



Africa-Indian Ocean Regional Traffic Forecasts 2010–2030

**Report of the Sixth Meeting
of the Africa-Indian Ocean Traffic
Forecasting Group (AFI TFG)**

Seychelles, 20–24 June 2011

**Approved by the AFI TFG and published
by authority of the Secretary General**

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**REPORT OF THE
AFRICA-INDIAN OCEAN
TRAFFIC FORECASTING GROUP (AFI TFG)
SIXTH MEETING**

(Seychelles, 20-24 June 2011)

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1. INTRODUCTION

1.1 The ICAO Africa-Indian Ocean Traffic Forecasting Group (AFI TFG) was set up in 1998 with the objective of developing traffic forecasts and other planning parameters in support of the planning of air navigation services in the AFI region. It has so far held six meetings in 1998, 2001, 2003, 2006, 2009 and 2011.

1.2 This report provides forecasts prepared by the sixth meeting of the AFI TFG held in Seychelles, from 20 to 24 June 2011. The passenger traffic forecasts were developed on the basis of major route groups (region-pairs) using econometric modelling. They were then converted into aircraft movements and expanded to the city-pair level.

2. GLOBAL TRENDS

2.1 The historical global economic and traffic trends are provided in **Appendix A**.

2.2 The global scheduled passenger traffic forecasts for the years 2010 and 2011, and over the period to the year 2030, have been developed by the ICAO Secretariat and are based on economic and passenger yield assumptions. According to those forecasts, after a decline of 2.1 per cent in 2009 and in line with the improving economic situation in many parts of the world, traffic recovered in 2010 with an 8 per cent traffic growth. This momentum is expected to continue in 2011, on the way with a growth rate of 5.3 percent per year. The ICAO long-term preliminary forecast over the period up to the year 2030 provides for an average annual increase of about 4.7 per cent.

3. REGIONAL TRENDS

3.1 Economic Trends

3.1.1 Over the 2000-2010 period, the aggregate economy of the African region grew at an average annual rate of 5 per cent, while the Gross Domestic Product (GDP) per capita increased at a rate of 2.9 per cent per annum in real terms. Factors, such as greater macroeconomic stability, modest progress in liberalizing markets and privatizing State enterprises, helped the region to attain improved economic performance. Favourable external conditions, such as the rapid growth in world trade and influx of private capital, also helped. During the years 2000 through 2002, the Region's economy grew only about 3 percent on the average, due mainly to factors such as increases in oil prices (for oil-importing countries), the resurgence of civil conflict, and losses of terms of trade resulting from weak commodity prices. During the period 2003-2008, the aggregate African economy showed remarkable improvement with growth rates in the 5 to 6 per cent range with oil-exporting countries benefiting from higher than average oil prices, while other countries benefited from the rise in non-fuel commodity prices, stronger domestic policy frameworks, a more supportive global economic environment and advantageous terms of trade. After recovering from the significant slowdown in 2009, the aggregate African GDP recovered and grew at an average annual growth rate of 5 per cent in 2010. Over the period 2010-2030, the African GDP is forecast to grow at an average annual rate of 4.4 per cent (GDP per capita of 2.4 per cent), reflecting, to a certain extent, economic reforms and liberalization to strengthen the private sector, increase domestic savings, expand non-oil exports and consolidate domestic and international economic policies.

3.1.2 Trends and prospects of the other regions' economies are discussed in **Appendix B**.

3.2 Passenger Air Traffic Trends

3.2.1 Over the 2000-2010 period, scheduled passenger traffic of airlines in the African region increased at an average annual rate of 6.4 per cent. After a poor performance in the late nineties, traffic rebounded in 2000 at an annual rate of about 9 per cent. The slowdown in the world economy and the subsequent global crisis in the airline industry following the events of 11 September 2001, initiated a new period of poor traffic performance until the end of 2003. The years 2004 and 2005 witnessed a strong rebound in traffic with growth rates of 13.1 and 14.5 per cent, respectively. Traffic continued to grow, in 2006 and 2007, at rates between 8 and 9 per cent to slow down in 2008 to a growth rate of only 3.5 per cent.

3.2.2 After suffering an expected decline of 3.3 per cent in 2009, scheduled passenger traffic for the airlines in the African region rebounded and increased by 13 per cent in 2010, well above the levels of passenger traffic growth worldwide. According to a medium-term forecast developed by the ICAO Secretariat in 2011, the traffic for the African region is expected to grow by 5.4, 8.0 and 8.3 per cent during 2011, 2012 and 2013, respectively. The long term average annual growth rate up to the year 2030 is anticipated to be around 5.1 per cent.

