1.0 INTRODUCTION

The Alaska International Airport System (AIAS), comprised of the Ted Stevens Anchorage International Airport (ANC) and Fairbanks International Airport (FAI), initiated the AIAS Planning Study to determine how to optimize use of the capacity of both ANC and FAI to attract and retain international technical stop cargo (tech stop) traffic. This study examines whether increased use of FAI by tech stop carriers could avoid or defer the need for a new capacity improvements at ANC. That question is addressed through:

- a forecast of aviation activity for both airports (Chapter 2.0);
- an evaluation of runway capacity at ANC and FAI, and consideration of the effects on runway capacity of shifting tech stops to FAI (Chapter 3.0);
- identification of facilities and services at AIAS for tech stop operations and improvements that should be considered to support future growth (Chapter 4.0);
- an examination of the feasibility of creating incentives to attract carriers to FAI (Chapter 5.0);
- a discussion of risks of taking action or not taking action to address potential airfield capacity issues (Chapter 6.0); and
- a summary of key findings and recommendations (Chapter 7.0).

This study provides technical information and broad recommendations for future actions for the AIAS. Specific improvements will be evaluated in the ANC and FAI Airport Master Plans. These Airport Master Plans, currently under way, will use the forecasts, capacity analysis, and other technical analysis and strategy in this report to complete more detailed long-range plans for each airport.

2.0 FORECAST SUMMARY

This chapter summarizes results of the aviation activity forecasts prepared for the AIAS. These AIAS forecasts for ANC, FAI, and Lake Hood Airport (LHD) are presented in more detail in the *Alaska International Airport System Plan Forecast Technical Report* (September, 2012).

Forecasts were prepared for 2015, 2020, 2025, and 2030. This chapter describes in succession:

- the purpose and background of the forecasts;
- key socioeconomic and aviation industry factors;
- projections of passenger and cargo activity;
- a summary of the aircraft operations forecasts including air taxi, general aviation (GA) and military; and
- a set of alternative forecast scenarios.

2.1 Purpose and Background

The AIAS forecasts support the AIAS Planning Study, as part of the AIAS's overall strategic planning effort. The forecasts are being used in the ANC and FAI Airport Master Plan Updates and in the ANC Part 150 Study.

More specifically, the AIAS forecasts are intended to help determine the capacity of the AIAS system in order to:

- explore options for transferring aviation activity between the two airports to optimize use of existing capacity, and
- determine trigger points for addressing system capacity needs.

The capacity modeling used the forecasts to prepare design day flight schedules for ANC and FAI. The baseline forecasts do not incorporate the impacts of capacity constraints or incentive programs and therefore assume that the AIAS airports will continue in their current roles. The scenario analysis at the end of this chapter describes the potential impact of constraints on forecast activity levels.

The study included a forecast methodology and a set of forecast assumptions for review and approval by the State of Alaska and other stakeholders. In addition, a comprehensive survey of the major passenger and cargo carriers serving ANC and FAI, described in more detail in the AIAS Forecast Technical Report, was undertaken.

Aviation activity at ANC and FAI consists of the following subcategories:

- Commercial Passenger Service Activity - Including enplaned, deplaned and transit passengers for domestic air carriers, regional carriers, charter and other carriers, and international carriers;
- Air Freight and Mail Activity - Including enplaned, deplaned, and transit tonnage operations for domestic and international carriers;
- Air Taxi and Other Activity - Including small, for-hire operators, and some other commercial operators that are not classified as passenger or cargo operators in the traditional United States (U.S.) Department of Transportation data sources;
- GA Activity; and
- Military Operations.

Passenger activity is organized into three main categories: intrastate; other U.S.; and international. These breakouts recognize the different forces driving activity in each region. Within Alaska, air transportation is a necessity. Many Alaska communities do not have access to other transportation modes such as highway and rail, and thus air travel to or from rural Alaska is a necessity. Compared to many other regions in the U.S., demand for air transportation within Alaska is relatively insensitive to price. Air travel between Alaska and the remainder of the U.S. is more discretionary since alternative transportation modes are available. Also, many Lower 48 passengers to Anchorage are tourists who have a range of options for travel destinations. Hence, air travel to the rest of the U.S. and to other countries is much more price-sensitive.

In general, domestic enplaning and deplaning passengers at ANC and FAI have experienced slow growth in recent years with downturns during economic recessions. More notably, the number of transit passengers has declined significantly. The number of domestic transit passengers has declined as airlines in Alaska, as in the rest of the U.S., have sharply reduced

their multi-stop and tag end routes. International enplanements and deplanements at the AIAS airports have fluctuated over the past three decades, but transit passengers have considerably declined. The main reasons for the decline have been: (1) the introduction of new-generation, long-range aircraft, especially the Boeing 747-400, which has enabled airlines to fly non-stop between Asia and the Lower 48 U.S.; and (2) the opening of Russian airspace to Asia-Europe flights.

Air cargo (freight plus mail) at ANC and FAI includes the following:

- Intrastate cargo to and from other Alaska airports;
- Origin-destination cargo flows from ANC to and from the Lower 48;
- Origin-destination cargo flows from ANC to and from other countries;
- Transfer cargo (cargo that is unloaded from one airplane and loaded to another airplane); this can be foreign to ANC, foreign to other U.S., or ANC to other U.S; and
- Transit cargo (cargo that is neither loaded nor unloaded at ANC, but is carried on aircraft that land at ANC for refueling or crew relief).

Available data sources do not provide an accurate breakout between origin-destination, transfer, and transit cargo; however, when surveyed, cargo operators indicated that origin-destination cargo flows from AIAS airports to and from other countries were minor, accounting for less than 1% of the total.

Air cargo activity is organized into two main categories, intrastate and other U.S./international. For the purpose of this analysis, non-Alaska U.S. cargo has been combined with international cargo because there is no practical way to separate the two categories. Many U.S. flag carriers commingle international and domestic cargo on the North American leg of their flights. Also, although cargo that clears U.S. Customs at ANC and continues to a U.S. destination is technically domestic, it is international in origin and more subject to the drivers that determine international cargo than domestic cargo.

Intra-Alaska cargo is typically loaded or unloaded at ANC and FAI, includes very little transit cargo, is carried on narrow body jets or turboprops, and has been stable or growing slowly.

