
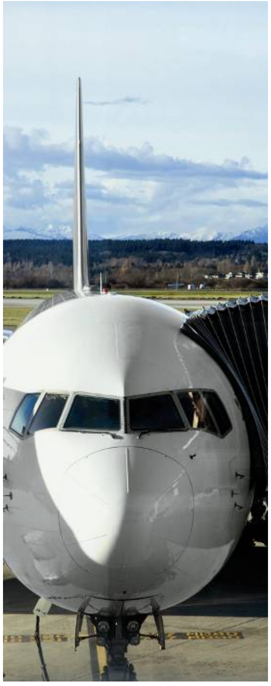


Annual Analyses of the EU Air Transport Market 2010

Final Report

September 2011

European Commission

Mott MacDonald

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Content

Introduction

Purpose of the Report

Mott MacDonald has been commissioned by the Directorate General for Mobility and Transport (DG MOVE) to provide an annual analysis of the EU Air Transport Industry in 2010. The European Commission has provided such annual reports since 1998; and the Mott MacDonald contract covers the three years of 2010, 2011 and 2012. In undertaking this work, we have been specifically requested to focus on a factual analysis of how and why European air transport has evolved in relation to other global regions, seeking the factors behind changes in trends and policies as well as their consequences.

Although this report is publicly available, the primary audience is DG MOVE. In this respect, the report is not intended to be just a statistical compendium or an activity report of aviation events that have happened in 2010. This knowledge is already known to the Commission. Instead, we have tried to provide 'value-added' to DG MOVE by drawing out the economic, regulatory and policy implications of aviation developments in 2010 in relation to the European air transport industry and its competitiveness in a global context.

In compiling this very broad-based report, we have necessarily drawn on the wealth of publicly available analysis from other organisations and industry commentators as well as our own. We acknowledge this, and have provided the source of all data and information used.

About Mott MacDonald

Mott MacDonald is a £1 billion turnover global consultancy of unrivalled diversity spanning 140 countries. Our breadth of skills, sectors, services and global reach makes us one of the world's top players in delivering management, engineering and development solutions for public and private sector customers.

We have over 14,000 staff working in all sectors from transport, energy, buildings, water and the environment to health and education, industry and communications. We provide a comprehensive range of planning, design, project delivery and business advisory services covering all stages of a project from concept to completion.

The Aviation team, based in Croydon, UK, comprises 40 staff and has a strong track record in providing independent technical support and advice to a wide variety of clients covering economics, forecasting, regulation, market analysis, aviation strategy, financial due diligence, airport construction and operations monitoring, airport planning and design and airline operations. We have provided consultancy support in over 120 countries around the world.

Structure of the Report

The report is structured in ten chapters covering all aspects of the air transport industry, together with an executive summary and a glossary. The following table provides the main components for each chapter.

Scope of the Report

The report was produced in March 2011, with key data and statistics updated in a September 2011 revision. The report concerns aviation developments in the calendar year 2010. Where data covering 2010 was not available, the most up to date information has been provided. Recent events in 2011 that might impact the air transport sector, such as the Japanese earthquake disaster and political changes in North Africa and the Middle East are outside of this scope.

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Executive Summary

2010 Headlines at a Glance

	World	Europe	Units	Source
Passengers	2.5 billion (+8.7%)	**0.8 billion (+6.0%)**	Departing Passengers	ICAO (World) Eurostat (Europe)
Airline Demand (RPK)	+8.2%	**+5.1%**	Revenue Passenger Kilometres	IATA
Airline Capacity (ASK)	+4.2%	**+2.6%**	Available Seat Kilometres	IATA
Commercial Air Transport Movements	53.6 million (+2.1%)	**15.5 million (+0.6%)**	Airport Movements	ACI
Cargo (FTK)	+20.6%	**+10.8%**	Freight Tonne Kilometres	IATA
GDP	+5.1%	**+1.8%**	GDP growth (Europe = EU27)	IMF
Value of Air Transport Industry	$408 billion	**$118 billion**	Contribution to Global GDP (2008)	Oxford Economics
Airline Profitability	$16.0 billion	**$0.4 billion**	Net Profits	ICAO, IATA
Busiest Airport (Passengers)	Atlanta, U.S. (89.2 million)	**Heathrow, UK (65.7 million)**	Passengers	ACI
Commercial Aircraft Fleet	20,168	**6,645**	Widebody, Narrowbody & Regional Jets	Boeing, Airbus, JP Fleets
Safety	26 accidents 817 fatalities	**0 accidents 0 fatalities**	Commercial Airline Fatal Accidents & Fatalities	Flightglobal ACAS / Air Transport Intelligence
Delays	n/a	**14.8 minutes (+40%)**	Average departure delay per flight	EUROCONTROL CODA
Emissions	n/a	**+2.7%**	Airline CO_2 emissions covered by EU ETS	RDC Aviation

Foreword

Following a year of record pain, the air transport industry experienced something akin to relief in 2010.

At a global level, GDP growth of over 5% encouraged air passenger traffic demand to increase by over 6%.

At a local level, air transport markets bounced back in 2010 but with some degree of regional variation. Growth in Europe and North America lagged behind that in Asia Pacific, Latin America and the Middle East.

Impressive international traffic growth and robust domestic market development in developing countries, coupled with economic growth higher than in mature economies, created a two-speed pattern producing regional disparities in growth – continuing the general trend of the last decade.

Airports in general enjoyed a recovery in 2010, both in terms of traffic development and profitability. Particular attention must go to the rise of the major Asia Pacific airports, achieving significant growth.

Similarly, airlines recorded traffic increases in 2010, outstripping capacity growth. Although European carriers were hit by the impact of the Icelandic volcanic ash cloud in April, as a collective they recovered to post full-year traffic growth in general. Financial results in 2010 markedly outperformed 2009.

European Air Traffic Management was severely tested by the Eyjafjallajökull volcano in April, causing unprecedented airspace closures and an estimated direct cost to the air transport industry of €2 billion.

The Single European Sky programme continued to make progress. Cooperation between Europe and the United States on ATM modernisation was cemented with the establishment of a Memorandum in 2010. The European Union has continued to make significant progress through its comprehensive and horizontal agreements with Non-EU states in widening the area in which the airline industry can compete freely.

For European consumers, the year presented its challenges. Although air transport in Europe continued its excellent safety record with no fatal commercial accidents, flight punctuality suffered with greater delays and cancellations due to adverse weather (particularly the Ash Cloud in April and heavy snowfalls across northern Europe in December) and industrial action.

The global industry continued its commitment to improve its environmental and sustainability credentials. It is recognised that although attaining the targets set by the industry will require dramatic gains in efficiencies, developments in engine design, airframe composite materials and ATM modernisation among others will help deliver these targets.

The salient points of the 2010 industry review are highlighted in the executive summary that follows.

Traffic

Global & European Traffic in 2010

2010 will largely be seen as a year of recovery, following the extraordinary downturn in global air traffic in 2009 which was precipitated by the Western financial and banking crisis and which led to a global economic recession beginning in 2008 and lasting throughout 2009.

Data from ICAO indicates that global passenger traffic increased by circa 8.7% in 2010 to approximately 2.5 billion passengers. By contrast, global traffic had declined by 0.7% in 2009 and 0.4% in 2008.

Airport passenger throughput at European Airports, as reported by Eurostat, increased by 6% in 2010 to an estimated 0.8 billion passengers, based on a European global passenger share of 30%.

Globally, commercial ATMs at airports were 53.6 million, up 2.1%, while movements at European airports were 15.5 million, up 0.6%.

The Chronological Year

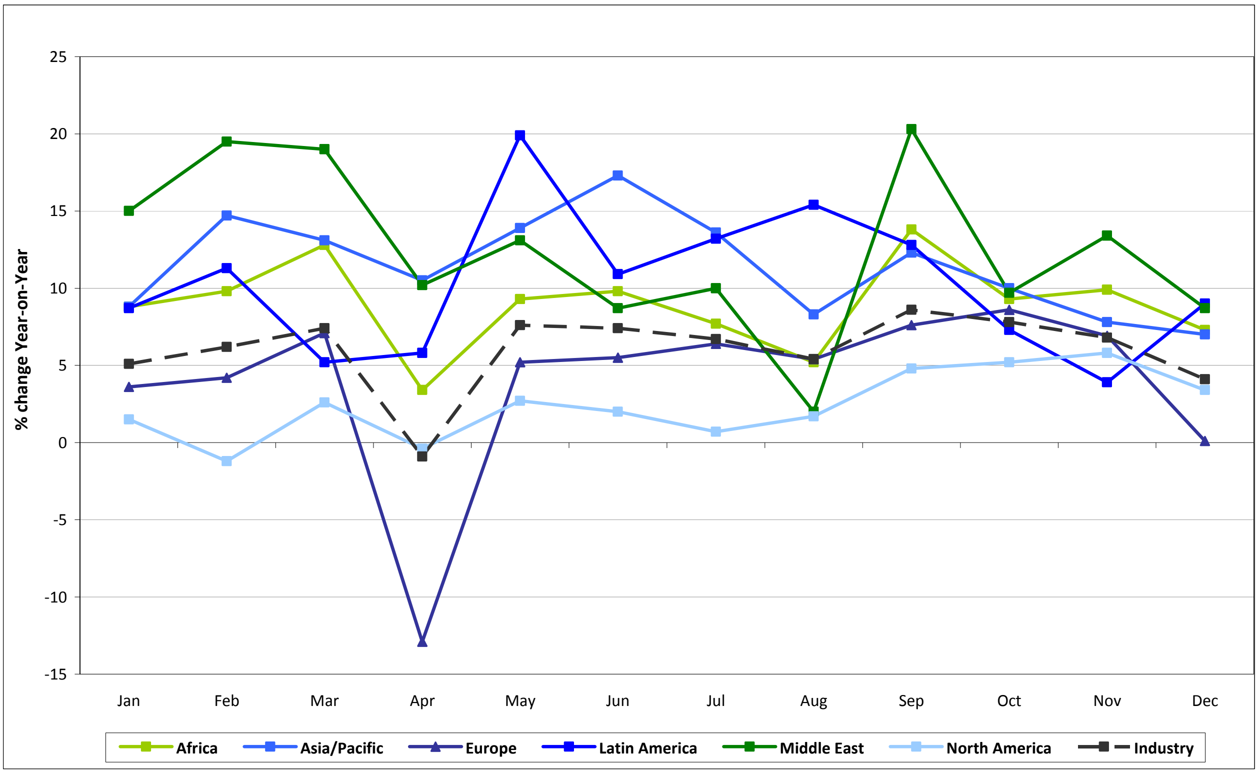
In chronological order, February 2010 saw ‘unprecedented’ snowfall on the eastern seaboard of the United States, severely affecting several major cities and consequently hub airports with the impact being felt most acutely on U.S. domestic and North Atlantic routes.

April witnessed the impact of the eruption of the Icelandic Eyjafjallajökull volcano which partially closed European airspace. More than 100,000 flights were cancelled over an 8 day period including, at its peak, 80% of the intra-European market with an estimated 10 million passengers affected. All global regional markets suffered declining growth in April, but Europe’s airports suffered most and recorded an estimated 12% drop year-on-year.

In August and September, industrial action blighted the European air transport sector with Spanish, Belgian and French air traffic controllers holding strikes and disrupting ‘business as usual’ across Europe.

December saw more adverse weather conditions – this time the focus was on northern Europe with heavy snowfall affecting the UK, France and Germany most severely; and the international hub airports of London Heathrow, Frankfurt Main and Paris CDG cancelled thousands of flights over several days.

Figure 1 Monthly Airport Passengers by Region - 2010



Source: ACI

Air Travel Demand Drivers

The global recovery saw world GDP grow by 5.1% in 2010. This was compared to a 0.6% decline in 2009. European growth in the EU 27 States was more muted at 1.8% but a significant improvement on the 4.1% decline in 2009. Central and Eastern Europe grew 4.5%.

The strongest economic growth worldwide in 2010 was experienced in Asia, in particular developing Asia which includes China and India, recording growth at 9.5%; almost double the global average. This region is also forecast to experience the highest economic growth rates going forward to 2016.

The cost of jet fuel has been an increasing burden for airlines since the middle of the last decade. Today, fuel costs typically account for around 30% of an airline's operating cost. The volatile nature of kerosene price fluctuations means that commercial aircraft operators are continually struggling to keep these operating costs under control. There is a close correlation between changes in fuel price and the subsequent change in average air fares in the European and U.S. domestic markets. After a downturn in 2009, fuel prices rose again in 2010 and are set to rise further in 2011. In 2010, the annual average price of jet fuel rose to USD 2.17 from USD 1.67 per U.S. Gallon, an increase of 30%.

In 2010, the euro continued to remain strong adversely impacting the competitiveness of Eurozone tourism destinations compared to other Mediterranean resorts in Turkey and North Africa.

Value of the Air Transport Industry

In 2008, Oxford Economics conducted a study for the Air Transport Action Group (ATAG)[1] on the economic and social benefits of air transport. Drawing upon 2006-2008 data, it was estimated that providing these services generated almost 5.5 million direct jobs globally within the air transport industry and contributed USD 408 billion to global GDP. Europe's contribution was estimated at USD 118 billion and 1.5 million jobs.

Airports

According to ACI, European airport passenger throughput rose from 1.40 billion in 2009 to 1.46 billion in 2010. Europe's airports recorded 4.3% growth year-on-year, higher growth than that achieved by North American airports at 2.5%. However, this was some way below the worldwide average growth of 6.6% and still below 2008 levels by -1.2%.

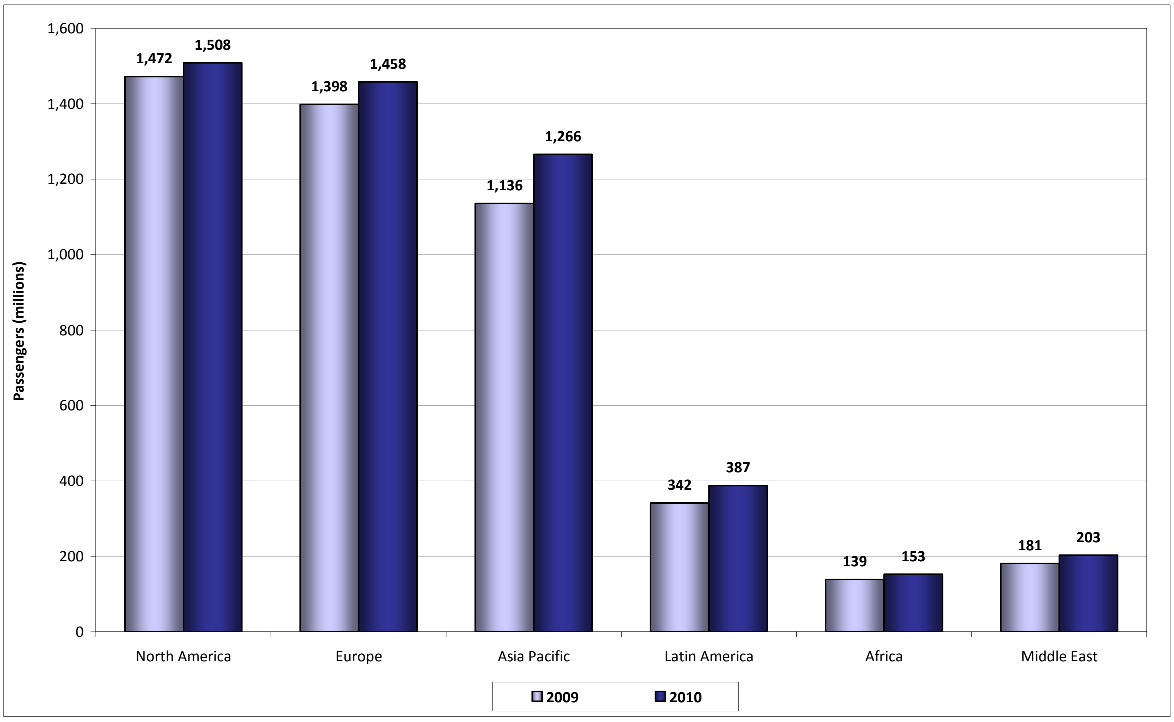
Although the European air transport market remains second only to North America by volume, the year was characterised by a continuation of one particular trend – the development of emerging markets and the stagnation in mature markets. Asia Pacific air passenger demand increased by 11.4% in 2010 over 2009, while the Middle East grew by 12.2%. Airports in Latin America showed even stronger growth at 13.4% while Africa grew by 9.9%. Each of these regions far exceeded the pace of growth experienced in the advanced mature markets of Europe and North America.

In terms of passenger volume, North American airports dominate the top 30 in the world with thirteen airports recording 637 million passengers; Asia Pacific has nine airports with 429 million passengers; EU has seven airports with 342 million passengers; and the Middle East has one airport with 46 million passengers (Dubai). In terms of growth, however, seven out of the top ten are Asia Pacific airports, with four of those Chinese (including Hong Kong S.A.R.). The bottom ten airports comprise seven North American and 3 EU.

In 2010, the world's busiest airport remained Atlanta in the U.S. with 89.2 million passengers, up 1.5% on 2009. In Europe, the busiest airport was London Heathrow with 65.7 million passengers in 2010, down 0.2% on 2009.

[1] The economic and social benefits of air transport 2008, Air Transport Action Group, April 2008

Figure 2: Annual Airport Passengers by Region, 2009 & 2010



Source: ACI

Airlines

IATA reported that in 2010 its member airlines recorded demand for scheduled air traffic showing an 8.2% increase in passenger business, measured in terms of revenue passenger kilometres. Demand growth outstripped a seat capacity increase of 4.4%. The average passenger load factor for the year was 78.4%, representing a 2.7 percentage point improvement on 2009.

The passenger growth recorded in 2010 was a significant improvement on 2009 when traffic had declined globally across all markets with the exception of the Middle East. Asia Pacific carriers recorded a 9.0% year-on-year increase in passenger demand in 2010, with the economies of China and India continuing to lead the world's recovery.

European carriers saw a year-on-year passenger demand increase 5.1%. This is double the capacity increase of 2.6% which meant that passenger load factor increased by 1.9 percentage points to 79.4%. However, Europe was the hardest hit by April's ash cloud and December's severe weather which slowed demand growth in the region.

North American carriers recorded year-on-year increases in passenger demand of 7.4% in 2010. A key feature in 2010 was the capacity discipline, where full year capacity was up by just 3.9% resulting in a passenger load factor at 82.2% for the full year (up from 79.6% in 2009).

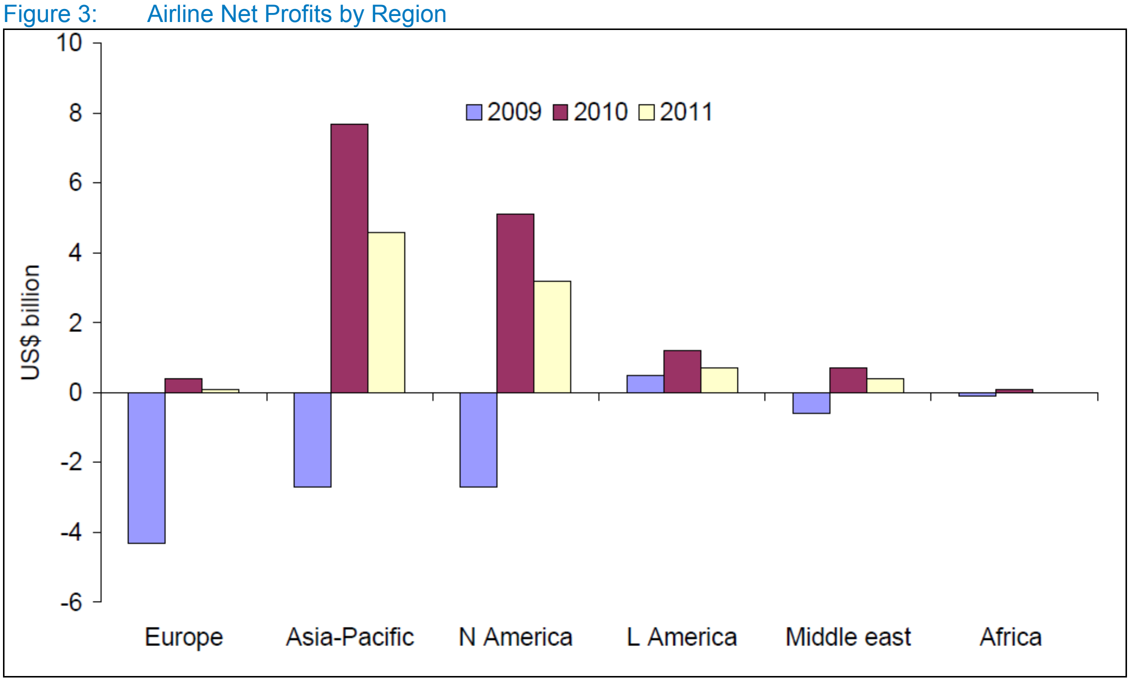
Middle Eastern carriers reported the strongest full year growth at 17.8% on the back of a 13.2% capacity increase, fuelled largely by aircraft deliveries to Gulf-based airlines – illustrating the structural shift that is taking place in the industry as a result of the region's expansion. Load factors for the region showed a three percentage point increase to 76.0%. The Middle East was the only region to see successive year on year growths.

African carriers experienced a sharp rebound of nearly 12.9% in 2010, although load factors remained well below the industry average at 69.1%. Latin American carriers saw demand grow 8.2% in 2010, recovering from a stagnating 0% growth in 2009.

Airline Finances

The cost of fuel continued to rise throughout 2010, putting immense strain on airline profitability. IATA estimated that the global airlines made a net profit of USD 16 billion in 2010, or a return of 2.9% on revenues of USD 552 billion. Although this was a great improvement on the results for 2009 (a net loss of USD 9.9 billion), the profits made were still insufficient to meet the cost of capital required to keep airlines financially fit. IATA estimates that European airlines will show only a very small level of profit for 2010, following a very poor 2009, and perhaps only a break-even situation in 2011. In comparison, large profits are forecast for Asian and North American airlines in 2010, plus a strong turn-round for Middle East airlines.

Figure 3: Airline Net Profits by Region



Source: IATA

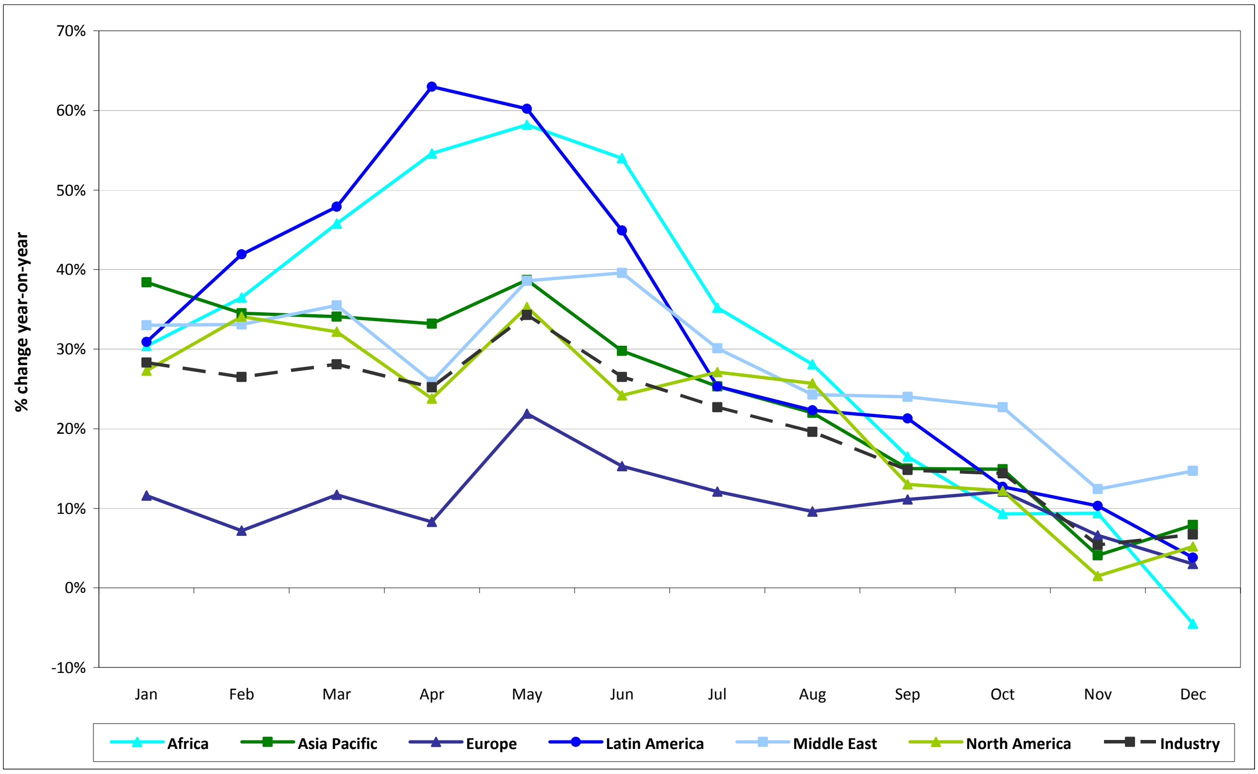
In 2010, there was a quickening in the pace of mergers between major global airlines. In the USA, the merger between United and Continental followed the previous year's merger between Northwest and Delta. In Europe, the merger between British Airways and Iberia was finally signed, mirroring the earlier groupings of Air France with KLM, and Lufthansa with Swiss, Austrian Airlines, bmi and SN Brussels airlines.

Global Air Cargo Growth

According to IATA, its member airlines recorded air cargo growth measured in Freight Tonne Kilometres (FTKs) of over 20% in 2010, a sign of global economic recovery, although the pace of growth in the second half of the year slowed down. This represents the largest increase in three decades after a decline of 10% in 2009. Demand for air cargo is an important indicator of world trade flows, which itself grew by a record 13.5% in 2010.

The regional variation in air cargo growth remains particularly marked. Latin American carriers recorded the highest full year growth rate of 29.1%, followed by Middle Eastern carriers (accounting for 11% of the market) at 26.7%. Asia Pacific airlines (with a 45% market share) grew by 24.0%, Africa at 23.8% and North America by 21.8%. Against these industry gains, Europe’s 10.8% growth stands out as weak by comparison.

Figure 4 Freight Tonne Kilometre (FTK) Growth by Region 2010 vs. 2009



Source: IATA

The monthly pattern of growth reflects the full year results, with European air cargo demand the slowest to pick up. All regions except Europe followed the average industry pattern of rapid recovery in the first half of 2010 followed by a marked slowdown.

Forecasts

IATA forecasts that global air travel is expected to increase to 3.3 billion passengers by 2014, up by a third from the 2.5 billion passengers in 2010. Longer term, both Boeing and Airbus forecast average annual growth of about 5% between 2010 and 2029. Growth will be driven by strong economic activity in Asia which will act as a key driver to the industry's expansion.

Asia overtook North America as the largest aviation market in 2009 and is forecast by IATA to account for 30% of air traffic by 2014, while North America will reduce to 23% of the total. China will be the largest contributor of new passengers, accounting for 214 million (181 million domestic and 33 million international) or 27% of the 800 million increase in passengers between 2009 and 2014.

Some 360 million (45%) of the new passengers are forecast to travel on Asia Pacific routes as the United Arab Emirates, Vietnam and Malaysia witness considerable growth in international passengers. The U.S. will remain the largest single-country market for domestic passengers (671 million) and international passengers (215 million).

Passenger traffic in Europe is expected by Boeing to grow at 4.4% annually to 2029, rising from 1.3 billion RPKs in 2009 to 3.2 billion showing that despite the economic challenges it faces, the European air transport industry remains resilient.

EUROCONTROL's base case forecast for flight movements in Europe is 11.6 million IFR flights in 2017, 22% more than the 9.5 million recorded in 2010. Traffic growth will bounce back in 2011 (above 4%), but the average growth rate over the seven year period is forecast to be 2.9% per annum. The long term forecast is for 16.9 million IFR flights in 2030, under their most likely scenario. It also reports that future air traffic growth will be limited by capacity at European airports.

Air Traffic Management

Eyjafjallajökull Volcano

The eruption of the Eyjafjallajökull volcano in Iceland on 14 April 2010 caused widespread and unprecedented airspace closures in Europe over the subsequent eight days, with the disruption of over 100,000 flights and an estimated 10 million passenger journeys. This volcanic event resulted in an interruption in global air traffic to an extent not seen since 11 September 2001 and the largest breakdown in European civil aviation since World War II. The direct financial impact on the air transport industry of the airspace closures was estimated at around €2 billion, with the total knock-on impact on global GDP of €3.7 billion.

There was considerable concern expressed by the airlines about the apparent confusion surrounding the airspace closure decisions. In 2010, ICAO formed an International Volcanic Ash Task Force which, in December, issued an updated volcanic ash contingency plan for the ICAO Europe and North Atlantic Regions and interim guidance material for the management of flight operations with known or forecast volcanic cloud contamination.

The European Commission and EUROCONTROL have created a European Aviation Crisis Co-ordination Cell (EACCC) to coordinate a timely response to any future pan-European crisis severely affecting aviation. A major European and North Atlantic volcanic ash exercise is planned for April 2011 to simulate and test the revised procedures that have been developed.

ATM Cost Effectiveness

Most European Member States recover the costs of providing Air Navigation Services on a full cost-recovery basis, which means there is little incentive for ANSPs to reduce costs year-on-year. Whilst voluntary targets introduced in 2003 through EUROCONTROL have had some success in improving cost effectiveness in recent years, the latest downturn in traffic is likely to have led to a deterioration.

To tackle this issue, Regulation 691/2010[2] was adopted in June 2010 to establish a performance scheme for air navigation services under the second package of the Single European Sky (SES II). The aim of the performance scheme is to contribute to the sustainable development of the air transport system by improving the overall efficiency of air navigation services across the key performance areas of safety, environment, capacity and cost-efficiency. Furthermore, in December 2010, Regulation 1191/2010[3] was adopted which amends earlier legislation laying down a common charging scheme for air navigation services in Europe. The new Regulation requires financial incentives and penalties to be set in relation to improving ATM performance.

Other Aspects of the Single European Sky

Progress continues to be made during the development phase of SESAR and in the implementation of Functional Airspace Blocks (FABs). In 2010, a Memorandum of Co-operation in civil aviation research and development was established between the European Commission and the FAA. This will help ensure the continuing co-operation and harmonisation of the SESAR and NextGen ATM modernisations programmes.

The Internal Market & Competition

Competition Issues

The EU remains vigilant over possible illegal price fixing. It co-operates with other bodies both within the Community and around the world in its investigations of price fixing and, where proven and justified, imposes fines, to protect consumers.

In September, Germany's competition authority fined the air carrier Condor €1.2 million for illegally fixing prices on routes to Turkey, having colluded with Lufthansa joint venture airline SunExpress.

In November, the Commission fined eleven air cargo carriers almost €800 million for operating a global air cargo cartel on routes to and from Europe. Five European airlines were fined. Lufthansa was however granted immunity following its leniency application. The carriers had coordinated their fuel and security surcharges over a six year period.

For decades there has been a dispute between the U.S. and the EU over subsidies and other forms of aid for the world's two dominant makers of civil aircraft, Boeing and Airbus. Both sides accuse the other of

[2] Commission Regulation (EU) No 691/2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005, 29 July 2010

[3] Commission Regulation (EC) No 1191/2010 amending Regulation (EC) No 1794/2006, 16 December 2010

distorting competition within the sector by receiving various forms of aid. Since October 2004 the World Trade Organization has been drawn into the dispute, which has recently been drawing to a close.

The WTO has issued two 'panel reports', consisting of a finding in June 2010 which concluded that repayable European loans to Airbus had illegally subsidised its aircraft programmes; and then an 'interim finding' in 15 September 2010 concluding that Boeing had received illegal subsidies in the form of non-repayable grants through contract work for NASA and the U.S. Department of Defense. On 31 January 2011 the WTO issued its final report (on a confidential basis to both companies) which confirmed its interim findings of September 2010.

In the UK, the Competition Commission reconfirmed its decision to oblige airport operator BAA to sell its airports at Stansted and either Glasgow or Edinburgh in order to increase competition. Gatwick Airport had been sold under OFT direction in December 2009.

The EU has continued to make significant progress through its comprehensive and horizontal agreements with non-EU states in widening the area in which the airline industry can compete freely.

Internal Market Issues

There were no major primary aviation regulatory or legislative actions relating to this area implemented by the EU during 2010. However, earlier legislation is beginning to have some impact on the aviation industry and consultations were undertaken on potential improvements to existing legislation.

The most significant impact felt by airlines was from the application of consumer protection Regulation 261/2004 following the volcanic ash incident in April 2010; and the exceptional snow conditions over much of Europe during December.

The closure of European air space because of the ash cloud was an unprecedented event. During the crisis, Regulation 261 remained fully applicable, with the closure being immediately qualified EU-wide as an exceptional circumstance. However, the volcanic event exposed some of the structural limits of the Regulation, which were tested under the magnified scale of the crisis. For example, the proportionality of some the current measures, like the unlimited liability regarding the right to care under major natural disasters, was called into question. Member States and the Commission have agreed to reflect on how to ensure that, in the future, this consumer care which in the volcano crisis was provided solely by part of the industry is correctly shared and financed.

The Commission has committed to work with the National Enforcement Body (NEB) Network to agree on harmonised interpretation of Regulation 261, and it will launch in 2011 an Impact Assessment to assess the proportionality of the current measures in the light of experience and the costs of the regulation for stakeholders, with a view to propose further measures on Air Passenger Rights (APR), including of a legislative nature, in 2012

Another area of concern for the aviation industry during 2010 was the increasing divergence of attitudes by Member States towards the taxation of aviation, particularly with reference to the imposition of increased levels of Air Passenger Duty (APD) by the UK and of a similar tax by Germany. During the year, Ireland announced plans to reduce its equivalent APD from €10 to €3 in 2011, while the Netherlands dropped its tax altogether. Belgium has also decided against APD-style taxation.

Aircraft Manufacturing & MRO

The European aeronautics industry is responsible for the design, development and production of a broad range of aviation products including civil and military aircraft, aero engines, helicopters, unmanned aerial vehicles and their associated systems, parts and equipment. It also includes activities associated with Maintenance, Repair and Overhaul (MRO).

The turnover of the European aeronautic sector in 2009 (civil and military aeronautics but excluding space activities, land and naval defence) totalled €100.4 billion, an increase of 3.2% over 2008. This represents a 5.2% CAGR in turnover since 2005. The number of persons employed in aeronautics reached 468,300, a marginal increase of 0.3% over 2008, despite the world economic downturn. In total terms of total aerospace sales, Europe accounted for 37.4% of the market in 2009 and the U.S. 52.6%.

Europe is a net exporter of aerospace and aviation products. In 2009 aerospace exports to the world from EU27 countries totalled €41.4 billion. The European aeronautics industry also contributes a large share of its activity to research and development. In 2009 R&D expenditure in the European aeronautics sector totalled €12.2 billion, which accounted for 12.1% of total turnover. However, the value of R&D spending has remained relatively flat over time, as has its proportion of total turnover.

Concerns about skill shortages are widespread in the aerospace industry. European sources indicate that availability of skilled workers and engineers has emerged as an important issue, particularly as the demand for such workers grows with increased European production of civil and military aircraft and requirements for R&D programmes. Experts estimated that Europe's aerospace industry faces a shortage of perhaps 25,000 engineers per year.

The global market value of MRO in 2010 was USD 42.3 billion, down 7.4% from the USD 45.7 billion achieved in 2009. The greatest proportion of MRO activity is due to engine maintenance, at 43%. The regional distribution of MRO activity is comparable to the global air transport market, with a centre of gravity in North America followed by Western Europe and the emerging Asia-Pacific Region. The decline in 2010 has been mainly due capacity reductions made by airlines in 2009. Reductions in capacity have been most pronounced in North America, Europe and Asia-Pacific (excluding China). In contrast, China and the Middle East are continuing to see robust growth but account for a relatively small share of the global market.

Global Airline Fleet

In 2010, the global airline fleet of civil jet aircraft (widebody, narrowbody and regional jets) was 20,168 aircraft, of which 6,645 (33%) were based in Europe. Boeing and Airbus aircraft types account for 73% of this global airline fleet.

In 2010, Airbus delivered 496 aircraft (+1.4% versus 2009), and booked 574 aircraft orders (+122%). Boeing delivered 448 aircraft (-4.3% versus 2009) and reported 530 orders (+273%).

The civil passenger turboprop aircraft market is smaller than the jet market but still significant. As of 31st December 2010, JP Airline Fleets International database recorded 4,553 civil passenger turboprop aircraft in service at a global level. Of this, 684 (or 15%) were registered in the European Union.

Environment

Industry Targets

Following ICAO's 37th Assembly in Montreal in October 2010 and the United Nations Framework Convention on Climate Change (UNFCCC) summit in Cancun in December 2010, ICAO is claiming success at securing a global framework to reduce greenhouse gas (GHG) emissions from aviation. Under this framework (ICAO Resolution A37-19) confirmed in Montreal, its 190 member states purportedly signed up to a global objective of improving fuel efficiency by 2% a year until 2050, while striving to collectively achieve carbon neutral growth from 2020. The resolution also called for the development of a global framework to manage market based measures, such as emissions trading schemes and taxation, to be reviewed in 2013.

ATAG has adopted collective global industry targets, including a 1.5% average annual fuel efficiency improvement through to 2020, carbon neutral growth from 2020 and a trajectory towards halving net carbon emissions by 2050 compared with 2005. These targets are dependent upon advancements in technologies and sustainable fuels.

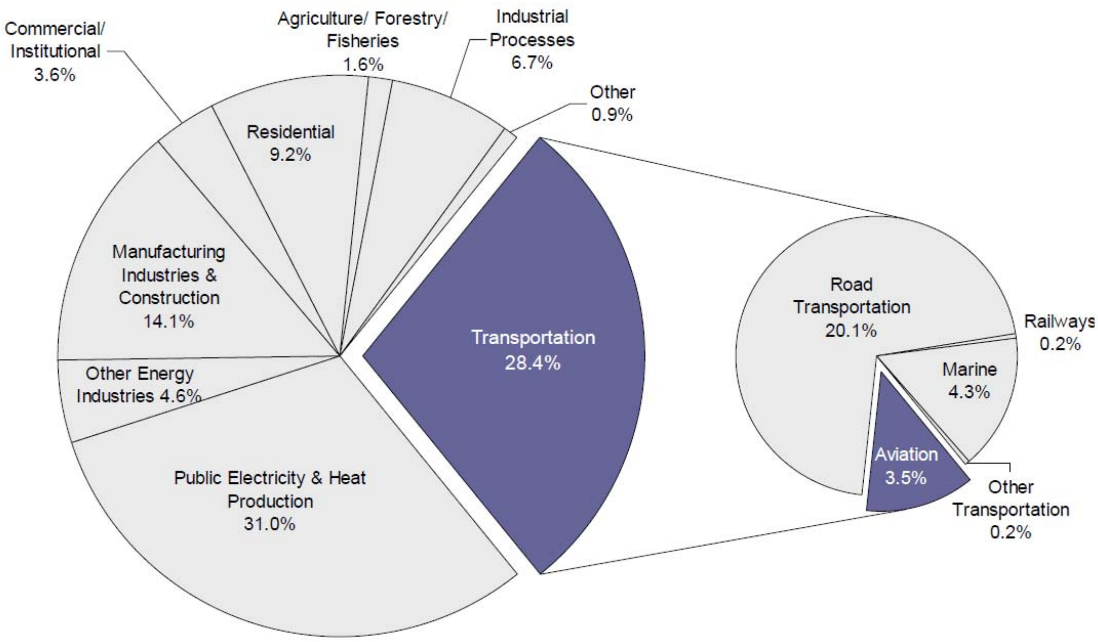
European Union Emissions Trading Scheme (EU ETS)

The EU ETS was implemented in 2005 and now spans the EU27 member states, covering the most energy-intensive sectors and representing around half of European greenhouse gas emissions. Domestic and international aviation will be included in the scheme from 2012 and airlines are now preparing for compliance. All airlines with operations at a European airport, be it a European or foreign carrier, are obligated to comply with the regulations.

In 2010, European CO_2 emissions increased by 2.7%. The UK is by far the most significant contributor of CO_2 emissions from aviation, in line with its position as the leading air transport market in Europe and in part due to its island status. Germany follows as the second largest emitter, while France and Spain make up the top four.

Aviation emissions account for 3.5% of man-made CO_2 emissions in Europe. The breakdown for all contributors by sector is shown in Figure 5 below.

Figure 5 Contribution of CO_2 Emissions by Sector in EU27 Area (2007)



Source: EUROCONTROL

Industry Developments

Attaining the operational and environmental efficiencies necessary to ensure the airline industry is able to achieve unconstrained growth over the next four decades will require dramatic gains.

Both SESAR and the U.S. NextGen ATM modernisation programmes are designed to implement a series of measures aimed at reducing GHG emissions and improving operational efficiencies. In addition the EC and the FAA have established the Atlantic Interoperability Initiative to Reduce Emissions (AIRE). AIRE aims to deliver the development and implementation of environmentally friendly procedures for all phases of flight (gate-to-gate) and validate continuous improvements with trials and demonstrations. A similar initiative, ASPIRE, has been developed in the Asia Pacific Region.

Additional efficiencies will be achieved through the use of advanced materials such as composites. Newer and lighter aircraft such as the B787 Dreamliner and the A350 XWB will require less fuel than older counterparts to complete the same flight journeys. The use of biofuels, which provide a carbon-neutral fuel source, will also play a major role in reducing the impact of carbon emissions. Virgin Atlantic, Air New Zealand, Japan Airlines, Qatar Airways, Continental Airlines, United Airlines and Air France-KLM have all successfully tested biofuels and alternative fuels and more airlines are set to join them in 2011.

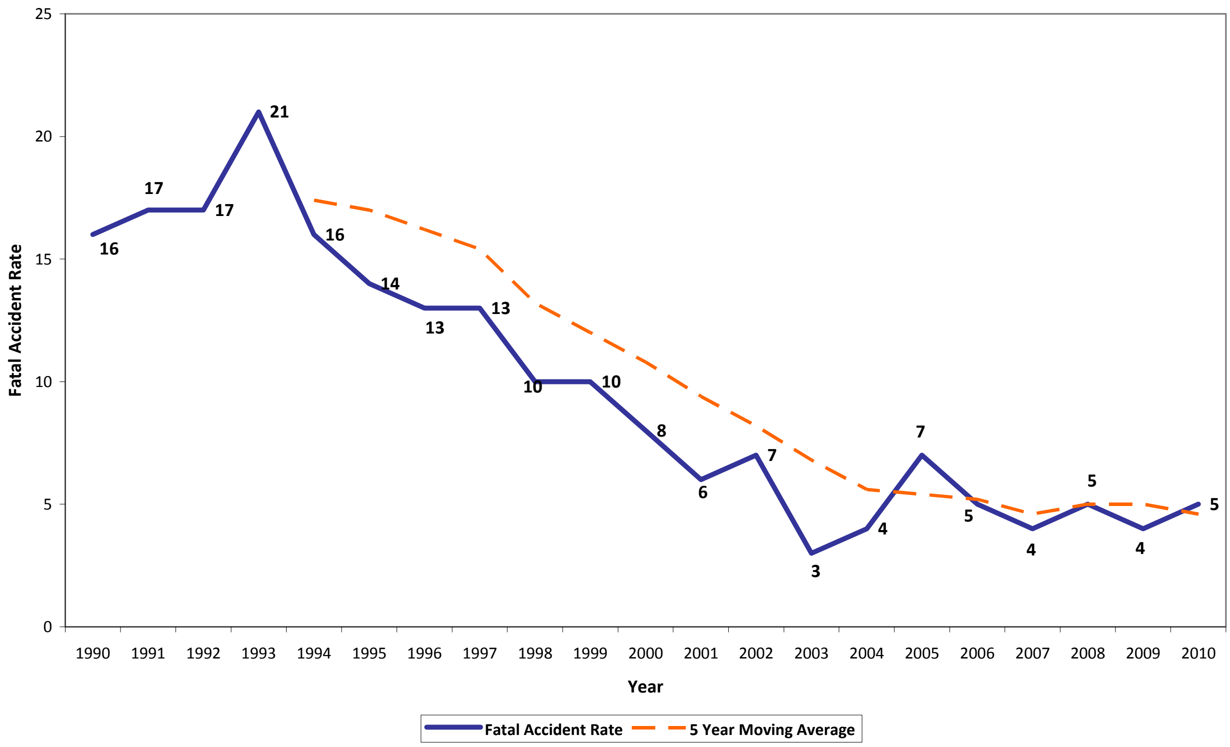
Safety

Fatal Accidents Worldwide

In 2010 there were 26 fatal airline accidents worldwide causing the deaths of 817 passengers and crew. This spans all types of commercial airline operations, including scheduled and non-scheduled passenger flights, by jets and turboprop aircraft; and non-passenger operations such as cargo or positioning flights. In 2009 there were 28 fatal airline accidents causing 749 deaths. The Figure shows the global twenty year trend in fatal accidents per 10 million flights which takes into account the increase in traffic over that period.

Whilst the longer term trend demonstrates a four-fold improvement in the annual numbers of fatal accidents per 10 million flights over the last twenty years, the graph indicates a flattening of the downward trend in the last ten years. The annual number of fatal accidents globally has remained somewhere between 25 and 40 since 2001, equivalent to between 3 and 7 fatal accidents in every 10 million flights.

Figure 6 Global Fatal Accident Rate (per 10 million Flights) 1990 to 2010



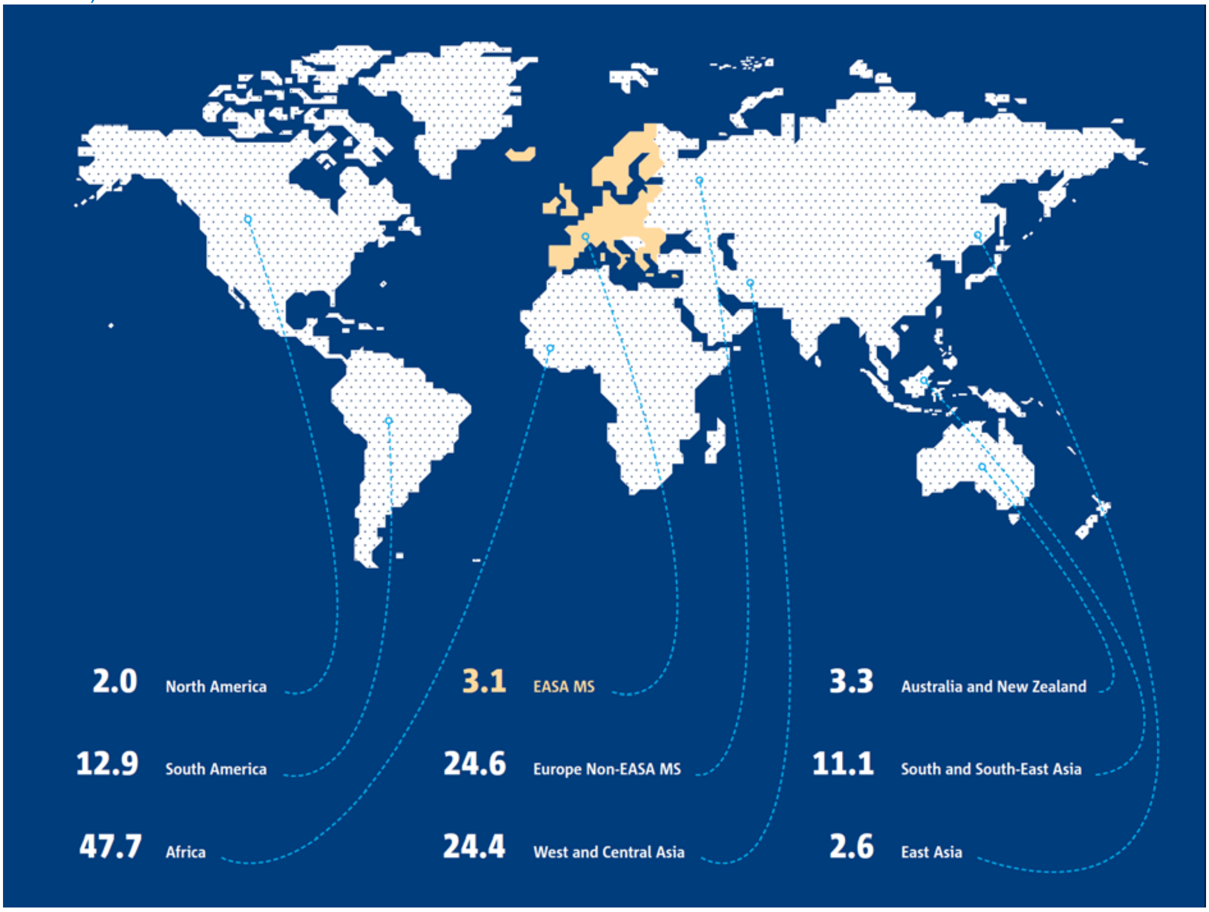
Source: EASA Annual Safety Review 2010

In June 2011, EASA highlighted the different rates of fatal commercial aviation accidents by world region over the last ten years. Operators from the 31 EASA Member State countries[4], along with those from the

[4] EU27 plus Iceland, Liechtenstein, Norway and Switzerland

regions of North America, East Asia, Australia and New Zealand have exhibited the lowest average rates of fatal accidents over the last ten years at between 2.0 and 3.3 fatal accidents per million flights. By contrast, the average fatal accident rate in other world regions ranges from 11.1 per 10 million flights in South and South-East Asia to 47.7 per 10 million flights in Africa. Whilst in 2010 there were no fatal commercial aviation accidents in Europe, the average accident rate for operators from European Non-EASA Member States over the last ten years has been 24.6 per 10 million flights which is over seven times the rate for the remainder of Europe.

Figure 7: Fatal Accident Rate per 10 Million Flights by World Region, 2001 to 2010 (Scheduled Passenger & Cargo Operations)



Source: EASA Annual Safety Review 2010

Worldwide, runway excursions – usually overruns after landing – continue to be by far the most common type of aircraft accident, normally leading to aircraft damage but not often involving fatalities. The worst runway excursion in 2010 involved an Air India Express Boeing 737-800 that overran the runway at Mangalore, despite good weather and a dry surface. After an unstable approach, the aircraft touched down long and fast and ran off the end of the runway down a very steep slope killing 158 people.

Industry commentators believe that between 15% and 20% of aviation accidents could be due to fatigue-related causes, and the FAA and EASA are trying to harmonise their respective regulations on flight time limitations and rest requirements for commercial air transport pilots. Another concern is with pilot training. Aircraft flight decks have changed radically over the past sixty years, with accelerated change in the last 20 with the advent of all glass cockpits and greater systems integration. As a result, there has been a concurrent change in the way in which pilots manage normal flight operations. The FAA is spearheading research into the way pilots use Flightpath Management Systems in order to try and improve pilot training in this area.

In terms of spreading best practice, IATA, ICAO and EASA have continued to develop and strengthen their Safety Oversight programmes in 2010.

Incident Reporting

Whilst in general, aviation accidents are well reported, there is some degree of variability of reporting of incidents across Europe. While in 2010, there has been a major improvement in the number of EASA Member States integrating their occurrence data into the European Central Repository, there remain significant shortfalls in the quality and completeness of the data recorded. EUROCONTROL estimates that as many as 30,000 incidents may not be being reported each year in the ECAC region – and this is only in the field of ATM. Although the number of ECAC States reporting ATM incidents had increased by 1 to 30 (out of 43) by the end of March 2010, this number has not changed in the previous five years.

Safety KPIs are being introduced under the SES II Performance Scheme to address issues of safety management effectiveness, harmonised rules for the reporting of incidents and the establishment of a “Just Culture” for incident reporting in Member States.

Delay Performance

Using the data provided by airlines to the EUROCONTROL CODA database, primary delays caused by airlines reduced as a percentage of all delays from 49.4% in 2009 to 41.8% in 2010, but ATFCM (Air Traffic Flow and Capacity Management) delays increased from 25.1% to 32.5%. The percentage of delays due to weather also increased.

In 2010 the average total departure delay per delayed flight was 33 minutes, a 17% increase over 2009, and the percentage delayed by more than 15 minutes increased from 18% to 23%. The average delay expressed across all departures (including those flights not delayed) increased to a 5-year peak of 14.8 minutes, an increase of 40% over 2009.

Although 2010 included the ash cloud crisis, the impact of this event in April and May was mainly upon cancellations rather than increased delays. In the summer peak it was primarily ATC industrial action and staffing related issues which had a significant impact on aircraft delays. France had the largest share of delays caused by industrial action, while Germany and Spain also suffered to a lesser extent. 2010 was also impacted by the airport delays caused by the heavy snowfalls in December across northern Europe.

Security

EU New Legislative Package

29 April 2010 marked the date at which Regulation (EC) No 300/2008 and its implementing provisions entered into force. This new regulatory framework consolidated and repealed for clarification reasons various European legal acts adopted under the former framework of Regulation (EC) No 2320/2002.

Air Cargo Security

In October 2010, two separate explosive devices were concealed within toner cartridges inside printers and sent via air freight to Chicago, U.S. from Yemen, but were intercepted and defused. Both devices were wired to circuit boards from mobile phones and it is assumed that the intention was to use the phones as timers in order to detonate the devices onboard the aircraft, possibly over the U.S.

The bomb plot highlighted wider weaknesses in air cargo security and, in November 2010, ICAO proposed amendments to Annex 17 to address them. In support of this IATA are calling for the global application of a cargo security assurance process[5] based on the supply chain approach, which means that from the moment a box is packed until the moment it arrives at the aircraft, train, truck or ship, it is protected from tampering. In December 2010 the European Commission presented an action plan to strengthen air cargo security[6].

Use of Enhanced Security Scanners ('Body Scanners')

On 25 December 2009 the attempted terrorist attack with hidden explosives on NWA Flight 253 highlighted the limits of metal detectors, commonly used at airports, in detecting non-metallic threat items on persons. As an immediate reaction several countries have accelerated the further development and eventual deployment of more advanced technology capable of detecting non-metallic and liquid explosives.

In January 2010, TSA was given a mandate in the U.S. to increase the use of enhanced screening techniques technologies for inbound passengers (specifically from known threat countries) on international flights. In March 2010 TSA began deploying 450 advanced imaging technology units or 'body scanners' which are designed to give airport security staff a much better chance of detecting explosives or other potentially harmful items hidden on a passenger's body. By November 2010 enhanced screening procedures (including the more widespread use of advanced security scanners) had been implemented at all U.S. airports.

At present the situation in Europe is fragmented as security scanners, where used, are not systematically and uniformly deployed by Member States at their airports. In addition, their use is not harmonised in terms of operational conditions as they are regulated at national level.

[5] Passenger and Cargo Security Update, Presentation for IATA Global Media Day, December 2010

[6] A European Action Plan to Strengthen Air Cargo Security, IP/10/1651, 2nd December 2010

In February 2010 EU Transport Ministers met to discuss this issue and in June the European Commission produced a detailed Communication on the use of security scanners at EU airports[7]. The Communication is subject to discussion within the European Parliament and the Council; and Stakeholders have been asked to provide opinions to a Task Force set up to determine the next steps.

Carriage of Liquids, Aerosols and Gels (LAGs)

In 2010, following the development of more sophisticated screening technologies, the European Commission through Regulation 297/2010[8] indicated a gradual move away from banning most liquids in hand luggage to a system where hand luggage is screened for liquid explosives.

[7] Communication from the Commission to the European Parliament and the Council on the Use of Security Scanners at EU Airports, COM(2010) 311/4, June 2010

[8] Commission Regulation (EU) No 297/2010 amending Regulation (EC) No 272/2009 supplementing the Common Basic Standards in Civil Aviation Security, 9th April 2010

1. Air Traffic Trends

1.1 Introduction

This chapter on air traffic trends has two central aims: firstly, it is intended to deliver the highlights of 2010 in terms of air traffic developments and provide a broad top-level overview of the impacts of key events during the year; secondly, the foundation will be provided for the remainder of the report, introducing certain themes, issues and trends which will be explored and analysed in greater detail and definition in subsequent chapters.

Because of the global nature of the air transport industry, developments in one geographical region can have far-reaching implications in others. In respect of this dynamic, the objective of this section will be to analyse the key air traffic developments and events of 2010 by world region and placing them into a global context, paying particular attention to the impact on the European air transport market.

Air traffic is a broad term, but for the purposes of this section it is defined as including and being limited to:

- Commercial air passengers
- Commercial air transport movements
- Commercial air cargo

At this point it is worth nothing that different ‘cuts’ of air traffic data will be used to elicit trends. From the airport perspective, air passenger throughput, air transport movement figures and air cargo tonnage data are drawn upon. Airline traffic data will also be used in analyses in the form of revenue passenger kilometres (RPK) and freight tonne kilometres (FTK). It is important to note at the outset that airport and airline traffic data may not necessarily correspond with each other due to the different sources used. When compiling air traffic statistics on an aggregate level, be it passengers by geographical region or air cargo tonnes uplifted by airline alliance, the base data is either airport passenger throughput or airline passenger uplift – a straight comparison will not produce an exact match.

For example, total European Union air passenger traffic can be calculated by aggregating Member States’ airport throughput, but also by aggregating Member States’ airline passenger uplift – the two results will vary. As far as is practicable, this section will endeavour to compare datasets of the same origin (like with like).

1.2 Overview of 2010

2010 will largely be seen as a year of recovery, following the extraordinary downturn in global air traffic in 2009 precipitated by the western financial and banking crisis which led to a global economic recession beginning in 2008 and lasting throughout 2009.

The International Civil Aviation Organisation (ICAO) stated airlines of its 190 member states handled 2.5 billion passengers in 2010, an 8.7% year-on-year increase from the depressed levels of 2009.

Airports Council International (ACI) reported that 4.975 billion terminal passengers passed through its 1,300 member airports worldwide, an increase of 6.6% over 2009.

Table 1-1: 2010 Worldwide Airport Traffic Summary

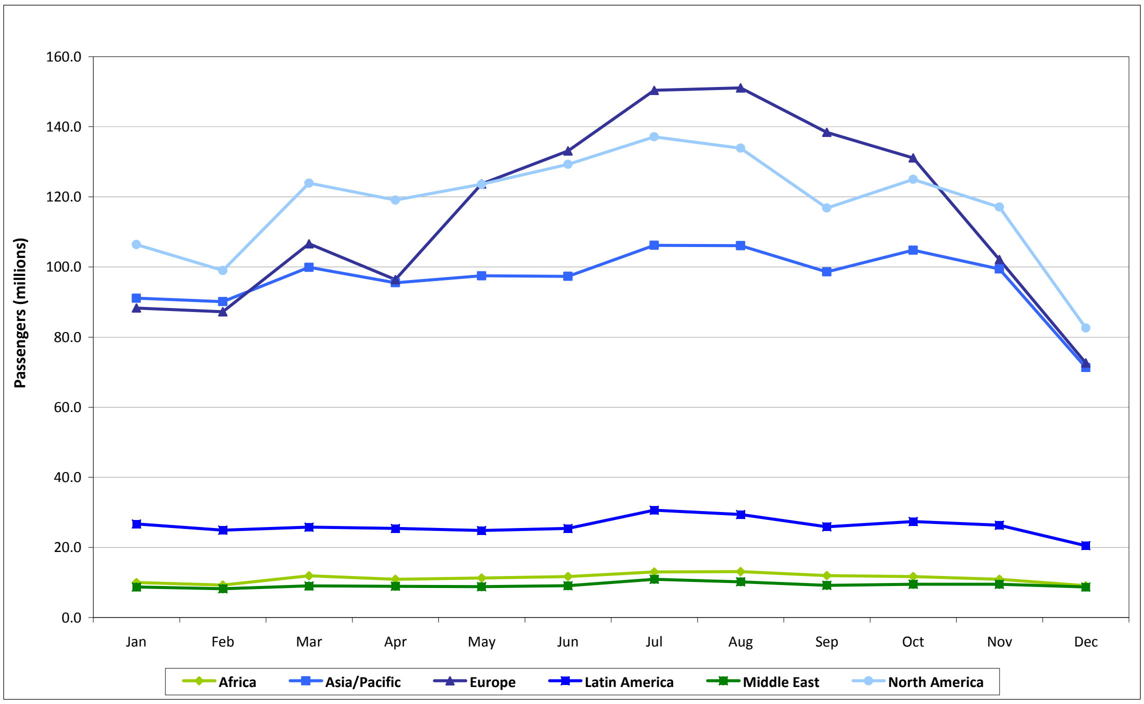
Statistics Region	Passenger Throughput (million)	% YOY	Air Transport Movements (million)	% YOY	Cargo tonnes (million)	% YOY
Africa (AFR)	152.7	9.9	2.1	4.8	1.7	1.9
Asia Pacific (ASP)	1,265.6	11.4	9.4	6.9	31.9	18.5
Europe (EUR)	**1,458.0**	**4.3**	**15.5**	**0.6**	**17.9**	**15.5**
Latin America (LAC)	387.4	13.4	4.9	7.8	4.7	14.3
Middle East (MEA)	203.4	12.2	1.7	8.3	5.9	13.7
North America (NAM)	1,508.5	2.5	19.8	-0.9	28.7	13.2
ACI Total	**4,975.5**	**6.6**	**53.6**	**2.1**	**90.7**	**15.3**

Source: ACI Worldwide Airport Traffic Report 2010

The significant growth reflects a more positive economic picture worldwide, based on a 5.1% increase in global real GDP.

Although the annual figures suggest that 2010 air traffic responded positively, there were several major exogenous events across the globe during the course of the year that impacted negatively on air travel demand and moreover, the ability of people to travel by air. The impact of these events was not uniform across the regions however. Figure 1.1 and Figure 1.2 plot 2010 airport passenger throughput[9] and growth by month, by world region.

Figure 1.1: Monthly 2010 Air Passenger Throughput at all ACI Reporting Airports



Source: ACI

[9] Provisional data from Airports Council International – data for December 2010 based on 74% of all ACI reporting airports

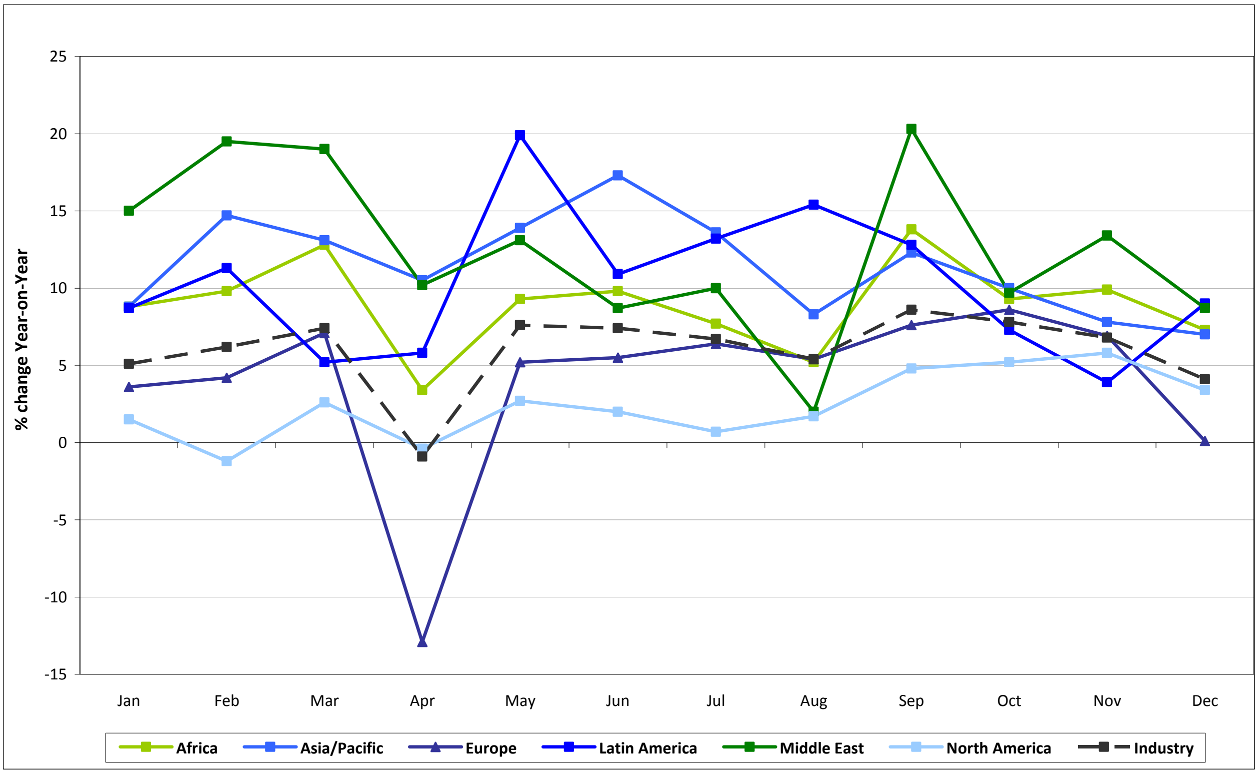
In chronological order, February 2010 saw 'unprecedented' snowfall on the eastern seaboard of the United States, severely affecting several major cities and consequently hub airports with the impact being felt most acutely on U.S. domestic and North Atlantic routes. The decline in growth in the North American market is visible in Figure 1.1.

April witnessed the impact of the eruption of the Icelandic Eyjafjallajökull volcano which partially closed European airspace. More than 100,000 flights were cancelled, including 80% of the intra-European market with an estimated 9 million passengers affected[10]. All global regional markets suffered declining growth in April, but naturally Europe's airports suffered most and recorded an estimated 12% drop year-on-year.

In August and September industrial action blighted the European air transport sector with Spanish, Belgian and French air traffic controllers holding strikes and disrupting 'business as usual' across Europe.

December saw more adverse weather conditions – this time the focus was on northern Europe with heavy snowfall affecting the UK, France and Germany most severely; and the international hub airports of London Heathrow, Frankfurt Main and Paris CDG cancelled thousands of flights over several days.

Figure 1.2: Monthly 2010 Airport Passenger Throughput Growth Rates



Source: ACI

According to ICAO, international airline traffic (RPKs performed on scheduled services) increased by 8.5% in 2010, led by a strong rebound in business and leisure long haul travel, particularly in emerging markets such as the BRIC (Brazil, Russia, India and China) nations where outbound tourism flourished. The largest

[10] 'Robust recovery in 2010; continued growth anticipated in 2011 and 2012: ICAO', Centre for Asia Pacific Aviation, 11 January 2011

percentage growth was registered by the airlines of the Middle East with 20.5%, followed by those of Africa (18.3%) and the Asia Pacific region. Latin America grew at 6.6%.

International traffic in the mature markets of North America and Europe grew by 6.6% and 7.7% respectively. The lower growth figures relate to a larger traffic base and therefore still represent significant increases. Moreover, ICAO noted that Europe is still benefiting from the ability of low cost carriers (LCCs) to expand their point-to-point markets, due in part to the geographical enlargement of the European Union and increasingly liberalised bilateral agreements with partners.

Table 1-2: ICAO Member State Airlines RPK Growth by World Region 2010

%	Domestic	International
Africa	7.6	18.3
Asia Pacific	12.8	12.6
Europe	***9.9***	***7.7***
Latin America	18.6	6.6
Middle East	7.7	20.5
North America	2.4	6.6
Industry	**7.1**	**8.5**

Source: ICAO Annual Report of the Council 2010

Domestically, in 2010 markets grew overall by 7.1% over 2009 levels. Lower growth rates of 2.4%, 7.7% and 7.6% in North America, the Middle East and Africa respectively were offset by rates of 12.8% in the Asia Pacific region, 18.6% in Latin America and 9.9% in Europe. Asia Pacific volumes benefited from an increase of around 17% in the Chinese domestic market.

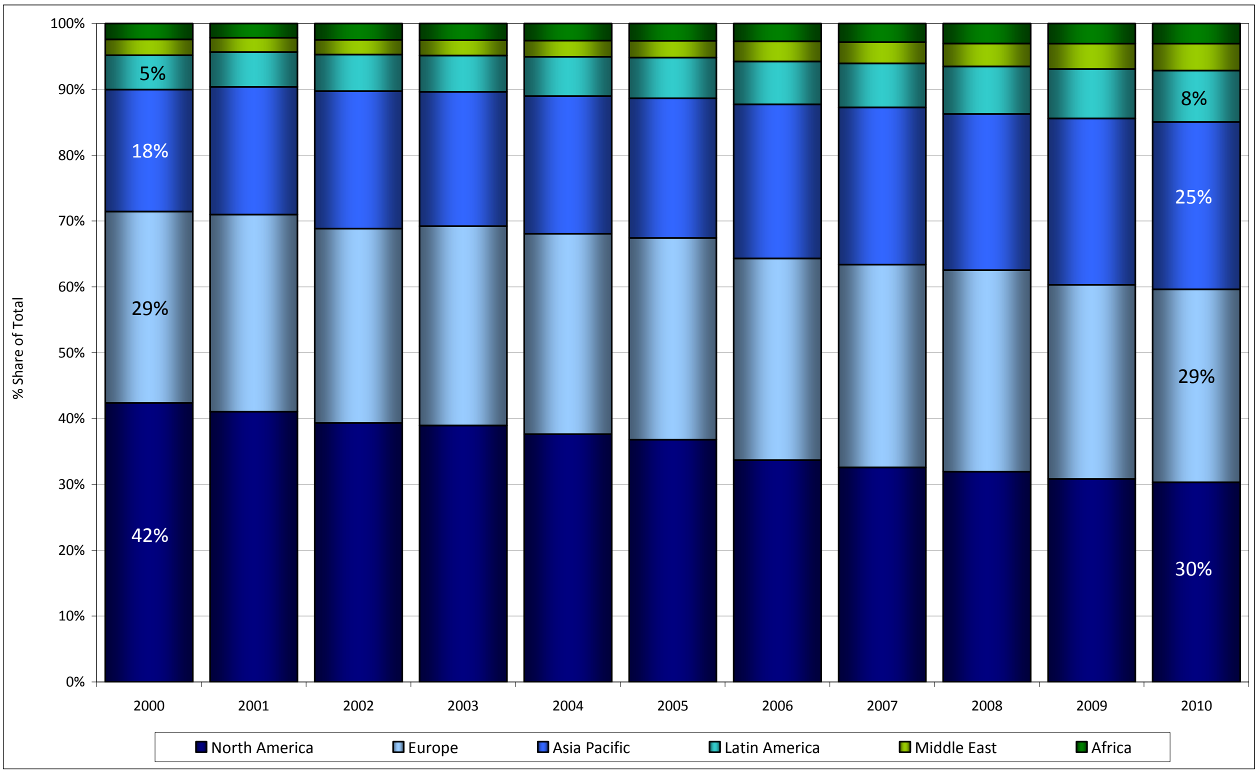
In response to the impact of the recession, several trends in the airline industry were either strengthened or confirmed in 2010. Consolidation accelerated mainly for American and European airlines while the development of new airline business models expanded. LCCs continued their expansion notably in the Asia Pacific market, where they now represent 15% of the passenger traffic market share.

One reason for the growth of the Middle East airlines is that they are taking advantage of the ongoing liberalisation within the sector to offer a ‘value for money’ brand of products, with strategically adopted connections to well-positioned geographical hubs; as well as new and efficient aircraft combined with attractive seating and amenities.

1.2.1 Historical Air Passenger Traffic trends

ICAO noted that impressive international traffic growth and robust domestic market development in developing countries, coupled with economic growth higher than in developed economies, created a two-speed pattern producing regional disparities in 2010. This is a continuation of the general trend over the last decade. Figure 1.3 below illustrates the relative growth or decline in air passenger market share by global region between 2000 and 2010.

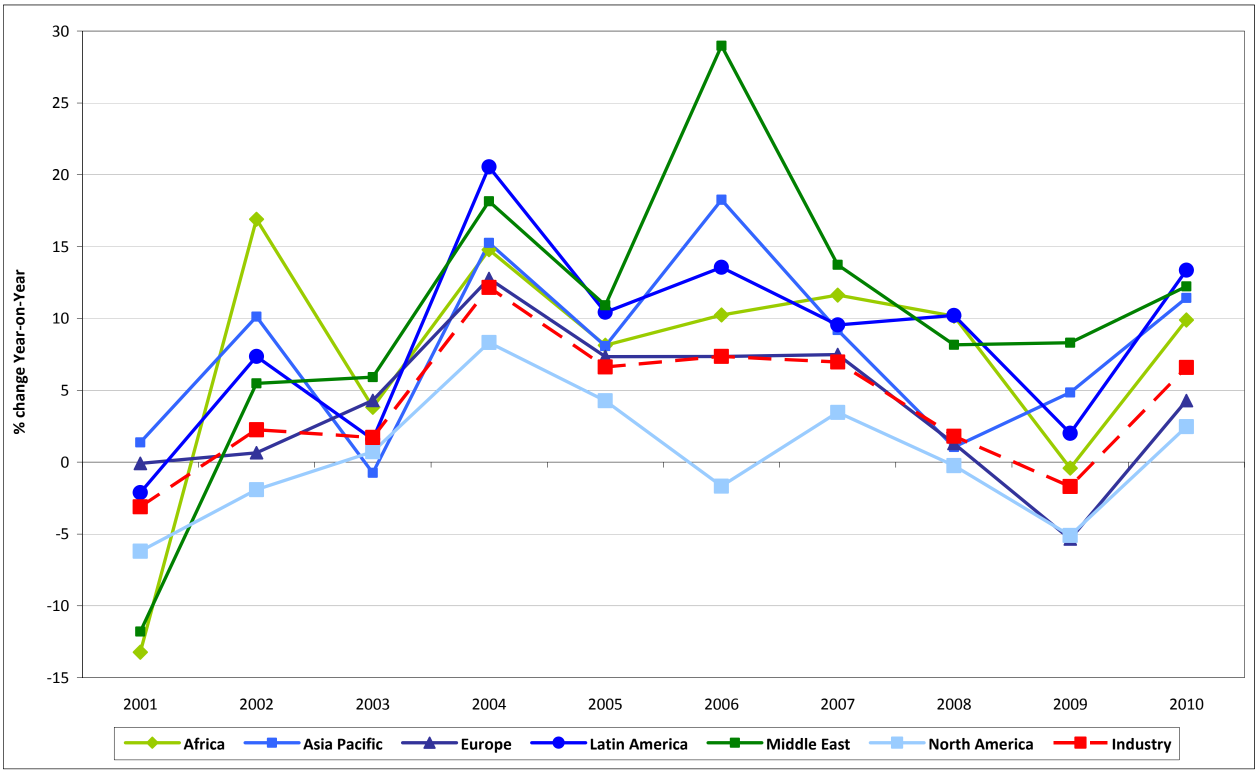
Figure 1.3: Evolution of Global Airport Passenger Throughput 2000-2010



Source: ACI

Air passenger traffic growth in 2010 needs to be placed in a historical context. Over the course of the last decade the underlying trend has been one of positive growth, albeit a fairly erratic one due to a variety of external ‘shock’ events. The industry declines experienced in 2001, 2003 and 2009 (due to the U.S terrorist attacks, the SARS epidemic and economic downturn, respectively) are particularly visible when historical air passenger growth is plotted in Figure 1.4 below. Equally evident is the resilience of the industry in ‘bouncing back’ after these shocks – note the sharp increase in overall growth in 2002, 2004 and 2010 following the shocks of the preceding years.

Figure 1.4: Airport Passenger Throughput Growth at ACI Reporting Airports 2001-2010



Source: ACI

1.3 Air Traffic Demand Drivers

Ever since the first commercial airliner entered into service, air travel has facilitated, indeed precipitated, globalisation. It has made the world smaller, for conducting both business and trade and also for pursuing leisure activities around the globe. Many industries now depend on the ability to transport products and equipment by air, such as those transporting perishables, high value manufactured products and international courier/postal services. Consumers rely on air transport to conduct critical face-to-face business meetings and to enjoy holidays in the remotest areas.

There are certain universal key drivers of air traffic demand growth. It is true that individual markets possess different air travel demand characteristics dependent upon geographic, socio-economic and political conditions, but particular factors are at the heart of stimulating demand for air travel.

1.3.1 Economic Growth & GDP

Economic growth is recognised as being the key driver for air traffic demand growth, passenger travel and air cargo.

The International Monetary Fund (IMF) records economic growth, measured in Gross Domestic Product (GDP), for individual nations and various geographical/political groupings. The groupings shown in Table 1-3 below represent a broad cross-section of the world. In a European context, sub-regions have been broken out and analysed individually, to investigate disparities in growth within the continent. In addition, a distinction is made between advanced economies and emerging ones in order to determine where the fastest growth is focused in a particular region. With regions as vast and contrasting as Europe and Asia, for example, it is essential to segment the broad market into sub-markets as differences in growth will exist within them.

Table 1-3: GDP % Growth Rates for Regional Groupings – Actual & Forecast

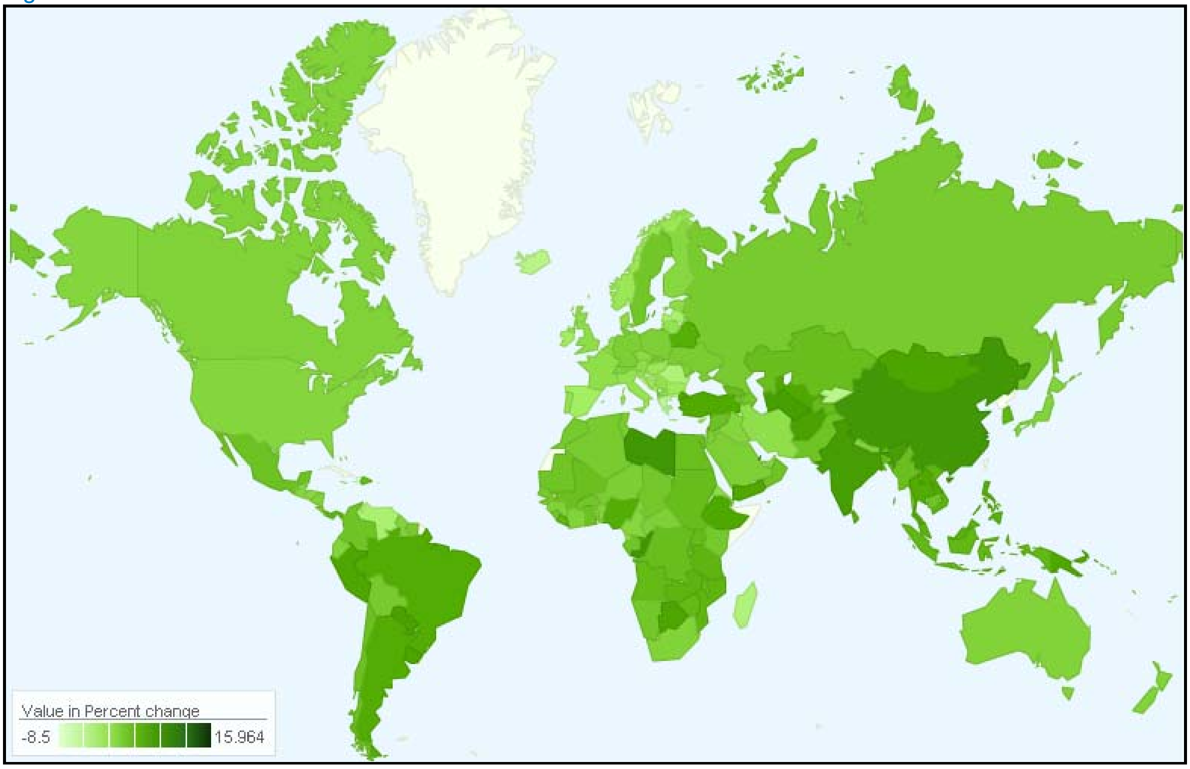
	Actual	Forecast					
Country Grouping	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Eurozone Area	1.8	1.6	1.1	1.5	1.7	1.7	1.7
European Union	1.8	1.7	1.4	1.9	2.1	2.1	2.1
Central & Eastern Europe	4.5	4.3	2.7	3.5	3.7	3.9	3.9
Commonwealth of Independent States	4.6	4.6	4.4	4.4	4.3	4.2	4.2
Middle East & North Africa	4.4	4.0	3.6	4.3	4.8	4.9	5.1
Sub-Saharan Africa	5.4	5.2	5.8	5.5	5.4	5.2	5.1
ASEAN-5	6.9	5.3	5.6	5.8	6.0	6.1	6.1
Developing Asia	9.5	8.2	8.0	8.4	8.5	8.6	8.6
Newly Industrialised Asian economies	8.4	4.7	4.5	4.4	4.3	4.3	4.3
Latin America & the Caribbean	6.1	4.5	4.0	4.1	4.1	4.0	3.9
Major Advanced Economies (G7)	2.9	1.3	1.7	2.2	2.5	2.6	2.6
World	**5.1**	**4.0**	**4.0**	**4.5**	**4.7**	**4.8**	**4.9**

Source: IMF World Economic Outlook database (September 2011 Update)

The most striking thing to note is that in 2010 the European Union and Eurozone countries achieved an aggregate economic growth rate (1.8%), far below the world average of 5.1%[11]. Indeed, these two blocs were the worst performing of all IMF-defined country categories, not even keeping pace with the G7 nations (representing the most industrialised countries in the world). The highest growth rates in 2010 within the European continent were recorded by Central and Eastern European nations (4.5%) and former Soviet bloc nations of the Commonwealth of Independent States (4.6%). The strongest economic growth worldwide was experienced in Asia, in particular developing Asia which includes China and India, recording growth at close to double the global average of 9.5%.

[11] International Monetary Fund, World Economic Outlook Database – September 2011 Update

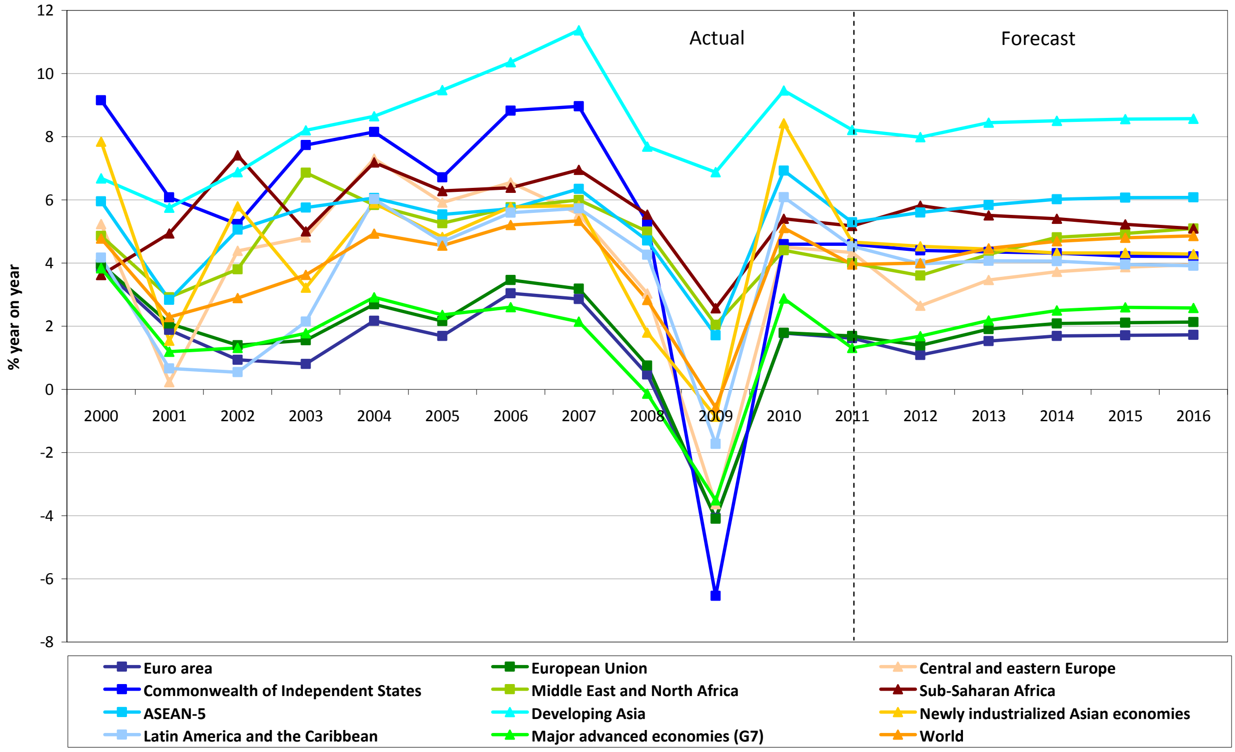
Figure 1.5: Worldwide GDP Growth in 2010



Source: IMF

It is important to place economic growth in an historical context to elicit trends. Focusing on 2010 in isolation will not provide the background necessary to determine whether growth in that year is a continuation of a long term trend or merely a short term 'blip'. For instance, the world average economic growth in 2009 was the lowest it had been throughout the decade (albeit each major region was impacted to a greater or lesser extent). However, exploring Figure 1.6 below suggests that in 2010 growth had nearly returned to its pre-recession levels, hinting that the economic environment in 2010 was conducive to allowing growth to return to its underlying trend.

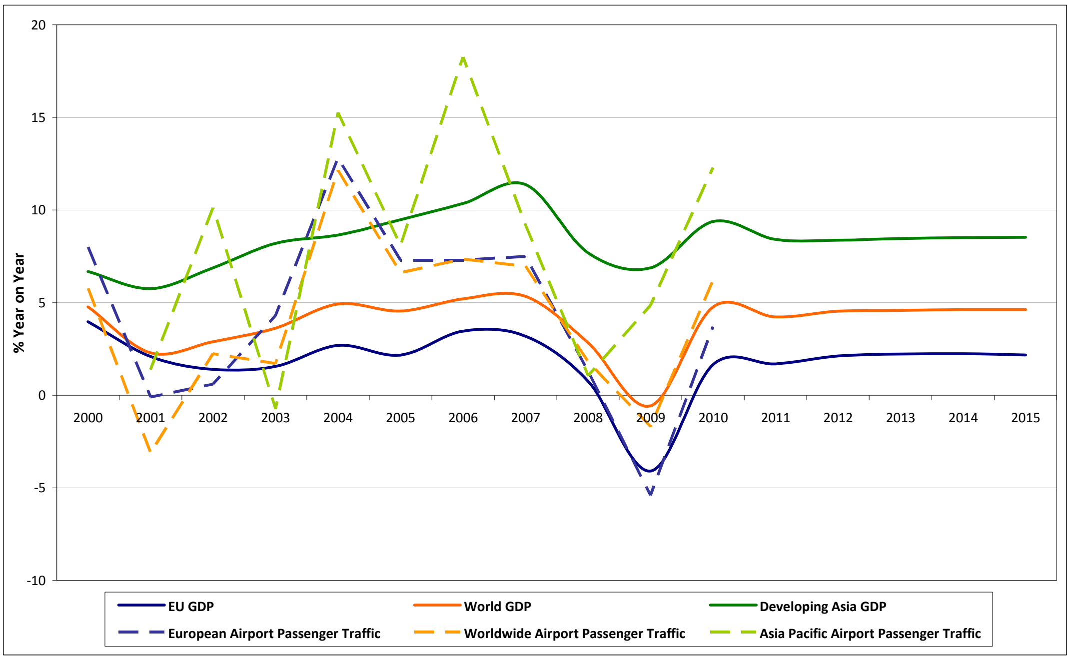
Figure 1.6: Historical GDP Growth by Geographical/Political Country Groupings



Source: IMF World Economic Outlook database (September 2011 Update)

It is arguable that a symbiotic relationship exists between economic growth and air travel demand. There is a high degree of correlation between the two variables, such that, if plotted against each other, when there is a measurable decline in economic growth there is an associated fall in air passenger traffic demand. The external shock events in 2001, 2003 and 2009 (the terrorist attacks in the U.S, the SARS virus epidemic and the global economic downturn, respectively), are illustrated with 'troughs' in demand with the associated rebound in traffic the following year depicted as 'peaks' in demand, such as 2002, 2004 and 2010. Note in Figure 1.7 how growth of air passenger demand closely tracks growth of GDP in 2008, 2009 and 2010 – when the global economy faltered in 2008 and 2009 and recovered in 2010, air passenger demand did likewise.

Figure 1.7: GDP Growth vs. Airport Passenger Growth



Source: ACI & IMF

1.3.2 Oil/Fuel Prices & Air Fares

The cost of jet fuel has been an increasing burden for airlines since the middle of the last decade. The volatile nature of kerosene price fluctuation means that commercial aircraft operators are continually struggling to keep operating costs under control. Statistics sourced from the UK Civil Aviation Authority (CAA) can be used as an industry example to highlight the growing importance of fuel costs to an airline's bottom line (see Table 1-4 below).

Table 1-4: UK Airline Fuel Cost Proportions

UK airlines[12]	% Fuel Cost of Total Operating Expenses		
	2009/10	2005/06	% increase
BMI British Midland	19.0	15.0	26.7
British Airways	30.0	23.0	30.4
easyJet	31.0	20.0	55.0
flybe	16.0	17.0	-5.9
Jet2.com	27.0	19.0	42.1
Monarch Airlines	34.0	24.0	41.7
Thomas Cook Airlines	35.0	24.0	45.8
Thomson Airways	30.0	27.0	11.1
Virgin Atlantic	36.0	25.0	44.0
Average	**28.7**	**21.6**	**33.0**

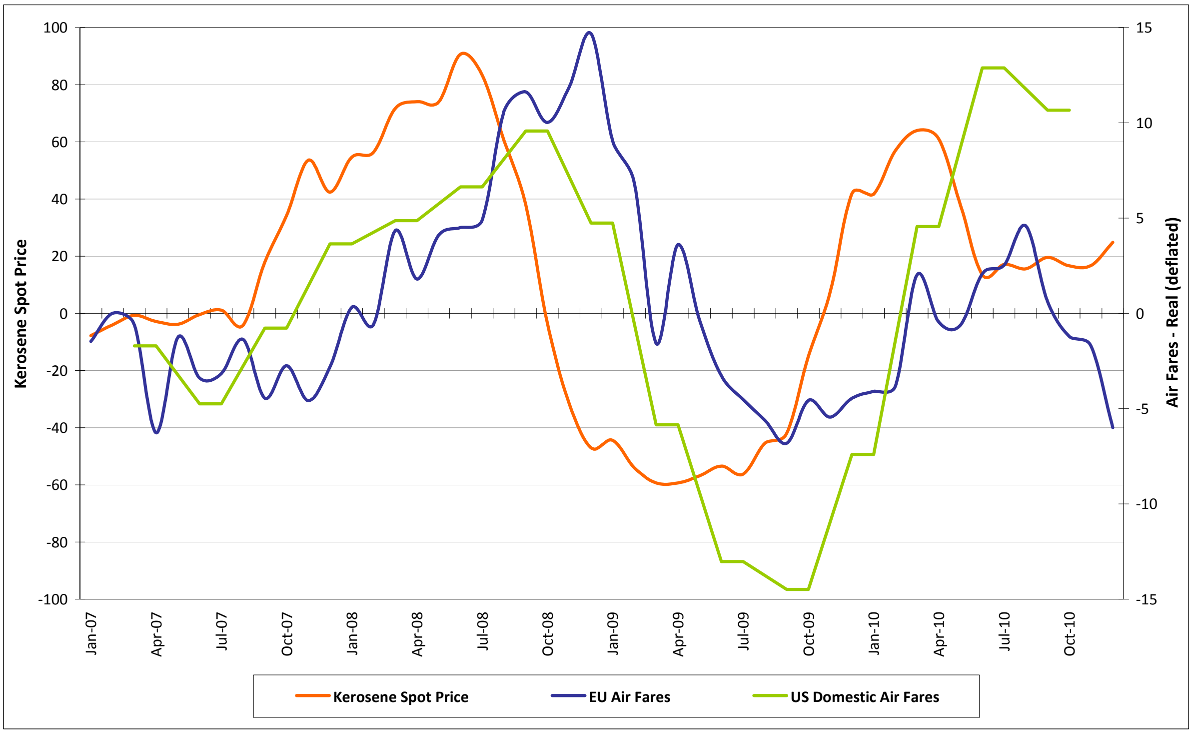
Source: CAA Airline Statistics

[12] UK Civil Aviation Authority Airline Financial Statistics table

Fuel now typically represents up to 30% of an average airline's total operating expenses, an increase of around one third from 21% in 2005/06. This is an industry-wide trend leading to many airlines passing on the cost to passengers by imposing a fuel surcharge on air fares. This practice has been implemented by many scheduled carriers for the last decade; and increasingly by leisure operators as the price of fuel in 2010 (annual average USD 2.17 per U.S. gallon) rose well above 2009 (USD 1.67 per U.S. gallon) levels[13].

Reliable data on air fares is difficult to obtain but is available for Europe and the United States[14]. Figure 1.8 below plots the year-on-year change in kerosene spot price[15] and variance in the average real air fares (deflated) in the EU and average U.S. domestic air fares.

Figure 1.8: Growth Year-on-Year in Jet Fuel Costs vs. Air Fares



Source: Airline Business (Jan-Dec 2010 editions), Eurostat, US Department of Transport – Research and Innovative Technology Administration (RITA)

As expected, there is quite clearly a pattern to the curves in Figure 1.8 which highlight the close correlation between changes in fuel price and the subsequent change in average air fares in EU and in the U.S. domestic markets. There is a lag effect between a rise in jet fuel price and a rise in air fares while airlines mobilise their ticket pricing strategies to cover the increase in costs. According to the data, since January 2007 average air fare rises were most significant immediately following the unprecedented spike in jet fuel prices in 2008 peaking in late 2008. Fares reached a recent low point in the second half of 2009 following a reduction in the kerosene spot price from late 2008; and kerosene maintained a consistent decline throughout 2009 to influence a downward trend in average air fares in EU and the United States.

[13] Jet kerosene spot prices, Airline Business

[14] European air fares data sourced from Eurostat, using EU27 as definition of Europe, U.S. domestic air fares data sourced from FAA

[15] Jet kerosene spot prices are world average = median of Europe/Singapore cargo and U.S. pipeline spot prices in U.S.¢/U.S. gallon

To mitigate the often unpredictable nature of fuel cost spikes many airlines choose to hedge their fuel costs – purchasing future fuel requirements at a fixed price – which can be equally as disadvantageous as it can be beneficial depending on which way the price of fuel goes. Airlines have ceased trading on the back of fuel hedging strategies, as much as others have prospered.

1.3.3 Currency Exchange Rates

Currency exchange rates can have a direct influence on air travel demand. This is borne out in several ways.

Firstly, variation in exchange rates will impact on the behaviour of air passengers travelling for leisure purposes. As tourists, air passengers are seeking the best possible value for money when travelling outside of their currency zone, so they will often choose a destination country that is weak against their home currency (whilst air passengers travelling on business are less sensitive to the cost of travel). Typically, the stronger the currency, the less desirable that country becomes as a destination for tourism as the tourist gets less foreign currency against their domestic currency. The reverse is equally applicable, where a weak currency in the international market can stimulate tourism demand (and thus air travel) as the cost of the visit is relatively less expensive.

Secondly, the competitiveness of Eurozone tourism destinations suffers when the euro is strong relative to North African and Turkish destinations. An analysis of airport passenger throughput in 2010 at Mediterranean region tourist destinations (as shown in Table 1-5) reveals a startling pattern.

Table 1-5: Mediterranean Area Tourist Destination Airports Passenger Throughput in 2010

	Airport	Country	2010 Passengers (millions)	% YoY
Non-Eurozone	Ankara	Turkey	7.79	25.9
	Izmir	Turkey	7.52	20.2
	Antalya	Turkey	21.85	18.7
	Sharm El Sheikh	Egypt	8.68	17.0
	Marrakech	Morocco	3.43	14.9
	Agadir	Morocco	1.62	12.1
	Cairo	Egypt	16.13	12.2
	Bodrum	Turkey	3.10	10.2
	Tunis	Tunisia	4.60	8.1
Eurozone	Faro	Portugal	5.34	5.4
	Larnaca	Cyprus	5.47	4.0
	Malaga	Spain	12.04	3.7
	Gran Canaria	Spain (Canary Islands)	9.46	3.5
	Alicante	Spain	9.38	2.7
	Tenerife	Spain (Canary Islands)	7.30	3.1
	Ajaccio	Corsica	1.11	2.3
	Paphos	Cyprus	1.65	0.4
	Palma de Mallorca	Spain (Balearic Islands)	21.11	-0.4
	Funchal	Madeira	2.23	-4.8
	Athens	Greece	15.40	-5.0

Source: ACI

In 2010, airports serving established and emerging tourism destinations throughout the Mediterranean region in non-euro countries outperformed those in the Eurozone by a wide margin. Growth at these non-euro airports reached double figures with the exception of Tunis, whereas airports in the Eurozone achieved growth of less than 5% (with the exception of Faro). In some cases the airports declined, notably Palma de Mallorca, Athens and Funchal.

The lack of competitiveness of Eurozone destinations compared to rival non-euro tourism resorts in the Mediterranean can be largely attributed to the disparity in the cost of a visit. Turkey, Egypt and Morocco are significantly cheaper than Spain, Greece and Cyprus – a tourist from the Eurozone will see a euro go a lot further in Antalya than in Tenerife; and is thus more likely to choose Turkey as a destination. Likewise, tourists from outside the Eurozone will be faced with a similar proposition when the euro is stronger than, for example, the Turkish Lira (TRY) or Egyptian Pound (EGP). This inevitably increases demand for tourism to non-euro destinations at the expense of Eurozone resorts. This is the current situation, but the trend could conceivably change should the euro weaken in international markets.

2010 began with certain members of the Eurozone, namely Greece, Ireland, Portugal and Spain, beset by serious financial difficulties and the strength of the euro reflected this with mixed fortunes throughout the year – starting the year depressed against other major international currencies but finishing stronger. Turkish and Egyptian airports achieved higher growth than any Mediterranean airport in the Eurozone in 2010, in part because of the better value for money offered to visitors to Egypt compared with, for example, the Spanish Canary Islands.

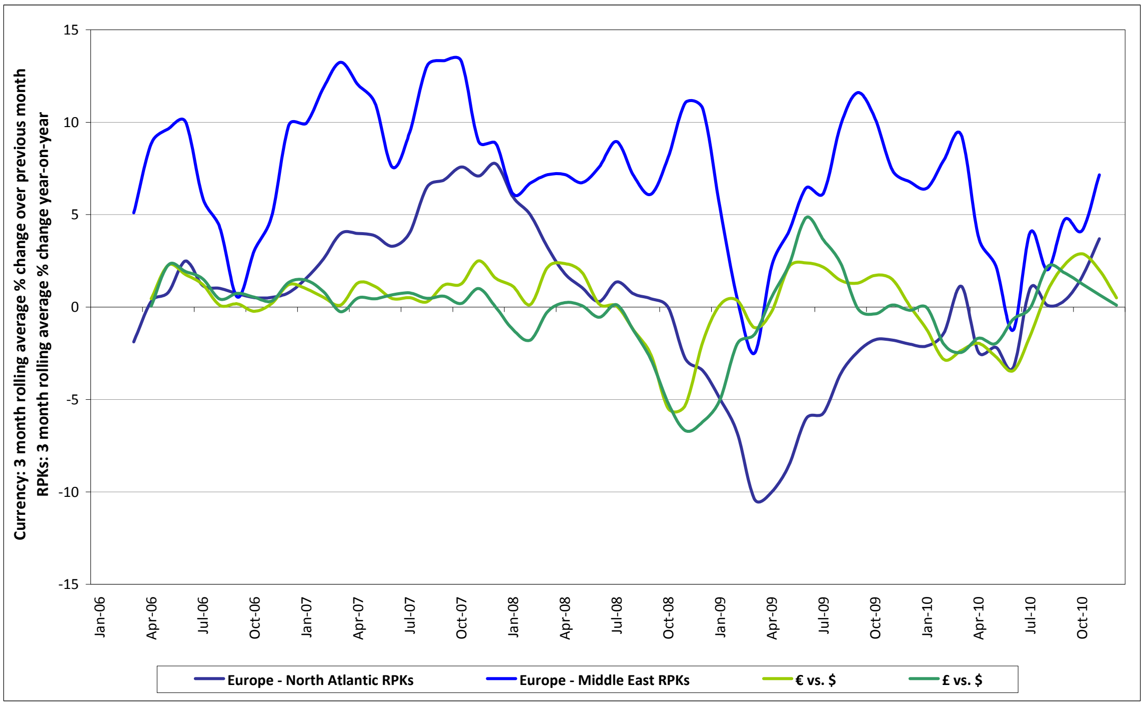
While non-euro destinations continue to offer better ‘value for money’ to tourists, the likes of Egypt and Turkey will continue to compete strongly against rival destinations in the Eurozone. The strength of the euro in international markets can help partially explain the lack of competitiveness of Eurozone markets in growing their tourism industries.

From a wider international standpoint, an analysis was performed on the recent historical strength of the euro (€) and GBP (£) against the U.S. dollar ($)[16]; and was compared with European airline RPK growth on all Europe-North Atlantic and Europe-Middle East routes[17]. The UAE Dirham (AED) is pegged to the U.S. dollar.

[16] OANDA Currency Exchange Rate online database

[17] AEA member airlines

Figure 1.9: Air Traffic vs. Exchange Rate Growth: Europe-North Atlantic/Middle East RPKs vs. €/£/$ Change



Source: AEA & OANDA

The traffic growth is measured in RPKs for European AEA member airlines – ostensibly carrying European passengers from Europe across the North Atlantic and to/from the Middle East. One would expect European passengers to be sensitive to a weakened exchange rate; and arguably one can infer from Figure 1.9 above that a weakening of European currency (€ and £) against the dollar has resulted in a corresponding fall in AEA member airline traffic growth historically. This was very evident during the second half of 2008 and early 2009 when the € and £ depreciated significantly against the dollar (at its low point GBP fell 9% in November/December 2008 alone) and this was mirrored by a decline in RPK growth of European airlines on North Atlantic and Middle Eastern routes.

The depreciation of European currencies against the U.S. dollar during this period coincided with the global financial crisis and economic recession, which will also have had a negative impact on air traffic demand. Therefore this analysis needs to be tempered with the awareness that air travel demand drivers do not exist in isolation and indeed demand can be influenced by myriad factors at any one time.

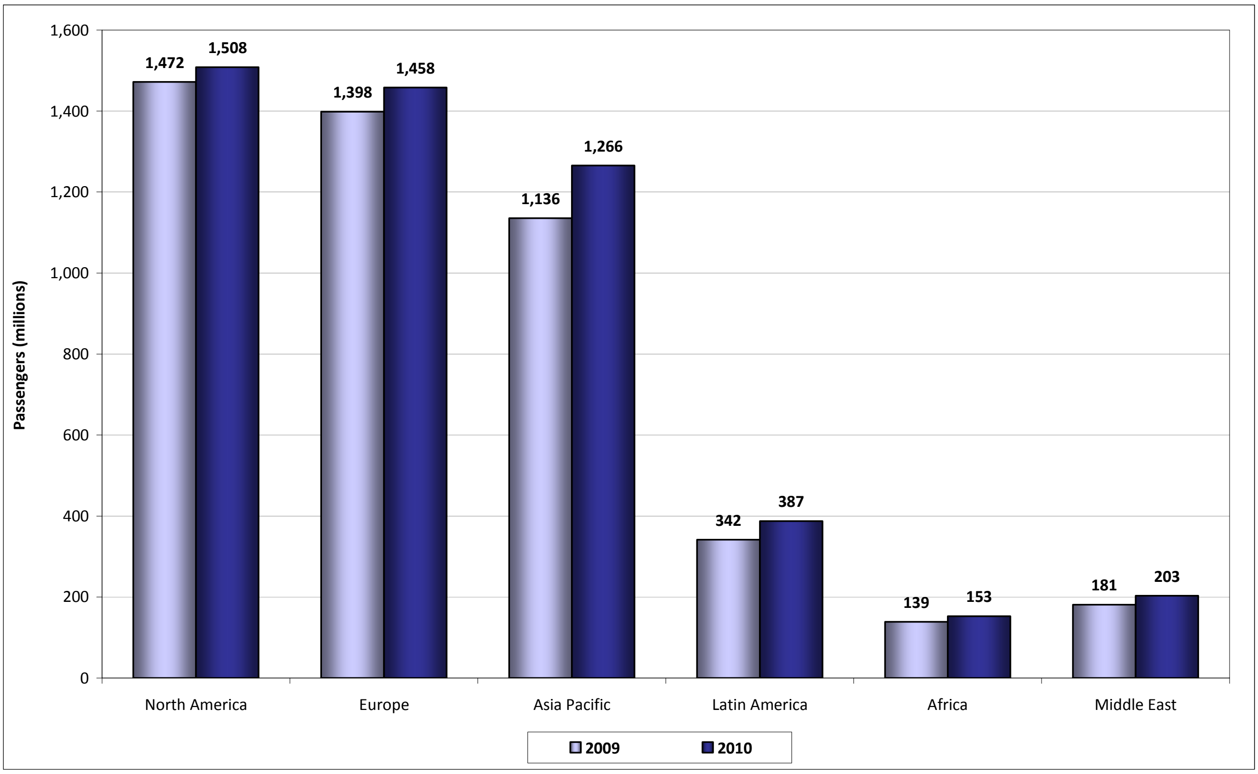
1.4 Air Passenger Traffic Growth in 2010

1.4.1 Europe in a global context

In 2010, ACI reported that a total of 4.97 billion passengers passed through worldwide airports, an increase of 6.6% compared to 2009.

In isolation, the European air transport sector can be fairly satisfied with the recovery achieved in 2010 following an extraordinarily poor 2009. According to ACI's full year 2010 data[18], European airport passenger throughput rose from 1.40 billion in 2009 to 1.46 billion in 2010. The size of the European market was 95% of the North American market in 2009; and although Europe has closed the gap in 2010 to be 97% of the size of the North American market it remains the second largest, ahead of Asia Pacific.

Figure 1.10: Worldwide Airport Passenger Throughput by Region in 2009 & 2010

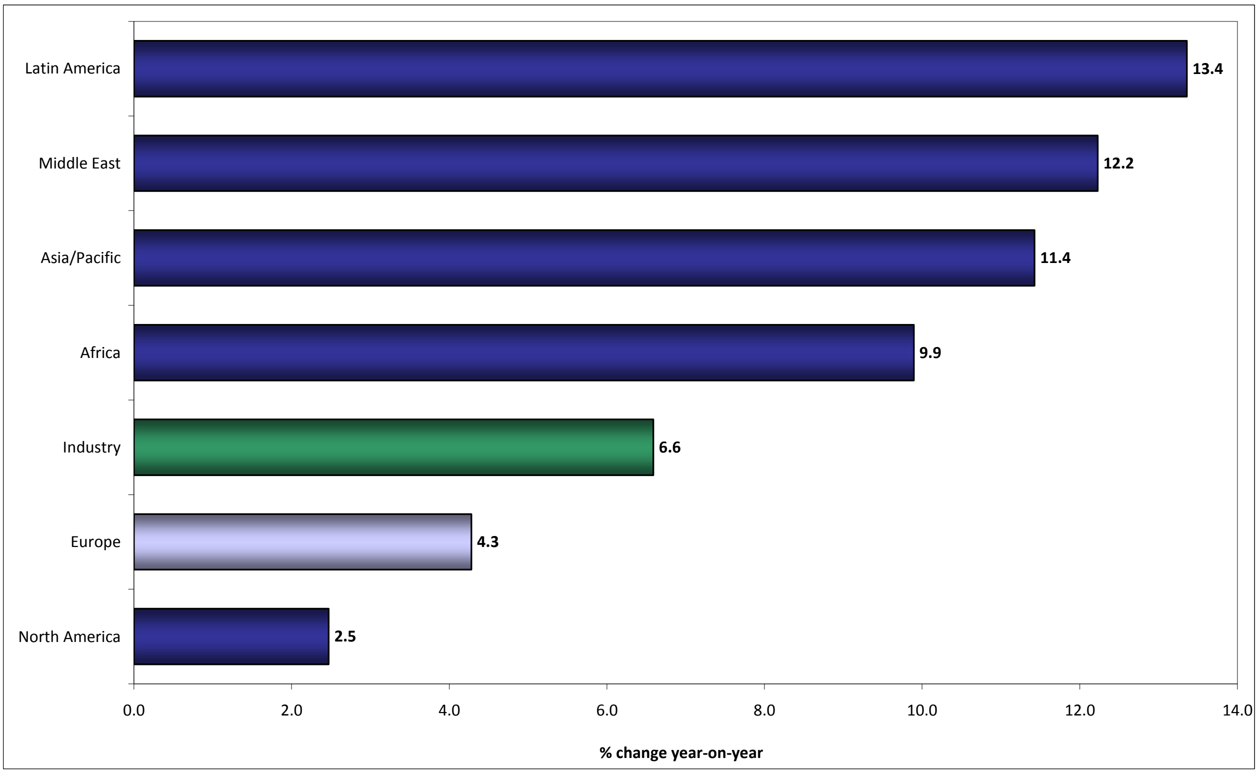


Source: ACI

Europe's airports recorded over 4% growth year-on-year, higher growth than that achieved by North American airports at 2.5%. However, this was some way below the worldwide average growth of 6.6% (see Figure 1.11).

[18] ACI Worldwide Airport Traffic Report 2010

Figure 1.11: Passenger Traffic Growth at Worldwide Airports by Region in 2010 vs. 2009

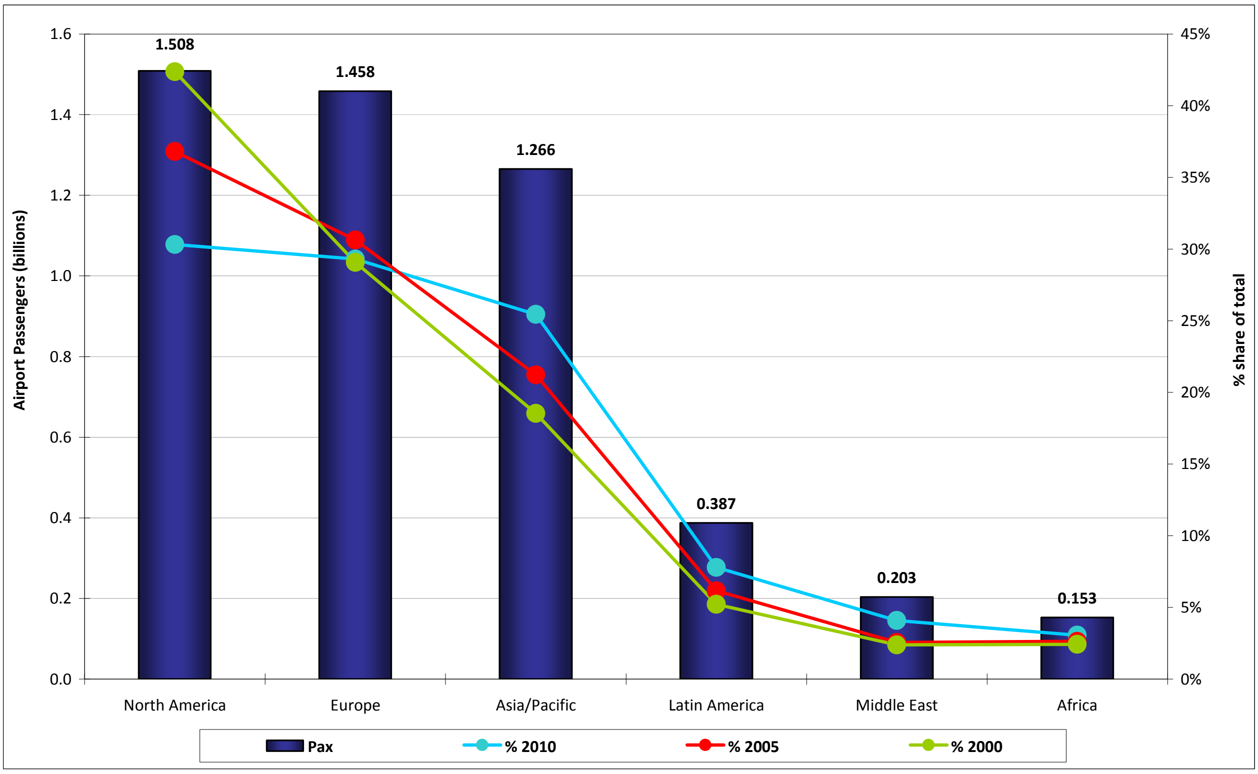


Source: ACI

Although the European air transport market remains second only to North America in 2010, the year was characterised by a continuation of one particular trend – the development of emerging markets and stagnation in mature markets. Latin American air passenger demand increased by an impressive 13.4% in 2010 over 2009, followed closely by the Middle East (12.2%), Asia Pacific with 11.4% growth, and Africa (9.9%), each far exceeding the pace of growth experienced in the advanced mature markets of Europe (4.3%) and North America (2.5%).

Figure 1.12 serves to underline this apparent shift in the focus of growth.

Figure 1.12: Regional Distribution of Worldwide Airport Passenger Traffic



Source: ACI

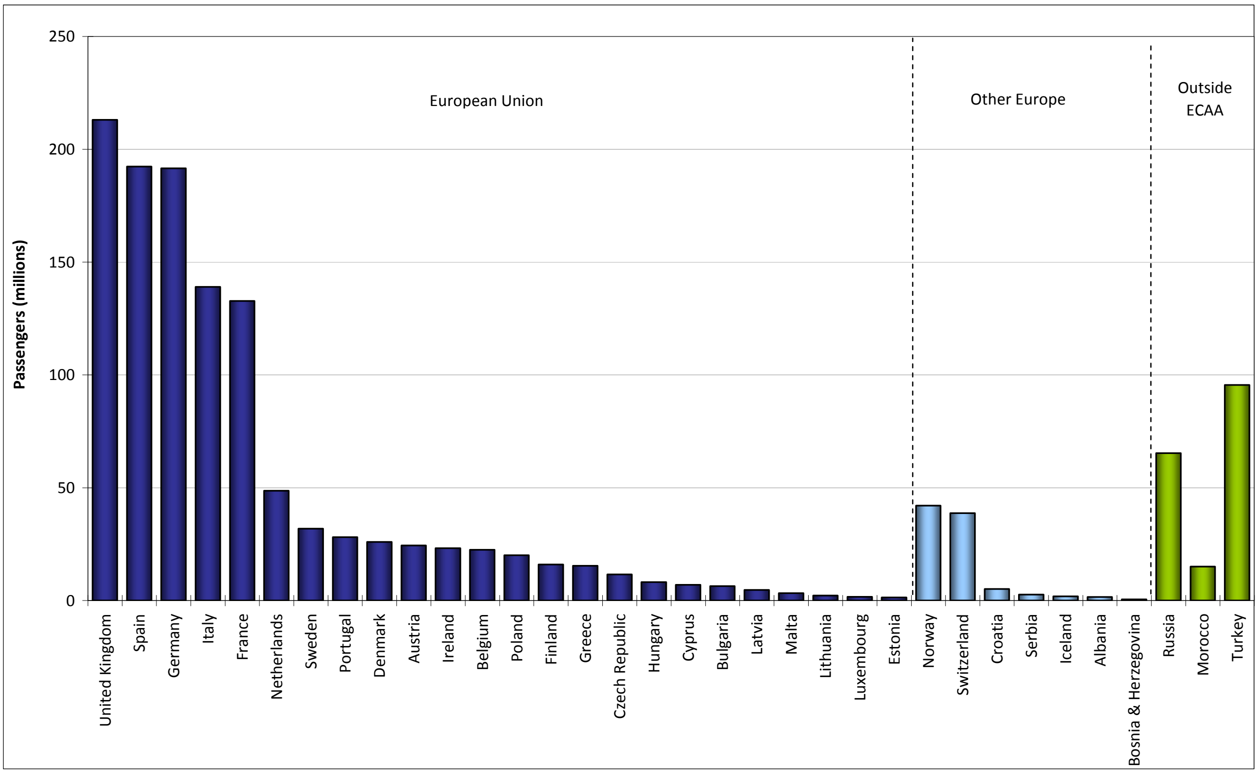
By comparing the regional market share of total global airport passenger throughput in 2010 with 2005 and 2000, a picture is emerging of the developing markets of Asia Pacific, Latin America, Middle East and Africa taking market share from (mostly) North America. While Europe's share of the global total has remained fairly constant in the last ten years, it has declined by 1.5% since 2005. The North American market has decreased by 5.5% since 2005 and by 12% since 2000. Meanwhile, Asia Pacific has increased its portion of the market by 7% since 2000, while Latin America's market share has risen 2.6% in the same period of time.

It should be noted that in real terms, each regional market is growing and because the North American and European markets have a larger air traffic base, it is to be expected that their growth rates will be lower than in markets with a smaller base.

1.4.2 The European Air Transport Market

Within Europe, there is considerable variety in the amount of air traffic on an individual country basis.

Figure 1.13: European Airport Passenger Traffic Throughput in 2010 by Country



Source: ACI

Based on ACI airport passenger data it is evident that Europe is dominated by certain core markets (Figure 1.13 and Table 1-6), notably the UK, Spain, Germany, Italy and France, which combined accounted for approximately 75% of European Union airport passenger traffic in 2010. Of these markets, Italy fared best in terms of growth, achieving a 7% increase year-on-year on the back of strong growth at its two main airports: Rome Fiumicino (+7.5%) and Milan Malpensa (+8.0%). After the widespread declines of 2009 due to the economic downturn, the UK (largest market) was the only country in the top ten European markets to suffer a further drop in 2010. The decline in passengers was -3.5% compared to 2009; this was partly due to the disruption caused by the Eyjafjallajökull volcano but mainly as a result of its regional airports continuing to peg back growth.

Table 1-6: Historical European Airport Passenger Traffic Throughput by Country (millions)

Country	2005	2006	2007	2008	2009	2010	% change 2010 vs. 2009	AAGR % 2005-2010
United Kingdom	224.07	231.12	241.72	237.15	220.50	213.09	-3.4	-1.0
Spain	179.29	191.16	208.68	202.25	186.90	192.36	2.9	1.4
Germany	163.14	171.74	184.77	186.03	182.99	191.60	4.7	3.3
Italy	107.05	116.57	128.79	126.23	130.05	139.06	6.9	5.4
France	126.00	131.94	139.35	141.48	131.19	132.79	1.2	1.1
Netherlands	46.37	48.47	50.52	50.28	46.47	48.65	4.7	1.0
Sweden	28.72	29.65	34.13	34.88	30.27	31.86	5.3	2.1
Portugal	22.33	24.16	26.33	27.16	26.39	28.15	6.7	4.7
Denmark	21.76	22.58	23.53	23.94	23.67	25.98	9.8	3.6
Austria	20.27	21.45	23.60	24.61	22.67	24.46	7.9	3.8
Ireland	25.92	29.17	30.42	30.38	26.68	23.20	-13.0	-2.2
Belgium	18.41	19.29	20.82	21.97	21.04	22.48	6.9	4.1
Poland	10.58	13.41	16.43	17.51	18.61	20.13	8.2	13.7
Finland	15.13	16.34	17.31	17.55	15.74	15.98	1.6	1.1
Greece	36.37	38.62	41.18	40.84	39.61	38.40	-3.1	1.1
Czech Republic	11.30	12.22	13.14	13.44	11.64	11.56	-0.7	0.5
Hungary	7.89	8.23	8.56	8.41	8.10	8.19	1.2	0.8
Cyprus	6.78	6.74	7.01	7.24	6.76	6.99	3.5	0.6
Bulgaria	4.97	5.53	6.26	6.64	6.06	6.42	5.9	5.2
Latvia	1.86	2.48	3.15	3.68	4.07	4.66	14.7	20.2
Malta	2.76	2.70	2.97	3.11	2.92	3.29	12.8	3.6
Lithuania	1.45	1.81	2.20	2.55	1.77	2.18	23.7	8.5
Luxembourg	1.56	1.61	1.64	1.70	1.55	1.63	5.1	0.8
Estonia	1.39	1.53	1.72	1.80	1.35	1.38	2.9	-0.1
Bosnia & Herzegovina	0.44	0.47	0.51	0.53	0.53	0.56	5.5	5.2
Norway	33.95	37.51	40.81	41.19	39.32	42.09	7.1	4.4
Switzerland	30.56	33.16	35.90	37.87	37.02	38.79	4.8	4.9
Croatia	3.81	4.25	4.75	5.07	4.82	5.16	7.0	6.3
Serbia‡			2.54	2.67	2.38	2.70	13.2	2.0
Iceland	1.51	1.73	1.88	1.75	1.66	1.79	8.0	3.5
Albania	0.79	0.91	1.11	1.27	1.39	1.54	10.2	14.3
Russia	36.98	41.21	71.62	79.07	54.35	65.28	20.1	12.0
Morocco	8.95	10.17	11.89	12.64	13.06	15.07	15.5	11.0
Turkey	52.10	56.48	64.08	72.49	79.79	95.56	19.8	12.9

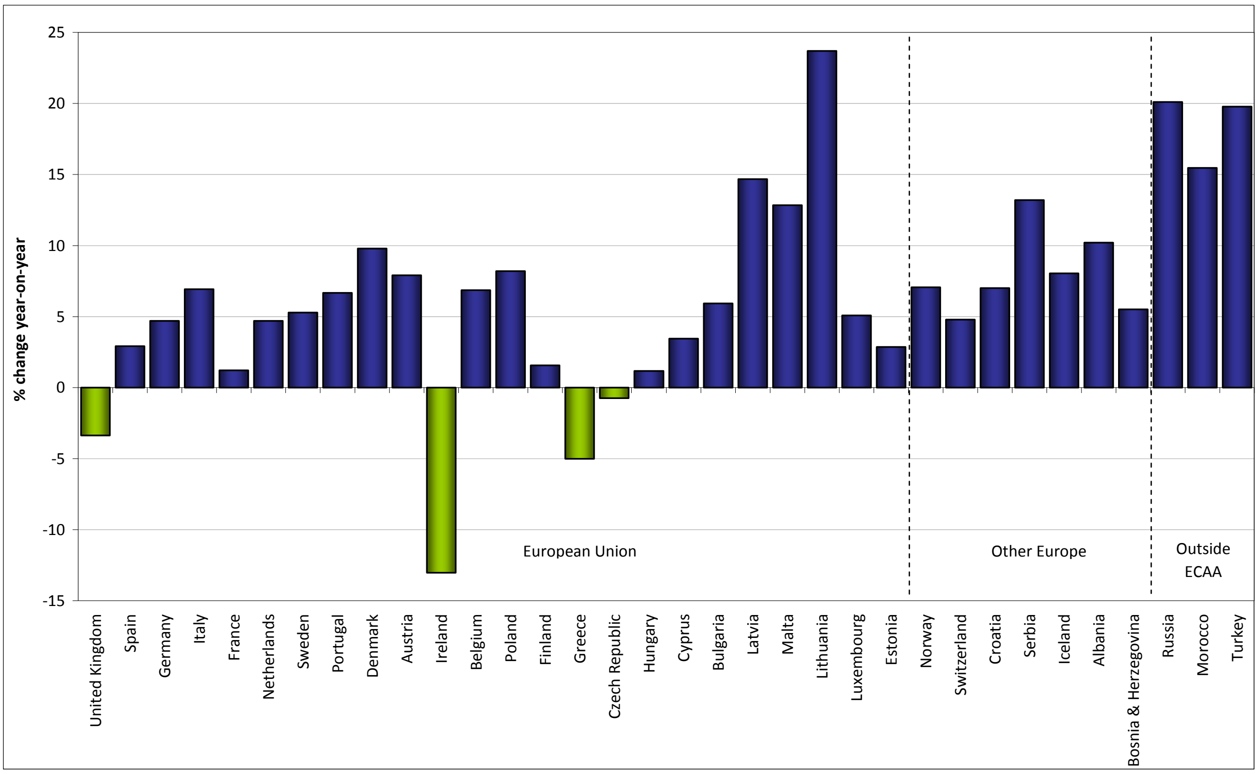
Source: ACI (‡Serbia AAGR 2007-2010)

Figure 1.14 shows the European Union Member States recording the highest growth in 2010 included Lithuania, Latvia, Malta, Denmark, Poland and Austria.

