

| Scenario 1: Potential Growth | Scenario 2: Constrained Growth |
|---|---|
| Liberalization effects | No real fare reductions |
| · Fare reductions in real terms | · Increase in cost and fees (e.g. VAT, airport charges,...) |
| · Route and frequency expansion | · Monopolistic pricing |
| Functioning infrastructure | Constrained frequency development |
| · Airport capacity | · Congested infrastructure |
| · Air traffic control capacity | · Reduced attractiveness |
| Pkm growth 4.9% p.a. | Pkm growth 3.8-4.0% p.a. |
| Frequency growth 2.8% p.a. | Frequency growth 1.9-2.2% p.a. |

FIGURE 21 European air transport development, 1989-2008.

| | Potential Growth | Constrained Growth |
|-------------------------------|-------------------------|---------------------------|
| Pkm growth | 4.9%p.a. | 4.0%p.a. |
| Seat growth | 4.4%p.a. | 3.5%p.a. |
| Frequency growth | 2.8%p.a. | 2.0%p.a. |
| Fleet size 1989 | 1800 | 1800 |
| Total deliveries/ retirements | + 2700/-1350 | + 2350/1500 |
| by a/c size category | | |
| ≥130 seats | + 350/-640 | + 250/700 |
| 131-170 seat | + 700/-300 | + 600/38 |
| 171-230 seats | + 500/- 80 | + 400/-100 |
| 231-340 seats | + 900/-200 | + 850/-200 |
| <341 seats | + 250/-130 | + 250/-120 |
| Fleet size 2008 | 3150 | 2650 |
| Avg.seat cap. 1989 | 164 | 164 |
| Avg.seat cap. 2008 | 220 | 230 |

FIGURE 22 European jet fleet, 1989-2008.

FORECASTS OF TRANSPACIFIC AVIATION ACTIVITY, 1989-2020

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There are challenging times ahead for the aviation community--particularly with respect to transpacific travel which has been growing at double digit rates during recent years. This paper presents forecasts of transpacific aviation activity through the year 2020 and discusses the factors which will be driving demand for aviation services, the evolving structure of the aviation industry, and FAA's assumptions concerning fleets, schedules, and fares.

FORECAST BACKGROUND

Forecasting air traffic to the year 2020--three decades into the future--is even more hazardous than a forecast of the present traffic would have been had it been made in 1960, just prior to the dramatic changes brought on by the advent of jet air travel followed by the U.S. deregulation experience. With an accelerating rate of change in technology, social values, and economic development, no one can predict with confidence 30 years into the future. Still, it is necessary to have some sense of future air travel demand in order to plan an air traffic system to serve the needs of future generations.

With some trepidation, therefore, my presentation today will be a general picture of how future air travel across the pacific might develop. The underlying economic and social reasons--economic growth, shifting demographic patterns, changing life-styles, and increasing reliance on air as the predominant mode of travel--will continue to stimulate air traffic demand well into the next century. This is especially true for the Pacific Rim. It is imperative, therefore, that the aviation community review the current status of transpacific travel and the future impact of traffic growth due to the movement toward worldwide deregulation and the growing interdependence of world economies.

Deregulation in the United States

Following deregulation in the United States in 1978, there was a boom in U.S. domestic airline passenger traffic--from 250 million enplanements in 1978 to 442 million in 1988. Many factors contributed to this unprecedented growth including lower fares, a wider variety of routes and types of service, and special incentives offered by airlines. The U.S. deregulation experience has become a model for the rest of the world and, as we witness the gradual spread of airline deregulation throughout a large part of the free world,

we anticipate that the aviation community will see a boom in international passenger traffic that will challenge the air traffic control systems and place severe strains on the world's airports.

Market Impacts

This paper will consider the marketing impact of new aircraft, such as the B-747-400 and the MD-11, which provide carriers with the ability to serve new direct transpacific routes. With the continued strong traffic growth being projected through 2020, we foresee not only more direct nonstop service to Pacific Rim airports but also that these airports will be served from many new North American and European gateways. By 2020, for example, nonstop service across the Pacific might be available from cities such as Denver, Las Vegas, Nashville, and Cincinnati to cities such as Tokyo and Sydney. The airline passengers of the future will have a wide selection of alternative routes, schedules, and fares in planning their transportation needs.