4. MAJOR ROUTE GROUPS TO, FROM AND WITHIN THE AFRICAN REGION

4.1 Definition

4.1.1 Traffic forecasts in this report are provided on the basis of route groups to, from and within the African region. The major route groups correspond to the following region-pairs:

- Africa – Europe
- Africa – Middle East
- Africa – Asia/Pacific
- Africa – North America
- Intra Africa

4.2 Historical Traffic

4.2.1 According to the historical data, air traffic on the five major route groups to, from and within the African region increased from some 33.5 million passengers in 2000 to 65 million passengers in 2010 at an average annual growth rate of 6.9 per cent. The annual passengers carried and growth rates for each of the route groups concerned are illustrated in **Table 1**, which shows that passenger air traffic on Intra-Africa, Africa-Asia/Pacific and Africa-Middle East routes had the highest growth rates, with the latter tripling over the period 2000-2010.

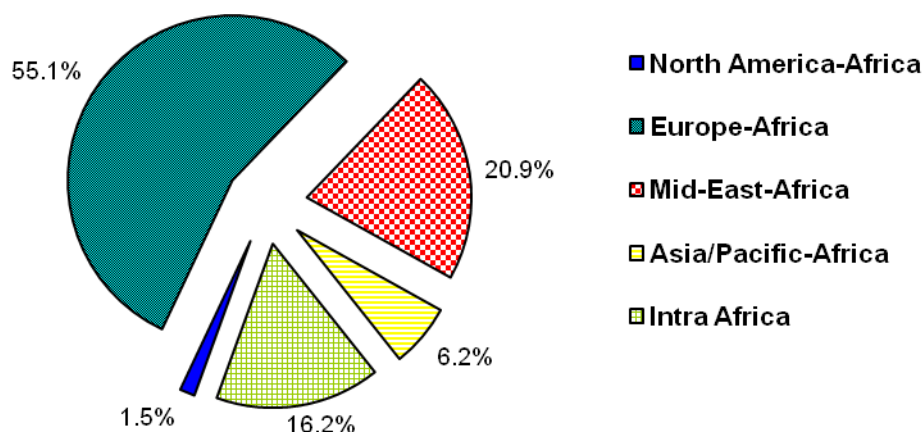
4.2.2 This historical data includes all airlines operating on these routes regardless of their region of registration.

TABLE 1
PASSENGER TRAFFIC BY MAJOR ROUTE GROUP 2000-2010
(Thousands of passengers carried)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average Annual Growth (%) (2000-2010)
Africa- North America	714	745	810	655	663	725	761	780	840	877	848	960	
Growth(%)	13.9	4.3	8.8	-19.2	1.3	9.3	4.9	2.6	7.6	4.5	-3.3	13.1	2.6
Africa – Europe	21,291	22,228	20,517	21,399	20,949	23,170	24,674	28,029	31,253	32,190	33,317	35,849	
Growth (%)	15.8	4.4	-7.7	4.3	-2.1	10.6	6.5	13.6	11.5	3.0	3.5	7.6	4.9
Africa – Middle East	4,179	4,162	4,275	4,676	5,205	6,522	7,385	8,537	9,843	11,250	12,229	13,586	
Growth (%)	1.6	-0.4	2.7	9.4	11.3	25.3	13.2	15.6	15.3	14.3	8.7	11.1	12.6
Africa – Asia/Pacific	1,519	1,706	1,744	1,892	1,862	1,933	2,296	2,415	2,978	3,186	3,123	4,047	
Growth (%)	-0.9	12.3	2.2	8.5	-1.6	3.8	18.8	5.2	23.3	7.0	-2.0	29.6	9.0
Intra-Africa	4,185	4,629	4,666	5,174	5,340	5,970	6,872	7,593	8,778	9,787	9,993	10,563	
Growth (%)	10.5	10.6	0.8	10.9	3.2	11.8	15.1	10.5	15.6	11.5	2.1	5.7	8.6
Total	31,889	33,470	32,011	33,796	34,019	38,319	41,987	47,355	53,691	57,292	59,510	65,005	
Growth (%)	12.1	5	-4.4	5.6	0.7	12.6	9.6	12.8	13.4	6.7	3.9	9.2	6.9

4.2.3 In 2010, the Africa-Europe route group had the highest passenger share in the total international traffic to, from and within Africa, followed by Africa-Middle East, Intra-Africa, Africa-Asia/Pacific and Africa-North America route groups as illustrated in **Figure 1**.

FIGURE 1
Passenger Traffic Shares 2010



5. METHODOLOGY

5.1 Demand for air travel is primarily determined by income levels, demographics and the price of air travel. In this report, GDP has been used as an explanatory variable as it is deemed to have maximum impact on demand for passenger travel. It is also assumed that the general political and economic climate affects air traffic growth; however, no specific assumptions are made about possible political and economic scenarios beyond those implicit in the basic GDP growth rates' forecast.

