APPENDIX B

Forecast Documentation

- **Forecasts, Data Sources, and Potential Economic Factors Technical Memorandum**

- **Proposed Scope of Work - Forecasting**

Technical Memorandum – Task 2
Forecasts, Data Sources, and Potential Economic Factors
HNTB
April 22, 2008

1. Introduction and Purpose

The purpose of this memorandum is to outline the approach to the forecasts required for the Alaska Aviation System Plan (AASP). Key requirements of the forecast will be identified first, followed by a discussion of the required data elements and the availability of said data. Recent airport and system forecast efforts in Alaska will be briefly summarized and their applicability for the system plan noted. Next, the major economic factors that could significantly influence activity at some or all of the system airports will be identified. The memorandum concludes with three potential forecast approaches for use in the AASP.

2. Key Requirements

A meeting/conference call was held with the Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Aviation Administration (FAA) on January 22, 2008 to identify key forecast issues and requirements. The conference call was followed by subsequent internal conferences to discuss the identified issues in greater depth. The key issues identified were:

- Fleet Mix – this forecast output was identified as more important for Alaska than more traditional system plan outputs such as based aircraft and aircraft operations. Capacity is not a significant issue at most airports in Alaska, but possessing a runway long enough to provide access for critical needs and emergencies is very important. The runway length requirements are determined by the critical aircraft type.
- Key trends – another key forecast element is the identification of key trends and their potential to affect aviation demand in discontinuous ways. These could include the opening up a new economic development such as new mining activity, the construction of a natural gas line, and the growth of new fish markets.
- Scenarios – scenarios are useful for illustrating the potential of various factors to affect aviation demand. These scenarios could include fuel costs, the introduction of very light jets (VLJs), changes in the Bypass Mail System, airline consolidation, the development of alternative transportation modes, and new economic development initiatives.

Other items that were also identified as important included:

- The impact of declining population in small Alaskan villages.
- Float plane activity may need to be addressed, even if it is not airport-specific
- Forecast could be spread over several phases depending on timing of need so the approach should be put together in modular form with optional tasks.

3. Required Data

A list of potential data sources for system plan elements is provided below, along with a listing of gaps and possible shortfalls:

Based Aircraft: Current and historical data for more than 250 airports at Alaska can be obtained from Airport Master Records (FAA Form 5010-5) which is also included in the FAA's Terminal Area Forecasts (TAF). This data consists of estimates which are sometimes dated or incorrect. Also it provides very limited detail on aircraft type.

Aircraft Operations: Current and historical data can be obtained from Airport Master Records and the TAFs, but consist of estimates that are limited to the air carrier, air taxi, general aviation and military categories. The FAA provides actual tower counts (as opposed to estimates) for eight airports in Alaska, Kodiak (ADQ), King Salmon (AKN), Anchorage (ANC), Bethel (BET), Kenai (ENA), Fairbanks (FAI), Juneau (JNU), and Merrill Field (MRI). Additional aircraft operations data can be obtained from the FAA's Enhanced Traffic Management System (ETMS) for all flights filing a flight plan. More detailed data on commercial operations can be obtained from the USDOT's T-100 data base and the Official Airline Guide (OAG). Many of the airports also collect detailed data on landings by large aircraft.

Fleet Mix: Historical fleet mix data for most commercial carriers can be obtained from the USDOT's T-100 data base. Current and near-term future fleet mix data on commercial operations can be obtained from the OAG for scheduled passenger carriers and some cargo carriers. Fleet mix data for general aviation and other non-commercial operations that file flight plans can be obtaining from tracking programs such as Flight Explorer.

Passenger Data: Commercial passenger data can be obtained from the T-100 data base and also from individual airport records. The TAFs also summarize historical passenger enplanement data by airport.

Cargo Data: The T-100 data base provides enplaned and deplaned cargo (freight and mail) tonnage information, and this can be supplemented from individual airport records. There are significant gaps in the T-100 data prior to 2003, since many cargo carriers did not file data. Neither the T-100 nor individual airport data sources provide a breakdown by commodity. Although commodity information can be obtained for international air cargo from the U.S. Customs Department, commodity breakouts for domestic cargo would require a survey of air cargo carriers.

Fish Haul Statistics: The Alaska Regional Office of the National Marine Fisheries Service provides fish catch statistics by species and by region within the Bering Sea and Aleutian Islands and the Gulf of Alaska. They do not break these numbers out by port of landing or ultimate market destination however.

Emergency Services (Medical Evacuation and Firefighting): There is no central source of data about the flight operations for medical evacuation (Medevac) or firefighting organizations within Alaska. This data would need to be collected from the individual state, regional and local agencies charged with providing these services.

Socioeconomic Statistics: Historical data on population, income, and employment by sector can be obtained from the Bureaus of the Census and Economic Analysis in the U.S. Department of Commerce. Socioeconomic projections for the State and major metropolitan areas can be obtained from the Institute of Social and Economic Research (ISER). Population and employment projections for less-populated regions can be obtained from the Alaska Department of Labor and Workforce Development. Private vendors such as Woods & Poole also provide socioeconomic forecasts by borough but they are generally less familiar with the unique aspects of the Alaska economy than local agencies.

Economic Development Initiatives: There is no single central source of information on all potential economic development initiatives that could materially influence the demand for aviation. The Alaska Office of Economic Development is a good general source on information on current and future initiatives, and regional economic development agencies such as the Anchorage Economic Development Corporation and the Fairbanks North Star Borough Economic Development Commission are also potential resources.

Other Airport Master Plan and System Plan Forecasts: Previous master plan, system plan, and regional transportation plans are also a good source of data and forecast information. Care must be taken to ensure that the data is not too dated and to ensure consistency in the data among various studies.

Based on this preliminary assessment of data sources, additional effort will be required to obtain information on the following key data items:

- Fleet mix for aircraft used by emergency services such as Medevac and firefighting;
- Future fleet plans for commercial carriers and Medevac operators.
- Estimates of air cargo and mail by commodity type, including fish haul;
- Local fish catch statistics; and
- A comprehensive listing of potential economic development initiatives.

