GLOBAL AIR TRANSPORT OUTLOOK

Narjess Teyssier
ICAO
Chief Economic Analysis & Policy Section
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Content

- 2011 revisited
- Industry Trends
- Forecasts
- Planning Impact
## Regional traffic overview for 2011

<table>
<thead>
<tr>
<th>Region</th>
<th>Traffic</th>
<th>Capacity</th>
<th>Load Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>+2.5%</td>
<td>+3.1%</td>
<td>-0.1 Pt</td>
</tr>
<tr>
<td>Latin America</td>
<td>+7.5%</td>
<td>+2.2 %</td>
<td>+3.9 Pt</td>
</tr>
<tr>
<td>Europe</td>
<td>+8.9%</td>
<td>+9.1%</td>
<td>-0.6 Pt</td>
</tr>
<tr>
<td>Middle East</td>
<td>+11.9%</td>
<td>+13.4%</td>
<td>-0.9 Pt</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>+6.3%</td>
<td>+5.8%</td>
<td>+0.4 Pt</td>
</tr>
<tr>
<td>Africa</td>
<td>+4.7%</td>
<td>+6.1%</td>
<td>- 0.9 Pt</td>
</tr>
<tr>
<td>World</td>
<td>+6.4 %</td>
<td>+6.5 %</td>
<td>-0.1 Pt</td>
</tr>
</tbody>
</table>

**Source:** ICAO
Market shares* achieved

* Market share of the scheduled traffic of the airlines domiciled in the region

International traffic represents 61% of the total passenger traffic

International passenger traffic**
- Europe: 39%
- Asia Pacific: 26%
- North America: 16%
- Middle East: 12%
- Latin America: 4%
- Africa *: 3%

Domestic passenger traffic**
- North America: 51%
- Asia Pacific: 31%
- Europe: 8%
- Middle East: 1%
- Latin America: 8%
- Africa *: 1%

**Expressed in Revenue Passenger Kilometre
Last decade traffic growth

Passenger traffic market share
By airline type

IATA members
93%
Non IATA airlines
7%

2000-2010
+4.4% p.a.

Source: ICAO, IATA
Air transport vs Economic growth

- World Real GDP
- Passenger traffic
- Cargo traffic

1979: Index Base 100

Source: ICAO, IHS/ Global Insight
The link between the promoting factors

- Improving Technology
- Falling Costs
- Falling Fares
- Growing Traffic
- Liberalized Services
- Economic Growth
Air transport conducted under liberal arrangements

As a % of international scheduled services

- Number of frequencies
- Number of country-pair routes

Source: ICAO
Low Cost Carriers development

Number of LCCs: 15
Deregulation: 1978

Number of LCCs: 38
Deregulation: accelerating

Number of LCCs: 12
Deregulation: in progress

Number of LCCs (Africa and Middle East): 10
Deregulation: uneven

Number of LCCs: 45

Network carriers: 79%
LCCs: 21%

Network carriers: 75%
LCCs: 25%

Network carriers: 85%
LCCs: 15%

Network carriers: 95%
LCCs: 5%

Source: ICAO
Long-term traffic forecasting methodology

**Approach:** Bottom-up methodology starting at the route-group level and building up to the global level

**Data:** On-flight origin destination (OFOD) and traffic by flight stage (TFS). ICAO data series, representing some 85% of total international passenger traffic, cross-checked with other sources. Domestic data are collected from each State through the Form A which covers around 92% of scheduled traffic worldwide.

**Models:** Econometric Modelling traffic by market considering quantitative relationships such as economic growth or pax yield as a proxy for the ticket price.

**Geographical breakdown:** 9 forecasting regions providing 53 route groups (36 International, 8 Intra-region & 9 Domestic) plus 1 non-scheduled segment

**Time horizon:** Air traffic for RPKs and FTKs have been produced for 20 years and extended to the 2040 horizon

**3 Scenarios built:** Most likely, Low and High Scenarios
Air travel demand drivers

- State of global economy (GDP growth)
- Airline ticket price. (measured in Yields)

Source: ICAO, IHS/ Global Insight
A two-speed world

Favoring the expansion of some regional air travel markets

China & India lead Emerging Markets and the BRIC* in Real GDP growth

China forecasted to have as many as 100 million of their inhabitants travelling internationally by 2020

Source: IHS Global Insight, Jan 2012

*BRIC: Brazil Russia India China
A key indicator for air travel demand

**Consumer Confidence Indexes (CCIs)**

- China CCI
- US Consumer Confidence Index
- EU CCI

*Source: IHS Global Insight*
Assumptions

- Air travel demand forecasts
- Unconstrained forecasts
- Oil price impact is included in each regional GDP forecasts
- Use of GDP at PPP*
- Yields decrease or increase according to the specificity of the market

*PPP: Purchasing Power Parity is an economic theory linking currency exchange rates to prices paid for goods and services in any two countries.
Long-term Passenger traffic forecast results

Source: ICAO

Total World RPKs (billions)


History

1990-2010: 4.4 % p.a.

