

Doc 9915



Asia/Pacific Area Traffic Forecasts 2008–2025

**Report of the Fourteenth Meeting
of the Asia/Pacific Area Traffic
Forecasting Group (APA TFG)**

Bangkok, 22–29 September 2008

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

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**REPORT OF THE
ASIA/PACIFIC AREA TRAFFIC FORECASTING GROUP
(APA TFG)
FOURTEENTH MEETING
BANGKOK, 22 TO 29 SEPTEMBER 2008**

Includes:

- Forecasts of Transpacific and Intra-Asia/Pacific Traffic to the Year 2025
- Forecasts for Major City-Pairs of Intra-Asia/Pacific and Transpacific to the Year 2012
- 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 produced by the Group at its fourteenth meeting held on 22-29 September 2008 in the premises of the ICAO Regional Office in Bangkok.
2. During the period 1980 to 2007, Gross Domestic Product (GDP), measured in real terms, grew at average annual growth rates of about 3.5 per cent, 2.8 per cent and 4.7 per cent for the world, the North American and Asia/Pacific regions, respectively. In the aggregate, GDP in the Transpacific area grew at 3.7 per cent (Table 2).
3. The average revenue yield, measured in real terms, of the world's airlines total scheduled passenger traffic decreased at an average annual rate of 2.7 per cent during the same period. It is estimated that the Transpacific yields for the period declined at an average annual rate of about 2 per cent (Table 2).
4. During the same period, international passenger traffic in the Transpacific market increased from 6.4 million to 29.5 million passengers, at an average annual growth rate of 5.8 per cent (Table 1). The comparable world international passenger traffic increased by 6.2 per cent per year over the same period. However, the Transpacific traffic experienced a decline of some 10 per cent both in 2001 and 2003 and about 2.1 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 continued to expand in 2006 and 2007 albeit at more modest growth rates (by some 1.1 and 3.3 per cent, respectively).
5. For the period 2007-2015, the GDP for the North American and Asia/Pacific regions is expected to increase at average annual rates of 2.5 per cent and 4.7 per cent, respectively, and for the period 2015-2025, at 2.4 per cent and 4.0 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 3.5 per cent for the forecast horizon 2007-2025 (Table 3).
6. Average Transpacific airline passenger yield is expected to increase in real terms by 0.3 per cent per annum for the period 2007-2015 and to decline at about 0.5 per cent annually during the period 2015-2025 (Table 3). Average Intra-Asia/Pacific yield is expected to decline only marginally over the forecast horizon, at a rate similar to that for Transpacific yield.

7. Based on these "most likely" GDP and yield projections, Transpacific traffic is forecast to increase at an average annual rate of 5.6 per cent for the period 2007-2015, reaching some 45.7 million passengers in the year 2015. A growth rate of 5.6 per cent per annum is also expected for the period 2015-2025 resulting in a forecast of about 78.6 million passengers by the year 2025 (Table 4).

8. 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 150 thousand in 2007 to 211 thousand in the year 2015, at an average annual growth rate of 4.4 per cent. For the whole period 2007-2025, these aircraft movements are expected to increase at an annual growth rate of 4.3 per cent, and reach 321 thousand aircraft movements by the year 2025 (Table 6).

9. Intra-Asia/Pacific passenger traffic is expected to increase at a "most likely" average annual rate of 5.8 per cent during 2007-2015, reaching some 174.1 million passengers in the year 2015. An average annual growth rate of 5.2 per cent is forecast for the period 2015-2025, resulting in almost 290 million passengers by the year 2025 (Table 9).

10. Intra-Asia passenger aircraft movements are forecast to increase from 950.3 thousand in 2007 to some 1 388 thousand in 2015, at an average annual growth rate of 4.8 per cent. For the period 2007 to 2025, aircraft movements are forecast to increase at an average annual growth rate of 4.4 per cent and reach some 2 078 thousand by 2025 (Table 11).