Significant markets outside of the European Union but within the European Common Aviation Area include Serbia and Albania, both of which achieved robust growth in 2010.

On the periphery of geographical Europe however, Russia, Turkey and Morocco each succeeded in recording growth above 15%, driven in large part by the growth in tourism. Turkey and Morocco were two of the destinations of choice for leisure air passengers in 2010, while Russia's growth was driven by the outbound travel of an expanding middle class.

Figure 1.14: European Airport Passenger Traffic Growth 2010 vs. 2009 by Country



Source: ACI

The relationship between economic growth and air travel demand can be used to justify the growth or decline in some markets (such as Ireland, Greece, the UK, Turkey and Russia) but other factors including air transport market maturity, airport capacity and congestion, the policy and regulatory environment; and taxation and pricing regimes will all contribute to affecting the demand for air travel, creating an uneven playing field throughout Europe allowing certain markets to flourish while others decline.

The European picture can be translated onto the global scene to explore the reasons for discrepancies in air travel demand growth between worldwide regions. The following section investigates the 'best and worst' airports in 2010 around the globe in mature and emerging markets.

1.4.3 The Global Air Transport Market

Worldwide Airport Passenger Traffic

The top 30 global airports by passenger throughput in 2010 have been examined and are shown in Table 1-7 below, by volume and growth year-on-year.

Table 1-7: Top 30 Global Airports by Passengers & Growth in 2010

Rank	Airport	Region	Total	% chg		Airport	Region	Total	% chg
1	ATLANTA GA, US (ATL)	North America	89,238,059	1.5		SHANGHAI, CN (PVG)	Asia Pacific	40,385,996	26.5
2	BEIJING, CN (PEK)	Asia Pacific	73,948,113	13.1		JAKARTA, ID (CGK)	Asia Pacific	42,043,642	18.9
3	CHICAGO IL, US (ORD)	North America	66,735,180	4.1		DUBAI, AE (DXB)	Middle East	46,313,680	15.5
4	**LONDON, GB (LHR)**	**Europe**	**65,747,173**	**-0.2**		SINGAPORE, SG (SIN)	Asia Pacific	40,923,716	13.4
5	TOKYO, JP (HND)	Asia Pacific	64,208,802	3.7		BEIJING, CN (PEK)	Asia Pacific	73,948,113	13.1
6	LOS ANGELES CA, US (LAX)	North America	59,070,127	4.5		CHARLOTTE NC, US (CLT)	North America	38,254,207	10.8
7	**PARIS, FR (CDG)**	**Europe**	**58,075,239**	**0.5**		HONG KONG, HK (HKG)	Asia Pacific	49,774,874	10.6
8	DALLAS/FORT WORTH TX, US (DFW)	North America	56,906,610	1.6		GUANGZHOU, CN (CAN)	Asia Pacific	40,857,345	10.6
9	**FRANKFURT, DE (FRA)**	**Europe**	**52,710,228**	**4.1**		SYDNEY, AU (SYD)	Asia Pacific	35,562,255	7.8
10	DENVER CO, US (DEN)	North America	52,209,377	4.1		**ROME, IT (FCO)**	**Europe**	**35,954,489**	**7.6**
11	**MADRID, ES (MAD)**	**Europe**	**49,784,941**	**3.1**		**MUNICH, DE (MUC)**	**Europe**	**34,598,634**	**6.0**
12	HONG KONG, HK (HKG)	Asia Pacific	49,774,874	10.6		BANGKOK, TH (BKK)	Asia Pacific	41,253,893	5.7
13	NEW YORK NY, US (JFK)	North America	46,514,154	1.4		MIAMI FL, US (MIA)	North America	35,698,025	5.3
14	DUBAI, AE (DXB)	Middle East	46,313,680	15.5		SAN FRANCISCO CA, US (SFO)	North America	39,116,764	5.1
15	**AMSTERDAM, NL (AMS)**	**Europe**	**45,136,967**	**3.7**		LOS ANGELES CA, US (LAX)	North America	59,070,127	4.5
16	JAKARTA, ID (CGK)	Asia Pacific	42,043,642	18.9		**FRANKFURT, DE (FRA)**	**Europe**	**52,710,228**	**4.1**
17	BANGKOK, TH (BKK)	Asia Pacific	41,253,893	5.7		CHICAGO IL, US (ORD)	North America	66,735,180	4.1
18	SINGAPORE, SG (SIN)	Asia Pacific	40,923,716	13.4		DENVER CO, US (DEN)	North America	52,209,377	4.1
19	GUANGZHOU, CN (CAN)	Asia Pacific	40,857,345	10.6		**AMSTERDAM, NL (AMS)**	**Europe**	**45,136,967**	**3.7**
20	HOUSTON TX, US (IAH)	North America	40,479,569	1.2		TOKYO, JP (HND)	Asia Pacific	64,208,802	3.7
21	SHANGHAI, CN (PVG)	Asia Pacific	40,385,996	26.5		ORLANDO FL, US (MCO)	North America	34,877,899	3.5
22	LAS VEGAS NV, US (LAS)	North America	39,757,359	-1.8		**MADRID, ES (MAD)**	**Europe**	**49,784,941**	**3.1**
23	SAN FRANCISCO CA, US (SFO)	North America	39,116,764	5.1		PHOENIX AZ, US (PHX)	North America	38,554,215	1.9
24	PHOENIX AZ, US (PHX)	North America	38,554,215	1.9		DALLAS/FORT WORTH TX, US (DFW)	North America	56,906,610	1.6
25	CHARLOTTE NC, US (CLT)	North America	38,254,207	10.8		ATLANTA GA, US (ATL)	North America	89,238,059	1.5
26	**ROME, IT (FCO)**	**Europe**	**35,954,489**	**7.6**		NEW YORK NY, US (JFK)	North America	46,514,154	1.4
27	MIAMI FL, US (MIA)	North America	35,698,025	5.3		HOUSTON TX, US (IAH)	North America	40,479,569	1.2
28	SYDNEY, AU (SYD)	Asia Pacific	35,562,255	7.8		**PARIS, FR (CDG)**	**Europe**	**58,075,239**	**0.5**
29	ORLANDO FL, US (MCO)	North America	34,877,899	3.5		**LONDON, GB (LHR)**	**Europe**	**65,747,173**	**-0.2**
30	**MUNICH, DE (MUC)**	**Europe**	**34,598,634**	**6.0**		LAS VEGAS NV, US (LAS)	North America	39,757,359	-1.8

Source: ACI Worldwide Airport Traffic Report 2010 (Left hand table by ranked by passengers, right hand table by growth)

In terms of passenger volume, North American airports dominate the top 30 in the world with thirteen airports recording 637 million passengers; Asia Pacific has nine airports with 429 million passengers; EU has seven airports with 342 million passengers; and the Middle East has one airport with 46 million passengers (Dubai).

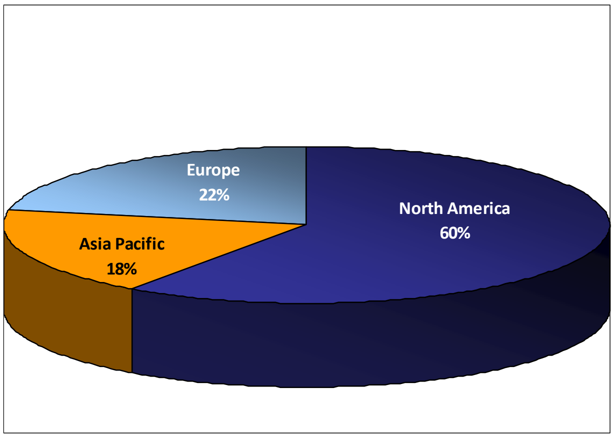
In terms of growth, however, seven out of the top ten are Asia Pacific airports, with four of those Chinese (including Hong Kong S.A.R.). The bottom ten airports comprise seven North American and 3 EU.

North America (44%) has the highest proportion of airports in the 2010 global top 30 in terms of passenger throughput, followed by Asia Pacific (29%) and EU (24%).

Historical Growth by World Region

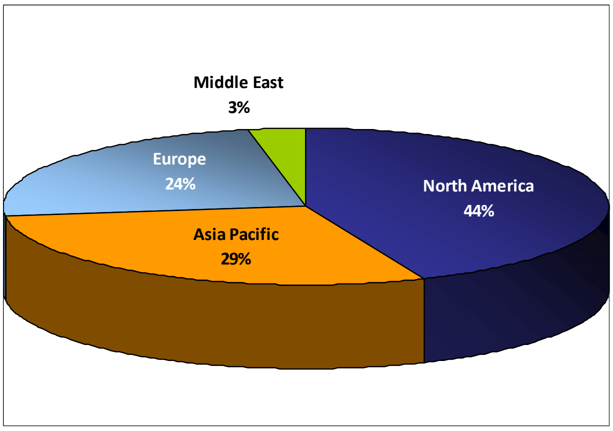
This has changed markedly from 2005 when North America dominated the top 30 global airports by passenger throughput, accounting for 60%. North America's decline has been Asia Pacific's gain, attaining a 29% market share of the top 30 global airports' passenger throughput in 2010 up from 18% in 2005.

Figure 1.15: Top 30 Global Airports by Passengers & Regional Share 2005



Source: ACI

Figure 1.16: Top 30 Global Airports by Passengers & Regional Share 2010

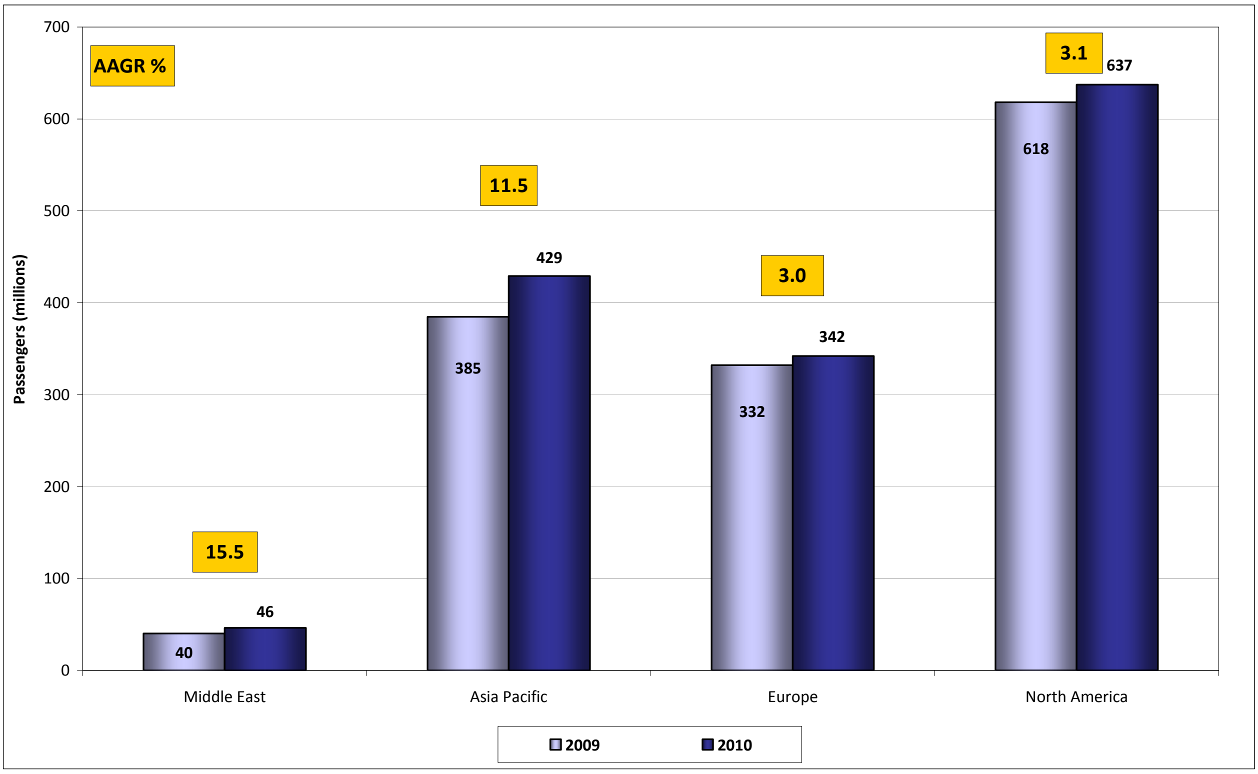


Source: ACI

Exploring the passenger growth of the top 30 global airports paints a picture of a changing environment. Growth in the Middle East (albeit from a small base) and Asia Pacific regions is far outpacing EU and North America, reflecting the maturity of the latter markets but also the shift in focus of economic growth across the world.

A comparison between the industrial powers of the United States, EU and China shows a stark contrast in air travel growth patterns. The Chinese airports (including Hong Kong S.A.R.) in the top 30 global list achieved combined passenger growth of greater than 14% in 2010 over 2009; the corresponding figure for U.S. and EU airports in the top 30 worldwide list is 3.1% and 3.0% respectively.

Figure 1.17: Top 30 Global Airports by Passenger & by Region – Growth 2010 vs. 2009



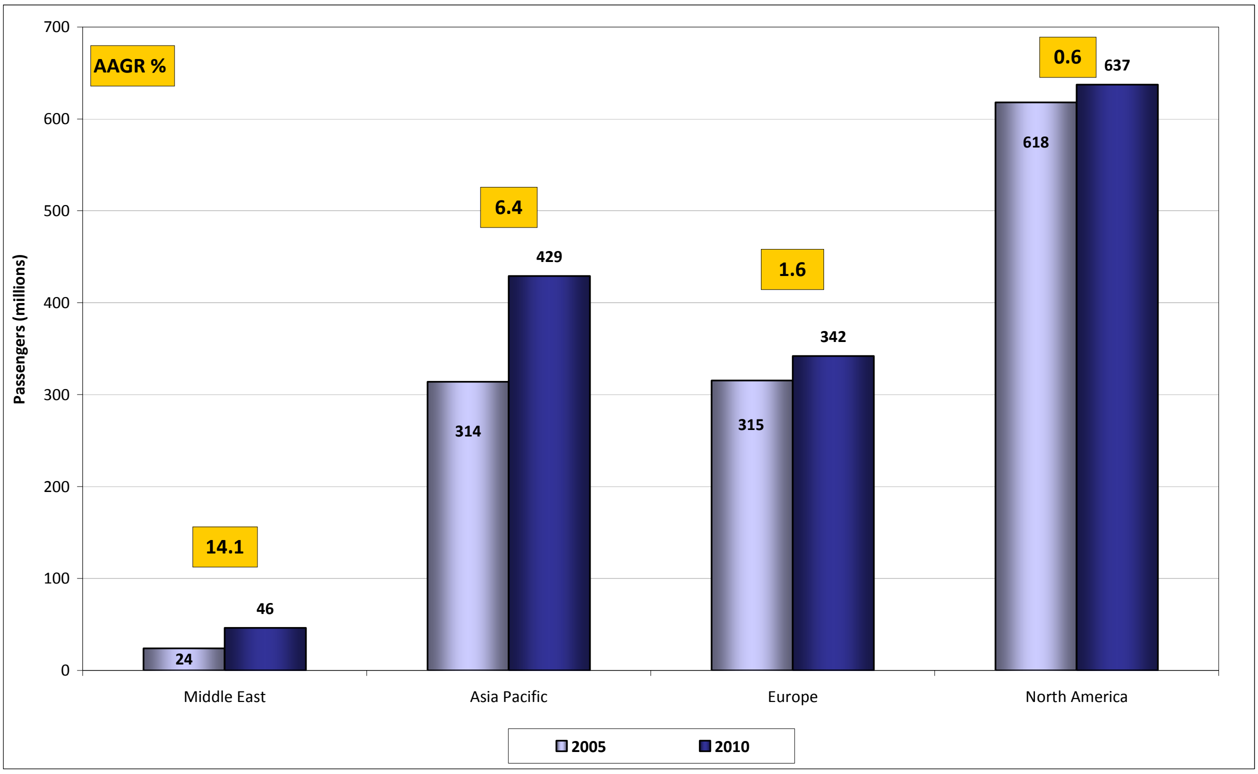
Source: ACI

Comparing 2010 airport passenger throughput with that of 2005 illustrates a similar pattern – one of a changing regional emphasis. Passenger throughput at North American airports has stagnated in the last five years, increasing at an average annual rate of 0.6%. EU airports have experienced similarly slow growth, recording 1.6% growth per year between 2005 and 2010.

Compare this with the growth achieved by the major Asia Pacific and Middle Eastern airports (6.4% and 14.1% average annual growth respectively), and it is evident that the global focus has shifted away from the mature (perhaps saturated) markets with sluggish economies, congested infrastructure and constraining planning laws to emerging markets with surplus demand and fresh opportunities with fewer regulatory barriers to entry and growth.

Tighter regulation in EU and North America is designed to address a range of issues (for example security, unfair competition and environmental concerns) and has certainly delivered a much better aviation safety record and better consumer rights. The challenge for EU and North America is how to continue to deliver these benefits without impacting growth. The challenge for the rest of the world is how to grow at an accelerated rate in a safe and sustainable way.

Figure 1.18: Top 30 Global Airports by Region – Growth 2005 to 2010

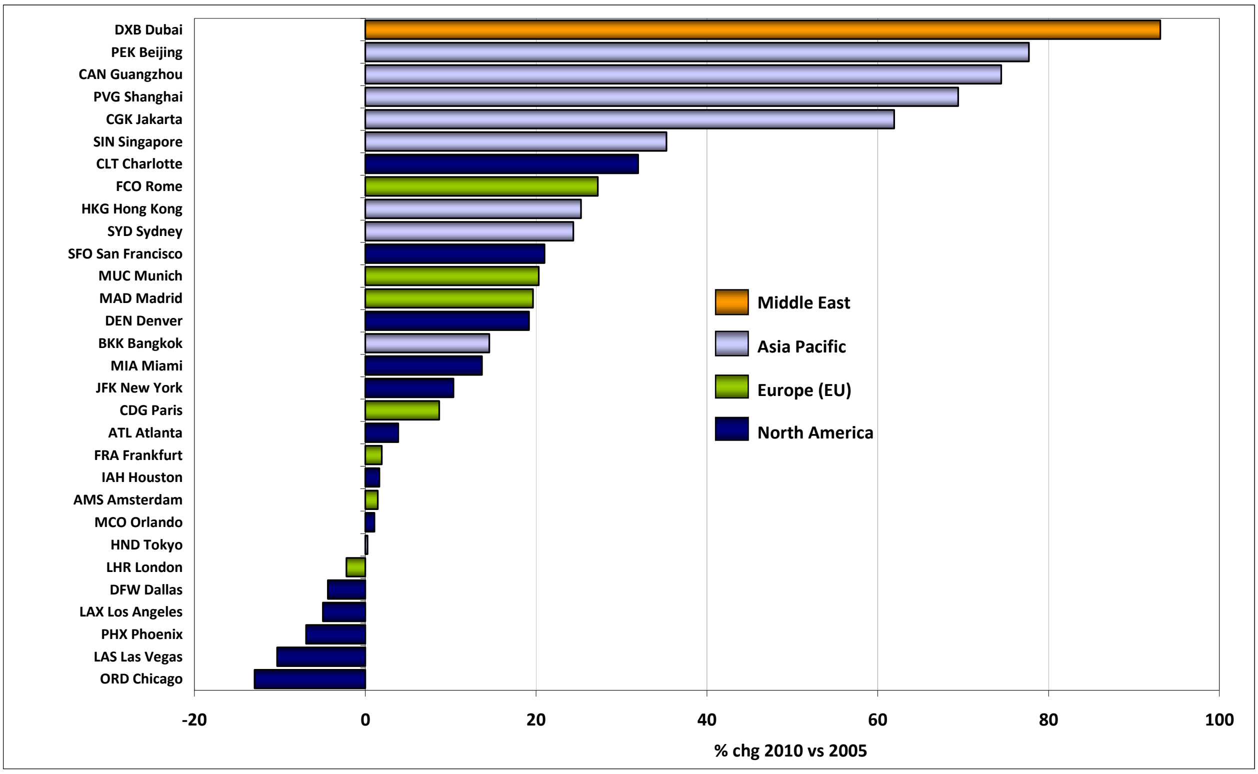


Source: ACI

Historical Growth by Worldwide Airport

Delving into individual airport detail allows further analysis of where growth and decline was focused between 2005 and 2010. Figure 1.19 below illustrates the rapid growth which has boosted the three Chinese airports of Beijing PEK, Guangzhou CAN and Shanghai PVG, while Dubai DXB has nearly doubled in the last five years. Other Asia Pacific airports at Jakarta CGK, Singapore SIN, Hong Kong HKG and Sydney SYD are also in the top ten. The different colours in Figure 1.19 represent the global regional groupings; the concentration of light blue bars near the top of the chart highlights the dominance of Asia Pacific airports in terms of growth. Conversely, of the six airports that have recorded declining passenger traffic levels between 2005 and 2010, five are located in North America.

Figure 1.19: Top 30 Global Airports – Growth 2005 to 2010



Source: ACI

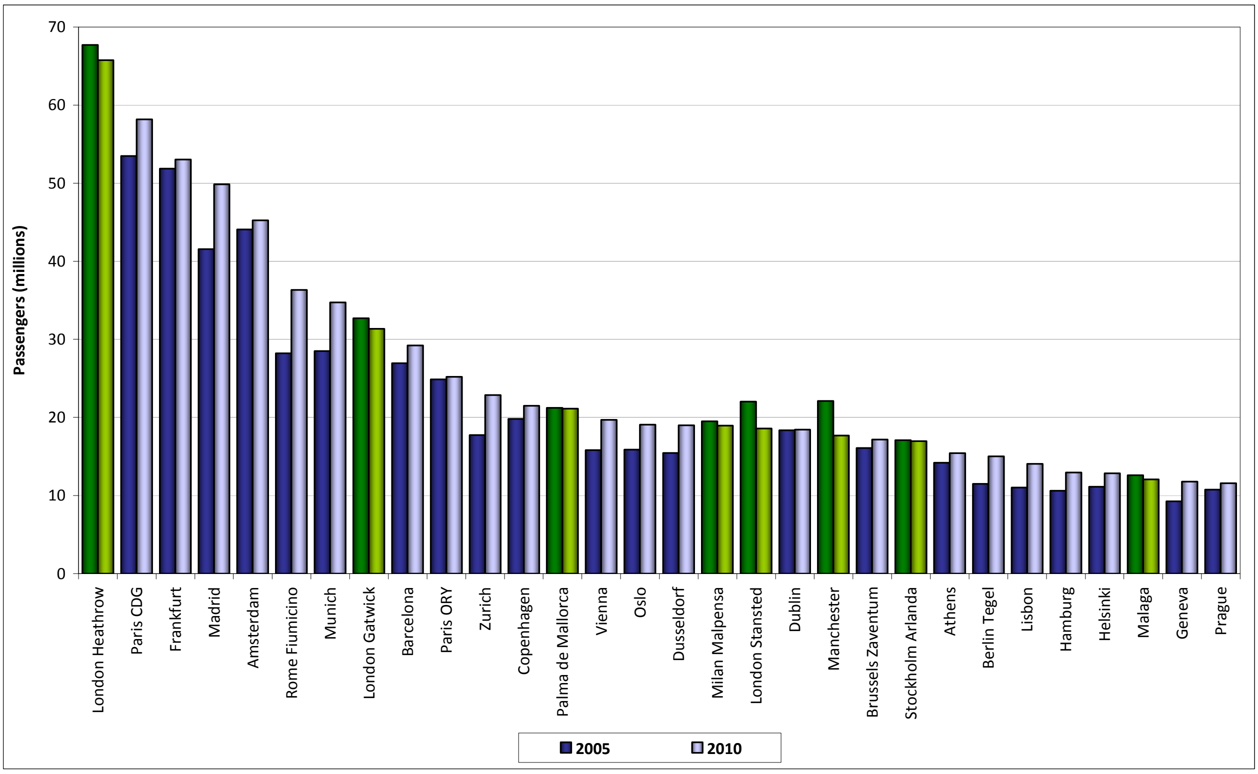
The prevailing reason for airport growth or decline is the underlying economic conditions in the origin country and, at an aggregate level, the region.

Asia Pacific is the growth region in terms of emerging economic strength and air travel demand increases in conjunction with this. The economies of North America and Europe are mature and growing at a far slower rate, reflected in the overall sluggish growth of air passenger traffic. There are notable exceptions however, such as Charlotte CLT, San Francisco SFO and Denver DEN in the United States; and Rome FCO, Munich MUC, and Madrid MAD in Europe. These airports have bucked the trend for a variety of reasons including a strong base airline, attraction of low cost carrier (LCC) services, increased infrastructure capacity, aggressive marketing and pricing policies, or a combination of these factors.

Historical Growth at Top 30 European Airports

According to ACI, of the top 30 European airports by passenger throughput in 2010, eight have declined since 2005 (Figure 1.20). Four of those are the top four UK airports, reflective of the UK being a mature air transport market but also of a constrained central policy on infrastructure expansion to relieve the heavily congested London airports of Heathrow and Gatwick. Manchester's network has been subject to increased competition from low cost services both at Manchester and surrounding airports, cannibalising charter services. A downsizing of its domestic operations has also impacted negatively on passenger traffic growth.

Figure 1.20: Top 30 European Airports by passengers in 2010 – Growth vs. 2005



Source: ACI

London Stansted, Stockholm Arlanda and Milan Malpensa have also suffered from competition from nearby airports and to some extent an over-reliance on LCCs to grow their traffic base. The economic downturn has hit LCC passengers more acutely as they are more price sensitive and liable to seek cheaper destinations or forego air travel altogether. The LCCs themselves have responded by concentrating more on cheaper markets and regions of higher growth. Palma de Mallorca has declined ostensibly due to its reliance on charter and LCC leisure traffic and has suffered as a result of competition from 'cheaper' Mediterranean destinations.

Table 1-8: Top 30 European Airports by Passengers – Historical Growth (millions)

Rank	Airport	Country	2005	2006	2007	2008	2009	2010	AAGR 05-10
1	London Heathrow	United Kingdom	67.69	67.34	67.86	66.91	65.91	65.75	-0.6%
2	Paris CDG	France	53.48	56.57	59.71	60.85	57.91	58.08	1.7%
3	Frankfurt	Germany	51.85	52.47	53.89	53.47	50.93	52.71	0.3%
4	Madrid	Spain	41.57	45.44	51.81	50.85	48.27	49.78	3.7%
5	Amsterdam	Netherlands	44.08	45.99	47.74	47.39	43.57	45.14	0.5%
6	Rome Fiumicino	Italy	28.21	29.73	32.48	35.23	33.81	35.95	5.0%
7	Munich	Germany	28.50	30.68	33.89	34.53	32.68	34.60	4.0%
8	London Gatwick	United Kingdom	32.70	34.09	35.17	34.16	32.36	31.35	-0.8%
9	Barcelona	Spain	26.94	29.84	32.81	30.21	27.31	29.17	1.6%
10	Paris ORY	France	24.85	25.62	26.43	26.21	25.11	25.20	0.3%
11	Zurich	Switzerland	17.75	19.06	20.63	22.10	21.93	22.79	5.1%
12	Copenhagen	Denmark	19.83	20.72	21.30	21.53	19.72	21.40	1.5%
13	Palma de Mallorca	Spain	21.22	22.39	23.21	22.83	21.20	21.10	-0.1%
14	Vienna	Austria	15.82	16.82	18.73	19.75	18.11	19.63	4.4%
15	Oslo	Norway	15.86	17.64	19.02	19.32	18.09	19.07	3.8%
16	Dusseldorf	Germany	15.43	16.55	17.81	18.15	17.79	18.94	4.2%
17	Milan Malpensa	Italy	19.50	21.62	23.72	19.22	17.55	18.71	-0.8%
18	London Stansted	United Kingdom	22.01	23.68	23.76	22.34	19.95	18.56	-3.3%
19	Dublin	Ireland	18.35	21.09	23.22	23.47	20.50	18.40	0.1%
20	Manchester	United Kingdom	22.10	22.14	21.90	21.06	18.63	17.68	-4.4%
21	Brussels Zaventum	Belgium	16.08	16.59	17.74	18.52	17.00	16.98	1.1%
22	Stockholm Arlanda	Sweden	17.10	17.54	17.91	18.14	16.06	16.96	-0.2%
23	Athens	Greece	14.20	14.97	16.41	16.47	16.23	15.30	1.5%
24	Berlin Tegel	Germany	11.50	11.79	13.35	14.49	14.18	14.99	5.4%
25	Lisbon	Portugal	11.01	12.13	13.24	13.60	13.26	14.04	5.0%
26	Hamburg	Germany	10.61	11.90	12.71	12.84	12.23	12.92	4.0%
27	Helsinki	Finland	11.13	12.14	13.14	13.44	12.59	12.87	2.9%
28	Malaga	Spain	12.59	13.01	13.55	12.75	11.62	12.00	-1.0%
29	Geneva	Switzerland	9.25	9.81	10.73	11.32	11.24	11.75	4.9%
30	Prague	Czech Republic	10.75	11.55	12.40	12.60	11.64	11.52	1.4%

Competitor airports outside ECAA

	Airport	Country	2005	2006	2007	2008	2009	2010*	AAGR 05-10
	Istanbul Ataturk	Turkey	19.29	21.27	23.20	28.55	29.76	32.14	10.8%
	Antalya	Turkey	15.86	14.64	17.71	18.79	18.35	22.01	6.8%
	Moscow Domodedovo	Russia	13.96	15.37	18.76	20.44	18.68	22.25	9.8%
	Moscow Sheremetyevo	Russia	12.10	12.74	14.00	15.15	14.77	19.28	9.8%

Source: ACI

Outside of the European Common Aviation Area and competing against European airports, among the most successful airports in the last five years in terms of passenger traffic growth are Turkish and Russian (see Table 1-8), for different reasons. Russia has been very active in increasing bilateral agreements[19] to cope with the surge in outbound air travel demand created by the Russian population's new found propensity to fly – Moscow has also grown as a business/commercial centre, reflected in Russia's GDP growth.

With reference to Turkey, the country has also witnessed impressive economic growth reflected in Istanbul's pre-eminence as a business hub in the region, with Atatürk Airport growing as a result of Turkish Airlines' rapid expansion and evolution into a leading carrier. Antalya has benefited from its ability to attract

[19] At the time of publication of this report, several European Union Member States (Belgium, Denmark, Italy, Luxembourg, the Netherlands, Sweden and the UK) were facing legal challenges from the European Commission over the legality of their air service agreements with Russia due to alleged infringement of the EC's 'EU designation clause'.

increasing volumes of visitors, being a prominent destination for international tourism. Rome Fiumicino airport has seen significant growth courtesy of base carrier Alitalia's expansion in 2010.

1.4.4 Trends in Average Passengers per ATM

The nature and role of an airport dictates the aircraft mix and thus the level of average number of passengers per air transport movement it is likely to achieve – whether it is an international gateway, domestic hub, point-to-point or regional airport.

Where airports are runway capacity constrained, passenger throughput can be grown by increasing the average passengers per air transport movement. By altering the aircraft mix at an airport to include a greater proportion of high seat density widebodies, for example, an airport's passenger volume can grow without significantly increasing the number of movements.

However, this is not a panacea for capacity constrained major hub airports, as there are commercial limitations on the optimum mix of aircraft by the nature of the way a hub airport needs short-haul connecting services to feed long-haul routes. Increasing the average number of passengers per movement by introducing larger aircraft at an airport cannot happen indefinitely – there is a threshold.

To investigate this further, the evolution of average passengers per ATM at the top thirty global airports, ranked by passenger volume in 2010, has been analysed in Table 1-9 below.

Table 1-9: Top 30 Global Airports Ranked by Passenger Volume – Passengers per ATM

Rank	Airport / City	Code	2003	2004	2005	2006	2007	2008	2009	2010	% change 2010 vs. 2003
1	Atlanta	ATL	120	87	88	87	90	93	91	94	-21.5
2	Beijing	PEK	103	114	120	129	134	130	134	143	38.2
3	Chicago	ORD	77	78	81	82	84	79	79	76	-1.6
4	**London Heathrow**	**LHR**	**138**	**143**	**143**	**143**	**143**	**141**	**143**	**145**	**4.7**
5	Tokyo	HND	210	205	205	204	201	197	184	187	-11.1
6	Los Angeles	LAX	94	99	101	100	101	102	107	102	8.4
7	**Paris**	**CDG**	**95**	**99**	**104**	**106**	**110**	**110**	**112**	**116**	**22.5**
8	Dallas/Fort Worth	DFW	109	114	122	87	88	120	119	87	-20.3
9	**Frankfurt**	**FRA**	**107**	**108**	**108**	**109**	**111**	**111**	**111**	**114**	**7.0**
10	Denver	DEN	77	77	79	81	82	83	83	83	7.3
11	Hong Kong	HKG	145	155	154	157	160	159	164	160	10.3
12	**Madrid**	**MAD**	**93**	**96**	**100**	**105**	**107**	**108**	**110**	**115**	**23.7**
13	Dubai	DXB	115	119	124	132	145	152	156	154	33.2
14	New York	JFK	117	123	123	115	109	110	112	117	0.3
15	**Amsterdam**	**AMS**	**101**	**105**	**109**	**109**	**110**	**111**	**111**	**112**	**10.9**
16	Jakarta	CGK	100	105	110	116	124	123	130	142	42.2
17	Bangkok	BKK	145	148	139	147	151	151	154	158	9.5
18	Singapore	SIN	150	155	150	156	160	156	150	157	4.4
19	Guangzhou	CAN	107	112	111	112	118	119	120	124	16.5
20	Shanghai	PVG	114	119	116	116	115	107	112	124	8.5
21	Houston	IAH	75	73	73	74	74	75	76	76	2.2
22	Las Vegas	LAS	89	88	82	82	86	82	86	78	-12.7

Rank	Airport / City	Code	2003	2004	2005	2006	2007	2008	2009	2010	% change 2010 vs. 2003
23	San Francisco	SFO	91	95	97	104	105	106	106	101	11.0
24	Phoenix	PHX	77	81	82	83	85	85	87	86	10.9
25	Charlotte	CLT	57	59	58	63	68	69	71	72	26.3
26	**Rome**	**FCO**	**86**	**91**	**93**	**96**	**99**	**102**	**105**	**110**	**27.5**
27	Sydney	SYD	106	108	109	115	120	117	121	117	10.0
28	Miami	MIA	78	79	83	86	88	92	98	95	22.1
29	Orlando	MCO	100	107	104	107	108	113	119	113	13.4
30	**Munich**	**MUC**	**72**	**74**	**76**	**79**	**83**	**84**	**87**	**89**	**23.5**

Source: ACI

The figures would suggest that London Heathrow – the ultimate example of a capacity constrained hub – has reached its threshold in average number of passengers per ATM. Between 2004 and 2009, passengers per movement remained at the same level at the UK's premier airport. In order to run a successful hub operation at Heathrow, there is an optimum balance of short-haul versus long-haul traffic – too many long-haul flights (thus larger aircraft) will not allow sufficient short-haul feeder traffic. At other major EU hubs like Paris CDG, Amsterdam, Frankfurt and Madrid, runway capacity and available slots are less of an issue; so there are ample slots to accommodate growth of both short-haul and long-haul flights, meaning average aircraft size can be increased without compromising the effective 'hub and spoke' operation.

Major airports in the Asia Pacific region, such as Beijing, Guangzhou and Jakarta have experienced rapid passenger traffic growth in the last eight years on the back of increasing the average number of passengers per movement – a reflection on the changing nature of these airports from regional hubs to international hubs; and the subsequent expansion of long-haul route networks utilising larger aircraft. Dubai in the Middle East has grown for ostensibly the same regions, with base carrier Emirates operating an almost exclusively widebody aircraft fleet.

In terms of passengers per ATM, North American airports in Table 1-9 paint a mixed picture, with growth in average passengers per movement highly dependent upon the nature of operations. JFK International Airport in New York, an international gateway and business destination, appears to have reached its threshold – in 2010 passengers per movement dropped back to 2003 levels. Airlines serving this hub airport rely on higher frequencies rather than dense passenger loads to satisfy the high proportion of premium passengers. Airports such as Atlanta, Dallas/Fort Worth and Las Vegas have all experienced a decrease in passengers per movement due to an increasing proportion of regional services operated with smaller narrowbody aircraft. At the same time, airports such as Miami, Charlotte and Phoenix have introduced more long-haul services with larger aircraft, resulting in increases in average passengers per ATM.

It is also worth noting that the global fleet of high seat-capacity Boeing 747s has been declining in recent years as the aircraft is slowly being 'phased out' with the introduction of more modern widebody aircraft into the global fleet. London Heathrow and Tokyo Haneda airports have both mirrored this trend, but it has been reflected differently in each airport's average passengers per ATM figure. At Heathrow, a rise in the operation of other widebody aircraft types such as the Boeing 777 and Airbus A380 has offset the decline in B747 usage, thus the average aircraft size has remained fairly constant. At Haneda, however, while B747 operations have dramatically reduced, this has been coupled with a steep rise in single-aisle aircraft operations (B737 and A320 in particular) leading to a decreasing trend in average passengers per ATM.

On average, major airports in Asia Pacific (represented in Table 1-9) had a higher average passenger per movement ratio in 2010 than other regions, reflecting the greater prevalence of widebody aircraft operated by major global network airlines on long-haul routes connecting the major Asian cities – Tokyo, Hong Kong, Singapore, Jakarta, Bangkok, Beijing – to European, North American and Middle Eastern destinations. It is also a reflection on the region's economic growth and latent air travel demand being satisfied by more liberal regulatory regimes creating a more competitive environment, increasing efficiencies of operation and driving up passenger load factors.

1.5 Airline Passenger Traffic

1.5.1 Growth of Passenger Traffic in 2010

At the time of report production, data available from IATA on airline traffic concentrates on growth rather than actual figures. This section therefore addresses trends in airline traffic growth rather than reporting on absolute numbers.

IATA reported that in 2010 its member airlines recorded demand for scheduled air traffic showing an 8.2% increase in passenger business. Demand growth outstripped a seat capacity increase of 4.4%. The average passenger load factor for the year was 78.4%, representing a 2.7 percentage point improvement on 2009.

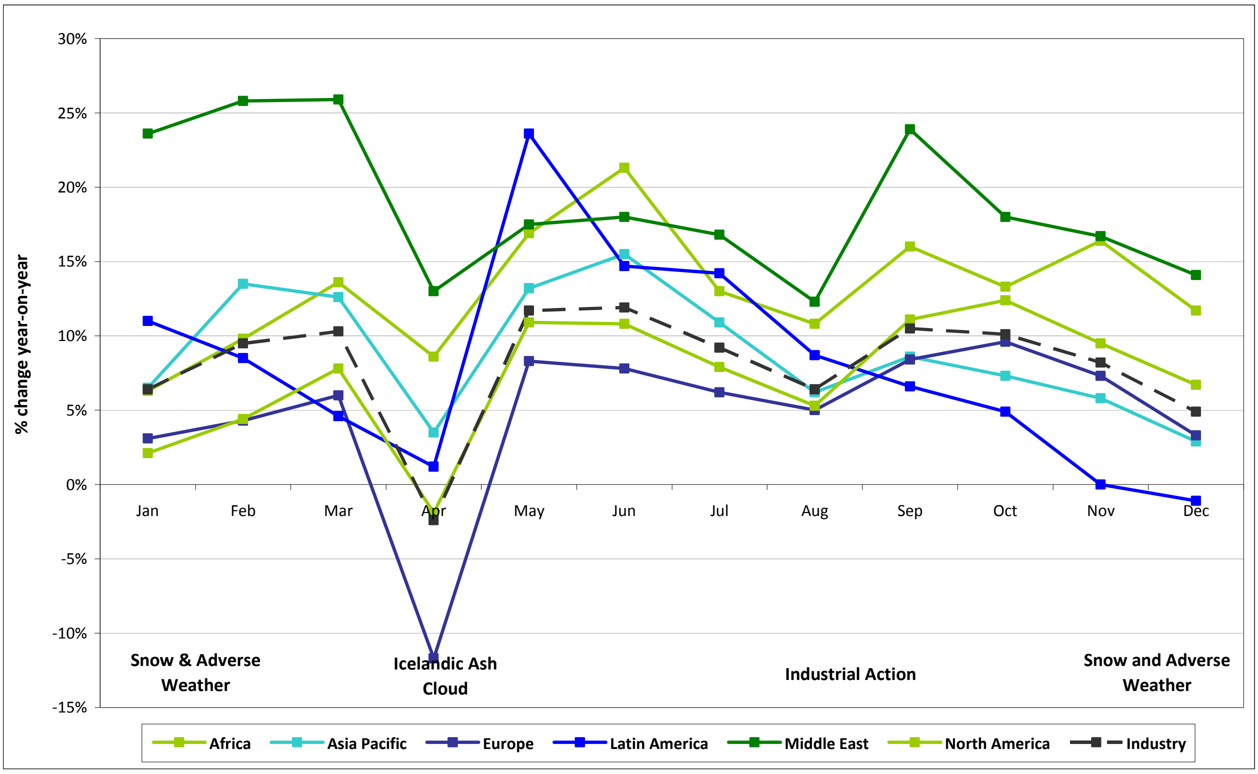
Table 1-10: Summary of Air Passenger Traffic growth by Region in 2010 vs. 2009

	Africa	Asia Pacific	Europe	Latin America	Middle East	North America	Industry
Revenue Passenger Kilometres (RPK)	12.9%	9.0%	5.1%	8.2%	17.8%	7.4%	8.2%
Available Seat Kilometres (ASK)	9.6%	3.6%	2.6%	2.9%	13.2%	3.9%	4.4%

Source: IATA

Demand for air travel in 2010 proved strong and resilient despite the impact of the Icelandic volcano eruption in April which caused a huge downward swing in demand across all regions, but felt particularly acutely in Europe as airspace closed for several days. Severe weather in Europe and North America in December also put a dent in the industry's recovery.

Figure 1.21: Revenue Passenger Kilometre (RPK) growth of IATA Airlines by Region 2010 vs. 2009



Source: IATA

Asia Pacific carriers recorded a 9% year-on-year increase in passenger demand in 2010. The economies of China and India continue to lead the region's recovery.

European carriers saw year-on-year passenger demand increase 5.1%. This is double the capacity increase of 2.6% which shored up the passenger load factor at 79.4%. But the continent's economic uncertainty and continuing debt crisis limited yield improvements. Moreover, Europe was the hardest hit by April's ash cloud and December's severe weather which slowed demand growth.

North American carriers recorded year-on-year increases in passenger demand of 7.4% in 2010. A key feature in 2010 was the capacity discipline, where full year capacity was up by just 3.9% resulting in a passenger load factor at 82.2% for the full year (up from 79.6% in 2009).

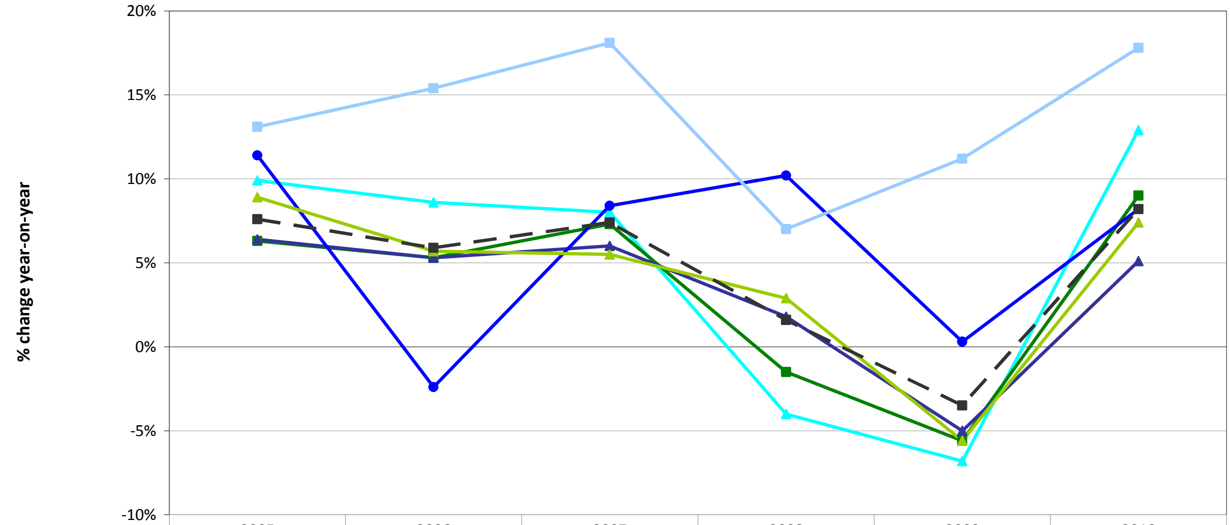
Middle Eastern carriers reported the strongest full year growth at 17.8% on the back of a 13.2% capacity increase, fuelled largely by aircraft deliveries to Gulf-based airlines – illustrating the structural shift that is taking place in the industry as a result of the region's expansion. Load factors for the region showed a three percentage point increase to 76.0%.

Latin American carriers saw the whole year demand grow 8.2% over 2009; and almost 8% more than pre-recession levels in 2008.

African carriers experienced a sharp rebound of nearly 12.9% in 2010, although load factors remained well below the industry average at 69.1%.

1.5.2 Historical Growth in Passenger Traffic

Figure 1.22: Historical RPKs by Region



	2005	2006	2007	2008	2009	2010
Africa	9.9%	8.6%	8.0%	-4.0%	-6.8%	12.9%
Asia Pacific	6.3%	5.3%	7.3%	-1.5%	-5.6%	9.0%
Europe	6.4%	5.3%	6.0%	1.8%	-5.0%	5.1%
Latin America	11.4%	-2.4%	8.4%	10.2%	0.3%	8.2%
Middle East	13.1%	15.4%	18.1%	7.0%	11.2%	17.8%
North America	8.9%	5.7%	5.5%	2.9%	-5.6%	7.4%
Industry	7.6%	5.9%	7.4%	1.6%	-3.5%	8.2%

Source: IATA

Figure 1.22 shows that since 2005, in broad terms, Middle Eastern airlines have been growing at the fastest pace followed by Latin American carriers (barring an exceptional decline in 2006). The growth of European, North American and Asia Pacific airlines have been fairly closely aligned, experiencing similar demand peaks and troughs over the five years from 2005. It is noteworthy that all regions suffered declining demand in 2009 when the global economic recession was at full pace, apart from the Middle East which is undergoing rapid expansion with Emirates, Etihad and Qatar Airways leading the growth.

1.5.3 The Top 30 Major Airlines Worldwide

From an analysis of 2010 traffic statistics of major airlines from four of the worlds' regions, a trend emerges that supports the underlying assumption that the focus of air travel demand growth is shifting away from the mature markets towards the emerging expanding markets. The top 30 of those airlines have been ranked according to RPK volume and RPK growth (see Table 1-11 below).

Table 1-11: Top 30 Global Airlines by RPK in 2010 (billion)

Rank	Airline	Region	RPK (m)	% YoY		Airline	Region	RPK (m)	% YoY
1	Delta Air Lines	North America	310,876	2.3		China Eastern	Asia Pacific	93,053	52.8
2	United Continental	North America	297,053	2.3		Aeroflot	Outside ECAA	34,777	33.8
3	Air France-KLM	Europe (EU)	203,115	0.5		SkyWest Airlines	North America	32,548	20.5
4	American Airlines	North America	201,883	2.5		China Southern	Asia Pacific	111,306	19.7
5	Lufthansa	Europe (EU)	129,443	4.8		TAM Linhas Aereas	Latin America	50,603	19.5
6	Southwest Airlines	North America	125,583	6.1		Turkish Airlines	Outside ECAA	46,313	18.7
7	China Southern	Asia Pacific	111,306	19.7		Air China	Asia Pacific	86,194	16.7
8	Qantas	Asia Pacific	106,335	3.7		Alitalia	Europe (EU)	32,942	16.0
9	British Airways	Europe (EU)	106,009	-5.7		Malaysia Airlines	Asia Pacific	37,838	15.0
10	Cathay Pacific	Asia Pacific	96,588	8.6		LAN Airlines	Latin America	33,145	11.1
11	US Airways	North America	94,911	1.9		Alaska Airlines	North America	32,747	10.4
12	China Eastern	Asia Pacific	93,053	52.8		Korean Air	Asia Pacific	60,553	9.8
13	Air China	Asia Pacific	86,194	16.7		JetBlue Airways	North America	45,508	9.0
14	Singapore Airlines	Asia Pacific	84,910	4.1		Cathay Pacific	Asia Pacific	96,588	8.6
15	Air Canada	North America	83,484	8.3		Air Canada	North America	83,484	8.3
16	Japan Airlines	Asia Pacific	66,456	-10.2		Southwest Airlines	North America	125,583	6.1
17	Korean Air	Asia Pacific	60,553	9.8		Thai Airways	Asia Pacific	55,677	5.9
18	All Nippon Airways	Asia Pacific	58,725	5.6		All Nippon Airways	Asia Pacific	58,725	5.6
19	Thai Airways	Asia Pacific	55,677	5.9		Lufthansa	Europe (EU)	129,443	4.8
20	Iberia	Europe (EU)	51,159	3.2		Singapore Airlines	Asia Pacific	84,910	4.1
21	TAM Linhas Aereas	Latin America	50,603	19.5		Qantas	Asia Pacific	106,335	3.7
22	Turkish Airlines	Outside ECAA	46,313	18.7		Iberia	Europe (EU)	51,159	3.2
23	JetBlue Airways	North America	45,508	9.0		American Airlines	North America	201,883	2.5
24	Virgin Atlantic	Europe (EU)	38,158	-2.8		Delta Air Lines	North America	310,876	2.3
25	Malaysia Airlines	Asia Pacific	37,838	15.0		United Continental	North America	297,053	2.3
26	Aeroflot	Outside ECAA	34,777	33.8		US Airways	North America	94,911	1.9
27	LAN Airlines	Latin America	33,145	11.1		Air France-KLM	Europe (EU)	203,115	0.5
28	Alitalia	Europe (EU)	32,942	16.0		Virgin Atlantic	Europe (EU)	38,158	-2.8
29	Alaska Airlines	North America	32,747	10.4		British Airways	Europe (EU)	106,009	-5.7
30	SkyWest Airlines	North America	32,548	20.5		Japan Airlines	Asia Pacific	66,456	-10.2

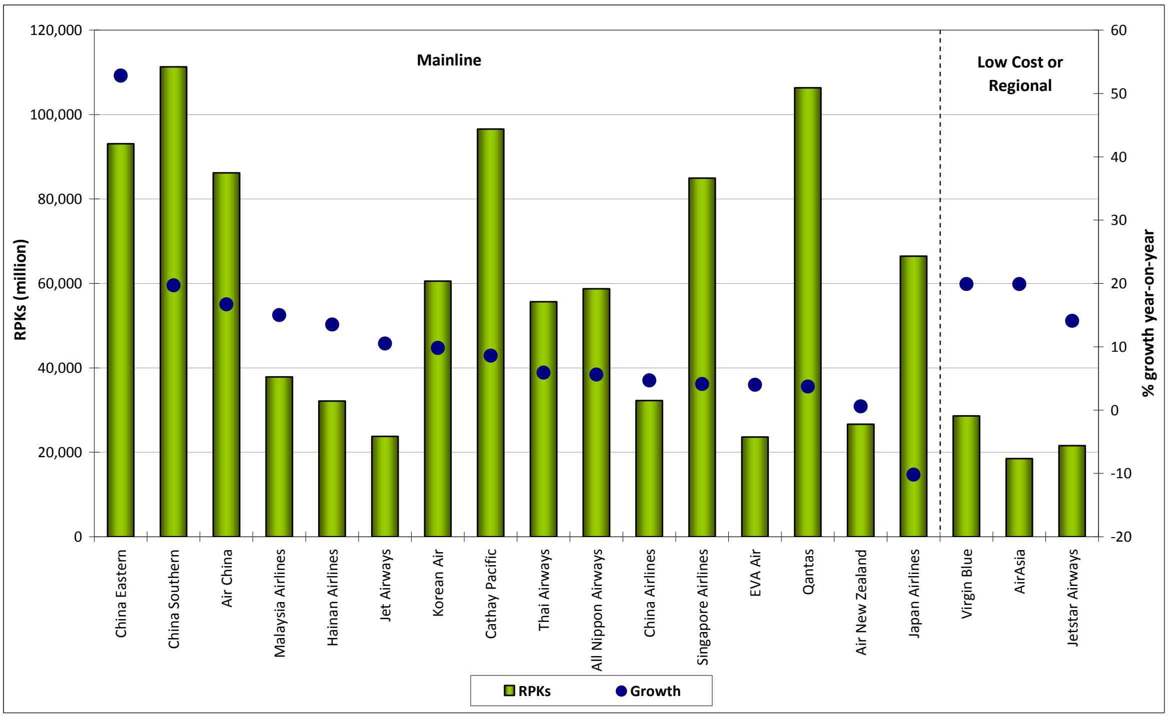
Source: Compiled from Airline Business March 2011 edition, sourced from Flightglobal Insight. (Left hand table by RPK, right hand table by growth)

Although the top six airlines in the analysis by RPK volume are North American or European, those carriers rank lowly on RPK growth achieved in 2010. However, Asia Pacific carriers claim half of the top twenty in terms of volume and those airlines have also been growing strongly – especially Chinese carriers.

Asia Pacific – Major Airlines Growth in 2010

It is perhaps no surprise that the top three major Asia Pacific mainline carriers in terms of RPK growth in 2010 over 2009 are from China, on the back of aggressive network expansion plans from the base hub airports of Beijing, Shanghai and Guangzhou. Asia Pacific's low cost and regional carriers have also grown significantly. Japan Airlines was alone among the major Asia Pacific carriers in recording a decline. It filed for bankruptcy protection in 2010 and is currently operating under a restructuring programme with a reduced network

Figure 1.23: Asia Pacific Airlines RPK Growth in 2010



Source: Compiled from Airline Business March 2011 edition, sourced from Flightglobal Insight

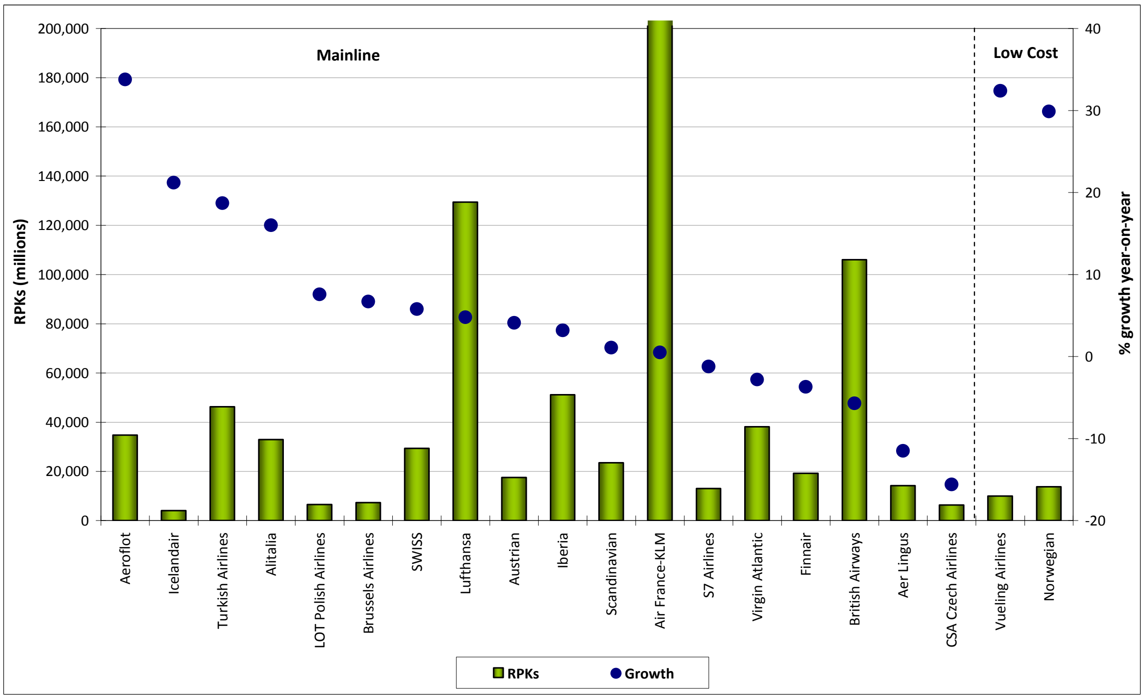
Europe – Major Airlines Growth in 2010

The major European mainline carriers presented a mixed bag of traffic results in 2010. The largest operators in the region (Air France-KLM, Lufthansa, British Airways and Iberia) recorded sluggish growth or decline, with Lufthansa faring best with a 4.8% growth in RPKs year-on-year and British Airways ending 2010 with a 5.7% contraction in traffic.

A familiar trend reappears with Russian and Turkish operators outperforming the traditional legacy carriers in Europe, with Aeroflot and Turkish Airlines achieving 34% and 19% growth respectively. The two low cost carriers Vueling and Norwegian Air Shuttle have both posted 30% growth, signalling that the European low fares market has more capacity for expansion.

It must be noted that the largest European LCCs of Ryanair, easyJet and Air Berlin are omitted from this analysis due to lack of RPK data, but did record passenger growth of 9%, 13% and 3% respectively, supporting the assumption that the low fares market in Europe has not reached maturity.

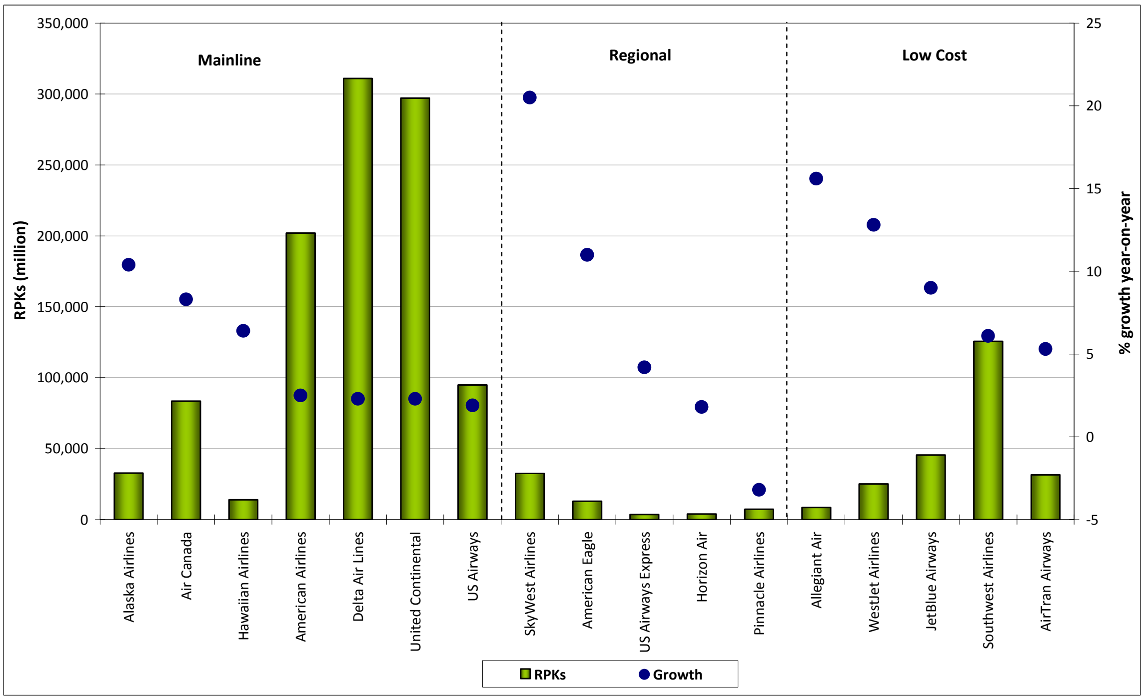
Figure 1.24: European Airlines RPK Growth in 2010



Source: Compiled from Airline Business March 2011 edition, sourced from Flightglobal Insight

North America – Major Airlines Growth in 2010

Figure 1.25: North American Airlines RPK Growth in 2010

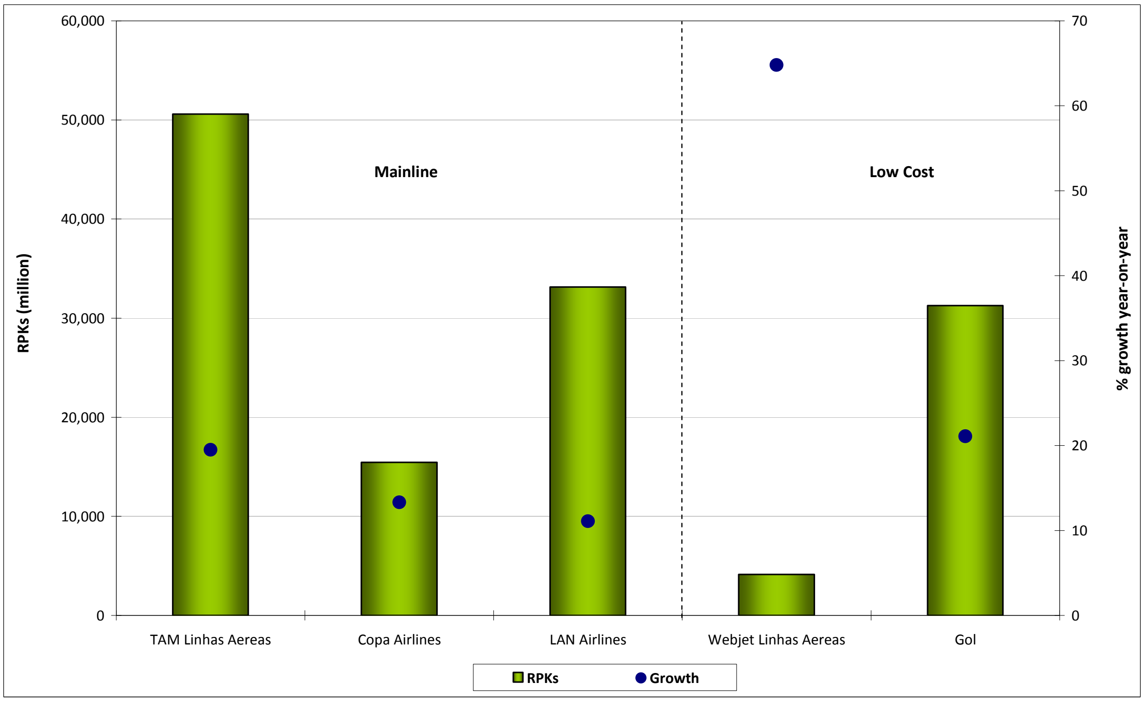


Source: Compiled from Airline Business March 2011 edition, sourced from Flightglobal Insight

The characteristics of the North American airline scene are similar to Europe, in that the major mainline carriers of Delta, United Continental, American and US Airways reported flat growth in 2010 (albeit positive), which presents a stark contrast to 2009. The main drivers of growth in 2010 were the regional and low cost carriers, albeit from small traffic bases. LCCs continue to bite into U.S. domestic market share at the expense of mainline operators.

Latin America – Major Airlines Growth in 2010

Figure 1.26: Latin American Airline RPK Growth in 2010



Source: Compiled from Airline Business March 2011 edition, sourced from Flightglobal Insight

The major Latin American carriers have experienced robust growth in RPKs in 2010 over 2009. The largest carrier, Brazilian mainline operator TAM, has grown an exceptional 20% due in large part to the underlying economic conditions in Brazil and its international market supremacy. Also benefiting from Brazil's increasing prosperity is Gol, the LCC with major domestic coverage and an increasing domestic market share.

1.5.4 European Route Network

An analysis of all scheduled air services within (OAG-defined) Europe shows that seat capacity on Intra-European Union routes has increased steadily in 2010, 2.6% higher than in 2009. However, this growth is at a slower pace when compared with seat capacity on Total Intra-European routes, which have increased at an average of 3.3% overall.

Table 1.12 illustrates that Intra-EU seat capacity accounts for 89% of the Intra-European total in 2010, with EU-Non EU services representing 11%.

Table 1.12: Seat Capacity change on Intra-European routes in 2010 versus 2009

	2009	2010	% Growth	No. of Competitors on routes in 2010
Intra-EU	634,391,864	650,844,684	2.6%	220
of which Domestic:	*493,050,050*	*495,767,578*	*0.5%*	
EU-Non EU	73,664,737	80,579,730	9.4%	129
Total Intra-Europe	708,056,601	731,424,414	3.3%	300
EU-Rest of World	871,557,736	907,269,678	4.1%	432

Source: OAG

Note: EU = EU27: Non-EU = Albania; Belarus; Bosnia & Herzegovina; Croatia; Iceland; Macedonia; Moldova; Montenegro; Norway; Serbia; Switzerland; Ukraine: Rest of World = all other.

On the top 30 Intra-EU routes by seat capacity in 2010, growth rates have varied. Of these routes, 20 were domestic and 10 were international operations.

Table 1.13: Seat Capacity change on Intra-EU routes in 2010 versus 2009

Rank	Route	2009	2010	% Growth
1	Madrid - Barcelona	6,761,094	6,578,088	-2.7%
2	Paris ORY - Toulouse	3,142,715	3,270,057	4.1%
3	Rome FCO - Milan LIN	3,379,075	2,821,660	-16.5%
4	Paris ORY - Nice	2,763,274	2,814,603	1.9%
5	Rome FCO - Catania	2,671,899	2,798,460	4.7%
6	Rome FCO - Palermo	2,486,802	2,483,212	-0.1%
7	Frankfurt - Berlin	2,331,788	2,481,308	6.4%
8	Munich - Dusseldorf	2,378,504	2,416,030	1.6%
9	Munich - Hamburg	2,360,168	2,398,644	1.6%
10	Munich - Berlin	2,254,898	2,371,564	5.2%
11	Frankfurt - Hamburg	1,888,194	2,345,828	24.2%
12	Madrid - Palma Mallorca	2,535,885	2,282,021	-10.0%
13	Barcelona - Palma Mallorca	2,342,731	2,228,369	-4.9%
14	London LHR - Dublin	2,251,833	2,123,951	-5.7%
15	London LHR - Paris CDG	1,978,223	1,953,962	-1.2%
16	Athens - Thessaloniki	2,187,288	1,946,555	-11.0%
17	London LHR - Amsterdam	2,086,095	1,937,476	-7.1%
18	Madrid - Las Palmas	2,036,625	1,924,881	-5.5%
19	Munich - Cologne	1,894,762	1,912,133	0.9%
20	London LHR - Frankfurt	1,889,733	1,904,708	0.8%
21	London LHR - Edinburgh	1,731,550	1,795,579	3.7%
22	Frankfurt - Paris CDG	1,669,019	1,746,216	4.6%
23	Madrid - Lisbon	1,688,830	1,743,698	3.2%
24	Madrid - Rome FCO	1,508,579	1,717,016	13.8%
25	Paris CDG - Rome FCO	1,975,973	1,715,884	-13.2%
26	London LHR - Madrid	1,701,979	1,700,897	-0.1%
27	Stockholm - Copenhagen	1,531,033	1,685,920	10.1%
28	Tenerife - Las Palmas	1,552,995	1,647,404	6.1%

Rank	Route	2009	2010	% Growth
29	Berlin - Cologne	1,728,281	1,644,394	-4.9%
30	Rome FCO - Turin	1,573,193	1,594,799	1.4%

Source: OAG

Table 1.13 highlights some notable discrepancies in growth across the continent's major routes.

The top Intra-EU route, Madrid-Barcelona, declined in 2010 year-on-year by 2.7% as Air Europa's capacity cuts were only slightly offset by Vueling Airlines' increase in seats on the Spanish domestic trunk operation. Also of note, Rome FCO-Milan LIN, 2010's third densest Intra-EU route, suffered a 16.5% drop in capacity due to the cessation of services by Air One.

The top 30 domestic Intra-EU route achieving highest growth in 2010 was Frankfurt-Hamburg (+24%), where Air Berlin increased seat capacity by over 400% to boost figures. Frankfurt-Berlin also performed well (+6.4%) on the back of increased capacity by Air Berlin.

The top international Intra-EU route in terms of growth in 2010 versus 2009 was Madrid-Rome Fiumicino (+13.8%) where easyJet significantly increased seat capacity by nearly 500%. Notably, all international routes involving London Heathrow in Table 1.13 suffered declines in 2010 versus 2009, barring the London LHR-Frankfurt service. Bmi British Midland's capacity cuts at Heathrow were the primary cause of declines on the Heathrow-Dublin and –Amsterdam routes.

Table 1.14 analyses seat capacity growth on the top 30 routes between EU and Non EU airports.

Table 1.14: Seat Capacity change on EU-Non EU routes in 2010

Rank	Route	2009	2010	% Growth
1	Oslo - Copenhagen	1,613,842	1,650,751	2.3%
2	Oslo - Stockholm	1,457,173	1,531,374	5.1%
3	Geneva - London LHR	871,641	1,345,962	54.4%
4	Zurich - London LHR	1,321,473	1,303,043	-1.4%
5	Zurich - Vienna	1,089,900	1,193,802	9.5%
6	Zurich - Berlin	985,752	1,133,010	14.9%
7	Geneva - Paris CDG	1,188,865	1,084,478	-8.8%
8	Zurich - Paris CDG	1,051,900	1,073,392	2.0%
9	Zurich - Dusseldorf	1,019,320	1,068,663	4.8%
10	Zurich - Frankfurt	1,004,443	1,043,958	3.9%
11	Oslo - London LHR	942,701	937,056	-0.6%
12	Zurich - Amsterdam	886,497	897,136	1.2%
13	Zurich - Hamburg	851,688	862,681	1.3%
14	Oslo - Amsterdam	813,202	798,402	-1.8%
15	Geneva - Amsterdam	737,564	760,260	3.1%
16	Geneva - Frankfurt	702,349	750,806	6.9%
17	Oslo - Frankfurt	722,070	707,764	-2.0%
18	Geneva - London LGW	706,583	701,445	-0.7%
19	Zurich - Madrid	678,457	692,749	2.1%
20	Geneva - Brussels	657,239	691,138	5.2%

Rank	Route	2009	2010	% Growth
21	Zurich - Copenhagen	609,322	645,666	6.0%
22	Zurich - Munich	593,376	626,008	5.5%
23	Zurich - London City	602,467	609,836	1.2%
24	Reykjavik - Copenhagen	531,407	586,095	10.3%
25	Geneva - Madrid	572,936	583,467	1.8%
26	Bergen - Copenhagen	445,530	551,140	23.7%
27	Geneva - Barcelona	449,186	542,340	20.7%
28	Zurich - Hannover	503,366	507,279	0.8%
29	Oslo - Helsinki	409,814	506,622	23.6%
30	Geneva - Lisbon	465,537	497,321	6.8%

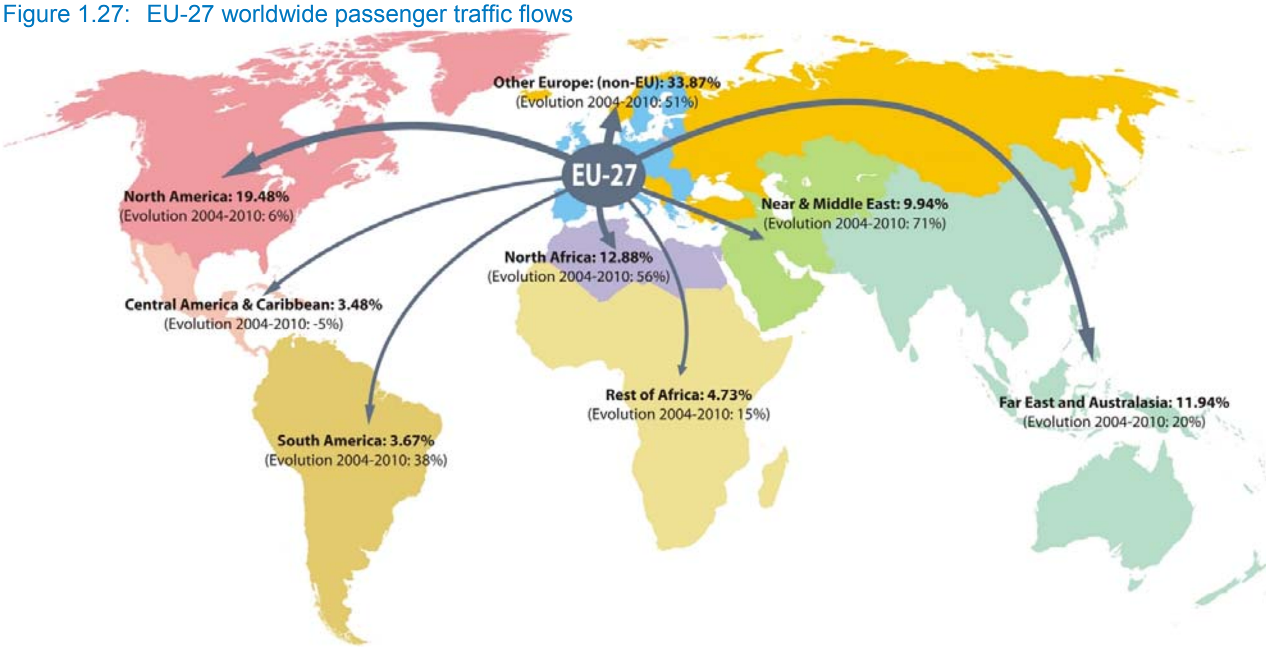
Source: OAG

The highest growth was achieved on the Geneva-London Heathrow route, a significant 54% more seats in 2010 compared to 2009. This is ostensibly a result of SWISS ramping up services. The Zurich-Berlin route also performed well in 2010, recording growth of 15% over 2009, as both Air Berlin and SWISS increase seat capacity. Significant increases by easyJet on the Geneva-Barcelona route and Norwegian Air Shuttle on the Oslo-Helsinki route have facilitated growth of over 20% on these routes in 2010.

Although the overall picture was one of positive growth on routes between EU and Non-EU airports in 2010, there were a handful of capacity cuts. Most notable is the 9% decline in seat capacity on the Geneva-Paris CDG route, ostensibly due to Air France cutting back.

Figure 1.27 shows the market share of international passenger flows from the European Union, and the associated growth between 2004 and 2010. EU-27 to Other Europe (Non-EU) is the largest international market with nearly 34% share and has grown by 50% since 2004.

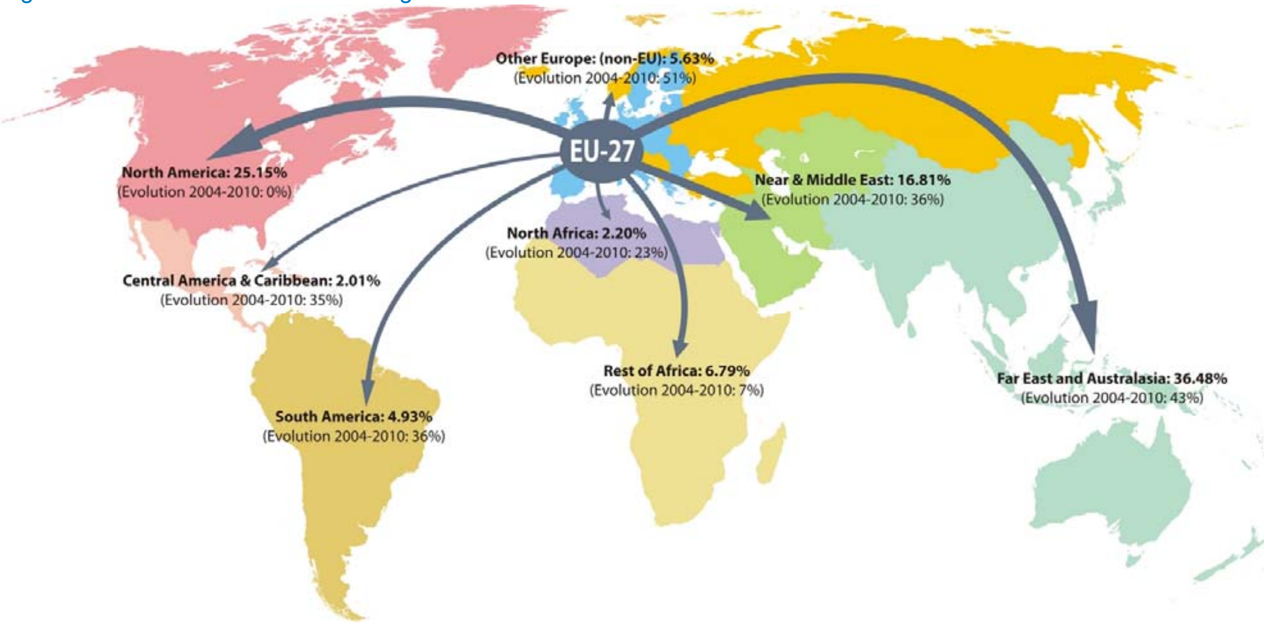
Figure 1.27: EU-27 worldwide passenger traffic flows



Source: Eurostat

Figure 1.28 illustrates the market share of international air cargo traffic flows from the EU. Asia-Pacific (Far East and Australasia) is the dominant market, commanding over 36% share and growing strongly (43% between 2004 and 2010).

Figure 1.28: EU-27 worldwide air cargo traffic flows



Source: Eurostat

1.6 Air Cargo Traffic Growth

1.6.1 Air Cargo by Global Region

At the time of report production, data available from IATA on air cargo traffic in 2010 concentrates on growth rather than actual figures. This section therefore addresses trends in air cargo traffic growth rather than reporting on absolute numbers.

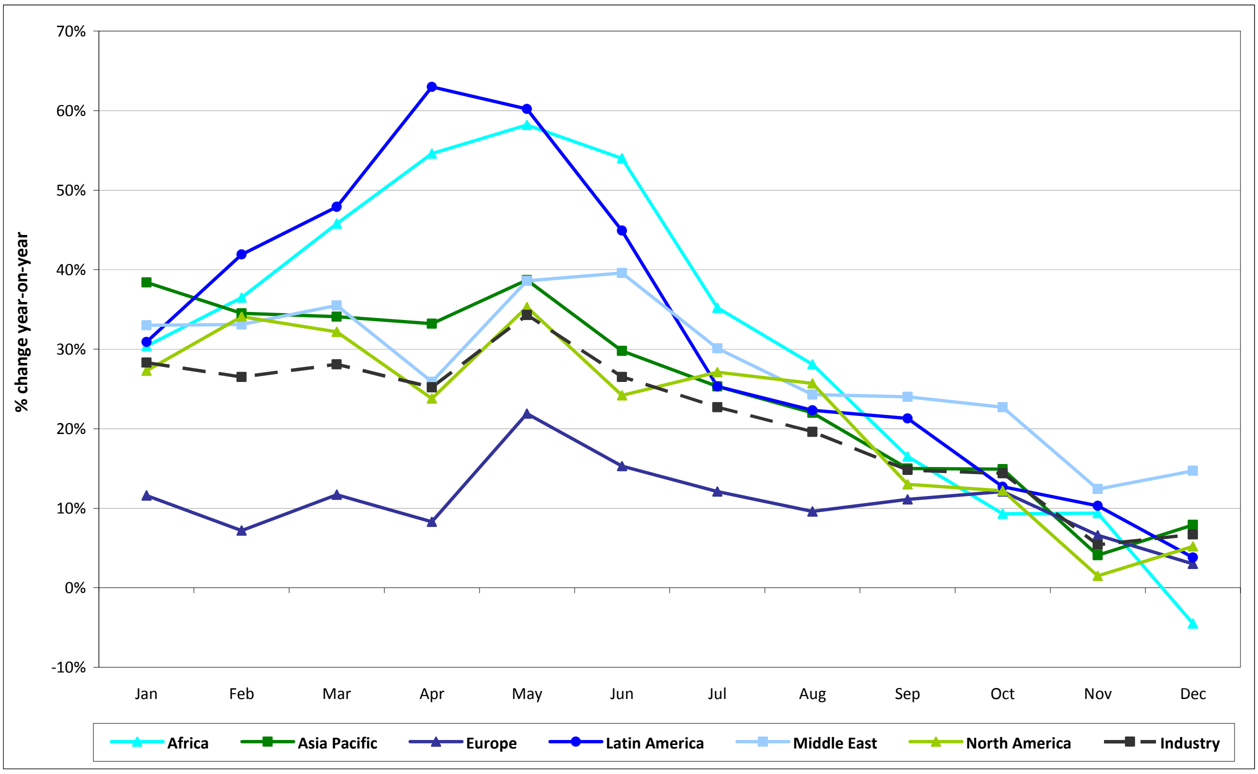
Table 1-15: Summary of Air Cargo Traffic growth by Region in 2010 vs 2009

	Africa	Asia Pacific	Europe	Latin America	Middle East	North America	Industry
Freight Tonne Kilometres	23.8%	24.0%	10.8%	29.1%	26.7%	21.8%	**20.6%**

Source: IATA

According to IATA, its member airlines recorded air cargo growth measured in Freight Tonne Kilometres (FTKs) of over 20% in 2010, a sign of global economic recovery, although the pace of growth in the second half of the year slowed down. This represents the largest increase in three decades after a decline of 10% in 2009.

Figure 1.29: Freight Tonne Kilometre (FTK) Growth by Region 2010 vs. 2009



Source: IATA

The monthly pattern of growth reflects the full year results, with European air cargo demand the slowest to pick up (largely due the sluggish economic growth and trade within Europe and across the North Atlantic[20]) and remaining consistent throughout the year (albeit comparatively weak), until severe weather in the later stages dented demand. All regions except Europe followed the average industry pattern of rapid recovery in the first half of 2010 followed by a marked slowdown. Industry growth in 2010 over 2009 oscillated between a peak of 35% in May and a low of 6% in November.

The regional variation in air cargo growth remains particularly marked. Latin American carriers recorded the highest full year growth rate of 29.1%, followed by Middle Eastern carriers (accounting for 11% of the market) at 26.7%. Asia Pacific airlines (with a 45% market share) grew by 24.0%, Africa at 23.8% and North America by 21.8%. Against these industry gains, Europe's 10.8% growth stands out as weak by comparison.

Demand for air cargo is an important indicator of world trade flows. Air cargo uplifted by airlines grew 20% in 2010 over 2009, with global trade rebounding by an estimated record 13.5%[21].

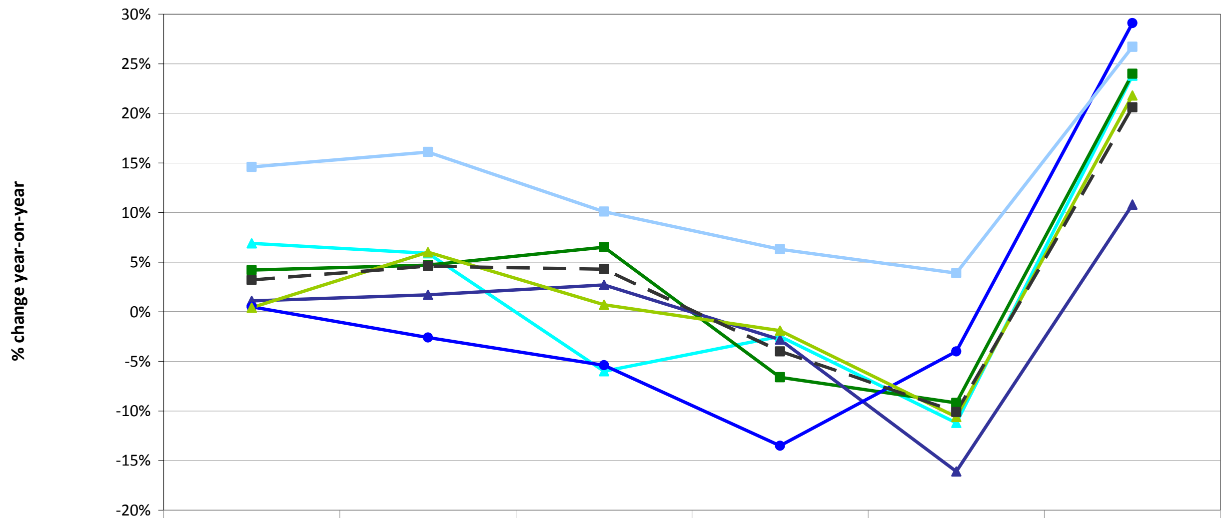
Figure 1.30 shows the historical growth of air cargo carried on airlines by global region. Since 2005, Middle Eastern airlines have consistently outperformed the industry average in terms of air cargo growth rates

[20] IATA Air Transport Market Analysis, January 2010

[21] World Trade Organization

achieved. This is primarily due to the region's emergence as an international gateway between Asia and Europe with the hub airports of Dubai and Doha, for example, aggressively expanding market share of transit flights between these two trade regions. Airlines such as Emirates, Etihad and Qatar Airways serving these hubs have a high proportion of widebody aircraft fleet with greater capacity to carry cargo.

Figure 1.30: Historical Air Cargo Growth by Region 2005-2010



	2005	2006	2007	2008	2009	2010
Africa	6.9%	5.9%	-6.0%	-2.5%	-11.2%	23.8%
Asia Pacific	4.2%	4.7%	6.5%	-6.6%	-9.2%	24.0%
Europe	1.1%	1.7%	2.7%	-2.8%	-16.1%	10.8%
Latin America	0.5%	-2.6%	-5.4%	-13.5%	-4.0%	29.1%
Middle East	14.6%	16.1%	10.1%	6.3%	3.9%	26.7%
North America	0.4%	6.0%	0.7%	-1.9%	-10.6%	21.8%
Industry	3.2%	4.6%	4.3%	-4.0%	-10.1%	20.6%

Source: IATA

1.6.2 Air Cargo by Worldwide Airport

Global airport cargo throughput is also indicative of where the main trade flow growth is concentrated. The top 30 list of worldwide airports by air cargo throughput, as reported by ACI, is dominated by Asia Pacific; accounting for nearly half of the top 30 airports' combined volume. Three of the top four airports are in the Asia Pacific region, and when looking at airports by growth rate in 2010 over 2009, six of the top ten are from Asia Pacific.

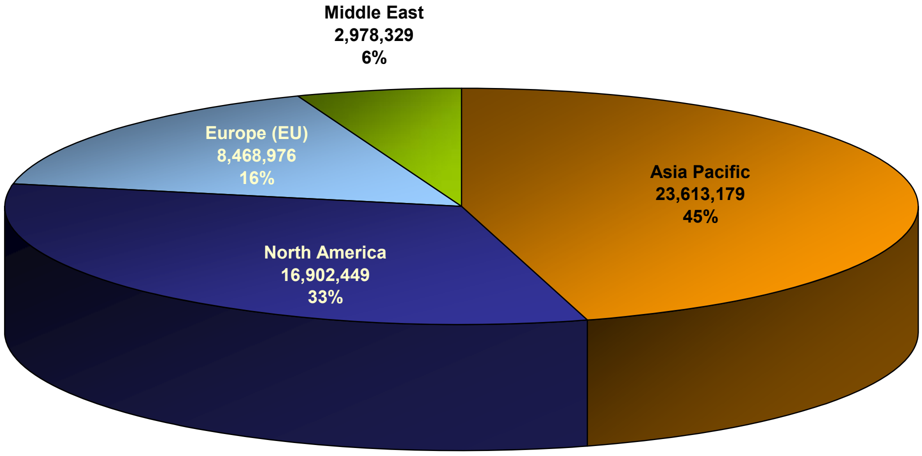
Table 1-16: Top 30 Worldwide Airports by Air Cargo Throughput (tonnes) & Growth in 2010

Rank	Airport	Region	Total	% chg		Airport	Region	Total	% chg
1	HONG KONG, HK (HKG)	Asia Pacific	4,165,852	23.2		ANCHORAGE AK, US (ANC)	North America	2,646,695	36.6
2	MEMPHIS TN, US (MEM)	North America	3,916,811	5.9		DOHA, QR (DOH)	Middle East	707,831	33.8
3	SHANGHAI, CN (PVG)	Asia Pacific	3,228,081	26.9		SHENZHEN, CN (SZX)	Asia Pacific	809,125	33.6
4	INCHEON, KR (ICN)	Asia Pacific	2,684,499	16.1		CHICAGO IL, US (ORD)	North America	1,376,552	31.4
5	ANCHORAGE AK, US (ANC)	North America	2,646,695	36.6		TAIPEI, TW (TPE)	Asia Pacific	1,767,075	30.1
6	**PARIS, FR (CDG)**	**EU**	**2,399,067**	**16.8**		SHANGHAI, CN (PVG)	Asia Pacific	3,228,081	26.9
7	**FRANKFURT, DE (FRA)**	**EU**	**2,275,000**	**20.5**		BANGKOK, TH (BKK)	Asia Pacific	1,310,146	25.3
8	DUBAI, AE (DXB)	Middle East	2,270,498	17.8		OSAKA, JP (KIX)	Asia Pacific	759,278	24.7

Rank	Airport	Region	Total	% chg		Airport	Region	Total	% chg
9	TOKYO, JP (NRT)	Asia Pacific	2,167,853	17.1		HONG KONG, HK (HKG)	Asia Pacific	4,165,852	23.2
10	LOUISVILLE KY, US (SDF)	North America	2,166,656	11.2		**FRANKFURT, DE (FRA)**	**EU**	**2,275,000**	**20.5**
11	SINGAPORE, SG (SIN)	Asia Pacific	1,841,004	10.9		GUANGZHOU, CN (CAN)	Asia Pacific	1,144,456	19.8
12	MIAMI FL, US (MIA)	North America	1,835,797	17.9		MUMBAI, IN (BOM)	Asia Pacific	671,237	18.5
13	TAIPEI, TW (TPE)	Asia Pacific	1,767,075	30.1		MIAMI FL, US (MIA)	North America	1,835,797	17.9
14	LOS ANGELES CA, US (LAX)	North America	1,747,629	15.8		DUBAI, AE (DXB)	Middle East	2,270,498	17.8
15	BEIJING, CN (PEK)	Asia Pacific	1,551,471	5.1		NEW YORK NY, US (JFK)	North America	1,344,126	17.5
16	**LONDON, GB (LHR)**	**EU**	**1,551,404**	**15.0**		TOKYO, JP (NRT)	Asia Pacific	2,167,853	17.1
17	**AMSTERDAM, NL (AMS)**	**EU**	**1,538,134**	**16.8**		**AMSTERDAM, NL (AMS)**	**EU**	**1,538,134**	**16.8**
18	CHICAGO IL, US (ORD)	North America	1,376,552	31.4		**PARIS, FR (CDG)**	**EU**	**2,399,067**	**16.8**
19	NEW YORK NY, US (JFK)	North America	1,344,126	17.5		INCHEON, KR (ICN)	Asia Pacific	2,684,499	16.1
20	BANGKOK, TH (BKK)	Asia Pacific	1,310,146	25.3		LOS ANGELES CA, US (LAX)	North America	1,747,629	15.8
21	GUANGZHOU, CN (CAN)	Asia Pacific	1,144,456	19.8		KUALA LUMPUR, MY (KUL)	Asia Pacific	694,296	15.4
22	INDIANAPOLIS IN, US (IND)	North America	1,012,589	7.2		**LONDON, GB (LHR)**	**EU**	**1,551,404**	**15.0**
23	NEWARK NJ, US (EWR)	North America	855,594	9.8		**LUXEMBOURG, LU (LUX)**	**EU**	**705,371**	**12.2**
24	TOKYO, JP (HND)	Asia Pacific	818,806	3.7		LOUISVILLE KY, US (SDF)	North America	2,166,656	11.2
25	SHENZHEN, CN (SZX)	Asia Pacific	809,125	33.6		SINGAPORE, SG (SIN)	Asia Pacific	1,841,004	10.9
26	OSAKA, JP (KIX)	Asia Pacific	759,278	24.7		NEWARK NJ, US (EWR)	North America	855,594	9.8
27	DOHA, QR (DOH)	Middle East	707,831	33.8		INDIANAPOLIS IN, US (IND)	North America	1,012,589	7.2
28	**LUXEMBOURG, LU (LUX)**	**EU**	**705,371**	**12.2**		MEMPHIS TN, US (MEM)	North America	3,916,811	5.9
29	KUALA LUMPUR, MY (KUL)	Asia Pacific	694,296	15.4		BEIJING, CN (PEK)	Asia Pacific	1,551,471	5.1
30	MUMBAI, IN (BOM)	Asia Pacific	671,237	18.5		TOKYO, JP (HND)	Asia Pacific	818,806	3.7

Source: ACI Worldwide Airport Traffic Report 2010 (Left hand table ranked by tonnage, right hand table by growth)

Figure 1.31: Top 30 Worldwide Airports by Air Cargo Throughput (tonnes) & Regional Share in 2010



Source: ACI

Although Latin American airlines led growth in FTKs in 2010 as noted previously, the region's airports are comparatively small in global terms when considering air cargo throughput, and thus Table 1-16 above is absent of any of the major Latin American airports for the same reason

Table 1-9 (the top 30 worldwide airports by passengers) is devoid of a Latin American presence – the region is emerging and still a developing air transport and trade market relative to the rest of the world. However, the dominant Latin American airports of Sao Paulo, Brazil; Mexico City, Mexico; and Buenos Aires, Argentina recorded robust passenger traffic growth of 7%, 22% and 33% respectively.

1.7 Business Aviation

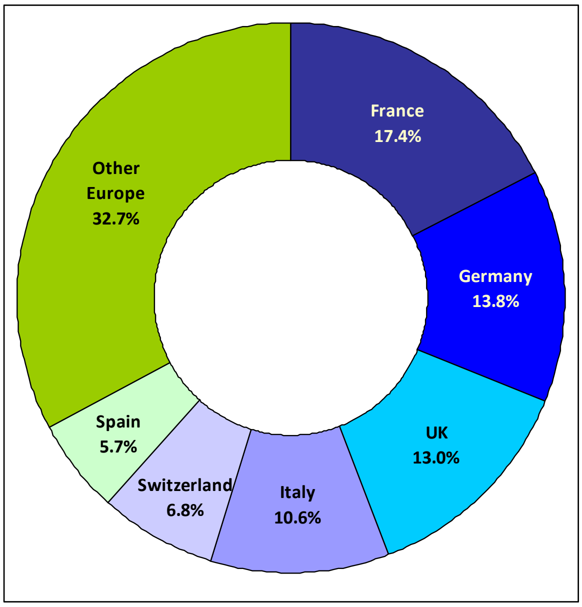
1.7.1 Europe Overview

According to Eurocontrol[22], business aviation movements in Europe in 2010 recorded 5.5% growth over a depressed 2009, signalling solid recovery for that sector of the industry.

France, Germany and the United Kingdom combined constituted nearly half of all business aviation departures in Europe in 2010, as highlighted in Figure 1.32.

In terms of growth experienced at individual airports in 2010, business aviation activity has increased by nearly 15% at each of Nice, London Luton, Zurich and Brussels airports.

Figure 1.32: States' share of European business aviation departures in 2010

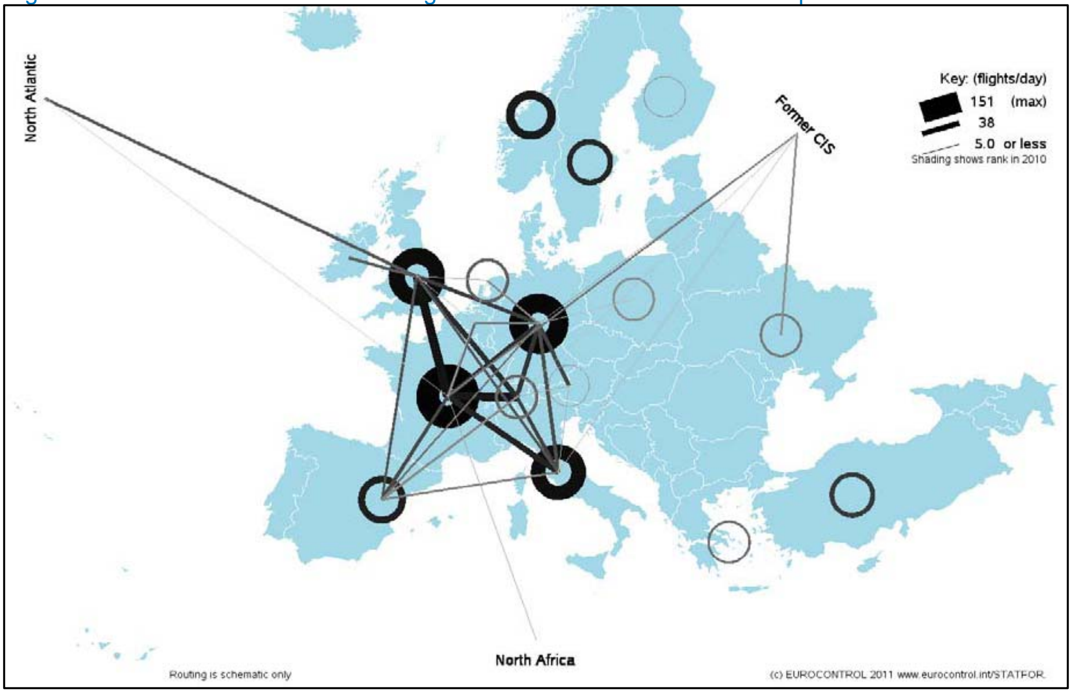


[22] Briefing: Business Aviation in Europe in 2010; Eurocontrol; March 2011

Source: Eurocontrol; 'Briefing: Business Aviation in Europe in 2010'; March 2011

Figure 1.33 shows the major business aviation traffic flows in 2010 between European States and regions outside. France domestic remains the single busiest domestic market, with France-UK the primary international flow.

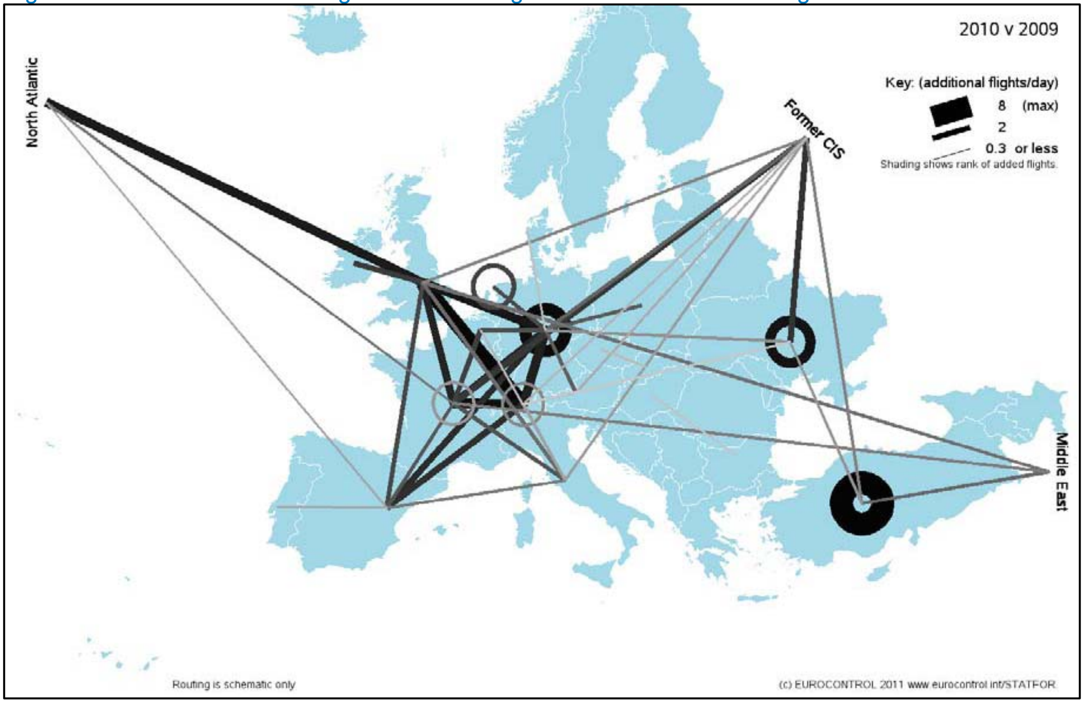
Figure 1.33: Busiest 50 Traffic Zone/Region Pairs for Business Aviation Departures in 2010



Source: Eurocontrol; 'Briefing: Business Aviation in Europe in 2010'; March 2011

Figure 1.34 highlights the routes and markets recording the highest growth in business aviation activity in 2010, with intra-Turkey the fastest-growing. The German domestic, UK-Switzerland and UK-North Atlantic are other markets showing significant additional daily movements.

Figure 1.34: 50 Traffic Zone/Region Pairs adding most business aviation flights in 2010 versus 2009



Source: Eurocontrol; 'Briefing: Business Aviation in Europe in 2010'; March 2011

1.7.2 Global focus on manufacturers

Although the European business aviation sector traffic results in 2010 implied a solid recovery following a poor 2009, 2010 remained a challenging year in a global context for the industry. According to Flight International's Business Aircraft Census 2010[23], falling aircraft demand, a bloated used aircraft inventory and an unprecedented squeeze on bank lending have forced manufacturers to respond by cutting aircraft production and jobs across their plants.

Flight International's 2010 business aircraft census – compiled using Flightglobal's ACAS business aviation database – reflects the industry's weak performance in the twelve months September 2009 to August 2010. The census revealed the global business jet fleet to have grown by 4% during this period, but that the impact of the economic recession was felt most acutely in the bottom half of the market – the smaller and lighter aircraft types. This has been partly attributed to the lower end of the market traditionally being dependent on third party finance, which has become increasingly hard to secure since the onset of the financial crisis.

The major manufacturers – Bombardier, Cessna and Hawker Beechcraft – each suffered in challenging conditions, particularly in the largest market, North America, where their exposure is greatest.

Cessna continues to dominate the business aircraft arena in terms of total inventory, with 5,823 business jets and 545 turboprops recorded in the census. However, in September 2010 it was forced to lay off a further 700 workers, mainly at its Wichita facility, on top of the 8,000 job cuts that had already been made

[23] 'Rough but ready: business aircraft census 2010'; Flight International 7th October 2010.

since the downturn hit in 2008. These losses were attributed to a slump in Citation business jet sales, Cessna's most popular aircraft family.

Hawker Beechcraft also had to cut its workforce significantly over the past year as demand for its turboprop aircraft fell, although the manufacturer's business jet fleet grew by 3% overall to 2,251 aircraft.

Bombardier's diverse product line has helped to lessen the impact of the economic crisis on its lower-end business jets. The Canadian manufacturer grew its total inventory over the census period to 3,606, achieved through impressive growth of the Challenger family, and at the top of the market the long-range types Global 5000 and the XRS.

Gulfstream, despite a cut in overall production numbers this year, has seen its in-service business jet fleet jump by 5% to 1,907 including a 25% increase in the long-range G550 inventory to 250 aircraft, a 20% increase in the large-cabin 450 fleet and a 7% increase in the G200 tally.

Dassault, the French manufacturer, dominates the high end of the business jet market which has helped it to ride the economic storm, although not be immune to it. The inventory of business jets has risen to 1,751 Falcons.

Embraer has recorded the largest fleet gains, reporting a 160% increase in its global inventory to 363 business jets. The jump is attributable to the production ramp-up of the Phenom 100, as the light jet fleet has leapt from 24 to 153 in the census period.

At the top end of the business jet market, Airbus and Boeing have continued to expand their fleets of VIP-configured airliners, but the past twelve months have brought mixed results. Boeing's BBJ, BBJ2 and BBJ3 inventory has climbed by a modest five aircraft and its 777 tally by two. Although deliveries are expected to pick up this year, market conditions have been tough for Boeing which suffered cancellations and deferrals from its high-end customers. In contrast Airbus, which has had few deferrals and cancellations, has seen its tally increase to 107 corporate airliners. The A318 Elite, A319 Airbus Corporate Jetliners and the twin-aisle A340 fleet all saw growth. Airbus is increasing its marketing activity within Asia Pacific, notably in China, where it forecasts a demand for around five 15-plus-seat VIP aircraft per year.

1.7.3 World Regions

Manufacturers' reliance on the global marketplace to boost their forward order books is as prevalent now as ever. The markets outside North America make up more than 50% of orders for manufacturers, due entirely to the economic downturn in North America (and the United States in particular) wrecking the continent's business aircraft inventory over 2009 and 2010.

ACAS lists the number of North American-registered business aircraft as nudging forward by 1.9% during the census period, the slowest growth of any of the world regions, as individuals and companies tighten their belts and wait for the fragile economy to grow. The U.S. is home to the largest installed base of business jets and turboprops with 11,490 and 7,095, respectively.

Europe is home to the second largest concentration of business aircraft, but the continent's exposure to the economic fallout has had an effect on the 2010 tally. ACAS reveals that the fleet has grown by just over 3% to 3,835 business jets and turboprops. The bulk of this growth is recorded in Russia and Austria – with gains of 13 and 26 business jets respectively.

Latin America is challenging Europe for second place. This thriving region has seen its installed base climb in the census period by 356 jets and turboprops to 3,331 aircraft. This 12% climb is almost entirely due to the bullish economies of Argentina, Brazil and Mexico, which are driving demand for these flexible forms of transport. Argentina saw its tally leap by 20% to 110 jets and 112 turboprops. Brazil, home to the largest installed base of business aircraft in Latin America, aw its fleet climb by 104 jets and 66 turboprops. Meanwhile, Mexico, which houses the continent's largest business jet fleet, saw its tally climb by 55 to 606 jets and 271 turboprops.

The Pacific Rim has also made strides over the past twelve months. ACAS lists the fleet rise as more than 11% to 501 jets and 416 turboprops. Australia has emerged over the past twelve months as a dominant player in the region, making gains of 11 jets and 11 turboprops respectively bringing its total fleet to 333 aircraft.

China has made the largest gains, recording a 20% increase in its business jet tally to 142 aircraft. The world's manufacturers expect the market to grow at an even greater pace as the country's economy continues to boom, regulations become more relaxed and the military loosens its grip on the nation's airspace.

The Middle Eastern fleet has also progressed over the past twelve months with much of the growth coming from sales of large-cabin business jets and airliners. ACAS data reveals a climb of 44 jets and six turboprops, with the major gains recorded in the United Arab Emirates (102 to 118 jets and turboprops) and Saudi Arabia, with 16 jets and six turboprops.

1.8 The Value of the Aviation Industry

In 2008, Oxford Economics conducted a study for the Air Transport Action Group (ATAG)[24] on the economic and social benefits of air transport. Drawing upon 2006-2008 data, it was estimated that providing these services generated almost 5.5 million direct jobs globally within the air transport industry and contributed USD 408 billion to global GDP.

It also estimated that aviation globally has a far greater and wider reach than its direct impact, actually sustaining 32 million jobs worldwide and contributing USD 3.5 trillion (or 7.5%) of world GDP when adding indirect, induced and catalytic impacts.

Of the 5.5 million jobs directly generated by the air transport industry:

- 2.0 million people work for airlines or handling agents, including flight crew, check-in staff, maintenance crew, etc.
- 2.3 million people have other jobs onsite at airports – for example, in retail outlets, restaurants, hotels, etc.
- 0.8 million people work in the civil aerospace sector, involved in the manufacture of aircraft systems, frames and engines, etc.
- 0.4 million people are employed by airport operators, in airport management, maintenance, security, etc.

[24] The economic and social benefits of air transport 2008, Air Transport Action Group, April 2008

Table 1-17: The Value of the Aviation Industry

	Direct Employment in Aviation Industry		Direct Contribution to Global GDP	
World Region	No.	% of total	USD million	% of total
Africa	154,891	2.8	3,401	0.9
Asia Pacific	1,188,632	21.5	56,472	13.8
Europe	1,526,188	27.6	118,014	28.9
Latin America & the Caribbean	255,777	4.6	8,193	2.0
Middle East	173,133	3.2	6,474	1.6
North America	2,228,140	40.3	215,779	52.8
Total	5,526,761		408,333	

Source: The economic and social benefits of air transport 2008, Air Transport Action Group, April 2008

The conclusions in the Oxford Economics study were based on 2006 data, when ACI reports that passenger throughput at worldwide airports was 4.44 billion and air cargo traffic reached 86.4 million tonnes. By 2010, world passenger traffic had grown by 4.8% to 4.65 billions and cargo had decreased by 4.1% to 82.9 million tonnes.

2. Air Transport Forecasts

2.1 Introduction

The purpose of this chapter is to provide an overview of the expected growth in passengers using air transport services over the next twenty year period. It is important to understand the trends and developments in the coming years in order to plan infrastructure capacity and efficiencies in the aviation system.

While there are potentially many sources of independent and more detailed air transport market forecasts at the country level, this chapter relies on publicly available and up-to-date industry-respected sources for analysis which provide an overview of the current global outlook at the regional level.

The chapter begins by examining the outlook for the primary growth driver of air travel demand, GDP. It then looks at the short term passenger forecast provided by IATA, which describes the expected developments over the next few years to 2014. For the remainder of the forecast period to 2029, Boeing's Current Market Outlook produced in 2010[25] is used to examine global and regional trends, as well as issues important to Europe. The Airbus forecast[26] for the same period supplements this analysis. EUROCONTROL's medium and long term forecasts are discussed to 2030[27] which provide a view from the operational standpoint of air transport movements, which highlight the capacity and constraints of European airspace. Finally, Boeing's comprehensive twenty year world air cargo forecast to 2029 is reviewed[28].

2.2 GDP – The Primary Forecast Driver

As discussed previously in Section 1.3.1, the underlying demand for air transport is primarily driven by economic growth and prosperity. The broad measurement of economic activity used for econometrics and air transport forecasts is GDP.

Boeing, Airbus and Embraer have used the global GDP forecast produced by IHS Global Insight which states that global GDP will grow on average by 3.2% per annum to 2029. The focus of this global growth is on strong economic activity in Asia which will act as a key driver to the industry's expansion. There will also be robust growth in emerging economies, especially those of the BRIC[29] countries which will record GDP growth above the world average.

[25] Current Market Outlook 2010-2029, The Boeing Company 2010

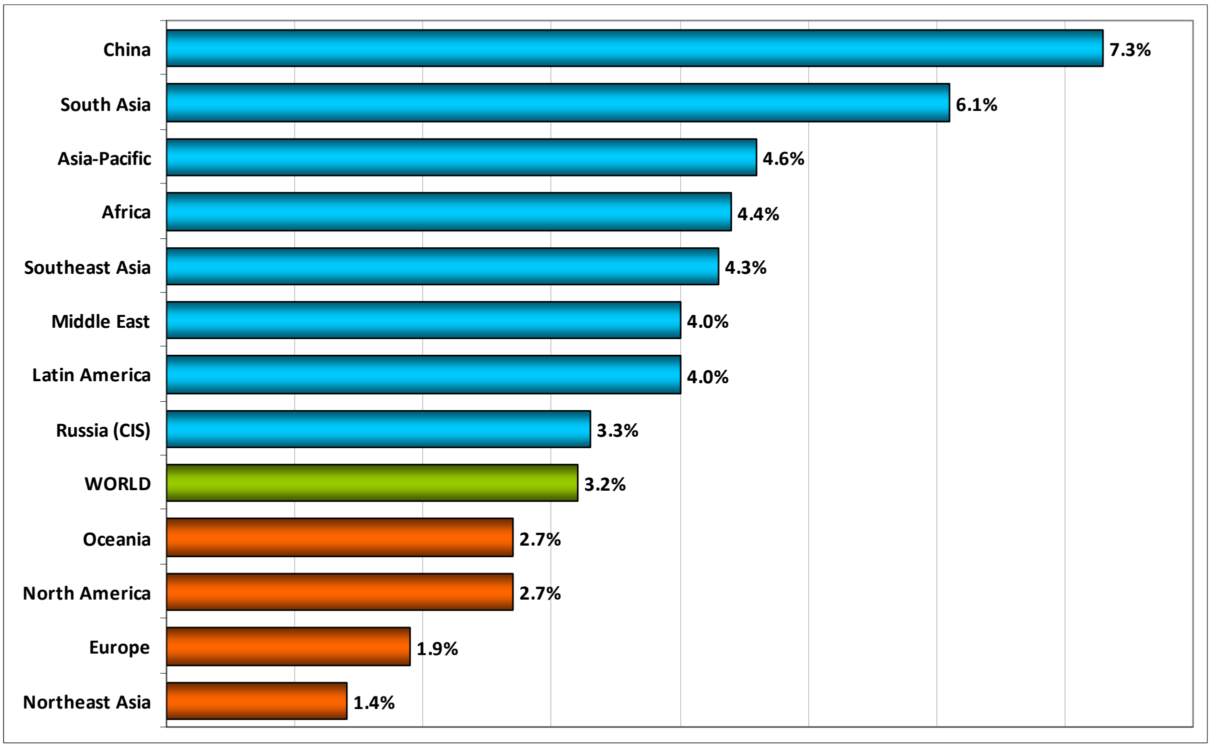
[26] Global Market Forecast 2010-2029, Airbus Industrie 2010

[27] Medium-Term Forecast February 2011 (Flight Movements 2011-2017) & Long-Term Forecast December 2010 (Flight Movements 2010-2030), EUROCONTROL

[28] World Air Cargo Forecast 2010-2011, The Boeing Company 2010

[29] The acronym BRIC refers to the nations of Brazil, Russia, India and China; commonly viewed as leaders in economic growth.

Figure 2.1: Average Annual GDP Growth 2010-2029



Source: Boeing/Global Insight

Figure 2.1 shows that regions with the highest forecast economic growth are concentrated in the Asia region, with China for example anticipated to exhibit average annual growth of 7.3% to 2029. Regions with well-developed mature economies such as North America and Europe are forecast to show modest growth below the world average. The lowest growth is anticipated in Northeast Asia, primarily due to the economies of South Korea and Japan which are also mature by comparison to their regional neighbours.

Forecast growth is not an indicator of economic size. Japan, for example, was the third largest world economy in 2010, but its lower forecast growth means other economies will soon surpass it. For example, the forecast rate of growth in the Asian region means that, by 2029, China is likely to possess the world's single largest economy with India also featuring in the top five (Table 2-1).

Table 2-1: Top 5 World Economies

Rank	2009	2019	2029
1	U.S.	U.S.	China
2	Japan	China	U.S.
3	China	Japan	India
4	Germany	Germany	Japan
5	France	India	Germany

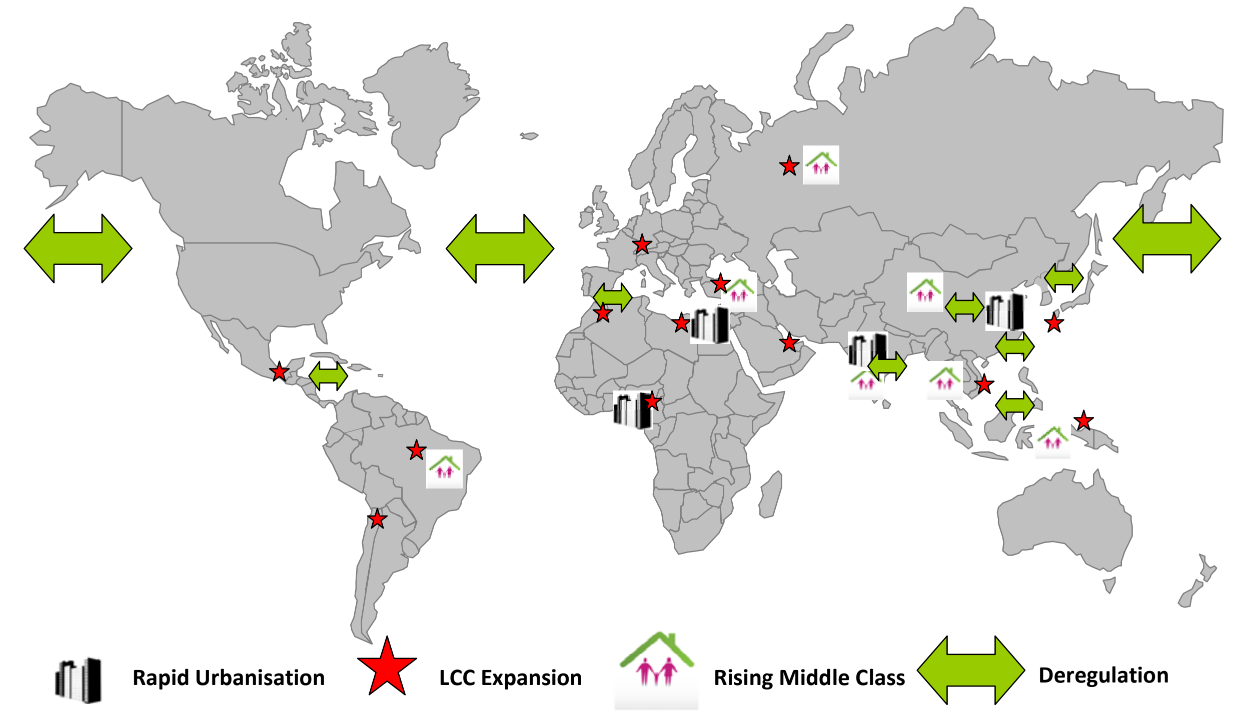
Source: Embraer/The Economist

The correlation between the growth in GDP and demand for air transport is well proven; this relationship is clearly visible when both metrics are plotted together on a graph (see Figure 1.7). However GDP alone is not the sole driver for the increase in airline passengers and the forecasts consider a number of other factors which will in turn increase demand. Some of the additional factors driving demand are linked to economic activity, such as the rise of the middle class in emerging economies and the rapid urbanisation that will ensue. Other drivers are based on political and operational trends, such as the liberalisation and deregulation of air transport markets; and the expansion of the low cost carrier (LCC) business model. As with growth in GDP, these factors are geographically dispersed and Figure 2.2 illustrates these trends.

The main drivers for growth over the forecast period 2009 to 2029 are considered to be[30]:

- The replacement of aircraft in service in mature markets
- Dynamic growth in emerging markets
- The continued growth of LCCs, especially in Asia
- Greater and continued market liberalisation and deregulation
- Traffic growth on the existing route network where it is more efficient to add capacity instead of frequency

Figure 2.2: Trends in Global Demand



Source: Airbus

[30] Airbus Global Market Forecast 2010-2029

2.3 IATA Short Term Forecast

In February 2011, IATA provided the latest update to its airline passenger forecast for the coming few years to 2014. IATA measures growth by the absolute numbers of passengers, as opposed to the forecasts that are discussed in the remainder of this chapter which use revenue passenger kilometres (RPK).

IATA forecasts that global air travel is expected to increase to 3.3 billion passengers by 2014, up by a third from the 2.5 billion passengers in 2009. Growth will be driven by strong economic activity in Asia which will act as a key driver to the industry's expansion.

Asia Pacific is forecast to account for 30% of passenger traffic by 2014, while North America will reduce to 23% of the total.

China will be the largest contributor of new passengers, accounting for 214 million (181 million domestic and 33 million international) or 27% of the 800 million increase in passengers between 2009 and 2014.

Some 360 million (45%) of the new passengers are forecast to travel on Asia Pacific routes as the United Arab Emirates, Vietnam and Malaysia witness considerable growth in international passengers. The U.S. will remain the largest single-country market for domestic passengers (671 million) and international passengers (215 million).

IATA also noted that based on market capitalisation there is a similar shift eastward. Currently the five largest airlines in the world by market capitalisation are Air China at USD 20 billion, the combined LAN and TAM at USD 15 billion, Singapore Airlines at USD 14 billion, Cathay Pacific at USD 12 billion and China Southern at USD 11 billion[31].

2.4 Long Term Airline Passenger Forecasts

The principal forecasts examined here are those produced by aircraft manufacturers Boeing and Airbus. Each has produced a global market forecast for the period 2010 to 2029 using the base year of 2009. It is not intended to produce a detailed analysis of the differences between the two forecasts here, as they each employ similar forecast methodologies and at an aggregate level are broadly comparable with each other. However there are some differences which warrant brief discussion.