AAGR for 20 years forecasts

4.5% p.a

5.2 % p.a.

3.6% p.a.

2030-2040: 4.3 %p.a.

Most Likely Low High

High GDP scenario = +0.3% for developed countries & +0.6 for the developing countries
Low GDP scenario= -0.5 for developed regions & -0.1 for the developing regions.
# Regional* passenger traffic forecasts

<table>
<thead>
<tr>
<th>Pax Traffic</th>
<th>International (%)</th>
<th>Domestic (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Region</strong></td>
<td><strong>Growth 2010-2030</strong></td>
<td><strong>Share 2030</strong></td>
<td><strong>Growth 2010-2030</strong></td>
</tr>
<tr>
<td>North America</td>
<td>3.9</td>
<td>14</td>
<td>2.6</td>
</tr>
<tr>
<td>Europe</td>
<td>4.3</td>
<td>37</td>
<td>1.7</td>
</tr>
<tr>
<td>Asia/Pacific</td>
<td>5.7</td>
<td>32</td>
<td>7.1</td>
</tr>
<tr>
<td>Latin America</td>
<td>6.1</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Africa</td>
<td>4.7</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>Middle East</td>
<td>5.2</td>
<td>9</td>
<td>4.8</td>
</tr>
<tr>
<td>WORLD</td>
<td>4.7</td>
<td>100</td>
<td>4.4</td>
</tr>
</tbody>
</table>

*Traffic of airlines domiciled in each region expressed in RPKs growth and market shares
Regional* passenger traffic market shares

**2010**
- North America: 30%
- Latin America: 5%
- Africa: 3%
- Asia Pacific: 27%
- Europe: 28%
- Middle East: 7%

**2030**
- North America: 20%
- Latin America: 6%
- Africa: 2%
- Asia Pacific: 36%
- Europe: 23%
- Middle East: 13%

*Traffic of airlines domiciled in each region expressed in RPKs market shares

Source: ICAO
2030 Main Domestic markets

Source: ICAO
Major International markets in 2030

Source: ICAO
Air freight traffic data collection

O.A.G Database (ATK)

- All-cargo (ATK)
- Belly-cargo (ATK)

- All-cargo Market share
- Belly-cargo Market share

- All-cargo (FTK)
- Belly-cargo (FTK)

ICAO Statistics programme
Form A / Form B

Total cargo (FTK)
Air freight traffic forecasting methodology

- 9 regions
- 9 domestic flows
- 38 inter-regional directional route groups
- 3 intra-regional flows
Modelling Air freight traffic

Tested explanatory variables:
- GDP (Origin and/or Destination)
- GDP per capita (Origin and/or Destination)
- Trade value by ton

Tested explanatory variables:
- RPKs
- GDP (Origin and/or Destination)
- GDP per capita (Origin and/or Destination)
Long term cargo traffic forecasting results

World Freight Traffic

- History
- Forecast
  - Total-freight
  - All-freight + Belly
  - All-freight
  - Belly-freight

AAGR:
- History: Total-freight: 5.2%
- Total-freight: 6.2%
- All-freight: 4.6%
Top ten air freight flows in 2030

- Domestic North America:
  - 2030: 4.8 billion FTKs
  - 2010: 3.8 billion FTKs

- China to Europe:
  - 2030: 8.2 billion FTKs
  - 2010: 13.7 billion FTKs

- China to North America:
  - 2030: 7.4 billion FTKs
  - 2010: 7.4 billion FTKs

- Domestic China:
  - 2030: 7.6 billion FTKs
  - 2010: 13.8 billion FTKs

- Europe to China:
  - 2030: 7.0 billion FTKs
  - 2010: 9.7 billion FTKs

- North America to Europe:
  - 2030: 3.5 billion FTKs
  - 2010: 2.5 billion FTKs

- Europe to North America:
  - 2030: 3.6 billion FTKs
  - 2010: 2.5 billion FTKs

- North Asia to North America:
  - 2030: 4.1 billion FTKs
  - 2010: 4.7 billion FTKs

- North Asia to Europe:
  - 2030: 4.4 billion FTKs
  - 2010: 7.3 billion FTKs

- China to Pacific/SW Asia:
  - 2030: 8.1 billion FTKs
  - 2010: 10.7 billion FTKs

Legend:
- Blue: Belly-Freight
- Red: All-Freight
- Green: AAGR 2011-2030 (Total Cargo)
- Orange: AAGR 1990-2010 (Total Cargo)
2030 main Domestic air freight markets

Total freight domestic traffic in 2030 (Billion FTKs)
### Aircraft movements forecasts

