



Chapter Two
FORECASTS

FORECASTS

An important factor in facility planning involves a definition of demand that may reasonably be expected to occur during the useful life of the facility's key components. In airport master planning, this involves projecting potential aviation activity over at least a twenty-year timeframe. For small-hub, primary commercial service airports such as Kona International Airport at Keahole (KOA), forecasts of passengers, cargo, based aircraft, and operations (takeoffs and landings) serve as a basis for facility planning.

The Federal Aviation Administration (FAA) has a responsibility to review aviation forecasts that are submitted to the agency in conjunction with airport planning, including master plans, CFR Part 150 Studies, and environmental studies. The FAA reviews such forecasts with the objective of including them in its *Terminal Area Forecasts* (TAF) and the



National Plan of Integrated Airport Systems (NPIAS). In addition, aviation activity forecasts are an important input to the benefit-cost analyses associated with airport development, and FAA reviews these analyses when federal funding requests are submitted.

As stated in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, dated December 4, 2004, forecasts should be:

- Realistic
- Based on the latest available data
- Reflect current conditions at the airport
- Supported by information in the study



- Provide adequate justification for the airport planning and development

The forecast process for an airport master plan consists of a series of basic steps that can vary depending upon the issues to be addressed and the level of effort required to develop the forecast. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and evaluation and documentation of the results.

The following forecast analysis for Kona International Airport at Keahole was produced following these basic guidelines. Other forecasts dating back to the previous master plan were examined and compared against current and historic activity. The historical aviation activity was then examined along with other factors and trends that could affect demand. The intent is to provide an updated set of aviation demand projections for KOA that will permit the Hawaii Department of Transportation Airports Division (DOT-A) to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

This forecast effort was completed in mid-2007 using 2006 as its base year. This chapter reflects the conditions at that time as well as utilizes socioeconomic and aviation industry forecasts in effect at that time. Since that time, Aloha Airlines ceased operations.

The economic downturn and recession in the last half of 2008 has affected at least the short term outlook for aviation activity. History has shown that aviation activity is affected in the short term by events such as an airline's bankruptcy and economic hard times. Over the long term, however, traffic has generally recovered. That assumption is maintained for the purposes of this master plan.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public.

The current edition when this chapter was prepared was *FAA Aerospace Forecasts - Fiscal Years 2007-2020*, published in March 2007. The forecasts used the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses were applied to the outlook for aviation growth in international markets.

In the seven years prior to the events of September 11, 2001, the U.S. civil aviation industry experienced unprec-

edented growth in demand and profits. The impacts to the economy and aviation industry from the events of 9/11 were immediate and significant. The economic climate and aviation industry, however, has been on the recovery.

The Office of Management and Budget (OMB) expected the U.S. economy to continue to grow in terms of Gross Domestic Product (GDP) at an average annual rate of 2.9 percent through 2020. The world GDP was forecast to grow at an even faster rate of 3.1 percent over the same period. This was expected to positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming there will be no new successful terrorists incidents against either U.S. or world aviation).

U.S. airline passengers (combined domestic and international) have surpassed pre-9/11 levels and were projected to grow at an average of 3.5 percent annually through 2020. Mainline air carriers were projected to grow at 3.7 percent annually, while the regional/commuter airlines were expected to maintain a pace of 3.1 percent annually. Total international traffic to and from the U.S. was forecast to grow even faster at a 4.9 percent annual rate.

U.S. airline air cargo revenue-ton-miles (RTMs) were projected to grow at 5.3 percent annually through 2020. The number of active general aviation aircraft was expected to grow at 1.4 percent annually.

COMMERCIAL PASSENGER AIRLINES

The passenger airlines in the United States are comprised of 33 mainline carriers and 81 regional carriers. The mainline carriers are airlines that primarily use passenger jets with over 90 seats, while the regional carriers are airlines that primarily use smaller propeller and jet aircraft up to 90 seats. The mainline carriers have also emerged into two other groupings: legacy network carriers and low-cost carriers.

Legacy Network Carriers - This group includes the airlines established prior to deregulation in 1978 (e.g., Alaska Airlines, Aloha Airlines, American Airlines, Continental Airlines, Delta Airlines, Hawaiian Airlines, Northwest Airlines, United Airlines, US Airways). The legacy airlines were the most impacted by 9/11, and many are now undergoing restructuring efforts to redefine themselves in the new operating environment of the industry. These airlines operate primarily in hub-and-spoke networks and generally have higher operating costs. The legacy airlines have been downsizing and cost-cutting to become competitive with the low-cost carriers. The string of negative external events, out of the control of the airlines, made it difficult for most of the legacy carriers to achieve profitability. Many have gone through bankruptcy as part of their restructuring.

Low-Cost Carriers - This group is comprised of established low-cost carriers, new entrants, and a few restruc-

tured legacy carriers (American Trans Air, AirTran, Frontier Airlines, Jet-Blue Airways, Southwest Airlines, and Spirit Air Lines). These carriers typically operate point-to-point and have lower operating costs than their legacy counterparts. Their post-9/11 strategy has been growth in airports and city-pairs served, aircraft fleet, and longer-haul flights. The recent sharp increases in oil prices have impacted the profits of the low-cost airlines.

Regionals/Commuters - This group's operating strategy focuses around providing feeder traffic through a code-sharing arrangement with a legacy airline. Some, like ExpressJet on the mainland and Mesa Airlines in Hawaii (Go! Airlines) have attempted point-to-point service in competition with the larger carriers. Since 9/11, the regional commuters have benefited from the route restructuring and cost-cutting of the legacy network, taking over service to thinner medium-haul and long-haul markets.

While continuing to recover from 9/11, new challenges and uncertainties unfolded. A slowed economy, the Severe Acute Respiratory Syndrome (SARS) epidemic, and the war in Iraq all added to the difficulties already facing the industry.

Jet fuel prices have affected the carriers worldwide, but the impacts to the bottom line have been greatest on the U.S. airlines. A relatively strong world economy allowed the world airlines to pass on the increased fuel costs through higher fares with minimal effect. The U.S. Airlines, however, raised fares, cut capacity, and in-

creased international flying. In spite of this, the U.S. airline industry lost money for the sixth consecutive year in 2006, while the world airlines made an estimated \$3.2 billion.

Following two years of strong growth in rebounding from 9/11, the U.S. carriers' passenger demand was flat in 2006. While demand remained healthy for the regional carriers, higher fares and capacity cuts by the legacy carriers reduced mainline carrier demand. Despite flat domestic demand, international markets experienced a five to six percent growth.

Capacity and demand growth were expected to rebound in 2007, with capacity (available seat-miles or ASMs) expected to grow 2.8 percent on the premise that the legacy carrier domestic market capacity stabilizes while capacity in their international markets and the capacity of the low-cost carriers grows. In addition, regional carrier capacity was expected to grow by 3.0 percent.

As the capacity begins to grow again in 2007, revenue passenger miles (RPMs) were also forecast to increase by 3.4 percent, while enplanements grow by 3.7 percent. In 2008, growth was expected to accelerate with capacity up 4.3 percent, RPMs up 4.2 percent, and passengers up 3.4 percent.

For the remainder of the forecast period, system capacity is expected to average 4.4 percent per year. Solid economic growth and falling real yields contribute to a projection of 4.5 percent average annual growth rate through 2020 for RPMs. System pas-

sengers are projected to increase at an average of 3.5 percent per year, with the mainline carriers growing faster (3.7 percent) than regional carriers (3.0 percent). **Exhibit 2A** depicts the history and projected growth in U.S. passenger enplanements.

Load factors are expected to continue to increase from an all-time high of 79.0 percent to 80.3 percent by 2020. Growth in longer international trips and more point-to-point service on domestic routes contributes to a projected growth in average passenger trip length of more than 130 miles to 1,198.1 miles by 2020.

Domestic Market Forecast

Capacity in the domestic markets declined in 2006 with legacy carriers cuts in aircraft and shifts of other aircraft to international markets. The cuts by Chapter 11 carriers not only affected mainline capacity, but also that of their regional carrier partners. As the airlines restructure, domestic capacity is expected to rebound and grow at an annual rate of 4.0 percent, with the mainline carrier growth slightly slower at 3.8 percent and the regional carriers averaging 5.0 percent through the planning period.

RPMs are expected to average 4.1 percent growth annually, again with mainline growth slower (4.0 percent) than regional carrier growth (5.2 percent). Domestic passenger growth is expected to average 3.4 percent annually; however, mainline traffic is expected to grow faster at 3.5 percent

compared to 3.0 percent for regional carriers. While total domestic traffic exceeded pre-9/11 levels in 2005, the mainline carrier traffic is not forecast to reach pre-9/11 levels until 2009.

International Market Forecast

The FAA forecasts total international traffic (that carried by both U.S. and foreign flag carriers) for travel between the U.S. and the three world travel areas of Atlantic, Latin America, and Asia/Pacific. Total U.S. international traffic grew 2.9 percent in 2006. The 141.5 million enplanements surpassed pre-9/11 levels for the first time. World and U.S. economic growth was expected to result in a 5.2 percent passenger increase in 2007 and 5.3 percent in 2008. After that, the FAA projected an average annual increase of 4.8 percent through 2020 to a total of 274.7 million enplaned passengers.

High economic growth expected in the Asia/Pacific region lead it to the highest regional growth rate of 7.0 percent annually. U.S./Canadian transborder markets are projected to grow at 3.6 percent annually.

AIR CARGO

Air cargo traffic is comprised of freight/express and mail. Air cargo is moved either in the bellies of passenger aircraft or in dedicated all-cargo aircraft. FAA data and forecasts are presented in revenue-ton-miles (RTMs).

Air cargo activity has historically had a high correlation to Gross Domestic Product (GDP). Other factors that affect air cargo growth are real yields, improved productivity, and globalization. Ongoing trends that are and will continue to improve the air cargo market include the opportunities from open skies agreements, decreasing costs from global airline alliances, and increasing business volumes from e-commerce. At the same time, trends that could limit air cargo growth include increased use of e-mail, decreased costs of sending documents by facsimile, and increased airline costs due to environmental and security restrictions.

Before 2001, air cargo was the fastest growing sector of the aviation industry. From 1994 through 2000, total tons and RTMs grew at annual average rates of 8.0 and 8.6 percent. An economic slowdown in the U.S., combined with the collapse of the high-tech industry and a slowing of imports, resulted in declines of 5.0 percent in tons and 3.9 percent in RTMs. Traffic began to recover in 2002 and is setting new record RTMs, especially in the international market.

The FAA notes there are several structural changes that are occurring within the air cargo industry. Among them are the following:

- **Security regulations** – Security regulations put in place shortly after 9-11 shifted cargo from the passenger airlines to the all-cargo airlines. Additional regulations have been put in place since. These include requiring the carriers to con-

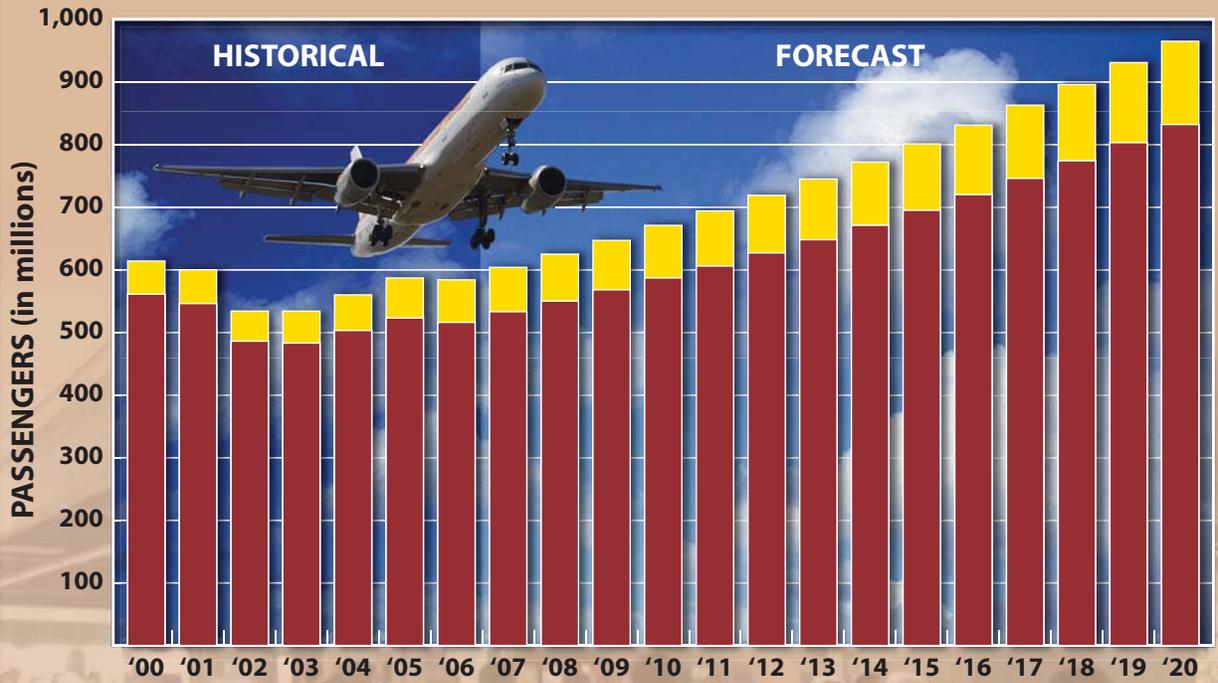
duct random inspections, codifying and strengthening the “known shipper” program, and establishing a security program specifically to all-cargo operations by aircraft over 20,000 pounds.

- **Market maturation** – The express market in the United States has matured after dramatic growth over the last two decades. This is the majority of domestic air cargo activity.
- **Modal shift** – Improved service and economics from the use of alternative modes of cargo transported by the integrated cargo carriers (e.g., FedEx, UPS, and DHL) has matured.
- **Increased USPS use of all-cargo carriers** – This initially resulted from the U.S. Postal Service’s (USPS) need to improve control over delivery. The trend has continued due to security regulations.
- **Increased use of mail substitutes** – Substitutes such as e-mail affect mail volume. The residual fear of mail because of terrorism has also been a factor.

FAA’s forecasts of air cargo RTMs are predicated on several assumptions:

- 1) Security restrictions concerning air cargo transportation will stay in place;
- 2) There will be no additional terrorist attacks in the U.S.;

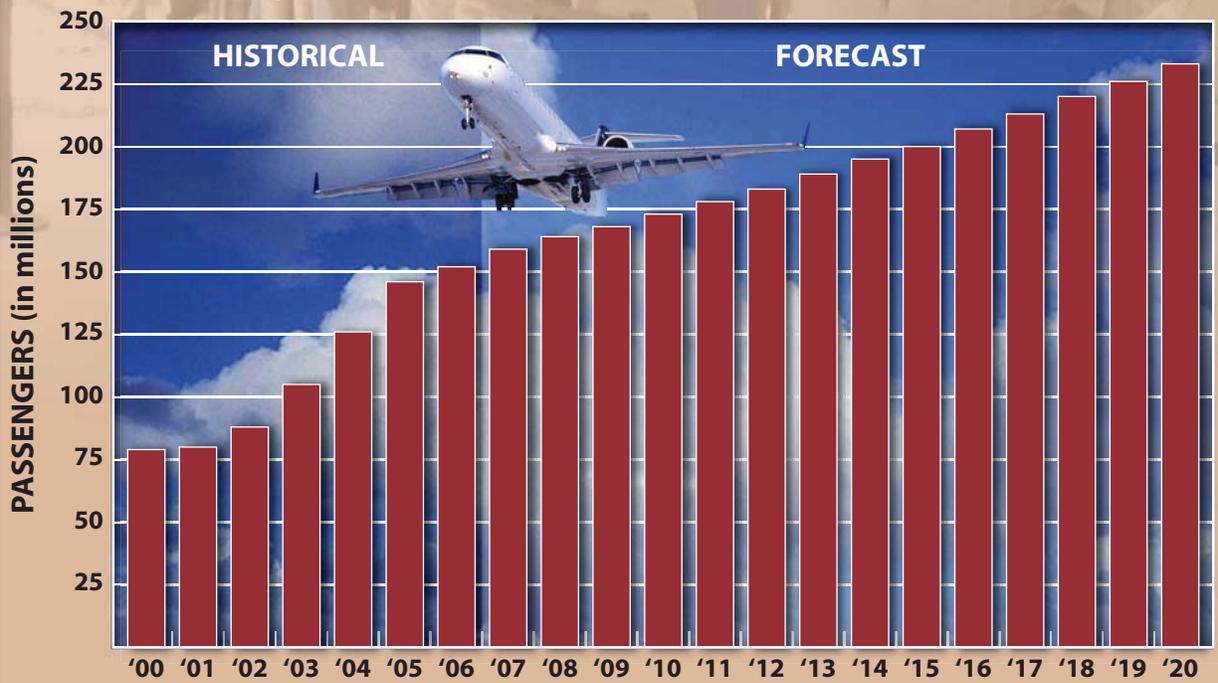
U.S. MAINLINE AIR CARRIER PASSENGER ENPLANEMENTS



Source: FAA Aerospace Forecasts, FY 2007-2020

Domestic International

U.S. REGIONAL/COMMUTER SCHEDULED PASSENGER ENPLANEMENTS



Source: FAA Aerospace Forecasts, FY 2007-2020



- 3) There will be continued domestic and international economic growth;
- 4) Most of the modal shift from air to ground has occurred; and
- 5) In the long term, cargo activity will be tied to economic growth.

