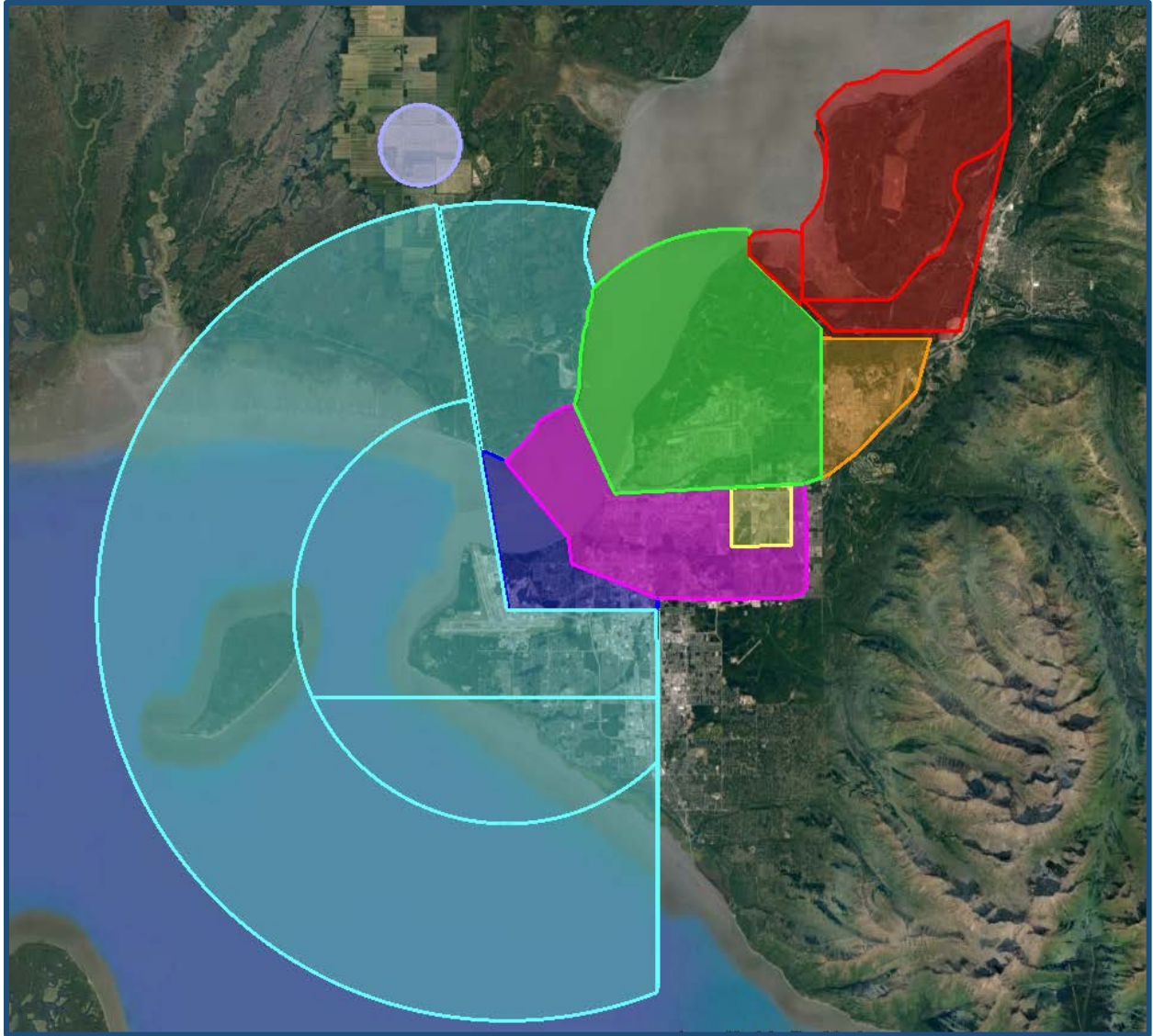


**G. FAA Anchorage Terminal Area Airspace and Procedures
Feasibility Study**

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Anchorage Terminal Area Airspace and Procedures Feasibility Study



May 2019

Version 2.0

Record of changes

All corrections/changes to this document are identified with a black bar located in the left margin of the document. Below is a list of what was corrected/changed:

1. Added legends to the graphs in Appendix F pages 85 through 87.
2. Added details on why we recommend two ILS Rwy 16 approaches page 96.

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Executive Summary

This report documents the findings of the Western Service Center (WSC) Operations Support Group (OSG) study team on the feasibility of installing an Instrument Landing System (ILS) procedure to the Elmendorf Air Force Base (EDF) Runway (RWY) 16. The study was conducted from August 13, 2018 through May 24, 2019.

The study team determined that the current flow of aircraft within the Anchorage bowl would be improved should EDF utilize RWY 16/24 instead of RWY 6/24, when conducting non-instrument approaches. The team used missed approach data to ascertain that the ILS procedure to RWY 16 would have an adverse impact to the Anchorage bowl area; however, most of those impacts can be mitigated utilizing tools currently available and tools in conceptual design, as referenced throughout this document.

Most of the recommendations made by the study team involve mitigating impacts of the ILS and improving system efficiencies within the Anchorage area. For example, arrival and departure flows into and out of Ted Stevens Anchorage International Airport (ANC) are not efficient for controllers or customers. Standard Instrument Departures (SID) in use at ANC could be re-engineered to reduce the requirement for all aircraft to be vectored, and procedurally allow aircraft to transition from the departure runway to their filed route.

Recommendations

The study team recommends the following mitigations to decrease/eliminate impacts of an ILS 16 approach at EDF:

1. Standardize missed approach procedures for ANC arrival aircraft.
2. Implement Converging Runway Display Aid (CRDA) or Arrival Departure Window (ADW) procedures into the Anchorage terminal environment.
3. Conduct a more in-depth review of current airspace design to take advantage of new technological advancements in navigation, surveillance and air traffic control, i.e., Performance Based Navigation (PBN) and Automatic Dependent Surveillance-Broadcast (ADS-B). The replacement of Micro-En route Automated Radar Tracking System (Micro-EARTS)) with En Route Automation Modernization (ERAM) in the next three to five years will facilitate the use of more advanced traffic management tools, such as Time Based Flow Management (TBFM).

4. Evaluate airspace sectorization at Anchorage Terminal Radar Approach Control (TRACON) (A11) and Anchorage Air Route Traffic Control Center (ARTCC or Center) (ZAN). Changes in arrival/departure flows at EDF will likely produce a workload imbalance at some operational air traffic control positions at A11 and ZAN. More in-depth investigation will be required to identify options and appropriate action.
5. Develop two ILS approaches at EDF. One for the slower maneuvering aircraft, and the other for faster, more maneuverable aircraft.
6. Track the use of CARTEE airspace.
7. Change the current configuration of the CARTEE airspace to accommodate use by both military and general aviation aircraft.

Introduction

The United States Air Force (USAF) Third Wing at Joint Base Elmendorf-Richardson (JBER) proposed: 1) an extension of EDF RWY 16/34 to the north by 2,500 feet, and 2) installation of an ILS to RWY 16 with associated precision approach procedures. The USAF also expressed a desire to use RWY 16 as the primary arrival runway.

The FAA Western Service Area (WSA) expressed concerns that the installation of an ILS approach to EDF RWY 16 would negatively impact the current flow of air traffic within the Anchorage terminal area, and at Merrill Field Airport (MRI).

Based on these concerns, the USAF requested the FAA perform a feasibility study to determine if the safety and/or efficiency of the Anchorage terminal area would benefit from an airspace redesign and procedures re-configuration, as well as, if the proposed changes at EDF would fit within the new design. A feasibility study would necessitate a dedicated work group of airspace specialists. They would use aviation modeling software to provide detailed analysis of current and projected Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) operations within the Anchorage terminal area, to determine the safest and most efficient configuration of airspace and procedures (including Code of Federal Regulations (CFR) Part 93 Special Air Traffic Rules). Additionally, the study would validate whether the use of an ILS to EDF RWY 16 would provide a benefit to efficiency and/or safety.

Scope

The study team review identified issues in four general categories:

- MRI impacts

- ANC impacts
- Traffic management
- Equipment/automation

Methodology

The methodology used for this study included the analysis of traffic data, review of published material, and simulations of potential impacts to ANC and MRI when operating in four different runway configurations. The study team also held numerous meetings with personnel at ANC and MRI.

The study team reviewed all airport design and planning efforts outlined in the airport master plan for the following airports:

- ANC
- MRI
- Palmer Airport (PAQ)
- Lake Hood Seaplane Base (LHD)
- Kenai Municipal Airport (ENA)
- Soldotna Airport (SXQ)

Other reference material and tools used in this study include review of A11 and ZAN traffic data using the Performance Data Analysis and Reporting System (PDARS), Airport and Airspace Delay Simulation Model (SIMMOD), and Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS). Operational data was also obtained via multiple FAA websites.

Existing Issues/Concerns

Anchorage Air Route Traffic Control Center

1. ZAN is one of three designated oceanic Centers, having control responsibility for more than two million square miles of airspace. It has three areas of specialty and 15 sectors. ZAN operates on two separate automation platforms, Advanced Technologies Oceanic Procedures (ATOP) and Micro-EARTS/Flight Data Processor Model 2000 (FDP-2000). Some of the sectors cover extremely large geographic areas, and on average use more communication frequencies per sector than any other facility in the National Airspace System (NAS).
2. The Micro-EARTS system has reached the end of its operational lifespan, and its automation data format is difficult to translate and evaluate. Replacement with an

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updated and more versatile automation system, called ERAM, is currently under consideration, with a replacement timeframe of Fiscal Year (FY) 2023 to FY2025. This estimated timeframe coincides with anticipated Standard Terminal Automation Replacement System (STARS) adaptation changes at A11, which would be required to accommodate implementation of the EDF RWY 16 ILS.

3. ZAN expressed concern that the EDF RWY 16 ILS missed approach would cause issues within the terminal environment, particularly to MRI airspace and operations along with adverse impacts to traffic flows to and from ANC RWY 7L/R.

Anchorage Terminal Radar Approach Control

1. A11 expressed concern that the EDF RWY 16 ILS missed approach would cause issues within the terminal environment, particularly to MRI airspace and operations along with adverse impacts to traffic flows to and from ANC RWY 7L/R.
2. Current arrival procedures to ANC do not allow aircraft to fly independently all the way to the assigned runway. There is a need to develop procedures using current technology that are more efficient and require less assistance from the controller.
3. In an effort to standardize traffic flows and provide more consistent procedures in the Anchorage area, a need has been identified to standardize missed approaches for all runways at ANC. Current procedures require aircraft to fly a slightly different route to the same holding fix, even when they are overflying the same runway.

Elmendorf Air Force Base

1. EDF has only one precision instrument approach to RWY 6. Current runway length on RWY 16/34 is too short for most aircraft stationed at EDF, therefore USAF efforts are underway to extend the runway to the north by 2,500 feet. EDF requires an alternate precision approach in the event of a runway closure and/or weather. Upon completion of the planned extension, the USAF intends to designate RWY 16 as the primary arrival runway and RWY 24 as the primary departure runway.
2. The proposed final approach course for the EDF RWY16 ILS passes approximately 0.5 NM west of restricted area (R) 2203C, which causes the ILS protected area to penetrate the restricted area. This will cause the instrument approach procedure to be unusable when the restricted area is active. Since the U.S. Army is the controlling agency for R2203C, current documented coordination requirements will need review to ensure a safe approach to EDF when the restricted area is active.

3. No Diverse Vectoring Area (DVA) exists for RWY 16, so aircraft must be at or above the Minimum Vectoring Altitude (MVA) before initiating a radar vector or turn.

Anchorage Airport Traffic Control Tower

ANC expressed concern that the EDF RWY 16 ILS missed approach would cause issues within the terminal environment, particularly to MRI airspace and operations along with adverse impacts to traffic flows to and from ANC RWY 7L/R.

Merrill Field Airport Traffic Control Tower

MRI expressed concerns that the increased use of EDF RWY 16 would adversely affect the current arrival and departure traffic flow and configuration of the MRI Class D airspace. Specifically, the anticipated increased use EDF RWY 16 would increase the use of CARTEE airspace (see Figure 1) to protect arrival operations to EDF. Due to the proximity of MRI and EDF, this traffic flow change is expected to adversely affect use of MRI RWY 7/25 by local aircraft.

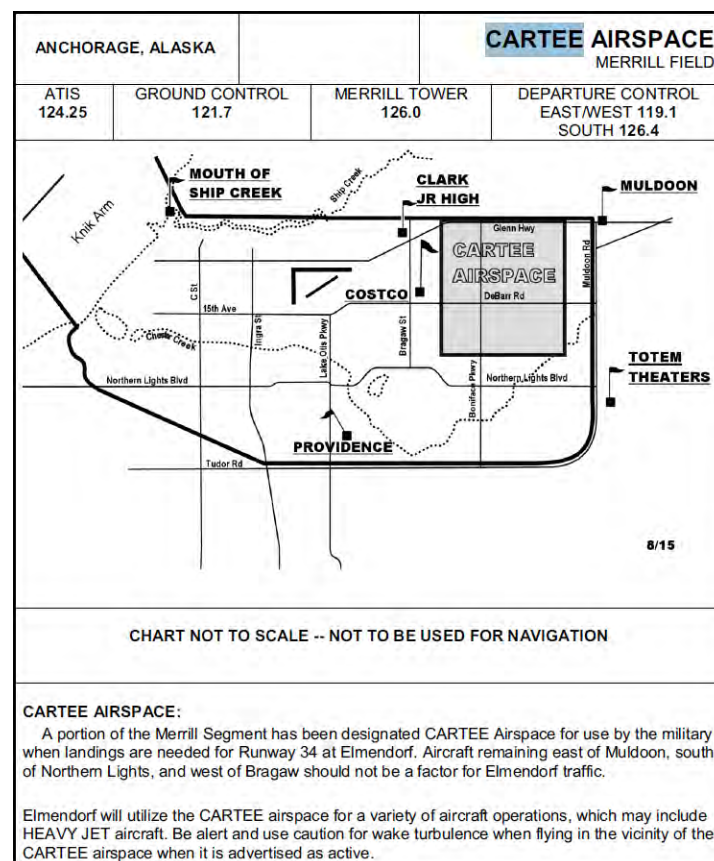


Figure 1: Alaska chart supplement showing CARTEE airspace

Bryant Army Airfield

Bryant Army Airfield (FRN) has a VFR tower surrounded by Class D airspace with no published IFR procedures to runways 17/35. The EDF RWY 16 ILS approach would have no discernable effect on traffic operating within the current FRN Class D airspace.

Lake Hood Seaplane Base

The missed approach portion of the proposed EDF RWY 16 ILS may have an adverse effect on the traffic flow into Lake Hood Seaplane Base (LHD). It is common for LHD arrivals from the east and northeast to pass south of MRI Class D airspace at an altitude that may conflict with aircraft executing a missed approach to EDF RWY 16.

Local User Groups

1. Municipality of Anchorage Planning Department
 - a. There has been an expressed concern regarding increased low flying air traffic over the Mountain View neighborhood which is located within the Accident Potential Zone 1 (APZ-1) for EDF RWY16.
 - b. There has been an expressed concern regarding an increase in aircraft noise over the Government Hill neighborhood.
2. Aircraft Owners and Pilots Association
 - a. Expansion of the military footprint in the terminal environment. As a representative for many General Aviation (GA) pilots in the Anchorage area, the Aircraft Owners and Pilots Association (AOPA) has expressed concern that traffic flow changes at EDF would have an adverse impact on GA traffic at MRI, LHD and ANC.
 - b. Consider airspace and/or procedural changes in the Anchorage area to accommodate the EDF RWY 16 ILS. AOPA has requested that they be included in this process. AOPA would also like to participate, if a need is identified, to conduct an environmental analysis, including any necessary public comment periods.
 - c. AOPA expressed concern that there has been limited success in past efforts to access documents regarding Anchorage airspace reviews and change recommendations. As this effort develops, AOPA would like to be included in the circulation of these documents.
 - d. The close proximity of MRI, a major GA hub, to EDF puts it in direct conflict with most proposals for an EDF RWY16 ILS missed approach. The anticipated negative

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impact on efficiency of operations at MRI would have an adverse economic impact on operators, the airport, and the surrounding community.

- e. Increased utilization of CARTEE airspace on the east side of the Merrill Class D airspace would impact local traffic flows to/from MRI RWY 7/25.

Communities That May be Affected by Procedure Changes

1. Municipality of Anchorage

- a. There has been an expressed concern regarding increased low flying air traffic over the Mountain View neighborhood, which is located within the APZ-1 for EDF RWY16.
- b. There has been an expressed concern regarding increased low flying aircraft noise over the Government Hill neighborhood.

2. Mountain View Neighborhood

This neighborhood is a densely populated area located south of EDF RWY 16/34 in a designated APZ-1. There are expressed safety concerns of low flying aircraft and the possibility of an aircraft accident.

Schools

- 1. Mountain View Elementary School: Located south of runway 16/34, the school has expressed a concern regarding the effect on schoolchildren's ability to learn with constant background jet noise caused by low flying military aircraft overhead.
- 2. Katmai Child Development Center (CDC): Located on JBER approximately 0.5 miles south of the approach end of EDF RWY 6. The CDC has expressed a concern regarding the effect on schoolchildren's ability to learn with constant background jet noise caused by low flying military aircraft overhead.

Alaska Native Tribes and Corporations

- 1. Knik Tribal Council (Wasilla) traditional territories extend throughout the Upper Cook Inlet including JBER.
 - a. The Knik tribe has expressed concern that the EDF RWY 16 extension and associated approach will increase aircraft noise pollution to residents, vulnerable elders and children.

- b. A mitigation plan may be required to address a potential increase in bird collisions as aircraft operations increase on EDF RWY 16/34.

Review Available Safety Data Reports from FAA and USAF

1. Quality Assurance and Quality Control Data

- a. Visual Flight Rules Departure Procedures: In an effort to provide better understanding and consistency for the pilot and controller, more clearly defined VFR departure routes and procedures, complete with documented restrictions may be required. These documented restrictions then become the rule, and the expectation, rather than ad hoc. This will reduce workload and potential for confusion between pilots and controllers when congestion and complexity are high.
- b. CARTEE Corrective Action Plan (CAP): The CARTEE airspace CAP indicates that this area should be defined and depicted in the “Alaska Supplement.”
 - i. Completed Mitigations: The boundaries and description of the CARTEE airspace have been incorporated into the Alaska Supplement (see Figure 1, page 11). The Anchorage Air Traffic Pilot Outreach team has completed briefings to pilots on the CARTEE airspace during their routine pilot briefing and controller training cycle.
 - ii. Completed Monitoring Plan: The monitoring plan for the CAP has been completed. It has been verified that the CARTEE airspace depiction and description have been published in the Alaska Supplement. The pilot outreach team has verified that the CARTEE airspace briefing to local pilots has been completed and will be included in future briefings to account for pilot turnover in the area.
- c. Red/Green Light Procedures Reports: Red/Green Light procedures are designed to allow quick multi-facility coordination between A11, ANC, LHD and MRI, to enable one facility to use the airspace when the others are not using it. A problem lies with the number of facilities involved, clarity of coordination, and complexity of situations that arise when these procedures are in use. The intent of these procedures is to allow aircraft to fly at an altitude and route of their choosing as they maneuver in Anchorage airspace. Unfortunately, Anchorage airspace is relatively complex and congested, and these procedures are work intensive for some facilities.

An alternative to Red/Green Light procedures would be to more precisely define arrival and departure routes utilizing current navigation technology. There is value for a pilot to be able to anticipate a consistent route and altitude when approaching or departing the Anchorage area airports. The value for the controller is knowing that an

aircraft maneuvering in the area will do the same thing, at the same location, every time. If an aircraft does not follow the correct route or altitude, the controller will be able to intervene and get the aircraft back on course.

- d. Area Navigation Departures – Anchorage Eight and Knik Two: A more precise and consistent departure procedure would be beneficial in resolving issues identified in the use of the Anchorage Eight and Knik Two departure procedures. As depicted in the established procedure, it is difficult for an aircraft utilizing RNAV to meet altitude and distance requirements without manual intervention from the pilot. This, in turn, requires dedicated attention from the controller to ensure the aircraft is flying the procedure properly. The study team recommends an overall review of these and other procedures in the Anchorage area to identify the needs and requirements of the users and Air Traffic Control (ATC). This effort should include affected users to gain their perspective and experience with the procedures.

2. Aviation Safety Reporting System (ASRS)

As with many metropolitan areas in the NAS, the Anchorage area has multiple airports to handle current aviation demands. These airports are in close proximity and compete for the most efficient use of available local airspace. Air traffic controllers utilize well-established radar separation rules to ensure a safe and efficient flow of traffic into and out of local Anchorage airports. However, today's separation rules constrain the ability for controllers to deliver an efficient flow of arrivals and departures to these competing adjacent airports. This inefficiency manifests itself in increased travel times, delayed operations at one airport to satisfy operations at another airport, inefficient route profiles to accommodate intersections of flows to multiple airports, and increased workload for controllers and pilots. The study team reviewed the NASA.gov website and associated ASRS data to identify operational issues at the following local airports and facilities:

- EDF
- FRN
- MRI
- LHD
- ANC
- A11
- ZAN
- ENA
- SXQ

Upon completion of a review of numerous documented events, the study team focused on 15 applicable records (see Appendix A). Review of these records led the study team to recommend more consistent and predictable handling of aircraft operating in ZAN and

A11 airspace. The consistency and predictability that results will provide the opportunity for pilots to accurately anticipate control instructions and flight paths, while reducing controller workload. Current operational requirements to monitor flights in local airspace are work intensive and do not take full advantage of current technological capabilities in air navigation and control. Controllers are required to provide control instructions to most, if not all aircraft as they maneuver in the airspace. There are limited technological capabilities in many military and private aircraft, however, a large percentage of commercial, and a significant number of private and military aircraft, have the capability to take advantage of PBN. NAS PBN Strategy 2016 builds on previous efforts that have been in process for more than 10 years and calls for the utilization of PBN operations to increase access, efficiency, and resiliency across the NAS to enable time and speed-based air traffic management and increase system predictability. The development of this strategy allows controllers to spend more time monitoring traffic flows rather than providing tactical radar separation. As the NAS continues to transition to a more consistent and predictable PBN based system, controllers will transition from tactical air traffic control processes and rules to more strategic procedural separation. Procedurally separated PBN routes provide consistent and predictable built-in separation between dependent routes and airports, allowing controllers to focus more on aircraft that do not have such capabilities, and on unusual situations that require a tactical response.

- a. Example 1: NASA Report ACN: 1447443 (reference Appendix A) described a scenario in which two experienced military pilots reported an altitude excursion on the EEEGL3 departure, due to the expectation of an ATC clearance similar to previous exercises. Had this departure route been procedurally separated from other routes, regardless of the technological capabilities of the aircraft, these pilots would have known what to expect and when, because the clearance and cleared route would have been consistent with previous flights and experience. The implementation of a more predictable process utilizing PBN would become the norm. The implementation of PBN procedures in this case would allow controllers to spend more time evaluating and responding to unusual events and exceptions to the proceduralized standard flow of air traffic.
- b. Example 2: NASA Report ACN: 1376577 (reference Appendix A) described a scenario in which a very experienced airline transport certified pilot flying a well-equipped aircraft (Beech Super King-Air 200) reported difficulties complying with ATC instructions during a visual approach. There were mitigating factors such as pilot fatigue and unclear ATC instructions, however, with the help of pre-programmed PBN flight routing, the pilot may have been able to focus more on flying the aircraft rather than concentrating on ATC instructions. PBN flight routing combined with aircraft equipped with proper instrumentation would allow

flights to transition from the IFR en-route structure, to the approach and landing phases, with minimal pilot and controller interaction.

- c. Example 3: NASA Report ACN: 1514691 (reference Appendix A) described a scenario in which two aircraft were vectored by ATC to land on converging runways and were inadvertently put in close proximity to each other. PBN procedures and the adoption of CRDA capability and procedures may have mitigated this event. The controller admitted he was aware of the developing situation and had options to mitigate it utilizing “S” turns. However, the controller became distracted and the situation deteriorated. Had PBN procedures and/or CRDA been in place, perhaps the controller would have addressed the situation more effectively.

In summary, taking advantage of existing technological capabilities in navigation and procedural separation and strategies will benefit the Anchorage area by providing more consistent, predictable and efficient utilization of NAS airspace, while decreasing workload for controllers and pilots.

3. Military Flight Operations Quality Assurance (MFOQA)

- a. Figure 2 (following page) depicts C-17 Terminal Collision Avoidance System (TCAS) events near EDF collected between September 2015 and August 2016. While the information shown is presented for the extended geographic area, the focus for this effort should be on the finals to EDF RWY 6 and 16, and also in the vicinity of MRI. It can be expected that as the USAF increases use of RWY 16 for arrivals and RWY 24 for departures, the incidence of the depicted Resolution Advisory (RA) and Traffic Advisory (TA) events will change. Additionally, the incidence of RA and TA events north of ANC in the vicinity of the 33 departure and 15 arrival corridor would be expected to subside as EDF arrival traffic shifts from RWY 6 to RWY 16. Conversely, without some sort of mitigation, RA and TA events may increase north of EDF with the increased use of EDF RWY 16 as an arrival runway.

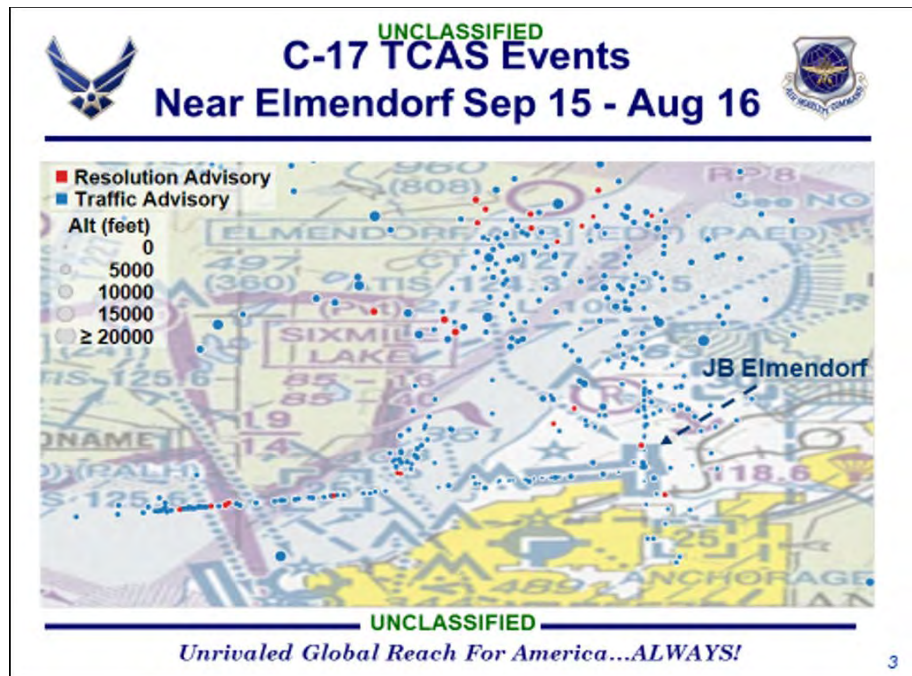


Figure 2: C-17 RA and TA events

- b. Figure 2 depicts several TA and one RA near MRI over the evaluation period. It can be expected that, as the use of EDF RWY 16 increases, the incidence of TA/RA events near MRI may also increase. Study team recommended mitigation options are:
 - i. Create a pilot outreach program to provide education and understanding of EDF flight operations to local users, specifically MRI and Six Mile Lake users.
 - ii. Evaluate possible adjustments to Part 93 airspace in the EDF segment area north of EDF, to provide a larger corridor for military aircraft arriving and departing EDF using RWY 16/34.
 - iii. Evaluate possible adjustments to routes and altitudes of transient aircraft north and south of EDF. This evaluation should include transient routes south of MRI Class D airspace.
 - iv. Evaluate the use of CARTEE airspace and options presented in the MRI section of this document.
 - v. Evaluate Class D operations and traffic flows at EDF in an attempt to mitigate RA and TA events in the local area.
- c. Figure 3 (following page) is a sectional chart excerpt of Portland International Airport (PDX) in Portland, Oregon, with Pearson Airport (VUO) located just north of PDX. In this case, there is a note on the sectional chart indicating VUO has associated Part 93 airspace. The intent is to prompt pilots to research the special rules associated

with VUO prior to arriving or departing. The incorporation of a similar note on the Anchorage Sectional may help local Anchorage area pilots also.