11. The selected top 45 city-pairs in terms of numbers of passengers in the Asia/Pacific and Transpacific are expected to show traffic increases in aggregate terms of passenger flow at an average annual growth rate of 4.5 per cent from 2007 to 2012. This growth will result in an increase in passenger traffic on the routes concerned from some 53.3 million passengers in 2007 to some 66.4 million passengers in the year 2012 (Table 12).

1. INTRODUCTION

1.1 This report includes medium-term forecasts of air traffic in the Transpacific area, in the Asia/Pacific region, and for selected Transpacific and Asia/Pacific city-pair markets through to 2012. The report also contains a long-term forecast with a horizon to the year 2025, including a short-term forecast for 2008-2010 and intermediate forecasts for each of the years 2015 and 2020. 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 2012. The peak hour analysis is based on a detailed review of traffic during a typical July week of 2007 and 2008, summarized in **Appendix B**.

1.2 These forecasts were produced by the APA TFG at its fourteenth meeting, held in Bangkok from 22 to 29 September 2008. Representatives from Canada, China, Japan and Thailand participated at the meeting (list of participants appears in **Appendix A**). Representatives from China attended the meeting for the first time. In addition to inputs from the participants, traffic and financial data for Transpacific market were received from the US FAA and Hong Kong FIR data were provided by the Hong Kong SAR CAD. 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 The economic downturn experienced in 1997/1998 in the Asia/Pacific region had major impacts on traffic levels, but the region regained economic strength. This was evidenced by a 5.7 per cent growth in total Asia/Pacific region GDP in 2000. The GDP of China grew at 8.0 per cent while Asia's four newly industrialized economies grew by almost 10 per cent. Consequently, traffic in the Transpacific and the Intra-Asia/Pacific regions in 2000 increased by 6.8 and 5.8 per cent, respectively. Tourism in the region also benefited from the recovery and experienced high growth rates. It was against this background that the tenth meeting of the APA TFG revised the Transpacific and Intra-Asia/Pacific forecasts in June 2001. In addition, forecasts of aircraft movements to the year 2015, for the Intra-Asia/Pacific route group, were introduced for the first time. The Group also considered ways and means of addressing the requirements identified by the ICAO Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) and its relevant sub-groups.

1.4 The events of 11 September 2001 in the United States precipitated a sudden drop in traffic and thereby invalidated the forecasts which had been developed by the Group in June 2001, particularly as weaknesses in the global economy began to emerge and as consumer confidence eroded.

1.5 In light of the above developments, the eleventh meeting of APA TFG concentrated primarily on the revision of the Transpacific and Intra-Asia/Pacific forecasts together with forecasts of aircraft movements to the year 2015 for the Intra-Asia/Pacific region.

1.6 The SARS outbreak had devastating effects on air traffic to, from and within the affected areas in the first half of 2003. Reported monthly figures suggest that the drop in passenger traffic reached its lowest in May after which it started a steady recovery. It is estimated that in 2003, passenger traffic on Transpacific and Intra-Asia/Pacific routes dropped by some 10 per cent. It was against this background that the twelfth meeting of the APA TFG focussed on the revision of the medium- and long-term forecasts for Transpacific and Intra-Asia/Pacific; the horizon of the long-term forecasts being extended to the year 2020.

1.7 The thirteenth meeting of the Group focussed on the update of the forecasts developed during the previous meeting of the Group, taking into account the developments which have taken place on both Transpacific and Intra-Asia air transport markets since mid-2004.

1.8 The fourteenth meeting of the Group updated the forecasts for the Transpacific and Intra-Asia/Pacific markets bearing in mind the developments in these markets up to mid-2008, including the

surge in the fuel prices and the slowdown in the economy. The Group also decided to extend the time horizon of the long-term forecasts up to the year 2025.

1.9 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 APANPIRG meeting held in early September 2008 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 region.