4. Major Economic Factors that Could Affect Demand for Aviation Services

There are several economic factors that could affect regional or statewide economic activity and the demand for aviation services, and could be candidates for forecast scenarios. These include the following:

Bypass Mail System: The United States Postal Service (USPS) currently operates the bypass mail system at a deficit by incurring air delivery costs and charging ground delivery rates. As a result there have been several efforts by the USPS to streamline or

reduce the bypass mail system. Many air routes would not be financially viable without bypass mail, and therefore elimination or major reductions in the program could cause a significant reduction in air service especially to small communities.

Alaska Gas Pipeline: Construction of the Alaska Gas Pipeline would be a huge endeavor resulting in thousands of additional jobs and support services throughout the interior of Alaska. It would result in a significant increase in demand for passenger and cargo air service to airports along the route and possibly a demand for new or expanded airport facilities.

Oil Prices: Continued high oil prices would benefit some segments of the Alaska economy, but would adversely affect other segments, including the air transportation industry. High oil prices have been and will continue to be passed on as higher air fares and freight and mail transportation costs and would likely result in reduced demand especially in discretionary sectors such as tourism.

Value Added Seafood

With most world fisheries in decline and demand for fresh seafood increasing, there may be an increase in the demand for Alaskan seafood. The increase in demand would likely be accompanied by increases in price and more of a premium on freshness. This would increase the demand for reliable air service and associated airport facilities to bring Alaskan seafood products to their final markets with greater speed.

Competing Transportation Modes

At many Alaska communities, air transport is the only means of access. At others, the only alternative is water transportation which in some cases is too slow to function as a viable substitute for air transport, especially for passengers. The introduction of highway or rail service on a route where none existed before would likely result in significant inroads on the demand for air transportation. Faster means of water transportation such as hydrofoils and ground effect vehicles could also have similar impacts.

5. Alternative Forecast Approaches

Three potential forecast approaches are outlined below for consideration for the DOT&PF. All the approaches limit the airports under analysis to those included in the NPIAS to reduce the level of effort. The approaches are presented for the purpose of stimulating thought and discussion, and it may well be that the selected approach incorporates sections from one or more the approaches presented below. Likewise, different elements of the forecast approach could be distributed over several phases.

Approach 1

Approach 1 is the most streamlined of the proposed approaches and involves the lowest level of detail.

Under this approach, all the Alaska NPIAS airports would be included, but commercial airports (defined as those with at least one commercial passenger or cargo operation per weekday) would be studied at more detail.

The following data would be required:

- Terminal Area Forecasts
- Base year cargo tonnage from US DOT T-100 data or airport sources
- Base year commercial fleet mix from US DOT T-100 data or the OAG
- GA operations data from ETMS
- Socioeconomic projections from ISER and Department of Labor
- A survey of air carriers and emergency operators for fleet mix trends.

Approach 1 would involve the tasks below:

1. Current forecasts (defined as those that were prepared after 9/11) will be used as a source of projections for based aircraft, operations, passengers and cargo at airports for which they are available.
2. At the remaining NPIAS airports, the TAF will be used for passenger and aircraft operation projections, adjusted as necessary using professional judgment to incorporate updated information.
3. Historical data on intrastate air cargo will be used to estimate trends in the ratio of air cargo to population, and applied to population forecasts to estimate future cargo at those airports for which existing cargo forecasts are not available.
4. Critical aircraft at each of the commercial airports will be based on the fleet plans of the air carriers, ETMS data, and emergency operators operating at that airport.
5. At other airports, the critical aircraft will be based on ETMS data and the fleet plans of the air taxi and emergency operators serving their region.
6. A qualitative analysis of the key aviation trends that could affect growth at Alaska airports will be provided.
7. A qualitative discussion of economic factors that could affect growth at airports at Alaska will be provided.

Deliverables of Approach 1 will include the following:

- Forecast of based aircraft for all Alaska NPIAS airports
- Forecast of operations for all Alaska NPIAS airports
- Forecast of passengers at all Alaska NPIAS airports
- Forecast of air cargo tonnage (freight and mail combined) for all Alaska NPIAS airports
- Forecast of critical aircraft for all Alaska NPIAS airports
- Discussion of key aviation trends that could affect growth at Alaska airports
- Discussion of economic factors that could affect growth at airports

The advantages of Approach 1 are that it involves less effort than the other two approaches, yet incorporates some consistency across all the airports because of its reliance on the FAA's TAF. The disadvantages of this approach are that it is very generic and therefore some information may be dated and some unique aspects of individual airports or markets may be overlooked. Also, key trends and economic development factors will be addressed in qualitative rather than quantitative terms.

The estimated expense would be in the range of $55,000 to $80,000.

Approach 2

Approach 2 would provide more detail and require more effort than Approach 1.

Like Approach 1, all the Alaska NPIAS airports would be included, but commercial airports (defined as those with at least one commercial passenger or cargo operation per day) would be studied at more detail.

The following data would be required:

- Terminal Area Forecasts
- Base year cargo tonnage from US DOT T-100 data or airport sources
- Base year commercial fleet mix from US DOT T-100 data or the OAG
- GA operations information from ETMS.
- Socioeconomic projections from ISER and Department of Labor
- A survey of air carriers and emergency operators for fleet mix trends.
- A survey of air carriers and/or airport operators on commodity breakdown for air cargo.

Approach 2 would involve the tasks below:

1. Current forecasts (defined as those that were prepared after 9/11) will be used as a source of projections for based aircraft, operations, passengers and cargo at airports for which they are available, if they are still within 10 percent of the latest activity levels.
2. For other commercial airports a generic forecast relationship will be estimated between aviation activity factors such as passenger, cargo and aircraft operations, and economic drivers such as population. The same forecast equation will be used for all commercial airports (more than one commercial flight per day based on T-100 data) except those addressed in Step 1.
3. At the remaining NPIAS airports, the TAF will be used for passenger and aircraft operation projections.
4. Historical data on intrastate air cargo will be used to estimate trends in the ratio of air cargo to population, and applied to population forecasts to estimate future cargo at those airports for which existing cargo forecasts are not available. The cargo forecasts will be broken out by commodity.
5. Historical data on general aviation based aircraft and operations will be used to estimate trends in the ratio of GA activity to population, and applied to population

forecasts to estimate future GA activity at those commercial airports for which existing GA forecasts are not available.