The number of RTMs flown by U.S. carriers grew by 1.2 percent in 2006 to 39.7 billion. Total RTMs flown are forecast to increase 4.6 percent in 2007 and 6.1 percent in 2008. Over the following twelve years, total RTMs are projected to increase at an annual average rate of 5.2 percent. **Exhibit 2B** depicts the FAA forecasts for air cargo and mail.

Domestic cargo RTMs decreased 2.4 percent in 2006, to 15.7 billion. This followed a 1.6 percent decline in 2005, and was primarily due to the modal shift from air to ground and the impact of jet fuel surcharges. Domestic RTMs are projected to increase 2.7 percent in 2007 and 4.7 percent in 2008. From 2008 through 2020, growth is expected to average 3.3 percent annually, based upon projected U.S. economic growth.

Between 1997 and 2006, the all-cargo carrier percentage of U.S. domestic RTMs grew from 65.4 percent to 79.4 percent. Significant growth in express service coupled with combined higher passenger load factors leaving less room for belly cargo were key factors in this shift. The October 2001 FAA security directive that strengthened security standards for cargo on passenger flights also impacted belly freight. By 2020, this share is pro-

jected to increase to 83.6 percent based upon increases in wide-body capacity for all-cargo carriers and security considerations.

International RTMs flown by U.S. carriers grew to 24.0 billion in 2006, a 3.7 percent increase over the previous year. The FAA forecasts a 5.9 percent increase in 2007, and a 7.0 percent increase in 2008, followed by an average annual increase of 6.3 percent through 2020. The all-cargo carriers' percentage of the international market is projected to increase from 65.5 percent in 2006, to 69.7 percent by 2020, due to increased capacity.

The all-cargo large jet aircraft fleet is expected to grow from 997 in 2006, to 1,468 by 2020. Narrow-body aircraft in the fleet are projected to decline by four aircraft per year over this period. Meanwhile, wide-body aircraft are projected to increase by more than 37 aircraft annually.

GENERAL AVIATION

Following more than a decade of decline, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act* in 1994, which limits the liability on general aviation aircraft to 18 years from the date of manufacture. This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry. The high cost of product liability insurance had been a major factor in the decision by many American aircraft manufacturers to

slow or discontinue the production of general aviation aircraft.

The sustained growth in the general aviation industry slowed considerably in 2001, negatively impacted by the events of September 11. Thousands of general aviation aircraft were grounded for weeks due to no-fly zone restrictions imposed on operations of aircraft in security-sensitive areas. This, in addition to the economic recession that began in early 2001, had a negative impact on the general aviation industry. General aviation shipments by U.S. manufacturers declined for three straight years from 2001 through 2003.

Stimulated by an expanding U.S. economy as well as accelerated depreciation allowances for operators of new aircraft, general aviation staged a relatively strong recovery with over ten percent growth in each of the last three years.

Resilience being demonstrated in the piston aircraft market offers hope that the new aircraft models are attracting interest in the low-end market of general aviation. The introduction of new, light sport aircraft is expected to provide further stimulation in the coming years.

New models of business jets are also stimulating interest for the high-end of the market. The FAA still expects the business segment to expand at a faster rate than personal/sport flying. Safety and security concerns combined with increased processing time at commercial terminals make business/corporate flying an attractive alternative. In addition, the bonus de-

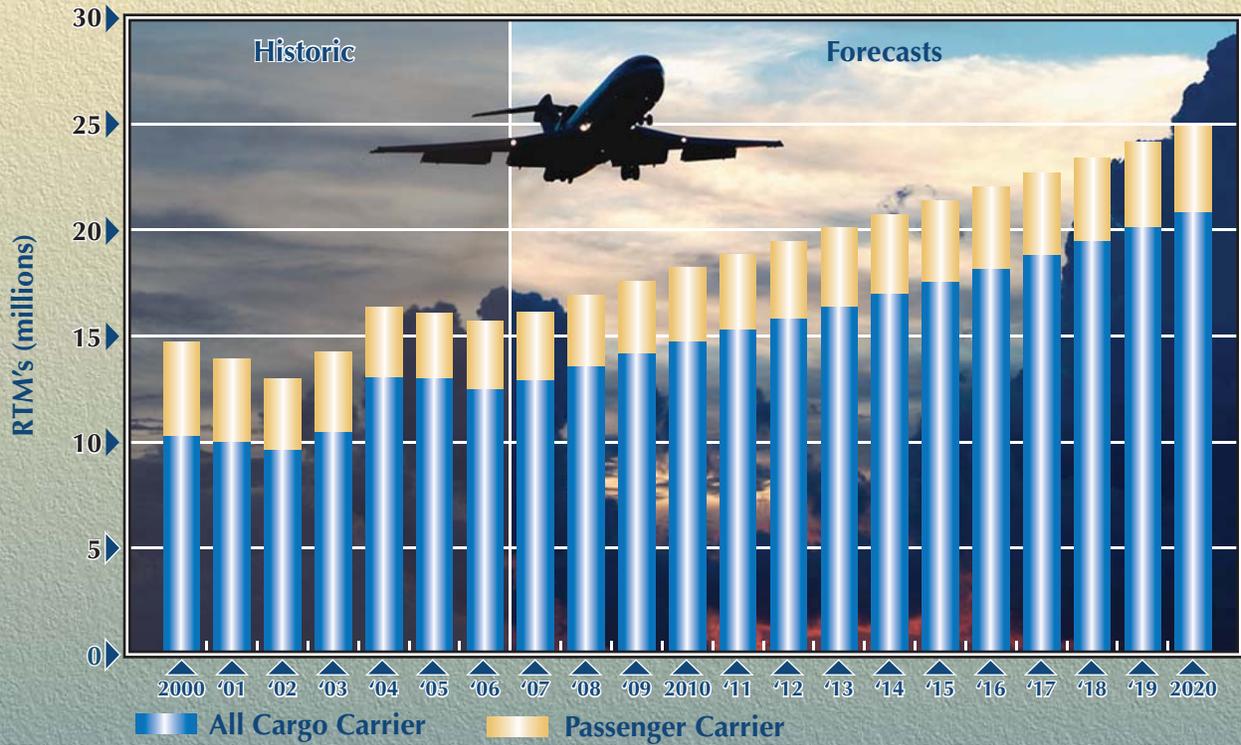
preciation provision of the President's economic stimulation package began to help business jet sales late in 2004.

In 2006, there were an estimated 226,422 active general aviation aircraft in the United States. **Exhibit 2C** depicts the FAA forecast for active general aviation aircraft. The FAA projects an average annual increase of 1.4 percent through 2020, resulting in 274,914 active aircraft. Piston-powered aircraft are expected to grow at an average annual rate of 0.4 percent. This is driven primarily by a 5.7 percent annual increase in piston-powered rotorcraft and growth in experimental and sport aircraft, as single engine fixed wing piston are projected to increase at just 0.3 percent annually, and multi-engine fixed wing piston aircraft are projected to decrease by 0.2 percent per year. This is due, in part, to declining numbers of multi-engine piston aircraft, and the attrition of approximately 1,500 older piston aircraft annually. In addition, it is expected that the new, light sport aircraft and the relatively inexpensive microjets will dilute or weaken the replacement market for piston aircraft.

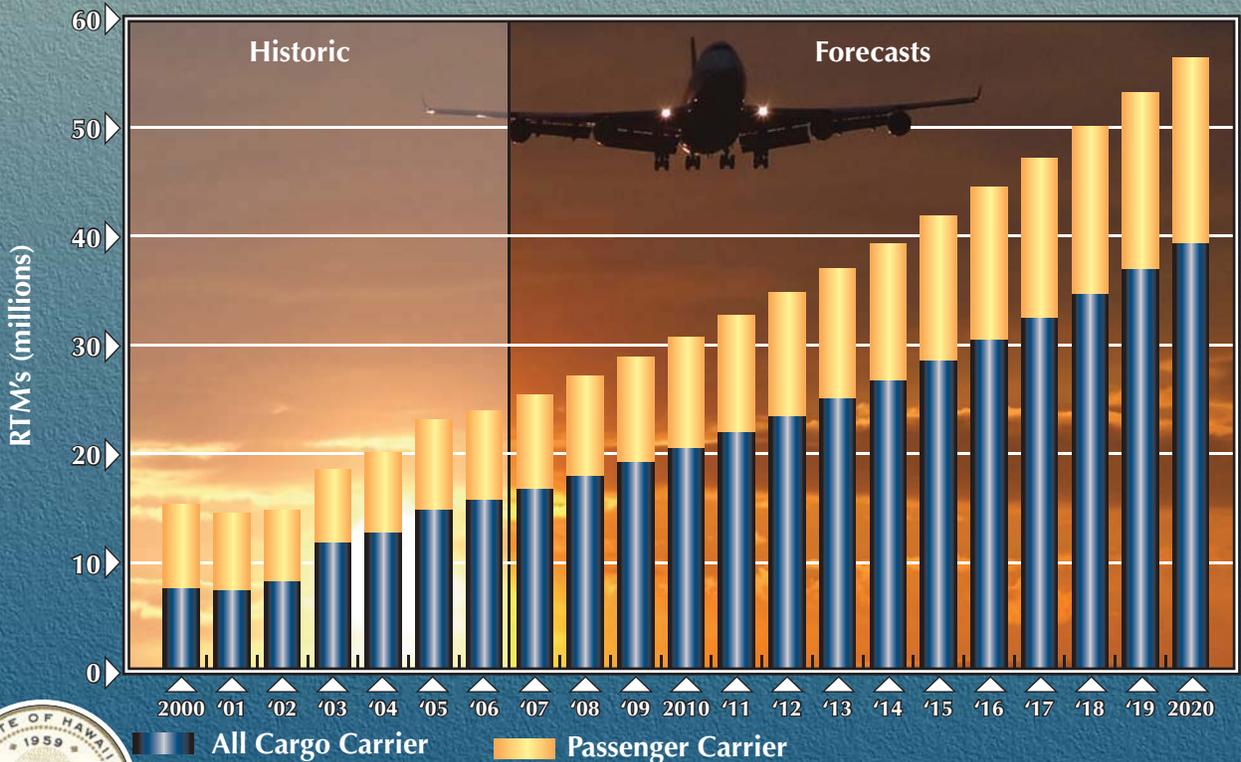
Owners of ultralight aircraft could begin registering their aircraft as "light sport" aircraft in 2005. The FAA estimates there will be a registration of 5,600 aircraft by 2010, and then grow to 13,200 aircraft by 2020.

Turbine-powered aircraft (turboprop and jet) are expected to grow at an average annual rate of 3.6 percent over the forecast period. Even more significantly, the jet portion of this fleet is expected to double in size in 12 years, with an average annual growth rate of

DOMESTIC AIR CARGO REVENUE TON MILES (RTM's) U.S. COMMERCIAL CARRIER

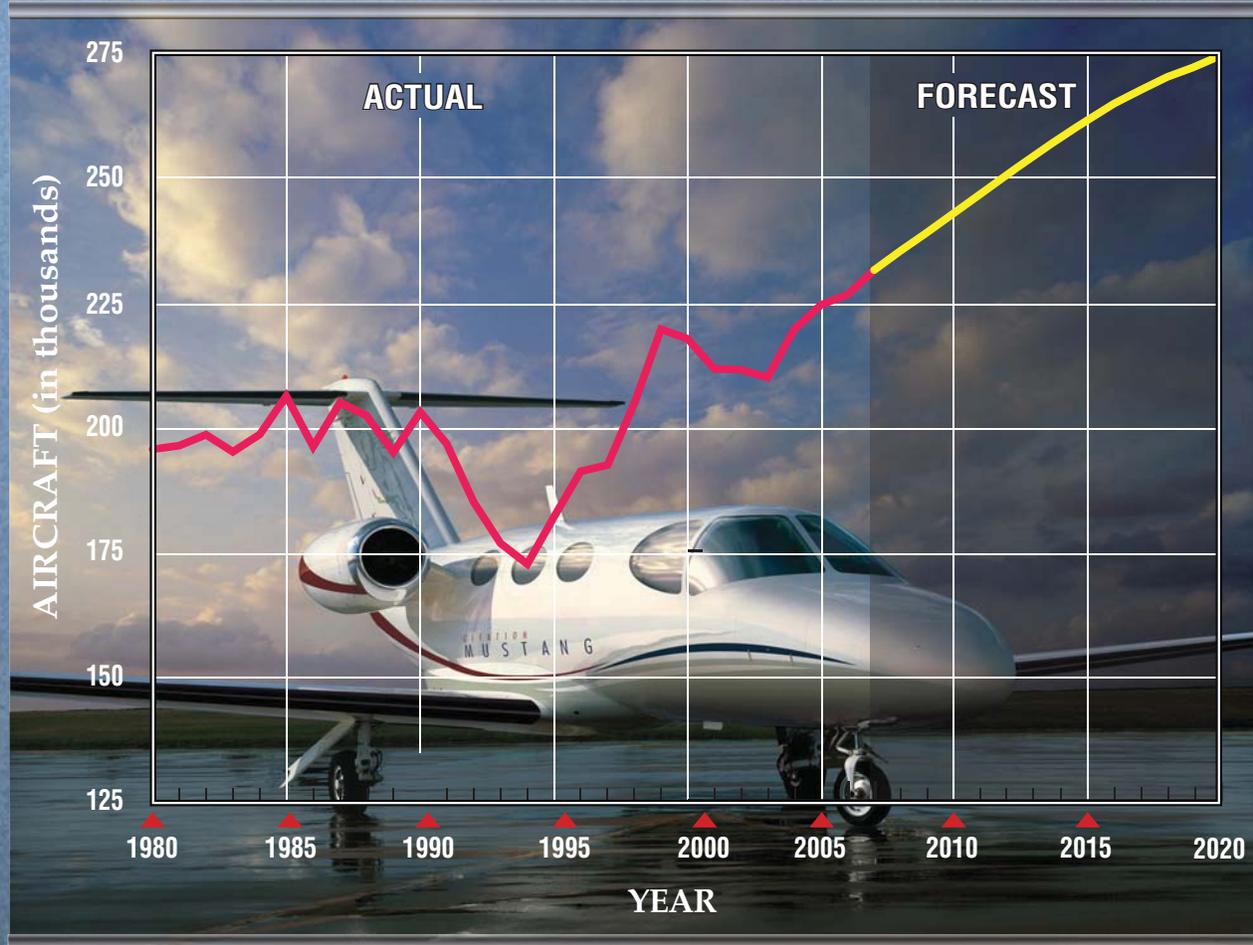


INTERNATIONAL AIR CARGO REVENUE TON MILES (RTM's) U.S. COMMERCIAL CARRIER



Source: FAA Aerospace Forecasts, Fiscal Years 2007-2020
Domestic figures prior to 2003 exclude Airborne Express Inc.

U.S. ACTIVE GENERAL AVIATION AIRCRAFT



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

Year	FIXED WING				ROTORCRAFT			Sport Aircraft	Other	Total
	PISTON		TURBINE		Piston	Turbine	Experimental			
	Single Engine	Multi-Engine	Turboprop	Turbojet						
2006 (Est.)	148.2	19.4	8.0	10.0	3.4	5.9	24.5	0.4	6.6	226.4
2010	150.4	19.2	8.2	13.4	4.8	6.5	27.7	5.6	6.8	242.8
2015	154.0	19.0	8.5	18.0	6.3	7.2	31.1	10.5	6.7	261.4
2020	155.6	18.8	8.8	22.8	7.4	7.9	33.9	13.2	6.6	274.9

Source: FAA Aerospace Forecasts, Fiscal Years 2007-2020.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.



6.0 percent. The total number of jets in the general aviation fleet is projected to grow from 10,032 in 2006, to 22,797 by 2020.

At the October 2006 workshop sponsored by the FAA and the Transportation Research Board, industry experts suggested that the market for the new, very light jet (VLJ), or microjet aircraft, could add 500 more aircraft a year to the fleet by 2010. These twin-engine jets are expected to be priced between \$1 million and \$2 million, and are believed to have the potential to redefine business jet flying with the capability to support a true on-demand air taxi business service. The FAA forecast assumes that microjets will begin to enter the active fleet in 2007, with 350 new aircraft. After this year's introduction, they are forecast to grow by 400 to 500 aircraft per year, contributing a total of 6,300 aircraft to the jet forecast by 2020.