Major U.S. carriers are expanding internationally. With increasing penetration of foreign markets by deregulated major carriers of the United States and Canada, there is a strong incentive for European and Pacific Rim national carriers to compete on equal terms. The development of strong multinational carriers in Europe is considered likely as a result of the denationalization and privatization of government-owned carriers in major European countries to take advantage of the European market with 350 million people. Once started, such consolidations are expected to move rapidly, as they have done in the United States. Also, these new multinational carriers will seek intercontinental mergers or consolidations with North American and Pacific Rim carriers, thereby forming "megacarriers" that will compete for traffic on a worldwide scale. The implications of these emerging trends and the forecasts represent significant challenges to each of us in aviation. The growth in congestion and delay that has occurred in the U.S. travel network since airline deregulation is a harbinger of problems facing the world of the future. With literally millions of passengers depending on commercial aviation for their transpacific travel needs, planning must be undertaken now in order to ensure that the system will not be overwhelmed and will function without intolerable delays and inconveniences. The world does face a challenging future in aviation. Planners of the future will have to assure that tomorrow's air transportation system is an efficient and as safe as it is in today's world.

FORECASTS FOR 2020

My presentation this morning relies heavily on work done by the FAA Office of Aviation Policy and Plans. In May 1988, we prepared a report, Transpacific Commercial Air Carrier Passenger and Operation Forecasts 1988-2000, as part of a cooperative study effort to determine FAA's operational and representational roles in the rapidly expanding Asian and Pacific Rim nations. Thus, in preparing my presentation for this morning, it was expedient to update that report using latest available data and to extend the forecasts to the year 2020 -- the time horizon of interest to this audience. Copies of this report will be made available following my presentation.

Forecast Assumptions

The basic economic and aviation assumptions underlying the forecasts of aviation activity are the following:

Gross National/Domestic Product

U.S. Gross National Product will reach 7.4 trillion dollars by the year 2020, 118 percent above the 1988 level of 3.4 trillion dollars. Pacific region gross domestic product will grow to 7.9 trillion dollars, surpassing U.S. GNP. Japan will continue to account for the lion's share of Pacific region gross domestic product (57.6 percent in 2020 compared to 67.2 percent in 1988.)

Passenger Yields

Real yield (defined as revenue per passenger per mile adjusted for inflation) is expected to decline from 11.6 cents in 1988 to 8.6 cents in 2020.

Number of Seats per Aircraft

With the addition of two new U.S. carriers to transpacific service in 1987, it appears that the number of U.S. flag carriers serving the transpacific has about reached its limit. Therefore, it is reasonable to expect that these carriers would begin to replace the smaller 3-engine widebody aircraft (DC-10 and L-1011) with the larger MD-11 and B-747-400 aircraft. For these reasons, we assume that the average seating capacity of U.S. flag carrier aircraft will increase by approximately three to four seats a year between 1988 and 2000, and by two seats annually between 2000 and 2020.

Similarly, we have assumed that the average size of the foreign flag carrier aircraft will increase by two and one-half seats annually as they begin to replace their older B-747 aircraft with the newer, larger seating capacity B-747-400 and MD-11 aircraft.

We may also anticipate that early in the next century there could be a viable supersonic transport aircraft (SST) competing in these markets. The best information available on the probable size of an SST is approximately 250 seats. This is significantly smaller than the average number of seats per aircraft assumed in our forecasts. Direct service by the smaller extended range 2-engine aircraft (such as the B-767 and the A-310) from Hawaii to Pacific Rim points and significant market penetration by a viable SST could also alter out projections of average aircraft size in these markets. Alternative scenarios of long-term transpacific air carrier aircraft operations, therefore, could be significantly higher than the outlook presented in our baseline forecasts.

Load factors

Historically, average load factors much higher than 69.0 percent have not been maintained consistently on transpacific routes. Nevertheless, we have assumed a gradual increase in load factors reaching 72.5 percent by the year 2010. We assume, further, that this load factor is attainable and maintainable because of improved marketing strategies which industry representatives have indicated they are striving to obtain. For example, development of certain Pacific areas as vacation resorts and the increasing number of immigrants from these regions will supplement the growing number of business travellers. Such high load factors will be attainable if carriers promote the market and attempt to fill seats that are added through capacity increases.

Total Passenger Demand

Total passenger demand in U.S. transpacific markets reached 11.8 million in 1988, nearly three and one-half times the 3.5 million passengers recorded in 1975.

During the last three years transpacific traffic has surged, increasing by an average of 14.2 percent a year between 1985 and 1988.

The relatively high growth is expected to continue in 1989 approximating 12.6 percent -- due, in large part, to an increase in the number of U.S. Pacific gateways and the large increase in capacity which has already taken place during the first six months of 1989.