Figure 3: PDX sectional chart depiction with VUO Part 93 note

Current IFR and VFR Operations

ZAN

1. Installation and use of the EDF RWY 16 ILS would have minimal direct effect on ZAN. If the FAA concludes that an A11 airspace redesign is in order to better accommodate traffic flows in the Anchorage area and balance controller workload, consideration must be given to ZAN airspace surrounding A11 to a recommended distance of 60 NM from ANC.
2. Current Letters of Agreement (LOA) were reviewed by the study team and require no changes at this time. However, if any identified recommendations are implemented, updates to current LOAs would be required.

A11

1. The current Part 93 design, including published altitude and routing, would not need to be changed.
2. There are two Standard Terminal Arrivals (STARs) and two SID procedures into EDF. None of these serves EDF RWY 16. Some modification to the procedures for RWY 16

operations would be required. These changes could affect current traffic flows and would require appropriate study prior to implementation.

3. The study team identified no significant issues with VFR aircraft transitioning or operating north of EDF, with the exception of operations at Six Mile Lake. A briefing to local users detailing current and future changes to EDF operations is recommended. This briefing should be included in established local pilot outreach programs.
4. The study team reviewed the current LOA and found no changes are required at this time. However, if any recommendations are implemented, updates to current LOAs would be required.

EDF

1. Current EDF operating procedures work effectively with the existing airspace design. When the EDF RWY 16/34 is extended and the associated RWY 16 ILS is implemented, current standard operating procedures will require modification to incorporate procedures for the ILS approach and missed approach segment. These changes will require close coordination between EDF, A11, ANC, MRI and FRN.
2. The existing EDF Class D airspace design works well with procedures developed for air traffic operations to and from RWY 6/24. However, the EDF Class D southern boundary is located less than one NM from the departure end of RWY 16. This distance will not accommodate air traffic operations without impact to MRI operations. To address this, coordination must take place with MRI, and in some cases, EDF must request the use of CARTEE airspace to accommodate arrivals and departures to RWY 16/34. As described under the MRI section of this document, the CARTEE airspace may require redesign to allow less coordination between facilities.
3. Currently, there are two STAR (GRUBB and JINXX) and two SID procedures into EDF. The GRUBB and JINXX STAR assist aircraft and controllers with the transition of EDF arrival aircraft from various special use airspace points into EDF RWY 6. The JINXX STAR accommodates aircraft arriving from the northeast, and may need modification to accommodate the proposed EDF RWY 16 ILS approach. The GRUBB STAR accommodates aircraft from all locations, with three feeder routes that cover the entire western portion to the northeast portion of the arrival structures. A portion of this procedure may need modification to accommodate the proposed EDF RWY 16 ILS. The EEEGL THREE SID serves EDF RWY 6/24/34, and does not allow departures from RWY 16/34 when R2203 is active, thus only allowing for RWY 24 departures. The ELMENDORF TWO SID is not authorized when R2203 is active. This departure procedure serves EDF RWY 6/34. There is currently no SID developed to accommodate

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aircraft departing EDF RWY 16, likely due to surrounding airspace conflicts and taxi distance.

4. The study team reviewed the current LOA and found no changes are required at this time. However, if any recommendations are implemented, updates to current LOA will be required.

ANC

1. The study team reviewed the current LOA and found no changes are required at this time. However, if any recommendations are implemented, an in-depth review of current LOA will be required.

LHD

1. The missed approach portion of the proposed EDF RWY 16 ILS may affect traffic flow into LHD. Currently, LHD arrival traffic from the northeast will proceed east and south of R2203, then continuing south of MRI Class D airspace into LHD. Aircraft will commonly fly at altitudes between 1,000 and 1,500 feet when they are south of MRI Class D airspace. If the EDF RWY 16 ILS missed approach proceeds straight out at an average climb rate of 300 feet per NM, EDF missed approach aircraft are projected to be at approximately 1,500 feet crossing the southern boundary of MRI Class D airspace and would be in conflict with LHD arrivals transiting the area.
2. Part 93 airspace requirements state that, *“no person may operate an aircraft at an altitude between 1,200 feet Mean Sea Level (MSL) and 2,000 feet MSL, in that portion of the LHD segment lying north of the mid-channel of Knik Arm. Additionally, each person operating an airplane within this segment (except that part described above) shall operate that airplane at an altitude of at least 600 feet MSL until maneuvering for a safe landing that requires further descent.”* The area described in this segment has proven effective in allowing VFR arrivals to LHD while aircraft approach EDF RWY 6.

MRI

1. As currently designed, MRI Class D airspace cannot contain all MRI operations within its boundaries. Arrival aircraft are not able to remain within the MRI Class D when inbound from the northwest and entering a right downwind to RWY 25, or departing RWY 7 with a left downwind departure north of MRI. By LOA between MRI and EDF, a portion of the airspace from EDF may be delegated to MRI to accommodate these operations. This area is known as the Bluff Line.
2. By LOA between MRI and EDF, CARTEE airspace (see Figure 1, page 11) can be released to EDF to accommodate RWY 16/34 operations. There is currently no record

indicating how often CARTEE airspace is utilized, however, estimates indicate usage around 20 percent of the time.

3. CARTEE airspace extends 1.4 NM into the MRI Class D surface area, and is approximately 1.4 NM wide, from the surface to 2,500 feet MSL (see Figure 4). Study team review of flight tracks within the CARTEE airspace identified three possible options to assist with the use of this airspace.
 - a. Option 1: CARTEE airspace, as defined, is not fully utilized. The southern boundary could be moved north approximately 0.5 NM and the eastern boundary extended east to the current boundary of MRI Class D airspace. Therefore reducing the amount of area that CARTEE extends into MRI Class D airspace (see Figure 4).
 - b. Option 2: Reassign primary responsibility of a portion of CARTEE airspace from MRI to EDF with the intent of reducing coordination between the two facilities.
 - c. Option 3: Divide CARTEE airspace into two separate volumes. The first defined as it is currently, surface to 2500 feet MSL. The second volume defined as starting at 1,000 feet MSL to 2,500 feet MSL. Depending on traffic demands at MRI and EDF, the airspace could be split vertically to allow MRI local traffic to transit underneath EDF local traffic.

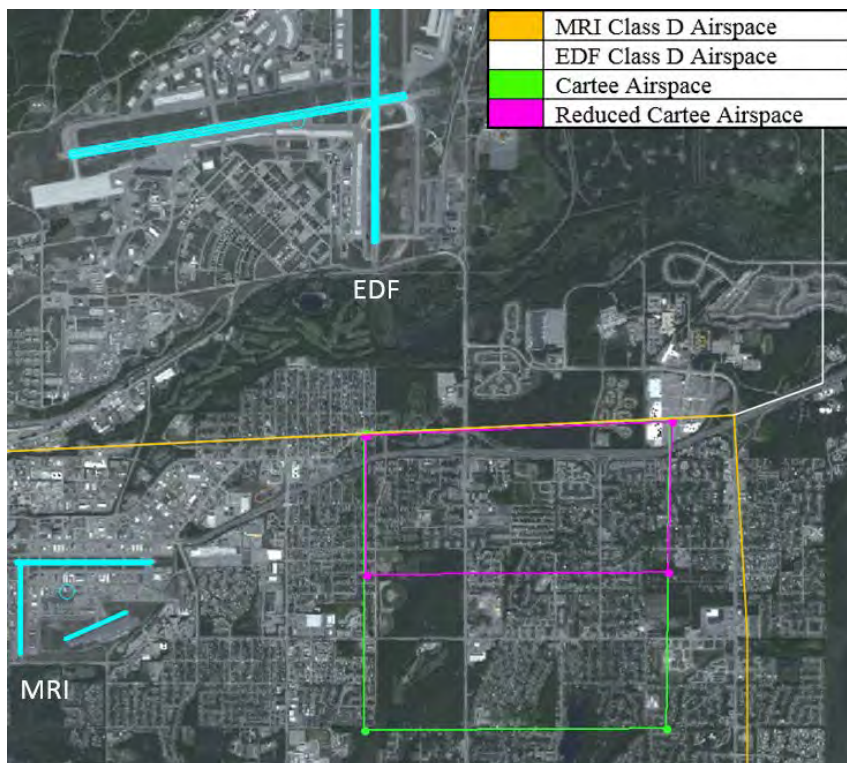


Figure 4: Depiction of CARTEE airspace (current and reduced)

4. The study team reviewed the current LOA and found no changes are required at this time. However, if any recommendations are implemented, updates to current LOAs will be required.

ENA

1. Existing airspace procedures and ATC facilities provide for a safe, orderly, and expeditious flow of traffic at ENA. Airspace and ATC considerations do not limit the capacity of aviation activity in the Kenai area, and they are not expected to limit capacity in the future given the existing and forecasted aviation demand. However, some interactions do exist between IFR operations at Kenai Municipal and Soldotna Municipal Airports, particularly when northerly operations at Kenai and easterly operations at Soldotna are in progress. Fortunately, the incidence of this combination is relatively infrequent and ATC procedures and strategies can reduce the impact on capacity.

FRN

1. FRN has a VFR ATCT surrounded by Class D airspace with no published IFR procedures to or from FRN RWY 17/35. The EDF RWY 16 ILS approach would have no discernable effect on FRN operations.
2. The U.S. Army made an unofficial request to expand FRN Class D airspace to the south/southeast beyond the Glenn Highway. This would allow FRN to keep local air traffic operations contained within their Class D airspace.
3. The reporting manager for the R2203A/B/C complex is the U.S. Army Fort Richardson Range Manager, AK. The following are the defined areas and reported usage:
 - a. R2203A is activated from surface to 11,000 feet MSL and is used an average of 60 days per year. Airframes vary from event to event within the area.
 - b. R2203B is activated from surface to 11,000 feet MSL and is used an average of 204 days per year. Airframes vary from event to event within the area.
 - c. R2203C is activated from surface to 5,000 feet MSL and is used an average of 54 days per year. This restricted area is normally used for tactical live fire operations and demolitions; however, 31 sorties were reportedly flown in 2017.
4. Part 93 airspace requires *“each person operating an airplane to or from the Bryant Airport to conform to the flow of traffic shown on the appropriate aeronautical charts, and while in the traffic pattern, they shall operate at an altitude of at least 1,000 feet*

MSL until maneuvering for a safe landing requires further descent. Additionally, each person operating an aircraft within the Bryant segment should self-announce intentions on the Bryant Airport CTAF (Common Traffic Advisory Frequency)."

PAQ

1. Palmer airport normally conducts parachute operations from the beginning of April through late October. Jumps are conducted at 10,500 feet and below within the drop zone located next to PAQ airport.
2. PAQ normally conducts glider activity from April through September. The gliders operate at 3,000 feet and below, and occasionally higher if local conditions and pilot qualifications allow. There are additional glider operations out of Birchwood (BCV) and Wasilla (IYS) airports.
3. Initial review by the study team indicates no impact to PAQ operations with the introduction of the EDF RWY 16 ILS.

Part 93 Airspace Elmendorf Segment

The Anchorage, Alaska terminal area Part 93 airspace Elmendorf Segment, depicted in Figure 5 and Figure 6, is designated as airspace that extends upward from the surface to the upper limit of the segment described below, and with the following requirements:

1. *Each person operating a turbine-powered aircraft within this segment shall operate that aircraft at an altitude of at least 1,700 feet MSL, until maneuvering for a safe landing requires further descent.*
2. *Each person operating an airplane (other than turbine-powered aircraft) at a speed of more than 105 knots within this segment shall operate that airplane at an altitude of at least 1,200 feet MSL, until maneuvering for a safe landing requires further descent.*
3. *Each person operating an airplane (other than turbine-powered aircraft) at a speed of 105 knots or less within the segment shall operate that airplane at an altitude of at least 800 feet MSL, until maneuvering for a safe landing requires further descent.*
4. *A person operating an aircraft landing or departing from Elmendorf AFB, may operate that aircraft at an altitude between 1,500 feet MSL and 1,700 feet MSL, within that portion of the International and Lake Hood segments lying north of the mid-channel of Knik Arm.*

5. A person operating an aircraft landing or departing from Elmendorf AFB, may operate that aircraft at an altitude between 900 feet MSL and 1,700 feet MSL, within that portion of the Merrill segment lying north of the mid-channel of Knik Arm.
6. A person operating an aircraft in VFR conditions at or below 600 feet MSL, north of a line beginning at the intersection of Farrell Road and longitude 149°43'08" W.; thence west along Farrell Road to the east end of Six Mile Lake; thence west along a line bearing on the middle of Lake Lorraine to the northwest bank of Knik Arm; is not required to establish two-way radio communications with ATC.

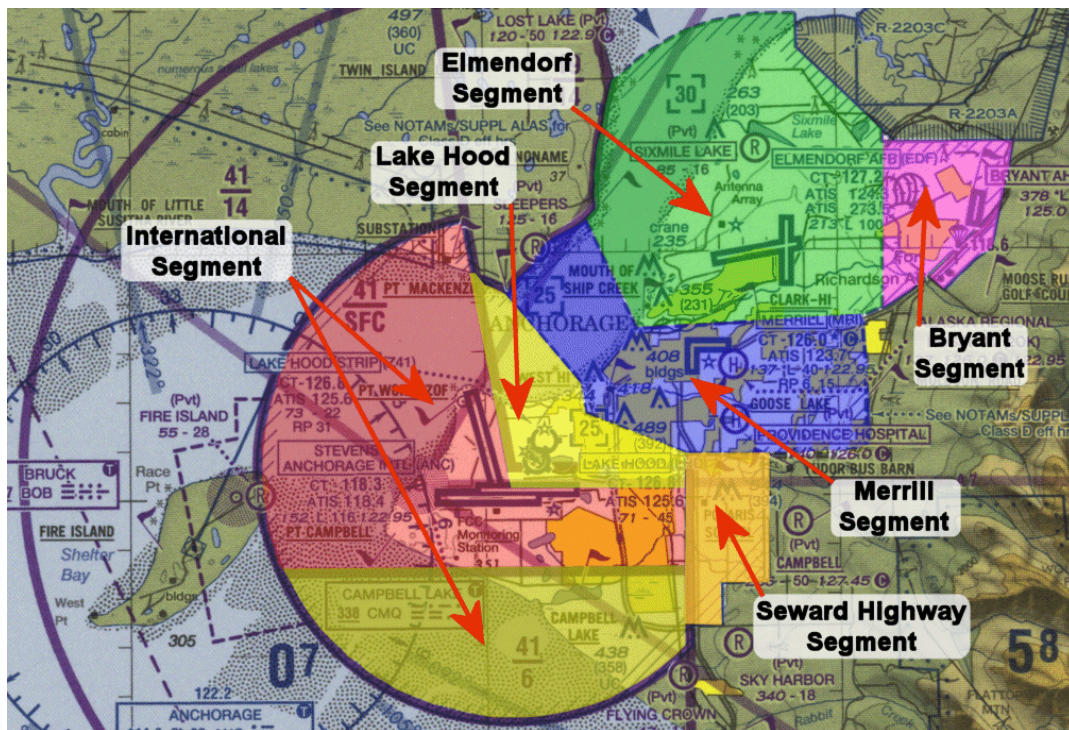


Figure 5: Part 93 airspace on sectional

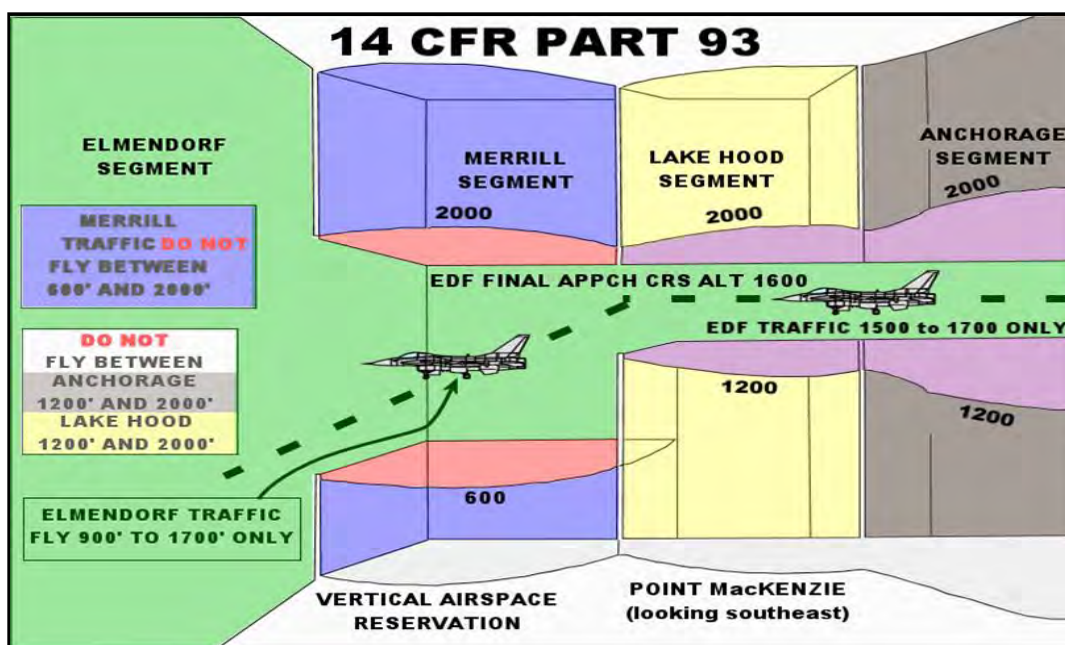


Figure 6: Part 93 airspace graphic

Airport/Airspace Configurations Modeled

The simulation program SIMMOD was used to determine impact of ILS RWY 16 at Elmendorf, on ANC and MRI. This airspace and air traffic simulator performs the following:

- Simulates airspace, runways, taxiways, gates.
- Computes delays and travel times.
- Answers 'what if' questions.

Considering the volume of VFR aircraft and numerous complexities of the Anchorage bowl area, using the total traffic count for ANC and MRI did not provide an accurate baseline for the simulations. Therefore, in coordination with ANC and MRI, the study team concluded that the traffic count numbers shown in Figure 7 would produce an accurate determination of impacts.

Facility	Arrivals	Departures	Total
ANC	350	350	700
MRI	63	63	126
EDF	58	57	115

Figure 7: Simulation traffic count numbers

The following are the dependencies used for the four simulations:

1. EDF RWY 16 arrivals holds ANC RWY 7L departures until arrival touches down. ANC departure holding begins when EDF RWY 16 arrival is 1.4 nm from RWY threshold.
2. EDF RWY 16 arrivals and ANC RWY 7R/7L arrivals are dependent.
3. ANC RWY 33 departures and approaches to EDF RWY 6 are dependent.
4. ANC RWY 33 departures and MRI approaches (along EDF RWY 6 track) are dependent.
5. MRI RWY 16 departures and ANC RWY 7R/7L arrivals are dependent.
6. MRI flights are protected from EDF RWY 16 missed approach area. This includes arrivals to MRI RWY 25, 16; and departures from MRI RWY 25, 16.
7. MRI RWY 16 departures and EDF RWY 16 arrivals are dependent.

Also included in the simulation were in-trail separation of 3.5 NM, and MRI SVFR aircraft treated as IFR with 3.4 NM separation.

Normal Flow Simulation

Config 1	Arr Rwy	Dep Rwy
ANC	7R (60%), 7L (40%)	33 (100%)
MRI	25 (75%), 16 (25%)	25 (75%), 16 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

Figure 8: Configuration 1 RWY configurations

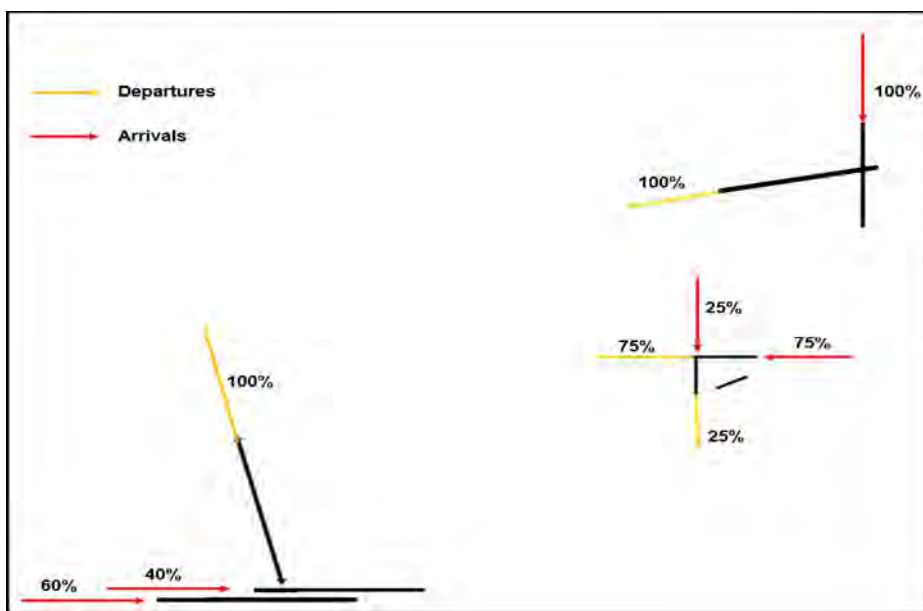


Figure 9: Graphic depiction of Configuration 1 RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	0.6	1.2	0.7	1.1	0.1	-0.1
MRI	0.1	0.1	0.1	0.2	0.0	0.1
EDF	0.1	0.1	0.4	0.3	0.3	0.2

Figure 10: Configuration 1 simulation model results - delay per aircraft (minutes)

In this model, consider Configuration 1 Baseline ANC Arrs (arrival) delay shows 0.6 minutes/aircraft total delay for half of 700 aircraft (350). Mathematically, this works out to 210 minutes of baseline system air delay (0.6 minute X 350 aircraft = 210 minutes).

The Configuration 1 new ILS simulation for ANC produced .7 minutes/aircraft Arrs delay, indicating an increase of .1 minutes or 6 seconds/aircraft for 350 aircraft in a 24 hour period. Total system air delay for ANC in this 24 hour period would increase 35 minutes (6 X 350 = 2100/60 = 35 minutes).

This simulation indicates that accumulated system arrival delays would increase 35 minutes from 210 minutes (3.5 hours) baseline to 245 minutes (4.08 hours) in a 24 hour period. Considering this is a simulation, actual realized delays will likely be different due to variables that are not considered or included. Since these unidentified variables are not considered or included in all of the scenarios (basically stating that all things being equal), it can be projected that the simulation delta results are valid. That said, the primary focus should be on the delta between the baseline and the new ILS results, rather than the overall system delays. In this case, the focus

should be on the 35 minutes additional delay in a 24 hour period, and not the 245 minutes overall delay produced by the simulation.

Using the same calculations, ANC departure delays would improve by 35 minutes in a 24 hour period. This would indicate that the delay realized in ANC arrivals would be absorbed by the improvement in ANC departures. The system as a whole for ANC would be projected to realize no change, positive or negative, from today's operation.

MRI would realize a 0.1 minute/aircraft system delay in a 24 hour period. Considering delay results for both arrivals and departures, MRI would realize a 12.6 minute total system delay (0.1 minute X 126 aircraft = 12.6 minutes).

EDF would realize a .5 minute/aircraft system delay in a 24 hour period. This equates to 57.5 minute total system delay (.5 minute X 115 aircraft = 57.5 minutes).

Config 2	Arr Rwy	Dep Rwy
ANC	7R (100%)	33 (60%), 7L (40%)
MRI	25 (75%), 16 (25%)	25 (75%), 16 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

Figure 11: Configuration 2 runway RWY configurations

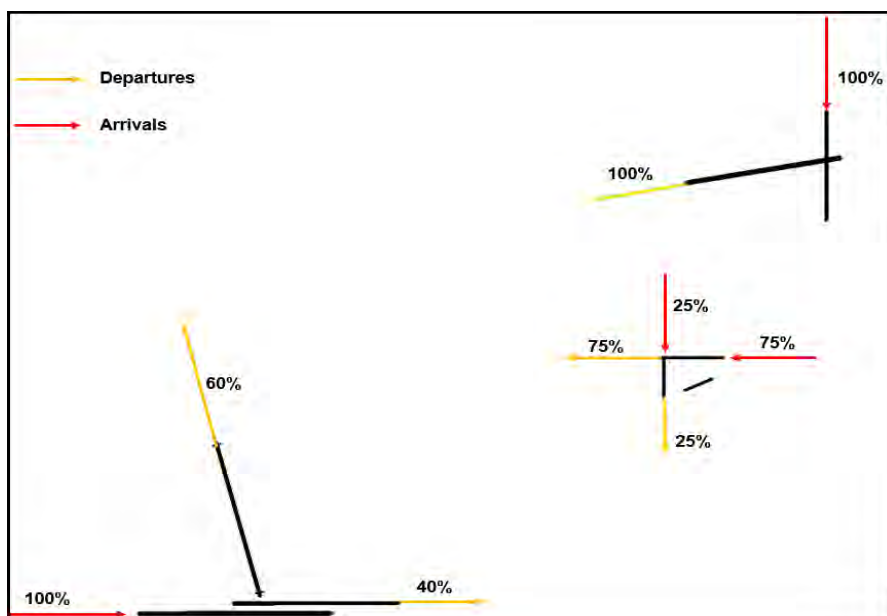


Figure 12: Graphic depiction of Configuration 2 runway RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	0.7	0.6	0.9	0.6	0.2	0.0
MRI	0.1	0.1	0.1	0.2	0.0	0.1
EDF	0.1	0.1	0.2	0.2	0.1	0.1

Figure 13: Configuration 2 simulation model results - delay per aircraft (minutes)

ANC would realize a .2 minute/aircraft system delay in a 24 hour period. This equates to 140 minute total system delay (.2 minute X 700 aircraft = 140 minutes).

MRI would realize a .1 minute/aircraft system delay in a 24 hour period. This equates to 12.6 minute total system delay (.1 minute X 126 aircraft = 12.6 minutes).

EDF would realize a .2 minute/aircraft system delay in a 24 hour period. This equates to 23 minute total system delay (.2 minute X 115 aircraft = 23 minutes).