2. FACTORS AFFECTING DEMAND FOR AIR TRAVEL AND TRAFFIC TRENDS

2.1 Factors Affecting Demand for Air Travel

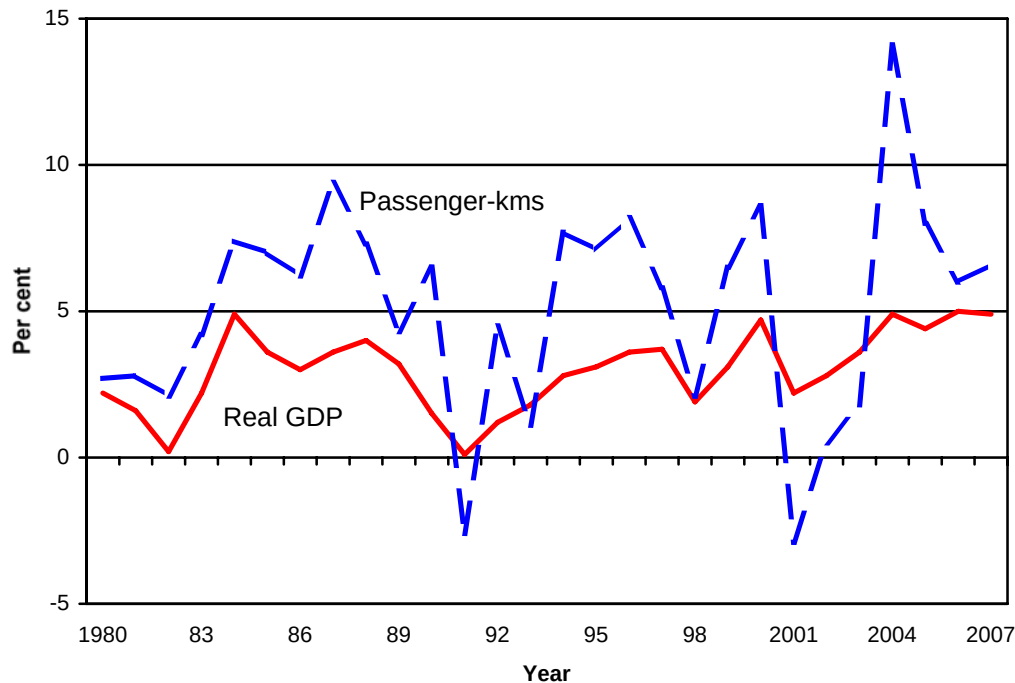
2.1.1 Economic theory and analytical studies indicate a high correlation between the air traffic growth patterns and economic trends in that the demand for air travel is primarily determined by economic factors such as income levels and the cost of travel. Changes in personal income affect the level 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 the GDP and traffic growth rates for the 1980-2007 period. It should be noted that the impact of event-related developments (such as events of 11 September 2001, war in Iraq and SARS outbreak) on air travel indicate the air transport industry is sensitive to safety and security concerns which influence consumer confidence.

2.1.2 The world recession in 1981, the sharp increase in oil prices in 1991, the financial crisis in Asia/Pacific in 1997 and the events of 11 September 2001 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 due mainly to a slow recovery after the events of 11 September 2001 and the SARS outbreak in the eastern part of Asia/Pacific. In 2004, traffic recovery gained strength registering a growth 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 the air traffic in 2006 and 2007 (6.0 per cent and 6.6 per cent, respectively). In 2008, a moderate increase is expected as a result of the economic slowdown witnessed in North America and soaring fuel prices which reached an historic peak in July.

2.1.3 In addition to broad economic trends, in the Transpacific and Intra-Asia/Pacific markets, the factors which 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.

FIGURE 1

**GDP AND SCHEDULED PASSENGER TRAFFIC
WORLD GROWTH, 1980 – 2007**



2.1.4 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. Recently, airline costs have been negatively affected by increasing insurance and security costs, in addition to the sharp hikes in oil prices.