6. Critical aircraft at each of the commercial airports will be based on the fleet plans of the air carriers and emergency operators operating at that airport.
7. At other airports, the critical aircraft will be based on ETMS data, and the fleet plans of the air taxi and emergency operators serving their region.
8. Sensitivity tests that show the impacts of key aviation trends on all commercial airports will be included
9. Case studies showing how a given economic scenario could affect activity at selected airports will be provided.

Deliverables of Approach 2 would include the following:

- Forecast of based aircraft for all Alaska NPIAS airports
- Forecast of operations for all Alaska NPIAS airports
- Forecast of passengers at all Alaska NPIAS airports
- Forecast of cargo tonnage by major commodity type for all commercial airports
- Forecast of air cargo tonnage (freight and mail combined) for all remaining Alaska NPIAS airports
- Forecast of critical aircraft for all Alaska NPIAS airports
- Discussion of key aviation trends that could affect growth at Alaska airports and up to three sensitivity tests providing quantitative estimates of key aviation trends on all commercial airports.
- Discussion of economic factors that could affect growth at airports and up to three case studies providing quantitative estimates of how a given economic scenario could affect activity at selected airports

The advantages of Approach 2 over Approach 1 are that it provides more detail for the commercial airports especially for cargo, while still using the TAF to maintain consistency for the remaining NPIAS airports. In addition, it provides quantified sensitivity tests so that users are better able to evaluate impacts on facility requirements. Likewise, quantitative assessments of the case studies for economic development scenarios will provide a better assessment of the true impact of these initiatives on aviation demand. The disadvantages of Approach 2 are that it requires more data collection than Approach 1, especially for air cargo commodities. .In addition, it requires more effort for the forecasts, the sensitivity tests and the case studies.

The estimated expense would be in the range of $85,000 to $120,000.

Approach 3

Approach 3 would provide more detail and require more effort than Approach 1 or 2.

Like the other approaches, all the Alaska NPIAS airports would be included, but each of the airports (including non-commercial airports) would be studied at more detail.

The following data would be required:

- Terminal Area Forecasts
- Base year cargo tonnage from US DOT T-100 data or airport sources
- Base year commercial fleet mix from US DOT T-100 data or the OAG
- Socioeconomic projections from ISER and Department of Labor
- A survey of air carriers and emergency operators for fleet mix trends.
- GA operations from ETMS.
- A survey of military operators.
- A survey of air carriers and/or airport operators on commodity breakdown for air cargo.

1. Survey of floatplane operators

Approach 3 would involve the tasks below:

1. Growth rates from current forecasts (defined as those that were prepared after 9/11) will be applied to the most recent base year data to prepare projections for based aircraft, operations, passengers and cargo at airports for which they are available.
2. For other commercial airports individual forecast relationships will be estimated between aviation activity factors such as passenger, cargo and aircraft operations, and economic drivers such as population. The airport-specific forecast equations will be used for all commercial airports (more than one commercial flight per day based on T-100 data) except those addressed in Step 1.
3. For other non-commercial NPIAS airports, a generic forecast relationship will be estimated between aviation activity factors such as passenger, cargo and aircraft operations, and economic drivers such as population. The same forecast equation will be used for all non-commercial NPIAS airports
4. Cargo projections will be broken out by commodity.
5. Historical data on general aviation based aircraft and operations will be used to estimate trends in the ratio of GA activity to population, and applied to population forecasts to estimate future GA activity at those airports for which existing GA forecasts are not available.
6. Adjust military operations forecasts to incorporate refined base year data and anticipated future mission changes obtained from interviews with military operators.
7. Critical aircraft at each of the commercial airports will be based on the fleet plans of the air carriers and emergency operators operating at that airport.
8. At other airports, the critical aircraft will be based on the fleet plans of the emergency operators serving their region.
9. A floatplane operations forecast will be provided organized by borough.
10. Sensitivity tests that show the impacts of key aviation trends on all commercial airports will be included
11. Case studies showing how a given economic scenario could affect activity at selected airports will be provided.

Deliverables of Approach 3 would include the following:

- Forecast of based aircraft for all Alaska NPIAS airports
- Forecast of operations for all Alaska NPIAS airports

- Forecast of passengers at all Alaska NPIAS airports
- Forecast of cargo tonnage by major commodity type for all Alaska NPIAS airports
- Forecast of critical aircraft for all Alaska NPIAS airports
- Forecast of floatplane operations for all Alaska boroughs
- Discussion of key aviation trends that could affect growth at Alaska airports and up to six sensitivity tests providing quantitative estimates of key aviation trends on all commercial airports.
- Discussion of economic factors that could affect growth at airports and up to six case studies providing quantitative estimates of how a given economic scenario could affect activity at selected airports

The advantages of Approach 3 over the other approaches are that it provides more detail for the all the Alaska NPIAS airports especially for cargo, and provides an alternative to the TAF that better reflects Alaska conditions. In addition, it provides a greater number of quantified sensitivity tests so that users are better able to evaluate impacts on facility requirements. Likewise, Approach 3 provides a greater number of quantitative assessments of the case studies for economic development scenarios thereby providing a better assessment of the true impact of these initiatives on aviation demand. The disadvantages of Approach 3 are that it requires more data collection than the other approaches, especially for floatplane activity. In addition, it requires more effort for the forecasts, the sensitivity tests and the case studies.

The estimated expense would be in the range of $150,000 to $190,000.

Recommended Approach

The Recommended Approach is based on the comments received during and after a conference call held April 3, 2008 and represents a combination of Alternatives 2 and 3.

Like the other approaches, all the Alaska NPIAS airports would be included, but each of the airports (including non-commercial airports) would be studied at more detail than in Approach 1.

The following data would be required:

1. Terminal Area Forecasts
2. Base year cargo tonnage from US DOT T-100 data or airport sources
3. Base year commercial fleet mix from US DOT T-100 data or the OAG
4. Socioeconomic projections from ISER and Department of Labor
5. A survey of air carriers and emergency operators for fleet mix trends.
6. “Ground truth” verification of based aircraft and operations at selected airports.
7. GA operations from ETMS.
8. A survey of key military operators.

It is assumed that items 5, 6, and 8 would be collected as part of the separate inventory effort.

The Recommended Approach would involve the tasks below:

1. Growth rates from current forecasts (defined as those that were prepared after 9/11) will be applied to the most recent base year data to prepare projections for based aircraft, operations, passengers and cargo at airports for which they are available.
2. For other NPIAS airports a generic forecast relationship will be estimated between aviation activity factors such as passenger, cargo and aircraft operations, and economic drivers such as population. The same forecast equation will be used for all NPIAS airports except those addressed in Step 1.
3. Historical data on general aviation based aircraft and operations will be used to estimate trends in the ratio of GA activity to population, and applied to population forecasts to estimate future GA activity at those airports for which existing GA forecasts are not available.
4. Military operations forecasts will be adjusted to incorporate refined base year data and anticipated future mission changes obtained from interviews with military operators.
5. Critical aircraft at each of the commercial airports will be based on the fleet plans of the air carriers and emergency operators operating at that airport.
6. At other airports, the critical aircraft will be based on the fleet plans of the emergency operators serving their region.
7. Sensitivity tests that show the impacts of key aviation trends on all commercial airports will be included
8. Case studies showing how a given economic scenario could affect activity at selected airports will be provided.

Deliverables of the Recommended Approach would include the following:

- Forecast of based aircraft for all Alaska NPIAS airports
- Forecast of passengers at all Alaska NPIAS airports
- Forecast of cargo tonnage (freight and mail combined) for all Alaska NPIAS airports
- Forecast of critical aircraft for all Alaska NPIAS airports
- Forecast of aircraft operations by general category (single engine piston, multi engine piston, turboprop, jet, rotor, floatplane for all Alaska NPIAS airports
- Discussion of key aviation trends that could affect growth at Alaska airports and up to three sensitivity tests providing quantitative estimates of key aviation trends on all commercial airports.
- Discussion of economic factors that could affect growth at airports and up to three case studies providing quantitative estimates of how a given economic scenario could affect activity at selected airports

The advantages of the Recommended Approach is that it provides detail for the all the Alaska NPIAS airports, and provides an alternative to the TAF that better reflects Alaska conditions. In addition, it provides for three quantified sensitivity tests so that users are better able to evaluate impacts on facility requirements. Likewise, the Recommended Approach provides three quantitative assessments of the case studies for economic

development scenarios thereby providing a better assessment of the true impact of these initiatives on aviation demand. Should it be deemed necessary, additional sensitivity tests or case studies could be added at a later stage with a contract amendment.

The estimated expense would be in the range of $85,000 to $120,000.

APPENDIX

SUMMARY OF OTHER ALASKA AVIATION FORECASTS

AASP Update

Airport(s) studied in the report: The state was divided into 6 sectors. There are over 1000 airports in the state. 32 Airports were used for Passenger forecast. Operations and Fleet mix projections were analyzed for over 65 of the Airports.

Base year for study:1990

Forecast Horizon year(s): 1995, 2000, 2005, 2010

Sources of Forecast Data: FAA Form 5010 electronic records, 1990 Tiltrotor Vertiport Study, FAA TAF, NPIAS, U.S. DOT, Alaska Dept. of Labor, Alaska State Office of Employment Security, FAA Census of Civil Aircraft, various FAA traffic activity publications, and airport master plans.

Methodology/Approach for based aircraft forecast: Used registration in the state to provide an estimate of based aircraft (although not necessarily accurate). Growth rates were developed by analyzing a variety of dependant variables including population, employment, and FAA estimates of active aircraft. These growths rates were then used to develop growth rates for based aircraft at selected airports. Current based aircraft estimates were obtained from FAA's 5010 Form data base (An airport must have 5 based aircraft from the FAA 1990 NPIAS in order to be analyzed, or recommended by the Alaska Dept. of Transportation).

Methodology/approach for passenger forecast: The 32 airports with highest enplanements and/or certified under FAR Part 139 were used for the passenger forecast. These airports represented over 90% of state's total enplanements. Data was derived from U.S. DOT's V2 & V3 records of enplaned passengers for larger carriers (> 60 seats), air taxi and other commercial operators. Growth rates were developed from the 1990 Alaska Tiltrotor, Vertiport Study, applying average regional growth rates. Data for Anchorage International was derived from its master plan.

Methodology/approach for cargo forecast: Airports were analyzed similarly to the passenger forecast. Since data was not available for all airports, airports included were FAA Part 139 airports, and Alaska mail hub airports (derived from U.S. DOT Schedule T100, Schedule T3, and Schedule 298C data). Growth rates used were based on cargo and mail growth rates in the 1990 Alaska Tiltrotor Vertiport Study.

Methodology/approach for aircraft operations: Base year operations were derived from the 5010 Form database tapes. Growth rates were developed for Commercial, Air Taxi, and GA operations using the FAA's TAF for select airports. For airports not in the TAF, average growth rates for the region were used.

Methodology/approach for aircraft fleet mix: Fleet mix for based aircraft were developed using estimates from the 5010 Form database.

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: N/A

Methodology/approach for fish haul forecasts: N/A

Methodology/approach for incorporating new mining/oil and gas development: N/A

Anchorage International Airport Master Plan Update

Airport(s) studied in the report: Anchorage International Airport

Base year for study: 2005

Forecast Horizon year(s): 2012, 2017, 2027

Sources of Forecast Data: FAA Aerospace Forecasts (March 2006); Boeing and Airbus market forecasts, US DOT O&D Survey, US DOT T-100 data, ISER economic forecasts, Woods & Poole economic forecasts, Airport records.

Methodology/Approach for based aircraft forecast: Adoption of Anchorage/Lake Hood General Aviation Master Plan Update forecast.

Methodology/approach for passenger forecast: Separated intrastate, interstate and international markets. Domestic forecasts were based on a regression analysis in which passenger originations were specified as a function of population, income and air fares. International forecasts were based on FAA, Boeing and Airbus regional forecasts and an assessment of the future of passenger technical stops.

Methodology/approach for cargo forecast: Separated intrastate and international markets. Future intrastate cargo was based on a share analysis of FAA estimates of cargo revenue ton miles. Future international cargo was based on a share analysis of combined FAA/Boeing/Airbus estimates of future Asia-North America air cargo flows coupled with an analysis of the potential reduction in technical stops because of newer longer range air cargo aircraft.

Methodology/approach for aircraft operations & aircraft fleet mix: Passenger forecasts were disaggregated by individual market and market analysis was prepared to identify carrier/fleet mix most likely to serve future demand in each market. Cargo forecasts were also disaggregated by individual market and a market analysis was prepared to identify the carrier/fleet mix most likely to serve future demand in each market. GA operations were adopted from Anchorage/Lake Hood General Aviation Master Plan Update forecast. Military operations were assumed to decline as a result of anticipated relocation of Kulis Air National Guard.

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: N/A

Methodology/approach for fish haul forecasts: N/A

Methodology/approach for incorporating new mining/oil and gas development: N/A

Fairbanks Chapter 2 (Forecast Chapter)

Airport(s) studied in the report: Fairbanks International Airport

Base year for study: 2000

Forecast Horizon year(s): 2005, 2010, 2020

Sources of Forecast Data: FAA's TAF, FAA Aerospace Forecasts (March 2000); State of Alaska International Airports System Revenue Bond Report; Fairbanks International Airport 1995 Master Plan Report; Fairbanks International Comparative Statistical FY Summary Report.

Methodology/Approach for based aircraft forecast: Data was obtained from the FAA TAF for GA to determine the number of based aircraft. They had increased from 420 in 1990 to 551 in 2000. Recommended forecast was an average between the TAF and Alaska Airport System Plan models which resulted in a 1% growth rate. The fleet mix is expected to stay the same for forecasting purposes since most planes are single engine aircraft.

Methodology/approach for passenger forecast: Examined the air service area, Markets served, and current commercial service that operates at the airport. The study also examined historical enplanements and deplanements. Forecasts were based on a combination of the following:

- projected growth in population,
- enplanements assumed to remain consistent with local share of national air passenger market,
- consideration of forecasts by other entities, and
- regression analysis of historical data.

Methodology/approach for cargo forecast: Used historical data for the air service area, Markets served, and current cargo service that operates at the Airport. Nationally air cargo was undergoing strong growth rates while mail growth was growing at a lesser rate. The majority of air cargo at Fairbanks is belly cargo. Deplaned air cargo originates in Anchorage. Forecasts considered 4 scenarios:

- State Official Statement's growth rate used in support of revenue bonds;
- A linear trend forecast based on historical data;
- An assumed average 2.4% growth rate; and
- Growth rate depicted in the forecast prepared by Boeing for North America.

Recommended forecast was determined by averaging results from the 2.4% & Boeing scenarios.

Methodology/approach for aircraft operations & aircraft fleet mix: Used historical data about the air service area, markets served, current fleet mix and current operations at the airport. Assumed a shift to larger (# of seats) aircraft mainly in the 80-139 seat and 160+ seat categories, with corresponding decreases in the 26-79 seat and 140-159 seat

categories. Regional and commuter service was assumed to be provided by aircraft with less than 10 seats per aircraft. Anticipated modest increase in regional jets, and modest decrease in 10-19 seat category. GA operations were broken into 2 types: Local & Itinerant. Historically, the balance between local and itinerant operations has remained at about 50/50. The recommended forecast assumed that GA operations will follow the national average rate of 1.7 percent per year. Military activity was not expected to change during the planning period therefore 2,500 annual military operations were used throughout the planning period

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: N/A

Methodology/approach for fish haul forecasts: N/A

Methodology/approach for incorporating new mining/oil and gas development: N/A

Kodiak Municipal Airports Master Plan

Airport(s) studied in the report: Kodiak Municipal Airports: Kodiak State Airport, Kodiak Municipal Airport, Lilly Lake Seaplane Facility, Trident Basin Seaplane Base.

Base year for study: 2003

Forecast Horizon year(s): 2009, 2014, 2019, 2024

Sources of Forecast Data: Federal Aviation Administration Advisory Circular 150/5070-6A; Forecasting Aviation Activity by Airport (July 2001); 2000 census data for the Kodiak Island Borough.

For all forecasts they assumed 3 scenarios: Low, Moderate, and High Growth. The forecasts were developed with trendline analysis, with some adjustment for possible one-time events with large impacts on traffic at these facilities. The analysis was developed from examination of historic growth trends in past air traffic, population, the economy and other factors impacting air transportation demand.

Methodology/Approach for based aircraft, aircraft operations, & passenger forecasts: Growth rates for all of these parts of the forecast were assumed to be the same since there was no evidence for changes in fleet mix and load factors, and air carriers stated no firm plans to change their service to the area.

Methodology/approach for cargo forecast: Growth rates of cargo and mail enplaned and deplaned at Kodiak are the same as the trend lines used for other air traffic indicators.

Methodology/approach for aircraft fleet mix: Fleet mix was assumed to remain the same for all three scenarios.

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: Any economic development initiatives were incorporated by using the professional judgment of the forecaster.

Methodology/approach for fish haul forecasts: Kodiak is the main port for the fishing industry in the Gulf of Alaska. However the report does not attempt any forecasts for fish haul

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Methodology/approach for incorporating new mining/oil and gas development: N/A

Matanuska-Susitna Borough

Airport(s) studied in the report: 10 public airports (Palmer, Wasilla, Talkeetna, Willow, Big Lake, Skwenta, Goose Bay, Summit, Sheep Mountain, Lake Louise) & 200 private airstrips.

Base year for study: 2005

Forecast Horizon year(s): 2010, 2015, 2020, 2025, 2030.

Sources of Forecast Data: Airport Master Plans, Alaska Aviation System Plan, Airport Layout Plans, Terminal Area Forecasts. The study also used existing forecasts for public airports in the Borough, forecasts from adjacent regions, pilot certification statistics from federal databases, aircraft counts from MSB property tax rolls, and existing population forecasts for the borough. Interviews with local pilots, aircraft repair businesses, air carriers, and airport management were included. Parts of the forecasts were developed from local and regional knowledgeable parties, and from the judgment of the forecasters.

Methodology/Approach for based aircraft forecast, aircraft operations, passenger forecast: Used data from existing forecasts for the Matanuska-Susitna Borough Public Airports (i.e. airport master plans, airport layout plans, TAF, etc.). The study also consolidated the forecasts of all the public airports in the borough. For General Aviation they performed a separate forecast, using 2 scenarios: without a Knik Arm Bridge and with a Knik Arm Bridge. These forecasts use the same growth rates as the LRTP population forecasts. Performed another forecast based upon population growth and it was done for 2 cases as well, with and without Knik Arm Bridge. This analysis assumed that growth of based aircraft and pilots will occur where population growth is predicted to occur

Methodology/approach for cargo forecast: They did not examine cargo in this report.

Methodology/approach for aircraft fleet mix: Little information is available regarding fleet mix of aircraft based in or operating in the Borough. During the summer season, it is estimated that one third of all aircraft based in the Borough are equipped with floats. In addition, the Matanuska-Susitna Borough differentiates between single engine and multi-engine aircraft for purposes of charging property taxes on those aircraft. In 2006, the Matanuska-Susitna Borough reported 996 single-engine and 28 multi-engine airworthy aircraft based in the Borough.

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: Since data and research available to estimate the economic impact of aviation activity in the region is sparse or nonexistent, the Alaska Department of Labor and Workforce Development industry category of Air Transportation was used to estimate indirect impacts, to show aviation economic impacts become multiplied throughout the economy.

Methodology/approach for fish haul forecasts: N/A

Methodology/approach for incorporating new mining/oil and gas development: N/A

Prince William Sound Transportation Plan

Airport(s) studied in the report:
Communities of Cordova, Seward and Valdez

Base year for study: 2000

Forecast Horizon year(s): 2010, 2020

Source of Forecast Data: Community level population forecasts were based on existing population data from the Alaska Department of Licensing, and on area-wide population forecasts from the Institute of Social and Economic Research. Enplanement forecasts came from the Prince William Sound/Copper River Transportation Plan Existing Conditions Technical Memorandum.

Methodology/Approach for based aircraft forecast: N/A

Methodology/approach for passenger forecast: Total enplanements were forecast for the years 2010 and 2020 as a function of population. The model that provided the best "fit" with existing conditions data was used. According to the model 39% of variations in enplanements can be explained by population. Low, Base, and High forecasts were done.

Methodology/approach for cargo forecast: Freight forecasts for other products including mail were developed as a function of existing population, existing tons of freight shipped in and out of communities, marine/railroad connections, road connections, and future population. Three scenarios were developed: Low, Base, and High. Forecasts were adjusted based on how well the function predicted current tons shipped.

Methodology/approach for aircraft operations: N/A

Methodology/approach for aircraft fleet mix: N/A

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: Three scenarios were developed, Low, Base, and High. In the low case, population increases by 100 per year, in the base case, 200. In the high Case, a spike in population is estimated from about the year 2006 to 2013, driven by two major assumptions: 1) a new oil field is developed in the Alaska National Wildlife Reserve, 2) a natural gas pipeline is constructed from Prudhoe Bay to Valdez.

Methodology/approach for fish haul forecasts: Existing data for fish tons shipped are average for the last several years during which data was collected by the Waterborne Commerce Statistics Center. The fisheries-related employment forecasts were developed by the Institute of Social and Economic Research. Most fisheries-related forecasts

indicate no change, or very little change in fisheries-related employment in the future, although 3 scenarios were developed; Low, Base, and High. For the low scenario a -1% growth rate was used. The Base scenario used a 0% growth rate. The High scenario used a 0.5% growth rate.

Methodology/approach for incorporating new mining/oil and gas development: The Institute of Social and Economic Research's 2010 and 2020 forecasts indicate no change in petroleum-related employment. Trends from 1986 to 1999 show a decline in oil production in Alaska. Low, base and high freight forecasts for petroleum products were developed for Valdez.

Sitka Rocky Gutierrez Airport

Airport(s) studied in the report: Sitka Rocky Gutierrez

Base year for study: 2002

Forecast Horizon year(s): 2007, 2012, 2017, 2022

Source of Forecast Data: Sitka Economic Development Association; U.S. Census Bureau; Alaska Dept. of Labor and Workforce Development;

Methodology/Approach for based aircraft forecast:

Methodology/approach for passenger forecast: Ran 3 scenarios: Low, Moderate, and High. The moderate range forecast was recommended. Passenger forecasts were based on projections contained in the FAA APO Terminal Area Forecasts, 2002-2020, that utilizes an average annual growth rate for enplanements of 1.4%

Methodology/approach for cargo forecast: Assumed a growth rate less than FAA's Aerospace Forecasts Fiscal years 2003-2014 of 3.9%; they estimated a growth rate of 1.3% since the FAA % is heavily weighted towards cargo.

Methodology/approach for aircraft operations: Only one carrier provided service in 2003 and it is Alaska Airlines. Passenger aircraft operations were derived from passenger forecasts using boarding load factors. GA peaking operations are very similar to passenger carriers. The FAA TAF was used to project GA Activity. They performed 3 scenarios: low, moderate, and high. The low scenario uses a growth rate of 0%, the moderate scenario uses 0.27% which corresponds to annual population growth in Sitka, and the high scenario uses the FAA Aviation Forecasts: Fiscal Years 2003-2014 growth rate for GA. The high series is the recommended forecast. Military Operations were forecast using DOD funding amounts, a fueling contract with the DOD, and the general location of aviation related military bases or training areas. The recommended high range scenario shows increases in 2017 of 400 more operations. The study also provides an operations forecast by aircraft type.

Methodology/approach for aircraft fleet mix: They did not perform a fleet mix forecast, but did break out types of aircraft used (i.e. engine type).

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: Positive Factors: Community Support; Facilities Potential. Negative or Neutral Factors: Has very few. The continued recovery from 9/11, and improvements to the highway system and service from cruise lines. Many other areas were looked at and taken into consideration when performing the forecasts.

Methodology/approach for fish haul forecasts: N/A

Methodology/approach for incorporating new mining/oil and gas development: N/A

Southeast Alaska

Airport(s) studied in the report: 23 Airports in the region.

Base year for study: 2006-2007

Forecast Horizon year(s): N/A – analysis was an inventory of current activity and future trends.

Sources of Forecast Data: Alaska Department of Labor and Workforce Development; Alaska Department of Transportation and Public Facilities; U.S. Department of Transportation, Bureau of Transportation Statistics; Federal Aviation Administration forms 5010, Airport Master Records;

Methodology/Approach for based aircraft forecast: The Study examined historical data to identify the based aircraft in the study areas by airport and region. Regional based aircraft were broken down by summer and winter.

Methodology/approach for passenger forecast: Examined historical information from 2004-2006 to describe what is occurring with the passenger loads over that time.

Methodology/approach for cargo forecast: Cargo was not included in the report.

Methodology/approach for aircraft operations: Examined historical data for operations to generate estimates for the year 2007.

Methodology/approach for aircraft fleet mix: No specific information on fleet mix was provided but the study examined the historical types of aircraft based in the region (Single engine, Multi-Engine, Jet, etc.).

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: The following was taken into account when forecasting:

- increased tourism activity;
- regional fish processors using more air freight service;
- increased economic returns from the petroleum industry in Alaska will likely increase the fortunes of regional residents and increase their demand for air travel for passengers and goods;
- the only commercial alternative to passenger transportation in the region currently is the Alaska Marine Highway System.

Factors that could cause a downturn include:

- economic downturn;
- high fuel costs;
- development of new highways;
- new water transportation alternatives.

Methodology/approach for fish haul forecasts: N/A

Methodology/approach for incorporating new mining/oil and gas development: Mine development is mostly dependant on mineral market prices, which have been rising due to strong demand for mineral commodities in developing countries. Undeveloped deposits of base metals in the region are small compared to some areas of Alaska and will likely not see production for a long while. Precious metal deposits could see production if market prices continue to rise. Uranium stockpiles worldwide are low and more small reactors are being built, so the demand for uranium is high. As metal prices increase, more exploration and drilling could occur in the region.

Southwest Alaska Transportation Plan

Airport(s) studied in the report: Multiple airports that serve 44 communities in Southwest Alaska.

Base year for study: 1997

Forecast Horizon year(s): 2010, 2020

Sources of Forecast Data: Institute of Social and Economic Research (U. of Alaska Anchorage); Southwest Alaska Transportation Plan Existing Conditions Technical Memorandum;

Methodology/Approach for based aircraft forecast: N/A

Methodology/approach for passenger forecast & aircraft operations: Enplanements were forecast for the years 2010 and 2020 by using the current and future population in each community, the current number of terminating trips, the current and future number of wage and salary jobs per person, and the current and forecast average per capita income. Some variations occurred within the analysis by community. A model with R^2 coefficient of 91% was chosen. They then showed 3 forecast scenarios; low, base, and high. They forecast visitor enplanements separately for the 5 communities with the most visitor attractions.

Methodology/approach for cargo forecast: The best fit model developed used only population as a variable with R^2 coefficient of 95%. Model is based on limited data sets of 16 communities. There were 3 forecast scenarios, low, base, and high.

Methodology/approach for aircraft fleet mix: N/A

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: N/A

Methodology/approach for fish haul forecasts: Forecasts were developed according to forecasts of fisheries related employment in the southwest region, which do not show any change in employment in the future. However, they still did 3 scenarios, with low (-1%), base (0%), and high (+0.5%) growth rates.

Methodology/approach for incorporating new mining/oil and gas development: Petroleum is shipped by sea and air. The model chosen is based on population and marine and airport types available in the region. The model only has a R^2 coefficient of 29%, partly because of confidentiality agreements in the industry that limit data availability. This included both sea and air shipping of petroleum to 11 communities and was done for low, base, and high scenarios.

Y-K Delta Region

Airport(s) studied in the report: The Y-K Delta region was broken down into 11 geographical centers based on proximity and 3 population centers and was forecast for the airports in those regions. No specific airports were forecast.

Base year for study: 1997

Forecast Horizon year(s): 2000, 2005, 2010, 2015, 2020

Source of Forecast Data: Air Carrier Activity Information System (compiled from FAA and U.S. DOT); U.S. DOT Bureau of Transportation Statistics; U.S. Postal Service; FAA Commuter Air Carrier Activity; OAG;

Methodology/Approach for based aircraft forecast: N/A

Methodology/approach for passenger forecast & aircraft operations: Forecasts were broken in to 5 legs: Village to Village; Village to Hub; Hub to Village; Hub to Hub; Hub to Anchorage. The forecast was divided into two categoriess: forecasts for villages and forecasts for hubs. The forecasts were then aggregated together for a total forecast. For the village forecasts linear regression analysis was used. The most reliable data for forecasting was population.

Methodology/approach for cargo forecast: They looked at cargo from the aspect of the US Postal Service and how it moved mail and bypass mail into the region. Bypass mail is at least 1000 pounds and is made of commodities comprised of perishable and non-perishable foods and frozen goods. Regular mail is also shipped by air. They forecast regular and bypass mail separately. The annual increases were based on proposed weight per capita. Applying the increases gives the regional weight per capita. Multiplying this weight per capita by the population forecast generates the total weight of mail to be delivered to the region.

Methodology/approach for aircraft fleet mix: The general trend of bush carriers is toward larger aircraft, which may lead to fewer aircraft in the fleet. Enplanements to/from Bethel from/to other hubs and villages will dictate aircraft selection. A 6 flight/week schedule was assumed for aircraft currently not in service.

Methodology/approach for medical transport: N/A

Methodology/approach for incorporating economic development initiatives: N/A

Methodology/approach for fish haul forecasts: N/A

Methodology/approach for incorporating new mining/oil and gas development: N/A

Alaska Aviation System Plan
Proposed Scope of Work – Forecasting

Task: AASP Forecasts

The contractor will prepare AASP forecasts for 2015, 2020, and 2030 in this task. The approach is based on the findings of NTP 1, Task 2 and incorporates comments received during and after a conference call with DOT&PF held April 3, 2008. All the Alaska NPIAS airports would be included, and up to fifty additional airports may be added at the discretion of the DOT&PF. The fifty busiest commercial airports (in terms of 2007 commercial operations) would be studied in more detail. Data gathered/produced for individual airports will be presented with the FAA site number so the data can be added to the project database. The approach will consist of the following subtasks:

1. Collect Data

The following data would be required:

1. The most recent Terminal Area Forecasts (TAFs).
2. Base year (2007) cargo tonnage from US DOT T-100 data or airport sources.
3. Base year (2007) commercial fleet mix from US DOT T-100 data or the Official Airline Guide (OAG).
4. Socioeconomic projections from ISER and State Department of Labor, as augmented by Northern Economics.
5. A survey of air carriers and emergency operators for fleet mix trends. All domestic certificated air carrier and commuter air carrier aircraft operators (approximately 80) will be sent mail surveys with a telephone follow-up. Up to five key air carriers will be selected for in-person interviews. Medevac operators in the state will be sent mail surveys with a telephone follow-up. All carriers and medevac operators will be asked whether their fleet mix plans would change if runways were lengthened at the airports where they operate. If one follow-up contact attempt (phone, fax, or email) is unsuccessful at reaching carriers/operators who do not return or who do not correctly complete the surveys, the Contractor will notify the Contracting Agency for assistance with the follow-up.
6. "Ground truth" verification of based aircraft and operations at selected airports, through contacts with DOT&PF.
7. GA instrument operations from ETMSC.
8. A survey of key military operators. All the military branches with operations at public Alaska airports will be surveyed to ascertain any changes in mission plans that would affect Alaska airports.
9. Current Essential Air Service (EAS) agreements.

2. Update Available Master Plan Forecasts

Growth rates from current airport master plan, ALP narrative sheets, and system/regional plan forecasts (defined as those that were prepared after 9/11) will be applied to the most recent base year data to prepare projections of based aircraft, operations, passengers, and cargo at airports for which they are available.

3. Identify General Forecast Factors and Relationships

At airports for which there is no recent master plan or system plan forecast, a generic statistical relationship will be estimated between aviation activity factors such as passenger, cargo, aircraft operations, and general aviation activity, and economic drivers such as population and fuel costs. The same forecast equations will be used for all the airports selected for the forecast analysis except those addressed in Subtask 2.2.

4. Prepare Passenger Forecasts

Passenger demand forecasts will be prepared for the fifty busiest commercial airports, except those addressed in Subtask 2.2, using the socioeconomic projections collected in Subtask 2.1 and the relationships estimated in Subtask 2.3. In some instances there may be unique factors associated with an airport that would warrant a judgmental adjustment to the numbers. These cases will be brought to the attention of the DOT&PF and no adjustments will be made without the approval of the DOT&PF.

5. Prepare Cargo Forecasts

Air cargo demand forecasts will be prepared for the fifty busiest commercial airports, except those addressed in Subtask 2.2, using the socioeconomic projections collected in Subtask 2.1 and the relationships estimated in Subtask 2.3. In some instances there may be unique factors associated with an airport that would warrant a judgmental adjustment to the numbers. These cases will be brought to the attention of the DOT&PF and no adjustments will be made without the approval of the DOT&PF.

6. Prepare General Aviation Forecasts

Historical data on general aviation (GA) based aircraft and operations will be used to estimate trends in the ratio of GA activity to population, and applied to population forecasts to estimate future GA activity at the NPIAS airports for which existing GA forecasts are not available. In some instances there may be unique factors associated with an airport that would warrant a judgmental adjustment to the numbers. These cases will be brought to the attention of the DOT&PF and no adjustments will be made without the approval of the DOT&PF.

7. Prepare Military Forecasts

Military operations forecasts will be adjusted to incorporate refined base year data and anticipated future mission changes obtained from interviews with military operators.

8. Prepare Critical Aircraft Forecasts

Critical aircraft at each of the airports selected for the forecast analysis will be based on one the following elements:

- fleet plans of the air carriers serving the airport, if applicable;
- fleet plans of emergency operators operating at the airport; or
- high performance general aviation aircraft based on the ETMSC data.

The critical aircraft will be the aircraft from the above categories that a) requires the longest runway and b) accounts for at least 500 annual operations (or other threshold defined by the DOT&PF).

9. Summarize Annual Forecasts

The results of Subtasks 2.1 through 2.8 will be summarized and aggregated to produce passenger and cargo forecasts for the fifty busiest commercial airports and based aircraft and total operation forecasts for all the airports selected for the forecast analysis.

As part of this subtask, graphics will be prepared using the existing T-100 and OAG data and the forecasts of activity showing the existing and projected routes flown by passenger and cargo carriers.

10. Sensitivity Analyses

Up to three sensitivity tests that show the impacts of key aviation trends on all commercial airports will be included. The specific tests will be reviewed and approved by the DOT&PF but could include some of the following:

- fuel costs
- high economic growth
- low economic growth
- change in the Essential Air Service program
- change in Bypass Mail program

More sensitivity tests could be added through an addendum if the DOT&PF desires.

11. Case Study Analyses

Up to three case studies showing how a given economic scenario could affect activity at a specific existing or planned airport will be provided. The specific case studies will be reviewed and approved by the DOT&PF but could include some of the following:

- impact of natural gas pipeline;

- impact of competing transportation mode, such as a new roadway where none existed before;
- impact of runway extension where current runway is shorter than justified by potential demand.

More case studies could be added through an addendum if the DOT&PF desires.

12. Meetings and Coordination

One trip from Virginia is assumed for coordination and presentations.

Deliverables

Deliverables of this task will include the following:

- Forecast of based aircraft for all Alaska NPIAS airports plus up to fifty additional airports selected by the DOT&PF.
- Forecast of passengers for the 50 busiest commercial airports in Alaska.
- Forecast of cargo tonnage (freight and mail combined) for the 50 busiest commercial airports in Alaska.
- Forecast of critical aircraft for all Alaska NPIAS airports plus up to fifty additional airports selected by the DOT&PF.
- Forecast of aircraft operations by general category (single-engine piston, multi-engine piston, turboprop, jet, rotor, floatplane) for all Alaska NPIAS airports.
- Discussion of key aviation trends that could affect growth at Alaska airports and up to three sensitivity tests providing quantitative estimates of key aviation trends on all commercial airports.
- Discussion of economic factors that could affect growth at airports and up to three case studies providing quantitative estimates of how a given economic scenario could affect activity at selected airports
- Graphic displaying existing and projected routes flown by passenger and cargo carriers.

Contracting Agency Will:

- Approve judgmental adjustments to forecasts.
- Select sensitivity tests to be performed.
- Select case studies to be performed.

DOWL Team Responsibility:

- Lead: HNTB
- Support: NEC
- Input: DOWL, ASCG

Contracting Method of Payment:

- Fixed Price