REPORT OF THE
ASIA/PACIFIC AREA TRAFFIC FORECASTING GROUP
(APA TFG)
SIXTEENTH MEETING
MONTREAL, 19 – 21 SEPTEMBER 2012

Includes:

- Forecasts of Transpacific and Intra-Asia/Pacific Traffic to the Year 2032
- Forecasts for Major City-Pairs of Intra-Asia/Pacific and Transpacific to the Year 2016
- Analysis of FIR Data

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SUMMARY

1. The ICAO Pacific Area Traffic Forecasting Group was formed in 1991 with the primary objective of developing forecasts of civil aviation activity in the Transpacific market to support air navigation systems planning activity for ICAO and its Contracting States. The scope of the Group was subsequently broadened to include Intra-Asia/Pacific, which is reflected in the current designation as Asia/Pacific Area Traffic Forecasting Group (APA TFG). The Group maintains close relationships with and provides essential data for regional meetings, as well as groups charged with air navigation planning and implementation in North America (NA) and Asia/Pacific (AP). This report contains forecasts developed by the Group in August-September 2012 and reviewed, and subsequently approved at its sixteenth meeting held on 19 – 21 September in the ICAO Headquarters in Montreal.

2. During the period 1980 to 2011, Gross Domestic Product (GDP), measured in real terms and at purchasing power parity, grew at average annual growth rates of about 3.4 per cent, 2.5 per cent and 5.2 per cent for the world, the North American and Asia/Pacific regions, respectively. In aggregate, GDP in the Transpacific area grew at 3.8 per cent (Table 2).

3. The average passenger yield, measured in real terms, for the Transpacific market over the same period is estimated to have declined at an average annual rate of about 1.4 per cent (Table 2). International passenger traffic in the Transpacific market increased from 6.4 million to 31.9 million passengers, at an average annual growth rate of 5.3 per cent (Table 1). The comparable world international passenger traffic increased by 6.3 per cent per year over the same period. Since the year 2000 the Transpacific traffic has experienced a number of ups and downs. Following declines of some 10 per cent both in 2001 and 2003 and of about 2 per cent in 2002, it rebounded in 2004 and increased by over 19 per cent, and continued to grow by over 6 per cent in 2005. It expanded further in 2006 and 2007, albeit at modest growth rates (by some 1.1 and 3.3 per cent, respectively). Due to the economic slowdown in the latter part of the year, the growth trend in traffic reversed in 2008, and a marginal decline of 0.5 per cent was witnessed. Amplified by the economic recession in the first part of the year, the negative traffic growth (-5.4 per cent) continued in 2009. Years 2010 and 2011 witnessed increases in Transpacific traffic resulting from improvement in the economic environment, although the growth in 2011 (5.6 per cent) was affected by the ramifications of an earthquake and tsunami that occurred in Japan in March 2011.

4. For the period 2011-2022, the GDP for the North American and Asia/Pacific regions is expected to increase at average annual rates of 2.6 per cent and 5.9 per cent, respectively, and for the period 2022-2032, at 2.5 per cent and 4.8 per cent per annum, respectively. In the aggregate, the most likely scenario (baseline) GDP average annual growth rate for the Transpacific area is projected at 4.4 per cent for the forecast horizon 2011-2032 (Table 3).

5. Average Transpacific airline passenger yield is expected to decrease in real terms by 0.1 per cent per annum for the period 2011-2022 and decline at about 0.5 per cent annually during the period 2022-2032 (Table 3). Average Intra-Asia/Pacific yield is expected to decline marginally over the forecast horizon, at a rate similar to that for Transpacific yield.

6. Based on these "most likely" GDP and yield projections, Transpacific traffic is forecast to increase at an average annual rate of 5.3 per cent for the period 2011-2022, reaching some 56.4 million passengers in the year 2022. A growth rate of 4.9 per cent per annum is expected for the period 2022-2032, resulting in a forecast of about 91.1 million passengers by the year 2032 (Table 4).

7. Consistent with the forecasts of passenger traffic growth, future expectations of load factors and average aircraft size (Table 5), total aircraft (including cargo) movements across the Pacific are expected to increase from an estimated 164.2 thousand in 2011 to 258.9 thousand in the year 2022, at an average annual growth rate of 4.2 per cent. For the whole period 2011-2032, these aircraft movements are expected to increase at an annual growth rate of 4.1 per cent, and reach some 384.2 thousand aircraft movements by the year 2032 (Table 6).

8. Intra-Asia/Pacific passenger traffic is expected to increase at a "most likely" average annual rate of 5.9 per cent during 2011-2022, reaching some 221.7 million passengers in the year 2022. An average annual growth rate of 5.0 per cent is forecast for the period 2022-2032, resulting in some 360.7 million passengers by the year 2032 (Table 9).

9. Intra-Asia/Pacific passenger aircraft movements are forecast to increase from 1 114.9 thousand in 2011 to some 2 024.5 thousand in 2022, at an average annual growth rate of 5.6 per cent. For the period 2011 to 2032, aircraft movements are forecast to increase at an average annual growth rate of 5.0 per cent and reach some 3 119.7 thousand by 2032 (Table 11).

10. The selected top 50 city-pairs - in terms of passenger numbers - in the Asia/Pacific and Transpacific markets are expected to show traffic increases in aggregate terms of passenger flow at an average annual growth rate of 5.5 per cent from 2011 to 2016. This growth will result in an increase in passenger traffic on the routes concerned from some 61.4 million passengers in 2011 to some 80.2 million passengers in the year 2016 (Table 12).

1. INTRODUCTION

1.1 This report contains long-term forecasts for the Transpacific and Intra-Asia/Pacific markets with a horizon to the year 2032, including short-term forecasts for 2012-2016 and intermediate forecasts for each of the years 2022 and 2032. Forecasts are provided for total passenger traffic and aircraft movements, and in the case of the aggregate Transpacific market, also for peak hour movements on selected route groups for the year 2016. It also includes passenger traffic forecasts for selected top 50 city-pairs markets through to 2016. The peak hour analysis is based on a detailed review of traffic during a typical July week of 2011 and 2012, summarized in **Appendix B**.

1.2 These forecasts were produced by the APA TFG in August-September 2012 and reviewed, and approved at its sixteenth meeting held from 19 to 21 September 2012 in Montreal. Representatives from Canada, Japan, Singapore and the United States participated at the meeting (the latter via teleconference); a list of participants appears in **Appendix A.** In addition to inputs from the participants, Hong Kong FIR data were provided by the Hong Kong SAR CAD, and Kolkata and Bangkok FIR data were provided by the Representatives of India and Thailand in the Group, respectively. The Group's activities are serviced and co-ordinated by the ICAO Secretariat at Headquarters, in close consultation with the ICAO Asia and Pacific Regional Office.

1.3 Apart from ICAO Member States, the primary users of these area forecasts are expected to be air navigation service providers in the regions concerned and planning groups, especially APANPIRG. This information is also likely to be of interest to airports and airlines of the regions concerned to assist in their planning processes. The format and content of reports, as well as the forecasts of the APA TFG will be modified progressively to respond to the requirements of primary users, such as APANPIRG, and assist the progressive implementation of CNS/ATM systems in the region. In that context, the Group received brief information about the recent APANPIFG meetings held in 2011 and 2012 in the premises of the ICAO Regional Office in Bangkok. The APANPIRG had confirmed that the forecasts produced by the APA TFG are broadly used in the planning process of the air navigation facilities and services of the Asia/Pacific region and called upon the Group to continue to provide its support to APANPIRG as necessary.

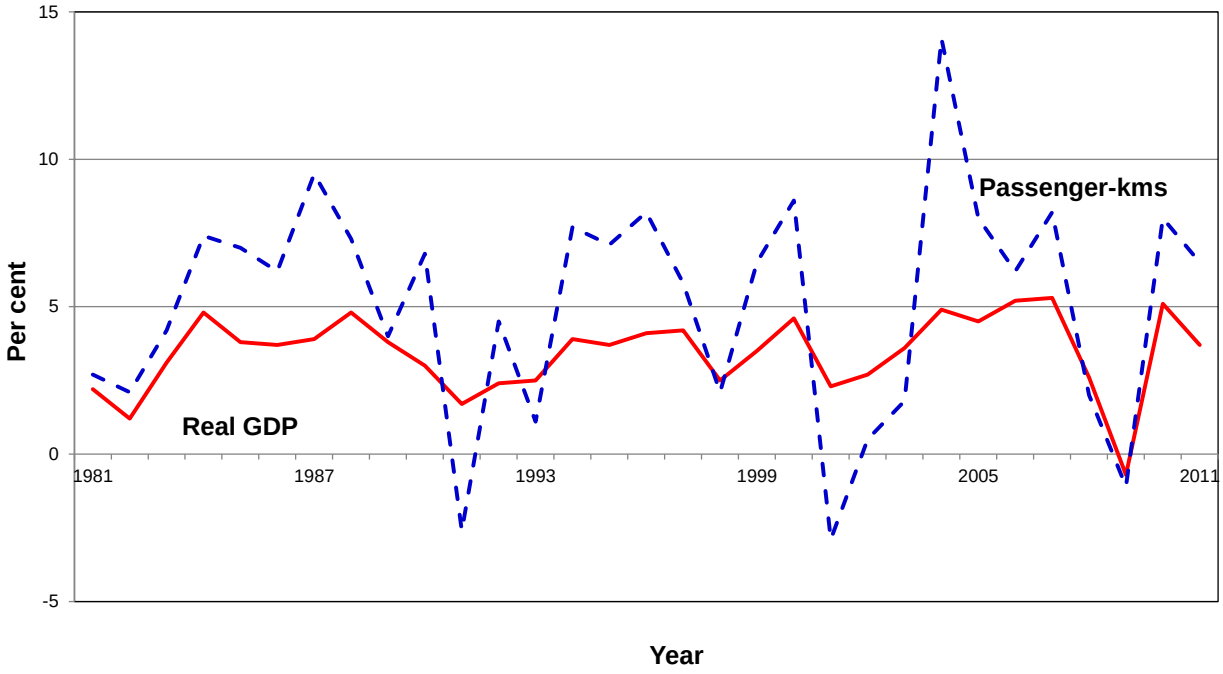
1.4 At its previous (fifteenth) meeting, the APA TFG also initially considered two proposals of the ICAO Bangkok Regional Office that the Group develop detailed forecasts of aircraft movements by specific air traffic service (ATS) routes and forecasts of aircraft movements in the Asia/Pacific airports, the latter by aircraft type. While forecasts of aircraft movements at the Asia/Pacific airports were considered to be too complex to be developed by the Group, the proposal to produce detailed forecasts of aircraft movements by specific ATS routes was referred to APANPIRG for consideration as additional resources would be required to carry out the task by the Group, unless the scope of the present work carried out by the Group was streamlined. At its 22nd meeting, APANPIRG reviewed the present scope of the APA TFG activities and did not consider necessary to modify it.

2. FACTORS AFFECTING DEMAND FOR AIR TRAVEL AND TRAFFIC TRENDS

2.1 Economic theory and analytical studies indicate a high correlation between the air traffic growth patterns and economic trends in that the demand for air travel is primarily determined by economic factors, such as income levels and the cost of travel. Changes in personal income affect the level of consumer purchasing power and the propensity to undertake leisure travel. Commercial activity and trade have a direct impact on the demand for business travel and for air freight. **Figure 1** illustrates the fluctuations in GDP and traffic growth rates for the 1981-2011 period, which implies a correlation of 0.91. It should be noted that the impact of event-related developments (such as events of 11 September 2001, the war in Iraq and the SARS outbreak) on air travel indicate the air transport industry is sensitive to safety and security concerns, which influence consumer confidence.

FIGURE 1

GDP AND SCHEDULED PASSENGER TRAFFIC
WORLD GROWTH, 1981 – 2011



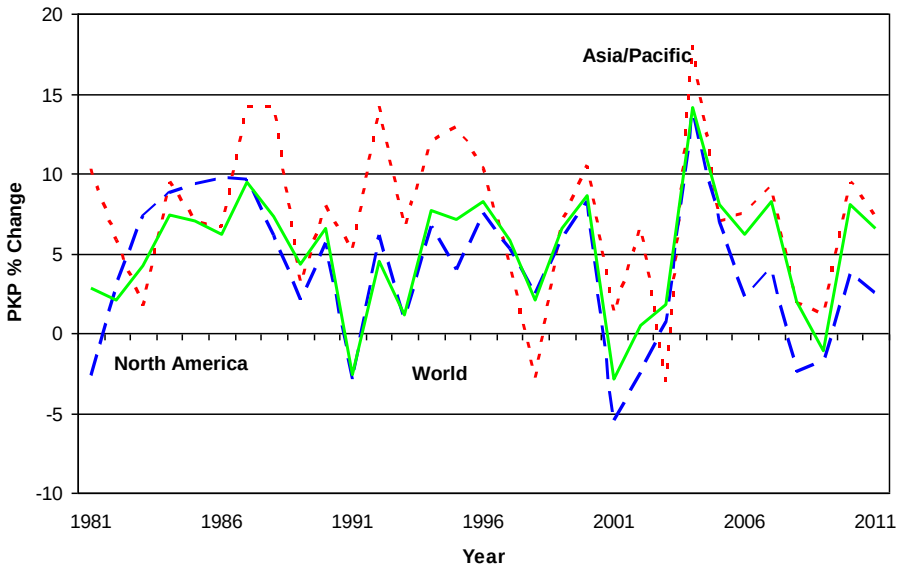
2.2 The world recession in 1981, the sharp increase in oil prices in 1991, the financial crisis in Asia/Pacific in 1997/1998, the events of 11 September 2001 and an unprecedented economic recession in 2008/2009 created a difficult environment for the global economic growth and, consequently, for the growth of world airline traffic. Even though the world economy showed signs of improvement in 2002, the world airline traffic remained depressed in 2002 and 2003, mainly due to a slow recovery from the ramifications of the events of 11 September 2001 and the SARS outbreak in the eastern part of Asia/Pacific. In 2004, traffic growth gained strength registering an increase of 14.1 per cent, as a result of the improved global economic performance and also a recovery from the SARS effects. The continued momentum and resilience of the global economy in 2005 led to a traffic growth estimated at 8.0 per cent. Further improvements in the performance of the world's economy contributed to increases of air traffic in 2006 and 2007. Due to the spread of the fallout from the financial (subprime) crisis in the United States to the rest of the world, the global economy slowed down sharply in the second part of 2008 and grew only by 2.7 per cent. The economic situation in most regions worsened further in 2009, as all advanced economies experienced a recession while the emerging economies slowed down considerably. It is

estimated that the global economy contracted, by some 0.7 per cent, the first time during the post- Second World War era. These economic developments, as well as soaring fuel prices in the first part of 2008, severely impacted the growth of air traffic; it is estimated that the world total (international and domestic) scheduled passenger traffic grew by only 2 per cent in 2008 and shrank by over 1 per cent in 2009. As the global economy staged a strong recovery in 2010, although unbalanced across the world, passenger scheduled traffic rebounded and grew by 8 per cent. The trend in traffic growth continued in 2011, at 6.5 per cent, benefitting from economic growth, albeit weaker than in the previous year.

2.3 During the period from 1981 to 2011, airlines in the Asia/Pacific region increased their traffic from some 176.7 billion to 1 496.1 billion passenger-kilometres performed (PKPs), at an average annual growth rate of 7.4 per cent, the second (after the Middle East) highest growth rate achieved by any region. The aggregate GDP of the region increased annually at an average rate of some 5.2 per cent. Traffic of airlines registered in the North American region increased over the 1981-2011 period from 433.6 billion PKPs to 1 434.2 billion PKPs, at an average annual growth rate of 4.1 per cent, while the region's GDP grew at some 2.5 per cent per year. At the same time, the global air transport in terms of PKPs grew at an average annual rate of 5.2 per cent and the global economy expanded at 3.4 per cent. The year-to-year growth rates for the world scheduled passenger traffic and those of the Asia/Pacific and North American regions over the period 1981-2011 are depicted in **Figure 2**.

FIGURE 2

SCHEDULED PASSENGER TRAFFIC GROWTH
1981-2011



2.4 In addition to broad economic trends in the Transpacific and Intra-Asia/Pacific markets, the factors that influence demand may at times be more complex than in comparable markets. Factors, such as regulatory/liberalization policies including traffic rights for foreign carriers in each country and designation of multiple international gateways, policies toward travel including restrictions or promotion, can be complex and affect traffic in the area. Overall economic factors, including the prospects for trading blocs, the pace of economic growth, especially for developing economies, the overall movement of business capital within the region, and the pace and cost of travel infrastructure development may be volatile, especially in the long run horizon used in this forecast.

2.5 Other economic factors that affect air traffic demand include airline costs and, hence, fares and rates. Rapid growth of air traffic in the 1960s coincided with the replacement of piston-engine aircraft with jet aircraft, which led to reduced fares. In addition to an adverse effect on the world economy, sharp changes in the price of oil and aviation fuel have had an important effect on airline costs over the past decades. In recent years, airline costs have also been negatively affected by increasing insurance and security costs, in addition to the sharp hikes in oil prices (the latter, especially in the first part of 2008).

2.6 The airline industry has a long history of improving productivity. As a result, the growth in output has been greater than the growth in various inputs used by the industry. Over the period concerned, there were significant improvements in partial productivity measures, i.e., for labour, fuel and aircraft. The progressive absorption of new technology aircraft into airline fleets has been a major reason for the improvement in productivity. In particular, new aircraft are more fuel and labour-efficient. Improved aircraft utilization and load factors have also made important contributions. As a consequence of productivity improvements, airline customers have benefited from lower real yields, which was possible by the combined effect of productivity growth, declines in the real input prices (the latter, except for fuel prices and security and insurance-related costs in recent years) as well as airline competition.

3. TRANSPACIFIC TRAFFIC TRENDS AND FORECASTS

3.1 Geographical Scope

3.1.1 For the purpose of these forecasts, the Transpacific traffic is defined as traffic between the ICAO statistical regions of North America (Canada and United States) and of Asia/Pacific (see **Appendix D**).

