
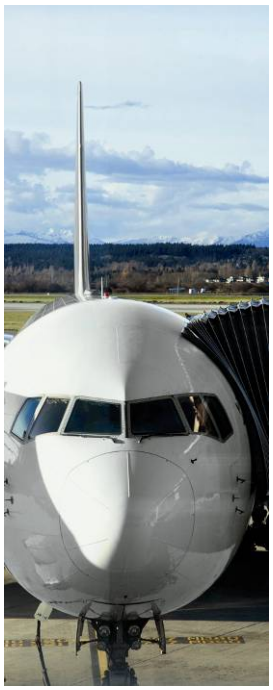


# Annual Analyses of the EU Air Transport Market 2011

Final Report

January 2013

European Commission

Mott MacDonald

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| B | 26 Jun 2012 | A. Knight | C. Collins | A. du Boulay | Final Interim Report |
| C | 30 Nov 2012 | A. Knight | C. Collins | A. du Boulay | Draft Final Report |
| D | 19 Dec 2012 | A. Knight | C. Collins | A. du Boulay | Draft Final Reportv2 |
| E | 25 Jan 2013 | A. Knight | C. Collins | A. du Boulay | Final Report |



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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 2011. 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 2011. 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 2011 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 50 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.

| Chapter | Title | Page | Main Content |
|---|---|---|---|
| 1 | Air Traffic Trends | 1 | Economic drivers; the value of aviation; overview of air passenger and cargo traffic in 2011 and historical trends. |
| 2 | Air Transport Forecasts | 47 | Forecasts of passengers, cargo and aircraft movements. |
| 3 | Airlines | 68 | Airline traffic and financial performance; airline developments and sector trends. |
| 4 | Airports | 103 | Airport traffic and financial performance; airport developments and capacity issues; charges, regulation and slot trading. |
| 5 | Aircraft Manufacturing & MRO | 130 | Aerospace developments including Maintenance Repair and Overhaul (MRO); aircraft manufacturing, aircraft fleets and orders. |
| 6 | Air Traffic Management | 159 | Impacts of the Eyjafjallajökull Volcano, ATM cost effectiveness, the Single European Sky, SESAR and NextGen. |
| 7 | The Internal Market & Competition Issues | 184 | The internal market; regulatory developments & impacts; competition issues; disputes; comprehensive and horizontal air services agreements. |
| 8 | Environmental Development & Sustainability | 210 | Carbon emissions, global targets and the ETS, industry developments and achievements. |
| 9 | Aviation Safety & Security | 230 | Fatal accidents worldwide; spread of best practice; safety focus areas. Security regulatory developments and key aviation security issues. |
| 10 | Consumer Issues | 259 | Punctuality, cancellations and delays; consumer protection issues. |

## Scope of the Report

The report was produced in March 2012, with key data and statistics updated in a November 2012 revision. The report concerns aviation developments in the calendar year 2011. Where data covering 2011 was not available, the current information has been provided. Recent events in 2012 that might impact the air transport sector are outside of this scope.

# Executive Summary

## 2011 Headlines at a Glance

| | World | Europe | Units | Source |
|---|---|---|---|---|
| Passengers | 2.7 billion (+5.6%) | **0.8 billion (+5.8%)** | Passengers carried | ICAO (Eurostat for Europe) |
| Airline Demand (RPK) | +6.9% | **+9.5%** | Revenue Passenger Kilometres | IATA |
| Airline Capacity (ASK) | +8.2% | **+10.2%** | Available Seat Kilometres | IATA |
| Commercial Air Transport Movements | 54.5 million (+1.7%) | **16.1 million (+3.8%)** | Airport Movements | ACI |
| Cargo (FTK) | -0.6% | **+1.5%** | Freight Tonne Kilometres | IATA |
| GDP | +3.9% | **+1.6%** | GDP growth (Europe = EU27) | IMF |
| Airline Profitability | $7.9 billion | **<$1.0 billion** | Net Profits | ICAO |
| Busiest Airport (Passengers) | Atlanta, U.S. (92.4 million) | **Heathrow, UK (69.4 million)** | Passengers | ACI |
| Commercial Jet Aircraft Fleet | 23,305 | **7,012** | Western and Russian-built Civil Jets | JP Airline-Fleets |
| Safety | 33 accidents 504 fatalities | **1 accident 6 fatalities** | Commercial Airline Fatal Accidents & Fatalities | EASA |

## Foreword

The global air transport industry endured a year of mixed fortunes in 2011. On a positive note, air passenger traffic largely continued its upward trend from the 2010 recovery, and worldwide airlines built on the financial success of the previous year to post a collective net profit for the industry. This came despite the impact of the ongoing Eurozone economic/sovereign debt crisis engulfing ever more countries, affecting air cargo more than passenger traffic.

Although the industry as a whole was generally enjoying an upturn, there remained marked regional differences in performance of airlines in terms of operational growth and financial viability. European carriers collectively posted robust traffic growth but suffered financially in comparison to the most profitable airlines of the Asia Pacific region, recording on average less than one tenth of the total profits.

However, the industry again displayed its vulnerability to exogenous events with the North Africa/Middle East political turmoil and natural disaster in Japan severely impacting local, regional and inter-regional air traffic flows.

At the European level, the political revolutions sweeping through Egypt and Tunisia had the intriguing effect of diverting European leisure travellers from these countries to 'safer' destinations in the region, such as Cyprus, Spain and Turkey.

One of the key airport developments in the European Union was the opening of Frankfurt Main's fourth runway to increase capacity and position itself as a leading European hub airport. However, as soon as the new runway was open, a regional court immediately imposed a night-flight ban on the airport.

With the initiation of the SES II Performance Scheme, there has been progress in terms of setting up the structures for reporting and assessing European ATM performance, both through the activities of the Performance Review Body and though the establishment of the Network Management Function. But the European Commission has been swift to follow up with proposed corrective actions where States have shown shortfalls against the agreed targets in terms of performance or implementation.

Following the major and widespread disruption to European airspace in April 2010 due to the eruption of the Icelandic volcano, Eyjafjallajökull, procedures were introduced to mitigate the impacts of a similar event – notably, the European Aviation Crisis Coordination Cell (EACCC) was established. The EACCC was activated for the first time in May 2011 when another volcano in Iceland (Grimsvötn) erupted.

The European aviation industry continues to lead the way on safety. In 2011, according to analyses by EASA, Europe had zero Western-built jet hull losses, and now Europe matches North America in its 10 year average Fatal Accident Rate from 2001-2011.

For European consumers, improvements in on-time arrival performance for European scheduled carriers as a collective were offset by declining standards in long delays on the network carriers in Europe.

The salient points of the 2011 industry review are highlighted in the executive summary that follows.

## Traffic

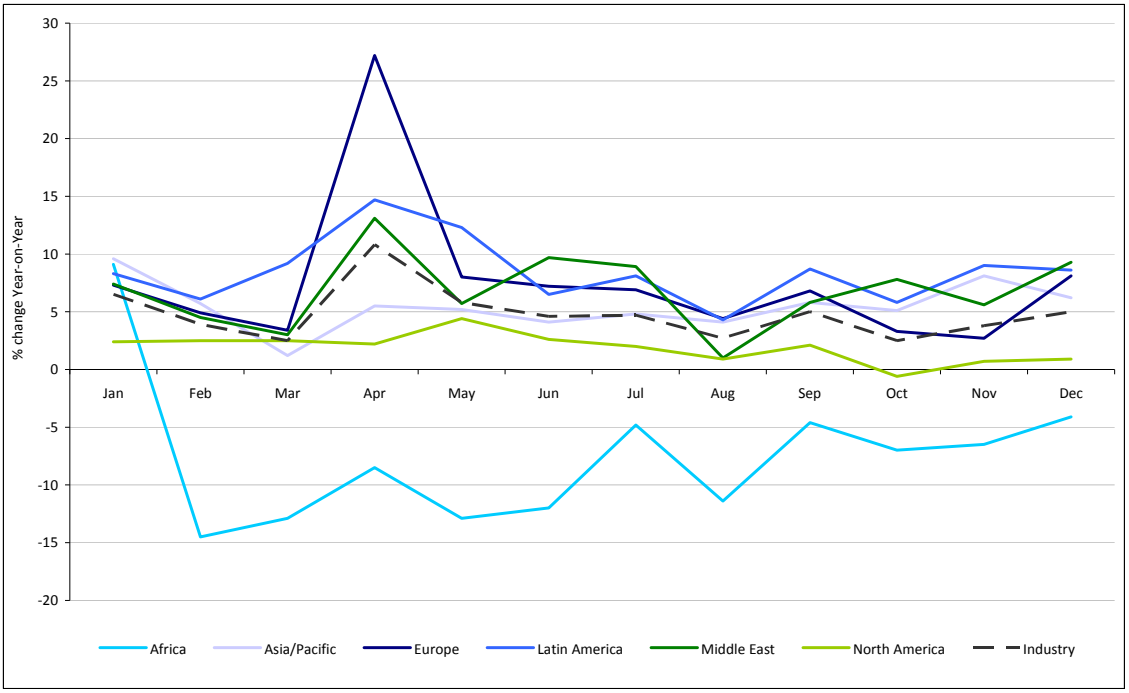
2011 largely continued the recovery in demand started in 2010, albeit at a slower rate.

The International Civil Aviation Organisation (ICAO) stated airlines of its 190 member states handled 2.7 billion passengers in 2011, a 5.6% year-on-year increase on 2010.

Airports Council International (ACI) reported that 5.4 billion passengers passed through its 1,345 member airports worldwide, an increase of 8.0% over 2010.

Although the passenger growth in 2011 is solid, it reflects a slowing down in growth compared to the previous year.

Monthly 2011 Airport Passenger Throughput Growth Rates




Source: ACI Monthly Worldwide Airport Traffic Reports, January-December 2011

The year began with the onset of political turmoil in some North African states, namely Tunisia and Egypt, spreading to Libya and some Middle East nations. Passenger demand growth progressively worsened through the first quarter of 2011 as the North African “revolutions” triggered civil unrest across the region into the Middle East. In March 2011, IATA reported that the political unrest was estimated to have suppressed global international traffic by as much as 1%[1].

[1] IATA; Political Unrest Slows Global Growth; 29 March 2011

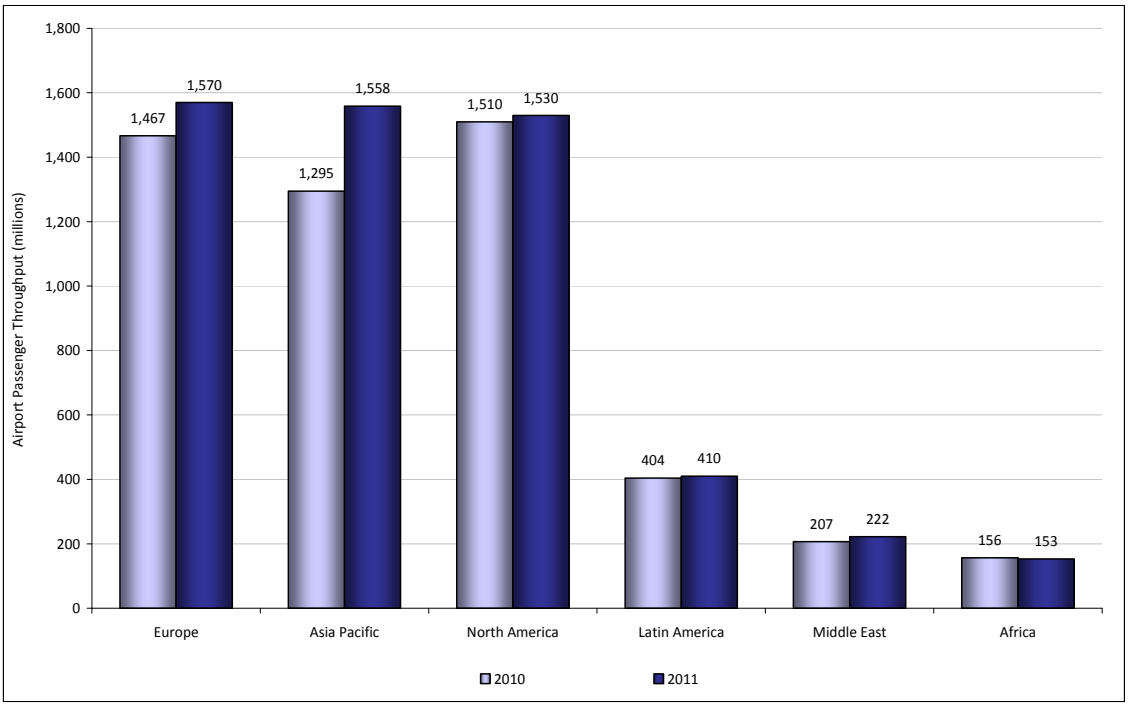
In March, a catastrophic earthquake and tsunami hitting Japan severely dented air travel demand. IATA estimated that the impact of the Japanese disaster on global international traffic was a 1% loss in that month, with Asia Pacific airlines bearing the brunt of the loss with demand hit by -2%, and Japan's domestic market decimated by 22% cut in demand[2]. Other regions were not immune, as North American and European carriers recorded a 1% and 0.5% fall in demand, respectively.

The other major event impacting international air travel demand in 2011 – which was more of an ongoing development – was the Eurozone debt crisis, dampening demand within Europe but also on international traffic flows to and from the region. In Europe, the impact was felt more acutely on airline yields rather than on traffic volumes, as premium class travellers sought lower fares on alternative carriers.

As a collective, European airports performed well, achieving passenger throughput growth of 7% in 2011, albeit marginally below the world average. According to ACI's full year 2011 data[3], European airport passenger throughput rose from 1.47 billion in 2010 to 1.57 billion in 2011.

The size of the European market actually supplanted the North American market as number one in terms of airport passenger throughput in 2011, and the Asia Pacific market claimed second spot ahead of it, such was the growth experienced in Europe and Asia Pacific compared to a stagnant North America during this year.

Worldwide Airport Passenger Throughput by Region in 2010 & 2011




Source: ACI Worldwide Airport Traffic Report

[2] IATA; Air travel shrinks in March – events in Japan and MENA impact air transport; 3 May 2011

[3] ACI Worldwide Airport Traffic Report 2011

While the 7% growth of Europe's airports was significant, it lagged far behind the growth of 20% year-on-year recorded by Asia Pacific airports in 2011. Europe's growth did, however, substantially outpace that of the static North American airports, which posted an aggregate increase of 1.3% over 2010, and kept pace with Middle Eastern competitors (7.4%).

### Airport Financial Results

According to the ACI Economics Survey 2011, based on a response from 604 airports that collectively handled 3.12bn passengers in 2010, or some 62% of global traffic in that year, worldwide total airport income in FY 2011 reached USD 101.8 billion, an increase of 7% on FY 2010/11. Aeronautical revenues worldwide increased by 7.3% while non-aeronautical revenue sources generated around 7% more revenue when compared to 09/10.

The global airport industry enjoyed aeronautical revenues of USD 54.5bn in FY 2011, an increase of 7.3%. This figure includes revenues from ground handling activities. 34% of this revenue was from aircraft based charges, 49% from passenger based charges and 10% from ground handling activities.

Overall non-aeronautical revenues increased by 7% to USD 47.3bn in FY 2011. Retail remains the most significant revenue stream in terms of airport non aeronautical revenue followed by Property Income and Car Parking. European Airports receive 35% of non aeronautical income through retail, slightly higher than the world average of 28%.

Airports worldwide in FY 2010/11 incurred operating expenses of USD 56bn or 55% of total revenue, a significant decline compared with 2009/10. ACI's hypothesis is that the decrease in Opex is a result of cost reductions and greater credit discipline in the wake of the Financial Crisis. The effects of which were still being felt in 2010/11.

### Airlines

2011 saw a continued recovery in global air passenger traffic following the resurgence witnessed in 2010. IATA member airline passenger traffic (measured in Revenue Passenger Kilometres) grew by nearly 6% in 2011 compared to 2010.

Airlines were able to maintain a similar level of passenger load factor (PLF) in 2011 as they collectively achieved in 2010, although they were more inclined to increase capacity in 2011 than in the previous year, with available seat-kms increasing 6.3% over 2010. PLF's were not uniform throughout the year, however, as early in 2011 load factors were depressed by shocks hitting Japan and North Africa.

As in most previous years, the cost of jet fuel remained a key concern for airlines in protecting profitability in 2011. Jet fuel prices were volatile during the year with peaks and troughs, but prices remained consistently higher than 2010 levels.

In 2011, industry-wide net profits, at a global level, of some US$ 8 billion are half of those recorded in the previous year, but still represents a reasonable outcome when compared against recent historical results. The core reason for the dip in net profits in 2011 is that the rise in costs (10.8% year-on-year) outstripped that of revenues (9.4%), with high fuel costs the main contributory factor accounting for 30% of total costs in 2011. Non-fuel expenses also rose to their highest level in the last seven years, to US$405 billion.

At the regional level, according to ICAO[4], "varying regional economic conditions and high jet fuel price volatility were the primary factors in the 2010–2011 global performance discrepancies. From a more regional standpoint, Asia/Pacific airlines posted the strongest financial performance during 2011, with net profits of $10.8 billion. European airlines posted less than $1 billion in net profit in 2011, while African operators registered a net loss of about $100 million."

IATA reported that its European-based airlines achieved year-on-year passenger traffic increases of 9.5%, narrowly trailing the collective seat capacity increase of 10.2% in 2011. Average load factors dipped to 78.9% from 79.4% in 2010. These increases have been recorded despite the ongoing Eurozone financial/debt crisis throughout 2011.

IATA's North American-based airlines achieved a collective year-on-year RPK increase of 4.0% in 2011 over 2010, trailing a seat capacity increase of 6.0%. Average load factors dipped to 80.7% from 82.2% in 2010.

In 2011 legacy carriers in Asia Pacific further underlined the rapid growth in the region which has seen Asia-Pacific carriers increase in importance on the global scene. IATA reported that its Asia Pacific airlines members achieved year-on-year passenger traffic growth of 4.1% on seat capacity increases of 6.4%, with a resulting dip in average load factors from 77.6% to 75.9% in 2011. According to industry sources[5] the top Chinese carriers, and the Chinese airline sector in general, have continued to contribute to the regions dynamic growth. In terms of revenues, the three major Chinese legacy carriers of Air China, China Southern and China Eastern are comfortably established within the top 20 in the world.

According to IATA figures, Middle Eastern carriers recorded strong passenger traffic growth in 2011. RPK demand increased by 8.6% over 2010. This compared to a capacity growth (ASK) of 9.1%, with a corresponding dip of 0.5 percentage points in passenger load factor to 75.5% for the year.

IATA reports Latin America as the strongest growth region for passenger traffic in 2011. Carriers in this region experienced passenger traffic (RPK) growth of 11.3% in the year on a capacity (ASK) growth of 9.8%. Despite traffic growth outstripping capacity, load factors for carriers in the region fell to 74.6% in 2011 from 76.7% the previous year.

Overall, African carriers reported a stagnation in passenger traffic growth (RPKs) of 0.5% in 2011, following a strong performance in 2010. Capacity increased 2.2% year-on-year, which meant load factors fell to an average of 67.6% from 69.1% a year earlier.

**Global Air Cargo Growth**

According to IATA, its member airlines collectively recorded an air cargo decline – measured in Freight Tonne Kilometres (FTKs) – of nearly 1% in 2011 over 2010 levels, due in large part to a slowdown in export demand from Asia Pacific to its major consumption markets in Europe and North America. In simple terms, the economic conditions in Europe and the U.S. in particular have dampened demand in these markets for

[4] ICAO News Release 5th July 2012; COM 14/12

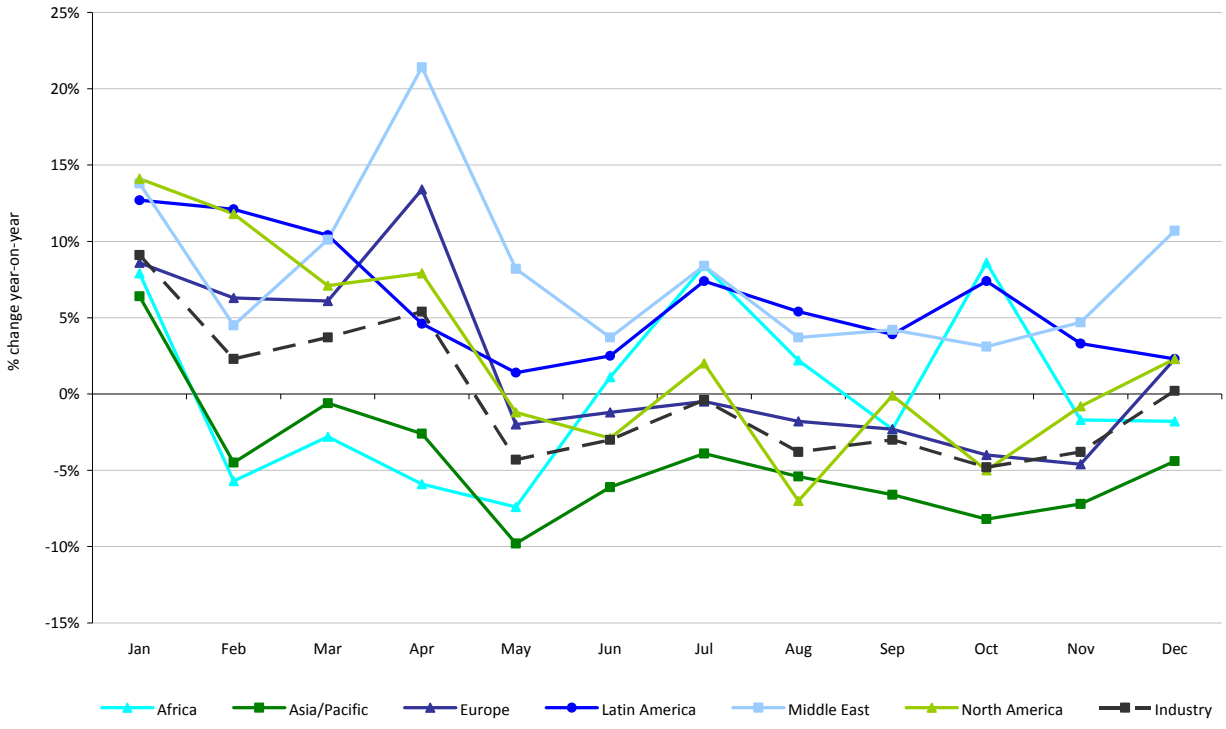
[5] Airline Business, August 2012, p38-39

Chinese, Korean and Thai goods. This is illustrated by the almost 5% reduction in FTKs for Asia Pacific carriers in 2011, and a flat growth of 1.5% experienced by European and North American airlines. Asian airlines were also the ones most severely affected by the Japanese natural disaster in March and the subsequent months.

The decline witnessed by African carriers (-1.2% FTKs) is – again – attributable to the troubles experienced in the north of the African continent in the first half of 2011 especially. Latin America remained fairly insulated from the adverse trading conditions afflicting Europe, North America and Asia, as the freight airline sector posted 5.5% growth, driven mainly by LAN Airlines expansion. The Middle Eastern airlines recorded the highest growth in 2011 of 8.2% year-on-year on the back of the ever-growing fleet of widebody aircraft in the region, operated by Emirates, Qatar and Etihad.

The monthly pattern of growth reflects the full year results, with Middle Eastern carriers the stellar performers across the year. Asia Pacific airlines posted declines in every month following January. The peak in April in most markets is due to the distorting nature of the Icelandic volcanic eruption in the same period in the previous year, when air freight volumes (along with passengers) were devastated by airspace closures and flight cancellations.

Freight Tonne Kilometre (FTK) Growth by Region 2011 vs. 2010




Source: IATA

The industry average is heavily influenced by the Asia Pacific results, as this region's airlines command a 40% market share of air freight traffic.

## Forecasts

In 2011, ICAO produced a passenger traffic forecast for the coming few years to 2014. ICAO measures growth in Passenger Kilometres Performed (PKP). The organisation forecasts that in 2012 global air traffic will continue to grow but at a slower rate than 2011 as oil prices are expected to remain at a higher level. In 2013 and 2014, global traffic is predicted to continue with positive growth.

The forecast traffic is dictated by the prevailing economic conditions on a regional basis and will vary by geographic region. From 2011-2014, the average annual growth rate (AAGR) ranges from 3% in North America to 10% in the Middle East. The AAGR for the world is 5.9%.

Airlines of mature markets such as North America and Europe are predicted to grow at a slower rate, whereas those in the Middle East, Asia/Pacific and Latin America/Caribbean are projected to experience growth significantly above the world average.

Of note is that ICAO projects air traffic to grow at a faster pace between 2011 and 2014 than it has averaged in the last ten years since 2001, driven by strong demand in Asia Pacific and the Middle East.

According to Boeing, airline passenger traffic will increase from almost 4.9 trillion RPKs in 2010 to 13.3 trillion in 2030. This represents an almost threefold increase with an average annual growth rate of 5.1%. Airbus points out in its forecast that historically (since the 1970s) air traffic has doubled every fifteen years and will do so again by 2025.

Based on the Boeing forecast, the highest growth will be concentrated in the Asia Pacific region with an annual average growth rate of 6.8%, followed by the Middle East (6.2%) and Latin America (5.9%). With Africa also experiencing substantial expansion (5.4%), these regional markets dominate growth compared to the mature economies of Europe (4.4%) and North America (3.2%).

Eurocontrol's medium term base case for flight movement growth in Europe is forecast to be 11.3 million movements in 2018, 16% higher than 2011. The average annual growth is relatively weak at 2.1%. Eurocontrol has also produced high and low traffic growth rates which differ in terms of methodology and input assumptions. Between them, the scenarios capture the most likely range of future growth in flight movements. The low case forecasts 10.6 million movements in 2018 with an annual growth of 1.1%. The high case forecasts 12.1 million movements in 2018 with an annual growth of 3.0%.

In its World Air Cargo Forecast 2012-2031, Boeing projects an average annual growth rate for global air cargo of 5.2% in the base case. The low and high cases forecast 4.5% and 5.6% respectively, measured in Revenue Tonne-Kilometres (RTKs), which is the amount of cargo carried multiplied by the distance it is transported.

Asia will continue to lead the world air cargo industry in average annual growth rates, with domestic China and intra-Asia markets expanding 8.0% and 6.9% per year, respectively. Latin America markets with North America and with Europe will grow at approximately the world average growth rate, as will Middle East markets with Europe. The more mature markets of North America and Europe reflect slower growth rates.

## Aircraft Manufacturing & MRO

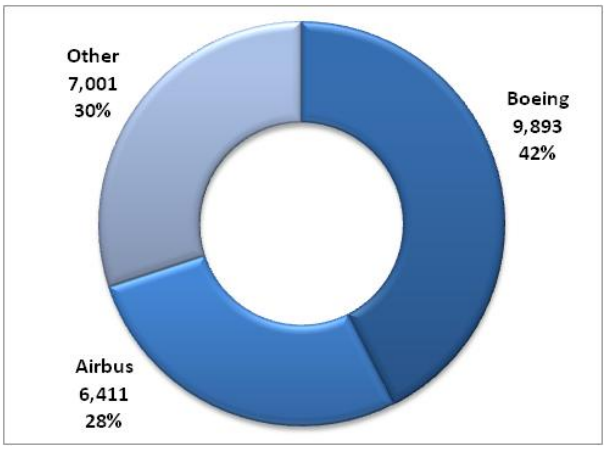
Based on the latest data available, the turnover of the European aeronautic sector in 2010 (civil and military aeronautics but excluding space activities, land and naval defence) totalled €106.6 billion, an increase of 6.2% over 2009. This represents a 3.9% CAGR in turnover since 2006[6].

The number of persons employed in aeronautics reached 458,700, a decrease of 2% over 2009. This represents a CAGR of 0.9% since 2006. France was the only one of the major countries to record an increase in employment in 2010 compared with the previous year. Spain was particularly adversely affected recording a 27% reduction in employment in aeronautics, reflecting the country's overall high unemployment rate in 2011 of 21.7%[7] as Spain struggled to contain its financial and economic problems.

Europe is a net exporter of aerospace and aviation products[8]. In 2011 aerospace exports to the world from EU27 countries totalled €53.8 billion. This represents a 5.5% increase on the previous year and a CAGR of 2.2% since 1999, although there have been cyclical peaks and troughs over the period. In 2010, the United Kingdom (11.3%) France (5.3%) and Germany (3.4%) all recorded increases in exports compared with 2010.

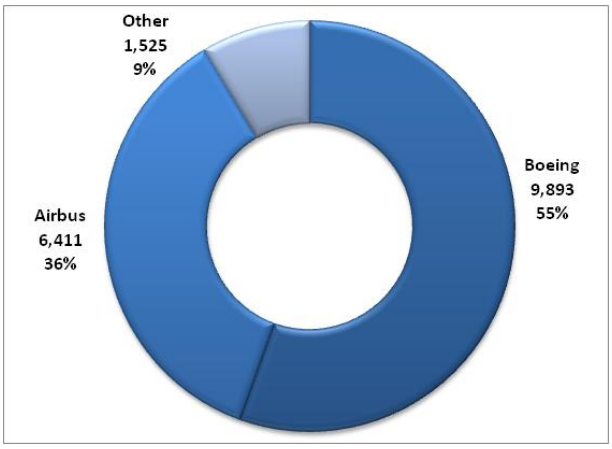
Of the current global jet fleet in service (to the end of 2011), Boeing and Airbus enjoys nearly three quarters of the global market share for civil airliner jets (which comprise regional, narrowbody and widebody aircraft, excluding turboprops), with Boeing accounting for a greater share of the total (42%) compared to Airbus (28%). The remaining 30% is dominated by Embraer and Bombardier in the regional jet sector.

Share of Global Civil Airliner Jet Fleet 2011




Source: JP Fleets (Regional, NB & WB Jets)

Share of Global NB & WB Jet Fleet 2011




Source: JP Fleets

The civil passenger turboprop aircraft market is smaller than the jet market but still significant. As of 31st December 2011, JP Airline Fleets International database recorded 4,460 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

[6] ASD Facts and Figures 2010

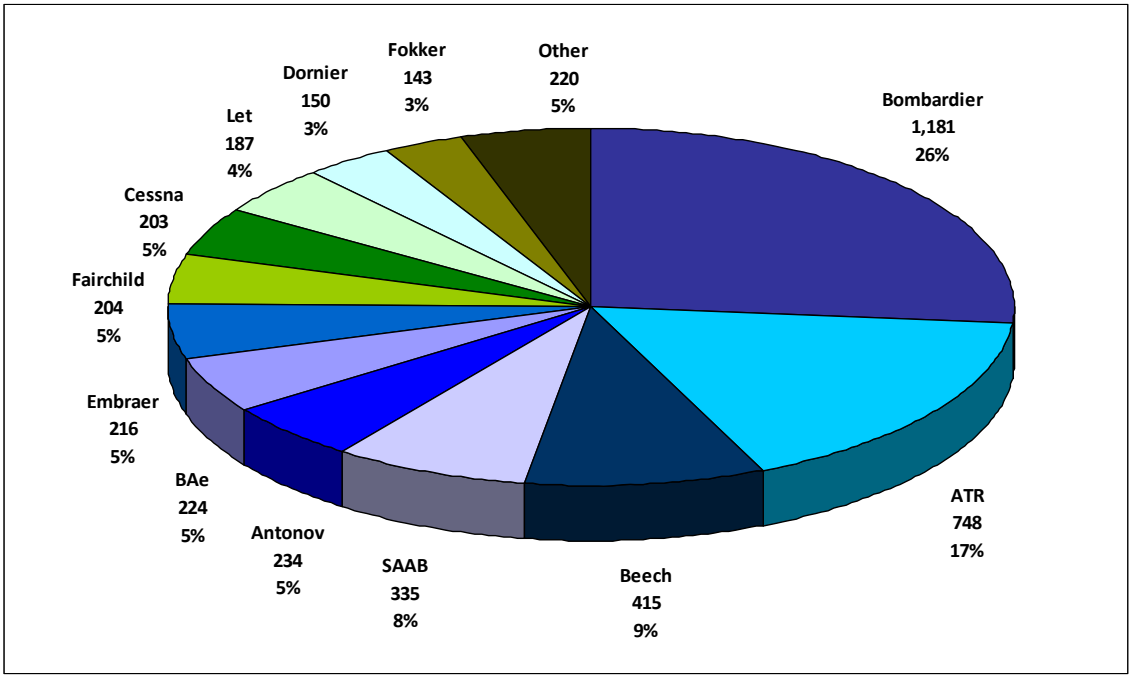
[7] Eurostat Unemployment Statistics: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Unemployment_statistics

[8] 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.

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. The top four combined – Bombardier, ATR, Beech and Saab – command 60% of the market.

Manufacturers of civil passenger turboprops by market share 2011




Source: JP Airline Fleets International database

The global market value of civil aeronautic MRO in 2011 was USD 46.9 billion, up 10.8% from the USD 42.3 billion achieved in 2010. The greatest proportion of MRO activity is due to engine maintenance, at 46%[9].

The regional distribution of MRO activity is directly comparable to the global air transport market as a whole. While North America and Western Europe currently have the largest aircraft fleets and MRO markets, the growth areas lie in emerging regions – particularly China, India and Eastern Europe. These regions are growing quickly, but their overall size currently represents a small proportion of the total MRO market.

The 10.8% rise in global MRO spend in 2011 shows a rebound from the 7.4% reduction in 2010; and the drivers of this change are important to understand as this increase is made up of components showing individual trends.

[9] Opportunities and Challenges in Today's MRO Market 2011-2021, TeamSAI, Aeroxchange Annual Conference, February 2012

In contrast to capacity reductions made by airlines during the economic recession in 2010, fleet renewal activity in 2011 drove a 3.2% increase alone. Aircraft utilisation rates also rose 1.5% for the year driving an MRO market increase of 0.4%.

A rise in component maintenance outpaced declines to airframe and line maintenance, resulting in a small net increase of 1.0%. In addition labour rates have reduced marginally, while engine MRO drove a significant 6.4% increase (1.6% in 2010)[10].

### Air Traffic Management

The European Commission has adopted a Commission Decision[11] setting EU-wide performance targets and alert thresholds for the first reference period (RP1) 2012 to 2014. These targets cover route environment (in terms of route efficiency), capacity (in terms of en route delays) and cost efficiency (in terms of en route unit rates).

For the key performance indicators (KPIs) on cost efficiency[12], 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 EU-wide cost efficiency targets are to achieve average ATM service unit rates of €57.88 in 2012, €55.87 in 2013 and €53.92 in 2014 (expressed in €2009).

In September 2011, EUROCONTROL (designated as the Performance Review Board [PRB]) published its first assessment of National/FAB performance plans for the period 2012 to 2014[13]. Volume I of the report presents the PRB's overall assessment of National/FAB Performance Plans for RP1, as well as PRB recommendations to the European Commission. The PRB's assessment of the 26 national and 2 FAB Performance Plans is found in Volume II.

In terms of the cost-efficiency target, the PRB assessed that there had been a solid start to the reference period with the total costs for 2012, in terms of determined unit rate, only 0.3% above target. However, it also assessed that the Performance Plans collectively would fall short of the EU-wide cost efficiency target for 2014 by 2.4%. In monetary terms, further savings of €256 million out of a total of €18,900 million are required in order to meet the EU-wide target and intermediate values over RP1.

[10] Opportunities and Challenges in Today's MRO Market 2011-2021, TeamSAI, 22 September 2011

[11] Commission Decision setting the European Union-wide performance targets and alert thresholds for the provision of air navigation services for the years 2012 to 2014, 21 February 2011

[12] The SES II performance scheme covers environment, delays and safety as well cost effectiveness. These areas are dealt with in other chapters of this report. This chapter concentrates on ATM cost effectiveness.

[13] SES II Performance Scheme, Assessment of National/FAB Performance Plans with Performance Targets for the period 2012-2014, prepared by the Performance Review Body (PRB) of the Single European Sky.

### The Internal Market & Competition

The EC acts to ensure that there is fair and open market competition throughout the EU Member States. At the same time, it recognises that the development of regional airports enhances the mobility of the general public and can provide an economic boost to the regions. The European Commission ensures a level playing field in the market by setting competition rules for State aid to airports and airlines.

In the context of changing market conditions, the Commission considered 2011 to be the right time to reflect on the previous application of the EU aviation guidelines from 1994 and 2005. To this end, the EC Directorate General for Competition carried out a public consultation between 7 April 2011 and 7 June 2011 to measure the impact so far of these two sets of guidelines. The Commission aimed to collect comments from all stakeholders allowing it to determine whether the guidelines need to be revised and if so, to what extent.

Since October 2004, the EU and U.S. have been contesting their Governments' respective support to their aerospace industries at the World Trade Organisation (WTO). Both WTO challenges relate to alleged WTO-incompatible support respectively to Airbus and Boeing over a twenty to thirty year period.

In the 'Airbus case', the WTO panel made its report public on 30 June 2010 followed by the Appellate Body (AB) report on 18 May 2011. The U.S. and EU agreed in February 2012 in Geneva on the next procedural steps in this WTO dispute. The EU has fully complied with its WTO obligations thanks to the comprehensive set of actions presented in December 2011.

In the 'Boeing case', the panel issued its final public report on 31 March 2011 followed by the Appellate Body report on 12 March 2012.

### Environment

Since the agreement by States of Resolution A37-19, ICAO has actively assisted Member States with the development of their aviation-related climate change action plans.

The Organisation wrapped up a recent round of workshops in this regard, with five regional action plan training sessions in Mexico City, Bangkok, Dubai, Nairobi, and Paris being held between May and July 2011. A final action plan workshop was held in November 2011 in Montreal. ICAO encouraged States that had made progress in the development and implementation of their plans to showcase their activities and share their experiences with other States at this event.

In tandem, an ICAO Workshop on Aviation and Sustainable Alternative Fuels was organised in October 2011 as part of ICAO preparations for the United Nations Conference on Sustainable Development (Rio+20) taking place in Brazil in June 2012.

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 5,000 trials are expected and other airlines will voluntarily join existing trials.

ACI Europe developed its 'Airport Carbon Accreditation' initiative to assess and recognise airport efforts to manage and reduce GHG emissions. It was launched in 2009 in Europe, and in late 2011 the scheme was rolled out to the Asia Pacific region in cooperation with ACI Asia Pacific, having already achieved significant results with this programme in Europe.

In Europe, the initiative is growing apace. In year one (2009-2010), 17 airports participated, representing 21% of European air traffic. By year two (2010-2011), 43 airports were involved, accounting for 43% of European air traffic.

Boeing delivered its first B787 Dreamliner to launch customer All Nippon Airways in September 2011. The all-new jetliner made from composite materials provides airlines with improved fuel economy and low operating costs than its predecessors. It also features a host of new technologies that are designed to enhance the passenger experience.

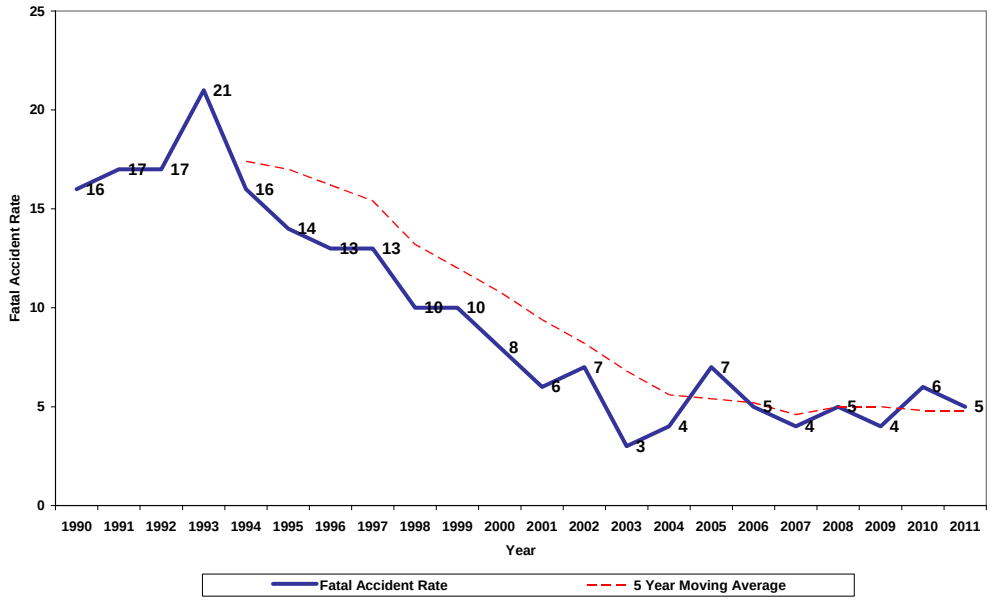
Airbus ended 2010 with the announcement of its A320neo, the A320 option with new fuel saving engines. Over 1,200 orders and commitments from more than 20 different customers have been placed. As well as offering the latest and most eco-efficient engine technologies, the A320neo will incorporate 'sharklets' – large fuel-saving wing tip devices. According to Airbus, the aircraft will deliver significant fuel savings of up to 15%, equating to up to 3,600 tonnes of CO2 savings annually per aircraft, as well as reduce NOx emissions. The A320neo is also expected to deliver noise reductions, through advances in engine design. Throughout 2011, Pratt & Whitney conducted initial ground testing on its 'PurePower' PW1000G series engine, selected for the launch of A320neo aircraft in 2015. According to PW, the redesigned engine uses an advanced gear system that allows the fan and compressor/turbine to operate at different speeds, resulting in up to 50% reduction in noise.

In Europe, German flag carrier Lufthansa has embarked upon a series of weight-saving initiatives on board its aircraft fleet in order to reduce fuel consumption. Firstly, Lufthansa is installing around 32,000 new seats on more than 180 aircraft in its short and medium-haul fleet – within the space of just one year – helping to reduce emissions. Each row of new seats is more than 12 kg lighter than the previous seat rows, equivalent to an almost 30% reduction in weight. Secondly, almost 30,000 new service trolleys will be introduced on Lufthansa flights over the next three years. The introduction of the 'Quantum Light Weight Trolley', which is one third lighter than its predecessor, will save about 9,000 tonnes of kerosene and 28,350 tonnes of CO2 annually.

### Safety

In 2011, there were 33 fatal commercial airline accidents worldwide causing the deaths of 504 passengers and crew with an additional 30 casualties on the ground. 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 2010 there were 26 fatal commercial airline accidents causing 817 deaths. The global twenty year trend in fatal accidents per 10 million flights takes into account the increase in traffic over that period.

Global Fatal Accident Rate (per 10 million Flights) 1990 to 2011

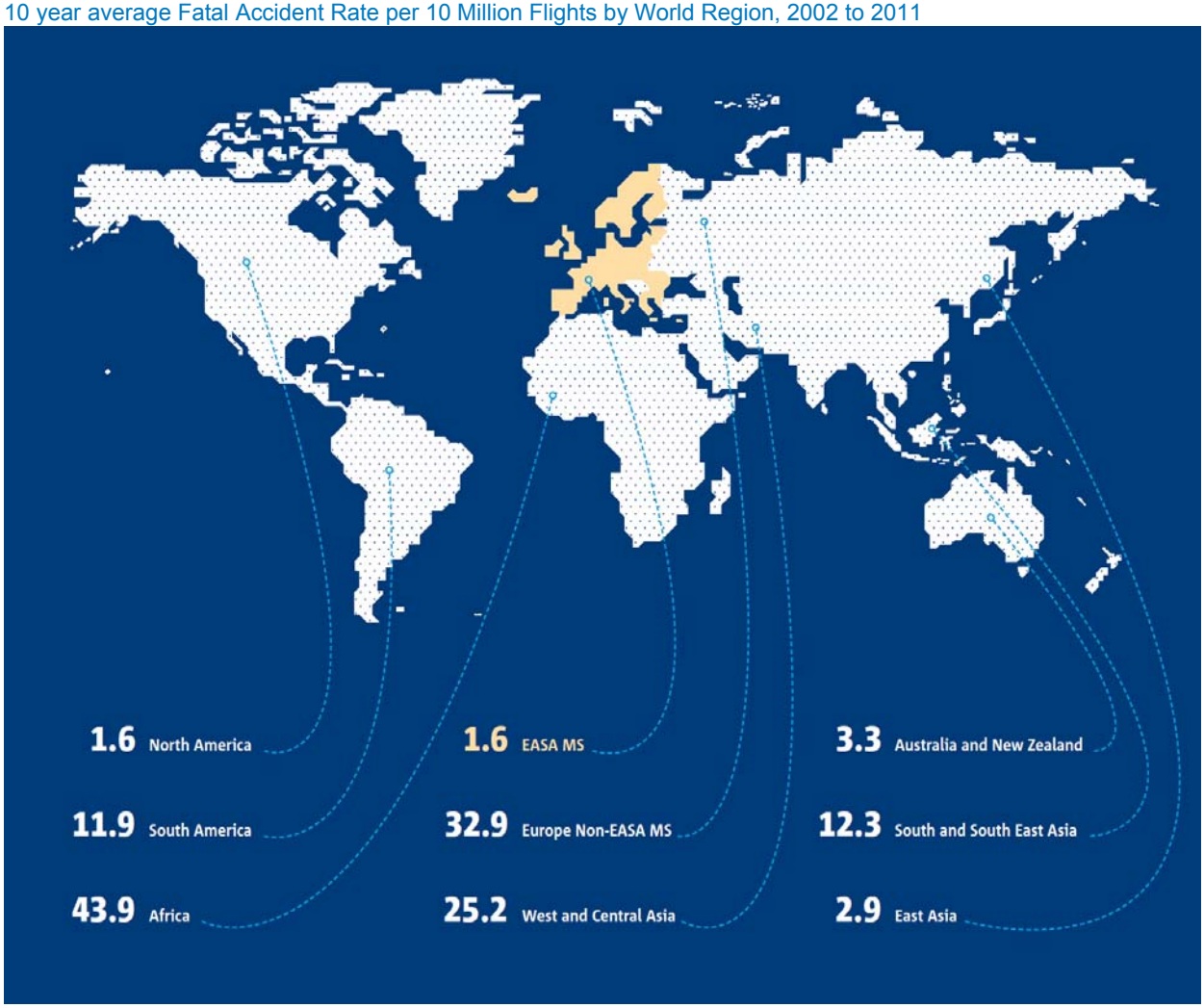



The year 2011 saw a rise in the number of identified world airline fatal accidents compared to 2010 but a decrease in the number of fatalities, reflecting the greater proportion of smaller regional aircraft, mostly turboprops in the 2011 accident list compared to fewer but, on average, larger aircraft types involved in fatal accidents in 2010.

In terms of western-built jet hull loss accidents, all regions performed better or the same in 2011 compared to 2010 with the exception of the Commonwealth of Independent States (CIS). Europe and North Asia had zero western-built jet hull losses. The same regional trends were evident when looking at all hull loss accidents, although for European (operated in EASA Member States) commercial turboprop operations, there was a fatal accident involving a Swearingen SA227. 6 of the 12 occupants on board received fatal injuries. Nevertheless, this was one of the lowest annual accident rates in Europe in the past decade.

As a result, compared to the EASA Annual Safety Review of 2010, the rate of accidents for EASA Member States has dropped from 3.3 to 1.6 fatal accidents. This change is mainly because of the exceptionally high European accident rate (11.7) in the year 2001. This year is not included in the EASA Review of 2011 which only covers the decade 2002 – 2011.

10 year average Fatal Accident Rate per 10 Million Flights by World Region, 2002 to 2011




Source: EASA Annual Safety Review 2011. Scheduled passenger and cargo operations only

**Incidence or Occurrence Reporting**

At the end of 2011 the ECR contained 625,267 occurrences, this was an increase of over 200,000 over the previous year (includes both incidents and accidents). This increase is not necessarily due to an increase in safety occurrences over the past 12 months, but is largely due to the endeavours of States in integrating their occurrence data into the ECR. Whilst this progress is to be applauded, there are a still a large number of incidents reported with very sparse supporting information.

## Air Cargo Security

More than 40%, by value, of the world's freight travels by air every year. The thwarted Yemen printer cartridge bomb plot in October 2010 has been described as air freight's 9/11. Within the EU, the current

regulatory framework provides for a comprehensive set of rules on the security of air cargo and mail[14], but the Yemeni event changed the way regulators view cargo security. In June 2011, ICAO and the World Customs Organisation (WCO) signed a Memorandum of Understanding (MOU)[15] for increased cooperation to protect air cargo from acts of terrorism or other criminal activity and for speeding up the movement of goods by air worldwide.

On 1 July 2011, more stringent ICAO standards, under Annex 17, concerning air cargo become applicable. They include a new requirement for Member States to establish a supply-chain security process.

In August 2011, Regulation (EU) No 859/2011[16] was adopted by the European Commission regarding security measures on cargo coming from non-EU countries. With the new regime Europe reaches out to other countries aviation security systems in order to benefit from security controls performed outside its own borders. Europe has thus created the nucleus of a worldwide secure supply chain programme and will further build upon it. Air carriers play a crucial role in providing the effective links between supply chain systems of different jurisdictions. Their security programmes will account for effective and seamless security controls undertaken outside Europe. In the future, independent validation will be based on commonly recognised ICAO standards of any actor in the supply chain worldwide - air carriers as well as regulated agents and known consignors. This will provide Europe and any other country that wishes to participate with the necessary comfort to trust each other's systems.

### Punctuality and Delays

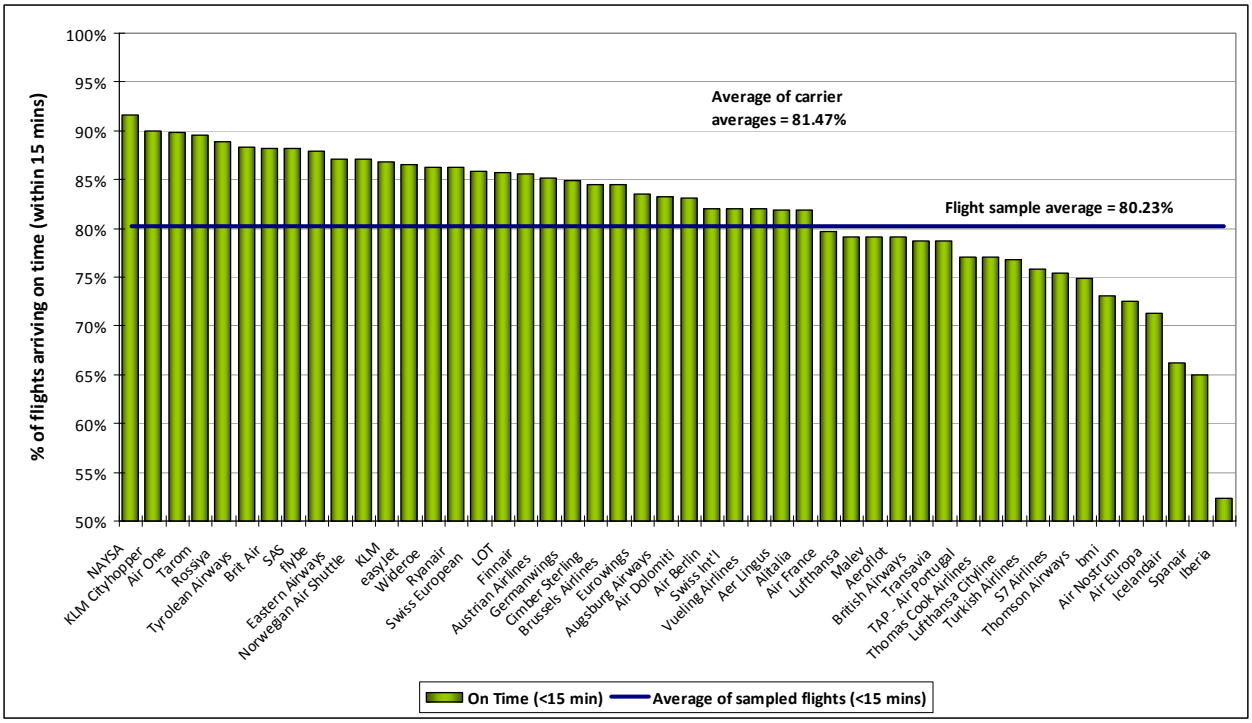
The annual European carrier arrival performance for scheduled flights for each airline sampled by FlightStats is shown below. While the average of all sampled flights in 2011 is 80.2% on time, the average of the individual carrier averages is 81.5%. The top five European airlines in terms of on-time punctuality recorded an average of 90% of flights on time, compared to the bottom five carriers achieving on-time punctuality averaging 65.4%; almost a 25 percentage point difference in on-time performance.

[14] Notably Section 6 of the Annex to Reg. 300/2008, Parts A and F of the Annex to Reg. 272/2009, and Section 6 of the Annex to Reg. 185/2010.

[15] ICAO News Release PIO 13/11, 27 June 2011

[16] Commission Implementing Regulation (EU) No 859/2011 amending Regulation (EU) No 185/2010 laying down detailed measures for the implementation of the common basic standards on aviation security in respect of air cargo and mail, 25 August 2011

2011 European Carrier On Time Arrival Performance (Scheduled Passenger Flights within 15 min)



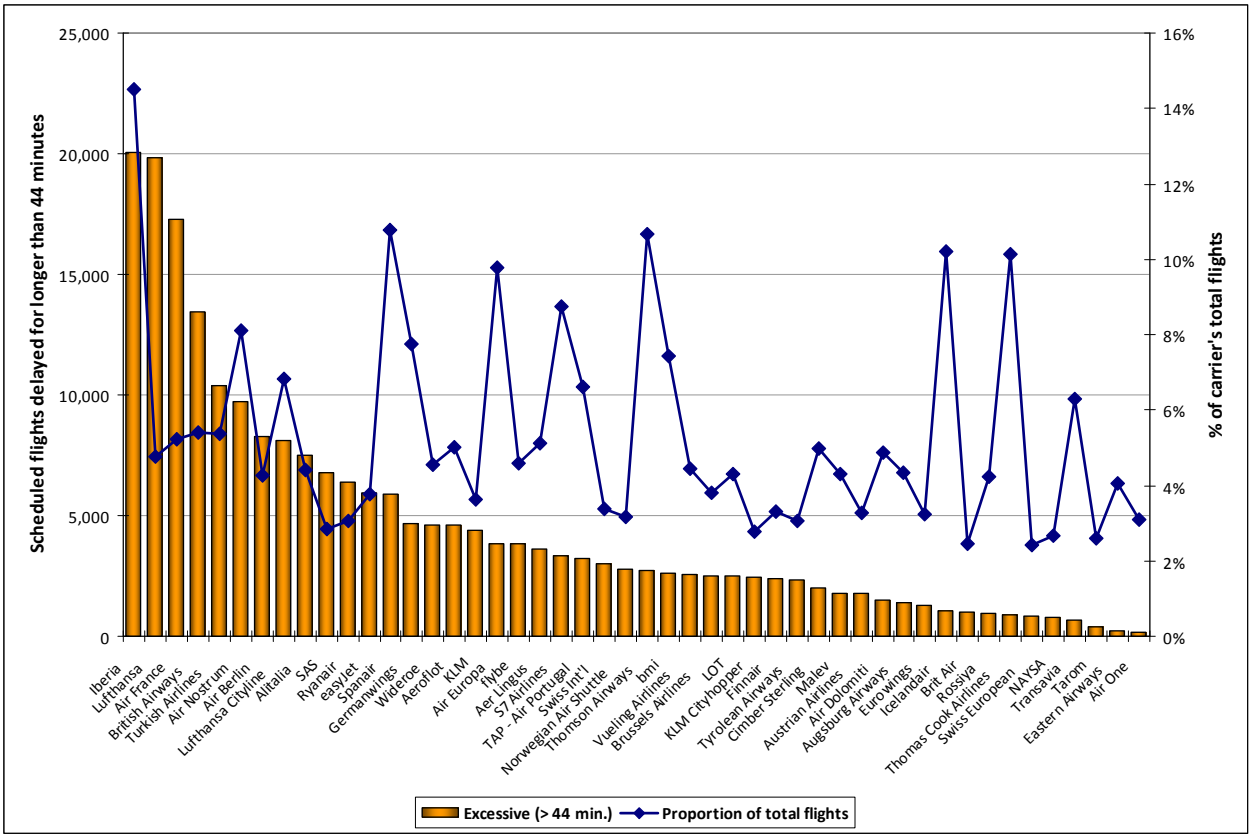

Source: www.flightstats.com

These figures represent an improvement in punctuality over 2010. The average of sampled flights improved by 6.9%, the individual carrier average improved by 3.0%, the top five European airlines achieved a marginally better result by 0.7% while the bottom five European carriers showed a 2.9% improvement in on time arrival performance.

Of the bottom ten European carriers, four of these are based in Spain (Iberia, Spanair, Air Europa and Air Nostrum) and two are UK carriers (bmi and Thomson Airways; bmi is primarily based at London Heathrow). The others are Turkish Airlines, Lufthansa Cityline, S7 Airlines and Icelandair.

In addition to data for on time arrivals (those arriving within 15 minutes of the scheduled time), FlightStats also collects data for longer delays and cancellations.

2011 European Carrier On Time Arrival Performance (Scheduled Passenger Flights Delayed >44min)




Source: www.flightstats.com

Airlines with the highest number of long delays were Iberia, Lufthansa, Air France and British Airways. These four carriers are full service network airlines operating a hub and spoke business model from major European hub airports. Airport delays can be attributed to the airports themselves due to airspace congestion in the surrounding area as well as runway and infrastructure capacity issues in some cases. However, these longer delays should be taken in the wider context of the proportion of flights operated. Of the four carriers mentioned, three incurred delays in excess of 44 minutes but this was less than 6% of their respective sampled total flights. Iberia however saw 14.5% of its total flights delayed in the same period.

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[17] 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.

[17] 2011 Year-end Report on Airport and Airline On-time Performance, FlightStats, 4 January 2012

In 2010 no European airports appeared in the top twenty; in 2011 this situation improved with London Stansted coming second after top global performer Tokyo Haneda, with Amsterdam and Munich also recording significant improvements. The main network carrier hub airports in Europe (Amsterdam, Frankfurt, Heathrow, Paris CDG and Madrid) achieved between them an average on-time departure punctuality of 73.6% in 2011, a collective improvement of over 6% on 2010. The best European 'hub' performance achieved was at Amsterdam with 81.3% of departures on time.

# 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 2011 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 2011 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 2011

2011 largely continued the recovery in demand started in 2010, albeit at a slower rate.

The International Civil Aviation Organisation (ICAO) stated airlines of its 190 member states handled 2.7 billion passengers in 2011, a 5.6% year-on-year increase on 2010.

Airports Council International (ACI) reported that 5.4 billion passengers[18] passed through its 1,345 member airports worldwide, an increase of 8.0% over 2010.

[18] Total Passenger figures refers to 'Terminal' plus 'Transit' Passengers as identified by ACI. A portion of airports do not report purely Terminal passengers but do report Total passengers (Terminal + Transit), so Total Passengers are used in this analysis.

Table 1-1: 2011 Worldwide Airport Traffic Summary

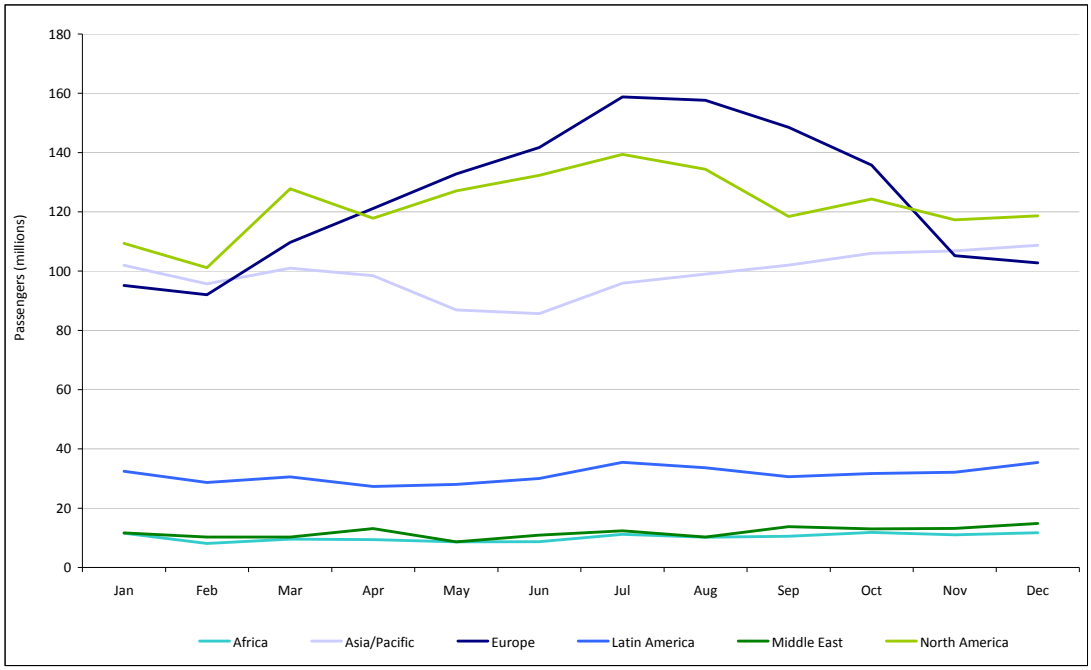
| | Passenger throughput (m) | | | ATMs (m) | | | Cargo tonnes (m) | | |
|---|---|---|---|---|---|---|---|---|---|
| Region | 2010 | 2011 | % chg | 2010 | 2011 | % chg | 2010 | 2011 | % chg |
| Africa | 156.5 | 152.9 | -2.3% | 2.1 | 2.1 | -0.1% | 1.7 | 1.8 | 4.6% |
| Asia Pacific | 1,294.8 | 1,558.3 | 20.4% | 9.4 | 9.6 | 1.9% | 31.9 | 34.0 | 6.7% |
| *Europe* | *1,466.8* | *1,570.0* | *7.0%* | *15.5* | *16.1* | *3.8%* | *17.9* | *18.2* | *1.4%* |
| Latin America | 403.7 | 409.7 | 1.5% | 4.9 | 5.0 | 1.0% | 4.7 | 5.0 | 7.7% |
| Middle East | 206.6 | 221.9 | 7.4% | 1.7 | 1.8 | 3.1% | 5.9 | 5.9 | 0.9% |
| North America | 1,509.8 | 1,529.7 | 1.3% | 19.8 | 19.9 | 0.3% | 28.7 | 28.3 | -1.6% |
| ACI Total | 5,038.2 | 5,442.5 | 8.0% | 53.6 | 54.5 | 1.7% | 90.7 | 93.2 | 2.7% |

Source: ACI Worldwide Airport Traffic Report

Although the passenger growth in 2011 is solid, it reflects a slowing down in growth compared to the previous year.

Air travel demand in 2011 was impacted by several major regional events during the course of the year that affected the ability of people (and goods) to travel by air. The events, although localised, were felt across the globe, but inevitably the impact was felt more acutely in the source regions. Figure 1.1 and Figure 1.2 plot 2011 airport passenger throughput[19] and growth by month, by world region.

Figure 1.1: Monthly 2011 Air Passenger Throughput at all ACI Reporting Airports




Source: ACI Monthly Worldwide Airport Traffic Reports, January-December 2011

[19] Provisional data from Airports Council International – data for December 2011 based on 74% of all ACI reporting airports

The year began with the onset of political turmoil in some North African states, namely Tunisia and Egypt, spreading to Libya and some Middle East nations. Passenger demand growth progressively worsened through the first quarter of 2011 as the North African "revolutions" triggered civil unrest across the region into the Middle East. In March 2011, IATA reported that the political unrest was estimated to have suppressed global international traffic by as much as 1%[20].

In March, a catastrophic earthquake and tsunami hitting Japan severely dented air travel demand. IATA estimated that the impact of the Japanese disaster on global international traffic was a 1% loss in that month, with Asia Pacific airlines bearing the brunt of the loss with demand hit by -2%, and Japan's domestic market decimated by 22% cut in demand[21]. Other regions were not immune, as North American and European carriers recorded a 1% and 0.5% fall in demand, respectively.

The other major event impacting international air travel demand in 2011 – which was more of an ongoing development – was the Eurozone debt crisis, dampening demand within Europe but also on international traffic flows to and from the region. In Europe, the impact was felt more acutely on airline yields rather than on traffic volumes, as premium class travellers sought lower fares on alternative carriers.

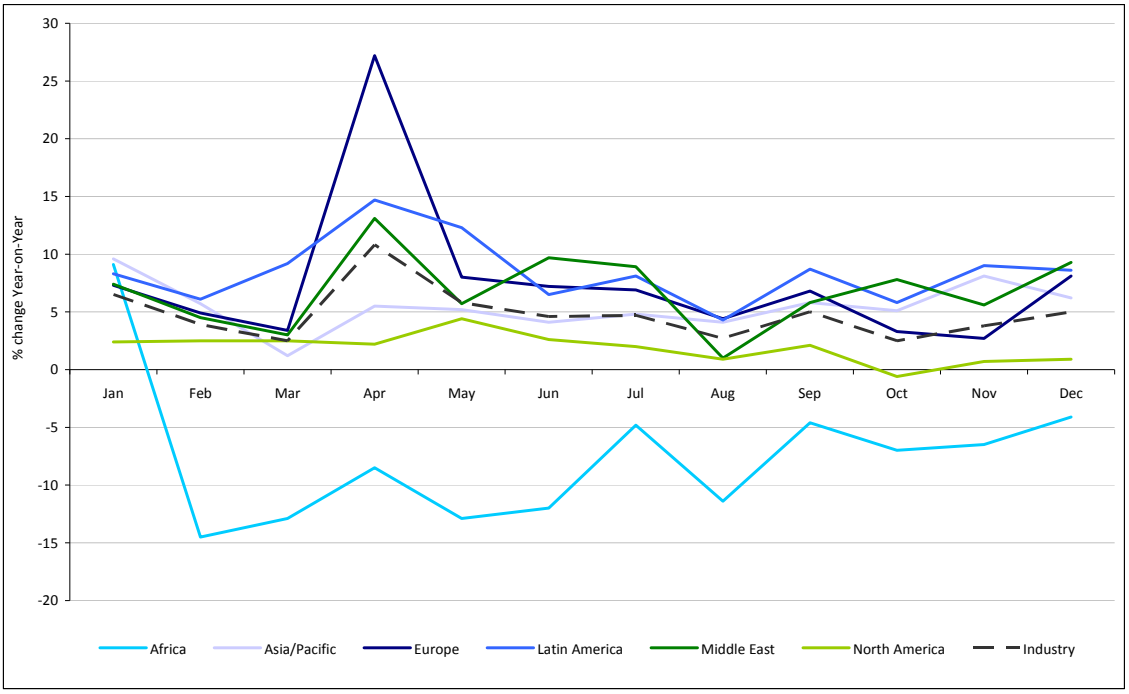
As a result of the political unrest in some Middle East states, fuel prices soared as fears grew about oil supply. Underlying air travel demand was suppressed by high fuel prices, adding to the airlines cost base and forcing up fares/surcharges. No region was immune.

Figure 1.2 below illustrates year-on-year growth by month of 2011, by global region. The most eye-catching trend is the negative growth in Africa, heavily influenced by the North African political unrest. The African market remained in contraction all year from February.

[20] IATA; Political Unrest Slows Global Growth; 29 March 2011

[21] IATA; Air travel shrinks in March – events in Japan and MENA impact air transport; 3 May 2011

Figure 1.2: Monthly 2011 Airport Passenger Throughput Growth Rates




Source: ACI Monthly Worldwide Airport Traffic Reports, January-December 2011

Demand in Europe spiked in April, due to the distorting impact of the airspace closures in the previous year when the Icelandic Eyjafjallajökull volcano erupted.

Also noticeable is the dent in March due to the Japanese natural disaster, affecting growth in all regions except Latin America. This region was insulated because of the relative insignificance of the Japan-Latin America market.

International traffic (measured in passenger-kilometres performed [PKPs]) increased by 7.1% overall in 2011, and, although lower than in the previous year, growth benefited from a strong demand in business and leisure travel, particularly in emerging markets. The largest percentage growth was registered by the airlines of the Middle East with 12%, followed by those of Europe (9.5%) and Latin America (9%).

Table 1-2: ICAO Member State Airlines RPK Growth by World Region 2011

| Passenger Traffic (PKPs) | International | | Domestic | | Total | | | |
|---|---|---|---|---|---|---|---|---|
| Region | Traffic Growth | Market Share | Traffic Growth | Market Share | Traffic Growth | Market Share | Capacity Growth (ASKs) | Load Factors |
| Africa | 4.6 | 3.7 | 5.4 | 0.8 | 4.7 | 2.6 | 6.1 | 66.7 |
| Asia/Pacific | 4.3 | 24.8 | 9.0 | 31.4 | 6.3 | 27.4 | 5.8 | 75.8 |
| ***Europe*** | ***9.5*** | ***40.5*** | ***4.5*** | ***9.2*** | ***8.9*** | ***28.5*** | ***9.7*** | ***75.9*** |
| Middle East | 11.9 | 11.6 | 11.6 | 1.7 | 11.9 | 7.8 | 13.4 | 73.2 |
| North America | 4.3 | 15.5 | 2.3 | 51.3 | 2.9 | 29.1 | 3.1 | 83.5 |
| Latin America/ Caribbean | 9.0 | 3.8 | 6.0 | 5.7 | 7.5 | 4.6 | 2.2 | 78.5 |

| Passenger Traffic (PKPs) | International | | Domestic | | Total | | | |
|---|---|---|---|---|---|---|---|---|
| **WORLD** | **7.4** | **100.0** | **4.9** | **100.0** | **6.4** | **100.0** | **6.5** | **77.5** |

Source: ICAO

Domestically, in 2011 markets grew overall by 4.9% over 2010 levels, again lower growth than that achieved in the previous year. Low growth rates of 2.3% and 4.5% in North America and Europe respectively were only partially offset by rates of 9.0% and 6.0% in the Asia Pacific and Latin America regions respectively.

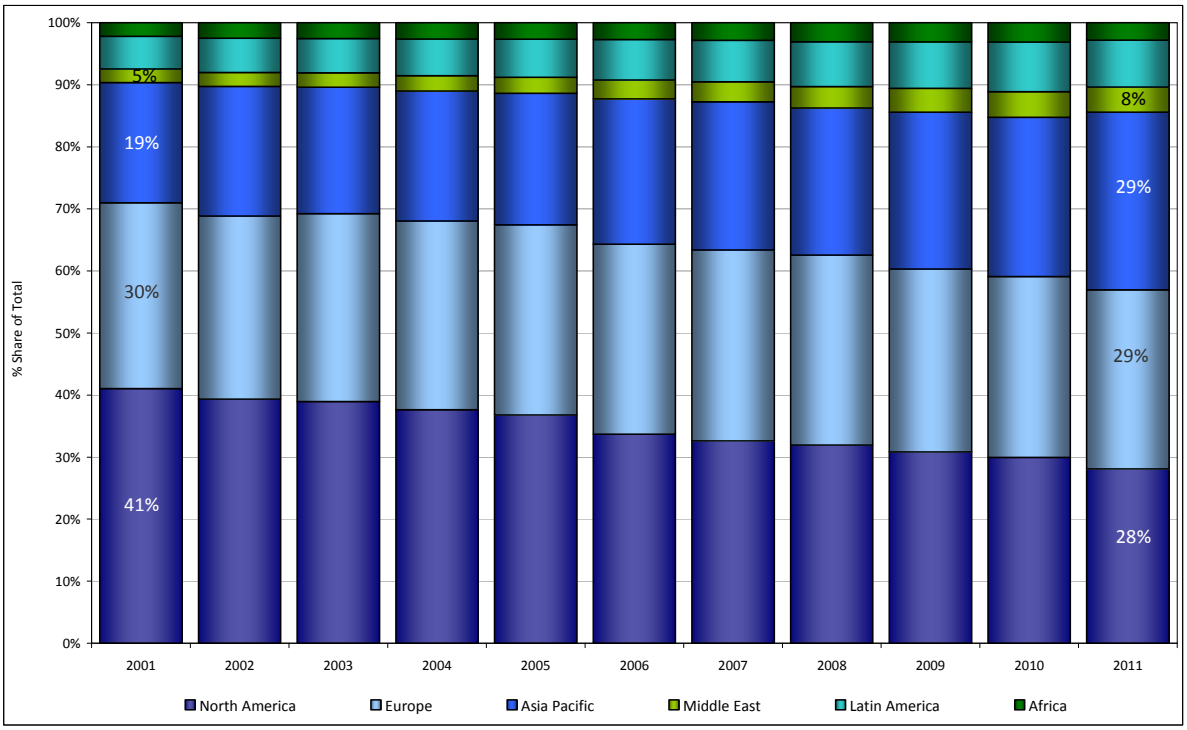
### 1.2.1 Historical Air Passenger Traffic trends

Figure 1.3 below illustrates the relative growth or decline in airport passenger throughput market share, by global region, between 2001 and 2011. From the graphic it is immediately apparent that over the last decade there has been a demonstrable shift in the focus of growth in a regional context.

At the beginning of the previous decade, North America's airports commanded the greatest market share of passengers, reflecting both the importance of its domestic air transport market and also the extent and development of its international air service network. The European market was not far behind but as deregulation of this market proceeded that of the United States, Europe was playing catch-up. At this stage, Asia Pacific was a relatively immature market yet to unlock its full potential.

Fast forward ten years to 2011 and the landscape has changed as Asia Pacific, dominated by huge domestic markets in China and India, has transformed the region on the global stage. It now holds parity, in terms of market share, with North America and Europe, with the former region ceding the most ground.

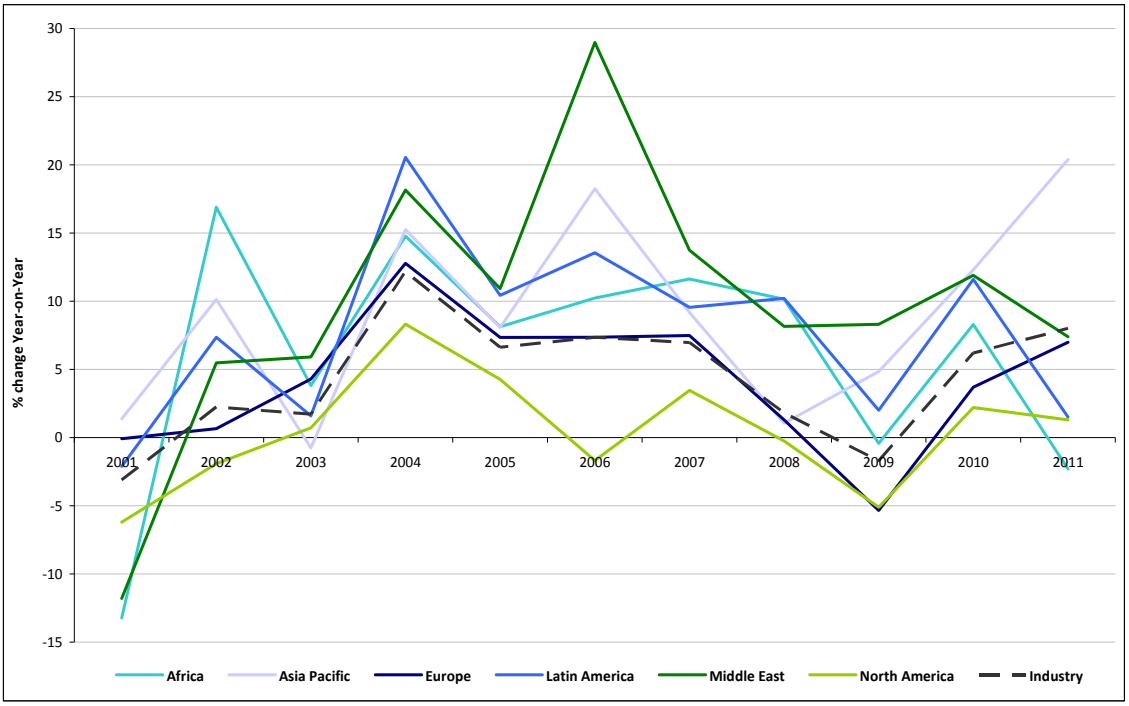
Figure 1.3: Evolution of Global Airport Passenger Throughput 2001-2011



Source: ACI Worldwide Airport Traffic Report

Air passenger traffic growth in 2011 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 2001-2011




Source: ACI Worldwide Airport Traffic Report

### 1.2.2 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 Group Name | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Euro area | 1.9 | 1.4 | -0.3 | 0.9 | 1.4 | 1.6 | 1.7 | 1.7 |
| European Union | 2.0 | 1.6 | 0.0 | 1.3 | 1.9 | 2.0 | 2.1 | 2.1 |
| Advanced economies | 3.2 | 1.6 | 1.4 | 2.0 | 2.4 | 2.6 | 2.7 | 2.7 |
| Central and eastern Europe | 4.5 | 5.3 | 1.9 | 2.9 | 3.6 | 3.9 | 4.0 | 4.0 |
| Commonwealth of Independent States | 4.8 | 4.9 | 4.2 | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 |
| Major advanced economies (G7) | 3.0 | 1.4 | 1.5 | 1.9 | 2.3 | 2.5 | 2.6 | 2.5 |
| Middle East and North Africa | 4.9 | 3.5 | 4.2 | 3.7 | 3.9 | 4.2 | 4.4 | 4.4 |
| Sub-Saharan Africa | 5.3 | 5.1 | 5.4 | 5.3 | 5.5 | 5.6 | 5.5 | 5.5 |
| ASEAN-5 | 7.0 | 4.5 | 5.4 | 6.2 | 5.9 | 6.0 | 6.0 | 6.1 |
| Developing Asia | 9.7 | 7.8 | 7.3 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 |
| Newly industrialised Asian economies | 8.5 | 4.0 | 3.4 | 4.2 | 4.3 | 4.3 | 4.3 | 4.3 |
| Latin America and the Caribbean | 6.2 | 4.5 | 3.7 | 4.1 | 4.1 | 4.0 | 4.0 | 4.0 |
| **World** | **5.3** | **3.9** | **3.5** | **4.1** | **4.4** | **4.5** | **4.6** | **4.7** |

Source: IMF World Economic Outlook Database; April 2012 Update

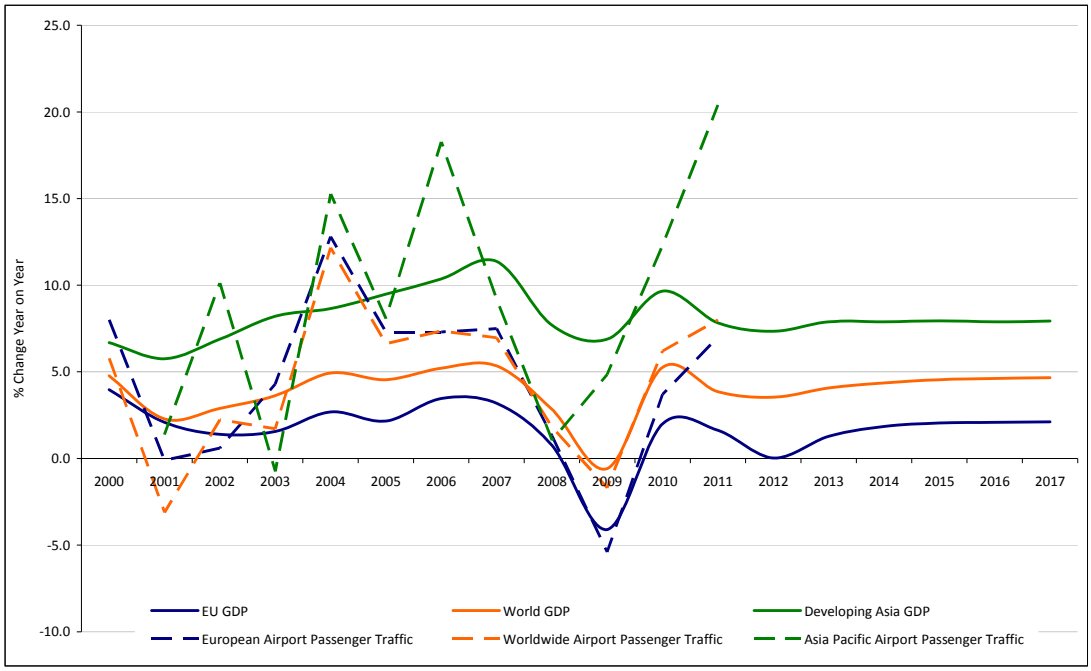
The most striking thing to note is that in 2011 the European Union (1.6%) and Eurozone countries (1.4%) achieved GDP growth rates far below the world average of 3.9%[22]. The highest economic growth rates in 2011 within the European continent were recorded by Central and Eastern European nations (5.3%) and former Soviet bloc nations of the Commonwealth of Independent States (4.9%). The strongest economic growth worldwide was experienced in Asia, in particular Developing Asia which includes China and India, recording growth at double the global average of 7.8%.

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 1.5 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. Note also the regional variation, the demonstration that the region experiencing the highest economic growth also experiences the highest growth in air travel demand.

[22] International Monetary Fund, World Economic Outlook Database

Figure 1.5: GDP Growth vs. Airport Passenger Growth




Source: ACI & IMF

### 1.2.3 North African market

At the beginning of 2011 several North African countries experienced the onset of political uprisings, effectively bringing large parts of Tunisia, Egypt and Libya, in particular, to a standstill. In Tunisia and Egypt, the air transport market in the first half of 2011 was decimated. Tunisia is a favourite leisure destination for French tourists. Egypt's Red Sea resorts are popular destinations for EU residents, especially German and British. With both countries effectively closed to tourists during the period of civil unrest, the tourist activity was inevitably displaced to other 'safer' destinations around the Mediterranean. Table 1.4 highlights passenger throughput at a selection of airports serving tourist resorts across the North African/Mediterranean area, in 2011.

Table 1.4: 2011 passenger volumes at selected North African and Mediterranean tourist destination airports

| City/Airport | Country | 2009 | 2010 | % chg '10 v '09 | 2011 | % chg '11 v '10 |
|---|---|---|---|---|---|---|
| Hurghada | Egypt | 6.73 | 8.06 | 19.8% | 5.97 | **-25.9%** |
| Sharm el Sheikh | Egypt | 7.42 | 8.68 | 17.0% | 5.47 | **-37.0%** |
| Djerba | Tunisia | 2.46 | 2.48 | 0.9% | 1.79 | **-27.8%** |
| Monastir/Enfidha | Tunisia | 3.83 | 3.96 | 3.3% | 2.29 | **-42.2%** |
| Chania, Crete | Greece | 1.80 | 1.65 | -7.9% | 1.77 | **7.2%** |
| Heraklion, Crete | Greece | 5.05 | 4.92 | -2.6% | 5.29 | **7.5%** |
| Kerkyra, Corfu | Greece | 1.79 | 1.74 | -2.7% | 1.84 | **5.7%** |
| Kos | Greece | 1.52 | 1.63 | 7.2% | 1.93 | **18.4%** |
| Rhodes | Greece | 3.47 | 3.59 | 3.4% | 4.15 | **15.7%** |
| Paphos | Cyprus | 1.64 | 1.65 | 0.4% | 1.79 | **8.5%** |

| City/Airport | Country | 2009 | 2010 | % chg '10 v '09 | 2011 | % chg '11 v '10 |
|---|---|---|---|---|---|---|
| Gran Canaria | Spain | 9.15 | 9.48 | 3.6% | 10.53 | **11.1%** |
| Lanzarote | Spain | 4.70 | 4.94 | 5.0% | 5.54 | **12.3%** |
| Palma de Mallorca | Spain | 21.20 | 21.11 | -0.4% | 22.72 | **7.6%** |
| Tenerife South | Spain | 7.08 | 7.30 | 3.1% | 8.61 | **17.9%** |
| Ankara | Turkey | 6.19 | 7.79 | 25.9% | 8.50 | **9.2%** |
| Antalya | Turkey | 18.40 | 22.08 | 20.0% | 25.10 | **13.7%** |
| Bodrum | Turkey | 2.81 | 3.11 | 10.7% | 3.39 | **9.1%** |
| Izmir | Turkey | 6.25 | 7.52 | 20.2% | 8.52 | **13.4%** |

Source: ACI Worldwide Airport Traffic Report

While full year traffic results for the selected Egyptian and Tunisian airports declined by huge margins, the passenger traffic seems to have been displaced to competing destinations in Greece, Spain and Turkey amongst others. Interestingly, while Greece was wrestling with extreme financial challenges, its island tourist resorts such as Rhodes, Kos and Crete were benefiting from the leisure traffic diverted from Egypt and Tunisia.

## 1.3 Air Passenger Traffic Growth in 2011

### 1.3.1 Europe in a global context

In 2011, ACI reported that a total of 5.4 billion passengers passed through worldwide airports, an increase of 8.0% compared to 2010.

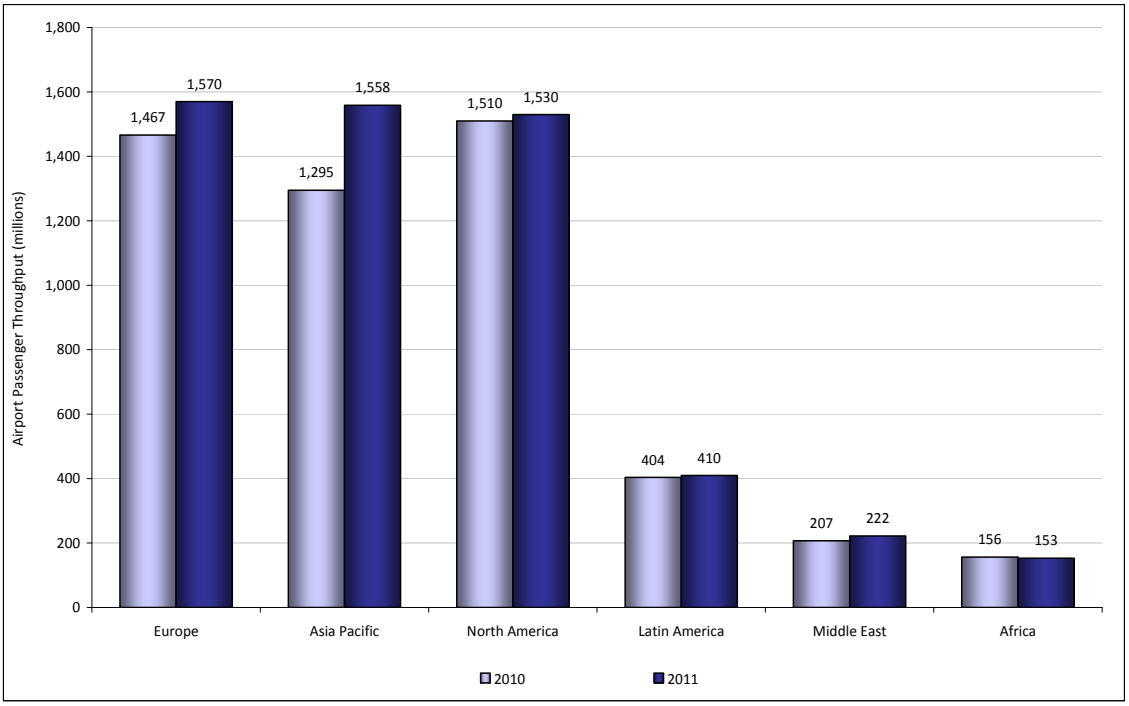
As a collective, European airports performed well, achieving passenger throughput growth of 7% in 2011, albeit marginally below the world average. According to ACI's full year 2011 data[23], European airport passenger throughput rose from 1.47 billion in 2010 to 1.57 billion in 2011.

The size of the European market actually supplanted the North American market as number one in terms of airport passenger throughput in 2011, and the Asia Pacific market claimed second spot ahead of it, such was the growth experienced in Europe and Asia Pacific compared to a stagnant North America during this year.

Figure 1.6 shows the relative market sizes by global region, a clear two-tier hierarchy existing with Europe, Asia Pacific and North America competing for dominance, and Latin America, Middle East and Africa developing their emerging markets.

[23] ACI Worldwide Airport Traffic Report 2011

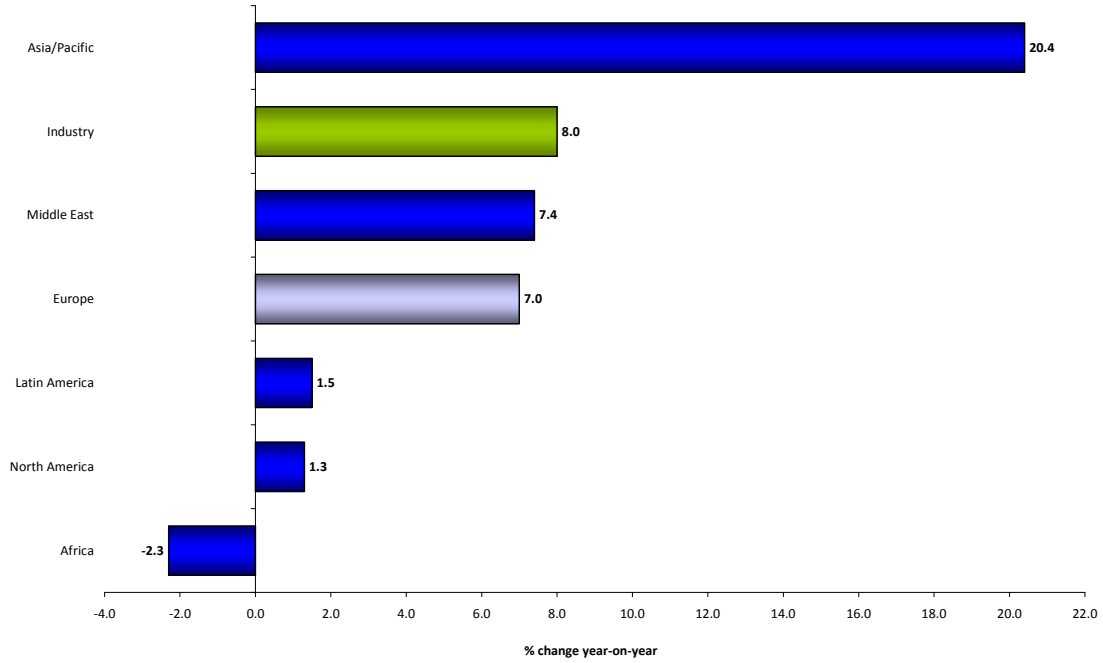
Figure 1.6: Worldwide Airport Passenger Throughput by Region in 2010 & 2011




Source: ACI Worldwide Airport Traffic Report

Figure 1.7 illustrates that while the 7% growth of Europe's airports was significant, it lagged far behind the growth of 20% year-on-year recorded by Asia Pacific airports in 2011. Europe's growth did, however, substantially outpace that of the static North American airports, which posted an aggregate increase of 1.3% over 2010, and kept pace with Middle Eastern competitors (7.4%).

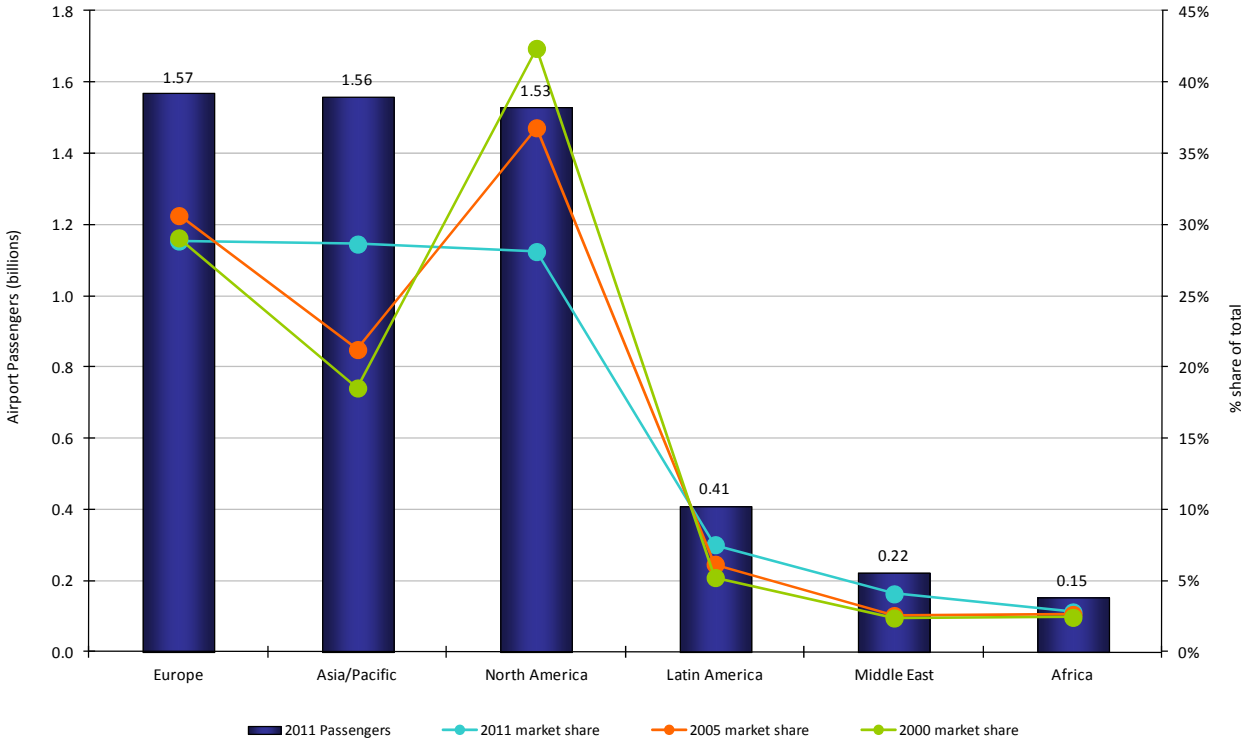
Figure 1.7: Passenger Traffic Growth at Worldwide Airports by Region in 2011 vs. 2010




Source: ACI Worldwide Airport Traffic Report

Figure 1.8 serves to underline the apparent shift in the focus of growth. As recently as 2000, North American airports dominated with market share of global passenger throughput around 43%. Since then, European and to a greater extent Asia Pacific airports have eroded that dominance and gained market share to achieve parity. In terms of passengers travelling through its regions airports, Europe, North America and Asia Pacific in 2011 have achieved equal market sizes.

Figure 1.8: Regional Distribution of Worldwide Airport Passenger Traffic




Source: ACI Worldwide Airport Traffic Report

Europe's market share has remained fairly constant in the last decade, hovering around 29% since 2000. During this period (2000-2011), European airports have increased passenger throughput at an average annual rate of 4.2%. When the blips and rebounds are ironed out, over 4% growth per year represents a solid achievement for a mature air transport market, indicating that saturation point is far from being reached and that stimulating further demand remains the core priority of the industry.

However, it seems rather paltry when compared to the meteoric growth recorded by Asia Pacific airports over the same time period. This regions' market share of total global airport passenger throughput increased from 18% in 2000 to 29% in 2011, on the back of 8.5% average growth per year (double that achieved by Europe's airports).

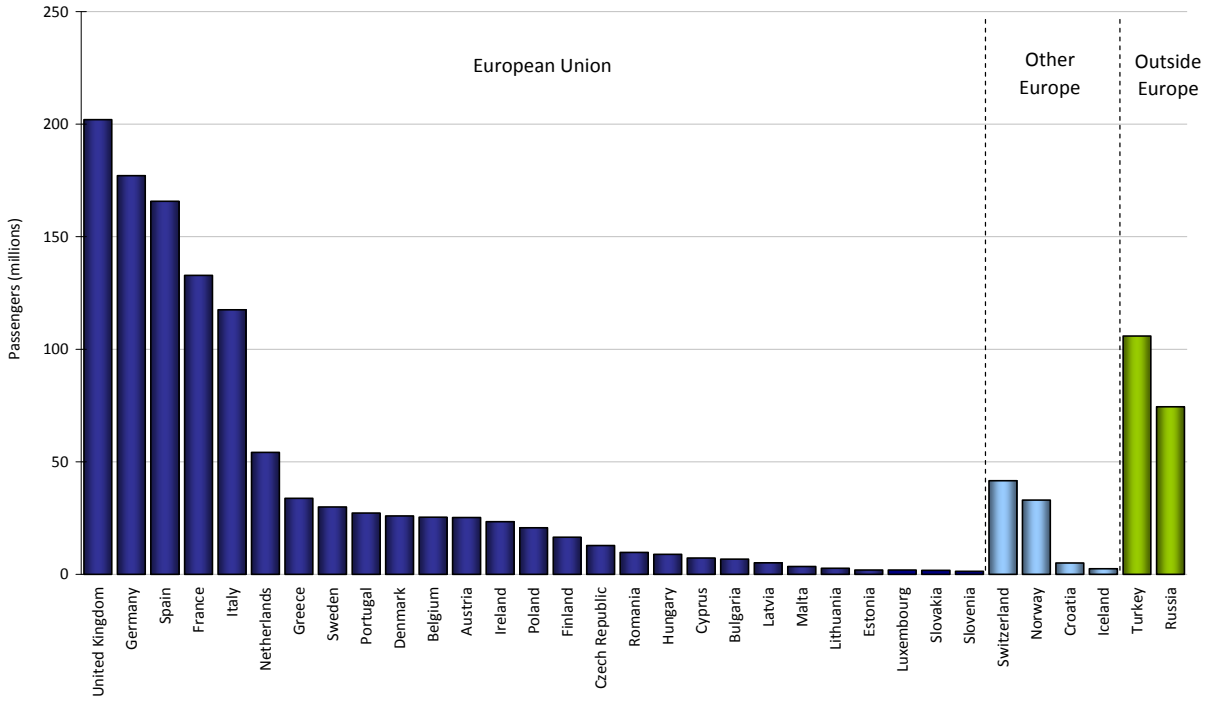
The market share gain made by Asia Pacific has been at the expense of North America. The saturated North American market has experienced sluggish growth between 2000 and 2011, growing at an average annual rate of 0.5%. Its market share reduced from 42% to 28% during this period.

This new power shift is set to continue with the Asia Pacific airports increasing in size and global importance, driven by the economic growth in China and India.

### 1.3.2 The European Air Transport Market

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

Figure 1.9: European Airport Passenger Traffic Throughput in 2011 by Country




Source: Eurostat (ACI for Turkey and Russia)

Based on Eurostat airport passenger data (Figure 1.9 and Table 1-5) it is evident that Europe is dominated by three key markets – the UK, Germany and Spain which combined accounted for nearly half of the European Union total – with a second tier comprising France and Italy. All of the leading EU nations posted solid growth in 2011, with the exception of Ireland, where continued low demand for air travel reflects ongoing economic challenges faced by the population. Passenger growth at Greek airports of 3.5% is an achievement in the face of unprecedented financial troubles impacting upon the country.

Observing the historical growth of passenger traffic, the UK is alone among the top markets in declining during the period 2005-2011, albeit only at an average annual rate of -0.3%. Ireland is the only other EU country to have experienced a loss of traffic volumes since 2005.

Table 1-5: Historical European Airport Passenger Traffic Throughput by Country (millions)

| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | % chg '11 v '10 | CAGR % 2005-2011 |
|---|---|---|---|---|---|---|---|---|---|
| United Kingdom | 205.4 | 212.6 | 218.6 | 214.9 | 199.2 | 193.5 | 202.0 | 4.4 | -0.3 |
| Germany | 148.1 | 156.4 | 165.9 | 167.8 | 160.6 | 168.8 | 177.1 | 4.9 | 3.0 |
| Spain | 140.9 | 148.0 | 163.0 | 162.2 | 149.0 | 153.9 | 165.7 | 7.6 | 2.7 |
| France | 108.0 | 113.2 | 120.3 | 122.7 | 117.6 | 126.3 | 132.8 | 5.2 | 3.5 |
| Italy | 89.7 | 98.0 | 108.7 | 106.5 | 103.3 | 110.7 | 117.5 | 6.1 | 4.6 |
| Netherlands | 46.7 | 48.9 | 50.8 | 50.7 | 46.7 | 48.9 | 54.2 | 10.8 | 2.5 |
| Greece | 30.8 | 32.8 | 34.8 | 35.1 | 33.4 | 32.6 | 33.8 | 3.5 | 1.5 |

| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | % chg '11 v '10 | CAGR % 2005-2011 |
|---|---|---|---|---|---|---|---|---|---|
| Sweden | 22.9 | 26.2 | 27.3 | 28.1 | 25.4 | 26.9 | 29.9 | 11.5 | 4.6 |
| Portugal | 20.2 | 21.5 | 24.1 | 24.8 | 23.8 | 25.4 | 27.2 | 7.1 | 5.1 |
| Denmark | 22.3 | 23.2 | 24.2 | 24.5 | 22.4 | 24.5 | 25.9 | 6.1 | 2.5 |
| Belgium | 17.9 | 19.3 | 21.0 | 22.3 | 21.7 | 23.0 | 25.4 | 10.2 | 6.0 |
| Austria | 20.0 | 21.1 | 23.1 | 24.1 | 22.0 | 23.7 | 25.3 | 6.7 | 4.0 |
| Ireland | 24.7 | 28.1 | 30.1 | 30.2 | 26.4 | 23.2 | 23.4 | 0.9 | -0.9 |
| Poland | 7.1 | 13.5 | 17.2 | 18.7 | 17.1 | 18.4 | 20.7 | 12.2 | 19.6 |
| Finland | 12.2 | 13.3 | 14.4 | 14.8 | 13.8 | 14.3 | 16.4 | 15.2 | 5.1 |
| Czech Republic | 11.4 | 12.3 | 13.3 | 13.6 | 12.6 | 12.4 | 12.8 | 3.2 | 2.0 |
| Romania | 3.6 | 4.9 | 7.0 | 8.1 | 8.0 | 8.9 | 9.8 | 9.5 | 17.9 |
| Hungary | 7.9 | 8.3 | 8.6 | 8.4 | 8.1 | 8.2 | 8.9 | 8.7 | 1.9 |
| Cyprus | 7.1 | 7.0 | 7.3 | 7.6 | 7.0 | 7.2 | 7.2 | -0.1 | 0.3 |
| Bulgaria * | : | : | 6.1 | 6.4 | 5.9 | 6.2 | 6.7 | 7.5 | 2.4 |
| Latvia | 1.9 | 2.5 | 3.2 | 3.7 | 4.1 | 4.7 | 5.1 | 9.5 | 18.1 |
| Malta | 2.8 | 2.7 | 3.0 | 3.1 | 2.9 | 3.3 | 3.5 | 6.5 | 4.1 |
| Lithuania | 1.5 | 1.8 | 2.2 | 2.6 | 1.9 | 2.3 | 2.7 | 15.9 | 10.9 |
| Estonia | 1.4 | 1.5 | 1.7 | 1.8 | 1.3 | 1.4 | 1.9 | 37.8 | 5.4 |
| Luxembourg | 1.5 | 1.6 | 1.6 | 1.7 | 1.5 | 1.6 | 1.8 | 14.4 | 3.0 |
| Slovakia | 1.6 | 2.2 | 2.3 | 2.6 | 2.0 | 1.9 | 1.8 | -3.9 | 2.5 |
| Slovenia | 1.3 | 1.4 | 1.5 | 1.7 | 1.4 | 1.4 | 1.4 | -1.7 | 1.4 |
| EU Total | 958.7 | 1,022.2 | 1,101.1 | 1,108.6 | 1,039.1 | 1,073.7 | 1141.0 | 6.3 | 2.9 |
| Switzerland | 29.3 | 32.3 | 34.8 | 36.8 | 36.1 | 37.7 | 41.6 | 10.1 | 6.0 |
| Norway | 23.2 | 25.9 | 27.9 | 29.0 | 28.1 | 30.0 | 33.0 | 9.9 | 6.1 |
| Croatia ** | : | : | : | 4.6 | 4.4 | 4.7 | 5.0 | 6.5 | 3.2 |
| Iceland | 2.1 | 2.3 | 2.5 | 2.2 | 1.9 | 2.1 | 2.5 | 19.3 | 2.7 |
| Russia | 37.0 | 41.2 | 71.6 | 79.1 | 54.4 | 66.9 | 74.4 | 11.2 | 12.3 |
| Turkey | 52.1 | 56.5 | 64.1 | 72.5 | 79.8 | 92.9 | 105.9 | 14.0 | 12.5 |

Source: Eurostat (ACI for Turkey and Russia) [*AAGR 2007-2011; ** AAGR 2008-2011]
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=avia_paoc&lang=en

Figure 1.10 shows the European Union Member States recording the highest growth in 2011 included Estonia (38%), Lithuania (16%) and Finland (15%), the former two being from a very small base but Finland's substantial growth was from an existing platform.

Finland's growth was driven by Helsinki's strong performance in 2011 (+15.5% versus 2010), as the airport expanded its network of destinations into Asia and North America[24]. Helsinki accounts for 90% of Finland's total air passenger traffic. Growth of air passenger traffic in Estonia was driven by Tallinn's significant increase in 2011. 11 new destinations were added and 2 new airlines started serving the airport to push

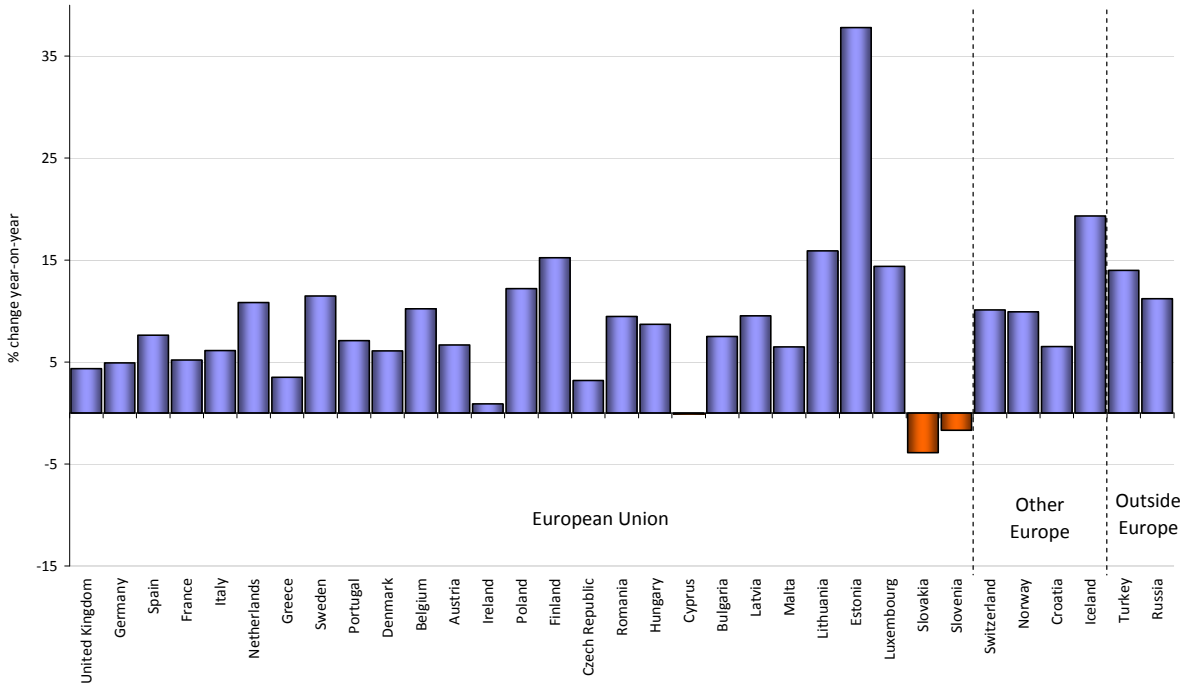
[24] Finavia – Record-breaking passenger volume at Helsinki Airport and at other Finavia airports: http://www.finavia.fi/press/pressreleases/finavia_releases/finavia_release?id=7979959

passenger throughput up to 1.9 million in the calendar year (+38% over 2010)[25]. Lithuania's growth was mainly attributable to Wizz Air opening a new base at Vilnius Airport in 2011.

Significant markets outside of the European Union but within the European Common Aviation Area include Switzerland and Norway, both of which achieved robust growth in 2011.

On the periphery of geographical Europe, Turkey continued to record significant growth of 14% in a market that has grown at an average annual rate of over 12% since 2005. Russia is growing at a similar pace.

Figure 1.10: European Airport Passenger Traffic Growth 2011 vs. 2010 by Country




Source: ACI Worldwide Airport Traffic Report

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; low cost carrier stimulation; 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 variation in growth at the top 30 airports in 2011 around the globe in mature and emerging markets.

[25] Tallinn Airport – 1.9 million passengers served in 2011:http://www.tallinn-airport.ee/eng/news/?archive=1&year=2012&newsID=6070

### 1.3.3 The Global Air Transport Market

#### Worldwide Airport Passenger Traffic

The top 30 global airports by passenger throughput in 2011 have been examined and are shown in Table 1-6 and Table 1.7 below, by passenger volume and growth year-on-year.

Table 1-6: Top 30 Global Airports by Passengers (millions) in 2011

| Rank | Airport | Region | 2011 | % chg |
|---|---|---|---|---|
| 1 | Atlanta (ATL) | N. America | 92.39 | 3.4 |
| 2 | Beijing (PEK) | Asia Pacific | 78.68 | 6.4 |
| 3 | London Heathrow (LHR) | Europe (EU) | 69.43 | 5.4 |
| 4 | Chicago (ORD) | N. America | 66.70 | -0.1 |
| 5 | Tokyo Haneda (HND) | Asia Pacific | 62.58 | -2.5 |
| 6 | Los Angeles (LAX) | N. America | 61.86 | 4.7 |
| 7 | Paris (CDG) | Europe (EU) | 60.97 | 4.8 |
| 8 | Dallas/Ft Worth (DFW) | N. America | 57.80 | 1.6 |
| 9 | Frankfurt (FRA) | Europe (EU) | 56.44 | 6.5 |
| 10 | Hong Kong (HKG) | Asia Pacific | 53.33 | 5.9 |
| 11 | Denver (DEN) | N. America | 52.85 | 1.2 |
| 12 | Jakarta (CGK) | Asia Pacific | 51.18 | 15.4 |
| 13 | Dubai (DXB) | Middle East | 50.98 | 8.0 |
| 14 | Amsterdam (AMS) | Europe (EU) | 49.76 | 10.0 |
| 15 | Madrid (MAD) | Europe (EU) | 49.64 | -0.4 |
| 16 | Bangkok (BKK) | Asia Pacific | 47.91 | 12.0 |
| 17 | New York (JFK) | N. America | 47.68 | 2.5 |
| 18 | Singapore (SIN) | Asia Pacific | 46.54 | 10.7 |
| 19 | Guangzhou (CAN) | Asia Pacific | 45.04 | 9.9 |
| 20 | Shanghai (PVG) | Asia Pacific | 41.45 | 2.1 |
| 21 | San Francisco (SFO) | N. America | 40.93 | 4.3 |
| 22 | Phoenix (PHX) | N. America | 40.59 | 5.3 |
| 23 | Las Vegas (LAS) | N. America | 40.56 | 2.0 |
| 24 | Houston (IAH) | N. America | 40.13 | -0.9 |
| 25 | Charlotte (CLT) | N. America | 39.04 | 2.1 |
| 26 | Miami (MIA) | N. America | 38.31 | 7.3 |
| 27 | Munich (MUC) | Europe (EU) | 37.76 | 8.8 |
| 28 | Kuala Lumpur (KUL) | Asia Pacific | 37.70 | 10.6 |
| 29 | Rome (FCO) | Europe (EU) | 37.65 | 3.9 |
| 30 | Istanbul (IST) | Europe (non-EU) | 37.41 | 16.3 |

Source: ACI Worldwide Airport Traffic Report

In terms of passenger volume, North American airports dominate the top 30 in the world with twelve airports recording 619 million passengers; Asia Pacific has nine airports with 464 million passengers; EU has eight airports with 399 million passengers; and the Middle East has one airport with 51 million passengers (Dubai).