Total transpacific passenger demand is expected to reach 29.2 million passengers by 2000 and to approximate 82.0 million by 2020. This represents an average annual growth rate of 6.2 percent over the 1988-2020 time frame. As might be expected, we anticipate slightly higher growth rates during the earlier time frame, for example, 7.6 percent during the 1990-2000 decade and slowing to 4.4 percent during the 2010-2020 time frame.

TABLE 1 TRANSPACIFIC PASSENGER DEMAND, 1975-2020

| | <u>Passengers</u> | | |
|-------------------|---------------------------------|------------------------------------|----------------------------------|
| | <u>U.S. Total (000)</u> | <u>U.S. Citizens (000)</u> | <u>U.S. Citizens (%)</u> |
| <u>Historical</u> | | | |
| 1975 | 3,508 | 1,091 | 31.1 |
| 1980 | 5,648 | 1,611 | 28.5 |
| 1985 | 7,923 | 3,378 | 42.6 |
| 1987 | 10,225 | 4,240 | 38.5 |
| 1988 | 11,807 | 4,550 | 38.5 |
| <u>Forecast</u> | | | |
| 2000 | 29,200 | 12,250 | 42.0 |
| 2020 | 82,000 | 37,700 | 46.0 |

United States Citizens

In 1988, U.S. citizens accounted for 4.6 million passengers, representing 38.5 percent of the total U.S. transpacific passenger demand. Based on data presented in Table 1, the proportion of U.S. citizens in transpacific travel has fluctuated between 28.5 percent in 1980 and 43.9 percent in 1986. The number of U.S. citizens travelling abroad is influenced, to some extent, by changes in the exchange rate of the U.S. dollar with other currencies. Currently, the exchange rate for the Japanese yen, for example, is unfavorable to U.S. citizens travelling to Japan.

The number of U.S. citizens participating in transpacific travel is expected to reach 12.3 million by 2000 and to climb to 37.7 million by the end of the forecast period.

After a slight decrease in the proportion of U.S. citizens to 37 percent in the short term, we anticipate that the proportion of U.S. citizens in transpacific travel will increase to 42 percent in 2000 and will continue increasing to 46 percent by 2020.

Geographic Distribution of Passenger Demand

In 1988, travel to and from Japan accounted for 7.3 million passengers, 62 percent of the total transpacific commercial travel market. South Korea had about 947,000; Australia and Hong Kong had 852,000 and 630,000, respectively. The shares of total passengers were 8.0 percent for South Korea, 7.2 percent for Australia, and 5.3 percent for Hong Kong.

It is important to note that the geographic distribution of the passengers indicated herein does not represent the final destinations of the travellers. The source of the data is the U.S. Department of Commerce, Immigration and Naturalization Service. For incoming passengers, the country of record is the last foreign departure airport prior to the aircraft's arrival in the United States or its territories. Similarly, for aircraft leaving the United States the country of the first port of entry where the aircraft lands is considered the destination point.

This "accounting" procedure implies that Japan will get credit for many passengers whose final destination is another foreign country, thereby overstating Japan's share of true origin-destination traffic. It is conceivable that Japan's share of the total traffic could decline as other countries develop "gateway" airports and the carrier's fleets include a greater proportion of long-range aircraft capable of overflying Japan and smaller aircraft to serve leaner markets directly.

Alternative Scenarios of Passenger Demand

Forecasting is an art as well as a science. Trying to predict all of the rapidly changing technology occurring in the world as well as changing social values requires us to place greater emphasis on the forecasting art rather than the mathematical models that purport to explaining future trends in aviation. As shown in Figure 23, we have hedged our bets on 2020 passenger demand to reflect a range of possible outcomes over the longer term.

However, even in our most pessimistic alternative, we are still projecting significant growth to 58 million passengers by the end of the forecast period.

Total Aircraft Operations

The transpacific market is currently served by 30 commercial air carriers: seven U.S. flag carriers and 23 foreign flag carriers. These 23 foreign flag carriers offer nonstop service from 12 U.S. international gateways. About three-quarters of all transpacific flights from the United States originate at four airports: Honolulu, Anchorage, Los Angeles, and San Francisco. In 1988, the 30 air carriers provided nonstop service to 12 Asian and Pacific countries from these 12 U.S. gateways. The vast majority of flights (over 86 percent) were destined for four countries: Japan, Australia, South Korea, and New Zealand.