3.2 Historical Transpacific Traffic

3.2.1 The most useful sources of traffic data for this market are the U.S. Immigration and Naturalization Service and the Canadian government statistics for the U.S. and Canadian gateway traffic, respectively. The data used for the basic time series of passenger traffic is shown in **Table 1**. Over the 1980-2011 period, the number of Transpacific passengers carried on scheduled air services increased from 6.4 million to some 31.9 million at an average annual growth rate of 5.3 per cent. This compares with an average annual growth rate (international traffic) of 6.3 per cent for the world. The Transpacific traffic declined in 1998 by 6.0 per cent due to the financial downturn that spread throughout the Asia/Pacific region towards the latter half of the year 1997. It rebounded in 1999 reaching almost the same level as that of 1997. In 2000, traffic grew by some 6.8 per cent, marginally below the average growth rates experienced in the decade prior to the financial downturn. In 2001, traffic declined by 10.6 per cent, due primarily to the ramifications of the events of 11 September. It further declined by some 2.1 per cent in 2002 and by 10.4 per cent in 2003, due to the effects of the SARS outbreak. However, in 2004, the traffic regained strength and grew by over 19 per cent and continued to increase by 6.2 per cent in 2005. In 2006 and 2007, it further expanded, although at moderate rates of about 1.1 and 3.3 per cent, respectively. The expanding trend was halted in 2008 and traffic dropped by some 0.5 per cent, followed by an over 5 per cent decrease in 2009 as a result of the global economic recession. As the economic conditions improved in 2010, the traffic grew by 9 per cent; it continued to grow in 2011 (by 5.6 per cent) but was affected by the ramifications of an earthquake and tsunami that occurred in Japan in March 2011.

3.2.2 Traffic flow patterns for several major U.S. gateways are shown in **Figures 3 a), 3 b)** and **3 c)**. It is interesting to note that the gateways through which traffic has flown have changed considerably in recent years, particularly in the case of U.S. gateways with the advent of the non-stop evolution of traffic.

TABLE 1
TRANSPACIFIC PASSENGERS CARRIED
(Thousands)

Year	U.S.- Asia	Canada-Asia	Total	U.S.-Oceania	Total Transpacific
1980	4 925	258	5 183	1 220	6 403
1981	5 286	287	5 573	1 272	6 845
1982	5 450	284	5 734	1 302	7 036
1983	5 525	303	5 828	1 230	7 058
1984	6 535	352	6 887	1 409	8 296
1985	7 002	370	7 372	1 517	8 889
1986	7 725	455	8 180	1 864	10 044
1987	8 863	577	9 440	2 077	11 517
1988	10 283	720	11 003	2 360	13 363
1989	11 481	810	12 291	2 438	14 729
1990	12 990	895	13 885	2 148	16 033
1991	13 228	974	14 202	2 161	16 363
1992	14 754	1 150	15 904	2 217	18 121
1993	15 390	1 356	16 746	2 221	18 967
1994	16 635	1 511	18 146	2 120	20 266
1995	18 548	1 776	20 324	2 243	22 567
1996	20 365	1 958	22 323	2 493	24 816
1997	21 845	2 306	24 151	2 628	26 779
1998	20 392	2 265	22 657	2 527	25 184
1999	21 450	2 351	23 801	2 806	26 607
2000	22 859	2 466	25 325	3 103	28 428
2001	20 142	2 433	22 575	2 848	25 423
2002	19 404	2 627	22 031	2 848	24 879
2003	17 336	2 076	19 412	2 876	22 288
2004	20 660	2 723	23 383	3 186	26 569
2005	22 024	3 050	25 074	3 148	28 222
2006	22 253	3 008	25 261	3 268	28 529
2007	23 246	3 157	26 403	3 063	29 466
2008	22 926	3 535	26 461	2 862	29 323
2009	21 353	3 311	24 664	3 072	27 736
2010	22 800	3 956	26 756	3 464	30 220
2011	24 115	4 059	28 174	3 734	31 908
Average Annual Percentage Growth Rates					
1980-2011	5.3	9.3	5.6	3.7	5.3

Source: ICAO, Transport Canada, United States Federal Aviation Administration

FIGURE 3 a)

US TRAFFIC TO/FROM ASIA

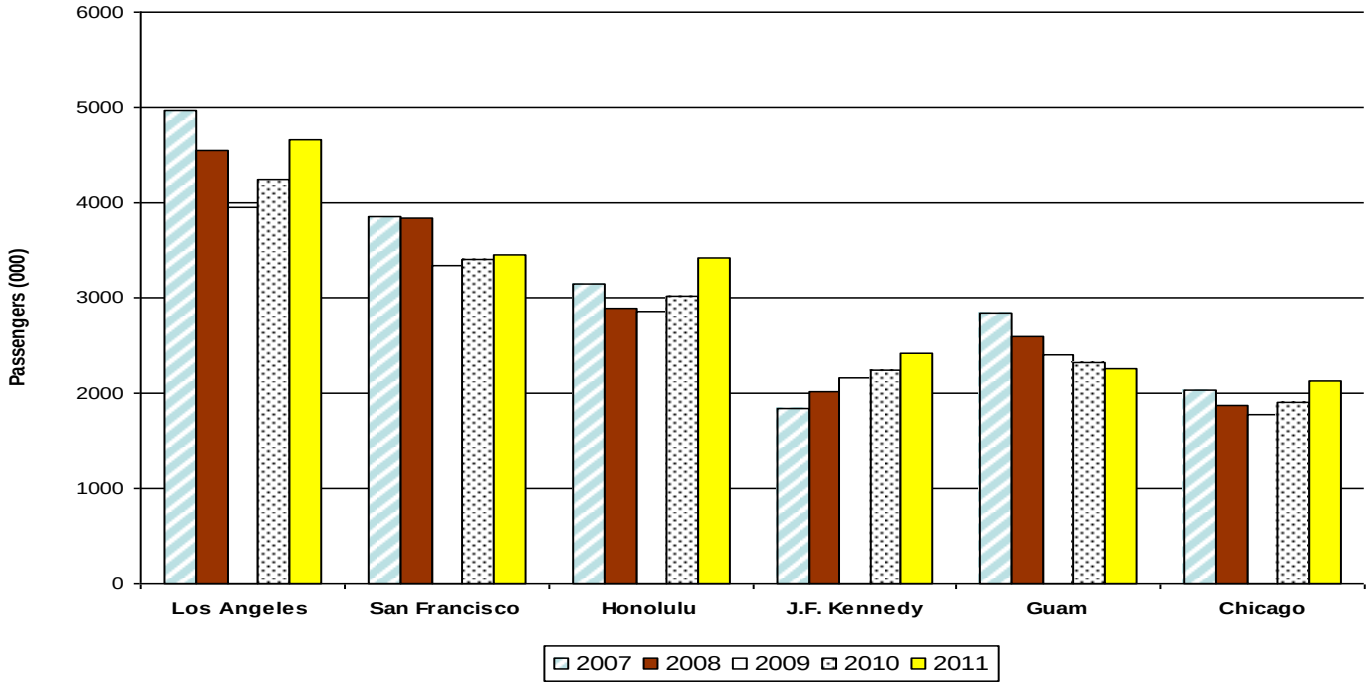


FIGURE 3 b)

US TRAFFIC TO/FROM ASIA

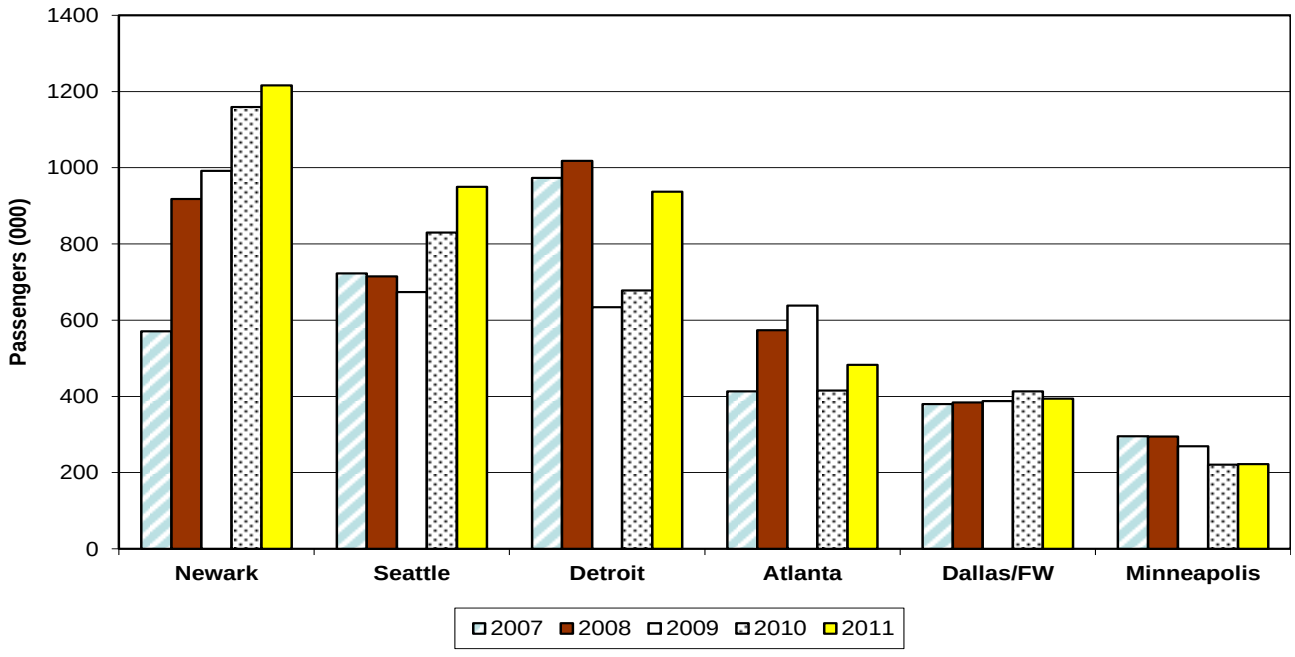
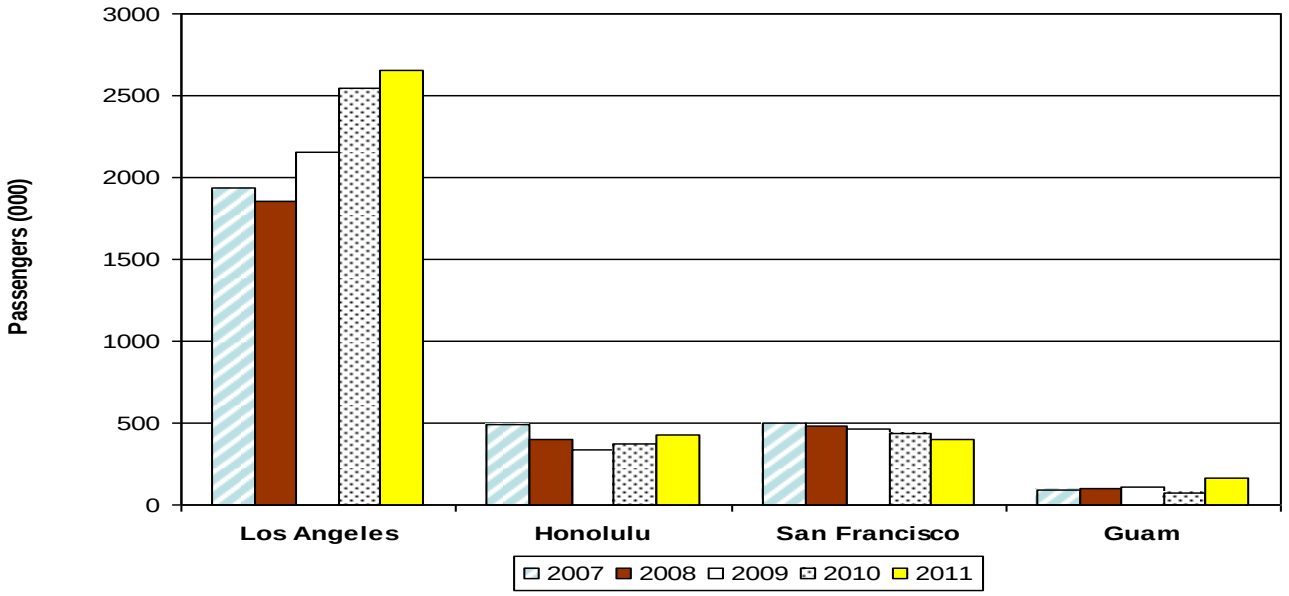


FIGURE 3 c)
US TRAFFIC TO/FROM AUSTRALIA AND OCEANIA



3.3 Regional Economic and Yield Developments

3.3.1 In order to study the relationship between traffic and the socio-economic trends in the Transpacific area, data from several sources were collected on the economies of the countries in the area. GDP data originate mainly from the IHS Global Insight and the International Monetary Fund (IMF). Over the 1980-2011 period, the combined average annual economic growth of the North American and Asia/Pacific regions is estimated at 3.8 per cent. At the same time, the Transpacific traffic increased at an average annual rate of 5.3 per cent per annum. As an evidence of strong correlation between the economic and traffic development, it should be observed that over the periods of strong economic performance during 1984-1989 and 1994-1997, when the combined GDP of both regions grew at over 4 per cent per annum, the average traffic growth rates were about 10 per cent per annum, well above the average for the whole 1980-1997 period. High GDP growth rates were also experienced by the combined economies of the two regions during the period 2003-2007, at some 5 per cent per annum. Traffic grew at that period on average at only 7.2 per cent per year, which indicates there were other factors affecting traffic growth, including the SARS outbreak in 2003 and the increase in the cost of travel (as measured by yields) observed since 2004. Also, in 2011 the traffic growth was not closely correlated with the GDP trend as it was affected by the ramifications of an earthquake and tsunami that occurred in Japan in early 2011.

3.3.2 The revenue yield index is a weighted index based on information available for airlines of the North American and Asia/Pacific regions operating in the Transpacific market. In real terms, airline yields have declined almost every year since the advent of jet aircraft. This is a consequence of airlines passing on to the consumer most of the cost savings that have resulted from technological advances, increased labour productivity, longer average trip length, and other economies of scale. Consequently, the marketing of air transportation has been aided by the fact that air fares represent a steadily increasing bargain, in comparison to most other goods and services. However, during the last eight years, except for 2009, the Transpacific yield in real terms is estimated to have increased mainly due to high fuel prices. In 2009, the trend in yield reversed and it is estimated to drop drastically as a result of airlines' efforts to stimulate traffic. In 2010 airlines managed to increase the Transpacific yield considerably as the economy

strengthened resulting in an increased demand for air traffic. Also, significant increases in fuel prices and hence in airline operating expenses put a pressure on airlines to increase fares. The increasing trend in yields continued in 2011, albeit at a lower rate, due to continued increases in fuel prices and positive economic environment. Other factors that had an effect on the trend in yields include the changing structure of airline networks by introducing longer and more direct flights and the strengthening of major Asian currencies against the U.S. currency. The trends in GDP and yields are summarized in **Table 2**. It is anticipated that following a moderate increase in 2012, the yield will decrease by some 0.5 per cent per annum throughout the forecast period.

TABLE 2

AGGREGATED GROSS DOMESTIC PRODUCT AND AIRLINE YIELD INDEX

Year	Gross Domestic Product (Billions of U.S.$ in 1990 real prices)			Trans- Pacific Yield Index
	North America	Intra-Asia/Pacific	Transpacific Total	
1980	4 708	2 980	7 688	139
1981	4 799	3 108	7 907	146
1982	4 692	3 216	7 908	135
1983	4 870	3 347	8 217	132
1984	5 173	3 531	8 704	127
1985	5 344	3 713	9 057	119
1986	5 501	3 862	9 363	126
1987	5 677	4 073	9 750	116
1988	5 905	4 364	10 269	108
1989	6 054	4 588	10 642	103
1990	6 120	4 817	10 937	100
1991	6 096	5 023	11 119	101
1992	6 289	5 269	11 558	94
1993	6 466	5 519	11 985	94
1994	6 733	5 828	12 561	94
1995	6 904	6 166	13 071	88
1996	7 150	6 531	13 681	84
1997	7 468	6 818	14 286	80
1998	7 791	6 881	14 672	80
1999	8 172	7 187	15 359	79
2000	8 517	7 579	16 096	85
2001	8 614	7 861	16 475	77
2002	8 779	8 232	17 010	70
2003	8 993	8 714	17 706	67
2004	9 311	9 301	18 611	73
2005	9 596	9 930	19 527	75
2006	9 852	10 674	20 527	78
2007	10 043	11 575	21 618	83
2008	10 018	12 134	22 152	84
2009	9 675	12 586	22 262	73
2010	9 970	13 609	23 579	86
2011	10 149	14 397	24 545	91
Average Annual Percentage Growth Rates				
1980- 2011	2.5	5.2	3.8	-1.4

3.4 **Forecast Methodology**

3.4.1 For the present forecast, the long-term demand for air travel is assumed to be primarily determined by economic developments, notably the growth of global and regional economic activity levels as measured by variations in GDP and the cost of air travel as measured by yields. It is also assumed that the political and economic climate is generally conducive to growth, and no specific assumptions are made about various possible political and economic scenarios (beyond basic GDP growth assumptions). World energy demand, supply and prices are important both to economic progress and to the cost of air travel. It is assumed that during the forecast period, there will not be any major disruptions in the availability of oil.

3.4.2 The first step in forecasting is to develop a model which can be used to explain the causes of historical traffic changes, and to forecast future traffic. At its earlier meetings, the APA TFG considered several types of models. The statistical model providing the best fit to traffic data was the one which used GDP growth rates and an index of real yield in a multiplicative form (all terms transformed into logarithms). The logarithmic transformation causes the statistical model to be based on rates of change, rather than absolute changes in the values of the variables. Such model was used to develop forecasts contained in this report

3.4.3 Following testing and evaluation of various functional forms and explanatory variables, the Group decided that a log-log model of the general form given below provides the most satisfactory explanation of likely future trends. Because of the autocorrelation concerns, it was decided to use the 1990-2011 data to calibrate the model. Four "dummy variables" were introduced to the model: the first (Dummy 1) to capture the impact of the traffic downturn that occurred in 2001 and 2002, the second (Dummy 2) to capture the effect of the SARS outbreak in 2003, the third (Dummy 3) to account for sharp fuel price increases from 2004 to 2011 (except for 2009), and the fourth (Dummy 4) to capture the impact of the economic recession of 2009. The introduction of these variables provided a more accurate simulation of the traffic forecast and improved the predicting capability of the model.

$$Log\ (Passengers) = Constant + A\ Log(GDP) + B\ Log(Yield) + C\ Dummy_1 + D\ Dummy_2 + E\ Dummy_3 + F\ Dummy_4$$

In this functional form, A, B, C, D, E and F are constant coefficients, and A and B represent GDP and yield elasticities.