Ranking these airports in terms of growth rates, however, shows that five out of the top ten are Asia Pacific airports. Seven out of the bottom ten airports are North American, reinforcing the trend that we pointed to earlier where a shift in focus has favoured the expansion of Asia Pacific airports.

Table 1.7: Top 30 Global Airports by Passenger Growth (%) in 2011

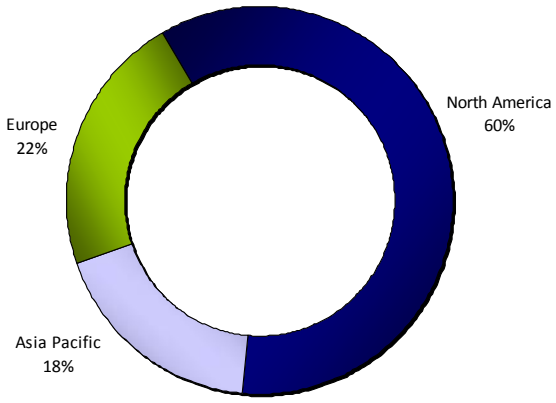
| Rank | Airport | Region | 2011 | % chg |
|---|---|---|---|---|
| 1 | Istanbul (IST) | Europe (non-EU) | 37.41 | 16.3 |
| 2 | Jakarta (CGK) | Asia Pacific | 51.18 | 15.4 |
| 3 | Bangkok (BKK) | Asia Pacific | 47.91 | 12.0 |
| 4 | Singapore (SIN) | Asia Pacific | 46.54 | 10.7 |
| 5 | Kuala Lumpur (KUL) | Asia Pacific | 37.70 | 10.6 |
| 6 | Amsterdam (AMS) | Europe (EU) | 49.76 | 10.0 |
| 7 | Guangzhou (CAN) | Asia Pacific | 45.04 | 9.9 |
| 8 | Munich (MUC) | Europe (EU) | 37.76 | 8.8 |
| 9 | Dubai (DXB) | Middle East | 50.98 | 8.0 |
| 10 | Miami (MIA) | N. America | 38.31 | 7.3 |
| 11 | Frankfurt (FRA) | Europe (EU) | 56.44 | 6.5 |
| 12 | Beijing (PEK) | Asia Pacific | 78.68 | 6.4 |
| 13 | Hong Kong (HKG) | Asia Pacific | 53.33 | 5.9 |
| 14 | London Heathrow (LHR) | Europe (EU) | 69.43 | 5.4 |
| 15 | Phoenix (PHX) | N. America | 40.59 | 5.3 |
| 16 | Paris (CDG) | Europe (EU) | 60.97 | 4.8 |
| 17 | Los Angeles (LAX) | N. America | 61.86 | 4.7 |
| 18 | San Francisco (SFO) | N. America | 40.93 | 4.3 |
| 19 | Rome (FCO) | Europe (EU) | 37.65 | 3.9 |
| 20 | Atlanta (ATL) | N. America | 92.39 | 3.4 |
| 21 | New York (JFK) | N. America | 47.68 | 2.5 |
| 22 | Shanghai (PVG) | Asia Pacific | 41.45 | 2.1 |
| 23 | Charlotte (CLT) | N. America | 39.04 | 2.1 |
| 24 | Las Vegas (LAS) | N. America | 40.56 | 2.0 |
| 25 | Dallas/Ft Worth (DFW) | N. America | 57.80 | 1.6 |
| 26 | Denver (DEN) | N. America | 52.85 | 1.2 |
| 27 | Chicago (ORD) | N. America | 66.70 | -0.1 |
| 28 | Madrid (MAD) | Europe (EU) | 49.64 | -0.4 |
| 29 | Houston (IAH) | N. America | 40.13 | -0.9 |
| 30 | Tokyo Haneda (HND) | Asia Pacific | 62.58 | -2.5 |

Source: ACI Worldwide Airport Traffic Report

### Historical Growth by World Region

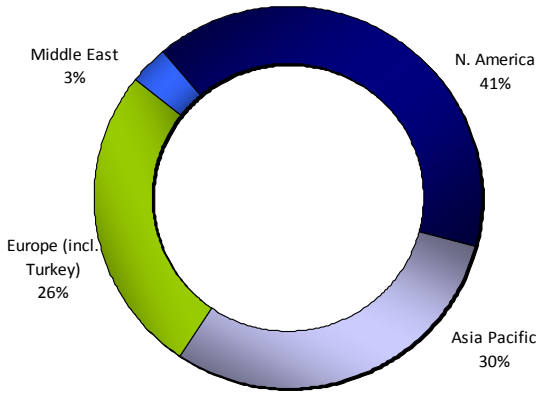
This has changed markedly from 2005 when North America dominated the top 30 global airports by passenger throughput, accounting for 60%. North America's decline has been Asia Pacific's gain, attaining a 30% market share of the top 30 global airports' passenger throughput in 2011 up from 18% in 2005.

Figure 1.11: Top 30 Global Airports by Passengers & Regional Share 2005




Source: ACI Worldwide Airport Traffic Report

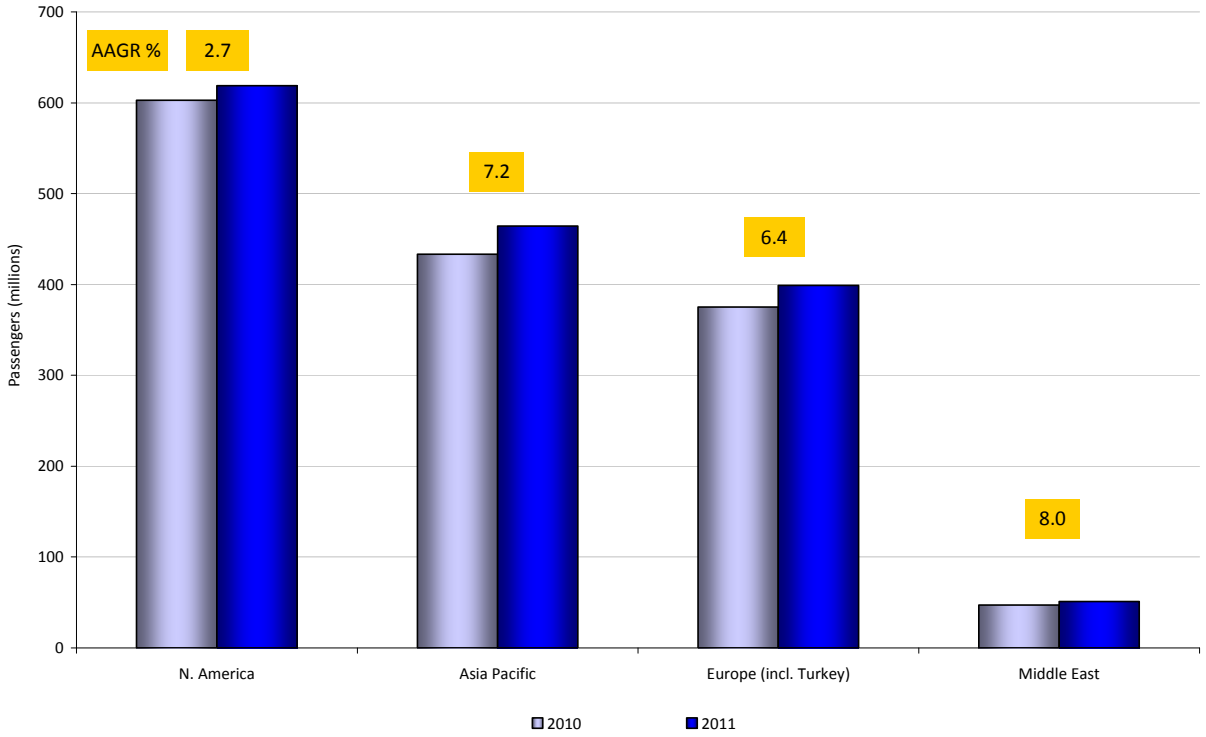
Figure 1.12: Top 30 Global Airports by Passengers & Regional Share 2011




Source: ACI Worldwide Airport Traffic Report

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, to a greater extent, the Asia Pacific region is far outpacing EU and North America, reflecting the maturity of the latter markets but also the continued shift in focus of economic growth to Asia, and an unconstrained operating environment in the Middle East nations.

Figure 1.13: Top 30 Global Airports by Passenger & by Region – Growth 2011 vs. 2010

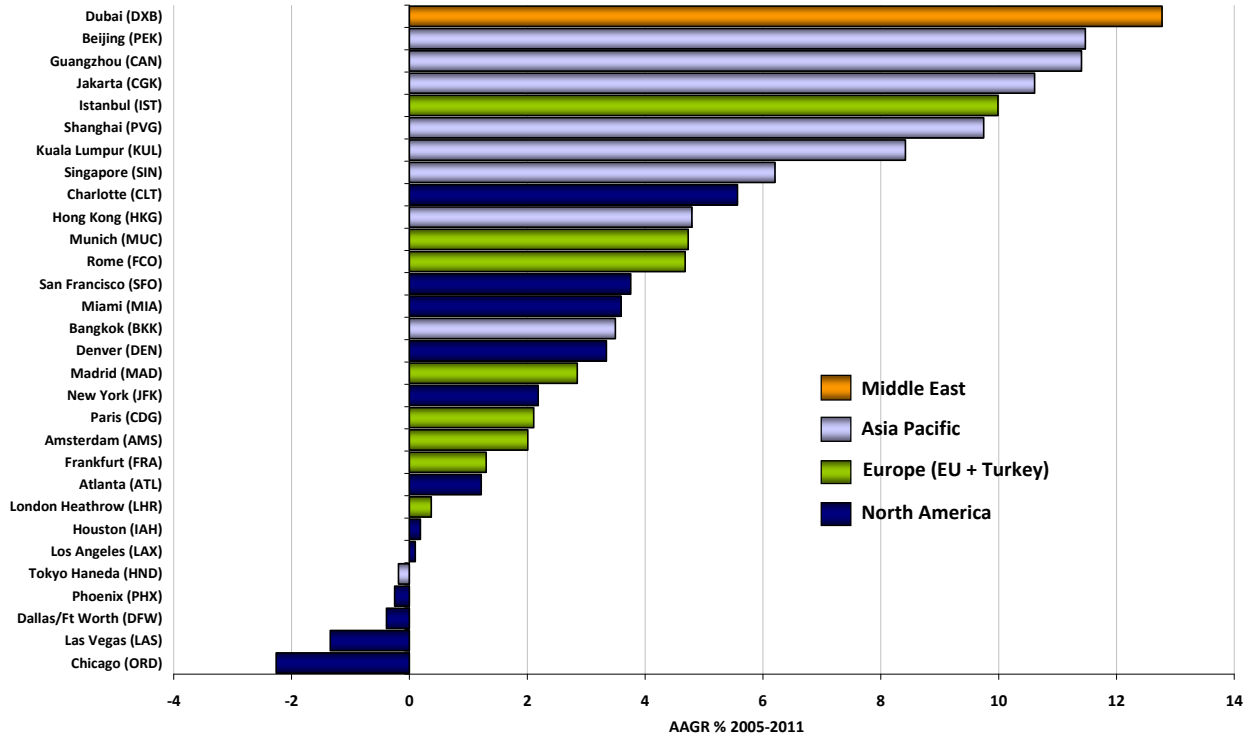



Source: ACI Worldwide Airport Traffic Report

## Historical Growth by Worldwide Airport

Delving into individual airport detail allows further analysis of where growth and decline was focused between 2005 and 2011. Figure 1.14 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 since 2005. Other Asia Pacific airports at Jakarta CGK, Singapore SIN and Hong Kong HKG are also in the top ten. The different colours in Figure 1.14 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 five airports that have recorded declining passenger traffic levels between 2005 and 2011, four are located in North America.

Figure 1.14: Top 30 Global Airports – Growth 2005 to 2011




Source: ACI

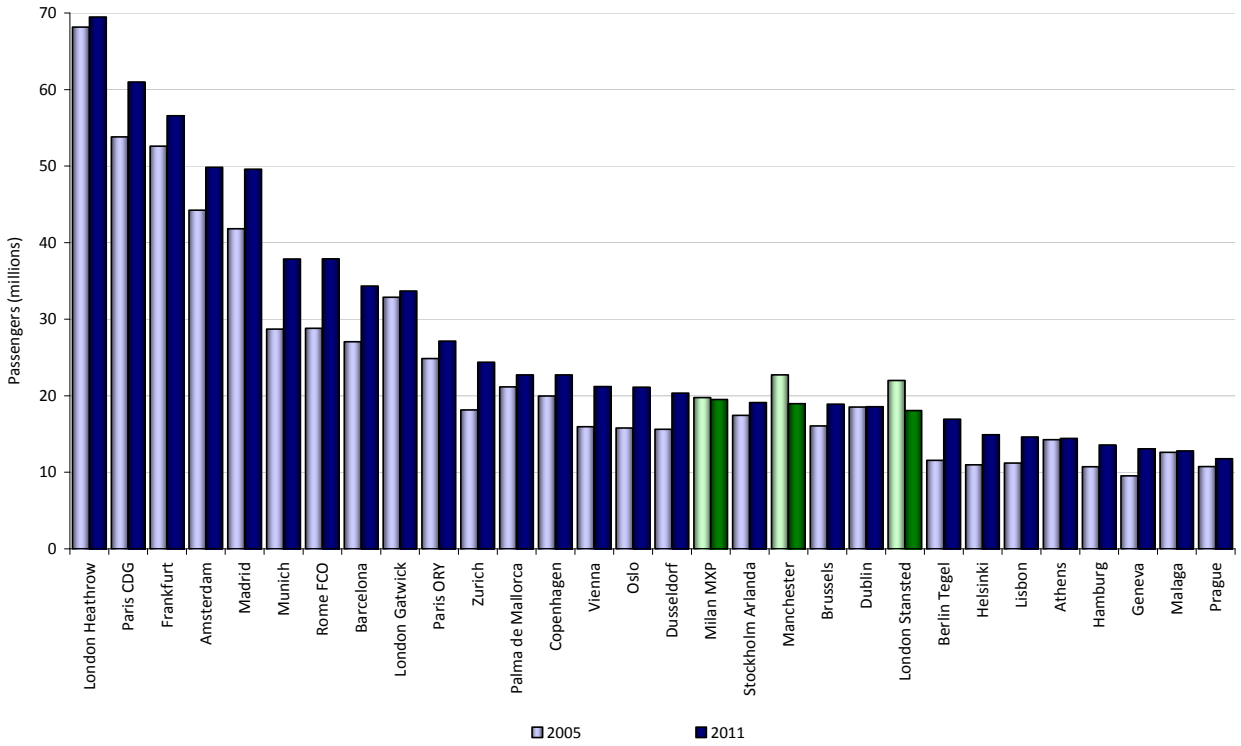
The prevailing reason for airport growth or decline is the underlying economic conditions in the origin country and, at an aggregate level, the region.

Asia Pacific is the growth region in terms of emerging economic strength and air travel demand increases in parallel 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 in the United States; and Istanbul IST, Rome FCO and Munich MUC 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 Eurostat, of the top 30 European airports by passenger throughput in 2011, only three have seen passenger volumes decline since 2005 (Figure 1.15). Two of those are major UK airports, reflective of the UK being a mature air transport market. Manchester Airports' decline is due 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 demand growth.

Figure 1.15: Top 30 European (ECAA) Airports by passengers in 2011 compared with 2005




Source: Eurostat (ACI 2011 figures for Paris CDG & ORY, Athens and Prague)

London Stansted and Milan Malpensa have also suffered from competition from nearby airports and to some extent a continuing over-reliance on LCCs to grow their traffic base. LCC passengers are more price sensitive and liable to seek cheaper destinations or forego air travel altogether, meaning this section of the market is very sensitive to cuts in disposable income resulting from the recent depressed economic environment in Europe.

Other instances where passenger growth at airports is reflective of general economic conditions of the host country are Dublin and Athens, where, respectively, 0.1% and 0.2% average annual growth rates have been impacted by the parlous state of the Irish and Greek economies.

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

| Rank | Airport | Country | 2005 | 2011 | AAGR % |
|---|---|---|---|---|---|
| 1 | London Heathrow | United Kingdom | 68.14 | 69.48 | 0.3 |
| 2 | Paris CDG | France | 53.80 | 60.97 | 2.1 |
| 3 | Frankfurt | Germany | 52.61 | 56.56 | 1.2 |
| 4 | Amsterdam | Netherlands | 44.22 | 49.84 | 2.0 |
| 5 | Madrid | Spain | 41.82 | 49.57 | 2.9 |
| 6 | Munich | Germany | 28.72 | 37.85 | 4.7 |
| 7 | Rome FCO | Italy | 28.83 | 37.90 | 4.7 |
| 8 | Barcelona | Barcelona | 27.04 | 34.34 | 4.1 |
| 9 | London Gatwick | United Kingdom | 32.86 | 33.70 | 0.4 |
| 10 | Paris ORY | France | 24.86 | 27.14 | 1.5 |
| 11 | Zurich | Switzerland | 18.15 | 24.38 | 5.0 |
| 12 | Palma de Mallorca | Spain | 21.17 | 22.71 | 1.2 |
| 13 | Copenhagen | Denmark | 19.96 | 22.71 | 2.2 |
| 14 | Vienna | Austria | 15.94 | 21.19 | 4.9 |
| 15 | Oslo | Norway | 15.79 | 21.11 | 5.0 |
| 16 | Dusseldorf | Germany | 15.61 | 20.34 | 4.5 |
| 17 | Milan MXP | Italy | 19.76 | 19.49 | -0.2 |
| 18 | Stockholm Arlanda | Sweden | 17.44 | 19.10 | 1.5 |
| 19 | Manchester | United Kingdom | 22.71 | 18.98 | -3.0 |
| 20 | Brussels | Belgium | 16.05 | 18.90 | 2.8 |
| 21 | Dublin | Ireland | 18.50 | 18.58 | 0.1 |
| 22 | London Stansted | United Kingdom | 22.01 | 18.05 | -3.2 |
| 23 | Berlin Tegel | Germany | 11.57 | 16.93 | 6.6 |
| 24 | Helsinki | Finland | 10.97 | 14.89 | 5.2 |
| 25 | Lisbon | Portugal | 11.21 | 14.61 | 4.5 |
| 26 | Athens | Greece | 14.27 | 14.43 | 0.2 |
| 27 | Hamburg | Germany | 10.74 | 13.57 | 4.0 |
| 28 | Geneva | Switzerland | 9.52 | 13.05 | 5.4 |
| 29 | Malaga | Spain | 12.61 | 12.78 | 0.2 |
| 30 | Prague | Czech Rep. | 10.76 | 11.76 | 1.5 |

Source: Eurostat (ACI 2011 figures for Paris CDG & ORY, Athens and Prague)

Outside of Europe 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 1.9), for different reasons. Russia has been very active in expanding bilateral air service agreements to cope with the surge in outbound air travel demand created by the Russian population's increasing propensity to fly, reflected in the two main Moscow airports' traffic growth, both nearly doubling since 2005.

Table 1.9: Major Competitor airports outside ECAA

| Airport | Country | 2005 | 2011 | AAGR % |
|---|---|---|---|---|
| Istanbul IST | Turkey | 21.13 | 37.41 | 10.0 |
| Antalya | Turkey | 15.98 | 25.10 | 7.8 |
| Moscow DME | Russia | 13.97 | 25.80 | 10.8 |

| Airport | Country | 2005 | 2011 | AAGR % |
|---|---|---|---|---|
| Moscow SVO | Russia | 12.15 | 22.56 | 10.9 |
| Istanbul SAW | Turkey | 1.02 | 13.69 | 54.2 |

Source: ACI Worldwide Airport Traffic Report

With reference to Turkey, the country has also witnessed significant 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. Istanbul's Sabiha Gokcen airport has undergone rapid expansion in the last five years as a low-cost alternative to Ataturk. Antalya has benefited from its ability to attract increasing volumes of visitors, being a prominent destination for international tourism.

### 1.3.4 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 (ATM) 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 2011, has been analysed in Table 1-10 below.

Table 1-10: Top 30 Global Airports Ranked by Passenger Volume – Passengers per ATM

| Rank | Airport Name | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | % chg 11 v 05 | % chg 11 v 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Atlanta (ATL) | 89 | 88 | 91 | 93 | 92 | 124 | 101 | 13.5 | -18.8 |
| 2 | Beijing (PEK) | 120 | 129 | 134 | 130 | 134 | 143 | 148 | 22.9 | 3.3 |
| 3 | London Heathrow (LHR) | 144 | 143 | 143 | 142 | 144 | 147 | 146 | 1.3 | -0.6 |
| 4 | Chicago (ORD) | 81 | 83 | 84 | 80 | 80 | 78 | 78 | -4.4 | 0.1 |
| 5 | Tokyo Haneda (HND) | 205 | 203 | 201 | 197 | 184 | 187 | 165 | -19.5 | -12.0 |
| 6 | Los Angeles (LAX) | 101 | 100 | 101 | 102 | 107 | 108 | 108 | 7.3 | 0.0 |
| 7 | Paris (CDG) | 105 | 107 | 110 | 110 | 112 | 118 | 120 | 14.8 | 1.7 |
| 8 | Dallas/Ft Worth (DFW) | 122 | 87 | 88 | 88 | 119 | 121 | 90 | -26.0 | -25.3 |
| 9 | Frankfurt (FRA) | 108 | 109 | 111 | 111 | 111 | 116 | 117 | 8.3 | 1.4 |
| 10 | Hong Kong (HKG) | 155 | 159 | 162 | 162 | 166 | 168 | 164 | 5.4 | -2.7 |
| 11 | Denver (DEN) | 79 | 81 | 82 | 83 | 83 | 83 | 85 | 7.0 | 1.4 |
| 12 | Jakarta (CGK) | 116 | 124 | 131 | 129 | 136 | 145 | 148 | 28.1 | 2.0 |
| 13 | Dubai (DXB) | 128 | 136 | 149 | 156 | 159 | 168 | 170 | 32.4 | 1.2 |

| Rank | Airport Name | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | % chg 11 v 05 | % chg 11 v 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 14 | Amsterdam (AMS) | 109 | 109 | 110 | 111 | 111 | 117 | 118 | 8.5 | 1.2 |
| 15 | Madrid (MAD) | 101 | 105 | 108 | 109 | 111 | 115 | 116 | 14.5 | 0.6 |
| 16 | Bangkok (BKK) | 145 | 153 | 158 | 157 | 159 | 161 | 160 | 9.9 | -0.6 |
| 17 | New York (JFK) | 123 | 119 | 109 | 110 | 112 | 119 | 118 | -3.6 | -0.5 |
| 18 | Singapore (SIN) | 159 | 164 | 166 | 163 | 155 | 159 | 154 | -2.9 | -3.3 |
| 19 | Guangzhou (CAN) | 112 | 113 | 119 | 120 | 120 | 125 | 130 | 15.8 | 3.7 |
| 20 | Shanghai (PVG) | 117 | 117 | 116 | 108 | 113 | 124 | 122 | 3.9 | -1.6 |
| 21 | San Francisco (SFO) | 99 | 99 | 106 | 106 | 107 | 110 | 110 | 11.1 | -0.1 |
| 22 | Phoenix (PHX) | 82 | 83 | 85 | 85 | 87 | 91 | 92 | 13.1 | 1.9 |
| 23 | Las Vegas (LAS) | 82 | 84 | 86 | 82 | 86 | 107 | 103 | 24.5 | -4.3 |
| 24 | Houston (IAH) | 73 | 73 | 74 | 75 | 76 | 79 | 79 | 9.5 | 0.9 |
| 25 | Charlotte (CLT) | 58 | 63 | 68 | 69 | 71 | 116 | 118 | 103.3 | 2.5 |
| 26 | Miami (MIA) | 83 | 86 | 88 | 92 | 98 | 96 | 98 | 18.5 | 2.2 |
| 27 | Munich (MUC) | 76 | 80 | 84 | 85 | 87 | 94 | 97 | 27.4 | 3.1 |
| 28 | Kuala Lumpur (KUL) | 128 | 132 | 138 | 131 | 132 | 140 | 141 | 9.8 | 0.7 |
| 29 | Rome (FCO) | 94 | 97 | 100 | 103 | 106 | 112 | 116 | 23.0 | 3.7 |
| 30 | Istanbul (IST) | 103 | 103 | 105 | 112 | 112 | 117 | 124 | 19.9 | 5.6 |

Source: ACI Worldwide Airport Traffic Report

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 2005 and 2011, passengers per movement remained broadly 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 the availability of slots are less of an issue; so there is more opportunity to accommodate growth of both short-haul and long-haul flights compared to Heathrow, 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, Jakarta and Guangzhou have experienced rapid passenger traffic growth in the last eight years – a reflection of the changing nature of these airports from regional hubs to international hubs, and the expansion of long-haul route networks utilising larger aircraft. A result of this has been significant growth in average aircraft size at these airports. Dubai in the Middle East has grown for ostensibly the same reasons, with base carrier Emirates operating an almost exclusively widebody aircraft fleet.

In terms of passengers per ATM, North American airports in Table 1-10 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, and the number of passengers per movement seems to have been in decline since 2005. 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 Chicago and Dallas/Fort Worth have 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.

## 1.4 Airline Passenger Traffic

### 1.4.1 Growth of Passenger Traffic in 2011

Due to data availability on airline traffic, this section addresses trends in airline traffic growth rather than reporting on absolute numbers.

IATA reported that in 2011 its member airlines recorded an increase in demand for scheduled air passenger traffic of 6.9%, lower than capacity growth of 8.2% over 2010 levels. In all regions except Latin America, capacity growth outstripped that of passenger demand.

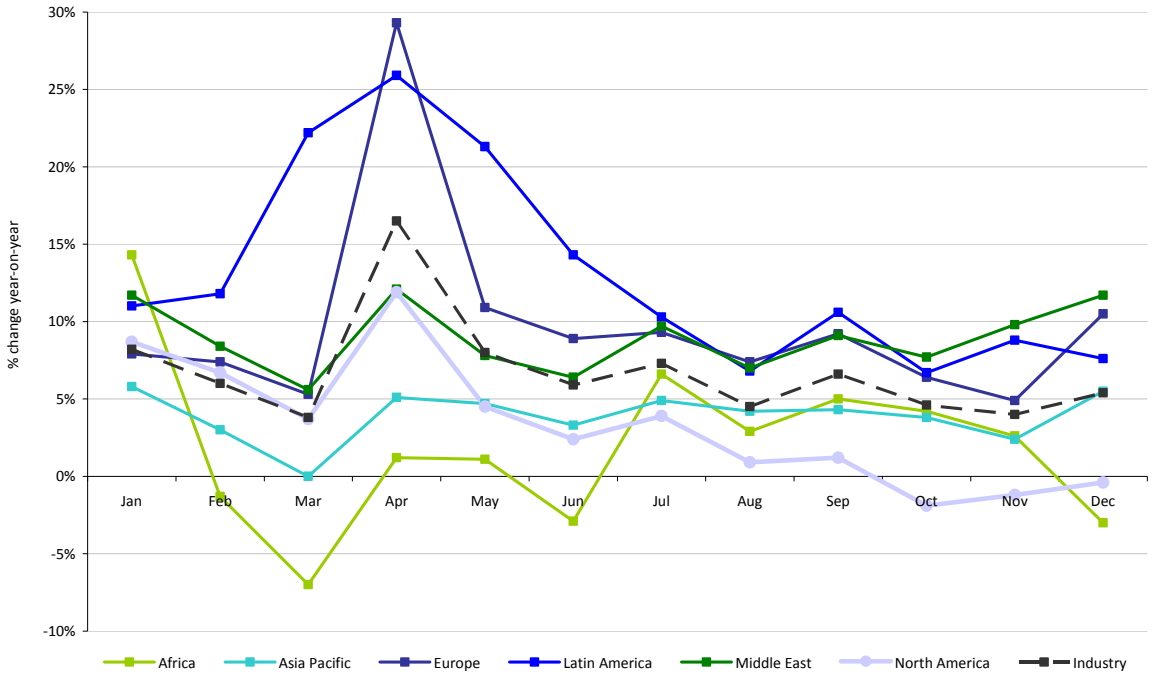
Table 1-11: Summary of Air Passenger Traffic growth by Region in 2011 vs. 2010

| | Africa | Asia Pacific | Europe | Latin America | Middle East | North America | Industry |
|---|---|---|---|---|---|---|---|
| Revenue Passenger Kilometres (RPK) | 2.3% | 4.1% | 9.5% | 10.2% | 8.9% | 4.0% | 6.9% |
| Available Seat Kilometres (ASK) | 4.4% | 6.4% | 10.2% | 9.2% | 9.7% | 6.0% | 8.2% |

Source: IATA

Overall demand for air travel in 2011 was solid despite the impact of the North African / Middle Eastern political turmoil in the first half of the year and the Japanese earthquake and tsunami in March, illustrated in Figure 1.16 by the depressed growth rates of African carriers from February through to June, and the dip experienced across all regions (except Latin America) in March. The spike in April year-on-year growth relates to the Icelandic volcano eruption in April 2010 that decimated that month's traffic growth rates.

Figure 1.16: Revenue Passenger Kilometre (RPK) growth of IATA Airlines by Region 2011 vs. 2010




Source: IATA

Traffic and capacity growth figures for European carriers in 2011 are slightly misleading due to the distorting impact of the airspace closures in April 2010, but nevertheless growth of 9.5% RPKs and 10.6% ASKs represents a solid year.

Latin American carriers saw the highest growth in RPKs (10.2%) across 2011, continuing the rapid expansion of its major carriers, including Brazilian flag carrier TAM due in large part to its home country's economic boom.

Traffic growth of Asia Pacific carriers slowed to 4.1% in 2011, with the region being affected directly by the Japanese tsunami and earthquake in March, and indirectly by reduced demand from the key markets of Europe and North America.

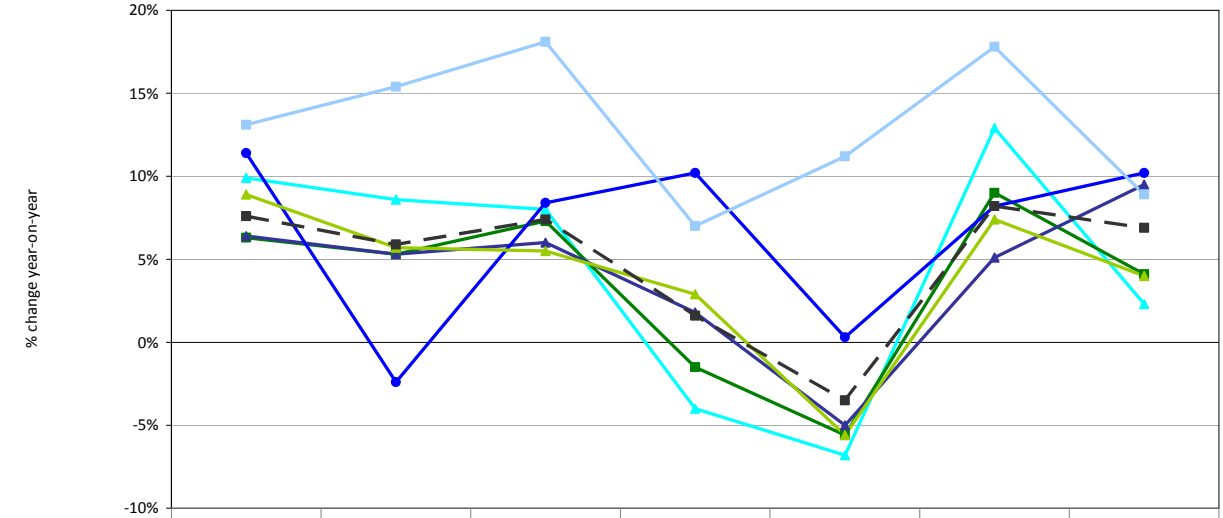
North American carriers recorded lower than industry average traffic growth of 4% in 2011. This is nonetheless solid, although it signals a slowdown over 2010 growth, due to volatility in the U.S. economy affecting business confidence and high unemployment levels influencing consumer spending. The continued 'Euro-crisis' also impacted on U.S. Majors on transatlantic volumes.

Middle Eastern carriers sustained high growth rates (8.9% RPKs; 9.7% ASKs) in 2011, determined largely by the aggressive expansion of the top 3 airlines in the region – Emirates, Etihad and Qatar.

African carriers experienced slow traffic growth in 2011 (2.3%), impacted in large part by the uprisings in the north of the continent as major commercial centres such as Cairo, Tunis and Tripoli were effectively 'closed for business' for parts of the year.

### 1.4.2 Historical Growth in Passenger Traffic

Figure 1.17: Historical RPKs by Region




| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|
| Africa | 9.9% | 8.6% | 8.0% | -4.0% | -6.8% | 12.9% | 2.3% |
| Asia/Pacific | 6.3% | 5.3% | 7.3% | -1.5% | -5.6% | 9.0% | 4.1% |
| Europe | 6.4% | 5.3% | 6.0% | 1.8% | -5.0% | 5.1% | 9.5% |
| Latin America | 11.4% | -2.4% | 8.4% | 10.2% | 0.3% | 8.2% | 10.2% |
| Middle East | 13.1% | 15.4% | 18.1% | 7.0% | 11.2% | 17.8% | 8.9% |
| North America | 8.9% | 5.7% | 5.5% | 2.9% | -5.6% | 7.4% | 4.0% |
| Industry | 7.6% | 5.9% | 7.4% | 1.6% | -3.5% | 8.2% | 6.9% |

Source: IATA

Figure 1.17 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 six years from 2005.

### 1.4.3 The Top 30 Major Airlines Worldwide

From an analysis of 2011 traffic statistics of major global airlines from 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 1-12 below).

Table 1-12: Top 30 Global Airlines by Passenger Traffic (RPKs) in 2011 (billion)

| Rank | Airline | Region | RPKs (billions) | % chg |
|---|---|---|---|---|
| 1 | Delta Air Lines | North America | 310.2 | -0.2 |
| 2 | American Airlines | North America | 203.6 | 0.8 |
| 3 | Southwest Airlines | North America | 167.2 | 6.4 |
| 4 | Emirates | Middle East | 160.4 | 9.8 |
| 5 | United Airlines | North America | 160.4 | -2.8 |
| 6 | Lufthansa | Europe (EU) | 141.1 | 8.8 |
| 7 | Air France | Europe (EU) | 133.0 | 6.3 |

| Airline | Region | % chg |
|---|---|---|
| Turkish Airlines | Europe | 22.8 |
| Qatar Airways | Middle East | 17.5 |
| Ryanair | Europe (EU) | 14.6 |
| TAM Linhas Aereas | Latin America | 12.1 |
| Air Berlin | Europe (EU) | 11.0 |
| British Airways | Europe (EU) | 10.6 |
| Emirates | Middle East | 9.8 |

| Rank | Airline | Region | RPKs (billions) | % chg |
|---|---|---|---|---|
| 8 | Continental Airlines | North America | 132.2 | 3.0 |
| 9 | British Airways | Europe (EU) | 117.4 | 10.6 |
| 10 | Qantas | Asia Pacific | 106.8 | 6.0 |
| 11 | China Southern Airlines | Asia Pacific | 101.6 | 9.1 |
| 12 | China Eastern Airlines | Asia Pacific | 100.7 | 8.3 |
| 13 | US Airways | North America | 97.8 | 3.1 |
| 14 | Ryanair | Europe (EU) | 93.9 | 14.6 |
| 15 | Air China | Asia Pacific | 93.2 | 8.1 |
| 16 | Cathay Pacific | Asia Pacific | 90.3 | 3.3 |
| 17 | Singapore Airlines | Asia Pacific | 87.8 | 3.6 |
| 18 | Air Canada | North America | 87.3 | 4.5 |
| 19 | KLM | Europe (EU) | 82.0 | 7.9 |
| 20 | Korean Air | Asia Pacific | 64.9 | 7.1 |
| 21 | Qatar Airways | Middle East | 64.8 | 17.5 |
| 22 | easyJet | Europe (EU) | 61.3 | 9.3 |
| 23 | All Nippon Airways | Asia Pacific | 59.9 | 2.6 |
| 24 | Turkish Airlines | Europe | 58.9 | 22.8 |
| 25 | TAM Linhas Aereas | Latin America | 56.7 | 12.1 |
| 26 | Thai Airways | Asia Pacific | 55.3 | -0.7 |
| 27 | Air Berlin | Europe (EU) | 52.1 | 11.0 |
| 28 | Iberia | Europe (EU) | 51.3 | 0.1 |
| 29 | jetBlue | North America | 49.4 | 8.6 |
| 30 | Japan Airlines | Asia Pacific | 48.2 | -19.3 |

| Airline | Region | % chg |
|---|---|---|
| easyJet | Europe (EU) | 9.3 |
| China Southern Airlines | Asia Pacific | 9.1 |
| Lufthansa | Europe (EU) | 8.8 |
| jetBlue | North America | 8.6 |
| China Eastern Airlines | Asia Pacific | 8.3 |
| Air China | Asia Pacific | 8.1 |
| KLM | Europe (EU) | 7.9 |
| Korean Air | Asia Pacific | 7.1 |
| Southwest Airlines | North America | 6.4 |
| Air France | Europe (EU) | 6.3 |
| Qantas | Asia Pacific | 6.0 |
| Air Canada | North America | 4.5 |
| Singapore Airlines | Asia Pacific | 3.6 |
| Cathay Pacific | Asia Pacific | 3.3 |
| US Airways | North America | 3.1 |
| Continental Airlines | North America | 3.0 |
| All Nippon Airways | Asia Pacific | 2.6 |
| American Airlines | North America | 0.8 |
| Iberia | Europe (EU) | 0.1 |
| Delta Air Lines | North America | -0.2 |
| Thai Airways | Asia Pacific | -0.7 |
| United Airlines | North America | -2.8 |
| Japan Airlines | Asia Pacific | -19.3 |

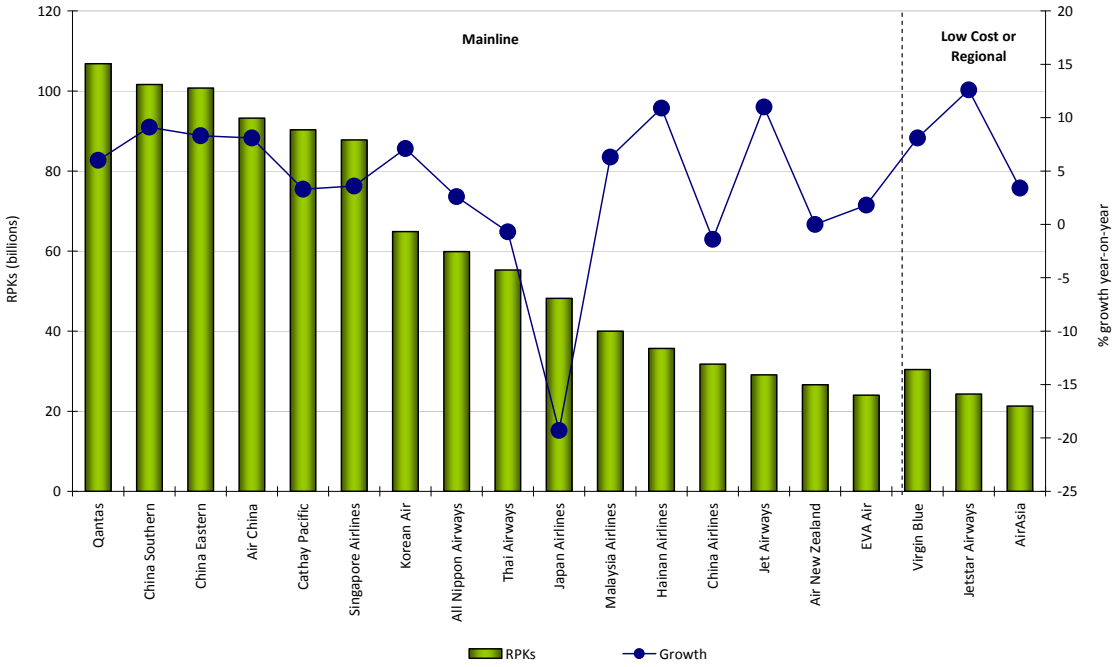
Source: Airline Business August 2012 edition (Left hand table ranked by RPK, right hand table by growth)

Although four of the top five airlines in the ranking by RPK volume are North American, the most notable development in 2011 is how far Emirates has closed the gap on the top carriers to now be considered a major global airline. Fellow Middle Eastern network carrier Qatar Airways also posted impressive growth of 17.5% in 2011. The three main Chinese airlines of China Southern, China Eastern and Air China are placed just outside the top 10 carriers by RPKs, but with continued strong growth will break into that group in the next couple of years. Japan Airlines' significant decline in the year stems from its exposure to the Japanese natural disaster and the knock-on effects.

### Asia Pacific – Major Airlines Growth in 2011

It will again be no surprise that the top three major Asia Pacific mainline carriers in terms of RPK growth in 2011 over 2010 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 also continue to grow significantly. Australian flag carrier Qantas remains the region's largest airline in 2011, although its hegemony is rapidly being challenged by the Chinese airlines.

Figure 1.18: Asia Pacific Airlines RPK Growth in 2011




Source: Airline Business August 2012 edition

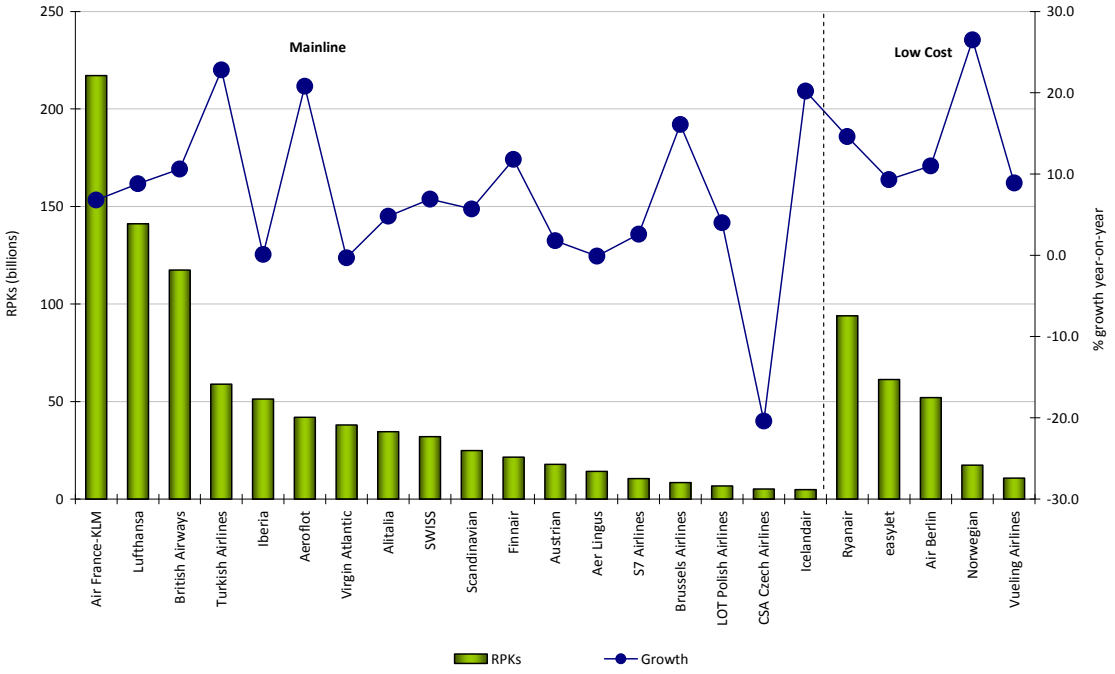
## Europe – Major Airlines Growth in 2011

In terms of growth, the major European mainline carriers presented a largely positive story in 2010. The big three network carriers in the region (Air France-KLM, Lufthansa, British Airways) recorded solid growth, with BA outperforming the other two following a poor 2010.

A familiar trend reappears with growth of Russian and Turkish operators outstripping the traditional legacy carriers in Europe, with Turkish Airlines and Aeroflot achieving 23% and 21% growth respectively. The European low cost sector collectively posted strong growth in traffic volume, with Norwegian Air Shuttle again recording impressive growth of over 25% in 2011, following 30% growth in 2010, giving credibility to the assumption that the low fares market in Europe is far from maturity or saturation.

The stand-out blip in Figure 1.19 belongs to CSA Czech Airlines, posting a decline in traffic of 20% in 2011, due the carriers' ongoing financial troubles and associated network cuts.

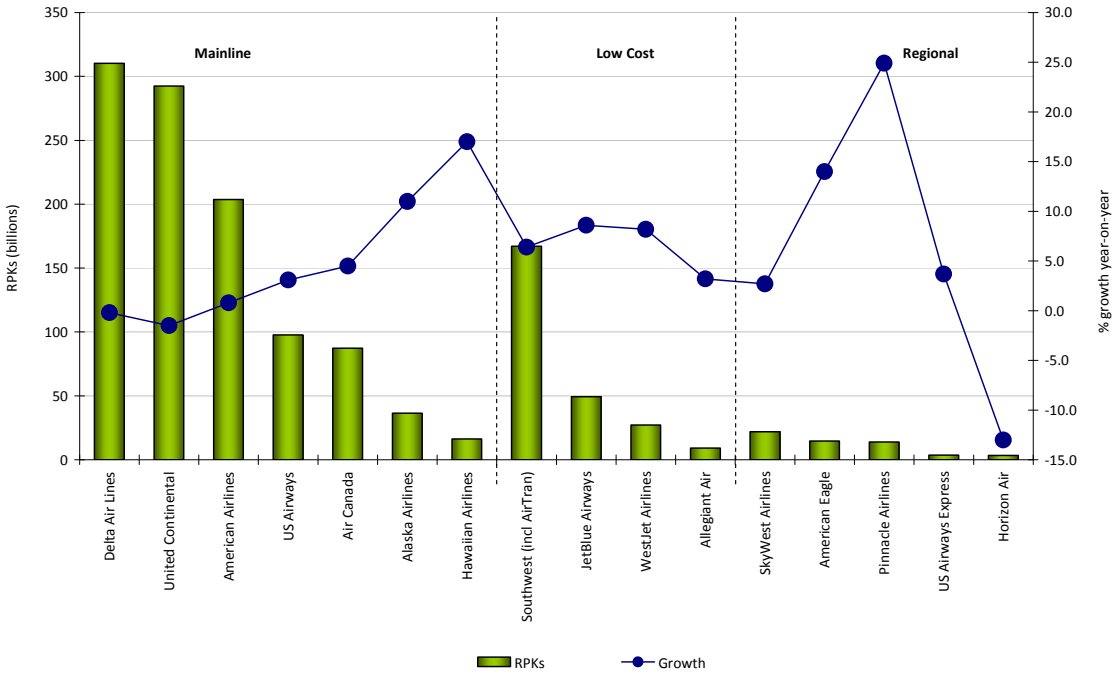
Figure 1.19: European Airlines RPK Growth in 2011




Source: Airline Business August 2012 edition

## North America – Major Airlines Growth in 2011

Figure 1.20: North American Airlines RPK Growth in 2011

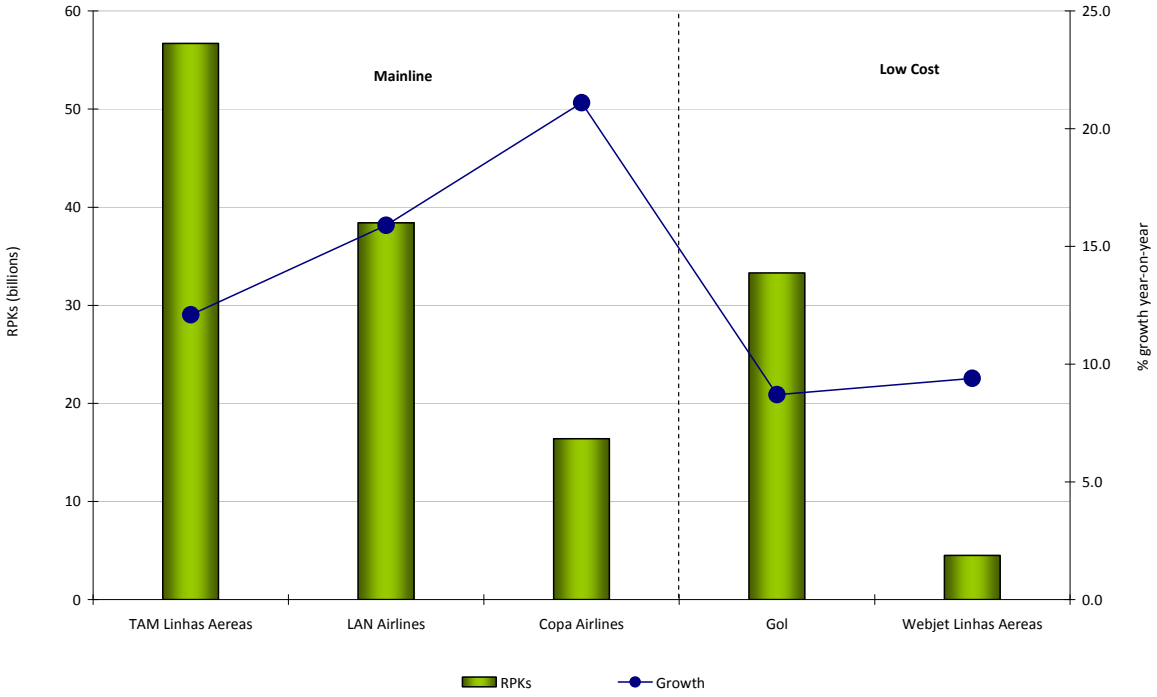



Source: Airline Business August 2012 edition

The North American major mainline carriers of Delta, United-Continental and American each reported fairly flat growth, but fellow U.S. Major US Airways fared better, with a steady 3% increase in 2011 traffic volume over 2010. The main growth sectors in 2011 were the regional and low cost markets, albeit carrying far less volumes than the mainline carriers. LCCs continue to bite into U.S. domestic market share at the expense of mainline operators.

### Latin America – Major Airlines Growth in 2011

Figure 1.21: Latin American Airline RPK Growth in 2011




Source: Airline Business August 2012 edition

The major Latin American carriers' rapid growth continued into 2011, with the largest carrier, Brazilian mainline operator TAM, posting over 12% growth, due in large part to the underlying economic conditions in Brazil and its international market dominance. Also benefiting from Brazil's increasing prosperity are the low cost carriers Gol and Webjet, both looking to secure increasing domestic market shares.

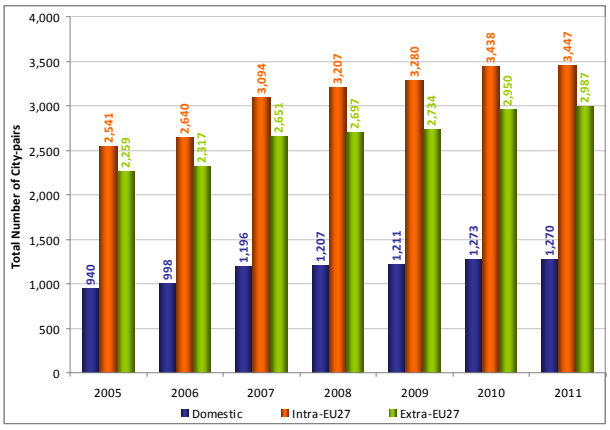
## 1.5 European Union (EU27) Route Competition

The level of competition on routes served from European Union (EU27) airports has evolved over recent history. An analysis of OAG data for EU airports, for the years 2005 to 2011 on Domestic, Intra-EU and Extra-EU routes, reveals differences by market in the number of carriers operating routes. For this analysis a route is defined as a service between two cities.

For context, Figure 1.22 shows that growth in the total number of routes served from EU airports has varied by market between 2005 and 2011, but not markedly. Overall, the total number of Domestic and Intra-EU

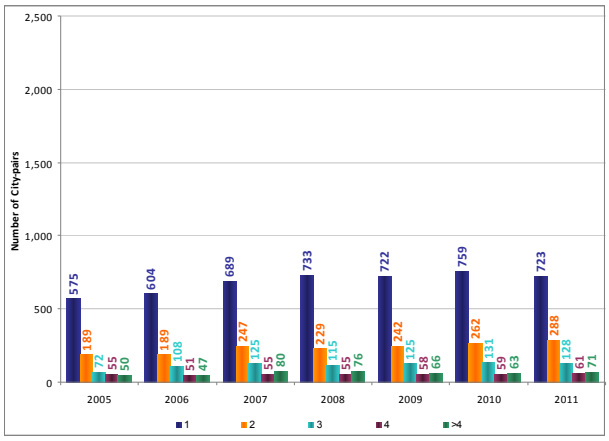
routes increased at an average annual rate of 5.1% and 5.2%, respectively, while Extra-EU routes expanded at a marginally lower level of 4.8% per year.

Figure 1.22: Total number of routes by market



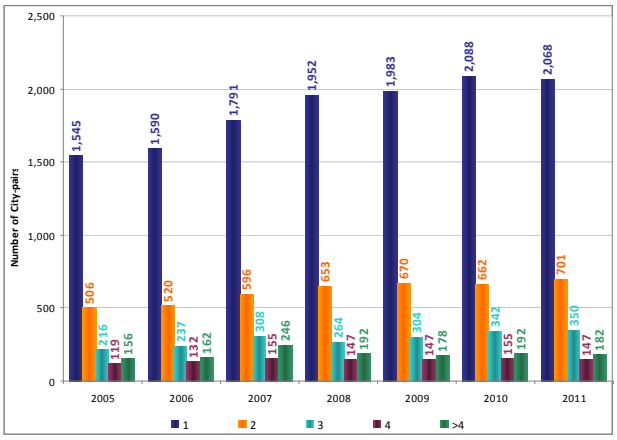

Source: OAG

Figure 1.23: Number of carriers on Domestic routes



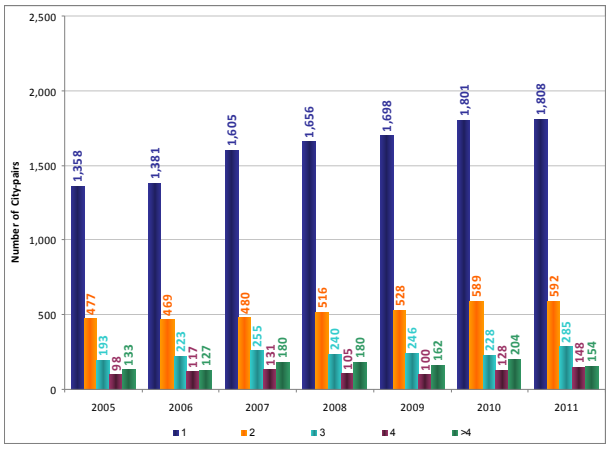

Source: OAG

Figure 1.24: Number of carriers on Intra-EU routes




Source: OAG

Figure 1.25: Number of carriers on Extra-EU routes




Source: OAG

Focussing on competition, Figure 1.23, Figure 1.24 and Figure 1.25 show the number of carriers operating on routes by market. The level of routes with only one carrier in service is high regardless of market. These routes account for over half of the total across Domestic, Intra-EU and Extra-EU markets, and have remained around this mark between 2005 and 2011. Actual growth in number of routes with one carrier has been high in each of the markets since 2005, but a flattening trend has been witnessed in latter years reflecting adverse economic conditions dampening overall demand for air travel in Europe in general.

Growth in the number of routes with only one carrier reflects the amount of 'thin' routes linking smaller markets inside and outside of the expanding European Union that can only support one airline.

Table 1.13, Table 1.14 and Table 1.15 highlight the share of routes with one carrier, duopoly and oligopoly routes of the total in the three separate markets – Domestic, Intra-EU and Extra-EU.

Table 1.13: Competition on Domestic routes at EU27 airports

| No. of Carriers | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | AAGR % |
|---|---|---|---|---|---|---|---|---|
| 1 | 61.1% | 60.5% | 57.6% | 60.7% | 59.6% | 59.6% | 56.9% | 3.9% |
| 2 | 20.1% | 18.9% | 20.7% | 18.9% | 20.0% | 20.6% | 22.7% | 7.3% |
| 3 | 7.6% | 10.8% | 10.5% | 9.5% | 10.3% | 10.3% | 10.0% | 10.1% |
| 4 | 5.9% | 5.1% | 4.6% | 4.5% | 4.8% | 4.6% | 4.8% | 1.7% |
| >4 | 5.3% | 4.7% | 6.7% | 6.3% | 5.4% | 4.9% | 5.6% | 5.9% |
| ≤2 | 81.2% | 79.4% | 78.3% | 79.7% | 79.6% | 80.2% | 79.6% | 4.8% |
| ≥3 | 18.8% | 20.6% | 21.7% | 20.3% | 20.4% | 19.8% | 20.4% | 6.6% |

Table 1.14: Competition on Intra-EU27 routes at EU27 airports

| No. of Carriers | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | AAGR % |
|---|---|---|---|---|---|---|---|---|
| 1 | 60.8% | 60.2% | 57.9% | 60.9% | 60.4% | 60.7% | 60.0% | 5.0% |
| 2 | 19.9% | 19.7% | 19.2% | 20.3% | 20.4% | 19.3% | 20.3% | 5.6% |
| 3 | 8.5% | 9.0% | 9.9% | 8.2% | 9.3% | 9.9% | 10.1% | 8.4% |
| 4 | 4.7% | 5.0% | 5.0% | 4.6% | 4.5% | 4.5% | 4.3% | 3.6% |
| >4 | 6.1% | 6.1% | 8.0% | 6.0% | 5.4% | 5.6% | 5.3% | 2.7% |
| ≤2 | 80.7% | 79.9% | 77.1% | 81.2% | 80.9% | 80.0% | 80.3% | 5.1% |
| ≥3 | 19.3% | 20.1% | 22.9% | 18.8% | 19.1% | 20.0% | 19.7% | 5.6% |

Table 1.15: Competition on Extra-EU27 routes at EU27 airports

| No. of Carriers | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | AAGR % |
|---|---|---|---|---|---|---|---|---|
| 1 | 60.1% | 59.6% | 60.5% | 61.4% | 62.1% | 61.1% | 60.5% | 4.9% |
| 2 | 21.1% | 20.2% | 18.1% | 19.1% | 19.3% | 20.0% | 19.8% | 3.7% |
| 3 | 8.5% | 9.6% | 9.6% | 8.9% | 9.0% | 7.7% | 9.5% | 6.7% |
| 4 | 4.3% | 5.0% | 4.9% | 3.9% | 3.7% | 4.3% | 5.0% | 7.1% |
| >4 | 5.9% | 5.5% | 6.8% | 6.7% | 5.9% | 6.9% | 5.2% | 2.5% |
| ≤2 | 81.2% | 79.8% | 78.6% | 80.5% | 81.4% | 81.0% | 80.3% | 4.6% |
| ≥3 | 18.8% | 20.2% | 21.4% | 19.5% | 18.6% | 19.0% | 19.7% | 5.6% |

Historically, in all of the three markets, monopoly and duopoly routes account for the vast majority of the total.

Routes with greater than 2 carriers in operation account for approximately 20% of the total in each market.

However, the highest growth in actual number of routes between 2005 and 2011 was experienced on oligopoly routes in the Domestic market (10.1% AAGR), indicating a trend of increased competition where the emphasis for carriers has been on competing on existing routes rather than stimulating new routes.

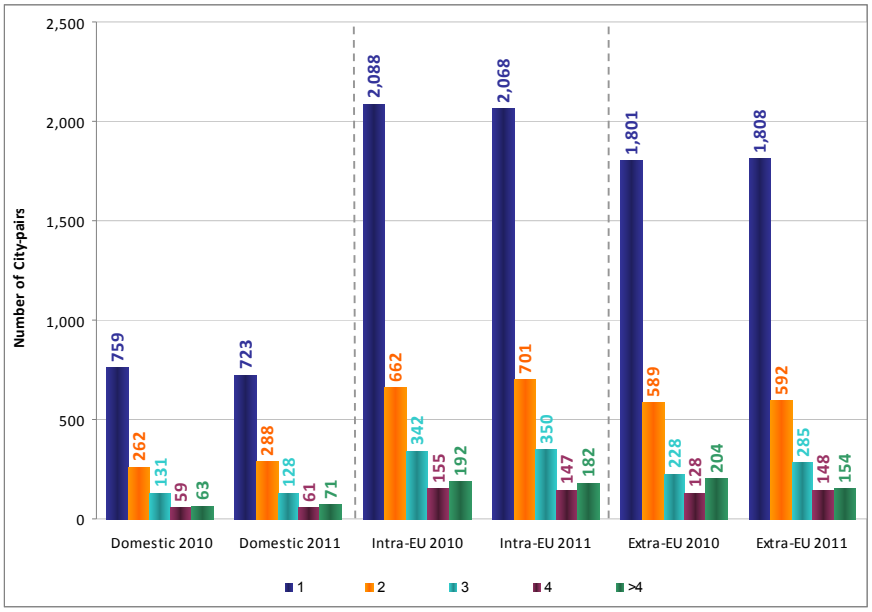
In the Intra-EU market, the total number of routes has grown faster than the other markets, which is an expected outcome of the introduction of the 'open market' European Union. However, routes with only one carrier and those with 2 or more carriers in operation have grown at a roughly equal pace, suggesting that carriers are creating demand by stimulating new routes *and* competing on existing routes.

In the Extra-EU market, growth in routes with only one carrier has outpaced that of routes with competition since 2005, perhaps a function of restrictive bilateral agreements with non-EU countries, but also carriers exploring new markets in Europe outside of the EU.

In all three of the markets, growth of routes with 3 or more carriers in operation has been higher than that of routes with 1 or 2 carriers, suggesting that growth of competition outpaced growth in the number of routes.

Figure 1.26 provides a closer look at competition in 2011 versus 2010, as well as giving a perception of scale between the markets. The markets largely illustrate the same broadly flat overall growth with some interesting nuances. In the Intra-EU market, the number of duopoly routes increased significantly, while in the Extra-EU market the number of routes with 3 and 4 carriers in competition jumped by around 20% at the same time as routes with greater than 4 carriers declined markedly.

Figure 1.26: Route competition by market, 2011 versus 2010

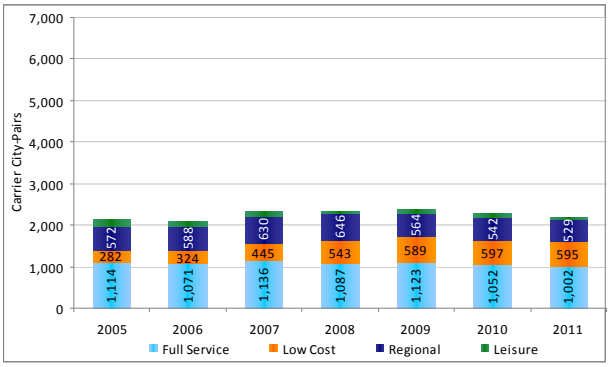



Source: OAG

## 1.6 Trends in Distribution of Supply by Carrier Type

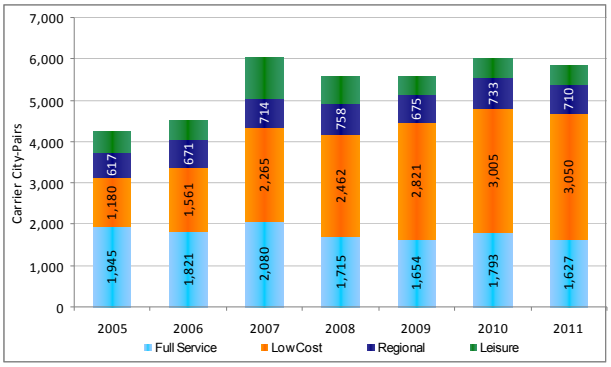
Analysing the distribution of supply by carrier type reveals some interesting trends. The figures below show number of routes operated at EU27 airports by type of airline, from 2005 to 2011, by market segment. On Domestic and Intra-EU routes, a trend of Low Cost Carriers competing with and usurping Full Service Airlines is evident from the OAG figures. A similar trend is exhibited on Extra-EU routes, but not to the same degree, as Full Service Airlines have been increasing the number of routes on which they operate, in parallel with a rise in Low Cost activity in this market segment. This is primarily due to the regulatory regime still in many Extra-EU markets where bilateral agreements restrict market entries.

Figure 1.27: Domestic routes by carrier type [26]



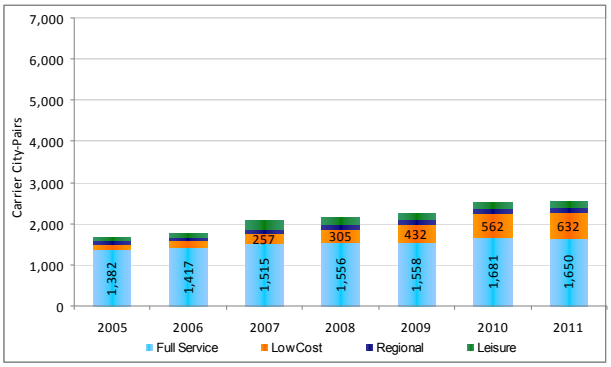

Source: OAG

Figure 1.28: Intra-EU routes by carrier type




Source: OAG

Figure 1.29: Extra-EU routes by carrier type




Source: OAG

If we compare the total number of carrier route-pairs by market in the figures above with the total number of routes by market (displayed in 1.1), the inference is that on many of the routes where more than one carrier is in operation the competition exists *between* carrier types. This seems to be more evident on Domestic and Intra-EU routes than on Extra-EU routes. The implication here is that on duopoly and oligopoly Domestic and Intra-EU routes, LCCs, FSCs and Regional carriers go head-to-head more regularly than is the case on Extra-EU services.

Table 1.16: Domestic routes by carrier type

| Domestic | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | AAGR % |
|---|---|---|---|---|---|---|---|---|
| Full Service | 53% | 51% | 49% | 46% | 47% | 46% | 46% | -1.7% |
| Low Cost | 13% | 15% | 19% | 23% | 25% | 26% | 27% | 13.3% |
| Regional | 27% | 28% | 27% | 27% | 24% | 24% | 24% | -1.3% |
| Leisure | 7% | 5% | 5% | 3% | 4% | 4% | 3% | -13.4% |

[26] Leisure carriers included in the OAG Flight Guide are defined as primarily those charter airlines operating scheduled services to holiday destinations on behalf of tour operators.

Table 1.17: Intra-EU27 routes by carrier type

| Intra-EU | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | AAGR % |
|---|---|---|---|---|---|---|---|---|
| Full Service | 46% | 40% | 34% | 31% | 30% | 30% | 28% | -2.9% |
| Low Cost | 28% | 34% | 38% | 44% | 51% | 50% | 52% | 17.2% |
| Regional | 15% | 15% | 12% | 14% | 12% | 12% | 12% | 2.4% |
| Leisure | 12% | 10% | 16% | 11% | 8% | 8% | 8% | -1.1% |

Table 1.18: Extra-EU27 routes by carrier type

| Extra-EU | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | AAGR % |
|---|---|---|---|---|---|---|---|---|
| Full Service | 83% | 79% | 72% | 72% | 69% | 67% | 65% | 3.0% |
| Low Cost | 8% | 10% | 12% | 14% | 19% | 22% | 25% | 30.8% |
| Regional | 5% | 5% | 5% | 6% | 5% | 5% | 5% | 4.8% |
| Leisure | 5% | 5% | 11% | 8% | 6% | 6% | 6% | 11.9% |

Historically, the Low Cost Carrier segment has been the major growth area across all markets. On Domestic routes, LCCs now compete on 27% of the total, up from 13% in 2005. Market share has been prised from Full Service and Regional carriers alike.

On Intra-EU operations the growth in LCCs has been explosive since 2005, with market share increasing from 28% to 52% in 2011. This implies that LCCs compete on over half the total routes between EU nations. Part of this growth has been at the expense of Full Service carriers, but there has also been a significant stimulation of demand in this market overall due to LCC growth.

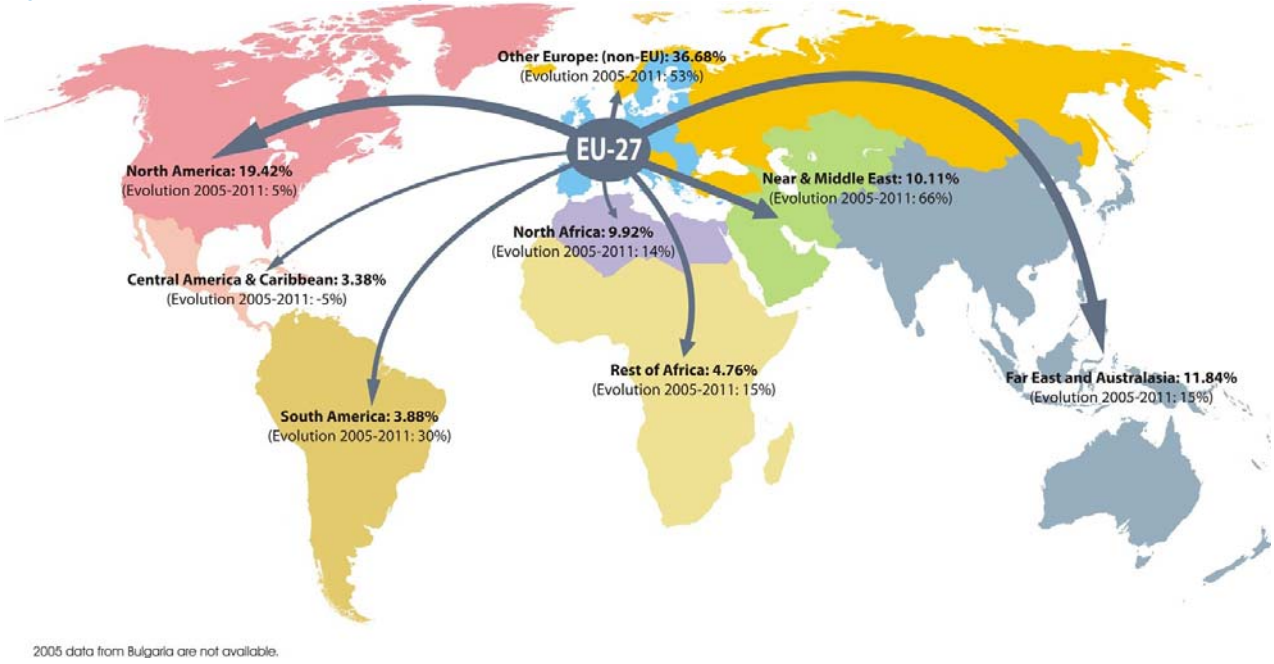
This trend is also evident on Extra-EU services, although the rise in LCC activity has mainly been on routes where only one carrier operates, i.e. LCCs starting up new routes.

## 1.7 European Union air traffic flows

Figure 1.30 shows the market share of international passenger flows from the European Union, and the associated growth between 2005 and 2011. EU-27 to Other Europe (Non-EU) is the largest international market with a 37% share and has grown by 53% since 2005. The fastest-growing market for air passenger traffic from the EU between 2005 and 2011 was the Near & Middle East, with overall growth of 66%.

Figure 1.31 illustrates the market share of international air cargo traffic flows from the EU. Asia-Pacific (Far East and Australasia) is the dominant market, commanding a 35% share having expanded by 33% between 2005 and 2011. The fastest-growing market for air cargo, however, is Other Europe (Non-EU), increasing by 83% since 2005, albeit the overall size of this market is relatively small.

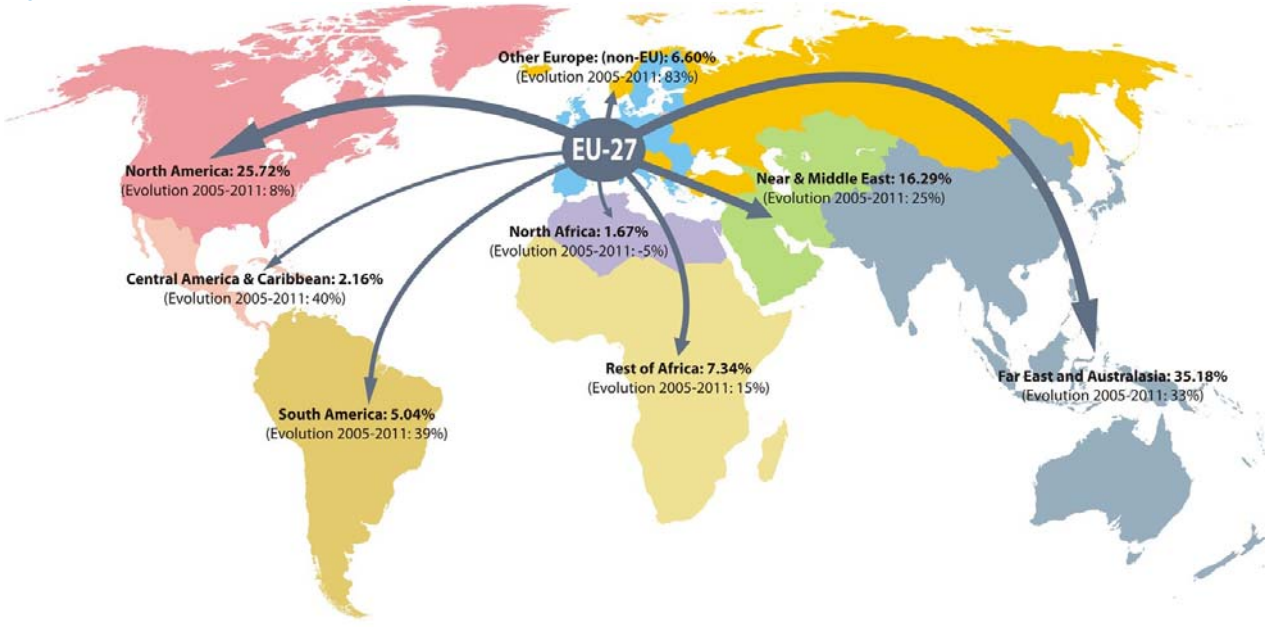
Figure 1.30: EU-27 worldwide passenger traffic flows




2005 data from Bulgaria are not available.

Source: Eurostat

Figure 1.31: EU-27 worldwide air cargo traffic flows




2005 data from Bulgaria are not available.

Source: Eurostat

## 1.8 Major Carriers at EEA airports

Table 1.19 displays the top 25 carriers by available seat capacity at EEA airports. According to OAG, the airline supplying the highest seat capacity at EEA airports in 2011 was the Irish Low Cost Carrier Ryanair, offering over 90 million seats, achieving growth of 3.7% over the previous year.

Table 1.19: Departing seat capacity by airline at all reporting EEA airports, 2010 vs 2011

| | | | | Seats (millions) | | |
|---|---|---|---|---|---|---|
| | Carrier | Country | Carrier Type | 2010 | 2011 | % chg |
| 1 | Ryanair | Ireland | Low Cost | 87.33 | 90.54 | 3.7% |
| 2 | Air France-KLM | France/Netherlands | Full-Service | 83.12 | 86.18 | 3.7% |
| 3 | Lufthansa | Germany | Full-Service | 77.37 | 82.66 | 6.8% |
| 4 | easyJet | UK | Low Cost | 54.09 | 56.96 | 5.3% |
| 5 | British Airways | UK | Full-Service | 35.63 | 36.49 | 2.4% |
| 6 | SAS Scandinavian | Sweden | Full-Service | 31.42 | 32.35 | 3.0% |
| 7 | Air Berlin | Germany | Low Cost | 36.50 | 32.21 | -11.8% |
| 8 | Iberia | Spain | Full-Service | 33.97 | 28.93 | -14.8% |
| 9 | Alitalia | Italy | Full-Service | 25.59 | 26.74 | 4.5% |
| 10 | Norwegian Air Shuttle | Norway | Low Cost | 18.16 | 20.99 | 15.6% |
| 11 | Vueling Airlines | Spain | Low Cost | 15.43 | 16.40 | 6.3% |
| 12 | Aer Lingus | Ireland | Low Cost | 13.35 | 13.50 | 1.1% |
| 13 | Austrian | Austria | Full-Service | 13.02 | 13.10 | 0.6% |
| 14 | Flybe | UK | Regional | 12.90 | 12.87 | -0.2% |
| 15 | Wizz Air | Hungary | Low Cost | 10.96 | 12.24 | 11.7% |
| 16 | TAP Air Portugal | Portugal | Full-Service | 11.57 | 11.65 | 0.7% |
| 17 | Finnair | Finland | Full-Service | 9.75 | 10.56 | 8.4% |
| 18 | Air Europa | Spain | Leisure | 9.96 | 9.71 | -2.5% |
| 19 | germanwings | Germany | Low Cost | 10.24 | 9.68 | -5.5% |
| 20 | Thomson Airways | UK | Leisure | 8.96 | 9.33 | 4.1% |
| 21 | Spanair | Spain | Low Cost | 9.96 | 9.26 | -7.1% |
| 22 | Aegean Airlines | Greece | Full-Service | 8.30 | 8.40 | 1.3% |
| 23 | Brussels Airlines | Belgium | Full-Service | 7.57 | 8.02 | 5.9% |
| 24 | SWISS | Switzerland | Full-Service | 7.29 | 7.62 | 4.5% |
| 25 | Meridiana | Italy | Regional | 8.63 | 6.60 | -23.5% |

Source: OAG

The figures provide evidence of a 'tier' structure among airlines operating at EEA airports. It is clear to see that the top 3 – Ryanair, Air France-KLM and Lufthansa – are out on their own in terms of vying for supremacy in Europe. A secondary tier – in relation to available seat capacity – would include the likes of easyJet, British Airways, SAS, Air Berlin, Iberia, Alitalia and Norwegian Air Shuttle, which make up the top 10 airlines in the ranking. If IAG – the parent group of BA and Iberia – was represented in the table, it would sit in 4$^{th}$ place with a combined seat capacity of over 65 million in 2011.

Of the top 10 carriers, there have been some marked differences in growth achieved in 2011. Most notable perhaps is the significant declines experienced by Air Berlin and Iberia. Air Berlin has been beset with

financial problems and scaled back capacity accordingly, while Iberia has been suffering since its home market of Spain has been dealing with the economic crisis and associated high unemployment rate, suppressing demand for air travel. It is for the same reasons that Spanish leisure carrier Air Europa and LCC Spanair struggled in 2011, recording declines in seat capacity of -2.5% and -7.1% respectively.

Notable growth was achieved by Lufthansa (6.8%) and LCC's Norwegian Air Shuttle (15.6%) and Wizz Air (11.7%).

As illustrated in Table 1.20, on balance solid growth was achieved across the Low Cost and Full Service carrier segments. The decline recorded in the Regional carrier segment is mostly attributable to Meridiana, the Italian airline struggling against the backdrop of economic woes in its home market.

Table 1.20: Aggregated departing seat capacity by airline type at all reporting EEA airports, 2010 vs 2011

| Carrier Type | 2010 | 2011 | % chg |
|---|---|---|---|
| Low Cost | 256.01 | 261.78 | 2.3% |
| Full-Service | 344.59 | 352.71 | 2.4% |
| Regional | 21.52 | 19.47 | -9.5% |
| Leisure | 18.92 | 19.04 | 0.6% |

Source: OAG

## 1.9 Air Cargo Traffic Growth

### 1.9.1 Air Cargo by Global Region

This section addresses trends in air cargo traffic growth in 2011 rather than reporting on absolute numbers due to publicly sourced data from IATA.

Table 1-21: Summary of Air Cargo Traffic growth by Region in 2011 vs 2010

| | Africa | Asia Pacific | Europe | Latin America | Middle East | North America | Industry |
|---|---|---|---|---|---|---|---|
| Freight Tonne Kilometres (FTKs) % chg 2011 v 2010 | -1.2 | -4.8 | 1.5 | 5.5 | 8.2 | 1.5 | -0.6 |

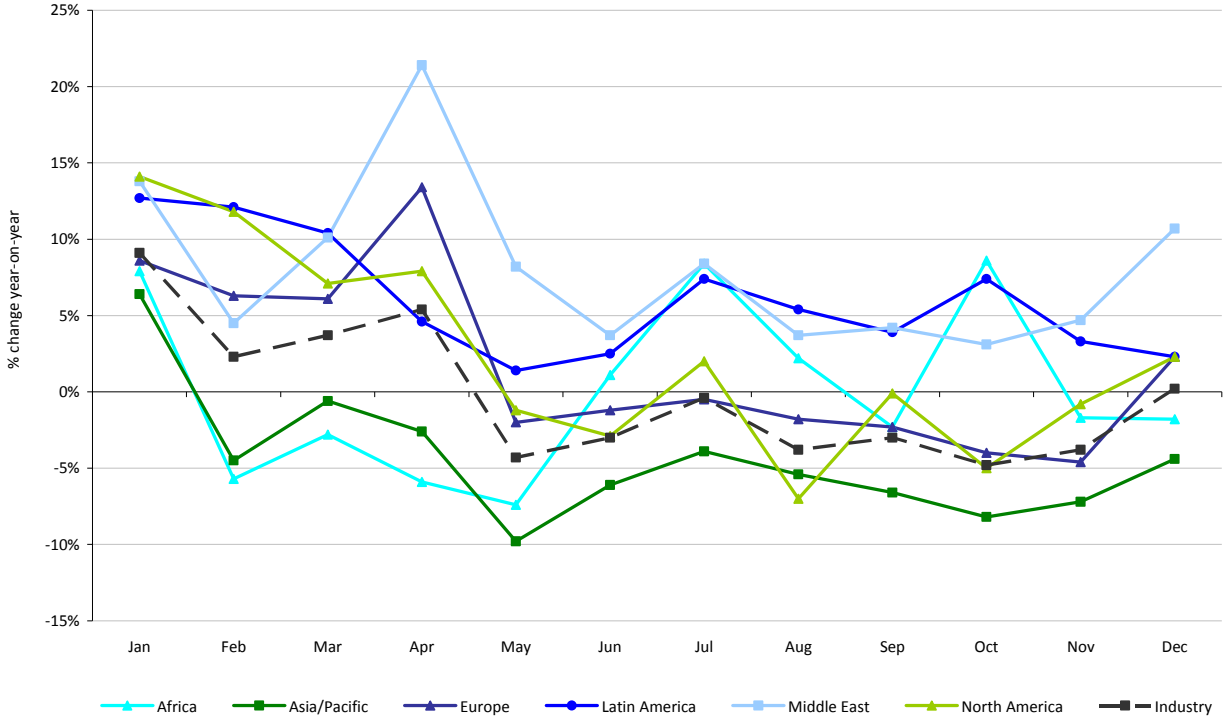
Source: IATA

According to IATA, its member airlines collectively recorded an air cargo decline – measured in Freight Tonne Kilometres (FTKs) – of nearly 1% in 2011 over 2010 levels, due in large part to a slowdown in export demand from Asia Pacific to its major consumption markets in Europe and North America. In simple terms, the economic conditions in Europe and the U.S. in particular have dampened demand in these markets for Chinese, Korean, Thai goods. This is illustrated by the almost 5% reduction in FTKs for Asia Pacific carriers in 2011, and a flat growth of 1.5% experienced by European and North American airlines. Asian airlines were also the ones most severely affected by the Japanese natural disaster in March and the proceeding months.

The decline witnessed by African carriers (-1.2% FTKs) is – again – attributable to the troubles experienced in the north of the African continent in the first half of 2011 especially. Latin America remained fairly insulated from the adverse trading conditions afflicting Europe, North America and Asia, as the freight airline sector posted 5.5% growth, driven mainly by LAN Airlines expansion. The Middle Eastern airlines

recorded the highest growth in 2011 of 8.2% year-on-year on the back of the ever-growing fleet of widebody aircraft in the region, operated by Emirates, Qatar and Etihad.

Figure 1.32: Freight Tonne Kilometre (FTK) Growth by Region 2011 vs. 2010



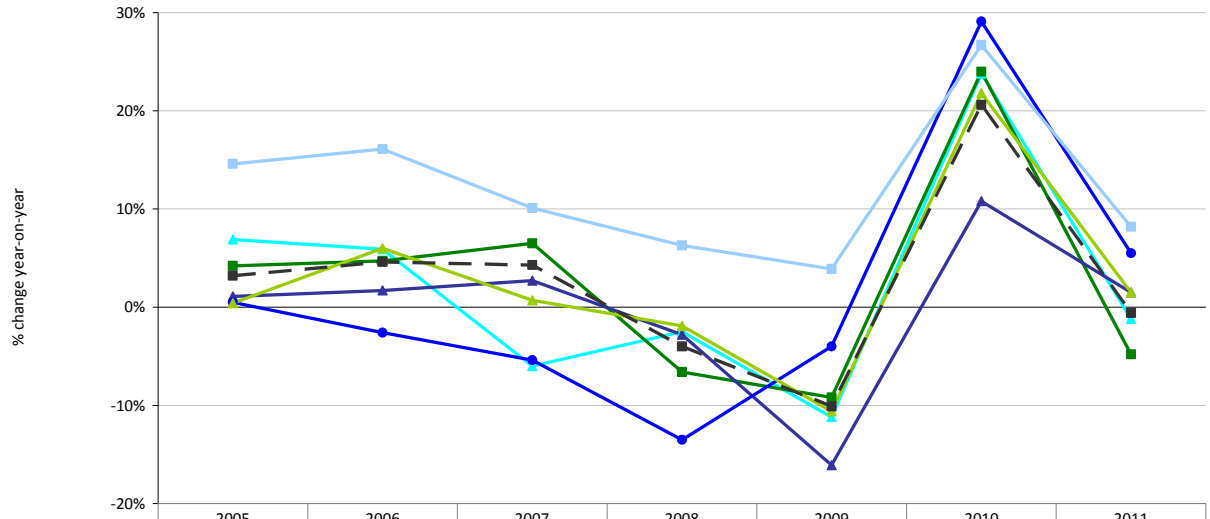

Source: IATA

Figure 1.32 shows the monthly pattern of growth reflecting the full year results, with Middle Eastern carriers the stellar performers across the year. Asia Pacific airlines posted declines in every month following January. The peak in April in most markets is due to the distorting nature of the Icelandic volcanic eruption in the same period in the previous year, when air freight volumes (along with passengers) were devastated by airspace closures and flight cancellations.

The industry average is heavily influenced by the Asia Pacific results, as this region's airlines command a 40% market share of air freight traffic.

Figure 1.33 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 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 1.33: Historical Air Cargo Growth by Region 2005-2011




| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|
| Africa | 6.9% | 5.9% | -6.0% | -2.5% | -11.2% | 23.8% | -1.2% |
| Asia/Pacific | 4.2% | 4.7% | 6.5% | -6.6% | -9.2% | 24.0% | -4.8% |
| Europe | 1.1% | 1.7% | 2.7% | -2.8% | -16.1% | 10.8% | 1.5% |
| Latin America | 0.5% | -2.6% | -5.4% | -13.5% | -4.0% | 29.1% | 5.5% |
| Middle East | 14.6% | 16.1% | 10.1% | 6.3% | 3.9% | 26.7% | 8.2% |
| North America | 0.4% | 6.0% | 0.7% | -1.9% | -10.6% | 21.8% | 1.5% |
| Industry | 3.2% | 4.6% | 4.3% | -4.0% | -10.1% | 20.6% | -0.6% |

Source: IATA

### 1.9.2 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 44% of the top 30 airports' combined volume. Three of the top five airports in 2011 are in the Asia Pacific region, but when looking at growth, these three airports declined year-on-year.

In Europe, the cargo express integrator DHL's base in Leipzig recorded significant growth in traffic, a result of the depressed base in the previous year when European airspace closures severely impacted all air operations, but also reflecting the case that the integrators are leading the market recovery.

Table 1-22: Top 30 Worldwide Airports by Air Cargo Throughput (tonnes) & Growth in 2011

| Rank | Airport Name | Region | 2011 | % chg |
|---|---|---|---|---|
| 1 | Hong Kong (HKG) | Asia Pacific | 3,977 | -4.5 |
| 2 | Memphis (MEM) | North America | 3,916 | 0.0 |
| 3 | Shanghai (PVG) | Asia Pacific | 3,085 | -4.4 |
| 4 | Anchorage (ANC) | North America | 2,543 | -3.9 |
| 5 | Seoul (ICN) | Asia Pacific | 2,539 | -5.4 |
| 6 | Paris (CDG) | Europe (EU) | 2,300 | -4.1 |
| 7 | Dubai (DXB) | Middle East | 2,270 | 0.0 |
| 8 | Frankfurt (FRA) | Europe (EU) | 2,215 | -2.6 |
| 9 | Louisville (SDF) | North America | 2,188 | 1.0 |

| Airport Name | Region | % chg |
|---|---|---|
| Leipzig (LEJ) | Europe (EU) | 16.5 |
| Doha (DOH) | Middle East | 14.2 |
| Cologne/Bonn (CGN) | Europe (EU) | 12.8 |
| Tokyo (HND) | Asia Pacific | 6.6 |
| Beijing (PEK) | Asia Pacific | 5.7 |
| Singapore (SIN) | Asia Pacific | 3.1 |
| Guangzhou (CAN) | Asia Pacific | 3.1 |
| Shenzhen (SZX) | Asia Pacific | 2.4 |
| London (LHR) | Europe (EU) | 1.2 |

| Rank | Airport Name | Region | 2011 | % chg |
|---|---|---|---|---|
| 10 | Tokyo (NRT) | Asia Pacific | 1,945 | -10.3 |
| 11 | Singapore (SIN) | Asia Pacific | 1,899 | 3.1 |
| 12 | Miami (MIA) | North America | 1,842 | 0.3 |
| 13 | Los Angeles (LAX) | North America | 1,682 | -3.8 |
| 14 | Beijing (PEK) | Asia Pacific | 1,640 | 5.7 |
| 15 | Taipei (TPE) | Asia Pacific | 1,627 | -7.9 |
| 16 | London (LHR) | Europe (EU) | 1,569 | 1.2 |
| 17 | Amsterdam (AMS) | Europe (EU) | 1,550 | 0.8 |
| 18 | New York (JFK) | North America | 1,349 | 0.4 |
| 19 | Bangkok (BKK) | Asia Pacific | 1,322 | 0.9 |
| 20 | Chicago (ORD) | North America | 1,312 | -4.7 |
| 21 | Guangzhou (CAN) | Asia Pacific | 1,180 | 3.1 |
| 22 | Indianapolis (IND) | North America | 972 | -4.0 |
| 23 | Tokyo (HND) | Asia Pacific | 873 | 6.6 |
| 24 | Shenzhen (SZX) | Asia Pacific | 828 | 2.4 |
| 25 | New York (EWR) | North America | 813 | -5.0 |
| 26 | Doha (DOH) | Middle East | 808 | 14.2 |
| 27 | Leipzig (LEJ) | Europe (EU) | 744 | 16.5 |
| 28 | Osaka (KIX) | Asia Pacific | 743 | -2.1 |
| 29 | Cologne/Bonn (CGN) | Europe (EU) | 726 | 12.8 |
| 30 | Kuala Lumpur (KUL) | Asia Pacific | 694 | 0.0 |

| Airport Name | Region | % chg |
|---|---|---|
| Louisville (SDF) | North America | 1.0 |
| Bangkok (BKK) | Asia Pacific | 0.9 |
| Amsterdam (AMS) | Europe (EU) | 0.8 |
| New York (JFK) | North America | 0.4 |
| Miami (MIA) | North America | 0.3 |
| Kuala Lumpur (KUL) | Asia Pacific | 0.0 |
| Memphis (MEM) | North America | 0.0 |
| Dubai (DXB) | Middle East | 0.0 |
| Osaka (KIX) | Asia Pacific | -2.1 |
| Frankfurt (FRA) | Europe (EU) | -2.6 |
| Los Angeles (LAX) | North America | -3.8 |
| Anchorage (ANC) | North America | -3.9 |
| Indianapolis (IND) | North America | -4.0 |
| Paris (CDG) | Europe (EU) | -4.1 |
| Shanghai (PVG) | Asia Pacific | -4.4 |
| Hong Kong (HKG) | Asia Pacific | -4.5 |
| Chicago (ORD) | North America | -4.7 |
| New York (EWR) | North America | -5.0 |
| Seoul (ICN) | Asia Pacific | -5.4 |
| Taipei (TPE) | Asia Pacific | -7.9 |
| Tokyo (NRT) | Asia Pacific | -10.3 |

Source: ACI Worldwide Airport Traffic Report

Although Latin American airlines posted solid growth in FTKs in 2011 (as noted previously), the region's airports are comparatively small in global terms when considering air cargo throughput – Table 1-22 above is absent of any of the major Latin American airports for this reason.

## 1.10 Business Aviation

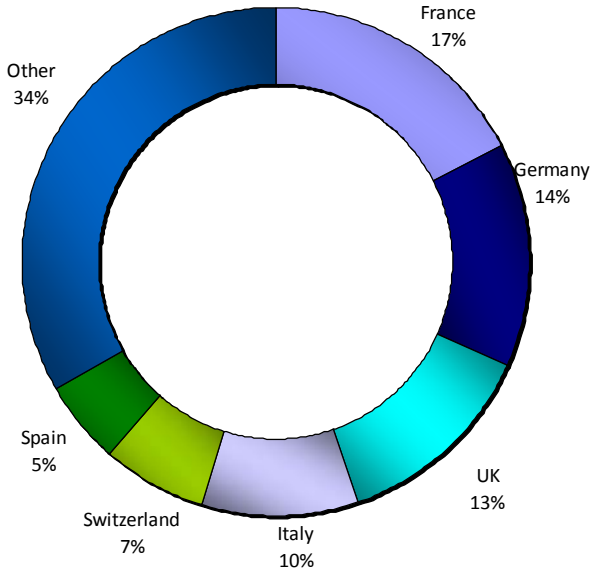
### 1.10.1 Europe Overview

According to Eurocontrol[27], business aviation movements in Europe in 2011 recorded 2.3% growth over 2010. The growth was uneven throughout the year, peaking at the beginning (+9%) and tailing off as the year progressed (-5.1% by December). This compares to growth of 3.1% for total flights in Europe in 2011. Business aviation accounted for 7.2% of all flights, with 704,000 movements out of 9.8 million.

France, Germany and the United Kingdom combined constituted nearly half of all business aviation departures in Europe in 2011, as highlighted in Figure 1.34. The domestic German market recorded highest growth in the year.

[27] Briefing: Business Aviation in Europe in 2011; Eurocontrol; May 2012

Figure 1.34: States' share of European business aviation departures in 2011

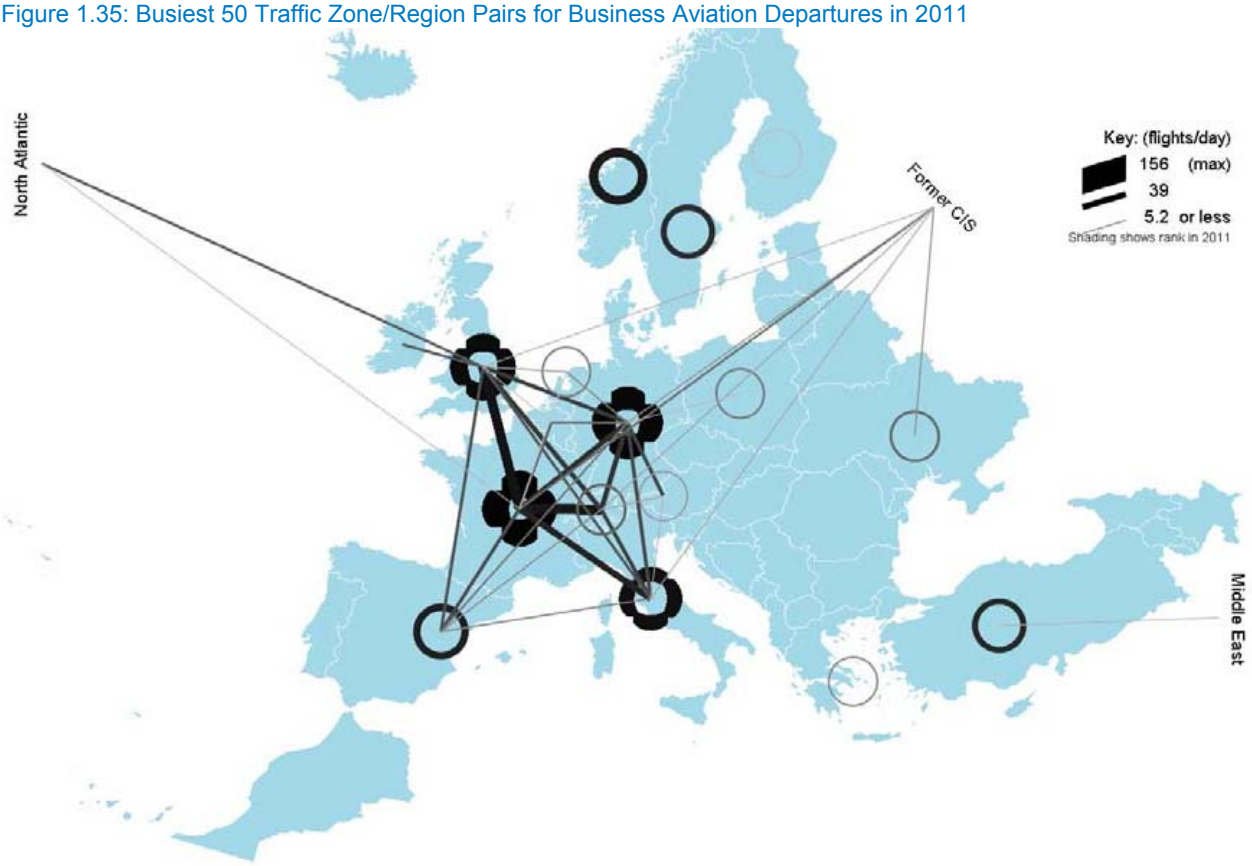



Source: Eurocontrol; 'Briefing: Business Aviation in Europe in 2011'; May 2012

In terms of growth experienced at individual European airports in 2011, business aviation activity at Nice has continued to surge, recording over 5% growth following a 15% increase the previous year. Biggin Hill (13%), Istanbul Ataturk (41%) and Amsterdam (10%) also posted solid gains. Notable declines include Rome Ciampino (-10%), Madrid Torrejon (-10%) and Athens (-18%).

Figure 1.35 shows the major business aviation traffic flows in 2011 between European States and regions outside. France domestic remains the single busiest domestic market, with France-UK the primary international flow.

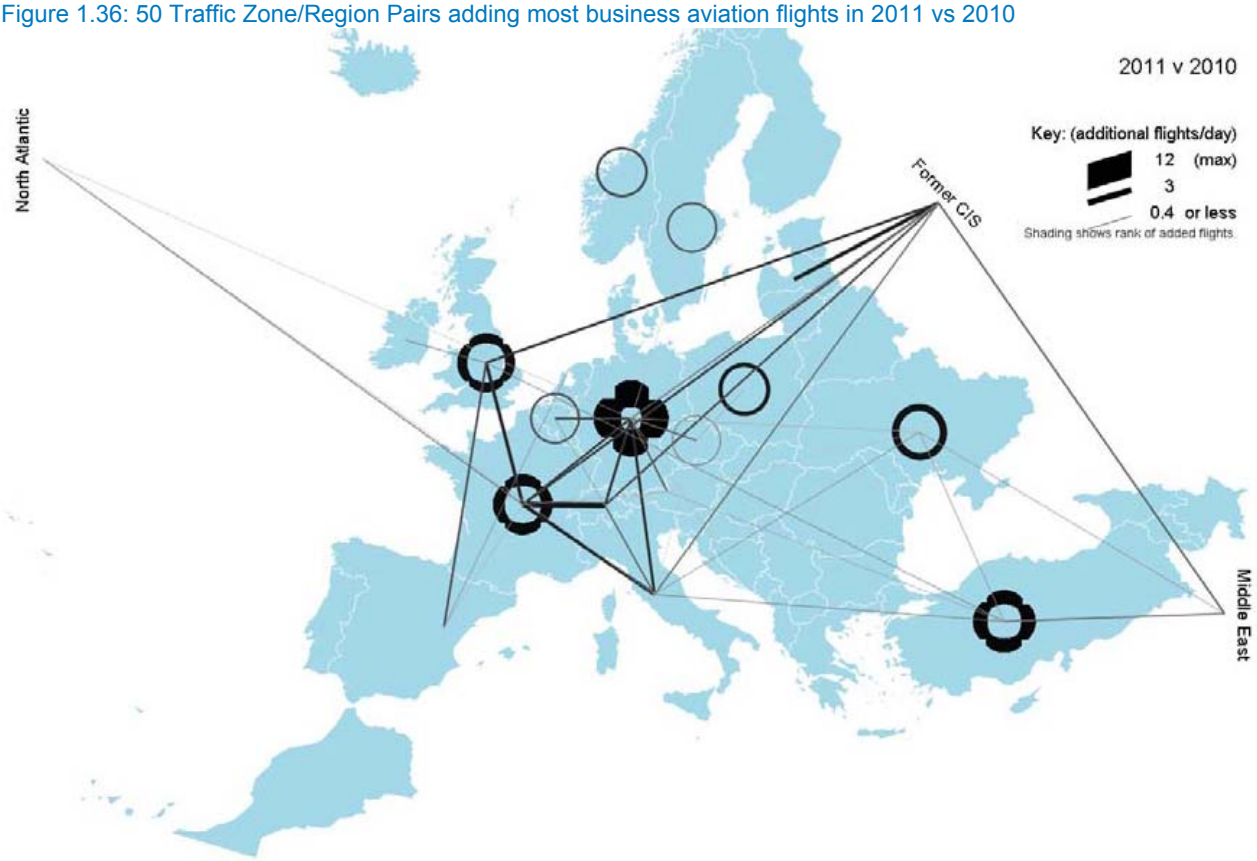
Figure 1.35: Busiest 50 Traffic Zone/Region Pairs for Business Aviation Departures in 2011




Source: Eurocontrol; 'Briefing: Business Aviation in Europe in 2011'; May 2012

Figure 1.36 highlights the routes and markets recording the highest growth in business aviation activity in 2011, with intra-Germany the fastest-growing, followed by domestic-Turkey. One notable development has been the continued growth of traffic to/from former CIS states, with growth rates of around 10% to 20% for the key routes to the UK, France, Germany and Switzerland.

Figure 1.36: 50 Traffic Zone/Region Pairs adding most business aviation flights in 2011 vs 2010




Source: Eurocontrol; 'Briefing: Business Aviation in Europe in 2011'; May 2012

### 1.10.2 Global focus on manufacturers

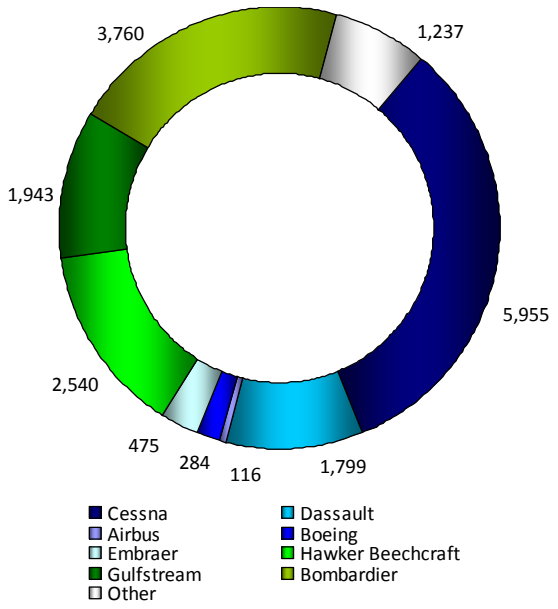
Despite European business aviation traffic growing in 2011, the global sector faced a challenging year. According to Flight International's Business Aircraft Census 2011[28], the business aviation industry has been impacted by falling aircraft demand due to the financial crisis overhanging mature markets and suppressing demand for capital investment.

Flight International's 2011 business aircraft census – compiled using Flightglobal's ACAS business aviation database – reflects the industry's performance in the twelve months September 2010 to August 2011. The census revealed the global business jet fleet to have grown by 4% during this period, but the turboprop inventory stagnated with 0.5% growth, representing the low demand at the bottom end of the market for smaller aircraft where traditional buyers such as small companies and private buyers have reined in expenses.

The major manufacturers had to react to the dip in demand. Cessna and Hawker Beechcraft halted production of the smaller 400XP and CJ1 business jets due to poor sales.

[28] 'Business aircraft census 2011'; Flight International 5th October 2011.

Figure 1.37: Business aircraft manufacturer market share 2011



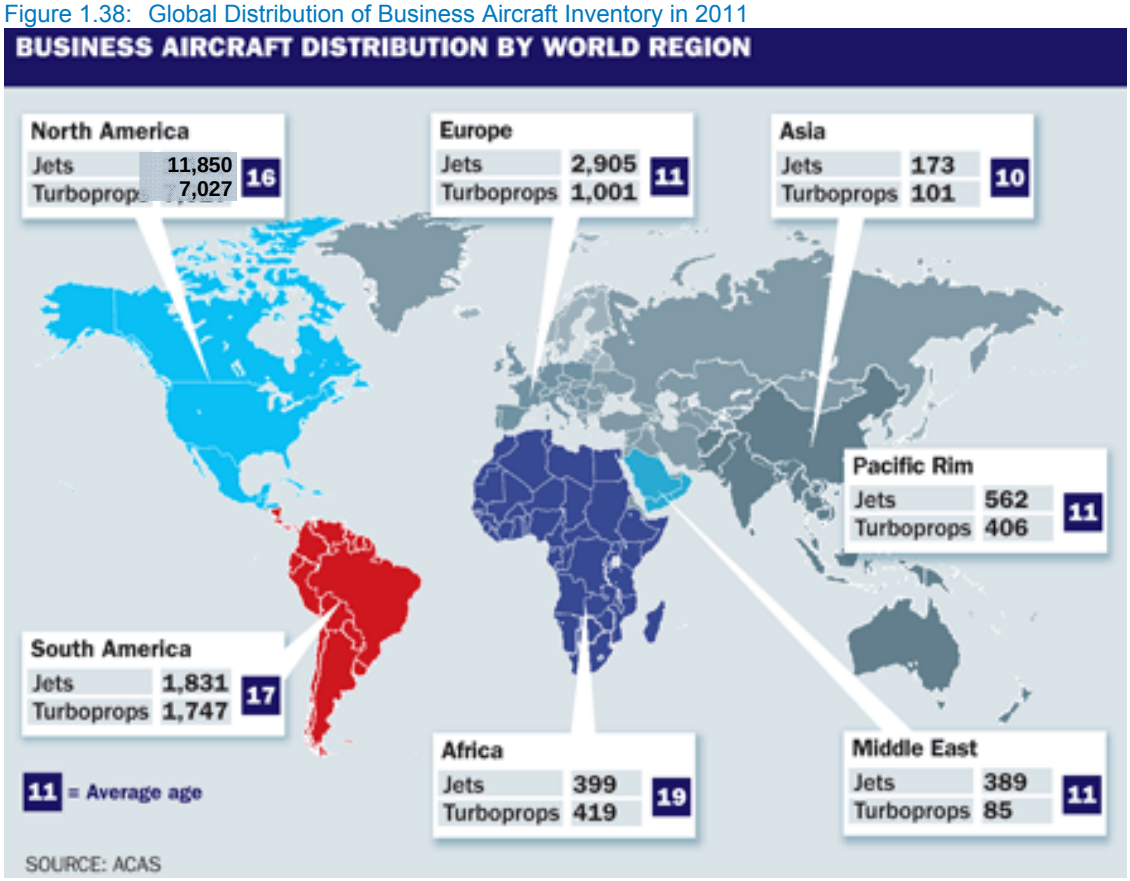

Source: Business aircraft census 2011; Flight International

Cessna continues to dominate the business jet fleet in terms of inventory, with 5,955 business jets recorded in the census. Following a series of job cuts in previous years, Cessna was hoping to turn its fortunes around in 2011. Its entry-level Mustang jet recorded the largest gains in fleet size, and the new Citation CJ4 entered the light jet market.

Hawker Beechcraft specialises in turboprops, and introduced its new longer range King Air 250 in 2011. The manufacturer increased its business aircraft fleet to 2,540.

Bombardier's diverse product line has helped to lessen the impact of the financial crisis on its lower-end business jets. The Canadian manufacturer grew its total inventory over the census period to 3,760, in spite of low demand for its light jets such as the Learjet 40XR and 45XR. Bombardier made most gains in the super midsize arena, with its Challenger 300 and 650 posting substantial inventory increases.

Figure 1.38: Global Distribution of Business Aircraft Inventory in 2011




Source: Business aircraft census 2011; Flight International

With the North American and European markets sluggish in the face of the economic crisis, the international market has been a lifeline for major manufacturers. In North America – by far the largest installed base of business aircraft – the tally has increased around 1.5% to 18,877 business jets and turboprops, whereas Europe has seen inventory grow 1.9% to 3,906, with the bulk of this growth in Russia (+16 aircraft) and Germany (+22).

In the comparatively thriving region of Latin America, the installed base climbed in 2011 by 267 jets and turboprops to 3,578 aircraft, mostly attributable to Brazil and Mexico which have seen demand for business aircraft boom as the economies expand. In Brazil alone – the largest installed base of business aircraft in Latin America – the fleet rose by 91 jets and turboprops.

In the Asia Pacific region, the growing importance of the Chinese market is reflected this year, with a significant fleet gain of 20% to 112 jets and 12 turboprops. The region as a whole experienced a fleet expansion of more than 6% to 562 jets and 406 turboprops. The world's airframers are increasingly looking to this region, and in particular China, for future growth to compensate for the slowing demand in the mature markets of North America and Europe.

# 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 respected industry 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, Gross Domestic Product (GDP). It then looks at the short term ICAO forecast, before considering the long term passenger forecast for the period 2011 to 2030. Boeing's Current Market Outlook produced in 2011[29] is used to examine global and regional trends, as well as issues important to Europe. The Airbus forecast[30] for the same period supplements this analysis. Eurocontrol's Flight Movement Forecast is reviewed followed by Boeing's World Air Cargo Forecast.

## 2.2 GDP – The Primary Forecast Driver

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.