SOCIOECONOMIC TRENDS

Local and regional forecasts developed for key socioeconomic variables provide an indicator of the potential for creating growth in aviation activities at an airport. Typical variables used in evaluating potential for traffic growth include population and employment. This data is readily available on an annual historic basis at the state and county level.

In Hawaii, the tourism and visitor industry plays a key factor in passenger traffic as well. As a result, the Research and Economic Analysis Division of the State of Hawaii Depart-

ment of Business, Economic Development, and Tourism (DBEDT) maintains data on both mainland and international visitors to the island. The DBEDT also prepares and regularly updates projections of visitors as well as population and other economic statistics. The most recent update was in August 2004 and provided projections on a state and county basis through 2030. **Tables 2A** and **2B** as well as **Exhibit 2D** depict historic and forecast numbers of key factors for the state and Hawaii County. These include civilian employment, per capita personal income, visitors by air, the average daily visitor census, population, and de facto population.

Civilian employment in Hawaii has grown at an annual average rate of 1.4 percent over the last twenty years. The DBEDT forecast that statewide civilian employment would grow at 0.8 percent annually through 2030. Hawaii County's civilian employment comprised 10.2 percent of the state employment in 1985. Averaging nearly 2.2 percent growth per year, the county now comprises 11.9 percent of the statewide civilian employment. The DBEDT forecasts employment in the county to grow at 1.2 percent in the future. This would result in 12.6 percent of the state's civilian employment in Hawaii County by 2030. As presented on **Table 2A** and **Exhibit 2D**, state and county employment appears to continue to trend along with the 2004 DBEDT forecasts.

Per capita personal income (PCPI) for the state and county is also presented on **Table 2A** and **Exhibit 2D** and are inflation-adjusted to year 2000 dollars.

Inflation-adjusted PCPI for the state has been growing at an annual average of 0.96 percent over the last twenty

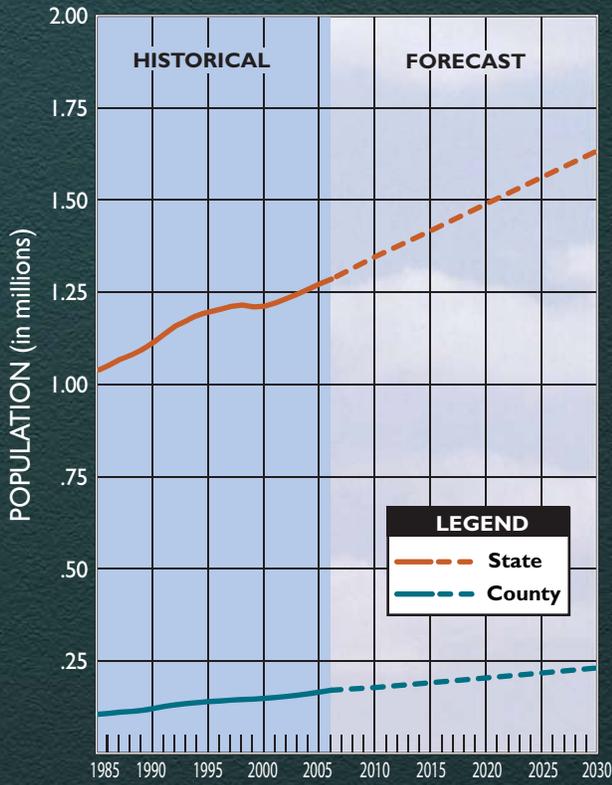
years. The DBEDT projects future growth at 1.6 percent annually.

TABLE 2A						
Socioeconomic Trends and Projections						
Hawaii County						
	Visitors by Air		Civilian Employment		Per Capita Income (2000\$)	
	State	County	State	County	State	County
ACTUAL						
1985	4,843,414	NA	452,000	46,150	\$25,107	\$18,760
1986	5,569,067	NA	468,050	47,500	\$25,730	\$19,460
1987	5,770,585	NA	494,000	50,950	\$26,098	\$19,392
1988	6,101,483	NA	501,750	52,200	\$27,178	\$19,990
1989	6,488,422	NA	511,000	54,700	\$28,498	\$21,317
1990	6,723,531	1,127,373	527,000	55,200	\$29,230	\$21,669
1991	6,518,460	1,111,035	557,750	60,900	\$28,947	\$21,534
1992	6,473,669	1,139,978	557,400	60,050	\$29,572	\$21,456
1993	6,070,995	1,117,656	560,850	60,400	\$29,262	\$21,335
1994	6,364,674	1,079,535	545,000	58,300	\$28,790	\$21,071
1995	6,546,759	1,081,047	542,650	57,600	\$28,252	\$20,526
1996	6,723,141	1,163,700	555,700	60,550	\$27,465	\$20,310
1997	6,761,135	1,205,081	558,550	61,950	\$27,453	\$20,010
1998	6,595,790	1,340,767	559,750	62,050	\$27,607	\$20,757
1999	6,741,037	1,307,720	559,550	63,350	\$27,879	\$21,007
2000	6,948,594	1,267,965	566,100	65,000	\$28,422	\$21,410
2001	6,303,790	1,181,551	564,200	65,950	\$27,963	\$21,631
2002	6,389,058	1,243,313	557,400	66,150	\$28,229	\$22,101
2003	6,380,439	1,207,164	NA	NA	\$28,427	\$22,072
2004	6,912,094	1,281,156	NA	NA	\$29,773	\$23,111
2005	7,416,574	1,521,536	593,376	70,643	\$30,410	\$23,446
2006	7,414,613	1,590,495	NA	NA	NA	NA
DBEDT 2030 Series, August 2004						
2010	7,810,000	1,420,000	621,451	74,863	\$33,339	\$25,084
2015	8,620,000	1,570,000	647,372	78,954	\$35,940	\$27,382
2020	9,290,000	1,700,000	672,912	83,045	\$38,780	\$30,142
2025	10,010,000	1,830,000	698,967	87,275	\$41,823	\$32,846
2030	10,780,000	1,980,000	725,838	91,726	\$44,906	\$35,215
Source: Population and Economic Projections for the State of Hawaii to 2030, DBEDT 2030 Series; Research and Economic Analysis Division – Department, Department of Business, Economic Development and Tourism; August 2004						

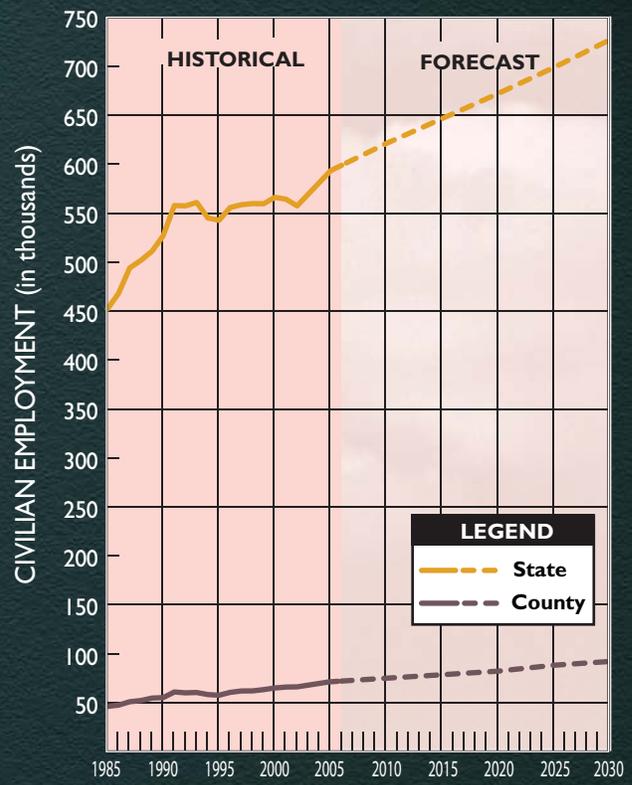
Hawaii County inflation-adjusted PCPI has grown at an average of 1.12 percent annually over the last twenty years. The DBEDT forecasts future growth at 1.7 percent annually.

Annual visitors by air to the state grew dramatically in the late 1980s from 4.84 million in 1985 to 6.72 million in 1990, for an increase of 39 percent. Since 1990, however, statewide visitor growth has totaled just over 10

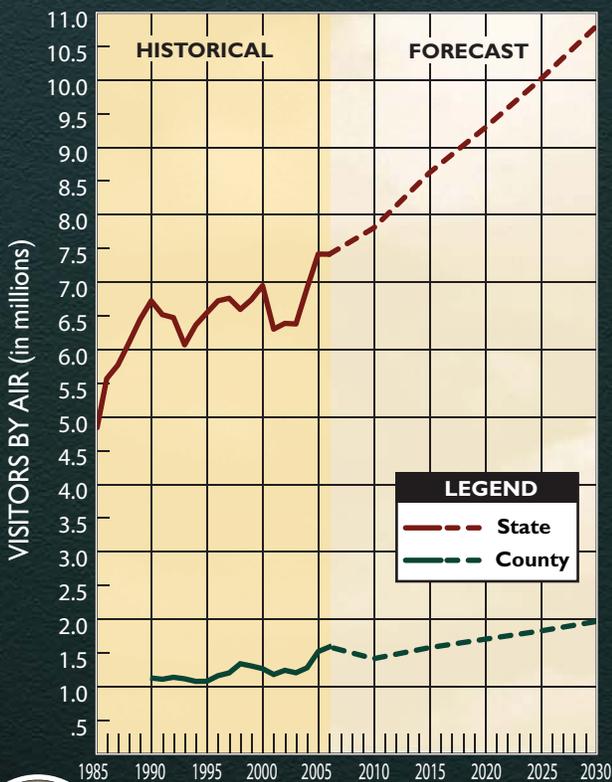
POPULATION



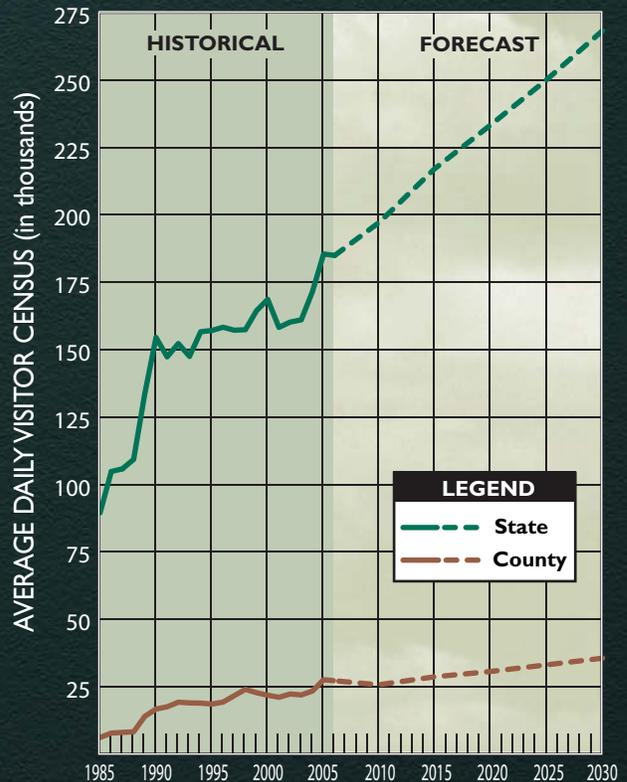
CIVILIAN EMPLOYMENT



VISITORS BY AIR



AVERAGE DAILY VISITOR CENSUS



Source: Population and Economic Projections for the State of Hawaii to 2030, DBEDT Series 2030; August 2004.



percent. The DBEDT projects a future annual growth rate of 1.5 percent for 10.78 million by 2030. After statewide

air visitor growth slowed in 2006, the DBEDT forecasts appear to continue to reflect the statewide trend.

TABLE 2B						
Population and Visitor Trends and Projections						
Hawaii County						
	Population		Average Daily Visitor Census		De Facto Population	
	State	County	State	County	State	County
ACTUAL						
1985	1,039,698	105,900	89,515	6,167	1,136,160	112,343
1986	1,051,762	108,362	104,787	7,781	1,165,826	116,451
1987	1,067,917	111,735	105,787	8,044	1,185,394	120,289
1988	1,079,827	113,439	109,290	8,262	1,198,637	122,038
1989	1,094,588	116,585	133,664	13,991	1,234,640	131,153
1990	1,113,491	121,572	154,516	16,698	1,240,013	137,103
1991	1,136,754	127,266	147,323	17,535	1,252,265	141,240
1992	1,158,613	131,630	152,249	19,245	1,271,662	146,421
1993	1,172,838	135,085	147,498	18,974	1,267,849	148,014
1994	1,187,536	137,713	156,630	18,902	1,289,804	150,311
1995	1,196,854	140,492	157,098	18,547	1,298,096	152,482
1996	1,203,755	141,935	158,297	19,285	1,303,915	154,364
1997	1,211,640	144,445	157,188	21,656	1,327,930	161,225
1998	1,215,233	145,833	157,389	23,993	1,334,125	165,205
1999	1,210,300	146,970	164,439	22,736	1,332,442	164,570
2000	1,212,113	149,243	168,637	21,831	1,334,599	166,428
2001	1,221,419	151,538	158,247	21,064	1,333,100	167,979
2002	1,233,249	154,348	160,195	22,277	1,346,687	171,556
2003	1,245,606	157,801	161,048	21,934	1,353,207	174,042
2004	1,259,299	161,798	171,481	23,376	1,373,299	179,053
2005	1,273,278	166,461	185,445	27,579	1,393,049	186,836
2006	1,285,498	171,191	184,930	28,011	1,407,616	191,733
PROJECTIONS						
<i>DBEDT 2030 Series, August 2004</i>						
2005	1,277,950	163,000			1,406,650	180,800
2010	1,346,600	176,750	196,849	25,479	1,490,500	196,500
2015	1,418,650	190,300	216,849	28,219	1,579,400	212,250
2020	1,489,500	203,050	233,288	30,411	1,663,450	226,800
2025	1,560,400	216,150	249,863	32,740	1,748,600	241,800
2030	1,630,450	229,700	268,082	35,479	1,834,200	257,700
<i>Updated Time-Series County Projections, Coffman Associates, August 2006</i>						
2010		180,736		29,117		203,421
2015		195,409		32,777		220,946
2020		210,083		36,438		238,472
2025		224,757		40,098		255,997
2030		239,430		43,759		273,523
Source: Population and Economic Projections for the State of Hawaii to 2030, DBEDT 2030 Series; Research and Economic Analysis Division – Department of Business, Economic Development and Tourism; August 2004						

In contrast, visitors to the Big Island have increased 41 percent since 1990. The DBEDT forecast a 1.7 percent average annual growth rate for Hawaii County annual visitors by air. That forecast, however, used a base year prior to 2004. Since 2004 alone, visitors to the Big Island have increased by 24 percent, and the 1.59 million visitors in 2006 exceed the 1.57 million forecast for 2015. This growing disparity is graphically depicted on **Exhibit 2D**.

As with visitors by air, the average daily visitor census for the state also increased 39 percent between 1985 and 1990, but has increased a total of 20 percent since then. The statewide visitor census was forecast by DBEDT to grow at a 1.5 percent average annual rate through 2030. As shown on **Table 2B** and **Exhibit 2D**, statewide growth is still trending with the DBEDT forecast.

The Hawaii County visitor census was forecast to grow at a 1.8 percent annual rate. As with the annual visitors, the average daily visitor census on the Big Island has increased dramatically since 2003. The actual figures for 2006 have reached the level DBEDT forecast for 2015.

Since 1985, the state population has been growing at an annual average rate of 1.0 percent per year. The DBEDT projects the state population to continue to grow at a similar rate through 2030. As shown on **Table 2B** and **Exhibit 2D**, the state's population is following closely the 2004 DBEDT forecast.

By comparison, the population of Hawaii County has grown at an annual average rate of 2.3 percent over the past 21 years. Subsequently, the percentage of the state's population on the Big Island has grown from 8.3 percent in 1985 to an estimated 13.3 percent in 2006. The county's population was forecast to grow at an average annual rate of 1.3 percent through 2030. Based upon this forecast, Hawaii County would comprise 14.1 percent of the state's population by 2030.

A review of the county population since 2003 indicates that it has grown nearly 8.5 percent (13,390 residents) and is exceeding the forecast trend.

Table 2B also examines the de facto population of the state and county. De facto population is defined as the number of persons physically present in an area, regardless of military status or usual place of residence. It includes persons present, but excludes residents temporarily absent, both calculated as an average daily census.

De facto population is important in examining the socioeconomics of Hawaii and each island. Not only are there short term visitors, but there are a growing number of second homes. The second home, or nonresident housing market on the Big Island has grown significantly over the past two decades. This is illustrated in the following nonresident housing data collected by the U.S. Census Bureau.

- 1980 – 1,114 units
- 1990 – 2,045 units
- 2000 – 5,101 units

DBEDT also forecast de facto population for the state and each county in its 2030 series forecasts in 2004. As with resident population and the daily visitor census, the recent state de facto population data is still in line with the DBEDT forecasts. Hawaii County, however, is growing faster than previously forecast.

