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Proposed Simultaneous Offset Instrument Approach (SOIA) Designs for Ted Stevens Anchorage International Airport, Anchorage Alaska (PANC)

Flight Systems Laboratory
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July 2008

Flight Systems Laboratory
6500 S. MacArthur Blvd.
Systems Training Building Annex, RM 217
Oklahoma City, Oklahoma 73169
Phone: (405) 954-8191

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Flight Systems Laboratory
Flight Technologies and Procedures Division
Flight Standards Service

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Reviewed by:

July 31, 2008

Stephen W. Barnes **Date**
Manager, Flight Systems Laboratory, AFS-450

Released by:

31 July 08

John W. McGraw **Date**
Manager, Flight Technologies and Procedures Division, AFS-400

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Technical Report

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12. Abstract The Ted Stevens Anchorage International Airport, (PANC) Airport Authority, Anchorage, Alaska is developing a plan to improve airport capacity by 1) evaluating options that could increase the capacity of the present runway configuration and 2) the construction of new runways that, when used with new procedures, could increase airport capacity. The Flight Systems Laboratory, AFS-450, Oklahoma City, was tasked to conduct a study of Simultaneous Offset Instrument Approaches (SOIA) designed for: 1) Present runways 7L and 7R, 2) Runways 7L and 7R after 7R is shifted 500 ft to the south, and, 3) Present runway 14 and a new parallel runway located about 906 feet west of present runway 14. It was assumed that for the runway 7L and 7R pair the straight-in ILS approach would be to runway 7R and the LDA approach with glideslope would be to runway 7L. It was assumed that for the runway 14L and 14R the straight-in ILS approach would be to runway 14L and the LDA approach with glideslope would be to runway 14R. The study concluded that SOIA can be conducted to the runway pairs considered. However, a waiver for the design of the approach at the present spacing (700 ft) between Runways 7R and 7L would be required since the minimum spacing allowed in Order 8260.49a is 750 ft. The landing threshold stagger on 7L and 7R mitigates the wake encounter risk, although operationally it may be necessary to mitigate wake in the event of a missed approach by the leading ILS aircraft by requiring the trailing aircraft to also execute a missed approach. There may be airspace, communication, or other issues that would impact the implementation of SOIA, which need careful consideration at the local level. SOIA can also be conducted to runways 14R and 14L. However, because of the runway spacing and approximately equal landing thresholds, wake must be mitigated by 1) using the Wake Protection Zone (WPZ) concept, 2) sorting the aircraft so that the aircraft in the larger wake class conducts the LDA approach and therefore is the trailer (pairing of two heavy/B757 aircraft would not be permitted), or 3) insuring that the ILS aircraft is operating downwind of the LDA aircraft. In the cases where the heavier weight class leads, it may be necessary to mitigate wake in the event of a missed approach by the leading ILS aircraft by requiring the trailing aircraft also to execute a missed approach.		
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Executive Summary

The Ted Stevens Anchorage International Airport, (PANC) Airport Authority, Anchorage, Alaska is developing a plan to improve airport capacity by: 1) evaluating options that could increase the capacity of the present runway configuration and 2) the construction of new runways that, when used with new procedures, could increase airport capacity.

The Flight Systems Laboratory, AFS-450, Oklahoma City, was tasked to conduct a study of Simultaneous Offset Instrument Approaches (SOIA) designed for:

1) Present runways 7L and 7R,
2) Runways 7L and 7R after 7R is shifted 500 ft to the south, and
3) Present runway 14 and a new parallel runway located about 906 feet west of present runway 14.

It was assumed that for the runway 7L and 7R pair the straight-in ILS approach would be to runway 7R and the LDA approach with glideslope would be to runway 7L. It was assumed that for the runway 14L and 14R the straight-in ILS approach would be to runway 14L and the LDA approach with glideslope would be to runway 14R.

The Flight Systems Laboratory applied the SOIA criteria (design and wake considerations) to the three runway pairing options to determine which options provide a viable SOIA that might provide increased runway landing capacity for PANC. The main concern in conducting parallel approaches to closely spaced runways is the effect of wake turbulence. Today, runways less than 2500 ft apart must be treated as a single runway for wake turbulence separation. Standard wake turbulence separation provided in 7110.65, paragraph 5-5-4, Minima must be applied between succeeding landing aircraft approaching the parallel runways.

The study concluded that SOIA can be conducted to each of the proposed runway pairs. However, a waiver for the design of the approach at the present spacing (700 ft) between Runways 7R and 7L would be required since the minimum spacing allowed in Order 8260.49a is 750 ft. The landing threshold stagger on 7L and 7R mitigates the wake encounter risk, although operationally it may be necessary to mitigate wake in the event of a missed approach by the leading ILS aircraft by requiring the trailing aircraft to also execute a missed approach. There may be airspace, communication, or other issues that would affect the implementation of SOIA, which need careful consideration at the local level.

SOIA can also be conducted to runways 14R and 14L. However, because of the runway spacing and approximately equal landing thresholds, wake must be mitigated by 1) using the Wake Protection Zone (WPZ) concept, 2) sorting the aircraft so that the aircraft in the larger wake class conducts the LDA approach and therefore is the trailer (pairing of two heavy/B757 aircraft would not be permitted), or 3) insuring that the ILS aircraft is operating downwind of the LDA aircraft. In the cases where the heavier weight class leads, it may be necessary to mitigate wake

in the event of a missed approach by the leading ILS aircraft by requiring the trailing aircraft also to execute a missed approach.

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1.0. Introduction

The PANC Airport has seen a steady increase in air traffic over the past several years. This growth is forecast to continue. The PANC Airport Authority is developing a plan to improve airport capacity by 1) evaluating options that could increase the capacity of the present runway configuration and 2) the construction of new runways that, when used with new procedures, could increase airport capacity.

The Flight Systems Laboratory, AFS-450, Oklahoma City, was tasked to conduct a study of Simultaneous Offset Instrument Approaches (SOIA) designed for:

1) Present runways 7L and 7R,
2) Runways 7L and 7R after 7R is shifted 500 ft to the south, and
3) Present runway 14 and a new parallel runway located about 906 feet west of present runway 14.

To accomplish this task, AFS-450 applied the Simultaneous Offset Instrument Approach (SOIA) criteria (design and wake considerations) to the three runway pairing options to determine which options provide a viable SOIA that might provide increased runway landing capacity for PANC. The main concern in conducting parallel approaches to closely spaced runways is the effect of wake turbulence. Today, runways less than 2500 ft apart must be treated as a single runway for wake turbulence separation. Standard wake turbulence separation provided in 7110.65, paragraph 5-5-4, Minima must be applied between succeeding landing aircraft approaching the parallel runways.

The effects of wake turbulence can be mitigated for the aircraft landing on the runway with the far threshold, if the landing runway thresholds are sufficiently staggered. If wake can be mitigated, then aircraft landing on closely spaced parallel runways are not subject to the single runway wake separation restrictions.

2.0. Simultaneous Offset Instrument Approach (SOIA)

The concept of SOIA offers one method to increase capacity in certain weather conditions by enabling aircraft to land on closely spaced parallel runways. In SOIA, a straight-in ILS approach is used for one runway, and a Localizer-Type Directional Aid (LDA) approach with glideslope, offset between 2.5 and 3.0 degrees with the ILS course, is installed on the adjacent runway. When runway spacing is less than 3000 ft, to achieve the lowest cloud ceiling and visibility minimums, SOIA criteria are used that require a one-second update rate Precision Runway Monitor (PRM) radar system or equivalent to monitor the No Transgression Zone (NTZ) between the two approach courses. The missed approach point (MAP) for the LDA approach is located at the point where the ILS and LDA courses converge to a distance of 3000 ft., the minimum course separation permitted for PRM monitored simultaneous approaches. The authority to conduct SOIA

is contained in FAA Orders 7110.65, paragraph 5-9-9, and 8260.49a. Outside of the LDA MAP, conventional closely spaced approach criteria are used. The aircraft are paired so that the ILS aircraft is in the leading position when the LDA aircraft approaches the LDA MAP. Before passing the LDA MAP, the crew of the LDA aircraft must report the ILS aircraft in sight. Having visually acquired the ILS aircraft, the LDA aircraft can proceed past the LDA MAP and execute an alignment maneuver with the runway served by the LDA. Collision avoidance becomes the responsibility of the pilot of the trailing aircraft after visual acquisition.

If wake cannot be mitigated by runway threshold stagger or other techniques, pilots also must provide wake turbulence avoidance between the LDA MAP and the runway threshold. In this case, the ceiling must be raised at least 500 ft above the Minimum Vectoring Altitude (MVA)[*] so that pilots conducting the LDA approach can identify the leading ILS aircraft and develop a wake avoidance strategy. Wake turbulence separation between the heaviest class aircraft in the leading pair and aircraft in the trailing pair is always provided by ATC.

3.0. SOIA Design for Runways 7L and 7R

AFS-450 has conducted both a preliminary design study and a wake evaluation study for runways 7L and 7R in their present location and assuming 7R is relocated to the south by 500 feet. It was assumed that the straight-in ILS approach would be to runway 7R and the LDA approach with glideslope would be to runway 7L. Results of the design study indicate that SOIA could be conducted in weather conditions as low as 1600 ft ceiling and 4 miles visibility. The wake turbulence study indicates that the 4600 ft landing runway threshold stagger mitigates the wake encounter potential, and hence SOIA could be conducted to those two runways without regard to the wake class of either the leading or the trailing aircraft within the SOIA pair. The study did conclude that, in the unlikely event that the leading ILS aircraft executed a missed approach, the trailing aircraft would also be obligated to execute a missed approach to mitigate wake turbulence during the initial portion of the ILS missed approach procedure. The trailing LDA aircraft would only be required to execute a missed approach if the leading ILS aircraft was a heavy jet or if the leading ILS aircraft was a large and the trailing aircraft was a small. If the runways remain in their current location with 700 ft separation, a waiver would be necessary since Order 8260.49a requires runways spaced at least 750 ft apart for SOIA.

4.0. SOIA Design for Runway 14(L) and Proposed Runway 14R

AFS-450 also conducted a design and wake turbulence evaluation for the present runway 14, referred to in this report as runway 14L, and a new runway referred to as 14R. It was

[*] The criteria for having a cloud ceiling of at least MVA plus 500 ft for pilot provided wake turbulence mitigation is in the process of being changed to read, “500 ft above the minimum ceiling (clear-of-clouds point) authorized to conduct SOIA operations.”

assumed that the straight-in ILS approach would be to runway 14L and the LDA approach with glideslope would be to runway 14R. Landing thresholds for these runways were assumed approximately equal. In this case, wake turbulence becomes an issue since the mitigation effect of stagger would not be present. Wake can be mitigated by:

- Sorting of arrival aircraft by ATC so that the heavier wake class trails. The pairing of aircraft in the same wake class is permitted except for two heavies.

- Emerging technology in which the PRM depicts a Wake Protection Zone (WPZ) behind the ILS aircraft. ATC can use the PRM to provide guidance to ensure that the LDA aircraft, when between the LDA MAP and the runway threshold, remains within the WPZ. In this case, aircraft of any wake category can be paired.

- Having the lead ILS aircraft downwind of the trailing LDA aircraft.

- The pilots. As earlier noted, when the pilot is given wake avoidance responsibility, the ceiling must be increased to 500 ft above the Minimum Vectoring Altitude (MVA)[*].

5.0. PANC Airspace for SOIA Operations

The AFS-450 study did not investigate the ramifications of conducting SOIA within the possible constraints of the PANC terminal airspace. SOIA requires sufficient airspace to turn aircraft on to their respective final approach courses with at least 1000 ft vertical separation. In addition, airspace must be available in the event one aircraft blunders off the final approach course, enters the NTZ, and causes a breakout of the threatened aircraft on the adjacent approach course. This breakout airspace must also be evaluated for obstacle clearance in accordance with TERPS. The published missed approach procedures must diverge by 45 degrees.

6.0 Capacity Increase

The determination of potential capacity increase is not a primary function of AFS-450. The landing capacity increases that may occur using the SOIA procedures require a thorough aeronautical study to capture the traffic mix, departure and arrival interactions, and other issues related to PANC airspace and operations. However, based on our experience with SOIA at other airports, we can provide some anecdotal information regarding capacity. At CLE, the landing rate for a single runway was about 36 aircraft per hour, while using SOIA, the rates were as high as 52 per hour. At SFO, where there

[*] The criteria for having a cloud ceiling of at least MVA plus 500 ft for pilot provided wake turbulence mitigation is in the process of being changed to read, “500 ft above the minimum ceiling (clear-of-clouds point) authorized to conduct SOIA operations.”

are a large number of heavy jets and the airspace and runway use is complex, the single runway landing rate is 28 per hour and the SOIA rate is between 39 and 44 per hour.

7.0. Included Appendices

Appendix A, SOIA Design and Wake Data
Wake Evaluation for Runways 7R and 7L, present spacing
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8.0. Conclusion

SOIA can be conducted to the runway pairs studied. However, a waiver for the design of the approach at the present spacing (700 ft) between Runways 7R and 7L would be required since the minimum spacing allowed in Order 8260.49a is 750 ft. The landing threshold stagger on 7L and 7R mitigates the wake encounter risk, although operationally it may be necessary to mitigate wake in the event of a missed approach by the leading ILS aircraft by requiring the trailing aircraft to also execute a missed approach. There may be airspace, communication, or other issues that would affect the implementation of SOIA, which need careful consideration at the local level.

SOIA can also be conducted to runways 14R and 14L. However, because of the runway spacing and approximately equal landing thresholds, wake must be mitigated by 1) using the WPZ concept, 2) sorting the aircraft so that the aircraft in the larger wake class conducts the LDA approach and therefore is the trailer (pairing of two heavy/B757 aircraft would not be permitted), or 3) insuring that the ILS aircraft is operating downwind of the LDA aircraft. In the cases where the heavier weight class leads, it may be necessary to mitigate wake in the event of a missed approach by the leading ILS aircraft by also requiring the trailing aircraft to execute a missed approach.

APPENDIX A: SOIA Design and Wake Data Analysis

A1.0. ASAT WAKE VORTEX RISK ANALYSIS MODULE

The primary analysis tool for this safety evaluation was ASAT. ASAT is a multifaceted, highly adaptable, computer-based tool for aviation related simulations and safety evaluations. ASAT consists of high fidelity models and in some cases, empirical data representing the following major components of a typical real-world aviation scenario.

a. At the heart of the system are flight dynamics models enhanced and tailored by empirical data collected in flight simulators and flight tests. Aircraft avionics are modeled based on requirements of the particular scenario. ASAT can model a broad range of advanced navigation systems such as Flight Management System (FMS), Global Positioning System (GPS), and Required Navigation Performance (RNP), as well as other navigation systems such as ILS, Microwave Landing System (MLS), and Distance Measuring Equipment (DME).

b. ASAT has access to a wide range of environmental models including temperature, atmospheric pressure, and both lateral and vertical wind profiles. The aerodynamic flight models described above respond to the ASAT generated atmosphere around them in the same manner as actual aircraft.

c. The environment in which ASAT scenarios are run is further defined by official FAA databases providing precise geographic locations of airports, runways, NAVAIDs, routes, fixes, waypoints, and other facilities, such as radar site locations. In addition, ASAT incorporates the FAA's obstacle and terrain database for use in obstacle clearance studies.

For purposes of this evaluation, ASAT was modified to include a wake vortex model based on the NASA AVOSS model described in the next section. The wake vortex model simulated the wake generation, transport, and decay characteristics of the wake turbulence aircraft classes, i.e., B757 and Heavy. Using information from the wake vortex model coupled with its Monte Carlo capability, ASAT was able to simulate various combinations of environmental conditions (primarily crosswind), aircraft positions on the runway, position of the succeeding aircraft relative to the Heavy aircraft/B757, wake turbulence generated by the Heavy aircraft/B757, and the movement of the wake turbulence as the result of crosswind. Ultimately, the outcome of the ASAT simulation was to determine whether the succeeding aircraft encountered a wake vortex generated by the Heavy aircraft/B757.

A1.1. AIRCRAFT VORTEX SPACING SYSTEM (AVOSS) PREDICTION ALGORITHM

For this study, the National Aeronautics and Space Administration's (NASA) AVOSS Prediction Algorithm (APA) version 3.2 was integrated into ASAT.

The APA accepts as input, meteorological data and aircraft data. After accepting the above parameters, the APA computes a transport and decay time for a wake. The decay time expresses the decrease in wake strength versus time. The analysis in this report used the APA's transport and decay times coupled with the ASAT's Monte Carlo simulation

capability to determine if aircraft on numerous and varied simulated departures from PANC encounter wake turbulence.

The APA is able to handle both wakes out of ground effect and wakes in ground effect. Wakes out of ground effect descend from the point at which they are generated and are transported horizontally by any crosswinds. Wakes in ground effect, i.e., close to the ground, can no longer descend and can even bounce back into the air upon contact with the ground.

A major contributor to the speed at which a wake decays is the level of atmospheric turbulence present in the immediate vicinity of the wake. Crosswinds are necessary to transport wakes to an adjacent runway in an operationally significant time. In general, significant winds do not occur at the same time as very low levels of atmospheric turbulence. Since atmospheric turbulence levels are not monitored at airports, these studies were conducted with a very low turbulence level, as represented by Eddy Dissipation Rate (EDR), of 1×10^{-5} m^2/sec^3. This turbulence level is lower than might be typically expected for crosswinds as high as the 15 knots used in the study and was chosen to provide a conservative result in the absence of known or measured turbulence levels.

A1.2. INITIAL ASAT SIMULATION CONDITIONS

A crosswind randomly varying up to 15 knots was set perpendicular to the runways, blowing from the straight-in ILS runway to the LDA runway. This represents the worst case scenario for a wake encounter. The initial position of the straight-in ILS aircraft was set abeam of the MAP of the LDA approach, since this point represents a closing of the lateral distance between the approaches. The initial position of the LDA procedure aircraft was uniformly varied between 0 and 4 NM behind the straight-in ILS aircraft. The simulation concluded when either a wake encounter was detected or the LDA procedure aircraft landed.

The analysis also included scenarios where the straight-in ILS approach began a missed approach at positions between 200 and 50 feet AGL. Two responses to the missed ILS approach by the LDA aircraft were tested. Data was collected for a landing by the LDA aircraft following the missed ILS approach, and a missed approach by the LDA aircraft in response to the missed ILS approach A 10 second delay was used to simulate a controller and pilot response prior to the LDA aircraft beginning a missed approach. The LDA aircraft's missed approach response included a climb varied between 500 and 2500 fpm while attaining runway heading. The straight-in ILS aircraft's missed approach followed the published approach plate for the given runway. In scenarios involving proposed runways, the chart of a similar runway was used. For instance, the missed approach procedure for the proposed shifted position of runway 7R used the current published procedure for the existing 7R. The climb rate of the straight-in ILS missed approach was uniformly varied between 500 and 2500 fpm.

The study was performed using a B747-800 on the lead ILS approach and a mix of Small, Large, and Heavies on the LDA approach. Gross weight and final approach indicated air speeds (IAS) were assigned to each aircraft across a range of operational values.

A1.3. WAKE VORTEX SIMULATION DESCRIPTION

To establish the occurrence of a wake vortex encounter, the location of the succeeding aircraft must be determined relative to the location of the B747-800 wake vortices. This complex task was accomplished by simulating the location of each of the two aircraft vortices at discrete locations along the departure path of the B747-800. These discrete locations are called "tiles" and can be described as large planar surfaces located at regularly spaced distances from the threshold as illustrated in Figure A1. Once the B747-800 penetrated a "tile," a simulation of its two wing-tip vortices began. Figure A1 illustrates the simulation of the vortices on two consecutive tiles. The first tile (tile *i*) was penetrated at a given time, T. At that moment, an analysis of the two simulated vortices began on tile *i*. Some time later, T + ΔT, the aircraft penetrated the next tile (tile *i* + 1). Meanwhile, the simulation that was started on tile *i* at time T was continuing as it evaluated the movement of the vortices due to crosswind and the inherent nature of wakes to descend, expand, and decay.

Figure A1: **Wake Vortex Evaluation "Tiles"**

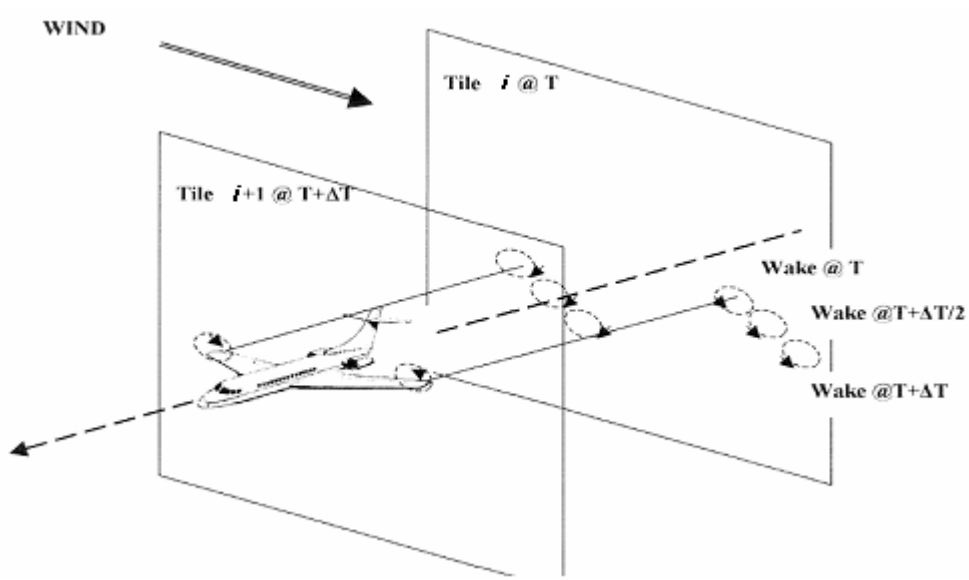


Figure A 2: **Wake Vortex Evaluation "Tiles"**

The crosswind serves to move the vortices from left to right in the illustration, and the wakes descend. The illustration depicts the position of the vortices after ΔT/2 and ΔT

seconds. When the succeeding aircraft penetrated a given tile, the position of the vortices on that particular tile was "frozen" and ASAT then computed the relative position between the succeeding aircraft and the vortices of the B747-800. Additional ASAT analysis took place to determine if the wake strength was sufficiently strong to count as a wake encounter on that particular tile (see section 2.8).

A1.4. WAKE VORTEX ENCOUNTER CRITERIA

For purposes of this study, an aircraft was considered to have encountered a wake vortex if a wake exceeding a strength of 100 m^2/sec penetrated a spherical Area of Interest (AOI) centered on the succeeding aircraft. The radius of the AOI is equal to the sum of the semi-spans of the leading and trailing aircraft. The reasoning behind this selection of AOI size is that the vortex of the leading aircraft induces velocities at distances proportional to the wingspan of the generating aircraft therefore, the greater the wingspan of the generator, the larger the AOI. For example, the AOI for the B757/A320 combination is 118.2 feet.

A1.5. SUMMARY OF DATA ANALYSIS

The analysis reported in this section was based on a maximum crosswind of 15 Knots and an Eddy Dissipation Rate (EDR) of 1.0×10^{-3} m^2/s^3.

A5.1. PANC SOIA ASAT RESULTS

Table A1 shows the results of the ASAT wake vortex evaluation conducted on the existing 7R/L runway pair, as well as the proposed 7R/L, and 14R/L runway configurations.

Table A1: SOIA ASAT Results

Scenario	Encounters	Total Pairs of Aircraft	Encounters ÷ Total Pairs of Aircraft	Average Wake Strength (m^2/s)	Max Wake Strength (m^2/s)	Average Aircraft Altitude (ft MSL)	Average Wake Altitude (ft MSL)
Existing 7R/L	53	50866	0.104%	140.0	209.3	315.1	253.1
Proposed 7R/L	39	50000	0.078%	279.5	478.6	490.6	442.2
Proposed 14R/L	7524	47497	15.84%	335.0	535.1	308.4	298.7

As Table A1 shows, a SOIA operation on the existing and proposed 7R/L runway pairs present less risk to a wake encounter compared to operations on the proposed 14R/L runways. The threshold stagger distance of the 7R/L runway configuration reduces the wake encounter risk. When comparing the existing 7R/L runway pair to the proposed 7R/L runway configuration, the increased runway separation of the proposed 7R/L runways resulted in less encounters. The recorded altitude data show that the LDA procedure aircraft was typically above the wake turbulence for the 7R/L scenarios, while vertical separation only averaged approximately 10 feet in the proposed 14R/L case.

A1.6. PANC SOIA WITH MISSED APPROACH RESULTS

Table A2: SOIA with Straight-In ILS Missed Approach

Scenario	Encounters	Total Pairs of Aircraft	Encounters ÷ Total Pairs of Aircraft	Average Wake Strength (m^2/s)	Max Wake Strength (m^2/s)	Average Aircraft Altitude (ft MSL)	Average Wake Altitude (ft MSL)
Existing 7R/L	9718	49132	19.8%	350.0	579.1	247.8	263.6
Proposed 7R/L	4532	47084	9.6%	289.8	493.8	251.3	269.4
Proposed 14R/L	7994	50346	15.9%	337.2	549.0	305.2	297.8

Table A2 provides the results of the first missed approach case. The straight-in ILS aircraft conducted a missed approach and the LDA procedure aircraft continued its approach until the simulation ended with the LDA aircraft landing. This scenario presents the greatest risk of a wake encounter along with the strongest wake strengths detected out of all the cases studied.

Table A3: SOIA with Straight-In ILS and LDA Missed Approach

Scenario	Encounters	Total Pairs of Aircraft	Encounters ÷ Total Pairs of Aircraft
Existing 7R/L	0	75000	0.0%
Proposed 7R/L	0	75000	0.0%
Proposed 14R/L	0	75000	0.0%

The results shown on Table A3 are from the second missed approach case. In this case, the LDA aircraft reacts to the straight-in ILS aircraft's missed approach by initiating a missed approach. A 10-second delay was used to approximate an ATC and pilot response time before the LDA aircraft began its missed approach procedure. This LDA aircraft response to the straight-in ILS aircraft missed approach resulted in no wake encounters for all scenarios.

A2.0. SOIA Design Tool

The SOIA design tool was developed to apply accurately the design criteria of TERPS Order 8260.49a for the LDA approach to the geometry of the runways planned for the SOIA operation. The tool uses inputs that include the runway centerline separation, glideslope threshold crossing altitude, runway threshold elevation, runway course, the localizer offset (2.5 to 3.0 degrees), maximum acceptable runway centerline overshoot, the course angle of the straight segment between the Missed Approach Point (MAP) and Stabilized Approach Point (SAP)-500 ft AGL on the extended runway center, and the aircraft with the highest approach speed authorized to fly the LDA approach. The tool uses these values to calculate the latitude and longitude of the LDA missed approach point, and the altitude of the glideslope at the MAP, which translates into the Decision Altitude (DA). Once the MAP position is fixed, airport designers can establish the location of the LDA antenna along a line that passes through the MAP at the chosen offset value, taking into account runway and taxiway locations, and other airport obstructions.

Figures A2, A3, and A4 are screen captures from the SOIA design tool showing the input and output for the runway pairs.

Figure A3: SOIA LDA Approach to Runway 7L with Centerline Spacing 700 ft from Runway 7R.

Note: SOIA design tool always depicts a left turn after the MAP. In 7L design, turn is actually right.

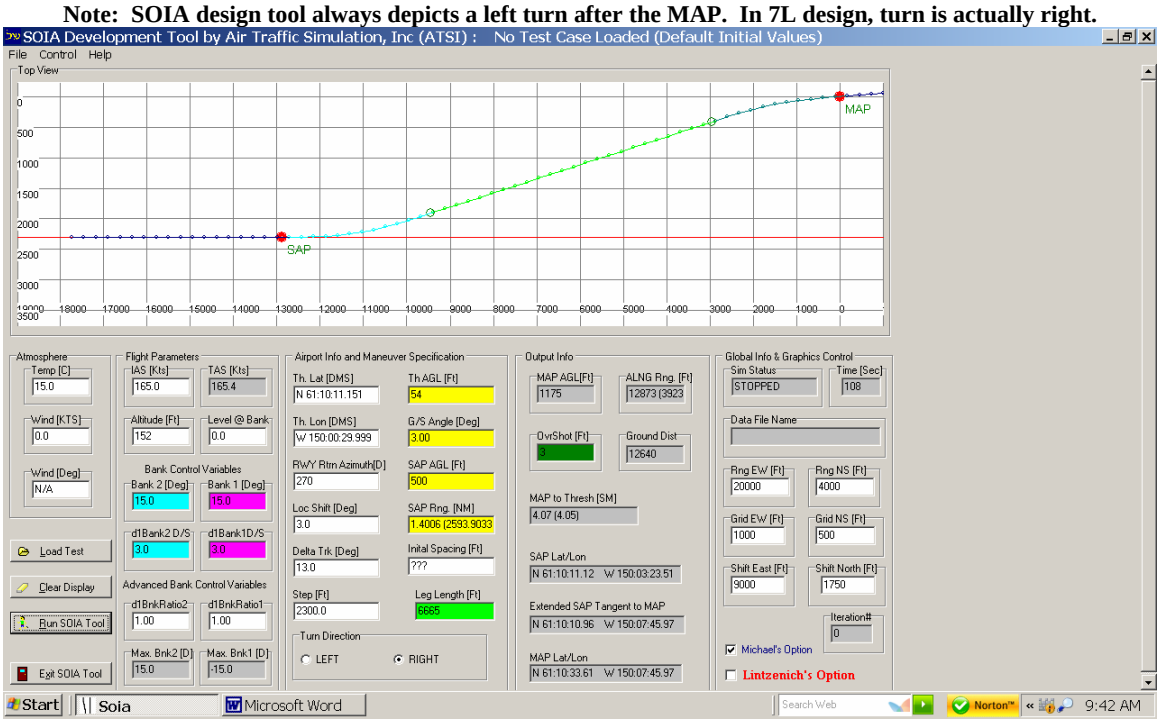


Figure A4: SOIA LDA Approach to Runway 7L with Centerline Spacing 1200 ft from Runway 7R.

Note: SOIA design tool always depicts a left turn after the MAP. In 7L design, turn is actually right.

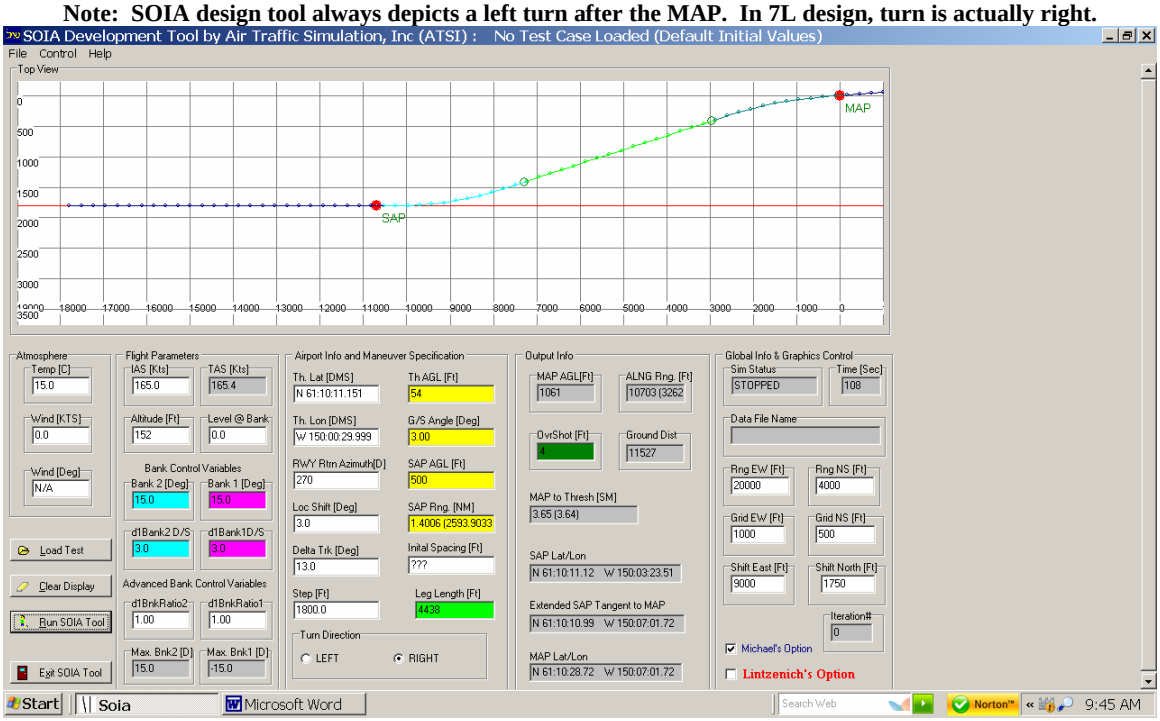
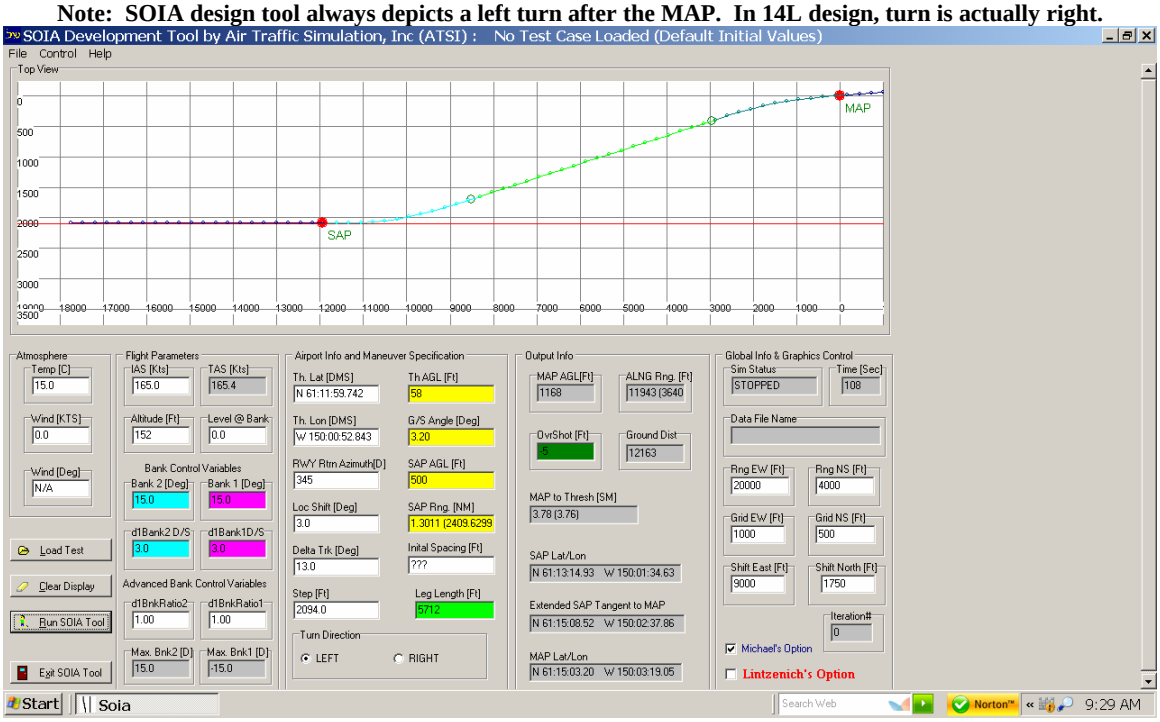


Figure A5: SOIA LDA Approach to Runway 14L with Centerline Spacing 906 ft from Runway 14R.

Note: SOIA design tool always depicts a left turn after the MAP. In 14L design, turn is actually right.



APPENDIX B: Operations Data

B1.0. Included Operational Data

The operational data included in Appendix B are:

- The airport diagram
- A draft approach plate runway 7L
- A draft approach plate runway 7R
- A draft attention all users page (AAUP) runway 7L
- A draft attention all users page (AAUP) runway 7R
- A depiction of NTZ for runways 7R and runway 7L

The data are presented in figures B1, B2, B3, B4, B5, and B6.

Figure B1: **Ted Stevens Anchorage International Airport**

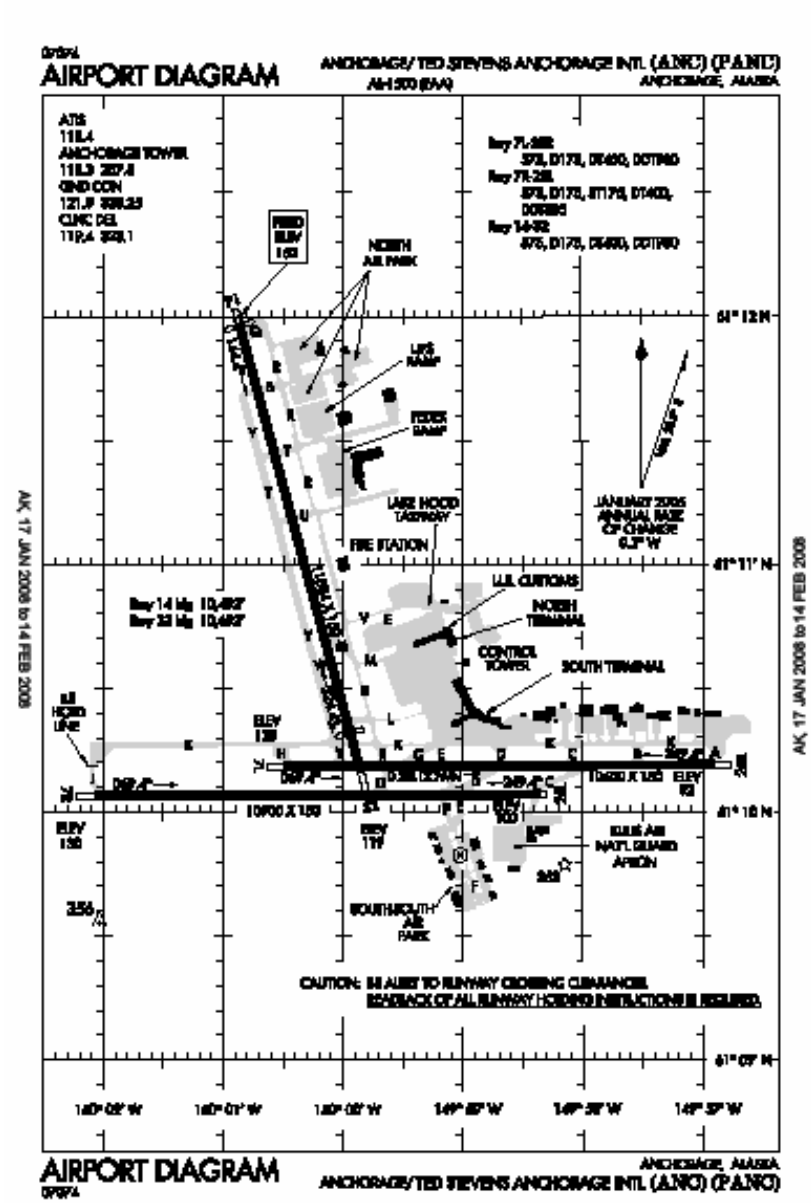


Figure B2: Draft Approach Plate LDA PRM Runway 7L

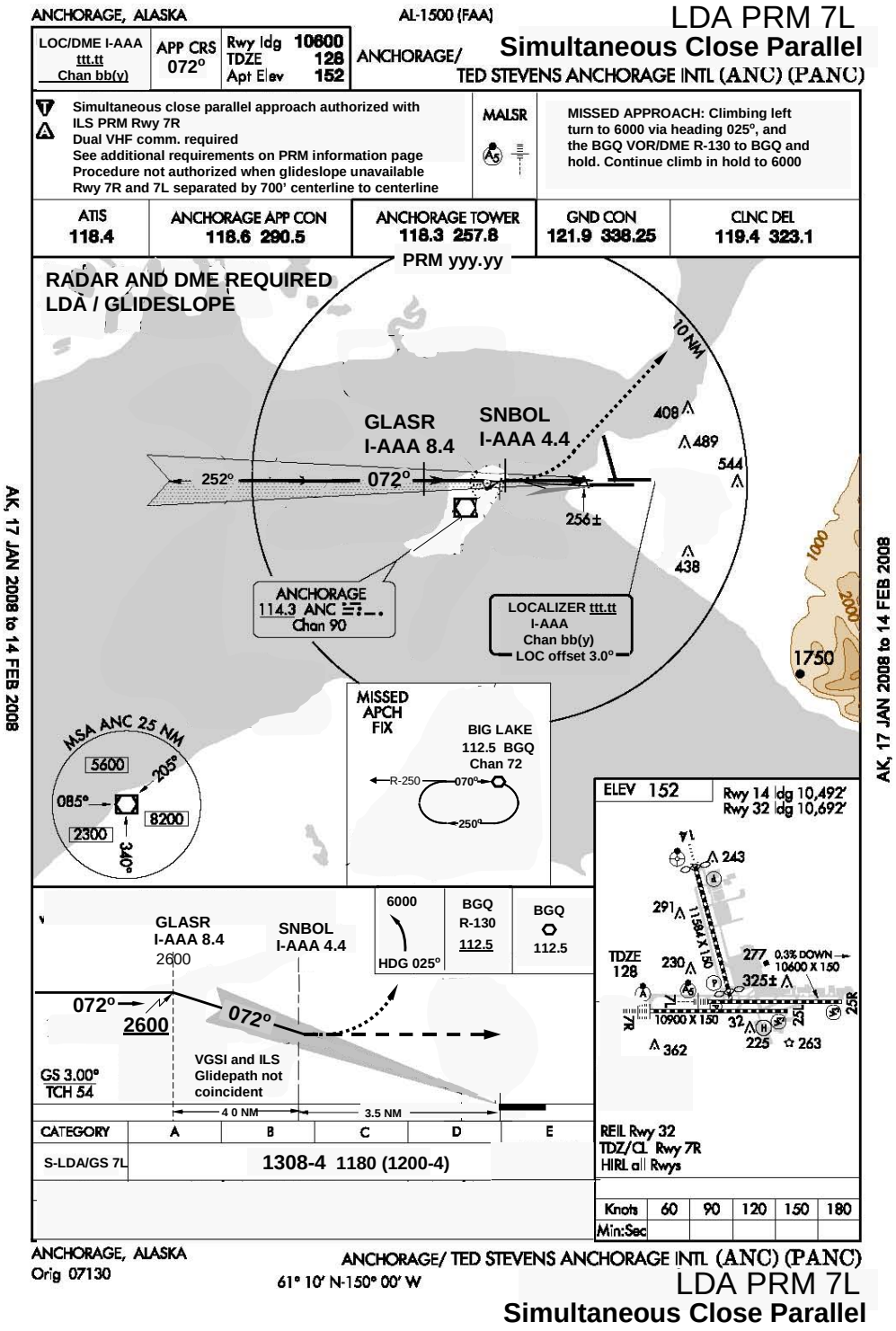


Figure B3: Draft Approach ILS PRM Plate Runway 7R

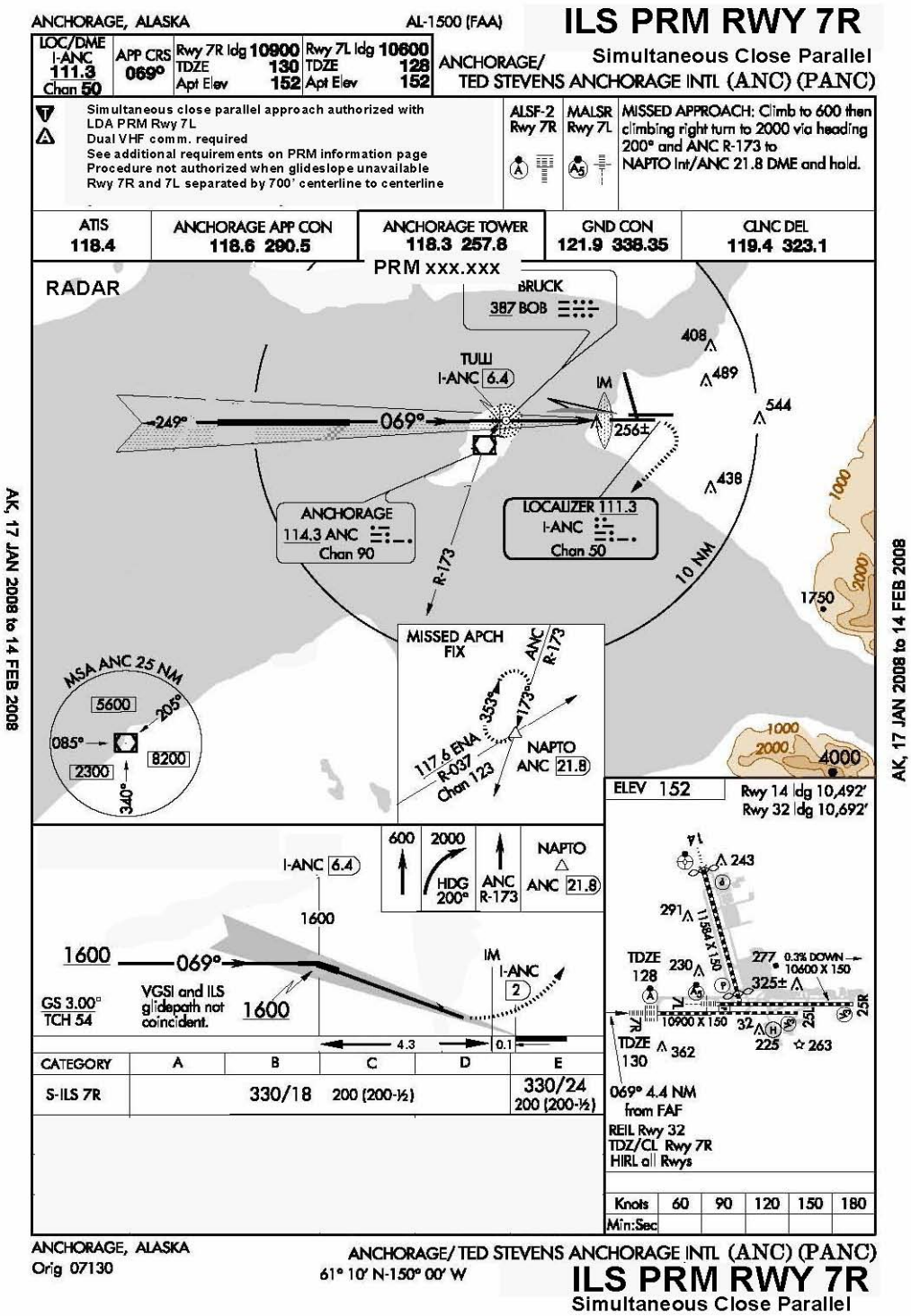


Figure B4: Draft Attention All Users Page (AAUP) Runway 7L

LDA PRM RWY 7L **TED STEVENS ANCHORAGE INTL AIRPORT (PANC)**
(SIMULTANEOUS CLOSE PARALLEL) **Anchorage, Alaska**

ATTENTION ALL USERS PAGE (AAUP)

Condensed Briefing Points:

- **When instructed, immediately switch to tower frequency and select the monitor frequency audio.**
- **Report the ILS traffic in sight as soon as practical and prior to LDA MAP. DO NOT PASS.**
- **Remain on the LDA until passing the LDA MAP so as not to penetrate the NTZ**

1. ATIS. When the ATIS broadcast advises that simultaneous ILS PRM and LDA PRM approaches are in progress, pilots should brief to fly the LDA PRM approach. If later advised to expect an LDA DME approach, the LDA/PRM chart may be used after completing the following briefing items:

a. Minimums and missed approach procedures are unchanged.
b. Monitor frequency no longer required.
c. Lower LDA intercept altitudes may be assigned when advised to expect LDA DME 7R approach.

Simultaneous parallel approaches will only be offered/conducted when the weather is at least 1,600 feet (ceiling) and 4 miles (visibility).

2. Dual VHF Communication required. To avoid blocked transmissions, each runway will have two frequencies, a primary and a monitor frequency. The tower controller will transmit on both frequencies. The Monitor controller's transmissions, if needed, will override both frequencies. Pilots will ONLY transmit on the tower controller's frequency, but will listen to both frequencies. Select the monitor frequency audio only when instructed by ATC to contact the tower. The volume levels should be set about the same on both radios so that the pilots will be able to hear transmissions on at least one frequency if the other is blocked. If executing a missed approach at the LDA MAP, begin the turn as soon as practical.

3. All "Breakouts" are to be hand flown to assure that the maneuver is accomplished in the shortest amount of time. Pilots, when directed by ATC to break off an approach, must assume that an aircraft is blundering toward their course and a breakout must be initiated immediately.

a. ATC Directed" Breakouts:" ATC directed breakouts will consist of a turn and a climb or descent. Pilots must always initiate the breakout in response to an air traffic controller instruction. Controllers will give a descending breakout only when there are no other reasonable options available, but in no case will the descent be below minimum vectoring altitude (MVA) which provides at least 1,000 feet required obstruction clearance. The applicable MVA is xxxx feet at PANC.

b. Phraseology - "TRAFFIC ALERT:" If an aircraft enters the "NO TRANSGRESSION ZONE (NTZ)," the controller will breakout the threatened aircraft on the adjacent approach. The phraseology for the breakout will be:

"TRAFFIC ALERT, (aircraft call sign) TURN (left/right) IMMEDIATELY, HEADING (degrees), CLIMB/DESCEND AND MAINTAIN (altitude)".

4. Glide Slope Navigation: Descending on the glide slope ensures compliance with any charted crossing restrictions.

5. PANC LDA Visual Segment. If advised that there is traffic on the 7R ILS, pilots may continue past the LDA MAP if:

a) the ILS traffic is in sight and is expected to remain in sight,
b) ATC has been advised that "traffic is in sight." (ATC is not required to acknowledge this transmission)
c) the runway environment is in sight.

Otherwise, execute a missed approach at the LDA MAP. Between the LDA MAP and the runway threshold, pilots are responsible for separating themselves visually from the traffic on the ILS approach, which means maneuvering the aircraft as necessary to avoid the ILS traffic until landing (do not pass), and providing wake turbulence avoidance, if applicable. If visual contact with the ILS traffic is lost, advise ATC as soon as practical and execute the published missed approach unless otherwise instructed bv ATC.

Special pilot training required. Pilots who are unable to participate, or dispatchers on their behalf, must contact the FAA Command Center prior to departure (1-800-333-4286 or 703-904-4452) to obtain an arrival reservation. Non-participating pilots enroute to PANC as an alternate, or trained pilots that are unexpectedly unable to participate due to in-flight circumstances will be afforded appropriate arrival services as operational conditions permit and shall notify the Anchorage ARTCC as soon as practical, but at least 100 miles from PANC.

Figure B5: Draft Attention All Users Page (AAUP) Runway 7R

ILS PRM RWY 7R **TED STEVENS ANCHORAGE INTL AIRPORT (PANC)**
(SIMULTANEOUS CLOSE PARALLEL) **Anchorage, Alaska**

ATTENTION ALL USERS PAGE (AAUP)

Condensed Briefing Points:

- **When instructed, immediately switch to tower frequency and select the monitor frequency audio.**

1. ATIS. When the ATIS broadcast advises that simultaneous ILS PRM and LDA PRM approaches are in progress, pilots should brief to fly the ILS PRM approach. If later advised to expect an ILS approach, the ILS PRM chart may be used after completing the following briefing items:

a. Minimums and missed approach procedures are unchanged.
b. Monitor frequency no longer required.
c. A lower ILS intercept altitudes may be assigned when advised to expect ILS 6L approach.

Simultaneous parallel approaches will only be offered/conducted when the weather is at least 1,600 feet (ceiling) and 4 miles (visibility).

2. Dual VHF Communication required. To avoid blocked transmissions, each runway will have two frequencies, a primary and a monitor frequency. The tower controller will transmit on both frequencies. The Monitor controller's transmissions, if needed, will override both frequencies. Pilots will ONLY transmit on the tower controller's frequency, but will listen to both frequencies. Select the monitor frequency audio only when instructed by ATC to contact the tower. The volume levels should be set about the same on both radios so that the pilots will be able to hear transmissions on at least one frequency if the other is blocked.

3. All "Breakouts" are to be hand flown to assure that the maneuver is accomplished in the shortest amount of time. Pilots, when directed by ATC to break off an approach, must assume that an aircraft is blundering toward their course and a breakout must be initiated immediately.

a. ATC Directed" Breakouts:" ATC directed breakouts will consist of a turn and a climb or descent. Pilots must always initiate the breakout in response to an air traffic controller instruction. Controllers will give a descending breakout only when there are no other reasonable options available, but in no case will the descent be below minimum vectoring altitude (MVA) which provides at least 1,000 feet required obstruction clearance. The applicable MVA is xxx feet at ANC.

b. Phraseology - "TRAFFIC ALERT:" If an aircraft enters the "NO TRANSGRESSION ZONE (NTZ)," the controller will breakout the threatened aircraft on the adjacent approach. The phraseology for the breakout will be:

"TRAFFIC ALERT, (aircraft call sign) TURN (left/right) IMMEDIATELY, HEADING (degrees), CLIMB/DESCEND AND MAINTAIN (altitude)".

4. Glide Slope Navigation: Descending on the glide slope ensures compliance with any charted crossing restrictions.

5. LDA Traffic. While conducting the ILS/PRM approach to runway 7R, other aircraft may be conducting the Offset LDA/PRM approach to Runway 7L. These aircraft will approach from the left-rear and will re-align with 7L after making visual contact with the ILS traffic.

Special pilot training required. Pilots who are unable to participate, or dispatchers on their behalf, must contact the FAA Command Center prior to departure (1-800-333-4286 or 703-904-4452) to obtain an arrival reservation. Non-participating pilots enroute to ANC as an alternate, or trained pilots that are unexpectedly unable to participate due to in-flight circumstances will be afforded appropriate arrival services as operational conditions permit and shall notify the Anchorage ARTCC as soon as practical, but at least 100 miles from ANC.

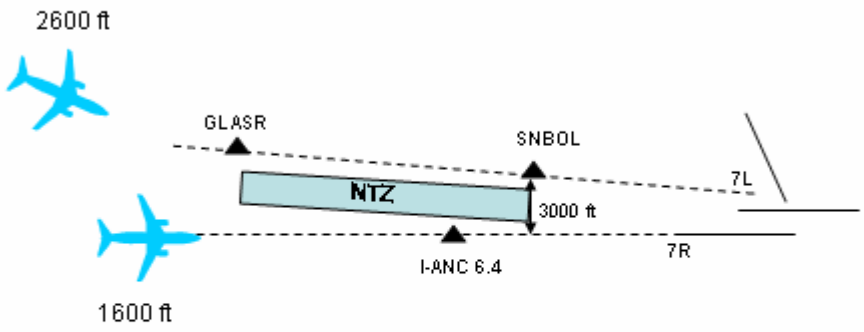



Figure B6: PANC No Transgression Zone (NTZ)