Table 2-2: Boeing & Airbus Forecast Comparison

	Boeing	Airbus
RPK (billion) 2009	4,386	4,760
RPK (billion) 2029	12,535	12,030
Total Growth	185%	153%
Average Annual Growth Rate	5.3%	4.7%

Source: Boeing, Airbus

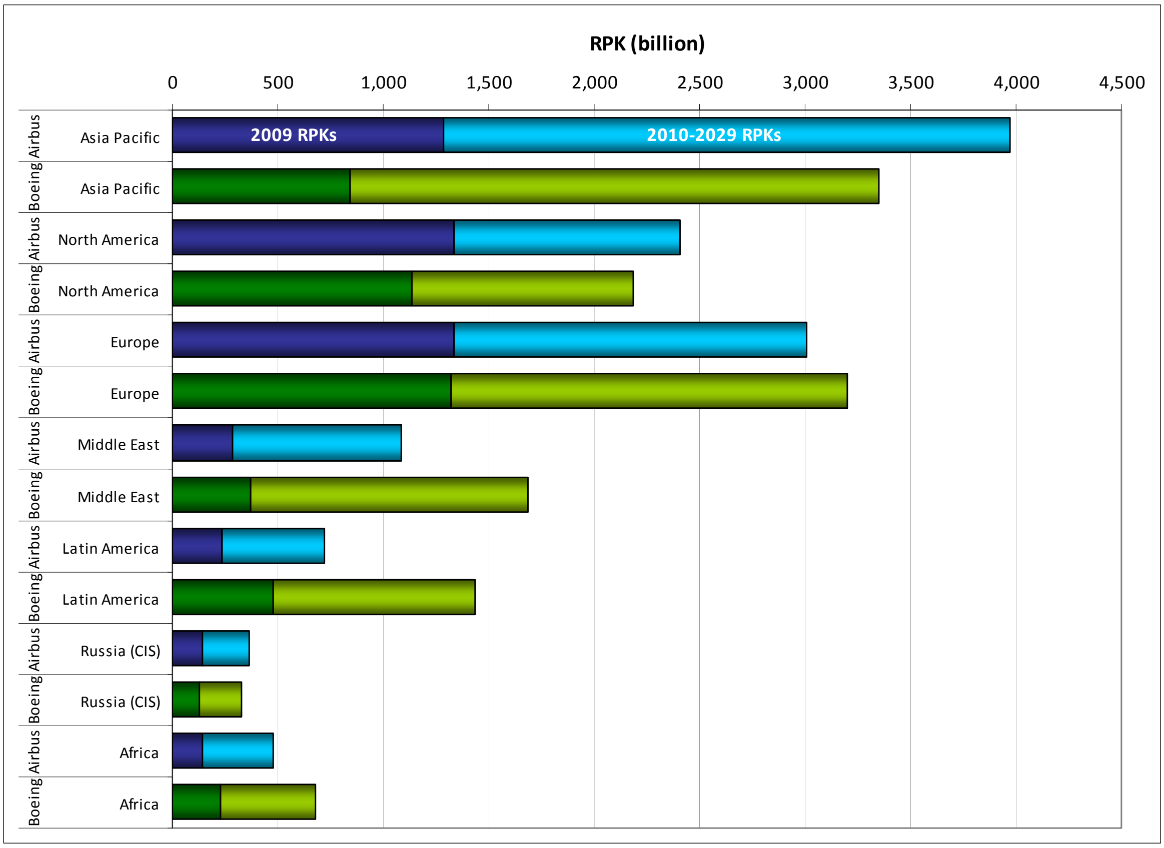
[31] Centre for Asia Pacific Aviation, 15 February 2011

Although Boeing has concluded on a 5.3% average annual growth rate to 2029, it has unusually quoted two separate growth rates for the period due to the large drop in traffic in 2009. The RPK growth rate is higher than forecasts of previous years as it is based on the lower base year traffic figure (2009), which yields a higher overall growth rate. If this low starting point is excluded, Boeing quotes the long-term steady growth rate for the period 2010 to 2030 to be 4.9%.

In Boeing's previous forecast for the period 2008-2028 produced before the unusual traffic shocks of 2009, it quotes a single figure for passenger growth also at 4.9%.

The two forecasts also display some disparity at a regional level, although again they are broadly comparable over a twenty-year forecast horizon. The minor differences that occur are due to the forecasts disagreeing on the amount of airline traffic carried in the base year, but also potentially due to the methodology of classifications and groupings used for countries within geographic regions (Figure 2.3).

Figure 2.3: Boeing & Airbus Regional Forecast Comparison 2010-2029



Source: Boeing, Airbus

2.4.1 Global Airline Passenger Growth

Both Boeing and Airbus express passenger traffic volume data as revenue passenger kilometres (RPK). This is a measure of the number of fare paying passengers multiplied by the number of kilometres flown. According to Boeing, airline passenger traffic will increase from 4.4 trillion RPKs in 2009 to 12.5 trillion in 2029. This represents a threefold increase with an average annual growth rate of 5.3%. Airbus points out in its forecast that historically (since the 1970s) air traffic has doubled every fifteen years and will do so again by 2024.

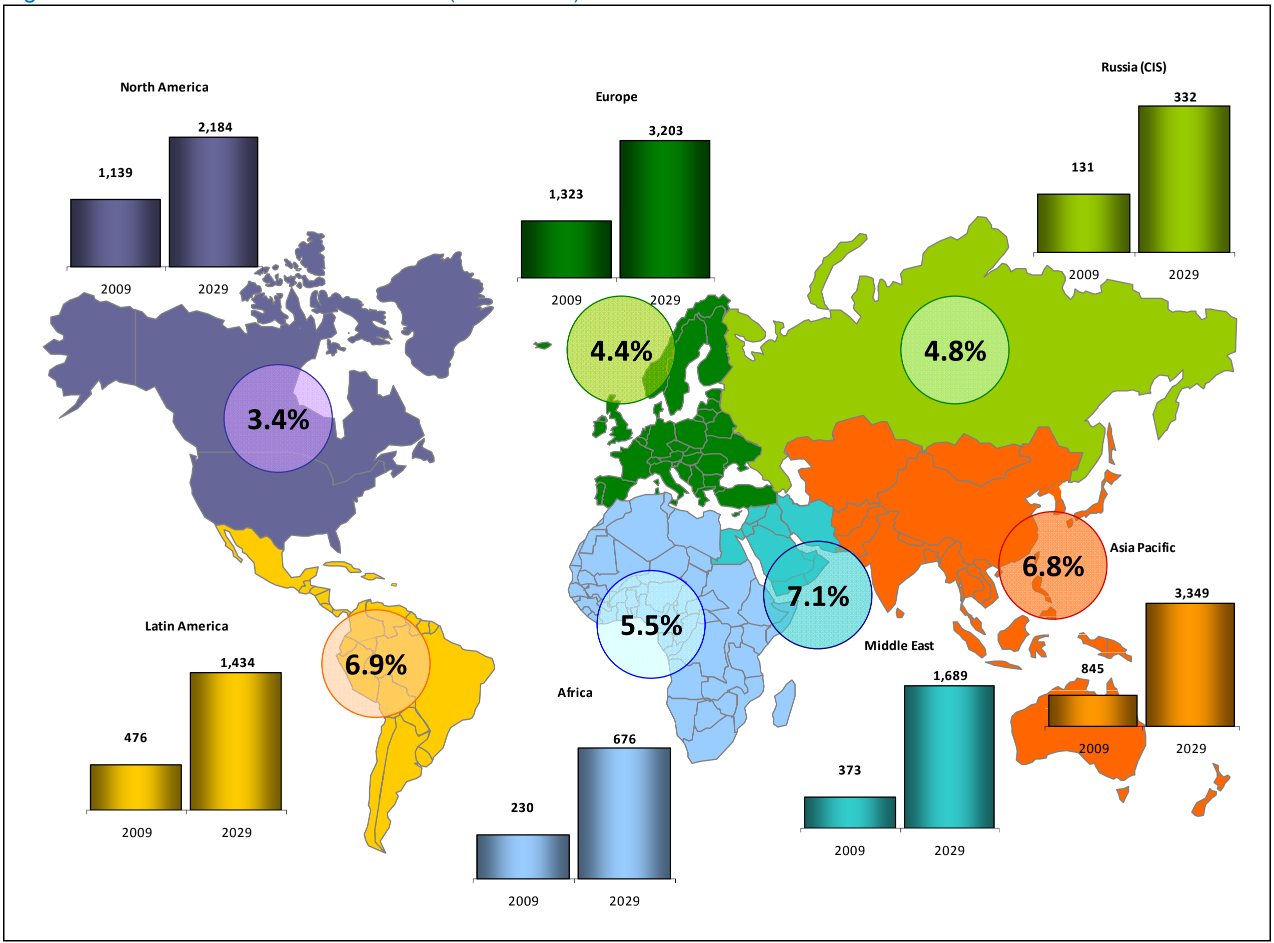
2.4.2 Airline Passenger Growth by World Region

Over the forecast period, growth in airline passenger traffic is geographically dispersed with regional variations displaying a close relationship with economic development.

Based on the Boeing forecast, the highest growth will be concentrated in the Middle East with an annual average growth rate of 7.1%, followed by Latin America (6.9%) and Asia Pacific (6.8%). With Africa experiencing 5.5% expansion, these regional markets dominate growth compared to the mature economies of Europe (4.4%) and North America (3.4%).

Despite the impressive growth rates in these regions, in absolute terms they make up a small proportion of overall airline traffic volume with the exception of Asia Pacific. In 2009, Europe and North America remained the largest markets by size (measured in RPK; North America was the single largest aviation market in 2009 purely in terms of domestic and international passenger numbers[32]), but by 2029 they are forecast to both be overtaken by the Asia Pacific region by some margin (see Figure 2.4).

Figure 2.4: World Airline Traffic Growth (RPK billion) 2009-2029



Source: Boeing

[32] IATA Airline Industry Forecast 2010-2014

The growth rates shown in Figure 2.4 represent total traffic growth to, from and within each region.

2.4.3 Intra-Regional Traffic Flow Growth

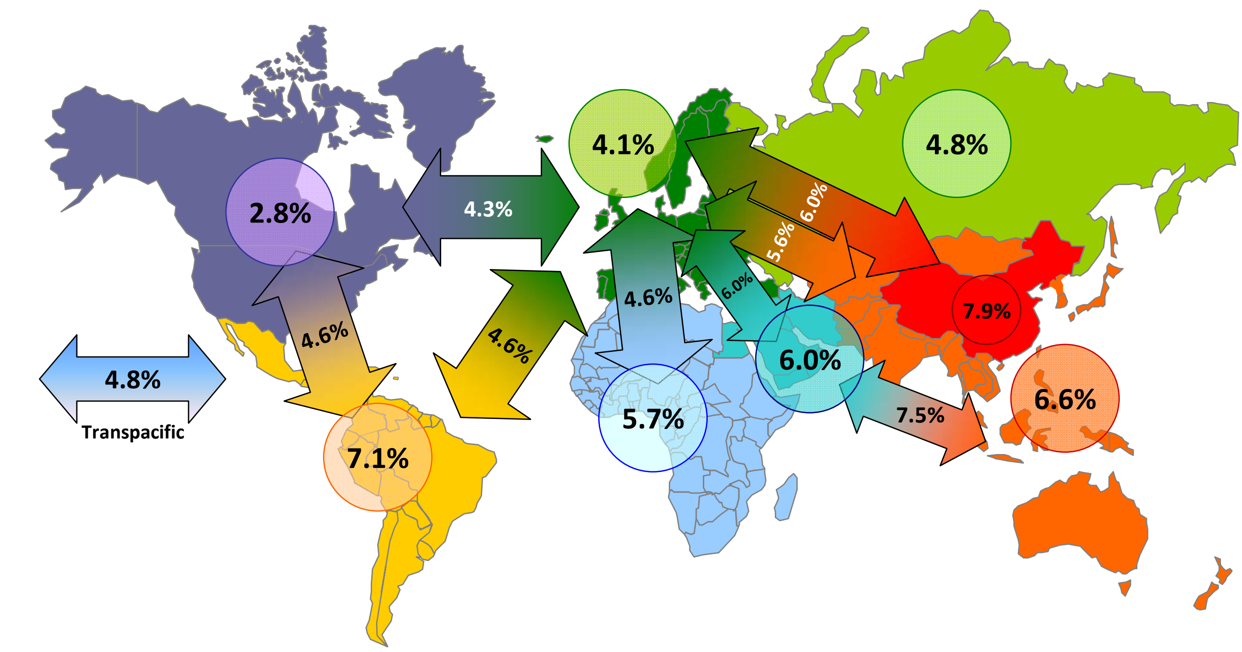
In addition to forecasting total passenger growth at a regional level, the Boeing forecast provides a breakdown of growth in traffic flows within and between these regions.

Figure 2.5 illustrates these flows. The figures contained within circles represent the traffic flow within the region only; those within arrows show flows between (to and from) the regions.

Half of the world's new traffic added during the next 20 years will be to, from, or within the Asia Pacific region. The highest growth will be seen within China. When China is included in growth rates for traffic within Asia Pacific, the aggregate growth rate is 7.1%. However when considered separately China accounts for a growth rate of 7.9% with the rest of Asia Pacific showing 6.6% growth.

Traffic within North America (the US and Canada) will represent the lowest overall growth, at 2.8%.

Figure 2.5: Inter-Regional Traffic Growth 2009-2029



Source: Boeing

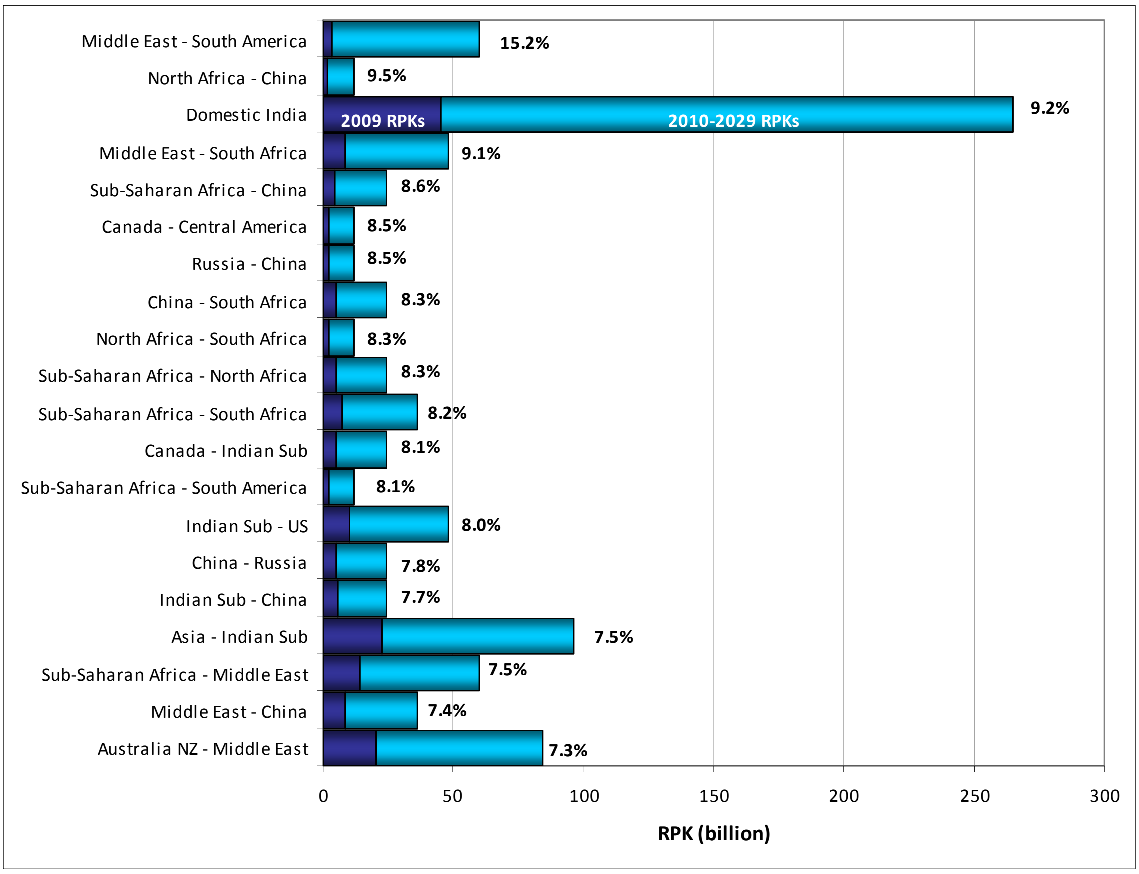
2.4.4 Inter-Regional Traffic Flow Growth

Figure 2.5 shows that the highest average annual growth in traffic between regions is expected from the Middle East to Asia Pacific at 7.5%. The United Arab Emirates, with a population of less than 5 million is home to several highly competitive and rapidly expanding airlines, such as Emirates and Etihad. With a globally central geographic position, the Middle East is growing as an international transport hub which will see increasing numbers of passengers routing via the region to continue their journeys to onward points. This is supported by the 6.0% average annual growth expected between this region and Europe. In 2029 the UAE is forecast to be the third largest market by value for new aircraft, behind the US and China[33].

Similarly to forecast trends in intra-regional traffic, when China is considered separately from the rest of Asia Pacific, growth between Europe and China is expected to grow at a faster rate (6.0%) than to Asia Pacific in total (5.6%).

In its latest Global Market Forecast for the period to 2029, Airbus has examined traffic flows and provided data for traffic routes at a detailed level. From this data the fastest growing flows by rate and the largest overall flows by volume can be determined.

Figure 2.6: Top 20 Fastest Growing Traffic Flows to 2029

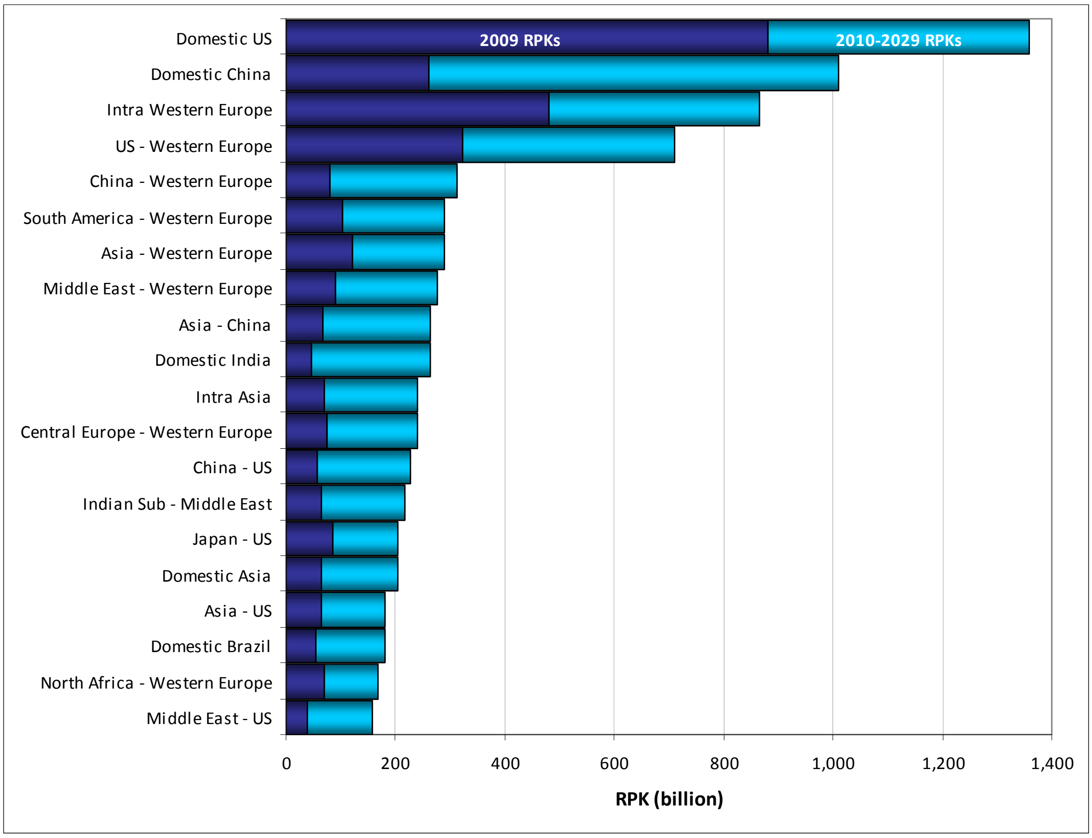


Source: Airbus

[33] Boeing Current Market Outlook 2010-2029

Traffic between the Middle East and South America will dominate growth at 15.2% annually; the remainder of the top five are connected to Asian markets. Routes to, from and within Africa are also well represented with growth rates expected above the world average (Figure 2.6 above).

Figure 2.7: Largest 20 Traffic Flows in 2029



Source: Airbus

In terms of the largest traffic flows in absolute volume, the domestic U.S. market will continue to command the greatest share but with domestic China following closely behind. While experiencing modest growth rates below the world average over the forecast period, traffic flows within Western Europe and across the Atlantic remain the next two largest passenger markets, also by some volume (Figure 2.7).

2.4.5 Trends in Europe

Passenger traffic in Europe is expected to grow at 4.4% annually to 2029, rising from 1.3 billion RPKs to 3.2 billion (see Figure 2.4), showing that despite the economic challenges it faces, the European air transport industry remains resilient.

Since 2000, the number of airlines operating in Europe has increased by more than 40%. Adapting to the changing business environment and formulating new operating strategies, airlines in Europe continue to evolve through mergers and acquisitions, code-share agreements and new product and service offerings.

In 2000, network carriers[34] provided 73% of all capacity but by 2029, the network carrier capacity share is projected by Boeing to drop to 62%. Low cost carriers (LCCs) have captured most of the capacity growth during the past ten years and are expected to continue to grow. Larger network carriers are taking advantage of joint ventures with foreign airlines to focus on the expansion of longer haul markets. LCCs are continuing to expand throughout Europe, especially in Central and Eastern Europe. Charter and inclusive tour operators (among the originators of low cost models) are diversifying to offer seat-only sales in addition to full travel packages.

Reflecting these trends, single aisle aircraft will account for 75% of new deliveries to 2029, making Europe one of the top regions for single aisle operations.

Europe's air transport market continues to liberalise. The EU and the United States are in the process of implementing Phase 2 of the Open Skies agreement (refer to Section 7.4 later in this report on Air Service agreements).

Environmental responsibility is an issue taken seriously by the European air transport industry, motivating European airlines to steadily replace older aircraft with new, more efficient types. By 2029, only 4% of the aircraft fleet currently in service in Europe will still be flying.

Aircraft operating on European routes are flying nearly full as airlines achieve historically high load factors[35]. The average distance per flight is rising as most new flights added by Europe's airlines are on longer range routes[36].

2.5 EUROCONTROL Flight Movement Forecasts

The STATFOR (Statistics and Forecasting) section of EUROCONTROL regularly produces short, medium and long term flight movement forecasts for European airspace. Due to the short horizon of EUROCONTROL's short-term forecast, this section considers the medium and long-term forecasts. The forecasts referenced are detailed in Table 2-3.

Table 2-3: EUROCONTROL STATFOR Flight Movement Forecasts

Forecast Type	Date Released	Forecast Period
Short-Term Forecast	Dec 2010	2010-2012
Medium-Term Forecast	Feb 2011	2011-2017
Long-Term Forecast	Dec 2010	2010-2030

Source: EUROCONTROL

It should be noted that EUROCONTROL's forecasts produce outputs as measured by air transport movements, or more specifically, IFR movements. Aircraft operating under instrument flight rules (IFR) are those flying in controlled airspace under regulations and procedures which allow the flight crew to navigate solely by reference to cockpit instruments and radio navigation aids.

[34] Network carriers are also variously described as full service airlines, flag or legacy carriers which primarily employ the hub and spoke operational model.

[35] Boeing Current Market Outlook 2010-2029

[36] Long-Term Forecast (Flight Movements 2010-2030), EUROCONTROL December 2010

The vast majority of commercial passenger and cargo air transport flights operate using an IFR flight plan. However, there are many other types of flights operating under IFR in Europe which cannot be typically characterised as commercial airline services, such as business jets, military transport, training flights and some light aircraft (General Aviation) flights.

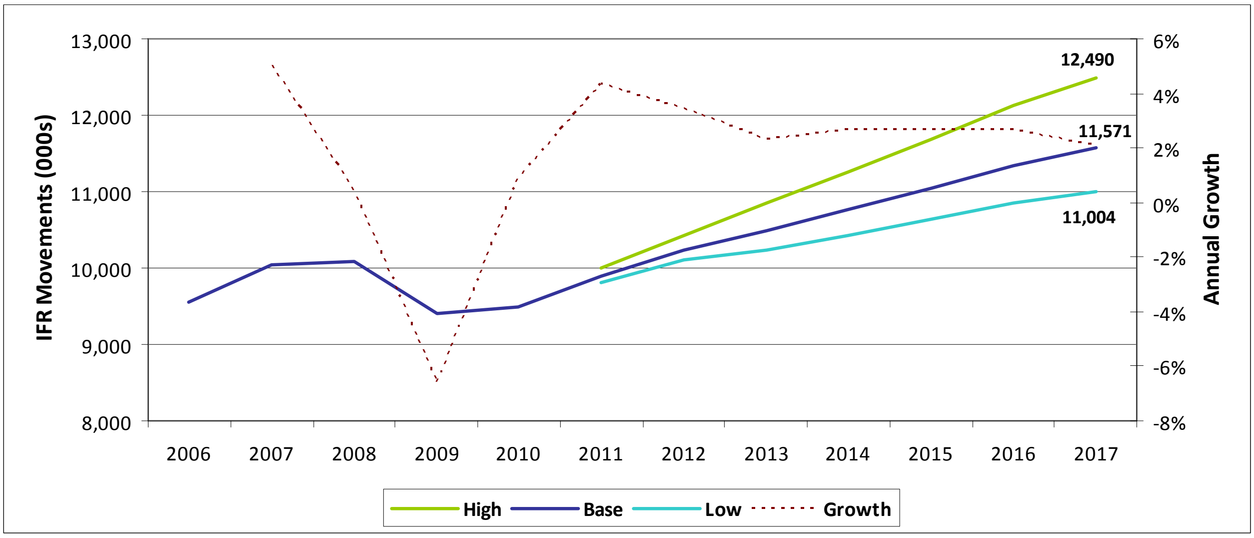
Using IFR movements as a measurement of aviation activity provides a useful overview from an operational standpoint. Rather than measuring absolute numbers of passengers or RPK, examining IFR movements allows for the analysis of overall aircraft operational activity within European airspace, therefore helping to determine its pressures, demands, capacity and constraints. This in turn is useful for planning improvements and efficiencies in the aviation system; essential for projects such as SESAR, Clean Sky JTI, the Emissions Trading Scheme and airport infrastructure and capacity. The forecasts do not however consider aircraft size, or average numbers of passengers per flight.

2.5.1 Medium Term Forecast

The medium term base case for traffic growth in Europe is forecast to be 11.6 million IFR flights in 2017, 22% more than in 2010. Traffic growth will bounce back in 2011 (above 4%), but with the underlying growth rate a little more than half of this, after allowing for the effects of the Icelandic ash-cloud, adverse weather events and industrial strikes. The average growth rate over the seven year period is 2.9% per annum.

EUROCONTROL has also produced low and high traffic growth rates based on three scenarios which differ in terms of the methodology input assumptions. The low and high growth scenarios between them capture the most likely range of future growth in flight movements; the baseline scenario indicates a likely position within this range. The low case results in 11.0 million flights in 2017, an annual growth of 2.1%; the high case shows 12.5 million flights in 2017 representing an annual growth of 4.0% (see Figure 2.8).

Figure 2.8: EUROCONTROL Medium Term Flight Movement Forecast 2011-2017



Source: EUROCONTROL STATFOR

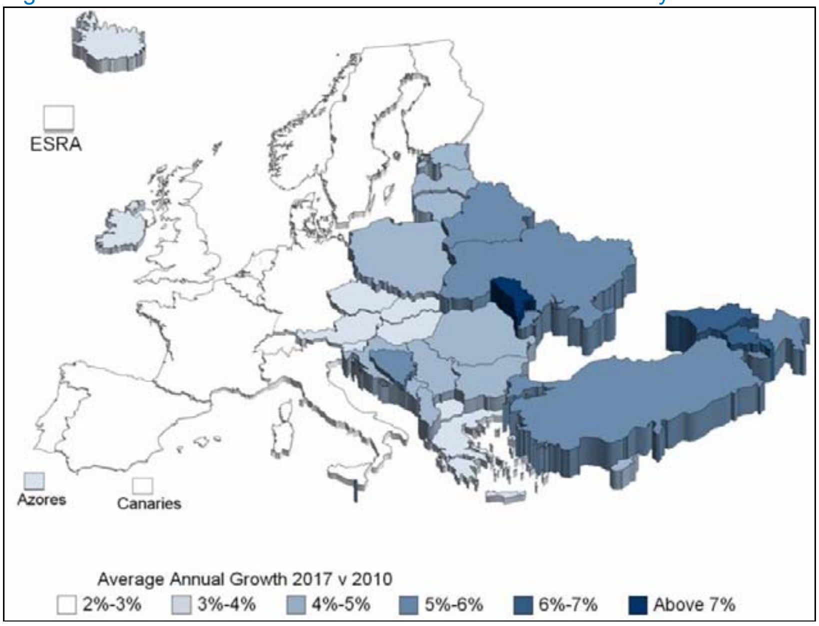
For the short term to 2012 the forecast is for a strengthened recovery at the European level but growth relies on different factors. There are also some risks which include:

- The potential for a switch of tourism preferences in the short term away from Tunisia and Egypt to the benefit of the northern side of the Mediterranean.
- The effects of aviation taxes in Germany, Austria and the UK are downside risks for those countries' local traffic.
- High fuel prices and weak economies present downside risks, although in some cases the potential for stronger economic recovery is an upside risk.
- Very recent data suggests slower growth in the Hungary-Romania overflight corridor, with an upswing along the Adriatic.

On a country-by-county basis there is a wide variation in traffic growth rates in the medium term period. Predicted growth is influenced by the capacity constraints expected at major airports. In the baseline scenario in 2017, demand for around 100,000 departures will not be accommodated due to airport congestion (mainly in the UK, Turkey and France).

By 2017 the growth is relatively stronger in the east of Europe. In contrast, in terms of the number of additional movements per day, traffic will increase the most in the big economies in the west of Europe (e.g. France, the UK, Germany, Italy) but also in Turkey, which is forecast to have one of the strongest traffic growth rates in Europe (see Figure 2.9).

Figure 2.9: EUROCONTROL Medium Term Traffic CAGR by State 2010-2017



Source: EUROCONTROL STATFOR

2.5.2 Long Term Forecast

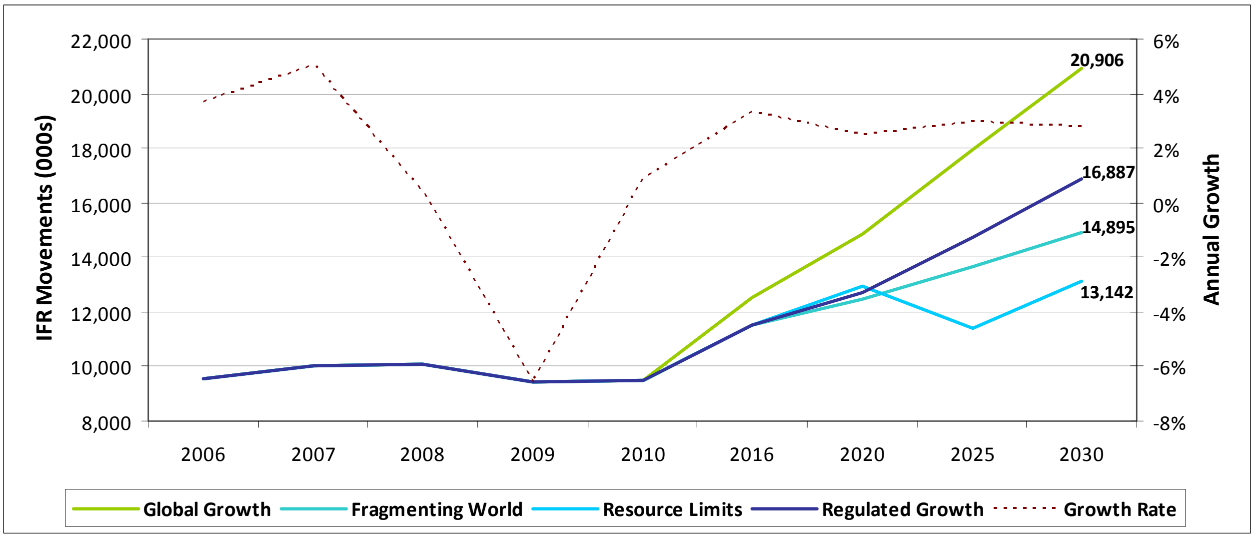
EUROCONTROL's approach to methodology in its long term forecast for the period 2010 to 2030 produces four forecast scenarios, each with a unique title:

- A: Global Growth – strong economic and technological growth
- C: Regulated Growth – moderate economic growth with regulation recognising sustainability factors
- D: Fragmenting World – increasing political tension, security threats, reduced trade, weaker economies
- E: Resource Limits – consequences of reaching peak oil supply in 2020[37]

Each scenario produces different levels of traffic and follows different paths of growth according the assumptions and mix of characteristics factored into the forecast. Scenario C, 'Regulated Growth' is considered by EUROCONTROL to be the most likely or baseline scenario, continuing current trends.

Under Scenario C there will be 16.9 million IFR movements in Europe in 2030, 1.8 times more than in 2009 and showing an average annual growth over the period of 2.8%. The four scenarios together represent a range of 13.1 to 20.9 million flights in 2030, or a range of 1.6% to 3.9% growth annually. The growth will be faster in the earlier period of the forecast, stronger in Eastern Europe and stronger for arrivals and departures to and from outside Europe than for intra-European flights (see Figure 2.10).

Figure 2.10: EUROCONTROL Long Term ATM Forecast 2010-2030



Source: EUROCONTROL STATFOR

Future air traffic will be limited by capacity at European airports. EUROCONTROL estimates that under the four scenarios a range of 700,000 to 5.0 million flights will not be accommodated in 2030, representing 5% to 19% of the demand.

[37] Peak Oil is defined as the point in time when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline.

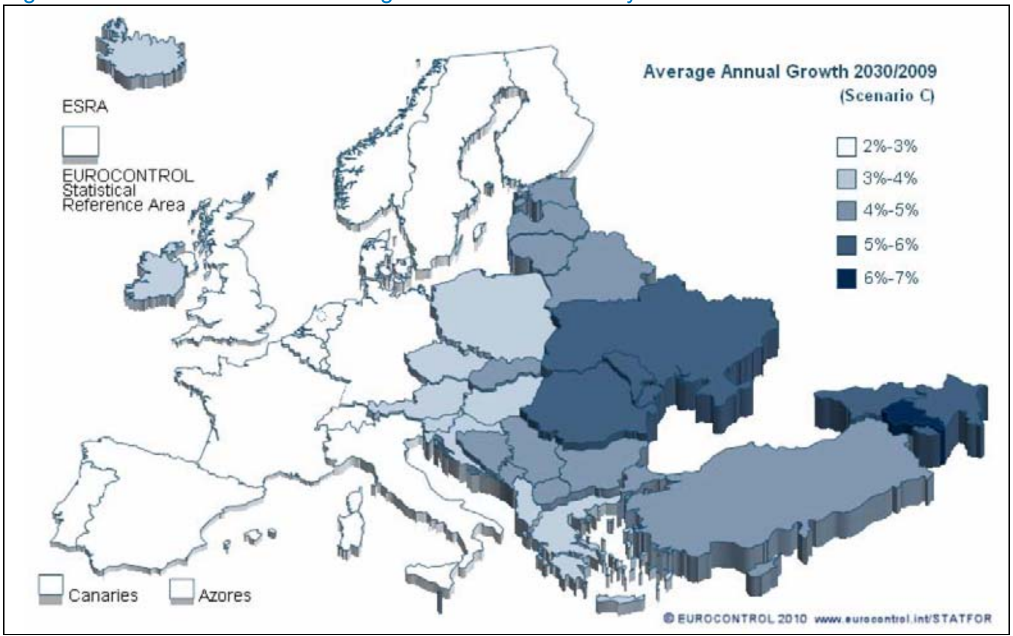
Airport congestion is now lower than in the long term forecast produced by EUROCONTROL two years ago. The recent drop in traffic has given the system some extra years to react and adapt but once the limits are reached the number of unaccommodated flights increases quickly. Congested airports create pressure on the flow of operations in the network and will exacerbate delays.

Even with capacity restrictions, airports will grow. In 2030, there will be 13 to 34 airports in Europe as big as the top seven are now. Some of the faster growing Eastern European airports will join the top 25. European hubs will be faced with competition from hubs outside Europe, primarily in the Middle East.

Due to factors such as business opportunities in emerging economies, saturation of intra-European markets, environmental initiatives and alternative modes of travel (e.g. high speed rail) passengers will travel further on average in 2030 than they do now. They will also fly in larger aircraft, especially on long-haul. On short-haul, high speed rail will continue to compete with air transport. New or improved high speed rail connections on some forty city-pairs will decrease the demand for flights by a little over 0.5%, but the effect will be more significant locally.

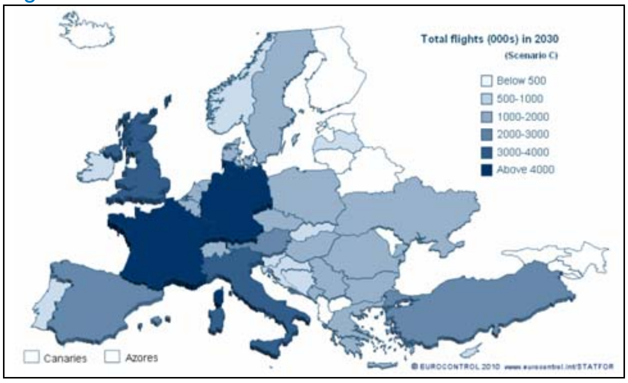
As with the medium term forecast, the principal focus for growth is concentrated in the east of Europe (see Figure 2.11). Despite the emphasis on traffic growth being concentrated mainly in Eastern European countries, in absolute terms it is still the nations of Western Europe which will command the largest traffic volumes in 2030 and record the highest number of additional daily flights compared with the present situation (with the exception of Turkey); see Figure 2.12 and Figure 2.13.

Figure 2.11: EUROCONTROL Long Term Traffic CAGR by State 2009-2030



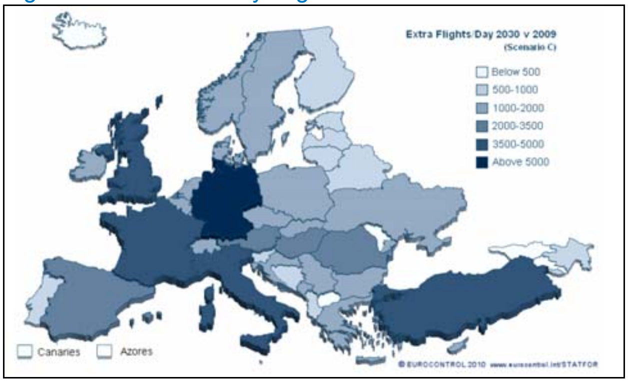
Source: EUROCONTROL STATFOR

Figure 2.12: Total Traffic in 2030



Source: EUROCONTROL STATFOR

Figure 2.13: Extra Daily Flights 2009 vs. 2030



Source: EUROCONTROL STATFOR

2.6 World Air Cargo Forecast

The most comprehensive long term forecast for global air cargo over the next twenty years is produced by Boeing[38] and is used in this section for analysis. Extracts and data from the report are presented here as they relate to the overall global activity in air cargo, important future regional markets, European trading partners and the outlook for the EU. The base year for the Boeing forecast is 2009 so the significant growth in cargo seen in 2010 (discussed previously in Section 0) although forecast is not captured as an actual.

Air cargo is comprised of air freight and air mail. It can be expressed either as a measure of the overall tonnage carried or as revenue tonne kilometres (RTK), which means the amount of cargo carried multiplied by the distance it is transported. Boeing considers that RTK is usually used interchangeably with the term freight tonne kilometres (FTK, used by Airbus).

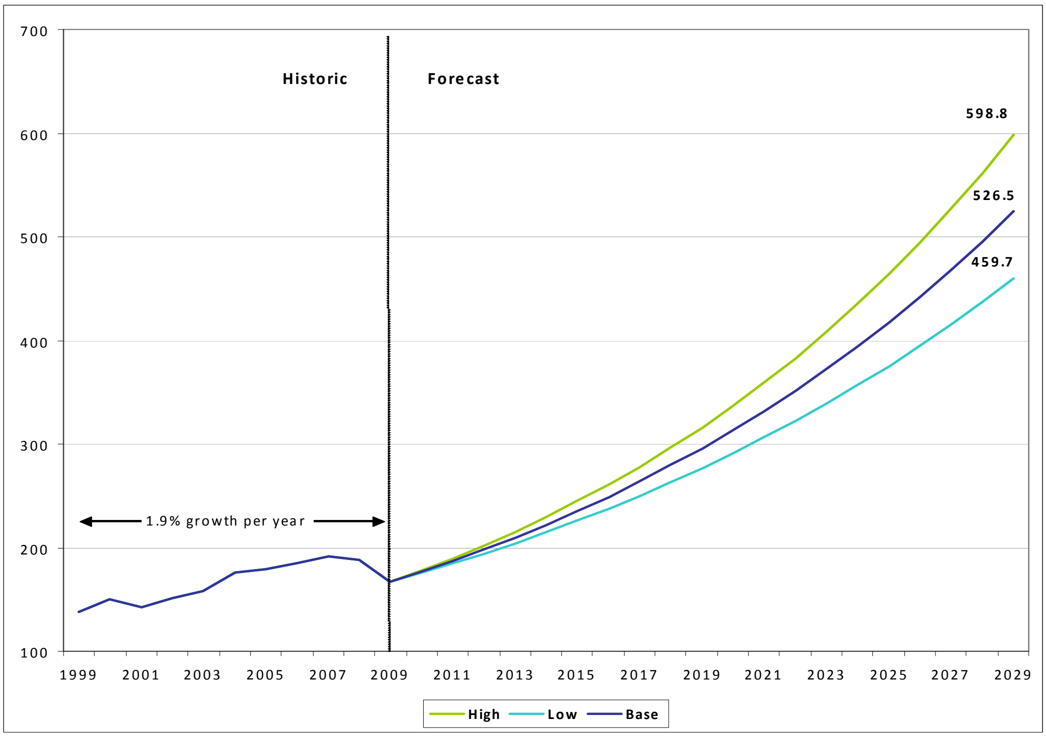
In 2009, global air cargo traffic amounted to 166.8 billion RTKs, and is forecast to expand at an average annual rate of 5.9% to 526.5 billion RTKs over the next two decades, which will triple the 2009 figure. The majority of air cargo currently carried is air freight, which accounted for 92% of the 2009 total.

Air freight RTK growth, including express traffic, will average 6.0% growth annually. Airmail traffic will grow much more slowly, averaging only 1.4% growth annually through 2029. It should be noted that because of the large drop in 2009, the historic ten year world air cargo growth rate fell from 3.9% during the 1997-2007 period to only 1.9% during the 1999-2009 period.

Boeing has produced three growth scenarios for world air cargo traffic over the next twenty years; these are shown below in Figure 2.14.

[38] World Air Cargo Forecast 2010-2011, The Boeing Company 2010

Figure 2.14: Historic & Forecast World Air Cargo Traffic 1999-2029 (RTK, billion)



Source: Boeing

The three scenarios are based on relationship to GDP. The report says that as a major driver of international trade, GDP growth stimulates air freight which will grow at nearly double the GDP growth rate.

Air cargo is essential for the global sourcing, manufacturing, assembling, and distribution of goods, which together account for much of the growth in air cargo traffic. Other factors affecting growth rates include available capacity, cargo yields, jet fuel prices, relative currency strengths, environmental regulations and national industrial incentives.

The baseline annual growth for the global forecast is 5.9%, with low and high scenarios corresponding to GDP growth of 0.5% above long term projections and 0.5% below respectively, at 5.3% and 6.8%.

2.6.1 Major Regional Air Cargo Flows

Future air cargo flow along the world's major regional trading routes will have a strong focus on the rising middle classes in emerging economies displaying robust growth and producing a demand for goods. Future trends in air cargo volume and direction will follow a similar pattern to the expected development in passenger travel.

Air cargo markets linked to Asia, especially the Pacific Rim countries, are forecast to lead all other international markets in terms of growth over the period to 2029. Intra-Asia will grow faster than any other international world market, averaging 7.9% growth per year. The Asia to North America and Europe to Asia markets will expand at average annual rates of 6.7% and 6.6%, respectively. Domestic China is forecast to be the fastest single growing market in the world, averaging 9.2% growth per year for the forecast period.

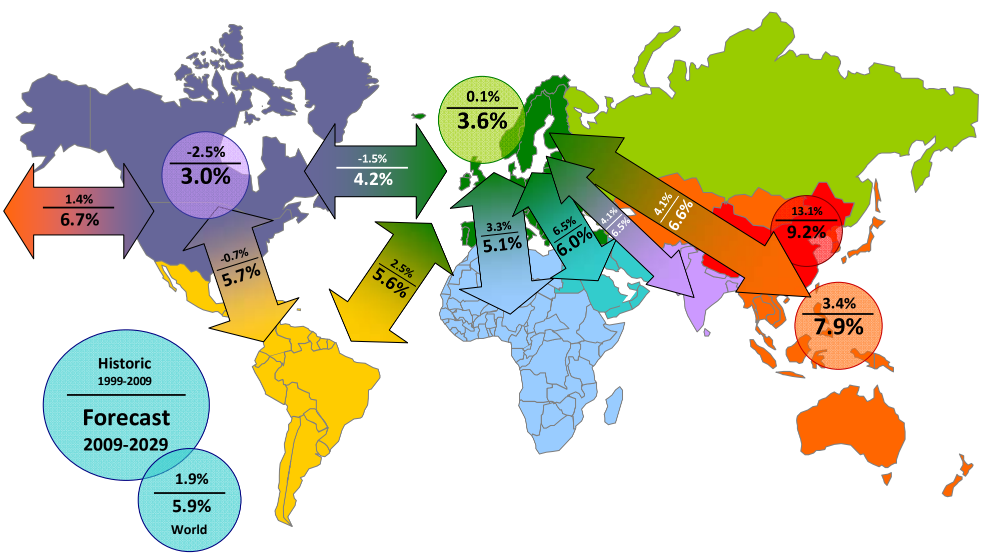
The mature domestic markets of North America and Europe are forecast to grow more slowly, with twenty year annual growth rates of 3.0% and 3.6% respectively. However, there is much stronger growth predicted for North American international air cargo in terms of the transpacific and Latin American markets (6.7% CAGR and 5.7% CAGR respectively), compared to the transatlantic market with Europe which is forecast to grow at 4.2% annually.

For European international markets, the South Asia market is forecast to show the highest growth at 6.5% average annual growth over the period. For Europe, the Middle Eastern and Latin American markets are also expected to exhibit strong growth, at 6.0% CAGR and 5.6% CAGR respectively.

Market shares will continue to change as a result of varying regional growth rates. Although it will grow 9.2% per year over the next twenty years, domestic China will still possess a relatively small market share given its current size and the market's relatively short average trip distance. Overall, the share of world air trade connected to Asia's markets, including the domestic markets of China and Japan and all international markets, will increase from 52.1% in 2009 to 60.1% in 2029.

Figure 2.15 below summarises these figures in a visual format. The growth rates contained within circles are for intra-regional flow and are shown for North America, Europe, domestic China and Asia Pacific. The growth rates contained within arrows represent air cargo flow between (to and from) regions. The smaller superscript figure denotes the historic growth rate of cargo for the period 1999 to 2009, while the larger figure shows the forecast average annual growth from 2009 to 2029. Note that historical average annual growth rates for the period 1999 to 2009 are heavily influenced by the 2009 downturn.

Figure 2.15: Regional Cargo Flow Growth Rates



Source: Boeing

The influence of Asia and emerging economies are clearly seen in Figure 2.15. All of the eastward air cargo markets in relation to Europe will produce an annual growth rate above the world average of 5.9% – the Middle East, South Asia, Asia Pacific and in particular domestic China.

2.6.2 The European Market

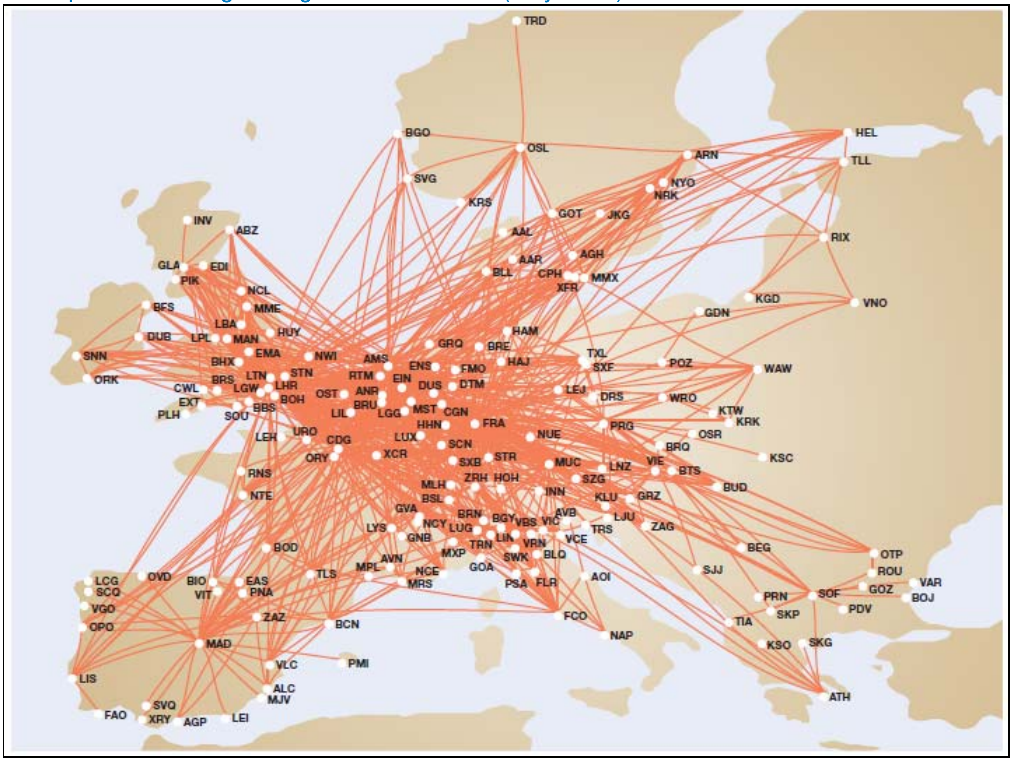
The intra-European air cargo market comprises approximately 3.6% of the world's air cargo tonnage, but because it is geographically compact, only 1.0% of revenue tonne-kilometres. Approximately 72% of all air cargo moving into, within and out of Europe passes through the northern European countries of Germany, France, the United Kingdom, the Netherlands, Belgium, and Luxembourg. These leading markets are geographically concentrated, so air cargo traffic within Europe is characterised by relatively short hauls of typically between 900 and 1,200 kilometres in distance.

The intra-European air cargo market declined 10.1% in RTKs in 2009 after falling 0.8% in 2008, following moderate growth of 3.7% in 2007. It has since bounced back by 11% in 2010 (discussed in more detail in Section 0), although this bounce back is not as strong as in other regions. The market had grown rapidly between 1990 and 2000 averaging 6% per year as express carriers built air networks and expanded service offerings. Since the late 1990s however, the relaxation of border controls and harmonisation of transport regulations within the EU have allowed surface truck shipments to erode much air cargo traffic growth.

Scheduled airlines that serve the intra-European market have long used truck flights, which are trucking services registered with their own flight number; to extend networks and add scheduling flexibility. Long-haul truck flight operations in Europe supplement overall air logistics systems. Their rise over the past five years has clearly contributed to a decline in growth of scheduled freight carried by air. Between 2005 and 2010, weekly truck flight frequencies offered by scheduled airlines grew from 8,263 to 19,752 per week, representing an average annual growth rate of 19%.

These truck flight operations provide regularly scheduled freight service for high-value or work-in-progress goods between manufacturing facilities, especially to and from central and Eastern Europe. Scheduled truck operations are often used where demand is too low or infrequent to warrant a dedicated freighter aircraft service.

Figure 2.16: European Truck Flight Cargo Service Routes (May 2010)



Source: Boeing

The intra-Europe air cargo market is forecast to expand at an average annual rate of 3.6% per year to 2029. The twenty year forecast growth in air cargo traffic is in contrast to the 1% decline during the five years leading to 2009 and slightly better than the 3.4% growth trend recorded during the previous twenty year period from 1989 to 2009.

Economic and industrial activity will remain the primary drivers for traffic growth in Europe. Downside factors will be inflexible labour markets, an aging population, expensive pension systems; and slow economic reforms will limit long term European economic growth especially in the countries of northern Europe. In the near term tight fiscal and monetary policies will continue to curb economic growth and entrepreneurial activity, thereby slowing air cargo growth. On the upside, the more distant eastern and southern European markets, where longer trucking times may be unacceptable for some shippers, offer air cargo traffic growth prospects for the next two decades. Also, projected EU expansion should bolster intra-Europe air cargo growth during the forecast period.

Based on these factors, the Boeing low and high case scenarios forecast air cargo growth ranging between 2.7% and 4.5% CAGR over the period.

3. Airlines

3.1 Overview

2010 saw a significant recovery in global air traffic following the major decline seen in 2009. IATA member airline passenger traffic (measured in Revenue Passenger Kilometres) grew by just over 8% in 2010 compared to 2009, while Freight Tonne Kilometres grew by just over 20%.

During 2010, average passenger load factors recovered to levels last seen in 2007/08, as did average aircraft utilisation, at least for short-haul aircraft. Just as importantly, average yields per passenger-kilometre recovered, although by the end of 2010 they had not recovered to the high point achieved in 2008.

In contrast, the cost of fuel continued to rise throughout 2010 putting immense strain on airline profitability. IATA has estimated that global airlines made a net profit of USD 16 billion in 2010, or a return of 2.9% on revenues of USD 552 billion. Although this was a great improvement on the results for 2009 (a net loss of USD 9.9 billion), the profits made are still insufficient to meet the cost of capital required to keep airlines financially fit.

During 2010, share values of European airlines quoted on stock exchanges showed a healthy increase of around 25%, but this was only on a par with the global average. In terms of share value, airlines based in Asia have consistently outperformed other European airlines in the period since 2004, while those based in the U.S. have yielded significantly inferior results.

In 2010, there was a quickening in the pace of mergers between major global airlines. In the United States, the merger between United and Continental followed the previous year's merger between Northwest and Delta. In Europe, the merger between British Airways and Iberia was finally signed, mirroring the earlier groupings of Air France with KLM; and Lufthansa together with Swiss, Austrian Airlines, bmi and SN Brussels Airlines.

IATA's initial estimates for 2010 show that although member airlines increased their passenger capacity by 4.4% compared to 2009 and their traffic by 8.2% (thus greatly improving their average load factors), airlines based in Europe were the least improved – capacity up by 2.6% and traffic by 5.1%. In comparison, Middle Eastern airlines increased their capacity by 13.2% and traffic by 17.8%.

All three global alliances (Star Alliance™, SkyTeam® and oneworld®) increased their membership and network coverage in 2010. Star Alliance remained the largest alliance in terms of aircraft, passengers and revenues – it is estimated to have earned some USD 151 billion in revenues in 2010, or 47% of total alliance revenues of USD 322 billion. SkyTeam and oneworld tied at USD 86 billion each.

The trend continues for more unaligned airlines to join one of the three alliances each year. Currently discussions are continuing with a further fourteen possible new airlines – although there are still several major carriers unattached, notably Emirates, Etihad, Qatar Airlines and Virgin Atlantic.

Six European regional airlines are included amongst the world's top 25 regional airlines in terms of scheduled seat-kilometres, with Lufthansa CityLine being the largest. In 2010, these six airlines reduced their advertised capacity by some 1%.

Partnerships and further consolidation continued in the European regional airline sector in 2010 as many regional airlines have cut their costs as far as they are able to. Many European regional airlines are at different stages in the re-equipment stakes and are introducing more fuel-efficient aircraft with lower seat costs; once this is complete European regional carriers will have little ability to lower seat costs any further. The new aircraft are enabling regional carriers to enter new (longer sector) markets and jet aircraft provide a competitive customer product advantage over turboprops. The removal of 50-seat regional jets by larger carriers continued with Lufthansa Regional targeting an exit from this aircraft size by February 2011.

There is no longer any fixed dividing line between legacy carriers, regional carriers and low cost carriers. Most airlines can easily be categorised into one or the other groupings, but many overlap the once clear distinctions. Some legacy airlines offer a set of low fares on otherwise standard services, while some of the low-cost carriers have begun to increase the number of legacy-style services they offer.

Worldwide, low cost airlines now account for some 23% of all advertised seat-kilometres, but the figure for Europe (35.3%) is now higher than any other world region. The European market share rose by three percentage points from the 32.1% share recorded in 2009. Figures for the nine European Low Fares Airline Association (ELFAA) members showed an increase of 11.5% in passenger numbers over 2009, with its two leading members (Ryanair and easyJet) accounting for some 71% of all ELFAA passengers.

2010 may also have seen the long-awaited breakthrough into long-haul markets by low cost airlines. Several have previously tried and failed, but the success of AirAsia X is being studied and used as a template by airlines elsewhere.

The year saw a continuation of the recent trend for all airlines – whether legacy, regional or low cost – to move towards a common model drawing upon the best aspects of each type of service. It may not be too many more years before the current distinction between the three airline types becomes so confused that it will become meaningless.

Examination of the European charter airline industry is made difficult by the lack of any published information on such airlines or on charter flights in general. However, the industry magazine Airline Business calculates figures for the top 50 global charter airlines, taken from a variety of sources. Data for 2009 (published in October 2010) estimated that the leading European charter airlines had 9% fewer passengers than in 2008, while more recent data for charter airlines using UK airports suggests a continuing decline in 2010. Three airline groups (TUI, Thomas Cook and Air Berlin) dominate the European market and accounted for almost two thirds of the industry in 2009.

Although short-haul charter operations are still under threat from further expansion by low cost airlines, it would appear that a new equilibrium may have been reached and their future secured, at least in Europe. Elsewhere in the world – apart from the significant charter operations needed for the annual Hajj pilgrimages to Saudi Arabia – charter flights appear to have shrunk into an almost negligible position.

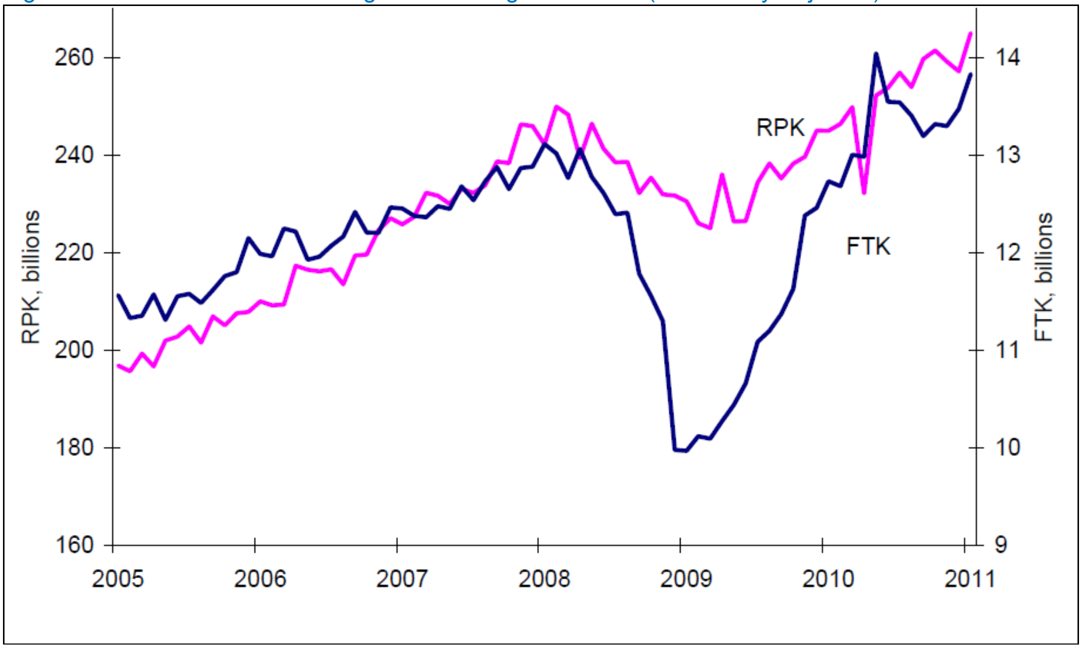
The volume of global air cargo recovered significantly during 2010 as the global economy recovered although, in Europe, the recovery was noticeably lower and unevenly spread. In Europe, cargo increased by 10.8% (in terms of Freight Tonne Kilometres) in 2010, but globally the increase was 20.8% led by Latin America (+29.6%) and the Middle East (+27.6%).

3.2 Airline Financial Performance

3.2.1 Traffic & Capacity

2010 saw a significant recovery in global air traffic following the major decline seen in 2009. IATA member airline passenger traffic (measured in Revenue Passenger Kilometres) grew by just over 8% in 2010 compared to 2009, while Freight Tonne Kilometres grew by just over 20%.

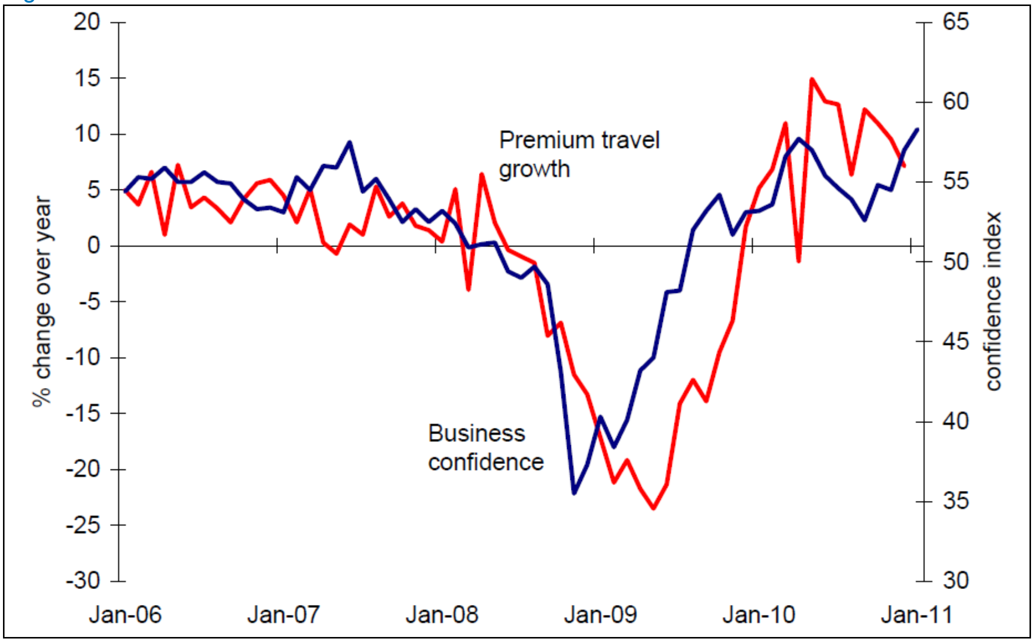
Figure 3.1: International Air Freight & Passenger Volumes (Seasonally Adjusted)



Source: IATA

The rebound was closely linked with global growth of GDP during 2010 and the associated rise in business confidence. Figure 3.2 shows that the growth of premium fare traffic (First Class and Business Class passengers) was averaging 11-12% by the end of 2010, and was lagging the increase in business confidence by some three to four months.

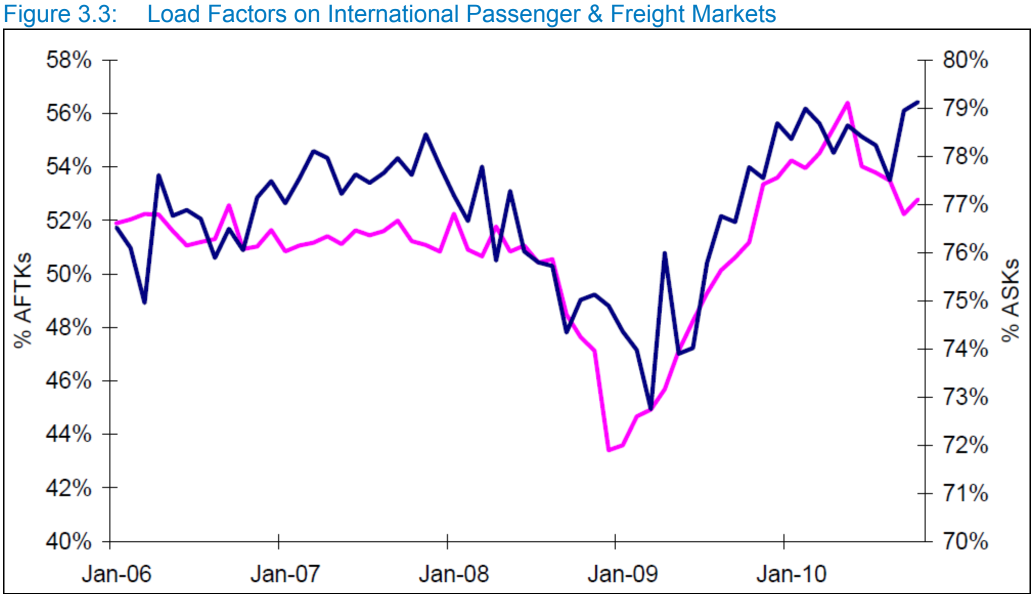
Figure 3.2: Premium Travel Growth & Business Confidence



Source: IATA, Markit

The decline in traffic demand in 2009 caught many airlines by surprise and they were unable to reduce their supply sufficiently to enable them to maintain their load factors – as a result global passenger load factors slipped from some 78% at the beginning of 2008 to around 73% by early 2009, recovering thereafter. During 2010 airlines had supply and demand once more in balance. Passenger capacity increased in 2010 by 4.4% and load factors increased globally by 2.7 percentage points to 78.4%. For air freight, capacity increased by 8.9% and load factors by 5.2 percentage points to 53.8% (Figure 3.3).

Figure 3.3: Load Factors on International Passenger & Freight Markets



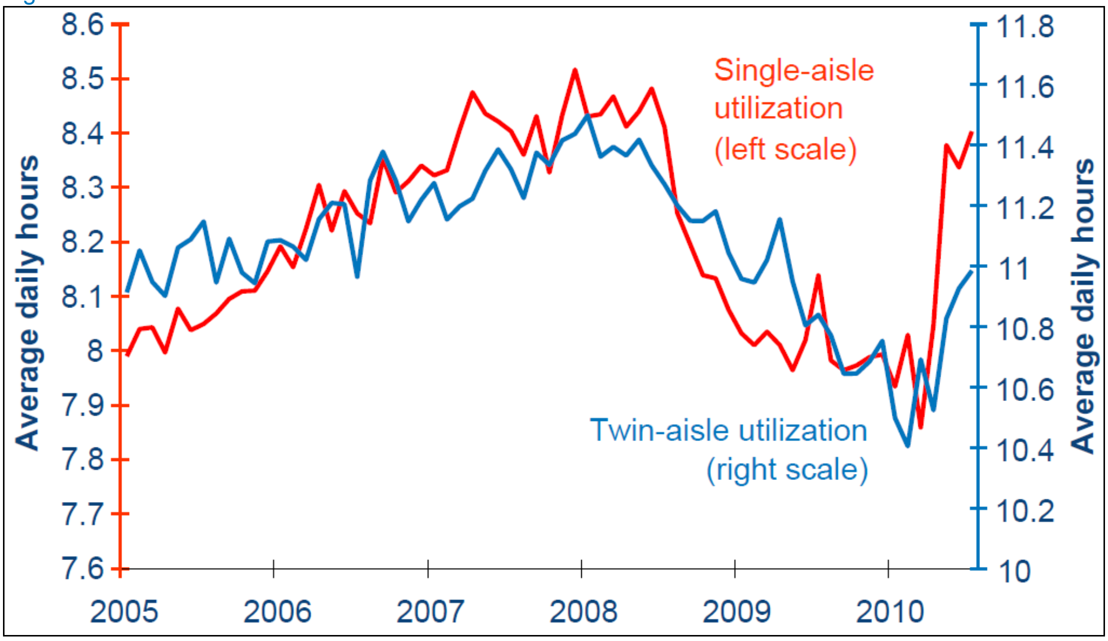
Source: IATA

Freight Tonne Kilometres (FTK) as a proportion of Available Freight Tonne Kilometres (AFTK) are always significantly below the levels achieved by passenger load factors, because of the seasonality of freight, directional imbalances by route; and the provision of excess freight capacity on many routes caused by the need to provide sufficient seat capacity to meet passenger demand, irrespective of freight demand.

Globally, airlines also achieved much more respectable aircraft utilisations during 2010 than had been possible during 2009, the year of greatest economic difficulty. By the end of 2008, airlines were regularly achieving an average of 8.45 hours a day (3,075 per annum) on their single-aisle aircraft (commonly used for domestic and intra-continental services); and 11.4 hours per day (4,150 per annum) on twin-aisle aircraft used predominantly for longer intercontinental services.

By early 2010, this had declined by some 6% to 7.95 hours per day on narrow bodied aircraft and by 8% to 10.5 hours per day for widebody aircraft. During 2010 much of this decline was recovered, particularly on short-haul aircraft, although only half of the long-haul decline had been recovered by year end (Figure 3.4).

Figure 3.4: Aircraft Utilisation



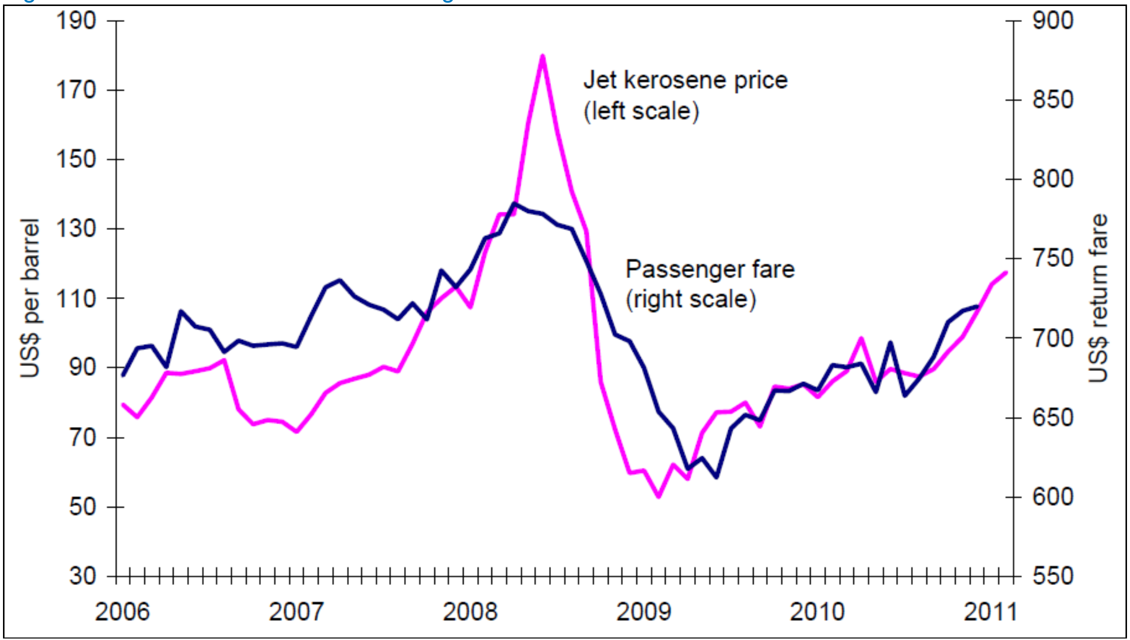
Source: IATA

3.2.2 Costs, Revenues & Profitability

Airlines had two main profit-related concerns in 2010, as in most previous years – the cost of fuel and the revenues per aircraft kilometre, the latter being a function both of demand and average yield.

The two factors are displayed together in Figure 3.5 below.

Figure 3.5: Jet Kerosene Price & Average International Return Fare



Source: IATA, Platts

The price of a barrel of jet kerosene (in USD) is shown for the period 2006 to 2010. There was a steady rise from January 2006 (at around $75 a barrel) to a peak of $180 by June 2008, then a substantial decline to around $52 by February 2009; followed by an apparently inexorable increase once more to some $115 by December 2010. The average price increase during 2010 has been around 70% year-on-year. There have been further dramatic increases in the early months of 2011 as a result of the political destabilisation of North Africa and the concern that this might spread to the oil-rich Middle East.

The oil industry currently believes that, on the basis of current global GDP estimates and increasing demand from Asia, the medium-term price of oil is likely to remain at between $100-110 a barrel once short-term political instabilities have been resolved.

Air fares have had to react to this surge in oil-prices, although the swings have not been so marked because there are many other costs that have not varied so wildly. Even so, yield (measured as an average return fare in USD) reduced dramatically from $780 in April 2008 to a low of $610 by June 2009 (a drop of 22%), rising once more to $725 by November 2010 (+19%) but still 7% below the peak 2008 yield.

Table 3-1 summarises the recent history of global airline costs and revenues, based on actuals from ICAO; and provides estimates and forecasts for 2009 to 2011 by IATA.

Table 3-1: System-Wide Global Commercial Airlines Revenues, Expenses, Operating & Net Profit

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010E	2011F
REVENUES, USD billion	**307**	**306**	**322**	**379**	**413**	**465**	**510**	**564**	**482**	**552**	**594**
% change	-6.4	-0.5	5.2	17.7	9.1	12.5	9.6	10.5	-14.4	14.4	7.6
Passenger	239	238	249	294	323	365	399	444	374	425	456
Cargo	39	38	40	47	48	53	59	63	48	63	68
Traffic Volumes											
Passenger growth, TKP, %	-2.7	1.0	2.3	14.9	7.0	5.0	6.4	1.5	-2.1	7.3	5.6
Passenger numbers (million)	1,640	1,639	1,691	1,888	2,022	2,129	2,284	2,293	2,277	2,439	2,570
Cargo growth, TKP, %	-6.0	8.7	3.9	7.9	0.4	4.8	4.8	-1.0	-9.8	18.3	6.1
Freight tonnes (million)	28.8	31.4	33.5	36.7	37.6	39.8	41.8	40.5	36.9	43.6	46.2
World economic growth, %	2.2	2.7	2.8	4.2	3.4	4.0	3.8	1.7	-2.3	3.8	3.1
Passenger yield, %	-4.0	-1.7	2.4	2.6	2.7	7.8	2.7	9.5	-14.0	6.1	1.5
Cargo yield, %	1.9	-9.5	2.0	7.4	2.4	5.9	5.5	7.4	-14.2	10.2	1.9
EXPENSES, USD billion	**319**	**311**	**323**	**376**	**409**	**450**	**490**	**573**	**486**	**524**	**575**
% change	0.5	-2.7	4.0	16.2	8.9	10.1	8.8	16.9	-15.2	8.0	9.7
Fuel	43	40	44	65	91	117	135	189	125	139	166
% of expenses	13	13	14	17	22	26	28	33	26	26	29
Crude oil price, USD/b	24.7	25.1	28.8	38.3	54.5	65.1	73.0	99.0	62.0	79.4	96.0
Non-Fuel	276	270	279	311	318	333	355	384	361	386	409
Cents per ATK (non-fuel unit cost)	39.7	38.8	38.9	39.5	38.6	38.9	39.3	42.0	40.9	41.5	41.5
% change	1.4	-2.3	0.3	1.4	-2.1	0.8	0.8	6.9	-2.5	1.5	0.0
Break even load factor, %	61.3	61.9	61.1	61.9	62.0	61.2	60.9	64.1	63.0	62.4	63.4
Weight load factor achieved, %	59.0	60.9	60.8	62.5	62.6	63.3	63.4	63.1	62.6	65.6	65.5
OPERATING PROFIT, USD billion	**-11.8**	**-4.8**	**-1.4**	**3.3**	**4.4**	**15.0**	**19.9**	**-8.9**	**-3.4**	**27.4**	**18.4**
% margin	-3.8	-1.6	-0.4	0.9	1.1	3.2	3.9	-1.6	-0.7	5.0	3.1
NET PROFIT, USD billion	**-13.0**	**-11.3**	**-7.5**	**-5.6**	**-4.1**	**5.0**	**14.7**	**-16.0**	**-9.9**	**16.0**	**8.6**
% margin	-4.2	-3.7	-2.3	-1.5	-1.0	1.1	2.9	-2.8	-2.1	2.9	1.4

Source: IATA, ICAO, OEF, Platts (TKP = tonne kilometres provided)

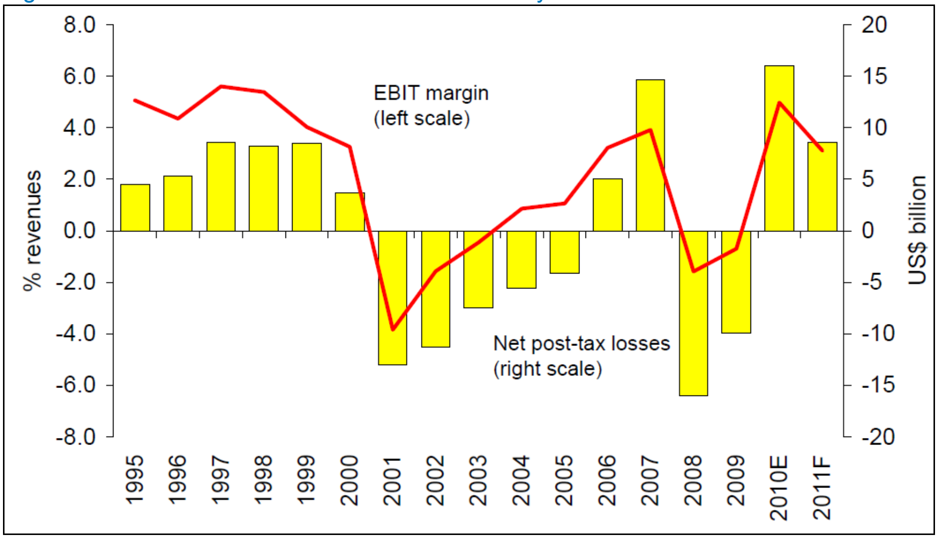
Costs and revenues shown in Table 3-1 are in current USD and therefore include the impacts of inflation.

Compared with previous years, the estimated airline (net) profits of some USD 16.0 billion are substantially higher than in eight of the previous nine years; and are a dramatic improvement from the expected outturn of a USD 2.1 billion loss in the previous year. IATA's forecasts for 2011 are for a reduced net profit level of USD 8.6 billion, but this is still greater than all the earlier years except 2007 and 2010. Early financial returns from airlines for the fourth quarter of 2010 suggest that the improvement has already peaked; and that continuing oil price rises are not being matched by further increases in yields or load factor.

It should be noted that even the substantial profits shown for 2010 represent only a 2.9% margin on revenues of some USD 552 billion – the global airline market overall is still not a healthy industry.

Figure 3.6 shows the same profits and losses in terms of net result as a percentage of revenue and covering the longer period from 1995, plus the related EBIT result. The impacts of the events of 2001 and the associated recession, plus the recession of 2008/09 are clearly shown, while the predicted result for 2010 is well above the recent trend-line.

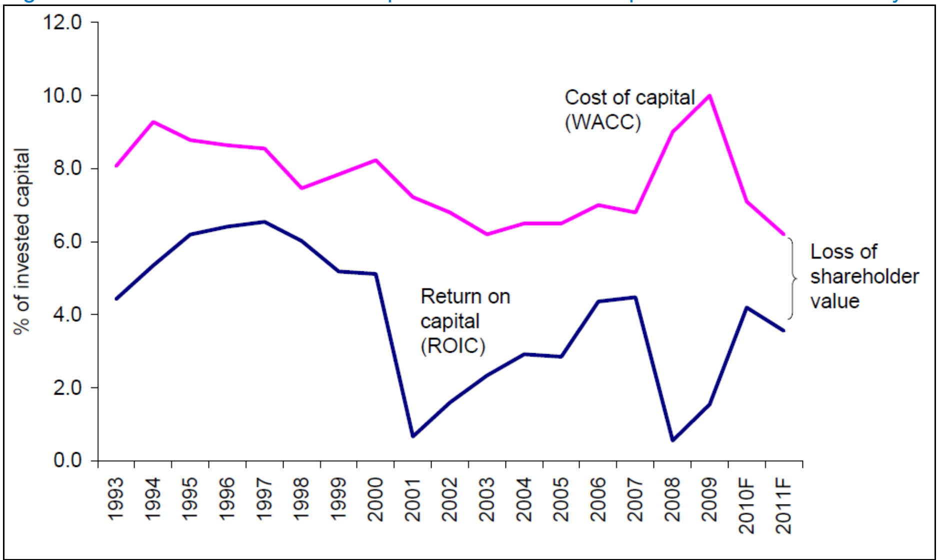
Figure 3.6: Global Commercial Airline Profitability



Source: IATA, ICAO

As Figure 3.7 shows below, the return on invested capital in the airline industry in 2010 showed a considerable improvement over both 2008 and 2009, but it is still seriously and continuously lagging behind the cost of the capital needed for investment purposes – money invested in airlines would have earned far more being invested elsewhere.

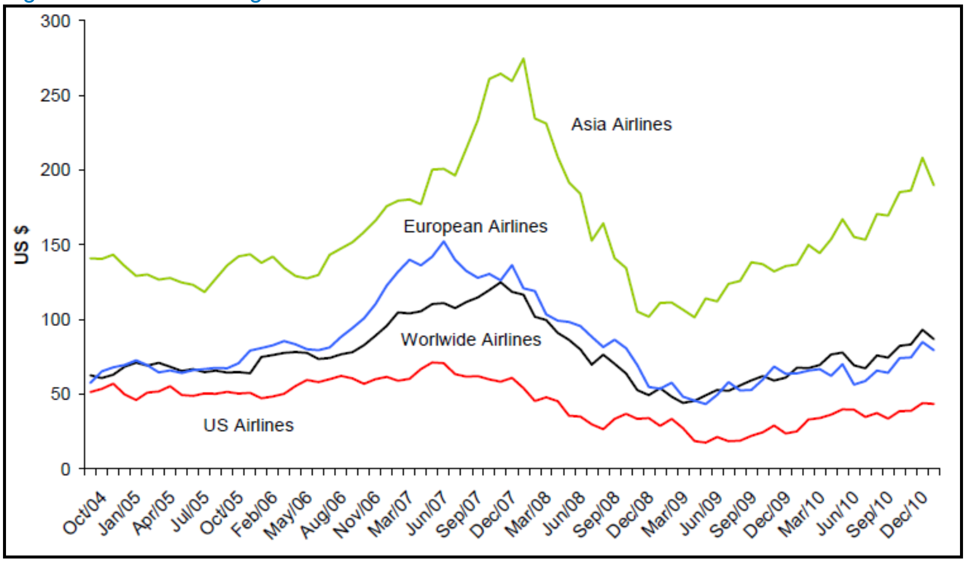
Figure 3.7: Return on Invested Capital vs. the Cost of Capital in the Airline Industry



Source: IATA

During 2010, share values of European airlines quoted on stock exchanges showed a healthy increase of around 25%, but this was only on a par with the global average. In terms of share value, airlines based in Asia have consistently outperformed other European airlines in the period since 2004, while those based in the U.S. have yielded significantly inferior results (Figure 3.8).

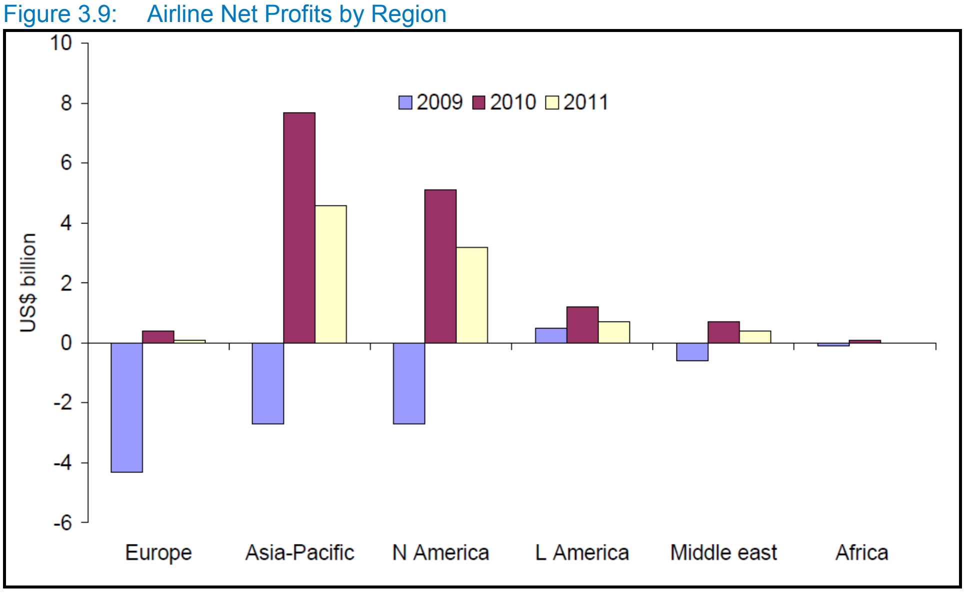
Figure 3.8: Bloomberg Airlines Index



Source: Bloomberg

However, share price is not necessarily a good indicator of airline profit. IATA estimates that European airlines will show only a very small level of profit for 2010 following a very poor 2009 and perhaps only a break-even situation in 2011. In comparison, large profits are forecast for Asian and North American airlines in 2010, plus a strong turn-round for Middle Eastern airlines (Figure 3.9).

Figure 3.9: Airline Net Profits by Region



Source: IATA

It is reported[39] that American Airlines' parent AMR Corp. was the only U.S. airline company among the top five which remained in the red in 2010 and analysts expect it to return to profits in 2011 following the cleared alliance with BA and Iberia. Total profits for U.S. airlines in 2010 are expected to be the best in over 10 years[40] with the major carriers estimated to achieve the annual earnings shown in Table 3-2.

Table 3-2: 2010 U.S. Airline Summary Financial Data

	United/ CO	Delta	AMR Corp.	US Airways	South-west	JetBlue	Alaska	Air Tran	Total
Operating Aircraft	710	722	618	339	548	160	114	138	3,349
Passengers (millions)	99.5	105.1	86.1	51.9	88.2	24.3	16.5	24.7	496.2
Passengers chg YoY (%)	-2.3	5.7	0.5	1.6	2.2	8.0	6.1	3.0	3.1
Load factor (%)	83.9	83.7	81.9	82.4	79.3	81.4	83.3	81.4	82.6
Load factor chg YoY (%)	2.5	1.2	1.5	0.6	4.3	2.1	5.0	2.0	2.4
Yield (cents per mile)	12.96	12.73	13.36	12.96	14.72	12.07	13.58	12.03	13.05
Yield chg YoY %	15.6	12.5	8.8	11.1	10.8	6.8	2.3	7.0	9.4
Seat cost (cents per available seat mile)	11.65	11.03	12.57	11.72	11.11	9.71	10.96	10.35	10.93
Seat cost chg YoY %	8.6	1.8	4.6	1.8	11.0	8.0	1.7	11.4	6.1

Source: AirlineFinancials.com

Revenue-wise, individual airlines recorded mixed fortunes in 2010, as highlighted in Table 3-3. However, there was a general rebound in financial strength and the majority of the major airline groupings worldwide posted more favourable operating results in 2010 than 2009.

Of note are the strong performances from the top 3 airline groupings – Lufthansa Group, United-Continental Holdings and Delta Air Lines – while 2009's number 2 group, Air France-KLM, recorded a comparatively modest operating result in 2010, but in light of its previous years' result it is a significant improvement. AMR, International Airlines Group and Japan Airlines Corp. also posted much-improved results over 2009.

Table 3-3: 2010 Top 30 Airline Groups by Revenue

Ranking						Operating Result ($m)	
2010	(2009)	Group/Airline	Country	Region	Revenues ($m)	2010	2009
1	(1)	Lufthansa Group	Germany	EU	36,067	1,762	266
2	(3)	United-Continental Holdings	USA	North America	34,013	1,818	-17
3	(4)	Delta Air Lines	USA	North America	31,755	2,217	-324
4	(2)	Air France-KLM Group	France	EU	31,276	162	-1,816
5	(5)	FedEx Express	USA	North America	24,581	1,228	1,127

39 Airline Industry Posts Record 2010 Profit, uptake.com, 20 January 2011

40 U.S. airlines are expected to report highest annual profits in more than 10 years, Los Angeles Times, 18 January 2011

Ranking						Operating Result ($m)	
2010	(2009)	Group/Airline	Country	Region	Revenues ($m)	2010	2009
6	(6)	AMR	USA	North America	22,170	308	-1,004
7	(7)	International Airlines Group	UK	EU	19,533	297	-1,267
8	(8)	Japan Airlines Corporation	Japan	Asia Pacific	16,018	2,216	-1,446
9	(9)	ANA Group	Japan	Asia Pacific	15,963	797	-587
10	(10)	Emirates	UAE	Middle East	14,807	1,481	971
11	(18)	Air China	China	Asia Pacific	12,203	1,617	805
12	(11)	Qantas	Australia	Asia Pacific	12,145	223	149
13	(13)	Southwest Airlines	USA	North America	12,104	988	262
14	(12)	US Airways	USA	North America	11,908	781	118
15	(15)	Cathay Pacific	Hong Kong	Asia Pacific	11,523	1,813	740
16	(17)	China Southern Airlines	China	Asia Pacific	11,317	930	211
17	(21)	China Eastern Airlines	China	Asia Pacific	11,089	841	267
18	(14)	Singapore Airlines Group	Singapore	Asia Pacific	10,957	959	44
19	(16)	Air Canada	Canada	North America	10,428	393	-278
20	(19)	Korean Air	South Korea	Asia Pacific	9,923	949	105
21	(22)	TAM Linhas Aereas	Brazil	Latin America	6,475	556	106
22	(20)	SAS Group	Sweden	EU	5,978	-285	-439
23	(24)	Thai Airways International	Thailand	Asia Pacific	5,822	717	404
24	(26)	Turkish Airlines	Turkey	Europe (Non-EU)	5,567	319	471
25	(31)	Qatar Airways	Qatar	Middle East	5,381	-	-
26	(23)	Saudi Arabian Airlines	Saudi Arabia	Middle East	5,300	-	-
27	(25)	Air Berlin	Germany	EU	4,915	-12	40
28	(27)	United Parcel Service (UPS)	USA	North America	4,910	230	259
29	(28)	Ryanair	Ireland	EU	4,807	647	568
30	(29)	easyJet	UK	EU	4,632	270	92

Source: Airline Business August 2011 World Airline Rankings – Financial

Of the top 30 airline groups by revenue in 2010, Asia Pacific carriers are best-represented with ten in the list. Eight North American airline groups feature, while seven from the European Union are included (plus Turkish Airlines from outside the ECAA). Three Middle Eastern and one Latin American airline group make up the list.

3.2.3 New entrants and exits in Europe

In 2010, several airlines of significance entered the European market, recorded in Table 3-4.

Table 3-4 European Airline New Entrants in 2010

Airline	Country	Remarks
Air Bucharest	Romania	International charter airline based in Bucharest, serving Turkish leisure market. Also provides lease services.
Belle Air Europe	Italy	Italian start-up low cost carrier linking Ancona and Bergamo with domestic destinations and regional services including Skopje and Tirana; July 2010
Eagles Airlines	Italy	Based at Venice operating domestic services with Fokker 100s; July 2010

Airline	Country	Remarks
Enter Air	Poland	International charter airline operating a fleet of eight B737s, with bases at three Polish airports – Warsaw, Katowice and Poznan. Provides services from Poland to Turkey, Greece, Egypt and Tunisia.

Source: OAG/Ascend

A number of airlines operating in Europe suspended operations and entered bankruptcy in 2010. Table 3-5 lists the most important of these.

Table 3-5 European Airlines Ceasing Operations in 2010

Airline	Country	Remarks
Blue Wings	Germany	Charter airline based in Dusseldorf went bankrupt in January
Hola Airlines	Spain	Charter airline based in Madrid ceased operations in February
MyAir	Italy	Low Cost Carrier based at Bergamo and Venice, entered bankruptcy in February
Air Slovakia	Slovakia	Scheduled and charter carrier based in Bratislava; AOC revoked in March
Highland Airways	UK	Commuter airline based in Inverness, Scotland, suspended in March
Air Volga	Russia	Regional carrier based in Volgograd ceased operations in April
MK Airlines	UK	Cargo operator based in Ostend-Bruges, Belgium, ceased operations in April
Cyprus Turkish Airlines	Turkey	Scheduled carrier based in Ercan, North Cyprus, collapsed in June
Athens Airways	Greece	Regional airline based in Athens ceased operations in September
Star1 Airlines	Lithuania	Low-cost airline based in Vilnius entered bankruptcy in October
Viking Airlines	Sweden	Charter airline based in Stockholm suspended operations in October
Blue Line	France	Charter airline based at Paris CDG ceased operating in October
Eurocypria Airlines	Cyprus	Charter airline based in Larnaca ceased in November

Source: OAG/Ascend

3.3 Legacy Carriers

Legacy carriers are full-service airlines operating domestic, regional and intercontinental passenger services, often from one hub in their home territory and providing between them a network of air services across the globe.

3.3.1 Top 25 Carriers

The worldwide capacity (ASKs) of all airlines publishing schedules increased by 6.9% in 2010 compared to 2009. Capacity growth for the top 25 legacy carriers measured in ASKs grew by 3.9% (see Table 3-6). Of the top 25 legacy carriers it was Middle Eastern, Chinese and Turkish airlines which increased capacity the most in percentage terms, with Emirates, Qatar, China Southern, Air China, China Eastern and Turkish Airlines all achieving double digit capacity growth in 2010 compared to 2009. In terms of absolute growth (in ASKs) the most capacity was added by Emirates, followed by Qatar and China Southern Airlines.

Consolidation in the legacy airline sector continued apace in 2010 with mergers between Delta Air Lines and Northwest Airlines; and between United Airlines and Continental Airlines.

The merger of Delta Airlines and Northwest Airlines was completed at the start of 2010 and created the world's largest legacy airline with the airline operating under one operating certificate, replacing American Airlines in pole position. The merger between United and Continental was approved and integration commenced in 2010; they will continue to operate separately under United Continental Holdings, Inc. until receipt of a single operating certificate from the Federal Aviation Administration, which they expect to receive by the end of 2011.

The final preparations also took place in 2010 for the merger of British Airways and Iberia with the two airlines joined together under a single parent company International Airlines Group (IAG), with the transaction completed on 24 January 2011.

Table 3-6: Top 25 Legacy Carriers

Rank	Airline	2010 ASKs (millions)	vs. 2009	ASK YoY growth (millions)
1	Delta Air Lines (inc NWA)	323,740	2.5%	7,929
2	American Airlines	253,463	1.5%	3,661
3	United Airlines	192,357	-0.1%	-227
4	Emirates Airlines	175,053	15.4%	23,409
5	**Lufthansa German Airlines**	**167,294**	**4.4%**	**6,988**
6	**Air France**	**158,289**	**3.1%**	**4,750**
7	Continental Airlines	152,748	1.4%	2,142
8	**British Airways**	**143,530**	**-1.6%**	**-2,276**
9	US Airways	115,741	2.0%	2,264
10	Cathay Pacific Airways	112,253	5.4%	5,741
11	Singapore Airlines	106,599	1.3%	1,337
12	China Southern Airlines	106,269	14.7%	13,584
13	Air China	100,173	12.1%	10,792
14	Japan Airlines	96,543	-15.9%	-18,264
15	Air Canada	93,764	7.5%	6,576
16	Qantas Airways	91,803	-0.5%	-446
17	China Eastern Airlines	88,219	10.2%	8,164
18	**KLM-Royal Dutch Airlines**	**86,539**	**3.0%**	**2,487**
19	Thai Airways Intl	78,337	6.8%	4,973
20	Korean Air	78,314	2.3%	1,773
21	Qatar Airways	70,811	25.0%	14,165
22	TAM Linhas Aereas	69,935	7.8%	5,045
23	All Nippon Airways	65,938	-1.8%	-1,224
24	**Iberia**	**61,868**	**3.9%**	**2,326**
25	**Turkish Airlines**	**59,167**	**14.7%**	**7,583**
	Top 25 Total	**3,048,747**	**3.9%**	**113,253**

Source: OAG

All but two of the top 25 carriers are (or in the case of China Eastern about to become) members of one of the three global airline alliances. The only non-aligned carriers are the Middle East based carriers Emirates and Qatar. Emirates has moved from 6th to 4th position overtaking both Lufthansa and Air France, Air China moved from 15th to 13th position overtaking Japan Airlines and Qantas Airways; and Qatar Airways moved from 24th to 21st position overtaking TAM Linhas Aereas, All Nippon Airways and Iberia.

Joint ventures across the Atlantic now combine the routes and resources of twenty airlines following the approval of the British Airways, American and Iberia joint business agreement and anti-trust immunity to these three carriers, plus Finnair and Royal Jordanian. Ten of the twenty carriers with transatlantic immunity pacts are in the above top 25 listing. The changes in airline alliance memberships in 2010 are covered later in this section.

Shanghai Airlines de-listed from the Shanghai stock exchange in January 2010 following its merger with China Eastern Airlines, though the two airlines' capacity remains reported separately. In 2010, Shanghai Airlines had ASK capacity 24.3% the size of China Eastern Airlines – combined, the two airlines' capacity was almost identical to that of China Southern Airlines.

3.3.2 Europe

IATA reported that its European-based airlines achieved year-on-year passenger traffic increases of 5.1%, double the seat capacity increase of 2.6%, lifting average load factors by 1.9 percentage points to 79.4%. European carriers were the hardest hit by December's severe weather which slowed demand growth to 3.3%, less than half the 7.8% growth recorded in November.

The Association of European Airlines (AEA) recorded an annual RPK growth for its member airlines of 2.7%, almost half that reported by IATA. AEA membership is primarily legacy European carriers and the lower growth recorded for member airlines reflects the fact that much of the additional capacity and passenger growth on European routes came from low cost carriers (LCCs). Traffic growth in 2010 was severely distorted by the effects of external shocks, the airspace closures in April and May, European airport closures due to snow in November and December; and the frequency and intensity of industrial action.

Table 3-7: Scheduled Services of AEA Member Airlines January to December 2010

Region	Passenger Data				Change vs. previous year			
	Passengers Boarded (000)	Traffic RPK (million)	Capacity ASK (million)	Load Factor %	Pax %	Traffic %	Capacity %	PLF Pts
Domestic (1)	92,739.1	48,999.4	72,366.4	67.7	2.0	1.8	-1.0	1.8
Cross-border Europe (2)	168,338.9	183,650.2	259,937.3	70.7	3.0	3.0	0.0	2.1
Total Europe (1+2)	**261,078.0**	**232,649.5**	**332,303.6**	**70.0**	**2.6**	**2.7**	**-0.2**	**2.0**
Europe - North Africa (3)	5,084.2	10,110.5	14,355.0	70.4	5.6	5.2	1.7	2.3
Europe - Middle East (4)	10,052.4	31,687.1	44,342.4	71.5	8.2	3.8	0.8	2.1
Intl Short/Medium Haul (2+3+4)	**183,475.4**	**225,447.6**	**318,634.5**	**70.8**	**3.3**	**3.2**	**0.2**	**2.1**
North Atlantic (5)	27,224.3	188,110.5	224,173.0	83.9	-0.2	0.3	-1.6	1.5
Mid Atlantic (6)	6,622.3	51,425.1	62,260.3	82.6	4.1	5.9	4.7	0.9
South Atlantic (7)	5,876.9	52,834.6	62,331.5	84.8	6.3	6.2	0.4	4.7
Europe - Sub Saharan Africa (8)	8,894.2	57,735.8	74,661.8	77.3	3.9	2.4	2.9	-0.3
Europe - Far East/Australasia (9)	18,444.2	149,995.4	180,179.0	83.2	3.1	2.6	-0.9	2.8
Total Long Haul (5 to 9*)	**67,308.8**	**500,401.3**	**604,099.0**	**82.8**	**2.2**	**2.4**	**0.0**	**1.9**
Total Intl (2 to 9*)	**250,784.2**	**725,848.8**	**922,733.6**	**78.7**	**3.0**	**2.7**	**0.1**	**2.0**
Total Scheduled (1 to 9*)	**343,523.3**	**774,848.3**	**995,100.0**	**77.9**	**2.7**	**2.6**	**0.0**	**2.0**

Source: AEA (passenger traffic is measured in passengers boarded (Pax), RPK (Revenue Passenger-Km) and capacity in ASK (Available Seat-Km), TFTK = Total Freight Tonne Km. *Long haul region 'Other' is not shown above, but is included in the total.)

For AEA carriers in 2010, strong passenger growth was achieved on routes to North Africa (+5.6%), the Middle East (+8.2%) and the South Atlantic (+6.3%). Growth of 2.6% was achieved within Europe and the only market to see a decline was across the North Atlantic (-0.2%).

Overall a measured recovery was achieved but specific AEA carriers Aegean Airlines, Air France, Finnair, British Airways, bmi, Iberia, Malev, Czech Airlines, Croatia Airlines and Virgin Atlantic all experienced overall passenger declines.

Significant growth in 2010 passenger volumes was achieved by other members with the following achieving double digit passenger growth rates: Air Baltic, Icelandair, Luxair, LOT Polish Airlines, Austrian, Ukraine International Airlines, Tarom Romanian Air Transport, Turkish Airlines and Aerosvit.

Table 3-8: Scheduled Services by Airline January to December 2010

Region	Passenger Data				Change vs. previous year			
	Passengers Boarded (000)	Traffic RPK (million)	Capacity ASK (million)	Load Factor %	Pax %	Traffic %	Capacity %	PLF Pts
A3 - AEGEAN AIRLINES	5,711.3	4,846.2	7 220.7	67.1	-5.3	5.7	3.2	1.6
AF - AIR FRANCE	46,982.9	125,050.5	155,402.3	80.5	-2.0	-1.0	-3.0	1.7
AY – FINNAIR	5,969.6	15,883.7	21,161.0	75.1	-3.0	1.5	0.1	1.1
AZ – ALITALIA	23,355.4	32,903.2	46,684.2	70.5	7.4	12.1	3.4	5.5
BA - BRITISH AIRWAYS PLC	30,484.3	105,551.5	135,973.0	77.6	-5.6	-5.8	-5.1	-0.5
BD – BMI*	6,019.4	6,572.2	10,116.9	65.0	-18.4	-23.3	-18.3	-4.3
BT – AIRBALTIC	3,158.1	3,564.2	5,253.1	67.8	16.2	19.0	18.9	0.0
CY - CYPRUS AIRWAYS*	1,591.8	3,037.5	4,264.6	71.2	1.2	-1.4	-2.9	1.1
FI - ICELANDAIR	1,476.4	4,065.7	5,197.6	78.2	14.0	19.4	14.6	3.2
IB – IBERIA	19,618.6	51,167.8	62,251.7	82.2	-4.2	3.3	0.3	2.4
JP - ADRIA AIRWAYS	979.8	894.1	1,355.0	66.0	2.8	2.5	-6.6	5.8
JU - JAT AIRWAYS	992.1	1,018.7	1,700.5	59.9	7.1	7.6	-2.0	5.4
KL - KLM ROYAL DUTCH AIRLINES	22,787.0	76,064.6	90,842.6	83.7	2.0	3.5	0.6	2.4
KM - AIR MALTA	1,695.3	2,261.2	3,276.6	69.0	3.0	3.6	0.3	2.2
LG – LUXAIR*	827.6	538.4	844.1	63.8	11.2	13.2	8.8	2.5
LH - DEUTSCHE LUFTHANSA AG	56,630.1	129,671.0	163,006.4	79.5	6.5	5.4	3.1	1.7
LO - LOT POLISH AIRLINES	4,007.9	6,547.6	8,782.9	74.5	10.0	7.6	4.7	2.0
LX - SWISS INTERNATIONAL AIRLINES	14,023.0	29,521.8	35,872.8	82.3	2.8	7.3	4.4	2.2
MA - MALEV HUNGARIAN AIRLINES	2,945.6	3,317.1	4,749.8	69.8	-8.9	-6.3	-7.9	1.1
OA - OLYMPIC AIR*	4,633.7	3,240.6	4,849.8	66.8				
OK - CZECH AIRLINES*	4,613.8	5,235.5	7,530.2	69.5	-1.6	-9.8	-14.7	3.8
OS – AUSTRIAN	9,784.4	15,958.1	20,711.4	77.0	15.3	8.1	3.3	3.4
OU - CROATIA AIRLINES	1,596.2	1,060.3	1,711.6	61.9	-6.1	-7.9	-9.3	0.9
PS - UKRAINE INTERNATIONAL AIRLINES	943.9	1,737.7	3,009.1	57.7	20.1	25.5	29.6	-1.9
RO - TAROM ROMANIAN AIR TRANSPORT	1,963.5	2,291.5	3,760.6	60.9	22.7	18.9	7.7	5.7
SK - SAS SCANDINAVIAN AIRLINES	21,532.2	23,494.7	31,253.6	75.2	0.7	1.1	-3.7	3.5
SN - BRUSSELS AIRLINES	4,889.5	7,312.9	11,597.9	63.1	4.5	6.7	6.1	0.3
TK - TURKISH AIRLINES	28,310.8	46,313.4	62,989.9	73.5	15.8	19.0	15.2	2.3
TP - TAP PORTUGAL	8,999.3	23,652.1	31,879.1	74.2	7.5	13.4	3.9	6.2
VS - VIRGIN ATLANTIC AIRWAYS	5,291.1	38,157.6	46,234.0	82.5	-2.2	-2.8	-7.0	3.6
VV - AEROSVIT	1,708.7	3,917.0	5,617.4	69.7	35.3	24.3	23.0	0.7
AEA	**343,523.3**	**774,848.3**	**995,100.0**	**77.9**	**2.7**	**2.6**	**0.0**	**2.0**

Source: AEA (passenger traffic is measured in passengers boarded (Pax), RPK (Revenue Passenger-Km) and capacity in ASK (Available Seat-Km). * = estimated data.)

Whilst many of the declines were as a result of lower capacity on offer, three specific airlines reported load factor reductions: British Airways, bmi and Ukraine International Airlines.

Passenger and RPK growth were achieved by AEA members in every month of 2010 except in April when declines of 15.7% in passengers and declines of 13.1% of RPKs were experienced due to the airspace closures caused by the Icelandic volcanic eruption.

The merger of British Airways and Iberia in early 2011 means that nearly 75% of the available capacity offered annually by AEA member airlines comes from three airline groups. In 2010, AEA share of the available capacity for the three groups was: Air France/KLM/Alitalia 29%; Lufthansa/Austrian/Swiss/bmi/Brussels Airlines 24%; and BA/Iberia 20%.

Whilst the merger between BA and Iberia was completed by January 2011, in the same month the European Commission blocked the proposed merger between Olympic and Aegean Airways announced by the two carriers in February 2010.

In September 2010 the Cyprus Government had opted to merge the country's two carriers Cyprus Airlines and Eurocypria Airlines after a four year split. However, this fell through when Eurocypria was shut down in November 2010. Cyprus Airways continues to evolve its restructuring plan to stem losses expected in 2010.

In November 2010, the Maltese Government announced it was intending to inject more than €100 million into Air Malta and the airline was granted a temporary €52 million loan facility while it determines its proposed restructuring plan.

3.3.3 North America

North American carriers were disciplined in adding capacity as the market returned (an increase in passenger demand of 7.4% compared to a capacity increase of 3.9%). Annual load factors increased by 2.6% for the year, contributing to the recovery in airline profits for this region. The average load factor for 2010 was 82.2% with December being the only month when load factors for North American carriers fell below 2009 levels. This was the month when snow closed a number of U.S. airports.

Annual capacity provided by U.S. Air Transport Association (ATA) carriers[41] grew by 3.4% with these carriers achieving passenger load factor increases of 1.7%. International traffic (RPKs) for ATA member carriers increased by 6.4%, more than three times the growth of domestic traffic (+1.9%). Within the international traffic markets it was the transpacific routes which grew the most (+12.2%), followed by Latin American routes (+8.7%) and North Atlantic routes (+2.5%).

For ATA carriers, domestic traffic (RPKs) accounted for 66.7% of the total in 2010, a reduction of 1% point compared to 2009.

The combination of increased load factors and improved passenger yields for the major U.S. carriers has meant an expectation of record profits for these carriers in 2010. Yields per mile for the U.S. majors increased by 9.4% with costs per seat mile increasing by 6.1% (Table 3-9).

[41] ATA members: ABX Air, AirTran Airways, Alaska Airlines, American Airlines, ASTAR Air Cargo, Atlas Air, Continental Airlines, Delta Airlines, Evergreen International Airlines, Fedex Express, Hawaiian Airlines, Jet Blue Airways, Southwest Airlines, United Airlines, UPS Airlines, US Airways.

Table 3-9: 2010 Summary Data for U.S Airlines

	United/CO	Delta	AMR Corp.	US Airways	South-west	Jet-Blue	Alaska	Air-Tran	Total
Operating aircraft	710	722	618	339	548	160	114	138	3,349
Passengers (millions)	99.5	105.1	86.1	51.9	88.2	24.3	16.5	24.7	496.2
Passengers YoY (%)	-2.3	5.7	0.5	1.6	2.2	8.0	6.1	3.0	3.1
Load factor (%)	83.9	83.7	81.9	82.4	79.3	81.4	83.3	81.4	82.6
Load factor YoY (% points)	2.5	1.2	1.5	0.6	4.3	2.1	5.0	2.0	2.4
Yield (cents per mile)	12.96	12.73	13.36	12.96	14.72	12.07	13.58	12.03	13.05
Yield YoY (%)	15.6	12.5	8.8	11.1	10.8	6.8	2.3	7.0	9.4
Seat cost (cents per available seat mile)	11.65	11.03	12.57	11.72	11.11	9.71	10.96	10.35	10.93
Seat cost YoY (%)	8.6	1.8	4.6	1.8	11.0	8.0	1.7	11.4	6.1

Source: AirlineFinancials.com

The continued consolidation of the U.S. major carriers not only affected the legacy carriers but also the low cost sector with the merger of Southwest and AirTran Airways announced in 2010. Based on the 2010 traffic data the merged carrier will be 25% larger than Southwest's current size in both aircraft fleet terms and passenger miles.

3.3.4 Asia Pacific

Legacy carriers in this region recorded significant improvements in load factors in the first half of 2010 with the economies of China and India leading the region's recovery. IATA reported that Asia Pacific airlines achieved year-on-year passenger traffic growth of 9.0% on seat capacity increases of 3.6%, lifting average load factors by 3.9 percentage points to 77.6%. According to industry sources[42] Chinese carriers have been at the heart of this recovery, recording double-digit traffic growth for a year in which the country's economy overtook Japan to become the second largest in the world. China Southern saw traffic jump nearly a fifth, Air China 17%, Hainan Airlines 14%, while China Eastern's growth was further bolstered by its acquisition of Shanghai Airlines at the start of 2010.

There was strong growth across the region as a whole although the heavy restructuring at Japan Airlines saw its traffic levels fall during the year. The region continues to see strong growth in its low cost sector with AirAsia, JetStar and Virgin Blue all recording double-digit traffic increases. Air Asia was aided by its long-haul expansion (Air Asia X). Tiger Airways boosted passenger numbers by over one fifth.

A significant part of the growth in this region comes from growth in domestic markets. For example, the domestic Indian market grew by 16.2% year-on-year in 2010[43] and has achieved positive double-digit growth every month since July 2009.

Preliminary international traffic (RPKs) reported[44] by members[45] of the Association of Asia Pacific Airlines (AAPA) increased by 9.8% in 2010 with load factors increasing by 4.1%, averaging 78.5% across the year.

[42] Airline Business, March 2011, p52-53

[43] Airline Leader Issue 4 p14, Centre for Asia Pacific Aviation

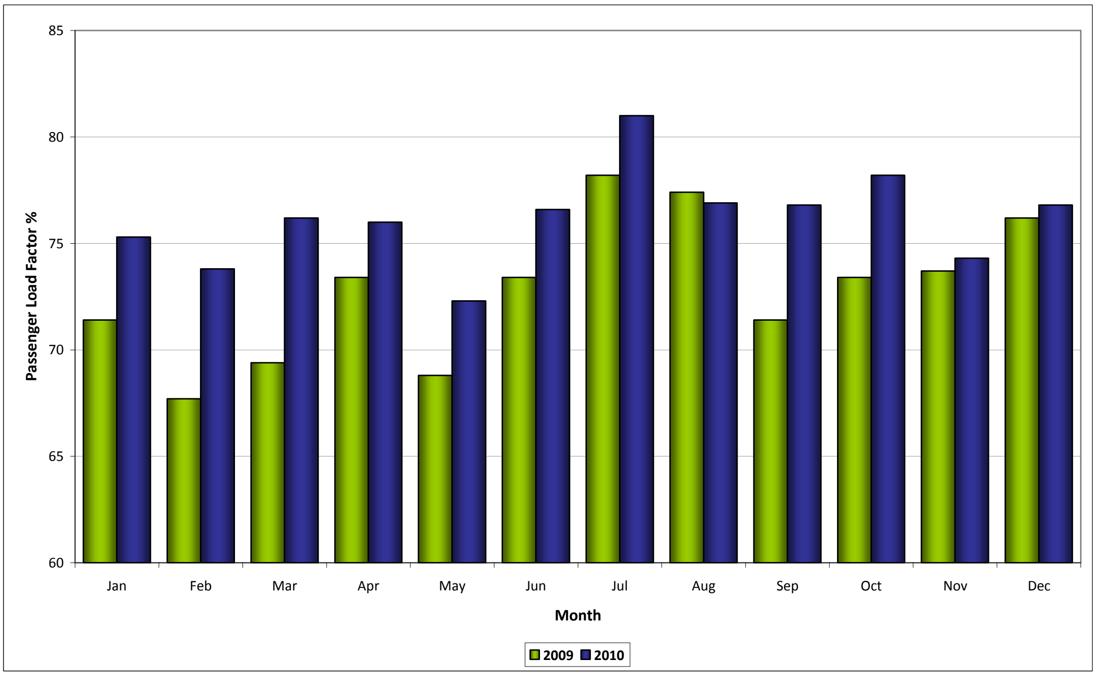
Japan Airlines filed for bankruptcy protection in January 2010 but continued to operate under a restructuring plan. In June, Japan Airlines and American Airlines applied to the Japanese Transport Ministry (MLITT) and were given approval for anti-trust immunity to operate as if they are one airline for commercial purposes on flights between North America and Asia. ANA, United and Continental filed a similar application. The U.S. Department of Transport gave final approval to both joint venture applications towards the end of the year enabling implementation of the U.S.-Japan 'Open Skies' accord to which the two nations had agreed in 2009.

In February 2010, Air India received its first equity infusion from the Indian government (INR 8 billion/USD 173 million) and embarked on a turn-round plan to stem losses. A further INR 12 billion of equity was confirmed in May 2010 and paid in December as the airline continued to restructure its business.

3.3.5 Middle East

Middle Eastern carriers reported the strongest full year growth in traffic of any region. RPK demand increased by 17.8% compared to a capacity growth (ASK) of 13.2%, with corresponding improvements of 3.0 percentage points in passenger load factor to 76.0% for the year. In 2010 load factors for airlines based in this region peaked at 81% in July with the lowest load factor of 72.3% achieved in May. The 2010 range in load factors at 8.7% compares to a range of 10.5% in 2009. Unlike in 2009 when three months achieved load factors below 70% in the first half of 2009, all months in 2010 achieved load factors above 72% (see Figure 3.10 below).

Figure 3.10: Passenger Load Factors – Middle East Carriers



Source: IATA

[44] Asia Pacific Airlines Report Strong Traffic Rebound in 2010, AAPA Press Release, 26 January 2011

[45] AAPA member airlines: All Nippon Airways, Asiana Airlines, Cathay Pacific Airways, China Airlines, Dragonair, EVA Airways, Garuda Indonesia, Japan Airlines, Korean Air, Malaysia Airlines, Philippine Airlines, Royal Brunei Airlines, Singapore Airlines, Thai Airways International, Vietnam Airlines.

Airlines of the Arab Air Carriers Organisation (AACO) recorded traffic (RPK) growth of 15.7% with a 1.7% increase in load factors to 72.3%. Intra-Arab world traffic (RPKs) grew by only 2% compared to non-intra-Arab traffic which grew by 17%; carriers such as Emirates, Qatar and Etihad are all members of this association and their networks are expanding primarily to destinations outside the Middle East. The three largest carriers in the Middle East – Emirates, Qatar and Etihad increased annual capacity (ASKs) by 15%, 25% and 16% respectively; all above the region's average of 13.2%.

In 2010, Gulf Air (Bahrain) was transferred from a Government investment vehicle to direct Government ownership.

3.3.6 Latin America

Carriers in this region experienced traffic (RPK) growth of 8.2% in the year on a capacity (ASK) growth of 2.9%. Load factors for carriers in the region grew by 3.8 percentage points and averaged 76.7% for the year. Load factors in every month of 2010 were above the previous year with the biggest year-on-year variance occurring in May. The 8.6% increase reflects the much lower load factors achieved in 2009 as a result of the swine flu outbreak in late April 2009.

Traffic (RPKs) reported by the Latin American and Caribbean Air Transport Association (ALTA)[46] for 2010 showed an 11.3% increase compared to 2009 and a load factor increase of 3.2%. The highest growth in load factors for the association were on intra-Latin American routes (+4.2%), +3.4% on other international routes and +2.9% on domestic routes. Domestic routes saw the highest increase in capacity (+9.6%) followed by intra-Latin American capacity (up by 7.1%) and other international routes (+1.4%).

In February, Group TACA and Avianca finalised their merger agreement with the forming of the joint holding company Avianca-TACA Ltd. This holding company is domiciled in the Bahamas and held 67% by parent company Synergy Aerospace Corp. and 33% by TACA parent Kingsland Holdings. The merged airline's fleet totalled 129 aircraft at the time of the merger and in total, 13 carriers from ten Latin American countries became part of one airline holding company.

In April, Caribbean Airlines took over Air Jamaica after a number of months of negotiation between the two island carriers. Under terms of the deal, the Government of Jamaica assumed responsibility for closure costs related to Air Jamaica and the Governments of Trinidad and Tobago contributed USD 49.2 million to Caribbean Airlines to use as working capital to facilitate the merger.

On 28 August Mexicana Airlines suspended operations after a brief period (since early August) of operating under creditor protection in both Mexico and the United States. For the remainder of 2010 there was speculation that Mexicana might re-launch but this did not occur.

Also in August, Chile-based LAN and Brazil-based TAM announced they had forged a non-binding memorandum of understanding outlining their intentions to combine their holdings. The deal is subject to both companies completing a binding definitive merger agreement and securing approval from their shareholders and relevant regulatory authorities. After initially unveiling their merger plans, Star Alliance™

[46] ALTA member airlines: Aerolíneas Argentinas, Aeroméxico, Aeroméxico Connect, Aerosur, Air Jamaica, Avianca, Bahamas Air, Caribbean Airlines, Cayman Airways, COPA Airlines, COPA Airlines Colombia, Cubana, GOL, LAN, LAN Ecuador, LAN Peru, LIAT, Mexicana, Mexicana Click, PLUNA, TACA, TACA Peru, TAM, TAM Mercosur, TAME, Volaris, VRG Linhas Aéreas -GOL Group

member TAM and oneworld® member LAN initially indicated they will stay in their respective alliances until at least 2012, at which point they will start to consider potentially selecting a single alliance.

In October LAN unveiled plans to acquire Colombia's second largest carrier Aires; in November it finalised its price for the carrier with integration of the airline in early 2011.

3.3.7 Africa

African carriers reported a sharp rebound in traffic with RPKs increasing by 12.9% on a capacity increase of 9.6%, increasing load factors by 2.4 percentage points to 69.1%. Whilst load factors for this region remain well below the industry average, carriers achieved load factor increases in every month of the year when compared with 2009.

Whilst much of the capacity expansion in Africa in 2010 was by low cost carriers, Ethiopian Airlines has been expanding its long-haul network. It added 12% extra capacity in 2010 compared to 2009, more than double the growth of other legacy African carriers such as South African Airways (+4%) and Kenya Airlines (+5%).

The African Airlines Association (AFRAA), which represents most of the African carriers, reported a passenger split for its carriers as 33% domestic, 22% intra-Africa and 45% intercontinental.

3.3.8 Global Airline Alliance Developments

2010 saw the continuation of the three main airline Alliances (Star Alliance™, SkyTeam® and oneworld®) although many world airlines continue to operate outside of any alliance. Table 3-10 shows that during 2010 the market shares of alliance airlines, unaligned airlines and low cost carriers did not change significantly; suggesting that the industry may have reached a new stable situation following the rapid increase in both alliances and low cost operations during the past decade.

Table 3-10: Global Airline Alliances – Capacity Advertised

Capacity Advertised (March 2010)	2010 ASK (billion)	2011 ASK (billion)	2010 %	2011 %	Growth %
Star Alliance™	129.4	143.0	25.6%	26.1%	10.5%
SkyTeam®	78.9	86.9	15.6%	15.8%	10.1%
oneworld®	75.6	77.8	15.0%	14.2%	2.9%
All Alliances	**283.9**	**307.7**	**56.2%**	**56.1%**	**8.4%**
Unaligned Legacy Carriers	142.5	152.9	28.2%	27.9%	7.3%
Low Cost Carriers	78.8	88.2	15.6%	16.1%	11.9%
Total	**505.2**	**548.8**	**100.0%**	**100.0%**	**8.6%**

Source: OAG (Centre for Asia Pacific Aviation)

Nevertheless, all three global alliances increased their membership and network coverage in 2010. Star Alliance remained the largest alliance in terms of aircraft, passengers and revenues having gained Brazilian airline TAM in May 2010; further strengthening the alliance's foothold in South America. At the end of June 2010, Greece's largest airline in terms of passengers carried also joined the alliance.

Shanghai Airlines left Star Alliance at the end of October 2010 following the airline's merger with SkyTeam's pending member China Eastern Airlines. In 2010 Ethiopian Airlines was accepted as a future

Star Alliance carrier and is expected to join in summer 2011, along with Air India who was originally scheduled to join in 2009 but whose membership has been delayed. The other three pending airlines to join Star Alliance are the Central and South American carriers Avianca, TACA and Copa Airlines.

China Eastern announced in April its intention to join the world's second largest alliance, SkyTeam, as its second Chinese airline (after China Southern). In June 2010, SkyTeam celebrated its tenth anniversary and in the same month Vietnam Airlines and TAROM Romanian Air Transport officially joined the alliance.