International cargo is mostly transit, with some transfer activity and very little origin-destination activity (as a percentage of all cargo activity). Virtually all international cargo is carried on large wide-body aircraft over long distances and with tight schedule constraints. In addition, until recently international cargo was the fastest growing aviation category at the AIAS airports.

Much of intrastate cargo is bypass mail. The bypass mail system allows shippers to deliver pallet loads of at least 1,000 pounds per shipment at a reduced rate directly to an air carrier without transiting a post office. In this respect, bypass mail is very similar to air freight and is often used by shippers as a substitute for air freight.

The international/other U.S. category experienced very rapid growth until 2007. International air cargo fell in 2008 and 2009 as a result of the fuel price spike and the recession. Cargo traffic recovered in 2010 but fell again in 2011 and 2012. The rapid increase in international air cargo at ANC prior to 2007 is attributable to several factors. First, air cargo has grown rapidly worldwide in recent decades, especially in the Asia-North America market, which according to Boeing, grew at a 9.0% annual rate between 1981 and 2007. This growth was achieved despite the disruptions of the Asian financial crisis in the late 1990s and the 9/11 terrorist attacks. Because of its strategic location along the great circle routes between Asia and North America, ANC was particularly well-suited to take advantage of this growth. In addition, carriers such as FedEx and United Parcel Service (UPS) were increasingly using ANC as a transfer hub to distribute aircraft payloads better along their North American and Asian routes.

ANC's single greatest advantage to air cargo carriers has been its location which allows carriers to maximize their trans-Pacific payloads. Otherwise they would have to sacrifice payload for additional fuel needed to fly non-stop between Asia and North America.

Total annual aircraft operations at ANC gradually declined from 249,677 in 2000 to 211,646 in 2011. The decline resulted from many factors including:

- The loss of international passenger flights;
- The increase in the average size and load factor of domestic passenger flights; and,
- A decline in air taxi, GA, and military operations.

All-cargo operations increased until 2005, but have since declined. Operations at FAI declined from 2000 to 2007, and have since increased.

In 2010 ANC received an average of 83 tech stops per day. In the peak month of October 2010, ANC handled 103 tech stops on a busy day. The airlines with the largest number of ANC tech stops include Cathay Pacific, EVA Airways, Korean Air, China Airlines, China Cargo Airlines, and Polar Air Cargo.

FAI previously served tech stops in the early 1990s through mid-2000s. At that time, Lufthansa, Cargolux, and Air France shifted tech stop operations from ANC to FAI. During that timeframe, FAI handled up to four tech stop aircraft of these carriers at one time. Scheduled international cargo tech stops at FAI dwindled to nothing after the opening of former Soviet airspace and the introduction of new generation aircraft that could fly non-stop between Europe and Asia. FAI currently occasionally receives tech stop traffic, primarily weather diversions from ANC and infrequent charter flights.

2.2 Key Forecast Assumptions

Aviation activity forecasts are highly dependent on assumptions about the future economic and operating environment. The ultimate determinants of passenger and air cargo demand are the strength of the economy and the cost and availability of service. Consequently, a clear understanding of local, national, and international economic forces and trends is important for developing an accurate aviation activity forecast.

Discussions with many key airport stakeholders led to development of a hybrid socioeconomic forecast for use in this study. The hybrid forecast:

- Applied the average of the Institute of Social and Economic Research (ISER) and Woods & Poole per capita income projections to the State of Alaska Department of Labor and Workforce Development population projections to develop an income forecast; and
- Applied the per capita employment projections from the Woods & Poole forecasts to the State of Alaska Department of Labor and Workforce Development population projections to develop employment projections.

Much of the cargo traffic at ANC depends primarily on world economic trends rather than local or national trends. Global Insight forecasts of Gross Domestic Product by world region, as published in the *Federal Aviation Administration (FAA) Aerospace Forecasts: FY 2010-2031* were selected for use in the international cargo forecasts. They are the most recent available forecasts that cover all the regions in question.

Both the regional and international economic forecasts assume no new major economic downturn, such as occurred during the depression of the 1930s or the financial crisis of 2008. Local, national, and international economies will periodically increase and decrease the pace of growth in accordance with business cycles. However, it is assumed that over the 20-year forecast term the high-growth and low-growth periods will offset each other so that the adjusted economic forecasts will be realized.

Jet fuel prices are an important determinant of aviation demand and were incorporated in both the passenger and cargo forecasts. Jet fuel prices are very sensitive to crude oil prices, which have been extremely volatile over the past several years. Several forecasts of jet fuel and crude oil prices were considered. Airlines need to cover their fuel costs, so jet fuel prices have a direct impact on air fares and freight rates as well.

Review of several alternative jet fuel price forecasts and consideration of stakeholder input led to the development of a composite fuel projection which assumes that fuel prices:

- Will grow gradually in real terms to the average of the U.S. Department of Energy Reference and High forecasts by 2015 and then;
- Continue to grow at the average of the U.S. Department of Energy Reference and High cases thereafter.

This assumption incorporates the continuing tendency of fuel prices to track higher than most forecasts, but does not completely accept the U.S. Department of Energy High forecast that was intended to represent an extreme case.

Estimates of future air fares were based on FAA forecasts of revenue per passenger mile (yield) and average trip distance, with an adjustment that incorporates the selected jet fuel cost projections selected earlier in this section. The fare projections indicate that the historical decline

in real airfares will reverse, resulting in future gradual increases, driven by higher fuel prices. Unlike the past, it is unlikely that higher fuel prices will be offset by higher load factors since loads are already close to 100% at peak times.

In addition to the economic and fuel price assumptions, other assumptions used to prepare the AIAS activity forecasts are described in detail in the Technical Report.

2.3 Passenger Forecasts

Separate forecast approaches were used for the domestic and international forecasts. Domestic passengers were projected using a bottom-up methodology based on projections of income and average air fares. The approach was used to estimate three separate forecasting equations; one for passengers between ANC and FAI, one for passengers to the rest of Alaska, and one for passengers to the rest of the U.S.

The methodology used to develop the international passenger forecasts was essentially a top-down approach that estimated the Alaska share of total Asia-North America passengers projected by Boeing and Airbus. Historically, international transit passengers through ANC have been declining as more and more international carriers acquire long-haul aircraft capable of flying from Asia to North America without a technical stop. Over the forecast period, it is likely that the introduction of additional long-haul aircraft such as the Boeing 787, coupled with security requirements and competitive pressures from other Asian and U.S. carriers, will force remaining transit carriers to operate non-stop. Therefore, the forecast assumes that all regular international passenger transit service will cease by 2015.