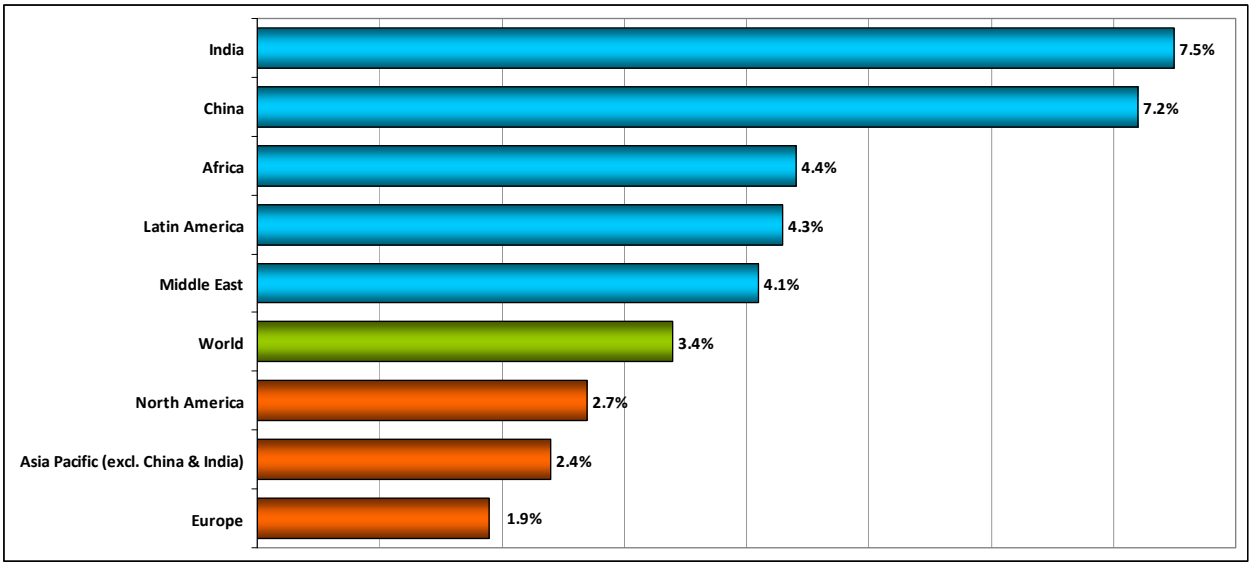
The major aircraft manufacturers Boeing, Airbus, Embraer and Bombardier use global GDP forecasts produced by IHS Global Insight which states that global GDP will grow on average in the range of 3.2% to 3.4% per annum to 2030. The focus of this global growth is on strong economic activity in Asia, particularly China, which will act as a key driver to the industry's worldwide expansion. There will also be robust growth in emerging economies, especially those of the BRIC[31] countries which will see GDP growth above the world average over the forecast period.

[29] Current Market Outlook 2011-2030, The Boeing Company 2011 (released 16 June 2011)

[30] Global Market Forecast 2011-2030, Airbus Industrie 2011 (released 19 September 2011)

[31] 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 2011-2030



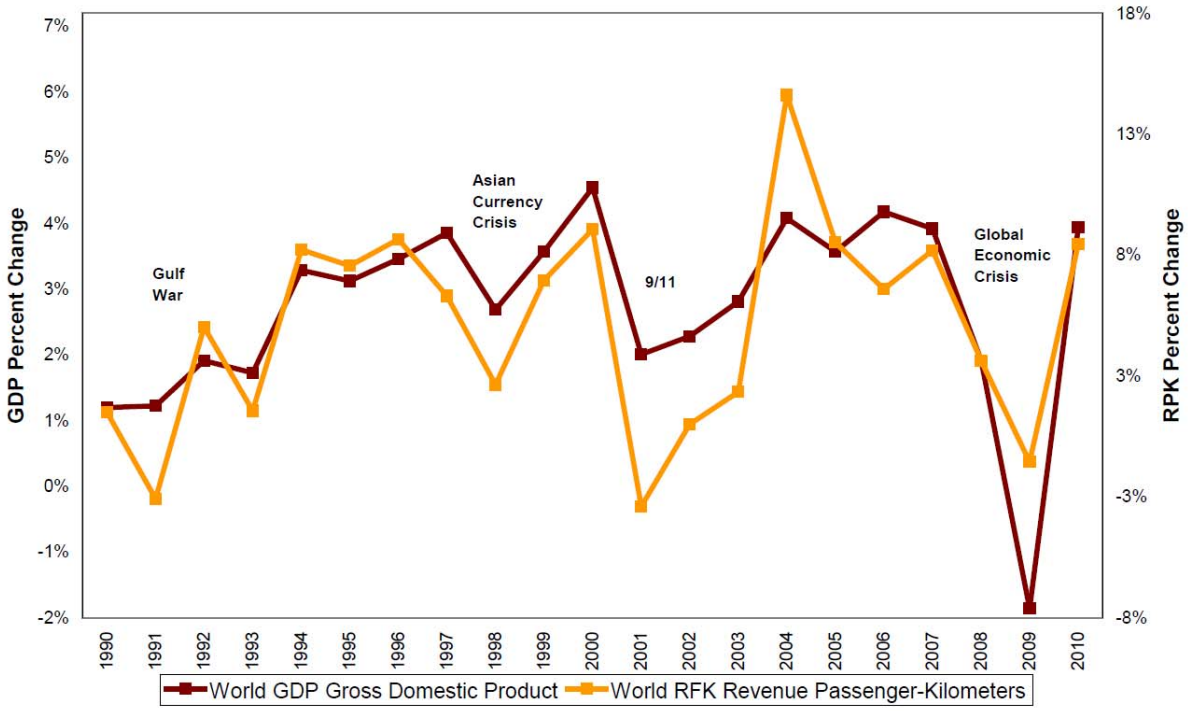

Source: Bombardier/Global Insight

Figure 2.1 shows that China and India will lead the world with the strongest economic growth; India is anticipated to exhibit the highest forecast average annual growth of 7.5% to 2030. It can be seen that by removing the effects of India and China's forecast GDP, the remainder of the Asia Pacific region will lag behind in terms of economic development. The developing economies of Africa and Latin America will also see growth above the world average.

Regions with well-developed mature economies such as North America and Europe are forecast to show modest growth below the world average.

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 visually in a chart, for example as shown in Figure 2.2 below.

Figure 2.2: Change in Global GDP (constant) vs. Change in Passenger Traffic (RPK) 1990-2010

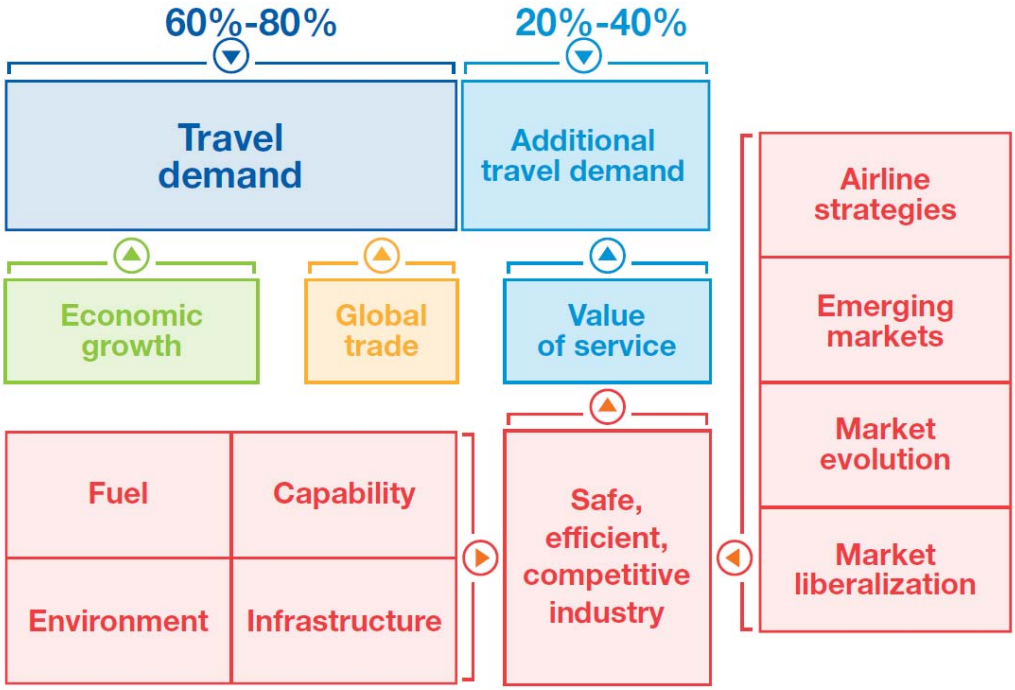



Source: Civil Air Navigation Services Organisation (CANSO)

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 follow. Other drivers are based on political and operational trends, such as the liberalisation and deregulation of air transport markets; and the expansion and evolution of the low cost carrier (LCC) business model.

The interrelationships of these factors and their role in driving long term air transport growth and the preparation of industry forecasts are shown below in Figure 2.3.

Figure 2.3: Drivers of Air Travel




Source: Boeing

The main drivers for growth over the forecast period 2011 to 2030 are considered to be[32]:

- Economic growth driven by BRIC Countries
- Strong yield decrease (– 2.4% yearly average in real terms since 1980)
- Deregulation in Europe & the Association of Southeast Asian Nations[33] region (ASEAN)
- Tourism development
- Entry into service of more capable very long range aircraft
- Hub & spoke networks in parallel with point-to-point traffic
- LCCs in Europe & Asia Pacific

## 2.3 ICAO Short Term Forecast

In 2011, ICAO produced a passenger traffic forecast for the coming few years to 2014. ICAO measures growth in Passenger Kilometres Performed (PKP). The organisation forecasts that in 2012 global air traffic

[32] Airbus Global Market Forecast 2011-2030

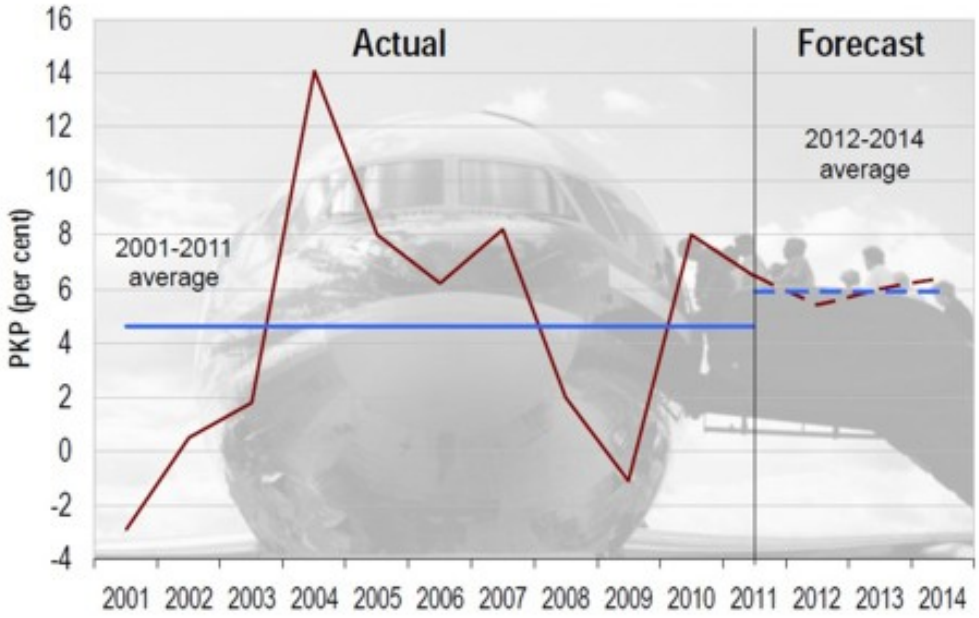
[33] Member countries of ASEAN are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar (Burma), Philippines, Singapore, Thailand and Viet Nam.

will continue to grow but at a slower rate than 2011 as oil prices are expected to remain at a higher level. In 2013 and 2014, global traffic is predicted to continue with positive growth.

The forecast traffic is dictated by the prevailing economic conditions on a regional basis and will vary by geographic region. From 2011-2014, the average annual growth rate (AAGR) ranges from 3% in North America to 10% in the Middle East. The AAGR for the world is 5.9%.

Airlines of mature markets such as North America and Europe are predicted to grow at a slower rate, whereas those in the Middle East, Asia/Pacific and Latin America/Caribbean are projected to experience growth significantly above the world average.

Figure 2.4: Medium Term Forecast Percentage Change




Source: ICAO Medium Term Forecast 2011

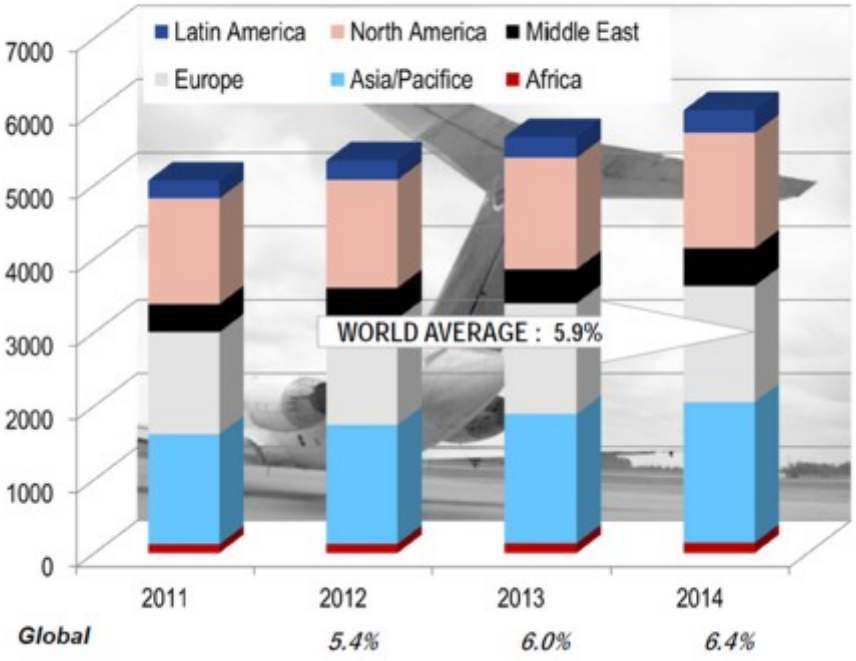
Table 2.1: ICAO Forecast

| Region of Airline Registration | 2001 (PKP in billions) | 2011 (PKP in billions) | Average Annual Growth 2001-2011 (%) | Forecast | | |
|---|---|---|---|---|---|---|
| | | | | 2012 (%) | 2013 (%) | 2014 (%) |
| Europe | 774 | 1,385 | 6.0 | 4.2 | 4.4 | 4.8 |
| Africa | 66 | 118 | 6.0 | 5.5 | 6.2 | 6.0 |
| Middle East | 100 | 383 | 14.4 | 9.5 | 10.2 | 11.0 |
| Asia/Pacific | 806 | 1,496 | 6.4 | 8.0 | 8.6 | 8.8 |
| North America | 1,110 | 1,434 | 2.6 | 2.3 | 3.1 | 3.5 |
| Latin America/Caribbean | 156 | 246 | 4.7 | 7.0 | 7.7 | 8.2 |
| **World** | **3,011** | **5,062** | **5.3** | **5.4** | **6.0** | **6.4** |

Source: ICAO Medium Term Forecast 2011

Of note is that ICAO projects air traffic to grow at a faster pace between 2011 and 2014 than it has averaged in the last ten years since 2001, driven by strong demand in Asia Pacific and the Middle East.

Figure 2.5: Regional Passenger Traffic




Source: ICAO Medium Term Forecast 2011

## 2.4 Long Term Airline Passenger Forecasts

### 2.4.1 Global Airline Passenger Growth

The principal forecasts examined here are those produced by aircraft manufacturers Boeing and Airbus. Each has produced a comprehensive long term global market forecast for the period 2011 to 2030 using the base year of 2010. 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.

Both Boeing and Airbus express passenger traffic volume data as revenue passenger kilometres (RPK), see Table 2-2. 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 almost 4.9 trillion RPKs in 2010 to 13.3 trillion in 2030. This represents an almost threefold increase with an average annual growth rate of 5.1%. Airbus points out in its forecast that historically (since the 1970s) air traffic has doubled every fifteen years and will do so again by 2025.

Table 2-2: Boeing & Airbus Forecast Comparison

| | Boeing | Airbus |
|---|---|---|
| RPK (billion) 2010 | 4,881 | 4,800 |
| RPK (billion) 2030 | 13,312 | 12,300 |
| Total Growth 2010 – 2030 | 173% | 157% |
| **Average Annual Growth Rate** | **5.1%** | **4.8%** |

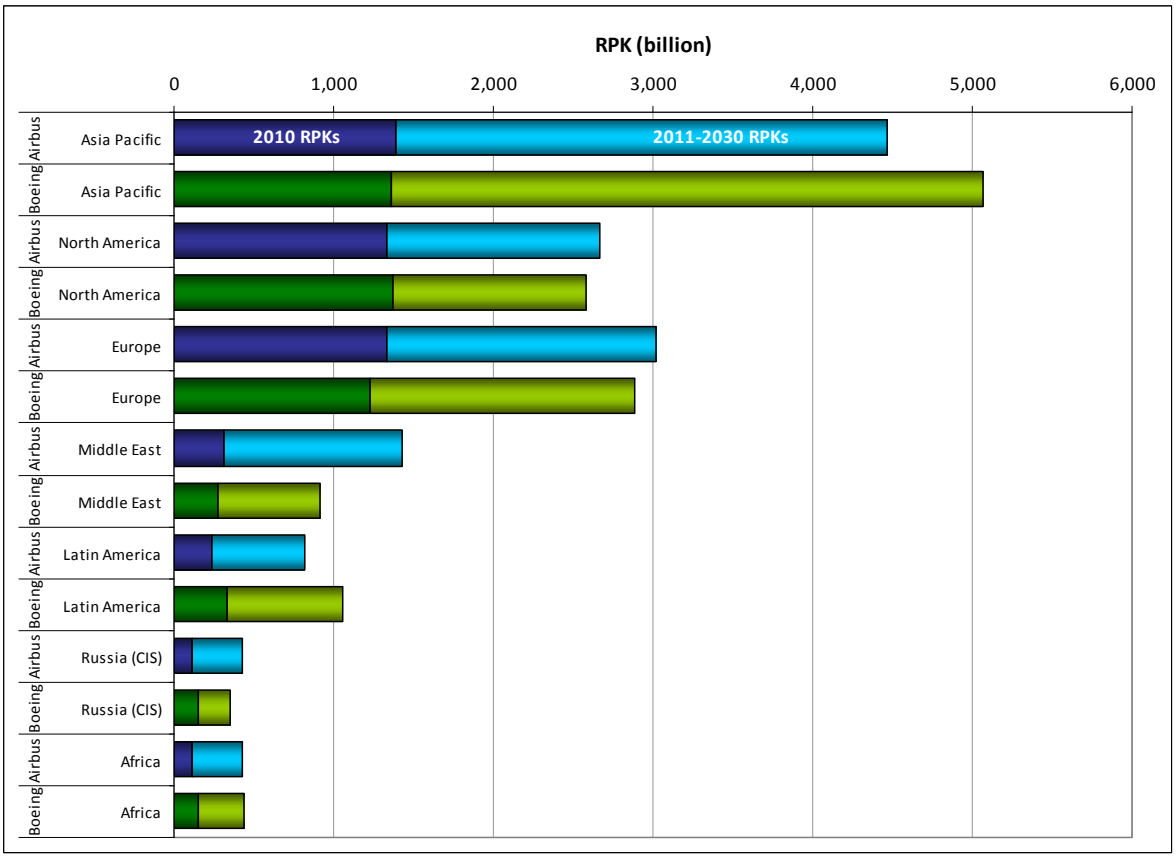
Source: Boeing, Airbus

### 2.4.2 Airline Passenger Growth by World Region

The two forecasts display some disparity at a regional level (Figure 2.6), although again they are broadly comparable over a twenty-year forecast horizon. The differences that occur are due to the forecasts disagreeing on the amount of airline traffic carried in the base year in each region coupled with varying forecast growth rates. For example, Boeing forecasts a robust annual average growth rate of 6.8% for Asia Pacific compared with 5.7% from Airbus. Conversely, Airbus predicts growth of 7.4% for the Middle East whereas Boeing has determined 6.2%.

The two forecasts were issued several months apart in 2011 (Boeing in June and Airbus in September); during this period GDP forecasts were revised sharply downwards due to worsening global economic conditions linked to the sovereign debt crisis in Europe amongst other factors such as rising oil prices. As a result, the Airbus forecast is slightly more pessimistic. Some other differences potentially arise due to the methodology of classifications and groupings used for countries within geographic regions.

Figure 2.6: Boeing & Airbus Regional Forecast Comparison 2010-2030



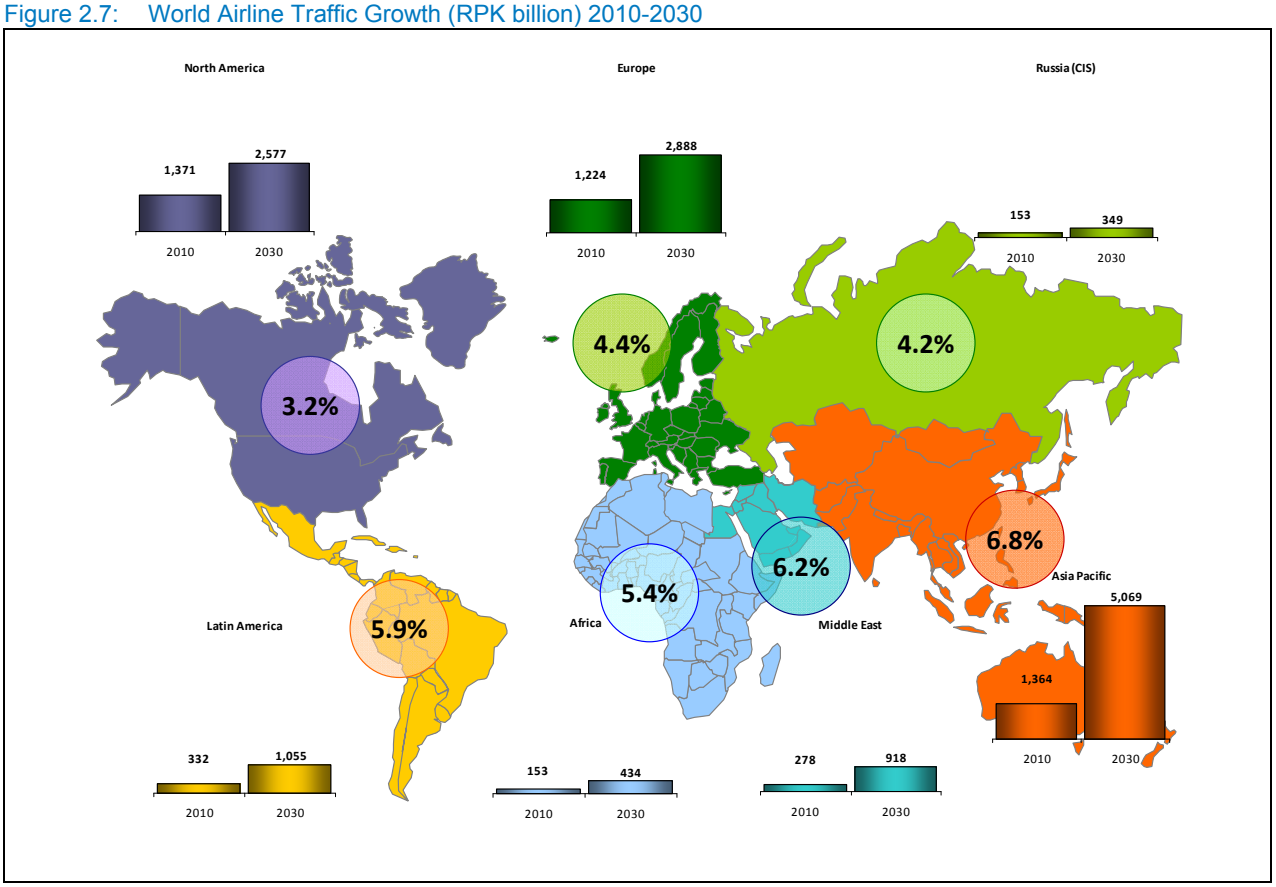

Source: Boeing, Airbus

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 Asia Pacific region with an annual average growth rate of 6.8%, followed by the Middle East (6.2%) and Latin America (5.9%). With Africa also experiencing substantial expansion (5.4%), these regional markets dominate growth compared to the mature economies of Europe (4.4%) and North America (3.2%).

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 2010 Asia Pacific, North America and Europe were the largest markets by size with fairly equal shares, but by 2030 Asia Pacific will become the dominant market by quite some margin (see Figure 2.7).

Figure 2.7: World Airline Traffic Growth (RPK billion) 2010-2030



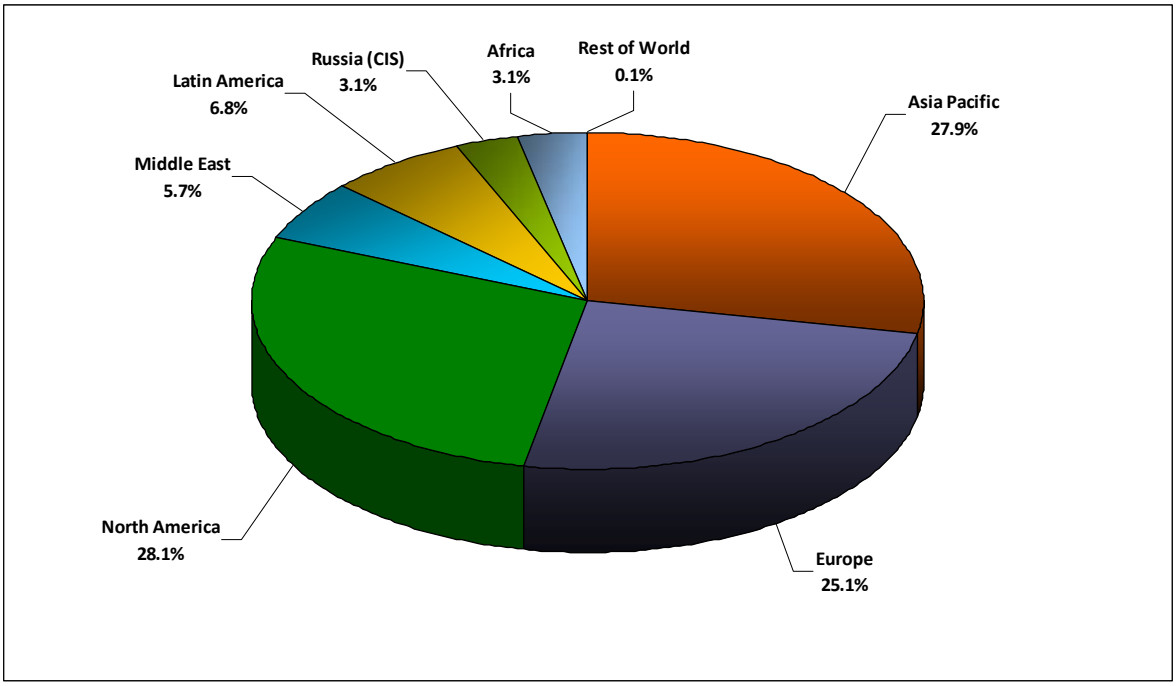

Source: Boeing

The growth rates and absolute numbers shown in Figure 2.7 represent total traffic growth within and to each region[34].

The pie charts in Figure 2.8 and Figure 2.9 below shows the proportion of market share captured by each region in 2010 and forecast for 2030.

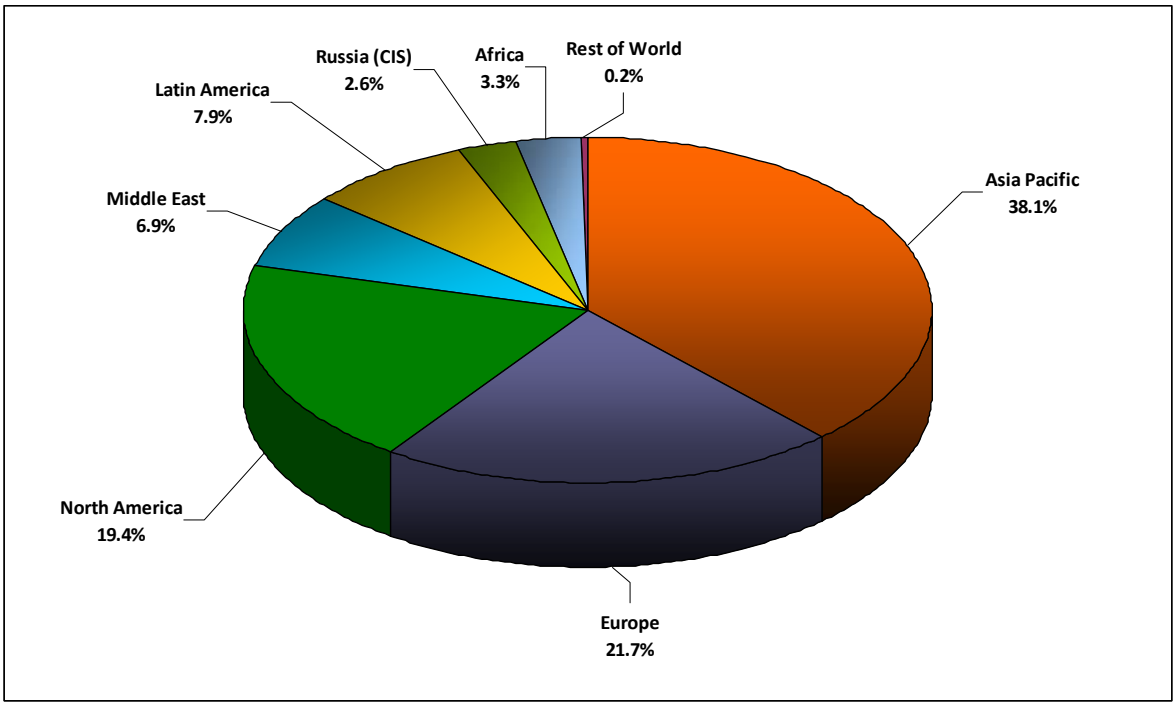
[34] Erratum: note that the same Figure produced in the previous edition of the annual analyses for 2010 contained incorrect figures for absolute RPK volumes in 2009 and 2029. This did not affect the stated growth rates for each region.

Figure 2.8: Actual Market Share of Global Passenger Traffic (RPKs) in 2010




Source: Boeing

Figure 2.9: Forecast Market Share of Global Passenger Traffic (RPKs) in 2030




Source: Boeing

### 2.4.3 Intra-Regional Traffic Flow Growth

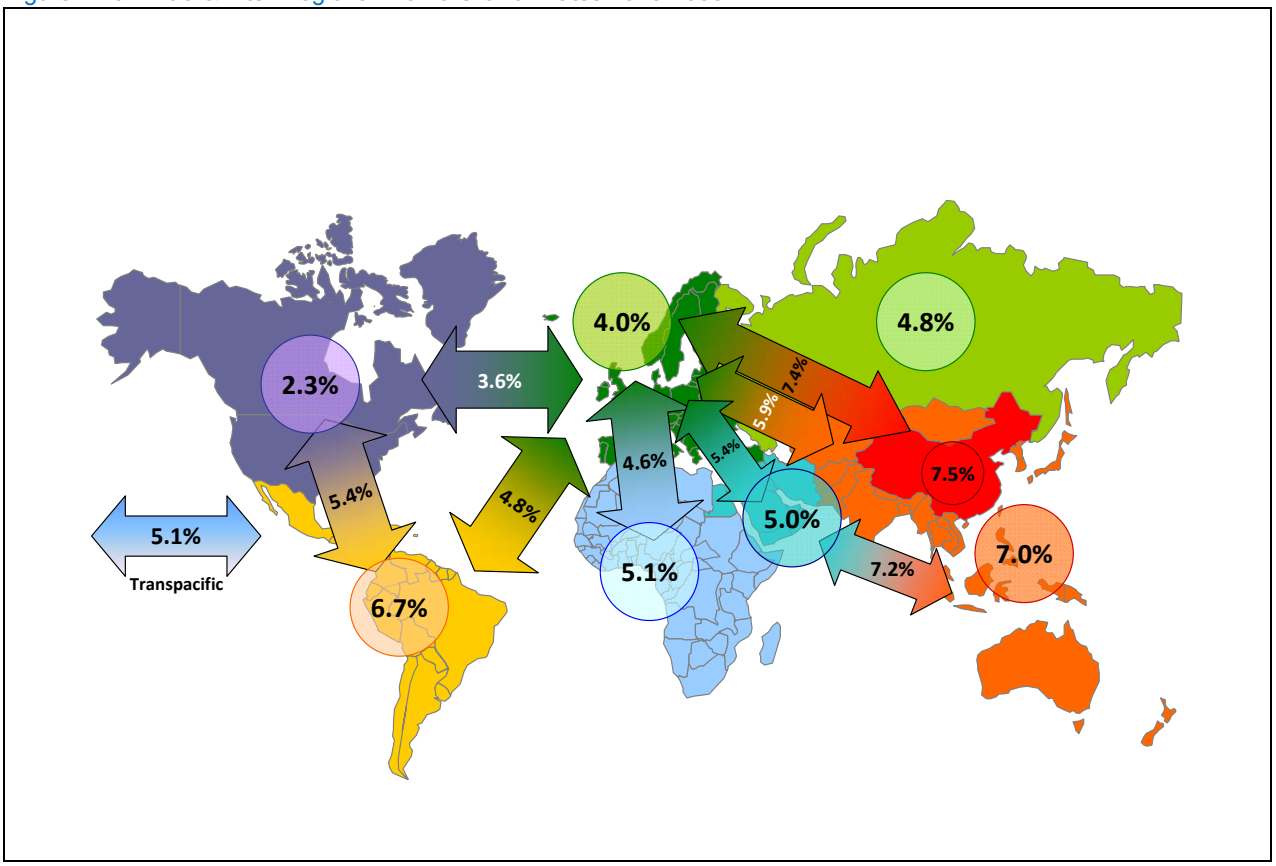
In addition to forecasting total passenger growth at a regional level, the Boeing forecast provides a breakdown of growth in traffic flows within and between these regions.

Figure 2.10 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) each region.

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 7.0%. However when considered separately China accounts for a growth rate of 7.5%.

Traffic within North America (the US and Canada) will represent the lowest overall growth, at 2.3%.

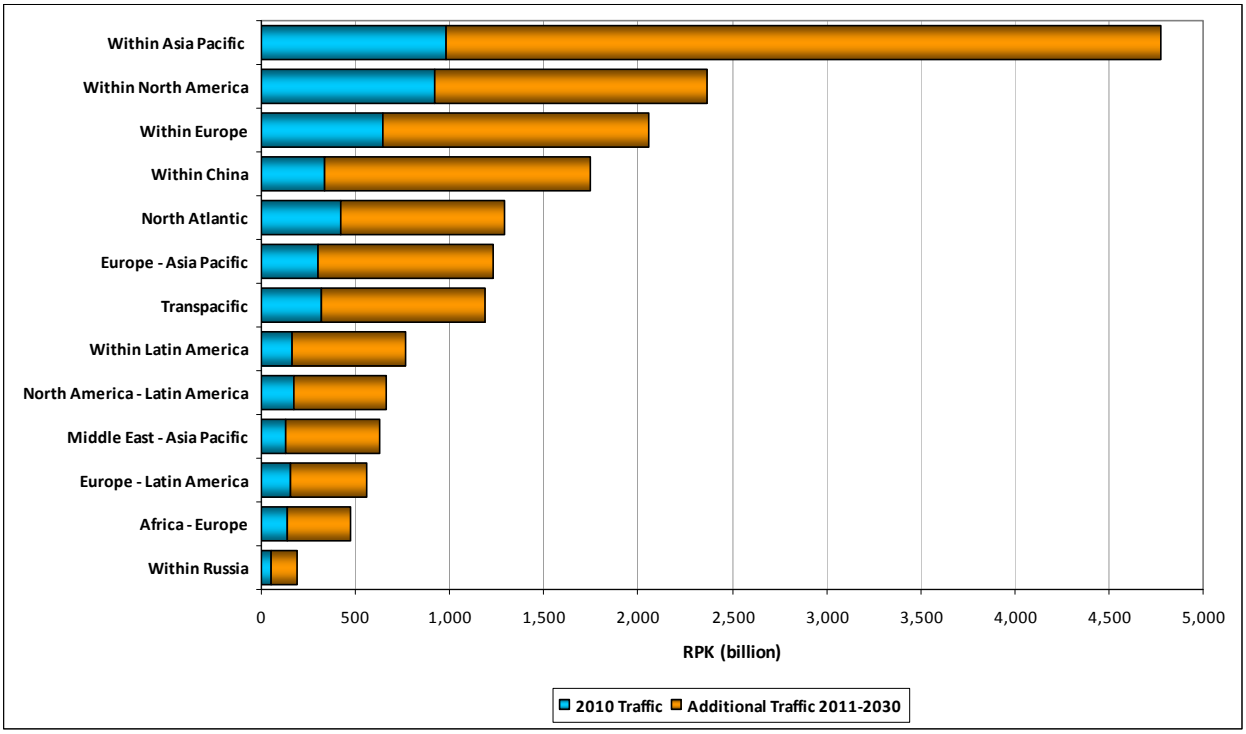
Figure 2.10: Intra & Inter-Regional Traffic Growth Rates 2010-2030




Source: Boeing

Figure 2.11 below shows these growth rates expressed in absolute terms as RPKs for each traffic flow. The emerging dominance of the Asia Pacific region can be clearly seen.

Figure 2.11: Intra & Inter-Regional Traffic RPKs 2010-2030




Source: Boeing

### 2.4.4 Inter-Regional Traffic Flow Growth

Figure 2.10 shows that the highest average annual growth in traffic between regions is expected from Europe to China at 7.4%, closely followed by the Middle East to Asia Pacific at 7.2%.

#### China

China is a good example of the pace at which the liberalisation of air services is increasing, which has helped enable international traffic to and from the country to more than double in the last ten years, with even more significant growth to the Middle East (+3,600%) and India (+1,100%) in the same period.

Other factors also expected to stimulate air travel growth in the region are increasing wealth and developing consumerism. Salaries in China are expected to grow at 14% per annum over the ten years from 2010 to 2019, leaving salaries more than 3.5 times higher. Savings rates, which are traditionally high in Asia, are also projected by economists to decline which should also feed into air travel growth. In China, where savings rates have been high, these are also projected to fall helping the country to move towards greater consumerism which further stimulates air travel[35].

[35] Airbus Global Market Forecast 2011-2030

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 (7.4%) than to Asia Pacific in total (5.9%).

### The Middle East

The civil unrest in Egypt, Bahrain, Libya, Syria, Yemen and Tunisia impacted on air travel demand in the Middle East region in 2011. While the impact on global traffic was relatively minor, some of the region's most important destinations were affected. Despite this, the region's economy is forecast to continue growing at a higher rate than the world average. The six nations of the Gulf Cooperation Council are forecasting even higher growth as energy production expands to cover the shortfall from other oil-producing nations.

Capacity at the principal Middle Eastern carriers of Emirates, Qatar Airways and Etihad has collectively grown at 23% annually over the past ten years. Their growth is likely to continue as the large backlog of new, efficient aircraft the three airlines have on order will provide a competitive advantage over European and Asian rivals. Approximately half of the 885 aircraft on order in the Middle East, including 72% of widebodies, will go to these carriers[36].

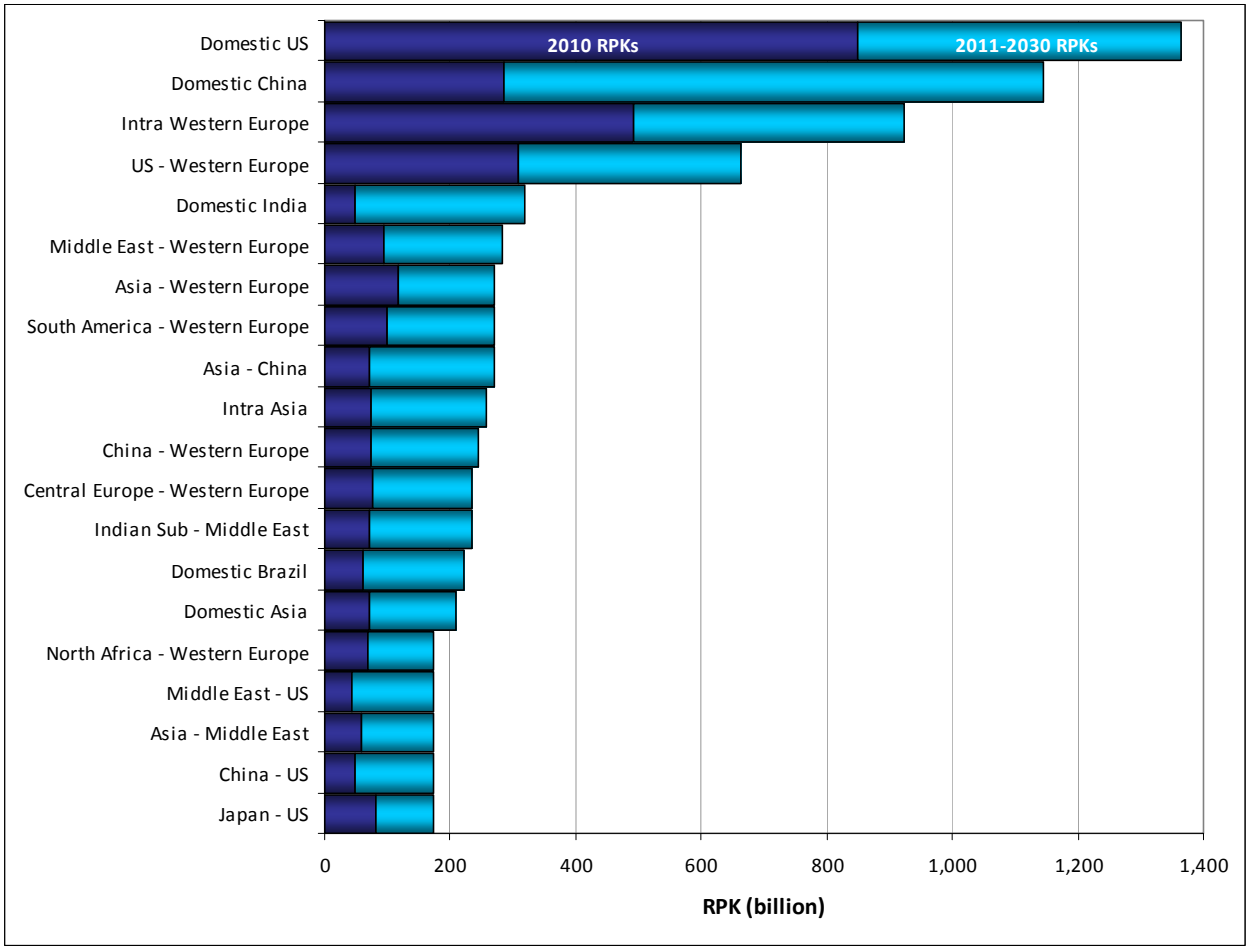
### Regional Flows

In its latest Global Market Forecast for the period to 2030, Airbus has examined traffic flows and provided data for traffic routes at a detailed level. From this data the largest overall flows by volume can be determined.

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 2.12).

[36] Boeing Current Market Outlook 2011-2030

Figure 2.12: Largest 20 Traffic Flows in 2030




Source: Airbus

### 2.4.5 Trends in Europe

Passenger traffic in Europe is expected to grow at 4.4% annually to 2030, rising from 1.2 billion RPKs in 2010 to 2.9 billion (see Figure 2.7), showing that despite the economic challenges it faces, the European air transport industry remains resilient.

Europe is an economically diverse region featuring both mature countries as well as newer, high-growth economies. It is still in the process of recovering from the recent recession, with some instability experienced in 2011 due to sovereign debt in the region. Concerns remain in some parts of the Eurozone on what effects correctional measures could have on confidence in general and the resulting short to medium term economic growth.

Despite areas of uncertainty, Europe's overall GDP is expected to continue to grow at an average rate of around 2% per year. (in 2011 Brazil was initiated, but not yet signed)

Airline operations in Europe continue to change as new ventures are launched and new business models are applied. Additional mergers and acquisitions are expected over the next twenty years, along with increased emphasis on collaboration with alliance partners around the world.

Recently, anti-trust immunities have been granted by European and U.S. authorities to the three main global airline alliances (**one**world®, SkyTeam™ and Star Alliance™). As a result, the respective airlines are allowed to jointly set prices; to cooperate on departure times, the types of aircraft in use, distribution and marketing; to share revenues and costs for all transatlantic flights; and also have the right to cede airport slots to their partners.

This provides access to markets where carriers are commercially weak, as they can provide services under code-share agreements with their partners. In addition, this collaboration allows them to cut costs, use their workforce and aircraft more efficiently; and reconfigure route networks to make them more competitive as well as efficient.

Anti-trust immunity may appear to run counter to the objectives of liberalisation (open skies) agreements, which intend to reinforce competition. However, the efficiency effects of consolidation can counter-balance the potential anti-competitive effects of market concentration. The decisions of the European Commission in this area have been aided by studies showing that fares are lower if cooperative measures exist[37].

There is also a trend among large network airlines to shift their focus away from short-haul routes which are targeted by low cost carriers and focus instead on longer haul routes. Low cost traffic is at an all time high in the domestic and intra-regional European markets, having reached more than 40% of total traffic (almost 50% if Western Europe is considered on its own)[38].

## 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. The long term forecast has not been updated since the annual analyses carried out in September 2011 (Annual Analyses of the EU Air Transport Market 2010) and so is not discussed in the section. Due to the short horizon of EUROCONTROL's short-term forecast, this section only considers the medium term forecast.

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.

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

[37] For example: Alliances, Codesharing, Antitrust Immunity, and International Airfares: Do Previous Patterns Persist? Brueckner et al, Journal of Competition Law & Economics, 7 (3): 573-602, 11 May 2011 (first published July 2010)

[38] Airbus Global Market Forecast 2011-2030

characterised as commercial airline services, such as business jets, military transport, training flights and some light aircraft (General Aviation) flights.

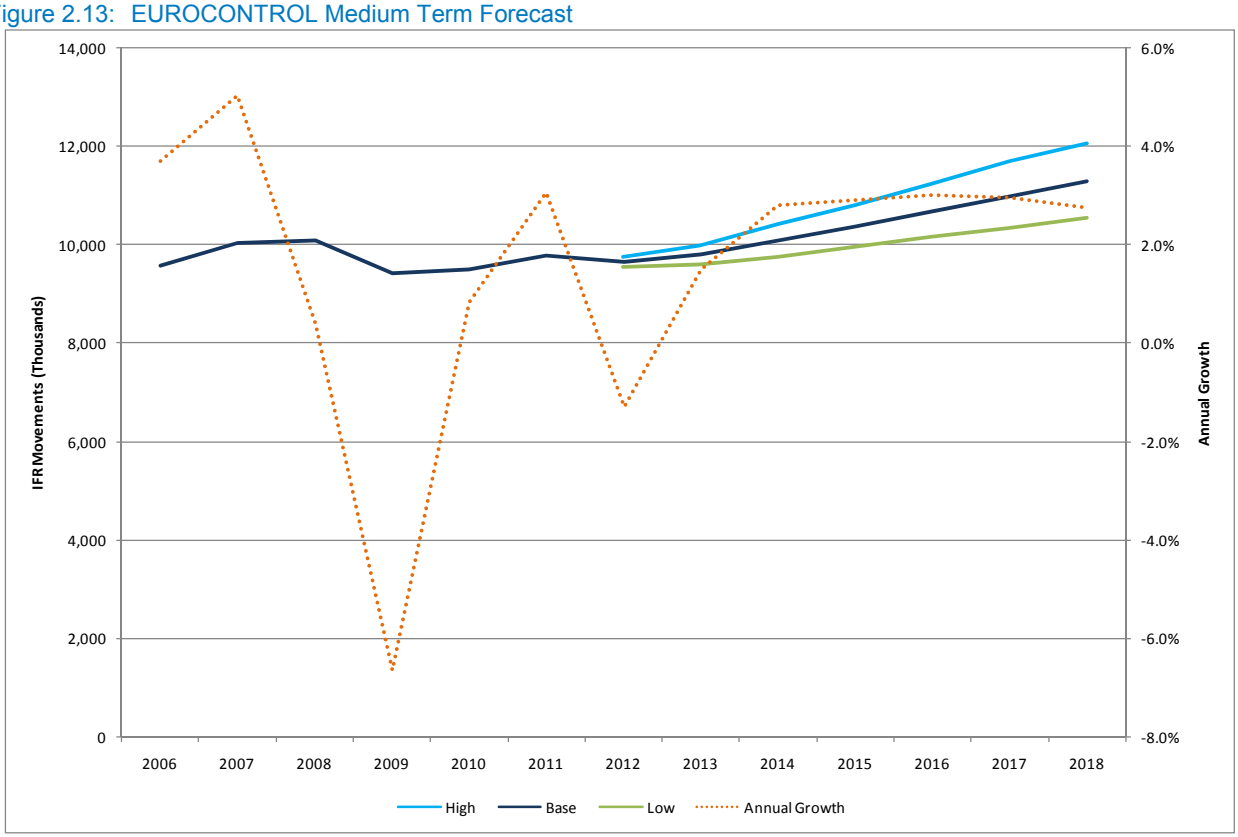
Using IFR movements as a measurement of aviation activity provides a useful overview from an operational standpoint. Rather than measuring absolute numbers of passengers or RPK, examining IFR movements allows for the analysis of overall aircraft operational activity within European airspace, therefore 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 The Medium Term Forecast

The medium term base case for traffic growth in Europe is forecast to be 11.3 million in 2018, 16% higher than 2011. The average annual growth is relatively weak at 2.1%. EUROCONTROL has also produced high and low traffic growth rates which differ in terms of methodology and input assumptions. Between them, the scenarios capture the most likely range of future growth in flight movements. The low case forecasts 10.6 million movements in 2018 with an annual growth of 1.1%. The high case forecasts 12.1 million movements in 2018 with an annual growth of 3.0%.

Figure 2.13 shows the low, base and high cases with the annual growth for the base case.

Figure 2.13: EUROCONTROL Medium Term Forecast




Source: EUROCONTROL

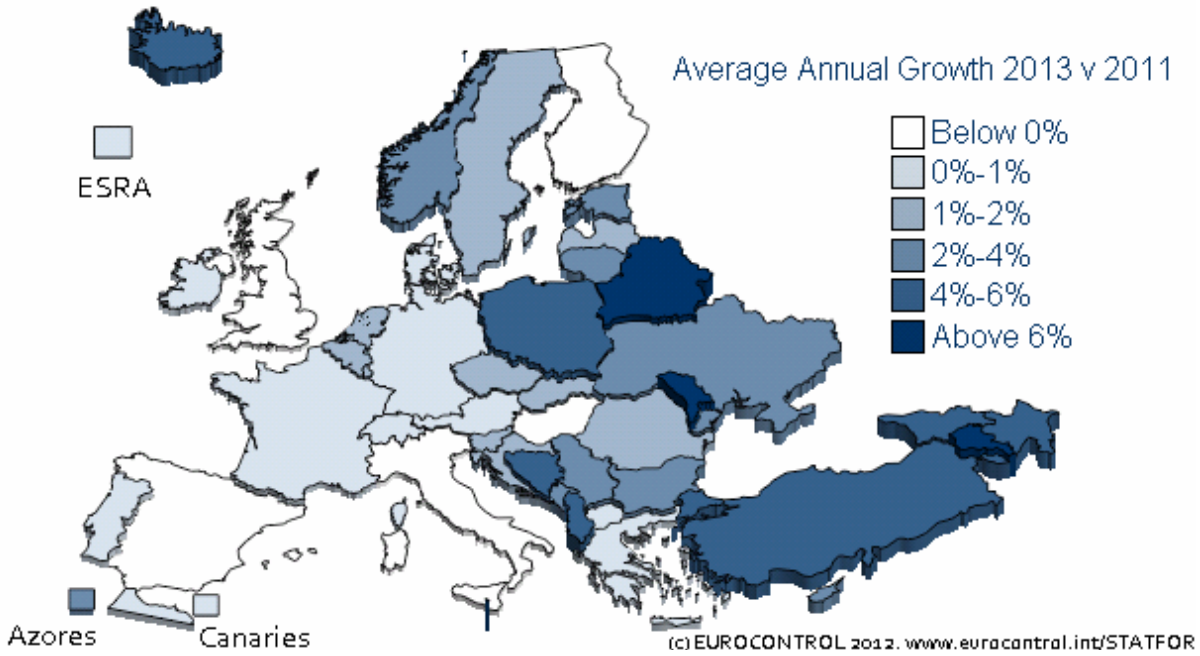
Traffic is forecast to decline in 2012 by 1.3% (+/- 1%). In Western Europe, this is largely influenced by the poor economic outlook and declines in traffic growth at the beginning of the winter timetable. To the East, traffic growth is forecast to remain positive in the short term. The recovery is expected to begin in 2013 with growth of 1.5% (+/- 1%).

The short term the forecast is influenced by a number of factors and events. These result in risks to the forecast that include:

- Recovery of flights to Egypt, affecting much of South-East Europe
- Reactions to the failures of Spanair and Malev
- Continuing revisions to airlines' plans for summer
- Restoration of Libyan overflights
- Growth to and from Russia
- The recent climb in fuel prices

Figure 2.14 highlights the differences at state level in average annual growth over two years.

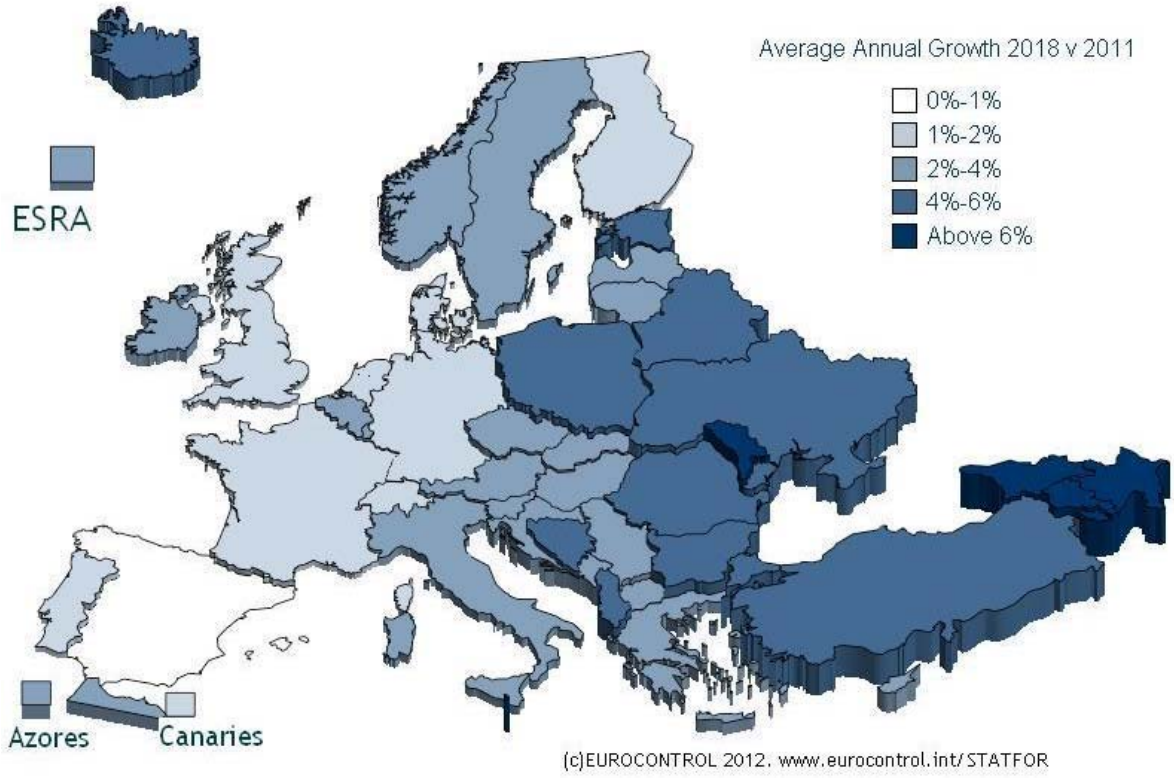
Figure 2.14: Average Annual Growth 2011-2013 by State




Source: EUROCONTROL

For the period from 2013 to 2018, traffic growth is expected to remain stable at approximately 3%. Similarly to the short term, growth will vary by state with stronger growth in the east. Figure 2.15 shows the medium term growth by state.

Figure 2.15: Average Annual Growth 2011-2018 by State



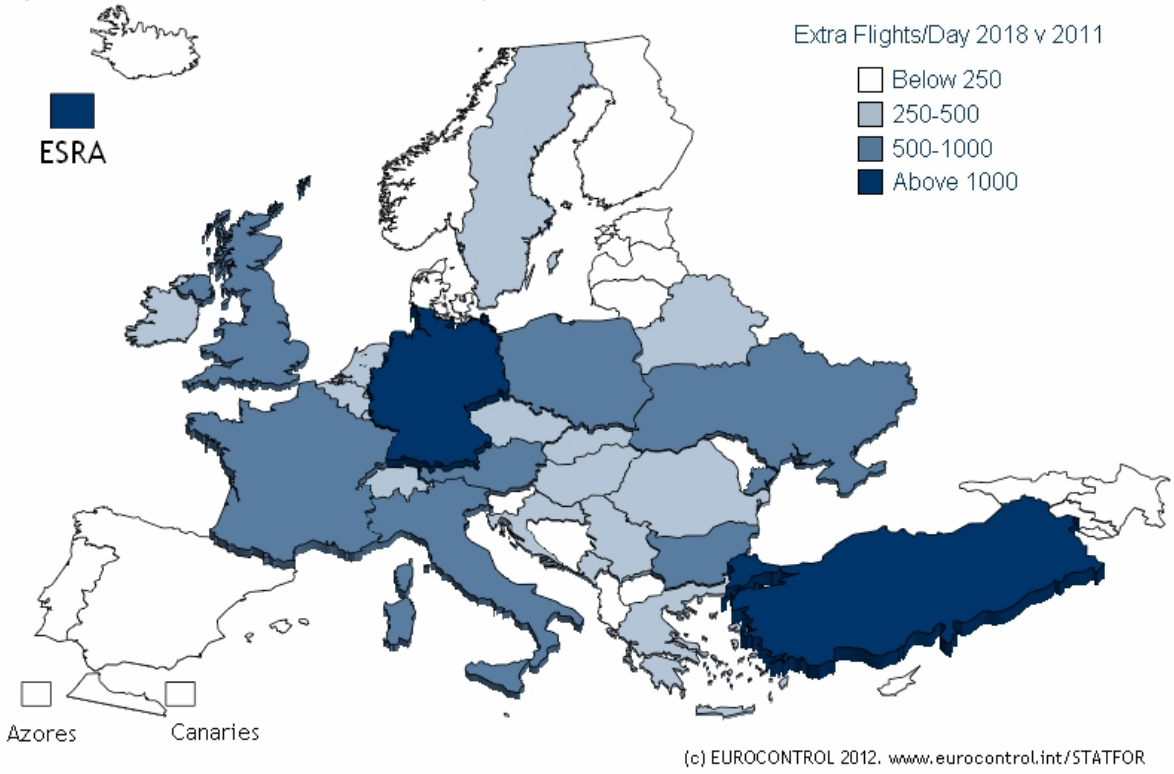

Source: EUROCONTROL

Over the whole period, a number of effects will reduce growth:

- Lack of airport capacity
- Continuing improvements to high-speed rail
- Aviation joining the EU Emissions Trading Scheme

In terms of absolute additional flights per day, traffic is forecast to increase the most in Turkey and Germany. Other major economies such as the UK and France are also forecast to have a significant increase in movements. Figure 2.16 shows the absolute change in movements between 2011 and 2018.

Figure 2.16: Absolute Growth 2018 v 2011 by State




Source: EUROCONTROL

## 2.6 World Air Cargo Forecast

While surface transport accounts for the majority of the world's freight market, air cargo remains important for industries that transport certain goods such as perishables and high value, low weight goods. The speed advantage of air cargo ensures air freight's role in the economy.

The most comprehensive long term forecast for global air cargo over the next 20 years is produced by Boeing. Boeing updates the cargo forecast bi-annually, with the most recent release in October 2012. Extracts and data from the report are presented here as they relate to the overall global activity of air cargo. The base year for the forecast is 2011.

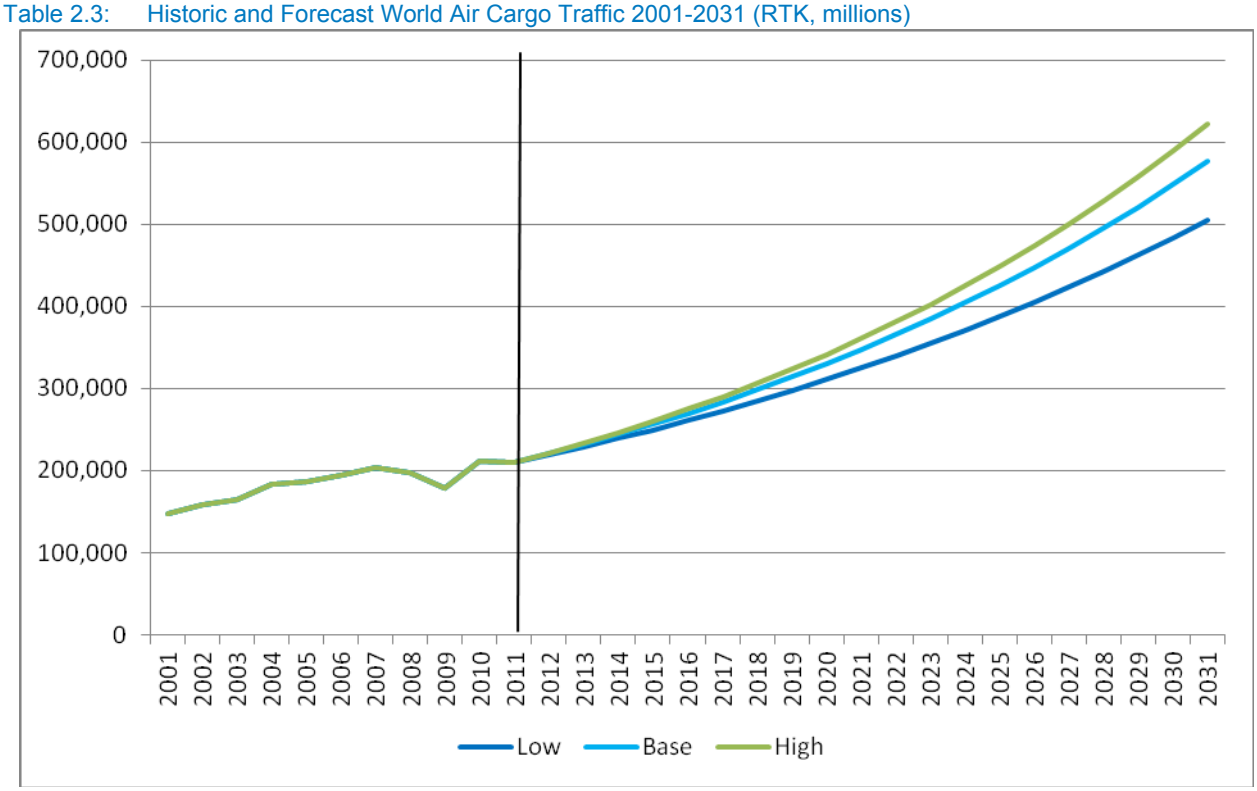
In its World Air Cargo Forecast 2012-2031, Boeing projects an average annual growth rate for global air cargo of 5.2% in the base case. The low and high cases forecast 4.5% and 5.6% respectively, measured in Revenue Tonne-Kilometres (RTKs), which is the amount of cargo carried multiplied by the distance it is transported.

Over the next 20 years Boeing forecasts that air freight, including express traffic, will average 5.3% annual growth while air mail will grow much more slowly, averaging 0.9% annual growth to 2031. Overall, world air cargo traffic will increase from 202.4 billion RTKs in 2011 to over 558.3 billion RTKs in 2031.

Asia will continue to lead the world air cargo industry in average annual growth rates, with domestic China and intra-Asia markets expanding 8.0% and 6.9% per year, respectively. Latin America markets with North

America and with Europe will grow at approximately the world average growth rate, as will Middle East markets with Europe. The more mature markets of North America and Europe reflect slower growth rates.

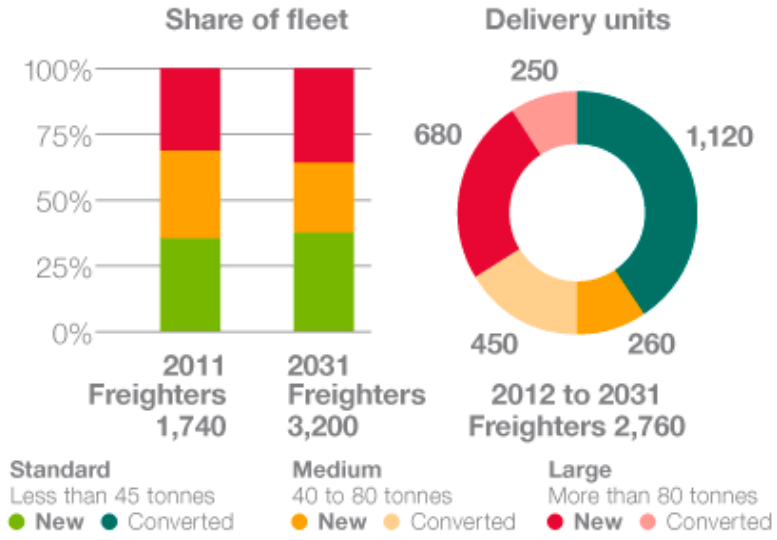
Table 2.3: Historic and Forecast World Air Cargo Traffic 2001-2031 (RTK, millions)




Source: Boeing World Air Cargo Forecast 2012-2031

Boeing predicts that the global economic growth and the need to replace aging airplanes will create a requirement for 2,760 freighter deliveries. The freighter fleet will nearly double in size, from 1,740 airplanes in 2011 to 3,200 in 2031.

Figure 2.17: Air Cargo market - Fleet Forecast




Source: Boeing World Air Cargo Forecast 2012-2031

New standard body freighters will mostly be passenger airplane conversions. The need for medium widebody freighters is driven by express carriers which value the balance between the lower cost per tonne achieved by larger aircraft and the schedule flexibility of smaller aircraft. The majority of large freighter deliveries will be new airplanes as the performance and reliability advantages outweigh the cost saving of a converted aircraft. This is particularly true for intercontinental cargo operations.

# 3. Airlines

## 3.1 Overview

2011 saw a continued recovery in global air passenger traffic following the resurgence witnessed in 2010. IATA member airline passenger traffic (measured in Revenue Passenger Kilometres) grew by nearly 6% in 2011 compared to 2010.

Airlines were able to maintain a similar level of passenger load factor (PLF) in 2011 as they collectively achieved in 2010, although they were more inclined to increase capacity in 2011 than in the previous year, with available seat-kms increasing 6.3% over 2010.

With an industry average of 78.1%, passenger load factors in 2011 were only slightly down on 2010 levels, a result of the increased capacity. PLF's were not uniform throughout the year, however, as early in 2011 load factors were depressed by shocks hitting Japan and North Africa.

As in most previous years, the cost of jet fuel remained a key concern for airlines in protecting profitability in 2011. Jet fuel prices were volatile during the year with peaks and troughs, but prices remained consistently higher than 2010 levels.

In reaction to higher costs spurred by the surge in fuel prices, airlines have responded by raising air fares.

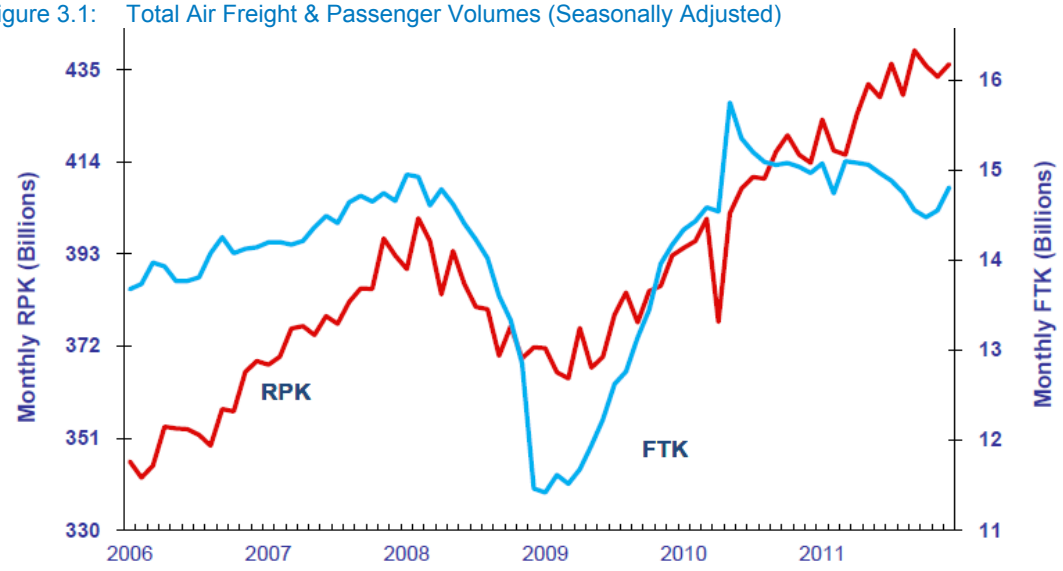
In 2011, industry-wide net profits of some US$ 8 billion are half of those recorded in the previous year, but still represents a reasonable outcome when compared against recent historical results. The core reason for the dip in net profits in 2011 is that the rise in expenses (10.8% year-on-year) outstripped that of revenues (9.4%), with high fuel costs the main contributory factor accounting for 30% of total costs in 2011. Non-fuel expenses also rose to its highest level in the last seven years, to US$405 billion.

## 3.2 Airline Financial Performance

### 3.2.1 Traffic & Capacity

2011 saw a continued recovery in global air passenger traffic following the resurgence witnessed in 2010. IATA member airline passenger traffic (measured in Revenue Passenger Kilometres) grew by nearly 6% in 2011 compared to 2010, while Freight Tonne Kilometres declined by just under 1%.

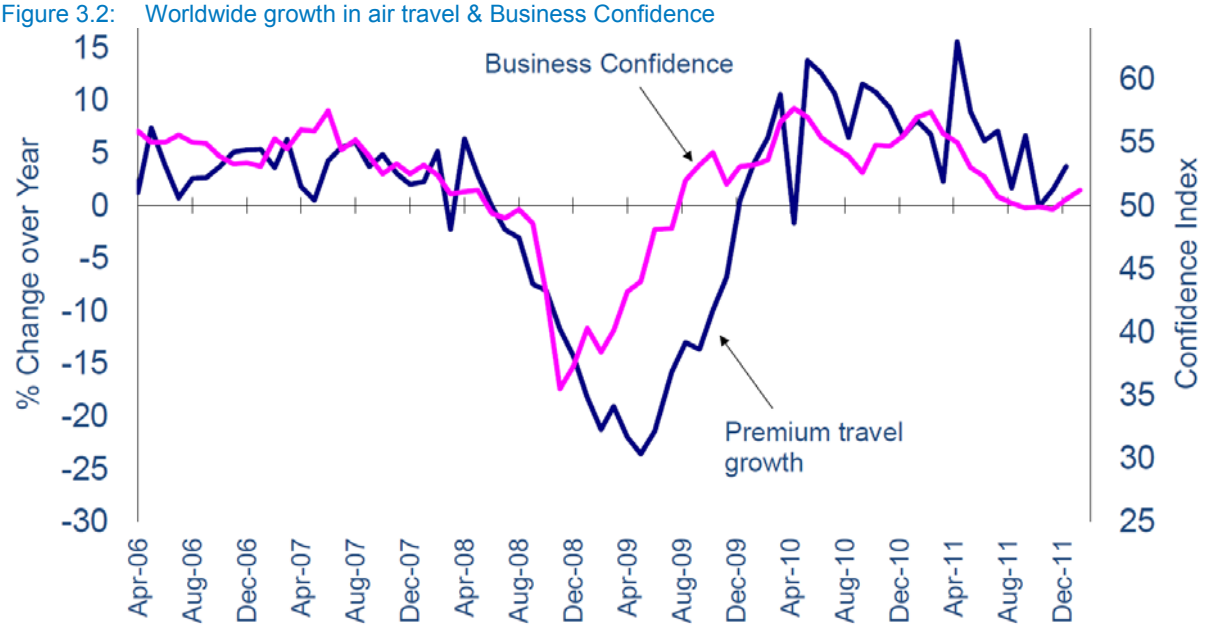
Figure 3.1: Total Air Freight & Passenger Volumes (Seasonally Adjusted)




Source: IATA

The continuation of the positive trend in passenger traffic growth was closely linked with steady global GDP growth during 2011 (albeit below 2010 levels), and its associated positive impact on business confidence. However, while Figure 3.2 shows that growth of premium fare traffic (First Class and Business Class passengers) remained positive in 2011, business confidence levels lagged those of 2010 resulting in lower average growth of premium air travel in 2011.

Figure 3.2: Worldwide growth in air travel & Business Confidence

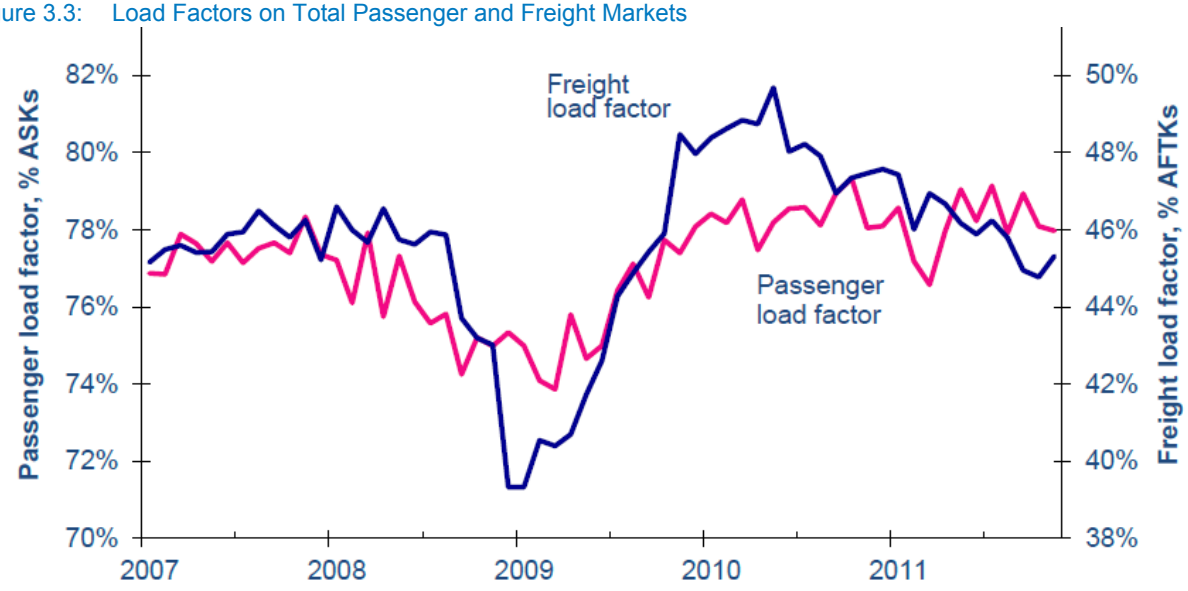



Source: IATA

Airlines were able to maintain a similar level of passenger load factor (PLF) in 2011 as they collectively achieved in 2010, although they were more inclined to increase capacity in 2011 than in the previous year

with available seat-kms increasing 6.3% over 2010, effectively restoring most of the capacity parked in 2010 in line with sustained growth in demand. With an industry average of 78.1%, passenger load factors in 2011 were only slightly down on 2010 levels, recording a decline of 0.3 percentage points (Figure 3.3), a result of this increased capacity. PLF's were not uniform throughout the year, however, as early in 2011 load factors were depressed by shocks hitting Japan and North Africa.

Figure 3.3: Load Factors on Total Passenger and Freight Markets



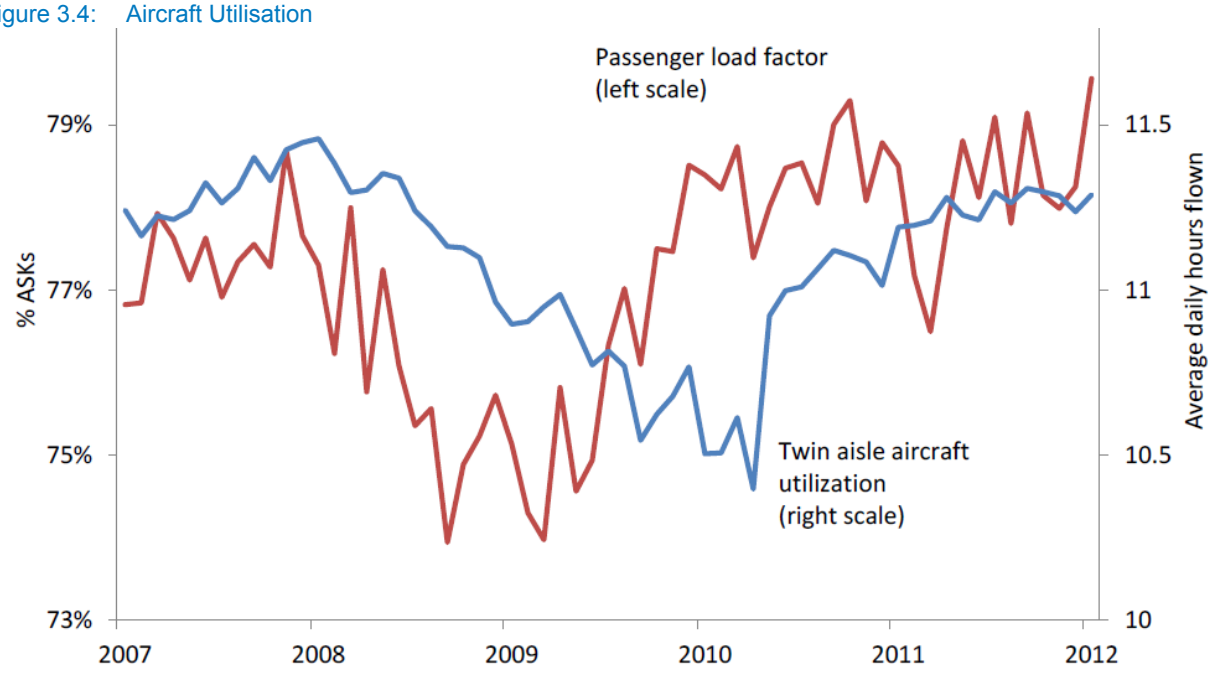

Source: IATA

For air freight, capacity declined in 2011 by 0.7% and load factors by 7.9 percentage points to 45.9%, continuing the downward that started in the 2nd quarter of 2010.

Freight load factors are always significantly below the levels achieved by passenger load factors for the following main reasons; the seasonality of freight; directional imbalances by route; 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 were using their assets more during 2011, achieving higher aircraft utilisations than in 2010 (Figure 3.4). This has been a key reason for the relatively good performance of the passenger business in most regions during 2011.

Figure 3.4: Aircraft Utilisation

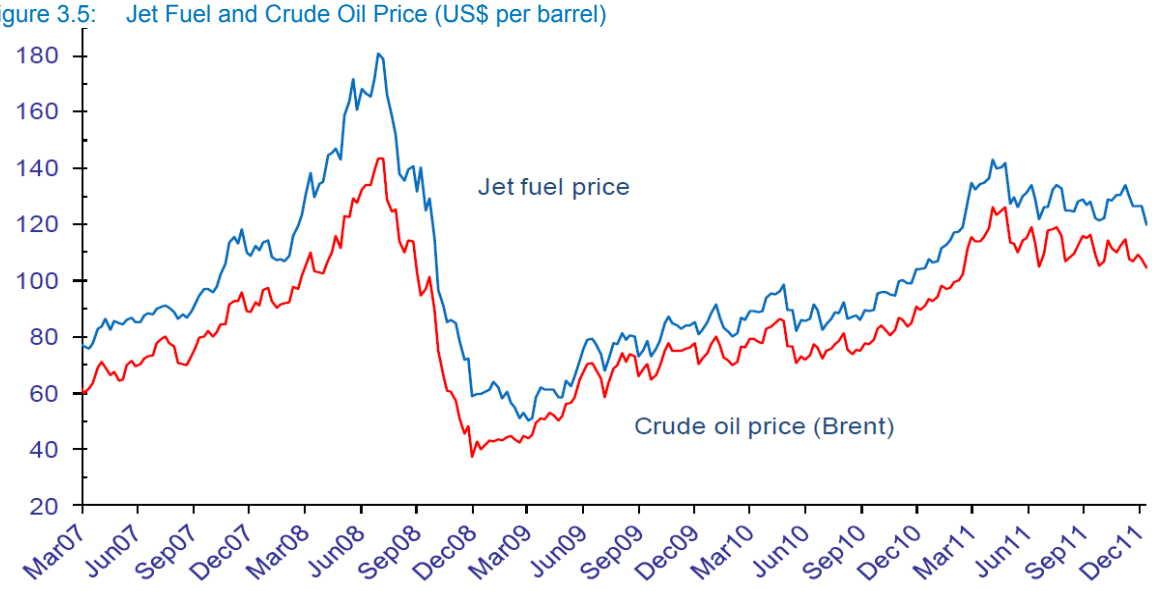



Source: IATA

### 3.2.2 Costs, Revenues & Profitability

As in most previous years, the cost of jet fuel remained a key concern for airlines in protecting profitability in 2011. Figure 3.5 below shows the volatility of jet fuel prices during the year with peaks and troughs, but prices remained consistently higher than 2010 levels.

Figure 3.5: Jet Fuel and Crude Oil Price (US$ per barrel)

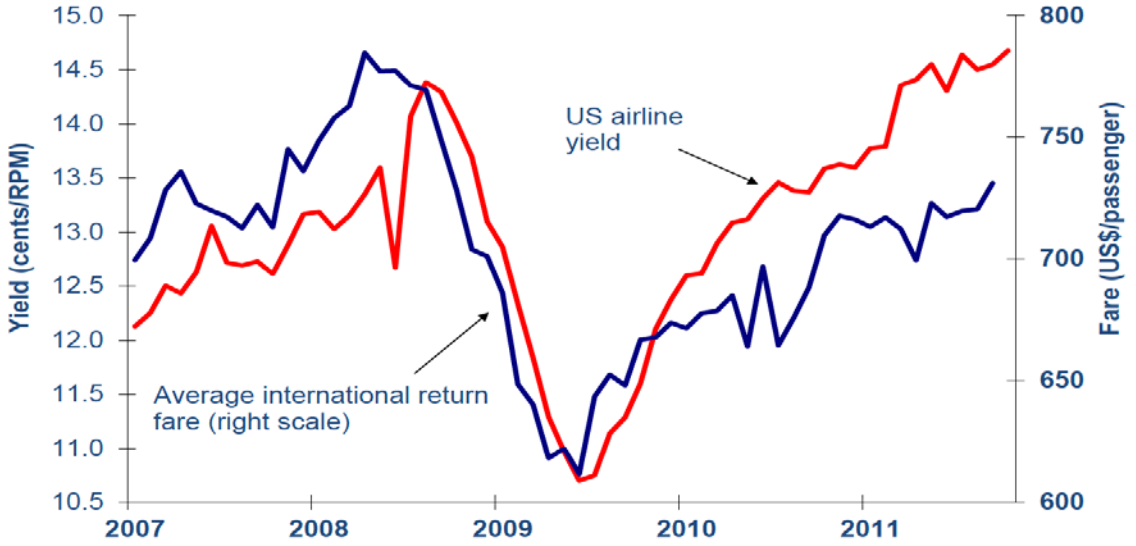



Source: IATA, Platts

The price of a barrel of jet kerosene (in US$) is shown for the period 2007 to 2011. There was a steady rise from March 2007 (at around $78 a barrel) to a peak of $180 by June 2008, then a substantial decline to around $52 by February 2009. This was proceeded by an apparently inexorable increase once more to a peak of some $140 by April 2011, since when prices remained consistently around the $120-$130 mark. The dramatic increases in the early months of 2011 are mainly attributed to the political destabilisation of North Africa and the oil-rich Middle East.

In reaction to higher costs spurred by the surge in fuel prices, airlines have responded by raising air fares. Figure 3.6 shows that the average international return air fare in 2011 was around US$50 higher than the previous year average. Also highlighted on the graph is how this increase in air fares translates into airline yields, with the example of US airline yields tracking the upward trend. Air fares and yields have been increasing since mid-2009 and continued to do so through 2011.

Figure 3.6: Average International Return Air Fare and US Airline Yield




Source: IATA

Table 3-1 is IATA's summary of the recent history of global airline costs and revenues, based on actuals provided by ICAO.

Table 3-1: System-Wide Global Commercial Airlines Industry Statistics

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|
| **REVENUES, US$ billion** | **413** | **465** | **510** | **570** | **476** | **547** | **598** |
| % change | 9.1 | 12.5 | 9.6 | 11.7 | -16.5 | 14.9 | 9.4 |
| Passenger | 323 | 365 | 399 | 444 | 374 | 425 | 468 |
| Cargo | 48 | 53 | 59 | 63 | 48 | 66 | 69 |
| Traffic Volumes | | | | | | | |
| Passenger growth, TKP, % | 7.0 | 5.0 | 6.4 | 1.5 | -2.1 | 7.3 | 5.9 |
| Passenger numbers (million) | 2,211 | 2,325 | 2,518 | 2,507 | 2,479 | 2,681 | 2,835 |
| Cargo growth, TKP, % | 0.4 | 4.8 | 4.8 | -1.0 | -9.8 | 18.7 | -0.6 |
| Freight tonnes (million) | 37.6 | 40.0 | 42.0 | 41.0 | 40.7 | 48.0 | 47.6 |
| World economic growth, % | 3.4 | 4.0 | 3.8 | 1.7 | -2.3 | 3.9 | 2.5 |

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|
| Passenger yield, % | 2.7 | 7.8 | 2.7 | 9.5 | -14.0 | 6.1 | 4.0 |
| Cargo yield, % | 2.4 | 5.9 | 5.5 | 7.4 | -14.2 | 15.0 | 5.5 |
| | | | | | | | |
| **EXPENSES, US$ billion** | **409** | **450** | **490** | **571** | **474** | **525** | **582** |
| % change | 8.9 | 10.1 | 8.8 | 16.5 | -16.9 | 10.7 | 10.8 |
| Fuel | 91 | 117 | 135 | 189 | 125 | 139 | 177 |
| % of expenses | 22 | 26 | 28 | 33 | 26 | 26 | 30 |
| Crude oil price, USD/b | 54.5 | 65.1 | 73.0 | 99.0 | 62.0 | 79.4 | 111.2 |
| Non-Fuel | 318 | 333 | 355 | 382 | 349 | 386 | 405 |
| Cents per ATK (non-fuel unit cost) | 38.6 | 38.9 | 39.3 | 41.8 | 39.6 | 41.6 | 41.3 |
| % change | -2.1 | 0.8 | 0.8 | 6.4 | -5.2 | 5.1 | -0.7 |
| | | | | | | | |
| Break even load factor, % | 62.0 | 61.2 | 60.9 | 63.2 | 62.3 | 63.1 | 62.9 |
| Weight load factor achieved, % | 62.6 | 63.3 | 63.4 | 63.1 | 62.6 | 65.7 | 64.7 |
| | | | | | | | |
| **OPERATING PROFIT, US$ billion** | **4.4** | **15.0** | **19.9** | **-1.1** | **1.9** | **28.9** | **14.1** |
| % margin | 1.1 | 3.2 | 3.9 | -0.2 | 0.4 | 5.3 | 2.3 |
| | | | | | | | |
| **NET PROFIT, US$ billion** | **-4.1** | **5.0** | **14.7** | **-26.1** | **-4.6** | **15.8** | **7.9** |
| % margin | -1.0 | 1.1 | 2.9 | -4.6 | -1.0 | 2.9 | 1.3 |

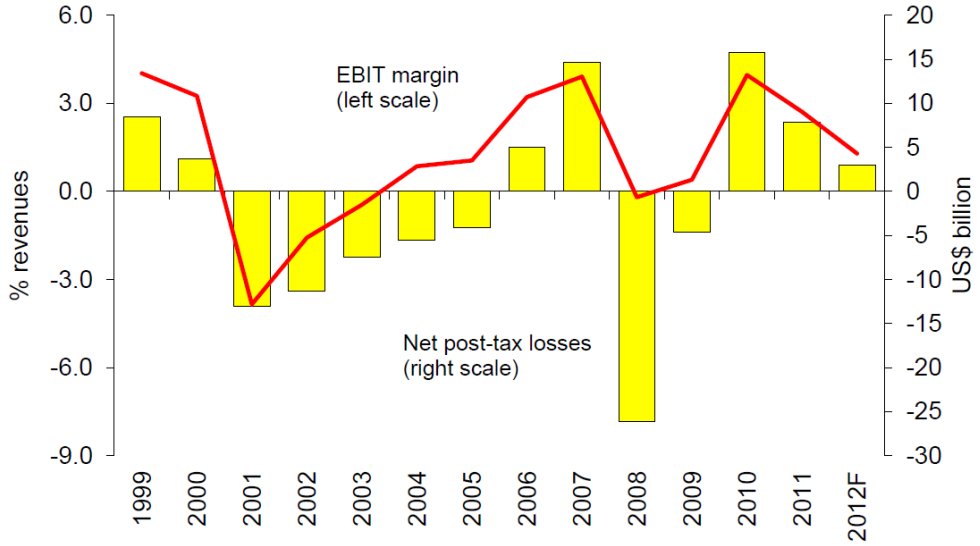
Source: IATA Fact Sheet March 2012; ICAO News Release 5th July 2012: COM 14/12

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

In 2011, industry-wide net profits of some US$ 8 billion are half of those recorded in the previous year, but still represents a reasonable outcome when compared against recent historical results. The core reason for the dip in net profits in 2011 is that the rise in expenses (10.8% year-on-year) outstripped that of revenues (9.4%), with high fuel costs the main contributory factor accounting for 30% of total costs in 2011. Non-fuel expenses also rose to its highest level in the last seven years, to US$405 billion.

Figure 3.7 shows the same profits and losses in terms of net result as a percentage of revenue and covering the longer period from 1999, including the related EBIT result. The impacts of the terrorism events of 2001 and the associated decline in air travel demand, as well as the recession of 2008/09 are clearly shown, while the result for 2011 shows positive returns but the start of a predicted downward trend, with a further reduction in profit predicted for 2012.

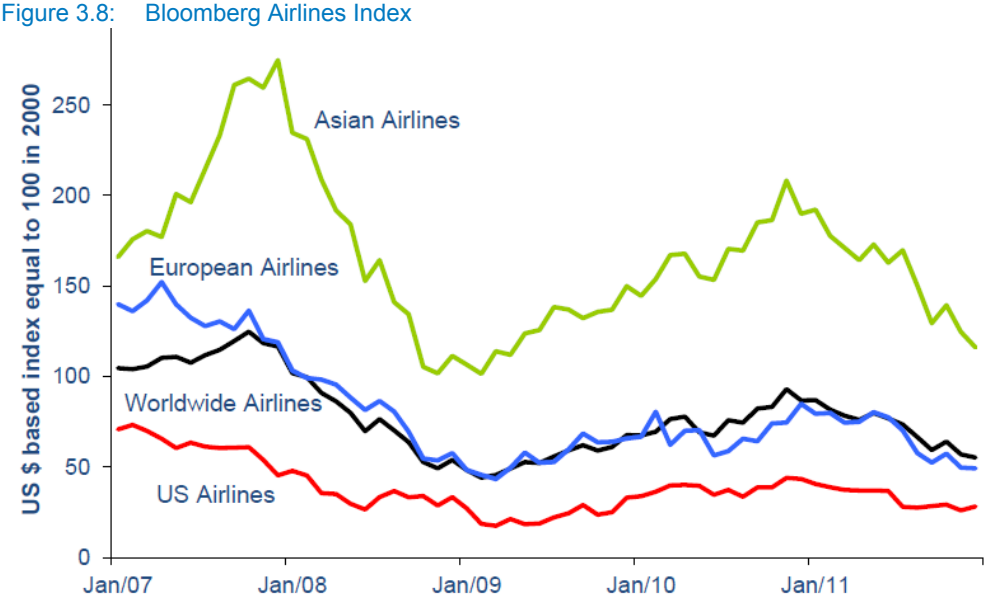
Figure 3.7: Global Commercial Airline Profitability




Source: IATA, ICAO

During 2011, share values of airlines across the globe quoted on stock exchanges showed a marked decline, reversing the trend seen in 2010. In terms of share value, airlines based in Asia have consistently outperformed other European airlines in the period since 2007, while those based in the U.S. have yielded significantly inferior results (Figure 3.8). The market outlook, as gauged by stock market performance, indicates a particularly negative sentiment for airlines relative to other industries.

Figure 3.8: Bloomberg Airlines Index




Source: IATA; Bloomberg

In a global regional context, according to ICAO[39], "varying regional economic conditions and high jet fuel price volatility were the primary factors in the 2010–2011 global performance discrepancies. From a more regional standpoint, Asia/Pacific airlines posted the strongest financial performance during 2011, with net profits of $10.8 billion. European airlines posted less than $1 billion in net profit in 2011, while African operators registered a net loss of about $100 million."

According to analyses of airline group financial results (Table 3-2), 2011 produced a mixed bag of fortunes. Among the top ten global carriers (ranked by revenues), six recorded increased net profit compared to 2010, and four recorded a decline year-on-year. Of these, the Air France/KLM Group, Lufthansa and American Airlines parent AMR Corp. all suffered net losses – with the US major carrier filing for Chapter 11 bankruptcy protection in the United States in the latter part of 2011.

Three of the top five airline groups ranked by revenue are European, with Lufthansa Group marginally topping the rankings ahead of the US majors United-Continental and Delta. The three European giants of Lufthansa, Air France-KLM and IAG all underwent business restructuring in 2011 – mostly in shorthaul operations – and their financial results were compounded by underperformance in key areas, in addition to coping with higher fuel costs and a generally weak economic climate.

Table 3-2: 2011 Top 25 Airline Groups by Revenue

| Ranking in 2011 | Group/Airline | Country | Region | Revenues (US$ m) | Net Profit ($m) | |
|---|---|---|---|---|---|---|
| | | | | | 2011 | 2010 |
| 1 | Lufthansa Group | Germany | EU | 37,206 | -17 | 1,499 |
| 2 | United-Continental Holdings | USA | North America | 37,110 | 840 | 253 |
| 3 | Delta Air Lines | USA | North America | 35,115 | 854 | 593 |
| 4 | Air France-KLM Group | France | EU | 31,542 | -581 | 1,299 |
| 5 | International Airlines Group (IAG) | UK | EU | 24,884 | 695 | - |
| 6 | FedEx Express | USA | North America | 24,581 | - | - |
| 7 | AMR | USA | North America | 23,979 | -1,979 | -471 |
| 8 | ANA Group | Japan | Asia Pacific | 17,154 | 342 | 283 |
| 9 | Emirates | UAE | Middle East | 16,954 | 441 | 1,488 |
| 10 | Qantas | Australia | Asia Pacific | 15,780 | 260 | 99 |
| 11 | Southwest Airlines | USA | North America | 15,658 | 178 | 459 |
| 12 | Japan Airlines Corporation | Japan | Asia Pacific | 15,170 | 2,350 | - |
| 13 | Air China | China | Asia Pacific | 14,928 | 1,071 | 1,871 |
| 14 | China Southern Airlines | China | Asia Pacific | 14,203 | 957 | 970 |
| 15 | US Airways | USA | North America | 13,055 | 71 | 502 |
| 16 | China Eastern Airlines | China | Asia Pacific | 12,661 | 722 | 750 |
| 17 | Cathay Pacific | Hong Kong | Asia Pacific | 12,645 | 707 | 1,805 |
| 18 | Singapore Airlines Group | Singapore | Asia Pacific | 11,816 | 356 | 1,124 |
| 19 | Air Canada | Canada | North America | 11,385 | -244 | -24 |
| 20 | Korean Air | South Korea | Asia Pacific | 10,575 | 85 | 538 |

[39] ICAO News Release 5th July 2012; COM 14/12

| Ranking in 2011 | Group/Airline | Country | Region | Revenues (US$ m) | Net Profit ($m) 2011 | 2010 |
|---|---|---|---|---|---|---|
| 21 | Turkish Airlines | Turkey | Europe (Non-EU) | 7,163 | 12 | 184 |
| 22 | TAM Linhas Aereas | Brazil | Latin America | 6,960 | 140 | 400 |
| 23 | Thai Airways International | Thailand | Asia Pacific | 6,456 | -338 | 491 |
| 24 | Ryanair | Ireland | EU | 6,100 | 709 | 565 |
| 25 | SAS Group | Sweden | EU | 6,005 | -245 | -327 |

Source: Air Transport World – World Airline Report July 2012

Ten of the top 25 in the list are Asia Pacific airline groups, with ANA and Qantas featuring in the top 10 and both posting improved net profits in 2011 over 2010. Indeed, all ten of this region's airlines groups (representing Asia Pacific's major carriers) posted net gains, bar Thai Airways, underlining the positive effect that a conducive economic environment can have on air travel demand.

On the periphery of the top 25 airline groups is embattled carrier SAS, which in 2011 recorded a net loss but improved upon its 2010 result.

## 3.3 Major Market Entries and Exits in Europe

In 2011, several airlines of significance entered the European market, recorded in Table 3-3.

Table 3-3 European Airline New Entrants in 2011

| Airline | Country | Remarks |
|---|---|---|
| Airmel Linhas Aereas | Spain | Started domestic scheduled passenger services from Melilla to Malaga, with help from DAT- Danish Air Transport |
| Corendon Dutch Airlines | Netherlands | Subsidiary of a Turkish carrier (Corendon) offering international charter passenger services from destinations in the Netherlands to destinations in Europe |
| FLYNEXT | Germany | International charter passenger services operated by Germania |
| Good Fly | Spain | Start up carrier offering regional services in Spain and Portugal |
| Helitt | Spain | Domestic scheduled passenger services from Malaga to Melilla |
| Hermes Airlines | Greece | Greek airline start up |
| HiAir | UK | Corporate Air Taxi service offering passenger services from Doncaster / Sheffield |
| Jet-Ops Europe | Bulgaria | Scheduled seaplane passenger services from Venice-Harbour |
| Nordic Global Airlines | Finland | International scheduled cargo services from Helsinki to Frankfurt, Hong Kong, New York-JFK, Seoul and Shanghai-Pudong, operated on behalf of Finnair Cargo (as at 08/11). |

Source: Ascend

A number of airlines operating in Europe ceased operations and entered insolvency in 2011. Table 3-4 lists the most significant of these.

Table 3-4 European Airlines Ceasing Operations in 2011

| Airline | Country | Remarks |
|---|---|---|
| Martinair Holland | Netherlands | Announced its intention to restructure as a pure cargo airline in October 2010. Completed its withdrawal from the passenger market on 31 October 2011 |

| Airline | Country | Remarks |
|---|---|---|
| Eagles Airlines (or Prima) | Italy | Italian domestic and regional carrier based in Venice ceased operating in November |
| Amsterdam Airlines | Netherlands | Dutch charter carrier based at Amsterdam ceased operations in November |
| Robin Hood Aviation | Austria | Austrian Graz-based regional carrier ceased operations in September following insolvency |
| Wizz Air Bulgaria | Bulgaria | In 2011 merged with parent Wizz Air Hungary citing operational reasons. Operated low cost services from Sofia base across Europe |
| Air Sweden | Sweden | Stockholm-Arlanda based regional carrier filed for bankruptcy in September. It operated 4 narrowbody aircraft |
| Astraeus Airlines | UK | UK wet-lease operator ceased operations in November citing lack of sufficient demand to continue service |
| Comtel Air | Austria | Austrian start-up carrier ceased operations in November after less than two months in service |
| Tor Air | Sweden | Gothenburg-based charter and wet-lease operator grounded in December for failure to meet financial criteria |

Source: OAG/Ascend

## 3.4 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.

### 3.4.1 Top 25 Carriers

The worldwide capacity (ASKs) of all airlines publishing schedules in OAG increased by 6.3% in 2011 compared to 2010.

Capacity growth for the top 25 legacy carriers measured in ASKs grew by 4.7% over 2010 (Table 3-5). Top of the capacity rankings by some distance is Delta Air Lines, which posted growth of 4.0%. US major carriers dominate the top three places with American and United in second and third respectively, but both of these airlines recorded flatter growth in capacity – indeed, United is one of only two carriers in the top 25 to post a decline in 2011 (the other being Japan Airlines due to the impact of the tsunami). United's capacity cuts were likely a result of restructuring resulting from its merger with Continental in 2010.

The Middle East airlines of Emirates and Qatar Airways both increased capacity substantially, as did Turkish Airlines, as each of these continued to extend their networks.

Table 3-5: Top 25 Legacy Carriers

| Rank | Airline | Region | 2011 ASKs (millions) | vs. 2010 | ASK YoY growth (millions) |
|---|---|---|---|---|---|
| 1 | Delta Air Lines | North America | 327,541 | 4.0% | 12,504 |
| 2 | American Airlines | North America | 255,405 | 0.8% | 1,942 |
| 3 | United Airlines | North America | 192,619 | -2.3% | -4,537 |
| 4 | Emirates Airlines | Middle East | 190,006 | 9.8% | 16,910 |
| 5 | Lufthansa German Airlines | EU | 179,779 | 7.9% | 13,200 |

| Rank | Airline | Region | 2011 ASKs (millions) | vs. 2010 | ASK YoY growth (millions) |
|---|---|---|---|---|---|
| 6 | Air France | EU | 161,004 | 4.8% | 7,319 |
| 7 | Continental Airlines | North America | 160,610 | 5.1% | 7,862 |
| 8 | British Airways | EU | 149,059 | 3.9% | 5,530 |
| 9 | Cathay Pacific Airways | Asia Pacific | 125,426 | 10.6% | 11,980 |
| 10 | Singapore Airlines | Asia Pacific | 117,025 | 6.2% | 6,883 |
| 11 | US Airways | North America | 116,934 | 1.2% | 1,435 |
| 12 | China Southern Airlines | Asia Pacific | 115,223 | 8.5% | 9,030 |
| 13 | Air China | Asia Pacific | 105,853 | 5.8% | 5,774 |
| 14 | Air Canada | North America | 101,962 | 8.7% | 8,198 |
| 15 | China Eastern Airlines | Asia Pacific | 95,307 | 8.1% | 7,177 |
| 16 | Qantas Airways | Asia Pacific | 91,109 | 2.3% | 2,066 |
| 17 | KLM-Royal Dutch Airlines | EU | 90,150 | 4.2% | 3,612 |
| 18 | Korean Air | Asia Pacific | 83,569 | 7.6% | 5,916 |
| 19 | Qatar Airways | Middle East | 83,101 | 17.4% | 12,290 |
| 20 | Thai Airways Intl | Asia Pacific | 79,967 | 3.8% | 2,955 |
| 21 | All Nippon Airways | Asia Pacific | 76,901 | 8.6% | 6,089 |
| 22 | TAM Linhas Aereas | Latin America | 76,244 | 9.0% | 6,309 |
| 23 | Turkish Airlines | Europe (ex-EU) | 75,308 | 23.2% | 14,177 |
| 24 | Japan Airlines | Asia Pacific | 73,256 | -23.5% | -22,446 |
| 25 | Iberia | EU | 64,222 | 0.4% | 261 |
| | **Top 25 Total** | | 3,187,581 | 4.7% | 142,436 |

Source: OAG

The final preparations for the merger of British Airways and Iberia under a single parent company, International Airlines Group (IAG), were completed in January 2011.

### 3.4.2 Europe

IATA reported that its European-based airlines achieved year-on-year passenger traffic increases of 9.5%, narrowly trailing the collective seat capacity increase of 10.2% in 2011. Average load factors dipped to 78.9% from 79.4% in 2010. These increases have been recorded despite the ongoing Eurozone financial/debt crisis throughout 2011.

The Association of European Airlines (AEA) recorded an annual RPK growth for its member airlines of 7.6%, lower than that reported by IATA (Table 3-6). This might be explained by the fact that AEA membership is primarily legacy European carriers and the lower growth recorded reflects that a significant portion of the additional capacity and passenger growth on European routes came from low cost carriers (LCCs). It is in the segmented data reported by AEA that we see the effects of the Eurozone financial/debt crisis on traffic growth. Domestic markets witnessed dampened demand, with traffic growth a mere 1.2% and declines in both passengers boarded (-0.7%) and capacity (-0.1%). However, the worst performing market in 2011 for AEA carriers was Europe-North Africa, severely impacted by the political turmoil in Tunisia, Egypt, and Libya in particular. Traffic and passengers declined by nearly a quarter as airlines cancelled flights to affected areas.

Table 3-6: Scheduled Services of AEA Member Airlines in 2011

| Region | Passenger Data (2011) | | | | Change vs. previous year | | | |
|---|---|---|---|---|---|---|---|---|
| | Passengers Boarded (000) | Traffic RPK (million) | Capacity ASK (million) | Load Factor % | Pax % | Traffic % | Capacity % | PLF Pts |
| Domestic (1) | 92,234 | 49,762 | 72,251 | 68.8 | -0.7% | 1.2% | -0.1% | 1.0 |
| Cross-border Europe (2) | 183,602 | 199,476 | 277,960 | 71.2 | 8.9% | 8.4% | 6.8% | 1.1 |
| Total Europe (1+2) | 275,837 | 249,238 | 350,211 | 70.7 | 5.5% | 6.9% | 5.3% | 1.1 |
| Europe - North Africa (3) | 3,936 | 7,788 | 11,605 | 67.1 | -24.1% | -23.4% | -19.6% | -3.2 |
| Europe - Middle East (4) | 10,482 | 33,189 | 47,579 | 69.7 | 6.1% | 5.1% | 7.7% | -1.7 |
| Intl Short/Medium Haul (2+3+4) | 198,020 | 240,453 | 337,143 | 70.9 | 7.8% | 6.5% | 5.7% | 0.6 |
| North Atlantic (5) | 29,526 | 205,254 | 248,327 | 82.0 | 7.8% | 8.3% | 10.1% | -1.5 |
| Mid Atlantic (6) | 7,054 | 54,875 | 66,990 | 81.8 | 8.6% | 9.2% | 10.0% | -0.6 |
| South Atlantic (7) | 6,615 | 59,902 | 70,481 | 84.9 | 12.3% | 13.1% | 13.0% | 0.1 |
| Europe - Sub Saharan Africa (8) | 9,468 | 61,226 | 78,992 | 77.5 | 6.4% | 6.0% | 5.8% | 0.2 |
| Europe - Far East/Australasia (9) | 20,366 | 163,286 | 204,946 | 79.6 | 10.3% | 8.7% | 13.7% | -3.7 |
| Total Long Haul (5 to 9*) | 73,272 | 544,848 | 670,213 | 81.1 | 8.7% | 8.7% | 10.9% | -1.7 |
| Total Intl (2 to 9*) | 271,292 | 785,302 | 1,007,356 | 77.7 | 8.1% | 8.1% | 9.1% | -0.8 |
| Total Scheduled (1 to 9*) | 363,526 | 835,064 | 1,079,607 | 77.1 | 5.7% | 7.6% | 8.4% | -0.6 |

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

For AEA carriers in 2011, strong passenger growth was achieved on routes to the South Atlantic (+12.3%), the Far East/Australasia (+10.3%) and Cross Border Europe (+8.9%).

Overall a solid platform of growth was achieved and, as Table 3-7 shows, most major European airlines contributed to that growth, as significant double-digit growth in passenger numbers were experienced by Lufthansa, KLM, easyJet, Turkish Airlines, Finnair, Norwegian, Wizz Air and Pegasus.

Other airlines achieving substantial passenger growth in 2011 were British Airways, Ryanair, Swiss, TAP and Condor.

According to the data, the only major European airlines to record declines in passenger numbers in 2011 were Virgin Atlantic, Air Europa, Thomas Cook and Monarch – the latter two UK airlines severely affected by the North African political turmoil.

Table 3-7: Top 25 European Airlines ranked by RPKs in 2011

| Airline | Passenger Data | | | | % change vs. previous year | | | |
|---|---|---|---|---|---|---|---|---|
| | Passengers Boarded (million) | Traffic RPK (million) | Capacity ASK (million) | Load Factor % | Pax | Traffic | Capacity | PLF Pts |
| Lufthansa | 65.5 | 141,055 | 182,609 | 77.2 | 11.1 | 8.8 | 11.8 | -2.2 |
| Air France | 50.0 | 133,036 | 165,555 | 80.4 | 6.4 | 6.3 | 6.4 | -0.1 |
| British Airways | 33.0 | 117,348 | 150,152 | 78.2 | 8.0 | 10.6 | 9.8 | 0.6 |
| Ryanair | 76.4 | 93,875 | 114,026 | 82.1 | 7.3 | 14.6 | 15.2 | -0.6 |
| KLM | 25.1 | 82,047 | 97,198 | 84.4 | 10.0 | 7.9 | 7.0 | 0.7 |

| | Passenger Data | | | | % change vs. previous year | | | |
|---|---|---|---|---|---|---|---|---|
| easyJet | 54.5 | 61,347 | 69,318 | 88.5 | 11.7 | 9.3 | 10.1 | -0.7 |
| Turkish Airlines | 32.6 | 58,876 | 81,120 | 72.6 | 12.1 | 22.8 | 24.6 | -1.1 |
| Air Berlin | 35.3 | 52,140 | 62,160 | 83.9 | 1.2 | 11.0 | 1.8 | 6.9 |
| Iberia | - | 51,268 | 63,042 | 81.3 | - | 0.1 | 1.2 | -0.9 |
| Virgin Atlantic Airways | 5.3 | 38,038 | 49,029 | 77.6 | -0.2 | -0.3 | 6.0 | -5.0 |
| Alitalia | 24.6 | 34,544 | 48,429 | 71.3 | 5.5 | 5 | 3.7 | 0.8 |
| Thomson Airways | 11.0 | 32,969 | 36,910 | 89.3 | 0.8 | 0.8 | 1.5 | -0.6 |
| Swiss International Air Lines | 15.3 | 31,606 | 38,627 | 81.8 | 8.1 | 7.1 | 7.7 | -0.5 |
| Thomas Cook Airlines | 8.0 | 27,418 | 29,383 | 93.3 | -1.8 | 0.1 | -0.1 | 0.2 |
| TAP Portugal | 9.8 | 25,945 | 34,009 | 76.3 | 8.8 | 9.7 | 6.7 | 2.1 |
| Scandinavian Airlines | 22.9 | 24,839 | 33,306 | 74.6 | 6.4 | 5.7 | 6.6 | -0.6 |
| Condor | 6.2 | 23,574 | 26,316 | 89.6 | 7.7 | 18.5 | 17.8 | 0.6 |
| Finnair | 8.0 | 21,498 | 29,345 | 73.3 | 12.2 | 11.8 | 16.8 | -3.3 |
| Austrian | 11.3 | 17,792 | 24,124 | 73.8 | 3.4 | 1.7 | 5.9 | -3.1 |
| Air Europa | 8.7 | 17,713 | 22,296 | 79.4 | -2 | 3.1 | 3.2 | 0 |
| Norwegian | 15.7 | 17,421 | 21,958 | 79.3 | 20.5 | 26.5 | 23.3 | 2 |
| Monarch Airlines | 5.9 | 14,277 | 16,972 | 84.1 | -2.4 | -5.6 | -4.4 | -1.1 |
| Wizz Air | 11.2 | 14,250 | 16,964 | 84 | 16.7 | 16.1 | 16.1 | 0 |
| Aer Lingus | 9.5 | 14,051 | 18,593 | 75.6 | 1.8 | 1.1 | 1.8 | -0.5 |
| Pegasus Airlines | 11.3 | 14,000 | 19,000 | 73.7 | 31.4 | 31.3 | 31.1 | 0.1 |
| Total Top 25 | 557.1 | 1,160,927 | 1,450,441 | 80.0 | | | | |

Source: Airline Business (August 2012 edition)

### 3.4.3 North America

IATA reported that its North American-based airlines achieved a collective year-on-year RPK increase of 4.0% in 2011 over 2010, trailing a seat capacity increase of 6.0%. Average load factors dipped to 80.7% from 82.2% in 2010.