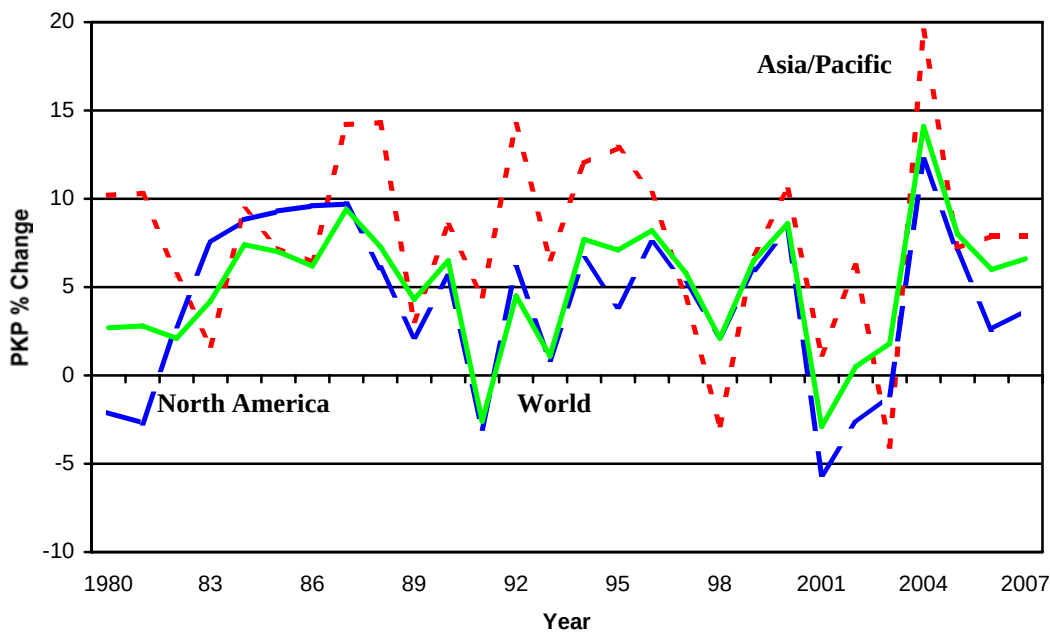
2.1.5 The airline industry has a long history of improving productivity. As a result, the growth in output has been greater than the growth in various inputs used by the industry. Over the period concerned, there were significant improvements in partial productivity measures, i.e., for labour, fuel and aircraft. The progressive absorption of new technology aircraft into airline fleets has been a major reason for the improvement in productivity. In particular, the 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 (it is estimated that over the period 1980-2007, an average global passenger yield expressed in real terms has decreased by some 2.7 per cent) which was possible by the combined effect of productivity growth and declines in the real input prices (the latter except for fuel prices in the recent years).

2.2 Regional Air Traffic Trends

2.2.1 During the period from 1980 to 2007, airlines in the Asia/Pacific region increased their traffic from some 160 billion to 1 126 billion PKPs, at an average annual growth rate of 7.5 per cent, the highest growth rate achieved by any region. Traffic of airlines registered in the North America region increased over the 1980-2007 period from 446 billion PKPs to 1 419 billion PKPs, at an average annual

growth rate of 4.4 per cent. However, since 1998, Intra-Asia/Pacific traffic, in terms of passengers carried, suffered some declines, namely in 1998, 2001 and 2003. The latter has been estimated at some 10 per cent resulting from the SARS outbreak which had a significant adverse impact on the passenger traffic to, from and within the affected areas. Due to the events of 11 September 2001 and the SARS outbreak, traffic declined sharply on all Transpacific corridors in 2001 and 2003 and as a result, a total decline of some 10 per cent was registered in both years. The year-to-year growth rates for the world airlines' scheduled passenger traffic and those of the Asia/Pacific and North American regions over the period 1980-2007 are depicted in **Figure 2**.

FIGURE 2
SCHEDULED PASSENGER TRAFFIC GROWTH
1980-2007



3. TRANSPACIFIC TRAFFIC TRENDS AND FORECASTS

3.1 Geographical Scope

3.1.1 For the purpose of these forecasts, the Transpacific 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 For the purpose of this analysis, the most useful sources of traffic data are the U.S. Immigration and Naturalization Service and the Canadian government statistics for Canadian gateway traffic. The data used for the basic time series of passenger traffic is shown in **Table 1**. Over the 1980-2007 period, the number of Transpacific passengers carried on scheduled air services increased from 64

million to some 29.5 million at an average annual growth rate of 5.8 per cent. This compares with an average annual growth rate (international and domestic traffic combined) of 4.2 per cent for the world. The Transpacific traffic declined in 1998 by about 6 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 rebounded 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.