In September, China Airlines, the flag carrier of Taiwan, formally announced the start of its joining process and is expected to join SkyTeam in 2011. Shanghai Airlines announced in November that following its merger with China Eastern and its exit from Star Alliance it would join SkyTeam in 2011. Two further carriers signed agreements to join SkyTeam – Aerolineas Argentina and Garuda Indonesia; and early in 2011 Middle East Airlines and Saudi Arabian Airlines signed agreements to join the alliance in 2012.

The oneworld alliance membership gained Russian airline S7 as its 12th member in November 2010, however oneworld member Mexicana suspended its operations in August (having only joined oneworld in November 2009).

In June 2010 Kingfisher Airlines of India signed a memorandum of understanding to join oneworld and the following month it was announced that Air Berlin would also join the alliance in early 2012. Following anti-trust immunity approval from both the U.S. Department of Transportation and the European Commission in July, the new joint business of oneworld member airlines British Airways, Iberia and American Airlines between the European Union (plus Switzerland and Norway) and the United States, Canada and Mexico was launched in October. This agreement includes revenue sharing, combined selling, schedules coordination and other benefits such as frequent flyer consistency and integration, alignment of baggage policies and improved connection timings.

The announcement in August 2010 that South American carriers LAN and TAM had unveiled plans to merge[47] will have implications for alliance membership, as LAN is a oneworld member and TAM is a recent Star Alliance member. A decision, whereby dual membership cannot be ruled out, is not expected in the short term[48].

The latest airline alliance member lists are detailed in Figure 3.11 below with pending members indicated in the blue shaded areas.

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[47] LAN and TAM to merge, Air Transport Intelligence, 13 August 2010

[48] TAM/LAN No Alliance Decision Imminent, ATW Online, 25 November 2010

Figure 3.11: Global Alliance Membership

Source: Mott MacDonald, Star Alliance, SkyTeam, oneworld

In terms of size and key indicators, an analysis of the latest traffic and financial data available is shown in Table 3-11 below, with oneworld alliance members achieving the largest revenue per aircraft departure and per passenger carried. oneworld's fleet and network compared to Star Alliance and SkyTeam is biased more to longer sectors and larger aircraft, as the passengers and revenue per departure and employees per aircraft ratios indicate. An analysis by Airline Business in 2010[49] identified traffic (RPKs) and passenger volumes for the three alliances. From this data the average stage length for each alliance can be calculated: oneworld 2,372km, Star Alliance 2,110km and SkyTeam 2,007km.

[49] Airline Business Alliances Survey, pages 31-44, September 2010

Table 3-11: Global Alliances Summary

Global Alliances	Star Alliance	oneworld	SkyTeam	Total
Member Airlines	**27**	**12**	**13**	**52**
Pending new members	**7**	**2**	**4**	**13**
Number of aircraft	4,023	2,242	3,140	9,405
Number of employees	402,208	295,930	316,445	1,014,583
Passengers per year (million)	604	297	384	1,285
Sales Revenue (in USD billion)	151	86	86	322
Daily departures	21,000	8,414	12,597	42,011
Revenue per passenger (USD)	250	289	223	251
Departures per aircraft per day	5.2	3.8	4.0	4.5
Passengers per departure	79	97	84	84
Employees per aircraft	100	132	101	108
Passengers per employee	1,501	1,003	1,213	1,266
Revenue per departure (USD 000s)	19.7	27.9	18.6	21.0

Source: Latest alliance websites/fact sheets, SkyTeam revenues estimated from individual airline revenues.

Alliances between legacy carriers continue to be the method by which most major airlines seek to reduce costs and increase their reach and market share. This is expected to remain the chosen route for such airlines until a situation is reached whereby nations no longer retain an interest in who owns the world's airlines. When that happens, there is likely to be a rapid contraction in the number of major airlines so that it would resemble the automobile industry or many other industries (including international shipping) where the result would be a handful of truly large multinational airlines, often based in low taxation territories with as much of their labour costs as possible contracted out to low-wage economies.

3.4 Regional Airlines

Regional airlines tend to operate, on average, small, sub-100 seat regional jet/turboprop aircraft. Many of these airlines operate feeder services to hub airports from regional points and operate thinner domestic and intra-continental routes. However, some regional airlines adopt a full-service 'legacy' approach to operations and marketing (particularly those feeding the hubs of their commercial partners), whilst others take on aspects of the low-cost model such as a 'no-frills' service.

Table 3-12 below shows the 2010 capacity increases for the top 25 regional airline operators worldwide.

Table 3-12: Top 25 Regional Airlines Worldwide

		Operator Capacity ASKs				
Rank	Operator	2009	2010	% chg YoY	Country	Airline group majority ownership
1	SkyWest Airlines	24,252,355,447	27,170,063,234	12%	USA	SkyWest Inc.
2	ExpressJet	16,832,480,735	19,497,280,152	16%	USA	SkyWest Inc.
3	American Eagle	16,167,014,850	18,147,906,800	12%	USA	AMR Corporation
4	Atlantic Southeast Airlines	11,763,094,240	12,069,374,360	3%	USA	SkyWest Inc.
5	Republic Airlines	9,195,418,989	10,130,962,240	10%	USA	Republic Airways Holdings
6	Pinnacle Airlines	9,978,003,412	9,985,980,557	0%	USA	Pinnacle Airlines Corp.
7	Air Canada Jazz	8,838,501,288	8,740,600,599	-1%	Canada	
8	Mesa Airlines	9,923,267,388	8,353,094,013	-16%	USA	
9	Mesaba Airlines	7,291,566,234	7,522,004,733	3%	USA	Pinnacle Airlines Corp.
10	Comair Inc.	7,293,935,503	6,991,024,940	-4%	USA	Delta Airlines Subsidiary
11	**Lufthansa Cityline**	**6,652,239,132**	**6,666,393,632**	**0%**	**Germany**	**Deutsche Lufthansa AG**
12	Horizon Air	5,380,126,754	5,274,187,178	-2%	USA	Alaska Air Group
13	Compass Airlines	4,824,982,294	4,970,030,531	3%	USA	Trans States Holdings
14	Chautauqua Airlines	5,039,776,408	4,750,119,621	-6%	USA	Republic Airways Holdings
15	**Tyrolean Airways**	**5,122,386,448**	**4,662,965,341**	**-9%**	**Austria**	**Austrian Airlines**
16	Aeromexico Connect	4,218,434,290	4,628,775,183	10%	Mexico	
17	Air Wisconsin	4,710,467,609	4,545,797,676	-3%	USA	
18	**KLM City Hopper**	**4,222,902,462**	**4,501,990,808**	**7%**	**Netherlands**	**Air France-KLM**
19	**Air Nostrum**	**4,069,814,632**	**3,989,716,520**	**-2%**	**Spain**	
20	PSA Airlines	3,632,689,965	3,743,181,445	3%	USA	US Airways
21	**Regional Compagnie Aerien**	**3,124,332,967**	**2,860,082,713**	**-8%**	**France**	**Air France-KLM**
22	Iran Asseman Airlines	2,375,811,322	2,798,465,482	18%	Iran	
23	Merpati Nusantara Airline	N/A (1)	2,705,512,454	N/A (1)	Indonesia	
24	**Eurowings Luftverkehrs**	**2,340,282,001**	**2,142,532,643**	**-8%**	**Germany**	**Lufthansa Cityline Group**
25	Colgan Air	1,831,667,160	1,883,930,882	3%	USA	Pinnacle Airlines Corp.

Source: OAG ([‡]Merpati 2009 schedule capacity (ASKs) not reported to OAG)

Note: Flybe has been included in the Low Cost Carriers analysis as the airline is a member of the European Low Fare Airlines Association (ELFAA)

3.4.1 United States

2010 was a year of significant change in the U.S. regional airline sector, particularly with regard to ownership with operators from this region continuing to dominate the worldwide top regional airline rankings. In the U.S. two regional airline groupings grew significantly via acquisition, a move which sees the U.S. regional market dominated by four large regional airline holding companies.

SkyWest Inc, the parent company of SkyWest and Atlantic Southeast Airlines, acquired the world's third largest regional carrier ExpressJet and is currently in the process of merging it with its Atlantic Southeast Airline subsidiary. The SkyWest Inc group was already the largest regional group and this acquisition aligns the largest commuter operations it operates on behalf of United and Continental Airlines.

Delta Air Lines disinvested in regional airline operators with the Pinnacle Airlines Corporation, parent company of Pinnacle Airlines and Colgan Air, acquiring former Delta regional operator Mesaba Airlines; this propelled the Pinnacle group to be the second largest regional airline operator group (based on total 2010 schedule ASKs for all subsidiary airlines). In 2010 Delta sold another of its regional operators, Compass

Airlines, to Trans States Holdings, the holding company of GoJet Airlines and Trans States Airlines. Delta's remaining owned regional subsidiary Comair announced a major restructuring in September 2010 entailing reducing its fleet from the then current 97 aircraft to 44 by the end of 2012, primarily removing 50-seater regional jets from its fleet where seat costs are uncompetitive.

Industry sources[50] suggest that pilot scope negotiations in the U.S. will continue to change the U.S. regional aviation scene. Delta and NWA, following their merger, have further aligned their regional operations and focus is shifting to United and Continental. Under bankruptcy protection, United lifted its scope restriction to 70 seats whereas Continental remains more restricted with a lower limit around 50 seats.

Mesa Airlines filed for Chapter 11 bankruptcy protection in early 2010 and is expected to emerge from this protection in early 2011, having filed a reorganisation plan reducing its fleet size and extending its code share agreement with US Airways to 2015. The company also reached an agreement to terminate its obligation to purchase ten 70-seat Bombardier CRJ700 jets, scheduled for delivery in 2013.

The Republic Airways Holdings group in 2010 selected the Frontier Airlines name for its consolidated branded network of Frontier Airlines and Midwest; and early in 2011 sought to register the trade name Frontier Express for its regional airline subsidiaries Chautauqua, Lynx Aviation and Republic Airlines.

In the United States, according to the Regional Airline Association, a staggering 99% of regional airline passengers travel on code-share flights[51] and as can be seen from Figure 3.12 regional airline operators and regional airline groups are providing capacity across the entire U.S. domestic airline arena as well as both north trans-border (U.S.-Canada) and south trans-border. It is not uncommon for U.S. regional airline groups and specific airlines to provide capacity across the boundaries of specific airline alliances; this is far less common in Europe and in other parts of the world.

[50] 'Sombre Fiesta', Airline Business, page 34, October 2010

[51] U.S. Regional Airline Fact Sheet, Regional Airline Association, 15 December 2010

Figure 3.12: U.S. Regional Airline Partnerships

Mainline Carrier	Regional Brand	Operating Partners
Alaska Airlines	N/A	Horizon Air
		Peninsula Airways
AirTran Airways	N/A	Skywest Airlines
American Airlines	American Eagle	American Eagle
		American Eagle/ Executive
	American Connection	Chautauqua Airlines
Continental Airlines	Continental Express	Chautauqua Airlines
		ExpressJet
	Continental Connection	Cape Air
		Colgan Air
		CommutAir
		Gulfstream International Airlines
Delta Air Lines	N/A	Atlantic Southeast Airlines
		Chautauqua Airlines
		Comair
		Compass Airlines
		Freedom Airlines
		Mesaba Airlines
		Pinnacle Airlines
		Shuttle America
		SkyWest Airlines

Mainline Carrier	Regional Brand	Operating Partners
Frontier Airlines	N/A	Great Lakes
		Lynx Aviation
		Republic Airlines
jetBlue Airways	N/A	Cape Air
Midwest Airlines	Midwest Connect	Chautauqua Airlines
		Republic Airlines*
		Frontier Airlines
United Airlines	United Express	Atlantic Southeast
		Colgan Air
		ExpressJet Airlines
		GoJet Airlines
		Great Lakes
		Mesa Airlines
		Shuttle America
		SkyWest Airlines
		Trans States Airlines
US Airways	US Airways Express	Air Wisconsin
		Chautauqua Airlines
		Colgan Air
		Mesa Airlines
		Piedmont
		PSA
		Republic Airlines
		Trans States Airlines

Source: Regional Airline Association 2010 Annual Report (OAG Schedules, July 2010. *Flights are outsourced)

3.4.2 Europe

Six European regional airlines are included amongst the world's top 25 regional airlines in terms of scheduled seat-kilometres, with Lufthansa CityLine being the largest. In 2010, these six airlines reduced their advertised capacity by around 1%.

In Europe, the removal of 50-seater regional jets by the larger carriers continued with Lufthansa Regional targeting an exit from this aircraft size by February 2011. Lufthansa Regional's operator Lufthansa CityLine produced the largest regional airline capacity in Europe in 2010. Further consolidation within the Lufthansa Regional airline group occurred with the Eurowings operation reducing its capacity by 8%, downsizing its staff numbers and transferring its headquarters and maintenance facilities from Nuremburg to Düsseldorf.

Partnerships and further consolidation continued in the European regional airline sector in 2010 as many regional airlines have cut their costs as far as they are able to. Many European regional airlines are at different stages in the re-equipment stakes and are introducing more fuel-efficient aircraft with lower seat costs; once this is complete European regional carriers will have little ability to lower seat costs any further. The new aircraft are enabling regional carriers to enter new (longer sector) markets and jet aircraft provide a competitive customer product advantage over turboprops.

In 2010, Air France-KLM's regional subsidiary CityJet of Ireland continued the integration of VLM Airlines which it had acquired in 2008. VLM (operating under the CityJet regional brand) launched its first French domestic route in 2010 between Nantes and Paris Orly on behalf of Air France-KLM. Both CityJet and VLM operations continue to operate under separate operating licences.

At the start of 2010, independent regional carrier Aer Arann of Ireland announced it was to operate twelve routes on behalf of Aer Lingus under a franchise partnership and operate as Aer Lingus Regional. In August, Aer Arran applied for 'examinership' – a legal process in Ireland which is similar to a U.S. Chapter 11 filing, offering a company protection from creditors. Following court approval of its business plan the carrier exited examinership in November and announced in December further expansion of its Aer Lingus Regional franchise operation; and by the end of the year was operating 15 routes under the franchise agreement. An interesting development as part of the airline's restructuring was an investment of €2.5 million by Stobart Air (the owner of Southend Airport, UK) in Aer Arran as well as a conditional five year operating agreement between the two companies[52].

In November 2010, UK regional airline Air Southwest based in Plymouth was acquired by another UK regional airline, Eastern Airways based in Humberside. In the same month Swiss regional carrier Darwin Airline announced its intention to take over the services and assets of Geneva based regional carrier BABOO.

3.4.3 Rest of the World

In South America, Aeromexico Connect remains the largest regional carrier achieving a 10% increase in scheduled capacity (ASKs) and in 2010 there was cross-continent investment with Canada's regional operator Jazz investing in Uruguay's regional operator Pluna. Since the investment Pluna has commenced talks with a number of South American carriers about operating regional aircraft under Capacity Purchase Agreements (CPAs) similar to those adopted in North America and Europe.

The airline in the top 25 regional operator listing achieving the greatest year-on-year growth was Air China-owned Shandong Airlines. Its capacity grew by almost one quarter for the second year in succession and is now one of the world's major regional players. However, with the carrier's fleet now consisting primarily of aircraft above 100 seats, its categorisation as a regional carrier is questionable. Iran Aseman Airlines remained in pole position of the Africa/Middle East regional airline operators with an 18% increase in capacity (ASKs).

[52] Stobart Group reaches conditional five year operating agreement with Aer Arann at Southend Airport, Stobart Group press release, 11 October 2010

3.5 Low Cost Carriers

3.5.1 Overview

It should be recognised that there is no longer a fixed dividing line between legacy carriers, regional carriers and low cost carriers. Most airlines can easily be categorised into one or the other groupings, but many overlap the once-clear distinctions. Some legacy airlines offer a set of low fares on otherwise standard services, while some of the low cost carriers have begun to increase the number of legacy-style services they offer.

Low cost carriers continue to compete almost entirely on price, although there are various ways forward being explored by different airlines. The original template for low cost airlines, Southwest, has been exploring the possibility of additional services for passengers while others, notably Ryanair, are looking to strip the service down to the absolute basic of air transport – with all other aspects of service being regarded as add-ons. These airlines share an ability to start and drop routes at very short notice; and have generally developed along a multiple hub strategy where cost savings are the prime consideration and where loyalty to airports and markets is a low priority.

The information in Table 3-13 below is based on the categorisation made by the Centre for Asia Pacific Aviation (CAPA) using data provided by OAG. The specific airlines included in this grouping have not been identified. However, the resulting calculations are almost certainly a good guide as to how the low cost airline grouping is continuing to make headway against legacy carriers in terms of market share.

Using CAPA's data, it is clear that the low cost carriers have continued to grow their share of the overall air passenger market, both in Europe and globally. Table 3-13 shows how their share of total seat-kilometres has continued to grow by world region over the past decade.

Table 3-13: Global & Regional Market Share of Low Cost Carriers

%	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Europe	**4.9**	**8.2**	**13.6**	**17.7**	**20.5**	**23.7**	**28.5**	**31.4**	**32.1**	**35.3**
N America	17.6	19.8	21.9	24.0	24.9	26.0	27.1	28.5	28.0	28.6
Latin America	3.2	5.7	7.1	7.8	9.6	14.2	17.7	21.7	28.3	29.9
Asia Pacific	1.1	1.8	2.4	4.5	6.2	9.0	12.3	14.1	15.7	17.6
Middle East	0.0	0.0	0.1	0.9	1.9	3.4	5.6	7.4	8.3	11.9
Global	**8.0**	**9.5**	**11.4**	**13.5**	**14.9**	**16.7**	**19.3**	**21.1**	**21.9**	**23.4**

Source: CAPA, based on OAG data (Year to October 2010)

Overall, the global share has continued to edge upwards having risen from 8.0% in 2001 to 21.9% by 2009, with a further significant increase to 23.4% in 2010. The original low cost market in North America, dominated by Southwest Airlines, led the world in the first half of the decade but has since stalled – having reached almost 25% of the aviation market in 2005, it has grown much more slowly to 28.6% by 2010 – similar to the figure of two years earlier.

By comparison, European low cost carriers have continued to grow rapidly throughout the decade, from just 4.9% of the overall air market for European airlines in 2001 to 35.3% in 2010. Of all global regions, it is now comfortably the leading region and shows no sign as yet of levelling off.

The three other regions are also growing rapidly from small bases in 2001. The low cost carriers of South and Central America grew steadily from 2001 to 2005 but have since expanded at a much faster rate, achieving an almost 30% share in 2010, having overtaken North America. Airlines in the Asia Pacific region have had a similar rapid growth in the past five years, but from a smaller base. There would appear to be no reason why they should not achieve a 30% share within a few more years.

The least successful market would appear to be in the Middle East, but it has still grown from less than a 2% share in 2005 to almost 12% by 2010 – there is apparently still much growth left in this market.

Alone amongst world regions, Africa has yet to spawn a significant number of large low cost carriers, but it is expected that some major carriers will arise within a few years to challenge the legacy and regional carriers of the continent. CAPA calculates that the LCC share of total African airlines seat-kilometres rose from 0.3% in 2001 to 10.2% by 2010 (still the smallest proportion of all continents), but has not published data for the intervening years.

3.5.2 Europe

Table 3-14 below shows how the fourteen largest European low cost airlines fared in 2010 compared to 2009, in terms of advertised seat-kilometres. Note that SkyEurope of Bratislava ceased operations on 1 September 2009.

Table 3-14: Largest fourteen European Low Cost Carriers performance in 2009 and 2010

Airline	State	seat-km (billion) 2009	seat-km (billion) 2010	% increase	Increase in seat-km	% share of increase
Ryanair	Ireland	80.4	98.8	22.8%	18.4	41.4%
easyJet*	UK	59.1	66.5	12.5%	7.4	16.7%
Air Berlin	Germany	32.1	37.9	18.0%	5.8	13.1%
Norwegian Air Shuttle	Norway	13.2	18.1	37.0%	4.9	11.0%
Vueling Airlines	Spain	10.0	13.9	39.8%	4.0	9.0%
Wizz Air	Hungary	11.0	13.9	26.4%	2.9	6.5%
germanwings	Germany	7.8	9.0	15.4%	1.2	2.7%
Transavia.com	Netherlands	6.8	6.8	-0.1%	0.0	0.0%
Jet2.com	UK	5.8	6.7	15.0%	0.9	2.0%
flybe	UK	5.5	5.8	4.8%	0.3	0.7%
Jetairfly	Belgium	4.9	5.6	14.4%	0.7	1.5%
Blue Air	Romania	2.5	3.2	31.2%	0.8	1.8%
bmibaby	UK	3.6	3.1	-11.9%	-0.4	-0.9%
SkyEurope	Slovakia	2.3	0.0	-100.0%	-2.3	-5.2%
Total (14)		**245.0**	**289.4**	**18.1%**	**44.4**	**100.0%**

Source: OAG

* Includes easyJet Switzerland

Overall, there was a significant increase of 18.1% in seat-kilometres advertised in 2010 compared to 2009 (no allowance has been made for the significant disruption caused by volcanic ash in April and snow in December). Small declines are shown for bmibaby and transavia.com, but all others grew by at least 13% during the year.

The largest percentage growths were shown by the mid-size airlines Vueling and Norwegian Air Shuttle, but the largest absolute growths were by the three largest airlines of Ryanair, easyJet and Air Berlin.

Ryanair's growth was 42.6% of the total growth in the sector and by 2010 it was providing some 35% of the output of these fourteen airlines.

The carrier's organisation, ELFAA, represented nine of these airlines in 2010 (down from thirteen in 2009 with the resignation of bmibaby and Blue Air of Romania; and the failures of SkyEurope and Myair of Italy). It should be noted that Air Berlin – as the third largest low cost airline – is not a member of the grouping.

Data for all thirteen airlines in 2009 (with a sub-total for those still in ELFAA in 2010) is as follows (Table 3-15):

Table 3-15: ELFAA Members 2009 Data

		Pax (million)	PLF%	Countries	Destinations	Routes	Daily flights	Fleet size	Fleet age	Employees
easyJet	UK	46.1	86.0	28	117	500	1,050	183	3.5	6,666
flybe	UK	7.3	N.A.	13	54	194	424	71	3.2	2,953
Jet2.com	UK	3.3	80.3	17	49	125	300	32	N.A.	1,250
Norwegian	Norway	10.8	78.0	28	95	210	285	46	10.7	1,600
Ryanair	Ireland	65.3	82.0	26	150	1,000	1,070	210	2.0	7,118
Sverigeflyg	Sweden	0.6	72.3	5	16	20	51	11	14.8	180
transavia.com	Netherlands	5.2	77.0	19	67	102	60	30	7.3	1,911
Vueling	Spain	8.2	72.8	17	46	92	212	35	6.3	1,195
Wizzair	Hungary	7.8	83.4	19	49	148	146	27	3.3	1,058
Total		**154.6**	**82.0**				**3,598**	**645**	**N.A.**	**23,931**
Blue Air	Romania	1.7	81.0	8	25	45	15	11	12.0	830
bmibaby	UK	2.9	67.2	11	33	65	83	14	15.0	567
Myair	Italy	0.9	70.7	10	36	63	47	9	7.7	187
Sky Europe	Slovakia	2.4	73.4	20	32	50	72	14	2.0	642
Total		**7.9**					**217**	**48**	**36.7**	**2,226**

Source: ELFAA

The figures for the nine remaining airlines in 2010 (plus the variance they showed against the same nine airlines in 2009) were as follows:

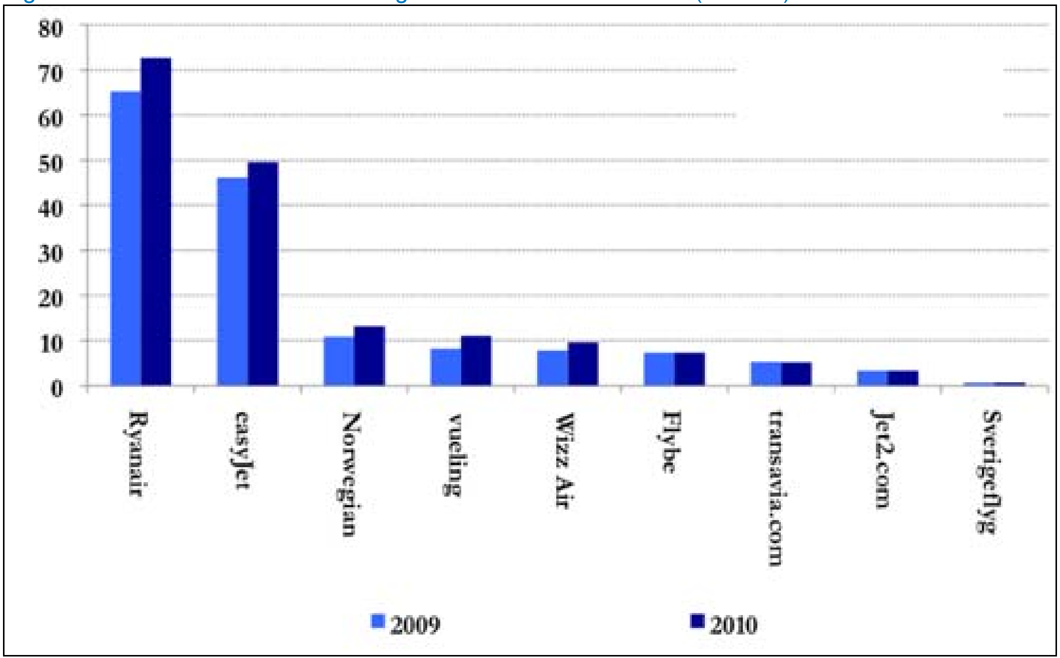
Table 3-16: ELFAA Members 2010 Data

		Pax (million)	PLF %	Countries	Destinations	Routes	Daily flights	Fleet size	Fleet age	Employees
easyJet	UK	49.6	87.2	29	125	541	1,033	193	3.9	7,359
flybe	UK	7.3	N.A	12	63	165	521	68	4.1	2,939
Jet2.com	UK	3.3	84.7	21	52	154	160	34	21.0	1,500
Norwegian	Norway	13.2	78.0	31	95	238	360	54	8.0	2,000
Ryanair	Ireland	72.7	82.0	27	160	1,200	1,500	256	3.1	8,000
Sverigeflyg	Sweden	0.6	73.0	10	21	30	52	9	13.6	130
transavia.com	Netherlands	5.1	76.0	22	96	126	55	44	7.9	1,871
Vueling	Spain	11.0	72.6	13	40	66	188	36	7.8	1,266
Wizzair	Hungary	9.6	84.0	25	69	221	175	34	3.6	1,280
Total		**172.4**	**82.3**				**4,044**	**744**	**5.3**	**26,345**
Growth 2010 cf. 2009		**11.5%**	**0.4%**				**12.4%**	**15.3%**		**10.1%**

Source: ELFAA

The passenger numbers are shown graphically in Figure 3.13 below and show convincingly the importance of the two main carriers, Ryanair and easyJet.

Figure 3.13: ELFAA Airlines Passenger numbers 2009 vs. 2010 (millions)



Source: CAPA, using data from ELFAA

Passenger growth at 11.5% was very healthy compared to the much slower growth of the legacy carriers, with the largest percentage growths being recorded by Vueling, Wizz Air and Norwegian. Load factors increased marginally from 82.0% in 2009 to 82.3% in 2010, with the larger increases recorded by easyJet and Jet2.com.

Of the nine airlines, eight showed an increase in the number of destinations served, while seven showed increases in the number of countries and routes served. Overall, there was a 12.5% increase in the average number of flights flown per day, with Ryanair showing a 46% growth.

The number of aircraft operated by these nine airlines grew by 15.9% while their employee count was up by 10.1% to some 26,000 employees. The composition of the ELFAA airlines fleet is shown in Table 3-17.

Table 3-17: ELFAA Airline Fleets

	2009	2010	% var.
Jets			
A320 family	228	260	14.0%
B737-300	55	46	-16.4%
B737-700	27	20	-25.9%
B737-800	243	318	30.9%
B757-200	10	12	20.0%
EMB195	15	14	-6.7%
Subtotal	**578**	**670**	**15.9%**
Turboprops			
DH8-400	56	54	-3.6%
ATR 72-500	2	3	50.0%
SF 2000	4	2	-50.0%
SF 340	5	5	0.0%
Subtotal	**67**	**64**	**-4.5%**
Total	**645**	**734**	**13.8%**

Source: ELFAA

The older, smaller and more expensive to operate B737-300 continues to be phased out, with most growth being in fleets of B737-800 and the A320 family. easyJet more than halved the number of B737-700s it operated in 2010 to just eight aircraft, with transavia.com increasing its fleet by two. Of the turbo-props, flybe operates the DH8-Q400 and Sverigeflyg the remainder. As a result of these changes, the average number of seats per aircraft continues to rise.

The most significant developments for individual European LCC airlines in 2010 were as follows:

- Air Berlin (Germany) successfully continued its hybrid operation throughout 2010, combining elements of an LCC operation together with legacy-style aspects on its regional services – similar to the other major hybrid regional airline flybe (United Kingdom). It is one of the increasing number of airlines which is now challenging the once clear-cut distinction between LCCs and legacy airlines.
- easyJet (United Kingdom) maintained its clear LCC stance throughout 2010, but has been successfully achieving a larger share of the business market. Problems were caused during the year by a protracted dispute with the airline's founder. It is now the largest operator at London Gatwick Airport.
- Norwegian Air Shuttle (Norway) is moving away from purely intra-European services and launched a service to Dubai. It is contemplating the order of B787s or A350 XWBs as it prepares to become an important long-haul LCC player.
- Ryanair (Ireland) continued to grow during 2010, with its fleet of 218 B737-800 aircraft increasing to 256 during the year and with firm orders for a further 64 units. Having concentrated much of its earlier efforts to developing services at secondary airfields, it now appears to see its future more linked with those primary airports where slots are still available, although this will increase costs. Long-haul flights are still under study but no decisions on dates, routes or aircraft have been made public.

3.5.3 Rest of the World

As with Europe, there is no hard and fast rule globally as to what constitutes a low cost airline; and the selection made by CAPA in Table 3-13 at the head of this section is unlikely to be replicated exactly by other industry analysts.

Table 3-18 below shows the 25 largest non-European airlines categorised as low cost by Mott MacDonald, showing how advertised seat-kilometres have changed from 2009 through to 2010.

Table 3-18: Top 25 Largest Non-European Low Cost Carriers

Airline	State	2009 Seat-km (billion)	2010 Seat-km (billion)	% increase 2010/09	Increase in seat-km	% share of increase
Southwest Airlines	U.S.	158.2	159.4	0.7%	1.2	1.5%
JetBlue Airways	U.S.	52.8	56.8	7.5%	4.0	5.2%
VARIG-GOL Airlines	Brazil	40.3	44.5	10.6%	4.2	5.5%
AirTran Airways	U.S.	37.5	38.5	2.9%	1.1	1.4%
WestJet	Canada	27.6	31.4	13.6%	3.8	4.9%
Jetstar Airways	Australia	24.8	28.3	13.9%	3.4	4.5%
Lion Air	Indonesia	13.0	25.4	95.7%	12.4	16.2%
AirAsia	Malaysia	21.6	23.9	10.8%	2.3	3.0%
Virgin Blue	Australia	19.2	21.6	12.4%	2.4	3.1%
AirAsia X	Malaysia	7.1	13.4	88.0%	6.3	8.2%
Spirit Airlines	U.S.	12.2	13.4	10.1%	1.2	1.6%
Virgin America	U.S.	10.5	12.4	18.2%	1.9	2.5%
IndiGo Air	India	8.8	11.5	30.7%	2.7	3.5%
Air Arabia	UAE	10.6	11.4	6.9%	0.7	0.9%
Pegasus Airlines	Turkey	0.0	10.7	-	10.7	13.9%
Cebu Pacific Air	Philippines	9.0	10.5	17.6%	1.6	2.1%
SpiceJet	India	7.9	9.3	17.2%	1.4	1.8%
Air India Express	India	8.6	9.2	6.5%	0.6	0.7%
Volaris	Mexico	7.3	8.7	18.4%	1.4	1.8%
Thai AirAsia	Thailand	6.5	7.4	14.4%	0.9	1.2%
Vaustralia	Australia	4.1	7.1	73.3%	3.0	3.9%
Atlas Blue	Morocco	3.1	6.3	107.1%	3.3	4.3%
Indonesia AirAsia	Indonesia	5.3	5.9	11.5%	0.6	0.8%
Kingfisher Red Service	India	5.7	5.7	0.7%	0.0	0.1%
Batavia Air	Indonesia	0.0	5.7	-	5.7	7.5%
Total (25)		**501.7**	**578.5**	**15.3%**	**76.8**	**100.0%**

Source: OAG

The expansion of advertised seat-kilometre output by 15.3% in 2010 is substantial, although still not as large as the 18.2% increase of European carriers. The most dramatic increases were by Lion Air and Batavia Air in Indonesia, by Pegasus in Turkey and by Malaysia's AirAsia X.

The most significant developments for individual LCCs outside Europe in 2010 were as follows:

- AirAsia X (Malaysia) continues to succeed as the first long-haul low cost carrier, but now provides business-class seating on its A330s and offers connecting possibilities at Kuala Lumpur on to its parent airline AirAsia.

- AirTran Airways (USA) has survived the economic crisis in good shape, due to sound business decisions concerning rapid reactions to changing conditions, reducing its rate of growth, diversifying its network, improving its capital structure and investing heavily in fuel hedging. In September 2010, a planned integration with Southwest Airlines was announced, organised by way of a $1.4 billion share repurchase by Southwest.
- Allegiant (USA) continues to expand rapidly, growing annually at more than 10% throughout recent years. It has become a rising force in the US industry and generates some of the highest operating profits of LCCs worldwide. It has now recorded profits for 32 consecutive quarters. In the latest quarter, ancillary revenues rose by 24%, totalling $45.7 million, or 28% of total revenues.
- Cebu Pacific (Philippines) continued to surge forward in 2010 as the largest carrier in the country. The airline raised some $500 mn in its October 2010 IPO, and is believed to be considering long-haul services on the AirAsiaX model, as it continues to replace Philippine Airways as the nation's largest airline. With an extremely large overseas migrant worker market, the Philippines provides a major low-cost long-haul opportunity.
- IndiGo (India) is now India's largest LCC and is now planning to start international services, connecting with Indigo Partner airlines such as Avianova (Russia) and Wizzair. It recently ordered 180 A320-aircraft – the world's largest ever order.
- JetBlue (USA) has maintained its strong liquidity position throughout the economic downturn, through careful capacity management, but domestic competition is likely to get tougher, particularly for its base at New York. It continues to explore the benefits of working closely with Lufthansa, its largest shareholder.
- Lion Air (Indonesia) has been expanding aggressively in domestic and regional markets and is now targeting China.
- Southwest Airlines (USA) has had to continue to evolve as ever more LCCs have entered the market, and mergers have continued apace. The airline achieved a remarkable financial turnaround in 2010 following its first ever quarterly loss in 2009. The AirTran acquisition is expected to generate further synergies and profits, increasing its route network by 25% and opening up new destinations including Atlanta and Washington National. It still plans to launch international services in the near future, but absorbing the different culture of AirTran may delay such plans.
- Tiger Airways (Singapore), one of the lower cost operators in South East Asia, is establishing itself as a major future force in the region, with the potential to become one of three large non-flag carrier operations, along with AirAsia and Jetstar. It continues to expand by setting up joint ventures in Australia, Thailand and elsewhere. In the Philippines it announced that SEAIR would be its first partner airline in the region, through a marketing arrangement allowing SEAIR to dry-lease Tiger's two Manila-based A320s.
- Virgin Blue (Australia) is in the middle of a transformation, from being Australia's first major LCC in 2000, to becoming a full service operation, aimed at higher-yield business traffic, and having close alliances with Etihad, Air New Zealand, and (planned) Delta.

3.5.4 Emerging Trends

A concise summary of trends in the low cost carrier market has been provided in an article produced for the Centre for Asia Pacific Aviation (CAPA)[53] in February 2011:

> *"The key development of 2011 will be the continuation of the rapid transformation of the business models of low cost airlines worldwide: expansion in intercontinental markets, interline agreements among themselves as well as with legacy network carriers, operations with multiple types of aircraft, two-class service, multiple channels of distribution, more service to conventional airports, enhanced brands and superior communications with potential customers through social networks. These enhanced value propositions will divert more premium-fare passengers from the legacy carriers, both from the business-class cabins and the top end of the economy-class buckets (individual travellers and corporate accounts)*."

The year 2010 saw a continuation of the recent trend for all airlines – whether legacy, regional or low cost – to move towards a common model; and drawing upon the best aspects of each type of service. It may not be too many more years before the current distinction between the three airline types becomes so confused that it will become meaningless.

The same market segments will remain – business, holiday and VFR; local, short-haul and long-haul; point-to-point and connecting; economy and premium; time-rich and time-poor – but individual airlines will continue to select strategies which maximise their profits, based on their financial capabilities and opportunities. Many airlines will choose strategies that cross over between what are now seen as different kinds of airlines. The 'pure' LCC model pioneered by Southwest Airlines may still be followed by a number of others, but it is unlikely to remain the majority.

Of the range of changes outlined above (possibly the most important in the past year) has been the apparent breakthrough into long-haul markets by LCC airlines. Several have previously tried and failed, but the success of AirAsia X is being studied and used as a template by airlines elsewhere.

Meanwhile, the true legacy carriers have long been reducing prices in their economy cabins so as not to lose market share to LCCs.

One of the recent changes which has been making it more difficult for LCC airlines to remain true to their original model has been the significant increase in the cost of fuel. With every other cost cut as much as possible, fuel prices are becoming an ever more important part of an LCC's overall costs – as such, it is proving more difficult to compete with legacy airlines and others, as the typical LCC features save a decreasing proportion of an airline's total costs.

[53] Airline Leader; Issue 4 Special Edition Outlook 2011; Centre for Asia Pacific Aviation February 2011

3.6 Charter Airlines

3.6.1 Overview

Charter airlines were a ‘child of the sixties’ and were set up by independent companies to provide low cost competition to the favoured legacy airlines, which alone were licensed to operate scheduled services. With the onset of deregulation in the U.S. and the EU, the rationale for charter airlines (particularly those operating regular services at set times to holiday destinations) became less obvious. Some, particularly in Germany, became scheduled airlines offering a small number of seats to the general public alongside their large charter groups, while others have generally succumbed to low cost carrier competition on short-haul routes. The main rationale today for charter airlines is as long-haul operators to holiday destinations, with an inferior seat pitch and in-flight service compared with scheduled legacy airlines, often from regional airports that cannot support a scheduled service and flying beyond the competitive reach of low cost airlines with their short haul aircraft. Low cost airlines keep looking to take over the longer haul flights from charter airlines, but to date they have not found a more efficient model than that already adopted by the charter airlines. The one exception may yet be the Malaysian airline Air Asia X and possibly Virgin Australia.

Table 3-19 below highlights a selection of major worldwide charter airlines in 2010 in comparison with 2009. This list is not comprehensive and is based solely on those charter airlines where data was available in the public domain at the time of publication. Nevertheless, this list is representative of the general charter industry growth in 2010.

Table 3-19: Worldwide Charter Airlines Traffic Growth: 2010 vs 2009

		Passengers (millions)			Revenue Passenger Kms (millions)		
Charter Airline	**Region**	**2010**	**2009**	**% chg ‘10 vs '09**	**2010**	**2009**	**% chg ’10 vs '09**
Thomson Airways	**EU-27**	**10.97**	**11.24**	**-2.4%**	**32,713**	**32,649**	**0.2%**
Thomas Cook Airlines	**EU-27**	**8.12**	**8.20**	**-1.0%**	**27,385**	**27,154**	**0.9%**
Condor	**EU-27**	**5.73**	**5.63**	**1.8%**	**19,888**	**19,159**	**3.8%**
Monarch Airlines	**EU-27**	**5.79**	**6.11**	**-5.2%**	**15,127**	**15,589**	**-3.0%**
Pegasus Airlines	**Europe**	**8.60**	**5.86**	**46.8%**	**-**	**-**	**-**
Air Transat	N. America	2.96	3.18	-6.9%	-	-	-
Iberworld	**EU-27**	**1.25**	**1.29**	**-3.1%**	**4,342**	**4,448**	**-2.4%**
World Airways	N. America	0.72	0.89	-19.1%	4,164	4,278	-2.7%
Omni Air International	N. America	0.91	0.84	8.3%	4,217	3,987	5.8%

Source: Air Transport Intelligence

European charter airlines are considerably larger than non-European counterparts. In terms of passenger traffic, two airlines dominate the market –Thomson Airways and Thomas Cook Airlines. Although both recorded a slight decline in the number of passengers carried in 2010 over 2009, RPKs registered growth. Overall, the table shows mixed results with growth and decline experienced across the charter carriers. With IATA member airlines recording an average growth in RPKs of 8.0% in 2010 versus 2009, the charter sector appears to be lagging. The general upturn in global economic conditions which has stimulated overall air travel demand in 2010 has not so much impacted upon the charter market, dependent as it is on leisure travellers who are the most price-sensitive and most likely to forego air travel when disposable income is inhibited.

Many of these European charter airlines - including Thomson, Monarch, Condor, Pegasus - also operate scheduled services. One of the reasons for this has been European deregulation, whereby any airline operating charter flights on intra-European routes and increasingly to other neighbouring destinations such as Morocco, may advertise series charter flights as scheduled services – even though the number of seats made available to the true scheduled market may be negligible. Some charter airlines, notably those in Germany, now perform very few pure charter flights except those to long-haul destinations where strict bilateral air service agreements may require them to do so.

Given the limited nature of the traffic statistics covering the European charter market for 2010, a useful proxy is available from the UK CAA which provides a comparison between 2009 and 2010 of charter passenger traffic both in total and by destination from UK airports.

Table 3-20: Charter Passengers at UK Airports 2010 vs. 2009

	2009	2010	% change	% share 2010
Short-Haul				
European Union - West	14,782,930	13,194,558	-10.7%	61.0%
European Union - East	370,687	356,940	-3.7%	1.7%
Other Western Europe	3,490,251	3,993,858	14.4%	18.5%
Other Eastern Europe	9,814	3,489	-64.4%	0.0%
North Africa	1,926,783	1,846,542	-4.2%	8.5%
Subtotal	**20,580,465**	**19,395,387**	**-5.8%**	**89.7%**
Long-Haul				
Other Africa	306,245	287,980	-6.0%	1.3%
Near, Middle East	31,807	32,739	2.9%	0.2%
Asia, Australasia	153,516	117,987	-23.1%	0.5%
North America	452986	394611	-12.9%	1.8%
Caribbean, Latin America	1,470,946	1,401,394	-4.7%	6.5%
Subtotal	**2,415,500**	**2,234,711**	**-7.5%**	**10.3%**
Total Charter	**22,995,965**	**21,630,098**	**-5.9%**	**100.0%**
Total Scheduled	**152,635,535**	**150,311,745**	**-1.5%**	
Total all international pax	**175,631,500**	**171,941,843**	**-2.1%**	
Charter %	**13.1%**	**12.6%**		

Source: UK CAA

In the UK market at least, the charter industry declined in 2010 reducing by 5.9% over 2009, with the longer haul flights declining at a slightly higher rate. Scheduled traffic to and from the UK declined less quickly in 2010 at 1.5%, with the result that the charter proportion of total international traffic at UK airports declined from 13.1% to 12.6%.

Table 3-20 also demonstrates that despite the undoubted impact that short-haul LCC carriers have had upon charter carriers, 63% of the charter market is still to other EU destinations while 90% is classified as short-haul. Because of the strength of the euro there was continuing rapid growth in flights to Turkey, which is classified by the UK CAA as ‘other Western Europe’ explaining the growth in that segment.

3.6.2 Emerging Trends

As mentioned in the previous section, the charter airline market in Europe first became important in the 1960s when loopholes in airline regulations and bilateral air service agreements first began to be exploited; and opportunities to introduce low-fare competition to the entrenched legacy carriers first began to take place. The two main approaches were the inclusive tour charter, designed to provide holidays around the Mediterranean for those living in Northern Europe; and the affinity charter, predominantly for VFR traffic to the U.S. and other long-haul destinations.

Over time, the long-haul legacy carriers have replaced the affinity charters (although a small number survive, operated by carriers such as Air Transat) but, despite total deregulation of the European aviation market the holiday charter airlines have not only survived but continued to prosper.

For some years, charter airlines suffered significant market share loss to low cost carriers who could offer leisure passengers a variety of itineraries (not just standard seven and fourteen day holidays) and the ability for passengers to create their own holidays by purchasing airline seats and accommodation separately. The charter airlines believe that the loss of market share has now ceased and that a new equilibrium has been reached on short-haul routes. The airlines (and their tour operators) are now making more play of the fact that their all-inclusive holiday prices are not subject to the additional ancillary charges now rampant in the low cost market – they are selling guaranteed total holiday cost.

As for long-haul holidays, the threat of long-haul low cost carriers is still as distant as ever and the three main groupings believe that their size and economies of scale will protect them from such incursions – these carriers have always been low cost in principle, if not in name. The charter airlines started life operating old, second-hand aircraft – now they are at the front of the queue when it comes to ordering new equipment from Boeing and Airbus – the Thomson Travel subsidiary of the TUI group has ordered the Boeing B787.

There remain some differences in approach to the market by the various carriers. In recent years, the three majors have tended to separate out their charter and scheduled aspects, allocating them to different members of their groups. Thus Condor Flugdienst, part of the Thomas Cook group, now solely operates scheduled services. The pure charter carriers leave all marketing activity to their (normally in-house) tour operators, while the scheduled members of the group market a small number of seats directly; whilst letting tour operators have the bulk of the seat allocation.

Some of the mid-size charter airlines, such as Monarch, still offer both scheduled and charter flights although both types are heavily leisure-dependent. Those airlines which rely upon independent tour operators have had to spread their risks more broadly, as many of these smaller retail companies are less stable and more likely to fail.

One trend that became more evident in 2009 and 2010, during the economic downturn, is that operations at many of the smaller generating airports were trimmed more savagely, with tour operators and their airlines retreating to the high ground – those major airports where demand could be concentrated. This retreat from minor markets was far less obvious at the receiving ends of the routes.

3.7 Cargo Airlines

3.7.1 Air Cargo Demand

The World Trade Organization's latest projection is for 13.5% growth of merchandise trade volume in 2010. The IMF recorded a 12% increase in world trade volume in goods and services in 2010, with advanced, emerging and developing economies enjoying strong growth in exports and imports throughout the year.

Table 3-21: World Trade Volumes (Goods and Services)

% change	2009	2010	2011E
World Trade Volume (Goods and Services)	-10.7%	12.0%	7.1%
Imports – Advanced Economies	-12.4%	11.1%	5.5%
Imports – Emerging and Developing Economies	-8.0%	13.8%	9.3%
Exports – Advanced Economies	-11.9%	11.4%	6.2%
Exports – Emerging and Developing Economies	-7.5%	12.8%	9.2%

Source: IMF World Economic Outlook Update (January 2011)

The performance of emerging and developing economies was stronger for both exports and imports. According to IATA[54], around 35% of world trade by value is transported by air.

Against the background of the much improved global economic and trade performance, air cargo demand recovered quickly in 2010 despite a relatively slow economic recovery in the U.S. and Europe. The recovery was primarily due to two main factors:

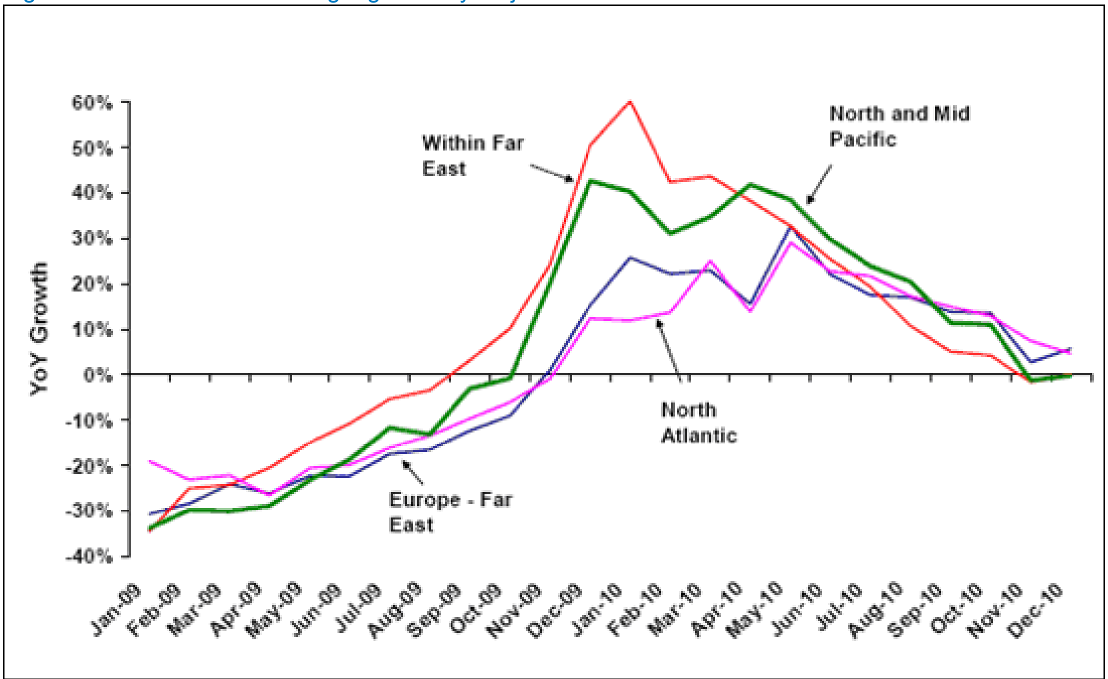
i. The economic recession had led to many manufacturers and retailers significantly reducing inventory, once the economy began to recover in the late summer of 2009 there were serious inventory shortfalls which air freight was ideally positioned to address.
ii. Asia came out of recession much more quickly than anticipated so that the bulk of growth during 2010 was Asia-centred.

It was therefore not surprising that IATA reported a 20.6% increase in global air cargo demand in 2010. However, these results should be viewed against the background of a relatively low base in the previous year. What was of concern was the reduction in demand growth towards the end of 2010.

The first half of 2010 saw a very divergent performance across trade lanes, with routes both ‘Within Far East’ and ‘North and Mid Pacific’ recording very high year-on-year growth rates.

[54] IATA Director General, IATA World Cargo Symposium, March 2011

Figure 3.14: International Freight growth by major routes



Source: IATA ODS

The striking feature of Figure 3.14 above is the reduction in year-on-year growth in all of the major routes in the second half of the year.

Both Boeing and Airbus are indicating that following the shock and rebound seen in 2009 and 2010, air cargo growth will return to more normal annual growth rates of around 6% per annum in 2011 and beyond. For 2011, IATA currently expects air cargo demand growth of 5.5%.

Some commentators make a more pessimistic note, suggesting that the air cargo market has matured to the point that traffic is unlikely to increase at a rate much faster than global GDP growth, which is estimated to average around 3% to 3.5% annually going forward.

Commentators agree that going forward Asia, especially China, will be the main engine of growth for the air cargo industry.

3.7.2 Cargo Traffic by World Region

The supply of capacity to meet demand for air cargo services comes from:

- Dedicated cargo aircraft operated by cargo airlines, including integrators;
- Cargo aircraft operated by cargo and passengers airlines;
- Lower holds of passenger aircraft operated by passenger airlines;
- Road feeder services – increasingly important in both North America and Europe.

According to Boeing[55], at the end of 2010 there were around 1,700 cargo aircraft in operation worldwide of which:

- 37% were standard body (<45 tonnes);
- 36% were medium widebody (45-80 tonnes);
- 27% were large (>80 tonnes).

Table 3-22 below details the number of FTKs performed by airlines domiciled in major regions of the world:

Table 3-22: Cargo Supply by World Region (FTKs million)

Region	Jan to Oct		Jan to Oct		Full Year Growth
	2010	Share	2009	Share	(IATA data)
U.S.	77,127	47.7%	64,435	48.1%	21.8%
Europe	27,771	17.2%	25,408	19.0%	10.8%
Asia Pacific	53,576	33.1%	41,694	31.1%	24.0%
Latin America	3,203	2.0%	2,453	1.8%	29.1%
Total	**161,677**	**100.0%**	**133,990**	**100.0%**	**20.6%**

Source: U.S. DOT, U.S. Bureau of Transportation Statistics, AEA, AAPA, ALTA, IATA

There was a 21% growth in freight traffic (FTKs) in 2010 compared to 2009. Consistent with both economic and trade performance, FTK growth in Asia Pacific (24.0%) and Latin America (29.1%) was far greater than in the U.S. (21.8%) and Europe (10.8%).

Overall, airlines domiciled in the U.S. had 48% share of global freight traffic (FTKs) in the first nine months of 2010, followed by Asia Pacific with a 33% share. Excluding domestic air freight it is estimated that around 44% of total international air freight traffic is transported by Asia Pacific-based carriers. Both Asia Pacific and Latin America increased their market share in 2010 compared with the previous year at the expense of the U.S. and Europe.

3.7.3 North America

The U.S. is home to the world's two largest air cargo carriers FedEx and UPS. Together, they operate around one third of the global cargo aircraft fleet and accounted for almost 50% of cargo revenue tonne-miles operated by U.S. carriers in 2010.

Table 3-23: Selected North American Airlines: Cargo Revenue Ton-Miles 2010 v 2009

Airline	Cargo Revenue Tonne-Kms (million)	Growth vs. 2009	Share
FedEx	17,580	12.8%	29.9%
UPS	11,600	11.6%	19.7%
Atlas Air	4,687	22.4%	8.0%
United Airlines	3,062	18.7%	5.2%
American Airlines	2,999	13.8%	5.2%
Continental	1,705	17.5%	2.9%

[55] Boeing World Air Cargo Forecast 2010-2011

Airline	Cargo Revenue Tonne-Kms (million)	Growth vs. 2009	Share
World Airways	1,365	34.0%	2.3%
ABX Air	753	29.6%	1.3%
US Airways	626	44.6%	1.1%
Subtotal	**44,377**	**15.2%**	**75.6%**
Other U.S. Airlines	14,356	15.7%	24.4%
All U.S. Airlines	**58,733**	**15.3%**	**100.0%**

Source: U.S. Bureau of Transportation Statistics

Carriers within all segments of the air cargo market achieved strong growth in 2010 compared with the previous year. Cargo integrators FedEx and UPS achieved aggregated growth of 12.3%; cargo airlines Atlas Air, ABX Air and World Airways achieved aggregated growth of just over 25% and the passenger combination airlines achieved just over 18% growth.

Despite the recovery during 2010 UPS furloughed 54 pilots in May 2010, which had been due to increase to 230 pilots by the year end. The reasons given were reduced demand, a more modern fleet and increasing the pilot retirement age from 60 to 65.

3.7.4 Europe

The Association of European Airlines (AEA) recorded an annual freight traffic growth (FTK) for its member airlines of 8.2%, well under half that reported by IATA. AEA membership is primarily legacy European carriers and the lower growth recorded for member airlines reflects the fact that much of the additional capacity and passenger growth on European routes came from low cost carriers which generally carry very little air cargo traffic. Freight traffic growth in 2010 was severely distorted by the effects of external shocks, the airspace closures in April and May, European airport closures due to snow in November and December and the frequency and intensity of industrial action.

Table 3-24: AEA Airlines Cargo Performance January to December 2010

REGION	Freight Traffic TFTK (millions)	TFTK %
Domestic (1)	80.3	-7.8
Cross-border Europe (2)	1,003.9	6.8
Total Europe (1+2)	1,084.2	5.5
Europe - North Africa (3)	199.7	-13.7
Europe - Middle East (4)	1,159.0	-2.8
Intl Short/Medium Haul (2+3+4)	2,362.6	-0.1
North Atlantic (5)	9,662.3	9.4
Mid Atlantic (6)	1,679.0	19.7
South Atlantic (7)	2,619.5	14.8
Europe - Sub Saharan Africa (8)	3,098.0	-2.9
Europe - Far East/Australasia (9)	13,658.1	6.9
Total Long Haul (5 to 9*)	31,043.7	9.0
Total Intl (2 to 9*)	33,406.3	8.3
Total Scheduled (1 to 9*)	33,486.5	8.2

Source: AEA (Freight traffic is measured in TFTK (Total Freight Tonne-Km) on passenger and all-cargo services, excluding mail.
*Long haul region 'Other' is not shown above, but is included in the total.)

AEA carriers achieved freight traffic growth of 9.0% on long-haul international routes compared with a 0.1% decline on international short and medium-haul routes, although the latter only accounted for 7% of total member airline traffic. The North Atlantic and Europe to Far East/Australasia, which together accounted for 70% of FTK traffic, achieved growth rates of 9.4% and 6.9% respectively.

Table 3-25: Selected European Airlines: FTKs 2010 v 2009

	From Jan to:	FTKs (000s)	Growth vs. same period 2009
Air France/KLM	Nov	7,895,000	-1.9%
Lufthansa Cargo	Dec	8,905,000	19.9%
British Airways	Dec	4,572,000	2.2%
Cargolux	Nov	4,494,700	5.8%
Virgin Atlantic Airways	Nov	1,411,300	17.5%
Swiss	Dec	1,322,000	21.4%
Total		**28,600,000**	

Source: Air Transport World, February 2011

Lufthansa Cargo enjoyed a particularly successful year with freight and mail tonnage increasing appreciably across all traffic regions. The airline's overall cargo load factor increased by 7.3% compared with 2009, to 70.9%. The biggest growth was in the Americas where tonnage increased by almost 25%, followed by the Asia/Pacific with growth of almost 21%.

During the year, Lufthansa Cargo increased capacity by 7.6%. Along with the airline's reactivated freighters, the increase was attributable to new aircraft joining the fleet operated by the AeroLogic subsidiary and the integration of the cargo capacities of Austrian Airlines.

In Europe, Cargo Integrators' DHL (part of Deutsche Post) and TNT share a slice of the air cargo market. AT the time this report was published traffic data is unavailable in the public domain. However, it is worth noting that Deutsche Post recorded an 11% increase in profit in 2010 over 2009[56], with TNT a corresponding 21% increase[57]. This reflects the general upturn in fortunes experienced in 2010 by the airlines carrying cargo listed in Table 3-25.

3.7.5 Asia Pacific

In 2009 Asia Pacific airlines overall saw a 10% decline in international FTK traffic with cargo capacity reduced by 11% and cargo load factor unchanged at around 65.1%. In 2010, AAPA members' traffic (FTKs) increased by 24.2% in 2010 compared with the previous year, with cargo load factors increasing by 4.9% (Table 3-26).

Table 3-26: International Scheduled Services of Asia Pacific Airlines (AAPA Members)

International	Jan-Dec 2010	Jan-Dec 2009	% Change
FTK (million)	64,593	52,025	24.2%
AFTK (million)	92,258	79,901	15.5%
Freight Load Factor	70.0%	65.1%	4.9%

Source: Association of Asia Pacific Airlines (AAPA)

[56] Deutsche Post Annual Report 2010

[57] TNT Annual Report 2010

In terms of carrier performance Table 3-27 below details a general picture of very strong recovery for most of the carriers domiciled in the Asia Pacific Region.

Table 3-27: Selected Asian Airlines FTKs 2010 vs. 2009

Airline	From Jan to:	FTKs (000s)	Growth vs. Same Period 2009
Cathay Pacific	Nov	9,244,468	9.2%
Korean Air	Oct	8,018,417	19.0%
Singapore Airlines	Dec	7,000,890	8.4%
China Airlines	Oct	5,587,894	47.3%
EVA Airways	Oct	4,318,100	51.2%
Japan Airlines	Nov	2,718,531	-8.1%
Thai Airways International	Sep	2,117,000	48.3%
Malaysia Airlines	Oct	1,999,290	23.9%
All Nippon Airways	Nov	1,715,093	25.5%
Total		**42,719,683**	

Source: Air Transport World, February 2011 (Note: Japan Airlines ceased cargo aircraft operations during 2010)

In 2010, Cathay Pacific Group's cargo revenue increased by 50.1% to HKD 25.9 billion. Freight carried by Cathay Pacific and Dragonair increased by 18.1% to 1.8 million tonnes. Cargo capacity increased by 15.2% as parked freighter aircraft were brought back into service. Despite the substantial increase in capacity, cargo load factor increased by 4.9 percentage points to 75.7%. Demand in all key markets was strong and especially so in the peak season of October and November.

Air China and Cathay Pacific signed a framework agreement in Beijing in late February 2010 to create a Shanghai-based cargo airline built on the assets of Air China Cargo. Air China will have a 51% in the new carrier and Cathay Pacific will acquire a 25% stake.

Korean Air and Cathay Pacific generate around 30% of their revenue from freight.

3.7.6 Latin America

The Latin America and Caribbean Air Transport Association (ALTA) reported that their members transported 3,917 million FTKs in 2010, an increase of 24.2% compared with the previous year.

Table 3-28: ALTA Members: FTK Growth 2010 v 2009 by Region

Latin America	2010	2009	Growth
Domestic	459,636	385,432	19.3%
Intra-Latin America	873,650	749,841	16.5%
Extra-Latin America	2,583,828	2,018,077	28.0%
Total	**3,917,114**	**3,153,350**	**24.2%**

Source: ALTA

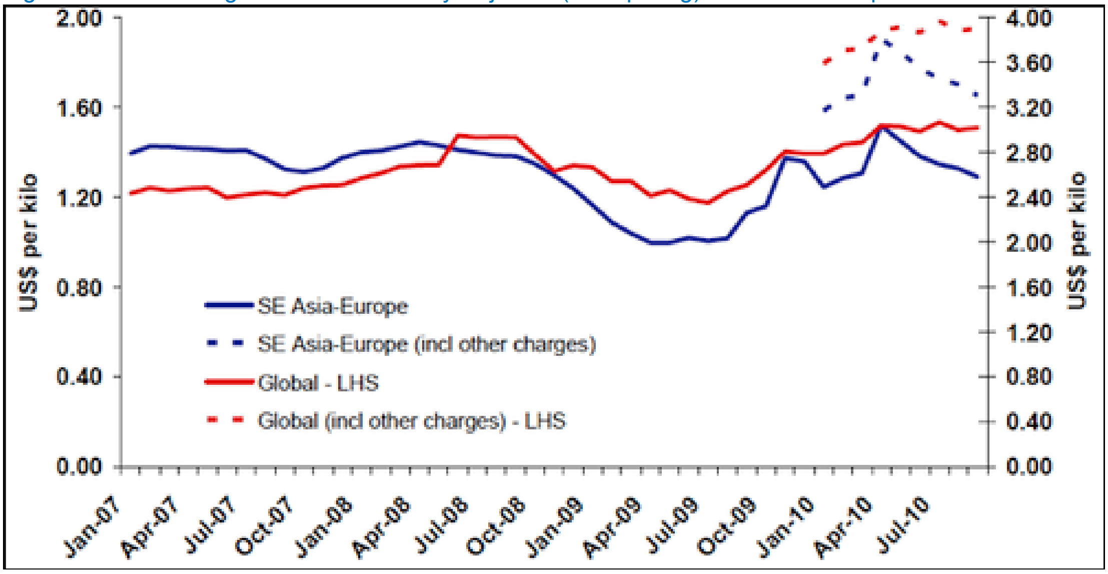
Table 3-28 above confirms that the largest growth in FTKs occurred on extra-Latin American services.

LAN Airlines, one of the largest South American carriers, reported a total of 3,239m revenue ton kilometres in 2010, a 23.5% increase compared with 2009. The airline achieved a cargo load factor of 72%.

3.7.7 Air Cargo Yields & Revenue

A trend of weakening yield growth over the second half of 2010 developed (see Figure 3.15 below) as more capacity re-entered the market at the same time as year-on-year growth rates were starting to decline.

Figure 3.15: Air Freight Yields Seasonally Adjusted (USD per kg) Jan-2007 to Sep-2010



Source: IATA (Note: LHS = Long Haul Services)

Cargo yields peaked in mid-2010 reducing towards the end of the year as load factors reduced. Other charges, including fuel surcharges, helped maintain cargo yields during the second half of 2010, however the Southeast Asia to Europe market experienced a significant reduction as supply-demand conditions worsened.

From those carriers reporting their 2010 cargo yields, Cathay Pacific Group's cargo yield increased by 25.3% to HKD 2.33 per kg and LAN Airlines reported an increase in cargo yield of 15.8% in 2010 compared with the previous year.

Cargo revenue growth is estimated to be around 30% in 2010[58] due to the significant increases in both traffic and yields. Overall, cargo revenues are expected to be around USD 62 billion, slightly below the level achieved in 2008.

[58] IATA Cargo e-Chartbook, Q1 2011

4. Airports

4.1 Introduction

This chapter provides an analysis of airport related issues. The first section provides summary passenger and movement statistics by world region and for the major airports in Europe in 2010, compared with 2009. This is intended to supplement the air traffic trends data and longer term trend analysis provided in Chapter 1 (which focuses on passenger and cargo traffic). The section also provides a synopsis of some of the key airport developments in 2010 together with financial results of major airport operators where known. The second section looks in more detail at four airport issues: the growing shortage of airport capacity in Europe and particularly the UK; the increasing competition facing European hub airports; the impact of low cost carriers on airport operations; and airport resilience to adverse weather conditions. The third section provides an update on airport charges regulation and the final section deals with slot allocation issues.

4.2 Airport Traffic & Developments in 2010

4.2.1 Traffic

Table 4-1 provides a summary of airport operating data for Europe and other world regions. Passenger numbers at European airports increased by 4.3% in 2010, while traffic at the world's airports grew by 6.6%. Particularly strong growth was evident in the Latin American market with growth of 13.4% and in the Middle East and Asia Pacific where traffic grew by 12.2% and 11.4% respectively.

Table 4-1: Global Air Traffic Throughput at Worldwide Airports by Region

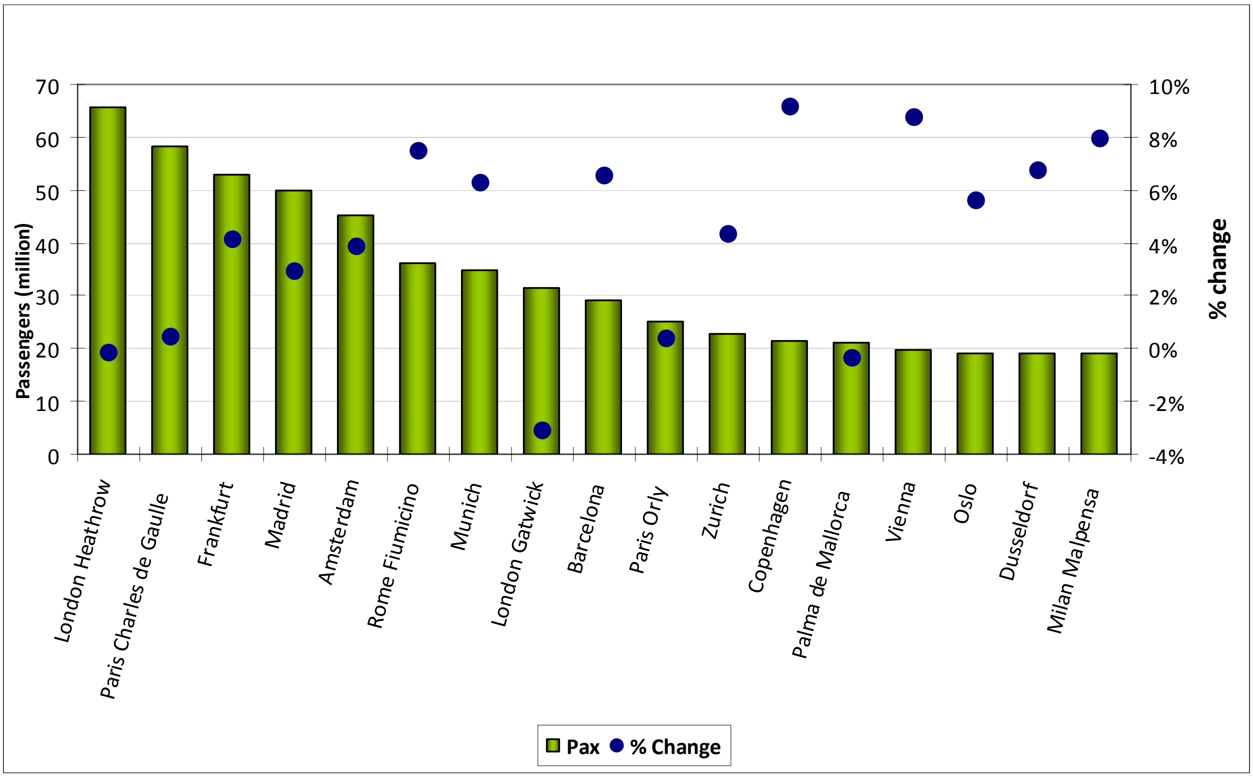
Region	EUR	AFR	ASP	LAC	MEA	NAM	World
Passengers 2009 (millions)	1,398.1	139.0	1,135.8	341.7	181.2	1,472.1	4,667.9
Passengers 2010 (millions)	1,458.0	152.7	1,265.6	387.4	203.4	1,508.5	4,975.5
% change	4.3%	9.9%	11.4%	13.4%	12.2%	2.5%	6.6%
Freight tonnes 2009 (millions)	15.52	1.68	26.88	4.08	5.17	25.37	78.70
Freight tonnes 2010 (millions)	17.92	1.72	31.86	4.67	5.88	28.71	90.75
% change	15.5%	1.9%	18.5%	14.3%	13.7%	13.2%	15.3%
Commercial ATMs 2009 (millions)	15.40	2.01	8.84	4.59	1.59	20.01	52.44
Commercial ATMs 2010 (millions)	15.50	2.11	9.44	4.95	1.72	19.84	53.56
% change	0.6%	4.8%	6.9%	7.8%	8.3%	-0.9%	2.1%
Pax per ATM 2009	90.8	69.0	128.6	74.5	113.9	73.6	89.0
Pax per ATM 2010	94.1	72.3	134.0	78.3	118.0	76.0	92.9

Source: ACI (EUR = Europe, AFR = Africa, ASP = Asia Pacific, LAC = Latin America-Caribbean, MEA = Middle East, NAM = North America)

Figure 4.1 shows European Airports with a passenger throughput of approximately 20 million passengers or more in 2010. It shows that 2010 saw a general trend of recovery in the European airports market, punctuated by two major events which had a substantial impact on traffic for the periods concerned. Over 104,000 flights were cancelled as a result of the eruption of the Icelandic volcano Eyjafjallajökull in late

April and the early part of May. December saw the cancellation of over 35,000 flights due to unseasonably heavy snowfall for much of Northern Europe[59]. Despite these unforeseen events the majority of major airports in Europe posted moderate growth figures, with the notable exceptions of London Heathrow, London Gatwick and Palma de Mallorca.

Figure 4.1: European Airports Passenger Throughput 2010

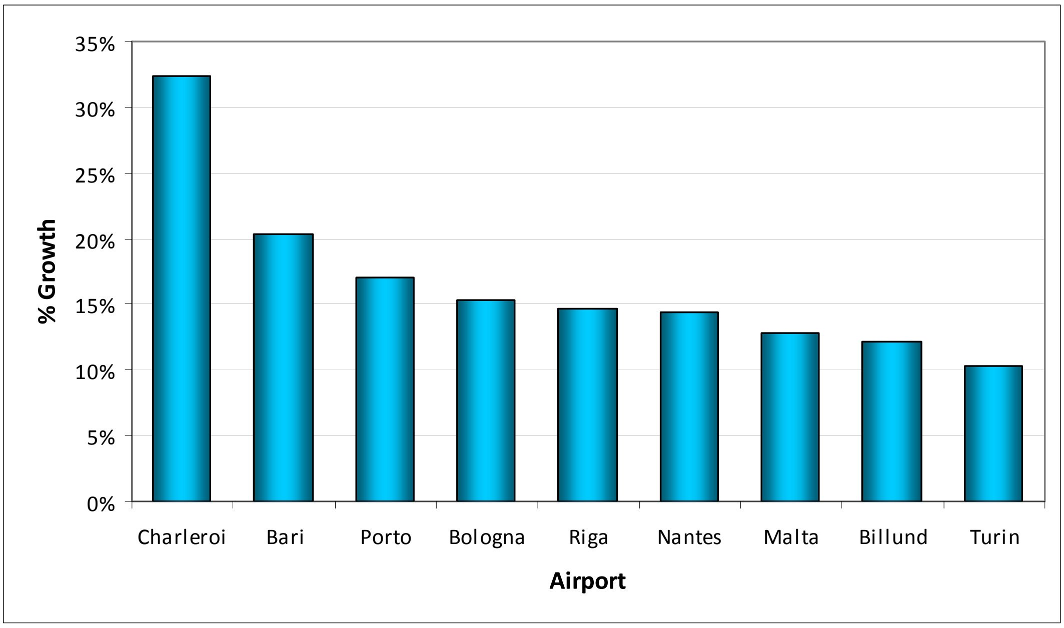


Source: ACI

Figure 4.2 and Figure 4.3 show European airports with over 2.5 million passengers which exhibited the highest and lowest growth figures in 2010. Of these, Brussels Charleroi posted the largest increase in traffic with growth figures of 32% in 2010. This is as a result of an expansion of services by Ryanair and charter carriers. The largest percentage decrease in traffic occurred at Belfast International and East Midlands Airport where passenger traffic was 11.1% lower than in 2009. Belfast International appears to struggle alongside the more centrally located Belfast City airport which attracted much of the short haul growth in 2010. Although Ryanair reduced service from Belfast City in October 2010, easyJet and Flybe have added services – a trend which has not been mirrored at Belfast International.

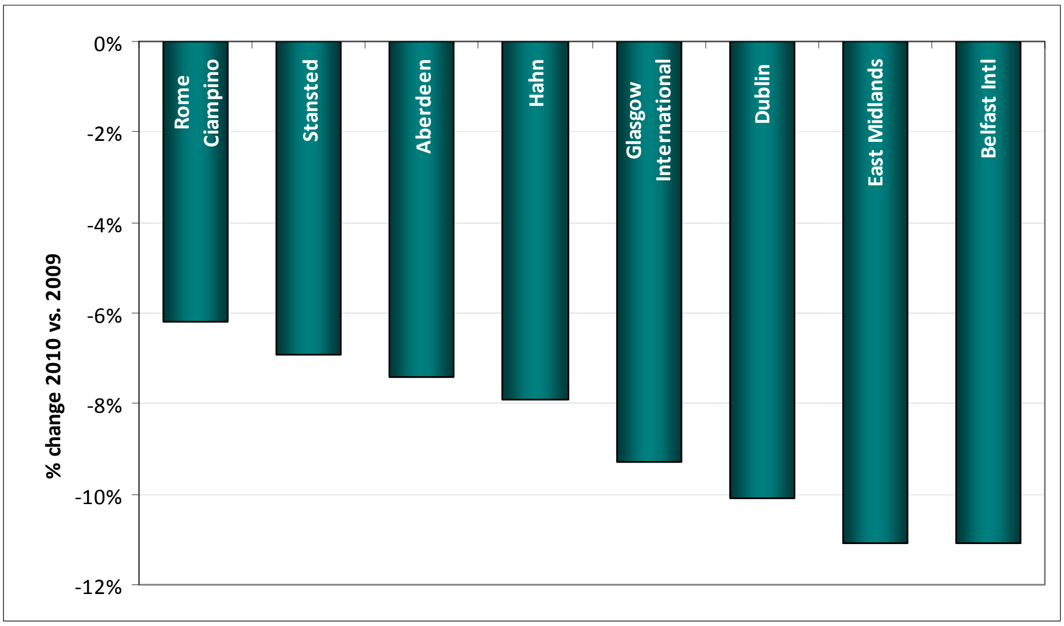
[59] EUROCONTROL STATFOR Industry Monitor, January 2011

Figure 4.2: European Airports (>2.5m pax) Exhibiting the Highest Growth in 2010



Source: ACI

Figure 4.3: European Airports (>2.5m pax) Exhibiting the Largest Declines in 2010



Source: ACI

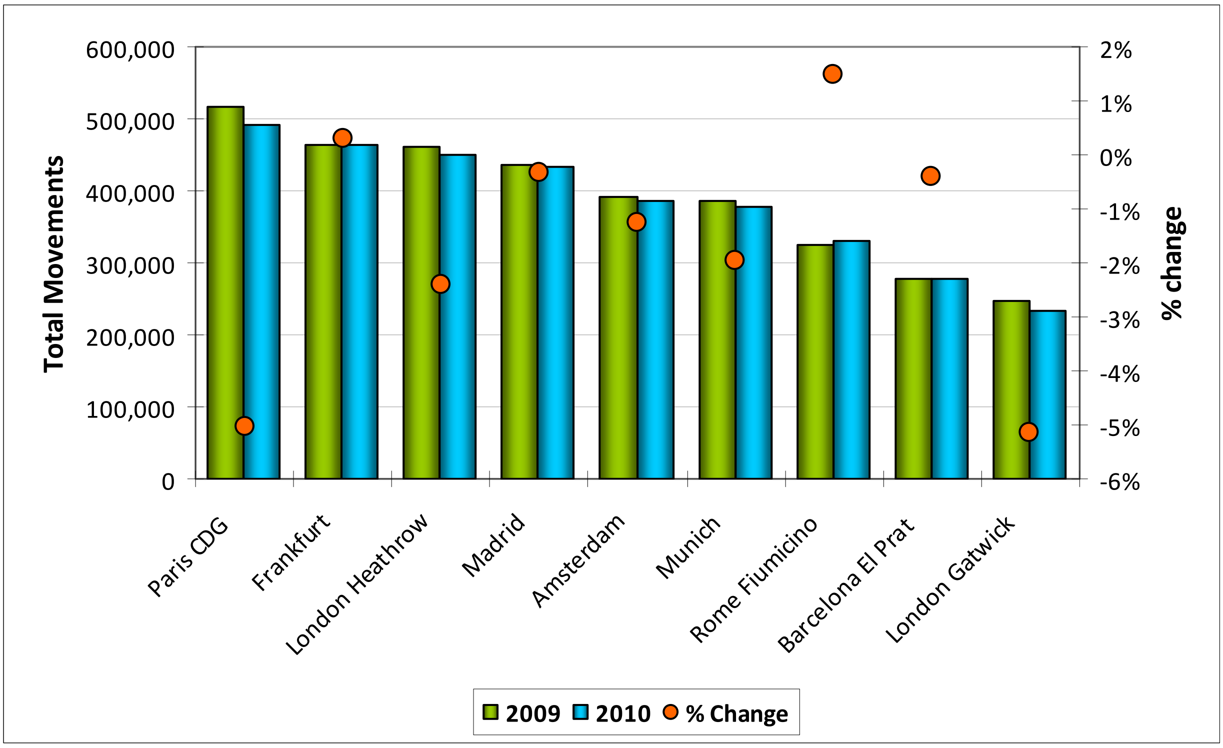
4.2.2 Air Transport Movements

The trend of growing passenger numbers has not been reflected in terms of an increase in air transport movements. Apart from Rome Fiumicino and Frankfurt, which experienced growth of 1.5% and 0.3% respectively, Europe's major airports handled fewer air transport movements than in 2009 (Figure 4.4). A partial explanation can be found in the impacts of unforeseen closures such as the volcanic ash cloud and the severe winter weather experienced in January and December. The trend would also suggest that on the whole airlines are responding cautiously to the upturn in traffic, preferring to increase load factors and/or using larger aircraft before adding further frequency or new routes to their networks (Figure 4.5).

Growth in the Asia Pacific region is continuing at a considerable pace. The growth at China's major airports has been rapid in recent years with Beijing Capital International Airport growing by 13% in 2010 and reaching 73.9 million passengers. However, this vigorous Chinese growth is causing airspace capacity problems in the Pearl River Delta area.

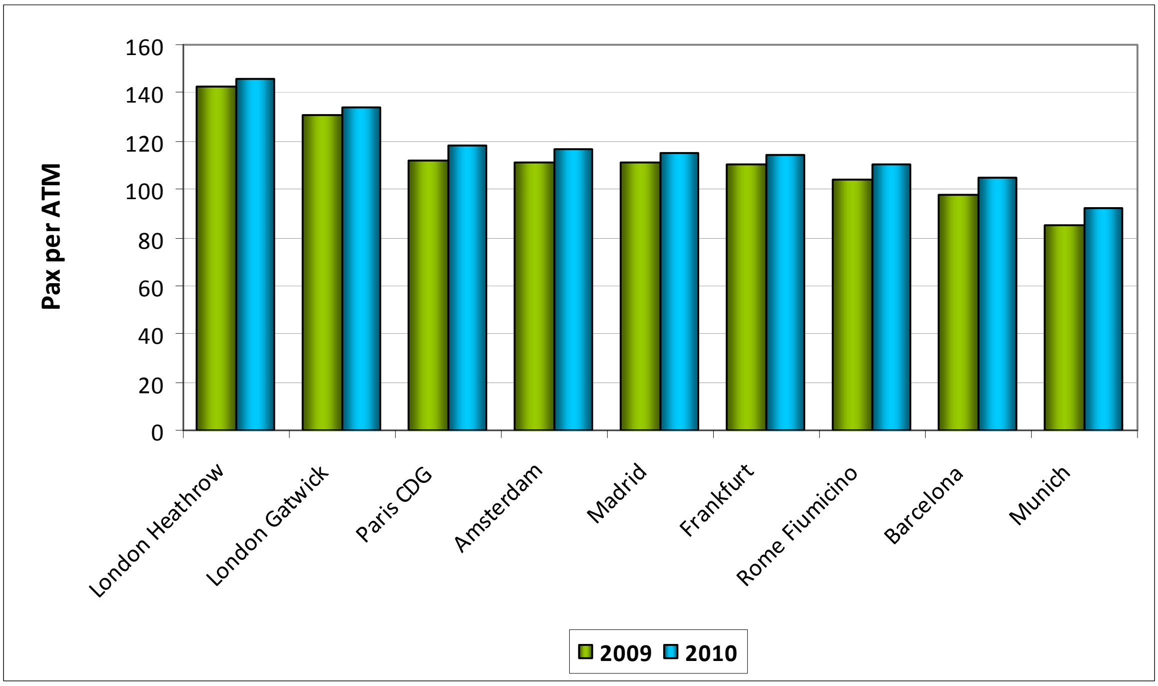
South America is also experiencing rapid growth in its aviation industry which is forecast to continue throughout the decade. European hubs such as Madrid and Lisbon with close cultural links to South America can expect to see vigorous growth in the forthcoming years fuelled by further economic development in South America, particularly Brazil.

Figure 4.4: Total Movements at Major European Airports 2010 vs. 2009



Source: ACI

Figure 4.5: Average Passengers per ATM at Major European Airports 2010 vs. 2009



Source: CAA, AdP, Aena, Fraport, Flughafen Munchen, ACI

4.2.3 Airport Financial Results

This section details financial results (based on the most recent data available) for the airport industry as a whole and individual results from a number of the major airports and airport groups operating in Europe and the rest of the world.

The data in Table 4-2 below is taken from the ACI Economics Survey 2010, based on a response from 646 airports that collectively handled 3.23bn passengers in 2009, or some 67.5% of global traffic in that year.

Table 4-2: Airport Industry Revenue and Costs, Financial Year 2009/10

	USD (billion)	Proportion of Revenues
REVENUES		
Total Airport Industry Revenues	95.0	
Of which:		
Aeronautical	50.8	53.5%
Non-Aeronautical	44.2	46.5%
COSTS		
Operating Expenses	57.0	60.0%
Capital Expenditure	34.6	36.4%
Capital Costs (Interest and Depreciation)	29.5	31.1%
Global Airport Industry Long-Term Debt	280.0	x 3

Source: ACI Annual Report 2010, Air Transport News

Worldwide total airport income in FY 2009, based on ACI extrapolation from the survey results, reached USD 95 billion. Compared to the income reported in 2008, industry revenue declined by roughly 2% in 2009. Aeronautical revenues worldwide declined by 2.5% while non-aeronautical revenue sources generated around 1.5% less revenue when compared to 2008.

The global airport industry generated USD 51 billion in aeronautical revenues in 2009 (including ground handling). Aeronautical revenue from passenger and airline user charges accounted for 53.5% of industry-wide income, a slightly lower proportion than 2008. Income from aircraft related charges was USD 17.3 billion, or 18.2% of total revenues. Non-aeronautical revenues worldwide made up 46.5% of industry revenue in 2009.

While non-aeronautical revenues overall declined by 1.5% worldwide relative to 2008 figures, revenues from the core commercial areas rose by 3% in 2009, driven by retail (+2%), real estate (+10%), car rental concessions (+9%) and Food & Beverage (+7%). Car parking (-3.5%) and advertising (-11%) revenues dropped. Performance in the retail and real estate sector underscore the resilience of the airport business model and helped to protect the bottom line of many airports in a difficult year.

Airports worldwide in 2009 incurred operating expenses in the amount of USD 57 billion or 60% of revenues. The largest expense item reported was personnel cost, accounting for 39.5% of operating expenses, followed by contracted services (outsourcing cost to third parties) as the second biggest cost item at 23% of total operating cost.

Capital expenditure at airports worldwide was almost 20% lower than predicted for 2009, with USD 34.6 billion spent on airport upgrades or expansions of existing airport infrastructure. These figures do not include new (‘greenfield’) airports, nor do they include capital investment in the Middle East and China, where significant amounts of capital are invested (to a large a degree in new airports). The lower numbers are a result of the global financial crisis which led to comprehensive reassessment of projects and tighter lending practices by banks delaying or reducing capital projects.

For 2010, airports expect capital expenditure to rise by 11% to USD 38.5 billion. In 2009, capital costs industry-wide (including depreciation) amounted to USD 29.5 billion or 31% of total revenue. 40% of that cost is for interest while the remainder constitutes depreciation. Of the 646 airports reporting, 165 airports (25%) made a net loss in 2009. By contrast, looking at operating results only (EBITDA), 35 airports (5%) did not operate profitably.

For long term debt (financial liabilities with a maturity of more than one year) based on two years of data, ACI revised its calculation of global airport industry debt upwards from USD 240 billion to USD 280 billion. This means that industry debt is three times higher than annual industry revenues.

Europe

For airport groups which have produced full year financial results, the vast majority of major European airport groups have posted profits which were an improvement on 2009 figures. The notable exception is BAA which has recorded a net loss for the second consecutive year.

Aena – Spanish Airports including Madrid Barajas

AENA is the State airport group owner and operator of 47 Spanish airports, overseeing 2.1 million air transport movements and 193 million passengers in 2010. According to AENA [60], it registered the following financial performance:

- Consolidated revenue remained steady at €3.094 million in 2010, down slightly from €3.095 million in 2009
- Consolidated EBITDA increased 57% in 2010 over 2009, rising from €574 million to €904 million.

Amsterdam Schiphol Group

The Schiphol Group is the owner and operator of Amsterdam Schiphol Airport and the airports at Rotterdam, The Hague, Eindhoven and Lelystad. The group also has airport interests in the United States, Australia, Italy, Indonesia, Aruba and Sweden as well as an 8% stake in Aéroports de Paris. Passenger numbers at Amsterdam Schiphol grew by 3.8% to 45.2 million. Results published for 2010 show[61]:

- Net revenue increased by 2.3% to €1.18 billion
- Operating profit for the full year 2010 increased by 58.6% to €297 million

BAA Airports Ltd (Six airports including London Heathrow and London Stansted)

BAA is the owner and operator of six airports in the United Kingdom (London Heathrow, London Stansted, Southampton, Aberdeen, Edinburgh and Glasgow). The group is owned by Spanish infrastructure company Ferrovial. Total passenger throughput was 1.8% below 2009 figures at 84.3 million, largely as a result of the disruption caused by the ash cloud in April/May and the severe winter weather experienced in December 2010. It should also be noted that British Airways (BA) endured a number of periods of strike action by cabin crew. As the largest carrier at Heathrow, it is likely that this will have had a considerable impact on landing fees as a result of BA flight cancellations. It was reported that the enforced closures as a result of the ash cloud cost the operator £28 million.

The results include the divestiture of BAA's assets in the U.S. and Naples Airport, Italy. Results published for 2010 show that[62]:

- BAA reduced its pre-tax losses by 61.3% to £316.6 million
- Revenue increased by 4.9% to £2.07 billion
- Revenue per passenger of £24.40 showed an increase from £23.02 in 2009

Aéroports de Paris (AdP)

Aéroports de Paris is the owner of all the major airfields in the Île-de-France region. Its high profile assets include the major Paris airports of Charles de Gaulle, Orly and the General/Business Aviation facility at Le

[60] AENA Annual Report 2010

[61] Schiphol Group 2010 Annual Results

[62] All Data BAA 2010 Annual Report

Bourget. Total passenger throughput in 2010 increased by 0.4% to 83.4 million. Financial Results for AdP in 2010 show that[63]:

- Net income increased by 11.3% from the 2009 figure to €300 million for the full year 2010
- Revenue increased by 4% to €2.74 billion
- Revenue per passenger was €32.84

Fraport

Fraport AG has significant worldwide airport business interests including Frankfurt am Main, Antalya in Turkey and Lima in Peru. For calendar year 2010, passenger numbers for the Group rose by 11% year-on-year to 164.7 million, with a 4% increase at Frankfurt to 53 million. Financial results for 2010 show that[64]:

- Profits of €271.5 million were 78% up on the previous year
- Revenue increased by 9% to €2.28 billion

Aeroporti di Roma

Aeroporti di Roma is responsible for Rome's two main airports – Fiumicino and Ciampino. In 2010 passenger traffic at the two airports increased by 5.9% to 40.9 milion[65]:

- Revenue increased by 6.7% to €599.7million in 2010
- Net income increased to €22.3 million in 2010 from €5.2 million in 2009

Flughafen Wien

Flughafen Wien is responsible for Vienna International Airport in Austria. 2010 passenger numbers were up 8.7% on 2009 to 19.7 million. Financial Results for 2010 show[66]:

- A 6.4% increase in revenue to €533.8 million
- An increase in net profit by 3.2% to €75.7 million

Manchester Airports Group

Manchester Airports Group (MAG) owns and operates Manchester, East Midlands, Bournemouth and Humberside airports. Total passenger numbers at MAG Airports were down by 6.9% to 22.8 million in 2010. Results for the Financial Year 2009/2010 show[67]:

- Decreased revenue of £348.9 million
- Profit at £56.1 million, down by 28.4%

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[63] All Data Aéroports de Paris 2010 Annual Financial Statement

[64] Fraport Consolidated Income Statement FY2010

[65] Aeroporti di Roma 2010 Annual Report

[66] Flughafen Wien 2010 Annual Report

[67] Financial Data: Manchester Airports Group Annual Report 2010

Zurich Airport

Flughafen Zurich AG operates Zurich Airport, where passenger numbers increased by 4.3% to just under 22.9 million passengers in 2010. Its financial performance was mixed:[68]

- Revenues rose to CHF862 million in 2010 from CHF820 million in 2009
- Profit declined 27% in 2010 to CHF138 million from CHF190 million in 2009

Flughafen München

Flughafen München is the owner and operator of Munich International Airport which in 2010 handled 34.7 million passengers. Financial data for the year 2010 shows that total revenue increased by 7.6% to €850 million. Earnings after taxes increased by 18.1% to €125 million for the full year 2010[69].

Københavns Lufthavne

Københavns Lufthavne owns Copenhagen Kastrup Airport and Roskilde Airport in Denmark. In addition the group has a 49% stake in Newcastle Airport (UK) and 10% of Aeropuertos del Sureste, a group of nine airports in Mexico.

Passenger numbers at Copenhagen Kastrup increased by 9.1% to 21.5 million in 2010[70].

- Total revenue rose by 11% to DKK 3.24 billion in the twelve months ended 31 December, with aeronautical revenues up 8.1% to DKK 1.69 billion
- Net profit increased by 48% to DKK 909 million for the full year 2010

Rest of the World

To provide a means of comparison with the European airport groups, a selection of results from other airport groups around the world is included below.

The Port Authority of New York & New Jersey

The Port Authority of New York & New Jersey is responsible for all airports and seaports and link tunnels in the New York City area including the five airports of John F Kennedy, Newark Liberty, La Guardia, Newburgh Stewart and Teterboro.

- Gross operating revenues increased by 2.3% to USD 3.6 billion for the year 2010
- Income from operations in 2010 totalled USD 223 million, a decrease of 57.9% on the previous year[71].

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[68] Zurich Airport Financial Report 2010

[69] Munich Airport Press Release, 'Bavaria's hub handles approximately 35 million passengers in 2010', 8 February 2011

[70] 'Copenhagen Airports net profit jumps 48% in 2010, Air Transport Intelligence 22 February 2011

[71] The Port Authority of New York & New Jersey, Financial Statements and Appended Notes for the year ended 31 December 2010

Greater Toronto Airports Authority

The Greater Toronto Airport Authority is responsible for Pearson International Airport in Toronto, Canada. In 2010 the airport served 31.9 million passengers and its financial performance highlights are as follows:[72]

- Total revenue decreased by -0.2% to CAD 1,112 million.
- Total 'revenue over expenses' increased by 4% to CAD 628 million.

Airports of Thailand

The Airports of Thailand group comprises the major airports in Thailand including Bangkok Suvarnabhumi, Bangkok Don Muang, Chiang Mai, Phuket, Hat Yai and Chiang Rai. The six airports accounted for 57.4 million passengers in 2010, an increase of 14.7% on 2009[73].

- Revenue increased 12% to THB 24 billion
- Full year profits increased by 97% to THB 1.4 billion

MAp Airports Group

The MAp airports group owns 74% of Sydney Airport, 39% of Brussels Airport, 30.8% of Copenhagen Airport and 1% of Bristol Airport. Full year financial results for 2010 show a 6.3% increase in total revenue to USD 1.01 billion and a profit of USD 51.8 million, compared to a loss of USD 615.7 million in 2009[74].

GMR

GMR is a major infrastructure group that manages and operates New Delhi International Airport and Sabiha Gökçen Airport in Istanbul. The group also has a significant interest in the expansion work at Malé Airport in the Maldives. Results for the fiscal year ending 31st March 2011 show a net loss of 3.72 billion Indian Rupees (Rs), compared with a loss of Rs1.23 billion the previous year[75]. GMR attributed the group's performance to losses incurred at New Delhi Airport, which alone accounted for a full-year net loss of Rs4.48 billion.

TAV Airports Holding

TAV Airports holding has significant airport interests in Turkey and surrounding countries, including the operation of Istanbul Atatürk, Ankara Esenboga, Monastir, Enfidha and both Skopje and Ohrid Airports in Macedonia.

- Revenue for the full year 2010 totalled €785 million
- Profit for the full year was €51 million[76]

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[72] Financial Data: Greater Toronto Airports Group September 2010 Quarterly Financials

[73] 'Airports of Thailand net profits up by 97%', Air Transport Intelligence , 30 November 2010

[74] MAp Airports Group 'MAp Airports Full Year Report 2010 full year results'

[75] 'Indian Airports Group GMR posts huge rise in Annual Profit', Air Transport Intelligence, 26 May 2010

[76] TAV Airports Investor Relations Financial Statements

4.2.4 Major Airport Developments

Europe

United Kingdom

In 2010 the incoming coalition government in the United Kingdom cancelled plans for a third runway at London Heathrow Airport and ruled out further expansion at any airport in London and the South East of England. The impact of the capacity constraints this policy will place on UK airport infrastructure will be examined in more detail later in this chapter.

In October, British airport operator BAA lost its appeal against the UK Competition Commission, which ruled that the airport group must divest itself of London Stansted and either Glasgow International or Edinburgh airports.

One result of this ruling is that for the first time in history London's three major airports will have different owners – a move which is hoped will further competition in the London airport market. BAA has not yet decided which of its two Scottish airports it will list for sale. BAA also sold its 65% stake in the concession owner of Naples International Airport (GESAC) and its retail management contracts at Boston, Pittsburgh, Cleveland and Baltimore Airports in the United States.

Global Infrastructure Partners, the new owners of Gatwick airport, dropped the 'London' prefix from the airport's previous official title. As part of the process to distance itself from former operator BAA, the group outlined £1 billion in development plans which its owners hope will make the airport "London's airport of choice for passengers and airlines." It was also noted that the reliability of Gatwick during the winter weather in December was superior to that of Heathrow. Gatwick Airport states that after the first incidence of snow in December, the owners invested £8 million in snow clearing equipment compared to the £500,000 spent at Heathrow.

Vancouver Airport Services acquired a 65% stake in Peel Airports for an undisclosed sum on 22 June 2010. Peel's airport assets comprise Liverpool John Lennon Airport, Robin Hood Airport Doncaster Sheffield, Durham Tees Valley Airport and the General and Business Aviation facility at Manchester City airport (formerly known as Barton).

Republic of Ireland

Dublin Terminal 2 was officially opened on 19 November with the first scheduled flight operating on 23 November. The terminal, which is believed to have cost €600 million, has a capacity of 15 million passengers and by 2011 will operate a U.S. border pre-clearance facility allowing passengers to clear all U.S. border formalities before boarding their flight and arrive in the U.S. as a domestic passenger. This is the second facility of its type in Europe; the first is at Shannon Airport[77].

The terminal will also become the new base of Irish airline Aer Lingus and will handle most long haul traffic, including airlines serving the U.S. with direct services from Dublin.

[77] Dublin Airport Authority website

France

It was reported in September that the French Government was interested in broadening the ownership structure of companies operating four of the country's biggest regional airports, in which the State currently holds a controlling stake. These airports are Lyon, Nice, Toulouse and Bordeaux. Aéroports Français reportedly stated:

> *"With the [economic] crisis now seemingly coming to an end, there was greater scope for the State to obtain better value from its assets and, within this context, the capital of airports could be opened up.[78]"*

At the same time, major French infrastructure company Vinci was named as the preferred bidder to operate airports at Nantes and St Nazaire. The company also increased its shareholding in Grenoble, Chambery, Clermont-Ferrand and Quimper-Cornwall airports.

Spain

The privatisation of the Spanish airports authority Aena was listed by Spain's Prime Minister Jose Zapatero as part of a series of reforms aimed at attracting investors and boosting the Spanish economy. Aena's airport portfolio includes virtually all of Spain's civil airports including Madrid and Barcelona, but by the end of 2010 it was unclear as to how much of the portfolio would be privatised[79]. The prospect of privatisation has been greeted with hostility by workers at Aena. This was demonstrated by Spanish air traffic controllers who organised a wildcat strike on 4 December 2010. Further strikes may occur in 2011.

Rest of the World

Turkey

The Turkish Transport Minister approved plans for a third airport serving the city of Istanbul. With capacity for 60 million passengers per annum the new airport will increase air traffic in Istanbul.[80]

Growth in the Turkish aviation market has been particularly strong in recent years with a 25% increase in passenger numbers recorded in 2010. Istanbul's main Atatürk International Airport is rapidly reaching capacity; and therefore new airport capacity will need to be provided if the growth aims of Turkish Airlines and other major airlines are to be realised.

Russia

Moscow's Bykovo Airport was officially closed on 2nd November 2010. The Russian air transport regulator Rosaviatsia terminated the lease agreement with the airport and it is expected that the airport land will be used for an alternative purpose. Moscow is served by three other airports Domodedovo, Sheremetyevo and Vnukovo.

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[78] 'France edging closer to opening capital of major airports', Air Transport Intelligence News, 29 September 2010

[79] Air Transport Intelligence News, 2 December 2010

[80] 'Istanbul to have third airport by 2020: transport minister', Air Transport Intelligence, 30 November 2010

Japan

A fourth runway opened at Tokyo Haneda Airport on 21 October with a new international passenger terminal. The new runway will allow Haneda to operate an additional 60,000 international flights a year. Japanese authorities plan to increase this to 90,000 a year by 2013 according to local reports[81]. Until now, international flights were severely restricted at Haneda; however Japanese airlines, together with British Airways, Air France, American Airlines and Air Canada have all received authority to operate from the airport from 2011 onwards.

United Arab Emirates

The new Al Maktoum International Airport in Dubai opened for freight services in June with initial services from carriers including RUS Aviation and Skyline. This development is the first phase in a longer term project that aims for the airport to expand to five runways and grow up to 100 million passengers[82].

India

Plans for the construction of a new airport in Navi Mumbai to serve the city of Mumbai and its surrounds were given approval in November 2010. The airport is to be built in stages; the first phase for 10 million passengers is expected to open in 2012 before doubling to 20 million by 2020 and 40 million by 2030, with scope to expand further should demand exist.

Terminal 3 at Delhi Indira Ghandi International Airport was opened in July 2010. Part of the airport owner's development plan, the 502,000m^2 terminal cost USD 3 billion to build over the course of three years and has a design capacity of 34 million passengers. The terminal will cater for most services by full service domestic and international carriers.

4.3 Airport Capacity Issues

4.3.1 European Capacity Constraints

The return to growth of the European air transport market again raised the important question of capacity constraints at European Airports. The EUROCONTROL report 'Challenges of Growth' published in 2008 forecast that in the most likely scenario, airport capacity would lag demand by 2.3 million IFR flights a year by 2030. Excluding Turkey, which is not a member of the EU, the disparity between forecast demand and capacity is most marked in the United Kingdom, followed by Germany and France (Figure 4.6).

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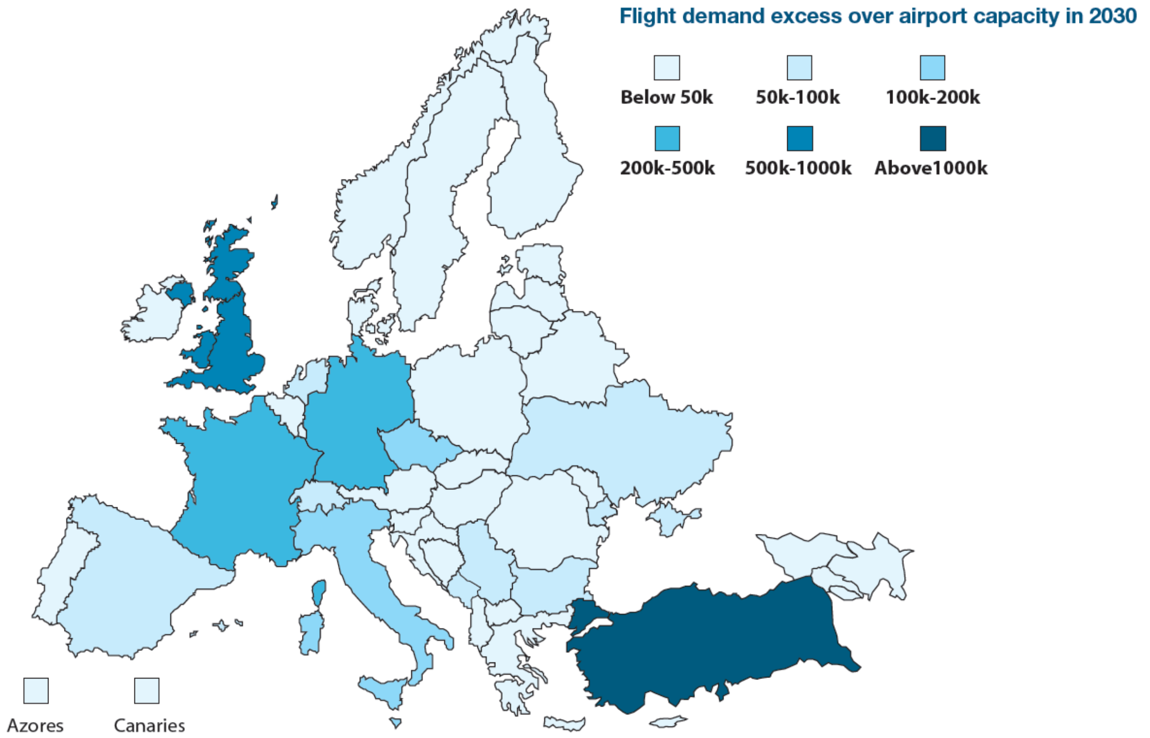
[81] 'Haneda's fourth runway begins operations', Air Transport Intelligence, 21 October 2010
[82] 'Dubai's Al Maktoum Airport opens for operations', Air Transport Intelligence, 28 June 2010

Figure 4.6: Summary of Excess Demand over Airport Capacity in the 'Most Likely' Regulation & Growth Scenario



Source: EUROCONTROL

This 2008 study also took into account planned infrastructure improvements (at the time) that would become operational before 2030. The recent cancellation of the planned third runway at London Heathrow and second runway at London Stansted will complicate the problem further at what are currently two of the Community's busiest airports.

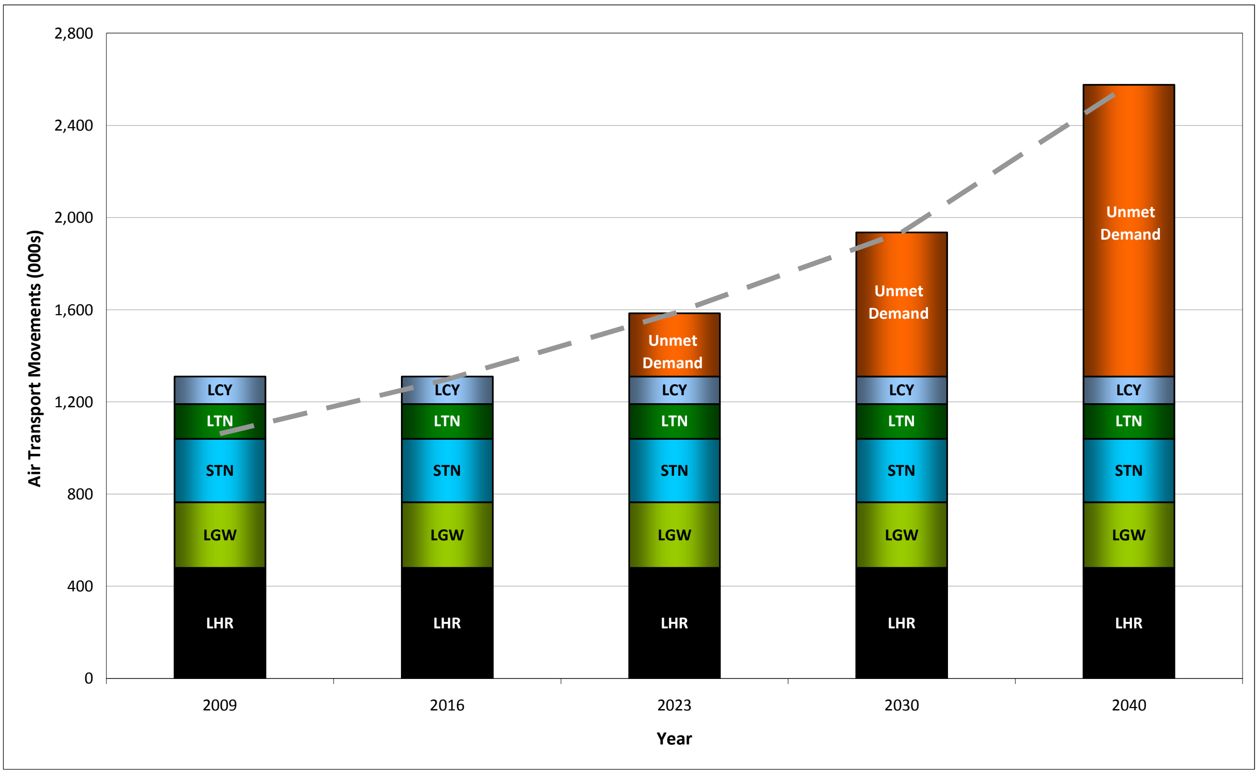
A fourth runway will be opened in 2011 at Frankfurt am Main airport in Germany, providing increased capacity at one of Europe's busiest and most congested airports. Incremental extra capacity is expected to become available at almost all congested airports after the phased implementation of aspects of the Single European Sky project from 2014, but the physical constraints of apron and runway capacity at Europe's busiest airports will still need to be addressed in order to meet the forecast demand.

The situation is most acute in London. Congestion at London Heathrow, Europe's busiest airport in terms of international passenger numbers, has worsened as the demand for air travel has continued to increase during the past decade. Plans for a third runway and sixth terminal which would have alleviated these capacity problems were cancelled after the UK General Election in 2010, when the newly elected Government formally opposed the construction of any new runways in London and the South East of England. Plans that had been in place for a second runway at London Stansted were also shelved as a result of the new Government's policy.

At its peak year in 2007, Heathrow operated at 99.1% of its nominal 480,000 ATM capacity. The economic recession caused a slight reduction in traffic during 2008 and 2009 before there was evidence of a recovery in the latter months of 2010. Figure 4.7 below shows the forecast unmet demand should there be no new runways in London and the South East of England before 2040. The current maximum capacity at each of London's five airports is shown not to increase beyond the 1,300,000 annual movements available in 2008.

The dotted line represents the estimated demand for movements at these airports based on the UK Government's forecasts of air traffic demand.

Figure 4.7: Estimated Unmet Demand at London's Airports 2009-2040 (Assuming No New Runways)



Source: Mott MacDonald analysis based on UK DfT Aviation Forecasts

The effects of the decision not to increase capacity in the South East are likely to be felt most severely in the peripheral regions of the UK, as slots for such services at the congested London airports are increasingly transferred to long haul carriers prepared to pay the highest slot prices.

Table 4-3: Domestic Airports Served from London Heathrow 1981-2010

1981	1987	1994	1998	2007	2010
Aberdeen	Aberdeen	Aberdeen	Aberdeen	Aberdeen	Aberdeen
Belfast	Belfast	Belfast	Belfast	Belfast	Belfast
Birmingham	Birmingham				
Carlisle					
Dundee					
East Midlands	East Midlands				
Edinburgh	Edinburgh	Edinburgh	Edinburgh	Edinburgh	Edinburgh
Glasgow	Glasgow	Glasgow	Glasgow	Glasgow	Glasgow
Guernsey	Guernsey				
Humberside	Humberside				
Inverness	Inverness	Inverness		Inverness	

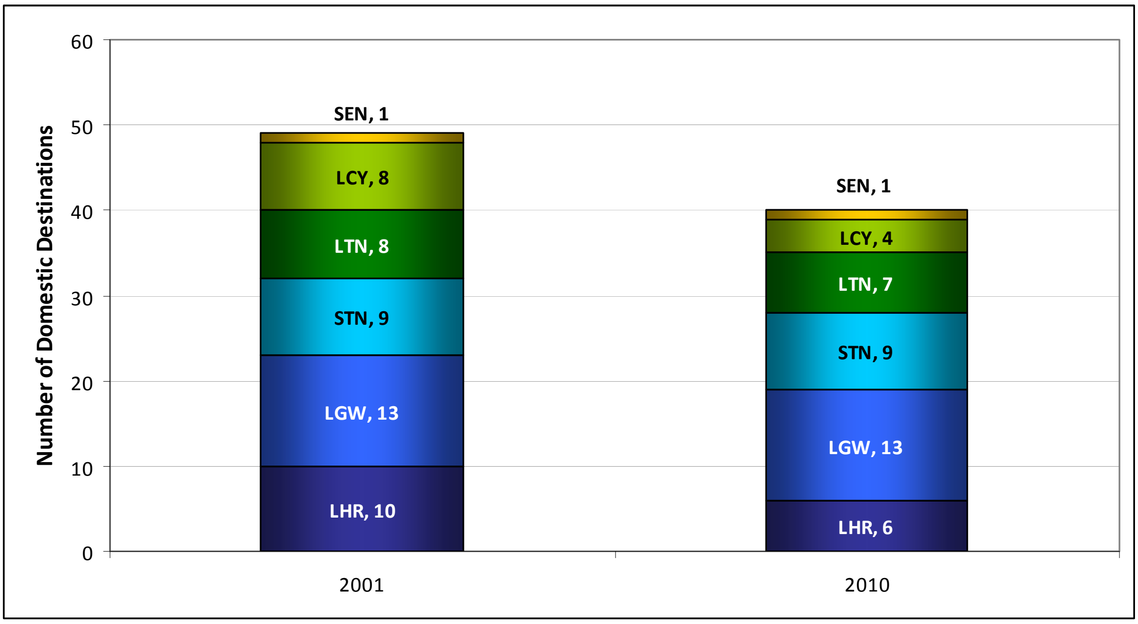
1981	1987	1994	1998	2007	2010
Islay					
Isle of Man	Isle of Man				
Isles of Scilly					
Jersey	Jersey	Jersey	Jersey	Jersey	
Leeds Bradford	Leeds Bradford	Leeds Bradford	Leeds Bradford	Leeds Bradford	
Lerwick					
Liverpool					
Manchester	Manchester	Manchester	Manchester	Manchester	Manchester
Newcastle	Newcastle	Newcastle	Newcastle	Newcastle	Newcastle
Newquay	Newquay	Newquay			
Norwich	Norwich				
	Plymouth	Plymouth			
Teesside	Teesside	Teesside	Teesside	Teesside	
23	**18**	**12**	**9**	**10**	**6**

Source: UK House of Commons Select Committee on Environment, Transport and Regional Affairs

The effect upon the UK regions has been to increasingly lose access to the most convenient airport for business travellers bound for London, but also to onward global destinations served only from the country's hub of London Heathrow. In total, 17 UK domestic points have had their air services to Heathrow withdrawn since 1981 (Table 4-3). By contrast, 13 new destinations to the United States have been added between 2003 and 2010.

Figure 4.8 shows that overall service from London airports to the regions is decreasing – not just at Heathrow (although Gatwick and Stansted have seen no change in the number of UK regional destinations served).

Figure 4.8: Number of Domestic Destinations Served from London Airports 2001 vs. 2010

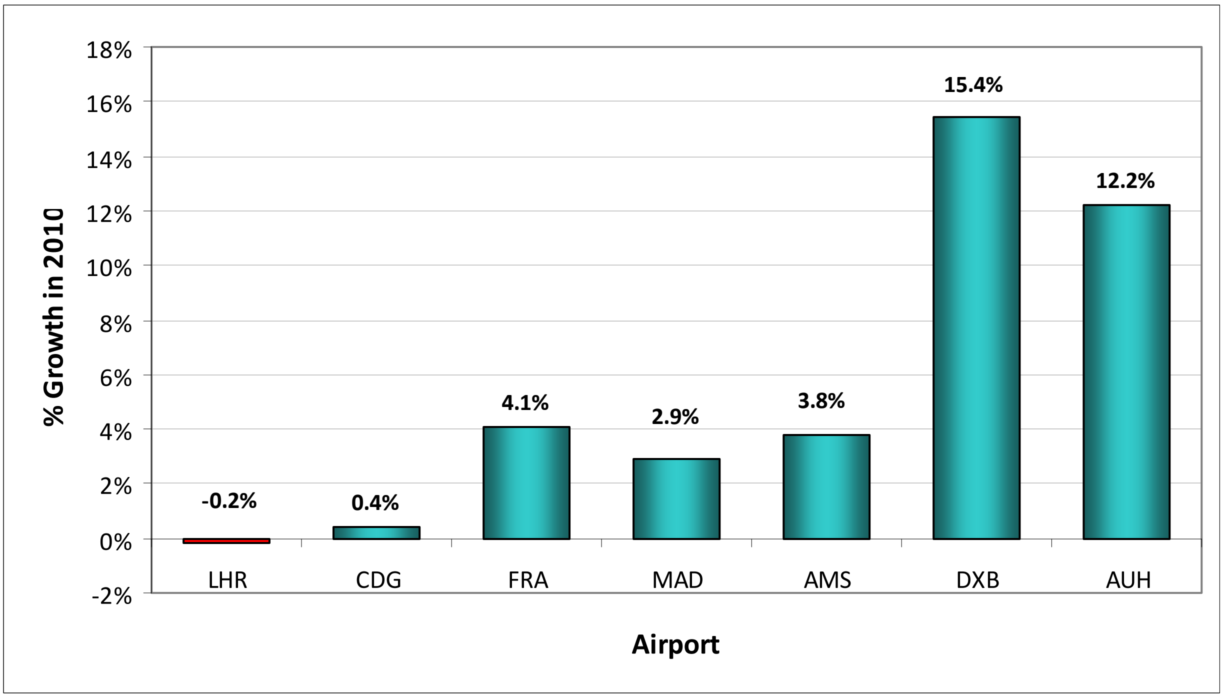


Source: OAG & Mott MacDonald analysis

4.3.2 The Competition Facing European Hub Airports

Europe has many of the world's largest hub airports. Increasingly the status of Europe's international hubs is coming under threat from airports in Asia and particularly the Middle East, which are now competing for much of the traffic previously passing through European hubs.

Figure 4.9: Growth in Passenger Numbers at Selected Airport Hubs in 2010



Source: BAA, AdP, Fraport, Aena, Dubai International Airport, Abu Dhabi International Airport, Beijing International Airport

The aggressive growth witnessed at Dubai and Abu Dhabi is almost entirely as a result of the expansion by each airport's based carrier – i.e. Emirates and Etihad respectively. Emirates is able to provide considerable capacity on all the routes that it operates due to the operation of a fleet of all widebody aircraft; and the airline has significant forward orders for an additional 197 widebody aircraft to be delivered throughout the next decade (including 90 Airbus A380s). Etihad also has orders and options for up to 200 aircraft including 12 Airbus A380s. The expansion plans of the Middle Eastern airlines show no signs of abating in the near future. In addition, Qatar Airways is aggressively building up a similar hub airport at Doha. Although the airport does not publish its own statistics, estimates suggest it processed 11 million passengers in 2009 and 14.5 million passengers in 2010, an increase of 35%.

A contrast is also evident when examining the expansion plans of European airports compared to their counterparts in Asia and the Middle East.

The constraints to building new airport infrastructure to increase capacity at major airports in Europe are recognised by ACI in its outlook paper published in 2010[83].

ACI suggests that the situation regarding the future capacity of the European airport network is critical and will result in unacceptable congestion, with far-reaching implications for European competitiveness. It considers how Europe's airports and airlines are already under increasing pressure from competitors outside the continent with no growth constraints. In particular, airports in the Gulf are benefiting from proactive and integrated aviation policies, fiercely competing with European hubs for transfer traffic between the Americas and Asia as well as Africa and Asia. For example, while Dubai International Airport is being enlarged to accommodate 75 million passengers, a second airport is also under construction. This new facility will ultimately have five runways with a total capacity of 120 million passengers, nearly twice the number of passengers presently handled by London Heathrow, Europe's busiest airport. Qatar is building a new airport to relieve the existing facility in Doha. It is designed to handle 50 million[84] passengers per year and will become the home hub of the rapidly expanding Qatar Airways. In 2010 Abu Dhabi International Airport opened its new Terminal 3 as the base for its own based airline Etihad.

Heathrow meanwhile had its plans for the construction of a third runway cancelled in 2010 by the UK Government, on the grounds of its potential adverse environmental impact on the local area. Frankfurt is adding a fourth runway, but there are no further runway expansion plans at London Heathrow, Madrid, Paris or Amsterdam.

With the Asia Pacific region expected to show the greatest continuing growth in the near future, the Middle East has a comparative geographical advantage to many other regions, lying midway between Europe and the Asia Pacific region and also offering good connecting opportunities between Asia and Africa. With the advent of extended range aircraft such as the Boeing 777LR and Airbus A340-500, much of North America is now within direct reach of the Middle East.

The vast amount of empty land available for redevelopment along the edge of the Persian Gulf also puts these hubs at an advantage. Where Dubai is able to construct a new five runway airport, constraints and population density would effectively forbid such a scheme in Europe. These new hubs provide an ever increasing threat to the established European hubs such as London Heathrow, Paris, Amsterdam and Frankfurt as low costs and aggressive expansion of capacity in both the airport and airline sector permit rapid growth in long haul markets which cannot be matched in Europe. Loss of connecting traffic from Europe to these new Middle Eastern hubs could have the effect of reducing the number of destinations served directly from Europe and could have an impact on the size and financial health of European airports and airlines.

Also in the region, Turkey's economic and air transport market growth is reflected in the expansion of Istanbul as an important hub. The country's national flag carrier, Turkish Airlines, has been allowed to expand its short haul operations at the smaller Istanbul airport at Sabiha Gökçen in order to free up slots at the larger Atatürk Airport for hub operations, creating a strong base to continue to expand its presence in the region to compete with the EU's network carriers. It is now a leading European airline, achieving the second highest rate of growth in 2010 of all major European carriers.

[83] An Outlook for Europe's Airports – Facing the Challenges of the 21st Century, ACI, 2010

[84] New Doha International Airport – A vision for the 21st Century, http://www.ndiaproject.com/

Significant airport developments are also taking place in China. Chinese airport development is set to take place at an astonishing rate over the coming five years, according to the latest information supplied by officials.

By 2015, China (which already has 175) is set to become home to no less than 220 airports. Its new airport construction programme includes four major air travel sites and regional hubs providing transport links to the most remote parts of China. The airport development will be financed with a share of an overall CNY 1.5 trillion (USD 230 billion) investment into aviation.

The Chinese airport expansion project is mirrored by the country's national carriers. At present, Air China, China Eastern, China Southern Airlines and others possess a combined fleet of 2,600 aircraft. Analysts expect this total to have almost doubled by 2015. Furthermore, while all but eight of the 43 airlines in operation in China are controlled by the State, this could change as a new generation of private domestic airlines prepare to enter the market.

In India, new airports at Delhi, Kochi, Bangalore, Hyderabad and Mumbai have indicated the Government's intent to support the air transport industry and use it to stimulate economic growth.

One advantage that European airports retain is their location in politically stable environments. At the time of writing, the unstable political situation in North Africa has spread to Bahrain and this may impact upon passengers' preparedness to transit at a point in the Middle East.

However, with the growth of Middle East and Asian airport 'mega hubs' likely to continue, in all probability by 2030 none of the world's ten biggest airports in terms of passenger traffic will be located in Europe.

4.3.3 Impact of Low Cost Carriers on European Airport Operations in 2010

Low cost carriers (LCCs) are placing ever increasing demands on airports in the form of reduced fees or short notice changes in operating patterns. A high profile case of this short term planning was in evidence at Marseille Airport in October when Ryanair announced that it would reallocate all of its based aircraft away from the airport following a legal challenge from the French authorities over tax and social insurance payments to Ryanair employees based at the airport.