Config 3	Arr Rwy	Dep Rwy
ANC	7R (60%), 7L (40%)	33 (100%)
MRI	16 (75%), 25 (25%)	16 (75%), 25 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

Figure 14: Configuration 3 RWY configurations

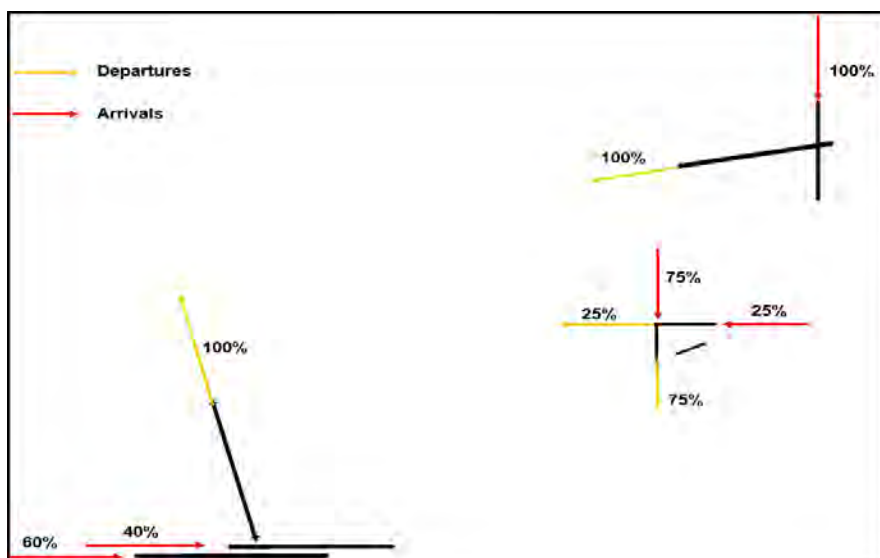


Figure 15: Graphic depiction of Configuration 3 RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	0.6	1.2	0.8	1.1	0.2	-0.1
MRI	0.2	0.3	0.2	0.4	0.0	0.1
EDF	0.2	0.1	0.4	0.3	0.2	0.2

Figure 16: Configuration 3 simulation model results - delayed per aircraft (minutes)

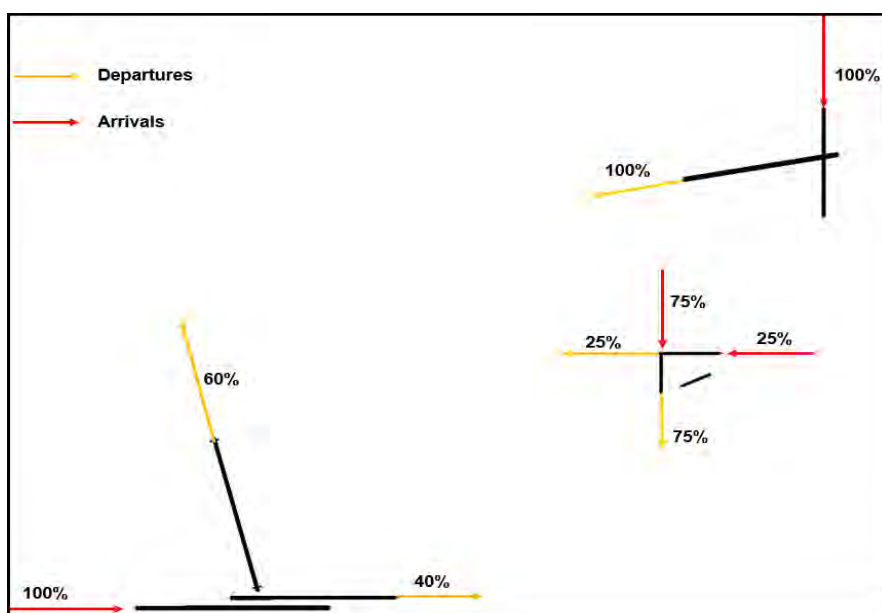
ANC would realize a .1 minute/aircraft system delay in a 24 hour period. This equates to 70 minute total system delay (.1 minute X 700 aircraft = 70 minutes).

MRI would realize a .1 minute/aircraft system delay in a 24 hour period. This equates to 12.6 minute total system delay (.1 minute X 126 aircraft = 12.6 minutes).

EDF would realize a .4 minute/aircraft system delay in a 24 hour period. This equates to 46 minute total system delay (.4 minute X 115 aircraft = 46 minutes).

Config 4	Arr Rwy	Dep Rwy
ANC	7R (100%)	33 (60%), 7L (40%)
MRI	16 (75%), 25 (25%)	16 (75%), 25 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

Figure 17: Configuration 4 RWY configurations



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Figure 18: Graphic depiction of Configuration 4 RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	0.8	0.6	1.0	0.6	0.2	0.0
MRI	0.2	0.3	0.2	0.4	0.0	0.1
EDF	0.1	0.1	0.3	0.3	0.2	0.2

Figure 19: Configuration 4 simulation model results - delay per aircraft (minutes)

ANC would realize a .2 minute/aircraft system delay in a 24 hour period. This equates to 140 minute total system delay (.2 minute X 700 aircraft = 140 minutes).

MRI would realize a .1 minute/aircraft system delay in a 24 hour period. This equates to 12.6 minute total system delay (.1 minute X 126 aircraft = 12.6 minutes).

EDF would realize a .4 minute/aircraft system delay in a 24 hour period. This equates to 46 minute total system delay (.4 minute X 115 aircraft = 46 minutes).

High Demand Configurations

The following model results identify impacts during a historically high demand period (1300-1559 local) for the local Anchorage area airports. Traffic volume used for this scenario is outlined in Figure 20.

Facility	Arrivals	Departures	Total
ANC	73	65	138
MRI	20	16	36
EDF	19	14	33

Figure 20: Simulation traffic count numbers for high demand scenario

Config 1	Arr Rwy	Dep Rwy
ANC	7R (60%), 7L (40%)	33 (100%)
MRI	25 (75%), 16 (25%)	25 (75%), 16 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

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Figure 21: Configuration 1 RWY configurations

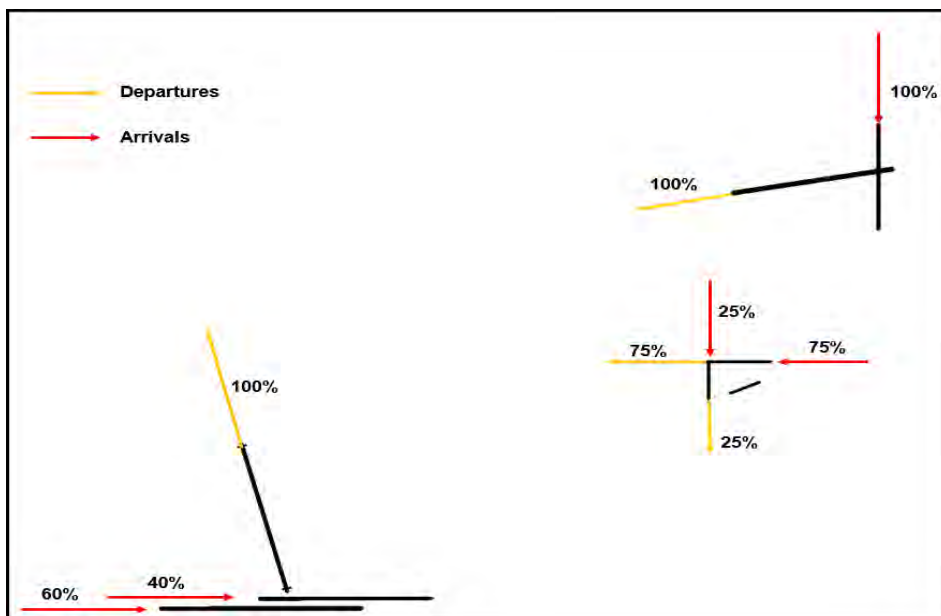


Figure 22: Graphic depiction of Configuration 1 RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	1.2	1.2	1.6	1.2	0.4	0.0
MRI	0.1	0.3	0.2	0.4	0.1	0.1
EDF	0.2	0.0	0.6	0.1	0.4	0.1

Figure 23: Configuration 1 simulation model results - delay per aircraft (minutes)

In this model, the simulation was run using data from a 3 hour time period, 1300-1600, that generates a historically high volume of traffic, on average, for the local Anchorage facilities.

ANC would realize a .4 minute/aircraft system delay in a 3 hour period. This equates to 55.2 minute total system delay (.4 minute X 138 aircraft = 55.2 minutes).

MRI would realize a .2 minute/aircraft system delay in a 3 hour period. This equates to 7.2 minute total system delay (.2 minute X 36 aircraft = 7.2 minutes).

EDF would realize a .5 minute/aircraft system delay in a 3 hour period. This equates to 16.5 minute total system delay (.5 minute X 33 aircraft = 16.5 minutes).

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Config 2	Arr Rwy	Dep Rwy
ANC	7R (100%)	33 (60%), 7L (40%)
MRI	25 (75%), 16 (25%)	25 (75%), 16 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

Figure 24: Configuration 2 RWY configurations

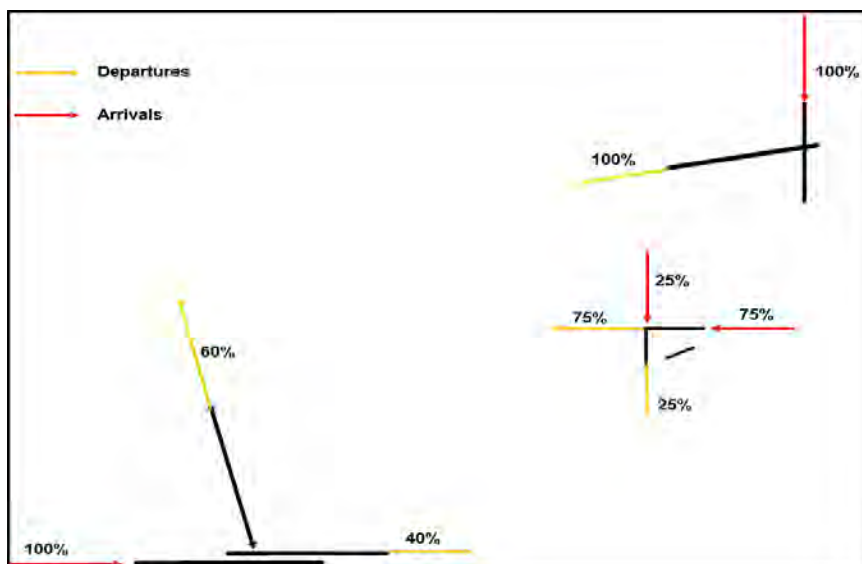


Figure 25: Graphic depiction of Configuration 2 RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	1.8	0.7	2.4	0.7	0.6	0.0
MRI	0.1	0.3	0.2	0.4	0.1	0.1
EDF	0.2	0.0	0.5	0.1	0.3	0.1

Figure 26: Configuration 2 simulation model results - delay per aircraft (minutes)

ANC would realize a .6 minute/aircraft system delay in a 3 hour period. This equates to 82.8 minute total system delay (.6 minute X 138 aircraft = 82.8 minutes).

MRI would realize a .2 minute/aircraft system delay in a 3 hour period. This equates to 7.2 minute total system delay (.2 minute X 36 aircraft = 7.2 minutes).

EDF would realize a .4 minute/aircraft system delay in a 3 hour period. This equates to 13.2 minute total system delay (.4 minute X 33 aircraft = 13.2 minutes).

Anchorage Terminal Area Airspace and Procedures Feasibility Study

Config 3	Arr Rwy	Dep Rwy
ANC	7R (60%), 7L (40%)	33 (100%)
MRI	16 (75%), 25 (25%)	16 (75%), 25 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

Figure 27: Configuration 3 RWY configurations

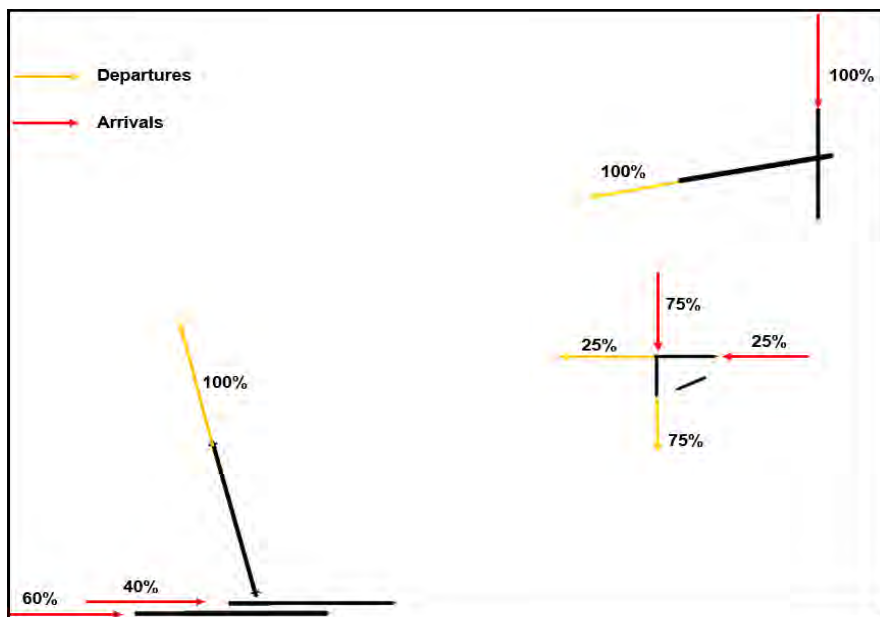


Figure 28: Graphic depiction of Configuration 3 RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	1.2	1.1	1.6	1.1	0.4	0.0
MRI	0.2	0.4	0.2	0.7	0.0	0.3
EDF	0.3	0.0	0.7	0.1	0.4	0.1

Figure 29: Configuration 3 simulation model results - delay per aircraft (minutes)

ANC would realize a .4 minute/aircraft system delay in a 3 hour period. This equates to 55.2 minute total system delay (.4 minute X 138 aircraft = 55.2 minutes).

MRI would realize a .3 minute/aircraft system delay in a 3 hour period. This equates to 10.8 minute total system delay (.3 minute X 36 aircraft = 10.8 minutes).

EDF would realize a .5 minute/aircraft system delay in a 3 hour period. This equates to 16.5 minute total system delay (.5 minute X 33 aircraft = 16.5 minutes).

Anchorage Terminal Area Airspace and Procedures Feasibility Study

Config 4	Arr Rwy	Dep Rwy
ANC	7R (100%)	33 (60%), 7L (40%)
MRI	16 (75%), 25 (25%)	16 (75%), 25 (25%)
EDF - Baseline	6 (83%), 16 (17%)	6 (68%), 34 (32%)
EDF – New ILS	16 (100%)	24 (100%)

Figure 30: Configuration 4 RWY configurations

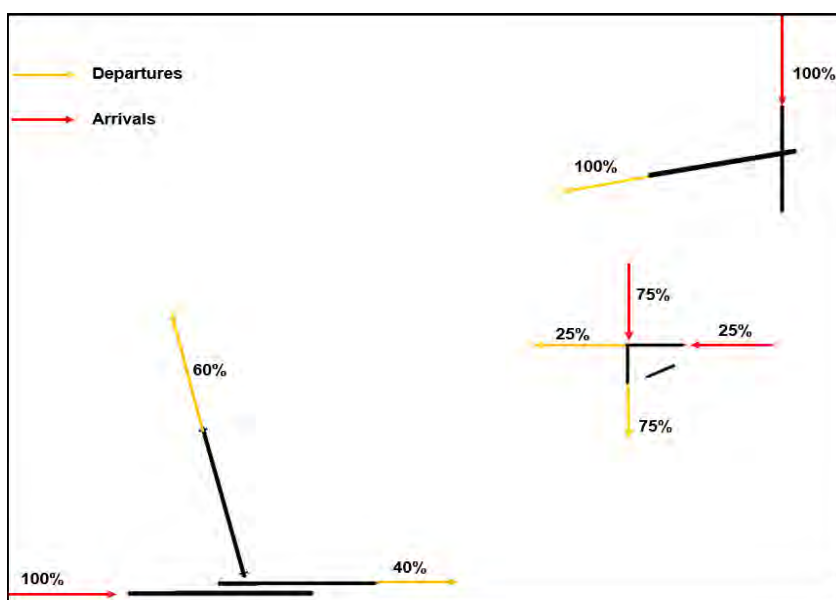


Figure 31: Graphic depiction of Configuration 4 RWY configurations

Facility	Baseline		New ILS		Delta	
	Arrs	Deps	Arrs	Deps	Arrs	Deps
ANC	1.6	0.6	2.2	0.6	0.6	0.0
MRI	0.2	0.5	0.2	0.5	0.0	0.0
EDF	0.2	0.0	0.6	0.1	0.4	0.1

Figure 32: Configuration 4 simulation model results - delay per aircraft (minutes)

ANC would realize a .6 minute/aircraft system delay in a 3 hour period. This equates to 82.8 minute total system delay (.6 minute X 138 aircraft = 82.8 minutes).

MRI would realize no additional impact from today's operation.

EDF would realize a .5 minute/aircraft system delay in a 3 hour period. This equates to 16.5 minute total system delay (.5 minute X 33 aircraft = 16.5 minutes).

Supporting Documents

Appendix A: ASRS Reports

EDF

ACN: 1447443 (1 of 1)

Time / Day

Date : 201705

Local Time Of Day : 1201-1800

Place

Locale Reference.Airport : EDF.Airport

State Reference : AK

Altitude.MSL.Single Value : 3000

Environment

Flight Conditions : VMC

Light : Daylight

Aircraft : 1

Reference : X

ATC / Advisory.TRACON : A11

Aircraft Operator : Military

Make Model Name : Military

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 91

Flight Plan : IFR

Mission : Training

Flight Phase : Initial Climb

Route In Use.SID : EEEGL3

Airspace.Class C : ANC

Aircraft : 2

Reference : Y

ATC / Advisory.TRACON : A11

Aircraft Operator : Military

Make Model Name : Military

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 91

Flight Plan : IFR

Mission : Training

Flight Phase : Initial Climb

Route In Use.SID : EEEGL3

Airspace.Class C : ANC

Person : 1

Reference : 1
Location Of Person.Aircraft : X
Location In Aircraft : Flight Deck
Reporter Organization : Military
Function.Flight Crew : Pilot Flying
Experience.Flight Crew.Total : 480
Experience.Flight Crew.Last 90 Days : 40
Experience.Flight Crew.Type : 240
ASRS Report Number.Accession Number : 1447443
Human Factors : Communication Breakdown
Human Factors : Confusion
Communication Breakdown.Party1 : Flight Crew
Communication Breakdown.Party2 : ATC

Person : 2

Reference : 2
Location Of Person.Aircraft : Y
Location In Aircraft : Flight Deck
Reporter Organization : Military
Experience.Flight Crew.Total : 2300
Experience.Flight Crew.Last 90 Days : 60
Experience.Flight Crew.Type : 1200
ASRS Report Number.Accession Number : 1447437
Human Factors : Situational Awareness

Events

Anomaly.Conflict : Airborne Conflict
Anomaly.Deviation - Altitude : Excursion From Assigned Altitude
Anomaly.Deviation - Procedural : Clearance
Detector.Person : Air Traffic Control
When Detected : In-flight
Result.Flight Crew : Requested ATC Assistance / Clarification
Result.Air Traffic Control : Separated Traffic

Assessments

Contributing Factors / Situations : Human Factors
Primary Problem : Human Factors

Narrative: 1

Flight of two cleared as filed via EEEGL3 departure, with altitude restriction at 2200 feet. Passing departure end cleared to 3000 feet in accordance with published departure. Reaching intercept heading, pilot then initiated climb to 6000 feet to comply with next published altitude. This departure requires a steep climb rate (>3000fpm), and in previous exercise events aircraft are automatically cleared to climb once established outbound.

Narrative: 2

On climbout was given 3000 feet. Lead aircraft continued climbing in accordance with departure as is usually the case. Was told to level off at 6000 feet. Lead aircraft was told that it was due to "loss of separation".

Synopsis

Two military pilots reported an altitude excursion due to expectation of clearance similar to previous exercises.

ATAAPS Summary

NASA Report ACN: 1447443 describes a scenario where 2 experienced military pilots reported an altitude excursion on the EEEGL3 departure due to the expectation of an ATC clearance similar to previous exercises. Had this departure route been procedurally separated from other routes, regardless of the technological capabilities of the aircraft, the pilots would know what to expect and when because the clearance and cleared route would be consistent with previous flights and experience. This more automated and predictable process would become the norm, which would allow controllers to spend more time evaluating and responding to unusual events and exceptions to the proceduralized standard flow of air traffic.

A11

ACN: 1502317 (1 of 1)

Time / Day

Date : 201712

Local Time Of Day : 1801-2400

Place

Locale Reference.ATC Facility : A11.TRACON

State Reference : AK

Altitude.MSL.Single Value : 6000

Environment

Flight Conditions : VMC

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.TRACON : A11

Aircraft Operator : Air Carrier

Make Model Name : B737-800

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 121

Flight Plan : IFR

Mission : Passenger

Nav In Use : FMS Or FMC

Flight Phase : Descent

Route In Use : Vectors

Route In Use.STAR : WITT13

Airspace.Class E : A11

Person

Reference : 1
Location Of Person.Facility : A11.TRACON
Reporter Organization : Government
Function.Air Traffic Control : Approach
Qualification.Air Traffic Control : Fully Certified
Experience.Air Traffic Control.Time Certified In Pos 1 (yrs) : 2
ASRS Report Number.Accession Number : 1502317
Human Factors : Situational Awareness
Human Factors : Workload
Human Factors : Distraction

Events

Anomaly.ATC Issue : All Types
Anomaly.Deviation - Track / Heading : All Types
Anomaly.Deviation - Procedural : Published Material / Policy
Anomaly.Deviation - Procedural : Clearance
Anomaly.Inflight Event / Encounter : CFTT / CFIT
Detector.Person : Air Traffic Control
When Detected : In-flight
Result.Flight Crew : Requested ATC Assistance / Clarification
Result.Air Traffic Control : Issued New Clearance
Result.Air Traffic Control : Issued Advisory / Alert

Assessments

Contributing Factors / Situations : Airspace Structure
Contributing Factors / Situations : Human Factors
Primary Problem : Airspace Structure

Narrative: 1

A B737 came over on the RNAV arrival. I was working my other aircraft when the B737 called to ask for clarification on what he was supposed to be doing. At that moment, it was clear the B737 was off the ground track for the RNAV arrival. It wasn't clear at the time if it was his clearance for the arrival that confused him or what. I began to give him a turn when I realized he had already descended below the MVA (Minimum Vectoring Altitude). In the same transmission, I asked if he can maintain his own terrain and obstruction clearance. He said he could, so I gave him a vector and altitude he currently was at to maintain. An hour or so the pilot called to apologize, and say it was their mistake they had come off course from the RNAV STAR.

Synopsis

A11 TRACON Controller reported they did not notice an aircraft had flown off course and into an area below the Minimum Vectoring Altitude.

ATAAPS Summary

This scenario indicates that the pilot was not sure what routing they should be flying. Developed properly, PBN flight routing and an aircraft with proper instrumentation will allow a flight to transition from the IFR enroute structure, to the approach phase and ultimately the landing phase with minimal pilot and controller interaction, thus reducing any misunderstanding or confusion regarding route of flight.

ACN: 1484433 (1 of 1)

Time / Day

Date : 201709

Local Time Of Day : 1201-1800

Place

Locale Reference.ATC Facility : A11.TRACON

State Reference : AK

Altitude.MSL.Single Value : 5600

Environment

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.TRACON : A11

Aircraft Operator : Military

Make Model Name : Fighter

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 91

Flight Plan : IFR

Mission : Training

Flight Phase : Initial Approach

Airspace.Class E : A11

Person

Reference : 1

Location Of Person.Facility : A11.TRACON

Reporter Organization : Government

Function.Air Traffic Control : Approach

Qualification.Air Traffic Control : Fully Certified

ASRS Report Number.Accession Number : 1484433

Human Factors : Communication Breakdown

Human Factors : Situational Awareness

Human Factors : Confusion

Communication Breakdown.Party1 : ATC

Communication Breakdown.Party2 : Flight Crew

Events

Anomaly.ATC Issue : All Types

Anomaly.Deviation - Altitude : Excursion From Assigned Altitude

Anomaly.Deviation - Procedural : Published Material / Policy

Anomaly.Deviation - Procedural : Clearance

Anomaly.Inflight Event / Encounter : CFTT / CFIT

Detector.Person : Air Traffic Control

When Detected : In-flight

Result.Flight Crew : Executed Go Around / Missed Approach

Result.Flight Crew : Became Reoriented

Result.Air Traffic Control : Issued New Clearance

Result.Air Traffic Control : Issued Advisory / Alert

Assessments

Contributing Factors / Situations : Airspace Structure

Contributing Factors / Situations : ATC Equipment / Nav Facility / Buildings

Contributing Factors / Situations : Company Policy

Contributing Factors / Situations : Human Factors

Contributing Factors / Situations : Procedure

Primary Problem : Company Policy

Narrative: 1

I took the hand off on Aircraft X. I went to work on other tasks for the sector and had my attention redirected to Aircraft X upon check in. His initial transmission was garbled. I then observed the aircraft descend 100 feet below what is commonly thought to be the base altitude for the arrival. I thought maybe he went through slightly as he was descending at approximately 7500 fpm. The next radar update showed 6400 feet at which point I immediately issued a low altitude alert. No response. The subsequent hit showed 5600 feet. I again issued an abbreviated low altitude alert as I brought up the EOVM (Emergency Obstruction Video Map) map and noticed Aircraft X within a few hundred feet from a mountain peak. I don't recall a response the second time either, but observe the aircraft at 7100 feet on the next update.

Sector complexity grew, and needless to say I was shaken, as I just witnessed the closest call in my career. The absence of a response from Aircraft X after the initial low altitude alert, combined with the garbled transmission on initial check in, led me to believe there was something wrong with the aircraft, and convinced me I was about to witness an aircraft crash into the mountains. After establishing separation from the terrain I proceeded to handle the aircraft as a normal arrival.

Clearly still shaken, I inadvertently issued 1300 feet to Aircraft X instead of the normal 1600 feet to maintain until established. I corrected the mistake in a timely matter. It is important to note that we lost all radar data on Aircraft X at this time too. His track completely disappeared from the radar display. I am told this is due to an anomaly with radar. Aircraft X was established on final safely and switched to tower. He ended up going missed approach. After the missed approach he wanted to join up with Flight X, a flight of 3 fighters and try another approach. Apparently the join up was not done correctly. I was never trained on flight join ups, and had only had a discussion with a trainer from a facility from several years ago. At this point the complexity of the sector and the workload volume was at a level that would have proven to have been a challenge under the best of circumstances.

As for why the initial incident happened? It was a mistake on the pilot's part that could have caught in a timelier manner if I had access to more reliable resources concerning the crossing restrictions outside of my airspace. The fixes are not displayed on the video map. As I said earlier, it is common thought that the base altitude on the "arrival" is 7000 feet. I say that because I noticed the aircraft seemed lower than normal and asked the room about it. The next restriction was an "at or above 7000 foot" restriction and we agreed that 7000 feet should be okay there. Had the fixes been displayed, we would likely have more of a connection to their significance and it would have been more apparent, sooner, that something was wrong.

The 1300 foot issuance was likely due to a transposition of information from a nearby data block. Again, the mistake was caught in time and had no real consequence. The flight join up was done incorrectly because quite frankly, I was guessing how to do it. As I said, I have ZERO experience or training on the matter, and I was recalling a conversation from over 11 years ago when I was a trainee at a Center. I would also like to mention again

that I was extremely shaken by the events. No relief was offered. Breaks weren't readily available because our staffing doesn't support it. We work combined positions that shouldn't be combined for periods of time that exceed safe operating limitations, on a regular basis.

Staffing is and always has been an issue here. It affects not only the operation, but also the ability to have skilled personnel available for details such as training, airspace development, etc. We are so far behind the power curve when it comes to a safe operation because of our lack of resources to make improvements that have been identified as deficient. What results is a patchwork of antiquated procedures that haven't truly been thought out or reviewed for compliance to safety standards that are readily found elsewhere in the NAS. If this trend continues, I am convinced that these close calls will continue to become more frequent and potentially more disastrous.

I was informed that the arrival is not an arrival at all. This came as a surprise to everyone because, well, it is clearly labeled "CRUZR ARRIVAL" on our references. We commonly use the phrase, 'descend via the CRUZR arrival...' This is why the aircraft altitude being below the MVA was not a concern. Again, the controllers think that our base altitude is 7000. I've asked. It is a VERY common thought. In fact, if you ask about crossing altitudes on the "arrival" it is often only after several minutes of research that someone is able to rattle them off.