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
Average annual percentage growth rates					
1980-2007	5.9	9.7	6.2	3.5	5.8

Source: ICAO, Transport Canada, United States (Federal Aviation Administration (FAA)), DOT.

FIGURE 3 a)

US TRAFFIC TO/FROM ASIA

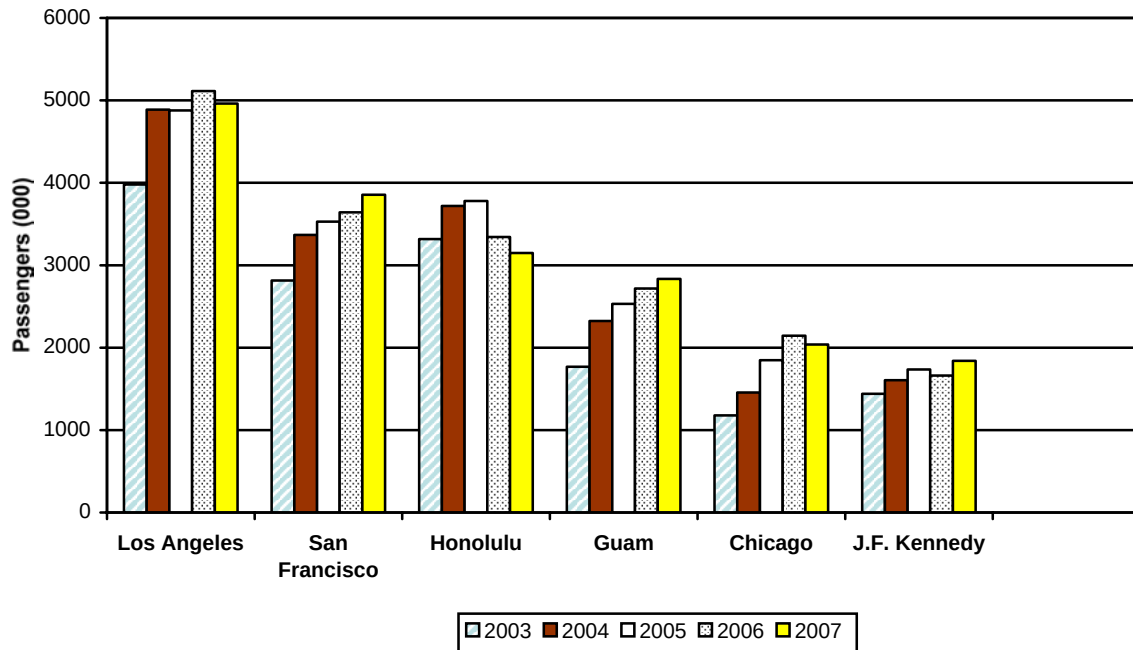


FIGURE 3 b)