3.4.4 The analysis resulted in the following formula:

$$\mathbf{Log\ (Passengers) = 2.28 + 1.11\ log(GDP) - 0.64\ log(Yield) - 0.25\ (Dummy_1) - 0.49(Dummy_2) - 0.31(Dummy_3) - 0.47\ (Dummy_4)}$$

$$\mathbf{(R^2 = 0.98,\ S.E. = 0.04,\ t_{GDP} = 13.61,\ t_{Yield} = 5.59)}$$

3.4.5 In recognition of the level of uncertainty necessarily associated with forecasts – particularly long-range horizons such as those to the year 2032 – the Group adopted the approach of formulating and using a three-tiered range of input assumptions or scenarios on future values of GDP and yield. For descriptive purposes, these were categorized into the generic categories of:

- most likely (baseline);
- high (high GDP and low yield growth); and
- low (low GDP and high yield growth).

These categories of assumptions provided the basis for upper and lower bounds for resultant forecasts of both passenger traffic and aircraft movements.

3.5 Forecast of GDP and Yield Scenarios

3.5.1 The forecasts of traffic for the most likely, low and high scenarios were developed based on different assumptions of GDP and yield. The forecast for the most likely economic scenario was developed using the economic forecasting services of IHS Global Insight. High and low ranges for GDP were developed, taking into account pertinent data and prevailing conditions that are likely to produce more optimistic or pessimistic conditions. Accordingly, the most likely scenario is for a 4.7 per cent increase over the 2011-2022 period, 4.1 per cent for the 2022-2032 period, and 4.4 per cent for the whole period from 2011 to 2032. Under the low case scenario, it is anticipated that the combined GDP for the two regions will increase at 4.2 per cent during the 2011-2022 period and 3.6 per cent during the 2022-2032 period, with the average for the whole forecast horizon at 3.9 per cent. Under the high case scenario, these growth rates are expected to be 5.2, 4.6 and 4.9 per cent, respectively.

3.5.2 As discussed earlier, airline yields are dependent on a number of factors, such as efficiency gains, operating expenses and the level of competition. Following an estimated increase of about 5.8 per cent in 2011, the yield for the Transpacific market, expressed in real terms, is expected to increase in 2012 by some 3 per cent and start to decrease the following year and continue to fall on average by 0.5 per cent per annum up to 2032, which will result in a 0.3 per cent decrease over the whole forecast horizon (2011-2032) for the most likely scenario. For the low and high scenarios for the 2011-2032 horizon, the average yield is expected to increase at 0.2 per cent and decrease at 0.8 per cent per annum, respectively (**Table 3**).

TABLE 3

TRANSPACIFIC AREA ECONOMIC AND YIELD ASSUMPTIONS
(North America and Asia/Pacific regions combined)

Year	GDP Estimates (Billions of U.S. $ in 1990 prices)			Yield Index		
	Low	Most Likely	High	High	Most Likely	Low
Historical						
2000		16 096			84.8	
2001		16 475			77.2	
2002		17 010			70.2	
2003		17 706			67.5	
2004		18 611			72.6	
2005		19 527			75.1	
2006		20 527			78.0	
2007		21 618			82.6	
2008		22 152			84.4	
2009		22 262			73.0	
2010		23 579			86.1	
2011		24 545			91.1	
Forecast						
2012	25 452	25 575	25 697	95.5	94.6	93.6
2013	26 416	26 671	26 928	95.0	94.1	93.1
2014	27 609	28 009	28 413	95.0	93.6	92.2
2015	28 926	29 485	30 052	95.0	93.1	91.3
2016	30 237	30 969	31 715	95.0	92.7	90.4
2022	38 530	40 614	42 799	94.9	89.9	85.0
2032	54 872	60 692	67 097	94.5	85.5	76.6
Average annual percentage growth rate						
2011 - 2022	4.2	4.7	5.2	0.4	-0.1	-0.6
2022 - 2032	3.6	4.1	4.6	0.0	-0.5	-1.0
2011 - 2032	3.9	4.4	4.9	0.2	-0.3	-0.8

3.6 Passenger Forecast

3.6.1 Applying the above scenarios of economic and yield trends to the econometric model resulted in alternative predictions of passenger traffic ("most likely", "low" and "high") for the forecast horizon. The forecasts of passenger traffic are given in **Table 4** and illustrated in **Figure 4**.

3.6.2 The Transpacific passenger traffic is expected to increase at a "most likely" average annual rate of 5.3 per cent for the period 2011-2022, reaching some 56.4 million one-way passengers in the year 2022. An average annual growth rate of 4.9 per cent is forecast for the remainder of the forecast horizon, resulting in 91.1 million one-way passengers by the year 2032. The most likely average annual growth rate for the period 2011-2032 is forecast to be 5.1 per cent. The low and the high growth rates for the period concerned are projected at 4.2 per cent and 6.0 per cent, respectively.

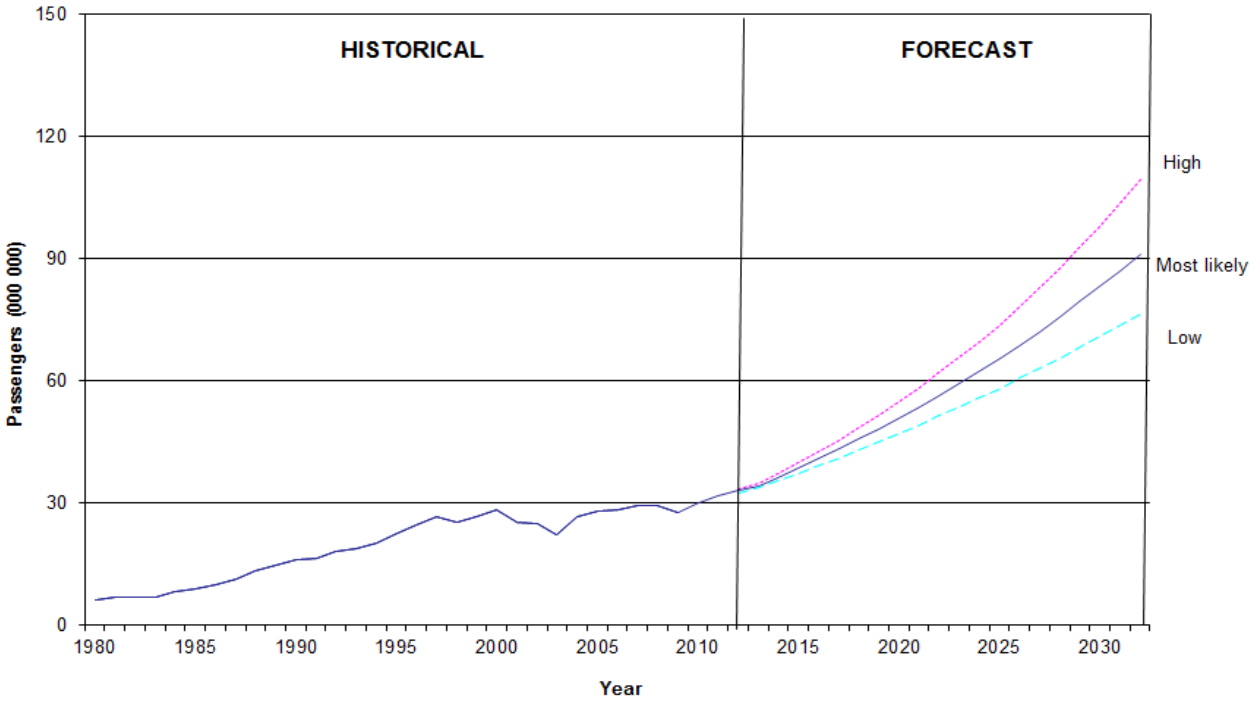
TABLE 4

TRANSPACIFIC PASSENGER FORECAST
(Thousands of one-way journeys)

Year	Low	Most Likely	High
Historical			
2000		28 428	
2001		25 423	
2002		24 879	
2003		22 288	
2004		26 569	
2005		28 222	
2006		28 529	
2007		29 466	
2008		29 323	
2009		27 736	
2010		30 220	
2011		31 908	
Forecast			
2012	32 651	33 027	33 409
2013	33 711	34 291	34 881
2014	35 414	36 328	37 269
2015	37 303	38 590	39 928
2016	39 195	40 891	42 672
2012	32 651	33 027	33 409
2022	51 388	56 382	61 963
2032	76 387	91 072	109 289
Average annual percentage growth rate			
2011 - 2022	4.4	5.3	6.2
2022 - 2032	4.0	4.9	5.8
2011 - 2032	4.2	5.1	6.0

FIGURE 4

TRANSPACIFIC PASSENGER FORECAST
(One-way journeys)



3.7 Aircraft Movement Forecast

3.7.1 Using the above passenger forecast, aircraft movement estimates for the total Transpacific market area were developed by projecting the average aircraft size, in terms of seats and load factors in the future.

3.7.2 In the development of the average aircraft seat size, the Group made use of detailed OAG data available from OAG Aviation Solutions. The current Transpacific fleet was grouped into 9 generic seat categories. The evolution of the historical frequency and capacity and its future trends based on the current in-service fleet and planned deliveries, as well as anticipated new aircraft types, were taken into consideration.

3.7.3 It was assumed that large capacity aircraft like A380 will account for some 13 per cent of the fleet by the year 2032. B787 aircraft that entered the Transpacific market in 2012 are assumed to account for some 19 per cent of Transpacific operations. B777 aircraft, currently most often operated on the Transpacific market is expected to continue to dominate, albeit towards the end of the forecast horizon, it will decrease its share to about 52 per cent from the present 63 per cent. Significant drop in the share in operations is assumed for B747 aircraft with some 3 per cent by 2032. A350 aircraft are anticipated to enter the Transpacific market by 2015 and to account for some 12 per cent of all operations on the Transpacific market by 2032. The analysis of the anticipated shares of specific aircraft seat categories indicated that the average aircraft seating capacity will increase from 311 seats per flight in 2011 to about 348 seats by 2032.

3.7.4 Load factors are high in the Transpacific market, and are expected to remain so. They are anticipated to fluctuate only marginally and to reach 84 per cent by 2032. The trends in average number of seats per flight and in average load factors are shown in **Table 5**.

TABLE 5

ESTIMATED TRANSPACIFIC AVERAGE AIRCRAFT SIZE AND LOAD FACTOR

Year	Average Number of Seats Per Flight	Average Load Factor (Per cent)
Historical		
2000	348	74
2001	338	72
2002	333	78
2003	325	74
2004	321	81
2005	317	80
2006	315	80
2007	314	80
2008	316	81
2009	317	78
2010	311	83
2011	311	82
Forecast		
2012	306	82
2013	308	82
2014	310	82
2015	312	82
2016	314	82
2022	329	83
2032	348	84
Average annual percentage growth rate		
2011 - 2022	0.5	0.2
2022 - 2032	0.6	0.1
2011 - 2032	0.5	0.1

3.7.5 The anticipated passenger aircraft movements were calculated by applying the aircraft size and load factor parameters and are shown in **Table 6**. The aircraft movement forecast for cargo aircraft was analysed separately, using data from OAG Aviation Solutions and trends in freight forecasts developed by ICAO.

TABLE 6

TRANSPACIFIC AIRCRAFT MOVEMENT FORECAST

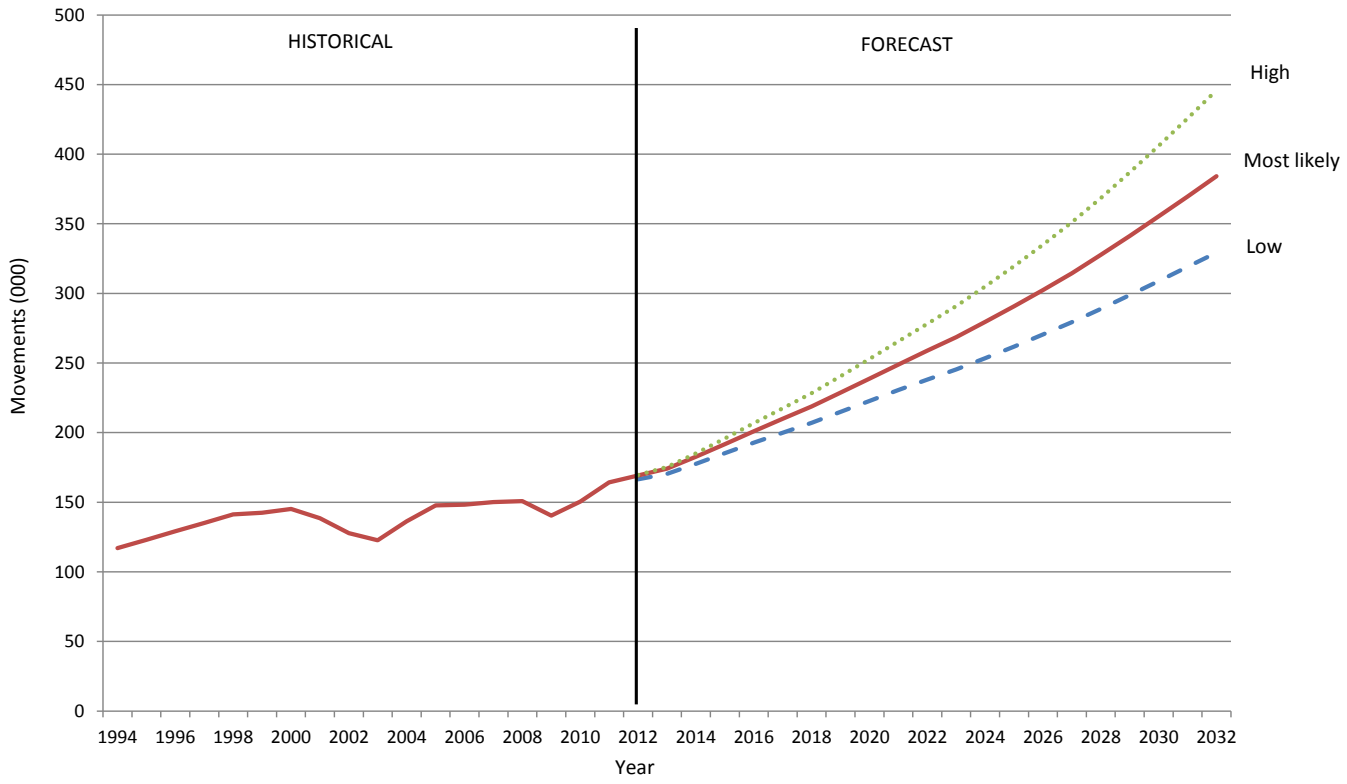
Year	Passenger Aircraft Movements			Cargo	Others	Total Movements Forecast		
	Low	Most Likely	High			Low	Most Likely	High
Historical								
2000		112 283		24 810	8 000		145 093	
2001		107 692		22 857	8 000		138 549	
2002		94 444		25 413	8 000		127 857	
2003		90 762		23 900	8 000		122 662	
2004		103 522		24 736	8 000		136 258	
2005		113 584		26 072	8 000		147 656	
2006		116 420		23 778	8 000		148 198	
2007		120 252		21 780	8 000		150 032	
2008		122 797		20 038	8 000		150 835	
2009		114 748		17 633	8 000		140 382	
2010		122 436		20 031	8 000		150 468	
2011		133 088		23 136	8 000		164 225	
Forecast								
2012	134 676	137 412	137 802	23 768	8 000	166 444	169 181	169 570
2013	138 090	141 686	142 880	24 385	8 000	170 475	174 070	175 265
2014	144 071	149 078	151 620	25 527	8 000	177 598	182 605	185 147
2015	150 487	157 035	161 079	26 753	8 000	185 240	191 788	195 832
2016	156 807	165 014	170 717	27 969	8 000	192 776	200 984	206 686
2022	194 743	215 525	234 816	35 407	8 000	238 150	258 932	278 223
2032	270 702	325 549	387 303	50 652	8 000	329 353	384 201	445 955
Average annual percentage growth rate								
2011 - 2022	3.5	4.5	5.3	3.9	0.0	3.4	4.2	4.9
2022 - 2032	3.3	4.2	5.1	3.6	0.0	3.3	4.0	4.8
2011 - 2032	3.4	4.4	5.2	3.8	0.0	3.4	4.1	4.9

3.7.6 Passenger aircraft movements are forecast to grow at an average annual rate of 4.4 per cent for the period 2011-2032. Accordingly, they will increase from 133.1 thousand in 2011 to some 325.5 thousand in 2032. The intermediate forecasts for the periods 2011-2022 and 2022-2032 are projected to be about 4.5 and 4.2 per cent, respectively.

3.7.7 All-cargo flights are projected to increase by 3.9 per cent annually to the year 2022, and continue to increase at 3.6 per cent for the remainder of the forecast horizon. The average annual forecast growth rate of 3.8 per cent is forecast for the whole period up to 2032. The all-cargo flights are forecast to increase from some 23.1 thousand in 2011 to some 50.7 thousand flights by the year 2032. Other aircraft movements were estimated based on an analysis of sample week traffic supplemented by data from Fukuoka Air Traffic Control Centre (formerly known as Tokyo/Naha Air Traffic Control Centre) and expected to remain at around 8 thousand flights per year. The total aircraft movement forecasts for the Transpacific market are shown graphically in **Figure 5.**

FIGURE 5

TRANSPACIFIC AIRCRAFT MOVEMENT FORECAST



3.8 Analysis of Sample Week Traffic - Historical and Forecast

3.8.1 Transpacific aircraft movement records for the period July 1-7 were provided by the Anchorage and Oakland Air Traffic Control Centres and the Fukuoka Air Traffic Control Centre for each year from 1989 to 2012. The analysis of these peak-week records for 2011 and 2012 is summarized in **Appendix B**, Tables B-1 to B-6.

3.8.2 Tables B-1 and B-2, Appendix B, summarize the flights in 2011 and 2012 by route and day of the week. Tables B-3 and B-4 summarize the flights in the sample weeks of 2011 and 2012 by route and aircraft type. Tables B-5 and B-6 present the busiest hour for each route, as well as the corresponding traffic for the other routes for these two sample weeks.

3.8.3 **Appendix C** shows the allocation of countries to the groups used in the analysis.

3.8.4 The peak-hour traffic analysis was conducted by examining the traffic flow in the period as it passed through the defined meridians of longitude and latitude. Due to the geographic size of the Pacific area, three lines are needed to account adequately for all traffic. The meridians used were 165 East longitude for markets in the North Pacific, 162 West longitude for markets in the Central Pacific and 3.5 North latitude for markets in the South Pacific.