From each of the socioeconomic indicators, it is clear that economic growth on the Big Island has been and is forecast to continue to increase at a faster rate than the state as a whole.

Because of the growing disparity between the actual and projected growth in county resident and de facto population as well as visitors, an updated projection was examined for each.

Table 2B presents updated county projections for population, average daily visitor census, and de facto population based upon a time-series analysis of annual data on each category since 1970. A correlation coefficient (Pearson's "r") measures the association between changes in the dependent variable and the independent variable(s) (calendar years). An r^2 greater than 0.90 indicates good predictive reliability. A value below 0.90 may be used with the understanding that the predictive reliability is lower.

The r^2 for the population time-series was very strong at 0.996. The resulting forecast, shown at the bottom of **Table 2B**, represents an annual average growth rate of 1.4 percent.

The r^2 for the daily visitor census time-series was not as strong but also good at 0.910. This resulting updated projection of **Table 2B** would represent an average annual visitor growth rate of 1.8 percent through 2030.

For de facto population, the times series correlation was again strong at 0.974. This updated projection reflects and average annual growth rate of 1.5 percent.

While the Big Island demographics are growing faster than that of the state as a whole, the west side of the island is growing even faster. **Table 2C** presents the population data and forecasts for the west coast districts as included in the *2005 Hawaii County General Plan*. The share of the county population in the four west coast districts of North and South Kohala and North and South Kona grew from less than 30 percent in 1980 to 36 percent in 1990. The west coast share of the population grew another two percent over the next decade, and was forecast to comprise 42.3 percent of the county's population by 2020. Although specific data was not available, much of the nonresident housing that has developed on the island is on the west side as well. There are also several new developments in various stages of permitting that will contribute to the continuance of this growth in both resident and de facto population.

	1980	1990	2000	2010	2020
County Population	92,053	120,317	148,677	176,938	217,718
West Coast Districts					
North Kohala	3,249	4,291	6,038	7,917	11,273
South Kohala	4,607	9,140	13,131	18,184	24,426
North Kona	13,478	22,284	28,543	34,024	42,275
South Kona	5,914	7,658	8,589	11,414	14,092
West District Total	27,248	43,373	56,301	71,539	92,066
Percent of County	29.6%	36.0%	37.9%	40.4%	42.3%

Source: Hawaii County General Plan, 2005

STATEWIDE PASSENGER FORECASTS

The last statewide update of aviation demand forecasts were prepared for the DOT-A in 2004. These were based on activity statistics through 2002 as well as the previous DBEDT socio-economic projections (2025 Series Projections) published in February 2000. In general, the 2004 DBEDT projections discussed in the previous section are more optimistic than the preceding forecasts.

The DOT-A forecasts were prepared based upon a series of regression analyses both statewide and for individual counties. A linear regression of historic passenger versus population and

visitor data was found to have a good correlation and was used to prepare the passenger forecast. **Exhibit 2E** graphically presents the resulting forecast for statewide passenger growth.

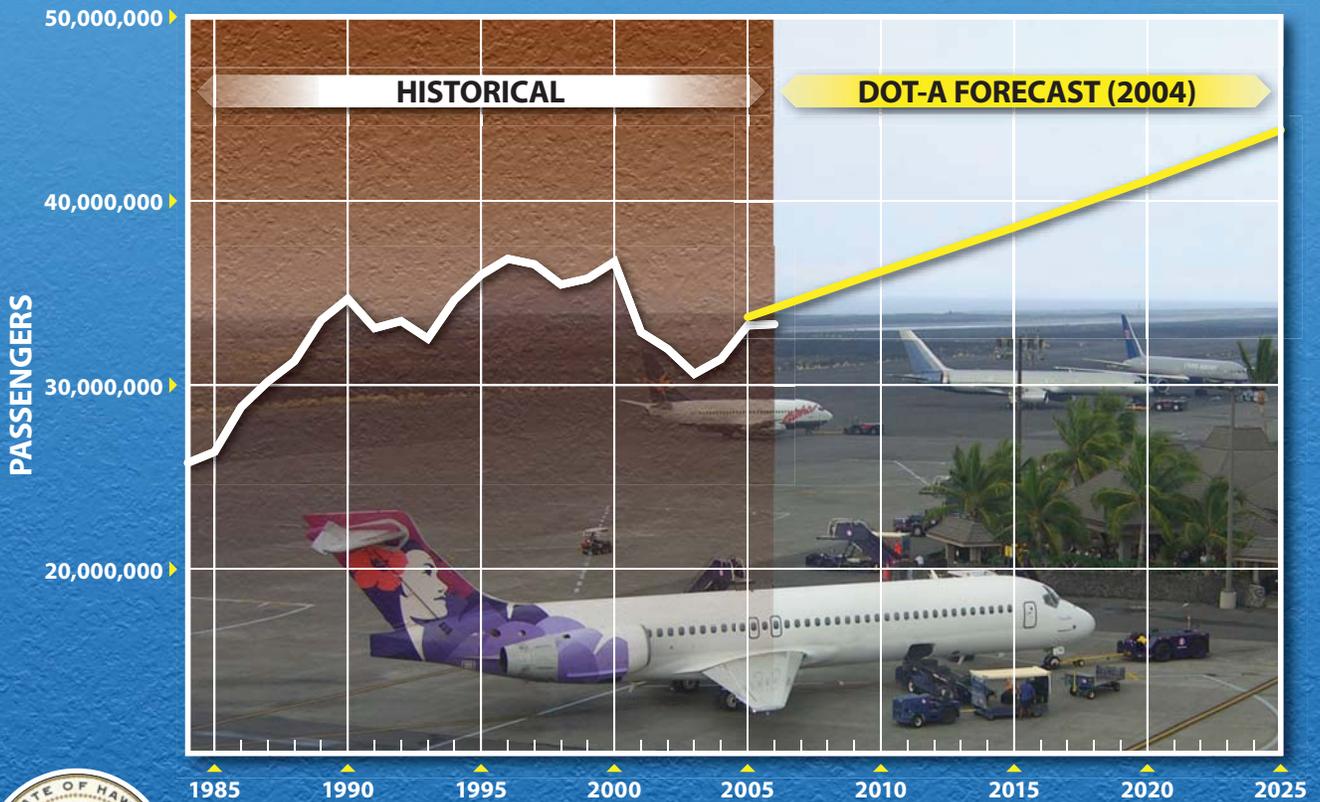
As indicated on **Table 2D**, passengers (excluding transits) were forecast to grow at an average annual rate of 1.4 percent from 32.0 million in 2002 to 43.9 million by 2025. Hawaii County passengers were forecast to grow the fastest at 1.7 percent annually, from 4.0 million in 2002 to 5.8 million in 2025. The Hawaii County share of the state's passengers was forecast to grow from 12.5 percent in 2002 to 13.2 percent by 2025.

	Actual		Forecast			
	2002	2005	2005	2010	2015	2025
Total Passengers						
Statewide	31,959,439	33,230,288	33,703,500	36,166,300	38,561,300	43,848,600
Hawaii County	4,006,465	4,265,261	4,244,200	4,615,600	4,982,800	5,802,800
County Percentage of State	12.5%	12.8%	12.6%	12.8%	12.9%	13.2%
County Airport Passengers						
Kona International	2,601,739	2,959,727	2,793,400	3,064,500	3,344,400	3,974,900
Hilo International	1,401,664	1,300,736	1,447,300	1,547,300	1,634,400	1,823,400
Waimea-Kohala	3,062	4,798	3,500	3,800	4,000	4,500

Source: Hawaii Aviation Demand Forecasts Update; Hawaii DOT-A; 2004.



STATEWIDE AIRPORT SYSTEM PASSENGER FORECAST



Source: Hawaii Aviation Demand Forecasts Update; State of Hawaii Department of Transportation Airports Division, 2004.



A review of the forecasts to date reveals The DOT-A statewide passenger forecast for 2005 was 33.7 million. The actual total in 2005 of 33.2 million was slightly behind, but still compared favorably with the forecast. Passenger levels in 2006 were 33.3 million.

The table also compares Hawaii County passengers. Comprised primarily of those using KOA and Hilo International Airport (ITO), county passengers were forecast at 4.24 million for 2005. This compares very favorably with the actual total of 4.26 million in 2005. If broken down by airport, however, the 2005 figures reveal that ITO actual passengers of 1.3 million were behind the DOT-A forecast of 1.45 million. Meanwhile, the KOA 2005 passenger total of 2.96 million was ahead of the 2.79 million forecast for that year. The following section will examine the passenger activity and forecasts for Kona International Airport at Keahole in more detail.

AIRLINE ACTIVITY FORECASTS

To determine the types and sizes of facilities necessary to properly accommodate present and future airline activity at any airport, two basic elements must be forecast: annual passengers and annual aircraft operations. Annual passengers serve as the most basic indicator of demand for commercial service activity. From a forecast of annual passengers, operations and other activity descriptors can be projected based upon behavioral factors characteristic of Kona International Airport at Keahole or the airline industry as a whole.

AIR SERVICE HISTORY

Table 2E and **Exhibit 2F** provide a review of the history of passenger traffic at KOA back to its opening in 1970. Over the past 36 years, KOA has seen its passenger activity grow from 508,681 in 1970, to an all-time high of 3,033,212 in 2006. The average annual growth rate over the 36-year period has been 5.1 percent, but the table and graph show how traffic has fluctuated on an annual basis.

Year	Kona Passengers	% Change
1970	508,681	NA
1971	515,378	1.3%
1972	635,914	23.4%
1973	728,200	14.5%
1974	808,970	11.1%
1975	865,961	7.0%
1976	1,294,556	49.5%
1977	1,106,257	-14.5%
1978	1,253,379	13.3%
1979	1,278,712	2.0%
1980	1,118,413	-12.5%
1981	1,057,881	-5.4%
1982	1,150,618	8.8%
1983	1,227,799	6.7%
1984	1,427,432	16.3%
1985	1,485,813	4.1%
1986	1,691,342	13.8%
1987	1,803,590	6.6%
1988	1,823,549	1.1%
1989	2,097,931	15.0%
1990	2,178,696	3.8%
1991	2,118,777	-2.8%
1992	2,161,936	2.0%
1993	2,179,062	0.8%
1994	2,238,583	2.7%
1995	2,303,455	2.9%
1996	2,524,402	9.6%
1997	2,628,157	4.1%
1998	2,652,955	0.9%
1999	2,668,182	0.6%
2000	2,842,097	6.5%
2001	2,640,318	-7.1%
2002	2,601,739	-1.5%
2003	2,542,566	-2.3%
2004	2,653,562	4.4%
2005	2,959,727	11.5%
2006	3,033,212	2.5%

Source: Hawaii Department of Transportation - Airports Division

Traffic has declined from the previous year just seven times since 1970. The only consecutive year declines were in 1980-81 following deregulation and in 2001-03 in the aftermath of 9/11.

As can be seen from the exhibit, the first several years after the airport opened comprised a period of strong growth as passenger traffic increased 150 percent. The largest single-year increase in the airport's history occurred in 1976, when traffic jumped 49.5 percent to exceed one million passengers for the first time. This was followed the next year by the largest single-year decline of 14.5 percent.

The 1970s ended with deregulation of the airline industry. The two-year period of decline immediately followed in the early 1980s as a prolonged national recession and rising fuel prices combined with the initial uncertainties of deregulation to affect traffic throughout the airline industry. As the airlines became more acclimated to their deregulated environment, traffic responded to the economic recovery and grew very strongly through the remainder of the decade. A major change at KOA resulting from deregulation was the introduction of direct mainland flights in 1983 by United Airlines. The runway was extended to 9,500 feet and the terminal expanded in 1988. The next year, passengers eclipsed the 2.0 million mark for the first time in 1989. As the 1990s began, traffic had more than doubled since 1981.

The economic recession in the early 1990s resulted in a 2.8 percent decline in passengers in 1991. Another decade of growth began the next year.

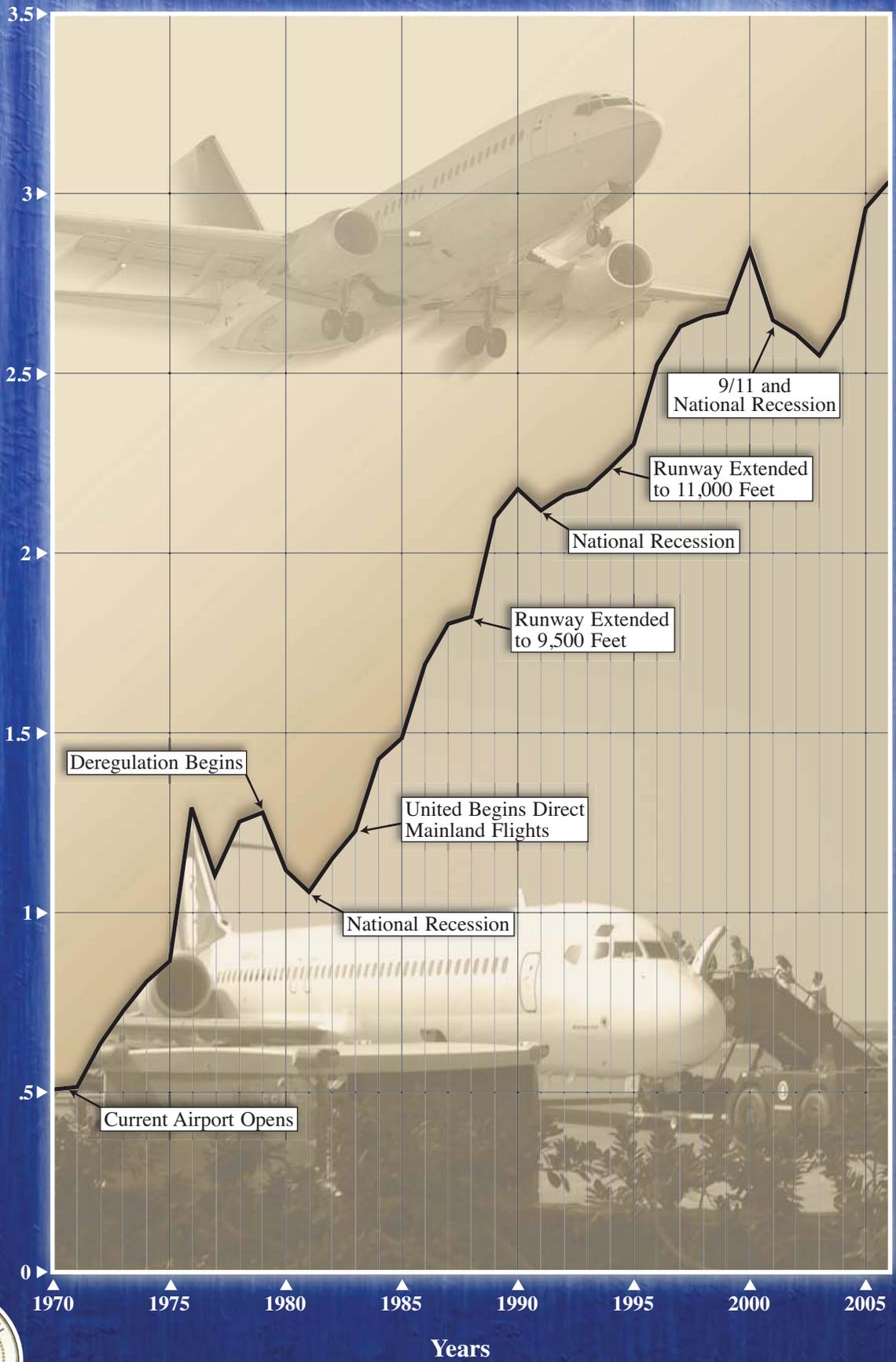
Each year from 1993 through 2000, new all-time highs in passenger traffic were set at the airport, culminating in 2.84 million passengers to begin the new millennium. The extension of the runway in 1994 to its current length of 11,000 feet opened the airport to more direct overseas flights by widebody aircraft.

A national recession began in March of 2001, which on its own, likely would have slowed passenger growth for that year. The events of September 11, 2001 had an immediate impact on traffic in the last quarter of the year. The impact to air travel, however, was prolonged, and KOA passenger traffic continued to decline through 2003.

Positive growth returned in 2004, but it was not until 2005 that traffic finally exceeded the levels experienced in 2000, as traffic increased by 11.5 percent from 2004. In 2006, the airport surpassed the 3.0 million passenger level for the first time with an all-time high of 3,033,212.

Over the years, the airport has grown from supporting only interisland flights to both mainland and international flights. **Exhibit 2G** depicts the non-stop destinations served from KOA during the peak month of August 2006. There were 58 daily flights from KOA according to the August 18, 2006 schedule. In addition to three interisland destinations, seven U.S. mainland destinations were served non-stop. International service to and from Narita, Japan is available as well. During the winter months, there is also international traffic from Canada.