5.2 The following forecast horizons have been considered:

- Medium-term forecasts (2010-2015)
- Long-term forecasts (2015-2030)

5.3 Econometric models were developed to determine the cause and effect relationship between traffic and other causal factors. It was recognized, however, that even where models were developed, the forecasts should incorporate a significant element of judgement.

5.4 Forecasts of aircraft movements for a particular route-group are determined using the base year movements and the estimated yearly growth rates over the forecast horizon. Yearly aircraft movement growth rates can be derived from the passengers annual growth rates and the changes in load factors and average aircraft size.

5.5 The relationship between the aircraft movements, passenger traffic, load factors and average aircraft size is as follows:

$$\begin{aligned}\text{Aircraft movements} &= \frac{\text{passenger numbers}}{(\text{passenger/seats}) \cdot (\text{seats per aircraft})} \\ &= \frac{\text{passenger numbers}}{(\text{load factor}) \cdot (\text{average aircraft seats})}\end{aligned}$$

5.6 The relationship between changes in the same variables can therefore be deduced:

$$Y = X_1 - X_2 - X_3$$

Where:

- Y = change in aircraft movements (%)
- X₁ = change in passenger numbers (%)
- X₂ = change in load factor (%)
- X₃ = change in average aircraft seats (%)

5.7 Assumptions were made about future trends in load factors and average aircraft seats based on expectations about airlines marketing strategies and the types of aircraft that might be introduced to the route over the forecast period.

5.8 The approach adopted for every route-group can be described as follows:

- i) Develop econometric models explaining the growth of passenger air traffic using historical data;
- ii) Develop aggregate passenger air traffic forecasts for each of the major route groups using appropriate models and judgement;
- iii) Analyze the historical trends of other parameters for each route-group: total seats offered, average aircraft capacity (seats per aircraft), average load factor, total passengers carried, as well as aircraft movements compiled by ICAO supplemented by data from the International Air Transport Association (IATA), the Official Airline Guide (OAG) and other sources; and
- iv) Derive aircraft movement forecasts based on assumptions about future trends in average aircraft capacity and load factors.

6. PASSENGER AIR TRAFFIC FORECASTS

6.1 Applying the approach described above, several econometric models were developed for the major route groups listed in paragraph 4.1.1 using GDP as the explanatory variable. An analysis of the statistical significance of each model led to the following selection. Each model is provided with its coefficient of determination adjusted R^2 and the t-statistics below each regression coefficient.

6.2 The following econometric model was selected for the **Africa-Europe** route group:

$$\text{Log(Traffic)} = -9.87 + 2.06 \text{ Log(GDP Europe+Africa)} \quad \text{Adj. } R^2 = 0.88$$

(9.8)

The model shows that the traffic between Africa and Europe is explained by the aggregated GDP of Africa and Europe with an elasticity of 2.06. This dependency can be explained by the growth in the in the GDP, especially in recent years. Assuming a GDP growth rate of 2.8 per cent in real terms for the 2010-2015 period, a passenger traffic growth rate of 5.9 per cent was obtained. Whereas, by assuming a GDP growth of 2.6 per cent for the period 2015-2030, a growth of 5.4 per cent was obtained for passenger traffic. The overall average for the period 2010-2030 was 5.5 per cent.

6.3 The following econometric model was selected for the **Africa-Middle East** route group:

$$\text{Log(Traffic)} = -8.37 + 2.05 \text{ Log(GDP Middle East + Africa)} \quad \text{Adj. } R^2 = 0.96$$

(18.4)

Traffic on this route group is influenced by the GDP of the Middle East region, as well as that of the African region. Assuming a GDP growth rate of 4.6 per cent over the period 2010-2015, the passenger traffic growth rate on this route group would be in the range of 9.7 per cent. Similarly by applying a GDP growth rate of 4 per cent for the long- term forecast for the period 2015-2030, the passenger growth would be 8.6 per cent. The overall growth for the period 2010-2030 would then be 8.9 per cent.

6.4 The following econometric model was selected for the **Intra-Africa** route group:

$$\text{Log(Traffic)} = -3.53 + 1.58 \text{ Log(GDP Africa)} \quad \text{Adj. } R^2 = 0.98$$

(31.8)

Intra-Africa traffic is extremely dependent on Africa GDP as proven by the high t-value showing significance of the coefficient. Assuming a real GDP growth rate of 6.2 per cent over the period 2010-2015, the passenger traffic growth rate on this route group would be in the range of 9.9 per cent. Whereas a GDP growth of 5.4 per cent would result in a passenger traffic growth of 8.7 per cent during the period 2015-2030. The overall growth for the period 2010-2030 would be 9 per cent.