LCCs are also proving to be swift to make decisions on underperforming routes and bases. For instance April 2010 saw easyJet commence services from Robin Hood Airport Doncaster Sheffield to five European destinations including Amsterdam, Barcelona and Faro. The carrier then announced in September 2010 that these services would be terminated from January 2011.

As another example, Ryanair suspended all services from Belfast City Airport in October 2010 after it was announced that a planned public inquiry into the airport runway extension would be delayed. Ryanair supported the extension as it would have allowed the airline to operate flights to a greater range of destinations with a full payload. These developments at Doncaster Sheffield and Belfast City demonstrate that changes can be made at short notice by LCCs which can have a substantial positive or negative impact on the service offerings from a particular airport, making airport planning particularly difficult.

4.3.4 Airport Resilience to Adverse Weather Conditions

During November and early December 2010 several European and UK airports experienced a high level of disruption due to severe weather. It is quite normal for flights to be disrupted by weather, but the levels of disruption at London Heathrow in particular were severe, causing the cancellation of 4,000 flights with a significant knock-on impact to airline schedules globally.

Other airports were also impacted. Aberdeen and Glasgow airports were both closed for short periods due to snow. Gatwick was closed for a period of two days in early December; and both Frankfurt and Paris Charles de Gaulle airports experienced some periods of closure during the same month. A summary of the percentage of airport departures cancelled over the week 16 to 21 Dec 2010 is shown below in Table 4-4.

Table 4-4: Departure Cancellations at European airports 16 to 21 Dec 2010

Airport	Thu 16 Dec	Fri 17 Dec	Sat 18 Dec	Sun 19 Dec	Mon 20 Dec	Tue 21 Dec
Aberdeen	38%	41%	62%	71%	44%	43%
Amsterdam	4%	71%	26%	19%	10%	11%
Edinburgh	5%	24%	71%	82%	48%	43%
Frankfurt	22%	42%	23%	52%	34%	51%
Gatwick	1%	16%	76%	21%	21%	10%
Glasgow	3%	27%	69%	56%	48%	58%
Heathrow	7%	24%	79%	95%	65%	56%
Madrid	3%	20%	42%	58%	39%	24%
Paris CDG	2%	13%	16%	56%	47%	13%

Source: Report of the Heathrow Winter Resilience Enquiry, Professor David Begg, 24 March 2011

Heathrow's apparent lack of preparedness drew criticism from a number of quarters and an independent report was commissioned by BAA in order to establish the lessons to be learned. This report was published in March 2011[85]. Drawing on winter operations plans from a number of airports worldwide, the report made a number of recommendations focused on improving crisis management procedures and establishing a 'snow plan' which sets out specific responsibilities for BAA, airlines, the regulator and air traffic control in the event of a similar disruption.

Heathrow is a major international hub airport and the fourth busiest airport in the world. Its two runways operate at near 100% capacity throughout most of the year. As a result, any incidents inevitably lead to substantial disruption to passengers worldwide.

Although the UK Government recognises this lack of resilience, it is not supporting the expansion of Heathrow (or other airports in the South East of the UK) due to environmental concerns both in terms of emissions and noise. Instead, it has embarked on a strategy of 'Better not Bigger' in order to improve the quality of the passenger experience but within current capacity constraints. In June 2010, a South East Airports Taskforce was established to harness industry expertise to help deliver the changes needed to improve the passenger experience for air travellers. The findings from this taskforce will inform an update to the UK Government's policy on a sustainable framework for the future of UK aviation, due in the first half of 2011.

Resilience of the air transport system (airports, airlines and ATM) to any incident, be it weather related, caused by industrial action, or as a result of safety/security events, is a key issue for Europe and one that needs to be addressed in order to lessen the disruption of these types of incident in the future.

[85] Report of the Heathrow Winter Resilience Enquiry, Professor David Begg, 24 March 2011

4.4 Airport Charges Regulation

4.4.1 Introduction

Airports worldwide are generally free to charge airlines what they wish for all services provided; but because they are perceived to be monopolistic providers there is a varying level of government regulation to ensure that the prices charged are not unrealistic.

Within the EU 27 countries, 77% of airport members of the airport trade association ACI are publicly owned, while the figure for all other European countries is 82%. It is considerably easier to regulate publicly owned airports than privately owned airports, where the profit motive for the latter is far more important.

Table 4-5: Ownership of Europe's Airports

European Airports	Publicly Owned	Mixed Ownership	Privately Owned	Total
EU27	237	43	26	306
18 other European countries	80	9	9	98
All Airports	**317**	**52**	**35**	**404**

Source: ACI, June 2010

Most airport charging systems (if not the absolute level of charges) are imposed and regulated by the respective national authorities. Even if the airports concerned are privately owned, the charges will normally have to comply with regulatory requirements set by authorities. Charging systems can also be used as management tools by airport operators; by varying specific charges, airports can improve the use of airport infrastructure or reduce the environmental impact of aviation.

Airport infrastructure charges can represent a significant expense for airlines. According to IATA[86] the total user charges for infrastructure worldwide was USD 64.1 billion in 2008, representing 11% of airline revenues. These infrastructure charges form the second largest external cost to airlines after fuel.

However, there is no general agreement on what aspects of service provision are to be paid to the airport operator by airlines; and what are paid directly by passengers (and freight shippers). Some aspects of cost are not always paid to airports but directly to other suppliers such as Air Navigation Service Providers, Aviation Meteorological Services providers and (particularly in the U.S.) to the operator of the passenger terminal. In addition, some government taxes will ultimately be paid by the passenger to the government either directly, indirectly via the airline, or indirectly via both the airline and the airport. As a result, direct comparisons of airport charges to airline operators across the world have limited value.

4.4.2 Airport Charges by World Region

As a general rule, airport and air traffic control charges are those fees paid by airlines for a range of services and facilities provided by airports and Air Navigation Service Providers and normally include:

- Use of the runway (landing charges)

[86] http://www.iata.org/whatwedo/airport-ans/charges/Pages/airport-atc-charges.aspx

- Use of the airport infrastructure (aircraft parking and airbridge charges)
- Use of the terminal building (passenger charges)
- Airport security (security charges)
- Protection of the environment (noise charges)
- Air traffic control (en route navigation and terminal area charges)
- Other air navigation services (Meteorological and Aeronautical Information Services)

These charges are ultimately paid by passengers and freight shippers via the ticket price or the freight transport charge.

Although the framework of airport charges is largely uniform and their structures are similar, the levels of charges can vary significantly among similar airports. Table 4-6 and Table 4-7 below detail the major airport charges at a selection of airports in Europe, Africa, Asia Pacific and the Americas for a narrow-bodied Boeing 737-800 and a wide-bodied Boeing 747-400 aircraft.

Table 4-6: Airport Charges (in GBP £) at Selected Airports: Boeing 737-800 Aircraft

Airport	Charges date	Terminal Charges	Runway Charges		Total Airport Charges	Passenger Charges			Total Charges
			Landing	Terminal Navigation		Passenger	Security	Total	
EUROPE									
Frankfurt	Oct 2010	419	103	188	798	1,971	111	2,305	3,103
London LHR	Apr 2010	64	698	148	944	2,550	0	2,550	3,494
Paris CDG	Apr 2010	0	329	250	544	2,051	1,166	3,483	4,027
Moscow DME	Oct 2010	0	523	353	876	1,153	433	1,586	2,462
AFRICA									
Johannesburg	Apr 2010	0	428	0	428	1,155	0	1,155	1,583
Nairobi	Jan 2009	63	368	0	431	1,373	0	1,373	1,804
ASIA PACIFIC									
Dubai	Oct 2010	64	189	0	253	1,402	0	1,402	1,655
Hong Kong	Dec 2010	41	481	0	521	204	292	496	1,017
Beijing	Mar 2009	19	321	0	340	728	125	853	1,193
Tokyo NRT	Dec 2010	576	1,052	0	1,628	1,692	0	1,692	3,320
Sydney	Dec 2010	89	0	275	364	3,440	0	3,440	3,804
AMERICAS									
Chicago ORD	Jan 2010	0	767	0	767	2,315	0	2,624	3,391
Rio de Janeiro GIG	Oct 2010	0	282	71	353	2,472	0	2,472	2,825

Source: RDC Aviation/airportcharges.com (Parameters: Currency – GBP; Aircraft – Turkish Airlines B737-800; international route; turnaround time – 60 mins; MTOW – 79.0 tonnes; MLW – 65.3 tonnes; capacity – 155 passengers; load factor – 70%; passengers – 109)

Table 4-7: Airport Charges (in GBP £) at Selected Airports: Boeing 747-400 Aircraft

Airport	Charges date	Terminal Charges	Runway Charges		Total Airport Charges	Passenger Charges			Total Charges
			Landing	Terminal Navigation		Passenger	Security	Total	
EUROPE									
Frankfurt	Oct 2010	2,679	520	583	4,404	4,448	251	5,203	9,607
London LHR	Apr 2010	208	776	457	1,588	5,754	0	5,754	7,342
Paris CDG	Apr 2010	0	1,858	1,068	2,947	4,630	2,632	7,860	10,807
Moscow DME	Oct 2010	0	2,626	1,776	4,402	2,603	977	3,579	7,980
AFRICA									
Johannesburg	Apr 2010	0	2,097	0	2,097	2,608	0	2,608	4,705
Nairobi	Jan 2009	63	1,102	0	1,165	3,100	0	3,100	4,265
ASIA PACIFIC									
Dubai	Oct 2010	64	950	0	1,014	3,164	0	3,164	4,178
Hong Kong	Dec 2010	41	2,106	0	2,147	460	659	1,119	3,266
Beijing	Mar 2009	19	1,874	0	1,893	1,643	283	1,926	3,819
Tokyo NRT	Dec 2010	1,060	5,286	0	6,346	3,818	0	3,818	10,164
Sydney	Dec 2010	449	0	1,381	1,830	7,764	0	7,764	9,594
AMERICAS									
Chicago ORD	Jan 2010	0	3,359	0	3,359	5,225	0	5,921	9,280
New York JFK	Jan 2010	0	3,445	0	3,445	0	0	696	4,141
Rio de Janeiro GIG	Oct 2010	0	1,415	71	1,486	5,579	0	5,579	7,065

Source: RDC Aviation/airportcharges.com (Parameters: Currency – GBP; Aircraft – British Airways B747-400; international route; turnaround time – 60 mins; MTOW – 369.9 tonnes; MLW – 285.8 tonnes; capacity – 351 passengers; load factor – 70%; passengers – 246)

These tables confirm the wide variation that can be found in airport charges. The most expensive airport for both aircraft types from those selected is Tokyo Narita, with the least expensive being Dubai. The cost for a B737-800 at Narita is 6.5 times greater than at Dubai, while the figure for the B747-400 is 6.3 times greater. The major European airports are mid-range in terms of their average charges.

Published airport charges across Europe's top fifty airports increased on average by less than 2% in 2010[87]. This is a much slower rate of growth than was recorded in either 2008 or 2009 and may indicate that many airports have set either zero or below inflation increases in response to the global economic recession. Where airports have increased their charges, passenger-related charges have risen more than aircraft-related charges – passenger charges are up by more than 2% over 2009, while the corresponding increase in aircraft-related charges was less than 1%.

In the detailed analysis of the published charges at the largest airports in Europe, the major hub airports consistently have the most expensive charges across a range of route types and aircraft types. At the other end of the scale, Spain, Italy and Turkey host some of Europe’s cheapest airports.

Despite the steady introduction of emissions charges over the last few years, no airports in the top fifty introduced new emissions charges in 2010 and only one airport introduced a new noise charge. Aside from one or two significant exceptions, environmental charges still remain a small component of the overall

[87] airportcharges.com, 18 August 2010

charges burden; and are expected to remain so as long as the financial crisis is deemed more important than the environmental one.

4.4.3 Airport Regulation

Europe

Because of its strong commitment to open and fair competition, the European Commission has stated that[88]:

> *"within the European single market, there is no justification for airport charges to be applied in a discriminatory manner, to the detriment or advantage of certain carriers."*

The EU considers that for the market to work properly it is important that minimum standards on the calculation of airport charges be applied in order to ensure fair competition among all carriers using an airport. However, these common standards do need to take account of the different systems of regulation which are in operation in Member States. The EU therefore adopted a Directive in March 2009[89], which is due to be implemented in all Member States by March 2011 at the latest.

This Directive builds on, and is complementary to, the policies on charges for airports and air navigation services drawn up by the International Civil Aviation Organization (ICAO).

The main objectives of the Directive, which will apply to all EU airports handling more than five million passengers per year and to the largest airport in each Member State, are as follows:

- Greater transparency is required on the costs which charges are to cover. Airports shall be obliged to share a detailed breakdown of costs with airlines in order to justify the calculation of airport charges.
- Non-discrimination: airlines receiving the same service shall pay the same charge. However, airports can differentiate their services as long as the criteria for doing so are clear and transparent (for example, low cost terminals). Airports can also vary charges on environmental grounds (for example, lower charges for more environmentally-friendly aircraft).
- Systems of consultation on charges between airports and airlines (which are already in place at many EU airports) will become mandatory at all airports covered by the Directive.
- Member States will be asked to designate or set up an independent supervisory authority whose job will be to help settle disputes over charges between airports and airlines.

The Commission will closely monitor the implementation of the Directive in Member States.

Other economic regulatory developments within Europe and globally during 2010 included:

[88] http://ec.europa.eu/transport/air/airports/airport_charges_en.htm

[89] Directive 2009/12/EC of the European Parliament and of the Council on airport charges, 11 March 2009

France

Aéroports de Paris (AdP)[90] signed a new Economic Regulation Agreement with the French Government for the 2011-2015 period. The agreement supersedes one signed in early 2006 and covers the major proposals put forward by AdP in February 2010 in a public consultation document. The points of the new agreement are:

- A €1.8 billion investment programme for the regulated aspects, mainly focusing on improving the oldest terminals and associated with financial incentives regarding the scheduling of major investments.
- A moderate pricing cap (average of 1.38% per year above inflation), alongside an adjustment clause to partially compensate for any major variance in traffic levels.
- The introduction of ten service quality indicators, which may involve financial incentives in the form of bonuses and penalties; and five of which directly relate to passenger satisfaction.

United Kingdom

In July 2010, the Transport Secretary[91] introduced proposals designed to improve Britain's major airports. The package of measures is designed to put passengers at the heart of how airports are run, encourage competition between airports and promote investment which will make Britain's major airports better, not bigger.

Under the plans – which will reform the (1986) framework for regulating airports – the aviation regulator, the Civil Aviation Authority (CAA), will be given a new primary duty to promote the interests of passengers. The CAA will also be given a supplementary financing duty – helping to drive passenger focused investment. It will also be granted new and more effective powers to take action against airports which under-perform and new powers to investigate and take action against anticompetitive behaviour.

The proposals would also see a switch to a new regulatory licensing regime. This will allow regulation to be tailored to meet the requirements of individual airports, rather than the same conditions being applied to all regulated airports. This will enable CAA to better target regulatory activity where and when it is needed to protect the interests of consumers.

These new powers will allow economic regulation to be used in a more targeted way and remove unnecessary bureaucracy, but there will be no change to the basis on which the current price caps at the London airports of Heathrow, Gatwick and Stansted are set. This is expected to become law during 2011.

North America

In July 2010, the Air Transport Association[92] filed a petition with the United States Court of Appeals for the District of Columbia Circuit, challenging a Department of Transportation (DOT)[93] rule that enables airports to adjust their landing fees based on an airline's passenger scheduling performance.

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[90] AdP develops and manages airports including Paris Charles de Gaulle, Paris Orly and Paris Le Bourget. The operator also holds investments and management contracts in other countries, including Cameroon, Madagascar, Guinea, Cambodia, Belgium, Mexico, Egypt and Saudi Arabia.

[91] Statement by UK Department for Transport, 21 July 2010

[92] The Air Transport Association (ATA) is America's oldest and largest airline trade association. ATA's 16 member airlines and their affiliates transport more than 90% of U.S. airline passenger and cargo traffic.

The Secretary of Transportation is required by statute to publish regulations “establishing ... the standards or guidelines” he will use to evaluate the reasonableness of an airport’s fees. This case involves a challenge to one set of regulations promulgated under that statute.

The court heard testimony from all parties involved and concluded that airports have the right to protect passengers from inconvenient flight delays. The court’s decision also specifically permits airports to impose a two-part landing fee structure and vary landing fees throughout the day at congested airports. Faced with higher fees, the airlines can shift flights to less busy hours, change the size of the aircraft flown during peak periods or pay higher fees to fly at the busiest hours. Such pricing regimes are already in place at some European airports.

Africa

The major event within Africa was the increase in charges at South African airports by 40.7% in 2010/11, 25.6% in 2011/12, 14.2% in 2012/13, 5.5% in 2013/14 and 5.6% in 2014/15. The charges agreed by the Regulating Committee of the South African Department of Transport were the result of an economic regulatory approach which states that the national airport operator (ACSA) must pre-fund all development and can only get its money back when the infrastructure comes online.

Originally ACSA was seeking an increase of 133% in 2010/11, a proposal which was met with fierce opposition from airlines operating in the country and industry bodies. Over the last three years, ACSA has invested ZAR 16 billion in infrastructure development, largely financed through debt.

Australia

In 2006, the Productivity Commission conducted a review of the regulatory arrangements for pricing airport services in Australia. The review examined the price monitoring regime which had replaced the price capping regime in 2002. The review found that the price monitoring regime had delivered important benefits and recommended that the existing arrangements continue.

The Australian Competition and Consumer Commission (ACCC) has continued to prepare Airport Monitoring Reports for public release on an annual basis. In 2008 the Government directed ACCC to formally monitor prices, costs and profits relating to car parking at Australia's five major airports.

In the 2009 National Aviation Policy White Paper, the Government announced that it would continue with the existing regime including the price and quality of service monitoring conducted by the ACCC with a review to be conducted by the Productivity Commission in 2012. The Government reserved the right to conduct the review earlier.

The purpose of this inquiry is to examine the effectiveness and efficiency of the current economic regulation and quality of service monitoring regime for airports and whether new arrangements are needed. It is also due to make recommendations in relation to the requirement for future regulation and monitoring of services; and the scope and appropriate mechanism for the provision of greater transparency and accountability in airport infrastructure provision and services.

[93] U.S. DOT, as the primary manager of the nation’s air transportation system, determines whether the fees an airport charges its users comply with the various Federal statutes requiring that the fees be reasonable.

The Commission is to undertake an appropriate public consultation process including holding hearings, inviting public submissions and releasing a draft report to the public.

The Government will consider the Commission's recommendations and the Government's response will be announced as soon as possible after the receipt of the Commission's report. The Government will release the Commission's report.

Summary

Around the world, regulators are showing considerable interest in the charges made by airports, particularly upon their airline customers. Although each administration may choose different tactics, they all reflect the inherent monopolistic position of each airport due to its location. It is incumbent on regulators to ensure that airport charges levied are both transparent and cost reflective.

4.4.4 Taxation

ICAO defines a tax as a “levy that is designed to raise national or local government revenues which are generally not applied to civil aviation in their entirety or on a cost-specific basis”. As it is often perceived that taxation takes money out of the industry, ICAO recommends that any levies be in the form of charges rather than taxes and that the funds collected should be applied to mitigating the environmental impact of aircraft engine emissions. Taxes do offer some advantages over other market based measures (such as emissions trading schemes) in that they are administratively simple and can be introduced quickly.

Most European nations apply or impose different levels of taxation to their civil aviation industries.

ACI offers an overview in its January 2011 position paper on Aviation Taxes in the EU[94].

It asserts that several EU Member States have introduced or are about to implement specific aviation taxes at national level. Some countries have also increased the level of their aviation tax to generate additional revenues. Although not explicit in all cases, some countries such as the UK, Ireland and Germany have stated the tax is to offset environmental costs of the aviation industry. A number of countries have withdrawn their plans to impose a tax on aviation or have abolished the tax following an assessment of its impact on the economy.

Austria

Austria will introduce a tax on departing passengers (excluding transfer) for all flights as of 30 March 2011. The tax will range from €8 (short-haul) to €35 (long-haul) per passenger.

Belgium

In October 2008 the Belgian Government announced its intention to impose an air travel tax of up to €40 per departing passenger from any Belgian airport. Following strong protests from both airlines and airports the Government withdrew its plans to introduce the tax in November 2008.

[94] Position on Aviation Taxes in the EU: Putting the economic recovery at risk, ACI EUROPE, January 2011

Denmark

Denmark abolished its Transportation tax in 2007 because of the negative economic impact and the competitive disadvantage for Danish airports stemming from the tax. The tax rate amounted to DKK75 (circa €10) per departing passenger (halved in 2006 before its complete abolition in 2007). According to the Danish Ministry of Finance in 2006, "eliminating the tax will support the framework conditions for Danish airports and strengthen the overall platform for air traffic in Denmark."

France

The French Government introduced a solidarity tax in 2006. The tax rate ranges from €1 for a short-haul flight in economy class to €40 for a long-haul flight in Business Class. All revenues from the tax are earmarked for development aid. In addition, France levies a 'civil aviation tax' of €4.11 for EU destinations and €7.38 for extra-European destinations per departing passenger.

Germany

The German Government agreed on the introduction of a new Air Passenger Tax in 2010, applying to departing passengers from German Airports for flights after 1 January 2011 (excluding transfer passengers). The tax ranges from €8 for domestic and European destinations to €45 per flight for long-haul routes.

Italy

In 2003 the Italian Government established a 'Municipal Surcharge' levied on each passenger departing from any Italian airport and progressively increased up to €4.50. In addition local authorities recently set a administrative surcharge at Rome's airports of €1 per air passenger, with a view to contributing to cover the Municipality of Rome's debt. This charge has been levied on passengers departing from airports in Rome since 1 January 2011.

Ireland

The current Irish Air Travel Tax was established in 2009 and is levied on each departing passenger. Short-haul flights are taxed €2, whereas all other flights are subject to a €10 levy. In December 2010 the Irish Finance Minister announced in his budget speech that from 1 March 2011 a reduced single rate of tax of €3 would apply. He acknowledged that this had arisen from calls for the abolition of the tax, which is blamed for the reduction in visitor numbers to Ireland. The position will be reviewed after a year with the potential for the tax to be increased again unless "there is clear evidence of an appropriate response by airlines".

Netherlands

The Dutch Government introduced a departure tax on 1 July 2008, taxing all departing passengers €11.25 for flights within the EU and €45 for intercontinental flights. However, given the dramatic consequences on the Dutch economy and the diversion of passengers to Belgium and Germany, the tax was suspended on 30 June 2009. As an aside, air passenger traffic throughput at Dutch airports recorded an 8% decline in 2009 over 2008, but recovered in 2010 after the abolition of the tax to post a 4.7% increase over 2009.

United Kingdom

The UK Air Passenger Departure tax (APD) was first introduced in 1994 and is levied on each departing passenger from a UK airport. The current rates range from £12 for short-haul flights up to £170 for long-haul flights per ticket. The UK Government is currently considering a change of the system in favour of taxation on a per-aircraft basis. However, critics argue that a shift to a tax on a per-aircraft basis could result in airlines focusing on routes with a high load factor to the detriment of thinner routes serving regional airports. Taxation on a per-aircraft basis would also include full freighters within the taxation scheme for the first time, with a potential negative impact on cargo traffic at UK airports.

Outside of Europe, taxation is similarly occupying industry lobbyists.

In Japan 2010 was a tough year for the air transport industry. January saw the bankruptcy of the country's flag carrier. When Japan Airlines entered bankruptcy protection at the beginning of the year, the high cost of operations in the country was highlighted as a major obstacle to future survival.

In July the Japanese Transport Ministry (MLITT) announced it was to reduce the punitive tax on jet fuel; subsequently approved in December 2010 for implementation in fiscal year 2011. Under international law aviation fuel for international flights is exempt from taxation, but Japan's domestic tax (unaltered since 1972) is close to USD 300 per kilolitre. The proposed new tax level to be introduced in 2011 is going to be closer to USD 200 per kilolitre. The reduction is expected to have a significant impact on JAL's and ANA's bottom lines.

To put this into an international context, the UK for example does not impose a duty on domestic aviation fuel, whereas the U.S. has a domestic tax rate of approximately USD 11 per kilolitre.

4.5 Slot Allocation Issues

4.5.1 Europe

The existence of a mechanism to regulate slot allocation is itself a recognition that, in some parts of the world, the air transport system has failed to match demand at particular airports.

So far Regulation 95/93[95] on the Common Rules for the allocation of slots at Community Airports has provided a transparent mechanism for the allocation and management of slots at constrained airports for the past seventeen years with no major problems identified. The Regulation was modified (but not replaced) by Regulation 793/2004[96] which made a number of technical improvements, for example, to the processes for monitoring the correct use of slots; and introduced sanctions for the abuse of slot use.

In September 2010, the EC issued a public consultation on the impact assessment for a possible revision of Regulation 95/93 on Common Rules for the allocation of slots at Community airports. The objective of the consultation was to receive stakeholders' comments on options to revise the Regulation on such issues as:

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[95] Council Regulation (EEC) no 95/93 on Common Rules for the Allocation of Slots at Community Airports, 18 January 1993

[96] Regulation (EC) No 793/2004 of the European Parliament and of the Council, 21 April 2004

- The number of slots for which services would actually be scheduled
- On the proportion of slots for which services have been scheduled which are actually used
- Impacts on the mix of traffic, types of carrier, size/type of aircraft and types of service (long or short haul)
- Impacts on administrative costs
- Impacts on competition and any other factors

This consultation is due to report in 2011 and follows in the wake of a previous benchmark study on secondary slot trading in 2006[97] (led by Mott MacDonald).

Currently, few new slots come on the market at congested airports and a 'secondary trading' market has grown between airlines, permitted under Regulation 95/93 as long as competition is not affected. Under COM(2008)227[98] the Commission makes it clear that it is not the Commission's intention to pursue infringement proceedings against Member States where secondary slot trading takes place in a transparent manner, where all administrative requirements for the allocation of slots detailed in the applicable legislation are respected.

Regulation 793/2004 states in Article 8a that slots can only be "exchanged, one for one, between air carriers." Airlines can circumnavigate this by exchanging some peak time slots for off-peak slots; and a sum of money. The unwanted slots are then returned to a pool to be reallocated, leaving one party with the slots they want and the other with a lump sum.

At congested and sought-after airports such as Heathrow, the value of a pair of slots on this grey market was estimated to be worth as much as £25 and £30 million[99] in 2008. In 2009, Lufthansa acquired a 100% stake in BMI primarily to gain access to its Heathrow slots. Recently the potential sale of Virgin Atlantic is generating similar significant interest because of its Heathrow operation.

Whilst the secondary slot trading market works for the legacy carriers, the price of a pair of slots on the grey market means smaller regional airlines may find it difficult to compete at the major European airports where slots are constrained. The availability of slots and the pricing regimes at major European hub airports favour large intercontinental widebody aircraft operations rather than services by 50-seat regional aircraft.

One of the issues with Regulation 95/93 has been the potential for conflict between its many objectives, as stated in the preamble to the regulation prior to the Articles. For example, one objective is to:

> *"...require strong support for carriers who intend to start operations on intra-Community routes"*;

while another states:

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[97] Study on the Impact of the Introduction of Secondary Trading at Community Airports, Mott MacDonald in co-ordination with Hugh O'Donovan, Oxera and Keith Boyfield Associates, November 2006

[98] COM(2008) 227 30th April 2008

[99] Open Skies, open for business? Deloitte, 2008

> *"It is desirable to make the best use of the existing slots in order to meet the objectives set out above."*

The conflict arises in the interpretation of the word 'best', because 'best' carries different meanings to airlines, airport operators and passengers. Where there is increased traffic with no new runways leading to pressure on slots, inevitably airlines will replace operations by small aircraft on domestic routes with large ones on medium and long haul routes. This provides more optimal and better (i.e. more profitable) use of the scarce slots but at the expense of regional services.

A consequence of this is highlighted in the earlier analysis of London Heathrow in Section 4.3 'Airport Capacity Issues', which showed that services to regional UK destinations from the hub airport have declined from 23 points to 6 between 1981 and 2010. While 17 UK domestic points have had their air services to Heathrow withdrawn since 1981, by contrast 13 new transatlantic destinations were added to Heathrow's longhaul route network between 2003 and 2010.

Whilst France, Spain and Italy make use of PSO regulation to protect ('ring-fence') some slots for services from peripheral areas (predominantly to slot-constrained hub airports), some countries such as the UK have yet to utilise this protection for services to vulnerable peripheral locations and thereby ensure sustainability and social inclusion.

One of the main concerns in Europe during 2010 was the impact on slot holdings and the retention of rights to slots under the 80% rule following the enforced closure of a large part of Europe's airspace due to the Icelandic volcano in April. Article 10 of Regulation 793/2004 implies that relaxation of the 80% rule may be justified if "unforeseeable and unavoidable circumstances outside the air carrier's control" leads to airport and/or airspace closure and the grounding of aircraft. Indeed, in the immediate aftermath of the ash cloud incident, the Commission recommended that slot coordinators exercise flexibility and take into account the effects of the crisis, allowing airlines to keep slots which were not used during the crisis and the period immediately afterwards[100].

4.5.2 Developments outside Europe

Many of the major airports of the world have become either facilitated or fully coordinated due to increasing traffic and the limited capacity available to meet growing demand. Two of the most critical situations affect New York and Tokyo.

United States

In the U.S. there has been continuing debate about slot allocation and availability at the major New York area airports. At La Guardia, John F Kennedy and Newark Airports the situation remains serious despite the economic downturn with a number of regulatory and other solutions being evaluated by academics, the FAA and the Port Authority of New York & New Jersey. These include auctions and lotteries, demand management, bans on small aircraft, and related measures. These are discussed in detail in a paper published by the U.S. Regional Plan Association[101].

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[100] European Commission Memo/10/152 27th April 2010: Volcanic ash cloud crisis: Commission outlines response to tackle the impact on air transport

[101] Upgrading to World Class – the Future of the New York Region's Airports, Regional Plan Association, January 2011

Japan

In Japan, after many years of strict environmental constraints and slot management, slot restrictions were relaxed in 2010 at the more central Tokyo airport of Haneda following opening of a new runway and international terminal in October 2010. Although more non-Japanese airlines are gaining access to Haneda, this access is governed by restrictive air service agreements. The Japanese government imposed a number of specific scheduling rules with the addition of the new runway capacity and extra slots at Haneda, with specific reference to the timing of some international services.

The Haneda slot issue played a major role in the U.S.-Japan talks that resulted in an Open Skies agreement between the two countries in 2010. This has led to increased competition for restricted slots at the two main Tokyo airports. At Tokyo Narita, U.S. bilateral negotiators obtained a commitment from Japan that a share of any new slots resulting from expansion would be allocated to U.S. carriers. The ratio agreed was 2,190 annual slots for U.S. carriers out of every 20,000 new slots created, or some 11%. This formula will apply until March 2015, or until Narita capacity reaches 300,000 slots per year.

It is understood that while access to Haneda and Narita were two of the main U.S. goals in the Open Skies negotiations, Japan primarily wanted its airlines to be able to form joint ventures with U.S. carriers. Because of this impasse, Japan said it will wait for antitrust immunity applications to be approved by the U.S. Government before it officially signs the Open Skies agreement.

Many EU longhaul legacy carriers have access to and are operating at Tokyo Narita but up until the end of 2010 did not have access to Haneda. In September 2010 British Airways announced it will begin services to Haneda commencing in February 2011, becoming the first European carrier to do so.

4.5.3 Possible Action

The Commission has been consulting on EU Slots Regulation for a number of years. In 2010, it engaged consultants Steer Davies Gleave to carry out work on the effects of possible changes to the Regulation; they are due to report in spring 2011. Areas under consideration are primary slot allocation, new entry arrangements, the mobility of slots and secondary trading, the independence of the coordinator, abuse or misuse of slots, late hand-back of slots, local rules, transparency of schedule data and business aviation.

5. Aircraft Manufacturing & MRO

5.1 Introduction

The purpose of this chapter is to provide an overview of the civil aeronautics and aircraft maintenance industries. Aerospace and civil aeronautic manufacturing activities in the EU represent the second largest global market after the United States and boasts high levels of productivity, innovation and technological development and research.

The chapter contains four main areas of focus intended to explore the activities, trends and issues in this sector of the industry:

- The manufacture of aircraft and civil aeronautic products, including key metrics on output, employment, productivity and import/export activity
- An overview of important global aeronautic markets and their development
- The composition of the current global aircraft fleet
- The maintenance, repair and overhaul industry, including its key metrics and trends.

In most cases the analysis is for 2009, the latest year for which data is available.

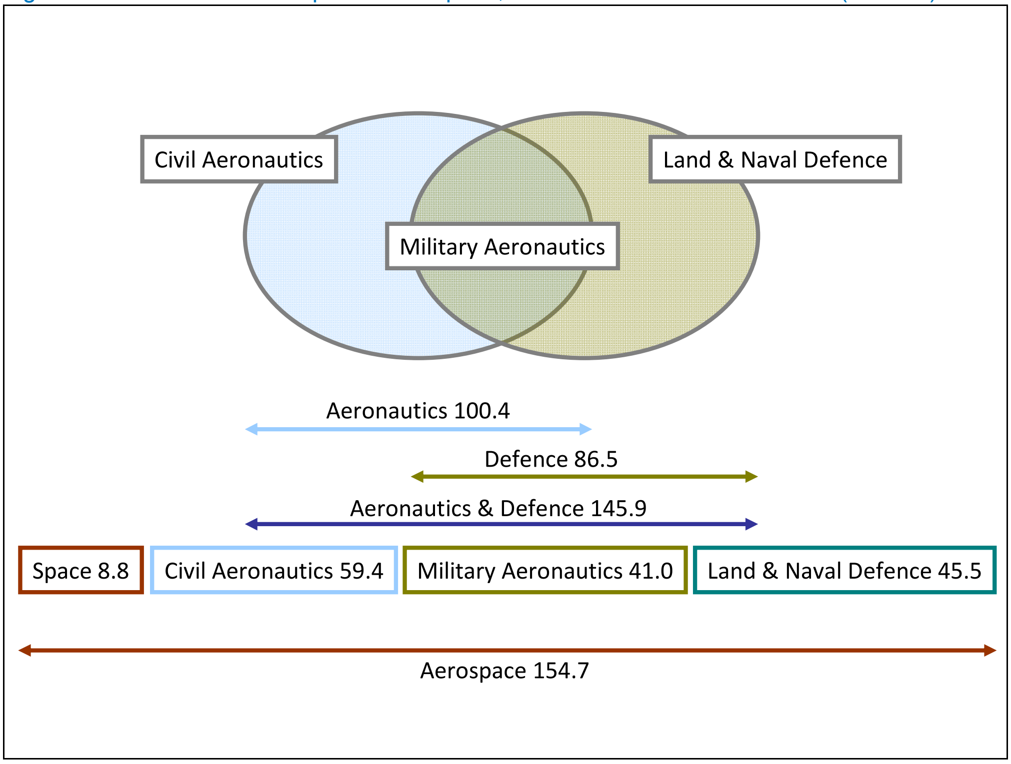
5.2 Aeronautics & Manufacturing Overview

The European aeronautics industry is responsible for the design, development and production of a broad range of aviation products including civil and military aircraft, aero engines, helicopters, unmanned aerial vehicles and their associated systems, parts and equipment. It also includes activities associated with Maintenance, Repair and Overhaul (MRO). Additional activities such as the space and defence sectors are specifically excluded from the term ‘aeronautics’, but when all of these activities are considered together they are encompassed in the term ‘aerospace’.

The focus of this chapter is on civil aeronautics, which excludes activities relating to space and those sectors relating to land and naval defence equipment. Due to the high interdependencies of civil and military aviation, the two are considered alongside each other where there can be no differentiation in data sources or where the relevance is important for comparative purposes.

In some cases space activities are included in the analysis where it is standard for major comparable markets (such as the U.S.) to include these figures in their aeronautical data reporting. Where this occurs the term aerospace is used. Figure 5.1 provides a visual description of the relationships between these sectors and the applied terminology.

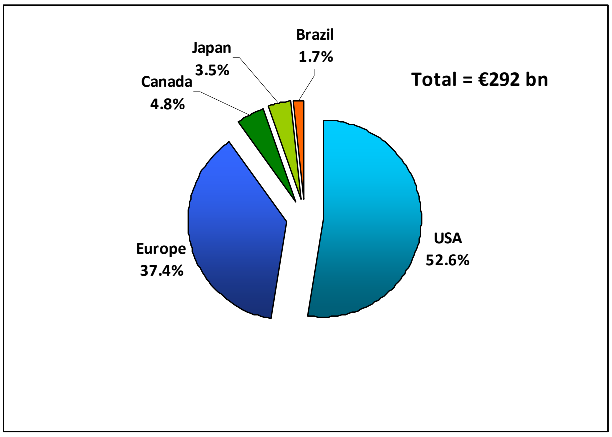
Figure 5.1: Inter-relationship between Space, Aeronautic & Defence Sectors (€ billion)



Source: ASD

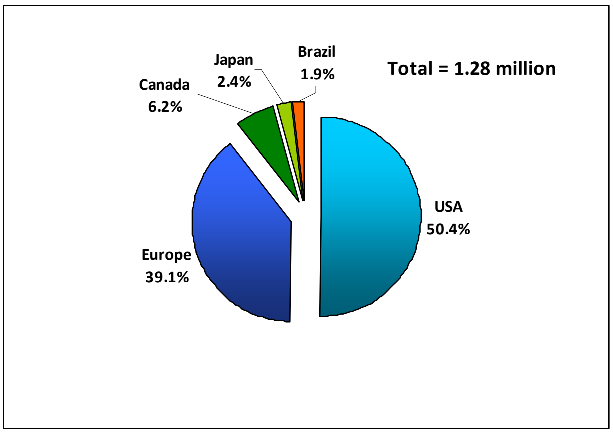
According to figures from the AeroSpace and Defence Industries Association of Europe (ASD), aerospace turnover in the EU totalled €154.7 billion in 2009 and the industry employed 500,000 people[102]. Comparisons to major international markets are shown below.

Figure 5.2: Comparative Aerospace Turnover 2009



Source: ASD (unconsolidated turnover for Europe)

Figure 5.3: Comparative Aerospace Employment 2009



Source: ASD

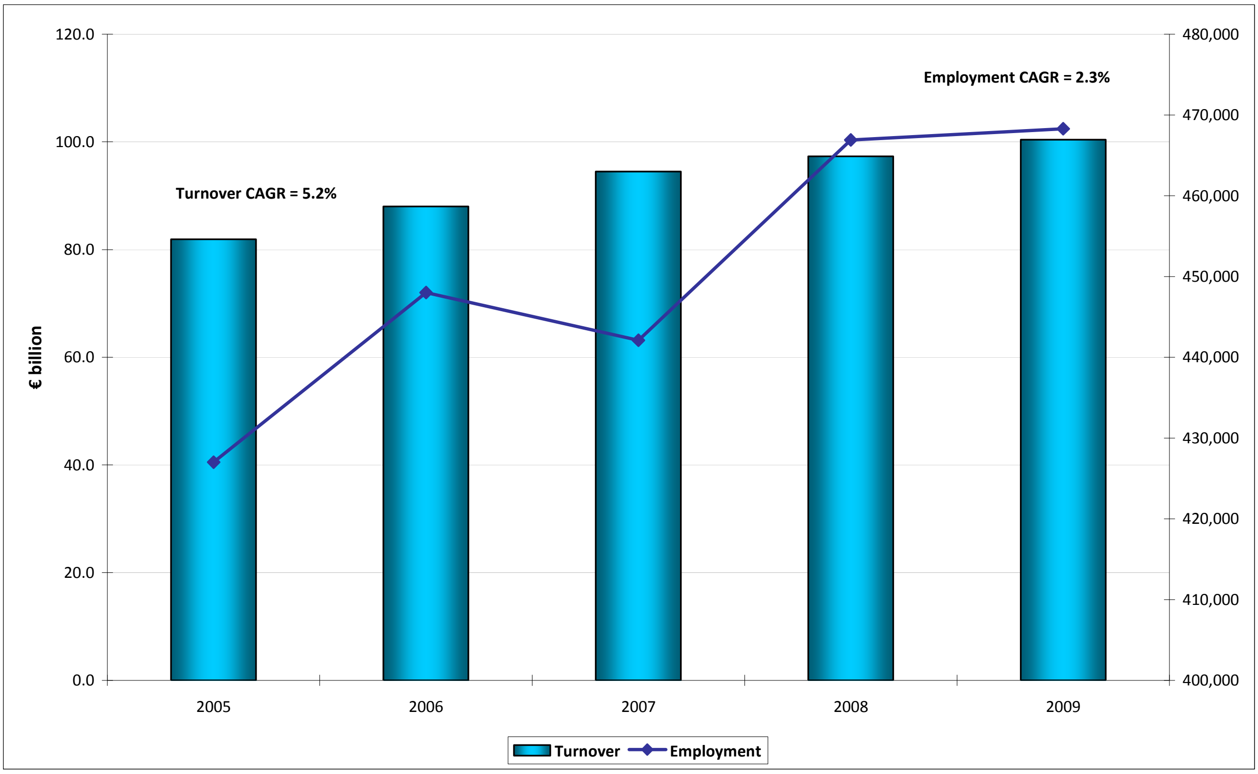
[102] AeroSpace and Defence Industries Association of Europe, Facts and Figures 2009

The turnover of the European aeronautic sector in 2009 (civil and military aeronautics but excluding space activities, land and naval defence) totalled €100.4 billion, an increase of 3.2% over 2008. This represents a 5.2% CAGR in turnover since 2005[103] (see Figure 5.4).

The number of persons employed in aeronautics reached 468,300, a marginal increase of 0.3% over 2008, despite the world economic downturn. This represents 2.3% CAGR since 2005, see Figure 5.4 below. Spain, Germany, Finland and Portugal were the main contributors to the positive trend in employment in 2009. Ireland was particularly affected by a downturn in the MRO sector.

Since 1980, the turnover per employee in the European aeronautical sector has steadily increased, reaching an overall long-term growth of 3% per year. After a peak reached in 2007, labour productivity declined in 2008 and 2009. Between 1991 (€143,000 per employee) and 2009 (€215,000 per employee), this is equivalent to a growth of 50% in labour productivity.

Figure 5.4: EU Aeronautical Turnover & Employment 2005-2009

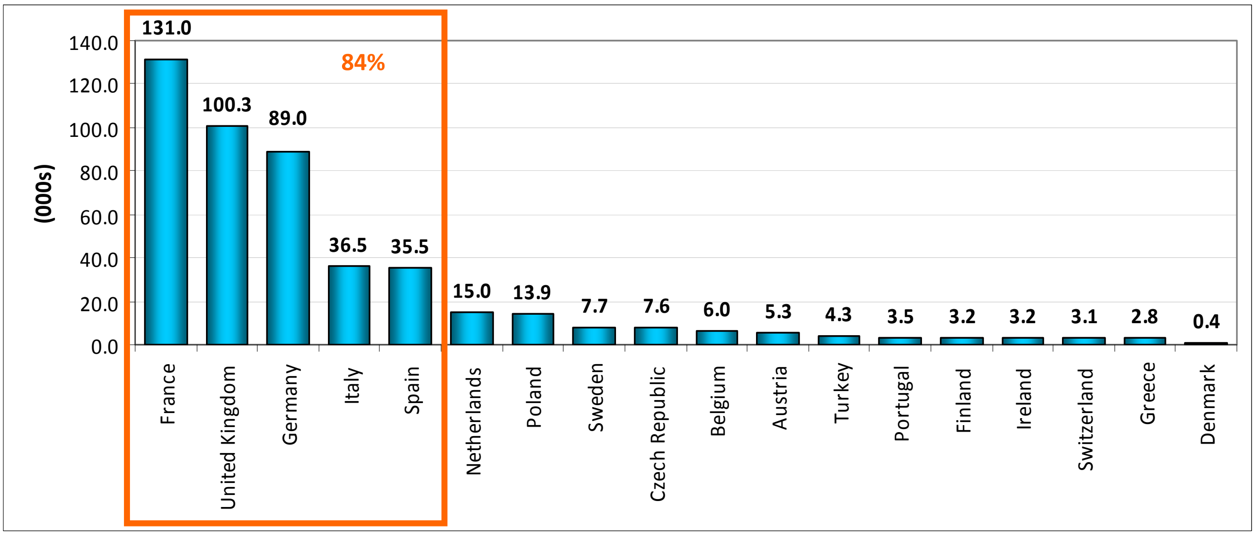


Source: ASD (2005 estimated)

The top five employers of aeronautical workers in Europe are France, the United Kingdom, Germany, Italy and Spain. Between them they account for 84% of aeronautical employment (see Figure 5.5).

[103] ASD 2009

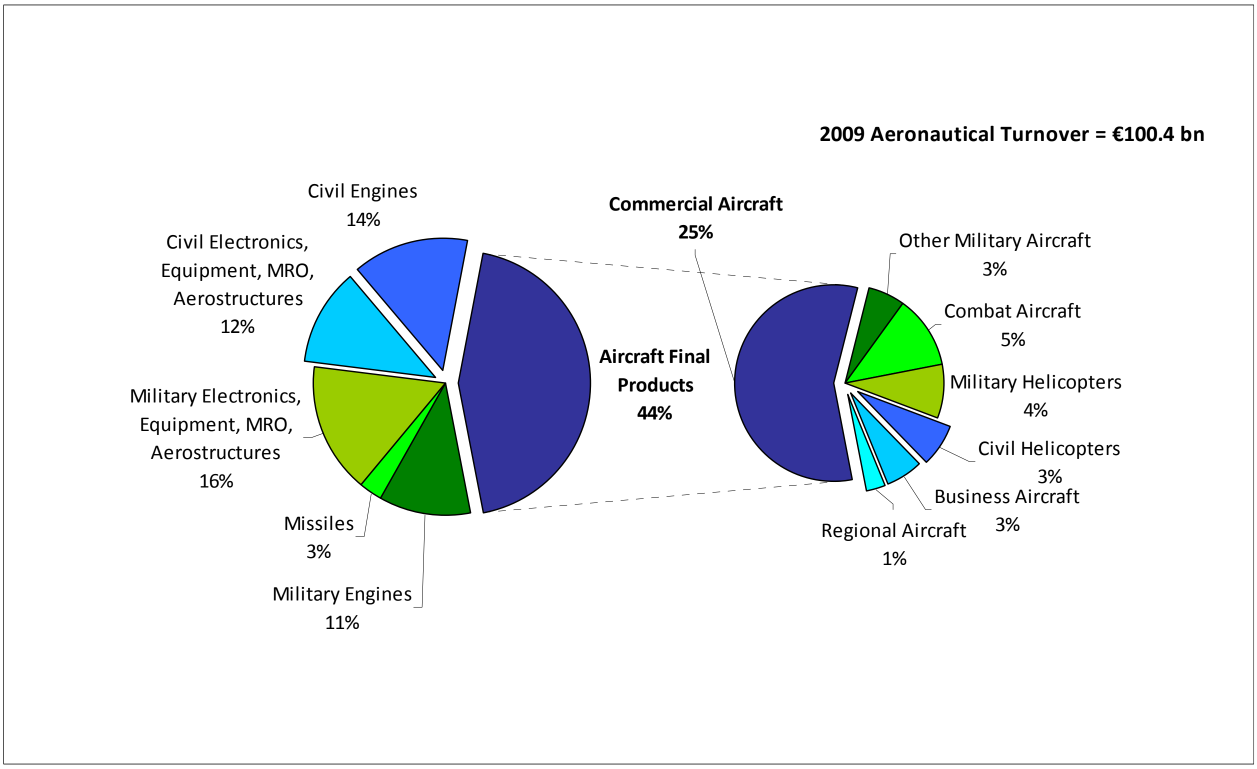
Figure 5.5: European Aeronautical Industry Employment by EU Member State 2009



Source: ASD

Civil aeronautics represents 58% of the European aeronautics industry and it is by far the most important sector (Figure 5.6).

Figure 5.6: European Aeronautical Activity by Product Segment 2009



Source: ASD

5.2.1 Aerospace Imports & Exports

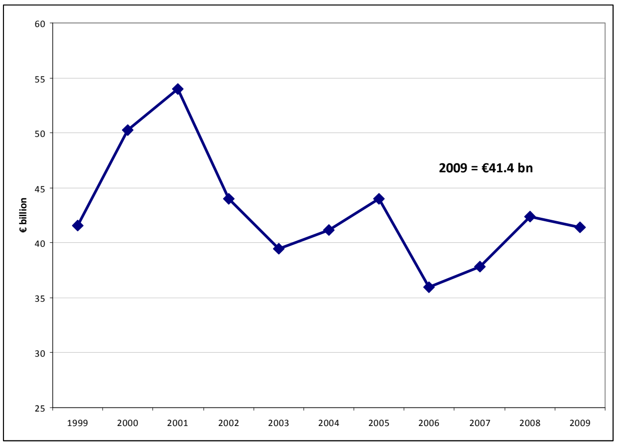
The European Aerospace Sector as a Whole

European aerospace companies and industries enjoyed a relatively good performance in 2009, despite the global economic recession resulting from 2008. In the civil aeronautics sector, the large volume of order backlogs taken during boom years made it possible for the industry to continue to produce and deliver aircraft at robust rates in the face of declining new orders.

The global economic crisis imposed strong financial pressure on the air transport industry in 2009, forcing airlines to preserve cash and consolidate route networks. To achieve this, airlines reduced capacity by postponing or cancelling orders for new aircraft and cutting back fleet expansion plans. In some European countries, the absence of affordable credit resulting from the lack of liquidity in the financial sector was partially offset by government export credit guarantees. There is a continuing need for European Governments to make credit available to customers and suppliers to ensure that the temporary collapse in orders does not threaten the long term viability of the industry and to encourage continued demand for new aircraft.

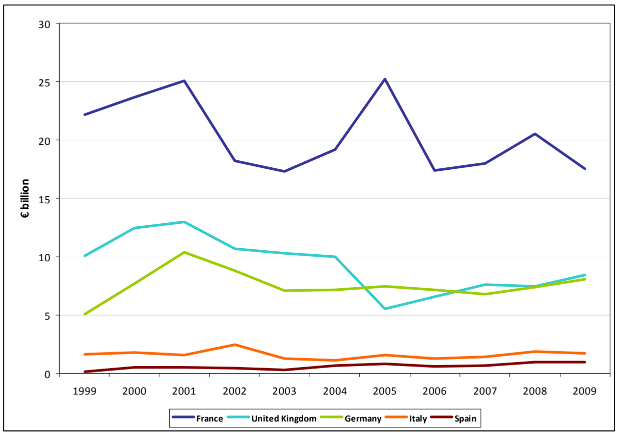
Europe is a net exporter of aerospace and aviation products[104]. In 2009 aerospace exports to the world from EU27 countries totalled €41.4 billion. This represents a 2.4% reduction on the previous year and a CAGR of -0.04% since 1999, although there have been cyclical peaks and troughs over the period (see Figure 5.7). In 2009, the United Kingdom (12.5%) and Germany (9.7%) recorded rises in exports compared with 2008, while France showed a 14.6% drop (Figure 5.8).

Figure 5.7: EU27 Aerospace Exports 1999-2009



Source: Eurostat

Figure 5.8: Top 5 EU Aerospace Exporters 1999-2009

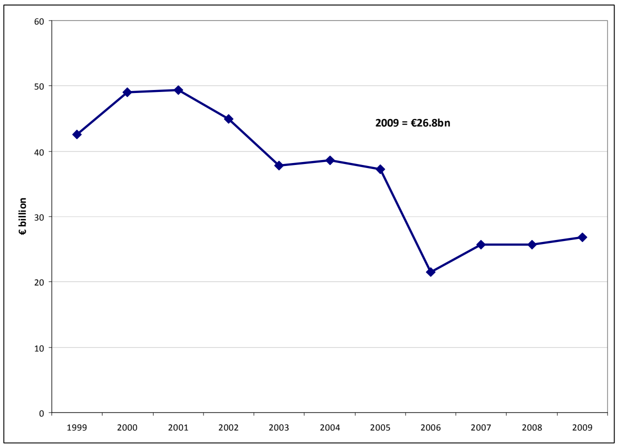


Source: Eurostat

In 2009 aerospace imports to the EU27 countries totalled €26.8 billion. This represents a growth of 4.4% over the previous year, but a general downward trend is occurring with a CAGR of -4.5% since 1999 (see Figure 5.9). Germany recorded a 9% rise in imports over 2008 while Spain showed a 66% drop; albeit on smaller overall volume (Figure 5.10).

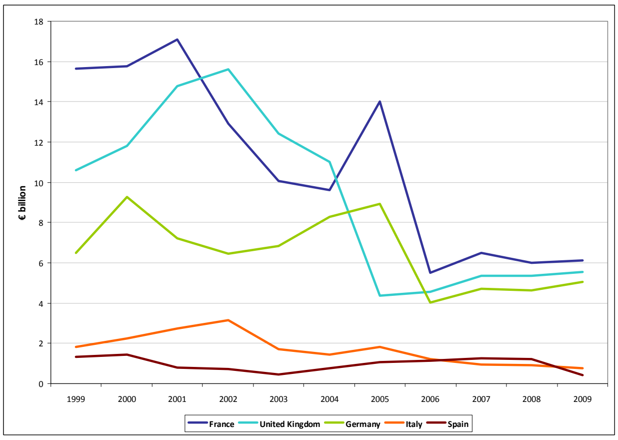
[104] All aerospace import and export data in Figure 5.7 to Figure 5.10 uses Eurostat SITC codes applicable to aerospace activity, including sub-groups of SITC 714, 792 and 874.

Figure 5.9: EU27 Aerospace Imports 1999-2009



Source: Eurostat

Figure 5.10: Top 5 EU Aerospace Importers 1999-2009

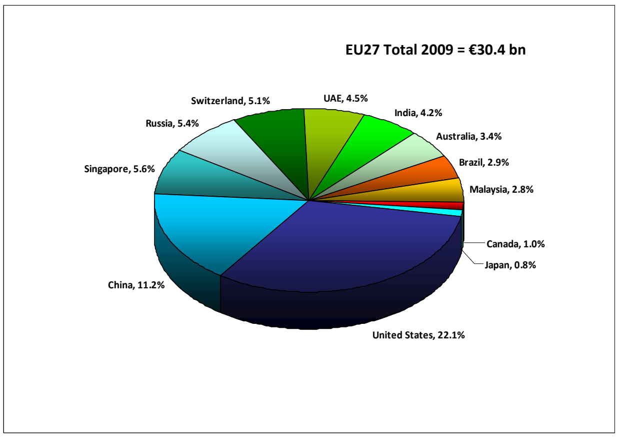


Source: Eurostat

Aircraft (Civil & Military) Exports

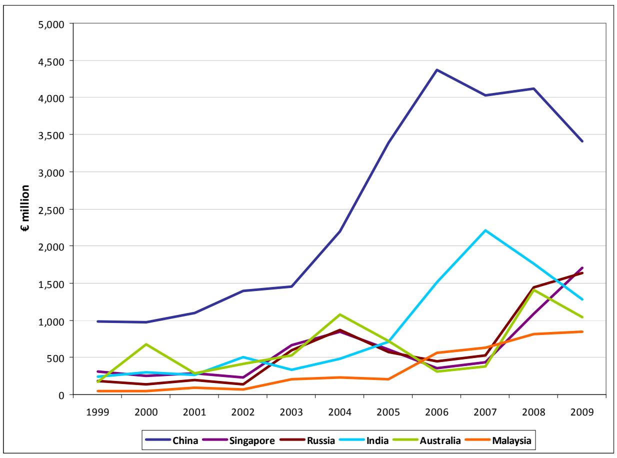
In 2009 aircraft[105] exports to the world from EU27 countries totalled €30.4 billion. This figure was a 5.7% reduction on 2008; however it has remained relatively constant since 1999 with a CAGR of -0.2% over the period. The primary trading partner for aircraft exports is the United States with a 22% share of the total, followed by China, Singapore and Russia (Figure 5.11). High performing aircraft export markets are shown in Figure 5.12. China is an important market to the EU; not only does it account for a high volume of export orders (€3.4 billion in 2009), but it has shown a robust growth of 13.2% CAGR since 1999 (despite a small reduction in recent years). The emerging markets of Russia and India are currently trading relatively small absolute volumes but have also shown high growth over the last decade (25% and 18% respectively). Other markets such as Singapore, Malaysia and Australia feature relatively mature economies but at the same time they reflect the increasing demand for air travel in the Asia-Pacific region (Figure 5.12).

Figure 5.11: EU Aircraft Export Partners 2009



Source: Eurostat (SITC 792 only)

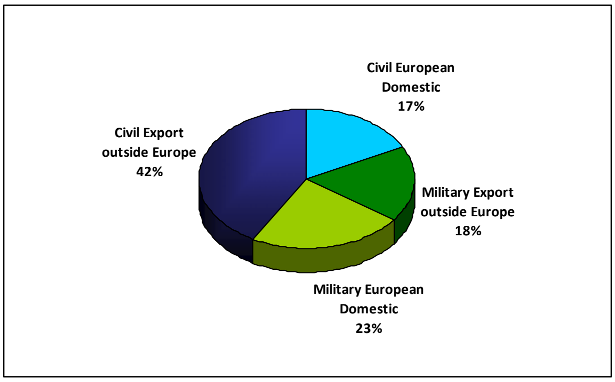
Figure 5.12: Selected EU Aircraft Export Partners 2009



Source: Eurostat (SITC 792 only)

105 Data for Eurostat SITC code 792, which encompasses aircraft & associated equipment, spacecraft (including satellites) & spacecraft launch vehicles, parts thereof.

Figure 5.13: Export Breakdown by Market 2009



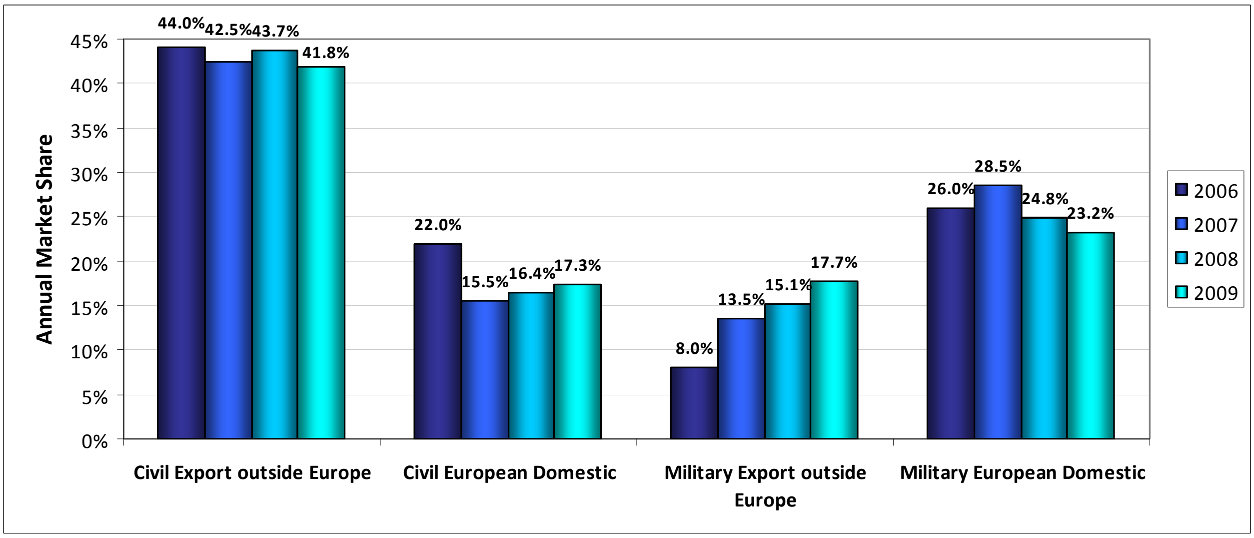
Source: ASD

Table 5-1: Export Breakdown by Market 2009

Civil Export outside Europe	42.0
Civil European Domestic	17.4
Military Export outside Europe	17.8
Military European Domestic	23.3
Total	**100.4**

Source: ASD

Figure 5.14: Export Comparison by Market 2006-2009



Source: ASD

5.2.2 Global Aerospace Markets

United States of America

The United States features the single largest aerospace industry in the world; with total industry sales in 2009 worth USD 214.5 billion (see Figure 5.2). Aircraft alone (civil and military) account for 52% of this figure. The industry employed 644,200 workers in 2009, of which 414,500 (64%) work in the aeronautics sector.

The European Union is the largest regional export market for the United States aerospace industry. Combined U.S. aerospace exports to France, the United Kingdom and Germany in 2009 totalled USD 19.4 billion and accounted for 23.8% of the total (USD 81.2 billion[106]). France alone is the single largest country market receiving 10% of U.S. aerospace exports in 2009 worth USD 8 billion. Of the top five country markets, Japan and China feature alongside these three European countries representing a combined export value of USD 30.3 billion, almost 40% of the total.

Canada

Canada's aerospace industry has remained stable with no substantial changes to overall revenue, global market share and growth figures since 2003. In 2009 its turnover was €14 billion and it is the next largest aerospace market after the U.S. and Europe, representing around 5% of the overall share[107]. Canada exports more than 82% of its aerospace output. The industry employs over 80,000 workers and 77% of its aerospace output is for the civil aeronautic sector [108].

58% of Canada's aerospace export revenue comes from its nearest neighbour, the United States. Europe is the next most important market at 24%[109], with other global regions accounting for single figures.

Canada is one of the few countries outside the U.S. and Europe producing complete commercial aircraft through its principal manufacturer, Bombardier. Through various acquisitions including de Havilland, the company produces a number of aircraft types for General Aviation operations but its main focus is on the regional jet and turbo-prop market. The Dash 8 and CRJ series of aircraft have established Bombardier as one of the world leaders in regional aircraft.

Japan

Japan's aerospace industry saw a total turnover of €10.2 billion in 2009 and employed approximately 31,000 workers. The country's aerospace turnover is mainly due to its participation in international civil aircraft production and the manufacture of military aircraft. Three Japanese companies supply integral structural components to Boeing for the B787 programme (main wing assembly, forward fuselage and centre wing box), with another eight suppliers providing parts and components. Japan has a long history of supplying Boeing; the first international joint project was on the B767 programme and from 1991 it also contributed to the B777.

Japanese industries also contributed to all current and past Airbus aircraft types as subcontractors and/or suppliers, while at least 20 Japanese companies currently contribute to A380 production. With more than two thirds of its output concentrated in civil aeronautics, overall production is linked to demand in North American and European markets and the corresponding manufacturing activity of Boeing and Airbus. This is expected to grow steadily in the short term once the 787 completes flight testing and commercial deliveries commence.

Japan remains a net importer of aerospace products, with only around 30% of total output being exported[110]. Of this amount, 99% is devoted to both airframe and engine parts, reflecting its dependency

[106] Aerospace Industries Association of America (AIA) 2010

[107] ASD 2009

[108] In 2008 (latest data available from Aerospace Industries Association of Canada)

[109] In 2008 (latest data available from AIAC)

on foreign aircraft programmes. Japan has a number of domestic aircraft development and manufacturing programmes but these form a small proportion of its overall aeronautics activity. Mitsubishi is currently developing the next-generation MRJ, a 70 to 90 seat regional jet, due for delivery in 2014.

Its largest export partner is the U.S. at 68% of all exports, Europe (17%) and Canada (9%). An overwhelming majority (88%) of its aerospace imports come from the U.S., with Europe accounting for only a tenth of this figure – yet it still represents the next largest import market.

Brazil

Brazil is the next largest aerospace market after the countries discussed above (€5 billion in 2009); and the largest in the southern hemisphere, employing over 24,000 workers in 2009.

Aircraft manufacturer Embraer is responsible for nearly 90% of total aerospace production in Brazil; as such the entire industry is affected by its performance. Recently Embraer has suffered from the consequences of the financial and the credit restrictions in international markets; despite this it retained the largest regional aircraft market share in 2009 of 50.5% ahead of Bombardier and ATR, based on a market value of USD 9.9 billion[111].

In overall terms the Brazilian aerospace industry is small compared to the major global players (the U.S., EU and Canada), but in terms of growth it has experienced high performance; almost tripling between 2003 and 2008 and reaching a high point in that year of €5.8 billion. These results are significant given that Canada, which is a direct competitor in the regional aircraft market, recorded sluggish growth over the same period[112].

Russia

The Russian aerospace industry collapsed following the disintegration of the Soviet Union. The decline in production of civil aircraft that followed was in the order of 80% with the entire industry producing on average 10 aircraft per year by 2005. Some manufacturers produced only one or two aircraft per year.

In order to meet the growing national demand for aircraft and to compete internationally, the Russian aircraft industry was consolidated under a state-owned joint stock company, the United Aircraft Corporation (UAC) in 2006. UAC has set the goal of becoming the world's third largest aircraft manufacturer by 2015. Achieving this ambition will depend on establishing cooperation between UAC member companies and with international competitors.

In the absence of any current meaningful aircraft production, Russian aircraft operators have turned to foreign suppliers, namely Boeing and Airbus, to fulfil their operational requirements. In July 2010 national carrier Aeroflot stated that it had plans to acquire 22 Boeing 787 and 22 Airbus A350 XWB aircraft by 2016. However, civilian carriers such as Aeroflot are under increasing political pressure to buy more Russian-made aircraft as they become available[113].

[110] In 2008 (latest data available from The Society of Japanese Aerospace Companies)

[111] Competitiveness of the EU Aerospace Industry with focus on: Aeronautics Industry, ECORYS, December 2009

[112] Competitiveness of the EU Aerospace Industry with focus on: Aeronautics Industry, ECORYS, December 2009

[113] Aeroflot picks Boeing, Airbus: Report, Reuters 10 Jul 2010

Current Russian aircraft development and production programmes include the Sukhoi SuperJet 100, a regional jet in the 78-98 seat range, designed to compete in that market against Bombardier and Embraer. The aircraft is due to be delivered to its first launch customer, Armenian carrier Armavia Airlines, in February 2011. Russian carrier Aeroflot has signed orders for 40 of the SuperJets[114]. Aircraft production features substantial international partnerships, including Alenia Aeronautics which owns a 25% stake and six other European companies.

Additionally UAC is developing the Irkut MS-21, a twin-engine, single aisle, medium range passenger aircraft which is intended to compete directly with existing narrow-body types – primarily the Boeing 737 and Airbus A320 families from 2016. This aircraft is also being developed with substantial international involvement, with a number of U.S. suppliers providing components. To date the aircraft has 146 orders with 50 of these going to Aeroflot. In January 2011, low cost operator Ryanair announced it was in talks with Russian and Chinese aircraft manufacturers for aircraft such as the MS-21 and C919, after it failed to conclude a satisfactory deal with Boeing for up to 200 B737s in 2009[115].

Ukraine

Ukraine is one of only six countries in the world which have the capacity to manufacture modern aircraft. Its aerospace Industry has all the elements of the production cycle, from conception to commercial production. There are 40 Ukrainian companies (the majority of which are public) which employ 90,000 people and manufacture a large range of aircraft, equipment, components and products for the aerospace industry[116].

Improvements in the aircraft industry are among Ukraine's priority directions for developing its economy. In 2007 the Ukrainian government gave aircraft manufacturing a boost by investing nearly USD $500 million in the industry[117]. However, in a global context the civil aeronautic output of Ukraine is minimal. Current data on aerospace industry turnover is difficult to source but in 2007 it was estimated to be USD $830 million.

The principal civil aircraft manufacturer in Ukraine is Antonov ATSC. Over 1,500 Antonov aircraft have been exported to more than 70 countries across the world; in total more than 22,000 aircraft have been built[118].

The international aircraft market faces tight competition, and Ukrainian analysts claim that, if aircraft mass production projects lack significant investment within the next few years, Ukraine is likely to lose its market share to competitors in Brazil, Canada, and Russia. Ukraine's aviation industry continues to pursue joint projects for mass production with companies from other countries[119].

In addition, Ukrainian aircraft producers are approaching customers in Asian and African countries including Egypt, Libya, Pakistan, Saudi Arabia, and the United Arab Emirates, which are not interested in

[114] First Sukhoi SuperJet 100 to be delivered to Armavia in February, Ria Novosti 19 January 2011

[115] Ryanair mulls Russian and Chinese aircraft, Flightglobal 1 February 2011; and Ryanair mulls MS-21 or C919 order, ATW Online 4 March 2011

[116] UKTI Aerospace Trade Mission Briefing Note 2010

[117] Ukraine's Technology Sector, U.S. Library Of Congress, October 2008

[118] Ukrainian Aeronautics Research and Technology Report, FP7 Aero-Ukraine Project May 2010

[119] Ukraine's Technology Sector, U.S. Library Of Congress, October 2008

expensive American and European aircraft. Iran imports Ukrainian aircraft sets for assembly. Ukraine is looking to China Aviation Industry Corporation II as a production partner in its Antonov An–70 military air-lifter programme and its other aviation programmes. Antonov already has worked with China Aviation Industry Corporation I, carrying out wind-tunnel tests on its ARJ21 regional jet and contributing to its wing design. Antonov and China's Shaanxi Aircraft also have discussed collaboration on the Chinese Y–8X turboprop-powered military air-lifter[120].

Although not currently a member of the EU, formal cooperation between Ukraine and the European Commission in aeronautics can be traced back to at least 1998 when the Partnership and Cooperation Agreement (PCA) came into force. Under this agreement several areas of cooperation were identified, including modernisation and development of airport and air navigation infrastructure and promotion of joint research and technology programmes[121]. Since 2005, EU-Ukraine cooperation activities have been largely defined by the bilateral EU-Ukraine European Neighbourhood Policy (ENP) Action Plan[122], which is based on the PCA. Under the ENP Action Plan, the EU funds technical assistance activities to support legislative approximation, regulatory convergence and institution-building via several mechanisms.

China

China has not yet gained any substantial position in the global aerospace market. However it is displaying strong growth in the air transport market and is an emerging force with strong ambitions and investment in domestic aircraft production, both for local consumption and international export.

Currently China imports aerospace products in an approximate 50:50 share from the U.S. and the EU. Export flows are mainly to the EU, U.S. and Japan with the EU capturing 30% of this share.

China has developed a regional jet, the COMAC ARJ-21. The aircraft was meant to enter service in 2010 but delays to the flight testing programme mean this is now likely for late 2011[123]. It is similar in size and appearance to the U.S.-built DC9. COMAC[124] hopes to sell 500 of the regional jets in 20 years and is interested in FAA certification to facilitate exports.

China has ambitions for larger aircraft types. It is proceeding with a new programme to develop a 168 to 190-seat narrow-body aircraft to compete directly with Boeing and Airbus in this market; thus COMAC has been tasked with the development and production of the designated C919. Construction commenced in 2009 with deliveries planned for 2016[125].

Technological advancement of China's aviation industry has been directly related to cooperation and investment from international firms. Western companies have sourced parts from China for several decades. Most major aerospace manufacturers outsource limited volumes of metalwork to Chinese machine tooling shops, due not only to lower labour rates but also to the wide availability of the latest tooling technology.

[120] Ukraine's Technology Sector, U.S. Library Of Congress, October 2008

[121] Partnership and Cooperation Agreement between the European Communities and their Member States, and Ukraine, http://trade.ec.europa.eu/doclib/docs/2003/october/tradoc_111612.pdf

[122] EU/Ukraine European Neighbourhood Action Plan, DG External Relations, http://ec.europa.eu/world/enp/pdf/action_plans/ukraine_enp_ap_final_en.pdf

[123] ARJ21 Wing Problems Drive Program Delay, Aviation Week 15 November 2010

[124] COMAC = Commercial Aircraft Corporation of China Ltd

[125] COMAC Begins Building C919 Structure, Aviation Week 8 September 2009

An example of the presence of foreign companies in China is given in Table 5-2 below, which describes the activities of Airbus in the country, including the first Airbus final assembly line outside of Europe (based in Tianjin).

Table 5-2: Airbus Manufacturing Activity & Trade Partnerships in China

Facility/Activity	Partnership
Airbus Beijing Training Centre (1998)	China Aviation Supplies Import & Export Corporation
Airbus A320 final assembly line Tianjin (Sep 2008)	Tianjin Free Trade Zone (TJFTZ) & China Aviation Industry Corporation (AVIC)
Tianjin Logistics Centre (2010)	TJFTZ
Airbus (Beijing) Engineering Centre (A350 XWB design & development)	AVIC I & II
A320 rear passenger door & nose section parts	Chengdu Aircraft Corporation
A320 emergency exit doors, fixed leading edges, wing interspar ribs, cargo doors & skin plates	Shenyang Aircraft Corporation
A 320/330/340 electronic bay doors, A320 fixed wing trailing edges, A330/340 brake blades & medium air ducts	Xi'an Aircraft Company
Titanium forging for engine wing mounts	Hong Yuan Aviation Forging & Casting
Aircraft maintenance jigs and tools	Guizhou Aviation Industrial Group
Airbus Beijing Customer Support Centre	Employs 270+ Chinese nationals

Source: Airbus

China's transition to a competitive producer of commercial jet aircraft and engines will be aided by its large and growing domestic aviation market, providing a ready market for new indigenous aircraft. China has the world's fastest growing domestic aviation industry, with air traffic forecast to increase at a rate of 7.6% per annum over the next twenty years[126]. Boeing and Airbus have identified China as the single most important market for sales over the next 20 years, and both companies are working hard to win orders from Chinese airlines. Traditionally, the Chinese government (through the China Aviation Supplies Corporation) directs the purchase and distribution of imported aircraft among the various Chinese airlines. This practice has started to change as the airlines become more independent; however the Chinese government could mandate that Chinese airlines purchase the ARJ-21 and the C919.

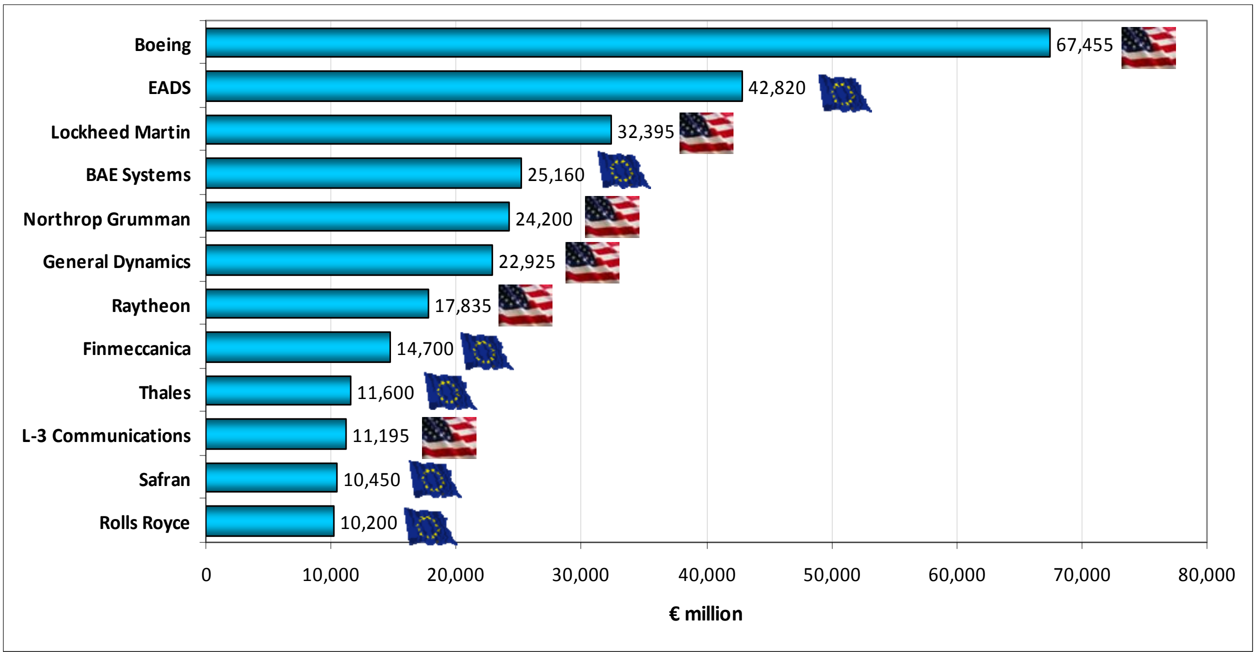
Future European export prospects may be reduced if Chinese companies are able to satisfy growing demand with indigenously produced aircraft and other equipment. European companies also may face new competition outside of China as Chinese manufacturers seek to expand their share of the global aircraft market.

5.2.3 Aerospace Companies

Europe is well placed in the global context against the 2009 ranking of the world's top aerospace companies. With the global aerospace industry concentrated in the U.S. and Europe, it is unsurprising that the top twelve companies originate from these regions. Half of these companies are based in Europe and together they account for 40% of the total collective turnover (Figure 5.15). EADS and BAE Systems are respectively the second and fourth largest aerospace companies in the world.

[126] Boeing Current Market Outlook 2010-2029

Figure 5.15: Global Aerospace Companies Turnover Ranking 2009



Source: ASD

It is estimated that the largest European companies shown in Table 5-3 below generated over €100 billion in the aerospace and defence sectors in Europe, representing two thirds of the total aerospace turnover in 2009[127].

Table 5-3: Major European Aerospace Companies Ranking 2009

Company	Turnover (€m)	Country	Company	Turnover (€m)	Country
EADS	42,820		Zodiac	2,200	
BAE Systems	25,160		Cobham	2,110	
Finmeccanica	14,700		Rheinmetall	1,900	
Thales	11,600		Avio	1,700	
Safran	10,450		GKN	1,670	
Rolls Royce	10,200		Kongsberg	1,548	
Dassault Aviation	3,420		Babcock	1,500	
MTU Aero Engines	2,600		Qinetiq	1,300	
DCNS	2,400		Meggit	1,290	
Saab	2,315		Krauss-Maffei Wegmann	1,230	

Source: ASD

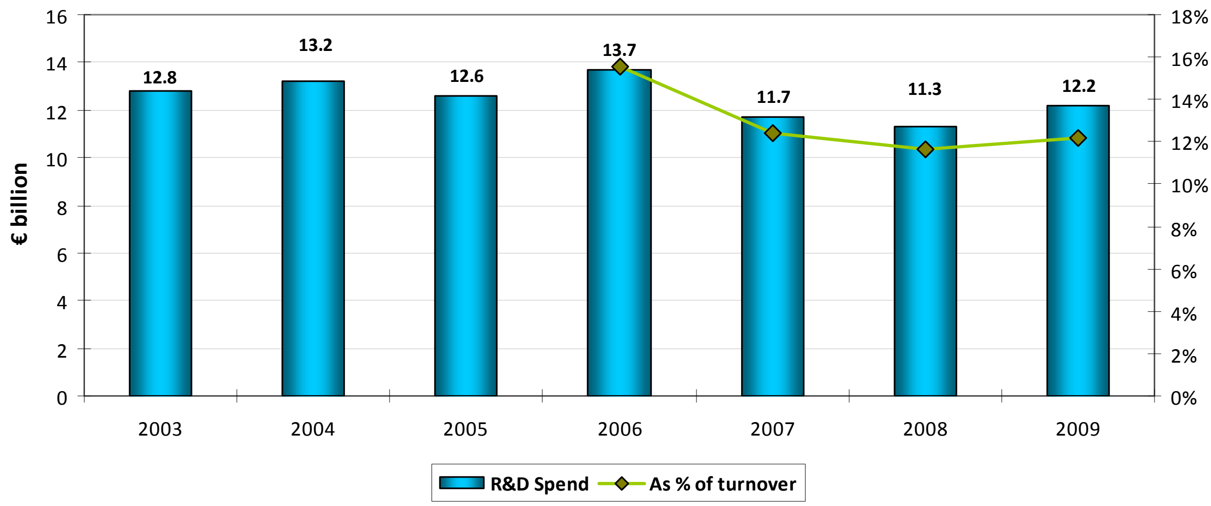
[127] ASD 2009

5.2.4 Research & Development

The European aeronautics industry contributes a large share of its activity to research and development. It is well above the objectives set in the Lisbon agenda, which set a target of 3% of GDP[128] to be dedicated to R&D, of which two thirds comes from private investment.

In 2009 R&D expenditure in the European aeronautics sector totalled €12.2 billion, which accounted for 12.1% of total turnover. The value of R&D spending has remained relatively flat over time, as has its proportion of total turnover (Figure 5.16 below). 79% of R&D funding comes from private industry for civil aeronautics, whereas for military aeronautics 60% is funded by public expenditure.

Figure 5.16: European Aeronautical R&D Expenditure 2003-2009

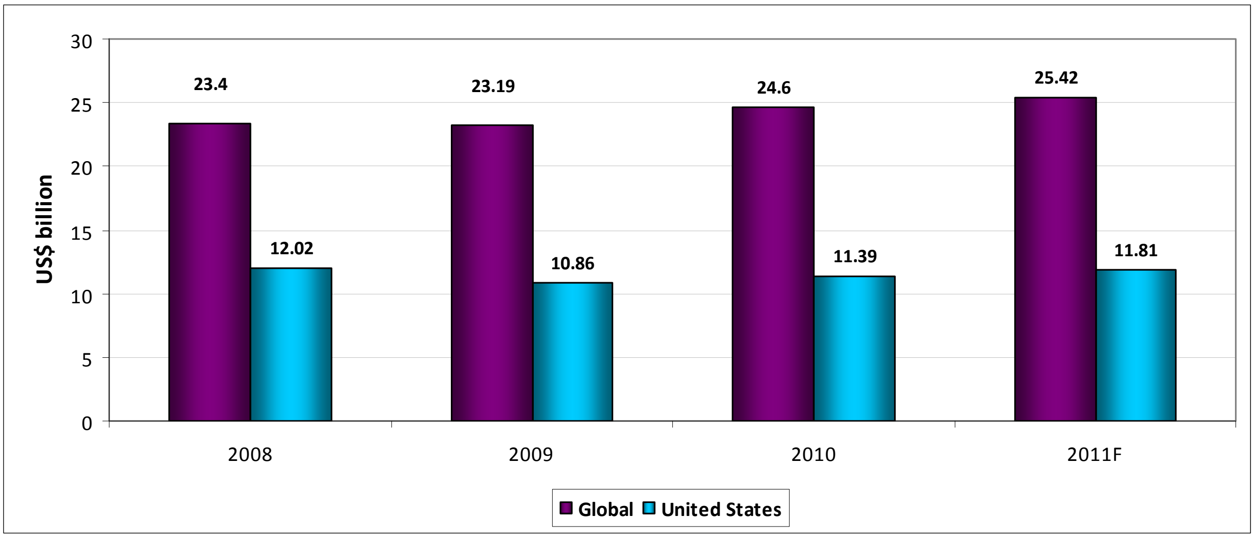


Source: ASD

Through the formation of the Advisory Council for Aeronautics Research in Europe (ACARE), the EU has set a clear agenda on the strategic direction of the aerospace industry. It has set the firm goal of becoming the global leader in aeronautics by 2020 and as such research programmes are aimed at enhancing the competitiveness of European industry and innovations in the aviation system (e.g. SESAR, Clean Sky JTI). This goal appears credible given the high level of funding for aeronautics research by government and private industry, plus rapidly growing effectiveness stemming from better coordination and cooperation on the basis of common research objectives.

[128] Science, technology and innovation in Europe, 2010 edition, Eurostat, European Commission

Figure 5.17: Privately Financed Global Aerospace, Defence & Security R&D Spending 2008-2011



Source: Battelle, R&D Magazine

Around 150 new aeronautic research projects have been approved by the European Commission for funding under Framework Programme 6 (FP6) and nearly forty more from the first Call for Proposals in Framework Programme 7[129]. Through FP7 they will account for a total expenditure, by the EC and private industry together, of €2.2 billion including €300 million for SESAR and €800 million for the Clean Sky JTI[130].

The United States is the current global leader in aeronautic activity, both in terms of overall annual sales (USD 112.6 billion in 2010[131]) and privately financed R&D expenditure (USD 11.4 billion). This represents around half of privately financed global spend on R&D annually (see Figure 5.17 above). However, by comparison, the U.S. Government is expected to spend seven times this amount, USD 80 billion, on defence R&D in 2011[132].

Levels of R&D are not necessarily a good indicator of an industry's growth potential or capacity for innovation. There is no linear relationship between R&D spending and commercial success. However, Europe's aerospace sector is an export-orientated, innovative industry that boasts very rapid growth in labour productivity (which has averaged around 2.3% growth per year since 1991). 20% of Europeans employed in the aerospace industry work in R&D. Only in the pharmaceuticals sector (another fast growing, R&D intensive industry) is the proportion higher. On average the relationship between R&D investment and competition is positive, as more competition acts as a driver of innovation in the industry[133].

For the second half of FP7 and for FP8, it is necessary to maintain ambitious European research programmes that benefit its citizens and European competitiveness. This includes large structural projects, such as Clean Sky and SESAR, which can be drivers for general interest policies. These programmes

129 ACARE 2008 Addendum to the Strategic Research Agenda
130 ASD Focus04 – European Aeronautics: Towards New Horizons, 2009
131 AIA total aircraft sales (civil and military) 2010
132 2011 Global R&D Funding Forecast – Industrial R&D: Aerospace, Defense and Security, R&D Magazine 15 December 2010
133 Sectoral Innovation Systems In Europe: The Case Of The Aerospace Sector, Europe Innova, April 2008

must be efficiently implemented, through relevant adaptation of the legislation and of its rules of application, in order for the European Union to fully play its role as policy setter[134].

5.2.5 Labour Availability, Skills & Training

Concerns about skill shortages are widespread in the aerospace industry. European sources indicate that availability of skilled workers and engineers has emerged as an important issue, particularly as the demand for such workers grows with increased European production of civil and military aircraft and requirements for R&D programmes. Experts estimated that Europe's aerospace industry faces a shortage of perhaps 25,000 engineers per year[135]. Demand for highly skilled European aerospace workers is also growing at the lower tiers of the industry. These companies are increasing their technical staff to handle the workload and responsibilities outsourced to them by other firms.

A further concern for the industry is the mobility of the workforce. Cultural, linguistic, and legal differences among EU States present challenges for companies wanting to shift work and employees across borders. Multinational companies such as EADS are keen to establish uniform education and training across Europe. The aim is to provide skilled workers from different countries with comparable qualifications to improve mobility between European sites and to improve international work capability. This increased level of cooperation requires consideration for a trans-border European vocational training system. A strategy for this harmonisation is provided by the European Qualification Framework (EQF), which aims to relate different countries' national qualifications systems to a common European reference framework[136].

To support a better match between the demand and supply (quantity and quality) of labour, to attract workforce and to strengthen the motivation of young (prospective) workers; academics, industries, associations, unions, labour agencies, chambers of commerce, authorities, education and training institutions need to cooperate in a coordinated environment. Existing aerospace clusters are a natural starting point for this cooperation.

With this and other issues in mind regarding globalisation and international competitiveness, the European Aerospace Cluster Partnership (EACP) was founded in 2009 as a pilot project in the frame of the EU project CLUNET[137]. It aims to ensure Europe's leading position in the world aerospace market through a strong network of excellence clusters. It has a focus on enabling European aerospace SMEs[138]. EACP features three working groups; 'Internationalisation', 'Funding' and 'Skills & Innovation'. This last group deals with identifying skill needs, competencies and cooperation in the field of qualifications. New trans-national qualification opportunities for trainees and skilled workers are intended to be implemented amongst its (current) 37 members in 12 European countries as a means for facilitating cooperation efforts.

[134] ASD Focus04 – European Aeronautics: Towards New Horizons, 2009

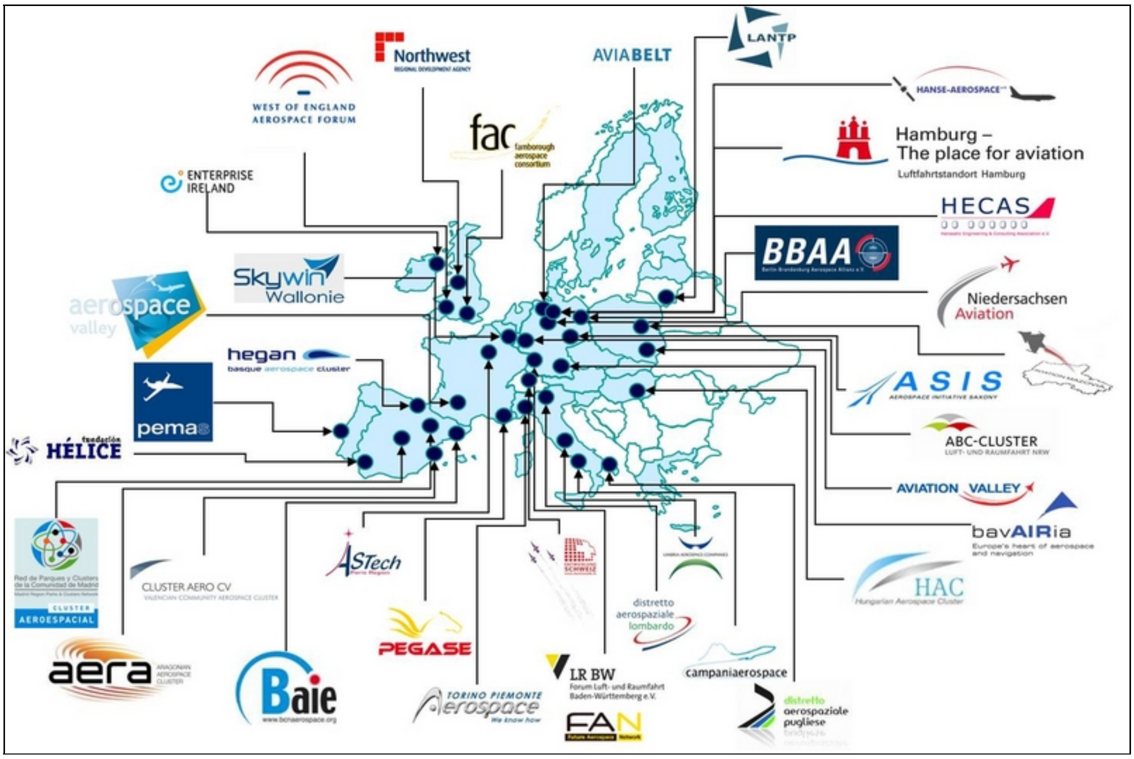
[135] Competitiveness of the EU Aerospace Industry with focus on: Aeronautics Industry, ECORYS, December 2009

[136] The European Qualifications Framework (EQF), European Commission Education & Training Website

[137] PRO INNO Europe® CLUster NETwork, an research initiative of DG Enterprise and Industry, see http://www.proinno-europe.eu/

[138] Small and Medium-Sized Enterprises

Figure 5.18: Current EACP Members



Source: EACP

The involvement of public bodies and research institutes in EACP’s work is important. A broad approach also ties in with EACP's aim to assist members in reaching some of the objectives established by ACARE. As the trend in global outsourcing and risk-sharing partnerships continues to grow, collaboration is becoming common in the aerospace industry. For a number of aerospace projects, companies (especially SMEs) need to build groups of project partners. These partners might not be located in the same aerospace cluster but can be found in other European clusters; and the establishment of these partnerships is facilitated by EACP[139].

5.3 The Global Aircraft Fleet in 2010

The data source used to analyse global aircraft fleets and forward orders is BUCHair's JP Airline Fleets International database, December 2010 update. The data used represents current airline fleet details as of December 2010, with forward orders up to and including those placed in 2010. No account is taken of aircraft orders placed in 2011.

Aircraft types have been assigned a market grouping due to their size. The following table identifies aircraft types by market group, as used in the analysis contained in this section:

[139] EACP: a path to new funding for Europe's small and medium-sized enterprises, Flightglobal 13 July 2010

Table 5-4: Global Aircraft Fleet Classification & Market Grouping

Widebody Jet	Narrowbody Jet	Regional Jet	Turboprop
Airbus A300	Airbus A318	Antonov 148	ATR 42 / 72
Airbus A310	Airbus A319	BAe 146	BAe Jetstream 31/32/41
Airbus A330	Airbus A320	Bombardier CRJ	Beech 99 / 1900 / King Air
Airbus A340	Airbus A321	Dornier 328JET	Bombardier DHC8-2/3/400
Airbus A380	Boeing 707	Embraer 170	De Havilland DHC6/7/8
Boeing 747	Boeing 717	Embraer 175	Dornier 228/328
Boeing 767	Boeing 727	Embraer 190	Fokker F27/F50
Boeing 777	Boeing 737	Embraer 195	Fairchild Merlin/Metro
Boeing 787	Boeing 757	Embraer ERJ-135	Britten Norman Islander
McDonnell-Douglas DC-10	McDonnell-Douglas DC-8	Embraer ERJ-140	Let 410
McDonnell-Douglas MD-10	McDonnell-Douglas DC-9	Embraer ERJ-145	Saab 2000/340
McDonnell-Douglas MD-11	McDonnell-Douglas MD-80	Fokker 100	Antonov AN12/24/26
Ilyushin 86	McDonnell-Douglas MD-90	Fokker F28	Cessna 208
Ilyushin 96	Ilyushin 62	Sukhoi Superjet 100	Piaggio 180
	Tupolev 154	Tupolev 134	Shorts 330/360
		Yakolev 40	Embraer EMB-110/120
		Yakolev 42	Pilatus PC12

Source: JP Fleets

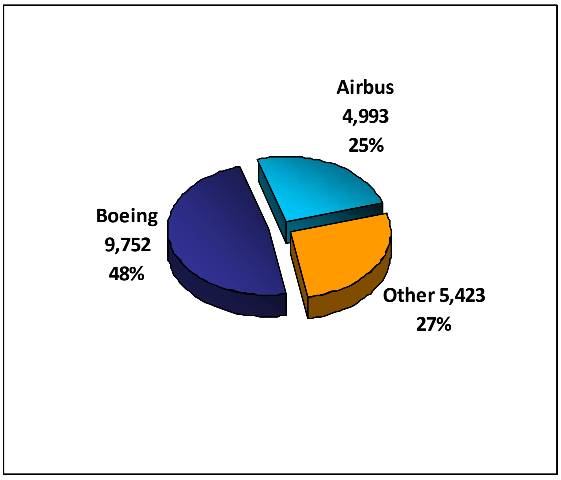
Note: analysis excludes turboprop aircraft

Where analyses by world region are undertaken, aircraft are assigned to the geographically defined region to which its country of registration belongs.

5.3.1 Global Civil Jet Fleet Overview

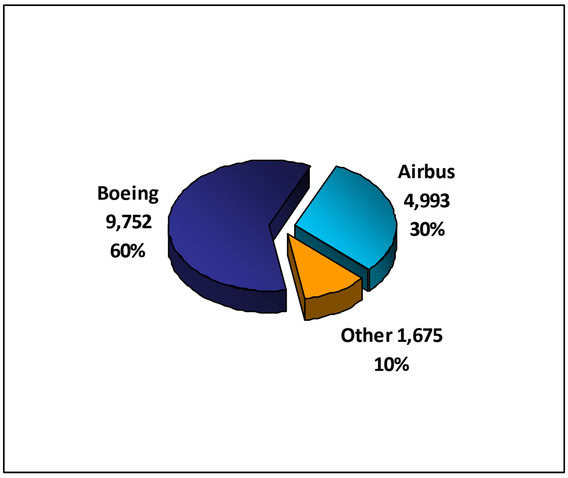
Of the current global jet fleet in service (to the end of 2010), Boeing and Airbus enjoy almost three quarters of the global market share for civil airliner jets (which comprise regional, narrowbody and widebody aircraft, excluding turboprops), with Boeing alone accounting for nearly one half of the total (Figure 5.19).

Figure 5.19: Share of Global Civil Airliner Jet Fleet 2010



Source: JP Fleets (Regional, NB & WB Jets)

Figure 5.20: Share of Global NB & WB Jet Fleet 2010



Source: JP Fleets

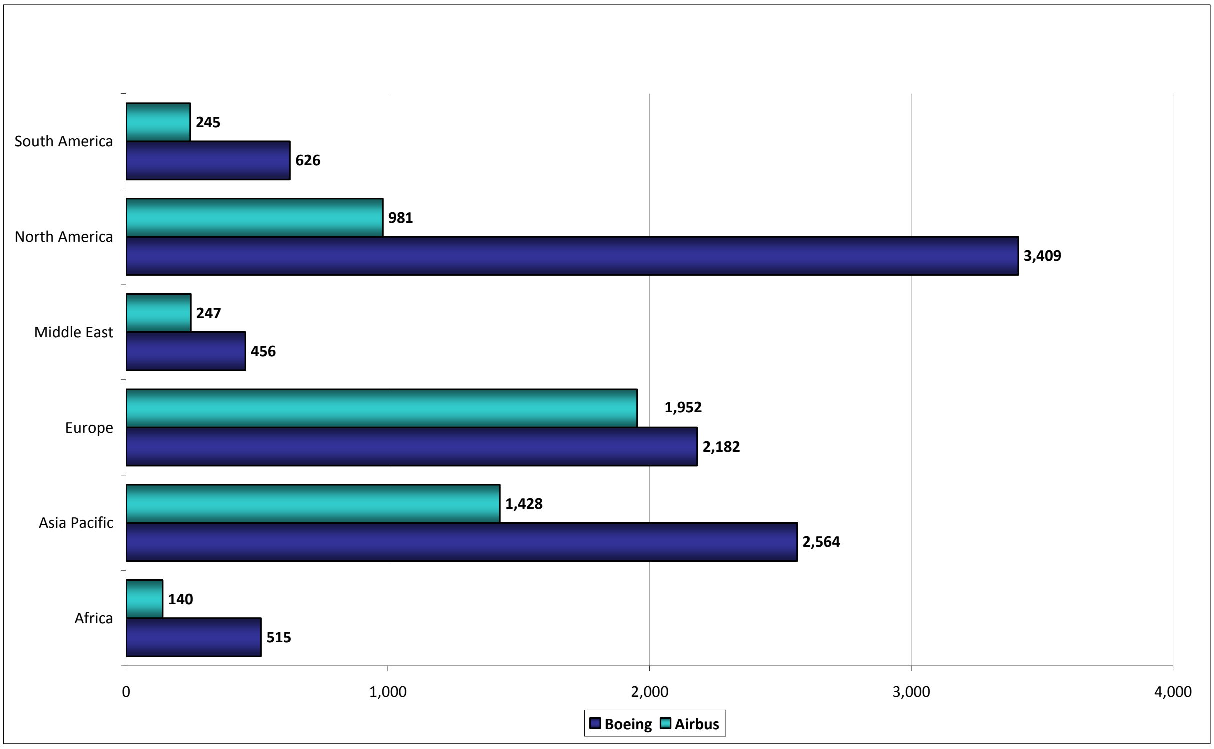
Neither Boeing nor Airbus competes in the regional jet market which makes up a smaller overall share of the civil airliner fleet (just under 20%). Excluding regional jets from this analysis to focus on narrow and widebody aircraft reveals a significant duopoly (Figure 5.20). It should be noted that despite the 60% share enjoyed by Boeing, the manufacturer has been producing aircraft for much longer than Airbus. By the late 1960s three U.S. manufacturers (Boeing, North American and Lockheed[140]) commanded 90% of the global market in large commercial aircraft. Airbus by comparison commenced production of its first aircraft type (the A300B) in the early 1970s followed by the A310 in 1979. It wasn't until the mid-1980s that Airbus began to produce the now ubiquitous A320 family which is currently the most common type in use in Europe (see Figure 5.25 later in this section). For the first time in 2003 Airbus attained 53% of all orders for aircraft over 100 seats and overtook Boeing in aircraft deliveries[141].

In 2010 Airbus delivered 496 aircraft (+1.4% versus 2009), also booking 574 aircraft orders (+112% versus 2009), while Boeing delivered 448 aircraft (-4.3% versus 2009) and reported 530 orders (+273% versus 2009) [142].

5.3.1.1 Jet Aircraft Fleets by Region

Figure 5.21 shows a breakdown of the global fleet in a regional context, highlights the major markets for civil airliner jets and indicates the competition between Boeing and Airbus in those regions.

Figure 5.21: Boeing & Airbus Operating Civil Jet Fleet by Region 2010



Source: JP Fleets (Regional, NB & WB Jets)

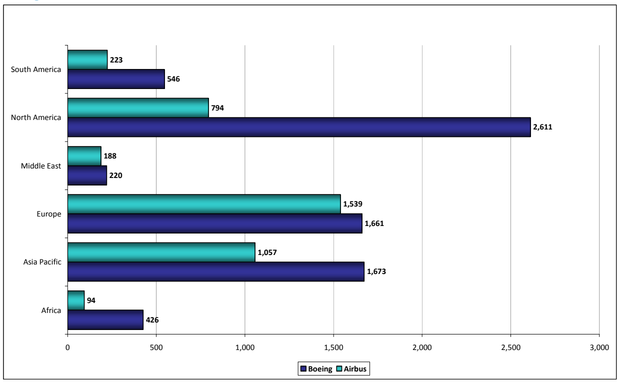
[140] McDonnell Douglas Corporation (MDC) Civil Aviation, GlobalSecurity.org, 13 February 2009
[141] ASD Focus04 – European Aeronautics: Towards New Horizons, 2009
[142] ENAC Air Transport Data Trends Bulletin 04/2011 edition

As might be expected, Boeing's stronghold is its home market of North America while Airbus enjoys its greatest share with the European region. Boeing also maintains a strong presence in Asia Pacific, which is primarily due to the air transport market density in the world's third largest economy, Japan.

Airbus' next largest market is also Asia Pacific. Airbus has a firm physical presence in the region with its first final assembly production line outside of Europe established in Tianjin, China (see 5.2.2). Japanese aerospace companies and suppliers participate heavily in the manufacture of several Boeing aircraft types while at least 20 Japanese companies are suppliers to the A380 programme. Despite the bankruptcy of Japan Airlines (JAL), Boeing has not received any cancellations of the approximately 70 Boeings JAL has on order. JAL, which filed for bankruptcy protection last month as part of state-led restructuring, plans to retire all of its 37 Boeing 747-400 and all 16 McDonnell Douglas MD-90 aircraft and buy smaller aircraft to take their place[143].

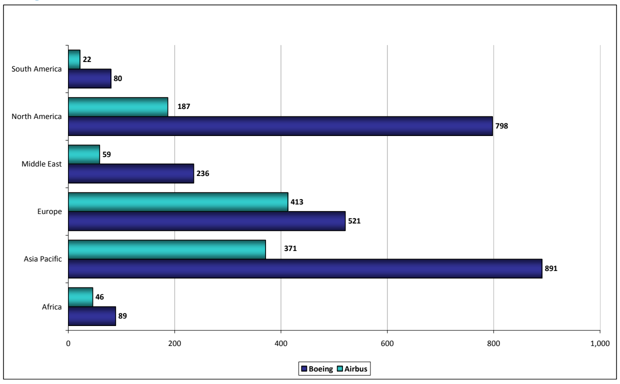
Figure 5.22 and Figure 5.23 consider the regional situation when the global fleet is separated into narrow and widebody aircraft types. The three regions with the greatest concentrations of narrowbody types are North America, Europe and Asia Pacific; together they account for 84% of the total.

Figure 5.22: Boeing & Airbus Narrowbody Jet Fleet by Region 2010



Source: JP Fleets

Figure 5.23: Boeing & Airbus Widebody Jet Fleet by Region 2010



Source: JP Fleets

Figure 5.24 shows the consolidated Boeing and Airbus aircraft fleets by narrowbody and widebody categorisation, by world region.

Generally speaking, narrowbody types are favoured on short haul routes especially where network carriers are feeding hubs from regional airports; and by low cost carriers (LCCs). Given the expansion of the LCC business model particularly in deregulated and/or liberalised markets, narrowbody aircraft are experiencing a rise in popularity reflected in the demand for orders.

Boeing reports that in Europe, single aisle aircraft will account for 75% of new deliveries through to 2029, making Europe one of the top region markets for single aisle operations[144]. The low cost carrier Ryanair, the biggest LCC in Europe and the sixth largest international carrier in the world (measured by scheduled passengers uplifted), plans to increase its fleet from 256 to 299 B737-800s by early 2013 pending a suitable deal with Boeing. Air China's current fleet is dominated by these types; 200 of its 278-strong

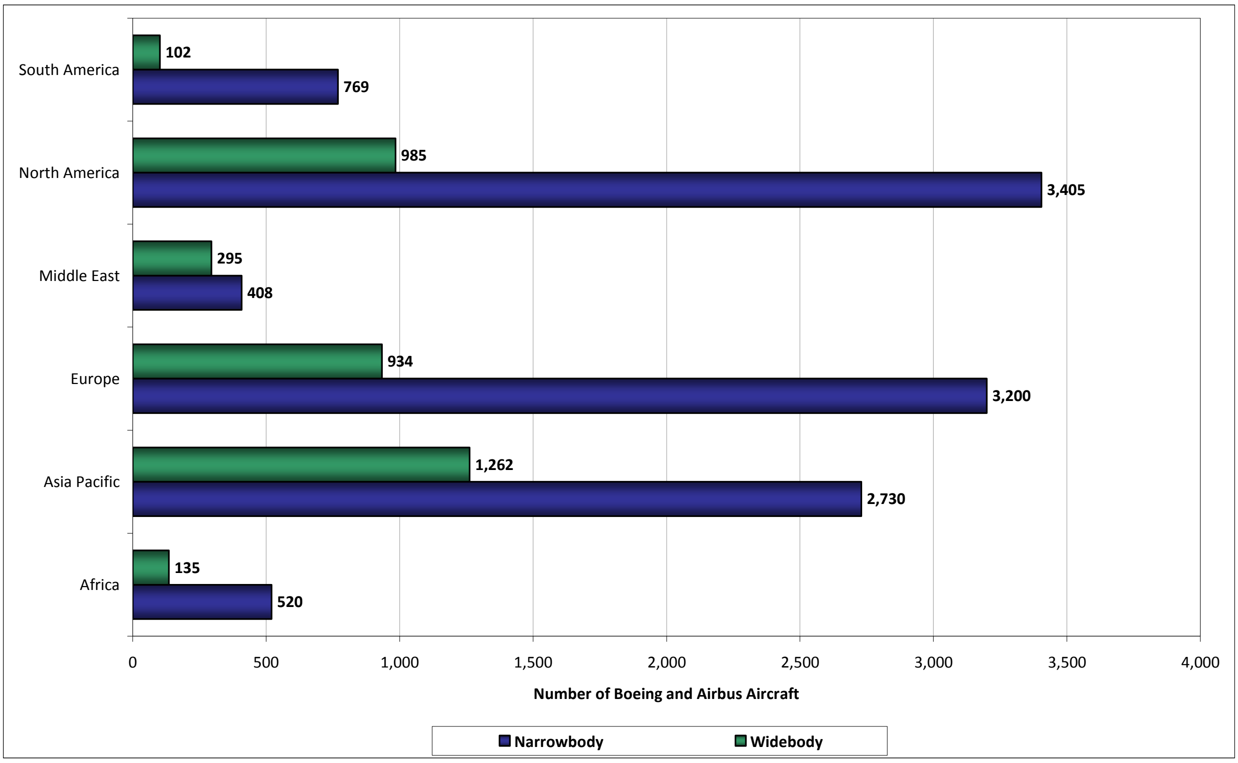
[143] 'Boeing sees aircraft order book shrinking', Reuters, 1 February 2010

[144] Boeing Current Market Outlook 2010-2029

aircraft fleet are narrowbodies (63% Boeing; 37% Airbus), as are 83% of the aircraft it expects to be delivered to the end of 2012[145].

By comparison the greatest concentration of the widebody fleet can be found in Asia Pacific, closely followed by North America and then Europe. Together these regions account for 86% of all widebody types. In the Middle East, long haul carrier Emirates has the largest order book for widebody aircraft in the world and will require more than USD 28 billion in financing through to 2017, nearly twice the amount it raised since 1996[146].

Figure 5.24: Boeing and Airbus aircraft by type, by Region in 2010



Source: JP Fleets

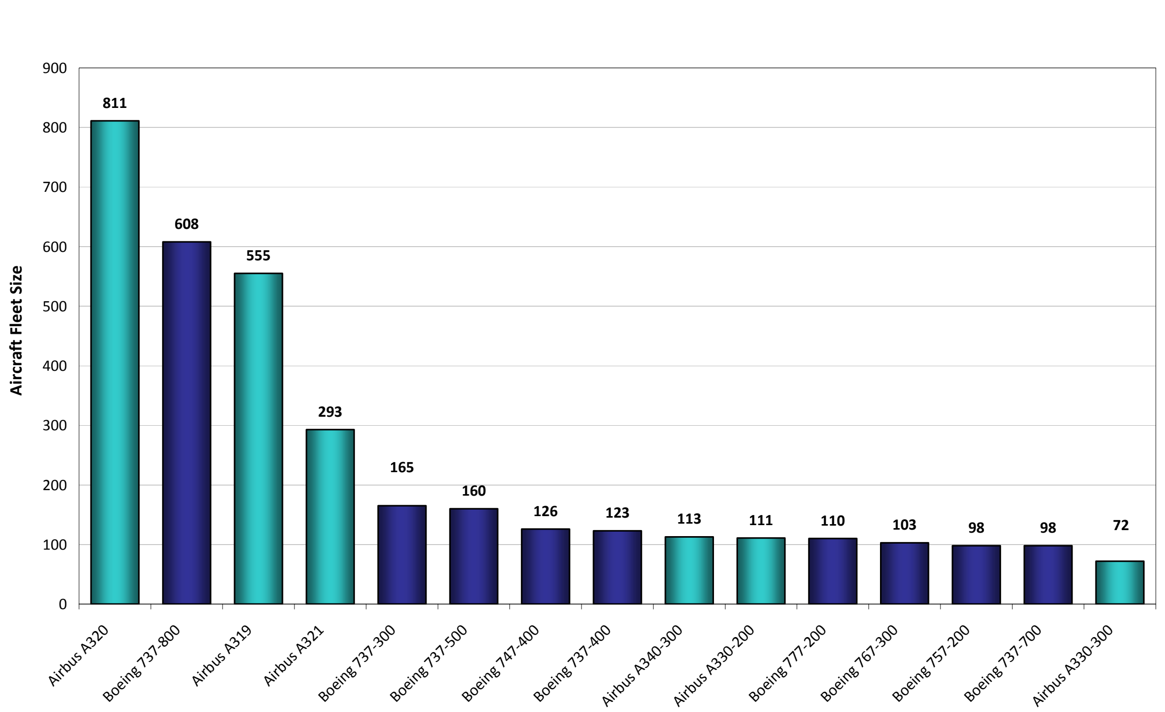
5.3.1.2 The Boeing & Airbus Fleet in Europe

Looking at the composition of the Boeing and Airbus fleets in Europe, Figure 5.25 shows the aircraft type distribution based in the region. Of the top five types produced by the two manufacturers, all are narrowbody types and only three of the top three are widebody. Overall the share between the two rivals is fairly even, with 55% of the fleet in Europe produced by Airbus.

The European Boeing and Airbus fleet is 82% comprised of narrowbodies. Of the top five narrowbody types, Airbus commands 75% of this share. The strong presence of the B737-800 in second position is boosted by the use of this aircraft by Ryanair, as previously discussed.

[145] Centre for Asia Pacific Aviation, January 2011
[146] Centre for Asia Pacific Aviation, January 2011

Figure 5.25: Boeing & Airbus European Operating Fleet by Aircraft Type 2010



Source: JP Fleets

5.3.2 Global Jet Fleet Orders & Deliveries

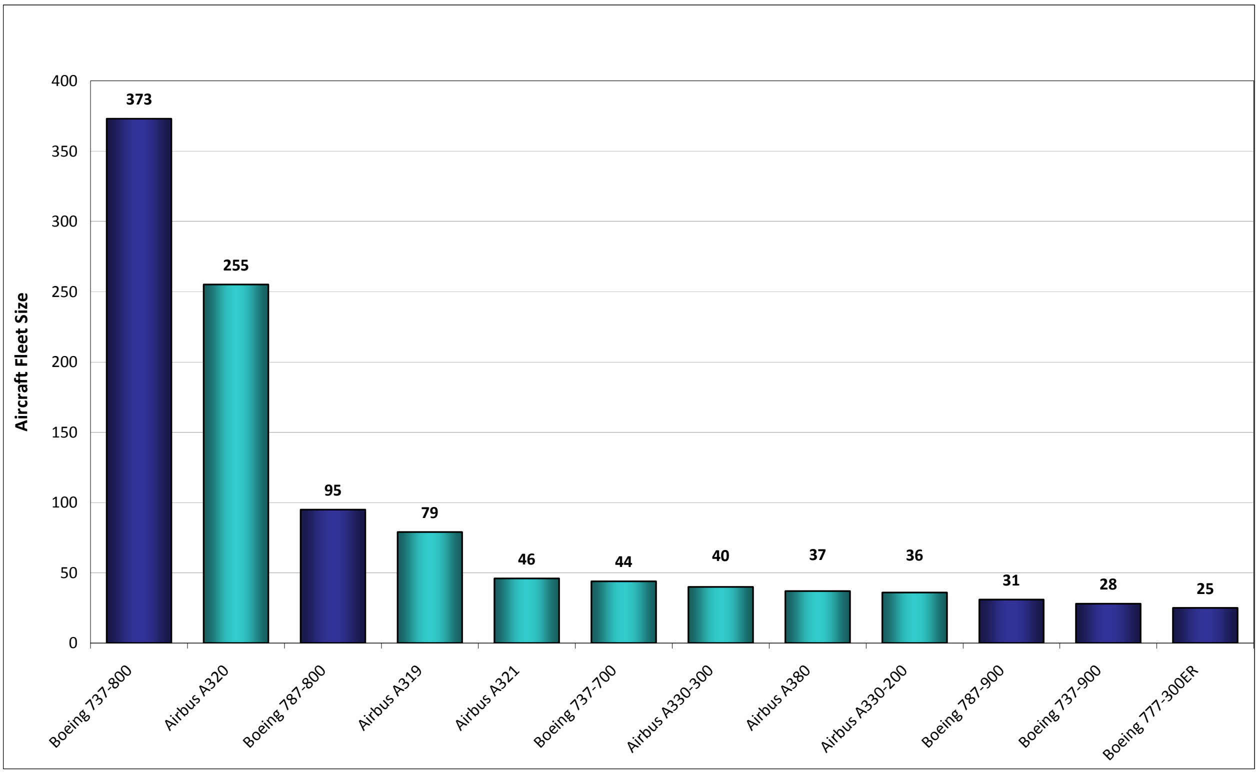
Global civil jet aircraft deliveries will increase in 2011 with more than 1,400 aircraft scheduled for delivery this year, up from 1,213 in 2010. Fleet expansion will be led by Ryanair, Air China and Turkish Airlines, all of which will take delivery of more than 30 aircraft by the end of 2011. Asian carriers will take delivery of the most aircraft of any region (32%, as was the case in 2010), followed closely by Europe (31%). North America has a smaller 11% share of total orders. LCCs and carriers in emerging markets are driving the expansion trend[147].

Figure 5.26 shows the current number of forward orders for Boeing and Airbus aircraft types. The data shown is for all historic aircraft orders to the end of 2010 which have not yet been delivered. The data does not include orders placed in 2011. Of the top five types on order, four are narrowbody types with the Boeing 787 representing the widebody family (which has not yet seen any actual deliveries).

Overall it is Boeing who can expect the greater share of aircraft deliveries, although it is fairly even at 55% of orders. Reflecting the trend for the demand for narrowbody types, these aircraft comprise 75% of orders to the end of 2010, which is consistent with Boeing's prediction that single-aisle aircraft will form the same proportion to the end of its current forecast period of 2029.

[147] Centre for Asia Pacific Aviation, January 2011

Figure 5.26: Top 12 Boeing & Airbus European Forward Orders by Aircraft Type

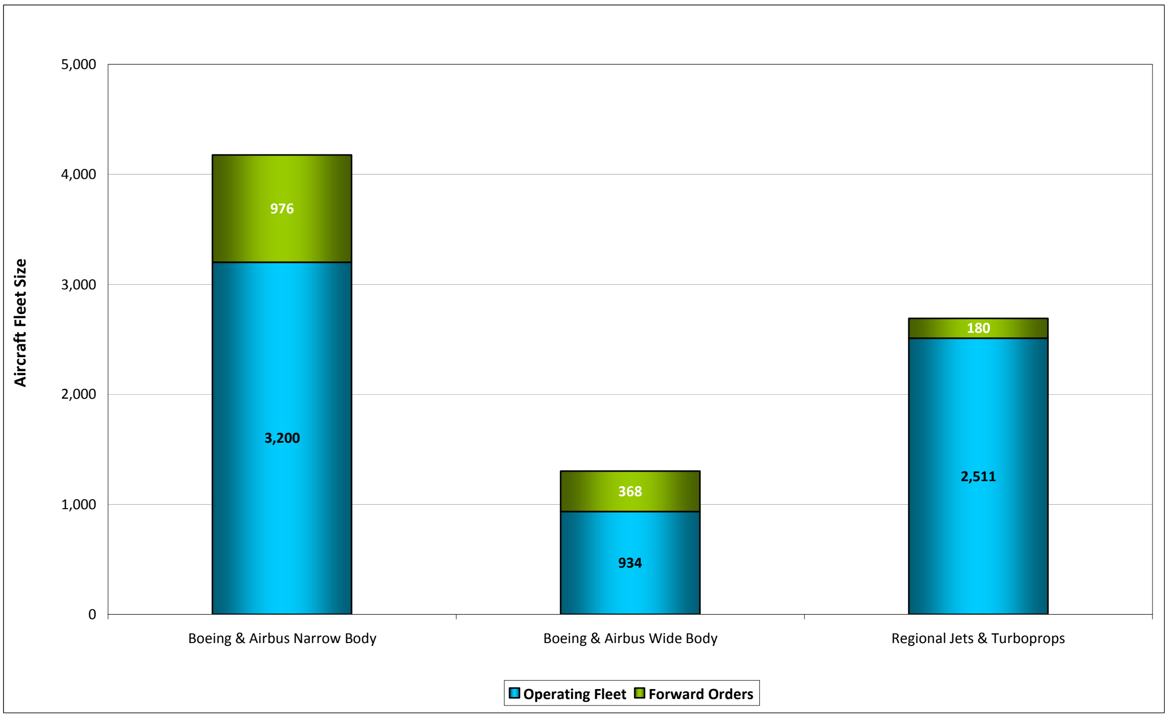


Source: JP Fleets (historic orders placed by end 2010 not yet delivered)

Figure 5.27 below summarises the situation in Europe, combining figures for the current operating fleet and forward orders. The high number of narrowbodies, regional jets and turboprops reflects the geographically compact nature of Europe's aviation network, a short average trip distance compared with other regions (especially Asia Pacific) and the expansion of the LCC model.

Currently widebody aircraft represent only 14% of the total European fleet and despite accounting for almost a quarter of all forward orders; they will not be utilised as much as narrowbody and regional aircraft. Together, including the current fleet and forward orders, these aircraft types will dominate the European fleet mix at 84% of the total.

Figure 5.27: Total European Fleet by Aircraft Category 2010



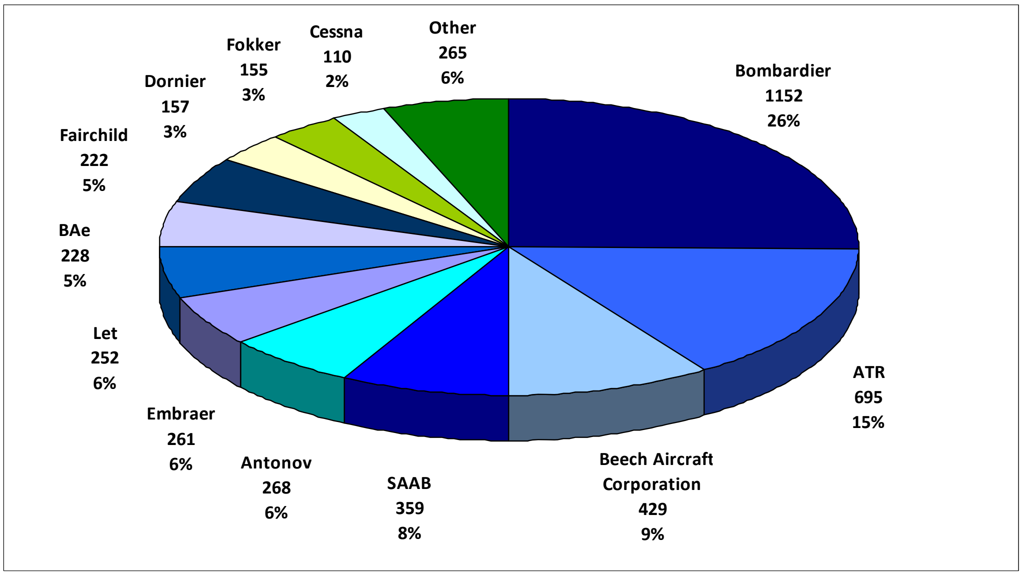
Source: JP Airline Fleets International database

5.3.3 Global Civil Passenger Turboprop Fleet

The civil passenger turboprop aircraft market is smaller than the jet market but still significant. As of 31st December 2010, JP Airline Fleets International database recorded 4,553 civil passenger turboprop aircraft in service at a global level. Aircraft in this market range from an eight-seat Cessna 208 at one end of the scale to a seventy-seat ATR 72 at the other. These aircraft are typically used by small commercial and regional carriers on operations that do not support large passenger demand, and might serve airfields or airstrips that preclude jet operations because of rugged runway condition.

Numerous manufacturers compete in the civil passenger turboprop aircraft market. Figure 5.28 illustrates the market share of the major companies in 2010. The top four – Bombardier, ATR, Beech and Saab – combined command over half of the market.