Kona Passengers (in millions)



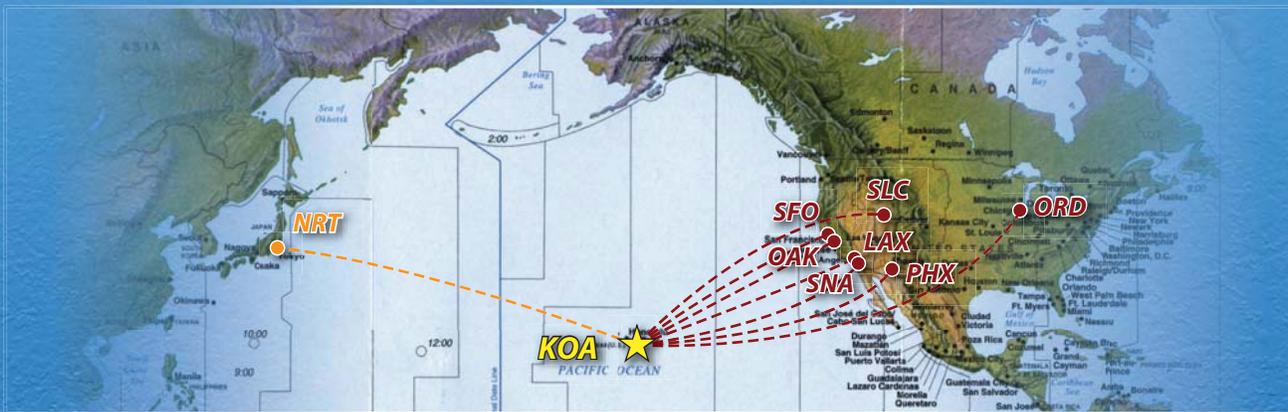
KOA NON-STOP FLIGHTS BY DESTINATIONS (August 2006)



INTERISLAND DESTINATIONS

- Hilo (ITO)
- Honolulu (HNL)
- Kahului (OGG)
- Kapalua (JHM)

Kona International Airport at Keahole (KOA)



INTERNATIONAL DESTINATIONS

- Narita, Japan (NRT)

MAINLAND DESTINATIONS

- Chicago, Illinois (ORD)
- Los Angeles, California (LAX)
- Oakland, California (OAK)
- Phoenix, Arizona (PHX)
- Salt Lake City, Utah (SLC)
- Santa Ana, California (SNA)
- San Francisco, California (SFO)



PASSENGER FORECASTS

As discussed in this chapter's introduction, the first steps involved in updating an airport's forecasts include reviewing previous forecasts in comparison to actual activity to determine what changes, if any, may be necessary. After that comes the consideration of the effects of any potential new factors that could affect the forecasts, such as changes in the socioeconomic climate, or the potential effects of service changes at KOA or other island airports.

forecasts prepared for KOA. Several sets of previous forecasts were reviewed and are outlined in **Table 2F**. These include projections from the previous master plan update for KOA (dated 1998), the *Hawaii Aviation Demand Forecasts Update* in 2004, prepared by Aries Consultants for DOT-A, and the FAA *Terminal Area Forecasts* (TAF), issued in December 2006. This is the FAA's most current forecast of activity for Kona International Airport at Keahole. The projections in this table are also depicted on **Exhibit 2H** for graphic comparison.

Previous Passenger Forecasts

The first step in this forecast update is to compare actual activity to previous

	2000	2005	2010	2015	2020	2025
Total Passengers						
Actual	2,842,097	2,959,727				
1998 Master Plan Update	2,654,000	2,923,000	3,201,000	3,489,000	3,780,000	
2004 DOT-A Forecasts		2,793,400	3,064,500	3,344,400	3,649,500	3,974,900
2006 TAF*			3,120,268	3,385,822	3,674,420	

*For comparison, the enplanement projections in the 2006 FAA Terminal Area Forecast (TAF) were doubled to reflect total passengers.

As can be seen from the exhibit, actual passenger traffic is higher than each of the earlier forecasts for the airport. As of 2005, the projections used in the 1998 Master Plan are within 1.2 percent of the actual traffic, while the 2004 DOT-A forecast is over 5.6 percent below the actual number. The more recent FAA forecasts as included in the TAF fall between the two earlier forecasts.

As indicated earlier in the discussion of statewide forecasts, the 2004 DOT-A forecast was derived from regression analyses relating passengers to population and island visitors. Also indicated earlier, the DBEDT forecasts of these variables have been updated since the 2004 forecasts were prepared. To examine the potential effect on passenger traffic at KOA, the fol-

lowing section will consider this updated information.

Analytical Projections

Two analytical techniques were re-examined for their applicability to projecting airline passengers at KOA. These included time-series extrapolation and regression analyses considering population and visitor statistics as independent variables.

A time-series analysis of airline passengers was prepared based upon the historic passengers between 1970 and 2006. The r^2 value for the 36-year time frame was very strong at 0.960. Several shorter periods beginning in later years were also tested, but all resulted in lower statistical correlations.

Thus, the longer period time-series was felt to be the most representative of past trends. The time-series projection for 1970-2006 is shown for comparison with the FAA TAF and the DOT-A forecast in **Table 2G** and on **Exhibit 2H**. As can be seen from the exhibit, the updated time series projection is higher than both the DOT-A and the FAA-TAF forecasts.

Next, a correlation analyses was run to re-examine the relationship between KOA passengers and the Hawaii County population and visitor census dating back to 1970. The correlation ($r^2 = 0.962$) was found to be as high as the time-series correlation. The resulting projection is also shown on **Table 2G** and **Exhibit 2H**. As the exhibit shows, the updated regression projection is very similar to the time-series projection.

	2012	2017	2030
2004 DOT-A Forecast*	3,171,200	3,461,500	4,332,500
Time Series Analysis (1970-2006)	3,476,192	3,824,304	4,729,396
Regression Analysis vs. County Population And Visitor Census (1970-2005)	3,471,629	3,818,715	4,721,138
Master Plan Forecast Update	3,472,000	3,819,000	4,721,000
2006 FAA TAF*	3,223,846	3,498,388	4,328,139
Percentage Difference	7.70%	9.16%	9.08%

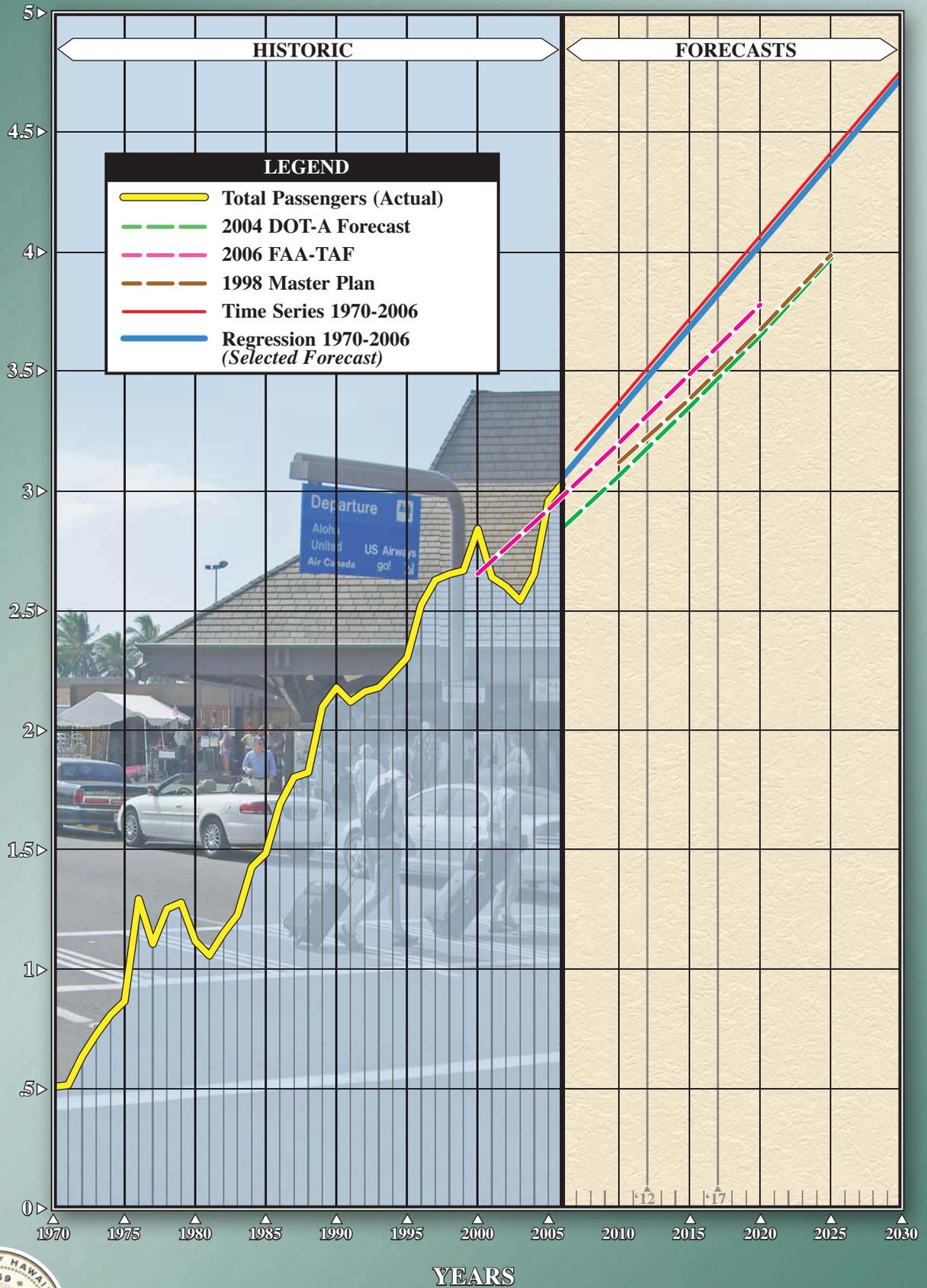
*2030 projection extrapolated by Coffman Associates.

Recommended Planning Forecast

The updated time-series and regression projections vary by less than two percent over the planning period. The updated population and visitor census forecasts (Table 2A) for Hawaii County were used in the regression projection to account for the fact that the

DBEDT forecasts for each are already tracking well below the 2006 actual estimates. Because of the similarity in the time-series and regression projections, the regression projection was selected as the preferred forecast as it best represents an update using the DOT-A forecast methodology.

KOA Passengers (in millions)



As depicted on **Table 2G**, the recommended forecast compares favorably with the FAA TAF. For 2012, the Master Plan forecast is within 7.7 percent of the TAF. For 2017, the Master Plan forecast is within 9.2 percent of the TAF.

Table 2H outlines the breakdown of interisland and overseas passengers

since 1995, the first year after the runway was extended to 11,000 feet. From this table, it is evident that the airport's passenger growth has been in passengers flying directly to and from KOA from mainland and international markets. In fact, direct overseas passenger traffic has increased nearly five times, while 2006 interisland passengers were slightly lower than in 1995.

Year	Total	Interisland		Overseas	
		Interisland Passengers	Interisland Percent	Overseas Passengers	Overseas Percent
1995	2,303,455	2,081,368	90.4%	222,087	9.6%
1996	2,524,402	2,248,511	89.1%	275,891	10.9%
1997	2,628,157	2,257,218	85.9%	370,939	14.1%
1998	2,652,955	2,241,765	84.5%	411,190	15.5%
1999	2,668,182	2,215,953	83.1%	452,229	16.9%
2000	2,842,097	2,271,216	79.9%	570,881	20.1%
2001	2,640,318	2,009,138	76.1%	631,180	23.9%
2002	2,601,739	1,940,181	74.6%	661,558	25.4%
2003	2,542,566	1,824,130	71.7%	718,436	28.3%
2004	2,653,562	1,807,289	68.1%	846,273	31.9%
2005	2,959,727	1,913,344	64.6%	1,046,383	35.4%
2006	3,033,212	1,984,319	65.4%	1,048,893	34.6%
Master Plan Forecast					
2012	3,472,000	2,153,000	62.0%	1,319,000	38.0%
2017	3,819,000	2,253,000	59.0%	1,566,000	41.0%
2030	4,721,000	2,502,000	53.0%	2,219,000	47.0%

The change represents the availability of more non-stop flights with overseas destinations on the U.S. mainland as well as Canada and Japan. The need to connect to flights in Honolulu has been reduced. Where less than 10 percent of the traffic was directly overseas in 1995, over one-third was in 2006. This percentage is expected to continue to grow, but at a slower rate, towards fifty percent.

The resulting forecast of interisland and overseas passengers is depicted at the bottom of **Table 2H**. Overseas passengers are projected to grow at an annual average rate of 3.2 percent through 2030. Interisland passengers are projected to grow at an average of 1.0 percent annually.

Table 2J provides an even more detailed breakdown of the passenger

forecasts, with enplanements (departing passengers) separated from deplanements (arriving passengers). Transit passengers are those that connect between aircraft at the airport. Currently, there are more interisland enplanements than deplanements, but more overseas deplanements than enplanements. This is, in part, because of interisland “hopping” where some overseas visitors arrive at

one island, visit other islands by plane or ship, then leave the state from the last island they visit. Another factor noticed in the statistical data is that the passengers arriving on international flights from Japan are counted as overseas deplanements, but departing passengers have generally been included in the interisland statistics. Over the long range, this differential is assumed to balance out.

TABLE 2J Passenger Forecast Summary Kona International Airport and Keahole				
	Actual	Forecast		
	2006	2012	2017	2030
Interisland Passengers				
Enplaned (Departures)	1,025,378	1,098,000	1,138,000	1,251,000
Deplaned (Arrivals)	958,941	1,055,000	1,115,000	1,251,000
Total Interisland	1,984,319	2,153,000	2,253,000	2,502,000
Overseas Passengers				
Enplaned (Departures)	497,060	628,000	753,000	1,077,000
Deplaned (Arrivals)				
Mainland Arrivals	451,319	562,000	660,000	817,000
International Arrivals	69,650	91,000	108,000	151,000
Subtotal Deplaned	520,969	653,000	768,000	1,078,000
Transits	30,864	38,000	45,000	64,000
Total Overseas	1,048,893	1,319,000	1,566,000	2,219,000
TOTAL PASSENGERS	3,033,212	3,472,000	3,819,000	4,721,000

Table 2J also includes a forecast for international arrivals. Since 1996, KOA has had a scheduled non-stop flight from Japan. The airport also has seasonal flights from Canada. The Canadian flights, however, are pre-cleared in Canada and are not included in the international arrival statistics shown in **Tables 2J** and **2K**.

Table 2K compares historic KOA international arrivals with total overseas arrivals at KOA and with statewide international arrivals. The airport’s international arrivals peaked at 87,521 in 1998, but declined to 65,652 by 2003. Over the next two years, traffic recovered to 86,111 in 2005, but in 2006 was down to 69,650.

The DOT-A forecast assumptions indicated that most other international markets are more likely to continue to utilize connections through Honolulu to reach the other islands in Hawaii.

Statewide, international traffic peaked in 2000 at 2.66 million arrivals. International traffic declined after 9-11 and SARS concerns. This traffic has still not grown back to pre-9-11 levels.

The 2004 DOT-A forecasts projected the state's international traffic to grow at an average annual rate of 1.8 percent. This is much lower than the

FAA's current projected growth rate of 5.9 percent for U.S international traffic.

Year	KOA Arrivals			Statewide	KOA %
	Overseas	International	% International	International Arrivals*	
1996	154,187	29,371	19.0%		
1997	213,268	40,988	19.2%		
1998	251,899	87,521	34.7%		
1999	253,630	80,087	31.6%	2,610,459	3.07%
2000	316,211	78,895	25.0%	2,664,373	2.96%
2001	356,118	65,141	18.3%	2,209,722	2.95%
2002	366,760	66,871	18.2%	2,195,631	3.05%
2003	397,057	65,652	16.5%	2,031,586	3.23%
2004	461,170	78,918	17.1%	2,207,944	3.57%
2005	486,730	86,111	17.7%	2,259,386	3.81%
2006	520,969	69,650	13.4%	2,143,799	3.25%
FORECAST					
2012	653,000	91,000	14.0%	2,722,890	3.34%
2017	768,000	108,000	14.0%	3,027,830	3.57%
2030	1,077,000	151,000	14.0%	3,931,950	3.84%
* Statewide International Arrivals forecast interpolated and extrapolated from Hawaii Aviation Demand Forecasts Update, DOT-A, 2004.					

For planning purposes, international arrivals at KOA were projected, at best, to grow at a rate similar to that of mainland passengers. This would essentially represent a doubling of international arrivals by 2030. The 3.3 percent annual growth rate is higher than the 1.8 percent rate projected statewide, suggesting a potential increase in market share for KOA. As depicted on **Table 2K**, however, that market share would remain within the range previously experienced at KOA.

With just one daily international flight currently serving KOA, the Master Plan forecast essentially allows plan-

ning for an eventual second international flight over the long term.