3.8.5 The busiest hour for a single route for 1-7 July 2011 was reported on US West-Asia Pac No (Route 6) on 1 July between 1000 and 1100 hours with 10 movements. The busiest hour of the week on all routes was also reported on 1 July between 1000 and 1100 hours with 38 movements. The busiest hour for 2012 for a single route was reported on 2 July on US West-Asia Pac No (Route 6) between 1000 and 1100 hours with 9 movements. The busiest hour of the week on all routes was reported twice: on 2 July between 1000 and 1100 hours and on 1 July between 1000 and 1100 hours, with 32 movements.

3.8.6 The most widely used aircraft type during the sample period was B777, which accounted for some 38 and 39 per cent of the flights for 2011 and 2012, respectively, and the share of this aircraft type has been steadily increasing. The next most used aircraft was the B747 with some 35 and 31 per cent of the movements in 2011 and 2012, respectively. It can be noticed that the share of B747 aircraft is much higher during this period than the share calculated on the basis annual OAG data; the latter being 23 and 18 per cent, respectively. This can be explained by the likely deployment of aircraft of bigger seating capacity during the peak season of the year (July).

3.8.7 The average day volume in 2011 and 2012 was 329 and 317 movements, respectively. The average day volume is forecast to be some 376 movements in 2016, with an average annual increase of 4.4 per cent for the period 2012-2016, as depicted in **Table 7**. The Group recognized that the imbalances in the volume of westbound and eastbound flights are entrenched in the operations within FIRs such as Fukuoka FIR, due to specific operational patterns used to address the jet stream phenomenon.

TABLE 7

TRANSPACIFIC TRAFFIC: AVERAGE DAILY FLIGHTS
DATES OF SAMPLE WEEK: JULY 1-7

		ACTUAL TRAFFIC REPORTED BY FIR																			FORECAST
	Direction/Route	1989	1991	1993	1995	1997	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2016
	WESTBOUND																				
1	ALASKA-ASIA PAC NO	29	22	25	30	36	34	35	26	26	25	38	37	33	31	28	23	26	24	19	23
2	ALASKA-ASIA PAC CE				1	1	3	4	3	8	4	4	6	6	6	8	5	9	7	6	7
3	HONOLULU-ASIA PAC NO	15	22	19	23	24	21	21	19	17	13	17	19	16	16	12	12	14	17	22	26
4	HONOLULU-ASIA PAC CE				1	0	0	1	1	1	0	1	2	1	1	1	0	1	1	1	1
5	HONOLULU-ASIA PAC SO																				
6	US WEST-ASIA PAC NO	28	34	36	42	47	46	49	41	36	33	48	47	50	44	52	36	48	53	47	56
7	US WEST-ASIA PAC CE				7	7	7	6	6	5	4	5	8	9	9	13	8	9	11	8	10
8	US WEST-ASIA PAC SO																				
9	US OTHER-ASIA PAC NO	9	13	15	15	17	24	25	24	21	21	24	25	27	25	30	22	25	23	24	28
10	CANADA-ASIA PAC NO	4	5	6	8	10	10	10	10	9	6	11	12	11	10	11	7	9	9	10	11
11	CANADA-ASIA PAC CE				3	4	4	4	4	4	3	5	4	4	5	6	4	5	5	4	5
	WB TOTAL	84	95	101	129	147	148	154	135	128	111	153	158	157	146	160	119	145	150	141	167
	EASTBOUND																				
15	ASIA PAC NO-ALASKA	28	25	24	26	33	34	38	28	30	26	46	50	51	45	49	30	40	34	31	37
16	ASIA PAC CE-ALASKA				3	3	4	3	5	7	6	5	7	7	7	12	7	11	10	7	8
17	ASIA PAC NO-HONOLULU	15	21	20	24	24	20	19	19	17	14	18	17	16	14	13	11	13	17	21	25
18	ASIA PAC CE-HONOLULU				0	0		0	0		0	0	0	0	0	0		0	1	0	0
19	ASIA PAC SO-HONOLULU																				
20	ASIA PAC NO-US WEST	30	33	36	44	50	51	52	44	37	33	47	50	48	47	51	42	45	53	51	60
21	ASIA PAC CE-US WEST				8	7	7	8	8	7	5	7	9	9	11	13	9	10	10	10	12
22	ASIA PAC SO-US WEST												0								
23	ASIA PAC NO-US OTHER	9	13	16	16	18	27	29	26	22	22	28	32	32	32	33	33	33	37	37	44
24	ASIA PAC NO-CANADA	4	5	6	8	10	11	10	9	9	6	12	13	13	12	10	10	11	12	12	14
25	ASIA PAC CE-CANADA				3	4	4	4	4	4	3	5	4	4	5	5	6	6	7	6	7
	EB TOTAL	86	96	101	131	150	158	163	142	133	115	169	182	181	173	187	147	169	180	176	209
	TOTAL (EB + WB)	170	192	202	260	296	306	317	277	260	226	322	340	338	318	347	266	314	329	317	376

4. INTRA-ASIA/PACIFIC TRAFFIC TRENDS AND FORECASTS

4.1 Geographical Scope

4.1.1 For the purpose of these forecasts, Asia/Pacific is defined as the ICAO statistical region concerned (see **Appendix D**).

4.2 Historical Passenger Traffic

4.2.1 Intra-Asia/Pacific traffic is estimated to have increased from 26.7 million passengers in 1982 to some 117.7 million in 2011 at an average annual rate of 5.2 per cent. The aggregate GDP of Asia/Pacific States for the same period increased by 5.3 per cent per year in real terms. The airline revenue yield index for the region fluctuated during the period 1982-1994, as shown in **Table 8**. However, yield indices have since declined steadily, from 111 in 1994 to an estimated value of 92 in the year 2003, but the trend reversed in 2004 and increases were observed for each of the years up to 2011, except for 2006 and 2009.

4.2.2 The Group noticed that the traffic and yield data would require verification as the time series had been built by applying annual growth rates to historical data. This was recognized as a major task in view the scarcity of detailed data but every effort should be made to carry out such verification before the next APA TFG meeting anticipated in 2014.

4.3 Forecast Methodology

4.3.1 The Group used an exponential model similar to that developed for the Transpacific market. In addition, five "dummy" variables were also introduced to improve the predictive capability of the model, by taking into account the impact of: the economic recession of 2009 (Dummy 1), cyclical fluctuations in yields in 1982 and 1984-1986 (Dummy 2), economic developments in 1987-1989 and 2004-2005 (Dummy 3), fuel prices during the period 2004-2011, except for 2009 (Dummy 4), and the SARS outbreak in 2003 (Dummy 5).

4.3.2 The econometric model resulted in the following equation:

$$\textbf{Log (Passengers)} = 4.43 + 0.99 \log(\text{GDP}) - 0.44 \log(\text{Yield}) - 0.25\,(\text{Dummy}_1) - 0.18\,(\text{Dummy}_2) - 0.06\,(\text{Dummy}_3) - 0.10\,(\text{Dummy}_4) - 0.20\,(\text{Dummy5})$$

$$(R^2 = 0.99,\ \text{S.E.} = 0.04,\ t_{\text{GDP}} = 17.53,\ t_{\text{Yield}} = 5.64)$$

TABLE 8

INTRA-ASIA/PACIFIC PASSENGER TRAFFIC, GDP AND YIELD

Year	Passengers (Thousands)	Real GDP (Billions U.S.$ in 1990 prices)	Real Yield Index
1982	26 716	3 216	100
1983	26 486	3 347	149
1984	31 000	3 531	92
1985	29 858	3 713	114
1986	31 305	3 862	126
1987	36 910	4 073	149
1988	41 476	4 364	135
1989	46 642	4 588	116
1990	44 627	4 817	125
1991	45 660	5 023	129
1992	51 142	5 269	120
1993	55 230	5 519	114
1994	59 096	5 828	111
1995	63 646	6 166	108
1996	67 100	6 531	104
1997	68 100	6 818	97
1998	67 480	6 881	97
1999	73 891	7 187	97
2000	78 197	7 579	98
2001	77 102	7 861	94
2002	83 270	8 232	94
2003	74 943	8 714	92
2004	89 857	9 301	96
2005	97 495	9 930	97
2006	102 760	10 674	95
2007	110 980	11 575	101
2008	108 206	12 134	106
2009	101 713	12 586	93
2010	112 698	13 609	111
2011	117 657	14 397	117
Average annual percentage growth rate			
1982 - 2011	5.2	5.3	0.5

4.4 Forecast of GDP and Yield Scenarios

4.4.1 GDP growth rates of 5.9 per cent per year for the period 2011-2022 and 4.8 per cent for the period 2022-2032 were used in the development of the "most likely" forecast, averaging 5.4 per cent for the whole period. High and low range forecasts were developed in a manner similar to that used in the Transpacific forecast. Low and high case scenarios were developed, using a low GDP increase per year of 4.9 per cent and a high GDP increase of 5.9 per cent, respectively, for 2011-2032.

4.4.2 Intra-Asia/Pacific yield, expressed in real terms, is estimated to have increased by about 5.5 per cent in 2011, and is projected to decline over the 2011-2032 period at 0.3 per cent, a rate similar to that for Transpacific yields. For the low and high case traffic scenarios, an increase of 0.2 per cent and a decrease of 0.8 per cent per annum over the forecast horizon were used, respectively.

4.5 Passenger Forecast

4.5.1 Intra-Asia/Pacific passenger traffic is forecast to increase at a "most likely" average annual rate of 5.5 per cent for the period 2011-2032, reaching some 360.7 million one way passengers by the year 2032. For the two interim periods of 2011-2022 and 2022-2032, traffic is projected to grow at average annual rates of 5.9 and 5.0 per cent, respectively. Under the low case scenario, traffic is expected to grow at an average annual growth rate of 4.6 per cent, and a 6.4 per cent growth rate is anticipated under the high case scenario. The range of forecasts are shown in **Table 9** and depicted in **Figure 6**.

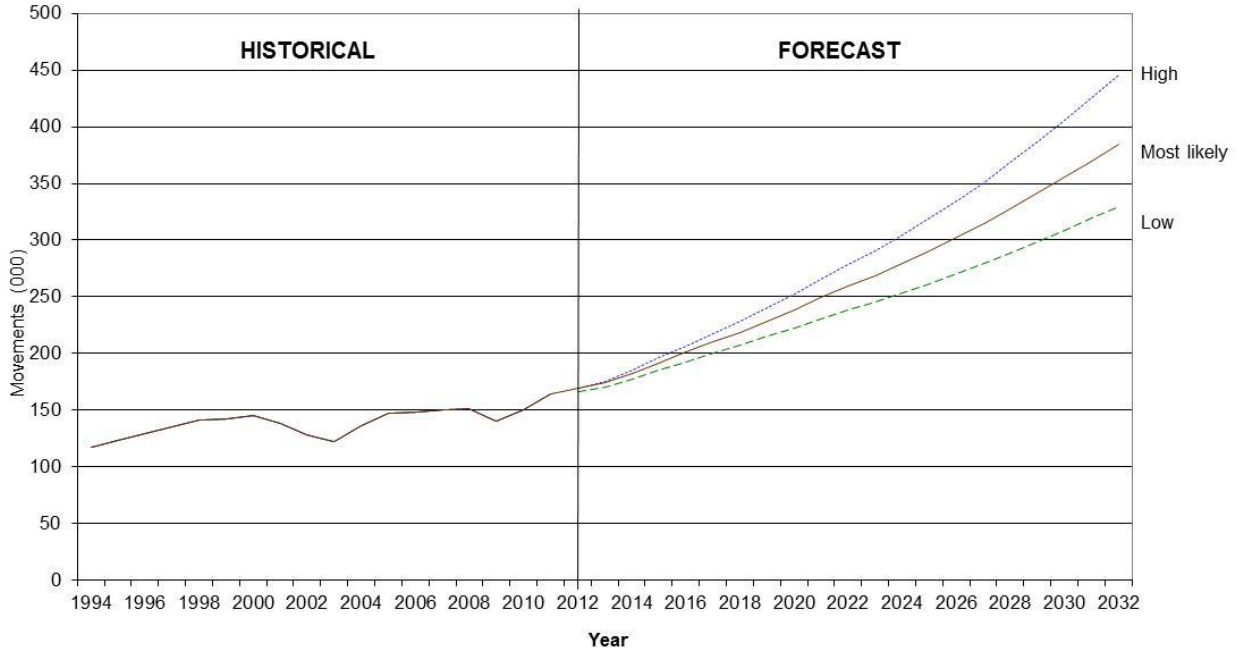
TABLE 9

INTRA-ASIA/PACIFIC PASSENGER TRAFFIC FORECAST
(Thousands of one-way journeys)

Year	Low	Most likely	High
Historical			
2000		78 197	
2001		77 102	
2002		83 270	
2003		74 943	
2004		89 857	
2005		97 495	
2006		102 760	
2007		110 980	
2008		108 206	
2009		101 713	
2010		112 698	
2011		117 657	
Forecast			
2012	120 184	122 489	124 828
2013	125 509	129 855	134 297
2014	132 834	138 523	144 395
2015	140 606	147 785	155 269
2016	148 479	157 293	166 570
2022	199 685	221 749	246 308
2032	300 405	360 700	434 328
Average annual percentage growth rates			
2011 - 2022	4.9	5.9	6.9
2022 - 2032	4.2	5.0	5.8
2011 - 2032	4.6	5.5	6.4

FIGURE 6

INTRA-ASIA/PACIFIC PASSENGER FORECAST
(One-way journeys)



4.6 Aircraft Movement Forecast

4.6.1 In addition to the passenger traffic forecast, the Group developed the air traffic movement forecast for the region, similar to the movement forecast developed for the Transpacific market. In order to develop the forecast aircraft movement growth rates, passenger traffic forecast, expected trends in average aircraft size (seats/flight) and the average load factor were utilized. As in the case of the Transpacific market, future average aircraft size for the period 2012-2032 was estimated using the distribution of current in-service fleet, evolution of frequency vs. capacity in the market and the aircraft orders and deliveries expected by the airlines of the region. Based on the above analysis, the average aircraft size in the Intra-Asia/Pacific market is projected to increase gradually through to the end of the forecast horizon and reach the level of 222 seats in 2032. An average load factor of 73 per cent was reached in 2011 and an increase of one percentage point is expected for 2012. For the period between 2012 and 2015, the load factor is anticipated to remain relatively constant, at 74 per cent, and thereafter to increase to an anticipated level of 76 per cent by 2032. The trends in average seats per flight and in load factor are given in **Table 10**. Using the above expectations of average aircraft size, average load factor and the forecast of passenger traffic, the aircraft movement forecast was developed. Growth rates for low and high movements were estimated using the same approach as for the Transpacific market.

TABLE 10

ESTIMATED INTRA-ASIA/PACIFIC AVERAGE AIRCRAFT SIZE AND LOAD FACTOR

Year	Average Number of Seats Per Flight	Average Load Factor (Per cent)
Historical		
1994	247	69
1995	243	70
1996	241	70
1997	239	70
1998	240	70
1999	239	71
2000	239	71
2001	238	68
2002	238	71
2003	237	67
2004	236	69
2005	233	70
2006	232	71
2007	224	74
2008	215	71
2009	213	71
2010	210	75
2011	208	73
Forecast		
2012	207	74
2013	208	74
2014	208	74
2015	209	74
2016	209	74
2022	213	75
2032	222	76
Average annual percentage growth rate		
2011 - 2022	0.2	0.2
2022 - 2032	0.4	0.1
2011 - 2032	0.3	0.2

4.6.2 Growth rates for the aircraft movements developed in this manner were applied to the data on aircraft movements for the year 2011 available from OAG Aviation Solutions. Similarly, the low and the high growth rates were used to obtain the range of aircraft movements for the forecast horizon.

4.6.3 The most likely Intra-Asia/Pacific passenger aircraft movements are expected to increase from some 1 114.9 thousand in 2011 to about 3 119.7 thousand movements by the year 2032, at an average annual growth rate of 5.0 per cent. The growth rates for the intermediate periods of 2011-2022 and 2022-2032 are 5.6 and 4.4 per cent, respectively. The range of growth rates for low and high movement forecasts are provided in **Table 11** and in **Figure 7**.