Figure 5.28: Manufacturers of civil passenger turboprops by market share 2010



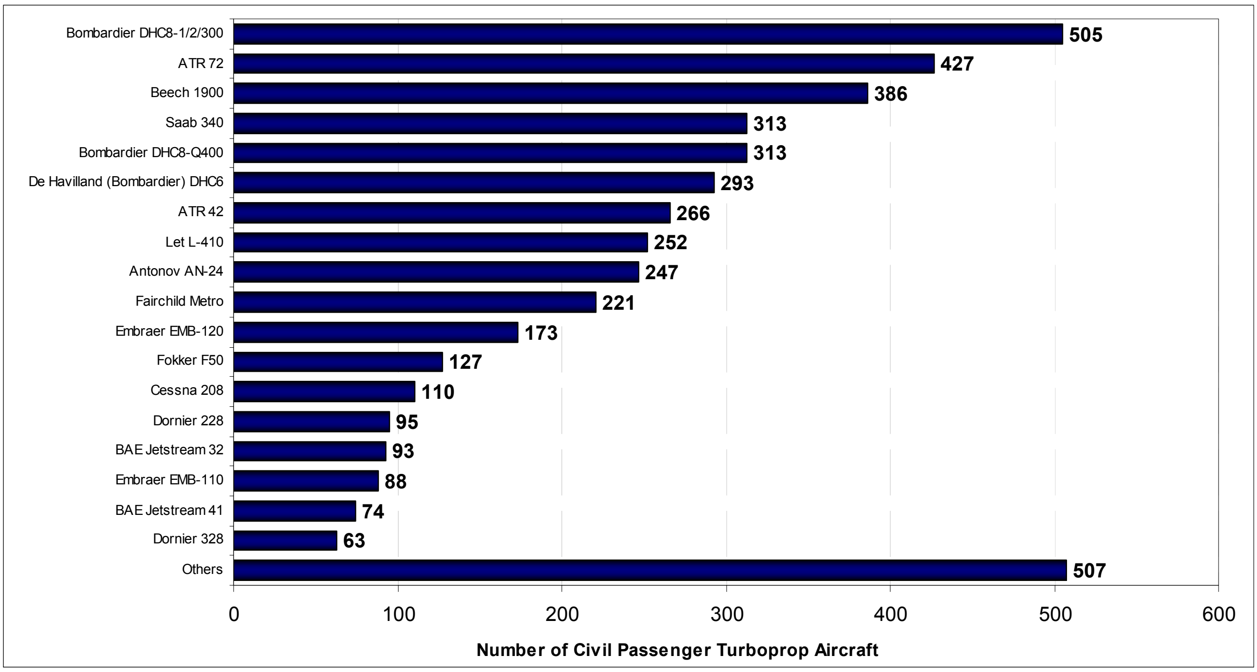
Source: JP Airline Fleets International database

Figure 5.29 shows the most popular civil passenger turboprop aircraft by global fleet size as recorded in 2010.

Bombardier's most successful single turboprop is the 78-seat DHC8-Q400, with the DHC8-100/200/300 family in the 30-50 seat range also in high utilisation across the world. De Havilland Canada (now part of Bombardier) used to produce the 19/20-seat DHC6-300 (Twin Otter), but is now being manufactured by Viking Air. ATR's most popular products are the 48-seat ATR 42 and 70-seat ATR 72. Beech Aircraft Corporation is responsible for the 19-seat Beech 1900 commuter aircraft.

Other civil passenger turboprop aircraft of note are the Czech-built 19-seat Let L-410 and Russian-built 40-seat Antonov AN-24, very popular among Russian and CIS operators. The Saab 340 is a 30-34 seat aircraft that is favoured by regional Western airlines.

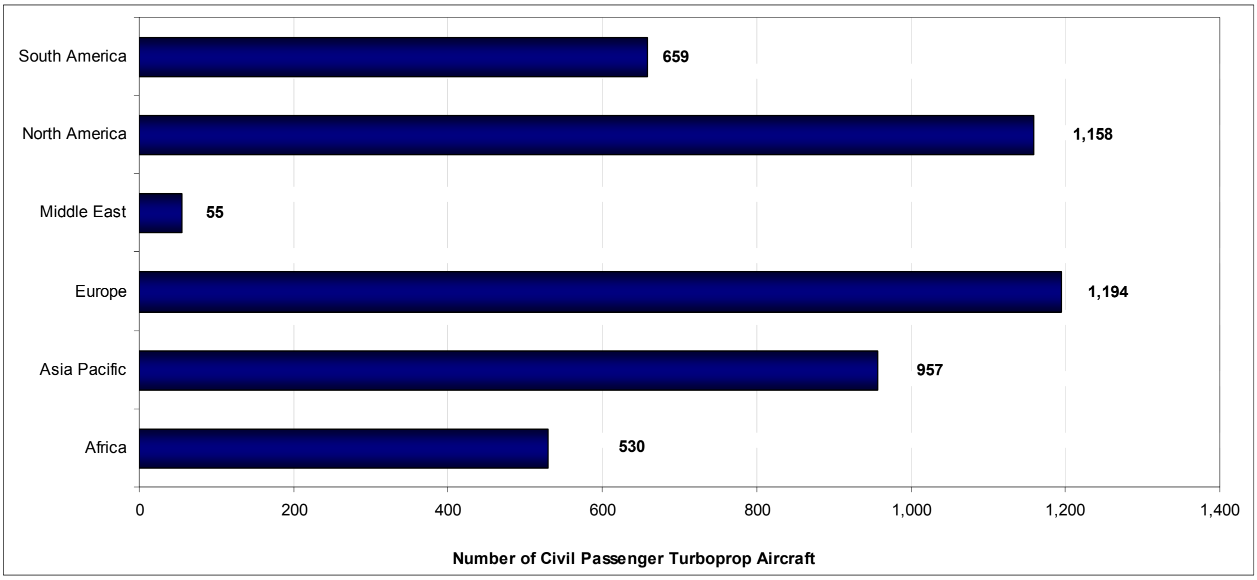
Figure 5.29: Most popular civil passenger turboprop aircraft by global fleet size, in 2010



Source: JP Airline Fleets International database

Examining the global distribution of civil passenger turboprop aircraft in 2010 (Figure 5.30) reveals that airlines in Europe and North America have the highest concentrations of these aircraft, followed by Asia Pacific. This is in part due to the maturity of the air transport markets in these regions and in part a legacy of the ‘hub and spoke’ nature of the European and North American systems, which require smaller aircraft to feed passengers into hub airports from regional areas with lower demand.

Figure 5.30: Global Civil Passenger Turboprop Fleet by Region in 2010

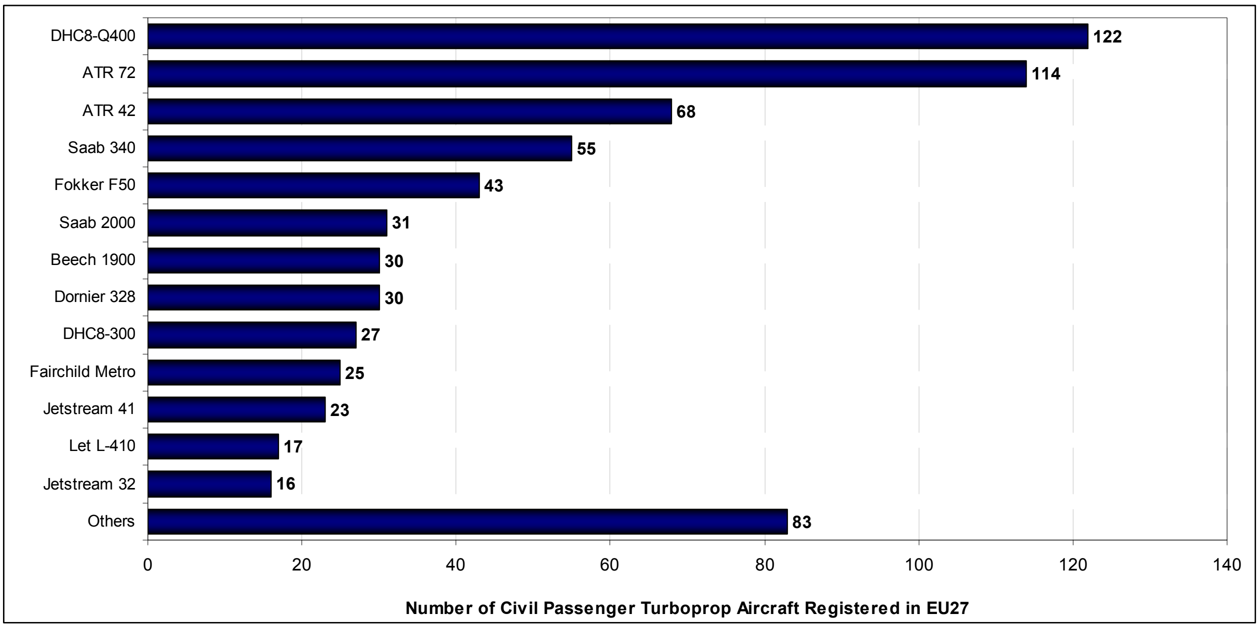


Source: JP Airline Fleets International database

Of the 1,194 civil passenger turboprops identified as being registered to 'European' airlines by BUCHair's JP Airline Fleets International database in 2010, 684 of those were from European Union countries.

Figure 5.31 shows that the larger 70+ seat DHC8-Q400 and ATR 72 are the most popular aircraft types in this category. The smaller 48-seat ATR 42 and 34-seat Saab 340 are also in demand from EU regional and commuter operators.

Figure 5.31: Most popular EU27-registered civil passenger turboprop aircraft in 2010



Source: JP Airline Fleets International database

5.4 Maintenance, Repair & Overhaul (MRO)

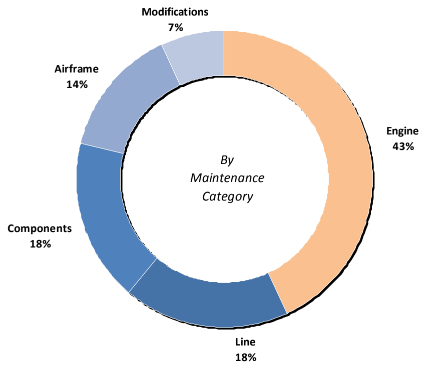
The acronym MRO describes any maintenance or engineering function in the aviation industry, including the airframe, engines, landing gear, auxiliary power units (APUs), avionics, fuel systems, electrical systems, hydraulics and other components of an aircraft. Maintenance can be scheduled in accordance with regulatory requirements and also in response to various defects as they arise.

5.4.1 Global MRO Activity

The global market value of civil aeronautic MRO in 2010 was USD 42.3 billion, down 7.4% from the USD 45.7 billion achieved in 2009. The greatest proportion of MRO activity is due to engine maintenance, at 43%[148].

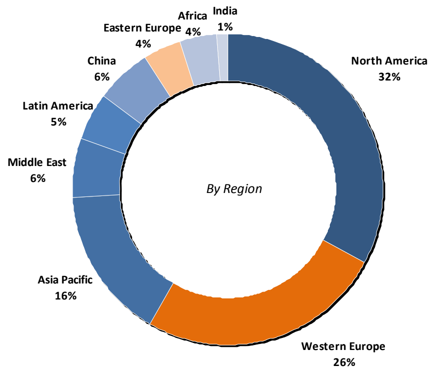
[148] The Global MRO Forecast 2010-2020, TeamSAI, 28 September 2010

Figure 5.32: Global MRO Activity by Category 2010



Source: TeamSAI

Figure 5.33: Global MRO Market Share 2010



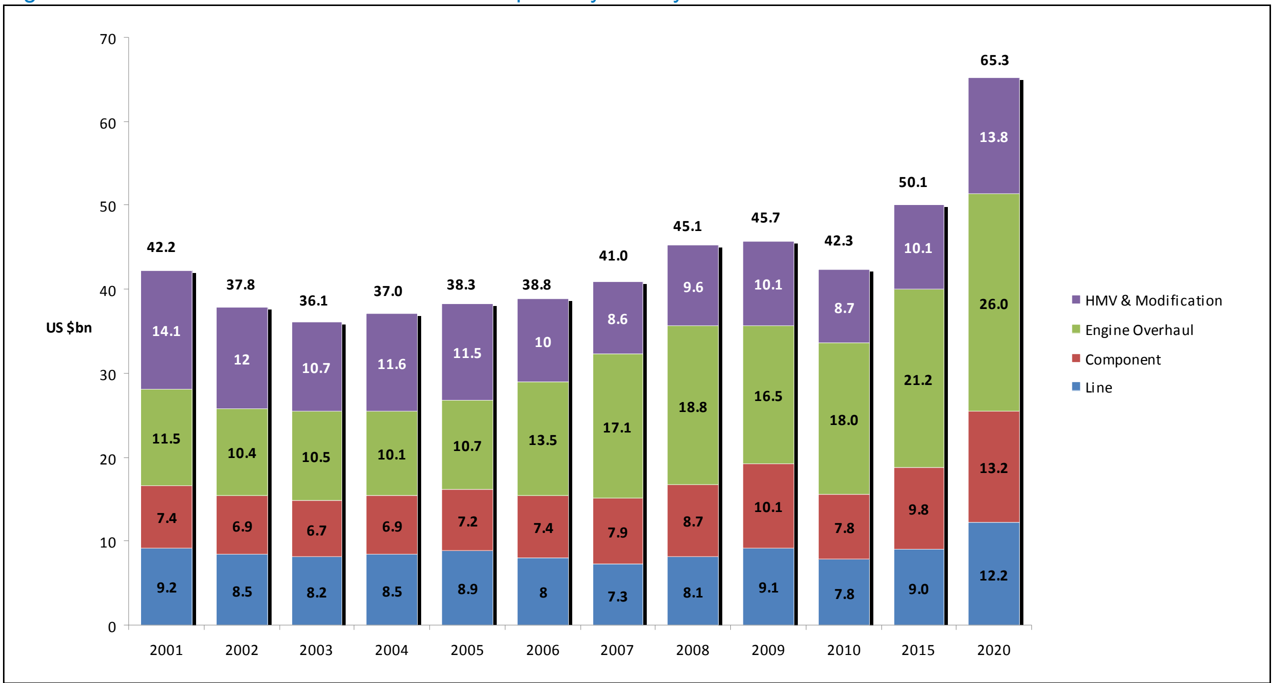
Source: TeamSAI

The regional distribution of MRO activity is comparable to the global air transport market, with a centre of gravity in North America followed by Western Europe and the emerging Asia-Pacific Region.

The underlying trends in the 7.4% reduction in 2010 are important to understand. This reduction is made up of components showing individual trends. Due to capacity reductions by airlines during the economic recession, fleet changes alone drive a 4.2% drop in MRO spend. Aircraft utilisation rates have also dropped in this period while airframe, component and line costs have fallen, driving the market down further by 1.4%. Labour rates have reduced marginally, while engine MRO has increased by 1.6%[149]. Reductions in capacity are most pronounced in North America, Europe and Asia-Pacific (excluding China). In contrast, China and the Middle East are continuing to see robust growth but account for a relatively small share of the global market.

[149] The Global MRO Forecast 2010-2020, TeamSAI, 28 September 2010

Figure 5.34: Historic & Forecast MRO Market Spend by Activity



Source: TeamSAI (HMV = Heavy Maintenance Visit)

While the global aircraft fleet has continued to expand, the growing attractiveness of newer generation aircraft which are less maintenance-intensive (and additionally more fuel efficient) is influencing the global MRO market. As a result, the high activity surrounding older aircraft types has been in decline as retirements have accelerated. The age at which aircraft are retired is also a consideration. Factors such as higher fuel prices, increased aircraft utilisation, and the desire of airlines in developing countries to purchase new aircraft have influenced the MRO trend[150].

At the same time, younger aircraft types have much lower unit costs. Even within the last two years, there has been a substantial shift towards the MRO share associated with newer fleets. As a result, the average MRO cost per aircraft has fallen from USD 2.4 million in 2008 to USD 2.1 million in 2010[151].

However 2010 is expected to be the point at which overall MRO value increases due to fleet size and utilisation increasing to meet demand. Global growth in MRO is expected to average a 4.4% CAGR between 2010 and 2020; growing to USD 65.3 billion (see Figure 5.34).

[150] Rolls Royce Market Outlook 2009

[151] The Global MRO Forecast 2010-2020, TeamSAI, 28 September 2010

Table 5-5: Current & Forecast MRO Market Share by Region

	Americas	Europe West | East	Asia	Middle East	Africa
Market (USD billion) (2010)	15.8	12.9 11.0 | 1.9	9.7	2.4	1.5
Market Share (2010)	37%	30% 26% | 4%	23%	6%	4%
CAGR (2010-2020)	2.4%	4.7% 3.6% | 9.8%	6.8%	5.3%	3.5%
Market Share (2020)	31%	31% 24% | 7%	29%	6%	3%

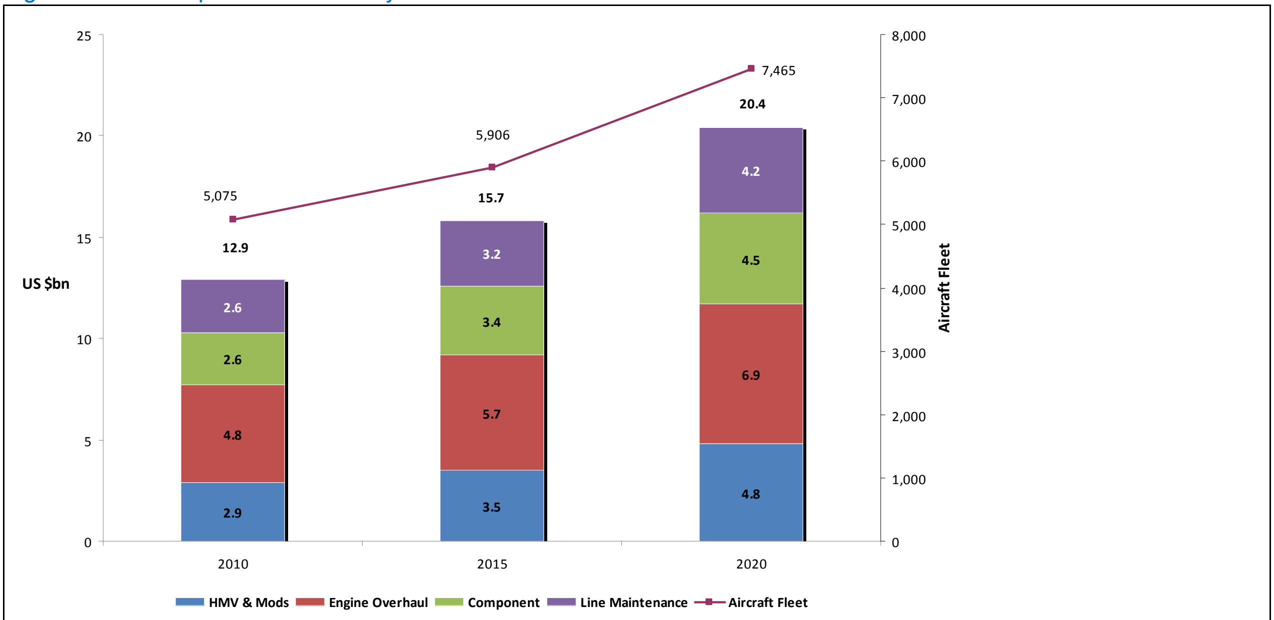
Source: TeamSAI (Americas = North America, Latin America & the Caribbean. Asia = Asia Pacific, China & India)

Eastern Europe is expected to recover more quickly than the rest of the world, while Western Europe leads the slower growth regions in mature markets. India, China and the Middle East will be the fastest growing markets over the next decade. By 2020 the Asia-Pacific, Chinese and Indian MRO markets will collectively represent around 30% of total global MRO activity, i.e. a comparative market by size to those of North America and Europe[152].

5.4.2 MRO Activity in Europe

The market value of MRO in Europe in 2010 was USD 12.9 billion. The greatest proportion of activity is also due to engine maintenance, at 37%. Maintenance of narrow-bodied aircraft makes up the largest share of MRO activity across Europe, but when Western Europe is considered alone wide-bodied aircraft have a significantly larger share.

Figure 5.35: European MRO Activity Forecast & Aircraft Fleet 2010-2020



Source: TeamSAI (fleet numbers based on TeamSAI data)

[152] Aerostrategy Air Transport MRO Outlook September 2010

MRO activity will be predominantly driven in Europe by growth and change in the aircraft fleet, which continues to be moderate over the next ten years with a CAGR of 4.1% from 2010 to 2015, rising to 5.2% to 2020 across all fleet classes (Figure 5.35).

During the economic recession airlines have responded by reducing capacity, leading to aircraft either being temporarily parked (inactive) or put into storage. Although the inactive fleet has fallen by 273 in 2010, the stored fleet has grown by 100. This suggests continued aircraft retirements with airline operators unlikely to return some parked aircraft to service. High fuel costs, expected to rise further in 2011[153] coupled with the recession have contributed to higher aircraft retirement rates as airlines hope to gain cost efficiencies with newer aircraft technology (see Section 0).

5.4.3 Key Trends & Issues in MRO

Airline Cost Focus

In the last decade, global airlines have seen only three profitable years (in 2006, 2007 and 2010, see Figure 3.6), resulting in a net cumulative loss over the period of USD 39.5 billion. The financial results of airlines have intensified a cost focus in the industry as profitability drives business behaviour. Revenue-focused innovation and cost improvements are needed throughout the MRO industry to meet future requirements.

In order to create this value in MRO supply, innovation will be imperative in both the supply chain and the preparation for new technologies. The practice of outsourcing will grow and consolidation in the industry will be important for creating value.

Labour Issues

Globally, increased MRO capacity planning will see a growing need for engineers and technicians, particularly in the Middle East. In the short to medium term competition remains high for the experience offered by ex-pat labour, in particular licensed engineers and sheet metal workers. The sourcing of labour has gained significant international focus in the last few years, with one particular MRO supplier reporting 32 different nationalities within their workforce at one location[154].

The use of contract staff is set to increase as the MRO industry recovers from the recent downturn; some major MROs are heavily reliant on contract labour where they have set up new foreign MRO facilities. This is expected to continue for some time until local workers can be trained to the required standard, which typically takes three years. Boeing forecasts the commercial aviation industry will require 596,500 maintenance personnel over the next 20 years – an average of 30,000 per year from 2010 to 2029[155]. The emphasis on re-training and attracting new people into the industry is the key to satisfying demand.

It will be important to ensure that the current international pool of labour has the ability to move quickly in a cross-border scenario. Currently labour and tax regulations for cross-border workers are complex and time-consuming to manage. On average, a cross-border contract worker can be assigned to four different countries in a 12-month period, with a change of employment contract and tax and social security

[153] Outlook Downgraded to $8.6 Billion - High Oil Price Cuts Airline Profits by Almost 50%, IATA 2 March 2011

[154] MRO Management, Volume 12 Issue 4, December 2010

[155] Boeing Current Market Outlook 2010-2029

regulations for each location. Often immigration restrictions apply, which means the worker is limited by time on the period in which he can remain in a country. Additionally in the UK for example, recent changes in the law mean that there are increased restrictions on employing non-EU personnel.

There are several ongoing programmes in terms of modifications, service bulletins, upgrades and 're-lifeing', principally with Boeing and Airbus, which are increasing the demand for highly skilled personnel. This is not so much a trend but a drive to increase the cost effectiveness and attractiveness of current fleets. In particular, programmes to increase the fuel efficiency of fleets with modifications such as retrofit winglets and sharklets are set to continue[156].

Outsourcing & Globalisation

Perhaps the most important trend in the MRO market is the practice of outsourcing maintenance which reduces overhead costs for the aircraft operator. To reduce costs even further maintenance providers are migrating to areas with lower costs of labour, therefore driving globalisation of the industry.

Outsourcing continues to grow as it offers a total cost advantage, it offers more flexibility to operators and gives independent MROs the opportunity to form credible networks – plus they have the ability to offer more value. It affords larger players in the industry key advantages; for example Lufthansa Technik and ST Aerospace have been very aggressive leaders driving globalisation. Additional future regulation may temper this trend to a certain degree, but large companies will adapt.

An aircraft operator essentially has four choices when it comes to maintenance. The first choice is simply to undertake MRO itself (in-house), provided it has the resources available. The remaining choices all involve outsourcing – it can be done by another aircraft operator (usually an airline) who already possesses the resource and capability (airline third party); an MRO provider who only provides maintenance services, i.e. not an aircraft operator (independent); or the original equipment manufacturer (OEM) who usually provides MRO services within an after sales package or contract.

Levels of outsourcing vary by region and maintenance category. From a global perspective outsourcing has tended to remain in the same region from where it originates, but the market is changing as MRO evolves from a regional to a global business. This is particularly true of airframe heavy maintenance.

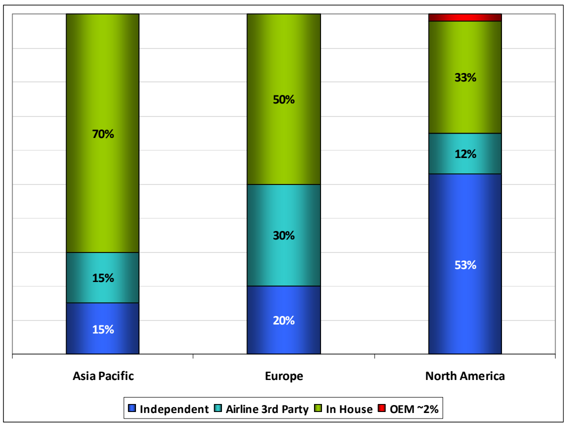
Airframe Heavy Maintenance

Large MRO suppliers are creating economies of scope and leveraging low-cost labour regions. Therefore heavy maintenance and modification work will increasingly migrate to lower labour cost regions with the result that smaller independent MROs are likely to lose market share.

Outsourcing has the effect of expanding the available market for MRO suppliers, which is offsetting the current slow market growth. Latin American and African MROs are expected to capture a growing share of North American and European maintenance demand over the next decade (see Figure 5.36 and Figure 5.37).

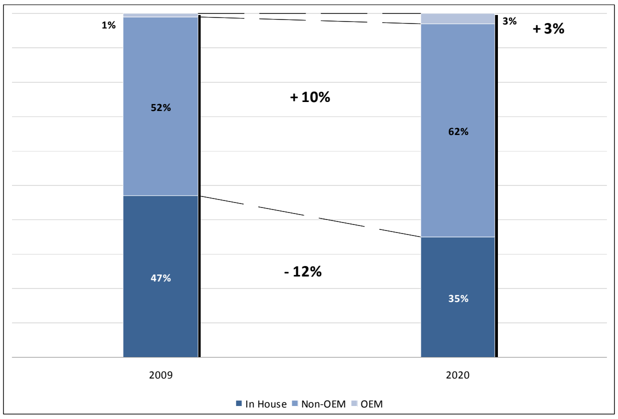
[156] MRO Management, Volume 12 Issue 4, December 2010

Figure 5.36: Airframe Heavy Maintenance Outsourcing Activity 2010



Source: Aerostrategy

Figure 5.37: Expected Evolution of Airframe Heavy Maintenance Market Share by 2020

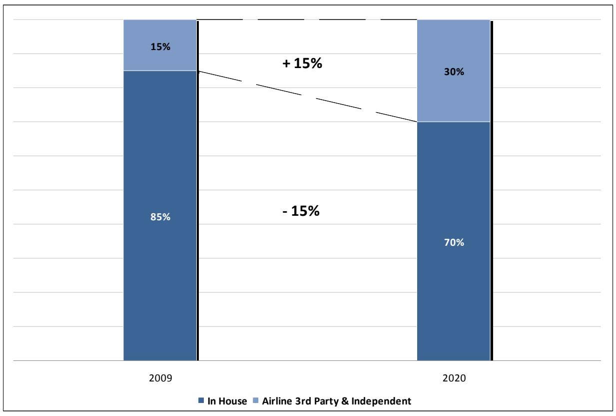


Source: Aerostrategy

Line Maintenance

Most airlines consider line maintenance to be a core activity, although the trend towards outsourcing over the next decade will be driven by the subcontracting of low skill activities. There will be an emergence of several large line maintenance networks as a result.

Figure 5.38: Expected Evolution of Line Maintenance Market Share by 2020



Source: Aerostrategy

Engine Maintenance

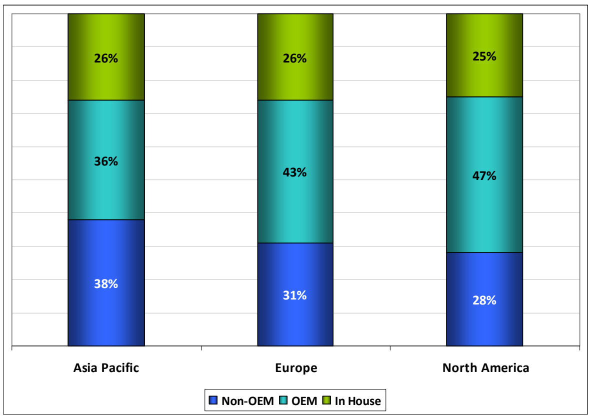
Approximately one quarter of engine overhauls are currently done in house, but engine outsourcing is expected to increase to 2020 with in house activity reducing to 10% by that time[157].

OEMs are attempting to gain firmer control of the engine overhaul market by the adoption of licensed service centres and joint ventures for some engine models, which will restrict the encroachment of parts

[157] Examining MRO And Aftermarket Trends And Forecasting Business Demand, Aerostrategy, January 2011

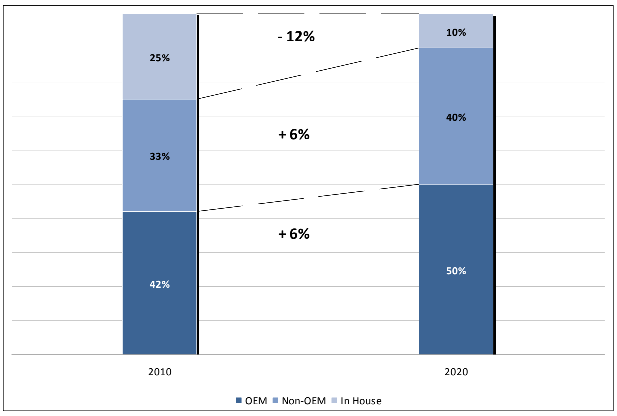
suppliers. It is expected that there will be some vertical integration by airline third party and independent overhaul providers into parts repair, however OEMs will retain the largest share in 2020 and control 50% of the engine overhaul market.

Figure 5.39: Engine Overhaul Outsourcing Activity 2010



Source: Aerostrategy

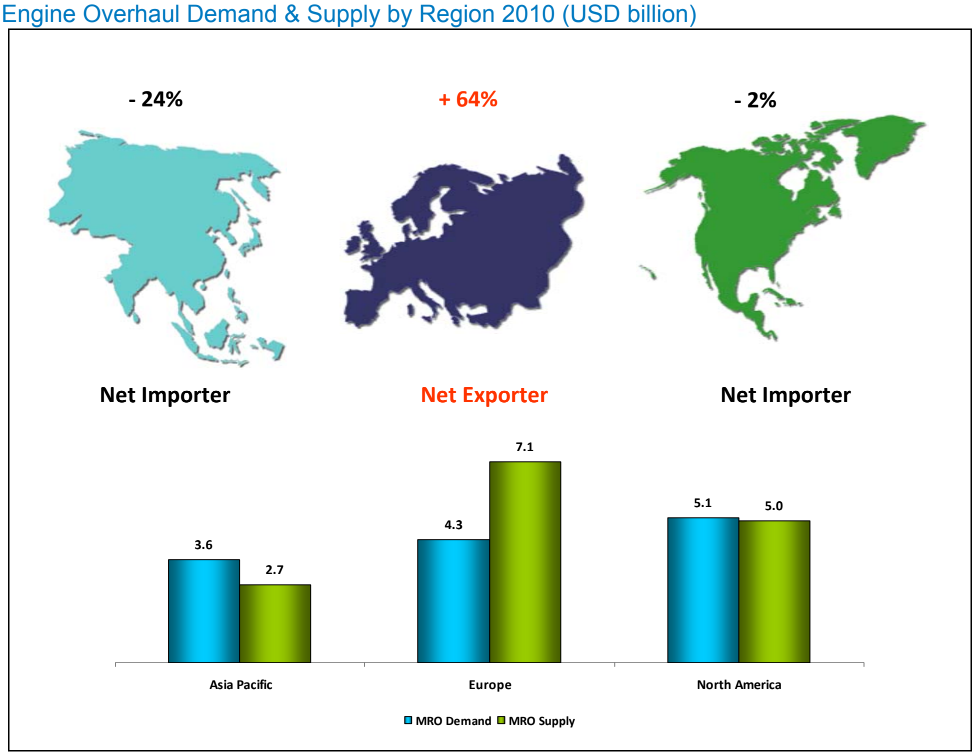
Figure 5.40: Expected Evolution of Engine Overhaul Market Share by 2020



Source: Aerostrategy

Compared to other major air transport regions, Europe is a net exporter of engine MRO services.

Figure 5.41: Engine Overhaul Demand & Supply by Region 2010 (USD billion)



Source: Aerostrategy

OEM After-Sales Trends

Airframe OEM After-Sales

Despite accounting for a very small share of the market which is only forecast to grow by 3% to 2020 (see Figure 5.37), airframe OEMs are beginning to increase their focus on and involvement in the aftermarket.

The Airbus network of Maintenance, Repair and Overhaul centres (branded the Airbus MRO network), which comprises 16 global MRO supply members to date (planned for 20 members in coming years[158]) , offers maintenance services to Airbus customers worldwide for all its aircraft families through extended cooperation with experienced MRO providers. The network started with 10 members in 2005.

The network is designed to provide customers with a worldwide choice of competitive maintenance services from MRO providers with Airbus aircraft experience. Since its launch in March 2005, Airbus and its MRO Network members have established performance benchmarks for maintenance efficiency and customer satisfaction. Through the Network, Airbus also integrates a broad range of tailored maintenance and engineering solutions for customers called 'Flight Hour Services' (FHS). Criteria for membership of the MRO Network have been extended recently, requiring new members to be capable of offering maintenance services for the newest Airbus types including the A380 and later, the A350 XWB.

Airbus wants to ensure there is adequate capacity and capability throughout the world for all Airbus types. The manufacturer has yet to provide network cover for Russia, but covering this region will depend on how many future customers are based there. Africa also has no Airbus MRO Network member yet on the continent, although a number of Airbus A350 XWB operators will be based in North Africa. Similarly, in South America, a MRO service provider still has to be identified for the aircraft.

Boeing is offering what it terms a 'lifecycle solution' for the B787 in the form of a suite of centrally managed services branded GoldCare; intended to simplify airline operations by providing extensive engineering and maintenance packages. It has four core components representing various levels of service and support that airline customers may choose from; the highest level of which is a lifecycle management solution covering base and heavy maintenance in addition to e-monitoring and planning. In April 2010 Boeing announced that TUI Travel had become the launch 787 customer for GoldCare.

Currently the GoldCare MRO suppliers consist of several partners including GE Aviation, Hamilton Sundstrand, Honeywell, Moog, Panasonic and Rockwell Collins. Monarch Aircraft Engineering (in the UK) is the only airframe maintenance partner although Boeing continues to discuss potential partnership deals with several other MRO providers. Boeing plans to eventually establish a global network of MRO partners, which will give its GoldCare customers the flexibility of having its 787s maintained in several different locations[159].

Although GoldCare was set up for the 787, the company is now looking at expanding it to include the 737NG, 777, 747-400 and 747-8; and is currently in negotiations with four to six airlines. In this way the

[158] Airbus beefs up MRO network, Aviation Maintenance, 21 April 2010
[159] Monarch joins Boeing GoldCare team, Flightglobal 4 May 2010

company is attempting to capture greater market share in airframe maintenance, hoping that airlines will delegate their maintenance to Boeing which can offer economies of scale.

Engine OEM After-Sales

The largest part of revenue and profit margin for the large manufacturers of aircraft engines comes from the sale of spare parts, maintenance and the rent of engines; and therefore the after-sales market. After-sales services generate two to three times the value of an engine sold to a client during its lifetime. The activities of engine manufacturers are strongly linked to the activities of airlines, in particular since the appearance of maintenance contracts based on flight hours instead of maintenance hours[160]. The British aerospace engine manufacturer Rolls Royce is a pioneer with this model.

As recently as the late 1980s, a substantial amount of support and maintenance for engines was licensed out and the profitability of the aero-engine manufacturers' aftermarket business depended largely on selling spare parts and fatigue repairs[161]. For every engine it sells, Rolls Royce offers long-term service agreements, branded TotalCare, for its airline customers. Currently 70% of the company's airline customer fleet is signed up to TotalCare (up from 48% in 2006) and it is in place on 92%[162] of all Trent engines. The service offering is designed to minimise customer financial risk, improve financial planning, and enhance operational performance and reliability; allowing operators to concentrate on their core business. 51% of Rolls Royce's civil aerospace revenue came from after-sales service arrangements in 2010.

As an indication of the value of such service packages, the company won a long-term servicing deal worth USD 2.2 billion with Middle East carrier Emirates in February 2011. It will see Rolls Royce technicians maintaining Trent engines on 70 A350 XWBs the airline will receive in the next few years. The contract, under the company's TotalCare scheme, follows a USD 1.2 billion deal in November 2010 to service engines on 48 other aircraft with the airline[163].

The company's two main rivals, General Electric and Pratt & Whitney, have both introduced similar packages over recent years[164].

New Technologies

Extended Maintenance Intervals & Reduced Tasks

In every new aircraft type brought to market, the turnaround time on the ground due to maintenance tends to be reduced due to new manufacturing technologies and implementation of new materials.

Airbus has based the A350 XWB maintenance programme mainly on that of the much more recent A380 due to the similarity of the aircraft systems. The programme features a reduced number of inspection requirements achieved by the wide application of newer technology materials, such as carbon fibre

[160] Competitiveness of the EU Aerospace Industry with focus on: Aeronautics Industry, ECORYS, December 2009

[161] Rolls Royce reaps the rewards of client care, Financial Times, 5 June 2008

[162] Rolls Royce Annual Report 2010

[163] Rolls-Royce wins $2.2bn TotalCare deal from Emirates, Rolls Royce press release, 14 February 2011

[164] Rolls Royce reaps the rewards of client care, Financial Times, 5 June 2008

reinforced plastic (CFRP) and titanium. The number of corrosion and fatigue tasks will be reduced by 60%, compared to a fully metallic structure. The requirements for overall aircraft maintenance have also been largely reduced. Compared to the A330, the A350 XWB should achieve a reduction of about 40% of the scheduled maintenance tasks[165].

The A350 XWB will have increased intervals between inspections owing to its improved design based on Airbus' experience with the A380, A340 and A330. The A350 XWB maintenance programme will also be flexible to let airline operators customise their own checks and intervals suited to their own operations.

Environmental Disposal of Aircraft

Disposing of aircraft that have reached the end of their service lives (EOL) will become an important issue in coming years, driven by environmental and sustainability pressures. Legislation increasingly requires recycling as an alternative to landfill for disposing of manufactured goods, including airframes.

The manufacturing trend of next generation aircraft (applicable to some types already in service, e.g. A380) is a transition away from aircraft with metal aerostructures to those which are predominantly reinforced plastic. While this presents opportunities for specialist recycling companies to enter the aviation EOL disposal supply chain, it also poses a challenge as the main type of composite material used in aircraft construction today (carbon fibre/epoxy) is harder to recycle than most metals.

Whilst difficult to recycle, solutions are currently being developed and are showing early indications that a supply chain will bring these recycling techniques to the market. Aircraft manufacturers are likely to outsource EOL disposal responsibilities to these specialist companies with the necessary knowledge and techniques. Recycling this type of material remains a commercially viable option as high-grade carbon is a valuable commodity.

The Boeing 787 is comprised of 80% composite materials by volume and 50% by weight; significantly reducing aircraft weight and therefore fuel costs, with Boeing claiming a 20% reduction in fuel consumption compared with a similarly sized aircraft[166].

The Airbus A350 XWB is similarly composed of 70% of composite materials by volume, 53% by weight[167] and claims a 25% reduction in fuel consumption compared to its current long-range competitor.

[165] MRO Management, Volume 12 Issue 4, December 2010

[166] 787 Dreamliner Program Fact Sheet, Boeing Website (http://www.boeing.com/commercial/787family/programfacts.html)

[167] MRO Management, Volume 12 Issue 2, June 2010, p.32

6. Air Traffic Management

6.1 Introduction

This chapter describes the key events in Air Traffic Management in 2010.

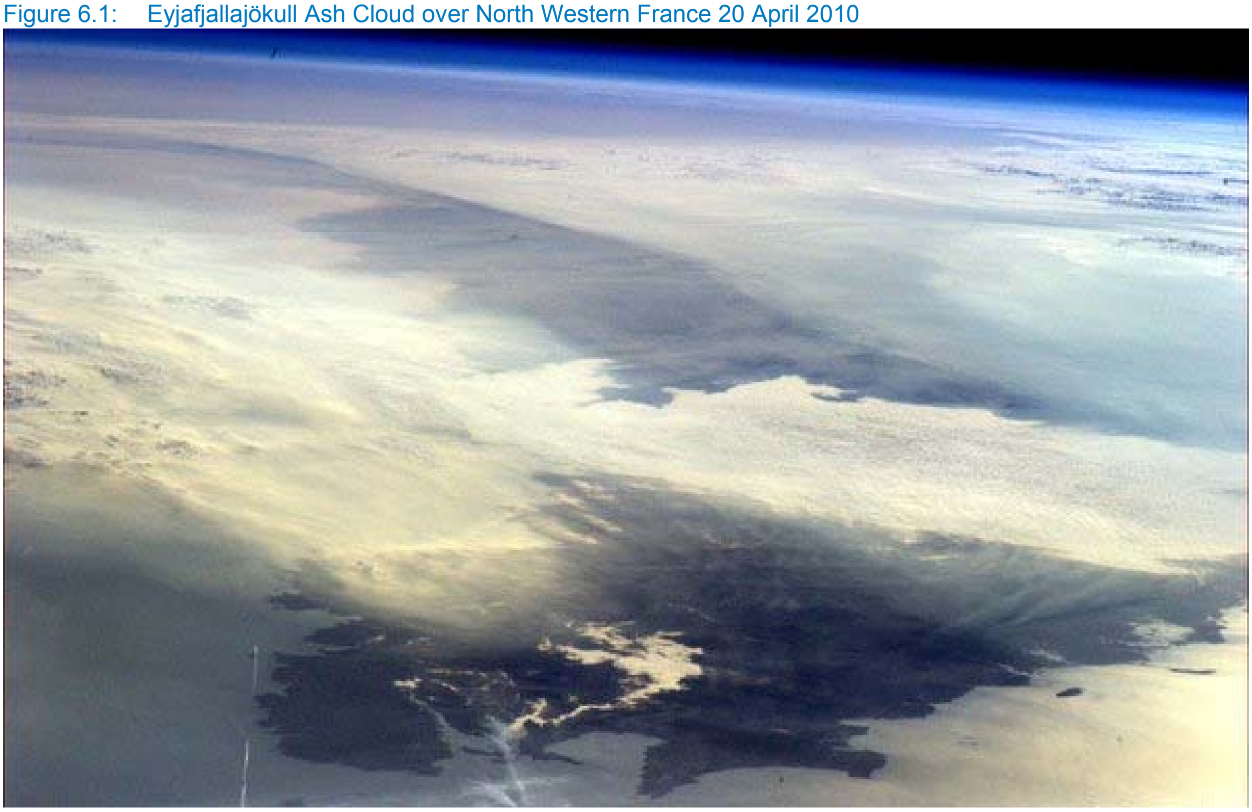
The event in 2010 that had the most significant impact on aviation was the eruption of the Eyjafjallajökull volcano in April. This chapter starts by describing the impacts of that event, concentrating on the air traffic management (ATM) response. It then continues with a discussion on current and predicted future ATM cost effectiveness within Europe and comparisons with the United States, including current developments in the Single European Sky, SESAR and NextGen. The chapter concludes by presenting the 2010 progress in the development and implementation of Functional Airspace Blocks (FABs) within Europe.

6.2 Impacts of the Eyjafjallajökull Volcano

The eruption of the Eyjafjallajökull volcano in Iceland on 14 April 2010 caused widespread and unprecedented airspace closures in Europe over the subsequent eight days, with the disruption of over 100,000 flights and an estimated 10 million passenger journeys.

This volcanic event resulted in an interruption in global air traffic to an extent not seen since 11 September 2001 and the largest breakdown in European civil aviation since World War II.

Figure 6.1: Eyjafjallajökull Ash Cloud over North Western France 20 April 2010



Source: Soichi Noguchi/JAXA/NASA

6.2.1 Impact on Traffic

The main period of the crisis was 15 to 22 April although the effects started earlier and continued later, especially in Scandinavia and Iceland. 104,000 commercial flights were cancelled during the crisis[168]. This represents approximately 50% of expected European traffic over the eight day period. Traffic was impacted on all European international routes (for example across the North Atlantic) as well as within Europe. At its peak on 18 April, 80% of total European traffic was impacted. Further eruptions in May caused another 7,000 flight cancellations. For a period, all civil aircraft were grounded, including piston engine aircraft, across a large swathe of Europe

Traffic levels in every European State were impacted and 27 States saw at least 90% of flights cancelled over one day or more. Three States (in addition to Iceland) saw a 90% reduction in traffic over five consecutive days: Finland, Ireland and the UK.

At the airport level, 30 of the top 40 airports in Europe saw 90% of flights cancelled on at least two days. Paris Charles de Gaulle, Frankfurt Main, London Heathrow, Munich and Schiphol Amsterdam were all significantly affected, with almost complete closure over three or more days. In total, over 300 European airports closed on at least one day.

6.2.2 Financial Impact

IATA estimates[169] that airline direct losses were €1.4 billion while ACI Europe[170] estimated that airports lost around €250 million in revenues. Ground handlers and air navigation service providers are also estimated to have lost around €200 million and €175 million respectively[171], putting the total of these direct losses at around €2 billion.

However, the effects of the crisis extended far beyond the direct impact on the air transport industry. The impact was felt acutely by travellers and destinations, exporters and those reliant on imported inputs; as well as in general production and productivity. In its report for Airbus, Oxford Economics summarised the total impact on global GDP at around $5 billion (€3.7 billion)[172].

6.2.3 The Volcanic Event

The Eyjafjallajökull volcano had been active since 20 March but had only produced lava with little explosive activity. The 14 April event was still relatively minor by volcanic standards, but magma from the volcano pierced a glacier, melting the ice and causing an estimated 230 million cubic metres of ash and gas to be ejected in a plume over 10km (33,000ft) in height[173].

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[168] Ash Cloud of April and May 2010: Impact on Air Traffic, EUROCONTROL STATFOR, Doc 394, June 2010

[169] IATA Press Release, 21 April 2010

[170] The Moodie Report, 21 April 2010

[171] ICAO International Volcanic Ash Task Force (IVATF), IP/17, Montreal 27 to 30 July 2010

[172] The Economic Impacts of Air Travel Restrictions due to Volcanic Ash, Oxford Economics, May 2010

[173] Flying through an Era of Volcanic Ash, Royal Aeronautical Society, February 2011

The eruption generated a high proportion of fine ash which stayed in the atmosphere, rather than settling close to the volcano. The combination of ash and water generated aerosol conditions with particularly high potential for corrosion and subsequent aircraft maintenance issues. The impact of this particular event was exacerbated by unusual weather conditions with prevailing winds pushing the ash cloud in a general south-westerly direction into the North Atlantic air corridors, rather than to the east as usual. Matters were further complicated by a blocking anticyclone which circulated the cloud over Western Europe as far south as the Iberian Peninsula.

6.2.4 Aviation Hazards

Each volcano creates its own specific eruption content. From a geophysical standpoint, it is likely that the hazard threshold would vary according to plume altitude, ash composition and mean particle size. From an aviation standpoint, the duration of exposure to ash by aircraft engines and their thrust settings at the time of the encounter have a direct influence on the hazard threshold.

Several short-term and long-term hazards can be identified and have been historically experienced in relation to ash encounters. The hazards that warrant the most attention are those affecting aircraft engines and aeronautical instrument sensors such as pitot tubes.

Some examples of hazards[174] are:

- Single engine failure with associated slow or no engine restart;
- multiple engine failure with the potential for associated failure of electrical, hydraulic and pneumatic systems;
- pitot-static instrument failure in the short term, as well as contamination of pitot tubes and static ports in the longer term and the impact on the accuracy of air speed indicators;
- abrasion of turbine fan-blades, engine inlet, and compressor blades;
- damage to, and corrosion of, the aircraft exterior; and
- health risks to operating crew and passengers

Following a volcanic eruption the oxidation and hydration of sulphur dioxide can lead to the formation of sulphuric acid droplets. The resulting ash/acid mix is highly corrosive and can cause damage to jet engines and pitting of windscreens and aircraft pressurisation and air conditioning systems. This can present a long term maintenance expense for aircraft operating regularly in airspace contaminated with even relatively low concentrations of such ash/acid.

6.2.5 Previous Aviation Incidents involving Volcanic Ash

Since 1980 more than 100 turbojet aircraft have sustained volcanic ash damage with repair costs in excess of $250 million. Seven of these encounters caused temporary engine failure and three of the aircraft involved temporarily lost all engine power. Whereas most documented engine failure events have occurred in the overhead plume relatively close to the eruption, some engine failures took place in downstream ash clouds as far away as 600 miles from the erupting volcano.

[174] Volcanic Ash Operations, IFALPA Position Paper, ICAO IVATF IP/12, July 2010

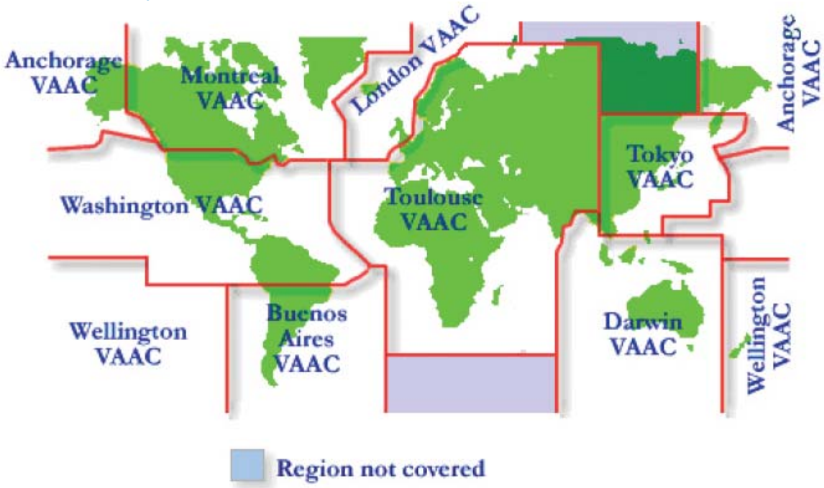
The most significant event occurred in 1982, following the eruption of the Galunggung volcano in Indonesia. Several Boeing 747s encountered ash from this eruption. One aircraft lost thrust from all four engines and descended from 36,000ft to 12,500ft before all four engines were restarted. The aircraft, on a flight from Kuala Lumpur, Malaysia, to Perth, Australia, diverted to Jakarta and landed safely despite major engine damage. The aircraft subsequently had all four engines replaced before returning to service. A few days after the initial encounters, another 747 flew into the ash cloud and suffered significant engine damage. This aircraft also diverted to Jakarta and subsequently performed a successful two-engine landing[175].

6.2.6 The International Airways Volcano Watch & ICAO Provisions

In 1991 ICAO established an international system for volcanic surveillance named the International Airways Volcano Watch (IAVW), responsible for a coordinated monitoring, detection, tracking and alerting service for aviation. The IAVW comprises observations of volcanic ash from selected observatories and other organisations, from satellites and from flight crew reports. Nine selected Volcanic Ash Advisory Centres (VAAC) around the world (Figure 6.2) are responsible for advising Meteorological Watch Offices (MWO) and international aviation via Aeronautical Information Services (AIS) of the location and expected movement of clouds of volcanic ash.

ICAO Doc 9691, Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds explains the current status of aircraft hazard knowledge and the role of the IAVW, VAACs and Air Traffic Services. The guidance compiled in ICAO Doc 9691 contains procedures covering the observation and reporting of volcanic activity, eruptions and ash clouds, the issuance of warnings to aircraft, closure of airspace and flight crew reporting.

Figure 6.2: Volcanic Ash Advisory Centres



Source: Royal Aeronautical Society

Until 2010 global aviation standards and guidelines for volcanic ash particle measurements and acceptable limits for aviation were absent. Given the seriousness of previous incidents, the recommended procedure in the case of volcanic ash contained within Doc 9691 was ‘AVOID AVOID AVOID regardless of ash

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[175] Volcanic Ash Avoidance, Aero Magazine No 9,The Boeing Company, January 2000

concentration'[176]. Critically this guidance had not been updated in the light of the significant experience that U.S. airlines had built up through operating close to volcanic activity in Alaska, Hawaii and the Pacific Northwest. As a result, the Volcanic Ash Contingency Plan EUR Region (EUR Doc 019)[177] and the North Atlantic Volcanic Ash Contingency Plan (contained in NAT Doc 006[178]) that had been developed around 2004 were based on a zero-tolerance principle.

6.2.7 Immediate Response to the Eyjafjallajökull Volcanic Eruption

Advance warning of the eruption based on satellite data came from the London VAAC's volcanic eruption detection system, which uses satellite data to issue automated alerts that an eruption has occurred and a detection tool to monitor the movement of ash clouds.

The ash crisis was unusual because of the need for urgent intervention. The ash cloud was moving in real time and the normal time for consultation was limited. In the congested skies over Europe avoidance options were less practical and the decision was taken initially by the UK and then by other States affected in Europe to halt air traffic services in controlled airspace to commercial traffic entirely.

As the crisis unfolded and on the basis of further information from engine and aircraft manufacturers, a more precise and detailed approach to defining and managing the effects of volcanic ash on aircraft was developed. This consisted of a three-zone[179] area based on VAAC ash predictions:

1. Enhanced Procedure Zones (EPZs) showing the total volume of airspace where volcanic ash may be encountered;
2. Time-Limited Zones (TLZs) where ash concentrations were predicted to exist but allowing a defined period of flight before manufacturer tolerance levels were exceeded; and
3. No Fly Zones (NFZs) where ash concentrations were predicted to exceed the engine manufacturer's tolerance levels.

An example chart is shown in Figure 6.3. The EPZ is depicted in red, the TLZs in Grey and the NFZ in black. The adoption of these procedures, subsequently published in an EASA Safety Information Bulletin (SIB) area[180], rationalised the timing and extent of subsequent airspace closures across Europe based on a clearer understanding of the potential hazard involved.

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[176] Para 3.4.8, ICAO Doc 9691, 2nd Edition, 2007

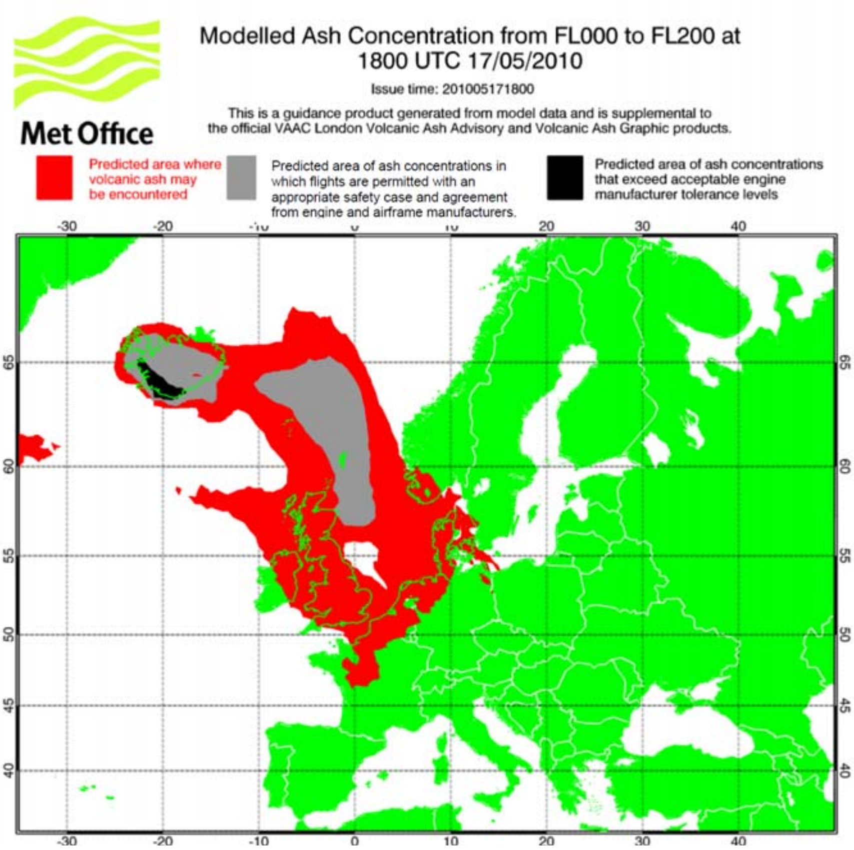
[177] ICAO Volcanic Ash Contingency Plan, EUR Region, 2nd Edition, September 2009

[178] ICAO NAT Doc 006, Air Traffic Management Operational Contingency Plan - North Atlantic Region, Part II

[179] Since then, further developments have allowed for a full alignment with the definitions as contained in the revised ICAO Volcanic Ash contingency Plan (EUR 019), Section 6.2.9

[180] Flight in Airspace with a Low Contamination of Volcanic Ash, EASA Safety Information Bulletin 2010-17R2, 21 May 2010

Figure 6.3: Example Ash Concentration Chart



Source: UK Met Office

6.2.8 Airline Concerns

There was considerable concern expressed by the airlines about the apparent confusion and lack of factual basis for the airspace closure decisions by the authorities in Europe based on limited scientific evidence and justification in their view. A number of high profile trial flights were undertaken by airlines including BA and KLM with no adverse consequences. This resulted in a unified call from the airlines and IATA for a more robust and transparent system to be established for such events. This call was made more critical because of the interpretation of EC Regulation 261/2004 which meant that the liability for passenger compensation and payment for delay and disruption fell to the airlines (Chapter 10). This was the case even though the decision to ground aircraft was outside the control of the airlines. Moreover, it was felt by many airlines that the decision to ground was an over-reaction to the event.

Reference was also made to the considerable experience of the U.S. and other parts of the world where airlines have been used to operating efficiently and safely, with required separation, in areas around active volcanoes including Alaska, Hawaii and Southern Italy (Etna and Stromboli). The reaction to the eruption of the Mount St Helens volcano in 1980 was also cited. Although this eruption caused major disruption to air traffic (including re-routing air services to and from the UK to the West Coast of the USA and Canada), it did not result in the wholesale grounding of aircraft, or the delay and disruption caused by the Eyjafjallajökull volcano.

6.2.9 Main Developments since April 2010

ICAO responded to the events surrounding the Eyjafjallajökull volcanic eruption by forming the International Volcanic Ash Task Force (IVATF)[181] which is a multi-disciplinary global group coordinating all work related to volcanic ash being carried out by ICAO. The IVATF will address issues related to air traffic management, airworthiness, aeronautical meteorology and atmospheric sciences and is tasked to identify work that needs to be undertaken together with plans on how to progress them relying, to the extent possible, on existing bodies. The first meeting of the group was held in July 2010 and a second (and probably final) meeting of the group is planned for summer 2011.

EASA is supporting the IVATF in its activities by defining and standardising airworthiness data required for operational risk assessments.

In December 2010 two new documents were issued. The first is an updated volcanic ash contingency plan for the ICAO Europe and North Atlantic Regions[182]. The second is interim guidance material[183] produced by the IVATF for the management of flight operations with known or forecast volcanic cloud contamination.

At the heart of the new guidance is the recognition that the responsibility for risk assessment and management; and for the safe operation of aircraft, resides with the operator of the aircraft. Regulatory authorities are required to prescribe operational procedures for flight crew to be followed in the case of operation in or near airspace that is contaminated by volcanic ash. Operators are required to assess the risk of operation in volcanic ash and to implement appropriate mitigation measures in accordance with their Safety Management System as approved by the State of the operator/registry as appropriate.

Following the publication of these new ICAO documents, the UK CAA has updated its own guidance[184] in this area. The concepts of EPZ, TLZ and NFZ have been withdrawn and replaced by areas of low, medium and high ash concentration in line with the terminology in the ICAO contingency plan.

The European Commission and EUROCONTROL have created a European Aviation Crisis Co-ordination Cell (EACCC)[185] to coordinate a timely response to any future pan-European crisis severely affecting aviation. A major European and North Atlantic volcanic ash exercise is planned for April 2011[186] to simulate and test the revised procedures that have been developed.

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[181] Composition and Terms of Reference of the IVATF, ICAO, April 2010

[182] ICAO Volcanic Ash Contingency Plan, EUR and NAT Regions, December 2010

[183] Management of Flight Operations with known or forecast Volcanic Cloud Contamination, Draft Version 3.1, Preliminary Issue, ICAO IVATF, 19 December 2010

[184] Guidance regarding Flight Operations in the Vicinity of Volcanic Ash, Version 1, UK CAA, 10 February 2011

[185] European Measures to minimise Disruption caused by Volcanic Ash, IP/10/601,Brussels, 21 May 2010

[186] Volcanic Ash Exercise – EUR/NAT Exercise VOLCEX 11/01, 13 and 14 April 2011, UK CAA Information Notice IN-2011/10, 21 February 2011

6.3 ATM Cost Effectiveness

6.3.1 Definitions

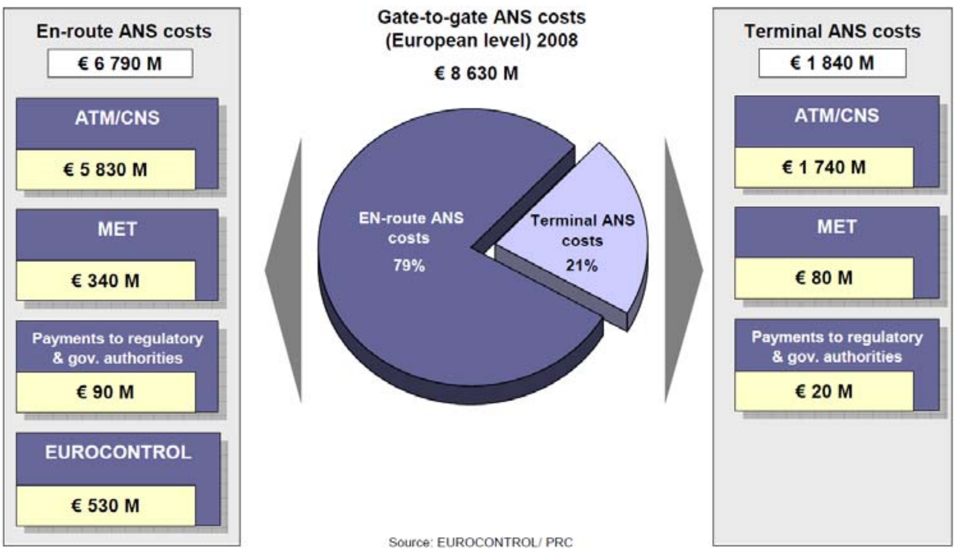
En Route ATM cost effectiveness is measured in costs per km. This is the total of en route Air Navigation Services (ANS) divided by the number of flight kilometres of air traffic control provided. Terminal or Airport ATM cost effectiveness is measured in costs per movement and is determined by dividing total airport ANS costs by the number of airport movements. Gate to Gate ANS costs are the sum of en route and airport ANS costs.

6.3.2 European Level

In Europe, Air Navigation Service Providers (ANSPs) generate revenues through charges for en route ANS levied on airspace users and additional terminal charges for providing air traffic control services at airports.

In 2008, the ratio of en route to terminal charges raised[187] was approximately 4 to 1 (Figure 6.4). The charges are primarily used (88% of revenues raised) to cover ANSP costs in terms of air traffic management (ATM) and communications, navigation and surveillance (CNS), but are also used to pay for Meteorological Services (5%), ATM regulatory work by National Supervisory Authorities (NSAs), other Government bodies in each State (1%) and the costs of the EUROCONTROL Agency (6%).

Figure 6.4: Breakdown of Gate-to-Gate ANS Costs (2008)



Source: EUROCONTROL

Each State sets its own en route charges which are agreed with users through EUROCONTROL prior to the start of each year. Charges are set in the State's own currency but billed in Euros. The applicable charges are published each month by the EUROCONTROL Central Route Charges Office (CRCO) which is responsible for coordinating the billing to airspace users and the redistribution of monies raised back to States. Each flight is billed in terms of Chargeable Service Units (CSUs) which are dependent on the

[187] Performance Review Report, PRR 2009, EUROCONTROL Performance Review Commission, May 2010

nominal route distance and the maximum take-off weight of the aircraft. The latter is utilised to introduce an 'ability to pay' element into the formula.

The cost of a CSU (the unit rate) in each State is determined by dividing the forecast ANS costs by the forecast traffic. This means that in times of traffic growth, unit rates will tend to fall year-on-year, whilst in times of traffic decline unit rates will rise. In addition, to take account of forecast errors, any over or under recovery of costs in any one year means States are entitled to make adjustments to the unit rates in subsequent years to ensure that ANS costs are fully recovered. This full cost recovery regime means there is little incentive for ANSPs to reduce costs year-on-year. The unit rate calculation method also means that rates are likely to rise during an economic downturn, exactly at the time when airspace users will be most sensitive to increasing costs.

To try and provide an incentive to improve performance the EUROCONTROL Performance Review Commission (PRC) has, since 1998, published an annual air traffic management Performance Review Report (PRR). This report compares the performance of European ANSPs using a range of metrics covering safety, delays, environmental performance and cost-effectiveness. In May 2010 the 2009 PRR indicated that its cost-effectiveness target in terms of a reduction of 3% per annum in en route ANS costs/km had been achieved for the period 2003 to 2008. However, since 2008 the economic recession has led to a significant downturn in traffic which has not resulted in a similar downturn in costs. As a result, the PRC, indicated in their May 2010 report, that ANS costs/km were likely to rise in 2009. Given the severity of the recession and the further impacts on traffic (but not on costs) of the Eyjafjallajökull volcano in 2010, it is likely that the 2010 PRR will confirm this deterioration in the cost-effectiveness metric.

This likely deterioration is borne out by the latest data. For the period 2008 to 2011, traffic (in terms of Service Units) is likely to have recovered and increased by 2.7% when compared to 2008. Given this forecast traffic increase, all else being equal, the expectation would be that unit rates would be able to fall. In actuality, average unit rates across Europe will have risen by 5.4% over this period (Table 6-1). This rise of 5% in unit rates coupled with a predicted 3% increase in traffic indicates a likely overall increase in en route ANS costs of just over 8% by 2011 compared to 2008.

Table 6-1: Forecast European Traffic and Average Unit Rate 2008 to 2011

Year	Total European[188] Traffic (TSUs[189])	Average Unit Rate (€)
2008	112,655,015	55.22
2009	106,577,341	56.98
2010	110,069,658	57.10
2011 (forecast)[190]	115,686,111	58.20
2011 compared to 2008	**2.7%**	**5.4%**

Source: CRCO, EUROCONTROL STATFOR, ERAA

[188] ESRA02 area which covers the airspace controlled by 29 ECAC States (30 Flight Information Regions)

[189] TSU = Total Service Units = CSUs plus Service Units from approx 1.7% flights that are exempt from charges

[190] Short and Medium Term Forecast of Service Units, EUROCONTROL STATFOR, February 2011 Update

6.3.3 Benchmarking within Europe

At the State level, unit rates (expressed in Euros) have fallen in 16 out of 35 States over the period 2008 to 2013, but in only twelve States when expressed in national currencies (Table 6-2 below). This is due to the appreciation of the Euro against most other European currencies over the same period. 2011 traffic in terms of Service Units is forecast to be below 2008 levels in seven States, the most notable being the UK and France. These were the only two States to show annual traffic declines in 2010 over 2009 due to the continuing impacts of the economic recession coupled with the closures in airspace due to the Eyjafjallajökull volcano.

Table 6-2: Forecast Traffic, Unit Rates & ANS Revenues over the Period 2008 to 2011

	Forecast Traffic	Unit Rates		ANS Revenues (estimated)	
State (and FIR)	TSUs	€	National Currency	€	National Currency
Spain - Canaries	-6%	-6%	-6%	-11%	-11%
Portugal - Santa Maria	10%	-18%	-18%	-10%	-10%
Greece	9%	-16%	-16%	-8%	-8%
United Kingdom	-10%	0%	7%	-10%	-4%
Bulgaria	11%	-14%	-14%	-4%	-4%
Spain - Continental	-1%	-2%	-2%	-3%	-3%
Malta	24%	-22%	-22%	-3%	-3%
Norway	8%	-2%	-7%	6%	0%
FYROM	6%	-5%	-4%	1%	1%
Finland	0%	0%	0%	1%	1%
Portugal - Lisbon	3%	2%	2%	5%	5%
Lithuania	4%	-1%	0%	4%	5%
Switzerland	-1%	34%	9%	32%	8%
Italy	3%	5%	5%	9%	9%
Netherlands	0%	11%	11%	10%	10%
Belgium-Luxembourg	0%	10%	10%	11%	11%
Germany	1%	11%	11%	12%	12%
France	-3%	15%	15%	12%	12%
Austria	-1%	15%	15%	13%	13%
Cyprus	10%	4%	4%	14%	14%
Denmark	0%	15%	15%	15%	15%
Sweden	-6%	39%	27%	31%	19%
Croatia	24%	-5%	-3%	17%	20%
Ireland	2%	19%	19%	21%	21%
Poland	13%	-2%	10%	11%	24%
Romania	9%	-1%	15%	8%	25%
Czech Republic	16%	14%	11%	32%	28%
Slovak Republic	18%	12%	12%	33%	33%
Hungary	2%	24%	33%	27%	37%
Slovenia	16%	21%	21%	41%	41%
Turkey	26%	17%	17%	48%	48%
Serbia Montenegro	11%	6%	35%	17%	50%
Albania	40%	-2%	13%	37%	59%
Bosnia & Herzegovina	37%	23%	22%	69%	67%
Moldova	87%	-18%	-10%	54%	68%

Source: CRCO, EUROCONTROL STATFOR, ERAA; & MM Analysis

Combining the unit rate and traffic changes shows that ANS revenues (and by implication ANS costs) are estimated to increase in all but six States by the end of 2011 compared to 2008 – Spain, Portugal, Greece, UK, Bulgaria and Malta. So whereas many States have responded to pressure from airlines to maintain or reduce unit rates during the economic downturn, only these six States have by implication reduced their costs over the period.

6.3.4 Regulatory Incentivisation

In the UK the ANSP unit rate for NATS is not determined based on the full cost recovery system but through a price formula that is agreed with airspace users and the regulator prior to each five year reference period. Annual unit rates (and therefore revenues) are fixed in advance typically on a reducing basis, which means there is an incentive on NATS to reduce costs in order to maintain profitability. The formula includes an element of 'traffic volume risk-sharing' whereby NATS is able to keep a proportion of additional revenues generated when traffic is higher than forecast but must lose a proportion of revenues when traffic falls. This serves to provide some protection to airspace users during a downturn, as has happened recently. In addition, the price formula contains performance-related penalties and incentives in terms of delays and other factors.

This method of setting the unit rate and of providing incentives and penalties has always been allowed for under Regulation 1794/2006[191] which laid down a common charging scheme for air navigation services in Europe, but has now been enshrined into law following the adoption of Regulation 1191/2010[192] in December 2010. This new amendment which is applicable from 2012 also incorporates traffic volume risk-sharing. One complicating factor here will be agreeing the forecast traffic in each State with airspace users prior to the start of each reference period. The actual traffic out-turn compared to this initial forecast will determine the proportion of revenues that are relinquished/retained in setting the unit rate for each year during the reference period.

In the run up to the agreement of NATS' price formula for 2011 to 2014, the UK CAA commissioned a cost benchmarking report[193] looking at NATS relative to other ANSPs. Based on data from 2008, Figure 6.5 and Figure 6.6 show ATCO employment costs and ATCO productivity for eleven selected ANSPs in Europe.

Publishing this comparative data (and in the PRR reports) certainly helps to incentivise ANSPs to improve efficiency and reduce costs. For example, Aena in Spain labelled as "the most expensive ANSP in Europe"[194], froze its unit rates in 2010 and made further reductions in 2011, both in response to pressure from airlines and in anticipation of its upcoming privatisation.

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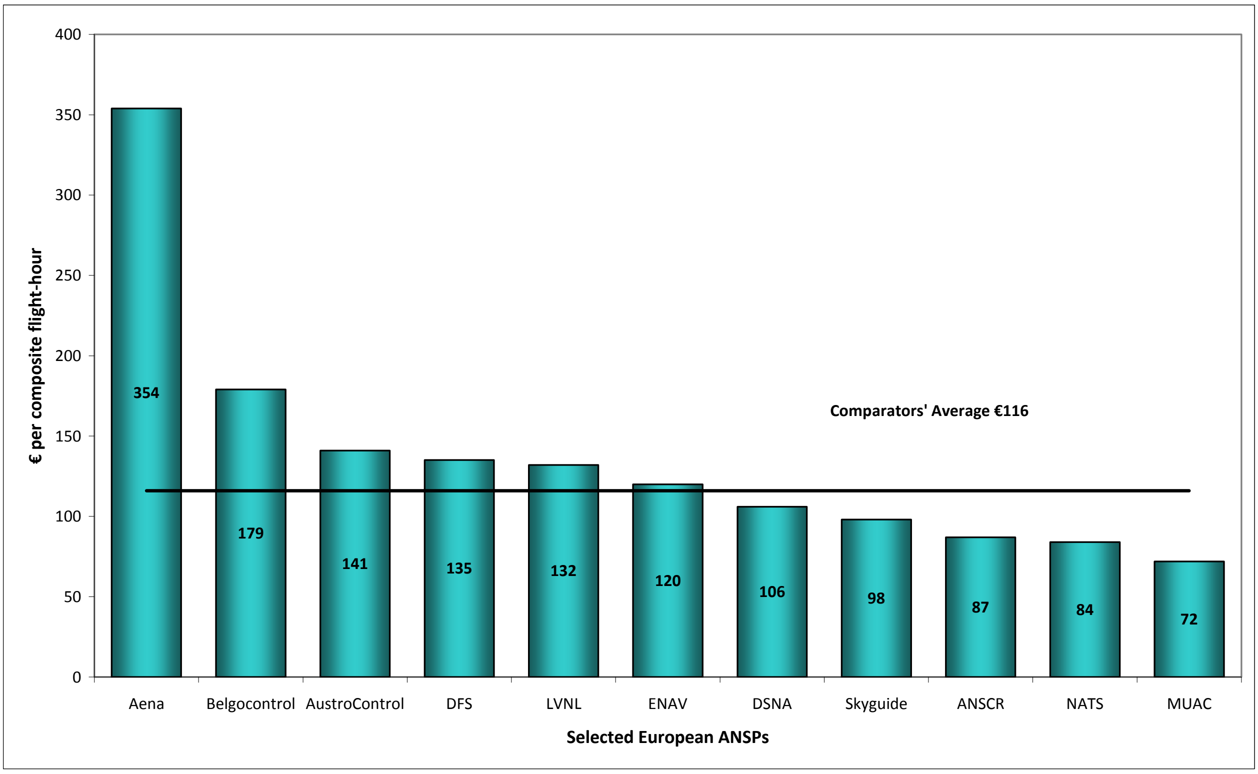
[191] Commission Regulation (EC) No 1794/2006 laying down a common charging scheme for air navigation services, 6 December 2006

[192] Commission Regulation (EC) No 1191/2010 amending Regulation (EC) No 1794/2006, 16 December 2010

[193] Cost Benchmarking of NATS relative to selected Air Navigation Service Providers, Helios, June 2010 Update

[194] IATA Applauds AENA Reform Plan – High Labour Costs Must be Addressed, IATA Press Release, 26 January 2010

Figure 6.5: ATCO Employment Costs per Composite Flight-Hour (2008)

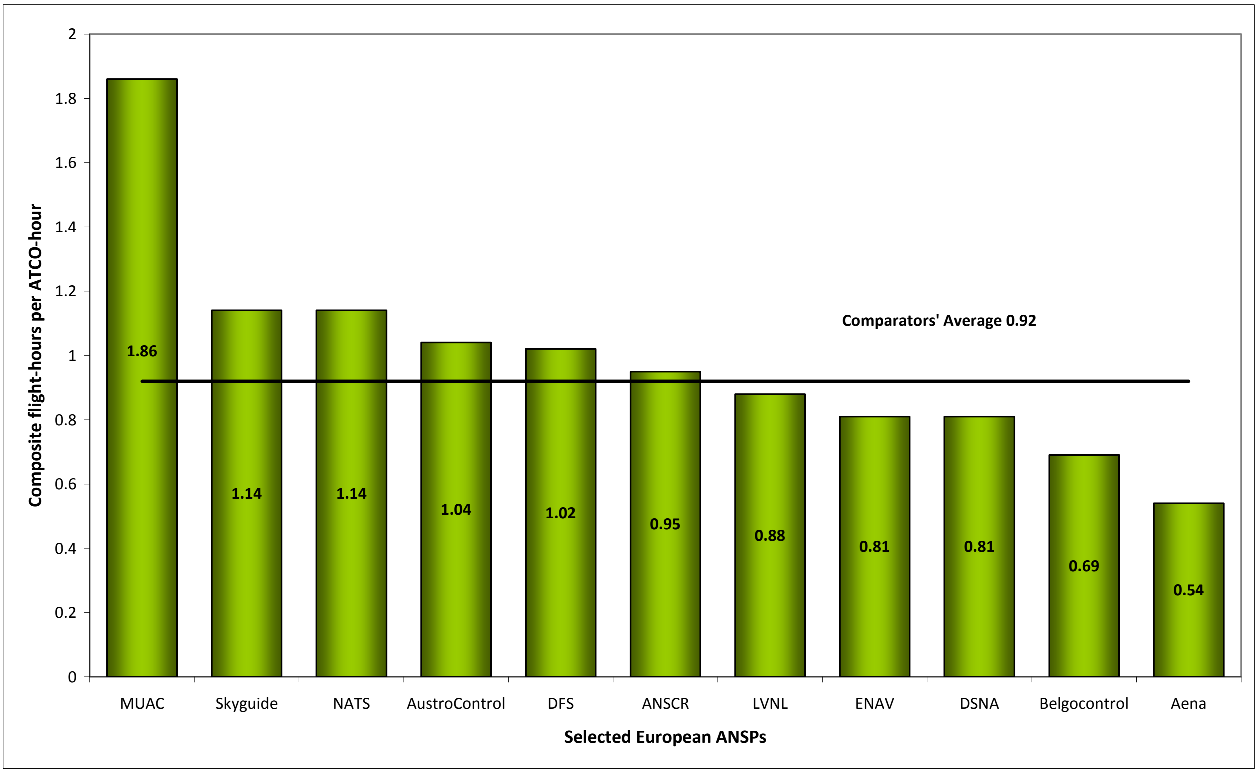


Source: Helios

Table 6-3: Key to Decoding ANSPs in Figure 6.5 & Figure 6.6

Abbreviated Name	Full Name	Airspace
Aena	Aeropuertos Españoles y Navegación Aérea	Spain
Belgocontrol	Belgocontrol	Belgium
AustroControl	Österreichische Gesellschaft für Zivilluftfahrt mbH	Austria
DFS	Deutsche Flugsicherung GmbH	Germany
LVNL	Luchtverkeersleiding Nederland	Netherlands
ENAV	Company for Air Navigation Services	Italy
DSNA	Directorate of Air Navigation Services	France
Skyguide	Skyguide	Switzerland
ANS CR	Air Navigation Services of the Czech republic	Czech Republic
NATS	NATS Ltd	United Kingdom
MUAC	Maastricht Upper Area Control Centre	Maastricht

Figure 6.6: ATCO Productivity (2008)



Source: Helios

A further incentivisation is being provided through Regulation 691/2010[195] which was adopted in July 2010 and establishes a performance scheme for air navigation services under the second package of the Single European Sky (SES II). The aim of the performance scheme is to contribute to the sustainable development of the air transport system by improving the overall efficiency of air navigation services across the key performance areas of safety, environment, capacity and cost-efficiency.

In terms of key performance indicators (KPIs) for cost efficiency, there will be a requirement to report annually on the actual and projected evolution of en route unit rates at the National or Functional Airspace Block (FAB) level during each reference period. The projected evolution will be based on forecast costs and traffic in national performance plans as required under the same legislation. The evolution will be expressed in national currency and in real terms. At the European level, the KPI will be the annual evolution of the average EU-wide unit rate expressed in Euros and in real terms.

During the first reference period which runs from 2012 to 2014 KPIs will be limited to en route air navigation service charges, although States will be required to report their terminal air navigation service charges in accordance with Regulation 1794/2006. During the second reference period (2015 to 2020), additional KPIs at the National/FAB and EU-wide levels will be introduced to cover for terminal air navigation service charges.

[195] Commission Regulation (EU) No 691/2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005, 29 July 2010

In 2010 the European Commission designated EUROCONTROL, acting through its Performance Review Commission, as the Performance Review Body (PRB) for the Single European Sky until June 2015. The PRB, working with Member States, will determine the KPIs and targets at national, FAB and EU level; and evaluate national/FAB performance plans.

6.3.5 Comparisons Outside of the EU

Since 2003 the EUROCONTROL PRC and FAA have been collaborating to provide factual high-level comparisons of the U.S. and European Air Traffic Management systems. In October 2009 a final report[196] was issued providing a comparison of ATM-related operational performance in the two areas. Table 6-4 summarises the key indicators.

The key differences from Table 6-4 show that in the U.S. 80% more flight hours were controlled in 2008 than in Europe but with 17% fewer air traffic controllers from far fewer en route centres (20 instead of 65). While the geographical areas are similar, the U.S. handles 70% more controlled flights. These differences have been known about for some time and are one of the main drivers for the Single European Sky and SESAR.

Table 6-4: U.S./Europe ATM System Figures (2008)

	Europe	U.S.	Difference (U.S. vs. Europe)
Geographical Area	11.5 million km^2	10.4 million km^2	≈ -10%
Number of en route ANSPs	38	1	
Number of en route Centres	65	20	≈ -70%
Number of Airports with ATC Services	≈ 450	≈ 263	≈ -42%
Number of Operational ATCOs	16,800	14,000	≈ -17%
Total Staff	56,000	35,000	≈ -40%
Controlled Flights (under IFR[197])	10 million	17 million	≈ +70%
Flight Hours Controlled	14 million	25 million	≈ +80%
Relative Density	1.2 flight hours per km^2	2.4 flight hours per km^2	≈ x 2
Average Length of Flights	541nm	497nm	≈ -8%

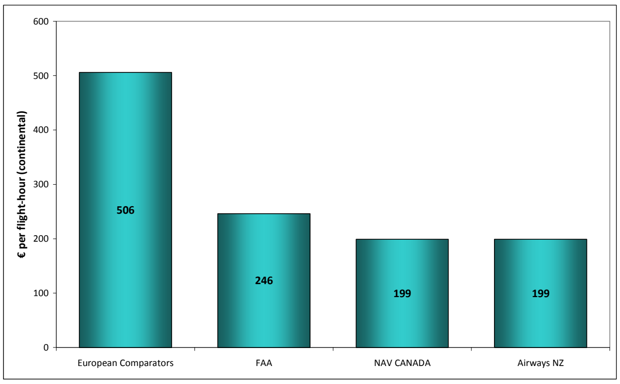
Source: EUROCONTROL, FAA/ATO (Data excludes oceanic areas. Airport data for U.S. only includes FAA managed facilities)

In June 2010 the benchmarking report commissioned for the UK CAA (referenced earlier) also provided comparative tables for European ANSPs versus FAA, NAV CANADA and Airways New Zealand. Figure 6.7 and Figure 6.8 show the financial cost-effectiveness and ATCO productivity indicators from that report.

[196] U.S./Europe Comparison of ATM-Related Operational Performance, Federal Aviation Administration and EUROCONTROL, Final Report, October 2009

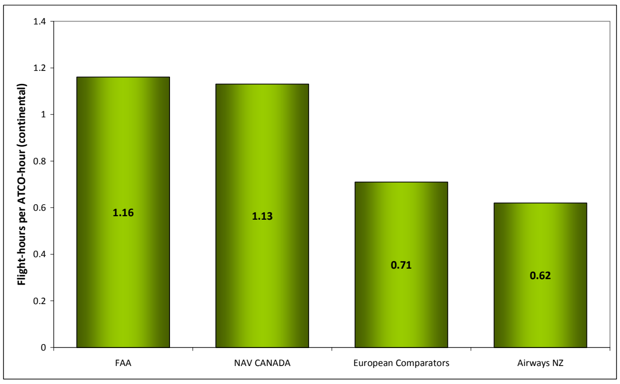
[197] IFR = Instrument Flight Rules

Figure 6.7: Financial Cost-Effectiveness (Continental Operations) 2008



Source: Helios

Figure 6.8: ATCO Productivity (Continental Operations) 2008



Source: Helios

The results indicate that on average European ANSPs cost more compared to FAA, NAV CANADA and Airways New Zealand, and that European ANSPs have lower productivity compared to FAA and NAV CANADA but higher when compared to Airways New Zealand. Although the authors caution that the data they utilised may not have been subjected to extensive validation, it is likely that these broad brush conclusions are still valid. The data was sourced from a wider, but confidential, Civil Air Navigation Services Organisation (CANSO) benchmarking study.

6.4 SESAR & NextGen

6.4.1 SESAR

The Single European Sky Air Traffic Management Research Programme (SESAR) is a European initiative aiming at modernising and harmonising the European Air Traffic Management (ATM) system, ensuring sustainable, safe and efficient air transport development through a performance driven approach.

SESAR is currently in its development phase, which is characterised by coordinated and focused research, development and validation activities to provide the equipment, standards and procedures which will constitute the new systems of the future concept of operations. This is based on flight adherence to 4D trajectories, monitored and managed through system-wide information sharing by all the relevant stakeholders.

The future concept of operations and the associated ATM Master Plan which details the roadmap for change were developed during the SESAR definition phase, which ran from 2005 to 2008 and included extensive stakeholder involvement. The cost of this phase was €60 million[198], financed with 50% funding from the EU and 50% from EUROCONTROL. The development phase which runs until 2013 is managed by the SESAR Joint Undertaking, a European Union body established by Regulation 219/2007, as amended by Regulation 1361/2008. The estimated cost of the development phase is €2.1 billion[199]. The

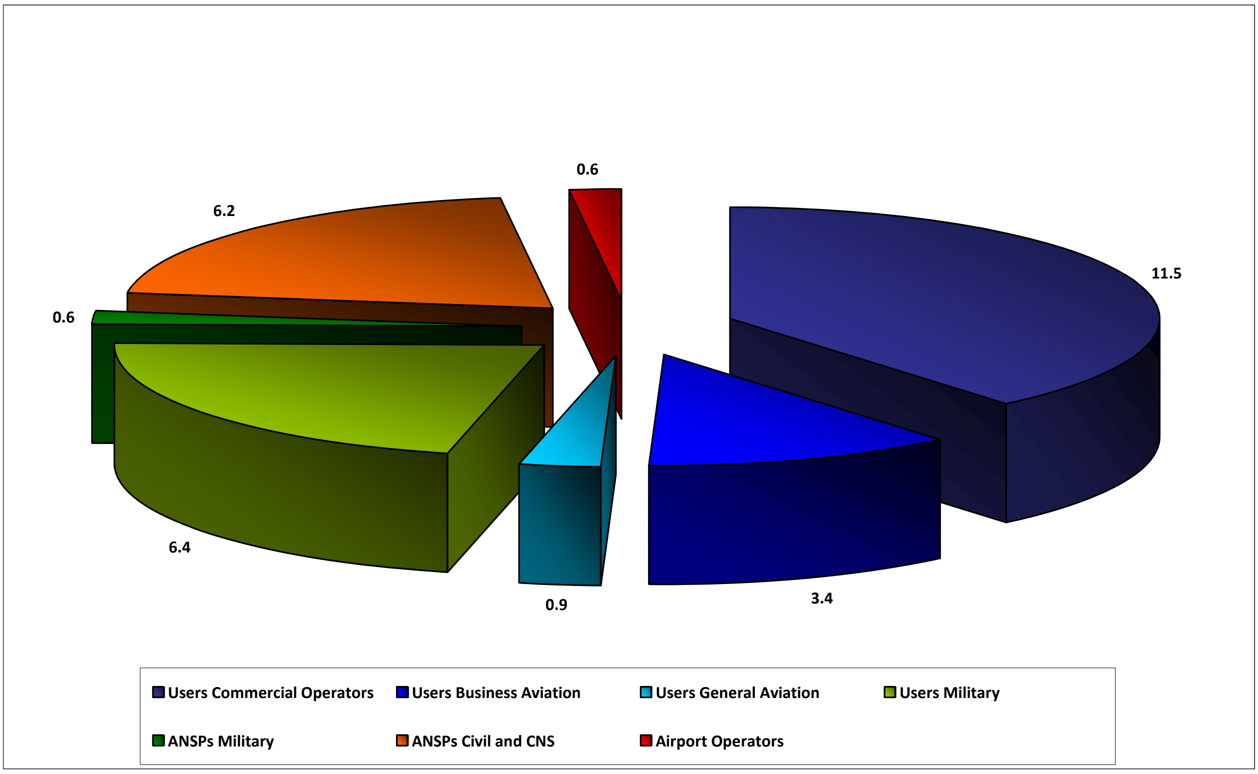
[198] SESAR in Brief, EUROCONTROL, October 2008

[199] Funding the SESAR JU, SESAR Joint Undertaking Web Site

EU, EUROCONTROL and the ATM industry have committed to each fund 33% (€700 million) of the estimated cost of development.

The SESAR deployment phase will run from 2014 to 2020 and will consist of the large scale production, procurement and implementation of the new ATM infrastructure and corresponding aircraft equipment. The SESAR ATM Master Plan[200] envisages a total investment requirement for the three phases of €29.5 billion, of which €22 billion will be borne by airspace users (commercial operators, business and general aviation and the military), €6.5 billion by ANSPs (both civil and military) and €0.5 billion by airport operators (Figure 6.9).

Figure 6.9: SESAR Investment – Deployment Phase (€ billion)



Source: SESAR ATM Master Plan, March 2009

The total investment cost of €29.5 billion is substantial and represents about 33% of the total current European gate-to-gate ANS costs over a ten year period. The cost benefit case relies on SESAR's performance target which is to halve annual ANS costs to users. This would bring the costs of the European ATM system more in line with those of the U.S. (Figure 6.7). These benefits will be derived through a combination of improved ANSP cost effectiveness, fuel savings due to more efficient routings, delay reduction due to increases in en route capacity and improved resilience to adverse weather conditions.

The financing mechanisms of the deployment phase are currently under discussion. In order to enjoy their full benefits, it is essential that the core elements of the ATM concept are implemented in a timely manner

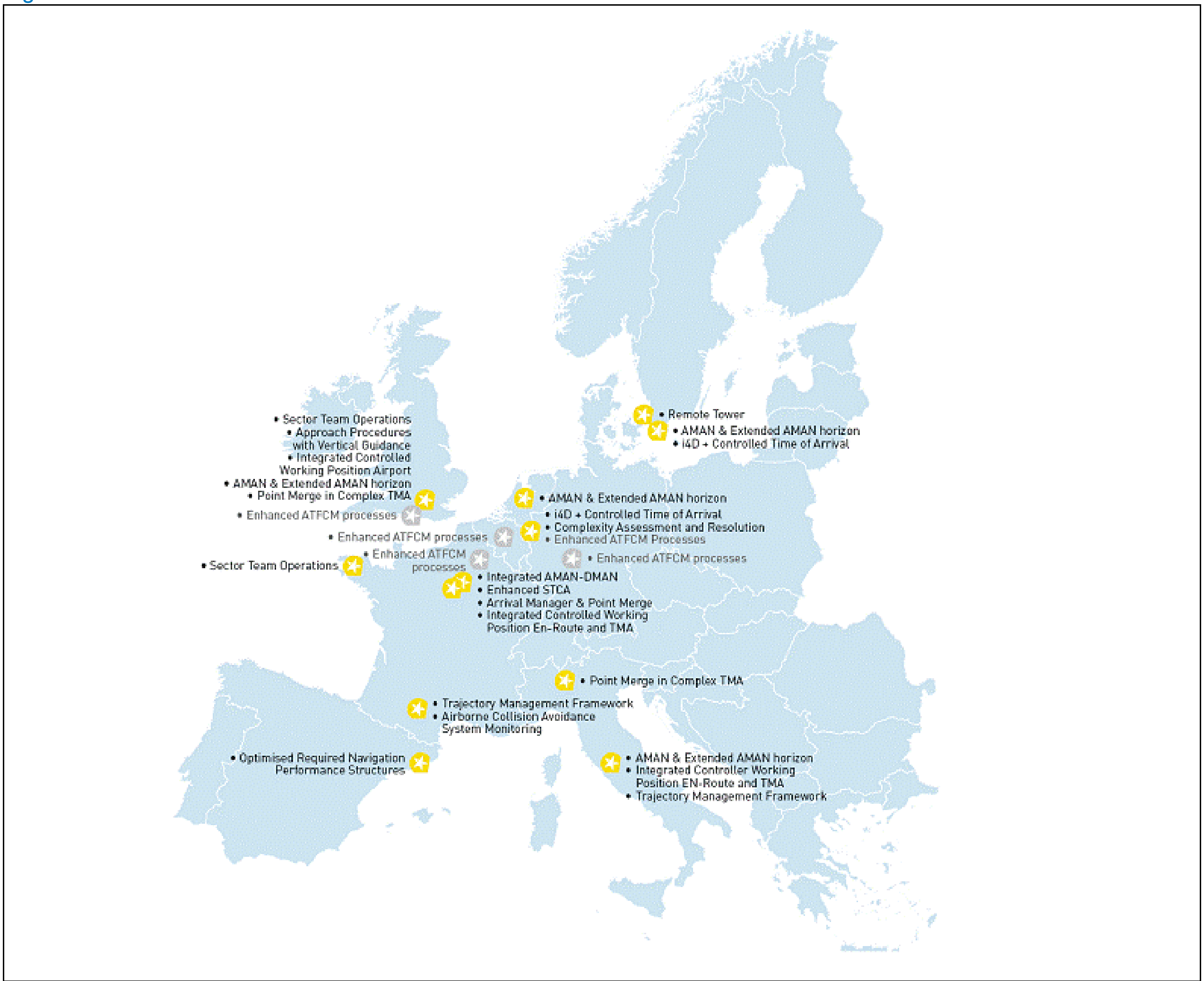
[200] European Air Traffic Management Master Plan, Edition 1, SESAR Joint Undertaking, March 2009

and consistently throughout the European ATM network. This requires coordination and synchronisation across countries and stakeholders.

The SESAR Programme is also expected to deliver ‘early benefits’ which after validation, could also be deployed throughout Europe. Therefore the deployment of SESAR products, systems and procedures needs to be seen as a gradual process, where the development activities run in parallel to the deployment activities.

Each of these SESAR ‘Releases’ will present to the aviation community new or improved air traffic management solutions at a pre-industrialisation stage ready for deployment. The first SESAR release aims to be accomplished by the end of 2011. It contains 29 validation exercises conducted by SESAR members all over Europe (Figure 6.10). These exercises will cover the areas of efficient and green terminal airspace operations, the initial 4D trajectory, end-to-end traffic synchronisation; as well as integrated and collaborative network management.

Figure 6.10: Main Validation Sites of SESAR Release 2011



Source: SESAR Release, SESAR Joint Undertaking 2011

Besides developing processes for controlled airspace, the industry also recognises the safety needs of General Aviation and other airspace users flying VFR[201] outside of controlled airspace. One recent development during 2010 has been the entry into operational service of EGNOS. By using three satellites and a 40-strong network of ground stations, the European Geostationary Navigation Overlay System (EGNOS) sharpens the accuracy of GPS satnav signals across Europe. EGNOS offers the aviation industry the means to provide accurate and safe vertically guided approaches to smaller airports where a conventional precision landing system is not currently economically viable.

6.4.2 Interoperability with NextGen

NextGen is an umbrella term for the ongoing transformation of the National Airspace System (NAS) in the United States. At its most basic level, NextGen represents an evolution from a ground-based system of air traffic control to a satellite-based system of air traffic management. Key to this is the use of Automatic Dependent Surveillance-Broadcast (ADS-B), coupled with airspace redesign and the use of Performance Based Navigation (PBN) procedures for separation assurance[202].

The United States and Europe share a common challenge – they operate highly complex, dense airspaces in support of their national economies. Both have ATM systems that are built on strong legacy infrastructures that must migrate to a new operational paradigm. While these challenges are similar in scope, they are quite different in terms of the changes required to management, structure, and control. The U.S. has nearly twice the average traffic density of Europe and has developed a single system that spans the entire continent. Europe, on the other hand, is a patchwork of service providers, systems and airspaces defined by the boundaries of sovereign states[203].

Unlike the United States, Europe consists of individual nations, each of which, under Article 1 of the Chicago Convention, has "complete and exclusive sovereignty over the airspace above its territory". This means decisions about optimising airspace and routings for the common good of the European network are much more difficult to achieve than in the U.S. Although SESAR is described as a 'gate-to-gate' concept and includes airport operators in order to optimise existing airport capacity, the European Union is powerless to influence airport planning and new runway capacity provision in Member States. A predicted 11% shortfall in airport capacity by 2030[204] remains a challenge to aviation growth in Europe, meaning that SESAR may not be able to deliver all its promised benefits. NextGen on the other hand has been described as a 'kerb-to-kerb' approach because it is inclusive of airport developments, passenger and intermodal considerations as well.

ATM management in the U.S. is not without its own difficulties, for example weather conditions (both summer convective storms as well as winter snow) are a source of major system-wide delay in the United States. As a result NextGen places a greater emphasis on this than SESAR, with a core element of NextGen focusing on infrastructure, prediction, modelling and planning for adverse weather. It should be recognised that most US airport operations capacity assessment assume VFR operations not IFR as in Europe, with the result that adverse weather will have a disproportionate reduction in capacity as compared with the situation in Europe.

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[201] VFR = Visual Flight Rules

[202] What is NextGen?, FAA website

[203] A Comparative Assessment of the NextGen and SESAR Operational Concepts, JPDO Paper, May 2008

[204] EUROCONTROL, Challenges of Growth Study, November 2008

In March 2010, FAA released an update to its NextGen Implementation Plan[205]. The plan provides an overview of FAA's ongoing transition to NextGen into the mid-term, which is defined as 2012-2018. The focus is on developing parallel commitments with the aviation community, particularly on avionics equipage. Both SESAR and NextGen will rely on the use of 4D trajectories and the use of System Wide Information Management (SWIM); both are operating to similar timescales. It is critically important that airborne equipage requirements will be able to serve both programmes.

Early on, both FAA and EUROCONTROL recognised that the evolution of the two systems had similar drivers and challenges. The early work performed under the FAA/EUROCONTROL Memorandum of Co-operation[206] led to alignment on terminology and approaches. These efforts were brought together in the ICAO Global ATM Operational Concept[207] which has influenced both NextGen and SESAR; and other global ATM concepts (e.g. Asia Pacific Seamless Sky, currently in the early definition phase).

U.S. industry representatives participated in the SESAR Definition Phase to ensure that work advanced under NextGen found its way into the SESAR ATM Master Plan. Similarly, those same members from the U.S. industry brought back concepts and ideas from participating in the various SESAR Work Packages and ensured that similar concepts were included in the NextGen Concept of Operations (ConOps).

In June 2010 the European Commission and the U.S. Federal Aviation Administration (FAA) concluded negotiations started in 2009, for the establishment of a Memorandum of Co-operation in civil aviation research and development[208]. The Memorandum will enable the EU and the U.S. to jointly pursue their common objective to develop and deploy greener and more efficient air transport systems through a legally binding cooperation framework, based on commonly agreed reciprocity principles. Under the Memorandum the two parties will be able to address through cooperative activities any research and development issues in civil aviation.

In addition, a first technical Annex to the Memorandum dedicated to SESAR-NextGen cooperation has been agreed. The scope of the technical annex covers operational concept development including road mapping and investment, information and trajectory management, CNS and airborne interoperability; and other collaborative projects such as the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) and improvements to monitoring and position tracking of aircraft over oceanic and remote regions.

6.4.3 Cyber Security

A 12th amendment to ICAO Annex 17 adds air traffic service providers to the list of participants that should be involved in the establishment of each State's national civil aviation security programme.

Involvement of air traffic management is particularly relevant in relation to the threat from cyber terrorism. An audit carried out by the Department of Transportation in 2009 indicated that U.S. air traffic control systems had been subject to and remained vulnerable to cyber attacks. The audit concluded that the FAA

[205] NextGen Implementation Plan, FAA, March 2010

[206] The first Memorandum of Co-operation (MoC) between EUROCONTROL and the FAA was established in 1986, followed by an update signed in 1992, and the latest update in 2004

[207] Global ATM Operational Concept, ICAO Doc 9854, 2005

[208] Memorandum of Co-operation NAT-I-9406 between the United States of America and the European Union, Public File, Council of the European Union, 22nd February 2011

was not able to detect potential cyber security attacks adequately and that it must better secure its systems against hackers and other intruders[209].

Information assurance is of paramount importance to ATM; and systems at the heart of NextGen and SESAR will become part of the critical infrastructure of the future. Confidentiality and integrity of shared data, as well as the security and availability of information networks are key issues.

As automation increases, so the possibility for new types of security breach unfolds – e.g. how to guard against signal integrity when controlling Unmanned Aerial Vehicles (UAVs) while at the same time preventing their unauthorised use. As systems are harmonised, so the impact of a security breach is magnified (e.g. the extensive reliance on GPS increases the potential for common mode failures).

6.5 Functional Airspace Blocks (FABs)

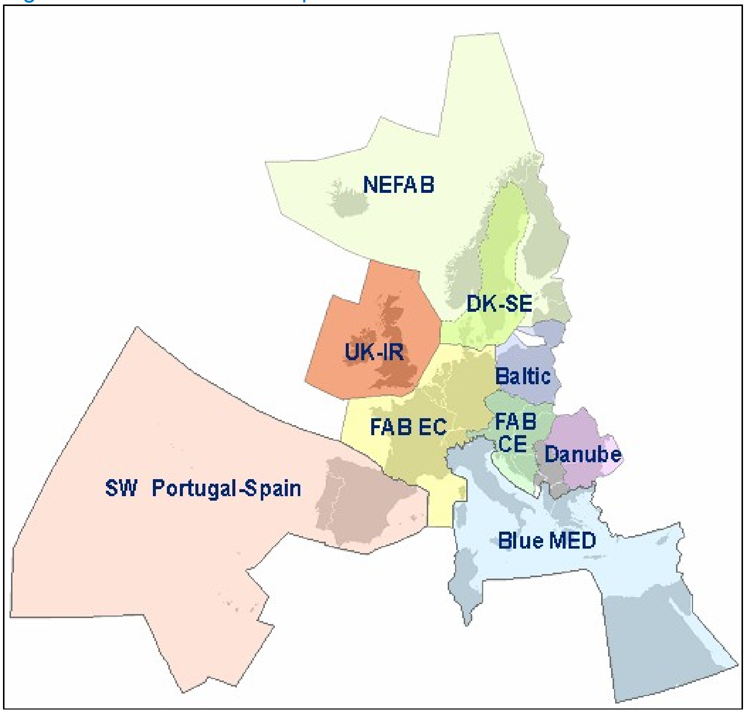
The formation of Functional Airspace Blocks (FABs) is a cornerstone of the SES strategy. FABs are key enablers for enhanced cooperation between ANSPs in order to improve performance and create synergies. There are nine FAB initiatives in Europe (Figure 6.11). SES II Regulation 1070/2009[210] provided a timetable of December 2012 for their establishment. The status of the nine FAB initiatives in 2010 is summarised in Table 6-5. Three out of the nine FABs can now be described as operational; four are in the pre-implementation phase and two are in the feasibility/definition phase.

As a result the FAB initiatives show wide differences in scope, timescales and approaches. All FABs aim to cover the basic SES I legislative requirements and to deliver improved performance. The operational FABs are also now preparing performance plans in accordance with SES II. Some of the FABs also address issues of service provision integration, ATM systems, training and ATFM, either through cooperation agreement, operational alliance (with some joint functions) or merger. This flexible approach has been adopted because each FAB is different and faces varying political, operational, technical and economic challenges.

[209] Review of Web Applications Security and Intrusion Detection in Air Traffic Control Systems, FAA Report Number: FI-2009-049, 4th May 2009

[210] Regulation (EC) No 1070/2009 of the European Parliament and of the Council amending Regulation (EC) No 594/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004 in order to improve the performance and sustainability of the European Aviation System, 21st October 2009

Figure 6.11: The Nine European FAB Initiatives



Source: Skybrary

Table 6-5: Status of European FAB Initiatives in 2010

FAB Initiative	Status by the end of 2010
Baltic FAB (Lithuania and Poland)	A major year-long feasibility study and cost benefit analysis was initiated by the Polish and Lithuanian ANSPs in August 2010
Northern UAC (Denmark and Sweden)	FAB established in December 2009, with NUAC (Nordic Unified Air traffic Control) created in early 2010 as a joint subsidiary of the Danish ANSP, Naviair, and the Swedish ANSP, LFV. NUAC will take over the operation of the three en route centres by 2013.
North Eastern FAB (NEFAB/NEAP)	NEAP is a collaboration between North European ANS Providers. Originally formed in 2007 out of the original Nordic Co-operation, it now consists of 9 members, Denmark (Naviair), Estonia (EANS), Finland (Finavia), Iceland (ISAVIA), Ireland (IAA), Latvia (LGS), Norway (Avinor), Sweden (LFV), and the UK (NATS) which signed a Memorandum of Co-operation in March 2010. NEAP's central focus is on safety, efficiency and environment, seeking common solutions to providing a seamless cost-effective service to customers.
FAB UK-Ireland	FAB operational since July 2008. In April 2010, a first annual report on 2009 performance was produced together with a plan for FAB activities and initiatives for the period 2010 to 2013. By 2013 when many of the initiatives are operational, it is estimated that the total distance saved will be 2,854,000 km, which is around 9% of the total excess distance within the UK-Ireland FAB. The initiatives achieve a CO_2 emissions reduction of 156,338 tonnes and fuel burn savings of 49,509 tonnes, around 49% of the CO_2 emissions and fuel burn in UK and Irish airspace. In March 2011, a Memorandum of Understanding was signed with the NUAC FAB.
FAB Europe Central (FABEC) (Belgium, France, Germany, Luxembourg, Netherlands, Switzerland and EUROCONTROL Maastricht)	Established by States Agreement in December 2010, to develop appropriate measures in the domains of airspace, harmonisation of rules and procedures, provision of air navigation services, civil-military cooperation, charging, supervision, performance and governance. By July 2011, it aims to report on the future institutional legal set up and governance of ANS provision. This will include the involvement of the military and the detailed scope of functions and services. A Memorandum of Co-operation between the National Supervisory Authorities (NSAs) is also planned. In June 2010, the FABEC ANSPs agreed on the joint provision of ATC basic training.
FAB Central Europe (FAB CE) (Austria, Bosnia-Herzegovina, Czech Republic, Croatia, Hungary, Slovakia and Slovenia)	A feasibility study was completed in February 2008. In May 2010, the FAB CE CEO Committee approved all deliverables of the FAB CE Preparatory phase, including the FAB CE Implementation Plan and the Performance and Safety Assessment. In December 2010 an agreement was reached on the future cooperation of the FAB CE ANSPs.
Danube FAB (Bulgaria and Romania)	A feasibility study was completed in 2008. Currently undergoing preliminary and detailed design prior to planned implementation time for the SES deadline in December 2012. In 2010, Memoranda of Understanding were agreed between the participating ANSPs and NSOs of the Danube FAB.
SW FAB (Portugal and Spain)	Preparation, feasibility and pre-implementation phases were initiated in 2009 with a target completion date of December 2011. Progress is likely to be impacted by the proposed privatisation of AENA.
Blue MED (Cyprus, Greece, Italy, Malta, and Tunisia, Egypt, Lebanon, Jordan and Albania as observers or associated members)	Currently in the definition phase, following the completion of a feasibility study in June 2008. In April 2010, the FAB Governing Body agreed the Strategic Action Plan for the definition phase which is due for completion by the end of 2011. In January 2011, the Governing Body initiated the process for setting up the institutional arrangements for the FAB.

Source: MM Analysis of various FAB Websites

With the approach of the December 2012 deadline, it appears that progress on most FABs has accelerated recently after a slow start when the SES was first adopted in 2004. Initially the main issues were over sovereignty but FABs involve the delegation of Air Traffic Services (ATS) provision, not airspace – so this does not violate Article 1 of the Chicago Convention. In a time of crisis or threat, States still have the power and ability to close and control their own airspace, should they need to.

These sovereignty issues were sometimes employed in the early phases of FAB development as a 'smoke screen' to mask the real reasons for the slow progress in the implementation of FABs – the real barriers being political, social and economic; for example:

- FABs are being developed bottom-up, with ANSPs from neighbouring States being encouraged to form FABs on geographical grounds, rather than necessarily for good operational or business reasons and irrespective of whether there is a good fit strategically or culturally.
- Consolidation of centres is expected, but the social upheaval costs are considerable and cost benefit cases based solely on 'economies of scale' may not always be convincing for some FABs.
- There may be financial disincentives (in terms of costs or revenues) for a State either to uptake the provision of Air Traffic Services from its neighbour, or to use the FAB to generate route efficiencies.

Notwithstanding these difficulties, the FAB initiatives have provided an invaluable opportunity for open and frank discussions between neighbouring States and ANSPs on both civil and military ATM issues. In many cases, solving the often complex issues that arise at FAB level is providing the precursor to addressing the issues at the European level in order to make the Single European Sky a reality.

7. The Internal Market & Competition Issues

7.1 Introduction

7.1.1 Summary of EU Actions in 2010

There were no major primary aviation regulatory or legislative actions implemented by the EU during 2010. However, earlier legislation is beginning to have some impact on the aviation industry and consultations were undertaken on potential improvements to existing legislation. Regulatory developments in other areas such as safety, security and the Single European Sky are dealt with in other chapters.

The EU has continued to make significant progress through its comprehensive and horizontal agreements with non-EU states in widening the area in which the airline industry can compete freely.

The most significant impact felt by airlines was from the application of Regulation 261/2004, following the volcanic ash incident in April 2010; and the exceptional snow conditions over much of Europe during December. A European Aviation Crisis Co-ordination Cell has now been put in place to provide urgent advice following any future volcanic ash incident.. The air traffic management aspects of the Eyjafjallajökull Volcano eruption are dealt with in detail in Section 6.2.

7.1.2 Summary of Regulatory Developments Elsewhere

2010 has also been a quiet year throughout the world in terms of primary legislation in this area. The updated U.S. aviation regulations concentrated on tidying up earlier legislation rather than developing any major new themes. In Asia, the ASEAN nations continue to push for increased airline deregulation based on the EU model, but they are finding it difficult to make headway – albeit Indonesia as the largest market in the ASEAN region is undertaking a major economic impact study of an Open Skies regime.

7.2 EU Regulatory Developments

The European Union and European Commission have issued several major pieces of legislation covering the aviation industry in Europe. Although none of major regulatory importance were published or introduced during 2010, implications continue to flow from earlier legislation that has had an impact on the industry. In 2010, the most important were the following:

7.2.1 Compensation and Assistance to Passengers

Introduction

The following extracts are taken from the European Commission Communication issued in April 2011[211].

Freedom of movement, one of the most important individual rights of EU citizens and an essential aspect of the internal market, is vital for the competitiveness and integration of the EU economy. Travelling is a necessary prerequisite for the exercise of the freedom of movement. (EC) Regulation 261/2004 [212] became

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[211] Communication from the Commission to the European Parliament and Council on the application of Regulation 261/2004. COM (2011) 174. 11 April 2011.

[212] Regulation 261/2004 of the European Parliament and of the Council establishing common rules on compensation and assistance

applicable on 17 February 2005. The Regulation set a minimum level of quality standards for passenger protection, adding an important citizen's dimension to the liberalisation of the aviation market.

The novelty of some provisions of the Regulation has led to different interpretations, and thus varied application, among air carriers and National Enforcement Bodies (NEBs), rendering it difficult for passengers and stakeholders to understand the scope and limits of the rights set out. In 2007 the Commission issued a Communication[213] where the main shortcomings related to the application of the Regulation were identified with a set of remedial measures. The Commission has committed to stakeholders and EU institutions to continue the efforts to improve the application in order to ensure harmonised interpretation and enforcement of the Regulation and to report on it regularly.

In line with this commitment, after 6 years of application, the Commission is assessing again the implementation of the Regulation. This is part of the Commission's work to remove obstacles to preventing citizens from effectively exercising their rights under EU law, as launched by the EU Citizenship Report 2010 "Dismantling the obstacles to EU citizens' rights"[214]. In that report the Commission announced its intention to ensure adequate enforcement of air passengers' rights in particular in the case of long delays and cancellations.

For industry, the main criticisms are linked to the Regulation's complexity; to the lack of a limitation of liability to provide care in the event of extraordinary circumstance beyond the carrier's control; to the difficulties in ensuring the costs incurred in applying the Regulation are covered by the responsible third party; to the lack of a better outlining of extraordinary circumstances both beyond and within the carriers' control; and to the lack of uniform interpretation and enforcement.

For passengers, the main criticisms are that the Regulation may not be correctly applied by carriers (e.g. right to be offered re-routing at the earliest opportunity by any comparable transport condition and to receive care whilst waiting to be re-routed); that (NEBs) do not handle complaints quickly and efficiently; that the decisions of NEBs are not binding and therefore are not always followed by carriers or recognised by judges; and that there is a lack of monitoring, measuring and publication of information on the performance of operators, relating to the application of the Regulation and to consumer satisfaction levels.

Volcano Crisis in 2010

The closure of European air space because of the ash cloud from an Icelandic volcano in April 2010 was an unprecedented event. The Regulation remained fully applicable, in particular with regard to care and assistance of stranded passengers. But the carriers were exempted from additional financial compensation as the closure was immediately qualified EU-wide as an exceptional circumstance.

A first assessment of the application of EU law on Air Passenger Rights (APR) during the volcano situation shows that the vast majority of airlines, airports and other travel operators worked effectively to minimise the impact on travellers. There is no doubt that, without the Regulation, the chaos and cost for both European citizens and society as a whole would have been much bigger. NEBs now have to take the necessary measures against those few carriers which have refused to comply with the Regulation, to avoid

to passengers in the event of denied boarding and of cancellation or long delay of flights, 11 February 2004

[213] Communication from the Commission to the European Parliament and the Council pursuant to Article 17 of Regulation EC 261/2004. COM (2007) 168, 4 April 2007

[214] EU Citizenship Report 2010, Dismantling the obstacles to EU citizens' rights. COM (2010) 603. 27 October 2010.

both distortion of competition among carriers and passengers' frustration at any lack of compliance with the law..

Figure 7.1: Eyjafjallajökull Volcano Erupting in April 2010

The exceptional natural events that occurred in 2010 - the volcano crisis and the severe weather conditions - have stressed the need to underline that, in those cases where the responsibility for the disruption belongs to any other person, including third parties (air service providers, airport managers, ground-handlers, tour operators, national administrations etc.) air carriers can seek compensation from them. Article 13 clearly establishes a shared liability, whereby the operating carrier has the responsibility to assist passengers, but not the obligation to pay all the costs. The purpose of using the operating carrier as the focal point for the obligations of the Regulation is to ensure the effective application of the Regulation to the benefit of passengers, while allowing cost-sharing with any other person, private or public, responsible for the disruption.

Situation in the United States

Compared with the situation in the EU, the situation in the U.S. is less regulated (except for tarmac delays) and the DOT are only now beginning to consider introducing airline passenger protection laws in relation to lengthy delays. The following extract from the DOT's 'Consumer Guide to Air Travel' is informative:

> *"Airlines don't guarantee their schedules, and you should realize this when planning your trip. There are many things that can and often do make it impossible for flights to arrive on time. Some*

of these problems, like bad weather, air traffic delays, and mechanical issues, are hard to predict and often beyond the airlines' control.

Each airline has its own policies about what it will do for delayed passengers waiting at the airport; there are no federal requirements. If you are delayed, ask the airline staff if it will pay for meals or a phone call. Some airlines, often those charging very low fares, do not provide any amenities to stranded passengers. Others may not offer amenities if the delay is caused by bad weather or something else beyond the airline's control. Contrary to popular belief, airlines are not required to compensate passengers whose flights are delayed or cancelled. As discussed in the [DOT] *chapter on overbooking, compensation is required by law only when you are 'bumped' from a flight that is oversold. Airlines almost always refuse to pay passengers for financial losses resulting from a delayed flight. If the purpose of your trip is to close a potentially lucrative business deal, give a speech or lecture, attend a family function, or connect to a cruise, you might want to allow a little extra leeway and take an earlier flight. In other words, airline delays and cancellations aren't unusual, and defensive planning is a good idea when time is your most important consideration."*

This extract confirms that the E.U. is well advanced in terms of consumer protection when compared to the U.S.

7.2.2 Ground Handling at Community Airports

The Council Directive of 15 October 1996[215], EC Regulation 96/67, was designed to open up access to the ground handling market at Community airports. The intention is to ensure that there is a guaranteed minimum level of competition at major airports in areas where competition is feasible, so as to offer airlines the ability to reduce costs by selecting from competing offers.

The Directive introduced minimum requirements for transparency of information and market access competition for provision of these services, at airports handling more than two million passengers a year or 50,000 tonnes of freight. The aim of the Directive is to introduce competition to reduce costs to airlines and improve the quality of service.

Although the Regulation has been in place for well over a decade, problems still arise.

During 2010, the EU:

- sent a formal request to German authorities for failing to ensure fair access for service providers to ground handling markets at 14 major airports
- asked the Maltese authorities to correctly apply the Directive at Malta-Luqa International Airport with regard to aircraft refuelling
- requested Bulgaria to ensure fair access at Sofia Airport
- requested Hungary to ensure fair access at Budapest Airport

Meanwhile, Poland reacted to earlier infringement proceedings by adopting new legislation providing for the full opening up of its airside ground handling market, notably at Warsaw-Okęcie (Frederic Chopin) Airport.

[215] Council Directive 96/67/EC on access to the groundhandling market at Community airports, 15 October 1996

During 2010 the Commission consulted on the possible revision of Directive 96/67, considered the responses to its consultation which closed in February 2010; and moved towards finalising the impact assessment of possible revisions to the Directive. The 28 questions (covering potential minor additions to, and clarifications and simplification of, the Directive) attracted 103 responses, but there was rarely much common ground between the respondents in their replies with consumers and operators regularly taking diametrically opposed views.

7.2.3 Aviation inclusion into the EU Emissions Trading Scheme (ETS)

The Aviation ETS Directive 2008/101/EC became legislation in 2008[216] and is beginning to have an impact on European aviation. The EU's intention is that aviation will be treated in the same way as other industries, being charged for exceeding agreed levels of greenhouse gas emissions and being encouraged to reduce emissions through financial penalties.

Directive 2003/87/EC of the European Parliament and of the Council ("the EU ETS Directive") established a scheme for greenhouse gas emission trading within the European Union. It was amended so as to include aviation activities in the scheme, by Directive 2008/101/EC ("the Aviation ETS Directive"). Commission Decision 2007/589/EC ("the Monitoring and Reporting Decision") established guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to the EU ETS Directive; and this was amended to include guidelines in relation to aviation activities. These Regulations transpose the Aviation ETS Directive and the Monitoring and Reporting Decision insofar as it relates to aviation.

The Directive concerns the expansion of the Emission Trading Scheme to aviation and its potential impact is covered in Section 8.6 on Environment Development and Sustainability. There is a potential concern in the industry that the introduction of ETS will be made in addition to many of the passenger duties that were originally introduced as a surrogate for the industry's impact on the environment, thus significantly and disproportionately impacting on airline cost. The issue of harmonisation of taxation in aviation is dealt with in Section 7.3.4 below.

7.3 Competition Issues

One of the main objectives of the European Commission is to ensure that there is fair and open competition throughout the 27 Member States and, as far as possible, in the three other EEA States[217]. This covers airports, airlines and their suppliers. Various developments occurred during the year which involved the EU, or which might be considered important for the EU to investigate further, as outlined below.

7.3.1 State Aid to Airlines & Airports

Historically, some Member states have given their domestic airlines and airports financial assistance. Such aid may be declared compatible, in particular when it facilitates the development of certain economic activities and does not adversely affect trading conditions to an extent contrary to the common interest..

[216] Directive 2008/101/EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, 19 November 2008

[217] European Economic Area includes EU27 countries plus Iceland, Liechtenstein and Norway

During 2010 the EU concluded its investigation into the Finnish Government's plan to support air cargo infrastructure investments of up to €3 million into the regional airport of Vaasa; and decided not to raise any objections.

Similarly, it concluded that in the agreement between Bratislava Airport and Ryanair, the airport operator had acted as a market economy investor and therefore no advantage had been granted to Ryanair.

In November, the Commission authorised, as rescue aid, a loan facility worth €52 million for Air Malta as being in line with State aid rules. By May 2011, the Maltese Authorities must communicate to the Commission a restructuring plan, or a liquidation plan, or proof that the aid has been reimbursed.

7.3.2 Boeing vs. Airbus WTO Ruling

For decades there has been a dispute between the U.S. and the EU over subsidies and other forms of aid for the world's two dominant makers of civil aircraft, Boeing and Airbus. Both sides accuse the other of distorting competition within the sector by receiving various forms of aid. Since October 2004 the World Trade Organization has been drawn into the dispute, which has recently been drawing to a close.

The WTO has issued two 'panel reports', consisting of a finding in June 2010[218] which concluded that repayable European loans to Airbus had illegally subsidised its aircraft programmes; and then an 'interim finding' in 15 September 2010[219] concluding that Boeing had received illegal subsidies in the form of non-repayable grants through contract work for NASA and the U.S. Department of Defense. On 31 January 2011 the WTO issued its final report (on a confidential basis to both companies) which confirmed its interim findings of September 2010.

The two competitors have since differed on their opinions of the significance of the rulings with claims of victory on both sides; however the reality is that the WTO has found both aircraft manufacturers guilty of allowing subsidies in support of their industries over decades.

Since the two dispute cases were filed in 2004, economic conditions have impacted funding options. Even in the absence of WTO involvement, austerity measures such as cuts in public spending are spreading through Europe; NASA and Department of Defense budgets in the U.S. are also being cut back. The pertinent issue centres on how the two competitors in a capital-intensive industry are going to fund future programmes to continue to meet the requirements of airline customers and environmental constraints.