AIRLINE OPERATIONS

The commercial service fleet mix is needed to project airline operations for the airport. A projection of the fleet mix for Kona International Airport at Keahole has been developed by reviewing the equipment used by the carriers serving the airport.

Changes in equipment, airframes, and engines have always had a significant impact on airlines and airport plan-

ning. There are many ongoing programs by the manufacturers to improve performance characteristics. These programs continue to focus on improvements in fuel efficiency. Regional jets have also become a larger factor as the airlines look for ways to reduce costs. On the mainland, many airlines have replaced larger commercial jets on smaller emerging routes with regional jets. In Hawaii, go! Airlines, a subsidiary of Mesa Air Group, has introduced the 50-seat regional jet into serving interisland routes.

At the same time as these smaller aircraft have been introduced at KOA, overseas traffic has been increasing. These routes are being served primarily by aircraft like the Boeing 757 up to the Boeing 747.

Table 2L compares the airline operational fleet mix by seat capacity for the last three years at KOA. The table includes a breakdown of interisland and overseas operations as well as the combined analysis. **Exhibit 2J** depicts the aircraft fleet mix and seating capacities of the airlines serving the airport.

Overall, the average seats per departure have declined from 131.6 in 2004, to 118.7 in 2005. This is primarily due to an increase in operations by aircraft with 60 seats or less. In 2004, less than 13 percent of the total flights

were by aircraft with 60 seats or less. In two years, this percentage has increased to nearly 30 percent of all airline operations.

It appears that these aircraft have added to operations rather than replace other aircraft in the fleet, as total airline operations increased from 26,768 in 2004 to 37,426 in 2006. The percentage of operations by larger aircraft with 165 or more seats has remained relatively constant over the last three years at around 19 percent. The medium-sized jet in the 105 to 134 seat range has seen its percentage decline from 68 to 51 percent. Like the regional aircraft, these aircraft are used primarily for interisland flights. While their market percentage has declined, the total number of annual operations by medium-sized jets has actually increased by approximately 800 operations in the last two years.

The boarding load factor (BLF) is defined as the ratio of passengers boarding aircraft compared to the seating capacity of the aircraft. With the increase in operations, the BLF at the Kona International Airport at Keahole has declined in recent years, from 75.3 percent in 2004, to 68.2 percent in 2005. By comparison, the BLF at most airports on the mainland has been increasing as airlines have worked to improve efficiency and reduce costs.



AIRCRAFT TYPE

B747-400				403		347			
B777-200A						348			
B747				310					
B767-400			287						
A330-300				298			286		270
A340-300									282
B777-200	245		268						
A330-200				243					
B767-300	212		250			244			212
B757-300				224					
B767-200	158						203		207
B757-200	188		184	182		182	193		



AIRCRAFT TYPE

B747-400									384
B767-300			260						240
B737-200	127								
B737-200A	127								
B737-700	124								
B717			123						
CRJ200						50			
DHC Dash 8 Q400					37				
Cessna 208B								14	

Bold faced figures represent aircraft that regularly operated at KOA in 2006-2007.



TABLE 2L
Airline Fleet Mix and Operations Forecast
Kona International Airport at Keahole

Seating Capacity	Historic			Forecast		
	2004	2005	2006	2012	2017	2030
TOTAL AIRLINE OPERATIONS						
>320	1.0%	4.2%	2.3%	2.6%	2.5%	3.4%
250-320	1.6%	0.5%	1.1%	1.6%	2.2%	3.4%
200-249	5.6%	5.6%	5.7%	6.2%	6.0%	6.5%
165-199	11.0%	9.6%	10.3%	10.8%	10.8%	11.1%
135-164	0.0%	0.0%	0.0%	0.0%	0.9%	4.5%
105-134	68.2%	57.6%	50.9%	49.2%	45.6%	38.5%
75-104	0.0%	0.0%	0.0%	0.0%	3.9%	7.4%
60-79	0.0%	0.0%	0.0%	3.2%	5.5%	7.4%
40-59	0.0%	0.0%	8.4%	8.0%	6.3%	3.7%
20-39	10.6%	16.1%	16.1%	14.4%	13.3%	11.1%
<19	2.0%	6.5%	5.2%	4.0%	3.1%	3.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average Seat per Op.	131.6	126.1	118.7	122.6	123.8	131.0
Boarding Load Factor	75.3%	73.9%	68.2%	69.5%	74.5%	78.7%
Passengers per Op.	99.1	93.1	81.0	85.3	92.2	103.1
Annual Passengers	2,653,562	2,959,727	3,033,212	3,472,000	3,819,000	4,721,000
Annual Operations	26,768	31,776	37,436	39,800	41,400	45,800
INTERISLAND OPERATIONS						
>320	0.0%	2.2%	2.0%	2.0%	1.0%	0.0%
250-320	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
200-249	0.0%	2.9%	2.4%	2.0%	1.0%	0.0%
165-199	0.0%	0.0%	0.6%	1.0%	1.0%	1.0%
135-164	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%
105-134	83.3%	66.9%	58.8%	58.0%	56.0%	51.0%
75-104	0.0%	0.0%	0.0%	0.0%	5.0%	10.0%
60-79	0.0%	0.0%	0.0%	4.0%	7.0%	10.0%
40-59	0.0%	0.0%	10.3%	10.0%	8.0%	5.0%
20-39	14.0%	20.0%	19.6%	18.0%	17.0%	15.0%
<19	2.7%	8.1%	6.4%	5.0%	4.0%	4.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average Seat per Op.	109.6	106.2	100.3	101.1	97.9	95.9
Boarding Load Factor	81.5%	70.9%	64.0%	67.0%	71.0%	77.0%
Passengers per Op.	89.3	75.2	64.3	67.7	69.5	73.8
Annual Interisland Passengers	1,812,930	1,923,503	1,970,937	2,153,000	2,253,000	2,502,000
Annual Interisland Operations	20,296	25,566	30,666	31,800	32,400	33,900
OVERSEAS OPERATIONS						
>320	4.0%	12.5%	3.6%	5.0%	8.0%	13.0%
250-320	6.4%	2.4%	6.0%	8.0%	10.0%	13.0%
200-249	24.1%	16.9%	20.9%	23.0%	24.0%	25.0%
165-199	45.0%	48.9%	54.2%	50.0%	46.0%	40.0%
135-164	0.0%	0.0%	0.0%	0.0%	4.0%	6.0%
105-134	20.5%	19.3%	15.2%	14.0%	8.0%	3.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average Seat per Op.	201.2	208.1	202.1	208.0	217.3	231.0
Boarding Load Factor	63.6%	80.2%	76.7%	79.0%	80.0%	81.0%
Passengers per Op.	128.0	166.9	154.9	164.3	173.8	187.1
Annual Overseas Passengers	840,632	1,036,224	1,048,893	1,319,000	1,566,000	2,219,000
Annual Overseas Operations	6,566	6,210	6,770	8,000	9,000	11,900

The BLF decline at KOA can be attributed to the increased competition brought on by the entry of more regional aircraft flights on interisland routes. The interisland BLF at KOA has declined from 81.5 percent to 64 percent while the island airlines compete for market share. Over the same period, the overseas BLF has increased from 63.6 percent to 76.7 percent. In the future, boarding load factors can be expected to begin to return to previous levels and even grow into the upper 70s.

The decline in seating capacity as well as load factor has resulted in a net decrease in passengers per flight at KOA. The average passengers per operation fell from 99 in 2004 to 81 in 2006. Again, the influx of operations on interisland routes was the primary factor as passengers per operation on overseas routes actually increased from 128 to 155.

Kona International Airport at Keahole can expect regional aircraft to continue to affect interisland service into the future. The 50-passenger regional jet has recently been introduced to the islands, but new airline orders for regional jets (RJs) are now focused on 70- and 90-seat aircraft. While the medium-sized commercial jet will continue to have the majority of interisland flights, these larger regional jet aircraft are likely to become more of a factor in the future.

The mix of aircraft used on overseas flights is expected to continue to grow in size. This will result in a net increase in aircraft seating capacity and in passengers per operation over the

long term. **Table 2L** presents the fleet mix and operations forecast for KOA.

AIR CARGO

Air cargo is comprised of air freight and air mail. Air cargo is critical to the Hawaiian Islands for timely delivery of mail as well as time-sensitive freight. Cargo is handled both in the bellies of the passenger airlines as well as by all-cargo carriers. **Table 2M** and **Exhibit 2K** depict the growth of air cargo at Kona International Airport at Keahole since it opened in 1970.

Most cargo at the airport was handled by the passenger airlines in the 1970s. Cargo grew steadily through the 1970s from 1,255 tons in 1970 to 8,812 tons in 1980. Virtually all of the cargo at that time was interisland with little overseas cargo.

The advent of express package carriers in the 1980s began to change cargo activity and handling at airports. The extension of the runway to 9,500 feet in the late 1980s brought the first significant overseas cargo to KOA. By 1990, the airport was handling 19,591 tons of freight and mail annually. Traffic continued to grow through the 1990s and the runway was extended to 11,000 feet. A new high of 29,206 tons of cargo was handled in 1999.

Cargo traffic reached its next new high in 2002 at 31,361 tons then slowed for the next three years. While air freight has actually declined each year since 2002, air mail has more than doubled. This growth in air mail

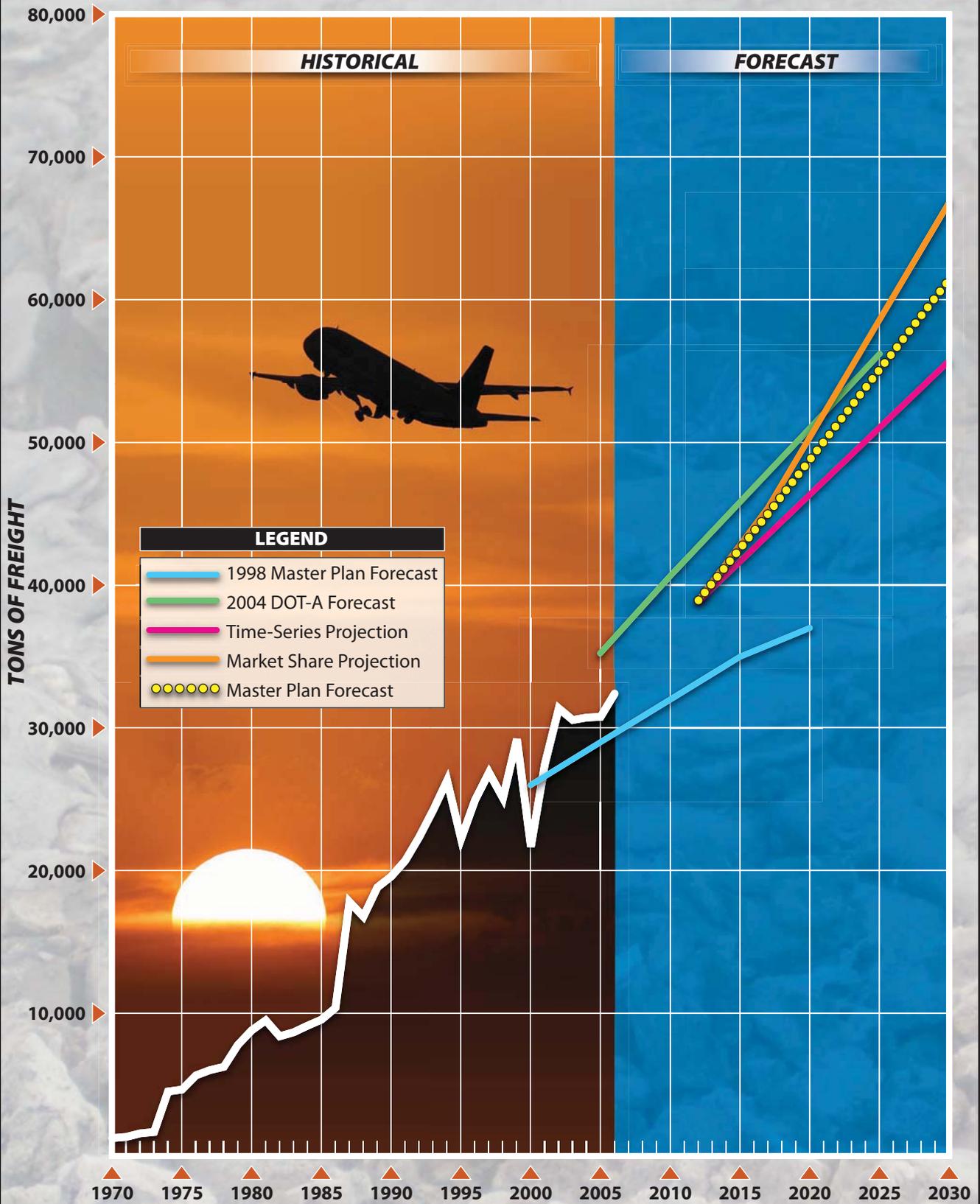


TABLE 2M**Air Cargo Forecast
Kona International Airport at Keahole**

	Air Freight Annual Tons	Air Mail Annual Tons	Total Cargo Annual Tons	Domestic Cargo RTMs (millions)	KOA Market Share %
1970	686	569	1,255	NA	NA
1971	724	613	1,337	NA	NA
1972	949	637	1,586	NA	NA
1973	939	743	1,682	NA	NA
1974	3,714	806	4,520	NA	NA
1975	3,742	912	4,654	NA	NA
1976	4,664	986	5,650	NA	NA
1977	4,991	1,027	6,018	NA	NA
1978	5,155	1,095	6,250	NA	NA
1979	6,630	1,152	7,782	NA	NA
1980	7,826	986	8,812	NA	NA
1981	8,498	1,006	9,504	NA	NA
1982	7,326	1,061	8,387	NA	NA
1983	7,430	1,239	8,669	NA	NA
1984	7,730	1,401	9,131	NA	NA
1985	8,212	1,346	9,558	NA	NA
1986	8,835	1,548	10,383	NA	NA
1987	16,047	1,751	17,798	NA	NA
1988	14,912	1,863	16,775	NA	NA
1989	16,813	2,008	18,821	NA	NA
1990	17,290	2,301	19,591	NA	NA
1991	18,720	2,425	20,695	NA	NA
1992	19,766	2,579	22,345	NA	NA
1993	21,565	2,668	24,233	10,394.1	0.000233%
1994	23,482	2,821	26,303	11,323.3	0.000232%
1995	19,512	2,710	22,222	12,415.7	0.000179%
1996	22,486	2,448	24,934	12,781.7	0.000195%
1997	24,636	2,222	26,858	13,454.1	0.000200%
1998	22,085	2,994	25,079	13,828.1	0.000181%
1999	23,317	5,889	29,206	13,974.9	0.000209%
2000	15,223	6,450	21,673	14,698.8	0.000147%
2001	21,540	5,907	27,447	13,934.0	0.000197%
2002	27,323	4,038	31,361	12,967.3	0.000242%
2003	25,836	4,710	30,546	14,972.4	0.000204%
2004	25,588	5,130	30,718	16,340.9	0.000188%
2005	24,477	6,290	30,767	16,089.6	0.000191%
2006	23,878	8,512	32,390	15,710.5	0.000206%
Time Series Analysis					
2012	27,947	10,868	38,815	19,473.4	0.000199%
2017	31,316	12,179	43,495	22,701.1	0.000192%
2030	40,078	15,586	55,664	33,416.2	0.000167%
Market Share Projection					
2012	28,042	10,905	38,947	19,473.4	0.000200%
2017	32,690	12,713	45,402	22,701.1	0.000200%
2030	48,119	18,713	66,832	33,416.2	0.000200%
2004 DOT-A Forecast					
2012	38,100	4,600	42,700	19,473.4	0.000219%
2017	42,900	5,000	47,900	22,701.1	0.000211%
2030	57,000	5,400	61,400	33,416.2	0.000184%
Master Plan Forecast					
2012	28,000	11,000	39,000	19,473.4	0.000200%
2017	32,400	12,600	45,000	22,701.1	0.000198%
2030	44,500	17,500	62,000	33,416.2	0.000186%

resulted in the most cargo traffic to date at 32,390 tons for 2006.

Exhibit 2K compares the air cargo forecasts prepared for the *1998 Master Plan* and the 2004 DOT-A Forecast to the actual traffic that has occurred since. With the slowdown in cargo growth since 2002, the actual activity is still ahead of the *1998 Master Plan*, but is behind the 2004 DOT-A Forecast pace.

To update the forecasts, the enplaned cargo data was evaluated using time-series, regression, and market share analyses in a manner similar to the passenger projections. The updated time-series analysis of the past 36 years resulted in a strong correlation ($r^2 = 0.962$). The resulting projection is presented for comparison on **Exhibit 2K** and in **Table 2M**. This projection has a slope similar to that of the DOT-A Forecast, but would lag approximately three years behind.

Regression analyses with Hawaii County population, defacto population, and employment were examined, but all resulted in correlations below 0.90.