Again, flight join ups aren't typically done here. And, it is certainly not something that there has been any level of documented training on. I spoke with the Quality Control official at the Center about how they do it there. He mentioned a declaration of MARSA having to take place. I have dealt with MARSA at previous facilities, but I was told that MARSA is not for formation flights - those are handled differently. Interesting that two ARTCCs would have glaring differences in how to handle the same situation.

Synopsis

A11 TRACON Controller reported losing communication with an aircraft which descended below the MVA before climbing and reestablishing communications. Later the aircraft requested to join up with a flight of aircraft and the Controller reported they (ATC) did not know the procedure for a flight join up.

ATAAPS Summary

Notwithstanding the indication that some controller training is needed regarding MARSA and formation flight join-up, and references to staffing challenges, established PBN procedures provide consist and predictable flight routing. This consistency and predictability allows the pilot and controller to focus their attention on other, out of the norm, issues, thus reducing workload on the controller and pilot. It is not mentioned what caused the aircraft to come into the airspace in a steep descent, but had the flight been assigned a consistent and predictable route, altitude and speed, the likelihood of this flight's described configuration and positioning may have been mitigated.

ACN: 1476347 (1 of 1)

Time / Day

Date : 201708

Local Time Of Day : 1801-2400

Place

Anchorage Terminal Area Airspace and Procedures Feasibility Study

Locale Reference.ATC Facility : A11.TRACON
State Reference : AK
Altitude.MSL.Single Value : 600

Environment

Weather Elements / Visibility : Fog
Weather Elements / Visibility : Rain
Weather Elements / Visibility : Windshear
Weather Elements / Visibility.Visibility : 3
Ceiling.Single Value : 1700

Aircraft : 1

Reference : X
ATC / Advisory.TRACON : A11
Aircraft Operator : Personal
Make Model Name : Small Aircraft, Low Wing, 1 Eng, Fixed Gear
Crew Size.Number Of Crew : 1
Operating Under FAR Part : Part 91
Flight Plan : None
Mission : Personal
Flight Phase : Descent
Route In Use : VFR Route
Airspace.Class C : ANC

Aircraft : 2

Reference : Y
ATC / Advisory.TRACON : A11
Aircraft Operator : Military
Make Model Name : Military
Mission : Training
Nav In Use.Localizer/Glideslope/ILS : ILS Runway 6
Flight Phase : Initial Approach
Route In Use : Vectors
Airspace.Class C : ANC

Person

Reference : 1
Location Of Person.Aircraft : X
Location In Aircraft : Flight Deck
Reporter Organization : Personal
Function.Flight Crew : Pilot Flying
Function.Flight Crew : Single Pilot
Qualification.Flight Crew : Multiengine
Qualification.Flight Crew : Commercial
Qualification.Flight Crew : Instrument
Experience.Flight Crew.Total : 11000
Experience.Flight Crew.Last 90 Days : 201
Experience.Flight Crew.Type : 4200
ASRS Report Number.Accession Number : 1476347
Human Factors : Communication Breakdown
Human Factors : Situational Awareness
Communication Breakdown.Party1 : Flight Crew
Communication Breakdown.Party2 : ATC

Events

Anomaly.ATC Issue : All Types
Anomaly.Deviation - Procedural : Published Material / Policy
Anomaly.Inflight Event / Encounter : Weather / Turbulence
Detector.Person : Flight Crew
Miss Distance.Horizontal : 0
Miss Distance.Vertical : 600
When Detected : In-flight
Result.Flight Crew : Took Evasive Action
Result.Air Traffic Control : Issued New Clearance

Assessments

Contributing Factors / Situations : Airspace Structure
Contributing Factors / Situations : Procedure
Primary Problem : Airspace Structure

Narrative: 1

I was approaching Anchorage from the north in an ADS-B in/out equipped [aircraft]. I called Approach for radar services for routing for landing. I was given an immediate Part 93 Deviation in the PAMR segment. Weather was raining, fog, getting dark with few clouds and 600-700, and rain obscuring visibility to 3-5 miles. Heavy wind and windshear occurring with the traffic at ANC being routed in for the ILS for Runway 15. There was significant traffic using Approach and I was watching the flow of the vectoring to the ILS and handoff to the Tower. Heavy jet traffic was reporting wind shear and turbulence. I was low at 600 feet as I had little wind and below the ground surface shear point.

Also in the mix was a [military aircraft], which was doing practice approaches and the TRACON controller twice told traffic that the [military aircraft] was doing "Touch and go's" and then corrected that to missed approaches. He was vectoring the [military aircraft] around very non-standard with tight turns and low altitudes. When I was approaching the [military aircraft] was returning to PAED on a visual. The ATC controller gave him a weather report of heavy precipitation between the [military aircraft] and PAED in the area which I was at the time. I am not sure if it was requested by the [military aircraft] or suggested by the controller, but the [military aircraft] was then cleared for the ILS on Runway 6 at PAED. The controller vectored the [military aircraft] onto the ILS INSIDE THE FAP! His clearance also said to maintain 1600 feet until established on the ILS. The controller then cancelled my FAR Part 93 deviation in and handed me off to my Tower with a "caution wake turbulence" warning. I switched to Tower and now had a visual on the [military aircraft] that was, according to my ADS-B, less than 800 feet vertical separation and he was coming right over me. I would like to see the track but it appeared that the [military aircraft] was below the ILS glideslope. I took evasive action by wide open throttle and full dive to the water to try to get east of the [military aircraft] and get the largest amount of vertical separation. I think this was way too much "cowboy" action by the TRACON controller and put lives in danger. If the [military aircraft] wanted to go IFR and ILS approach into PAED why the heck he was not vectored out to join at an IAP or outside the FAP!

This did not need to happen. There was no emergency or rush to put the [military aircraft] back into PAED that was communicated on the frequency I was on. Doing "touch and go's" or even the missed practice approaches that they really were at ANC at a time of heavy traffic flow and difficult conditions of wind shear, turbulence and low weather was questionable as the ILS was stacked up with traffic. What makes the air traffic work well in this area is that the flows of traffic at all of the airports is usually predictable, and with ADS-B even a "little general aviation guy operation" like me can get a good sense of where

the traffic is and will be due to the normal approach/departure flows out of the airports. This was a fly in the ointment and seemingly only the TRACON controller and the USAF flyboys knew what was going to be coming next. I am available to discuss this, although I am flying commercially and not contactable much of the day until I return.

Synopsis

A single engine pilot reported approach control vectored a military aircraft over his aircraft which the pilot felt was unsafe.

ATAAPS Summary

This scenario describes a situation, from an experienced pilot perspective where there is significant weather and traffic in the area and the controller is busy. It can be speculated that the controller is attempting to accommodate a military aircraft request for multiple approaches, gets distracted, or overloaded and inadvertently vectors the military aircraft over the small aircraft causing a dangerous situation. Establishment of an ILS to EDF Runway 16 would provide the military aircraft an opportunity to practice in less congested airspace north of EDF and allow more room for aircraft maneuvering in the Part 93 PAMR Segment.

ACN: 1465288 (1 of 1)

Time / Day

Date : 201707

Local Time Of Day : 1801-2400

Place

Locale Reference.ATC Facility : A11.TRACON

State Reference : AK

Altitude.MSL.Single Value : 5000

Environment

Light : Daylight

Aircraft : 1

Reference : X

ATC / Advisory.TRACON : A11

Aircraft Operator : Air Carrier

Make Model Name : Dash 8 Series Undifferentiated or Other Model

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 121

Flight Plan : IFR

Nav In Use : FMS Or FMC

Flight Phase : Cruise

Route In Use : Vectors

Airspace.Class E : A11

Aircraft : 2

Reference : Y

ATC / Advisory.TRACON : A11

Aircraft Operator : Air Carrier

Make Model Name : Commercial Fixed Wing

Operating Under FAR Part : Part 121

Flight Plan : IFR

Anchorage Terminal Area Airspace and Procedures Feasibility Study

Nav In Use : FMS Or FMC
Flight Phase : Initial Approach

Aircraft : 3

Reference : Z
ATC / Advisory.TRACON : A11
Aircraft Operator : Air Carrier
Make Model Name : Commercial Fixed Wing
Crew Size.Number Of Crew : 2
Operating Under FAR Part : Part 121
Flight Plan : IFR
Nav In Use : FMS Or FMC
Flight Phase : Initial Approach
Route In Use.STAR : NEELL5

Person

Reference : 1
Location Of Person.Facility : A11.TRACON
Reporter Organization : Government
Function.Air Traffic Control : Approach
Function.Air Traffic Control : Handoff / Assist
Qualification.Air Traffic Control : Developmental
ASRS Report Number.Accession Number : 1465288
Human Factors : Distraction
Human Factors : Training / Qualification
Human Factors : Situational Awareness

Events

Anomaly.ATC Issue : All Types
Anomaly.Deviation - Track / Heading : All Types
Anomaly.Deviation - Procedural : Clearance
Anomaly.Inflight Event / Encounter : CFTT / CFIT

Assessments

Contributing Factors / Situations : Airspace Structure
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Procedure
Primary Problem : Procedure

Narrative: 1

It was a busy training session. I was training on south radar and south hand off combined. We had an unusual flight schedule due to fly-bys to Runway 7R. I was instructed to vector all of our traffic to Runway 7L, except for the Runway 7R aircraft. After the fly-by was completed, tower still didn't want any aircraft to go to Runway 7R. Aircraft X entered our airspace direct to ANC VOR at 050. I told Aircraft X to expect Runway 7L. When he reached an appropriate place to turn upwind, I gave Aircraft X a 070 heading to parallel Aircraft Y that was on downwind. I started getting busy, intending to turn Aircraft X to a 340 heading to the downwind about 5 miles in trail of Aircraft Y I had Aircraft Z that was on the NEELL5 arrival that was in conflict with Aircraft Y so I was watching that and listening to final radar to see if he had turned Aircraft Y to base. I then shipped Aircraft Z to final and continued my scan. I saw Aircraft X about 1 mile from the 6,000 feet MVA. I immediately turned Aircraft X left to a 350 heading and pulled up my EOVM [emergency obstruction video map]. Aircraft X was over the water and not near any terrain. I saw Aircraft X continue straight after acknowledging the heading so I verified that the aircraft had the terrain in sight. He answered affirmatively and was instructed to maintain his own terrain and obstruction clearance. He was in the 6,000 feet MVA for a total of about 4

flying miles and remained over the water the entire time. During my debrief, my On the Job Training Instructor said that I had caught the aircraft in time and corrected it before it was a factor. I was notified by a supervisor, that the region was made aware of it and called the front office. The front office watched and listened to the entire thing and made a determination that separation from terrain was lost.

I recommend that the MVA's change around the ANC area. There are MVA's over the water (sea level) that are 060-080 feet which is ridiculous. I know the terrain makes it difficult to establish consistent MVA's but our airspace is cramped and too small as it is, now we are not utilizing it in a way to help move airplanes.

Synopsis

A11 TRACON Controller reported vectoring an aircraft below the Minimum Vectoring Altitude.

ATAAPS Summary

This scenario describes a situation where the controller sets up a sequencing plan for arrivals, gets distracted, and fails to implement the plan in a timely fashion.

Notwithstanding the suggestion to evaluate MVAs in the area, the implementation of PBN flight routing and an aircraft with proper instrumentation will allow a flight to transition from the IFR enroute structure, to the approach phase and ultimately the landing phase with minimal pilot and controller interaction, thus reducing any misunderstanding or confusion regarding route of flight. It also reduces workload on the pilot and controller allowing them to concentrate on other, out of the ordinary, items and situations.

ACN: 1392749 (1 of 1)

Time / Day

Date : 201610

Local Time Of Day : 1201-1800

Place

Locale Reference.ATC Facility : A11.TRACON

State Reference : AK

Altitude.MSL.Single Value : 2000

Environment

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.TRACON : A11

Aircraft Operator : Air Carrier

Make Model Name : Widebody Transport

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 121

Flight Plan : IFR

Mission : Cargo / Freight

Flight Phase : Climb

Route In Use.SID : KNIK2

Airspace.Class C : ANC

Person

Reference : 1
Location Of Person.Facility : A11.TRACON
Reporter Organization : Government
Function.Air Traffic Control : Departure
Qualification.Air Traffic Control : Fully Certified
Experience.Air Traffic Control.Time Certified In Pos 1 (yrs) : 0.2
ASRS Report Number.Accession Number : 1392749
Human Factors : Communication Breakdown
Human Factors : Situational Awareness
Human Factors : Confusion
Communication Breakdown.Party1 : ATC
Communication Breakdown.Party2 : Flight Crew

Events

Anomaly.ATC Issue : All Types
Anomaly.Deviation - Track / Heading : All Types
Anomaly.Deviation - Procedural : Published Material / Policy
Anomaly.Inflight Event / Encounter : CFTT / CFIT
Detector.Person : Air Traffic Control
When Detected : In-flight
Result.Flight Crew : Requested ATC Assistance / Clarification
Result.Flight Crew : Became Reoriented
Result.Air Traffic Control : Issued New Clearance
Result.Air Traffic Control : Provided Assistance

Assessments

Contributing Factors / Situations : Airspace Structure
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Procedure
Primary Problem : Human Factors

Narrative: 1

Aircraft X departed ANC IFR on the KNIK departure. On initial contact I radar identified him and climbed him to 20000 feet. About 30 seconds later he said confirm heading 200. I said negative continue the "KNIK departure and climb and maintain FL200". Aircraft X was already in the turn to the south in the 6000 ft MVA at 2000 ft. I asked him to expedite climb. Once above the MVA I gave him a turn to the north.

Synopsis

A11 TRACON Controller reported a pilot misunderstood his instruction and turned to a 200 heading instead of climbing to FL200.

ATAAPS Summary

This scenario describes a situation where the pilot is confused whether they were issued a climb or a turn on the assigned departure procedure. Established PBN procedures provide consistent, predictable flight routing that can be programmed into appropriately equipped aircraft to reduce confusion and workload for the controller and pilot, thus reducing the opportunity for mistakes described in this scenario.

ACN: 1376577 (1 of 1)

Time / Day

Anchorage Terminal Area Airspace and Procedures Feasibility Study

Date : 201607

Place

Locale Reference.ATC Facility : A11.TRACON

State Reference : AK

Altitude.MSL.Single Value : 7000

Environment

Flight Conditions : VMC

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.TRACON : A11

Aircraft Operator : Personal

Make Model Name : Super King Air 200

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 91

Flight Plan : IFR

Mission : Ferry

Flight Phase : Initial Approach

Airspace.Class E : A11

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Carrier

Function.Flight Crew : Captain

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1376577

Human Factors : Communication Breakdown

Human Factors : Fatigue

Human Factors : Situational Awareness

Communication Breakdown.Party1 : ATC

Communication Breakdown.Party2 : Flight Crew

Events

Anomaly.Deviation - Track / Heading : All Types

Anomaly.Deviation - Procedural : Clearance

Anomaly.Deviation - Procedural : Published Material / Policy

Detector.Person : Flight Crew

Detector.Person : Air Traffic Control

When Detected : In-flight

Result.Flight Crew : Returned To Clearance

Result.Flight Crew : Became Reoriented

Result.Air Traffic Control : Issued New Clearance

Assessments

Contributing Factors / Situations : Human Factors

Primary Problem : Human Factors

Narrative: 1

I had filed an IFR flight plan for the part 91 flight to Anchorage and the flight was uneventful until the approach phase of the flight. On the descent, center had me switch to approach control and I received radar vectors initially for the right downwind to runway 15. After several radar vectors, I was instructed to precede direct CARDD; the initial approach

fix on the ILS 15. Approximately 8 miles from CARDD, I received a vector toward the approach course and a second vector onto it but because of the close proximity I passed through it. Approach control asked if I would like a re-vector and I requested it. The instruction was, "Right one eighty to re-intercept". I interpreted this instruction as a right 180 degree turn off the approach course to be re-vector back onto it. After beginning the turn, approach quickly noticed the error and assigned a heading of 140 to maintain with the instruction to "Call the airport". I turned to heading 140, but in the confusion of the moment, I misunderstood the instruction about calling the airport and called the tower frequency without approach control specifically authorizing me to do so.

In hindsight, I should not have accepted the flight to Anchorage. I was worn-out from 14 days of heavy flying with mostly poor IFR weather. The fatigue was to the point where I was not fit for the flight, especially with the effects of the 12000 ft MSL altitude required for the route prior to descending into Anchorage. In that state, normal ATC instructions seemed ambiguous and confusing. In the future, I will give much more careful consideration to fatigue, flying near part 91 limits without use of supplemental oxygen, and ensure clarification of ATC instructions.

Synopsis

King air pilot reported the difficulties he had trying to comply with ATC instructions during a visual approach, due to extreme fatigue and flying at 12000 feet.

ATAAPS Summary

This scenario describes a situation where a very experienced pilot (ATP) flying a well-equipped aircraft (Beech Super King-Air 200) reported difficulties complying with ATC instructions during a visual approach. While there were mitigating factors such as pilot fatigue and unclear ATC instructions, with the help of pre-programmed PBN flight routing, the pilot may have been able to focus more on flying the aircraft rather than concentrating on ATC instructions. Developed properly, PBN flight routing and an aircraft with proper instrumentation will allow a flight to transition from the IFR enroute structure, to the approach phase and ultimately the landing phase with minimal pilot and controller interaction.

MRI

ACN: 1453052 (1 of 1)

Time / Day

Date : 201705

Local Time Of Day : 1801-2400

Place

Locale Reference.Airport : MRI.Airport

State Reference : AK

Environment

Light : Daylight

Aircraft

Reference : X

ATC / Advisory.Tower : MRI

Anchorage Terminal Area Airspace and Procedures Feasibility Study

Aircraft Operator : Military
Make Model Name : E-3 Sentry (AWACS)
Flight Plan : IFR
Mission : Tactical
Nav In Use : FMS Or FMC
Flight Phase : Final Approach
Airspace.Class D : MRI

Person

Reference : 1
Location Of Person.Facility : MRI.Tower
Reporter Organization : Government
Function.Air Traffic Control : Supervisor / CIC
Qualification.Air Traffic Control : Fully Certified
Experience.Air Traffic Control.Time Certified In Pos 1 (yrs) : 14
ASRS Report Number.Accession Number : 1453052
Human Factors : Situational Awareness
Human Factors : Communication Breakdown
Communication Breakdown.Party1 : ATC
Communication Breakdown.Party2 : ATC

Events

Anomaly.Airspace Violation : All Types
Anomaly.ATC Issue : All Types
Anomaly.Deviation - Procedural : Published Material / Policy
Detector.Person : Air Traffic Control
When Detected : In-flight
Result.General : Flight Cancelled / Delayed
Result.Air Traffic Control : Issued Advisory / Alert

Assessments

Contributing Factors / Situations : Procedure
Contributing Factors / Situations : Airspace Structure
Contributing Factors / Situations : Airport
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Chart Or Publication
Contributing Factors / Situations : Company Policy
Primary Problem : Company Policy

Narrative: 1

I had just been relieved of Controller in Charge (CIC) by the Front Line Manager (FLM) when the LC1 stated turned to the FLM to advise him that Anchorage Approach (A11) called with a "red light" as an E3 flew over Point McKenzie (the northwest boundary of MRI airspace). The LC1 told A11 that we had been "red light" for the past 2 hours. It is like an afterthought on A11's part. I just do not know if it is a lack of training, a lack of controller proficiency, complacency or disregard for safety. It may be a combination of all those factors.

This same situation happened the day before. However, I will be submitting safety problem report on that once I review the recordings.

This has become a dangerous trend where A11 controllers leave us with a "red light" for hours on end. A11 does not understand that our single engine aircraft rely on a deviation across the water (Knik Arm / FAR Part 93). Sometimes a couple extra hundred feet can mean the difference between life or death. Alaska's cold waters are not forgiving even if

rescue and recovery are immediate.

A11 and MRI need to revisit the LOA which addresses "red / green light." Both parties need to check their pride at the door. The complaint needs to be viewed from our single engine user's point of view. Their safety depends on it.

Synopsis

MRI Tower Controller reported the Approach Control was not complying with an automated point out procedure causing unnecessary delay and flight time over water for aircraft.

ATAAPS Summary

This scenario describes a situation where prearranged coordination (red light / green light) is not being used appropriately. Implementation of the EDF Runway 16 ILS and associated primary runway designation change from Runway 6 to Runway 16 at EDF will serve to mitigate this scenario. It can be predicted that the use of EDF RWY 6 for arrivals will be greatly reduced, thus reducing the need for this type of prearranged coordination.

ANC

ACN: 1514691 (1 of 1)

Time / Day

Date : 201801

Local Time Of Day : 1201-1800

Place

Locale Reference.ATC Facility : ANC.Tower

State Reference : AK

Altitude.AGL.Single Value : 0

Environment

Flight Conditions : VMC

Light : Daylight

Aircraft : 1

Reference : X

ATC / Advisory.Tower : ANC

Aircraft Operator : Air Carrier

Make Model Name : Commercial Fixed Wing

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 121

Flight Plan : IFR

Mission : Passenger

Flight Phase : Landing

Route In Use : Visual Approach

Airspace.Class C : ANC

Aircraft : 2

Reference : Y

ATC / Advisory.Tower : ANC

Aircraft Operator : Air Carrier

Make Model Name : Commercial Fixed Wing

Anchorage Terminal Area Airspace and Procedures Feasibility Study

Crew Size.Number Of Crew : 2
Operating Under FAR Part : Part 121
Flight Plan : IFR
Mission : Passenger
Flight Phase : Final Approach
Route In Use : Visual Approach
Airspace.Class C : ANC

Person : 1

Reference : 1
Location Of Person.Facility : ANC.Tower
Reporter Organization : Government
Function.Air Traffic Control : Local
Qualification.Air Traffic Control : Fully Certified
Experience.Air Traffic Control.Time Certified In Pos 1 (yrs) : 6
ASRS Report Number.Accession Number : 1514691
Human Factors : Distraction

Person : 2

Reference : 2
Location Of Person.Aircraft : X
Location In Aircraft : Flight Deck
Reporter Organization : Air Carrier
Function.Flight Crew : First Officer
Function.Flight Crew : Pilot Flying
Qualification.Flight Crew : Air Transport Pilot (ATP)
Experience.Flight Crew.Total : 2700
Experience.Flight Crew.Last 90 Days : 200
Experience.Flight Crew.Type : 680
ASRS Report Number.Accession Number : 1515281
Human Factors : Communication Breakdown
Communication Breakdown.Party1 : Flight Crew
Communication Breakdown.Party2 : ATC

Person : 3

Reference : 3
Location Of Person.Aircraft : X
Location In Aircraft : Flight Deck
Reporter Organization : Air Carrier
Function.Flight Crew : Captain
Function.Flight Crew : Pilot Not Flying
Qualification.Flight Crew : Air Transport Pilot (ATP)
ASRS Report Number.Accession Number : 1515282
Human Factors : Communication Breakdown
Communication Breakdown.Party1 : Flight Crew
Communication Breakdown.Party2 : ATC

Person : 4

Reference : 4
Location Of Person.Aircraft : Y
Location In Aircraft : Flight Deck
Reporter Organization : Air Carrier
Function.Flight Crew : First Officer
Function.Flight Crew : Pilot Not Flying
Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1515528

Human Factors : Communication Breakdown

Communication Breakdown.Party1 : Flight Crew

Communication Breakdown.Party2 : ATC

Events

Anomaly.ATC Issue : All Types

Anomaly.Deviation - Procedural : Published Material / Policy

Anomaly.Ground Incursion : Runway

Detector.Person : Flight Crew

Detector.Person : Air Traffic Control

When Detected : In-flight

Result.Flight Crew : Requested ATC Assistance / Clarification

Result.Air Traffic Control : Separated Traffic

Assessments

Contributing Factors / Situations : Human Factors

Contributing Factors / Situations : Procedure

Primary Problem : Human Factors

Narrative: 1

I was working LC and in the process of giving a relief briefing to the next controller. The wind was strong out of the north and we had aircraft landing runway 7L, 7R and 33. Aircraft X was on a mile final for RY 7L and Aircraft Y was on 1.5 mile final RY33 doing a visual approach. I asked Aircraft Y if he would be able to pass behind Aircraft X and the pilot said he wasn't sure if he could. I knew it was going to be very close but I decided to watch the situation closely and allow Aircraft Y to continue his approach to RY33. I observed Aircraft Y pass directly behind the now landed Aircraft X on RY7L.

The position relief was a distraction from this close sequence and there was extra noise from people starting their shift. If I had realized the development of the situation sooner I could have asked the Aircraft Y to do an S turn through final to ensure more separation.

Narrative: 2

I was the First Officer and Pilot Flying. We were cleared for a visual approach to runway 7L. After issuing our clearance, ATC then cleared Aircraft Y for a visual approach to runway 33. ATC did not specifically indicate which aircraft was number one to the field. However it was, in my opinion, implied that we were number one as our clearance was issued first and we were lined up for a final to 7L. Aircraft Y maneuvered behind us to enter a downwind/base for runway 33. Once we switched to tower we were cleared to land 7L. Aircraft Y then checked in and was cleared to land 33. On short final to 7L tower advised Aircraft Y to reduce speed so as to not overtake us landing on 7L. They replied that they may be unable. At this point it became apparent of how close they were to landing on 33, and we were then committed to land on 7L for any attempt to make a go around would've placed us in an even more hazardous situation. Our mains touched down as Aircraft Y passed several hundred feet over us. Both aircraft landed without further incident. At the end of our duty day our Dispatch asked the Captain of my flight to contact the ANC Tower. They had a brief discussion of the event, and Tower indicated that they had reviewed their tapes and discovered that they had not instructed either aircraft as to which should be first. They felt that they could have sequenced us both better and would review the event to prevent it from occurring in the future. In conclusion I do not feel that my aircraft violated any regulations nor did we violate an ATC instruction. I am submitting this report in order to communicate the event to hopefully prevent this from occurring in the future.

Narrative: 3

Cleared for a visual approach to 7L and received, "cleared to land", from ANC tower with a caution about Aircraft Y who was going to 33. I found the caution odd because I was able to locate Aircraft Y high in our 8 o'clock passing above and behind us. I reported the traffic in sight above and behind us. We proceeded configured and stabilized to the runway. My expectation was that the tower would sequence Aircraft Y behind us since we were cleared to land and straight in to 7L versus above and behind on a downwind to intersecting runway 33. On very short final I again noticed Aircraft Y, now on short final for 33. I was surprised, and said as much to the first officer who was doing the landing. After we were on the runway Aircraft Y passed over or slightly behind us. In my opinion there was a decided lack of direction from the tower as to the sequence, however, I was not aware of the pending conflict until a go around was no longer an option. It's hard for me to imagine how an aircraft flying a downwind base and final to an intersecting runway could become a conflict for another aircraft on a straight in approach to the intersecting runway considering our positions relative to each other when the tower was issuing our landing clearances. I'm not an ATC specialist, but I've spent a lot of my professional life communicating with ATC, and this situation could have easily been mitigated if the tower had simply told Aircraft Y to fly downwind and await tower's ok to turn onto the base leg of their visual approach to 33.

Typically, we only file reports when we know we have made an error and are sharing our experience in order to enhance safety through the reporting system as well as protecting ourselves against certificate action. I want to be clear that I believe I was not operating in error or in any way contrary to safety. I am filing this report at the direction of my supervisors in order to help all involved understand what happened and how a similar event can be avoided in the future.

Narrative: 4

We were cleared for a visual approach to runway 33 and were told to maintain visual separation with Aircraft X that was on a visual approach to runway 7L. When Aircraft X was about to flare to land on 7L the tower controller told us to pass above and behind Aircraft X. Then the controller said disregard they are landing now. The other aircraft was on the runway by the time we flew over them, and they were off to our right side so we did pass behind them as well. I can't recall exactly how high we were when we flew over them but I do remember that we were above the PAPI visual glideslope. I don't believe we violated any regulations.

Synopsis

ANC Tower Controller and three pilots reported that two aircraft were cleared to land on different runways with intersecting approach courses.

ATAAPS Summary

This scenario describes a situation where 2 aircraft are vectored to land on converging runways and are put in close proximity to each other. Appropriately developed PBN procedures associated with the adoption of Converging Runway Display Aid (CRDA) capability and procedures may have mitigated this event. The controller admitted that he was aware of the developing situation and had options to mitigate it utilizing "S" turns. However, the controller became distracted and the situation deteriorated. Had PBN procedures and/or CRDA been in place, perhaps the controller could have addressed the situation more effectively.

ACN: 1452915 (1 of 1)

Time / Day

Date : 201705

Local Time Of Day : 1201-1800

Place

Locale Reference.Airport : ANC.Airport

State Reference : AK

Altitude.MSL.Single Value : 2000

Environment

Flight Conditions : VMC

Light : Daylight

Aircraft : 1

Reference : X

ATC / Advisory.Tower : ANC

Aircraft Operator : Air Carrier

Make Model Name : Widebody Transport

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 121

Flight Plan : IFR

Mission : Cargo / Freight

Nav In Use : FMS Or FMC

Nav In Use : GPS

Flight Phase : Climb

Route In Use.SID : KNIK2

Airspace.Class C : ANC

Aircraft : 2

Reference : Y

Aircraft Operator : Personal

Make Model Name : Small Aircraft

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 91

Mission : Personal

Flight Phase : Cruise

Airspace.Class E : A11

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Carrier

Function.Flight Crew : Captain

Function.Flight Crew : Pilot Flying

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1452915

Events

Anomaly.ATC Issue : All Types

Anomaly.Conflict : Airborne Conflict

Anomaly.Deviation - Track / Heading : All Types

Anomaly.Deviation - Procedural : Clearance

Detector.Person : Flight Crew

When Detected : In-flight

Result.Flight Crew : Took Evasive Action

Assessments

Contributing Factors / Situations : Airspace Structure

Contributing Factors / Situations : Human Factors

Primary Problem : Human Factors

Narrative: 1

The KNIK 2 departure has a left hand turn to 329 after 2000 or 4 miles, whichever occurs first. During the climb out off of 07L, right before the turn, we receive a traffic alert and I see traffic on the magenta line on the ND at our Altitude. He was right where we were about to turn into. We were cleaning up and believe we were at flaps 1. Rather than lower the pitch to accelerate, I kept the pitch attitude to maintain a better climb, increasing it a little. We see the traffic cross to the left and below as we then start our turn. In the middle of the turn departure control queries if we are in the turn. The first officer responded we are in the turn, traffic insight, even though the controller did not call it out. Looking at the ND it appeared that we were on course. After rolling out on the heading, we received a traffic alert for another aircraft from ATC. Due to the mountains, there is a lot of VFR traffic that flies in the corridor between the mountains and the airport. It is distracting for crews to have VFR traffic during the climb out located on the assigned departure at or near the aircraft altitude.

My recommendation would be for Anchorage tower not to issue a takeoff clearance when traffic will conflict. There have been many instances in Anchorage where we will pass over traffic with minimum separation and during a climb with a high-power setting. Being that this is a heavy aircraft that is very dangerous for a single engine airplane with regards to wake turbulence.

Synopsis

Air carrier Captain reported a TCAS TA on departure from ANC which led to delayed turn on the KNIK2 Departure.

ATAAPS Summary

This scenario describes a situation where a heavy air cargo carrier is cleared for departure from ANC and flies into an area congested with small VFR aircraft. An airspace redesign associated with the implementation of PBN departure procedures may alleviate these situations. Both of these recommendations will serve to reduce pilot and controller workload and allow them to concentrate on other, out of the ordinary, issues, such as local traffic issuance and avoidance, thus improving safety.

LHD

ACN: 1581617 (1 of 1)

Time / Day

Date : 201809

Local Time Of Day : 1801-2400

Place

Locale Reference.Airport : LHD.Airport

State Reference : AK

Altitude.MSL.Single Value : 1100

Environment

Light : Dusk

Ceiling : CLR

Aircraft : 1

Reference : X

ATC / Advisory.Tower : LHD

Aircraft Operator : Personal

Make Model Name : Skylane 182/RG Turbo Skylane/RG

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 91

Flight Plan : None

Mission : Personal

Flight Phase : Initial Approach

Route In Use : Visual Approach

Airspace.Class D : LHD

Aircraft : 2

Reference : Y

ATC / Advisory.Tower : EDF

Aircraft Operator : Military

Make Model Name : Globemaster (C-17)

Flight Phase : Final Approach

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Personal

Function.Flight Crew : Pilot Flying

Function.Flight Crew : Single Pilot

Qualification.Dispatch : Dispatcher

Qualification.Flight Crew : Private

Experience.Dispatch.Dispatch : 28

Experience.Flight Crew.Last 90 Days : 45

ASRS Report Number.Accession Number : 1581617

Analyst Callback : Attempted

Events

Anomaly.Aircraft Equipment Problem : Critical

Anomaly.Inflight Event / Encounter : Wake Vortex Encounter

Detector.Person : Flight Crew

When Detected : In-flight

Result.Flight Crew : Became Reoriented

Result.Aircraft : Aircraft Damaged

Assessments

Contributing Factors / Situations : Environment - Non Weather Related

Contributing Factors / Situations : Procedure

Primary Problem : Ambiguous

Narrative: 1

I was returning to Lake Hood strip when I contacted LHD Tower. They informed me of a C17 on approach to Elmendorf AFB, caution wake turbulence. At that point I called the Tower and requested a 360 for separation which is standard practice entering LHD airspace. I made a 180 and flew north for a bit admiring the view of Denali then continued

the turn toward LHD. I crossed the north shore of Cook Inlet just west of Point Mackenzie at 1100 ft, 3.6 miles behind the C17 according to radar data. About mid-channel I hit the wake turbulence from the C17. It was the most violent turbulence I have ever experienced. May have lasted for a second but caused substantial damage to the aircraft. Both bottom wing skins are wrinkled and spars are cracked. I was light, 1 passenger and 20 gallon gas onboard. If I was at gross I don't believe we would be having this discussion. I have been flying out of LHD for over thirty years without incident. Is the C17 to blame or does the approach need to be changed, I don't know.

Synopsis

C182 pilot reported the aircraft was damaged following a wake turbulence encounter with a C-17 in the vicinity of EDF.

ATAAPS Summary

This scenario describes a situation, from a pilot perspective where a small aircraft landing LHD is allowed to fly in close proximity to a heavy aircraft on approach to EDF, allowing the small aircraft to fly through the wake of the heavy. Establishment of an ILS to EDF Runway 16, and the designation of EDF Runway 16 as the primary landing runway will provide the military aircraft an opportunity to approach EDF in less congested airspace north of the airfield and allow more room for aircraft maneuvering in the Part 93 LHD Segment.

ZAN

ACN: 1488431 (1 of 1)

Time / Day

Date : 201710

Local Time Of Day : 1201-1800

Place

Locale Reference.ATC Facility : ZAN.ARTCC

State Reference : AK

Aircraft

Reference : X

ATC / Advisory.Center : ZAN

Aircraft Operator : Air Carrier

Make Model Name : Widebody Transport

Crew Size.Number Of Crew : 2

Operating Under FAR Part : Part 121

Flight Plan : IFR

Mission : Passenger

Flight Phase : Climb

Route In Use : Direct

Route In Use : Vectors

Route In Use.SID : ANC8

Airspace.Class A : ZAN

Person

Reference : 1

Location Of Person.Aircraft : X

Location In Aircraft : Flight Deck

Reporter Organization : Air Carrier

Function.Flight Crew : Captain

Qualification.Flight Crew : Air Transport Pilot (ATP)

ASRS Report Number.Accession Number : 1488431

Human Factors : Confusion

Human Factors : Situational Awareness

Human Factors : Communication Breakdown

Communication Breakdown.Party1 : Flight Crew

Communication Breakdown.Party2 : ATC

Events

Anomaly.ATC Issue : All Types

Anomaly.Deviation - Track / Heading : All Types

Anomaly.Deviation - Procedural : Published Material / Policy

Anomaly.Deviation - Procedural : Clearance

Detector.Person : Flight Crew

When Detected : In-flight

Result.Flight Crew : Returned To Clearance

Result.Flight Crew : Requested ATC Assistance / Clarification

Result.Air Traffic Control : Provided Assistance

Assessments

Contributing Factors / Situations : Procedure

Contributing Factors / Situations : Human Factors

Primary Problem : Procedure

Narrative: 1

Previously, ANC has typically given us direct-to clearances after takeoff. Lately, they have given us more clearances to intercept an airway, which is difficult to program into the box because of the departure:

The ANC8 has a discontinuity, and then vectors before the first airway. A direct-to clearance would be much easier to understand and program and follow than these intercept an airway clearances.

We were vectored westbound, away from our route, for traffic, by our initial ANC departure controller. Then he told us to fly heading 270 degrees to intercept J133, and change to a different ANC frequency.

When I tried to input this into the RTE page it didn't work. I called the new controller and asked him for a direct-to clearance to JOH. The ANC controller said we had the wrong frequency and gave us another frequency change.

I asked the first observer pilot for the magnetic course from TED to JOH and tried to use LEGS page to get a good intercept to join the J133. It didn't work because we were not on an intercept heading. Then I called the new ANC frequency. There was no answer.

We went back to the original ANC frequency/controller and told him that we could not contact anyone on the new frequencies. We asked him for a direct-to clearance to JOH. He gave us a heading of 090 degrees and changed us to a new ANC frequency. When we contacted the new ANC controller, she gave us direct-to clearance to LAIRE, which was on the J133.

During all of this the three of us were discussing that we didn't understand what our ANC controller wanted us to do. We were flying away from our route, and the heading he gave us didn't make sense. We couldn't ask him what he meant as he immediately changed our frequency after the clearance.

We wondered if he confused our flight with a [different] flight that had rejected on takeoff just before our departure, due to lack of thrust in an engine. We wondered if that flight was going [elsewhere], and our controller thought we were also departing westbound...

Synopsis

Captain of a Widebody Transport reported having issues with ANC ATC in both communications and clearances.

ATAAPS Summary

This scenario describes the difficulties an air carrier pilot faced when they were attempting to fly an assigned route. Established PBN procedures would alleviate this scenario in that the pilot would be able to program the route prior to takeoff rather than accepting vectors to an intersection on an airway, and attempting to program the route of flight in the air.

ENA

ACN: 466050 (1 of 1)

Time / Day

Date : 200003

Local Time Of Day : 1201-1800

Place

Locale Reference.Airport : ENA.Airport

State Reference : AK

Relative Position.Distance.Nautical Miles : 0

Altitude.AGL.Single Value : 0

Environment

Flight Conditions : VMC

Weather Elements / Visibility.Visibility : 10

Light : Daylight

Ceiling.Single Value : 6000

Aircraft

Reference : X

ATC / Advisory.CTAF : SQX

ATC / Advisory.Tower : ENA.Tower

Aircraft Operator : Personal

Make Model Name : Skyhawk 172/Cutlass 172

Crew Size.Number Of Crew : 1

Operating Under FAR Part : Part 91

Flight Plan : VFR

Mission : Personal

Flight Phase : Taxi

Flight Phase : Landing

Component : 1

Aircraft Component : ILS/VOR
Aircraft Reference : X
Problem : Improperly Operated

Component : 2

Aircraft Component : VHF
Aircraft Reference : X
Problem : Design
Problem : Improperly Operated

Person : 1

Reference : 1
Location Of Person.Aircraft : X
Reporter Organization : Personal
Function.Flight Crew : Pilot Flying
Function.Flight Crew : Single Pilot
Qualification.Flight Crew : Student
Qualification.Flight Crew : Private
Experience.Flight Crew.Total : 51
Experience.Flight Crew.Last 90 Days : 7
Experience.Flight Crew.Type : 6
ASRS Report Number.Accession Number : 466050

Person : 2

Reference : 2
Location Of Person.Aircraft : X
Reporter Organization : Personal
Function.Other

Person : 3

Reference : 3
Location Of Person.Facility : ENA.Tower
Reporter Organization : Government
Function.Air Traffic Control : Local
Qualification.Air Traffic Control : Fully Certified

Events

Anomaly.Airspace Violation : All Types
Anomaly.Deviation - Procedural : FAR
Anomaly.Deviation - Procedural : Landing Without Clearance
Anomaly.Ground Incursion : Runway
Anomaly.Other
Detector.Person : Air Traffic Control
Detector.Person : Other Person
Result.General : None Reported / Taken

Assessments

Contributing Factors / Situations : Aircraft
Contributing Factors / Situations : Human Factors
Primary Problem : Human Factors

Narrative: 1

INADVERTENT RWY INCURSION LNDG AT KENAI ARPT, AK, INSTEAD OF INTENDED SOLDOTNA ARPT, AK. SUBSEQUENT TAXI WITHOUT CLRNC AT KENAI WHILE MONITORING AND ANNOUNCING ON THE SOLDOTNA CTAF. MY WIFE AND I DEPARTED MERRILL ARPT, ANCHORAGE TO THE S FOR A POSSIBLE LNDG AT THE SOLDOTNA ARPT WHICH IS UNATTENDED WITH NO ACTIVE CTL TWR. PRIOR TO DEP, I CALLED FOR A

STANDARD WX BRIEFING. I FILED A FLT PLAN AND DEPARTED. WITH BOTH KENAI AND SOLDOTNA ARPTS IN VISUAL DISTANCE, APPROX 6 MI OUT, I BECAME DISORIENTED WHILE READING ARPT INFO FROM THE ALASKA SUPPLEMENT AND WHILE FUMBLING WITH THE RADIO DIALING SYS THAT WAS REQUIRING 2 HANDS TO DIAL THE APPROPRIATE FREQ. IT TOOK SEVERAL MINS TO CHK WIND CONDITIONS AND TUNE INTO THE SOLDOTNA CTAF 122.5. DURING THIS PROCESS I INADVERTENTLY MUST HAVE VEERED TO THE N AND W APCHING KENAI ARPT FROM MY L WHICH WOULD HAVE BEEN FROM NW, INSTEAD OF THE SOLDOTNA ARPT FROM NW. THESE ARPTS ARE 9 MI APART WITH SOLDOTNA BEING SE OF KENAI. THINKING I WAS INBOUND FOR SOLDOTNA ARPT, I MONITORED THE SOLDOTNA CTAF WITH THE TFC AT SOLDOTNA CLOSELY RESEMBLING WHAT I WAS OBSERVING IN THE KENAI AIRSPACE. I DID CONTINUOUSLY SCAN FOR OTHER AIR TFC AND MY OBSERVATION OF TFC IN THE AREA INCLUDED WATCHING FOR AN INBOUND PLANE AND AN ACFT TAXIING ON THE GND. I ANNOUNCED MY INTENTIONS ON THE SOLDOTNA CTAF, LANDED AND TAXIED OFF THE ACTIVE RWY, THE WHOLE TIME BELIEVING I HAD LANDED AT SOLDOTNA. AFTER LNDG AND ON THE GND OBVIOUSLY NOTHING LOOKED FAMILIAR. I HAD VISITED THE SOLDOTNA ARPT BY ROAD BEFORE. I NOTICED ANOTHER C172 TAXIING TO DEPART AND DID NOT SEE ANY OTHER TFC ON THE GND. I DID NOT FEEL IT WAS WISE TO SPEND MORE TIME IN THE AREA WITH THE ENG RUNNING AND THE PROP TURNING, SO I DETERMINED TO FOLLOW THE OTHER C172 OFF THE SAME TXWY AND DEPART WHEN THEY WERE CLR OF THE AREA. THE OTHER C172 TAXIED AND HELD SHORT OF THE RWY FOR APPROX 5-7 MINS. HE WAS DEPARTING VIA THE TXWY I HAD EXITED UPON LNDG. I JUDGED THIS TO BE ADEQUATE ROOM FOR TKOF. I TAXIED AND HELD APPROX 75 YARDS BEHIND THE OTHER C172. I THOUGHT HE MAY BE A STUDENT DOING A PREFLT/RUNUP OR HE WANTED TO TURN AROUND. I DID NOT REALIZE AT THE TIME THAT THE TWR HAD INSTRUCTED THIS PLANE TO TAXI AND HOLD TO BLOCK ME FROM DEPARTING THE AREA BECAUSE I CONTINUED TO MONITOR THE SOLDOTNA CTAF. I HAD NOW BEEN ON THE GND ABOUT 10 MINS AND WAS ANXIOUS TO GET AIRBORNE FOR THE RETURN TRIP TO ANCHORAGE. I ELECTED TO TURN AROUND AND TAXI S TO THE N END OF THE RWY WHILE THE OTHER C172 HELD SHORT. WHILE TAXIING TO THE HEAD OF THE RWY, MY WIFE POINTED OUT THE KENAI TERMINAL. IT WAS ONLY THEN THAT I REALIZED I HAD LANDED AT THE WRONG ARPT. I CONTACTED THE KENAI TWR AND INFORMED THEM OF MY INADVERTENT MISTAKE AND REQUESTED INSTRUCTIONS. THEY INFORMED ME THAT A POLICE OFFICER HAD BEEN DISPATCHED AND WAS ON HIS WAY. THERE WERE SEVERAL CONTRIBUTING FACTORS: 1) I DID NOT ADEQUATELY PLAN MY FLT PRIOR TO DEP. I DID NOT WRITE DOWN THE RWY DIRECTIONS, TFC FLOW REQUIREMENTS OR THE ARPT FREQS PRIOR TO DEPARTING MERRILL. I OBVIOUSLY LOST FOCUS ON MY DEST AT A CRITICAL POINT. I DID NOT FILL OUT A FLT PLANNING LOG AS I DID DURING MY TRAINING. 2) I MISREAD THE SOLDOTNA ARPT RWY DIRECTION AS 007 DEGS INSTEAD OF 070 DEGS. HAD I RECOGNIZED MY MISTAKE I WOULD HAVE KNOWN I WAS LNDG IN THE WRONG DIRECTION AND OBVIOUSLY IN THE WRONG LOCATION. I WAS TRAINED TO KNOW THE DIFFERENCE BUT DID NOT PICK IT UP WHILE IN THE AIR. 3) THE RADIO DIAL WAS A MAJOR CONTRIBUTING FACTOR. THE DIALING MECHANISM HAS A LARGE AND SMALL KNOB. THE LARGE KNOB DIALS THE NUMBERS TO THE L OF THE DECIMAL WHILE THE SMALL KNOB DIALS THE NUMBERS TO THE R. BOTH KNOBS TURNED BOTH SETS OF NUMBERS MAKING IT IMPOSSIBLE TO SET THE FREQ UNLESS 2 HANDS WERE USED TO KEEP BOTH DIALS FROM SPINNING SIMULTANEOUSLY. I FEEL THAT THIS SIT WAS THE MAJOR CAUSE IN MY GETTING OFF COURSE. 4) I DID NOT USE THE POS LOCATOR EQUIP AVAILABLE TO ME. 5) I SHOULD HAVE STARTED MY PRE LNDG CHKLIST SEVERAL MI EARLIER GIVING MORE TIME FOR PROPER SEQUENCE. 6) PROBABLY THE MOST IMPORTANT FACTOR WAS THAT I FOCUSED TOO CLOSELY ON THE ARPT, WINDSOCK AND TFC, AND DID NOT TAKE THE TIME TO SIZE UP THE GENERAL AREA SURROUNDING THE ARPT. HAD I DONE SO, I

WOULD HAVE SEEN THE LETTERS KENAI WRITTEN IN HUGE WHITE LETTERS ON THE TARMAC LIKE I SAW WHEN I DEPARTED. I WAITED TO TRANSIENT APPROX 10 MINS AND CONTACTED KENAI GND FOR PERMISSION TO DEPART TO THE N, WHICH WAS GRANTED. BACK IN ANCHORAGE, I RETRACED MY STEPS TO DETERMINE AT WHAT POINT I BECAME DISORIENTED AND THE REASONS WHY. I HAVE DETERMINED TO USE A FLT PLANNING LOG FOR A XCOUNTRY TRIPS. ADDITIONALLY, I WILL WRITE DOWN THE RADIO FREQS, RWY INFO AND RWY DIRECTION OF THE DEST AND ALTERNATE ARPTS. THIS WILL HELP ME BETTER MANAGE AND ORGANIZE THE COCKPIT. LASTLY, I WILL USE EACH FLT TO HONE BOTH MY PLTING AND DEAD RECKONING SKILLS. CONCLUSION: I AM OBVIOUSLY VERY EMBARRASSED BY WHAT HAPPENED. I AM STILL AMAZED BY HOW QUICKLY I GOT OFF COURSE, I WAS VERY COMFORTABLE WITH THE APCH, TFC AND LNDG EVEN THOUGH IT WAS THE WRONG ARPT. I HAVEN'T BEEN A PLT LONG, BUT I THINK MY TRAINING IS ADEQUATE.

Synopsis

A C172 LOW TIME PVT PLT LANDS AT THE WRONG ARPT WHILE ATTEMPTING TO DO HIS DELAYED FLT PLANNING IN THE AIR NEAR ENA, AK.

ATAAPS Summary

This scenario describes a situation where an inexperienced VFR pilot inadvertently lands at ENA rather than SXQ. Part of the ATAAPS effort is to evaluate NAS benefits to Anchorage TRACON (A11) assuming IFR control of the airspace encompassing ENA and SXQ. Had A11 had responsibility for the airspace and the pilot requested flight following, the controller may have been able to assist in ensuring the aircraft was going to the correct airport.

ACN: 449502 (1 of 1)

Time / Day

Date : 199909

Local Time Of Day : 0001-0600

Place

Locale Reference.Airport : ENA.Airport

State Reference : AK

Relative Position.Distance.Nautical Miles : 0

Altitude.AGL.Single Value : 0

Environment

Flight Conditions : IMC

Weather Elements / Visibility : Fog

Weather Elements / Visibility.Visibility : 0.25

Light : Night

Ceiling.Single Value : 100

RVR.Single Value : 1400

Aircraft

Reference : X

ATC / Advisory.Center : ZAN.ARTCC

Aircraft Operator : Air Carrier

Make Model Name : McDonnell Douglas Undifferentiated or Other Model

Crew Size.Number Of Crew : 3

Operating Under FAR Part : Part 125

Flight Plan : IFR
Mission : Cargo / Freight
Nav In Use.Localizer/Glideslope/ILS : 19R
Flight Phase : Initial Approach
Flight Phase : Landing
Route In Use.Other
Airspace.Class E : ENA.E

Person : 1

Reference : 1
Location Of Person.Aircraft : X
Reporter Organization : Air Carrier
Function.Flight Crew : Captain
Function.Flight Crew : Pilot Flying
Qualification.Flight Crew : Multiengine
Qualification.Flight Crew : Instrument
Qualification.Flight Crew : Air Transport Pilot (ATP)
Qualification.Flight Crew : Commercial
Experience.Flight Crew.Total : 13172
Experience.Flight Crew.Last 90 Days : 31
Experience.Flight Crew.Type : 6
ASRS Report Number.Accession Number : 449502
Analyst Callback : Completed

Person : 2

Reference : 2
Location Of Person.Aircraft : X
Reporter Organization : Air Carrier
Function.Flight Crew : Pilot Not Flying
Function.Flight Crew : First Officer
Qualification.Flight Crew : Multiengine
Qualification.Flight Crew : Instrument
Qualification.Flight Crew : Commercial

Person : 3

Reference : 3
Location Of Person.Aircraft : X
Reporter Organization : Air Carrier
Function.Flight Crew : Flight Engineer / Second Officer
Qualification.Flight Crew : Multiengine
Qualification.Flight Crew : Instrument
Qualification.Flight Crew : Commercial
Qualification.Flight Crew : Flight Engineer

Events

Anomaly.Conflict : Ground Conflict, Critical
Anomaly.Deviation - Procedural : FAR
Anomaly.Ground Excursion : Runway
Anomaly.Inflight Event / Encounter : CFTT / CFIT
Detector.Person : Other Person
Result.General : None Reported / Taken
Result.Flight Crew : Executed Go Around / Missed Approach

Assessments

Contributing Factors / Situations : Weather
Contributing Factors / Situations : Human Factors
Primary Problem : Weather

Narrative: 1

ON SEP/XA/99, I WAS CLRED FOR AN ILS APCH TO RWY 19R AT THE KENAI ARPT. I HAD THE CROSS HAIRS IN THE DOUGHNUT AND AT MINIMUMS. WE HAD THE RWY IN SIGHT. WE CONTINUED DOWN TO THE RWY. THE VISIBILITY WAS GETTING WORSE AS WE WENT DOWN TO THE RWY. WE EXECUTED A MISSED APCH AND TOUCHED DOWN ON THE RWY BRIEFLY AND RETURNED TO PALMER. THE FAA INSPECTOR SAYS THAT WE TOUCHED DOWN 1600 FT SHORT OF THE RWY. THERE WAS NO DAMAGE TO THE ACFT. AND OUR TOUCHDOWN DID NOT FEEL ROUGH. I DO NOT KNOW THAT WE DID NOT HIT THE RWY ON THE MISSED APCH. THE RWY WAS IN SIGHT THE WHOLE TIME DURING THE LNDG SEGMENT. THE ILS WAS NAILED/CTRED ON BOTH MINE AND THE COPLT'S SIDE. I BELIEVE WE TOUCHED DOWN 500-1000 FT DOWN THE RWY FOR THIS REASON. CALLBACK CONVERSATION WITH RPTR REVEALED THE FOLLOWING INFO: RPTR STATED THAT THE ACFT OPERATED IN THIS INCIDENT WAS A DC6 CARGO ACFT OPERATED UNDER A PART 125 CERTIFICATE. HE STATED THAT HE RECEIVED A LETTER OF INVESTIGATION FROM THE FAA REGARDING TOUCHING DOWN SHORT OF THE RWY SINCE ARPT GND PERSONNEL HAD NOTICED TIRE TRACKS IN THE TUNDRA PRIOR TO THE RWY. THEY ALLEGED THAT IT INDICATED CFTT AND AN ILS APCH BELOW IFR LNDG MINIMUMS. IN ADDITION, HE AS ACCUSED OF FALSIFYING THE ACFT LOG RECORD AND OPERATING THE ACFT NOT APPROVED ON THEIR ACR OPERATING CERTIFICATE. HE HAS HEARD NOTHING FURTHER REGARDING THIS INCIDENT.

Synopsis

CAPT OF A DC6 CARGO FLT TOUCHED DOWN SHORT OF RWY DURING A GAR AFTER THE VISIBILITY DECREASED DURING AN ILS APCH AFTER DECISION HT.

ATAAPS Summary

This scenario describes a situation where an experienced commercial pilot inadvertently lands short of the runway at ENA. Part of the ATAAPS effort is to evaluate NAS benefits to Anchorage TRACON (A11) assuming IFR control of the airspace encompassing ENA and SXQ. Had A11 held responsibility for this airspace and the controller was monitoring the aircraft conducting IFR approaches to ENA, the controller may have noted that the aircraft was below the glideslope on the ILS and advised the pilot.

SXQ

ACN: 1447001 (1 of 1)

Time / Day

Date : 201705

Local Time Of Day : 0601-1200

Place

Locale Reference.Airport : SXQ.Airport

State Reference : AK

Environment

Flight Conditions : VMC

Light : Daylight

Ceiling : CLR

Aircraft : 1

Reference : X
ATC / Advisory.Center : ZAN
ATC / Advisory.CTAF : SXQ
Aircraft Operator : Air Carrier
Make Model Name : Commercial Fixed Wing
Crew Size.Number Of Crew : 2
Operating Under FAR Part : Part 91
Flight Plan : VFR
Mission : Training
Flight Phase : Initial Approach
Airspace.Class E : ZAN

Aircraft : 2

Reference : Y
ATC / Advisory.CTAF : SXQ
Make Model Name : PA-31P Navajo P
Crew Size.Number Of Crew : 1
Flight Plan : VFR
Flight Phase : Initial Approach
Airspace.Class E : SXQ

Person

Reference : 1
Location Of Person.Aircraft : X
Location In Aircraft : Flight Deck
Reporter Organization : Air Carrier
Function.Flight Crew : Check Pilot
Function.Flight Crew : Captain
Qualification.Flight Crew : Air Transport Pilot (ATP)
ASRS Report Number.Accession Number : 1447001
Human Factors : Situational Awareness
Human Factors : Workload

Events

Anomaly.Conflict : Airborne Conflict
Detector.Person : Other Person
When Detected : Aircraft In Service At Gate
Result.General : None Reported / Taken

Assessments

Contributing Factors / Situations : Airport
Contributing Factors / Situations : Environment - Non Weather Related
Contributing Factors / Situations : Human Factors
Contributing Factors / Situations : Procedure
Primary Problem : Environment - Non Weather Related

Narrative: 1

I was performing a proficiency checkride on another Check airmen. I was notified by our flight following center after the completion of the flight that I had a near miss with another aircraft that was reported. During our entire flight we never did have a TCAS alert. I assume the only possibility was around Soldotna airport since when we were holding at the OLT beacon as published we heard a Navajo starting on the GPS 25 to SXQ. At this same time we left the hold starting the NDB 25 to SXQ with a circle to RWY 07. We did have traffic on our TCAS but it was not close for a near miss since no TCAS alert. We were

giving traffic advisories on the CTAF 122.5 but no one was talking back with us but did hear other aircraft. Entire check ride was done in VMC conditions.

Synopsis

Air carrier Captain reported being advised of a near miss near SXQ, possibly during an ADF approach. TCAS had not detected the event.

ATAAPS Summary

This scenario describes a situation where an experienced commercial pilot is advised of a near-miss with another aircraft near SXQ. Part of the ATAAPS effort is to evaluate NAS benefits to Anchorage TRACON (A11) assuming IFR control of the airspace encompassing ENA and SXQ. Had A11 held responsibility for this airspace and the controller was monitoring the aircraft conducting IFR maneuvers in the area, the controller may have noted that there were other aircraft in the vicinity and advised the pilot.

Appendix B: AOPA Input

2005



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September 13, 2017

JBER Public Affairs
Bldg. 10480, Sijan Ave., Suite 123
JBER, AK 99506

Re: *Proposal to Improve F-22 Operational Efficiency at Joint Base Elmendorf-Richardson, Alaska: Draft Environmental Impact Statement.*

To Whom It May Concern:

The Aircraft Owners and Pilots Association (AOPA), the world's largest aviation membership association, submits the following comment in response to the Draft Environmental Impact Statement (DEIS) prepared by the United States Air Force (USAF) to improve F-22 operational efficiency at Joint Base Elmendorf-Richardson, Alaska (JBER). AOPA supports the mission of the USAF and understands their need to operate continuously at JBER.

General aviation has a long history of collaborating with the military to ensure each other's airspace needs are understood and safely accommodated. In review of the DEIS, we are concerned the long-term airspace impacts of the proposed runway changes are not being fully considered and communicated to the public. We believe the DEIS is incomplete given the lack of transparency on airspace modifications the changes in runway utilization are likely to trigger. The USAF must work with the Federal Aviation Administration (FAA) to document the airspace actions that are likely subsequent to any proposed alternative being implemented.

Alaska's reliance on aviation

Alaska relies on aviation more than any other state in the union. According to *The Economic Contribution of the Alaska Aviation Industry to Alaska's Economy*, Northern Economics, Inc., the aviation industry in Alaska contributes \$3.5 billion, or approximately 8%, of the gross state product. This 2009 report highlights the fact that this is almost 40% greater than the industry's role in the national economy. This figure demonstrates the importance of the aviation industry to Alaska's economy. An estimated 47,000 jobs are directly and indirectly related to aviation in the state of Alaska.

Aviation not only has a significant economic impact in Alaska, it is the only manner many communities are accessible. On February 17, 2017, the FAA published a story in the *FAA Daily Broadcast* stating 82% of Alaska's communities are not accessible by road. Some communities may be accessible by barge; however, much of the year the water ways freeze over leaving only aviation to provide basic access, deliver healthcare, food, and to ensure these communities can send and receive mail on a year-round basis. The average number of enplanements per capita for off-road communities in Alaska is between eight and thirty times higher than in comparable communities in western rural states. Alaskans tend to rely on air freight 39 times more than

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cont'd

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comparable communities according to a 2009 study published by the Alaska Department of Transportation & Public Facilities.

Parallel Anchorage Bowl airspace study not addressed

AM-1 The DEIS notes the large number of civil aircraft operations in close proximity to JBER. General aviation is heavily concentrated in the Anchorage Bowl, operating in and out of airports and seaplane bases only a few miles apart. The DEIS states "the overall manner in which the high density Anchorage Bowl airspace is configured, managed, and used...has provided a safe, efficient, and reasonably compatible airspace environment that meets both military and civilian aviation needs." AOPA concurs with this statement and agrees it is through our collaboration with the military that this airspace has worked so well. We are concerned that the DEIS does not address the airspace modifications that are likely to be required following the utilization of new runway configurations. We believe the USAF must fully document the airspace modifications that may be triggered by this action and that may upset the current balance between civil and military operational needs.

AM-2 General aviation and other civil aviation stakeholders have been unable to participate in the USAF and FAA effort to define a scoping document for an Anchorage airspace study. The need for such a study is directly tied to the USAF's desire for an additional Instrument Landing System (ILS) approach at JBER. Installing an ILS approach for Runway 16 at JBER could have significant airspace impacts in the congested and complicated Anchorage Bowl airspace. The proposals laid out in the DEIS could further increase air traffic's utilization of unusual landing and departing configurations that will eventually overtax the existing airspace structure such that a redesign becomes required. The USAF must address their parallel proposal to install the Runway 16 ILS and what the airspace impact would be in concert with this action.

AM-3 The DEIS mentions the "Cartee" airspace located south of JBER but the document does not discuss what the proposed change's impact will be on the utilization of this airspace cutout. Understanding JBER must control "Cartee" airspace to ensure safe operations while in certain configurations, the USAF must detail what increase or decrease in "Cartee" activation will be a result of this proposal. "Cartee" airspace activation has a negative impact on operational efficiency at Merrill Field (PAMR), and more frequent activation could result in pilot confusion, increased workload, and needless airspace violations unless additional mitigations are put in place. The USAF should be transparent about their proposal's effect on this airspace segment to ensure general aviation is aware of the impact.

Impact on civil IFR aircraft not addressed

AM-4 The change proposed for the F-22's runway utilization at JBER could have an adverse impact on IFR general aviation traffic flying in and out of PAMR and Ted Stevens Anchorage International Airport (PANC). In our review of the proposal, we foresee an increase in arrival and departure delays for civil IFR traffic due to the new flight patterns by the F-22. The USAF should document the anticipated impact on IFR aircraft, either awaiting a departure release or inbound for an instrument approach, for those operations at airfields located in the Anchorage Bowl, and the USAF should note which alternative results in the most minimal impact.

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Conclusion

AM-5

AOPA recognizes and fully supports the USAF's need to train as they fight and to do so economically and efficiently. We can foresee the proponent utilizing new runway configurations that overtime strain the existing airspace structure and lead to an unsustainable situation. The USAF must address this oversight in the DEIS given airspace changes are not being fully considered. This proposal has the possibility of disrupting general aviation operations in the Anchorage Bowl so the impacts must be fully considered before any alternative selected.

Thank you for reviewing our comment on this important issue. Please feel free to contact me at 202-509-9515 if you have any questions.

Sincerely,



Rune Duke
Director, Airspace and Air Traffic

The Aircraft Owners and Pilots Association (AOPA) is a not-for-profit individual membership organization of General Aviation Pilots and Aircraft Owners. AOPA's mission is to effectively serve the interests of its members and establish, maintain and articulate positions of leadership to promote the economy, safety, utility, and popularity of flight in General Aviation aircraft. Representing two thirds of all pilots in the United States, AOPA is the largest civil aviation organization in the world.

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AOPA Informal Feedback on Anchorage Terminal Area Airspace *Feasibility of ILS Approach to RWY16 at Elmendorf AFB*

AOPA has been aware of the USAF's proposal for the establishment of an ILS approach to RWY 16 at Elmendorf for some time. We believe it is important the FAA conduct a thorough and impartial analysis of the impacts of this procedure on adjacent airports and other operators located in the Anchorage bowl. Local general aviation pilots regularly express concern to AOPA regarding military SUA expansion and are apprehensive about what effect the military expanding their footprint in the terminal environment might mean. The concerns these general aviation pilots, who fly commercial as well as Part 91, bring up relate to the possible impact a redesign on Anchorage airspace may have on their ability to operate, VFR and IFR. We submit these initial comments on the topics of scope, and aeronautical and environmental process concerns to begin a dialogue on this effort.

Scope of work

The proposed instrument flight procedure could have significant impacts on the operations of the adjacent civil airports as well as on VFR and IFR traffic efficiency. As you know, the Anchorage area is governed by special air traffic rules published in Part 93. Should the airspace need to be redesigned to allow this ILS approach, the Part 93 airspace, Class C airspace, and D airspace may need to be modified. Many operators have established their routines based on the existing airspace and the freedom to fly that it facilitates. This is a complex area of airspace with significant utilization by all types of aircraft.

AOPA has met with the USAF and is willing to engage in a collaborative initiative to find a solution that will work for the military as well as civil airspace users; however, it must be acknowledged that a practical solution may not be possible in this congested area. We strongly feel it is vital to success that the impacted civil users, not just the military, are offered an opportunity to participate in this airspace study. We would welcome the opportunity to meet with the FAA and their contractors as there are airspace issues that the several thousand general aviation pilots we represent in this area have. We feel it would be a disservice to only capture a single customer's desires, including when discussing scope. Our hope is we can work together and have a better final product as a result if we work collaboratively to discuss related issues.

Aeronautical concerns

Lack of access to relevant documents

We understand previous airspace studies have been completed for Anchorage; however, we have been unable to receive relevant copies. On August 9, 2018, AOPA submitted a Freedom of Information Act requesting a copy of the FAA study from 2008 titled "Alaska National Airspace System Review," which we understand evaluated an Anchorage airspace redesign. We have yet

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to receive a copy and do not have a date when we might be provided one. We also do not have current copies of relevant Letters of Agreement. If there are relevant studies or documents, we would appreciate a copy to be better informed as to the complexity of the airspace.

Merrill operations and Cartee airspace

Merrill has about 850 based aircraft and accounts for approximately 130,000 annual operations. General aviation accounts for the majority of these aircraft and operations. The close proximity of this major general aviation hub to EDF puts it in direct conflict with most proposals for an ILS RWY16 missed approach. Negatively impacting the efficiency of operations at Merrill would have an economic impact on operators, the airport, and the surrounding community. AOPA will strongly oppose any adverse operational impacts at Merrill airport. We need to look for a solution that will not create disruptions for other aviation users in the Anchorage airspace environment.

We are concerned that this airspace review may look at increasing utilization of Cartee airspace within the Merrill Class D airspace. Cartee airspace was designed for very limited operations, not routine utilization or for activation for extended periods of time. The details of this airspace utilization and operational practices are not publicly available as they are described in an LOA. Furthermore, as this airspace is informally defined via an LOA, AOPA and the public had no ability to submit comments or concerns on this airspace. The lack of public comment on airspace that effectively prioritizes one user over another is concerning.

Cartee airspace activation is a challenge for general aviation users as it is (a) not charted, (b) not depicted on any moving map or EFB system, (c) depiction in the Chart Supplement is not user friendly and not for navigation, and (d) Cartee is not described in Part 93, the AIM, or other relevant airspace guidance for pilots who may not be locally based. Numerous updates to the primary pilot resource for Cartee airspace, the Chart Supplement, have been proposed; however, those have yet to be submitted. AOPA will strongly oppose any increase in Cartee airspace activation based on the adverse impacts this informal airspace has on general aviation users of Merrill.

Safety reports

The FAA should review ASRS, HATR, and other safety reports for the Anchorage airspace. Recent reports note concerns about the Merrill LOA and air traffic controller communication/process breaking down. There must be effective procedures in place for air traffic controllers and pilots if new airspace or instrument flight procedures are to be implemented. An analysis of existing issues should be undertaken and a survey of user concerns promulgated.

MARS concept

In September 2018, the FAA solicited industry feedback on the Multiple Airport Route Separation (MARS) Concept of Operations (ConOps). The description of the ConOps states:

MARS supports the PBN Strategy and builds on past progress where PBN is used as the basis for daily operations. It extends the Established on RNP (Required Navigation Performance) ConOps where PBN-based procedures are utilized to alleviate separation requirements when vectoring to straight-in approaches to parallel runways at medium or

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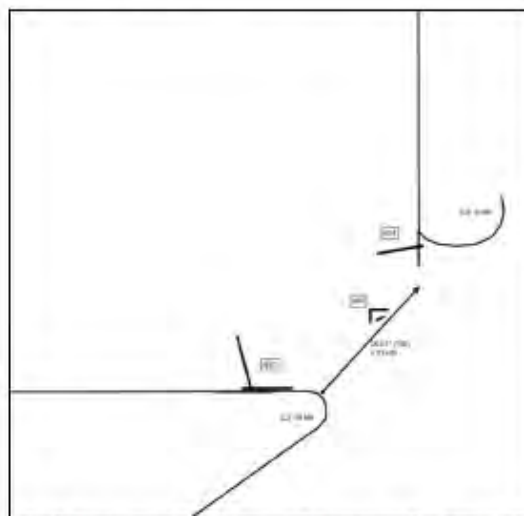
Anchorage Terminal Area Airspace and Procedures Feasibility Study

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high-density airports. Plus, it applies to adjacent IFP paths to and from neighboring airports to deconflict operations among these airports.

AOPA submitted feedback to AJV-14 and ANG-C5 noting the MARS solution is applicable at more locations than just NSG1 airports and major metro areas. We noted ANC is NSG2 and resides in very congested airspace with MRI and EDF nearby. The large volume of general aviation, commercial aviation, and military aircraft, as well as precipitous terrain in close proximity, makes this a challenging airspace environment. We proposed the Anchorage terminal airspace would be a good example of where MARS would have a positive effect given the USAF is looking at installing an ILS for RWY 16, which would have significant effects on operations at MRI and ANC. PBN and MARS could facilitate safe and efficient separation of the EDF ILS RWY 16/PBN procedure's missed approach with other IFR aircraft.



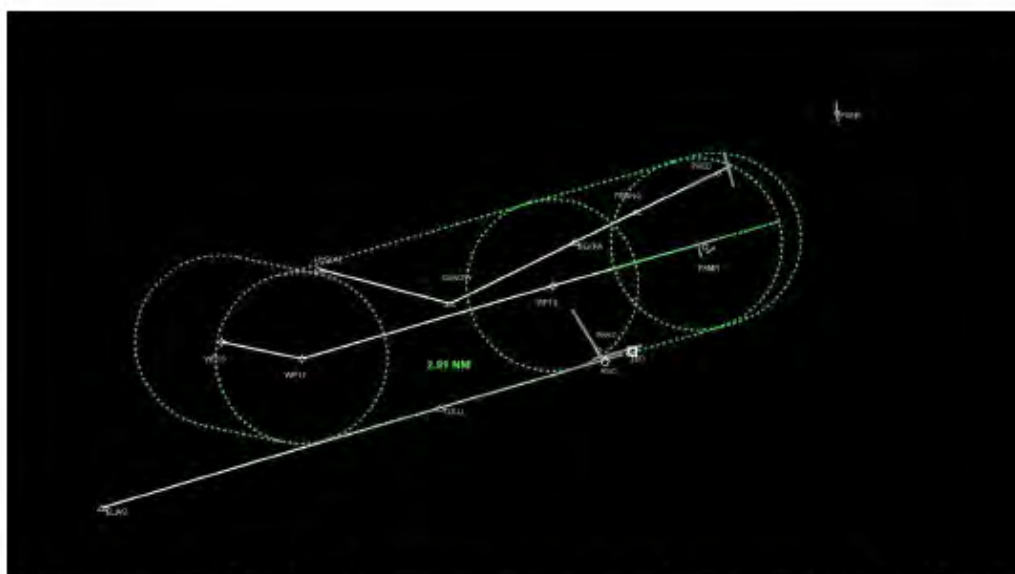
This is an AOPA produced diagram of a notional concept for how MARS could be employed between ANC/MRI/EDF in order to initiate a conversation with the MARS authors.

The FAA's initial review indicated MARS has the potential to mitigate/deconflict the operations between the Anchorage terminal airports in a couple of the flows; although, local agreements, noise, etc., were not considered and may have a significant impact on procedure design in this area. The below images and analysis were provided by the FAA.

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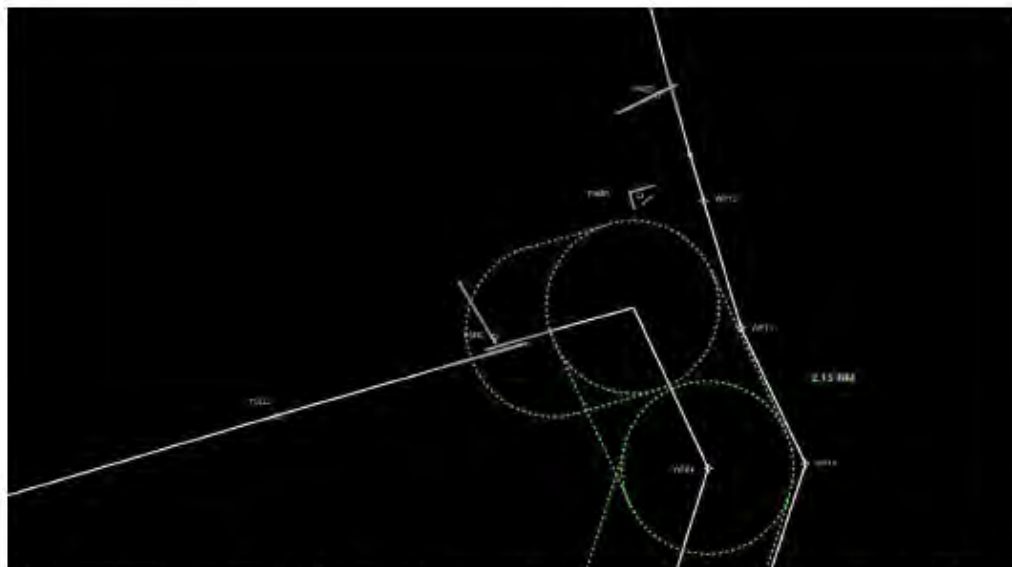
Depiction of notional East flow. An instrument approach can be constructed into MRI RWY7 that is parallel to ANC RWY7R and spaced at 2.91nm. This fits within the MARS ConOps for simultaneous independent operations without any separate monitor controllers. However, it does not separate from Elmendorf's ILS to RWY6. In this scenario, EDF and MRI would be dependent operations and both would be independent from ANC.



ANC departures and missed approach RWY7L with EDF missed approach RWY16.

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ANC departures east and EDF missed approach to the south. The missed approach off the new EDF RWY16 ILS could be developed to remain 2.15nm (more if terrain allows) away from the ANC missed approach and departures. A new ANC missed approach and a new ANC SID would be required. In this scenario, EDF and ANC would be independent from each other.

There are many considerations, including military aircraft PBN equipage, that would need to be studied before a solution such as this could be implemented, but we believe the FAA should consider all solutions including more forward leaning NextGen opportunities. As the FAA and their contractors develop an Anchorage Terminal Area Airspace Study to evaluate the new ILS RWY 16 at EDF, the MARS ConOps and PBN solutions should be part of the evaluation.

Environmental process concerns

In September 2017, AOPA submitted comments to the USAF *Proposal to Improve F-22 Operational Efficiency at Joint Base Elmendorf-Richardson, Alaska: Draft Environmental Impact Statement*. Our comments to the Draft EIS centered on the USAF failing to address the inevitable airspace changes that would result from their proposal. We understand the FAA is considering these concerns as part of their evaluation.

As a summary, please find below our relevant comment:

The DEIS notes the large number of civil aircraft operations in close proximity to JBER. General aviation is heavily concentrated in the Anchorage Bowl, operating in and out of airports and seaplane bases only a few miles apart. The DEIS states "the overall manner in which the high density Anchorage Bowl airspace is configured, managed, and used...has provided a safe, efficient, and reasonably compatible airspace environment that meets both military and civilian aviation needs." AOPA concurs with this statement and agrees it is through our collaboration with the military that this airspace has worked

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so well. We are concerned that the DEIS does not address the airspace modifications that are likely to be required following the utilization of new runway configurations. We believe the USAF must fully document the airspace modifications that may be triggered by this action and that may upset the current balance between civil and military operational needs.

General aviation and other civil aviation stakeholders have been unable to participate in the USAF and FAA effort to define a scoping document for an Anchorage airspace study. The need for such a study is directly tied to the USAF's desire for an additional Instrument Landing System (ILS) approach at JBER. Installing an ILS approach for Runway 16 at JBER could have significant airspace impacts in the congested and complicated Anchorage Bowl airspace. The proposals laid out in the DEIS could further increase air traffic's utilization of unusual landing and departing configurations that will eventually overtax the existing airspace structure such that a redesign becomes required. The USAF must address their parallel proposal to install the Runway 16 ILS and what the airspace impact would be in concert with this action.

The DEIS mentions the "Cartee" airspace located south of JBER but the document does not discuss what the proposed change's impact will be on the utilization of this airspace cutout. Understanding JBER must control "Cartee" airspace to ensure safe operations while in certain configurations, the USAF must detail what increase or decrease in "Cartee" activation will be a result of this proposal. "Cartee" airspace activation has a negative impact on operational efficiency at Merrill Field (PAMR), and more frequent activation could result in pilot confusion, increased workload, and needless airspace violations unless additional mitigations are put in place. The USAF should be transparent about their proposal's effect on this airspace segment to ensure general aviation is aware of the impact.

The change proposed for the F-22's runway utilization at JBER could have an adverse impact on IFR general aviation traffic flying in and out of PAMR and Ted Stevens Anchorage International Airport (PANC). In our review of the proposal, we foresee an increase in arrival and departure delays for civil IFR traffic due to the new flight patterns by the F-22. The USAF should document the anticipated impact on IFR aircraft, either awaiting a departure release or inbound for an instrument approach, for those operations at airfields located in the Anchorage Bowl, and the USAF should note which alternative results in the most minimal impact.

As our comments detail, we believe any airspace change in the Anchorage bowl would have significant impacts on general aviation. In the disposal of comments the USAF responds to AOPA stating definitively that "there is no proposed change in the Anchorage Bowl airspace associated with this EIS." In response to our comment on Cartee airspace utilization, the USAF stated:

The F-22 Operational Efficiency EIS alternatives for runway use do not propose changes in the use of the Cartee airspace or in any other Anchorage Bowl airspace (see response to AM-1). The Cartee activation is expected to be comparable to what has been historically experienced.

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However, it is apparent from the USAF Record of Decision and the Final EIS that the USAF and FAA have been working collaboratively on an Anchorage Airspace Study, which may lead to changing the terminal airspace. We believe this airspace study is a direct result of the USAF proposal to improve efficiency at JBER. The latest briefing we received from the USAF (July 11, 2018) also indicated that the Anchorage Airspace Study may lead to airspace changes.

We are concerned at the ambiguity and lack of harmony between documents and processes. We contend that if airspace changes are needed to support the USAF proposal of improving operational efficiency, additional environmental analysis and public comment should be allowed. We believe the USAF used definitive language to describe the lack of airspace impacts in their environmental documentation and it is important those statements are honored. Furthermore, AOPA will strongly oppose any increase in Cartee airspace activation based on the absolute statements the USAF included in their Final EIS.

The Aircraft Owners and Pilots Association (AOPA) is a not-for-profit individual membership organization of General Aviation Pilots and Aircraft Owners. AOPA's mission is to effectively serve the interests of its members and establish, maintain and articulate positions of leadership to promote the economy, safety, utility and popularity of flight in general aviation aircraft. Representing two thirds of all pilots in the United States, AOPA is the largest civil aviation organization in the world.

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Appendix C: Part 93 Descriptions

Title 14 Part 93, Subpart D

Web link: <https://ecfr.io/Title-14/pt14.2.93#sp14.2.93.d>

Subpart D—Anchorage, Alaska, Terminal Area

Source: Docket No. 29029, 64 FR 14976, Mar. 29, 1999, unless otherwise noted.

§93.51 Applicability.

This subpart prescribes special air traffic rules for aircraft operating in the Anchorage, Alaska, Terminal Area.

[Doc. No. FAA-2002-13235, 68 FR 9795, Feb. 28, 2003]

§93.53 Description of area.

Description deleted for brevity. Pictorial description provided at the end of this section.

Specific details provided at:

Web link: <https://ecfr.io/Title-14/pt14.2.93#sp14.2.93.d>

[Doc. No. 29029, 64 FR 14976, Mar. 29, 1999; Amdt. 93-77, 64 FR 17439, Apr. 9, 1999]

§93.55 Subdivision of Terminal Area.

The Anchorage, Alaska, Terminal Area is subdivided as follows:

(a) International segment. That area from the surface to and including 4,100 feet MSL, within a 5.2-mile radius of the Anchorage International ATCT; excluding that airspace east of the 350° bearing from the Anchorage International ATCT and north of the 090° bearing from the Anchorage International ATCT and east of a line bearing 180° and 360° from the intersection of the new Seward Highway and International Airport Road and the airspace extending upward from the surface to but not including 600 feet MSL, south of lat. 61°08'28" N.

(b) Merrill segment. That area from the surface to and including 2,500 feet MSL, within a line beginning at Point Noname; thence direct to the mouth of Ship Creek; thence direct to the intersection of the Glenn Highway and Muldoon Road; thence south along Muldoon Road to Tudor Road; thence west along Tudor Road to the new Seward Highway; thence direct to West Anchorage High School; thence direct to Point MacKenzie; thence via the north bank of Knik Arm to the point of beginning.

(c) Lake Hood segment. That area from the surface to and including 2,500 feet MSL, within a line beginning at Point MacKenzie; thence direct to West Anchorage High School; thence direct to the intersection of Tudor Road and the new Seward Highway; thence south along the new

Seward Highway to the 090° bearing from the Anchorage International ATCT; thence west direct to the Anchorage International ATCT; thence north along the 350° bearing from the Anchorage International ATCT to the north bank of Knik arm; thence via the north bank of Knik Arm to the point of beginning.

(d) Elmendorf segment. That area from the surface to and including 3,000 feet MSL, within a line beginning at Point Noname; thence via the north bank of Knik Arm to the intersection of the 4.7-mile radius of Elmendorf AFB; thence clockwise along the 4.7-mile radius of Elmendorf AFB to long. 149°46'44" W.; thence south along long. 149°46'44" W. to lat. 61°19'10" N.; thence to lat. 61°17'58" N., long. 149°44'08" W.; thence to lat. 61°17'30" N., long. 149°43'08" W.; thence south along long. 149°43'08" W. to the Glenn Highway; thence south and west along the Glenn Highway to Muldoon Road; thence direct to the mouth of Ship Creek; thence direct to the point of beginning.

(e) Bryant segment. That area from the surface to and including 2,000 feet MSL, within a line beginning at lat. 61°17'13" N., long. 149°37'35" W.; thence west along lat. 61°17'13" N., to long. 149°43'08" W.; thence south along long. 149°43'08" W., to the Glenn Highway; thence north and east along the Glenn Highway to Ski Bowl Road; thence southeast along the Ski Bowl Road to a point one-half mile south of the Glenn Highway; thence north and east one-half mile south of and parallel to the Glenn Highway to its intersection with a line one-half mile east of and parallel to the Bryant Airport Runway 16/34 extended centerline; thence northeast along a line one-half mile east of and parallel to Bryant Airport runway 16/34 extended centerline to the point of beginning.

(f) Seward Highway segment. That area from the surface to and including 4,100 feet MSL, within a line beginning at the intersection of a line bearing 180° from the intersection of the new Seward Highway and International Airport Road, and O'Malley Road; thence east along O'Malley Road to its intersection with Lake Otis Park Way, lat. 61°07'23" N., long. 149°50'03" W.; thence northerly along Lake Otis Park Way to its intersection with Abbott Road, lat. 61°08'14" N., long. 149°50'03" W.; thence east along Abbott Road to its intersection with Abbott Loop Road, lat. 61°08'14" N., long. 149°48'16" W.; thence due north to intersect with Tudor Road, lat. 61°10'51" N., long. 149°48'16" W.; thence west along Tudor Road to its intersection with the new Seward Highway, lat. 61°10'51" N., long. 149°51'38" W.; thence south along the new Seward Highway to its intersection with a line bearing 180° and 360° from the intersection of the new Seward Highway and International Airport Road; thence south to the point of beginning.

[Doc. No. 29029, 64 FR 14976, Mar. 29, 1999; Amdt. 93-77, 64 FR 17439, Apr. 9, 1999]

§93.57 General rules: All segments.

(a) Each person operating an aircraft to, from, or on an airport within the Anchorage, Alaska, Terminal Area shall operate that aircraft according to the rules set forth in this section and

Anchorage Terminal Area Airspace and Procedures Feasibility Study

§§93.59, 93.61, 93.63, 93.65, 93.67, or 93.68 as applicable, unless otherwise authorized or required by ATC.

(b) Each person operating an airplane within the Anchorage, Alaska Terminal Area shall conform to the flow of traffic depicted on the appropriate aeronautical charts.

(c) Each person operating a helicopter shall operate it in a manner so as to avoid the flow of airplanes.

(d) Except as provided in §93.65 (d) and (e), and §93.67(b), each person operating an aircraft in the Anchorage, Alaska, Terminal Area shall operate that aircraft only within the designated segment containing the arrival or departure airport.

(e) Except as provided in §§93.63(d) and 93.67(b), each person operating an aircraft in the Anchorage, Alaska, Terminal Area shall maintain two-way radio communications with the ATCT serving the segment containing the arrival or departure airport.

§93.59 General rules: International segment.

(a) No person may operate an aircraft at an altitude between 1,200 feet MSL and 2,000 feet MSL in that portion of this segment lying north of the midchannel of Knik Arm.

(b) Each person operating an airplane at a speed of more than 105 knots within this segment (except that part described in paragraph (a) of this section) shall operate that airplane at an altitude of at least 1,600 feet MSL until maneuvering for a safe landing requires further descent.

(c) Each person operating an airplane at a speed of 105 knots or less within this segment (except that part described in paragraph (a) of this section) shall operate that airplane at an altitude of at least 900 feet MSL until maneuvering for a safe landing requires further descent.

§93.61 General rules: Lake Hood segment.

(a) No person may operate an aircraft at an altitude between 1,200 feet MSL and 2,000 feet MSL in that portion of this segment lying north of the midchannel of Knik Arm.

(b) Each person operating an airplane within this segment (except that part described in paragraph (a) of this section) shall operate that airplane at an altitude of at least 600 feet MSL until maneuvering for a safe landing requires further descent.

§93.63 General rules: Merrill segment.

(a) No person may operate an aircraft at an altitude between 600 feet MSL and 2,000 feet MSL in that portion of this segment lying north of the midchannel of Knik Arm.

(b) Each person operating an airplane at a speed of more than 105 knots within this segment (except for that part described in paragraph (a) of this section) shall operate that airplane at an altitude of at least 1,200 feet MSL until maneuvering for a safe landing requires further descent.

(c) Each person operating an airplane at a speed of 105 knots or less within this segment (except for that part described in paragraph (a) of this section) shall operate that airplane at an altitude of at least 900 feet MSL until maneuvering for a safe landing requires further descent.

(d) Whenever the Merrill ATCT is not operating, each person operating an aircraft either in that portion of the Merrill segment north of midchannel of Knik Arm, or in the Seward Highway segment at or below 1200 feet MSL, shall contact Anchorage Approach Control for wake turbulence and other advisories. Aircraft operating within the remainder of the segment should self-announce intentions on the Merrill Field CTAF.

§93.65 General rules: Elmendorf segment.

(a) Each person operating a turbine-powered aircraft within this segment shall operate that aircraft at an altitude of at least 1,700 feet MSL until maneuvering for a safe landing requires further descent.

(b) Each person operating an airplane (other than turbine-powered aircraft) at a speed of more than 105 knots within this segment shall operate that airplane at an altitude of at least 1,200 feet MSL until maneuvering for a safe landing requires further descent.

(c) Each person operating an airplane (other than turbine-powered aircraft) at a speed of 105 knots or less within the segment shall operate that airplane at an altitude of at least 800 feet MSL until maneuvering for a safe landing requires further descent.

(d) A person landing or departing from Elmendorf AFB, may operate that aircraft at an altitude between 1,500 feet MSL and 1,700 feet MSL within that portion of the International and Lake Hood segments lying north of the midchannel of Knik Arm.

(e) A person landing or departing from Elmendorf AFB, may operate that aircraft at an altitude between 900 feet MSL and 1,700 feet MSL within that portion of the Merrill segment lying north of the midchannel of Knik Arm.

(f) A person operating in VFR conditions, at or below 600 feet MSL, north of a line beginning at the intersection of Farrell Road and the long. 149°43'08" W.; thence west along Farrell Road to the east end of Sixmile Lake; thence west along a line bearing on the middle of Lake Lorraine to the northwest bank of Knik Arm; is not required to establish two-way radio communications with ATC.

[Doc. No. 29029, 64 FR 14977, Mar. 29, 1999; Amdt. 93-77, 64 FR 17439, Apr. 9, 1999]

§93.67 General rules: Bryant segment.

(a) Each person operating an airplane to or from the Bryant Airport shall conform to the flow of traffic shown on the appropriate aeronautical charts, and while in the traffic pattern, shall operate that airplane at an altitude of at least 1,000 feet MSL until maneuvering for a safe landing requires further descent.

(b) Each person operating an aircraft within the Bryant segment should self-announce intentions on the Bryant Airport CTAF.

§93.68 General rules: Seward Highway segment.

(a) Each person operating an airplane in the Seward Highway segment shall operate that airplane at an altitude of at least 1,000 feet MSL unless maneuvering for a safe landing requires further descent.

(b) Each person operating an aircraft at or below 1,200 feet MSL that will transition to or from the Lake Hood or Merrill segment shall contact the appropriate ATCT prior to entering the Seward Highway segment. All other persons operating an airplane at or below 1,200 feet MSL in this segment shall contact Anchorage Approach Control.

(c) At all times, each person operating an aircraft above 1,200 MSL shall contact Anchorage Approach Control prior to entering the Seward Highway segment.

§93.69 Special requirements, Lake Campbell and Sixmile Lake Airports.

Each person operating an aircraft to or from Lake Campbell or Sixmile Lake Airport shall conform to the flow of traffic for the Lake operations that are depicted on the appropriate aeronautical charts.

Appendix D: ANC Master Plan Comments

ANC Master Plan Update Comment Response 3.

#91 Page 54. Issue ID# 16604.

Dear Anchorage International Airport Master Plan team Thank you for the opportunity to provide comments on the Anchorage International Airport's Master Plan Update draft alternatives. We value our relationship with the Anchorage International Airport (ANC), and our comments are submitted as a local stakeholder. On Draft Alternative 3 - 'Optimize Use of Existing Anchorage International Airport Infrastructure,' currently occasional north-bound departures from Runway 7 fly over Elmendorf Field airspace and military Restricted airspace, or possibly even through such airspace in the case of slow-climbing aircraft. We have three specific comments on the potential regular use of Runway 7L for departures: 1. The initial approach to Elmendorf Field (EDF) may be made unviable. Aircraft returning to Elmendorf Field report to a designated location just outside of ANC and EDF airspace at approximately 4000 feet MSL and descend to 3500 feet MSL to enter EDF airspace. This high altitude approach is currently restricted or prohibited when northbound traffic departs Runway 7. 2. The proposed Simulated Flame Out (SFO) airspace for F-16 emergency recovery that overlays EDF airspace would not be available during departures from Runway 7. Additionally, if an F-16 experienced an actual emergency and needed the SFO pattern, the airspace conflict would increase the risk to both the F-16 and civilian aircraft. 3. Portions of the Restricted airspace associated with the Eagle River Flats Impact Area (R-2203) extend from the surface to 11,000 feet MSL. Air traffic that enters R-2203 may prevent or disrupt military training activities, such as indirect live fire and Airborne drops. We request the ANC Master Plan Update team consider potential airspace conflicts that may occur under Draft Alternative 3 when selecting a preferred alternative. We understand that these alternatives would not be implemented until the capacity of the current infrastructure and flight patterns is reached. We would further request that the Master Plan document the potential conflicts described in this letter so they can be referenced in future decision making. Thank you again for the opportunity to comment on this important planning effort and we look forward to hearing from you.

ANC Master Plan Update Comment Response 4.

#96. Page 129. I oppose the proposal to use RW7L for departures to the east during future daytime periods of peak congestion. I live in an Eagle River neighborhood that is already impacted by increased jet flyover noise and this activity would exacerbate the existing problem. I oppose any change that would increase the number of departures or arrivals over this area of Eagle River. My neighborhood is in an intensely quiet, wilderness area with little to no introduced background noise in normal conditions. Our homes are located in a steep-walled

mountain valley at 2000+-foot elevations where the effects of noise from outbound jets climbing to reach altitude are significant and disruptive. Our situation is very different from urban residential areas and should be treated differently in deciding where to direct jet traffic. I understand the outbound path over Eagle River has been in use for many years; however, I've lived at my current location for over 20 years and cannot recall there being such a problem as there has been in recent years. It's not just the number of jets flying over, it's the associated rumbling, booming noise that goes on and on as it reverberates in our valley. Some of us are now feeling that our area is being targeted for more over flights because of our lower population density. At the December 11 public meeting, the consultant more than once referenced departures to the north going over Mat-Su--he did not mention Eagle River at all. It's my understanding that the flight path from the north runway over Eagle River is the "ANC 5 Departure to Outer 2 Fix" and that about 80% of the traffic heading to the Lower 48 uses this route. Given that, the potential impacts of runway use changes on Eagle River neighborhoods need to be addressed in the airport master planning process. Some of us have been participating in the Part 150 Noise Study update; however, our area is not included in the evaluation because we are outside the 65 DNL noise contour and because the noise impact model does not address the unique physical characteristics of our area. If there is additional analysis of noise impacts related to any proposed changes in the preferential runway use program, then Eagle River should be included in the evaluation.

Appendix E: Airspace Redesign Synopsis

A tasking of follow-on activities described in the ATAAPS scope requires a review of current IFR and VFR operations, including airspace configurations, and the exploration of options to increase safety and efficiency within the affected air traffic facilities; ZAN, A11, ANC ATCT, LHD ATCT, MRI, EDF, ENA, and FRN.

Among several items addressed elsewhere in this document, the tasking requests a review of:

ZAN:

- i. Arrival and departure gate location and efficiency
- ii. IFR feeds in various runway configurations
- iii. Efficiency of Standard Terminal Arrival Routes (STARs) and Standard Instrument Departures (SIDs) at ANC, MRI, EDF, etc.
- iv. IFR overflight routing
- v. EDF STAR and SID design

A11:

- i. Arrival and departure gate location and efficiency including a review of the dimensions of A11 airspace
- ii. Efficiency of STARs and SIDs at ANC, MRI, EDF, etc.
- iii. Sector load balance
- iv. Airport approach and departure efficiency including missed approach procedures
- v. IFR overflight routing
- vi. Expanding airspace to 60nm radius
- vii. Inclusion of approach control services to Kenai (ENA) and Soldotna (SXQ) airports
- viii. Possible expansion of ANC Class C airspace to protect ANC RWY 15 and RWY 7 finals

MRI:

- i. Airport approach and departure efficiency including missed approach procedures
- ii. VFR and SVFR altitudes and routing to include hospital heliports

ENA:

- i. Evaluate efficiency of approach control services into ENA between ZAN and A11

ii. Lower vectoring altitudes may be available through use of Terminal Minimum Vectoring Altitude (MVA) charts versus Minimum IFR Altitude (MIA) charts used by ZAN

FRN:

- i. Use of restricted area R-2203 A/B/C to include traffic flows in and out, types of aircraft, origin and destination of aircraft using the area and mission profile

Since the construction of Ted Stevens Anchorage International Airport in 1951, ANC, the surrounding airports, and aviation facilities have witnessed and been a part of several significant and historical changes in the aviation industry and the National Airspace System (NAS). Most notable to the current ATAAPS project was the Alaskan Capstone project that ran from 1999 to 2006 at which point the project was integrated into the national Automatic Dependent Surveillance – Broadcast (ADS-B) program, through the oversight of the Surveillance and Broadcast Services (SBS) Program Office.

The Alaskan Capstone Program was a joint industry and FAA Alaskan Region effort to improve aviation safety and efficiency by putting cost effective, new technology avionics equipment into aircraft and providing the supporting ground infrastructure. The demonstration areas were non-radar environments where most air carrier operations were limited to Visual Flight Rules (VFR). Phase II of the Capstone Program equipped aircraft flying primarily in Southeast Alaska with a government-furnished Global Positioning System (GPS) based avionics package. This system employed the first certified application of the Wide Area Augmentation System (WAAS) for the enroute portion of flights on routes that were outside the operational service volume of ground based navigational aids, such as Very High Omni-directional Range (VOR), and Non-Directional Beacon (NDB).

Phase II Capstone equipment and procedures increased the number of Alaska airports served by instrument approaches, and improved surveillance and communications coverage for IFR air traffic control services.

Special Federal Aviation Regulation 97 became effective March 13, 2003. This rule authorizes properly trained pilots with certified GPS/WAAS navigation systems to fly on routes at special (lower than usual) GPS Area Navigation (RNAV) altitudes using only the specified GPS/ WAAS avionics for navigation.

In addition to enhanced safety and new operational capabilities in Alaska, the Capstone program provided real world information and experience essential to the modernization of the National Airspace System (NAS).

In January 2007, the Capstone program was consolidated into the FAA's Surveillance and Broadcast Services (SBS) Program Office tasked with implementing ADS-B across the NAS. This consolidation streamlined national ADS-B activities and made them more cost-effective. It

also accelerated deployment of ADS-B technologies in Alaska, thus capitalizing on identified safety benefits from previous efforts.

Currently in Alaska, the SBS team is working with the state and Alaskan aviation industry to continue ADS-B deployment and encourage operators to equip with ADS-B avionics.

This history of technological evolution has set the foundation to evaluate current air traffic control airspace usage and identify ways to take advantage of the changes that have taken place and plan for changes coming in the future with the goal of improving safety and efficiency. To effectively accomplish this task will require the replacement of the existing Micro-EARTS (Micro-Enroute Automated Tracking System) at Anchorage Air Route Traffic Control Center (ZAN) with ERAM (EnRoute Automation Modernization). This replacement is scheduled to take place in the next 3 to 5 years. The new automation system will allow ZAN to utilize more advanced Traffic Management tools such as TBFM (Time Based Flow Management) that will improve efficiency by using the capabilities of the TBFM decision-support tool, a system already deployed at all air traffic control centers in the contiguous United States (lower 48). In particular, improvements in TBFM's core Time Based Metering capability and its trajectory modeler, and improvements to TBFM's departure capabilities, will enhance efficiency and optimize demand and capacity at ANC and surrounding airports.

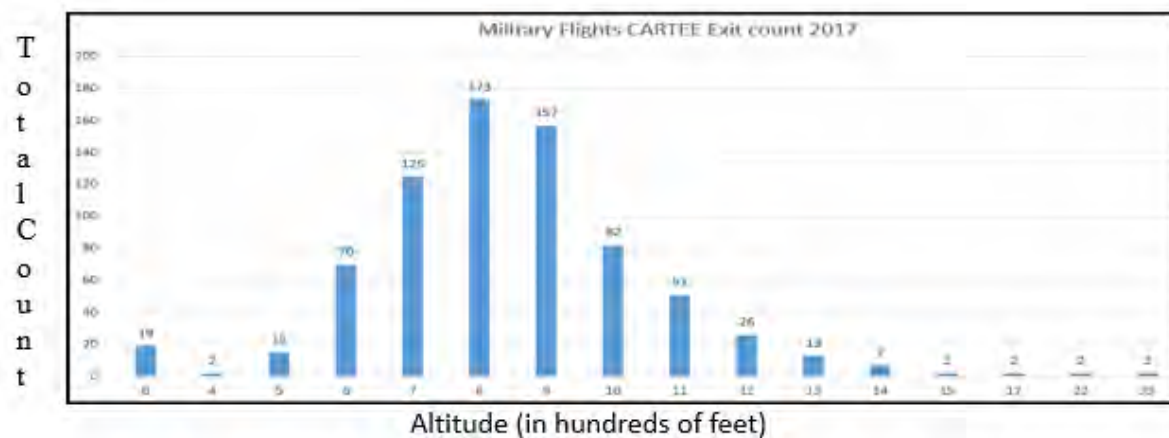
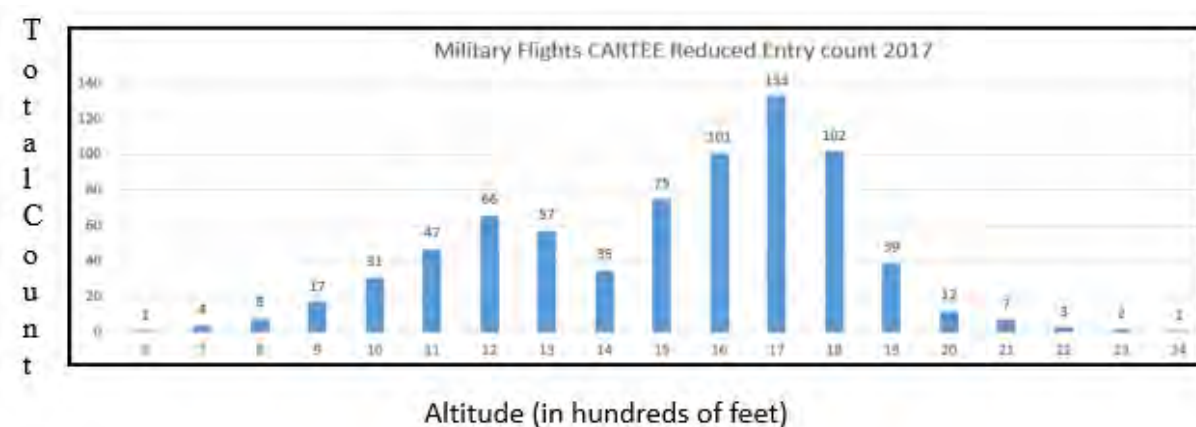
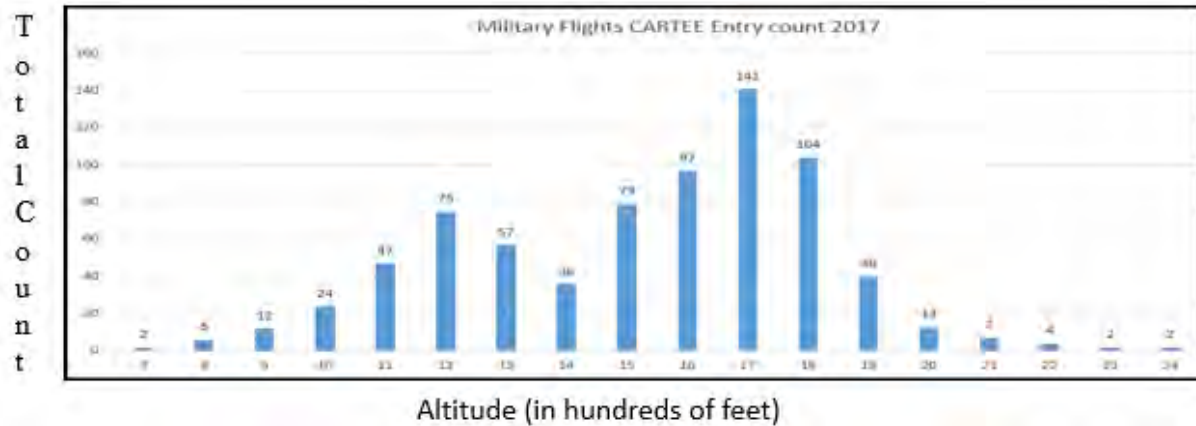
TBFM will enable aircraft to maintain consistent spacing behind a preceding aircraft, further improving capacity and flight efficiency. This function will also enable ZAN controllers to more accurately deliver aircraft to A11 while providing the opportunity for arrival aircraft to fly optimized descents.

As mentioned in other sections of this document, the NAS PBN (Performance Based Navigation) Strategy calls for the utilization of PBN operations to increase access, efficiency and resiliency across the NAS to enable time and speed-based air traffic management (ex.: TBFM) and increase system predictability. The development of this strategy will allow controllers to spend more time monitoring traffic flows rather than providing tactical radar separation. As the NAS continues to transition to a more consistent and predictable PBN based system, controllers will also need to transition from tactical air traffic control processes and rules to more strategic procedural separation. Procedurally separated PBN routes will provide consistent and predictable built-in separation between dependent routes and airports, allowing controllers to focus more on aircraft that do not have such capabilities, and on unusual situations that require a tactical response.

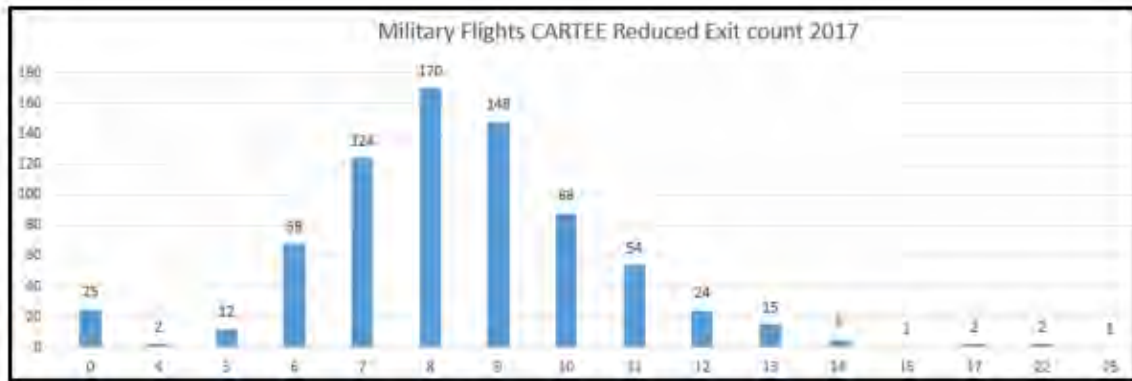
As these relatively new (to Alaska) automation systems and tools are implemented, airspace needs and requirements will change. To accommodate these changes, there will be a need to project installation and implementation timelines and compare anticipated flow and route changes to existing airspace design. This effort will set the stage for redefining arrival, departure and overflight traffic flows in the local Anchorage area.

In summary, acknowledging that there is no expectation that any new runways will be built in the Anchorage area, the existing airports will continue to grow in their current geographic location. It would be most beneficial to review existing airspace and make necessary adjustments to accommodate anticipated technological changes. This airspace review would need to begin in ZAN airspace anticipating that arrival aircraft will want/need the opportunity to take advantage of optimized descents from their cruise altitude that would transition into the approach and final phase of flight at the runway. Departure aircraft can expect to be assigned an RNAV route of flight from takeoff, throughout the climb-out phase to cruise. To accomplish this will require a holistic review of the airspace, and consider all users in all phases of flight. There are several instances in the NAS where this type of effort has been successful. It will be a matter of identifying the necessary resources to accomplish this task in the Anchorage area, and engaging local users and communities to ensure their unique needs are identified and considered as the project moves forward into future phases.

Appendix F: CARTEE Airspace Data

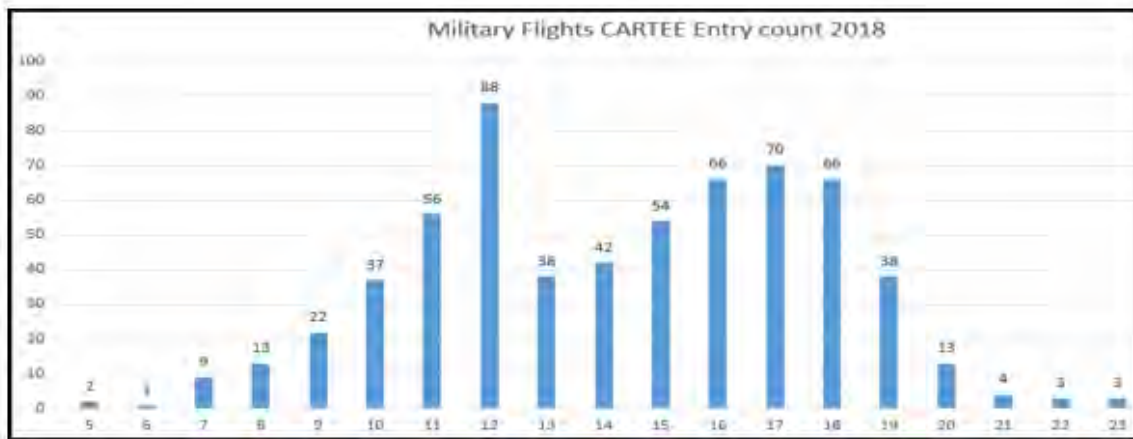


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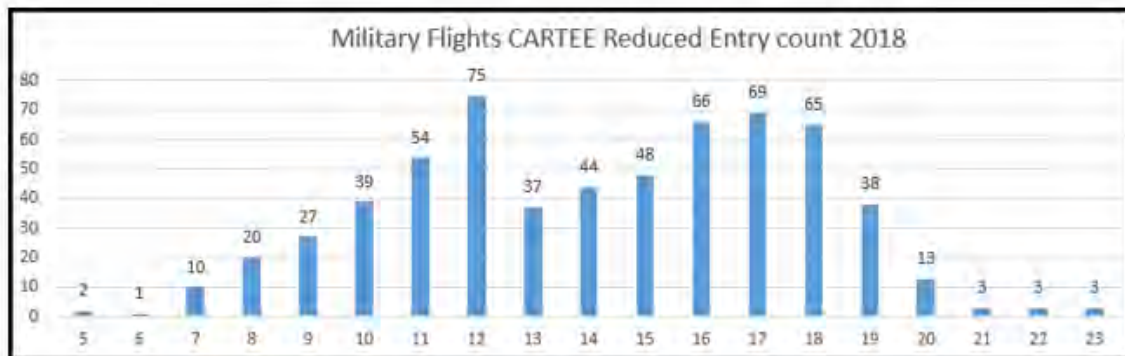
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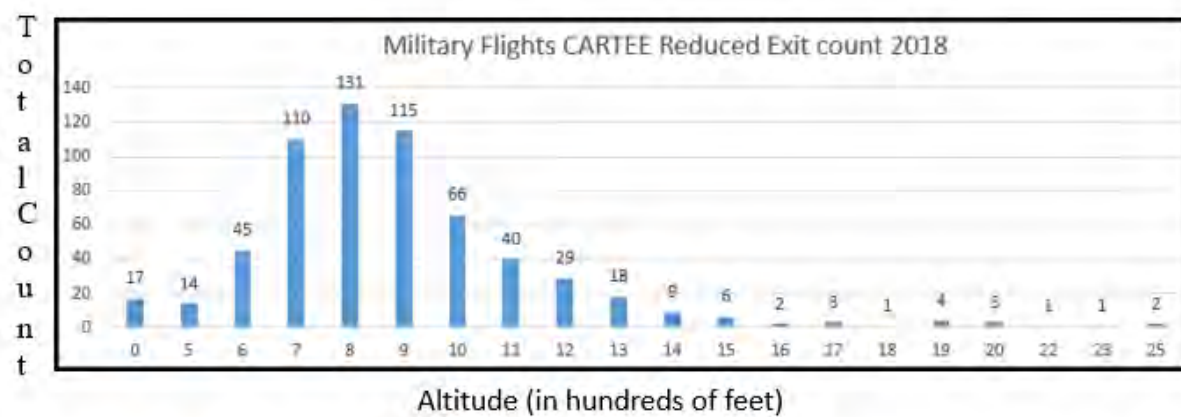
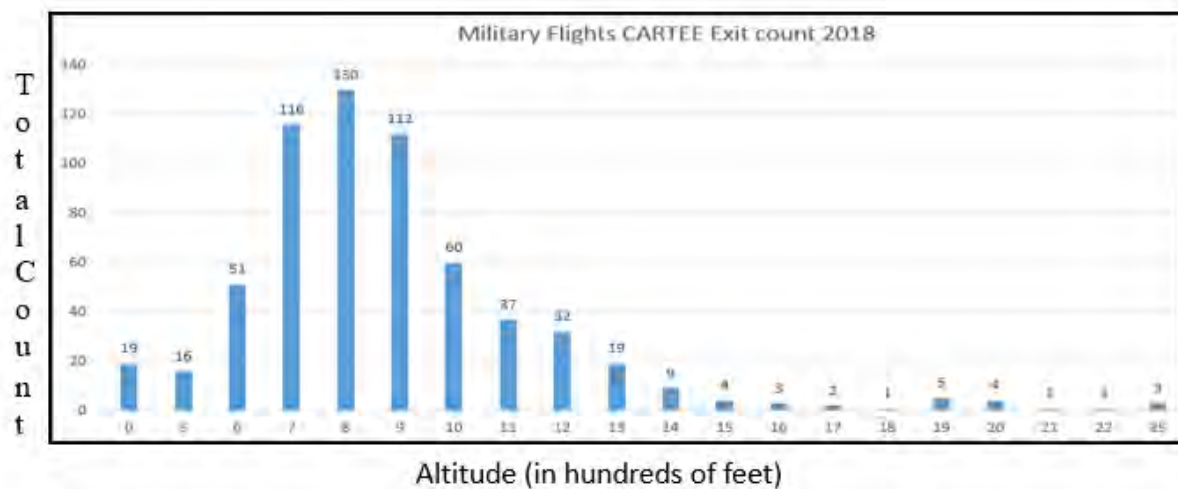


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Altitude (in hundreds of feet)



Appendix G: Missed Approach Instructions

1. ANC RNAV (GPS) RWY 15 MISSED APPROACH: Climb to 2500 direct ZUXAN on track 229 to JUKEP and hold.
2. ANC RNAV (RNP) Z RWY 7R MISSED APPROACH: Climb to 3000 on the missed approach route to JUKEP and hold.
3. ANC RNAV (GPS) Y RWY 7R MISSED APPROACH: Climb to 900 then climbing right turn to 3000 direct to JUKEP and hold.
4. ANC RNAV (GPS) RWY 7L MISSED APPROACH: Climb to 800 then climbing right turn to 2500 direct JUKEP and hold.
5. ILS or LOC RWY 7L MISSED APPROACH: Climb to 600 then climbing right turn to 2500 on heading 230 and TED VOR/DME R-210 to JUKEP/TED 15 DME and hold.
6. ILS or LOC RWY 7R MISSED APPROACH: Climb to 600 then climbing right turn to 2500 on TED VOR/DME R-210 to JUKEP/TED 15 DME and hold.
7. ANCHORAGE EIGHT DEPARTURE AIRCRAFT MORE THAN 20000 LBS OR TURBOJET AIRCRAFT: Climb heading 072° until leaving 2000 or TED 4 DME, whichever comes first, turn right heading 199°. Advise ATC prior to departure if unable to be established on heading 199° by 4 DME east of TED VOR/DME. ALL OTHER AIRCRAFT: Climb heading 072°, upon passing 600 or reaching TED 4 DME, climbing right turn to heading 199°. Advise ATC prior to departure if unable to be established on heading 199° by 4 DME east of TED VOR/DME. Thence. . .
8. A11 Order 7210.1P w/Change 3. Page 83. Section 4-5-13 Missed Approach Procedures. Subsection a.4.(a): (a) Runway 7R/7L/15: LEAVING SIX-HUNDRED, TURN RIGHT HEADING TWOZERO-ZERO, CLIMB AND MAINTAIN TWO-THOUSAND FIVE-HUNDRED.

Appendix H: Comprehensive Electronic Data Analysis and Reporting Information

Anchorage Airspace Issues

VFR Departure Procedures: Little Su and Chickaloon

Identified in an ECV conducted September 2014:

Intersecting Runway Separation: Lake Hood aircraft on the Little Su Departure were permitted to cross over runway 33 without restriction. In some cases, crossings occurred ahead of departing runway 33 aircraft.

Facility action:

2015: Controllers did not always apply N JO7110.652 separation requirements for aircraft operating on converging flight paths of non-intersecting runways. Aircraft were cleared for departure on runway 33 before aircraft departing on the west waterway at Lake Hood had passed the flight path of the first aircraft. N JO7110.652 specifies the requirements in a new paragraph 3-9-9 of FAAO 7110.65.

2017: Lake Hood aircraft on the Little Su Departure must be coordinated prior to departure by notice, included in the ANC SOP 7210.1P Change 3 preventing runway 33 crossings without restriction.

2018: Review of operation during the past 30 days shows IAW rules.

Identified in an ECV conducted August 2018:

Positive control is not always maintained for airborne traffic crossing the Anchorage (ANC) runways. Coordination does not include the crossing location or altitude and is not always accomplished on recorded lines. Conflicts that arise after crossing approval is issued are not always addressed. Effective scanning on potential traffic conflicts does not always occur.

The Chickaloon Departure, a southbound VFR departure procedure from LHD, depicts crossing of the ANC runway 7/25 complex approximately by ANC taxiway C and also east of the runways. Aircraft cross at either point depending on the LHD configuration or if on a left or right downwind departure. Coordination is accomplished by the LHD controller with ANC Local control (LC) however a crossing point is not stated and in a few instances, restrictions were not issued by the ANC LC. During the ECV, in one instance the ANC LC approved a Chickaloon departure and advised of traffic on final. After this approval, a twin aircraft requested a runway 7L intersection departure and the aircraft was cleared for takeoff. The Chickaloon departure crossed the runway 7 complex off the east end and traffic was not

exchanged with either aircraft, in conflict alert (CA) status, until after they passed. On another occasion, the ANC LC only stated approval of the Chickaloon without providing information for traffic on 2-mile final. The LHD controller observed the traffic on final and instructed the Chickaloon departure to pass behind the ANC arrival however this instruction was conveyed to the LHD aircraft prior to departure, with limited visibility to the runway 7 finals.

Prior to the ECV, another instance occurred involving a helicopter inbound from the north to the south ramp. No restriction was issued to the helicopter on crossing the runway 7/25 complex. The ANC LC cleared an aircraft for departure on runway 7L, resulting in a conflict between the departure and the helicopter crossing.

Facility Action:

2018:

1. Facility will conduct an SSR on an event that is representative of not maintaining positive control for traffic crossing runways.
2. A Special Alert Bulletin, collaboratively developed; has been issued to all Operational Tower personnel. This bulletin outlines expectations on positive control regarding transitioning traffic that will cross active runways.
3. A collaborative work group will be tasked with reviewing and creating procedures for aircraft transitioning "C" airspace. The work group will have specific tasking with identifying if specific crossing instructions and/or restrictions need to be developed including geographic fixes and altitudes.
4. A collaborative work group will be tasked with reviewing the facility SOP to change or enhance the memory aid and strip-board management requirements.
5. ANC has added facility specific emphasis items to all OSAs. These items are: Apply Class C service procedures, Provide Class C services to all participating aircraft, and Separate VFR aircraft from IFR. The emphasis items will be reviewed monthly and a report provided to the Management team by QC staff. The review will continue until at least January 31, 2019 or until the facility is 90% or higher in compliance with requirements.
6. ANC will conduct an SSR on any event including validated pilot complaints or concerns that involve lack of positive control for traffic crossing runways.
7. ANC will restrict VFR transitions from LHD during specific times of day during the 2019 construction season. This will be accomplished by including the restrictions in the 2019 construction SRM and SIR produced by ZAN TMU.
8. ANC will facilitate a FAAST Blast from the FAAST team and provide information to the Local Outreach team to insure the public is notified of these restrictions.

9. Training SYSIRs that result from the SSR conducted on ANC-M-2018/08/23-0001 (Temporary SSR number ANC#293184) will be completed within 90 days of the closure of the SSR.

VFR Arrival Procedure: MacKenzie:

2013, a near midair collision was reported by Alaska Airlines on a VFR operating on the MacKenzie Arrival. In August 2013, the following was identified in a report by the collaborative operational assessment team (COAT):

The team conducted an in-depth discussion on the MacKenzie Arrival conflicting with ANC Runway 33 departures and ways to mitigate any inherent risk. Currently the facility has already conducted a thorough and comprehensive System Service Review (SSR). Mitigations included creative video briefings and pilot outreach. They recognize the hot spot and place heavy emphasis on issuing traffic alerts. With all the operations at Lake Hood the facility feels that they are very competent with traffic calls/alerts.

Identified in a MacKenzie VFR Arrival Procedure Audit conducted June 2016:

Indirect monitoring was accomplished using Performance Data Analysis and Reporting System (PDARs) data on aircraft tracking over the MacKenzie Arrival route and validating services via audio. 25 MacKenzie VFR Arrival operations were reviewed for the period between May 15 - 20, 2016. Noted during the indirect monitoring:

- Anchorage TRACON initiates STARs handoff to Anchorage Tower on MacKenzie arrivals prior to the communications transfer.
- Traffic advisories were issued between MacKenzie VFR arrivals and Anchorage runway 15/33 arrivals and departures.
- While traffic was also exchanged between MacKenzie VFR arrivals and Lake Hood departures, there were some instances of inconsistency.
- There were nine instances where conditions did not warrant traffic issuance.
- In addition to the audit, a review of CEDAR data for MORs associated with a MacKenzie Arrival between January 1, 2015, to June 13, 2016, was conducted. No MORs were located on MacKenzie arrivals.

Corrective Action Plans prepared by Anchorage and Merrill.

Anchorage 2016 CAP on Point Out Procedures with EDF. This CAP has since been closed.

Risk: Point-out Procedures between EDF ATCT and A11.

Background: Currently, EDF ATCT cannot accept point outs. This leads to coordination without standardized approval/disapproval procedures. It also lacks clarity in determining who's responsible for the separation of aircraft.

Completed Mitigations: Revise the EDF/A11 LOA to include point out procedures IAW JO 7210.3 and JO 7110.65. Train personnel on new procedures.

Completed Monitoring Plan: Review A11 OSAs to ensure compliance.

Target: At least 90 percent of point outs between EDF and A11 will be IAW national orders and conducted properly (ie separation ensured).

Note: This CAP is associated with an SSR. Identified issues in this SSR:

1. The SSR Panel identified a hazard in that A11 and EDF Tower disagreed on the responsibilities associated with point outs to a tower. A11 TRACON referenced 7110.65W 2-1-1, 2-1-2 a., 2-1-6, 2-1-14 a., 2-1-21, 3-1-1, 3-1-9 b., 5-1-1, 5-3-1, 5-4-1, 5-4-2, 5-4-3 a. 2, 5-4-3 a. 3, 5-4-3 a. 4, 5-4-7, 7-1-2 a. 1 (a), 7-1-2 a. 1 (b), 7-1-2 a. 1 (c), 7-6-1, stating an expectation that EDF Tower would provide applicable radar separation standards to aircraft operating within the class Delta airspace. EDF Tower referenced AFI 13-204 V3 Par9.5 interpreting that to mean that EDF Tower would be providing expanded services that needed to be clearly stated in a Letter of Procedures or Letter of Agreement with A11 TRACON.
2. Shelved Airspace Issue: North Low requested a point out with EDF Tower for a GA aircraft to transition the EDF Class D directly towards MRI. EDF Tower approved the transition through the Class D airspace. EDF Tower then coordinated a release of an IFR military departure with North Radar. EDF Tower operated under the assumption that coordinating with any sector in A11 TRACON meant that all sectors within in A11 TRACON were advised appropriately within the TRACON. The releasing authority North Radar was not aware of the traffic North Low was working in EDF Tower airspace. The North Low controller operated on the assumption that EDF Tower would restrict any departing aircraft reference the transitioning GA aircraft.
3. Systemic Airspace Issue: EDF Tower noted that the Class D airspace for EDF is not typical. EDF Class D is restricted due to close proximity to FRN, MRI and LHD Class D Airspace and the R2203 airspace. EDF Tower stated that optimizing Class D airspace for EDF may have mitigated this situation.
4. Issue Covered in a LOA or Directive: EDF Tower explained that IAW AFI 13-204 V3 Par9.5 EDF Tower is currently unable to accept point outs IAW 7110.65W. A point-out to EDF is not currently covered in the ANCHORAGE TERMINAL RADAR APPROACH

CONTROL and 3rd OPERATIONS GROUP LETTER OF AGREEMENT. The Air Force has limitations on providing radar services at EDF Tower without specific language being included in the ANCHORAGE TERMINAL RADAR APPROACH CONTROL and 3rd OPERATIONS GROUP LETTER OF AGREEMENT. The limitations can be mitigated with a change to that document.

5. Potential Systemic Procedural Issues: The SSR panel discussed the 7110.65W 5-4-7, 5-4-8, 5-4-9 and the relevance of those paragraphs concerning the operation under review. The SSR panel discussed the 7110.65 W 3-1-9 a. and 7110.65W 3-1-9 b. These two paragraphs discuss the use of tower radar displays. Radar services and traffic advisories are not to be provided using uncertified tower display workstations. Local controllers may use certified tower radar displays to determine an aircraft's identification, exact location, or spatial relationship to other aircraft, to provide aircraft with radar traffic advisories and to provide a direction or suggested headings to VFR aircraft as a method for radar identification or as an advisory aid to navigation. The potential systemic procedural issues identified by the SSR Panel was that A11 TRACON operates with the understanding that EDF Tower has a certified tower radar display, and EDF Tower operates with the understanding that while they do have a certified tower radar display, they cannot provide those expanded services unless it is covered in the LOA.

Merrill 2015 CAP on CARTEE Airspace. This CAP has since been closed.

Risk: During Relief Briefing overlap, awareness of where traffic was and a developing situation was not recognized. Controllers did not issue potential traffic, then when it became an imminent situation, traffic alerts were not issued. CARTEE Airspace not depicted in any charts or publications.

Background: LC1 gave a BE20 a choice of 2 RYs and the BE20 chose a right downwind to RY 25. LC1 advised him that the CARTEE airspace was active. (CARTEE airspace is granted from MRI to EDF for operations during north/south RY operations. This airspace extends approx. 1.3 miles east of the approach end of RY25 to Muldoon rd, then South almost to Northern lights Blvd). The BE20 reported over shipcreek and LC1 told him to base west or inside of Bragaw road to avoid the CARTEE airspace that was active, pilot acknowledged.

LC1 began relief briefing and did not pass any traffic for the CARTEE airspace to the BE20. A flight of military fighter aircraft north of the BE20 was landing at EDF. The relieving controller believed that traffic had been passed and the relieved controller didn't see it as a factor at the time.

The BE20 entered the airspace for a normal pattern but believed he was complying with ATC instructions. LC1 did not give a traffic alert to the BE20 reference the military aircraft and did not issue a corrective turn. The relieved LC1 controller did not believe that he should have keyed

up but was still plugged in for the 2 minute overlap. Many pilots are aware of what the CARTEE airspace means but it is not published on any chart or publication readily available.

Completed Mitigations: Publish the boundaries and description of the CARTEE airspace in the Alaska Supplement and all other pertinent publications.

- 1) Have pilot outreach team brief pilots on the CARTEE airspace during their routine briefing.
- 2) Controller Training.

Completed Monitoring Plan: Verify that the CARTEE airspace was submitted for the publication process. Have the pilot outreach team verify the briefing of the CARTEE airspace to the pilots and what it means for them. (This will be a continued briefing due to pilot turnover on the airfield).

Target: The CARTEE airspace is published correctly and accurately. 100% of the FBO Pilots understand the CARTEE airspace and what it means when it is active. For the non-FBO pilots this will be a continued briefing most likely because of pilot turn over on the airfield.

Merrill 2019 CAP on Red/Green Light Coordination. This CAP is still open.

Risk: Reliance on manual coordination and system inputs for a rapidly changing process is prone to having a high error rate. This is especially true when multiple facilities are involved with needing the same coordination/information exchanged. Although ANC/A11 has an automated system to accomplish the red/green light coordination, MRI does not. MRI/ANC/A11 all need to have the same coordination/information exchanged in a timely and accurate manner.

Background: Over the years, an automated coordination system has been requested for the facilities within the Anchorage bowl. It has been determined that the technology in the past was cost prohibitive and therefore a system was never developed. This lack of technology has led to numerous safety issues over the years. The most recent issue is the one that occurred on February 7, 2019. Due to the complexity of Anchorage bowl airspace and density of traffic, coordination between the multiple facilities needs to happen expeditiously and with great accuracy to ensure applicable facilities are aware of the status of the EDF final approach course and the FAR 93 airspace. Reliance on manual inputs to maintain airspace status is susceptible to confusion and having inaccurate information between one or more of the facilities involved.

Open Mitigation: MRI needs to obtain an automated system that is compatible with the ANC/A11 system so that coordination can be accomplished and tracked via automated means.

Open Monitoring Plan: Utilize QC processes (CV, MORs, OSAs) to validate to accuracy of the automated coordination system.

Target: Less than 3 incidents of inaccurate coordination displayed on the automated system within 6 months of the equipment being used for coordination purposes.

Merrill 2019 CAP on Red/Green Light Coordination. This CAP is still open.

Risk: Inadequate coordination procedures between multiple facilities may potentially increase the chance of a near midair collision.

Background: The LOA between A11, ANC, LHD, and MRI needs to clarify the Red/Green light procedures. Currently, the procedures have a process to activate/deactivate the "light" but it does not have cutoff points or processes in the event the request cannot be immediately approved.

Open Mitigations: Train controllers to not approve/release the corridor until potential conflicts are resolved. Form a CWG to review and recommend changes to the ANC/A11/MRI Coordination and Control LOA.

Open Monitoring Plan: Review ANC/A11/MRI MORs and OSAs to see if the coordination issues are resolved.

Target: Less than three incidents are reported that pertained to inadequate coordination with aircraft on the EDF Runway 6 final and aircraft transiting the FAR 93 airspace.

Appendix I: EDF ILS RWY 16 Proposed Missed Approaches

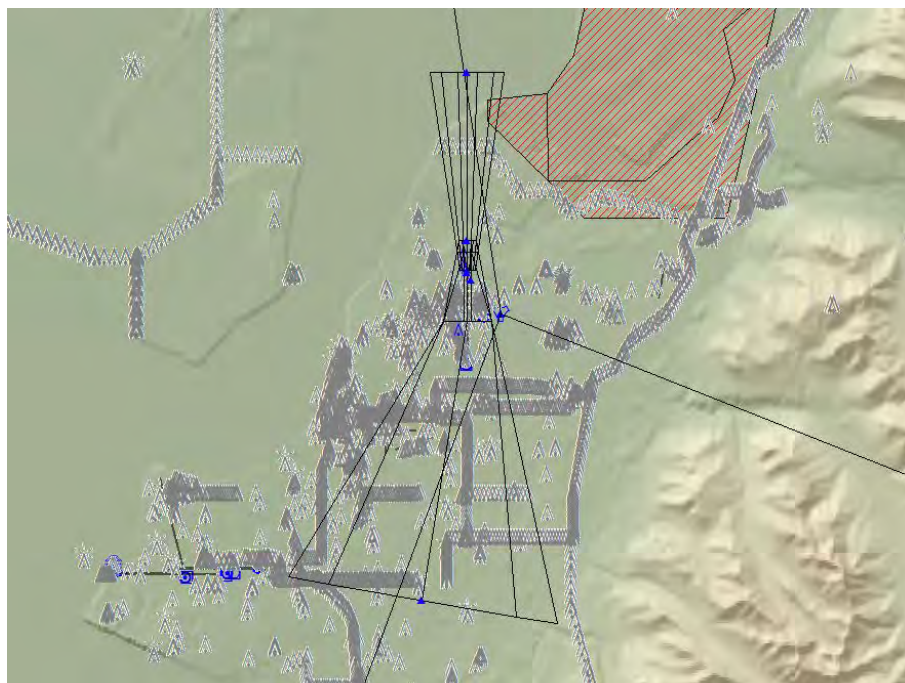
A primary concern with installing an ILS RWY 16 approach into EDF is that air traffic controllers at A11 must protect for the possibility of a missed approach south of EDF. Considering EDF, MRI and ANC are situated so closely to each other, operations at each airport are dependent on operations at the other two, resulting in a complex air traffic flow in the Anchorage area. Special Use Airspace (SUA) northeast of EDF compounds this complexity. In an effort to mitigate these inherent complexities, the study team believes that a missed approach procedure from the EDF ILS Rwy 16 will require a higher than standard climb gradient. This will position EDF arrivals on the ILS Rwy 16 missed approach to better align with MRI and ANC traffic flows.

Detailed review of aircraft types that frequently fly into and out of EDF shows that some aircraft would not be able to maintain the higher climb gradient recommended by the study team. To address this, it is suggested that another approach procedure be developed with a standard climb gradient to accommodate these aircraft.

The approach phase of these two procedures will be the same. The difference will be that one approach will have a higher climb gradient than the other to allow aircraft that can climb and turn at a faster rate to use their performance to help mitigate the air traffic flow complexities that will be introduced with the installation of the EDF ILS Rwy 16.

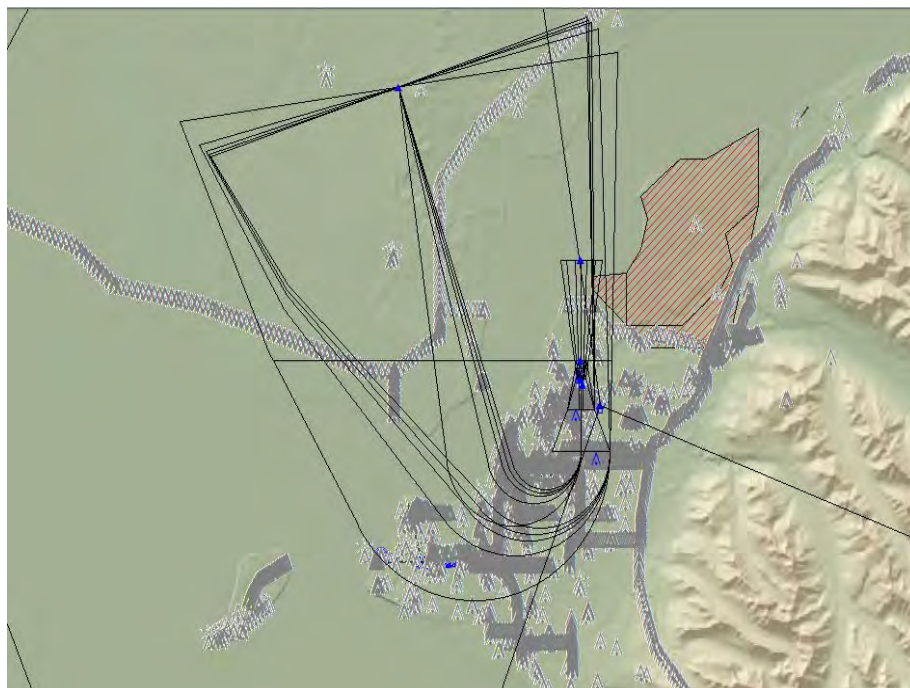
Below are three missed approaches developed by the USAF. We did not include all of the information packets in this document; however, they are available upon request.

Straight out Missed approach

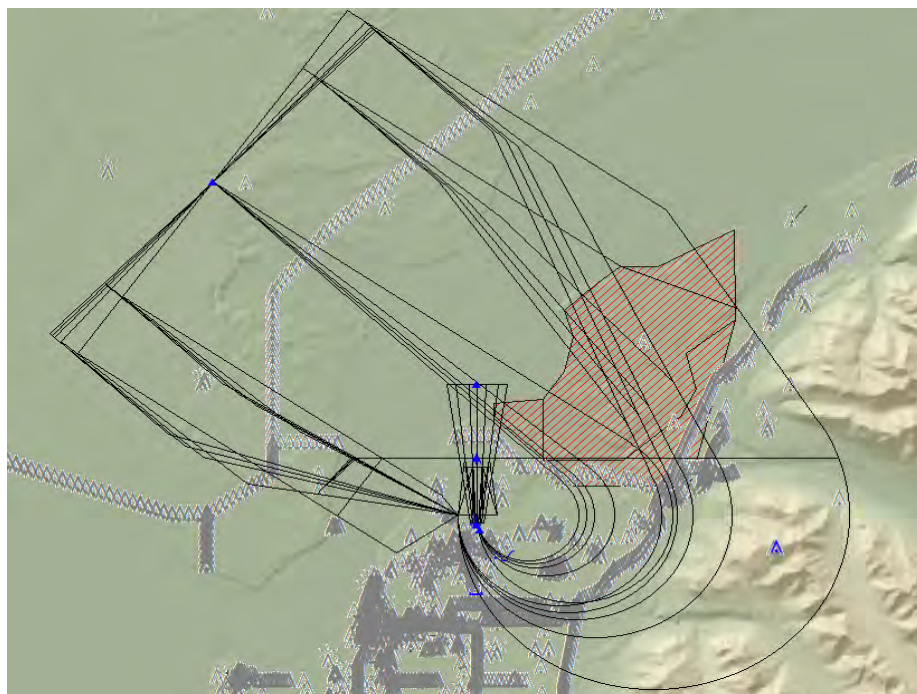


Anchorage Terminal Area Airspace and Procedures Feasibility Study

Right turn out Missed Approach



Left turn out Missed Approach



Appendix J: Reference Materials

1. Ted Stevens Anchorage International Airport Master Plan Update, December 2014.
www.ancmasterplan.com
2. Anchorage Part 150 Study: <http://www.anc150study.com/>
3. Alaska International Airport System (AIAS) Planning Study
<http://dot.alaska.gov/aias/index.shtml>
4. Residential Sound Insulation Program (RSIP)
<http://www.dot.alaska.gov/anc/business/noise/insulation/index.shtml>
5. Lake Hood Seaplane Base Masterplan Update, September 2017.
<http://www.dot.state.ak.us/anc/business/generalAviation/Lake-Hood-Master-Plan-Final-Report.pdf>
6. Title 14 Part 93, Subpart D: <https://ecfr.io/Title-14/pt14.2.93#sp14.2.93.d>
7. Proposal to Improve F-22 Operational Efficiency at Joint Base Elmendorf-Richardson, Alaska, February 2018. <http://www.jberf22eis.com/>
8. Merrill Field Master Plan Update and Noise Study, December 2016.
https://www.muni.org/Departments/merrill_field/Pages/MasterPlan.aspx
9. Kenai Municipal Airport Master Plan Update, July 2017 <http://www.ci.kenai.ak.us/node/421>
10. Soldotna Airport Master Plan Draft Update, December 2017
<https://soldotna.org/departments/airport/airport-master-plan-update>
11. Aviation Safety Reporting System
https://titan-server.arc.nasa.gov/ASRSPublicQueryWizard/QueryWizard_Filter.aspx
12. Performance Based Navigation (PBN) NAS Navigation Strategy 2016
https://www.faa.gov/nextgen/media/PBN_NAS_NAV.pdf
13. 2014 Recommendation Blueprint For Success To Implementing PBN
https://www.rtca.org/sites/default/files/2014_recommendation_blueprint_for_success_to_implementing_pbn.pdf
14. FAA Community Involvement Plan
15. https://www.faa.gov/nextgen/nextgen_near_you/community_involvement/