However, data for the U.S major carriers in 2011 showed that generally load factors had increased on 2010 levels. Although average passenger yields increased for this group of airlines, rising per seat costs (Table 3-8) had held back net gains.

Table 3-8: 2011 Summary Data for U.S Major Airlines

| | Operating aircraft | Passengers (millions) | Passengers YoY (%) | Load factor (%) | Load factor YoY (% points) | Yield (cents per mile) | Yield YoY (%) | Seat cost (cents per available seat mile) | Seat cost YoY (%) |
|---|---|---|---|---|---|---|---|---|---|
| United / Continental | 697 | 95.8 | -1.6 | 82.8 | 1.5 | 13.97 | 6.5 | 11.25 | 0.1 |
| Delta Air Lines | 727 | 163.8 | 0.8 | 82.1 | -0.9 | 14.11 | 11.7 | 12.63 | 16.4 |
| American Airlines | 612 | 86.2 | -0.1 | 82 | 0.1 | 13.9 | 4.7 | 13.85 | 9.7 |

| | Operating aircraft | Passengers (millions) | Passengers YoY (%) | Load factor (%) | Load factor YoY (% points) | Yield (cents per mile) | Yield YoY (%) | Seat cost (cents per available seat mile) | Seat cost YoY (%) |
|---|---|---|---|---|---|---|---|---|---|
| US Airways | 338 | 53 | 2.1 | 83.7 | 1.3 | 14.02 | 6.9 | 13.12 | 14.8 |
| Southwest | 694 | 135.3 | 3.3 | 80.8 | 1.1 | 14.97 | 0.3 | 12.49 | 15.5 |
| jetBlue Airways | 165 | 26.4 | 8.7 | 82.4 | 1.1 | 13.6 | 13.9 | 11.1 | 16.2 |
| Alaska Airlines | 117 | 17.8 | 7.8 | 85.2 | 1.9 | 14.39 | 3.9 | 12.75 | 12.8 |

Source: 1, 4 & 5 AirlineFinancials.com (note: 2nd Quarter 2011 figures); 2 & 3 Airline Business August 2012

### 3.4.4 Asia Pacific

In 2011 legacy carriers in Asia Pacific further underlined the rapid growth in the region which has seen Asia-Pacific carriers increase in importance on the global scene. IATA reported that its Asia Pacific airlines members achieved year-on-year passenger traffic growth of 4.1% on seat capacity increases of 6.4%, with a resulting dip in average load factors from 77.6% to 75.9% in 2011. According to industry sources[40] the top Chinese carriers, and the Chinese airline sector in general, have continued to contribute to the regions dynamic growth. In terms of revenues, the three major Chinese legacy carriers of Air China, China Southern and China Eastern are comfortably established within the top 20 in the world.

Although still the most profitable of the regions, the Asia Pacific sector did see profits decline in comparison to 2010 levels as carriers could not hide from rising fuel costs in 2011. Industry commentators also observed that Asia Pacific carriers were harder hit than many others by the continued weak air freight market because of their relatively higher exposure to air cargo activities, further eroding net gains.

Traffic-wise, there was solid growth across the region as a whole in 2011. Top-tier legacy airlines such as Singapore Airlines, Qantas Airways, Cathay Pacific and All Nippon retain their pre-eminence, but because of the higher fuel prices and the fact that the premium market has not recovered as well as they thought it would after the 2008 financial crisis, the Chinese mainline carriers of China Eastern, China Southern and Air China have in recent years joined the top league of airlines in the Asia Pacific region.

2011 saw continued competition for the legacy carriers from the low cost sector. A significant challenge for the likes of Singapore Airlines, Thai Airways, Malaysia Airlines and others is that they must restructure their shorthaul operations while facing increased competition in the shorthaul market from growing low cost carriers that had hitherto been more dominant in Southeast Asia but are increasingly penetrating the Northeast of the region. Malaysia's AirAsia has set up affiliates in Indonesia, Thailand and the Philippines. Singapore's Tiger Airways, which is one third owned by Singapore Airlines, is following that model with Australian, Indonesian and Filipino operations.

Similarly to 2010, a significant part of the growth in this region in 2011 came from growth in domestic markets. For example, passenger traffic in the domestic Indian and Chinese markets grew by 16.4% and

[40] Airline Business, August 2012, p38-39

10.9% respectively, over 2010 levels. Traffic growth outstripped capacity in the Chinese market, leading to sustainable financial results for players in this market. However, Indian carriers continue to be plagued by poor financial results as many operated at sub-break even load factors in 2011 as capacity grew at 18.6% in the domestic Indian market.

The major shock in 2011 to afflict the Asia Pacific was the Japanese earthquake/tsunami of March. This devastated the domestic market which saw a year-on-year decline of 15.2% in traffic, and 11.5% down in capacity, resulting in average passenger load factors of 61.2% in 2011.

### 3.4.5 Middle East

According to IATA figures, Middle Eastern carriers recorded strong passenger traffic growth in 2011. RPK demand increased by 8.6% over 2010. This compared to a capacity growth (ASK) of 9.1%, with a corresponding dip of 0.5 percentage points in passenger load factor to 75.5% for the year.

In financial terms, a strong rise in revenues for Middle East carriers was offset by the impact of higher fuel costs. The largest of this region's carriers, Emirates, which contributes over 40% of the Middle East's total airline revenues, saw net profit decline markedly albeit still remaining positive.

The three Middle East network carriers – Emirates, Etihad Airways and Qatar Airways – have remained unaligned to any global airline alliance, but in 2011 increased involvement between them and other airlines around the world. For instance, Qatar Airways obtained a 35% share in European cargo operator, Cargolux, and Etihad Airways acquired a 29% stake in Air Berlin. These deals will ultimately allow the Gulf carriers to extend their global reach and gain access to new markets.

### 3.4.6 Latin America

IATA reports Latin America as the strongest growth region for passenger traffic in 2011.

Carriers in this region experienced passenger traffic (RPK) growth of 11.3% in the year on a capacity (ASK) growth of 9.8%. Despite traffic growth outstripping capacity, load factors for carriers in the region fell to 74.6% in 2011 from 76.7% the previous year.

Two significant trends are contributing to the growth in Latin America. Firstly, the Brazilian domestic market recorded exceptional traffic growth in 2011 of 13.7%, with TAM Linhas Aereas, the largest carrier operating in this market, growing its passenger numbers by 9.5% and RPKs by 12.1%. GOL, the major low cost carrier in the Brazilian domestic market, also experienced impressive growth in passenger numbers (10.0%) and RPKs (8.7%) in 2011.

Secondly, IATA reported that air passenger travel between North and South America, representing a combination of business activity and leisure travel, continued to be one of the strongest markets with growth averaging 12.3% in 2011.

Other legacy airlines in Latin America contributed to the region's growth, with LAN Airlines (30.6%), Aeromexico (23.1%), Avianca (19.0%), Copa Airlines (7.6%) and Aerolineas Argentinas (4.2%) all reporting increased passenger numbers in 2011.

With the Avianca-Taca merger finalised in 2010, the consolidation news in 2011 focussed on TAM and LAN obtaining approval for its merger to form Latin America's mega-carrier, LATAM. This finally became reality in June 2012 when the authorities signalled the green light on the creation of the region's largest carrier.

### 3.4.7 Africa

Overall, African carriers reported a stagnation in passenger traffic growth (RPKs) of 0.5% in 2011, following a strong performance in 2010. Capacity increased 2.2% year-on-year, which meant load factors fell to an average of 67.6% from 69.1% a year earlier.

The major legacy airlines in Africa reported a mixed bag of passenger growth results in 2011. South African Airways, the largest African carrier, posted an increase in RPKs of 1.5%. Egyptair was impacted heavily by the political turmoil in Egypt and saw RPKs fall by 24.0% compared to the previous year. Ethiopian Airlines, however, was able to increase RPKs by 19.5%, and Kenya Airways by 11.8% versus 2010.

According to IATA, the markets achieving strongest growth in premium passenger traffic are Intra-Africa (2.9%) and Southwest Pacific (9.6%). Travel within Africa has proved resilient in 2011 due to a number of African countries with solid economic growth rates facilitating air travel activity.

However, travel between Africa and the Middle East and Far East, which had hitherto in 2010 grown strongly, reported significant declines in 2011 of -5.7% and -7.9% respectively. Largely as a consequence of the North African political turmoil, most international markets suffered downturns in passenger traffic demand, not least the European scheduled market which was 4.8% down on 2010.

Key issues impacting on air travel demand in Africa in 2011 continued to include slow progress on liberalising African skies and competition from overseas airlines.

### 3.4.8 Global Airline Alliance Developments

2011 saw the continuation of the three main airline Alliances – Star Alliance™, SkyTeam® and oneworld® - although many world airlines continue to be unaligned.

Table 3-9: Global Alliances Summary (as July 2012)

| Global Alliances | Star Alliance | oneworld | SkyTeam | Total |
|---|---|---|---|---|
| Member Airlines | 27 | 12 | 17 | 56 |
| Pending new members | 1 | 2 | 3 | 7 |
| | | | | |
| Number of aircraft | 4,433 | 2,381 | 2,621 | 9,435 |
| Number of employees | 436,000 | 277,500 | 414,686 | 1,128,186 |
| Passengers per year (million) | 678.9 | 324.4 | 531.0 | 1,534 |
| Sales Revenue (in USD billion) | 182.24 | 105.5 | 127.8 | 415.54 |
| Daily departures | 21,555 | 8,627 | 14,816 | 44,998 |
| Revenue per passenger (USD) | 268.43 | 325.22 | 240.68 | 270.83 |
| Departures per aircraft per day | 4.9 | 3.6 | 5.7 | 4.8 |
| Passengers per departure | 86 | 103 | 98 | 93 |
| Employees per aircraft | 98.4 | 116.5 | 158.2 | 119.6 |
| Passengers per employee | 1,557 | 1,169 | 1,280 | 1,360 |

| Global Alliances | Star Alliance | oneworld | SkyTeam | Total |
|---|---|---|---|---|
| Revenue per departure (USD 000s) | 23.16 | 33.50 | 23.63 | 25.30 |

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

All three global alliances increased their membership and network coverage in 2011.

Star Alliance remained the largest alliance in terms of aircraft, passengers and revenues. In 2011 and to-date, several airlines have joined Star, notably newly formed Avianca-Taca, Copa Airlines and Ethiopian Airlines. Several carriers also left the alliance, namely bmi, Spanair and Continental (after it merged with United Airlines).

Air India was originally scheduled to join in 2009 but its membership has been delayed indefinitely as the invitation to join has been suspended. EVA Air is a pending member.

China Eastern, China Airlines, Saudia and Middle East Airlines have all joined the second largest alliance, SkyTeam, since 2011, with Aerolieas Argentinas, Garuda Indonesia and Xiamen Airlines pending.

The oneworld alliance membership gained Air Berlin in 2012, but lost Malev due to the airline ceasing operations. Malaysia Airlines is pending late 2012 but struggling Indian carrier Kingfisher Airline's entry to the alliance has been put on hold to strengthen its financial position.

The latest airline alliance member lists are detailed in Figure 3.9 below with pending members indicated in the blue shaded areas.

Figure 3.9: Global Alliance Membership (as of July 2012)


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 3-9 above, with oneworld alliance members achieving the combined highest revenue per aircraft departure and per passenger carried. An analysis by Airline Business in 2011[41] identified traffic (RPKs) and passenger volumes for the three alliances. From this data the average stage length for each alliance can be calculated: Star Alliance 2,359km, oneworld 2,340km and SkyTeam 1,932km.

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.

[41] Airline Business; Airline Alliance Survey, page 32, September 2011

## 3.5 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 3-10 below shows the 2011 capacity increases for the top 25 regional airline operators worldwide.

Table 3-10: Top 25 Regional Airlines Worldwide in 2011

| | | Operator Capacity ASKs (mill) | | | | |
|---|---|---|---|---|---|---|
| Rank | Operator | 2011 | 2010 | % chg YoY | Country | Airline group majority ownership |
| 1 | SkyWest Airlines | 25,721 | 27,170 | -5% | USA | SkyWest Inc. |
| 2 | American Eagle | 21,126 | 18,148 | 16% | USA | AMR Corporation |
| 3 | Shandong Airlines | 14,094 | 11,423 | 23% | China | |
| 4 | Expressjet/CO Express | 13,961 | 17,224 | -19% | USA | SkyWest Inc. |
| 5 | Atlantic Southeast Ai(NC) | 12,902 | 12,069 | 7% | USA | SkyWest Inc. |
| 6 | Republic Airlines | 11,825 | 9,924 | 19% | USA | Republic Airways Holdings |
| 7 | Pinnacle Airlines | 9,705 | 9,986 | -3% | USA | Pinnacle Airlines Corp. |
| 8 | Mesa Airlines | 7,498 | 7,952 | -6% | USA | |
| 9 | Lufthansa Cityline | 7,065 | 6,666 | 6% | Germany | Deutsche Lufthansa AG |
| 10 | Skymark Airlines | 6,989 | 4,564 | 53% | Japan | |
| 11 | Mesaba Airlines | 6,860 | 7,522 | -9% | USA | Pinnacle Airlines Corp. |
| 12 | Juneyao Airlines | 6,725 | 5,348 | 26% | China | |
| 13 | Comair Inc. | 5,732 | 6,876 | -17% | USA | Delta Airlines Subsidiary |
| 14 | Compass Airlines | 5,516 | 4,970 | 11% | USA | Trans States Holdings |
| 15 | KLM City Hopper | 4,949 | 4,502 | 10% | Netherlands | Air France-KLM |
| 16 | Air Canada Jazz | 4,923 | 8,741 | -44% | Canada | Chorus Aviation Inc. |
| 17 | Aeromexico Connect | 4,862 | 4,629 | 5% | Mexico | Aeromexico |
| 18 | Air Wisconsin | 4,576 | 4,546 | 1% | USA | |
| 19 | Tyrolean Airways | 4,487 | 4,711 | -5% | Austria | Austrian Airlines |
| 20 | Horizon Air | 4,440 | 5,274 | -16% | USA | Alaska Air Group |
| 21 | Chautauqua Airlines | 4,248 | 4,750 | -11% | USA | Republic Airways Holdings |
| 22 | PSA Airlines | 3,781 | 3,683 | 3% | USA | US Airways |
| 23 | Iran Asseman Airlines | 3,264 | 2,806 | 16% | Iran | |
| 24 | Merpati Nusantara Airline | 2,874 | 2,739 | 5% | Indonesia | |
| 25 | Regional Compagnie Aerien | 2,846 | 2,860 | 0% | France | Air France-KLM |

Source: 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)

### 3.5.1 United States

The U.S. regional market is dominated by four large regional airline holding companies, with SkyWest Inc. being the largest. According to OAG, under its umbrella, the conglomerate controls SkyWest Airlines, Expressjet and Atlantic Southeast, offering a combined capacity (ASKs) of 53 million in 2011, around 5% lower than 2010.

Within this, Expressjet suffered the greatest decline of 19% year-on-year, while Atlantic Southeast grew capacity by 7%. SkyWest Airlines, the largest provider of regional operator capacity in the U.S. experienced a reduction in ASKs of 5% in 2011.

In general, the U.S. regional airlines as a collective experienced flat growth in capacity in 2011 over 2010, indicating a cautious approach to adding capacity in a challenging demand environment. Some regional carriers posted growth, some decline.

In 2012 Delta Air Lines announced that it will be divesting its interest in its only owned regional subsidiary Comair, which underwent a major restructuring in 2010/2011 aiming to drastically reducing its fleet to 44 by the end of 2012. Comair's capacity shrank by 17% in 2011 over 2010 due to this.

Delta is a mainline partner of U.S. regional carrier's Pinnacle Airlines and Mesaba Airlines, both of which recorded a drop in capacity (ASKs) in 2011.

AMR Corps' American Eagle operation was one of the successes of 2011, posting a significant 16% increase in capacity helping to feed mainline partner American Airlines' services.

In March 2011, Mesa Airlines emerged from Chapter 11 Bankruptcy protection after reorganising and disposing of 100 excess aircraft.

According to industry analysts[42], scheduling changes by U.S. mainline carriers in 2011 had a negative impact on the profitability of Regional airline partners. Cited as an example, regional groups SkyWest and Pinnacle suffered third quarter hikes in costs triggered by shifting crews and support staff to accommodate the changes by Delta Air Lines in particular.

### 3.5.2 Europe

Four European regional airlines are included amongst the world's top 25 regional airlines in terms of scheduled available seat-kilometres (ASKs). According to OAG, in 2011, these four airlines of Lufthansa Cityline, KLM City Hopper, Tyrolean Airways and Regional Compagnie Aerien increased their combined advertised capacity by around 9%.

Lufthansa CityLine is the largest European regional carrier and recorded capacity growth of 6% year-on-year. The Lufthansa subsidiary also posted an increase in passenger numbers to 6.8 million in 2011, growth of 6.3%. Growth was facilitated by opening new routes from its Frankfurt base to the likes of Aberdeen (UK), Minsk (Belarus), Rostov (Russia) and expanding existing routes to Katowice (Poland),

[42] Source: Flightglobal – ANALYSIS: US regionals struggle to cope with partner scheduling changes; 04 Nov 2011

Stavanger (Sweden) and Billund (Denmark) amongst others. This expansion helped to offset cuts in capacity on routes including Munich-Graz, Frankfurt-Hannover and Hamburg-Stockholm.

2011 also saw Lufthansa Group accelerating the disposal of older aircraft in its fleet, including up to seven Avro RJ85's operated by Cityline.

KLM City Hopper is the continent's second largest regional carrier in terms of ASKs, achieving significant capacity growth of 10% in 2011. The Dutch Air France-KLM regional subsidiary also grew its passenger numbers by a strong 16%, carrying 6.2 million travellers in 2011. City Hopper's growth was largely achieved through expansion of existing routes from its Amsterdam base to destinations such as Newcastle (UK), Berlin (Germany), Geneva (Switzerland), Edinburgh (UK) and Glasgow (UK). New routes were also introduced to Aalborg (Denmark) and Basel (Switzerland) in 2011.

### 3.5.3 Rest of the World

Outside of North America and Europe, the largest regional airline in terms of capacity (ASKs) is Air China majority-owned Shandong Airlines. It reportedly increased capacity by 23% in 2011, and passenger traffic (RPKs) by over 27%. Shandong Airlines achieved similar growth in 2010 versus 2009 and is now one of the world's major regional players. According to OAG, the Chinese airline grew the number of flights across its network by an additional 13% in 2011, adding new domestic routes from its Jinan base including to Weihai, Ningbo and Nanching. However, with the majority of its 60-strong fleet of aircraft being B737s and having only a handful of regional jets, its status as a regional airline is questionable.

Like Shandong Airlines, Skymark Airlines, a Japanese carrier operating purely domestic trunk routes, also has its status as a regional airline in question. Skymark operates with B737s but does so on scheduled Japanese domestic services and carried over 6 million passengers in 2011, growing capacity by over 50% in the process.

In South America, Aeromexico Connect remains the largest regional carrier achieving a 5% increase in scheduled capacity (ASKs).

Iran Aseman Airlines remained in pole position of the Africa/Middle East regional airline operators with an 16% increase in capacity (ASKs).

## 3.6 Low Cost Carriers

### 3.6.1 Overview

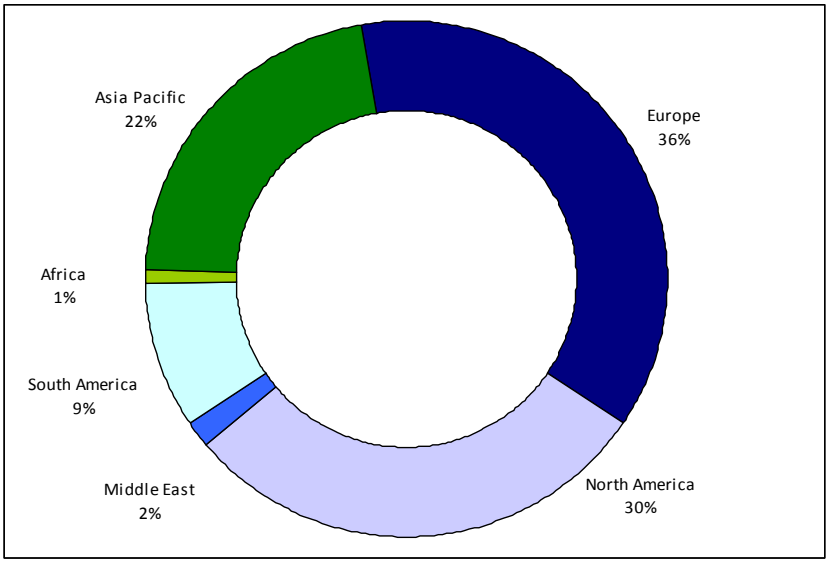
It should be recognised that there is no longer a fixed dividing line between legacy carriers, regional carriers and low cost carriers. Most airlines can easily be categorised into one or the other groupings, but many overlap the once-clear distinctions. Some legacy airlines offer a set of low fares 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.

Figure 3.10 below highlights the share of global passengers uplifted by low cost carriers by world region in 2011. Europe and North America share two thirds of the total, while the Asia Pacific low cost sector is closing the gap with nearly a quarter of all low cost passenger traffic. Low cost airlines are still in their infancy in South America, Africa and the Middle East.

Figure 3.10: Low Cost Carrier Passengers by Region, 2011




Source: Airline Business low cost traffic survey; Airline Business May 2012

### 3.6.2 Europe

Table 3-11 below shows how the fifteen largest European low cost airlines fared in 2011 compared to 2010, in terms of available seat-kilometres.

Table 3-11: Largest fifteen European Low Cost Carriers performance in 2011

| Airline | State | Available Seat-km (million) 2010 | Available Seat-km (million) 2011 | % increase | Increase in seat-km (million) | % share of increase |
|---|---|---|---|---|---|---|
| Ryanair | Ireland | 98,804 | 110,283 | 11.6% | 11,479 | 31.6% |
| easyJet | UK | 62,542 | 69,954 | 11.9% | 7,412 | 20.4% |
| Air Berlin | Germany | 38,460 | 43,761 | 13.8% | 5,301 | 14.6% |
| Norwegian Air Shuttle | Norway | 17,935 | 20,704 | 15.4% | 2,770 | 7.6% |
| Wizz Air | Hungary | 13,888 | 16,288 | 17.3% | 2,399 | 6.6% |
| Vueling Airlines | Spain | 13,923 | 14,390 | 3.4% | 467 | 1.3% |
| Pegasus Airlines | Turkey | 10,729 | 13,104 | 22.1% | 2,375 | 6.5% |
| Transavia (Netherlands) | Netherlands | 7,459 | 9,251 | 24.0% | 1,792 | 4.9% |
| germanwings | Germany | 8,706 | 8,666 | -0.5% | -40 | -0.1% |
| Jet2.com | UK | 6,700 | 8,336 | 24.4% | 1,635 | 4.5% |

| Airline | State | Available Seat-km (million) 2010 | Available Seat-km (million) 2011 | % increase | Increase in seat-km (million) | % share of increase |
|---|---|---|---|---|---|---|
| Jetairfly | Belgium | 5,670 | 6,307 | 11.2% | 637 | 1.8% |
| flybe | UK | 5,782 | 5,830 | 0.8% | 48 | 0.1% |
| Anadolu Jet | Turkey | 4,614 | 5,232 | 13.4% | 618 | 1.7% |
| bmibaby | UK | 3,132 | 2,840 | -9.3% | -293 | -0.8% |
| Transavia (France) | France | 3,073 | 2,749 | -10.5% | -324 | -0.9% |
| Total (15) | | 301,418 | 337,695 | 12.0% | 36,277 | 100.0% |

Source: OAG

Overall, there was a significant increase of 12.0% in seat-kilometres advertised in 2011 compared to 2010, but it wasn't a growth story across the board. A small decline was reported by germanwings (-0.5%), Lufthansa's low cost unit, and more significant declines were registered by bmibaby (-9.3%) and Transavia France (-10.5%).

At the top of the rankings in Europe, both Ryanair and easyJet significantly increased capacity by 12% over 2010. Ryanair expanded services in some of its major markets, notably Spain (including Canary Islands) with 22% more operations in 2011 and Italy, with 15% additional flights versus 2010, more than offsetting declines in other markets such as the UK (-9%), Ireland (-12%) and Germany (-25%).

easyJet, Europe's second largest low cost carrier, achieved its 12% capacity growth by providing additional services in all of its major markets. In the UK, easyJet's largest market accounting for one third of its annual flights in 2011, a solid 5% growth in the number of operations was recorded. However, the strongest growth in number of flights occurred in Switzerland (141%), Netherlands (34%), France (20%) and Germany (16%).

The European Low Fares Airline Association (ELFAA) provide more detailed operating figures for its nine member carriers:

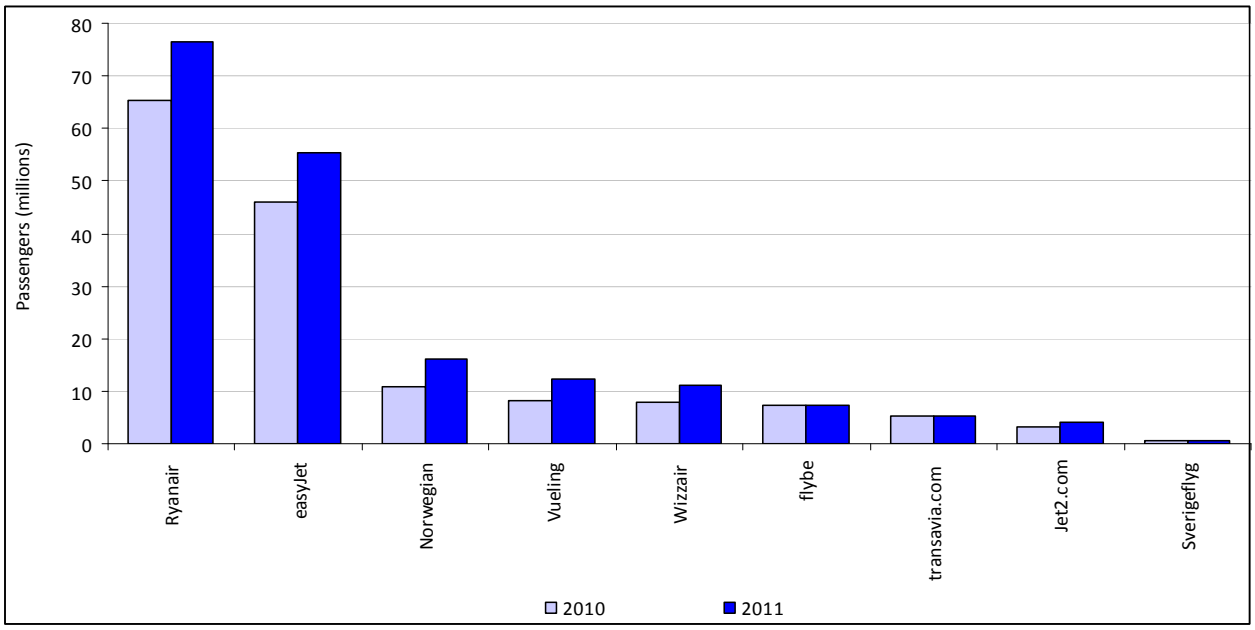
Table 3-12: ELFAA Members 2011 Data

| | | Pax (mill) | PLF % | Countries served | Destinations served | Routes | Daily flights | Fleet size | Average Fleet age | Employees |
|---|---|---|---|---|---|---|---|---|---|---|
| Ryanair | Ireland | 76.4 | 82.2 | 27 | 162 | 1,400 | 1,353 | 275 | 3.0 | 9,000 |
| easyJet | UK | 55.5 | 87.5 | 30 | 130 | 611 | 1,260 | 202 | 3.9 | 7,571 |
| Norwegian | Norway | 16.0 | 80.0 | 31 | 110 | 297 | 390 | 62 | 6.0 | 2,500 |
| Vueling | Spain | 12.3 | 75.6 | 20 | 110 | 144 | 253 | 47 | 9.0 | 1,438 |
| Wizzair | Hungary | 11.0 | 84.0 | 27 | 59 | 199 | 199 | 34 | 3.4 | 1,370 |
| flybe | UK | 7.4 | n/a | 18 | 97 | 203 | 655 | 84 | 4.4 | 3,350 |
| transavia.com | Netherlands | 5.4 | 81.0 | 22 | 96 | 126 | 54 | 44 | 7.9 | 1,871 |
| Jet2.com | UK | 4.2 | 87.1 | 19 | 51 | 168 | 125 | 38 | - | 2,100 |
| Sverigeflyg | Sweden | 0.6 | 75.0 | 7 | 17 | 25 | 50 | 9 | 14.6 | 130 |
| Total | | 188.8 | 83.4 | | | | 4,339 | 795 | 4.5 | 29,330 |
| Growth 2011 vs 2010 | | 9.5% | 1.3% | | | | 7.3% | 6.9% | | 11.3% |

Source: ELFAA

The passenger numbers are shown graphically in Figure 3.11 below and show convincingly the importance of the two main carriers, Ryanair and easyJet.

Figure 3.11: ELFAA Airlines Passenger numbers 2011 vs. 2010 (millions)




Source: ELFAA

Passenger growth at 9.5% for ELFAA members was above the lower growth of the legacy carriers, with all members showing increases or flat growth. The number of aircraft operated by these nine airlines grew by 8.2% in 2011, with the composition of the ELFAA airlines fleet shown in Table 3-13.

Table 3-13: ELFAA Airline Fleets

| | 2010 | 2011 | % var. |
|---|---|---|---|
| Jets | | | |
| A320 family | 260 | 283 | 8.8% |
| B737-300 | 46 | 37 | -19.6% |
| B737-700 | 20 | 12 | -40.0% |
| B737-800 | 318 | 358 | 12.6% |
| B757-200 | 12 | 12 | 0.0% |
| EMB195 | 14 | 14 | 0.0% |
| EMB170/75 | 0 | 6 | - |
| Subtotal | 670 | 722 | 7.8% |
| Turboprops | | | |
| DH8-400 | 54 | 50 | -7.4% |
| ATR 42 | 0 | 2 | - |
| ATR 72-500 | 3 | 14 | 366.7% |
| SF 2000 | 2 | 2 | 0.0% |
| SF 340 | 5 | 4 | -20.0% |
| Subtotal | 64 | 72 | 12.5% |

| | 2010 | 2011 | % var. |
|---|---|---|---|
| Total | 734 | 794 | 8.2% |

Source: ELFAA

In a continuation of the trend witnessed in 2010, 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 disposed of its remaining B737-700s in 2011.

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

- Air Berlin (Germany) – recognised as a 'low cost hybrid' airline as it adopts some aspects of the legacy business model – completed its full integration of German longhaul unit LTU in April 2011. In advance of Air Berlin's entry into the oneworld alliance, it started or expanded codeshare services with future partners British Airways and American Airlines on European and North Atlantic operations. Although the carrier grew capacity and passenger traffic in 2011, the year was challenging in terms of finances. Its net loss widened to US$380m from US$140m the previous year.
- easyJet (United Kingdom) maintained market share in 2011 by opening a number of new routes across the European continent. The UK's largest low cost carrier also announced plans to open a new base at London Southend Airport in 2012. Behind the scenes, easyJet management were distracted by continued clashes with founder and shareholder Stelios Haji-Ioannou, about strategy and direction. Operationally, the carrier enjoyed a strong year turning growth in capacity and passengers into an increased net profit of US$362m, up from US$189m in 2010.
- Ryanair (Ireland), the largest European low cost carrier, continued its practice in 2011 of shedding and adding routes with a frequency unrivalled by its competitors. During the year, the Irish carrier closed its bases at Marseille, Reus following legal challenges from authorities, and cut back capacity at Glasgow Prestwick and Frankfurt Hahn, amongst others. But additional routes, including to Barcelona El Prat Airport, helped Ryanair to post a growth in net profit to US$774m in 2011 from US$496 a year earlier.

### 3.6.3 Rest of the World

Table 3-14 below shows the 25 largest non-European airlines categorised as low cost by Mott MacDonald, showing how advertised seat-kilometres have changed from 2010 through to 2011.

Table 3-14: Top 25 Largest Non-European Low Cost Carriers by capacity in 2011

| | | Available Seat-km (billion) | | | | |
|---|---|---|---|---|---|---|
| Airline | State | 2010 | 2011 | % increase 2011/10 | Increase in seat-km | % share of increase |
| Southwest Airlines[43] | U.S. | 164,299 | 173,241 | 5.4% | 8,942 | 12.3% |
| jetBlue Airways | U.S. | 56,789 | 60,730 | 6.9% | 3,940 | 5.4% |
| VARIG-GOL Airlines | Brazil | 44,526 | 48,149 | 8.1% | 3,623 | 5.0% |
| AirTran Airways | U.S. | 38,543 | 39,681 | 3.0% | 1,139 | 1.6% |
| WestJet | Canada | 31,393 | 33,920 | 8.0% | 2,527 | 3.5% |
| Jetstar Airways | Australia | 28,252 | 31,806 | 12.6% | 3,555 | 4.9% |

[43] Southwest Airlines and AirTran Airways continued to operate independently through 2011, despite merger in May 2011.

| Airline | State | Available Seat-km (billion) 2010 | 2011 | % increase 2011/10 | Increase in seat-km | % share of increase |
|---|---|---|---|---|---|---|
| Lion Air | Indonesia | 25,380 | 29,685 | 17.0% | 4,304 | 5.9% |
| AirAsia | Malaysia | 23,929 | 25,514 | 6.6% | 1,585 | 2.2% |
| Virgin Australia (NC) | Australia | 23,075 | 24,420 | 5.8% | 1,345 | 1.9% |
| Frontier Airlines | U.S. | 18,409 | 19,342 | 5.1% | 933 | 1.3% |
| AirAsia X | Malaysia | 13,437 | 16,743 | 24.6% | 3,306 | 4.6% |
| IndiGo Air | India | 11,487 | 16,568 | 44.2% | 5,081 | 7.0% |
| Virgin America | U.S. | 12,372 | 15,971 | 29.1% | 3,600 | 5.0% |
| Spirit Airlines | U.S. | 13,416 | 15,153 | 12.9% | 1,737 | 2.4% |
| SpiceJet | India | 9,314 | 12,635 | 35.7% | 3,321 | 4.6% |
| Cebu Pacific Air | Philippines | 10,573 | 12,584 | 19.0% | 2,011 | 2.8% |
| Air Arabia | U.A.E. | 11,367 | 12,205 | 7.4% | 839 | 1.2% |
| Volaris | Mexico | 8,762 | 12,080 | 37.9% | 3,318 | 4.6% |
| Allegiant Air | U.S. | 9,050 | 9,198 | 1.6% | 148 | 0.2% |
| Thai AirAsia | Thailand | 7,406 | 9,002 | 21.5% | 1,596 | 2.2% |
| flydubai | U.A.E. | 4,506 | 8,972 | 99.1% | 4,466 | 6.1% |
| Spring Airlines | China | 4,973 | 8,848 | 77.9% | 3,875 | 5.3% |
| Azul Airlines | Brazil | 5,125 | 8,719 | 70.1% | 3,595 | 4.9% |
| Indonesia AirAsia | Indonesia | 6,535 | 8,688 | 32.9% | 2,153 | 2.9% |
| Interjet | Mexico | 5,379 | 8,179 | 52.1% | 2,801 | 3.8% |
| Total (25) | | 588,295 | 662,035 | 12.5% | 73,740 | 100.0% |

Source: OAG

The expansion of advertised seat-kilometre output by 11.5% in 2011 is substantial, in line with the same increase by European low cost carriers. The most dramatic increases were by IndiGo Air (44%) and Spicejet (36%) in the domestic Indian market, and Asia Pacific carriers AirAsia X (25%), Cebu Pacific Air (19%) and Lion Air (17%).

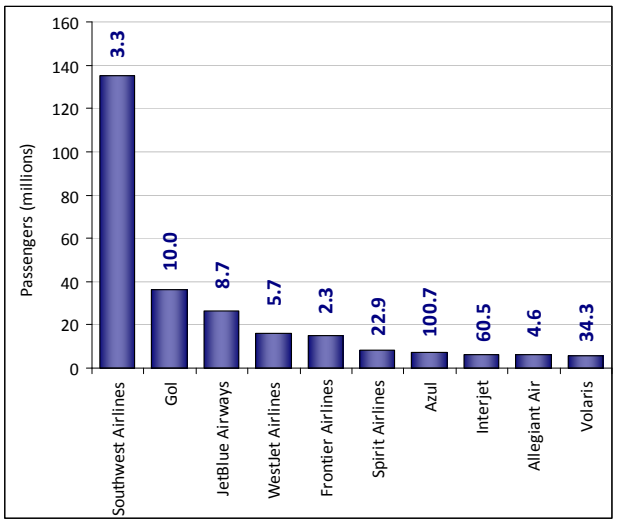
flyDubai, low cost subsidiary of Dubai-based legacy airline Emirates, recorded the single greatest capacity growth figure of 99% in 2011 versus 2010, as it expands to feed its partner's growing network.

Southwest Airlines continues its dominance as the world's largest low cost airline, increasing capacity by a significant 5.4% in 2011, to give it almost triple the advertised seat-kilometres of its nearest U.S rival, jetBlue Airways. However, while capacity and passenger traffic both increased favourably, the airline posted a dip in net profit of US$178m, versus US$459 in 2010. In May 2011, Southwest completed its acquisition of AirTran Airways but continued to operate independently (until AirTran merged onto the Southwest AOC in March 2012).

The largest Brazilian low cost carrier, GOL, increased its size and reach in 2011 with the acquisition of rival airline Webjet, receiving approval from the authorities in September. However, despite impressive growth in operations, GOL posted a net loss in 2011 of US$401m, citing higher-than-expected fuel costs and unforeseen expenses related to the Puyehue volcano eruption in Chile which resulted in flight cancellations.

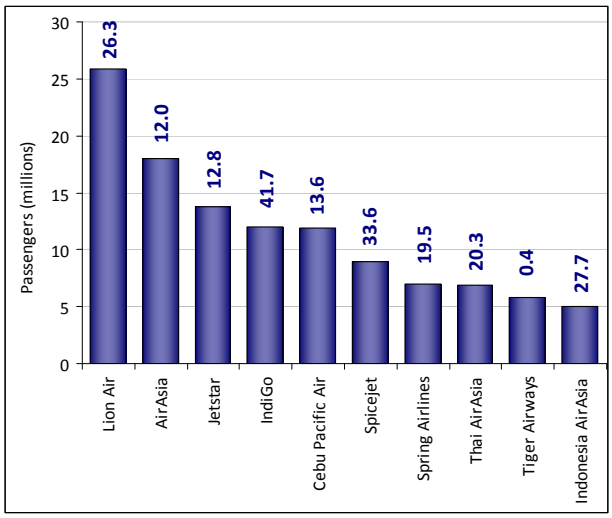
In terms of passenger numbers and growth, Figure 3.12 and Figure 3.13 show the Top 10 Low Cost Carriers in 2011 for the Americas and Asia Pacific regions.

Figure 3.12: 2011: Top 10 LCCs: The Americas




Source: Airline Business May 2012

Figure 3.13: 2011: Top 10 LCCs: Asia Pacific




Source: Airline Business May 2012

## 3.7 Charter Airlines

### 3.7.1 Overview

Charter airlines were originally set up by independent companies to provide low cost competition to the legacy airlines on 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 shorthaul routes. The main rationale today for charter airlines is as longhaul 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 shorthaul aircraft.

Table 3-15 below highlights a (limited) selection of major worldwide charter airlines in 2011 in comparison with 2010. 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 2011.

Table 3-15: Selected Worldwide Charter Airlines Traffic Growth: 2011 vs 2010

| | | Passengers (millions) | | | Revenue Passenger Kms (millions) | | |
|---|---|---|---|---|---|---|---|
| Charter Airline | Region | 2011 | 2010 | % chg '11 vs '10 | 2011 | 2010 | % chg '11 vs '10 |
| Thomson Airways | EU-27 | 11.05 | 10.97 | 0.7% | 32,969 | 32,713 | 0.8% |

| | | Passengers (millions) | | | Revenue Passenger Kms (millions) | | |
|---|---|---|---|---|---|---|---|
| Thomas Cook Airlines | EU-27 | 7.97 | 8.12 | -1.8% | 27,418 | 27,385 | 0.1% |
| SunExpress | Europe | 7.25 | 6.67 | 8.6% | 11,750 | 10,840 | 8.4% |
| Condor | EU-27 | 6.17 | 5.73 | 7.7% | 23,574 | 19,888 | 18.5% |
| Monarch Airlines | EU-27 | 5.93 | 5.79 | 2.4% | 14,277 | 15,127 | -5.6% |
| Air Transat | N. America | 3.64 | 2.93 | 24.3% | 16,626 | 13,277 | 25.2% |
| Omni Air International | N. America | 0.97 | 0.91 | 6.6% | 4,578 | 4,217 | 8.6% |
| World Airways | N. America | 0.42 | 0.72 | -41.7% | 3,548 | 4,164 | -14.8% |

Source: Air Transport Intelligence

European charter airlines are considerably larger than non-European counterparts. In terms of passenger numbers, two airlines dominate the market – Thomson Airways and Thomas Cook Airlines, although the former recorded a slight increase and the latter a slight decrease in the number of passengers carried in 2011 over 2010. Overall, the table shows mixed results with growth and decline experienced across the charter carriers. This sector is as vulnerable to volatile fuel costs as the legacy and low cost airlines.

Many 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.

Given the limited nature of traffic statistics covering the European charter market for 2011, a useful proxy is available from the UK CAA which provides a comparison between 2011 and 2010 of charter passenger traffic both in total and by destination from UK airports.

Table 3-16: Charter Passengers at UK Airports 2011 vs. 2010

| | 2010 | 2011 | % change | % share 2011 |
|---|---|---|---|---|
| **Short-Haul** | | | | |
| European Union - West | 13,194,589 | 13,243,596 | 0.4% | 63.7% |
| European Union - East | 356,940 | 346,553 | -2.9% | 1.7% |
| Other Western Europe | 3,989,659 | 3,541,493 | -11.2% | 17.0% |
| Other Eastern Europe | 3,489 | 1,941 | -44.4% | 0.0% |
| North Africa | 1,847,301 | 1,497,203 | -19.0% | 7.2% |
| Subtotal | 19,391,978 | 18,630,786 | -3.9% | 89.6% |
| **Long-Haul** | | | | |
| Other Africa | 202,173 | 184,683 | -8.7% | 0.9% |
| Near, Middle East | 32,739 | 27,104 | -17.2% | 0.1% |
| Asia, Australasia | 203,794 | 180,151 | -11.6% | 0.9% |
| North America | 398,810 | 446,734 | 12.0% | 2.1% |
| Caribbean, Latin America | 1,401,394 | 1,327,610 | -5.3% | 6.4% |
| Subtotal | 2,238,910 | 2,166,282 | -3.2% | 10.4% |
| **Total Charter** | **21,630,888** | **20,797,068** | **-3.9%** | **100.0%** |
| | | | | |
| Total Scheduled | 150,312,916 | 159,811,329 | 6.3% | |

| | 2010 | 2011 | % change | % share 2011 |
|---|---|---|---|---|
| Total all international passengers | 172,658,269 | 181,369,094 | 5.0% | |
| **Charter % share of international pax** | **12.5%** | **11.5%** | | |

Source: UK CAA

In the UK market at least, the charter industry declined in 2011 by 3.9%, following a contraction in 2010 of 5.9% over 2009. Comparing this with scheduled traffic to and from the UK growing at over 6%, and total international passengers at 5% in 2011, the decline in charter traffic is significant – highlighted by its continued cut in market share of UK air passenger traffic.

Table 3-16 demonstrates that, of the main shorthaul markets, only the Western EU destinations have bucked the downward trend, recording increased passenger traffic by 0.4% in 2011. This market from the UK accounts for two thirds of the total, and is dominated by holidaymakers to Spain and Greece in particular.

All longhaul charter markets were down year-on-year, except for UK-North America which posted growth of 12%, mainly due to increased demand to Orlando, Florida, from UK regional airports.

## 3.8 Cargo Airlines

### 3.8.1 Air Cargo Demand

The IMF recorded a marked slow-down in growth of world trade volumes (goods and services) in 2011 (5.8%), compared to 2010 (12.9%). A two-speed growth pattern occurred with Advanced Economies achieving less growth than Emerging and Developing Economies for both imports and exports, reflecting where the economic growth in 2011 was strongest. According to IATA[44], around 35% of world trade by value is transported by air.

Table 3-17: World Trade Volumes (Goods and Services)

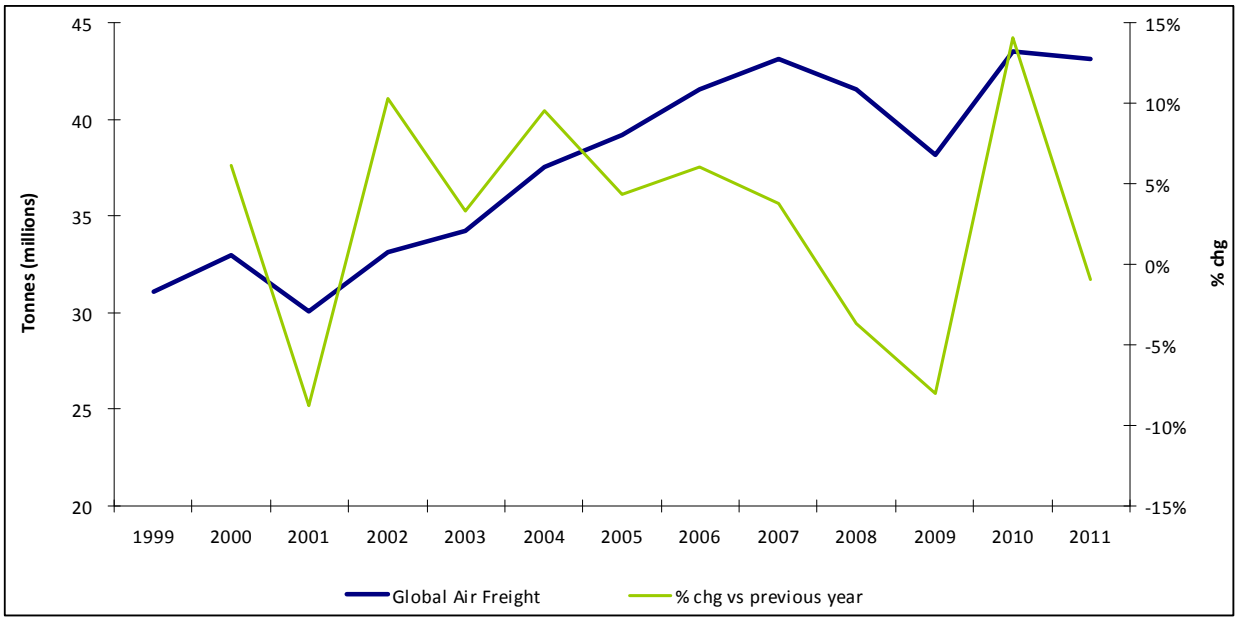
| | Actual | | Projection | |
|---|---|---|---|---|
| % change | 2010 | 2011 | 2012 | 2013 |
| World Trade Volume (Goods and Services) | 12.9 | 5.8 | 4.0 | 5.6 |
| Imports – Advanced Economies | 11.5 | 4.3 | 1.8 | 4.1 |
| Imports – Emerging and Developing Economies | 15.3 | 8.8 | 8.4 | 8.1 |
| Exports – Advanced Economies | 12.2 | 5.3 | 2.3 | 4.7 |
| Exports – Emerging and Developing Economies | 14.7 | 6.7 | 6.6 | 7.2 |

Source: IMF World Economic Outlook (April 2012)

Against the background of slow-down in the global economy and trade performance, air freight demand was similarly dampened in 2011. Figure 3.14 shows historical air freight throughput at ACI-reporting airports over the last decade.

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

Figure 3.14: Global Air Freight Tonnage – ACI Airport Throughput

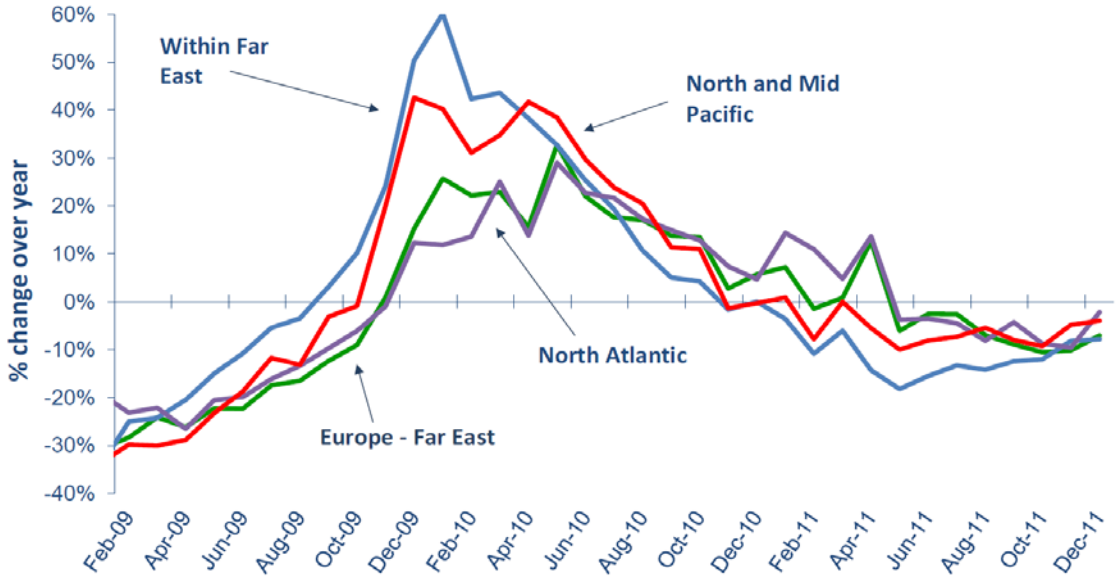



Source: ACI

While 2010 represented a recovery for global air freight volumes, 2011 slipped back to negative growth of -1%.

It was therefore not surprising that IATA reported a -0.6% decrease in global air cargo demand in 2011 (measured as Freight Tonne Kilometres [FTKs]) for its member airlines.

Figure 3.15: International Freight growth by major routes




Source: IATA ODS

The beginning of 2011 saw a divergent performance across trade lanes, with routes both 'North Atlantic' and 'Europe-Far East' recording growth, but routes 'Within Far East' and 'North and Mid Pacific' falling into (and staying into) negative growth territory (Figure 3.15). However, by the second half of the year, all major international freight routes were registering year-on-year declines, with falling demand in Europe and the U.S. in particular for the manufactured goods from Asia.

It is noteworthy that IATA previously forecast air cargo demand to grow at 5.5% in 2011. It is a testament to the challenging conditions faced in 2011 that this forecast was significantly over-optimistic.

In its air cargo market analysis for 2011[45], IATA suggests that the business environment for air cargo declined in 2011 because of flat trade indicators and confidence as well as competition from reduced sea freight rates – all of which put downward pressure on volumes and yields.

### 3.8.2 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 over 50% of freight tonne-kilometres operated by U.S. carriers in 2011.

Table 3-18: Selected North American Airlines: Freight Tonne-Kilometres (FTKs) [millions] 2011 v 2010

| Airline | 2011 | % chg vs 2010 |
|---|---|---|
| FedEx | 16,104 | 1.2 |
| UPS | 10,190 | 3.7 |
| Atlas Air | 4,681 | 10.1 |
| Delta Air Lines | 3,461 | 4.4 |
| American Airlines | 2,734 | -5.5 |
| United Airlines | 2,505 | -9.8 |
| Southern Air | 2,016 | -14.2 |
| Polar Air Cargo | 1,781 | -3.5 |
| Kalitta Air | 1,773 | 6.5 |
| Continental Airlines | 1,359 | -12.1 |
| US Airways | 554 | -2.4 |

Source: Air Transport World July 2012; Airline Business August 2012

Table 3-18 shows a selection of North American airlines operating within all segments of the air cargo market. These carriers achieved mixed growth in 2011 compared with the previous year. Cargo integrators FedEx and UPS achieved aggregated growth of 1.2% and 3.7% respectively. This is down from a combined growth of 12.3% in 2010, but the positive growth still represents an achievement given the environment. The integrators operate global networks so low demand in one region can be offset by increased demand in another.

[45] Cargo E-Chartbook Q4 2011; IATA

Cargo airline Atlas Air achieved significant growth of just over 10% and the passenger legacy airlines offering cargo capacity generally recorded declines, such as American Airlines (-5.5%), United Airlines (-9.8%), and Continental Airlines (-12.1%).

### 3.8.3 Europe

The Association of European Airlines (AEA) recorded an annual freight traffic growth (FTK) for its member airlines of 2% in 2011, well under the 8% growth achieved in 2010. This slow-down in freight traffic growth in 2011 was primarily due to low demand for manufactured goods and falling business confidence arising from the continuing challenges in the Eurozone economies during the year. External 'shock' events, such as the Japanese earthquake/tsunami, also impacted trade flows due airspace closures.

Table 3-19: AEA Airlines Cargo Performance 2011

| REGION | Freight Traffic FTK (millions) | TFTK % chg vs prev. yr. |
|---|---|---|
| Domestic (1) | 73 | -8.5% |
| Cross-border Europe (2) | 765 | 3.2% |
| Total Europe (1+2) | 838 | 2.0% |
| Europe - North Africa (3) | 151 | -23.2% |
| Europe - Middle East (4) | 1,124 | -1.0% |
| Intl Short/Medium Haul (2+3+4) | 2,040 | -1.6% |
| North Atlantic (5) | 10,189 | 4.0% |
| Mid Atlantic (6) | 1,738 | 10.8% |
| South Atlantic (7) | 2,720 | 3.7% |
| Europe - Sub Saharan Africa (8) | 3,060 | -1.2% |
| Europe - Far East/Australasia (9) | 13,542 | -0.7% |
| Total Long Haul (5 to 9*) | 31,764 | 2.3% |
| Total Intl (2 to 9*) | 33,803 | 2.1% |
| Total Scheduled (1 to 9*) | 33,876 | 2.0% |

Source: AEA (Freight traffic is measured in FTK (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 2.3% on long-haul international routes compared with a 1.6% decline on international short and medium-haul routes, although the latter only accounted for 6% of total member airline traffic. The North Atlantic routes, accounting for 30% of FTK traffic, achieved 4% growth year-on-year. However, the largest market, Europe to Far East/Australasia (40% of total), recorded a decline of 0.7%.

Table 3-20: Selected European Airlines: Freight Tonne-Kilometres (FTKs) [millions] 2011 v 2010

| | 2011 | % chg vs 2010 |
|---|---|---|
| Air France-KLM | 11,294 | -1.3 |
| Lufthansa Cargo | 9,487 | 6.5 |
| Cargolux | 5,039 | -4.6 |
| British Airways | 4,793 | 4.4 |
| Virgin Atlantic Airways | 1,528 | -1.5 |
| Turkish Airlines | 1,465 | 38.6 |

| | 2011 | % chg vs 2010 |
|---|---|---|
| Swiss | 1,374 | 4.6 |
| Iberia Group | 1,363 | 3.7 |
| Scandinavian Airlines | 493 | -10.4 |

Source: Air Transport World July 2012; Airline Business August 2012

Lufthansa Cargo enjoyed a particularly strong year with cargo tonnage increasing substantially across all traffic regions, by 6.5% over 2010 levels. This is despite the introduction of a ban on night-flights at its Frankfurt base from October 2011.

Air France-KLM posted a freight traffic decline of 1.3% over 2010. The group reduced its all-freighter fleet which now accounts for a third of its overall cargo capacity – with the majority comprised of belly and combi-aircraft space.

### 3.8.4 Asia Pacific

In 2011, the major Asia Pacific airlines with freight traffic generally suffered declines, as shown in Table 3-21 below. As a collective, the airlines shown in the table recorded a drop in FTKs of 4.2% compared to 2010.

Table 3-21: Selected Asia Pacific Airlines: Freight Tonne-Kilometres (FTKs) [millions] 2011 v 2010

| | 2011 | % chg vs 2010 |
|---|---|---|
| Cathay Pacific | 9,648 | -5.2 |
| Korean Air | 9,118 | -5.7 |
| Singapore Airlines | 7,198 | 0.3 |
| China Airlines | 5,670 | -15.0 |
| EVA Air | 4,883 | -5.5 |
| China Eastern Airlines | 4,415 | 2.5 |
| Air China | 4,415 | -2.5 |
| Asiana Airlines | 3,923 | 9.1 |
| China Southern Airlines | 3,303 | 14.1 |
| Thai International Airways | 2,766 | -4.5 |
| All Nippon Airways | 2,703 | 7.3 |
| Qantas | 2,301 | -6.0 |
| Malaysia Airlines | 2,068 | -15.6 |
| Japan Airlines | 1,770 | -28.3 |
| Total Selected Airlines | 63,787 | -4.2 |

Source: Air Transport World July 2012; Airline Business August 2012

Cathay Pacific and Korean Air, the two largest cargo-carrying legacy airlines in the region, both saw FTKs fall over 5% from 2010 levels. Interestingly, Asiana, South Korea's second airline, posted significant increases of 9% in 2011. Singapore Airlines, the two Chinese carriers of China Eastern and China Southern, and All Nippon Airways also registered growth.

Particularly hard hit were Malaysia and Japan Airlines, albeit with smaller freight operations, recording declines of 15.6% and 28.3% respectively.

### 3.8.5 Latin America

The Air Cargo industry in Latin America is a fraction of that of Europe, North America and Asia Pacific.

Air Cargo traffic (FTKs) for selected airlines in the region is displayed in Table 3-22. Collectively, the major carriers achieved growth of over 10% in 2011 compared to 2010.

Table 3-22: Selected Latin American Airlines: Freight Tonne-Kilometres (FTKs) [millions] 2011 v 2010

| | 2011 | % chg vs 2010 |
|---|---|---|
| LAN Airlines | 3,612 | 11.5 |
| TAM Linhas Aereas | 212 | 21.6 |
| Avianca | 152 | -15.6 |
| GOL | 122 | 0.8 |
| Total Selected Airlines | 4,098 | 10.3% |

Source: Air Transport World July 2012; Airline Business August 2012

LAN Airlines, the second largest Latin American carrier after TAM[46] by revenue, reported a total of 3,612m freight tonne-kilometres in 2011, a substantial increase of 11.5% over 2010. According to industry analysis[47] LAN's cargo division raised US$1.57bn in revenue in 2011 (+23% growth over 2010), and accounted for nearly 30% of total airline revenues.

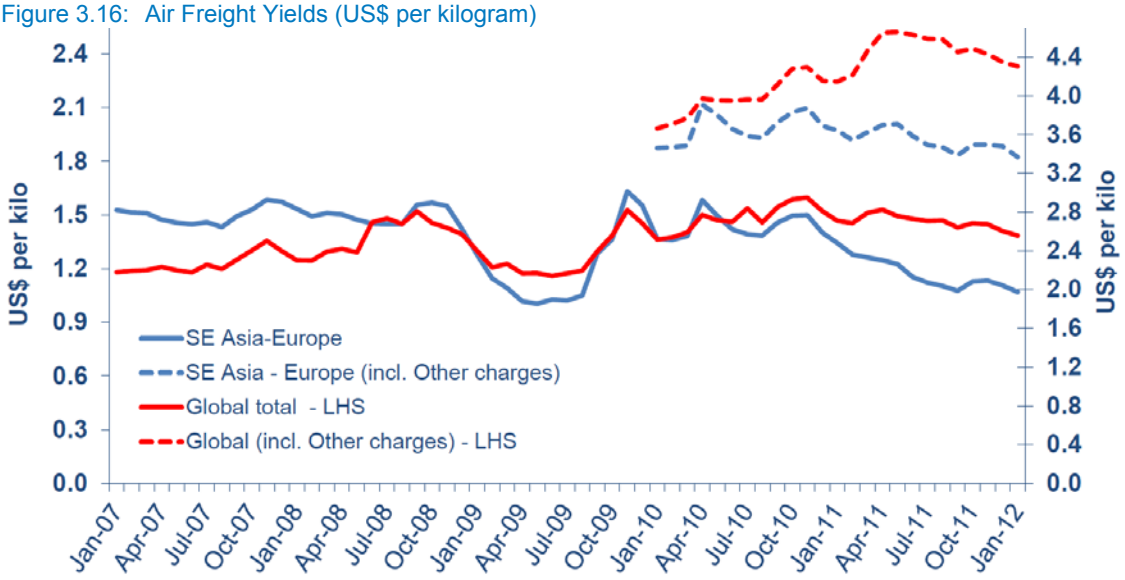
### 3.8.6 Air Cargo Yields & Revenue

A trend of weakening yield growth continued through 2011 (see Figure 3.16 below) due to an unsupportive economic climate. Downward pressure on revenues persisted, with some regions suffering more than others. Global cargo rates fell around 8% on 2010 levels, and rates in the SE Asia-Europe market dropped a dramatic 24% year-on-year.

[46] LAN Airlines and TAM Linhas Aereas received official approval for their merger in 2012.

[47] Airline Business; World Airline Rankings – Financial; August 2012

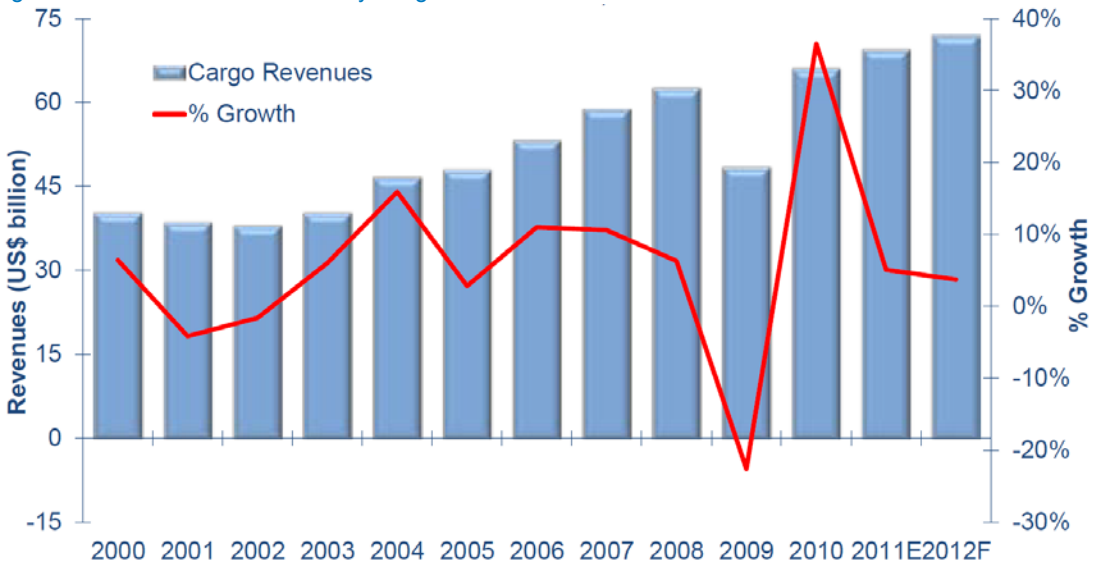
Figure 3.16: Air Freight Yields (US$ per kilogram)




Source: IATA CASS (Note: LHS = Long Haul Services; Other charges include handling charges, dangerous goods fees, special charges, fuel surcharges, security etc.)

Other charges, including fuel surcharges, helped boost cargo yields during 2011, however the Southeast Asia to Europe market experienced a significant reduction as supply-demand conditions worsened – in particular, a lack of U.S. and European demand for Asian manufacturing and increased capacity from growing passenger fleets.

Figure 3.17: Global Airline Industry Cargo Revenues




Source: IATA

Following substantial global airline industry cargo revenue growth in 2010, 2011 growth is flatter (albeit still positive) due to the downward pressure on both traffic and yields.

# 4. Airports

## 4.1 Introduction

After the shock events of 2010, 2011 saw a return to more stable and predictable movements in the airport industry. All of the world regions saw sustained growth with the exception of Africa, where air traffic demand in the northern part of the continent was impacted heavily by the political turmoil experienced in Tunisia, Egypt and Libya in particular. The cargo market meanwhile remained relatively stable. In terms of airport developments, the major news from a European perspective was the opening of a fourth runway at Frankfurt. The majority of Europe's airport operators were profitable in 2011 and enjoyed the rewards of increased passenger numbers.

While much of Europe saw increases in passenger numbers, airports such as Girona (Barcelona) and Frankfurt (Hahn) saw significant decreases as their based Low Cost Carriers relocated capacity to other stations on their network. Ciudad Real Airport in Spain ceased operations altogether only four years after opening due to a lack of business. It is a somewhat harsh reality for many European regional airports that whilst Low Cost Carriers can quickly increase passenger numbers, they can also leave at very short notice leaving these airports with little or no air service.

Regulation, taxation and congestion continued to impact on the operation of Europe's airports during 2011. Frankfurt's new runway was immediately hit with a night operations ban which caused Lufthansa to reconsider its plans to open a cargo base at the airport. There was no resolution to the acute capacity problem affecting the London area, UK politicians continuing to openly oppose expansion at London Heathrow. This news contrasts heavily to developments in the Far East and China in particular, which plans to build 45 new airports by 2016.

## 4.2 Airport Traffic & Developments in 2011

### 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 7.0% in 2011, while traffic at the world's airports grew by 8%. Particularly strong growth was evident in the Asia Pacific market (20.1%) whilst there was also good growth in the Latin American market with growth of 1.5% and in the Middle East where traffic grew by 7.4%. Africa saw a 2.3% decline in traffic during 2011.[48]

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

| Region | EUR | AFR | ASP | LAC | MEA | NAM | World |
|---|---|---|---|---|---|---|---|
| Passengers 2010 (millions) | 1,466.7 | 156.5 | 1,294.8 | 403.7 | 206.6 | 1,509.8 | 5,038.2 |
| 2010 share of World % | 28.7% | 3.1% | 25.7% | 8.0% | 4.1% | 30.0% | 100.0% |
| Passengers 2011 (millions) | 1,570.0 | 152.9 | 1,555.8 | 409.7 | 221.9 | 1,529.7 | 5,442.5 |

[48] These statistics must be handled with care as ACI relies on the airports to report their statistics to them. This leads to a situation where some airports statistics may not be available in a specific year.

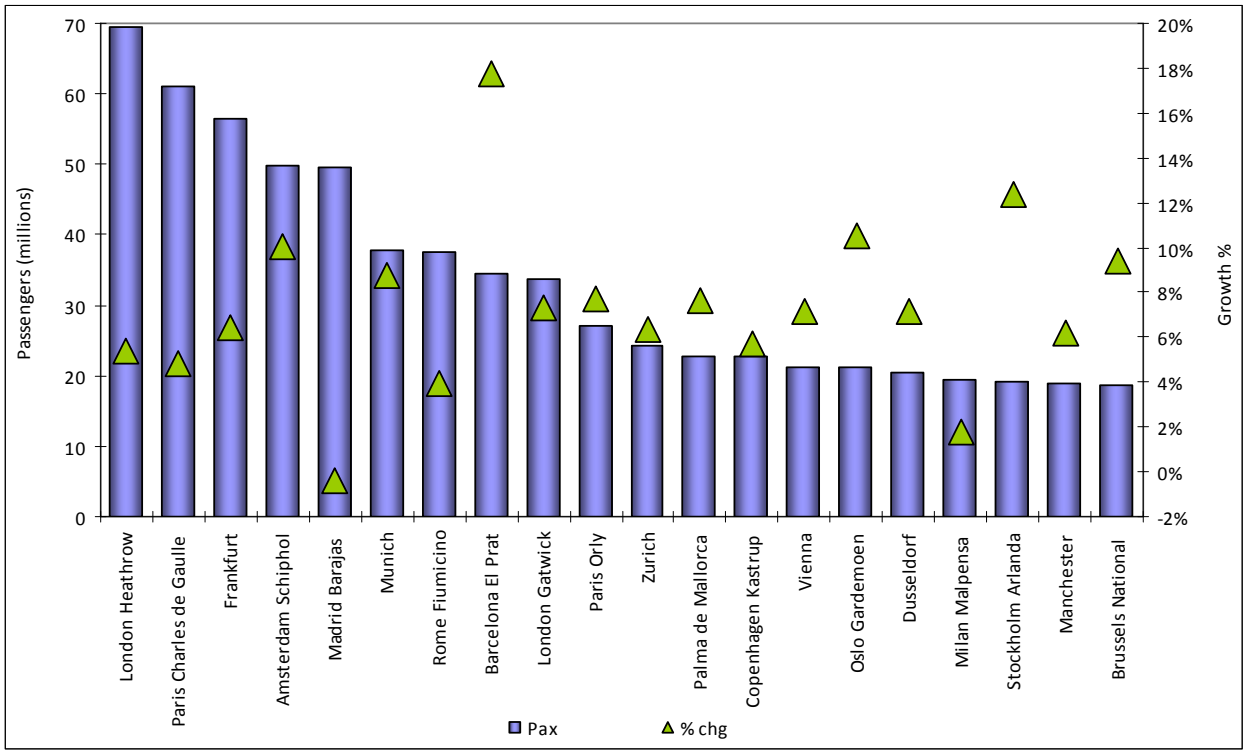
| Region | EUR | AFR | ASP | LAC | MEA | NAM | World |
|---|---|---|---|---|---|---|---|
| 2011 share of World % | 28.8% | 2.8% | 28.6% | 7.5% | 4.1% | 28.1% | 100.0% |
| % change 2011 v 2010 | 7.0% | -2.3% | 20.1% | 1.5% | 7.4% | 1.3% | 8.0% |
| Freight tonnes 2010 (millions) | 17.9 | 1.7 | 31.9 | 4.7 | 5.9 | 28.7 | 90.7 |
| 2010 share of World % | 19.6% | 1.9% | 35.2% | 5.2% | 6.5% | 31.6% | 100.0% |
| Freight tonnes 2011 (millions) | 18.2 | 1.8 | 34.0 | 5.0 | 5.9 | 28.3 | 93.1 |
| 2011 share of World % | 19.5% | 1.9% | 36.5% | 5.4% | 6.3% | 30.4% | 100.0% |
| % change | 1.6% | 5.9% | 6.2% | 6.4% | 0% | -1.4% | 0.2% |
| Commercial ATMs 2010 (millions) | 15.5 | 2.1 | 9.4 | 4.9 | 1.7 | 19.8 | 53.6 |
| 2010 share of World % | 28.9% | 3.9% | 17.5% | 9.1% | 3.2% | 36.9% | 100.0% |
| Commercial ATMs 2011 (millions) | 16.1 | 2.1 | 9.6 | 5.0 | 1.8 | 19.9 | 54.5 |
| 2011 share of World % | 29.5% | 3.8% | 17.6% | 9.2% | 3.3% | 36.5% | 100.0% |
| % change | 3.9% | 0.0% | 2.1% | 2.0% | 5.9% | 0.1% | 1.7% |
| Pax per ATM 2010 | 95 | 74 | 137 | 82 | 120 | 76 | 94 |
| Pax per ATM 2011 | 98 | 72 | 162 | 82 | 125 | 77 | 100 |

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

Figure 4.1 shows the passenger throughput and year on year growth rates of the 20 largest EU airports. 2011 saw growth at all the major airports with the exception of Madrid Barajas, which suffered from industrial action at its main carrier Iberia and a reduction in services by some low cost carriers. London Heathrow remained at the top of the list with 69.4 million passengers (growth of 5.4%) whilst Paris CDG and Frankfurt Airports remained in 2$^{nd}$ and 3$^{rd}$ position with growth of 4.8% and 6.5% respectively.

Strong growth was in evidence at Barcelona El Prat (17.9%), Stockholm Arlanda (12.4%) and Oslo Gardemoen (10.5%). In all three cases, the growth has largely come as a result of increasing low cost carrier activity.

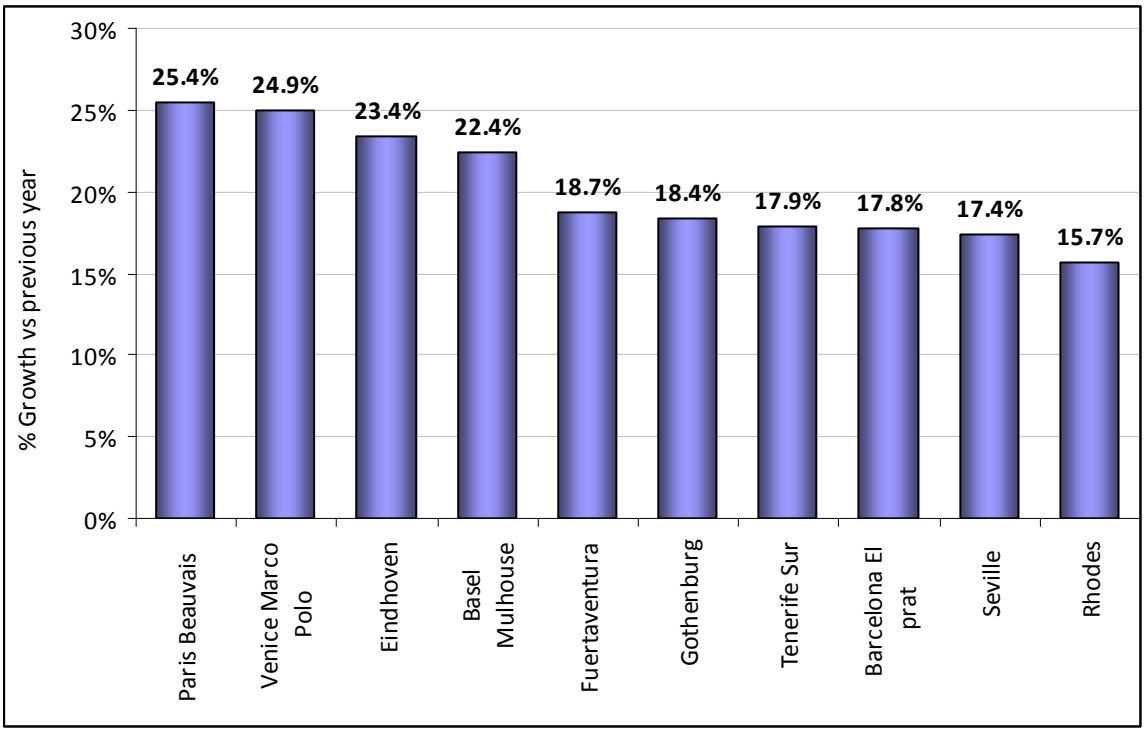
Figure 4.1: European Airports Passenger Throughput 2011




Source: ACI World Airport Statistics 2011

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 2011. Paris Beauvais saw the largest growth in passenger numbers as both Ryanair and Wizzair increased its operations at the airport. Venice Marco Polo also saw a substantial increase as a result of the temporary closure of nearby Venice Treviso airport for significant works. Aircraft were diverted from Treviso to Marco Polo for a significant portion of the summer season. Holiday airports such as Fuerteventura, Tenerife and Rhodes saw significant growth in excess of 15% as traditional European holiday destinations benefited from uncertainty in North Africa in the early part of 2011.

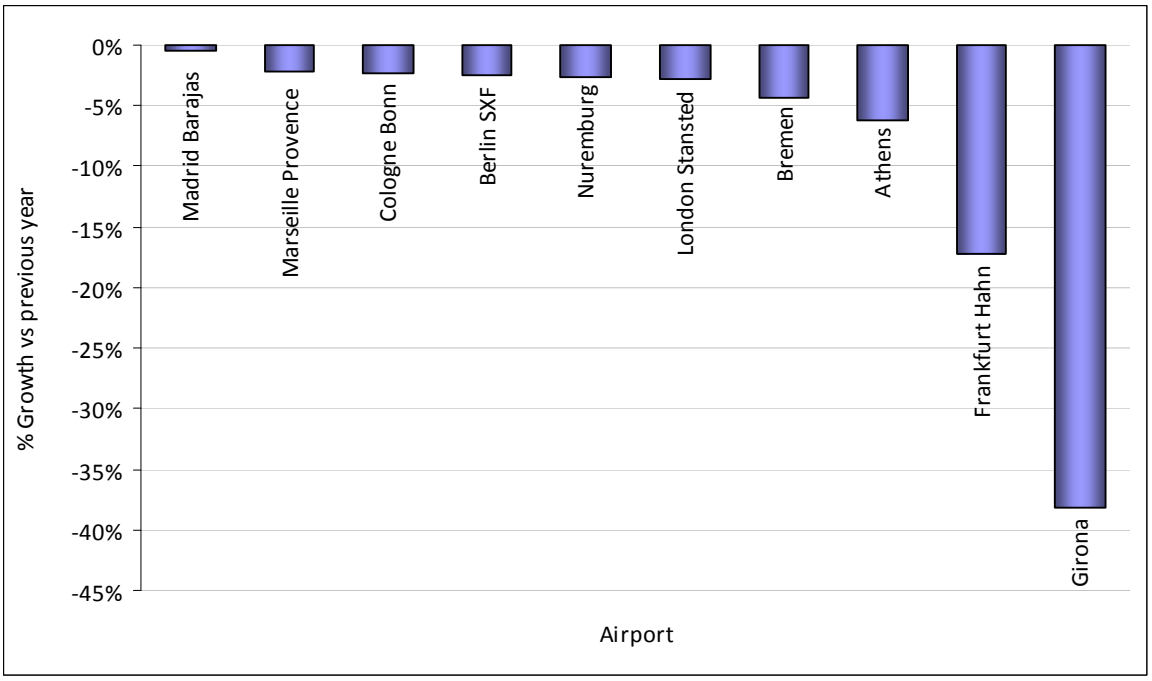
Figure 4.2: European Airports (>2.5m pax) Exhibiting the Highest Growth in 2011




Source: ACI Airport Statistics 2011

The largest declines in passenger numbers were recorded at Girona airport (38.2%) and Frankfurt Hahn Airport (17.2%). In both cases the decline can be attributed to the reduction in service by Ryanair who have transferred capacity to other airports in its network. In the case of Girona, much of the capacity has transferred to Barcelona's main airport, El Prat.

Figure 4.3: European Airports (>2.5m pax) Exhibiting the Largest Declines in 2011




Source: ACI World Airport Statistics 2011

### 4.2.2 Global Airports

Table 4.2: World Top 20 Airports by passenger throughput 2011

| Rank | City, Country | Airport Code | Total Passengers | % Change | 2010 Rank |
|---|---|---|---|---|---|
| 1 | Atlanta, USA | ATL | 92,389,023 | 3.5% | 1 |
| 2 | Beijing Capital, China | PEK | 78,675,058 | 6.4% | 2 |
| 3 | London Heathrow, UK | LHR | 69,433,565 | 5.4% | 4 |
| 4 | Chicago, USA | ORD | 66,701,241 | -0.1% | 3 |
| 5 | Tokyo Haneda, Japan | HND | 62,584,426 | -2.5% | 5 |
| 6 | Los Angeles, USA | LAX | 61,862,052 | 4.7% | 6 |
| 7 | Paris CDG, France | CDG | 60,970,551 | 4.8% | 7 |
| 8 | Dallas Fort Worth, USA | DFW | 57,803,439 | 1.5% | 8 |
| 9 | Frankfurt, Germany | FRA | 56,436,255 | 6.5% | 9 |
| 10 | Hong Kong | HKG | 53,328,613 | 5.9% | 10 |
| 11 | Denver, USA | DEN | 52,849,132 | 1.7% | 11 |
| 12 | Jakarta, Indonesia | CGK | 51,178,188 | 15.4% | 16 |
| 13 | Dubai, UAE | DXB | 50,977,960 | 8.0% | 13 |
| 14 | Amsterdam, Netherlands | AMS | 49,755,252 | 10.0% | 15 |
| 15 | Madrid, Spain | MAD | 49,644,680 | -0.4% | 12 |
| 16 | Bangkok, Thailand | BKK | 47,910,904 | 12.0% | 17 |

| Rank | City, Country | Airport Code | Total Passengers | % Change | 2010 Rank |
|---|---|---|---|---|---|
| 17 | New York JFK, USA | JFK | 47,683,529 | 2.5% | 14 |
| 18 | Singapore Changi, Singapore | SIN | 46,543,845 | 0.7% | 18 |
| 19 | Guangzhou, China | CAN | 45,040,340 | 9.9% | 19 |
| 20 | Shanghai Pudong, China | PVG | 41,447,730 | 2.1% | 20 |

Source: ACI

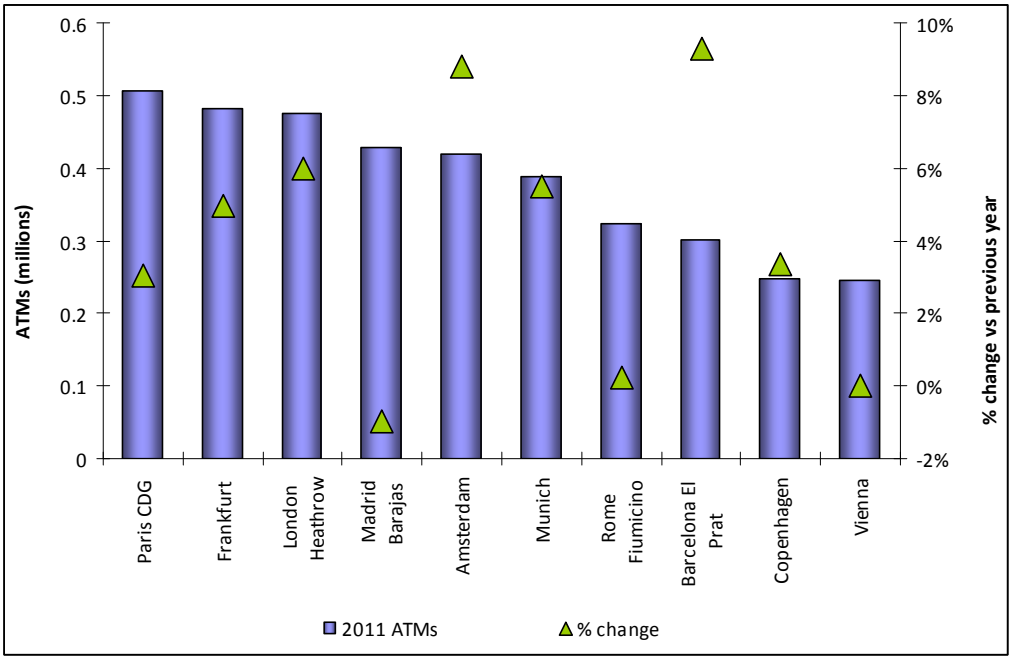
In common with 2010, the strongest growth was seen in the Asia-Pacific region in 2011. Jakarta Airport in Indonesia grew by 15.4% in 2011, whilst Bangkok Airport grew by 12%. Guangzhou Airport in Southern China also grew by 9.9%. All three of these airports are in strong growth regions with high populations and based carriers who are expanding quickly.

European Airports occupy 5 of the top 20 positions in the table. London Heathrow moved from 4th place to 3rd, Amsterdam from 15th to 14th whilst Madrid dropped from 12th to 15th. Paris Charles De Gaulle and Frankfurt both maintained their positions of 7th and 9th respectively.

### 4.2.3 Air Transport Movements

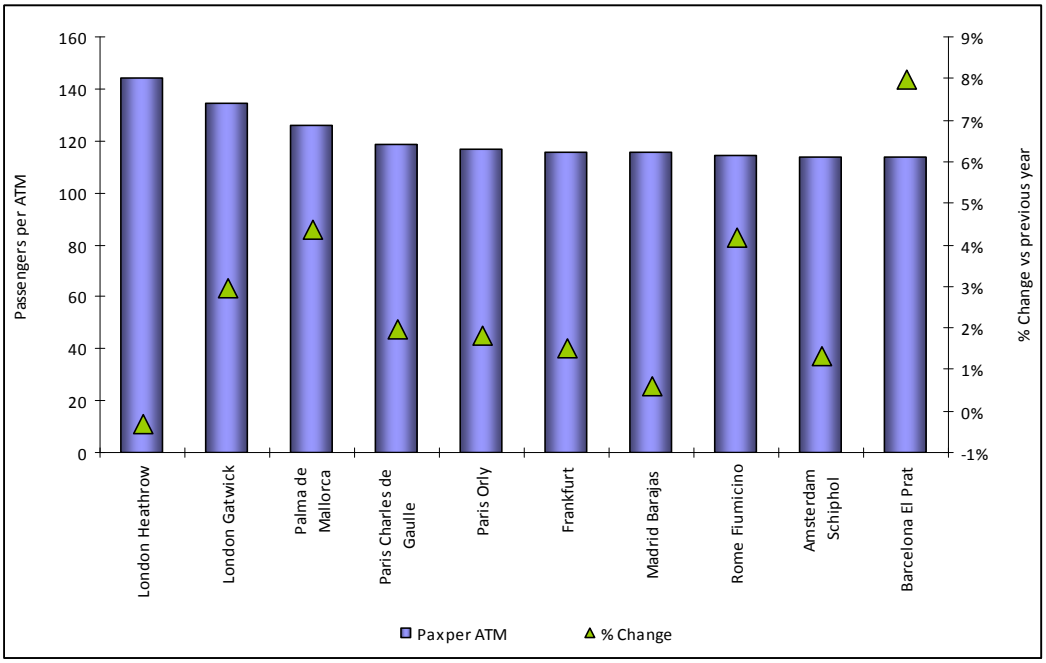
The trend of growing passenger numbers has also been reflected in terms of an increase in air transport movements. Aside from Madrid Barajas, which also saw a decrease in passenger numbers, all of the ten largest airports in Europe saw an increase in Air Transport Movements. Barcelona El Prat saw the largest percentage increase (9.3%) whilst strong growth was also in evidence at Amsterdam Schiphol (8.8%), London Heathrow (6%) and Munich (5.5%). On the edge of Europe, Istanbul Ataturk saw ATM growth of 10.1%. It should be recognised however that 2010 saw significant disruption to operations caused by the volcanic ash cloud and severe winter weather conditions.

Figure 4.4: Total Movements at Major European Airports 2011 vs. 2010



Source: ACI

Figure 4.5: Average Passengers per ATM at Major European Airports 2011 vs. 2010




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

### 4.2.4 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 4-3 below is taken from the ACI Economics Survey 2011, based on a response from 604 airports that collectively handled 3.12bn passengers in 2010, or some 62% of global traffic in that year.

Table 4-3: Airport Industry Revenue and Costs, Financial Year 2010/11

| | USD (billion) | Proportion of Revenues |
|---|---|---|
| **REVENUES** | | |
| Total Airport Industry Revenues | 101.8 | |
| Of which: | | |
| Aeronautical | 54.5 | 53.5% |
| Non-Aeronautical | 47.3 | 46.5% |
| | | |
| **COSTS** | | |
| Operating Expenses | 56.0 | 55.0% |
| Capital Expenditure | 29.5 | 29.0% |
| Capital Costs (Interest and Depreciation) | 32.0 | 31.4% |

| | USD (billion) | Proportion of Revenues |
|---|---|---|
| Global Airport Industry Long-Term Debt | 260.0 | x 2.6 |

Source: ACI Annual Report 2010, Air Transport News

Worldwide total airport income in FY 2011, based on ACI extrapolation from the survey results, reached USD 101.8 billion, an increase of 7% on FY 2010/11. Aeronautical revenues worldwide increased by 7.3% while non-aeronautical revenue sources generated around 7% more revenue when compared to 09/10.

The global airport industry enjoyed aeronautical revenues of USD 54.5bn in FY 2011, an increase of 7.3%. This figure includes revenues from ground handling activities. 34% of this revenue was from aircraft based charges, 49% from passenger based charges and 10% from ground handling activities.

Overall non-aeronautical revenues increased by 7% to USD 47.3bn in FY 2011. Retail remains the most significant revenue stream in terms of airport non aeronautical revenue followed by Property Income and Car Parking. European Airports receive 35% of non aeronautical income through retail, slightly higher than the world average of 28%.

Airports worldwide in FY 2010/11 incurred operating expenses of USD 56bn or 55% of total revenue, a significant decline compared with 2009/10. ACI's hypothesis is that the decrease in Opex is a result of cost reductions and greater credit discipline in the wake of the Financial Crisis. The effects of which were still being felt in 2010/11.

Capital expenditure at airports worldwide was almost a third lower than predicted 2010, with USD 29.5 billion spent on airport upgrades or expansions of existing airport infrastructure. This markedly reduced expenditure has been attributed to the global financial crisis which had led to greater fiscal conservatism in the airport business. The data in the survey does not include Capital Expenditure for The Middle East or China where significant investments in Airport infrastructure were ongoing during FY 2010/11.

For 2011, airports expect capital expenditure to rise by 14% to USD 29 billion, significantly below previous forecasts. In 2010, capital costs industry-wide (including depreciation) amounted to USD 32 billion or 31% of total revenue. 36% of that cost is for interest while the remainder constitutes depreciation.[49]

### Europe

For airport groups which have produced full year financial results, the vast majority of major European airport groups have posted profits or improved figures compared with 2010.

#### 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 204 million passengers in 2011. According to AENA [50], it registered the following financial performance:

[49] ACI Airport Economics Survey 2011

[50] AENA Annual Report 2011

- Consolidated revenue remained steady at €3.094 million in 2011, down slightly from €3.095 million in 2010
- Consolidated EBITDA increased 57% in 2011 over 2010, 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 airport grew by 3.8% to 45.2 million. Results published for 2011 show[51]:

- Net revenue increased by 8.3% to €1.28 billion
- The Amsterdam Schiphol Group achieved an Operating Result of €304 million.

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

As of the end of 2011, BAA was the owner and operator of six airports in the UK (London Heathrow, London Stansted, Southampton, Glasgow, Aberdeen and Edinburgh).

BAA Financial Highlights for 2011[52]

- BAA reduced its pre-tax losses by 17.9% to £255.8 million
- Revenue increased by 10% to £2.28 billion
- Revenue per passenger of £26.09 showed an increase from £24.40 in 2010

### 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 Bourget. Total passenger throughput in 2011 increased by 5.6% to 88.1 million. Financial Results for AdP in 2011 show that[53]:

- Net income increased to €348 million for the full year 2011.
- Total Revenue was €2.5 billion
- Revenue per passenger was €28.77

[51] Schiphol Group 2011 Annual Results

[52] BAA Investor Centre Financial Results for the full year 2011

[53] All Data Aéroports de Paris 2011 Annual Financial Statement

### Fraport

Fraport AG has significant worldwide airport business interests including Frankfurt am Main, Antalya in Turkey and Lima in Peru. For calendar year 2011, passenger numbers for the Group rose by 9.8% year-on-year to 180 million, with a 4% increase at Frankfurt to 53 million. Financial results for 2011 show that[54]:

- Profits of €250.8 million were 7.6% below the previous year
- Revenue increased by 8% to €2.37bn

### Aeroporti di Roma

Aeroporti di Roma is responsible for Rome's two main airports – Fiumicino and Ciampino. In 2011 passenger traffic at the two airports increased by 5.9% to 40.9 million[55]:

- Revenue increased by 6.7% to €599.7million in 2011
- Net income increased to €41.5 million in 2011 from €22.3 million in 2010

### Flughafen Wien

Flughafen Wien is responsible for Vienna International Airport in Austria. 2011 passenger numbers were up 7.1% on 2010 to 21.1 million. Financial Results for 2011 show[56]:

- A 9% increase in revenue to €580 million
- A net profit of €31.6m

### Manchester Airports Group

As at the end of 2011 Manchester Airports Group (MAG) owns and operates Manchester, East Midlands, Bournemouth and Humberside airports. Total passenger numbers at MAG Airports stayed static at 22.8 million passengers. Financial results for FY2010/11 show:[57]

- Slight increase in revenue to £350.2m
- A 51% increase in net profit to £84.7m.

### Zurich Airport

Flughafen Zurich AG operates Zurich Airport, where passenger numbers increased by 6.1% to 24.3 million passengers in 2011. Its financial performance was mixed:[58]

- Revenues rose by 4.9% to 905.4m CHF.
- Profit rose by 23% to 170.9m CHF.

[54] Fraport Consolidated Income Statement FY2011

[55] Aeroporti di Roma 2011 Annual Report

[56] Flughafen Wien 2011 Annual Report

[57] Manchester Airports Group Annual report and accounts 2011

[58] Zurich Airport Financial Report 2011

### Flughafen München

Flughafen München is the owner and operator of Munich International Airport which in 2011 handled 37.8 million passengers. Financial data for the year 2011 shows that total revenue increased by 6% to €950 million. Earnings after taxes increased by 18.1% to €230 million for the full year 2011[59].

### 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 5.6% to 22.7 million in 2011[60].

- Total revenue rose by 3% to DKK 3.34 billion in the twelve months ended 31 December
- Net profit declined by 16.8% to 755.7 million DKK

## 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.

### Greater Toronto Airports Authority

The Greater Toronto Airport Authority is responsible for Pearson International Airport in Toronto, Canada. In 2011 the airport served 33.4 million passengers and its financial performance highlights are as follows:[61]

- Total revenue decreased by -0.2% to CAD 1,112 million.
- The GTAA recorded a net loss of CN$17.1m.

### 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 66 million passengers in 2011, an increase of 16% on 2010[62].

- Revenue increased by 19.2% to THB 28.6 billion
- Full year profits increased by 79% to THB 2.5 billion

[59] Flughafen Munchen Annual report 2011

[60] 'Kobenhavns Lufthavne Annual report 2011

[61] Financial Data: Greater Toronto Airports Group September 2011 Annual report

[62] 'Airports of Thailand 2011 Annual report

### 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 profit after tax of 588 million Indian Rupees (Rs), compared with a loss of Rs1.23 billion the previous year

### 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 and Tblisi and Batumi in Georgia.

- Revenue for the full year 2011 totalled €881 million
- Profit for the full year was €53 million[63]

## 4.2.5 Major Airport Developments

### Europe

### European Union

The European Commission continued its investigation into State Aid at EU airports by launching detailed investigations into several Community airports, including Frankfurt-Hahn in Germany and Marseille in France.

On state aid, Vice-President of the Commission in charge of competition policy, Joaquin Almunia, declared: “State aid may, under certain conditions and circumstances, constitute an appropriate instrument to develop small regional airports and air transport services. However, the Commission also has a duty to avoid distortions of competition within the EU's single market and some of the regional airports in Europe are no longer so new or small"[64].

Regarding Marseille Airport, the Commission announced it was to investigate the public support the airport received for its low cost terminal and separately the fee reductions awarded to operating airlines. The Commission is concerned that the subsidy granted for construction may not have been necessary, and that the discounted fees offered to airlines for start up routes may have resulted in a “selective advantage to the beneficiaries”, contravening EU state aid rules.

With Frankfurt-Hahn Airport, the Commission is particularly concerned that state aid the airport received (via a credit line, loan re-financing and an underlying guarantee) may be giving it an unfair advantage over its competitors, given its size (21st largest in Europe by passenger ranking at the time of the investigation).

[63] TAV Airports Investor Relations Financial Statements

[64] European Commission Press Release – State Aid; IP/11/874: 13th July 2011

## United Kingdom

The airport capacity debate in the UK continued with London mayor Boris Johnson championing the construction of a new hub airport in the Thames Estuary to the east of London. Architectural firm Fosters and Partners alongside consultants Halcrow produced an outline plan for a 150 mppa airport with full tidal defences. Fosters believe that the new airport would help the UK remain competitive, while reducing carbon emissions and providing a boost to the local economy in Kent and Essex.[65]

BAA was also ordered to sell one of their Scottish airports as part of the findings of the Competition Commission report of 2008. The operator originally planned to sell London Stansted first but had continued to appeal against the decision via the courts. The Competition Commission therefore insisted that the sale of a Scottish airport be concluded before the Stansted sale.[66]

Southend Airport marked a major stage in its development into London's sixth airport with the opening of an adjacent railway station in June. It was announced in the latter half of 2011 that low cost carrier easyJet would set up a base at the airport with service to eight European destinations.[67]

## Spain

In September it was revealed that seven consortia had made bids for the 90.05% stakes in Madrid Barajas and Barcelona El Prat airports. Groupo San Jose was bidding solely for Madrid, while Abertis were bidding solely for their home city airport of Barcelona. The other groups are said to be Ferrovial (owners of BAA0, Fraport, GMR Infrastructure, Aeroports de Paris and Changi Airports International. The Spanish government hoped to raise €3.7bn from the sale of Madrid Barajas and €1.6bn from the sale of Barcelona El Prat.[68]

Ciudad Real Airport in Spain saw its last commercial flight in 29th October 2011. The airport opened in 2008 and was envisaged as a catalyst to open the Ciudad Real region to tourism as well as providing a reliever to Madrid Barajas, 150 miles to the North. The expected levels of traffic never materialised and the airport, already in deep financial difficulty, effectively closed by the end of 2011. Castellon Airport in the Valencia Spain was also officially declared 'Open' in July 2011, although to date, no airline has served the airport.

## France

Nantes Airport was announced as the European Regional Airlines Association Airport Achievement Award in 2011. First-time winner Nantes Atlantique Airport, located in the Loire-Atlantique area in the North-West of France, impressed the judges by its strict cost control measures, its strong emphasis on increasing non-aviation revenues and its innovative techniques to improve service quality and operational efficiency.[69]

[65] Foster and Partners unveil Thames UK hub – Building UK 01/08/11

[66] Reuters - BAA told to sell Scottish airport before Stansted 07/10/11

[67] Southend Airport – "Railway Station officially opened" 21/09/11.

[68] Flight Global "Seven consortia bid for Madrid and Barcelona airports" 6/9/11

[69] Eraa.org "Nantes Atlantique Wins Airport Award" 30/9/11

## Germany

The major development in the German aviation market in 2011 came on 24th October, when Frankfurt's fourth runway was opened. The new 2,800m runway is to be used for landings only and is connected to the current airport infrastructure by a link bridge over a main highway and a high speed railway. The runway will allow an increase in capacity from 86 to 90 movements per hour initially, before increasing capacity to 126 movements once the final stage of development is completed.[70]

Two weeks prior to the opening of the new runway at Frankfurt a German court at Hessen ruled that night movements (between 11pm and 5am) at Frankfurt would be banned once the new runway opened. The ban is expected to mostly affect cargo flights and Lufthansa has blamed the ban for a decision to cancel a €1bn investment in a new cargo hub at Frankfurt as the curfew would affect 30% of its services.

In June, it was announced that infrastructure group Hochtief was offering its shares in five European airports for sale. Valued at a combined €1.6bn in 2011, its shares in Hamburg, Dusseldorf, Budapest, Tirana and Athens attracted interest from a number of major players in the airport market including Vinci, Fraport and China's HNA group. The sale was expected to be completed by the end of 2011 but after Fraport withdrew from the process on competition grounds the bid process stuttered to a halt amid the sovereign debt crisis.[71]

The New Berlin Brandenburg Airport was due to open in October 2011 but has since been dogged by delays due to problems with the construction process this has subsequently been delayed to October 2013. Berlin Tegel and Schönefeld will remain open until the new airport is fully operational.

## Finland

Helsinki Airport continued to implement its Greener Landings policy which sees aircraft follow a 'Continuous Descent Approach" to the airport which is believed to reduce fuel consumption, emissions and noise. This approach reduces the need for changes in direction and altitude and ensures more efficient operations. Use of CDA requires favourable air traffic and weather conditions, but Helsinki airport states that the CDA is used 60% of the time at present. [72]

## Poland

The Polish Civil Aviation Ministry announced in August 2011 that Warsaw Chopin International Airport was to be slot coordinated from the summer 2012 IATA season. Airport Coordination Limited (ACL) was appointed to the position. ACL are currently responsible for slot coordination at a number of airports including London Heathrow, London Gatwick, Dublin and Dubai.[73]

[70] ATW Online "Frankfurt Airport fourth runway opens amid night-flight ban concerns"
[71] Businessweek 3rd Nov 2011 Hochtief Airport Sale Said to Stall Amid Sovereign Debt Crisis

[72] Helsinki Airport on the leading edge of green landings. helsinki-vantaa.fi.
[73] Airport Coordination Limited.

### Romania

European Commission launched two in-depth investigations under EU state aid rules into a Romanian support scheme for investments in regional airports. The EC is seeking to determine whether certain rebates and discounts granted by the airport at Timisoara to some airlines, mainly Wizz Air, distort competition.

The Commission said it doubts whether public financing in regional airports in Romania meets a "clearly defined objective of general interest, given the apparent oversupply of airport services" in the country. It also wants to assess whether the upgraded infrastructure is "necessary and proportional, in particular with a view to the limited activity of the airports." The initial investigation showed that Romania's regional airports are generally loss-making and that their operating losses are covered by the state on a yearly basis. While EU rules allow for aid to startup services at regional airports or to cover services of general economic interest, they do not allow for covering operating losses on a continuing basis.

### Croatia

The process to privatise Zagreb Pleso International airport began in earnest during 2011. An Aeroports de Paris led consortium won the tender to operate the airport and is expected to take full control in H2 2012.

### Macedonia

September 2011 saw the opening of the new terminal building, apron and associated facilities at Skopje – Alexander the Great International Airport. The airport is currently managed by TAV on a 20 year concession from the Macedonian Government. A refurbishment of Ohrid Airport in Western Macedonia was also undertaken by TAV and completed in 2011.[74]

## Rest of the World

### USA

A partial shutdown of the Federal Aviation Authority in July caused the temporary halt of a number of airport construction contracts. An impasse in Congress over passing the 21st temporary funding extension since FAA's long-term authorisation expired Sept. 30, 2007, led to a lapse in authority for many of the agency's functions. Air Traffic Control was not affected and projects resumed after an agreement was reached.[75]

The long running negotiations to allow Delta Airlines and US Airways to swap slots at the congested New York La Guardia and Washington Regan Airports reached a tentative agreement after the airlines and the USDOT agreed on financial and slot divestments which would allow the deal to proceed. The negotiations had been ongoing for over 2 years.

[74] Macedonia opens New Skopje Airport – Balkan Insight 7/9/11

[75] MSNBC and Washington Post – August/September 2011

The government of Puerto Rico, a US Commonwealth territory, initiated the privatisation of Luis Munoz Marin International Airport. The concession is set to be the first airport privatisation in the US following the failed Chicago Midway attempt some years ago.[76]

### Brazil

Brazil's government is planning to hand over the country's five largest airports to the private sector through concession agreements, in an effort to accelerate upgrades ahead of two major international events, Brazilian presidential Chief of Staff Antonio Palocci said Tuesday.

The operations and expansion of Brazilian airports have become a key issue in the run-up to the 2014 soccer World Cup, spread among 12 Brazilian cities, and the 2016 Olympic Games, to be held in Rio de Janeiro. There are growing concerns that the airport infrastructure won't be ready to deal with the expected influx of visitors. The government has approved plans to tender concessions for private sector companies to manage two airports in São Paulo state and one in Brasilia.

Tender documents for the construction of a new airport near the city of Natal in Northern Brazil were released in May 2011. The airport will serve the Greater Natal area and will be privately operated from its inception. The Brazilian government is keen to privatise some of its major airport assets in order to expedite the investment required to modernise the nation's airports. Further airports including Sao Paulo Garulhos are expected to follow into privatisation.[77]

### Turkey

Alanya Gazipasa Airport in Southern Turkey welcomed its first international passengers in 2011 with Transavia commencing regular service from Amsterdam. The airport located 120km to the east of Antalya is seeking to provide additional capacity to the swiftly expanding tourist areas in Southern Turkey.

### India

The Airbus A380 aircraft continues to be banned from operating to Indian Airports by the Indian authorities, despite the infrastructure to handle them already being in place. Delhi and Mumbai airports are seen as prime destinations for the super jumbo, with limited bilaterals available and a substantial market to serve. It is understood that Indian carriers have objected to the A380 operating into their home market.[78]

### Egypt

On 20th September 2011 Cairo opened a 'Seasonal Flight Terminal' which is primarily designed to relieve pressure on the main terminals during the heavy pilgrimage seasons. Egyptair's daily flight to Madinah operates from the terminal as well as all dedicated Hajj pilgrimage flights to the holy sites in Saudi Arabia.[79]

[76] Centre for Aviation, Forward Steps Puerto Rico airport privatisation as a milestone for US airports, 28/6/11

[77] The Rio Times, Brazil moving to airport privatisation, 3/5/11

[78] Aviation Week, How long can India's A380 stalling tactic last? 22/7/11

[79] Cairo Airport, Latest News, 20/9/11

## 4.3 Airport Charges Regulation

Although airports worldwide are generally free to charge airlines what they wish for services provided, ICAO lays out guidance and principles for airports in determining the cost basis for charges in its Doc9082 "ICAO's Policies on Charges for Airports and Air Navigation Services; 8th Edition" published in 2009.

### 4.3.1 Airport Charges by World Region

Although the framework of airport charges is largely uniform and their structures are similar, the levels of charges can vary significantly among similar airports 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.

Airport Charges (in GBP £) at Selected Airports Boeing 737-800 Aircraft

| Airport | Airport Charges 2010 | Pax Charges 2010 | Total Charges 2010 | Airport Charges 2011 | Pax Charges 2011 | Total Charges 2011 | % Chg Airport Charges | % Chg Pax Charges | % Chg Total Charges |
|---|---|---|---|---|---|---|---|---|---|
| **EUROPE** | | | | | | | | | |
| Frankfurt | 798 | 2,305 | 3,103 | 679 | 2,514 | 3,193 | -14.9% | 9.1% | 2.9% |
| London LHR | 944 | 2,550 | 3,494 | 1,253 | 3,308 | 4,561 | 32.7% | 29.7% | 30.5% |
| Paris CDG | 544 | 3,483 | 4,027 | 526 | 3,291 | 3,816 | -3.3% | -5.5% | -5.2% |
| Moscow DME | 876 | 1,586 | 2,462 | 868 | 1,537 | 2,405 | -0.9% | -3.1% | -2.3% |
| **AFRICA** | | | | | | | | | |
| Johannesburg | 428 | 1,155 | 1,583 | 1,066 | 2,107 | 3,173 | 149.1% | 82.4% | 100.4% |
| Nairobi | 431 | 1,373 | 1,804 | 137 | 2,662 | 2,800 | -68.2% | 93.9% | 55.2% |
| **ASIA PACIFIC** | | | | | | | | | |
| Dubai | 253 | 1,402 | 1,655 | 195 | 1,449 | 1,644 | -22.9% | 3.4% | -0.7% |
| Hong Kong | 521 | 496 | 1,017 | 516 | 481 | 996 | -1.0% | -3.0% | -2.1% |
| Beijing | 340 | 853 | 1,193 | 331 | 862 | 1,193 | -2.6% | 1.1% | 0.0% |
| Tokyo NRT | 1,628 | 1,692 | 3,320 | 1,864 | 2,162 | 4,026 | 14.5% | 27.8% | 21.3% |
| Sydney | 364 | 3,440 | 3,804 | 380 | 3,550 | 3,930 | 4.4% | 3.2% | 3.3% |
| **AMERICAS** | | | | | | | | | |
| Chicago ORD | 767 | 2,624 | 3,391 | 777 | 2,482 | 3,259 | 1.3% | -5.4% | -3.9% |
| Rio de Janeiro GIG | 353 | 2,472 | 2,825 | 502 | 2,202 | 2,704 | 42.2% | -10.9% | -4.3% |

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)

Airport Charges (in GBP £) at Selected Airports for Boeing 747-400 Aircraft

| Airport | Airport Charges 2010 | Pax Charges 2010 | Total Charges 2010 | Airport Charges 2011 | Pax Charges 2011 | Total Charges 2011 | % Chg Airport Charges | % Chg Pax Charges | % Chg Total Charges |
|---|---|---|---|---|---|---|---|---|---|
| **EUROPE** | | | | | | | | | |
| Frankfurt | 4,404 | 5,203 | 9,607 | 3,634 | 5,727 | 9,361 | -17.5% | 10.1% | -2.6% |
| London LHR | 1,588 | 5,754 | 7,342 | 1,926 | 7,535 | 9,461 | 21.3% | 31.0% | 28.9% |
| Paris CDG | 2,947 | 7,860 | 10,807 | 2,811 | 7,496 | 10,307 | -4.6% | -4.6% | -4.6% |
| Moscow DME | 4,402 | 3,579 | 7,980 | 4,306 | 3,501 | 7,807 | -2.2% | -2.2% | -2.2% |

| Airport | Airport Charges 2010 | Pax Charges 2010 | Total Charges 2010 | Airport Charges 2011 | Pax Charges 2011 | Total Charges 2011 | % Chg Airport Charges | % Chg Pax Charges | % Chg Total Charges |
|---|---|---|---|---|---|---|---|---|---|
| **AFRICA** | | | | | | | | | |
| Johannesburg | 2,097 | 2,608 | 4,705 | 4,473 | 4,799 | 9,272 | 113.3% | 84.0% | 97.1% |
| Nairobi | 1,165 | 3,100 | 4,265 | 1,079 | 3,033 | 4,112 | -7.4% | -2.2% | -3.6% |
| **ASIA PACIFIC** | | | | | | | | | |
| Dubai | 1,014 | 3,164 | 4,178 | 966 | 3,301 | 4,267 | -4.7% | 4.3% | 2.1% |
| Hong Kong | 2,147 | 1,119 | 3,266 | 2,102 | 1,095 | 3,197 | -2.1% | -2.1% | -2.1% |
| Beijing | 1,893 | 1,926 | 3,819 | 1,911 | 1,963 | 3,874 | 1.0% | 1.9% | 1.4% |
| Tokyo NRT | 6,346 | 3,818 | 10,164 | 6,738 | 4,925 | 11,662 | 6.2% | 29.0% | 14.7% |
| Sydney | 1,830 | 7,764 | 9,594 | 1,888 | 8,086 | 9,974 | 3.2% | 4.1% | 4.0% |
| **AMERICAS** | | | | | | | | | |
| Chicago ORD | 3,359 | 5,921 | 9,280 | 4,346 | 5,597 | 9,943 | 29.4% | -5.5% | 7.1% |
| Rio de Janeiro GIG | 1,486 | 5,579 | 7,065 | 2,166 | 5,016 | 7,181 | 45.8% | -10.1% | 1.6% |

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)

The tables above demonstrate the key changes in airport charges at a number of key world airports in 2011 compared with the charges for 2010. The general trend being shown is that most airports have kept their charges at similar levels to 2010. A change of +/- 5% can invariably be accounted for by fluctuations in exchange rates and inflationary rises. The notable exceptions are London Heathrow, Tokyo Narita and Johannesburg, which have all shown double digit increases in their charges for 2011.

The tables confirm the wide variations in airport charging regimes. For instance, the most expensive airport for a Boeing 737-800 to land (Tokyo Narita) is almost 4 times more expensive than the cheapest (Hong Kong). A similar story is in evidence for the Boeing 747-400 with Tokyo Narita almost 4 times more expensive than Hong Kong. As a benchmark, the European airports tend to show charges at the higher end of the world spectrum.

As was the case in previous years, 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. In the case of Spain, virtually all airports outside of Madrid and Barcelona are operated by AENA and employ a uniform charging regime. With margins for airlines under increasing pressure due to fuel prices and increased taxation, it is likely that they will seek to drive a hard bargain in the coming year.

### BAA & Gatwick Airport Ltd

Airport Charges at London Heathrow and London Gatwick also came under the microscope after complains from Bmi at Heathrow and Ryanair at Gatwick. Bmi complained that the new charging regime introduced by BAA in April discriminated against Domestic and Short Haul operations which form the substantial majority of Bmi's operations. By the end of December 2011, a decision on the matter was still pending. Ryanair's

complaint at Gatwick resulted in an order from the UK Civil Aviation Authority for the airport operators to adopt a more transparent pricing policy for check in and baggage facilities.[80] (ATW)

### Amsterdam Noise Charging Regime

Amsterdam Schiphol Airport introduced a new charging regime in May 2011 that allowed quieter aircraft and those landing during the hours of 6am and 11pm to pay lower fees. Aircraft landing outside of these hours or noisier aircraft will be subject to increased charges.

Basic charge for a take-off or landing for a point-to-point passenger flight with associated handling for aircraft over 20,000kg will be €4.76 per 1,000kg. A cargo flight will pay €2.48 per 1,000kg. Typical aircraft in the "basic" category include most modern passenger jets such as Boeing 737NGs and 777s or Airbus A320s.

A "marginally compliant chapter 3" (MCC3) aircraft - such as a Boeing 737-200 or McDonnell Douglas DC-10 - will pay a 60% surcharge on the basic rate. Aircraft in "noise category A" such as a Boeing 737-300 or McDonnell Douglas MD-80, will pay a surcharge of 40% over the basic rate. Particularly quiet aircraft, such as the Airbus A340, A380 and Boeing MD-90, will receive a 20% reduction on the basic rate.
All charges mentioned above will be increased by 50% for aircraft taking off between 23:00 and 06:00, while landings during those hours will receive a 27% surcharge. MCC3 types will be subject to a further 50% charge over and above the "normal" night-time charges.[81]

## 4.3.2 Airport Regulation

### Europe - Introduction of European Union Directive on Airport Charges

March 2011 saw the final date for all EU nations to be compliant with the new EU Directive on Airport Charges

Because of its strong commitment to open and fair competition, the European Commission has stated that[82]:

> *"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[83], which is due to be implemented in all Member States by March 2011.

[80] ATW, London Heathrow charges investigated by CAA after bmi complaint, 7/7/11.

[81] Schiphol Airport Charges and Conditions 31/5/11

[82] http://ec.europa.eu/transport/air/airports/airport_charges_en.htm

[83] Directive 2009/12/EC of the European Parliament and of the Council on airport charges, 11/3/09

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 Organisation (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 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. Airports can also vary charges on environmental grounds (e.g. 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 designate or set up an independent supervisory authority whose job will be to help settle disputes over charges between airports and airlines.

### ERAA

The European Regions Airline Association reacted negatively to certain aspects of a study which sought to assess the most economically valuable use of Airport Capacity at Europe's congested airports. The ERA felt that its members would lose out if the conclusions of the study were implemented. The ERA Director General stated "The EC needs to understand that changes to the EU slot allocation regulation have the potential to destabilise air transport within Europe and isolate the regional communities served by ERA's members."[84]

### United Kingdom

A draft version of the UK Civil Aviation Authority bill was produced in November 2011. The new bill released by the UK Department for Transport appears to give the CAA additional responsibilities including closer monitoring of airports. Under the draft bill the CAA will be able to fine airports up to 10% of their turnover for breaching licence conditions and poor performance. The UK government hopes that these measures will further incentivise compliance and reduce poor performance. Both Virgin Atlantic and easyJet welcomed the new legislation[85].

In April 2011, the UK Civil Aviation Authority extended the price controls in place at London Heathrow and London Gatwick for another year until the UK government produces the full details of a new Civil Aviation Bill. The Government's proposals include introducing a new licensing regime for airports with significant market power, in line with other economic regulators. The CAA states that this allows regulation to be tailored to meet the requirements of individual airports, rather than the current one size fits all approach

[84] ERAA, Airport Slot Study Bad News for Europe, 2/6/11

[85] ABTN 23rd November 2011 (CAA to be given more powers and Airlines welcome airport regulation bill)

being applied to the designated airports. This will enable the CAA to better target regulatory activity where and when it is needed to protect the interests of passengers.[86]

The Civil Aviation Authority was also supportive of the Supreme Court's decision not to hear BAA's appeal against the Competition Commission ruling that it should sell Stansted Airport and one of its Scottish Airports. BAA had contended that since the original decision of 2008, market conditions had changed substantially and that the Commission's ruling was no longer valid.[87]

The Civil Aviation Authority was also involved in the implementation of the Operational Freedoms trial that commenced at London Heathrow airport in November 2011. The trials will involve trialling a variety of different airspace management scenarios in order to improve efficiency at the heavily congested Heathrow Airport. At present operations are generally restricted to take offs and landings in segregated mode but the aim of the trial is to see if this is still the most efficient method of traffic management at Heathrow.[88]

### UK Regional Airports

Birmingham Airport, Bristol Airport and Manchester Airports Group joined with UK airlines Jet2 and Flybe to call on the UK government for a reduction in the levels of APD outside London. The group argued that "They (the regions) have a lower percentage of business travellers or inbound tourists than the London airports and have been hit hard by the economic downturn. By reducing the APD it would support economic growth and the rebalancing of the UK economy." The move came after the UK government announced that it would cancel APD for the United Airlines daily flight between Belfast International and Newark (New York) after fears that the route would be withdrawn due to the levels of taxation making the route unsustainable.

### Germany

A local court in Hesse imposed a night curfew on the newly opened runway at Frankfurt in November 2011. It had been expected that the runway would be open throughout the night but the court ruled that it had to be closed between 11pm and 5am. Similar arrangements are in place throughout the European Union. For example London Heathrow is limited to 18 movements between 11pm and 6am, whilst Dusseldorf has a curfew between 10pm and 6am.

### North America

#### Federal Aviation Authority

The United States Federal Aviation Authority was forced to shut down for two weeks in July and August 2011 due to delays in the passing of legislation in the Senate and House of Representatives. The organisation was forced to furlough 4,000 employees for the duration of the shutdown which also called a halt to over 200 airport construction projects and resulted in the non-collection of over $350 million of airport and airline taxes.

[86] Civil Aviation Authority Newsroom, 31/3/11

[87] Civil Aviation Authority Newsroom, 19/7/11

[88] Civil Aviation Authority Newsroom, 30/10/11

Prior to 2011, the FAA's funding bill had been extended on a year on year basis since the previous long term bill expired in 2007. As a result of a strategy of reducing public spending, the US government was unwilling to simply rubber stamp a further extension without amendments to the existing bill. A temporary solution was found in August before a further longer term solution which allowed regular operations to continue until January 2012 was agreed in September.[89]

### Africa

The substantial increase in charges at ACSA airports continued to be the major talking point in African Airport regulation. IATA in particular was critical of the new regime stating that ACSA fees are now "some of the highest in the world" and that "the situation was untenable and cannot be allowed to continue." ACSA responded by stating that due to regulatory delays at the Department of Transport, the charges had been increased by a greater amount in order to recoup the budgeted fees for the year in a five month period. IATA estimated that the increased charges will cost airlines $1.6bn during the 2010-2015 regulatory period.

### 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.

## 4.3.3 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. New or changed taxation regimes in Europe are detailed below.

### ACI Europe

In January 2011 ACI Europe published a position paper on Aviation Taxation in the European Union. The report was highly critical of the taxes being levied and stated that "all national aviation taxes should be withdrawn upon entry into force of the EU ETS. The report also criticised new aviation taxes being promoted as environmental levies stating that "In reality, these so-called "Green" taxes are simply blunt instruments for public revenue generation, which do not deliver any significant environmental benefits."

The key points of the ACI position:

- Aviation taxes have a negative economic impact on the economy
- Expected revenues are largely outweighed by losses in the overall economy

[89] MoneyWeb South Africa, ACSA Fees are the highest in the world, 10/7/11

- Existing taxes at a national level should be abolished
- An aviation tax at an EU level is economically and socially not sustainable[90]

### Austria

Austria introduced a new Aviation Tax on 1st April 2011. The rates per passenger are €8 for short haul flights, €20 for 'mid haul flights and €35 for long haul flights. It is expected that the cost of the tax will be borne by the passenger.[91]

### Germany

The German Air Passenger Tax came into force on 1 January 2011 (excluding transfer passengers). The tax ranges from €8 for domestic and European destinations to €45 per flight for long-haul routes. The German government has stated that the tax will help to offset the environmental impact of aviation.[92]

### Ireland

The Irish government agreed to abolish its controversial aviation tax in return for increased tourist traffic, prompting Dublin Airport Authority to expand its incentive scheme to attract airline growth at Dublin, Cork and Shannon.

The Government in December announced that the travel tax introduced in March 2009 would be slashed from €10 ($14.4) to €3 from 1 March, 2011. However, Irish minister for transport, tourism and sport Leo Varadkar said yesterday that the remaining €3 would be abolished "if airlines commit to deliver more tourists to Ireland".

The Dublin Airport Authority has subsequently introduced a new three-year incentive scheme which will rebate passenger service charges to airlines for any traffic growth at Dublin, Cork and Shannon between now and the end of 2013.[93]

### 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 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.

The current rates range from £12 for short-haul flights up to £170 for long-haul flights per ticket. On 29th November 2011, the UK government announced a further 8% increase in the levels of Air Passenger Duty which would be payable with effect from April 1st 2012. The new charges range from £13-£92 for an

[90] ACI Europe, Position Papers, ACI Europe Position on Aviation Taxes within the EU, Putting the economic recovery at risk. 31/1/11.
[91] Tmf-vat.com, Austrian Aviation Tax
[92] AirBerlin.com
[93] Flight Global, Irish Government scraps tax in return for increased travel. 11/5/11

Economy class ticket to £26 to £184 for other classes of travel. It is widely reported that UK Air Passenger Duty is now the highest tax of its type in the world.[94]

## 4.4 Slot Allocation Issues

### 4.4.1 Europe

#### SDG Slot Report

Consultants Steer Davies Gleave produced a report on the EU's airport slot regulations which contained a number of recommendations to ensure the most efficient use of airport capacity at Europe's slot controlled airports. According to the report demand exceeds capacity for most of the day at six of Europe's main airports; London Heathrow, London Gatwick, Dusseldorf, Paris Orly, Milan Linate and Rome Ciampino. The report claims that benefits of €5bn and 28 million additional passengers could be accommodated at European Airports over the lifetime period 2012 to 2025.

The recommendations, as stated in the report[95], were as follows:

| Category | Issue identified | Recommendations |
|---|---|---|
| Operation of coordinator | Some aspects of how coordinators structured could be interpreted to limit the independence of the coordinator | Require organisational rather than functional separation of the coordinators from interested parties.<br><br>Require that funding of coordinators be shared between airlines and airports.<br><br>Commission should use powers to encourage States to comply with existing obligations. |
| | The extent to which information is publicly available on capacity parameters, slot availability and allocation, and local rules varies | Require all coordinators to publish online capacity parameters and local rules; at start of every season, summary of slot requests and allocations (by hour); and at end of every season utilisation by airline; and to produce and publish an annual report |
| | Non-availability of historical data limits scope for investigations of slot market by regulatory authorities | Require coordinators to keep data on slot allocations and requests for at least 5 years |
| | Coordinators can face financial problems if main contributing airline also does | Require that funding of coordinators be shared between airlines and airports<br><br>States to have ultimate obligation to ensure coordinator adequately funded |
| Slot misuse and abuse | Late hand-back of slots continues to be an issue at some airports, leading to under-utilisation of scarce capacity | Regulation should require penalties are available for late hand-back and make clear that slot reservation fees are not incompatible with the Regulation if they are revenue neutral |

[94] Daily Telegraph, The Autumn statement, 29/11/11

[95] Impact assessment of revisions to Regulation 95/93; Final report March 2011; SDG

| | | |
|---|---|---|
| | Ex ante monitoring of consistency between flight plans and slots does not happen in all States | Clarify that the coordinator should provide information on cleared airport slots to the air traffic management authorities if requested, and a flight plan should only be rejected after consultation with the coordinator |
| | Some States have not introduced sanctions as required by Article 14 | Commission should use powers to encourage States to comply with existing obligations |
| | Slot monitoring and enforcement could be more effective | Article 14 to be amended to clarify and extend coordinators' powers and scope of enforcement |
| | In some States imposition of penalties is slow and distant from coordinator | Coordinator to be informed of the outcome of each case referred to national authorities |
| Business aviation | It is difficult for business aviation to obtain slots at congested airports | No change – would not be consistent with efficient use of constrained capacity, and Member States already have other options by which they can reserve capacity for business/general aviation |
| Slot allocation | At some congested airports administrative mechanism has led to inefficient allocation, as scarce capacity is used for flights with small aircraft | Regulation should clarify that secondary trading through slot transfers may take place at all EU airports<br><br>Allow auctions for newly created slots. |
| | Secondary trading not transparent, particularly at non-London airports | Explicit authorisation for secondary trading facilitates improved transparency.<br>Require airlines to disclose transfers to coordinator and coordinator to publish list each season.<br>Coordinators to establish bulletin board on which airlines can advertise willingness to trade. |
| | Competition authorities concerned secondary trading could increase concentration | Prohibit anti-competitive restrictive covenants.<br>Require airlines to disclose transfers to coordinator and coordinator to publish list each season.<br>Coordinators to establish bulletin board on which airlines can advertise willingness to trade. |
| Local guidelines | Some stakeholders believe that there should be more flexibility for local guidelines | No change – Regulation sufficiently clear. More flexibility would increase risk of non-neutral/discriminatory slot allocation. |
| New entrant rule | New entrant rule leads to fragmentation of schedule and is not appropriate where there are a large number of slots to allocate (if capacity expanded) | Revise new entrant rule to allow slots to be allocated to carriers with larger holdings.<br><br>Allow auctions for newly created slots. |
| Utilisation and 80-20 rule | Even at some congested airports such as London Gatwick, utilisation is still low | Increase utilisation threshold to 85%.<br>Introduce penalties for late hand-back and clarify that slot reservation fees permitted.<br>Introduce secondary trading at all EU airports. |
| | Different interpretations between coordinators on when 'fill in' of gaps in series permitted | Regulation to state (and limit) when fill in permitted. |

| | |
|---|---|
| Some coordinators do not properly enforce current requirements | Commission should monitor and use powers to encourage States and coordinators to comply with existing obligations. |
| Short series of slots in peak summer can block capacity year-round | Extend minimum length of a series of slots to 15 (summer) and 10 (winter). Allow exceptions by local rules. |

Source: Steer Davies Gleave

### 4.4.2 'Better Airports' Package

In December 2011 the European Commission announced a package of comprehensive measures designed to assist the increase of Europe's airport capacity, reduce delays and improve service quality standards.

The package includes three legislative measures on slots, ground-handling and noise.

#### Slots

With the raising of the threshold on the "use it or lose it rule" from 80%-85%, the Commission intends to ensure that existing capacity is used by airlines. The Commission proposals also introduce market based mechanisms for the trading of slots between airlines in a transparent way.

The Commission estimates that the proposed measures would increase EU-wide passenger throughput by 24 million a year by 2025, contribute an extra €5 billion to the European economy and create up to 62,000 jobs over the period 2012-2025.

#### Ground-handling

Measures that the Commission is proposing to improve the quality and efficiency of ground-handling services at Community airports include: increasing the minimum choice of ground-handlers available to airlines at large airports from two to three; allow Member States to go further in protecting workers rights so staff can transfer under existing conditions when a contract goes to a new provider.

The proposals are designed to strengthen the role of airports as the ground co-ordinator with overall responsibility for the coordination of ground-handling services at an airport.

#### Noise

The Commission proposals increase the transparency in the process of setting noise-related restrictions at airports, including an oversight role for the Commission. The proposals are also designed to update existing legislation in line with technological developments to make it easier for authorities to phase-out the noisiest planes.

### 4.4.3 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 as well as Washington Regan Airport and Chicago O Hare. Most recently Delta and US Airways have tried to swap slots at Washington Regan and New York La Guardia Airports, strengthening their positions in the respective markets. The US Department of Transport required certain concessions from each carrier which largely centred on making new slots available for new entrant carriers at the heavily congested airports. The deal took two years to complete and required Delta to pay US Airways US$66m and transfer their route operating rights to Sao Paulo, Brazil as part of the deal.

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[96].

### 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. 2011 marked the first full year of operations which saw flights added to London, Paris, New York, Honolulu and Los Angeles. 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. International flights can only depart between 11pm and 6am to ensure that airlines do not simply abandon their services to Narita (60km from the city centre and located in a less densely populated area).

2011 marked the first full year of International operations at Haneda. After a year of operating international flights at Haneda, reports from Japan have varied regarding the success of providing international slots. All Nippon Airways president Shinichiro Ito stated that passenger loads and transfers between domestic and international flights were steadily increasing. Statistics suggest however that only 20% of passengers have switched from Narita to Haneda citing poor flight times due to the restrictive nature of the slot provision.[97]

### IATA

IATA updated its 'Worldwide Slot Guidelines' publication for the 3rd edition in 2011. The principles set out are intended to provide the global air transport community with a single set of standards for the management of airport slots.

The IATA member airlines and the community of airport coordinators from across the globe jointly produce the WSG. The document has been developed since 1974 and is reviewed and revised on a regular basis.

The 3rd edition contains no material amendments, other than two minor changes to wording.

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[96] Upgrading to World Class – the Future of the New York Region's Airports, Regional Plan Association, January 2011

[97] Yomiuri.com, Haneda far from International. 22/10/11.

# 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.

The most recently published data available in the public domain is used – in some cases this means that the reference year is 2010 for some analyses.

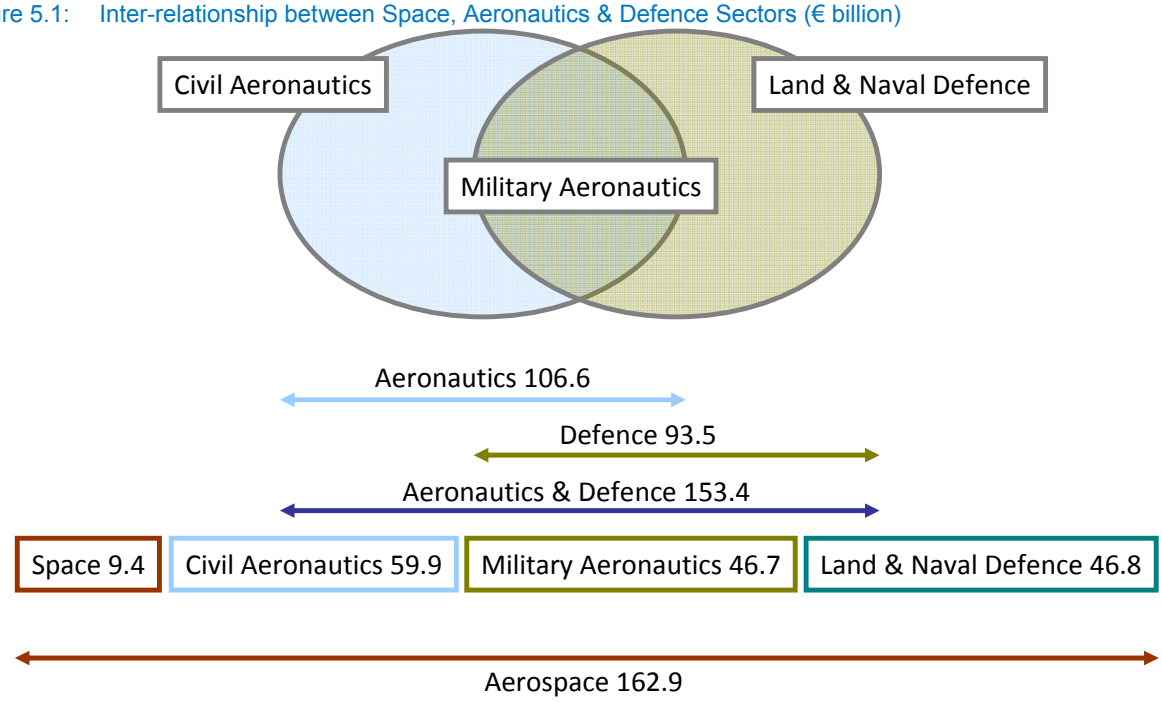
## 5.2 Aeronautics and Manufacturing Overview

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.

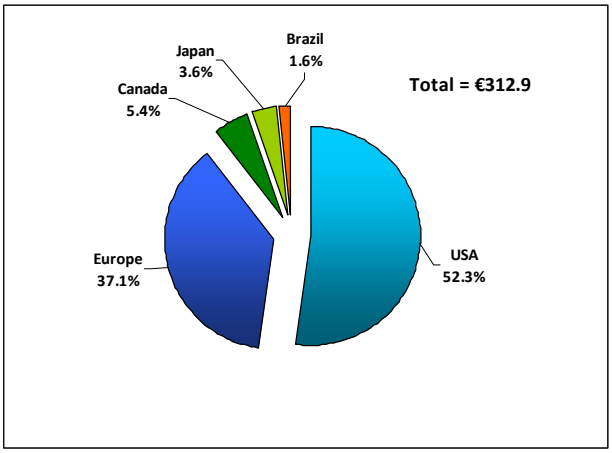
Figure 5.1: Inter-relationship between Space, Aeronautics & Defence Sectors (€ billion)




Source: ASD

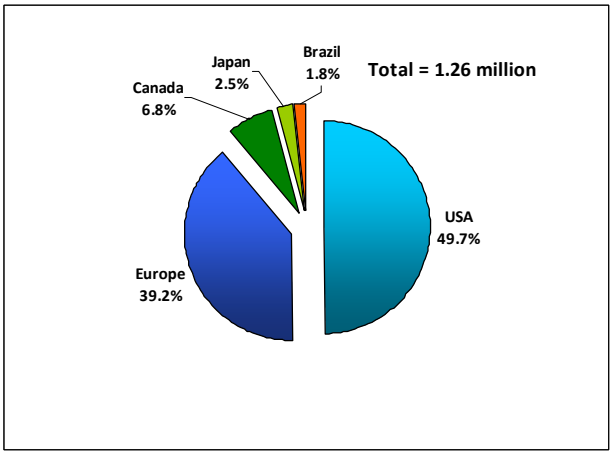
According to figures from the AeroSpace and Defence Industries Association of Europe (ASD), aerospace turnover in the EU totalled €162.9 billion in 2010 and the industry employed 500,000 people[98]. Comparisons to major international markets are shown below.

Figure 5.2: Comparative Aerospace Turnover 2010




Source: ASD (unconsolidated turnover for Europe)

Figure 5.3: Comparative Aerospace Employment 2010




Source: ASD

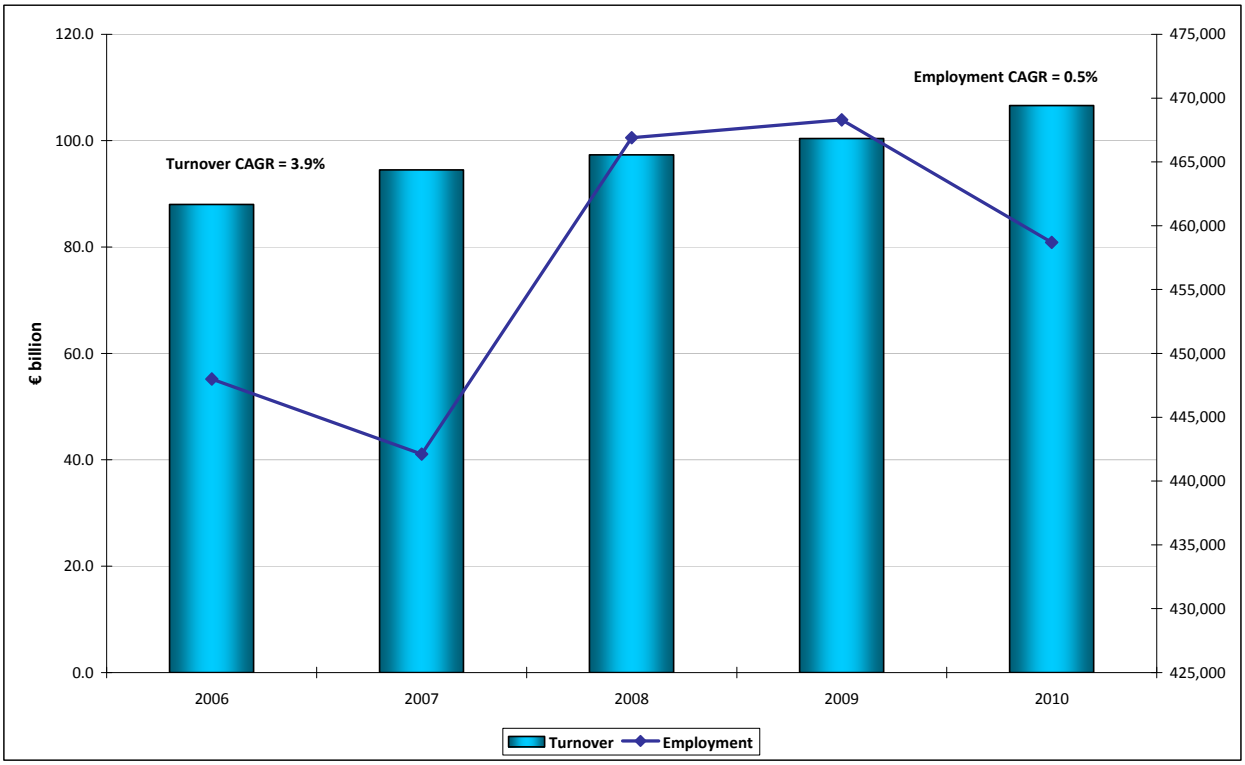
[98] AeroSpace and Defence Industries Association of Europe, Facts and Figures 2010

The turnover of the European aeronautic sector in 2010 (civil and military aeronautics but excluding space activities, land and naval defence) totalled €106.6 billion, an increase of 6.2% over 2009. This represents a 3.9% CAGR in turnover since 2006[99] (see Figure 5.4).

The number of persons employed in aeronautics reached 458,700, a decrease of 2% over 2009. This represents a CAGR of 0.9% since 2006, see Figure 5.4 below. France was the only one of the major countries to record an increase in employment in 2010 compared with the previous year. Spain was particularly adversely affected recording a 27% reduction in employment in aeronautics, reflecting the country's overall high unemployment rate in 2011 of 21.7%[100] as Spain struggled to contain its financial and economic problems.

Since 1980, the turnover per employee in the European aeronautical sector has steadily increased, recording an overall long-term growth of 3% per year. In 2010, a new peak of €232,396 per employee was achieved. This followed an increase in 2009 compared with the previous year. Between 1991 (€143,000 per employee) and 2010 (€232,396 per employee) average turnover per employee has increased by 63%.

Figure 5.4: EU Aeronautical Turnover and Employment 2006-2010



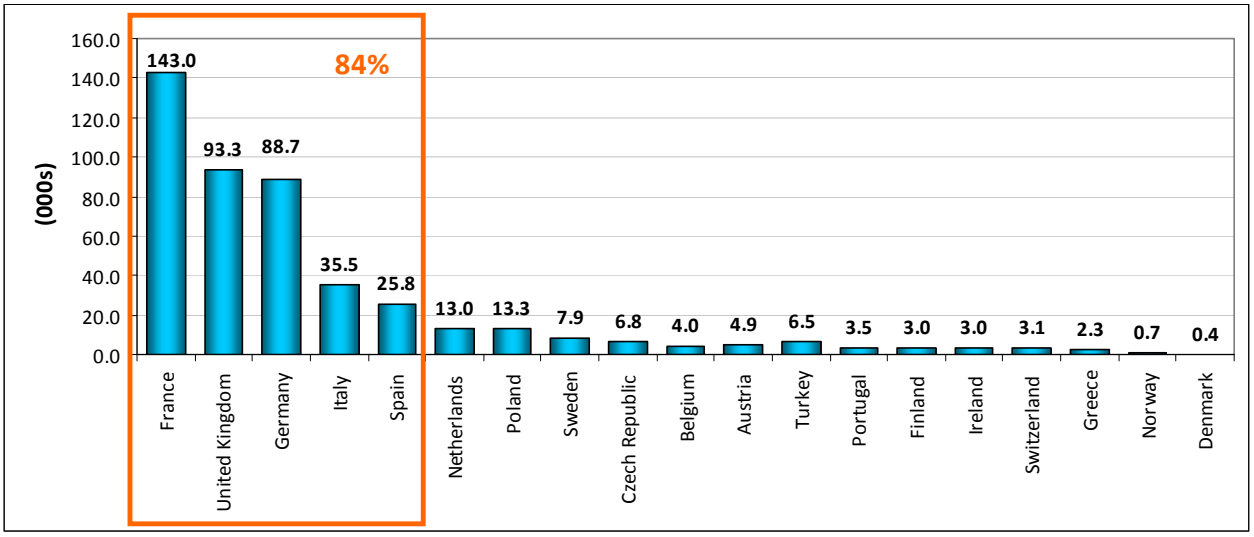

Source: ASD

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).

[99] ASD Facts and Figures 2010

[100] Eurostat Unemployment Statistics: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Unemployment_statistics

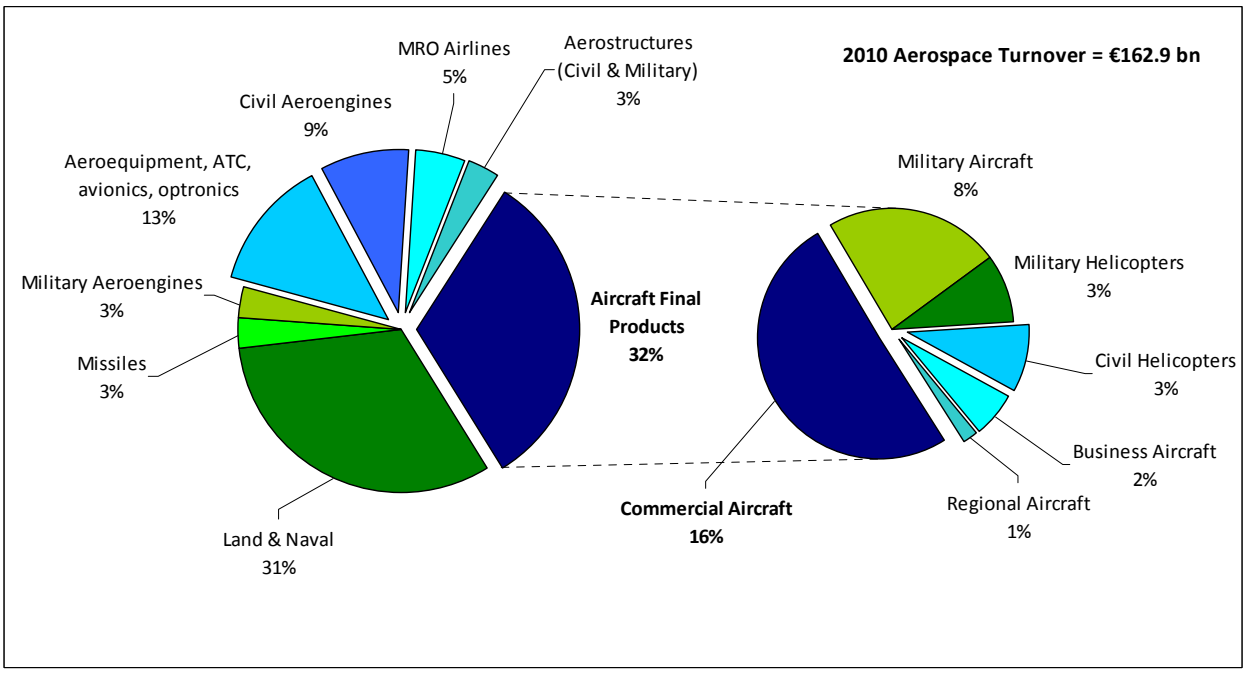
Figure 5.5: European Aeronautical Industry Employment by EU Member State 2010




Source: ASD

Civil aeronautics represents 56% of the European aeronautics industry and it is by far the most important sector (Figure 5.6).

Figure 5.6: European Aerospace and Defence Activity by Product Segment 2010




Source: ASD

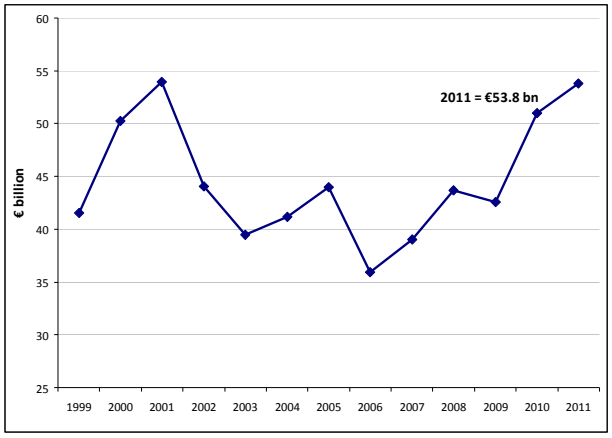
### 5.2.1 Aerospace Imports & Exports

#### The European Aerospace Sector as a Whole

European aerospace and defence companies and industries enjoyed a relatively good performance in 2010, despite the global economic recession which started in 2008. However, challenges remained with growing pressure on defence budgets, the continuing economic frailty of the air transport system, a difficult financial environment and increased competition from new and emerging countries.

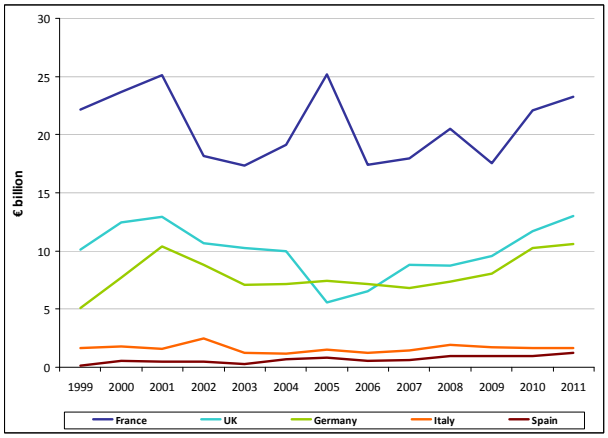
Europe is a net exporter of aerospace and aviation products[101]. In 2011 aerospace exports to the world from EU27 countries totalled €53.8 billion. This represents a 5.5% increase on the previous year and a CAGR of 2.2% since 1999, although there have been cyclical peaks and troughs over the period (see Figure 5.7). In 2010, the United Kingdom (11.3%) France (5.3%) and Germany (3.4%) all recorded increases in exports compared with 2010 (Figure 5.8).

Figure 5.7: EU27 Aerospace Exports 1999-2011




Source: Eurostat

Figure 5.8: Top 5 EU Aerospace Exporters 1999-2011

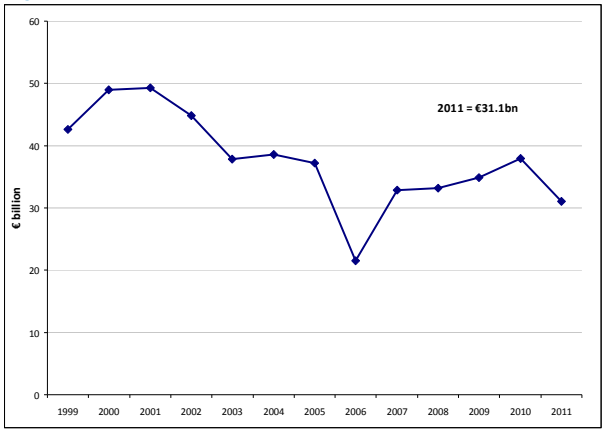



Source: Eurostat

In 2011 aerospace imports to the EU27 countries totalled €31.1 billion. This represents a decrease of 18.1% over the previous year, continuing the general downward trend with a CAGR of -2.6% since 1999 (see Figure 5.9). The UK recorded a -39.8% decrease in imports over 2010, whilst other countries including France and Germany recorded increases of 5.8% and 4.8% respectively (Figure 5.10).

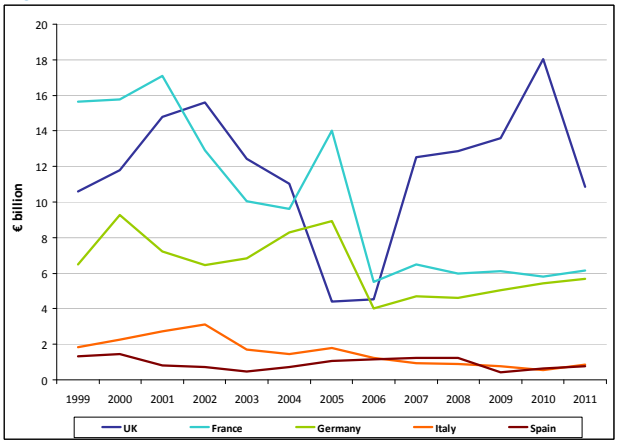
[101] All aerospace import and export data in Figure 5.7 to Figure 5.10 uses Eurostat SITC codes applicable to aerospace activity, including sub-groups of SITC 714, 792 and 874.

Figure 5.9: EU27 Aerospace Imports 1999-2011




Source: Eurostat

Figure 5.10: Top 5 EU Aerospace Importers 1999-2011




Source: Eurostat

## Aircraft (Civil & Military) Exports

In 2011 aircraft[102] exports to the world from EU27 countries totalled €44.8 billion. This figure was a 6.4% increase on 2010; the strong performance in both 2010 and 2011 were mainly responsible for the CAGR since 1999 of 3.1% over the period. The primary trading partner for aircraft exports is the United States with a 16% share of the total, followed by China, UAE and Australia (Figure 5.11). High performing aircraft export markets are shown in Figure 5.12. China is an important market for the EU; not only does it account for a high volume of export orders (€5.5 billion in 2011), but it has shown a robust growth of 15.5% CAGR since 1999 (despite a small reduction in 2009). The emerging markets of Russia and India are currently trading relatively small absolute volumes but have also shown high growth over the last decade (18.5% and 9.1% 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 2011

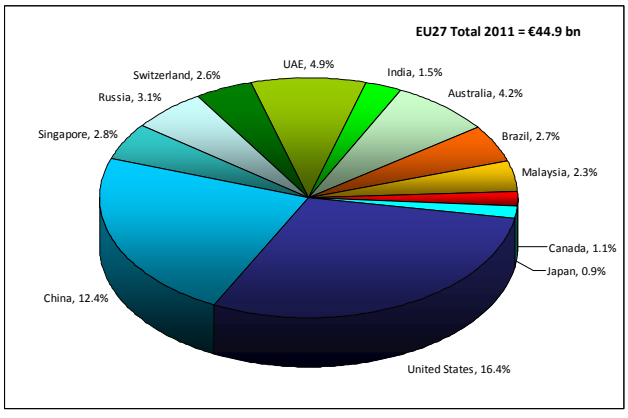
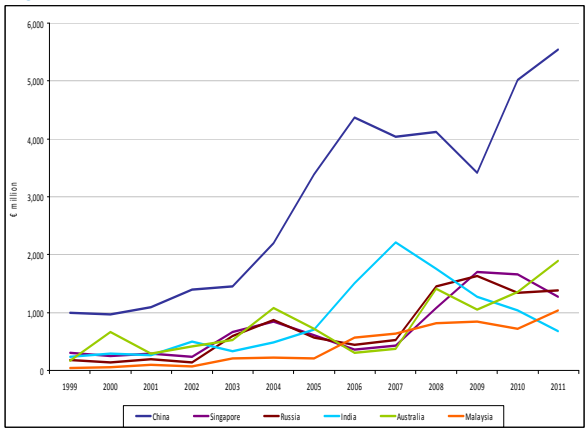


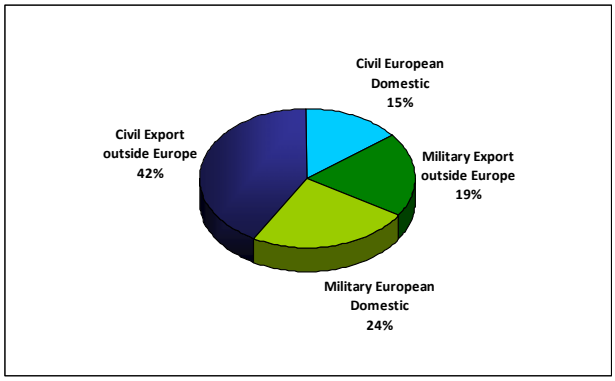

Figure 5.12: Selected EU Aircraft Export Partners 2011




[102] Data for Eurostat SITC code 792, which encompasses aircraft & associated equipment, spacecraft (including satellites) & spacecraft launch vehicles, parts thereof.

Source: Eurostat (SITC 792 only)

Figure 5.13: Export Breakdown by Market 2010




Source: ASD

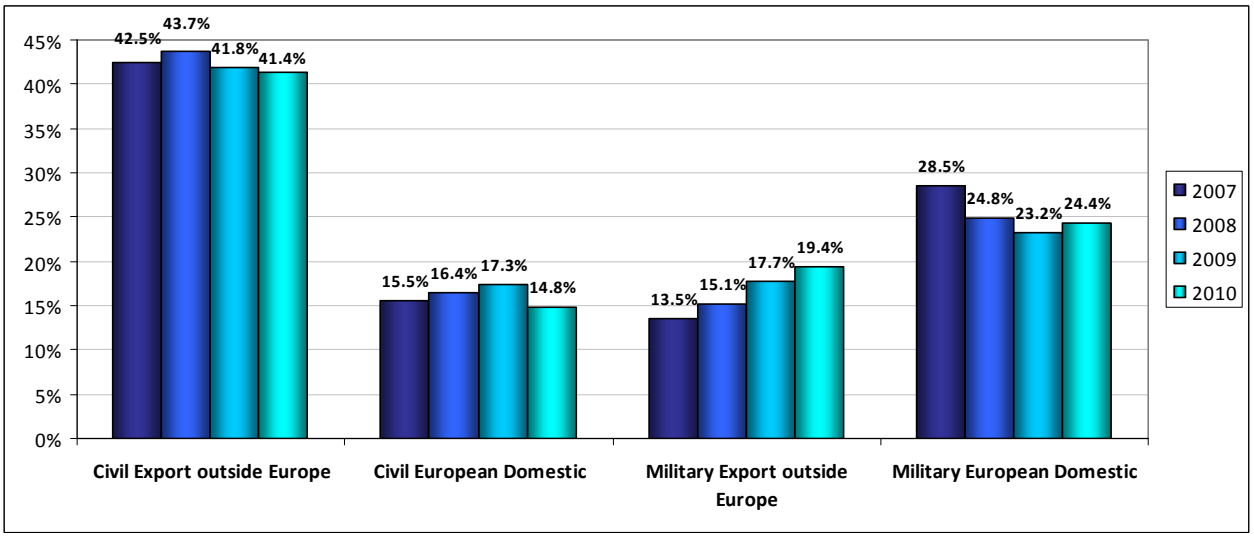
Source: Eurostat (SITC 792 only)

Table 5-1: Export Breakdown by Market 2010

| | |
|---|---|
| Civil Export outside Europe | 44.1 |
| Civil European Domestic | 15.8 |
| Military Export outside Europe | 20.7 |
| Military European Domestic | 26.0 |
| **Total** | **106.6** |

Source: ASD

Figure 5.14: Export Comparison by Market 2007-2010




Source: ASD

### 5.2.2 Global Aerospace Markets

#### United States of America

The United States has the single largest aerospace industry in the world; with provisional total industry sales in 2011 worth USD 218.1 billion. Civil and military aircraft alone account for 53% of this figure. The industry employed 624,400 workers in 2011, of which 412,000 (66%) work in the aeronautics sector. The total numbers of employees in 2011 increased by 400 compared with the previous year.

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 2011 totalled USD 18.3 billion and accounted for 21.3% of the total (USD 85.7 billion[103]). France alone is the single largest country market receiving 8% of U.S. aerospace exports in 2011 worth USD 6.6 billion. Of the top five country markets, China and Japan feature alongside these three European countries representing a combined export value of USD 29.8 billion, almost 35% 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 2005. In 2011 its turnover was €16.3 billion and it is the next largest aerospace market after the U.S. and Europe. Canada exported 73% of its aerospace output in 2011. The industry employs over 87,000 workers and 77% of its aerospace output in 2011 was for the civil aeronautic sector [104].

60% of Canada's aerospace export revenue comes from its nearest neighbour, the United States. Europe is the next most important market at 24%[105], 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 and LearJet Corporation, the company produces a number of aircraft types for business aviation operations but its main focus is on the regional jet and turbo-prop market. The LearJet, Global, Dash 8 and CRJ series of aircraft have established Bombardier as one of the world leaders in business and regional aircraft. Bombardier is currently engaged in developing the narrow-bodied, twin-engine C-Series aircraft programme. The aircraft, scheduled to enter service in 2013, will offer between 100-149 seats.

### Japan

Japan's aerospace industry saw a total turnover of USD15.1 billion in 2010 and employed 31,412 workers[106]. The country's aerospace turnover is mainly due to its participation in international civil aircraft production and the manufacture of military aircraft. Japanese companies supply integral structural components to Boeing for the Boeing 787 programme (main wing assembly, forward fuselage and centre wing box), with other suppliers providing parts and components. Japan has a long history of supplying Boeing; the first international joint project was on the Boeing 767 programme and from 1991 it also contributed to the Boeing 777 programme.

Japanese industries also contributed to all current and past Airbus aircraft types as subcontractors and/or suppliers, with a number of Japanese companies currently contributing to A380 production. With almost 40% 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 now that the Boeing 787 has completed flight testing and

[103] U.S. Department of Commerce, Bureau of the Census

[104] Aerospace Industries Association of Canada

[105] Aerospace Industries Association of Canada

[106] The Society of Japanese Aerospace Companies

commercial deliveries have commenced. The generally buoyant demand in the civil aircraft sector is contrasted with defence aircraft production, which is decreasing due to budget reductions.

Japan remains a net importer of aerospace products, with only around 28% of total output being exported[107]. Of this amount, 99% is devoted to both airframe and engine parts, reflecting its dependency on foreign aircraft programmes. Japan has a number of domestic aircraft development and manufacturing programmes but this forms a small proportion of its overall aeronautics activity. Mitsubishi Aircraft Corporation is currently developing the next-generation MRJ (Mitsubishi Regional Jet), a 70 to 90 seat regional jet, due for delivery in 2015. SkyWest Inc., a Utah-based regional airline company that operates 20% of the world's regional aircraft fleet, has recently agreed in principle to buy 100 MRJs for delivery from 2017 through to 2020.

Based on 2009 data, Japan's largest export partner is the U.S. at 71% of all exports, Europe (17%) and Canada (7%). An overwhelming majority (84%) of its aerospace imports come from the U.S., with Europe accounting for only 11% 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 (USD6.8 billion in 2011); and the largest in the southern hemisphere, employing 22,900 workers in 2011.

Aircraft manufacturer Embraer is responsible for most of the aerospace production in Brazil; as such the entire industry is affected by its performance. Embraer employed around 17,250 people at the end of 2011, representing around 75% of total aerospace employment in the country. Embraer has suffered from the consequences of the financial and the credit restrictions in international markets, however its commercial aviation business remained steady in 2011 with 105 deliveries compared to 100 in 2010, representing 64% of revenues. Its business jet division fared less well coinciding with poor performance in the worldwide sector, delivering 99 aircraft in 2011 compared with 144 in the previous year[108].

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 experienced high performance; almost tripling between 2003 and 2008. Since that time annual turnover has declined to between USD 6.7 and USD 6.8 billion in each year 2009 to 2011. Employment has also reduced from a high of 27,100 people in 2008 to 22,900 in 2011.

### Russia

The Russian aerospace industry collapsed following the dissolution 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. The Corporation's long-term strategy is aimed at 10% of the global market of civil aviation in 2025, while maintaining its share of the military (including transport aircraft) market at a rate of between

[107] In 2009 (latest data available from The Society of Japanese Aerospace Companies)

[108] Embraer set for decade of international expansion, Flightglobal, 22 May 2012

12% and 15%. Achieving this ambition will depend on establishing cooperation between UAC member companies and with international competitors.

UAC consolidated revenue in 2010 was 165 billion roubles, an increase of 45% compared with the previous year[109]. Sales of defence aircraft accounted for 71% of revenue. In 2011, combined output totalled 110 aircraft worth about US$5.5 billion.

In the absence of any current meaningful aircraft production, Russian commercial aircraft operators have turned to foreign suppliers, namely Boeing and Airbus, to fulfil their operational requirements. In June 2012 national carrier Aeroflot stated that it had plans to acquire 16 Boeing 787, 13 Boeing 777, 8 Airbus A330, 26 Sukhoi SuperJet (SJ) 100, 6 Airbus A320 and 8 Airbus A321aircraft between 2012 and 2015110. It is noteworthy that Aeroflot, perhaps responding to political pressure, has ordered the Sukhoi SJ100 aircraft.

Current Russian aircraft development and production programmes include the Sukhoi SJ100, a regional jet in the 78-98 seat range, designed to compete against manufacturer's including Bombardier and Embraer. The aircraft was delivered to its first launch customer, Armenian carrier Armavia Airlines, in April 2011. Production of the SJ100 features substantial international partnerships, including Alenia Aeronautics which owns a 25% stake. This agreement makes the Sukhoi SJ100 Programme the most relevant aviation partnership that has occurred between Russia and Europe.

The aircraft has suffered a number of setbacks, notably a crash in May 2012 on a demonstration flight in Indonesia. Armavia has returned its only aircraft to the manufacturer, citing the aircraft was below the declared standards and the high cost of spare parts. Armavia has also cancelled its order for a second aircraft. However, the Mexican airline InterJet has ordered five SuperJets, with the first aircraft due for delivery by the end of 2012.

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. Irkut report that they 185 firm orders for the aircraft and, including options, memoranda of understanding and conditional orders, a total order book for 250 aircraft.

### Ukraine

Ukraine is home to the aircraft manufacturer, Antonov Company. Several key developments occurred in 2011.

In February, the 99-seat AN−158 regional jet – a stretched version of the AN-148 – received type certification from Russian airworthiness authorities. Following this, in June, the AN-158 received an order for 10 aircraft from Ilyushin Finance (IFC) Russian Leasing Company.

[109] United Aircraft Corporation 02.02.2011

[110] Aeroflot: Order and phase off plan August 2012

In August, a Ukrainian aircraft leasing company, Leasingtechtrans, signed an agreement to purchase 22 AN-148s and 28 AN-158s, with a view to establishing a programme of leasing the commercial aircraft to Ukrainian airlines.

In November, it was reported111 that Antonov and Kazakh companies had agreed to form a venture for joint production of regional passenger aircraft at a plant near the Kazakh commercial centre Almaty. According to AeroKZ, the Kazakh partner, the Eurasian Development Bank, a lender set up by the governments of Russia and Kazakhstan, may fund the $150 million project to make as many as 20 AN-148s a year.

### China

Although not yet a major participant in the global aerospace market, China 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.

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 and certification programme mean this is now likely for late 2013[112]. It is similar in size and appearance to the U.S.-built DC9. COMAC[113] 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 is progressing with the development and production of the designated C919. Construction commenced in 2009 with deliveries planned for 2016[114].

In the regional market, in 2011 COMAC received 95 orders for the C919 narrow-body and 10 orders for the ARJ21.

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.

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 |

[111] Bloomberg: http://www.bloomberg.com/news/2011-11-24/ukraine-kazakhstan-form-venture-to-make-antonov-aircraft.html

[112] ARJ21 first delivery pushed to end 2013, Flightglobal, 11 July 2012

[113] COMAC = Commercial Aircraft Corporation of China Ltd

[114] COMAC Begins Building C919 Structure, Aviation Week 8 September 2009

| Facility/Activity | Partnership |
|---|---|
| Airbus A320 final assembly line Tianjin (Sep 2008) | Tianjin Free Trade Zone (TJFTZ) & China Aviation Industry Corporation (AVIC); Airbus delivered its 50th Airbus A320 from Tianjin in June 2011 |
| Tianjin Logistics Centre (2010) | TJFTZ |
| Airbus (Beijing) Engineering Centre (A350 XWB design & development) (Jul 2005) | 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 |
| Harbin Hafei Airbus Composite Manufacturing Centre (Feb 2011) | Harbin Aircraft Industry Group Corporation Limited, Hafei Aviation Industry Company Limited, AviChina Industry & Technology Company Limited and Harbin Development Zone Infrastructure Development Company Limited |

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 6.9% per annum over the period 2011 to 2031[115]. 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.

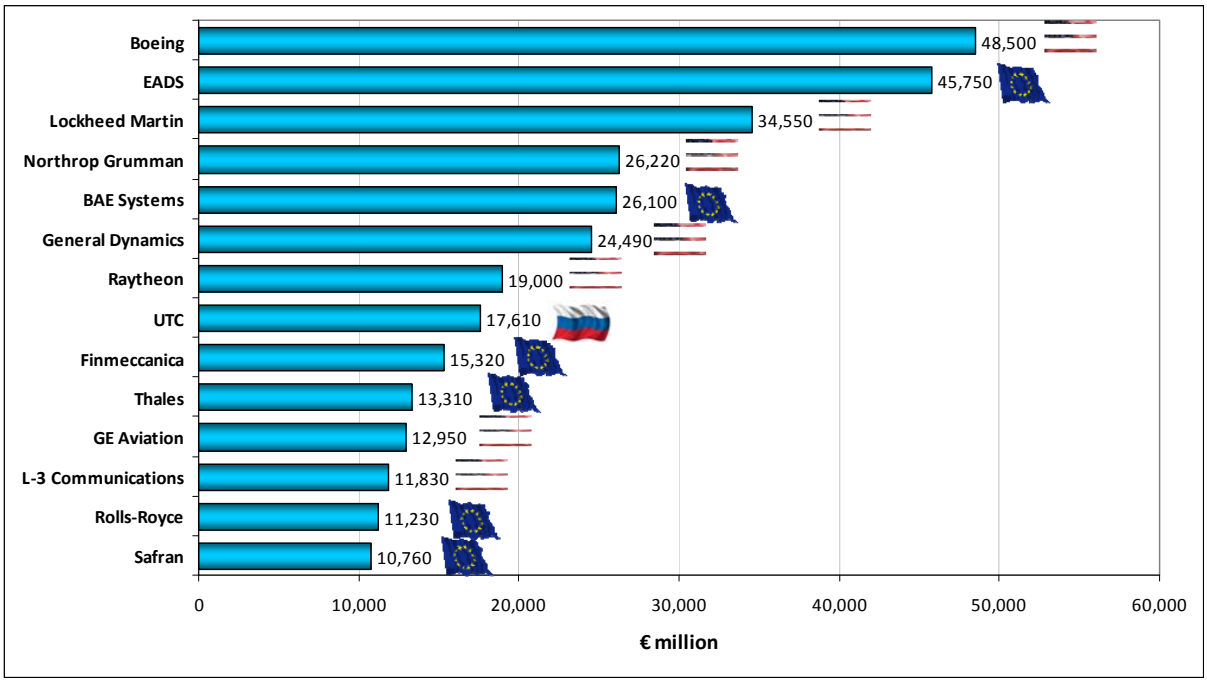
Future European export prospects may be reduced if Chinese companies are able to satisfy growing demand with indigenously produced aircraft and other equipment. European companies also may face new competition outside of China as Chinese manufacturers seek to expand their share of the global aircraft market.

### 5.2.3 Aerospace Companies

Europe is well placed in the global context against the 2010 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 39% of the total collective turnover (Figure 5.15). EADS and BAE Systems are respectively the second and fifth largest aerospace companies in the world.

[115] Boeing Current Market Outlook 2012-2031

Figure 5.15: Global Aerospace Companies Turnover Ranking 2010




Source: ASD

It is estimated that the six largest European companies shown in Table 5-3 below generated over €120 billion in the aerospace and defence sectors in Europe, representing two thirds of the total aerospace turnover in 2010[116].

Table 5-3: Major European Aerospace Companies Ranking 2010

| Company | Turnover (€m) | Country | Company | Turnover (€m) | Country |
|---|---|---|---|---|---|
| EADS | 45,750 | | Cobham | 2,220 | |
| BAE Systems | 26,100 | | Zodiac | 2,150 | |
| Finmeccanica | 15,320 | | Rheinmetall | 2,010 | |
| Thales | 13,130 | | Qinetiq | 1,980 | |
| Rolls Royce | 11,230 | | Kongsberg | 1,920 | |
| Safran | 10,760 | | Avio | 1,750 | |
| Dassault Aviation | 4,190 | | Babcock | 1,730 | |
| MTU Aero Engines | 2,710 | | GKN | 1,690 | |
| Saab | 2,560 | | Meggit | 1,350 | |
| DCNS | 2,500 | | Krauss-Maffei Wegmann | 900 | |

Source: ASD

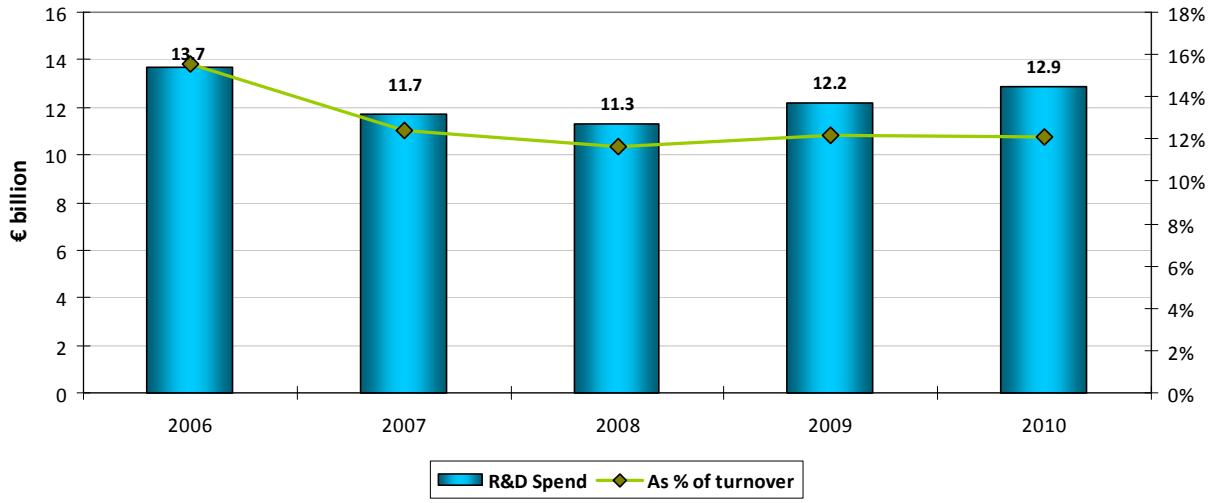
[116] ASD 2010

### 5.2.4 Research & Development

The European aeronautics industry contributes a large share of its activity to research and development (R&D). It is well above the objectives set in the EU 2020 Strategy, which set a target of 3% of GDP[117] to be dedicated to R&D and innovation.

In 2010 R&D expenditure in the European aeronautics sector totalled €12.9 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). 82% of R&D funding comes from private industry for civil aeronautics, whereas for military aeronautics more than 50% is funded by public expenditure.

Figure 5.16: European Aeronautical R&D Expenditure 2006-2010




Source: ASD

Through the formation of the Advisory Council for Aviation 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.

A long-term vision of aviation in Europe, 'Flightpath 2050' was prepared in 2011 by a high-level group from aviation and aeronautics research companies. The vision for 2050 lays out how and where the European research priorities should be set to bring clear EU-added value, so as to preserve EU growth and competitiveness worldwide, whilst meeting market needs as well as energy and environmental challenges. The central message of the report is to promote global leadership of the European industry and a competitive, clean, safe and secure aviation by 2050, with citizens' and society's needs at the heart of the strategy.

[117] Science, technology and innovation in Europe, 2010 edition, Eurostat, European Commission

The European Commission's 7th Framework Programme for Research and Development (FP7) has set aside a budget of €4.16 billion over seven years (2007-2013) for transport, including aeronautics. Research priorities are set by the European Commission with advice from ACARE. Research priorities for civil aeronautics under FP7 are:

- the greening of air transport;
- increasing time efficiency;
- customer satisfaction and safety;
- improving cost efficiency;
- protection of aircraft and passengers; and
- air transport of the future.

One of the key research programmes under FP7 is the Clean Sky 'Joint Technology Initiative' (JTI) which is intended to develop breakthrough technologies to improve the impact of air transport on the environment. The Clean Sky JTI will receive an EU contribution of up to €800 million from FP7, matched by funds from industry leading to a total budget of up to €1.6 billion. The overall objective is to develop a new generation of environmentally friendly aircraft and is based on six technical areas: Smart Fixed Wing Aircraft, Green Regional Aircraft, Green Rotorcraft, Systems for Green Operations, Green and Sustainable Engines; and Eco-Design[118].

The United States is the current global leader in aeronautic activity, both in terms of overall annual sales (USD 110.5 billion in 2010[119]) and privately financed R&D expenditure (USD 9.1 billion). 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.

## 5.3 The Global Aircraft Fleet in 2011

The data source used to analyse global aircraft fleets and forward orders is BUCHair's JP Airline Fleets International database, December 2011 update. The data used represents current airline fleet details as of December 2011, with forward orders up to and including those placed in 2011. No account is taken of aircraft orders placed in 2012.

Aircraft types have been assigned a market grouping due to their size/number of seats. The following table identifies aircraft types by market group, as used in the analysis contained in this section:

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 |

[118] European Commission Enterprise and Industry, Aeronautic Industries Research, http://ec.europa.eu/enterprise/sectors/aerospace/research/index_en.htm

[119] AIA total aircraft sales (civil and military) 2010

| Widebody Jet | Narrowbody Jet | Regional Jet | Turboprop |
|---|---|---|---|
| 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 |

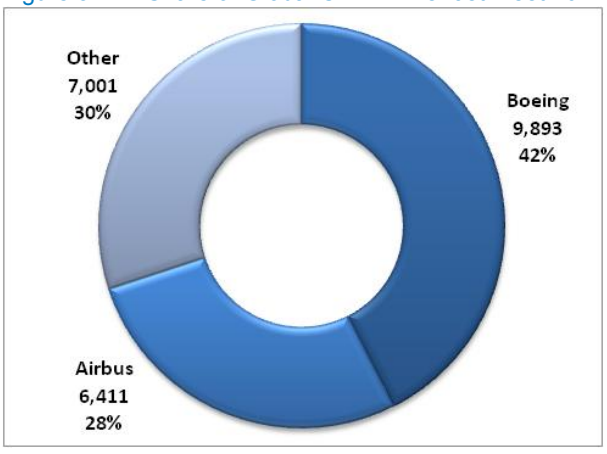
Source: JP Fleets

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

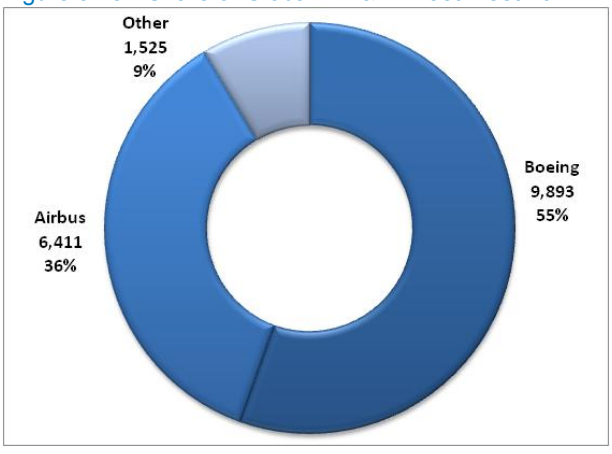
Of the current global jet fleet in service (to the end of 2011), Boeing and Airbus enjoys nearly three quarters of the global market share for civil airliner jets (which comprise regional, narrowbody and widebody aircraft, excluding turboprops), with Boeing accounting for a greater share of the total (42%) compared to Airbus (28%) (see Figure 5.17). The remaining 30% is dominated by Embraer and Bombardier in the regional jet sector.

Figure 5.17: Share of Global Civil Airliner Jet Fleet 2011




Source: JP Fleets (Regional, NB & WB Jets)

Figure 5.18: Share of Global NB & WB Jet Fleet 2011



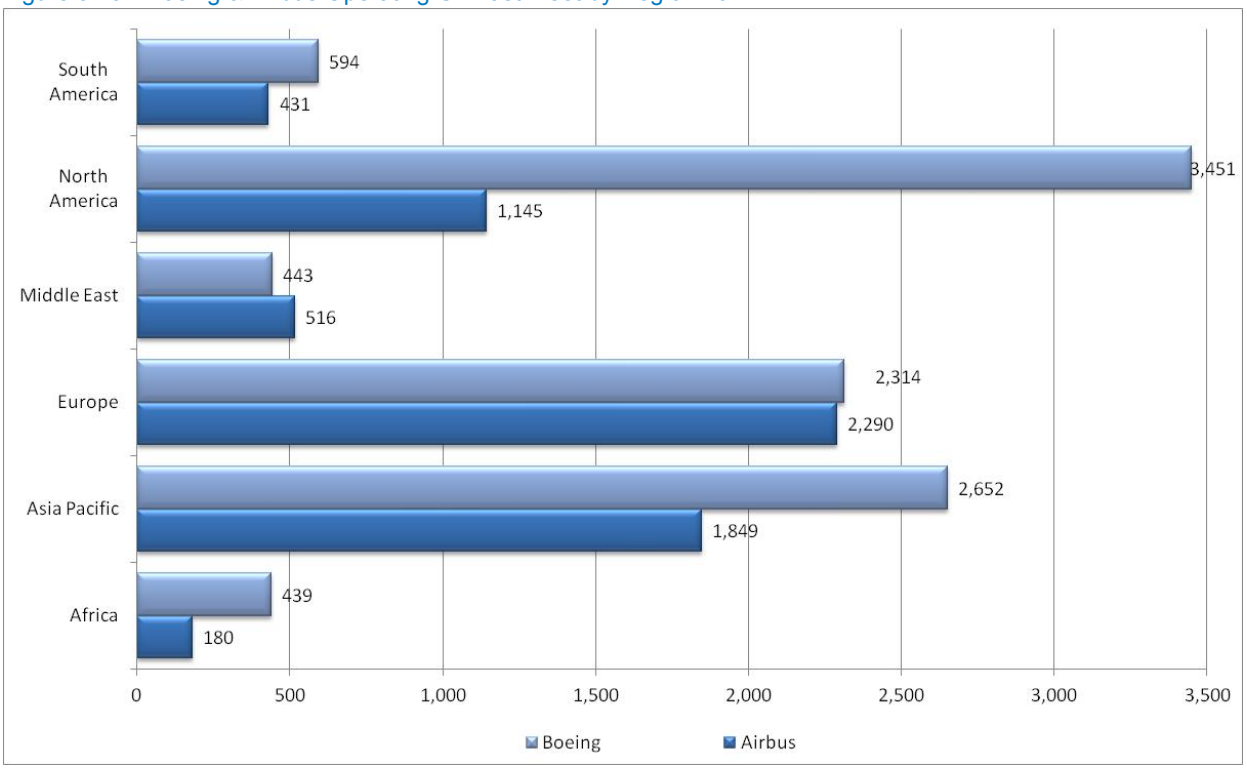

Source: JP Fleets

Neither Boeing nor Airbus competes in the regional jet market which makes up a smaller overall share of the civil airliner fleet (approximately 18%). Excluding regional jets from this analysis to focus on narrow and widebody aircraft reveals a significant duopoly (Figure **5.18**).

#### 5.3.1.1 Jet Aircraft Fleets by Region

Figure 5.19 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 5.19: Boeing & Airbus Operating Civil Jet Fleet by Region 2011



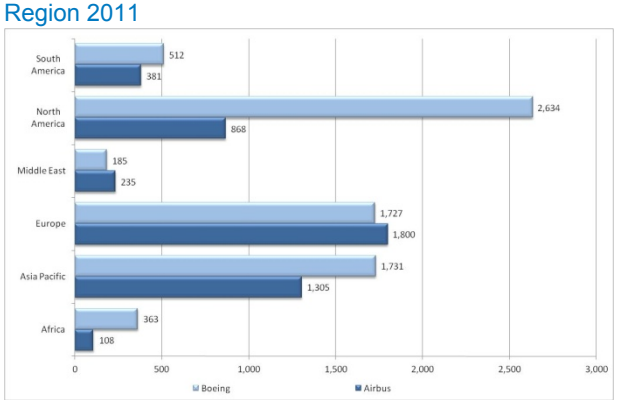

Source: JP Fleets (Regional, NB & WB Jets)

As might be expected, Boeing's stronghold is its home market of North America, where it accounts for exactly three quarters of the civil jet fleet in that region. It might be expected for Airbus to be stronger than Boeing in Europe but this is not the reality – Boeing enjoys a marginal advantage but is by no means dominant.

Both manufacturers have a significant presence in the Asia Pacific region. Boeing's is primarily due to the air transport market density in Japan. Airbus has a firm physical presence in the Asia Pacific region with its first final assembly production line outside of Europe established in Tianjin, China. Japanese aerospace companies and suppliers participate heavily in the manufacture of several Boeing aircraft types (including the 787) while at least 20 Japanese companies are suppliers to the A380 programme.

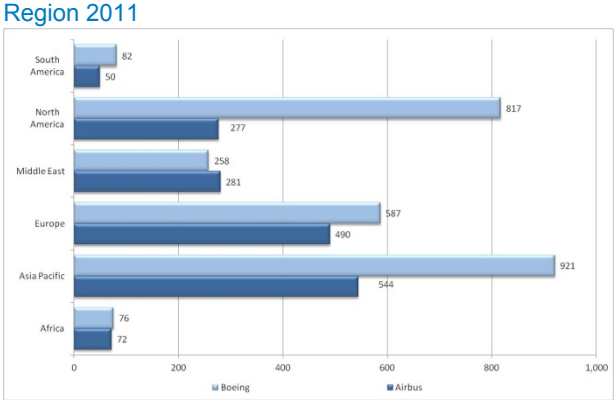
Figure 5.20 and Figure 5.21 consider the regional situation when the global fleet is separated into narrowbody and widebody aircraft types. The three regions with the greatest concentrations of narrowbody types are North America, Europe and Asia Pacific; together they account for 85% of the total. Again, Boeing dominates the North American market for narrow and widebody aircraft, but Airbus is competitive in all other regions. Boeing's total widebody fleet is over 50% larger than Airbus', due to the popularity of the B747 and B777.

Figure 5.20: Boeing & Airbus Narrowbody Jet Fleet by Region 2011




Source: JP Fleets

Figure 5.21: Boeing & Airbus Widebody Jet Fleet by Region 2011




Source: JP Fleets

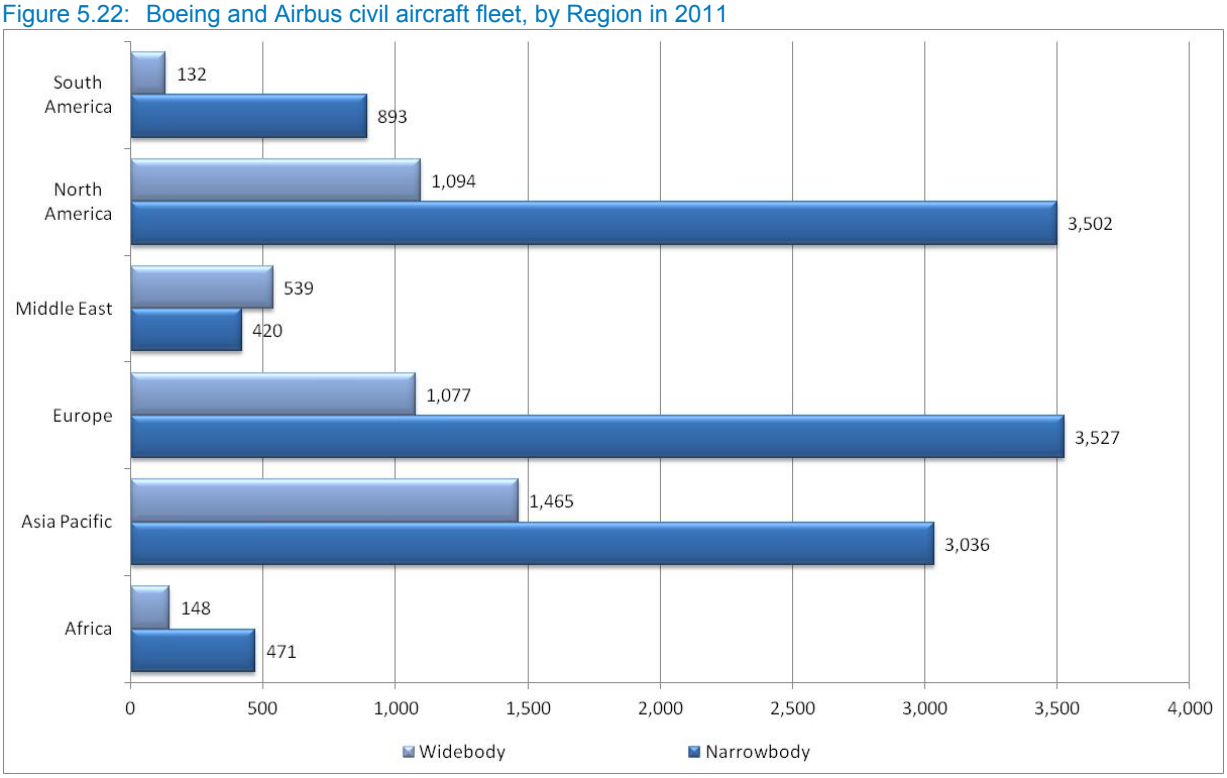
Figure 5.22 shows the consolidated Boeing and Airbus aircraft fleets by narrowbody and widebody categorisation, by world region.

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 2031, making Europe one of the top region markets for single aisle operations[120]. By comparison the greatest concentration of the widebody (twin aisle) fleet can be found in Asia Pacific, where 27% of deliveries by 2031 will be this size of aircraft. This compares with a figure of 18% in North America and Europe.

[120] Boeing Current Market Outlook 2012-2031

Figure 5.22: Boeing and Airbus civil aircraft fleet, by Region in 2011



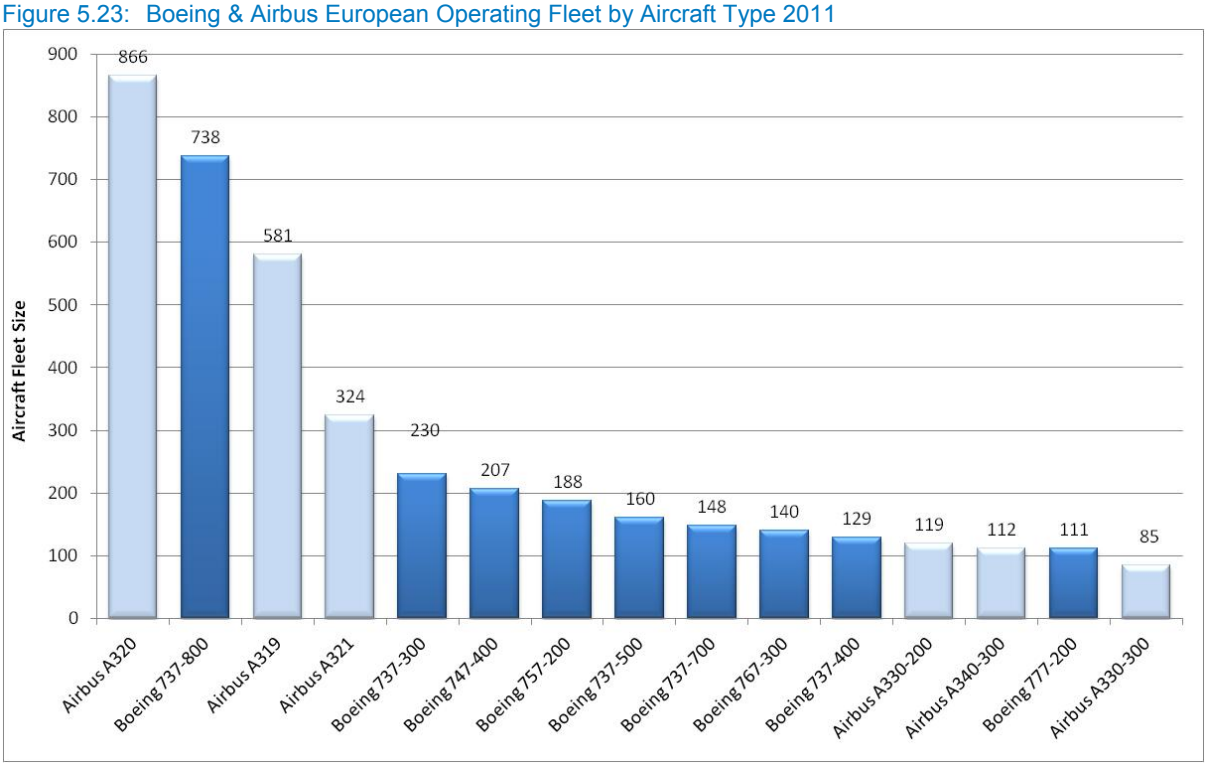

Source: JP Fleets

### 5.3.1.2 The Boeing & Airbus Fleet in Europe

Looking at the composition of the Boeing and Airbus fleets in Europe, Figure 5.23 shows the aircraft type distribution based in the region. The top five types produced by the two manufacturers are all narrowbody types and only two of the top ten are widebody. Overall the share between the two rivals is even, with precisely 50% of the top 15 aircraft type fleet in Europe manufactured by Airbus.

The European Boeing and Airbus fleet is 81% comprised of narrowbodies. Of the top five narrowbody types, Airbus commands 65% of this share. The strong and growing presence of the B737-800 in second position is boosted by the use of this aircraft by the likes of Ryanair and other low cost carriers in the region.

Figure 5.23: Boeing & Airbus European Operating Fleet by Aircraft Type 2011



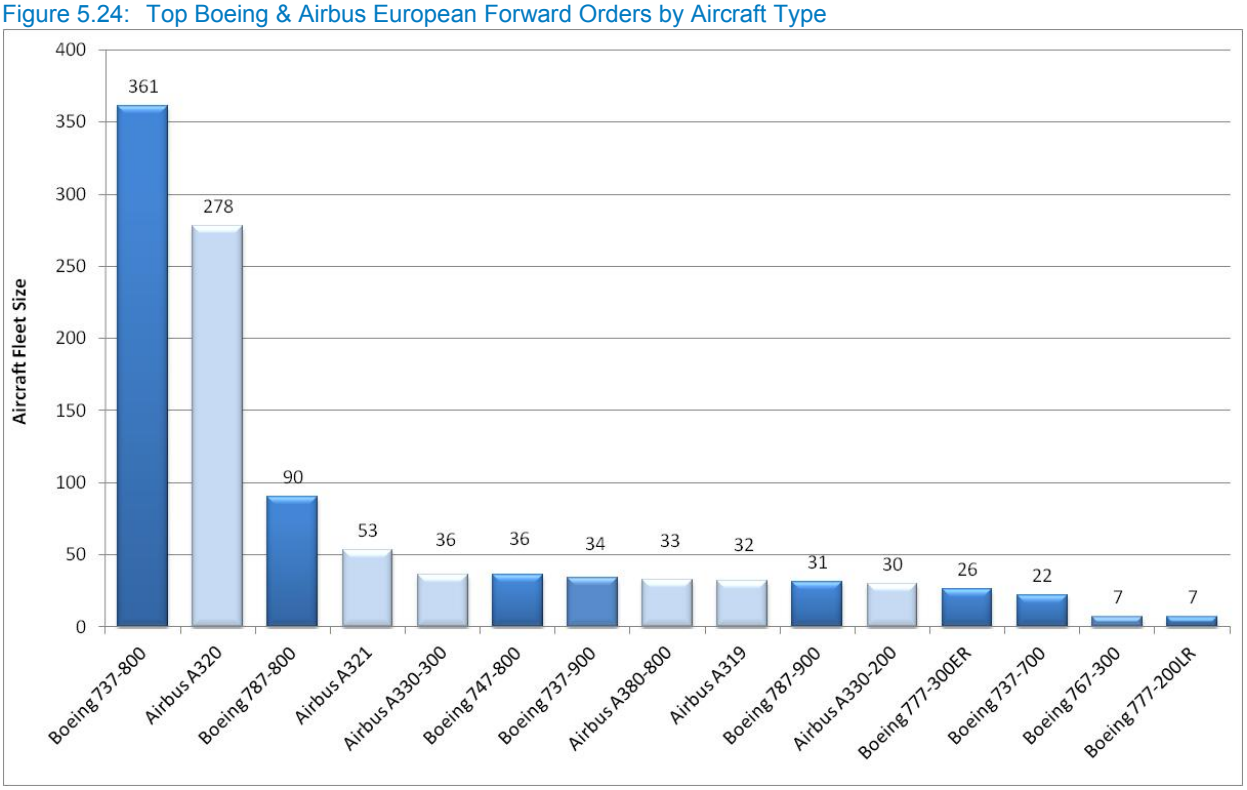

Source: JP Fleets

### 5.3.2 Jet Fleet Orders & Deliveries

Figure 5.24 shows the current number of forward orders for Boeing and Airbus aircraft types in Europe. The data shown is for all historic aircraft orders to the end of 2011 which have not yet been delivered. The data does not include orders placed in 2012. The most popular aircraft in terms of forward orders is the Boeing 737-800, which is a favoured type among European low cost carriers such as Ryanair, Air Berlin and hybrid airline Air Europa.

Overall it is Boeing who has logged the greater share of aircraft deliveries, although it is fairly even at 57% of the total top 15 aircraft type orders. Reflecting the trend for the demand for narrowbody types, these aircraft comprise 70% of orders to the end of 2011, which is consistent with Boeing's prediction that single-aisle aircraft will predominate to the end of its current forecast period of 2031.

Figure 5.24: Top Boeing & Airbus European Forward Orders by Aircraft Type

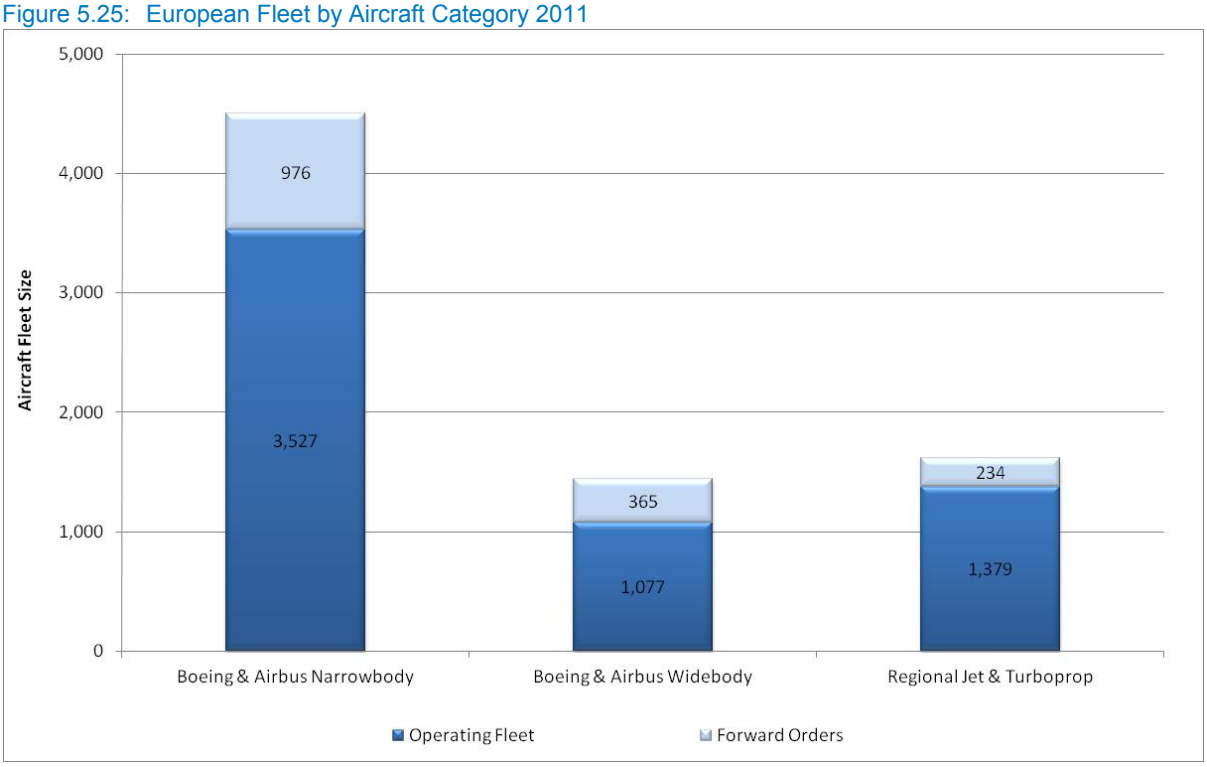



Source: JP Fleets (historic orders placed by end 2011 not yet delivered)

Figure 5.25 below summarises the situation in Europe, combining figures for the current operating fleet and forward orders. The high number of narrowbody, regional jet and turboprop aircraft 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. These aircraft account for 77% of the European order book. Together, including the current fleet and forward orders, narrowbody, regional jet and turboprop aircraft dominate, and will continue to lead the European fleet mix at 81% of the total.

Currently widebody aircraft represent only 18% of the total European fleet, but account for 23% of forward orders. This indicates that although twin-aisle aircraft types represent the minority, European network carriers are looking to grow their widebody fleets as they compete with the likes of the Middle East and Asian operators on longhaul routes.

Figure 5.25: European Fleet by Aircraft Category 2011



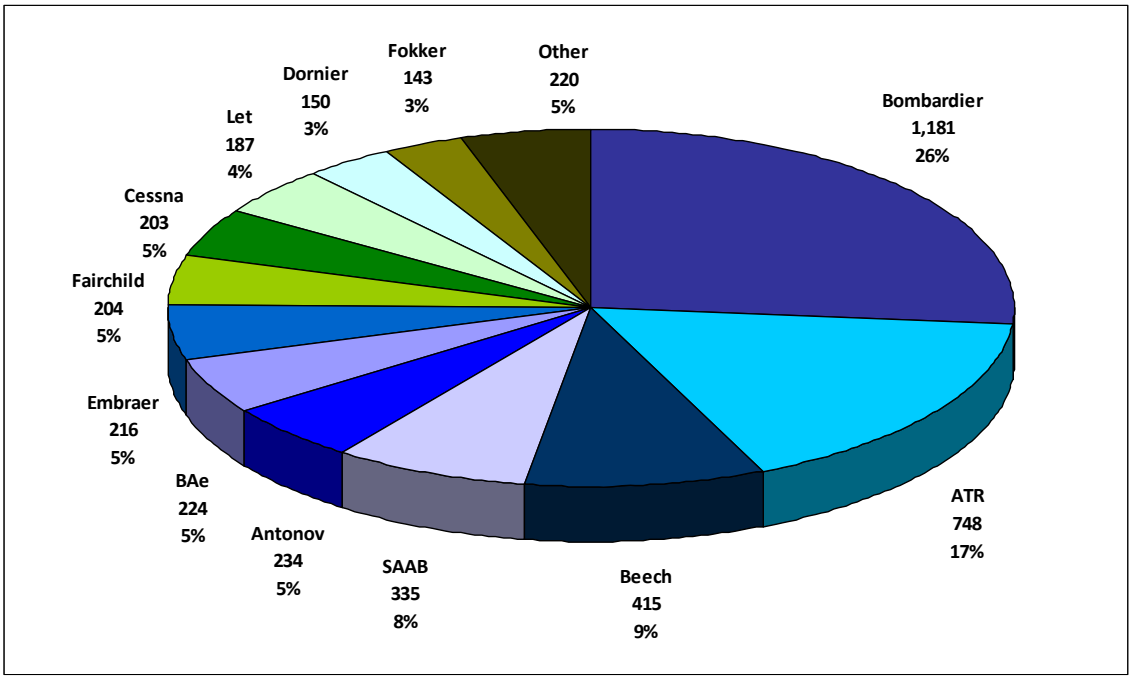

Source: JP Airline Fleets International database

### 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 2011, JP Airline Fleets International database recorded 4,460 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 5.26 illustrates the market share of the major companies in 2011. The top four combined – Bombardier, ATR, Beech and Saab – command 60% of the market.

Figure 5.26: Manufacturers of civil passenger turboprops by market share 2011




Source: JP Airline Fleets International database

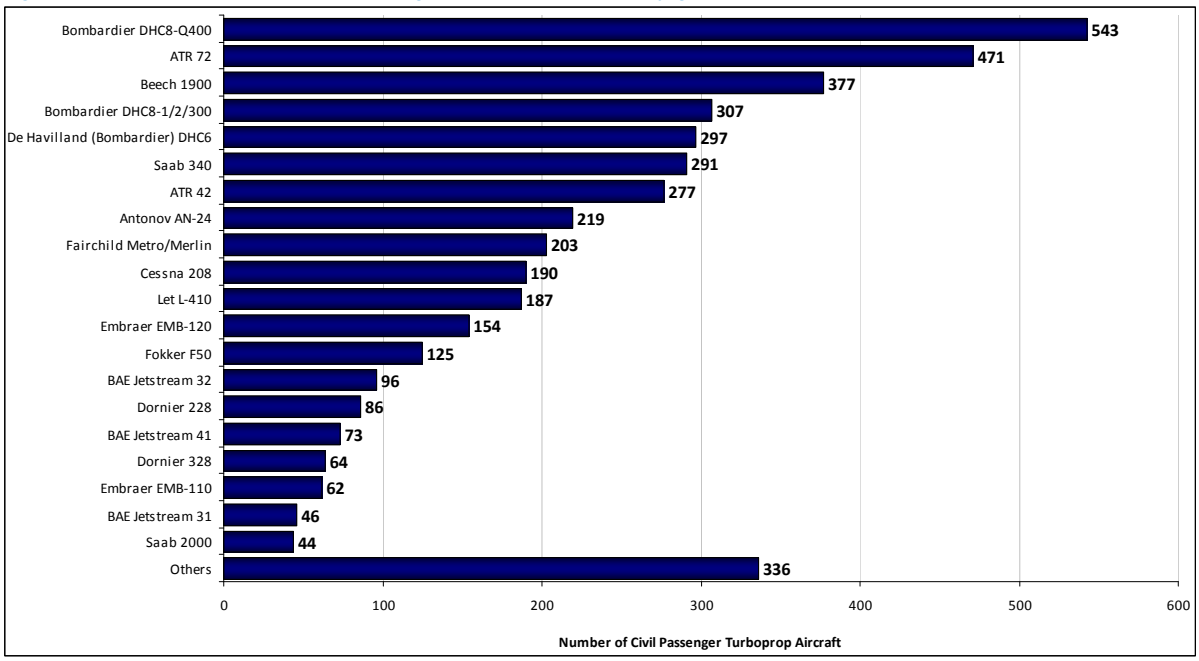
Figure 5.27 shows the most popular civil passenger turboprop aircraft by global fleet size as recorded in 2011.

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 aircraft is the 70-seat ATR 72, followed by the 48-seat ATR 42. Beech Aircraft Corporation is responsible for the 19-seat Beech 1900 commuter aircraft, popular in North America and Africa.

Other civil passenger turboprop aircraft of note are the Czech-built 19-seat Let L-410 and Soviet Union/Ukraine-built 40-seat Antonov AN-24/AN-26. The Let-L-410 is a robust aircraft in high demand in parts of Africa and South America where terrain is rough and good runway performance is required. The AN-24/AN-26 is very popular among Russian and CIS operators, with nearly 90% of the world's AN-24 fleet registered in geographical Europe. The Saab 340 is a 30-34 seat aircraft that is favoured by regional Western airlines, with pockets of demand for this aircraft all across the globe in North America (44% of global Saab 340 fleet), South America (25%) and Europe (20%).

In the Asia Pacific region, the ATR 72 is the most popular turboprop aircraft type in operation, representing one quarter of the region's turboprop fleet. The DHC6-300 Twin Otter is the next most popular in the region accounting for 9% of the Asia Pacific total turboprop fleet.

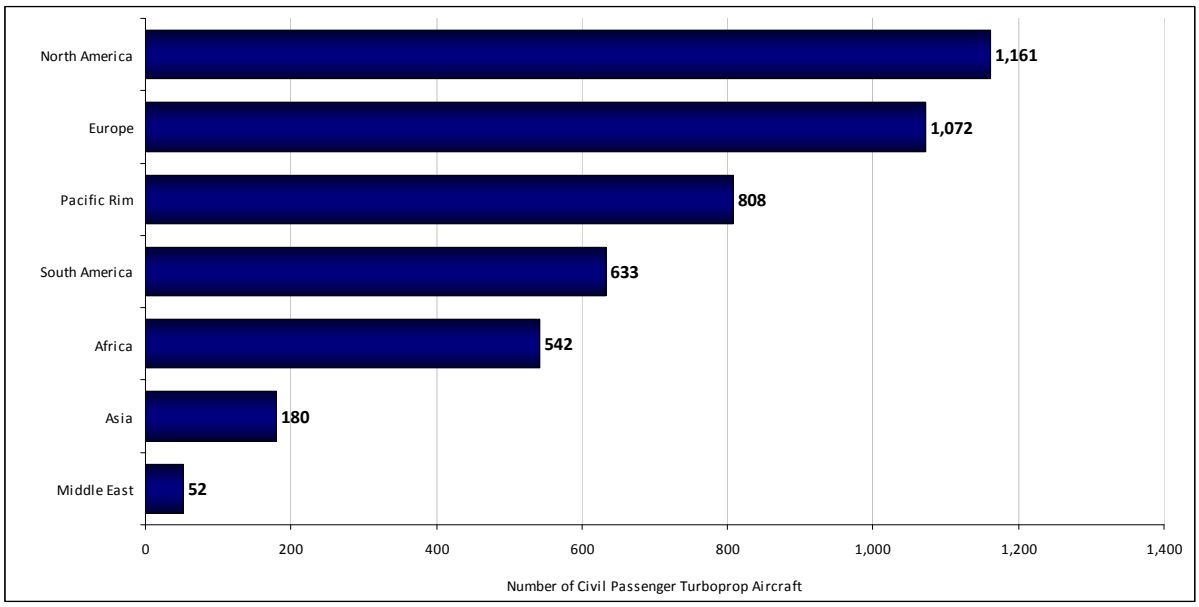
Figure 5.27: Most popular civil passenger turboprop aircraft by global fleet size, in 2011




Source: JP Airline Fleets International database

Examining the global distribution of civil passenger turboprop aircraft in 2011 (Figure 5.28) 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 5.28: Global Civil Passenger Turboprop Fleet by Region in 2011

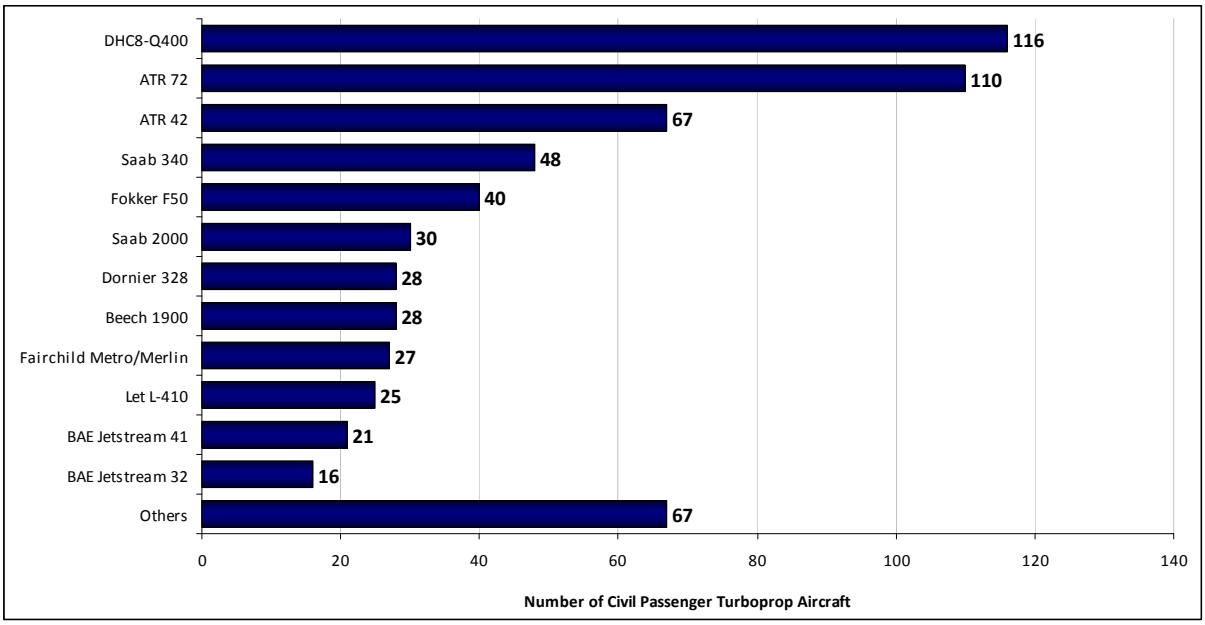



Source: JP Airline Fleets International database

Of the 1,072 civil passenger turboprops identified as being registered to 'European' airlines by BUCHair's JP Airline Fleets International database in 2011, 623 of those airlines were from European Union member states.

Figure 5.29 shows that the larger 70+ seat DHC8-Q400 and ATR 72 are the most popular aircraft types in this category in the EU. The smaller 48-seat ATR 42 and 34-seat Saab 340 are also in demand from EU regional and commuter operators.

Figure 5.29: Most popular EU27-registered civil passenger turboprop aircraft in 2011




Source: JP Airline Fleets International database

## 5.4 Maintenance, Repair & Overhaul (MRO)

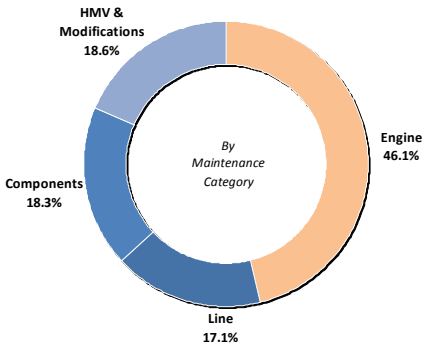
The acronym MRO describes any maintenance or engineering function in the aviation industry including the airframe, engines, landing gear, auxiliary power units (APUs), avionics, fuel systems, electrical systems, hydraulics and other components of an aircraft. Maintenance can be scheduled in accordance 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 2011 was USD 46.9 billion, up 10.8% from the USD 42.3 billion achieved in 2010. The greatest proportion of MRO activity is due to engine maintenance, at 46%[121].

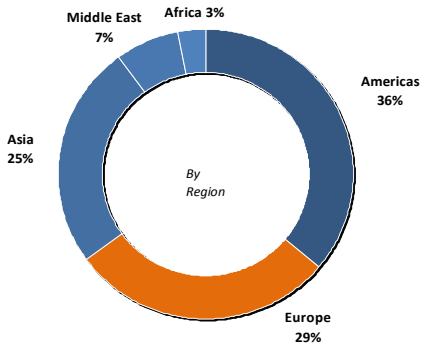
[121] Opportunities and Challenges in Today's MRO Market 2011-2021, TeamSAI, Aeroxchange Annual Conference, February 2012

Figure 5.30: Global MRO Activity by Category 2011




Source: TeamSAI (HMV = Heavy Maintenance Visit)

Figure 5.31: Global MRO Market Share 2011




Source: TeamSAI

The regional distribution of MRO activity is directly comparable to the global air transport market as a whole. While North America and Western Europe currently have the largest aircraft fleets and MRO markets, the growth areas lie in emerging regions – particularly China, India and Eastern Europe. These regions are growing quickly, but their overall size currently represents a small proportion of the total MRO market.

The 10.8% rise in global MRO spend in 2011 shows a rebound from the 7.4% reduction in 2010; and the drivers of this change are important to understand as this increase is made up of components showing individual trends.

In contrast to capacity reductions made by airlines during the economic recession in 2010, fleet renewal activity in 2011 drove a 3.2% increase alone. Aircraft utilisation rates also rose 1.5% for the year driving an MRO market increase of 0.4%.

A rise in component maintenance outpaced declines to airframe and line maintenance, resulting in a small net increase of 1.0%. In addition labour rates have reduced marginally, while engine MRO drove a significant 6.4% increase (1.6% in 2010)[122].

The structure of the civil air transport MRO industry is being shaped by several key trends. The practice of outsourcing maintenance is increasing, with aircraft manufacturers becoming MRO integrators – both Boeing and Airbus now offer after-sales MRO services. Boeing GoldCare is an integrated service providing asset management, engineering, maintenance and support for airline customers; available for the 787, Next Generation 737 and the 747-400 with the intended introduction of similar packages for the 777 and 747-8[123]. Airbus has a similar product named 'Flight Hour Services' which is modular in the sense that an airline can select the level of support it needs to complement its own MRO capability, or defer all maintenance to Airbus and its service partners under a 'Tailored Support Package'[124]. This is a recent development in the MRO market; previously airlines have traditionally undertaken maintenance themselves, or have outsourced to either another airline or a standalone third party MRO provider.

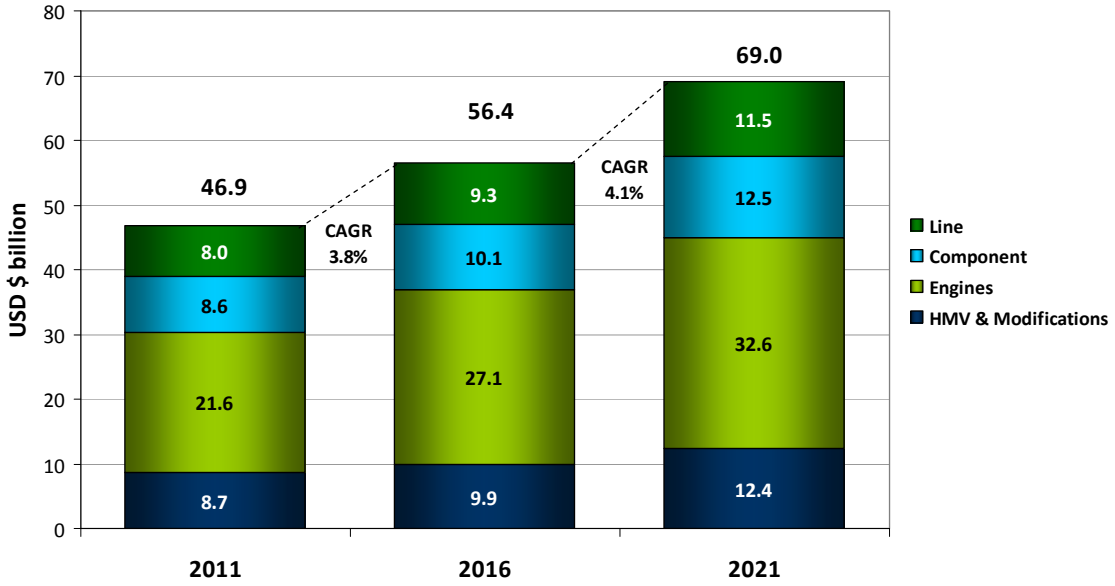
[122] Opportunities and Challenges in Today's MRO Market 2011-2021, TeamSAI, 22 September 2011

[123] Integrated Services GoldCare, Boeing, http://www.boeing.com/commercial/goldcare/pdf/goldcare.pdf

[124] FHS Tailored Support Package, Airbus, http://www.airbus.com/support/flight-hour-services/fhs-tailored-support-package/

Current economic conditions and increasing fuel prices have placed an intense cost focus on airline operators, who in turn are placing pressure on MRO providers to improve the cost, structure and performance of the supply chain. Improvements in engine technology have resulted in fuel burn reduction, which is both accelerating fleet replacement and modifications to existing aircraft in turn stimulating MRO activity. The introduction to service of newer generation aircraft such as the Airbus A380, Boeing 787, 747-8 and the planned Airbus A350XWB means more time between maintenance inspections and less time spent in the hangar. There is an increase in the practice of leasing aircraft where contractual return conditions often specify more MRO work; and there is an increased focus on asset utilisation for all aspects of the inventory such as the aircraft, MRO facilities and hangars – including aircraft mechanics who are now expected to have skills harmonisation across aircraft types[125].

Figure 5.32: Forecast Global MRO Market Spend by Activity 2011-2021




Source: TeamSAI

Global growth in MRO is expected to average a 3.9% CAGR between 2011 and 2021; growing to USD 69.0 billion over the period (see Figure 5.32). Overall MRO growth is driven by the demand for air transport, in turn driven by economic prosperity and growth in GDP, the expanding middle classes worldwide and the corresponding increase in the global aircraft fleet. The rapid growth of fleets in Asia and India indicates a shift in the regional MRO distribution towards the east, which will eventually see a level of parity between Asia, the Americas and Europe.

This is being further driven by the increase in MRO outsourcing from Europe, the Americas and the Middle East, where there is an increasing focus on cost controls in airlines. The emergence of efficient MRO and integrated service providers in Asia combined with lower labour costs means that outsourcing work will outpace organic growth in the region. For example, MRO market growth in India had a CAGR of 14.2% in 2011 and the market is expected to triple to USD 1.9 billion per year by 2020[126].

[125] Trends in Aviation & Impact on MROs, Boeing, IATA 7th Maintenance Cost Conference, October 2011

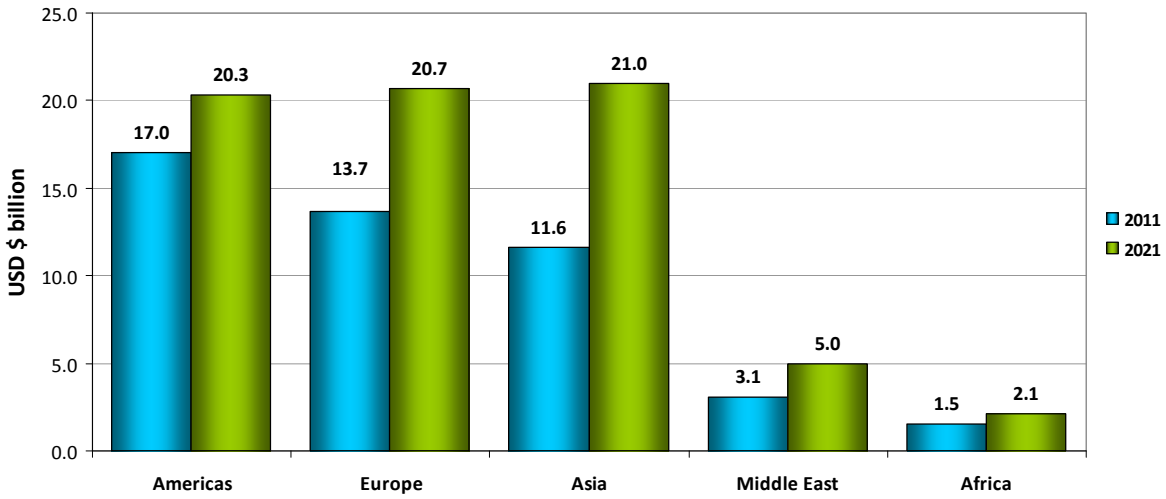
[126] Trends in Aviation & Impact on MROs, Boeing, IATA 7th Maintenance Cost Conference, October 2011

Table 5.5: Current & Forecast Global MRO Market Share & Growth Rates by Region 2011-2021

| | Americas | Europe | Asia | Middle East | Africa |
|---|---|---|---|---|---|
| **Market (USD bn) (2011)** | 17.0 | 13.7 | 11.6 | 3.1 | 1.5 |
| **Market Share (2011)** | 36% | 29% | 25% | 7% | 3% |
| **CAGR (2011-2021)** | 2.4% | 4.7% | 6.8% | 5.3% | 3.5% |
| **Market Share (2021)** | 29% | 30% | 30% | 7% | 3% |

Source: TeamSAI (Americas = North America, Latin America & the Caribbean. Asia = Asia Pacific, China & India)

Figure 5.33: Current & Forecast Global MRO Market Share by Region 2011-2021



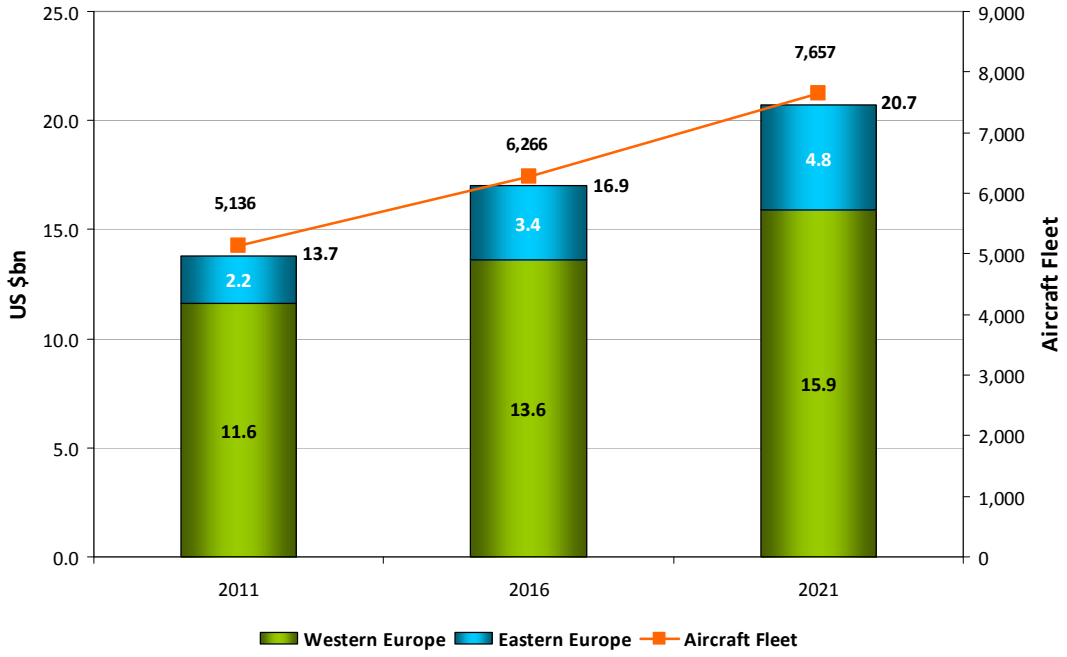

Source: TeamSAI (Americas = North America, Latin America & the Caribbean. Asia = Asia Pacific, China & India)

As can be seen in Table 5.5, the dominance of the mature American and European MRO will come to an end as Asia develops into a major market, displaying the highest overall growth in the period to 2021 with a CAGR of 6.8%. The size of regional markets in absolute terms in 2011 and 2021 are illustrated in Figure 5.33, showing that Asia is set to become the largest MRO market by 2021 with a value of USD 21.0 billion.

### 5.4.2 MRO Activity in Europe

The market value of MRO in Europe in 2011 was USD 13.7 billion. Overall, Europe can expect a moderate annual average growth in MRO activity over the next ten years at the rate of 4.2%, which is predominantly driven by growth and change in the total aircraft fleet. The fleet itself is forecast to grow at a CAGR of 4.1% to 2021 across all aircraft types (Figure 5.34).

Figure 5.34: European Forecast MRO & Aircraft Fleet 2011-2021




Source: TeamSAI

As a mature market, Western Europe will experience 3.2% annual average growth over the same period. Fleet growth was slightly stronger in the region than expected in 2011, having returned to growth after a decline in 2010. This modest growth rate is below the global average as a result of the depressed economic growth in the region. Despite these conditions the absolute increase in MRO spend of USD 4.3 billion to 2021 is significant, due to the large size of the market.

Eastern Europe is among the worldwide regions displaying the highest annual growth. Although the market is smaller in size compared to Western Europe, it is forecast to gain between 8% and 9% of the overall European market share by 2021[127]. Due to the age demographics of the fleet in the region, which sees older aircraft on average being used by carriers, airframe heavy maintenance will be a key driver of this growth[128]. It is also supported by the current high growth rate in the aircraft fleet, which saw close to 1,000 deliveries in 2011.

[127] The Global MRO Forecast 2011-2021, TeamSAI, MRO Europe 2011 Conference, September 2011

[128] MRO Forecast, Trends, Challenges and Opportunities, ICF SH&E, Aviation Week – MRO Europe, September 2011

# 6. Air Traffic Management

## 6.1 Introduction

This chapter describes the key events in Air Traffic Management (ATM) in 2011.

With the initiation of the SES II Performance Scheme, there has been significant progress in terms of reporting and assessing European ATM performance, both through the activities of the Performance Review Body and though the establishment of the Network Management Function. The European Commission has been swift to follow up with proposed corrective actions where States have shown shortfalls against the agreed targets. There has also been some progress in the establishment of Functional Airspace Blocks (FABs) prior to the deadline in 2012.

2012 is also likely to see a return to improving ATM cost effectiveness in the European Air Navigation Service Providers (ANSPs) and the chapter starts with a detailed analysis of historical and projected ATM cost effectiveness at both the European and State levels. It also includes some of the benchmarking data against non-European ANSPs published by CANSO (Civil Air Navigation Services Organisation). The chapter then continues with sections on ATM/ANS standardisation inspections, European network management; progress on the implementation of FABs, and on developments related to SESAR and NEXTGEN. The chapter finishes with an update on ATM developments following the Iceland volcanic eruption in 2010.

Throughout this chapter the emphasis is on ATM cost effectiveness. More information on delays, safety and environment can be found in other chapters of this report.

## 6.2 ATM Cost Effectiveness

### 6.2.1 SES II Performance Scheme

In September 2010, EUROCONTROL was designated by the European Commission's designation as the Performance Review Body (PRB) of the Single European Sky (SES). The designation is valid until 30 June 2015.

The purpose of the PRB is to assist the European Commission in the implementation of the performance scheme and to assist the National Supervisory Authorities (NSAs) on request. The PRB's complete list of tasks is described in Article 3 of Regulation 691/2010[129]. Two of the PRB's key tasks include:

- advising the European Commission in setting EU-wide performance targets and assessing National/Functional Airspace Block (FAB) Performance Plans.
- monitoring the performance of the system in four Key Performance Areas: Safety, Capacity, Environment and Cost-Efficiency.

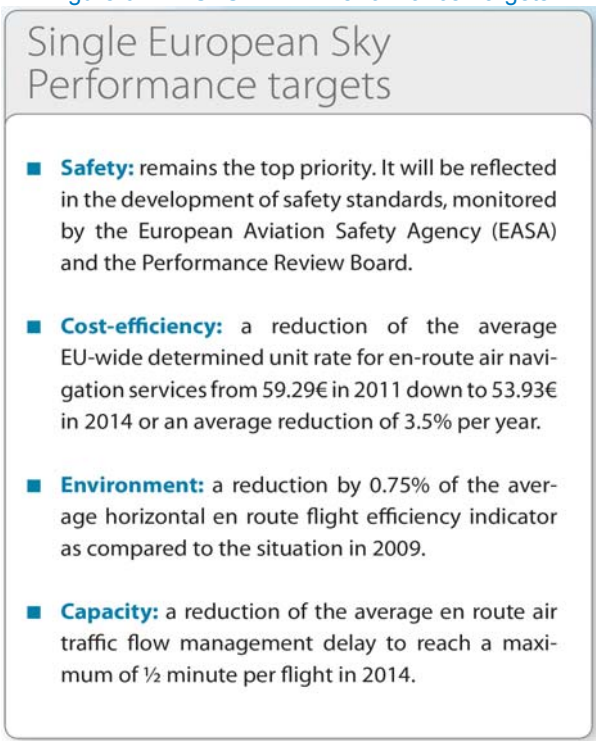
The European Commission has adopted a Commission Decision[130] setting EU-wide performance targets and alert thresholds for the first reference period (RP1) 2012 to 2014. These targets (Figure 6.1) cover

[129] 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, 20 July 2010

[130] Commission Decision setting the European Union-wide performance targets and alert thresholds for the provision of air navigation services for the years 2012 to 2014, 21 February 2011

route environment (in terms of route efficiency), capacity (in terms of en route delays) and cost efficiency (in terms of en route unit rates).

Figure 6.1: SES II ATM Performance Targets




Source: Eurocontrol Network Manager Fact Sheet based on European Commission Decision, 21 Feb 2011

For the key performance indicators (KPIs) on cost efficiency[131], 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 EU-wide cost efficiency targets are to achieve unit rates of €57.88 in 2012, €55.87 in 2013 and €53.92 in 2014 (expressed in €2009).

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 terminal air navigation service charges.

In September 2011, EUROCONTROL (designated as the PRB) published its first assessment of National/FAB performance plans for the period 2012 to 2014[132]. Volume I of the report presents the PRB's overall assessment of National/FAB Performance Plans for RP1, as well as PRB recommendations to the

[131] The SES II performance scheme covers environment, delays and safety as well cost effectiveness. These areas are dealt with in other chapters of this report. This chapter concentrates on ATM cost effectiveness.

[132] SES II Performance Scheme, Assessment of National/FAB Performance Plans with Performance Targets for the period 2012-2014, prepared by the Performance Review Body (PRB) of the Single European Sky.

European Commission. The PRB's assessment of the 26 national and 2 FAB Performance Plans is found in Volume II.

In terms of the cost-efficiency target, the PRB assessed that there had been a solid start to the reference period with the total costs for 2012, in terms of determined unit rate, only 0.3% above target. However, it also assessed that the Performance Plans collectively would fall short of the EU-wide cost efficiency target for 2014 by 2.4%. In monetary terms, further savings of €256 million out of a total of €18,900 million are required in order to meet the EU-wide target and intermediate values over RP1.

Concerning safety, the European Aviation Safety Agency (EASA), which is accountable to the European Commission for the safety of air transport, will develop in conjunction with the PRB safety performance indicators and respective metrics. The PRB at the same time shall consult EASA on the other EU-wide targets on capacity, environment, cost-efficiency to ensure consistency with the safety objectives and standards and methodologies laid down in Regulation (EC) No 216/2008[133], as amended by Regulation (EC) No 1108/2009[134], and its implementing rules.

Following on from the PRB assessment, the European Commission published its recommendations[135] for revised performance targets at the National/FAB level in order to remain consistent with the EU-wide performance targets. Revised National/FAB performance plans were due to be submitted by the end of 2011.

The SES II performance scheme is working to incentivise National Authorities to work together to deliver improved ATM performance at the EU level. It appears to have made a promising start. Considerable effort has been spent in the first year setting up the process and all parties have played a significant part in this. In the view of the PRB, the experience gained from assessing the Performance Plans and the knowledge gained of best practices in the States/FABs will constitute a solid foundation for performance monitoring and target setting in the second reference period.

### 6.2.2 Performance Review Report

EUROCONTROL, through the Performance Review Commission (PRC), continues to publish ATM performance reports for a wider European geographical area covering 38 EUROCONTROL Member States. The report covering ATM performance in 2010[136] was published in May 2011. The report provides a detailed analysis in all ATM performance areas, and at both the en route and airport level.

#### En Route Cost Effectiveness

In terms of ATM cost effectiveness, the PRC reported that after a constant decrease between 2003 and 2008, en route unit costs had increased by 8.1% in 2009 to €0.80/km (Figure 6.2) following an

[133] Regulation (EC) No 216/2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, 20 February 2008

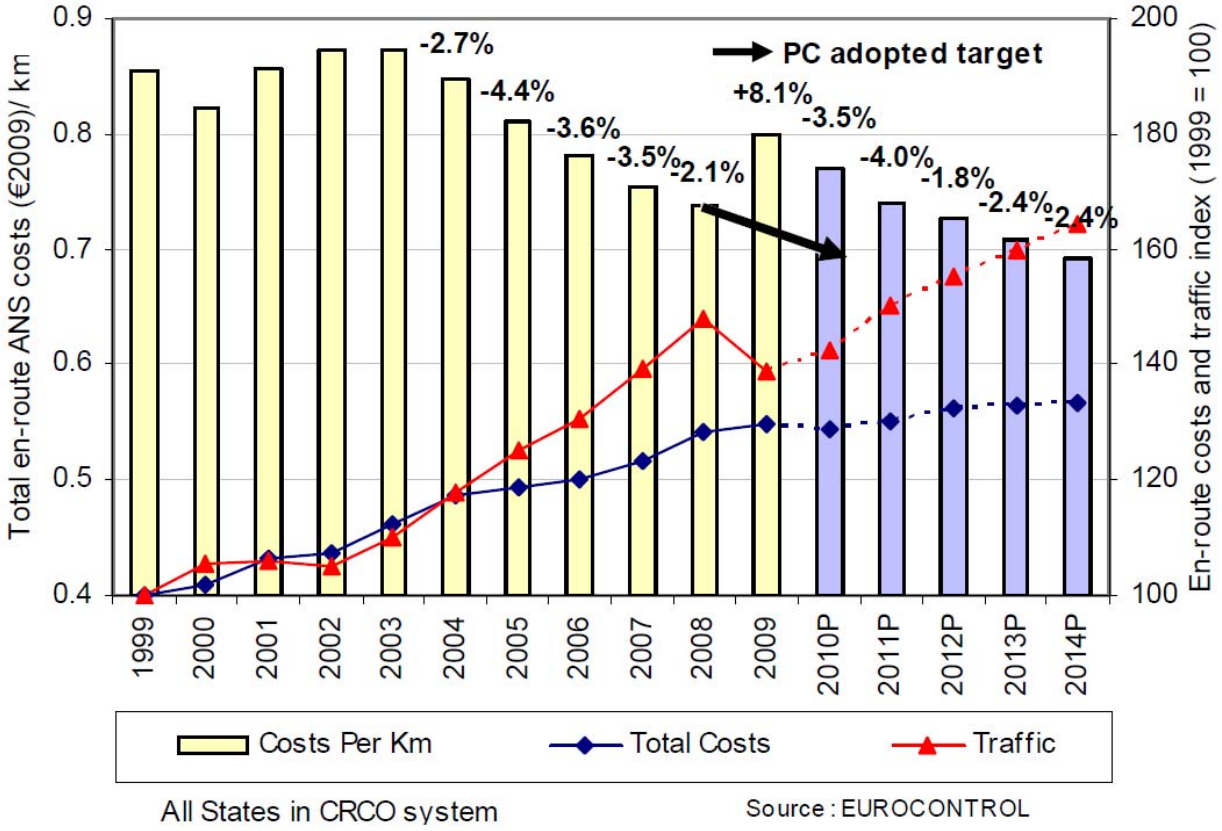
[134] Regulation (EC) No 1108/2009 amending Regulation (EC) No 216/2008 in the field of aerodromes, air traffic management and air navigation services and repealing Directive 2006/23/EC

[135] Commission Recommendation of 23 November 2011 on the revision of targets established contained in performance plans under Commission Regulation (EU) No 691/2010.

[136] An assessment of Air Traffic Management in Europe during the Calendar Year 2010, PRR 2010, EUROCONTROL Performance Review Commission, May 2011

unprecedented traffic downturn (–6.2% in terms of kilometres controlled). Although at the system level en route unit costs are planned to decrease by –2.8% p.a. between 2009 and 2014, this is well below the performance improvement achieved between 2003 and 2008 (–3.3% p.a.).

Figure 6.2: European En Route ANS (Air Navigation Services) Costs




Source: EUROCONTROL PRR2010 Report (CRCO = Central Route Charges Office, PC = EUROCONTROL Provisional Council)

The five largest States plan to decrease en route unit costs between 2009 and 2014. According to the PRC, initiatives taken in France and Spain to address performance issues show that cost effectiveness improvements can be achieved when there is a strong political and managerial commitment.

### Airport (Terminal) ATM

Available 2009 data shows that average European terminal unit costs per IFR airport movement increased by 10.5% over 2008 in real terms. This results from a significant decrease in traffic (–8.3%) coupled with an increase in costs (+1.3%); a pattern similar to en route costs.

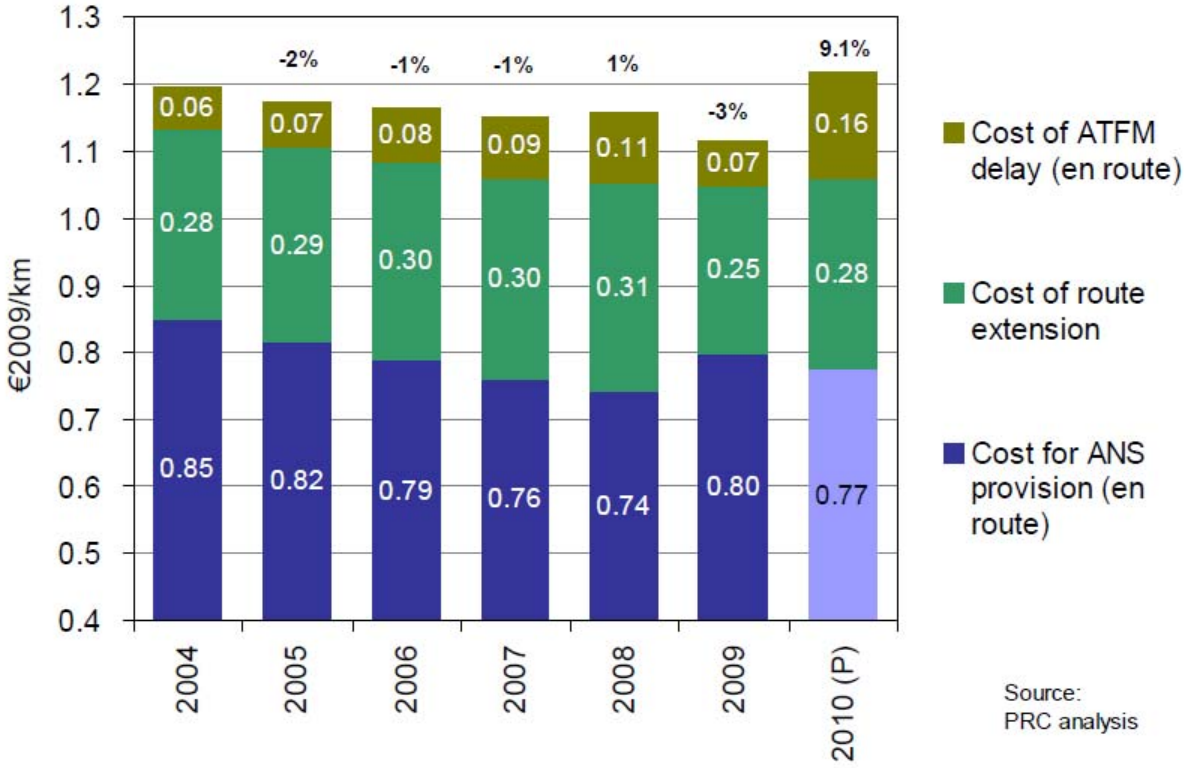
Some States covered by the SES Performance Scheme have no airports above the 50,000 IFR airport movements threshold set by the Charging Scheme regulation and therefore do not report terminal ANS costs and unit rate information. However, all SES States and the PRB will have to monitor terminal ANS costs and unit rates during RP1 (2012-2014) to ensure that improvements in en route ANS cost efficiency are not achieved at the expense of a deterioration in terminal ANS cost efficiency performance.

## Economic Impacts

Besides safety, which is ensured mainly through a prescriptive approach, ANS performance can be translated in economic terms. In Europe, airspace users bear the cost of capacity (charges), of delays associated with insufficient capacity, and of flight inefficiencies (additional fuel burn and flight time). Better understanding of the trade-offs between quality of service and cost effectiveness at both the system and State level will become increasingly important in view of target setting and performance management under the SES Performance Scheme.

The total economic en route unit cost of ANS (charges + delays + flight inefficiencies) increased significantly in 2010 (+9.1%).

Figure 6.3: Economic Impacts of Performance




Source: EUROCONTROL PRR 2010 Report

The increase was mainly due to a significant increase in en route ATFM (Air Traffic Flow Management) delay costs (+145%), originating principally from industrial actions, implementation of new ATM systems and the cost of route extension (mainly caused by increasing jet fuel price, circumnavigation of airspace affected by the ash cloud in April 2010 and industrial actions). This was the worst performance since 2004 (Figure 6.3).

The adoption of binding performance targets and corrective mechanisms under the Single European Sky offers the opportunity to make performance improvements more robust.

### 6.2.3 En Route Unit Rates 2011

Table 6.1 shows an analysis of the yearly evolution of en route traffic handled by Air Navigation Service Providers in Europe and the overall average unit rate charged. Traffic is measured in Total Service Units which include an aircraft weight factor and take account of the distance travelled. The States included within Europe are those covered by the SES Performance Scheme[137]. Data for 2008 to 2011 are actuals based on data from the Central Route Charges Office (CRCO), while 2012 is based on the latest forecast from EUROCONTROL STATFOR[138]. The unit rate at the European level for each year was determined as the average estimated unit rates for each Member State in euros (€) weighted by the number of service units handled by each State. Unit rates are nominal, i.e. as charged each year.

Table 6.1: Evolution of Traffic & En Route Unit Rates at the European level

| Year | Traffic (TSUs) | YoY Growth | Average Unit Rate (Nominal €) | YoY Growth |
|---|---|---|---|---|
| 2008 | 103,587,964 | | 59.73 | |
| 2009 | 96,828,680 | – 6.5% | 60.83 | 1.8% |
| 2010 | 99,317,925 | 2.6% | 62.33 | 2.5% |
| 2011 | 103,719,612 | 4.4% | 63.09 | 1.2% |
| 2012F | 103,275,096 | – 0.4% | 62.82 | – 0.4% |
| 2008 to 2012F | | – 0.3% | | 5.2% |

Source: Mott MacDonald analysis based on STATFOR and CRCO data (TSU = Total Service Unit)

In terms of traffic, 2011 saw an increase of 4.4% in 2011 over 2010 but in 2012, due to the weakening economic outlook, traffic is expected to decline by 0.4%. In 2011 average unit rates increased by 1.2% despite the 4.4% increase in traffic, indicating a likely decline in en route ATM cost effectiveness. However, in 2012 this trend is reversed – both traffic and charges are forecast to fall by 0.4% in that year. If inflation was also taken into account then the decline in charges, in real terms, would be even more significant. This indicates that en route ATM cost effectiveness is set to improve in 2012 across Europe as a whole.

To some extent this reversal in 2012 may just be a reflection of the adjustments in charges that occur at the end of each year in respect to the over-recovery or under-recovery of costs in previous years, based on actual outturn traffic handled versus that which was forecast at the time. It is therefore more appropriate to look at longer term trends over a number of years. In terms of the five year period between 2008 and 2012, traffic has declined by 0.3% (due to the economic downturn) while charges, nominally, have risen by 5.2%. As a crude measure this represents a decline in en route ATM cost effectiveness in nominal terms but is likely to still represent an improvement in real terms, if inflation is taken into account.

Table 6.2 shows the same analysis for 2011 and 2012 at the State level. The table shows actual growth in TSUs in 2011 over 2010 and forecast growth for 2012 over 2011. Growth rates are also shown for unit

[137] EU27 + Norway and Switzerland. Note that Estonia and Latvia were not included in this analysis because full data was not available for these States.

[138] EUROCONTROL Medium Term Forecast of Service Units 2012 to 2017, EUROCONTROL STATFOR, February 2012

rates. In 2011 the growth rate is shown for unit rates expressed in € (i.e. how they are billed) and in local currency (i.e. how they are determined). Entries are arranged in 2012 charge reduction order in relation to traffic growth, starting with the greatest reduction. So for example, Portugal is set to reduce its charges in the Lisbon Flight Information Region (FIR) by 30.5% in 2012. This comes on top of a forecast increase in traffic of 1.8% which with all else being equal, might be expected to stimulate a reduction of 1.8% in charges. Thus as a crude measure, a 30.5% decrease in nominal charges minus 1.8% represents a net improvement of 28.7% in en route ATM cost effectiveness.

In terms of the nominal unit rate, twelve States reduced their en route charges in 2011 compared to 2010; and fifteen States in 2012 compared to 2011. Ten States reduced their rates in both years. However when traffic levels are taken into account, only five States improved their en route ATM cost effectiveness in 2011 – these were Spain, Lithuania, Czech Republic, Greece and Malta. By contrast, in 2012 fourteen States are forecast to improve their en route ATM cost effectiveness. These are the top fourteen entries in the table, highlighted in grey.

Table 6.2: Actual/Forecast Traffic & Unit Rates for 2011 and 2012

| State (and FIR) | Growth 2011/2010 | | | Growth 2012F/2011 | |
|---|---|---|---|---|---|
| | TSUs | Unit Rates | Unit Rates | TSUs | Unit Rates |
| | | € | Local Currency | | € |
| Portugal-Lisbon | 7.5% | -3.0% | -3.0% | 1.8% | -30.5% |
| Spain-Continental | 5.3% | -7.3% | -7.3% | -5.7% | -7.7% |
| Ireland | 4.3% | 8.1% | 8.1% | -0.3% | -8.9% |
| Spain-Canaries | 8.2% | -7.3% | -7.3% | 0.6% | -7.4% |
| Romania | 3.5% | -3.1% | -2.3% | 1.5% | -7.5% |
| France | 6.3% | 3.2% | 3.2% | -1.7% | -3.7% |
| Bulgaria | 9.7% | -7.0% | -7.0% | 3.7% | -8.1% |
| Lithuania | 13.2% | 0.3% | -13.3% | 0.3% | -4.4% |
| Belgium-Luxembourg | 4.6% | 0.2% | 0.2% | 0.6% | -3.5% |
| Czech Republic | 5.2% | -5.0% | -7.6% | 2.2% | -4.2% |
| Slovenia | 16.3% | -3.4% | -3.4% | 1.6% | -3.5% |
| Greece | 2.1% | -3.1% | -3.1% | 4.3% | -5.9% |
| Norway | 8.2% | -1.4% | -4.0% | 3.7% | -5.1% |
| Netherlands | 4.8% | 0.2% | 0.2% | -0.7% | -0.1% |
| Switzerland | 1.5% | 11.6% | -0.5% | -1.8% | 1.9% |
| Poland | 11.0% | -9.8% | 7.6% | 6.0% | -5.8% |
| Austria | 2.9% | 0.3% | 0.3% | -0.8% | 1.2% |
| Hungary | -1.2% | 14.3% | 15.8% | 0.2% | 0.5% |
| Germany | 3.6% | 4.5% | 4.5% | -1.4% | 3.3% |
| Denmark | 4.2% | 5.8% | 5.8% | -2.1% | 5.7% |
| Sweden | 7.9% | 9.7% | 3.8% | -1.1% | 6.5% |
| United Kingdom | 4.0% | 4.3% | 5.4% | -2.5% | 9.5% |
| Cyprus | -0.3% | 17.5% | 17.5% | 4.6% | 6.4% |
| Italy | -2.9% | 2.9% | 2.9% | 1.0% | 11.6% |
| Slovak Republic | 5.2% | 0.5% | 0.5% | 1.8% | 12.8% |

| State (and FIR) | Growth 2011/2010 | | | Growth 2012F/2011 | |
|---|---|---|---|---|---|
| Finland | 12.6% | 0.4% | 0.4% | -0.2% | 24.2% |
| Malta | 3.9% | -18.8% | -18.8% | 3.4% | 33.3% |

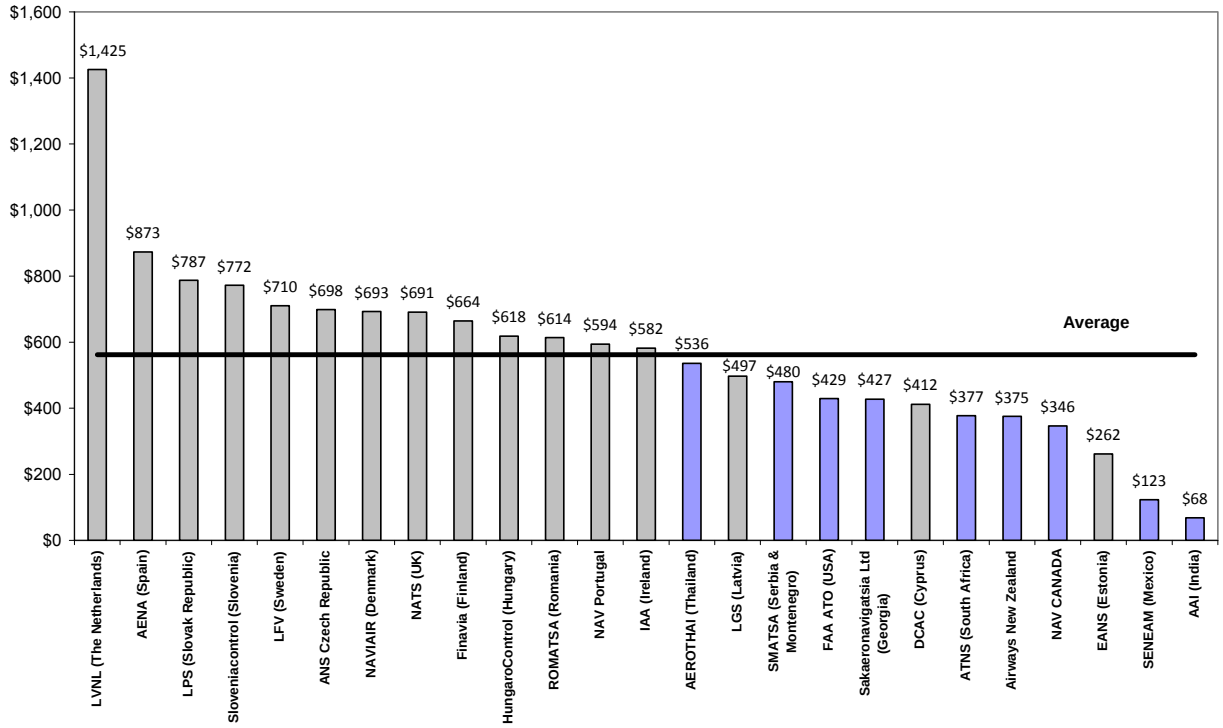
Source: Mott MacDonald analysis based on STATFOR and CRCO data (TSU = Total Service Unit, FIR = Flight Information Region, entries are arranged in 2012 charge reduction order in relation to traffic growth.)

### 6.2.4 Global Benchmarks

In December 2011, the Civil Air Navigation Services Organisation (CANSO) published its second public release of global air navigation service (ANS) performance, covering the period 2006 to 2010[139]. This included performance data related to productivity, cost effectiveness, price, revenue and profitability for 29 Air Navigation Service Providers (ANSPs) around the world.

In the CANSO report, ATM cost effectiveness is measured in terms of the costs per IFR[140] Flight Hour handled. The report details results for both continental and oceanic airspace but only the results for continental airspace are reproduced here. Figure 6.4 shows a comparison of 25 ANSPs that provided 2010 data on costs. For comparison reasons, the data is shown in 2010 U.S. Dollars. The average for the 25 ANSPs supplying data is also shown and EU ANSPs are shown in grey.

Figure 6.4: Cost per IFR Flight Hour (Continental) by ANSP - 2010 US Dollars




Source: CANSO 2011 report on Global ANS Performance. EU ANSPs shown in grey

[139] Global Air Navigation Services Performance Report 2011, 2006-2010 ANSP Performance Results, CANSO, December 2011

[140] IFR = Instrument Flight Rules. In this context it refers to all flight-planned flights in controlled airspace

Figure 6.4 highlights the higher than average costs of most European ANSPs in the data sample.

Table 6.3 shows comparative cost effectiveness data in (constant 2006) U.S. Dollars for 22 ANSPs for the period 2006 to 2010. The table is arranged in descending order of average annual increases in cost over the period. EU ANSPs that provided data are again highlighted in grey. The average annual cost increase over the period for all ANSPs in the sample was 3.8%. Whilst the costs of some European ANSPs in this sample have shown above average increases in this period, others have been below average or have shown decreases. This provides some encouragement that European ATM cost effectiveness is improving, meaning that over time fewer European ANSPs will be above the global average in terms of costs and therefore charges.

Table 6.3: Cost (USD 2006) per IFR Flight Hour (Continental) by ANSP

| ANSP | 2006 | 2007 | 2008 | 2009 | 2010 | AAGR |
|---|---|---|---|---|---|---|
| HungaroControl (Hungary) | 394 | 433 | 513 | 553 | 684 | 14.8% |
| LFV (Sweden) | 409 | 494 | 507 | 632 | 702 | 14.5% |
| EANS (Estonia) | 153 | 204 | 232 | 245 | 260 | 14.2% |
| SMATSA (Serbia & Montenegro) | 392 | 542 | 526 | 583 | 662 | 14.0% |
| ATNS (South Africa) | 233 | 255 | 274 | 298 | 359 | 11.4% |
| Sloveniacontrol (Slovenia) | 501 | 639 | 718 | 758 | 769 | 11.3% |
| NAVIAIR (Denmark) | 484 | 573 | 649 | 722 | 689 | 9.2% |
| LGS (Latvia) | 365 | 386 | 400 | 440 | 503 | 8.3% |
| FAA ATO (USA) | 320 | 338 | 366 | 407 | 429 | 7.6% |
| SENEAM (Mexico) | 103 | 97 | 108 | 126 | 123 | 4.5% |
| LPS (Slovak Republic) | 658 | 617 | 647 | 800 | 784 | 4.5% |
| NATS (UK) | 741 | 723 | 725 | 851 | 875 | 4.2% |
| IAA (Ireland) | 500 | 486 | 514 | 544 | 580 | 3.8% |
| Airways New Zealand | 298 | 294 | 295 | 325 | 344 | 3.7% |
| DFS (Germany) | 757 | 728 | 704 | 814 | - | 2.4% |
| LVNL (The Netherlands) | 1,301 | 1,346 | 1,428 | 1,645 | 1,419 | 2.2% |
| ANS Czech Republic | 593 | 666 | 623 | 635 | 637 | 1.8% |
| ROMATSA (Romania) | 750 | 700 | 840 | 862 | 773 | 0.8% |
| NAV CANADA | 296 | 302 | 289 | 290 | 297 | 0.1% |
| AENA (Spain) | 947 | 1,001 | 1,056 | 1,158 | 870 | -2.1% |
| NAV Portugal | 660 | 655 | 699 | 684 | 591 | -2.7% |
| Sakaeronavigatsia Ltd (Georgia) | 685 | 744 | 798 | 428 | 426 | -11.2% |

Source: CANSO 2011 report on Global ANS Performance (EU ANSPs highlighted in grey)

Another interesting set of data from the CANSO report shows the evolution of employment costs over the period 2006 to 2010 for operational Air Traffic Control Officers (ATCOs). This data is shown in Table 6.4 and is depicted in decreasing order of 2010 employment costs. Additionally, GCA (UAE)[141] is included in this table as compared to the previous one. The data is for total costs of employment so will include overheads as well as ATCO salaries.

[141] General Civil Aviation Authority, United Arab Emirates

EU ANSPs are highlighted in grey; and again they feature heavily in the top half of the table, reflecting the higher cost of living and therefore costs of employment in the more mature economies of the European Union. However, with the exception of the FAA and NAV CANADA, employment costs in the non-EU ANSPs in the sample have been growing at above the annual average rate over the period (AAGR 4.3%). Although in 2010 AENA was still the highest in terms of employment costs, these have been reduced significantly following actions instigated by AENA both in response to pressure from airlines and in anticipation of its upcoming privatisation.

Table 6.4: Employment Costs (000's USD 2006) per Operational ATCO (Continental) by ANSP:

| ANSP | 2006 | 2007 | 2008 | 2009 | 2010 | AAGR |
|---|---|---|---|---|---|---|
| AENA (Spain) | 387 | 436 | 453 | 428 | 291 | -6.9% |
| LVNL (The Netherlands) | 172 | 197 | 270 | 266 | 284 | 13.4% |
| NAV Portugal | 268 | 250 | 305 | 304 | 274 | 0.6% |
| NATS (UK) | 187 | 179 | 199 | 224 | 217 | 3.8% |
| DFS (Germany) | 182 | 204 | 209 | 209 | - | 4.7% |
| IAA (Ireland) | 147 | 161 | 178 | 178 | 203 | 8.4% |
| LFV (Sweden) | 125 | 115 | 166 | 187 | 187 | 10.6% |
| GCAA (UAE) | 147 | 147 | 147 | 186 | 186 | 6.1% |
| NAVIAIR (Denmark) | 134 | 153 | 175 | 217 | 184 | 8.3% |
| HungaroControl (Hungary) | 99 | 109 | 124 | 161 | 177 | 15.6% |
| FAA ATO (USA) | 173 | 176 | 177 | 167 | 171 | -0.3% |
| ANS Czech Republic | 149 | 185 | 156 | 146 | 162 | 2.1% |
| NAV CANADA | 135 | 141 | 150 | 153 | 156 | 3.7% |
| Sloveniacontrol (Slovenia) | 112 | 121 | 131 | 135 | 145 | 6.7% |
| LPS (Slovak Republic) | 88 | 88 | 91 | 106 | 133 | 10.9% |
| ROMATSA (Romania) | 84 | 105 | 119 | 119 | 115 | 8.2% |
| SMATSA (Serbia & Montenegro) | 62 | 77 | 87 | 97 | 105 | 14.1% |
| Airways New Zealand | 79 | 82 | 89 | 94 | 98 | 5.5% |
| EANS (Estonia) | 93 | 82 | 103 | 83 | 81 | -3.4% |
| ATNS (South Africa) | 39 | 46 | 55 | 63 | 64 | 13.2% |
| LGS (Latvia) | 50 | 59 | 64 | 51 | 51 | 0.5% |
| SENEAM (Mexico) | 40 | 41 | 42 | 48 | 49 | 5.2% |
| Sakaeronavigatsia Ltd (Georgia) | 13 | 14 | 17 | 17 | 17 | 6.9% |

Source: CANSO 2011 report on Global ANS Performance (EU ANSPs highlighted in grey)

## 6.3 ATM/ANS Standardisation Inspections

In January 2012 EASA, exerting the competences laid down in Regulation (EC) No 216/2008, as amended by Regulation (EC) No 1108/2009 and its implementing rules[142], started its activities in the field of ATM/ANS standardisation. In order to have in place a single standardisation programme addressing all

[142] As previously referenced in Section 6.2.1

aspects of aviation safety in Europe, both for EU and non-EU States, as well as no overlap or duplication of tasks, the Eurocontrol ESIMS[143] Programme has been discontinued at the same time that the EASA Standardisation Inspection Programme in the field of ATM/ANS is launched.

Standardisation inspections are conducted by EASA pursuant to Article 24 of Regulation (EC) No 216/2008 in order to assist the Commission in monitoring the implementation of the EU aviation safety rules by the EU Member States, Iceland, Norway, Switzerland and States Party to ECAA (European Common Aviation Area) agreements and working arrangements signed in this field between EASA and non-EU countries.

EASA standardisation activities have already been put in place for several years and EASA has developed the required organisational structure, personnel qualification and professional experience to conduct standardisation inspections. EASA started to conduct standardisation inspections in 2005. The remit, initially addressing initial and continuing airworthiness only, has been progressively extended to cover all flight operations, crew licensing, simulator training devices, and most recently ATM/ANS.

The working methods for carrying standardisation inspections are set forth by the Commission Regulation (EC) No 736/2006[144]. The Commission adopted in February 2012 a new Implementing Regulation No 90/2012[145] amending Regulation (EC) No 736/2006 to extend the scope of EASA standardisation inspections to the new remits of air operations, ramp inspections, air crew, air traffic controllers as well as air traffic management and air navigation services as soon as implementing rules are in place. This will provide a solid legal basis for EASA to conduct standardisation inspections in these new areas and ensure full standardisation of the EASA working methods used in the various sectors within one month of entry into force).

The EASA Standardisation Inspection Programme is established every year in agreement with the Commission. Each State is inspected at least every second year. In line with ICAO USOAP Comprehensive System Approach, the majority of EASA inspections combine inspections in the various fields (airworthiness, operations, licensing, ATM/ANS) into a comprehensive inspection. In line with the ICAO Continuous Monitoring Approach, EASA also conducts inspections limited to one or more fields and ad-hoc inspections to address specific issues. Altogether, around 100 individual inspections are conducted every year by the Agency.

## 6.4 European ATM Network Management

Following the implementation of Regulation (EU) No 677/2011[146] in July 2011, an ATM Network Manager function was created by the European Commission to optimise the performance of the aviation network in Europe. The EUROCONTROL agency has taken on this new function.

The Network Manager brings together the different aviation and air traffic management actors involved in the design, planning and management the European ATM network.

[143] ESARR Implementation Monitoring and Support Programme

[144] Commission Regulation (EC) No 736/2006 on working methods of the European Aviation Safety Agency for conducting standardisation inspections, 16 May 2006

[145] Commission Implementing Regulation (EU) No 90/2012 amending Regulation (EC) No 736/2006 on working methods of the European Aviation Safety Agency for conducting standardisation inspections, 02 February 2012

[146] Commission Regulation (EU) no 677/2011 laying down detailed rules for the implementation of air traffic management (ATM) network functions and amending Regulation (EU) No 691/2010, 07 July 2011

In practice, the Network Manager is involved in every domain that is required in air traffic management, i.e.:

- airspace design;
- air traffic flow and airspace management;
- capacity planning both for airspace and airports;
- managing scarce resources; and
- introducing new technologies and procedures.

The Network Manager also provides daily support to the air traffic operations across the 'network', which covers the 39 Member States of the EUROCONTROL organisation.

The Network Manager is a key element of the SES II package. Its main objective is to ensure improved performance across the aviation network by developing and implementing common procedures for designing, planning and managing the European ATM network.

As set out in the Network Function Regulation, the Network Manager will:

- monitor, report and forecast the performance of the European ATM network based on the agreed performance targets;
- act as a central unit for air traffic flow management across Europe;
- ensure European airspace can accommodate additional capacity needs and seamlessly integrate airports into the network;
- give Member States and partners access to common resources; and
- support the deployment of technological improvements across the European ATM network.

The Network Manager is also responsible for the development, maintenance and implementation of a Network Strategy Plan (NSP). The aim of this plan is to define the necessary operational objectives in order to achieve the required ATM performance. The NSP will be aligned with the ATM Master Plan developed through SESAR.

The NSP, currently under development, will:

- provide a common understanding on the way the ATM network as a whole will achieve the 2014 performance targets, while preparing for the following reference period until 2020;
- identify the roles and responsibilities of the various operational stakeholders to implement the plan;
- serve as reference for the activities to be performed by the Network Manager and operational stakeholders.

As part of its network management function, EUROCONTROL produces monthly, seasonal and annual operations performance reports which review European traffic levels and the origin and attribution of en route and terminal air traffic flow management (ATFM) delays. The seasonal and annual reports additionally provide detailed analyses for each air traffic control centre (ACC) and for key airports. As well as providing an analysis of traffic and delays, these reports provide information on flight efficiency evolution and airport and ACC programme initiatives – factors influencing the capacity delivered as well as areas of

concern. Note that airline and ATFM delays in 2011 are considered in detail in another chapter of the Annual Analyses.

## 6.5 Functional Airspace Blocks (FABs)

### 6.5.1 FAB Status

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 6.5). SES II Regulation 1070/2009[147] provided a timetable of December 2012 for their establishment.

As part of FAB implementation and to facilitate an exchange of views, Member States in all FAB initiatives will consult other Member States, the European Commission, EASA, and other 'interested parties'. By 24 June 2012 the consultation material of all FABs will be submitted to the European Commission[148]. The European Commission will distribute the material to Member States, EASA and 'interested parties' who will be invited to submit observations to the related FAB. It is expected that this process will contribute to establish FABs on a solid legal, technical and operational basis, fully in line with SES objectives. As defined in Commission Regulation (EU) 176/2011[149], 'interested parties' means the neighbouring third countries to a FAB; relevant airspace users or groups of airspace users; and staff representative bodies as well as air navigation service providers adjacent to the FAB.

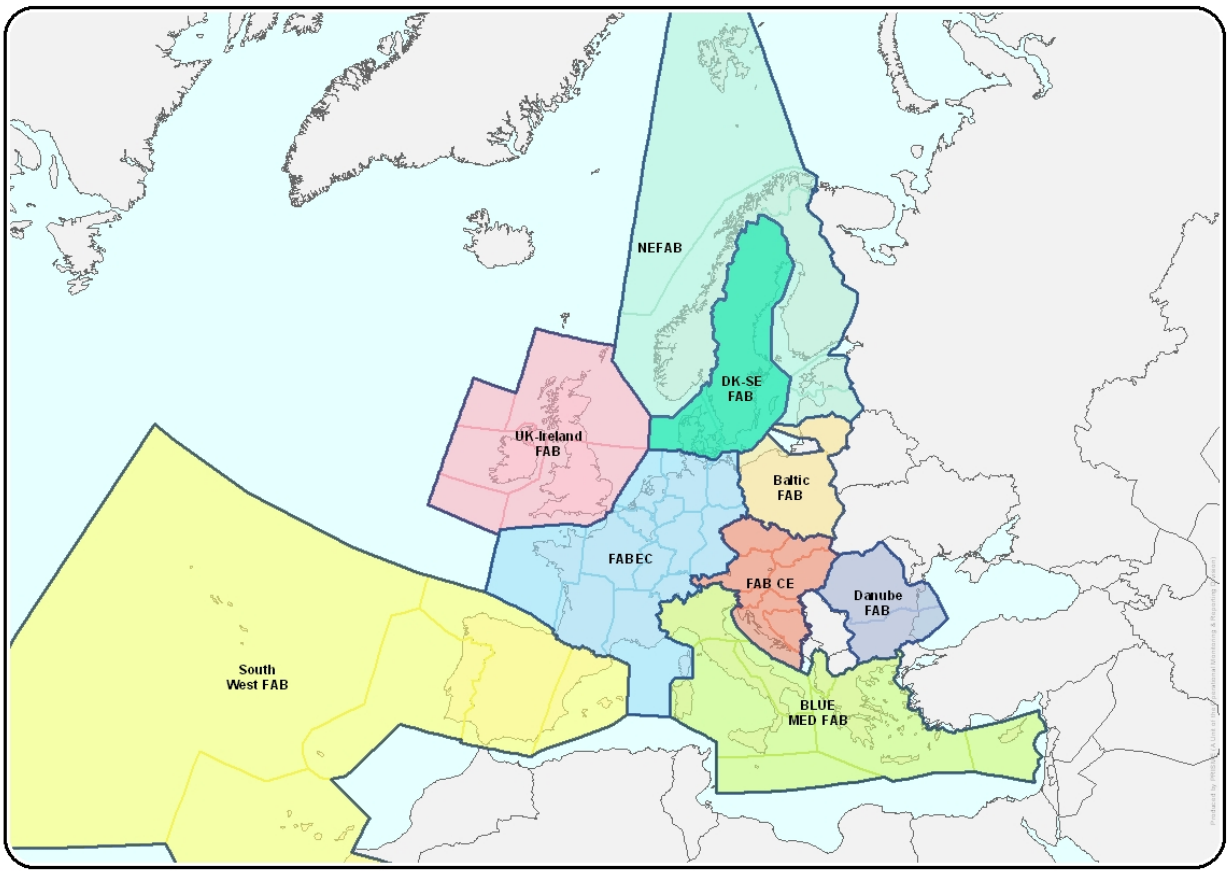
The status of the 9 FAB initiatives in 2011 is shown in Table 6.5.

[147] 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

[148] In January 2012 the NEFAB became the first such FAB to do so.

[149] Commission Regulation (EU) No 176/2011 on the information to be provided before the establishment and modification of a functional airspace block, 24 February 2011.

Figure 6.5: The Nine European FAB Initiatives




Source: European Commission

Table 6.5: Status of European FAB Initiatives in 2011

| FAB Initiative | Status at the end of 2011 |
|---|---|
| **Baltic FAB** (Lithuania and Poland) | The Baltic FAB Feasibility Study, the Implementation Plan and the Development Study have been completed. In July 2011, the Ministers of Transport from both States signed a Letter of Agreement to establish the formal and institutional arrangements for the Baltic FAB. A Strategic Committee and relevant working groups were also constituted. |
| **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. At the beginning of 2011 parts of both parent companies' operations were integrated into the joint enterprise. By 2012 the integration will be complete and both countries' airspace will function as one. NUAC will take over the operation of the three en route centres by 2013. In June 2011 NUAC was one of the first two FABs to submit a joint performance plan as part of the SES II Performance Scheme. |
| **North Eastern FAB** (NEFAB/NEAP) | The North European FAB (NEFAB) combines the airspace of Estonia, Finland, Latvia and Norway and was the first FAB to submit its consultation material to the European Commission on 4 January 2012. NEFAB is part of a wider collaboration between nine North European ANS Providers (NEAP): 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. |
| **FAB UK-Ireland** | FAB operational since July 2008. In April 2011 the annual report on 2010 performance was produced together with a rolling plan for FAB activities and initiatives for the period 2011 to 2014. Inter-FAB coordination is being enhanced through a Memorandum of Understanding between ANSPs of the UK Ireland FAB, Danish-Swedish FAB and through the Borealis framework of wider integration between all NEAP ANSP members. |
| **FAB Europe Central** (FABEC) (Belgium, France, Germany, Luxembourg, Netherlands, Switzerland and EUROCONTROL Maastricht) | In October 2011 the first provisional FABEC Council meeting took place which initiates the formal change from project to operational status. The FABEC Council will be the main governance body as laid down in the FABEC Treaty which is under national ratification. All FABEC bodies are composed of civil and military representatives and will be provisional until the treaty has been ratified. In June 2011 FABEC was one of the first two FABs to submit a joint performance plan, as part of the SES II Performance Scheme. |
| **FAB Central Europe** (FAB CE) (Austria, Bosnia-Herzegovina, Czech Republic, Croatia, Hungary, Slovakia and Slovenia) | In May 2011 the State Treaty defining the legal and structural framework for the implementation of FAB CEA was signed, along with the ANSP agreement defining the co-operation between ANSPs with the goal of ensuring an efficient realisation of FAB CE on the operational level. The CEO of the Air Navigation Services of the Czech Republic, was elected Chairman of the FAB CE CEO Committee (CEOC). Following this, in September a program management function has been set up to co-ordinate the projects required for the establishment of the FAB. |
| **Danube FAB** (Bulgaria and Romania) | In December 2011 the governments of Bulgaria and Romania signed the agreement formally establishing the Danube FAB. The Agreement lays down the governance structure for cooperation that will be in place before the end of 2012. Oversight of the FAB will be made by the Governing Council taking over the responsibilities of the existing Steering Committee. It will continue to represent the interests of States, Military, regulatory and air traffic service authorities and their staff. Following signature of the Agreement, both States will now proceed in 2012 to the ratification process. |
| **SW FAB** (Portugal and Spain) | Feasibility and pre-implementation phases were initiated in 2009 with a target completion date of December 2011. The signing of a draft State Agreement was also foreseen during 2011. |
| **Blue MED** (Cyprus, Greece, Italy, Malta, and Tunisia, Egypt, Lebanon, Jordan and Albania as observers or associated members) | In February 2012 the 7th meeting of the Governing Body established the final draft of the BLUE MED FAB State Level Agreement, while in November 2011 the ANSP Strategic Board, also at the 7th meeting, made further progress on the ANSP Agreement. The next steps have been agreed that will allow information about the constitution of the FAB to be submitted by the deadline. |

Source: Mott MacDonald Analysis of various FAB Websites

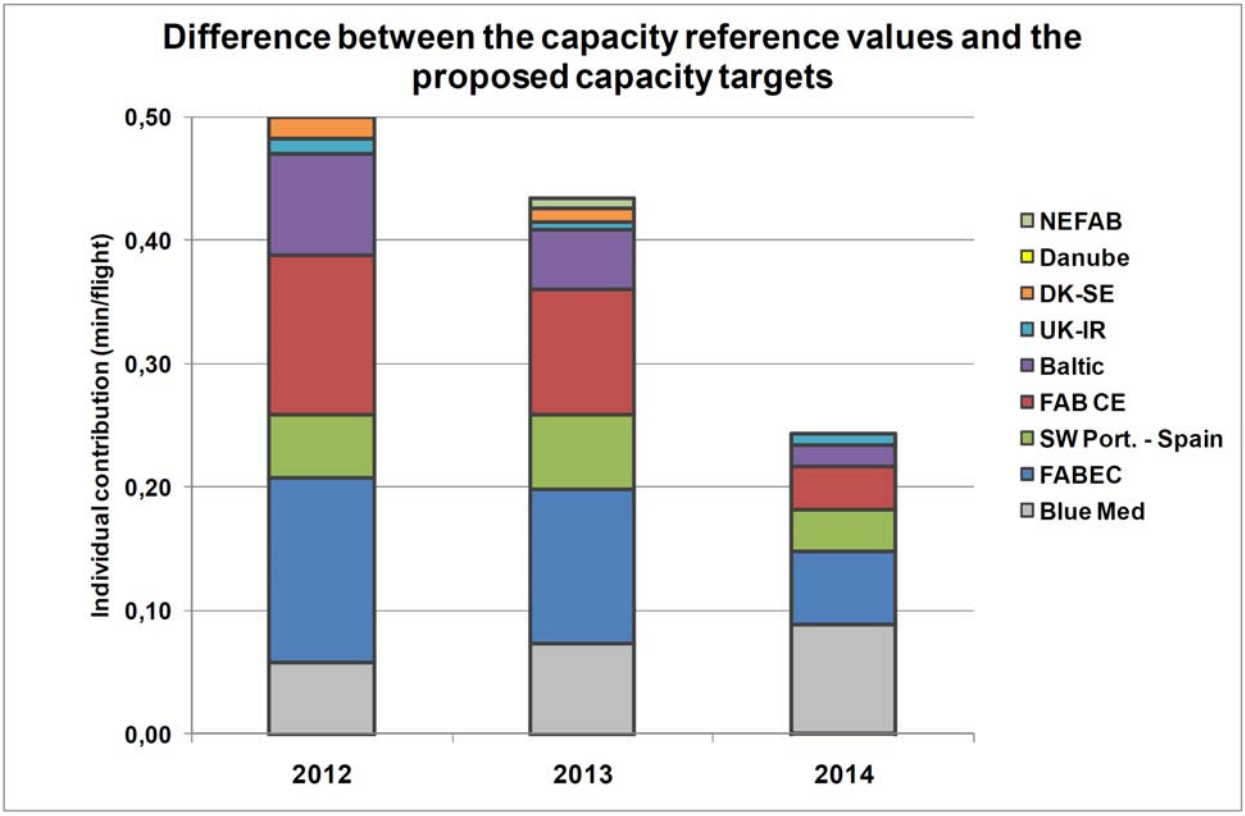
### 6.5.2 FAB ATM Performance

In September 2011, EUROCONTROL (designated as the PRB) published its first assessment of National/FAB performance plans for the period 2012 to 2014[150]. Included within Volume I of the report is a first assessment of European ATM performance at the FAB level.

Figure 6.6 shows the impact of national/FAB targets exceeding the indicative values (2012-13) or the EU-wide target for 2014 on the capacity KPI, aggregated at FAB level. FABs contributing to not meeting the capacity target in 2014 are, in order of decreasing impact: Blue-Med, FABEC, SW Portugal-Spain, FAB CE, Baltic and UK-IR.

In its report, the PRB recommends specific actions to address these potential shortfalls.

Figure 6.6: FAB Contribution to Projected Capacity Shortfalls versus SES II Targets




Source: EUROCONTROL (as PRB)

[150] SES II Performance Scheme, Assessment of National/FAB Performance Plans with Performance Targets for the period 2012-2014, prepared by the Performance Review Body (PRB) of the Single European Sky

## 6.6 SESAR

### 6.6.1 NextGen & Global Interoperability

ICAO created the overall blueprint for a new global system over twenty years ago. Since then the concepts have been explored and refined, strategic plans have been developed, and the required technology has matured. Over the past decade ICAO member states have initiated a number of programmes based on the ICAO blueprint. Their aim is to increase airspace capacity and reduce costs and delays. Currently NextGen (U.S.) and SES/SESAR (Europe) are among the most advanced in terms of cooperation.

SESAR and NextGen have similar goals and are driven by similar requirements. They draw on CNS[151]/ATM concepts and are strongly influenced by the ICAO Global ATM Operational Concept[152] (GATMOC). Their architectures can be mapped to each other and to the ICAO vision and concept, with considerable correspondence between all three (Figure 6.7).

Figure 6.7: SESAR, NextGen & the ICAO Global ATM Operational Concept


Source: Aerospace International

Both SESAR and NextGen aim to enhance airspace capacity very substantially, while increasing safety. They will achieve this through the increased use of automation, increased sharing of information, new approaches to flight plans and flight routings, new methods of separation; and extensive use of satellite technology.

[151] CNS = Communications Navigation Surveillance

[152] Global ATM Operational Concept, ICAO Doc 9854, 2005

Global interoperability is a must for the aviation community. Aircraft fly all over the world and cannot afford to have non-standardised certifications for ground and airborne systems, crews trained in non-standard ways or facing many different procedures. Standardisation allows interoperability and prevents aviation from becoming more expensive – or less safe.

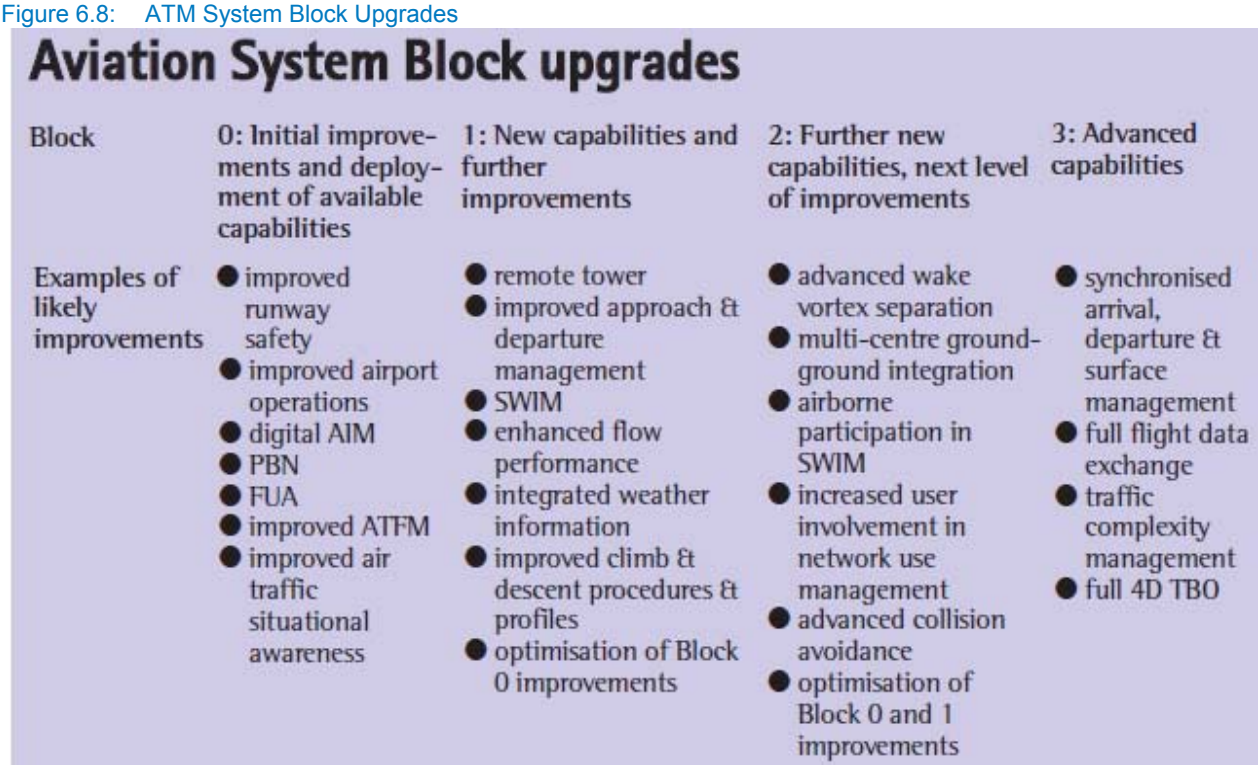
Delay due to standards-making processes had been seen as a risk to timely programme delivery, especially where concepts required development. A new method of working was agreed by ICAO, EUROCONTROL, FAA, SJU and the international standards bodies in October 2009. It was designed to allow all parties to work together in a timely and co-ordinated way. Its key features were:

- Concept development work would be carried out by agreed parties and the results reviewed and refined by ICAO
- Relevant ICAO sections would develop required provisions and industry groups would develop specifications and technical standards

Whereas in the past standards had been developed individually, it was now proposed that standards development would be for bundles of improvements. The bundles would form packages which would fit into the timescales of the major programmes; and could be deployed consistently anywhere in the world and at different times in different areas, to provide the same set of capabilities.

ICAO has adopted the name 'One Sky' for its vision for achieving a harmonised global air navigation system. The One Sky approach is intended to be progressive, cost effective and cooperative. The approach consists of three levels of activity: global conception, regional implementation planning and national implementation of infrastructure. At the heart of the One Sky approach is the Block Upgrades architecture (Figure 6.8), the framework for global harmonisation.

Figure 6.8: ATM System Block Upgrades



Source: Aerospace International based on ICAO

In order to ensure global interoperability for future ATM systems, there is a specific Annex in the EU-U.S. Memorandum of Cooperation[153] for mutual cooperation in the promotion and development of civil aviation research and development, which covers SESAR-NextGen cooperation for global interoperability.

The provisions of this Annex will work to ensure interoperability between the future U.S. ATM system (developed under the NextGen programme) and the future European systems (developed under the SESAR programme) and will contribute to global interoperability through a coordinated EU-U.S. support to the ICAO standardisation process.

Europe is also interested in cooperating with other regions of the world. An example of this is the Framework of Cooperation, which was established in July 2011 between the European Commission and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) of Japan. It will establish a framework of cooperation between Japan's long-term vision of the future air transportation system, CARATS[154], and the EU's SESAR programme.

The four key institutional European actors – EUROCONTROL, the European Commission, the European Aviation Safety Agency (EASA) and the SESAR Joint Undertaking – were present at the Global Air Navigation Industry Symposium (GANIS) in September 2011. They are fully committed to defining, together with ICAO and the other regions of the world, the next steps towards a seamless air navigation system ahead of the 12th ICAO Air Navigation Conference which will take place in 2012.

In October 2011, the SESAR Master Plan Update project was launched. The new Master Plan scheduled for summer 2012 will prepare for the SESAR deployment phase and both reflect, and provide input to, the movement towards global interoperability.

### 6.6.2 SESAR Releases

As part of the SESAR Programme, the Release approach is an effort to validate mature key SESAR solutions in an operational environment and to prepare for their deployment. This not only creates potential for early improvements of the current ATM system, but provides a platform for a more result oriented approach to research and development (R&D).

The main benefits from the SESAR release process are twofold: firstly, it provides a direct relationship between SESAR and the future ATM system, allowing all SESAR partners to validate new procedures and technologies from a very early stage on. Secondly, it considerably changes how research and development in the ATM domain are brought about. The developed concepts are directly validated and if they are not fit for purpose, they will be adapted or not further pursued. Especially by including the airlines as well as military airspace users in this process, SESAR also makes sure that all new technologies and procedures are in line with users' expectations.

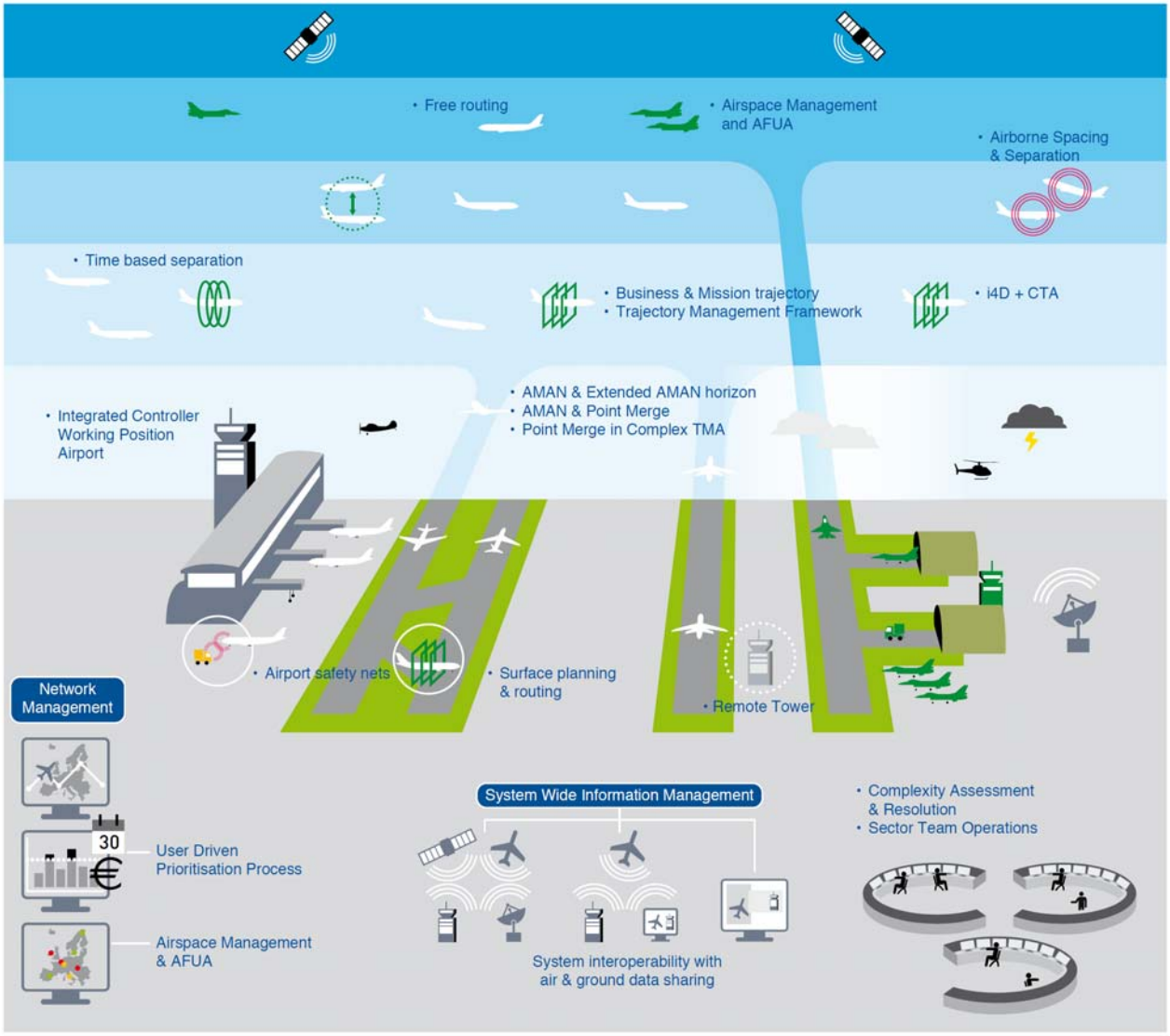
[153] Memorandum of Co-operation NAT-I-9406 between the United States of America and the European Union, Public File, Council of the European Union, 22nd February 2011

[154] Collaborative Actions for Renovation and Air Traffic Systems

During 2011, 25 exercises were completed under the Release 1 programme. They mainly centred on the development of efficient and green terminal airspace operations, the initial 4D trajectory, end-to-end traffic synchronisation and integrated and collaborative network management. The SESAR Releases will not only lead to early improvements to the European ATM system, but will also serve to increase confidence in the SESAR concept.

Final assessment of the results of Release 1 will be conducted in April 2012, leading to a formal conclusion as to the suitability of the achievements for industrialisation. The results are also being fed into the next update of the ATM Master Plan.

Figure 6.9: SESAR activities addressed in Release 1 and 2




Source: 2012 SESAR Release, SESAR Joint Undertaking

Release 2 will build on the results from Release 1 but will be wider in scope and will emphasise on coherence with the overall SESAR programme. The main operational improvements aimed for in Release 2 are in the areas of airport platform safety, airborne operations, ATC operations and network management.

Priority has been given to exercises demonstrating that future deployment is feasible in the short-medium term, assuming validation results confirm their suitability for delivery.

### 6.6.3 Governance and Incentive Mechanisms for the Deployment Phase

In December 2011, the European Commission issued a Communication[155] on governance and incentive mechanisms for the deployment of SESAR. At the heart of SESAR is the European ATM Master plan[156] (Master plan), a cooperative framework bringing together all relevant stakeholders. Today the Programme is in the development phase, managed by the SESAR Joint Undertaking (SJU)[157], a Public Private Partnership (PPP) that comprises 17 members and over 80 other participants also from third countries.

According to the Master plan, SESAR deployment will require total investments exceeding EUR 30 billion but will generate significant economic value and improvements in safety, quality of service and environment for Europe. These benefits are however extremely dependent on the ability of the stakeholders to move forward with deployment in a timely and synchronised way[158] (Table 6.6).

Table 6.6: Macroeconomic Impacts of SESAR

| | SESAR deployed according to the Master Plan | Impact if 10 years delayed deployment | Impact if unsynchronised deployment |
|---|---|---|---|
| Cumulative impact on EU GDP | EUR 419 billion | -30% | -28% |
| Jobs Created | 328,000 | -58% | -22% |
| CO2 saved | 50 million tons | -110% | -70% |

Source: SJU study on the macroeconomic impact of SESAR

The Communication discusses a number of actions that the Commission will undertake to facilitate SESAR deployment. A number of these actions will be initiated without delay as it is estimated that the set up of the Deployment Manager and the launch of the most urgent common projects could require up to 36 months. In particular, the Commission will ensure coherence of development and deployment processes with the SES framework and that the human factor, military and safety issues are duly addressed.

In order to prepare the transition to SESAR deployment, the Commission will ensure consistency between the Network Strategy Plan and the Master plan update (planned to be adopted by July 2012), which will be the references for the Deployment Programme. It will ensure that industrialisation issues are duly addressed in the Master plan and that appropriate connections are established and support is maintained to standardisation and certification bodies as well as manufacturing industry through SJU's technical expertise.

The Commission will carry out the necessary assessments and consultations in view of submitting a proposal before 2013, consistent with the future financial perspectives, for extending the SJU's mandate beyond 31 December 2016. The proposal will also address the governance and funding of future ATM R&D, Master plan maintenance and coordination between development and deployment governances.

[155] COM (2011) 923 final, 22 Dec 2011

[156] European Air Traffic Management Master Plan), first issued 30 March 2009 (subject to updates)

[157] Established by Council Regulation (EC) No 219/2007, 27 February 2007

[158] Assessing the macroeconomic impact of SESAR, SJU, Final Report, June 2011

The Commission will also implement the actions endorsed by the Single Sky Committee to consolidate the steering process for early deployment activities, as test bed for the deployment governance mechanisms to be implemented, and ensure its continuation up to the establishment of the future deployment governance (January 2012). This will include the initialisation of an interim deployment programme (March 2012).

Deployment governance will be implemented through three levels ensuring a strong EU political oversight, an effective deployment management through a binding industrial partnership and an efficient management within each individual implementation project. Incentive mechanisms will include focussed EU financial support provided through existing instruments, in particular through the Connecting Europe Facility (CEF)[159] in accordance with the TEN-T guidelines.

## 6.7 2011 Developments since the Icelandic Volcanic Eruption

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 ten million passenger journeys. The background to this event and the developments thereafter were covered in the previous edition of the Annual Analyses[160]. This sub-section concentrates on those further developments which have occurred in 2011.

In March 2011, new research was published[161] by the University of Copenhagen in Denmark and the University of Iceland in Reykjavik which characterised the volcanic ash particles from the Eyjafjallajökull eruption. The sharp, abrasive nature of the particles suggested that they could have damaged the bodies of aircraft and their windows, reducing visibility. The research supported the decision to close the airspace in the immediate aftermath of the eruption.

On 13 and 14 April 2011, EUROCONTROL, EASA and the European Commission together with 77 airlines, fourteen ANSPs, ten regulatory authorities and the Volcanic Ash Advisory Centres in London and Toulouse participated in a major ICAO exercise simulating a volcanic eruption in Iceland. The European Aviation Crisis Coordination Cell (EACCC) which was established following the real volcanic event in 2010 (and now underpinned by Regulation (EU) No 677/2011), participated in the exercise as the coordinator of a European air traffic management response. This was the largest volcanic ash crisis exercise ever organised.

The objectives of the exercise were:

- to test updated national and European region procedures described in the revised and agreed ICAO EUR/NAT Volcanic Eruption Contingency Plan[162]; and
- to simulate, together with airspace users, a scenario which includes the use of a safety risk assessment methodology which is under consideration by ICAO, EASA and national authorities.

[159] Proposal for a Regulation of the European Parliament and of the Council establishing the Connecting Europe Facility, COM(2011) 665 of 19 October 2011

[160] Annual Analyses of the EU Air Transport Market 2010, Final Report for the European Commission, Mott MacDonald, September 2011

[161] Characterization of Eyjafjallajökull volcanic ash particles and a protocol for rapid risk assessment, Proceedings of the National Academy of Sciences of the United States of America (PNAS), 15 March 2011

[162] ICAO Volcanic Ash Contingency Plan, EUR and NAT Regions, December 2010

Preliminary conclusions of the exercise were that:

- real progress had been made since last year in improving operational efficiency while maintaining safety: by applying the revised ICAO procedures, 70% of all planned flights would have taken place – three times more than last year during the Eyjafjallajökull eruption;
- there were still differences in the application of these revised procedures, which would require further efforts at European level to harmonise national responses; and
- the European Crisis Visualisation Interactive Tool for AFTCM (EVITA), developed by EUROCONTROL, allowed for improved decision-making and use of airspace by aircraft operators.

Following the eruption of the Grimsvötn volcano in Iceland on 21 May 2011, the EACCC was activated for the first time. Globally, during 2011, a cloud of ash from a volcano in Chile (Figure 6.10) disrupted air travel for several days in June and later in October, forcing the cancellation of flights in South America, Australia and New Zealand. A volcano in Eritrea also disrupted flights in East Africa in June.

The International Volcanic Ash Task Force (IVATF) met for a second time in July 2011[163] to review the progress of the various task groups that were formed a year previously; and determine which proposals and recommendations should go forward for further consideration and validation by already existing ICAO groups. The IVATF task groups deal with ATM, airworthiness, science and International Airways Volcano Watch coordination.

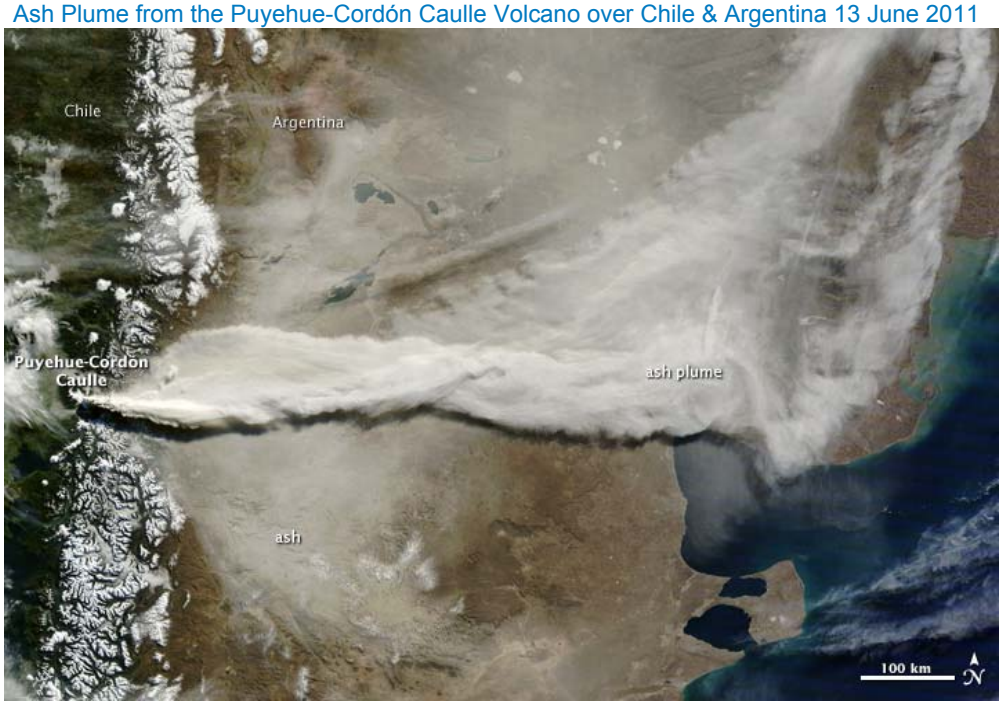
A newly formed Volcanic Ash Challenge Team (VACT) met in September 2011[164]. VACT has been tasked with identifying ways of simplifying and improving information flow on ash contamination. The following areas were discussed:

- volcano monitoring and communication links to the aviation community;
- satellite coverage, resolution and availability of data to Volcanic Ash Advisory Centres (VAACs);
- development of standardised information from VAACs to allow safe and efficient flight operations;
- simplified aeronautical information for each eruptive event;
- aircraft manufacturer information needed for operational decisions on flights during an eruptive event;
- assimilation of State/regional level scientific research into the operational environment.

[163] International Volcanic Ash Task Force (IVATF) Second Meeting, Montreal 11 to 15 July 2011

[164] Volcanic Ash Challenge Team, Synopsis of Discussions, 20 September 2011

Figure 6.10: Ash Plume from the Puyehue-Cordón Caulle Volcano over Chile & Argentina 13 June 2011




Source: NASA

In terms of institutional issues and noting the roles and responsibilities of the State of the Operator, the Provider State and the Air Operator as embedded in the ICAO Convention and its Annexes, the VACT endorsed the following principle as the basis for the further work of the IVATF:

*"Except in unique circumstances, airspace should be closed only for reasons of national security".*

In 2011, there has been good progress in the development of proposals to improve flight crew procedures in the event of ash encounters; and guidance on the susceptibility of airframes and engines to volcanic ash. EASA is supporting the IVATF in its activities by defining and standardising airworthiness data required for operational risk assessments. In September 2011, EASA published a Notice of Proposed Amendment (NPA)[165] proposing new obligations on manufacturers to identify any susceptibility of aircraft features to the effects of volcanic cloud contamination and to ensure that information necessary for safe operation is provided to operators.

In May 2011, EASA published a Safety Information Bulletin concerning flights in airspace with contamination of volcanic ash. This referred to the latest edition of the guidance material, now published[166], 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

[165] Notice of Proposed Amendment (NPA) No 2011-17, EASA, 22 September 2011

[166] Flight Safety and Volcanic Ash. Risk Management of Flight Operations with known or forecast Volcanic Cloud Contamination, ICAO Doc 9974, First Edition, 2012

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.

In December 2011, following consultation with stakeholders, EASA initiated a rule making task[167] to implement this guidance material into the European regulatory framework.

[167] Decision No 2011/014/R, 12 December 2011

# 7. The Internal Market & Competition Issues

## 7.1 Introduction

This section on the internal market and competition issues seeks to address the key developments concerning air service agreements, both comprehensive and horizontal, in Europe and other world regions such as Asia Pacific, Japan, the United States, Africa, Middle East and India.

The impact of the creation of a European Common Aviation Area (ECAA) on growth of services and increased competition in the Intra-ECAA market has also been examined.

The section moves on to consider competition issues in Europe, focussing on state aid, the Boeing versus Airbus subsidy-dispute, airline ownership and control, cartels and antitrust legislation, and public service obligation (PSO) provision.

## 7.2 Air Service Agreements with Non-EU Countries

A guiding principle behind EU aviation agreements has been to achieve deregulation and liberalisation. Within the EU itself, this is now considered to have reached its conclusion with few areas still to be tackled. The challenge for the EU is to now liberalise its international aviation links beyond its borders. 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 to conclude comprehensive agreements, relying on horizontal agreements where this has not yet proved possible.

### 7.2.1 Comprehensive Agreements

#### EU-Brazil

March 2011 heralded a significant breakthrough in negotiations when a comprehensive air transport service agreement between the EU and Brazil was initialled. Once signed and after a phase-in, the agreement will allow airlines from both sides to operate direct flights to any destination in the EU and Brazil from any international airport within the two areas, without restrictions on routes, prices or the number of weekly services.

#### EU-Moldova

Following a mandate to open discussions in June, the Republic of Moldova and the EU initialled a comprehensive air services agreement in October 2011, to open up and integrate the respective markets and to strengthen cooperation on matters such as safety and security. Moldova is expected to harmonise its legislation with European standards and implement EU aviation rules in areas such as aviation safety, security, environment, consumer protection, air traffic management, economic regulation, competition issues and social aspects. The agreement allows all EU airlines to operate direct flights to Moldova from anywhere in the EU and vice-versa for Moldovan carriers, and replaces the horizontal agreement between Moldova and EU Member States.

#### EU-Azerbaijan

Also in October 2011 the European Commission received the mandate to begin negotiations with Azerbaijan on a comprehensive air transport agreement, enabling Azerbaijan to adopt safety, security, air traffic management, environmental and consumer protection standards championed by the EU.

#### EU/US Open Skies

Following the signature of the Second Stage Agreement Protocol Amendment in June 2010[168], the EU/US Open Skies pact has seen little development other than the expansion to incorporate Norway and Iceland into the agreement, effective in June 2011. Under the deal, airlines in non-EU member states Norway and Iceland will be able to fly to the United States from anywhere in the EU27, rather than just from domestic airports. Similarly, EU carriers are permitted to operate on routes to the US from Oslo or Reykjavik.

### 7.2.2 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.

In March 2011, the EU and Cape Verde authorities signed an aviation agreement allowing any EU airline to operate services between Cape Verde and Member States where a bilateral agreement with Cape Verde exists, subject to traffic rights. The agreement means that the existing bilateral agreements between eight EU Member States and Cape Verde will now conform to European law.

In June 2011, the EU and Indonesia signed an agreement complementing existing bilateral agreements on aviation which Indonesia had earlier signed with 18 EU Member States: Austria, Belgium, Bulgaria, Czech, Denmark, Finland, France, Germany, Hungary, Italy, Luxembourg, the Netherlands, Poland, Romania, Spain, Sweden, the United Kingdom and Greece. The agreement will serve to restore the legal ground for bilateral agreements on certain aspects of air services, such as aviation safety, taxation requirements and compliance with regulations on competition issues. The agreement is expected to stimulate trade and passenger flows, increasing investment and the growth of tourism between the two parties.

In June 2011, the EU and Macao Special Administrative Region (SAR) initialled an agreement ensuring the compliance of 15 bilateral air services agreements between EU Member States and Macao SAR.

In October 2011, the EU and Sri Lanka initialled an aviation agreement aimed at restoring a sound legal basis for developing future aviation relations between Sri Lanka and EU Member States. The agreement ensures compliance with EU legislation of the 15 bilateral air services agreements between EU Member States and the Democratic Socialist Republic of Sri Lanka. Significantly, nationality restrictions in the agreements will be removed, thereby allowing any EU airline to operate flights between Sri Lanka and any EU Member State in which it is established.

These agreements represent an important step towards strengthening aviation relations and enhancing the overall cooperation between the EU and other nations.

[168] Protocol to Amend the Air Transport Agreement between the United States of America and the European Community and its Member States. 24 June 2010.

Currently, there are 47 such horizontal agreements with partner countries worldwide. More than 960 bilateral air services agreements have already been modified by the joint efforts of the European Commission and EU Member States to replace nationality rules with the principle of EU airline designation.

### 7.2.3 Impact of Creation of a European Common Aviation Area (ECAA)

In 2006 the European single aviation market was extended through the incorporation of ten states in an agreement between the parties. Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Iceland, former Yugoslav Republic of Macedonia,( FYROM), Norway, Romania, Serbia and Montenegro, plus Kosovo under UN Security Council Resolution 1244/99 joined the then 25 European Union member states in creating a European Common Aviation Area (ECAA)[169].

The purpose of the European single aviation market is to remove constraints to growth and stimulate competition, as well as to bring those 'outside' markets in line with EU aviation standards, including safety and security.

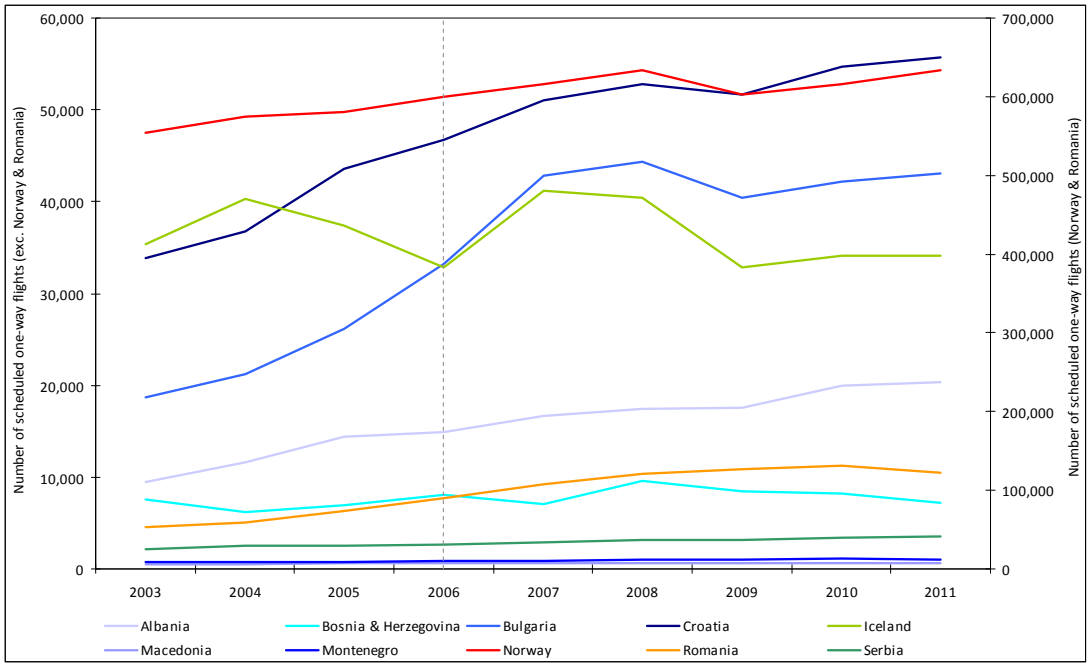
To the extent that this vision of increased traffic and competition has been realised, the following analyses derived using OAG schedules are intended to cast some light on the impact of air service liberalisation on the number of operations and carriers in the new ECAA markets (listed above).

#### Impact on growth of air services

Figure 7.1 and Table 7.1 show the historical number of intra-ECAA scheduled one-way flights for the post-2006 ECAA countries of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Iceland, FYROM, Norway, Romania, Serbia and Montenegro.

[169] Romania and Bulgaria subsequently acceded to the European Union in 2007

Figure 7.1: Number of Intra-ECAA annual scheduled one-way flights by country




Source: OAG

In each of the markets (and the overall total), the trend has been positive since 2006 – with the exception of Bosnia & Herzegovina (due to flag carrier BH Airlines halving its frequencies in 2011 versus 2010). It could be argued that the liberalisation of these aviation markets has helped provide growth in air services. However, it should be noted that while growth in each market post-2006 is positive (except Bosnia & Herzegovina), it has not exceeded levels experienced pre-2006. In any event, the fact that growth has been experienced in each of the expanded-ECAA markets should be seen as a positive development.

Table 7.1: Number of Intra-ECAA annual scheduled one-way flights by country

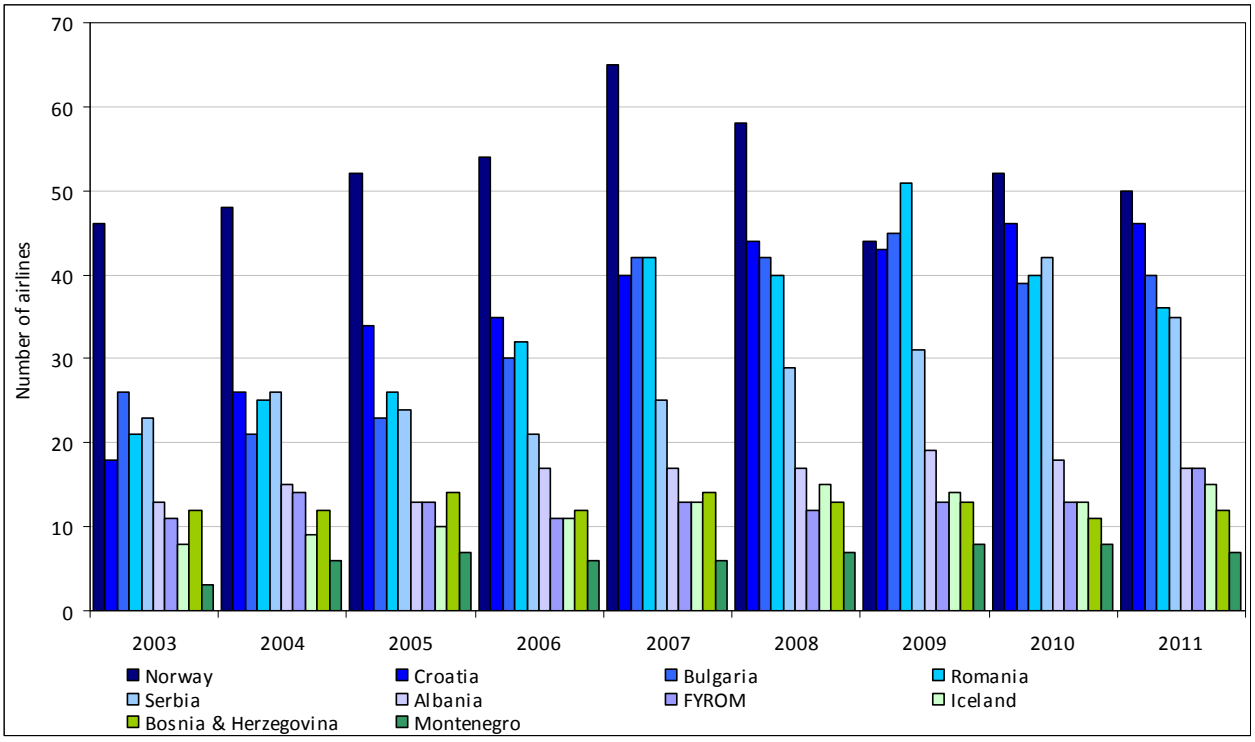
| ECAA Market | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | AAGR 2003-2006 | AAGR 2006-2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | 554.0 | 574.9 | 580.9 | 599.8 | 616.4 | 633.9 | 602.4 | 616.5 | 633.0 | 2.7% | 1.1% |
| Romania | 52.9 | 59.0 | 73.7 | 89.7 | 107.4 | 120.9 | 126.4 | 130.5 | 122.5 | 19.2% | 6.4% |
| Croatia | 33.9 | 36.8 | 43.5 | 46.7 | 51.1 | 52.9 | 51.7 | 54.6 | 55.6 | 11.3% | 3.6% |
| Bulgaria | 18.7 | 21.3 | 26.2 | 33.2 | 42.8 | 44.4 | 40.5 | 42.1 | 43.1 | 21.2% | 5.4% |
| Serbia | 24.8 | 28.9 | 29.8 | 31.6 | 33.9 | 37.0 | 36.2 | 40.4 | 41.6 | 8.5% | 5.6% |
| Iceland | 35.4 | 40.3 | 37.4 | 32.8 | 41.2 | 40.4 | 32.9 | 34.1 | 34.1 | -2.5% | 0.8% |
| Albania | 9.5 | 11.6 | 14.4 | 14.9 | 16.7 | 17.4 | 17.6 | 19.9 | 20.3 | 16.1% | 6.4% |
| Montenegro | 8.4 | 8.7 | 8.7 | 9.6 | 10.6 | 11.8 | 12.4 | 13.7 | 11.5 | 4.7% | 3.6% |
| FYROM | 6.2 | 6.0 | 6.8 | 7.0 | 7.0 | 7.3 | 7.0 | 6.8 | 7.5 | 4.1% | 1.6% |
| Bosnia & Herzegovina | 7.6 | 6.2 | 6.9 | 8.1 | 7.1 | 9.6 | 8.4 | 8.2 | 7.2 | 2.5% | -2.4% |
| Grand Total | 751.3 | 793.8 | 828.2 | 873.5 | 934.2 | 975.6 | 935.4 | 966.8 | 976.5 | 5.2% | 2.3% |

Source: OAG

## Impact on Level of Competition

In terms of the expanded single aviation market creating increased competition in the post-2006 ECAA markets, the number of airlines operating Intra-ECAA air services has been examined for the period 2003-2011 to observe the situation before and after ECAA expansion.

Figure 7.2: Number of Airlines Operating Intra-ECAA Air Services by Country




Source: OAG

In all of the markets studied – with the exception of Bosnia & Herzegovina – the number of air carriers operating Intra-ECAA services increased between 2003 and 2011, albeit at different levels. The greatest increase in the level of competition post-2006 was experienced in the markets of Serbia, Croatia and Bulgaria – each benefiting from a liberalised environment where airlines from ECAA member states are free to compete on existing routes or open up new ones.

Table 7.2: Number of airlines operating Intra-ECAA air services by country

| | | | | | | | | | | Number of additional airlines | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ECAA Market | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2003-2011 | 2006-2011 |
| Norway | 46 | 48 | 52 | 54 | 65 | 58 | 44 | 52 | 50 | 4 | -4 |
| Croatia | 18 | 26 | 34 | 35 | 40 | 44 | 43 | 46 | 46 | 28 | 11 |
| Bulgaria | 26 | 21 | 23 | 30 | 42 | 42 | 45 | 39 | 40 | 14 | 10 |
| Romania | 21 | 25 | 26 | 32 | 42 | 40 | 51 | 40 | 36 | 15 | 4 |
| Serbia | 23 | 26 | 24 | 21 | 25 | 29 | 31 | 42 | 35 | 12 | 14 |
| Albania | 13 | 15 | 13 | 17 | 17 | 17 | 19 | 18 | 17 | 4 | 0 |

| ECAA Market | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | Number of additional airlines 2003-2011 | Number of additional airlines 2006-2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FYROM | 11 | 14 | 13 | 11 | 13 | 12 | 13 | 13 | 17 | 6 | 6 |
| Iceland | 8 | 9 | 10 | 11 | 13 | 15 | 14 | 13 | 15 | 7 | 4 |
| Bosnia & Herzegovina | 12 | 12 | 14 | 12 | 14 | 13 | 13 | 11 | 12 | 0 | 0 |
| Montenegro | 3 | 6 | 7 | 6 | 6 | 7 | 8 | 8 | 7 | 4 | 1 |
| Grand Total | 181 | 202 | 216 | 229 | 277 | 277 | 281 | 282 | 275 | 94 | 46 |

Source: OAG

With this analysis of the impact of creating a European Common Aviation Area (ECAA), it is important to recognise that the economic backdrop – or landscape – in Europe since 2008 has not been conducive to a growing and prosperous air transport industry. Furthermore, the growth in air services and number of air carriers in ECAA markets examined above is very likely to have been adversely impacted by the financial and economic crises in many European nations.

## 7.3 Competition Issues

### 7.3.1 State Aid to Airlines & Airports

The EC acts to ensure that there is fair and open market competition throughout the EU Member States. At the same time, it recognises that the development of regional airports enhances the mobility of the general public and can provide an economic boost to the regions. The European Commission ensures a level playing field in the market by setting competition rules for State aid to airports and airlines.

In 1994, the European Commission adopted the first EU aviation guidelines on State aid, in the context of the liberalisation of the market for air transport services and in order to provide a level playing field for air carriers[170]. In 2000, the General Court (EGC) ruled that the operation of an airport is an economic activity subject to State aid rules[171]. As the construction of airport infrastructure and financing of equipment cannot be separated from the operation of the airport, the compatibility of State aid to airports for financing these investments was assessed by the Commission directly under the EC Treaty.

In 2005 the 1994 guidelines were clarified and strengthened by new guidelines on the public financing of airports and airlines under EU State aid law[172], compiling in particular the Commission's decision-making practice on the assessment of the investment aid to airports. In 2011, the General Court confirmed this

[170] Application of Articles 92 and 93 of the EC Treaty and Article 61 of the EEA Agreement to State aids in the aviation sector (94/C 350/07), 10 December 1994

[171] T-128/98 Aéroports de Paris vs. Commission of the European Communities, Judgement of the Court of First Instance, 12 December 2000

[172] Communication from the Commission: Community guidelines on financing of airports and start-up aid to airlines departing from regional airports (2005/C 312/01), 9 December 2005

long-standing practice by stating that the construction of airport infrastructure cannot be separated from the operation of an airport and is also considered an economic activity to be subject to State aid rules[173].

However, not all of the activities of an airport operator are necessarily of an economic nature. Certain economic activities carried out by airports can be considered by public authorities as constituting a service of general economic interest (SGEI). In this case, the authority imposes certain public service obligations on the airport operator in order to ensure that the general public interest is appropriately served. In such circumstances, the airport operator may be compensated by the relevant public authority for the additional costs derived from the obligation. In order to rule out State aid for public service compensation, the criteria as defined by the European Court of Justice (ECJ) in its 2003 Altmark judgement need to be fulfilled[174].

Likewise, airport activities such as en-route air traffic control, customs and police activity, security activity, (i.e. actions necessary against public threats, terrorist attacks etc.) are considered to fall under the public policy remit of an airport and are therefore not economic activities subject to State aid control.

In general, State aid is forbidden under EU law, but it can be approved in cases where it is unlikely to distort competition or affect trade “contrary to the common interest”. Since the entry into force of the 2005 guidelines, the Commission has adopted more than 60 decisions concerning the financing of airports, airlines and start-up aid for the financing of new routes.

The air transport market has evolved significantly in recent years. Low cost carriers have gained substantial market shares with new business models linked to regional airports; also the overall level of air freight has increased over the last decade. The EC recognises that a balance needs to be found between facilitating the development of regional airports in their formative years and open and fair competition between European airports.

In the context of changing market conditions, the Commission considered 2011 to be the right time to reflect on the previous application of the EU aviation guidelines from 1994 and 2005. To this end, the EC Directorate General for Competition carried out a public consultation between 7 April 2011 and 7 June 2011 to measure the impact the two sets of guidelines have had so far. The Commission aimed to collect comments from all stakeholders allowing it to determine whether the guidelines need to be revised and if so, to what extent.

The Commission received 89 replies from Member States, private citizens and various stakeholders of the aviation sector which have been published on the Commission's website[175].

The information provided by the stakeholders in the public consultation will be used for an impact assessment in order to assess the development of the aviation market. The EC will also consider the impact assessment and evaluation work of other Directorates General as submitted to the impact assessment steering group[176].

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[173] T-443/08 and T-455/08, Freistaat Sachsen, Mitteldeutsche Flughafen AG and Flughafen Leipzig/Halle GmbH, 24.March 2011

[174] C-280/00 Altmark Trans and Regierungspräsidium Magdeburg v Nahverkehrsgesellschaft Altmark, 24.July 2003

[175] Consultation on review of the Community guidelines on financing of airports and start-up aid to airlines departing from regional airports [http://ec.europa.eu/competition/consultations/2011_aviation_guidelines/index_en.html]

[176] Review of the Community Guidelines on financing of airports and Start-up aid to airlines departing from regional airports [http://ec.europa.eu/governance/impact/planned_ia/docs/2012_comp_009_state_aid_airports_airlines_en.pdf]

In terms of investigation of alleged State aid and enforcement of State aid rules with regard to airports and airlines, the following developments took place in 2011:

- The Commission is actively investigating over 40 cases in the aviation sector[177]. In 2011 the Commission adopted more than fifteen decisions concerning the financing of airports and their interaction with airlines, passenger tax schemes, social aid for benefit of European consumers and restructuring of airlines. The main decision notably concerned the opening of the procedure on the financing of Leipzig-Halle Airport[178], Marseille Airport and Frankfurt Hahn Airport[179].
- The Commission was faced with an increase in rescue and restructuring aid notifications in the aviation industry as a result of the financial and economic crisis. Even though former flag carriers in old Member States had undergone a restructuring process in the 1990s, former flag carriers in the new Member States were yet not restructured. The Commission initiated an in-depth investigation into the restructuring of Czech Airlines[180] and Malév Hungarian Airlines[181].
- On 13 July the Commission adopted two other decisions in the field of air transport, concerning passenger tax schemes in The Netherlands and the Republic of Ireland[182]. Both cases originated from complaints filed with the Commission by low cost carriers (LCCs). They raised the question to what extent Member States can design tax schemes as they wish.

### 7.3.2 Boeing vs. Airbus WTO Ruling

#### General Context

Since October 2004, the EU and U.S. have been contesting their Governments' respective support to their aerospace industries at the World Trade Organisation (WTO). Both WTO challenges relate to alleged WTO-incompatible support respectively to Airbus and Boeing over a twenty to thirty year period.

Prior to these WTO challenges, U.S. and EU government support to their aircraft producers had been regulated by the 'Bilateral EU-US Agreement on Trade in Large Civil Aircraft'. This agreement, concluded in 1992, allowed each party to provide a certain level of support to their respective aircraft industries.

In the case of the EU the agreement permitted the granting of 'Repayable Launch Investment' (RLI) to Airbus, i.e. loans repaid with interest under terms specified in the Agreement.

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[177] Speech Joaquím Almunia, Vice President of the European Commission responsible for Competition Policy: "An integrated approach to State aid", European State aid Law Institute Conference, 26 May 2011, SPEECH/11/385, page 5. For instance the Commission examined alleged aid in favour of the following airports and their relations with airlines (in particular Ryanair) Frankfurt-Hahn, Lübeck-Blankensee and Dortmund airports in Germany; Aarhus airport in Denmark; Tampere-Pirkkala airport in Finland; Alghero airport in Italy and Pau airport in France.

[178] State aid: Commission opens in-depth investigation into financing of infrastructure projects at German Leipzig/Halle airport, Commission press release of 15 June 2011, IP/11/706 [http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/706&type=HTML]; (this investigation concerns the financing of investments after 2006)

[179] State aid: Commission opens 3 in-depth state aid investigations in air transport in France, Germany and Ireland; clears Dutch air passenger tax, EC press release, 13 July 2011 [http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/874]

[180] Commission decision of 23 February 2011, State aid case SA.30908 (ex N 176/2010) – Czech Republic – CSA – Czech Airlines – Restructuring plan, OJ C 182, 23 June 2011, page 13.

[181] Commission decision of 21 December 2010, State aid case C 38/2010 – Hungary – Malév Hungarian airlines, OJ C 156, 26 May 2011, page 11. Following the final negative decision adopted in February 2012, Malév ceased trading and all operations.

[182] See press release IP/11/874 on 13 July 2011, see also decision published in OJEU C 306/10, 18 October 2011

In the case of the U.S. it allowed a certain level of government financed R&D support to the U.S. aerospace manufacturer, Boeing. In order to monitor compliance with the terms of the bilateral agreement, annual meetings and regular exchanges of information took place.

In October 2004 the United States quite unexpectedly and unilaterally announced its withdrawal from the 1992 Agreement and immediately filed a challenge at the WTO of all EU support ever granted to Airbus, even though the U.S. had previously agreed to this support.

In turn, the EU was left with little option other than to respond itself immediately with a parallel WTO challenge of U.S. Government support to its own aerospace industry (i.e. Boeing) by Federal, State and local authorities; including benefits to Boeing under the so-called U.S. Foreign Sales Corporation Scheme, which the U.S. Government had continued to provide to Boeing despite these subsidies having repeatedly been found to violate WTO rules.

These two parallel WTO challenges, the 'Airbus case' (DS 316: the U.S. challenge of EU support for Airbus) and the 'Boeing case' (DS 353: the EU challenge of U.S. support to Boeing), despite having been initiated on the same day (6 October 2004), have followed different timetables due to a number of delays at the WTO.

In the 'Airbus case', the WTO panel made its report public on 30 June 2010 followed by the Appellate Body (AB) report on 18 May 2011. The U.S. and EU agreed in February 2012 in Geneva on the next procedural steps in this WTO dispute. The EU has fully complied with its WTO obligations thanks to the comprehensive set of actions presented in December 2011.

In the 'Boeing case', the panel issued its final public report on 31 March 2011 followed by the Appellate Body report on 12 March 2012.

### The EU's Challenge of U.S. Subsidies to Boeing – 'The Boeing Case'

In its WTO challenge against the U.S., the EU has challenged various U.S. Federal, State and local subsidies benefiting Boeing, totalling as confirmed by the AB report USD $5-6 billion in WTO-inconsistent subsidies disbursed between 1989 and 2006. Subsidies to be granted after this date are estimated to be at least USD $3.1 billion.

**Details of the Boeing Case**

- NASA has provided Boeing with more than USD $2.6 billion in subsidies through eight NASA-funded federal research programmes through direct payments and free access to facilities, equipment and employees;
- The AB confirmed that the above programmes provided subsidies in the form of a direct transfer of funds or the provision of goods and services by NASA to Boeing for which no fee is payable and for which Boeing acquired the commercial intellectual property rights;
- The AB confirmed that the U.S. Department of Defence (DOD) under its Research Development, Test and Evaluation programmes has transferred to Boeing, at no cost, dual use technology worth up to USD $1.2 billion for direct use in Boeing's production of Large Civil Aircraft as well as free access to DOD's facilities;

- The AB clarified that the relationship between NASA and DOD on the one side, and Boeing on the other side was akin to that of a joint venture, with the essential feature that the fruits of the joint labour largely went to one partner, Boeing, which had provided none of the funding;
- Boeing continued to be eligible for USD $2.2 billion in Foreign Sales Corporation export subsidies, despite previous WTO rulings that these are prohibited subsidies under WTO law;
- The City of Wichita (Kansas) granted almost USD $500 million in the form of tax abatements on Industrial Revenue Bonds between 1989 and 2006;
- Washington State tax breaks to be granted for the period 2006-24 amount to a subsidy value of close to USD $3.1 billion;
- NASA and DOD research and development subsidies enabled Boeing to develop key technologies, without which it would not have been possible to launch the 787 'Dreamliner' in 2004;
- The above research subsidies gave Boeing a competitive advantage causing Airbus to lose sales campaigns, thus losing sales of the A330 and A350 models (i.e. in the 200-300 seat market) and threatening to lose its share of certain export markets. Even where it was able to make sales, it had to make them at reduced prices because of the presence of the subsidised 787 on the market; and
- The AB has also confirmed that the Washington tax subsidies and Foreign Sales Corporation subsidies, as well as the Wichita subsidies, enabled Boeing to beat Airbus to winning orders in the 'single aisle' 100-200 seat aircraft market (Boeing 737 vs. A320).

The most recent decision by the WTO means that the U.S. has six months to comply with the ruling and end subsidies to Boeing or face possible trade sanctions.

### The U.S. Challenge of EU Support to Airbus – 'The Airbus Case'

The Appellate Body overturned several key findings made by the Panel in favour of the EU. Most importantly, the Appellate Body found that support provided by Germany, Spain and the UK for the launch of Airbus' A380 aircraft is not a prohibited export subsidy under WTO Law. It also rejected the U.S. appeal that other instances of Repayable Launch Investment (RLI) were export subsidies.

#### Details of the Airbus Case

The Appellate Body report contains a number of clear findings – vindicating many of the EU's long held positions, including:

- Repayable Launch Investment (RLI) for the A380 granted by France, Germany, Spain and the UK is not a prohibited export subsidy;
- All R&D programmes in the EU (European, national and regional) are fully compatible with WTO rules, especially relevant when compared to the findings on NASA and Department of Defense support in the Boeing case;
- Treatment of infrastructure – the U.S. challenge on Aéroconstellation in France has been fully rejected, and the finding for the Mühlenberger Loch facility in Hamburg substantially improved;
- The French government's transfer of its interest in Dassault Aviation to Aerospatiale in 1998 was not a subsidy;

- The Appellate Body reduced the element of subsidy that may exist in RLI, giving greater weight to the EU's proposed benchmark. It also substantially reduced the impact of adverse effects findings made by the Panel, reflecting the limited damage to Boeing from Airbus subsidies; and
- The EU has fully complied with its WTO obligations thanks to the comprehensive set of actions presented in the December 2011 package.

Certain 'actionable subsidy' findings do remain, even though the economic impact of these support measures in the Large Civil Aircraft (LCA) market has been found to be very limited. RLI may contain an element of subsidy, however nowhere near the allegations of USD $15-20 billion that have been claimed. Certain old equity infusions and restructuring measures by France and Germany, infrastructure measures in Germany and certain regional grants by Spain and Germany also remain[183].

However, as with previous rulings throughout the course of this dispute, the latest development has been claimed as a victory by parties on both sides.

In a press release Boeing said that the Appellate Body's decision "confirms that in terms of amount, effect and nature, U.S. Government support to Boeing is minimal in comparison to the massive European subsidies provided Airbus." It noted that "the Appellate Body found that unaddressed subsidies to Boeing total approximately USD $3 billion – about one sixth of the USD $18 billion Europe has given to Airbus."[184]

Conversely, Airbus announced that the decision was a "sweeping loss for Boeing" and confirmed the existence of illegal U.S. subsidies – previously identified by the WTO as "at least USD $5.3 billion" – resulting in an estimated loss of approximately USD $45 billion in sales for Airbus. It said that Boeing will have to make major changes to comply with the final WTO ruling[185].

The WTO Appellate Body also recognised that the ruling may not end the dispute, stating, "We realise that, after more than five years of panel proceedings and eleven months of appellate review, a number of issues remain unresolved in this dispute."[186] Moving forward, high-level diplomatic talks might be the only way to end the confrontation.

### 7.3.3 Ownership & Control of Airlines

The EC permits foreign investment and ownership of EU airlines of up to 49%, as provided for by Article 4 (f) of Regulation No 1008/2008[187] where it states:

[183] All WTO text in this section: Background Fact Sheet, WTO Disputes, EU/US Large Civil Aircraft, 12 March 2012 [http://trade.ec.europa.eu/doclib/docs/2010/september/tradoc_146486.pdf]

[184] Boeing Statement Regarding the WTO Appellate Decision in DS 353, 12 March 2012 [http://boeing.mediaroom.com/index.php?s=43&item=2166]

[185] Sweeping Loss for Boeing in WTO Appeal, Airbus press release, 12 March 2012 [http://www.airbus.com/presscentre/pressreleases/press-release-detail/detail/sweeping-loss-for-boeing-in-wto-appeal/]

[186] Appellate Body issues report on Boeing dispute, World Trade Organization, 12 March 2012 [http://www.wto.org/english/news_e/news12_e/353abr_e.htm]

[187] Regulation (EC) No 1008/2008 of the European Parliament and of the Council on common rules for the operation of air services in the Comminity (Recast), 24 September 2008

> *"Member States and/or nationals of Member States own more than 50% of the undertaking and effectively control it, whether directly or indirectly through one or more intermediate undertakings, except as provided for in an agreement with a third country to which the Community is a party."*

The exception by agreement as provided for in Article 4 (f) is important as the EC seeks the eventual goal of relaxing ownership restrictions to allow foreign ownership and effective control, in a reciprocal manner, to remove the remaining market barriers and to allow airlines` access to global capital. This is particularly relevant in the case of on-going bilateral talks with the United States.

### Ownership & Control in the United States

The Federal Aviation Act of 1958 replaced the Civil Aeronautics Act of 1938 and is still in effect today. Although altering many airline regulations and creating the Federal Aviation Administration (FAA), the Act maintained the required voting interest of a U.S. citizen in an airline at 75%, but modified the provisions by requiring air carriers to obtain a 'Certificate of Public Convenience and Necessity'. The requirement that an air carrier obtain this certificate of public convenience and necessity, also known as the 'fitness' requirement, is the vehicle the DOT uses to require a review of air carriers and determine if foreign ownership and control levels are in violation of statutory limits.

A U.S. citizen is defined as:

- An individual U.S. citizen
- A partnership each of whose partners are U.S. citizens
- A corporation or association organised under the laws of the U.S. where the president and at least two-thirds of the board of directors and other managing officers are U.S. citizens; and at least 75% of the voting interest is owned or controlled by U.S. citizens

In order to pass the fitness review and obtain a certificate of public convenience and necessity, an airline must meet the citizenship requirements stated above[188].

### Progress under EU-U.S. Air Transport Agreement

The second stage of the EU-U.S. Air Transport Agreement (known as Open Skies) signed on 24 June 2010[189], strongly incentivises a change in U.S. law in order to enable investors from each side to take full ownership and control of the other's airlines. In May 2009 the U.S. House of Representatives approved the FAA Reauthorisation Act of 2009 which introduced a restrictive interpretation of what constitutes a U.S. citizen:

> *"An air carrier shall not be deemed to be under the actual control of citizens of the United States unless citizens of the United States control all matters pertaining to the business and structure of*

[188] Air Cargo Foreign Ownership Restrictions in the United States, University of Miami School of Law, [http://www.tiaca.org/images/tiaca/PDF/Air%20Cargo%20Foreign%20Ownership%20Restrictions%20in%20the%20United%20State.pdf]

[189] International aviation: United States, EC Mobility & Transport [http://ec.europa.eu/transport/air/international_aviation/country_index/united_states_en.htm]

*the air carrier, including operational matters such as marketing, branding, fleet composition, route selection, pricing and labor [sic] relations."*

Contrary to the provisions in the House Bill, the Senate Bill as approved by the Committee did not contain this restrictive language on ownership and control of U.S. airlines[190]. The 2010 agreement included a commitment to engage in a process towards the reform of ownership and control; the incentives contributing towards this eventual goal are:

- When the United States changes its legislation to allow EU investors majority ownership of U.S. airlines, the EU will reciprocally allow majority ownership of EU airlines by U.S. investors
- U.S. airlines will benefit from additional market access rights to and from the EU

Progress towards this outcome will be reviewed regularly[191]. In June 2010 MEPs asked the Commission to commence third stage negotiations with the U.S. on Open Skies with the aim of concluding the remaining outstanding issues, including foreign ownership, by December 2013[192].

**EU-Canada**

A comprehensive aviation agreement between the EU and Canada commenced in November 2008 and was further endorsed at an EU-Canadian summit in May 2009; then signed in December 2009. The European Parliament gave its final consent to the agreement in March 2011. This Agreement can fairly be described as the most ambitious air transport agreement between the EU and a major world partner. Amongst many other things, the agreement provides for investment opportunities and provisions for a phased opening up of the market linked to the grant of greater investor rights.

Phase one applies where the foreign ownership of airlines is limited to 25%, as was the case when the negotiations on the agreement were completed. Phase two starts when Canada has taken the steps necessary to enable European investors to own up to 49% of a Canadian carriers' voting equity. Phase three begins once both sides enable investors to set up and control new airlines in each others' markets. It is more ambitious and specific agreement than the EU-U.S. Agreement with regard to traffic rights, ownership and control[193].

### 7.3.4 Cartels & Antitrust Legislation

Antitrust regulations issued by the Commission specific to air transport have been gradually repealed over the years and no such regulation is in force today. General antitrust regulations are however applicable. Current pieces of legislation in place are Council Regulation 1/2003[194], which applies to all air transport

[190] Aviation: ownership restrictions and foreign repair stations, EU Market Access Database [http://madb.europa.eu/madb_barriers/barriers_details.htm?barrier_id=990028&version=7]

[191] Breakthrough in EU–US second-stage Open Skies negotiations: Vice-President Kallas welcomes draft agreement, EU press release, 25 March 2010 [http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/371]

[192] EU-US Open Skies: MEPs call for open markets and better passenger data protection, European Parliament, 17 June 2010 [http://www.europarl.europa.eu/sides/getDoc.do?language=en&type=IM-PRESS&reference=20100616IPR76229]

[193] Airline ownership restrictions, Mayer Brown, April 2011 [http://www.mayerbrown.com/publications/article.asp?id=10844&nid=6]

[194] Council Regulation (EC) No 1/2003 on the implementation of rules on competition laid down in Articles 81 and 82 of the Treaty, 16 December 2002

services, including on routes between the EU and third countries. The latter was achieved through the adoption of Council Regulation 411/2004[195].

General notices and communications on antitrust are also applicable, but there are currently no notices or communications specific to antitrust in the air transport sector[196].

In 2011 there were no cases brought by the Commission concerning cartels in the airline sector; the last such case dates to November 2010 when it fined eleven air cargo carriers a total of €799 million for operating a worldwide cartel over a six year period which affected cargo services within the European Economic Area (EEA)[197].

From March 2008 EC officials carried out unannounced inspections at the premises of a number of international air carriers. The carriers provided scheduled passenger air transport services on long-haul routes between Europe and a third country and the Commission had reason to believe that the companies concerned may have violated EC Treaty rules on restrictive business practices under Article 81 (now Article 101 of TFEU)[198]. This investigation was administratively closed in November 2011 without finding[199].

In December 2011 EC officials entered the premises of Brussels Airlines and TAP Portugal in Belgium and Portugal as part of its investigation to verify whether the carriers' codeshare agreements were in breach of antitrust rules. The Commission was concerned about possible effects the agreements may have had on consumers, as well as having reasons to suspect illegal collusion between the airlines; in respect of the Brussels to Lisbon route where the airlines are the only operators. The Commission has also opened a similar probe into the codeshare practices between Lufthansa and Turkish Airlines on routes from Germany to Turkey[200].

In 2009 and 2010 several members of the SkyTeam® airline alliance (Air France-KLM, Alitalia and Delta) signed agreements establishing a transatlantic joint venture focusing on the routes between Europe and North America. Under these agreements, the airlines fully coordinate their transatlantic operations with respect to capacity, schedules, pricing and revenue management. They also share profits and losses of their transatlantic flights. The EC has opened an investigation to assess whether the joint venture breaches EU antitrust rules. The Commission is currently investigating whether the partnership may harm passengers on certain EU-U.S. routes where, in the absence of the joint venture, the airlines would be providing competing services. This could be in breach of Article 101 of the Treaty on the Functioning of the EU (TFEU) which prohibits anticompetitive agreements. The new investigation is coherent with the

[195] Council Regulation (EC) No 411/2004 repealing Regulation (EEC) No 3975/87 and amending Regulations (EEC) No 3976/87 and (EC) No 1/2003, in connection with air transport between the Community and third countries, 26 February 2004

[196] European Commission, Legislation > Air Transport > Antitrust [http://ec.europa.eu/competition/sectors/transport/legislation_air.html]

[197] Antitrust: Commission fines 11 air cargo carriers €799 million in price fixing cartel, EU press release, 9 November 2010 [http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/1487]

[198] Antitrust: Commission carries out inspections in the international airline passenger sector, EU press release, 11 March 2008 [http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/158&format=HTML&aged=0&language=EN&guiLanguage=en]

[199] 39419 International airline passenger services, DG COMP, 10 November 2011 [http://ec.europa.eu/competition/antitrust/cases/dec_docs/39419/39419_1968_4.pdf]

[200] EU competition authorities raid Brussels Airlines, TAP Portugal offices, ATW Online, 20 December 2011 [http://atwonline.com/international-aviation-regulation/news/eu-competition-authorities-raid-brussels-airlines-tap-portuga]

Commission's recent enforcement action in relation to the transatlantic joint ventures of the two other airline alliances, **one**world® and Star Alliance™[201].

### Competition Law & EU ETS

Following the extension of the EU Emissions Trading Scheme (EU ETS) to airlines operating flights to and from countries in the EU, a number of airlines have announced new passenger surcharges. The issue of surcharges in relation to the EU ETS may provoke a response from the Commission for the following reasons[202]:

1. The Commission expects the cost of complying with the ETS to become one of the parameters of competition between airlines, harnessing competitive forces to drive further reductions in $CO_2$ emissions by aircraft flying to and from the EU. If clusters of airlines are perceived instead to be passing the costs of compliance on to consumers, that may be seen as an attempt to undermine the potential for $CO_2$ emissions to be reduced through a competitive process.
2. Recently announced surcharges have been reported as being in excess of the actual cost of complying with the EU ETS. That will be disputed by the airline industry for whom the EU ETS represents a significant added financial burden. However, there is a possibility of the Commission examining potentially anti-competitive behaviour if the impression is created that surcharging is providing airlines with a windfall from consumers.
3. The introduction of surcharges at the same time and at similar levels could be viewed as being consistent with an agreement between airlines possibly amounting to an infringement of competition rules, along similar lines to previous surcharges cases.

## 7.3.5 Public Service Obligation Provision

In order to maintain appropriate scheduled air services on routes which are vital for the economic development of the region they serve, EU Member States may impose public service obligations (PSOs) on these routes. They must respect the conditions and the requirements set out in Article 16 of the Air Services Regulation 1008/2008[203].

Article 16 states that routes between airports in the EU serving a peripheral or development region or on any 'thin routes' qualifying for a PSO, has obligations imposed only to the extent necessary to ensure fixed standards of continuity, regularity, pricing or minimum capacity; which air carriers would not assume if they were solely considering their commercial interests. These standards must be set in transparent and non-discriminatory way.

[201] Antitrust: Commission opens a probe into transatlantic joint venture between Air France-KLM, Alitalia and Delta and closes proceedings against eight members of SkyTeam airline alliance, EU press release, 27 January 2012 [http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/79&type=HTML]

[202] The EU ETS: airline surcharges and antitrust law - a case of déjà vu? Holman Fenwick Willan, January 2012 [http://www.hfw.com/home/airline-surcharges]

[203] 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

In the case that no air carrier is interested in operating the route on which the obligations have been imposed, the Member State concerned may restrict the access to the route to a single air carrier and compensate its operational losses resulting from the PSO. The selection of the operator must be made by public tender at EU level[204].

Table 7.3 shows those countries within the EU currently operating PSO routes and the number of routes within each State (last updated 1 December 2010 and covering the period until 31 May 2015)[205].

Table 7.3: Quantity of PSO Routes in the EU

| Country | No. of PSO Routes |
|---|---|
| France | 57 |
| Norway | 42 |
| Italy | 40 |
| Portugal | 28 |
| Greece | 27 |
| United Kingdom | 21 |
| Spain | 17 |
| Sweden | 12 |
| Iceland | 7 |
| Ireland | 7 |
| Czech Republic | 3 |
| Finland | 3 |
| Germany | 3 |

Source: European Commission

PSO routes are either designated 'O' for open access to all air carriers fulfilling the PSO, or 'R' for restricted access where an exclusive concession has been granted following a call for tender as provided for in Article 16. In the case of an unsuccessful call for tenders or if an air carrier accepts to serve the route without compensation, access to the route remains open. At the end of the concession period (a maximum of four years, or five for the regions), access to the route becomes open again except if a new call for tenders has been launched.

Where such routes are only commercially viable with compensation gained from an exclusive concession, once this funding is withdrawn at the end of the concession period then the air carrier will also usually withdraw from the route if it cannot make a profit. This was the case for example with Irish carrier Aer Arann, which operated restricted access PSO routes from Dublin to Sligo, Knock and Galway; from July 2008 until the end of the PSO period July 2011. It announced in April 2011 that it would stop operating these routes once funding was withdrawn as "the routes would no longer be financially viable."[206]

As a comparison, low cost carrier Ryanair also operated a restricted access route for the same concession period (to July 2011) from Dublin to Kerry; it no longer serves this route.

[204] European Commission, Public Service Obligations (PSOs) [http://ec.europa.eu/transport/air/internal_market/pso_en.htm]

[205] http://ec.europa.eu/transport/air/internal_market/doc/2009_12_pso-eu_and_eea.pdf

[206] Aer Arann to cut "unviable" routes, ABTN, 12 April 2011 [http://www.abtn.co.uk/news/1215643-aer-arann-cut-unviable-routes]

### Changes to Schengen

Under present conditions, PSO routes may not cross national borders and must be operated domestically. In September 2011 the Commission recognised that the Schengen Agreement, whilst creating an effective system for mobility and access throughout the EU due to fewer restrictions on border controls, was at the same time inadequate in terms of monitoring and evaluation[207]. It indicated that it would produce proposals to strengthen its efficacy and legitimacy[208].

The resulting Communication from the Commission[209] was in response to the European Council calling for a mechanism in June 2011[210] to be "introduced in order to respond to exceptional circumstances putting the overall functioning of Schengen cooperation at risk, without jeopardising the principle of free movement of persons."

While the intention of new proposals are primarily aimed at ensuring that EU citizens are able to enjoy the right of freedom of movement and to travel freely in a safe, border-free Europe; and such new border control measures will address management and governance of the system and dealing with 'exceptional circumstances', there is potentially some scope within the ongoing dialogue and eventual legislative instruments to extend these measures to PSO routes to allow them to be operated across the borders of Member States.

### The Situation in the United States[211]

The Airline Deregulation Act of 1978 gave U.S. airlines almost total freedom to determine which domestic markets to serve and what airfares to charge. This raised the concern that communities with relatively low passenger levels would lose service as carriers shifted their operations to serve larger and often more profitable markets.

To address this concern, Congress added section 419 to the Federal Aviation Act, which established the Essential Air Service (EAS) programme to ensure that smaller communities would retain a link to the national air transport system. The purpose of the EAS programme is to provide a continuation of service to those small communities that were served by certified air carriers before deregulation, with subsidies if necessary.

The EAS programme is now administered by the Department of Transportation (DOT), which determines the minimum level of service required at each eligible community by specifying:

- a hub through which the community is linked to the national network;
- a minimum number of round trips and available seats that must be provided to that hub;

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[207] 'Strengthening Schengen', [http://blogs.ec.europa.eu/malmstrom/strengthening-schengen/]

[208] Schengen governance: press conference, 16 September 2011 [http://europa.eu/eucalendar/event/id/247086-schengen-governance-press-conference/mode/standalone]

[209] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Schengen governance - strengthening the area without internal border control, COM(2001) 561 final, 16 September 2011

[210] EUCO 23/11 of 24.06.2011

[211] Essential Air Service: Frequently Asked Questions, Congressional Research Service, 3 March 2011 [http://assets.opencrs.com/rpts/R41666_20110303.pdf]

- certain characteristics of the aircraft to be used; and
- the maximum permissible number of intermediate stops to the hub.

Where necessary DOT provides federal subsidies to a carrier to ensure that the specified level of service is provided. The EAS programme is funded through annual transfers of FAA overflight fees, supplemented by annual appropriations of varying size. In FY2010, the total EAS authorisation was USD $200 million. This amount includes USD $50 million in annual mandatory funding from FAA, with a discretionary appropriation of USD $150 million.

Over the years, Congress and DOT have worked to streamline the programme and make it more efficient, mostly by eliminating subsidy support from communities within a reasonable driving distance from a major hub airport. Communities are excluded from eligibility for subsidies if:

- they are located fewer than 70 miles from the nearest large or medium hub airport; or
- they require a rate of subsidy per passenger in excess of USD $200, unless the community is more than 210 miles from the nearest hub airport.

DOT currently subsidises air services to approximately 150 rural communities across the United States which otherwise would not receive any scheduled air service. In general terms, DOT subsidises two to four round trips with small aircraft per day from an EAS community to a major hub airport.

### U.S. Legislative Changes

The current legislative period of Congress (ending January 2013) continued to work on legislation concerning EAS during 2011.

The FAA reauthorisation bill (H.R. 658) intended to completely phase out the programme over three years, ending EAS in the contiguous states on 30 September 2013. Only Alaska and Hawaii would be eligible for EAS subsidies afterwards. The bill was introduced on 11 February 2011 and became public law on 17 February 2012 (finally named the FAA Modernisation and Reform Act of 2012). It now eliminates federal subsidies to some small airports and prohibits new communities from joining the programme[212].

The bill passed by the Senate on 17 February 2011 (S. 223 FAA Air Transportation Modernization and Safety Improvement Act) intends to extend the programme but add more restrictions. Specifically, it would limit EAS subsidies to airports that are 90 miles or more from the nearest medium or large hub, an increase from the current limit of 70 miles. It would also limit EAS subsidies to locations that have ten or more enplanements per day, except in Alaska. However, the FAA administrator would be able to waive both the distance and the minimum enplanements requirement. While this bill has been passed by the Senate, it has yet to be voted on in the House.

[212] FAA Modernization and Reform Act, Transportation and Infrastructure Committee, 14 February 2012 [http://republicans.transportation.house.gov/singlepages.aspx/908]

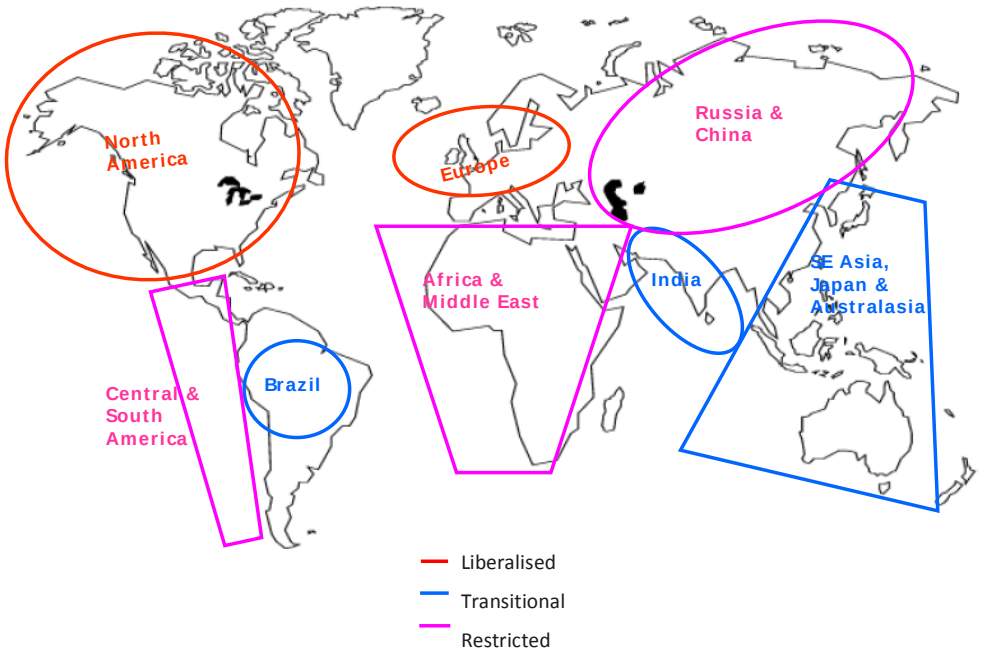
## 7.4 International Developments (outside of the EU)

### 7.4.1 Open Skies Developments

The theory of introducing open skies is that the removal of market entry and operational restrictions and consequent liberalisation it brings will, in most cases, lead to an increase in air services, including networks, routes, frequency, schedules products, prices and innovation. This in turn will lead to an increased opportunity to travel stimulated by the new opportunities. The results are an accelerated growth in air traffic that stimulates growth in the economy, economic activity and increased employment.

Figure 7.3 shows the progress that has been made to date towards the implementation of Open Skies agreements across the world.

Figure 7.3: Global Progress on Implementation of Open Skies Agreements




Source: Mott MacDonald

The following subsections look at the state of play with Open Skies, and 2011 developments, in six of these areas: the ASEAN countries, Japan, the United States, the Middle East, Africa and India.

#### 7.4.1.1 ASEAN[213] Open Skies

In December 2011, the ASEAN Transport Ministers, at their 17th meeting, welcomed the entry into force of the ASEAN Multilateral Agreement on the Full Liberalisation of Passenger Air Services (MAFLPAS) and its two Protocols signed on 12 November 2010. The MAFLPAS together with the RIATS (Roadmap for Integration of Air Travel Sector) Agreements – Multilateral Agreement on Air Services and Multilateral Agreement on the Full Liberalisation of Air Freight Services allows designated airlines of a Member State to provide air services from any city with international airport in its territory to any city with international airport in the territory of the other Member States and vice-versa with full third (3rd), fourth (4th), and fifth (5th) freedom traffic rights.

At the 17th meeting, the Ministers issued the Declaration on the Adoption of the Implementation Framework of the ASEAN Single Aviation Market (ASAM). The Implementation Framework is a significant undertaking that will guide the key work of ASEAN in the aviation sector over the next four years and beyond 2015. The implementation of ASAM would include areas such as air services liberalisation, the alignment of aviation safety and security standards and practices, and the harmonisation of air traffic management in support of the ASAM.

The ASAM provides a roadmap of activities to 2020 and beyond, grouped under economic and technical elements as follows:

##### Economic Elements

- charters;
- airline ownership and control;
- tariffs;
- commercial activities;
- competition law and policy/state aid;
- consumer protection;
- airport user charges;
- dispute resolution; and
- dialogue partner engagement.

##### Technical Elements

- aviation safety;
- aviation security; and
- air traffic management.

At the meeting, the Ministers also signed the Protocol to Implement the Seventh Package of Commitments on Air Transport Services under the ASEAN Framework Agreement on Services. This protocol covers limitations on market access and national treatments in the following sectors:

[213] The Governments of Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, Lao People's Democratic Republic (Lao PDR), Malaysia, the Republic of the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Kingdom of Thailand and the Socialist Republic of Viet Nam

- Aircraft Repair and Maintenance Services
- Selling and Marketing of Air Transport Services
- Computer Reservation System Services
- Aircraft Leasing with and without Crew
- Airfreight Forwarding Services
- Aircraft Catering Services

In November 2010, the ASEAN Member States agreed through a Memorandum of Understanding that they would approve and ratify ASEAN-wide air service agreements and implementing protocols before individually approving and ratifying corresponding agreements and protocols with Dialogue Partners[214].

In 2010, the **ASEAN** Members States as a whole had reached an air services agreement with **China**. The landmark deal allows unlimited third and fourth freedoms between China and ASEAN nations that have ratified the accord. So far[215] these are Singapore, Malaysia, Thailand and Vietnam. This means that Air Asia, for example, can now offer unlimited capacity from Malaysia to anywhere in China, subject to slot restrictions.

Six ASEAN nations have yet to ratify the agreement and continue to be bound by existing bilaterals. Once fully ratified, each ASEAN carrier will still only be able to carry traffic between China and its own country whereas Chinese carriers will be able to fly between any domestic point and any ASEAN point, a market of 2 billion passengers. This is in an unavoidable result of any air services agreement that only grants third and fourth freedoms between a group of smaller states and a single bigger state.

**ASEAN** Member States are also looking to conclude an Air Transport Agreement with **South Korea** and are supporting **Japan**'s policy to further expand its "Open Skies" with ASEAN Member States.

#### 7.4.1.2 Japan

In October 2010, Japan signed an open skies accord with the **United States** as part of a government push to liberalise aviation markets, with Haneda unveiling a new international terminal to help meet demand.

In September 2011, **Australia** and Japan signed an open skies aviation agreement that will allow Australian carriers to fly into smaller Japanese airports. The deal allows unlimited flights between the two countries, including to Tokyo's Haneda airport, and lifts capacity restrictions at Tokyo's larger Narita Airport from 2013. It also makes it possible for Australian airlines to fly beyond Japan to third countries including key markets such as China and Europe. More than one million people fly between Australia and Japan each year and passenger numbers are forecast to grow by 25 percent by 2020.

At the same time, Qantas announced plans to set up a low-cost airline partnership in Japan. Qantas, Japan Airlines and Mitsubishi are to launch a new domestic airline, Jetstar Japan, as part of the Australian carrier's wide-ranging overhaul to improve profitability. Australia's Jetstar, a low-cost Qantas subsidiary, was the first no-frills carrier to begin services in Japan, flying into Kansai International Airport in 2008.

[214] Australia, Canada, China, EU, India, Japan, New Zealand, Republic of South Korea, Russia and the United States.
[215] Airline Business March 2012

Jetstar Japan, in which Qantas, JAL and Mitsubishi would each hold one-third share, will launch in summer 2012 with an initial fleet of three new Airbus A320 aircraft.

Also in September 2011, Japan and **Canada** reached an Open Skies agreement, due to come into effect by 2013. Canadian carriers will have unlimited 5th freedom rights beyond Japan but with some restrictions on Tokyo airports, while Japanese carriers will have unlimited 5th freedom rights beyond Canada. Restrictions for services to/from Tokyo Narita will be removed by summer 2013.

In November 2011, Japan signed an open skies accord with **Taiwan**. The agreement allows an unlimited number of Taiwan and Japanese carriers to operate scheduled flights between the two countries and an unlimited number of flights between Taiwan and Japanese destinations outside of Tokyo, the Japanese capital. The agreement includes 5$^{th}$ freedom rights, allowing both Taiwan and Japanese airlines to carry passengers from either country to a second country and from that country to a third country, and so on. The agreement also lifts all restrictions on the number of carriers operating non-scheduled chartered flights, whether they carry passengers or freight, as well as the restrictions on the number of such flights between the two countries.

In January 2012, as a result of bilateral civil aviation talks, **Japan** and the **UK** agreed to add Tokyo Narita International Airport, the country's largest international gateway, to their open skies agreement. The addition of Tokyo Narita will take effect in summer 2013, when the combined number of departures and arrivals at the airport is to be raised to 270,000 a year.

These agreements are part of the Japanese effort to revive its tourist industry after a sharp decline in the number of foreign visitors in the aftermath of its earthquakes and tsunamis in March 2011.

#### 7.4.1.3 USA

The United States has more than a hundred Open Skies accords with foreign governments and continues to pursue additional agreements.

In December 2010, **Brazil** became the 101st open skies partner with the US. The framework will progressively and significantly liberalise air services between the two countries by October 2015. The agreement expands a 2008 document that increased services between the countries. Until the agreement was signed, Brazil was one of the five economies in South America without an open skies agreement with the US. The Brazil agreement is important as the country is a key and high-potential market given its emergence on the world stage and its growing middle class.

In April 2011, the US and **Saudi Arabia** signed an open skies agreement that according to the US State Department would strengthen and expand the already strong trade and tourism links with Saudi Arabia, and will benefit American and Saudi Arabian businesses and travellers.

The US continues to pursue an open skies deal with **China**. The two sides had last met in June 2010. Further talks were resumed in 2011 as part of the continuing efforts to lift restrictions on passenger and cargo flights between the countries stemming from a 1980 accord. The US China deal has been amended three times since 1980, each allowing more flights between the countries.

There are also ongoing efforts to conclude pacts with Mexico, Russia, South Africa and the Dominican Republic.

#### 7.4.1.4 The Middle East

Gulf Co-Operation Council (GCC) open skies has been a topic of discussion and study for many years, but implementation has been slowed by a lack of economic and political integration in the bloc, along with generally protectionist flag carrier attitudes[216]. In early 2010, GACA announced regional governments, civil aviation authorities and military/security organs were all working toward open skies in the GCC. Despite the proclamations, there have been few tangible outcomes.

However in 2011, Saudi authorities have announced they are seriously considering a move to allow other carriers from within the GCC access to operate services in the Kingdom's domestic market. This may provide the catalyst for greater liberalisation of air services in the Middle East.

Saudi Arabia has invested heavily in its aviation infrastructure in recent years, particularly its airports. It has earmarked another USD12.5bn for airport infrastructure investment by 2020, including more than USD5 billion on smaller domestic airports. The country, which has the only large domestic aviation market in the GCC, requires a strong commercial aviation market to support its development objectives.

If opening the domestic market to foreign carriers were to occur, it would transform Saudi Arabia's aviation landscape, but there could also be a broader effect in the Gulf and potentially the Middle East as a whole. Basic regulations would be needed for foreign carriers operating in the domestic market, but if Saudi Arabia were to go ahead with its liberalisation proposal, the move need not be entirely one-sided. In exchange for granting GCC carriers access to its domestic market, Saudi Arabia could ask for reciprocal rights, helping bring down regulatory barriers.

This could provide just the commercial and regulatory precedent required to get the long-talked about GCC open skies process properly underway. Liberalisation of this scale could trigger a new wave of growth in the intra-Middle East market.

Unlike the European Union, the GCC's structure puts responsibility for integration in the hands of national governments, rather than EU-style supranational institutions that can act independently to drive change. While there has been some progress on bringing the GCC together, including the 2008 introduction of a common market, major steps such as the proposed introduction of a unified currency have proved to be stumbling blocks rather than milestones.

In 2004, 13 Arab nations signed the Damascus Convention. The stated aim of the agreement is to liberalise air traffic between Arab countries in the Middle East and North Africa. Notably, Saudi Arabia is not a signatory, and neither are several other important aviation players in the region, including Qatar and Kuwait.

There are approximately 20 agreements on creating open skies between a handful of Arab countries. In the Middle East, only Kuwait, the UAE, Bahrain, Oman and Lebanon have adopted formal open skies policies.

The current web of bilateral air services agreements thus continues to impose limits on growth in the region. Restrictions on market access, seat capacity, frequencies, aircraft types and limitations in other operational areas inhibit the growth potential for the air transport sector across the Middle East and North

[216] Airline Leader, December 2011

Africa. The 13 Damascus Convention signatories alone have combined populations of just over 235 million, spread across 5.3 million sq km (more than 1 million sq km larger than the land area of the European Union).

Across the region, marked differences in national aviation strategy and approaches to aviation liberalisation exist, both in terms of market access and airline ownership and control. Variations in economic and aviation regulations and standards and government approaches to commercial airline ownership have all slowed progress towards liberalisation.

#### 7.4.1.5 Africa

Despite Africa's size and population, it accounts for only 2 percent of the world air transport industry. Annual passenger numbers are estimated at 40 million, only one eighth of the world total, although there are about 300 registered airlines in the continent, directly employing about 500 000 people.

The Yamoussoukro decision was endorsed by the African Heads of State in 1999 in the capital city of the Cote d'Ivoire but has faced a number of challenges in the years since then. Its primary objective is to pool resources among African Airlines with a view to enhancing operations of air services by African airlines through:

- Multi-designation of air carriers;
- Deregulation of frequencies;
- Deregulation of capacity and tariffs; and
- Removal of restrictions on traffic rights (Freedoms of the air) including 5thFreedom.

Although most countries have signed the Yamassoukro Agreement to open their borders to competition from other African airlines, only a few have done so. Local demand for air travel is low and most airlines are at least partly state-owned, with no competition. On intercontinental routes, African airlines on average are responsible for 40% capacity compared to 60% provided by other operators. On Europe and Middle Eastern routes, the imbalance is further skewed with African carriers only accounting for about 30% of the capacity. As a result, many African airlines run at a loss, incurring large debts.

Africa is a continent undergoing significant change and in order not to lose out on growing opportunities for tourism, trade and investment, more of its countries need to abandon their protectionism of loss-making national airlines and allow others to compete, but this will be a painful process for some.

In July 2011, speaking at the Connectivity in Africa conference organised by Embraer in Nairobi, the secretary general of the African Airlines Association (AFRAA) re-iterated his belief[217] that African governments and airlines need to stop holding back the growth of the air transport industry on the continent by imposing higher than global average taxation and impeding liberalisation. Frustrated by the protectionist approach of some members and their governments, AFRAA is now working with and lobbying for the so-called CREW, "Club of the Ready and Willing states," to move on with liberalisation on a more regional scale and "show the protectionist countries the benefits of opening up the market."

[217] ATW online, July 25 2011

#### 7.4.1.6 India

In March 2011 it was reported that **India** and **Brazil** signed a new bilateral air services agreement to increase connectivity between the two nations. Under the terms of the agreement, both the countries will be entitled to designate any number of airlines to operate to any point in each other's territory, via any intermediate point and beyond to any point.

The designated airlines will be entitled to operate 21 services per week in each direction with any type of aircraft not exceeding the capacity of Boeing 747 aircraft. It is reported that the capacity and frequency is subject to agreement by both countries, and the designated airlines may enter into cooperative marketing arrangements, such as codeshare, block space or any other joint venture agreement. They will also have the right to establish offices to promote and sell air services in each other's country. The airlines are also exempt from customs duties, excise taxes, inspection fees and other national duties and charges of the other country.

### 7.4.2 Ownership & Control of Airlines

In October 2011 the Malaysian low cost carrier AirAsia cited bureaucratic hurdles as the reason for halting a joint venture with start-up airline VietJet Aviation, to operate the AirAsia franchise in Vietnam. Regulatory approval from the Vietnamese government for VietJet to use the AirAsia brand across its commercial operations was not granted.

It was suggested there was also domestic political and business opposition to allowing foreign companies to invest in the country's airline market. AirAsia has existing affiliates in Thailand and Indonesia, with agreements to commence low cost operations in 2012 in the Philippines and Japan with joint venture partners[218].

Also in October 2011, the Government of India announced it would be reviewing restrictions on ownership of Indian airlines by foreign carriers. At the time, no investment or holdings were permitted by foreign airlines, although up 49% is currently allowed for foreign financial institutions and non-airline investors.

The Indian Department of Industrial Policy and Promotion (DIPP) favoured a cap of 26%, but the Ministry of Civil Aviation wanted this cap to be limited to 24% as a holding above 25% gives the right to block a 'special resolution'. The review has largely been prompted by financial difficulties experienced by Indian carriers with the view that foreign investment would provide access to capital to pay down debt[219].

No further progress was made on this issue in 2011, however early in 2012 the Ministers of Aviation and Finance indicated that they fully backed a proposal to allow foreign airlines to own a stake in Indian carriers of up to 49% and that they wanted to remove the restrictions "as soon as possible."[220]

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[218] AirAsia drops plans for Vietnamese joint venture, Flightglobal, 18 October 2011 [http://www.flightglobal.com/news/articles/airasia-drops-plans-for-vietnamese-joint-venture-363344/]

[219] Cabinet to consider proposal to allow foreign airlines to invest in domestic carriers, Airlineberg, 23 October 2011 [http://www.airlineberg.com/2011/10/23/cabinet-to-consider-proposal-to-allow-foreign-airlines-to-invest-in-domestic-carriers/]

[220] India's civil aviation minister supports foreign airline investment, ATW Online, 18 January 2012 [http://atwonline.com/international-aviation-regulation/news/indias-civil-aviation-minister-supports-foreign-airline-inves]

### 7.4.3 Cartels & Antitrust Legislation

In June 2011 the U.S. Department of Transportation (DOT) gave its final approval of antitrust immunity for a transpacific alliance between Delta Air Lines and Virgin Australia Airlines, allowing the carriers to implement a joint venture on services between the U.S. and Australia. The ruling was a reversal of its prior opposition to the alliance[221].

In November 2011 DOT also approved an application by several Star Alliance™ member carriers to include Brussels Airlines in the scope of their transatlantic antitrust immunity (ATI) and the Atlantic Plus-Plus agreement (an existing antitrust immunity provision for United, Lufthansa, Continental and Air Canada)[222].

In December 2011 two Cargolux Airlines executives, including its former CEO, entered into a plea agreement with the U.S. Dept. of Justice (DOJ) in which they agreed to serve thirteen months in prison for fixing surcharge rates on air cargo shipments. The agreement followed their indictment by a U.S. grand jury in October 2010 for alleged violations of U.S. antitrust laws. Cargolux itself pleaded guilty in the U.S. in 2009 to cargo price fixing and agreed to pay a fine of USD $119 million. To date, 22 airlines and 21 executives have been charged in the DOJ's ongoing investigation into price fixing in the air transportation industry. More than USD $1.8 billion in criminal fines have been imposed and four executives have been handed prison sentences[223].

In June 2011 the Australian Competition and Consumer Commission (ACCC) granted interim approval for a proposed joint business agreement (JBA) between Qantas and American Airlines on their services between Australia/New Zealand and the U.S., within these regions and beyond to third countries[224]. In August 2011 ACCC issued a further draft approval[225] and the JBA gained final approval from the U.S. DOT in November 2011[226].

[221] DOT finalizes Delta/Virgin Australia ATI approval, ATW Online, 13 June 2011 [http://atwonline.com/it-distribution/news/dot-finalizes-deltavirgin-australia-ati-approval-0612]

[222] DOT clears Brussels Airlines' inclusion into Star's Atlantic Plus-Plus, ATW Online, 18 November 2011 [http://atwonline.com/airline-finance-data/news/dot-clears-brussels-airlines-inclusion-star-s-atlantic-plus-plus-1117]

[223] Cargolux execs plead guilty to price-fixing, face 13 months in prison, ATW Online, 12 December 2011 [http://atwonline.com/international-aviation-regulation/news/cargolux-execs-plead-guilty-price-fixing-face-13-months-priso]

[224] ACCC grants interim approval for Qantas/American JBA, ATW Online, 10 June 2011 [http://atwonline.com/airline-finance-data/news/accc-grants-interim-approval-qantasamerican-jba-0609]

[225] Australian Regulator approves Qantas/American JBA, ATW Online, 24 August 2011 [http://atwonline.com/international-aviation-regulation/news/australian-regulator-approves-qantasamerican-jba-0823]

[226] American Airlines and Qantas Receive Final Approval to Launch Joint Business Agreement, AA press release, 11 November 2011 [http://aa.mediaroom.com/index.php?s=43&item=3385]

# 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 defined by its contribution to economic and social development. 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 2011 in an environmental context.

The chapter begins with a brief high level review of the ICAO Framework for addressing climate change from international aviation, and then reports on the developments and achievements of the industry during 2011. Separate sections are provided on the progress on sustainable aviation fuels and aviation environmental developments in the United States. The chapter ends with an update on developments in the European Union Emissions Trading Scheme in relation to the inclusion of aviation in 2012.

## 8.2 ICAO Framework

The 37th Session of the ICAO Assembly in Montreal in October 2010 was a seminal moment in ICAO's approach to addressing climate change from international aviation. Resolution A37-19 marked a transition from policy to implementation when it urged States to voluntarily submit climate change action plans to ICAO, in addition to annual reports on international aviation CO2 emissions. Under A37-19, States were invited:

> *"…to submit their plan to ICAO as soon as possible, preferably by the end of June 2012, in order that ICAO can compile the information in relation to achieving the global aspirational goals, and the action plans should include information on the basket of measures considered by States…"* [227]

Since the agreement by States of Resolution A37-19, ICAO has actively assisted Member States with the development of their aviation-related climate change action plans.

The Organisation wrapped up a recent round of workshops in this regard, with five regional action plan training sessions in Mexico City, Bangkok, Dubai, Nairobi, and Paris being held between May and July 2011. A final action plan workshop was held in November 2011 in Montreal. ICAO encouraged States that had made progress in the development and implementation of their plans to showcase their activities and share their experiences with other States at this event.

[227] ICAO Aviation & Sustainability Vol.66,6

In tandem, an ICAO Workshop on Aviation and Sustainable Alternative Fuels was organised in October 2011 as part of ICAO preparations for the United Nations Conference on Sustainable Development (Rio+20) taking place in Brazil in June 2012.

With ICAO Resolution A37-18[228], the organisation set out to offer guidelines on controlling the adverse impact of aviation-related noise on communities, among other things. The guidelines encourage States to:

> *"apply noise abatement operational procedures, to the extent possible without affecting safety…"*
>
> *"promote and support… research… programmes aimed at reducing noise at source…"*
>
> *"apply land-use planning and management policies to limit the encroachment… into noise-sensitive areas and mitigation measures for areas affected by noise…"*

In respect of this guidance, the industry has collectively sought to implement measures to mitigate the impact of noise on communities, measures such as reconfiguring takeoff and approach routes at an airport or redesigning engines. Some examples of industry developments on noise mitigation are explored throughout this section.

## 8.3 Industry Developments & Achievements

### 8.3.1 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[229]. 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).

**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 5,000 trials are expected and other airlines will voluntarily join existing trials.

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[228] Resolution A37-18: Consolidated statement of continuing ICAO policies and practices related to environmental protection – General provisions, noise and local air quality.

[229] Signed at the Paris Air Show in June 2007

- **Surface:**

Two current projects cover surface trials – one each in Paris and Vienna. 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):**

Five projects carried out in 2010 and 2011 focused on the optimisation of operations on the Terminal Area through looking at Continuous Descent Approach operations. One of these projects was conducted by Lufthansa in cooperation with DFS and Germanwings. The partners trialled 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 oceanic procedures, four new projects were selected as part of the AIRE cycle 2010/2011, covering five key locations (Portugal, Canada, Morocco, the United Kingdom and the United States). NAV Portugal, for example, with TAP Portugal and the Moroccan ONDA (Office National des Aéroports) offered shortest flight paths across the flight information regions of Lisbon and Casablanca to heavy long-range aircraft that operate those routes. This project – named ONATAP - entailed significant fuel savings and CO2 reduction.

- **Full Gate to Gate flights:**

In total, seven gate-to-gate projects were scheduled to 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.

Under the auspices of AIRE, in August 2011, NAV Canada began flight trials to demonstrate new procedures to improve fuel efficiency and reduce emissions for international flights transiting the North Atlantic airspace. The flight trials, which began with an Air Canada flight from Frankfurt to Toronto continued through the autumn of 2011 with other participants, including Air France, British Airways, Delta and United Airlines.

According to NAV Canada, analysis of the Air Canada flight exhibited a saving of more than 800 litres of fuel and a reduction in GHG emissions by more than 2,100 kg. This exceeded preliminary estimates, which predicted a saving of 250 litres of fuel and 650 kg of GHG emissions.

### 8.3.2 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. In 2011, ASPIRE welcomed the Aeronautical Radio of Thailand Limited (AEROTHAI).

Working closely with airline partners and other stakeholders in the region, ASPIRE's objective is to accelerate the development and implementation of operational procedures to reduce the environmental impact for all phases of flight on an operation by operation basis, from gate to gate.

To develop a set of best practices, in late 2010 ASPIRE partners agreed to a proposal for 'ASPIRE-Daily', an initiative designed to identify and promote city-pairs where utilisation of best practices were evident.

There are currently seven ASPIRE-Daily best practices, by which a city-pair route is assessed:

1. User Preferred Routes (UPRs)

   A cleared lateral profile, customised for each individual flight in order to meet the specific requirements of the aircraft operator for that flight, including fuel optimisation, cost-index performance or military mission needs. When UPRs are created based on fuel optimisation considerations, the resultant savings in GHG emissions are reported to be significant.

2. Dynamic Airborne Reroute Procedures (DARP)

   A coordinated oceanic in-flight procedure to continuously modify the lateral profile of a flight to benefit from updated atmospheric conditions. This allows operators to calculate revised flight profiles whilst in-flight to realise time- and fuel-savings.

3. 30/30 Reduced Oceanic Separation

   The minimum separation standard in oceanic airspace where ground-based navigation, surveillance and voice communications are not available. In airspace where these separation reductions have been implemented, qualified aircraft can achieve substantially greater efficiencies than non-compliant aircraft.

4. Time-Based Arrivals Management

   Automated procedures designed to reduce arrivals congestion into high density airspace and improve fuel and emissions efficiency by shifting delays to the less congested en route phase of flight. A product of this procedure is to reduce the need for inefficient fuel techniques such as low altitude vectoring and aircraft holding.

5. Arrivals Optimisation

   These procedures include Continuous Descent Approach, Optimised Profile Descent, and Tailored Arrivals, with the objective of improving fuel efficiency in the final descent phase of flight by minimising fuel burn for the arrival segment.

6. Departure Optimisation

These procedures facilitate unconstrained ascent after takeoff to cruise altitude, reducing fuel burn by minimising the need to level-off at interim altitudes during the climb-to-cruise flight segment.

7. Surface Movement Optimisation

   Aimed at reducing quantities of fuel burned and emissions during the surface movement phase of flight, these procedures and monitoring technologies reduce taxi times and minimise the delay from initial start request right up to take-off.

By meeting three or more of these best practice standards a city pair will qualify for the designation of an ASPIRE-Daily City Pair and assigned a rating based on its compliance with these seven standards.

The ultimate aim of this initiative is to increase awareness of best practice in the Asia Pacific region by promoting the most environmentally efficient international city pairs in the hope that these standards can be adopted region-wide, helping to achieve significant efficiencies in aircraft operations.

### 8.3.3 Airports

#### Airport Emissions Reduction in Europe

ACI Europe developed its 'Airport Carbon Accreditation' initiative to assess and recognise airport efforts to manage and reduce GHG emissions. It was launched in 2009 in Europe, and in late 2011 the scheme was rolled out to the Asia Pacific region in cooperation with ACI Asia Pacific, having already achieved significant results with this programme in Europe.

In Europe, the initiative is growing apace. In year one (2009-2010), 17 airports participated, representing 21% of European air traffic. By year two (2010-2011), 43 airports were involved, accounting for 43% of European air traffic.

The initiative recognises that airports are at different stages in the process of carbon management and has therefore defined a stepped approach to accreditation, with the ultimate goal being carbon neutrality. The four levels of **Mapping**, **Reduction**, **Optimisation** and **Neutrality** provides a common framework for airports. Figure 8.1 outlines the aggregated carbon dioxide emissions footprint and reduction from all participating airports.

Figure 8.1: Aggregated emissions and data from all Airport Carbon Accreditation participants

| | 2009-2010 | 2010-2011 |
|---|---|---|
| Total aggregate scope 1 & 2 reduction ($tCO_2$) | 51,657 | 54,565 |
| Total aggregate scope 3 reduction ($tCO_2$) | 359,733 | 675,124 |

| Variable | Year 1 | | Year 2 | |
|---|---|---|---|---|
| | Emissions | Number of Airports | Emissions | Number of Airports |
| Aggregate carbon footprint for 'year 0'[1] for emissions under airports' direct control (all airports) | 803,050 $tCO_2$ | 17 | 2,275,469 $tCO_2$ | 43 |
| Carbon footprint per passenger | 2.6 kg $CO_2$ | | 3.73 kg $CO_2$ | |
| Reduction in emissions from sources under airports' direct control (Level 2 and above)[2] | 51,657 $tCO_2$ | 9 | 51,819 $tCO_2$ | 19 |
| Carbon footprint reduction per passenger | 0.351 kg $CO_2$ | | 0.11 kg $CO_2$ | |
| Total carbon footprint for 'year 0' for emissions sources which an airport may guide or influence (level 3 and above) | 2,397,622 $tCO_2$ | 6 | 6,643,266 $tCO_2$[3] | 13 |
| Reductions from emissions sources which an airport may guide or influence[3] | 359,733 $tCO_2$ | | 675,124 $tCO_2$ | |
| Total emissions offset (Level 3+) | 13,129 $tCO_2$ | 4 | 85,602 $tCO_2$ | 8 |

Source: Annual Report 2010-2011; Airport Carbon Accreditation; ACI Europe, June 2011

Chisinau Airport in Moldova is an example of an airport that has recently achieved Level 1 (Mapping) of Airport Carbon Accreditation by mapping its carbon footprint in 2010. As part of this, the airport management had to define the airport's organisational boundary; differentiate between direct and indirect emissions sources; identify emissions factors. During 2011, the airport was implementing an energy management system in order to help reduce emissions and achieve Level 2 (Reduction) of the scheme.

Kristiansand Airport, in southern Norway, is at Level 2 after defining emissions reduction targets and implementing procedures and systems designed to achieve them. A specific area of focus is on ground vehicle emissions which represent a significant portion of the carbon inventory at Kristiansand.

BAA at Heathrow Airport has achieved Level 3 (Optimisation) after introducing its 'Aircraft on the Ground $CO^2$ Reduction (AGR) programme, identifying areas in ground operations with a potential for carbon savings. Targeted areas for reducing Heathrow's carbon footprint include reducing engine taxi times and the usage of auxiliary power units (APUs).

Stockholm Arlanda Airport has been awarded 'carbon neutral' status since late 2009 due to its ongoing commitment to reducing its carbon footprint and achieved a 50% reduction in emissions between 2005 and 2008. An important contributor has been the aquifer beneath the airport, that provides natural cooling in the summer and heating in the winter.

### Airport Emissions Reduction in Other Regions

In the Asia Pacific region, a new passenger terminal under construction at Thailand's Phuket Airport, scheduled to open in 2015, will be a double-sided glass building to allow more natural light in and prevent heat from entering the terminal to help reduce energy consumption of central air conditioning systems. This design has already been implemented at Bangkok's Suvarnabhumi Airport, where passenger terminals are equipped with glass to allow more natural light in, while the energy generated from heated water is converted into electricity for cooling purposes.

In South Korea, Seoul Incheon Airport hopes to achieve carbon neutral status by 2013. A large part of this plan hinges on a new eco-friendly passenger terminal, which will incorporate solar panels that can generate 100kW of energy as well as five wind power turbines with a generating capacity of 10kW.

Malaysia Airports, operator of Kuala Lumpur Airport, has introduced a range of schemes as part of an effort to achieve carbon neutral growth. To reduce emissions, the company has implemented an energy savings project, with the installation of 250 energy saving devices aimed at reducing electricity consumption. The devices have recorded savings of 39%. Other initiatives include activities to improve water, storm water and waste management. Malaysia Airports is also working with airline partners to conduct continuous descent approach (CDA) landings at Kuala Lumpur, potentially saving between 160kg and 480kg of carbon emissions per landing through reduced fuel burn.

In the United States, San Francisco Airport's renovated second terminal – opened in 2011 – is to be certified by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system. The upgrade is expected to reduce the airport's carbon emissions by an estimated 1,667 tonnes annually. The bulk of the terminal's estimated annual carbon savings will come from energy efficiency, with a reduction of 1,640 tonnes of GHG emissions per year coming from energy-efficient lighting and other equipment.

Using the same LEED principles, Boston Logan Airport has realised 12% in energy savings and 36% in water savings through a number of green design and construction features. Among them, over 75% of construction and demolition waste was reused or recycled; more than 10% of building materials came from recycled materials; special storm water filtration devices to remove suspended solids and phosphorous from site runoff; roofing membrane and paving to reflect heat from the building; drip irrigation instead of spray head to reduce the amount of irrigation water; and extensive use of controls which automatically dim lights when ample natural light is available.

In Latin America, the new Quito Airport is being constructed in such a way as to minimise the impact on local communities, while the airport also employs sophisticated stormwater management, fuel management and wildlife protection procedures.

In Australia, Alice Springs Airport Solar Power Station opened for business in late 2010 and, using Concentrator Photovoltaic (CPV) technology, supplies about 28% of the airport's energy needs. Alice Springs is reportedly the first Australian airport to have a large scale (over 100kW) photovoltaic system

providing a direct source of renewable energy to its internal grid. The result is a reduction in the Airport's carbon emissions by about 470 tonnes a year.

**Airport Noise-related developments**

Zurich Airport, Switzerland, has achieved significant progress in implementing noise mitigation measures at the airport. The takeoff and approach routings have been reconfigured in such a way as to reduce or avoid aircraft noise over densely populated areas to the extent possible. Noise levels are dependent on the number of flights and the distribution of these across the individual runways, and punctuality is key to driving down the number of night flights which is the aspect that most affects the local residents.

At Hamburg Airport, noise has been cited as the biggest environmental pressure, as the cross-runways mean there are four areas affected by aircraft noise instead of two if the runways were parallel. Mitigation measures for the local communities affected by noise include fitting over 15,000 homes with insulated glazing and noise-proof ventilators. The airport also implemented an annual cumulative noise level which cannot be exceeded – the level of which is steadily reducing in line with aircraft becoming quieter. As at Zurich Airport, the issue of night flights is contentious and causes the local community most concern. At Hamburg, although the airport is shut between 23:00 and 06:00, to discourage flights at 'unsociable' hours a financial penalty is imposed on flights after 22:00.

Staying in Germany, the air navigation service provider DFS announced plans to introduce continuous descent approaches off-peak at Frankfurt Main Airport with a view to mitigating noise impact on local communities. With the new approach path design it is expected that noise will be reduced in areas normally overflown at lower altitudes. As a result of this, departing aircraft can also climb quicker because they do not have to avoid as many sectors for low-flying arrivals, with a similar impact on noise reduction in local areas.

At the same airport, a German regional court imposed a temporary ban on night operations at Frankfurt Main in October 2011, pending a decision from a higher court on 4 April 2012. The decision came as Frankfurt opened its fourth runway, and was based on local resident complaints about noise levels in particular.

Dutch air navigation service provider LVNL formally published its first Standard Instrument Departure (SID) at Amsterdam Schiphol Airport, enabling aircraft to use high accuracy turns during departure. Using KLM Boeing B737s during testing, the new SID procedure is designed to reduce noise levels in local communities under the flight paths.

### 8.3.4 Aircraft developments

Boeing delivered its first B787 Dreamliner to launch customer All Nippon Airways in September 2011. The all-new jetliner made from composite materials provides airlines with improved fuel economy and low operating costs than its predecessors. It also features a host of new technologies that are designed to enhance the passenger experience.

Airbus ended 2010 with the announcement of its A320neo, the A320 option with new fuel saving engines. Over 1,200 orders and commitments from more than 20 different customers have been placed. As well as

offering the latest and most eco-efficient engine technologies, the A320neo will incorporate 'sharklets' – large fuel-saving wing tip devices (as illustrated on an A320 in Figure 8.2). According to Airbus, the aircraft will deliver significant fuel savings of up to 15%, equating to up to 3,600 tonnes of CO2 savings annually per aircraft, as well as reduce NOx emissions. The A320neo is also expected to deliver noise reductions, through advances in engine design. Throughout 2011, Pratt & Whitney conducted initial ground testing on its 'PurePower' PW1000G series engine, selected for the launch of A320neo aircraft in 2015. According to PW, the redesigned engine uses an advanced gear system that allows the fan and compressor/turbine to operate at different speeds, resulting in up to 50% reduction in noise.

Figure 8.2: A320 with sharklets for fuel burn research - maiden flight from Toulouse - November 2011


Source: Airbus

In the wake of Airbus' A320neo, Boeing announced its intention to launch a rival re-engined narrowbody aircraft, the B737 Max based on the leading B737 family. According to Boeing, the aircraft will deliver significant efficiencies. The company states that, compared to a fleet of 100 of the most current fuel-efficient aircraft, the B737 Max will emit 277,000 fewer tonnes of carbon dioxide and save around $85 million in fuel costs on an annual basis.

In 2011, Boeing also partnered with American Airlines to announce the launch of the 'ecoDemonstrator Program', intended to accelerate the market readiness of emerging technologies that Boeing is pioneering. Using a B737-800 next generation aircraft for flight testing, Boeing and American Airlines engineers will be trialling specific technology applications to reduce emissions and noise, including adaptable trailing edge and variable area fan nozzle technologies.

Canadian aircraft manufacturer Bombardier Aerospace confirmed that its CRJ1000 NextGen regional jet and Q400 turboprop airliner are both achieving better than expected fuel burn. According to Bombardier, the CRJ1000 NextGen aircraft is achieving a mission fuel consumption rate that is 4% better than estimated, resulting in an average annual fuel cost saving of $220,000 per aircraft. The improved fuel burn also directly results in a 4% reduction in CO2 emissions, equivalent to an average annual reduction of nearly 700 tonnes of GHG's per aircraft. Bombardier also reports that the Q400 turboprop is on target to deliver up to 1.5% in additional fuel burn improvements, along with the 2% improvement already achieved during high-speed cruise.

### 8.3.5 Airline Initiatives

In Europe, German flag carrier Lufthansa has embarked upon a series of weight-saving initiatives on board its aircraft fleet in order to reduce fuel consumption. Firstly, Lufthansa is installing around 32,000 new seats on more than 180 aircraft in its short and medium-haul fleet – within the space of just one year – helping to reduce emissions. Crucially, each row of new seats is more than 12 kg lighter than the previous seat rows, thanks to the materials used and the seat's innovative structure, That is equivalent to an almost 30% reduction in weight, which in turn lowers specific fuel consumption. Secondly, almost 30,000 new service trolleys will be introduced on Lufthansa flights over the next three years. The 'Quantum Light Weight Trolley' is not only expected to ease the work process for flight attendants but will also have a positive ecological impact. The introduction of the Quantum trolley, which is one third lighter than its predecessor, will save about 9,000 tonnes of kerosene and 28,350 tonnes of CO2 annually. They will be introduced gradually until mid-2014 on all Lufthansa's long-haul intercontinental flights. In addition, from autumn 2011, the container fleet at Lufthansa and Lufthansa Cargo will be partially replaced by new containers made of a light plastic material, making them up to 15% lighter enabling kerosene consumption to be reduced by about 2,180 tonnes per year. Lufthansa expects to save 6,867 tonnes of CO2.

UK-based low cost carrier easyJet announced that it is the first commercial airline to trial a revolutionary nano-technology coating on its aircraft aimed at reducing drag and increasing fuel efficiency. The ultra thin coating, pioneered by the US military on its aircraft, is a polymer that cross links and bonds to the paint surface, adding a mere 4 ounces to the weight of the aircraft. The coating is designed to reduce the build-up of debris on the aircraft's structure, leading edge and other surfaces, reducing drag on the surface of the aircraft, potentially reducing easyJet's fuel consumption by 1-2% per aircraft. The airline has coated eight aircraft with a view to comparing fuel consumption with the rest of the fleet during a controlled trial period.

In the Middle East, Gulf carrier Emirates released its first environmental report in 2011, a study that revealed the airline's carbon dioxide emissions efficiency was 26% better than the global airline average. Covering the 2010-2011 fiscal year, the audited report analysed environmental performance data from a range of Group activities, including airline operations, cargo and ground handling, and commercial activities on the ground from engineering to catering. Significant highlights in the report include:

- An airline fuel efficiency figure of 4.12 litres per 100 passenger kilometres (PK).
- 3.3 million kilogrammes of on-board waste recycled by dnata and Emirates Flight Catering.
- Dnata Freight Gate 5 opened as the first carbon neutral warehouse in the Middle East.
- 175,000 trees planted at the carbon-neutral certified Wolgan Valley Resort and Spa.
- Fauna and flora improvements via the sponsorship of the Dubai Desert Conservation Reserve, which represents over 5% of Dubai's land area.

In the United States, United-Continental Airlines, in 2011, announced it is converting to paperless flight decks and deploying 11,000 iPads to all United and Continental pilots. The electronic flight bags (EFB) replace paper flight manuals, and as a first for major network carriers, provide pilots with paperless aeronautical navigational charts through an iPad app. Each iPad, weighing less than a kilogram, will

replace approximately 17 kg of paper operating manuals, navigation charts, reference handbooks, flight checklists, logbooks and weather information in a pilot's flight bag. A conventional flight bag full of paper materials contains an average of 12,000 sheets of paper per pilot. The green benefits of moving to EFBs are two-fold – it significantly reduces paper use and printing, and, in turn, reduces fuel consumption. The airline projects EFBs will save nearly 16 million sheets of paper a year which is equivalent to more than 1,900 trees not cut down. Saving 326,000 gallons of jet fuel a year reduces greenhouse gas emissions by 3,208 tonnes.

In Latin America, Brazilian airline GOL worked with GE Aviation's PBN Services to obtain regulatory authorisation to fly Required Navigation Performance (RNP) flight procedures in Brazil. Once approved, the airline will be allowed to fly RNP paths in its fleet of Boeing 737s, reducing fuel consumption and emissions while increasing airspace capacity. RNP allows aircraft to fly precisely defined trajectories without relying on ground-based radio-navigation signals, which can be designed to shorten the distance an aircraft has to fly en-route, and to reduce noise, fuel burn and exhaust emissions.

### 8.3.6 Airspace / Air Traffic Management

#### SESAR

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 being developed in the US and both programmes are being developed in close collaboration to ensure airspace user requirements evolve in a harmonious manner.

In terms of environmental impacts, flight paths often follow set air corridors that make the route longer than necessary. On arrival at the destination the aircraft may have to circle in a holding pattern or descend in stages while awaiting a landing slot. These factors increase fuel consumption, pollution and greenhouse gas emissions. SESAR technology will enable more direct flight paths and smooth descent and climb that will eliminate some of the main causes of avoidable energy waste. SESAR aims to deliver[230] a 10% reduction in $CO_2$ emissions per flight.

In March 2011, SESAR published its first 'SESAR Release'. The aim of a SESAR Release is to present to the aviation community new or improved air traffic management solutions at a pre-industrialisation stage ready for deployment. It is hoped that through its incremental release of new procedures or products, the SESAR Joint Undertaking (SJU) can continuously provide results.

The first SESAR Release contains 29 validation exercises conducted all across Europe. Those exercises intend to cover all manner of areas, including efficient and green terminal airspace operations; the initial 4D trajectory; end to end traffic synchronisation, and; integrated and collaborative network management. The following are practical examples of how SESAR intends to achieve some of its validation exercises in 2011:

[230] European Air Traffic Management Master Plan, Edition 1, European Commission/EUROCONTROL/SESAR Joint Undertaking, 30 March 2009

- In Barcelona, to deliver increased capacity and decreased environmental impact through optimised aircraft routing, AENA is validating key procedures, requirements and operational guidelines for Precision Area Navigation in complex terminal areas.
- It is expected that new point merge-procedures on platforms operated by ENAV (Italy) and NATS (UK) will improve and harmonise arrival operations. The exercises are aimed at facilitating Continuous Descent Arrivals.
- Through operational simulations in four different locations, ENAV, LVNL, NATS and NORACON will validate procedures on extending the arrival tasks to the en-route controllers within the Arrival Manager horizon at an airport. This is intended to ensure a better sequencing of arriving flights to reduce the workload of controllers and increase the capacity in the terminal area.
- Through live trials across Europe, enhanced air traffic flow and capacity management processes are being implemented to allow for the best use of available airspace to safely accommodate demand in changing conditions (e.g. adverse weather or unexpected traffic changes).

### Other Developments

Eurocontrol's Maastricht Upper Area Control (MUAC) Centre implemented the first step of its 'Free Route Airspace Maastricht' (FRAM) program, aimed at installing a direct route network to reduce flight times, fuel burn, GHG emissions and costs in high-density European airspace.

Between March and November 2011, 142 new direct routings became available in the MUAC airspace. The distance savings expected from the first phase of FRAM deployment during nights and weekends are estimated at 1.16 million km per year, resulting in economies of 3,700 tonnes of kerosene, 12,000 tonnes of carbon dioxide and 37 tonnes of NOx, in comparison to the fixed route network

The UK air navigation service provider, NATS' 'Vision 2011' program was reported to be yielding benefits. NATS stated in April 2011 that during the 2010/2011 period it delivered over 50 emissions improvements in the management of air traffic. The ANSP also reported significant progress in delivering a lower carbon estate – by January 2011, NATS had reduced its energy consumption by a quarter, cut down its waste to landfill by 65% and lowered water consumption by 35%.

The iFlex concept, which is the culmination of work between IATA, ICAO and various ANSPs, was announced in September 2011. The initiative will provide for a greater and more flexible choice of routes on longhaul operations which cross multiple flight information regions, and is expected to deliver savings in distance, time, fuel burn and emissions. The iFlex concept was trialled by Delta Air Lines on the Johannesburg-Atlanta route, with the carrier reporting an average time saving of 8 minutes per flight, equivalent to 900kg of fuel and 2.9 tonnes of carbon dioxide. Annualised, on the basis of two daily flights, this translates to a reduction of over 2,000 tonnes of GHG emissions.

## 8.4 Sustainable Aviation Fuels

The price of jet fuel has seldom been higher. During 2010, increasing demand for oil pushed jet fuel prices up from $88 a barrel at the start of the year to $107 a barrel by year end. The 12-month average was $91 a barrel, a rise of almost 30% from average 2009 levels. The airline industry fuel bill rose more than 11% to $139 billion in 2010, equivalent to 26% of operating expenses.

2011 has seen further increases, driven largely by unrest in the Middle East, where prices reached $130 a barrel in March 2011, corresponding to around 33% of operating costs.

It is against this backdrop that the aviation industry seeks to prioritise the commercial development of sustainable biofuels as an alternative to petroleum fuel products. 2011 witnessed an unprecedented push forward from around the globe, with airlines and national governments teaming up with producers and refiners to implement programs, initiatives and demonstrations.

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, and membership, which is growing every year, reflects the global nature of interest and commitment in tackling the issue.

Table 8-1: SAFUG Membership in 2011

| SAFUG Members | | Affiliates |
|---|---|---|
| Aeromexico | Gulf Air | Boeing |
| Air China | Japan Airlines | Airbus |
| Air France-KLM | Lufthansa | Embraer |
| Air New Zealand | Qantas | Honeywell |
| Alaska Airlines | SAS Scandinavian Airlines | Aeropuertos y Servicios Auxiliares (ASA) |
| All Nippon Airways | Singapore Airlines | |
| British Airways | TAM | |
| Cargolux | TUI Travel | |
| Cathay Pacific | Virgin Atlantic | |
| Etihad Airways | Virgin Australia | |
| Gol | Virgin America | |

Source: SAFUG

### 8.4.1 Developments in 2011

In March 2011 the Spanish government, Iberia Airlines and Airbus signed a cooperative agreement to develop a Spanish 'value chain' for sustainable aviation biofuel for commercial use. The core intention was to identify, promote and invest in initiatives to create an entire biofuel production chain for Spanish aviation using sustainable resources. The chain aims to bring together producers, refiners and airlines.

Staying in Spain, Iberia and AENA together with the Spanish government and AlgaEnergy launched plans in April 2011 to cooperate on a microalgae-based biofuel production project at Madrid's Barajas Airport. A research platform is to be installed at the airport for research and development into cultivation of microalgae, with the purpose of reducing the costs of biomass production. Both AENA and Iberia intend to use biofuel to future power airport ground vehicles and aircraft.

Also in Spain, in October 2011, Iberia operated the country's first biofuel powered commercial flight with an A320 from Madrid to Barcelona, using a mixture of 75% Jet A-1 fuel and 25% camelina-derived biofuel. The carrier reported a reduction of nearly 1,500kg of $CO^2$ emissions compared to a flight powered with conventional fuel.

In Australasia, in May 2011, a report was published on biofuel potential and application in the region. The report, conducted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), concluded that by using existing and new biomass resources and sustainable practices for growing them, Australia and New Zealand will have sufficient biomass to support nearly half their aviation fuel requirements by 2020, and over 100% of fuels needs by 2050. In the report, the CSIRO examined a road map scenario under which the two nation's aviation sectors achieve a 5% bio-derived jet fuel share in their fuel use by 2020, increasing to 40% by 2050 – the result of which could lead to cost savings of over A$2 billion by 2030 on jet fuel imports, and a 17% reduction in GHG emissions per year.

In June 2011, Honeywell operated its first transatlantic flight to be powered by a biofuel blend. A Gulfstream G450 became the first aircraft to fly from North America to Europe with a 50/50 blend of camelina-derived biofuel and conventional jet fuel powering one of its engines. Based on lifecycle analyses, Honeywell estimated that the flight saved over 5 tonnes of net carbon dioxide emissions.

Also announced in June 2011, Airbus, the European Commission, several European airlines and biofuel producers joined forces to develop a 'roadmap' aimed at producing 2 million tonnes of biofuel for aviation use by 2020. 'Biofuel Flightpath' will set milestones towards producing biofuels from European feedstocks as a commercially viable alternative, and aims to facilitate the development of standards for the certification of drop-in biofuels.

On 1 July 2011, paving the way for the trial of commercial flights powered with biofuel blends, certifying body ASTM International (formerly the American Society for Testing and Materials) officially approved the commercial use of biofuels for aviation. Opening the door for commercial flights to run on fuels derived from feedstocks such as algae, camelina or jatropha, or from animal fats called tallow, ASTM gave the green signal for up to a 50% blend of hydroprocessed esters and fatty acids (HEFA) fuels – more commonly known as hydrotreated renewable jet (HRJ fuels – to be mixed with conventional kerosene.

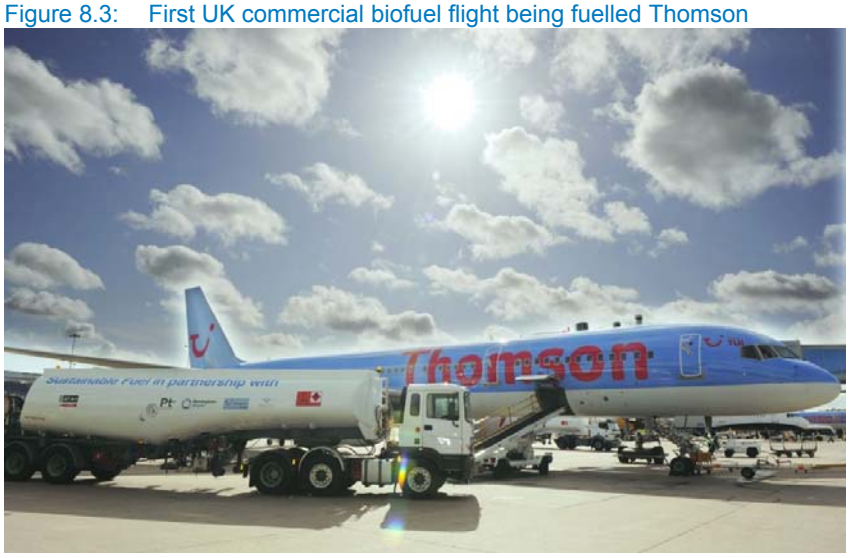
Also in July, both Finnair and KLM continued their sustainability commitments by launching flights powered with biofuel. Finnair flew from Amsterdam to Helsinki using a 50/50 mix of part biofuel derived from recycled vegetable oil – supplied by SkyNRG, a consortium launched by KLM – and part conventional jet fuel. Using the same source of biofuel and blend of standard kerosene, KLM announced the start a series of green flights between Amsterdam and Paris in September, with B737s.

The Federal Government of Mexico announced in July 2011 the completion of the first demonstration flight using biofuel on a commercial Mexico-registered aircraft operated by Interjet, between Mexico City and Tuxtla Gutierrez, Chiapas. The biofuel used was a blend of bio synthetic paraffinic kerosene and Jet A-1 fuel, consumed by one of the A320-200's engines – the other engine using conventional fuel.

In Latin America, TAM and Airbus have teamed up with American bioenergy company SG Biofuels to progress the production of jatropha-derived jet fuel. Announcing in September 2011, the partners aim to establish a jatropha plantation in the central-west region of Brazil covering 75,000 acres, and to convert the oil derived from the crops into biokerosene for use by local airlines.

October saw the UK's first biofuel passenger flight. Thomson Airways flew from Birmingham to Lanzarote with an aircraft powered by a mixture of conventional fuel and fuel derived from used cooking oils (hydroprocessed esters and fatty acids).

Figure 8.3: First UK commercial biofuel flight being fuelled Thomson




Source: Thomson

In late October, Air China together with Boeing and Chinese and US aviation energy partners, conducted China's first biofuel flight, from Beijing Airport with a B747-400, using home-grown jatropha based sustainable fuel. It is the beginning of a partnership that sees Air China and Boeing already working on plans for an international biofuel-powered flight between the US and China.

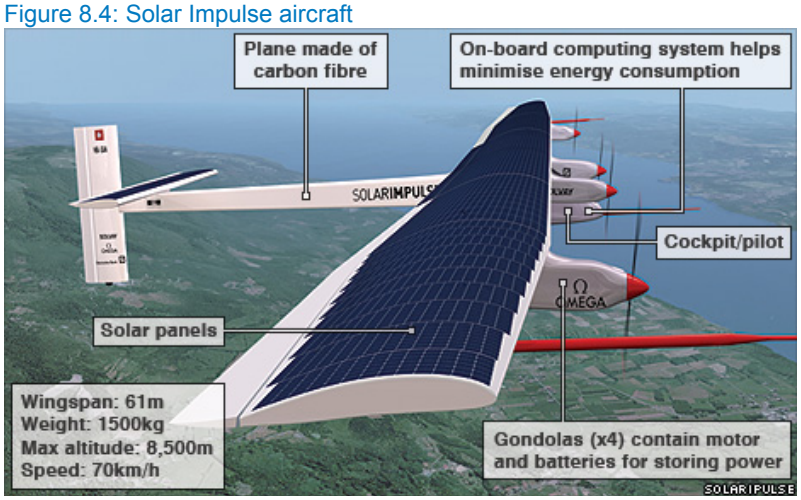
In November, United-Continental operated a commercial flight in the US powered by a blend of algae-derived advanced biofuels and conventional jet fuel, from Houston to Chicago with a B737-800.

In December, Thai Airways made its inaugural successful test flight using biofuel with a B777-200 aircraft, departing from Bangkok's Suvarnabhumi Airport and returning 20 minutes later.

### 8.4.2 Solar-powered flight

In May 2011, 'Solar Impulse', the four-engine aircraft which features around 12,000 solar cells arranged on its wingspan, successfully completed a 13-hour flight, powered solely by solar energy – no jet fuel was used. The aircraft departed from Payerne Airport near Berne, Switzerland, before arriving at Brussels Airport, Belgium, in what was heralded as the world's first international flight powered by the sun.

Figure 8.4: 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[231] 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.

[231] 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.

Since drawing up the mission statement, the U.S. Government has made headway in 2011 on defining a way forward for policy, research and development of sustainable fuels.

In January 2012 the U.S. Department of Agriculture (USDA) in conjunction with Airlines for America (A4A, formerly the ATA) and Boeing, published a scoping document[232] looking at accelerating the availability of a commercially viable and sustainable aviation biofuel industry in the United States, and the steps that are required to achieve this.

In respect of this overarching aim, in August 2011 the U.S. Administration announced a joint effort by the USDA, Department of Energy (DOE) and the Department of the Navy to develop and support biofuel production facilities for use in aviation and maritime.

In terms of enabling policy, in July 2011 ASTM International approved an alternative advanced method of aviation biofuel production based on hydroprocessed esters and fatty acids (HEFA).

The following is a chronology of events/developments that highlights the United States' activity in the sustainable aviation fuels arena.

Table 8.2: U.S. developments in sustainable aviation fuels in 2011

| Month of 2011 | Event / Development |
|---|---|
| January | Boeing and Air China announce agreement to initiate planning of an inaugural international flight using sustainable aviation biofuels |
| March | The U.S. and Brazil sign a Memorandum of Understanding to advance the development of aviation biofuels |
| May | Alaska Airlines, Boeing, the Ports of Seattle and Portland, and Spokane International Airport complete the year-long Sustainable Aviation Fuels Northwest (SAFN) project, and release the roadmap report |
| June | Seven A4A member airlines sign letters of intent with Solena for a future supply of jet fuel derived exclusively from biomass |
| July | ASTM International formally permits renewable fuels to be blended with conventional jet fuels |
| August | President Obama announces a partnership between the private sector, USDA, DOE and U.S. navy to produce advanced drop-in aviation and marine biofuels |
| September | U.S. Administration announce $136m in research and development grants for biofuels |

[232] Agriculture and Aviation: Partners in Prosperity; January 2012; USDA, A4A, Boeing.

| Month of 2011 | Event / Development |
|---|---|
| November | United Airlines and Alaska Airlines complete the United States' first biojet powered commercial service airline flights. |

Source: Agriculture and Aviation: Partners in Prosperity

## 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, with all airlines operating at a European airport - be it a European or foreign carrier - obligated to comply with the regulations.

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.

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[233].

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.

2011 was the year when all aircraft operators were required to have submitted applications and received approved Annual Emissions monitoring plans and tonne-kilometre (TKM) monitoring plans from their competent authority, in advance of conducting the final review for submission of the verified report on level of emissions.

### 8.6.1 International opposition to the scheme

In 2011, a legal challenge against aviation's inclusion in the EU ETS by several major U.S. airlines together with the Air Transport Association (ATA) of America was rejected by the European Court of Justice in Luxembourg. The ruling stated that the inclusion of international aviation in the EU ETS is fully compliant with international law and all relevant international agreements.

However, opposition remains as ICAO met with 26 country representatives opposed to the EU ETS in September 2011 to voice concerns. The main opposition argument against aviation's inclusion into a unilateral scheme is centred round the assertion that it contravenes international law and the Chicago Convention, and that it is an 'illegal tax' on international flights unnecessarily imposing a financial burden on airlines.

[233] http://ec.europa.eu/clima/policies/transport/aviation/allowances_en.htm

In an effort to provide an objective review of the actual cost of compliance for airlines, the European Commission Climate Commissioner published results of an analysis into the cost of compliance for Indian and Chinese airlines (India and China have reportedly instructed their airlines not to comply with the scheme). A key extract[234] states the following:

> "With the inclusion of aviation in the EU Emissions Trading System, the fact is that 85% of aviation allowances will be allocated for free to aircraft operators covered by the system in 2012. In the period 2013-2020 this percentage of free allocation will reduce to 82%. The costs to passengers will then depend on whether the airlines pass through the value of the 85% of free allowances.
>
> Depending on the airlines' decisions, costs can range between €2 and €12 a ticket each way on a transatlantic or other long-haul flight at current carbon prices.
>
> (For example)… the total costs and cost per passenger for Chinese and Indian airlines:
>
> - Total costs of purchasing additional allowances and CDM credits for 2012 emissions for Chinese airlines operating in Europe, assuming constant flight traffic, are estimated at around €4.23 million assuming that the full amount of CDM is used.
> - The estimated CO2 emissions per passenger of a one-way flight from Paris to Beijing would be around 627 kg. The value of the allowances that need to be surrendered would be €7.52 per passenger at current carbon prices. Given the high level of free allocation of allowances to airlines, it is estimated that the cost for the airline in purchasing additional allowances to cover the emissions would be €1.50.
> - Total costs of purchasing additional allowances and CDM credits for 2012 emissions for Indian airlines operating in Europe, assuming constant flight traffic, are estimated at around €1.1 million assuming that the full amount of CDM is used.
> - The estimated CO2 emissions per passenger of a one-way flight from Delhi to London would be 480 kg per passenger. At current carbon prices the full value of allowances needed is €3.80 per passenger each way. As Indian airlines will be getting 85% of the allowances they need for free, the additional cost per passenger carried will be around 65 cents."

On the basis of this analysis alone, the extra cost implication for airlines complying with the EU ETS scheme appears to be minimal.

Several carriers have already announced intentions to pass on the additional costs to passengers through implementing a surcharge. For example:

| Airline | Surcharge (US$) | Per |
|---|---|---|
| Ryanair | 0.38 | One way flight |
| Qantas | 3.76 | Roundtrip |
| Etihad | 3.00 | Roundtrip |
| Adria Airways | 1.30 | One way flight |

[234] EU ETS and Aviation SN/SC/5533; House of Commons Library; 13 February 2012

| Airline | Surcharge (US$) | Per |
|---|---|---|
| Delta (with partners Air France-KLM and Alitalia) | 6.00 | Transatlantic roundtrip |
| United-Continental | 6.00 | Transatlantic roundtrip |

The EU is adamant that until a global approach to tackling aviation emissions is brokered, aviation's inclusion in the European ETS should remain in force. To this end, ICAO has reinforced its focus on championing this cause in 2012.

# 9. Aviation Safety & Security

## 9.1 Introduction

This chapter covers aviation safety and security matters.

In March 2011, the European Commission published its White Paper on Transport[235], in which it stated the clear aim that the European Union should be the safest region for aviation. In addition, the Report of the High Level Group on Aviation Research[236] stated a goal for 2050 of reducing the accident rate of commercial aircraft flights to less than one per ten million flights, i.e. half the current level. However, whilst the aviation accident rate continues to decline the rate of decline has slowed markedly since 2004 and at the same time there is a continued growth in the number of flights, which are set to almost double by 2030.

The section on safety details fatal accidents that occurred worldwide in 2011 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. In order to preserve the current low level of fatalities resulting from air accidents, the rate of accidents needs to decline in order to match the continued growth in the number of flights. The section outlines some of the various developments and initiatives in 2011 aimed at realising that goal.

In this tenth anniversary year of the terrorist attacks in the US, there were thankfully no major on board security incidents in 2011. It was also a quieter year in terms of new EU security regulations, following the significant developments in 2010. These developments were summarised by the European Parliament which, in June 2011, published a guidance note on the EU regulatory Framework applicable to Civil Aviation Security[237]. The section on security provides up to date discussion on some of the current aviation security issues: air cargo security, carriage of liquids, use of “body scanners”, use of Passenger Name Record (PNR) data and the future of aviation security.

## 9.2 2011 Safety Review

### 9.2.1 Fatal Accidents Worldwide

In 2011, there were 33 fatal commercial airline accidents worldwide causing the deaths of 504 passengers and crew (Table 9.1) with an additional 30 casualties on the ground. 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 2010 there were 26 fatal commercial airline accidents causing 817 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 commercial fatal accidents per 10 million flights over the last twenty years, both graphs indicate a flattening of the

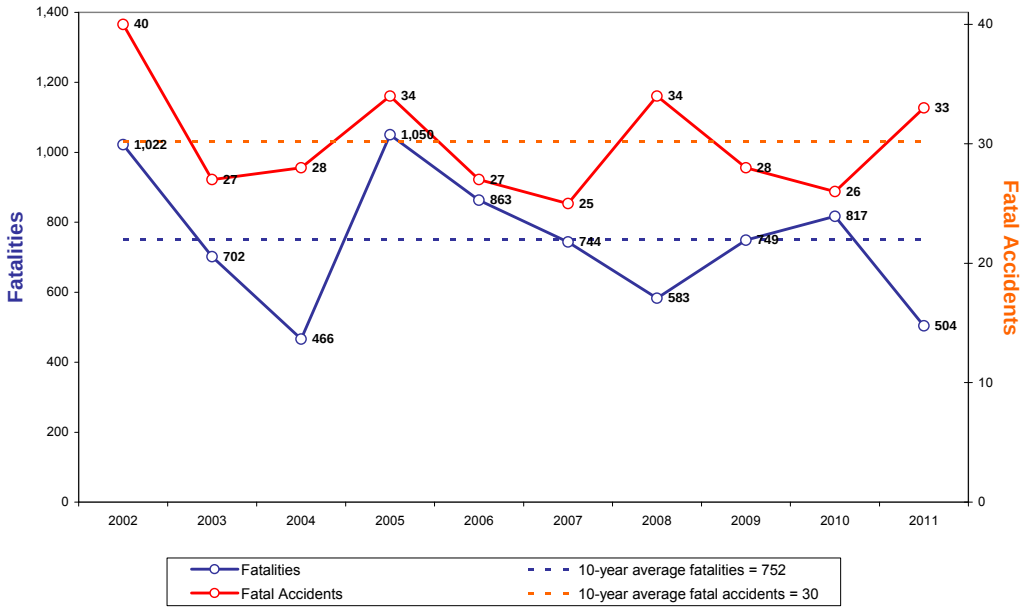
[235] COM(2011) 144 – White Paper – Roadmap to a single European Transport Area – Towards a competitive and resource efficient transport system, European Commission, 28 March 2011

[236] Flightpath 2050 – Europe’s Vision for Aviation, Report of the High Level group on Aviation Research, European Commission, 02 March 2011

[237] The EU Regulatory Framework applicable to Civil Aviation Security, European Parliament Directorate-General for Internal Policies, IP/B/TRAN/NT/2011-01, June 2011

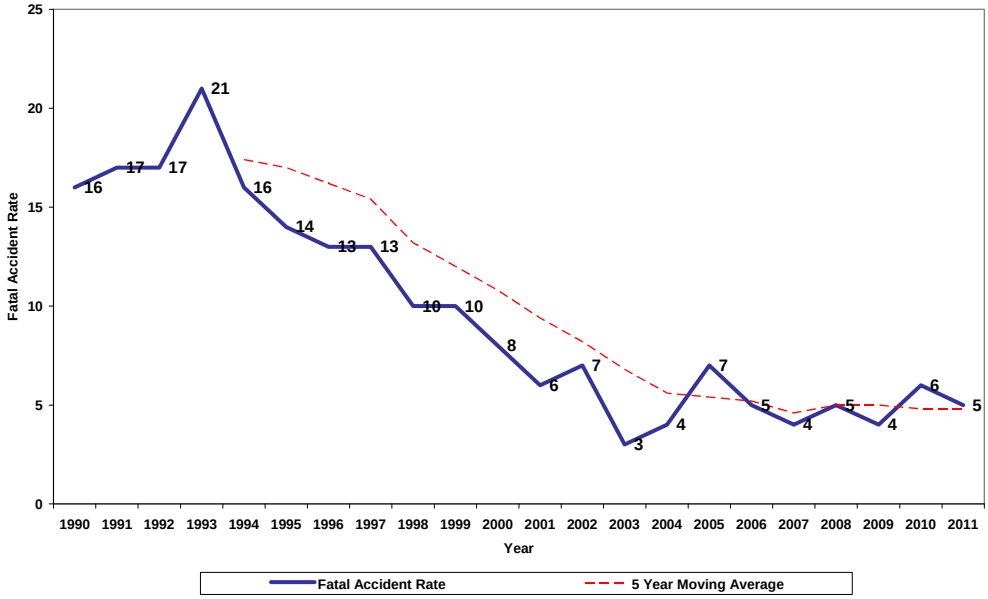
downward trend in the last ten years. The annual number of commercial fatal accidents globally has remained somewhere between 25 and 40 since 2002, equivalent to between 3 and 7 fatal accidents in every 10 million flights.

Figure 9.1: World Commercial Airline Fatal Accidents and Fatalities 2002 to 2011




Source: Flight International based on Ascend/Flightglobal ACAS updated by EASA Annual Safety Review 2011

Figure 9.2: Global Fatal Accident Rate (per 10 million Flights) 1990 to 2011




Source: EASA Annual Safety Review 2011

The year 2011 saw a rise in the number of identified world airline fatal accidents compared to 2010 but a decrease in the number of fatalities, reflecting the greater proportion of smaller regional aircraft, mostly turboprops in the 2011 accident list compared to fewer but, on average, larger aircraft types involved in fatal accidents in 2010. In 2011, there were nine fatal jet accidents, two of which were freighters and two of regional-jet aircraft size. For the five remaining large passenger jet accidents, all involved ageing aircraft types: two Boeing 727s, a 737-200, a Tupolev Tu-154 and a Yakovlev Yak-42.

The two worst accidents of the year involved 727s: a 36 year-old Iran Air Boeing 727-200 on a domestic flight that crashed in January near Orumiyeh, killing 78 of the 105 people on board, and a 46 year-old Hewa Bora Airways Boeing 727-100 that crashed in adverse weather at Kisangani in the Democratic Republic of the Congo, with 73 casualties.

Of the 33 fatal accidents in 2011, 5 (15%) occurred during take off or climb, 12 (36%) en route and 15 (45%) during approach or landing. The remaining fatal accident occurred on the ground. The 2011 percentages of fatal accidents by phase of flight are similar to those seen in 2010. In June 2011, Boeing published its annual statistical summary of commercial jet airplane accidents[238]. Figure 9.3 (sourced from that report) shows the breakdown by phase of flight for fatal accidents over the last 10 years.

The Boeing report also showed the number of fatalities by accident type (Figure 9.4). Accidents classified as Loss of Control (in Flight), Controlled Flight into Terrain (CFIT) and Runway Excursions have resulted in the greatest number of casualties over the last 10 years.

Of the 33 fatal accidents in 2011, 9 (27%) were related to operators on the European safety list of air carriers subject to operating bans and other operational restrictions.

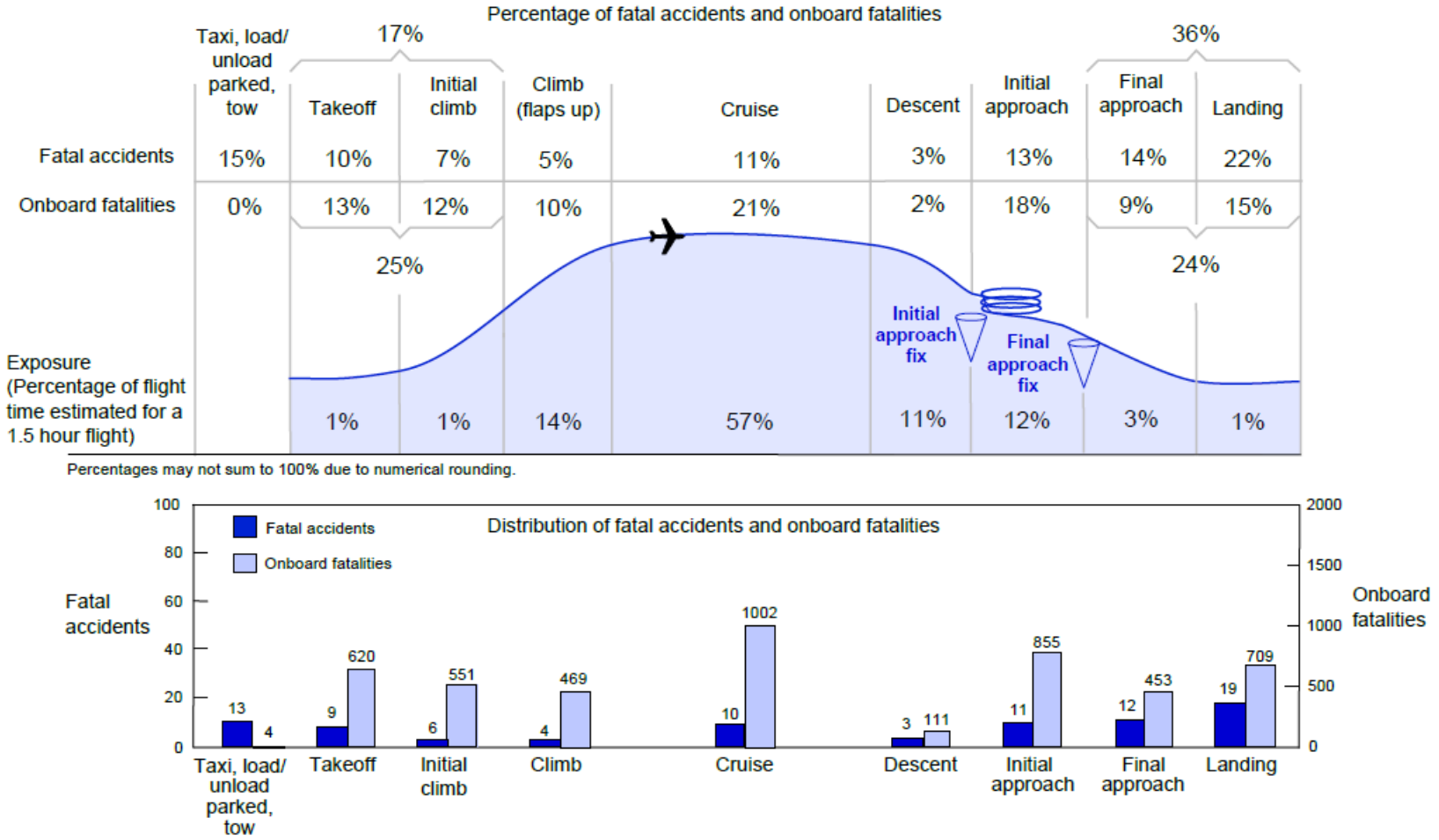
[238] Statistical Summary of Commercial Jet Airplane Accidents, Worldwide Operations 1959 – 2010, Boeing, June 2011

Table 9.1: Fatal Commercial Aviation Accidents 2011

| Date | Operation | Operator | A/c Type | Location | Fatalities | Phase |
|---|---|---|---|---|---|---|
| 01-Jan | Scheduled Pax | Kolavia | Tu-154B-2 | Surgut Airport, Russia | 3 | G |
| 09-Jan | Scheduled Pax | Iran Air | B727-200 | Near Orumiyehi Airport, Iran | 78 | M/A |
| 20-Jun | Scheduled Pax | RusAir | Tu-134A | Petrozavodsk Airport, Russia | 44 | RA |
| 08-Jul | Scheduled Pax | Hewa Bora Airways | B727-100 | Kisingani Airport, DR Congo | 73 | RA |
| 04-Apr | Non-Scheduled Pax | Georgian Airways (for UN) | CRJ100ER | Kinshasa Ndjili Airport, DR Congo | 32 | L |
| 20-Aug | Non-Scheduled Pax | First Air | B737-200 | Near Resolute Bay Airport, Canada | 12 | AA |
| 07-Sep | Non-Scheduled Pax | Yak Service | Yak-42 D | Near Yaroslavi Airport, Russia | 44 | C |
| 22-Sep | Non-Scheduled Pax | Arctic Sunwest Charters | DHC Twin Otter | Yellowknife, Canada | 2 | RA |
| 14-Oct | Non-Scheduled Pax | Moremi Air | Cessna 208B Caravan | Xakanaka Airstrip, Botswana | 8 | C |
| 10-Feb | Regional/Commuter | Manx2 leased from Flightline (Spain) | Swearingen Metro III | Cork Airport, Ireland | 6 | RA |
| 14-Feb | Regional/Commuter | Central American Airways | Let 410UVP | Near Cerro de Hula, Honduras | 14 | ER |
| 07-May | Regional/Commuter | Merpati Nusantara Airlines | Xian MA60 | Kaimana-Utarom Airport, Indonesia | 25 | AA |
| 18-May | Regional/Commuter | Sol Linéas Aéreas | Saab 340A | Near Prahuaniyeu, Argentina | 22 | ER |
| 04-Jul | Regional/Commuter | Mississippi Airlines | Cessna 208B Caravan | Pukatawagan, Canada | 1 | TO |
| 11-Jul | Regional/Commuter | Angara Airlines | Antonov An-24 | Near Strezhevoy, Russia | 5 | ER |
| 13-Jul | Regional/Commuter | NOAR Linhas Aéreas | Let 410 | Near Recife Airport, Brazil | 16 | C |
| 06-Sep | Regional/Commuter | Aerocon | Swearingen Metro | Trinidad Airport, Bolivia | 8 | RA |
| 20-Sep | Regional/Commuter | SALSA d'Haiti | Beech 99 | Near Milot, Haiti | 3 | ER |
| 23-Sep | Regional/Commuter | Servant Air | DHC Turbine Otter | Near Kodiak, Alaska, USA | 1 | AA |
| 25-Sep | Regional/Commuter | Buddha Air | Beech 1900D | Near Kathmandu Tribhuvan, Nepal | 19 | AA |
| 29-Sep | Regional/Commuter | Nusantara Buana Air | Casa Nurtanio NC-212 | Bohorok, Sumatra, Indonesia | 18 | ER |
| 04-Oct | Regional/Commuter | Air Twindi | Cessna 208B Caravan | Near Great Slave Lake, Canada | 2 | ER |
| 13-Oct | Regional/Commuter | Airlines PNG | Dash 8-100 | Near Madang, PNG | 28 | AA |
| 12-Feb | Non-Passenger Flight | Sabang Merauke Raya | Casa Nurtanio NC212 | Near Kijang Airport, Bintan, Indonesia | 5 | ER |
| 14-Feb | Non-Passenger Flight | African Air Services | Let 410 | Mont Biega, DR Congo | 2 | ER |
| 21-Mar | Non-Passenger Flight | Trans Air Cargo | Antonov An-12 | Near Pointe Noire Airport, Congo | 4 (+19 ground) | RA |
| 06-Jul | Non-Passenger Flight | Silk Way Airlines | Ilyushin Il-76TD | Near Bagram Air Base, Afghanistan | 9 | AA |
| 28-Jul | Non-Passenger Flight | Asiana Airlines | B747-400F | Sea between Seoul and Shanghai | 2 | ER |
| 09-Aug | Non-Passenger Flight | Avis-Amur | Antonov An-12 | Near Omsukchan, Russia | 11 | ER |
| 02-Sep | Non-Passenger Flight | Grant Aviation | Cessna 208B | Near Nightmute, Alaska, USA | 1 | ER |
| 09-Sep | Non-Passenger Flight | Susi Air | Cessna 208B Caravan | Near Tangma, Irian Jaya, Indonesia | 2 | ER |
| 23-Nov | Non-Passenger Flight | Susi Air | Cessna 208B Caravan | Near Sugapa, Indonesia | 1 | AA |
| 10-Dec | Non-Passenger Flight | Aviation Technology Innovator | Beechcraft 65-80 Queen Air | Near Manila, Indonesia | 3 (+11 ground) | TO |

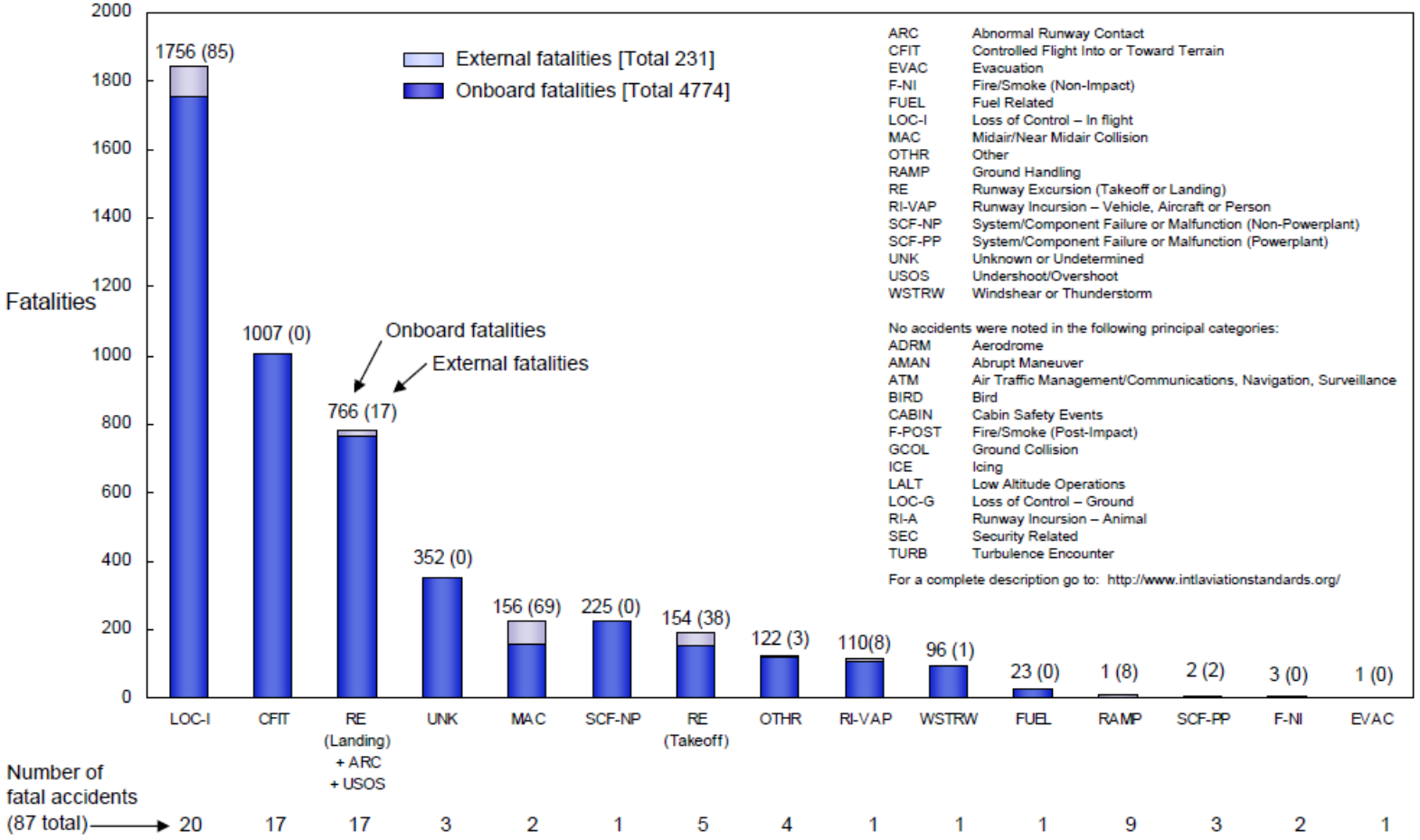
Source: Flight International updated (Key to Phase of Flight: AA = Airfield Approach; C = Climb; ER = En Route, G= On Ground; L = Landing, M/A = Missed Approach; RA = Runway/Final Approach; TO = Take Off)

Figure 9.3: Fatal Accidents and Onboard Fatalities by Phase of Flight (Worldwide Commercial Jet Fleet 2001 to 2010)




Source: Statistical Summary of Commercial Jet Airplane Accidents, Worldwide Operations 1959 – 2010, Boeing, June 2011

Figure 9.4: Fatalities by Accident Type (Fatal Accidents Worldwide Commercial Jet Fleet 2001 to 2010)




Source: Statistical Summary of Commercial Jet Airplane Accidents, Worldwide Operations 1959 – 2010, Boeing, June 2011

### 9.2.2 2011 Accidents by Region

In December 2011, IATA published[239] statistics (complete up to the end of November 2011) of accident rates by world region based on hull losses rather than fatal accidents. Separate rates were provided for western-built jet hull losses (Figure 9.5) and total hull losses which includes eastern and western jets and turboprop aircraft (Figure 9.6). Updated information (including 2011) on fatal accidents by World Region was provided by EASA in June 2012[240].

In terms of western-built jet hull loss accidents, all regions performed better or the same in 2011 compared to 2010 with the exception of the Commonwealth of Independent States (CIS). Europe and North Asia had zero western-built jet hull losses. The same regional trends were evident when looking at all hull loss accidents, although for European (operated in EASA Member States) commercial turboprop operations, there was a fatal accident involving a Swearingen SA227. 6 of the 12 occupants on board received fatal injuries. Nevertheless, this was one of the lowest annual accident rates in Europe in the past decade.

As a result, compared to the EASA Annual Safety Review of 2010, the rate of accidents for EASA Member States has dropped from 3.3 to 1.6 fatal accidents. This change is mainly because of the exceptionally high European accident rate (11.7) in the year 2001. This year is not included in the EASA Review of 2011 which only covers the decade 2002 – 2011.

Africa showed the most improvement with a 63% drop in hull loss accidents in 2011 versus 2010. IATA reported that there were zero accidents involving Africa IOSA-members (i.e. those carriers undergoing IATA Operational Safety Audits) in 2011. IPSOA, launched in 2009, is designed to ensure that all IATA carriers have operational Flight Data Analysis (FDA) programs, with all carriers in the program now meeting targets and three carriers exceeding the desired performance level. It is too early yet to say whether the improvement in the 2011 airline fatal accident data for Africa can be attributed in full or in part to this program. While the improvement in 2011 is to be welcomed, Africa continues to remain the region with the highest rate of fatal accidents over a 10 year period, as reported by EASA (Figure 9.7).

The CIS showed the worst deterioration with five jet hull losses in 2011 resulting in a 55% increase in accidents compared to 2010. This was following a good year in 2010 when CIS had recorded zero western-built jet hull losses. In April 2011, Russia reported[241] that the government has adopted a program to raise flight safety standards in the country. Russian aviation has been criticised in the past by IATA for having a safety record "well below international standards". The program envisions a gradual reform of the country's flight safety management system through the creation of an advanced integrated data control and exchange network and the development of hardware and software to assist air traffic officials in decision-making processes. Russia is also planning the technical overhaul of about 300 air traffic control facilities and will establish new entities to analyse aircraft crashes.

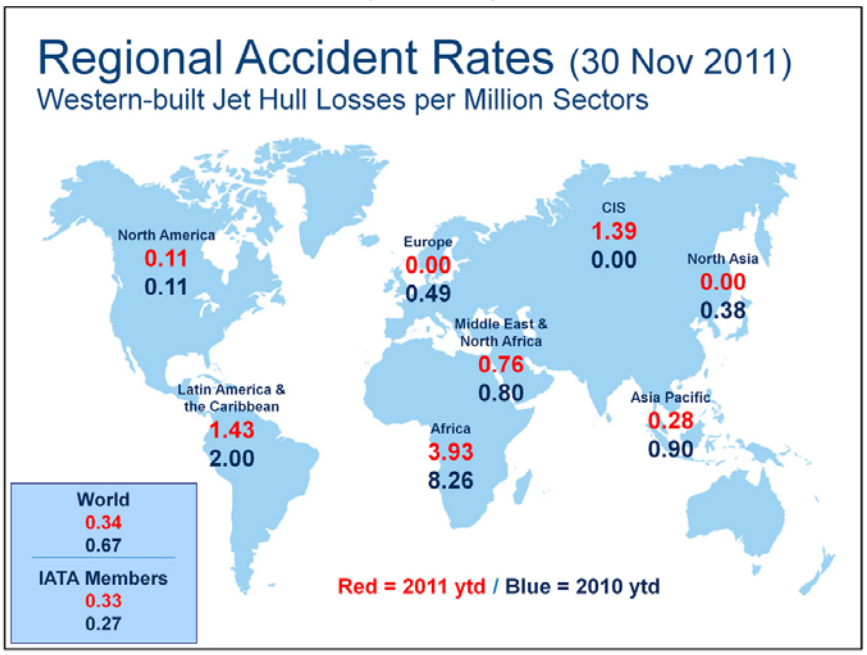
Indonesia has a consistently poor airline safety record, especially on domestic routes, and 2011 was no exception. There were four fatal domestic airline accidents in Indonesia, despite its government working to improve the country's safety oversight systems. All the accidents involved turboprop-powered aircraft rather than jets.

[239] Safety Presentation, IATA Global Media Day, 07 Dec 2011

[240] Annual Safety Review 2011, EASA, June 2012

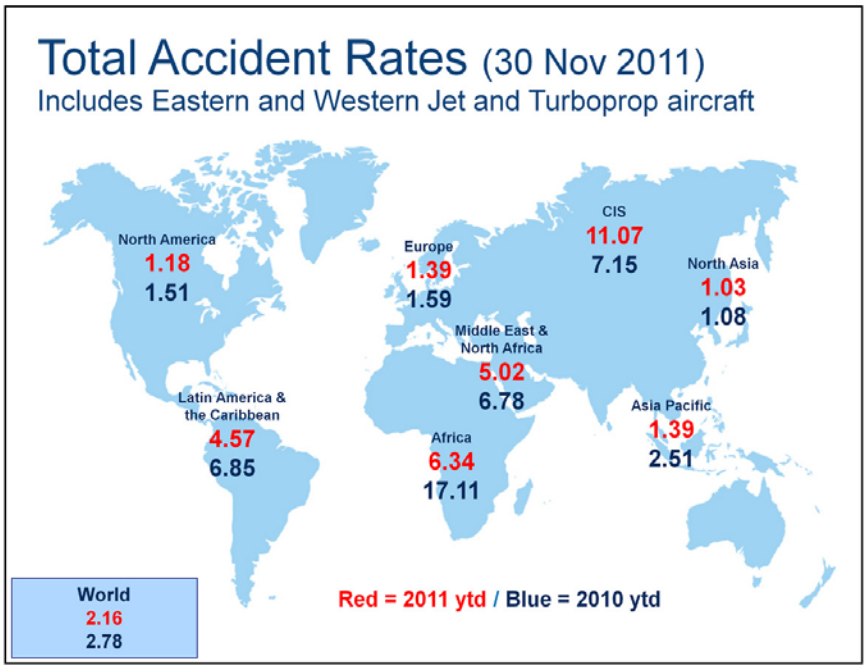
[241] http://awery.net/news/219

Figure 9.5: 2011 v 2010 Accident Rates by World Region – Western Built Jet Hull Loss Accidents



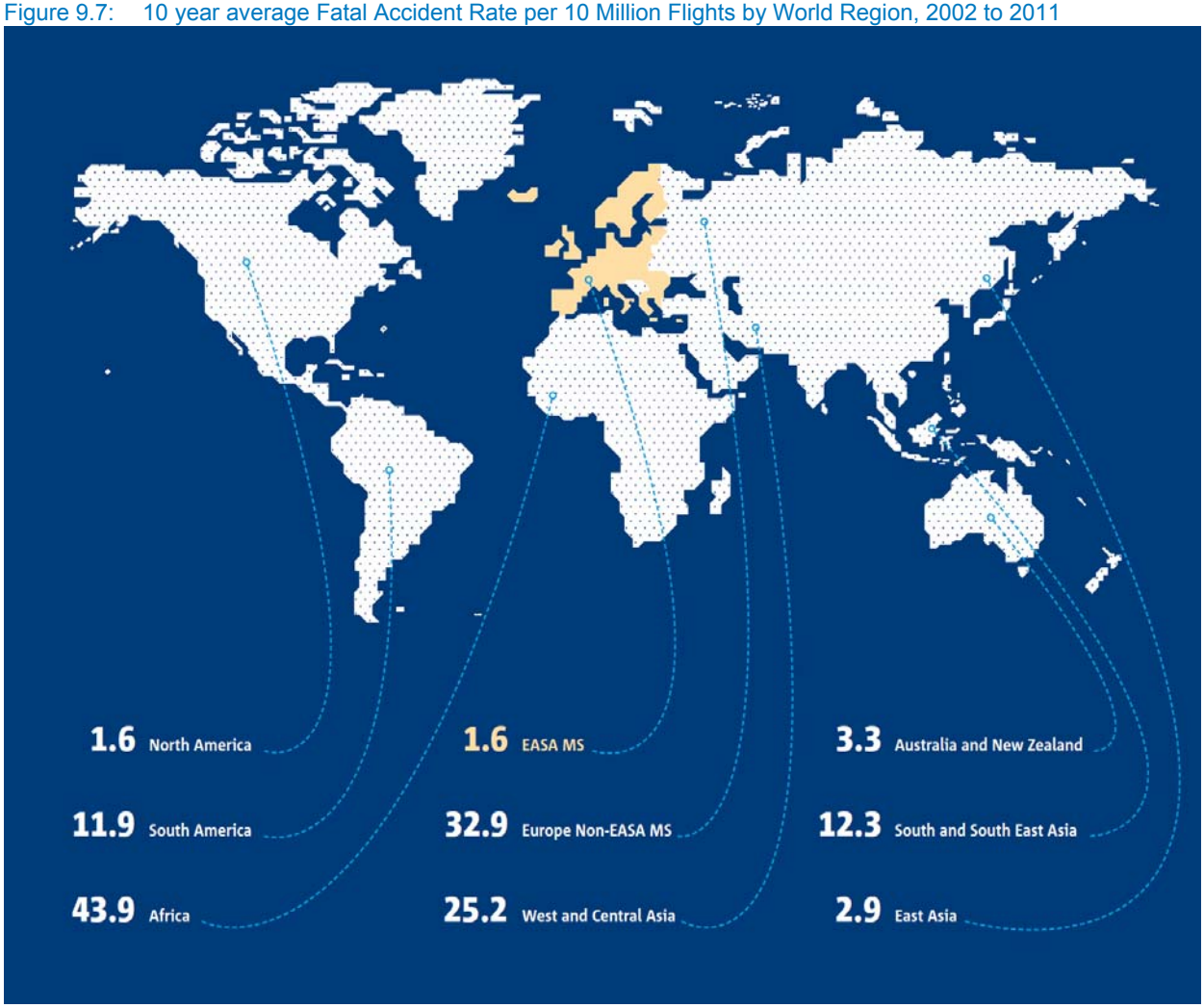

Source: IATA

Figure 9.6: 2011 v 2010 Accident Rates by World Region – All Hull Loss Accidents




Source: IATA

Figure 9.7: 10 year average Fatal Accident Rate per 10 Million Flights by World Region, 2002 to 2011

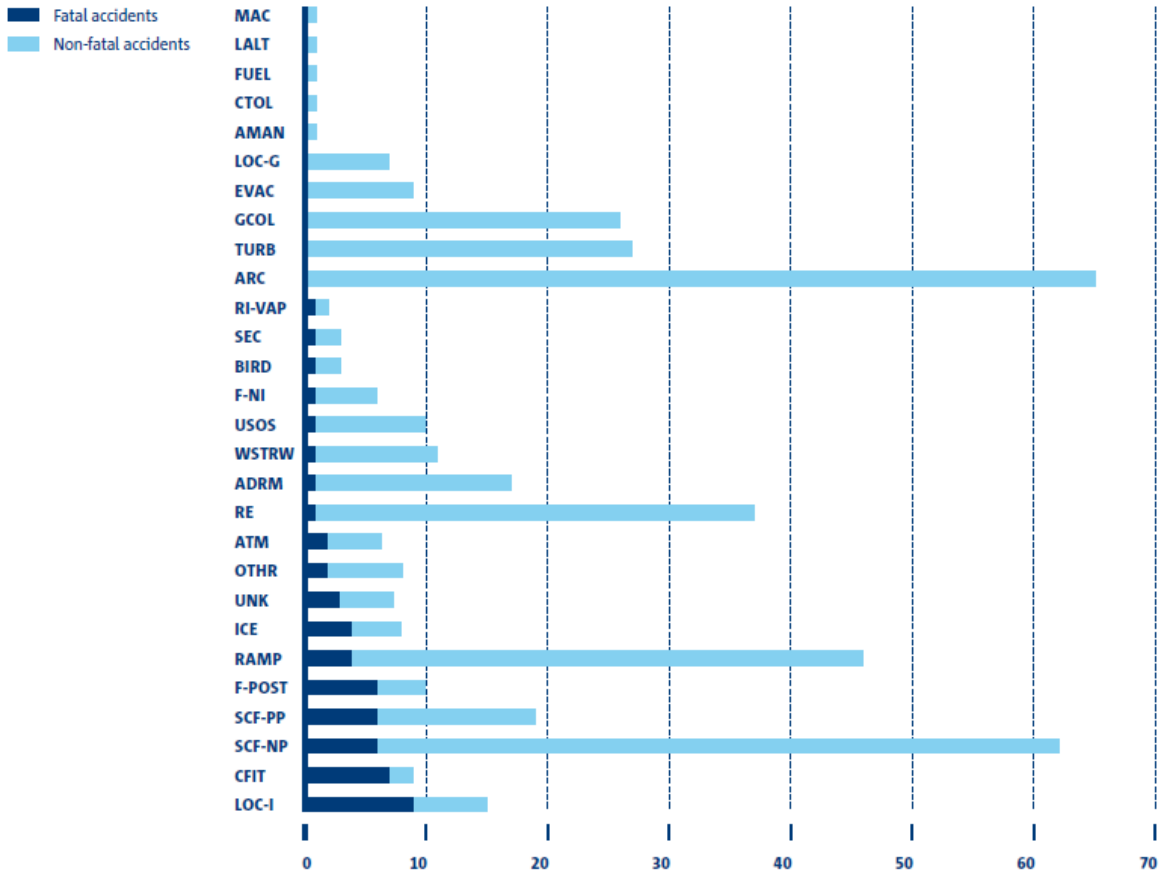



Source: EASA Annual Safety Review 2011. Scheduled passenger and cargo operations only

### 9.2.3 Trends in Accident Categories for European Commercial Flights (Operated in EASA Member States)

From the EASA 2011 Annual Safety Review, Figure 9.8 shows that the accident categories with the highest number of fatal accidents in the decade of 2002 to 2011 were LOC-I ('Loss of control in flight') and CFIT ('Controlled Flight Into Terrain'). Events assigned under LOC-I involve the momentary or total loss of control of the aircraft by the crew. This loss might be the result of reduced aircraft performance or because the aircraft was flown outside its capabilities for control. CFIT accidents involve the aircraft colliding with terrain while it is still under the control of the crew. Such accidents can be the result of loss of situational awareness or of errors of the crew in managing the aircraft systems. The Figure also shows that the highest number of non-fatal accidents involved an ARC ('Abnormal runway contact'). These accidents include long, fast or hard landings as well as the scraping of the tail or the wing of the aircraft during take-off or landing.

Figure 9.8: Accident categories for EASA Member State operated aeroplanes (2002 – 2011)



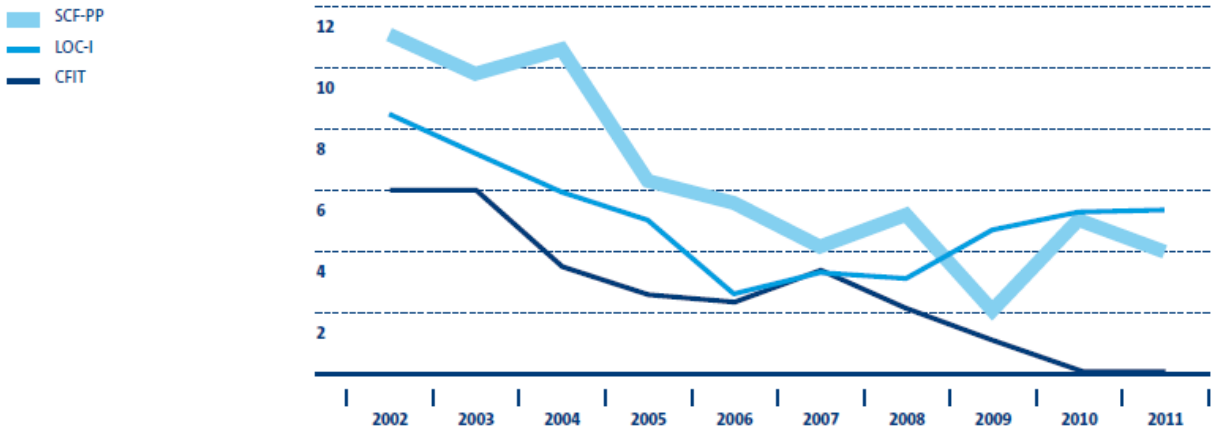

Source: EASA Annual Safety Review 2011

KEY

| | | | |
|---|---|---|---|
| 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 or malfunction (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 or Malfunction (powerplant) |

Figure 9.9 shows the trend of some of the occurrence categories over time. From this Figure it is evident that CFIT accidents involving EASA Member State operated aircraft have an overall decreasing trend over the past decade. This can be attributed to technological improvements and to increased awareness of situations which may lead to such accidents. A similar trend is also shown for accidents which involve the failure of a system or component directly related to the operation of an engine, SCF-PP ('System or Component failure related to powerplant'). In recent years there has been an increasing trend in the number of accidents involving loss of control (LOC-I).

Figure 9.9: Annual percentage of CFIT, SCF-PP and LOC-I accident categories (EASA MS operated aeroplanes)




Source: EASA Annual Safety Review 2011

## 9.3 Strategic Safety Issues

Regulation EC 691/2010 was adopted in July 2010 and set out a performance scheme to monitor/measure improvements in the field of safety. The three key performance indicators in terms of safety are detailed in the previous 'Annual Analyses of the EU Air Transport Market'[242]. These indicators cover the effectiveness of safety management, the application of harmonised rules for the reporting of incidents, and the establishment of a "Just Culture". Although Reg. 691/2010 does not obligate Member States to adopt national safety targets, they are encouraged to include in their Performance Plans their own safety targets and indicators for monitoring purposes.

### 9.3.1 Just Culture

One of those key principles of safety management is Just Culture. Just Culture is defined in Article 2(k) Regulation EC 691/2010 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 ambition being that the

[242] Annual Analyses of the EU Air Transport Market 2010, Final Report; Mott MacDonald; September 2011.

implementation of Just Culture will create a non-punitive and learning environment allowing for the collection of reliable and accurate safety data.

In its report of 20 September 2011[243], the Performance Review Body (PRB) of the Single European Sky comments that work on the measurement of Just Culture is still in its infancy and recommends that "the European Commission encourages all States to implement and prepare for the measurement of Just Culture at three levels (ANSPs, NSA/CAA, and State)".

### 9.3.2 Incidence or Occurrence Reporting

European Directive 2003/42/EC on occurrence reporting in civil aviation placed an obligation on Member States to make 'all relevant safety-related information' stored in their databases available to the competent authorities of other Member States and the European Commission and to ensure that their databases were compatible with software developed by the European Commission (i.e. ECCAIRS software). Furthermore, Member States were obliged to integrate their occurrence data into the ECR according to Commission Regulation (EC) No 1321/2007. By the end of 2011, all of the Member States are now integrating their data into the ECR.

At the end of 2011 the ECR contained 625,267 occurrences, this was an increase of over 200,000 over the previous year (includes both incidents and accidents). This increase is not necessarily due to an increase in safety occurrences over the past 12 months, but is largely due to the endeavours of States in integrating their occurrence data into the ECR. Whilst this progress is to be applauded, there are a still a large number of incidents reported with very sparse supporting information.

For the ECR to provide the best possible information to the whole European Aviation Community, it is vital that the data within it is of the greatest possible detail. The task to improve data quality will continue over the coming years and the establishment of a European Network of Safety Analysts, lead by EASA and involving the National Aviation Authorities of Member States is already starting to provide real benefits in this area.

In terms of reporting ATM incidences or occurrences, a report by Eurocontrol's Performance Review Commission published in May 2011[244] points out that reporting "remains unsatisfactory in some areas of Europe" and that "no or limited progress has been made in… 8 (Member) States during the past 6 years". It suggests that there is an "urgent need to accelerate the deployment of automatic safety data reporting tools in Europe in order to improve the reporting culture".

The PRB's report (referred to above) goes further in recommending that the European Commission requests member states that have not already done so to use the RAT methodology during safety occurrence analysis to develop performance indicators for monitoring purposes, to establish a harmonised benchmark for reporting across all States.

[243] SES II Performance Scheme; Assessment of National/FAB Performance Plans with Performance Targets for the period 2012-2014; Prepared by the Performance Review Body (PRB) of the Single European Sky; 20 September 2011.

[244] Performance Review Report – An Assessment of Air Traffic Management in Europe during the Calendar Year 2010; May 2011.

## 9.4 Safety Developments relating to 2011

This section details global, regional, national and industry aviation safety developments relating to 2011. It is not a comprehensive listing, but is intended to highlight initiatives or analysis of particular interest. Only new material is presented that was not covered in the previous edition of Annual Analyses.[245]

### 9.4.1 EU-US Agreement on Civil Aviation Safety

In March 2011, the EU and the United States concluded an agreement on cooperation in the regulation of civil aviation safety[246]. The purpose of the agreement is to enable the reciprocal acceptance of findings of compliance and approvals, promote a high degree of safety in air transport and ensure regulatory cooperation and harmonisation between the United States and the EU as regards airworthiness approvals and monitoring of civil aeronautical products, environmental testing and approvals of such products, and approvals and monitoring of maintenance facilities.

### 9.4.2 Global System for Reporting Aviation Accidents and Incidents

In September 2011, the European Commission and ICAO agreed on the use of a single repository and a common categorisation scheme (taxonomy) to report all aviation accidents and incidents worldwide. Under the agreement, ICAO will promote, among its 190 Member States, the European Coordination Centre for Accident and Incident Reporting Systems (ECCAIRS), developed by the European Commission Joint Research Centre (JRC) for collecting and analysing aviation safety data as well as the sharing of safety information. The European Commission will promote the use of the ICAO taxonomy as the standard for reporting and exchanging accident and incident information within the EU. The ICAO categorisation of accidents is fully compatible with ECCAIRS.

The agreement provides new impetus for more States to join ECCAIRS, and is a follow-up to the Memorandum of Cooperation (MOC) signed earlier in 2011[247] between the EU and ICAO providing a framework for enhanced cooperation in the field of civil aviation. The MOC makes it possible for Europe to contribute to the work on policy and standard setting in ICAO in the fields of safety, security, air traffic management and environmental protection.

### 9.4.3 ICAO State of Global Aviation Safety in 2011

In December 2011, ICAO issued a report entitled the State of Global Aviation Safety[248]. This inaugural 2011 report is intended to provide Member States, the aviation community and the travelling public with a high-level analysis of air transport safety trends and indicators (up to and including the end of 2010). It is also a comprehensive account of the significant aviation safety programmes being undertaken by ICAO and its partners. Future ICAO Safety Reports will be published annually, providing ongoing updates to the air transport community on key safety indicators.

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[245] Annual Analyses of the EU Air Transport Market 2010, Final Report for the European Commission, Mott MacDonald, September 2011

[246] Agreement between the United Sates of America and the European Community on co-operation in the regulation of civil aviation safety, Council of the European Union 8312/09, 01 March 2011

[247] Provisional application of a Memorandum of Cooperation between the European Union and the International Civil Aviation Organisation providing a framework for enhanced cooperation, Council of the European Union Decision 7702/11, 21 March 2011

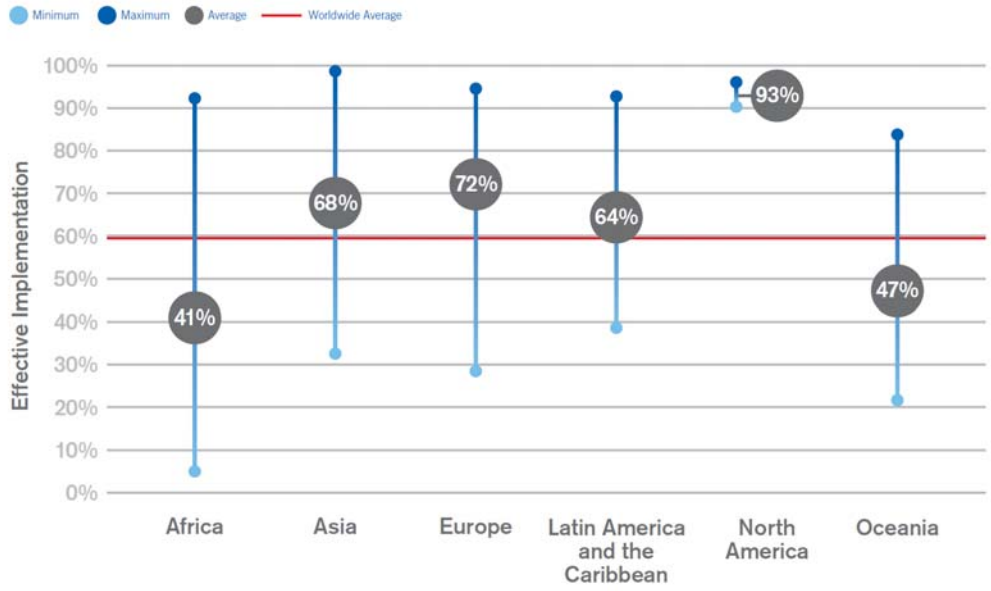
[248] 2011 State of Global Aviation Safety, ICAO Special Edition, December 2011

In 2011, ICAO began the transition of its Universal Safety Oversight Audit Programme (USOAP) to a Continuous Monitoring Approach (CMA), which will be implemented in a phased evolution as of 2013. The CMA represents a long-term, flexible, cost-effective and sustainable method of identifying safety deficiencies, assessing associated risks, developing assistance strategies and prioritising improvements. The CMA aims to provide a continuous report of a States' effective implementation, as opposed to the 'snap-shot' audit conducted once every six years under the comprehensive systems approach.

Effective State safety oversight capabilities, as measured by the USOAP, provide a proactive indicator of safety performance. Figure 9.10 shows the maximum, minimum and average effective implementation value of USOAP protocols for each region, based on the 177 out of 190 ICAO Member States audited as of 31 December 2010. The figure shows the wide range of levels of effective implementation that exist across the globe.

The USAOP audit protocol is a comprehensive checklist covering all areas of a State's safety oversight system. Using the audit protocol as a guideline, auditors are then able to determine a State's capability for safety oversight. Figure 9.11 shows the global audit results by each of the eight Critical Elements evaluated. Air navigation services and aircraft accident and investigation are the two poorest performing areas.

Figure 9.10: Effective Implementation of USOAP protocols




Source: ICAO 2011 State of Global Aviation Safety

Figure 9.11: Global USAOP Results: Effective Implementation of Safety Oversight by Area.


Source: ICAO 2011 State of Global Aviation Safety

### 9.4.4 European Commission Transport White Paper

In publishing its White Paper on Transport[249], the Commission stated the clear aim that the European Union should be the safest region for aviation. In addition, the Report of the High Level Group on Aviation Research[250] stated a goal for 2050 of reducing the accident rate of commercial aircraft flights to less than one per ten million flights, i.e. half the current level. However, whilst the aviation accident rate continues to decline, the rate of decline has slowed markedly since 2004[251]. At the same time there is a continued growth in the number of flights, which are set to almost double by 2030[252]. As a consequence, in order to preserve the current low level of fatalities resulting from air accidents, the accident rate needs to continue to decline at a rate commensurate with the growth in the number of flights.

The EU is therefore faced with a significant challenge over the coming years if it is to be a world leader in aviation safety and save lives that would otherwise be lost. There is therefore a clear need for action. The following section describes the European Aviation Safety Programme and the setting up of an Aviation Safety Management System for Europe. It is Europe's contribution in support of the aim, agreed at the International Civil Aviation Organisation's (ICAO) High Level Safety Conference[253] held in Montreal in 2010, of moving towards a pro-active, evidence based, management of aviation safety.

[249] COM(2011) 144 - WHITE PAPER - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system

[250] ISBN 978-92-79-19724-6 - Flightpath 2050 - Europe's Vision for Aviation.

[251] ISBN: 978-92-9210-097-1 - EASA Annual Safety Review

[252] EUROCONTROL CND/STATFOR Doc415 of 17 December 2010 - Long-Term Forecast - Flight Movements 2010 - 2030

[253] ICAO Doc 9935, HLSC 2010

### 9.4.5 European Aviation Safety Programme

Following on from the production of the White Paper, a Commission Staff Working Paper was issued in October 2011 describing the current aviation safety framework at European level. It was prepared jointly by the Commission and EASA and is called the "European Aviation Safety Programme"(EASP)[254]

The objective of the European Aviation Safety Programme is to ensure that the system for the management of aviation safety in the European Union (EU) delivers a safety performance that is the best of any world region, uniformly enjoyed across the whole Union, and continuing to improve over time.

In the EU, standards are set at the level of the European Union in the fields of EU competence, and the Member States and EASA are responsible for their implementation. Safety is achieved through compliance with the requirements as well as performance to the desired safety levels. The activities contributing to the improvement of safety in Europe can be conceptually grouped into three complementary functions: the rulemaking function, the oversight function and the safety assurance and promotion function.

The EASP describes the integrated set of regulations at EU level, together with the activities and processes used to jointly manage safety at European level. In doing so, it first sets high level safety policies and objectives. It describes how the European Commission, the Member States and EASA cooperate to detect unsafe conditions and take actions as appropriate in order to minimise safety risks.

The components for a safe aviation system in Europe comprise, firstly, of a set of rules and regulations enforced by action at both Member State and EU level; and, secondly, a system of detailed investigations conducted by the Member States into the causes of accidents and serious incidents. The lessons learned following such investigations are used by both Member States and EASA to prevent a repetition of such events. These two pillars of sound regulation and detailed safety investigations, together with an effective system of safety oversight are the foundation on which the current high safety standards in Europe have been built.

In addition, the EU, with the active participation of the Member States and the Industry, is developing a more systematic and proactive system which utilises modern safety management techniques. A proactive “total system approach” is required to continually improve safety performance in line with the ever expanding scale and complexity of commercial aviation. It is called a "total system approach" based on the fact that the aviation system components – products, organisations, operators, crews, aerodromes, ATM, ANS, on the ground or in the air – are part of a single network.

The approach to setting up an Aviation Safety Management System in Europe, together with specific actions to be undertaken, was described in a Communication[255] from the Commission which accompanied the Working Paper on the EASP.

[254] Commission Staff Working Paper - The European Aviation Safety Programme - SEC (2011) 1261 final, 25 October 2011

[255] Communication from the Commission to the Council and the European Parliament – Setting up an Aviation Safety Management System for Europe, COM (2011) 670 final, 25 October 2011

### 9.4.6 European Aviation Safety Plan

In January 2012, EASA published the second edition of the European Aviation Safety Plan[256], covering the 4 year period 2012 to 2015. The plan is organised according to a Safety Plan Framework (Figure 9.12) covering three broad areas: systemic, operational and emerging issues. The risks identified in these areas are mitigated by safety actions undertaken by the Member States, EUROCONTROL, the European Commission, the industry and EASA. The second edition provided an update on the status of the 91 actions identified in the previous year's initial plan covering 2011 to 2014[257], as well as identify 24 new actions. In 2011, 12 actions were completed and 60% of actions are on schedule according to the initial plan.

Figure 9.12: EASA Safety Plan Framework


Source: EASA Aviation Safety Plan 2012 to 2015

### 9.4.7 UK Safety Plan

Through the European Aviation Safety Plan, EASA is encouraging Member States to develop their own safety plans. For example, in July 2011, the UK CAA published its own safety plan[258] covering the years 2011 to 2013. The framework for this plan is based around the "Significant Seven" safety issues which were identified and prioritised following analyses of global fatal accidents and high-risk occurrences involving large UK commercial air transport aeroplanes. The framework (Table 9.2) also includes the key capabilities underpinning total system safety.

Table 9.2: UK CAA Safety Framework

| |
|---|
| **1. Loss of Control** |
| **2. Runway Excursion** |
| **3. Controlled Flight into Terrain** |
| **4. Runway Incursion** |
| **5. Airborne Conflict** |

[256] European Aviation Safety Plan 2012-2015, Final, EASA, January 2012

[257] European Aviation Safety Plan 2011-2014, Draft, EASA, Updated 04 February 2011

[258] Safety Plan 2011 to 2013, UK Civil Aviation Authority, July 2011

| |
|---|
| **6. Ground Handling** |
| **7. Airborne and Post-Crash Fire** |
| |
| **Key Capabilities Required for the Total Aviation System** |
| • Integrated Safety Risk Management Process |
| • Continuing Airworthiness |
| • Safety Management Systems |
| • Just Culture |
| • Human Factors |
| • Performance-Based Oversight |
| • Fatigue Risk Management Systems |
| • Total System Threats |

Source: CAA Safety Plan 2011 to 2013

### 9.4.8 Flight and Duty Time Limitations (FTL)

It is well established that human performance is a key paradigm in aviation safety today, and fatigue is one of the main factors affecting human performance. It is crucial that safety regulations provide both flight and cabin crew with the best possible conditions to ensure they remain alert during all phases of the flight.

EASA has the double mandate to update Flight and Duty Time Limitations and rest requirements for commercial air transport with aeroplanes while taking into account recent scientific and medical evidence, and to further harmonise existing European requirements in order to provide a level-playing field for European airlines.

In addressing fatigue, the Agency aims to find a well-balanced set of rules, which ensure a safe work environment for crews and promote the high safety standards of European civil aviation.

In January 2012, EASA published the Comment Response Document (CRD)[259] on implementing rules on Flight and Duty Time Limitations and rest requirements for commercial air transport with aeroplanes, commonly known as FTL regulations.

The Agency issued a first proposal in the form of a Notice of Proposed Amendment (NPA) in December 2010 (NPA 2010-14)[260] and received comments from a large number of stakeholders during the three month consultation phase which followed.

This CRD contains an updated set of FTL rules, which reflects the comments received and the extensive discussions that took place within the FTL expert group set up by EASA. This review group consisted of representatives from operators, national authorities and crew organisations. The Agency also contracted three independent scientists to assess the original NPA proposal in order to ensure that the revision is based on the latest scientific evidence.

[259] Comment Response Document (CRD) to NPA 2010-14, related to the Implementing Rules on flight and duty time limitations and rest requirements for commercial air transport (CAT) with aeroplanes, EASA, 18 Jan 2012

[260] Notice of Proposed Amendment (NPA) No 2010-14A, related to the Implementing Rules on flight and duty time limitations and rest requirements for commercial air transport (CAT) with aeroplanes, EASA, 20 Dec 2010

The final Opinion, including an amended Regulatory Impact Assessment (RIA) is expected to be published in September 2012. Following the final Opinion, the proposed rule will enter the legislative process, where the Commission assisted by National Authorities under Parliamentary scrutiny will finalise and adopt the proposal.

In December 2011, the FAA issued its final rule on Flightcrew Member Duty and Rest Requirements[261]. The rule amends the FAA's existing flight, duty and rest regulations applicable to certificate holders and their flightcrew members operating under 14 CFR Part 121. The new rules come in the aftermath of the Colgan Air crash in February 2009. The investigation into that crash, which killed 50 people, found that one of the causes of the crash was that both pilots were dangerously fatigued.

### 9.4.9 Fatigue Risk Management Systems

Until 2011, the only international Standards available for managing fatigue in flight operations were related to flight and duty time limitations. Scientific and operational support of Fatigue Risk Management Systems (FRMSs), however, is increasingly becoming accepted as a means for more comprehensively managing fatigue risks. In the few cases where States have allowed some operators to implement an FRMS, they have done so in the absence of internationally accepted minimum requirements. This has resulted in:

- Certain operators being seen to have unfair operational advantages.
- A lack of consistency in the implementation of FRMS.
- Difficulties in the provision of adequate assessment and monitoring of FRMS by regulators.

To address these concerns, ICAO established an FRMS Task Force consisting of 35 scientists, regulators, operators and industry representatives. The Task Force developed a proposal for FRMS Standards and Recommended Practices (SARPs) and, during 2011, published detailed guidance material in the form of two complementary manuals: one for operators and one for States. The FRMS Implementation Guide for Operators[262] has been developed with IATA and IFALPA. It provides information about, and examples of, how the minimum requirements can be put into operation. The FRMS Manual for Regulators[263] provides information related to a process for the regulatory oversight of FRMS.

To keep the aviation community better informed and provide easy access to FRMS resources, a dedicated fatigue management area has been developed for ICAO's public web site. It aims to help States and operators better manage fatigue-related risks and will continue to evolve with increased scientific insights and as the aviation industry's experience with FRMS grows.

In support of this cooperation and to further facilitate understanding and implementation, IATA, ICAO and IFALPA are delivering FRMS information workshops around the globe in 2011-12 to outline the context for the FRMS requirements from the perspective of each of the stakeholders – regulator, operator and pilot.

As part of its final rule on Flightcrew Member Duty and Rest Requirements[264], the FAA allows airlines to develop alternative ways of mitigating fatigue based on science and using data that must be validated by the FAA and continuously monitored.

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[261] Flightcrew Member Duty and Rest Requirements, 14 CFR parts 117, 119 and 121, Federal Aviation Administration

[262] Fatigue Risk Management Systems, Implementation Guide for Operators, ICAO, IATA, IFALPA, 1st Edition, July 2011

[263] Fatigue Risk Management Systems, Manual for Regulators, ICAO Doc 9966, 2011 Edition

[264] Flightcrew Member Duty and Rest Requirements, 14 CFR parts 117, 119 and 121, Federal Aviation Administration

In 2010, the US Congress mandated a Fatigue Risk Management Plan (FRMP) for all airlines and they have developed these plans based on FAA guidance materials. An FRMP provides education for pilots and airlines to help address the effects of fatigue which can be caused by overwork, commuting, or other activities. Airlines will be required to train pilots about the potential effects of commuting.

Required training updates every two years will include fatigue mitigation measures, sleep fundamentals and the impact to a pilot's performance. The training will also address how fatigue is influenced by lifestyle – including nutrition, exercise, and family life – as well as by sleep disorders and the impact of commuting.

### 9.4.10 European Safety List of Air Carriers subject to an Operating Ban

In April and November 2011, the European Commission published the 17th and 18th updates of the European safety list of air carriers subject to operating bans and other operational restrictions in the EU[265].

The 17th update removed the previous ban on the operations of four Indonesian all cargo air carriers – Cardig Air, Republic Express, Asia Link and Air Maleo. This was due to solid enforcement action taken by the Indonesian authorities to ensure that their operations are safe. Restrictions on Ukrainian airline UMAir were also removed after solid evidence showed its performance had improved. However, all air carriers certified in Mozambique were banned from flying into the EU as were the operations of Air Madagascar for two specific aircraft because of significant safety deficiencies requiring decisive action in both cases. All decisions were taken with the unanimous support of the Air Safety Committee, which consists of experts from the Member States.

The 18th update concluded that no measures were necessary by the Commission vis-à-vis air carriers licensed in Albania or in the Russian Federation. This followed a period of close and intense cooperation with the aviation authorities in these two countries which have now adopted strong measures to control and contain any risks to safety of their air carriers flying into the EU. Also thanks to further improvements in the safety performance of TAAG Angolan Airlines, the air carrier has been allowed to add two aircraft to those operating into the EU. The Commission was compelled, however, to impose operating restrictions to exclude part of the fleet of Jordan Aviation in view of numerous and repeated safety deficiencies and to ban fully all operations of the air carrier Rollins Air certified in Honduras.

The updated European list includes all carriers certified in 21 States, accounting for 273 known air carriers, whose operations are fully banned in the European Union: Afghanistan, Angola, Benin, Republic of Congo, the Democratic Republic of Congo, Djibouti, Equatorial Guinea, Gabon (with the exception of three carriers which operate under restrictions and conditions), Indonesia (with the exception of six carriers), Kazakhstan (with the exception of one carrier which operates under restrictions and conditions), the Kyrgyz Republic, Liberia, Mauritania, Mozambique, Philippines, Sierra Leone, Sao Tome and Principe, Sudan, Swaziland and Zambia.

The list continues to include four individual carriers: Blue Wing Airlines from Surinam, Meridian Airways from Ghana, Rollins Air from Honduras and Silverback Cargo Freighters from Rwanda.

Additionally, the list includes 11 air carriers which are allowed to operate into the EU under strict restrictions and subject to conditions: Air Astana from Kazakhstan as mentioned before, Air Koryo from the Democratic

[265] Commission Implementing Regulation (EU) No 1197/2011 of 21 November 2011 amending regulation (EC) No 474/2006 establishing the community list of air carriers which are subject to an operating ban within the Community,

People Republic of Korea, Airlift International from Ghana, Air Service Comores, Afrijet, Gabon Airlines and SN2AG from Gabon, Iran Air, TAAG Angolan Airlines, Air Madagascar certified in Madagascar and Jordan Aviation certified in the Hashemite Kingdom of Jordan.

It is worth noting that of the 33 fatal accidents in 2011, 9 (27%) were related to operators on the European safety list of air carriers subject to operating bans and other operational restrictions.

### 9.4.11 Carriage of Lithium Batteries

The largest aircraft involved in a fatal crash in 2011 was an Asiana Boeing 747-400F. Although the investigation is not yet complete, it looks as though the aircraft crashed because of a fire in the main cargo hold. The crew reported a cargo-hold fire and their intention to divert to the nearest airport, at Jeju, but they never made it.

This, together with the similar fatal accident involving a UPS 747-400F near Dubai on 3 September 2010, has triggered an examination of dangerous cargoes, particularly packs of lithium ion batteries which, if they ignite through short-circuiting, generate considerable heat. In both 747 freighters, lithium batteries were on board but not properly identified, and although both crews attempted diversion as quickly as they could, their aircraft became uncontrollable before they could land.

In September 2011, according to the US Federal Aviation Administration, the Massachussetts Institute of Technology shipped a container of lithium batteries with FedEx, which burst into flames in the company's cargo handling depot before loading, causing considerable heat damage to surrounding fabric. Because the material was not identified properly, the FAA said, FedEx employees could not initially extinguish the fire. The FAA heavily fined MIT for its alleged negligence.

The International Federation of Airline Pilots Associations says there have been 40 reports of smoke and fire incidents associated with lithium batteries since 1990. As lithium batteries in personal electronic devices can ignite, passengers will be asked about equipment they are carrying. It is thought to be more dangerous to put a battery-powered laptop in checked luggage as a fire in the cabin can be quickly detected and extinguished.

The ICAO Dangerous Goods Panel (DGP) met in October 2011 and again in February 2012 to discuss revised procedures for the carriage of Lithium Batteries. Following these meetings, IATA have revised their guidance on the transport of Lithium Metal and Lithium Ion Batteries based on the provisions set out in the 2011-2012 Edition of the ICAO Technical Instruction for the Safe Transport of Dangerous Goods by Air and the 53rd Edition of the IATA Dangerous Goods Regulations (DGR). Further changes will be incorporated into the 54th edition, effective 1 January 2013, once approved by the ICAO Council.

### 9.4.12 Performance Based Navigation

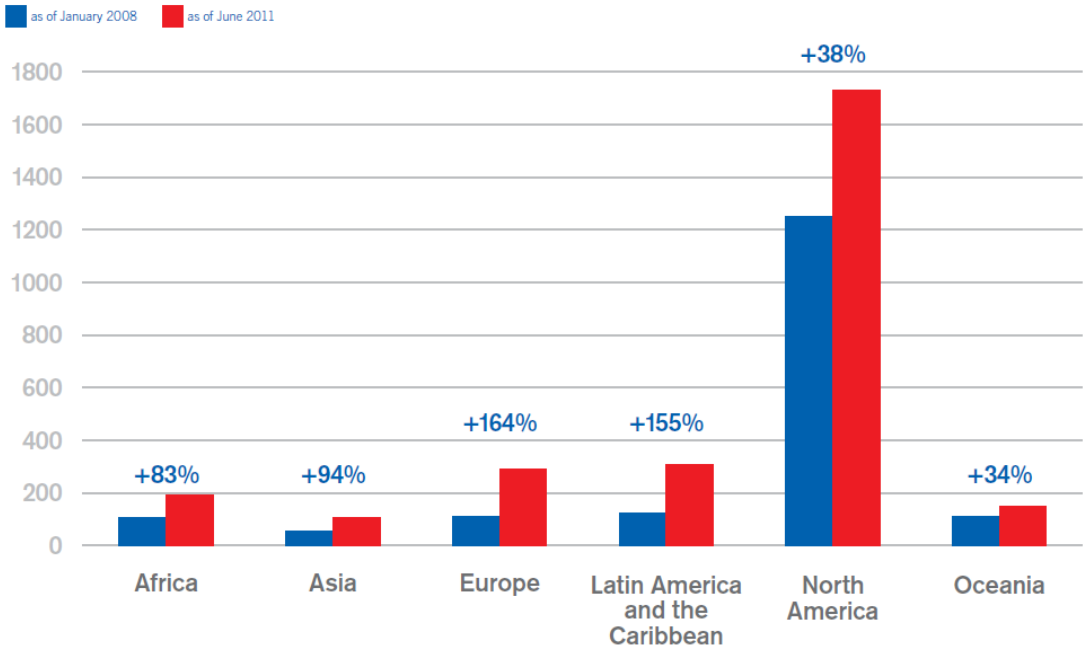
The evolution of air navigation systems coupled with advances in flight deck automation provide a means for aircraft to navigate more accurately without having to overfly ground-based navigation aids. This capability is known as Area Navigation or RNAV.

The PBN concept has facilitated RNAV implementation through the introduction of globally applicable navigation performance specifications. As a result, the navigation capabilities are very predictable, enhancing safety by providing improved obstacle and terrain clearance as well as aircraft-to-aircraft

separation. PBN is also a key enabler for runway safety, providing lateral and vertical guidance to virtually any runway as a cost-effective alternative to non-precision approaches.

PBN implementation has grown rapidly as shown in Figure 9.13, with the number of PBN approaches approved prior to June 2011 depicted in blue, while those approved after 1 June 2011 are depicted in red.

Figure 9.13: Number of implemented PBN approach procedures on international airports per UN Region




Source: ICAO 2011 State of Global Aviation Safety

Given that PBN operations (PBN OPS) require that the aircraft and flight crew be approved according to well-defined performance specifications, controllers have a high degree of confidence that the aircraft flying PBN routes will navigate accurately, adhering closely to their assigned trajectories. This reduces controller workload allowing them to focus on other tasks and, in this manner, enhancing safety.

The Go-Team is a collaborative effort involving ICAO, IATA and other industry partners, which assists States in PBN implementation. To date, the Go-Team has carried out five visits to Thailand, UAE, Mexico, Germany and Kenya. Four workshops were performed in 2011 to familiarise participants with airspace design as it relates to PBN implementation. Four additional workshops are planned in New Delhi, Mexico City, Paris and Kiev.

### 9.4.13 EGNOS

In May 2011, an airport in southern France became Europe's first to guide aircraft in for landing using highly accurate satellite navigation signals. According to the European Space Agency[266], Pau Pyrenees Airport is the first to utilise the new EGNOS Safety-of-Life Service. The aim of the service is to improve safety on smaller runways, where no vertically guided approach is available.

[266] http://www.esa.int/esaNA/SEMTV1ASJMG_egnos_0.html

The European Geostationary Navigation Overlay System (EGNOS) combines geostationary satellites with a network of ground stations to sharpen the accuracy and integrity of GPS signals across Europe. The EGNOS system was officially made available March 2 for the safety-critical task of providing vertical guidance to aircraft on final approach.

Clermont-Ferrand Airport in central France is set to start using EGNOS, as is Marseilles Airport and Le Bourget in Paris. Before a suitably equipped aircraft can perform EGNOS-based approaches to any runway, a dedicated approach procedure has to be published. EUROCONTROL is now working with the air navigation service providers in Europe, the airspace users and the national civil aviation authorities to promote the use of EGNOS. France's Directorate General for Civil Aviation (DGAC) is one of the most active partners. By 2020, all of France's approximately 100 airports should be EGNOS-capable. Work throughout Europe aimed at fostering the growth of EGNOS operations is also being supported by Ten-T funds from the European Commission. For example, in December 2011, Alderney airport in the Channel Islands became the first airfield in Europe to use EGNOS to support scheduled passenger services.

## 9.5 Aviation Security

### 9.5.1 Air Cargo Security

More than 40%, by value, of the world's freight travels by air every year. The thwarted Yemen printer cartridge bomb plot in October 2010 has been described as air freight's 9/11. Within the EU, the current regulatory framework provides for a comprehensive set of rules on the security of air cargo and mail[267], but the Yemeni event changed the way regulators view cargo security. In June 2011, ICAO and the World Customs Organisation (WCO) signed a Memorandum of Understanding (MOU)[268] for increased cooperation to protect air cargo from acts of terrorism or other criminal activity and for speeding up the movement of goods by air worldwide.

"The global air cargo system is a complex, multifaceted network for transporting vast amounts of freight, packages and mail on both passenger and all-cargo aircraft. The solution to improving security without sacrificing speed of delivery is through the consistent application of relevant and effective controls, from start to finish during the shipping process," said Raymond Benjamin, Secretary General of ICAO.

"International trade is the lifeline of economies around the world and is critical to economic growth and social development," said Secretary General of the WCO, Kunio Mikuriya. "Moving goods by air is an essential part of the global supply chain and ensuring the security of air cargo is paramount which is why this MOU is a powerful tool in our collective efforts to keep potential threats at bay," Mikuriya added.

Cooperation between the two Organisations will focus on aligning air cargo regulatory frameworks to include electronic advance data, the sharing of information at various levels (government-to-government, Customs-to-Customs and Customs-to-industry), training and education and risk management.

Given the volume of goods transported by air and the impracticality of screening all cargo, a risk-based approach is considered necessary. WCO and ICAO experts will explore the application of risk management

[267] Notably Section 6 of the Annex to Reg. 300/2008, Parts A and F of the Annex to Reg. 272/2009, and Section 6 of the Annex to Reg. 185/2010.

[268] ICAO News Release PIO 13/11, 27 June 2011

to cargo for identifying threats and implementing the required security measures, including the vetting of advance-cargo information.

On 1 July 2011, more stringent ICAO standards, under Annex 17, concerning air cargo become applicable. They include a new requirement for Member States to establish a supply-chain security process.

IATA and ICAO are aligned on a supply chain approach to cargo security[269]. The concept is to ensure that shipments are secured upstream in the supply chain and then are transported in a secure environment and delivered as secure cargo to the aircraft operator.

There are a number of elements within this philosophy, one of which is the need for standardised electronic data. Work has begun on reviewing the timelines for submission of advance electronic information for risk assessment through the WCO's SAFE Framework of Standards. ICAO is now recommending the use of the standard security declaration in its guidance material and is amending Annex 17 to that effect. The standard consignment security declaration provides an audit trail of how, when, and by whom cargo has been secured along the supply chain. IATA presented the standard consignment security declaration at the Stakeholders Advisory Group on Aviation Security (SAGAS) meeting in late September.

There have also been discussions with the European Commission on revising its regulations regarding cargo security and with the US Transportation Security Administration (TSA) and Customs and Border Protection (CBP) on advance electronic information. IATA is participating in the US CBP/TSA Air Cargo Advance Screening (ACAS) pilot in the United States, which centres on collecting data for inbound cargo.

Aligning the major markets is an important start but supply chain security must win global acceptance. If one country's secure supply chain program is not recognised by another country, it could result in a costly duplication of the screening procedures.

Through the Secure Freight program, IATA is providing assistance and advice to countries to implement a secure supply chain program where none exists. Major shippers have generally been happy to comply with the program, seeing the benefits of the streamlined process.

In August 2011, Regulation (EU) No 859/2011[270] was adopted by the European Commission regarding security measures on cargo coming from non-EU countries. With the new regime Europe reaches out to other countries aviation security systems in order to benefit from security controls performed outside its own borders. Europe has thus created the nucleus of a worldwide secure supply chain programme and will further build upon it. Air carriers play a crucial role in providing the effective links between supply chain systems of different jurisdictions. Their security programmes will account for effective and seamless security controls undertaken outside Europe. In the future, independent validation will be based on commonly recognised ICAO standards of any actor in the supply chain worldwide - air carriers as well as regulated agents and known consignors. This will provide Europe and any other country that wishes to participate with the necessary comfort to trust each other's systems.

[269] http://www.iata.org/pressroom/airlines-international/october-2011/Pages/cargo-security.aspx

[270] Commission Implementing Regulation (EU) No 859/2011 amending Regulation (EU) No 185/2010 laying down detailed measures for the implementation of the common basic standards on aviation security in respect of air cargo and mail, 25 August 2011

### 9.5.2 Carriage of Liquids, Aerosols and Gels (LAGs)

Restrictions on carrying liquids, aerosols and gels (commonly referred to as LAGs) in hand luggage were introduced in 2006[271] following the terrorist attempts at London Heathrow concerning seven aircraft bound to the US. It was agreed then that the measures would be temporary, and reviewed regularly until technology allows liquid explosives to be detected through screening.

Under the current regime[272] all LAGs in hand baggage shall be screened, with the exception of the following exemptions: their volume is less than 100 ml; they are to be used during the trip for medical or dietary requirements; they have been obtained at certain secured areas of an EU airport or on-board an aircraft of an EU carrier and they are packed in a "security tamper-evident bag" (STEB) as recommended by ICAO[273]. By virtue of Regulation 358/2010, the LAGs packed in STEB obtained at US or Canadian airports, or at some airports in Croatia, Malaysia or Singapore are also exempted from screening[274].

In actual fact, in the absence of appropriate liquid scanning equipment, LAGs which are not exempted from screening are confiscated. The current law therefore also aims at progressively imposing the deployment at EU airports of methods, including technologies, for detection of liquid explosives, according to the following steps[275]:

- By 29 April 2011 LAGs obtained at third country airport or on-board an aircraft of a third country carrier shall be permitted into security-restricted areas and on-board aircraft on condition that they are packed in STEB[276] and that they are screened.
- By 29 April 2013 all EU airports shall screen all LAGs and the restrictions shall have been withdrawn.

At expiration of the first period, however, it appeared that most of the Member States were not in a position/reluctant to modify the current regime on LAGs from third countries[277]. Moreover a lot of them let it be understood that they would maintain it unchanged on the grounds of their right to apply "more stringent measures"[278]. In addition, it is worth noting that a number of third countries, including the EU main aviation partners, continue applying restrictions on LAGs. Thus, the USA still impose that LAGs purchased at third country airports are surrendered before embarking any US bound flight at a European airport, and they strongly oppose the relaxation of the EU regime. Considering this situation, the Commission advised to defer the measure "for a limited period", and proposed to review it together with the Member States and in consultation with the United States[279].

In the meantime, the technology for liquid scanners continues to advance, with over thirty Liquid Explosive Detection Systems (LEDS) that can differentiate between liquid explosives and water, now evaluated as

[271] Commission Regulation (EC) No 1546/2006 of 4 October 2006 amending Regulation (EC) No 622/2003 laying down measures for the implementation of the common basic standards on aviation security (OJ L 286, 17.10.2006).

[272] Mainly set by Commission regulations 272/2009, 297/2010, 358/2010 and 334/2011.

[273] A "security tamper-evident bag" (STEB) is a transparent plastic bag that conforms to the recommended security control guidelines of the ICAO.

[274] On condition that they have been purchased airside within the preceding 36 hours. The exemption is due to expire on 29 April 2013 as provided for by Reg. 334/2011.

[275] Annex to Reg. 297/2010.

[276] And that they have been purchased airside or on board within the preceding 36 hours.

[277] According to the Commission at least 18 Member States were not in a position to implement the relaxing measure.

[278] Even if only 2 Member States formally informed the Commission pursuant to Article 6(2) of Regulation 300/2008 of their intention to maintain the existing regime as a "more stringent measure".

[279] Commission's Press Release MEMO/11/262 of 29.4.2011.

meeting European Civil Aviation Conference (ECAC) performance standards under the Common Evaluation Process of Security Equipment (CEP) framework[280]. Some of these scanners are currently undergoing trials at various EU airports. The much sought after requirement for the industry will be the ability to screen LAGs within traveller's cabin bags and not separately. This is considered essential by security and facilitation experts, given that more than 700 million departing passengers will need to be screened. The technology will also need to be thoroughly tested operationally.

### 9.5.3 Use of "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, notably the USA, have accelerated the further development and eventual deployment of more advanced technology capable of detecting non-metallic and liquid explosives. This includes the deployment of 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.

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.

In November 2011, the European Commission adopted a proposal for a European Union legal framework on security scanners[281]. This legislation allows airports and Member States that wish to use security scanners – which do not use ionising radiation - for the screening of passengers to do so under strict operational and technical conditions.

Since the 2009 terrorist incident, Member States have been trialling or testing security scanners[282], but this had been done under a patchwork of different national operational procedures and standards and in a limited way. As a common EU-wide framework, the new legislation legally allows Member States and airports to replace current security systems with security scanners. It also ensures the uniform application of security rules at all airports and provides strict and mandatory safeguards to ensure compliance with fundamental rights and the protection of health. Member States and airports do not have an obligation to deploy security scanners, but if they decide to use them, they will have to comply with the operational conditions and performance standards set at European level.

The scanner technology is developing rapidly and has the potential to significantly reduce the need for manual searches ("pat-downs") applied to passengers, crews and airport staff.

[280] https://www.ecac-ceac.org//activities/security/cip_for_security_equipment

[281] Commission Implementing Regulation (EU) No1147/2011 amending Regulation (EU) No 185/2010 implementing the common basic standards on civil aviation security as regards the use of security scanners at EU airports, 11 November 2011

[282] For example in the UK, Finland, the Netherlands, Germany, France and Italy

### 9.5.4 Passenger Name Record (PNR) Data

PNR data is unverified information provided by passengers, and collected by and held in the carriers' reservation and departure control systems for their own commercial purposes. It contains several different types of information, such as travel dates, travel itinerary, ticket information, contact details, the travel agent at which the flight was booked, means of payment used, seat number and baggage information.

Law enforcement authorities may use PNR data in several ways:

- for the use in investigations and prosecutions after an event has occurred;
- in real time, for use prior to the arrival or departure of passengers in order to prevent a crime, or
- for research and analysis e.g. in order to develop criteria for the pre-arrival and pre-departure assessment of passengers.

PNR data are different from and should not be confused with Advance Passenger Information (API). API data are the biographical information taken from the machine-readable part of a passport and contain the name, place of birth and nationality of the person, the passport number and expiry date. Thus they are different and more limited in scope than PNR data. In the EU, the use of API is regulated by the API Directive.[283]

The use of PNR data, however, is not currently regulated at EU level. Even though only a limited number of Member States have set up a PNR system to date, most Member States do use PNR data for the prevention, detection, investigation and prosecution of terrorist offences and serious crime in a non-systematic way or under general powers granted to the police or other authorities. Within the EU, the United Kingdom already has a PNR system, while France, Denmark, Belgium, Sweden and the Netherlands have either enacted relevant legislation or are currently testing using PNR data. Several other Member States are considering setting up PNR systems. Those national measures diverge in several respects, including the purpose of the system, the period of data retention, the structure of the system, the geographic scope and the modes of transport covered.

In February 2011, the European Commission published a proposal[284] for a Directive that would harmonise Member States' provisions on obligations for air carriers, operating flights between a third country and the territory of at least one Member State, to transmit PNR data to the competent authorities for the purpose of preventing, detecting, investigating and prosecuting terrorist offences and serious crime. It does not require air carriers to collect any additional information from passengers or to retain any data, nor does it require passengers to provide any data in addition to that already being provided to air carriers.

In November 2011, the European Commission published a proposal[285] for a Council Decision concluding an agreement between the USA and the EU on the use and transfer of PNR data to the United States Department of Homeland Security (DHS). The legislation would allow for the electronic transfer of PNR data from the EU to the US in advance of a flight's arrival.

[283] Directive 2004/82/EC of 29 August 2004

[284] Proposal for a Directive of the European Parliament and of the Council on the use of Passenger Name Record data for the prevention, detection, investigation and prosecution of terrorist offences and serious crime, COM(2011) 32 final, 2 February 2011

[285] Proposal for a Council Decision on the conclusion of an agreement between the USA and the EU on the use and transfer of Passenger Name Records to the United States Department of Homeland Security, COM(2011) 807 final, 23 November 2011

### 9.5.5 Future of Aviation Security

The European Commission is engaged with stakeholders such as ACI, AEA and IATA and with them is looking into ways of improving aviation security measures in the future, to make them more effective and in more efficient ways. In September 2011, the Commission organised a high level conference[286] on protecting civil aviation from terrorism. The conference involved more than 100 aviation security experts from around Europe, ICAO and partner countries.

The event enabled both government representatives and stakeholders to discuss developments in the field of aviation security in the past decade. In particular:

- What lessons have been learnt from incidents in the past few years?
- What further measures could be taken on an international level to improve risk assessment and resilience to terrorist attacks?
- Should a more risk based approach to passenger and cargo security control be adopted?
- How can a common platform be developed for the sharing of information?
- Can better use be made of existing tools and mechanisms in counter-terrorism and customs for the purpose of civil aviation security?
- How successful has the work on a European Union common risk assessment method been so far?
- Is today's model of aviation security controls sustainable in the long term?
- How can security measures be implemented that are adequate to the threat assessment results with minimum impact on travel and commerce, especially between high-security countries?
- Should more unpredictable controls/more differentiated controls based on risk be considered?
- How can the approach to developing security technologies in the EU be improved?

Participants agreed that the development of a common European risk assessment for cargo and mail security has been a positive experience. It is the basis for new security requirements for inbound cargo which are tailored, in terms of their severity, to specific risk situations thus delivering effective security where needed while avoiding an across the board new burden on trade and industry and, for example, safeguarding one-stop security within the EU. As confidence in the threat and risk methodology grows, the common EU risk assessment should be developed further and broadened to other areas than cargo.

Security measures can and should relate to the risk they intend to mitigate. If a high quality risk assessment is available, security resources can be targeted to where the risk is greater. Inconvenient consequences for passengers and unnecessary burdens on trade can thus be avoided while keeping a high level of security focused on those areas where the threat and risk is highest.

There was agreement that sooner or later our current security system will come under strain. There is a risk that it will accumulate many controls, at high cost and passenger inconvenience, but still not manage to capture a clever and adaptive adversary. More unpredictable measures including highly deterrent elements should be considered in more areas of the security process. Focussing on the security outcome rather than the across-the-board application of a fixed set of controls should be considered in order to increase unpredictability.

Risk-focused measures require data on goods and passengers travelling, so that the right controls can be applied to them. But aviation is global, and so is the threat. For maximum effectiveness, it is essential that

[286] Protecting Civil Aviation from Terrorism, High Level Conference, Brussels, 27 September 2011

security information is shared between States and by industry, local authorities, customs, and border controls in a harmonised and an appropriate way that is both efficient and fully respectful of passenger fundamental rights and freedoms.

Internationally, the ICAO Universal Security Audit Programme (USAP) can offer technical assistance to those countries that lack the methods or resources to deliver to ICAO security standards; while for countries that are committed to, and able to deliver, the highest level of security, mutual recognition offers the opportunity to deliver more cost-efficient one-stop security by eliminating unnecessary duplication of security measures. This also allows security efforts to be focussed on those operations which face risks that are currently insufficiently mitigated.

The future of aviation security will be further progressed at ICAO's high level conference in September 2012.

# 10. Consumer Issues

## 10.1 Introduction

This chapter examines the progress of European aviation during 2011 from the viewpoint of consumers, 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 or arrive at the gate within 15 minutes of the advertised time. The aim is to have published information which enables 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 other service aspects of concern to consumers; principally how airlines and airports deal with denied boarding, delays, cancellations and lost or damaged baggage. Concerns are increasingly 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. Note that only new material for updates and progress in 2011 is presented, which was not covered in the previous edition of this series of Annual Analyses[287].

## 10.2 Punctuality & Delays

### 10.2.1 Introduction

Whilst punctuality of commercial aircraft operations 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.

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)[288], together with Network Operations

[287] Annual Analyses of the EU Air Transport Market 2010, Final Report for the European Commission, Mott MacDonald, September 2011

Reports[289] on Air Traffic Management (ATM) performance from its Central Flow Management Unit (CFMU). 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.

Generally, departure/arrival delays in excess of fifteen minutes are considered as a useful measure of punctuality and publicly available data series often use this time period as the measure of a flight operating on time.

Delays can occur at all points along the flight's timeline, for example:

- delays in passenger boarding
- aircraft push-back from the stand
- taxiing & runway access
- en route airspace/air traffic congestion
- holding of aircraft prior to landing
- stand availability & airport infrastructure capacity (immigration, customs, baggage retrieval etc)
- adverse weather conditions

The likelihood of a flight delay is greater at times of high demand when resources and capacity are stretched and therefore more likely to impact on a greater proportion of the travelling public.

With regard to passenger rights, whilst regulation (EC) No 261/2004[290] 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 across the EU. There are examples of individual Member States whose regulatory agencies produce national punctuality and delay statistics, such as the CAA in the UK[291] and the DGAC in France[292].

On a global basis, the FlightStats[293] 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.

[288] http://www.eurocontrol.int/coda/public/subsite_homepage/homepage.html

[289] http://www.eurocontrol.int/documents/network-operations-report-january-2012

[290] 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

[291] http://www.caa.co.uk/punctuality

[292] Observatoire des retards du transport aérien, DGAC, 28 December 2011 [http://www.developpement-durable.gouv.fr/Observatoire-des-retards-du,10339.html]

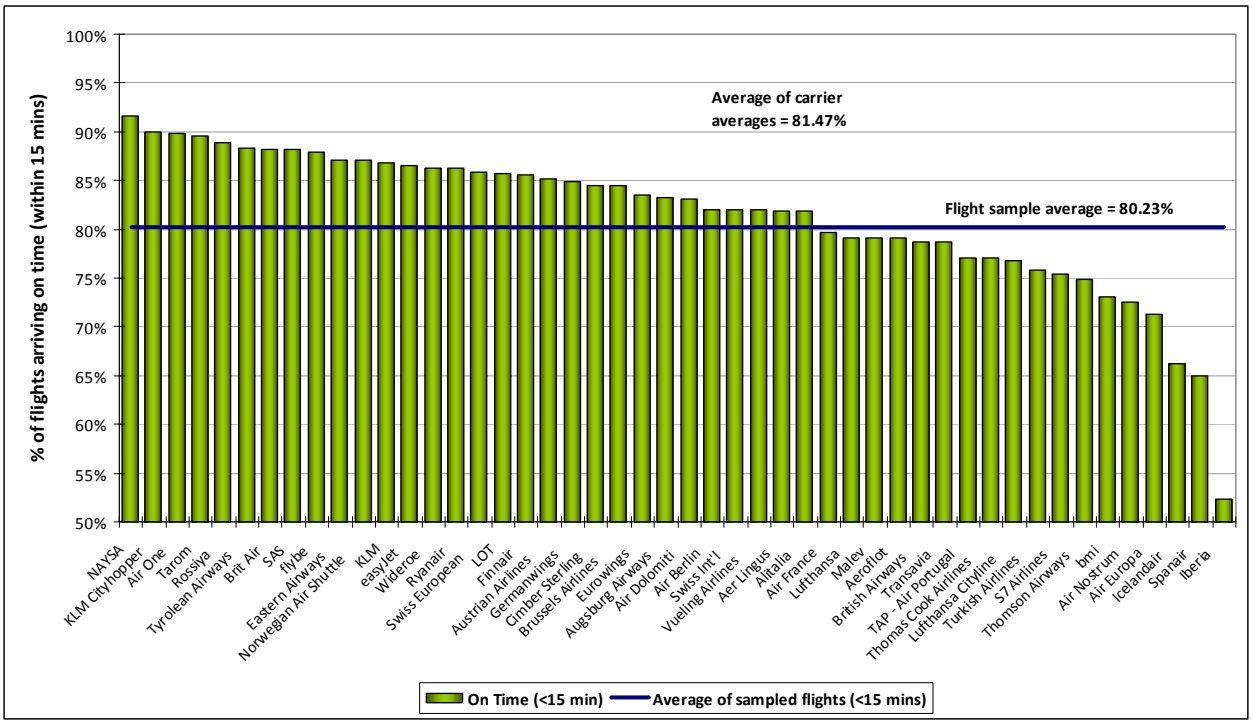
[293] www.flightstats.com

### 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 in 2011 is 80.2% on time, the average of the individual carrier averages is 81.5%. The top five European airlines in terms of on-time punctuality recorded an average of 90% of flights on time, compared to the bottom five carriers achieving on-time punctuality averaging 65.4%; almost a 25 percentage point difference in on-time performance.

Figure 10.1: 2011 European Carrier On Time Arrival Performance (Scheduled Passenger Flights within 15 min)



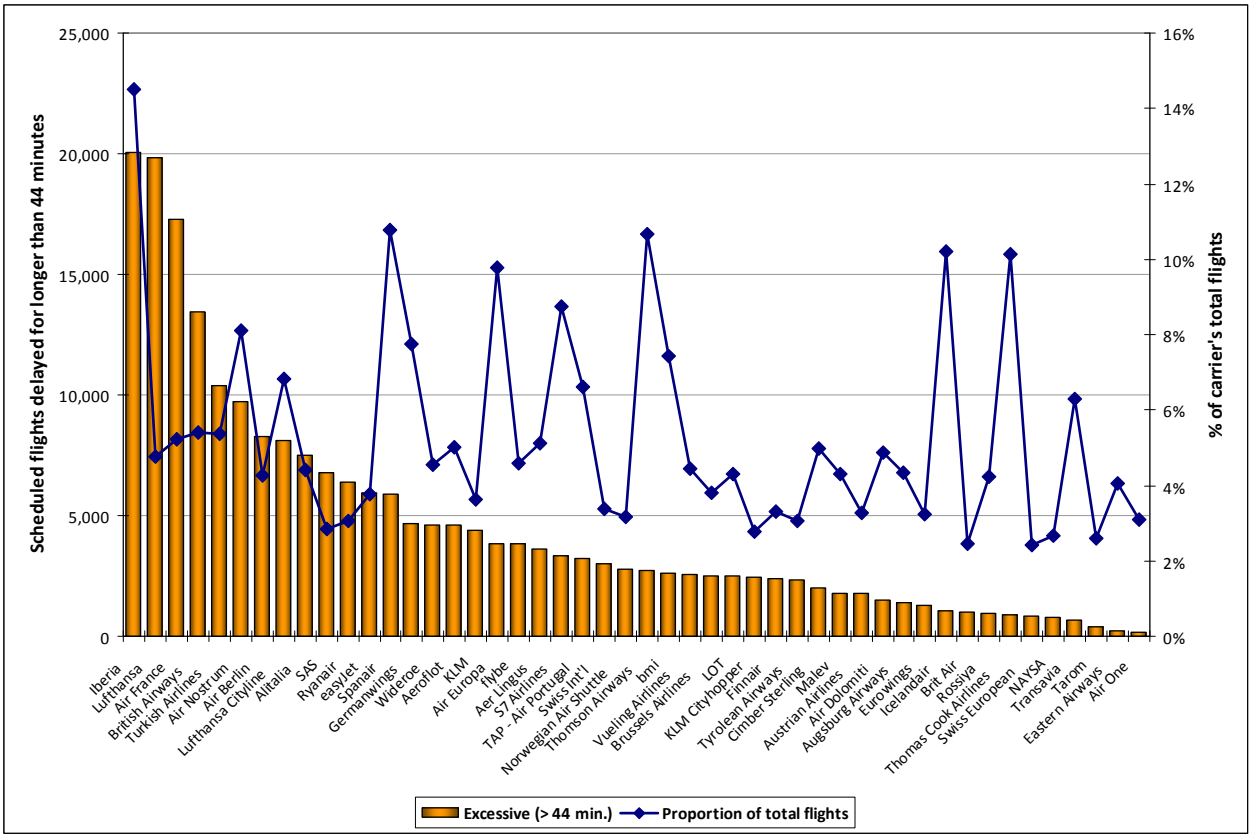

Source: www.flightstats.com

These figures represent an improvement in punctuality over 2010. The average of sampled flights improved by 6.9%, the individual carrier average improved by 3.0%, the top five European airlines achieved a marginally better result by 0.7% while the bottom five European carriers showed a 2.9% improvement in on time arrival performance.

Of the bottom ten European carriers, four of these are based in Spain (Iberia, Spanair, Air Europa and Air Nostrum) and two are UK carriers (bmi and Thomson Airways; bmi is primarily based at London Heathrow). The others are Turkish Airlines, Lufthansa Cityline, S7 Airlines and Icelandair.

In addition to data for on time arrivals (those arriving within 15 minutes of the scheduled time), FlightStats also collects data for longer delays and cancellations. These are described in Figure 10.2 and Figure 10.3 below.

Figure 10.2: 2011 European Carrier On Time Arrival Performance (Scheduled Passenger Flights Delayed >44min)

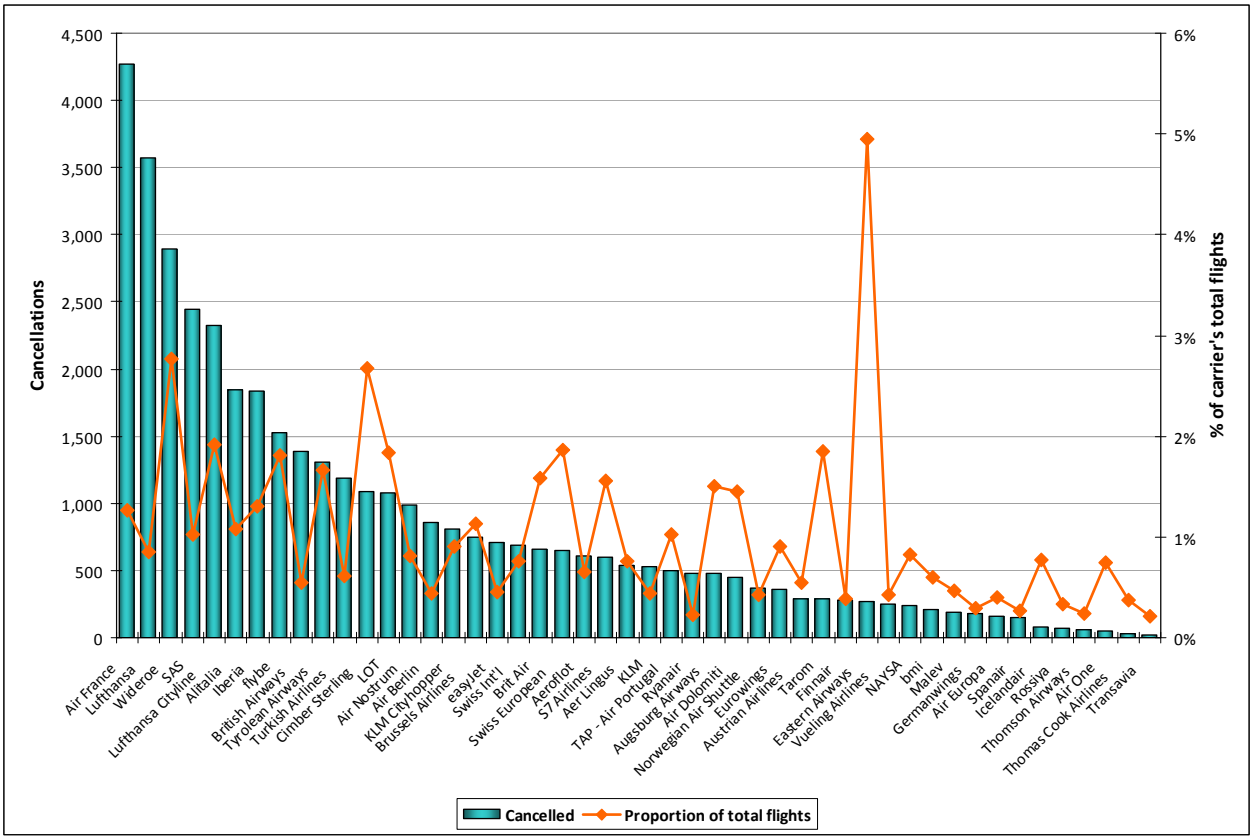



Source: www.flightstats.com

Airlines with the highest number of long delays were Iberia, Lufthansa, Air France and British Airways. These four carriers are full service network airlines operating a hub and spoke business model from major European hub airports. Airport delays can be attributed to the airports themselves due to airspace congestion in the surrounding area as well as runway and infrastructure capacity issues in some cases. However, these longer delays should be taken in the wider context of the proportion of flights operated. Of the four carriers mentioned, three incurred delays in excess of 44 minutes but this was less than 6% of their respective sampled total flights. Iberia however saw 14.5% of its total flights delayed in the same period.

Other carriers saw much fewer delays over 44 minutes but in some cases these numbers represent a greater proportion of their flying programmes, i.e. a greater number of individual flights affected. Spanair (now ceased operating), Thomson Airways, Icelandair and Thomas Cook Airlines each recorded excessive delays on more than 10% of their total flights.

Figure 10.3: 2011 European Carrier Scheduled Passenger Flight Cancellations




Source: www.flightstats.com

A similar pattern is seen for scheduled flight cancellations, although in this case the proportion of the carrier's total sampled flights is much lower – usually less than 2% of flights are affected. Higher than average flight cancellations were recorded for Widerøe, Cimber Sterling and particularly Eastern Airways (4.95%). In absolute terms the highest numbers of cancellations were for Air France, Lufthansa, Widerøe, SAS and Lufthansa Cityline.

## 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. Analysis provided by flightontime.info of UK CAA data saw an improvement in long delays at reporting airports: the average delay to charter flights operating from the UK decreased by nearly 30% to 20.2 minutes in summer 2011 (April to October) compared to 28.5 minutes in 2010 (which was an increase of almost 50% on 2009). Charter airline on-time performance (within 15 minutes of the scheduled departure time) was on average 74%, a 9% improvement on summer 2010 levels. Summer season 2011 punctuality (within 15 minutes) for the three largest charter companies in the UK at 76% was marginally above the charter industry average, with these operators representing 89% of total charter movements. All three large carriers experienced an improvement in performance compared with summer 2010 with the average delay reducing by over ten minutes to 18.6 minutes.

Table 10-1: Summer 2011 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 11 | Apr-Oct 10 | Apr-Oct 11 | Apr-Oct 10 | Apr-Oct 11 | Apr-Oct 10 | Apr-Oct 11 | Apr-Oct 10 | Apr-Oct 11 | Apr-Oct 10 | |
| 1 | Thomson Airways | 17.33 | 22.36 | 77.05 | 70.58 | 6.87 | 9.30 | 1.65 | 1.97 | 28,401 | 27,226 | -22.49% |
| 2 | Thomas Cook Airlines | 19.75 | 34.92 | 75.56 | 62.35 | 8.81 | 16.48 | 1.90 | 4.24 | 21,215 | 21,038 | -43.43% |
| 3 | Monarch Airlines | 21.97 | 29.40 | 70.54 | 66.19 | 8.11 | 12.03 | 1.97 | 3.30 | 3,602 | 5,968 | -25.29% |
| Average (above 3 airlines) | | 18.61 | 29.03 | 76.02 | 65.96 | 7.73 | 12.85 | 1.77 | 3.15 | 53,218 | 56,618 | -33.55% |
| Average (all charter flights) | | 20.22 | 28.52 | 74.28 | 65.19 | 8.28 | 12.43 | 1.94 | 2.96 | 60,167 | 63,785 | -29.12% |

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 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 2011 season): Monarch Airlines STN (2), EDI (5), GLA (6); Thomas Cook Airlines LTN (11). 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, of the five largest airlines in terms of movements sampled[294], the five best performers were flybe at 85.8% of scheduled flights departing within 15 minutes, Ryanair (85.5%), easyJet (80.7%), British Airways (80.2%) and bmi at 79.2% [295]. Four of the carriers saw improvements compared to their 2010 annual performance (bmi remained static), with easyJet seeing the largest rise from 61.4% in 2010 to 80.7% of flights in 2011 on time within 15 minutes.

Regional airlines achieved the best overall punctuality performance, with carriers bmi Regional, CityJet (including VLM) and Loganair achieving 92.6%, 89.9% and 89.5% respectively of flights departing within 15 minutes. Of the low cost carriers operating from the UK, the best performer was again Air Berlin with 87.7% of flights departing within 15 minutes and the worst performer being Iberia with 56.7% of departures within 15 minutes of the scheduled time.

Comparing both scheduled and charter flights in the UK during the 2011 summer season (April to October), average delays on scheduled flights decreased by 28% (increased 39% in 2010) with an almost identical decrease of 29% in the average delay for charter carriers (increased 49% in 2010).

### Regional Carriers

The European Regions Airlines Association (ERA) publishes punctuality statistics for its (generally smaller) member airlines. Of its member carriers, the best punctuality was achieved by Montenegro Airlines achieving 97.8% of flights departing on time (within 15 minutes) in the ten months to October of 2011.

[294] As reported at www.flightontime.info; carriers with more than 50,000 annual departures. Figures for January to September 2011.

[295] Note this data is for departure delays and is not directly comparable with the flightstats arrival delay data for bmi presented earlier

Situated in the Balkans on the Adriatic coast, the national carrier of Montenegro has a small fleet and network characteristics of a regional airline. It operates five Fokker 100s and three Embraer 195s on 13 routes to European destinations from its main base at Podgorica Airport.

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: Departing Punctuality of Individual ERA Carriers 2011

| | Number of flights operated | % Flights On Time | % chg 11/10 | % Flights within 60 mins | % chg 11/10 | Regularity (%) | % chg 11/10 |
|---|---|---|---|---|---|---|---|
| Aegean Airlines | 51,531 | 85.0 | -1.1 | 96.3 | -1.7 | 99.9 | 2.5 |
| Aer Arann | 26,364 | 83.4 | -1.4 | 94.6 | -1.6 | 98.2 | 2.3 |
| Air Alps Aviation | 3,581 | 94.4 | 2.2 | 98.3 | 0.0 | 98.8 | - 0.1 |
| Air Iceland | 6,262 | 85.5 | -1.4 | 95.9 | 0.9 | 93.2 | 1.7 |
| Air Nostrum | 107,831 | 78.5 | -1.3 | 95.7 | 1.0 | 99.2 | 1.2 |
| airBaltic | 47,519 | 88.2 | 4.5 | 98.6 | 0.1 | 99.6 | 2.2 |
| Binter Canarias | 44,275 | 93.3 | - 0.6 | 98.5 | - 0.7 | 99.2 | 1.3 |
| Carpatair | 13,239 | 84.4 | 6.0 | 94.4 | 2.2 | 91.5 | -1.6 |
| City Airline | 8,088 | 90.8 | 1.9 | 97.7 | 0.5 | 97.8 | 1.9 |
| CityJet | 39,719 | 89.3 | 4.4 | 98.3 | 1.7 | 99.1 | 3.3 |
| Eastern Airways | 20,400 | 89.1 | - 0.1 | 96.9 | 0.3 | 98.6 | 3.6 |
| Finncomm Airlines | 29,193 | 87.8 | -3.8 | 98.3 | -1.3 | 99.4 | - 0.2 |
| Golden Air | 20,320 | 87.0 | - 4.0 | 94.2 | -2.4 | 98.8 | 4.6 |
| Malmö Aviation | 14,583 | 91.8 | 4.8 | 98.4 | 1.6 | 99.2 | 4.2 |
| **Montenegro Airlines** | **7,303** | **97.8** | **13.3** | **100.0** | **13.6** | **97.9** | **- 0.4** |
| Nordavia-Regional Airlines | 17,291 | 86.5 | 1.3 | 93.7 | 0.3 | 95.9 | -2.4 |
| Olympic Air | 50,049 | 90.2 | 0.4 | 97.9 | - 0.4 | 98.3 | 0.5 |
| PGA Portugália Airlines | 21,896 | 82.3 | 0.4 | 95.2 | 0.4 | 98.4 | 0.6 |
| Régional | 78,461 | 90.1 | 5.6 | 98.7 | 1.7 | 98.7 | 3.1 |
| SATA Air Açores | 12,929 | 87.1 | 11.7 | 96.2 | 4.9 | 97.0 | 3.7 |
| Sky Work Airlines | 2,800 | 68.5 | 21.6 | 94.5 | 4.0 | 99.6 | 2.8 |
| Widerøe | 92,604 | 87.2 | -3.5 | 97.1 | -1.2 | 96.3 | 0.6 |

Source: ERA Business Databank (January to October 2011)

However it was Binter Canarias recognised in the FlightStats On-Time Performance Service (OPS) Awards[296] as achieving the best arrival performance amongst regional European airlines overall for 2011, also placing it third in any category. 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 (SAS at 88.2%) was ahead of the best major North American carrier by the slimmest of margins and 2.0% below the best major Asian carrier; an improvement in both respects over 2010.

[296] Based on FlightStats data for the full year 2011, ERA data shown in Table 10-2 is for the period January to October 2011.

Table 10-3: FlightStats Best On-Time Performance Awards 2011

| Category | Best Carrier | On-Time Arrival (within 15 mins) | Other Finalists |
|---|---|---|---|
| Major International Airlines | All Nippon Airways | 90.18% | Japan Airlines International<br>Gulf Air<br>KLM Royal Dutch Airlines<br>SAS Scandinavian |
| Major North American Airlines | Alaska Airlines | 87.79% | United Airlines<br>US Airways<br>Delta Air Lines<br>Airtran Airways |
| Major European Airlines | SAS Scandinavian | 88.22% | KLM Royal Dutch Airlines<br>LOT Polish Airlines<br>Ryanair<br>Finnair |
| Major Asian Airlines | All Nippon Airways | 90.18% | Singapore Airlines<br>Korean Air Lines<br>Japan Airlines International<br>Bangkok Airways |
| Regional North American Airlines | Hawaiian Airlines | 91.96% | Horizon Airlines<br>Mesa Airlines<br>Copa Airlines<br>Central Mountain Air |
| **Regional European Airlines** | **NAYSA (Binter Canarias)** | **91.67%** | KLM Cityhopper B.V<br>Regional Compagnie Aérienne<br>Air Baltic<br>CSA Czech Airlines |
| **Regional Asian Airlines** | **Japan Air Commuter** | **92.60%** | Japan Transocean Air<br>JAL Express<br>JAL J-Air<br>ANA Wings |

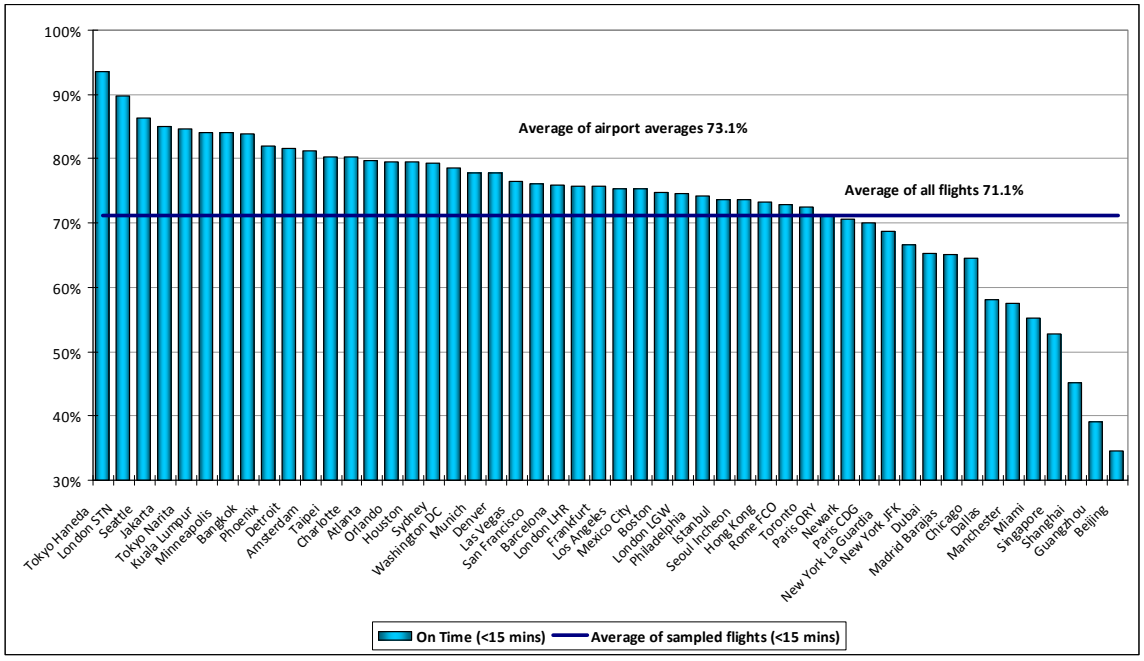
Source: FlightStats Ops Awards website (http://opsawards.flightstats.com/winners-airline-2011.html)

### 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[297] 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.

[297] 2011 Year-end Report on Airport and Airline On-time Performance, FlightStats, 4 January 2012

Figure 10.4: 2011 Airport Departure Performance Report for World's Busiest Airports (Sampled Scheduled Airlines)




Source: www.flightstats.com

In 2010 no European airports appeared in the top twenty; in 2011 this situation improved with London Stansted coming second after top global performer Tokyo Haneda, with Amsterdam and Munich also recording significant improvements. The main network carrier hub airports in Europe (Amsterdam, Frankfurt, Heathrow, Paris CDG and Madrid) achieved between them an average on-time departure punctuality of 73.6% in 2011, a collective improvement of over 6% on 2010. The best European 'hub' performance achieved was at Amsterdam with 81.3% of departures on time.

UK CAA punctuality statistics for the full year 2011 indicate improving on-time performance and reducing delays at all ten UK monitored airports. Overall 82% of flights departed on time, an 8.3% improvement over 2010 with an average delay of 11 minutes, or seven minutes less than 2010.

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.

A further factor to consider when comparing 2011 punctuality data to the previous year is the impact of the April 2010 Eyjafjallajökull volcanic eruption in Iceland and the resulting ash cloud crisis, combined with severe winter weather in December 2010, which forced significant cancellations and delays across Europe; meaning that improvements seen in performance in 2011 data will have benefited from this effect.

## 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)

Progress in each of these various issues is analysed in this section.

#### Overall Review of Passenger Rights Legislation

Since 2010 the European Commission has been reviewing the various pieces of legislation covering passenger rights with a view to revising them where necessary. The Commission's overriding objective is to modify rules to strengthen the enforcement of passenger rights while clarifying key issues such as limits of liability in case of extraordinary circumstances[298].

Early in 2010 the Commission carried out a public consultation on Air Passenger Rights[299] in order to gather opinions from national authorities, stakeholders, 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[300] into EU Law ('the Liability Regulation') which covers 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, cancellation or long delay;
- 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.

[298] Europe to modify controversial passenger rights legislation, Flightglobal, 12 April 2011 [http://www.flightglobal.com/news/articles/europe-to-modify-controversial-passenger-rights-legislation-355450/]

[299] http://ec.europa.eu/transport/passengers/consultations/2010_03_01_apr_legislation_en.htm

[300] Convention for the Unification of Certain Rules for International Carriage by Air, Montreal, 28 May 1999

The results of this consultation were published in July 2010.

The Commission began to assess the level of enforcement across the EU in September 2010 by publishing a report which examined the enforcement of rules by individual Member States and the application of penalties for infringements, initially in respect of Regulation 1107/2006 on the rights for people with reduced mobility. The report found (at the time it was published) that four years after its entry into force, the Regulation was not fully implemented across the EU. Four Member States had not yet adopted (or enforced) penalty rules for infringement of the Regulation and some others imposed penalties only in some specific cases (not for all infringements under the Regulation)[301].

In April 2011 the Commission signalled its intention to continue this review process by stating it would conduct a public consultation and an impact assessment specifically in view of a possible revision of Regulation 261/2004. This process would result in a draft proposal in 2012.

The consultation was launched on 19 December 2011 and ran until 11 March 2012, specifically covering:

> *"…a possible revision of Regulation (EC) 261/2004 establishing common rules on compensation and assistance to passengers in the event of denied boarding, cancellation and long delay of flights, and complementary measures to amend Regulation (EC) 889/2002."* [302]

### 10.3.2 People with Disabilities & People with Reduced Mobility (PRMs)

Under current EU legislation, people with disabilities and of reduced mobility are protected from discrimination during reservation and boarding. They are also entitled to receive assistance free of charge at EU airports (on departure, on arrival and in transit) and onboard aircraft. In order to facilitate the provision of assistance, Regulation 1107/2006 requires that passengers pre-notify their needs at least 48 hours prior to the flight.

Following an assessment of the Regulation, which was accompanied by an additional study in September 2010 examining enforcement amongst Member States[303], the Commission issued a report based on both studies to the European Parliament and Council in April 2011. The report showed that the Regulation has brought advantages to PRMs; in particular through a single framework of protection, a clear division of tasks between airports and air carriers, and the establishment of a network of National Enforcement Bodies (NEBs) in all Member States.

It also recognised that a number of difficulties remain in applying the Regulation which might weaken its impact. Despite this, the Commission concluded that the overall impact of the Regulation was positive and

[301] EC TENDER TREN/A3/448-2009 on the "Assessment on rules on penalties applicable to Regulation infringements 1107/2006, concerning the rights of disabled persons and persons with reduced mobility when travelling by air", Philippe & Partners, 24 September 2011

[302] Passenger Rights – Public Consultation, European Commission Mobility & Transport [http://ec.europa.eu/transport/passengers/consultations/2012-03-11-apr_en.htm]

[303] EC TENDER TREN/A3/448-2009 on the "Assessment on rules on penalties applicable to Regulation infringements 1107/2006, concerning the rights of disabled persons and persons with reduced mobility when travelling by air", Philippe & Partners, 24 September 2011

a legislative review was not necessary. Instead it proposes that a number of improvements be made within the existing framework, including:

- a uniform interpretation of the Regulation;
- improving how the regulatory instruments work in practice;
- strengthening the efficacy of the penalties and their supervision by national authorities; and
- addressing the issue of the transport and supply of medical oxygen[304].

The rights of PRMs are further strengthened when they experience situations of denied boarding, cancellation or long delay. PRMs and any persons accompanying them, as well as unaccompanied children, have the right to care in accordance with Article 9 ('right to care', which specifies those items or assistance offered to passengers free of charge), "as soon as possible"[305].

### 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 surrender their reservation in exchange for certain benefits[306]. In addition, the air carrier must also offer volunteers the choice between a full refund and re-routing[307]. When there are insufficient volunteers, passengers who are denied boarding against their will are additionally entitled to compensation of between €250 and €600[308], depending on the length of the flight; and to care (phone call, refreshments, food, accommodation and transportation to and from the accommodation)[309].

In the United States, major carriers are required to publish 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 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 planned departure, or they were re-routed close to the original scheduled times, or unless 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 a choice between:

- reimbursement of the full cost of the ticket within seven days;
- rerouting to the final destination under similar conditions; and

[304] REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the functioning and effects of Regulation (EC) No 1107/2006 of the European Parliament and of the Council of 5 July 2006 concerning the rights of disabled persons and persons with reduced mobility when travelling by air, COM(2011) 166 final, 11 April 2011

[305] Article 11 of Regulation 261/2004

[306] Article 4 of Regulation 261/2004

[307] Article 8 of Regulation 261/2004

[308] Article 7 of Regulation 261/2004

[309] Article 9 of Regulation 261/2004

- if necessary, care (phone call, refreshments, food, accommodation and transportation to and from the accommodation).

In 2011 Regulation 261/2004 was tested in respect of flight cancellations and right to compensation when the European Court of Justice (ECJ) was asked to rule on a case where affected passengers were claiming 'further compensation' beyond the provisions explicitly stated in the Regulation (meals, accommodation, phone calls etc), to cover 'non-material items'[310].

In this example 'further compensation' following a flight cancellation was the additional transport and assistance costs incurred by the passenger after being rerouted the following day to a different destination airport than that originally intended, where the passenger had to hire a taxi to get home. In addition, the passenger claimed for the cost of keeping his pet in a kennel for a day longer than intended.

The Court ruled that the concept of 'further compensation' in Regulation 261/2004 allows for compensation for non-material damage arising from breach of a contract of carriage by air under the Montreal Convention or national law. Further compensation therefore allows passengers to be compensated for the entirety of the material and non-material damage they incurred due to the failure of the air carrier to fulfil its contractual obligations[311]. However unlike the Regulation where defined compensation is mandatory, the ECJ accepted that a passenger would need to demonstrate the additional losses they incurred.

Some observers commented on the ECJ's interpretation and ruling on the Regulation as "an extreme pro-consumer opinion that will likely increase airlines' costs associated with the [Regulation]"[312]. However, the Regulation seeks to achieve a level playing field in this respect by stating in Article 4 that an operating air carrier shall not be obliged to pay compensation in accordance with Article 7 if it can prove that the cancellation is caused by extraordinary circumstances which could not have been avoided, even if all reasonable measures had been taken[313]. The Montreal convention allows for a similar, although not identical, defence.

A further ramification of this case was the determination of what constitutes a flight cancellation under European law. In the final judgement handed down in October 2011, the ECJ confirmed that a 'cancellation' does not refer exclusively to a situation in which the aircraft fails to take off at all, but also covers any case in which the aircraft departed but, for whatever reason, was subsequently forced to return to the airport of departure where its passengers were transferred to other flights[314].

Despite these clarifications issued by the ECJ, further challenges to this aspect of the Regulation remain in progress.

The volcanic ash cloud and snow disruption of 2010/11 led to thousands of flights being cancelled and passengers stranded at various airports across Europe. The Regulation requires air carriers to care for passengers where flights are cancelled until they can be rebooked on another flight. This requirement

[310] Advocate General's Opinion in Case C-83/10, Sousa Rodriguez and others v Air France, Court of Justice of the European Union, 28 June 2011 [ http://curia.europa.eu/jcms/upload/docs/application/pdf/2011-06/cp110064en.pdf]

[311] Court of Justice of the European Union, Press Release No 111/11, Judgment in Case C-83/10, Luxembourg, 13 October 2011

[312] ECJ advocate general calls for defining 'passenger compensation' more broadly, ATW Online, 29 June 2011 [http://atwonline.com/international-aviation-regulation/news/ecj-advocate-general-calls-defining-passenger-compensation-mo]

[313] Article 4 of Regulation 261/2004

[314] Court of Justice of the European Union, Press Release No 111/11, Judgment in Case C-83/10, Luxembourg, 13 October 2011

forced airlines to pay out millions of euros in compensation, many of which complained publicly about this additional financial burden.

In reaction to these 2010 events, Ryanair added a €2 'compensation surcharge' from April 2011 to fund the cost of compensating passengers under the legislation, saying it would stay in place permanently until such time as the legislation is changed[315].

The airline is now testing the Regulation further with a hearing scheduled at the ECJ in February 2012[316] where it is asking the Court to decide on what constitutes 'extraordinary circumstances' (Article 4) and to find that 'force majeure' events such as the volcanic ash cloud and extreme winter weather should relieve an airline from its compensation commitments under Article 7, especially where it is beyond the carrier's control[317].

Another issue, which is however not in the scope of the APR Regulation, can arise when passengers – 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. With many airlines charging a minimum administration charge for processing refunds (of varying amounts between carriers), it may not be worthwhile for the passenger to submit a claim. When no flight has taken place by the passenger, the additional surcharges for items such as fuel, insurance and security 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 – passengers' entitlement to compensation if their flight has a significant delay.

Under Regulation 261/2004, passengers are entitled to care by the air carrier (phone call, refreshments, meal, accommodation, transportation to the place of accommodation) if they experience significant delays. For delays of more than five hours they are also entitled to choose between reimbursement of the cost of their ticket or being transported to their point of origin.

In April 2011 the Commission published a Staff Working Paper[318] 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. This study has not been repeated or updated but at that time, from the data provided, it was observed that the provisions of the Regulation regarding long delays applied to less than 1% of short and medium haul flights and 1.5% of long haul flights. Over the period 2006-2009 passengers were entitled to:

[315] Ryanair adds €2 levy to cover EU rules on compensation, The Guardian, 30 March 2011 [http://www.guardian.co.uk/business/2011/mar/30/ryanair-levy-compensation-eu261]

[316] Case C-12/11: Reference for a preliminary ruling from Dublin Metropolitan District Court (Ireland) made on 10 January 2011 — Danise McDonagh v Ryanair Ltd [http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:080:0014:02:EN:HTML]

[317] Ryanair Challenges Discriminatory EU261 Regulations in EU Courts in Strasbourg, aviator.aero, 9 February 2012 [http://www.aviator.aero/newswire/index.php/2012/02/ryanair-challenges-discriminatory-eu261-regulations-in-eu-courts-in-strasbourg/]

[318] 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

- 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. The Working Paper presented information on all long delays for departing flights based on the available information and therefore included 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.

### 10.3.6 Lost, Damaged & Mishandled Luggage

If passenger baggage is lost, damaged or delayed, passengers may be entitled to compensation under the terms of the Montreal convention but this is limited to about €1,220. However, airlines would not be liable provided they had taken all reasonable measures to avoid such damages or if it proved impossible to take such measures.

There was no further legislative progress to rules on lost, mishandled and damaged baggage in 2011 but this aspect of passenger rights and entitlement to compensation will be examined further in the current public consultation and subsequent draft proposal expected in 2012, as discussed in Section 10.3.1 above.

### 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 Commission continues to vet individual airlines and nations over the security of their aircraft and their operating procedures. From November 2011, the EU bans almost all carriers from a total of 24 countries including seventeen African nations, five Asian nations and two in Latin America.

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 same 2010 consultation and resulting report[319] referred to in Section 10.3.6 also looked at airline insolvency protection schemes available in individual countries with respect to the current Regulation 1008/2008 (common rules on the operation of air services).

The issue of airline insolvency was further examined by an impact assessment on this specific topic, with results published in a report in March 2011[320]. It found that between 2000 and 2010 there were some 96 airline insolvencies. It highlighted the disparity between rights afforded to passengers booking package tours who currently receive protection against airline insolvency under the Package Travel Directive[321]; and those who purchase tickets directly from an airline or its agents.

The latter are not afforded the same level of protection and remain responsible for ensuring that their private insurance arrangements cover this risk. Some protection is available from the Scheduled Airline Failure Insurance (SAFI) fund, should passengers elect to purchase this commercially available cover, but the report noted that the scope and availability of the fund is currently limited.

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.

This could potentially be addressed if a scheme such as SAFI is extended to other EU Member States. As well as tracking airline failures globally, SAFI monitors the financial health of carriers and makes this information publicly available on its website[322]. It also offers insurance to cover not only the failure of an airline but also the 'end suppliers', including:

- Hotels, youth hostels, car ferries and villas
- Coach journeys
- Car hire
- Caravan sites/campsites/mobile homes
- Camper rental
- Euro tunnel
- Theme parks (such as Disneyland Paris)

This type of insurance offered by SAFI provides a level of protection similar to that afforded to package tour customers, but it is not automatic and passengers must make arrangements separately prior to travel.

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[319] 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 Environmental Law & Policy, July 2010

[320] Impact assessment of passenger protection in the event of airline insolvency, Steer Davies Gleave, March 2011

[321] Council Directive 90/314/EEC of 13 June 1990 on package travel, package holidays and package tours

[322] http://www.protectmyholiday.com/news-articles.aspx

SAFI currently only offers this service to bookings made in the UK, Channel Islands, Isle of Man and the Republic of Ireland.

Tour organisers and retailers of package holidays are obliged to provide precise, complete information about booked package holidays under the Package Travel Directive. 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.

In Denmark, the fund which provides protection under the Package Travel Directive (the Rejsegarantifonden) was extended in 2010 to offer passengers the option of this protection on all flights from Denmark on carriers established in that country. A similar extension has been legislated in Belgium.

The scheme protecting package tour passengers in the UK is the Air Travel Organisers Licence (ATOL). The UK Government conducted a consultation into this area of concern from June 2011 and this has resulted in a planned reform of the ATOL scheme which will take effect in April 2012[323]. The Government recognised the need to update the ATOL Scheme to bring it into line with new trade practices and provide clarity when customers book what appears to be a package holiday. The Government is changing the ATOL regulations so that any travel firm selling a flight together with overseas holiday accommodation (and/or car hire) at the same time or within a day of each other, must hold an ATOL. Licence holders are required to pay the ATOL Protection Contribution (APC) for each customer booked to guarantee the financial protection of their customers should the travel company fail.

The scheme is overseen by the UK Civil Aviation Authority which noted in April 2011 that the renewal failure rate reached a record low in that year – of the 976 companies applying to renew their licences, only 27 failed in their application. This was attributed to the strong working relationships the regulator has established with the travel industry[324].

The impact assessment report on airline insolvency made a number of policy recommendations to improve passenger protection when airline failures occur, ranging from such initiatives as improved monitoring of carriers, tighter regulation and the creation of a general reserve fund.

These recommendations combined with the 2010 consultation will inform the EC's overall review of legislation, alongside other Regulations and Directives of passenger rights within the EU, with a draft proposal due in 2012 (see Section 10.3.1).

### 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 the time of purchase. 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

[323] ATOL Reform Home Page, accessed February 2012 [http://www.caa.co.uk/default.aspx?catid=2094&pagetype=90]

[324] ATOL renewal failure rate hits record low, Travelmole, 4 April 2011 [http://www.travelmole.com/news_feature.php?id=1147077]

fees which are unavoidable and foreseeable at the time of publication (Article 23), as well as displaying these fare components individually as part of the final price.

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.

A recent market development is the introduction of airline ancillary revenues which represent an increasing proportion of overall airline revenues, bringing added complexity to the selling proposition by airlines and travel websites.

GDS provider Amadeus teamed with consultants IdeaWorks in 2010 to produce an analysis of worldwide ancillary revenues; repeating this study in 2011[325]. The 2010 study reported the revenues disclosed by 47 airlines; these statistics were applied to a larger list of more than 200 airlines to provide a more global projection in 2011.

The studies have identified natural groupings amongst carriers based on their ability to generate ancillary revenue:

- **Ancillary Revenue Champs –** These carriers generate the highest activity as a percentage of operating revenue. The average achieved by this group was 19.8%, which is slightly up from 19.4% for 2010. Examples include AirAsia, Aer Lingus, easyJet, Ryanair and Spirit Airlines.
- **Major US Airlines –** US-based majors generate strong ancillary revenue through a combination of frequent flier revenue and baggage fees. The average for this group was 11.9%, which is a sizeable increase above the 2010 rate of 7.2%. Examples include Alaska, American and United.
- **Low Cost Carriers –** LCCs throughout the world typically rely upon a mix of à la carte fees to generate good levels of ancillary revenue. The average in this group was 6.5% and is above last year's 5.4%. Examples include AirTran, Blue1, IndiGo, Jazeera Airways, Pegasus and Spring Airlines.
- **Traditional Airlines –** This category represents a catch-all for the largest number of carriers. Ancillary revenue activity may consist of fees associated with excess or heavy bags and limited partner activity for a frequent flier program. The average here remained at 2.9%. Examples include Air China, Emirates, Finnair, LAN, Qatar Airways and Singapore Airlines.

Table 10-4 shows that total airline ancillary revenues were €23.4 billion in 2011, an increase of almost 44% on 2010. In the face of difficult worldwide trading conditions in 2011 which impacted on airline profits, in particular rising jet fuel costs, contributions from ancillary revenue have provided a boost to the industry by moving it away from a loss-making position and providing an effective hedge against fuel costs.

[325] Airline ancillary revenue soars to $32.5 billion worldwide in 2011, Amadeus Press Release, 19 October 2011 [http://www.amadeus.com/amadeus/x213158.html]

Table 10-4: Worldwide Estimate of Ancillary Revenue by Carrier Grouping

| Airline Category | 2010 Ancillary Revenue (billion) EUR (USD) | 2011 Ancillary Revenue (billion) EUR (USD) | % change 11/10 (based on USD) |
|---|---|---|---|
| Major U.S. Airlines | €5.1 ($6.7) | €9.0 ($12.5) | 86.6% |
| Low Cost Carriers | €2.7 ($3.6) | €3.5 ($4.8) | 33.3% |
| Traditional Airlines | €6.4 ($8.5) | €7.8 ($10.9) | 28.2% |
| Ancillary Revenue 'Champions' | €2.9 ($3.8) | €3.1 ($4.3) | 13.2% |
| **Worldwide Totals** | **€17.1 ($22.6)** | **€23.4 ($32.5)** | **43.8%** |

Source: Amadeus/IdeaWorks October 2011 (2010 & 2011 USD/EUR average annual historical exchange rate, oanda.com)

There is an increasing interest in developing ancillary revenues from full service carriers which are starting to implement ancillary services through global distribution systems. The major U.S. airlines have a large share of this revenue; their USD $12.5 billion result in 2011 (38% of the global total) represents only seven airlines: Alaska Airlines, American, Continental, Delta, Hawaiian, United and US Airways. The majority of this revenue (50%) is generated by the sale of frequent flier miles, notably those linked to co-branded credit cards.

Table 10-5 shows this revenue grouped by world region. Carriers in North America began to focus on this type of revenue after the oil price shock of 2008 and continue to lead the world in ancillary revenue production.

Table 10-5: Worldwide Estimate of Ancillary Revenue by Region

| World Region | 2010 Ancillary Revenue (billion) EUR (USD) | 2011 Ancillary Revenue (billion) EUR (USD) | % change 11/10 (based on USD) |
|---|---|---|---|
| North America | €6.6 ($8.7) | €10.8 ($15.0) | 72% |
| Africa/Middle East | €0.7 ($0.9) | €1.0 ($1.4) | 52% |
| Latin America/Caribbean | €0.5 ($0.6) | €0.6 ($0.8) | 47% |
| Asia/Pacific | €3.6 ($4.8) | €4.5 ($6.3) | 30% |
| Europe | €5.7 ($7.6) | €6.5 ($9.0) | 18.7% |

Source: Amadeus/IdeaWorks October 2011 (2010 & 2011 USD/EUR average annual historical exchange rate, oanda.com)

However, revenues rose around the globe and were largely driven by traffic and passenger revenue increases as the industry recovered from the 2009 recession. The study estimated that 48% of the USD $9.9 billion increase over 2010 is attributable to this higher overall level of revenue and passenger traffic, with the remaining 52% as a result of carriers becoming more focused on ancillary revenue through better financial disclosure, stronger marketing efforts, and adding more à la carte services for sale.

The European 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.

These ancillary services vary widely by airline, both in the scope of services offered and the price charged to passengers. Generally these types of services can be grouped into two main headings:

- The air fare (headline price) – including government departure taxes, passenger service charges, fuel surcharges, check-in fees and fees relating to insurance and security costs
- Optional extras & other charges – checked baggage, allocated seating, priority boarding, etc

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

In the UK, the Civil Aviation Authority (CAA) regularly monitors both additional taxes and surcharges which apply to the 'headline fare'; and those which are optional extras and/or other charges chosen by the passenger when making a booking. It looks at the top 24 airlines (based on the number of scheduled flights) operating in the UK, which covers 84% of the passengers travelling to and from the country[326].

The CAA comparison shows that in addition to the charges which are compulsory and included in the headline fare (taxes, security, insurance etc), there remains a wide variation between carriers depending on what form of payment has been used, namely:

- Credit card
- Debit card
- Other method (airline branded payment cards or 'cash passports', PayPal, voucher, bank transfer, payment in person at the airline's ticket office)

Fees for optional extras during the booking process also vary widely between carriers and the CAA monitors charges for the following items:

- Check-in
- Priority boarding
- Text message booking confirmation
- Carriage of sports equipment
- Hold baggage

[326] Comparing airline fees for optional extras and other charges, UK CAA, 7 February 2012 [http://www.caa.co.uk/docs/2200/Comparing_airline_charges.pdf]

- Advanced reserved seating
- Meals & refreshments
- Other – late check-in, missed departure, refund administration, name changes, flight changes, airport lounge access, cancellation, service fees

Issues relating to price transparency and the potential harmonisation of booking and check-in practices across the EU are part of the package of legislation being considered for new draft proposals expected in 2012, as listed in Section 10.3.1.

In addition to legislation specifically developed for aviation, in October 2011 the EU adopted new consumer rules[327] which limit credit card surcharges on 'distance' purchases – those made online or by telephone. The package of rules, called the EU Consumer Rights Directive, prohibits online traders from charging consumers more for paying by credit card (or other means of payment) than what it actually costs the trader to offer such means of payment. The Directive merges four existing consumer directives into one set of rules[328]:

- Sale of consumer goods & guarantees (99/44/EC)
- Unfair contract terms (93/13/EC)
- Distance selling (97/7/EC)
- Doorstep selling (85/577/EC)

Passenger transport is excluded from the scope of the Directive as it is already subject to legislation elsewhere, but its provisions protecting consumers against excessive fees for the use of means of payment or against hidden costs also apply to passenger transport contracts (paragraph 27 of the Directive).

Airlines with a high dependency on ancillary services and charges may face bigger issues with the new rules, particularly those who charge extra to make reservations by telephone or only offer a premium rate contact number. Article 21 of the Directive requires that the consumer is not charged any more than the basic rate when contacting a trader by telephone. The Directive also bans 'pre-ticked boxes' on websites, requiring that the consumer has the ability to opt in, rather than opt out, meaning that they are less likely to pay for an additional service that they were not aware of at the time of making the transaction.

The surcharges airlines currently impose for making bookings with credit and debit cards vary widely, ranging from airlines such as SAS who make no charges for paying by any method (for passengers departing from the UK[329]), to others – for example SWISS – who at the lower end of their charging scale impose a €5 surcharge (domestic flights within Germany) ranging up to €18 per ticket depending on the country of origin and distance flown[330].

[327] DIRECTIVE 2011/83/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council, 25 October 2011

[328] http://ec.europa.eu/consumers/rights/dir_replacing_en.htm

[329] Comparing airline fees for optional extras and other charges, UK CAA, 7 February 2012 [http://www.caa.co.uk/docs/2200/Comparing_airline_charges.pdf]

[330] Optional Payment Charge, SWISS International Airlines [http://www.swiss.com/web/EN/various/Pages/optional_payment_charge.aspx]

Should they face pressure or enforcement to remove such fees from the booking process, it is likely that airlines will simply re-brand their existing charges with a different name. In December 2011 Ryanair angered some consumer groups when it declared that it didn't impose any credit or debit card fees on its passengers, but instead charged an 'admin fee'. It said that its €6 charge per passenger per flight related to costs associated with its booking system and was not a payment surcharge[331]. easyJet has also moved towards a single admin fee per booking (regardless of the number of passengers or sectors flown), although it still imposes an additional fee for booking by credit card[332].

### 10.3.10 Other Consumer Issues under Consideration in the U.S.

#### Wide-Ranging Updates to U.S. Passenger Protection Legislation in 2011

In the U.S. during 2010, demands for 'transparent' pricing and full travel cost disclosure amongst other consumer protection issues were considered both in U.S. DOT rule-making drafts and legislation, being pushed by a consortium led by Democrat Senator Robert Menendez. This regulatory movement ran into stiff opposition from Airlines for America (A4A, formerly known as the Air Transport Association of America), the body representing U.S. air carriers.

A number of airlines stated they had taken steps to reduce the confusion around fees and most U.S. carriers claimed they had taken steps by posting their fees on their websites. However opponents claimed there was 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 (GDS).

A notice of proposed rulemaking (NPRM) was introduced in June 2010 which eventually passed into law in April 2011. DOT delayed the effective date from 23 August 2011 to 24 January 2012 for requirements pertaining to baggage fees, post purchase price increases, flight status changes and holding a reservation without payment for 24 hours. It also delayed the effective date from 24 October 2011 to 24 January 2012 for requirements pertaining to full fare advertising. The effective date remained 23 August 2011 for all the others requirement in the final rule[333].

The final rule addresses a wide range of passenger protections and the effective updates are summarised in Table 10.7 below.

[331] Ryanair defiant over credit card surcharges crackdown, The Guardian, 23 December 2011 [http://www.guardian.co.uk/money/2011/dec/23/ryanair-credit-card-surcharges-crackdown]

[332] easyJet introduces administration fee, easyJet website, 13 January 2012 [http://corporate.easyjet.com/media/latest-news/news-year-2012/13-01-2012-en.aspx]

[333] Answers to Frequently Asked Questions Concerning the Enforcement of the Second Final Rule on Enhancing Airline Passenger Protections, U.S. Department of Transportation, 11 January 2012 [http://airconsumer.dot.gov/rules/EAPP_2_FAQ_01-11-2012final.pdf]

Table 10.7: Summary of Final Rule on Enhancing Airline Passenger Protections

| Subject | Final Rule |
|---|---|
| Tarmac Delay Contingency Plans | ■ Requires foreign air carriers operating to or from the U.S. with at least one aircraft with 30 or more passenger seats to adopt and adhere to tarmac delay contingency plans<br>■ Requires U.S. and foreign air carriers to not permit an international flight to remain on the tarmac at a U.S. airport for more than three hours without allowing passengers to deplane subject to safety, security, and ATC exceptions<br>■ Expands the airports at which airlines must adhere to the contingency plan terms to include small hub and non-hub airports, including diversion airports<br>■ Requires U.S. and foreign carriers to coordinate plans with Customs and Border Protection (CBP) and the Transportation Security Administration (TSA)<br>■ Requires notification regarding the status of delays every 30 minutes while aircraft is delayed, including reasons for delay, if known<br>■ Requires notification of opportunity to deplane from an aircraft that is at the gate or another disembarkation area with door open if the opportunity to deplane actually exists |
| Tarmac Delay Data | ■ Requires all carriers that must adopt tarmac delay contingency plans to file data with the Department regarding lengthy tarmac delays |
| Customer Service Plans | ■ Requires foreign air carriers that operate scheduled passenger service to and from the U.S. with at least one aircraft with 30 or more passenger seats to adopt, follow and audit customer service plans.<br>■ Establishes standards for the subjects U.S. and foreign air carriers must cover in customer service plans. Examples include:<br>– delivering baggage on time, including reimbursing passengers for any fee charged to transport a bag if the bag is lost;<br>– where ticket refunds are due, providing prompt refunds including refund of optional fees charged to a passenger for services that the passenger was unable to use due to an oversale situation or flight cancellation; and<br>– allowing reservations to be held at the quoted fare without payment, or cancelled without penalty, for at least twenty-four hours after the reservation is made if the reservation is made one week or more prior to a flight's departure date |
| Posting of Customer Service Plans & Tarmac Delay Contingency Plans | ■ Requires foreign carriers to post their required contingency plans, customer service plans, and contracts of carriage on their websites as is already required of U.S. carriers |
| Response to Consumer Problems | ■ Expands the pool of carriers that must respond to consumer problems to include foreign air carriers operating scheduled passenger service to and from the U.S. with at least one aircraft with 30 or more passenger seats (i.e. monitor the effects of irregular flight operations on consumers; inform consumers how to file a complaint with the carrier, and provide substantives responses to consumer complaints within 60 days) |
| Oversales | ■ Increases the minimum denied boarding compensation (DBC) limits to $650/$1,300 or 200%/400% of the one-way fare, whichever is smaller<br>■ Implements an automatic inflation adjuster for minimum DBC limits every 2 years<br>■ Clarifies that DBC must be offered to 'zero fare ticket' holders (e.g. holders of frequent flyer award tickets) who are involuntarily bumped<br>■ Requires that a carrier verbally offer cash/check DBC if the carrier verbally offers a travel voucher as DBC to passengers who are involuntarily bumped<br>■ Requires that a carrier inform passengers solicited to volunteer for denied boarding about all material restrictions on the use of transportation vouchers offered in lieu of cash |

| Subject | Final Rule |
|---|---|
| Full Fare Advertising | ■ Enforces the full fare advertising rule as written (i.e. ads which state a price must state the full price to be paid). Carriers currently may exclude government taxes/fees imposed on a per-passenger basis<br>■ Clarifies the rule's applicability to ticket agents<br>■ Prohibits carriers and ticket agents from advertising fares that are not the full fare and imposes stringent notice requirements in connection with the advertisement of 'each-way' fares available for purchase only on a round-trip basis<br>■ Prohibits opt-out provisions in ads for air transportation |
| Baggage, Other Fees & Related Code-share Issues | ■ Requires U.S. and foreign air carriers to disclose changes in bag fees/allowances on their homepage for three months, to include information regarding the free baggage allowance<br>■ Requires carriers (U.S. and foreign) and ticket agents to include on e-ticket confirmations information about the free baggage allowance and applicable fees for the first and second checked bag and carry-on but allows ticket agents, unlike carriers, to do so through a hyperlink<br>■ Requires carriers (U.S. and foreign) and ticket agents to inform passengers on the first screen on which the ticket agent or carrier offers a fare quotation for a specific itinerary selected by a consumer that additional airline fees for baggage may apply and where consumers can go to see these baggage fees<br>■ Requires U.S. and foreign air carriers to disclose all fees for optional services to consumers through a prominent link on their homepage<br>■ Requires that the same baggage allowances and baggage fees apply throughout a passenger's journey<br>■ Requires the marketing carrier to disclose on its website any difference between its optional services and fees and those of the carrier operating the flight. Disclosure may be made through a hyperlink to the operating carriers' websites that detail the operating carriers' fees for optional services, or to a page on its website that lists the differences in policies among code-share partners |
| Post-Purchase Price Increases | ■ Bans the practice of post-purchase price increases in air transportation or air tours unless the increase is due to an increase in government-imposed taxes or fees and only if the passenger was provided full disclosure of the potential for the increase and affirmatively agreed to the potential for such an increase prior to purchase.<br>■ Requires any seller of scheduled air transportation to notify a consumer of the potential for a price increase for the scheduled air transportation prior to the time that the full amount agreed upon has been paid by the consumer and to obtain the consumer's written consent to the potential for such an increase prior to accepting any payment, including a partial payment |
| Flight Status Changes | ■ Requires U.S. and foreign air carriers operating scheduled passenger service with any aircraft with 30 or more seats to notify consumers through whatever means is available to the carrier for passengers who subscribe to the carrier's flight status notification services, in the boarding gate area, on a carrier's telephone reservation system and on its website of delays of 30 minutes or more, cancellations and diversions within 30 minutes of the carrier becoming aware of a change in the status of a flight |
| Choice-of-Forum Provisions | ■ Prohibits U.S. and foreign air carriers from limiting a passenger's forum to pursue litigation to a particular inconvenient venue |

Source: U.S. Department of Transportation

### Pricing Transparency & Booking Practices

The final rule made 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 final rule addressed the following:

- It requires full disclosure of all fees and charges before passengers purchase a ticket whether directly from an airline or from a third-party intermediary.
- It requires sellers of air transportation to display a 'full price' including optional fees selected by the passenger when a passenger searches for a particular itinerary.
- It requires that carriers make all ancillary fee information available to travel agencies through global distribution systems (GDS).

Even prior to the new legislation taking effect, DOT signalled its high priority to protect passenger rights by imposing civil penalties on carriers. In June 2011 it fined Continental Airlines (CO) and US Airways (US) for violating rules which prohibited deceptive price advertising. CO received a penalty of USD $120,000 for not including fuel surcharges on its website and US was fined USD $45,000 for not providing an explanation of fees and taxes on its website[334]. Another U.S. carrier, AirTran, was fined USD $60,000 for deceptive price advertising when it was found that consumers were not provided details about taxes and fees on the airline's website until they scrolled to the bottom of the page where the information appeared in fine print[335]. Spirit Airlines was also fined USD $50,000 in 2011 for deceptive pricing when it advertised $9 fares from Los Angeles to Las Vegas. The ticket price was closer to $35; Spirit said the ads were not widespread and that the incident was a mistake[336].

### Punctuality & Long Delays

In the United States, airlines were previously not required by law to compensate passengers whose flights are delayed or cancelled but the final rule now requires airlines to improve their handling of passengers kept on board aircraft on the tarmac.

[334] DOT fines Continental, US Airways for violating price advertising rules, ATW Online, 3 June 2011 [http://atwonline.com/international-aviation-regulation/news/dot-fines-continental-us-airways-violating-price-advertising-]

[335] Authorities cracking down on hidden airline fees, Travelmole, 10 January 2012 [http://www.travelmole.com/news_feature.php?news_id=1150969]

[336] 'Spirited' response to new airline rules no surprise, Travelmole, 31 January 2012 [http://www.travelmole.com/news_feature.php?news_id=2000131]

The two main issues in the rule effective from August 2011 were the adoption of tarmac delay contingency plans 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.

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. The airline is required to provide food and water to passengers on board a delayed aircraft after two hours, to allow passengers to deplane subject to safety, security, and ATC exceptions if delayed by more than three hours for domestic flights and four hours for international flights; and to ensure toilet serviceability and adequate medical attention if needed; and to 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 November 2011 American Eagle Airlines became the first carrier to be fined for lengthy tarmac delays. The USD $900,000 penalty is the largest to be paid by an airline in a consumer protection case not involving civil rights violations[337]. In June 2011 DOT reported that there had been only 20 tarmac delays of more than 3 hours for the period May 2010 to April 2011, compared to 693 in the previous corresponding period. This was the first full year of data since the three-hour delay rule came into effect; DOT claimed that this showed the rule had achieved its goal of reducing such delays[338].

However, critics of the rule claim that airlines are now pre-cancelling certain flights to avoid risking the hefty fines of up to USD $27,500 per delayed passenger[339]. This is prevalent during periods of extreme weather when flights are at greater risk of being delayed on the ground[340].

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.

[337] US DOT issues first tarmac delay fine of $900,000 to American Eagle, ATW Online, 16 November 2011 [http://atwonline.com/international-aviation-regulation/news/us-dot-issues-first-tarmac-delay-fine-900000-american-eagle-1]

[338] DOT: Tarmac delays 'dramatically diminished' in first year of 3-hr. rule, ATW Online, 10 June 2011 [http://atwonline.com/airline-finance-data/news/dot-tarmac-delays-dramatically-diminished-first-year-3-hr-rule-0609]

[339] Delayed Impact, ATW Online, 1 May 2011 [http://atwonline.com/international-aviation-regulation/article/delayed-impact-0429]

[340] New study: Tarmac rule fuels flight cancellations, Orlando Sentinel, 29 March 2011 [http://articles.orlandosentinel.com/2011-03-29/business/os-airline-cancelations-tarmac-rule-20110329_1_tarmac-rule-airlines-that-strand-passengers-marks-aviation]

# Glossary

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|---|---|
| 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 |

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|---|---|
| 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 |

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|---|---|
| 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 |

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|---|---|
| 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 |

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|---|---|
| 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 |

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|---|---|
| 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 |

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|---|---|
| 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 |