Table 2M presents a market share review of cargo tons at KOA versus U.S. domestic cargo revenue ton-miles (RTMs). The percentage has been fluctuating around an average of 0.0000490 percent over the past eight years. A projection of cargo based upon maintaining this percentage into the future is presented on the table and exhibit as well.

The constant market share would project the airport's cargo to grow at

the industry rate for domestic air cargo. As can be seen from the exhibit, this projection is lower through at least the first ten years, then grows beyond the DOT-A forecast. For the purposes of this master plan update, a hybrid projection representing the middle range between the time-series and market share projections was selected as the recommended forecast for air cargo, and is presented on **Table 2M** as well as **Exhibit 2K**. This forecast essentially falls in line with the 2004 DOT-A forecast over the long term.

Table 2M also presents a breakdown of air mail and air freight forecasts. In the past ten years, the air mail percentage of the total air cargo has increased from 8.3 percent in 1997 to 26.3 percent in 2006. This percentage was projected to grow in the short term to 28 percent then remain relatively stable over the long term.

ALL-CARGO OPERATIONS

Kona International Airport at Keahole is served by several all-cargo carriers or their contract carriers. United Parcel Service (UPS) and Aloha Airlines operate all-cargo commercial jet aircraft to KOA. There are also several contract carriers operating commuter aircraft. UPS primarily utilizes Boeing 747 or 767 aircraft, while Aloha utilizes Boeing 737-200 cargo aircraft. The primary commuter aircraft are turboprops such as the Beech 1900 and the Shorts 360.

A combination of additional flights and more of the larger all-cargo air-

craft can be expected as cargo volumes increase. Thus, air cargo operations were projected to increase, although not as fast as the cargo tonnage.

As shown on **Table 2N**, all-cargo operations totaled 4,372 in 2006. This

was down from 2005, when there were 4,842 all-cargo operations. This was due to a decline in commuter operations from 1,952 to 1,360. Cargo jet operations actually increased from 2,890 to 3,012 in the last year.

TABLE 2N			
All-Cargo Operations Forecast			
Kona International Airport at Keahole			
	ALL-CARGO OPERATIONS		
	Total	Commercial Jet	Commuter Aircraft
ACTUAL			
2004	4,484	2,926	1,558
2005	4,842	2,890	1,952
2006	4,372	3,012	1,360
FORECAST			
2012	4,700	3,300	1,400
2017	5,100	3,700	1,400
2030	6,100	4,700	1,400

The table also presents the forecasts for all-cargo operations. The growth in operations is expected primarily in commercial jets, with commuter aircraft operations remaining fairly stable after declining in recent years.

GENERAL AVIATION FORECASTS

General aviation encompasses all portions of civil aviation except commercial operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. These indicators of general aviation demand include based aircraft, aircraft fleet mix, and annual operations.

BASED AIRCRAFT

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft, the growth of other general aviation activities and demands can be projected.

Aircraft basing at an airport is somewhat dependent upon the nature and magnitude of aircraft ownership in the local service area. As a result, aircraft registrations in the area were reviewed and forecast first.

Aircraft Registrations

Data was collected on the history of aircraft ownership in Hawaii County

over the last two decades. This information was obtained from records of the FAA's Aircraft Registry over the years and is presented in **Table 2P**, as well as on **Exhibit 2L**.

Registered aircraft in Hawaii County have grown steadily since the early 1990s. Between 1990 and 2006, registered aircraft in the county grew from 97 to 167. There are no recently prepared forecasts of registered aircraft to examine and compare. As a result, a projection of county registrations was developed.

The Hawaii County share of the U.S. general aviation (GA) active aircraft market is examined in **Table 2P**. Because of a change in how the FAA counts active aircraft, this comparison could only be extended back to 1993. From 1993 through 2006, Hawaii County's market share has grown from 0.0574 percent 0.0738 percent. A projection that would maintain a constant share of 0.738 percent into the future results in 221 registered aircraft by 2030.

TABLE 2P			
Hawaii County Registered Aircraft			
	Registered Aircraft	U.S. Active Aircraft	County Market Share
1990	97	NA	NA
1991	87	NA	NA
1992	96	NA	NA
1993	102	177,719	0.0574%
1994	104	172,936	0.0601%
1995	106	188,089	0.0564%
1996	104	191,129	0.0544%
1997	107	192,414	0.0556%
1998	114	204,710	0.0557%
1999	116	219,464	0.0529%
2000	117	217,533	0.0538%
2001	118	211,535	0.0558%
2002	121	211,345	0.0572%
2003	144	209,788	0.0686%
2004	155	219,426	0.0706%
2005	156	224,352	0.0695%
2006	167	226,422	0.0738%
Constant Market Share Projection			
2012	185	250,587	0.0738%
2017	197	267,470	0.0738%
2030	221	299,766	0.0738%

Next, trend line or "time-series" analysis was conducted for the period dating back to 1990. The correlation coefficient, or r^2 was 0.857. While not as strong a correlation as preferred, the resulting projection does provide

an indication if the historic growth trend continued. This would result in 255 registered aircraft by 2030. The projection is included for comparison on **Exhibit 2L** as well as in **Table 2Q**.

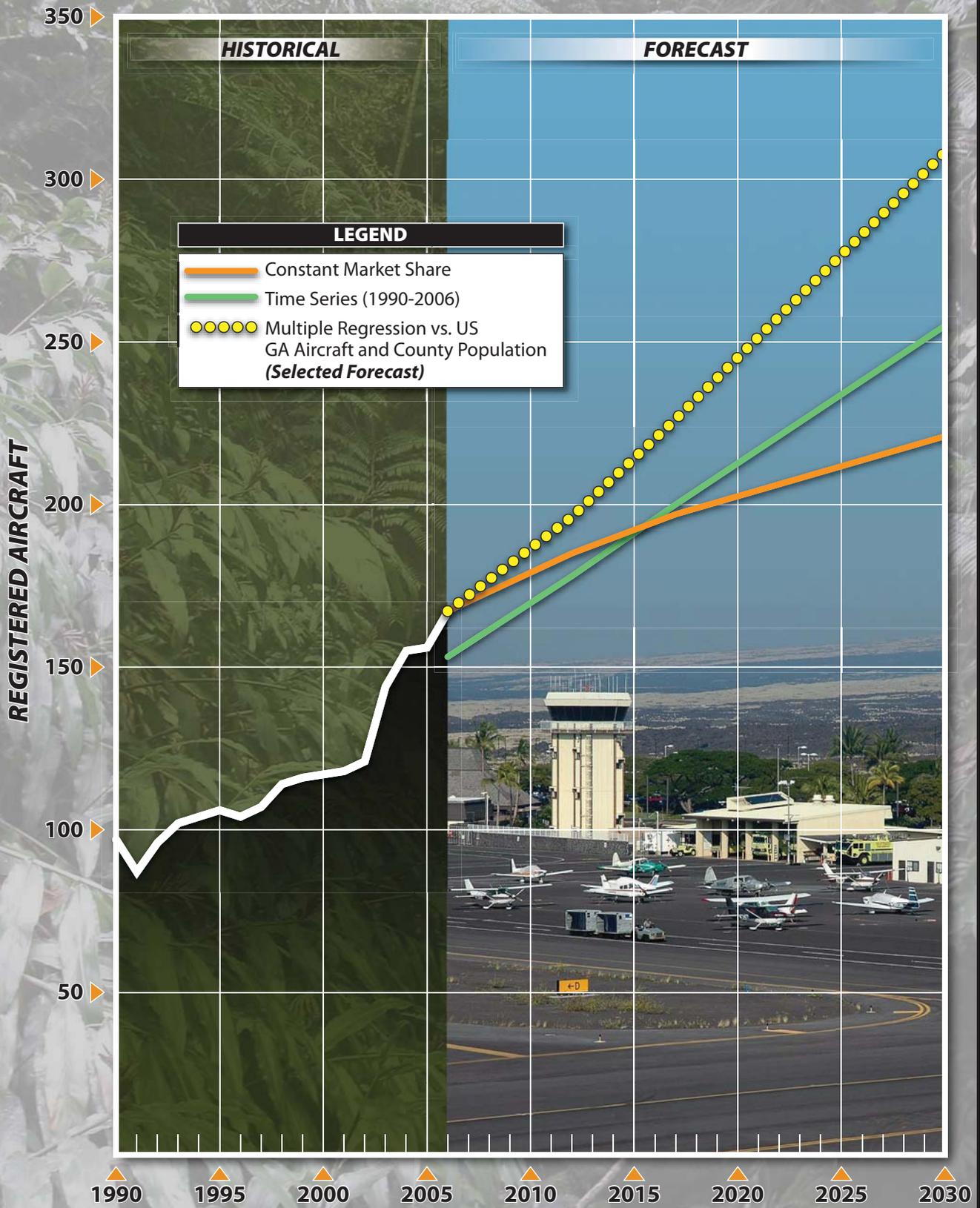


TABLE 2Q Registered Aircraft Projections Hawaii County				
	Actual	Forecast		
	2006	2012	2017	2030
Constant Market Share	167	185	197	221
Time Series (1990-2006)	167	178	200	255
Multiple Regression vs. U.S. GA Aircraft & County Population	167	196	226	308
Selected Forecast	167	196	226	308

Several regression analyses comparing registered aircraft to Hawaii County's socioeconomic variables were conducted. These included population, employment, the daily visitor census, inflation-adjusted per capita personal income, and de facto population. U.S. active aircraft were also considered in combination with these variables. The best correlation involved a multiple regression of registered aircraft versus U.S. active aircraft and county population which produced an r^2 of 0.944. De facto population was specifically substituted for resident population to examine the effect of the nonresident population on registered aircraft. This resulted in a lower r^2 of 0.915.

Applying the updated population projections from **Table 2B** provided the regression projection that is presented for comparison on the exhibit and table. With 308 registered aircraft in 2030, this results in the highest projection. The regression utilizing de facto population resulted in a very similar projection of 307 by 2030.

The good correlation with U.S. active GA aircraft and population suggests

that the county's aircraft ownership is likely to grow faster than the national rate. Substituting the de facto population for resident population in the regression results in essentially the same projection. As a result, the regression forecast was selected as the preferred forecast and is shown in bold on the exhibit and the table.

Based Aircraft Forecast

Having forecast the aircraft ownership demand in Hawaii County, the historic basing at Kona International Airport at Keahole was reviewed to examine the change in market share over the years. **Table 2R** examines the based aircraft at KOA as a percentage of the aircraft registered to owners' addresses on the island.

Based aircraft for 2006 were derived from survey information provided by the Hawaii County General Aviation Council (HCGAC). The historic based aircraft figures at the KOA were taken from airport records when available,

and for other years, from FAA records of counts conducted as part of an an-

nual airport inspection by the FAA or state aviation officials.

TABLE 2R			
Based Aircraft Forecasts			
Kona International Airport at Keahole			
Year	KOA Based Aircraft	County Registered	KOA Percent
1990	36	97	37.1%
1991	36	87	41.4%
1992	32	96	33.3%
1993	46	102	45.1%
1994	46	104	44.2%
1995	46	106	43.4%
1996	46	104	44.2%
1997	40	107	37.4%
1998	42	114	36.8%
1999	42	116	36.2%
2000	42	117	35.9%
2001	35	118	29.7%
2002	34	121	28.1%
2003	36	144	25.0%
2004	55	155	35.5%
2005	55	156	35.3%
2006	61	167	36.5%
2006 Demand	79	167	47.3%
Master Plan Forecast			
2012	102	196	52.0%
2017	118	226	52.0%
2030	160	308	52.0%

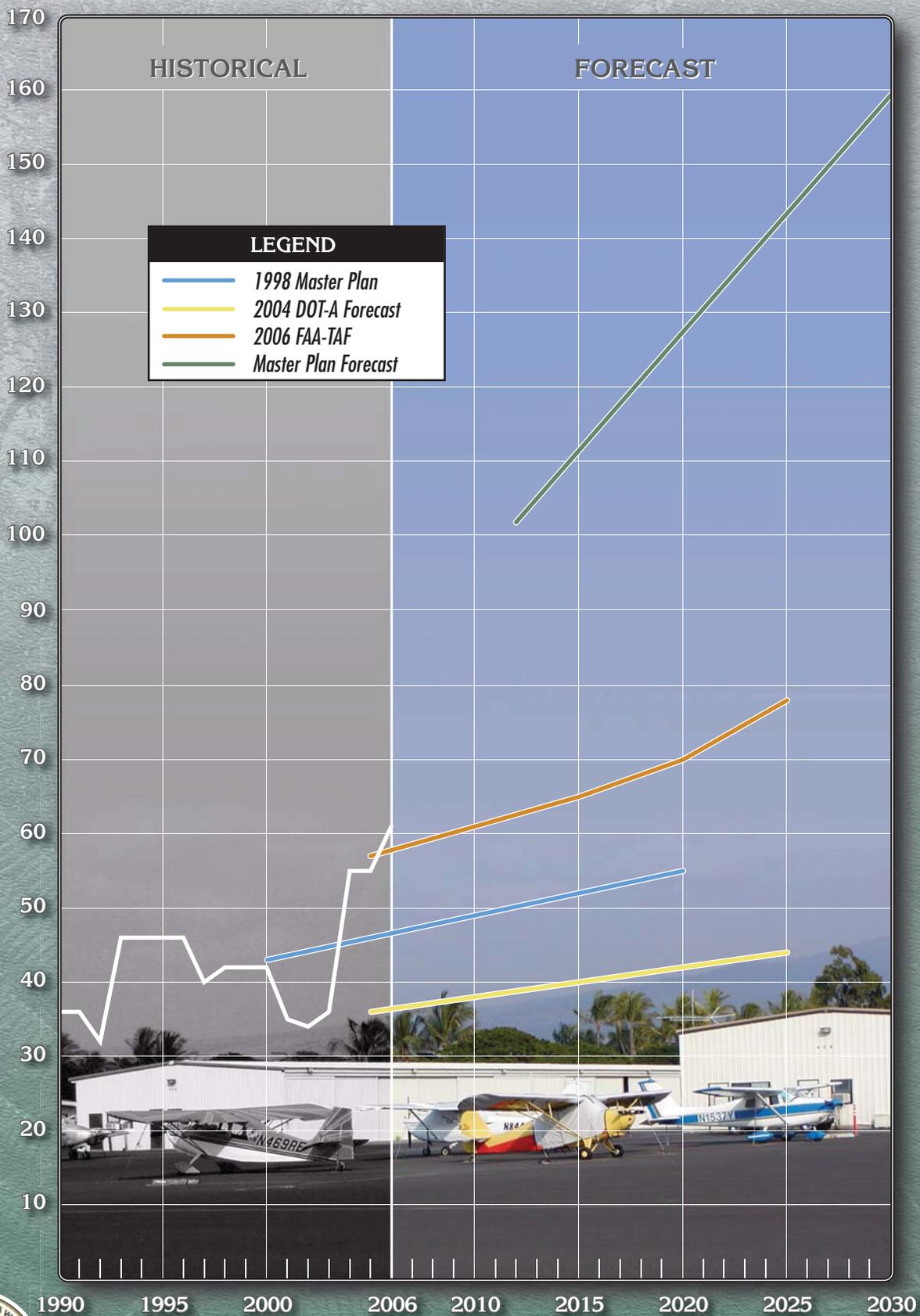
Between 1990 and 2003, KOA based aircraft fluctuated between 32 and 36. More recent FAA records indicate 55 based aircraft in 2004 and 2005. According to information derived from the HCGAC survey, there were 61 based aircraft in 2006. Several operators on the airport have added aircraft in 2007, so based aircraft are anticipated to total at least 67 by the end of the year.

Exhibit 2M graphically depicts the previous forecasts for based aircraft. The current based aircraft already exceeds the 2025 projection of the 2004 DOT-A Forecast as well as those of the *1998 Master Plan* which projected 55

based aircraft by 2020. The FAA TAF forecasts are the highest of the three, and project 78 based aircraft by 2025.

In the 1990s, the based aircraft were equivalent to 35 to 45 percent of the aircraft registered aircraft in the county. Between 2000 and 2003, this percentage declined to 25 percent. The decline in percentage may have been, at least in part, due to the limited hangar space available on the airport. There are local aircraft owners who have indicated they would base an aircraft at the airport if hangars were available. The limited general aviation services available are also a factor.

BASED AIRCRAFT



Although the current based aircraft level is growing, the lack of hangars and other services is still constraining the based aircraft at KOA. The HCGAC estimates there would be at least 20 additional aircraft based at the airport if sufficient hangars were available.

In addition, there are several general aviation businesses that are expected to expand their fleets at KOA within the next few years. Flight schools at the airport are growing as are the charter and tour flights. One local operator is examining the potential for establishing an airline-oriented flight school at the airport, taking advantage of the superb climate and weather conditions. This alone could eventually result in up to 48 additional based aircraft.