Based on aircraft operations data developed from the *Official Airline Guide (OAG)*, commercial aircraft operations in the transpacific totaled nearly 51,700 in 1988. This level of activity represented an increase of 38.6 percent in just the last three years. (Table 2)

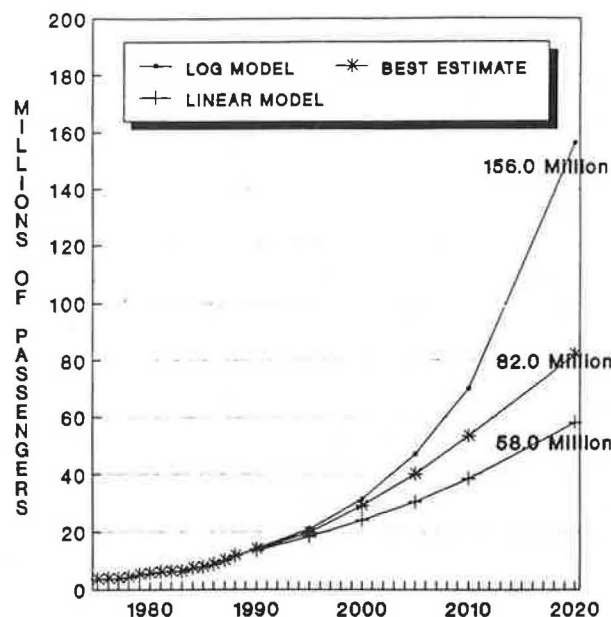


FIGURE 23 Transpacific passenger demand scenarios, 1975-2020.

TABLE 2 TRANSPACIFIC AIR CARRIER OPERATIONS, 1984 to 2020

| | Operations | | |
|-------------------|------------|-------------------------|---------|
| | Total | U.S. Carriers Number | Percent |
| Historical | | | |
| 1984 | 36,462 | 16,630 | 45.6 |
| 1985 | 37,298 | 17,162 | 46.0 |
| 1986 | 43,196 | 19,796 | 45.8 |
| 1987 | 47,222 | 21,906 | 46.4 |
| 1988 | 51,688 | 24,942 | 48.3 |
| Forecast | | | |
| 2000 | 113,600 | 53,400 | 47.0 |
| 2020 | 276,700 | 130,000 | 47.0 |

Based on the forecasts of transpacific passenger demand presented earlier and on the assumptions enumerated before, total commercial aircraft operations are expected to increase to 113,600 by 2000 and to grow to 276,700 by 2020. Overall, commercial aircraft operations are expected to increase at an average annual rate of 5.4 percent. The increase in total aircraft operations is only slightly less than the increase forecast for total transpacific passenger demand (6.2 percent) due largely to the fact that few efficiency gains will be realized from increased capacity or load factors. Overall, average aircraft seating capacity is expected to increase by only 1.0 percent annually.

U.S. Flag Carriers

In 1988, U.S. flag carriers had 24,900 aircraft operation in transpacific routes. This represented 48.3 percent of total commercial aircraft transpacific operations. The proportion of U.S. flag carrier aircraft operations has increased to over 50 percent during the first six months of 1989.

By 2000, the number of aircraft operations flown transport sector is relatively large (some 7 percent policy the importance of the two main ports by U.S. flag carriers in transpacific service is of GNP), issued a major policy document on infrastructure planning to the year 2015. In this 2020, represent an average annual increase of 5.3 percent over the 32-year forecast period, virtually the same as the average annual increase in the total transpacific service. Although, the U.S. flag expected to increase to 53,400. By 2020, the U.S. flag aircraft operations will reach 130,000, or 47 carrier's share of total operations is expected to reach as high as 51 percent in the short term, we anticipate that bilateral agreements will eventually reduce this percentage to around 47 percent.

CONCLUSION

This paper has shown that economic growth in the Pacific Rim nations is expected to continue to outperform the rate of growth in the United States.

Similarly, transpacific commercial passenger activity and commercial aircraft operations which have been growing at double-digit rates in recent years are expected to continue to increase at relatively high rates well into the forecast period.

Introduction of new long-range aircraft into the transpacific fleet, the incorporation of new gateways on both sides of the Pacific, and the possible introduction of supersonic transport aircraft in transpacific service are expected to cause changes in the geographic route patterns across the Pacific. Further the possible development of megacarriers through mergers and agreements will influence the route structures which will emerge. In short, the anticipated growth and expected changes would put severe strain on the existing network of airports and airway facilities.

Whether or not the pictures sketched in this presentation for 2020 and the intervening years develop as forecast, one thing is certain. There will be considerable growth and substantial changes in transpacific aviation during the next 32 years. While our crystal ball might be hazy, perhaps even opaque, when focusing on 2020, it is still imperative that we in aviation consider the emerging developments and possible alternative scenarios. Further, we are obligated to plan for accommodating and managing the growth and the changes lest they overwhelm both us and future generations of aviators and the flying public. The safety and efficiency of the system demand nothing less.