6.5 The following econometric model was selected for the **Africa-North America** route group:

$$\text{Log(Traffic)} = -11.6 + 1.92 \text{ Log(GDP North America)} \quad \text{Adj. } R^2 = 0.84$$

(9.36)

Traffic between Africa and North America is explained by the GDP North America as shown in the model by a moderately high R-sq value. Assuming that the GDP would grow at a rate of 2.9 per cent over the period 2010-2030, the passenger traffic growth rate on this route group would be around 5.7 per cent. During the period 2015-2030, a GDP growth of 2.6 per cent would result in a projected passenger traffic growth of 5 per cent. The average growth for the period 2010-2030 would be 5.2 per cent.

6.6 The following econometric model was developed for the **Africa-Asia/Pacific** route group:

$$\text{Log (Traffic)} = -3.08 + 1.10 \text{ Log (GDP Africa + Asia/Pacific)} \quad \text{Adj. } R^2 = 0.87$$

(10.6)

Assuming a real total GDP growth rate of 6.4 per cent over the period 2010-2015, the passenger traffic growth rate on this route group would be 7 per cent, whereas, a GDP growth of 5.4 per cent would result in a passenger traffic growth of 5.9 per cent during the period 2015-2030. The growth for the period 2010-2030 is projected to be 6.2 per cent.

6.7 Based on the results described above, passenger air traffic to, from and within the African region on the five major route groups for the period 2010-2030 is expected to increase at an average annual rate of 7.1 per cent. The Intra-Africa route group is expected to experience the highest average annual growth rate of 9 per cent per annum, followed by Africa-Middle East, Africa-Asia/Pacific, Africa-Europe, and Africa-North America route groups with growth rates of 8.9 per cent, 6.2 per cent, 5.5 per cent and 5.2 per cent, respectively, for the period concerned as illustrated in **Table 2**.

TABLE 2

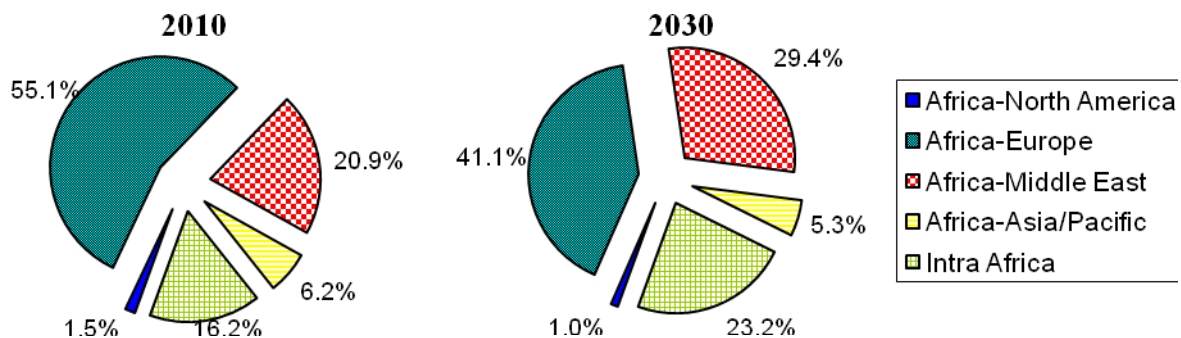
PASSENGER FORECAST TO THE YEAR 2030
(thousands of passengers carried)

	2010		2015	2030	Average annual growth (%)		
					2010-2015	2015-2030	2010-2030
Africa-North America	960		1 266	2 645	5.7	5.0	5.2
Africa-Europe	35 849		47 748	104 599	5.9	5.4	5.5
Africa-Middle East	13 586		22 180	74 757	10.3	8.4	8.9
Africa-Asia/Pacific	4 047		5 676	13 478	7.0	5.9	6.2
Intra-Africa	10 563		16 935	59 199	9.9	8.7	9.0
TOTAL	65 005		93 805	254 678	7.6	6.9	7.1

6.8 These forecasts resulted in a change of the relative passenger traffic shares of the various route groups, from the year 2010 to the year 2030 as depicted in **Figure 2**.

FIGURE 2

PASSENGER TRAFFIC SHARES BY ROUTE GROUP 2010 AND 2030



7. ROUTE GROUP AIRCRAFT MOVEMENT FORECASTS

7.1 Having established the passenger traffic growth rates for each route group in the manner described above, forecasts of aircraft movement growth rates for the period 2010-2030 were developed using the methodology outlined in section 5 and the assumptions related to the future evolution of load factors and average aircraft seats over the same period. Historical trends from the past decade for these two elements were examined carefully and their growth patterns were kept fairly consistent with their past behaviour.

7.2 The future trends in load factors and average seats for the route groups concerned are described in **Tables 3 and 4**, respectively.