For planning purposes, it is assumed that the airport's general aviation facilities can be developed in a manner that will allow it to serve its demand and maintain a larger portion of the market share based primarily upon convenience and airfield capabilities.

Table 2R depicts the forecast based upon this premise. Considering the underserved demand, KOA's based aircraft as a percentage of county registrations should currently be at least 47 percent. With the west coast of the Big Island growing at a faster rate than the rest of the County, and the planned additions of aircraft expected at KOA, this share was projected to continue to increase to 52 percent. This would result in a based aircraft forecast of 160 in 2030.

As is evident from **Exhibit 2M**, the updated forecast is significantly higher than previous forecasts, all of which did not fully take into account the affect that the lack of hangar space and general aviation services has had on aircraft basing in the past.

Based Aircraft Fleet Mix

The based aircraft fleet mix at Kona International Airport at Keahole, as shown on **Table 2S**, was compared to the existing and forecast U.S. general aviation fleet mix trends as presented in *FAA Aerospace Forecasts Fiscal Years 2007-2020*. The FAA expects business jets will continue to be the fastest growing general aviation aircraft type in the future. The number of business jets in the industry fleet is expected to double in the next twelve years.

Single-engine piston aircraft (including sport aviation and experimental aircraft), helicopter, and turboprop aircraft are expected to grow at slower rates. The number of multi-engine piston aircraft in the U.S. will actually decline slightly as older aircraft are retired, according to the FAA forecasts.

GENERAL AVIATION OPERATIONS

General aviation operations are classified by the airport traffic control tower (ATCT) as either local or itinerant. A local operation is a take-off or landing performed by an aircraft that operates

within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the air-

port. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and commercial use, since business aircraft are operated on a higher frequency.

	Current		2012		2017		2030	
	Number	%	Number	%	Number	%	Number	%
KOA Based Aircraft								
Single Engine Piston	39	63.9%	65	63.7%	74	62.7%	99	61.9%
Multi-Engine Piston	6	9.8%	7	6.9%	7	5.9%	7	4.4%
Turboprop	4	6.6%	9	8.8%	11	9.3%	14	8.8%
Jet	1	1.6%	4	3.9%	7	5.9%	14	8.8%
Rotorcraft	9	14.8%	16	15.7%	19	16.1%	26	16.3%
Other	2	3.3%	1	1.0%		0.0%	0	0.0%
Totals	61	100.0%	102	100.0%	118	100.0%	160	100.0%
U.S. Active Aircraft (from FAA Aerospace Fiscal Years [2007-2020])								
Single Engine Piston	173,177	76.5%	188,737	75.3%	199,099	74.4%	214,562	71.6%
Multi-Engine Piston	19,364	8.6%	19,101	7.6%	18,916	7.1%	18,444	6.2%
Turboprop	8,026	3.5%	8,352	3.3%	8,605	3.2%	9,301	3.1%
Jet	10,032	4.4%	15,304	6.1%	19,881	7.4%	32,393	10.8%
Rotorcraft	9,232	4.1%	12,308	4.9%	14,272	5.3%	18,551	6.2%
Other	6,592	2.9%	6,785	2.7%	6,698	2.5%	6,515	2.2%
Totals	226,423	100.0%	250,587	100.0%	267,471	100.0%	299,766	100.0%
Note: Experimental and sport aircraft are included under single engine piston.								

Itinerant Operations

Table 2T depicts general aviation itinerant operations, as counted by the ATCT at Kona International Airport at Keahole since 1990. Between 1990 and 2002, itinerant GA operations more than doubled from 9,563 to 21,170. Since that time, traffic has declined to 18,340 operations in 2006.

KOA's market share as a percentage of GA itinerant operations at towered airports across the country steadily rose from 1990 (0.041 percent) through 2005 (0.102 percent). The market share declined in 2006 to 0.098 percent.

In *FAA Aerospace Forecasts Fiscal Years 2007-2020*, the FAA projects itinerant general aviation operations at towered airports. **Table 2T** presents this forecast as well as a projection for KOA based upon maintaining its recent share of the itinerant operations market.

The table also examines the relationship of annual operations to based aircraft. Operations per based aircraft grew from a low of 203 in 1993 to a high of 623 in 2002. By 2006, the ratio had declined to 301. The sharp increases in the price of fuel affected the decline in 2006. In the first half of 2007, itinerant operations were comparable to for the same period in 2006.

TABLE 2T
General Aviation Itinerant Operations Forecast
Kona International Airport at Keahole

Year	KOA Itinerant Operations	U.S. ATCT GA Itinerant (millions)	KOA Market Share %	KOA Based Aircraft	Itinerant Ops Per Aircraft
1990	9,563	23.10	0.041%	36	266
1991	9,972	22.20	0.045%	36	277
1992	8,857	22.10	0.040%	32	277
1993	9,336	21.14	0.044%	46	203
1994	9,757	21.06	0.046%	46	212
1995	9,556	20.86	0.046%	46	208
1996	9,485	20.82	0.046%	46	206
1997	13,250	21.70	0.061%	40	331
1998	13,987	22.09	0.063%	42	333
1999	14,853	23.02	0.064%	42	354
2000	18,011	22.84	0.079%	42	429
2001	19,570	21.43	0.091%	35	558
2002	21,170	21.45	0.099%	34	623
2003	19,894	20.23	0.098%	36	553
2004	20,122	20.00	0.101%	55	366
2005	19,737	19.32	0.102%	55	359
2006	18,340	18.75	0.098%	61	301
Constant Market Share Projection					
2012	21,840	21.84	0.100%	102	214
2017	24,150	24.15	0.100%	118	205
2030	29,600	29.60	0.100%	160	185
Operations Per Based Aircraft Projection					
2012	30,600	21.84	0.140%	102	300
2017	35,400	24.15	0.147%	118	300
2030	48,000	29.60	0.162%	160	300
FAA-TAF Projection					
2012	21,586	21.84	0.099%	62	348
2017	23,662	24.15	0.098%	67	353
2030	28,476	29.60	0.096%	86	331
Master Plan Forecast					
2012	31,000	21.84	0.142%	102	304
2017	36,000	24.15	0.149%	118	305
2030	48,000	29.60	0.162%	160	300

Thus, the ratio can be expected to maintain at least its current level. With the forecast increase in based aircraft, however, the operations ratio is not likely to increase back to its 2002 levels. The second projection in **Table 2T** reflects the itinerant operational levels that could be expected if the operations per based aircraft ratio were to average 300 in the future.

Based upon the historic growth, it is likely that the KOA market share will continue to grow. Thus, the constant market share would be a low range forecast. For planning purposes, a projection maintaining the current level of itinerant operations per based aircraft ratio was selected as most representative of the potential growth.

The resulting forecast is included at the bottom of **Table 2T**.

As can be seen from the table, the Master Plan forecast is significantly higher than the FAA TAF. This reflects the higher forecast for based aircraft.

Local Operations

A similar methodology was utilized to forecast local operations. **Table 2U**

depicts the history of local operations at Kona International Airport at Keahole and examines its historic market share of GA local operations at towered airports in the United States. Local operations grew nearly ten-fold between 1990 (7,941) and 2005 (73,055). In 2006, traffic dropped off to 54,650, but is up nine percent in the first half of 2007.

Year	KOA Local Operations	U.S. ATCT GA Local (millions)	KOA Market Share %	KOA Based Aircraft	Local Ops Per Aircraft
1990	7,941	17.10	0.046%	36	221
1991	5,336	16.60	0.032%	36	148
1992	12,306	16.31	0.075%	32	385
1993	8,990	15.46	0.058%	46	195
1994	11,412	15.19	0.075%	46	248
1995	11,888	15.07	0.079%	46	258
1996	12,106	14.48	0.084%	46	263
1997	24,299	15.16	0.160%	40	607
1998	23,150	15.96	0.145%	42	551
1999	22,666	16.98	0.133%	42	540
2000	29,010	17.03	0.170%	42	691
2001	35,544	16.19	0.220%	35	1,016
2002	45,310	16.17	0.280%	34	1,333
2003	46,904	15.29	0.307%	36	1,303
2004	60,105	14.96	0.402%	55	1,093
2005	73,055	15.85	0.461%	55	1,328
2006	54,650	14.38	0.380%	61	896
Constant Market Share Projection					
2012	74,475	16.55	0.450%	102	730
2017	79,740	17.72	0.450%	118	676
2030	89,550	19.90	0.450%	160	560
Operations Per Based Aircraft Projection					
2012	91,800	16.55	0.555%	102	900
2017	106,200	17.72	0.599%	118	900
2030	144,000	19.90	0.720%	160	900
FAA-TAF Projection					
2012	71,849	16.55	0.434%	62	1,159
2017	83,292	17.72	0.470%	67	1,243
2030	122,316	19.90	0.615%	86	1,422
Master Plan Forecast					
2012	89,000	16.55	0.538%	102	873
2017	101,000	17.72	0.570%	118	856
2030	134,000	19.90	0.673%	160	838

The market share has grown significantly as well, from around 0.046 percent to 0.461 percent, although the share in 2006 declined to 0.380. **Table 2U** presents a market share projection based upon carrying forward a constant share of 0.450 percent.

Local operations per based aircraft have also increased over the same period from 221 in 1990 to 1,333 in 2002. The ratio in 2006 was 896. The second projection in **Table 2U** maintains a similar ratio of 900 local operations per based aircraft into the future.

As with the itinerant forecast, the local operations market share is likely to continue to increase in the future. At the same time, however, local operations per based aircraft are more likely to decline slowly as based aircraft increase. Thus, a declining ratio forecast is recommended for the purposes of this master plan and is depicted at the bottom of **Table 2U**.

The FAA TAF forecasts are also presented on **Table 2U**. As with itinerant operations, the master plan forecast is significantly higher reflecting the higher based aircraft forecast based upon the assumption of meeting currently underserved demand for hangars and other general aviation services.

OTHER AIR TAXI

Air taxi operations as reported by the ATCT include commuter passenger, commuter cargo, as well as for-hire general aviation operations. Some op-

erations by aircraft operated under fractional ownership programs are also counted as air taxi operations. Since the airline and cargo operations have been forecast, this section reviews the growth potential for the “other air taxi” operations. At KOA this includes interisland charters and tour operators as well.

Table 2V presents the other air taxi operations for the past three years. These operations have averaged approximately 50 percent of the itinerant general aviation operations. Because of the relationship to general aviation activity, other air taxi operations were projected to increase in line with that of general aviation itinerant operations. The resulting forecast is also presented on **Table 2V**.

TABLE 2V	
Other Air Taxi Operations	
Kona International Airport at Keahole	
Year	Other Air Taxi
<i>Actual</i>	
2004	11,798
2005	8,419
2006	9,116
<i>Forecast</i>	
2012	15,500
2017	18,000
2030	24,000

MILITARY

In spite of the fact that there are no military units based there, Kona International Airport at Keahole has a significant amount of military activity. **Table 2W** provides the history of military operations at KOA since 1990. The military operations at KOA primarily consist of training operations

by aircraft from other military bases in Hawaii and the Pacific Ocean.

Unless there is an anticipated mission change in the area, military operations are typically forecast to remain at current levels. That was the case with the previous forecasts for KOA. The *1998 Master Plan* forecast military activity at KOA to maintain a level of 12,700 annual operations through 2020. The 2004 DOT-A Forecast projected military activity at 17,600 annual operations through 2025. In 2006, there were 19,304 military operations at the airport. This is comparable to the current FAA TAF projection of 19,256 through 2025.

TABLE 2W			
Military Operations			
Kona International Airport at Keahole			
Year	Itinerant	Local	Total
1990	1,636	2,500	4,136
1991	1,350	1,978	3,328
1992	1,564	2,642	4,206
1993	1,944	3,584	5,528
1994	1,685	4,373	6,058
1995	2,104	6,997	9,101
1996	2,368	7,315	9,683
1997	1,999	5,394	7,393
1998	2,084	5,570	7,654
1999	2,359	6,648	9,007
2000	2,856	9,069	11,925
2001	3,176	11,414	14,590
2002	4,203	13,411	17,614
2003	4,227	11,344	15,571
2004	3,070	11,571	14,641
2005	3,686	13,456	17,142
2006	3,453	15,851	19,304
FORECAST			
2012	4,000	26,000	30,000
2017	4,000	26,000	30,000
2030	4,000	26,000	30,000

A mission change that was fully implemented in the first half of 2006 was the arrival of eight C-17 Globemasters

to be stationed at Hickam Air Force Base in Honolulu. The C-17s use KOA regularly as part of their training activities. This contributed to the increase in military traffic over the last three years at KOA.

There are two changes expected in the near future that will affect military activity at KOA. The airport is the preferred location for an auxiliary training runway at KOA to be used by the C-17 aircraft to practice short field landings.

Based upon information provided by the 15th Airlift Wing at Hickam Air Force Base, annual military operations can be expected to increase by approximately 10,000 after the Kona auxiliary training runway (KATR) is constructed.

In another expected change, the Hawaii Air National Guard is expected to undergo an aircraft conversion from the F-15 to the F-22. This change is not expected to significantly change operations at KOA. The forecasts presented in **Table 2W** reflect the planned mission changes.

ANNUAL INSTRUMENT APPROACHES (AIAs)

Forecasts of annual instrument approaches provide guidance in determining an airport's requirements for navigational aid facilities. An instrument approach as defined by FAA is "an approach to an airport with intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when visibility is less than

three miles and/or when the ceiling is at or below the minimum initial approach altitude.”

Data on instrument approaches to Kona International Airport at Keahole since 1995 were examined. True instrument weather conditions are not a common occurrence at KOA, with an average of just 64 AIAs over the 12 years examined. In fact, there have been several years when no AIAs were reported. The highest AIAs reported occurred in 1996 with 302. This included 265 by commercial aircraft, 19 by general aviation, and 18 by military. For commercial operations, the AIAs in that year were just 1.2 percent of the commercial landings. The AIA percentage for military activity was 1.5 percent of itinerant military landings. The AIAs for general aviation were just 0.4 percent of itinerant landings. These percentages were applied to the forecast operations to estimate the future AIA potential at KOA. **Exhibit 2N** includes the AIA forecast for KOA.

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period. **Exhibit 2N** is a summary of the aviation forecasts prepared in this chapter. Actual activity is included for 2006, which was the base year for these forecasts.

Airline passenger activity has good potential for growth, especially for overseas traffic. The increase in direct overseas traffic will have a dampening effect on interisland passenger figures. Regional jets have recently been introduced on interisland routes and can be expected to affect the future mix of aircraft on these routes.

Based aircraft at KOA are expected to see strong growth over the planning period, but the extent of that growth will be dependent upon the availability of services and facilities (especially hangars) in the future. Business and corporate jet traffic will be a contributor to that growth.

Air cargo activity can be expected to grow in volume. Other air taxi operations can be expected to continue to grow with increased interisland charter and tour flights. Military activity is expected to continue to be a factor in the mix of traffic at Kona International Airport at Keahole as well.

The next step in the planning process is to assess the capabilities of the existing facilities to determine what upgrades may be necessary to meet future demands. The forecasts developed here will be taken forward in the next chapter as planning horizon activity levels that will serve as milestones or activity benchmarks in evaluating facility requirements. Peak activity characteristics will also be determined for the various activity levels for use in determining facility needs.

Forecast Summary

	ACTUAL	FORECAST		
	2006	2012	2017	2030
ANNUAL OPERATIONS				
General Aviation				
Local	54,650	89,000	101,000	134,000
Itinerant	18,340	31,000	36,000	48,000
Total General Aviation	72,990	120,000	137,000	182,000
Airline	37,436	39,800	41,400	45,800
Air Cargo	4,372	4,700	5,100	6,100
Other Air Taxi	9,116	15,500	18,000	24,000
Military	19,304	30,000	30,000	30,000
Total Annual Operations	143,218	210,000	231,500	287,900
AIRLINE PASSENGERS				
Overseas				
U.S. Mainland	941,260	1,160,000	1,348,000	1,853,000
International	76,769	121,000	173,000	302,000
Transits	30,864	38,000	45,000	64,000
Total Overseas Passengers	1,048,893	1,319,000	1,566,000	2,219,000
Interisland	1,984,319	2,153,000	2,253,000	2,502,000
Total Airline Passengers	3,033,212	3,472,000	3,819,000	4,721,000
AIR CARGO (total tons)				
Air Freight	23,878	28,000	32,400	44,500
Air Mail	8,512	11,000	12,600	17,500
Total Air Cargo	32,390	39,000	45,000	62,000
BASED AIRCRAFT				
Single-Engine Piston	39	65	74	99
Multi-Engine Piston	6	7	7	7
Turboprop	4	9	11	14
Jet	1	4	7	14
Helicopter	9	16	19	26
Other	2	1	0	0
Total Based Aircraft	61	102	118	160
INSTRUMENT APPROACHES (AIA's)				
	35	490	477	567

Operations Forecast

Legend

- 1998 Master Plan
- 2004 DOT-A Forecast
- 2006 FAA-TAF
- Master Plan