<table>
<thead>
<tr>
<th>Formula</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available seat-kilometres = $\frac{\text{Revenue passenger-kilometres}}{\text{Average load factor}}$</td>
<td>Equation (1)</td>
</tr>
<tr>
<td>Aircraft-kilometres = $\frac{\text{Available seat-kilometres}}{\text{Average aircraft seating capacity}}$</td>
<td>Equation (2)</td>
</tr>
<tr>
<td>Aircraft movements = $\frac{\text{Aircraft-kilometres}}{\text{Average stage length}}$</td>
<td>Equation (3)</td>
</tr>
</tbody>
</table>

### Main assumptions:
- Growth in RPKs of **4.5%** per annum
- Slight increase in average load factor from **76 (2011)** to **79%** in 2030
- Increase in average passenger aircraft size from **169** to **174 seats**
- Growth in average aircraft stage length of **0.6%** per annum
2030 Aircraft movement forecast

Aircraft movements 2010
World total: 24.791 Million

- North America: 37.7%
- Asia Pacific: 22.9%
- Europe: 27.5%
- Middle East: 2.6%
- Latin America: 7.1%

World total aircraft movements in 2030: 51.708 Million

- North America: 32.3%
- Asia Pacific: 31.7%
- Europe: 23.3%
- Middle East: 2.9%
- Latin America: 7.7%
- Africa: 2.0%
ATCO ratios

- Average worldwide ratio of annual movements per ATCO in 2010 estimated at 370 movements per year.

- Foreseeable increases in ATCO productivity (SESAR/NextGen*) = augmented productivity scenario.

- Assumption: 555 annual movements per ATCO instead of 370 (i.e. 50% increase in annual ATCO productivity).

* SESAR: Single European Sky ATM (Air Traffic Management) Research
  Next Gen: Next Generation Air Transportation System
### Annual training needs and capacities between 2010 and 2030

(Attrition: 5% per annum; 555 movements/ATCO)

<table>
<thead>
<tr>
<th>Region</th>
<th>Training needs</th>
<th>Training capacity</th>
<th>Shortage/surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>100</td>
<td>210</td>
<td>110</td>
</tr>
<tr>
<td>Asia/Pacific</td>
<td>1,862</td>
<td>1,865</td>
<td>3</td>
</tr>
<tr>
<td>Europe</td>
<td>967</td>
<td>1,440</td>
<td>473</td>
</tr>
<tr>
<td>Latin America</td>
<td>488</td>
<td>935</td>
<td>447</td>
</tr>
<tr>
<td>Middle East</td>
<td>155</td>
<td>90</td>
<td>-65</td>
</tr>
<tr>
<td>North America</td>
<td>1,770</td>
<td>2,200</td>
<td>430</td>
</tr>
<tr>
<td>World</td>
<td>5,342</td>
<td>6,740</td>
<td>1,398</td>
</tr>
</tbody>
</table>

Source: ICAO
2010 fleet distribution by a/c groups

Source: Official Airline Guide (OAG) current fleet [UBM Aviation]
### Pilot and maintenance personnel per aircraft ratios

#### Number of pilots per aircraft

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Twin aisle</th>
<th>Single aisle</th>
<th>Cargo</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High scenario</strong></td>
<td>20</td>
<td>13</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td><strong>Most likely scenario</strong></td>
<td>14</td>
<td>10</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td><strong>Low scenario</strong></td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Number of maintenance personnel per aircraft

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger aircraft</td>
<td>20</td>
</tr>
<tr>
<td>Cargo aircraft</td>
<td>20</td>
</tr>
<tr>
<td>Other aircraft</td>
<td>3</td>
</tr>
</tbody>
</table>

*Source: ICAO*
### Future pilots requirements* vs training capacities

**Most likely scenario**

<table>
<thead>
<tr>
<th>Region</th>
<th>Pilots Needs</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>ICAO 10 449</td>
<td>27 655</td>
</tr>
<tr>
<td>Africa</td>
<td>ICAO 3 814</td>
<td>1 010</td>
</tr>
<tr>
<td>Latin America</td>
<td>ICAO 6 250</td>
<td>1 945</td>
</tr>
<tr>
<td>Middle East</td>
<td>ICAO 2 458</td>
<td>860</td>
</tr>
<tr>
<td>Europe</td>
<td>ICAO 15 552</td>
<td>7 955</td>
</tr>
<tr>
<td>Asia / Pacific</td>
<td>ICAO 13 983</td>
<td>4 935</td>
</tr>
<tr>
<td>World</td>
<td>ICAO 52 506</td>
<td>44 360</td>
</tr>
</tbody>
</table>

*Source: ICAO*

*Estimate of average annual needs for 2010 to 2030 period based on various world fleet categories; Regional and business jets, Turboprops, Single aisle, Twin aisles and Freighters*

Training capacity is based on current figures without any incremental effect due to planned additional capacities.
Next Generation aviation professionals

ICAO vision for NGAP

- The need for reliable statistics
- The « Best and the Brightest »
- Facilitating the use of competency-based approaches
- Removing regulatory obstacles
- A coordinating mechanism is required

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