US TRAFFIC TO/FROM ASIA

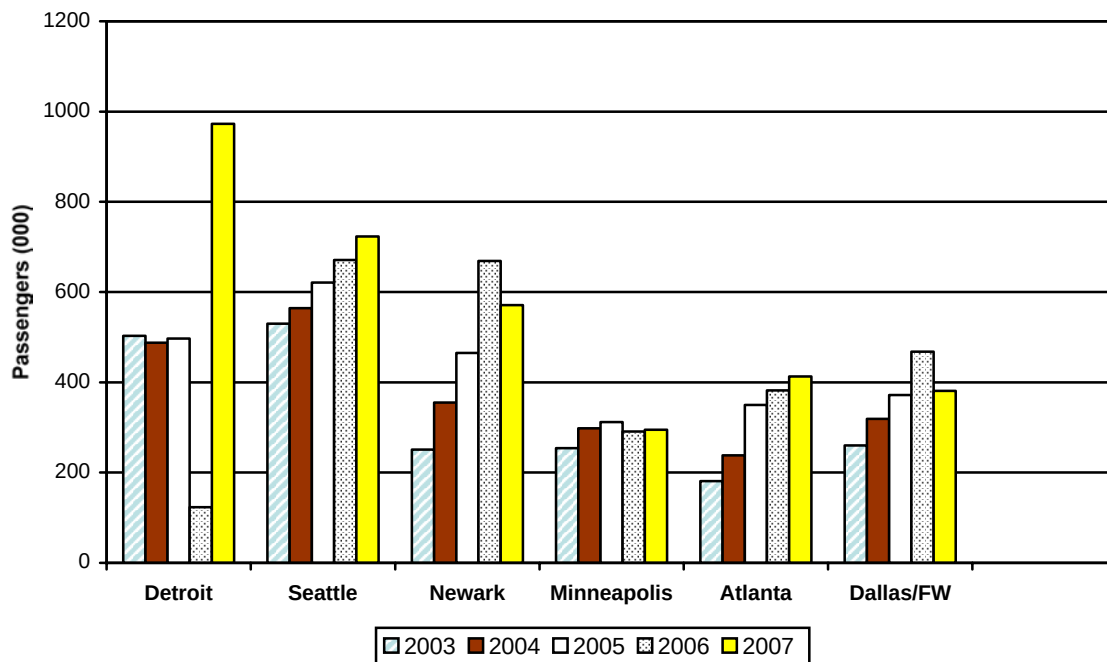
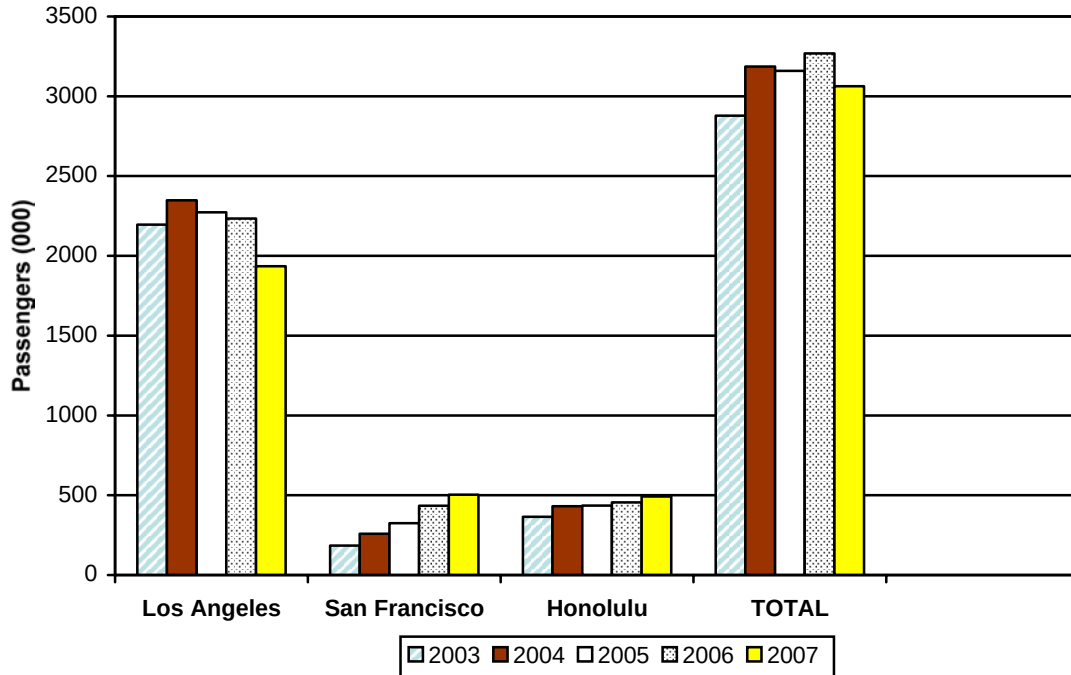


FIGURE 3 c)

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 Global Insight and the International Monetary Fund (IMF). Over the 1980-2007 period, the combined average annual economic growth of the North American and Asia/Pacific regions is estimated at 3.7 per cent. At the same time, the Transpacific traffic increased at an average annual rate of 5.8 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 over the average for the whole 1980-2007 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 annum 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.