Tables 2.1 and 2.2 summarize the annual passenger forecasts for ANC and FAI, including domestic and international passengers. As shown, total ANC passengers are projected to increase at about 1.0% per year. The growth rate is lower than it would be otherwise because of the loss of the international transit passengers. Total FAI passengers are projected to increase at about 1.2% per year.

Table 2.1: Forecast of Anchorage Enplaned and Transit Passengers by Category

	Enplaned			Transit			Enplaned plus Transit		
Year	Domestic	International	Air Taxi and Other	Domestic	International	Air Taxi and Other	Domestic	International	Total
2010	2,229,457	31,724	137,331	22,891	165,663	15	2,389,694	197,387	2,587,081
2015	2,360,370	36,874	152,711	10,072	18,589	17	2,523,170	55,463	2,578,633
2020	2,495,425	42,861	165,539	10,649	21,607	18	2,671,631	64,468	2,736,099
2025	2,651,942	49,820	176,159	11,316	25,115	19	2,839,436	74,935	2,914,371
2030	2,850,202	57,908	183,060	12,162	29,193	20	3,045,444	87,101	3,132,545
				Average Annual Growth Rate					
2010-2030	1.2%	3.1%	1.4%	-3.1%	-8.3%	1.4%	1.2%	-4.0%	1.0%

Source: Table 10.1 in AIAS Forecast Technical Report.

Table 2.2: Forecast of Fairbanks Enplaned and Transit Passengers by Category

	Enplaned			Transit			Enplaned plus Transit		
Year	Domestic	International	Air Taxi and Other	Domestic	International	Air Taxi and Other	Domestic	International	Total
2010	452,427	5,703	6,439	36,911	2,971	15,088	510,865	8,674	519,539
2015	479,153	6,492	7,160	39,091	3,382	16,778	542,182	9,874	552,056
2020	502,592	7,395	7,762	41,004	3,852	18,187	569,545	11,247	580,792
2025	529,375	8,428	8,260	43,189	4,391	19,354	600,178	12,819	612,997
2030	565,123	9,611	8,583	46,105	5,007	20,112	639,923	14,618	654,541
				Average Annual Growth Rate					
2010-2030	1.1%	2.6%	1.4%	1.1%	2.6%	1.4%	1.1%	2.6%	1.2%

Source: Table 10.2 in AIAS Forecast Technical Report.

The forecasts of passenger aircraft operations were derived from the passenger enplanement forecasts and incorporated trends in passenger load factor and expected changes in the passenger fleet mix resulting from new aircraft orders. The forecasts were developed by considering:

- Individual market and incorporated historical service patterns;
- Current dominant carriers;
- Aircraft in place and on order;
- Length of haul; and
- Announced plans of current carriers and new entrants.

The operations forecasts for each market were summarized to generate forecasts of annual aircraft operations and fleet mix.

2.4 Cargo Forecasts

Separate forecast approaches were used for the intrastate and international/other U.S. air cargo tonnage forecasts. The intrastate cargo tonnage forecasts were bottom-up and based on projections of regional income and employment and anticipated fuel prices.

The international/other U.S. cargo tonnage forecast was based on an analysis of the flow of worldwide air cargo and the role that AIAS airports perform in facilitating that flow. Aircraft carrying air cargo from Asia to North America can take a variety of routings. They can go non-stop, although even the new Boeing 747 or 777 freighters cannot carry enough fuel on most routes without sacrificing payload. Second, aircraft can make technical stops for refueling at intermediate points, such as ANC, FAI, or an alternative airport. To save fuel and time, aircraft that do not need to enplane or off-load cargo will usually try to minimize the distance flown. Cargo that is neither loaded nor off-loaded is transit cargo.

Some cargo aircraft currently landing at ANC transfers cargo to and from other aircraft, allowing carriers to serve Asian and North American cargo markets that generate insufficient traffic to justify a direct route. A transfer operation requires coordinated schedules and adequate on-airport facilities for the transfer operations.

Airline routing and operating decisions over the next twenty years, coupled with AIAS' and competing airports' facility investments, will determine the share of this air cargo flow that:

- Goes non-stop;
- Becomes transit cargo at an AIAS airport or a competing airport; or
- Is transferred at an AIAS airport or a competing airport.

These factors will largely determine the amount and type of international air cargo activity at ANC and FAI.

Another characteristic of the Asia-North America market is that it is directionally unbalanced. Asian countries export much more to the U.S. (measured in both weight and value) than they import. As a result, eastbound cargo tonnage flows - from Asia to North America - are approximately twice westbound flows. Consequently, aircraft flying eastbound tend to have very

full (and profitable) loads while they fly light (and unprofitable) loads going westbound. Carriers have adopted a variety of strategies to optimize profitability, including:

- overflying Alaska on westbound flights to save the time and expense of en route tech stops, since with reduced payload they can carry more fuel;
- reducing rates on westbound routes to help increase demand; and
- flying eastbound round-the-world itineraries to avoid the money-losing North America to Asia route.

These factors have had, and will continue to have, an impact on the extent and character of cargo activity at the AIAS airports.

The approach used to project international/other U.S. air cargo involved first preparing an independent estimate of Asia-North America air cargo flows and then estimating the freighter (non-passenger aircraft) share of these flows. The amount of future international freighter cargo that flows through AIAS airports will depend on the need and desirability of ANC or FAI as a technical stop for the carriers engaged in this traffic. In addition to adequate facilities, the desirability of Alaska as a technical stop will depend on four principal factors (all considered in the AIAS cargo forecast):

- shifts in geographic location of demand;
- potential competition from other technical stops;
- continued improvements in aircraft technology that will allow longer flights at full payloads; and
- opportunities for transferring cargo at Alaska (cross-loading) not available elsewhere.

ANC and FAI currently capture about 77% of non-transfer eastbound freighter flows between Asia and North America. By 2030, based on the factors enumerated above, this percentage is projected to decline to about 55%. As a result, total eastbound cargo flowing through AIAS airports is expected to increase from about 1.7 million tons to 3.1 million tons, an average annual increase of 3.1%.

ANC and FAI currently capture about 63% of non-transfer westbound freighter cargo between North America and Asia. By 2030, as average aircraft range increases, this percentage is projected to decline to about 39%. Based on this decline in traffic share, AIAS total westbound cargo is expected to increase from 0.7 million tons to 1.3 million tons, an average annual increase of 2.7%.

Tables 2.3 and 2.4 summarize the cargo tonnage forecasts for ANC and FAI. Note that these forecasts are baseline forecasts and do not take into account the potential impact of capacity constraints or incentive programs to divert traffic between ANC and FAI.

Table 2.3: Forecast Anchorage International and other U.S. Cargo Tonnage

	Intra-Alaska				International/U.S.				Total			
Year	Enplaned	Deplaned	Transit	Total	Enplaned	Deplaned	Transit	Total	Enplaned	Deplaned	Transit	Total
2010	88,500	21,134	14	109,661	365,766	412,284	2,030,406	4,838,862	454,266	433,418	2,030,420	4,948,523
2015	97,217	22,701	15	119,948	400,212	451,109	2,199,289	5,249,898	497,429	473,810	2,199,304	5,369,846
2020	100,195	23,098	15	123,323	525,738	592,600	2,687,503	6,493,344	625,933	615,698	2,687,518	6,616,667
2025	102,456	23,404	16	125,892	678,461	764,745	3,070,720	7,584,646	780,917	788,149	3,070,736	7,710,538
2030	104,218	23,666	16	127,916	842,823	950,011	3,441,557	8,675,948	947,041	973,677	3,441,573	8,803,864
					Average Annual Growth Rate							
2010-2030	0.8%	0.6%	0.8%	0.8%	4.3%	4.3%	2.7%	3.0%	3.7%	4.1%	2.7%	2.9%

Source: Table 10.5 in AIAS Forecast Technical Report.

Table 2.4: Forecast Fairbanks International and other U.S. Cargo Tonnage

	Intra-Alaska				International/U.S.				Total			
Year	Enplaned	Deplaned	Transit	Total	Enplaned	Deplaned	Transit	Total	Enplaned	Deplaned	Transit	Total
2010	16,885	4,800	1,616	24,917	74	153	6,624	13,474	16,958	4,954	8,240	38,391
2015	17,088	5,243	1,684	25,699	81	168	7,173	14,595	17,169	5,411	8,857	40,294
2020	17,053	5,003	1,652	25,360	106	220	9,007	18,339	17,159	5,223	10,659	43,699
2025	17,037	4,827	1,629	25,122	137	284	10,452	21,325	17,174	5,111	12,081	46,447
2030	17,067	4,712	1,616	25,011	170	353	11,894	24,310	17,237	5,065	13,510	49,321
					Average Annual Growth Rate							
2010-2030	0.1%	-0.1%	0.0%	0.0%	4.3%	4.3%	3.0%	3.0%	0.1%	0.1%	2.5%	1.3%

Source: Table 2.4 in AIAS Forecast Technical Report.

The forecasts of all-cargo aircraft operations were derived from the cargo tonnage forecasts and incorporate trends in cargo load factor and expected changes in the cargo carrier fleet mix

resulting from new aircraft orders. The forecasts were developed by individual market and incorporated:

- historical service patterns;
- current dominant carriers;
- aircraft in place and on order;
- length of haul; and
- announced plans of current carriers and new entrants.

The operations forecasts for each market were aggregated to generate forecasts of annual aircraft operations and fleet mix.

2.5 Other Activity Forecasts

In addition to passenger and cargo activity, forecasts were prepared for three other categories: air taxi and other, GA, and military.

For the purpose of this analysis, the air taxi and other category includes both traditional "for-hire" air taxi and non-commercial charter activity such as the flights operated by BP Exploration and Conoco-Phillips.

Conoco Phillips shuttle flights to the North Slope account for the majority of air taxi and other passengers at ANC and FAI. Through 2007, this passenger activity varied from year to year, but with little discernible long-term trend. This passenger traffic dropped off sharply in 2008, followed by a strong rebound in 2009, 2010 and 2011. These operations serve primarily the intrastate market and are driven mainly by oil and natural gas exploration and development. The AIAS air taxi and other passenger forecast was therefore based on a forecast equation in which air taxi and other passengers are a function of crude oil prices.

Although historical data for air taxi and other aircraft operations are sparse, there appears to have been little change in the aircraft used by this segment in recent years. In addition, there are no published plans for major changes in aircraft types among the air taxi operators at ANC and FAI. Consequently, air taxi and other operations were assumed to increase at the same rate as air taxi and other passengers.

GA is an important component of aviation in Alaska. Nationally, personal and recreational GA has been in decline while corporate and business-related GA has been increasing. Both categories suffered declines during the fuel spike and recession of 2008 and 2009, but have experienced a partial recovery in 2010 and 2011.

The GA operations forecasts for ANC, FAI, and LHD were based on a market share analysis of U.S. GA activity, measured by GA hours flown. The change in the historical ratio of AIAS GA operations to U.S. GA hours flown was calculated, and this change in the ratio was projected to continue in the future.

Military operations at ANC have declined significantly since 2010 because of the relocation of the Kulis Air National Guard to Joint Base Elmendorf Richardson (JBER) completed in February, 2011. Military operations are related to national and international political and institutional factors rather than local economic conditions and are therefore difficult to forecast using traditional approaches. Consequently, military operations were assumed to remain constant at the 2011 level of activity, after an adjustment for the impact of Kulis-related operations in January, 2011. Military operations at FAI were assumed to remain constant at the 2011 level of activity at FAI.

2.6 Operations Forecasts

Tables 2.5, 2.6, and 2.7 summarize the aircraft operations forecasts for ANC, FAI, and LHD. These baseline forecasts are unconstrained and assume that there will be adequate airfield, terminal, and cargo facilities to accommodate projected traffic. The impact of constraints on aviation activity will be addressed in Section 2.7.

Total aircraft operations at ANC are projected to increase from 215,564 in 2010 to 281,942 by 2030, an average annual increase of 1.4%. All-cargo aircraft operations represent the fastest growing category while military operations show the greatest reduction as a result of the Kulis relocation.

Total aircraft operations at FAI are projected to increase from 121,981 in 2010 to 156,128 in 2030, an average annual increase of 1.2%. All-cargo operations are projected to be the fastest growing category and military is projected to be the slowest growing category.