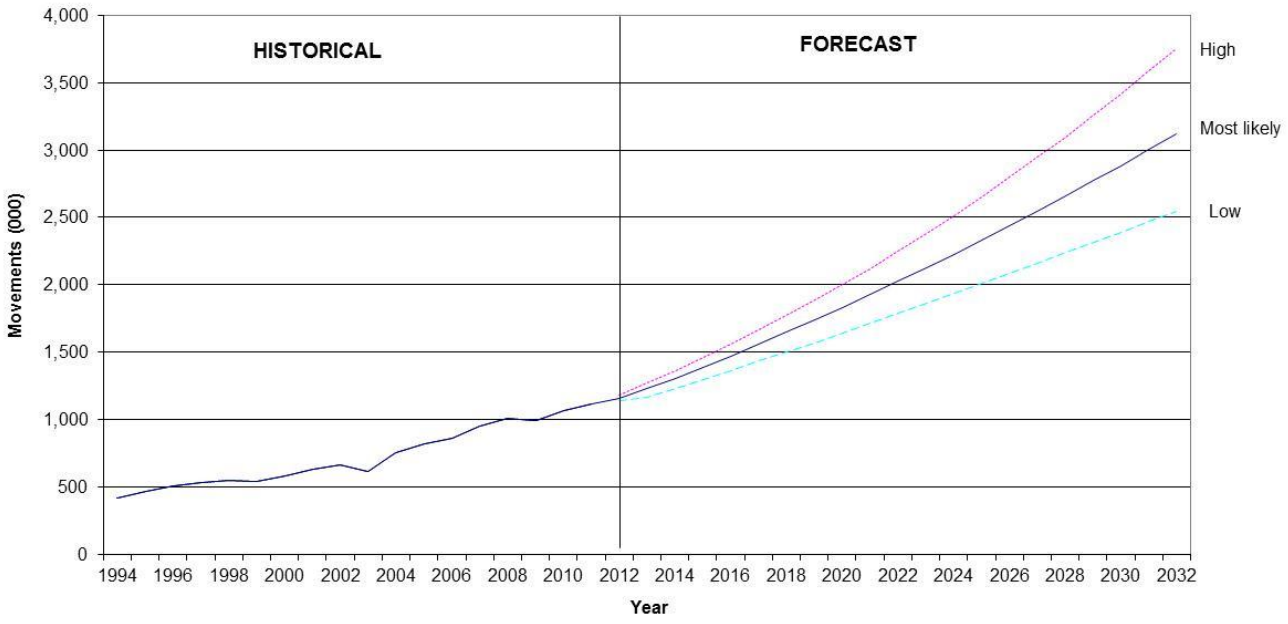
TABLE 11

INTRA-ASIA/PACIFIC AIRCRAFT MOVEMENT FORECAST

Year	Low	Most likely	High
Historical			
2000		577 819	
2001		633 020	
2002		662 000	
2003		613 338	
2004		750 975	
2005		818 845	
2006		863 021	
2007		950 297	
2008		1 010 166	
2009		991 544	
2010		1 067 893	
2011		1 114 881	
Forecast			
2012	1 137 660	1 159 476	1 181 613
2013	1 162 353	1 227 146	1 269 130
2014	1 227 817	1 306 526	1 361 916
2015	1 292 471	1 386 190	1 456 387
2016	1 360 378	1 470 548	1 557 272
2022	1 786 593	2 024 494	2 248 712
2032	2 546 241	3 119 707	3 756 513
Average annual percentage growth rate			
2011 - 2022	4.4	5.6	6.6
2022 - 2032	3.6	4.4	5.3
2011 - 2032	4.0	5.0	6.0

FIGURE 7

INTRA-ASIA/PACIFIC AIRCRAFT MOVEMENT FORECAST



5. SELECTED MAJOR CITY-PAIRS WITHIN TRANSPACIFIC AND INTRA-ASIA/PACIFIC

5.1 Scope and Methodology

5.1.1 In accordance with Recommendation 14/5 of the Asia/Pacific/RAN/3 meeting, the APA TFG expanded its forecasts to include the 40 busiest routes in terms of passengers carried. The number of city-pairs was subsequently increased to 41 in 2001, 43 in 2006 and further to 45 in 2008. In 2012 a few city-pairs considered not to be major ones any more were removed and several new ones added, mainly those touching India and Singapore. At its 16th meeting, the Group developed forecasts for 50 city-pairs. The 50 city-pairs concerned have been classified into two major categories: Transpacific and Intra-Asia/Pacific. Intra-Asia/Pacific city-pairs have been further sub-divided into short, medium and long-haul categories.

5.1.2 These forecasts are based on historical city-pair time series. Projections were adjusted as necessary by the Group's expertise and judgment, as well as the macro-economic forecasts developed by the Group. The Group believed that historical city-pair data might need a complex verification using all data sources available, including OAG.

5.2 Passenger Forecast

5.2.1 The projected average annual traffic growth rates for the period 2012-2016 for the city-pairs concerned (50) are depicted in **Table 12**.

TABLE 12
PASSENGER FORECAST FOR SELECTED TOP 50 CITY-PAIRS
TRANSPACIFIC AND INTRA-ASIA/PACIFIC
(One-way passengers carried)

CITY PAIR	2000	2005	2006	2007	2008	2009	2010	2011	Average Annual growth (%) 2000-2011*	Passenger Forecast 2016	Average Annual Growth (%) 2011-2016
LONG HAUL CITY PAIRS											
Hong Kong-Sydney vv	485 792	835 395	919 893	894 436	976 870	972 297	1 020 263	1 101 884	7.7	1 426 519	5.3
Singapore-Sydney vv	951 084	982 797	1 018 290	1 042 478	1 122 689	1 085 094	1 126 744	1 162 210	1.8	1 283 174	2.0
Singapore-Melbourne vv	641 461	804 464	840 850	845 216	865 486	852 368	902 547	1 077 213	4.8	1 218 768	2.5
Tokyo-Singapore vv	1 275 803	1 076 131	1 122 265	1 193 005	1 181 281	1 110 027	1 319 942	1 315 288	0.3	1 530 728	2.5
Tokyo-Bangkok vv	1 607 319	1 661 248	1 808 036	1 934 599	1 745 008	1 479 767	1 445 465	1 440 216	- 1.0	1 705 950	2.8
Singapore-Taipei vv	754 447	739 175	837 203	832 732	767 692	689 828	835 855	1 092 478	3.4	1 427 825	5.5
Tokyo-Manila vv	883 831	969 707	1 095 768	1 084 811	628 156	580 558	518 247	463 374	- 5.7	637 058	3.5
Singapore-Shanghai vv		944 291	1 086 344	1 179 123	1 124 060	1 058 666	1 202 931	1 189 754	3.9	1 379 251	3.0
Singapore-Mumbai		355 002	429 199	484 839	513 849	443 135	605 894	559 069	7.9	802 616	7.5
Bangkok-Mumbai vv		244 059	329 698	350 066	346 150	435 152	530 632	599 377	16.2	922 216	9.0
Hong Kong-Delhi vv vv		185 849	180 632	182 971	309 080	306 369	465 252	473 912	16.9	732 523	9.1
Singapore-Delhi vv		315 779	375 573	420 185	397 996	405 762	445 973	479 296	7.2	672 237	7.0
Hong Kong-Mumbai vv		128 734	140 327	157 379	269 300	367 468	444 375	441 134	22.8	710 451	10.0
MEDIUM HAUL CITY PAIRS											
Hong Kong-Tokyo vv	2 037 093	1 894 708	2 038 889	1 906 953	1 852 195	1 502 130	1 440 315	1 046 621	- 5.9	1 574 902	1.5
Hong Kong-Singapore vv	1 917 430	2 200 331	2 248 050	2 374 526	2 367 689	2 290 494	2 848 753	3 392 471	5.3	4 433 824	5.5
Hong Kong-Kuala Lumpur vv	569 717	635 703	622 989	796 281	753 282	754 035	911 905	922 848	4.5	1 150 036	4.5
Bangkok-Taipei vv	530 173	531 711	513 289	508 156	554 398	581 564	784 393	759 292	3.3	932 712	4.2
Hong Kong-Osaka vv	717 036	587 326	678 970	722 968	672 360	635 380	492 080	521 605	- 2.9	570 662	2.5
Tokyo-Taipei vv	1 148 199	1 486 330	1 501 193	1 486 181	1 416 331	1 616 033	1 601 870	1 453 799	2.2	1 935 109	3.2
Tokyo-Beijing vv	722 943	808 059	932 233	1 009 952	885 728	850 299	916 604	966 648	2.7	1 159 796	4.0
Sydney-Auckland vv	937 056	1 077 688	914 425	742 903	733 988	607 742	606 527	605 920	- 3.9	668 985	2.0
Seoul-Hong Kong vv	1 326 504	1 224 027	1 587 557	1 651 059	1 733 612	1 676 403	1 861 289	2 014 692	3.9	2 534 791	4.7
Singapore-Manila vv	676 050	784 403	877 802	1 000 209	1 167 966	1 275 117	1 571 645	1 911 715	9.9	3 078 836	10.0
Bangkok-Delhi vv		318 041	358 263	426 286	385 527	602 404	662 785	695 771	13.9	1 070 530	9.0

CITY PAIR	2000	2005	2006	2007	2008	2009	2010	2011	Average Annual growth (%) 2000-2011*	Passenger Forecast 2016	Average Annual Growth (%) 2011-2016
SHORT HAUL CITY PAIRS											
Shanghai-Tokyo vv		1 591 677	1 727 449	1 821 278	1 733 857	1 478 980	1 753 135	1 545 143	- 0.5	1 974 314	2.0
Hong Kong-Bangkok vv	2 036 646	1 906 501	1 975 242	1 896 232	1 784 355	1 677 293	1 929 956	1 865 563	- 0.8	2 009 741	1.5
Seoul-Taipei vv	418 119	693 784	577 661	577 661	670 087	692 870	693 844	680 376	4.5	769 783	2.5
Singapore-Bangkok vv	2 172 403	2 976 281	3 028 259	2 827 812	2 590 611	2 351 300	2 425 813	2 768 912	2.2	3 057 103	2.0
Tokyo-Seoul vv	2 498 117	2 931 184	2 995 337	2 935 430	3 401 272	3 656 367	3 397 549	3 450 689	3.0	4 225 112	3.7
Hong Kong-Manila vv	977 181	1 085 467	1 105 947	1 058 182	1 174 582	1 170 096	1 095 051	1 100 526	1.1	1 197 306	1.7
Singapore-Jakarta vv	1 943 633	2 186 173	2 276 202	2 410 401	2 473 904	2 629 343	3 512 883	3 952 989	6.7	6 082 164	9.0
Seoul-Osaka vv	1 522 414	1 706 169	1 343 477	1 343 477	1 390 187	1 362 076	1 321 691	1 493 950	- 0.2	1 445 194	1.5
Hong Kong-Taipei vv	2 759 426	2 840 092	2 785 311	2 813 164	2 804 725	2 431 696	2 300 385	2 445 309	-1.1	2 647 295	1.6
Singapore-Kuala Lumpur vv	2 252 744	1 750 414	1 686 837	1 697 682	1 894 710	2 530 116	2 892 473	3 143 768	3.1	4 837 077	9.0
Shanghai-Osaka vv		734 169	786 908	829 899	736 120	825 191	1 015 788	894 541	3.3	1 345 769	4.8
Singapore-Denpasar vv	612 136	651 148	699 110	801 815	935 681	953 473	1 086 330	1 228 529	6.5	1 805 112	8.0
Singapore-Ho Chi Minh City vv	270 363	467 626	559 611	720 433	879 015	902 102	1 062 757	1 183 383	14.4	1 905 850	10.0
Colombo-Chennai vv		493 411	508 228	575 357	607 633	658 049	784 033	640 170	4.4	817 037	5.0
Kathmandu-Delhi vv		337 422	381 597	375 817	367 492	468 059	533 325	786 684	15.2	1 386 406	12.0
TRANSPACIFIC CITY PAIRS											
Tokyo-Honolulu vv	1 776 873	1 782 765	1 662 168	1 583 969	1 474 675	1 465 827	1 522 957	1 352 150	- 2.5	1 745 587	2.3
Tokyo-Los Angeles vv	1 659 023	1 529 559	1 216 994	1 002 362	1 114 886	958 335	1 140 964	1 029 708	- 4.2	1 300 102	2.2
Tokyo-Guam vv	990 499	1 111 482	1 244 860	1 332 001	1 238 761	1 168 151	1 151 797	962 902	- 0.3	1 415 853	3.5
Tokyo-San Francisco vv	905 590	863 627	856 787	865 597	789 424	697 851	723 121	585 324	- 3.9	814 352	2.0
Honolulu-Osaka vv	846 995	807 231	654 688	641 594	624 271	576 202	563 243	396 903	- 6.7	623 192	1.7
Tokyo-New York vv	937 721	1 031 261	848 123	777 519	742 531	622 241	727 694	633 824	-3.5	920 766	4.0
Hong Kong-San Francisco vv	493 199	693 261	695 087	785 448	872 041	837 437	896 653	826 991	4.8	1 080 844	5.5
Tokyo-Chicago vv	759 332	719 473	820 526	783 863	696 854	631 350	628 920	502 498	- 3.7	716 640	2.2
Los Angeles-Seoul vv	888 988	810 632	761 311	776 537	809 838	807 838	911 559	975 101	0.8	1 050 461	1.5
Los Angeles-Sydney vv	604 572	868 258	757 254	746 962	689 446	674 968	692 517	772 156	2.2	886 484	2.8
Hong Kong-Vancouver vv	525 675	464 247	475 465	523 181	555 135	470 434	537 714	532 200	0.1	590 477	2.1
TOTAL - ALL ROUTES	45 033 587	53 824 271	54 888 178	55 730 988	55 822 786	54 875 737	59 864 436	61 436 876	2.9	80 209 517	5.5

* When not available, first year of data

6. ASIA/PACIFIC AIRCRAFT MOVEMENTS (PEAK PERIOD)

6.1 Fukuoka FIR Traffic

6.1.1 As a first step in meeting the requirements of APANPIRG's CNS/ATM Sub-Group, the Group reviewed data provided by the Fukuoka FIR. Traffic flows to and from the Fukuoka FIR for a sample week of 1-7 July 2011 and 2012 are illustrated in **Figures 8 a)** and **8 b)**, respectively.

6.2 Fukuoka FIR City-Pairs

6.2.1 Aircraft movements for the major city-pairs passing through the Fukuoka FIR were also analysed. This information for the first week of July in each of the years 1994-2012 is illustrated in **Table 13**.

6.2.2 As shown in Table 13, among city-pairs for which data were available for the whole period concerned, seven witnessed decreases in movements mainly due to decreases experienced in 2009 and 2011. It should be noted that in 2011 there were significant decreases on several of the top 50 city-pairs, most likely due to the effects of March earthquake and tsunami in Japan. Most of those city-pairs witnessed a rebound in the aircraft movement numbers in 2012. The highest traffic density in 2012 was on the Shanghai (Pudong) – Tokyo city-pair with 254 movements.

6.2.3 This information is presented to indicate the level of traffic on high-density city-pairs within the Transpacific and Intra-Asia/Pacific markets. Forecasts of this density may be developed in the future as resources permit and priorities for various tasks have been assigned.

FIGURE 8 a)

ZONE PAIR TRAFFIC MOVEMENTS
(To/from/through Fukuoka FIR from July 1 to July 7, 2011)

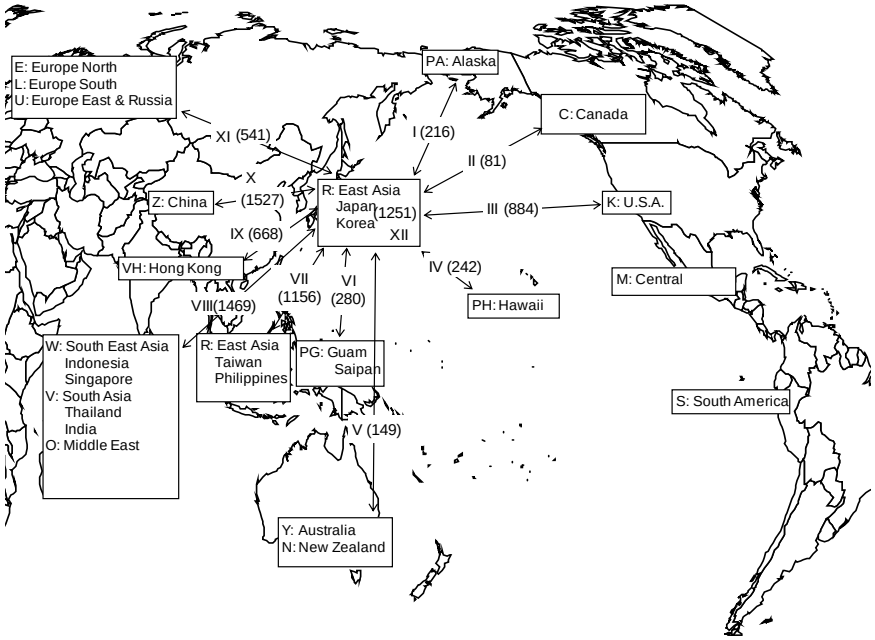


FIGURE 8 b)

ZONE PAIR TRAFFIC MOVEMENTS
(To/from/through Fukuoka FIR from July 1 to July 7, 2012)

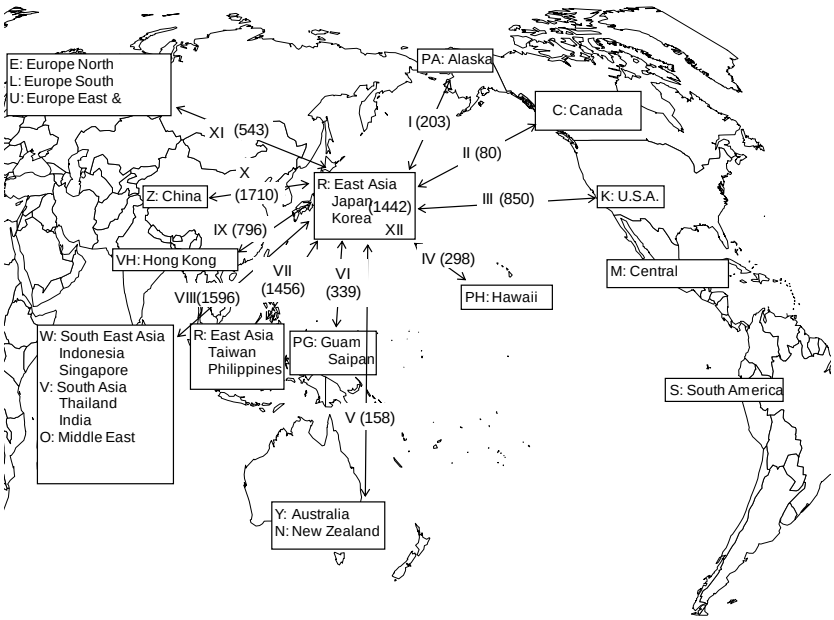


TABLE 13

AIRCRAFT MOVEMENTS BETWEEN MAJOR CITY-PAIRS THROUGH FUKUOKA FIR

(1-7 July 1994-2012)

	CITY-PAIR	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Annual Growth (%) 09-10	10-11	11-12	94-12
1	PUDONG(SHANGHAI)-TOKYO							50	38	106	142	199	200	230	258	264	259	250	251	254	-3.5	0.4	1.2	
2	SEOUL-HONG KONG	104	98	105	100	99	110	133	153	170	164	194	175	206	225	233	187	236	252	250	26.2	6.8	-0.8	5.0
3	TOKYO-SEOUL	155	152	141	149	165	169	179	200	291	240	254	232	255	234	227	229	233	237	242	1.7	1.7	2.1	2.5
4	HONG KONG-TOKYO	169	166	181	160	152	166	168	159	248	170	219	229	220	192	205	194	205	156	202	5.7	-23.9	29.5	1.0
5	OSAKA-SEOUL	52	104	100	110	108	117	154	173	144	140	131	147	148	150	173	165	129	130	201	-21.8	0.8	54.6	7.8
6	OSAKA-PUDONG(SHANGHAI)							34	40	42	87	149	140	146	208	216	207	203	209	195	-1.9	3.0	-6.7	
7	TOKYO-TAIPEI	115	124	109	109	108	116	119	116	238	186	232	225	231	231	212	217	223	182	188	2.8	-18.4	3.3	2.8
8	BANGKOK-SEOUL	66	69	71	69	53	65	71	78	82	86	105	95	102	113	99	78	102	135	177	30.8	32.4	31.1	5.6
9	TOKYO(HANEDA)-SEOUL(KIMPO)											56	56	112	112	113	112	112	171	169	0.0	52.7	-1.2	
10	TAIPEI-OSAKA	47	56	53	75	100	84	103	94	112	76	94	94	96	111	122	79	106	118	156	34.2	11.3	32.2	6.9
11	MANILA-SEOUL	59	56	78	77	49	60	51	51	71	63	62	68	70	98	101	99	100	126	144	1.0	26.0	14.3	5.1
12	BANGKOK-TOKYO	101	99	96	117	125	113	113	116	120	114	140	160	158	166	162	141	137	128	143	-2.8	-6.6	11.7	2.0
13	SEOUL-FUKUOKA	44	45	42	42	43	42	42	46	42	42	51	56	64	64	64	66	72	84	124	9.1	16.7	47.6	5.9
14	TOKYO-LOS ANGELES	116	119	130	123	154	141	132	127	109	101	119	128	110	109	126	107	110	116	123	2.8	5.5	6.0	0.3
15	TOKYO-HONOLULU	143	149	163	147	141	145	133	128	153	105	159	122	117	113	145	107	122	114	119	14.0	-6.6	4.4	-1.0
16	HONG KONG-OSAKA	48	56	79	75	69	84	111	115	107	89	110	108	106	111	118	78	98	87	115	25.6	-11.2	32.2	5.0
17	SEOUL-TAIPEI	101	78	79	83	89	53	48	48	49	64	120	123	108	109	102	100	93	99	113	-7.0	6.5	14.1	0.6
18	TOKYO-BEIJING	70	68	69	73	65	70	64	73	122	81	125	122	114	137	135	136	126	112	111	-7.4	-11.1	-0.9	2.6
19	TOKYO(HANEDA)-TAIPEI(SONGSHAN)																		98	110			12.2	
20	SEOUL-SINGAPOR	41	63	69	69	66	74	92	96	93	79	87	87	86	89	94	65	73	96	107	12.3	31.5	11.5	5.5
21	NAGOYA-PUDONG(SHANGHAI)											59	71	79	90	94	85	105	106	104	23.5	1.0	-1.9	
22	TAIPEI-ANCHORAGE	56	65	95	104	104	128	135	117	125	129	181	155	161	159	122	109	151	117	102	38.5	-22.5	-12.8	3.4
23	TOKYO-SHINGAPOR	128	123	117	118	111	111	114	115	123	122	134	128	116	133	131	119	119	101	100	0.0	-15.1	-1.0	-1.4
24	TOKYO-GUAM ISLAND	48	44	49	28	28	63	66	68	92	92	92	86	84	102	113	99	112	88	98	13.1	-21.4	11.4	4.0
25	SEOUL(KIMPO)-OSAKA																56	98	98	98	75.0	0.0	0.0	

	CITY-PAIR	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Annual Growth (%) 09-10	10-11	11-12	94-12
26	HONG KONG-ANCHORAGE	30	39	50	67	69	72	81	75	142	104	86	92	94	94	166	88	136	117	95	54.5	-14.0	-18.8	6.6
27	SEOUL-ANCHORAGE	129	140	142	176	147	154	175	133	207	212	201	139	129	127	166	101	131	105	88	29.7	-19.8	-16.2	-2.1
28	SEOUL-NAGOYA	42	43	42	44	42	42	42	58	50	42	50	89	96	99	88	85	70	71	88	-17.6	1.4	23.9	4.2
29	HO CHI MINH-SEOUL																		73	82			12.3	
30	SEOUL-MACTAN								6	12	12	22	14	28	36	54	43	64	76	81	48.8	18.8	6.6	
31	MANILA-TOKYO	56	50	51	51	46	72	67	69	74	72	71	65	68	63	63	56	57	71	78	1.8	24.6	9.9	1.9
32	SEOUL-LOS ANGELES	66	55	59	87	71	64	100	104	93	89	95	74	77	58	97	54	80	90	74	48.1	12.5	-17.8	0.6
33	TAIPEI-LOS ANGELES	71	79	79	102	88	93	92	98	106	98	101	93	103	107	118	77	92	83	69	19.5	-9.8	-16.9	-0.2
34	OSAKA-BEIJING											51	54	52	74	56	54	57		64	5.6			
35	ANCHORAGE-TOKYO	206	190	250	203	220	211	204	185	214	208	205	170	140	110	131	61	57	63	63	-6.6	10.5	0.0	-6.4
36	PUDONG(SHANGHAI)-LOS ANGELES																		69	63			-8.7	
37	SAN FRANCISCO-TOKYO	97	93	92	88	85	97	94	91	107	85	90	81	82	88	76	76	76	61	62	0.0	-19.7	1.6	-2.5
38	TOKYO(HANEDA)-SHANGHAI(HONGQIAO)																		56	58			3.6	
39	PARIS-TOKYO	46	48	56	42	56	58	58	56	62	65	74	81	84	90	85	70	68	58	58	-2.9	-14.7	0.0	1.3
40	GUAM ISLAND-OSAKA		56	56	68	63	49	49	60	46	42	60	46	35	41	56	35	62	56	57	77.1	-9.7	1.8	
41	KIMHAE-TOKYO				21	22	22	22	22	41	49	45	48	42	42	56	58	59	70	57	1.7	18.6	-18.6	
42	TOKYO(HANEDA)-HONG KONG																		58	57			-1.7	
43	TOKYO-GUANGZHOU											28	54	62	88	85	72	58	58	56	-19.4	0.0	-3.4	
44	SAN FRANCISCO-HONG KONG	38	47	50	44	57	49	47	42	50	42	42	50	30	47	68	56	57	57	56	1.8	0.0	-1.8	2.2
45	LONDON-TOKYO	72	70	69	74	74	74	74	74	77	68	84	84	72	72	72	72	56	56	56	-22.2	0.0	0.0	-1.4
46	KIMHAE-FUKUOKA				20	20	21	22	19	16	18	7	18	20	18	28	34	56	55	56	64.7	-1.8	1.8	
47	KIMHAE-OSAKA																			56				
48	TOKYO(HANEDA)-BEIJING																		58	56			-3.4	
49	TAIPEI-FUKUOKA																			56				
50	CHICAGO-TOKYO	40	40	39	40	56	70	71	76	72	70	70	73	78	79	84	56	56	56	56	0.0	0.0	0.0	1.9

NOTE: "OSAKA" APPLIED THE DATA OF OSAKA TILL 1994, AND APPLIED THE DATA OF KANSAI FROM 1995
"SEOUL" APPLIED THE DATA OF KIMPO TILL 2000, AND APPLIED THE DATA OF INCHEON FROM 2001
"NAGOYA" APPLIED THE DATA OF NAGOYA TILL 2004, AND APPLIED THE DATA OF CHUBU FROM 2005
"BANGKOK" APPLIED THE DATA OF BANGKOK TILL 2006, AND APPLIED THE DATA OF SUVARNABHUMI FROM 2007

6.3 **Bangkok FIR City-Pairs**

6.3.1 Aircraft movements for the top 50 city-pairs passing through Bangkok FIR during the same week in July for the years 2004 to 2012 are depicted in **Table 14**. Traffic flows to and from the Bangkok FIR for the top routes during the sample weeks of 2011 and 2012 are illustrated in **Figures 9 a)** and **9 b)**.

FIGURE 9 a)

MAJOR ROUTES THROUGH BANGKOK FIR
(Aircraft movements in both directions during sample week 1 - 7 July 2011)

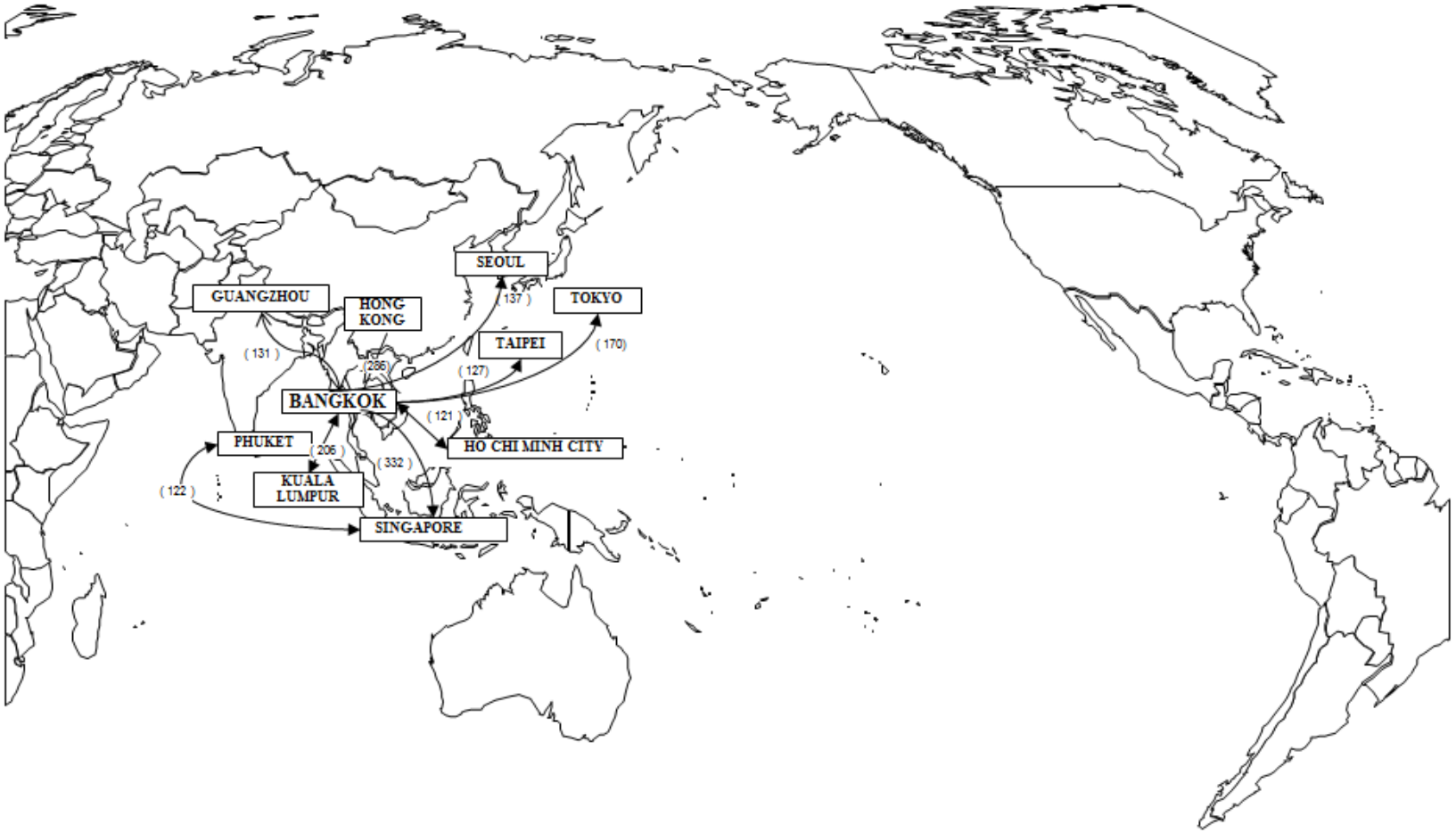


FIGURE 9 b)

MAJOR ROUTES THROUGH BANGKOK FIR
(Aircraft movements in both directions during sample week 1 - 7 July 2012)

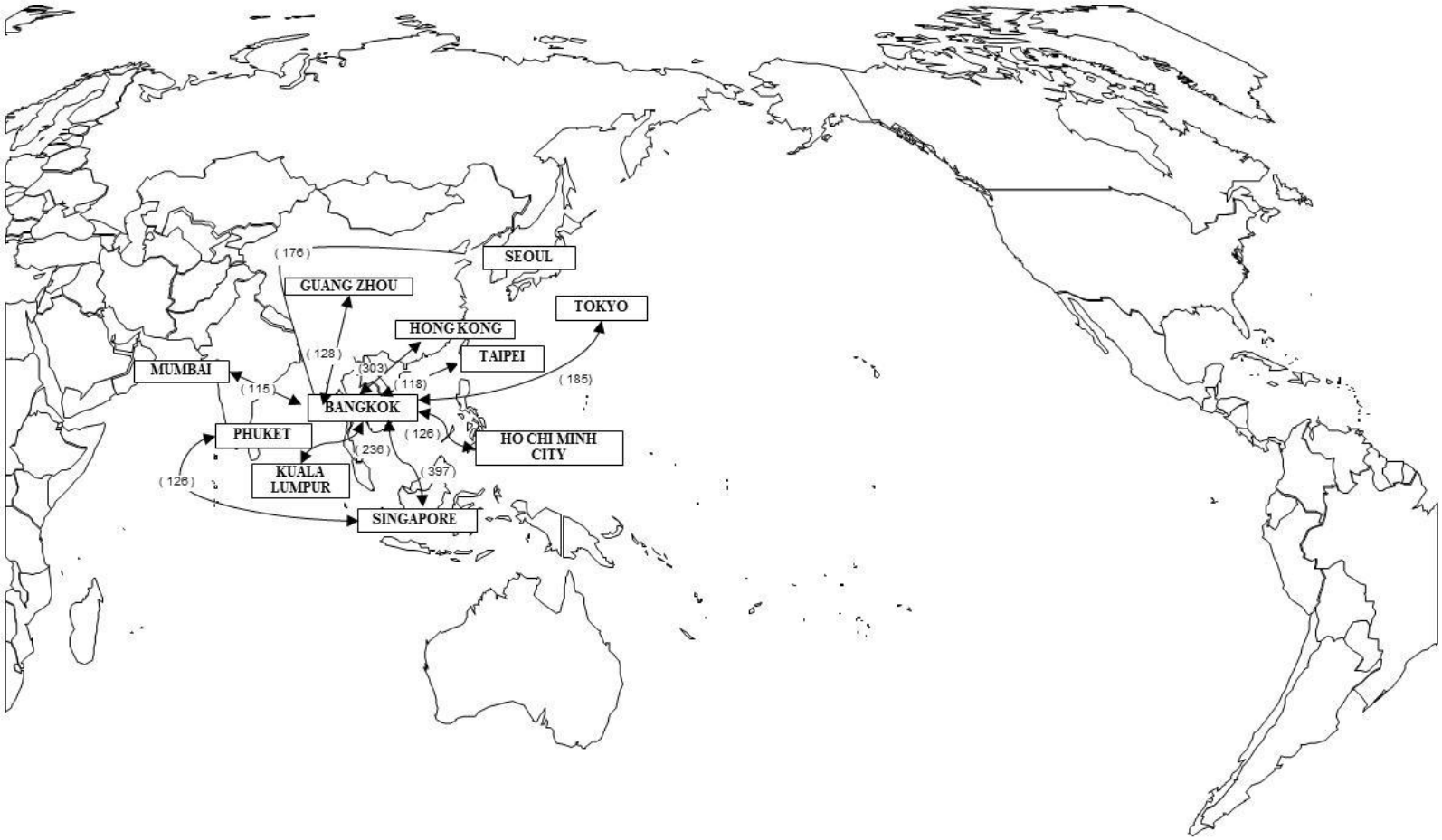


TABLE 14

AIRCRAFT MOVEMENTS THROUGH BANGKOK FIR

(During sample week 1-7 July)

	From	To	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average annual growth rate (%) 2004-2012
1	Bangkok	Singapore	327	412	363	355	325	278	266	332	397	2.5
2	Bangkok	Hong Kong	294	270	271	241	260	222	264	286	303	0.4
3	Bangkok	Kuala Lumpur	135	167	153	208	220	208	199	206	236	7.2
4	Bangkok	Seoul	106	96	101	112	97	78	101	137	176	6.5
5	Bangkok	Tokyo	138	162	158	166	161	140	137	170	185	3.7
6	Bangkok	Guangzhou	31	46	46	68	71	93	110	131	128	19.4
7	Bangkok	Ho Chi Minh City	73	81	72	81	103	104	111	121	126	7.1
8	Phuket	Singapore	50	64	78	98	85	93	126	122	126	12.2
9	Bangkok	Taipei	145	144	146	145	140	127	128	127	118	-2.5
10	Bangkok	Mumbai	18	41	52	48	55	54	79	102	115	26.1
11	Bangkok	Yangon	72	71	63	92	51	63	73	113	112	5.7
12	Bangkok	Shanghai	60	71	83	72	69	52	80	99	103	7.0
13	Bangkok	Phnom-Penh	84	84	98	78	83	86	86	100	98	1.9
14	Phuket	Kuala Lumpur	42	28	40	56	55	70	70	98	98	11.2
15	Bangkok	Delhi	37	53	40	56	51	71	83	99	94	12.4
16	Bangkok	Hanoi	44	53	78	76	90	76	63	68	90	9.4
17	Bangkok	Macau	22	28	56	56	84	78	56	58	89	19.1
18	Bangkok	Manila	73	48	48	65	73	77	77	87	80	1.2
19	Bangkok	Dubai	51	63	58	63	74	67	73	72	73	4.6
20	Delhi	Singapore				73	48	55	62	62	72	
21	Bangkok	Siem Reap	56	62	60	67	66	60	56	70	68	2.5
22	Phuket	Hong Kong	25	5	15	33	32	22	39	54	66	12.9
23	London	Singapore				56	63	44	40	64	60	
24	Yangon	Singapore				35	38	42	47	55	60	
25	Bangkok	Vientiane	28	28	28	42	56	57	58	60	58	9.5
26	Bangkok	Jakarta	27	38	18	29	64	34	45	53	56	9.5
27	Bangkok	Sydney	49	64	65	76	88	79	78	79	55	1.5
28	Bangkok	London	64	66	70	67	69	68	66	72	54	-2.1
29	Bangkok	Kolkata	24	33	38	50	43	40	44	57	50	9.6
30	Bangkok	Osaka	65	56	60	66	54	44	36	43	49	-3.5
31	Bangkok	Colombo	25	29	30	26	28	28	34	40	46	7.9
32	Bangkok	Penang	42	57	56	54	53	41	39	47	46	1.1
33	Bangkok	Frankfurt	60	46	50	48	42	42	44	49	45	-3.5
34	Bangkok	Abu Dhabi	33	27	39	33	31	29	29	28	45	4.0
35	Phuket	Seoul	12	4	16	26	34	22	27	34	44	17.6
36	Bangkok	Doha	15	22	30	30	28	28	30	42	42	13.7
37	Bangkok	Dhaka	28	31	30	31	31	19	32	43	42	5.2
38	Bangkok	Beijing	26	49	48	48	49	34	30	34	42	6.2
39	Dhaka	Kuala Lumpur								47	41	
40	Yangon	Kuala Lumpur				20	20	18	20	39	40	
41	Dhaka	Singapore								28	37	
42	Bangkok	Busan	10	16	16	22	22	20	14	28	35	17.0
43	Bangkok	Amsterdam	35	34	34	34	36	32	34	32	33	-0.7
44	Bangkok	Melbourne	14	14	15	30	32	34	34	35	30	10.0
45	Phuket	Shanghai	12	6	4	4	12	8	8	28	29	11.7
46	Frankfurt	Singapore				32	35	23	23	26	29	
47	Singapore	Chengdu				24	12	21	18	19	29	
48	Bangkok	Zurich	26	25	27	27	29	25	26	28	28	0.9
49	Bangkok	Luang Prabang	14	14	14	20	24	24	28	28	28	9.1
50	Bangkok	Bangalore					17	14	17	14	28	

6.4 **Hong Kong FIR City-Pairs**

6.4.1 Aircraft movements for the top 50 city-pairs passing through Hong Kong FIR during the same week in July for the years 2004 to 2012 are depicted in **Table 15**. Traffic flows to, from and through the Hong Kong FIR for the routes with the highest volume of movements during the sample weeks of 2011 and 2012 are illustrated in **Figures 10 a) and 10 b)**.

FIGURE 10 a)

MAJOR ROUTES THROUGH HONG KONG FIR
(Aircraft movements in both directions during sample week 1 - 7 July 2011)

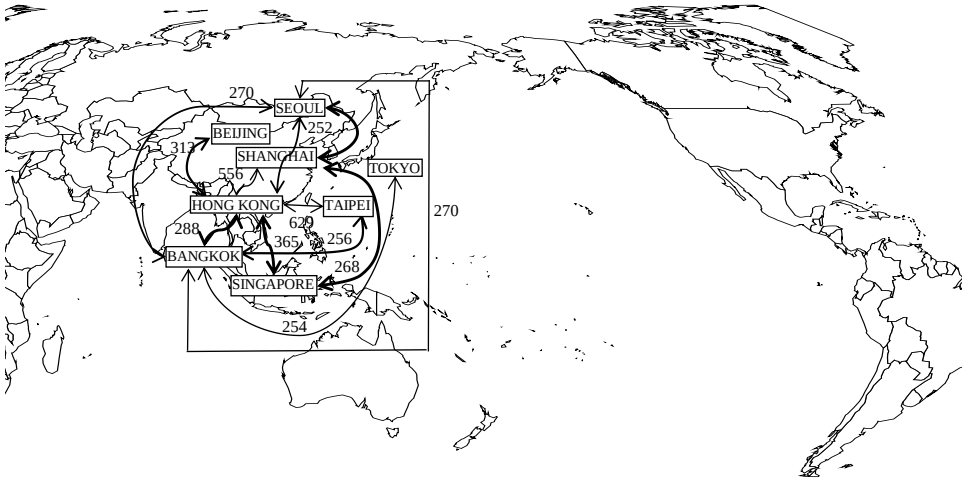


FIGURE 10 b)

MAJOR ROUTES THROUGH HONG KONG FIR
(Aircraft movements in both directions during sample week 1 - 7 July 2012)

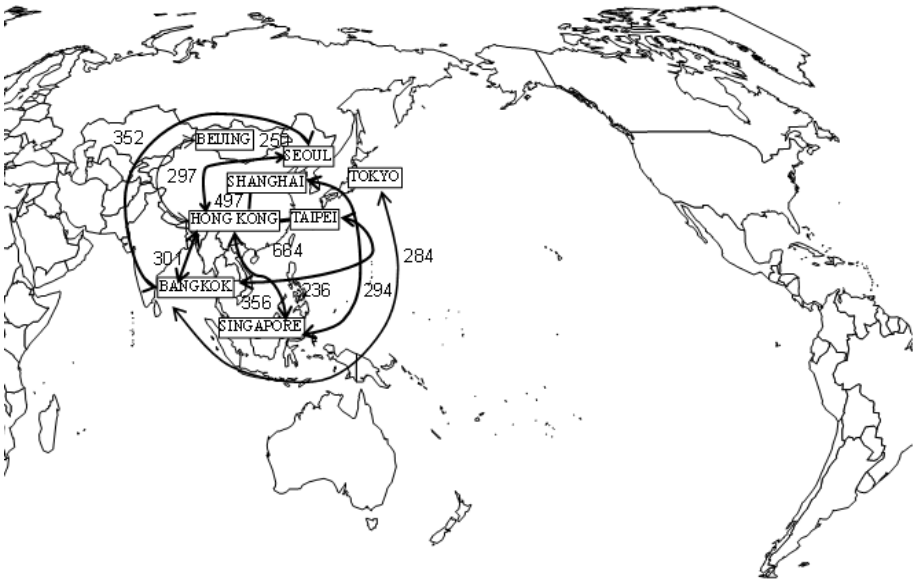


TABLE 15

AIRCRAFT MOVEMENTS THROUGH HONG KONG FIR

(During sample week 1-7 July)

	From	To	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average annual growth rate (%) 2004-2012
1	Hong Kong	Taipei	666	667	592	616	615	575	575	629	664	0.0
2	Hong Kong	Shanghai	450	480	317	474	476	444	485	556	497	1.2
3	Hong Kong	Singapore	235	295	364	328	398	207	288	365	356	5.3
4	Seoul	Bangkok	126	113	193	207	228	156	202	270	352	13.7
5	Hong Kong	Bangkok	315	281	281	227	258	222	264	288	301	-0.6
6	Beijing	Hong Kong	212	287	246	238	225	245	269	313	297	4.3
7	Singapore	Shanghai	129	123	270	310	331	242	268	268	294	10.8
8	Tokyo	Bangkok	191	182	334	330	338	276	272	254	284	5.1
9	Hong Kong	Seoul	202	184	173	180	206	187	237	252	250	2.7
10	Bangkok	Taipei	127	182	294	283	298	248	256	256	236	8.1
11	Singapore	Guangzhou	25	44	96	115	130	100	130	164	222	31.4
12	Manila	Hong Kong	176	161	155	70	148	227	235	235	221	2.9
13	Tokyo	Hong Kong	236	236	182	176	208	196	205	156	202	-1.9
14	Kuala Lumpur	Guangzhou	28	22	32	32	112	134	134	190	190	27.0
15	Singapore	Beijing	60	74	165	163	180	134	134	144	182	14.9
16	Hong Kong	Kaohsiung	134	128	109	121	118	114	114	155	166	2.7
17	Macau	Taipei	349	352	326	267	203	187	172	158	152	-9.9
18	Bangkok	Guangzhou							164	176	144	
19	Kuala Lumpur	Hong Kong	91	90	157	144	170	103	115	116	133	4.9
20	Dubai	Hong Kong	125	155	90	101	106	107	137	123	122	-0.3
21	Osaka	Hong Kong	116	111	98	99	106	77	98	86	118	0.2
22	Hong Kong	London	99	108	117	120	130	153	126	126	118	2.2
23	Hong Kong	Ching Chuan Kang			14	36	74	42	70	80	108	
24	Xiamen	Singapore	45	42	96	87	126	84	88	110	102	10.8
25	Guangzhou	Ho Chi Minh City	20	26	67	91	69	66	66	102	102	22.6
26	Anchorage, AK	Hong Kong	66	94	86	106	103	93	135	115	101	5.5
27	Sydney	Hong Kong	74	93	88	68	76	80	91	93	100	3.8
28	Shanghai	Kuala Lumpur	71	65	69	45	101	60	96	100	100	4.4
29	Osaka	Bangkok	66	72	120	125	104	88	72	86	98	5.1
30	Xiamen	Hong Kong	64	74	48	75	67	80	74	94	96	5.2
31	Chengdu	Hong Kong	41	74	45	74	40	49	66	66	94	10.9
32	Hong Kong	Hangzhou	57	85	84	82	92	72	78	77	93	6.3
33	Jakarta	Hong Kong	80	62	120	73	85	57	59	80	91	1.6
34	Taipei	Hanoi	52	37	54	71	66	80	94	106	90	7.1
35	Macau	Bangkok	29	42	63	51	90	78	56	58	89	15.0
36	Taipei	Ho Chi Minh City	47	61	142	125	126	112	116	98	88	8.2
37	Phuket	Seoul	14	6	31	43	85	44	54	66	88	25.8
38	Beijing	Kuala Lumpur	20	24	17	29	56	36	44	48	80	18.9
39	Ho Chi Minh City	Hong Kong	34	72	72	68	107	58	63	61	77	10.8
40	Ho Chi Minh City	Seoul	31	33	28	44	53	48	48	76	70	10.7
41	Jakarta	Guangzhou	35	35	50	32	36	44	68	70	70	9.1
42	Guangzhou	Manila	5	23	22	32	16	44	64	68	68	38.6
43	Bangkok	Busan	0	0	0	22	47	40	28	56	68	
44	Xiamen	Manila	30	21	36	16	46	56	56	56	68	10.8
45	Hong Kong	Phuket	28	6	16	31	35	22	39	54	67	11.5
46	Guangzhou	Sydney	10	11	16	26	16	28	48	74	66	26.6
47	Hong Kong	Hanoi	31	30	20	33	38	41	45	63	65	9.7
48	Seoul	Siem Reap		10	16	38	34	34	44	48	62	
49	Hong Kong	Denpasar Bali		21	13	10	40	40	40	47	61	
50	Kuala Lumpur	Shenzhen		7		12	80	62	88	76	58	

6.4 **Kolkata FIR City-Pairs**

6.4.1 Aircraft movements for the top 50 city-pairs passing through Kolkata FIR in 2012, the first year for which data have been available, during the week 1-7 July are depicted in **Table 16**.

TABLE 16

AIRCRAFT MOVEMENTS THROUGH KOLKATA FIR
(During sample week 1-7 July, 2012)

	From	To	Number of movements
1	Hong Kong	Dubai	124
2	Bangkok	Mumbai	114
3	Bangkok	Delhi	96
4	Singapore	London	94
5	Singapore	Delhi	76
6	Bangkok	Dubai	73
7	Dhaka	Dubai	63
8	London	Bangkok	59
9	Hong Kong	Delhi	58
10	Frankfurt	Singapore	56
11	Delhi	Kathmandu	51
12	Abu Dhabi	Bangkok	47
13	Bangkok	Kolkata	47
14	Mumbai	Hong Kong	44
15	Frankfurt	Bangkok	43
16	Doha	Bangkok	42
17	Shanghai	Dubai	42
18	Hong Kong	Doha	32
19	Amsterdam	Bangkok	32
20	Doha	Kathmandu	30
21	Amsterdam	Kuala Lumpur	30
22	Amsterdam	Singapore	30
23	Paris	Singapore	30
24	Bangkok	Paris	28
25	Dubai	Chittagong	28
26	Abu Dhabi	Manila	28
27	Doha	Manila	28
28	Dubai	Guangzhou	28
29	Kuala Lumpur	London	28
30	Bangkok	Zurich	27
31	Manila	Dubai	27
32	Dhaka	Doha	26
33	Bangkok	Copenhagen	26
34	Bangkok	Muscat	25
35	Delhi	Kuala Lumpur	25
36	Dhaka	Delhi	25
37	Dhaka	Sharjah	25
38	Dhaka	Kathmandu	24
39	Instanbul	Singapore	24
40	Munich	Singapore	24
41	Abu Dhabi	Shanghai	23
42	Dhaka	Abu Dhabi	23
43	Dubai	Kolkata	23
44	Bahrain	Dhaka	22
45	Delhi	Shanghai	21
46	Bangkok	Instanbul	21
47	Riyadh	Dhaka	20
48	Bangkok	Vienna	20
49	Dhaka	Kuwait	20
50	Bahrain	Hong Kong	19

APPENDIX A

LIST OF ATTENDEES – APA TFG/16

COUNTRY/ORGANIZATION	MEMBER
Canada	Mr. Raynald Ouellet Senior Advisor, Aviation Forecasts Economic Analysis (ACAEA) Transport Canada Place de Ville, Tower C Ottawa, Ontario Canada K1A 0N5 Tel.: (613) 990 3831 Fax: (613) 957 3280 Email: raynald.ouellet@tc.gc.ca Mr. J Paul Cripwell Nav Canada Manager, Traffic Analysis and Forecasting Revenues and pension Administration Tel.:(613) 563 5876, (613) 293 9920 Email: Paul.Cripwell@navcanada.ca
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International Civil Aviation Organization (ICAO)	Ms. Grazyna Resiak Secretary – Asia/Pacific Area Traffic Forecasting Group (APA TFG) Economist Economic Analysis and Policy Section Air Transport Bureau International Civil Aviation Organization (ICAO) 999 University Street Montreal, Quebec Canada H3C 5H7 Tel.: (514) 954 8219, ext. 8068 Fax: (514) 954 6744 Email: gresiak@icao.int

*Participation via teleconferencing

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APPENDIX B

ROUTES AND PEAK-HOUR MOVEMENTS

TABLE B-1

TRANSPACIFIC DAILY TRAFFIC SUMMARY
WEEK BEGINNING JULY 1, 2011

	Route	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total	Average
1	ALASKA-ASIA PAC NO	31	22	21	14	23	27	29	167	24
2	ALASKA-ASIA PAC CE	12	5	3	9	5	3	9	46	7
3	HONOLULU-ASIA PAC NO	18	16	17	17	17	18	17	120	17
4	HONOLULU-ASIA PAC CE	1	0	1	1	2	1	1	7	1
6	US WEST-ASIA PAC NO	55	50	51	55	54	52	52	369	53
7	US WEST-ASIA PAC CE	12	10	12	10	9	13	9	75	11
9	US OTHER-ASIA PAC NO	23	22	22	19	24	24	30	164	23
10	CANADA-ASIA PAC NO	10	9	9	10	8	8	11	65	9
11	CANADA-ASIA PAC CE	4	4	5	5	6	6	5	35	5
15	ASIA PAC NO-ALASKA	36	29	32	31	30	43	34	235	34
16	ASIA PAC CE-ALASKA	6	10	10	9	9	14	12	70	10
17	ASIA PAC NO-HONOLULU	17	17	20	17	16	17	15	119	17
18	ASIA PAC CE-HONOLULU	0	0	2	1	0	2	0	5	1
20	ASIA PAC NO-US WEST	52	51	54	54	50	54	54	369	53
21	ASIA PAC CE-US WEST	8	13	10	9	11	9	13	73	10
23	ASIA PAC NO-US OTHER	35	37	34	40	36	38	39	259	37
24	ASIA PAC NO-CANADA	13	11	12	13	10	12	10	81	12
25	ASIA PAC CE-CANADA	7	7	6	6	7	7	7	47	7
	WESTBOUND TOTALS	166	138	141	140	148	152	163	1,048	150
	EASTBOUND TOTALS	174	175	180	180	169	196	184	1,258	180

TABLE B-2

TRANSPACIFIC DAILY TRAFFIC SUMMARY
WEEK BEGINNING JULY 1, 2012

	Route	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total	Average
1	ALASKA-ASIA PAC NO	24	23	14	18	16	19	22	136	19
2	ALASKA-ASIA PAC CE	7	7	5	4	5	4	9	41	6
3	HONOLULU-ASIA PAC NO	20	22	22	23	21	21	22	151	22
4	HONOLULU-ASIA PAC CE	1	0	0	0	2	1	2	6	1
6	US WEST-ASIA PAC NO	49	51	48	48	47	43	44	330	47
7	US WEST-ASIA PAC CE	7	8	8	8	8	8	10	57	8
9	US OTHER-ASIA PAC NO	26	21	22	22	25	27	24	167	24
10	CANADA-ASIA PAC NO	11	8	8	9	12	8	11	67	10
11	CANADA-ASIA PAC CE	5	4	3	3	4	5	6	30	4
15	ASIA PAC NO-ALASKA	32	21	29	31	40	35	29	217	31
16	ASIA PAC CE-ALASKA	7	6	6	5	10	9	7	50	7
17	ASIA PAC NO-HONOLULU	20	21	22	22	20	21	24	150	21
18	ASIA PAC CE-HONOLULU	0	0	1	0	0	0	0	1	0
20	ASIA PAC NO-US WEST	50	51	48	52	57	47	51	356	51
21	ASIA PAC CE-US WEST	10	11	11	9	10	10	11	72	10
23	ASIA PAC NO-US OTHER	36	35	38	37	39	37	37	259	37
24	ASIA PAC NO-CANADA	12	11	12	12	11	12	12	82	12
25	ASIA PAC CE-CANADA	5	6	6	7	6	7	7	44	6
	WESTBOUND TOTALS	150	144	130	135	140	136	150	985	141
	EASTBOUND TOTALS	172	162	173	175	193	178	178	1,231	176

TABLE B-3

TRANSPACIFIC AIRCRAFT CATEGORY SUMMARY
WEEK BEGINNING JULY 1, 2011

	Route	B747	A340	MD11	DC10	B777	B767	Other	Total
1	ALASKA-ASIA PAC NO	86	0	42	0	15	16	8	167
2	ALASKA-ASIA PAC CE	41	0	3	0	1	0	1	46
3	HONOLULU-ASIA PAC NO	24	0	0	0	14	67	15	120
4	HONOLULU-ASIA PAC CE	1	4	0	0	0	2	0	7
5	HONOLULU-ASIA PAC SO	0	0	0	0	0	0	0	0
6	US WEST-ASIA PAC NO	122	7	2	0	174	23	41	369
7	US WEST-ASIA PAC CE	38	13	0	0	24	0	0	75
8	US WEST-ASIA PAC SO	0	0	0	0	0	0	0	0
9	US OTHER-ASIA PAC NO	36	0	0	0	123	0	5	164
10	CANADA-ASIA PAC NO	3	13	0	0	21	21	7	65
11	CANADA-ASIA PAC CE	10	4	0	0	21	0	0	35
12	CANADA-HONOLULU	0	0	0	0	0	0	0	0
13	US MAINLAND-HONOLULU	0	0	0	0	0	0	0	0
14	CSA - HONOLULU	0	0	0	0	0	0	0	0
15	ASIA PAC NO-ALASKA	153	0	59	0	1	15	7	235
16	ASIA PAC CE-ALASKA	66	0	4	0	0	0	0	70
17	ASIA PAC NO-HONOLULU	26	0	0	0	14	65	14	119
18	ASIA PAC CE-HONOLULU	1	1	0	0	0	2	1	5
19	ASIA PAC SO-HONOLULU	0	0	0	0	0	0	0	0
20	ASIA PAC NO-US WEST	106	8	2	0	189	24	40	369
21	ASIA PAC CE-US WEST	36	14	0	0	23	0	0	73
22	ASIA PAC SO-US WEST	0	0	0	0	0	0	0	0
23	ASIA PAC NO-US OTHER	52	7	0	0	190	0	10	259
24	ASIA PAC NO-CANADA	3	14	0	0	34	23	7	81
25	ASIA PAC CE-CANADA	7	4	0	0	36	0	0	47
26	HONOLULU - CANADA	0	0	0	0	0	0	0	0
27	HONOLULU-US MAINLAND	0	0	0	0	0	0	0	0
28	HONOLULU - CSA	0	0	0	0	0	0	0	0
	WESTBOUND TOTALS	361	41	47	0	393	129	77	1,048
	EASTBOUND TOTALS	450	48	65	0	487	129	79	1,258

TABLE B-4

TRANSPACIFIC AIRCRAFT CATEGORY SUMMARY
WEEK BEGINNING JULY 1, 2012

	Route	B747	A340	MD11	DC10	B777	B767	Other	Total
1	ALASKA-ASIA PAC NO	76	0	26	0	17	11	6	136
2	ALASKA-ASIA PAC CE	21	0	2	0	3	0	15	41
3	HONOLULU-ASIA PAC NO	43	1	0	0	7	74	26	151
4	HONOLULU-ASIA PAC CE	2	2	0	0	0	2	0	6
5	HONOLULU-ASIA PAC SO	0	0	0	0	0	0	0	0
6	US WEST-ASIA PAC NO	98	7	3	0	157	23	42	330
7	US WEST-ASIA PAC CE	20	3	0	0	34	0	0	57
8	US WEST-ASIA PAC SO	0	0	0	0	0	0	0	0
9	US OTHER-ASIA PAC NO	38	0	0	0	113	0	16	167
10	CANADA-ASIA PAC NO	4	6	0	0	26	20	11	67
11	CANADA-ASIA PAC CE	5	4	0	0	20	0	1	30
12	CANADA-HONOLULU	0	0	0	0	0	0	0	0
13	US MAINLAND-HONOLULU	0	0	0	0	0	0	0	0
14	CSA - HONOLULU	0	0	0	0	0	0	0	0
15	ASIA PAC NO-ALASKA	145	0	50	0	1	13	8	217
16	ASIA PAC CE-ALASKA	32	0	1	0	2	0	15	50
17	ASIA PAC NO-HONOLULU	43	0	0	0	7	74	26	150
18	ASIA PAC CE-HONOLULU	0	1	0	0	0	0	0	1
19	ASIA PAC SO-HONOLULU	0	0	0	0	0	0	0	0
20	ASIA PAC NO-US WEST	99	6	3	0	183	23	42	356
21	ASIA PAC CE-US WEST	28	6	0	0	38	0	0	72
22	ASIA PAC SO-US WEST	0	0	0	0	0	0	0	0
23	ASIA PAC NO-US OTHER	39	7	0	0	189	0	24	259
24	ASIA PAC NO-CANADA	4	7	0	0	35	25	11	82
25	ASIA PAC CE-CANADA	6	4	0	0	33	0	1	44
26	HONOLULU - CANADA	0	0	0	0	0	0	0	0
27	HONOLULU-US MAINLAND	0	0	0	0	0	0	0	0
28	HONOLULU - CSA	0	0	0	0	0	0	0	0
	WESTBOUND TOTALS	307	23	31	0	377	130	117	985
	EASTBOUND TOTALS	396	31	54	0	488	135	127	1,231

TABLE B-5

TRANSPACIFIC BUSY HOUR REPORT
WEEK BEGINNING JULY 1, 2011

					Busiest Hour & Corresponding Traffic by Route																											
	Route	Hour	Day	Flts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Sum
1	ALASKA-ASIA PAC NO	5	Saturday, July 02, 2011	4	4	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	11
2	ALASKA-ASIA PAC CE	8	Sunday, July 03, 2011	4	0	4	2	0	0	1	1	0	3	0	0	0	0	0	0	1	1	0	0	2	0	0	2	0	0	0	0	0	17
3	HONOLULU-ASIA PAC NO	12	Friday, July 01, 2011	4	1	1	4	0	0	2	1	0	1	1	1	0	0	0	4	1	2	0	0	4	1	0	1	2	2	0	0	0	29
4	HONOLULU-ASIA PAC CE	5	Friday, July 01, 2011	1	2	0	0	1	0	4	1	0	1	0	0	0	0	0	1	0	0	0	0	2	0	0	4	0	0	0	0	0	16
5	HONOLULU-ASIA PAC SO	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	US WEST-ASIA PAC NO	11	Friday, July 01, 2011	10	2	0	1	0	0	10	0	0	4	2	1	0	0	0	1	3	1	0	0	8	0	0	4	0	1	0	0	0	38
7	US WEST-ASIA PAC CE	21	Sunday, July 03, 2011	4	0	0	0	0	0	2	4	0	0	0	1	0	0	0	2	0	0	0	0	2	0	0	2	1	0	0	0	0	14
8	US WEST-ASIA PAC SO	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	US OTHER-ASIA PAC NO	9	Saturday, July 02, 2011	6	0	0	2	0	0	1	1	0	6	2	0	0	0	0	0	1	1	0	0	3	2	0	2	0	0	0	0	0	21
10	CANADA-ASIA PAC NO	9	Friday, July 01, 2011	3	1	0	2	0	0	1	1	0	5	3	0	0	0	0	1	0	0	0	0	4	1	0	1	2	0	0	0	0	22
11	CANADA-ASIA PAC CE	10	Thursday, July 07, 2011	2	2	1	1	0	0	5	1	0	4	1	2	0	0	0	0	1	3	0	0	5	0	0	5	0	0	0	0	0	31
12	CANADA-HONOLULU	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	US MAINLAND-HONOLULU	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	CSA - HONOLULU	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	ASIA PAC NO-ALASKA	24	Friday, July 01, 2011	7	1	0	0	0	0	4	0	0	0	0	0	0	0	0	7	0	1	0	0	1	0	0	0	0	0	0	0	0	14
16	ASIA PAC CE-ALASKA	11	Friday, July 01, 2011	3	2	0	1	0	0	10	0	0	4	2	1	0	0	0	1	3	1	0	0	8	0	0	4	0	1	0	0	0	38
17	ASIA PAC NO-HONOLULU	15	Thursday, July 07, 2011	5	2	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	5	0	0	1	0	0	4	2	0	0	0	0	18
18	ASIA PAC CE-HONOLULU	2	Friday, July 01, 2011	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	2	0	0	1	0	0	0	0	1	0	0	0	0	0	7
19	ASIA PAC SO-HONOLULU	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	ASIA PAC NO-US WEST	11	Friday, July 01, 2011	8	2	0	1	0	0	10	0	0	4	2	1	0	0	0	1	3	1	0	0	8	0	0	4	0	1	0	0	0	38
21	ASIA PAC CE-US WEST	18	Thursday, July 07, 2011	3	2	0	0	0	0	1	0	0	1	0	0	0	0	0	2	1	0	0	0	1	3	0	0	0	0	0	0	0	11
22	ASIA PAC SO-US WEST	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	ASIA PAC NO-US OTHER	10	Friday, July 01, 2011	6	0	0	2	0	0	7	2	0	4	1	1	0	0	0	0	1	3	0	0	5	0	0	6	2	0	0	0	0	34
24	ASIA PAC NO-CANADA	15	Saturday, July 02, 2011	3	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	2	3	2	0	0	0	16
25	ASIA PAC CE-CANADA	12	Friday, July 01, 2011	2	1	1	4	0	0	2	1	0	1	1	1	0	0	0	4	1	2	0	0	4	1	0	1	2	2	0	0	0	29
26	HONOLULU - CANADA	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	HONOLULU-US MAINLAND	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	HONOLULU - CSA	0	Friday, July 01, 2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	WESTBOUND	11	Tuesday, July 05, 2011	21	1	0	3	0	0	8	1	0	5	2	1	0	0	0	4	1	1	0	0	3	1	0	3	2	1	0	0	0	37
	EASTBOUND	12	Wednesday, July 06, 2011	24	0	0	1	0	0	3	0	0	2	0	0	0	0	0	4	3	1	0	0	6	1	0	5	2	2	0	0	0	30

TABLE B-6

TRANSPACIFIC BUSY HOUR REPORT
WEEK BEGINNING JULY 1, 2012

					Busiest Hour & Corresponding Traffic by Route																											
	Route	Hour	Day	Flts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Sum
1	ALASKA-ASIA PAC NO	5	Monday, July 02, 2012	4	4	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	0	0	13
2	ALASKA-ASIA PAC CE	24	Monday, July 02, 2012	2	0	2	0	0	0	3	0	0	0	0	0	0	0	0	3	0	2	0	0	1	0	0	1	0	0	0	0	0	12
3	HONOLULU-ASIA PAC NO	12	Tuesday, July 03, 2012	6	0	1	6	0	0	3	0	0	0	0	0	0	0	0	2	1	2	0	0	6	0	0	1	2	1	0	0	0	25
4	HONOLULU-ASIA PAC CE	4	Sunday, July 01, 2012	1	3	0	0	1	0	4	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	12
5	HONOLULU-ASIA PAC SO	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	US WEST-ASIA PAC NO	11	Monday, July 02, 2012	9	1	0	3	0	0	9	0	0	5	2	0	0	0	0	0	2	1	0	0	3	0	0	5	0	1	0	0	0	32
7	US WEST-ASIA PAC CE	21	Sunday, July 01, 2012	3	1	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	3	0	0	2	1	0	0	0	0	12
8	US WEST-ASIA PAC SO	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	US OTHER-ASIA PAC NO	11	Tuesday, July 03, 2012	7	1	0	1	0	0	8	0	0	7	2	0	0	0	0	2	1	1	0	0	4	1	0	2	1	0	0	0	0	31
10	CANADA-ASIA PAC NO	9	Thursday, July 05, 2012	3	0	0	0	0	0	1	3	0	4	3	1	0	0	0	0	1	3	0	0	3	0	0	2	1	0	0	0	0	22
11	CANADA-ASIA PAC CE	10	Sunday, July 01, 2012	2	0	1	1	0	0	4	2	0	3	2	2	0	0	0	1	0	2	0	0	7	0	0	2	0	0	0	0	0	27
12	CANADA-HONOLULU	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	US MAINLAND-HONOLULU	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	CSA - HONOLULU	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	ASIA PAC NO-ALASKA	23	Wednesday, July 04, 2012	8	0	0	0	0	0	3	0	0	0	0	0	0	0	0	8	0	1	0	0	2	1	0	1	0	0	0	0	0	16
16	ASIA PAC CE-ALASKA	13	Sunday, July 01, 2012	2	1	1	2	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0	3	1	0	2	1	1	0	0	0	16
17	ASIA PAC NO-HONOLULU	14	Saturday, July 07, 2012	5	0	0	2	0	0	4	0	0	0	1	0	0	0	0	2	1	5	0	0	7	1	0	5	1	1	0	0	0	30
18	ASIA PAC CE-HONOLULU	13	Tuesday, July 03, 2012	1	0	0	1	0	0	2	0	0	0	2	0	0	0	0	1	2	0	1	0	2	1	0	2	0	1	0	0	0	15
19	ASIA PAC SO-HONOLULU	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	ASIA PAC NO-US WEST	10	Monday, July 02, 2012	8	0	1	2	0	0	4	3	0	3	1	1	0	0	0	0	0	2	0	0	8	0	0	2	0	0	0	0	0	27
21	ASIA PAC CE-US WEST	19	Tuesday, July 03, 2012	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	6
22	ASIA PAC SO-US WEST	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	ASIA PAC NO-US OTHER	6	Saturday, July 07, 2012	8	4	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	2	1	0	8	3	0	0	0	0	22
24	ASIA PAC NO-CANADA	11	Sunday, July 01, 2012	3	1	0	3	0	0	6	0	0	6	1	0	0	0	0	0	0	2	0	0	4	1	0	5	3	0	0	0	0	32
25	ASIA PAC CE-CANADA	12	Sunday, July 01, 2012	2	2	0	3	0	0	2	0	0	2	1	0	0	0	0	1	1	2	0	0	5	0	0	0	1	2	0	0	0	22
26	HONOLULU - CANADA	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	HONOLULU-US MAINLAND	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	HONOLULU - CSA	0	Sunday, July 01, 2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	WESTBOUND	10	Friday, July 06, 2012	23	1	2	1	0	0	7	3	0	6	3	0	0	0	0	2	2	3	0	0	7	0	0	5	1	0	0	0	0	43
	EASTBOUND	14	Saturday, July 07, 2012	23	0	0	2	0	0	4	0	0	0	1	0	0	0	0	2	1	5	0	0	7	1	0	5	1	1	0	0	0	30

TABLE C-1

TRANSPACIFIC TRAFFIC: ROUTE AREA CODES

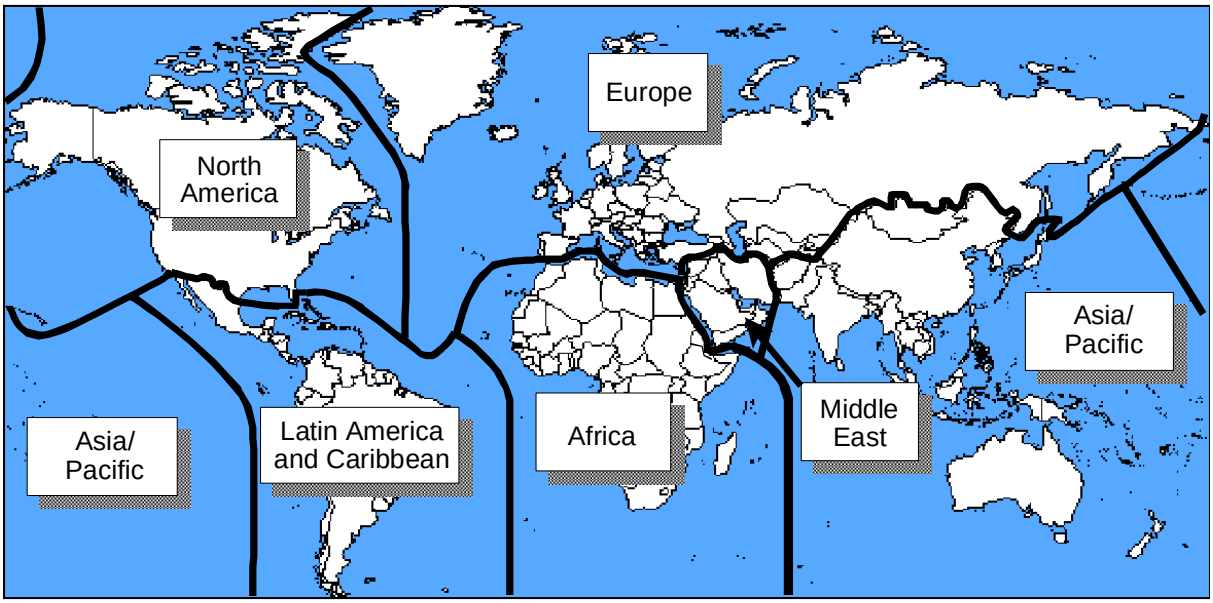
Region Code	Market Region	Region Code	Market Region
AK	Alaska	CAN	Canada
HA	Hawaii	APN	Asia Pacific Northern
USW	Conterminous US West Coast	APC	Asia Pacific Central
USO	Conterminous US Other	APS	Asia Pacific Southern

ID	Location	Region Code	ID Code	Location	Region Code
AB	Australia	APS	RJ	Japan	APN
AD	Australia	APS	RK	Korea, Rep of	APN
AG	Solomon Island	APS	RO	Japan (Ryukyu Island)	APN
AM	Australia	APS	RP	Philippines	APC
AN	Naura	APS	U	Russian Federation	APN
AP	Australia	APS	VA	India	APC
AS	Australia	APS	VB	Myanmar	APC
AY	Papua New Guinea	APS	VC	Sri Lanka	APC
C	Canada	CAN	VD	Cambodia	APC
CU	Canada	CAN	VE	India	APC
CW	Canada	CAN	VG	Bangladesh	APC
CY	Canada	CAN	VH	Hong Kong	APC
CZ	Canada	CAN	VI	India	APC
K	Conterminous US	USW, USO**	VL	Laos	APC
NC	Cook Island	APS	VM	Macao	APC
NF	Fiji, Tonga	APS	VN	Nepal	APC
NG	Kiribati, Tuvalu	APS	VO	India	APC
NI	Niue I	APS	VQ	Bhutan	APC
NL	Wallis I, Futuna I	APS	VR	Maldives	APC
NS	Samoa, American Samoa	APS	VT	Thailand	APC
NT	French Polynesia	APS	VV	Vietnam	APC
NV	Vanuatu	APS	WA	Indonesia	APC
NW	New Caledonia	APS	WB	Brunei Darussalam, Malaysia	APC
NZ	New Zealand	APS	WI	Indonesia	APC
PA	Alaska	AK	WM	Malaysia	APC
PB	Baker I (APC), Barter I (AK)	APC	WP	East Timor	APC
PC	Phoenix Island	APC	WR	Indonesia	APC
PF	Alaska	AK	WS	Singapore	APC
PG	Mariana Island, Guam	APC	ZB	China	APN
PH	Hawaii	HA	ZG	China	APN
PJ	Johnston I	APC	ZH	China	APN
PK	Marshall Is	APC	ZK	Korea, Dem People's Rep of	APN
PL	Line I, Kiribati	APC	ZL	China	APN
PM	Midway Island	APC	ZM	Mongolia	APN
PO	Alaska	AK	ZP	China	APN
PP	Alaska	AK	ZS	China	APN
PT	Micronesia	APC	ZU	China	APN
PW	Wake I	APC	ZW	China	APN
RC	China	APN	ZY	China	APN

****** Per Conterminous US: Airports located in California, Oregon and Washington States are assigned to the Conterminous US West Coast (USW) region; other airports are assigned to Conterminous US Other (USO) region.

APPENDIX D

ICAO STATISTICAL REGIONS



International boundaries shown on this map do not imply official endorsement or acceptance by ICAO.