With the mounting pressure on non-repayable grants and other R&D assistance, the U.S. Government may be required to shift to some form of repayable launch aid (RLA) in order to assist its aircraft industry in maintaining global competitiveness. At the same time however it is attacking the very same European RLA funding received by Airbus. If the U.S. Government was to put RLA arrangements in place, it could end disputes by creating a level playing field and has the advantage of receiving interest and royalties on future RLA, possibly exceeding the loans originally given to manufacturers.

[218] European Communities and Certain Member States – Measures Affecting Trade in Large Civil Aircraft, World Trade Organization, 30 June 2010

[219] 15 September 2010 report issued to EU and U.S. officials, not yet public.

A further solution may be the creation of a global multilateral agreement along the lines of the EU-U.S. 1992 Agreement on Large Civil Aircraft (from which the U.S. unilaterally withdrew in order to progress the WTO dispute). This is currently considered unrealistic in light of the likely reluctance of emerging aerospace markets such as China, Russia and Brazil to sign an agreement until their commercial aircraft industries reach maturity.

Longer term, industry commentators propose a fresh start for both sides. At present only Boeing and Airbus are capable of designing and integrating the manufacture of large civil aircraft. Both of these national champions are critically important to the future economic and technical security of the transatlantic alliance and the West. Both manufacturers should focus on placing emphasis on competitiveness in today's global economy; instead of basing their future on state entitlements which are now coming under political and financial pressure[220].

7.3.3 Ownership & Control of Airlines

The EU allows up to 49% of non-EU participation in EU airlines..

Existing law in the United States specifically limits non-U.S. ownership of U.S. certificated airlines to smaller shareholdings of 25%. These provisions are viewed by many as exclusionary, preventing all but limited foreign investment in the U.S. domestic airline industry and preventing any real non-U.S. control over an airline's business decisions. These laws are seen by proponents of the industry's internationalisation as major barriers to a fully open international aviation market. An initiative to lift some of the existing ownership and control restrictions through the regulatory process was opposed by Congress and ultimately abandoned by the Bush Administration.

The 'Open Skies' agreement between the U.S. and the EU in 2010 suggests that the discussion about airline ownership and control issues should be reopened, particularly at the review phase, although achieving a marked change by U.S. authorities may be a challenge.

Airline alliances are currently the only accepted option, subject to their compliance with respective anti-trust rules, in lieu of changes in ownership and control rules, allowing airlines to compete globally. At some future date the global airline industry may become completely deregulated.

7.3.4 Harmonisation of Taxation on Aviation

Distortion of the market can come about for various reasons of which state aid is but one. Another reason involves the imposition of varying levels of taxation applied to aviation which may distort fair competition, even though that may not have been the Member State's objective.

An area which caused concern for the aviation industry during 2010 was the increasing divergence of attitudes by Member States towards the taxation of aviation, particularly with reference to the imposition of increased levels of Air Passenger Duty (APD) by the UK and of a similar tax by Germany. During the year, Ireland announced plans to reduce its equivalent APD from €10 to €3 in 2011, while the Netherlands dropped its tax altogether. Belgium has also decided against APD-style taxation.

[220] Hufbauer, Rubini & Wong, 'Swamped by Subsidies: Averting a US-EU Trade War After the Great Crisis', 4 August 2009

A further summary of taxation by European country is offered in Chapter 8, examining market based measures to reduce environmental impacts of the industry.

With the UK now surcharging passengers ranging from £12 (€14) for an economy flight within Europe up to £170 (€195) for a journey in excess of 6,000 miles in premium class, there is scope for significant distortion of markets with passengers electing to fly (or travel by surface modes) from the UK to Amsterdam or Paris in order to take long-haul flights. The German tax is now €8 for European flights and €45 for the longest flights; and is equally affected by competition from Amsterdam and elsewhere.

When considering that the original purpose of APD was stated to be as a tax on aviation to address its greenhouse gas emissions, and that the purpose of extending the ETS scheme to aviation was to raise similar sums for the same purpose, there is concern within the industry that this will represent a duplication of taxation within the UK Other Member States such as Germany have stated explicitly that its APD tax will be discontinued once EU ETS comes into force. Such a commitment is not yet universal amongst Member States, and the industry is keen to see a level playing field in this respect.

7.3.5 Cartels & Antitrust Legislation

The EU remains vigilant over possible illegal price fixing. It co-operates with other bodies both within the Community and around the world in its investigations of price fixing and , where proven and justified, imposes fines, to protect consumers.

In September, Germany's competition authority fined the air carrier Condor €1.2 million for illegally fixing prices on routes to Turkey, having colluded with Lufthansa joint venture airline SunExpress[221].

In November, the Commission fined eleven air cargo carriers almost €800 million[222] for operating a global air cargo cartel on routes to and from Europe. Five European airlines were fined. Lufthansa was however granted immunity following its leniency application. The carriers had coordinated their fuel and security surcharges over a six year period.

In the UK, the Competition Commission reconfirmed its decision to oblige airport operator BAA to sell its airports at Stansted and either Glasgow or Edinburgh in order to increase competition in provision of airport services. Gatwick Airport had been sold in December 2009. The deal was notified to and cleared by the European Commission.

The U.S. authorities are also concerned about the possibility of collusion between companies to fix prices, as evidenced by its extensive antitrust legislation.

Several U.S. airlines have been partners in the three major international airline alliances for many years. United and US Airways, for example, are part of Star Alliance™; Delta, (now including Northwest Airlines) is part of the SkyTeam®; and American participates in oneworld®. Alliances allow partner airlines to jointly market their collective alliance brand internationally, to code share in certain instances; and to otherwise provide passengers with services to many destinations served by each of the partner airlines. In order to co-operate in an alliance (e.g., to code-share or involve in closer forms of co-operation) an airline must receive immunity or an antitrust exemption, from DOT. Over time some airlines have changed alliances.

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[221] German airline Condor fined for price fixing, New Europe, 3 October 2010

[222] Commission Slaps Fine On Cargo Cartel, Aviationweek.com, 10 November 2010

Continental for example recently left the SkyTeam alliance and joined the Star Alliance. After having received DOT immunity, it joined the Star revenue sharing joint venture, also involving Lufthansa, United and Air Canada.

Airlines generally view these alliances quite favourably and believe they can offer to each member airline significant advantages relating to savings in marketing costs, improved competitiveness, improved quality of service and other cost savings. These advantages are non-negligible also in light of these carriers' inability to merge. There are other observers, however, who may view alliances or, more specifically, revenue sharing joint ventures within these alliances, as being anti-competitive. In their view, these joint ventures can act as a monopoly operator on certain routes and can use market power to preclude new competition, raise fares, and engage in other anti-competitive practices, particularly where there are slot constraints at one or both ends of a route.

The 2010 U.S. Aviation Regulation contained no changes to antitrust legislation despite calls from some Members of Congress who have long questioned the public interest of immunity (i.e., exemption from U.S. anti-trust rules)to revenue-sharing partners within global alliances. They lobbied for a study on alliances (revenue sharing joint ventures) and questioned the need for antitrust immunity, but this was not reflected in the final legislation.

7.3.6 Public Service Obligation Provisions

The Public Service Obligation (PSO) rules, recently clarified as part of EC Regulation 1008/2008[223], allow Member States to protect services from peripheral airports to their hub airports. No amendments were made to this legislation in 2010.

The United States House of Representatives recommended some minor changes to the country's equivalent Essential Air Service (EAS) programme, particularly in relation to the level of federal financial support. However, the Senate rejected them and there were no significant changes in the HR 1586 Regulation[224] passed in March 2010.

The new bill does however provide for the establishment of an Office of Rural Aviation within DOT and gives the office several duties beyond those included in the House provision, for example, the development of model four year EAS contracts.

7.4 Air Service Agreements with Non-EU Countries

7.4.1 Comprehensive Agreements

One of the guiding principles behind all EU aviation regulation has been the opening up of as many aviation markets as possible to complete deregulation. Within the EU itself, this is now considered to have reached its conclusion with few areas still to be tackled. The main drive of the EU is to now roll out these improvements to include its international aviation links beyond the borders of the EU itself. The main approach is expected to be the continuation of deregulation and relaxation of rules in bilateral air services agreements between the EU, its Member States and states beyond. Wherever possible the EU has sought

[223] Regulation (EC) no 1008/2008 of the European Parliament and of the Council on common rules for the operation of air services in the Community (Recast), 24 September 2008

[224] FAA Air Transportation Modernization and Safety Improvement Act

to conclude comprehensive agreements, relying on horizontal agreements where this has not yet proved possible.

EU/US Open Skies

Following the launch of second-stage negotiations in May 2008 and seven further rounds of talks, negotiators ended with the initialling of the Second Stage Agreement, on 25 March 2010, and was formally adopted as a Protocol Amendment on 24 June 2010[225]. This latest accord fulfils the mandate given in the last EU-US Summit in November 2009 to reach a balanced agreement in 2010. The Second Stage Agreement builds on the considerable benefits of the ground-breaking First Stage Agreement by providing for considerable further advances including additional investment and market access opportunities, as well as strengthening the framework of cooperation in regulatory areas such as safety, security and, in particular, the environment, where both sides agreed on a dedicated Joint Statement on the Environment. The protocol amendment also lifted the "fly America" limitation placed on US government officials

Other Agreements

During 2010 European airlines and consumers continued to benefit from earlier successful negotiations setting up a comprehensive multilateral agreement between the EU and Morocco. The EU signed the multilateral aviation agreement with Morocco in December 2006 and this has led to satisfactory growth both in terms of the number of scheduled routes operated between Morocco and the 30 EEA states, increasing from 85 airport pairs in August 2006 to 165 in August 2010. Flights and seats offered almost doubled during the period (Table 7-1).

Table 7-1: Total Scheduled Flights between Morocco & the EU/EEA

	August 2006	August 2010	% change
Moroccan airports with direct services to EU/EEA	11	13	18.2%
EU/EEA airports with direct services to Morocco	36	65	80.6%
Airport pairs operated	85	166	95.3%
Airlines	22	30	36.4%
Weekly flights	576	1,068	85.5%
Weekly seats	88,506	173,993	96.6%
Average seats per flight	154	163	6.0%

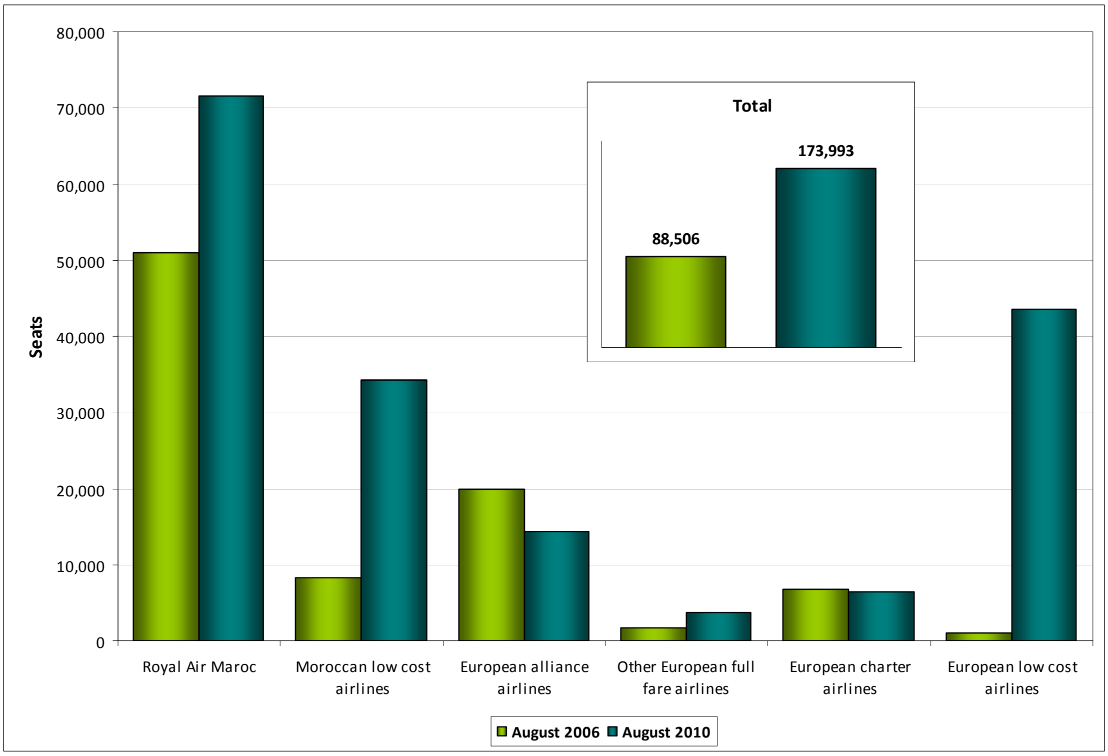
Source: OAG iSchedules

Figure 7.2 shows that most of the growth came from Royal Air Maroc, Moroccan low cost carriers and a small number of European low cost carriers. Legacy airlines belonging to the three major airline alliances lost a quarter of their traffic, while charter airlines offering seats to scheduled passengers held on to their passenger numbers but not their market share.

[225] Protocol to Amend the Air Transport Agreement between the United States of America and the European Community and its Member States. 24 June 2010.

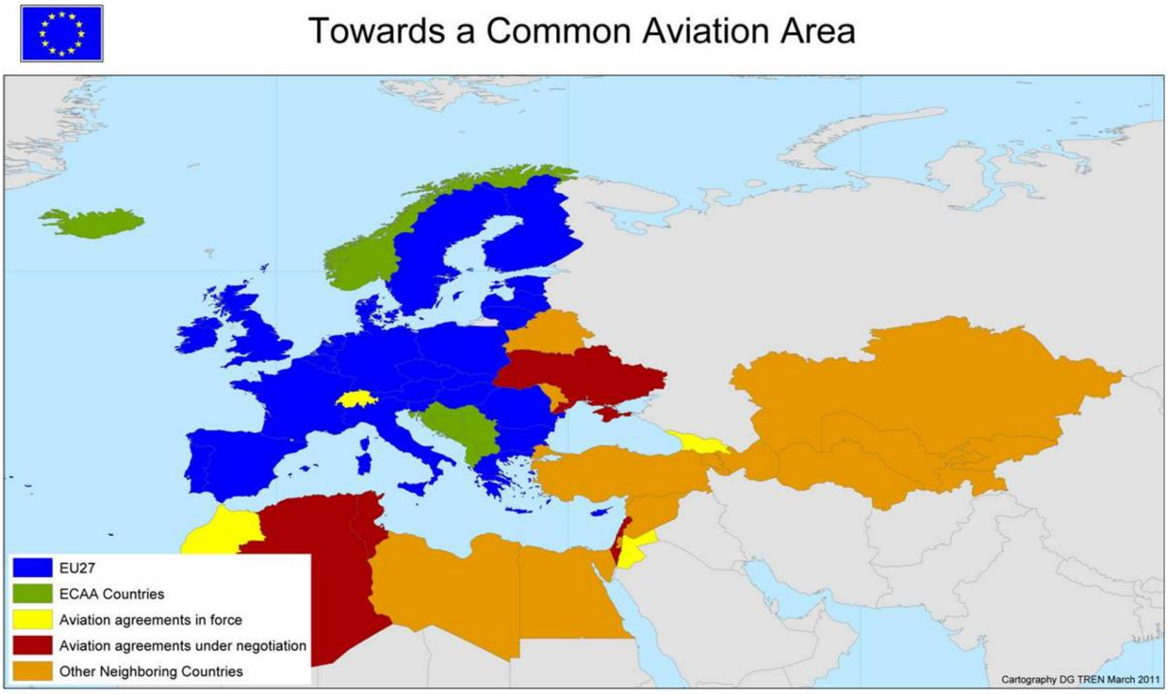
Figure 7.3 shows how the growth of similar comprehensive agreements is spreading within Europe and with its neighbours.

Figure 7.2: Scheduled Flights between Morocco & the EU/EEA by Airline Type



Source: OAG iSchedules (excludes some charter airlines and possibly some small scheduled airlines)

Figure 7.3: Towards a Common Aviation Area



Source: DG MOVE

The ECAA multilateral agreement originally signed in 2005, now covers 36 countries. Of the 13 States covered by the European Neighbourhood Programme (ENP) comprehensive aviation agreements were signed with Jordan and Georgia during 2010, while talks are under way with Ukraine, Israel and Lebanon; and have been requested by Algeria, Tunisia and Moldova. The EU is ahead of all other world areas in spreading the benefits of such comprehensive agreements.

The United States started to develop its open skies policy following an agreement with the Netherlands in 1992. Apart from its agreement with the 27 Member States of the EU, the U.S. has now concluded open skies agreements with the three other EEA states and 69 other nations, although they are yet to be applied in Benin, Croatia and Israel. At year end, discussions were continuing with Barbados and Colombia. However, these are all bilateral air services agreements – there is no comparable regional development allowing Canadian and Mexican carriers (for example) to fly between the U.S. and these countries.

The ASEAN Multilateral Agreement on Air Services and the ASEAN Multilateral Agreement on the Full Liberalisation of Air Freight Services were approved on 20 May 2009 in Manila, Philippines. These are multilateral air transport agreements among the ten-member Association of Southeast Asian Nations (ASEAN). The two agreements took effect in January 2010 and they call for a calibrated and gradual implementation in each contracting State, to allow countries with less developed airline industries to catch up with the more developed ones. It is part of the broader ASEAN Air Transport Integration and Liberalisation Plan.

7.4.2 Horizontal Agreements

Where the concept of comprehensive agreements is either not yet understood or welcomed by other states, the EU has been successfully developing its policy of horizontal bilateral air services agreements.

These agreements were made during 2010 with the Republic of Cape Verde, Saudi Arabia and Vietnam, bringing the current number of such horizontal agreements to 45.

There is no such agreement yet with Russia. In October the Commission launched infringement procedures against France, Germany, Austria and Finland as their bilateral air services agreements with Russia do not include the necessary clause allowing any EU carrier to seek to operate routes between those countries in accordance with a decision of the EU Court of Justice. The EU is now assessing carefully the remaining 23 bilateral agreements between Russia and EU Member States.

Once again, the EU is leading the way in opening up global aviation to increased competition.

There could however be some downstream difficulties associated with these two policies, in that airlines currently based in the higher-cost areas of the EU could choose to relocate to lower-cost states; and yet still have access to all of their current operational routes. This could cause employment difficulties in the high-cost states, although providing vital employment opportunities for low-cost Member States. To a certain extent this is already happening, with the example of Ryanair maintaining its operational and crew bases in Ireland, while the bulk of its operations are to or from higher-cost Member States. The airline abandoned its operating base in Marseille in order to avoid paying the higher social costs for their staff in France than those which apply in Ireland.

8. Environmental Development & Sustainability

8.1 Introduction

Air transport has helped to bring global communities closer together. The benefits of the aviation industry are well-rehearsed from both an economic and social perspective. From the goods we send, to the people and places we visit, air travel has shaped the quality of modern life and heightened awareness of our global society.

However, this progress has not been without cost to the environment. The broad target for the air transport industry is, along with every other global industry, to reduce its greenhouse gas (GHG) emissions. The core principles of sustainability are at the forefront of every airport master plan, airline business model and air traffic management vision. As international pressure mounts for the aviation industry to develop ever more efficient technology and means of operation, this chapter provides an overview of the key issues facing the industry in 2010 in an environmental context.

The chapter begins with a high level review of the agreed industry targets, followed by a brief overview of the major CO_2-emitting nations, airports and airlines in Europe. A report on the developments and achievements of the industry precedes a review of the progress on sustainable aviation fuels. Environmental developments in the United States are highlighted following a meeting of the Future of Aviation Advisory Committee in late 2010. Market based measures are explored with a focus on taxation in Europe and elsewhere, preceded by an update of the potential ramifications of the inclusion of aviation in the European Union Emissions Trading Scheme in 2012.

8.2 Emissions Targets

8.2.1 ICAO Framework

Following ICAO's 37th Assembly in Montreal in October 2010 and the United Nations Framework Convention on Climate Change (UNFCCC) summit in Cancun in December 2010, ICAO has established a global framework to reduce GHG emissions from aviation. Under this framework (ICAO Resolution A37-19) , the 190 ICAO member states signed up to a global aspirational goal of improving fuel efficiency by 2% a year until 2050, while striving to collectively achieve carbon neutral growth from 2020. The resolution also called for the development of a global framework for market based measures, such as emissions trading schemes and taxation, to be considered in 2013.

In approaching the mitigation of international aviation emissions ICAO has placed emphasis on airframe and engine technology, air traffic management and operational measures; with measured success. Recognising that technological and operational advances will prove inadequate on their own to counter the impact of continuing growth of air traffic, ICAO has also addressed economic instruments such as taxes, charges and emissions trading. However, ICAO has not been able to reach agreement on these market based measures (MBM) despite intensive examination over a number of years. At the same time, it should be recognised that thirteen years after ICAO was given its Kyoto mandate, its new Assembly Resolution has finally established a framework for moving forward.

8.2.2 ATAG Industry Targets

Formed in the early 1990s the Air Transport Action Group (ATAG) is an independent coalition of organisations and companies throughout the air transport industry which have united to drive aviation infrastructure improvements in an environmentally responsible manner. ATAG membership is comprehensive with members including airports, airlines, manufacturers, air navigation services providers, airline pilot and air traffic controller unions, chambers of commerce, travel and tourism organisations, ground transportation and communications providers.

ATAG has adopted collective global industry targets, including a 1.5% average annual fuel efficiency improvement through to 2020, carbon neutral growth from 2020 and a trajectory towards halving net carbon emissions by 2050 compared with 2005. These targets are dependent upon advancements in technologies and sustainable fuels.

Critics maintain that ATAG's goal of a 1.5% average annual fuel efficiency improvement through 2020 is effectively a 'business as usual' scenario, achieved through the introduction of newer aircraft types as well as air traffic management (ATM) and operational enhancements.

ICAO's target of an additional 0.5% per annum is thought to be more onerous.

8.3 Aviation CO_2 Emissions in Europe

In a European context, the UK is by far the most significant contributor of CO_2 emissions from aviation, in line with its position as the leading air transport market in Europe and in part due to its island status. Germany follows as the second largest emitter, while France and Spain make up the top four.

Table 8-1 below depicts estimated CO_2 output from scheduled commercial air transport operations within the scope of the European Union Emissions Trading System (EU ETS), within that country's borders. For example, the United Kingdom CO_2 output is an estimated aggregate of emissions from scheduled air transport operations at UK airports. The data does not include overflight emissions[226].

Table 8-1: CO_2 Emissions Estimate by Country 2010

Country	Tonnes CO_2	% share
United Kingdom	44,900,745	26.2%
Germany	31,411,992	18.3%
France	25,001,122	14.6%
Spain and Canary Islands	17,034,457	9.9%
Netherlands	13,300,655	7.8%
Italy	13,245,207	7.7%
Portugal	3,709,925	2.2%
Belgium	3,285,707	1.9%
Greece	2,548,752	1.5%
Austria	2,533,994	1.5%
Denmark	2,508,991	1.5%

[226] CO_2 emissions were generated using methodology for calculating aircraft fuel burn from scheduled air transport operations within the scope of EU ETS and flight schedule data from Innovata.

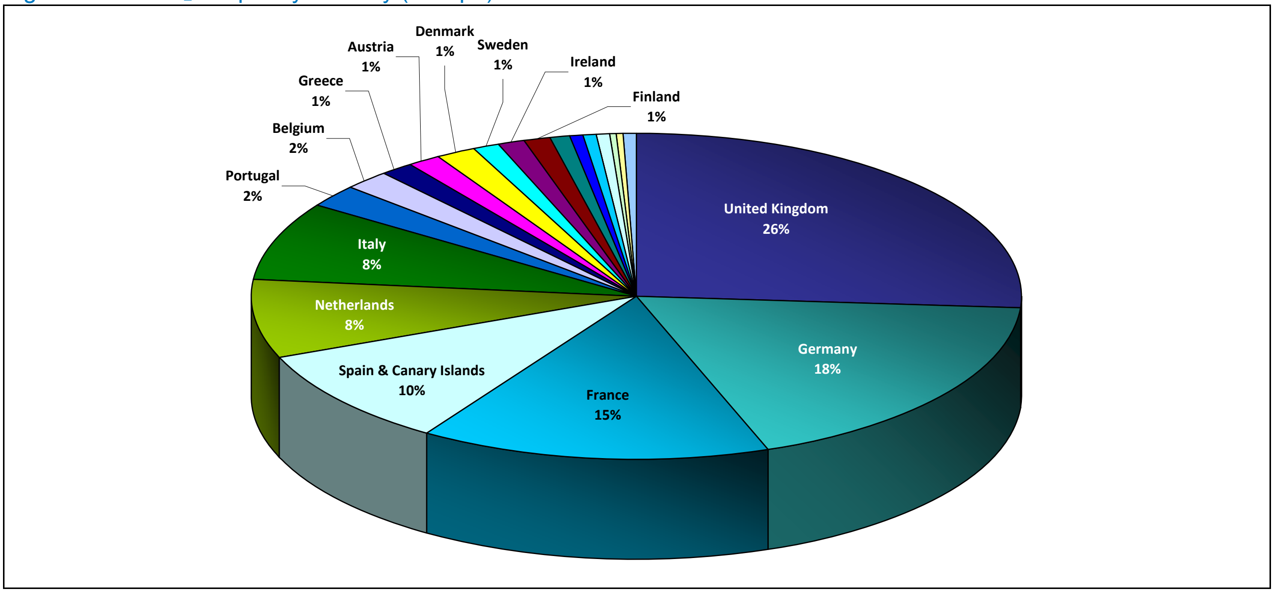
Country	Tonnes CO_2	% share
Sweden	2,256,051	1.3%
Ireland	1,954,267	1.1%
Finland	1,942,486	1.1%
Poland	1,184,921	0.7%
Czech Republic	1,035,855	0.6%
Cyprus	844,036	0.5%
Romania	774,932	0.5%
Hungary	676,272	0.4%
Latvia	418,517	0.2%
Others	1,028,067	0.6%
Total Europe	**171,596,951**	**100.0%**

Source: RDC Aviation

In total, European aviation-related CO_2 emissions were 171.6 million tonnes, up 2.7% on 2009.

The UK accounts for over one quarter of total European aviation-related CO_2 emissions. It is interesting to note that although Germany and Spain have approximately equally sized air transport markets (in terms of airport passenger throughput in 2010), Germany contributes nearly double the CO_2 emissions of Spain chiefly due to the aircraft mix at Frankfurt Main as opposed to Madrid Barajas – there is a greater proportion of four-engine long-haul widebody aircraft at Frankfurt compared to Madrid[227].

Figure 8.1: CO_2 Output by Country (Europe) 2010



Source: RDC Aviation

[227] RDC Aviation, Q4 2010 EU Aviation Emissions Report

Table 8-2: CO_2 Emissions Estimate by Airport 2010

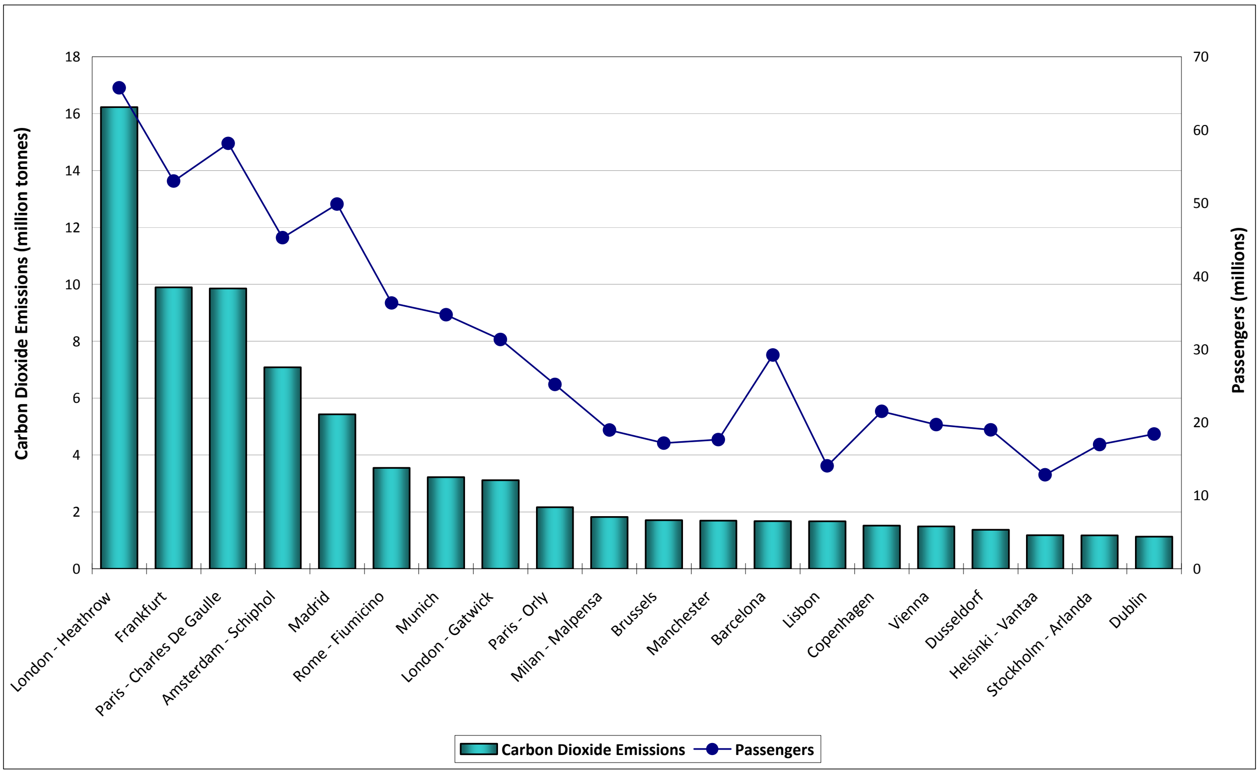
Airport	Tonnes CO_2	% share
London - Heathrow	16,227,256	15.1%
Frankfurt	9,892,726	9.2%
Paris - Charles De Gaulle	9,849,611	9.2%
Amsterdam - Schiphol	7,084,182	6.6%
Madrid	5,430,924	5.0%
Rome - Fiumicino	3,545,825	3.3%
Munich	3,224,331	3.0%
London - Gatwick	3,110,108	2.9%
Paris - Orly	2,161,269	2.0%
Milan - Malpensa	1,822,088	1.7%
Brussels	1,702,166	1.6%
Manchester	1,687,637	1.6%
Barcelona	1,678,411	1.6%
Lisbon	1,665,559	1.5%
Copenhagen	1,518,023	1.4%
Vienna	1,486,280	1.4%
Dusseldorf	1,367,974	1.3%
Helsinki - Vantaa	1,177,644	1.1%
Stockholm - Arlanda	1,170,956	1.1%
Dublin	1,132,956	1.1%
Total – All Airports	**107,603,581**	**100.0%**

Source: RDC Aviation

In terms of individual airports, CO_2 emissions are naturally concentrated around the major European hubs where legacy flag carriers operate global networks, with London Heathrow contributing nearly 65% more CO_2 than Frankfurt and Paris CDG; and more than double Amsterdam's emissions. Heathrow dominates the list due to the proliferation of widebody aircraft on transatlantic and other long-haul routes – it remains the busiest international airport in the world (Table 8-2).

Figure 8.2 below illustrates a 'tiered' structure to the emission contributions of European airports with Heathrow dominant, followed by other major European hubs (Frankfurt, Paris CDG, Amsterdam, Madrid), then second tier airports of Rome FCO, Munich, London Gatwick, Paris Orly, Milan Malpensa and Brussels; which is in line with traffic volumes at those airports.

Figure 8.2: Carbon Dioxide Emissions & Passenger Throughput at European Airports 2010



Source: RDC Aviation

Airline contributions to European CO_2 emission levels are calculated according to scheduled operations at European airports (i.e. within the scope of EU ETS). Legacy carriers dominate the table below on account of the major global networks operated and the aircraft fleet mix with a significant proportion of four-engine long-haul types.

Table 8-3: CO_2 Emissions Estimate by Airline 2010

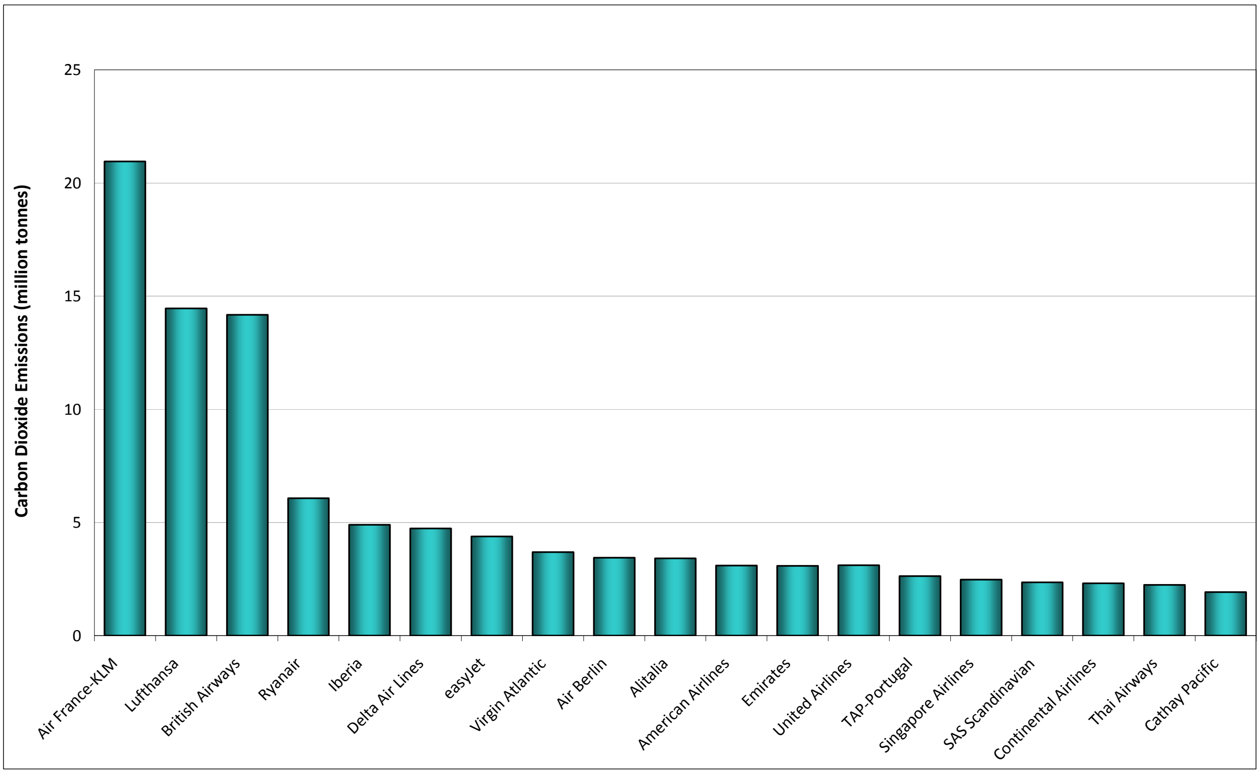
Airline	Tonnes CO_2	% share
Air France-KLM	20,952,155	12.2%
Lufthansa	14,464,175	8.4%
British Airways	14,176,078	8.3%
Ryanair	6,075,227	3.5%
Iberia	4,894,727	2.9%
Delta Air Lines	4,735,336	2.8%
easyJet	4,385,713	2.6%
Virgin Atlantic	3,691,004	2.2%
Air Berlin	3,445,351	2.0%
Alitalia	3,412,540	2.0%
American Airlines	3,096,937	1.8%
Emirates	3,088,106	1.8%
United Airlines	3,115,202	1.8%
TAP-Portugal	2,630,159	1.5%

Airline	Tonnes CO_2	% share
Singapore Airlines	2,468,749	1.4%
SAS Scandinavian	2,353,106	1.4%
Continental Airlines	2,318,799	1.4%
Thai Airways	2,239,219	1.3%
Cathay Pacific	1,923,994	1.1%
Others	68,130,376	39.7%
Total – All Airlines	**171,596,953**	**100.0%**

Source: RDC Aviation

Air France-KLM, Lufthansa and British Airways contribute an aggregate 29% of calculated airline CO_2 emissions from European airport operations. This is due to their global network coverage and consequent high average sector length, compared to short-haul or regional airlines. Ryanair, easyJet and Air Berlin emit the same level of CO_2 as secondary national flag carriers such as Iberia, Alitalia, TAP-Portugal and SAS Scandinavian; a sign of the strength and size of European low cost carriers.

Figure 8.3: Carbon Dioxide Emissions of Airlines Operating within Europe in 2010



Source: RDC Aviation

8.4 Industry Developments & Achievements

ICAO outlines some of the major achievements in the industry and highlights the progress made towards meeting the targets the industry has set itself, in its report 'Environmental Report 2010: Aviation and Climate Change'[228].

In terms of practical measures, the Advisory Council for Aeronautics Research in Europe (ACARE) has established its 'Vision 2020' which targets an overall reduction of 50% in CO_2 emissions coupled with a 50% reduction in the perceived noise level; and a reduction of 80% in NOx emissions – each compared to 2000 levels. These ACARE objectives are technology goals set in 2000 and thus should be mature enough for introduction into aircraft by 2020, given the advances already made since the goals were specified. Two significant examples of how the European air transport industry is working to achieve these goals through initiatives are the Clean Sky Joint Technology Initiative (JTI) – one of the largest European research projects ever launched – and the Single European Sky ATM Research project (SESAR).

In North America, taking advantage of a continuous transformation of air traffic management (ATM) within the concept of a single sky is necessary to provide the environmental protection that allows sustained aviation growth. This will be done primarily through the 'NextGen' project in the United States in cooperation with the aviation industry and the project features comparable objectives in line with those in Europe.

In addition some cooperation initiatives exist, such as the 'Atlantic Interoperability Initiative to Reduce Emissions' (AIRE), with collaboration between FAA and the European Commission; and the 'Asia Pacific Initiative to Reduce Emissions' (ASPIRE), a joint venture comprising Asia Pacific airlines and ANSPs.

8.4.1 NextGen

The U.S. NextGen programme is designed to implement a series of measures aimed at reducing greenhouse gas (GHG) emissions and improving operational efficiencies.

NextGen will transform aircraft surveillance from ground based radar technology to the satellite global positioning system (GPS), which will change navigation from indirect navigational sectors into more direct trajectories. Under NextGen much of the air-ground communication traffic will move from voice to data. It will create a data system that provides all stakeholders with the same information at the same time. These new technologies will also help develop more fuel efficient airframes and engines and will assist in the development and deployment of sustainable alternative fuels. NextGen systems and procedures will enable simpler, more direct trajectories throughout all phases of flight including surface operations before takeoff and after landing. Collaboration between air traffic controllers, aircraft operators, airline flight operations centres and airport operations managers will progress departing aircraft to their takeoff holding positions and arriving aircraft to their gates or parking assignments more quickly and efficiently. System-wide management and sharing of information will make improved surveillance, communications and weather reporting and forecasting available to all these parties in a common format, enabling everyone to see and act on the same data at the same time.

[228] Environmental Report 2010: Aviation and Climate Change, ICAO 2010

8.4.2 SESAR

The Single European Sky (SES) is an initiative launched by the European Commission in 2004 to reform the European ATM system. It sets a legislative framework to meet future capacity, safety, cost-efficiency and environmental needs at a pan-European level. SES is the political transformation of the European ATM system.

SESAR is the operational and technological dimension of the Single European Sky. It will help create a 'paradigm shift' supported by state-of-the-art and innovative technologies designed to eliminate fragmentation in the future European ATM system. The operational concept of 4D trajectories at the heart of SESAR is the same as that of NextGen and both programmes are being developed in close collaboration to ensure airspace user requirements evolve in a harmonious manner.

SESAR is currently in its Development Phase which runs until 2013. The initial Definition Phase resulted in the European ATM Master Plan[229] which defined the path towards the achievement of performance goals as agreed at EU ministerial level (horizon 2020, baseline 2005) as follows:

- Enable a 10% reduction in CO_2 emissions per flight;
- Reduce ATM costs by 50%;
- Enable a threefold increase in capacity;
- Improve safety by a factor of 10.

European Commission Regulation 691/2010 sets out environmental indicators for the aviation industry. EUROCONTROL produced its Performance Review Report in May 2010 in which it assesses the environmental performance of European Air Traffic Management against its targets[230].

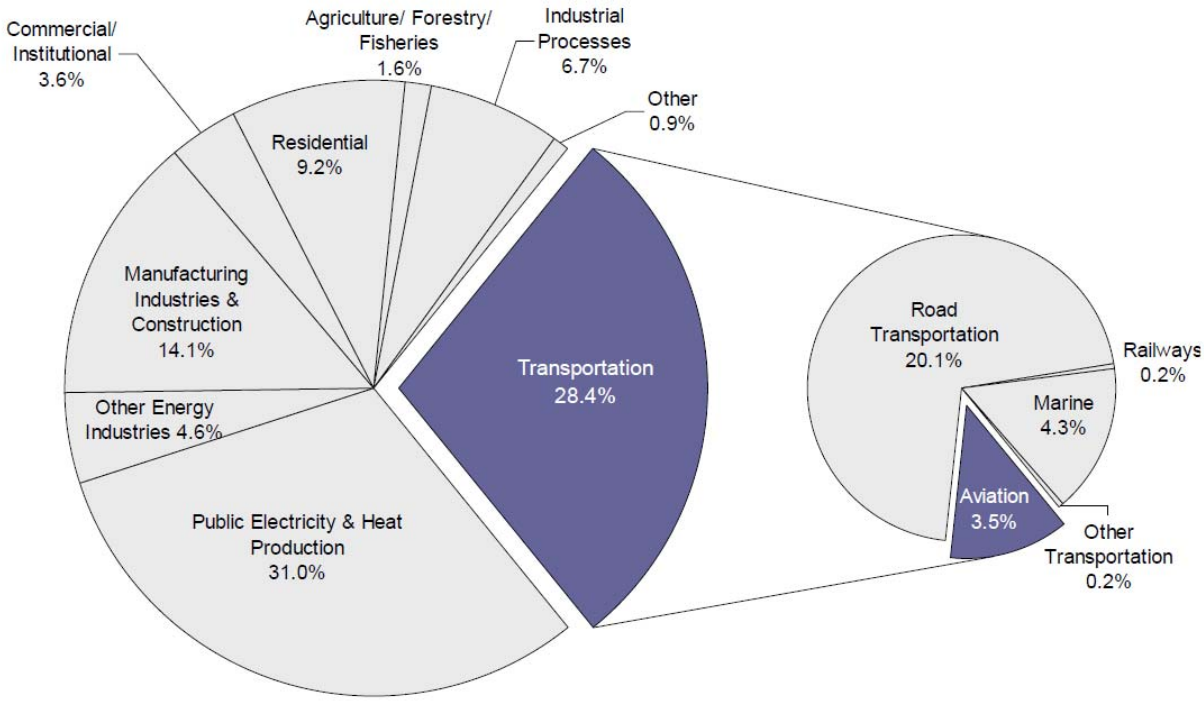
A summary of the main findings are as follows:

- Aviation represents 3.5% of man-made CO_2 emissions in Europe. Long-haul flights (>3 hours) for which there is virtually no substitute account for 13% of flights, but 60% of fuel burn. Flights shorter than one hour, which could possibly be substituted, represent 23% of flights but only 4% of total fuel burn in Europe (see Figure 8.4).

[229] European Air Traffic Management Master Plan, Edition 1, European Commission/EUROCONTROL/SESAR Joint Undertaking, 30 March 2009

[230] Performance Review Report: An Assessment of Air Traffic Management in Europe during the Calendar Year 2009, EUROCONTROL, May 2010

Figure 8.4: Contribution of CO_2 Emissions by Sector in EU27 Area (2007)



Source: EUROCONTROL

- The average ANS fuel efficiency is estimated to be close to 94%, meaning there is limited scope for improvement from ANS.
- Total ANS actionable CO_2 emissions are estimated to be around 6% of total aviation related emissions and account for some 0.2% of total CO_2 emissions in Europe. Due to safety, noise and capacity limitations the ANS actionable inefficiencies cannot be reduced to zero.
- The extension of the horizontal en route flight path is the main component of emissions (3.6% of total fuel burn) followed by delays in the terminal area (1.1% of total fuel burn). Significant fuel efficiency improvements could be realised by giving high priority to the optimisation of the route network and the implementation of arrival managers at main airports. In the longer term (SESAR) the focus should move to a more integrated management of the flight trajectory, geared to optimising arrival time.
- Noise and local air quality are major concerns of residents in the vicinity of major airports. The implementation of local restrictions implies complex trade-offs between noise, emissions, capacity and safety which need to take into account local characteristics.
- The implementation of Airport Collaborative Decision Making (CDM) at more European airports would help to improve taxi efficiency (and hence local air quality) and improve the accuracy and timeliness of information locally and at the network level.

8.4.3 The Atlantic Interoperability Initiative to Reduce Emissions (AIRE)

The European Commission (EC) and the U.S. Federal Aviation Administration (FAA) signed a cooperative agreement establishing the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) in June 2007[231]. AIRE is part of SESAR and NextGen joint efforts to hasten environmental improvements and aims to deliver the development and implementation of environmentally friendly procedures for all phases of flight (gate-to-gate) and validate continuous improvements with trials and demonstrations.

Under this initiative, airlines, air navigation service providers (ANSP), the manufacturing industry, and airports work collaboratively and perform integrated flight trials and demonstrations validating solutions for the reduction of CO_2 emissions in all phases of flight (gate-to-gate).

During 2010, six projects awarded for funding in 2008/2009 (AIRE1) were closed, international outreach activities were carried out, a new call for tender were issued (AIRE2), and consequently selection of 18 new projects enlarging extensively the geographical and technical scope of the programme.

Additionally, the links with the FAA were also strengthened with the establishment of weekly conference calls and more regular exchange of technical information.

AIRE 1: Flight Trials

Under AIRE 1, approximately 1,150 demonstration trials for ‘green’ surface, terminal and oceanic procedures took place in five locations involving 18 partners in 2009, with an additional two full ‘green’ gate-to-gate flights from Paris Charles de Gaulle (CDG) to Miami which took place in April 2010.

Some key achievements include:

- 6 successful projects;
- 6 efficient consortiums comprising 18 partners of which 5 airlines and 5 ANSPs;
- 152 trials performed;
- CO_2 savings per flight ranged from 90 to 1,250kg and the accumulated savings during trials were equivalent to 400 tons of CO2;
- Awareness raising and crews and controllers motivation boosting to carry out more environmental friendly activities;
- Attracted international attention and high interest in the initiative.

- **Surface Movements**

Three types of innovative ground movement measures were evaluated: ‘departure taxiing with one or two engines off’, to measure fuel savings; ‘minimising arrival taxi time’, to reduce taxi time for arrivals when possible; and ‘minimising departure taxi time’, with the objective of optimising the sequence of departures to reduce waiting time at the departure threshold.

- **Terminal Area (TMA)**

Three separate projects were undertaken at Terminal Areas across Europe.

[231] Signed at the Paris Air Show in June 2007

In Stockholm, Sweden, a consortium carried out the 'Minimum CO_2 in the TMA' (MINT) project. Optimised aircraft operations during descent into Stockholm Arlanda airport were performed, identifying fuel savings per flight of between 140 to 165kg. From an operational perspective no problems were reported in implementing the new procedure, planned to enter into normal operations in the short-term initially during low traffic periods.

The Paris project was conducted by a consortium composed of the French DSNA and Air France. The demonstrations included Continuous Climb Departure (CCD) from Charles de Gaulle (CDG) and from Orly; 'Tailored Arrivals' to CDG and to Orly; and Continuous Descent Approach (CDA) to Orly.

In Madrid, Spain, Air Navigation Service Provider and Airports Operator of Spain (AENA), Iberia and INECO conducted the RETACDA project. CDA procedures were performed at night using Airbus A320 and A340 Iberia aircraft in a North configuration. Data from other flights in the same fleet not performing the CDA approach was used as a baseline to compare the CDA fuel savings benefit, estimated at approximately 80kg. For the four-engine aircraft (A340), the fuel consumption reduction was about 260kg. For both types of aircraft around 25% less fuel was consumed during descent performing CDA rather than non-CDA. Translated to emissions reductions, the results show that the potential savings per flight are about 250kg and 800kg of CO_2 for the A320 and A340 respectively.

- **Oceanic**

Two projects in two different locations tested the optimisation of flight profiles.

In Santa Maria, Portugal the NATCLM Project was conducted by a consortium where demonstration flights were carried out inside the Santa Maria Oceanic Flight Information Region (FIR, ICAO NAT region) managed by NAV Portugal, with optimised flight profiles. Overall the project achieved estimated potential savings of between 14 and 29kg of fuel.

The Oceanic-NAT ADSB Project in Reykjavik, Iceland was conducted by a consortium comprising the Service Provider ISAVIA, Icelandair and TERN Systems. Icelandair ran 38 flight trials on the Keflavik–Seattle route between October 2009 and January 2010. Icelandair's flight control evaluated each flight and executed step climbs with a reduced rate of climb, direct routing, and/or variable speed when desirable.

- **Full Gate-to-Gate Flights**

The two first complete (gate-to-gate) green transatlantic flights were operated in April 2010 from Paris CDG to Miami airport. The flights were carried out by Air France (6 April) and American Airlines (7 April). During the approximately nine hour flight, enhanced procedures were used to improve the aircraft's energy efficiency. These procedures, applied at each flight stage and coordinated among all project participants, reduced fuel consumption (and hence CO_2 emissions) throughout the flight from taxiing at CDG to arrival on the parking stand in Miami. Additionally, during the departure and arrival phases the procedures helped minimise noise levels. Air France estimates that by applying these optimisations to all Air France long-haul flights to and from North America, a reduction of CO_2 emissions of 135,000 tonnes per year could be achieved with fuel savings of 43,000 tonnes; which Air France calculates is roughly equivalent to 0.5% of total Air France fuel consumption[232]. The airline estimates that its long-haul flights account for almost 80% of its CO_2 emissions.

[232] http://corporate.airfrance.com/en/

AIRE 2: Eighteen new AIRE projects committed for EUR 2.6 million.

Eighteen out of twenty-five new AIRE projects were selected for co-funding during 2010 following a call for tender according to pre-established criteria – always projects entailing significant environmental benefits and strongly linked to implementation – resulting in a significant enlargement of the programme's geographical coverage and partners. These projects have a maximum duration of 15 months with the majority of them extending to the end of 2011. More than 5000 trials are expected and other airlines will voluntarily join existing trials.

- **Surface:**

Two projects cover surface trials. The project "Greener airports operations under adverse conditions" executed by DSNA in partnership with Aéroports de Paris and Air France will for example study operational situations in adverse conditions, caused by bad weather conditions or other factors that constrain runway use.

- **Terminal Area (TMA):**

Out of the five proposals considered for terminal operations, one is conducted by Lufthansa in cooperation with DFS and Germanwings. The partners propose to trial a new procedure coupling the arrival flows of Dusseldorf and Cologne. This area has a high traffic density and is a complex area entailing the achievement of significant environmental benefits when implemented.

- **Oceanic:**

For en-route/oceanic, four projects are selected covering five key locations (Portugal, Canada, Morocco, the United Kingdom and the United States). NAV Portugal will for example with TAP Portugal and the Moroccan ONDA (Office National des Aéroports) aim to offer shortest flight paths across the flight information regions of Lisbon and Casablanca to heavy long-range aircraft that operate those routes. The miles and minutes saved using this procedure entail significant fuel savings and CO2 reduction.

- **Full Gate to Gate flights:**

In total, seven gate-to-gate projects will be conducted through the programme. Amongst others, AIRBUS, Air France, NATS, and NAV Canada will perform a series of transatlantic green flights with the A380. The project will demonstrate the benefits of the next generation ATM operations with today's technology, leading to significant reductions in fuel burn and CO2 compared to current operations.

In total, some 40[233] partners involving 11 airlines, 7 airports and/or airport authorities, 14 air navigation service providers, and 10 industrial partners will demonstrate that significant efficiency gains can be achieved through new procedures using existing technology. The FAA is effectively contributing to three projects with technical and operational support.

[233] Some partners are at the same time ANSPs and Airport authorities

8.4.4 The ASPIRE Project

In 2008 ANSPs Airservices Australia, Airways New Zealand and the U.S. FAA joined forces to create the 'Asia Pacific Initiative to Reduce Emissions' (ASPIRE). Since the group's inception ANSP membership has expanded with the inclusion of the Japan Civil Aviation Bureau (JCAB) in 2009 and the Civil Aviation Authority of Singapore (CAAS) in 2010.

Working closely with airline partners Air New Zealand, Qantas, United Airlines, Japan Airlines and Singapore Airlines, ASPIRE will measure the efficiency of every aspect of the flight from gate-to-gate.

As part of establishing a baseline for air traffic management performance and carbon emissions, ASPIRE undertook a series of three trans-Pacific flights operating a Boeing B777, B747-400 and an Airbus A380 aircraft. Each flight was managed by an ANSP and involved close collaboration with the airline partners. These three flights resulted in a total fuel saving of 17,200kg, representing a CO_2 emissions reduction of 54,200kg. Two additional demonstration flights conducted by JCAB and CAAS in sequence both operating a B747-400 aircraft showed fuel savings of about 15,600kg, equivalent to a CO_2 emissions reduction of about 47,000kg.

8.4.5 Brasília Terminal Area

It is important to note that initiatives are underway outside of Europe and North America in the 'emerging' nations. In some of these economies a real recognition exists that developing efficiencies will benefit growth opportunities as well as limiting the environmental impacts of aviation.

A pertinent example of how a range of operational measures can be applied in practice to one geographical area is Brasília, where recent changes in air navigation and airport operations at Brasília Airport located in Brazil's capital have had or will result in an environmental impact. Brasília's international airport ranks third in Brazil in terms of aircraft movements and passengers. Due to its strategic location the airport is now becoming one of the main hubs of the country. In parallel with strong economic growth, the Brazilian civil aviation sector has recently been experiencing a period of significant growth.

The Brasília Terminal Area (TMA) is operational airspace centrally located in Brazilian territory. It acts as a hub for much of the national air traffic and connects the north and northeast cities to the south and southeast regions, playing a crucial connecting role in the region. In addition, all international flights originating in Central and North America which are destined for main airports in the southern region of the continent are controlled by this area. In this broad context, the consideration of environmental issues is important because the large amount of operations taking place in this area have the potential to generate a significant environmental impact, both locally and globally.

The recent redesign of airspace in the Brasília Terminal Area in 2010 from sensor-based to performance-based navigation (PBN) is aimed at producing more efficient, streamlined and safe use of airspace. It has yielded important gains in fuel savings and reductions in greenhouse gas emissions. Other important benefits were also obtained such as improved traffic control and safety, as well as reduced workload for pilots and air traffic controllers. The results of the implementation of PBN showed a reduction of about 75,500kg of CO_2 per day in emissions from aircraft operating in the terminal area, or approximately 0.11% of all daily carbon dioxide emissions. This reduction, although modest, is equivalent to the fuel use and emissions of about ten Boeing B737 flights from Brasília to São Paulo.

Allied to changes in the TMA, ongoing modifications in runway and taxiway management have also been introduced to optimise taxiing operations, thus reducing aircraft taxi time and fuel burn.

A second runway at Brasilia Airport was opened in 2005 which significantly increased the overall capacity of the runway system. New procedures for use of the runways were adopted as well as a special noise abatement procedure, resulting in the avoidance of overflying populated areas. In terms of emissions, the changes in runway and taxi areas represent a daily saving of about 63,000kg of jet fuel due to reduced taxi times; equivalent to a reduction of 198,000kg of CO_2 emissions, or about 72,000 tonnes per year of CO_2 emissions around the airport. This is a substantial result that has clear implications for local air quality.

In summary, preliminary assessments of these operational changes at Brasília Airport have shown that reductions in greenhouse gases and noise can be achieved. While some of the individual savings are relatively modest, the compound effect contributes to a net reduction in GHG emissions and noise.

8.4.6 Advances in Weight Reduction & Engine Efficiencies

Attaining the operational and environmental efficiencies necessary to ensure the airline industry is able to achieve unconstrained growth over the next four decades will require dramatic gains.

Many of these will be achieved through the use of advanced materials such as composites[234]. The use of such materials will have the impact of reducing the weight of aircraft and because lighter aircraft need less fuel to get airborne, fuel efficiencies will follow as newer aircraft will require less fuel than older counterparts to complete the same flight journeys.

8.4.7 Use of Composite Materials

Airbus and Boeing are building aircraft today with more than 50% composite structures whilst engine manufacturers offer a variety of new propulsion solutions, from the advanced high-bypass and geared turbofan to the open rotor. Concurrently component suppliers are making substantial progress with composite solutions to reduce the weight and complexity of parts and assemblies.

As an example of the evolution of technological progress, Boeing reports that 1% of the B747 was made from composites while 3% was used in the B757 and B767 structures. In modern types composites form 11% of the B777 and more than 50% of the B787. Similarly in Airbus types around 25% of the A380 is composite in such areas as the vertical and horizontal tail, tail cone, flap track fairings, centre wing box, wing ribs and undercarriage gear doors. Industry sources believe that although the B787 and A350 currently represent the cutting edge of aircraft manufacturing technology, there is much further potential to gain from the use of composite materials.

8.4.8 Gains in Engine Efficiency

Historical improvements in the efficiency of the jet engine have been remarkable with fuel consumption improving dramatically in the last forty years. The Rolls Royce RB211-535E4 which powered the Boeing B757 consumed 20% more fuel than the current Rolls Royce Trent 1000 engine used on Airbus A380s. Even in the last ten years the efficiency gains have been significant. The Trent 1000 is about 13% more fuel efficient than the Trent 895 on the B777 and produces 33% less NOx.

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[234] Lighter is Greener, ATW Air Transport World, January 2011

Engine manufacturers across the industry are investing heavily in the development of improved hardware. Pratt & Whitney is claiming double-digit improvements in fuel efficiency with its PW1000G series as it prepares to roll out the engine on the new Airbus A320neo (new engine option) aircraft halfway through this decade. Airbus has declared fuel savings of up to 15% (equivalent to 3,600 tonnes of CO_2 annually) and similar reductions in NOx, noise and operating costs with an increase in range or payload. According to Pratt & Whitney the key to the fuel saving potential of the geared turbofan is the significant increase in bypass ratio through the gear system and high-speed LP turbine. The new engines on the A320neo aircraft have a bypass ratio[235] up to double that of the current narrowbody engines. Engine manufacturer CFM with its LEAP-X engine technology has also been selected for the A320neo with similar efficiencies promised.

Engine weight is another area of development for manufacturers. GE Aviation has developed the GEnx engine with the use of titanium aluminide (TiAl) for the Boeing B747-8 and B787; the material is reportedly half the density of nickel alloys. GE states that the main benefit of TiAl is its ability to withstand high temperatures and to operate in high-corrosion and high-oxidation environments. On the B787, the GEnx composite fan case using TiAl delivers a 160kg saving for each engine.

8.4.9 Airline Initiatives

Dubai-based airline Emirates is recognised as an industry leader in the area of pursuing weight savings as it investigates every aspect of its own operation and cabin fitting to cut weight. It has scrapped its in-flight magazine and made significant gains with seat design. The airline states that economy seats in its new A380 fleet weigh 21kg each, compared to 29kg in its A340-500. According to Emirates, the weight per economy seat could drop to 11kg on its newer A380 deliveries using the latest fibre-optic technology in IFE systems. With over 400 economy seats, the cumulative weight saving could reach three tonnes per A380.

8.4.10 Components

Aircraft component suppliers are offering smaller but cumulatively significant weight gains by developing metal replacement components for parts such as structural brackets and fittings. As an example, U.S.-based multinational supplier Greene Tweed has developed the capability to produce complex components using long-fibre carbon materials as an alternative to metals, offering great potential for weight savings as the alternative material is reported to have a density 40% less than aluminium, 65% less than titanium and 80% less than steel.

8.4.11 Sustainable Aviation Fuels

IATA is targeting carbon neutral growth for aviation from 2020 and a 50% reduction in emissions compared with 2005 levels by 2050. Included in this effort is a projected 1.5% annual increase in fuel efficiency to 2020, driven by better airframes, engines and air traffic management techniques and airspace usage[236]. Sustainable aviation fuels, or ‘biofuels’, which hold the promise of a carbon-neutral fuel source, will also play a major role in IATA’s green target.

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[235] Bypass ratio (BPR) is defined as the ratio between the mass flow rate of air drawn in by the fan bypassing the engine core to the mass flow rate passing through the engine core. A low BPR gives a higher exhaust speed, needed to maintain higher air speeds but also increases fuel consumption.

[236] Biofuel developments; Centre for Asia Pacific Aviation 17th Sept. 2010

Emissions from biofuels are only fractionally lower than those of traditional fossil fuels, but plant and algae feedstocks capture CO_2 as they grow, offsetting what will be emitted when they are burned. Testing by commercial airlines has already been conducted with 50:50 'drop-in' mixtures of biofuel and traditional aviation kerosene, proving that drop-in fuels can be used without making any modifications to the aircraft or the fuel infrastructure such as pumps, storage or pipelines. The target is to fully certify aviation biofuels by 2013 although there is a possibility that drop-in biofuel blends could be certified before the end of 2011.

Airlines and the aviation industry are collectively taking the move to biofuels seriously. In 2008 the Sustainable Aviation Fuel Users Group (SAFUG) was formed to accelerate the development and commercialisation of sustainable aviation fuels. Membership reflects the global nature of interest and intent in tackling the issue.

Table 8-4: Sustainable Aviation Fuel Users Group Members

SAFUG Members		Affiliates
Air France-KLM	Gulf Air	Boeing
Air New Zealand	Japan Airlines	Airbus
Alaska Airlines	Lufthansa	Embraer
All Nippon Airways	Qantas	Honeywell
Avianca	SAS Scandinavian Airlines	
British Airways	TAM	
Cargolux	TUI Travel	
Cathay Pacific	Virgin Atlantic	
Etihad Airways	Virgin Blue	
Gol		

Source: SAFUG

Virgin Atlantic, Air New Zealand, Japan Airlines, Qatar Airways, Continental Airlines, United Airlines and Air France-KLM have all successfully tested biofuels and alternative fuels and more airlines are set to join them in 2011.

British Airways is also getting involved in 'green' developments[237], having set itself some challenging carbon emission reduction targets over the next decade. It announced in 2010 that it will partner with U.S. company Solena to build a biofuel plant in London to convert biomass waste into liquids in commercial quantities, to power its fleet operating from London City Airport. While the small scale (16 million gallons per annum) does not represent full commercialisation, British Airways calculates the plant could save £36 million in landfill costs by utilising 500,000 tonnes of biomass feedstock each year.

Already active in Europe are the French-driven CALIN and CAER projects and the EU-wide ALFA-BIRD (Alternative Fuels and Biofuels for Aircraft Development) research and development programme; and SWAFEA, the European Commission's incentive to investigate the feasibility and the impact of the use of alternative fuels in aviation.

In Russia, state-owned Russian Technologies announced it will begin construction of the country's first biofuel facility in early 2011.

[237] Fresh Greens, Aerospace International, February 2011

In Asia, Thailand's PTT Aromatics and Refinery announced plans this month to invest USD 150 million to develop aviation biofuel and bio-diesel products and production facilities. The move is driven by the need to meet the inclusion of aviation into the EU ETS, which will take effect in 2012. If the company goes ahead with the plan, large-scale production is proposed to commence by early to mid-2012.

American aerospace firm Honeywell also announced in 2010 it is ready to move into the production of aviation biofuels on a commercial scale. The company has started certification and licensing processes and it estimates that production could commence within the next two or three years. Honeywell expects fossil fuel and biofuel costs will eventually be comparable.

With consensus in the industry agreeing that accelerating the development of an alternative solution to kerosene would bring the biggest near-term benefit to airlines, industry players point out that the greatest challenge facing biofuel developments or any form of renewable aviation fuels is not volume but price. Should biofuels be widely accepted, competition from other industries could see the aviation industry battling for its share.

The major problem for aviation biofuels revolves around commercialisation, the investment required for large-scale production and the cost of the fuel itself, which is still well above fossil fuels. Airbus estimates that biofuel in 2010 was up to 25 times as expensive as normal jet fuel and it was for this reason in late 2010 that European aerospace leaders were urging the European Union to fund research into scaled production of aviation biofuels, citing the high costs that inhibit their use.

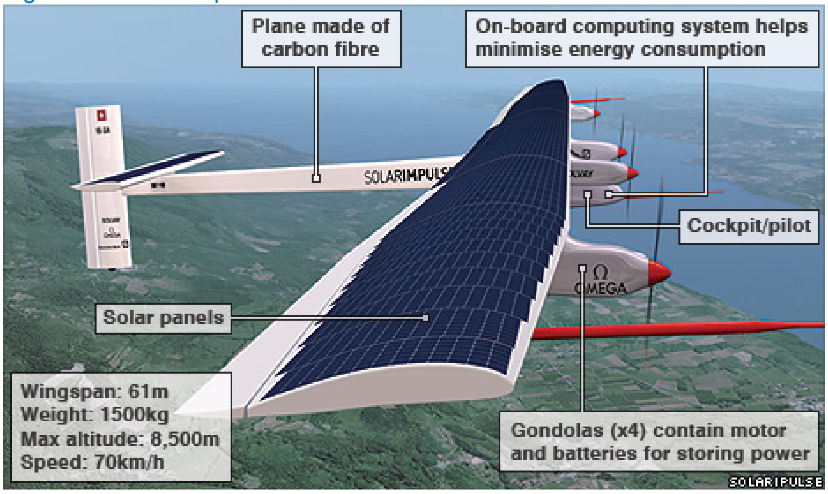
With continued funding support it is estimated that in the next two decades as standardisation occurs and production increases, biofuels could be adopted wholesale by airlines. Best case estimates forecast that 50 to 70% of jet fuel could be replaced with biofuels by 2035, potentially even full replacement (particularly when combined with synthetic fuels).

Airbus and Boeing project that the 'tipping point' for aviation biofuel use to become commercially viable is around 1% of total fuel use. They estimate that this target could be achieved as early as 2015.

8.4.12 Solar-powered flight

In July 2010, 'Solar Impulse', the four-engine aircraft which features around 12,000 solar cells arranged on its wingspan, successfully completed a 26-hour day-and-night flight, powered solely by solar energy – no jet fuel was used. The aircraft reached an altitude of almost 29,000 feet before touching down at Payerne Airport near Berne, Switzerland. The average speed measured 38 km per hour, with a maximum speed of 125 kmph. It is the longest and highest flight recorded by a solar-powered plane.

Figure 8.5: Solar Impulse aircraft



Source: www.bbc.co.uk

8.5 Developments in the United States

In December 2010 the Future of Aviation Advisory Committee of the U.S. Department of Transportation came to agreement on several wide-reaching recommendations[238] to address current issues. Of those topics, the environment was one of the most pressing.

Much of the Environment Subcommittee's recommendations reiterated current industry commitments on reducing greenhouse gas emissions, but called for harmonisation and support for the global sectoral approach adopted at ICAO's 37th Assembly in Montreal in October.

Promotion of the development of sustainable alternative fuels, adoption of operational practices and technology, NextGen progress and development of an airport energy efficiency program were amongst the issues identified as priorities.

The recommendations and mission statement of the Future of Aviation Advisory Committee pertaining to the environment were as follows:

- Sustainable alternative aviation fuels – to exercise strong national leadership to promote and showcase U.S. aviation as a first user of sustainable alternative fuels.
- Research and development related to airframe and engine technologies – to accelerate aircraft technology development with more robust research and development by government and industry.
- Operational and infrastructure improvements – to advocate substantial additional targeted investment to accelerate start-up elements of NextGen; and establish airport terminal area and infrastructure changes to enhance energy efficiencies and reduced emissions.

[238] Wide-reaching recommendations from Future Aviation Advisory Committee - more studies and spending, Centre for Asia Pacific Aviation, 21 December 2010

- Harmonised sectoral approach for aviation CO_2 emissions reductions – to lead an effort to align FAA policy to support an aviation industry approach to carbon emissions, building on the ICAO resolution adopted in Montreal 8 October 2010.

With these goals the U.S. is aspiring to position itself as a global leader in mitigating the environmental costs of the aviation industry.

8.6 European Union Emissions Trading Scheme (EU ETS)

The EU ETS was implemented in 2005 and now spans the EU27 member states, covering the most energy-intensive sectors and representing around half of European greenhouse gas emissions. Domestic and international aviation will be included in the scheme from 2012 and airlines are now preparing for compliance. All airlines with operations at a European airport, be it a European or foreign carrier, are obliged to comply with the regulations. Several major U.S. airlines together with the Air Transport Association of America (ATA) launched a legal challenge against the EU in the English High Court in December 2009 against inclusion in the EU ETS, which was later referred to the European Court of Justice in Luxembourg. While awaiting judgement, the U.S. airlines have announced their intentions to comply under protest.

When the aviation sector is included in the EU ETS in 2012, airlines will receive allowances to emit almost 213 million tonnes of carbon dioxide[239].

The European Commission announced that, based on average annual aviation emissions from 2004 to 2006, it had calculated the number of available allowances for 2012 to be just under 213 million tonnes; representing 97% of the 2004 to 2006 emissions figure.

From 2013 onwards the aviation sector will have access to 208.5 million tonnes of carbon dioxide permits each year, a level equivalent to 95% of the historic emissions level from 2004 to 2006.

The legislation stipulates that in the first year, 2012, 85% of emissions allowances will be allocated without charge. From 2013 to 2020, 82% of emissions allowances will be allocated free of charge[240].

[239] EC outlines emissions allowances for airlines ahead of ETS, Air Transport Intelligence news, March 2011

[240] http://ec.europa.eu/clima/policies/transport/aviation/allowances_en.htm

9. Aviation Safety & Security

9.1 Introduction

This chapter covers aviation safety and security matters. The section on safety details fatal accidents that occurred worldwide in 2010 together with trends in aviation accidents over the last twenty years. Whilst the longer term trend demonstrates a four-fold improvement in the annual numbers of fatal accidents, there has been a flattening of this downward trend in the last ten years. The section outlines the two-pronged approach being taken to further improve aviation safety, first through the spread of best practice and secondly through reducing the residual fatal accident rate even in the better performing regions, such as Europe and North America. The section highlights safety initiatives being taken around the world in 2010 by ICAO, IATA, the European Commission, EASA, the FAA and the NSTB. The safety section ends with a case study on the potential for human fatigue to cause accidents and the efforts being made to regulate working hours to prevent it.

The subsequent section on security adopts a similar structure, first by detailing recent aviation security incidents and then by describing the worldwide developments to try and tackle them. It details the initiatives undertaken in 2010 by ICAO and IATA and goes on to describe recent developments in Europe, the U.S. and the Asia/Pacific Region. The section ends with a discussion of some of the current aviation security issues: use of body scanners, carriage of liquids, security of cargo, and the costs of security. Not that cyber security issues in relation to Air Traffic Management were discussed in Section 6.4.3.

9.2 2010 Safety Review

9.2.1 Fatal Accidents Worldwide

In 2010 there were 26 fatal airline accidents worldwide causing the deaths of 817 passengers and crew (Table 9-1). This spans all types of commercial airline operations, including scheduled and non-scheduled passenger flights, by jets and turboprop aircraft; and non-passenger operations such as cargo or positioning flights. In 2009 there were 28 fatal airline accidents causing 749 deaths. The trend over the last ten years in absolute terms is shown in Figure 9.1, whilst Figure 9.2 shows the global twenty year trend in fatal accidents per 10 million flights which takes into account the increase in traffic over that period.

Whilst the longer term trend demonstrates a four-fold improvement in the annual numbers of fatal accidents per 10 million flights over the last twenty years, both graphs indicate a flattening of the downward trend in the last ten years. The annual number of fatal accidents globally has remained somewhere between 25 and 40 since 2001, equivalent to between 3 and 7 fatal accidents in every 10 million flights.

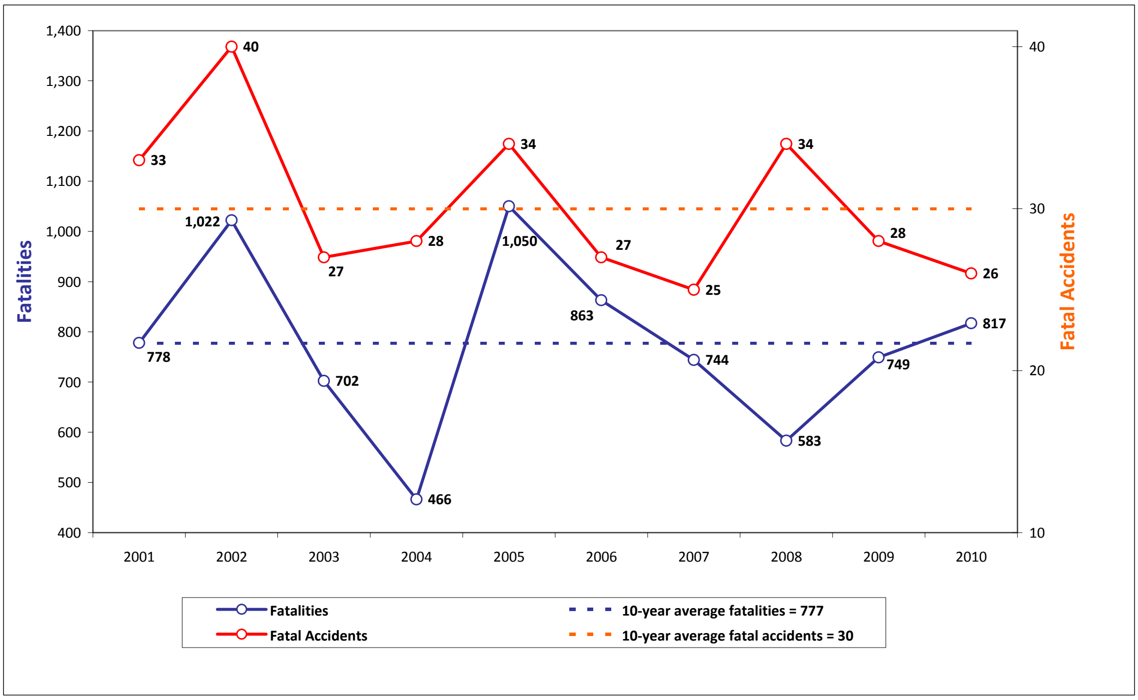
This flattening of the trend may not be surprising given the historically low level of aviation accidents annually, but this should not lead to complacency either in terms of continuing to put safety first or in striving to find ways to further improve safety and reduce the accident rate still further. This is particularly important as new and more complex aircraft; systems and technologies are being employed and as the level of traffic continues to grow globally. Many of these systems require a reduced level of “hands on” flying skill and a different approach to aircraft and systems management, which in turn requires different skills and attributes.

Table 9-1: Fatal Commercial Aviation Accidents 2010

Date	Operation	Operator	A/c Type	Location	Fatalities	Phase
22-Jan	Non-Passenger Flight	Alaska Central Express	Beech 1900C	Sand Point Airport, Alaska, USA	2	C
25-Jan	Scheduled Pax	Ethiopian Airlines	B737-800	Offshore from Beirut, Lebanon	90	C
22-Mar	Non-Passenger Flight	Airnorth	Embraer Brasilia	Darwin Airport, Australia	2	C
13-Apr	Non-Passenger Flight	AeroUnion	A300 B4F	Monterrey Airport, Mexico	5	RA
21-Apr	Non-Passenger Flight	Interisland Airways	An-12	Pampanga, Philippines	3	ER
12-May	Scheduled Pax	Afriqiyah Airways	A330-200	Near Tripoli Airport, Libya	103	RA
15-May	Regional/Commuter	Blue Wing Airlines	An-28	North Eastern Surinam	8	ER
17-May	Regional/Commuter	Pamir Airways	An-24B	Near Salang Pass, Afghanistan	44	ER
22-May	Scheduled Pax	Air India Express	B737-800	Mangalore Airport, India	158	L
28-Jun	Scheduled Pax	Airblue	A321	Near Islamabad Airport, Pakistan	152	AA
01-Aug	Non-Passenger Flight	All West Freight	Fairchild Provider	Mount Healy, Alaska, USA	3	ER
03-Aug	Regional/Commuter	Katekavia	An-24	Igarka Airport, Russia	12	RA
16-Aug	Scheduled Pax	Aires Colombia	B737-700	San Andres Islandv Airport, Colombia	2	L
24-Aug	Regional/Commuter	Henan Airlines	Embraer 190LR	Yichun Lindu Airport, Henan, China	42	L
24-Aug	Regional/Commuter	Agni Air	Dornier 228-100	Mear Bastipur, Nepal	14	
25-Aug	Regional/Commuter	Filair	Let L-410UVP	Bandundu Airport, DR Congo	20	RA
03-Sep	Non-Passenger Flight	United Parcel Service	B747-400F	Near Dubai Airport, UAE	2	AA
13-Sep	Regional/Commuter	Conviasa	ATR 42-300	Near Puerto Ordaz, Venezuela	17	RA
12-Oct	Non-Passenger Flight	Transafrik	L-100-20	Near Kabul, Afghanistan	8	ER
21-Oct	Non-Passenger Flight	TRACEP	Let L-410UVP	Near Bukavu	2	ER
04-Nov	Regional/Commuter	Aerocaribbean	ATR 72-212	Guasimal, Cuba	68	ER
05-Nov	Non-Scheduled Pax	JS Air	Beech 1900C	Near Karachi Jinnah Airport, Pakistan	21	C
11-Nov	Non-Passenger Flight	Tarco Airlines	An-24	Zalingei Airport, Sudan	6	L
28-Nov	Non-Passenger Flight	Sun Way	Ilyushin 76	Near Katachi Jinnah Airpot, Pakistan	8	C
04-Dec	Scheduled Pax	Dagestan Airlines	Tu-154M	Moscow Domodedovo Airport, Russia	2	ER
15-Dec	Regional/Commuter	Tara Air	DHC Twin Otter 300	Palunge, Near Lamidanda, Nepal	22	ER

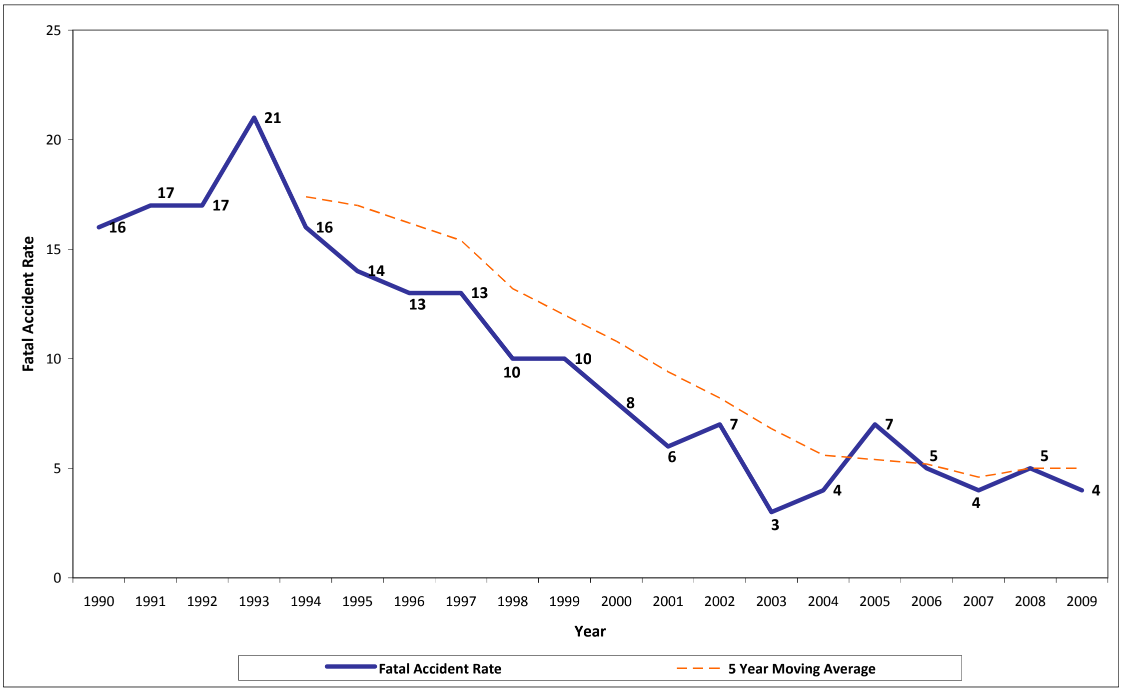
Source: Flight International (Key to Phase of Flight: AA = Airfield Approach; C = Climb; ER = En Route, L = Landing, RA = Runway/Final Approach)

Figure 9.1: World Airline Fatal Accidents and Fatalities 2001 to 2010



Source: Flight International

Figure 9.2: Global Fatal Accident Rate (per 10 million Flights) 1990 to 2009



Source: EASA Annual Safety Review 2009

9.2.2 Noteworthy Incidents

Apart from the aviation impact of the Eyjafjallajökull volcano in April 2010 (which was covered in Chapter 6), the aviation safety incident that most caught the world's attention in 2010 was the engine failure of the Qantas A380. This was the first major mishap to befall this aircraft type since it entered service in October 2007. The engine failure occurred on 4 November 2010 on a flight from Singapore to Sydney.

Following a normal take off, the crew retracted the landing gear and flaps. The crew reported that, while maintaining 250 kts in the climb and passing 7,000 ft above sea level, they heard two almost coincident 'loud bangs', followed shortly after by indications of a failure of the No 2 engine.

The crew advised Singapore Air Traffic Control of the situation and were provided with radar vectors to a holding pattern. The crew undertook a series of actions before returning the aircraft to land at Singapore. There were no reported injuries to the crew or passengers on the aircraft, although there were reports of minor injuries to two persons on Batam Island, Indonesia.

A subsequent examination of the aircraft indicated that the No 2 engine had sustained an uncontained failure of the Intermediate Pressure (IP) turbine disc. Sections of the liberated disc penetrated the left wing and the left wing-to-fuselage fairing, resulting in structural and systems damage to the aircraft (Figure 9.3).

Figure 9.3: Damage Sustained by No 2 engine of A380-842 VH-OQA

Source: Australian Transport Safety Bureau

As a result of this occurrence, a number of safety actions were immediately undertaken by Qantas, the Australian Civil Aviation Safety Authority, Airbus, Rolls-Royce plc, and EASA. The Australian Transport Safety Bureau prepared a Preliminary Factual Report on the investigation of the occurrence which was released publicly on 3 December 2010[241].

Recent examination of components removed from the failed engine at the Rolls-Royce plc facility in Derby, United Kingdom, has identified the presence of fatigue cracking within a stub pipe that feeds oil into the

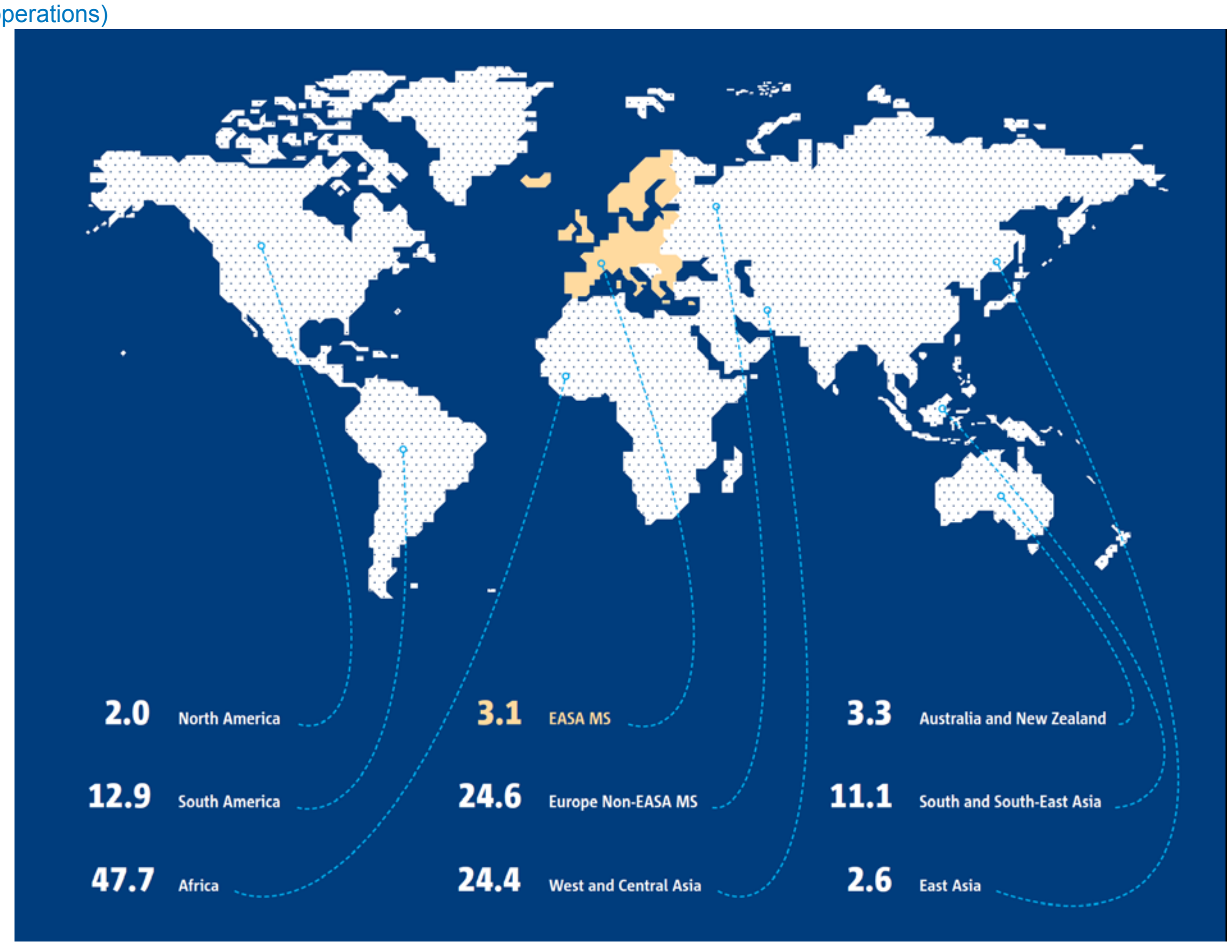
[241] In-flight uncontained engine failure overhead Batam Island, Indonesia, 4 November 2010 VH-OQA Airbus A380-842, ATSB Transport Safety Report Preliminary, 3 December 2010

High Pressure (HP) / Intermediate Pressure (IP) bearing structure. While the analysis of the engine failure is ongoing, it has been identified that the leakage of oil into the HP/IP bearing structure buffer space (and a subsequent oil fire within that area) was central to the engine failure and IP turbine disc liberation event.

9.2.3 A Two-Pronged Approach to Improving Safety

In June 2011 EASA published its 2010 Annual Safety Review[242]. It highlighted the different rates of fatal commercial aviation accidents by world region (Figure 9.4) over the last ten years. Operators from the 31 EASA Member State countries[243], along with those from the regions of North America, East Asia, Australia and New Zealand have exhibited the lowest average rates of fatal accidents over the last ten years at between 2.0 and 3.3 fatal accidents per million flights. By contrast, the average fatal accident rate in other world regions ranges from 11.1 per 10 million flights in South and South-East Asia to 47.7 per 10 million flights in Africa. Whilst in 2010 there were no fatal commercial aviation accidents in Europe, the average accident rate for operators from European Non-EASA Member States over the last ten years has been 24.4 per 10 million flights which is over seven times the rate for the remainder of Europe.

Figure 9.4: Fatal Accident Rate per 10 Million Flights by World Region, 2001 to 2010 (scheduled passenger & cargo operations)



Source: EASA Annual Safety Review 2010

[242] Annual Safety Review 2010, EASA, June 2011
[243] EU27 plus Iceland, Liechtenstein, Norway and Switzerland

Industry commentators report[244] that the difference between airlines from countries with 21st century performance and those whose carriers still have 1980s accident rates is in many cases due to a shift from reactive to proactive safety management. This is exemplified by a change from using safety regulations to try and enforce good practice towards the recognition that regulations define a minimum legal standard, not a desirable one. The Flight Safety Foundation at their international aviation seminar in October 2010 indicated that the key to resuming global safety improvement is persuading those countries (mostly developing economies) to embrace the radical cultural change in going 'beyond compliance' – the recognition that complying with legal minima does not deliver satisfactory safety[245].

In this respect it has been cited[246] that almost all of the serious commercial aviation accidents occurring in 2010, as in the previous decade, could easily have been prevented if the airlines concerned had applied existing, fully understood, simple intervention strategies. Examples include fitting ground proximity warning systems to all commercial aircraft including turboprops, providing upset recovery training for pilots; and rigorous adherence to stabilised approach procedures.

The disparity in world regional accident rates, coupled with the flattening downward trend in recent years in the better safety-performing regions requires a two-pronged approach to improving safety. First, there is a need to spread best practice to ensure all world regions achieve a level of safety performance in line with that already achieved by the better performing regions. Simultaneously there is a need to analyse and determine ways to further improve aviation safety and reduce the residual fatal accident rate present even in these better performing regions.

9.3 Spread of Safety Best Practice

9.3.1 ICAO Universal Safety Oversight Audit Programme

The objective of the ICAO Universal Safety Oversight Audit Programme (USOAP) is to promote global aviation safety through auditing Contracting States on a regular basis, to determine States' capability for safety oversight. The USOAP was established in 1997 and since 2006 the results of the periodic audits have been made available on ICAO's public website.

In spring 2010 ICAO held a high-level safety conference in Montreal[247] which was attended by participants from 117 (out of 190) Contracting States and Observers from 32 international organisations. At this conference it was agreed that, from 2010, USOAP would move from a system of periodic compliance-based audits to one of continuous monitoring; and that this would also incorporate a safety risk management approach. Other significant conference outcomes included progress in the field of Key Performance Indicators for safety; and plans to develop a new Annex to the Chicago Convention dedicated to safety management.

At the ICAO Assembly in September 2010, a memorandum of understanding between ICAO, the EC, IATA and the FAA was signed to set up a Global Safety Information Exchange programme (GSIE) with the aim to start the process of integrating safety information from the four organisations[248].

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[244] Airline Safety, David Learmount, Flight International, 18-24 January 2011

[245] Airline Safety Review, Flightglobal, March 2011

[246] Airline Safety, David Learmount, Flight International, 18-24 January 2011

[247] High-Level Safety Conference 2010, Montreal, Doc 9935, ICAO, 29th March to 1st April 2010

[248] 37th Assembly of ICAO, Montreal, Information Note from the European Commission, 13th October 2010

9.3.2 IATA Operational Safety Audit Programme

In 2010 the hull-loss accident rate for IATA carriers flying western-built jets dropped to an all-time low of 0.25 hull losses per million flights, whereas the world average remained fairly static at 0.61[249].

IATA's safety strategy[250] is implemented through its six-point safety programme. It focuses on:

1. infrastructure safety;
2. operations;
3. maintenance;
4. Safety Data Management;
5. Safety Management Systems; and
6. Auditing.

The IATA Operational Safety Audit (IOSA) programme is an internationally recognised and accepted evaluation system designed to assess the operational management and control systems of an airline. It has been introduced gradually since 2003 and has become compulsory every two years for member carriers. In total 1,042 audits have been conducted. In 2010, the 3rd Edition of the IOSA Standards Manual[251] was issued to include updates on ICAO-mandated Safety Management Systems provisions.

IATA and its member airlines have implemented a variety of standards and best practices and associated audits across all fields, not just safety. By combining all audit activities into a 'Circle of Excellence' (Figure 9.5) it is anticipated that significant efficiencies can be gained for both the audit agencies and the airlines, reducing costs to airline customers.

In 2008 IATA launched the Implementation Programme for Safety Operations in Africa (IPSOA). In 2010 the Flight Data Exchange programme was introduced to twelve African carriers which makes use of the capabilities of IATA's Global Safety Information Centre (GSIC) to identify, monitor and implement specific improvements in procedures, training and infrastructure and address specific hazards in Africa.

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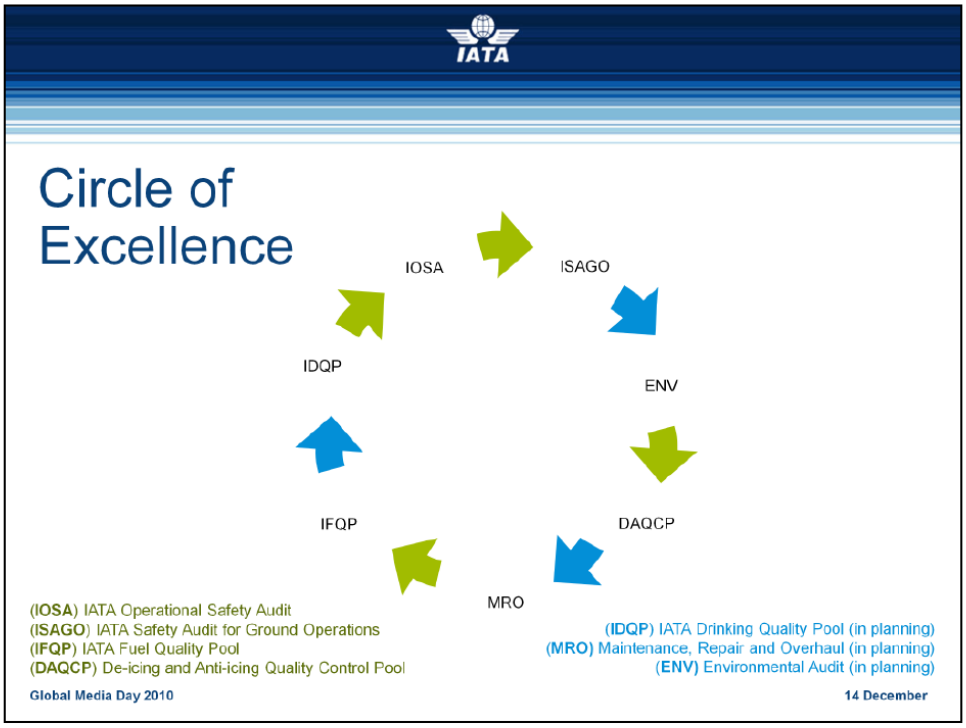
[249] 2010 Aviation Safety Performance, IATA, 23 February 2011

[250] IATA Presentation on Safety, Global Media Day, 14 December 2010

[251] IOSA Standards Manual, 3rd Edition, IATA, October 2010

Figure 9.5: IATA Audit Activities Combined in a 'Circle of Excellence'



Source: IATA

9.3.3 EC Safety Assessment of Foreign Aircraft Programme

Under the EC Safety Assessment of Foreign Aircraft (SAFA) programme established by Directive 2004/36/EC[252], EU Member States are required to perform ramp inspections on third country aircraft landing at airports located in the Member States. The inspections are designed to show compliance with flight crew licensing, aircraft operation and airworthiness requirements established under the relevant Annexes to the Chicago Convention. EASA has a coordination function and is responsible for maintaining the database of reports from ramp inspections and providing analysis and reports on the collected data. The SAFA Standardisation Programme was initiated in 2009 and this has ensured a high degree of harmonisation among the participating States. In this regard it is noteworthy that SAFA now extends to 42 out of 44 states within ECAC[253]. Its scope is therefore wider than just the EU, meaning it is able to influence safety in those parts of Europe where average accident rates are higher.

Additionally, since the coming into force of Regulation (EC) No 2111/2005[254] which established a list of carriers banned from flying into EC territory, SAFA inspections have acquired an increasing importance as one of the criteria considered by the Commission in taking its decisions on the inclusion of carriers in the Community list.

[252] Directive 2004/36/EC of the European Parliament and the Council on the safety of third-country aircraft using Community Airports, 21st April 2004

[253] European Civil Aviation Conference

[254] Regulation (EC) No 2111/2005 of the European Parliament and of the Council on the establishment of a Community List of Air Carriers subject to an Operating Ban within the Community, 14th December 2005

In January 2010 the Commission published a report[255] on the application of this regulation. Since the establishment and publication of the first list of banned carriers in March 2006 it has functioned as a strong incentive to air carriers and civil aviation authorities to continuously improve safety; and there are a number of areas where the Commission intends to further develop its policy in this area, some examples of which are:

1. strengthening of the EC SAFA programme by, for example, introducing a minimum number of ramp inspections by Member States;
2. continuing support for the establishment of partnerships with civil aviation authorities from third countries to ensure a high and uniform level of aviation safety and support to ICAO's efforts at global harmonisation in the area of safety; and
3. proposing ways to broaden the exchange of safety data at an international level and promoting the exchange of best practice, for example in terms of the harmonisation of ramp inspections procedures and in the worldwide banning of unsafe air carriers.

9.3.4 Safety Performance under the Single European Sky

In July 2010 Regulation 691/2010[256] was adopted establishing a performance scheme for air navigation services under the second package of the Single European Sky (SES II). The aim of the performance scheme is to contribute to the sustainable development of the air transport system by improving the overall efficiency of air navigation services across the key performance areas of safety, environment, capacity and cost-efficiency. In terms of safety, which remains the overriding objective, there is a requirement for the development of three key performance indicators (KPIs) at the National or Functional Airspace Block (FAB) level, covering:

1. the effectiveness of safety management as measured through an ATM Safety Maturity Framework;
2. the application of harmonised rules for the severity classification of Separation Minima Infringements, Runway Incursions and other ATM Occurrences; and
3. the establishment of 'Just Culture' within Member States, in order to encourage the full reporting of incidents. A 'Just Culture' is defined as a culture in which front line operators or others are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but where gross negligence, wilful violations and destructive acts are not tolerated.

The Regulation requires that the KPIs are developed to allow reporting under the performance scheme during the first reference period which runs from 2012 to 2014. Member States may set their own targets for these KPIs during this first reference period.

The EU-wide KPIs will be the minimum levels of safety maturity and Just Culture achieved within Member States and the percentage application of harmonised severity classification rules. There will be no EU-wide targets for safety KPIs during the first reference period.

It is important to note that the establishment of the Single European Sky (SES) is not limited to the 27 EU Member States. A smoothly functioning ATM system should not be constrained by the borders of the

[255] COM(2009) 710 final, 11th January 2010

[256] Commission Regulation (EU) No 691/2010 laying down a Performance Scheme for Air Navigation Services and Network Functions and amending Regulation (EC) No 2096/2005, 29th July 2010

Community; and to avoid bottlenecks, promote interoperability and enhance safety and environmental efficiency, neighbouring States are also associated. Following a Multilateral Agreement in 2005 a European Common Aviation Area (ECAA) was established; and in total 38 States are now involved in the building of the SES.

9.3.5 Accident Investigation

In October 2010, following consultation, Regulation 996/2010[257] was adopted which repealed the earlier Directive 94/56/EC[258] on the investigation and prevention of accidents and incidents. The purpose of the Regulation is to modernise the existing legal framework on accident investigation and strengthen the investigation capacity of Europe through the creation of a network of accident investigation bodies.

9.3.6 Incident Reporting

Whilst in general, aviation accidents are well reported, there is still some degree of variability of reporting of incidents across Europe. Harmonised procedures for the reporting of incidents and occurrences were established under Directive 2003/42/EC[259], while under Regulation 1321/2007[260] EASA Member States are obliged to integrate their occurrence data into the European Central Repository for occurrences (ECR). Whilst by the end of 2009, EASA reported that only 20 (out of 31) EASA Member States were doing so, the number of States reporting by the end of 2010 had increased to 29. This represents a major improvement. However, there remain significant shortfalls in the quality and completeness of the data recorded. For example, in 2010, the event type, type of operation, aircraft category or weight group was not reported in over 50% of all ECR records, although the percentages of these non-classifications did show some small improvements over 2009[261].

The EUROCONTROL Safety Review Commission in its 2010 annual safety report[262] stated that while the number of ATM occurrences being reported has increased overall, the level of reporting by States is very variable and in some cases not consistent with the levels of traffic in each State. As a result, EUROCONTROL estimate that as many as 30,000 incidents may not be being reported each year in the ECAC region – and this is only in the field of ATM. Although the number of ECAC States reporting ATM incidents had increased by 1 to 30 (out of 43) by the end of March 2010, this number had not changed in the previous five years.

[257] Regulation (EU) No 996/2010 of the European Parliament and of the Council on the investigation and prevention of accidents and incidents in civil aviation, 20th October 2010

[258] Council Directive 94/56/EC establishing the Fundamental Principles governing the Investigation of Civil Aviation Accidents and Incidents, 21st November 1994

[259] Directive 2003/42/EC of the European Parliament and of the Council on Occurrence Reporting in Civil Aviation, 13th June 2003

[260] Commission Regulation (EC) No 1321/2007 laying down Implementing Rules for the Integration into a Central Repository of Information on Civil Aviation Occurrences, 12th November 2007

[261] Annual Safety Review 2010, EASA, June 2011

[262] Annual Safety Report 2010, EUROCONTROL Safety Regulation Commission, March 2011

9.4 Safety - Key Focus Areas

9.4.1 EASA Annual Safety Review

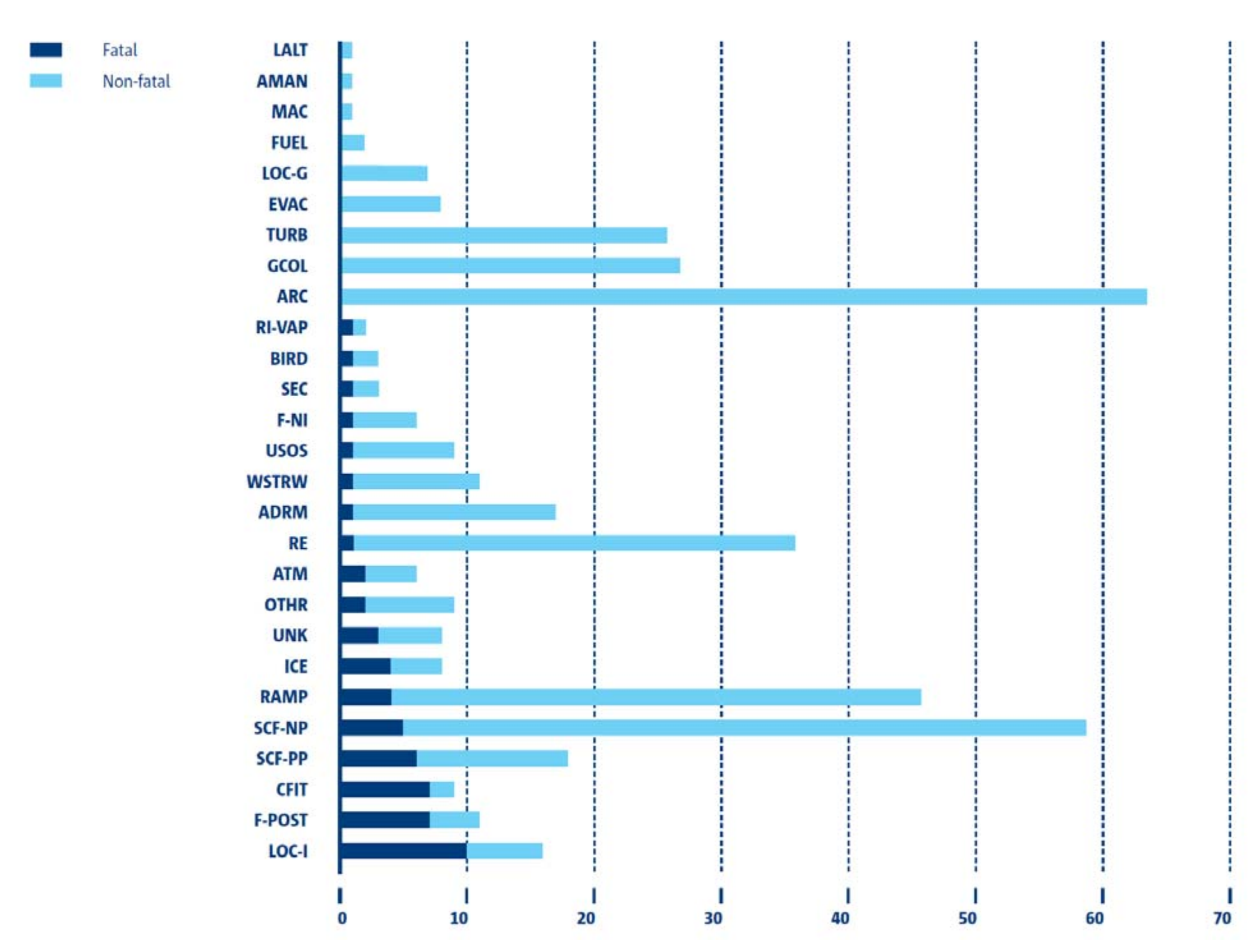
In its Annual Safety Review for 2010[263] EASA reported that the most common type of aircraft accidents for EASA Member State-operated aeroplanes between 2001 and 2010 (Figure 9.6) were Abnormal Runway Contact (63 accidents), Non-Powerplant System/Component Failure or Malfunction (59 accidents), Ground Handling (46 accidents) and Runway Excursion (36 accidents). Worldwide, runway excursions – usually overruns after landing – continue to be by far the most common type of aircraft accident, normally leading to aircraft damage but not often involving fatalities. A 90m Runway End Safety Area (RESA) is now the international standard for all new runways, but a RESA is not always possible to incorporate in existing airports where space may be at a premium. In these circumstances, the impact of runway excursion accidents can be reduced by installing restraining/deceleration beds at the ends of runways. However, this kind of work is only required when runway development is taking place which means that not all existing airports have incorporated these safety features.

The worst runway excursion in 2010 (see Table 9-1) involved an Air India Express Boeing 737-800 that overran the runway at Mangalore, despite good weather and a dry surface. After an unstable approach, the aircraft touched down long and fast and ran off the end of the runway down a very steep slope killing 158 people.

For fatal accidents between 2001 and 2010 (Figure 9.6), the most common accident categories among EASA Member State operators were Loss of Control in Flight (10 accidents), Controlled Flight into Terrain (7 accidents), Fire/Smoke Post Impact (7 accidents) and Powerplant System Component Failure or Malfunction (6 accidents) .

[263] Annual Safety Review 2010, EASA, June 2011

Figure 9.6: Accident Categories for Fatal & Non-Fatal accidents (EASA Member State Operated Aircraft) 2000-2009



Source: EASA Annual Safety Review 2009

Table 9-2: Acronym Key to Figure 9.6

LALT	Low Altitude Operations	**F-NI**	Fire/Smoke (non-impact)
AMAN	Abrupt Manoeuvre	**USOS**	Undershoot/Overshoot
MAC	Airprox/TCAS alert/loss of separation/near mid-air collision/midair collision	**EVAC**	Evacuation
FUEL	Fuel Related	**ADRM**	Aerodrome
LOC-G	Loss of Control - Ground	**RE**	Runway excursion
GCOL	Ground Collision	**ATM**	Air Traffic Management
TURB	Turbulence Encounter	**UNK**	Unknown or undetermined
ARC	Abnormal Runway Contact	**ICE**	Icing
CABIN	Cabin Safety Events	**RAMP**	Ground Handling
BIRD	Collision/Near Collision with bird(s)	**SCF-NP**	System/Component Failure (non-powerplant)
WSTRW	Windshear or Thunderstorm	**CFIT**	Controlled flight into or toward terrain
RI-VAP	Runway Incursion – Vehicle, aircraft or person	**F-POST**	Fire/Smoke (post-Impact)
SEC	Security Related	**SCF-PP**	System/Component Failure (powerplant)
OTHR	Other	**LOC-I**	Loss of control – In-flight

Source: EASA Annual Safety Review 2009

9.4.2 FAA Study into Operational Use of Flightpath Management Systems

A significant emerging study from the Federal Aviation Administration suggests that flight crew are not properly trained for modern cockpits and there is a need for radical change in their recurrent training[264]. Preliminary findings presented at the Flight Safety Foundation international aviation seminar in November 2010 suggest that inadequate crew knowledge of automated systems was a factor in more than 40% of accidents and 30% of serious airline incidents between 2001 and 2009.

Aircraft flight decks have changed radically over the past sixty years, with accelerated change in the last 20 with the advent of all glass cockpits and greater systems integration. As a result, there has been a concurrent change in the way in which pilots manage normal flight operations, but training has not changed to reflect this. The study, due to be published in 2011 and provisionally entitled 'Operational Use of Flightpath Management Systems', examines how flight crew use today's sophisticated flight management systems (FMS) and the effect they have on overall pilot performance. It has been found that pilots frequently focus on programming the FMS to the detriment of monitoring the aircraft's navigational flightpath.

Pilots also have to deal with some failures for which there are no checklists and for which there is only limited training , such as failures and malfunctions of air-data computers, un-commanded autopilot disconnects or pitch-up incidents for which the reason is unknown.

At the same Flight Safety Foundation conference industry representatives from Airbus, Boeing and the U.S. Airline Pilots Association all acknowledged a worrying decline in line pilots' basic flying skills, for example in stalling, stall recovery and the art of the go-around. Another study of thirty experienced pilots from a major U.S. airline showed that many of these professional pilots had suffered a significant decline in their basic instrument skills and that they were not fully aware of this skill degradation. The gradual reduction in the number of ex-military pilots in airline flight operations departments may have contributed to this trend. Some airlines such as KLM are insisting that all their new aircrew are given additional training in the air, rather than in simulators, in stalls, spins and unusual attitudes.

9.4.3 NTSB Most Wanted List

Since 1990 the National Transportation Safety Board, which is the body in the United States responsible for transportation accident investigation as well as promoting transportation safety, has been publishing its 'most wanted' lists for improvements in safety. Figure 9.7 shows the 2010 NTSB Most Wanted List for Aviation. This list details a number of issues in relation to aircraft and airport operations in the USA and includes a specific focus by the FAA to reduce an increased accident rate among Emergency Medical Service flights which are usually operated by helicopters and often involve landings in difficult locations and at night.

[264] Training is Failing, David Learmount, Flight International, 8th to 14th February 2011

Figure 9.7: NTSB Most Wanted List – Aviation (2010)

Most Wanted List

MOST WANTED Transportation Safety Improvements
Aviation Issue Areas

Legend:

- = Unacceptable response
- = Acceptable response, progressing slowly
- = Acceptable response, progressing in a timely manner
- = Being assessed, classification code to be assigned soon

Federal Issues		
Unacceptable response	**Improve Oversight of Pilot Proficiency** **Action Needed by** The Federal Aviation Administration	• Evaluate prior flight check failures for pilot applicants before hiring. • Provide training and additional oversight that considers full performance histories for flight crewmembers demonstrating performance deficiencies.
Unacceptable response	**Require Image Recorders** **Action Needed by** The Federal Aviation Administration	• Install crash-protected image recorders in cockpits to give investigators more information to solve complex accidents.
Unacceptable response	**Improve the Safety of Emergency Medical Services (EMS) Flights** **Action Needed by** The Federal Aviation Administration	• Conduct all flights with medical personnel on board in accordance with stricter commuter aircraft regulations. • Develop and implement flight risk evaluation programs for EMS operators. • Require formalized dispatch and flight-following procedures including up-to-date weather information. • Install terrain awareness and warning systems (TAWS) on aircraft used for EMS operations.
Acceptable response, progressing slowly	**Improve Runway Safety** **Action Needed by** The Federal Aviation Administration	• Give immediate warnings of probable collisions/incursions directly to flight crews in the cockpit. • Require specific air traffic control (ATC) clearance for each runway crossing. • Require operators to install cockpit moving map displays or an automatic system that alerts pilots when a takeoff is attempted on a taxiway or a runway other than the one intended. • Require a landing distance assessment with an adequate safety margin for every landing.
Unacceptable response	**Reduce Dangers to Aircraft Flying in Icing Conditions** **Action Needed by** The Federal Aviation Administration	• Use current research on freezing rain and large water droplets to revise the way aircraft are designed and approved for flight in icing conditions. • Apply revised icing requirements to currently certificated aircraft. • Require that airplanes with pneumatic deice boots activate the boots as soon as the airplane enters icing conditions.
Acceptable response, progressing slowly	**Improve Crew Resource Management** **Action Needed by** The Federal Aviation Administration	• Require commuter and on-demand air taxi flight crews to receive crew resource management training.
Unacceptable response	**Reduce Accidents and Incidents Caused by Human Fatigue in the Aviation Industry** **Action Needed by** The Federal Aviation Administration	• Set working hour limits for flight crews, aviation mechanics, and air traffic controllers based on fatigue research, circadian rhythms, and sleep and rest requirements. • Develop a fatigue awareness and countermeasures training program for controllers and those who schedule them for duty. • Develop guidance for operators to establish fatigue management systems, including a methodology that will continually assess the effectiveness of these systems.

Source: National Transportation Safety Board

9.4.4 Case Study – Effects of Human Fatigue

One of the unresolved issues on the NTSB most wanted list is the need to reduce accidents and incidents caused by human fatigue. Industry commentators believe that between 15% and 20% of aviation accidents could be due to fatigue-related causes[265]. The need to regulate flight time and rest periods to control and mitigate the effects of fatigue is recognised internationally and is covered in ICAO Annex 6, but different regions have interpreted this guidance differently. The issue is commercially sensitive because operators want to maximise use of their aircraft; and the number of hours that flight crew are available for duty directly impacts the number of pilots that need to be employed. The issue has been exacerbated by the growing shortage of suitably qualified pilots caused by the worldwide growth in air traffic, coupled with declines in airline-sponsored training and the transfer of military pilots into the commercial sector.

In September 2010 FAA issued a new legislative proposal in the form of a Notice of Proposed Rulemaking (NPRM)[266] on flight time limitations and rest requirements for commercial air transport pilots. This followed the crash of the Colgan Airlines Dash 8-400 aircraft where duty time and rest periods were noted as a contributory cause. Currently the rules require only eight hours of rest. The proposed regulations would require nine hours of rest between assignments and reduce the maximum shift a pilot can work to 15 hours. Under the new regulations a pilot's duty time in the cockpit could be decreased based upon the time of day, time zones and the amount of sleep a pilot has had. Pilots will also have the right to decline an assignment, without penalty, if fatigued.

This is especially important given the commercial pressures on airlines to maximise aircraft use in an environment where there is a growing shortage of trained pilots. Rules on flight and duty time limitations and rest requirements are laid down in Subpart Q of Annex III to the EU OPS Regulation[267]. The regulation lays down harmonised rules by setting a minimum safety level. However some elements of subsidiarity[268] remain in Subpart Q. In particular, there are several cases where different rules apply in different Member States. For example, individual EU countries (e.g. the UK) can currently apply stricter flight time limitation rules at the national level. Subpart Q is currently undergoing revision; the UK Air Safety Group[269] and the British Air Lines Pilot Association (BALPA)[270] are keen to ensure that a suitable minimum safety level is maintained.

In December 2010 EASA presented[271], for consultation, its draft Opinion on the Implementing Rules on Flight and Duty Time Limitations and rest requirements for commercial air transport (CAT). It also presented a draft Decision with related acceptable means of compliance (AMC) and guidance material (GM).

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[265] Meeting to Discuss the Role of EU Flight Time Limitations in reducing Cumulative Fatigue in Civil Aviation, European Transport Safety Council, Brussels, 19th February 2003

[266] Flightcrew Member Duty and Rest Requirements, Notice of Proposed Rulemaking, Notice No.10-11, FAA, September 2010

[267] Commission Regulation (EC) No 859/2008 of 20th August 2008 amending Council Regulation (EEC) No 3922/91 as regards common technical requirements and administrative procedures applicable to commercial transportation by aeroplane (Annex III referred to as EU OPS)

[268] The 'subsidiarity principle' means that EU decisions must be taken as closely as possible to the citizen. In other words, the Union does not take action (except on matters for which it alone is responsible) unless EU action is more effective than action taken at national, regional or local level.

[269] http://www.airsafetygroup.org/index.html

[270] http://www.balpa.org/

[271] Notice of Proposed Amendment (NPA) No 2010-14A, EASA, 20th December 2010

On a related issue, the UK Air Safety Group is also concerned over the lack of separate regulation over duty hours for Aircraft Maintenance Engineers (AMEs). Aircraft maintenance and servicing is a 'safety critical' occupation with a direct link in the chain of events that can lead to a major aircraft safety incident/accident. Yet AMEs in Member States which choose to opt out of the average 48-hour week stipulated in the Working Time Directive[272], such as the UK for example, are permitted to work as long as they wish.

These two issues illustrate the difficulties for international bodies such as EASA, FAA and ICAO in determining harmonised legislation; and emphasise that safety regulations normally represent the minimum legal standard, not necessarily the desirable one.

The U.S. and the EU are currently negotiating an air safety agreement which will provide for greater cooperation in rule making, the exchange of safety data and the reciprocal acceptance of safety oversight in terms of airworthiness. It will also establish a joint forum to consult on urgent safety issues. The 2008 agreement is currently undergoing ratification and once agreed will replace the many bilateral agreements that currently exist between individual EU Member States and the U.S.

9.5 Aviation Security

9.5.1 Major Aviation Security Incidents (December 2009 to January 2011)

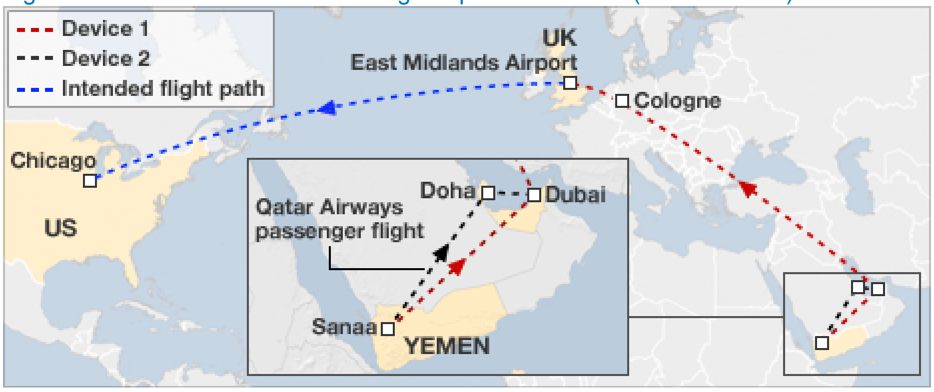
25 December 2009 – A male passenger hid a package of explosives (mainly crystalline PETN[273]) on his body and attempted to detonate it on NWA Flight 253 on approach to Detroit. The package failed to explode fully and the passenger was arrested.

29 October 2010 – Two separate explosive devices (containing PETN explosive) were concealed within toner cartridges inside printers and sent via air freight to Chicago, U.S. from Yemen, but were intercepted and defused. The first device was intercepted at East Midlands Airport in the UK. It was posted via UPS in Yemen and is believed to have been flown via Dubai and Cologne. The second device was intercepted in Dubai after flying on two Qatar Airways passenger jets from Yemen (Figure 9.8). It was posted via the freight company FedEx.

[272] Directive 2003/88/EC of the European Parliament and of the Council concerning certain aspects of the organisation of working time, 4th November 2003

[273] Pentaerythritol tetranitrate

Figure 9.8: Routes of Toner Cartridge Explosive Devices (October 2010)



Source: BBC News (4 November 2010)

Both devices were wired to circuit boards from mobile phones and it is assumed that the intention was to use the phones as timers in order to detonate the devices onboard the aircraft, possibly over the U.S.

24 January 2011 – A lone suicide bomber kills 36 people and injures more than 100 when he detonates an explosive device in the arrivals hall at Moscow's Domodedovo Airport.

9.6 Security Regulatory Developments

9.6.1 ICAO Annex 17 & the USAP programme

Provisions for international aviation security were first disseminated as Annex 17 to the Chicago Convention in 1974 and since then have been improved and updated eleven times. Guidance material to assist with the implementation of international security measures is provided through the Security Manual for Safeguarding Civil Aviation Against Acts of Unlawful Interference (Doc 8973 – Restricted).

The 21st ICAO Aviation Security Panel (AVSEC) was held in March 2010 in Montreal. Among the subjects discussed were staff screening, air cargo security, air traffic management security, the NW253 incident, LAGs Restrictions, Next Generation Screening and the treatment of unruly passengers.

Following discussions at the AVSEC Panel meeting, a 12th amendment to Annex 17 has been approved by the ICAO Council and is expected to become applicable on 1 July 2011. This 12th amendment introduces more robust procedures for the screening of persons other than passengers and for the screening of cargo. It also adds air traffic service providers to the list of participants that should be involved in the establishment of each State's national civil aviation security programme. Involvement of air traffic management is particularly relevant in relation to the threat from cyber terrorism (Section 6.4.3).

The Universal Security Audit Programme (USAP) was launched by ICAO in June 2002 to ascertain the level of implementation of Annex 17 standards in all Contracting States by conducting regular, mandatory, systematic and harmonised audits. The first cycle of audits, in which 182 audits were conducted, was completed in December 2007 and the second cycle of expanded audits, which commenced in 2008, is expected to be completed in 2013[274]. To promote transparency and mutual confidence between States, information on the level of implementation of the critical elements of an audited State's aviation security oversight system is available to all ICAO member States on a restricted website. Beyond 2013 ICAO is considering the feasibility of adopting a continuous monitoring approach, similar to that now being adopted for USAOP.

9.6.2 European Union

29 April 2010 marked the date at which Regulation (EC) No 300/2008 [275] and its implementing provisions entered into force. This new regulatory framework consolidated and repealed for clarification reasons various European legal acts adopted under the former framework of Regulation (EC) No 2320/2002[276]. Furthermore, it took into account technical developments and procedural evolutions and provided more detail on such in response to recent unlawful acts in the area of civil aviation security. As a result, standards for certain types of screening equipment and screening procedures were refined and additional new screening methods based on common basic standards were adopted. Additionally, rules and conditions for passengers carrying liquids on to aircraft were completed.

Regulation 300/2008 is the primary legislative package for aviation security in the EU and is applicable to the 30 States that are signatories to the wider European Economic Area (ECAA) Agreement, that includes Iceland and Norway, as well as Switzerland.

The common basic standards cover twelve areas: (1) airport security; (2) demarcated areas of airports; (3) aircraft security; (4) passengers and cabin baggage; (5) hold baggage; (6) cargo and mail; (7) air carrier mail and air carrier materials; (8) in-flight supplies; (9) airport supplies; (10) in-flight security measures; (11) staff recruitment and training; and (12) security equipment.

Under Articles 4(2) and 4(3) of Regulation 300/2008, additional secondary legislation may be adopted to provide (a) general measures that amend and supplement the non-essential elements of the common basic standards and (b) detailed measures for their implementation. In 2010 the detailed measures were adopted as Regulation 185/2010[277].

Regulation 272/2009[278] is the second level in the legislative package, supplementing the Annex in Regulation 300/2008. It sets out common basic standards where implementing rules may be developed, listing, for instance, the various types of screening technologies allowed for passengers and cargo, but not specifying how these should be deployed. New aviation security legislative acts published during 2010 mainly aimed at completing and refining the new legal framework under Regulation (EC) 300/2008 applicable as from 29 April 2010. Furthermore, common basic standards for two new screening methods in aviation security were defined.

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[274] http://www2.icao.int/en/AVSEC/USAP/default.aspx

[275] Regulation (EC) no 300/2008 of the European Parliament and of the Council on Common Rules in the Field of Civil Aviation Security, 11th March 2008

[276] Regulation (EC) No 2320/2002 of the European Parliament and of the Council establishing Common Rules in the Field of Civil Aviation Security, 16th December 2002

[277] Commission Regulation (EC) No 185/2010 laying down Detailed Measures for the Implementation of the Common Basic Standards on Aviation Security, 4th March 2010

[278] Commission Regulation (EC) No 272/2009 supplementing the Common Basic Standards on Civil Aviation Security laid down in the Annex to Regulation (EC) No 300/2008, 2nd April 2009

In addition, Regulation 297/2010[279] was adopted in April, amending Regulation 272/2009 and specifying the timetable for the change in regulation regarding the carriage of liquids, aerosols and gels (LAGs) on board aircraft. The regulation outlines the progressive move from a system of prohibition of LAGs to a system of screening for liquid explosives by April 2013.

In January 2010, Regulation 18/2010[280] was adopted, amending Regulation 300/2008 and setting out specifications for quality control programmes in order to ensure the effectiveness of national compliance monitoring activities in the field of aviation security. Regulation 72/2010[281] was also adopted laying down procedures for conducting Commission inspections in order to monitor the application by Member States of Regulation 300/2008.

Additional supplementary regulation was also adopted in 2010: Regulations (EU) 357/2010, (EU) 358/2010, (EU) 573/2010 and (EU) 983/2010 and Decisions C(2010)774, C(2010)2604, C(2010)3572 and C(2010)9139.

One of the key objectives of the European legislation is to provide "one stop security" by screening people for prohibited items once, at the beginning of their journey without the need to be re-screened if they transfer to a connecting flight. The EU provides expertise and advice in collaborative capacity building with the goal of improving global international aviation security standards. The concept of one stop security is applied within the EU and with the intention to extend to the USA and other third countries that have aviation agreements with the EU.

The EU has established a Memorandum of Cooperation with ICAO[282] in respect of aviation security and audits, to share expertise and avoid duplication of effort. The EU and U.S. also cooperate in joint inspections of both EU and U.S. airports. In January 2010 the EU and U.S. further strengthened their ties by making a joint declaration on aviation security[283].

EU initiatives on screening, cargo security and carriage of liquids and gels are discussed in Section 9.9.2.

9.6.3 ECAC

Founded in 1955 as an intergovernmental organisation, the European Civil Aviation Conference seeks to harmonise civil aviation policies and practices amongst its Member States and, at the same time, promote understanding on policy matters between its Member States and other parts of the world. There are currently 44 Member States.

Security is one of the three strategic priorities of ECAC, and represents a key area of ECAC activities. Maintaining high standards of security while at the same time anticipating new and emerging threats are serious challenges facing all Member States and the industry. In this context, ECAC's security activities

[279] Commission Regulation (EU) No 297/2010 amending Regulation (EC) No 272/2009 supplementing the Common Basic Standards in Civil Aviation Security, 9th April 2010

[280] Commission Regulation (EU) No 18/2010 amending Regulation (EC) No 300/2008 as far as Specifications for National Quality Control Programmes in the Field of Civil Aviation Security are concerned, 8th January 2010

[281] Commission Regulation (EU) No 72/2010 laying down Procedures for conducting Commission Inspections in the Field of Aviation Security, 26th January 2010

[282] ICAO Press Release PIO/68, 17th September 2008

[283] Department of Homeland Security Press Release, 21st January 2010

are multi-faceted: they include the development of recommendations and good practices by several groups, and the management and implementation of four operational programmes.

The objectives of ECAC's 2010 to 2012 work programme are to:

- Ensure consistency between ECAC Doc 30, Part II and EU/EC Regulations and ICAO Annex 17 SARPS, and contribute to EU and ICAO meetings.
- Facilitate the implementation of required security measures by Member States by developing guidelines and best practices in both the Guidance Material Task Force and the Training Task Force (e.g. future screening checkpoints.
- Ensure that security equipment deployed at European airports meets required minimum standards by developing technical specifications, type testing methodology and field testing methodology (e.g. detection of liquid explosives) in the Technical Task Force (TTF), and extending the ECAC Common Evaluation Process for security equipment to other types of equipment than Explosive Detection Systems (e.g. security scanners).

9.7 Regional Developments outside Europe

9.7.1 Developments in the United States and Canada

The Transportation Security Administration (TSA) which reports to the Department of Homeland Security was created in the wake of the September 11 terrorist attacks to strengthen the security of U.S. transportation systems whilst ensuring freedom of movement for people and commerce. Within a year TSA assumed responsibility for security at the nation's airports and deployed a Federal workforce to meet Congressional deadlines for screening all commercial airline passengers and baggage. In March 2003 TSA transferred from the Department of Transportation to the Department of Homeland Security[284].

As in the EU, the U.S. has implemented ancillary legislation and regulations which serve to add various levels of detailed requirements and procedures to the basic aviation security standards set out in Annex 17 of the Chicago Convention. Although the U.S. approach is not always aligned with that of the EU, there is a large degree of compatibility.

TSA pursues a 'legislate and verify' approach to aviation security, by which it seeks to proactively ensure compliance with security requirements through a programme of inspections and audits. It is able to do this in part through establishing direct regulatory oversight of air carriers that fly into the U.S. Through establishing a direct contractual relationship with an air carrier, TSA establishes the right to conduct limited security inspections even on foreign soil. For example, in 2009 TSA conducted 5,600 foreign air carrier inspections. Air carriers are heavily incentivised to collaborate with TSA air carrier inspections through fear that the U.S. will otherwise refuse entry. According to TSA, the threat of suspension of flights is sufficient motivation for the air carrier to comply with their stringent security measures.

Through its approach to aviation security and its regulation of the carrier (in addition to the relationship with the host state), the U.S. can move swiftly and respond to threats by putting in place additional security measures. The U.S. air carrier security programmes are regularly amended and security directives issued from time to time in response to security incidents such as the 2009 Christmas Day terrorist attack on

[284] http://www.tsa.gov/

Northwest Airlines Flight 253. The directive prescribed, amongst other measures, boarding gate pat-down checks of all passengers and in-flight restrictions on passenger movement starting one hour prior to arrival at the destination. Similarly following the October 2010 cargo planes bomb plot, TSA prohibited passengers from carrying certain printer cartridges on flights.

The U.S., like the EU, also provides resources, personnel, expertise and advice in collaborative capacity building programmes in third countries, with the goal of improving global international aviation security standards in the long term.

According to TSA, international information sharing in respect of aviation security concerns could be considerably improved. Save for the information available on the secure ICAO website, at present TSA has no formal means of obtaining information relating to the findings of an ICAO audit of a third country; and to the extent that it obtains such information on an informal basis it may be unable to take direct action. Consequently verification efforts are often duplicated and a State's ability to take enforcement action may be restricted. TSA considers that a formal system for sharing information between those States who are equally concerned about aviation security would increase the efficiency and effectiveness of international efforts to achieve global compliance with Annex 17 security standards.

The Canadian Air Transport Security Authority (CATSA), established in 2002, is responsible for passenger and baggage screening at Canadian airports. Full-body screening technology has now been in operation at major Canadian airports for one year. CATSA shares responsibility for civil aviation security with several federal departments and agencies, including Transport Canada, as well as air carriers and airport operators. Transport Canada is the regulator for aviation security under the Aeronautics Act.

Transport Canada consulted stakeholders in March 2010 through a Notice of Intent to put airport security programs in place that will require airport operators to assess their current security measures, clarify and document their responsibilities; and develop and clearly outline their security needs and the best ways to reduce real security risks.

In May 2010, the Government of Canada announced a plan to ensure that air cargo shipments are protected from the threat of terrorism and to help exporters move cargo securely and efficiently. The enhanced Air Cargo Security Program is a $95.7-million investment over five years, to be phased in and fully implemented by 2015.

In June 2010, the Government of Canada launched a full review of CATSA. This review, which followed an increase in the Air Travellers' Security Charge, was undertaken to ensure that travellers are getting value for their money.

In August 2010, Transport Canada more clearly defined requirements under the Identity Screening Regulations to clarify that air carriers must match photo documentation presented to passengers' physical appearance.

9.7.2 Developments in Asia Pacific

As well as through ICAO, developments in aviation security are coordinated in the Asia Pacific region through the Asia Pacific Economic Cooperation (APEC) forum. APEC[285] was established in 1989 and is a

[285] http://www.apec.org/

forum for 21 Pacific Rim countries that seek to promote free trade and economic cooperation throughout the Asia Pacific region.

In 2003 APEC established the Aviation Security Sub Group (AEG-SEC) to increase cooperation between economies in relation to aviation security issues in the Asia Pacific region. The AEG-SEC is a sub-group of the Aviation Expert Group, which is itself a sub-group of the APEC Transportation Working Group. Additionally, APEC established the Counter Terrorism Task Force (CTTF) with a mandate to coordinate and implement Leaders' and Ministers' commitments and instructions on counter-terrorism and secure trade.

The key Asia Pacific aviation security meetings in 2010, as reported by AEG-SEC at the 33rd APEC Transportation Working Group Meeting in October 2010[286] were as follows:

In March 2010 Japan hosted the Asia Pacific Ministerial Conference on Aviation Security (APAM-AVSEC). This was one of five regional conferences held in response to the NWA Flight 253 incident. The meeting was attended by officials from 18 states and administrations in the region and the Secretary General of ICAO. The key outcome of the Conference was the adoption of the Asia-Pacific Joint Declaration on Aviation Security, under which all the states and administrations indicated their commitment and determination to pursue the identified ten action items.

In April 2010 an Asia Pacific Aviation Security Regulators' Meeting was held in Singapore. The objective of the meeting was to discuss the challenges in international aviation security and to explore opportunities for further collaboration within the region.

The meeting was attended by representatives from Australia, Brunei, Darussalam, People's Republic of China, Hong Kong, Japan, Malaysia, New Zealand, Singapore, Sri Lanka and Viet Nam. Observers and speakers from the Netherlands, the U.S., ICAO and IATA were also invited.

A key outcome of the meeting was the development of an Asia-Pacific Aviation Security Action Plan (AP-ASAP), a framework for enhanced aviation security collaboration amongst the Asia and Pacific States containing six key initiatives:

1. To promote the implementation of aviation security measures in a practical manner and in compliance with the Standards of Annex 17 to the Chicago Convention;
2. To promote information sharing and to enhance risk assessment for effective management of aviation security threats;
3. To promote and enhance capacity building programmes and training for effective implementation of aviation security measures;
4. To promote the use of modern technology;
5. To enhance security of air cargo; and
6. To enhance collaboration with States and industry.

In June 2010 the 2nd APEC Air Cargo Security Workshop was held in Singapore, following on from the first workshop held in Thailand in 2008. The workshop was co-sponsored by the United States, Singapore and

[286] Aviation Security Sub-Group Final Report, 33rd APEC Transportation Working Group Meeting, Tokyo, 10th to 14th October 2010

Australia, with the objective of promoting further exchange of best practices and lessons learned in the area of air cargo security. In the Asia Pacific region, air carriers ship nearly half of global freight.

The workshop focused on the top three areas of interest to air cargo security experts, namely information sharing, capacity building and technology. It also included a unique networking session that provided voluntary one-on-one expertise, advice and capacity building assistance for economies seeking to establish or improve air cargo security arrangements.

9.8 Industry Initiatives

In January 2010 the International Air Transport Association (IATA) hosted a security summit in Geneva to launch a new era of industry-government cooperation and action. At the meeting IATA and airline chief executives presented heads of the U.S. Department of Homeland Security (DHS), ICAO and member airlines with five principles of a Vision for Intelligent Aviation Security. IATA's Director General and CEO Giovanni Bisignani[287] stated:

> *"Our actions should take a risk-based approach, involve globally coordinated action by all stakeholders, harmonise best practice across borders, be practical to implement, and be strategically focused on defined objectives."*

IATA presented five recommendations based on these principles:

1. Implement formal consultation with all airlines including non-U.S. carriers
2. Refine existing emergency orders to address the international environment
3. Streamline the data collection process
4. Strengthen government-to-government outreach for greater harmonisation and coordination
5. Start developing a 'Next Generation Checkpoint'

The Next Generation Screening Process (NGSP) and Checkpoint is based around three pillars: (1) use of passenger data in identifying high-risk passengers; (2) behavioural analysis and (3) detection technology. IATA believes the aviation industry needs "screening systems that focus on finding bad people, not just bad objects", combining technology and intelligence. The key lies in leveraging all the passenger information provided by governments before the start of the trip, including by immigration, customs and security authorities. This overview must then be analysed by intelligence agencies. Detailed results of the passenger's vetting will be made known to screeners at the checkpoint, determining whether or not a more thorough physical search is warranted. The end result is a stronger and more efficient checkpoint[288].

In December 2010 IATA and Airports Council International (ACI) hosted an ICAO workshop to determine the next steps in developing NGSP.

The ACI World Security Standing Committee covers security in airport design; passenger and baggage screening; access control; security technology; the impact of security on airport facilitation; biometric applications for security; cargo security; contingency planning for natural disasters; measures to combat biological and chemical threats to aviation; and auditing methodologies appropriate for airports based on compliance with ICAO Annex 17.

[287] IATA Press Release, 2nd November 2010

[288] Security and Facilitation Recommendations, IATA Website

The Committee has been working with ICAO and IATA to make sure that global standards are sustainable and that States fund counter-terrorism measures as an element of national defense. ACI has also initiated a series of worldwide security seminars and runs training courses on security regulatory awareness. ACI continues to partner with IATA for the annual AVSEC World Symposium, the industry's largest and most prestigious annual security event.

9.9 Key Aviation Security Issues

9.9.1 Use of Enhanced Security Scanners ('Body Scanners')

On 25 December 2009 the attempted terrorist attack with hidden explosives on NWA Flight 253 highlighted the limits of metal detectors, commonly used at airports, in detecting non-metallic threat items on persons. As an immediate reaction several countries have accelerated the further development and eventual deployment of more advanced technology capable of detecting non-metallic and liquid explosives.

In January 2010 TSA was given a mandate in the U.S. to increase the use of enhanced screening techniques technologies for inbound passengers (specifically from known threat countries) on international flights. In March 2010 TSA began deploying 450 advanced imaging technology units or 'body scanners' which are designed to give airport security staff a much better chance of detecting explosives or other potentially harmful items hidden on a passenger's body. By November 2010 enhanced screening procedures (including the more widespread use of advanced security scanners) had been implemented at all U.S. airports.

The concerns raised on the use of security scanners for screening at airports relate primarily to two issues, the creation of body images and the use of x-ray radiation. Firstly, until recently all security scanners produced images of the screened person's body in order to allow a human reviewer of these images to assess the absence of items prohibited from being brought on board aircraft. Secondly, part of the security scanner technologies emit low doses of radiation, ionising (x-ray) and non-ionising, for detection purposes. In particular the use of ionising radiation raises health questions.

Today technologies exist that neither produce images nor emit radiation, however the two concerns raised above have created a fierce debate on the security scanner's compliance with fundamental human rights and public health principles and legislation, applicable in the EU. All EU legislation, including legislation on aviation security and its application must fully comply with fundamental rights and health standards established and protected by European Union law.

At present the situation in Europe is fragmented as security scanners, where used, are not systematically and uniformly deployed by Member States at their airports. In addition, their use is not harmonised in terms of operational conditions as they are regulated at national level.

In February 2010 EU Transport Ministers met to discuss this issue and in June of the same year the European Commission produced a detailed Communication on the use of security scanners at EU airports[289]. Some of the key issues covered include effectiveness of scanners, privacy and health concerns and financing. The Communication is subject to discussion within the European Parliament and the Council; and Stakeholders have been asked to provide opinions to a Task Force set up to determine

[289] Communication from the Commission to the European Parliament and the Council on the Use of Security Scanners at EU Airports, COM(2010) 311/4, June 2010

the next steps. The Commission's view is that where Member States decide to authorise security scanners, a common EU-wide framework would be the best way to legally guarantee the uniform application of security rules at all airports and provide strict and mandatory safeguards to ensure compliance with European fundamental rights and health provisions.

9.9.2 Carriage of Liquids, Aerosols and Gels (LAGs)

In August 2006 police authorities in the UK acted to prevent a suspected suicide bomb plot that would have simultaneously impacted several flights leaving the UK. The plot was to destroy several commercial passenger aircraft leaving the UK en route to the USA using liquid explosives carried on board in hand luggage.

Immediate restrictions on hand luggage and the carriage of liquids were introduced in the UK and many other countries; subsequently measures for the implementation of common basic standards were adopted under Regulation 820/2008[290]. However, rules on the carriage of LAGs continued to be applied differently at different airports around the world and the additional required screening caused huge disruption to air travellers.

In 2010, following the development of more sophisticated screening technologies, the European Commission through Regulation 297/2010[291] indicated a gradual move away from banning most liquids in hand luggage to a system where hand luggage is screened for liquid explosives.

This is aligned with the ICAO Aviation Security Panel meeting in March 2010, whose members agreed that it would be desirable to replace the current restrictions on LAGs with a security regime that allows for the carriage of LAGs by bona fide passengers, based on a technology for the screening of liquid explosives.

9.9.3 Cargo Security

After the October 2010 cargo planes bomb plot, in which air cargo containing laser printers with toner cartridges filled with explosives were discovered on separate cargo planes, the U.S. prohibited passengers from carrying certain printer cartridges on flights.

The bomb plot highlighted wider weaknesses in air cargo security and in November 2010 ICAO proposed amendments to Annex 17 to address them. The amendments specifically call for appropriate screening of cargo and mail and the approval of regulated agents and consignors who are involved in implementing screening or other security controls of cargo. This envisages the development of a secure supply chain of the type already adopted within the EU and the United States.

In support of this IATA are calling for the global application of a cargo security assurance process[292] based on the supply chain approach, which means that from the moment a box is packed until the moment it arrives at the aircraft, train, truck or ship, it is protected from tampering. It is based on the premise that

[290] Commission Regulation (EC) No 820/2008 laying down Measures for the Implementation of the Common Basic Standards on Aviation Security, 8th August 2008

[291] Commission Regulation (EU) No 297/2010 amending Regulation (EC) No 272/2009 supplementing the Common Basic Standards in Civil Aviation Security, 9th April 2010

[292] Passenger and Cargo Security Update, Presentation for IATA Global Media Day, December 2010

shippers, forwarders, manufacturers, and airlines should all have a responsibility for maintaining the security of air cargo. Most importantly it allows the flexibility for cargo to be screened at an appropriate point on its journey to the airport or dock and then transported securely. This has several advantages:

- it prevents creating choke points where cargo might be stalled or backed up, which would certainly be the case of relying on airports where space constraints and facility limitations are common;
- it allows for security tailored to the commodity being shipped, rather than ‘one size fits all’ inefficient security; and
- it makes for multimodal security, meaning land and sea shipping is secure as well.

This is a system used by many countries. For example the EU has a Regulated Agent and Known Consignor programme called secure supply chain, the U.S. has introduced the Certified Cargo Screener Program, and EU security regulations have been changed along similar principles. IATA has been committed to supply chain security for many years and its ‘Secure Freight’ programme is currently being piloted in Malaysia and Egypt.

In December 2010, following a report[293] from a High Level Working Group set up by the Belgian Presidency of the Council of the European Union and the European Commission, an action plan was presented to strengthen air cargo security[294]. This called for emergency procedures, put in place by several EU Member States following the Yemen incident, to be replaced by a joint EU approach. Working closely with national and industry experts from the Air Cargo Working Group, the Commission will finalise in 2011 new legislative proposals in relation to cargo originating from outside the EU. These proposals are likely to include actions to be taken by EU air carriers wanting to bring cargo from countries outside the EU. The proposals will also draw on experience gained in the customs sector, using a risk-based approach and requiring more advance information about shipments. The first steps will be to define criteria for identifying cargo which represents a particular risk and to establish mechanisms to allow for the evaluation of security standards at non-EU airports.

Member States will be encouraged to accelerate the implementation of the EU's system of supply chain security in relation to known consignor certification with an implementation deadline of April 2013. Validation of relevant parties in countries outside the EU should be considered in order to underpin the necessary security controls that already exist there. This will mitigate the risk of consignments arriving from external countries and will have minimal impact on transfer cargo handling at EU airports.

9.9.4 Costs of Security

The terrorist attacks of 11 September 2001 in the United States had a profound impact on the global aviation sector including within Europe. Strong measures were essential to address the threats posed by international terrorism and to restore public confidence in the aviation sector. Consequently the cost of aviation security has increased over the last years.

[293] Report of the High Level Group on Strengthening Air Cargo Security, Council of the European Union, 16271/1/10, 30 November 2010

[294] A European Action Plan to Strengthen Air Cargo Security, IP/10/1651, 2nd December 2010

A study for the Commission estimated that in 2002 more than 90% of these costs were recovered through security charges (or taxes) levied on air passengers, airlines and cargo shippers. In 2007 these security charges yielded estimated revenue of €1.6 billion in the EU, which constituted approximately 1% of the average air fare[295]. In the U.S., TSA – a large part of whose remit concerns aviation security – has approximately $8.2 billion in budget authority for the fiscal year 2011[296]. Of this, the introduction of full body scanners and other related technology at U.S. airports will cost $1billion[297].

But to what extent should a government's responsibility for aviation security be shared with airport operators and airlines; and consequently what proportion of the costs should be borne by the taxpayer or passed onto fee-paying passengers through additional taxes and surcharges? At the moment, aviation security costs are recovered in different ways in different countries. The consistent position would seem to be that the threat is against the State, so it should be the State that bears the cost, just as it does with national defence and policing through central taxation.

Allegedly rigorous systems that we had in place at the time have not always prevented potential suicide bombers from boarding aircraft. The 2001 "shoe" bomber and the much more recent incident on Christmas Day 2009, already described, are two such examples. But on the other hand, the successes of security measures are not easily quantified and often not put in the public domain. It is important that a balanced approach is adopted where aviation security is not just developed in a reactive way as events unfold, but is determined by evaluating and continuing to evaluate the cost effectiveness of alternative solutions.

Sometimes the trade-offs are clear cut, sometimes less so. Few would argue now that the introduction of reinforced cockpit doors and restricted access to the flight deck has not been beneficial since this has all but eliminated instances of hijacking, but have there been any knock-on consequences in terms of aviation safety? In another example, would less obtrusive but targeted or random screening, including profiling and new technology offer a better solution to 100% (and not necessarily effective) screening of hand luggage?

There is a need for a more rigorous cost benefit approach to security improvements, because once a new security procedure or process is implemented it is difficult to revert back due to the perceived increase in risk (real or otherwise) that this may cause. It is also important to consider the potential impact of security procedures on airport operations. For example, the issue of airside-access security needs to be developed without constraining the safe and efficient operation and management of the air transport system. In addition, States should look to harmonising security by mode where the risks and threats are similar in the event of an incident e.g. the Channel Tunnel.

There are also extra hidden costs of security. For example, enhanced screening procedures have greatly increased the amount of time passengers spend waiting at the airport by extending the buffer time between arriving at the airport and getting on a flight. In the U.S. it has been reported that in the three years following September 11, the number of passengers who arrived at an airport two to three hours before departure rose from around 20% of the total to nearly 40%, while the number who arrived one hour in advance fell from around 20% of all passengers to less than 10%. Furthermore, these arrival patterns seem to have stabilised at those new levels[298]. That extra time spent in airport security queues has a

[295] Commission Staff Working Document accompanying the Proposal for a Directive of the European Parliament and the Council on Aviation Security Charges – Impact Assessment, SEC(2009) 616, 11th May 2009

[296] Study on the Legal Situation Regarding Security of Flights from Third Countries to the EU, Innovative Compliance and DLA Piper, Final Report for the European Commission, November 2010

[297] Homeland Security Newswire, 3rd February 2010

[298] The High Cost of Airport Security, U.S. News and World Report, 1 December 2010

direct impact on airport revenues (less time to spend in airport retail outlets) but also has a cost in terms of less time to spend at work, less time with family and less time for leisure.

In 2009, the European Commission issued a proposal for a Directive on the harmonisation of aviation security charging across the EU[299], particularly in relation to transparency, cost-relatedness of security charges and consultation before charges are determined or modified. This draft Directive is currently going through the legislative process in the European Parliament and the Council.

There is a recognition within the EU that aviation security comes at a cost to both Governments and the Industry. The aims of EU legislation are therefore to cut these costs wherever possible by the elimination of duplication and the adoption of a simplified focused approach to security, that allows for the revision (including relaxation) of existing rules where feasible. The objective is to harmonise rules within the EU and extend “one-stop security” to countries outside the EU that have high security standards, based on extensive quality control, technology, training and standards.

[299] Proposal of the European Parliament and of the Council on Aviation Security Charges, COM(2009) 217 final, 11 May 2009

10. Consumer Issues

10.1 Introduction

This chapter examines the progress of European aviation during 2010 through the eyes of the consumer, whose main concern is how airlines and airports deal with them, particularly when unscheduled events lead to cancellations and delays.

Increasingly, the consumer is also becoming interested in all aspects of customer service from the booking process right through to their final exit at the destination airport. This includes their airport and airline experience and how their baggage is handled.

The European Union seeks to standardise these aspects of consumer concern for two reasons – to ensure that the contract between airline and consumer is fair to both parties; and to ensure that consumers across Europe are treated equally.

Section 10.2 of this chapter deals with the important aspect of punctuality, here regarded as being the ability of an aircraft to either depart from the gate, or arrive at the gate, within 15 minutes of the advertised time. The aim is to have published information which enables both consumers and regulators to have access to comparable data which will both inform consumer choice and lead to better enforcement of acceptable standards. This information should not only accord rankings to airports and airlines, but also give detailed reasons for the causes of each delay so as to be able to adopt appropriate responses. However, the amount of strictly comparable data is becoming reduced as organisations either cease collecting and publishing data, or restrict the detail made available.

Section 10.3 deals with all the other aspects of service of real concern to consumers; principally how airlines and airports deal with denied boarding, delays and cancellations, plus lost or damaged baggage. Increasingly concerns are being felt about the treatment of disabled passengers, the transparency of pricing information and the impact of airline failures.

Progress on each of these aspects is discussed in this section, along with relevant progress in the other main global aviation market, the United States.

10.2 Punctuality & Delays

10.2.1 Introduction

Whilst punctuality of operation is one of the key measures of airline and airport performance, consumer access to punctuality data aggregated across the EU for both airlines and airports is very limited. The Association of European Airlines (AEA) has previously published punctuality data for its airline members but since 2009 this has now ceased.

Some individual States, through their respective national aviation regulators, produce statistical analyses at an airline and/or airport level; but data reporting on a pan-European basis is primarily limited to airline de-identified monthly reports produced by EUROCONTROL's Central Office for Delay Analysis (CODA)[300],

[300] http://www.eurocontrol.int/coda/public/subsite_homepage/homepage.html

together with Network Operations Reports[301] on Air Traffic Management (ATM) performance from their Central Flow Management Unit (CFMU).

Delays to flights are normally a symptom of either inefficiency (on the part of the airline, airport or traffic management system) or inadequate capacity (airport and/or traffic management) and trends in delays are an important measure of network performance. To operators, delays mean increased costs of operation while to the consumer punctuality is an important service differentiator. Business traveller surveys frequently cite that after safety, on time performance is a primary 'hygiene' factor affecting airline and airport choice.

Delays can occur at all points on the flight timeline, e.g. delays in passenger boarding, aircraft push-back, taxiing, runway access, en route air traffic, holding of aircraft prior to landing, stand availability and airport facilities upon arrival. Weather disruption can further impact on the performance of a flight. The likelihood of a flight delay is greater at times of higher demand, as resources are stretched and therefore more likely to impact on a greater proportion of the travelling public.

Delays cost money and any knock-on (or reactionary or secondary) effects of a primary delay also need to be minimised as the costs per minute of a secondary delay are no less than that of a primary delay. Generally, departure delays in excess of fifteen minutes are considered as a useful measure of punctuality and publicly available data often use this time period as the measure of a flight operating on time.

With regard to passenger rights, whilst regulation (EC) No 261/2004[302] has established common rules on compensation and assistance to passengers in the event of cancellation and long delays, there appears to be no monitoring of long delays by carrier. In the U.S. the Bureau of Transport Statistics provide comprehensive data covering on-time performance, flight delays, flight cancellations and chronically delayed flights for airlines (the largest 16 carriers) and airports.

Whilst there is a recognised categorisation of delay causes for airlines to use (provided by IATA), the breakdown by delay cause is not made available in the public domain. Of those airlines publicising their delay performance, most quote overall departure delays although some quote their arrival punctuality as their measure of performance. In Europe, it is an airline's prerogative whether and how its punctuality is promoted and many carriers do not publish performance statistics. Publicly available data on both airline and airport punctuality differs across the world and across Europe with much detailed analysis kept 'behind closed doors' on the part of the operator, whether airline or airport.

Delay statistics for airlines belonging to AEA (Association of European Airlines) are no longer produced, making European airline comparisons of punctuality difficult. On a global basis, the FlightStats[303] platform of Conducive Technology Corp. provides both real time and historical flight information by collating actual flight time information from a variety of sources (civil aviation authorities, airlines, airports and airline reservation systems). FlightStats tracks the performance of nearly 150,000 daily flights and archives the data allowing analysis by airline, by route or by airport. The FlightStats data primarily captures airline arrival time information, without providing any information on the causes of delays. Comparisons of airline

[301] http://www.cfmu.eurocontrol.int/cfmu/public/standard_page/data_provision_reporting_monthly_nor_2010.html

[302] Regulation (EC) No 261/2004 of the European Parliament and of the Council establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights, and repealing Regulation (EEC) No 295/91, 11 February 2004

[303] www.flightstats.com

arrival punctuality data year-on-year can also be skewed by annual reviews of schedule block times and subsequent adjustments made by airlines trying to achieve better punctuality.

Airlines remain the primary recorder of delay information and are an important part of EUROCONTROL's Central Office for Delay (CODA) analysis, supplementing air traffic management data with more detailed delay coding. Airline-supplied data within CODA is held under strict confidentiality and no attempt is made or permitted to identify the performance of any individual airline. However, those companies that supply flight and delay data to CODA can have access to a further level of analysis, which permits them to benchmark their own performance against the network as a whole.

CODA is the only source of pan-European punctuality performance indicators, but the data comes from airlines and only limited information is in the public domain. CODA produces air transport delay reports but with full access available to only specific user groups (e.g. airlines, airports); however monthly operational and seasonal peak traffic reports from EUROCONTROL CFMU provide useful public statistics on general air traffic delay. In addition, the EUROCONTROL Performance Review Unit provides very detailed and informative annual reports on ATM performance including analysis of en route and airport Air Traffic Flow Management (ATFM) delay.

There are also some published examples of national punctuality and delay data; and two examples are referred to here.

In the UK, the Civil Aviation Authority (CAA) compiles passenger aircraft punctuality data for the ten largest reporting airports in the UK with the cooperation of the airports and the designated slot coordinator Airport Coordination Limited (ACL). The data is based on taking actual times of operation derived from airport returns to the CAA and comparing them with the planned times supplied by ACL.

However, the two data sources are not strictly comparable. Airline schedules are based on the arrival/departure at the stand whereas the actual time of the operation provided by the airport relate to the time the aircraft takes off or lands on the runway. Because of this, assumptions are made for the average taxi time for each reporting airport. UK CAA punctuality data is analysed both at an airport, route and carrier level with monthly and annual reports available to the public. The UK punctuality data is normally available in less than three months from the end of the reporting month and the CAA additionally issues quarterly press notices covering trends in delays. Quarterly and seasonal analyses of this CAA punctuality data have been undertaken by a private organisation Flightontime[304] since 2003, which is available to the general public. The majority of data presentations by both CAA and Flightontime are in a tabular format and trend information is not easily extracted.

In France, the Direction Générale de l'Aviation Civile (DGAC) produces its 'Observatoire des retards du transport aérien' report twice a year detailing punctuality at fifteen French airports (those with more than one million passengers or more than 30,000 annual movements). The report is at airport level only, with no specific punctuality performance by airline. It details delays by one of six key categories: airport and security delays, passenger delays, airline delays, air traffic control delays, weather delays and 'rotational' delays. The latest report was issued by DGAC in December 2010 and covered the annual report for 2009, some considerable time after the period to which it relates.

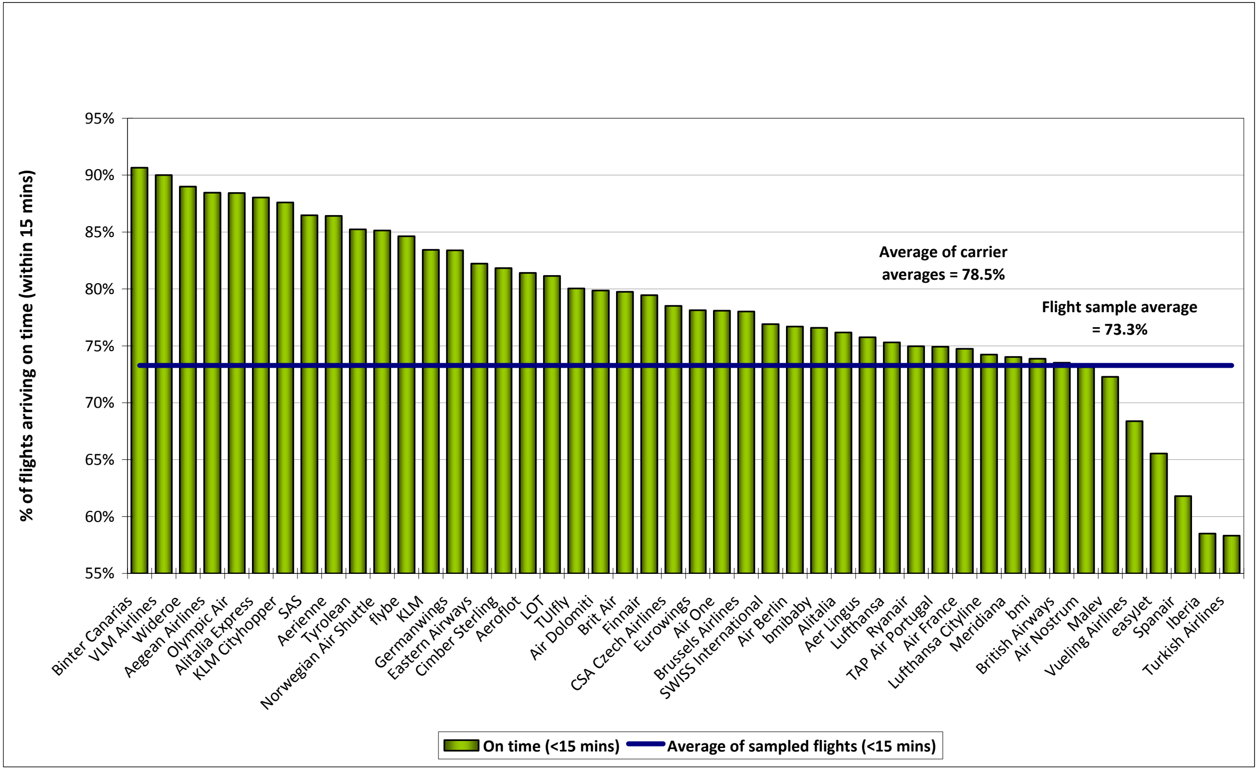
[304] www.flightontime.info

10.2.2 Airline Punctuality & Delays

European Scheduled Carriers

The annual European carrier arrival performance for scheduled flights for each airline sampled by FlightStats is shown below in Figure 10.1. While the average of all sampled flights is 73.3% on time, the average of the individual carrier averages is 78.5%. The top five European airlines in terms of on-time punctuality recorded an average of 89.3% of flights on time, compared to the bottom five carriers achieving on-time punctuality averaging 62.5%, giving an almost 25% point difference in on-time performance.

Figure 10.1: 2010 European Carrier Arrival Performance (Scheduled Passenger Flights



Source: www.flightstats.com

Of the bottom ten European carriers, four of these are based in Spain (Iberia, Spanair, Vueling and Air Nostrum) and three are UK carriers (easyJet, bmi and British Airways, two of which are primarily London-Heathrow based). The others are Turkish Airlines, Malev and Meridiana.

Charter Carriers

Similar data for charter flights is not available. The significant Mediterranean charter programmes operating across Europe in summer will impact on overall total airline network punctuality. The flightontime analysis of UK CAA data saw a return to long delays at reporting airports: the average delay to charter flights operating from the UK increased by nearly 50% to 28.5 minutes in summer 2010 (April to October) compared to 19.1 minutes in 2009. Charter airline on-time performance (within 15 minutes of the scheduled departure time) was on average 65%, nearly 10% below summer 2009 levels. The worst months were May and July. Summer season 2010 punctuality (within 15 minutes) for the four largest charter companies in the UK at 66% was marginally above the charter industry average, with these four operators representing 89% of total charter movements. All four large carriers experienced a worsening in performance compared with summer 2009 with the average delay increasing by over ten minutes to 29 minutes (close to a nine year high).

Table 10-1: Summer 2010 UK Charter Airline Punctuality (April to October)

		Average Delay (mins)		OTP (%)		1 hour+ late (%)		3 hours+ late (%)		Total Flights Analysed		Change in average delay YoY (%)
Rank	Airline	Apr-Oct 10	Apr-Oct 09	Apr-Oct 10	Apr-Oct 09	Apr-Oct 10	Apr-Oct 09	Apr-Oct 10	Apr-Oct 09	Apr-Oct 10	Apr-Oct 09	
1	Thomson Airways	22.36	14.10	70.58	79.92	9.30	5.13	1.97	1.07	27,226	28,671	+58.55
2	Monarch Airlines	29.40	19.91	66.19	72.87	12.03	7.67	3.30	1.84	5,968	6,469	+47.65
3	Thomas Cook Airlines	34.92	21.28	62.35	76.47	16.48	10.16	4.24	2.42	21,038	22,240	+64.06
4	Viking Airlines	52.22	38.76	44.59	49.36	23.39	16.45	6.58	3.17	2,386	2,431	+34.74
Average (above 4 airlines)		29.03	18.40	65.96	76.63	12.85	7.74	3.15	1.74	56,618	59,811	+57.73
Average (all charter flights)		28.52	19.08	65.19	74.70	12.43	7.95	2.96	1.68	63,785	68,239	+49.48

Source: www.flightontime.info (Notes: OTP = On-Time Performance, % of flights operating early, on time or up to 15 mins late. All charter flight movements (arrivals & departures) were analysed at all ten UK reporting airports for each airline, except where a small number of flights were operated which were excluded from the analysis, as follows (exclusions apply to summer 2010 season): Monarch Airlines STN (3), GLA (2); Thomas Cook Airlines LTN (2); Viking Airlines STN (2). UK reporting airports are BHX, EDI, GLA, LCY, LGW, LHR, LTN, MAN, STN and NCL.

UK Data

Looking in more detail at scheduled operators in the UK (January to December 2010), of the five largest airlines in terms of movements sampled[305], the best UK performers were flybe at 81.0% and bmi at 79.2% of schedule flights departing within 15 minutes[306]; with the worst performer (easyJet) at 61.4% within 15 minutes. All five carriers (flybe, bmi, Ryanair, British Airways and easyJet) suffered deteriorations from their 2009 annual performance with easyJet seeing the largest fall from 77% in 2009 to 61.4% in 2010 on time within 15 minutes.

Regional airlines achieved the best overall punctuality performance, with UK regional carriers bmi Regional and Eastern Airways achieving 89.7% and 89.2% respectively of flights departing within 15 minutes. Of the low cost carriers operating from the UK, the best performer was Air Berlin with 79.1% within 15 minutes and the worst performer being Jet2 with 48.1% of departures within 15 minutes (note: Jet2 primarily operates from UK regional airports).

Comparing both scheduled and charter flights in the UK during the 2010 summer season (April to October), average delays on scheduled flights increased by 39% in contrast with an increase of 49% in the average

[305] As reported at www.flightontime.info; carriers with more than 50,000 annual departures

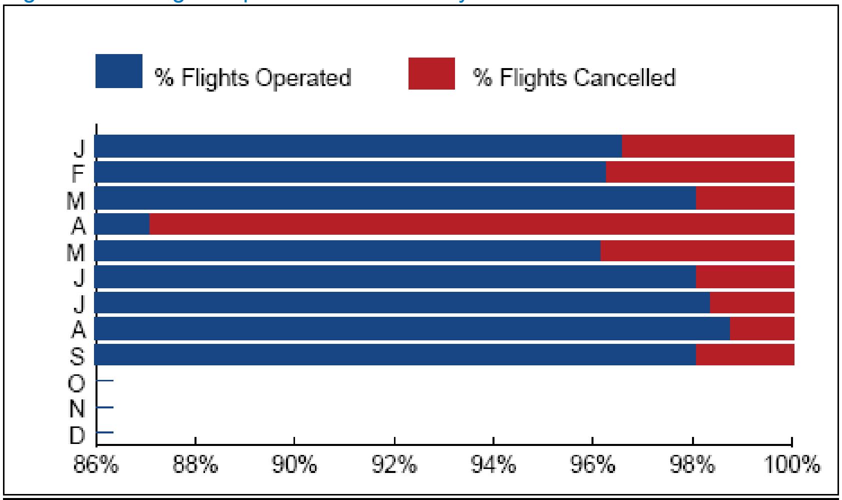
[306] Note this data is for departure delays and is not directly comparable with the flightstats arrival delay data for bmi presented earlier

delay for charter carriers. On-time performance within 15 minutes for scheduled carriers fell by less than 7% compared to a 10% fall in on-time performance of charter carriers.

Regional Carriers

The European Regions Airlines Association (ERA) publishes punctuality statistics for its (generally smaller) member airlines. Punctuality for this sector also deteriorated with a 3% reduction in flights departing on time (within 15 minutes of departure) to 86%. Cancelled flights increased from 1.5% of the total in 2009 to 3.6% in 2010, primarily as a result of the cancellations due to the volcanic ash cloud in April (see Figure 10.2).

Figure 10.2: Flights Operated/Cancelled by ERA Carriers



Source: ERA Business Databank[307]

Of the ERA member carriers, the best punctuality was achieved by Binter Canarias achieving 94.2% of flights departing on time (within 15 minutes) in the first half of 2010. It is important to note that the following statistics are for departing punctuality; some of these carriers are also surveyed by FlightStats which tracks airport arrival punctuality.

Table 10-2: Punctuality of Individual ERA Carriers 2010

	Number of flights operated	% Flights On Time	% chg 10/09	% Flights within 60 mins	% chg 10/09	Regularity (%)	% chg 10/09
Aegean Airlines	28,562	87.2	-2.0	98.7	0.4	96.3	-3.0
Aer Arann	12,085	83.9	-5.6	95.8	-0.7	93	-6.1
Air Alps Aviation	2,217	93.8	2.3	98.3	0.8	98.3	1.6
Air Iceland	5,278	86.5	-0.3	95.6	2.9	87.6	-5.7
Air Nostrum	60,145	84.9	-5.3	96.3	-1.3	97.9	-1.2
airBaltic	26,113	84.8	-6.6	97.9	-1.9	95.9	-3.9
BABOO	4,150	79.8	-	94.7	-	97.8	-
Binter Canarias	26,847	94.2	-3.0	99.3	0.5	97.2	-2.1
Carpatair	7,566	79.1	-3.8	92.1	-3.1	91.7	-4.0

[307] Based on ERA carrier data for January to June 2010 and more general data to September 2010

	Number of flights operated	% Flights On Time	% chg 10/09	% Flights within 60 mins	% chg 10/09	Regularity (%)	% chg 10/09
City Airline	3,761	88.6	-7.3	97.2	-1.9	93.1	-6.6
CityJet	21,931	83.5	-2.6	95.5	-1.9	94.0	-3.7
Eastern Airways	10,837	86.8	0.1	95.5	-0.7	92.0	-6.3
Finncomm Airlines	16,426	89.8	-2.7	99.5	0.1	99.7	0.3
Golden Air	8,628	90.0	-0.5	95.9	-0.3	91.1	-7.5
Malmö Aviation	8,086	87.2	-4.7	96.8	-1.2	92.4	-7.0
Montenegro Airlines	4,292	84.3	1.8	86.3	-0.7	97.3	-1.2
Nordavia-Regional Airlines	8,975	81.8	-3.4	91.8	0.6	98.2	1.4
PGA Portugália Airlines	11,516	84.7	-3.5	95.0	-2.3	97.2	3.6
Régional	44,365	85.7	-4.2	96.9	-1.2	94.5	-3.6
SATA Air Açores	7,180	66.9	-17.5	87.7	-8.0	90.5	-5.5
Skyways	11,107	92.0	-3.6	100.0	0.4	90.6	-8.4
Tyrolean Airways	45,852	90.1	0.1	98.8	-0.1	97.0	-2.3
Widerøe	47,234	89.3	1.6	98.1	0.3	94.4	-1.9

Source: ERA Business Databank (January to June)

Binter Canarias was also recognised in the FlightStats On-Time Performance Service (OPS) Awards as achieving the best arrival performance amongst regional European airlines. Table 10-3 below highlights the better punctuality performance of regional carriers around the globe compared to major carriers. The best punctuality of any major European airline was behind the best major North American carrier by almost 1% and 3.5% below the best major Asian carrier.

Table 10-3: FlightStats Best On-Time Performance Awards 2010

Category	Best Carrier	On-Time Arrival (within 15 mins)	Other Finalists
Major International Airlines	Japan Airlines International	89.90%	Singapore Airlines Qatar Airways Air New Zealand SAS Scandinavian All Nippon Airways
Major North American Airlines	Alaska Airlines	87.36%	United Virgin America Frontier Airlines US Airways
Major European Airlines	SAS Scandinavian	86.47%	KLM Royal Dutch Airlines Austrian Airlines Tarom-Romanian Air Transport Aeroflot Russian Airlines
Major Asian Airlines	Japan Airlines International	89.90%	All Nippon Airways Singapore Airlines Thai Airways International Korean Air Lines
Regional North American Airlines	Hawaiian Airlines	92.01%	Horizon Airlines

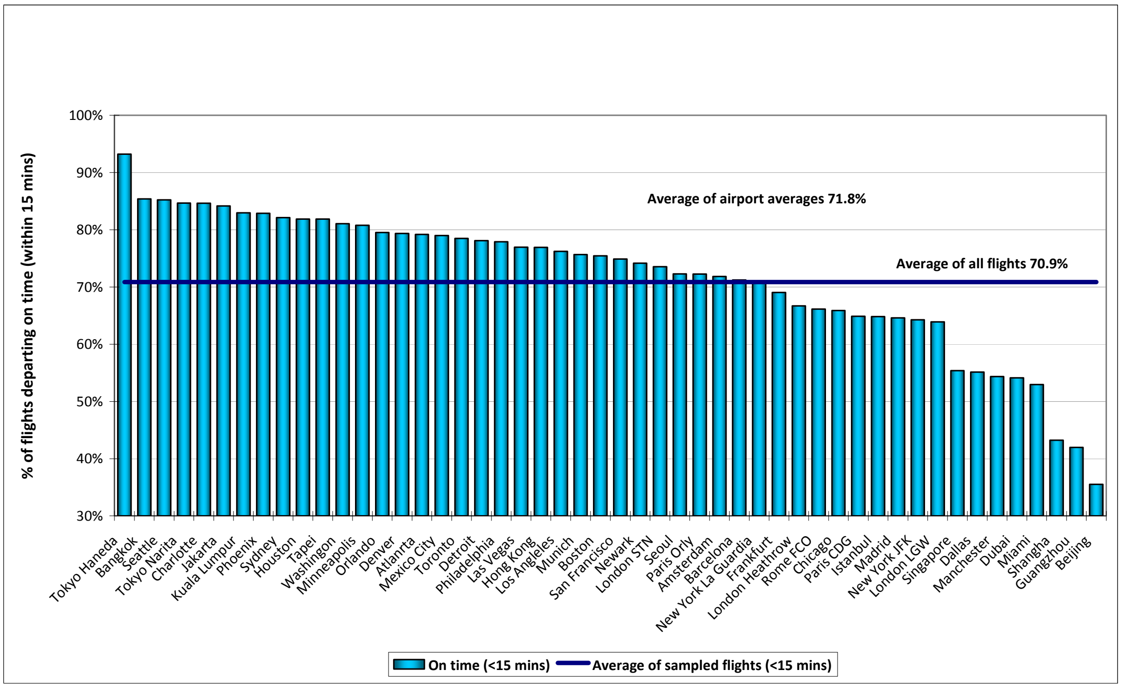
Category	Best Carrier	On-Time Arrival (within 15 mins)	Other Finalists
			Mesa Airlines Porter PSA
Regional European Airlines	Binter Canarias	90.64%	Widerøe's Flyveselskap KLM Cityhopper B.V bmi Regional Aer Arann Express
Regional Asian Airlines	JAL J-Air	93.32%	JAL Express Air Nippon Network Bangkok Airways Japan Transocean Air

Source: FlightStats Ops Awards website

10.2.3 Airport Punctuality & Delays

In previous years AEA statistics have given an insight into airport punctuality across Europe, albeit limited to its airline members, but since 2009 such data is no longer available. However, FlightStats produces an analysis for the top 50 worldwide airports on a monthly basis as well as an annual analysis[308] collating data from those airlines that provide punctuality statistics. To reiterate, the data is based on the sampling of reporting airlines and is not a complete record of punctuality of all scheduled carriers operating at a given airport.

Figure 10.3: 2010 Airport Departure Performance Report for World's Busiest Airports (Sampled Scheduled Airlines)



Source: www.flightstats.com

[308] 2010 Year-end Report on Airport and Airline On-time Performance, FlightStats, 4 February 2011

No European airport appears in the top twenty with Munich, London Stansted and Paris Orly being the best airports and appearing mid-table. The main network carrier hub airports in Europe (Amsterdam, Frankfurt, Heathrow, Paris and Madrid) achieved average on-time departure punctuality of 67.4%. The best European 'hub' performance achieved was at Munich with 75.7% of departures on time.

UK CAA punctuality statistics for the last quarter available (July to September 2010) indicate reducing on-time performance and increasing delays at all ten UK monitored airports. For scheduled flights 72% departed on time, an 8% fall on the same three months in 2009 with an average delay of 16 minutes, or four minutes longer than 2009. For charter flights punctuality was 63% on time, a fall of 11% on 2009; the average delay increased from 20 to 30 minutes in the quarter over 2009.

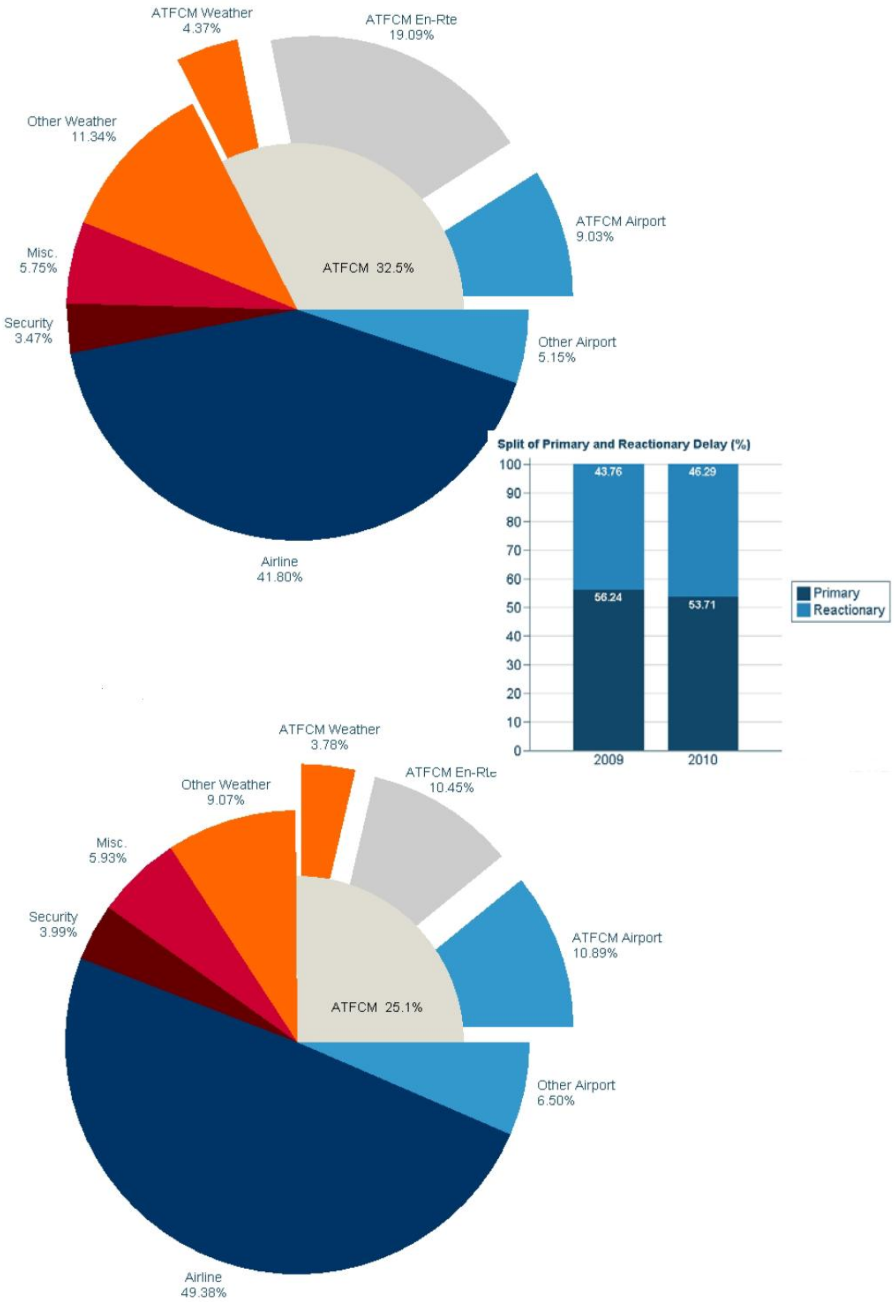
It is important to note that the data being reported is airline delay data. An airport may appear to be performing poorly in the league table merely because it is served by poorly performing airlines. In addition, delays at airports can be due to a number of reasons, some of which may be under the control of the airport (e.g. preparedness for snow), but some not. For example in the UK, London Heathrow and London Gatwick are recognised as the most efficient dual and single runway airports in the world, respectively, operating at near full capacity. However, their delay performance is generally very poor. Due to environmental concerns, the policy of successive UK Governments has not allowed any increases in runway capacity at these airports; and airlines accept the resulting delays in order to achieve the near 100% throughput. This is, of course, of no consolation to air passengers.

10.2.4 Delays Reported by CODA

The CODA digest report gives an overview of the delay situation in the European Civil Aviation Conference (ECAC) Area and is based on EUROCONTROL data and delay data provided directly by airlines. Departure delays are based on the difference between the planned off-block time and the calculated off-block time, taking into account slot time and estimated taxi time. Airline data from the CODA database contain real recorded delays provided to CODA by airlines and is based on the difference between scheduled time of departure and off-block time.

Using the data provided by airlines to the EUROCONTROL CODA database, primary delays caused by airlines reduced as a percentage of all delays from 49.4% in 2009 to 41.8% in 2010, but ATFCM (Air Traffic Flow and Capacity Management) delays increased from 25.1% to 32.5%. The percentage of delays due to weather also increased.

Figure 10.4: Primary Delay Causes 2009 & 2010

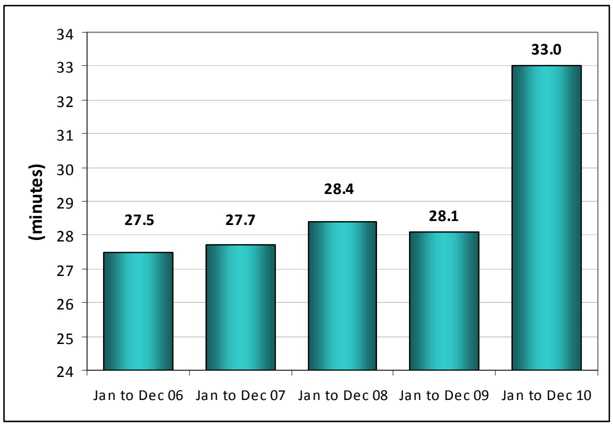


Source: EUROCONTROL CODA

In 2010 the average total departure delay per delayed flight was 33 minutes, a 17% increase over 2009; and the percentage delayed by more than 15 minutes increased from 18% to 23%.

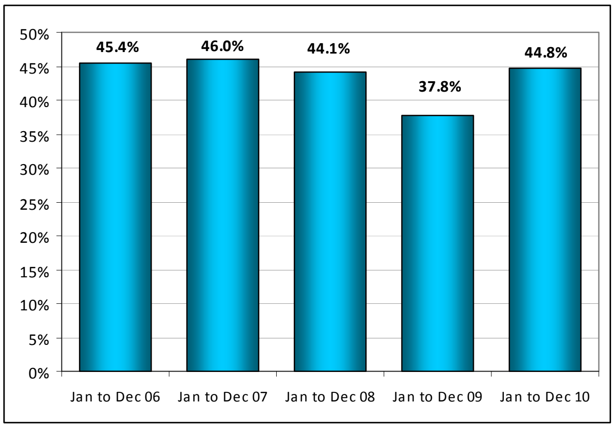
Although 2010 included the ash cloud crisis, the impact of this event in April and May was mainly upon cancellations rather than increased delays. In the summer peak it was primarily ATC industrial action and staffing related issues which had a significant impact on aircraft delays. France had the largest share of delays caused by industrial action, while Germany and Spain also suffered to a lesser extent. 2010 was also impacted by airport delays caused by the heavy snowfalls in December across northern Europe.

Figure 10.5: Average Delay per Delayed Departure



Source: EUROCONTROL CODA

Figure 10.6: Percentage Delayed Departures

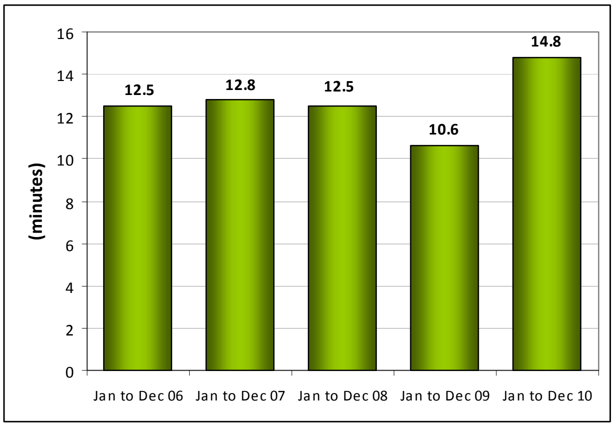


Source: EUROCONTROL CODA

Although the average delay per delayed departure was the highest over the past five years (Figure 10.5), the actual percentage of flights delayed was on a par with previous years with the exception of 2009, when traffic was depressed due to the economic downturn. 44.8% of flights were delayed in 2010, higher than the 2009 figure of 37.8%, but close to that of 2008 and lower than the percentages recorded in 2006 and 2007 (Figure 10.6).

The average delay expressed across all departures (including those flights not delayed) increased to a 5-year peak of 14.8 minutes, an increase of 40% over 2009 (Figure 10.7).

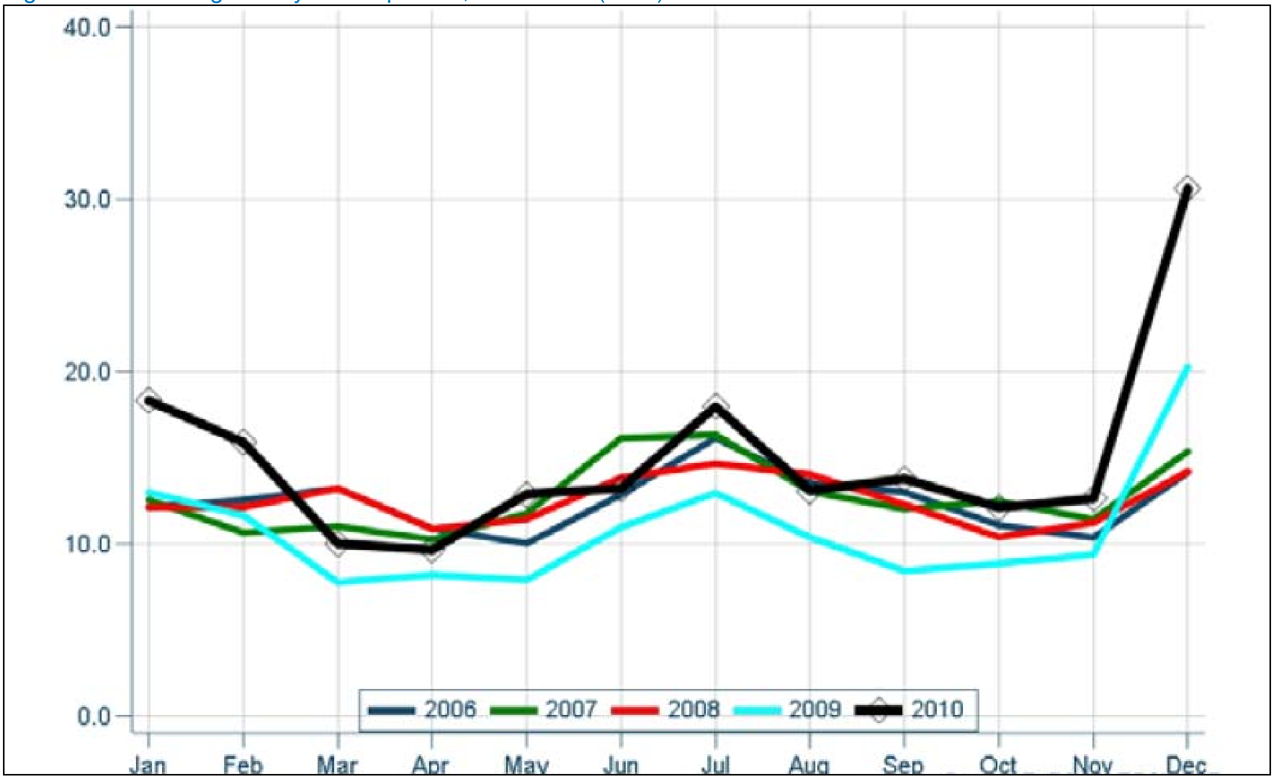
Figure 10.7: Average Delay Per Departure



Source: EUROCONTROL CODA

Figure 10.8 highlights the average delay by month for the past five years. During the summer season each month in 2010 was higher than 2009. In the months of May, July and September the average delay was the highest recorded over the five year period for these specific months. Weather, industrial action (France seeing a notable increase), significant ATFCM and subsequent reactionary delays were the primary causes of the increases in delays across these specific months and the year generally. Punctuality in January, February and December 2010 was significantly worse than previous years primarily due to the snow disruptions in Europe.

Figure 10.8: Average Delay Per Departure, All Causes (mins)



Source: EUROCONTROL CODA

The top twenty affected airports for all delays in the summer 2010 season are summarised below in Table 10-4 and highlights significant delays across a number of Spanish airports in summer 2010, with seven airports in Spain averaging delays of over 20 minutes per departure across the period. Both London Gatwick and London Luton also saw average delays above 20 minutes; both these airports are large bases for easyJet which saw a significant increase in delays versus the previous year according to UK CAA punctuality statistics.

Table 10-4: Top 20 Affected Departure Airports (Summer 2010) All Causes

Rank	Departure Airport	ICAO Code	Average Delay Per Departure	Average Delay per Movement Percentage Change	Average Delay Per Delayed Departure	Percentage Delayed Departures
1	Tunis/Carthage	DTTA	28.4	68%	44.4	64.1%
2	New York	KJFK	26.9	71%	50.2	53.7%
3	Tenerife Sur	GCTS	23.4	91%	48.4	48.4%
4	Malaga	LEMG	22.5	75%	40.0	56.3%
5	Palma de Mallorca	LEPA	22.3	107%	38.0	58.6%
6	London Gatwick	EGKK	21.5	61%	37.9	56.9%
7	Madrid Barajas	LEMD	21.3	96%	35.7	59.7%
8	Ibiza	LEIB	20.9	96%	42.4	49.2%
9	London Luton	EGGW	20.8	65%	36.4	57.2%

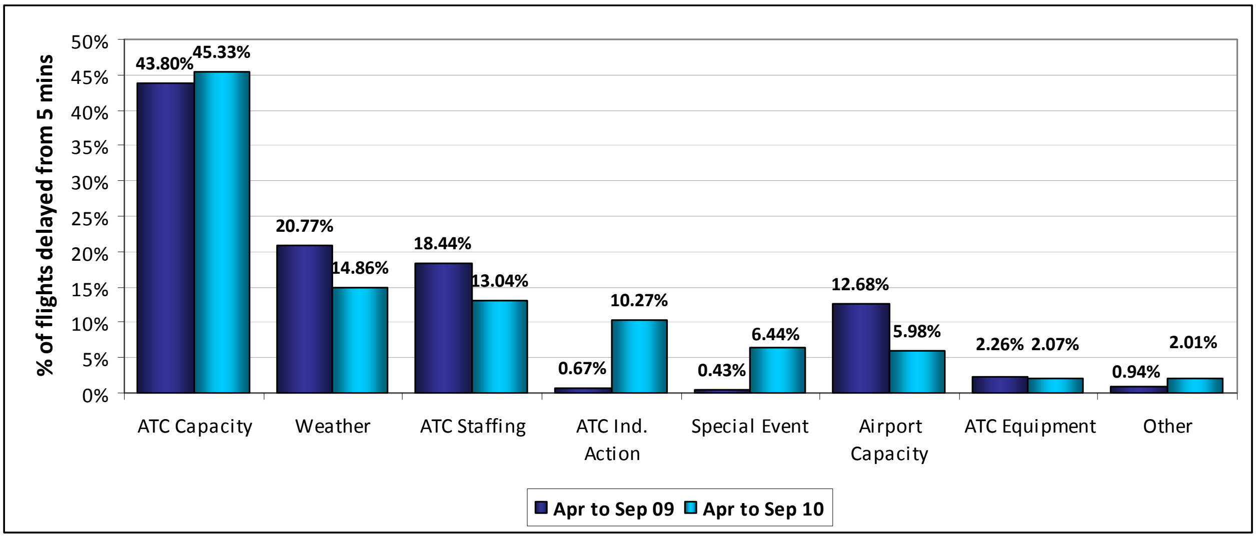
Rank	Departure Airport	ICAO Code	Average Delay Per Departure	Average Delay per Movement Percentage Change	Average Delay Per Delayed Departure	Percentage Delayed Departures
10	Alicante	LEAL	20.5	117%	40.1	51.1%
11	Las Palmas	GCLP	20.3	72%	40.4	50.2%
12	Faro	LPFR	20.1	64%	36.7	54.8%
13	Belfast/Aldergrove	EGAA	20.0	93%	43.5	46.0%
14	Nice	LFMN	19.9	82%	34.6	57.6%
15	Nikos/Kazantzakis	LGIR	19.5	37%	46.4	42.1%
16	Tel Aviv/Ben Gurion	LLBG	18.7	45%	31.7	59.0%
17	Lisboa	LPPT	18.6	42%	33.8	55.1%
18	Larnaca	LCLK	18.5	15%	42.1	44.0%
19	Roma Ciampino	LIRA	18.1	37%	30.9	58.6%
20	Porto	LPPR	17.9	99%	34.4	52.0%

Source: EUROCONTROL CODA

10.2.5 ATFCM (Air Traffic Flow & Capacity Management) Delays

The previous section summarised the primary causes of aircraft delays of which ATFCM delay is one such category. ATFCM delays accounted for more than one in three (37.4%) of all delays in summer 2010 compared to one in four (26.1%) in summer 2009; and was primarily caused by increasing ATFCM en route delays. ATC capacity continued to be the main cause of ATFCM delays accounting for 45% of all ATFCM delays. However, the magnitude of average ATFCM delay still remains small. Over the year, the average ATFCM delay per departure was 2.9 minutes in 2010 compared to 1.6 minutes in 2009. By comparison, delays due to all causes in 2010 were, on average, 14.8 minutes per departure (see Figure 10.7 above).

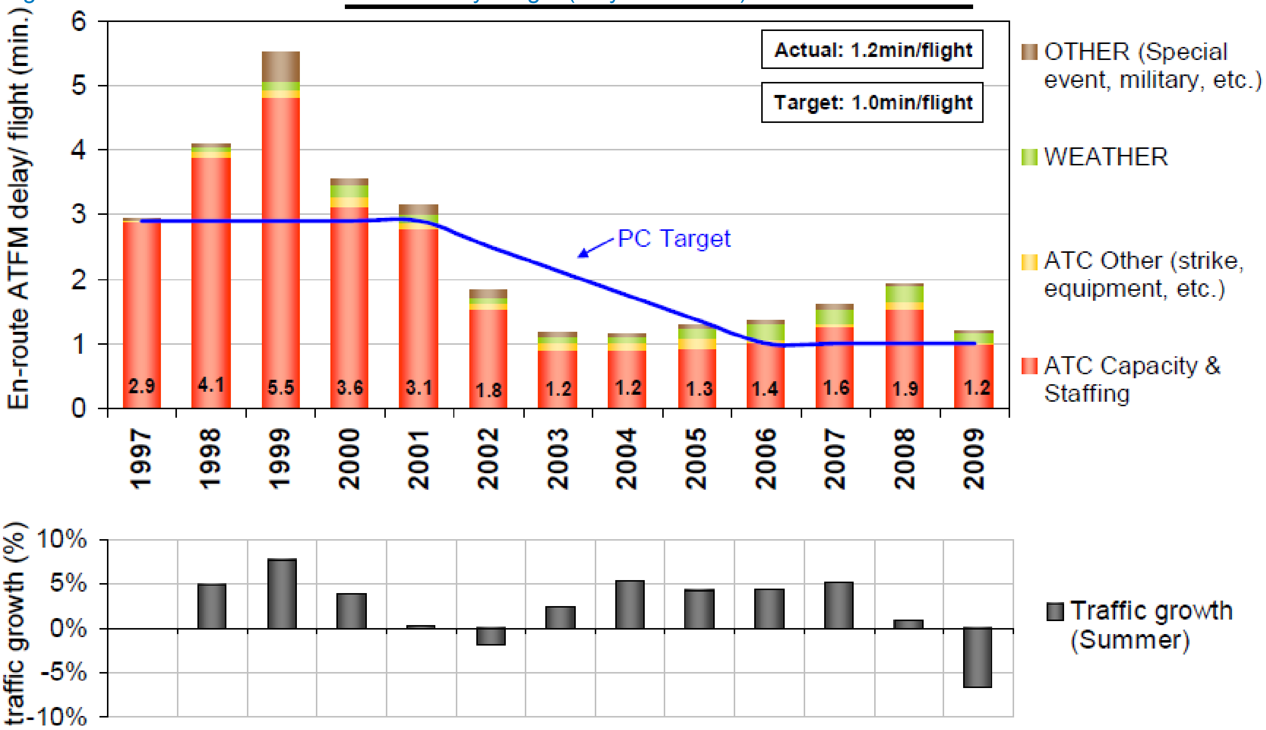
Figure 10.9: Causes of ATCFM Delay in Summer 2009 & 2010



Source: EUROCONTROL CFMU

Currently targets for en route ATFM[309] delay are adopted by the EUROCONTROL Member States through the Provisional Council (PC). The evolution of the average summer (May to October) en route ATFM delay against the adopted target over the period 1997 to 2009 is shown in Figure 10.10. In 2009, the average summer en route ATFM delay was 1.2 minutes per flight. The value for summer 2010 has not yet been published by EUROCONTROL but, based on the CODA analysis for April to September, it is likely to be significantly higher than 2009. The current EUROCONTROL target is for an average of less than one minute en route ATFM delay per flight for the period May to October.

Figure 10.10: Summer ATFM En Route Delay Target (May to October)



Source: EUROCONTROL CFMU

In July 2010, Regulation 691/2010[310] was adopted by the European Commission establishing a performance scheme for air navigation services under the second package of the Single European Sky (SES II). The aim of the performance scheme is to contribute to the sustainable development of the air transport system by improving overall efficiency of air navigation services across the key performance areas of safety, environment, capacity and cost-efficiency.

In terms of capacity there is a requirement for the development of key performance indicators (KPIs) at the National, Functional Airspace Block (FAB) and EU-wide levels detailing the average number of minutes of en route ATFM delay per flight. There is also a requirement to develop KPIs covering the proportion of total ATFM delays attributable to terminal and airport air navigation services.

[309] Note that in the context of delay terminology, the terms ATFCM (Air Traffic Flow & Control Management) and ATFM (Air Traffic Flow Management) are largely interchangeable.

[310] Commission Regulation (EU) No 691/2010 laying down a Performance Scheme for Air Navigation Services and Network Functions and amending Regulation (EC) No 2096/2005, 29 July 2010

The Regulation requires that the en route KPIs are developed to allow reporting under the performance scheme during the first reference period which runs from 2012 to 2014. The additional KPIs on airport ATFM delay are required to be rolled out in time for the second reference period which runs from 2015 to 2020.

10.3 Consumer Protection

10.3.1 Introduction

The EU defines the main air passenger rights as covering the following issues:

- People with disabilities and people with reduced mobility (Section 10.3.2)
- Denied boarding (Section 10.3.3)
- Cancellation (Section 10.3.4)
- Long delays (punctuality) (Section 10.3.5)
- Baggage (Section 10.3.6)
- Identity of the airline (Section 10.3.7)
- Protection against airline insolvency (and package holidays) (Section 10.3.8)
- Price transparency (Section 10.3.9)

Section 10.3.10 touches upon a number of other passenger rights which are considered important under U.S. legislation, but which have not yet become major areas of concern in Europe.

Early 2010, the Commission carried out a Public Consultation on Air Passenger Rights[311] in order to gather opinions from national authorities, citizens and private and public organisations on the existing or perceived problems and preferred solutions with regard to five pieces of European legislation in the field of air passenger rights:

- Regulation (EC) No 889/2002, which transposed the Montreal Convention[312] into EU Law ('the Liability Regulation') and which notably concerns the liability for lost, damaged and mishandled luggage;
- Regulation (EC) No 261/2004 ('the APR Regulation') establishing rules for compensation and assistance to passengers in the event of denied boarding, cancellations and long delays;
- Regulation (EC) No 1107/2006 on the rights of passengers with reduced mobility ('the PRM Regulation');
- Regulation (EC) 1008/2008 on common rules for the operation of air services in the EU; and
- Directive 96/67 on the conditions for access to ground-handling markets.

The results of this consultation were published in July 2010.

[311] http://ec.europa.eu/transport/passengers/consultations/2010_03_01_apr_legislation_en.htm

[312] Convention for the Unification of Certain Rules for International Carriage by Air, Montreal, 28 May 1999

Not unsurprisingly, consumer bodies and the airline industry differ on the way in which consumer rights should be treated. Speaking for airlines, IATA stated:

> *"IATA does not share the view that better passenger experiences can be created by new and more regulation. Indeed, our experienced view is that competition within the airline industry is the best provider of benefits to the consumer. Competition always effectively and promptly responds to the variety of customer needs and expectations. Indifference to these needs is punished swiftly in the marketplace."* – Monique de Smet, IATA Director for Government and Industry Affairs in Europe, October 2010

In opposition to this view the general approach of consumer-led organisations is that, without regulation, private companies will tend to ride rough-shod over the needs of consumers wherever they can until such time as competition shames them into better responses to consumer needs.

Progress in each of these various issues in 2010 is analysed in this section.

10.3.2 People with Disabilities & People with Reduced Mobility (PRMs)

Under current EU legislation, people with disabilities and/or reduced mobility are protected from being discriminated against during reservation and boarding. They are also entitled to receive assistance at airports (on departure, on arrival and in transit) and on board aircraft. In order to facilitate the provision of assistance, it has been recommended that passengers pre-notify their needs.

Two main areas of the current legislation (1107/2006) were questioned in the recent consultation:

- Whether airlines should harmonise their policies on the carriage of mobility, respiratory or other equipment along with their passengers, or provide additional information
- Whether pre-notification of at least 48 hours should be made compulsory

These questions generated a varied response from the large number of responses received.

No similar initiatives have been located in other parts of the world; and some of the respondents suggested that the EU should lead discussions with ICAO and IATA to try and develop a global policy towards harmonisation and information.

In its report on the Evaluation of Regulation 1107/2006 (June 2010), consultants Steer Davies Gleave (SDG)[313] assessed that approximately 0.5% of all passengers are PRMs; and that on average 0.1% of these complained about the PRM product offering. More than 90% of all PRM requests were for wheelchairs.

It was argued by some respondents that any obligations imposed on air carriers under EU law should not be inconsistent with other (non-EU) jurisdictions, notably in the United States.

SDG reported that:

[313] Evaluation of Regulation 1107/2006, Steer Davies Gleave, June 2010

> *"A particular issue raised by stakeholders was the conflict between the [EU] Regulation and the equivalent U.S. legislation (14 CFR Part 382), which applies to European carriers operating flights to/from the U.S., and other flights where these are operated as codeshares with U.S. carriers. The most significant conflict is the allocation of responsibilities for assistance: the [EU] Regulation requires airports to arrange the provision of services to PRMs, while under the U.S. legislation it is the airlines that have this responsibility. The U.S. legislation also prohibits airlines from imposing numerical limits on PRMs, and from requiring pre-notification from PRMs. This has caused issues for carriers who are required to comply with pieces of legislation that conflict, although the U.S. legislation does allow carriers to apply for a waiver where there is a conflict of laws."*

No conflicts with other regional legislation were raised.

10.3.3 Denied Boarding

EU legislation protects passengers who have booked flights and are denied seats on those flights as a result of deliberate over-booking policies by airlines. When passengers are denied boarding on a flight, airlines are first obliged to seek volunteers to give up their reservation in exchange for certain benefits. In addition, the air carrier must also offer volunteers the choice between a full refund and re-routing[314]. When there are insufficient volunteers, passengers who are denied boarding against their will are additionally entitled to compensation up to €600[315], depending on the distance of the flight and the delays experienced before being re-routed; and to care (phone call, refreshments, food, accommodation and transportation to and from the accommodation)[316].

No records are kept of the number of passengers benefiting from this compensation legislation, but the industry belief is that the number of instances has reduced significantly in recent years.

In the United States, major carriers are required to provide the number of instances of denied boarding and the recompense provided to affected passengers. There is no equivalent requirement in Europe.

10.3.4 Cancellation of Flights

If flights are cancelled, passengers are also entitled to identical compensation to that offered in the case of denied boarding; unless they were informed of the cancellation at least 14 days before the flight, or they were re-routed close to the original times, or if the airline can prove that the cancellation was caused by extraordinary circumstances.

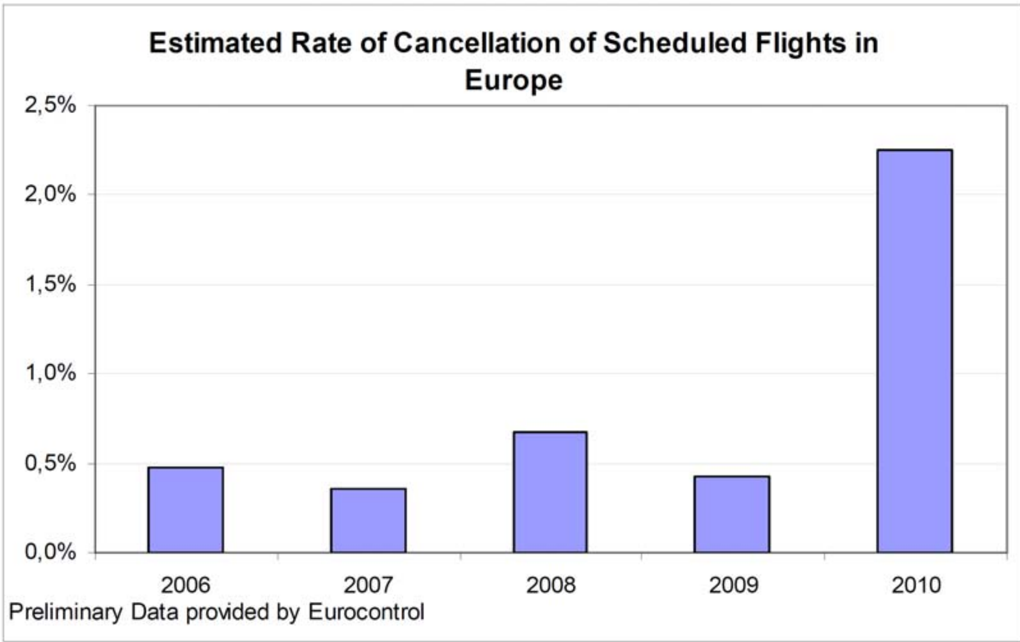
In addition to the compensation under Article 7, the airline must offer the passenger the choice between:

- reimbursement of the ticket within seven days;
- rerouting to the final destination under similar conditions; and
- if necessary, care (phone call, refreshments, food, accommodation and transportation to and from the accommodation).

[314] Article 8 of Regulation 261/2004
[315] Article 7 of Regulation 261/2004
[316] Article 9 of Regulation 261/2004

Specific data collection on cancelled flights will only start from 2011, but Figure 10.11 below shows estimates for the percentage of cancelled flights for the years 2006 to 2010 based a comparison of published schedules with recorded scheduled flights, produced by EUROCONTROL. Note that such estimations may be subject to a significant error margin, but they do give an idea of the order of magnitude of flight cancellations.

Figure 10.11: Proportion of Cancelled Scheduled Flights in Europe



Source: European Commission Staff Working Paper SEC(2011) 428 final

It appears from the figure that the proportion of cancellations in the four years up to 2009 was of the order of 0.5% of scheduled flights. The huge increase in cancellations in 2010 was largely due to the disruption caused by the eruption of the Eyjafjallajökull volcano in April (discussed in Chapter 6) together with the exceptional falls of snow that occurred in December.

However, these preliminary data from EUROCONTROL do not distinguish the causes for the cancellations and therefore do not give the proportion of cancelled flights that would give rise to a right for compensation. The proportion of flights for which compensation is due will therefore be only a percentage of the figures presented here.

Another issue, which is however not in the scope of the APR Regulation, can arise when passengers – and not the airline – elect to cancel a reservation. Depending on the circumstances, passengers may not be entitled to a full refund of the ticket price. Airlines charge the passenger a fare and some or all of the following charges:

- government, authority and airport charges;
- insurance and security surcharges; and
- fuel surcharges.

Refunds of these additional charges in the event of a passenger cancelling a flight in advance of travel (or not travelling) vary across the airline operators. Even though some of the charges are not payable by the airline as a result of the passenger not travelling, in many cases a refund of certain charges is not offered. For example, Ryanair will only refund Government taxes whereas British Airways will refund Government and airport authority charges. British Airways (BA) will also refund insurance, security and fuel surcharges but only to passengers who have booked fully flexible tickets; BA's rules on non-flexible fares stipulate no refund of insurance security and fuel surcharges. Depending on the size of the airline's minimum administration charge for processing refunds, it may not be worthwhile for the passenger to submit a claim. In these circumstances, when no flight has taken place by the passenger, the charges are kept by the airline except for sales taxes/VAT on non-refundable tickets.

10.3.5 Long Delays (Punctuality)

Section 10.2 of this Chapter dealt primarily with the punctuality data available to consumers to inform them of general levels of punctuality by airline and by airport, to assist them with their travel decisions.

This section relates to a separate aspect of punctuality – the compensation due to passengers if their flight has a significant delay.

Under Regulation 261/2004, passengers are entitled to care by the airline (phone call, refreshments, meal, accommodation, transportation to the place of accommodation) if the delay is:

- two hours or more for flights of 1,500km or less;
- three hours or more for longer flights within the European Union or for other flights of between 1,500 and 3,500km; or
- four hours or more for flights of over 3,500km outside the European Union.

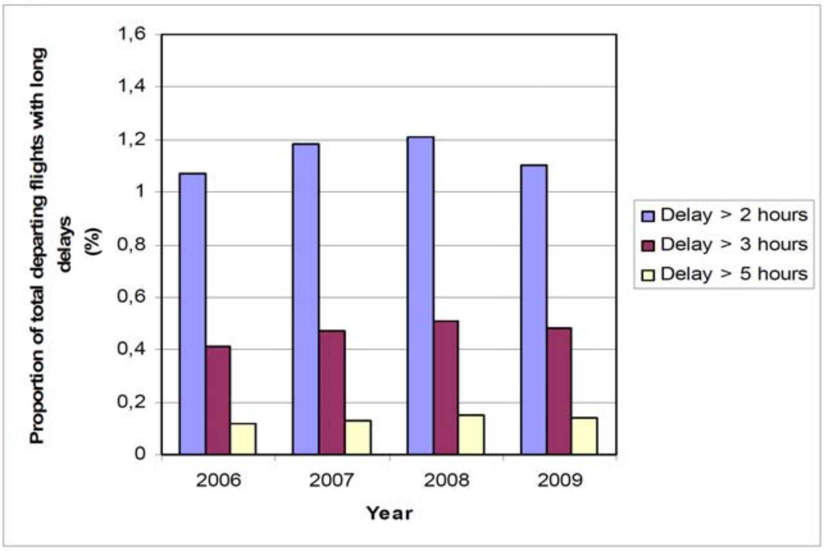
If the delay is more than five hours and the passengers decide not to continue their journey, they are also entitled to have their ticket reimbursed and be flown back to where they originally started their journey.

In April 2011, the European Commission published a Staff Working Paper[317] on the incidence of long delays over the period 2006 to 2009. The information was based on voluntary data provided by airlines, representing 60% of all flights over this period. In the Working Paper, delay data for both arriving and departing are presented for short haul (<1500km), medium haul (1500km to 3500km) and long haul (>3500km) flights. The data are portrayed in Figure 10.12 below. Note that delay data > 2 hours includes delays of 2, 3, 4, 5 or more hours, delays of >3 hours includes delays of 3, 4, 5 or more hours etc.

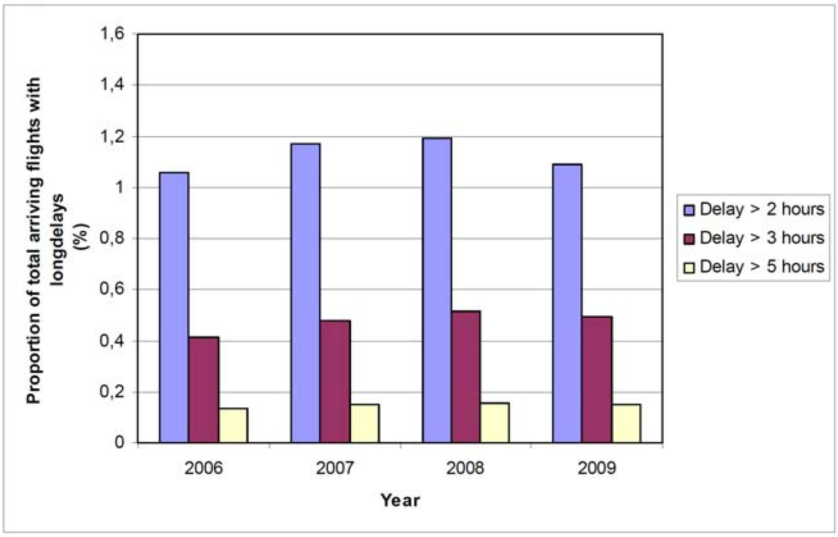
[317] Commission Staff Working Paper accompanying document to the Communication on the Operation and the Results of Regulation (EC) 261/2004, SEC(2011) 428 final, 11 April 2011

Figure 10.12: Proportion of flights with Long Delays

Proportion of total flights departing from EU airports that experienced long delays at departure, 2006-2009



Proportion of total flights arriving at EU airports that experienced long delays at departure, 2006-2009[3]



Source: European Commission

The data show that, on average, less than 1,2% of flights potentially fall under the scope of the Regulation 261/2004 measures on long delays (i.e. where flights are delayed by at least 2 hours). This figure includes two hour delays on short, medium and long-haul flights. Since the right to care after two hours only applies to short-haul flights (it applies after 3 and 4 hours for medium and long-haul flights respectively), the proportion of total flights affected by the Regulation is therefore likely to be even less than 1,2%..

Passengers may be entitled to compensation for flights where arrival is delayed by 3 hours and when the delay is not due to extraordinary circumstances. According to the data available, this only potentially affects less than 0,5% of all flights (those which are delayed for more than 3 hours). In fact, this figure is an overestimate because it represents all delays, including those caused by extraordinary circumstances (in which case the obligation to offer compensation does not apply).

The proportion of flights affected by the Regulation's obligation to offer reimbursement for long delays is, on average, less than 0,15%.

A comparison of the two graphs in Figure 10.12 illustrates that delays of at least 2, 3 and 5 hours are relatively similar for those flights departing from the EU as for those flights arriving in the EU (arrival data includes flights that have departed from within the EU as well as flights that have departed from third countries). Delays of at least 2, 3 and 5 hours all peaked in 2008, and fell slightly in 2009. Although this decrease may be due to a number of factors, it should be noted that 2009 witnessed a decrease in overall air traffic. This is likely to be one of the contributing factors to the reduction in delays.

Based on delay data for departing flights, Figure 10.13 below shows the proportion of short haul, medium haul and long haul flights where long delays might result, under Regulation 261/2004, in the right to compensation (article 7), the right to reimbursement of the full cost of the ticket (article 8)) and the right to care (article 9). Regarding the right to compensation, it must be noted that only a percentage of the total number of flights presented actually lead to the right to compensation, since all those flights whose delay was caused by extraordinary circumstances are excluded from the application of article 7. The graphs in Figure 10.13 illustrate the rights of passengers experiencing long delays on flights departing from the EU, separated by the distance of flights in order to assess the information in the context of the Regulation.

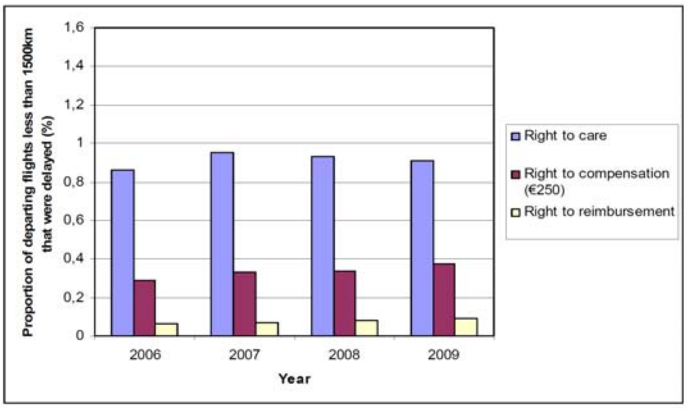
From the data provided, it can be seen that the provisions of the Regulation regarding long delays may apply to less than 1% of the short and medium haul flights and 1.5% of long haul flights. Over the period 2006-2009 passengers were entitled to:

- care on less than 1% of all flights;
- reimbursement on at least 0.5% of long haul flights compared to less than 0.,1% of short haul flights and 0.35% of medium haul flights; and
- compensation on potentially 1.5% of long haul flights compared to less than 0.4% of short haul and less than 1% for medium haul flights.

However, these may be overestimates. These graphs present information on all long delays for departing flights based on the available information and therefore include data on flights that may be delayed due to "extraordinary circumstances" for which carriers do not have to pay compensation. Furthermore, this also captures delay upon departure, yet the right to compensation only applies to three hour delays upon arrival. Some flights that are delayed by 3 hours upon departure may reduce the length of delay during flight and therefore may, upon arrival, fall outside the scope of the obligation to pay compensation.

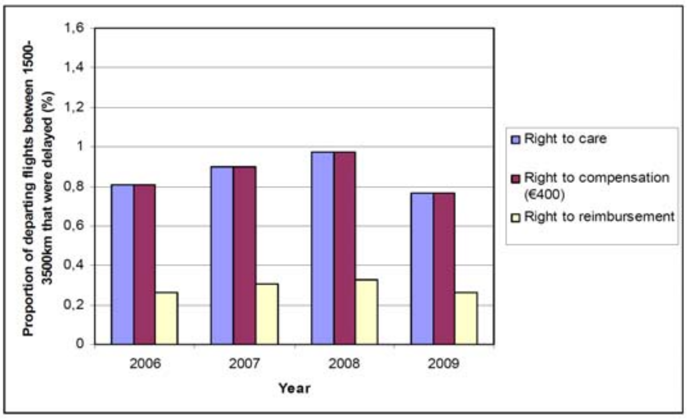
Figure 10.13: Proportion of flights that might be eligible for care, compensation or re-imbursement as a result of long delays

Short-haul flights (less than 1500km) experiencing long delays



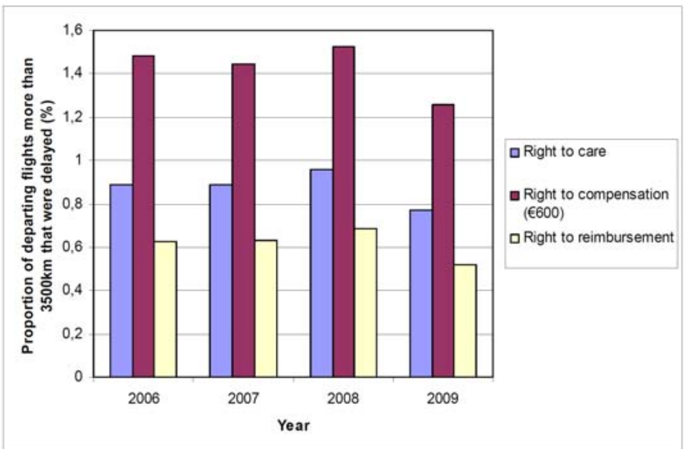
Passengers are entitled to care after 2 hours, to compensation after 3 hours and reimbursement after 5 hours

Medium-haul flights (1500-3500km) experiencing long delays



Passengers are entitled to care and compensation after 3 hours and reimbursement after 5 hours

Long-haul flights (more than 3500km) experiencing long delays



Passengers are entitled to compensation after 3 hours, to care after 4 hours and reimbursement after 5 hours

Source: European Commission

In the United States, airlines are not required by law to compensate passengers whose flights are delayed or cancelled but in June 2010, the U.S. Department of Transportation (DOT) initiated a Notice of Proposed Rulemaking (NPRM)[318] which would require airlines to improve their handling of passengers kept on board aircraft on the tarmac.

There are two main issues proposed in the rule (which became effective in August 2011[319]): the adoption of tarmac delay contingency plans (discussed below) and customer service plans addressing carriers' responsibility to passengers, which must be incorporated into the contracts of carriage to generate greater awareness amongst passengers of their rights (discussed in Section 10.3.10).

The tarmac delay policy is to strengthen the protection for consumers and avoid passengers remaining on board aircraft for lengthy periods during a delay situation, provide food and water to passengers on board an aircraft if delayed by more than two hours, ensure toilet serviceability and adequate medical attention if needed; and ensure that sufficient resources are available to meet the contingency plan. Assurances will be needed that each airline plan has been coordinated with the relevant airport authorities and that records will be kept and reported to DOT of all tarmac delays over three hours.

Under the rule, the tarmac delay contingency plans cover operations at each large U.S. hub airport, medium hub airport, small hub airport and non-hub U.S. airport. Further, the rule requires that both U.S. and foreign air carriers update passengers every 30 minutes during a tarmac delay regarding the status of their flight and the reasons for the tarmac delay.

In the EU, although Regulation 261/2004 provides consumer protection in the event of long delays including on-board delays, it does not specifically address the on board duty of care of an airline to its passengers in the situation where passengers are held on board an aircraft for a lengthy period. In other words, the current EU regulations make no distinction between a long delay in an airport terminal compared to one of equal length on board an aircraft.

10.3.6 Lost, Damaged & Mishandled Luggage

If passenger baggage is lost, damaged or delayed, passengers may be entitled to compensation limited to about €1,220. However, airlines shall not be liable if they have taken all reasonable measures to avoid the damages or if it proved impossible to take such measures.

The EU is considering areas covered by the Montreal Convention of 1999 (reflected in Regulation 889/2002) where it might enhance consumer protection for European air travellers beyond what might be available elsewhere. The 2009/2010 consultation concentrated on seeking views on:

- customer knowledge and information regarding lost luggage
- regulatory oversight
- levels of compensation
- possible harmonisation of airline rules on sizes of both checked-in and hand luggage
- specialised training for baggage handlers

[318] Enhancing Airline Passenger Protections, U.S. Government Federal Register, 8 June 2010

[319] Enhancing Airline Passenger Protections, Final Rule April 25 2011, effective August 23 2011

Regarding the first three bullet points, there were as expected divergent views held by consumer representatives and by airlines.

A number of questions were asked during the consultation with regards to training for baggage handlers (under the auspices of Directive 96/97). Introducing compulsory training was seen by many as an effective way to reduce loss and damage to baggage and would be beneficial in terms of security. Of those in favour of compulsory training, a majority seemed in favour of making access to the European ground handling market conditional upon a license that would include such training conditions.

An internet search of other agencies has so far failed to uncover any other administrations seeking to enhance these aspects of the Montreal Convention in favour of consumer rights.

In earlier annual reports in this series, information was obtained on trends in the levels of baggage mishandling and delays throughout Europe from the Association of European Airlines (AEA). This data is no longer collected and published, although the EU could consider instituting a standardised reporting of this information by all (major) EU airlines.

Apart from incidents in connection with the major occurrences of cancellations and delays in 2010 (see above) there is no evidence to suggest that the level of baggage being lost, mishandled or delayed across Europe has been increasing.

10.3.7 Identity of the Airline

One of the protected passenger rights is the need to be informed, in advance, of the identity of the airline expected to operate any particular flight. This may be important when compensation is needed or complaints may need to be made. It may also impact upon a passenger’s choice of carrier. The need for this will rise as incidences of code-sharing and sub-chartering continue to increase.

The European Community continues to vet individual airlines and nations over the security of their aircraft and their operating procedures. Currently, the EU bans almost all carriers from fourteen African nations and five Asian nations plus four other airlines.

Airlines found to be unsafe are banned or restricted within the European Union, although this protection does not extend to European citizens if they elect to fly on any of these airlines on flights not involving a European destination.

The U.S. has a similar list of banned carriers and nations, with an emphasis on airlines operating in Central America and the Caribbean. Although such airlines tend to operate small aircraft which are not capable of flying directly to Europe, it could prove valuable for European consumers to be given this list of additional carriers to inform their choices when flying between points in the western hemisphere.

10.3.8 Protection against Airline Insolvency (& Package Holidays)

The EC consultation reported by Milieu[320] attempted to identify airline insolvency protection schemes available in individual countries. The majority of respondents indicated that current insolvency protection

[320] Analysis and evaluation of contributions to the public consultation on air passenger rights carried out by the European Commission from 15/12/2009 to 10/03/2010, Milieu, July 2010

schemes in their countries are ineffective. Insurance schemes were believed to be the most widely available forms of protection but that availability of such schemes varies across Member States. Most comments on national guarantee schemes related to the UK Air Travel Organiser's License (ATOL) guarantee system and the Denmark Travel Guarantee Fund.

Given the new financial fitness criteria for airlines set out in Regulation 1008/2008, the 2010 consultation gave the following – sometimes conflicting - solutions:

- Member States must be urged to use the already available tools properly and revoke operating licences in due time if the financial requirements for an operating licence are not met;
- complete protection should be compulsory for all airlines irrespective of how and where the ticket is purchased;
- a decision on the method of protection in the event of insolvency should be preceded by an analysis of the costs of all methods and their influence on the market;
- the national regulator should be encouraged to monitor continuously airlines' liquidity;
- clarification should be provided on the application of insolvency rules by National Enforcement Boards (NEBs); and
- in cases of insolvency, an external agency be appointed to ensure compensation is protected for tickets booked in advance.

Whilst consumer organisations were in favour of a compulsory insurance scheme, airlines and airline associations had opposing views. Nevertheless the majority of respondents favoured harmonisation of rules on insolvency protection across the EU.

The situation is more complicated in relation to package holidays booked from EU airlines websites., Current applicable rules and insurance schemes designed at a time when the majority of such holidays used to be booked as combined flight and accommodation packages through specialist retailers.

Such tour organisers and retailers of package holidays are obliged to provide precise, complete information about booked package holidays. They are also obliged to honour contractual terms and to protect passengers in the event of insolvency. Package tour operators must give accurate information on the holiday booked, comply with contractual obligations and protect passengers in the case of the organiser's (or an airline's) insolvency.

EU governments provide a variety of safety nets to protect such passengers when their tour operator or airline fails. One of the emerging problem areas relates to holidays booked via the internet, where air travel, hotel accommodation, car hire, insurance and other holiday aspects may all be covered by separate transactions. There is no clear line of responsibility to reimburse the passenger for hotel accommodation or other holiday elements if the chosen airline fails; and where there is no contractual link between these parties.

The UK Government has announced a consultation into this area of concern and its conclusions are likely to prove of value should the EU decide to have a standard agreement across all Member States to ensure all EU passengers are treated in the same way.

10.3.9 Price Transparency

Under EU legislation, when a passenger purchases a ticket for flights departing from EU airports, the applicable conditions should be made clear at that time. Provisions on airline pricing in regulation 1008/2008 and directive 2005/29, the 'Unfair Commercial Practices Directive', have already been used to tackle misleading advertising and unfair practices on airline ticket selling. The provisions on pricing in regulation 1008/2008 should ensure the final price to be paid when purchasing through an airline or travel website will include the applicable fare as well as all applicable taxes and charges, surcharges and fees which are unavoidable and foreseeable at the time of publication.

It should also show the breakdown between the fare, taxes, airport charges and any other charges, surcharges and fees.

Optional price supplements are required to be communicated in a clear, transparent and unambiguous way at the start of the booking process and acceptance of them by the person making the booking should be on an 'opt in' basis.

The coordinated EU-wide internet sweep started in 2007 (carried out by the Member States' enforcement authorities) and has led to greater compliance. The latest results show that 94% of the sites originally checked are now compliant. Member States' enforcement authorities have the power to conduct an investigation to determine whether or not a breach of rules has been committed and the European Commission has committed to collaborate with enforcers to develop instruments to ensure compliance in the long term with added value for consumers.

A recent market development is airline ancillary revenues, that represent an increasing proportion of airline revenues, bringing added complexity to the selling proposition by airline and travel websites. A recent study by Amadeus (The Amadeus Guide to Ancillary Revenue by IdeaWorks 2010[321]) predicts further growth in airline ancillary revenues as well as a move to more ancillary services being sold through travel agency channels.

Table 10-5 shows that total airline ancillary revenues are estimated at €18.4 billion in 2010; whilst still less than 5% of airline total operating revenues, there is a significant difference between the ancillary revenue 'champions' such as Ryanair and traditional airlines such as British Airways.

Table 10-5: Worldwide Estimate of Ancillary Revenue

Airline Category	As % of Carrier Revenue	Total Operating Revenue euro (USD) billions	Ancillary Revenue euro (USD) billions
Ancillary Revenue 'Champions'	19.4%	€15.8 ($19.4)	€3.1 ($3.8)
Major U.S. Airlines	7.2%	€75.5 ($92.6)	€5.4 ($6.7)
Low Cost Carriers	5.4%	€53.9 ($66.2)	€2.9 ($3.6)
Traditional Airlines	2.9%	€240.8 ($473.6)	€7.0 ($8.5)
Totals		**€386.0 ($473.6)**	**€18.4 ($22.6)**

Source: Air Transport World, July 2010

321 Airline Ancillary Revenue to soar to 18.4 billion EUR (22.6 billion USD) Worldwide, Amadeus Press Release, 14 October 2010

All carriers are continuing to experiment with new initiatives. Some of the airline initiatives reported in the Amadeus report include:

- AirAsia X achieving ancillary revenue in excess of €17 per passenger with an online à la carte booking facility; and with more than 80% of their passengers pre-paying baggage fees
- Continental Airlines implementing flexible pricing for seats with extra legroom; i.e. the higher the demand the higher the price charged to consumers for a given seat on a given flight
- easyJet offering unlimited early boarding benefits for 12 months through its easyJet Plus membership card (£99 (€112) per annum)
- KLM testing premium pre-order à la carte meal options for €10 on eight long haul routes
- Ryanair now selling carry-on compliant luggage from Samsonite on its website
- Vueling Airlines promoting frequent flier bonus points to encourage consumers to book hotel accommodation at its website

The Commission has committed to dialogue with the air travel industry in order to monitor compliance with EU law and to collaborate with enforcers to develop instruments to ensure compliance in the long term with an added value for consumers. Many of the current and planned ancillary charges will be optional charges that will have to be clearly identified and are on an 'opt in' basis.

However, there remains an increasing number of ancillary charges applied by airline and travel sites which in the main do not fall under current legislation; whilst they are 'opt in', airline, tour operator and travel websites do their utmost to sell them.

The following are current examples of ancillary charges on airline and travel websites:

Table 10-6: Airline & Travel Site Ancillary Charges

Pre-Travel Ancillaries	At Airport & Pre-Flight Ancillaries	On-Board Ancillaries
Insurance	Checked baggage	Seat assignment
Credit card/debit card surcharges	Excess baggage	Premium seats (e.g. extra legroom, exit rows)
Currency conversion charges	Check-in charges (online & airport)	Food & beverage pre-order
Call centre premiums	Priority boarding	
Sale of approved baggage	Lounge access	
Hotel & Car Hire	Change fees	

Source: Mott MacDonald

The EU public consultation in 2010 on air passenger rights did not specifically consider general matters of pricing transparency. However, business practices which impact on passengers were tabled and may merit the Commission's attention. These included discussions on the harmonisation of e-booking and check-in practices. Recommendations from the consultation included the tackling of abusive practices such as:

- imposing charges on bookings per traveller rather than per booking;
- online check-in practices should be harmonised to allow passengers to check-in at any stage between finalising their booking and flight departure time rather than during a time-bound period before the flight;

- taking actions against airlines charging unavoidable fees for on-line check-in in breach of article 23 of the EC Air Services Regulation (ASR)[322]; and
- airport check-in should be included in the cost of the ticket.

In the U.S. during 2010, demands for 'transparent' pricing and full travel cost disclosure were considered both in U.S. DOT rule-making drafts and legislation, being pushed by a consortium led by U.S. Senator Robert Menendez (D-NJ). This regulatory movement has run into stiff opposition from the Air Transport Association of America (ATA), the body representing U.S. air carriers. A number of airlines state they have taken steps to reduce the confusion around fees and most U.S. carriers claim they have taken steps by posting their fees on their websites. However opponents claim there is no requirement for airlines to set out their fee information in a 'consumable' format to the public, on-line travel agencies and Global Distribution Systems (GDSs).

The proposed bill would make it an unfair or deceptive practice for an air carrier or ticket agent to sell a ticket for air transportation without displaying all tax and fee information in reasonable proximity to the price listed for the ticket; and provide information on taxes and fees – including the amounts and a description of each before requiring the purchaser to provide any personal information.

The taxes and fees covered by the provision include all taxes and fees, charges and surcharges included in the price of the ticket. Among these charges are fuel surcharges, surcharges relating to peak or holiday travel, baggage fees, seating assignment fees; and operational services which are charged when the ticket is purchased.

Specifically with regard to disclosure of ancillary/optional charges the NPRM rule-making proposal seeks to address the following (the response of ATA member carriers is shown in italics):

- Require full disclosure of all fees and charges before passengers purchase a ticket whether directly from an airline or from a third-party intermediary.
  - *ATA airlines support disclosure with a hyperlink to a page disclosing optional fees*
  - *carriers should not be forced to provide a fee schedule for optional services to alternative distribution channels*
  - *many fees for services vary dependent on frequent-flier status and/or whether the passenger has a loyalty credit card and/or the passenger has purchased an annual subscription*
  - *the DOT should not let the GDS acquire more market power*
  - *there is no proposed mandate for other travel suppliers (e.g. hotels/car hire) selling through the same channels*
- Require sellers of air transportation to display a 'full price' including optional fees selected by the passenger when a passenger searches for a particular itinerary.
  - *Since carriers vary on (1) what optional services are available on a particular flight; (2) which customers can choose optional services; and (3) what services, if offered, incur a fee, it would be impossible to mandate a set of criteria that carriers would have to include in a display.*
  - *In addition, carriers support transparency of fees, and ample information on the cost of such services is already available on carrier websites.*

[322] The ASR came into effect across the EU on 1 November 2008. It consolidates and updates the air transport liberalisation measures put in place in 1992, known as the 'Third Package'

- Require that carriers make all ancillary fee information available to travel agencies through the global distribution systems (GDSs).
  - *Whether carriers should provide fee schedules for optional services to GDSs, or authorize travel agents to sell such services and collect the fees from customers, are among the principal competitive issues presently being negotiated between carriers, GDSs and travel agents. Neither Congress nor the administration should interfere in these contractual discussions.*
  - *Deregulation of GDSs was predicated on the negotiation of commercial arrangements between airlines and GDSs. A government mandate that carriers must provide GDSs with fee schedules would interfere with these commercial negotiations, further strengthen GDS market power and thwart the entry of new competitors in the GDS market.*

The response of ATA suggests that a completely transparent booking process will not take place without further EU action. However, it should be possible to continue to make a series of improvements through dialogue with airlines and GDS companies.

10.3.10 Other Consumer Issues under Consideration in the U.S.

The other main issue proposed in the U.S. NPRM of 4 June 2010 was the adoption of customer service plans addressing carriers' responsibility to passengers; and which must be incorporated into airline contracts of carriage. These plans will cover each airline's approach to:

- the reporting of tarmac delay information;
- responding to consumer complaints;
- enhancing 'Denied Boarding Compensation' (DBC) limits and coverage;
- providing complete fare information in advertisements;
- providing adequate disclosure on ancillary/optional fees;
- prohibiting post-purchase price increases;
- notifying flight status changes;
- widening choice-of-forum provisions; and
- addressing peanut allergies.

The proposed rules would require U.S. and foreign carriers to adopt customer service plans to address, at a minimum, the following service areas:

- offering the lowest fare available
- notifying consumers of known delays, cancellations, and diversions
- delivering baggage on time
- allowing reservations to be held or cancelled without penalty for a defined amount of time
- providing prompt ticket refunds
- properly accommodating disabled and special-needs passengers, including during tarmac delays
- meeting customers' essential needs during lengthy on-board delays
- handling off-loaded passengers in the case of over-sales with fairness and consistency

- disclosing travel itinerary, cancellation policies, frequent flyer rules, and aircraft configuration
- ensuring good customer service from code-share partners
- ensuring responsiveness to customer complaints
- identifying the services they provide to mitigate passenger inconveniences resulting from flight cancellations and misconnections

The U.S. DOT is proposing to adopt a rule requiring carriers (both U.S. and foreign) to include their contingency plans and customer service plans in their contracts of carriage.

10.3.11 Future work on air passenger rights

The volcano crisis in 2010 has illustrated some of the structural limits of the Air Passenger Rights (APR) Regulation, which have been tested under the magnified scale of the crisis. The proportionality of some current measures, like the unlimited liability regarding the right to care under major natural disasters, may merit assessment. Member States and the Commission need to reflect on how to ensure that, in the future, this vital support which in the volcano crisis was provided solely by part of the industry is correctly shared and financed.

In spite of the progress made since 2007, the Commission considers that there are three areas where measures are still necessary to improve the application of the Regulation: effectively harmonised enforcement of EU rights, facilitation of their enjoyment in practice, and raising awareness about these rights.

In its Communication (reference missing), the Commission has identified 12 actions to overcome the obstacles that passengers and the industry still face when applying and enjoying the rights provided by the Regulation. In the short term, these actions build on the mechanisms and procedures already in place, to better structure and use them. In the medium term, the Commission will carry out an assessment to evaluate the impact of the current Regulation and the different scenarios that may help to improve the protection of air passengers' rights and to keep pace with evolving socio-economic realities. This should allow the Commission to announce in 2012 which further measures, including those of a legislative nature, may appear necessary.

Glossary

AACO	Arab Air Carriers Organisation
AAGR	Average Annual Growth Rate
AAPA	Association of Asia Pacific Airlines
ACARE	Advisory Council for Aeronautics Research in Europe
ACAS	AirCraft Analytical System
ACCC	Australian Competition and Consumer Commission
ACI	Airports Council International
ACL	Airport Coordination Limited
AdP	Aéroports de Paris
ADS-B	Automatic Dependent Surveillance-Broadcast
AEA	Association of European Airlines
AED	UAE Dirham
AEG-SEC	APEC Aviation Security Sub Group
AFRAA	African Airlines Association
AFTK	Available Freight Tonne Kilometres
AIA	Aerospace Industries Association of America
AIAC	Aerospace Industries Association of Canada
AIRE	Atlantic Interoperability Initiative to Reduce Emissions
AIS	Aeronautical Information Service
ALTA	Latin American and Caribbean Air Transport Association
AMC	Acceptable Means of Compliance
AME	Aircraft Maintenance Engineer
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
APAM-AVSEC	Asia Pacific Ministerial Conference on Aviation Security
AP-ASAP	Asia-Pacific Aviation Security Action Plan
APD	Air Passenger Duty
APEC	Asia Pacific Economic Cooperation
APR	Air Passenger Rights
ASD	AeroSpace and Defence Industries Association of Europe
ASEAN	Association of Southeast Asian Nations
ASK	Available Seat Kilometre
ASPIRE	Asia Pacific Initiative to Reduce Emissions
ASR	Air Services Regulation
ASSA-I	Aviation Security Services Association – International
ATA	Air Transport Association of America
ATAG	Air Transport Action Group

ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATFCM	Air Traffic Flow & Capacity Management
ATFM	Air Traffic Flow Management
ATI	Air Transport Intelligence
ATM (1)	Air Traffic Management
ATM (2)	Air Transport Movement
ATOL	Air Travel Organiser's Licence (UK)
ATR	Aerei da Trasporto Regionale or Avions de Transport Régional
ATS	Air Traffic Services
AVIC	China Aviation Industry Corporation
BA	British Airways
BAA	BAA Airports Ltd
BALPA	British Air Lines Pilot Association
BHX	Birmingham Airport
BMI	BMI British Midland
BRIC	Brazil, Russia, India & China
CAA	Civil Aviation Authority
CAAS	Civil Aviation Authority of Singapore
CAD	Canadian dollar
CAGR	Compounded Annual Growth Rate
CAN	Guangzhou Baiyun International Airport
CANSO	Civil Air Navigation Services Organisation
CAPA	Centre for Asia Pacific Aviation
CAT	Commercial Air Transport
CCD	Continuous Climb Departure
CDA	Continuous Descent Approach
CDG	Paris Charles de Gaulle Airport
CDM	Collaborative Decision Making
CEO	Chief Executive Officer
CFMU	EUROCONTROL Central Flow Management Unit
CFRP	Carbon Fibre Reinforced Plastic
CGK	Jakarta Soekarno-Hatta International Airport
CHF	Swiss franc
CLT	Charlotte Douglas International Airport
CNS	Communications, Navigation & Surveillance
CNY	Chinese yuan

CODA	EUROCONTROL Central Office for Delay Analysis
COMAC	Commercial Aircraft Corporation of China Ltd
CPA	Capacity Purchase Agreement
CRCO	EUROCONTROL Central Route Charges Office
CSU	Chargeable Service Units
CTTF	APEC Counter Terrorism Task Force
DBC	Denied Boarding Compensation'
DEN	Denver International Airport
DfT	UK Department for Transport
DGAC	Direction Générale de l'Aviation Civile
DHS	U.S. Department of Homeland Security
DKK	Danish krone
DME	Moscow Domodedovo International Airport
DOT	U.S. Department of Transportation
DSNA	Direction des Services de la Navigation Aérienne (France)
DXB	Dubai International Airport
EACCC	European Aviation Crisis Coordination Cell
EACP	European Aerospace Cluster Partnership
EADS	European Aeronautic Defence and Space Company N.V.
EAS	Essential Air Service
EASA	European Aviation Safety Agency
EBIT	Earnings Before Interest & Taxes
EBITDA	Earnings before interest, tax, depreciation & amortisation
EC	European Commission
ECAA	European Common Aviation Area
ECAC	European Civil Aviation Conference
ECR	European Central Repository for Aviation Occurrences
EDI	Edinburgh Airport
EEA	European Economic Area
EEC	European Economic Community (now the EU)
EGP	Egypt Pound
ELFAA	European Low Fares Airline Association
ENP	European Neighbourhood Policy
EOL	End of Service Life
EPZ	Enhanced Procedure Zone
EQF	European Qualification Framework
ERA	European Regions Airlines Association

ERAA	European Regions Airline Association
ETS	Emission Trading Scheme
EU	European Union
FAA	Federal Aviation Administration
FAB	Functional Airspace Block
FCO	Leonardo da Vinci-Fiumicino Airport
FHS	Flight Hour Services
FIR	Flight Information Region
FMS	Flight Management System
FTK	Freight Tonne Kilometres
FYROM	Former Yugoslav Republic of Macedonia
GAO	U.S. Government Accountability Office
GBP	British Pound Sterling
GDP	Gross Domestic Product
GDS	Global Distribution Systems
GHG	Greenhouse Gas
GIG	Rio de Janeiro-Galeão International Airport
GLA	Glasgow Airport
GM	Guidance Material
GPS	Global Positioning System
GSIC	IATA Global Safety Information Centre
GSIE	Global Safety Information Exchange programme
HKD	Hong Kong dollar
HKG	Hong Kong International Airport
HMV	Heavy Maintenance Visit
IACA	International Association of Charter Airlines
IAG	International Airlines Group
IATA	International Air Transport Association
IAVW	International Airways Volcano Watch
ICAO	International Civil Aviation Organisation
IFE	In-flight Entertainment System
IFR	Instrument Flight Rules
IMF	International Monetary Fund
INECO	Ingeniería y Economía del Transporte
INR	Indian rupee
IOSA	IATA Operational Safety Audit
IPO	Initial Public Offering

IPSOA	IATA Implementation Programme for Safety Operations in Africa
IVATF	International Volcanic Ash Task Force
JAL	Japan Airlines
JAXA	Japan Aerospace Exploration Agency
JCAB	Japan Civil Aviation Bureau
JFK	John F. Kennedy International Airport
JTI	Joint Technology Initiative
KPI	Key Performance Indicator
LAGs	Liquids, aerosols & gels
LAN	Línea Aérea Nacional de Chile (LAN Chile)
LCC	Low Cost Carrier
LCY	London City Airport
LGW	London Gatwick Airport
LHR	London Heathrow Airport
LP	Low pressure
LTN	London Luton Airport
MAD	Madrid Barajas Airport
MAG	Manchester Airports Group
MAN	Manchester Airport
MBM	Market Based Measures
MINT	Minimum CO_2 in the TMA
MLITT	Japanese Ministry of Land, Infrastructure, Transport & Tourism
MLW	Maximum Landing Weight
MM	Mott MacDonald
MRO	Maintenance, Repair & Overhaul
MTOW	Maximum Take-off Weight
MUC	Munich Franz Josef Strauss International Airport
MWO	Meteorological Watch Office
NAS	National Airspace System
NASA	U.S. National Aeronautics and Space Administration
NAT	North Atlantic Track
NATS	NATS Ltd (UK)
NB	Narrowbody Aircraft
NCL	Newcastle International Airport
NEB	National Enforcement Body
NFZ	No Fly Zone
NGSP	Next Generation Screening Process

NPRM	Notice of Proposed Rulemaking
NRT	Tokyo Narita International Airport
NSA	National Supervisory Authority
NTSB	National Transportation Safety Board
NWA	Northwest Airlines
OAG	Official Airline Guide
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
OFT	UK Office of Fair Trading
ORD	Chicago O'Hare International Airport
ORY	Paris Orly Airport
PBN	Performance Based Navigation
PEK	Beijing Capital International Airport
PETN	Pentaerythritol tetranitrate
PRB	SES Performance Review Body
PRC	EUROCONTROL Performance Review Commission
PRM	Person of Reduced Mobility
PRR	EUROCONTROL Performance Review Report
PSO	Public Service Obligation
PVG	Shanghai Pudong International Airport
R&D	Research & Development
RETACDA	Reduction of Emissions in Terminal Areas (TMA) using Continuous Descent Approaches (CDA)
RLA	Repayable Launch Aid
RPK	Revenue Passenger Kilometre
SAFA	EC Safety Assessment of Foreign Aircraft
SAFUG	Sustainable Aviation Fuel Users Group
SARS	Severe Acute Respiratory Syndrome
SDG	Steer Davies Gleave
SES	Single European Sky
SESAR	Single European Sky ATM Research
SFO	San Francisco International Airport
SIB	Safety Information Bulletin
SIN	Singapore Changi International Airport
SITC	Standard Industry Trade Classification
SJAC	The Society of Japanese Aerospace Companies
SME	Small and Medium-Sized Enterprises

STN	Stansted Airport
SWAFEA	Sustainable Way for Alternative Fuel and Energy in Aviation
SWIM	System Wide Information Management
SYD	Sydney Airport
TAM	TAM Linhas Aéreas (TAM Airlines)
TAWS	Terrain Awareness and Warning System
THB	Thai baht
TJFTZ	Tianjin Free Trade Zone
TLZ	Time-Limited Zone
TMA	Terminal Manoeuvring Area
TRY	Turkish Lira
TSA	Transportation Security Administration
TSU	Total Service Unit
U.S.	United States of America
UAC	United Aircraft Corporation
UAE	United Arab Emirates
UK	The United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
USAP	Universal Security Audit Programme
USD	U.S. Dollars
USOAP	Universal Safety Oversight Audit Programme
UTC	Coordinated Universal Time
VAAC	Volcanic Ash Advisory Centre
VAT	Value Added Tax
WB	Widebody Aircraft
WTO	World Trade Organization
YoY	Year-on-Year
ZAR	South African Rand