Estimated aircraft operations at LHD are projected to increase from 59,214 in 2010 to 78,348 in 2030, an average annual increase of 1.4%.

Table 2.5: Summary of Aircraft Operations Forecast - Anchorage

Year	Passenger (a)	All-Cargo (a)	Air Taxi and Other	General Aviation	Military	Total
2010	86,543	81,612	6,948	36,060	4,401	215,564
2015	90,504	86,348	7,726	38,152	2,267	224,997
2020	92,656	99,114	8,375	39,863	2,267	242,275
2025	97,080	110,155	8,912	43,324	2,267	261,738
2030	101,504	121,196	9,262	47,713	2,267	281,942
			Average Annual Growth Rate			
2010-2030	0.8%	2.0%	1.4%	1.4%	-3.3%	1.4%

(a) Aircraft departure forecasts multiplied by two.

Sources: Tables 5.7, 6.7, 7.3, 8.1, and 9.1 in AIAS Forecast Technical Report.

Table 2.6: Summary of Aircraft Operations Forecast - Fairbanks

Year	Passenger (a)	All-Cargo (a)	Air Taxi and Other	General Aviation	Military	Total
2010	36,496	3,337	8,328	71,099	2,721	121,981
2015	39,828	3,748	9,261	74,456	2,830	130,123
2020	41,950	4,426	10,039	77,003	2,830	136,248
2025	44,304	4,835	10,683	82,834	2,830	145,486
2030	46,658	5,244	11,101	90,295	2,830	156,128
			Average Annual Growth Rate			
2010-2030	1.2%	2.3%	1.4%	1.2%	0.2%	1.2%

(a) Aircraft departure forecasts multiplied by two.

Sources: Tables 5.8, 6.8, 7.4, 8.2, and 9.2 in AIAS Forecast Technical Report.

Table 2.7: Summary of Aircraft Operations Forecast - Lake Hood Seaplane Base and Lake Hood Strip

Year	Passenger	All-Cargo	Air Taxi and Other	General Aviation	Military	Total
2010	-	-	14,286	44,928	-	59,214
2015	-	-	15,115	47,534	-	62,649
2020	-	-	15,793	49,667	-	65,460
2025	-	-	17,164	53,978	-	71,142
2030	-	-	18,902	59,446	-	78,348
Average Annual Growth Rate						
2010-2030	-	-	1.4%	1.4%	-	1.4%

Source: Table 10.11 in AIAS Forecast Technical Report.

2.7 Forecast Scenarios

The Baseline Forecast was approved by the FAA and serves as the official forecast. It provides the basis for determining what additional facilities or policies will be required to manage capacity at the AIAS airports through 2030. However, the assumptions used in developing the forecasts are likely to vary over the forecast period, and the variations could be material. One way to explore the impact of these variations is to develop alternative scenarios in which the impact of a variation in a critical assumption on the forecast is evaluated. The scenarios help identify the range of contingencies that the AIAS may need to respond to, taking into account political and economic changes, technological changes, and changes in the policies of individual airlines.

To address these potential changes, seven alternative forecast scenarios were selected with the assistance of the State of Alaska Department of Transportation and Public Facilities staff and the airlines. The seven scenarios differ from the FAA-approved baseline forecast and include:

Scenario 1 - No Action: The No Action Scenario assumes no airfield, parking, or terminal expansion at ANC, FAI, or LHD and no policy initiatives to transfer traffic between the two AIAS airports. Based on the capacity analysis, airlines will begin to adjust operations to manage delay when the unconstrained forecast exceeds 258,000 annual operations (discussed in

Chapter 3.0 of this report), estimated to occur around 2024. Airlines will react differently to delay, depending on the cost of delay to their operations and their options for managing the delay, and these differences were accounted for in developing the scenario. Note that although the annual capacity of ANC is estimated at 258,000 operations, growth can continue afterwards during off-peak periods, but at a slower pace than under the baseline forecast.

Scenario 2 - High Fuel Price: The High Fuel Price Scenario assumes the U.S. Department of Energy's high fuel price scenario occurs. Under the High Fuel Price Scenario, jet fuel prices would be significantly higher than under the baseline case. To remain financially viable, air carriers would need to pass on higher fuel prices through higher air fares and cargo rates, thereby lowering demand. In addition, the higher oil prices would lower economic growth and also lower demand.

Scenario 3 - High Economic Growth/Increased International Air Cargo: The High Economic Growth/Increased International Air Cargo Scenario assumes that the state, U.S., and world economy will grow more rapidly than currently expected. This scenario also uses the average Boeing/Airbus Asia/North America air cargo forecast growth rates as the basis for the international air cargo forecasts, resulting in higher cargo tonnage and operation forecasts for ANC and FAI.

Scenario 4 - Starburst: The Starburst Scenario assumes major transfer operations at AIAS result in large aircraft coming in from Asia and off-loading cargo to a many smaller aircraft flying to a multitude of North American markets. The scenario assumes that airlines take extensive advantage of the Stevens Act to transfer cargo at ANC and FAI. The result would be that less Asia/North America cargo would be lost to overflying than under the Baseline Forecast, and that there would be many more aircraft operations by smaller aircraft.

Scenario 5 - Low Fuel Price: The Low Fuel Price Scenario is the reverse of the High Fuel Price Scenario and assumes the U.S. Department of Energy's low fuel price scenario occurs. Under the Low Fuel Price Scenario, jet fuel prices would be significantly lower than under the Baseline Forecast. As a result of competition, air carriers are assumed to pass on lower fuel prices through lower air fares and cargo rates. The combination of lower air travel costs and a stronger economy would be expected to significantly increase aviation activity at ANC and FAI.

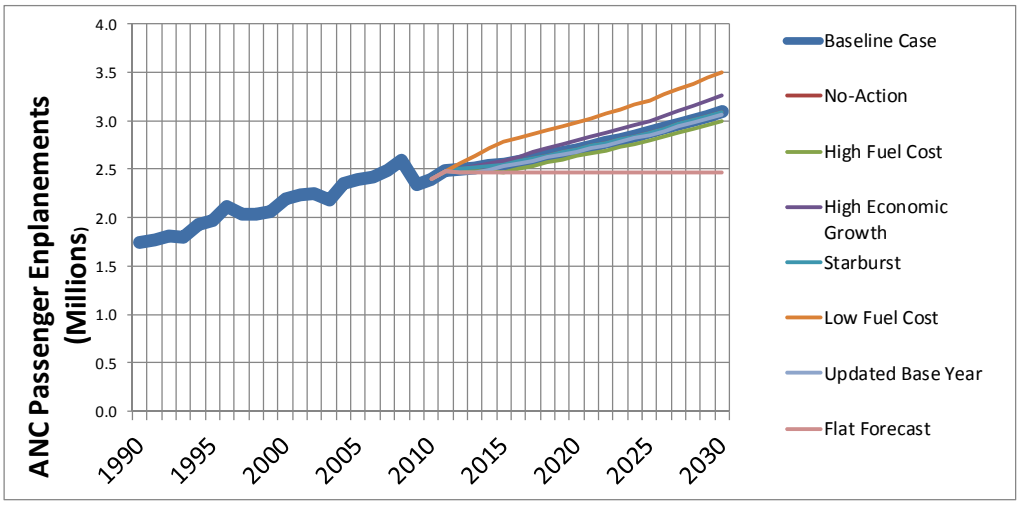
Scenario 6 - Updated Base Year: The Updated Base Year Scenario is based on the recognition that, as of early 2013, current activity, especially air cargo activity, is tracking below Baseline Forecast levels at ANC. Therefore, this scenario uses the best available estimate of current activity levels and applies the Baseline Forecast growth rates to the estimated current activity levels. Growth was assumed to resume after 2013, at the same rates as in the Baseline Forecast. When compared to the Baseline Forecast, the Updated Base Year Scenario generates lower projections for ANC, very similar projections for FAI, and higher activity projections for LHD.

Scenario 7 - Flat Growth: Discussions with the airlines during the review of the forecasts indicated that, in addition to the adverse impacts of the slow economy and high fuel cost, there is an ongoing change in air carrier business models that may further constrain growth. It is too soon to discern the details of these potential business model changes, so a quantifiable analysis of their impacts on the forecast is not possible. As an alternative, a Flat Growth Scenario was developed that assumes all passenger, cargo, and aircraft operations activity remains constant at 2013 levels.

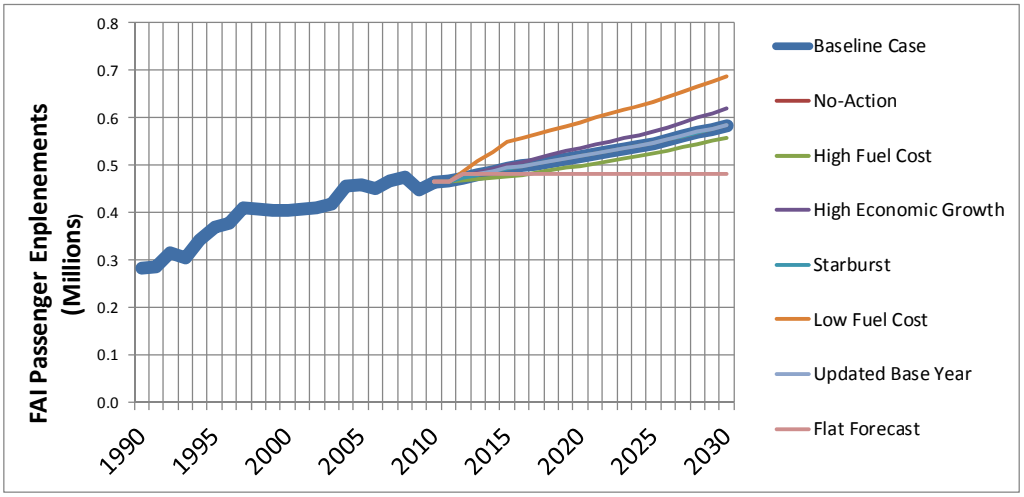
Exhibit 2.1 presents the alternative passenger enplanement forecasts. The Low Fuel Cost Scenario generates the highest enplanement forecast for all three airports, because of the combined impacts of lower travel costs and a stronger economy resulting from the reduced fuel costs. As would be expected, the High Economic Growth Scenario is also higher than the Baseline Forecast. The Updated Base Year Scenario is higher than the Baseline Forecast for both FAI and LHD because passenger enplanements have tracked above the forecast between 2010 and 2012.

The High Fuel Cost Scenario passenger enplanement forecast is lower than the Baseline Forecast for all three airports as a result of higher transportation costs and lower economic growth. The Flat Forecast Scenario is the lowest of all the scenarios for both ANC and FAI. However, for LHD it compares well with the Baseline Forecast because of the actual growth that has occurred since 2010.

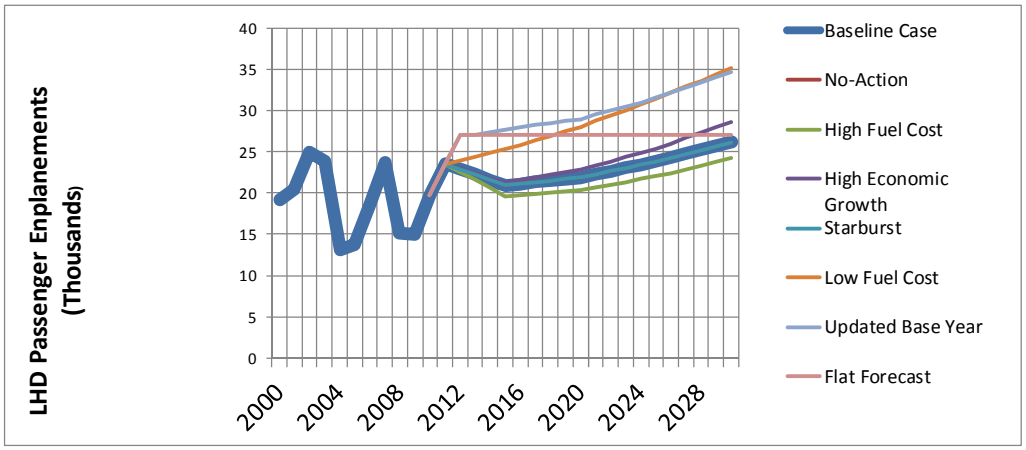
Anchorage International Airport



Fairbanks International Airport



Lake Hood Airport



Sources: Tables 11.1, 11.2 and 11.3.

Exhibit 2.1: Summary of Forecast Scenarios - Passenger Enplanements

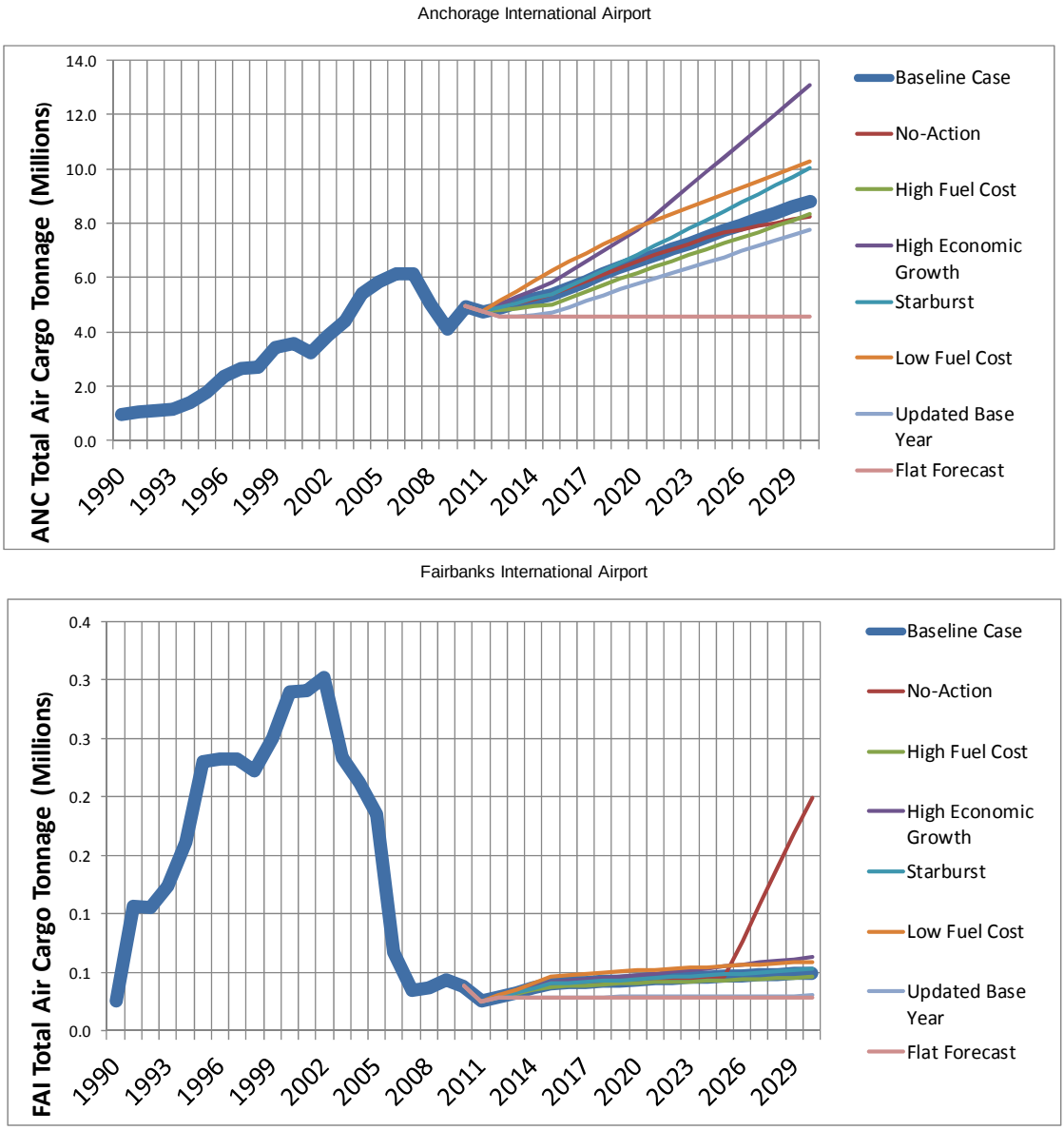
The Starburst Scenario is the same as the Baseline Forecast because the assumptions for this scenario are not expected to have any measurable impact on passenger enplanements. The No-Action Scenario enplanement forecast is also the same as the Baseline Forecast, because it is expected that passenger carriers would be able to accommodate demand with schedule adjustments through 2030. At some point after 2030, however, the continued growth in passenger demand coupled with no increases in airport capacity at ANC would result in a divergence between the Baseline and No-Action passenger forecasts at ANC.

Exhibit 2.2 compares the cargo tonnage forecasts for the Baseline Forecast and the scenarios for ANC and FAI. Four forecasts anticipate higher than Baseline cargo tonnage:

- The High Economic Growth Scenario shows the highest growth rate for ANC since it also incorporates the aggressive Boeing and Airbus international air cargo projections;
- The Low Fuel Cost Scenario is also higher than the Baseline Forecast because of lower transport costs coupled with higher economic growth under this scenario;
- The Starburst Scenario is higher than the Baseline Forecast because less cargo would be lost to overflying; and
- For FAI, the No-Action Scenario is the highest of all the scenarios because of the diverted cargo resulting from capacity constraints at ANC.

Three forecasts anticipate a lower than Baseline cargo tonnage:

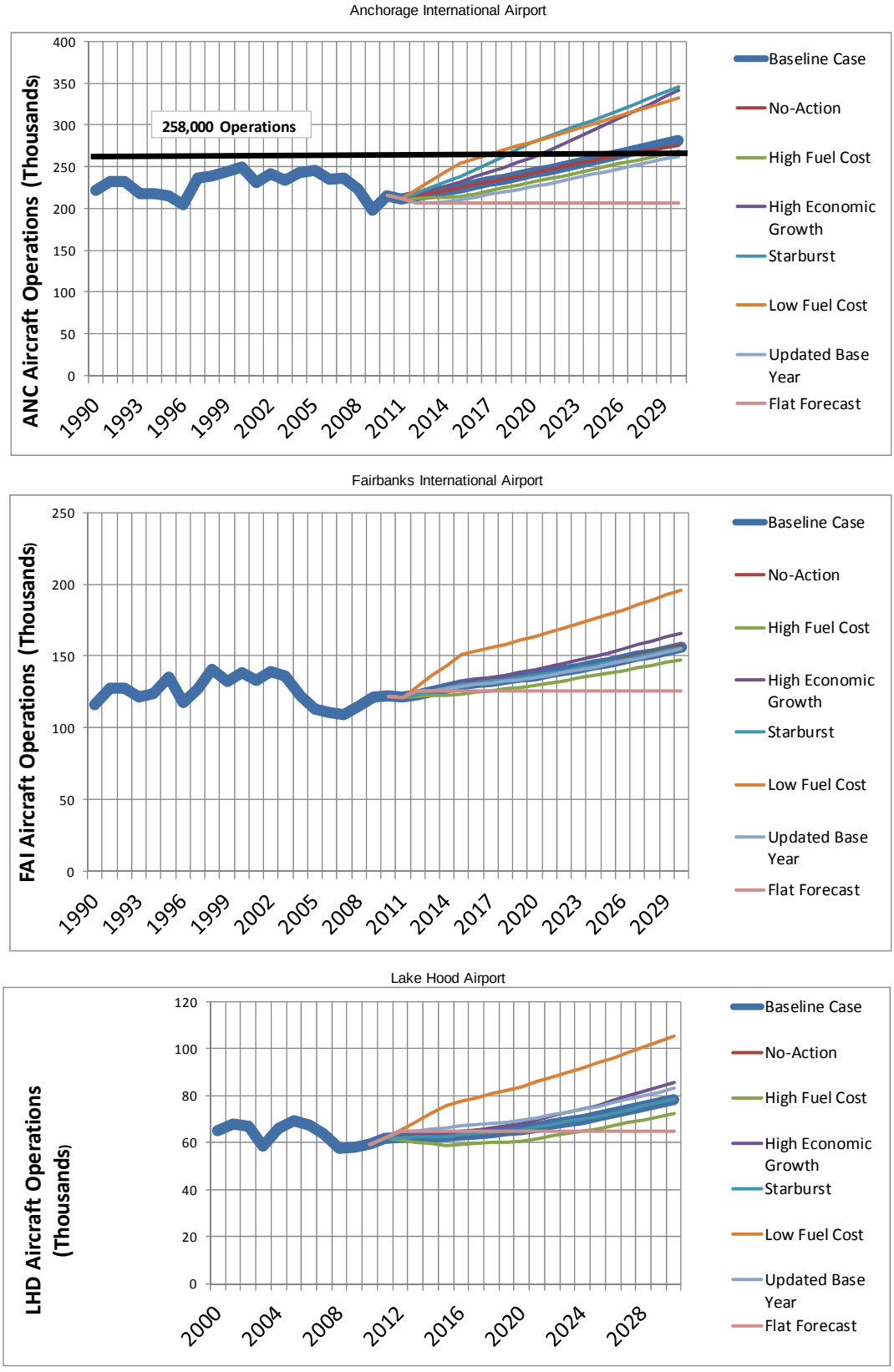
- The No-Action Scenario for ANC is lower than the Baseline Forecast because of the increase in overflights and diversions resulting from airfield capacity constraints;
- The higher fuel costs and lower economic growth from the High Fuel Cost Scenario cause this scenario to be lower than the baseline for both ANC and FAI;
- The Updated Base Year Scenario is also lower than the Baseline Forecast because of the downturn in air cargo between 2010 and 2012; and
- The Flat Scenario is the lowest of all the scenarios because no growth is assumed after the 2010-2012 air cargo downturn.



Sources: Tables 11.4 and 11.5.

Exhibit 2.2: Summary of Forecast Scenarios - Air Cargo Tonnage

Exhibit 2.3 presents aircraft operation forecasts for the Baseline Forecast and the seven scenarios. For ANC, the Starburst Scenario generates the greatest number of operations since on many routes larger aircraft would be replaced by greater numbers of smaller aircraft. The High Economic Growth Scenario and Low Fuel Cost Scenario forecasts of operations are also higher than the Baseline, consistent with the passenger and cargo forecasts. At ANC, the No-Action Scenario, High Fuel Cost Scenario, Updated Base Year Scenario, and Flat Scenario are all lower than the Baseline Forecast.



Sources: Tables 11.6, 11.7 and 11.8.

Exhibit 2.3: Summary of Forecast Scenarios - Total Aircraft Operations

With the exception of the No-Action Scenario, all the forecast scenarios are unconstrained. However, Exhibit 2.3 shows that most of the forecast scenarios would reach the ANC airfield capacity constraint (258,000 annual operations) sometime within the forecast period:

- 2016 for the Low Fuel Cost Scenario;
- 2018 for the Starburst Scenario;
- 2020 for the High Economic Growth Scenario;
- 2017 for the High Fuel Cost Scenario; and
- 2029 for the Updated Base Year Scenario.

Therefore, with the exception of the Flat Forecast Scenario, none of the forecast scenarios could be fully realized without capacity improvements or initiatives to transfer demand from ANC to FAI.

At FAI, the Low Fuel Cost Scenario would generate the greatest number of operations since GA, which accounts for the majority of operations at the Airport, is very sensitive to fuel prices. In addition, the High Economic Growth Scenario and No-Action Scenario would be expected to generate more operations at FAI than the Baseline Forecast. Although the effects of the Starburst Scenario would mostly affect ANC, the increased number of operations at ANC would increase the number of unscheduled diversions to FAI, and thereby increase FAI operations slightly. The High Fuel Cost Scenario, Updated Base Year Scenario and Flat Forecast Scenario are lower than the Baseline Forecast at FAI.

At LHD, the Low Fuel Cost Scenario generates the greatest number of operations among all the scenarios, followed by the High Economic Growth Scenario and Updated Base Year Scenario. The High Fuel Cost Scenario and Flat Forecast Scenario generate the fewest operations.

2.8 Forecast Conclusions

The above demand forecasts are subject to political, economic, and technological factors that are difficult to predict. Therefore, the forecasts should be monitored and compared to actual activity to identify any material deviations. Also, the addition of new airport capacity should be tied to trigger levels to ensure that facilities are phased to come on line when needed and not too soon or too late. Finally, it should be reemphasized that these forecasts, with the exception of the

No-Action Scenario, represent unconstrained demand. Therefore, if physical, financial, political, or environmental obstacles prevent the implementation of capacity required to accommodate this demand, then actual activity levels may be lower than anticipated in the Baseline Forecasts.