3.3.2 The revenue yield index is a weighted index based on information provided by airlines of the States of the North America and Intra-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 with most other goods and services. However, during the last

four years, the Transpacific yield in real terms is estimated to increase mainly due to high fuel prices and it is expected to further increase in 2008 and to stabilize and decrease thereafter. The trends in the GDP and yields are summarized in **Table 2**.

TABLE 2
AGGREGATED GROSS DOMESTIC PRODUCT AND AIRLINE YIELD INDEX

Year	Gross Domestic Product (Billions of U.S. \$ in 1990 real prices)			Transpacific
	North America	Intra-Asia/Pacific	Transpacific Total	Yield Index
1980	4 708	2 980	7 688	139.5
1981	4 799	3 108	7 907	145.7
1982	4 692	3 216	7 908	134.5
1983	4 870	3 347	8 217	132.1
1984	5 172	3 532	8 704	127.4
1985	5 344	3 713	9 057	119.3
1986	5 501	3 862	9 363	126.1
1987	5 677	4 073	9 750	115.6
1988	5 905	4 364	10 269	108.4
1989	6 054	4 588	10 642	103.2
1990	6 120	4 817	10 937	100.0
1991	6 077	5 032	11 109	100.8
1992	6 207	5 287	11 494	93.6
1993	6 396	5 331	11 727	94.0
1994	6 659	5 526	12 185	93.7
1995	6 873	5 859	12 732	88.0
1996	7 084	6 157	13 241	83.9
1997	7 360	6 379	13 739	80.4
1998	7 626	6 315	13 941	80.4
1999	7 946	6 536	14 482	78.8
2000	8 280	6 909	15 189	84.8
2001	8 321	7 178	15 499	77.2
2002	8 504	7 508	16 012	70.2
2003	8 768	7 959	16 727	67.5
2004	9 100	8 500	17 600	72.6
2005	9 401	9 061	18 462	75.1
2006	9 702	9 705	19 407	78.0
2007	9 925	10 432	20 357	82.6
Average annual percentage growth rates				
1980 – 2007	2.8	4.7	3.7	-1.9

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 income levels as measured by variations in GDP, demographic trends, and the cost of air travel as measured by yields. It is also assumed that the political and the 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 As discussed previously, there are complex causal relationships and factors which have and will affect traffic volumes. However, the demand for air travel is primarily determined by economic activity and the demographics of the travelling population, as well as by the cost, and hence the price of air travel.

3.4.3 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 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.

3.4.4 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. Three “dummy variables” were introduced to the model; the first two to capture the impact of the traffic downturn that occurred in 2001 and 2003 (Dummy 1) and in 2002 and 2003 (Dummy 2), the third to account for sharp increases of fuel prices and consequently the yield index for the years 2004-2005. The introduction of these variables provided a more accurate simulation of the traffic forecast and improved the predicting capability of the model.

$$\text{Log (Passengers)} = \text{Constant} + A \text{ Log(GDP)} + B \text{ Log(Yield)} + C \text{ Dummy}_1 + D \text{ Dummy}_2 + E \text{ Dummy}_3$$

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

3.4.5 The analysis resulted in the following formula:

$$\text{Log (Passengers)} = 0.05 + 1.50 \log(\text{GDP}) - 0.95 \log(\text{Yield}) - 0.25(\text{Dummy}_1) - 0.41(\text{Dummy}_2) - 0.46(\text{Dummy}_3)$$
$$(R^2 = 0.99, \text{S.E.} = 0.05, t_{\text{GDP}} = 8.4, t_{\text{Yield}} = -4.93)$$

3.4.6 In recognition of the level of uncertainty necessarily associated with forecasts – particularly long-range horizons such as those to the year 2025 – 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: