

Appendices for the Noise Exposure Map Update

Pursuant to Title 14 of the Code of Federal Regulations Part 150

Louisville Muhammad Ali International Airport

Prepared for:



Prepared by:



This page intentionally left blank.

Appendix A: Noise Terminology

Table of Contents

A.1 Aircraft Noise Terminology.....	A-3
A.1.1 Introduction to Noise Terminology.....	A-3
A.1.2 Sound Pressure Level, SPL, and the Decibel, dB	A-3
A.1.3 A-Weighted Decibel	A-4
A.1.4 Maximum A-Weighted Sound Level, Lmax	A-6
A.1.5 Sound Exposure Level, SEL.....	A-7
A.1.6 Equivalent A-Weighted Sound Level, Leq	A-8
A.1.7 Day-Night Average Sound Level, DNL or Ldn	A-9

This page intentionally left blank.

A.1 Aircraft Noise Terminology

Noise is a complex physical quantity. The properties, measurement, and presentation of noise involve specialized terminology that can be difficult to understand. To provide a basic reference on these technical issues, this section introduces fundamentals of noise terminology, the effects of noise on human activity, and noise propagation.

A.1.1 Introduction to Noise Terminology

Analyses of potential impacts from changes in aircraft noise levels rely largely on a measure of cumulative noise exposure over an entire calendar year, expressed in terms of a metric called the day-night average sound level (DNL). However, DNL does not provide an adequate description of noise for many purposes. A variety of measures, which are further described in subsequent subsections, are available to address essentially any issue of concern, including:

- Sound Pressure Level (SPL) and the decibel (dB)
- A-Weighted Decibel (dBA)
- Maximum A-Weighted Sound Level (L_{max})
- Time Above (TA)
- Sound Exposure Level (SEL)
- Equivalent A-Weighted Sound Level (L_{eq})
- Day-Night Average Sound Level (DNL)

A.1.2 Sound Pressure Level, SPL, and the Decibel, dB

All sounds come from a sound source—a musical instrument, a voice speaking, an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any sound source travels through the air in sound waves—tiny, quick oscillations of pressure just above and just below atmospheric pressure. The ear senses these pressure variations and, with much processing in our brain, translates them into “sound.”

Our ears are sensitive to a wide range of sound pressures. The loudest sounds that we can hear without pain contain about one million times more energy than the quietest sounds we can detect. To allow us to perceive sound over this very wide range, our ear/brain “auditory system” compresses our response in a complex manner, represented by a term called sound pressure level (SPL), which we express in units called decibels (dB).

Mathematically, SPL is a logarithmic quantity based on the ratio of two sound pressures, the numerator being the pressure of the sound source of interest (P_{source}), and the denominator being a reference pressure ($P_{reference}$).¹

$$\text{Sound Pressure Level (SPL)} = 20 * \text{Log} \left(\frac{P_{source}}{P_{reference}} \right) \text{dB}$$

¹ The reference pressure is approximately the quietest sound that a healthy young adult can hear.

The logarithmic conversion of sound pressure to SPL means that the quietest sound that we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds that we hear without pain have sound pressure levels of about 120 dB. Most sounds in our day-to-day environment have sound pressure levels from about 40 to 100 dB².

Because decibels are logarithmic quantities, we cannot use common arithmetic to combine them. For example, if two sound sources each produce 100 dB operating individually, when they operate simultaneously, they produce 103 dB, not the 200 dB we might expect. Increasing to four equal sources operating simultaneously will add another 3 dB of noise, resulting in a total SPL of 106 dB. For every doubling of the number of equal sources, the SPL goes up another 3 dB.

If one noise source is much louder than another is, the louder source "masks" the quieter one and the two sources together produce virtually the same SPL as the louder source alone. For example, a 100 dB and 80 dB sources produce approximately 100 dB of noise when operating together.

Two useful "rules of thumb" related to SPL are worth noting: (1) humans generally perceive a six to 10 dB increase in SPL to be about a doubling of loudness,³ and (2) changes in SPL of less than about 3 dB for any particular sound are not readily detectable outside of a laboratory environment.

A.1.3 A-Weighted Decibel

An important characteristic of sound is its frequency, or "pitch." This is the per-second oscillation rate of the sound pressure variation at our ear, expressed in units known as Hertz (Hz).

When analyzing the total noise of any source, acousticians often break the noise into frequency components (or bands) to consider the "low," "medium," and "high" frequency components. This breakdown is important for two reasons:

- Our ear is better equipped to hear mid and high frequencies and is least sensitive to lower frequencies. Thus, we find mid- and high-frequency noise more annoying.
- Engineering solutions to noise problems differ with frequency content. Low-frequency noise is generally harder to control.

The normal frequency range of hearing for most people extends from a low of about 20 Hz to a high of about 10,000 to 15,000 Hz. Most people respond to sound most readily when the predominant frequency is in the range of normal conversation, typically around 1,000 to 2,000 Hz. The acoustical community has defined several "filters," which approximate this sensitivity of our ear and thus, help us to judge the relative loudness of various sounds made up of many different frequencies.

The so-called "A" filter ("A weighting") generally does the best job of matching human response to most environmental noise sources, including natural sounds and sound from common transportation sources. A-weighted decibels are abbreviated dBA. Because of the correlation with our hearing, the U. S. Environmental Protection Agency (EPA) and nearly every other federal and state agency have adopted

² The logarithmic ratio used in its calculation means that SPL changes relatively quickly at low sound pressures and more slowly at high pressures. This relationship matches human detection of changes in pressure. We are much more sensitive to changes in level when the SPL is low (for example, hearing a baby crying in a distant bedroom), than we are to changes in level when the SPL is high (for example, when listening to highly amplified music).

³ A "10 dB per doubling" rule of thumb is the most often used approximation.

A-weighted decibels as the metric for use in describing environmental and transportation noise. **Figure A-1** depicts A-weighting adjustments to sound from approximately 20 Hz to 10,000 Hz.

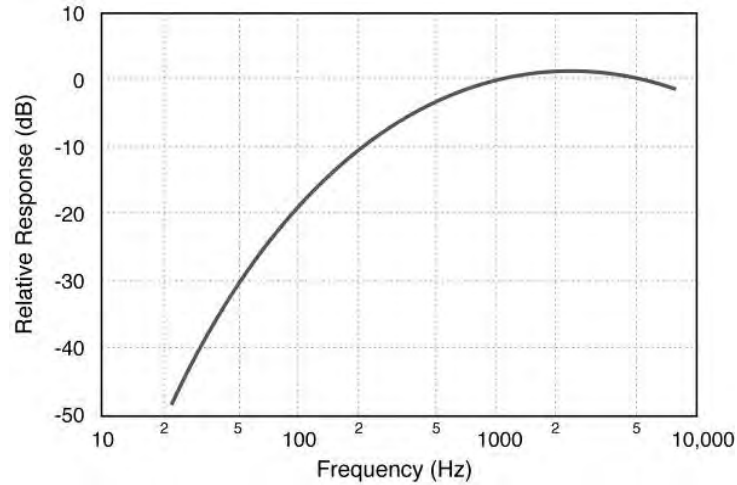


Figure A-1. A-Weighting Frequency Response

Source: Extract from Harris, Cyril M., Editor, "Handbook of Acoustical Measurements and Control," McGraw-Hill, Inc., 1991, pg. 5.13; HMMH

As the figure shows, A-weighting significantly de-emphasizes noise content at lower and higher frequencies where we do not hear as well, and has little effect, or is nearly "flat," in for mid-range frequencies between 1,000 and 5,000 Hz. All sound pressure levels presented in this document are A-weighted unless otherwise specified.

Figure A-2 shows representative A-weighted levels for many common sounds.

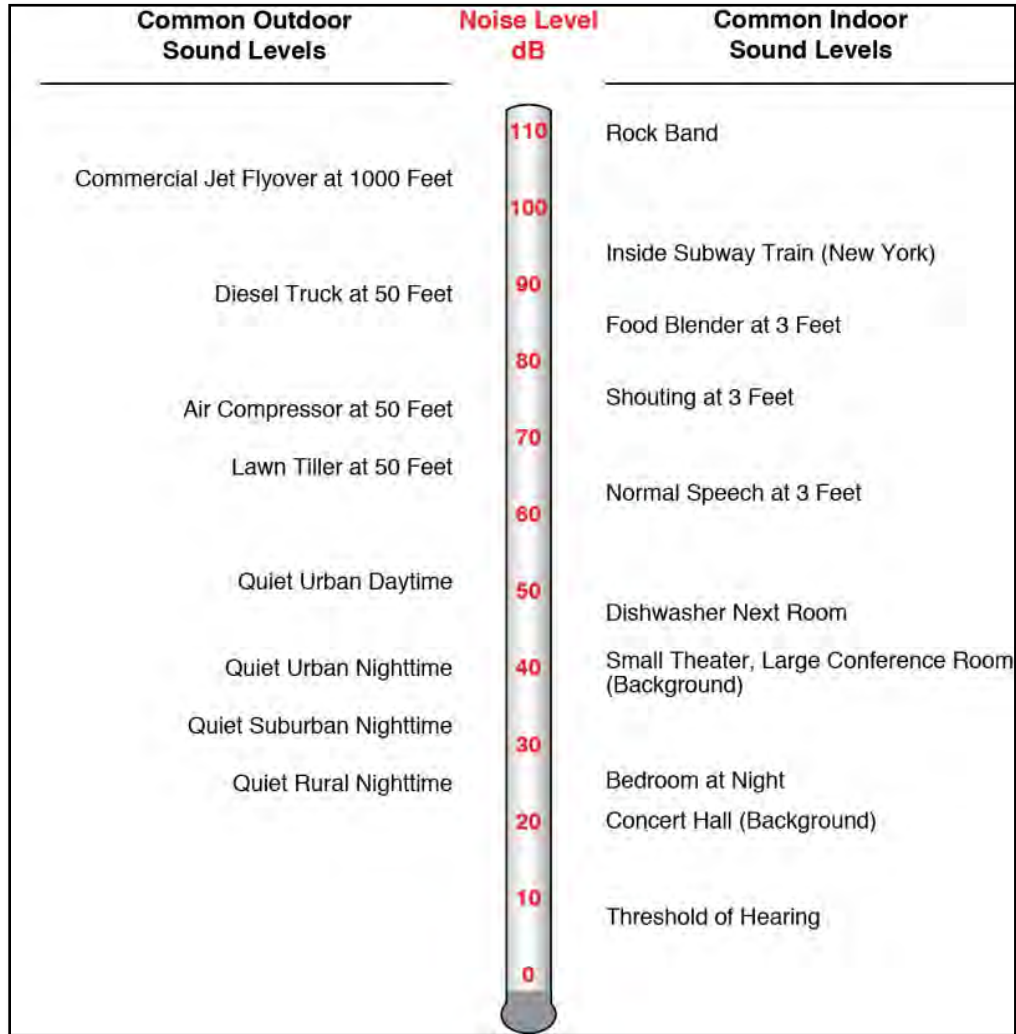


Figure A-2. A-Weighted Sound Levels for Common Sounds

Source: HMMH

A.1.4 Maximum A-Weighted Sound Level, L_{max}

An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound level increases as a car or aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. The background or “ambient” level continues to vary in the absence of a distinctive source, for example due to birds chirping, insects buzzing, leaves rustling, etc. It is often convenient to describe a particular noise “event” (such as a vehicle passing by, a dog barking, etc.) by its maximum sound level, abbreviated as L_{max} .

Figure A-3 depicts this general concept, for a hypothetical noise event with an L_{max} of approximately 102 dB.

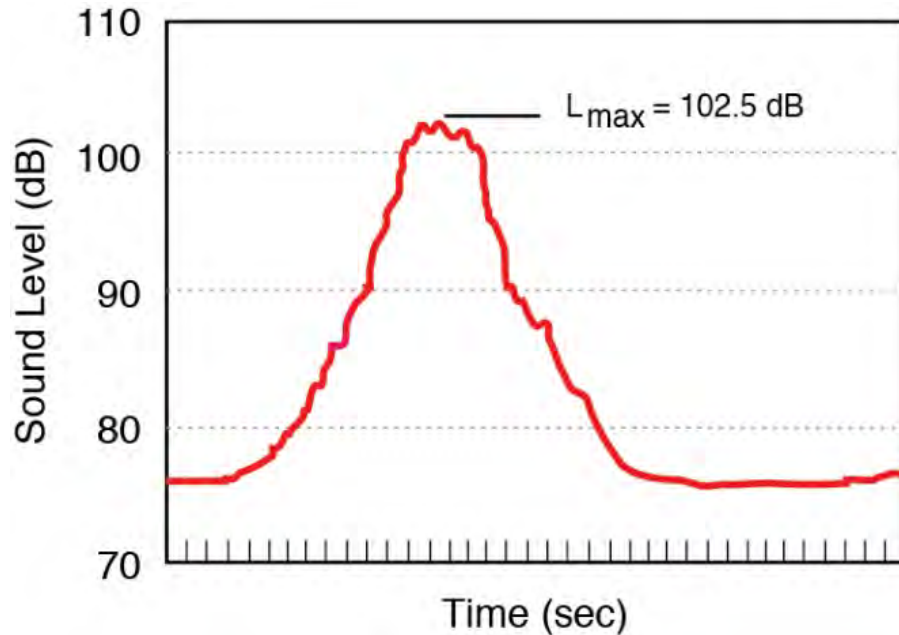


Figure A-3. Variation in A-Weighted Sound Level over Time and Maximum Noise Level

Source: HMMH

While the maximum level is easy to understand, it suffers from a serious drawback when used to describe the relative “noisiness” of an event such as an aircraft flyover; i.e., it describes only one dimension of the event and provides no information on the event’s overall, or cumulative, noise exposure. In fact, two events with identical maximum levels may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged much more annoying.

The next section introduces a measure that accounts for this concept of a noise “dose,” or the cumulative exposure associated with an individual “noise event” such as an aircraft flyover.

A.1.5 Sound Exposure Level, SEL

The most commonly used measure of cumulative noise exposure for an individual noise event, such as an aircraft flyover, is the Sound Exposure Level, (SEL). SEL is a summation of the A-weighted sound energy over the entire duration of a noise event. SEL expresses the accumulated energy in terms of the one-second-long steady-state sound level that would contain the same amount of energy as the actual time-varying level.

SEL provides a basis for comparing noise events that generally match our impression of their overall “noisiness,” including the effects of both duration and level. The higher the SEL, the more annoying a

noise event is likely to be. In simple terms, SEL “compresses” the energy for the noise event into a single second. **Figure A-4** depicts this compression, for the same hypothetical event shown in **Figure A-3**. Note that the SEL is higher than the L_{max} .

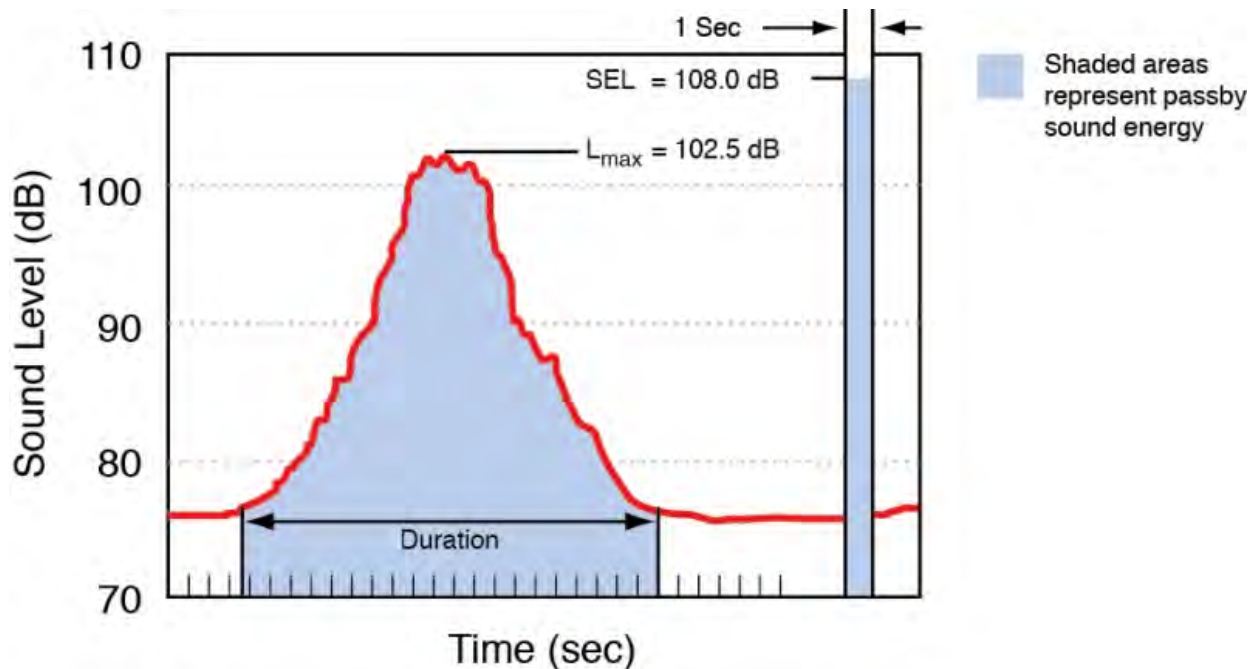


Figure A-4. Graphical Depiction of Sound Exposure Level

Source: HMMH

The “compression” of energy into one second means that a given noise event’s SEL will be a higher numerical value than its L_{max} if the event lasts longer than one second. For most aircraft flyovers, SEL is roughly five to 12 dB higher than L_{max} . Adjustment for duration means that relatively slow and quiet propeller aircraft can have the same or higher SEL than faster, louder jets, which produce shorter duration events.

A.1.6 Equivalent A-Weighted Sound Level, L_{eq}

The Equivalent Sound Level, abbreviated L_{eq} , is a measure of the exposure resulting from the accumulation of sound levels over a particular period of interest; e.g., one hour, an eight-hour school day, nighttime, or a full 24-hour day. L_{eq} plots for consecutive hours can help illustrate how the noise dose rises and falls over a day or how a few loud aircraft significantly affect some hours.

L_{eq} may be thought of as the constant sound level over the period of interest that would contain as much sound energy as the actual varying level. It is a way of assigning a single number to a time-varying sound level. **Figure A-5** illustrates this concept for the same hypothetical event shown in **Figure A-3** and **Figure A-4**. Note that the L_{eq} is lower than either the L_{max} or SEL.

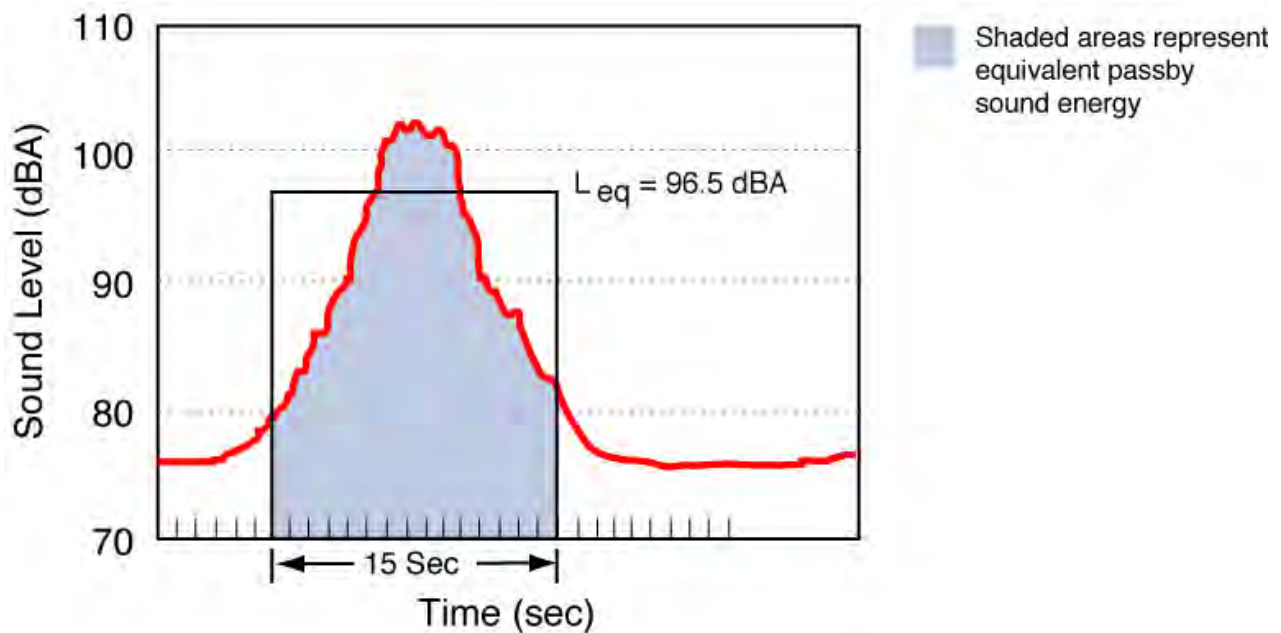


Figure A-5. Example of a 15-Second Equivalent Sound Level

Source: HMMH

A.1.7 Day-Night Average Sound Level, DNL or L_{dn}

The FAA requires that airports use a measure of noise exposure that is slightly more complicated than L_{eq} to describe cumulative noise exposure: the day-night average sound level (DNL).

The EPA identified DNL as the most appropriate means of evaluating airport noise based on the following considerations:⁴

- The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods.
- The measure should correlate well with known effects of the noise environment and on individuals and the public.
- The measure should be simple, practical, and accurate. In principle, it should be useful for planning as well as for enforcement or monitoring purposes.
- The required measurement equipment, with standard characteristics, should be commercially available.
- The measure should be closely related to existing methods currently in use.
- The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.

⁴ "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," U. S. EPA Report No. 550/9-74-004, March 1974.

- The measure should lend itself to small, simple monitors, which can be left unattended in public areas for long periods.

Most federal agencies dealing with noise have formally adopted DNL. The Federal Interagency Committee on Noise (FICON) reaffirmed the appropriateness of DNL in 1992. The FICON summary report stated, “There are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric.”

In 2015, the FAA began a multi-year effort to update the scientific evidence on the relationship between aircraft noise exposure and its effects on communities around airports.⁵ This was the most comprehensive study using a single noise survey ever undertaken in the United States, polling communities surrounding 20 airports nationwide. The FAA Reauthorization Act of 2018 under Section 188 and 173, required FAA to complete the evaluation of alternative metrics to the DNL standard within one year. The Section 188 and 173 Report to Congress was delivered on April 14, 2020⁶ and concluded that while no single noise metric can cover all situations, DNL provides the most comprehensive way to consider the range of factors influencing exposure to aircraft noise. In addition, use of supplemental metrics is both encouraged and supported to further disclose and aid in the public understanding of community noise impacts. The full study supporting these reports was released in January 2021. If changes are warranted in the use of DNL, which DNL level to assess or the use of supplemental metrics, FAA will propose revised policy and related guidance and regulations, subject to interagency coordination, as well as public review and comment.

In simple terms, DNL is the 24-hour L_{eq} with one adjustment; all noises occurring at night (defined as 10 p.m. through 7 a.m.) are increased by 10 dB, to reflect the added intrusiveness of nighttime noise events when background noise levels decrease. In calculating aircraft exposure, this 10 dB increase is mathematically identical to counting each nighttime aircraft noise event ten times.

DNL can be measured or estimated. Measurements are practical only for obtaining DNL values for limited numbers of points, and, in the absence of a permanently installed monitoring system, only for relatively short periods. Most airport noise studies use computer-generated DNL estimates depicted as equal-exposure noise contours (much as topographic maps have contours of equal elevation).

The annual DNL is mathematically identical to the DNL for the average annual day, i.e., a day on which the number of operations is equal to the annual total divided by 365 (366 in a leap year). **Figure A-6** graphically depicts the manner in which the nighttime adjustment applies in calculating DNL. **Figure A-7** presents representative outdoor DNL values measured at various U.S. locations.

⁵ Federal Aviation Administration. Press Release – FAA To Re-Evaluate Method for Measuring Effects of Aircraft Noise. https://www.faa.gov/news/press_releases/news_story.cfm?newsId=18774

⁶ Federal Aviation Administration. Report to Congress on an evaluation of alternative noise metrics. https://www.faa.gov/about/plans_reports/congress/media/Day-Night_Average_Sound_Levels_COMPLETED_report_w_letters.pdf

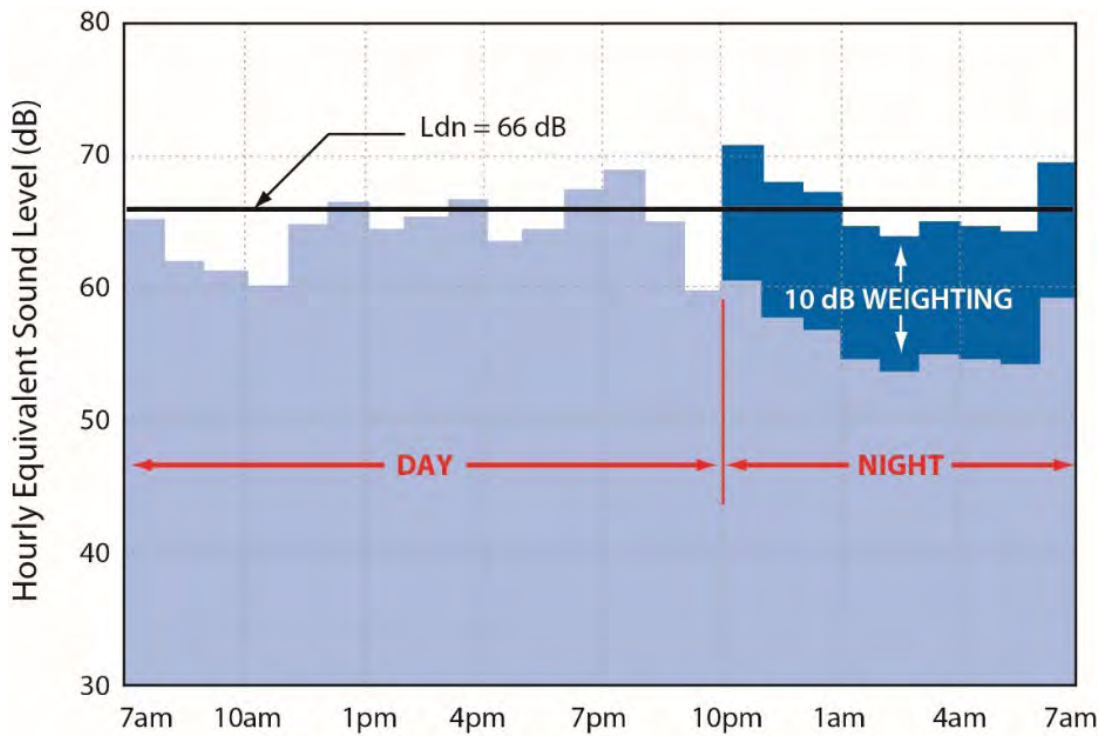


Figure A-6. Example of a Day-Night Average Sound Level Calculation

Source: HMMH

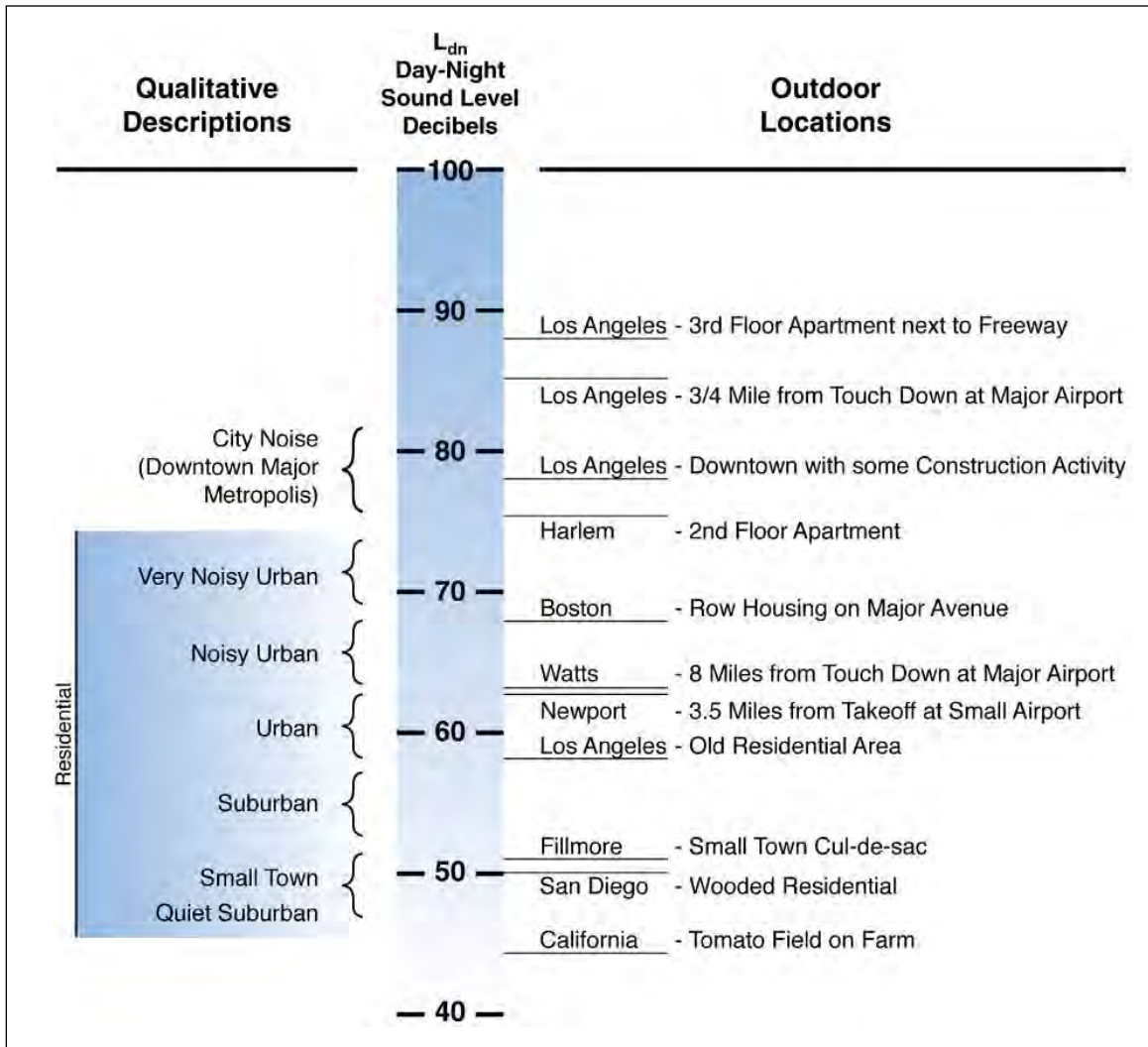


Figure A-7. Examples of Measured Day-Night Average Sound Levels, DNL

Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," March 1974, p.14.

Appendix B: Existing Noise Compatibility Program Documents

Table of Contents

2004 FAA Record of Approval for the SDF Noise Compatibility Program.....	B-3
2009 FAA Record of Approval for the SDF Noise Compatibility Program.....	B-15
Attachment 1: Request for Implementation of SDF Part 150 Measure 7	B-20
Attachment 2: FAA Response to Request for Implementation of Measure 7	B-29

This page intentionally left blank.

Part 150: Records of Approval

Louisville International Airport, Louisville, Kentucky

Approved on 5/14/04

The approvals listed herein include approvals of actions that the Regional Airport Authority of Louisville and Jefferson County, Kentucky (RAA) recommends be taken by the Federal Aviation Administration (FAA). It should be noted that these approvals indicate only that the actions would, if taken, be consistent with the purposes of Part 150. These approvals do not constitute decisions to implement the actions. Later decisions concerning possible implementation of the actions may be subject to applicable environmental or other procedures or requirements.

The recommendations below summarize as closely as possible the airport operator's recommendations in the noise compatibility program and are cross-referenced to the program. The statements contained within the summarized recommendations and before the indicated FAA approval, disapproval, or other determination do not represent the opinions or decisions of the FAA.

The Noise Compatibility Program (NCP) for Louisville International Airport is divided into three interrelated types of measures: the Noise Abatement Measures (primarily operational), the Noise Mitigation Measures (land uses), and the Program Management Measures. These recommendations are documented in Chapter 11, Volume 1, Federal Aviation Regulation (FAR) Part 150 Noise Study Update.

I. NOISE ABATEMENT MEASURES

(Air Traffic Measures)

NA-1: Maintain South flow runway preference. This measure would continue the current daytime preference for south flow when wind conditions permit except as revised in measure NA-3 below. (pages 8-6 & 7, table 8-2, & table 11-2).

(Previous ROA, Measure NAA #7.3 in the 1994 & 1995 ROAs)

FAA Action: Approved as voluntary. This measure continues a previously approved measure that places flights over areas to the south that are less densely populated.

NA-2: Reverse East-West preference (Day and Night). Reverse the current runway use program to prefer the west runway. The trigger of 3 aircraft in the landing or departure queue currently used to direct air traffic to both runways would be retained. (pages 8-6, 8-49 thru 8-53, 8-79, table 8-2, & table 11-2). This measure would reduce the noise impacts within the DNL 65 contour to about 2,175 residents and 1,079 dwelling units but would increase noise over the University of Louisville, Old Louisville and neighborhoods to the northwest. Because students at U of L were not included in the impact analysis the number of students experiencing noise impacts are not known. The measure, if combined with Measure NA-7, would take advantage of a corridor of compatible land uses immediately north of the airport.

FAA Action: No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). A technical analysis of this measure in concert with Measures NA-3 and NA-7, and an environmental analysis, are required to determine its feasibility and environmental impacts. The FAA also will determine during any follow-on analysis whether the measure provides an overall net benefit to populations impacted, including the U of L, a requirement for approval under Part 150.

NA-3: Morning North flow Preference; Revision of Existing Measure NA-1. In conjunction with the offset approach and departure recommendation (NA-7), reverse the normal daytime runway use preference from south flow to north flow during morning hours 9:30 a.m. to 12:30 p.m. to minimize overflights of the University of Louisville and residential areas to the north of the airport. (page 8-79, table 11-2). There are more aircraft arrivals than departures during this period at SDF.

FAA Action: No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). A technical analysis of this measure in concert with Measures NA-2 and NA-7, and an environmental analysis, are required to determine its feasibility and environmental impacts. Implementation of this measure would be in conjunction with NA-2 and NA-7 if approved. (This measure would modify measure NAA 7.1 in the 1995 ROA.)

NA-4: Southbound Divergence According to Destination; Continuation of Existing Air Traffic Control procedure. (page 8-83, table 8-2, table 11-2 and supplemental table 11-2). Continue the current practice of obtaining necessary divergence between aircraft departing to the south by assigning aircraft to departure tracks based on their route of flight.

FAA Action: Approved as voluntary. This is a continuation of a previously approved measure. The NCP states that no other tracks to the south would provide a greater noise benefit.

NA-5: Maintain Contraflow Program; Continuation of Existing ATC Procedure. Contraflow at SDF means that arrivals between 10:00p.m. and 7:00 a.m. are to the north and departures are to the south (subject to weather, wind and operational demand). (pages 8-7, 8-64, table 8-2, & table 11-2). This directs air traffic south of the airport over southern Jefferson and Bullitt counties which are less densely populated and where mitigation (relocation) measures have been and continue to be implemented.

FAA Action: Approved as voluntary. This measure is a combination of previously approved measures 7.1, 7.3 and 7.5 in the 1995 ROA and would help reduce the DNL 65 dB noise contour to the north over noise-sensitive areas.

NA-6: Reduce exceptions to contraflow; Enhancement of existing measure. (pages 8-64, 8-42, 8-91, table 8-2 table 11-2, & supplemental table 11-2). Airport owner would work with airlines to adjust arrival and departure times for scheduled flights to more closely conform to normal peak arrival and departure periods.

FAA Action: Disapproved for purposes of Part 150. The FAA disapproves reducing exceptions to contraflow. Contraflow requires departing aircraft to be "aimed" directly at arriving aircraft, and greater use increases the potential for loss of separation between arriving and departing aircraft. This could cause substantial delay. This disapproval under Part 150 does not prohibit airport management from seeking cooperation from the airlines to adjust schedules on a voluntary basis to more closely conform to normal peak periods. Scheduling changes that reduce exceptions to contraflow will require consultation with FAA's Air Traffic office to determine whether they impact aircraft operational safety.

NA-7: Use an Offset Departure from Runway 35L and Offset Approach to Runway 17R. (pages 8-61, 8-74, 8-81, table 8-2, & table 11-2). This measure is to take advantage of an industrial

corridor to the northwest of the runway to reduce the adverse effects of the recommended change in preferential use of the east and west runways (Measure NA-2). Aircraft not equipped with GPS/FMS would require installation of a Localizer type directional aid (LDA). It is assumed that a Local Area Augmentation System (LAAS) would be required for a Global Positioning System (GPS) approach. This measure would remove about 423 homes north of the airport from the DNL 65 contour.

FAA Action: No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). A technical analysis of this measure in concert with Measures NA-2 and NA-3, and an environmental analysis, are required to determine its feasibility and environmental impacts. FAA is concerned that adoption of the arrival portion of this measure would reduce runway arrival capacity by approximately one-third when the offset approach is in use. While we do not object in principle to the departure procedure as a voluntary measure, the NCP does not provide separate analysis for the departure procedure alone. The FAA will review the study results to determine whether this measure is feasible. At present, when parallel approaches are being conducted, current procedures allow for lateral separation of 2 miles between two aircraft landing on the parallel runways. Using an offset approach to RWY 17R, this separation standard would increase to 3 miles.

NA-8: Designate departure and arrival flight tracks to be used by all turbojet and applicable turboprop aircraft weighing over 12,500 pounds. These measures have the effect of reducing the width of noise contours and noise exposure as measured in grid point analyses by reducing aircraft dispersion around the existing flight tracks (New Measure). (pages 8-9 & 10, 8-61, 8-84 thru 8-86, table 8-2 & table 11-2). Conformance to recommended noise abatement flight tracks by non GPS/FMS or RNAV equipped aircraft would require the installation of navigational aids to define each course segment.

FAA Action: Approved in part, as voluntary. Airport management may work with SDF ATCT to designate flight tracks within existing approved corridors. FAA's Flight Standard's office (ESO-31) must review these procedures before they may take effect.

This measure is disapproved for new noise abatement flight tracks outside of existing corridors. It is noted that there is no request in this NCP for FAA approval, or a commitment by FAA, to install NAVAIDS to be used as departure navigational aids. At this time, FAA has suspended RNAV departure procedure development.

NA-9: Assign GPS/FMS or RNAV equipped aircraft to defined FMS/GPS Departure and Arrival Flight Tracks for Turbojet and Military Aircraft (New Measure). (pages 8-9 7 10, 8-62, 8-87, table 8-2, & table 11-2). The tracks recommended for this measure are generally consistent with those defined in Measure NA-8 above but are defined using area navigation (RNAV) capabilities, either satellite or ground based to reduce or eliminate the need for additional ground based facilities to define tracks.

FAA Action: Approved in part, as voluntary. Flight tracks may be defined within existing or approved flight corridors. There are a number of actions necessary to implement the recommended ANAV procedures. Most of the required actions are the responsibility of FAA, primarily its Air Traffic Division.

This measure is disapproved for new noise abatement flight tracks outside of existing corridors. There is no request for approval in this NCP, nor any commitment by FAA, to install NAVAIDS to be used as departure navigational aids. At this time, FAA has suspended RNAV departure procedure development.

NA-10: FMS/GPS Departure and Arrival Flight Tracks for Turboprop Aircraft weighing over 12,500 pounds (New Measure). (pages 8-9 & 10, 8-62, 8-87, table 8-2, & table 11-2). Place FMS/GPS equipped turboprop aircraft on different departure tracks from those defined for turbojet aircraft in Measure NA-9 to minimize impact on departure capacity. This is to reduce aircraft dispersion around the existing flight tracks. Direct routes or earlier turns would be provided consistent with noise abatement goals to enhance conformance.

FAA Action: Approved in part, as voluntary. Flight tracks may be defined within existing or approved flight corridors. This measure is disapproved for new noise abatement flight tracks outside of existing corridors.

NA-11: Request FAA ATCT to require all aircraft to intercept the runway centerline at or beyond the initial approach fix. (pages 8-11, 8-63, 8-88, table 8-2 & table 11-2). Compliance with this measure would require limiting use of visual approaches that do not conform to the approach paths defined by the instrument approaches and result in arriving aircraft intercepting the glide slope at higher altitudes.

FAA Action: No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). A technical evaluation on feasibility and environmental impacts should examine the measure's effects on aircraft safety, capacity, and efficiency.

NA-12: Request FAA to publish a Standard Instrument Departure (SID) Procedure for each runway to be used in all weather conditions, including VFR conditions (New Measure). (pages 8-10, 8-15, 8-102, table 8-2, & table 11-2). SIDs would be developed to enhance conformance to the recommended noise abatement departure procedures. These procedures would include instructions for following each segment of proposed departure flight tracks based on navigational equipment available. Inclusion of the ANAV would reduce dispersion of aircraft over noncompatible land uses.

FAA Action: No action required at this time under 49 U.S.C. section 47504(b). This measure is to publish SIDs for flight procedures proposed in the NCP. The FAA has deferred action on those flight procedures because they require additional technical and other analyses.

Implementation of this measure would be subject to: FAA approval of the proposed equipment to be used; development of the procedures in conjunction with airlines operating at SDF (primary carriers); and development of special charting and flight-testing. The FAA notes that there is no request in this NCP for FAA approval, or a commitment by FAA, to install NAVAIDS to be used as departure navigational aids. Not all air carrier aircraft would be equipped with devices that would allow them to utilize these procedures.

NA-13: Request FAA to publish a Standard Terminal Arrival Route (STAR) for each runway to be used in all weather conditions including VFR conditions (New Measure). (pages 8-11, 8-13, 8-103, table 8-2, & table 11-2). These procedures would include instructions for following each segment of proposed arrival flight tracks based on navigational equipment available.

FAA Action: No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). The FAA has deferred action on noise abatement approach procedures that would use the recommended STARs (NA-7, NA-11). The FAA notes that STAR guidance typically terminates 15-20 miles from the airport, and may be of little value in reducing noise. The results of the required studies for the deferred measures should specify changes to impacts and benefits so that FAA can make an informed determination under Part 150.

NA-14: As part of an ongoing noise management program, extend noise abatement flight tracks beyond those identified in Measures NA-8 through NA-11 (New Measure). (page 8-97, table 8-2,

& table 11-2) This would enable aircraft operators to conform more closely to recommended flight tracks over noise sensitive areas that are beyond the noise contours. Implementation would require more detailed information on the land uses affected and the effects on airspace and air traffic control than is possible in this [part 150] study. Development of flight procedures should be conducted in consultation with FAA, aircraft operators, and members of potentially affected communities.

FAA Action: No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). There is insufficient information to determine either the noise benefits or operational impacts of extending the flight tracks. Environmental analysis would be required. This measure attempts to address impacts outside of the DNL 65 dB noise contour. Because it could introduce operational delay, analysis should show how any additional aircraft operational delay is offset by the expected benefits in those areas.

NA-15: Elimination of early descent (New Measure). (No analysis found in NCP) Current approach procedures allow aircraft to descend to the initial approach altitude prior to the initial approach point if directed by ATC. Under this measure, RAA would discourage ATC from directing descents earlier than required to maintain a constant rate of descent to the initial approach while maintaining adequate safety margins.

FAA Action: Disapproved. This measure, if changed as described, would have the effect of "prohibiting descents" rather than "discourage descents" below the minimum, published altitude at those fixes. Any aircraft, including smaller fixed-wing and helicopters operating from any nearby base of operations would be required to climb to a minimum of the published altitude for any given fix until reaching that fix. The existing 2500' authorization for reduced altitudes was added at ATC's request for operational efficiency.

Requiring aircraft to remain at or above 5000 feet would remove two IFR altitudes (3000 and 4000 feet) from ATC use, effectively reducing airspace by 25%. Implementing this proposal would restrict the ability of ATC to perform functions in a safe efficient manner. The NCP acknowledges, at page 8-10, that "In practice, modification to approach procedures are likely to entail unacceptable reductions in safety margins."

(Operator Procedures)

NA-16: Request the airlines serving the airport to use the FAA Distant Noise Abatement Departure Procedure in Advisory Circular (AC) 91-53A, Noise Abatement Departure Procedure. (pages 8-13 thru 8-15, 8-93, table 8-2, & table 11-2) This measure would benefit areas exposed to departure noise of DNL 65+ from Runways 35R, 35L, and 17L.

FAA Action: Approved as voluntary. RAA can request the airlines follow the Distant Noise Abatement Procedure.

NA-17: Continue Airport regulation restricting aircraft engine run-ups to certain hours and locations. (pages 8-29, 8-95, table 8-2, & table 11-2)

FAA Action: Approved. FAA approved as noise beneficial in 1994 the following run-up measures in the RAA's previous Part 150 submittal:

§ Require RAA pre-approval to conduct static run-ups between 9:00 p.m. and 7:00 a.m.

§ Require run-ups lasting more than 1 minute to be conducted on the south end of Runway

1/19

§ Require run-ups lasting more than 1 minute to be conducted on the east parallel taxiway at the south end of Runway 17R/35L

NA-18: Limit use of North runway extension to aircraft needing full runway length and use south extension for departures to the north.

FAA Action: Disapproved pending submission of additional information to make an informed analysis. FAA's 2003 Finding of No Significant Impact for the proposed north runway extension included a mitigation commitment that only aircraft requiring the full runway length for departures would use *either* runway extension. The ATCT has granted a waiver allowing some procedures based on the runway being declared departure only between the hours of 3:30 AM to 6:00 AM local time. The NCP speculates, but does not show, how this measure is more noise beneficial than that included in the 2003 FONSI. Changes to operational procedures also would require environmental analysis.

II. NOISE MITIGATION MEASURES

These recommended measures would continue the ongoing property acquisition program and would expand the program to include noise insulation or soundproofing for residential and noise-sensitive public uses. Recommended noise mitigation measures include remedial, preventive, and compensatory measures. The NCP states that implementation of some measures would be dependent upon the availability of noise program funding through FAA grants and the ability of the RAA to devote the necessary matching funds for these programs.

Any new noncompatible development that takes place after October 1, 1998, normally is not eligible for approval under Part 150 for remedial mitigation, and is not included in any approval of the following land use measures. The location of noise sensitive structures described below may change in relation to the noise contour due to FAA disapproval and no action decisions in this ROA. If the overall approved NCP would yield maps different from those previously submitted to the FAA and determined in compliance with Part 150, Section B150.3 requires revised maps.

Remedial Measures

These measures would be implemented by the RAA to reduce or otherwise mitigate the effect of noise that cannot be eliminated through the aircraft operational/abatement measures.

M-1: Continue the current Voluntary Residential Acquisition Program including the Innovative Housing Program. (pages 9-2, 9-7, 9-34, table 9-2, & Table 11-2)

FAA Action: Approved. Voluntary acquisition must comply with the Uniform Relocation and Real Property Acquisition Policies Act in order to be eligible for Federal funding. (Approved as measure LU #11A, #11B, & #11C in ROA 1994 and amended in ROA 1995.)

M-2: Expanded Voluntary Residential Acquisition within the DNL 65 db to the south of the airport that will continue to be exposed to significant noise levels in 2008. (pages 9-2,9-7, 9-35, table 9-2, & table 11-2)

FAA Action: Approved. Voluntary acquisition must comply with the Uniform Relocation and Real Property Acquisition Policies Act in order to be eligible for Federal funding. (Expansion of measure LU #11C, ROA 1995.)

M-3: Provide soundproofing in residential areas within the DNL 65 db contour to the north of the airport. Eligibility of individual structures would depend on the feasibility of achieving at least a

5.0 db noise level reduction as required by FAA. (Pages 9-9, 9-35, table 9-2, & table 11-2) (Measure LU#11 in ROA 1995 and considered in the LAIP EIS but not implemented with new runways construction.)

FAA Action: Approved.

M-4: Offer sound insulation for noncompatible institutional areas within DNL 65 (Potentially University of Louisville & additional churches). (Pages 9-10, 9-38, table 9-1, & table 11-2)

FAA Action: Approved. The airport sponsor made a commitment to soundproof the University of Louisville in the FAA's 1991 EIS. The sponsor has not yet fulfilled that commitment (see LAIP EIS page 1-30, FEIS, Addendum I, page 8 and FAA Record of Decision, January 7, 1991, p.18). This approval under Part 150 acknowledges that the measure would be noise beneficial.

M-5: Residential Sales Assistance Program within DNL 65. (pages 9-10, 9-40, table 9-2, & table 11-2) Concurrently with the residential soundproofing program for areas within the DNL 65 contour, offer sales assistance to homeowners declining to participate in the soundproofing program.

FAA Action: Approved. Implementation of this measure must comply with the Uniform Relocation and Real Property Acquisition Policies Act to be eligible for Federal funding.

M-6: Construct an earth berm along the northwest side of the airfield to reduce ground noise associated with aircraft takeoffs on Runway 17R. (pages 9-11, 9-41, table 9-2, & table 11-2)

FAA Action: Approved. The RAA estimates that over 200 homes could receive a 5-7 dBA reduction in departure noise. This measure also was included in the November 21, 2003, FONSI for the runway extensions.

M-7: Study potential noise barrier for Preston Park neighborhood. New airport facilities are anticipated in the southeast portion of the airport. The RAA would fund a study to determine whether such facilities could be constructed and oriented to shield areas to the east of the airport from ground noise originating in the immediate vicinity of the structures. (pages 9-11, 9-41 & 43, table 9-2, & table 11-2)

FAA Action: Approved for study.

M-8: Construct Ground Run-up Enclosure (Hush Houses) if required to reduce noise from maintenance run-up activity. This measure should be given further consideration if changes in the pattern of engine run-ups generate community concerns. (page 9-43, table 9-2, & table 11-2)

FAA Action: Disapproved pending submission of additional information to make an informed analysis. Construction of run-up enclosures must be supported by sufficient analysis to demonstrate their noise benefits.

M-9: Residential sound insulation for areas between DNL 60 and DNL 65 that would experience a 3dB increase in noise levels as a result of recommended noise abatement measures. (page 9-36, table 9-2, & table 11-2)

FAA Action: Disapproved for purposes of Part 150. Section 189 of Public Law 108-176, Vision 100-Century Of Aviation Reauthorization Act, December 12, 2003, specifically prohibits FAA approval of Part 150 program measures that call for Federal funding to mitigate aircraft noise below DNL 65 (through Fiscal Year 2007).

M-10: Offer sound insulation to noncompatible institutional land uses (examples, portions of University of Louisville and churches) between DNL 60 to DNL 65 that would experience a 3 dB increase in noise levels from the noise abatement measures. (page 9-39, table 9-2 & table 11-2)

FAA Action: Disapproved for purposes of Part 150. Section 189 of Public Law 108-176, Vision 100-Century Of Aviation Reauthorization Act, December 12, 2003, specifically prohibits FAA approval of Part 150 program measures that call for Federal funding to mitigate aircraft noise below DNL 65 (through Fiscal Year 2007).

M-11: Compatible Land Use Planning - The RAA would coordinate with the Planning Commission to adopt policies in its Cornerstone 2020 Plan to discourage new noncompatible development and disclose noise levels for new residential development. Measures to provide notification for new development would apply to DNL 60 dB and to areas within DNL 65 dB that are already substantially developed. (page 9-49, 9-51, table 9-2, & table 11-2)

FAA Action: The portion of this measure that permits new incompatible development within the DNL 65 dB, even with sound attenuation and/or disclosure, is inconsistent with the FAA's guidelines and 1998 policy and is disapproved for the purposes of Part 150.

Other portions of this compatible land use planning measure that do not permit incompatible development within the DNL 65 dB noise contour are approved for the purposes of Part 150.

This decision relates to the measure's consistency with the purposes of Part 150. This measure is within the authority of the RAA and local planning jurisdiction. The Federal Government has no control over local land use planning.

M-12: RAA would coordinate with the Planning Commission to adopt a policy concerning rezoning from compatible to noncompatible uses in the Airport environs. (page 9-50, 9-58, table 9-2, & table 11-2)

FAA Action: Approved. This measure is within the authority of the RAA and local planning jurisdiction. The Federal Government has no control over local land use planning.

M-13: Subdivision Regulations-The RAA would coordinate with the Planning Commission to include a noise disclosure statement for new subdivisions in Policy Areas 1 & 2, Cornerstone 2020 Plan. This would allow future residents to make informed land purchase decisions. (page 9-51, 9-58 table 9-2, & table 11-2)

FAA Action: The portion of this measure that permits new incompatible development within the DNL 65 dB, even with sound attenuation and/or disclosure, is inconsistent with the FAA's guidelines and 1998 policy and is disapproved for the purposes of Part 150.

Other portions of this compatible land use planning measure that do not permit incompatible development within the DNL 65 dB noise contour are approved for the purposes of Part 150.

This decision relates to the measure's consistency with the purposes of Part 150. This measure is within the authority of the RAA and local planning jurisdiction. The Federal Government has no control over local land use planning.

M-14: RAA would consider participation in a Redevelopment Program (Renaissance Zone Program) initiative that would redevelop areas in the Airport environs as part of a joint effort with the Fairgrounds, UPS, and Ford Motor Company. In conjunction with other participants, the RAA

will work with the City of Louisville and Jefferson County to develop incentives for compatible development. (pages 9-52 thru 53)

FAA Action: The portion of this measure that permits new incompatible development within the DNL 65 dB, even with sound attenuation and/or disclosure, is inconsistent with the FAA's guidelines and 1998 policy and is disapproved for the purposes of Part 150.

Other portions of this compatible land use planning measure that do not permit incompatible development within the DNL 65 dB noise contour are approved for the purposes of Part 150.

This decision relates to the measure's consistency with the purposes of Part 150. This measure is within the authority of the RAA and local planning jurisdiction. The Federal Government has no control over local land use planning.

Release of land under control of the RAA must comply with FAA grant agreements, be consistent with FAA's Eligibility Handbook to preserve compatible land uses, and is subject to environmental review.

M-15: RAA would work with the Planning Commission to develop an overlay zone, to supplement other land use planning techniques. This would be based on the 2007 NEM to be reflected in the Core Graphics section of the Cornerstone 2000 Plan. (pages 9-51, 9-58, table 9-2, & table 11-2)

FAA Action: The portion of this measure that permits new incompatible development within the DNL 65 dB, even with sound attenuation and/or disclosure, is inconsistent with the FAA's guidelines and 1998 policy and is disapproved for the purposes of Part 150.

Other portions of this compatible land use planning measure that do not permit incompatible development within the DNL 65 dB noise contour are approved for the purposes of Part 150.

This decision relates to the measure's consistency with the purposes of Part 150. This measure is within the authority of the RAA and local planning jurisdiction. The Federal Government has no control over local land use planning.

We note that the official NEMs (Chapter 10) are for the years 2003 and 2008. The document states that the 2008 NEM was based on a review of forecasts for the year 2007. The FAA assumes the reference to the "2007 NEM" in this measure is a reference to the official 2008 NEM.

M-16: Building Code Revision-The RAA would work with the Commonwealth of Kentucky to develop and adopt enabling legislation either permitting local building code provisions or incorporating sound insulation provisions in the statewide building code. (page 9-54, table 9-2, & table 11-2)

FAA Action: The portion of this measure that permits new incompatible development within the DNL 65 dB, even with sound attenuation and/or disclosure, is inconsistent with the FAA's guidelines and 1998 policy and is disapproved for the purposes of Part 150.

Other portions of this compatible land use planning measure that do not permit incompatible development within the DNL 65 dB noise contour are approved for the purposes of Part 150.

This decision relates to the measure's consistency with the purposes of Part 150. This measure is within the authority of the RAA and local planning jurisdiction. The Federal Government has no control over local land use planning.

M-17: Consider Disclosure Ordinances. Work with local governmental bodies to examine the feasibility of ordinances to require disclosure of airport noise exposure within designated distances from the airport and/or documented levels of exposure. Disclosure would be for vacant and residentially developed properties within the DNL 65+ dB and DNL 60-65 dB noise contours. (pages 9-53, 9-58, table 8-2, & table 11-2)

FAA Action: Approved. This measure is within the authority of the RAA and local planning jurisdiction. The Federal Government has no authority over local land use planning decisions.

Compensatory Measures-These measures would provide an alternative to remedial measures for homeowners that would not benefit from either sound insulation or sales assistance measures.

M-18: Avigation easement purchase within DNL 65-The RAA would purchase avigation easements from homeowners in areas eligible for residential soundproofing and sales assistance who do not believe they would benefit from either program. Program implementation would be contingent upon FAA grant funding. (pages 9-44, 9-56, table 9-2, & table 11-2)

FAA Action: Approved.

M-19: The RAA would offer to purchase avigation easements from home owners in areas exposed to DNL 60 to DNL 65 noise levels that experience a 3 dB increase in noise exposure and that are eligible for residential soundproofing and sales assistance

who do not believe they would benefit from either program. (pages 9-44, 9-56 table 9-2, & table 11-2)

FAA Action: Disapproved for purposes of Part 150. Section 189 of Public Law 108-176, Vision 100-Century Of Aviation Reauthorization Act, December 12, 2003, specifically prohibits FAA approval of Part 150 program measures that call for Federal funding to mitigate aircraft noise below DNL 65 (through Fiscal Year 2007).

III. Program Management

The recommended program management measures would enhance the effectiveness of both the noise abatement and mitigation measures through continuing stakeholder coordination, research and development, data collection, and dissemination of program information.

PM-1: Establish new RAA staff position dedicated to management of noise compatibility program. Incumbent performs duties associated with data collection and analysis, implementation, liaison and further study. (This position has been established.) (page 8-96, table 8-2, & table 11-2)

FAA Action: Approved.

PM-2: Establish advisory committee composed of community, user and air traffic control interests to maintain coordination among the stakeholders in the noise compatibility program. (page 8-96, table 8-2, & table 11-2)

FAA Action: Approved.

PM-3: Acquire portable noise monitoring equipment to enable the Authority's Noise/Environmental Programs Coordinator to monitor actual noise and provide accurate information to community members. (page 8-100, table 8-2, table 11-2)

FAA Action: Approved. For reasons of aviation safety, this approval does not extend to use of the monitoring equipment for enforcement purposes by in situ measurement of any present noise thresholds.

PM-4: Acquire equipment to monitor aircraft operations and establish a regular program of monitoring and reporting conformance with recommended noise abatement procedures. (page 8-101 and table 11-2)

FAA Action: Approved. For reasons of aviation safety, this approval does not extend to use of the monitoring equipment for enforcement purposes by in situ measurement of any present noise thresholds.

PM-5: The RAA would use the Airport Noise Office as a central point to collect and disseminate information. (page 9-55, table 9-2, & table 11-2)

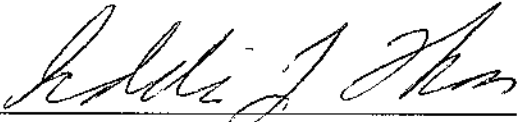
FAA Action: Approved.

This page intentionally left blank.

FEDERAL AVIATION ADMINISTRATION

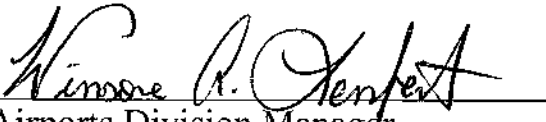
**RECORD OF APPROVAL
14 CFR PART 150
NOISE COMPATIBILITY PROGRAM**

**LOUISVILLE INTERNATIONAL AIRPORT
LOUISVILLE, KY**



Regional Counsel, ASO-7

CONCUR NONCONCUR
8/3/09
Date



Airports Division Manager
Southern Region

APPROVED DISAPPROVED
8/4/09
Date

RECORD OF APPROVAL LOUISVILLE INTERNATIONAL AIRPORT Louisville, KY

BACKGROUND

On October 29, 2008, the Louisville Regional Airport Authority (LRAA) provided the Federal Aviation Administration (FAA) Air Traffic Organization with a letter and supporting documentation requesting an Offset Approach to Runway 17R at Louisville International Airport (SDF). In the request, LRAA referred to a noise abatement (NA) measure, NA-7, proposed when they submitted their Noise Compatibility Program under Part 150 to the FAA for action in 2003. Noise Abatement (NA) -7, included in part, a proposal for an offset approach to Runway 17R.

Following normal FAA protocol for reviewing flight procedure requests, the FAA Air Traffic Organization evaluated the approach request and supporting technical data that LRAA provided.

On, April 03, 2009, the FAA sent a response letter to LRAA disapproving their request to implement an offset approach to Runway 17R at SDF. The FAA disapproval letter identified serious concerns with safety, efficiency, and incompatibility with existing and proposed arrival routes at SDF as the basis for the disapproval.

INTRODUCTION

On May 14, 2004, of the 42 measures proposed by the LRAA for the Louisville International Airport (SDF) Noise Compatibility Program (NCP), the Federal Aviation Administration (FAA) approved 20; approved in part 8; disapproved 3; disapproved for FAR Part 150 purposes 4; and took no action on 7. The FAA took no action on 7 of the measures because they related to new or revised flight procedures for which insufficient data was provided to allow an approval/disapproval determination.

The FAA has determined that the technical information provided by LRAA in support of their request (outside of the Part 150 Process) for an offset approach to runway 17R and the subsequent analysis by ATO is sufficient information to issue a ROA in accordance with 40 CFR Part 150 for 3 of the 7 previously deferred Noise Compatibility Program (NCP) noise abatement measures.

This Record of Approval (ROA) contains the FAA's approval/disapproval decisions for 3 of the 7 NCP measures that were previously deferred: Noise Abatement Measure 2 (NA-2); Noise Abatement Measure 3 (NA-3); and Noise Abatement Measure 7 (NA-7). All other portions of the previously issued ROA remain in effect.

The approvals listed herein include approvals of actions that the airport recommends be taken by the Federal Aviation Administration (FAA). It should be noted that these approvals indicate only that the actions would, if implemented, be consistent with the purposes of 14 CFR Part 150. The FAA has provided technical advice and assistance to the airport to ensure that the operational elements are feasible (see 14 CFR 150.23(c)). These approvals do not constitute decisions to implement the actions. Later decisions concerning possible implementation of measures in this ROA will be subject to applicable environmental or other procedures or requirements, including Section 106 of the National Historic Preservation Act (NHPA).

The ROA summarizes as closely as possible the LRAA's recommendations for noise abatement measures which were identified in their NCP. Note, the recommendations/measures in this ROA were developed by the sponsor (LRAA), not the FAA. The ROA depicts the sponsors recommendation followed first by the FAA's action/determination executed in the May 14, 2004 ROA, and then by the FAA's current action/determination.

- 1) **NA-7: Use an Offset Departure from Runway 35L and Offset Approach to Runway 17R.** (pages 8-16, 8-74, 8-81, table 8-2, and table 11-2). This measure is to take advantage of an industrial corridor to the northwest of the runway to reduce the adverse effects of the recommended change in preferential use of the east and west runways (Measure NA-2). Aircraft not equipped with GPS/FMS would require installation of a Localizer type directional aid (LDA). It is assumed that a Local Area Augmentation System (LAAS) would be required for a Global Positioning System (GPS) approach. This measure would remove about 423 homes north of the airport from the DNL 65 contour.

May 5, 2004 FAA Action (Previous):

No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). A technical analysis of this measure in concert with Measures NA-2 and NA-3, and an environmental analysis, are required to determine its feasibility and environmental impacts. FAA is concerned that adoption of the arrival portion of this measure would reduce runway arrival capacity by approximately one-third when the offset approach is in use. While we do not object in principle to the departure procedure as a voluntary measure, the NCP does not provide separate analysis for the departure procedure alone. The FAA will review the study results to determine whether this measure is feasible. At present, when parallel approaches are being conducted, current procedures allow for lateral separation of 2 miles between two aircraft landing on the parallel runways. Using an offset approach to RWY 17R, this separation standard would increase to 3 miles.

FAA Action (Current): Disapproved. Operational procedures necessary to implement this measure were detailed in the supplemental supporting information provided by LRAA requesting FAA approval for implementation of an Offset Approach to Runway 17R outside of the Part 150 process (See

attachment 1). The result of the FAA's technical evaluation concluded the procedures were unacceptable and the request was disapproved (See attachment 2). This measure cannot be implemented without reducing the level of aviation safety provided and adversely affecting the efficient use and management of the navigable airspace and air traffic control systems. Because the measure was disapproved operationally, no additional environmental study or analysis is necessary.

- 2) **NA-2: Reverse East-West preference (Day and Night).** Reverse the current runway use program to prefer the west runway. The trigger of 3 aircraft in the landing or departure queue currently used to direct air traffic to both runways would be retained. (NCP pages: 8-6, 8-49 thru 8-53, 8-79, tables 8-2, and 11-2). This measure would reduce the noise impacts within the DNL 65 contour to about 2,175 residents and 1,079 dwelling units but would increase noise over the University of Louisville, Old Louisville and the neighborhoods to the northwest. Because students at U of L were not included in the impact analysis the number of students experiencing noise impacts are not known. The measure, if combined with Measure NA-7, would take advantage of a corridor of compatible land uses immediately north of the airport.

May 5, 2004 FAA Action (Previous):

No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). A technical analysis of this measure in concert with Measures NA-3 and NA-7, and an environmental analysis, are required to determine its feasibility and environmental impacts. The FAA also will determine during any follow-on analysis whether the measure provides an overall net benefit to populations impacted, including the U of L, a requirement under Part 150.

FAA Action (Current):

Disapproved. This measure is disapproved because it is dependent/relational to NA-7 which is disapproved. Because the measure was disapproved operationally, no additional environmental study or analysis is necessary.

- 3) **NA-3: Morning North flow Preference; Revision of Existing Measure NA-1.** In conjunction with the offset approach and departure recommendation (NA-7), reverse the normal daytime runway use preference from south flow to north flow during morning hours 9:30 a.m. to 12:30 p.m. to minimize overflights of the University of Louisville and residential areas to the north of the airport. (page 8-79, table 11-2). There are more aircraft arrivals than departures during this period at SDF.

May 5, 2004 FAA Action (Previous):

No action required at this time. This measure relates to flight procedures under 49 U.S.C. section 47504(b). A technical analysis of this measure in concert with Measures NA-2 and NA-7, and an environmental analysis, are required to determine its feasibility and environmental impacts. Implementation of this measure would be in conjunction with NA-2 and NA-7 if approved (This measure would modify measure NAA 7.1 in the 1995 ROA).

FAA Action (Current):

Disapproved. This measure is disapproved because it is dependent/relational to NA-7 and NA-2 which were disapproved. Because the measure was disapproved operationally, no additional environmental study or analysis is necessary.

ATTACHMENT 1

LOUISVILLE

REGIONAL October 29, 2008

AIRPORT Mr. David Senechal
Federal Aviation Administration
Louisville-Standiford ATCT/TRACON
AUTHORITY 755 Grade Lane
Louisville, KY 40213



Re: Request for the Implementation of the Louisville International Airport FAR Part 150 Update Noise Abatement Measure 7 Offset Approach

Dear Mr. Senechal:

PO Box 9129

LOUISVILLE, KY

40209-0129

TEL 502/368-6524

FAX ADMINISTRATIVE
502/367-0199

FAX ENGINEERING
502/369-5395

FAX MAINTENANCE/
PURCHASING AND
PROCUREMENT
502/380-8270

LOUISVILLE
INTERNATIONAL
AIRPORT

BOWMAN FIELD

The Louisville Regional Airport Authority (RAA) formally requests the implementation of the offset approach component of Noise Abatement Measure 7 as detailed in the Louisville International Airport FAR Part 150 Update dated May 24, 2004. The intent of this measure is to implement an offset approach to Runway 17R at the Louisville International Airport (SDF) through an industrial corridor northwest of the airport and south of the University of Louisville campus, alleviating noise and reducing the need for sound insulation in neighborhoods north of the airport.

As you know, the LRAA has conducted various working meetings with UPS and local Air Traffic Control personnel over the past two years in order to determine the feasibility of the approaches and define the steps for implementation. UPS has conducted flight simulator tests of these procedures and has indicated a willingness to fly the procedures provided capacity is not impacted and that proper vertical guidance is available (electronic or visual).

Implementation of the measure involves the development of two procedures: 1) an RNAV (GPS), and 2) an LDA to Runway 17R. Modification of the existing Precision Approach Path Indicator (PAPI) serving Runway 17R and the installation of a localizer and DME are also required.

The following paragraphs detail the history of this project, define the project purpose and need, identify NAVAID equipment requirements, and provide general costs associated with the implementation of the measure.

Project History, Purpose and Need:

In January of 2003 an FAA FAR Part 150 Noise Study Update for the Louisville International Airport, prepared by airport consultants Leigh Fisher Associates was submitted to the Federal Aviation Administration. This Noise Compatibility Study (the Study) was initiated to update aircraft noise and land use compatibility plans first completed in 1993. A number of recommendations came out of the Study, two of which will be addressed in this request: measures NA-2 and NA-7.

Measure NA-2 is an Air Traffic Control measure that calls for the reversal of the current East-West Runway Preference (Day and Night). The proposal is to reverse the current runway use program to prefer the west runway. The "trigger" of three aircraft in the landing or departure queue currently used to direct ATC to use both parallel runways would be retained as part of this measure. This measure would be combined with measure NA-7, described below, to mitigate potential noise increases at the University of Louisville and in Old Louisville, a community located immediately north of the University.

Measure NA-7 is an Approach and Departure Procedure measure which recommends an offset departure from Runway 35L and an offset approach to Runway 17R. The purpose of the measure is to route air traffic through a noise compatible industrial corridor to the northwest of Runway 17R, thereby reducing the number of homes and noise sensitive facilities within the DNL 65 noise contours in the areas north of the airport. Implementation of this measure could reduce the cost of sound insulation (to be funded through FAA AIP grants) by \$36 million.

As previously discussed, only the approach procedures are being requested at this time. The intent is to utilize the approaches during VFR conditions only when capacity is not impacted. The concept is modeled after the Simultaneous Offset Instrument Approach (SOIA) currently in use at the San Francisco International Airport. The SOIA approach has been implemented successfully and has accommodated arrival rates ranging from 30 to 60 operations per hour as detailed in Table 1.

Table 1
Simultaneous Offset Instrument Approach (SOIA)
San Francisco International Airport (SFO)
Historical Operations

Date	Began	Ended	Duration	Arrivals 28L/28R	Rate	LDA/PRM 28R	Sky Conditions	Vis.
10/25/04	11:31	12:04	0:33	22	40	9	BKN 42 to BKN 50	10
10/27/04	8:54	9:42	0:48	25	31	10	BKN 22	10
10/27/04	11:07	12:48	1:41	61	36	22	FEW 25 to SCT 40	10
11/08/04	9:32	11:26	1:54	65	34	32	BKN 30	10
11/08/04	11:57	12:46	0:49	25	30	11	OVC 31	10
11/08/04	14:38	15:28	0:50	26	31	4	OVC 30 to OVC 37	10
11/27/04	10:35	11:09	0:34	18	32	8	BKN 29 to BKN 32	10
12/07/04	9:33	9:59	0:26	21	48	11	BKN 21 to BKN 24	10
12/07/04	11:25	11:42	0:17	14	49	7	BKN 26	10
01/28/05	9:42	11:30	1:48	61	34	30	SCT 028 BKN 038 BKN 055	9
01/28/05	14:13	15:12	0:59	32	33	11	SCT 024 BKN 037	10
02/07/05	11:07	11:38	0:31	21	41	10	FEW 037 SCT 045 BKN 60	10
02/24/05	9:31	11:14	1:43	59	34	27	OVC 021	10
02/24/05	12:08	12:41	0:33	19	35	10	SCT 019 OVC 021	10
02/24/05	16:06	19:37	1:31	54	36	25	OVC 021	10
02/25/05	10:18	10:38	0:20	12	36	7	SCT 024 OVC 029	10
02/25/05	11:11	12:31	1:20	51	38	24	OVC 031	10
03/13/05	10:07	10:21	0:14	8	34	4	SCT 023	10

03/22/05	9:40	11:44	2:03	68	33	38	SCT 15 BKN 22 OVC 34	7
03/23/05	9:22	10:18	0:51	37	43	21	BKN 025 OVC 048	10
03/23/05	11:12	12:04	0:52	38	43	19	SCT 025 SCT 042 OVC 055	10
04/07/05	10:06	10:34	0:26	20	43	9	FEW 020 SCT 035 OVC 180	10
04/08/05	12:51	14:17	1:26	50	35	22	SCT 031 BKN 085	8
04/11/05	9:42	10:28	0:46	31	40	16	BKN 020 BKN 038	10
04/11/05	11:34	12:08	0:34	26	46	11	SCT 018 BKN 028	10
04/24/05	11:15	11:50	0:35	27	46	15	SCT 027 BKN 035 BKN 060	10
04/29/05	9:12	10:16	1:04	49	46	24	FEW015 BKN025	10
05/05/05	10:15	10:47	0:32	23	43	12	FEW012 SCT023 BKN065	10
05/05/05	14:21	14:56	0:34	17	29	8	SCT033 BKN055	10
05/05/05	11:12	11:33	0:21	16	44	8	SCT025 SCT055	10
05/08/05	18:45	20:00	1:15	39	31	18	SCT022 BKN033 BKN090	10
05/06/05	20:52	21:34	0:42	31	44	16	FEW017 SCT038 BKN070	10
05/07/05	9:04	12:30	3:26	123	36	62	FEW017 SCT024 BKN 041	10
05/09/05	9:36	10:36	0:59	44	44	21	SCT021 BKN033 BKN050	6
05/16/05	11:11	11:42	0:31	21	41	11	SCT022 SCT028	10
05/17/05	9:34	10:14	0:40	31	48	14	SCT024 BKN180	10
05/19/05	17:04	17:42	0:38	24	37	8	FEW021 SCT025 BKN040	10
05/28/05	10:23	10:49	0:26	16	37	8	FEW009 SCT014 BKN250	10
06/17/05	9:33	10:26	0:53	37	42	19	FEW028 BKN034 BKN041	10
06/18/05	9:30	10:23	0:53	31	35	16	SCT024 SCT034 BKN043	10
06/18/05	11:05	11:57	0:52	34	38	15	SCT024 SCT036 BKN050	10
06/25/05	9:49	12:08	2:19	81	35	39	BKN024	10
06/27/05	10:34	11:25	0:51	35	41	18	BKN024	10
10/15/05	9:19	9:56	0:37	29	47	14	BKN018 OVC032	7
10/15/05	11:05	11:37	0:32	28	53	10	FEW015 SCT023	10
10/19/05	9:27	11:52	2:25	99	40	41	FEW015 OVC024	10
10/26/05	15:18	15:47	0:29	9	21	5	FEW012	10
12/12/05	17:08	17:58	0:50	33	46	16	BKN32 to BKN43	10
01/07/06	9:13	10:45	1:32	53	30	24	BKN 28	10
03/07/06	10:51	11:19	0:28	29	62	11	SCT060 SCT150	10

Notes:

1. Information obtained from September 12, 2006 SFO Port Authority presentation
2. SOIA approach used only when ceiling minimums are 2100' or greater.
3. Runway 28L and 28R separation = 3000'.

Procedure(s) Development Request:

The implementation of these measures requires the development of an offset RNAV (GPS) approach and an LDA Approach to Runway 17R. It is requested that the development of these procedures be separated into two phases: Phase 1 and Phase 2.

Phase 1 focuses on accommodating GPS approach capable aircraft and includes the development of an RNAV (GPS) approach procedure. This phase is based on the premise that a procedure of this type requires little or no investment in ground based NAVAIDs and can be implemented immediately. Phase 1 represents the starting point of the implementation of NA-7 and could serve as the catalyst to perfecting the operation prior to the implementation of Phase 2. Based on a sample of operations data obtained from the SDF tracking system data, this approach could accommodate up to 45% of the existing UPS fleet at SDF.

Phase 2 focuses on accommodating non-GPS/FMS equipped aircraft and includes the development of an LDA approach and the implementation of Localizer and DME infrastructure. Implementation of Phase 2 will be conducted after the RNAV GPS procedures have been implemented and ground based NAVAID equipment has been installed. Combined with Phase 1, this approach should accommodate all operations at SDF.

Two prototype approach procedures have been developed by ASRC Research and Technology Solutions (ARTS). These procedures have been coordinated with the Louisville Regional Airport Authority (LRAA) and meet the intent of Noise Measure NA-7. As previously mentioned, the RNAV procedure could be implemented immediately. However, the LDA approach requires ground based infrastructure and a final procedure can not be developed or implemented until the equipment is installed.

Phase 1: RNAV (GPS) Runway 17R

The procedure requested is an RNAV (GPS) approach procedure to Runway 17R. The final approach course is 150.75° True and is offset from the runway centerline of 165.41° True by 14.66° . The final approach course crosses runway centerline 5200' from the displaced threshold of Rwy 17R which is the maximum allowed by criteria. The intermediate segment is aligned with the final segment, is 6 NM in length, and has a minimum altitude of 2500' MSL, which is the intercept altitude for the LNAV/VNAV portion of the approach. The glide path angle and the TCH for the LNAV/VNAV are 3.0° and 55' respectively. The missed approach clearance limit is proposed as BETHY intersection (waypoint) or as requested by ATC. Differences in criteria do not allow the use of DAMEN intersection as a missed approach clearance limit.

There are two initial approach fixes, (IAFs) for this procedure. One is at NABB VORTAC and the other is at MAIZE intersection which will have to be modified to include a waypoint. A minimum altitude of 3000' is proposed for each initial segment. A copy of the proposed RNAV (GPS) approach procedure is shown in Attachment I.

Phase 2: LDA Runway 17R

The second procedure requested is an LDA approach to Runway 17R for aircraft not equipped to fly the RNAV approach, including almost every aircraft operating at SDF. Development of Phase 2 is requested to begin after the implementation of the RNAV procedure. The procedure will require the installation of a localizer and DME which will be funded by the Airport Improvement Program as part of the FAA approved FAR Part 150 Noise Study and installed in accordance with FAR Part 171 *Non Federal Navigation Facilities*. It would be the intent of the LRAA to request FAA take over the maintenance of the system upon its commissioning.

The ground track of the LDA is identical to the RNAV 17R approach. The final approach course is 150.75° True and the final approach course crosses the runway centerline 5200' from the displaced threshold for Runway 17R. The glide path angle is 3.0° and will utilize an offset PAPI for 17R. The missed approach is different from the RNAV (GPS) Rwy 17R procedure. The missed approach clearance limit for the LDA is DAMEN intersection as is the current missed approach for the ILS Runway 17R procedure.

The intermediate segment altitude remains at 2500' MSL. The length of the intermediate segment is 6 NM. The initial approach fix (IAF) is at NABB VORTAC and the initial segment altitude is 3000' MSL. DME or RADAR is required to identify the intermediate fix and the final approach fix.

A copy of the proposed LDA approach procedure is shown in **Attachment 2**. A full feasibility study and siting report, estimate for the installation of the PAPI, localizer and DME is contained in **Attachment 3**.

Cost Benefit of the Requested Equipment and Procedures:

Costs of implementing these procedures include procurement of NAVAIDs, engineering and installation, flight check, and maintenance. For budgetary purposes, rough order-of-magnitude costs have been developed for the RNAV (GPS) and the LDA procedures and are detailed in **Tables 2 and 3**.

**Table 2
Estimated Cost for Implementation of
RNAV(GPS) Approach to Runway 17R**

Facility	Procure Cost	Install Cost	Notes
PAPI	\$40,000	\$20,000	Assumes an additional PAPI system will be installed. An additional PAPI may not be required.
Totals	\$40,000	\$20,000	

Notes:

1. Cost generated for planning purposes only. Upon the approval of the measure, cost estimates will be refined based on specific site requirements and discussions with vendors.
2. PAPI installation may not be required as existing facility may provide coverage or be modified to provide coverage.

Table 3
Estimated Cost for Implementation of
LDA Approach to Runway 17R

Facility	Procure Cost	Install Cost	Notes
Localizer	\$250,000	\$350,000	Assumes terminal mounted system work, power and access available; ground-mounted antenna array
DME	\$100,000	\$30,000	Co-sited with LOC
PAPI	\$40,000	\$20,000	Assumes an additional PAPI system will be installed. An additional PAPI may not be required.
Miscellaneous	---	\$50,000 \$30,000	Sight Testing Flight inspection
Maintenance Fee LOC/GS		\$15,000	Cost per year routine conditions/flight inspections
Totals	\$540,000	\$570,000	

Notes:

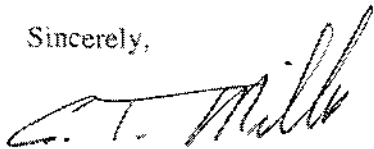
1. Cost generated for planning purposes only. Upon the approval of the measure cost estimates will be refined based on specific site requirements and discussions with vendors.
2. PAPI installation may not be required as existing facility may provide coverage or be modified to provide coverage.
3. PAPI costs are duplicated from RNAV costs.

As previously mentioned, the implementation of these approaches is anticipated to save up to \$36 million in sound insulation for houses north of the airport, representing a significant benefit based on the investment dollars required for the RNAV or LDA approaches.

We understand the implementation of the NA-7 approach procedures will require coordination from other FAA departments including: Airports, Airway Facilities, Flight Procedures Office, and Flight Standards. We have copied key FAA personnel on our request in an effort to move forward quickly and in a coordinated manner.

We look forward to working with you on this project and thank you for your assistance. If you have any questions, please contact me at 502-368-6524.

Sincerely,



C.T. "Skip" Miller, A.A.E.
Executive Director
Louisville Regional Airport Authority

October 29, 2008

Page 7 of 7

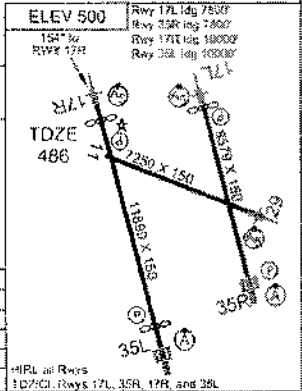
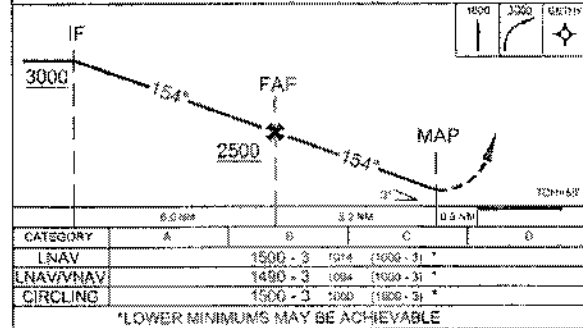
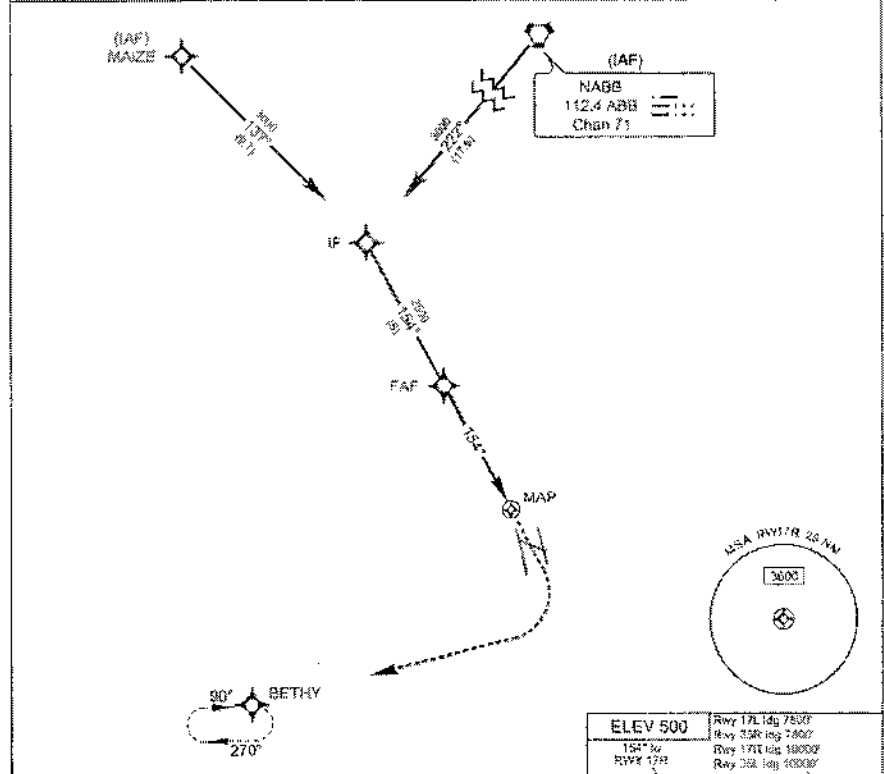
Cc: Philip Braden, FAA Airports District Office
Rusty Chapman, FAA Southern Region Airports Office
Gerald Lynch, FAA Eastern Region Flight Procedures Office
Douglas Murphy, FAA Southern Region Administrator
Karen Scott, LRAA Deputy Executive Director
Bob Slattery, LRAA Noise Abatement Manager

LOUISVILLE, KY

RNAV RWY 17R

LOUISVILLE INTL - STANDIFORD FIELD (SDF)

APP CRS 154°	Rwy Idg 10000' TDZE 486' Apt Elev 500'	MALSR	MISSED APPROACH: Climb to 1500' then climbing right turn to 3000' direct BETHY WP and hold.		
ATIS 119.725	LOUISVILLE APP CON 132.075 327.0 (EAST) 123.675 327.5 (WEST)	LOUISVILLE TOWER 124.2 257.8	GND CON 121.7 348.6	CLNC DEL 128.1	



LOUISVILLE, KY 38° 10'N-85° 34'W LOUISVILLE INTL - STANDIFORD FIELD (SDF)

RNAV RWY 17R

Prepared by ASRC
4255 Pleasant Ridge
Drive
Suite 402
Minneapolis, MN 55449
763.786.9592

DRAFT ONLY - NOT FOR COCKPIT USE

LOUISVILLE, KY

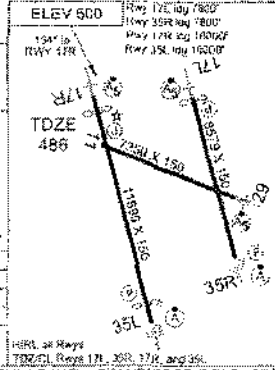
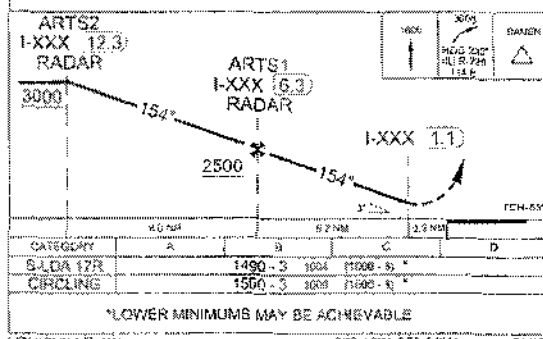
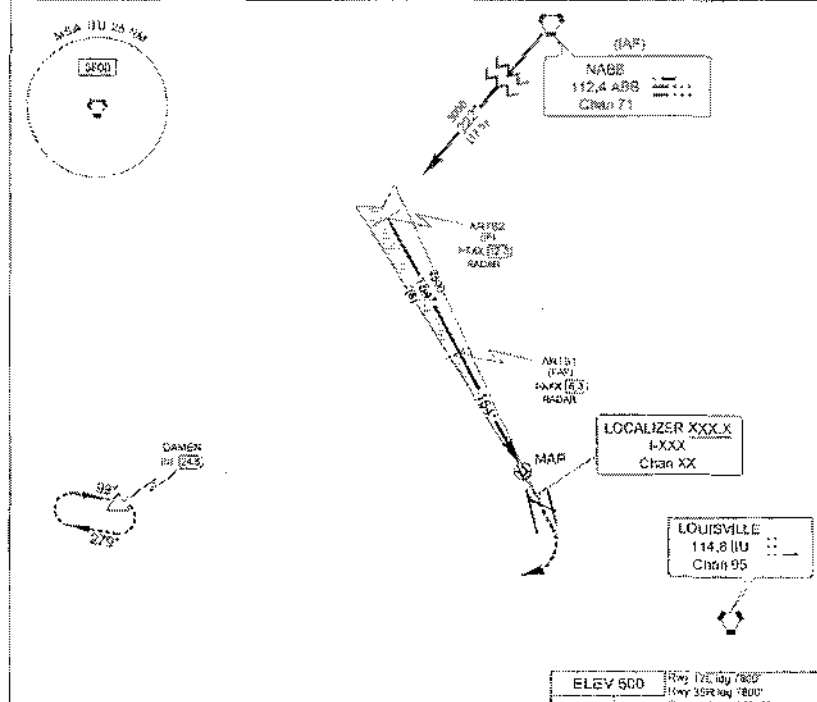
LOUISVILLE I-XXX XXXA Chan XX	APP CRN 154°	Rwy Egs 10000 TDZE 980' Apt Elev 500'
-------------------------------------	-----------------	---

LDA RWY 17R

LOUISVILLE INTL - STANDIFORD FIELD (SDF)

<p>▽ DME or RADAR required</p> <p>△ NA</p>	<p>MALSR</p>	<p>MISSED APPROACH: Climb to 1600' then climbing right turn to 3000' via heading 230° and IJF VORTAC R-279 to DAMEN and hold</p>
--	--------------	--

<p>ATIS 118.725</p>	<p>LOUISVILLE APP CON 132.075 327.0 (EAST) 123.675 327.0 (WEST)</p>	<p>LOUISVILLE TOWER 124.2 257.8</p>	<p>GND CON 121.7 348.6</p>	<p>CLNC DEL 126.1</p>
-------------------------	---	---	--------------------------------	---------------------------



LOUISVILLE, KY 38° 10'N-85° 44'W LOUISVILLE INTL - S (STANDIFORD FIELD) (SDF)

LDA RWY 17R

Prepared by ASRC
4225 Pheasant Ridge
Drive
Suite 402
Metropolis, MO 65449
Tel: 536.9502

DRAFT ONLY - NOT FOR COCKPIT USE

ATTACHMENT 2



U.S. Department
of Transportation
**Federal Aviation
Administration**

1701 Columbia Avenue
College Park, GA 30337-2748

APR 03 2009

Mr. C. T. "Skip" Miller, A.A.E.
Executive Director
Louisville Regional Airport Authority (LRAA)
P.O. Box 9129
Louisville, KY 40209

Dear Mr. Miller

A handwritten signature in black ink that reads "Skip" with a long horizontal stroke extending to the right.

This is in response to your October 29, 2008 letter requesting implementation of the Louisville-Standiford International Airport (SDF) 14 Code of Federal Regulations (CFR), Part 150 Update, *Noise Abatement Measure 7 Offset Approach*.

In the Federal Aviation Administration (FAA) Record of Approval (ROA), dated May 14, 2004 a determination of "No action required at this time" was given for Noise Compatibility Program (NCP) Measure NA-7, which included the proposed offset approach procedure. The determination additionally stated "a technical analysis of this measure...and an environmental analysis are required to determine its feasibility and environmental impacts." The determination also highlighted operational and capacity concerns that were not addressed adequately in the Louisville Regional Airport Authority (LRAA) NCP. Finally, NA-7 speaks specifically to a Global Positioning System (GPS) or Localizer-Type Directional Aid (LDA) offset instrument approach to runway 17R. We started a formal analysis when we received the additional approach information in your October 29, 2008 request.

FAA's approval or disapproval of 14 CFR, Part 150 NCP recommendations is measured according to standards in Part 150 and the Aviation Safety and Noise Abatement Act of 1979. Part 150, Section 150.35 includes language stating that programs will be approved under this part if program measures relating to the use of flight procedures for noise control can be implemented within the period covered by the program and without reducing the level of aviation safety provided or adversely affecting the efficient use and management of the navigable airspace and air traffic control systems.

While not considering the absence of an environmental analysis nor a subsequent Safety Risk Management evaluation, FAA evaluated potential safety issues, technical feasibility, and operational efficiencies of your proposed offset approach procedure. As a result, the proposed instrument offset approach procedure to Runway 17R at Louisville-Standiford

International Airport (SDF), and the corresponding components of measure NA-7, are both deemed unacceptable and are disapproved for implementation.

FAA's decision includes these comments:

- The Flight Standards Division does not consider this procedure to be a safe operation. The stabilized approach would be compromised, and the missed approach (particularly with loss of engine power) would be under less than ideal conditions and would place the aircraft over a populated area close to the surface, as well as the parallel runway, while maneuvering in a non-favorable environment.
- The Quality Oversight and Technical Advisory, National Flight Procedures Office does not support development of the offset approach due to runway alignment and stabilization criteria, as well as an excessive required missed approach climb gradient.

The Air traffic Organization (ATO) has serious concerns about safety, efficiency, and incompatibility with existing and proposed arrival routes. ATO specifics include:

- The flight path of the proposed offset procedure would place the published missed approach procedure in conflict with arrivals and departures operating from RWY 17L/35R. This would create a significant safety risk. In addition, IFR arrivals from the east, destined for the offset approach, would be required to cross the straight-in final approach course for both Runways 17L and 17R before entering the pattern for the offset approach, which would result in an increased safety risk, along with an increased risk of separation errors.
- Use of an offset approach would eliminate Air Traffic control (ATC) ability to run simultaneous approaches to Runways 17L and 17R. This existing ability is key to an expeditious arrival traffic flow, and was one of the criteria used when designing the airport layout. Simultaneous approaches require that the approaches be parallel precision approaches. An offset approach to RWY 17R is neither parallel nor precise, and does not meet this criterion.
- An offset approach would require the use of increased separation standards, and result in substantial delays for arriving aircraft. It is estimate that an "offset" instrument approach procedure would restrict arrival capacity by approximately 1/3 during instrument (non-visual) weather conditions. Further reductions in capacity would result from the necessity to move the downwind leg of the Runway 17R approach approximately 5-7 miles beyond its normal location in order to accommodate this approach. This inefficiency would be exacerbated if Runway 17R were the preferred runway for all instrument arrivals, as proposed in NA-7.
- Normally, during visual conditions, and light-to-moderate traffic levels, arriving aircraft fly a "visual approach," which is generally the most direct and efficient route to the airport. Mandating the use of an instrument procedure during visual

conditions, for non-operational reasons, would result in extended flying miles, added time, and increased costs for our users.

- UPS and FAA are, at this time, collaboratively working to develop RNAV STARS for all runways at SDF. When complete, these STARS (Standard Terminal Arrival Routes) are expected to standardize arrival procedures into SDF, and provide significant cost and efficiency benefits to UPS and other airport users. The offset approach procedure proposed by LRAA is not compatible with these RNAV STARS.
- The proposed offset approach, as specified in the Part 150 Update, would be used in conjunction with NA-2, which reverses the current runway use program to prefer the west runway (RWY 17R). This would imply a significant use of this offset procedure, which would exacerbate the concerns highlighted above.

Based on your request and the aforementioned comments resulting from our technical analysis, the noise abatement measure NA-7, Use an Offset Departure from Runway 35L and Offset Approach to Runway 17R, is disapproved, from a procedural standpoint. In addition, the other noise abatement measures dependent on the Offset Approach, NA-2, Reverse East-West Preference and NA-3, Morning North Flow Preference are also disapproved. This proposal cannot be implemented without reducing the level of aviation safety provided and adversely affecting the efficient use and management of the navigable airspace and air traffic control systems. This disapproval does not constitute a determination under Part 150 which will be completed by the Memphis Airports District Office. They will be contacting you to revise the Record of Approval to reflect these disapprovals in accordance with Part 150.

Finally, according to 14 CFR Part 150, Subpart B, 150.21(d)(4), if your forecast Noise Exposure Map (NEM) is based on assumptions involving recommendations in the Noise Compatibility Program that are subsequently disapproved by FAA and that would change the future NEM such that a substantial, non-compatible land use is either excluded or included, contrary to the forecast NEM, a revised map must be submitted. Revised NEMs are subject to the same requirements and procedures as initial submissions of NEMs under Part 150. Please contact the Memphis Airports District Office at 901-322-8181 for further guidance on Part 150 issues.

If you need more information, please contact me at 404-305-5000.

Sincerely,



Douglas R. Murphy
Regional Administrator, Southern Region

This page intentionally left blank.

Appendix C: Noise Modeling Supporting Information

Table of Contents

Operational Forecast Documents:

Memorandum to FAA: Summary of Forecast Data for SDF NEM Update	C-5
NEM Derivative Forecast for 2024.....	C-15
NEM Derivative Forecast for 2029.....	C-17
FAA Approval Letter of Forecast Data for SDF NEM Update	C-19

Noise Model Inputs, Supplemental Information:

Table C-1. Modeled 2024 and 2029 Aircraft Types and AEDT Aircraft Type Assignment	C-23
Table C-2. Modeled Average Daily Detailed Air Taxi Aircraft Operations for 2024.....	C-29
Table C-3. Modeled Average Daily Detailed General Aviation Aircraft Operations for 2024.....	C-30
Table C-4. Modeled Average Daily Detailed Air Taxi Aircraft Operations for 2029.....	C-31
Table C-5. Modeled Average Daily Detailed General Aviation Aircraft Operations for 2029.....	C-32
Table C-6. Modeled Average Daily Detailed Military Operations for 2024 and 2029	C-33
SDF Contraflow Report, January 2024	C-35

Non-Standard Modeling Documents:

Memorandum to FAA Requesting Approval of Flight Profiles.....	C-47
FAA Approval Letter to Non-Standard Modeling Request.....	C-223

This page intentionally left blank.

Operational Forecast Documents

This page intentionally left blank.

TECHNICAL MEMO



Date: June 25, 2024

Project: Louisville Muhammad Ali International Airport (SDF)
Summary of Forecast Data for SDF NEM Update

From: Joni Steigerwald, ENV SP - C&S Engineers, Inc.

File: F87.023.200

This Technical Memo provides the recommended aviation activity levels for use in the development of the aircraft noise exposure contours representing the 2024 Existing Condition and 2029 Forecast Condition for the Louisville Muhammad Ali International Airport (SDF) Noise Exposure Map (NEM) Update in accordance with Title 14 of the Code of Federal Regulations Part 150 (Part 150). As a result of the analysis reported below, we recommend using the Federal Aviation Administration (FAA) Terminal Area Forecast (TAF)¹ as the basis for aircraft operations in 2024 and 2029 for the NEM Update.

I. Master Plan Forecast: Approved Baseline Forecast

The latest approved Master Plan at SDF was developed by Kimley-Horn and Associates, Inc. (KHA) and was provided for use in this technical memo. **Table 1** details the FAA-approved operations forecast presented in the Master Plan for the baseline forecast. For the purpose of this memo and the SDF NEM Update, the forecasted operations for 2024 and 2029 have been extrapolated per the Master Plan published growth rates².

Table 1 – 2021 SDF Master Plan Approved Forecast

Operations	MP Baseline 2018	MP Forecast	Extrapolation	MP Forecast	Extrapolation
		2023	2024	2028	2029
Commercial Operations	53,530	54,264	54,335	54,630	54,701
Air Cargo Operations	88,486	100,533	101,689	104,134	105,332
General Aviation Operations	25,316	27,330	27,724	29,285	29,707
Military Operations	2,367	2,878	2,878	2,878	2,878
TOTAL OPERATIONS	169,699	185,005	186,625	190,927	192,617

Source: 2021 SDF Master Plan completed by KHA; C&S Engineers, Inc.

¹ FAA TAF January 2024² Table 2.26 Baseline Forecast Summary (Master Plan 2021): AAGR Commercial Operations 0.13%, AAGR Air Cargo Operations 1.15%, AAGR GA Operations 1.44%, AAGR Military operations 0.0%.

² Table 2.26 Baseline Forecast Summary (Master Plan 2021): AAGR Commercial Operations 0.13%, AAGR Air Cargo Operations 1.15%, AAGR GA Operations 1.44%, AAGR Military operations 0.0%.

II. Operations Forecast from Most Recent FAA TAF (February 2023 / January 2024)

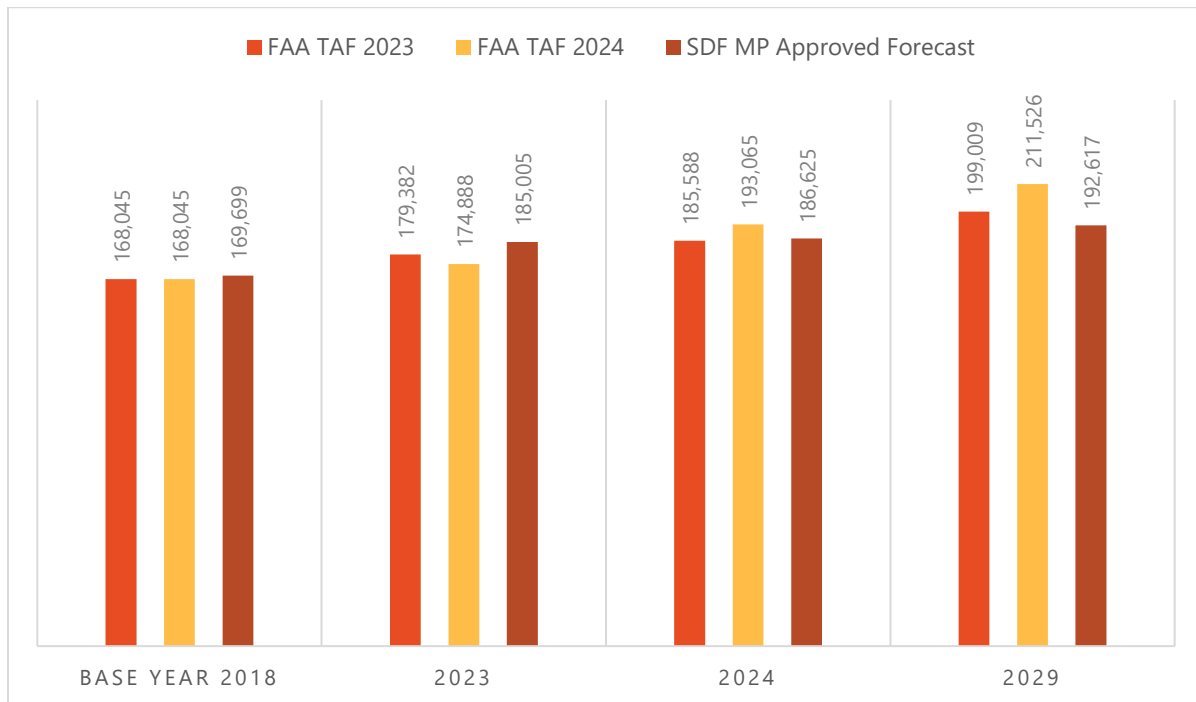
A review of the published FAA TAF (February 2023) information as well as the latest FAA TAF (January 2024) data is provided below in **Table 2**. The latest FAA TAF data includes higher operations than the approved 2021 Master Plan forecast for the projected years beyond 2023. **Figure 1** depicts the same data graphically.

Table 2 – FAA TAF Operations

Operations Forecast Source	2023	2024	2029
FAA TAF (Published February 2023)	179,382	185,588	199,009
FAA TAF (Published January 2024)	174,888	193,065	211,526
<i>SDF Master Plan Approved Forecast 2021</i>	<i>185,005</i>	<i>186,625</i>	<i>192,617</i>

Source: FAA TAF February 2023; FAA TAF January 2024; SDF Master Plan 2021

Figure 1 – SDF Operations FAA TAF v. SDF MP Approved Forecast



Source: FAA TAF February 2023; FAA TAF January 2024; SDF Master Plan 2021

III. Operations from Recent 12 Months of Activity

LRAA provided a recent 12 months (September 1, 2022, through August 30, 2023) of flight track and aircraft identification data from the SDF noise and operations monitoring system (NOMS)³ to serve as the basis for the NEM derivative forecasts and other data required for noise modeling purposes, e.g., fleet mix, day-night split, runway use, and flight path use. **Table 3** summarizes the 12 months of aircraft operations from the SDF NOMS data and scales those operations by category to match the FAA’s Operations Network (OPSNET)⁴ counts for the same time period.

Table 3 – SDF Radar Operations / OPSNET Operations

Operations	NOMS Operations	Scaled to OPSNET Totals
Air Carrier Cargo Operations	100,158	100,592
Air Carrier Passenger Operations	47,275	47,511
Air Taxi Operations	13,689	15,265
General Aviation Operations	8,303	9,877
Military Operations	70	1,889
TOTAL OPERATIONS	169,495	175,134*

*Does not include 372 local operations

Source: Symphony EnvironmentalVue Airport Operations Management Systems, September 2022 through August 2023; OPSNET, September 2022 through August 2023

IV. Additional Input from SDF Stakeholders/Tenants

Through conversations with key stakeholders at the Airport, an indication of what can be expected at SDF over the next five years of forecasted activity is noted below by category.

Cargo

Reports from both LRAA staff and cargo operators have noted there has been a 10 percent decrease in cargo operations activity over the past year as compared to the prior year. Published operations data corroborate this information in tower data (OPSNET). The following list includes key findings from these conversations:

- It’s been noted that the Master Plan forecast was developed prior to the rise in cargo during COVID-19.

³ Aircraft Flight Tracking and Noise Management System (NOMS)

⁴ The Operations Network (OPSNET) is the official source of FAA air traffic operations and delay data. Daily Operations Data is available from FY 1990 through yesterday. Daily Delay Data is available from FY 2000 through yesterday. Although operations and delay data are available through yesterday, they are not publicly accessible until after the 20th of the next month.

- The MD-11 aircraft are in the process of being phased out at SDF, with Boeing 767-300 aircraft increasing in operations as a result.
- Projections for cargo aircraft operations are expected to increase over the planning period due to a current tenant securing a new contract for cargo operations.

Airlines

Conversations with LRAA staff concurred that SDF is trending ahead of the 2021 Master Plan approved forecast in enplanements. It is important to understand the correlation of those enplanements to the aircraft being utilized and the operations associated with that growth. The conversations included the following commentary:

- Aircraft operations are not increasing at the rate of increased enplanements as air carriers have been up-gauging to larger aircraft to accommodate the growth in passengers with fewer pilots and aircraft available as compared to 2019.
- Since 2019, enplanements have increased 15 percent while operations have decreased 8 percent.
- In 2023, enplanements increased 25 percent from 2022 but flights have only increased 13 percent.
- The airlines are tracking leisure travel trends, showing growth in the number of leisure enplanements.
- There is currently more leisure travel than compared to pre-COVID-19 numbers, with increased capacity to BOS, DEN, DFW, LAS, PHX and other destinations.
- LRAA expects continued growth in enplanements (8 to 10 percent per year) associated with 1 to 2 percent growth in operations. SDF is seeing more activity with the Boeing 737 MAX aircraft (MAX 8, MAX 9) and the Airbus A321neo aircraft types.
- There has been a change in frequency of flights associated with up-gauging. Whereas the SDF previously had six to seven flights with smaller regional jets per day to Chicago, there are now four to five flights per day with two to three of the larger jet types. LRAA believes the increase is due to the Airport being previously underserved, in addition to the increase in leisure activities in the area (bourbon tours, etc.). The Airport will continue to pursue additional airlines (Air Canada, Alaska Airlines, Jet Blue, etc.) with hopes to increase growth at SDF. These airlines currently operate with a fleet mix similar to SDF's current fleet.

Military

The Airport is home to the 123rd Kentucky Air National Guard, which operates the majority of the military activity at SDF. While this activity can change depending on national military initiatives, there is no known plan for a change in military operations. The Airport has noted that the Guard is in the process of changing their fleet from C-130H to C-130J aircraft.

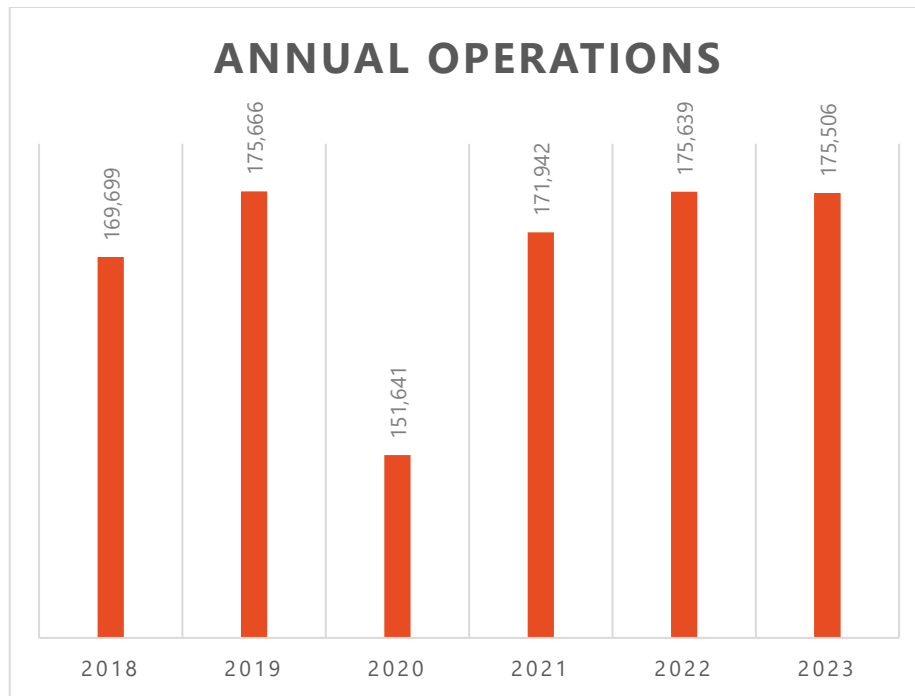
V. Forecast Comparison/Recommendation

While SDF has seen continual growth in operations since the published/approved forecast from the 2021 Master Plan, the post-COVID-19 activity in cargo operations has not grown at the published growth rates beyond 2023. With this in mind, it's important to evaluate the trend in actual annual tower operations over the years since the Master Plan's baseline of 2018.

A historical review of the OPSNET annual operations between the years of 2018 (the Master Plan baseline year) and 2022, shows the average annual growth rate (AAGR) of total operations to be 1.34 percent. Incorporating 2023 totals in the calculation from 2018 results in an AAGR of 1.06 percent.

Figure 2 presents the six years of OPSNET data graphically.

Figure 2 – SDF OPSNET Operations



Source: OPSNET

During the course of the development of this Technical Memo and forecast analysis, cargo operators at SDF have acquired a new contract for additional cargo activity. Conversations with the Airport indicate that cargo activity at SDF is expected to increase over the course of 2024 by an additional average daily 52 operations or approximately 19,000 annual operations. With this knowledge, it is important to include the growth in this five-year forecast. Projections in other categories of activity are for similar growth rates as seen over the past five years.

Table 4 summarizes the forecast information for the years 2023 (baseline), 2024 (existing), and 2029 (forecast). Included for comparison are the extrapolated projections from the approved Master Plan forecast, the most recent published FAA TAF annual operations forecast, and the projected growth based on the five-year trend (2018 – 2022) in the OPSNET operations. The bottom line identifies the projected annual operations recommended for the SDF NEM Forecast.

The recommendation for the SDF NEM Forecast follows the growth realized at the Airport over the past five years and includes the new activity in cargo operations, which parallels the FAA TAF projections. Based on this evaluation, the FAA TAF published operations forecast for the years 2024 and 2029 are the proposed operations levels for the SDF NEM Update.

Table 4 –Operations Forecast

Operations Forecast Source	2023 (Base Year)	2024 (Existing Conditions)	2029 (5-Year Forecast)
Master Plan ¹	N/A	N/A	192,617
FAA TAF ²	174,888	193,065	211,526
OPSNET Operations Trend ³	175,506*	177,858**	190,436**
Proposed SDF NEM Update Operations	N/A	193,065	211,526

1. 2021 Master Plan approved forecast 2023
2. FAA TAF January 2024
3. SDF NEMS Operations scaled to OPSNET (September 1, 2022 through August 31, 2023)
*Includes local operations (372)
**OPSNET extrapolated based on AAGR from 2018 annual operations through 2022 (1.34% AAGR)

VI. Operations Fleet Mix Forecast Summary

Table 5 provides the aircraft fleet mix forecast data for 2024 and 2029.

Table 5 – Operations Fleet Mix Forecast

2024	Category	Type	Operations	% Annual Operations
	Air Carrier	Jets	163,424	85%
	Air Taxi	Jets	10,447	5%
		Non-Jets	6,381	3%
	GA	Helicopters	213	Less than 1%
		Jets	8,750	5%
		Non-Jets	1,927	1%
	Military	KYANG C-130s	1,194	1%
		Transient	729	Less than 1%
TOTAL			193,065	100.00%
2029	Category	Type	Operations	% Annual Operations
	Air Carrier	Jets	179,613	85%
	Air Taxi	Jets	11,296	5%
		Non-Jets	6,900	3%
	GA	Helicopters	228	Less than 1%
		Jets	9,462	5%
		Non-Jets	2,082	1%
	Military	KYANG C-130s	1,208	1%
		Transient	737	Less than 1%
TOTAL			211,526	100.00%

ATTACHMENTS:

1. FAA TAF January 2024
2. OPSNET 2018-2023

APO TERMINAL AREA FORECAST DETAIL REPORT

Forecast Issued January 2024

SDF

AIRCRAFT OPERATIONS														
Fiscal Year	Enplanements			Itinerant Operations					Local Operations			Total Ops	Total Tracon Ops	Based Aircraft
	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total			
REGION:ASO STATE:KY LOCID:SDF														
CITY:LOUISVILLE AIRPORT:LOUISVILLE MUHAMMAD ALI INTL														
2013	897,738	763,595	1,661,333	92,930	42,505	10,213	2,840	148,488	252	119	371	148,859	206,050	26
2014	942,957	711,232	1,654,189	96,633	36,755	11,619	2,799	147,806	431	242	673	148,479	205,003	27
2015	855,274	776,478	1,631,752	102,860	30,108	11,560	2,953	147,481	458	131	589	148,070	203,499	23
2016	860,498	768,257	1,628,755	110,487	27,948	11,340	2,706	152,481	637	213	850	153,331	208,772	35
2017	854,451	800,153	1,654,604	123,002	24,404	10,573	2,887	160,866	711	213	924	161,790	219,719	27
2018	967,375	849,750	1,817,125	127,716	25,750	11,574	2,327	167,367	573	105	678	168,045	224,892	36
2019	1,115,241	903,961	2,019,202	136,394	24,002	10,311	2,121	172,828	510	176	686	173,514	232,853	29
2020	597,391	519,893	1,117,284	132,437	16,925	7,025	1,547	157,934	369	137	506	158,440	211,389	29
2021	658,891	581,490	1,240,381	138,351	16,102	8,383	2,119	164,955	558	117	675	165,630	226,816	29
2022	1,134,071	754,463	1,888,534	148,668	16,701	10,287	1,730	177,386	475	86	561	177,947	248,277	31
2023*	1,486,301	681,129	2,167,430	147,817	15,019	9,808	1,917	174,561	186	141	327	174,888	245,596	31
2024*	1,961,352	652,354	2,613,706	169,281	11,378	10,108	1,917	192,684	240	141	381	193,065	262,582	31
2025*	1,996,020	663,838	2,659,858	172,839	13,425	11,222	1,917	199,403	527	141	668	200,071	273,248	31
2026*	2,018,757	671,385	2,690,142	176,704	12,456	11,235	1,917	202,312	532	141	673	202,985	275,842	31
2027*	2,042,896	679,397	2,722,293	179,680	12,327	11,248	1,917	205,172	537	141	678	205,850	278,973	31
2028*	2,067,202	687,459	2,754,661	182,383	12,455	11,261	1,917	208,016	543	141	684	208,700	282,265	31
2029*	2,089,820	694,972	2,784,792	185,063	12,584	11,273	1,917	210,837	548	141	689	211,526	285,521	31
2030*	2,111,966	702,330	2,814,296	187,755	12,713	11,286	1,917	213,671	554	141	695	214,366	288,788	31
2031*	2,133,915	709,622	2,843,537	190,468	12,843	11,299	1,917	216,527	559	141	700	217,227	292,078	31
2032*	2,156,060	716,979	2,873,039	193,214	12,974	11,312	1,917	219,417	565	141	706	220,123	295,406	31
2033*	2,178,088	724,298	2,902,386	195,984	13,107	11,325	1,917	222,333	570	141	711	223,044	298,762	31
2034*	2,200,037	731,588	2,931,625	198,779	13,241	11,338	1,917	225,275	576	141	717	225,992	302,145	31
2035*	2,222,510	739,056	2,961,566	201,619	13,376	11,351	1,917	228,263	582	141	723	228,986	305,584	31
2036*	2,245,619	746,737	2,992,356	204,507	13,512	11,364	1,917	231,300	588	141	729	232,029	309,081	31
2037*	2,269,172	754,559	3,023,731	207,436	13,650	11,377	1,917	234,380	593	141	734	235,114	312,624	31
2038*	2,292,647	762,359	3,055,006	210,393	13,789	11,390	1,917	237,489	599	141	740	238,229	316,196	31
2039*	2,316,594	770,316	3,086,910	213,393	13,929	11,403	1,917	240,642	605	141	746	241,388	319,817	31
2040*	2,341,162	778,482	3,119,644	216,442	14,071	11,416	1,917	243,846	611	141	752	244,598	323,499	31
2041*	2,365,223	786,472	3,151,695	219,506	14,214	11,429	1,917	247,066	618	141	759	247,825	327,194	31
2042*	2,390,181	794,767	3,184,948	222,628	14,358	11,442	1,917	250,345	624	141	765	251,110	330,960	31

APO TERMINAL AREA FORECAST DETAIL REPORT

Forecast Issued January 2024

SDF

AIRCRAFT OPERATIONS

Fiscal Year	Enplanements			Itinerant Operations				Local Operations			Total Ops	Total Tracon Ops	Based Aircraft	
	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military				Total
2043*	2,415,418	803,149	3,218,567	225,789	14,504	11,455	1,917	253,665	630	141	771	254,436	334,772	31
2044*	2,440,600	811,515	3,252,115	228,980	14,651	11,469	1,917	257,017	636	141	777	257,794	338,618	31
2045*	2,465,820	819,891	3,285,711	232,204	14,800	11,482	1,917	260,403	643	141	784	261,187	342,499	31
2046*	2,491,151	828,307	3,319,458	235,464	14,950	11,495	1,917	263,826	649	141	790	264,616	346,422	31
2047*	2,516,533	836,738	3,353,271	238,758	15,101	11,508	1,917	267,284	656	141	797	268,081	350,385	31
2048*	2,541,846	845,147	3,386,993	242,084	15,254	11,521	1,917	270,776	662	141	803	271,579	354,387	31
2049*	2,567,460	853,656	3,421,116	245,452	15,408	11,534	1,917	274,311	669	141	810	275,121	358,440	31
2050*	2,593,455	862,295	3,455,750	248,866	15,564	11,547	1,917	277,894	675	141	816	278,710	362,549	31

OPSNET : Airport Operations : Standard Report

From 01/2018 To 09/2023 | Facility=SDF

Calendar Year	Facility	State	Region	DDSO Service		Air Carrier	Air Taxi	Itinerant General Aviation		Local			Total Operations		
				Area	Class			Military	Total	Civil	Military	Total			
2018	SDF	KY	ASO	CE	Combined	TRACON & Tower with I	129,765	25,423	11,553	2,247	168,988	591	120	711	169,699
2019	SDF	KY	ASO	CE	Combined	TRACON & Tower with I	138,987	24,018	9,959	2,083	175,047	470	149	619	175,666
2020	SDF	KY	ASO	CE	Combined	TRACON & Tower with I	129,078	13,982	6,391	1,611	151,062	411	168	579	151,641
2021	SDF	KY	ASO	CE	Combined	TRACON & Tower with I	142,917	17,261	9,143	1,958	171,279	584	79	663	171,942
2022	SDF	KY	ASO	CE	Combined	TRACON & Tower with I	146,560	16,169	10,352	1,921	175,002	435	202	637	175,639
2023	SDF	KY	ASO	CE	Combined	TRACON & Tower with I	108,878	11,214	7,370	1,448	128,910	122	25	147	129,057
Total:							796,185	108,067	54,768	11,268	970,288	2,613	743	3,356	973,644

Report created on Mon Oct 30 14:37:48 EDT 2023

Sources: The Operations Network (OPSNET)

[Show data notices.](#)

This page intentionally left blank.

This page intentionally left blank.



U.S. Department
of Transportation
**Federal Aviation
Administration**

Memphis Airports District Office
2600 Thousand Oaks Blvd, Suite 2250
Memphis, Tennessee 38118
Phone: 901-322-8180

July 30, 2024

Mr. Brian J. Sinnwell, C.M.
Vice President, Planning & Facilities
Louisville Regional Airport Authority
4320 Park Blvd
Louisville, Kentucky 40209

**Summary of Forecast Data for Noise Exposure Map Update
Louisville Muhammad Ali International Airport (SDF)**

Dear Mr. Sinnwell:

We have reviewed the technical memo, titled “Summary of Forecast Data for SDF NEM Update,” dated June 25, 2024. As a result of our review, we concur with and approve the use of 2024 Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) as the baseline forecast for use in the Noise Exposure Map Update. Should you have any questions, please feel free to contact me at Kabrina.d.webb@faa.gov.

Sincerely,

Kabrina Webb, Community Planner
Memphis Airports District Office

This page intentionally left blank.

Noise Model Inputs, Supplemental Information

This page intentionally left blank.

Table C-1. Modeled 2024 and 2029 Aircraft Types and AEDT Aircraft Type Assignment
Source: SDF NOMS radar data, AEDT 3f database, and HMMH, 2023

Category	Engine Type	ICAO Type Designator	AEDT Airframe	AEDT Aircraft Type
Air Carrier	Jet	A20N	Airbus A320-NEO	A320-270N
		A21N	Airbus A321-NEO	A321-232
		A306	Airbus A300F4-600 Series	A300-622R
		A319	Airbus A319-100 Series	A319-131
		A320	Airbus A320-200 Series	A320-211
		A320	Airbus A320-200 Series	A320-232
		A321	Airbus A321-100 Series	A321-232
		B38M	Boeing 737-8	737MAX
		B39M	Boeing 737-9	737MAX
		B712	Boeing 717-200 Series	717200
		B722	Boeing 727-200 Series Freighter	727EM2
		B732	Boeing 737-200 Series	737N17
		B733	Boeing 737-300 Series Freighter	737300
		B734	Boeing 737-400 Series	737400
		B737	Boeing 737-700 Series	737700
		B738	Boeing 737-800 Series	737800
		B739	Boeing 737-900 Series	737800
		B739	Boeing 737-900-ER	737800
		B744	Boeing 747-400 Series Freighter	747400
		B744	Boeing 747-400 Series Freighter	747400RN
		B748	Boeing 747-8F	7478
		B752	Boeing 757-200 Series Freighter	757RR
		B752	Boeing 757-200 Series	757PW
		B762	Boeing 767-200 Series Freighter	767CF6
		B763	Boeing 767-300 Series	767300
		B763	Boeing 767-300 ER Freighter	7673ER
		BCS3	Airbus A220-300	737700
		CRJ7	Bombardier CRJ-700	CRJ9-ER
		CRJ9	Bombardier CRJ-900	CRJ9-ER
		DC91	Boeing DC-9-10 Series Freighter	DC93LW
		DC93	Boeing DC-9-30 Series Freighter	DC93LW
		E170	Embraer ERJ170	EMB170
		E190	Embraer ERJ190	EMB190
		E195	Embraer ERJ195	EMB195
		E75L	Embraer ERJ175-LR	EMB175
		E75S	Embraer ERJ175	EMB175
		MD11	Boeing MD-11 Freighter	MD11GE
		MD11	Boeing MD-11 Freighter	MD11PW
		MD82	Boeing MD-82	MD82
		MD83	Boeing MD-83	MD83
	MD88	Boeing MD-88	MD83	
Turboprop		CVLT	Convair CV-640	CVR580

Category	Engine Type	ICAO Type Designator	AEDT Airframe	AEDT Aircraft Type
Air Taxi/ Commuter	Jet	BE40	Raytheon Beechjet 400	MU3001
		C25A	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C25B	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C25C	Cessna CitationJet CJ4 (Cessna 525C)	CNA525C
		C25M	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C525	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C550	Cessna S550 Citation S/II	CNA55B
		C560	Cessna 560 Citation V	CNA560U
		C56X	Cessna 560 Citation XLS	CNA560XL
		C680	Cessna 680 Citation Sovereign	CNA680
		C68A	Cessna 680-A Citation Latitude	CNA680
		C700	Cessna 700 Citation Longitude	CNA680
		C750	Cessna 750 Citation X	CNA750
		CL30	Bombardier Challenger 300	CL600
		CL35	Bombardier Challenger 350	CL600
		CL60	Bombardier Challenger 601	CL601
		CL60	Bombardier Challenger 604	CL600
		CL60	Bombardier Challenger 605	CL600
		CL60	Bombardier Challenger 600	CL601
		CRJ2	Bombardier CRJ-200	CL600
		CRJ2	Bombardier (Canadair) CRJ200 ExecLiner	CL601
		CRJ2	Bombardier (Canadair) CRJ200PF Bulk Freighter	CL600
		E135	Embraer ERJ140	EMB145
		E135	Embraer ERJ135 Legacy Business	EMB145
		E145	Embraer ERJ145-LR	EMB14L
		E45X	Embraer ERJ145-XR	EMB145
		E50P	Embraer Phenom 100 (EMB-500)	CNA510
		E545	Embraer Praetor 500	CNA750
		E550	Embraer Praetor 600	CL601
		E55P	Embraer Phenom 300 (EMB-505)	CNA55B
		F2TH	Dassault Falcon 2000	CNA750
		F900	Dassault Falcon 900-EX	FAL900EX
		FA20	Dassault Falcon 20-C	FAL20
		FA20	Dassault Falcon 20-D	FAL20
		FA20	Dassault Falcon 20-F	FAL20
		FA20	Dassault Falcon 200	FAL20
		FA50	Dassault Falcon 50	FAL900EX
		FA7X	Falcon 7X	GIV
		G150	Gulfstream G150	IA1125
		GALX	Gulfstream G200	CL600
		GL5T	Bombardier Global 5000	BD-700-1A11
		GLEX	Bombardier Global Express	BD-700-1A10
GLEX	Bombardier Global 6000	BD-700-1A10		
GLF4	Gulfstream IV-SP	GIV		
GLF4	Gulfstream G450	GIV		
GLF5	Gulfstream G-5 / Gulfstream G500	GV		
GLF6	Gulfstream G650ER	G650ER		

Category	Engine Type	ICAO Type Designator	AEDT Airframe	AEDT Aircraft Type
Air Taxi/ Commuter continued	Jet	H25B	Raytheon Hawker 800	LEAR35
		HA4T	Raytheon Hawker 4000 Horizon	CNA750
		HDJT	Honda HA-420 Hondajet	CNA510
		LJ35	Bombardier Learjet 35	LEAR35
		LJ35	Bombardier Learjet 36	LEAR35
		LJ40	Bombardier Learjet 40	LEAR35
		LJ45	Bombardier Learjet 45	LEAR35
		LJ55	Bombardier Learjet 55	LEAR35
		LJ60	Bombardier Learjet 60	LEAR35
		LJ70	Bombardier Learjet 70	LEAR35
		LJ75	Bombardier Learjet 75	LEAR35
		PC24	Pilatus PC-24	CNA55B
		PRM1	Raytheon Premier I	CNA55B
	SF50	Cirrus SF-50 Vision	ECLIPSE500	
	Turboprop	B190	Raytheon Beech 1900-C	1900D
		B350	Raytheon Super King Air 300	DHC6
		BE20	Raytheon Super King Air 200	DHC6
		BE30	Raytheon Super King Air 300	DHC6
		BE99	Raytheon Beech 99	DHC6
		C208	Cessna 208 Caravan	CNA208
		E110	Embraer EMB110 Bandeirante	DHC6
		E120	Embraer EMB120 Brasilia	EMB120
		MU2	Mitsubishi MU-2	DHC6
		PC12	Pilatus PC-12	CNA208
		SB20	Saab 2000	HS748A
		SF34	Saab 340-A	SF340
		SH36	Shorts 360-100	SD330
		SH36	Shorts 360-200	SD330
		SW4	Fairchild SA-227-AC Metro III	DHC6
		SW4	Fairchild Metro IVC	DHC6
		Piston	DA40	Diamond DA40
	DV20		Diamond DA20	CNA172
	P28R		Piper PA-28 Cherokee Series	GASEPF
General Aviation	Jet	ASTR	Gulfstream G100	IA1125
		BE40	Raytheon Beechjet 400	MU3001
		C25A	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C25B	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C25C	Cessna CitationJet CJ4 (Cessna 525C)	CNA525C
		C25M	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C500	Cessna 500 Citation I	CNA500
		C501	Cessna 501 Citation ISP	CNA500
		C510	CESSNA CITATION 510	CNA510
		C525	Cessna CitationJet CJ/CJ1 (Cessna 525)	CNA525C
		C550	Cessna S550 Citation S/II	CNA55B
		C560	Cessna 560 Citation V	CNA560U
		C560	Cessna 560 Citation Encore	CNA560E
		C56X	Cessna 560 Citation XLS	CNA560XL
		C650	Cessna 650 Citation III	CIT3

Category	Engine Type	ICAO Type Designator	AEDT Airframe	AEDT Aircraft Type
General Aviation continued	Jet	C680	Cessna 680 Citation Sovereign	CNA680
		C68A	Cessna 680-A Citation Latitude	CNA680
		C700	Cessna 700 Citation Longitude	CNA680
		C750	Cessna 750 Citation X	CNA750
		CL30	Bombardier Challenger 300	CL600
		CL35	Bombardier Challenger 350	CL600
		CL60	Bombardier Challenger 604	CL600
		CL60	Bombardier Challenger 600	CL601
		CRJ2	Bombardier CRJ-200	CL600
		CRJ2	Bombardier (Canadair) CRJ200 ExecLiner	CL601
		E135	Embraer ERJ135-LR	EMB145
		E135	Embraer ERJ140	EMB145
		E135	Embraer ERJ135 Legacy Business	EMB145
		E145	Embraer ERJ145-EP	EMB145
		E50P	Embraer Phenom 100 (EMB-500)	CNA510
		E545	Embraer Praetor 500	CNA750
		E550	Embraer Praetor 600	CL601
		E55P	Embraer Phenom 300 (EMB-505)	CNA55B
		EA50	Eclipse 500 / PW610F	ECLIPSE500
		F2TH	Dassault Falcon 2000	CNA750
		F900	Dassault Falcon 900-EX	FAL900EX
		FA10	Dassault Falcon 100	LEAR35
		FA20	Dassault Falcon 200	FAL20
		FA50	Dassault Falcon 50	FAL900EX
		FA7X	Falcon 7X	GIV
		G150	Gulfstream G150	IA1125
		G280	Gulfstream G280	CL601
		GA5C	Gulfstream Aerospace Gulfstream G500 (G-7)	GV
		GA6C	Gulfstream G600	GV
		GALX	Gulfstream G200	CL600
		GL5T	Bombardier Global 5000	BD-700-1A11
		GLEX	Bombardier Global Express	BD-700-1A10
		GLF4	Gulfstream G450	GIV
		GLF4	Gulfstream IV-SP	GIV
		GLF5	Gulfstream G550	GV
		GLF5	Gulfstream G-5 / Gulfstream G500	GV
		GLF6	Gulfstream G650ER	G650ER
		H25B	Raytheon Hawker 800	LEAR35
		HDJT	Honda HA-420 Hondajet	CNA510
		LJ31	Bombardier Learjet 31	LEAR35
		LJ35	Bombardier Learjet 35	LEAR35
		LJ40	Bombardier Learjet 40	LEAR35
		LJ45	Bombardier Learjet 45	LEAR35
		LJ55	Bombardier Learjet 55	LEAR35
		LJ60	Bombardier Learjet 60	LEAR35
		LJ75	Bombardier Learjet 75	LEAR35
		PC24	Pilatus PC-24	CNA55B
PRM1	Raytheon Premier I	CNA55B		

Category	Engine Type	ICAO Type Designator	AEDT Airframe	AEDT Aircraft Type
General Aviation continued		SF50	Cirrus SF-50 Vision	ECLIPSE500
	Turboprop	B190	Raytheon Beech 1900-C	1900D
		B350	Raytheon Super King Air 300	DHC6
		BE10	Raytheon King Air 100	DHC6
		BE20	Raytheon Super King Air 200	DHC6
		BE9L	Raytheon Beech 99	DHC6
		C208	Cessna 208 Caravan	CNA208
		C441	Cessna 441 Conquest II	CNA441
		M600	Piper PA46-TP Meridian	CNA208
		MU2	Mitsubishi MU-2	DHC6
		P180	Piaggio P.180 Avanti	DHC6
		P46T	Piper PA46-TP Meridian	CNA208
		PAY2	Piper PA-31T Cheyenne	CNA441
		PC12	Pilatus PC-12	CNA208
		SW4	Fairchild SA-227-AC Metro III	DHC6
		TBM7	EADS Socata TBM-700	CNA208
		TBM8	SOCATA TBM 850	CNA208
		TBM9	Daher TBM 900 Series	CNA208
	Piston Piston	BE33	Raytheon Beech Bonanza 36	GASEPV
		BE55	Raytheon Beech 55 Baron	BEC58P
		BE58	Raytheon Beech Baron 58	BEC58P
		C150	Cessna 150 Series	GASEPF
		C172	Cessna 172 Skyhawk	CNA172
		C182	Cessna 182	CNA182
		C195	Cessna 195 (FAS)	GASEPV
		C206	Cessna 206	CNA206
		C210	Cessna 210 Centurion	GASEPV
		C310	Cessna 310	BEC58P
		C340	Cessna 340	BEC58P
		C414	Cessna 414	BEC58P
		C421	Cessna 421 Piston	BEC58P
		CORS	Piper PA-32 Cherokee Six	GASEPV
		DA40	Diamond DA40	GASEPV
		DA42	Diamond DA42 Twin Star	PA30
		DV20	Diamond DA20	CNA172
		G44	Raytheon Beech Baron 58	BEC58P
		M20P	Mooney M20-K	GASEPV
		P28A	Piper PA-28 Cherokee Series	GASEPF
		P32R	Piper PA-32 Cherokee Six	GASEPV
		PA24	Piper PA-24 Comanche	GASEPV
		PA30	Piper PA-30 Twin Comanche	PA30
		PA31	Piper PA-31 Navajo	BEC58P
		PA32	Piper PA-32 Cherokee Six	GASEPV
		PA34	Piper PA-34 Seneca	BEC58P
		PA44	Piper PA-44-180T (FAS)	PA30
		PA46	Piper PA46 Malibu (FAS)	GASEPV
		RV12	Vans RV12 (FAS)	GASEPF
		RV7	Vans RV-7	GASEPV

Category	Engine Type	ICAO Type Designator	AEDT Airframe	AEDT Aircraft Type
General Aviation continued	Piston	SR20	Cirrus SR20	COMSEP
		SR22	Cirrus SR22 (FAS)	COMSEP
	Helicopter	B06	Bell 206B-3	B206B3
		B407	Bell 407	B407
		B430	Bell 430	B430
		EC30	Eurocopter EC-130	EC130
		EC35	Eurocopter EC-T2 (CPDS)	EC130
Military	Jet	T38	T-38 Talon	T-38A
		F18	Boeing F/A-18 Hornet	F18EF
		C560	Cessna 560 Citation XLS	CNA560XL
		C17	Boeing C-17A	C17
		BE40	Raytheon Beechjet 400	MU3001
		B762	Boeing 767-200 ER	767300
		LJ35	Bombardier Learjet 35	LEAR35
	Turboprop	C30J	Lockheed C-130 Hercules ANP:C130AD	C130AD
		BE20	Raytheon Super King Air 200	DHC6
		TEX2	Beechcraft T-6 Texan 2	CNA208
	Piston	PA23	Piper PA-23 Apache	BEC58P
	Helicopter	H60	Sikorsky UH-60 Black Hawk	S70

Table C-2. Modeled Average Daily Detailed Air Taxi Aircraft Operations for 2024
Source: HMMH, C&S, LRAA, 2024

Category	Propulsion	AEDT Type	Arrivals		Departures		Total
			Day	Night	Day	Night	
Air Taxi	Jet	BD-700-1A10	0.04	0.00	0.04	0.00	0.08
		BD-700-1A11	0.04	0.00	0.04	0.00	0.08
		CL600	3.18	1.01	3.36	0.83	8.38
		CL601	0.30	0.28	0.50	0.09	1.17
		CNA510	0.20	0.01	0.20	0.00	0.41
		CNA525C	0.39	0.03	0.37	0.04	0.84
		CNA55B	1.41	0.04	1.35	0.09	2.89
		CNA560U	0.12	0.01	0.11	0.02	0.26
		CNA560XL	0.72	0.02	0.71	0.03	1.48
		CNA680	1.22	0.07	1.21	0.09	2.59
		CNA750	0.53	0.02	0.55	0.01	1.11
		ECLIPSE500	0.03	0.00	0.03	0.00	0.05
		EMB145	0.13	0.00	0.13	0.00	0.25
		EMB14L	1.19	0.01	1.20	0.00	2.40
		FAL20	0.20	0.24	0.22	0.22	0.88
		FAL900EX	0.05	0.00	0.05	0.00	0.11
		G650ER	0.01	0.00	0.02	0.00	0.03
		GIV	0.18	0.00	0.17	0.00	0.35
		GV	0.04	0.00	0.04	0.00	0.09
		IA1125	0.01	0.00	0.00	0.00	0.01
		LEAR35	0.66	0.09	0.63	0.12	1.50
	MU3001	0.60	0.01	0.59	0.03	1.23	
	Turboprop	1900D	0.02	0.85	0.05	0.82	1.74
		CNA208	0.18	0.83	0.18	0.83	2.02
		DHC6	0.94	0.68	1.20	0.42	3.23
		EMB120	0.20	0.27	0.25	0.22	0.93
		HS748A	0.05	0.00	0.04	0.01	0.10
		SD330	0.01	3.84	0.09	3.76	7.70
		SF340	0.04	0.08	0.07	0.05	0.24
	Piston	CNA172	0.01	0.00	0.01	0.00	0.02
		GASEPF	0.03	0.02	0.04	0.01	0.10
		GASEPV	0.08	0.01	0.07	0.02	0.17
	Air Taxi Total			12.81	8.43	13.51	7.73

Table C-3. Modeled Average Daily Detailed General Aviation Aircraft Operations for 2024
Source: HMMH, C&S, LRAA, 2024

Category	Propulsion	AEDT Type	Arrivals		Departures		Total	
			Day	Night	Day	Night		
General Aviation	Jet	BD-700-1A10	0.24	0.02	0.24	0.01	0.51	
		BD-700-1A11	0.12	0.00	0.11	0.01	0.24	
		CIT3	0.28	0.03	0.27	0.04	0.61	
		CL600	0.51	0.03	0.52	0.02	1.07	
		CL601	0.30	0.01	0.31	0.01	0.63	
		CNA500	0.03	0.00	0.03	0.00	0.08	
		CNA510	0.10	0.00	0.10	0.00	0.21	
		CNA525C	1.29	0.09	1.29	0.08	2.75	
		CNA55B	1.30	0.09	1.25	0.15	2.78	
		CNA560E	0.02	0.00	0.02	0.00	0.04	
		CNA560U	0.27	0.01	0.27	0.01	0.55	
		CNA560XL	0.61	0.02	0.61	0.03	1.27	
		CNA680	0.56	0.04	0.60	0.01	1.21	
		CNA750	1.36	0.13	1.40	0.09	2.98	
		ECLIPSE500	0.10	0.01	0.10	0.00	0.21	
		EMB145	0.13	0.00	0.12	0.02	0.27	
		FAL20	0.01	0.01	0.01	0.01	0.04	
		FAL900EX	0.35	0.02	0.35	0.02	0.73	
		G650ER	0.03	0.00	0.03	0.00	0.06	
		GIV	0.33	0.01	0.32	0.02	0.67	
		GV	0.22	0.01	0.21	0.02	0.46	
		IA1125	0.04	0.00	0.04	0.00	0.08	
		LEAR35	1.20	0.09	1.18	0.11	2.58	
		MU3001	0.30	0.04	0.31	0.03	0.68	
	Turboprop	1900D	0.04	0.00	0.04	0.00	0.08	
		CNA208	0.43	0.03	0.41	0.06	0.92	
		CNA441	0.03	0.00	0.03	0.00	0.05	
		DHC6	0.63	0.05	0.62	0.06	1.36	
	Piston	BEC58P	0.32	0.02	0.32	0.02	0.68	
		CNA172	0.31	0.01	0.29	0.04	0.65	
		CNA182	0.06	0.00	0.06	0.00	0.11	
		CNA206	0.02	0.00	0.02	0.00	0.04	
		COMSEP	0.20	0.02	0.20	0.02	0.45	
		GASEPF	0.13	0.01	0.13	0.02	0.29	
		GASEPV	0.33	0.02	0.32	0.03	0.70	
		PA30	0.04	0.01	0.04	0.01	0.10	
	Helicopter	B206B3	0.07	0.15	0.08	0.15	0.44	
		B407	0.04	0.01	0.02	0.03	0.10	
		B430	0.08	0.01	0.07	0.02	0.18	
		EC130	0.06	0.23	0.07	0.23	0.59	
	General Aviation Total			12.47	1.27	12.40	1.34	27.48

Table C-4. Modeled Average Daily Detailed Air Taxi Aircraft Operations for 2029
Source: HMMH, C&S, LRAA, 2024

Category	Propulsion	AEDT Type	Arrivals		Departures		Total
			Day	Night	Day	Night	
Air Taxi	Jet	BD-700-1A10	0.04	0.00	0.04	0.00	0.09
		BD-700-1A11	0.04	0.00	0.04	0.00	0.09
		CL600	3.40	1.08	3.60	0.88	8.96
		CL601	0.33	0.30	0.53	0.10	1.26
		CNA510	0.21	0.01	0.22	0.00	0.44
		CNA525C	0.42	0.03	0.40	0.05	0.89
		CNA55B	1.50	0.04	1.45	0.10	3.09
		CNA560U	0.13	0.01	0.12	0.02	0.28
		CNA560XL	0.77	0.02	0.75	0.04	1.58
		CNA680	1.31	0.08	1.29	0.09	2.77
		CNA750	0.57	0.03	0.59	0.01	1.19
		ECLIPSE500	0.03	0.00	0.03	0.00	0.05
		EMB145	0.14	0.00	0.14	0.00	0.27
		EMB14L	1.27	0.01	1.28	0.00	2.56
		FAL20	0.21	0.26	0.23	0.24	0.94
		FAL900EX	0.06	0.00	0.06	0.00	0.11
		G650ER	0.01	0.00	0.02	0.00	0.03
		GIV	0.19	0.00	0.19	0.00	0.38
		GV	0.05	0.00	0.04	0.00	0.09
		IA1125	0.01	0.00	0.00	0.00	0.01
	LEAR35	0.71	0.10	0.67	0.13	1.61	
	MU3001	0.65	0.01	0.63	0.03	1.32	
	Turboprop	1900D	0.02	0.91	0.05	0.88	1.86
		CNA208	0.19	0.88	0.19	0.89	2.16
		DHC6	1.00	0.72	1.28	0.44	3.45
		EMB120	0.21	0.29	0.27	0.23	0.99
		HS748A	0.05	0.00	0.04	0.01	0.11
		SD330	0.01	4.10	0.09	4.02	8.23
	Piston	SF340	0.05	0.08	0.08	0.05	0.26
		CNA172	0.01	0.00	0.01	0.00	0.02
GASEPF		0.04	0.02	0.05	0.01	0.11	
Air Taxi Total			13.69	9.01	14.44	8.26	45.40

Table C-5. Modeled Average Daily Detailed General Aviation Aircraft Operations for 2029
Source: HMMH, C&S, LRAA, 2024

Category	Propulsion	AEDT Type	Arrivals		Departures		Total	
			Day	Night	Day	Night		
General Aviation	Jet	BD-700-1A10	0.25	0.02	0.26	0.01	0.54	
		BD-700-1A11	0.12	0.00	0.12	0.01	0.25	
		CIT3	0.29	0.03	0.29	0.04	0.65	
		CL600	0.54	0.03	0.56	0.02	1.15	
		CL601	0.32	0.01	0.33	0.01	0.68	
		CNA500	0.04	0.00	0.04	0.00	0.08	
		CNA510	0.11	0.00	0.11	0.00	0.23	
		CNA525C	1.38	0.09	1.38	0.09	2.94	
		CNA55B	1.39	0.10	1.33	0.16	2.97	
		CNA560E	0.02	0.00	0.02	0.00	0.05	
		CNA560U	0.29	0.01	0.29	0.01	0.59	
		CNA560XL	0.66	0.02	0.65	0.03	1.36	
		CNA680	0.60	0.04	0.64	0.01	1.29	
		CNA750	1.45	0.14	1.50	0.09	3.18	
		ECLIPSE500	0.10	0.01	0.11	0.00	0.23	
		EMB145	0.14	0.00	0.12	0.02	0.29	
		FAL20	0.01	0.01	0.01	0.01	0.04	
		FAL900EX	0.37	0.02	0.38	0.02	0.79	
		G650ER	0.03	0.00	0.03	0.00	0.07	
		GIV	0.35	0.01	0.34	0.02	0.72	
		GV	0.23	0.01	0.23	0.02	0.49	
		IA1125	0.04	0.00	0.04	0.00	0.08	
		LEAR35	1.28	0.10	1.26	0.12	2.76	
	MU3001	0.32	0.04	0.34	0.03	0.73		
	Turboprop	1900D	0.04	0.00	0.04	0.00	0.09	
		CNA208	0.46	0.03	0.43	0.06	0.99	
		CNA441	0.03	0.00	0.03	0.00	0.05	
		DHC6	0.67	0.06	0.67	0.06	1.45	
	Piston	BEC58P	0.34	0.02	0.34	0.02	0.73	
		CNA172	0.33	0.01	0.31	0.04	0.69	
		CNA182	0.06	0.00	0.06	0.00	0.12	
		CNA206	0.02	0.00	0.02	0.00	0.04	
		COMSEP	0.22	0.03	0.22	0.02	0.48	
		GASEPF	0.14	0.01	0.14	0.02	0.31	
		GASEPV	0.35	0.02	0.34	0.03	0.75	
		PA30	0.04	0.01	0.04	0.01	0.11	
	Helicopter	B206B3	0.07	0.16	0.08	0.16	0.47	
		B407	0.04	0.01	0.02	0.03	0.10	
		B430	0.08	0.01	0.08	0.02	0.19	
		EC130	0.07	0.25	0.07	0.25	0.63	
	General Aviation Total			13.33	1.36	13.25	1.43	29.37

Table C-6. Modeled Average Daily Detailed Military Aircraft Operations for 2024 and 2029
Source: HMMH, C&S, LRAA, 2024

Category	Propulsion	AEDT Type	Arrivals		Departures		Total
			Day	Night	Day	Night	
General Aviation	Jet	T-38A	0.14	0.00	0.14	0.00	0.28
		F18EF	0.08	0.00	0.08	0.00	0.16
		CNA560XL	0.06	0.00	0.06	0.00	0.12
		C17	0.04	0.00	0.04	0.00	0.08
		MU3001	0.03	0.00	0.03	0.00	0.07
		767300	0.01	0.00	0.01	0.00	0.02
		LEAR35	0.01	0.00	0.01	0.00	0.02
	Turboprop	DHC6	0.19	0.00	0.19	0.00	0.39
		CNA208	0.13	0.00	0.13	0.00	0.25
		C130AD	1.42	0.08	1.51	0.00	3.01
	Piston	BEC58P	0.01	0.00	0.01	0.00	0.01
	Helicopter	S70	0.22	0.00	0.11	0.11	0.43
	Military Total			2.34	0.08	2.32	0.11

This page intentionally left blank.



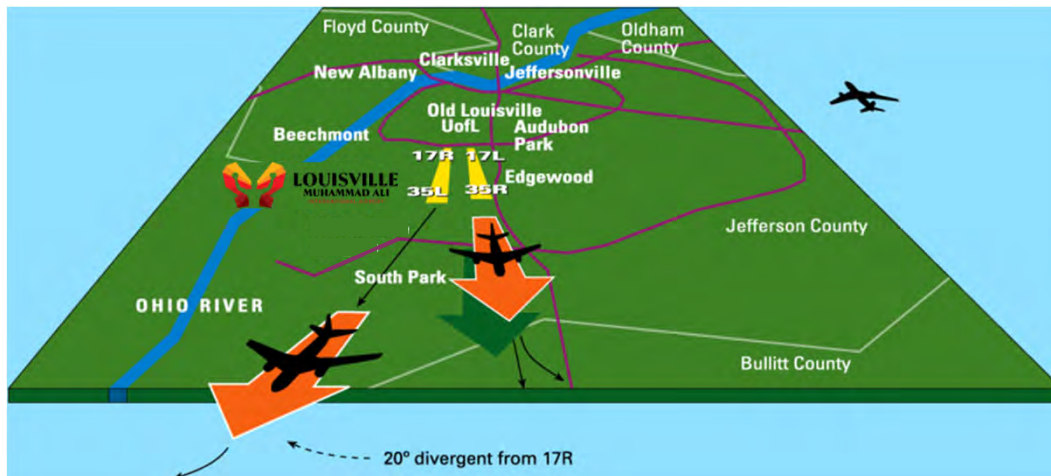
LOUISVILLE MUHAMMAD ALI INTERNATIONAL AIRPORT

CONTRAFLOW (10:00 p.m. - 7:00 a.m.)
OPERATIONS REPORT
January 2024

CONTRAFLOW

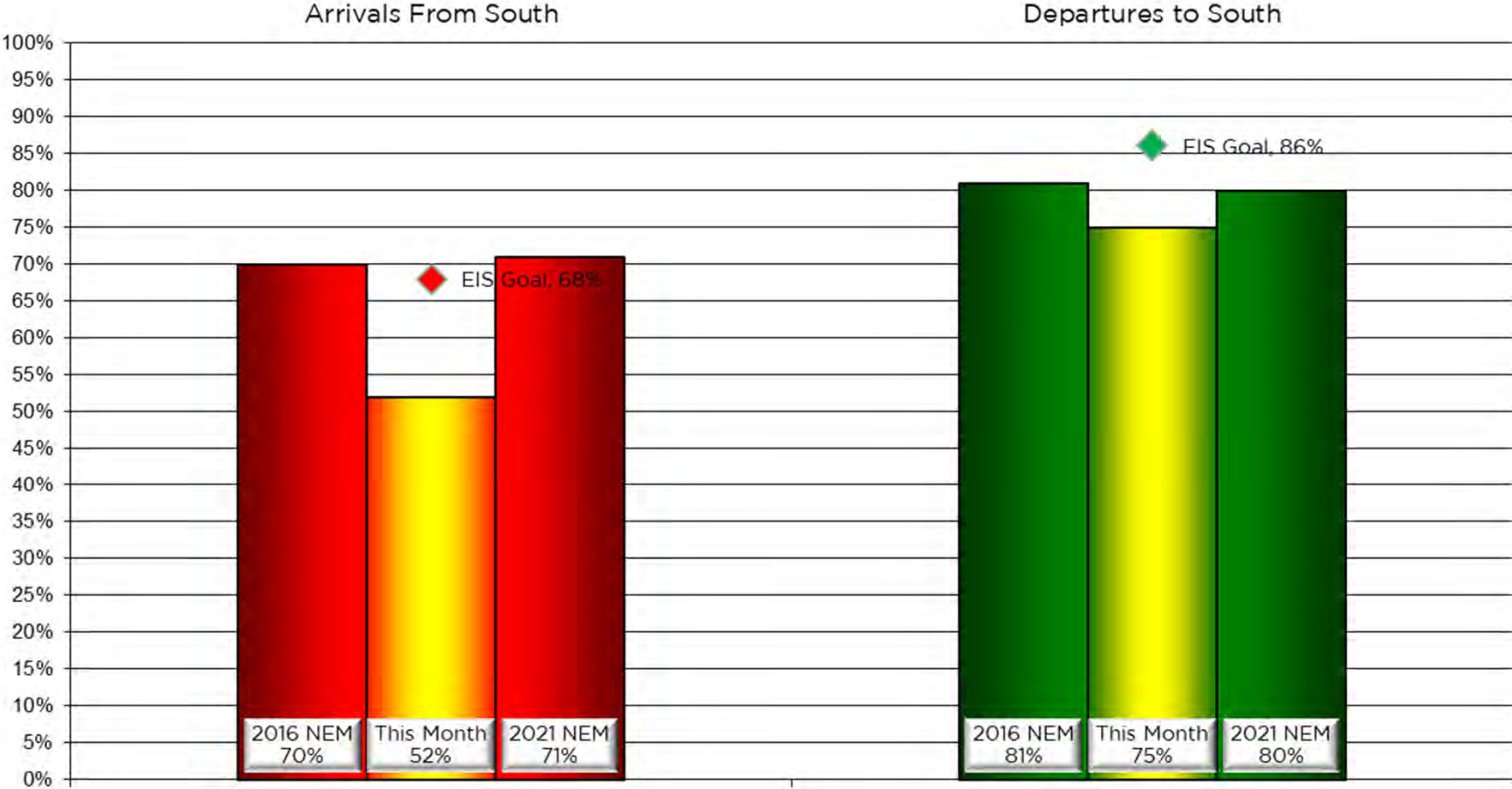
Between the hours of 10:00 p.m. and 7:00 a.m., the Airport operates from the south and to the south (contraflow) whenever wind, weather, and demand allow. Contraflow procedures require aircraft to arrive on Runways 35R and 35L and depart on Runways 17R and 17L in order to direct aircraft operations south of the Airport over areas which are less densely populated than areas north of the Airport.

Inbound

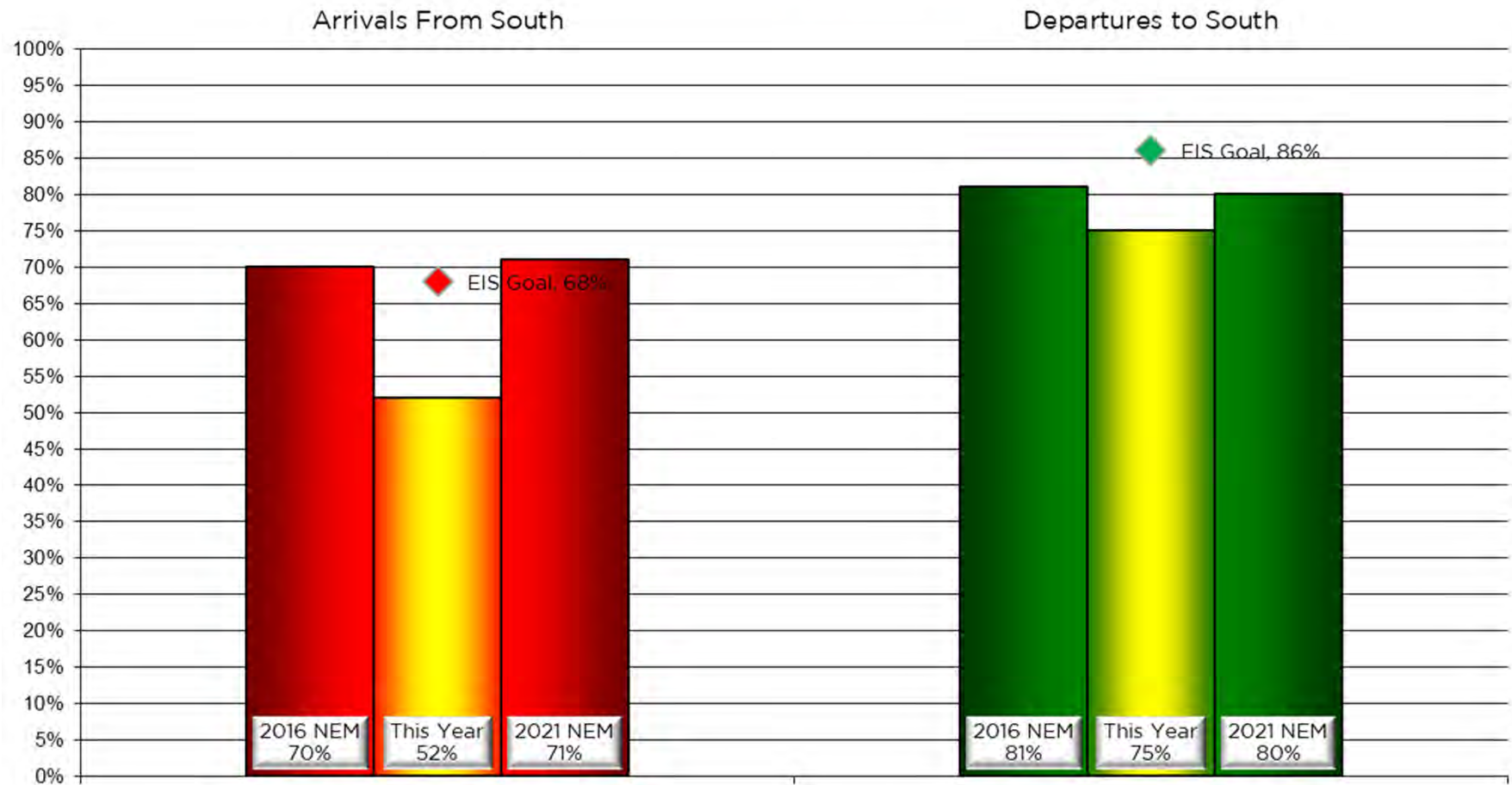


Outbound

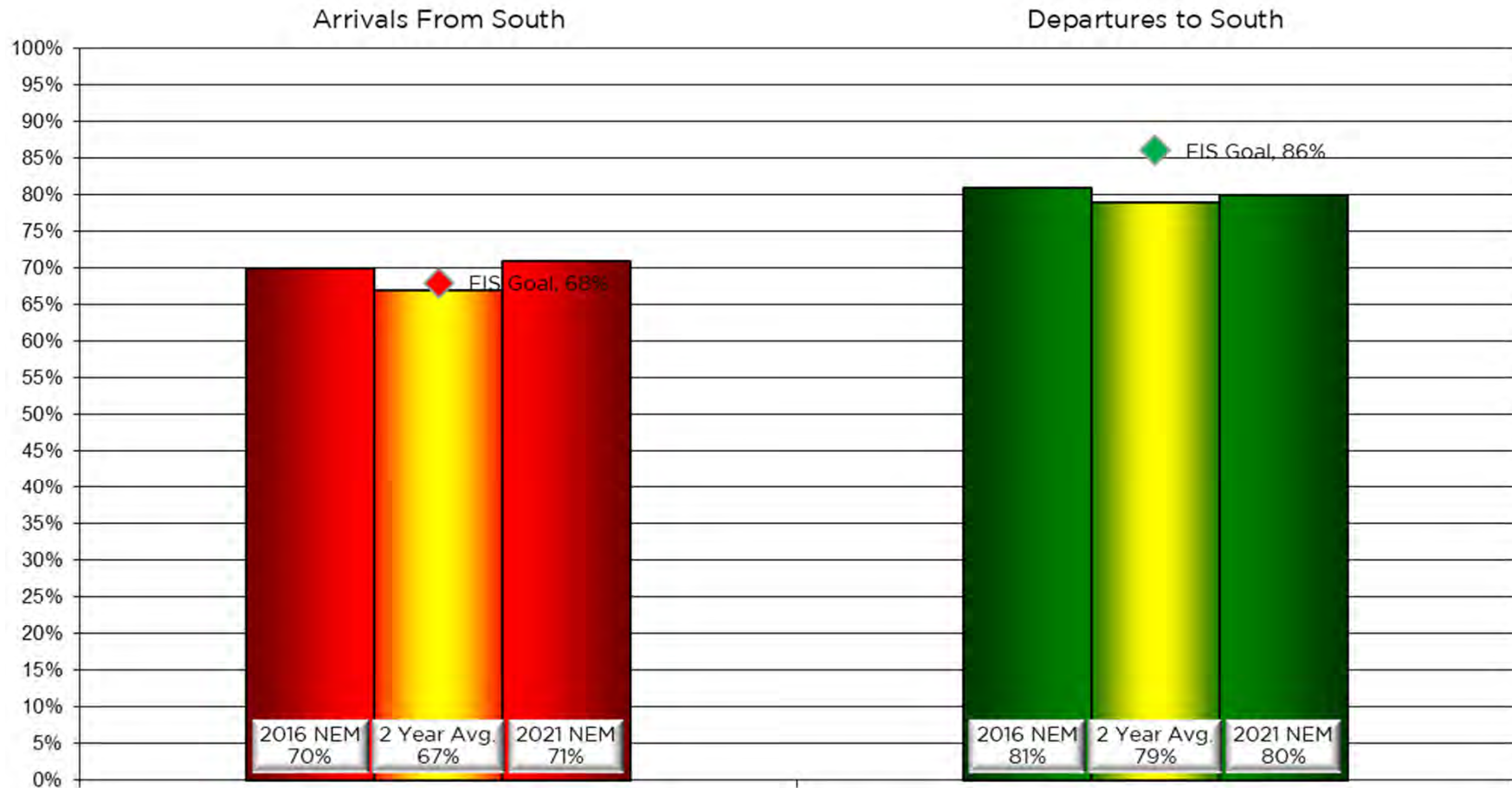
Monthly Contraflow January 1-31, 2024



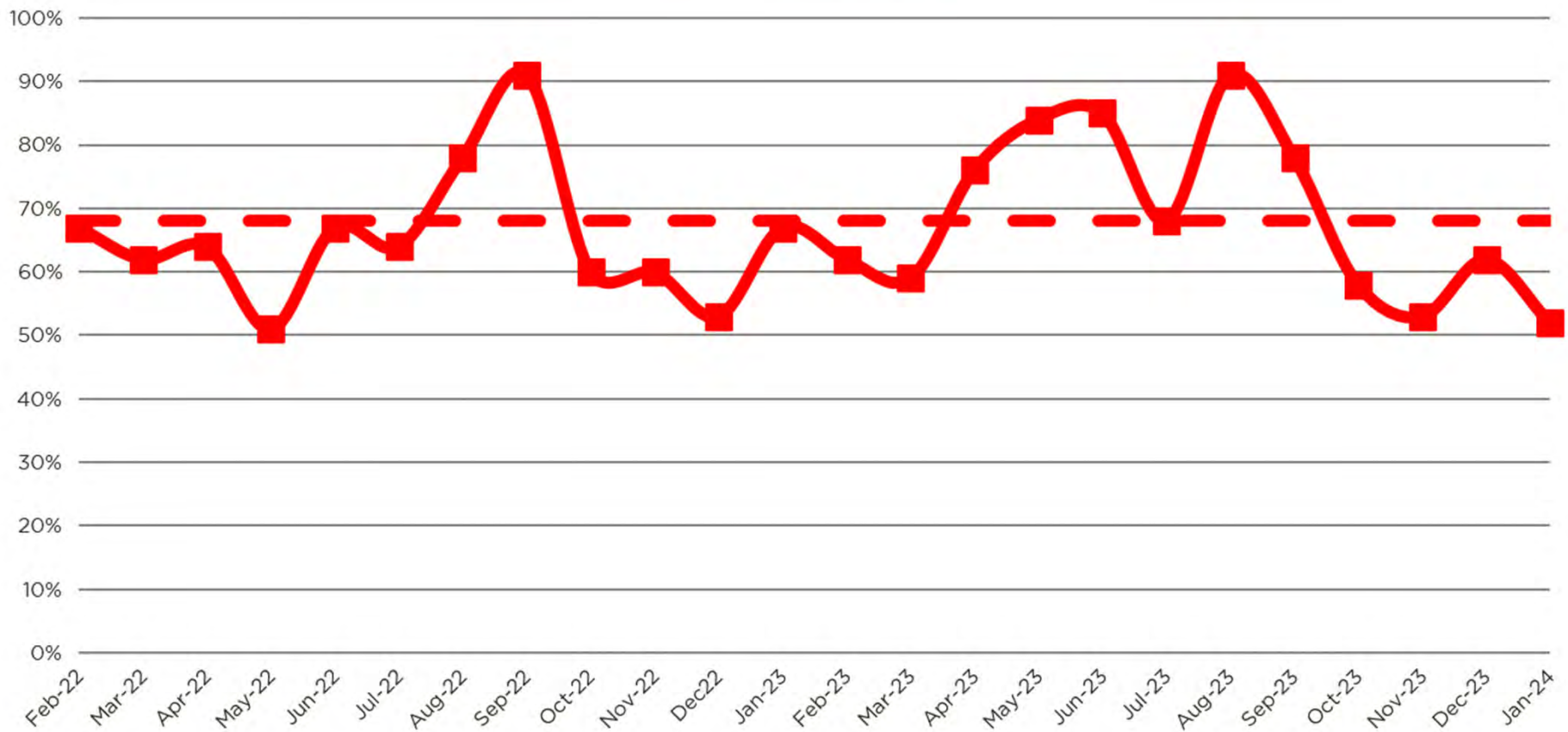
Contraflow This Year As of January 31, 2024



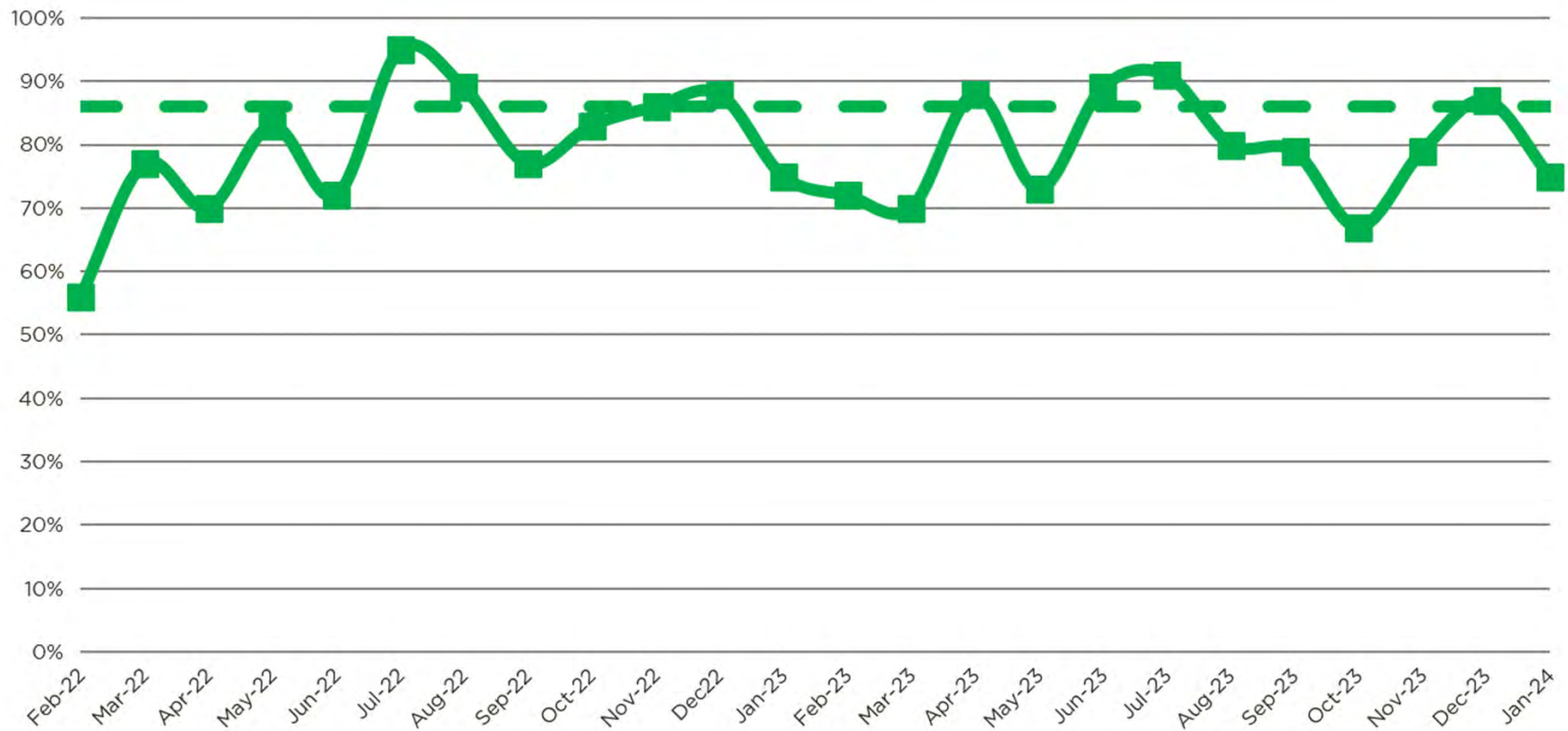
Contraflow 2 Year Average February 2022 - January 2024



Arrivals From The South February 2022 through January 2024 (10:00 pm to 7:00 am) (68% is Goal)



Departures To The South February 2022 through January 2024 (10:00 pm to 7:00 am) (86% is Goal)



Year-to-Year by Month Percent* Contraflow

	Arrivals From the South (Goal 68%)									Departures to the South (Goal 86%)								
	2017	2018	2019	2020	2021	2022	2023	2024	Avg	2017	2018	2019	2020	2021	2022	2023	2024	Avg
Jan	65%	60%	75%	56%	71%	78%	67%	52%	66%	61%	72%	69%	82%	71%	65%	75%	79%	72%
Feb	58%	67%	78%	78%	87%	67%	62%		72%	77%	70%	57%	43%	45%	56%	72%		61%
Mar	79%	84%	82%	65%	51%	62%	59%		68%	62%	61%	89%	64%	77%	77%	70%		72%
Apr	56%	73%	65%	71%	62%	64%	76%		69%	80%	72%	82%	69%	75%	82%	88%		78%
May	75%	43%	65%	71%	71%	51%	84%		65%	80%	89%	90%	90%	63%	83%	73%		81%
Jun	74%	74%	50%	69%	65%	67%	85%		70%	93%	91%	91%	88%	84%	70%	89%		86%
Jul	85%	90%	75%	72%	70%	55%	68%		72%	85%	77%	87%	91%	76%	95%	91%		87%
Aug	79%	72%	88%	82%	74%	78%	91%		80%	90%	88%	89%	87%	88%	89%	82%		88%
Sep	85%	80%	83%	83%	63%	91%	78%		81%	31%	87%	77%	85%	90%	75%	79%		77%
Oct	81%	77%	79%	71%	69%	68%	58%		73%	82%	76%	78%	72%	76%	78%	67%		76%
Nov	69%	76%	70%	51%	61%	60%	53%		64%	75%	54%	72%	78%	81%	86%	79%		75%
Dec	74%	72%	76%	67%	56%	53%	62%		67%	74%	61%	72%	69%	80%	88%	87%		74%
Avg	73%	72%	74%	70%	67%	66%	70%	52%		74%	75%	79%	77%	76%	79%	79%	79%	

Nightly Runway Use Summary - January 2024

(from 10:00 PM date list in first column to 7:00 AM the following morning)

		% of all arrivals from the south									% of all departures to the south								
Date	Day	* in compliance	Runway #						Unknown Runway Use	Notes / Comments	** in compliance	Runway #						Unknown Runway Use	Notes / Comments
			11	17L	17R	29	35L	35R				11	17L	17R	29	35L	35R		
01-01-24	Mon	93%		7				62	31	0			23	77				0	
01-02-24	Tue	97%		1	2			59	38	0			36	54		8	2	0	
01-03-24	Wed	100%						57	43	0						58	42	0	300-101@7-17
01-04-24	Thu	96%		1	3			59	37	0			36	56		5	3	0	
01-05-24	Fri	4%		38	58			3	1	0	040-070@7-11, ra,		1	3		52	44	0	020-060@7-13,ra
01-06-24	Sat																		
01-07-24	Sun																		
01-08-24	Mon	0%		44	56					0	080-120@15-31, ra	100%	40	60				0	
01-09-24	Tue	0%		38	62					0	220-250@27-42,g60,sn	93%	38	55	7			0	
01-10-24	Wed	0%		43	57					0	130-220@9-21,g29	100%	41	59				0	
01-11-24	Thu	42%		23	35			26	16	0	090-150@7-21	97%	43	54		2	1	0	
01-12-24	Fri	0%		2	6		92			0	250-260@29-44,g64,sn	92%	40	52	8			0	
01-13-24	Sat																		
01-14-24	Sun																		
01-15-24	Mon	100%						61	39	0		0%				55	45	0	290-310@15-23
01-16-24	Tue	94%			5		1	59	35	0		92%	35	57		4	4	0	
01-17-24	Wed	0%		46	54					0	180-210@11-19	100%	42	58				0	
01-18-24	Thu	100%						62	38	0		0%				60	40	0	270-320@7-17,sn
01-19-24	Fri	100%						65	35	0		0%				54	46	0	280-300@15-23
01-20-24	Sat																		
01-21-24	Sun																		
01-22-24	Mon	0%		43	57					0	100-120@5-9	100%	43	57				0	
01-23-24	Tue	0%		41	59					0	080-120@5-7,ra	100%	43	57				0	
01-24-24	Wed	0%		43	57					0	060-200@3-11,ra	100%	40	60				0	
01-25-24	Thu	0%		41	59					0	220-280@17-31,ra	97%	44	53		1	2	0	
01-26-24	Fri	97%			3			66	31	0		97%	36	61		1	2	0	
01-27-24	Sat																		
01-28-24	Sun																		
01-29-24	Mon	81%		4	15			47	34	0		98%	40	58		1	1	0	
01-30-24	Tue	98%			2			60	38	0		84%	31	53		6	10	0	
01-31-24	Wed	99%			1			58	41	0		93%	39	54		6	1	0	

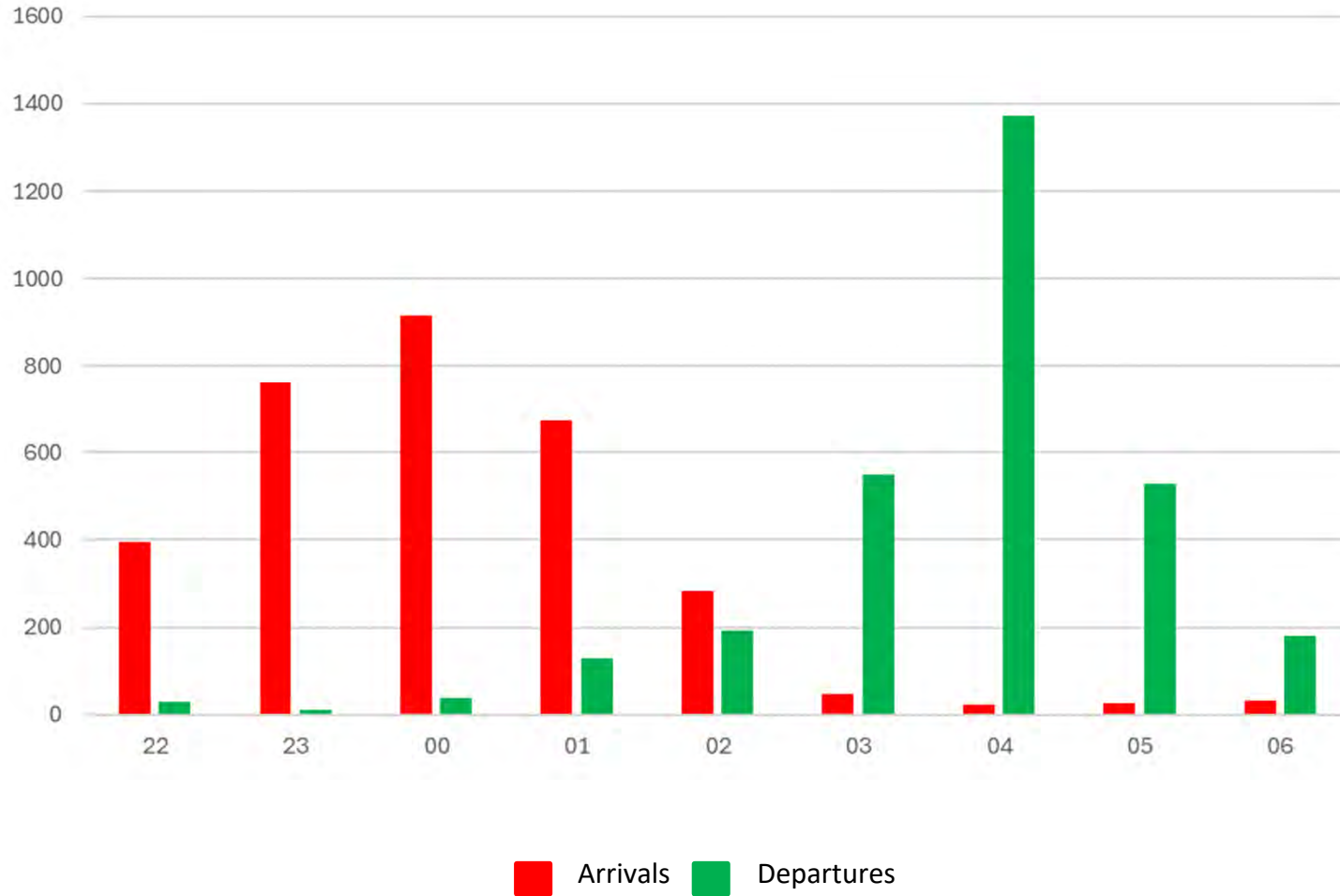
Preferred Flow

DATIS Reported Conditions Indicate Support for Non-Preferred Flow

DATIS Reported Conditions Do Not Indicate Support for Non-Preferred Flow



Arrivals/Departures by Hour January 2024



Non-Standard Modeling Documents

This page intentionally left blank.



TECHNICAL MEMORANDUM

To: Kabrina Webb
Peggy Kelley
Memphis Airports District Office
Federal Aviation Administration
2600 Thousand Oaks Blvd., Suite 2250
Memphis, TN 38118

CC: Bob Slattery, LRAA

From: David Crandall, Aofei Li, and Kate Larson
HMMH

Date: 8/14/2024

Subject: Request for Approval: AEDT 3f User-Defined Profiles for SDF NEM Update

Reference: HMMH Project Number 22-0185A

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Louisville Regional Airport Authority (LRAA) to prepare a Noise Exposure Map (NEM) update for Louisville International Airport (SDF). For the noise modeling with AEDT version 3f, we are requesting approval of user-defined profiles for several aircraft. The profiles presented here have been developed in coordination with the respective aircraft types' primary operator at SDF. This follows similar collaboration efforts for the data development of the prior two SDF NEMs (in 2011 and in 2016) which were approved by Federal Aviation Administration (FAA).

Activity by the cargo aircraft in this submittal represents a very important segment of operations at SDF; they constitute approximately half of the operations at SDF and, importantly from a noise perspective, their activity is more heavily weighted toward the nighttime hours than other aircraft. Approximately two-thirds of departures by these aircraft occur during the nighttime period.

HMMH has prepared this technical memorandum in accordance with Section 5 of FAA's document titled "Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA" dated October 27, 2017.¹ This particular request falls under this Section 5.2.2 "Analysis methods/data that require AEE review and approval," which includes:

- "User-defined aircraft profiles (including modifications to standard profiles) developed by methods other than AEDT's FAA-accepted methodology."

HMMH believes that this request should be routed in accordance with Section 5.1 of that AEDT guidance document, which states that the project consultant must submit the review package to the appropriate FAA headquarters office after coordinating with the FAA project manager in the district office.

We ask that you route this memo appropriately within FAA. After review at FAA headquarters, we would expect a document from the Office of Environment and Energy (AEE) responding to the methods presented in this memorandum. That AEE response will be included in the NEM's technical documentation supporting the noise analysis.

This user-defined profile submission has been prepared in accordance with FAA guidance. The profile information, with supporting documentation, is included in the following sections of this review package, grouped by the operators' pilot ratings and respective procedures. The data includes six

¹ https://aedt.faa.gov/Documents/guidance_aedt_nepa.pdf

representative AEDT Aircraft Noise and Performance (ANP) aircraft types, organized into three main sections:

- A. Airbus 300, modeled by AEDT ANP type **A300-622R**
- B. Boeing 747-400 series and 747-800series, modeled by AEDT ANP types **747400** and **7478**
- C. Boeing 757-200 series and 767-300ER aircraft, modeled by AEDT ANP types **757PW**, **757RR** and **7673ER**

This package is a compilation of two earlier submissions, the first dated April 18, 2024, and the subsequent dated June 19, 2024. The initial submission provided a complete description of the proposed departure flight profiles and included an original concurrence page dated May 15, 2024. The subsequent document, prepared after HMMH receipt of FAA feedback, consisted of replacement pages where corrections were needed and additional pages for each aircraft section supplying altitude vs distance and speed vs distance graphics for each aircraft, by stage length designation.

Each of the supporting documentation sections combines the pages from the separate submissions; this compiled package includes all non-standard noise model input for which we are requesting approval. The refreshed operators' concurrence page indicates the corresponding header dates; the full package has been reviewed in its entirety. The operators' concurrence is provided as page 3 of this memo.

As outlined by Section 5.3 of the aforementioned AEDT guidance document, each section provides:

1. Statement of Benefit
2. Analysis Demonstrating Benefit in the form of sound exposure level results at 0.5 nmi increments under the flight path from the user-defined departure procedures compared to the AEDT standard profiles.
3. Verification of New Parameters in the form of procedure step profiles using modification of standard AEDT 3f profiles. An AEDT study containing the user-defined profiles will be included as an appendix to the memorandum.
4. Graphical and Tabular Comparison: a series of graphs depicting AEDT standard climb and speed profiles and the proposed modified climb and speed profiles to actual SDF climb and speed profiles.

The AEDT 3f study is available in electronic file format upon request, as are the spreadsheets which generated the graphs in the packet.

UPS Global Operations Center
 825 Lotus Avenue
 Louisville, KY 40213



UPS Concurrence Certification

UPS certifies review and concurrence with the below-listed proposed departure flight profiles for use in preparation of the Noise Exposure Map update for Louisville International Airport. The profiles fall within reasonable bounds of actual aircraft performance for UPS operations at SDF.

UPS acknowledges that the profiles were developed from AEDT's reduced thrust departure profiles, as described in the Statement of Benefit section of the documentation for each aircraft type.

Aircraft Type	Documentation Section	Dated	Reviewer's Signature
Airbus A300-600	A	April 18, 2024 June 19, 2024	J. Kozak
Boeing 747-400	B	April 18, 2024	J. Kozak
Boeing 747-8		June 19, 2024	J. Kozak
Boeing 757-200 PW	C	April 18, 2024	J. Kozak
Boeing 757-200 RR		June 19, 2024	J. Kozak
Boeing 767-300			J. Kozak

Concurrence provided by:

Michael Ausley Michael Ausley
 Name

8/7/24
 Date

UPS AIRLINES
DIRECTOR OF OPERATIONS
 Position/ Title



Section A:

Airbus A300-600

This section describes the user-defined inputs for Airbus A300-600. This aircraft makes up a notable portion of SDF existing operations, both daytime and nighttime. The A300-600 is represented by ANP type A300-622R.

The primary cargo operator of the A300-600 at SDF (UPS) has provided information related to the development of these AEDT profiles and has indicated that these profiles are representative of current (2024) operations and are expected to be continued in the future.

Overall, the proposed user-defined profiles reflect current SDF A300-600 procedures that operators refer to as “NADP 2.” In simple terms, these procedures are described with the following steps:

- Take-off thrust and take-off flaps while climbing at constant airspeed speed to 1,000 ft Above Field Elevation (AFE);
- At 1,000 ft AFE, reduce thrust to climb thrust setting, reduce aircraft pitch, accelerate and retract flaps on the aircraft manufacturer’s recommended speed schedule (i.e., sometimes referred to as “retract flaps on schedule” or “flap retraction schedule”);
- Continue accelerating to 250 knots indicated airspeed with flaps fully retracted; and
- Constant speed climb at 250 knots to 10,000 ft AFE.

The closest profiles available with AEDT include an additional climb step between acceleration for the “retract flaps on schedule” step and the “accelerating to 250 knots indicated airspeed with flaps fully retracted” step. Current operators of the A300-600 have indicated that the extra climb segment within the default AEDT profiles is not representative of actual operations at SDF. The proposed user-defined profiles developed are modifications of existing AEDT profiles and continue to use AEDT’s flap retraction schedule for a given weight.

The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Airbus A300-600 operations will be represented with AEDT ANP stage lengths 1 – 4, while stage lengths 5 – 6 will be used much less often.

HMMH has prepared this documentation in accordance with Section 5 of FAA’s document titled “Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA” dated October 27, 2017.¹

¹ https://aedt.faa.gov/Documents/guidance_aedt_nepa.pdf

Contents

A.1.	Airbus A300-600 (ANP Type A300-622R) Profile Review with AEDT 3f.....	A-4
A.1.1.	Statement of Benefit.....	A-4
A.1.1.1.	Figures Supporting Statement of Benefit.....	A-4
A.1.2.	Analysis Demonstrating Benefit.....	A-7
A.1.3.	Concurrence on Aircraft Performance.....	A-7
A.1.4.	Certification of New Parameters.....	A-7
A.1.4.1.	A300-622R, Profile Weight 278,700.....	A-8
A.1.4.2.	A300-622R, Profile Weight 290,300.....	A-9
A.1.4.3.	A300-622R, Profile Weight 302,400.....	A-10
A.1.4.4.	A300-622R, Profile Weight 324,100.....	A-11
A.1.4.5.	A300-622R, Profile Weight 353,300.....	A-12
A.1.5.	Graphical and Tabular Comparison.....	A-13
A.1.5.1.	Tables and Figures Supporting Analysis Demonstrating Benefit.....	A-13
A.2.	Additional Graphs: Comparison of Altitude and Speed Profiles by Stage Length.....	A-19

Figures

Figure A-1.	A300-622R AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance.....	A-5
Figure A-2.	A300-622R AEDT Standard Speed Profiles Compared to Actual Aircraft Performance.....	A-6
Figure A-3.	A300-622R Proposed Altitude Profiles Compared to Actual Aircraft Performance.....	A-6
Figure A-4.	A300-622R Proposed Speed Profiles Compared to Actual Aircraft Performance.....	A-6
Figure A-5.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1.....	A-8
Figure A-6.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1.....	A-8
Figure A-7.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_15; PROF_ID2: 2.....	A-9
Figure A-8.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2.....	A-9
Figure A-9.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 3.....	A-10
Figure A-10.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 3.....	A-10
Figure A-11.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4.....	A-11
Figure A-12.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4.....	A-11
Figure A-13.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5.....	A-12
Figure A-14.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5.....	A-12
Figure A-15.	SEL Contours for A300-622R Departures at Take-Off Weight 278,700 Pounds.....	A-14
Figure A-16.	SEL Contours for A300-622R Departures at Take-Off Weight 290,300 Pounds.....	A-15
Figure A-17.	SEL Contours for A300-622R Departures at Take-Off Weight 302,400 Pounds.....	A-16
Figure A-18.	SEL Contours for A300-622R Departures at Take-Off Weight 324,100 Pounds.....	A-17
Figure A-19.	SEL Contours for A300-622R Departures at Take-Off Weight 353,300 Pounds.....	A-18
Figure A-20.	A300-622R Departures, Stage Length 1, Altitude vs. Distance.....	A-20
Figure A-21.	A300-622R Departures, Stage Length 1, Speed vs. Distance.....	A-20
Figure A-22.	A300-622R Departures, Stage Length 2, Altitude vs. Distance.....	A-21
Figure A-23.	A300-622R Departures, Stage Length 2, Speed vs. Distance.....	A-21
Figure A-24.	A300-622R Departures, Stage Length 3, Altitude vs. Distance.....	A-22
Figure A-25.	A300-622R Departures, Stage Length 3, Speed vs. Distance.....	A-22
Figure A-26.	A300-622R Departures, Stage Length 4, Altitude vs. Distance.....	A-23
Figure A-27.	A300-622R Departures, Stage Length 4, Speed vs. Distance.....	A-23
Figure A-28.	A300-622R Departures, Stage Length 5, Altitude vs. Distance.....	A-24
Figure A-29.	A300-622R Departures, Stage Length 5, Speed vs. Distance.....	A-24

Tables

Table A-1. SELs for A300-622R Departures at 278,700 Pounds: AEDT Standard and User-defined Profiles..... A-14
Table A-2. SELs for A300-622R Departures at 290,300 Pounds: AEDT Standard and User-defined Profiles..... A-15
Table A-3. SELs for A300-622R Departures at 302,400 Pounds: AEDT Standard and User-defined Profiles..... A-16
Table A-4. SELs for A300-622R Departures at 324,100 Pounds: AEDT Standard and User-defined Profiles..... A-17
Table A-5. SELs for A300-622R Departures at 353,300 Pounds: AEDT Standard and User-defined Profiles..... A-18

A.1. Airbus A300-600 (ANP Type A300-622R) Profile Review with AEDT 3f

A.1.1. Statement of Benefit

Operators at SDF use a version of “Noise Abatement Departures Procedures” (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. The proposed A300-622R climb profiles and thrust settings during the various stages of flight provide a better representation of what is actually being flown by cargo aircraft at SDF. These profiles were developed from the default (i.e. included) reduced thrust profiles in AEDT.

The proposed user-defined profiles were developed with considerations of SDF runway specific length and minimum climb requirements. Correspondence with the operators has indicated a high agreement with their procedures at SDF.

A.1.1.1. *Figures Supporting Statement of Benefit*

Figure A-1 and **Figure A-3** compare the standard AEDT profiles and proposed profiles to actual aircraft climb performance at SDF. **Figure A-2** and **Figure A-4** compare the standard AEDT profiles and proposed profiles to actual aircraft ground speed profiles at SDF. The standard profiles are identified in the figure legends as “Stage length - Weight”. The proposed profiles are identified in the figure legends as “Name – Stage length - Weight.”

Additional Figures, **A-20** through **A-29**, provide further comparison by stage length representative weight.

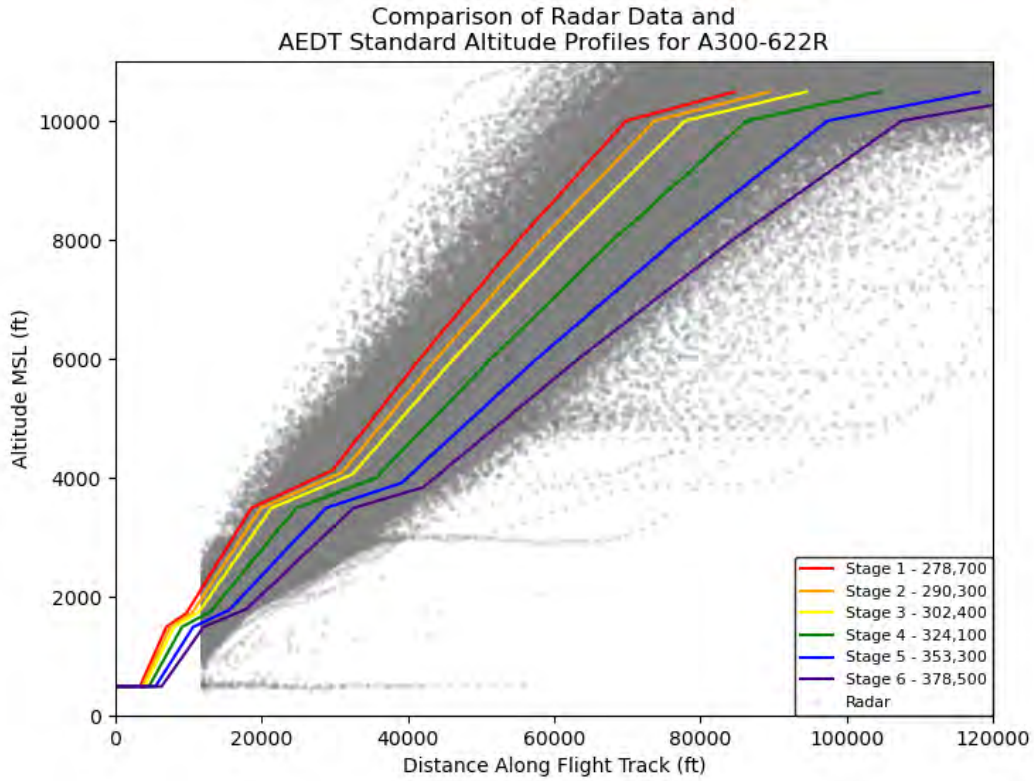


Figure A-1. A300-622R AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance

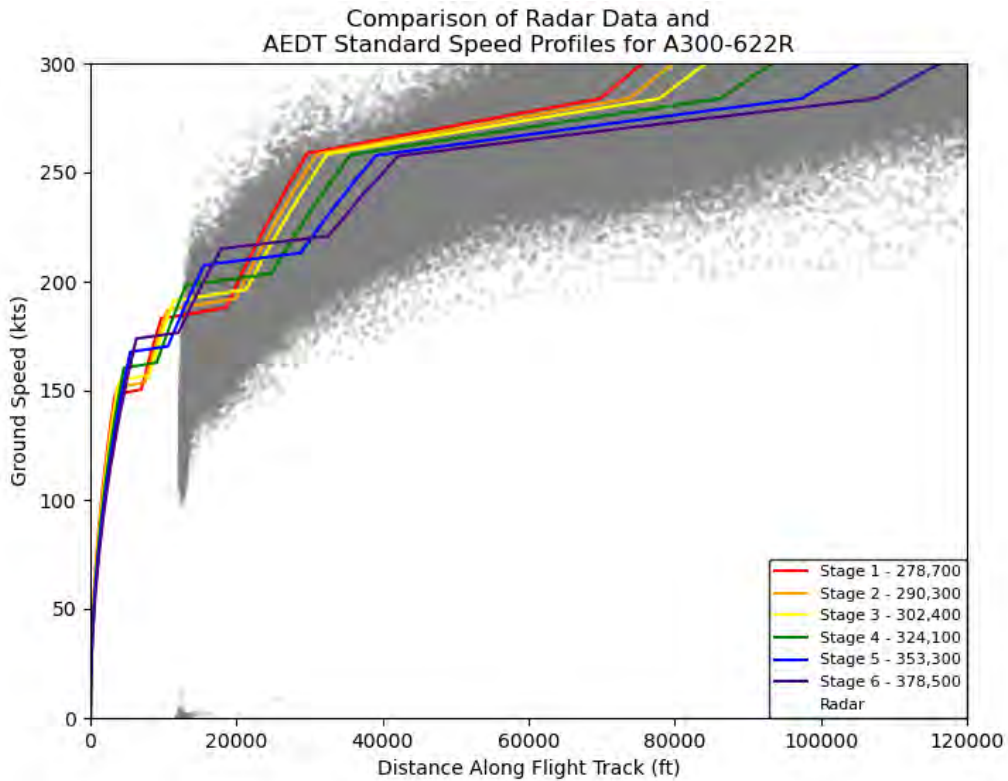


Figure A-2. A300-622R AEDT Standard Speed Profiles Compared to Actual Aircraft Performance

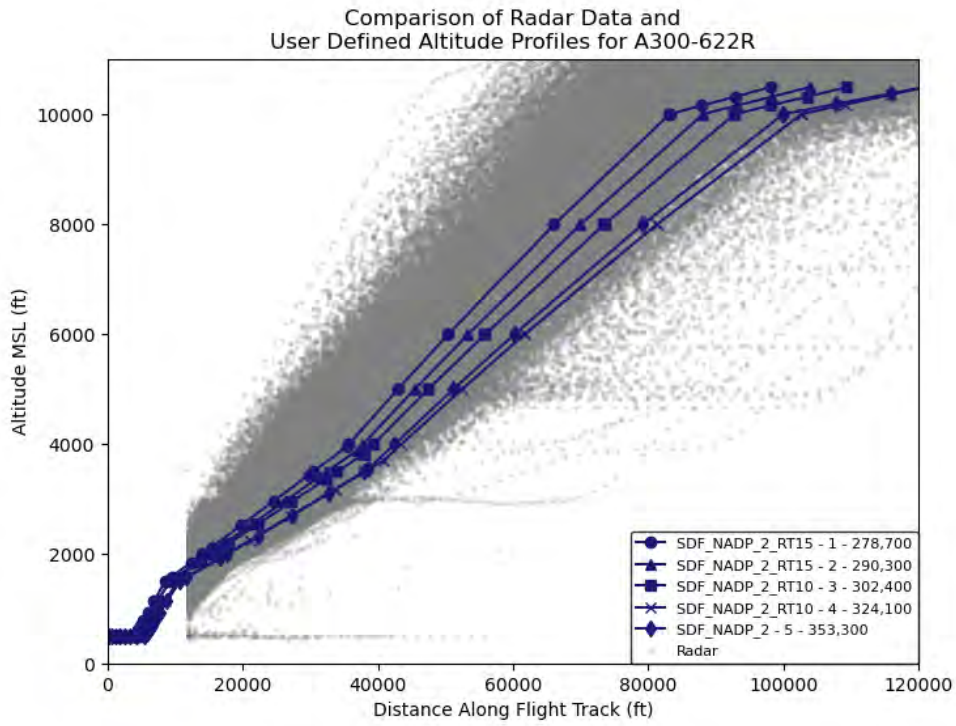


Figure A-3. A300-622R Proposed Altitude Profiles Compared to Actual Aircraft Performance

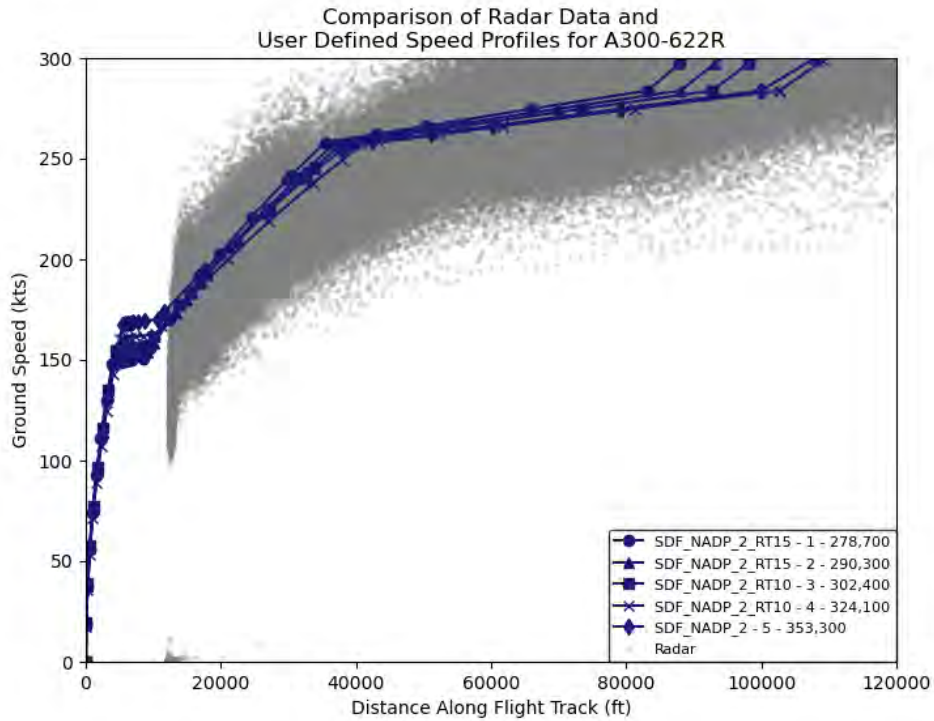


Figure A-4. A300-622R Proposed Speed Profiles Compared to Actual Aircraft Performance

A.1.2. Analysis Demonstrating Benefit

The differences between the existing A300-622R profiles in AEDT 3f and the proposed user-defined profiles are primarily due to the use of reduced thrust, reduced acceleration energy share percentage, and climb altitude on departure. The sound exposure level results under the flight path from the user-defined departure procedures are shown in **Section A.1.5.1**. In general, the proposed user-defined profiles show less noise associated with the take-off roll, a different location where aircraft change from take-off thrust to climb thrust, and additional noise under the flight path miles out because of a slower climb.

A.1.3. Concurrence on Aircraft Performance

Preparation of these profiles for the current project and AEDT 3f was done in cooperation with the relevant airline. Airline concurrence documentation accompanies this memorandum for submission to FAA.

A.1.4. Certification of New Parameters

The profiles developed for this study are procedure step profiles created by modifying profiles already included in AEDT 3f. Screenshots from the AEDT user interface (UI) of starting default profiles and the proposed user-defined profiles are presented for comparison as **Figure A-5** through **Figure A-14**. An AEDT study containing the profiles developed for this project is available in electronic form upon request. Altitudes are listed as feet above airfield elevation. Speeds are true airspeed in knots. Thrust is in units of pounds which matches the units of thrust settings used in the aircraft's associated noise-power-distance curves.

A.1.4.1. A300-622R, Profile Weight 278,700

The “stage length 1” user-defined profile for the A300-622R assumes a weight of 278,700 pounds, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1 This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1 to change the thrust cut back to occur at the end of the initial climb to 1,000 ft AFE (rather than after the first flap retraction) and to remove the climb at 3,000 AFE in step 4. The acceleration energy share percentage was also reduced from 70 percent to 45 percent to provide a better match to flight track samples’ altitude range and speed range shown in Figure 3 and Figure 4, respectively. To assist AEDT, a climb was introduced at 4,500 AFE in step 5.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 15% Reduced		0	
2	Climb	1500	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	1500	Max Takeoff 15% Reduced		185.3	70
4	Climb	0000	Max Climb 10% Reduced	3000		
5	Percent Accelerate	0000	Max Climb 10% Reduced		250	70
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-5. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 15% Reduced		0	
2	Climb	1500	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	1500	Max Climb 10% Reduced		185.3	45
4	Percent Accelerate	0000	Max Climb 10% Reduced		250	45
5	Climb	0000	Max Climb 10% Reduced	4500		
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-6. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1

A.1.4.2. A300-622R, Profile Weight 290,300

The “stage length 2” user-defined profile for the A300-622R assumes a weight of 290,300 pounds, and is identified as PROF_ID1: SDF_NADP_2_RT_15; PROF_ID2: 2. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT_15; PROF_ID2: 2 to change the thrust cut back to occur at the end of the initial climb to 1,000 ft AFE (rather than after the first flap retraction) and to remove the climb at 3,000 AFE in step 4. The acceleration energy share percentage was also reduced from 70 percent to 45 percent to provide a better match to flight track samples altitude range and speed range shown in Figure 3 and Figure 4, respectively. To assist AEDT, a climb was introduced at 4,500 AFE in step 5.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 15% Reduced		0	
2	Climb	1500	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	1500	Max Takeoff 15% Reduced		189.3	70
4	Climb	0000	Max Climb 10% Reduced	3000		
5	Percent Accelerate	0000	Max Climb 10% Reduced		250	70
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-7. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_15; PROF_ID2: 2

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 15% Reduced		0	
2	Climb	1500	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	1500	Max Climb 10% Reduced		189.3	45
4	Percent Accelerate	0000	Max Climb 10% Reduced		250	45
5	Climb	0000	Max Climb 10% Reduced	4500		
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-8. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2

A.1.4.3. A300-622R, Profile Weight 302,400

The “stage length 3” user-defined profile for the A300-622R assumes a weight of 302,400 pounds, and is identified as PROF_ID1: SDF_NADP_2_RT_10; PROF_ID2: 3. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 3 to change the thrust cut back to occur at the end of the initial climb to 1,000 ft AFE (rather than after the first flap retraction) and to remove the climb at 3,000 AFE in step 4. The acceleration energy share percentage was also reduced from 70 percent to 45 percent to provide a better match to flight track samples altitude range and speed range shown in Figure 3 and Figure 4, respectively. To assist AEDT, a climb was introduced at 4,500 AFE in step 5.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 10% Reduced		0	
2	Climb	1500	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	1500	Max Takeoff 10% Reduced		193.2	70
4	Climb	0000	Max Climb 10% Reduced	3000		
5	Percent Accelerate	0000	Max Climb 10% Reduced		250	70
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-9. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 3

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 10% Reduced		0	
2	Climb	1500	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	1500	Max Climb 10% Reduced		193.2	45
4	Percent Accelerate	0000	Max Climb 10% Reduced		250	45
5	Climb	0000	Max Climb 10% Reduced	4500		
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-10. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 3

A.1.4.4. A300-622R, Profile Weight 324,100

The “stage length 4” user-defined profile for the A300-622R assumes a weight of 324,100 pounds, and is identified as PROF_ID1: SDF_NADP_2_RT_10; PROF_ID2: 4. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4 to change the thrust cut back to occur at the end of the initial climb to 1,000 ft AFE (rather than after the first flap retraction) and to remove the climb at 3,000 AFE in step 4. The acceleration energy share percentage was also reduced from 70 percent to 45 percent to provide a better match to flight track samples altitude range and speed range shown in Figure A-3 and Figure A-4, respectively. To assist AEDT, a climb was introduced at 4,500 AFE in step 5.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 10% Reduced		0	
2	Climb	1500	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	1500	Max Takeoff 10% Reduced		200.1	70
4	Climb	0000	Max Climb 10% Reduced	3000		
5	Percent Accelerate	0000	Max Climb 10% Reduced		250	70
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-11. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 10% Reduced		0	
2	Climb	1500	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	1500	Max Climb 10% Reduced		200.1	45
4	Percent Accelerate	0000	Max Climb 10% Reduced		250	45
5	Climb	0000	Max Climb 10% Reduced	4500		
6	Climb	0000	Max Climb 10% Reduced	5500		
7	Climb	0000	Max Climb 10% Reduced	7500		
8	Climb	0000	Max Climb 10% Reduced	10000		

Figure A-12. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4

A.1.4.5. A300-622R, Profile Weight 353,300

The “stage length 5” user-defined profile for the A300-622R assumes a weight of 353,300 pounds, and is identified as PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT_05; PROF_ID2: 5 to change the thrust cut back to occur at the end of the initial climb to 1,000 ft AFE (rather than after the first flap retraction) and to remove the climb at 3,000 AFE in step 4 and modified to set thrust level to maximum at step 1 and step 2. The acceleration energy share percentage was also reduced from 70 percent to 45 percent to provide a better match to flight track samples altitude range and speed range shown in Figure A-3 and Figure A-4, respectively. To assist AEDT, a climb was introduced at 4,500 AFE in step 5.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff 5% Reduced		0	
2	Climb	1500	Max Takeoff 5% Reduced	1000		
3	Percent Accelerate	1500	Max Takeoff 5% Reduced		209.1	70
4	Climb	0000	Max Climb	3000		
5	Percent Accelerate	0000	Max Climb		250	70
6	Climb	0000	Max Climb	5500		
7	Climb	0000	Max Climb	7500		
8	Climb	0000	Max Climb	10000		

Figure A-13. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	1500	Max Takeoff		0	
2	Climb	1500	Max Takeoff	1000		
3	Percent Accelerate	1500	Max Climb		209.1	45
4	Percent Accelerate	0000	Max Climb		250	45
5	Climb	0000	Max Climb	4500		
6	Climb	0000	Max Climb	5500		
7	Climb	0000	Max Climb	7500		
8	Climb	0000	Max Climb	10000		

Figure A-14. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5

A.1.5 Graphical and Tabular Comparison

An MS Excel file containing the profile points as found in the AEDT XML Performance Report Export file is available in electronic form upon request. It was developed for comparison of performance data to the AEDT Standard profiles and was used to generate the following tables and line graphs.

A.1.5.1. *Tables and Figures Supporting Analysis Demonstrating Benefit*

Table A-1 through **Table A-5** show the Sound Exposure Level (SEL) results under the flight path from the user-defined departure profiles; SEL values resulting from the standard AEDT departure profiles are presented for comparison. **Figure A-5** through **Figure A-19** show the same SEL computations in the form of SEL contours.

Table A-1. SELs for A300-622R Departures at 278,700 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: A300-622R Profile Weight: 278,700 lbs. (PROF_ID2 = 1) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.3	130.2	-3.1
0.5	121.8	119.3	-2.5
1.0	103.0	103.1	0.1
1.5	98.4	96.4	-2.1
2.0	91.7	92.9	1.2
2.5	89.3	90.9	1.6
3.0	87.7	89.3	1.6
3.5	86.3	87.8	1.5
4.0	85.1	86.4	1.3
4.5	84.0	85.1	1.2
5.0	82.9	84.0	1.1
5.5	81.9	83.0	1.0
6.0	81.0	81.9	0.9
6.5	80.2	81.0	0.8
7.0	79.4	80.1	0.7
7.5	78.8	79.4	0.6
8.0	78.1	78.6	0.5
8.5	77.5	77.9	0.4
9.0	76.9	77.3	0.4
9.5	76.4	76.7	0.3
10.0	75.9	76.2	0.3

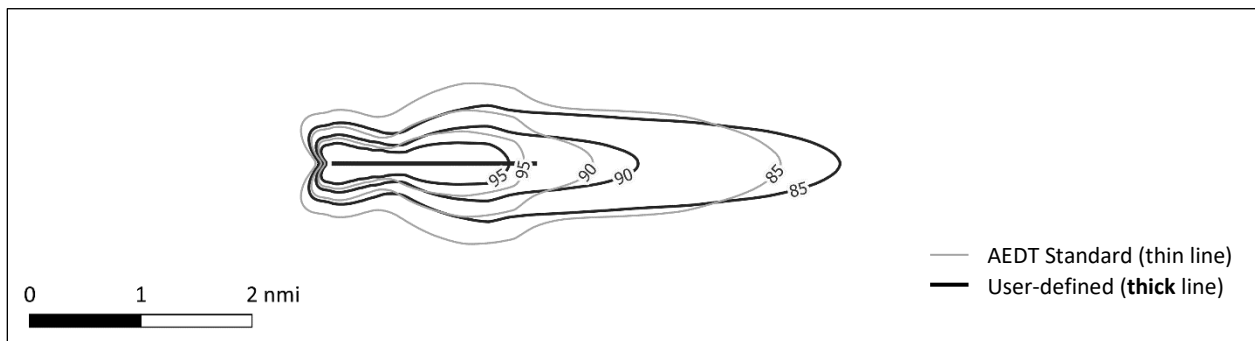


Figure A-15. SEL Contours for A300-622R Departures at Take-Off Weight 278,700 Pounds

Table A-2. SELs for A300-622R Departures at 290,300 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: A300-622R Profile Weight: 290,300 lbs. (PROF_ID2 = 2) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.2	130.1	-3.1
0.5	121.8	119.9	-1.9
1.0	103.8	104.5	0.6
1.5	99.0	97.9	-1.1
2.0	92.5	93.4	0.8
2.5	89.9	91.4	1.5
3.0	88.1	89.7	1.6
3.5	86.8	88.4	1.6
4.0	85.5	87.0	1.5
4.5	84.5	85.8	1.3
5.0	83.4	84.7	1.2
5.5	82.5	83.6	1.2
6.0	81.5	82.6	1.0
6.5	80.8	81.7	1.0
7.0	80.0	80.8	0.8
7.5	79.3	79.9	0.7
8.0	78.7	79.3	0.6
8.5	78.0	78.5	0.5
9.0	77.5	77.9	0.4
9.5	76.9	77.3	0.5
10.0	76.4	76.8	0.4

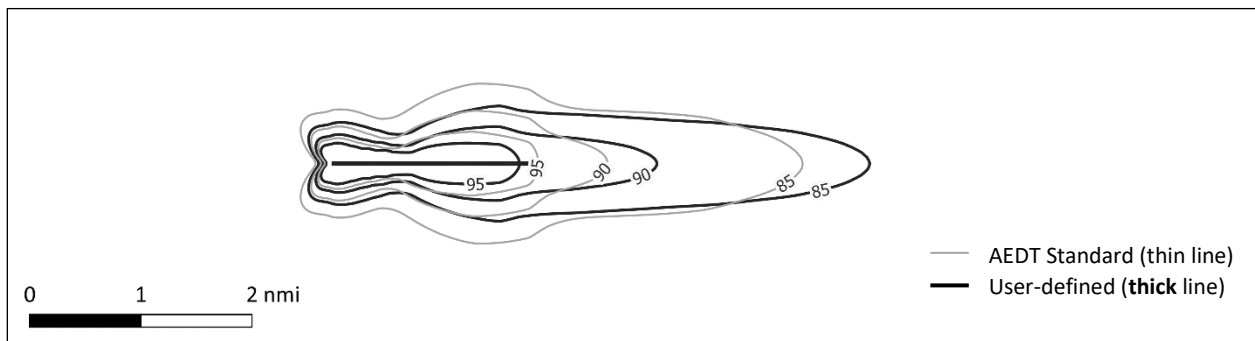


Figure A-16. SEL Contours for A300-622R Departures at Take-Off Weight 290,300 Pounds

Table A-3. SELs for A300-622R Departures at 302,400 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: A300-622R Profile Weight: 302,400 lbs. (PROF_ID2 = 3) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.1	131.0	-2.1
0.5	122.1	120.7	-1.4
1.0	105.1	105.6	0.5
1.5	99.6	98.8	-0.8
2.0	94.5	93.4	-1.1
2.5	90.4	91.6	1.1
3.0	88.6	90.0	1.4
3.5	87.2	88.7	1.5
4.0	86.0	87.3	1.3
4.5	84.9	86.1	1.2
5.0	83.9	85.0	1.1
5.5	83.0	84.0	1.1
6.0	82.1	83.1	1.0
6.5	81.3	82.1	0.9
7.0	80.5	81.3	0.8
7.5	79.8	80.5	0.7
8.0	79.2	79.7	0.6
8.5	78.6	79.1	0.5
9.0	78.0	78.4	0.4
9.5	77.4	77.8	0.4
10.0	76.9	77.3	0.4

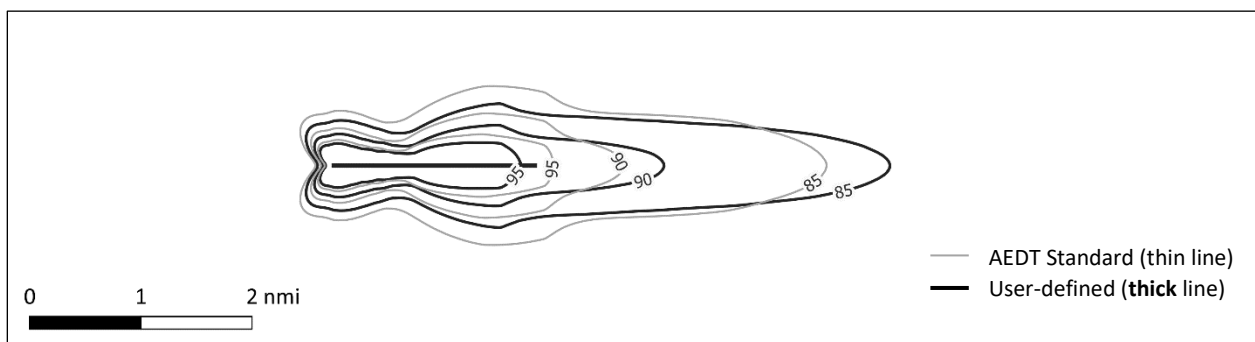


Figure A-17. SEL Contours for A300-622R Departures at Take-Off Weight 302,400 Pounds

Table A-4. SELs for A300-622R Departures at 324,100 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: A300-622R Profile Weight: 324,100 lbs. (PROF_ID2 = 4) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.5	131.4	-2.1
0.5	122.2	121.2	-1.0
1.0	107.5	108.8	1.3
1.5	100.6	100.0	-0.6
2.0	97.6	94.1	-3.5
2.5	91.8	92.5	0.7
3.0	89.7	90.9	1.1
3.5	88.2	89.5	1.3
4.0	86.9	88.3	1.4
4.5	85.9	87.2	1.3
5.0	85.0	86.1	1.1
5.5	84.1	85.1	1.0
6.0	83.2	84.2	1.0
6.5	82.4	83.3	1.0
7.0	81.6	82.5	0.9
7.5	80.9	81.6	0.8
8.0	80.3	80.9	0.6
8.5	79.6	80.2	0.6
9.0	79.0	79.6	0.5
9.5	78.4	78.9	0.5
10.0	77.9	78.3	0.4

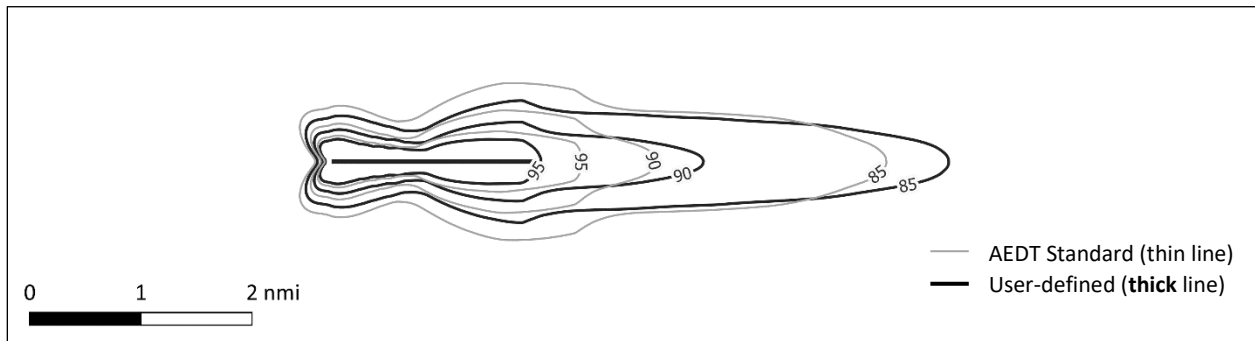


Figure A-18. SEL Contours for A300-622R Departures at Take-Off Weight 324,100 Pounds

Table A-5. SELs for A300-622R Departures at 353,300 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: A300-622R Profile Weight: 353,300 lbs. (PROF_ID2 = 5) User PROF_ID1: SDF_NADP_2_RT00			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.3	133.3	0.0
0.5	122.7	122.7	0.0
1.0	112.5	112.5	0.0
1.5	102.3	102.3	0.0
2.0	98.8	95.2	-3.6
2.5	96.6	93.4	-3.2
3.0	91.1	91.8	0.8
3.5	89.4	90.6	1.2
4.0	88.0	89.3	1.4
4.5	86.9	88.2	1.3
5.0	86.0	87.1	1.1
5.5	85.1	86.1	1.0
6.0	84.3	85.2	0.9
6.5	83.5	84.4	0.9
7.0	82.8	83.4	0.7
7.5	82.0	82.7	0.7
8.0	81.4	82.0	0.7
8.5	80.8	81.3	0.5
9.0	80.2	80.7	0.5
9.5	79.6	80.1	0.5
10.0	79.1	79.5	0.3

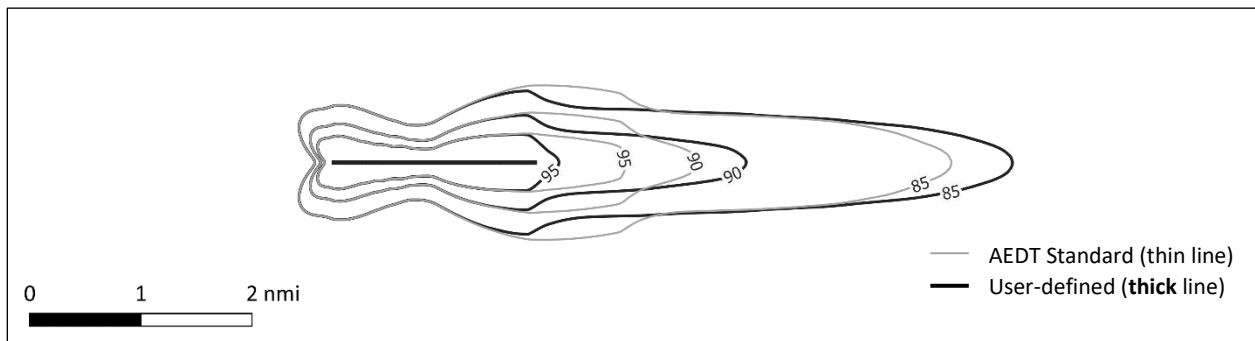


Figure A-19. SEL Contours for A300-622R Departures at Take-Off Weight 353,300 Pounds

A.2. Additional Graphs: Comparison of Altitude and Speed Profiles by Stage Length

The additional graphs of altitude vs. distance and speed vs. distance, organized by stage length, are included in this section in response to FAA's request in the feedback dated May 29, 2024. The following figures are complementary to Figures A-1 through A-4 in the original memorandum (dated April 18, 2024) and show the same data. **Figures A-20 through A-29** reorganize the data by specific profile weights and respective stage lengths.

The distribution of departures by stage length (as derived by an analysis of the city-pair data in the 12-month NOMS sample) show that 44% of the A300-600 departures are in stage length 1, 39% in stage length 2, 6% in stage length 3, and 10% in stage length 4. The stage length distribution, which will be applied to the cargo aircraft for noise modeling, is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Airbus A300-600 operations will be represented with AEDT ANP stage lengths 1 – 4. Although A300-600 stage length 5 (PROF_ID2 = 5, with representative profile weight of 353,300 pounds) did not appear in the 12-month flight track sample, we include that departure profile in this documentation in case the forecast data indicate that such operations should be included in the forecast NEM.

As noted in the "Statement of Benefit" (Section A.1.1), operators at SDF use a version of "Noise Abatement Departure Procedures" (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. Operators did not provide the exact reduced thrust. Therefore, we used the thrust-to-weight ratio of the AEDT maximum thrust profile associated with current and historical A300 operations at SDF. The similar thrust-to-weight ratio should maintain a similar acceleration rate during the take-off roll and, combined with the lower rotation speed needed for a lower weight aircraft, should have a shorter take-off roll. Therefore, all of the proposed procedures follow the NADP 2 described on page A-1, although they may use various thrust settings based on weight. This should not be confused with AEDT's definition of a single procedure (PROF_ID1 and PROF_ID2), which combines both the altitude and flap retraction speeds along with the power settings. It also should be noted that our efforts to develop the proposed profiles were limited to the selection of thrust coefficients already available in AEDT. In other words, we did not attempt to define new thrust coefficients to represent power levels not already represented in AEDT. We did not modify the flap retraction speed schedule relative to that in AEDT, and we also kept all clean climbs (i.e., flaps fully retracted) at a speed of 250 knots calibrated airspeed, which matches both the AEDT standard profiles and the indicated airspeed listed in the procedures provided by the operator. In addition, the comparison of the AEDT profiles is done at the SDF annual average day conditions documented in the AEDT database, which will be used in the calculation of the NEM contours. As such, the ground speeds reported by AEDT are not expected to match the flight track data precisely; therefore, we recommend viewing the general speed patterns rather than comparing absolute values.

A300-622R AEDT Departures at Take-off Weight 278,700 Pounds
Compared to Actual Performance Associated with Stage Length 1, Altitude vs. Distance

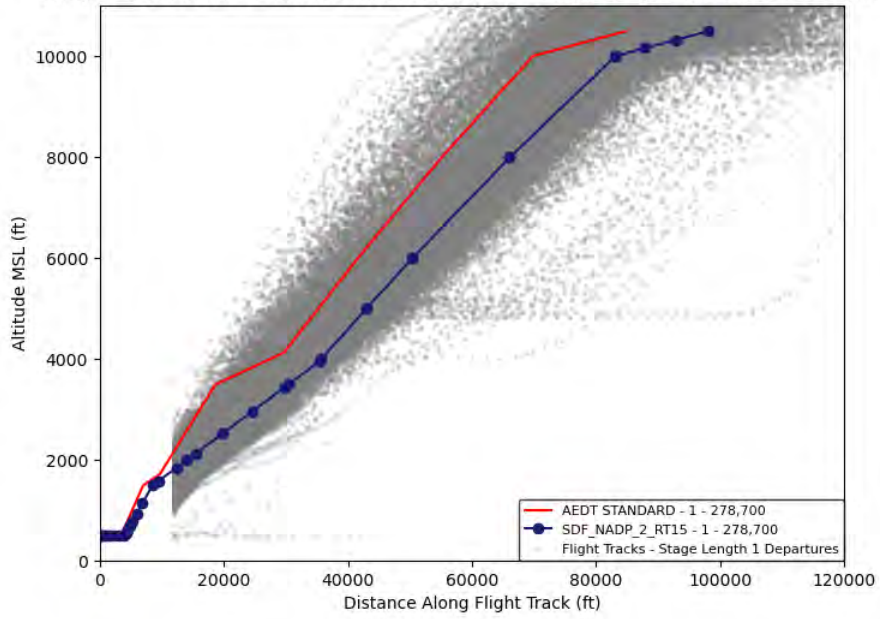


Figure A-20. A300-622R Departures, Stage Length 1, Altitude vs. Distance

A300-622R AEDT Departures at Take-off Weight 278,700 Pounds
Compared to Actual Performance Associated with Stage Length 1, Speed vs. Distance

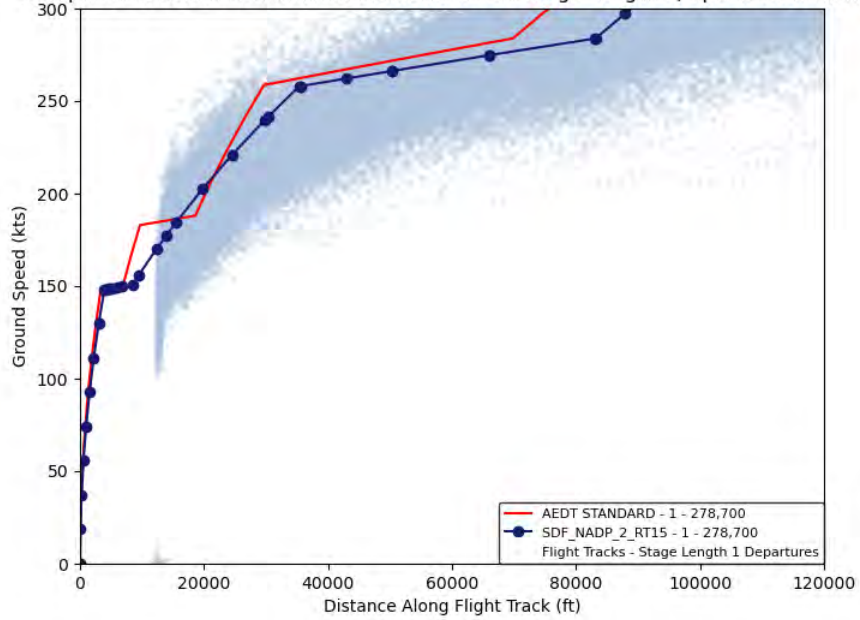


Figure A-21. A300-622R Departures, Stage Length 1, Speed vs. Distance

A300-622R AEDT Departures at Take-off Weight 290,300 Pounds
Compared to Actual Performance Associated with Stage Length 2, Altitude vs. Distance

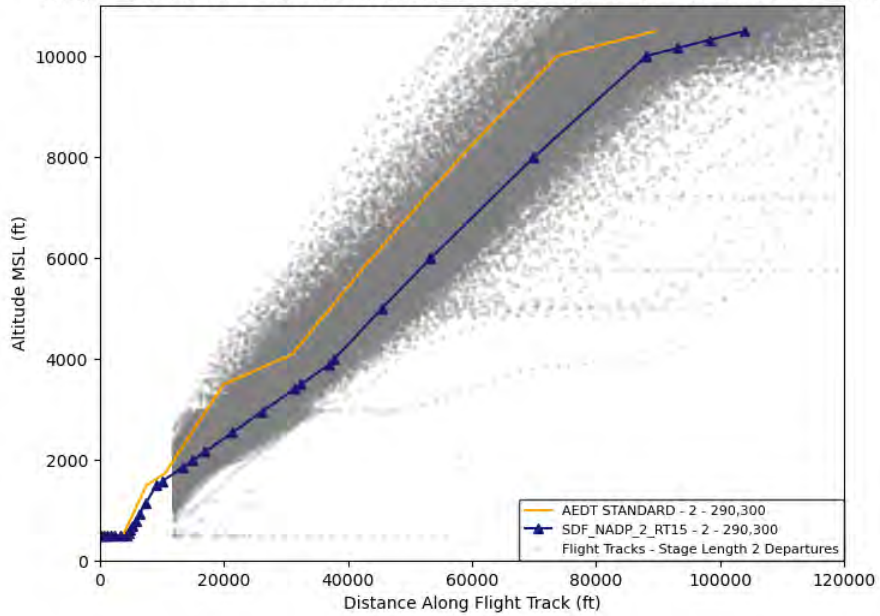


Figure A-22. A300-622R Departures, Stage Length 2, Altitude vs. Distance

A300-622R AEDT Departures at Take-off Weight 290,300 Pounds
Compared to Actual Performance Associated with Stage Length 2, Speed vs. Distance

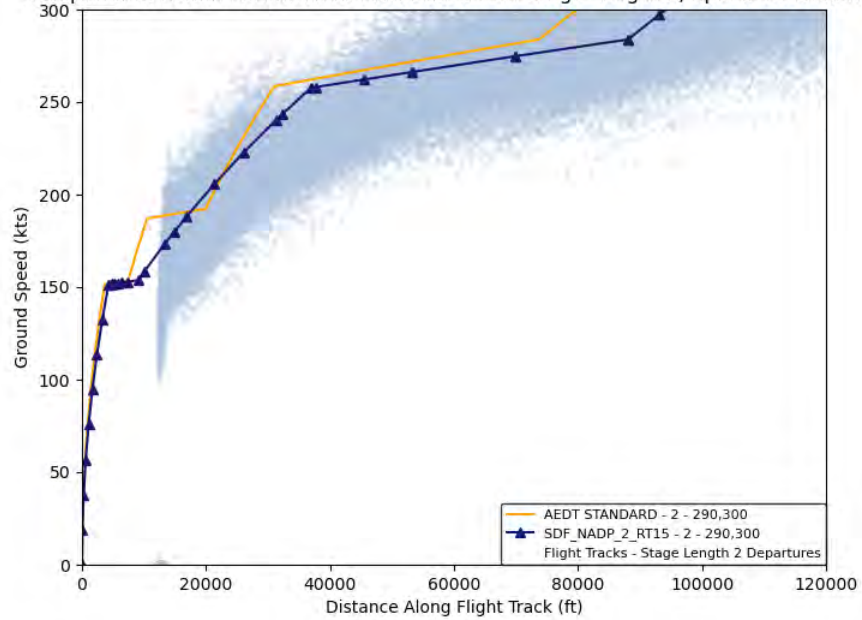


Figure A-23. A300-622R Departures, Stage Length 2, Speed vs. Distance

A300-622R AEDT Departures at Take-off Weight 302,400 Pounds
Compared to Actual Performance Associated with Stage Length 3, Altitude vs. Distance

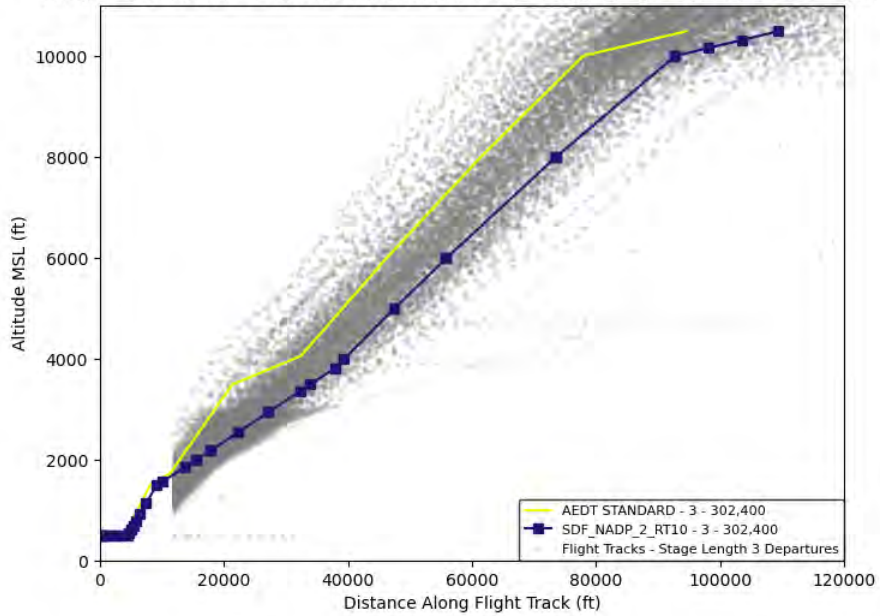


Figure A-24. A300-622R Departures, Stage Length 3, Altitude vs. Distance

A300-622R AEDT Departures at Take-off Weight 302,400 Pounds
Compared to Actual Performance Associated with Stage Length 3, Speed vs. Distance

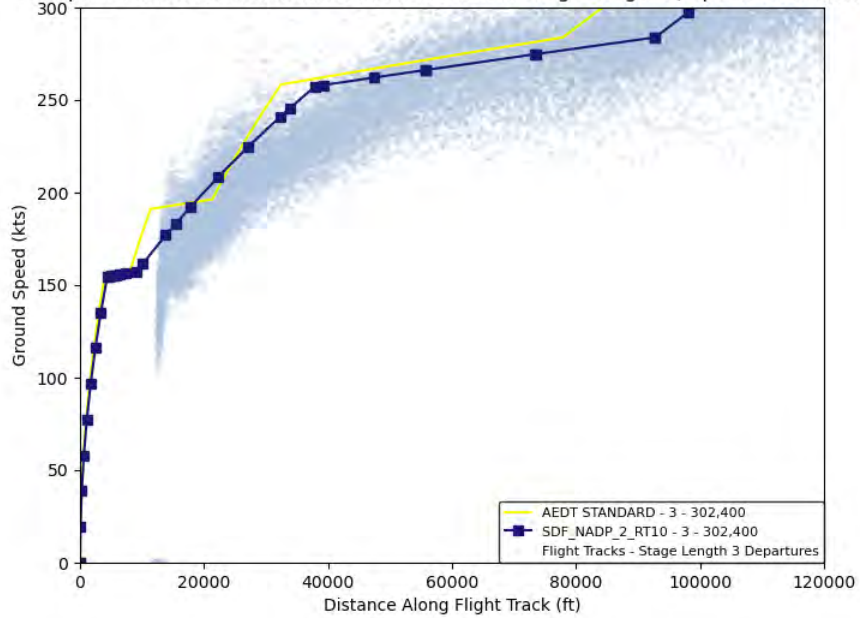


Figure A-25. A300-622R Departures, Stage Length 3, Speed vs. Distance

A300-622R AEDT Departures at Take-off Weight 324,100 Pounds
Compared to Actual Performance Associated with Stage Length 4, Altitude vs. Distance

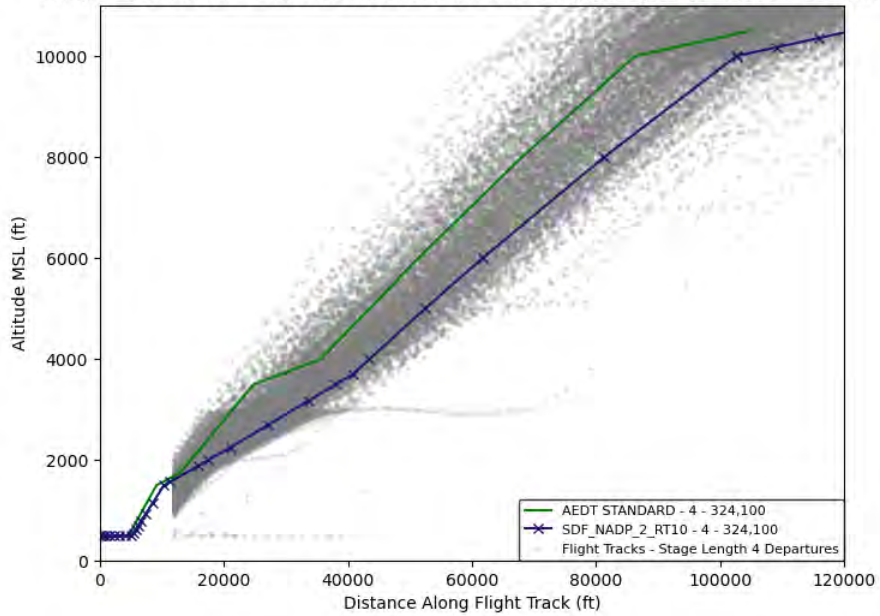


Figure A-26. A300-622R Departures, Stage Length 4, Altitude vs. Distance

A300-622R AEDT Departures at Take-off Weight 324,100 Pounds
Compared to Actual Performance Associated with Stage Length 4, Speed vs. Distance

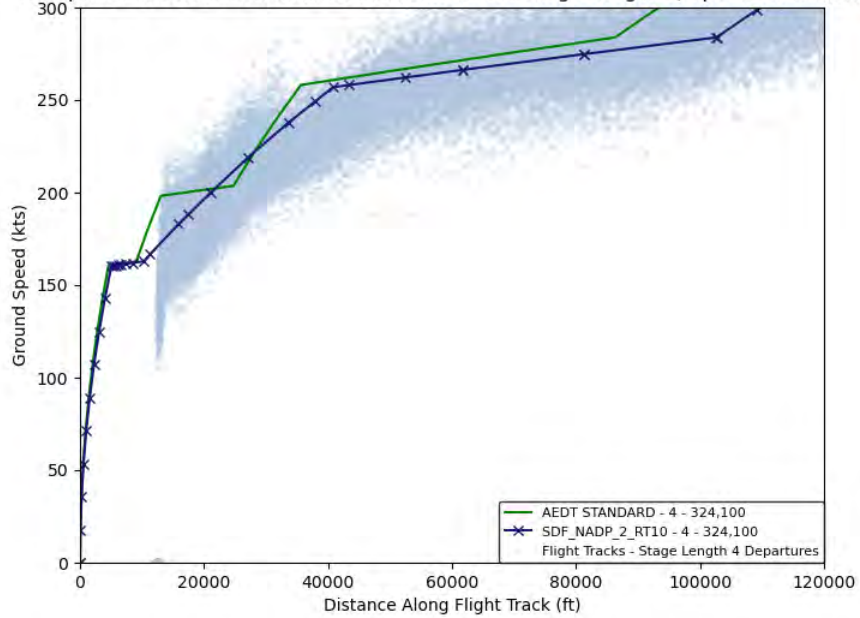


Figure A-27. A300-622R Departures, Stage Length 4, Speed vs. Distance

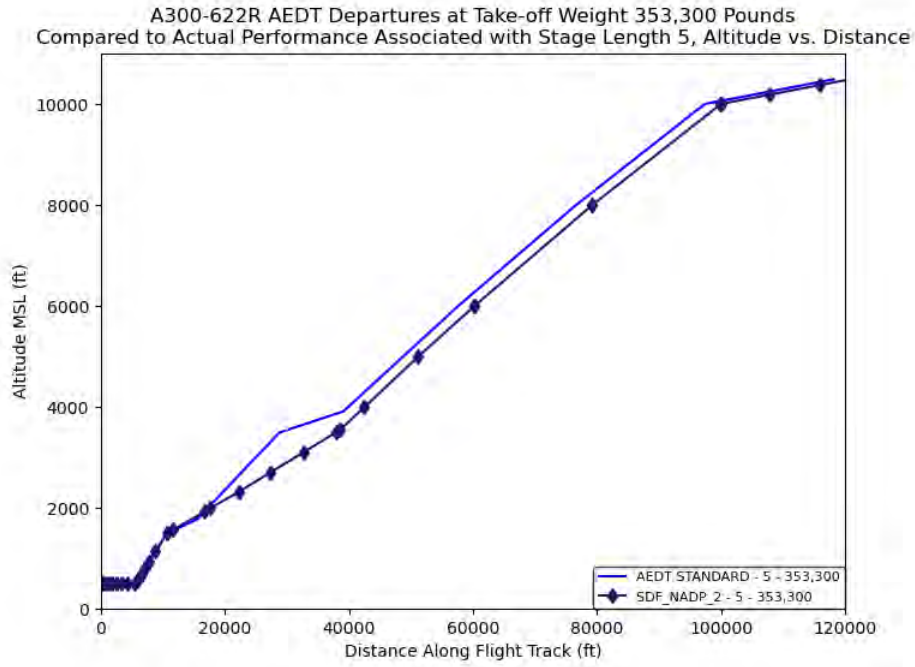


Figure A-28. A300-622R Departures, Stage Length 5, Altitude vs. Distance

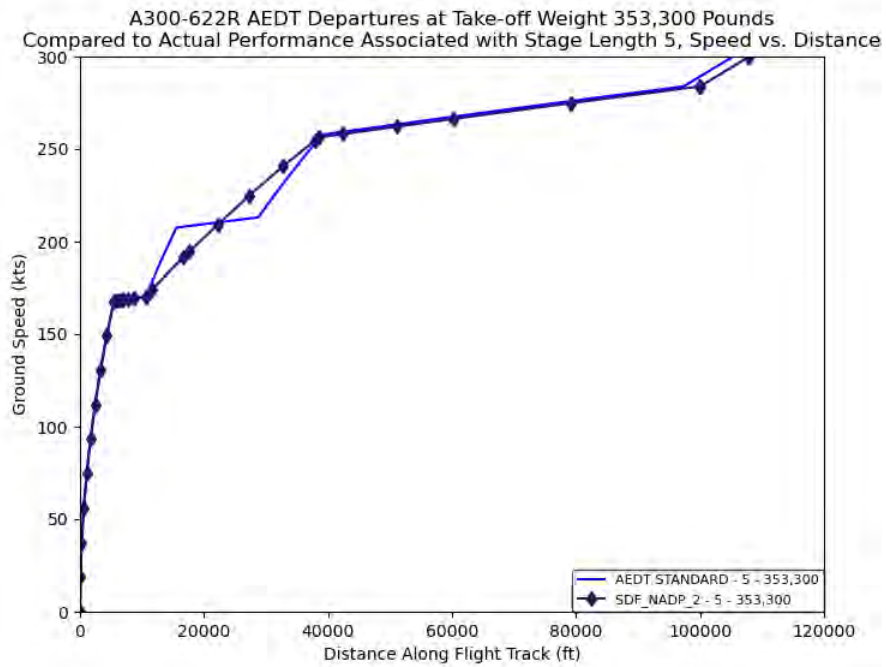


Figure A-29. A300-622R Departures, Stage Length 5, Speed vs. Distance



Section B:

Boeing 747-400 and 747-8

This section describes the user-defined inputs for Boeing 747-400 and 747-8. These aircraft make up a notable portion of SDF existing operations, both day-time and night-time. The 747-400 is represented by ANP type 747-400 and the 747-8 is represented by ANP type 7478. Our discussion with operators indicates that procedures for both types are the same and that the same pilots operate both variants.

Current operators of the 747-400 and 747-8 at SDF have provided information related to development of these AEDT profiles and have indicated that these profiles are representative of current 2024 operations and are expected to be in place in the future. This user-defined profile submission has been prepared in accordance with FAA guidance. The profile information and supporting documentation is included in the following sections.

Overall, the proposed user-defined profiles reflect current SDF Boeing 747 procedures that operators refer to as "NADP 2." In simple terms, these procedures are described with the following steps:

- Take-off thrust and take-off flaps while climbing at constant airspeed speed to 1,000 ft Above Field Elevation (AFE);
- At 1,000 ft AFE, reduce thrust to climb thrust setting, reduce aircraft pitch, accelerate and retract flaps on the aircraft manufacturer's recommended speed schedule (i.e., sometimes referred to as "retract flaps on schedule" or "flap retraction schedule");
- Continue accelerating to 250 knots indicated airspeed with flaps fully retracted; and
- Constant speed climb at 250 knots to 10,000 ft AFE.

The closest profiles available with AEDT include an additional climb step between acceleration for the "retract flaps on schedule" step and the "accelerating to 250 knots indicated airspeed with flaps fully retracted" step. Current operators of the Boeing 747 have indicated that the extra climb segment within the default AEDT profiles is not representative of actual operations at SDF. The proposed user-defined profiles developed are modifications of existing AEDT profiles and continue to use AEDT's flap retraction schedule for a given weight.

The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Boeing 747s operations will be represented with AEDT ANP stage lengths 1 – 7, while stage lengths 8 – 9 will be used much less often.

HMMH has prepared this documentation in accordance with Section 5 of FAA's document titled "Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA" dated October 27, 2017.¹

¹ https://aedt.faa.gov/Documents/guidance_aedt_nepa.pdf

Contents

B.1.	Boeing 747-400 (ANP Type 747400) Profile Review with AEDT 3f	B-5
B.1.1.	Statement of Benefit	B-5
B.1.1.1.	Figures Supporting Statement of Benefit.....	B-5
B.1.2.	Analysis Demonstrating Benefit	B-8
B.1.3.	Concurrence on Aircraft Performance.....	B-8
B.1.4.	Certification of New Parameters	B-8
B.1.4.1.	747400, Profile Weight 545,000	B-9
B.1.4.2.	747400, Profile Weight 563,800	B-10
B.1.4.3.	747400, Profile Weight 583,100	B-11
B.1.4.4.	747400, Profile Weight 621,500	B-12
B.1.4.5.	747400, Profile Weight 669,500	B-13
B.1.4.6.	747400, Profile Weight 720,900	B-14
B.1.4.7.	747400, Profile Weight 776,600	B-15
B.1.4.8.	747400, Profile Weight 836,200	B-16
B.1.4.9.	747400, Profile Weight 875,000	B-17
B.1.5.	Graphical and Tabular Comparison	B-18
B.1.5.1.	Tables and Figures Supporting Analysis Demonstrating Benefit.....	B-18
B.1.5.3.	Graphical Comparison of Profiles	B-28
B.2.	Boeing 747-8 (ANP Type 7478) Profile Review with AEDT 3f	B-30
B.2.1.	Statement of Benefit	B-30
B.2.1.1.	Figures Supporting Statement of Benefit.....	B-30
B.2.2.	Analysis Demonstrating Benefit	B-33
B.2.3.	Concurrence on Aircraft Performance.....	B-33
B.2.4.	Certification of New Parameters	B-33
B.2.4.1.	7478, Profile Weight 671,100	B-34
B.2.4.2.	7478, Profile Weight 691,200	B-35
B.2.4.3.	7478, Profile Weight 713,300	B-36
B.2.4.4.	7478, Profile Weight 752,400	B-37
B.2.4.5.	7478, Profile Weight 801,000	B-38
B.2.4.6.	7478, Profile Weight 853,400	B-39
B.2.4.7.	7478, Profile Weight 909,300	B-40
B.2.4.8.	7478, Profile Weight 969,000	B-41
B.2.4.9.	7478, Profile Weight 987,000	B-42
B.2.5.	Graphical and Tabular Comparison	B-43
B.2.5.1.	Tables and Figures Supporting Analysis Demonstrating Benefit.....	B-43
B.2.5.3.	Graphical Comparison of Profiles	B-53
B.3.	Additional Graphs: Comparison of Altitude and Speed Profiles by Stage Length	B-55

Figures

Figure B-1.	747400 AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance.....	B-6
Figure B-2.	747400 AEDT Standard Speed Profiles Compared to Actual Aircraft Performance.....	B-6
Figure B-3.	747400 Proposed Altitude Profiles Compared to Actual Aircraft Performance	B-7
Figure B-4.	747400 Proposed Speed Profiles Compared to Actual Aircraft Performance	B-7
Figure B-5.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1	B-9
Figure B-6.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1	B-9
Figure B-7.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2	B-10
Figure B-8.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2	B-10
Figure B-9.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3	B-11
Figure B-10.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3	B-11
Figure B-11.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 4	B-12
Figure B-12.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 4	B-12
Figure B-13.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 5	B-13
Figure B-14.	AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 5	B-13
Figure B-15.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 6	B-14

Figure B-16. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 6 B-14
Figure B-17. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 7 B-15
Figure B-18. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 7 B-15
Figure B-19. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 8 B-16
Figure B-20. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 8 B-16
Figure B-21. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 9 B-17
Figure B-22. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 9 B-17
Figure B-23. SEL Contours for 747400 Departures at Take-Off Weight 545,000 Pounds..... B-19
Figure B-24. SEL Contours for 747400 Departures at Take-Off Weight 563,800 Pounds..... B-20
Figure B-25. SEL Contours for 747400 Departures at Take-Off Weight 583,100 Pounds..... B-21
Figure B-26. SEL Contours for 747400 Departures at Take-Off Weight 621,500 Pounds..... B-22
Figure B-27. SEL Contours for 747400 Departures at Take-Off Weight 669,500 Pounds..... B-23
Figure B-28. SEL Contours for 747400 Departures at Take-Off Weight 720,900 Pounds..... B-24
Figure B-29. SEL Contours for 747400 Departures at Take-Off Weight 720,900 Pounds..... B-25
Figure B-30. SEL Contours for 747400 Departures at Take-Off Weight 836,200 Pounds..... B-26
Figure B-31. SEL Contours for 747400 Departures at Take-Off Weight 875,000 Pounds..... B-27
Figure B-32. 747400 AEDT Profiles, Altitude vs. Distance B-28
Figure B-33. 747400 AEDT Profiles, Speed vs. Distance B-29
Figure B-34. 747400 AEDT Profiles, Thrust vs. Distance B-29
Figure B-35. 7478 AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance..... B-31
Figure B-36. 7478 AEDT Standard Speed Profiles Compared to Actual Aircraft Performance..... B-31
Figure B-37. 7478 Boeing Altitude Profiles Compared to Actual Aircraft Performance..... B-32
Figure B-38. 7478 Boeing Speed Profiles Compared to Actual Aircraft Performance..... B-32
Figure B-39. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1 B-34
Figure B-40. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1 B-34
Figure B-41. AEDT UI Screenshot of Starting Default Profile Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2..... B-35
Figure B-42. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2 B-35
Figure B-43. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3 B-36
Figure B-44. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3 B-36
Figure B-45. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 4 B-37
Figure B-46. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 4 B-37
Figure B-47. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 5 B-38
Figure B-48. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 5 B-38
Figure B-49. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 6 B-39
Figure B-50. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 6 B-39
Figure B-51. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 7 B-40
Figure B-52. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT05; PROF_ID2: 7 B-40
Figure B-53. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 8 B-41
Figure B-54. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 8 B-41
Figure B-55. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 9 B-42
Figure B-56. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 9 B-42
Figure B-57. SEL Contours for 7478 Departures at Take-Off Weight 671,100 Pounds B-44
Figure B-58. SEL Contours for 7478 Departures at Take-Off Weight 691,200 Pounds B-45
Figure B-59. SEL Contours for 7478 Departures at Take-Off Weight 713,300 Pounds B-46
Figure B-60. SEL Contours for 7478 Departures at Take-Off Weight 752,400 Pounds..... B-47
Figure B-61. SEL Contours for 7478 Departures at Take-Off Weight 801,000 Pounds B-48
Figure B-62. SEL Contours for 7478 Departures at Take-Off Weight 853,400 Pounds B-49
Figure B-63. SEL Contours for 7478 Departures at Take-Off Weight 909,300 Pounds B-50
Figure B-64. SEL Contours for 7478 Departures at Take-Off Weight 969,000 Pounds B-51
Figure B-65. SEL Contours for 7478 Departures at Take-Off Weight 987,000 Pounds B-52
Figure B-66. 7478 AEDT Profiles, Altitude vs. Distance B-53
Figure B-67. 7478 AEDT Profiles, Speed vs. Distance B-54
Figure B-68. 7478 AEDT Profiles, Thrust vs. Distance B-54
Figure B-69. 747400 Departures, Stage Length 1, Altitude vs. Distance..... B-56
Figure B-70. 747400 Departures, Stage Length 1, Speed vs. Distance..... B-56
Figure B-71. 747400 Departures, Stage Length 2, Altitude vs. Distance..... B-57
Figure B-72. 747400 Departures, Stage Length 2, Speed vs. Distance..... B-57
Figure B-73. 747400 Departures, Stage Length 3, Altitude vs. Distance..... B-58
Figure B-74. 747400 Departures, Stage Length 3, Speed vs. Distance..... B-58

Figure B-75. 747400 Departures, Stage Length 4, Altitude vs. Distance..... B-59
Figure B-76. 747400 Departures, Stage Length 4, Speed vs. Distance..... B-59
Figure B-77. 747400 Departures, Stage Length 5, Altitude vs. Distance..... B-60
Figure B-78. 747400 Departures, Stage Length 5, Speed vs. Distance..... B-60
Figure B-79. 747400 Departures, Stage Length 6, Altitude vs. Distance..... B-61
Figure B-80. 747400 Departures, Stage Length 6, Speed vs. Distance..... B-61
Figure B-81. 747400 Departures, Stage Length 7, Altitude vs. Distance..... B-62
Figure B-82. 747400 Departures, Stage Length 7, Speed vs. Distance..... B-62
Figure B-83. 747400 Departures, Stage Length 8, Altitude vs. Distance..... B-63
Figure B-84. 747400 Departures, Stage Length 8, Speed vs. Distance..... B-63
Figure B-85. 747400 Departures, Stage Length 9, Altitude vs. Distance..... B-64
Figure B-86. 747400 Departures, Stage Length 9, Speed vs. Distance..... B-64
Figure B-87. 7478 Departures, Stage Length 1, Altitude vs. Distance..... B-65
Figure B-88. 7478 Departures, Stage Length 1, Speed vs. Distance..... B-65
Figure B-89. 7478 Departures, Stage Length 2, Altitude vs. Distance..... B-66
Figure B-90. 7478 Departures, Stage Length 2, Speed vs. Distance..... B-66
Figure B-91. 7478 Departures, Stage Length 3, Altitude vs. Distance..... B-67
Figure B-92. 7478 Departures, Stage Length 3, Speed vs. Distance..... B-67
Figure B-93. 7478 Departures, Stage Length 4, Altitude vs. Distance..... B-68
Figure B-94. 7478 Departures, Stage Length 4, Speed vs. Distance..... B-68
Figure B-95. 7478 Departures, Stage Length 5, Altitude vs. Distance..... B-69
Figure B-96. 7478 Departures, Stage Length 5, Speed vs. Distance..... B-69
Figure B-97. 7478 Departures, Stage Length 6, Altitude vs. Distance..... B-70
Figure B-98. 7478 Departures, Stage Length 6, Speed vs. Distance..... B-70
Figure B-99. 7478 Departures, Stage Length 7, Altitude vs. Distance..... B-71
Figure B-100. 7478 Departures, Stage Length 7, Speed vs. Distance..... B-71
Figure B-101. 7478 Departures, Stage Length 8, Altitude vs. Distance..... B-72
Figure B-102. 7478 Departures, Stage Length 8, Speed vs. Distance..... B-72
Figure B-103. 7478 Departures, Stage Length 9, Altitude vs. Distance..... B-73
Figure B-104. 7478 Departures, Stage Length 9, Speed vs. Distance..... B-73

Tables

Table B-1. SELs for 747400 Departures at 545,000 Pounds: AEDT Standard and User-defined Profiles B-19
Table B-2. SELs for 747400 Departures at 563,800 Pounds: AEDT Standard and User-defined Profiles B-20
Table B-3. SELs for 747400 Departures at 583,100 Pounds: AEDT Standard and User-defined Profiles B-21
Table B-4. SELs for 747400 Departures at 621,500 Pounds: AEDT Standard and User-defined Profiles B-22
Table B-5. SELs for 747400 Departures at 669,500 Pounds: AEDT Standard and User-defined Profiles B-23
Table B-6. SELs for 747400 Departures at 720,900 Pounds: AEDT Standard and User-defined Profiles B-24
Table B-7. SELs for 747400 Departures at 720,900 Pounds: AEDT Standard and User-defined Profiles B-25
Table B-8. SELs for 747400 Departures at 836,200 Pounds: AEDT Standard and User-defined Profiles B-26
Table B-9. SELs for 747400 Departures at 875,000 Pounds: AEDT Standard and User-defined Profiles B-27
Table B-10. SELs for 7478 Departures at 671,100 Pounds: AEDT Standard and User-defined Profiles B-44
Table B-11. SELs for 7478 Departures at 691,200 Pounds: AEDT Standard and User-defined Profiles B-45
Table B-12. SELs for 7478 Departures at 713,300 Pounds: AEDT Standard and User-defined Profiles B-46
Table B-13. SELs for 7478 Departures at 752,400 Pounds: AEDT Standard and User-defined Profiles B-47
Table B-14. SELs for 7478 Departures at 801,000 Pounds: AEDT Standard and User-defined Profiles B-48
Table B-15. SELs for 7478 Departures at 853,400 Pounds: AEDT Standard and User-defined Profiles B-49
Table B-16. SELs for 7478 Departures at 909,300 Pounds: AEDT Standard and User-defined Profiles B-50
Table B-17. SELs for 7478 Departures at 969,000 Pounds: AEDT Standard and User-defined Profiles B-51
Table B-18. SELs for 7478 Departures at 987,000 Pounds: AEDT Standard and User-defined Profiles B-52

B.1. Boeing 747-400 (ANP Type 747400) Profile Review with AEDT 3f

B.1.1. Statement of Benefit

Operators at SDF use a version of “Noise Abatement Departures Procedures” (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. The proposed 747400 climb profiles and thrust settings during the various stages of flight provide a better representation of what is actually being flown by cargo aircraft at SDF. These profiles were developed from the default (i.e. included) reduced thrust profiles in AEDT.

The proposed user-defined profiles were developed with considerations of SDF runway specific length and minimum climb requirements. Correspondence with the operators has indicated a high agreement with their procedures at SDF.

B.1.1.1. *Figures Supporting Statement of Benefit*

Figure B-1 and **Figure B-3** compare the standard AEDT profiles and proposed profiles to actual aircraft climb performance at SDF. **Figure B-2** and **Figure B-4** compare the standard AEDT profiles and proposed profiles to actual aircraft ground speed profiles at SDF. The standard profiles are identified in the figure legends as “Stage length - Weight”. The proposed profiles are identified in the figure legends as “Name – Stage length - Weight.”

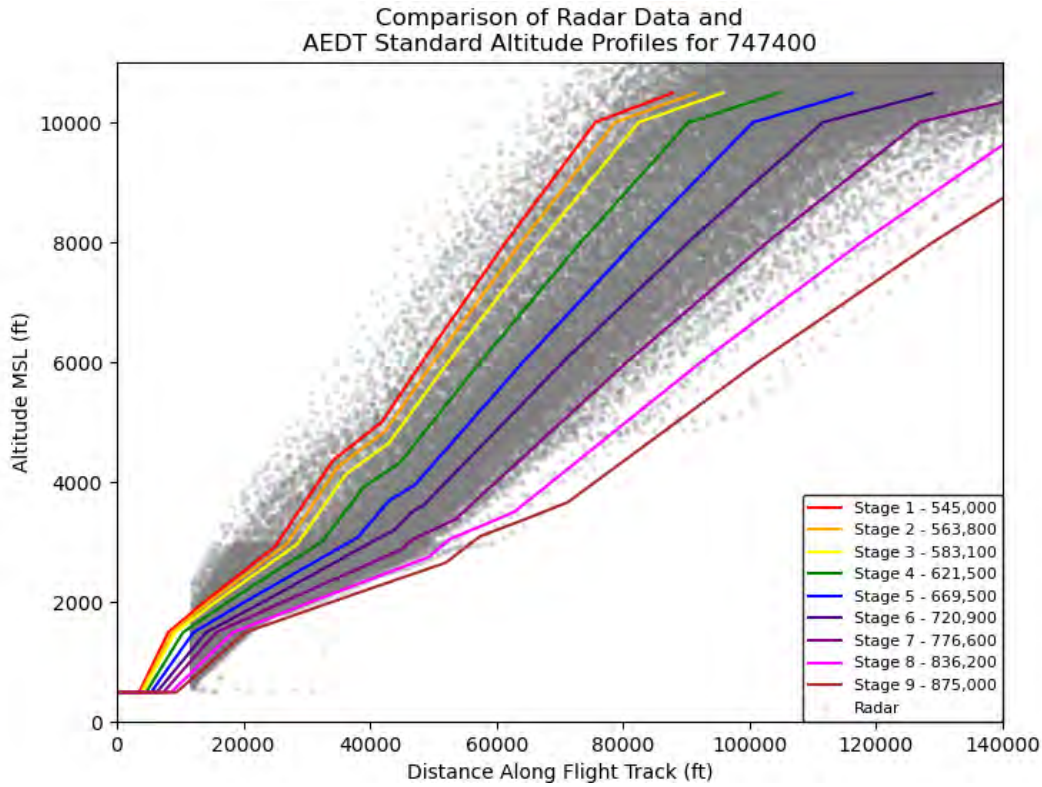


Figure B-1. 747400 AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance

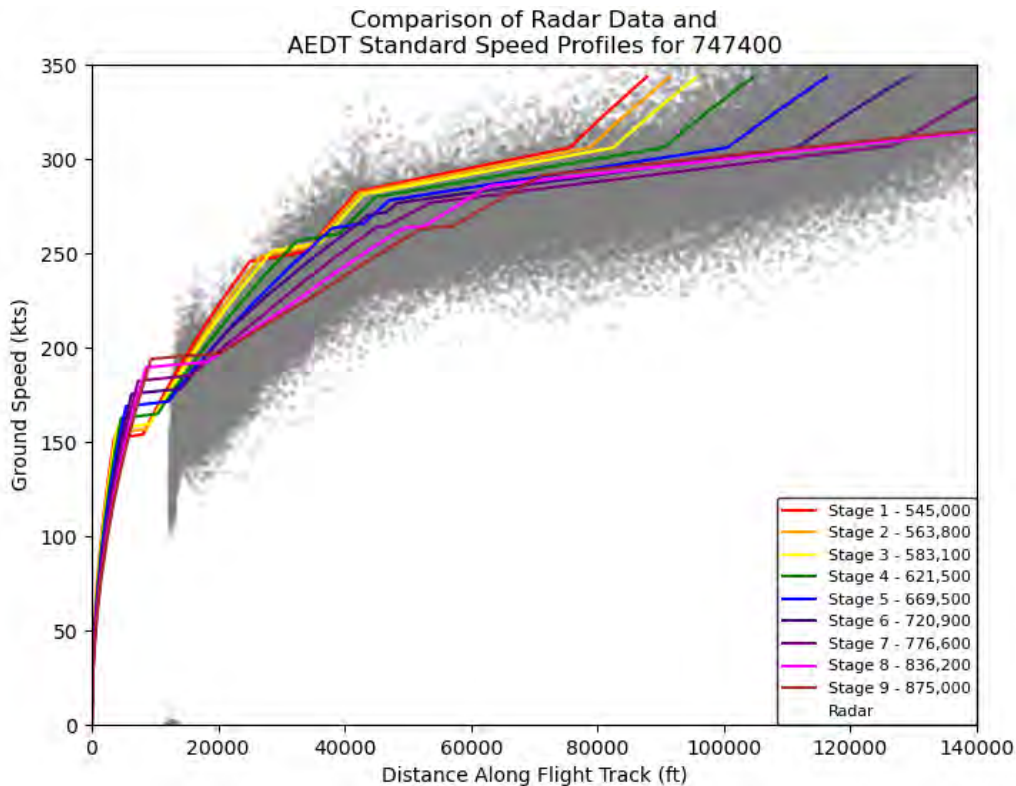


Figure B-2. 747400 AEDT Standard Speed Profiles Compared to Actual Aircraft Performance

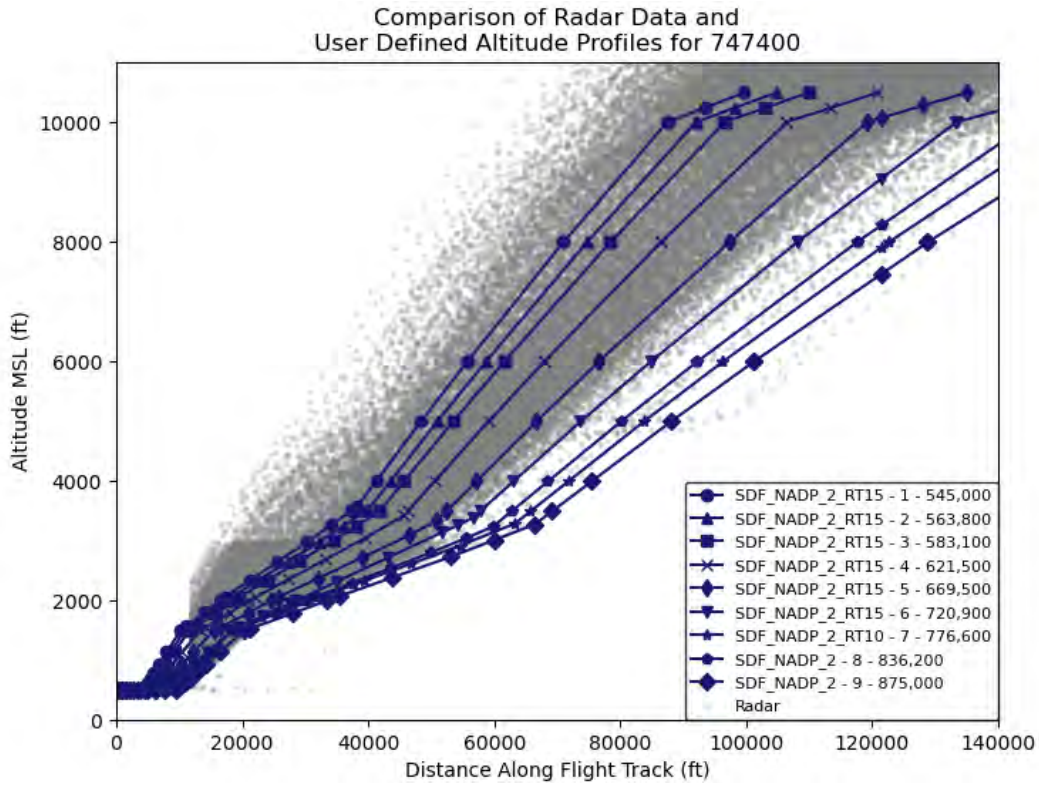


Figure B-3. 747400 Proposed Altitude Profiles Compared to Actual Aircraft Performance

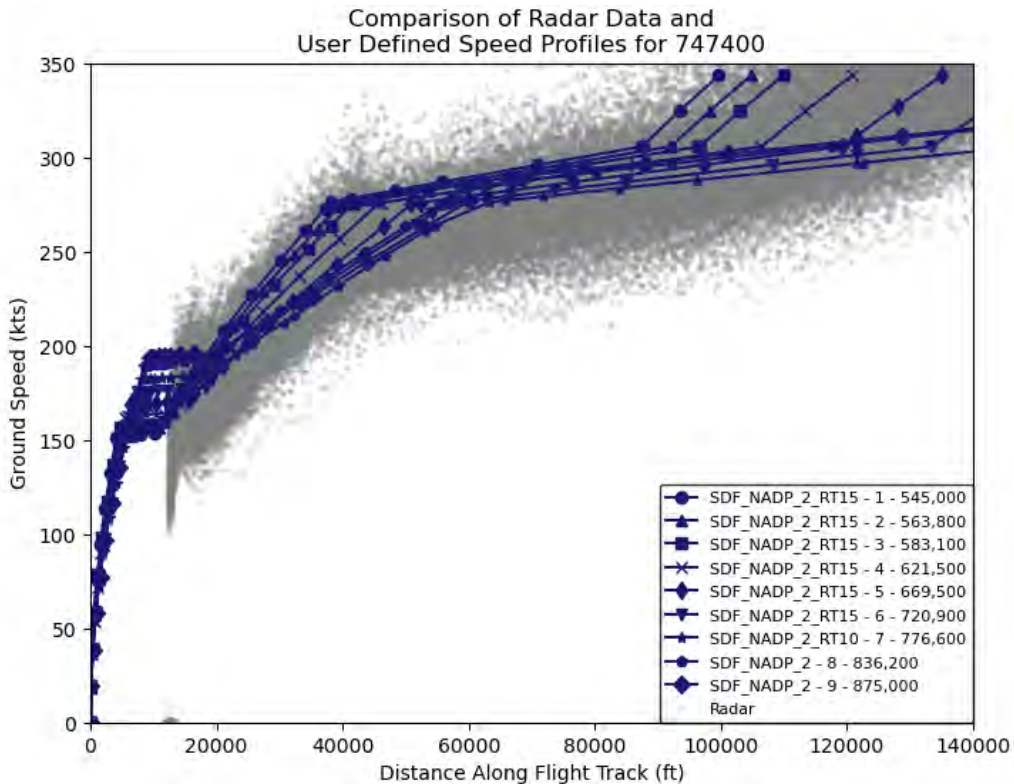


Figure B-4. 747400 Proposed Speed Profiles Compared to Actual Aircraft Performance

B.1.2. Analysis Demonstrating Benefit

The differences between the existing 747400 profiles in AEDT 3f and the proposed user-defined profiles are primarily due to the use of reduced thrust and climb altitude on departure. The sound exposure level results under the flight path from the user-defined departure procedures are shown in **Section B.1.5.1**. Overall, the proposed user-defined profiles at most weights show less noise associated with the take-off roll, a different location where aircraft change from take-off thrust to climb thrust, and additional noise under the flight path miles out because of a slower climb. At the higher weights with maximum thrust, the proposed user-defined profiles produce noise results almost identical to the AEDT standard profiles.

B.1.3. Concurrence on Aircraft Performance

Preparation of these profiles for the current project and AEDT 3f was done in cooperation with the relevant airline. Airline concurrence documentation accompanies this memorandum for submission to FAA.

B.1.4. Certification of New Parameters

The profiles developed for this study are procedure step profiles created by modifying profiles already included in AEDT 3f. Screenshots from the AEDT user interface (UI) of starting default profiles and the proposed user-defined profiles are presented for comparison as **Figure B-5** through **Figure B-22**. An AEDT study containing the profiles developed for this project is available in electronic form upon request. Altitudes are listed as feet above airfield elevation. Speeds are entered as true airspeed in units of knots. Thrust is in units of pounds which matches the units of thrust settings used in the aircraft's associated noise-power-distance curves.

B.1.4.1. 747400, Profile Weight 545,000

The “stage length 1” user-defined profile for the 747400 assumes a weight of 545,000 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1 to remove the climb at 3,869 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT151	1	Takeoff	10	Max Takeoff 15% Reduced			
MODIFIED_RT151	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT151	3	Percent Accelerate	10	Max Climb 10% Reduced		190.8	50
MODIFIED_RT151	4	Percent Accelerate	T_05	Max Climb 10% Reduced		242	55
MODIFIED_RT151	5	Climb	5	Max Climb 10% Reduced	3869		
MODIFIED_RT151	6	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
MODIFIED_RT151	7	Climb	T_00H	Max Climb 10% Reduced	5500		
MODIFIED_RT151	8	Climb	T_00H	Max Climb 10% Reduced	7500		
MODIFIED_RT151	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-5. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT151	1	Takeoff	10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT151	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT151	3	Percent Accelerate	10	Max Climb 10% Reduced		190.8	50
SDF_NADP_2_RT151	4	Percent Accelerate	T_05	Max Climb 10% Reduced		242	55
SDF_NADP_2_RT151	5	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
SDF_NADP_2_RT151	6	Climb	T_00H	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT151	7	Climb	T_00H	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT151	8	Climb	T_00H	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT151	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-6. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1

B.1.4.2. 747400, Profile Weight 563,800

The “stage length 2” user-defined profile for the 747400 assumes a weight of 563,800 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_15; PROF_ID2: 2. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2 to remove the climb at 3,756 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT152	1	Takeoff	10	Max Takeoff 15% Reduced			
MODIFIED_RT152	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT152	3	Percent Accelerate	10	Max Climb 10% Reduced		192.9	50
MODIFIED_RT152	4	Percent Accelerate	T_05	Max Climb 10% Reduced		244.6	55
MODIFIED_RT152	5	Climb	T_01	Max Climb 10% Reduced	3756		
MODIFIED_RT152	6	Percent Accelerate	T_00H	Max Climb 10% Reduced		269	55
MODIFIED_RT152	7	Climb	T_00H	Max Climb 10% Reduced	5500		
MODIFIED_RT152	8	Climb	T_00H	Max Climb 10% Reduced	7500		
MODIFIED_RT152	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-7. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT152	1	Takeoff	10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT152	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT152	3	Percent Accelerate	10	Max Climb 10% Reduced		192.9	50
SDF_NADP_2_RT152	4	Percent Accelerate	T_05	Max Climb 10% Reduced		244.6	55
SDF_NADP_2_RT152	5	Percent Accelerate	T_00H	Max Climb 10% Reduced		269	55
SDF_NADP_2_RT152	6	Climb	T_00H	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT152	7	Climb	T_00H	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT152	8	Climb	T_00H	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT152	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-8. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2

B.1.4.3. 747400, Profile Weight 583,100

The “stage length 3” user-defined profile for the 747400 assumes a weight of 583,100 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_15; PROF_ID2: 3. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3 to remove the climb at 3,637 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT153	1	Takeoff	10	Max Takeoff 15% Reduced			
MODIFIED_RT153	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT153	3	Percent Accelerate	10	Max Climb 10% Reduced		195.1	50
MODIFIED_RT153	4	Percent Accelerate	T_05	Max Climb 10% Reduced		247.2	55
MODIFIED_RT153	5	Climb	T_01	Max Climb 10% Reduced	3637		
MODIFIED_RT153	6	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
MODIFIED_RT153	7	Climb	T_00H	Max Climb 10% Reduced	5500		
MODIFIED_RT153	8	Climb	T_00H	Max Climb 10% Reduced	7500		
MODIFIED_RT153	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-9. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT153	1	Takeoff	10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT153	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT153	3	Percent Accelerate	10	Max Climb 10% Reduced		195.1	50
SDF_NADP_2_RT153	4	Percent Accelerate	T_05	Max Climb 10% Reduced		247.2	55
SDF_NADP_2_RT153	5	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
SDF_NADP_2_RT153	6	Climb	T_00H	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT153	7	Climb	T_00H	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT153	8	Climb	T_00H	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT153	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-10. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3

B.1.4.4. 747400, Profile Weight 621,500

The “stage length 4” user-defined profile for the 747400 assumes a weight of 621,500 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_15; PROF_ID2: 4. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 4 to remove the climb at 3,435 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT154	1	Takeoff	10	Max Takeoff 15% Reduced			
MODIFIED_RT154	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT154	3	Percent Accelerate	10	Max Climb 10% Reduced		199.4	50
MODIFIED_RT154	4	Percent Accelerate	T_05	Max Climb 10% Reduced		252.3	55
MODIFIED_RT154	5	Climb	T_01	Max Climb 10% Reduced	3435		
MODIFIED_RT154	6	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
MODIFIED_RT154	7	Climb	T_00H	Max Climb 10% Reduced	5500		
MODIFIED_RT154	8	Climb	T_00H	Max Climb 10% Reduced	7500		
MODIFIED_RT154	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-11. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 4

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT154	1	Takeoff	10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT154	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT154	3	Percent Accelerate	10	Max Climb 10% Reduced		199.4	50
SDF_NADP_2_RT154	4	Percent Accelerate	T_05	Max Climb 10% Reduced		252.3	55
SDF_NADP_2_RT154	5	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
SDF_NADP_2_RT154	6	Climb	T_00H	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT154	7	Climb	T_00H	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT154	8	Climb	T_00H	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT154	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-12. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 4

B.1.4.5. 747400, Profile Weight 669,500

The “stage length 5” user-defined profile for the 747400 assumes a weight of 669,500 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_15; PROF_ID2: 5. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 5 to remove the climb at 3,199 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT155	1	Takeoff	10	Max Takeoff 15% Reduced			
MODIFIED_RT155	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT155	3	Percent Accelerate	10	Max Climb 10% Reduced		204.8	50
MODIFIED_RT155	4	Percent Accelerate	T_05	Max Climb 10% Reduced		258.4	55
MODIFIED_RT155	5	Climb	T_01	Max Climb 10% Reduced	3199		
MODIFIED_RT155	6	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
MODIFIED_RT155	7	Climb	T_00H	Max Climb 10% Reduced	5500		
MODIFIED_RT155	8	Climb	T_00H	Max Climb 10% Reduced	7500		
MODIFIED_RT155	9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure B-13. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 5

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT155	1	Takeoff	10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT155	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT155	3	Percent Accelerate	10	Max Climb 10% Reduced		204.8	50
SDF_NADP_2_RT155	4	Percent Accelerate	T_05	Max Climb 10% Reduced		258.4	55
SDF_NADP_2_RT155	5	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	55
SDF_NADP_2_RT155	6	Climb	T_00H	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT155	7	Climb	T_00H	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT155	8	Climb	T_00H	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT155	9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure B-14. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 5

B.1.4.6. 747400, Profile Weight 720,900

The “stage length 6” user-defined profile for the 747400 assumes a weight of 720,900 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_15; PROF_ID2: 6. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 6 to remove the climb at 3,004 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT156	1	Takeoff	10	Max Takeoff 15% Reduced			
MODIFIED_RT156	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT156	3	Percent Accelerate	5	Max Climb 10% Reduced		210.4	55
MODIFIED_RT156	4	Percent Accelerate	5	Max Climb 10% Reduced		259.5	50
MODIFIED_RT156	5	Percent Accelerate	T_01	Max Climb 10% Reduced		264.7	55
MODIFIED_RT156	6	Climb	T_01	Max Climb 10% Reduced	3004		
MODIFIED_RT156	7	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	50
MODIFIED_RT156	8	Climb	T_00H	Max Climb 10% Reduced	5500		
MODIFIED_RT156	9	Climb	T_00H	Max Climb 10% Reduced	7500		
MODIFIED_RT156	10	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-15. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 6

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT156	1	Takeoff	10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT156	2	Climb	T_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT156	3	Percent Accelerate	5	Max Climb 10% Reduced		210.4	55
SDF_NADP_2_RT156	4	Percent Accelerate	5	Max Climb 10% Reduced		259.5	50
SDF_NADP_2_RT156	5	Percent Accelerate	T_01	Max Climb 10% Reduced		264.7	55
SDF_NADP_2_RT156	6	Percent Accelerate	ZERO	Max Climb 10% Reduced		269	50
SDF_NADP_2_RT156	7	Climb	T_00H	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT156	8	Climb	T_00H	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT156	9	Climb	T_00H	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT156	10	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-16. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 6

B.1.4.7. 747400, Profile Weight 776,600

The “stage length 7” user-defined profile for the 747400 assumes a weight of 776,600 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_10; PROF_ID2: 7. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 7 to remove the climb at 2,544 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT107	1	Takeoff	10	Max Takeoff 10% Reduced			
MODIFIED_RT107	2	Climb	T_10H	Max Takeoff 10% Reduced	1000		
MODIFIED_RT107	3	Percent Accelerate	10	Max Climb 10% Reduced		216.4	50
MODIFIED_RT107	4	Percent Accelerate	5	Max Climb 10% Reduced		259.6	55
MODIFIED_RT107	5	Climb	T_01	Max Climb 10% Reduced	2544		
MODIFIED_RT107	6	Percent Accelerate	T_05	Max Climb 10% Reduced		270	45
MODIFIED_RT107	7	Climb	T_00H	Max Climb 10% Reduced	5500		
MODIFIED_RT107	8	Climb	T_00H	Max Climb 10% Reduced	7500		
MODIFIED_RT107	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-17. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 7

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT107	1	Takeoff	10	Max Takeoff 10% Reduced			
SDF_NADP_2_RT107	2	Climb	T_10H	Max Takeoff 10% Reduced	1000		
SDF_NADP_2_RT107	3	Percent Accelerate	10	Max Climb 10% Reduced		216.4	50
SDF_NADP_2_RT107	4	Percent Accelerate	5	Max Climb 10% Reduced		259.6	55
SDF_NADP_2_RT107	5	Percent Accelerate	T_05	Max Climb 10% Reduced		270	45
SDF_NADP_2_RT107	6	Climb	T_00H	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT107	7	Climb	T_00H	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT107	8	Climb	T_00H	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT107	9	Climb	T_00H	Max Climb 10% Reduced	10000		

Figure B-18. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 7

B.1.4.8. 747400, Profile Weight 836,200

The “stage length 8” user-defined profile for the 747400 assumes a weight of 836,200 lbs, and is identified as PROF_ID1: SDF_NADP_2; PROF_ID2: 8. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 8 to change the thrust level to “Max Takeoff” in Steps 1 and 2, and to remove the climb at 2,561 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT058	1	Takeoff	10	Max Takeoff 5% Reduced			
MODIFIED_RT058	2	Climb	T_10H	Max Takeoff 5% Reduced	1000		
MODIFIED_RT058	3	Percent Accelerate	10	Max Climb		222.8	50
MODIFIED_RT058	4	Percent Accelerate	5	Max Climb		259.6	55
MODIFIED_RT058	5	Climb	T_01	Max Climb	2561		
MODIFIED_RT058	6	Percent Accelerate	T_01	Max Climb		270	55
MODIFIED_RT058	7	Percent Accelerate	T_00H	Max Climb		278	55
MODIFIED_RT058	8	Climb	T_00H	Max Climb	5500		
MODIFIED_RT058	9	Climb	T_00H	Max Climb	7500		
MODIFIED_RT058	10	Climb	T_00H	Max Climb	10000		

Figure B-19. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 8

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_28	1	Takeoff	10	Max Takeoff			
SDF_NADP_28	2	Climb	T_10H	Max Takeoff	1000		
SDF_NADP_28	3	Percent Accelerate	10	Max Climb		222.8	50
SDF_NADP_28	4	Percent Accelerate	5	Max Climb		259.6	55
SDF_NADP_28	5	Percent Accelerate	T_01	Max Climb		270	55
SDF_NADP_28	6	Percent Accelerate	T_00H	Max Climb		278	55
SDF_NADP_28	7	Climb	T_00H	Max Climb	4500		
SDF_NADP_28	8	Climb	T_00H	Max Climb	5500		
SDF_NADP_28	9	Climb	T_00H	Max Climb	7500		
SDF_NADP_28	10	Climb	T_00H	Max Climb	10000		

Figure B-20. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 8

B.1.4.9. 747400, Profile Weight 875,000

The “stage length 9” user-defined profile for the 747400 assumes a weight of 875,000 lbs, and is identified as PROF_ID1: SDF_NADP_2; PROF_ID2: 9. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 9 to change the thrust level to “Max Takeoff” in Steps 1 and 2, and to remove the climb at 2,600 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT059	1	Takeoff	10	Max Takeoff 5% Reduced			
MODIFIED_RT059	2	Climb	T_10H	Max Takeoff 5% Reduced	1000		
MODIFIED_RT059	3	Percent Accelerate	10	Max Climb		226.8	50
MODIFIED_RT059	4	Percent Accelerate	5	Max Climb		259.6	55
MODIFIED_RT059	5	Climb	T_01	Max Climb	2600		
MODIFIED_RT059	6	Percent Accelerate	T_01	Max Climb		271.8	55
MODIFIED_RT059	7	Percent Accelerate	T_00H	Max Climb		282.7	55
MODIFIED_RT059	8	Climb	T_00H	Max Climb	5500		
MODIFIED_RT059	9	Climb	T_00H	Max Climb	7500		
MODIFIED_RT059	10	Climb	T_00H	Max Climb	10000		

Figure B-21. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 9

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_29	1	Takeoff	10	Max Takeoff			
SDF_NADP_29	2	Climb	T_10H	Max Takeoff	1000		
SDF_NADP_29	3	Percent Accelerate	10	Max Climb		226.8	50
SDF_NADP_29	4	Percent Accelerate	5	Max Climb		259.6	55
SDF_NADP_29	5	Percent Accelerate	T_01	Max Climb		271.8	55
SDF_NADP_29	6	Percent Accelerate	T_00H	Max Climb		282.7	55
SDF_NADP_29	7	Climb	T_00H	Max Climb	4500		
SDF_NADP_29	8	Climb	T_00H	Max Climb	5500		
SDF_NADP_29	9	Climb	T_00H	Max Climb	7500		
SDF_NADP_29	10	Climb	T_00H	Max Climb	10000		

Figure B-22. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 9

B.1.5. Graphical and Tabular Comparison

An accompanying MS Excel file, “Appendix_A_Profile_Performance.xls”, contains the profile points as found in the AEDT XML Performance Report Export file for comparison of performance data to the AEDT Standard profiles.

B.1.5.1. *Tables and Figures Supporting Analysis Demonstrating Benefit*

Table B-1 through **Table B-9** show the Sound Exposure Level (SEL) results under the flight path from the user-defined departure profiles; SEL values resulting from the standard AEDT departure profiles are presented for comparison. **Figure B-23** through **Figure B-31** show the same SEL computations in the form of SEL contours.

Table B-1. SELs for 747400 Departures at 545,000 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 545,000 lbs. (PROF_ID2 = 1) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	135.9	131.1	-4.8
0.5	122.4	120.3	-2.2
1.0	105.8	105.9	0.0
1.5	99.0	100.3	1.3
2.0	96.0	96.3	0.3
2.5	94.1	94.5	0.4
3.0	92.7	92.8	0.2
3.5	91.3	91.5	0.3
4.0	90.0	90.4	0.5
4.5	88.8	89.3	0.5
5.0	87.8	88.2	0.5
5.5	86.8	87.3	0.5
6.0	86.0	86.5	0.5
6.5	85.1	85.6	0.5
7.0	84.2	84.6	0.5
7.5	83.6	83.9	0.3
8.0	82.8	83.1	0.2
8.5	82.3	82.5	0.2
9.0	81.7	81.8	0.0
9.5	81.2	81.2	0.0
10.0	80.7	80.7	0.0

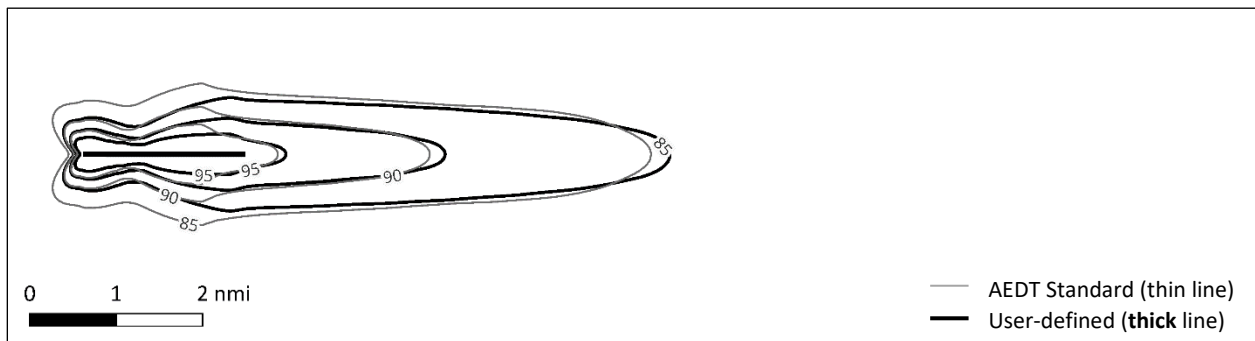


Figure B-23. SEL Contours for 747400 Departures at Take-Off Weight 545,000 Pounds

Table B-2. SELs for 747400 Departures at 563,800 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 563,800 lbs. (PROF_ID2 = 2) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	135.8	131.0	-4.8
0.5	122.4	120.2	-2.2
1.0	106.6	107.0	0.5
1.5	101.0	101.0	0.0
2.0	96.3	96.7	0.5
2.5	94.5	94.8	0.4
3.0	93.0	93.3	0.3
3.5	91.8	92.0	0.3
4.0	90.5	90.9	0.4
4.5	89.2	89.8	0.5
5.0	88.1	88.8	0.7
5.5	87.2	87.9	0.8
6.0	86.4	87.0	0.6
6.5	85.4	86.1	0.6
7.0	84.5	85.3	0.8
7.5	83.9	84.5	0.6
8.0	83.2	83.7	0.5
8.5	82.6	83.0	0.3
9.0	82.1	82.4	0.3
9.5	81.6	81.7	0.2
10.0	81.1	81.2	0.1

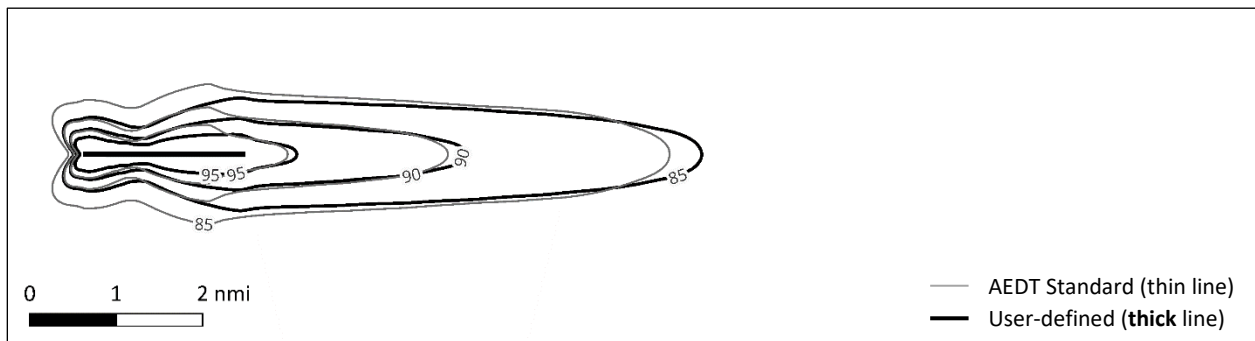


Figure B-24. SEL Contours for 747400 Departures at Take-Off Weight 563,800 Pounds

Table B-3. SELs for 747400 Departures at 583,100 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 583,100 lbs. (PROF_ID2 = 3) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	135.7	130.9	-4.8
0.5	123.1	120.2	-2.9
1.0	107.5	108.4	1.0
1.5	102.3	101.6	-0.7
2.0	96.7	98.0	1.3
2.5	94.9	95.3	0.5
3.0	93.5	93.8	0.3
3.5	92.2	92.4	0.2
4.0	91.0	91.3	0.4
4.5	89.8	90.3	0.5
5.0	88.7	89.3	0.6
5.5	87.7	88.4	0.7
6.0	86.8	87.6	0.8
6.5	85.9	86.7	0.8
7.0	85.1	85.8	0.8
7.5	84.4	85.0	0.6
8.0	83.7	84.3	0.6
8.5	83.1	83.6	0.5
9.0	82.6	82.9	0.3
9.5	82.0	82.3	0.3
10.0	81.5	81.7	0.2

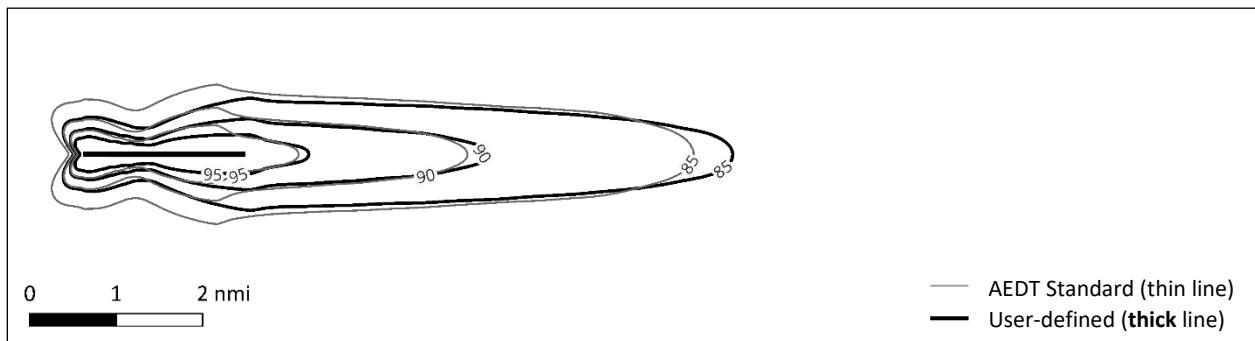


Figure B-25. SEL Contours for 747400 Departures at Take-Off Weight 583,100 Pounds

Table B-4. SELs for 747400 Departures at 621,500 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 621,500 lbs. (PROF_ID2 = 4) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	136.1	131.3	-4.8
0.5	123.0	120.6	-2.3
1.0	109.6	112.2	2.6
1.5	103.2	103.2	0.0
2.0	97.5	99.5	2.0
2.5	95.7	96.1	0.4
3.0	94.2	94.6	0.4
3.5	93.0	93.4	0.3
4.0	91.8	92.1	0.3
4.5	90.8	91.2	0.4
5.0	89.8	90.3	0.5
5.5	88.8	89.4	0.6
6.0	87.8	88.6	0.8
6.5	87.0	87.8	0.8
7.0	86.2	87.0	0.8
7.5	85.3	86.2	0.9
8.0	84.7	85.5	0.8
8.5	84.0	84.7	0.7
9.0	83.5	84.1	0.6
9.5	82.9	83.4	0.5
10.0	82.4	82.8	0.4

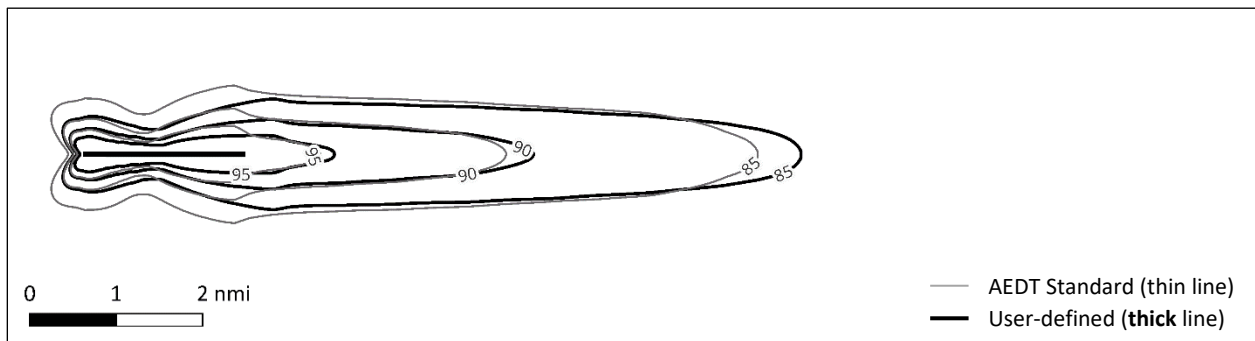


Figure B-26. SEL Contours for 747400 Departures at Take-Off Weight 621,500 Pounds

Table B-5. SELs for 747400 Departures at 669,500 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 669,500 lbs. (PROF_ID2 = 5) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	135.9	131.1	-4.8
0.5	123.6	120.5	-3.1
1.0	113.6	118.5	5.0
1.5	104.7	105.4	0.6
2.0	101.3	101.1	-0.3
2.5	96.5	98.6	2.0
3.0	95.1	95.6	0.5
3.5	93.8	94.4	0.6
4.0	92.9	93.3	0.4
4.5	91.8	92.2	0.4
5.0	91.0	91.5	0.5
5.5	90.0	90.6	0.6
6.0	89.2	89.8	0.6
6.5	88.3	89.0	0.7
7.0	87.5	88.3	0.8
7.5	86.7	87.7	1.0
8.0	85.9	87.0	1.1
8.5	85.3	86.3	1.0
9.0	84.6	85.6	1.0
9.5	84.1	84.8	0.8
10.0	83.6	84.2	0.7

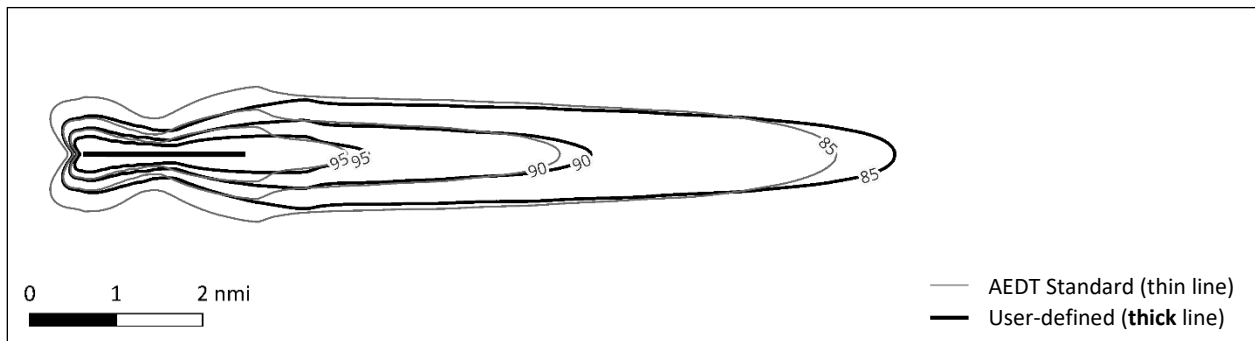


Figure B-27. SEL Contours for 747400 Departures at Take-Off Weight 669,500 Pounds

Table B-6. SELs for 747400 Departures at 720,900 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 720,900 lbs. (PROF_ID2 = 6) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	135.8	130.9	-4.8
0.5	123.6	121.2	-2.4
1.0	120.8	118.5	-2.3
1.5	106.7	108.5	1.8
2.0	102.5	103.0	0.5
2.5	97.7	100.1	2.4
3.0	95.9	98.1	2.2
3.5	94.6	95.4	0.7
4.0	93.5	94.2	0.7
4.5	92.6	93.2	0.6
5.0	91.6	92.2	0.6
5.5	90.9	91.5	0.6
6.0	90.0	90.6	0.7
6.5	89.3	89.9	0.7
7.0	88.6	89.3	0.7
7.5	87.8	88.5	0.7
8.0	87.0	87.9	0.9
8.5	86.3	87.3	1.1
9.0	85.7	86.8	1.1
9.5	85.0	86.1	1.0
10.0	84.5	85.5	1.0

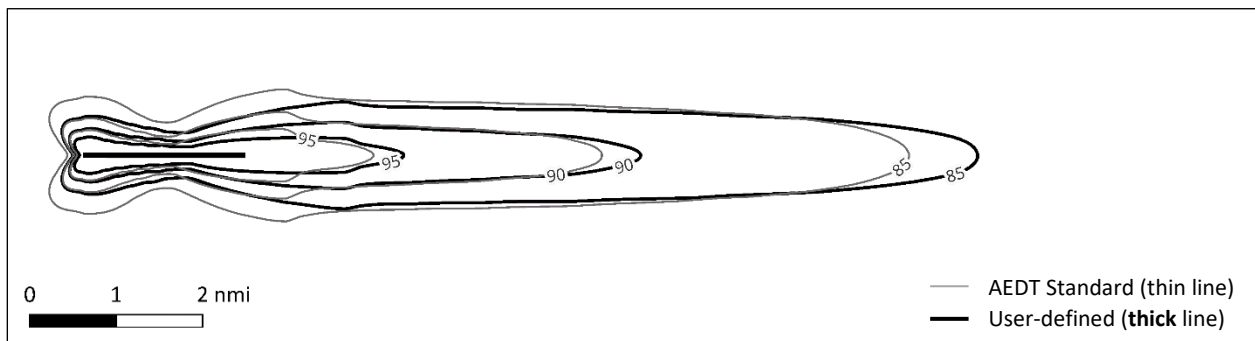


Figure B-28. SEL Contours for 747400 Departures at Take-Off Weight 720,900 Pounds

Table B-7. SELs for 747400 Departures at 720,900 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 720,900 lbs. (PROF_ID2 = 7) User PROF_ID1: SDF_NADP_2			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	136.0	132.8	-3.2
0.5	124.0	121.7	-2.4
1.0	120.8	119.6	-1.2
1.5	109.4	111.5	2.0
2.0	103.7	104.2	0.5
2.5	100.9	100.9	0.0
3.0	96.5	98.8	2.2
3.5	95.5	95.4	-0.1
4.0	94.5	94.6	0.1
4.5	93.6	93.6	0.0
5.0	92.8	92.9	0.2
5.5	92.0	92.1	0.1
6.0	91.3	91.4	0.2
6.5	90.5	90.8	0.3
7.0	89.8	90.1	0.3
7.5	89.2	89.7	0.5
8.0	88.4	89.0	0.5
8.5	87.9	88.5	0.6
9.0	87.3	87.9	0.6
9.5	86.7	87.4	0.7
10.0	86.0	87.0	0.9

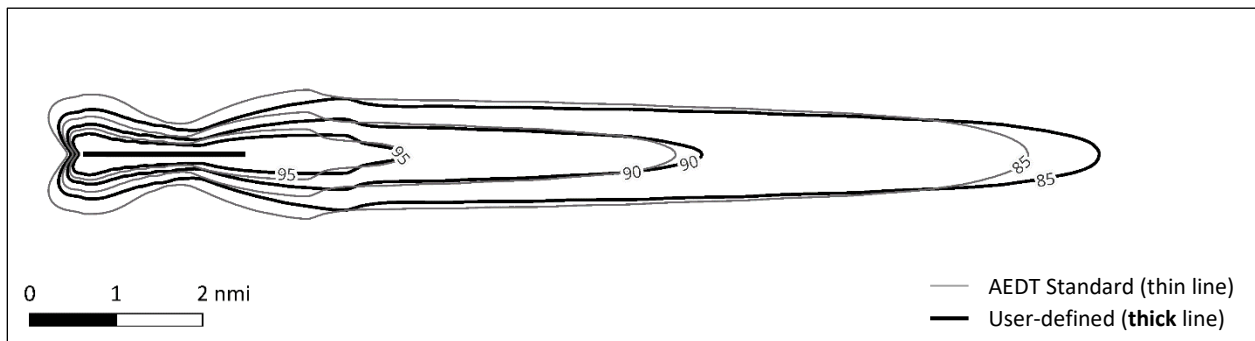


Figure B-29. SEL Contours for 747400 Departures at Take-Off Weight 720,900 Pounds

Table B-8. SELs for 747400 Departures at 836,200 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 836,200 lbs. (PROF_ID2 = 8) User PROF_ID1: SDF_NADP_2			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	135.9	135.9	0.0
0.5	124.8	124.8	0.0
1.0	121.3	121.3	0.0
1.5	115.6	115.6	0.0
2.0	106.0	106.0	0.0
2.5	102.5	102.5	0.0
3.0	100.3	100.3	0.0
3.5	96.3	96.3	0.0
4.0	95.5	95.5	0.0
4.5	94.5	94.5	0.0
5.0	93.8	93.8	0.0
5.5	92.9	92.9	0.0
6.0	92.4	92.3	0.0
6.5	91.6	91.6	0.0
7.0	91.1	91.1	0.0
7.5	90.4	90.4	0.0
8.0	89.8	89.8	0.0
8.5	89.1	89.2	0.1
9.0	88.4	88.6	0.2
9.5	87.9	88.1	0.2
10.0	87.4	87.5	0.1

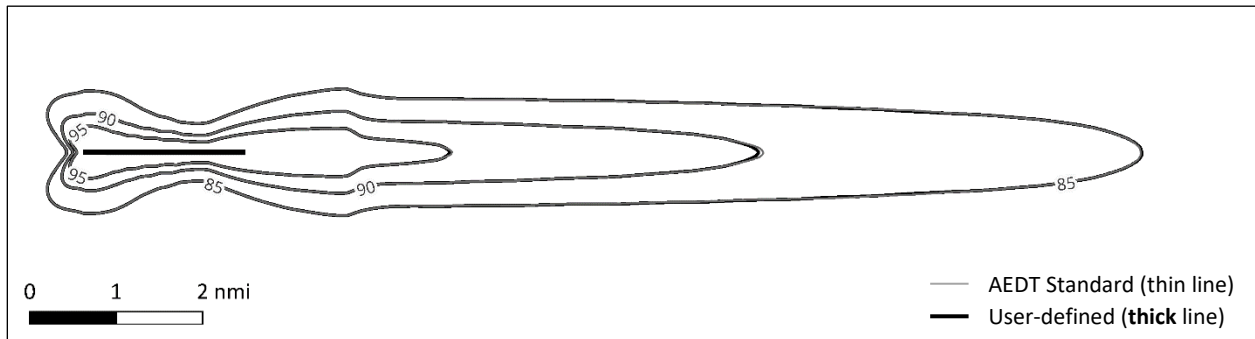


Figure B-30. SEL Contours for 747400 Departures at Take-Off Weight 836,200 Pounds

Table B-9. SELs for 747400 Departures at 875,000 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 747400 Profile Weight: 875,000 lbs. (PROF_ID2 = 9) User PROF_ID1: SDF_NADP_2			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	135.8	135.8	0.0
0.5	124.7	124.7	0.0
1.0	121.3	121.3	0.0
1.5	119.9	119.9	0.0
2.0	107.9	107.9	0.0
2.5	103.6	103.6	0.0
3.0	101.1	101.1	0.0
3.5	97.3	97.3	0.0
4.0	95.9	95.9	0.0
4.5	95.2	95.2	0.0
5.0	94.3	94.3	0.0
5.5	93.7	93.6	-0.1
6.0	92.9	92.9	0.0
6.5	92.3	92.3	-0.1
7.0	91.8	91.8	0.0
7.5	91.1	91.1	0.0
8.0	90.6	90.5	-0.1
8.5	90.0	90.1	0.0
9.0	89.3	89.5	0.2
9.5	88.6	88.9	0.3
10.0	88.1	88.4	0.3

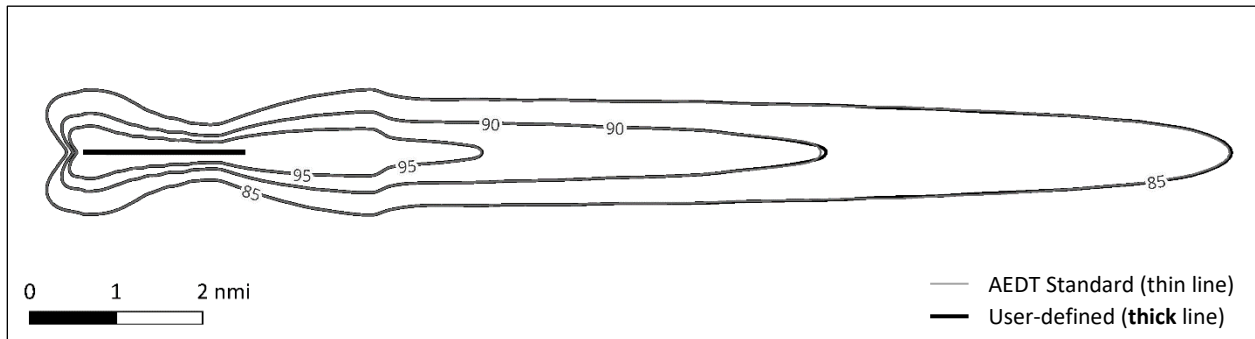


Figure B-31. SEL Contours for 747400 Departures at Take-Off Weight 875,000 Pounds

B.1.5.3. Graphical Comparison of Profiles

Graphs of Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance are included as **Figure** , **Figure** , and **Figure** , respectively.

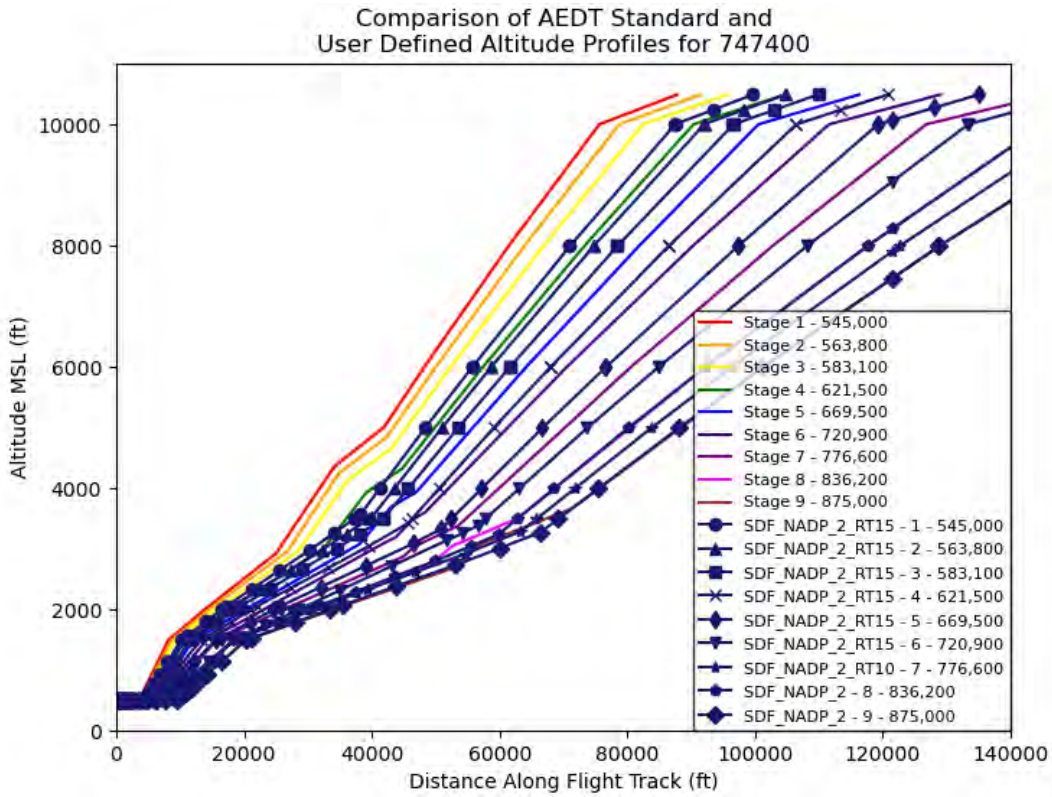


Figure B-32. 747400 AEDT Profiles, Altitude vs. Distance

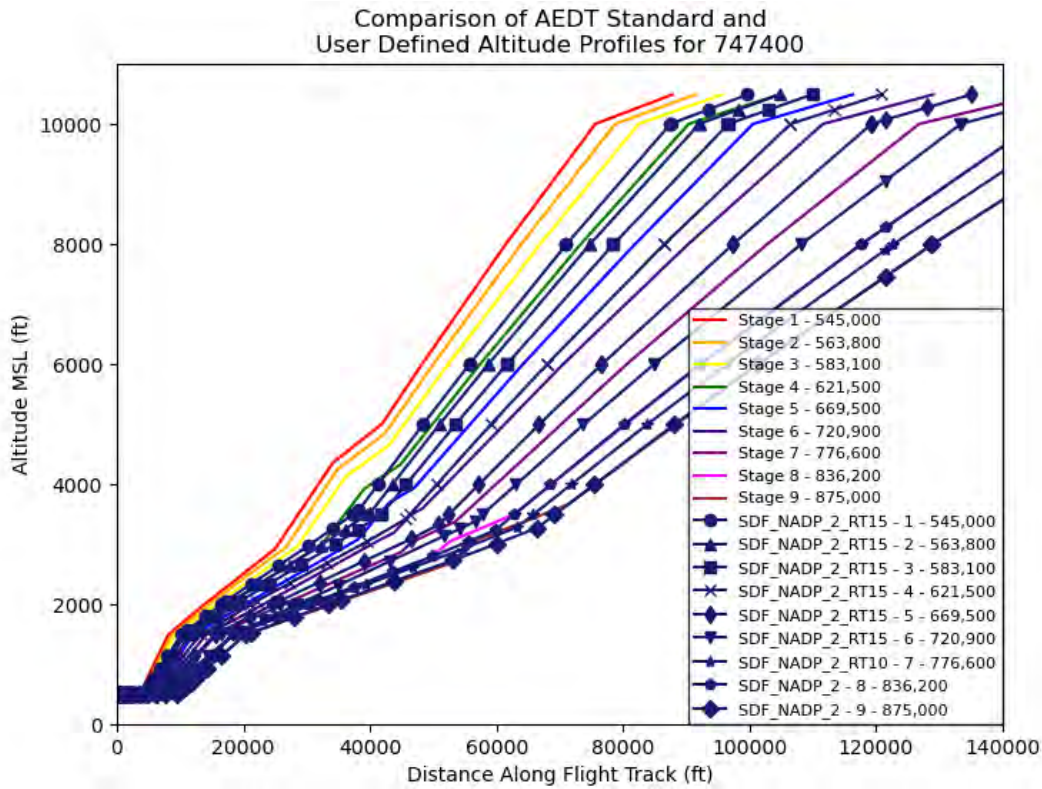


Figure B-33. 747400 AEDT Profiles, Speed vs. Distance

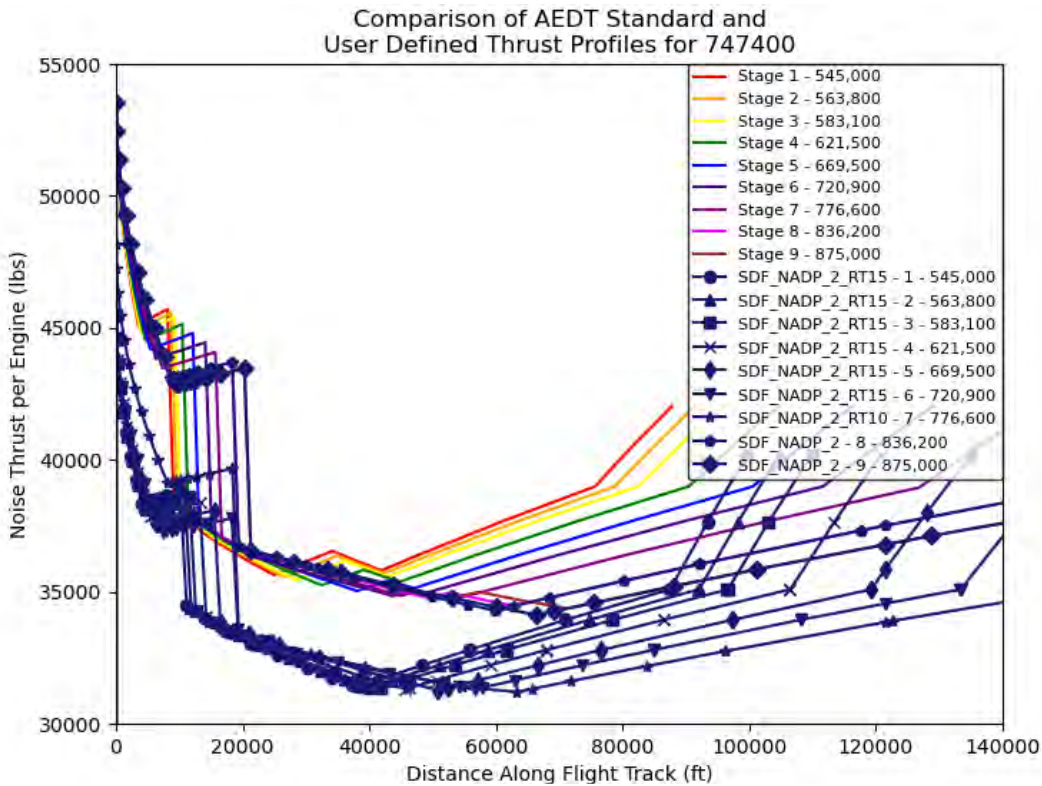


Figure B-34. 747400 AEDT Profiles, Thrust vs. Distance

B.2. Boeing 747-8 (ANP Type 7478) Profile Review with AEDT 3f

B.2.1. Statement of Benefit

Operators at SDF use a version of “Noise Abatement Departures Procedures” (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. The proposed 7478 climb profiles and thrust settings during the various stages of flight provide a better representation of what is actually being flown by cargo aircraft at SDF. These profiles were developed from the default (i.e. included) reduced thrust profiles in AEDT.

The proposed user-defined profiles were developed with considerations of SDF runway specific length and minimum climb requirements. Correspondence with the operators has indicated high agreement with their procedures at SDF.

B.2.1.1. *Figures Supporting Statement of Benefit*

Figure B-35 and **Figure B-37** compare the standard AEDT profiles and proposed profiles to actual aircraft climb performance at SDF. **Figure B-36** and **Figure B-38** compare the standard AEDT profiles and proposed profiles to actual aircraft speed profiles at SDF. The standard profiles are identified in the figure legends as “Stage length - Weight”. The proposed profiles are identified in the figure legends as “Name – Stage length - Weight.”

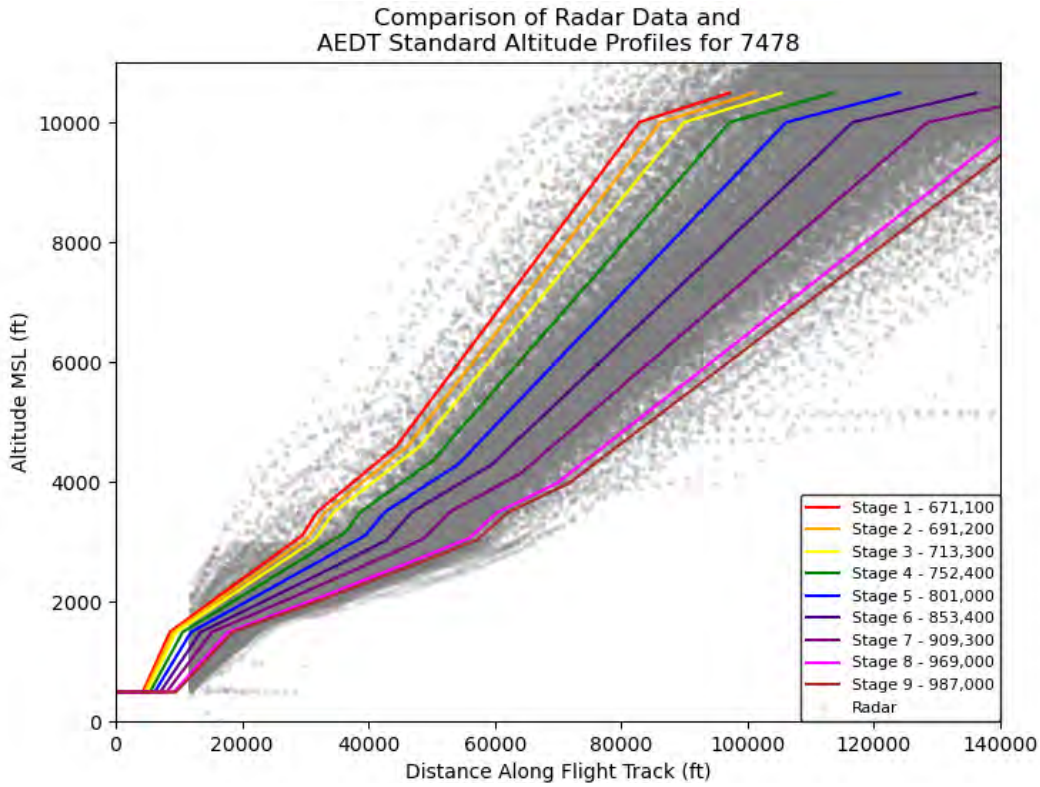


Figure B-35. 7478 AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance

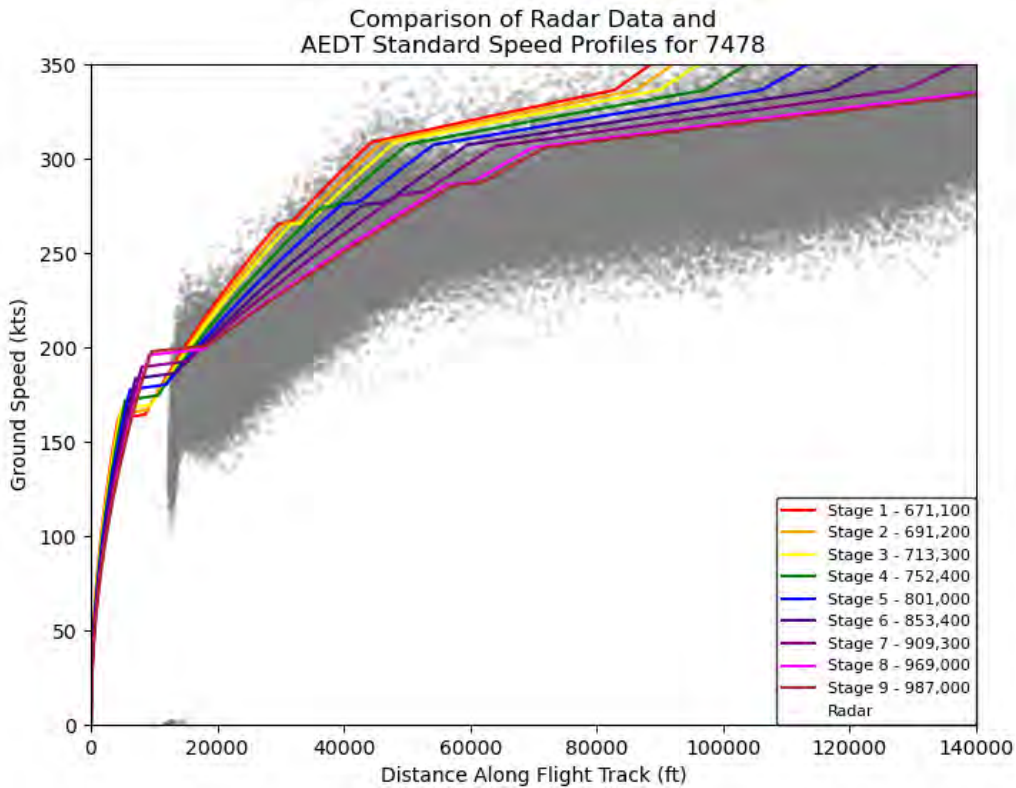


Figure B-36. 7478 AEDT Standard Speed Profiles Compared to Actual Aircraft Performance

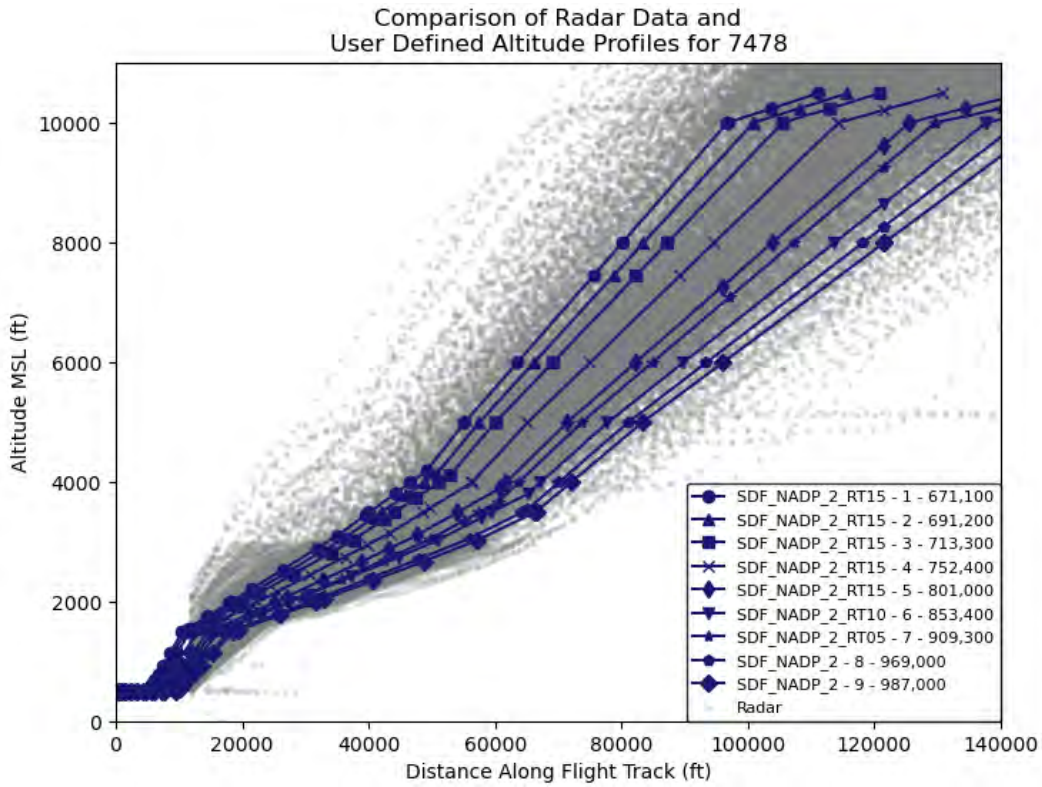


Figure B-37. 7478 Boeing Altitude Profiles Compared to Actual Aircraft Performance

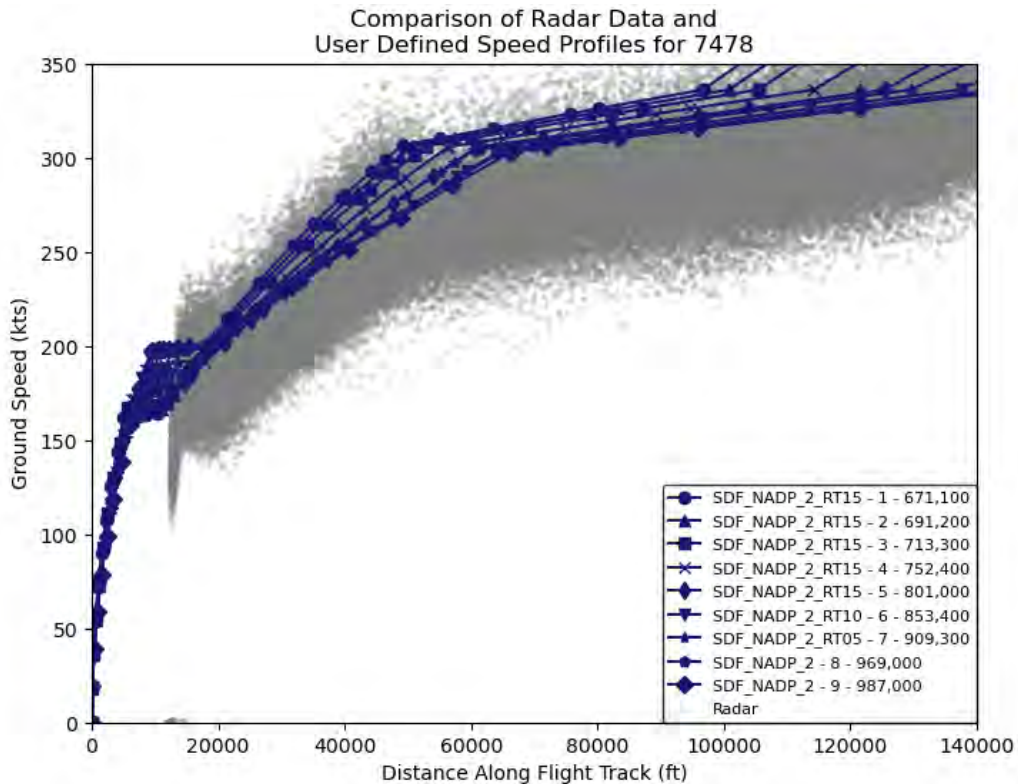


Figure B-38. 7478 Boeing Speed Profiles Compared to Actual Aircraft Performance

B.2.2. Analysis Demonstrating Benefit

The differences between the existing 7478 profiles in AEDT 3f and the proposed user-defined profiles are primarily due to the use of reduced thrust and climb altitude on departure. The sound exposure level results under the flight path from the user-defined departure procedures are shown in **Section B.2.5.1**. Overall, the proposed user-defined profiles at most weights show less noise associated with the take-off roll, a different location where aircraft change from take-off thrust to climb thrust, and additional noise under the flight path miles out because of a slower climb. At the higher weights with maximum thrust, the proposed user-defined profiles produce noise results almost identical to the AEDT standard profiles.

B.2.3. Concurrence on Aircraft Performance

Preparation of these profiles for the current project and AEDT 3f was done in cooperation with the relevant airline. Airline concurrence documentation accompanies this memorandum for submission to FAA.

B.2.4. Certification of New Parameters

The profiles developed for this study are procedure step profiles created by modifying profiles already included in AEDT 3f. Screenshots from the AEDT UI of starting default profiles and the proposed user-defined profiles are presented for comparison as **Figure B-39** through **Figure B-56**. An AEDT study containing the profiles developed for this project is available in electronic form upon request. Altitudes are listed as feet above airfield elevation. Speeds are entered in units of true airspeed in knots. Thrust is in units of pounds which matches the units of thrust settings used in the aircraft's associated noise-power-distance curves.

B.2.4.1. 7478, Profile Weight 671,100

The “stage length 1” user-defined profile for the 7478 assumes a weight of 671,100, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT151	1	Takeoff	F_10	Max Takeoff 15% Reduced			
MODIFIED_RT151	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT151	3	Percent Accelerate	F_10	Max Climb 10% Reduced		215	55
MODIFIED_RT151	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
MODIFIED_RT151	5	Percent Accelerate	F_1	Max Climb 10% Reduced		260	55
MODIFIED_RT151	6	Climb	F_0	Max Climb 10% Reduced	3000		
MODIFIED_RT151	7	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
MODIFIED_RT151	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-39. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT151	1	Takeoff	F_10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT151	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT151	3	Percent Accelerate	F_10	Max Climb 10% Reduced		215	55
SDF_NADP_2_RT151	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
SDF_NADP_2_RT151	5	Percent Accelerate	F_1	Max Climb 10% Reduced		260	55
SDF_NADP_2_RT151	6	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
SDF_NADP_2_RT151	7	Climb	F_0	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT151	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-40. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1

B.2.4.2. 7478, Profile Weight 691,200

The “stage length 2” user-defined profile for the 7478 assumes a weight of 691,200 pounds, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT152	1	Takeoff	F_10	Max Takeoff 15% Reduced			
MODIFIED_RT152	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT152	3	Percent Accelerate	F_10	Max Climb 10% Reduced		215	55
MODIFIED_RT152	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
MODIFIED_RT152	5	Percent Accelerate	F_1	Max Climb 10% Reduced		260	55
MODIFIED_RT152	6	Climb	F_0	Max Climb 10% Reduced	3000		
MODIFIED_RT152	7	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
MODIFIED_RT152	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-41. AEDT UI Screenshot of Starting Default Profile Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT152	1	Takeoff	F_10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT152	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT152	3	Percent Accelerate	F_10	Max Climb 10% Reduced		215	55
SDF_NADP_2_RT152	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
SDF_NADP_2_RT152	5	Percent Accelerate	F_1	Max Climb 10% Reduced		260	55
SDF_NADP_2_RT152	6	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
SDF_NADP_2_RT152	7	Climb	F_0	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT152	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-42. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2

B.2.4.3. 7478, Profile Weight 713,300

The “stage length 3” user-defined profile for the 7478 assumes a weight of 713,300, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT153	1	Takeoff	F_10	Max Takeoff 15% Reduced			
MODIFIED_RT153	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT153	3	Percent Accelerate	F_10	Max Climb 10% Reduced		215	55
MODIFIED_RT153	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
MODIFIED_RT153	5	Percent Accelerate	F_1	Max Climb 10% Reduced		260	55
MODIFIED_RT153	6	Climb	F_0	Max Climb 10% Reduced	3000		
MODIFIED_RT153	7	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
MODIFIED_RT153	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-43. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT153	1	Takeoff	F_10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT153	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT153	3	Percent Accelerate	F_10	Max Climb 10% Reduced		215	55
SDF_NADP_2_RT153	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
SDF_NADP_2_RT153	5	Percent Accelerate	F_1	Max Climb 10% Reduced		260	55
SDF_NADP_2_RT153	6	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
SDF_NADP_2_RT153	7	Climb	F_0	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT153	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-44. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3

B.2.4.4. 7478, Profile Weight 752,400

The “stage length 4” user-defined profile for the 7478 assumes a weight of 752,400, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 4. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 4 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT154	1	Takeoff	F_10	Max Takeoff 15% Reduced			
MODIFIED_RT154	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT154	3	Percent Accelerate	F_10	Max Climb 10% Reduced		220	55
MODIFIED_RT154	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
MODIFIED_RT154	5	Percent Accelerate	F_1	Max Climb 10% Reduced		268	55
MODIFIED_RT154	6	Climb	F_0	Max Climb 10% Reduced	3000		
MODIFIED_RT154	7	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
MODIFIED_RT154	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-45. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 4

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT154	1	Takeoff	F_10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT154	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT154	3	Percent Accelerate	F_10	Max Climb 10% Reduced		220	55
SDF_NADP_2_RT154	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
SDF_NADP_2_RT154	5	Percent Accelerate	F_1	Max Climb 10% Reduced		268	55
SDF_NADP_2_RT154	6	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
SDF_NADP_2_RT154	7	Climb	F_0	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT154	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-46. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 4

B.2.4.5. 7478, Profile Weight 801,000

The “stage length 5” user-defined profile for the 7478 assumes a weight of 801,000, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 5. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 5 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT155	1	Takeoff	F_10	Max Takeoff 15% Reduced			
MODIFIED_RT155	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
MODIFIED_RT155	3	Percent Accelerate	F_10	Max Climb 10% Reduced		220	55
MODIFIED_RT155	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
MODIFIED_RT155	5	Percent Accelerate	F_1	Max Climb 10% Reduced		270	55
MODIFIED_RT155	6	Climb	F_0	Max Climb 10% Reduced	3000		
MODIFIED_RT155	7	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
MODIFIED_RT155	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-47. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 5

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT155	1	Takeoff	F_10	Max Takeoff 15% Reduced			
SDF_NADP_2_RT155	2	Climb	F_10	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT155	3	Percent Accelerate	F_10	Max Climb 10% Reduced		220	55
SDF_NADP_2_RT155	4	Percent Accelerate	F_5	Max Climb 10% Reduced		250	55
SDF_NADP_2_RT155	5	Percent Accelerate	F_1	Max Climb 10% Reduced		270	55
SDF_NADP_2_RT155	6	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
SDF_NADP_2_RT155	7	Climb	F_0	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT155	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-48. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 5

B.2.4.6. 7478, Profile Weight 853,400

The “stage length 6” user-defined profile for the 7478 assumes a weight of 853,400, and is identified as PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 6. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 6 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT106	1	Takeoff	F_10	Max Takeoff 10% Reduced			
MODIFIED_RT106	2	Climb	F_10	Max Takeoff 10% Reduced	1000		
MODIFIED_RT106	3	Percent Accelerate	F_10	Max Climb 10% Reduced		227	55
MODIFIED_RT106	4	Percent Accelerate	F_5	Max Climb 10% Reduced		258	55
MODIFIED_RT106	5	Percent Accelerate	F_1	Max Climb 10% Reduced		270	55
MODIFIED_RT106	6	Climb	F_0	Max Climb 10% Reduced	3000		
MODIFIED_RT106	7	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
MODIFIED_RT106	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-49. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 6

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT106	1	Takeoff	F_10	Max Takeoff 10% Reduced			
SDF_NADP_2_RT106	2	Climb	F_10	Max Takeoff 10% Reduced	1000		
SDF_NADP_2_RT106	3	Percent Accelerate	F_10	Max Climb 10% Reduced		227	55
SDF_NADP_2_RT106	4	Percent Accelerate	F_5	Max Climb 10% Reduced		258	55
SDF_NADP_2_RT106	5	Percent Accelerate	F_1	Max Climb 10% Reduced		270	55
SDF_NADP_2_RT106	6	Percent Accelerate	F_0	Max Climb 10% Reduced		295	50
SDF_NADP_2_RT106	7	Climb	F_0	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT106	8	Climb	F_0	Max Climb 10% Reduced	10000		

Figure B-50. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 6

B.2.4.7. 7478, Profile Weight 909,300

The “stage length 7” user-defined profile for the 7478 assumes a weight of 909,300, and is identified as PROF_ID1: SDF_NADP_2_RT05; PROF_ID2: 7. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 7 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT057	1	Takeoff	F_10	Max Takeoff 5% Reduced			
MODIFIED_RT057	2	Climb	F_10	Max Takeoff 5% Reduced	1000		
MODIFIED_RT057	3	Percent Accelerate	F_10	Max Climb		230	55
MODIFIED_RT057	4	Percent Accelerate	F_5	Max Climb		260	55
MODIFIED_RT057	5	Percent Accelerate	F_1	Max Climb		275	55
MODIFIED_RT057	6	Climb	F_0	Max Climb	3000		
MODIFIED_RT057	7	Percent Accelerate	F_0	Max Climb		295	50
MODIFIED_RT057	8	Climb	F_0	Max Climb	10000		

Figure B-51. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 7

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT057	1	Takeoff	F_10	Max Takeoff 5% Reduced			
SDF_NADP_2_RT057	2	Climb	F_10	Max Takeoff 5% Reduced	1000		
SDF_NADP_2_RT057	3	Percent Accelerate	F_10	Max Climb		230	55
SDF_NADP_2_RT057	4	Percent Accelerate	F_5	Max Climb		260	55
SDF_NADP_2_RT057	5	Percent Accelerate	F_1	Max Climb		275	55
SDF_NADP_2_RT057	6	Percent Accelerate	F_0	Max Climb		295	50
SDF_NADP_2_RT057	7	Climb	F_0	Max Climb	4500		
SDF_NADP_2_RT057	8	Climb	F_0	Max Climb	10000		

Figure B-52. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT05; PROF_ID2: 7

B.2.4.8. 7478, Profile Weight 969,000

The “stage length 8” user-defined profile for the 7478 assumes a weight of 969,000, and is identified as PROF_ID1: SDF_NADP_2; PROF_ID2: 8. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 8 to change the thrust level to “Max Takeoff” in steps 1 and 2, and to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT058	1	Takeoff	F_10	Max Takeoff 5% Reduced			
MODIFIED_RT058	2	Climb	F_10	Max Takeoff 5% Reduced	1000		
MODIFIED_RT058	3	Percent Accelerate	F_10	Max Climb		235	55
MODIFIED_RT058	4	Percent Accelerate	F_5	Max Climb		265	55
MODIFIED_RT058	5	Percent Accelerate	F_1	Max Climb		280	55
MODIFIED_RT058	6	Climb	F_0	Max Climb	3000		
MODIFIED_RT058	7	Percent Accelerate	F_0	Max Climb		295	50
MODIFIED_RT058	8	Climb	F_0	Max Climb	10000		

Figure B-53. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 8

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_28	1	Takeoff	F_10	Max Takeoff			
SDF_NADP_28	2	Climb	F_10	Max Takeoff	1000		
SDF_NADP_28	3	Percent Accelerate	F_10	Max Climb		235	55
SDF_NADP_28	4	Percent Accelerate	F_5	Max Climb		265	55
SDF_NADP_28	5	Percent Accelerate	F_1	Max Climb		280	55
SDF_NADP_28	6	Percent Accelerate	F_0	Max Climb		295	50
SDF_NADP_28	7	Climb	F_0	Max Climb	4500		
SDF_NADP_28	8	Climb	F_0	Max Climb	10000		

Figure B-54. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 8

B.2.4.9. 7478, Profile Weight 987,000

The “stage length 9” user-defined profile for the 7478 assumes a weight of 987,000, and is identified as PROF_ID1: SDF_NADP_2; PROF_ID2: 9. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 9 to change the thrust level to “Max Takeoff” in Steps 1 and 2, and to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT059	1	Takeoff	F_10	Max Takeoff 5% Reduced			
MODIFIED_RT059	2	Climb	F_10	Max Takeoff 5% Reduced	1000		
MODIFIED_RT059	3	Percent Accelerate	F_10	Max Climb		235	55
MODIFIED_RT059	4	Percent Accelerate	F_5	Max Climb		265	55
MODIFIED_RT059	5	Percent Accelerate	F_1	Max Climb		280	55
MODIFIED_RT059	6	Climb	F_0	Max Climb	3000		
MODIFIED_RT059	7	Percent Accelerate	F_0	Max Climb		295	50
MODIFIED_RT059	8	Climb	F_0	Max Climb	10000		

Figure B-55. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 9

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_29	1	Takeoff	F_10	Max Takeoff			
SDF_NADP_29	2	Climb	F_10	Max Takeoff	1000		
SDF_NADP_29	3	Percent Accelerate	F_10	Max Climb		235	55
SDF_NADP_29	4	Percent Accelerate	F_5	Max Climb		265	55
SDF_NADP_29	5	Percent Accelerate	F_1	Max Climb		280	55
SDF_NADP_29	6	Percent Accelerate	F_0	Max Climb		295	50
SDF_NADP_29	7	Climb	F_0	Max Climb	4500		
SDF_NADP_29	8	Climb	F_0	Max Climb	10000		

Figure B-56. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 9

B.2.5. Graphical and Tabular Comparison

An accompanying MS Excel file, “Appendix_A_Profile_Performance.xls”, contains the profile points as found in the AEDT XML Performance Report Export file for comparison of performance data to the AEDT Standard profiles.

B.2.5.1. *Tables and Figures Supporting Analysis Demonstrating Benefit*

Table B-10 through **Table B-18** show the SEL results under the flight path from the user-defined departure profiles; SEL values resulting from the standard AEDT departure profiles are presented for comparison. **Figure B-57** through **Figure B-65** show the same SEL computations in the form of SEL contours.

Table B-10. SELs for 7478 Departures at 671,100 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 671,100 lbs. (PROF_ID2 = 1) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.1	129.8	-3.3
0.5	121.2	119.9	-1.3
1.0	105.5	107.2	1.8
1.5	99.0	99.5	0.6
2.0	95.1	95.4	0.3
2.5	93.4	93.8	0.3
3.0	92.0	92.4	0.4
3.5	90.8	91.1	0.3
4.0	89.6	90.1	0.5
4.5	88.5	89.1	0.6
5.0	87.3	88.2	0.8
5.5	86.3	87.3	1.0
6.0	85.3	86.3	1.0
6.5	84.5	85.5	0.9
7.0	83.7	84.7	1.0
7.5	82.8	84.0	1.2
8.0	82.1	83.2	1.1
8.5	81.3	82.5	1.1
9.0	80.6	81.6	1.0
9.5	80.0	80.9	0.9
10.0	79.4	80.2	0.8

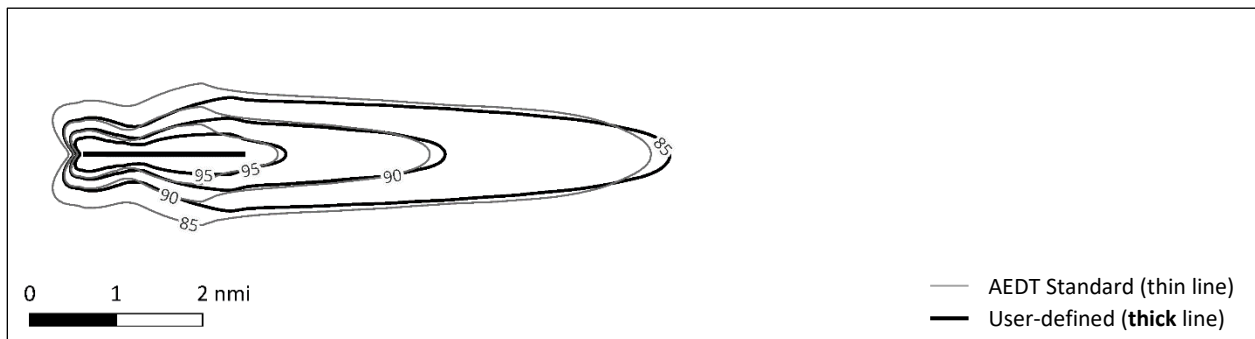


Figure B-57. SEL Contours for 7478 Departures at Take-Off Weight 671,100 Pounds

Table B-11. SELs for 7478 Departures at 691,200 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 691,200 lbs. (PROF_ID2 = 2) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.0	129.8	-3.3
0.5	121.2	119.4	-1.8
1.0	106.5	109.0	2.5
1.5	100.4	100.1	-0.2
2.0	95.4	95.8	0.4
2.5	93.8	94.0	0.3
3.0	92.3	92.8	0.5
3.5	91.1	91.5	0.4
4.0	90.0	90.4	0.4
4.5	88.9	89.5	0.6
5.0	87.7	88.5	0.8
5.5	86.7	87.7	1.0
6.0	85.7	86.7	1.0
6.5	84.9	86.0	1.0
7.0	84.1	85.2	1.1
7.5	83.3	84.4	1.1
8.0	82.6	83.7	1.2
8.5	81.8	82.9	1.2
9.0	81.1	82.2	1.1
9.5	80.4	81.4	1.0
10.0	79.9	80.8	0.9

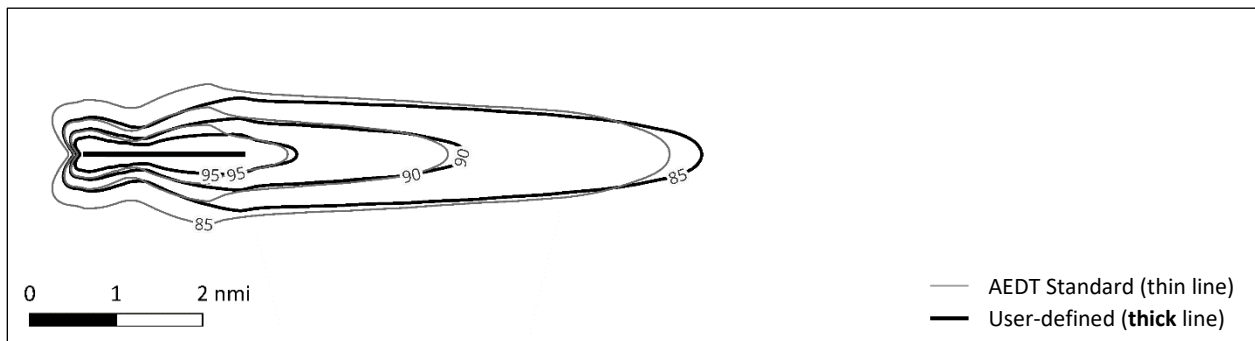


Figure B-58. SEL Contours for 7478 Departures at Take-Off Weight 691,200 Pounds

Table B-12. SELs for 7478 Departures at 713,300 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 713,300 lbs. (PROF_ID2 = 3) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.0	129.7	-3.3
0.5	121.2	119.3	-1.8
1.0	107.9	112.7	4.8
1.5	100.8	101.0	0.2
2.0	95.7	97.1	1.4
2.5	94.2	94.5	0.3
3.0	92.7	93.1	0.4
3.5	91.5	91.9	0.5
4.0	90.4	90.8	0.4
4.5	89.3	90.0	0.6
5.0	88.3	89.0	0.7
5.5	87.2	88.1	0.9
6.0	86.2	87.3	1.1
6.5	85.3	86.4	1.1
7.0	84.6	85.7	1.1
7.5	83.9	85.0	1.1
8.0	83.0	84.2	1.2
8.5	82.3	83.5	1.2
9.0	81.6	82.8	1.2
9.5	80.9	82.1	1.1
10.0	80.3	81.3	1.0

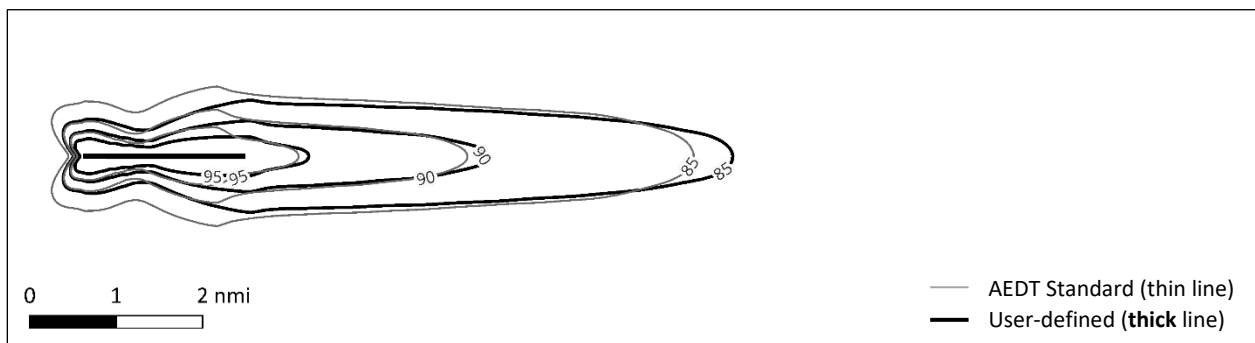


Figure B-59. SEL Contours for 7478 Departures at Take-Off Weight 713,300 Pounds

Table B-13. SELs for 7478 Departures at 752,400 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 752,400 lbs. (PROF_ID2 = 4) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.8	129.6	-3.3
0.5	121.8	119.2	-2.5
1.0	111.2	117.4	6.2
1.5	101.8	102.6	0.8
2.0	96.4	98.1	1.8
2.5	94.7	94.9	0.3
3.0	93.3	93.7	0.4
3.5	92.1	92.6	0.5
4.0	91.1	91.5	0.4
4.5	90.1	90.6	0.5
5.0	89.1	89.8	0.7
5.5	88.1	88.9	0.8
6.0	87.2	88.1	0.9
6.5	86.3	87.3	1.0
7.0	85.5	86.6	1.1
7.5	84.8	85.9	1.1
8.0	84.0	85.2	1.1
8.5	83.3	84.5	1.2
9.0	82.6	83.9	1.3
9.5	81.9	83.2	1.3
10.0	81.3	82.5	1.2

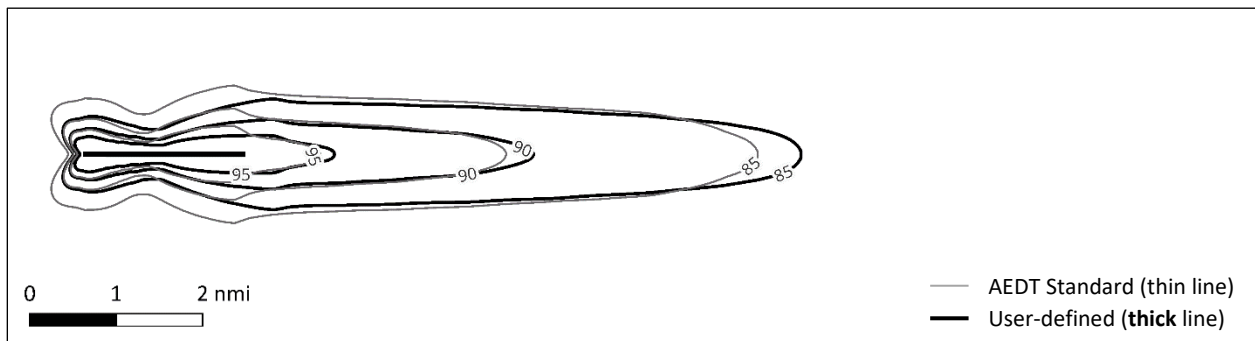


Figure B-60. SEL Contours for 7478 Departures at Take-Off Weight 752,400 Pounds

Table B-14. SELs for 7478 Departures at 801,000 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 801,000 lbs. (PROF_ID2 = 5) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.7	129.4	-3.3
0.5	121.7	119.9	-1.8
1.0	119.4	117.3	-2.0
1.5	103.5	105.2	1.7
2.0	99.2	99.6	0.4
2.5	95.3	96.5	1.2
3.0	94.0	94.3	0.3
3.5	92.9	93.3	0.4
4.0	91.7	92.3	0.6
4.5	90.8	91.3	0.5
5.0	90.0	90.5	0.6
5.5	89.1	89.8	0.7
6.0	88.2	89.1	0.8
6.5	87.3	88.3	1.0
7.0	86.5	87.6	1.1
7.5	85.7	86.9	1.2
8.0	85.0	86.2	1.2
8.5	84.4	85.6	1.2
9.0	83.6	84.9	1.3
9.5	83.0	84.3	1.3
10.0	82.3	83.7	1.4

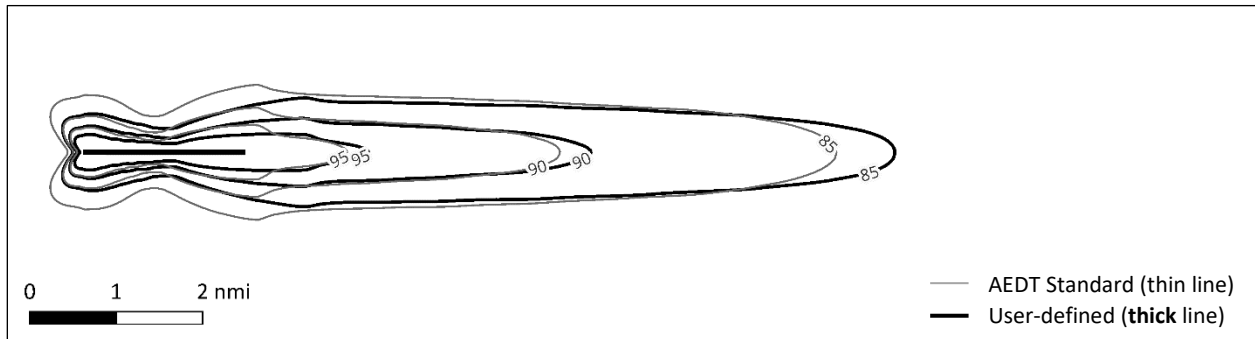


Figure B-61. SEL Contours for 7478 Departures at Take-Off Weight 801,000 Pounds

Table B-15. SELs for 7478 Departures at 853,400 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 853,400 lbs. (PROF_ID2 = 6) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	133.0	130.8	-2.2
0.5	122.1	120.3	-1.8
1.0	119.3	118.3	-1.0
1.5	105.8	107.5	1.7
2.0	100.5	100.9	0.3
2.5	95.9	97.8	1.8
3.0	94.7	94.5	-0.2
3.5	93.6	93.7	0.1
4.0	92.6	92.7	0.1
4.5	91.6	91.9	0.3
5.0	90.9	91.1	0.1
5.5	90.0	90.4	0.3
6.0	89.3	89.8	0.5
6.5	88.5	89.0	0.5
7.0	87.6	88.5	0.8
7.5	86.8	87.8	1.0
8.0	86.0	87.2	1.1
8.5	85.4	86.5	1.2
9.0	84.8	85.9	1.1
9.5	84.2	85.4	1.2
10.0	83.5	84.8	1.3

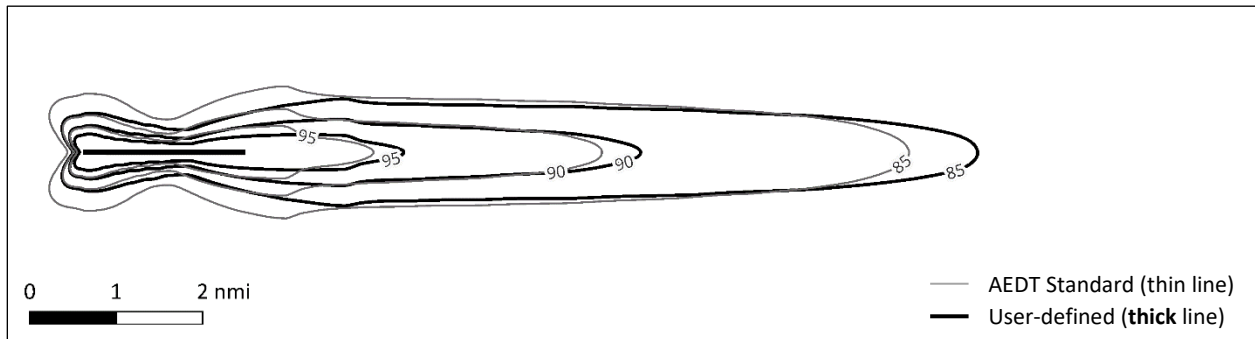


Figure B-62. SEL Contours for 7478 Departures at Take-Off Weight 853,400 Pounds

Table B-16. SELs for 7478 Departures at 909,300 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 909,300 lbs. (PROF_ID2 = 7) User PROF_ID1: SDF_NADP_2_RT05			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.9	131.8	-1.1
0.5	122.1	122.4	0.3
1.0	119.8	119.0	-0.8
1.5	109.5	111.5	2.0
2.0	102.2	102.5	0.3
2.5	99.1	98.8	-0.2
3.0	95.2	95.7	0.4
3.5	94.4	94.7	0.3
4.0	93.3	93.6	0.3
4.5	92.5	92.7	0.2
5.0	91.6	91.9	0.3
5.5	91.0	91.2	0.2
6.0	90.2	90.4	0.3
6.5	89.5	89.7	0.2
7.0	88.8	89.0	0.2
7.5	88.1	88.3	0.2
8.0	87.3	87.7	0.4
8.5	86.6	87.1	0.4
9.0	85.9	86.4	0.5
9.5	85.3	85.8	0.5
10.0	84.8	85.1	0.3

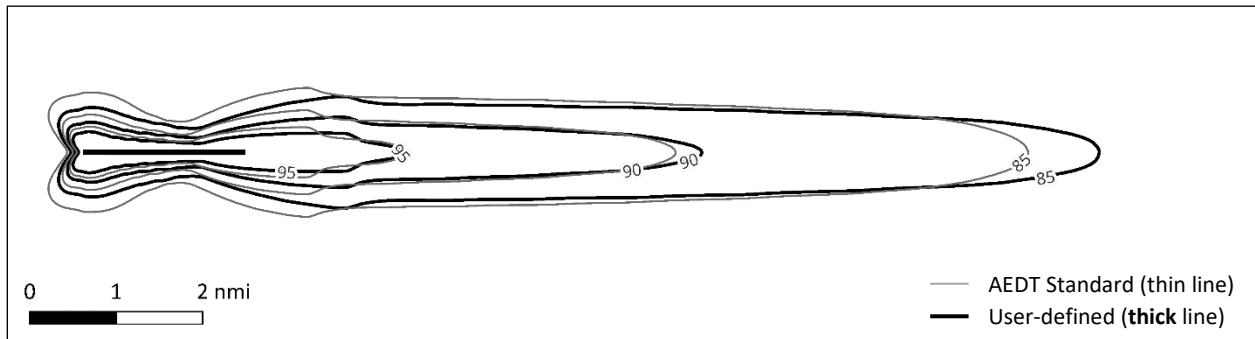


Figure B-63. SEL Contours for 7478 Departures at Take-Off Weight 909,300 Pounds

Table B-17. SELs for 7478 Departures at 969,000 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 969,000 lbs. (PROF_ID2 = 8) User PROF_ID1: SDF_NADP_2			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.7	132.7	0.0
0.5	122.7	122.7	0.0
1.0	119.8	119.8	0.0
1.5	118.5	118.5	0.0
2.0	104.8	104.8	0.0
2.5	100.8	100.8	0.0
3.0	97.8	97.8	0.0
3.5	95.0	95.0	0.0
4.0	94.3	94.3	0.0
4.5	93.3	93.3	0.0
5.0	92.6	92.6	0.0
5.5	91.8	91.8	0.0
6.0	91.2	91.2	0.0
6.5	90.6	90.6	0.0
7.0	89.9	89.9	0.0
7.5	89.4	89.4	0.0
8.0	88.7	88.7	0.0
8.5	88.1	88.1	0.0
9.0	87.6	87.6	0.0
9.5	86.9	86.9	0.1
10.0	86.1	86.3	0.3

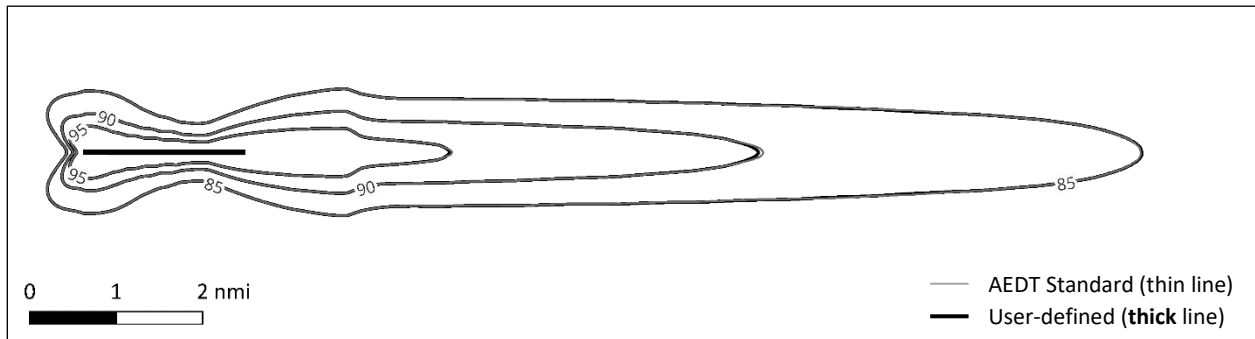


Figure B-64. SEL Contours for 7478 Departures at Take-Off Weight 969,000 Pounds

Table B-18. SELs for 7478 Departures at 987,000 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7478 Profile Weight: 987,000 lbs. (PROF_ID2 = 9) User PROF_ID1: SDF_NADP_2			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.7	132.7	0.0
0.5	122.7	122.7	0.0
1.0	120.3	120.3	0.0
1.5	118.5	118.5	0.0
2.0	105.7	105.7	0.0
2.5	101.2	101.2	0.0
3.0	98.7	98.7	0.0
3.5	95.2	95.2	0.0
4.0	94.4	94.4	0.0
4.5	93.5	93.5	0.0
5.0	92.9	92.9	0.0
5.5	92.1	92.1	0.0
6.0	91.4	91.4	0.0
6.5	90.9	90.9	0.0
7.0	90.2	90.2	0.0
7.5	89.6	89.6	0.0
8.0	89.0	89.0	0.0
8.5	88.3	88.4	0.0
9.0	87.9	87.9	0.0
9.5	87.2	87.3	0.1
10.0	86.5	86.6	0.1

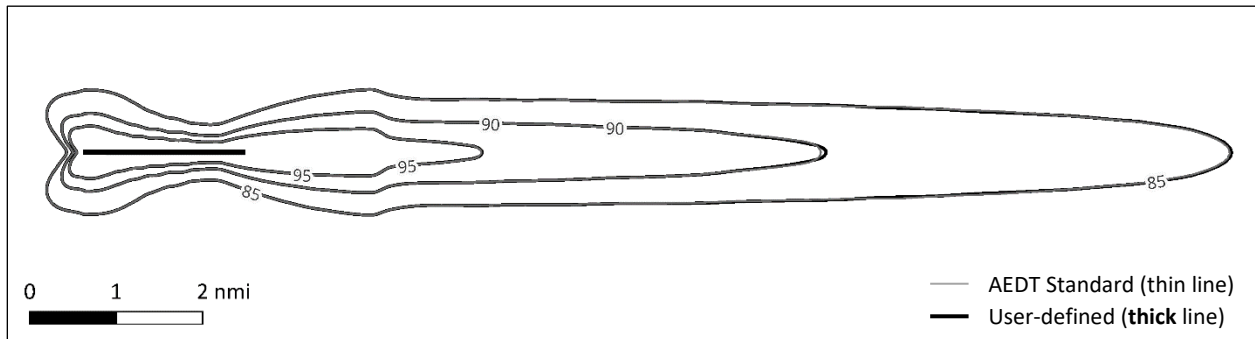


Figure B-65. SEL Contours for 7478 Departures at Take-Off Weight 987,000 Pounds

B.2.5.3. Graphical Comparison of Profiles

Graphs of Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance are included as **Figure B-66**, **Figure B-67** and **Figure B-68**, respectively.

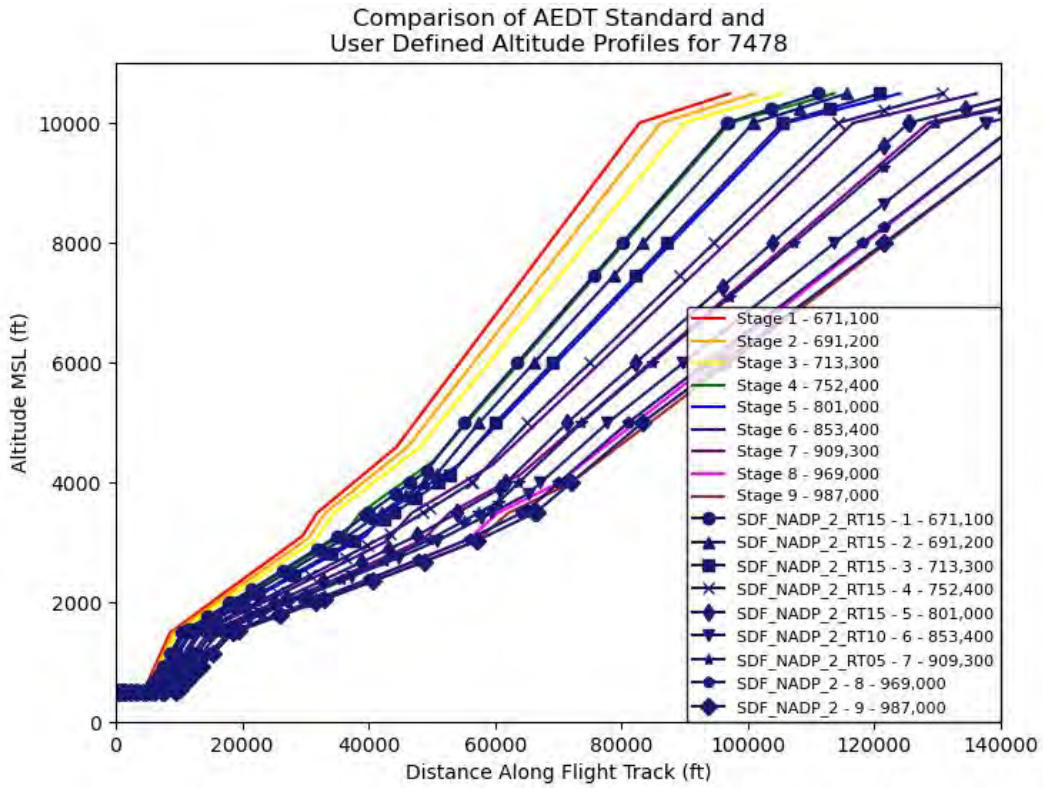


Figure B-66. 7478 AEDT Profiles, Altitude vs. Distance

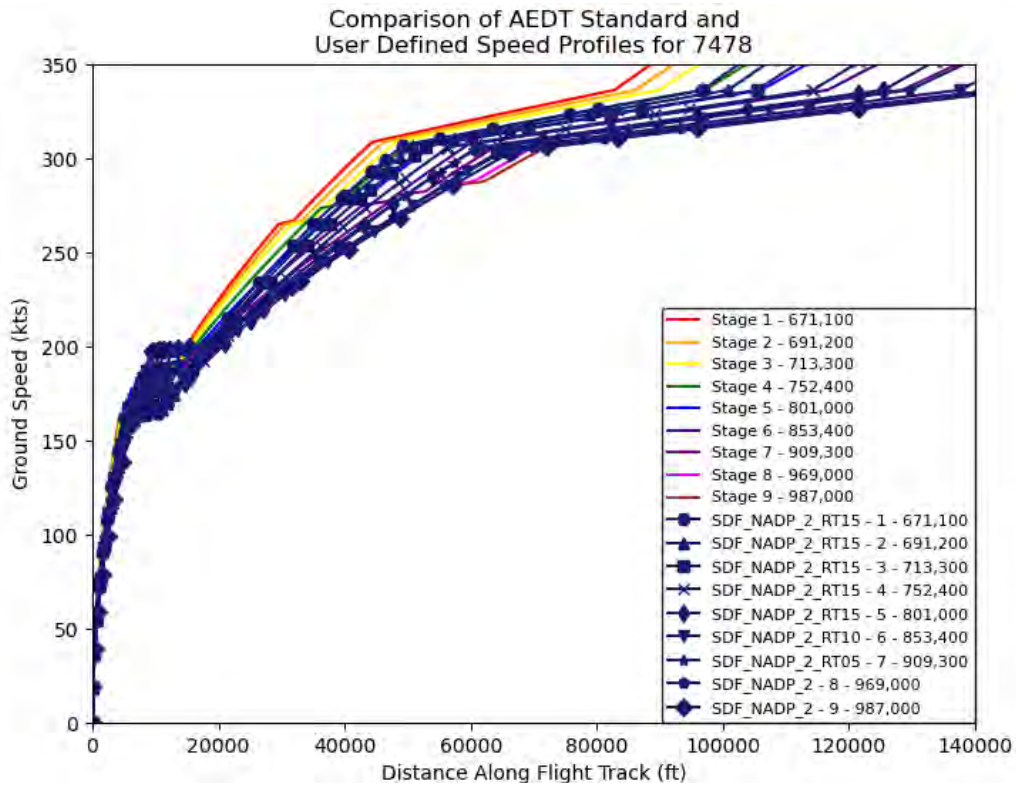


Figure B-67. 7478 AEDT Profiles, Speed vs. Distance

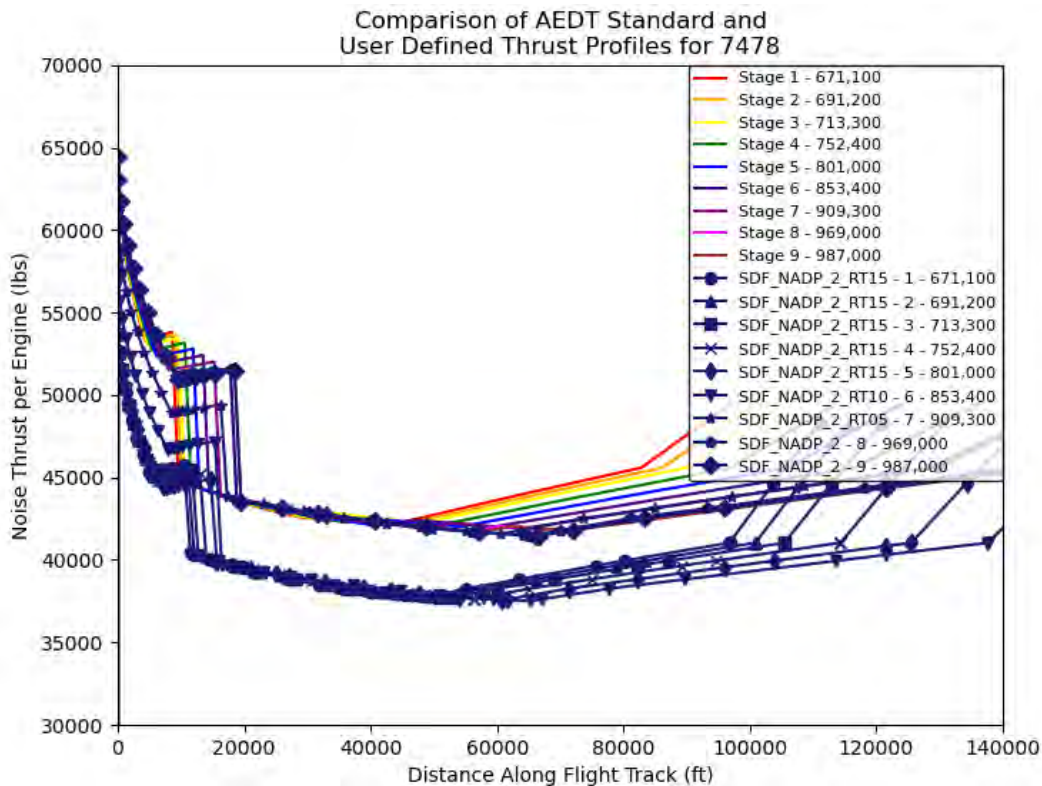


Figure B-68. 7478 AEDT Profiles, Thrust vs. Distance

B.3. Additional Graphs: Comparison of Altitude and Speed Profiles by Stage Length

The additional graphs of altitude vs. distance and speed vs. distance, organized by stage length, are included in this section in response to FAA's request in the feedback dated May 29, 2024. The following figures are complementary to Figures B-1 through B-4 in the original memorandum dated April 18, 2024 and show the same data. **Figures B-69 through B-104** reorganize the data by specific profile weights and respective stage lengths.

The distribution of departures by stage length (as derived by an analysis of the city-pair data in the 12-month NOMS sample) show that:

- 7% of the 747400 departures are in stage length 1, 18% in stage length 2, 1% in stage length 3, 24% in stage length 4, 24% in stage length 5, 20% in stage length 6, and 6% in stage length 8. The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Boeing 747-400 operations will be represented with AEDT ANP stage lengths 2 – 6. Although 747400 stage length 7 (PROF_ID2 = 7, with representative profile weight of 720,900 pounds) and 747400 stage length 9 (PROF_ID2 = 9, with representative profile weight of 875,000 pounds) did not appear in the 12-month flight track sample, we include those departure profiles in this documentation in case the forecast data indicate that such operations should be included in the forecast NEM.
- 3% of the 7478 departures are in stage length 1, 7% in stage length 2, less than 1% in stage length 3, 4% in stage length 4, 34% in stage length 5, 38% in stage length 6, and 13% in stage length 8. The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Boeing 747-8 operations will be represented with AEDT ANP stage lengths 5 – 8. Although 7478 stage length 7 (PROF_ID2 = 7, with representative profile weight of 909,300 pounds) and 7478 stage length 9 (PROF_ID2 = 9, with representative profile weight of 987,000 pounds) did not appear in the 12-month flight track sample, we include those departure profiles in this documentation in case the forecast data indicate that such operations should be included in the forecast NEM.

As noted in the "Statement of Benefit" (section B.1.1) operators at SDF use a version of "Noise Abatement Departure Procedures" (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. Operators did not provide the exact reduced thrust. Therefore, we used the thrust-to-weight ratio of the AEDT maximum thrust profile associated with current and historical B747-400 operations at SDF. The similar thrust-to-weight ratio should maintain a similar acceleration rate during the take-off roll and, combined with the lower rotation speed needed for a lower weight aircraft, should have a shorter take-off roll. Therefore, all of the proposed procedures follow the NADP 2 described on page B-1, although they may use various thrust settings based on weight. This should not be confused with AEDT's definition of a single procedure (PROF_ID1 and PROF_ID2), which combines both the altitude and flap retraction speeds along with the power settings. It also should be noted that our efforts to develop the proposed profiles were limited to the selection of thrust coefficients already available in AEDT. In other words, we did not attempt to define new thrust coefficients to represent power levels not already represented in AEDT. We did not modify the flap retraction speed schedule relative to that in AEDT, and we also kept all clean climbs (i.e. flaps fully retracted) at a speed of 250 knots calibrated airspeed, which matches both the AEDT standard profiles and the indicated airspeed listed in the procedures provided by the operator. In addition, the comparison of the AEDT profiles is done at the SDF annual average day conditions documented in the AEDT database, which will be used in the calculation of the NEM contours. As such, the ground speeds reported by AEDT compared to the flight track data do not match precisely; therefore, we recommend viewing the general speed patterns rather than comparing absolute values.

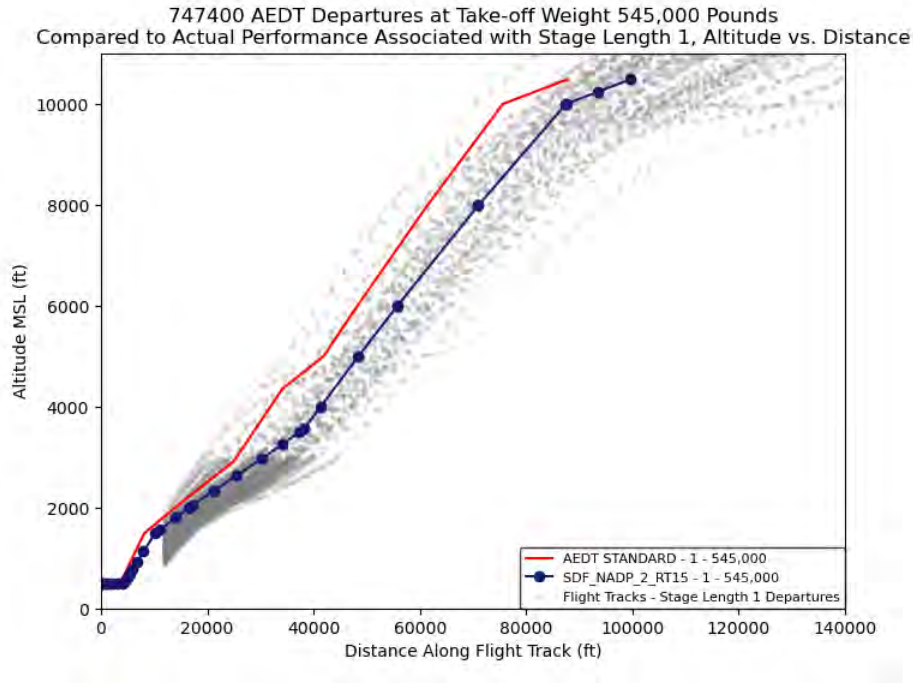


Figure B-69. 747400 Departures, Stage Length 1, Altitude vs. Distance

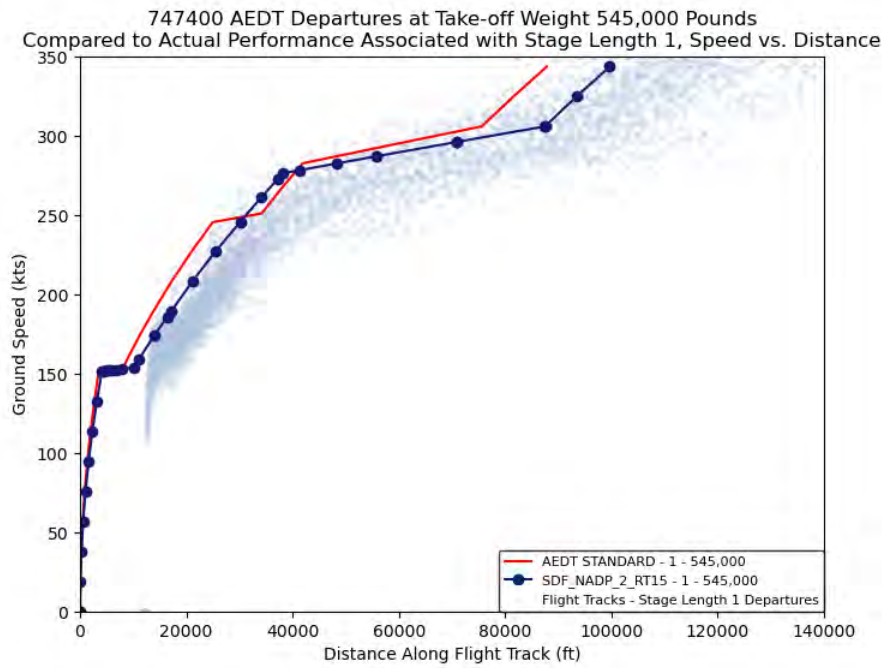


Figure B-70. 747400 Departures, Stage Length 1, Speed vs. Distance

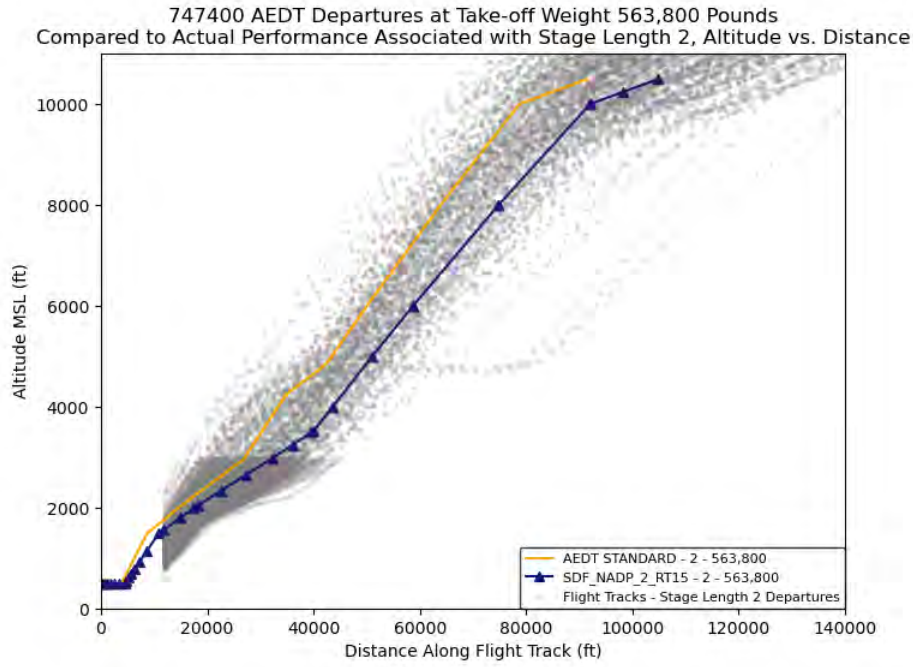


Figure B-71. 747400 Departures, Stage Length 2, Altitude vs. Distance

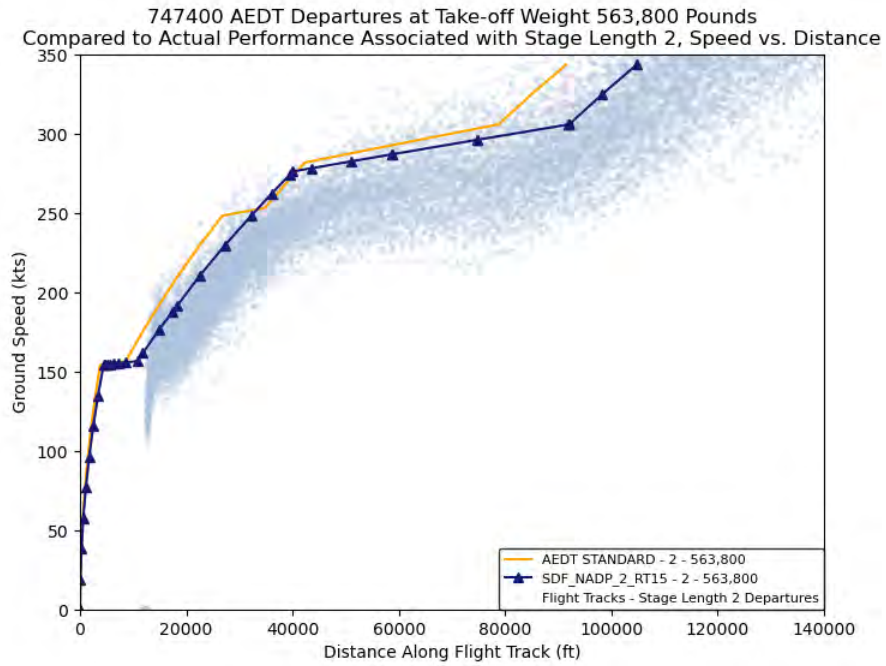


Figure B-72. 747400 Departures, Stage Length 2, Speed vs. Distance

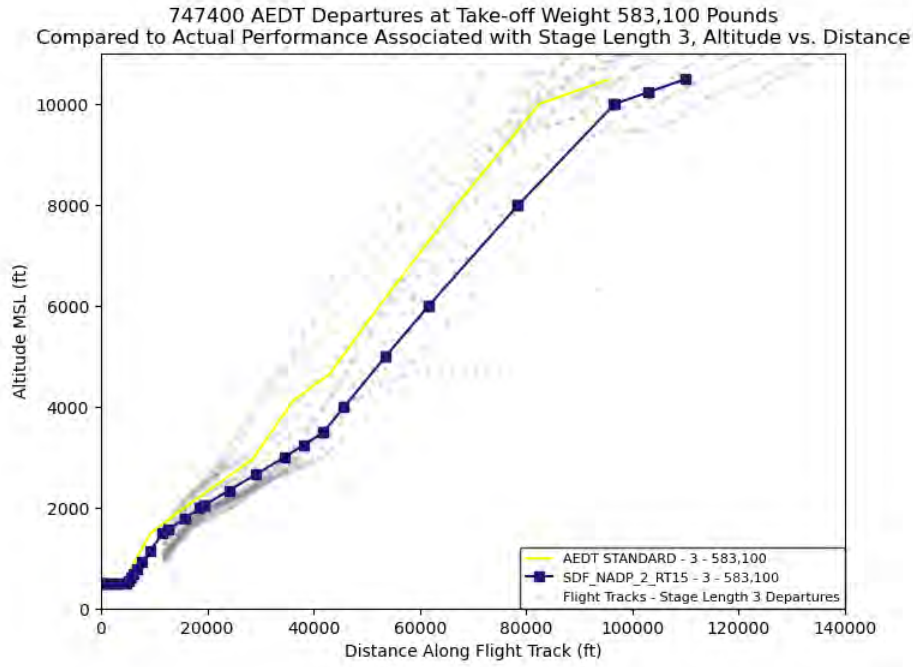


Figure B-73. 747400 Departures, Stage Length 3, Altitude vs. Distance

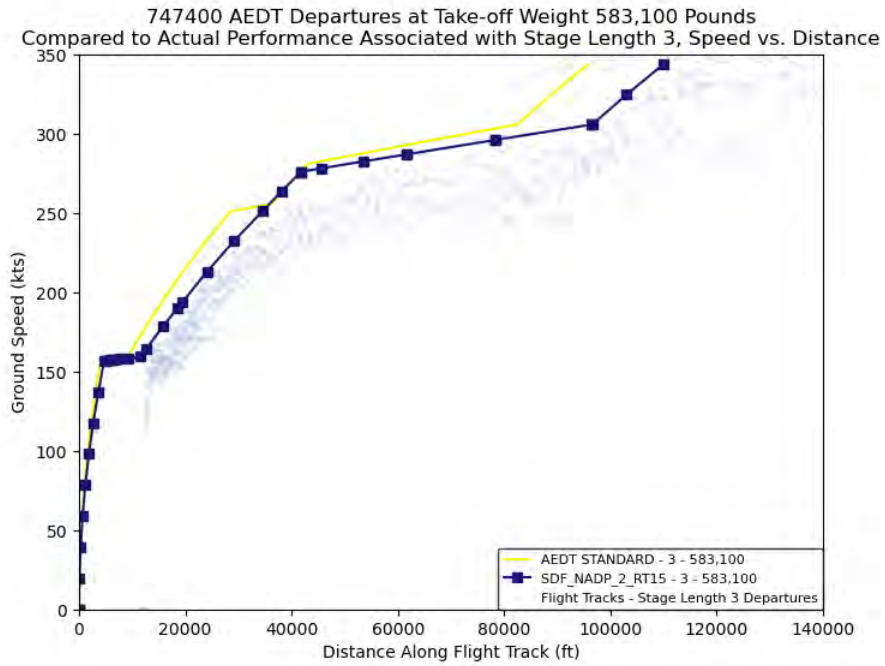


Figure B-74. 747400 Departures, Stage Length 3, Speed vs. Distance

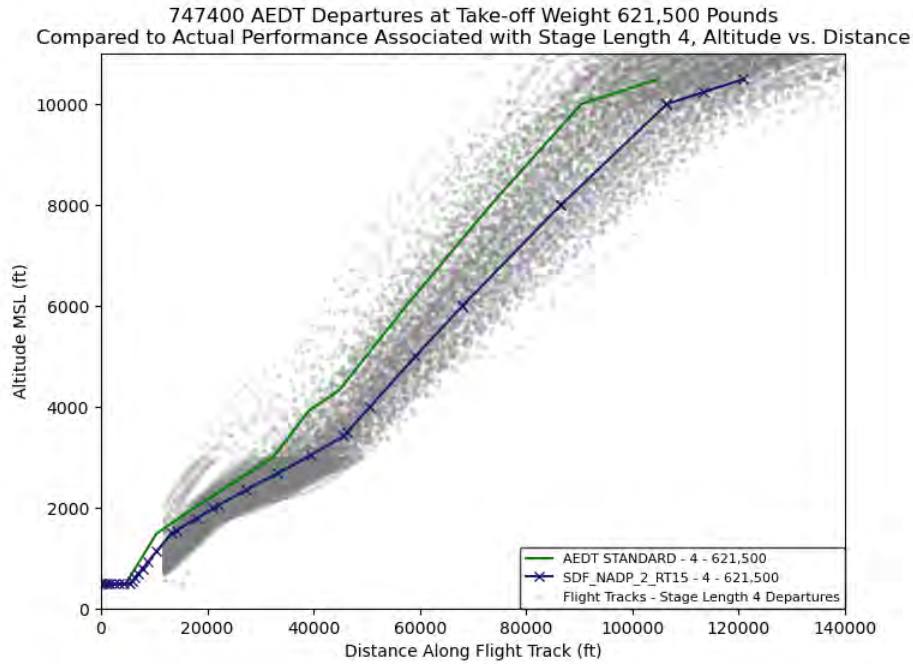


Figure B-75. 747400 Departures, Stage Length 4, Altitude vs. Distance

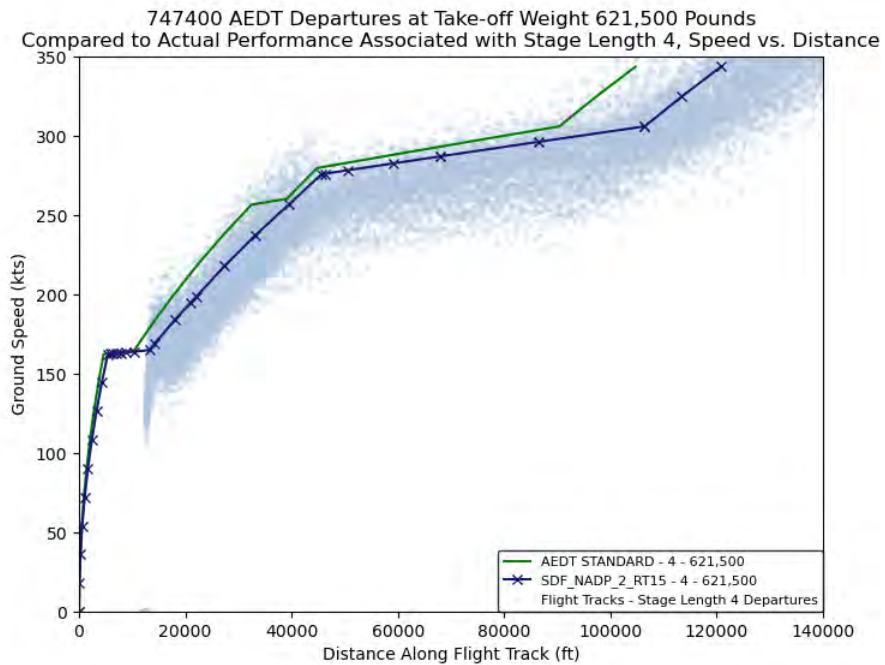


Figure B-76. 747400 Departures, Stage Length 4, Speed vs. Distance

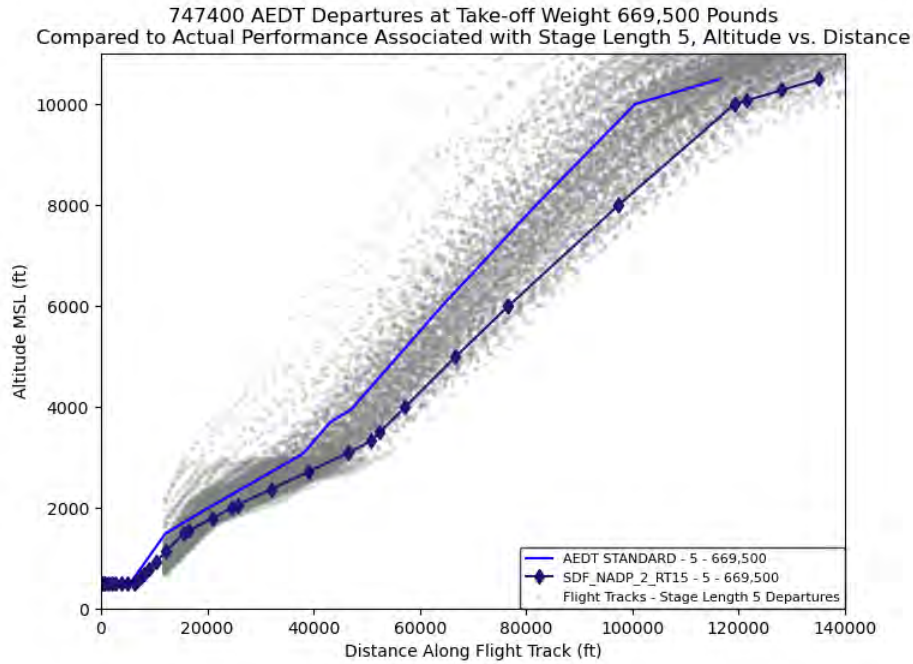


Figure B-77. 747400 Departures, Stage Length 5, Altitude vs. Distance

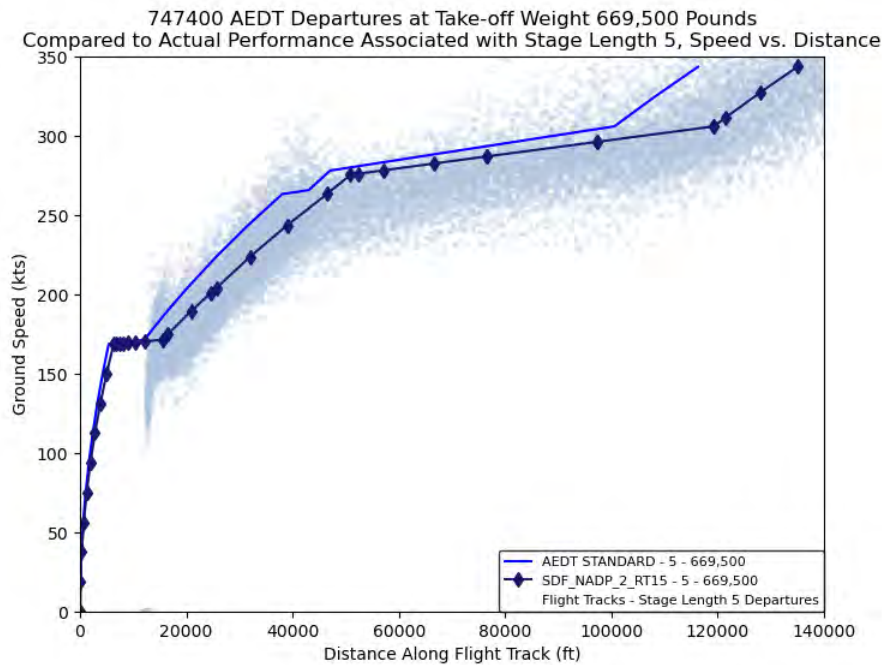


Figure B-78. 747400 Departures, Stage Length 5, Speed vs. Distance

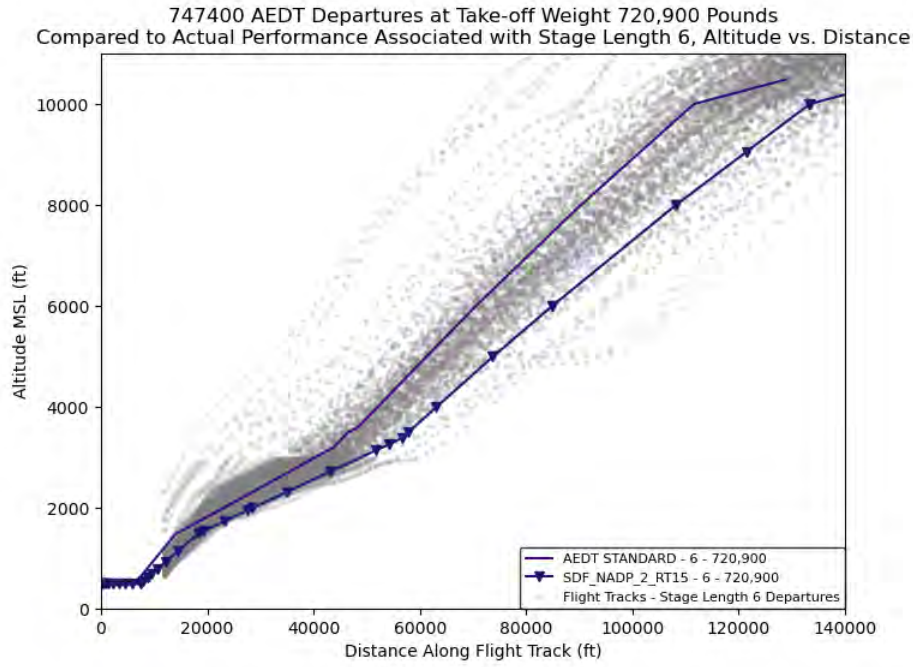


Figure B-79. 747400 Departures, Stage Length 6, Altitude vs. Distance

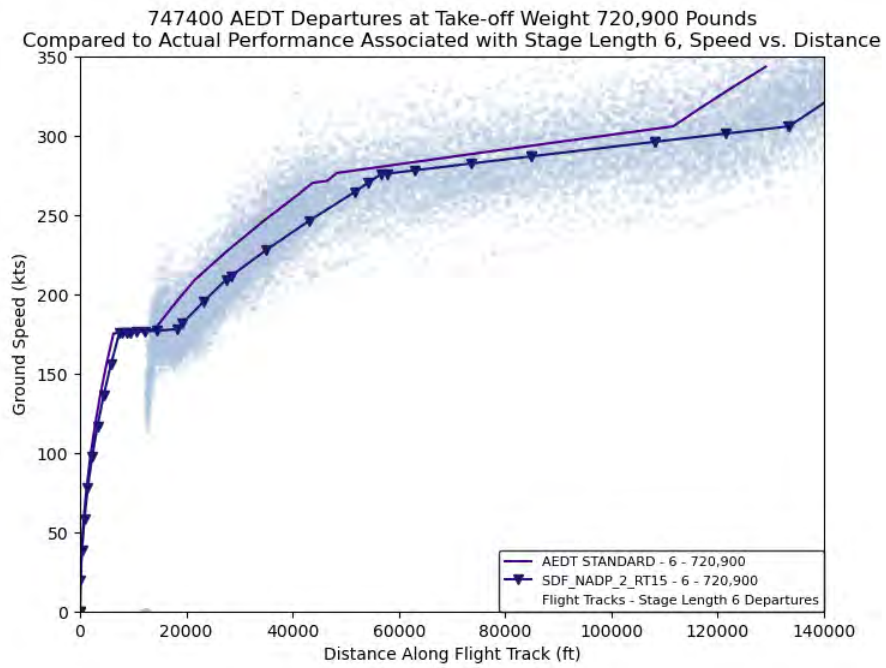


Figure B-80. 747400 Departures, Stage Length 6, Speed vs. Distance

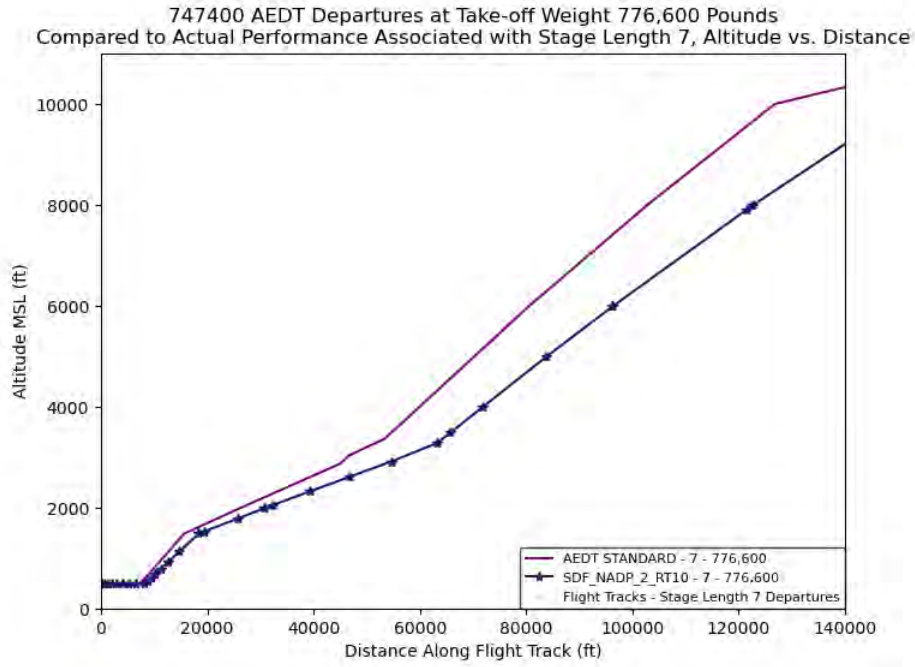


Figure B-81. 747400 Departures, Stage Length 7, Altitude vs. Distance

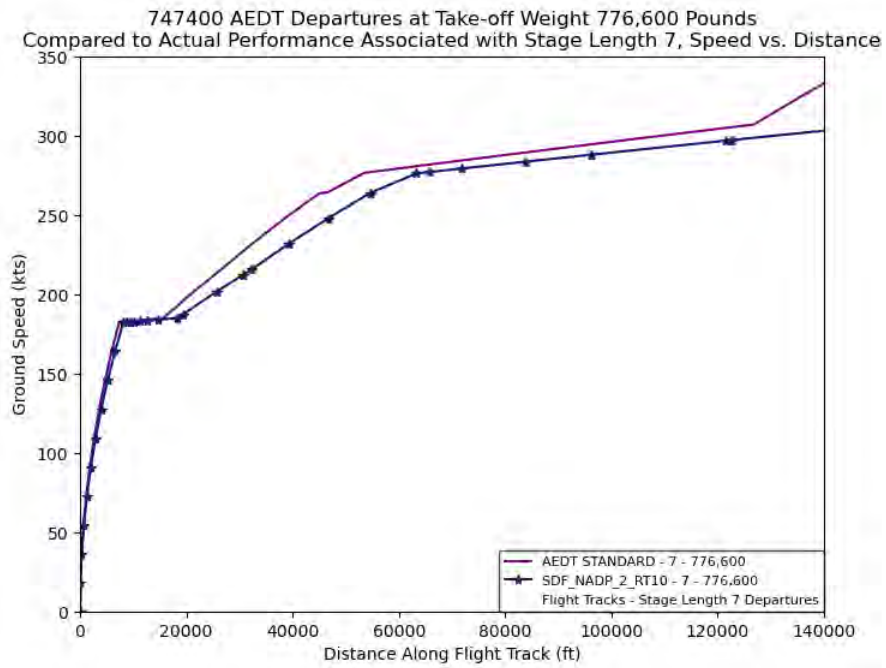


Figure B-82. 747400 Departures, Stage Length 7, Speed vs. Distance

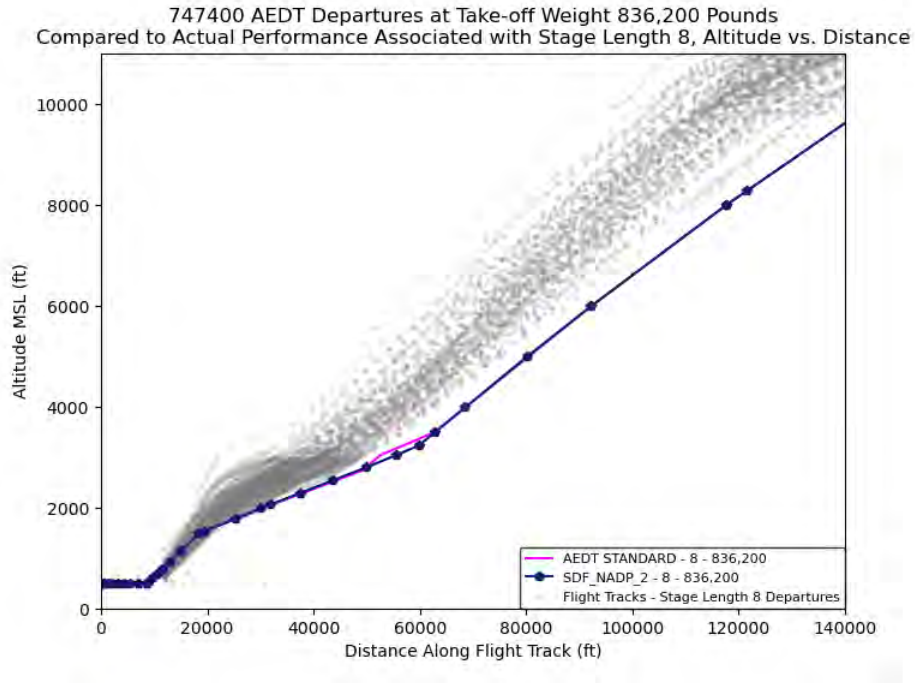


Figure B-83. 747400 Departures, Stage Length 8, Altitude vs. Distance

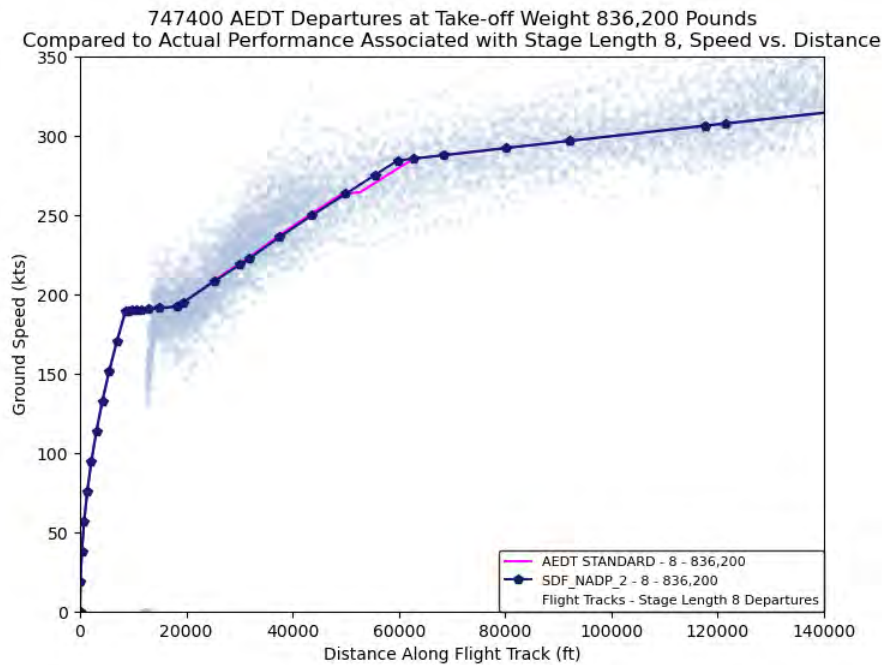


Figure B-84. 747400 Departures, Stage Length 8, Speed vs. Distance

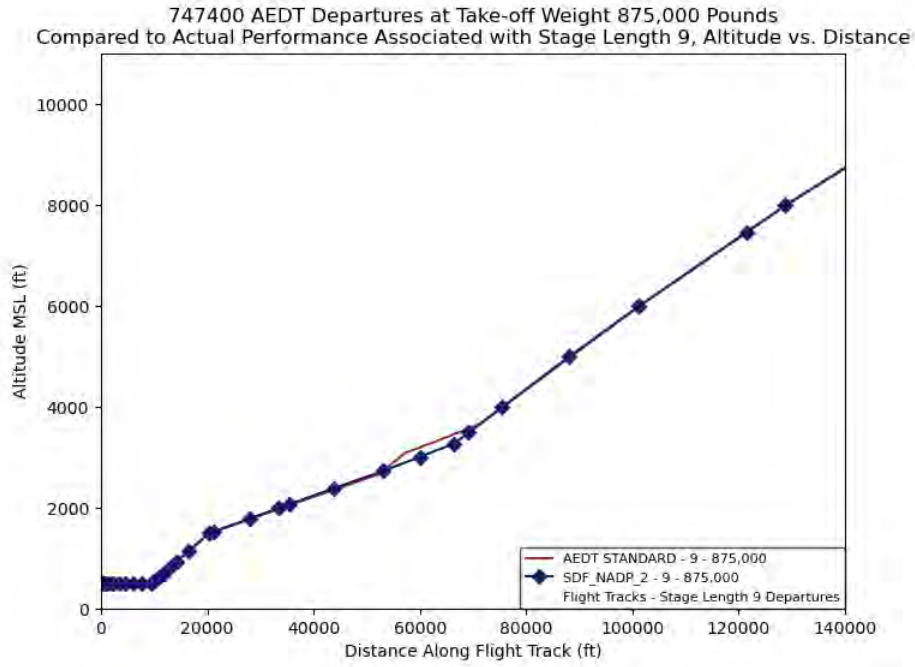


Figure B-85. 747400 Departures, Stage Length 9, Altitude vs. Distance

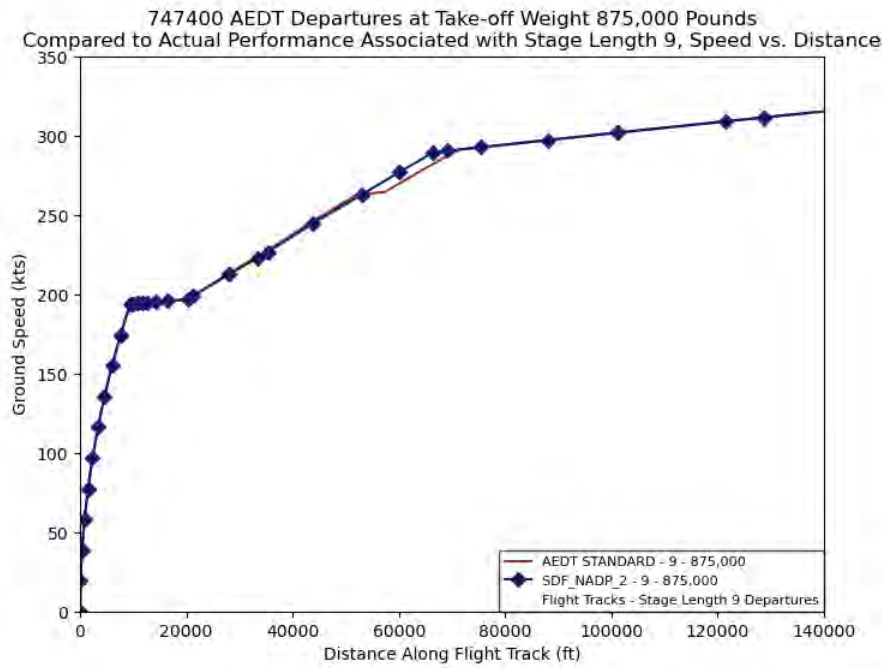


Figure B-86. 747400 Departures, Stage Length 9, Speed vs. Distance

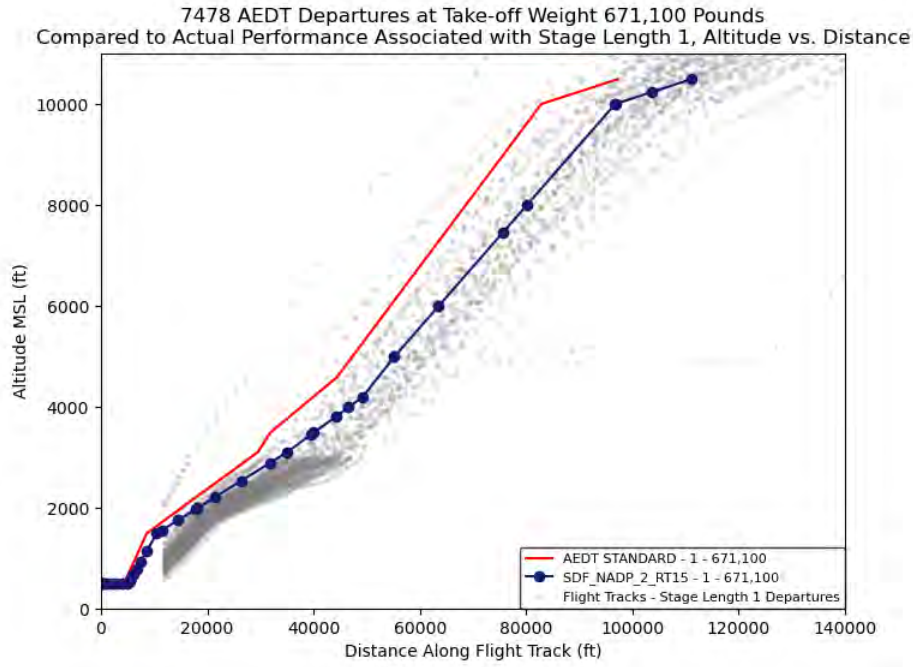


Figure B-87. 7478 Departures, Stage Length 1, Altitude vs. Distance

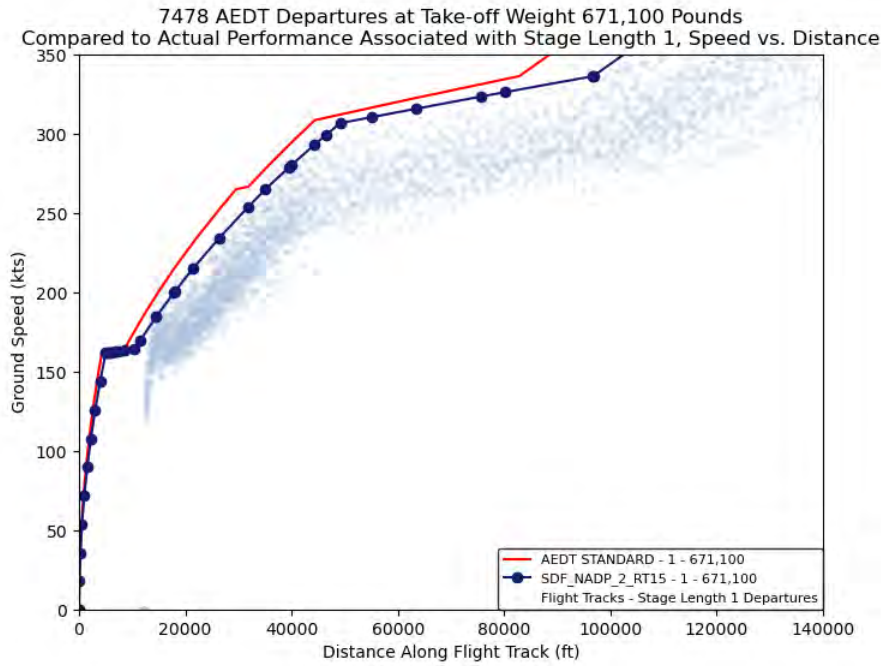


Figure B-88. 7478 Departures, Stage Length 1, Speed vs. Distance

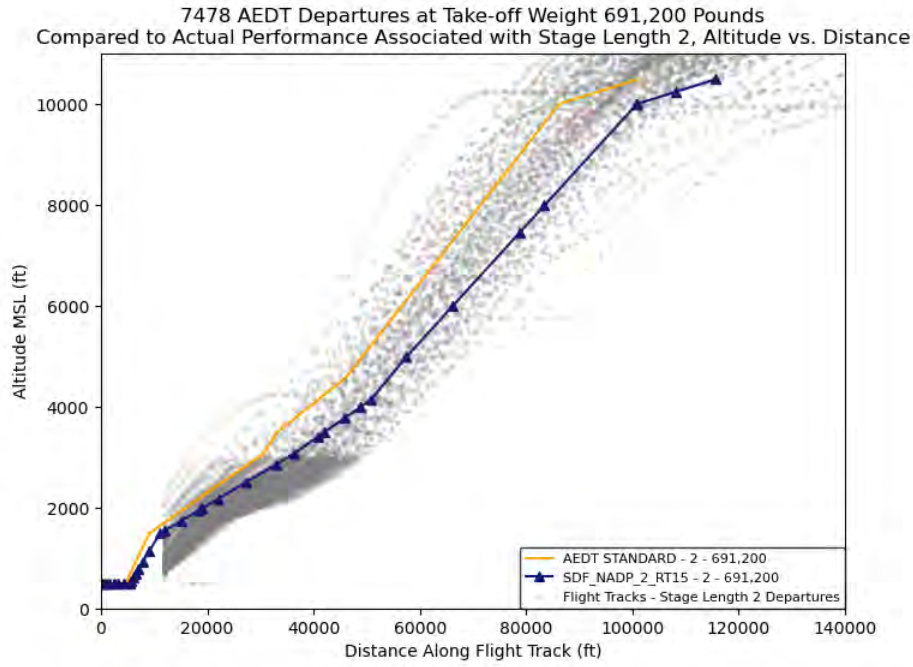


Figure B-89. 7478 Departures, Stage Length 2, Altitude vs. Distance

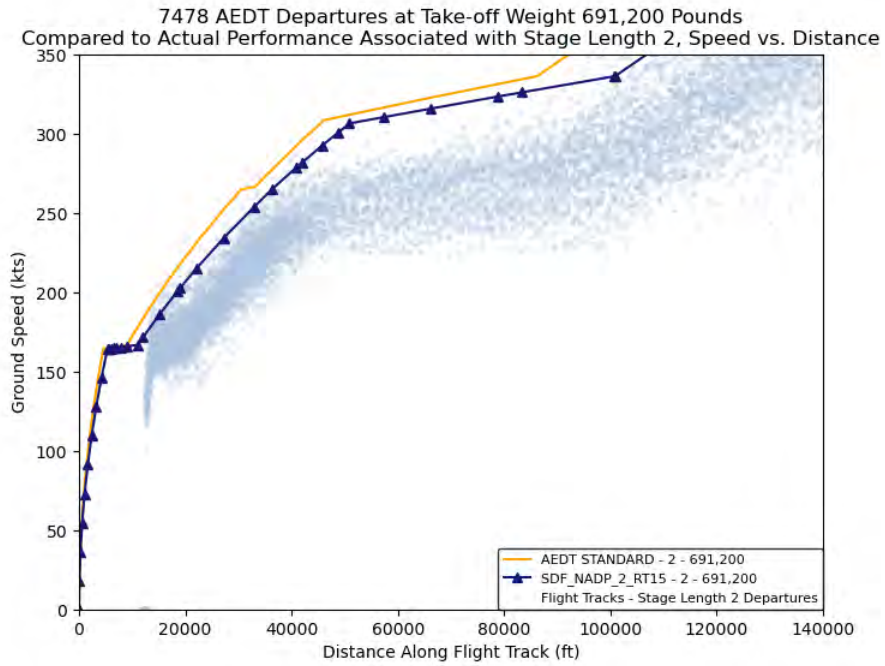


Figure B-90. 7478 Departures, Stage Length 2, Speed vs. Distance

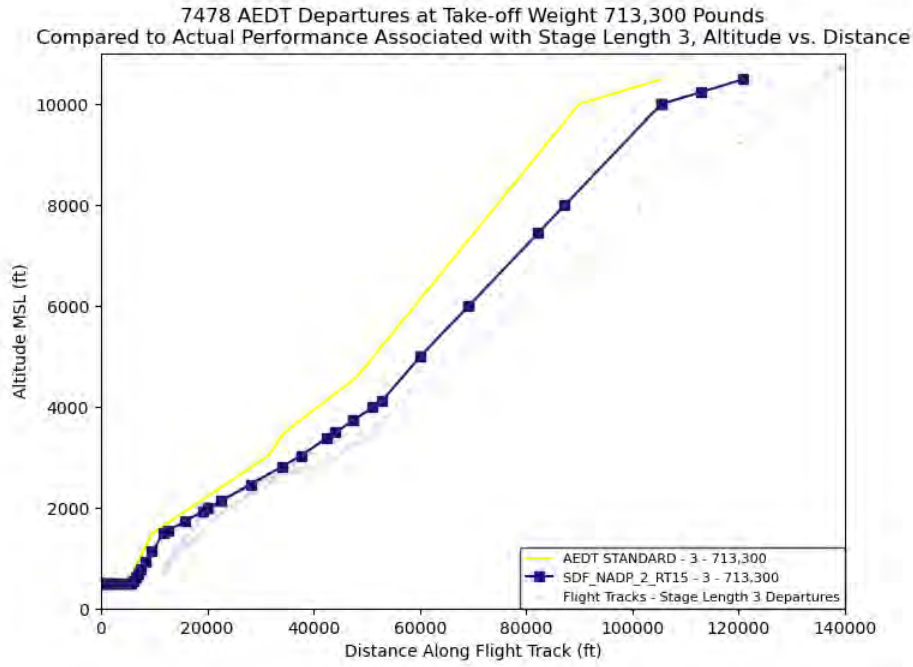


Figure B-91. 7478 Departures, Stage Length 3, Altitude vs. Distance

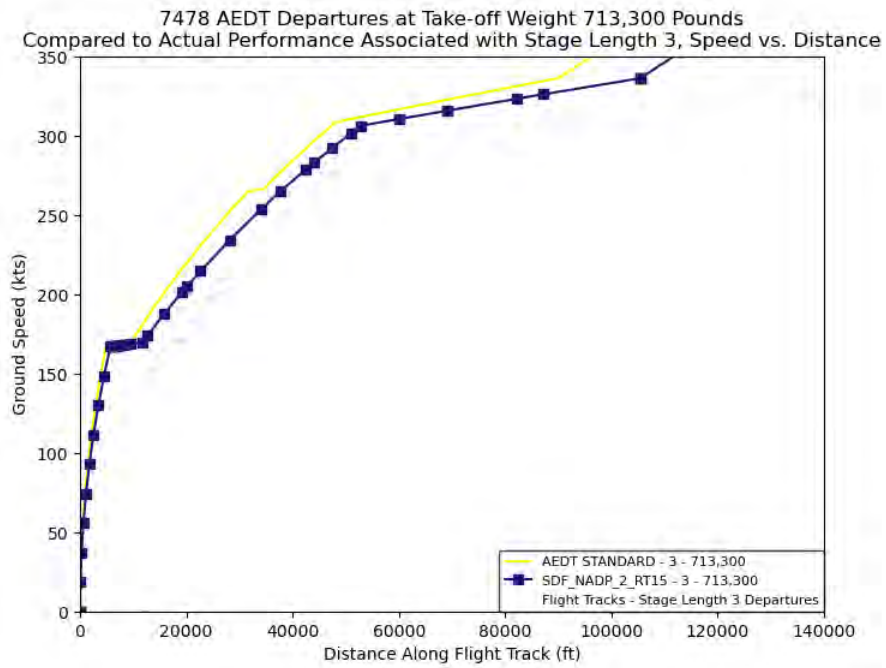


Figure B-92. 7478 Departures, Stage Length 3, Speed vs. Distance

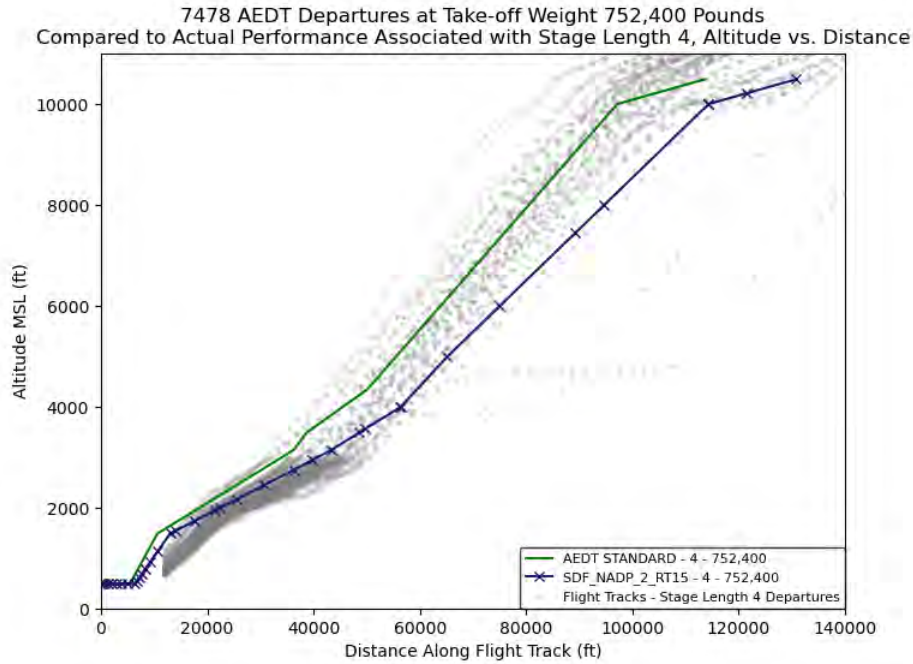


Figure B-93. 7478 Departures, Stage Length 4, Altitude vs. Distance

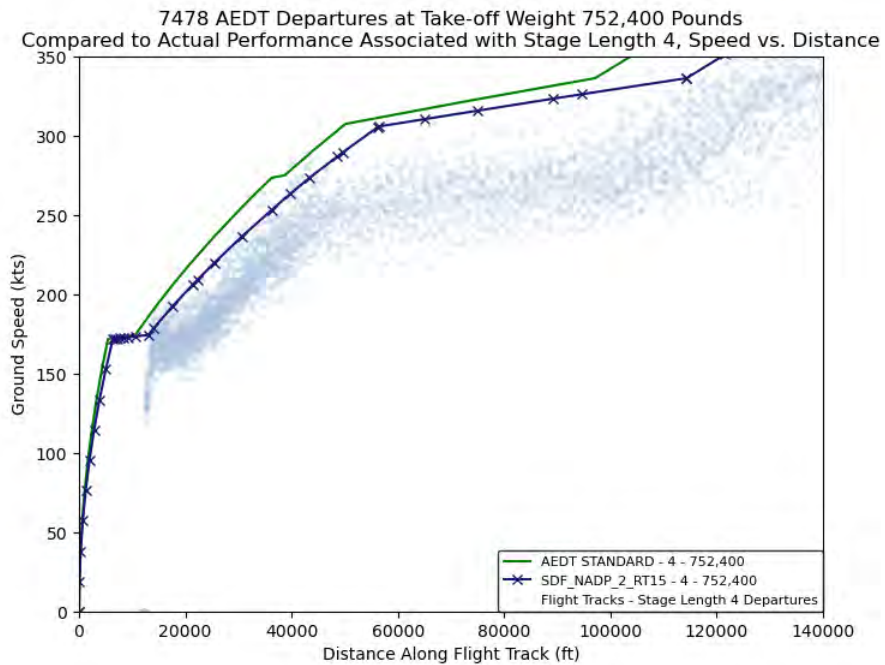


Figure B-94. 7478 Departures, Stage Length 4, Speed vs. Distance

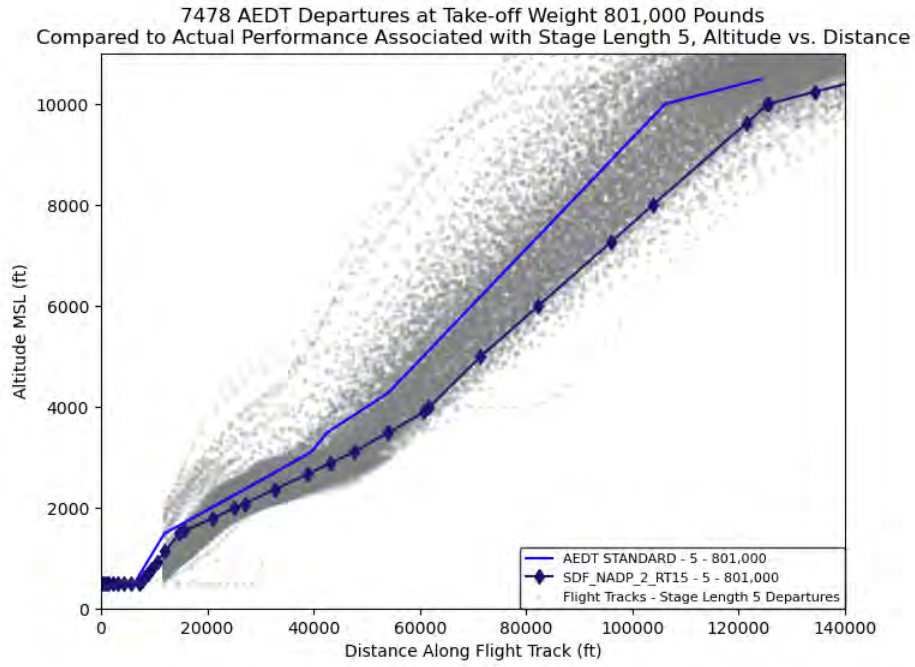


Figure B-95. 7478 Departures, Stage Length 5, Altitude vs. Distance

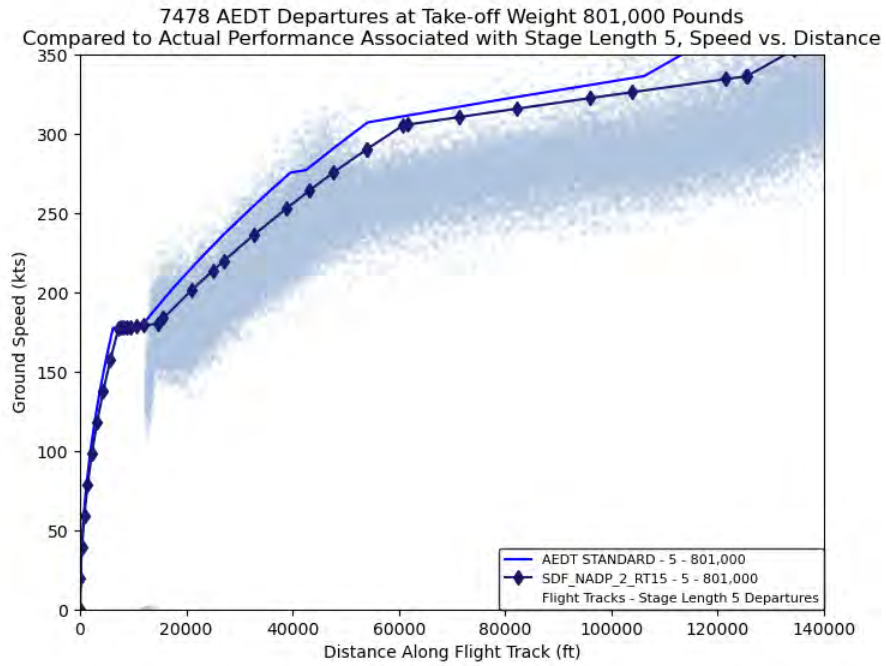


Figure B-96. 7478 Departures, Stage Length 5, Speed vs. Distance

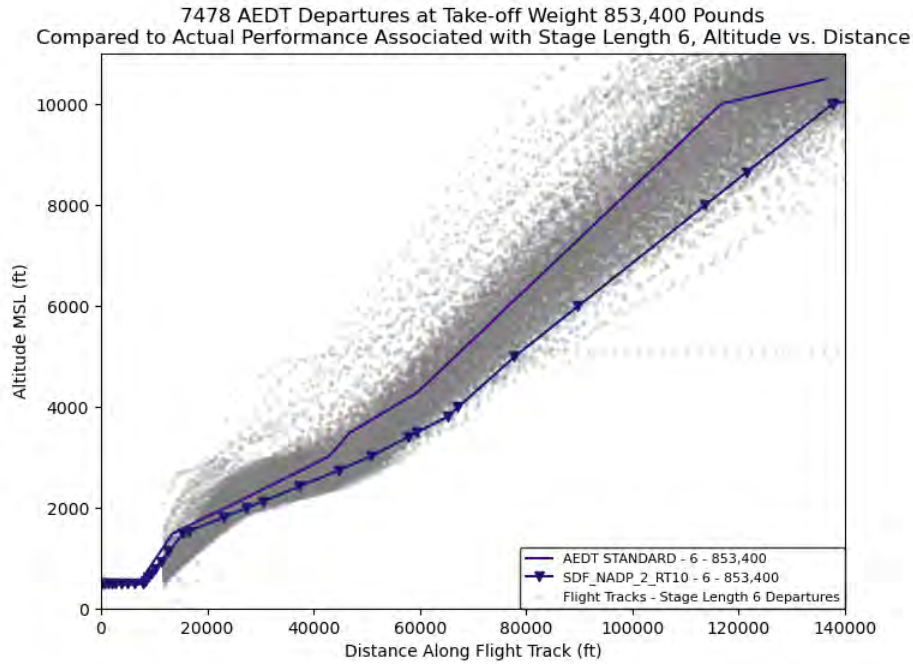


Figure B-97. 7478 Departures, Stage Length 6, Altitude vs. Distance

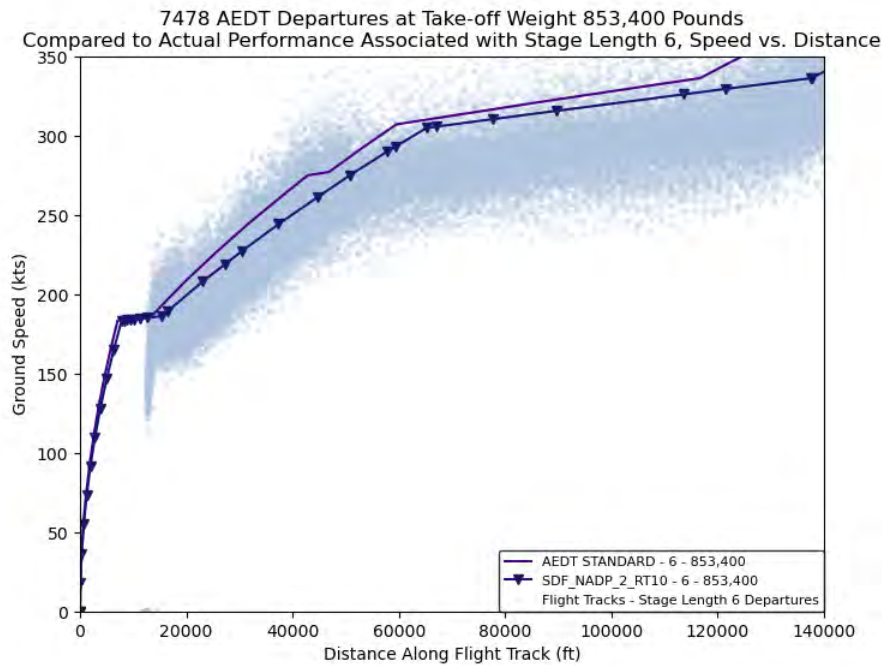


Figure B-98. 7478 Departures, Stage Length 6, Speed vs. Distance

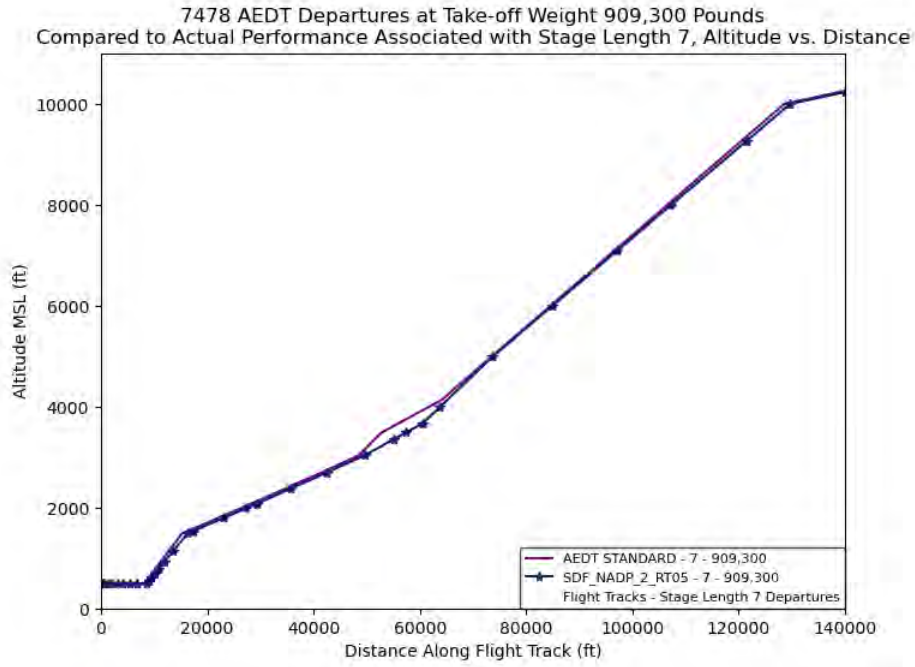


Figure B-99. 7478 Departures, Stage Length 7, Altitude vs. Distance

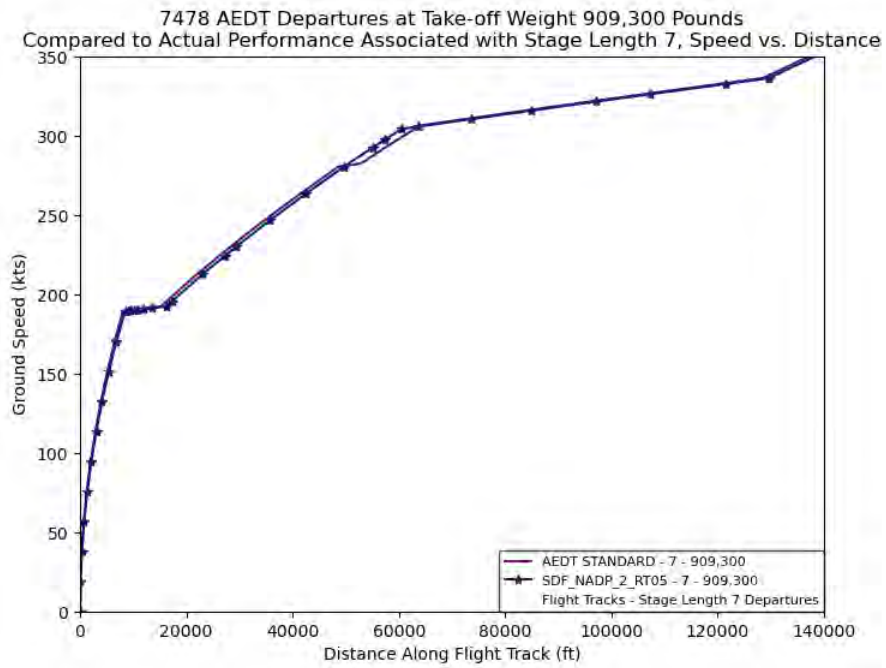


Figure B-100. 7478 Departures, Stage Length 7, Speed vs. Distance

7478 AEDT Departures at Take-off Weight 969,000 Pounds
Compared to Actual Performance Associated with Stage Length 8, Altitude vs. Distance

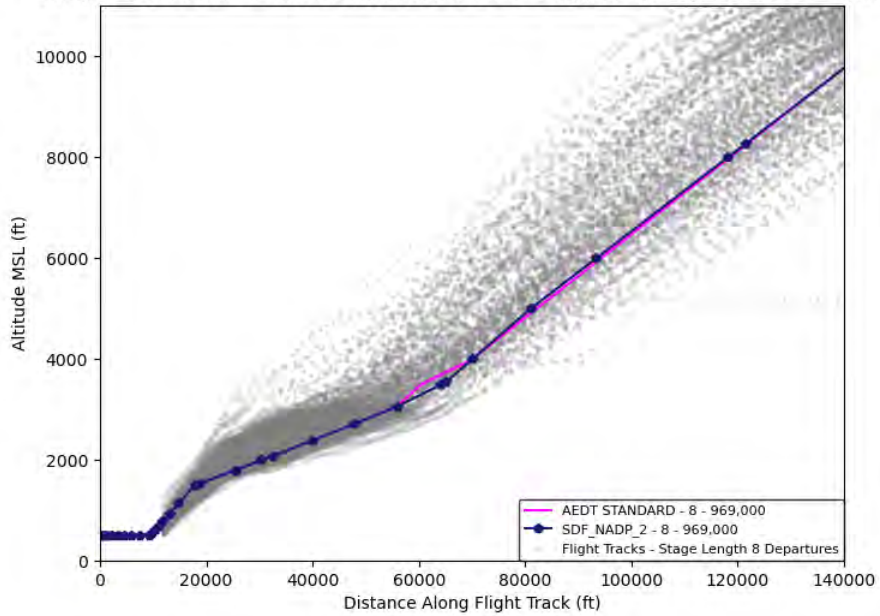


Figure B-101. 7478 Departures, Stage Length 8, Altitude vs. Distance

7478 AEDT Departures at Take-off Weight 969,000 Pounds
Compared to Actual Performance Associated with Stage Length 8, Speed vs. Distance

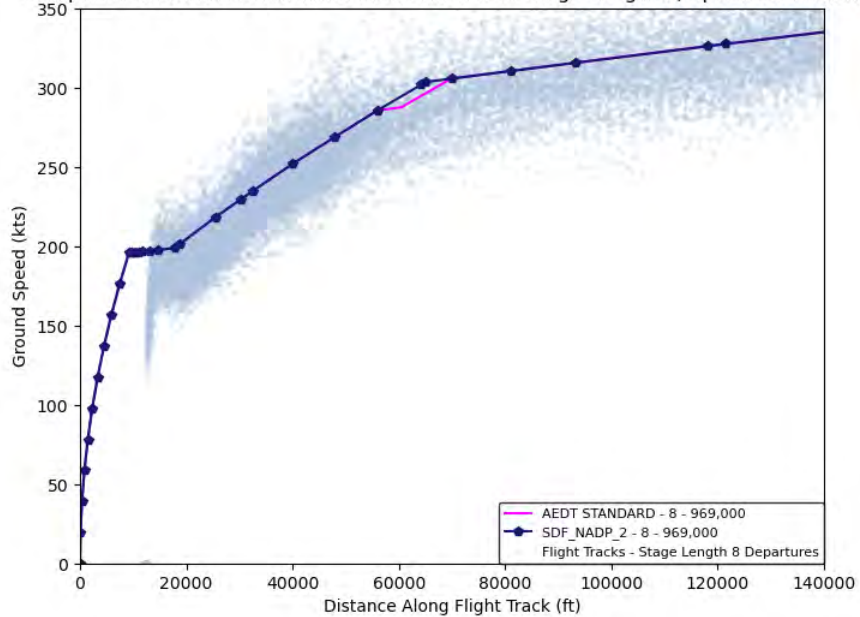


Figure B-102. 7478 Departures, Stage Length 8, Speed vs. Distance

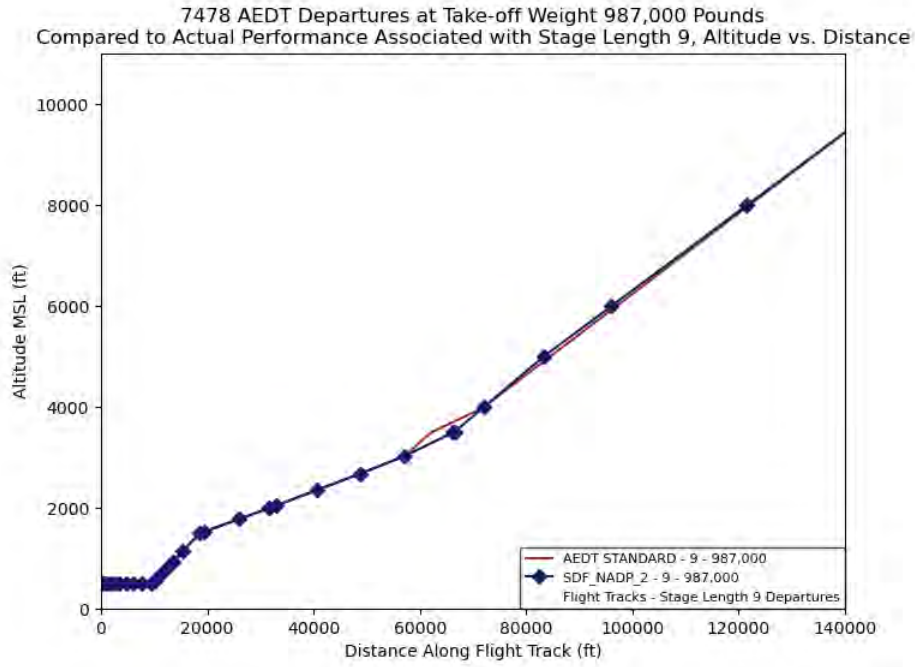


Figure B-103. 7478 Departures, Stage Length 9, Altitude vs. Distance

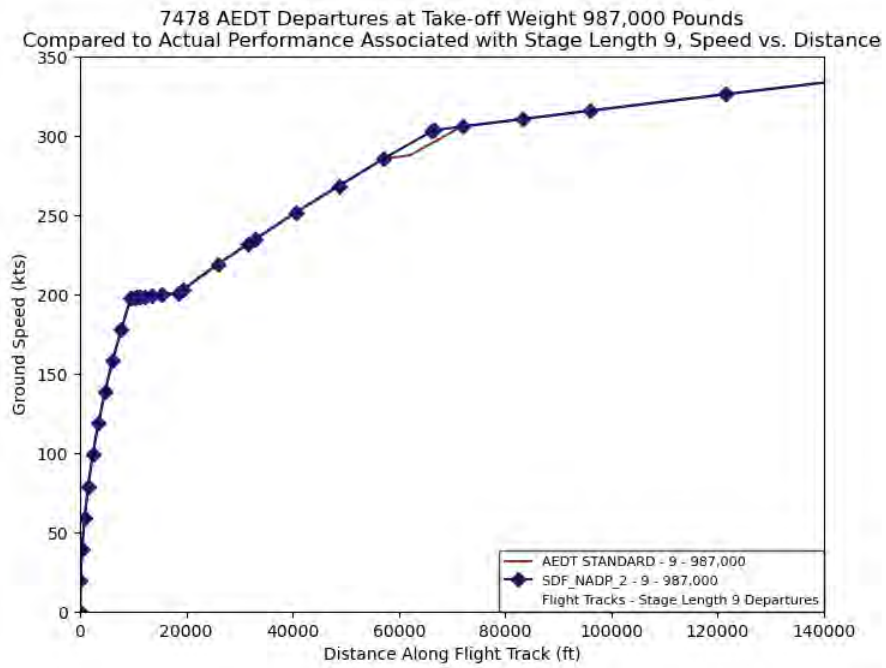


Figure B-104. 7478 Departures, Stage Length 9, Speed vs. Distance



Section C:

Boeing 757-200 and 767-300

This section describes the user-defined inputs for Boeing 757-200 and 767-300. These aircraft make up a notable portion of SDF existing operations, both daytime and nighttime. The 757-200 at SDF is represented by two ANP types: 757PW and 757RR, depending on the engine. The 767-300 is represented by ANP type 7673ER. Our discussion with operators indicates that procedures are the same for the 757-200 and 767-300 and that both aircraft are flown by the same group of pilots. From the operators' perspective, there is no operational difference for the 757-200 represented by ANP type 757PW versus those 757-200 represented by ANP type 757RR.

Current operators of the 757-200 and 767-300 at SDF have provided information related to development of these AEDT profiles and have indicated that these profiles are representative of current 2024 operations and are expected to be in place in the future. This user-defined profile submission has been prepared in accordance with FAA guidance. The profile information and supporting documentation is included in the following sections.

Overall, the proposed user-defined profiles reflect current SDF 757-200 and 767-300 procedures that operators refer to as "NADP 2." In simple terms, these procedures are described with the following steps:

- Take-off thrust and take-off flaps while climbing at constant airspeed speed to 1,000 ft Above Field Elevation (AFE);
- At 1,000 ft AFE, reduce thrust to climb thrust setting, reduce aircraft pitch, accelerate and retract flaps on the aircraft manufacturer's recommended speed schedule (i.e., sometimes referred to as "retract flaps on schedule" or "flap retraction schedule");
- Continue accelerating to 250 knots indicated airspeed with flaps fully retracted; and
- Constant speed climb at 250 knots to 10,000 ft AFE.

The closest profiles available with AEDT include an additional climb step between acceleration for the "retract flaps on schedule" step and the "accelerating to 250 knots indicated airspeed with flaps fully retracted" step. Current operators of the Boeing 757-200 and Boeing 767-300 have indicated that the extra climb segment within the default AEDT profiles is not representative of actual operations at SDF. The proposed user-defined profiles developed are modifications of existing AEDT profiles and continue to use AEDT's flap retraction schedule for a given weight.

The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Boeing 757-200 and 767-300 operations will be represented with AEDT ANP stage lengths 1 – 4, while stage lengths 5, 6 and 7 will be used much less often. Stage lengths 8 and 9 are not expected to be used for these aircraft.

HMMH has prepared this documentation in accordance with Section 5 of FAA's document titled "Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA" dated October 27, 2017.¹

¹ https://aedt.faa.gov/Documents/guidance_aedt_nepa.pdf

Contents

C.1.	Boeing 757-200 (ANP Type 757PW) Profile Review with AEDT 3f.....	C-5
C.1.1.	Statement of Benefit	C-5
C.1.1.1.	Figures Supporting Statement of Benefit.....	C-5
C.1.2.	Analysis Demonstrating Benefit	C-8
C.1.3.	Concurrence on Aircraft Performance.....	C-8
C.1.4.	Certification of New Parameters	C-8
C.1.4.1.	757PW, Profile Weight 183,200.....	C-9
C.1.4.2.	757PW, Profile Weight 190,000.....	C-10
C.1.4.3.	757PW, Profile Weight 197,500.....	C-11
C.1.4.4.	757PW, Profile Weight 212,599.....	C-12
C.1.4.5.	757PW, Profile Weight 230,900.....	C-13
C.1.5.	Graphical and Tabular Comparison	C-14
C.1.5.1.	Tables and Figures Supporting Analysis Demonstrating Benefit.....	C-14
C.1.5.4.	Graphical Comparison of Profiles	C-20
C.2.	Boeing 757-200 (ANP Type 757RR) Profile Review with AEDT 3f.....	C-22
C.2.1.	Statement of Benefit	C-22
C.2.1.1.	Figures Supporting Statement of Benefit.....	C-22
C.2.2.	Analysis Demonstrating Benefit	C-24
C.2.3.	Concurrence on Aircraft Performance.....	C-24
C.2.4.	Certification of New Parameters	C-24
C.2.4.1.	757RR, Profile Weight 183,900.....	C-25
C.2.4.2.	757RR, Profile Weight 191,200.....	C-26
C.2.4.3.	757RR, Profile Weight 199,100.....	C-27
C.2.4.4.	757RR, Profile Weight 215,200.....	C-28
C.2.4.5.	757RR, Profile Weight 234,800.....	C-29
C.2.5.	Graphical and Tabular Comparison	C-30
C.2.5.1.	Tables and Figures Supporting Analysis Demonstrating Benefit.....	C-30
C.2.6.1.	Graphical Comparison of Profiles	C-36
C.3.	Boeing 767-300 (ANP Type 7673ER) Profile Review with AEDT 3f.....	C-38
C.3.1.	Statement of Benefit	C-38
C.3.1.1.	Figures Supporting Statement of Benefit.....	C-38
C.3.2.	Analysis Demonstrating Benefit	C-40
C.3.3.	Concurrence on Aircraft Performance.....	C-40
C.3.4.	Certification of New Parameters	C-40
C.3.4.1.	7673ER, Profile Weight 289,800	C-41
C.3.4.2.	7673ER, Profile Weight 299,600	C-42
C.3.4.3.	7673ER, Profile Weight 310,000	C-43
C.3.4.4.	7673ER, Profile Weight 329,900	C-44
C.3.4.5.	7673ER, Profile Weight 354,900	C-45
C.3.4.6.	7673ER, Profile Weight 381,700	C-46
C.3.4.7.	7673ER, Profile Weight 410,100	C-47
C.3.5.	Graphical and Tabular Comparison	C-48
C.3.5.1.	Tables and Figures Supporting Analysis Demonstrating Benefit.....	C-48
C.3.5.2.	Graphical Comparison of Profiles	C-56
C.4.	Additional Graphs: Comparison of Altitude and Speed Profiles by Stage Length	C-58

Figures

Figure C-1.	757PW AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance.....	C-6
Figure C-2.	757PW AEDT Standard Speed Profiles Compared to Actual Aircraft Performance.....	C-6
Figure C-3.	757PW Proposed Altitude Profiles Compared to Actual Aircraft Performance.....	C-7
Figure C-4.	757PW Proposed Speed Profiles Compared to Actual Aircraft Performance.....	C-7
Figure C-5.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1.....	C-9
Figure C-6.	AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1	C-9
Figure C-7.	AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2.....	C-10

Figure C-8. AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2 C-10

Figure C-9. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 3 C-11

Figure C-10. AEDT UI Screenshot of User-defined Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 3 C-11

Figure C-11. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4 C-12

Figure C-12. AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4 C-12

Figure C-13. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5 C-13

Figure C-14. AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5 C-13

Figure C-15. SEL Contours for 757PW Departures at Take-Off Weight 183,200 Pounds..... C-15

Figure C-16. SEL Contours for 757PW Departures at Take-Off Weight 190,000 Pounds..... C-16

Figure C-17. SEL Contours for 757PW Departures at Take-Off Weight 197,500 Pounds..... C-17

Figure C-18. SEL Contours for 757PW Departures at Take-Off Weight 212,599 Pounds..... C-18

Figure C-19. SEL Contours for 757PW Departures at Take-Off Weight 230,900 Pounds..... C-19

Figure C-20. 757PW AEDT Profiles, Altitude vs. Distance C-20

Figure C-21. 757PW AEDT Profiles, Speed vs. Distance C-21

Figure C-22. 757PW AEDT Profiles, Thrust vs. Distance C-21

Figure C-23. 757RR AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance C-22

Figure C-24. 757RR AEDT Standard Speed Profiles Compared to Actual Aircraft Performance C-23

Figure C-25. 757RR User Defined Altitude Profiles Compared to Actual Aircraft Performance C-23

Figure C-26. 757RR User Defined Speed Profiles Compared to Actual Aircraft Performance C-24

Figure C-27. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_15; PROF_ID2: 1..... C-25

Figure C-28. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1 C-25

Figure C-29. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_15; PROF_ID2: 2..... C-26

Figure C-30. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2 C-26

Figure C-31. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_10; PROF_ID2: 3..... C-27

Figure C-32. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 3 C-27

Figure C-33. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_10; PROF_ID2: 4..... C-28

Figure C-34. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4 C-28

Figure C-35. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5..... C-29

Figure C-36. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5 C-29

Figure C-37. SEL Contours for 757RR Departures at Take-Off Weight 183,900 Pounds..... C-31

Figure C-38. SEL Contours for 757RR Departures at Take-Off Weight 191,200 Pounds..... C-32

Figure C-39. SEL Contours for 757RR Departures at Take-Off Weight 199,100 Pounds..... C-33

Figure C-40. SEL Contours for 757RR Departures at Take-Off Weight 215,200 Pounds..... C-34

Figure C-41. SEL Contours for 757RR Departures at Take-Off Weight 234,800 Pounds..... C-35

Figure C-42. 757RR AEDT Profiles, Altitude vs. Distance C-36

Figure C-43. 757RR AEDT Profiles, Speed vs. Distance C-37

Figure C-44. 757RR AEDT Profiles, Thrust vs. Distance..... C-37

Figure C-45. 7673ER AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance C-38

Figure C-46. 7673ER AEDT Standard Speed Profiles Compared to Actual Aircraft Performance..... C-39

Figure C-47. 7673ER User Defined Altitude Profiles Compared to Actual Aircraft Performance C-39

Figure C-48. 7673ER User Defined Speed Profiles Compared to Actual Aircraft Performance C-40

Figure C-49. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1..... C-41

Figure C-50. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1 C-41

Figure C-51. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2..... C-42

Figure C-52. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2 C-42

Figure C-53. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3..... C-43

Figure C-54. AEDT UI Screenshot of Proposed profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3 C-43

Figure C-55. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4..... C-44

Figure C-56. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4 C-44

Figure C-57. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5..... C-45

Figure C-58. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT05; PROF_ID2: 5 C-45

Figure C-59. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 6..... C-46

Figure C-60. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 6 C-46

Figure C-61. AEDT UI Screenshot of Starting Default Profile Profile1: MODIFIED_RT05; PROF_ID2: 7 C-47

Figure C-62. AEDT UI Screenshot of Proposed Profile1: SDF_NADP_2; PROF_ID2: 7 C-47

Figure C-63. SEL Contours for 7673ER Departures at Take-Off Weight 289,800 Pounds..... C-49

Figure C-64. SEL Contours for 7673ER Departures at Take-Off Weight 299,600 Pounds..... C-50

Figure C-65. SEL Contours for 7673ER Departures at Take-Off Weight 310,000 Pounds..... C-51

Figure C-66. SEL Contours for 7673ER Departures at Take-Off Weight 329,900 Pounds..... C-52

Figure C-67. SEL Contours for 7673ER Departures at Take-Off Weight 354,900 Pounds..... C-53

Figure C-68. SEL Contours for 7673ER Departures at Take-Off Weight 381,700 Pounds..... C-54

Figure C-69. SEL Contours for 7673ER Departures at Take-Off Weight 410,100 Pounds..... C-55

Figure C-70. 7673ER AEDT Profiles, Altitude vs. Distance C-56
Figure C-71. 7673ER AEDT Profiles, Speed vs. Distance C-57
Figure C-72. 7673ER AEDT Profiles, Thrust vs. Distance C-57
Figure C-73. 757PW Departures, Stage Length 1, Altitude vs. Distance C-59
Figure C-74. 757PW Departures, Stage Length 1, Speed vs. Distance C-59
Figure C-75. 757PW Departures, Stage Length 2, Altitude vs. Distance C-60
Figure C-76. 757PW Departures, Stage Length 2, Speed vs. Distance C-60
Figure C-77. 757PW Departures, Stage Length 3, Altitude vs. Distance C-61
Figure C-78. 757PW Departures, Stage Length 3, Speed vs. Distance C-61
Figure C-79. 757PW Departures, Stage Length 4, Altitude vs. Distance C-62
Figure C-80. 757PW Departures, Stage Length 4, Speed vs. Distance C-62
Figure C-81. 757PW Departures, Stage Length 5, Altitude vs. Distance C-63
Figure C-82. 757PW Departures, Stage Length 5, Speed vs. Distance C-63
Figure C-83. 757RR Departures, Stage Length 1, Altitude vs. Distance C-64
Figure C-84. 757RR Departures, Stage Length 1, Speed vs. Distance C-64
Figure C-85. 757RR Departures, Stage Length 2, Altitude vs. Distance C-65
Figure C-86. 757RR Departures, Stage Length 2, Speed vs. Distance C-65
Figure C-87. 757RR Departures, Stage Length 3, Altitude vs. Distance C-66
Figure C-88. 757RR Departures, Stage Length 3, Speed vs. Distance C-66
Figure C-89. 757RR Departures, Stage Length 4, Altitude vs. Distance C-67
Figure C-90. 757RR Departures, Stage Length 4, Speed vs. Distance C-67
Figure C-91. 757RR Departures, Stage Length 5, Altitude vs. Distance C-68
Figure C-92. 757RR Departures, Stage Length 5, Speed vs. Distance C-68
Figure C-93. 7673ER Departures, Stage Length 1, Altitude vs. Distance C-69
Figure C-94. 7673ER Departures, Stage Length 1, Speed vs. Distance C-69
Figure C-95. 7673ER Departures, Stage Length 2, Altitude vs. Distance C-70
Figure C-96. 7673ER Departures, Stage Length 2, Speed vs. Distance C-70
Figure C-97. 7673ER Departures, Stage Length 3, Altitude vs. Distance C-71
Figure C-98. 7673ER Departures, Stage Length 3, Speed vs. Distance C-71
Figure C-99. 7673ER Departures, Stage Length 4, Altitude vs. Distance C-72
Figure C-100. 7673ER Departures, Stage Length 4, Speed vs. Distance C-72
Figure C-101. 7673ER Departures, Stage Length 5, Altitude vs. Distance C-73
Figure C-102. 7673ER Departures, Stage Length 5, Speed vs. Distance C-73
Figure C-103. 7673ER Departures, Stage Length 6, Altitude vs. Distance C-74
Figure C-104. 7673ER Departures, Stage Length 6, Speed vs. Distance C-74
Figure C-105. 7673ER Departures, Stage Length 7, Altitude vs. Distance C-75
Figure C-106. 7673ER Departures, Stage Length 7, Speed vs. Distance C-75

Tables

Table C-1. SELs for 757PW Departures at 183,200 Pounds: AEDT Standard and User-defined Profiles C-15
Table C-2. SELs for 757PW Departures at 190,000 Pounds: AEDT Standard and User-defined Profiles C-16
Table C-3. SELs for 757PW Departures at 197,500 Pounds: AEDT Standard and User-defined Profiles C-17
Table C-4. SELs for 757PW Departures at 212,599 Pounds: AEDT Standard and User-defined Profiles C-18
Table C-5. SELs for 757PW Departures at 230,900 Pounds: AEDT Standard and User-defined Profiles C-19
Table C-6. SELs for 757RR Departures at 183,900 Pounds: AEDT Standard and User-defined Profiles C-31
Table C-7. SELs for 757RR Departures at 191,200 Pounds: AEDT Standard and User-defined Profiles C-32
Table C-8. SELs for 757RR Departures at 199,100 Pounds: AEDT Standard and User-defined Profiles C-33
Table C-9. SELs for 757RR Departures at 215,200 Pounds: AEDT Standard and User-defined Profiles C-34
Table C-10. SELs for 757RR Departures at 234,800 Pounds: AEDT Standard and User-defined Profiles C-35
Table C-11. SELs for 7673ER Departures at 289,800 Pounds: AEDT Standard and User-defined Profiles C-49
Table C-12. SELs for 7673ER Departures at 299,600 Pounds: AEDT Standard and User-defined Profiles C-50
Table C-13. SELs for 7673ER Departures at 310,000 Pounds: AEDT Standard and User-defined Profiles C-51
Table C-14. SELs for 7673ER Departures at 329,900 Pounds: AEDT Standard and User-defined Profiles C-52
Table C-15. SELs for 7673ER Departures at 354,900 Pounds: AEDT Standard and User-defined Profiles C-53
Table C-16. SELs for 7673ER Departures at 381,700 Pounds: AEDT Standard and User-defined Profiles C-54
Table C-17. SELs for 7673ER Departures at 410,100 Pounds: AEDT Standard and User-defined Profiles C-55

C.1. Boeing 757-200 (ANP Type 757PW) Profile Review with AEDT 3f

C.1.1. Statement of Benefit

Operators at SDF use a version of “Noise Abatement Departures Procedures” (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. The proposed 757PW climb profiles and thrust settings during the various stages of flight provide a better representation of what is actually being flown by cargo aircraft at SDF. These profiles were developed from the default (i.e. included) reduced thrust profiles in AEDT.

The proposed user-defined profiles were developed with considerations of SDF runway specific length and minimum climb requirements. Correspondence with the operators has indicated a high agreement with their procedures at SDF.

C.1.1.1. *Figures Supporting Statement of Benefit*

Figure C-1 and **Figure C-3** compare the standard AEDT profiles and proposed profiles to actual aircraft climb performance at SDF. **Figure C-2** and **Figure C-4** compare the standard AEDT profiles and proposed profiles to actual aircraft ground speed profiles at SDF. The standard profiles are identified in the figure legends as “Stage length - Weight”. The proposed profiles are identified in the figure legends as “Name – Stage length - Weight.”

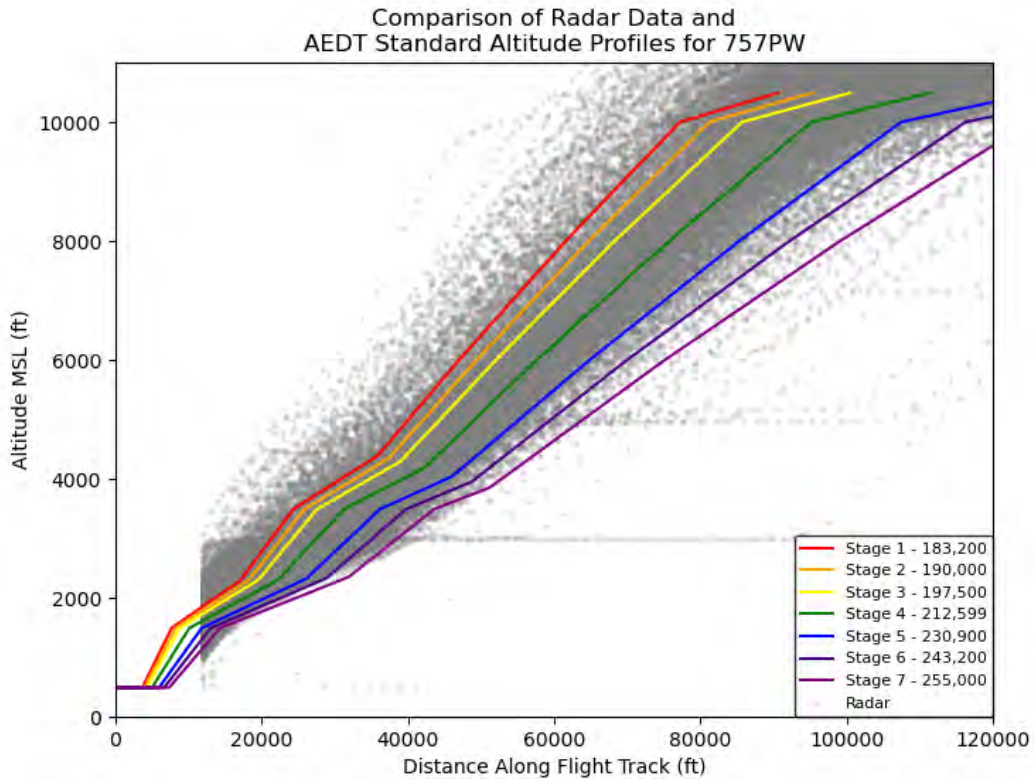


Figure C-1. 757PW AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance

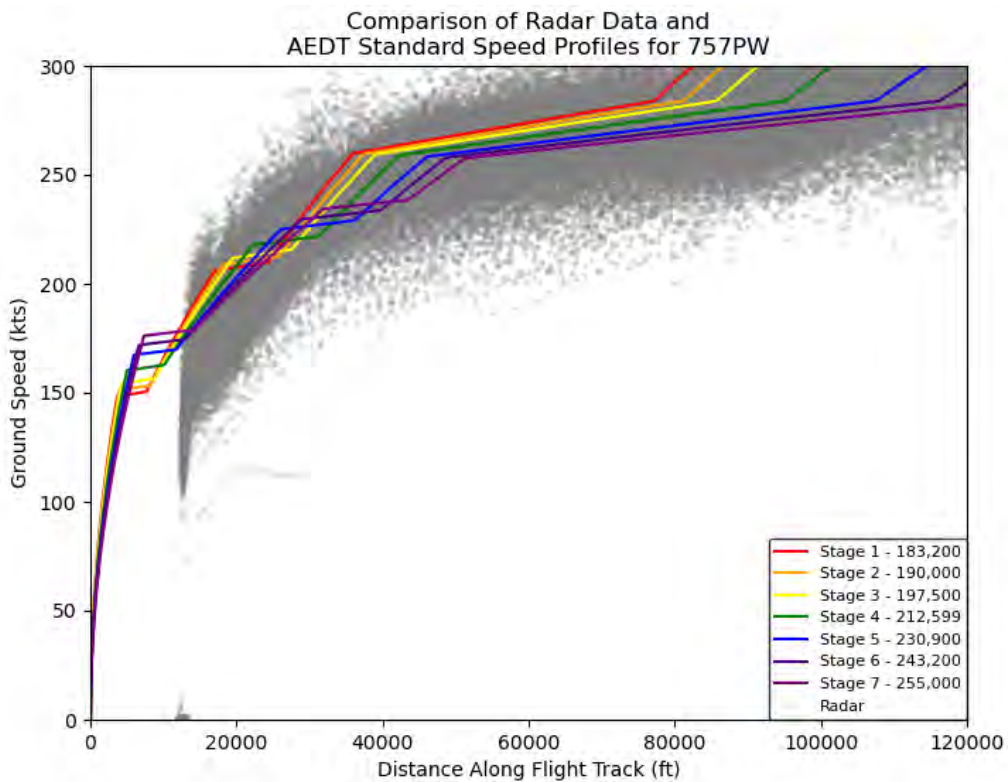


Figure C-2. 757PW AEDT Standard Speed Profiles Compared to Actual Aircraft Performance

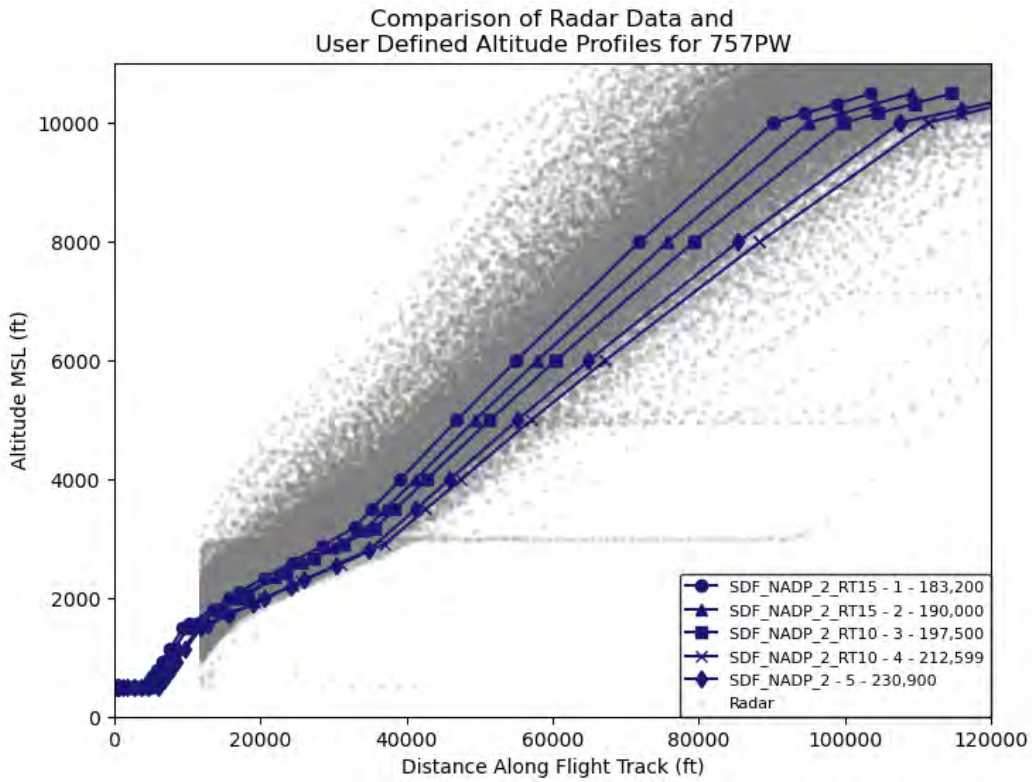


Figure C-3. 757PW Proposed Altitude Profiles Compared to Actual Aircraft Performance

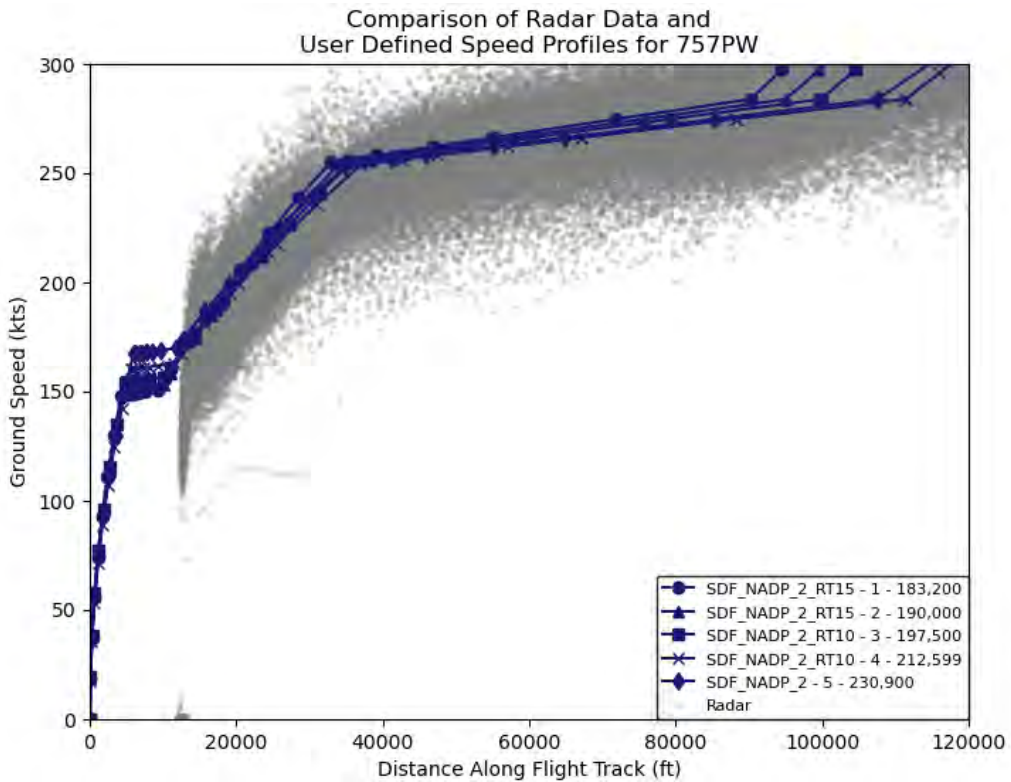


Figure C-4. 757PW Proposed Speed Profiles Compared to Actual Aircraft Performance

C.1.2. Analysis Demonstrating Benefit

The differences between the existing 757PW profiles in AEDT 3f and the proposed user-defined profiles are primarily due to the use of reduced thrust and climb altitude on departure. The sound exposure level results under the flight path from the user-defined departure procedures are shown in **Section C.1.5.1**. Overall, the proposed user-defined profiles show less noise associated with the take-off roll, a different location where aircraft change from take-off thrust to climb thrust, and additional noise under the flight path miles out because of a slower climb.

C.1.3. Concurrence on Aircraft Performance

Preparation of these profiles for the current project and AEDT 3f was done in cooperation with the relevant airline. Airline concurrence documentation accompanies this memorandum for submission to FAA.

C.1.4. Certification of New Parameters

The profiles developed for this study are procedure step profiles created by modifying profiles already included in AEDT 3f. Screenshots from the AEDT user interface (UI) of starting default profiles and the proposed user-defined profiles are presented for comparison as **Figure C-5** through **Figure C-14**. An AEDT study containing the profiles developed for this project is available in electronic form upon request. Altitudes are listed as feet above airfield elevation. Speeds are entered as true airspeed in units of knots. Thrust is in units of pounds which matches the units of thrust settings used in the aircraft's associated noise-power-distance curves.

C.1.4.1. 757PW, Profile Weight 183,200

The “stage length 1” user-defined profile for the 757PW assumes a weight of 183,200 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT 15; PROF_ID2: 1. This user-defined profile was created by copying and editing default AEDT 3f profile MODIFIED_RT15; PROF_ID2: 1 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced		0	
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		190.1	50
4	Percent Accelerate	T_01	Max Climb 10% Reduced		206	55
5	Climb	T_00	Max Climb 10% Reduced	3000		
6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-5. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced		0	
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		190.1	50
4	Percent Accelerate	T_01	Max Climb 10% Reduced		206	55
5	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
6	Climb	ZERO	Max Climb 10% Reduced	4500		
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-6. AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1

C.1.4.2. 757PW, Profile Weight 190,000

The “stage length 2” user-defined profile for the 757PW assumes a weight of 190,000 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_15; PROF_ID2: 2. This user-defined profile was created by copying and editing default AEDT 3f profile MODIFIED_RT_15; PROF_ID2: 2 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced	0		
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		191.4	50
4	Percent Accelerate	T_01	Max Climb 10% Reduced		208.7	55
5	Climb	T_00	Max Climb 10% Reduced	3000		
6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-7. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced	0		
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		191.4	50
4	Percent Accelerate	T_01	Max Climb 10% Reduced		208.7	55
5	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
6	Climb	ZERO	Max Climb 10% Reduced	4500		
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-8. AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2

C.1.4.3. 757PW, Profile Weight 197,500

The “stage length 3” user-defined profile for the 757PW assumes a weight of 197,500 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_10; PROF_ID2: 3. This user-defined profile was created by copying and editing default AEDT 3f profile MODIFIED_RT_10; PROF_ID2: 3 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced		0	
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		193	50
4	Percent Accelerate	T_01	Max Climb 10% Reduced		211.1	50
5	Percent Accelerate	T_00	Max Climb 10% Reduced		211.6	50
6	Climb	T_00	Max Climb 10% Reduced	3000		
7	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
8	Climb	ZERO	Max Climb 10% Reduced	5500		
9	Climb	ZERO	Max Climb 10% Reduced	7500		
10	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-9. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 3

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced		0	
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		193	50
4	Percent Accelerate	T_01	Max Climb 10% Reduced		211.1	50
5	Percent Accelerate	T_00	Max Climb 10% Reduced		211.6	50
6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
7	Climb	ZERO	Max Climb 10% Reduced	4500		
8	Climb	ZERO	Max Climb 10% Reduced	5500		
9	Climb	ZERO	Max Climb 10% Reduced	7500		
10	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-10. AEDT UI Screenshot of User-defined Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 3

C.1.4.4. 757PW, Profile Weight 212,599

The “stage length 4” user-defined profile for the 757PW assumes a weight of 212,599 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT_10; PROF_ID2: 4. This user-defined profile was created by copying and editing default AEDT 3f profile MODIFIED_RT_10; PROF_ID2: 4 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced		0	
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		196.4	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		213.7	55
5	Percent Accelerate	T_00	Max Climb 10% Reduced		217.4	55
6	Climb	T_00	Max Climb 10% Reduced	3000		
7	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
8	Climb	ZERO	Max Climb 10% Reduced	5500		
9	Climb	ZERO	Max Climb 10% Reduced	7500		
10	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-11. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced		0	
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		196.4	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		213.7	55
5	Percent Accelerate	T_00	Max Climb 10% Reduced		217.4	55
6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	55
7	Climb	ZERO	Max Climb 10% Reduced	4500		
8	Climb	ZERO	Max Climb 10% Reduced	5500		
9	Climb	ZERO	Max Climb 10% Reduced	7500		
10	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-12. AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4

C.1.4.5. 757PW, Profile Weight 230,900

The “stage length 5” user-defined profile for the 757PW assumes a weight of 230,900 lbs, and is identified as PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 4. This user-defined profile was created by copying and editing default AEDT 3f profile MODIFIED_RT05; PROF_ID2: 5 to remove the climb at step 6 and modified to set thrust level to maximum at step 1 and step 2. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 5% Reduced		0	
2	Climb	5	Max Takeoff 5% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb		200.8	55
4	Percent Accelerate	T_01	Max Climb		218.5	55
5	Percent Accelerate	T_00	Max Climb		224.3	55
6	Climb	T_00	Max Climb	3000		
7	Percent Accelerate	T_00	Max Climb		250	55
8	Climb	ZERO	Max Climb	5500		
9	Climb	ZERO	Max Climb	7500		
10	Climb	ZERO	Max Climb	10000		

Figure C-13. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff		0	
2	Climb	5	Max Takeoff	1000		
3	Percent Accelerate	T_05	Max Climb		200.8	55
4	Percent Accelerate	T_01	Max Climb		218.5	55
5	Percent Accelerate	T_00	Max Climb		224.3	55
6	Percent Accelerate	T_00	Max Climb		250	55
7	Climb	ZERO	Max Climb	4500		
8	Climb	ZERO	Max Climb	5500		
9	Climb	ZERO	Max Climb	7500		
10	Climb	ZERO	Max Climb	10000		

Figure C-14. AEDT UI Screenshot of Proposed User-defined Profile PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5

C.1.5. Graphical and Tabular Comparison

An MS Excel file containing the profile points as found in the AEDT XML Performance Report Export file is available in electronic form upon request. It was developed for comparison of performance data to the AEDT Standard profiles and was used to generate the following tables and line graphs.

C.1.5.1. *Tables and Figures Supporting Analysis Demonstrating Benefit*

Table C-1 through **Table C-5** show the Sound Exposure Level (SEL) results under the flight path from the user-defined departure profiles; SEL values resulting from the standard AEDT departure profiles are presented for comparison. **Figure C-15** through **Figure C-19** show the same SEL computations in the form of SEL contours.

Table C-1. SELs for 757PW Departures at 183,200 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757PW Profile Weight: 183,200 lbs. (PROF_ID2 = 1) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	126.0	124.0	-2.0
0.5	114.8	114.2	-0.6
1.0	97.9	99.3	1.4
1.5	90.6	92.8	2.2
2.0	88.1	88.6	0.6
2.5	86.2	86.8	0.6
3.0	84.4	85.2	0.8
3.5	82.4	83.9	1.5
4.0	81.0	82.6	1.7
4.5	79.7	81.5	1.8
5.0	78.7	80.4	1.7
5.5	77.7	79.2	1.5
6.0	76.6	78.2	1.6
6.5	75.8	77.0	1.3
7.0	74.9	76.1	1.2
7.5	74.0	75.2	1.1
8.0	73.3	74.3	1.0
8.5	72.6	73.5	0.9
9.0	71.9	72.8	0.8
9.5	71.3	72.1	0.8
10.0	70.8	71.5	0.7

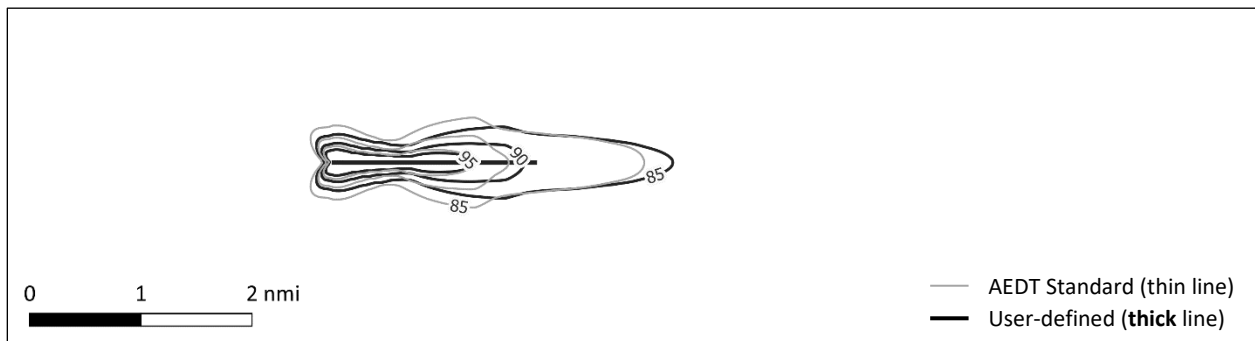


Figure C-15. SEL Contours for 757PW Departures at Take-Off Weight 183,200 Pounds

Table C-3. SELs for 757PW Departures at 197,500 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757PW Profile Weight: 197,500 lbs. (PROF_ID2 = 3) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	125.8	124.5	-1.3
0.5	115.3	114.5	-0.8
1.0	100.1	101.5	1.5
1.5	93.8	94.1	0.2
2.0	88.9	89.0	0.1
2.5	87.0	87.3	0.3
3.0	85.6	85.8	0.2
3.5	83.9	84.5	0.6
4.0	82.1	83.4	1.3
4.5	80.8	82.2	1.4
5.0	79.7	81.2	1.6
5.5	78.8	80.3	1.5
6.0	77.9	79.2	1.3
6.5	76.9	78.2	1.4
7.0	76.1	77.2	1.1
7.5	75.2	76.3	1.1
8.0	74.5	75.5	1.0
8.5	73.7	74.7	0.9
9.0	73.1	73.9	0.9
9.5	72.4	73.3	0.8
10.0	71.9	72.6	0.7

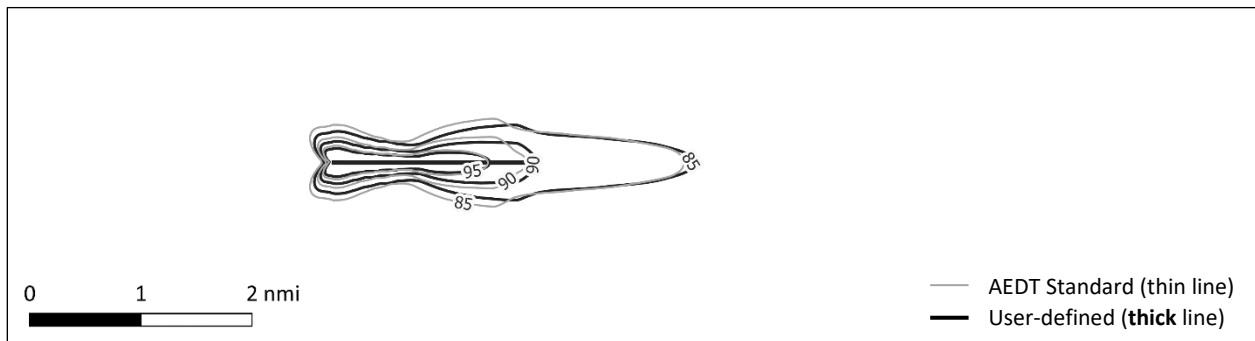


Figure C-17. SEL Contours for 757PW Departures at Take-Off Weight 197,500 Pounds

Table C-4. SELs for 757PW Departures at 212,599 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757PW Profile Weight: 212,599 lbs. (PROF_ID2 = 4) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	126.2	124.9	-1.3
0.5	115.3	114.9	-0.3
1.0	103.1	106.3	3.2
1.5	95.4	95.9	0.5
2.0	89.7	90.9	1.2
2.5	87.9	88.3	0.4
3.0	86.4	86.9	0.4
3.5	85.2	85.6	0.4
4.0	83.6	84.5	0.9
4.5	82.1	83.4	1.4
5.0	80.8	82.6	1.8
5.5	79.8	81.6	1.8
6.0	78.9	80.7	1.8
6.5	78.1	79.6	1.5
7.0	77.2	78.6	1.4
7.5	76.5	77.7	1.2
8.0	75.7	76.8	1.2
8.5	74.9	76.0	1.1
9.0	74.3	75.3	1.0
9.5	73.6	74.6	1.0
10.0	73.0	73.9	0.9

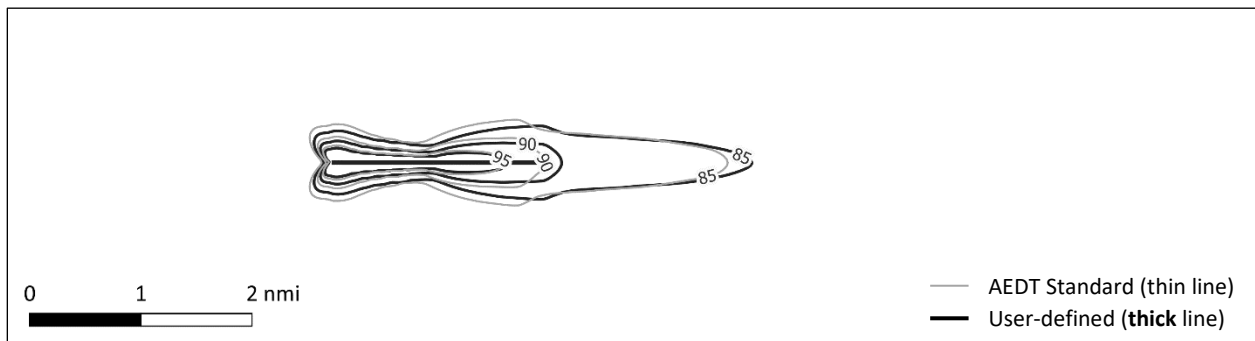


Figure C-18. SEL Contours for 757PW Departures at Take-Off Weight 212,599 Pounds

Table C-5. SELs for 757PW Departures at 230,900 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757PW Profile Weight: 230,900 lbs. (PROF_ID2 = 5) User PROF_ID1: SDF_NADP_2_RT00			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	126.0	126.0	0.0
0.5	115.7	115.7	0.0
1.0	116.3	116.3	0.0
1.5	97.5	97.5	0.0
2.0	92.9	92.9	0.0
2.5	89.0	89.0	0.0
3.0	87.5	87.5	0.0
3.5	86.2	86.2	0.0
4.0	85.1	85.1	0.0
4.5	83.9	84.1	0.2
5.0	82.4	83.1	0.7
5.5	81.2	82.1	1.0
6.0	80.2	81.1	0.9
6.5	79.3	80.0	0.6
7.0	78.6	79.0	0.4
7.5	77.8	78.0	0.2
8.0	77.1	77.2	0.1
8.5	76.4	76.4	0.1
9.0	75.7	75.7	0.0
9.5	75.0	75.0	0.0
10.0	74.4	74.4	0.0

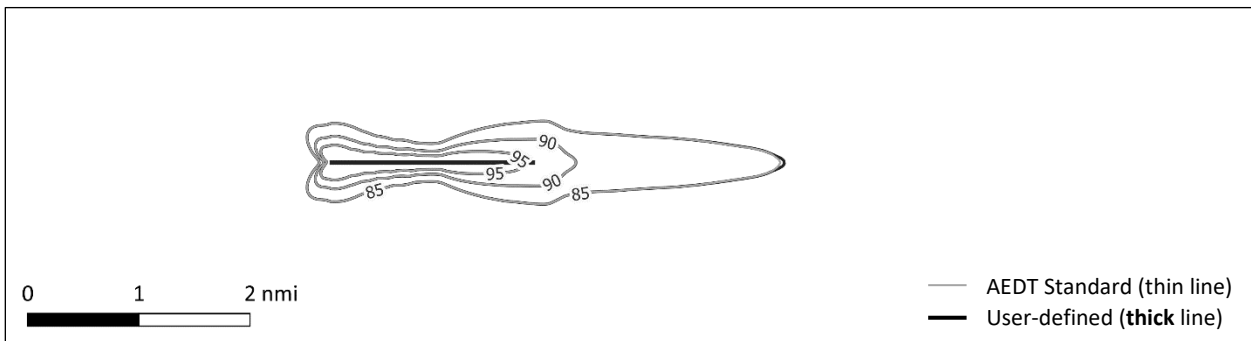


Figure C-19. SEL Contours for 757PW Departures at Take-Off Weight 230,900 Pounds

C.1.5.4. Graphical Comparison of Profiles

Graphs of Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance are included as **Figure C-20**, **Figure C-21**, and **Figure C-22**, respectively.

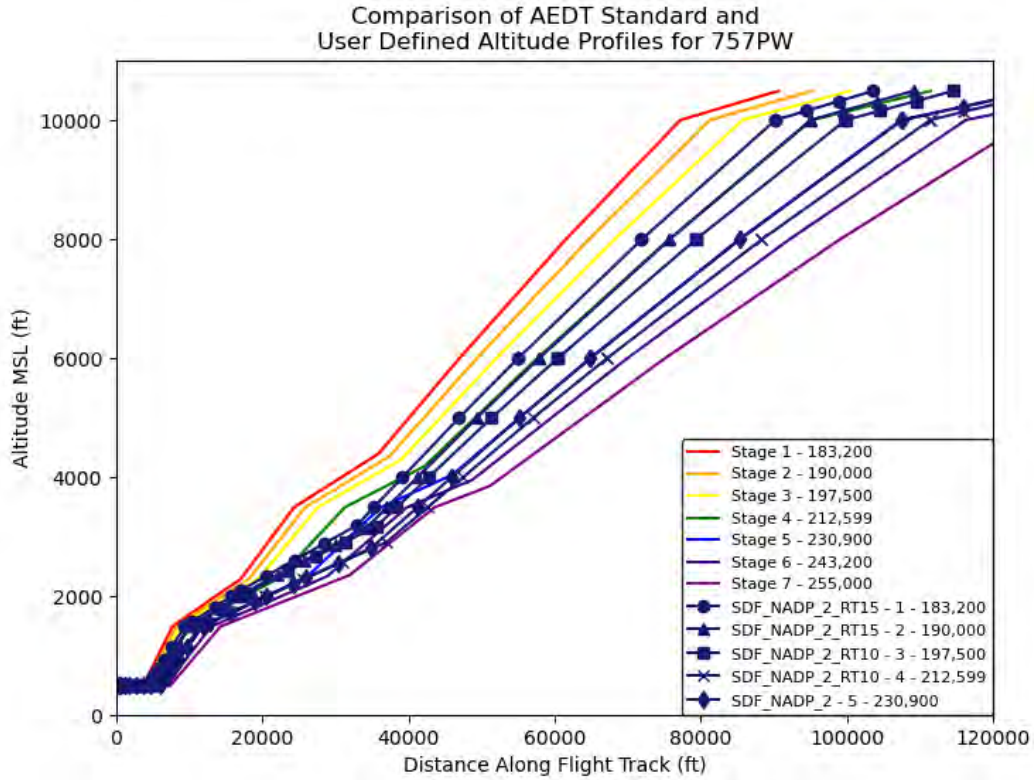


Figure C-20. 757PW AEDT Profiles, Altitude vs. Distance

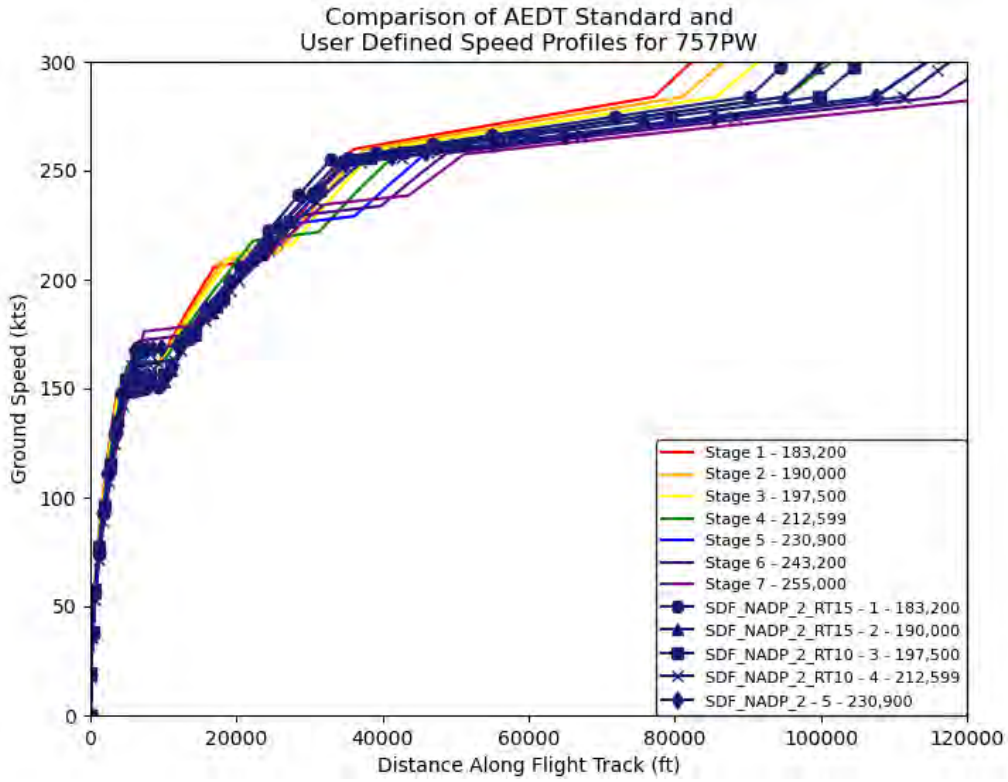


Figure C-21. 757PW AEDT Profiles, Speed vs. Distance

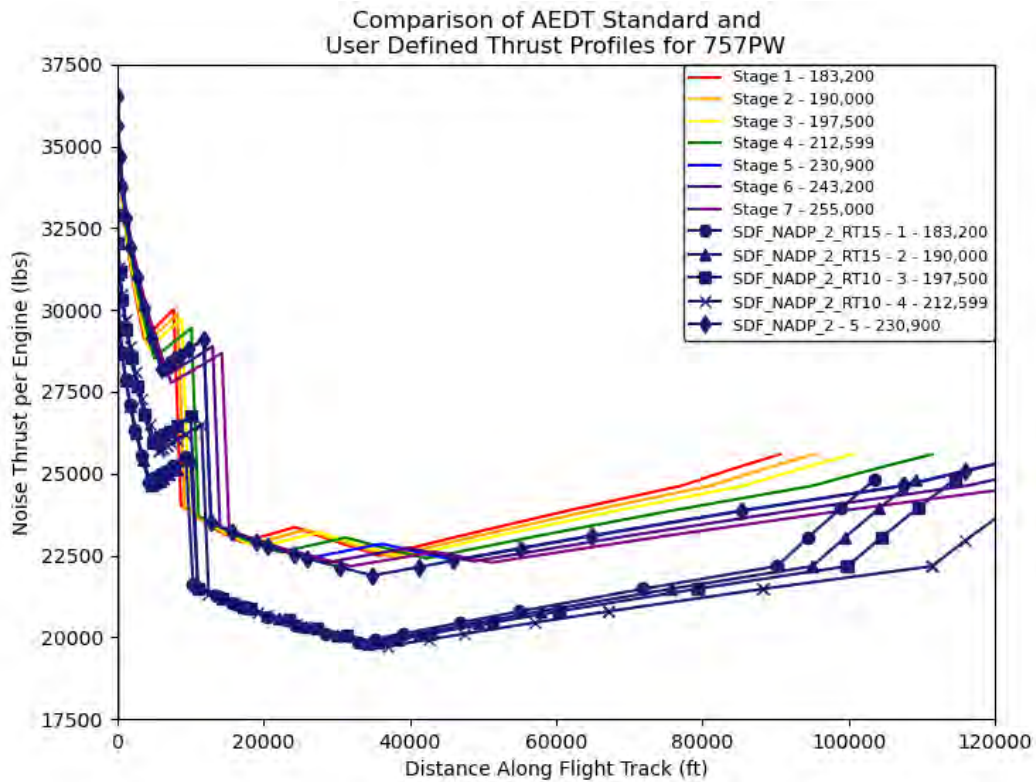


Figure C-22. 757PW AEDT Profiles, Thrust vs. Distance

C.2. Boeing 757-200 (ANP Type 757RR) Profile Review with AEDT 3f

C.2.1. Statement of Benefit

Operators at SDF use a version of “Noise Abatement Departures Procedures” (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. The proposed 757RR climb profiles and thrust settings during the various stages of flight provide a better representation of what is actually being flown by cargo aircraft at SDF. These profiles were developed from the default (i.e. included) reduced thrust profiles in AEDT.

The proposed user-defined profiles were developed with considerations of SDF runway specific length and minimum climb requirements. Correspondence with the operators has indicated high agreement with their procedures at SDF.

C.2.1.1. Figures Supporting Statement of Benefit

Figure C-23 and **Figure C-25** compare the standard AEDT profiles and Boeing profiles to actual aircraft climb performance at SDF. **Figure C-24** and **Figure C-26** compare the standard AEDT profiles and proposed profiles to actual aircraft speed profiles at SDF. The standard profiles are identified in the figure legends as “Stage length - Weight”. The proposed profiles are identified in the figure legends as “Name – Stage length - Weight.”

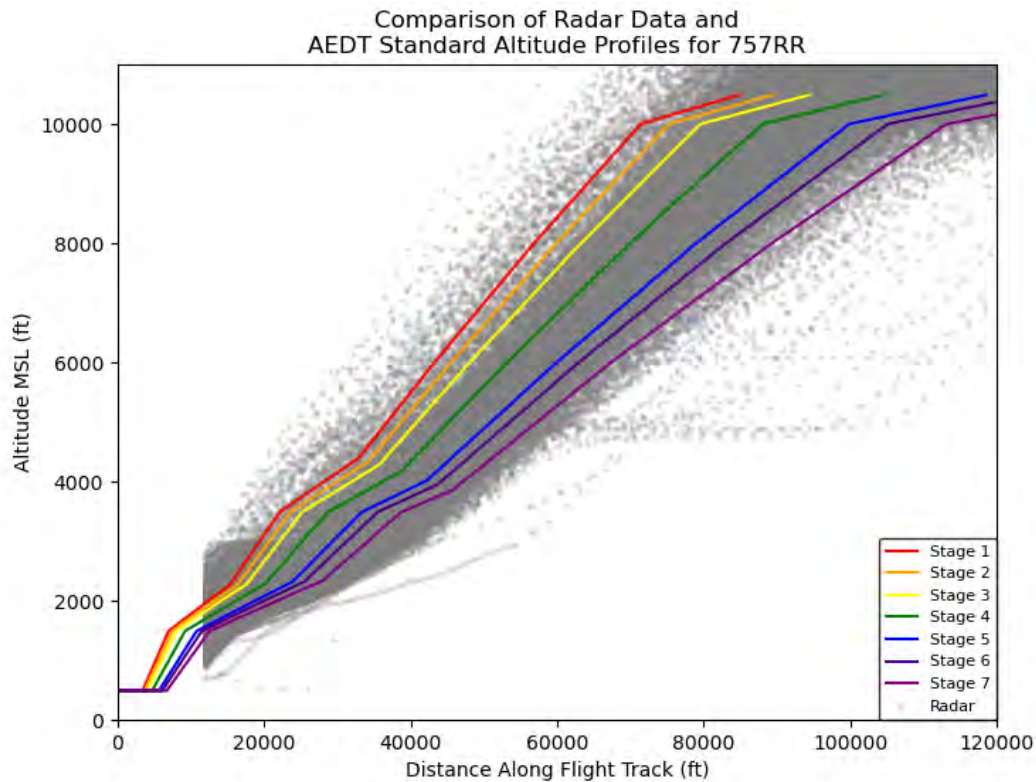


Figure C-23. 757RR AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance

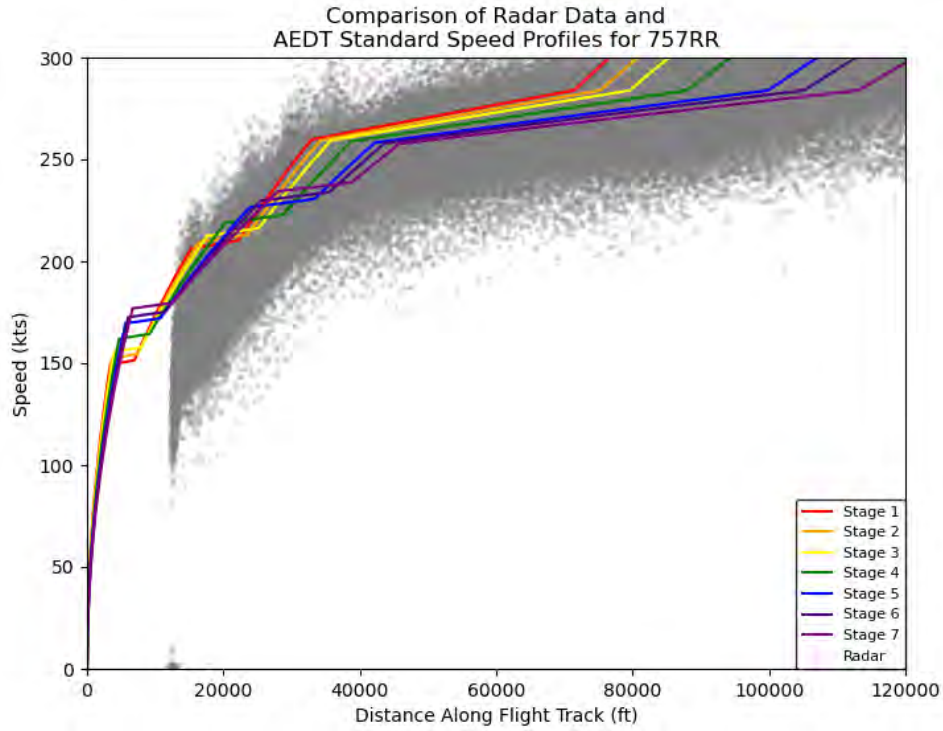


Figure C-24. 757RR AEDT Standard Speed Profiles Compared to Actual Aircraft Performance

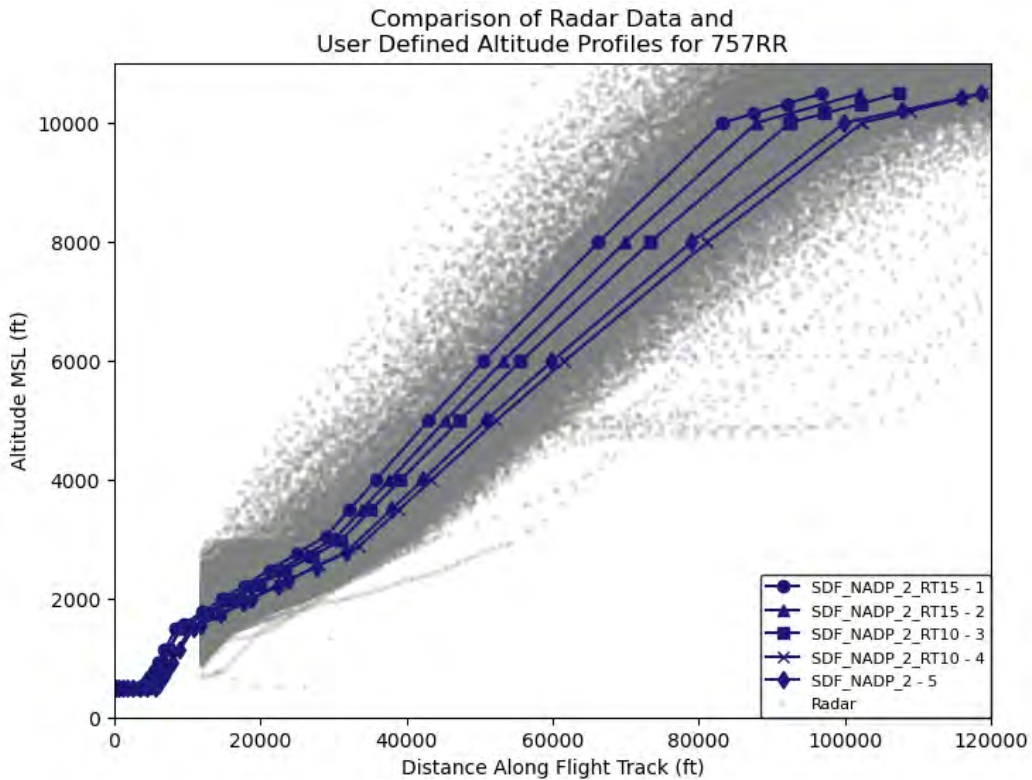


Figure C-25. 757RR User Defined Altitude Profiles Compared to Actual Aircraft Performance

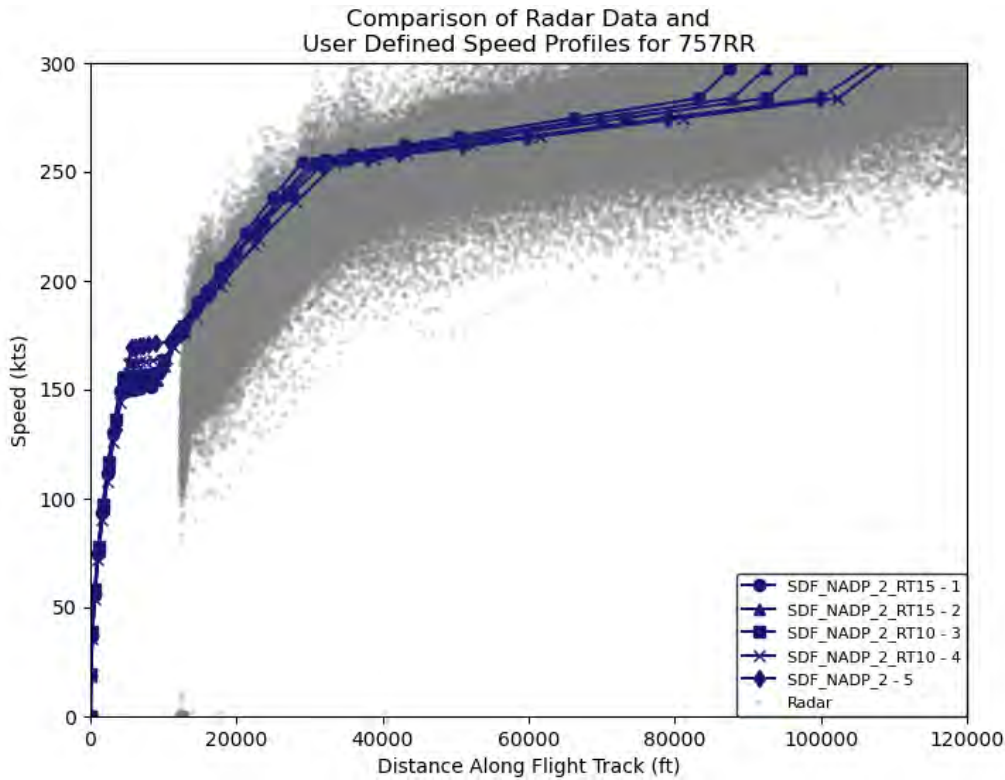


Figure C-26. 757RR User Defined Speed Profiles Compared to Actual Aircraft Performance

C.2.2. Analysis Demonstrating Benefit

The differences between the existing 757RR profiles in AEDT 3f and the proposed user-defined profiles are primarily due to the use of reduced thrust and climb altitude on departure. The sound exposure level results under the flight path from the user-defined departure procedures are shown in **Section C.2.5.1**. Overall, the proposed user-defined profiles show less noise associated with the take-off roll, a different location where aircraft change from take-off thrust to climb thrust, and additional noise under the flight path miles out because of a slower climb.

C.2.3. Concurrence on Aircraft Performance

Preparation of these profiles for the current project and AEDT 3f was done in cooperation with the relevant airline. Airline concurrence documentation accompanies this memorandum for submission to FAA.

C.2.4. Certification of New Parameters

The profiles developed for this study are procedure step profiles created by modifying profiles already included in AEDT 3f. Screenshots from the AEDT UI of starting default profiles and the proposed user-defined profiles are presented for comparison as **Figure C-27** through **Figure C-36**. An AEDT study containing the profiles developed for this project is available in electronic form upon request. Altitudes are listed as feet above airfield elevation. Speeds are true airspeed in knots. Thrust is in pounds which matches the units of thrust settings used in the aircraft's associated noise-power-distance curves.

C.2.4.1. 757RR, Profile Weight 183,900

The “stage length 1” user-defined profile for the 757RR assumes a weight of 183,900, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced		0	
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		192.4	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		206.3	55
5	Climb	ZERO	Max Climb 10% Reduced	3000		
6	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-27. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_15; PROF_ID2: 1

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced		0	
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		192.4	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		206.3	55
5	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
6	Climb	ZERO	Max Climb 10% Reduced	4500		
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-28. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1

C.2.4.2. 757RR, Profile Weight 191,200

The “stage length 2” user-defined profile for the 757RR assumes a weight of 191,200, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced		0	
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		193.9	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		209.2	55
5	Climb	ZERO	Max Climb 10% Reduced	3000		
6	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-29. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_15; PROF_ID2: 2

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 15% Reduced		0	
2	Climb	5	Max Takeoff 15% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		193.9	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		209.2	55
5	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
6	Climb	ZERO	Max Climb 10% Reduced	4500		
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-30. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2

C.2.4.3. 757RR, Profile Weight 199,100

The “stage length 3” user-defined profile for the 757RR assumes a weight of 199,100, and is identified as PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 3. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 3 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced		0	
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		195.5	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		212.2	55
5	Climb	ZERO	Max Climb 10% Reduced	3000		
6	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-31. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_10; PROF_ID2: 3

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced		0	
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		195.5	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		212.2	55
5	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
6	Climb	ZERO	Max Climb 10% Reduced	4500		
7	Climb	ZERO	Max Climb 10% Reduced	5500		
8	Climb	ZERO	Max Climb 10% Reduced	7500		
9	Climb	ZERO	Max Climb 10% Reduced	10000		

Figure C-32. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 3

C.2.4.4. 757RR, Profile Weight 215,200

The “stage length 4” user-defined profile for the 757RR assumes a weight of 215,200, and is identified as PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4. This user-defined profile was created by copying and editing standard AEDT 3f profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4 to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced	0		
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		199	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		216.4	55
5	Percent Accelerate	ZERO	Max Climb 10% Reduced		218.3	55
6	Climb	ZERO	Max Climb 10% Reduced	3000		
7	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
8	Climb	T_00	Max Climb 10% Reduced	5500		
9	Climb	T_00	Max Climb 10% Reduced	7500		
10	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-33. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT_10; PROF_ID2: 4

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 10% Reduced	0		
2	Climb	5	Max Takeoff 10% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb 10% Reduced		199	55
4	Percent Accelerate	T_01	Max Climb 10% Reduced		216.4	55
5	Percent Accelerate	ZERO	Max Climb 10% Reduced		218.3	55
6	Percent Accelerate	ZERO	Max Climb 10% Reduced		250	55
7	Climb	T_00	Max Climb 10% Reduced	4500		
8	Climb	T_00	Max Climb 10% Reduced	5500		
9	Climb	T_00	Max Climb 10% Reduced	7500		
10	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-34. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4

C.2.4.5. 757RR, Profile Weight 234,800

The “stage length 5” user-defined profile for the 757RR assumes a weight of 234,800, and is identified as PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5 to change the thrust level to “Max Takeoff” in Steps 1 and 2, and to remove the climb at 3,000 AFE in step 6. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff 5% Reduced		0	
2	Climb	5	Max Takeoff 5% Reduced	1000		
3	Percent Accelerate	T_05	Max Climb		203.7	55
4	Percent Accelerate	T_01	Max Climb		221.1	55
5	Percent Accelerate	T_00	Max Climb		225.7	55
6	Climb	ZERO	Max Climb	3000		
7	Percent Accelerate	ZERO	Max Climb		250	55
8	Climb	T_00	Max Climb	5500		
9	Climb	T_00	Max Climb	7500		
10	Climb	ZERO	Max Climb	10000		

Figure C-35. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5

Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
1	Takeoff	5	Max Takeoff		0	
2	Climb	5	Max Takeoff	1000		
3	Percent Accelerate	T_05	Max Climb		203.7	55
4	Percent Accelerate	T_01	Max Climb		221.1	55
5	Percent Accelerate	T_00	Max Climb		225.7	55
6	Percent Accelerate	ZERO	Max Climb		250	55
7	Climb	T_00	Max Climb	4500		
8	Climb	T_00	Max Climb	5500		
9	Climb	T_00	Max Climb	7500		
10	Climb	ZERO	Max Climb	10000		

Figure C-36. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT00; PROF_ID2: 5

C.2.5. Graphical and Tabular Comparison

An MS Excel file containing the profile points as found in the AEDT XML Performance Report Export file is available in electronic form upon request. It was developed for comparison of performance data to the AEDT Standard profiles and was used to generate the following tables and line graphs.

C.2.5.1. *Tables and Figures Supporting Analysis Demonstrating Benefit*

Table C-6 through **Table C-10** show the SEL results under the flight path from the user-defined departure profiles; SEL values resulting from the standard AEDT departure profiles are presented for comparison. **Figure C-38** through **Figure C-41** show the same SEL computations in the form of SEL contours.

Table C-6. SELs for 757RR Departures at 183,900 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757RR Profile Weight: 183,900 lbs. (PROF_ID2 = 1) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	130.0	127.3	-2.6
0.5	118.7	117.8	-0.8
1.0	100.4	100.5	0.1
1.5	93.1	94.1	1.0
2.0	90.6	90.6	0.0
2.5	88.6	88.8	0.2
3.0	86.8	87.2	0.5
3.5	85.2	85.9	0.6
4.0	84.1	84.7	0.6
4.5	83.0	83.6	0.6
5.0	82.0	82.5	0.5
5.5	80.8	81.3	0.5
6.0	80.0	80.3	0.3
6.5	79.2	79.5	0.3
7.0	78.4	78.6	0.2
7.5	77.8	78.0	0.1
8.0	77.2	77.2	0.0
8.5	76.7	76.6	-0.1
9.0	76.1	76.1	0.0
9.5	75.6	75.5	0.0
10.0	75.2	75.1	-0.1

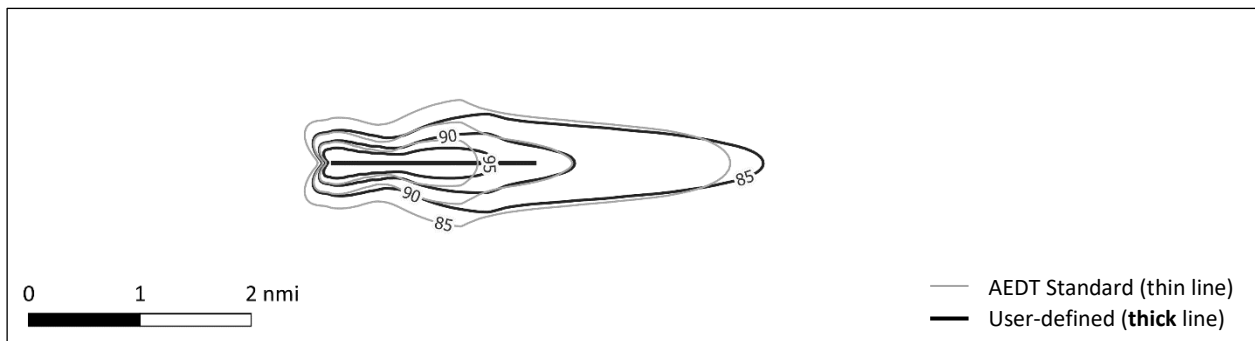


Figure C-37. SEL Contours for 757RR Departures at Take-Off Weight 183,900 Pounds

Table C-7. SELs for 757RR Departures at 191,200 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757RR Profile Weight: 191,200 lbs. (PROF_ID2 = 2) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	129.9	127.3	-2.6
0.5	118.6	117.3	-1.3
1.0	101.0	101.9	0.9
1.5	93.6	95.5	1.9
2.0	91.1	91.1	0.0
2.5	89.2	89.2	0.1
3.0	87.4	87.7	0.3
3.5	85.7	86.4	0.7
4.0	84.5	85.2	0.8
4.5	83.4	84.1	0.7
5.0	82.3	82.9	0.5
5.5	81.4	81.9	0.4
6.0	80.6	80.9	0.4
6.5	79.7	80.0	0.4
7.0	79.0	79.2	0.3
7.5	78.3	78.4	0.2
8.0	77.7	77.9	0.1
8.5	77.1	77.1	0.0
9.0	76.6	76.6	0.0
9.5	76.1	76.1	0.0
10.0	75.6	75.5	0.0

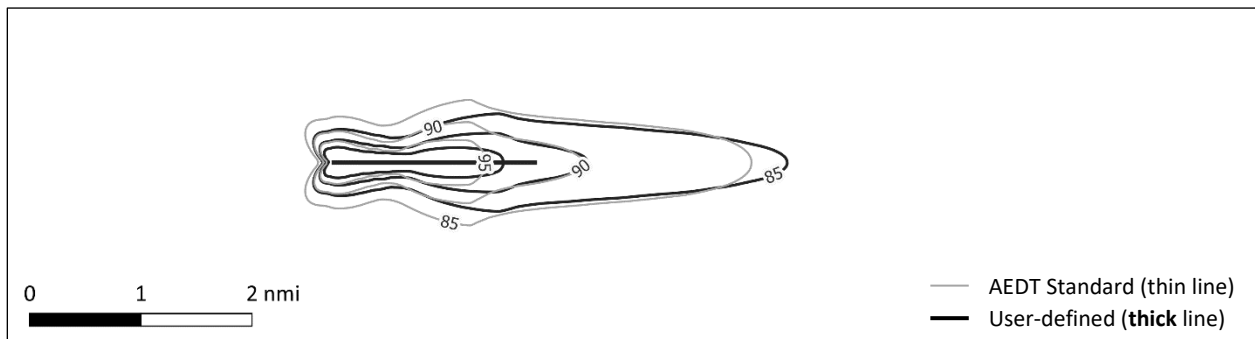


Figure C-38. SEL Contours for 757RR Departures at Take-Off Weight 191,200 Pounds

Table C-8. SELs for 757RR Departures at 199,100 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757RR Profile Weight: 199,100 lbs. (PROF_ID2 = 3) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	129.8	128.0	-1.8
0.5	119.2	117.8	-1.3
1.0	102.1	102.8	0.6
1.5	94.4	96.2	1.8
2.0	91.5	91.2	-0.3
2.5	89.6	89.4	-0.2
3.0	88.0	87.8	-0.1
3.5	86.3	86.7	0.4
4.0	84.9	85.5	0.6
4.5	83.9	84.3	0.4
5.0	82.9	83.3	0.4
5.5	82.0	82.3	0.3
6.0	81.0	81.4	0.3
6.5	80.2	80.4	0.1
7.0	79.5	79.7	0.2
7.5	78.8	78.9	0.1
8.0	78.2	78.2	0.1
8.5	77.6	77.6	0.0
9.0	77.1	77.0	-0.1
9.5	76.6	76.5	-0.1
10.0	76.1	76.0	-0.1

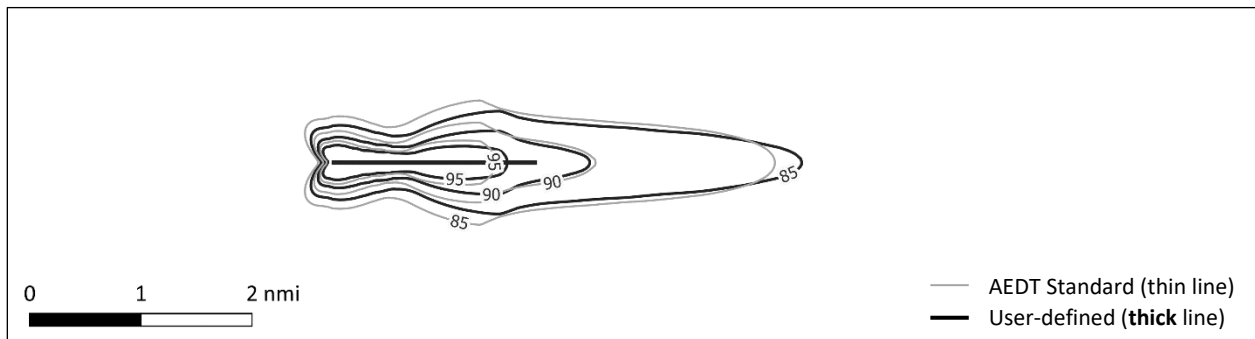


Figure C-39. SEL Contours for 757RR Departures at Take-Off Weight 199,100 Pounds

Table C-9. SELs for 757RR Departures at 215,200 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757RR Profile Weight: 215,200 lbs. (PROF_ID2 = 4) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	130.1	128.4	-1.8
0.5	119.0	118.2	-0.8
1.0	104.7	106.7	1.9
1.5	98.2	97.8	-0.4
2.0	92.3	92.1	-0.2
2.5	90.4	90.2	-0.2
3.0	88.9	88.8	-0.1
3.5	87.6	87.5	-0.1
4.0	86.0	86.4	0.4
4.5	84.8	85.4	0.6
5.0	83.9	84.4	0.5
5.5	82.9	83.4	0.5
6.0	82.2	82.5	0.3
6.5	81.3	81.5	0.3
7.0	80.5	80.7	0.2
7.5	79.8	80.0	0.2
8.0	79.2	79.3	0.1
8.5	78.6	78.6	0.0
9.0	78.0	78.1	0.1
9.5	77.5	77.5	0.0
10.0	77.0	76.9	-0.1

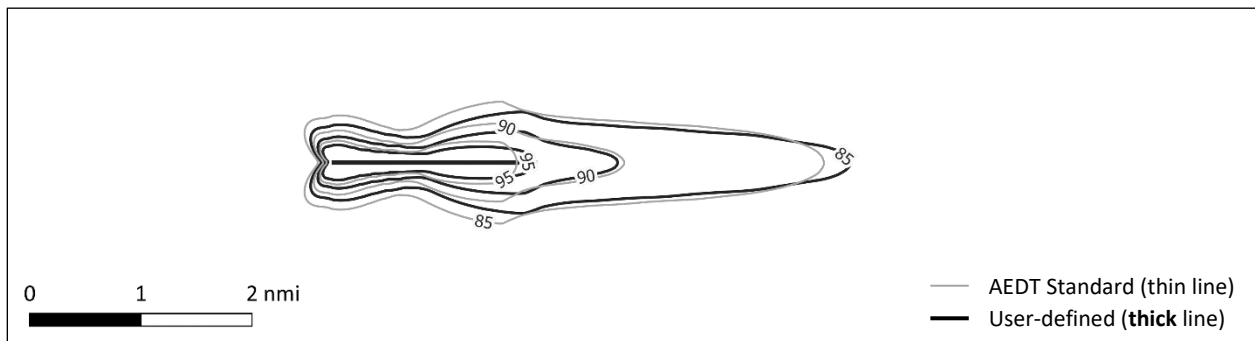


Figure C-40. SEL Contours for 757RR Departures at Take-Off Weight 215,200 Pounds

Table C-10. SELs for 757RR Departures at 234,800 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 757RR Profile Weight: 234,800 lbs. (PROF_ID2 = 5) User PROF_ID1: SDF_NADP_2_RT00			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	129.9	129.9	0.0
0.5	119.5	119.5	0.0
1.0	110.8	110.8	0.0
1.5	99.7	99.7	0.0
2.0	93.5	93.5	0.0
2.5	91.4	91.4	0.0
3.0	90.0	90.0	0.0
3.5	88.6	88.6	0.0
4.0	87.5	87.5	0.1
4.5	86.1	86.4	0.4
5.0	85.0	85.5	0.6
5.5	84.0	84.5	0.5
6.0	83.2	83.5	0.2
6.5	82.5	82.7	0.1
7.0	81.7	81.7	0.1
7.5	81.0	81.1	0.1
8.0	80.3	80.4	0.1
8.5	79.7	79.7	0.0
9.0	79.2	79.2	0.0
9.5	78.7	78.6	0.0
10.0	78.1	78.1	0.0

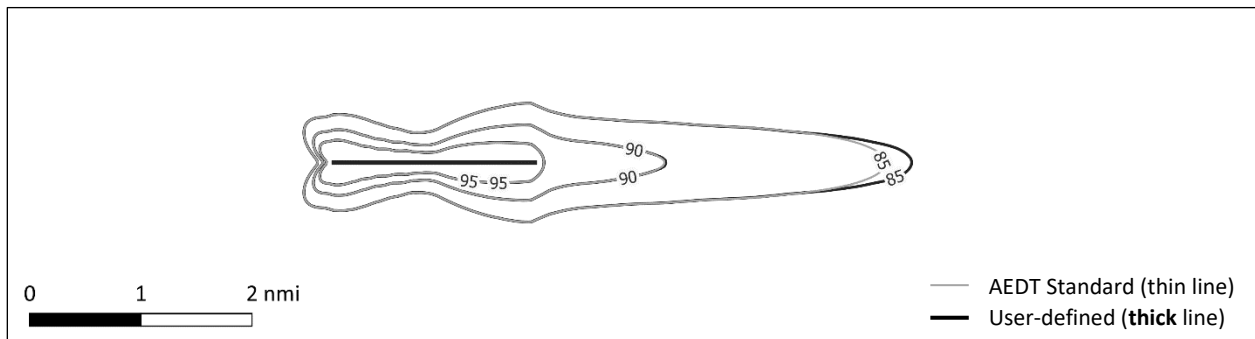


Figure C-41. SEL Contours for 757RR Departures at Take-Off Weight 234,800 Pounds

C.2.6.1. Graphical Comparison of Profiles

Graphs of Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance are included as **Figure C-42**, **Figure C-43**, and **Figure C-44**, respectively.

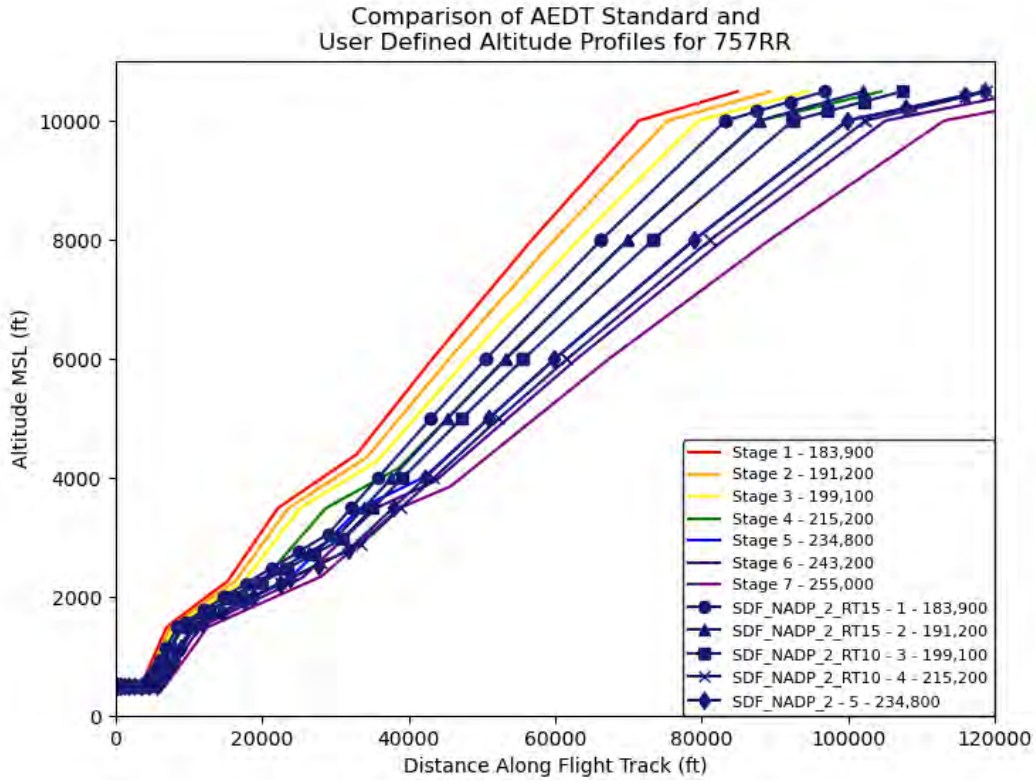


Figure C-42. 757RR AEDT Profiles, Altitude vs. Distance

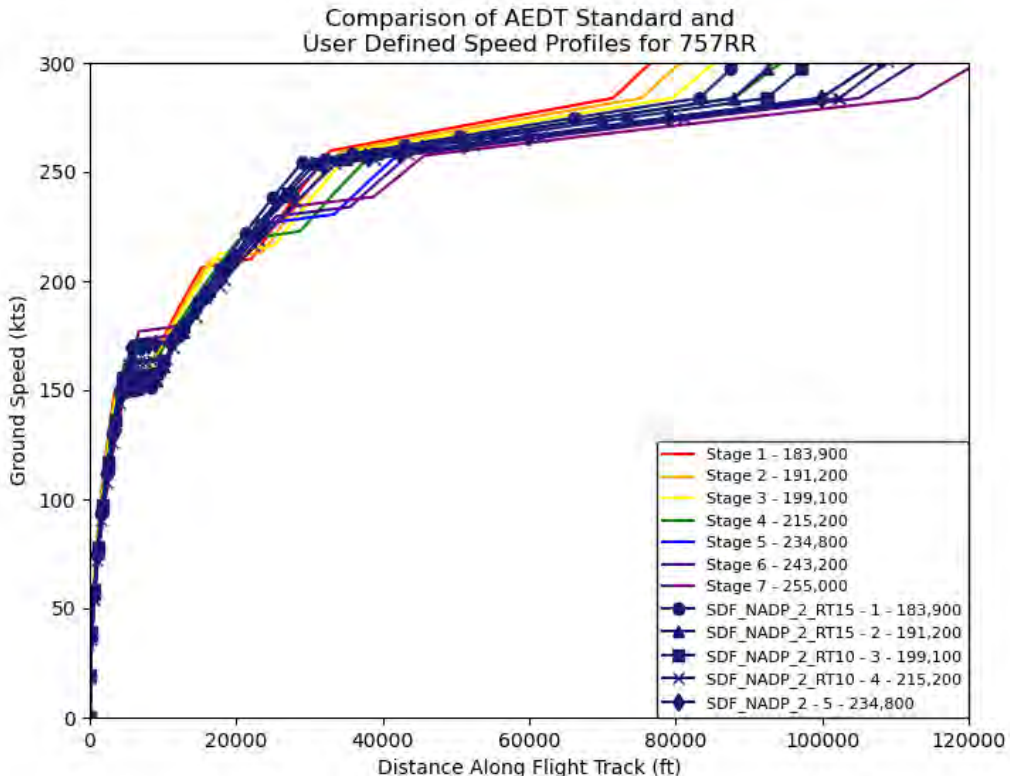


Figure C-43. 757RR AEDT Profiles, Speed vs. Distance

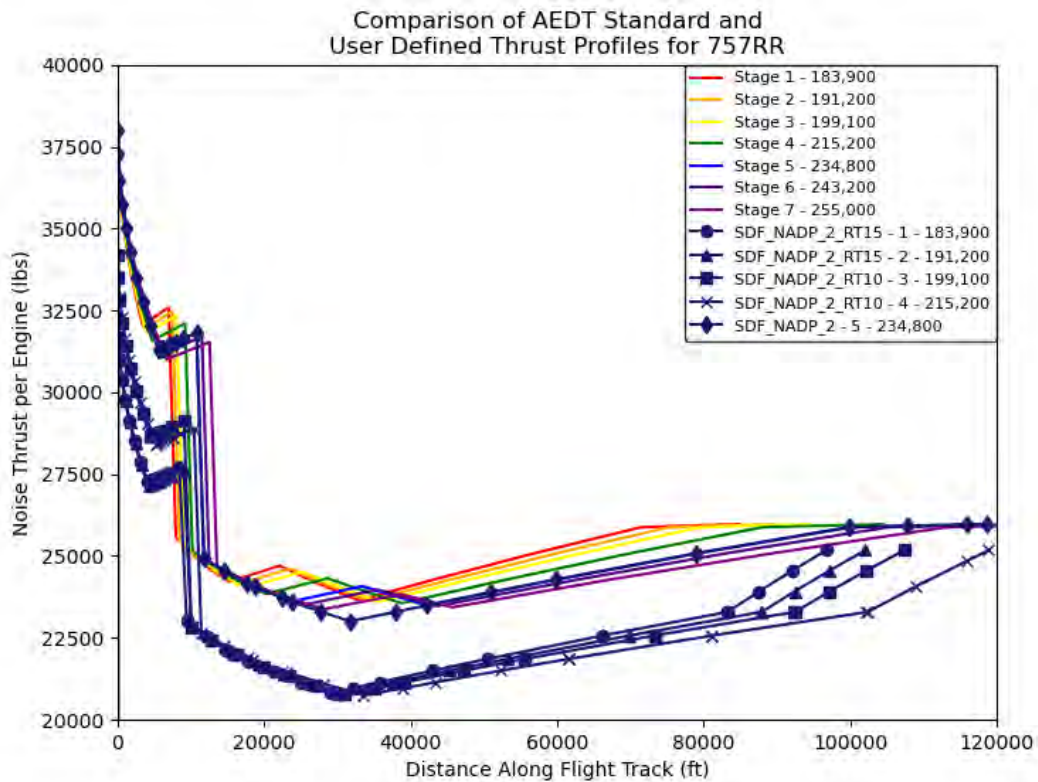


Figure C-44. 757RR AEDT Profiles, Thrust vs. Distance

C.3. Boeing 767-300 (ANP Type 7673ER) Profile Review with AEDT 3f

C.3.1. Statement of Benefit

Operators at SDF use a version of “Noise Abatement Departures Procedures” (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. The proposed 7673ER climb profiles and thrust settings during the various stages of flight provide a better representation of what is actually being flown by cargo aircraft at SDF. These profiles were developed from the default (i.e. included) reduced thrust profiles in AEDT.

The proposed user-defined profiles were developed with considerations of SDF runway specific length and minimum climb requirements. Correspondence with the operators has indicated high agreement with their procedures at SDF.

C.3.1.1. Figures Supporting Statement of Benefit

Figure C-45 and **Figure C-47** compare the standard AEDT profiles and Boeing profiles to actual aircraft climb performance at SDF. **Figure C-46** and **Figure C-48** compare the standard AEDT profiles and proposed profiles to actual aircraft speed profiles at SDF. The standard profiles are identified in the figure legends as “Stage length - Weight”. The proposed profiles are identified in the figure legends as “Name – Stage length - Weight.”

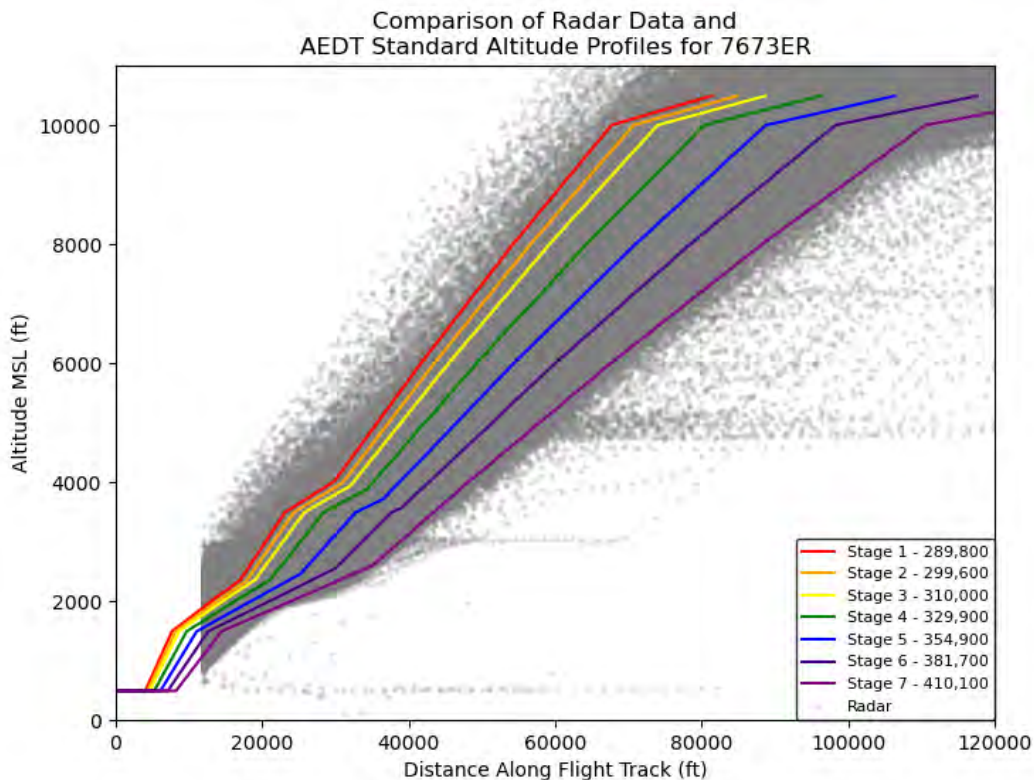


Figure C-45. 7673ER AEDT Standard Altitude Profiles Compared to Actual Aircraft Performance

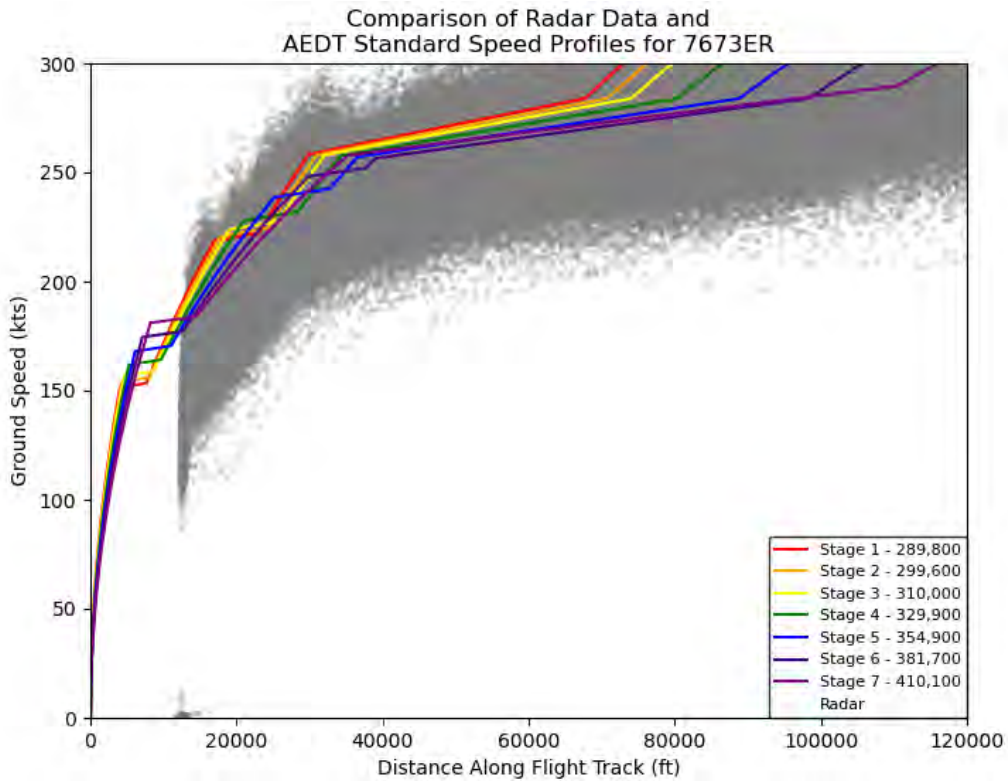


Figure C-46. 7673ER AEDT Standard Speed Profiles Compared to Actual Aircraft Performance

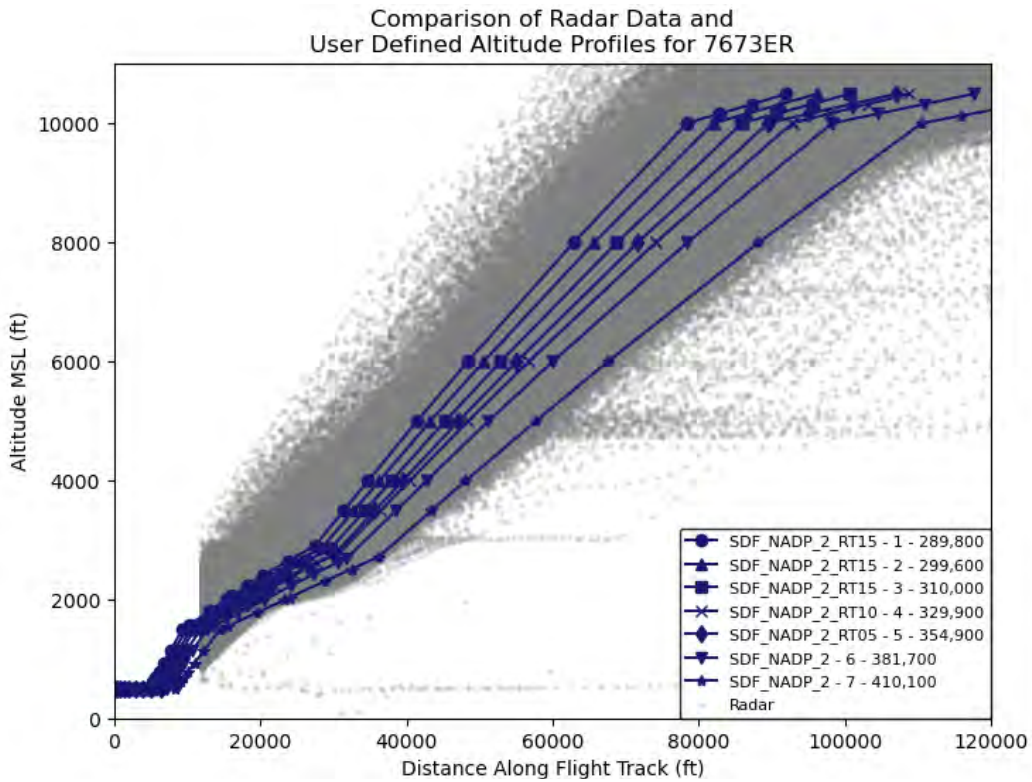


Figure C-47. 7673ER User Defined Altitude Profiles Compared to Actual Aircraft Performance

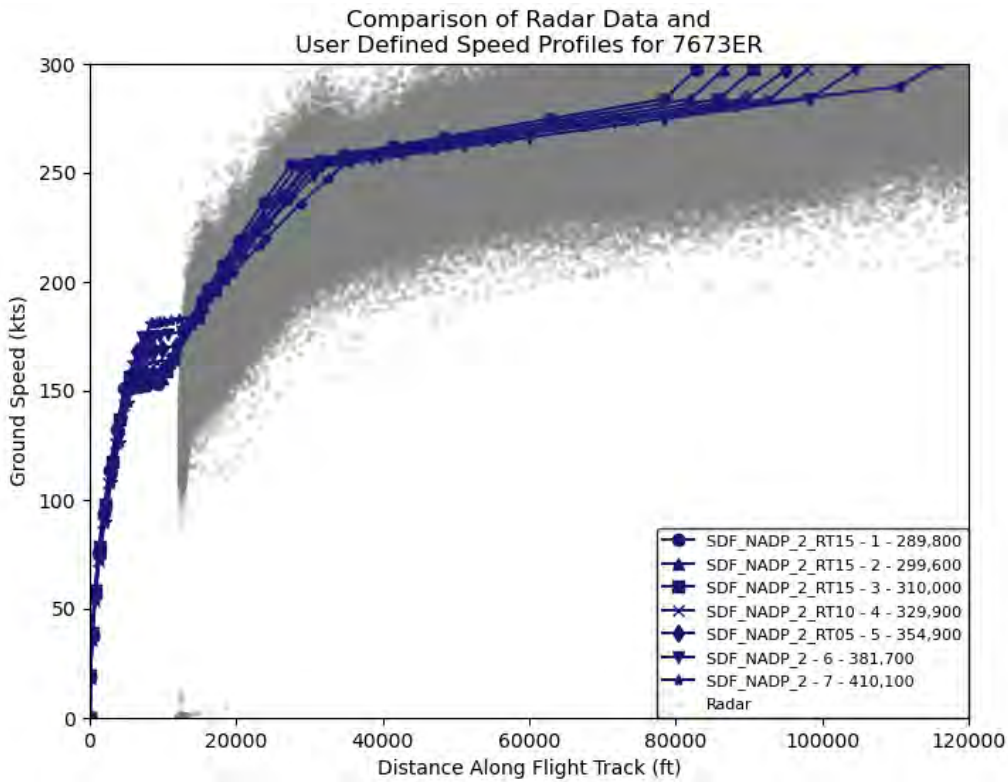


Figure C-48. 7673ER User Defined Speed Profiles Compared to Actual Aircraft Performance

C.3.2. Analysis Demonstrating Benefit

The differences between the existing 7673ER profiles in AEDT 3f and the proposed user-defined profiles are primarily due to the use of reduced thrust and climb altitude on departure. The sound exposure level results under the flight path from the user-defined departure procedures are shown in **Section C.3.5.1**. Overall, the proposed user-defined profiles show less noise associated with the take-off roll, a different location where aircraft change from take-off thrust to climb thrust, and additional noise under the flight path miles out because of a slower climb.

C.3.3. Concurrence on Aircraft Performance

Preparation of these profiles for the current project and AEDT 3f was done in cooperation with the relevant airline. Airline concurrence documentation accompanies this memorandum for submission to FAA.

C.3.4. Certification of New Parameters

The profiles developed for this study are procedure step profiles created by modifying profiles already included in AEDT 3f. Screenshots from the AEDT UI of starting default profiles and the proposed user-defined profiles are presented for comparison as **Figure C-49** through **Figure C-62**. An AEDT study containing the profiles developed for this project is available in electronic form upon request. Altitudes are listed as feet above airfield elevation. Speeds are entered as true airspeed in knots. Thrust is in pounds which matches the units of thrust settings used in the aircraft's associated noise-power-distance curves.

C.3.4.1. 7673ER, Profile Weight 289,800

The “stage length 1” user-defined profile for the 7673ER assumes a weight of 289,800, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT151	1	Takeoff	T_05	Max Takeoff 15% Reduced			
MODIFIED_RT151	2	Climb	T_05U	Max Takeoff 15% Reduced	1000		
MODIFIED_RT151	3	Percent Accelerate	T_01	Max Climb 10% Reduced		198	55
MODIFIED_RT151	4	Percent Accelerate	T_00	Max Climb 10% Reduced		218	55
MODIFIED_RT151	5	Climb	T_00	Max Climb 10% Reduced	3000		
MODIFIED_RT151	6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
MODIFIED_RT151	7	Climb	T_00	Max Climb 10% Reduced	5500		
MODIFIED_RT151	8	Climb	T_00	Max Climb 10% Reduced	7500		
MODIFIED_RT151	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-49. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 1

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT151	1	Takeoff	T_05	Max Takeoff 15% Reduced			
SDF_NADP_2_RT151	2	Climb	T_05U	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT151	3	Percent Accelerate	T_01	Max Climb 10% Reduced		198	55
SDF_NADP_2_RT151	4	Percent Accelerate	T_00	Max Climb 10% Reduced		218	55
SDF_NADP_2_RT151	5	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
SDF_NADP_2_RT151	6	Climb	T_00	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT151	7	Climb	T_00	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT151	8	Climb	T_00	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT151	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-50. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 1

C.3.4.2. 7673ER, Profile Weight 299,600

The “stage length 2” user-defined profile for the 7673ER assumes a weight of 299,600, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT152	1	Takeoff	T_05	Max Takeoff 15% Reduced			
MODIFIED_RT152	2	Climb	T_05U	Max Takeoff 15% Reduced	1000		
MODIFIED_RT152	3	Percent Accelerate	T_01	Max Climb 10% Reduced		200	55
MODIFIED_RT152	4	Percent Accelerate	T_00	Max Climb 10% Reduced		220	55
MODIFIED_RT152	5	Climb	T_00	Max Climb 10% Reduced	3000		
MODIFIED_RT152	6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
MODIFIED_RT152	7	Climb	T_00	Max Climb 10% Reduced	5500		
MODIFIED_RT152	8	Climb	T_00	Max Climb 10% Reduced	7500		
MODIFIED_RT152	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-51. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 2

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT152	1	Takeoff	T_05	Max Takeoff 15% Reduced			
SDF_NADP_2_RT152	2	Climb	T_05U	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT152	3	Percent Accelerate	T_01	Max Climb 10% Reduced		200	55
SDF_NADP_2_RT152	4	Percent Accelerate	T_00	Max Climb 10% Reduced		220	55
SDF_NADP_2_RT152	5	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
SDF_NADP_2_RT152	6	Climb	T_00	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT152	7	Climb	T_00	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT152	8	Climb	T_00	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT152	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-52. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 2

C.3.4.3. 7673ER, Profile Weight 310,000

The “stage length 3” user-defined profile for the 7673ER assumes a weight of 310,000, and is identified as PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT153	1	Takeoff	T_05	Max Takeoff 15% Reduced			
MODIFIED_RT153	2	Climb	T_05U	Max Takeoff 15% Reduced	1000		
MODIFIED_RT153	3	Percent Accelerate	T_01	Max Climb 10% Reduced		203	55
MODIFIED_RT153	4	Percent Accelerate	T_00	Max Climb 10% Reduced		223	55
MODIFIED_RT153	5	Climb	T_00	Max Climb 10% Reduced	3000		
MODIFIED_RT153	6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
MODIFIED_RT153	7	Climb	T_00	Max Climb 10% Reduced	5500		
MODIFIED_RT153	8	Climb	T_00	Max Climb 10% Reduced	7500		
MODIFIED_RT153	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-53. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT15; PROF_ID2: 3

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT153	1	Takeoff	T_05	Max Takeoff 15% Reduced			
SDF_NADP_2_RT153	2	Climb	T_05U	Max Takeoff 15% Reduced	1000		
SDF_NADP_2_RT153	3	Percent Accelerate	T_01	Max Climb 10% Reduced		203	55
SDF_NADP_2_RT153	4	Percent Accelerate	T_00	Max Climb 10% Reduced		223	55
SDF_NADP_2_RT153	5	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
SDF_NADP_2_RT153	6	Climb	T_00	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT153	7	Climb	T_00	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT153	8	Climb	T_00	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT153	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-54. AEDT UI Screenshot of Proposed profile PROF_ID1: SDF_NADP_2_RT15; PROF_ID2: 3

C.3.4.4. 7673ER, Profile Weight 329,900

The “stage length 4” user-defined profile for the 7673ER assumes a weight of 329,900, and is identified as PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT104	1	Takeoff	T_05	Max Takeoff 10% Reduced			
MODIFIED_RT104	2	Climb	T_05U	Max Takeoff 10% Reduced	1000		
MODIFIED_RT104	3	Percent Accelerate	T_01	Max Climb 10% Reduced		207	55
MODIFIED_RT104	4	Percent Accelerate	T_00	Max Climb 10% Reduced		227	55
MODIFIED_RT104	5	Climb	T_00	Max Climb 10% Reduced	3000		
MODIFIED_RT104	6	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
MODIFIED_RT104	7	Climb	T_00	Max Climb 10% Reduced	5500		
MODIFIED_RT104	8	Climb	T_00	Max Climb 10% Reduced	7500		
MODIFIED_RT104	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-55. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT10; PROF_ID2: 4

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT104	1	Takeoff	T_05	Max Takeoff 10% Reduced			
SDF_NADP_2_RT104	2	Climb	T_05U	Max Takeoff 10% Reduced	1000		
SDF_NADP_2_RT104	3	Percent Accelerate	T_01	Max Climb 10% Reduced		207	55
SDF_NADP_2_RT104	4	Percent Accelerate	T_00	Max Climb 10% Reduced		227	55
SDF_NADP_2_RT104	5	Percent Accelerate	T_00	Max Climb 10% Reduced		250	60
SDF_NADP_2_RT104	6	Climb	T_00	Max Climb 10% Reduced	4500		
SDF_NADP_2_RT104	7	Climb	T_00	Max Climb 10% Reduced	5500		
SDF_NADP_2_RT104	8	Climb	T_00	Max Climb 10% Reduced	7500		
SDF_NADP_2_RT104	9	Climb	T_00	Max Climb 10% Reduced	10000		

Figure C-56. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT10; PROF_ID2: 4

C.3.4.5. 7673ER, Profile Weight 354,900

The “stage length 5” user-defined profile for the 7673ER assumes a weight of 354,900, and is identified as PROF_ID1: SDF_NADP_2_RT05; PROF_ID2: 5. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5 to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT055	1	Takeoff	T_05	Max Takeoff 5% Reduced			
MODIFIED_RT055	2	Climb	T_05U	Max Takeoff 5% Reduced	1000		
MODIFIED_RT055	3	Percent Accelerate	T_01	Max Climb		217	55
MODIFIED_RT055	4	Percent Accelerate	T_00	Max Climb		237	55
MODIFIED_RT055	5	Climb	T_00	Max Climb	3000		
MODIFIED_RT055	6	Percent Accelerate	T_00	Max Climb		250	60
MODIFIED_RT055	7	Climb	T_00	Max Climb	5500		
MODIFIED_RT055	8	Climb	T_00	Max Climb	7500		
MODIFIED_RT055	9	Climb	T_00	Max Climb	10000		

Figure C-57. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 5

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_2_RT055	1	Takeoff	T_05	Max Takeoff 5% Reduced			
SDF_NADP_2_RT055	2	Climb	T_05U	Max Takeoff 5% Reduced	1000		
SDF_NADP_2_RT055	3	Percent Accelerate	T_01	Max Climb		217	55
SDF_NADP_2_RT055	4	Percent Accelerate	T_00	Max Climb		237	55
SDF_NADP_2_RT055	5	Percent Accelerate	T_00	Max Climb		250	60
SDF_NADP_2_RT055	6	Climb	T_00	Max Climb	4500		
SDF_NADP_2_RT055	7	Climb	T_00	Max Climb	5500		
SDF_NADP_2_RT055	8	Climb	T_00	Max Climb	7500		
SDF_NADP_2_RT055	9	Climb	T_00	Max Climb	10000		

Figure C-58. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2_RT05; PROF_ID2: 5

C.3.4.6. 7673ER, Profile Weight 381,700

The “stage length 6” user-defined profile for the 7673ER assumes a weight of 381,700, and is identified as PROF_ID1: SDF_NADP_2; PROF_ID2: 6. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 6 to change the thrust level to “Max Takeoff” in steps 1 and 2, and to remove the climb at 3,000 AFE in step 5. To assist AEDT, a climb was introduced at 4,500 AFE in step 6.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT056	1	Takeoff	T_05	Max Takeoff 5% Reduced			
MODIFIED_RT056	2	Climb	T_05U	Max Takeoff 5% Reduced	1000		
MODIFIED_RT056	3	Percent Accelerate	T_01	Max Climb		226	55
MODIFIED_RT056	4	Percent Accelerate	T_00	Max Climb		246	55
MODIFIED_RT056	5	Climb	T_00	Max Climb	3000		
MODIFIED_RT056	6	Percent Accelerate	T_00	Max Climb		250	60
MODIFIED_RT056	7	Climb	T_00	Max Climb	5500		
MODIFIED_RT056	8	Climb	T_00	Max Climb	7500		
MODIFIED_RT056	9	Climb	T_00	Max Climb	10000		

Figure C-59. AEDT UI Screenshot of Starting Default Profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 6

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_26	1	Takeoff	T_05	Max Takeoff			
SDF_NADP_26	2	Climb	T_05U	Max Takeoff	1000		
SDF_NADP_26	3	Percent Accelerate	T_01	Max Climb		226	55
SDF_NADP_26	4	Percent Accelerate	T_00	Max Climb		246	55
SDF_NADP_26	5	Percent Accelerate	T_00	Max Climb		250	60
SDF_NADP_26	6	Climb	T_00	Max Climb	4500		
SDF_NADP_26	7	Climb	T_00	Max Climb	5500		
SDF_NADP_26	8	Climb	T_00	Max Climb	7500		
SDF_NADP_26	9	Climb	T_00	Max Climb	10000		

Figure C-60. AEDT UI Screenshot of Proposed Profile PROF_ID1: SDF_NADP_2; PROF_ID2: 6

C.3.4.7. 7673ER, Profile Weight 410,100

The “stage length 7” user-defined profile for the 7673ER assumes a weight of 410,100, and is identified as PROF_ID1: SDF_NADP_2; PROF_ID2: 7. This user-defined profile was created by copying and editing default AEDT 3f profile PROF_ID1: MODIFIED_RT05; PROF_ID2: 7 a to change the thrust level to “Max Takeoff” in steps 1 and 2. To assist AEDT, a climb was introduced at 4,500 AFE in step 7.

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
MODIFIED_RT057	1	Takeoff	T_05	Max Takeoff 5% Reduced			
MODIFIED_RT057	2	Climb	T_05U	Max Takeoff 5% Reduced	1000		
MODIFIED_RT057	3	Percent Accelerate	T_01	Max Climb		235	55
MODIFIED_RT057	4	Percent Accelerate	T_00	Max Climb		255	55
MODIFIED_RT057	5	Climb	T_00	Max Climb	3000		
MODIFIED_RT057	6	Climb	T_00	Max Climb	3500		
MODIFIED_RT057	7	Climb	T_00	Max Climb	5500		
MODIFIED_RT057	8	Climb	T_00	Max Climb	7500		
MODIFIED_RT057	9	Climb	T_00	Max Climb	10000		

Figure C-61. AEDT UI Screenshot of Starting Default Profile Profile1: MODIFIED_RT05; PROF_ID2: 7

Profile ID	Step Number	Step Type	Flap ID	Thrust Level	Altitude AFE (ft)	Calibrated Airspeed (kt)	Accel Energy Share (%)
SDF_NADP_27	1	Takeoff	T_05	Max Takeoff			
SDF_NADP_27	2	Climb	T_05U	Max Takeoff	1000		
SDF_NADP_27	3	Percent Accelerate	T_01	Max Climb		235	55
SDF_NADP_27	4	Percent Accelerate	T_00	Max Climb		255	55
SDF_NADP_27	5	Climb	T_00	Max Climb	3000		
SDF_NADP_27	6	Climb	T_00	Max Climb	3500		
SDF_NADP_27	7	Climb	T_00	Max Climb	4500		
SDF_NADP_27	8	Climb	T_00	Max Climb	5500		
SDF_NADP_27	9	Climb	T_00	Max Climb	7500		
SDF_NADP_27	10	Climb	T_00	Max Climb	10000		

Figure C-62. AEDT UI Screenshot of Proposed Profile1: SDF_NADP_2; PROF_ID2: 7

C.3.5. Graphical and Tabular Comparison

An MS Excel file containing the profile points as found in the AEDT XML Performance Report Export file is available in electronic form upon request. It was developed for comparison of performance data to the AEDT Standard profiles and was used to generate the following tables and line graphs.

C.3.5.1. *Tables and Figures Supporting Analysis Demonstrating Benefit*

Table C-11 through **Table C-16** show the SEL results under the flight path from the user-defined departure profiles; SEL values resulting from the standard AEDT departure profiles are presented for comparison. **Figure C-63** through **Figure C-69** show the same SEL computations in the form of SEL contours.

Table C-11. SELs for 7673ER Departures at 289,800 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7673ER Profile Weight: 289,800 lbs. (PROF_ID2 = 1) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.3	127.3	-5.1
0.5	119.8	116.9	-2.9
1.0	102.5	102.9	0.4
1.5	94.4	96.2	1.8
2.0	91.8	92.0	0.2
2.5	89.7	90.0	0.3
3.0	88.0	88.3	0.3
3.5	86.4	87.0	0.5
4.0	85.3	85.7	0.4
4.5	84.1	84.5	0.4
5.0	82.9	83.4	0.5
5.5	82.1	82.4	0.3
6.0	81.3	81.4	0.1
6.5	80.6	80.6	0.0
7.0	79.9	79.8	-0.1
7.5	79.4	79.2	-0.2
8.0	78.8	78.5	-0.3
8.5	78.3	78.0	-0.3
9.0	77.8	77.5	-0.3
9.5	77.4	77.0	-0.4
10.0	77.0	76.5	-0.5

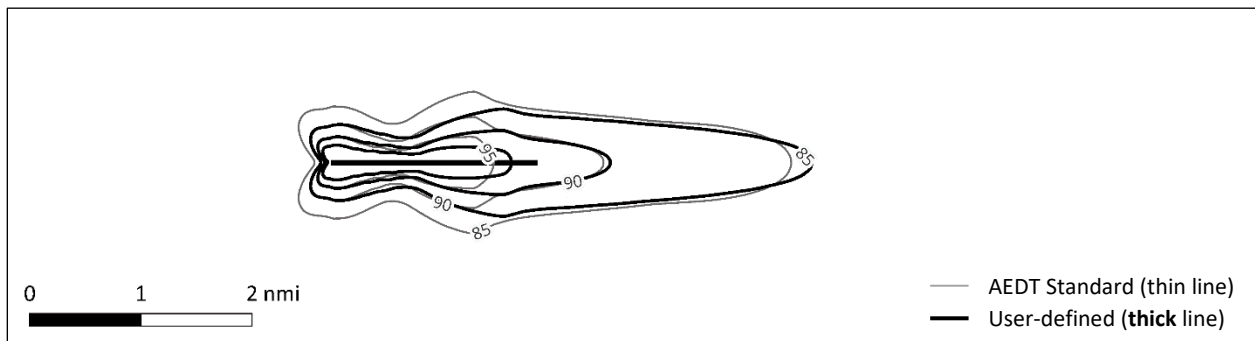


Figure C-63. SEL Contours for 7673ER Departures at Take-Off Weight 289,800 Pounds

Table C-12. SELs for 7673ER Departures at 299,600 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7673ER Profile Weight: 299,600 lbs. (PROF_ID2 = 2) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.3	127.2	-5.1
0.5	119.8	116.8	-3.0
1.0	103.4	104.7	1.3
1.5	95.3	96.8	1.4
2.0	92.1	92.3	0.2
2.5	90.2	90.4	0.2
3.0	88.4	88.8	0.4
3.5	86.8	87.3	0.5
4.0	85.6	86.1	0.5
4.5	84.5	85.0	0.6
5.0	83.4	83.9	0.5
5.5	82.5	82.8	0.3
6.0	81.7	81.8	0.1
6.5	81.0	81.0	0.1
7.0	80.3	80.2	-0.1
7.5	79.7	79.6	-0.1
8.0	79.1	79.0	-0.2
8.5	78.6	78.3	-0.3
9.0	78.2	77.9	-0.3
9.5	77.7	77.4	-0.3
10.0	77.3	76.9	-0.4

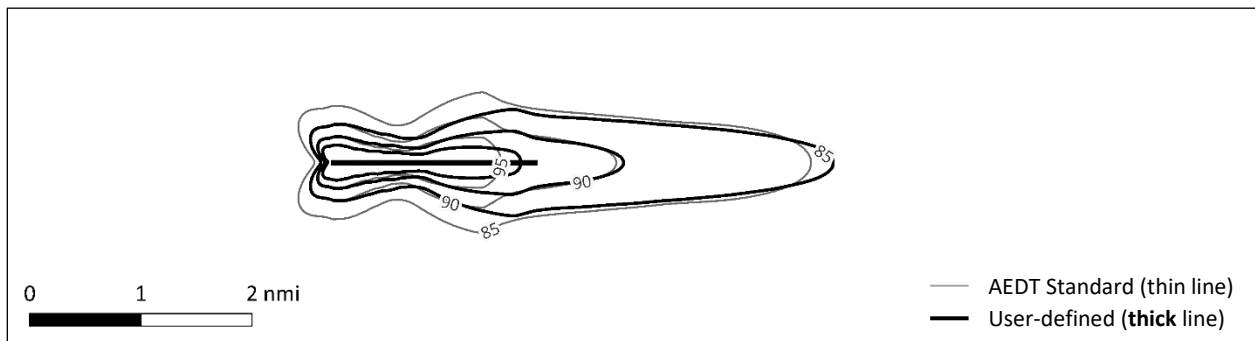


Figure C-64. SEL Contours for 7673ER Departures at Take-Off Weight 299,600 Pounds

Table C-13. SELs for 7673ER Departures at 310,000 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7673ER Profile Weight: 310,000 lbs. (PROF_ID2 = 3) User PROF_ID1: SDF_NADP_2_RT15			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	Used-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.2	127.1	-5.1
0.5	119.8	118.5	-1.4
1.0	104.6	106.9	2.3
1.5	97.4	97.5	0.1
2.0	92.5	92.8	0.3
2.5	90.6	90.9	0.3
3.0	88.9	89.2	0.2
3.5	87.3	87.8	0.5
4.0	86.0	86.6	0.6
4.5	85.0	85.5	0.5
5.0	83.9	84.3	0.4
5.5	82.9	83.3	0.4
6.0	82.1	82.4	0.3
6.5	81.4	81.5	0.1
7.0	80.7	80.7	0.0
7.5	80.1	80.0	-0.1
8.0	79.5	79.4	-0.1
8.5	79.0	78.8	-0.2
9.0	78.5	78.2	-0.3
9.5	78.1	77.8	-0.3
10.0	77.6	77.3	-0.3

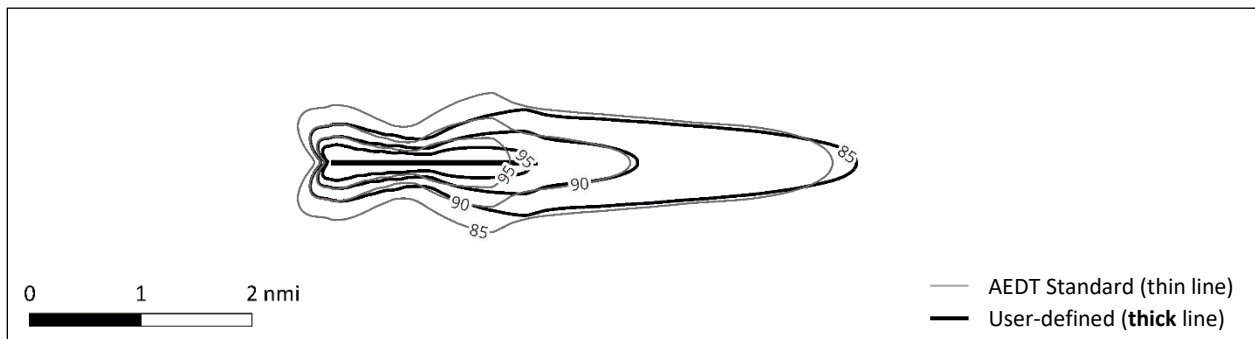


Figure C-65. SEL Contours for 7673ER Departures at Take-Off Weight 310,000 Pounds

Table C-14. SELs for 7673ER Departures at 329,900 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7673ER Profile Weight: 329,900 lbs. (PROF_ID2 = 4) User PROF_ID1: SDF_NADP_2_RT10			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.6	129.2	-3.4
0.5	120.3	117.9	-2.4
1.0	107.6	112.4	4.8
1.5	99.3	98.8	-0.5
2.0	93.2	93.2	0.0
2.5	91.3	91.2	-0.1
3.0	89.7	89.6	-0.1
3.5	88.1	88.2	0.1
4.0	86.8	87.0	0.3
4.5	85.7	86.0	0.3
5.0	84.7	85.0	0.2
5.5	83.7	84.0	0.2
6.0	82.9	83.0	0.1
6.5	82.1	82.2	0.1
7.0	81.4	81.4	0.0
7.5	80.8	80.7	-0.1
8.0	80.2	80.0	-0.2
8.5	79.7	79.5	-0.2
9.0	79.2	78.9	-0.3
9.5	78.7	78.4	-0.3
10.0	78.3	77.9	-0.4

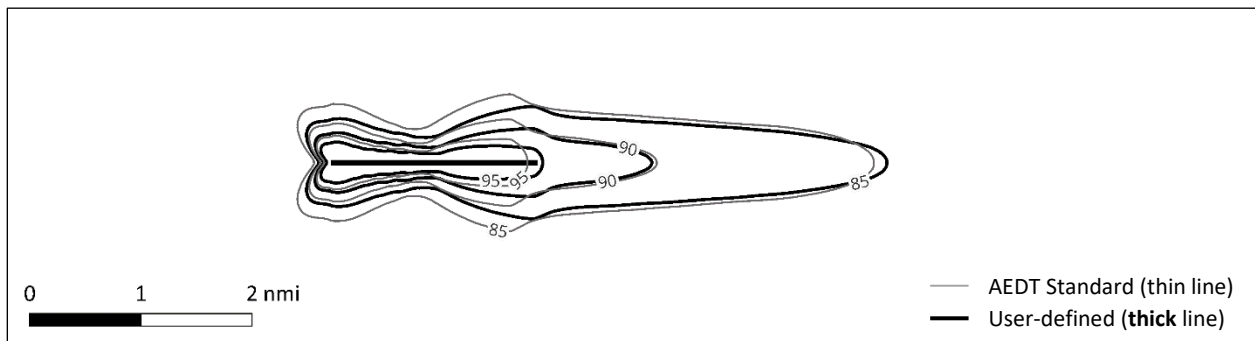


Figure C-66. SEL Contours for 7673ER Departures at Take-Off Weight 329,900 Pounds

Table C-15. SELs for 7673ER Departures at 354,900 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7673ER Profile Weight: 354,900 lbs. (PROF_ID2 = 5) User PROF_ID1: SDF_NADP_2_RT05			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	Used-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.4	130.7	-1.7
0.5	120.3	118.9	-1.4
1.0	117.5	116.6	-0.9
1.5	100.9	100.8	0.0
2.0	94.3	96.1	1.7
2.5	92.2	92.4	0.3
3.0	90.6	90.9	0.2
3.5	89.3	89.4	0.1
4.0	88.0	88.3	0.2
4.5	86.7	87.2	0.4
5.0	85.6	86.0	0.4
5.5	84.8	85.0	0.3
6.0	83.8	84.1	0.4
6.5	83.0	83.2	0.2
7.0	82.3	82.5	0.2
7.5	81.7	81.9	0.2
8.0	81.1	81.2	0.2
8.5	80.6	80.7	0.1
9.0	80.0	80.1	0.1
9.5	79.6	79.6	0.1
10.0	79.1	79.2	0.1

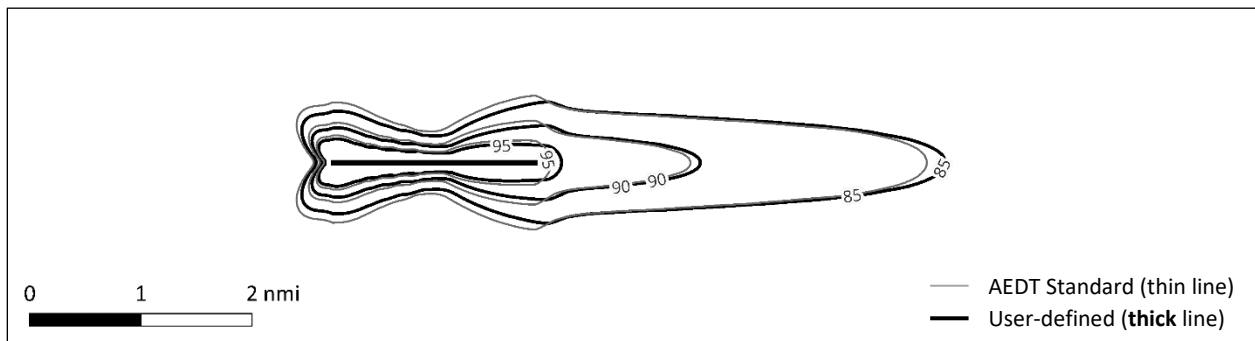


Figure C-67. SEL Contours for 7673ER Departures at Take-Off Weight 354,900 Pounds

Table C-16. SELs for 7673ER Departures at 381,700 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7673ER Profile Weight: 381,700 lbs. (PROF_ID2 = 6) User PROF_ID1: SDF_NADP_2			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.2	132.2	0.0
0.5	121.0	121.0	0.0
1.0	117.6	117.6	0.0
1.5	103.3	103.3	0.0
2.0	98.2	98.2	0.0
2.5	92.9	92.9	0.0
3.0	91.4	91.4	0.0
3.5	90.2	90.1	-0.1
4.0	89.0	88.9	-0.1
4.5	87.9	87.8	-0.1
5.0	86.8	86.9	0.1
5.5	85.7	85.9	0.1
6.0	84.9	84.9	0.0
6.5	84.1	84.1	0.0
7.0	83.2	83.3	0.0
7.5	82.6	82.6	0.0
8.0	82.0	82.0	0.1
8.5	81.4	81.4	0.0
9.0	80.9	80.9	0.0
9.5	80.5	80.4	0.0
10.0	79.9	79.9	0.0

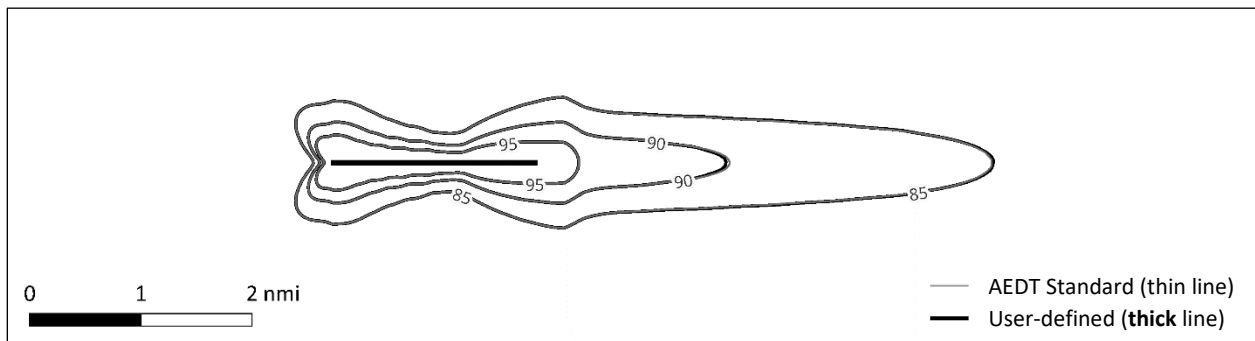


Figure C-68. SEL Contours for 7673ER Departures at Take-Off Weight 381,700 Pounds

Table C-17. SELs for 7673ER Departures at 410,100 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: 7673ER Profile Weight: 410,100 lbs. (PROF_ID2 = 7) User PROF_ID1: SDF_NADP_2			
Distance from Brake Release (nmi)	AEDT Standard, SEL (dBA)	User-Defined Profile, SEL (dBA)	Difference SEL (dBA)
0.0	132.5	132.5	0.0
0.5	120.7	120.7	0.0
1.0	118.0	118.0	0.0
1.5	107.7	107.7	0.0
2.0	99.8	99.8	0.0
2.5	94.9	94.9	0.0
3.0	92.4	92.3	-0.1
3.5	91.0	90.9	-0.1
4.0	90.0	89.8	-0.1
4.5	88.9	88.8	-0.1
5.0	88.0	87.9	-0.1
5.5	87.1	87.0	-0.1
6.0	86.1	86.0	-0.1
6.5	85.2	85.2	0.0
7.0	84.4	84.4	0.0
7.5	83.7	83.7	0.0
8.0	82.9	82.9	0.0
8.5	82.4	82.4	0.0
9.0	81.8	81.8	0.0
9.5	81.3	81.3	0.0
10.0	80.8	80.8	0.0

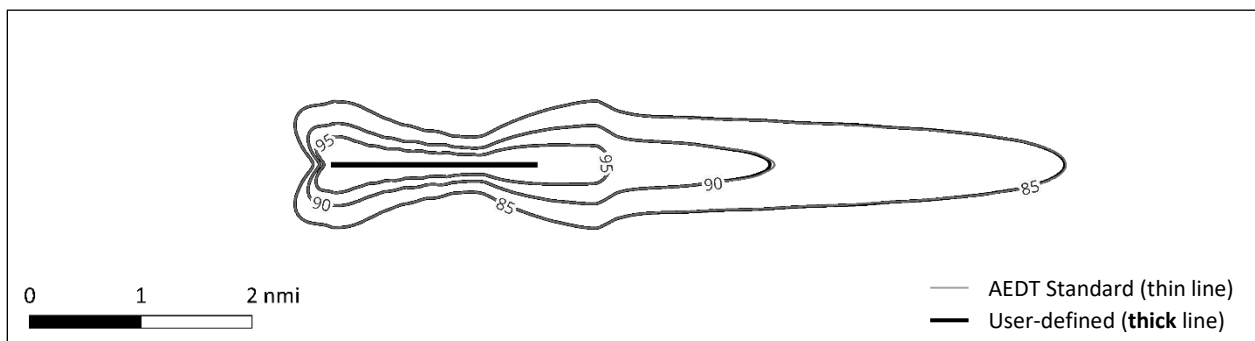


Figure C-69. SEL Contours for 7673ER Departures at Take-Off Weight 410,100 Pounds

C.3.5.2. Graphical Comparison of Profiles

Graphs of Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance are included as **Figure C-70**, **Figure C-71**, and **Figure C-72**, respectively.

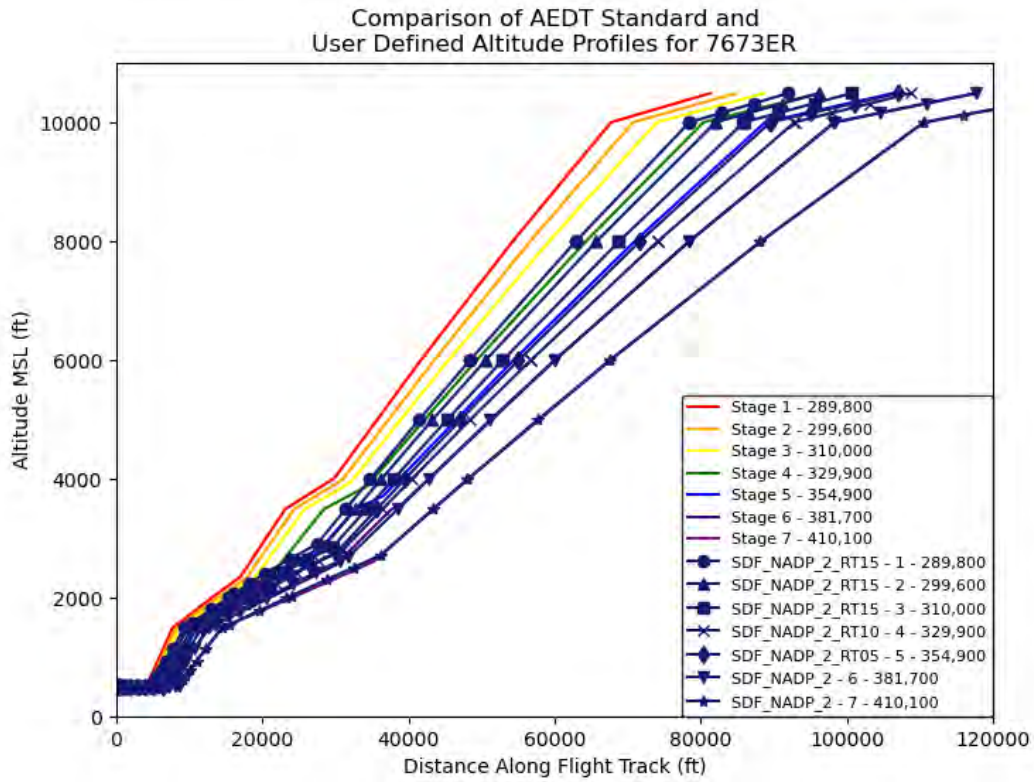


Figure C-70. 7673ER AEDT Profiles, Altitude vs. Distance

C.4. Additional Graphs: Comparison of Altitude and Speed Profiles by Stage Length

The additional graphs of altitude vs. distance and speed vs. distance, organized by stage length, are included in this section in response to FAA's request in the feedback dated May 29, 2024. The following figures are complementary to Figures C-1 through C-4 in the original memorandum dated April 18, 2024 and show the same data. **Figures C-73 through C-106** reorganize the data by specific profile weights and respective stage lengths.

The distribution of departures by stage length (as derived by an analysis of the city-pair data in the 12-month NOMS sample) show that:

- 30% of the 757PW departures are in stage length 1, 43% in stage length 2, 11% in stage length 3, and 15% in stage length 4. The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Boeing 757PW operations will be represented with AEDT ANP stage lengths 1 – 4. Although 757PW stage length 5 (PROF_ID2 = 5, with representative profile weight of 230,900 pounds) did not appear in the 12-month flight track sample, we include that departure profiles in this documentation in case the forecast data indicate that such operations should be included in the forecast NEM.
- 28% of the 757RR departures are in stage length 1, 46% in stage length 2, 11% in stage length 3, and 15% in stage length 4. The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Boeing 757RR operations will be represented with AEDT ANP stage lengths 1 – 4. Although 757RR stage length 5 (PROF_ID2 = 5, with representative profile weight of 234,800 pounds) did not appear in the 12-month flight track sample, we include that departure profile in this documentation in case the forecast data indicate that such operations should be included in the forecast NEM.
- 20% of the 7673ER departures are in stage length 1, 32% in stage length 2, 19% in stage length 3, 26% in stage length 4, 2% in stage length 5, and less than 1% in stage length 6. The stage length distribution which will be applied to the cargo aircraft for noise modeling is based upon forecasted weight information provided by the cargo operator. While the exact distribution is still in development, the majority of Boeing 7673ER operations will be represented with AEDT ANP stage lengths 1 – 4. Although 7673ER stage length 7 (PROF_ID2 = 7, with representative profile weight of 410,100 pounds) did not appear in the 12-month flight track sample, we include that departure profile in this documentation in case the forecast data indicate that such operations should be included in the forecast NEM.

As noted in the “Statement of Benefit” (section C.1.1), operators at SDF use a version of “Noise Abatement Departure Procedures” (NADP 2) at a reduced thrust instead of standard departure procedures at max thrust. Operators did not provide the exact reduced thrust. Therefore, we used the thrust-to-weight ratio of the AEDT maximum thrust profile associated with current and historical 757RR operations at SDF. The similar thrust-to-weight ratio should maintain a similar acceleration rate during the take-off roll and, combined with the lower rotation speed needed for a lower weight aircraft, should have a shorter take-off roll. Therefore, all of the proposed procedures follow the NADP 2 described on page C-1, although they may use various thrust settings based on weight. This should not be confused with AEDT's definition of a single procedure (PROF_ID1 and PROF_ID2), which combines both the altitude and flap retraction speeds along with the power settings. It also should be noted that our efforts to develop the proposed profiles were limited to the selection of thrust coefficients already available in AEDT. In other words, we did not attempt to define new thrust coefficients to represent power levels not already represented in AEDT. We did not modify the flap retraction speed schedule relative to that in AEDT, and we also kept all clean climbs (i.e. flaps fully retracted) at a speed of 250 knots calibrated airspeed, which matches both the AEDT standard profiles and the indicated airspeed listed in the procedures provided by the operator. In addition, the comparison of the AEDT profiles is done at the SDF annual average day conditions documented in the AEDT database, which will be used in the calculation of the NEM contours. As such, the ground speeds reported by AEDT compared to the flight track data do not match precisely; therefore, we recommend viewing the general speed patterns rather than comparing absolute values.

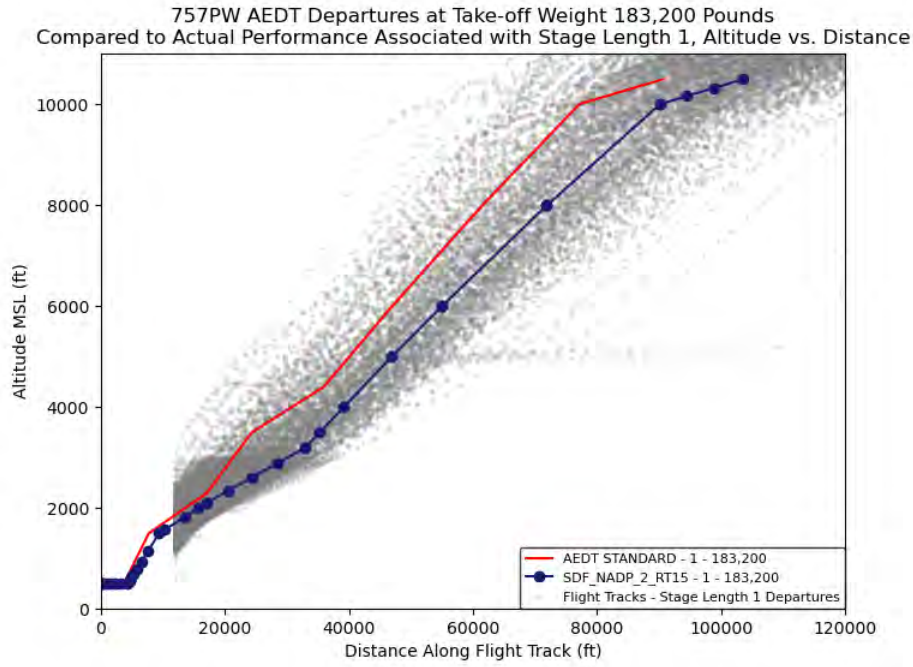


Figure C-73. 757PW Departures, Stage Length 1, Altitude vs. Distance

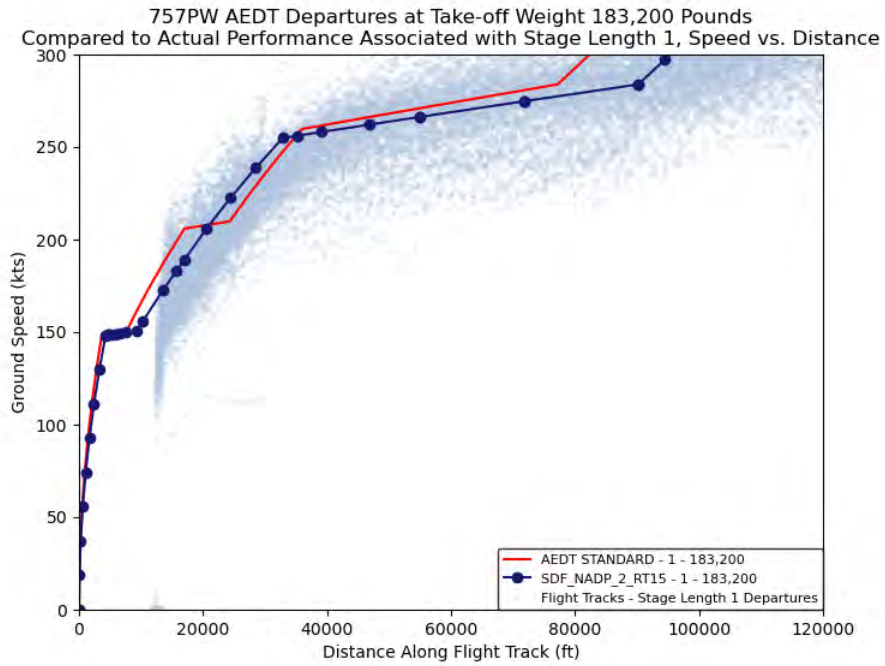


Figure C-74. 757PW Departures, Stage Length 1, Speed vs. Distance

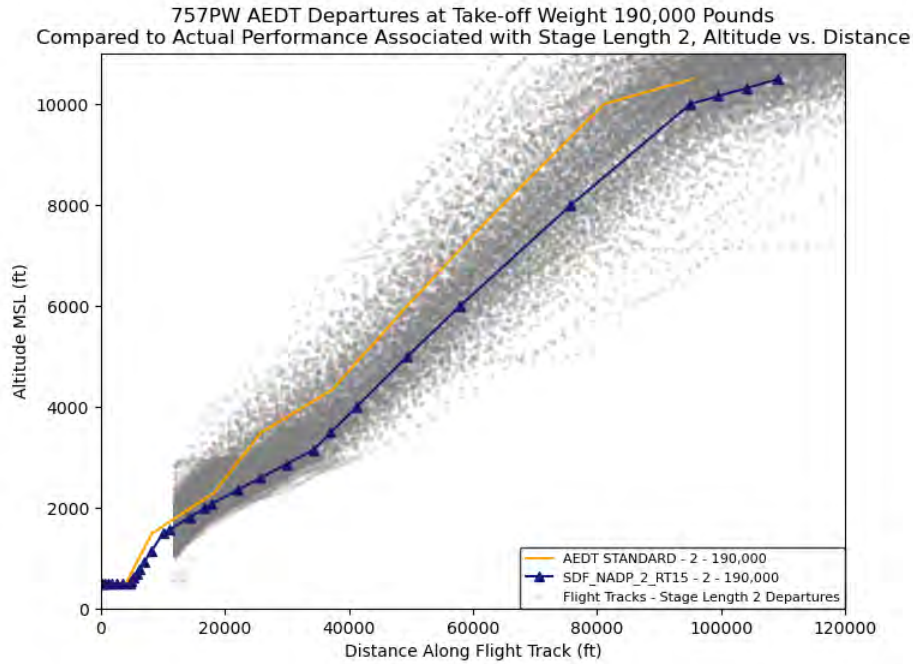


Figure C-75. 757PW Departures, Stage Length 2, Altitude vs. Distance

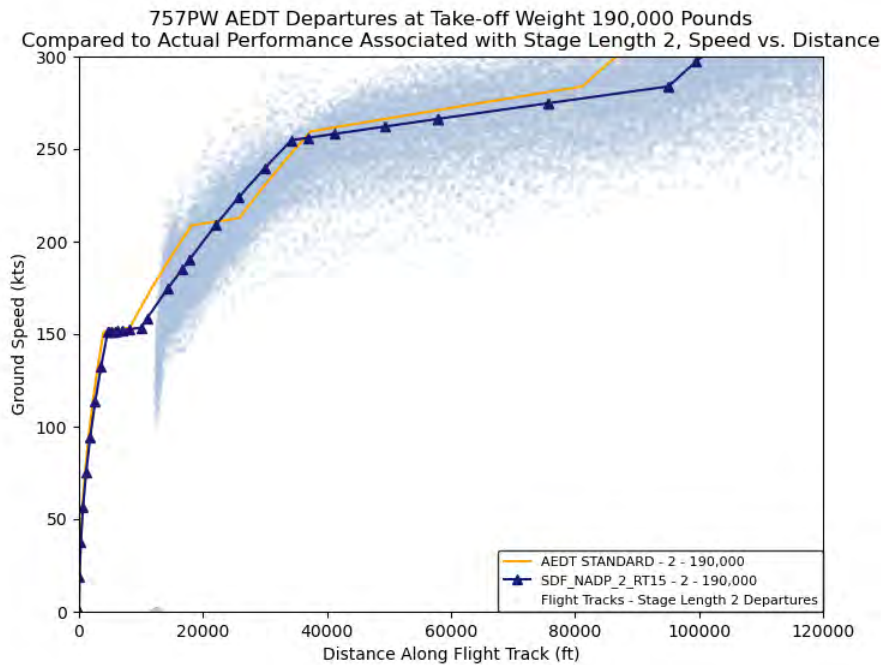


Figure C-76. 757PW Departures, Stage Length 2, Speed vs. Distance

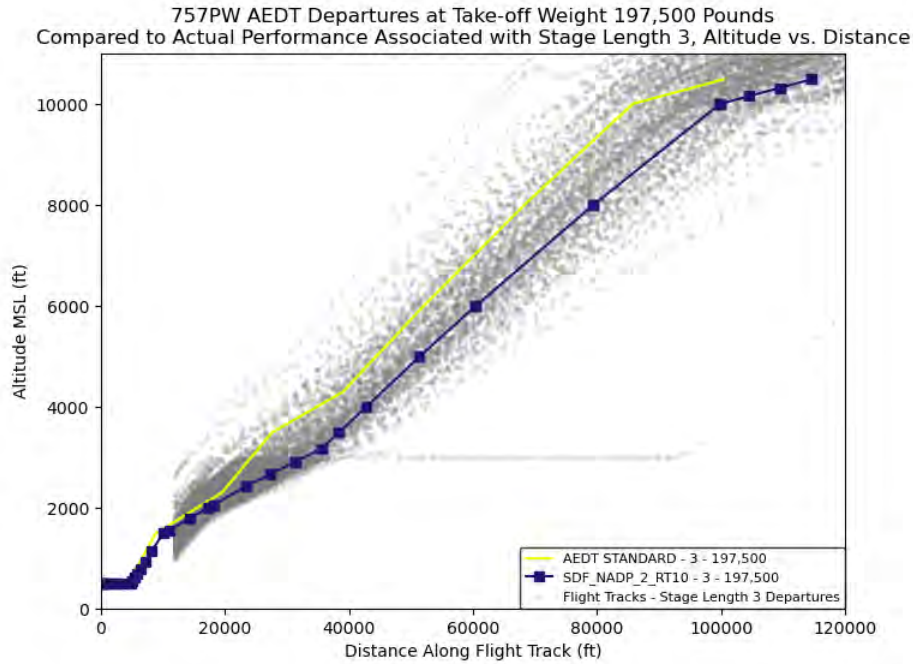


Figure C-77. 757PW Departures, Stage Length 3, Altitude vs. Distance

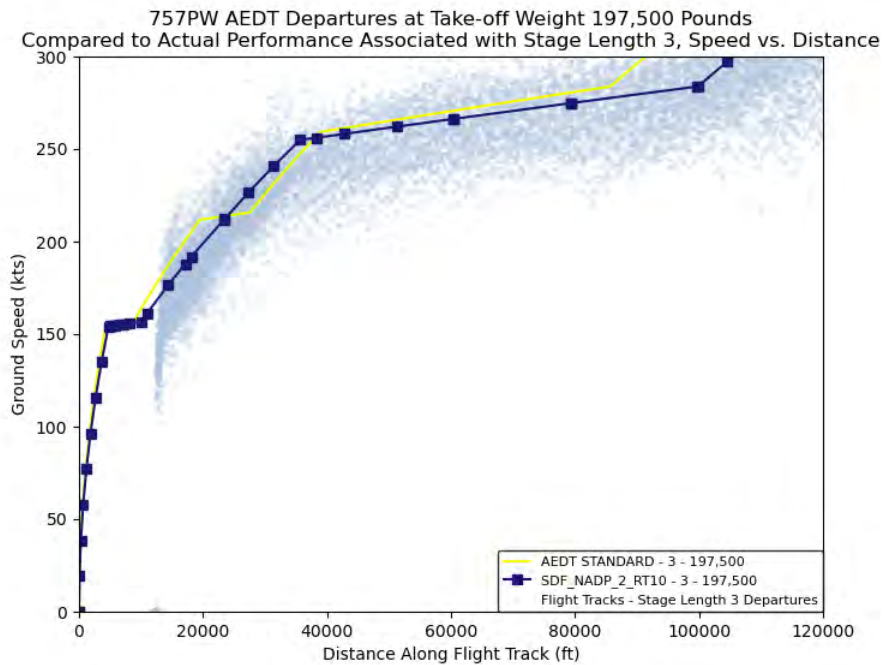


Figure C-78. 757PW Departures, Stage Length 3, Speed vs. Distance

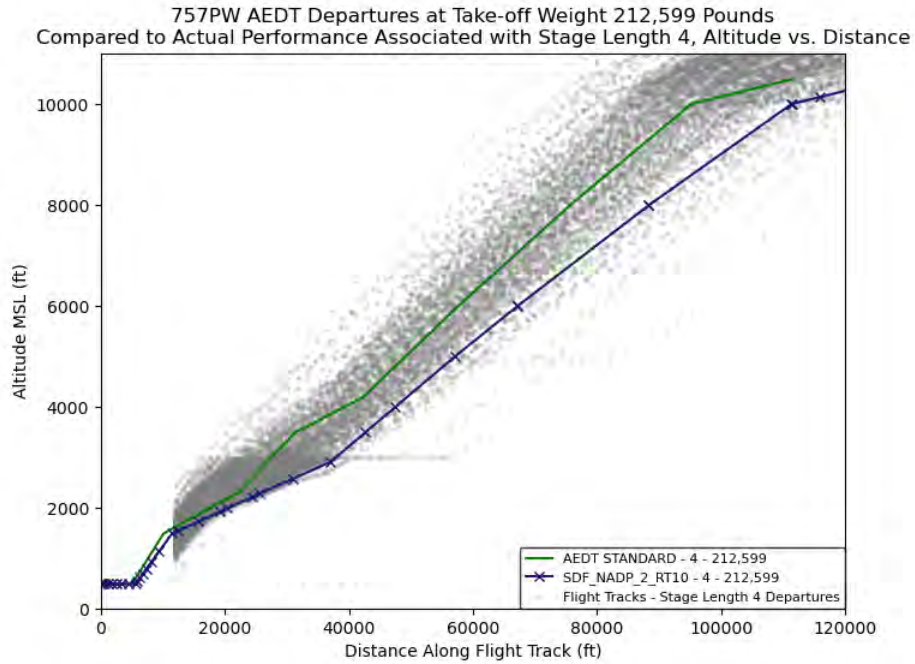


Figure C-79. 757PW Departures, Stage Length 4, Altitude vs. Distance

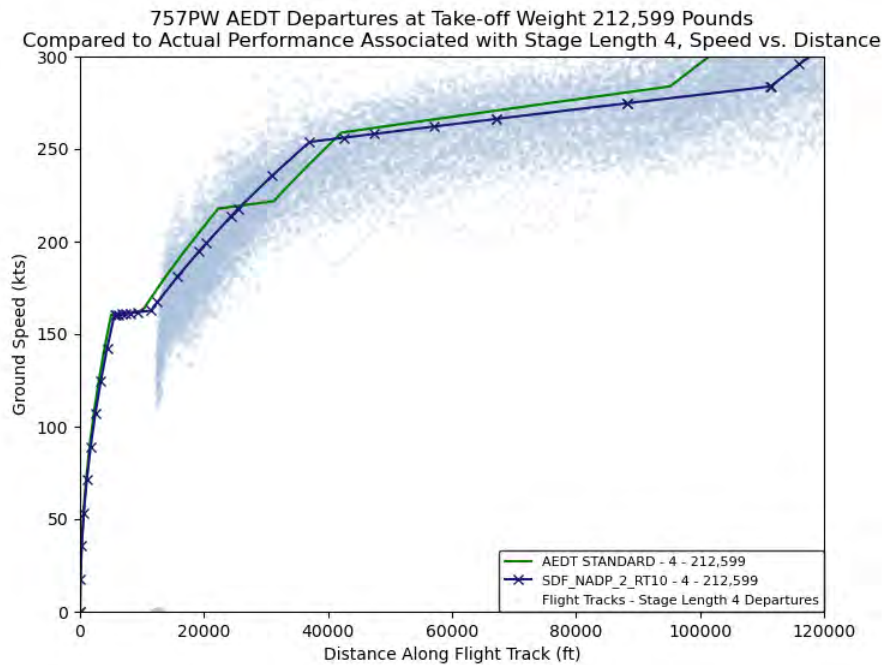


Figure C-80. 757PW Departures, Stage Length 4, Speed vs. Distance

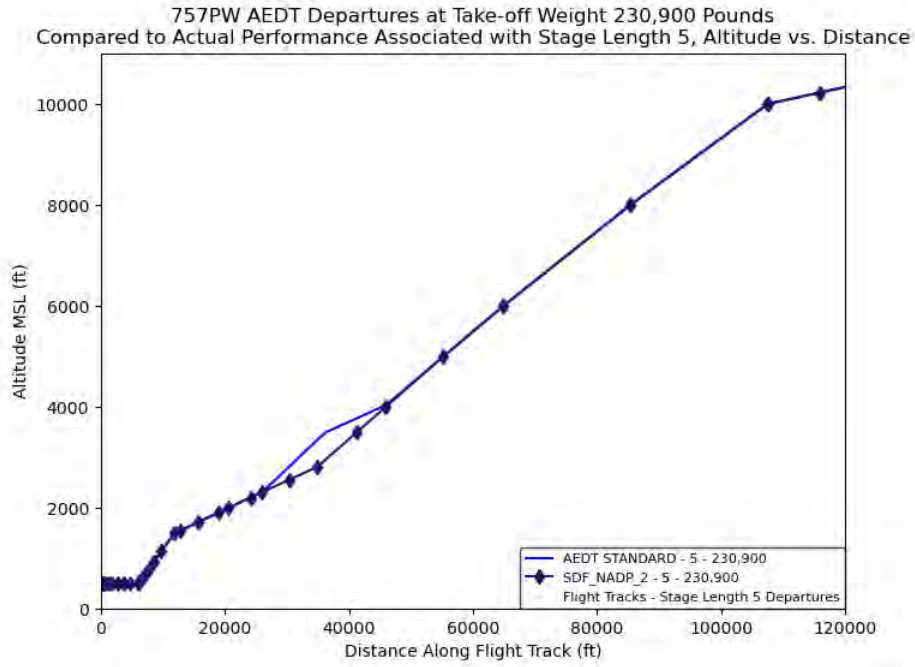


Figure C-81. 757PW Departures, Stage Length 5, Altitude vs. Distance

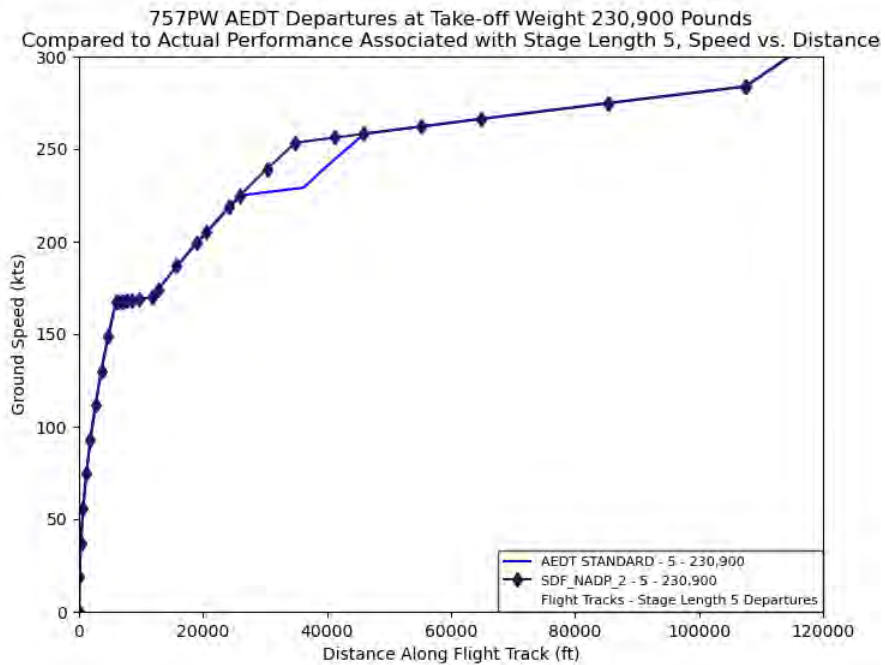


Figure C-82. 757PW Departures, Stage Length 5, Speed vs. Distance

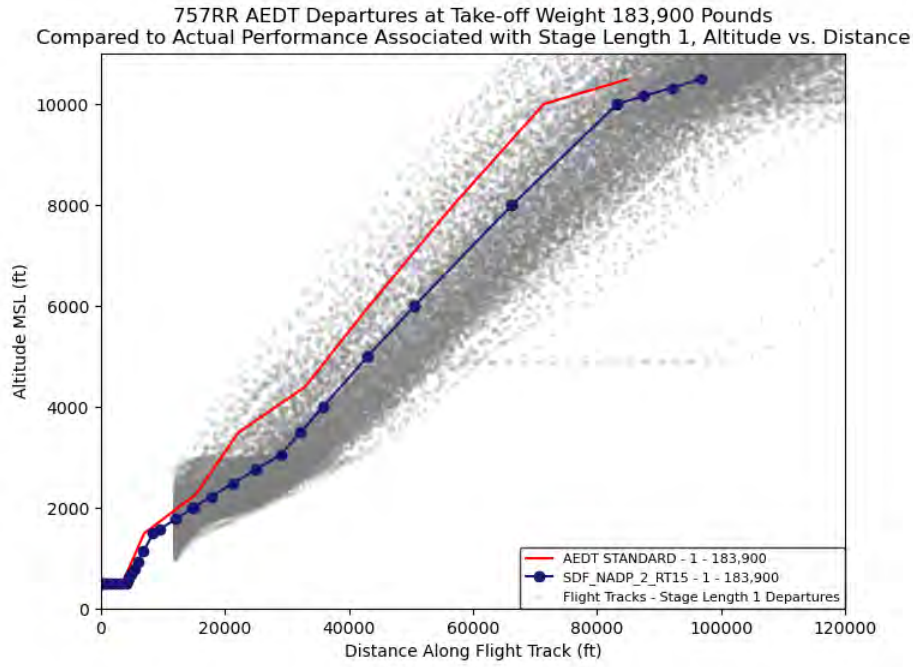


Figure C-83. 757RR Departures, Stage Length 1, Altitude vs. Distance

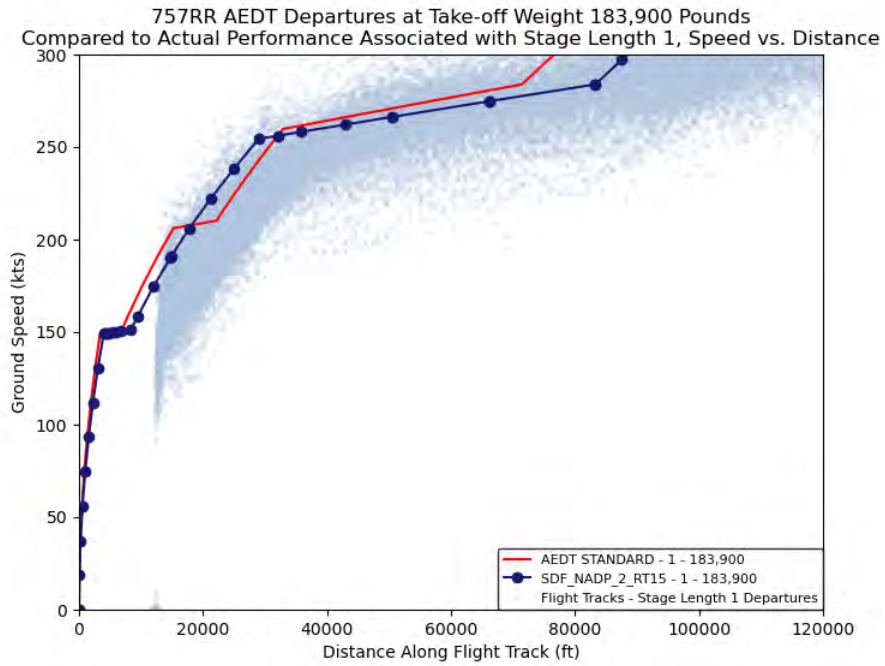


Figure C-84. 757RR Departures, Stage Length 1, Speed vs. Distance

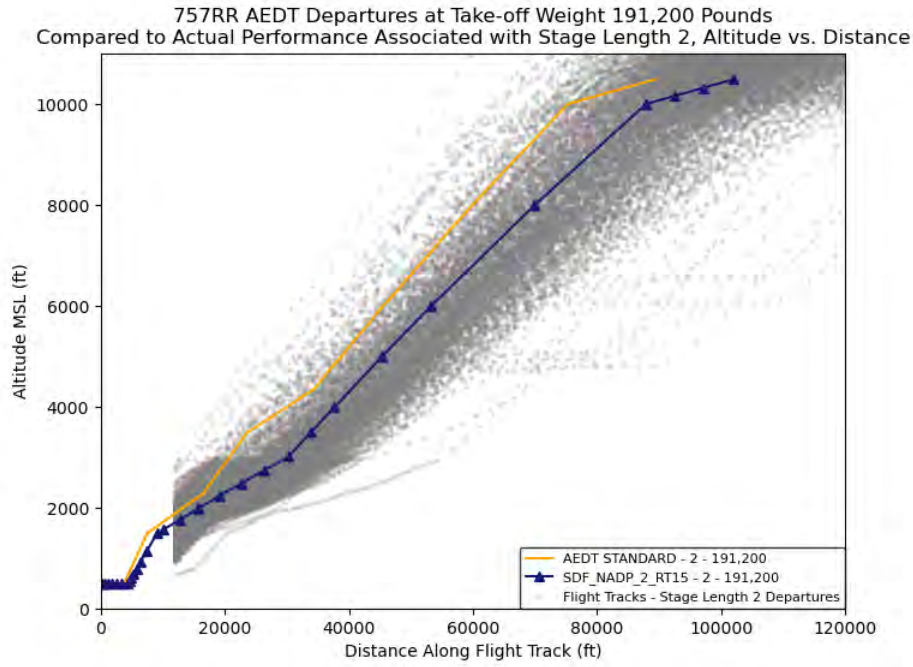


Figure C-85. 757RR Departures, Stage Length 2, Altitude vs. Distance

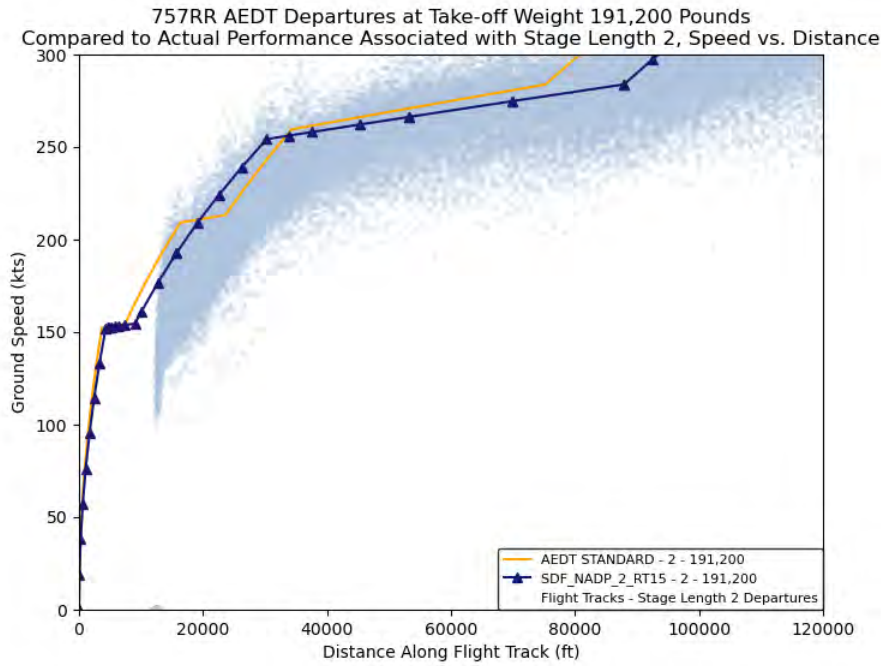


Figure C-86. 757RR Departures, Stage Length 2, Speed vs. Distance

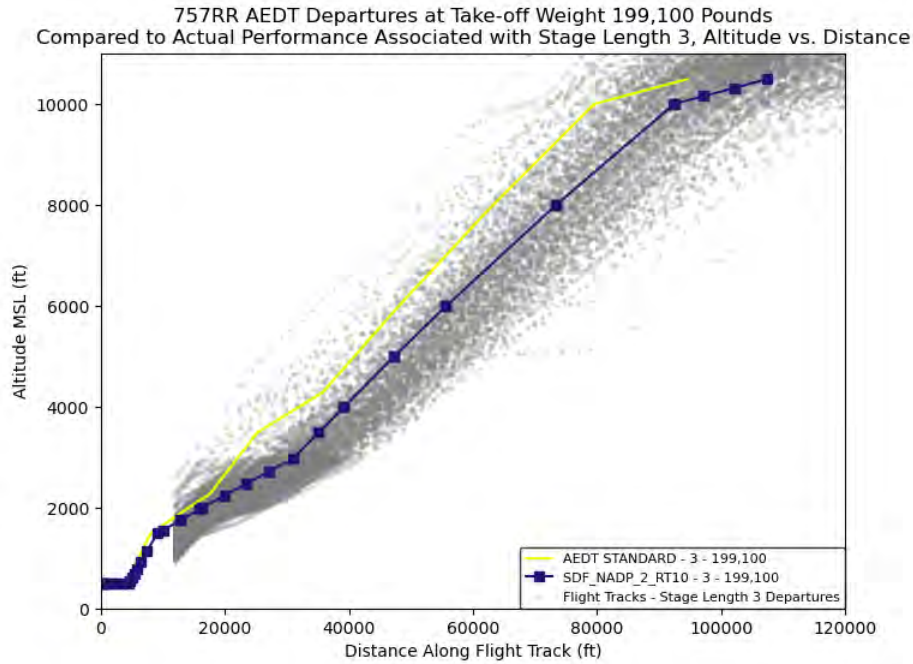


Figure C-87. 757RR Departures, Stage Length 3, Altitude vs. Distance

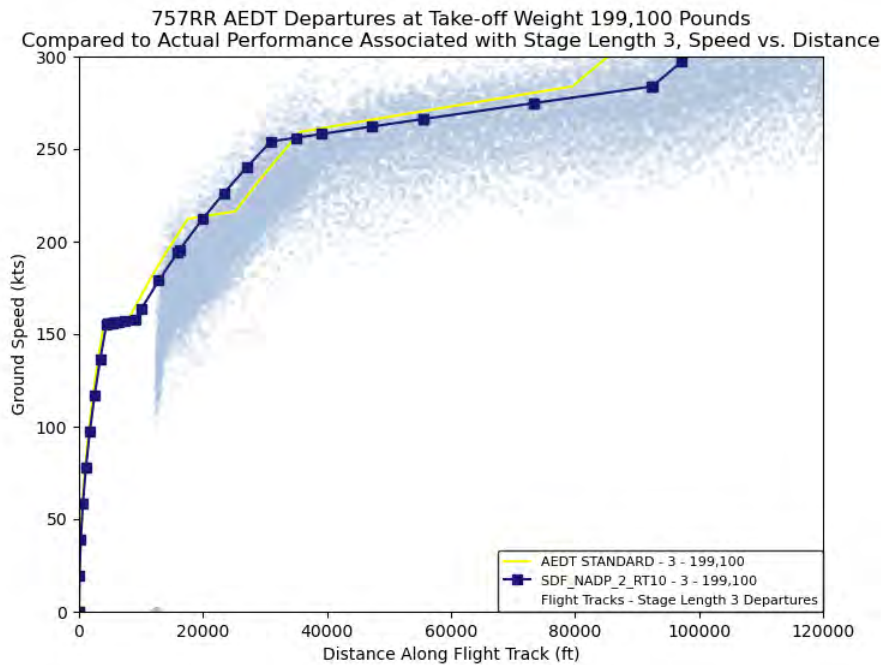


Figure C-88. 757RR Departures, Stage Length 3, Speed vs. Distance

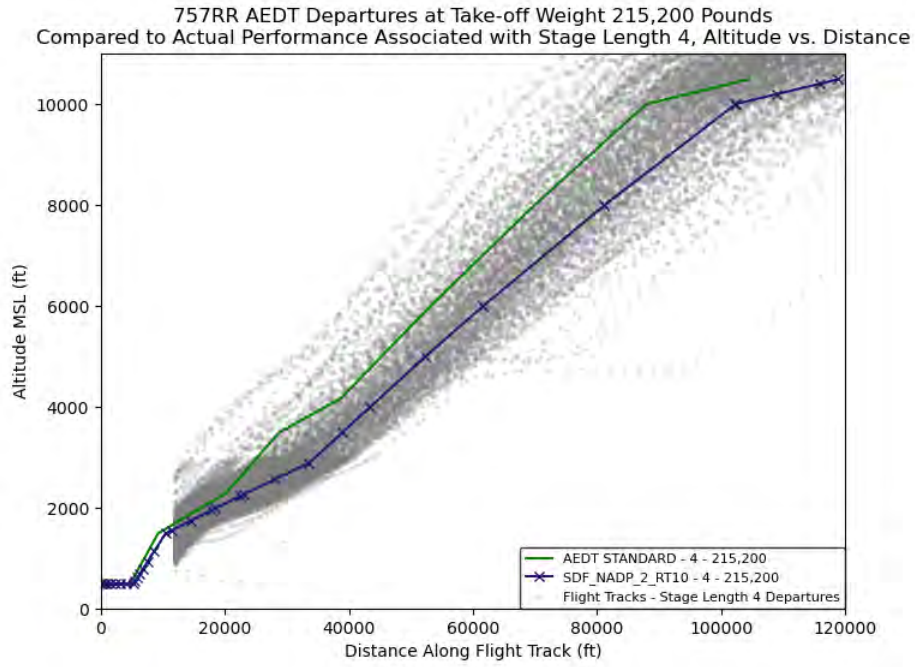


Figure C-89. 757RR Departures, Stage Length 4, Altitude vs. Distance

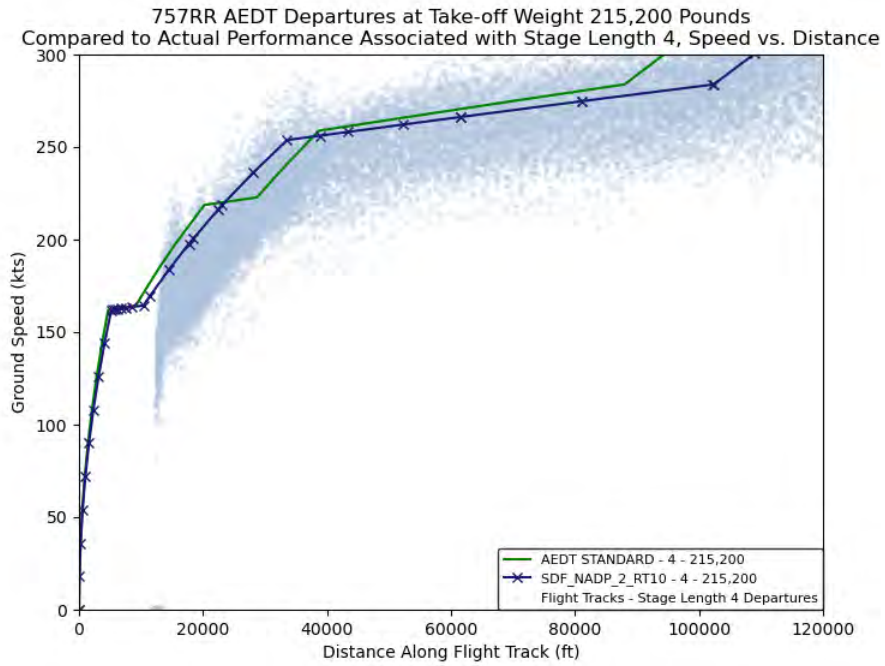


Figure C-90. 757RR Departures, Stage Length 4, Speed vs. Distance

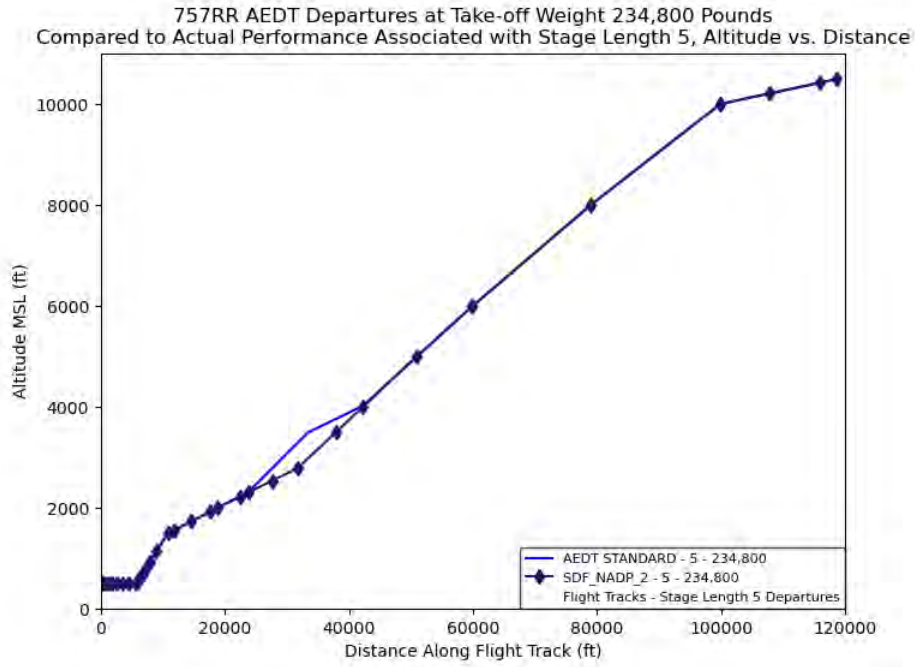


Figure C-91. 757RR Departures, Stage Length 5, Altitude vs. Distance

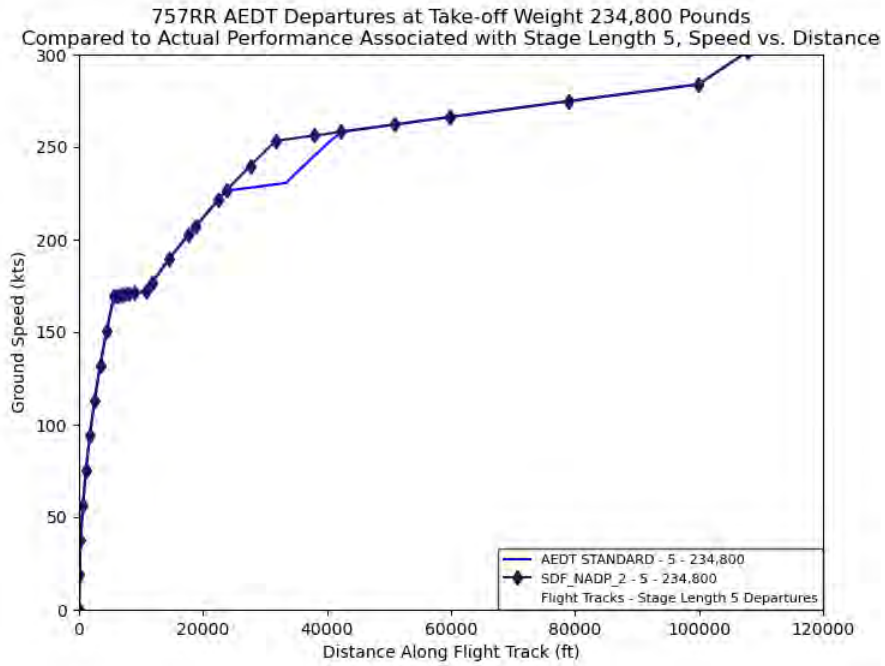


Figure C-92. 757RR Departures, Stage Length 5, Speed vs. Distance

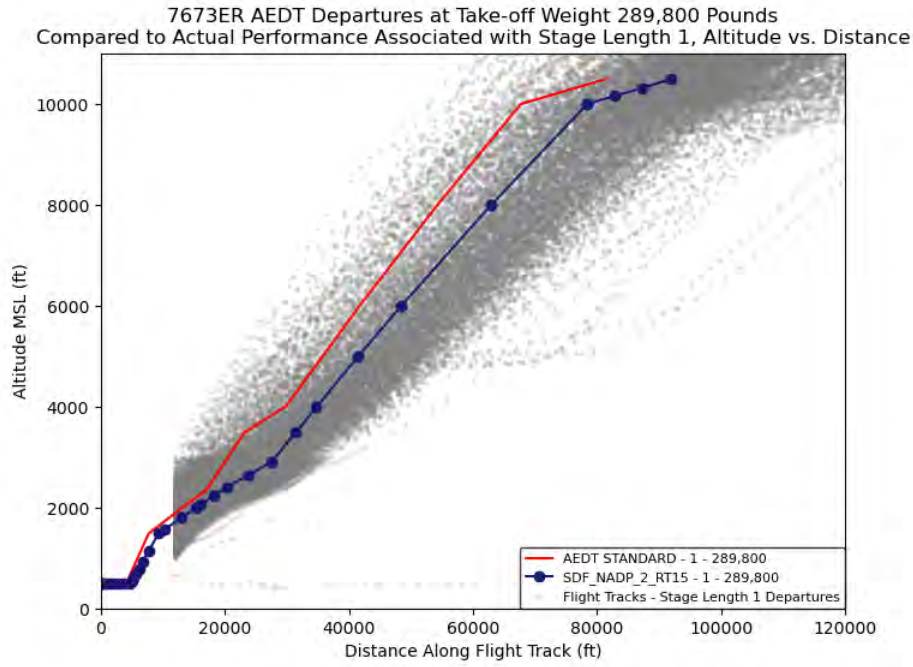


Figure C-93. 7673ER Departures, Stage Length 1, Altitude vs. Distance

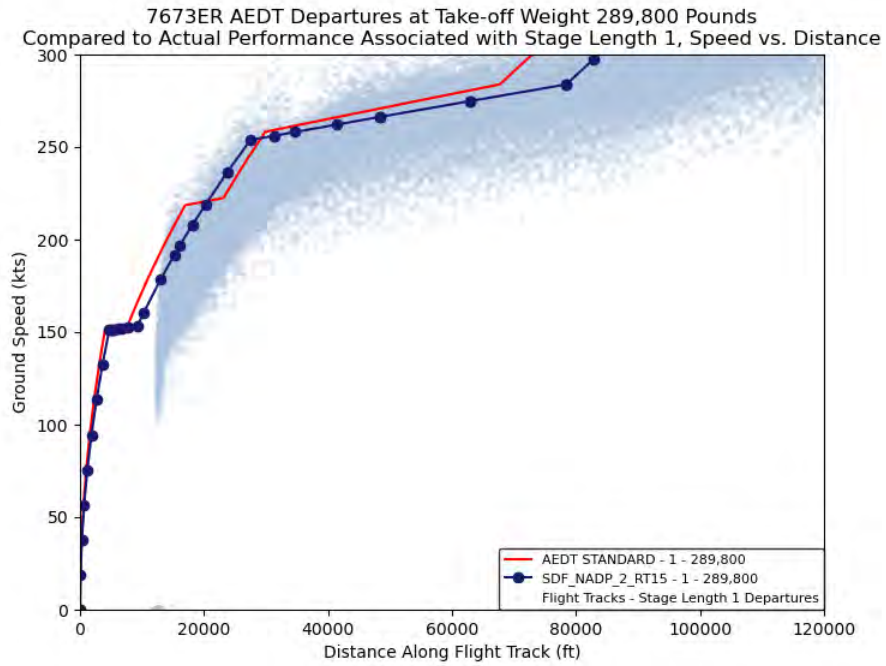


Figure C-94. 7673ER Departures, Stage Length 1, Speed vs. Distance

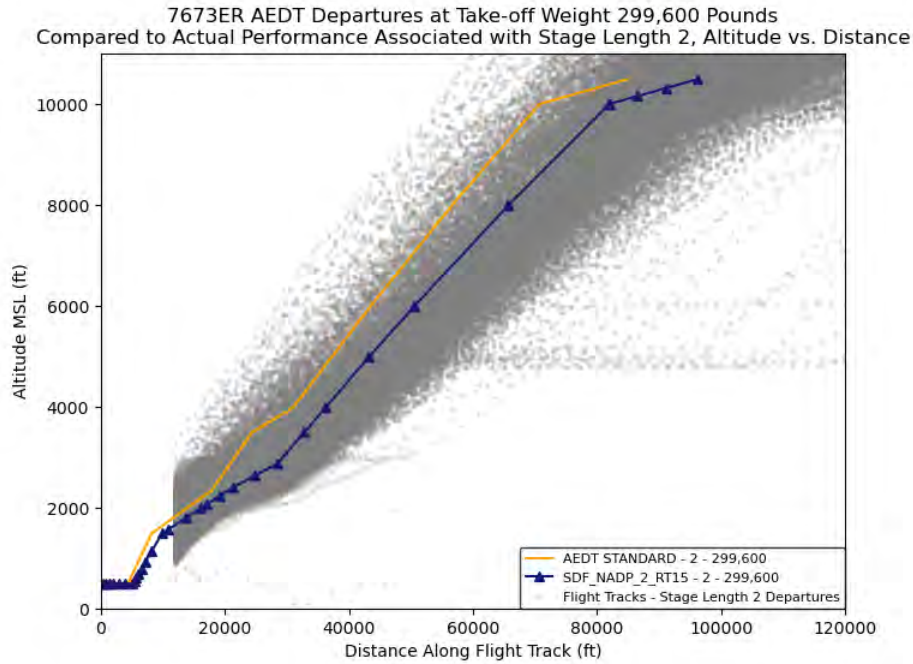


Figure C-95. 7673ER Departures, Stage Length 2, Altitude vs. Distance

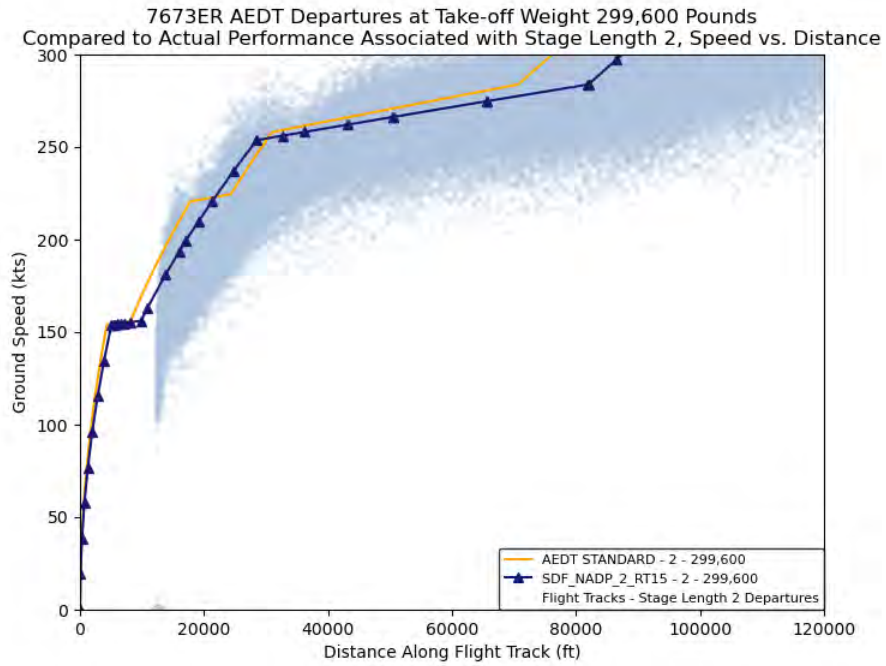


Figure C-96. 7673ER Departures, Stage Length 2, Speed vs. Distance

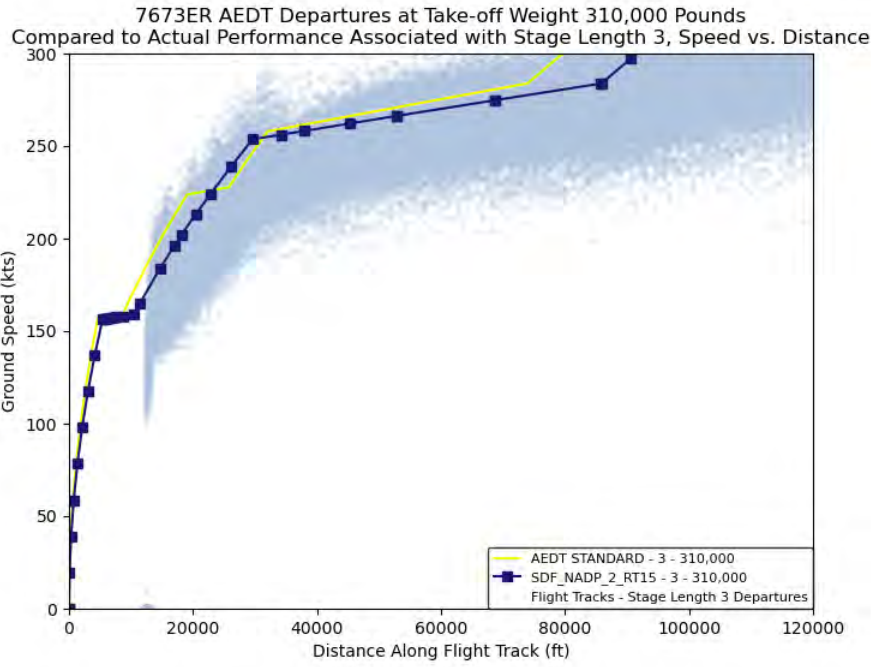


Figure C-97. 7673ER Departures, Stage Length 3, Altitude vs. Distance

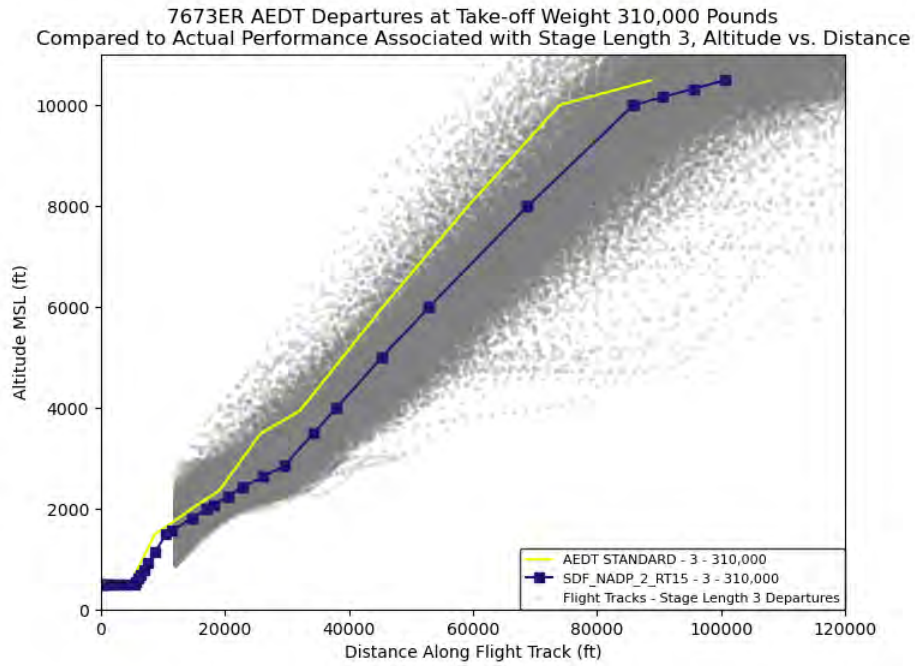


Figure C-98. 7673ER Departures, Stage Length 3, Speed vs. Distance

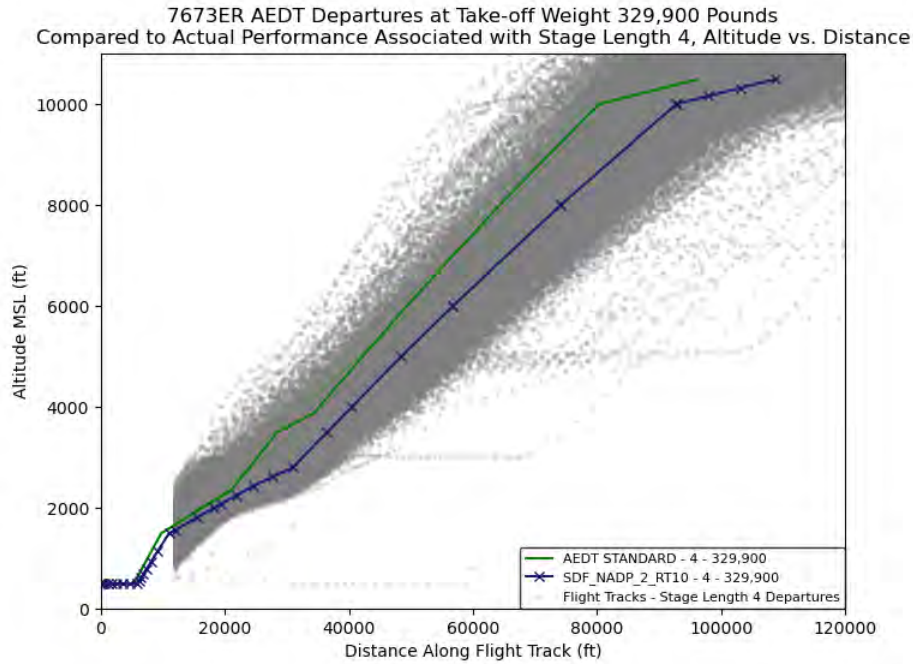


Figure C-99. 7673ER Departures, Stage Length 4, Altitude vs. Distance

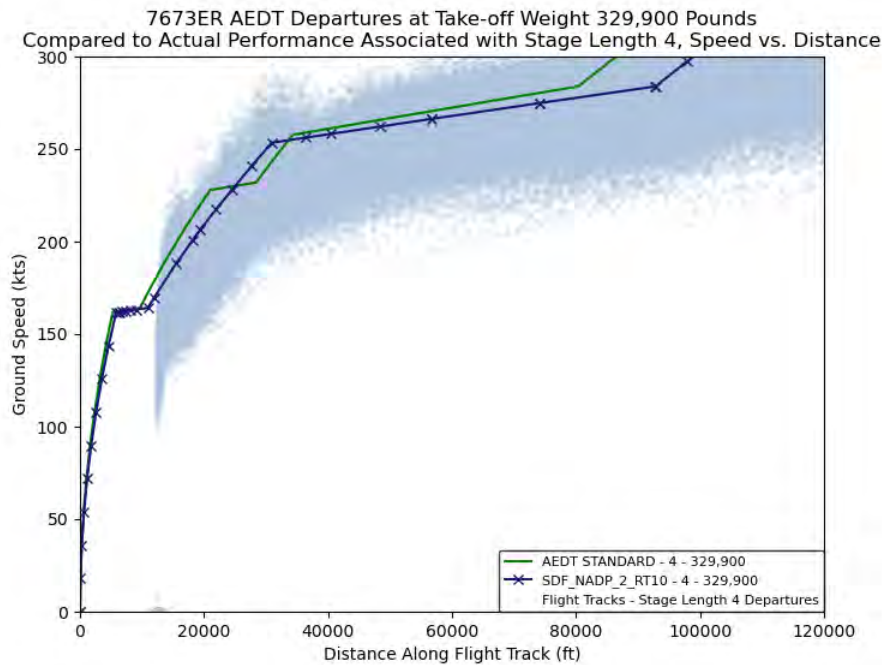


Figure C-100. 7673ER Departures, Stage Length 4, Speed vs. Distance

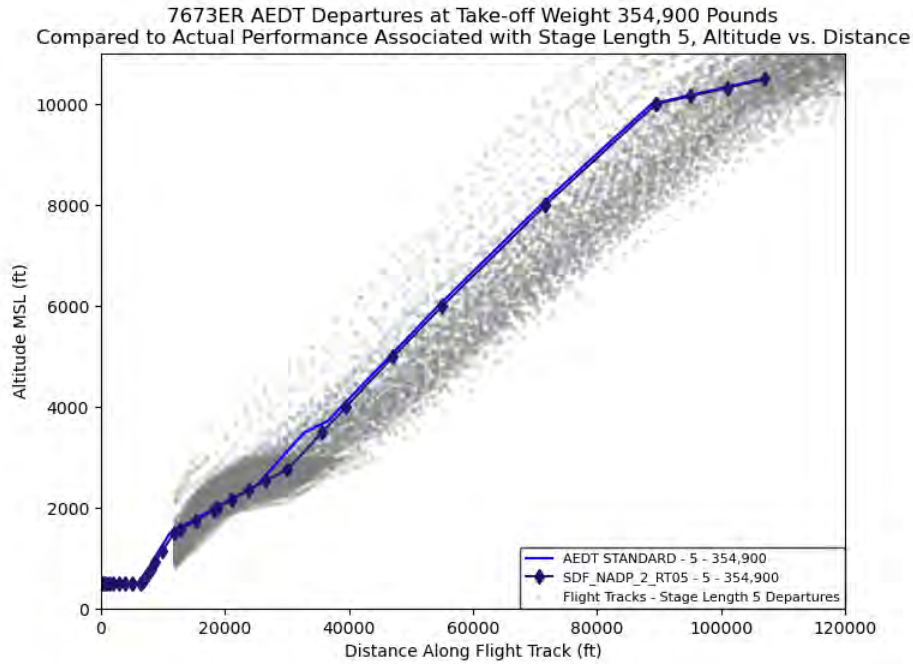


Figure C-101. 7673ER Departures, Stage Length 5, Altitude vs. Distance

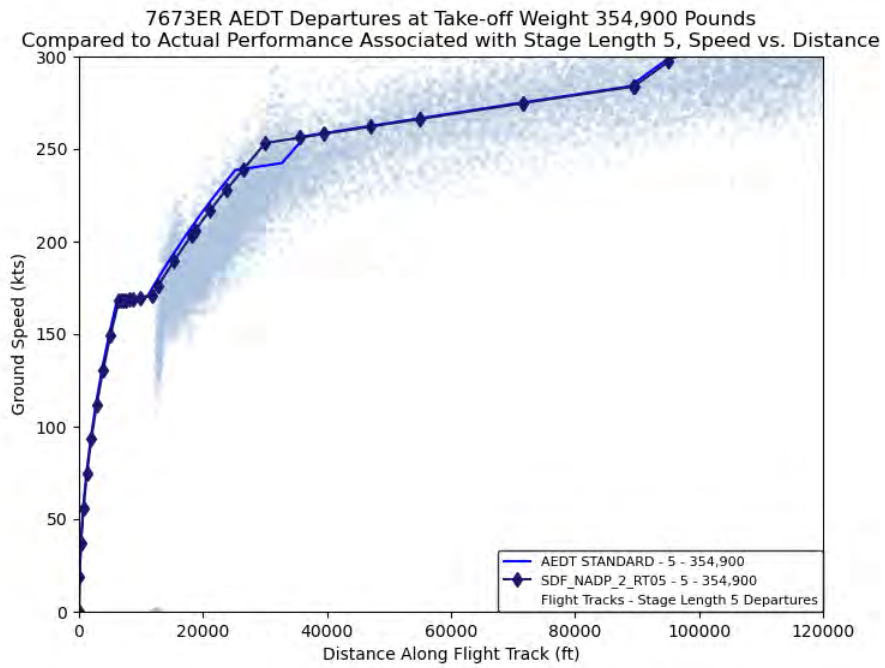


Figure C-102. 7673ER Departures, Stage Length 5, Speed vs. Distance

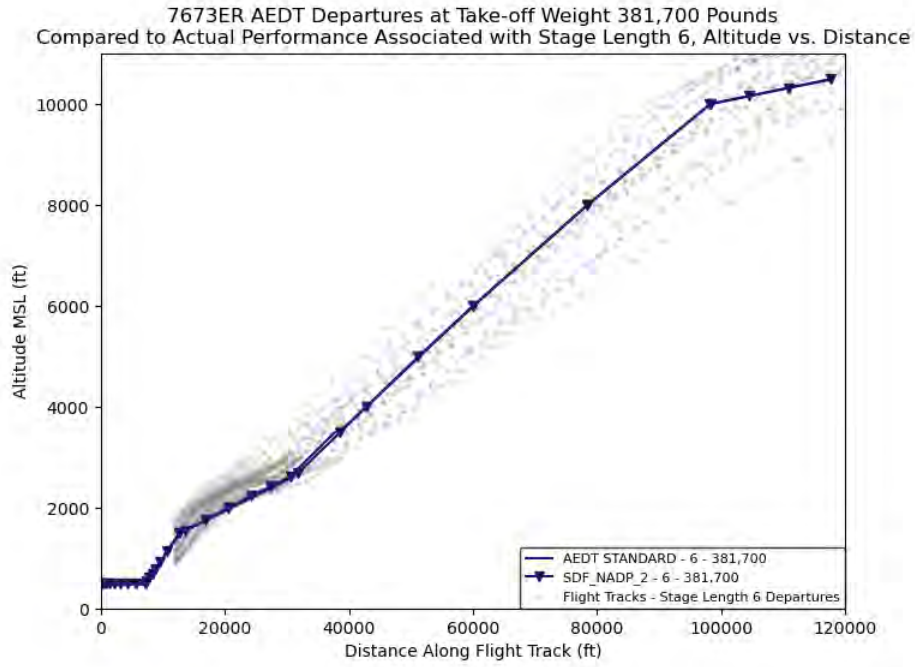


Figure C-103. 7673ER Departures, Stage Length 6, Altitude vs. Distance

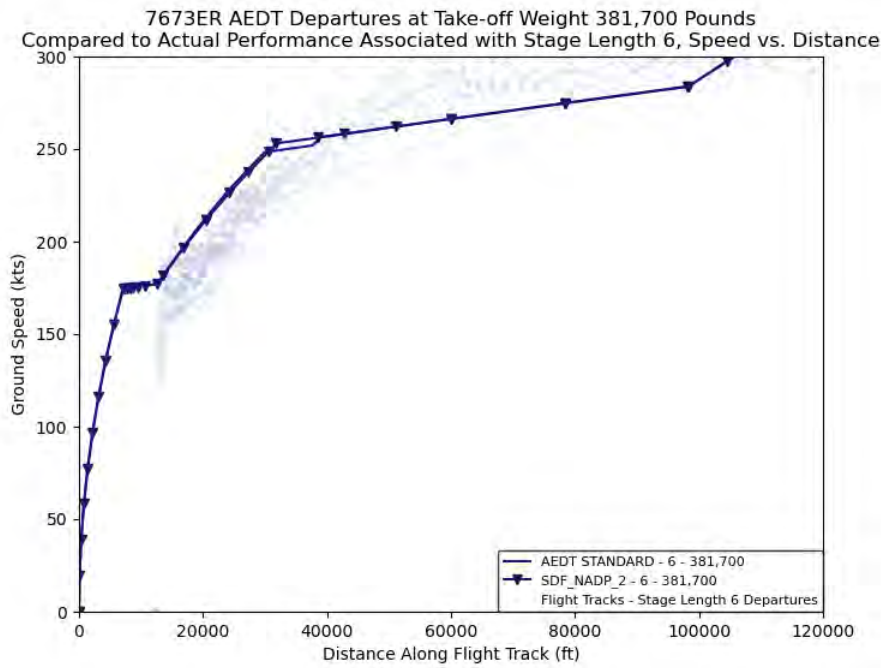


Figure C-104. 7673ER Departures, Stage Length 6, Speed vs. Distance

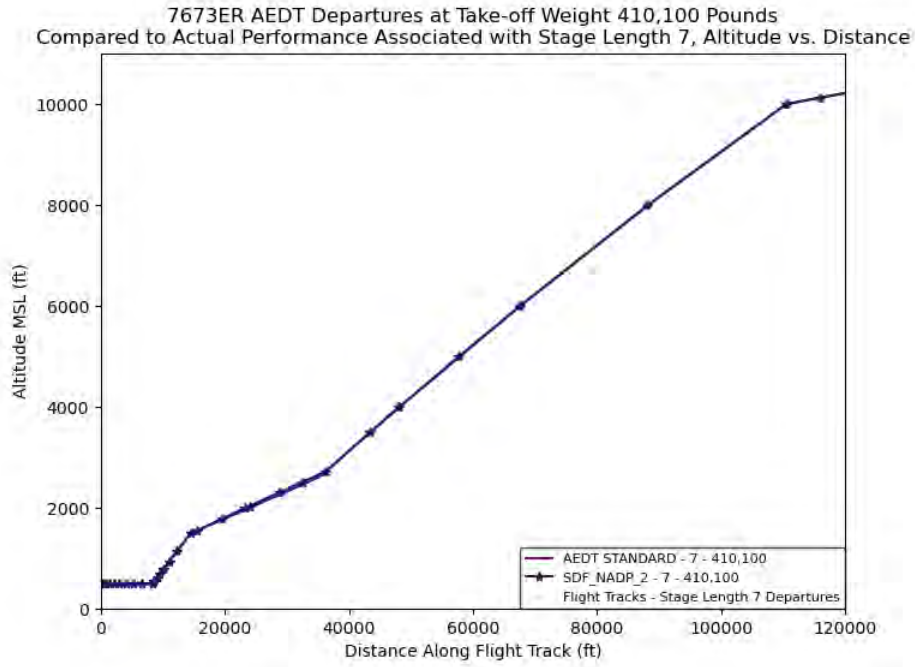


Figure C-105. 7673ER Departures, Stage Length 7, Altitude vs. Distance

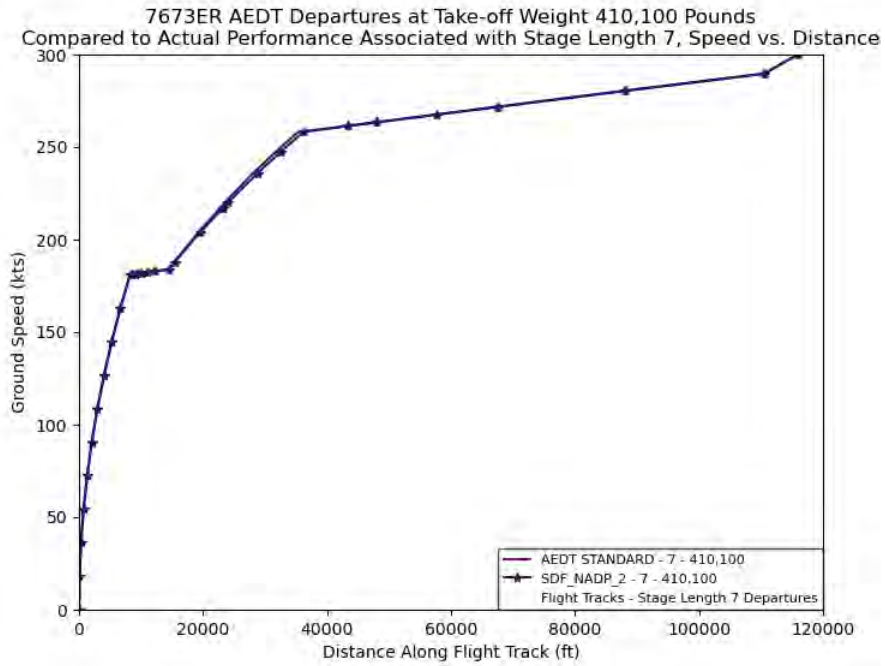


Figure C-106. 7673ER Departures, Stage Length 7, Speed vs. Distance

This page intentionally left blank.



U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

8/23/2024

Peggy Kelley
Environmental Protection Specialist
Memphis Airports District
2600 Thousand Oaks Blvd
Memphis TN 38118-2462

Dear Peggy,

The Office of Environment and Energy (AEE) has received the memo from HMMH on behalf of Louisville Regional Airport Authority, dated August 14, 2024 proposing use of non-standard departure profiles in AEDT 3f to be used by United Parcel Service (UPS). This request is in support of a Noise Exposure Map (NEM) update for Louisville International Airport (SDF).

UPS uses the distant noise abatement departure procedure referred to as NADP2 with the reduced thrust settings. HMMH's memo includes Aircraft and Noise Performance (ANP) aircraft types of A300-622R, 747400, 7478, 757PW, 757RR, and 7673ER.

In accordance with FAA guidance as detailed in the document "Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA"¹, use of non-default methods or data for environmental analysis of FAA actions within AEDT must be approved by AEE.

As provided in the request, UPS has certified their intended use of the user-defined profiles. AEE therefore approves the proposed user-defined profiles for this project. Please understand that this approval is limited to this particular NEM update for SDF and for use with AEDT 3f only. Further non-standard AEDT inputs or methodologies for additional projects at this or any other site will require separate approval.

Sincerely,

Donald Scata
Deputy Director
Office of Environment and Energy

cc: APP-400 Susan Staehle, ASO-610 Peter Green

¹ Federal Aviation Administration, *Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA*, Retrieved from https://aedt.faa.gov/Documents/guidance_aedt_nepa.pdf on January 31, 2022

This page intentionally left blank.

Appendix D: Stakeholder Consultation

Table of Contents

Community Noise Forum meeting materials

September 25, 2023 CNF Meeting Presentation.....	D-3
January 22, 2024 CNF Meeting Presentation.....	D-13
January 22, 2024 CNF Meeting Summary Notes.....	D-29
Public Workshop Boards, Noise 101 handout, and Presentation.....	D-39
Public Workshop Announcements.....	D-57

This page intentionally left blank.





LOUISVILLE
MUHAMMAD ALI
INTERNATIONAL AIRPORT

Louisville International Airport Noise Exposure Map Update

Community Noise Forum Meeting
September 25, 2023



1

LOUISVILLE NEM UPDATE
Consultant Project Team

 <ul style="list-style-type: none"> • Project Management • Noise Lead • Documentation 	 <ul style="list-style-type: none"> • Aviation Forecast • Land Use Verification 	<p>Kimley»Horn</p> <ul style="list-style-type: none"> • Aviation Forecast Review 	 <ul style="list-style-type: none"> • Community/ CNF Liaison
---	--	---	--



LOUISVILLE
MUHAMMAD ALI
INTERNATIONAL AIRPORT

2

LOUISVILLE NEM UPDATE Meeting Agenda

1 What is an NEM Update?

2 NEM Update Goals

3 Roles and Responsibilities

4 History of Part 150 at SDF

5 Public Participation Process

6 Aircraft Noise Terminology

7 Supplemental Analysis

8 Noise Modeling Overview

9 Process Summary

10 Schedule



3

WHAT IS A NOISE EXPOSURE MAP UPDATE?

Airport Noise Compatibility Planning

REGULATION

Title 14 of the Code of Federal Regulations Part 150 (14 CFR Part 150 or "Part 150"), "Airport Noise Compatibility Planning"

- Voluntary FAA-defined process for airport noise studies
 - Over 250 airports have participated
- Sets national standards for analysis
- Provides access to FAA funding of some approved measures

TECHNICAL ELEMENTS

Part 150 has two technical elements:

1. Noise Exposure Map (NEM)
 - This project is an NEM update only
2. Noise Compatibility Program (NCP)
 - This project will not update the NCP



4

4

WHAT IS A NOISE EXPOSURE MAP UPDATE?

Noise Exposure Map (NEM)

The NEM describes:



- NEM must provide information for two timeframes
 - Year of submission (2024)
 - Five-year forecast (2029)
- FAA [checklist](#) identifies NEM requirements and documentation
- Annual average daily noise exposure is depicted using contour lines on a map



5

FAA-Accepted 2021 Forecast NEM for Louisville International Airport (prepared in 2016)

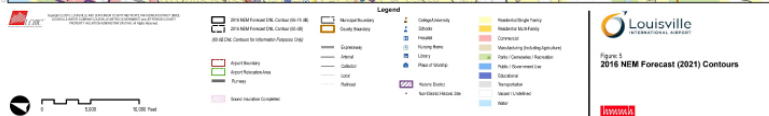
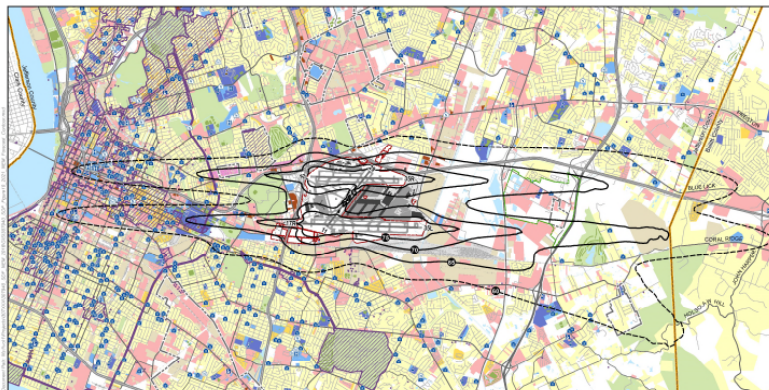
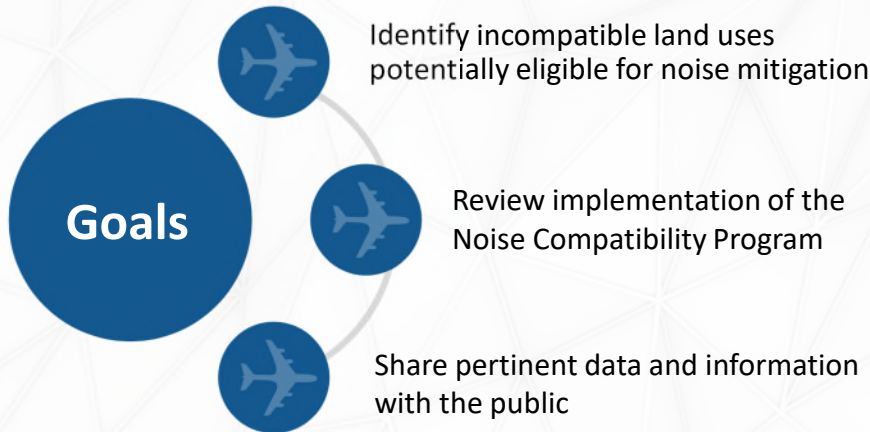


Figure 1
2016 NEM Forecast (2021) Contours



6

LOUISVILLE NEM UPDATE
NEM Update Goals



Note: FAA requires that Noise Exposure Maps reflect existing and/or forecast conditions at all times – thus the need to update them on a regular basis.



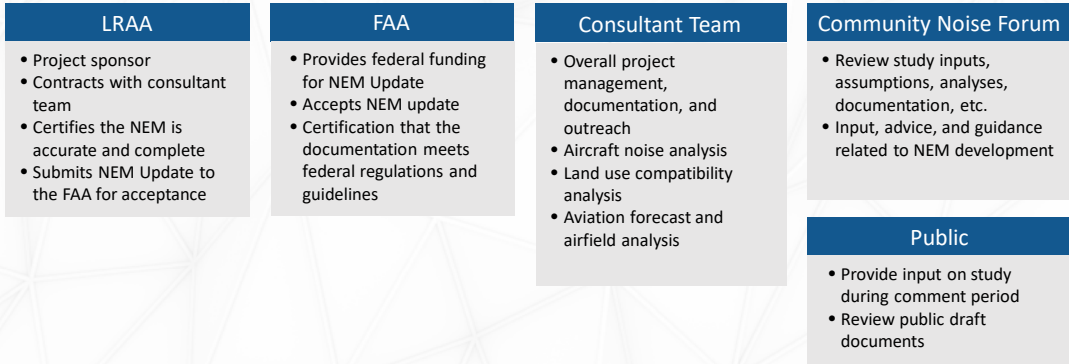
ROLES AND RESPONSIBILITIES
Airport Noise Compatibility

Stakeholder	Responsibilities
Federal government (FAA)	Regulate source noise emissions, air traffic control, funding, and safety oversight
Airport operators	Plan and implement noise compatibility measures
State and local government	Compatible land use planning and control
Aircraft operators	Develop noise-sensitive schedules, cockpit procedures, and fleet improvements
Air travelers and shippers	Bear the costs (through ticket tax)
Current and potential residents	Seek to act in an informed manner



ROLES AND RESPONSIBILITIES

Louisville NEM Update

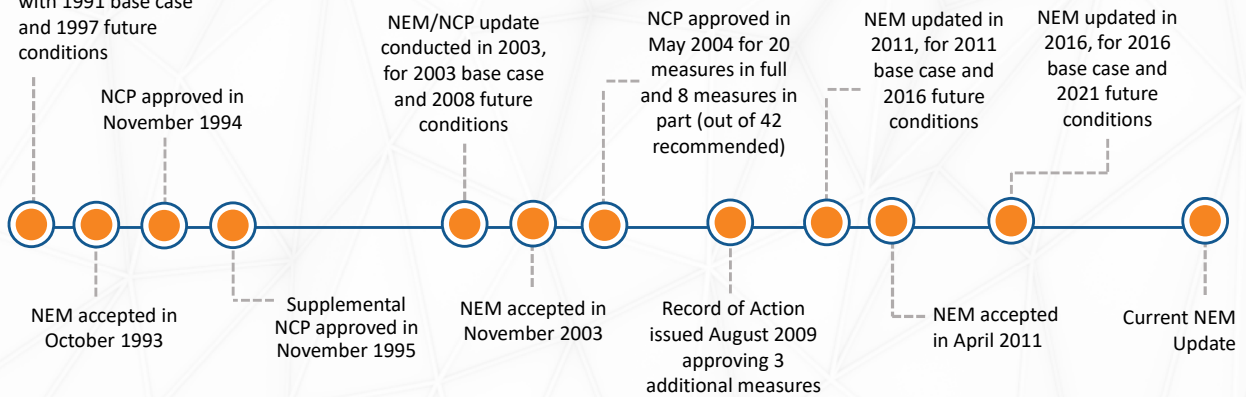


9

LOUISVILLE NEM UPDATE

History of Part 150 at SDF

Original NEM/NCP with 1991 base case and 1997 future conditions



10

Public Participation Process

Provide public with an opportunity for review of the Draft NEM Update and associated documentation

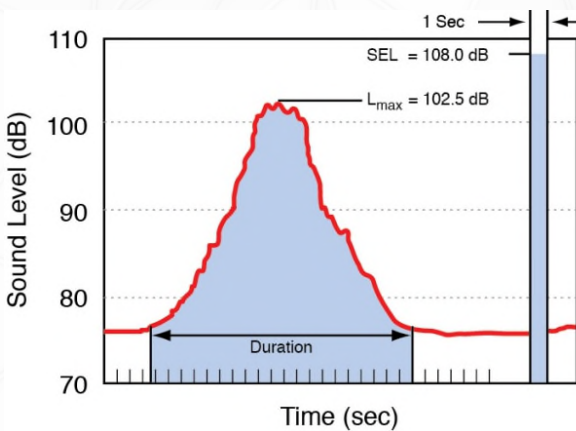
Request comments from public on Draft NEM Update

Hold a public workshop:

- Provide overview of Draft NEM Update
- One-on-one time with NEM Update project team
- Information sharing
- Education

11

Aircraft Noise Terminology

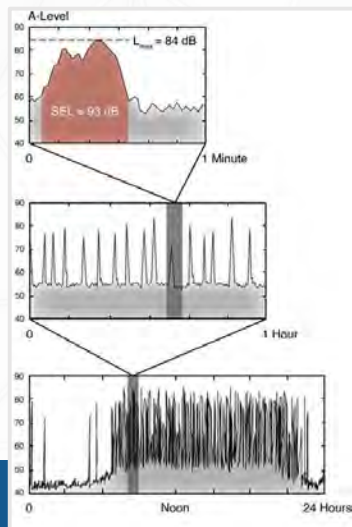


• Noise levels can be expressed many ways, including but not limited to:

- Maximum Noise Level (L_{max})
- Sound Exposure Level (SEL)
- Day-Night Average Sound Level (DNL)

12

Aircraft Noise Terminology – DNL



- FAA requires use of DNL in a Part 150 study
 - DNL represents noise as it occurs over a 24-hour period, with 10 decibels (dB) added to noise events occurring at night (10 p.m. to 7 a.m.).
 - Nighttime operations are weighted to represent the greater sensitivity for most people by nighttime sounds.
- Part 150 guidelines consider all land uses compatible below 65 dB DNL

Supplemental Analysis

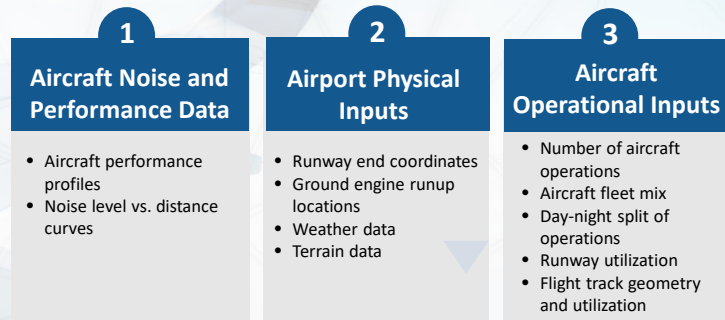
- LRAA requested two supplemental noise metrics:
 - Number of aircraft noise events above 70 dB (N70)
 - Results will be shown in grid point plots
 - Estimated time during a school day that instruction may be disrupted by aircraft noise at local educational facilities
 - The CNF and LRAA will determine up to six educational facilities for analysis
 - Results will be reported as school day equivalent sound level (Leq) and school day loudest 1-hour Leq(1)
- LRAA requested flight track density plots

Noise Modeling Overview

Use of FAA's Aviation Environmental Design Tool (AEDT) noise modeling software is required

- The most current version at study's commencement
- Version 3e
(<https://aedt.faa.gov>)

AEDT requires noise model input data in three categories:



NEM Update Process Summary

1. Collect data and information
2. Develop five-year forecast of aircraft operations
3. Prepare noise model inputs
4. Run the noise model and assess land use compatibility
5. Prepare draft Noise Exposure Map (NEM) documentation
6. Publish NEM documentation for public review and hold public workshop
7. Submit NEM to the FAA for review and acceptance

LOUISVILLE NEM UPDATE
NEM Update Schedule

Phase		Expected Completion
No.	Description	
1	Project Initiation	September 2023
2	Data Collection and Forecast	January 2024
3	Prepare Draft Noise Exposure Maps	May 2024
4	Public Comment Period and Workshop	June 2024
5	Prepare and Submit Noise Exposure Maps	July 2024



17



18

18

This page intentionally left blank.



1



2

INTRODUCTIONS

Consultant Project Team



- Project Management
- Noise Lead
- Documentation



- Aviation Forecast
- Land Use Verification



- Aviation Forecast Review



- Community/CNF Liaison



3

ROLES AND RESPONSIBILITIES

Noise Exposure Map Update

LRAA

- Project sponsor
- Contracts with consultant team
- Certifies the NEM is accurate and complete
- Submits NEM Update to the FAA for acceptance

FAA

- Provides federal funding for NEM Update
- Accepts NEM update
- Certification that the documentation meets federal regulations and guidelines

Consultant Team

- Overall project management, documentation, and outreach
- Aircraft noise analysis
- Land use compatibility analysis
- Aviation forecast and airfield analysis

Community Noise Forum

- Review study inputs, assumptions, analyses, documentation, etc.
- Input, advice, and guidance related to NEM development

Public

- Provide input on study during comment period
- Review public draft documents



4

PART 150 OVERVIEW

Airport Noise Compatibility Planning

REGULATION

Title 14 of the Code of Federal Regulations Part 150 (14 CFR Part 150 or “Part 150”), “Airport Noise Compatibility Planning”

- Voluntary FAA-defined process for airport noise studies
 - Over 250 airports have participated
- Sets national standards for analysis
- Provides access to FAA funding of some approved measures

TECHNICAL ELEMENTS

Part 150 has two technical elements:

1. Noise Exposure Map (NEM)
 - This project is an NEM update only
2. Noise Compatibility Program (NCP)
 - This project will not update the NCP

5

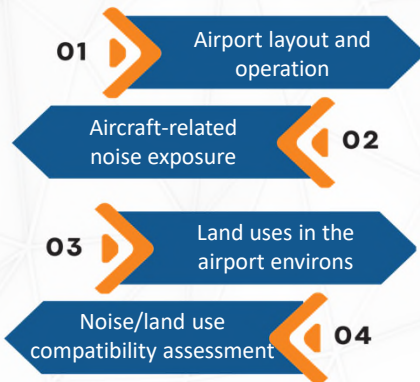


5

PART 150 OVERVIEW

Noise Exposure Map (NEM)

The NEM describes:



- NEM must provide information for two timeframes:
 - Year of submission (2024)
 - Five-year forecast (2029)
- FAA [checklist](#) identifies NEM requirements and documentation
- Annual average daily noise exposure is depicted using contour lines on a map

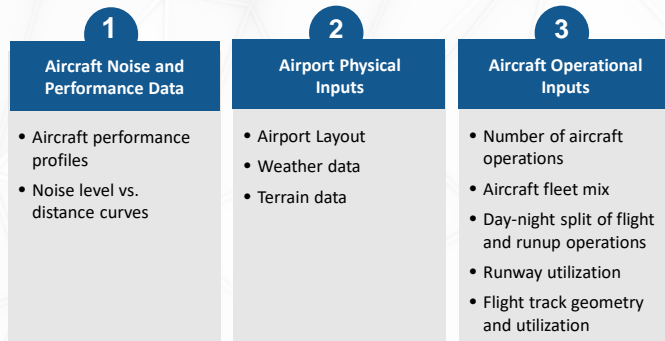
6



Noise Modeling Overview

- FAA requires use of their Aviation Environmental Design Tool (AEDT) for civilian aircraft operations
 - Version 3f is the most current version (at study's commencement)
 - <https://aedt.faa.gov>

AEDT requires noise model input data in three categories:



7

NOISE MODELING OVERVIEW

Noise Modeling Input Categories

AEDT Input Category	Data Source
1 Aircraft Noise and Performance Characteristics	Standard AEDT database
2 Physical Description of the Airfield Layout	FAA 5010 data and AEDT database
Meteorological Conditions	AEDT database - National Climatic Data Center data
Terrain Data	U.S. Geological Survey National Elevation Dataset - geoTIFF
Aircraft Flight Operations	SDF NOMS system data for baseline conditions fleet mix and SDF forecast data for 2024 and 2029
Aircraft Ground Runup Operations	Aircraft Operators
Runway Utilization Rates	SDF NOMS system data
Flight Track Geometry And Utilization Rates	SDF NOMS system data

All materials presented on the following slides are draft and subject to:

- Community Noise Forum review
- Airport review and approval
- FAA review and approval

The acronym NOMS (Noise and Operations Monitoring System) refers to SDF's Aircraft Flight Tracking and Noise Management System (sometimes called AFTNMS)



8

NOISE MODELING OVERVIEW

Aircraft Noise and Performance Data

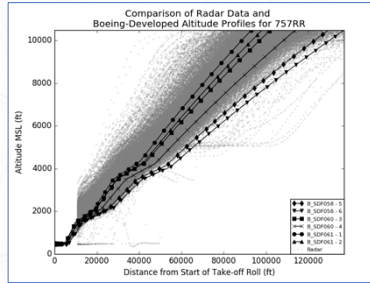
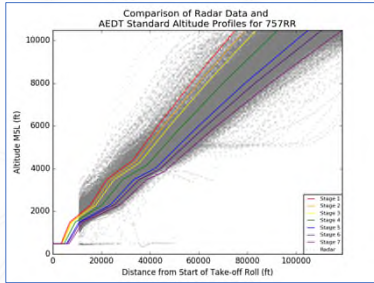
AEDT's 3f database contains:

- 181 fixed-wing civilian aircraft
- 84 military aircraft
- 26 Helicopters

Aircraft performance profiles – how the aircraft is flown

- Altitude, Speed, and Engine Thrust along flight track
- Curves of noise level vs. distance

Any adjustments to default AEDT profile database require FAA approval



Example profile graphics from SDF 2016 NEM memorandum to FAA requesting approval of Boeing corporation's profile data in modeling certain aircraft



9

NOISE MODELING OVERVIEW

Physical Input Requirements

AIRFIELD LAYOUT

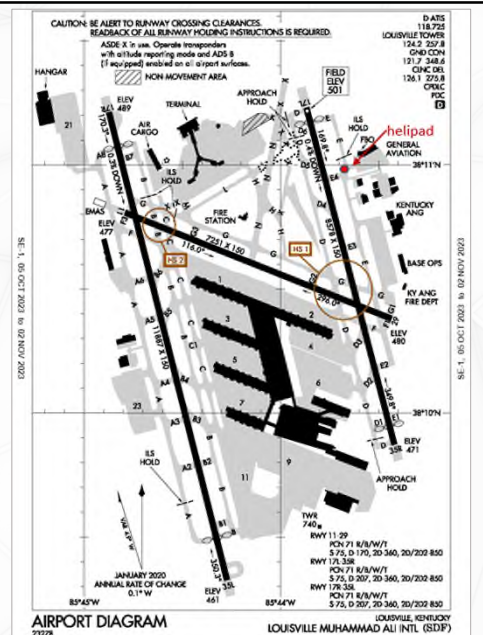
Runways

- Runway 17L/35R – Parallel
- Runway 17R/35L - Parallel
- Runway 11/29 - Crosswind

Helipad (red dot)

- On Taxiway E4

Diagram Source: https://www.faa.gov/airports/runway_safety/diagrams, accessed October 12, 2023
 Annotations added by HMMH for noise modeling purposes; data sources are SDF NOMS and information from SDF staff



10

NOISE MODELING OVERVIEW

Physical Input Requirements

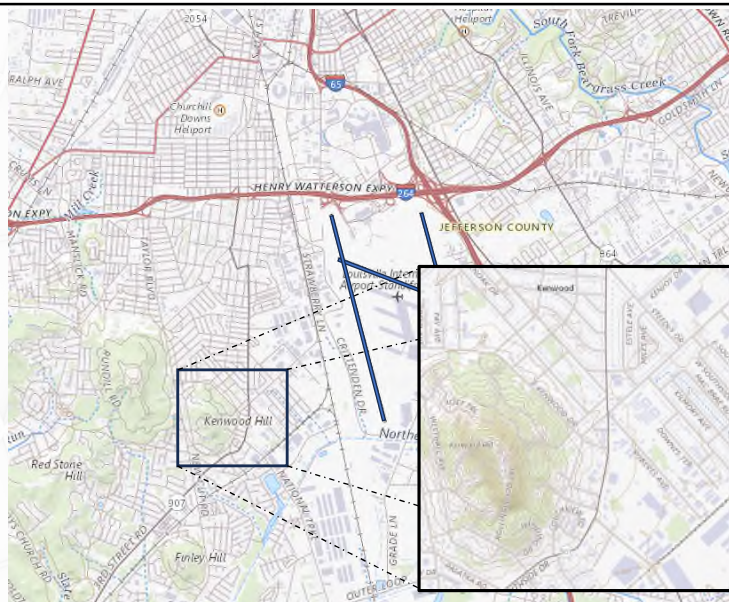
METEOROLOGICAL CONDITIONS

- AEDT database includes recent 10-year (2013-2022) averages:

Temperature	58.6° F
Station Pressure	999.66 mbar
Relative Humidity	65.01 %
Dew Point	46.9° F
Wind Speed	6.94 knots

TERRAIN DATA

- Data obtained from the U.S. Geological Survey National Elevation Dataset



USGS topographical map, excerpt of area southwest of SDF



11

NOISE MODELING OVERVIEW

Operational Input Requirements

Annual Average Day Operations	Existing Year 2024 Forecast Year 2029	
Aircraft Type	Jet Turboprop Helicopter Piston	<i>Matched to specific AEDT Aircraft Types</i>
Day-Night Split	Day: 7 AM – 10 PM Night: 10 PM – 7 AM	
Runway Use, Flight Tracks, Track Use	<i>Represents where the flight operations occur</i>	
Stage Length	Surrogate for aircraft weight; determined by distance from departure to destination airport	

Year	Air Carrier	Air Taxi	General Aviation	Military	Total
2024	150,554	15,502	10,031	1,771	177,858
2029	161,569	16,569	10,721	1,771	190,098

Note 1: Forecast Pending FAA Approval.

Note 2: Operations sums may appear to be off due to rounding.

Source: Kimley-Horn and Associates, Inc.; C&S Engineers, Inc.; ATADS



12

NOISE MODELING OVERVIEW

Runway Use

Runway End	11	17L	17R	29	35L	35R	Total
Day							
Departure	0.0%	24.4%	32.4%	3.1%	15.8%	24.3%	100%
Arrival	<0.1%	26.9%	20.4%	2.8%	26.3%	23.5%	100%
Night							
Departure	0.0%	32.6%	47.9%	0.2%	10.8%	8.5%	100%
Arrival	<0.1%	13.3%	17.6%	0.5%	42.0%	26.4%	100%
Overall							
Departure	0.0%	28.2%	39.6%	1.8%	13.5%	17.0%	100%
Arrival	<0.1%	20.3%	19.0%	1.7%	34.0%	24.9%	100%

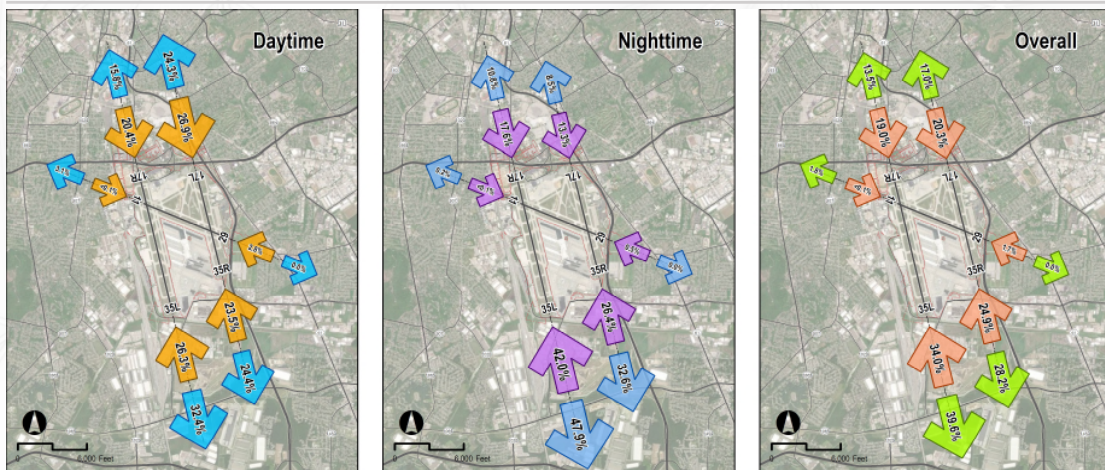
Source: SDF NOMS data 9/1/2022 – 8/31/2023 and HMMH, 2024



13

NOISE MODELING OVERVIEW

Runway Use



14

NOISE MODELING OVERVIEW

Flight Tracks

HMMH AEDT-preprocessor software uses individual NOMS flight tracks for modeling

- Conventional modeling relies on consolidated, representative flight tracks
- Preprocessor method models each aircraft operation
 - On the specific runway it actually used
 - At the actual time of day of the arrival or departure
 - On the actual flight path (no need to estimate dispersion)
- Most military operations are removed from NOMS data
 - Nominal military flight tracks developed in the previous Part 150 will be used



Image source: FAA Public Information Workshop, 11/14/2023

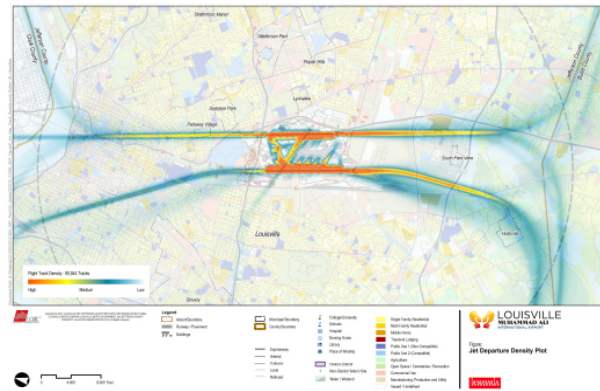
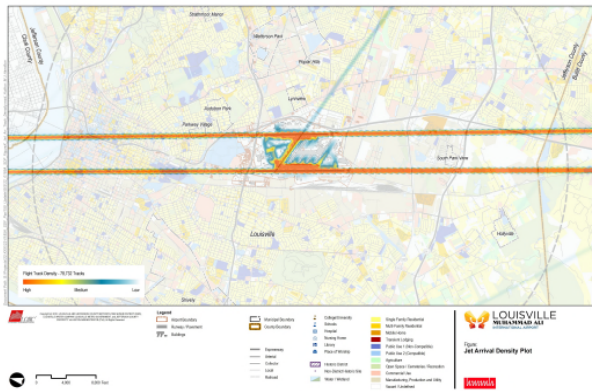
FAA changes to SDF airspace routing / standard flight procedures

- HMMH analysis - flight track changes for forecast conditions modeling



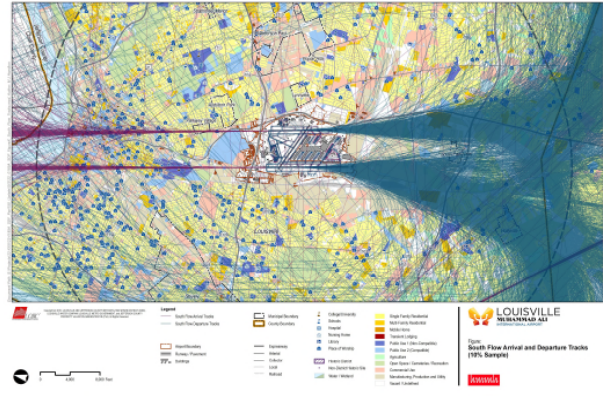
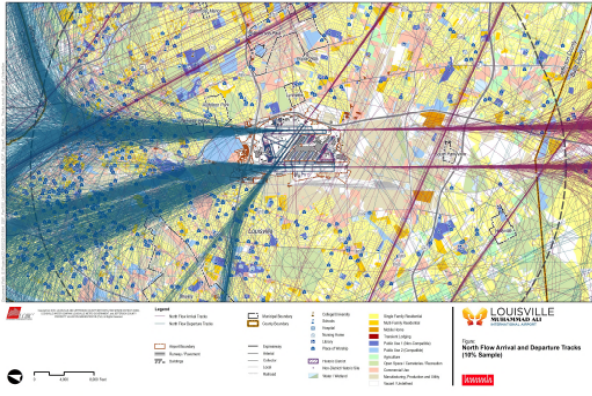
NOISE MODELING OVERVIEW

Existing Flight Track Density (12 months)



NOISE MODEL OVERVIEW

Existing Flight Tracks (10% of 12 months)



17

NOISE MODELING OVERVIEW

Flight Track Development (FAA Airspace Changes)

Example of development of new model flight tracks for a modified procedure

- Identify which current tracks are flying the current RNAV procedures
- Determine which aircraft would fly new procedures*
- Develop model tracks to represent new procedures
- Shift operations in forecast case onto new model tracks

*UPS does not currently fly the procedures at night, but they **will** fly the new procedures at night.



18

AVIATION FORECAST

Baseline Data Analysis - Civilian

Based on 12 months of flight track and aircraft identification data:
September 1, 2022 through August 31, 2023

Data sources include:

- FAA Aircraft Tracking and Data System (ATADS)
- SDF NOMS
- Operator interviews

Adjusted annual aircraft operations to FAA tower counts.

Category	NOMS Tracks	Tower Counts
Air Cargo	100,158	100,592
Air Carrier	47,275	47,511
Air Taxi	13,689	15,265
GA	8,303	9,877
Military	70	1,889
Total	169,495	175,134

Determined the following for each FAA category (air carrier, air taxi, air cargo, and general aviation):

- Day-night split of operations
- Fleet mix
- Departure stage length

Each flight in the scaled NOMS data is modeled on the actual flight track that was flown.

No need to apply runway use averages or develop average representative tracks.



19

AVIATION FORECAST

Baseline Data Analysis - Military

Based on discussions with Kentucky Air National Guard and 2023 military aircraft refueling data from Atlantic Aviation FBO

Data sources include:

- Kentucky Air National Guard interviews
- Atlantic Aviation military refueling counts

Kentucky Air National Guard's 123rd Airlift Wing operates fleet of C-130J aircraft

- 1,100 annual operations
- The only nighttime operations are arrivals during summer

Military aircraft utilize the active runway at time of operation. C-130J aircraft operate:

- Tuesday – Thursday
- 12:00 PM – 3:00 PM
- 7:00 PM – 9:00 PM

Transient military operations estimated at 671 annually

Transient military fleet determined from Atlantic Aviation refueling records:

- One refueling treated as two operations (one arrival, one departure)

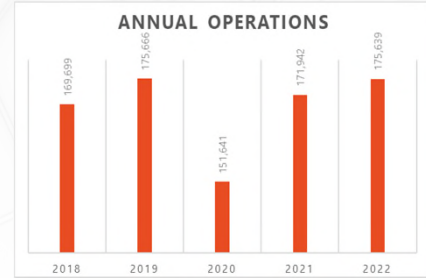


20

AVIATION FORECAST

Existing (2024) and Forecast (2029) Conditions

- Validation/Comparison of published operations activity at SDF since 2021 Master Plan forecast
- Review of OPSNET (ATADS) activity from 2018 to 2022
 - Trend analysis with 1.34% average annual growth rate (AAGR)
- Review of FAA Terminal Area Forecast activity from 2018 to 2022
 - Projected FAA TAF growth comparison
- SDF Forecast for NEM 2024 to 2029
 - Utilizes existing total operations (2023) from ATADS data
 - Projects growth at 1.34% AAGR through 2029



21

AVIATION FORECAST

2024 Annual Aircraft Operations

Category	Type		Arrivals		Departures		Total Operations
			Day	Night	Day	Night	
Air Carrier	Jets	Passenger	22,641	6,630	23,380	5,891	58,541
		Cargo	15,598	30,408	17,160	28,846	92,012
Air Taxi	Jets	Passenger	4,132	680	4,231	581	9,625
		Non-jets	561	984	690	855	3,090
		Cargo	-	1,394	20	1,374	2,788
GA	Helicopters		41	57	46	52	195
	Jets		3,776	254	3,773	258	8,062
	Non-jets		819	68	798	90	1,774
Military	KYANG	C-130s	550	-	550	-	1,100
	Transient		336	-	297	39	671
Totals			48,454	40,475	50,944	37,958	177,858

Note 1: Forecast Pending FAA Approval
 Note 2: Operations sums may appear to be off due to rounding
 Source: C&S Engineers, Inc.; ATADS



22

AVIATION FORECAST

2029 Annual Aircraft Operations

Category	Type		Arrivals		Departures		Total Operations
			Day	Night	Day	Night	
Air Carrier	Jets	Passenger	24,511	7,177	25,311	6,377	63,376
		Cargo	16,799	32,031	18,476	30,355	97,661
Air Taxi	Jets	Passenger	4,416	727	4,522	621	10,287
		Non-jets	599	1,052	737	914	3,303
		Cargo	-	1,490	21	1,469	2,980
GA	Helicopters		43	61	49	55	208
	Jets		4,036	272	4,032	276	8,616
	Non-jets		876	72	852	96	1,896
Military	KYANG	C-130s	550	-	550	-	1,100
	Transient		335	-	297	39	671
Totals			52,167	42,882	54,848	40,201	190,098

Note 1: Forecast Pending FAA Approval
 Note 2: Operations sums may appear to be off due to rounding
 Source: C&S Engineers, Inc.; ATADS

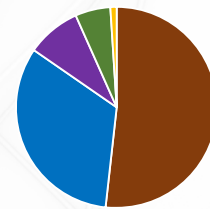


AVIATION FORECAST

Aircraft Fleet Mix

Category	Type	2024	2029
Air Carrier/Cargo (6 types)	Airbus A300	23%	20%
	Boeing 747-400	7%	7%
	Boeing 747-800	4%	4%
	Boeing 757-200	13%	14%
	Boeing 767-300	37%	48%
	Boeing MD-11	17%	7%
Air Carrier/Passenger (14 types)	Embraer ERJ170	5%	
	Embraer ERJ175	32%	
	Boeing 737-700	10%	
	Boeing 737-800	9%	
	Boeing 717-200	5%	
Air Taxi (14 types)	Bombardier CRJ-200	17%	
	Embraer ERJ145	7%	
	corporate jet (8 types)	38%	
	turboprop (2 types)	15%	
	single engine (PC12)	5%	
General Aviation (14 types)	SH36 turboprop - cargo	18%	
	corporate jet (9 types)	78%	
	single engine (2 types)	15%	
	turboprop (2 types)	5%	
Military (12 types)	helicopter (EC35)	2%	
	Lockheed C-130	62%	
	T-38 Talon	6%	
	Beechcraft Texan	5%	
	Other (8 types)	18%	

Fleet Mix by Category

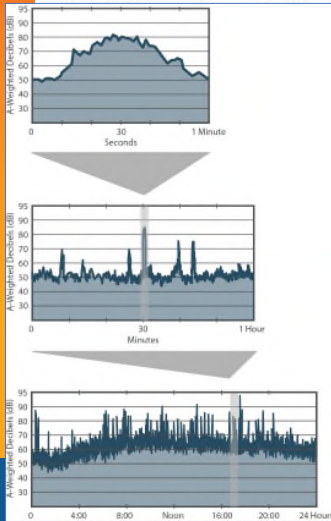


Category	2024	2029
Air Carrier/Cargo	51.7%	51.4%
Air Carrier/Passenger	32.9%	33.3%
Air Taxi	8.7%	8.7%
General Aviation	5.6%	5.6%
Military	1.0%	0.9%



REQUIRED NOISE METRIC

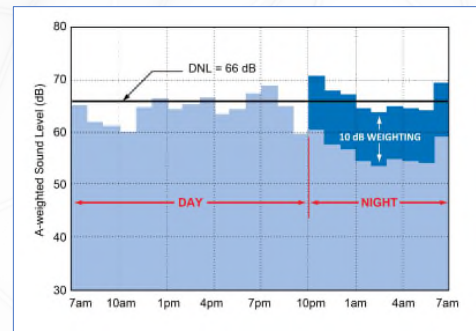
Day-Night Average Sound Level (DNL)



DNL is a way to describe the noise dose for a 24-hour period

- Accounts for event “noisiness” (SEL)
- Accounts for number of noise events
- Nighttime* noise gets a 10 dB weighting

*Nighttime is defined as 10:00 pm to 7:00 am



25

SUPPLEMENTAL NOISE METRICS

FAA Recommended

Maximum Sound Level (Lmax)

- Flight track/procedure analyses
- Speech/sleep interference assessments

Sound Exposure Level (SEL)

- Flight track/procedure analyses

Time Above a Threshold (TA)

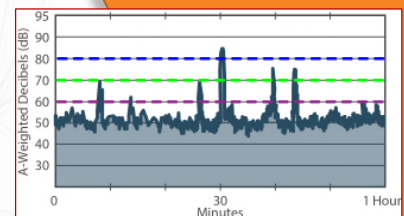
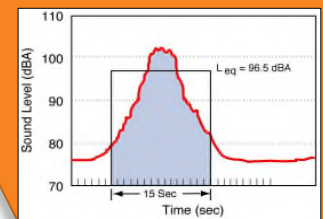
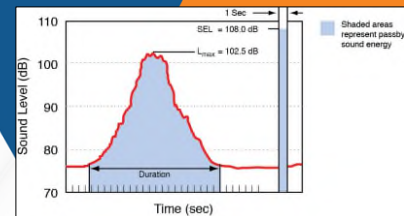
- Informational purposes

Equivalent Noise Level (Leq)

- School/learning assessments

Number of Events Above a Threshold (NA)

- Informational purposes



26

26

HEALTH EFFECTS

Overview



Community Annoyance



Sleep Disturbance



Non-Auditory Health Effects



Children's Learning

Note: Part 150 does not evaluate health effects of noise exposure – limited to land use compatibility by regulation.



PROJECT SCHEDULE

SDF Noise Exposure Map Update

Phase		Expected Completion
No.	Description	
1	Project Initiation	September 2023
2	Data Collection and Forecast	January 2024
3	Prepare Draft Noise Exposure Maps and Documentation	May 2024
4	Public Comment Period and Workshop	June 2024
5	Prepare and Submit Noise Exposure Maps / Documentation	July 2024

Discussion

29

Thank you!



30

This page intentionally left blank.



SDF Part 150 Noise Exposure Map Update

Community Noise Forum (CNF) Meeting

January 22, 2024, 6:00pm

Zoom and In-person at SDF

Table 1. Attendees

Consultant Team	Community Noise Forum Members	Guests
Kate Larson (HMMH)	Bob Slattery (LRAA)	Dorn Crawford (Zoom)
Gene Reindel (HMMH)	Brian Sinnwell (LRAA)	Travis (Zoom)
Julia Nagy (HMMH)	Mary Rose Evans (ANA)	Pat Gould (Zoom)
Tom Schnetzer (KHA)	John Sistarenik (LRAA Board)	Edward Mansfield (Zoom)
Joni Steigerwald (C&S)	Jeff Kozak (UPS)	Suzi Wessel
Wendy Harrower (C&S)	Tom Foote (Airline Affairs)	Christian Cobler (FAA)
Steve Kozarovich (PW)	Greg Petto (FAA)	Jessie Roth
Ali Hammond (PW)	Doug Black (Southwest resident)	Mark Roth
		Troy Tucker
		Courtney Tucker

COMMUNITY NOISE FORUM MEETING AGENDA

1. Call to Order
2. Approval of Prior Minutes
3. Active Noise Cancellation Grant Update
4. Airspace Project Update
5. Southwest Quadrant Working Group
6. Noise Exposure Map (NEM) Update
Consultant Team Presentation
7. Part 150 NCP
8. Current Noise Concerns
9. Guest Comments
10. Announcements
11. Next Meeting: March 25, 2024
12. Adjournment

This document provides detailed notes for agenda item 6.



NEM Update Consultant Team Presentation Notes (Agenda item 6)

a. Introductions

- Gene Reindel reviewed the Part 150 presentation agenda items.
- Gene introduced himself, Kate Larson, and Julia Nagy of HMMH.
- Gene noted that HMMH is leading the project as the prime consultant and managing the noise components. HMMH has a long history of working with Louisville Regional Airport Authority (LRAA) on Part 150 projects.
- Joni Steigerwald introduced herself and the C&S role as the aviation forecasters.
- Tom Schnetzer introduced himself and the Kimley-Horn role which is to ensure consistency with the forecast for the Louisville Muhammad Ali International Airport (SDF) Master Plan.
- Steve Kozarovich and Ali Hammond introduced themselves and the Price-Weber role as public outreach and engagement consultant.

b. Roles and Responsibilities

- Gene reviewed roles and responsibilities of the various stakeholders critical to the Noise Exposure Map (NEM) update process including the LRAA, FAA, consultant team, Community Noise Forum (CNF), and the public.
- Gene provided a brief overview of each stakeholder's role as outlined in slide 4.
- Gene noted that the public is a critical stakeholder in the NEM update process.

c. Part 150 Overview

- Gene presented a historical regulatory perspective of airport noise compatibility planning and identified the technical elements included in the Part 150 process.
- The Noise Exposure Map (NEM) identifies incompatible land uses and the Noise Compatibility Program (NCP) is used to address incompatible land uses.
- This project only includes an NEM update and a review of the NCP; it is not a full Part 150 update.
- The NEM describes the noise exposure around the airport.
- Land use data was reviewed by HMMH and verified by C&S through windshield surveys.
- The NEM includes two timeframes by regulation: existing condition (year of submittal, or 2024 in this project) and 5-year forecast condition (2029 for this project).

d. Noise Modeling Overview

- The Aviation Environmental Design Tool (AEDT) has been used since 2016 for noise modeling as required by the FAA. AEDT Version 3f is the most recent version and will be used for this project.



- Kate Larson provided an overview of the AEDT inputs including 3 categories: aircraft noise and performance data, airport physical layout, and aircraft operational data.
- Kate provided a detailed overview of the data sources associated with each of the inputs required for AEDT.
- Kate reviewed the aircraft noise and performance data, noting the extensive AEDT database of aircraft and flight profiles for users to choose from; this data was collected and verified by FAA.
- Adjusting any noise and performance parameters within the AEDT requires FAA approval (also known as a non-standard modeling request).
- Kate reviewed physical AEDT input requirements, including the airfield layout, helipad location and displaced runway thresholds.
- Kate discussed meteorological conditions and terrain data inputs and noted that these factors may affect noise propagation.
- Doug Black asked a question about whether the NEMs take into effect the way noise propagates across the water. He lives near lakes southwest of the airport and he noted that studies have shown that water reflects noise.
- Gene and Kate explained that AEDT does not take ground impedance into account.
- Gene explained an example in the Boston area near the water where that concern was studied and the over-water noise propagation over a large bay only made a negligible difference.
- Kate described that operational noise inputs include the projected operations, aircraft types, day-night split, runway use, flight tracks, track use, and stage length (based on aircraft weight).
- Kate described the runway use table that shows the six runway ends which are broken out by arrivals and departures.
- HMMH will be modeling every flight captured in the flight track and aircraft identification data representing the existing year; therefore, the runway use represents an actual year of flights. For this study the data are from September 1, 2022, through August 31, 2023.
- Kate described the runway use figures that show the runway use percentages for each runway end. The size of the arrow correlates to the proportion of runway use on arrival and departure to each runway end.
- Kate described how HMMH's proprietary preprocessing software models the complete year of actual aircraft operations, which for SDF, includes over 170,000 actual flight tracks in the 12-month timeframe.
- Doug Black asked a question about the vertical climb rates since these affect noise.



- Kate confirmed that the modeled vertical climb rates come from the AEDT flight profiles rather than the flight track data.
- Kate explained how military flight inputs come from military representatives since those flight tracks are not included in the flight track and aircraft identification data (due to national security concerns).
- Kate presented the flight track density map that shows arrival and departure dispersion as a “heat map” with the warmer colors showing areas of higher density of flight tracks.
- Kate showed flight track plots representing a random ten percent of 2022/2023 flights; this demonstrates the dispersion area.
- Question from Mary Rose about why the graphic only represents a sample of the flight tracks.
- Kate confirmed that the sample is used for illustrative purposes since the full year of flight tracks would be too dense to see the underlying map.
- Kate explained how HMMH developed future case tracks based on anticipated FAA airspace changes.
- Kate explained how model tracks need to replace some of the radar tracks for future year noise modeling due to the new FAA procedures that will be in use at that time (2029).
- Tom Foote asked presenters to confirm that 2024 noise contours will be based on existing flight tracks and 2029 contours will account for FAA airspace changes.
- Gene explained that for the future conditions where there is a new procedure that replaces an existing procedure then those existing tracks will be replaced with model tracks representing the new procedure. In subsequent NEM updates we will be able to use actual tracks but that data for the new procedures does not yet exist.

e. Aviation Forecast

- Joni explained the forecast process and validation of the Master Plan forecast.
- The forecast was based on the same twelve months of flight track and aircraft identification data (from September 1, 2022, through August 31, 2023).
- Joni explained coordination with the Kentucky Air National Guard to obtain and confirm military forecast operations.
- Consultant team explored whether airport Master Plan forecast was still valid since it was completed prior to the Covid pandemic. That forecast was compared to Air Traffic Activity System (ATADS)/ Operations Network (OpsNet) data (FAA Air Traffic Control Tower count data) and also compared with FAA’s Terminal Area Forecast (TAF). The forecast growth rate from the Master Plan was a bit lower than the

growth seen in the actual most recent five-year period. C&S created a trend analysis and determined a 1.34% average annual growth rate.

- Mary Rose asked what is a derivative forecast?
- Joni explained that it is a full list of aircraft types and Gene explained how it is more detailed than what is required for the Master Plan because these inputs are needed for the noise model.
- Gene noted that there is a current nationwide reduction in cargo operations after the pandemic, which is seen in the industry as a correction, given the increase in cargo related to the pandemic.
- Doug asked whether UPS / cargo should be separated from passenger data to reflect the changes in the growth rates between different types of operations.
- Gene confirmed that they are separated and this is accounted for in the forecast.
- Bob Slattery explained that each aircraft category operation will have an associated forecast.
- Joni explained the table showing projected 2029 annual aircraft operations.
- Joni explained that aircraft fleet mix changes were determined based on input from operators; the breakdown of the aircraft types are projected to remain the same for most categories other than cargo.
- Doug asked whether hush kits are adjusted for?
- Tom explained that the hush-kitted aircraft of the past are out of the fleet now.
- Joni noted that the forecast has been submitted to the FAA but has not yet been approved by the FAA, therefore all operations data in the presentation are draft numbers.
- FAA's TAF is higher than the forecast for this study but the difference is not more than ten percent (it's close to seven percent), which does not require headquarters approval from the FAA. It was again noted that the reduction from the TAF was due to the reduction in cargo operations.

f. Noise Metric (DNL)

- Gene explained the Day-Night Average Sound Level (DNL) noise metric and its weighting based on time of day, where noise at night has a higher weighting.
- DNL accounts for the total number of noise events and it represents the noise level on an average annual day.
- DNL (average noise exposure) is the required metric from the FAA for Part 150 studies.

- Gene explained total noise exposure versus average noise exposure, specifically that total noise exposure is approximately 50 dB higher than average noise exposure.
- Doug asked about the time interval for measuring overflight, how many seconds is each event counted as?
- Gene explained that each event is counted separately based on its characteristics, there is no set time for a noise event. He noted that the next slide on supplemental noise metrics would explain more.

g. Supplemental Noise Metrics

- Gene described FAA-recommended supplemental noise metrics including Maximum Sound Level (L_{max}), Single Event Level (SEL), Time Above (TA), Equivalent Continuous Sound Level (Leq), Number Above (NA).
- SEL describes total noise energy of an event. The length and magnitude of the noise event are both captured in the SEL.
- AEDT takes the total noise energy of an event into account, whether the event lasts 3 seconds or 30 seconds.
- Number of events Above a threshold (NA) can be used for informational purposes.
- Gene explained an example of the use of NA at Charlotte International Airport to supplement the DNL metric.
- Bob explained that supplemental metrics can be used as a component of this study and that LRAA wants input from the CNF on what metrics would be useful to them.
- Doug asked about the FAA noise policy review and whether the metrics explained on this slide are the same ones that FAA presented on.
- Gene confirmed these are the same standard noise metrics.
- Mary Rose asked when is the timeline for choosing supplemental metrics for this study?
- Gene confirmed that over the next few months the project team would need to know what is chosen so that the team can complete the analysis and draft the documentation.
- Doug asked whether the study can use supplemental metrics for the forecast.
- Gene confirmed that the same supplemental metrics will be used for the forecast since they are calculated based on the model inputs and will allow for comparison of existing to future noise environments.

h. Health Effects

- Gene stated that health effects are not currently included in the Part 150 Study process.

- Gene explained that FAA is undertaking research to assess health effects of noise and whether there can be thresholds determined. There is not enough research data to make specific determinations at this time.
- Gene confirmed that studies show that noise affects children’s learning which is why sound insulation programs include schools.
- Doug noted that children’s learning is also affected by lack of sleep/ awakenings at night at home as well.
- Gene noted that this project will be focused on land use compatibility which does not include health effects but does classify noise sensitive uses (like residential and educational) exposed to certain levels of aircraft noise.

i. Project Schedule

- HMMH is currently developing a detailed noise model input memorandum and asks the CNF to provide feedback on the inputs presented in tonight’s meeting so that they can be considered in the model inputs.
- Mary Rose asked how long the CNF has to review the noise model inputs and get their comments to us.
- Gene suggested two weeks as we anticipate finalizing the noise model input memorandum in early February.
- The CNF will be provided with a copy of the noise model input memo to review and the team will request LRAA concurrence with the modeling assumptions.
- The team anticipates presenting the NEMs to the public in June.

j. Wrap up and discussion

- Question from audience about noise data collection
 - Gene explained that the data contained in the noise model is based on aircraft engine certification data from FAA; noise data from measurements goes into the noise model through the FAA certification process. The noise contours are not based on community noise measurements. Measurements/sampling are not components of this project. AEDT is more accurate for aircraft noise results since it does not include other noise sources.
- Question from audience on measurement uncertainty
 - Gene explained that the FAA has never published uncertainty data or tests. FAA creates the database. Gene explained how noise monitors have uncertainty since there are other community noises that they capture. FAA is more concerned with consistency of methodology for determining

noise/land use compatibility across the nation. Gene confirmed that there is no localized verification process.

- Gene confirmed that if AEDT inputs are accurate, then the results will provide a reliable representation of aircraft noise.
- Question from audience about the percentage of flights that come into SDF during regular sleeping hours/ nighttime?
 - Gene confirmed that the nighttime operations data are shown in the tables within the presentation. DNL defines daytime operations as those between 7 am to 10 pm and nighttime operations as 10 pm to 7 am. Gene confirmed that we have the data for any range of time and asked whether the audience member would suggest a different time period.
 - The audience member noted that 10 pm to 7 am is the time period they would define as nighttime as well so no further analyses were suggested.
- Doug noted that in his opinion takeoffs are louder than arrivals.
 - Doug asked whether arrivals or departures are louder at his location.
 - Mary Rose noted that arrivals are louder at her house.
 - Gene explained that aircraft are higher performing now, and departures are no longer always louder than arrivals.
- Question from audience whether it is normal for thirty flights to depart within a one-hour time period in the morning. He lives north of Audubon Park and east of the parallel runway and experiences sleep disturbance.
 - Greg Petto explained the runway use patterns and confirmed that this number is typical in certain time periods.
 - Bob explained that departures to the south are preferred.
- Question from audience about whether airlines are required to monitor their engines, are they tested?
 - Gene described how there is a regulation that sets limits to how loud an aircraft can be on arrival or departure. After aircraft are manufactured they have to be tested for compliance with this regulation.
 - Gene described how newer aircraft make less noise than older aircraft.
 - Aircraft currently must meet Stage 5 noise standards or higher when tested.
 - Jeff Kozak added that runway surface conditions may require the use of more thrust (including when it is snowing or raining) to ensure a safe takeoff; these are not preferred since it is not ideal for the engine to constantly be at full thrust. However, that might explain people noticing louder-than-usual takeoff noise.



- Question from Edward Mansfield (Zoom) about modeling procedures.
 - Gene confirmed the modeling methodology.
- Question from Dorn Crawford (Zoom): will team be analyzing NCP measures from prior study?
 - Gene explained that compliance with operational procedures that have been implemented will be captured through flight track data. We are not updating NCP as a component of this study.
 - Dorn asked, why is the study reviewing the NCP if that information is not used in the modeling process? The purpose of the NCP review is to understand the status of existing measures rather than evaluate whether updated measures are needed.
 - Bob explained that LRAA was considering a full NCP update and guidance from FAA was to start with NEM and see what the results show, then potentially update NCP in the future.
- Doug noted that he has taken noise measurements within his house and some measurements are over 80 dB.
 - Gene explained that DNL represents an average annual day and that is why, even though there may be loud single events, the home may fall outside of the 65 DNL noise contour. Gene explained that we could create an Lmax contour to illustrate these events or use the Number Above metric to determine the number of aircraft noise events in the vicinity of his house.
 - Doug asked whether noise exposure can be shown.
 - CNF to review recommendations on supplemental metrics.

This page intentionally left blank.





LOUISVILLE
MUHAMMAD ALI
 INTERNATIONAL AIRPORT

Louisville International Airport Noise Exposure Map Update

Public Workshop

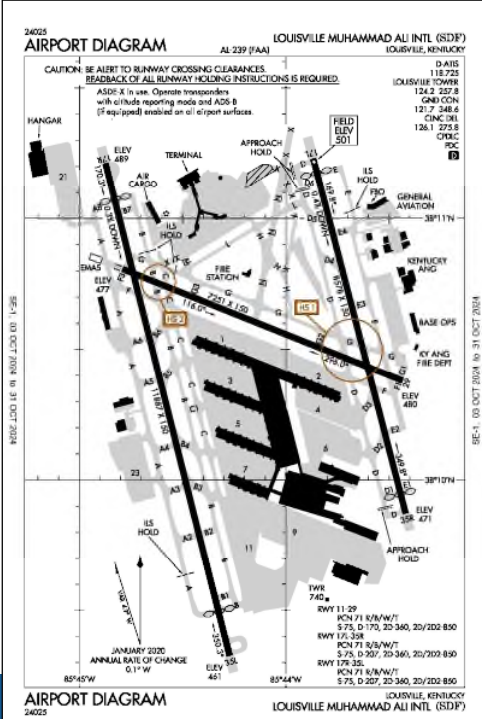
November 7, 2024
5:00 – 7:00 p.m.

1

Airport Layout

Runway End	Elevation (ft. MSL)	Length (ft)	Landing Displaced Threshold (ft)	Magnetic Orientation (degrees)*
11	476	7,250	-	116
29	480		-	296
17L	501	8,578	328	170
35R	471		449	350
17R	489	11,890	846	170
35L	461		1040	350

In the Forecast Condition, a planned extension to the east end of Runway 11/29 would move the start-of-takeoff roll point back 546 feet for aircraft departing Runway 29. A displaced threshold for arrivals would retain the landing threshold for aircraft arriving to Runway 29 in its current location. Runway 11/29 will be renumbered to Runway 12/30 due to magnetic declination.



AIRPORT DIAGRAM
 LOUISVILLE MUHAMMAD ALI INTL (SDF)
 24025 AL 239 (FAA) LOUISVILLE, KENTUCKY

CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES. FEEDBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.

ASOS: 4 in use. Operate transmitters with callouts reporting mode and ADS-B (if equipped) enabled on all airport surfaces.

D ATIS 116.725
 LOUISVILLE TOWER 124.2 357.8
 UNICOM 121.7 348.4
 CINC DEL 126.1 275.8
 CINC CTRC PDC 130

RWY 11 29 I/R/W/W/T 5.75, D 170, 25-340, 25/202 850
 RWY 17L 35R I/R/W/W/T 5.25, D 207, 25-340, 25/202 850
 RWY 17R 35L I/R/W/W/T 5.75, D 207, 25-340, 25/202 850

JANUARY 2020 ANNUAL RATE OF CHANGE 0.11° W

AIRPORT DIAGRAM
 LOUISVILLE MUHAMMAD ALI INTL (SDF)
 24025 LOUISVILLE, KENTUCKY

2

Compatibility Guidelines

Part 150 requires the review of existing land uses surrounding an airport to determine land use compatibility associated with aircraft activity at the airport.

The FAA land use compatibility designations are contained in Part 150, Appendix A, Table 1.

All land uses with aircraft-related noise below DNL 65 are generally considered compatible by the FAA.

Land Use	Yearly Day-Night Average Sound Level [DNL] in Decibels					
	<65	65-70	70-75	75-80	80-85	>85
Residential Use						
Other Residential	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock), forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas, spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

3

Community Noise Forum

- The Community Noise Forum (CNF) was created to monitor and collaborate on the implementation of the Noise Compatibility Program.
- Members of the Forum Include:
 - The Airport Authority's Board
 - Airport Authority's management team
 - Louisville Air Traffic Control staff
 - Louisville Airport Affairs Committee
 - Kentucky Air National Guard
 - UPS
 - General aviation community at SDF
 - University of Louisville
 - Louisville Metro Government
 - Airport Neighbors' Alliance (ANA)
 - Southern Indiana communities
 - Community representatives from each quadrant bounding the airport.

CNF Responsibilities:

Assess effectiveness of the program's components.

Propose amendments & refinements to the program's initiatives.

Collect necessary feedback & knowledge to facilitate future needs.

- The CNF reviewed and commented on information and documentation for development of the 2024 NEM Update
- All CNF meetings are free and open to the public and they are typically held every-other-month on the fourth Monday of the month.
- CNF Charter: <https://www.flylouisville.com/wp-content/uploads/2019/06/CNF-Charter-amended-2012.pdf>

4

Forecast

Five-year forecast based on:

- 2021 SDF Airport Master Plan Forecast
- FAA Terminal Area Forecast (TAF)
- FAA Air Traffic Activity Data System (ATADS)
- FAA Traffic Flow Management System Counts
- Kentucky Air National Guard (KyANG) for Military Operations
- Operator Interviews

Modeled Annual Aircraft Operations

Year	Air Carrier	Air Taxi	General Aviation	Military	Total
2024	165,761	15,502	10,031	1,771	193,065
2029	182,465	16,569	10,721	1,771	211,526

5

Detailed Forecast Data

- Base fleet mix developed from 2022/2023 flight track and aircraft identification data
 - specific aircraft types
 - categorization (air carrier*, air taxi, general aviation, and military)
 - time of day
- Base fleet mix then scaled to the 2024 and 2029 Forecast levels for each category
- Input obtained from air carriers & scheduled flight data

*Cargo is included in air carrier category

2024 Modeled Aircraft Operations

Category	Percentage
daytime Non-Jet	51.8%
nighttime Jet	43.2%
daytime Jet	2.4%
nighttime Non-Jet	2.5%

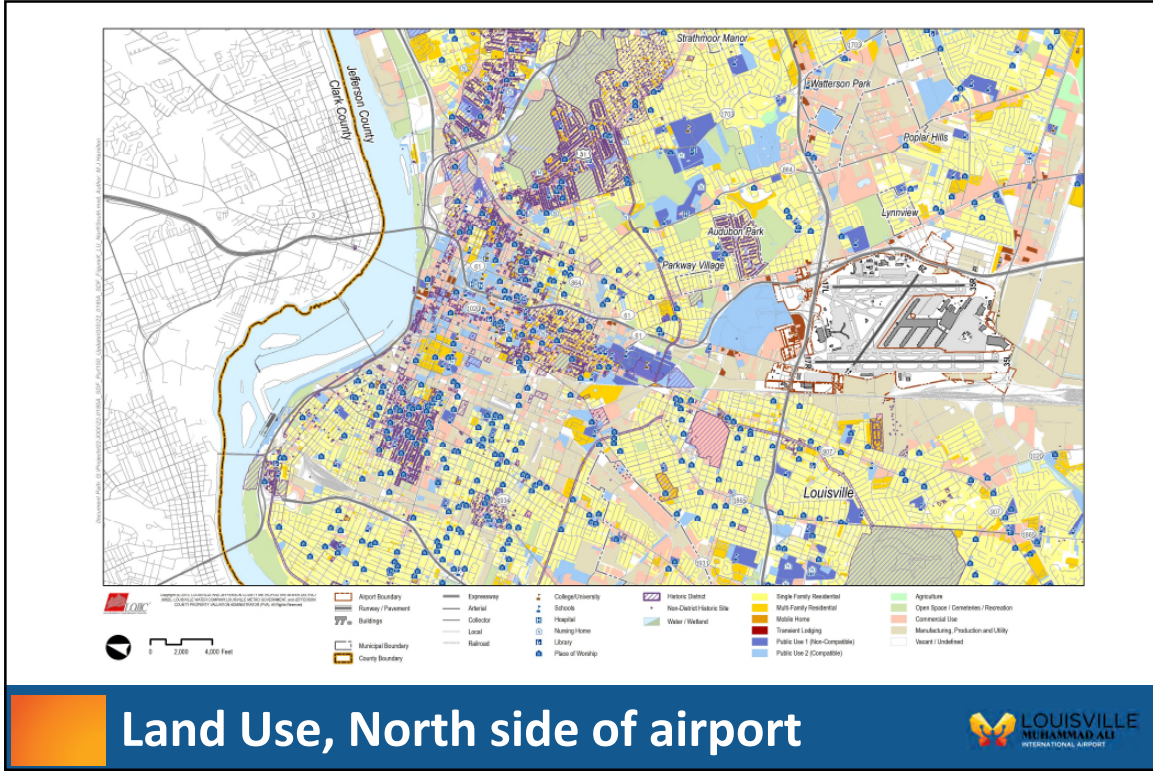
2029 Modeled Aircraft Operations

Category	Percentage
daytime Non-Jet	52.4%
nighttime Jet	42.8%
daytime Jet	2.3%
nighttime Non-Jet	2.5%

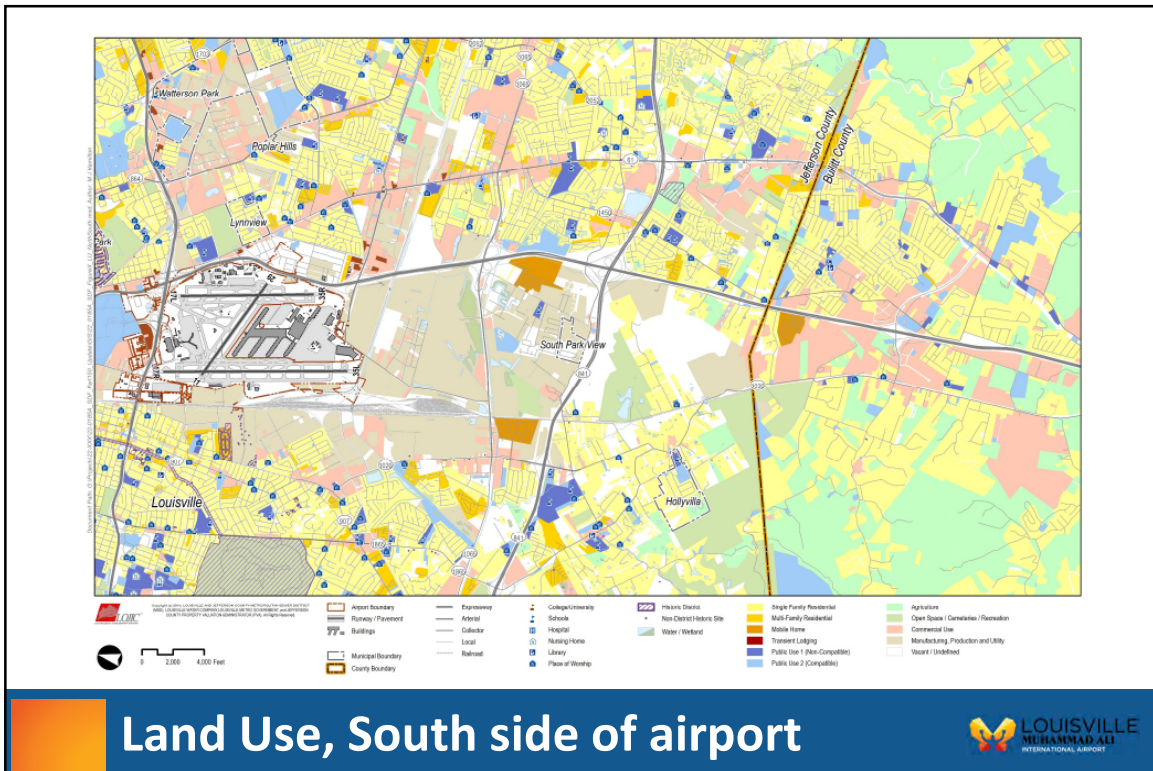
6

Public Workshop Boards

D-41




7



8

Noise Modeling Overview




Part 150 requires use of FAA's Aviation Environmental Design Tool (AEDT) noise modeling software.

- AEDT Version 3f was the most current version available at study's commencement (<https://aedt.faa.gov>)

AEDT requires noise model input data in three categories:

1	2	3
Aircraft Noise and Performance Data	Airport Physical Inputs	Aircraft Operational Inputs
<ul style="list-style-type: none"> Aircraft performance profiles Noise level vs. distance curves 	<ul style="list-style-type: none"> Runway end coordinates Ground engine runup locations Weather data Terrain data 	<ul style="list-style-type: none"> Number of aircraft operations Aircraft fleet mix Day-night split of operations Runway utilization Flight track geometry and utilization

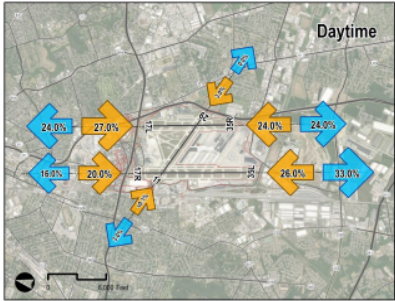


9

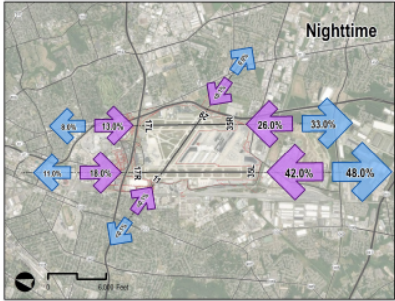
Noise Modeling Process

For Commercial and General Aviation Operations


- Base Year: 9/1/2022 to 8/31/2023**
 - Obtained, processed and analyzed 12 months of flight track and aircraft identification data
 - Determined day-night split of aircraft operations, and fleet mix
- Existing and Forecast Conditions – 2024 & 2029**
 - Confirmation of FAA's Terminal Area Forecast (TAF)
 - Scaled base year operations with updated fleet to TAF totals
 - Developed model flight tracks for FAA's new procedures



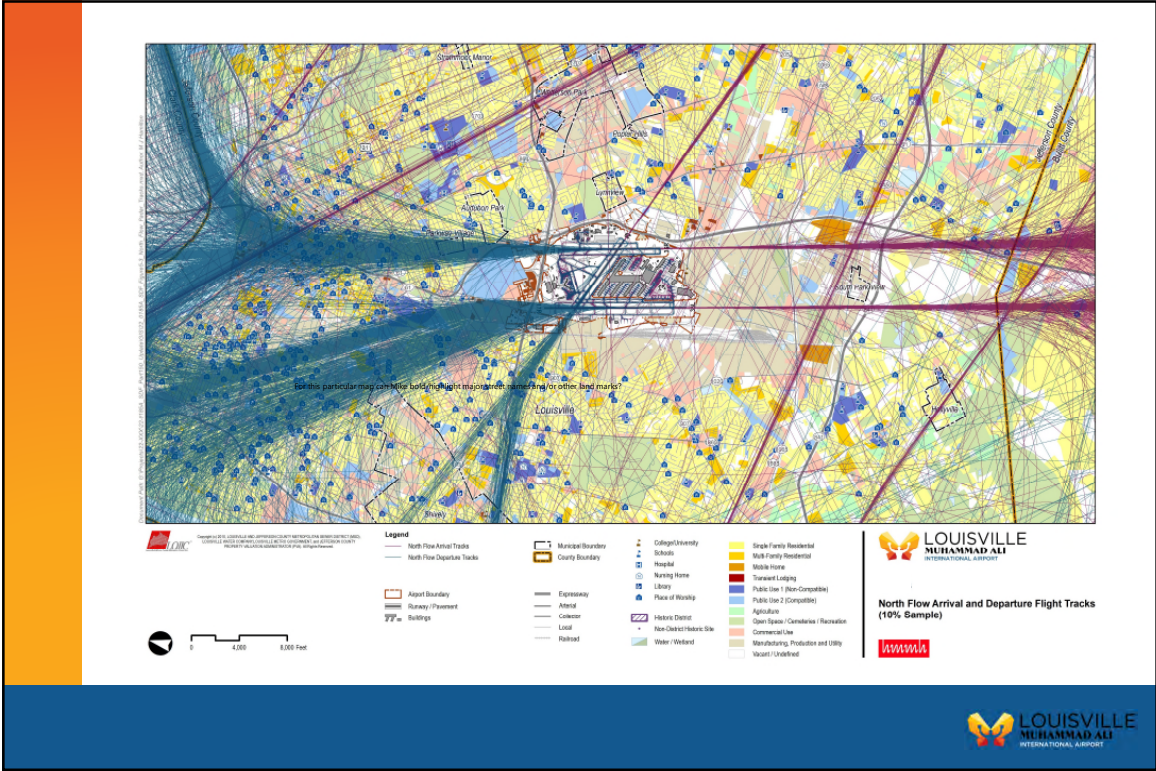
Daytime



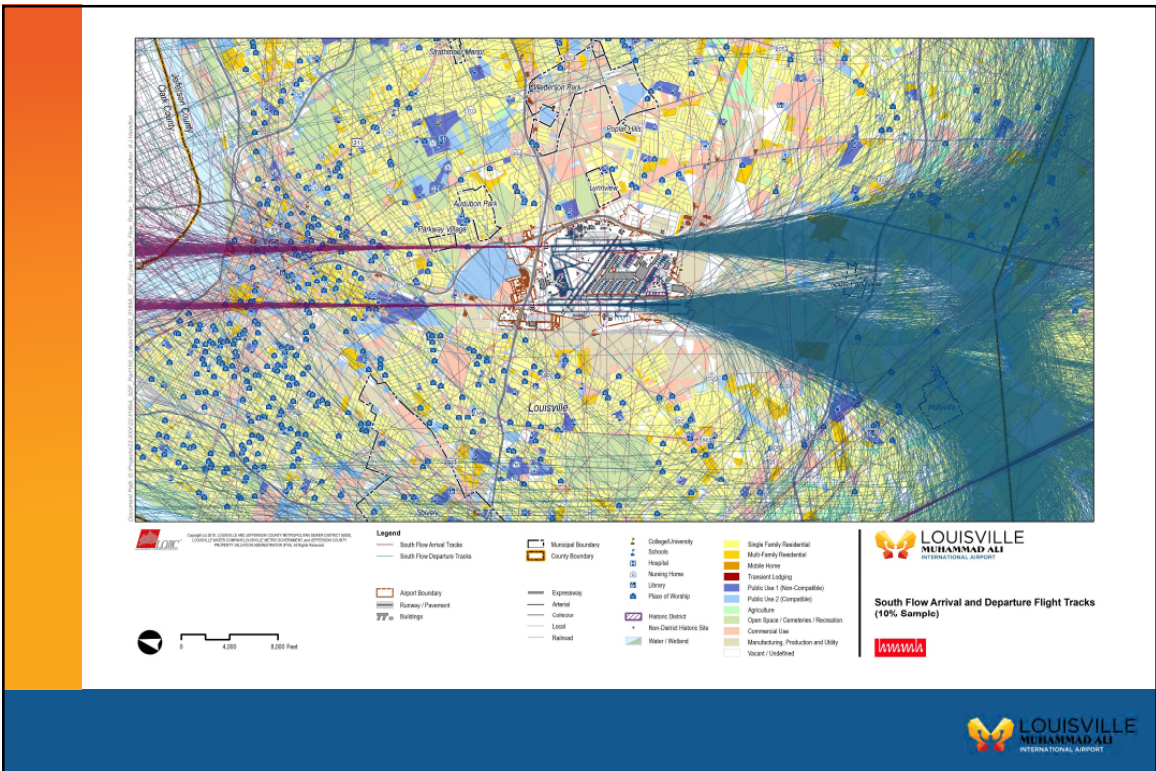
Nighttime



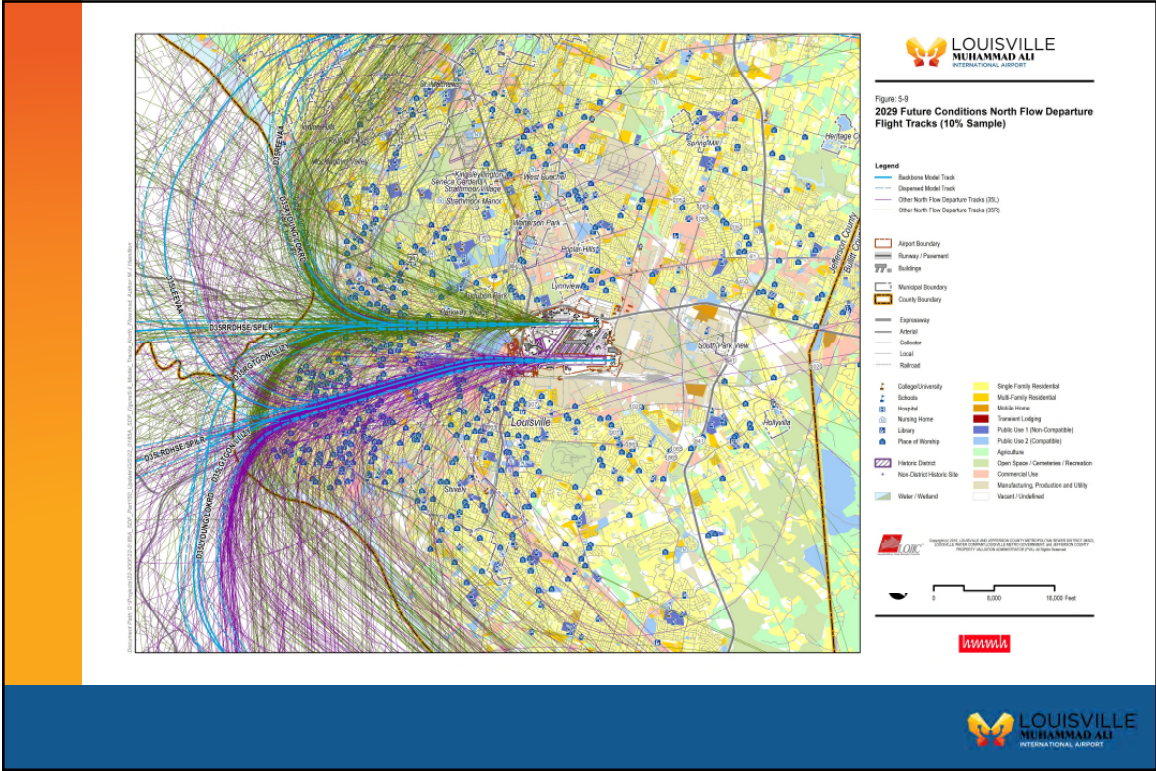
10



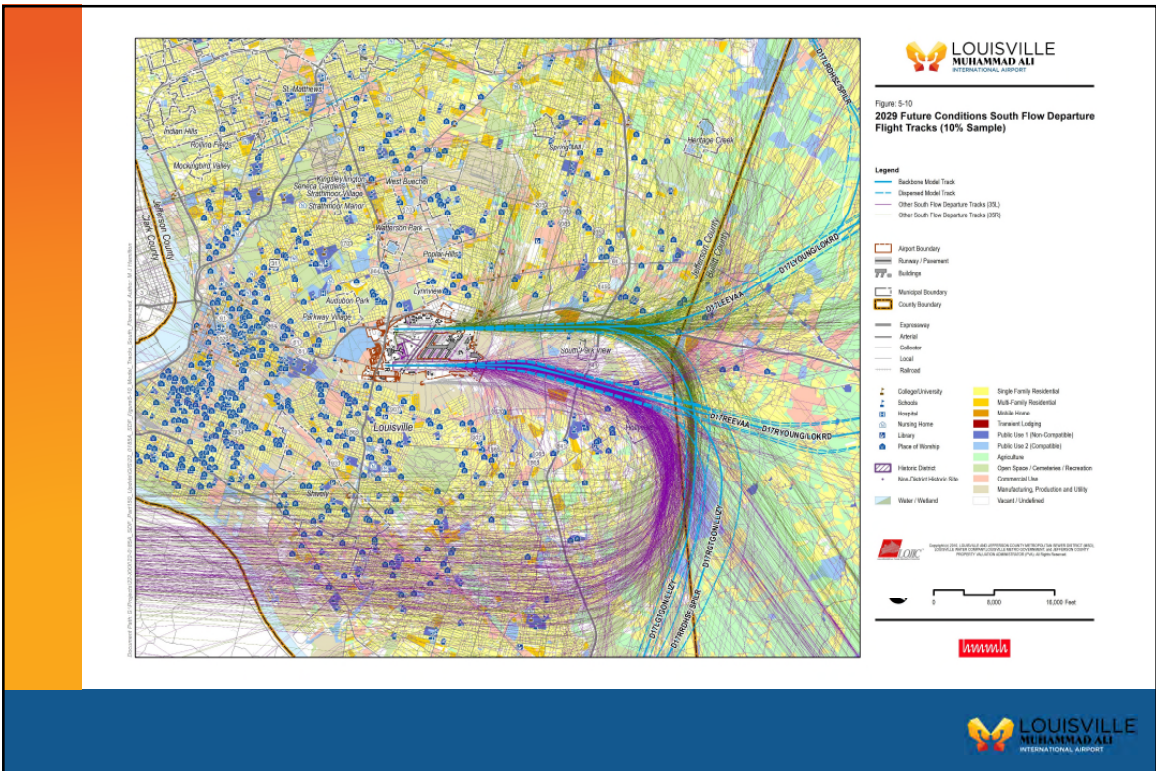
11



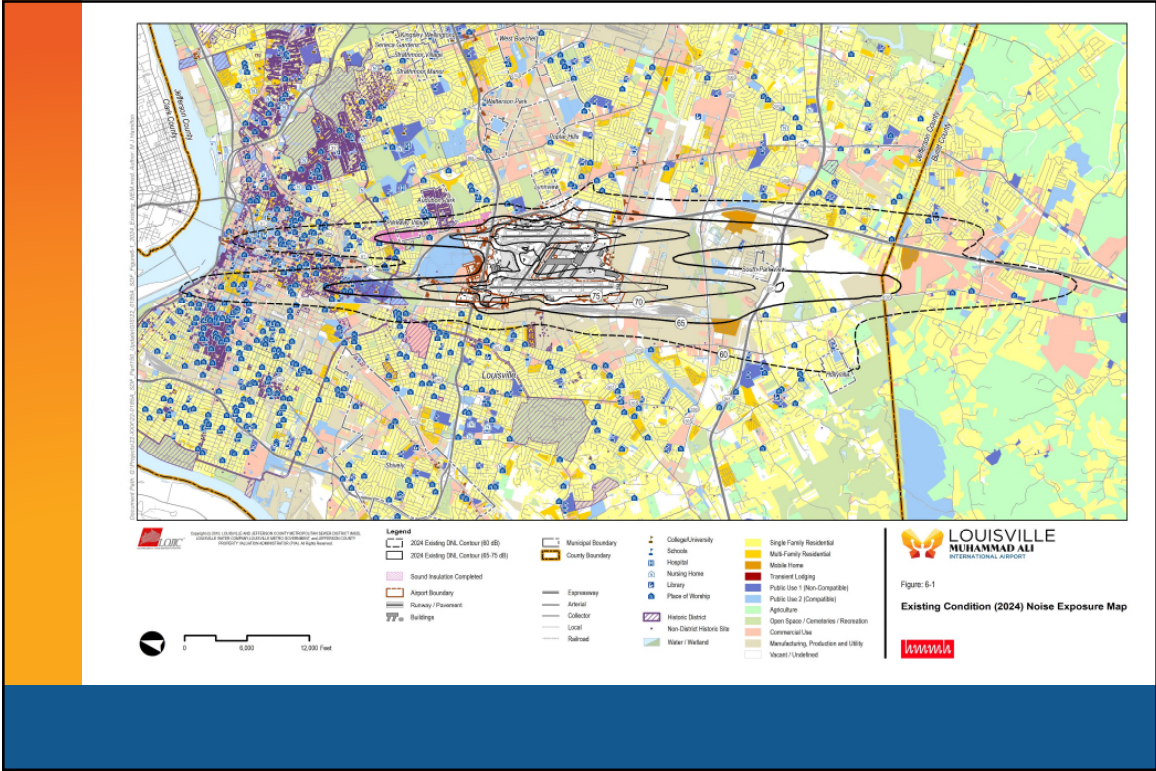
12



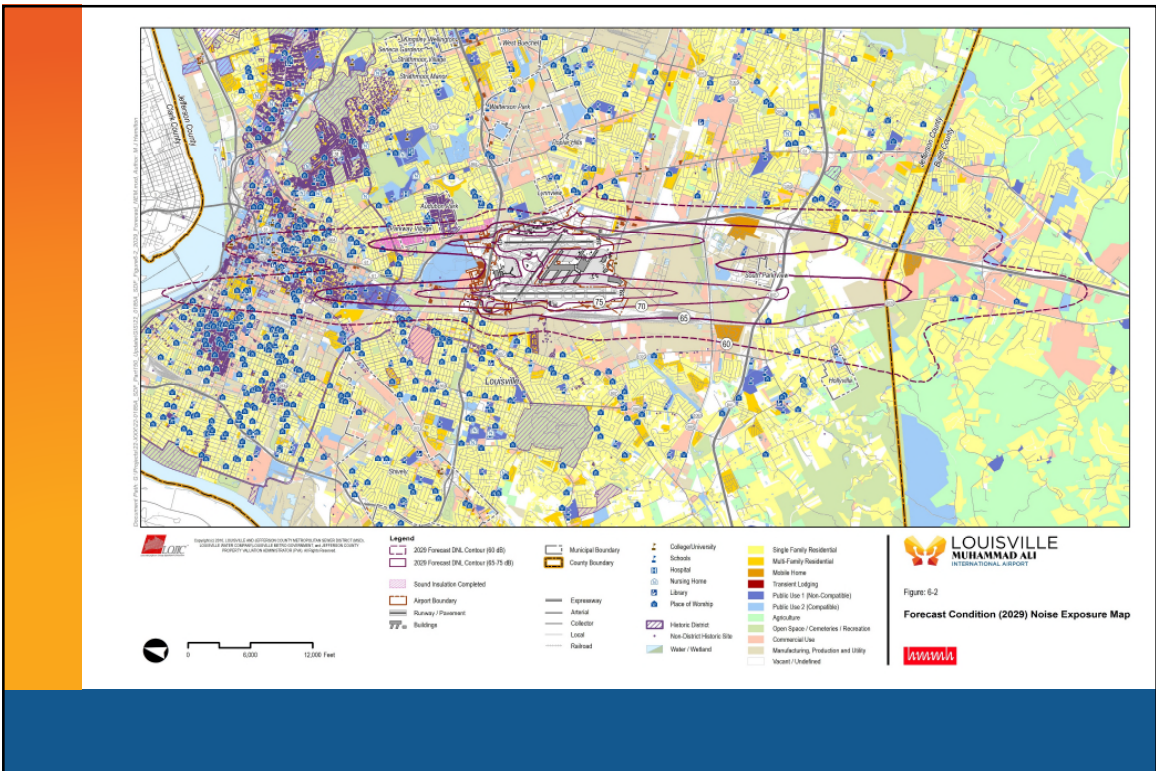
13



14



15



16

Land Use Assessment for Existing and Forecast Conditions

Contour Interval	Estimated Population	Estimated Total Housing Units	Estimated Incompatible Housing Units
2024 Existing Condition			
65-70 DNL	4,166	1,997	1,561
70-75 DNL	35	24	24
> 75 DNL	0	0	0
Total	4,201	2,021	1,585
2029 Forecast Condition			
65-70 DNL	5,286	2,640	2,111
70-75 DNL	54	37	37
> 75 DNL	0	0	0
Total	5,340	2,677	2,148

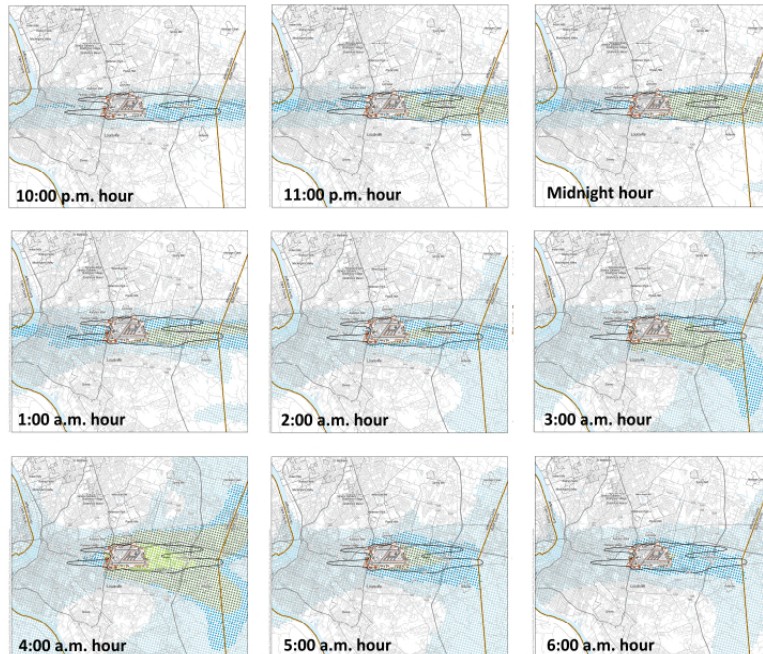
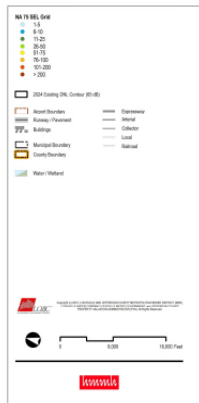
Note: Population and housing units estimated using 2020 US Census data

17

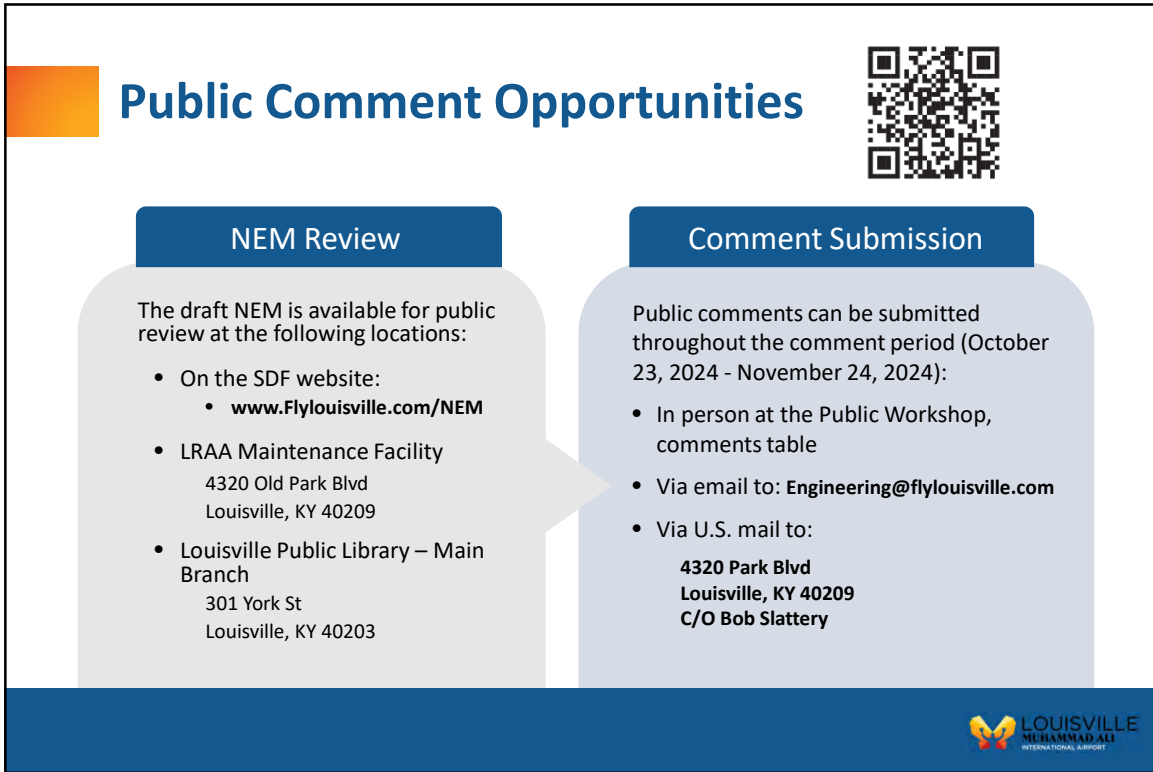
Supplemental Noise Analysis:

Number Above 70 dB SEL


2024 Existing Conditions



18



Public Comment Opportunities



NEM Review


The draft NEM is available for public review at the following locations:

- On the SDF website:
 - www.flylouisville.com/NEM
- LRAA Maintenance Facility
4320 Old Park Blvd
Louisville, KY 40209
- Louisville Public Library – Main Branch
301 York St
Louisville, KY 40203

Comment Submission

Public comments can be submitted throughout the comment period (October 23, 2024 - November 24, 2024):

- In person at the Public Workshop, comments table
- Via email to: Engineering@flylouisville.com
- Via U.S. mail to:
4320 Park Blvd
Louisville, KY 40209
C/O Bob Slattery





NOISE 101

What is Noise?

By definition, noise is unwanted sound. All sounds come from a source such as a musical instrument, a voice speaking, or an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any source travels through the air in waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. These waves penetrate the ear, creating the sound we hear.

Noise metrics are used to convey aircraft noise levels experienced in the communities near airports. There are two main categories of noise metrics: (1) distinct noise events (single-event noise metrics) and (2) cumulative noise over durations that include a number of distinct events (cumulative noise metrics).

The Decibel (dB)

Table 1 demonstrates the concept of the *decibel* (dB), a ratio that compares the sound pressure of the sound source of interest (for example, the aircraft overflight) to a reference sound pressure (the quietest sound that people can hear).

Table 1: Common Environmental Sound Levels

"Energy"	dB	Common Sounds
100,000,000,000,000	140	Near jet engine at start of takeoff
10,000,000,000,000	130	Threshold of pain
1,000,000,000,000	120	On stage at a loud rock concert
100,000,000,000	110	
10,000,000,000	100	Jack hammer at 6 feet
1,000,000,000	90	
100,000,000	80	Vacuum cleaner at user's ear
10,000,000	70	Vacuum cleaner at 10 feet
1,000,000	60	Normal speech
100,000	50	
10,000	40	Quiet residential area
1,000	30	
100	20	Whisper
10	10	
1	0	Threshold of hearing
0.1	-10	

Because the range of sound pressures is very large and our ears are not very sensitive to small differences in them, we use logarithms (a mathematical exponent that indicates the power of ten of a number's size) to simplify the ratio to a smaller range. The resulting value is expressed in dB.

Rules of Thumb When Comparing Individual Sound Sources

- Most people perceive a 10 dB increase to be about a doubling of loudness, and
- Changes of less than 3 dB are not easily detected outside of a controlled and/or laboratory setting.

A-Weighted Sound Level

Frequency, or pitch, is an important characteristic of sound. The human ear does not respond equally to equal noise levels at different frequencies. To adjust noise levels to resemble the human ear, we apply the *A-filter*. The resulting value is the *A-weighted sound level*, which the EPA recommends and the FAA requires be used for evaluating aircraft noise in communities. Studies have shown that A-weighted sound levels compare well with human judgment/perception of "noisiness" in community settings. A-weighted noise levels are assumed in the reporting of aircraft noise unless explicitly stated to the contrary.

Maximum A-Weighted Sound (L_{max})

Sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. L_{max} is the highest value reached during a noise event. However, it is important to realize that two events with identical L_{max} values may be perceived quite differently, since one may be of very short duration and the other may be much longer.

Sound Exposure Level (SEL)

SEL is the most common measure of noise exposure for a single aircraft flyover. Mathematically, it is the sum of the sound energy over the entire duration of a noise event – one can think of it as an equivalent noise event with a one-second duration. Because the SEL is "normalized" to one second, it will almost always be larger in magnitude than the L_{max} for the event.



NOISE 101

In fact, for most aircraft events, the SEL is about 7 to 12 dB higher than the L_{max} . The fact that it measures noise exposure over time means that a higher SEL can result from either a louder or longer event, or some combination of those factors.

Figure 1 illustrates an example of L_{max} and SEL for an aircraft fly over.

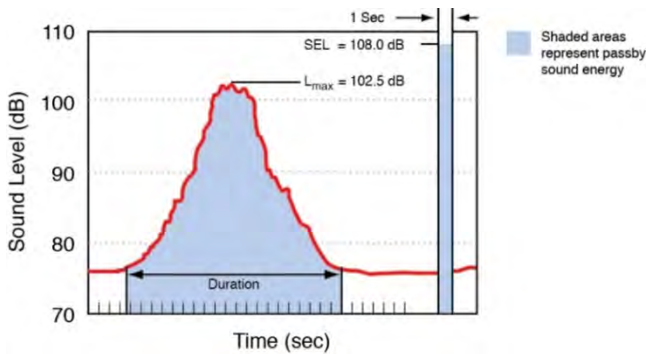


Figure 1: Relationship of L_{max} and SEL

Day-Night Average Sound Level (DNL)

DNL is a cumulative noise metric, representing noise as it occurs over a 24-hour period, with one important exception: the DNL calculation adds 10 dB to events between 10:00 p.m. and 7:00 a.m. People often judge noises at night to be twice as loud as they would perceive the same noise during the day because background noise at night is lower.

Figure 2 graphically depicts the manner in which the nighttime adjustment applies in calculating DNL. Each bar in the figure is a 1-hour equivalent sound level (L_{eq}) (a measure of the exposure resulting from the accumulation of all SELs over one hour). The 10 dB penalty is added for the 9 hours defined as “night.”

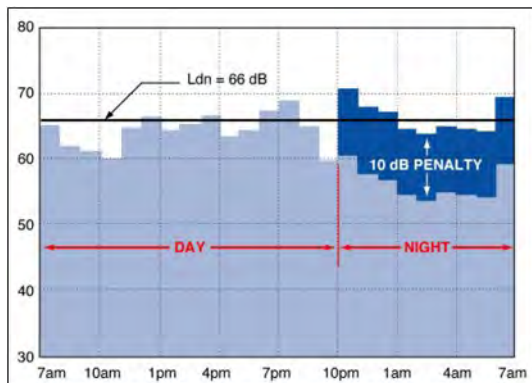


Figure 2: Example of a DNL Calculation

The FAA requires that airports use computer-generated DNL contours (FAA Order 1050.1F). Noise contours are lines of equal noise exposure around an airport (much like topographic maps that indicate contours of equal elevation). DNL contours usually reflect average annual operating conditions, taking into account the average number of flights each day, how often each runway is used throughout the year, and where over the surrounding communities the aircraft fly.

The FAA and most other federal agencies have formally adopted DNL for land use compatibility and for evaluating effects from aircraft operations near an airport. The Federal Interagency Committee on Noise (FICON) reaffirmed the appropriateness of DNL in a 1992 report. The summary report stated, “There are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric.”¹

Noise Modeling

As required by the FAA, the Aviation Environmental Design Tool (AEDT) is used to generate the DNL contours for the SDF Noise Exposure Map. AEDT uses a database of aircraft noise characteristics to predict DNL based on aircraft types, operating conditions, aircraft performance, and aircraft flight tracks. The Noise Exposure Map is based on the average annual day aircraft operations (the average daily number of aircraft operations over a year).

Important Links

SDF Noise Information:

www.flylouisville.com/corporate/noise-compatibility-management

FAA Noise Information:

www.faa.gov/noise

Draft NEM document:

www.flylouisville.com/NEM

¹ FICON, “Federal Agency Review of Selected Airport Noise Analysis Issues,” September 1992.



LOUISVILLE
MUHAMMAD ALI
INTERNATIONAL AIRPORT

**Louisville International Airport
Noise Exposure Map Update**


Public Workshop

**November 7, 2024
5:00 – 7:00 p.m.**

1

Public Workshop Organization

- Sign-in table with Noise 101 printed handouts
- Workstations
 1. Operations forecast & Land Use (7 boards)
 2. Noise modeling process (6 boards)
 3. Noise Modeling Results (4 boards)
 4. Find my Home (laptop)
- Comments table
 - ❖ Recording station available with a machine to take oral comments
 - ❖ Written – 3 options:
 - Leave handwritten comment card tonight
 - Mail card to Bob Slattery at LRAA, 4320 Park Blvd, Louisville, KY 40209
 - Email comments to Bob Slattery: Engineering@flylouisville.com



2

SDF Airport Overview and Facilities

Airfield

- Two north-south parallel runways
- One east-west crosswind runway

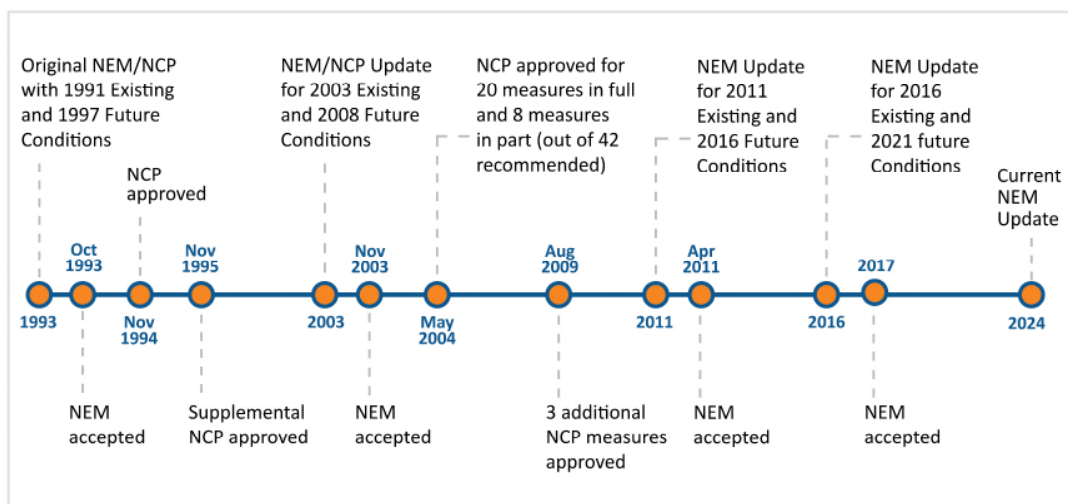
Airport users/ tenants

- Commercial airlines
- Military - Kentucky Air National Guard 123rd Airlift Wing
- Cargo - UPS Worldport
- General Aviation - Atlantic Aviation

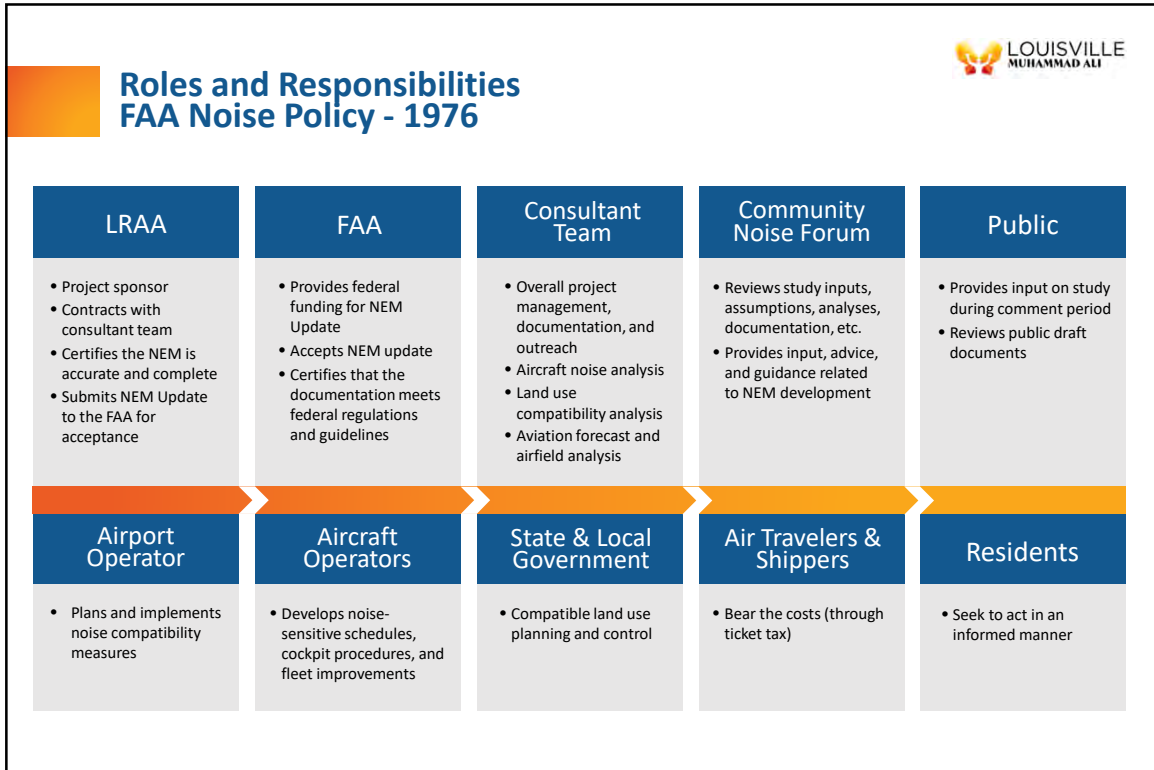


3

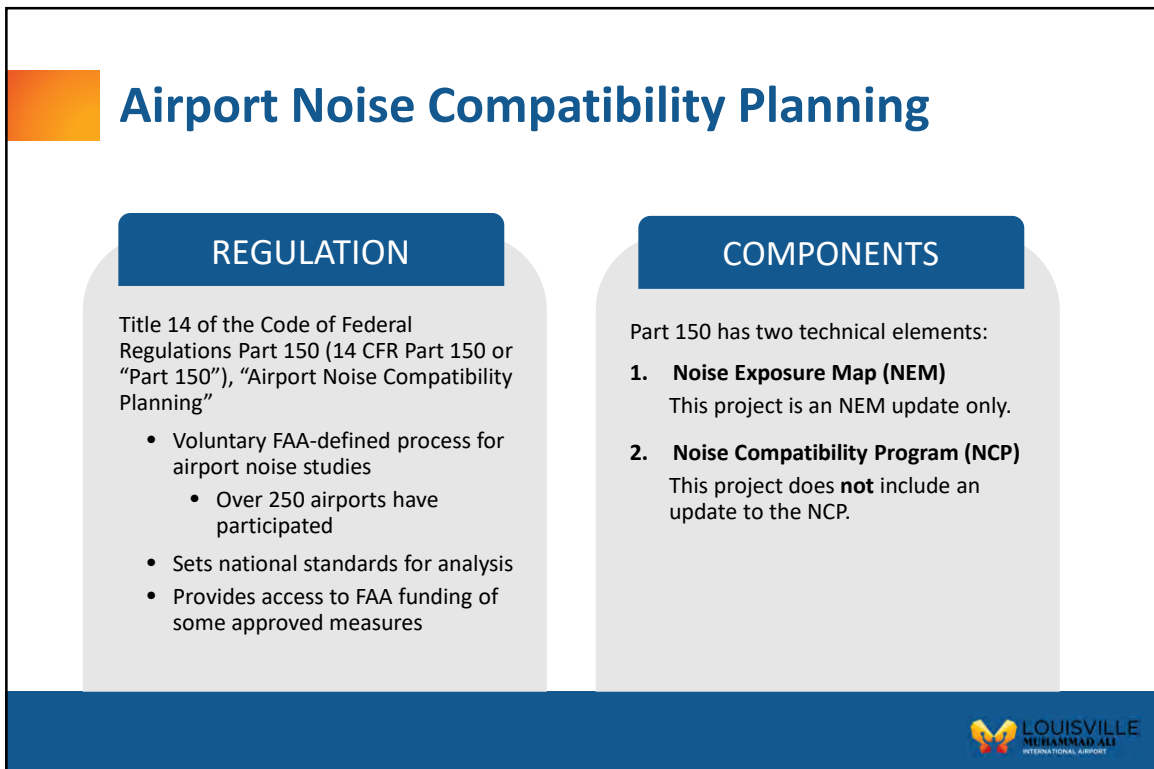
SDF Part 150 History



4



5



6

Noise Exposure Map

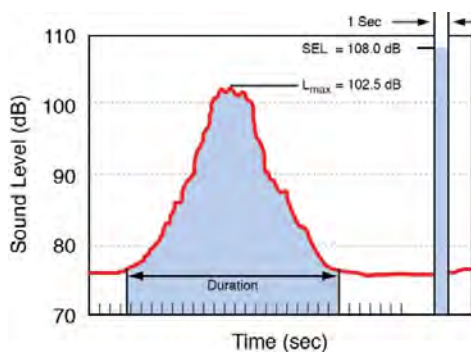
The NEM describes:

- Airport layout and operation
- Aircraft-related noise exposure
- Land uses in the airport environs
- Noise/land use compatibility

- An NEM must provide information for two timeframes:
 - Year of submission (2024)
 - Five-year forecast (2029)
- An FAA checklist identifies NEM requirements and documentation
- Annual average daily noise exposure (DNL) is depicted using contour lines on a map

7

Aircraft Noise Terminology

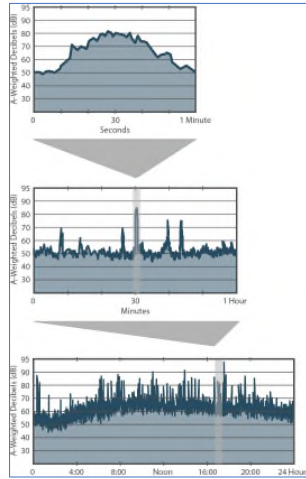


Noise levels can be expressed in many ways, including but not limited to:

- Maximum Noise Level (L_{max})
- Sound Exposure Level (SEL)
- Day-Night Average Sound Level (DNL)

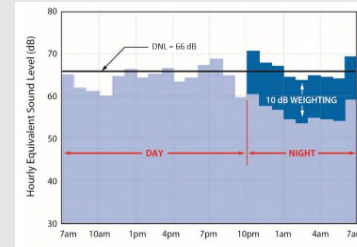
8

Aircraft Noise Terminology - DNL



FAA requires the use of DNL in a Part 150 study.

- DNL represents noise as it occurs over a 24-hour period, with 10 decibels (dB) added to noise events occurring at night (10 p.m. to 7 a.m.)
- Nighttime operations are weighted to represent the greater sensitivity for most people by nighttime sounds



Part 150 guidelines consider all land uses below DNL 65 as compatible.

This page intentionally left blank.

Noise Exposure Map Update

The Louisville Regional Airport Authority (LRAA) has developed a draft update to its Noise Exposure Maps for the Louisville Muhammad Ali International Airport (SDF) in accordance with Federal Aviation Administration guidelines, known as Part 150. Part 150 is a voluntary federal program administered by the FAA that sets guidelines for aircraft noise exposure, and in establishing programs to minimize incompatibilities with surrounding land uses.

The Draft Noise Exposure Maps and accompanying documentation are being made available for public review beginning October 24, 2024. For the 30-day public review period, the draft document and appendices can be accessed online at this site by clicking the yellow button below and hard copies may be viewed at the LRAA Maintenance Facility (4320 Old Park Blvd, Louisville, KY 40209) and Louisville Free Public Library – Main Branch (301 York Street, Louisville, KY 40203).

In addition, the LRAA is inviting the public to an open house on Thursday, November 7, 2024 between 5:00 p.m. and 7:00 p.m. at Fourth Presbyterian Church (3016 Preston Highway). Those in attendance may review the draft Noise Exposure Map update, draft aircraft noise exposure contours, the resulting assessed land use compatibility and the data that supported the development of the draft noise exposure contours. They will also be able to ask questions of the technical staff that prepared the updated Noise Exposure Map. A short presentation summarizing the process and results will take place at 5:30 p.m. The public will have the opportunity to provide written comments at the workshop or to record oral comments.

In addition, the LRAA is accepting written comments during the 30-day review period. Written comments can be submitted to Bob Slattery at Engineering@FlyLouisville.com or at the following address by November 22, 2024:

Bob Slattery
 LRAA Maintenance Facility
 4320 Old Park Blvd
 Louisville, KY 40209

CLICK HERE TO VIEW DRAFT NOISE EXPOSURE MAP UPDATE

CLICK HERE TO VIEW DRAFT APPENDICES FOR THE NOISE EXPOSURE MAP UPDATE

FLIGHTS
 Flight Status
 Destinations
 Arrivals

BEFORE YOU FLY
 Getting to and From the Airport
 Travel Tips

LRAA

SDF

BOWMAN FIELD

RENAISSANCE ZONE

BIDS & PROPOSALS

SIGN UP FOR OUR NEWSLETTER

first name _____ last name _____

email address _____

6C | THURSDAY, OCTOBER 24, 2024 | COURIER JOURNAL

Fact checking Anna Kendrick's drama 'Woman of the Hour'

Marco della Cava USA TODAY

Anna Kendrick's directorial debut, "Woman of the Hour," has an implausible plot that, sadly, is ripped right from the headlines.

The movie stars Kendrick as Sheryl, a very close stand-in for Cheryl Bradshaw, a 28-year-old woman who in 1978 won a popular TV show called "The Dating Game."

The show's premise was simple: The bachelorette would ask scripted questions of three bachelors hidden behind a large wall, and she would eventually select one for a paid mini-vacation together. Bradshaw chose Rodney Alcala, unaware that he was not only a convicted sex offender who had already served time in prison but also a serial killer.

"I can understand why it might be surprising to people that this would be something I would choose to do as my first time being a director," Kendrick says. But what intrigued her about the grim tale was the opportunity to twist a well-worn police procedural drama that focused on men.

"On paper, this story was ready for Hollywood, with an emphasis on being a young detective who finally takes on this case, and a determined prosecutor who keeps the criminal behind bars," she says.

Kendrick chose instead to center "Woman of the Hour" on the countless women who fell victim to Alcala.

We review the facts of this true-crime drama:

Was Rodney Alcala a serial killer?

Yes, Rodney Alcala, who was born in Texas, was finally caught in 1979 and subsequently convicted of murder. Over his 10-year spree, Alcala is believed to have assaulted hundreds and possibly killed more than 100 people.

Alcala was arrested in July 1979 after police found earrings belonging to one of his victims in a Seattle storage locker he had rented. He was sentenced to death but died of natural causes at age 77 in 2021.

Did he study with Roman Polanski?

In "Woman of the Hour," Alcala impresses women by telling them he's a



Tony Hale as Ed, and Anna Kendrick as Sheryl in "Woman of the Hour." LEAH GALLO/NETFLIX

professional photographer who sees something promising in their beauty, and he name-drops that he studied at New York University with Roman Polanski. The real Alcala enrolled at NYU but did not complete his studies. There is no indication he encountered Polanski, by then the celebrated director behind films such as "Rosemary's Baby," at the school.

This was a period in the late '60s and early '70s when Alcala was a fugitive from crimes in California and had moved to New York to live under an assumed name, John Berger. In "Woman of the Hour," while in New York, Alcala seduces and kills a flight attendant, played by Kathryn Gallagher, an allusion to various crimes he committed in the area.

How did Rodney Alcala get on 'The Dating Game' in 1978?

Alcala made it on the air with "The Dating Game," a Los Angeles-based TV show, simply by applying to be one of the three bachelors who were featured each episode. There were no rigorous background checks conducted — otherwise, show producers likely would have discovered his criminal record.

On the show, as in "Woman of the Hour," Alcala, sporting long hair and a gap-toothed grin, was introduced by the show's host (played by Tony Hale in the film) as a photographer "who between takes is skydiving and motorcycling." Although Bradshaw selected Alcala, she sensed something was off and ultimately did not go on a date with him, a decision that likely saved her life. Alcala was thought to have killed a few other women after her rejection.

'Goyhood' mixes religion with Southern road trip

A preposterous journey that is over the top

Don Noble
Special to Tuscaloosa News
USA TODAY NETWORK

"Goyhood" by Reuven Fenton (Publisher: Central Avenue Press, Simon & Schuster)

There is a real scarcity of comic fiction these days, so I received "Goyhood" gratefully and enjoyed it thoroughly.

The set-up takes a minute to explain.

Marty and David Belkin are twins, poor, white, scruffy 12-year-old fatherless boys in fictional Moab, a hot, useless town in rural Georgia. Their mother, Ida Mae Belkin, is 37, peroxide blonde, mild-ly alcoholic.

Now in his own black suit and fedora, he joins his brother to bury Ida Mae. Reading the letter she left for them they learn — surprise! — they are NOT Jewish. She did it on a whim and to improve their lives.

David doesn't care; he never took it to heart. But Mayer, a very strictly observant, a literalist, is devastated. It means he is no longer actually married. He must convert at once — and his wife must not know she has been living in sin for decades, so, in phone calls to Sarah, every sentence he utters contains some kind of lie and he is convulsed with guilt.

They have a week until the next possible conversion ceremony for Mayer, so David, now wealthy from having invested early in e-cigarettes, mischievously insists they drive to New Orleans, stopping to eat in Tuscaloosa. (Eating.



Classifieds

To Advertise, visit our website: classifieds.courier-journal.com
Public Notices/Legals email: legals@courier-journal.com
Business & Services email: servicesdirector@courier-journal.com
To post job openings, visit: courier-journal.com/jobs

All classified ads are subject to the applicable rate card, copies of which are available from our Advertising Dept. All ads are subject to approval before publication. Louisville Courier Journal reserves the right to edit, refuse, reject, classify or cancel any ad at any time. Errors must be reported in the first day of publication. Louisville Courier Journal shall not be liable for any loss or expense that results from an error in or omission of an advertisement. No refunds for early cancellation of order.

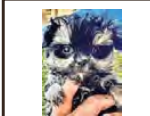
Adopt Me
Pets
all your favorites...

Domestic Pets

Yorkshire Terriers
Registered, Dew clawed, deformed, doctored Miller Puppies 502-264-3940



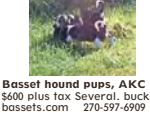
DOBERMAN PUPPIES
AKC \$500.00 CALLS ONLY
606-878-6395



Ocherese Pups Beautiful pee wee females for sale, NON-SHEDDING, smart, crate & paper training on going, raised in loving home, parents on site, great w/ kids & seniors, vaccines, worming UTD. Located near Lou, Call/ text for details & pics. (502)314-0125



Basset hound pups, AKC
\$600 plus tax. Several, bucks-bosses.com 270-597-6909
270-286-4649



PUPPIES
Twin Oaks Kennels LLC



Bowling Green, KY
Looking For A Hunting Retreat? 80+/- Acre Tract 8 Miles North Of Town! Used for Centuries As A Family Hunt Site. Cabin Ready! Paved Frontage, Water/Electric At Street. Densely Wooded, Gated, Oil Wells, Private! Info: HuntingLandSeller.com Berkshire Hathaway Home Services Partners Realty. \$349K! 270-598-1648

120 acres in Perry County TN. 15 min from Tell City 25 min from I64. 67 acres tillable. 53 acres woods, excellent deer, turkey hunting. \$ 625000.00, email lcwheat72@gmail.com call 812-608-0131 offer 3pm

Assorted Stuff
all kinds of things...

Wanted to Buy

MOTORCYCLES

Garage sales Market
neighborly deals...

Garage Sales

Lake Forest, 10/25 & 10/26
from 9am-2pm, 14116 WILLOW GROVE WAY, Infant to adult clothing (m/f), high chair, pack-n-play, furniture, toys, various household, educational material, and other misc. items. NO EARLY SALES!

October 26, 2024 8 AM to 1 PM, Southern Estates is having another Fall Yard Sale since the one in September got rained out. Southern Estates is located off Charlestown Road, Sellersburg, IN 47172

Estate Sales

AETHER ESTATE SALE
Fri-Sun, 10/25-10/27 9am-2pm
10011 Fern Creek Rd. Louisville, KY 40291

2006 Mustang Convertible
Low Miles, Tools, Antiques, Barn Finds and Much More!!!
Photos at aetherestatesales.com

Professional Service
all your needs...

Home Improvement

Hauling Anything
Yardwork-Weeding-Trimming Lot Cleanings-House Clean-Outs
Handyman Services
502-365-7343

Real Estate Homes
starting fresh...

Acreage



120 acres in Perry County TN. 15 min from Tell City 25 min from I64. 67 acres tillable. 53 acres woods, excellent deer, turkey hunting. \$ 625000.00, email lcwheat72@gmail.com call 812-608-0131 offer 3pm

LANESVILLE EXIT 1 3/4 ACRES I-64 ZONED COMMERCIAL \$299,000
SCOTT CO. 7 ACRES HWY 356 OPENWOODS WITH CREEK \$89,900
ELIZABETH 7+ ACRES WOODED PRIVATE UTILS AT ROAD \$91,900
SALEM 4 ACRES OPENTREES DRIVEWAY SEPTIC APPROVED CREEK \$49,900
NEW WASHINGTON 9 3/4 ACRES OPEN MOSTLY WOODS CREEK \$79,900
MILLTOWN 3 ACRES SETUP FOR HOME WOODED WITH OLD MH \$59,900
INDIANA LAND COMPANY OWNER FINANCING AVAILABLE
GEORGETOWN 812-923-9823
SELLERSBURG 812-246-1300
www.indianalandcompany.com

Lots and Building Sites

Lots and Building Sites

Automotive Wheels
best deal for you...

Autos Wanted

A Buyer of Old Cars Classic & Antique: 1930s, 40s, 50s, 60s, 70s Running or not. Call: 513-403-7386

SUVs / Trucks



Ford F350 super duty cargo
2010 \$6,000.00, 178K miles, Side shelves, 2 parts drawer cabinets.

Cab is separated from the back of the van. Ladder rack and pipe storage on roof. 502-964-8332

Your Source Public Notices
for the latest...

Govt Public Notices

CASE NO: CV43-22-00276
NOTIFICATION OF TERMINATION OF PARENT RIGHTS TRIAL IN THE DISTRICT COURT OF THE FOURTH JUDICIAL DISTRICT IN THE STATE OF IDAHO, IN AND FOR THE COUNTY OF VALLEY, IN the Interest of: Anikah Garaos, Child Under Eighteen Years of Age; TO: Eugene DOUGLAS Garaos, the natural FATHER of said child; YOU AND EACH OF YOU, will hereby take notice: That an Responsive Petition for Termination of Parent/Child Relationship was filed in the above-entitled matter on October 1, 2024. That a Termination Trial on the Petition has been set for the March 10, 2025, at 9:00 a.m., in the Magistrate Court, Valley County Courthouse, 219 N Main St, Cascade, ID 83611. Unless you file a responsive pleading within twenty (20) days, a default judgment may be entered against you. That you have the right to be represented by Counsel of your choosing or upon good cause shown, providing you are financially needy, the Court may appoint Counsel to act on your behalf. That you are required to register your claim of paternity with the Vital Statistics Unit of the Department of Health and Welfare prior to the date of any termination proceeding, or proceeding wherein the child is placed with an agency licensed to provide adoption services, pursuant to Idaho Code 16-1513(5). DATED this 10th day of October, 2024. Idaho Attorney General's Office 1017, 1024, 1031/24
CNS-3861928
LOUISVILLE COURIER JOURNAL

Public Notices

PUBLIC HEARING: The Louisville Metro Planning Commission will hold a public hearing on November 7th, 2024, at 1:00 pm at the Old Jail Building, 314 W. Liberty Street, Louisville, Kentucky for case no. 24-ZON-090, a change in zoning from R-4 to R-7 on property located at 2100 W. Jefferson St. Louisville, KY 40212. Said case may be inspected in the office of Metro Planning and Design, 444 S 5th St., Suite 300, Louisville, Kentucky. If special accommodations will be required or additional information is needed, please contact Planning and Design at 574-6230 or www.louisville.gov/planninganddesign

Classifieds

To Advertise, visit our website: classifieds.courier-journal.com
 ■ Public Notices/Legals email: legals@courier-journal.com
 ■ Business & Services email: servicedirectory@courier-journal.com
 ■ To post job openings, visit: courier-journal.com/jobs



TO ADVERTISE
 Visit Our Website:
classifieds.courier-journal.com

All classified ads are subject to the applicable rate card, copies of which are available from our Advertising Dept. All ads are subject to approval before publication. Louisville Courier Journal reserves the right to edit, refuse, reject, classify or cancel any ad at any time. Errors must be reported in the first day of publication. Louisville Courier Journal shall not be liable for any loss or expense that results from an error in or omission of an advertisement. No refunds for early cancellation of order.

Adopt Me
Pets
 all your favorites...

Domestic Pets

DOBERMAN PUPPIES
 AKC \$500.00 CALLS ONLY
 606-878-6395

Basset hound pups, AKC
 \$600 plus tax Several. bucks-basset.com 270-597-6909
 270-286-4649

Specificizing in small breed family puppies. Maltipoo, F1b Cavapoo, Shihpoo, 1 yr health contract UTD shots and much more. Located in Western KY area. FACEBOOK: Twin Oaks Kennels of Fredonia. www.twinoakskennels.com 270-601-3210 or 815-520-3607

Miniature Schnauzer We have AKC registered Miniature Schnauzers males and females. Our puppies are up to date on all vaccination. 812-585-5374 or quarrykennel@comcast.net

SELL YOUR CAR
FIND A HOME
GET A JOB
ADOPT A PET
BUY A BOAT
HIRE A HANDYMAN

Check out the classified section everyday.

Domestic Pets

Yorkshire Terriers
 Registered, Dew clawed, dewormed, docktailed Miller Puppies 502-264-3940

Ocherese Pups Beautiful pee wee females for sale, NON-SHEDDING, smart, crate & paper training on going, raised in loving home, parents on site, great w/kids & seniors, vaccines, worming UTD. Located near Lou. Call/ text for details & pics. (502)314-0125

PUPPIES
 Twin Oaks Kennels LLC

www.twinoakskennels.com 270-601-3210 or 815-520-3607

Jobcase
FIND THE BEST TALENT TODAY!

Get started at jobs.usatoday.com

Lost - Pets

LOST DOG!!
 DO NOT CHASE!

(502) 694-2224

Cavapoo Carl is still missing! :(Last seen Sat, 10/19 2am in Crossgate neighborhood off of Hwy 22/Brownsboro Rd. 5yo 10lb Tricolor Cavapoo (black w/brown eyebrows/paws). **All Businesses & Homes- please check your back yard & any exterior camera footage you have.** Call 502-694-2224 if you have her or have seen her!!!

Assorted Stuff
 all kinds of things...

Wanted to Buy

MOTORCYCLES
WANTED
 ALL MOTORCYCLES WANTED *BEFORE 1985* ALL MAKES & MODELS. ANY CONDITION. RUNNING OR NOT! \$CASH PAID! CALL: (315)-569-8094 OR EMAIL: Cyclorrestoration@aol.com FREE APPRAISALS!

BUYING RARE/OLD BOURBON MUST BE SEALED CALL/TEXT
 859-230-0705

WE PAY CASH FOR YOUR USED RECORD ALBUMS AND 45'S
 812-949-9706

WE PAY CASH! VINYL RECORDS Call: 812-949-9706

Wanted to Buy

LOOK!

INSTANT CASH PAID!
 For Baseball Cards, Sports Memorabilia, Coins, Gold, Silver, Diamonds, Antiques, Old Toys, Watches, Comics, Old Photos, Military, Trains, Autographs, Huge Collections, Many Others!
 We Pick Up. 513-295-5634

Professional Service
 all your needs.

Home Improvement

Hauling Anything
 Yardwork-Weeding-Trimming Lot Clearing-House Clean-Outs
Handyman Services
 502-365-7343 Louis

Professional Service

Caregiver Seeking Employment
 I am a college educated caregiver seeking live in / live out position. Excellent references. 512-799-5013 502-999-3222

Real Estate Homes
 starting fresh...

Acreage

120 acres in Perry County TN. 15 min from Tell City 25 min from I64. 67 acres tillable, 53 acres woods, excellent deer, turkey hunting, 5 62500.00. email cwheat729@gmail.com cell 812-608-0131 offer 5pm

Automotive Wheels
 best deal for you...

Autos Wanted

A Buyer of Old Cars Classic & Antique: 1930s, 40s, 50s, 60s, 70s Running or not. Call: 513-403-7386

SUVs / Trucks

Ford F350 super duty cargo
 2010 \$6,000.00, 178K miles, Side shelves, 2 parts drawer cabinets. Cab is separated from the back of the van. Ladder rack and pipe storage on roof. 502-964-8532

Your Source
Public Notices
 for the latest...

Beer/Liquor Licenses

Golden Retriever Rescue and Adoption of Needy Dogs, Inc. (GRAND), PO Box 6132 Louisville, Kentucky 40206. Hereby declares intention(s) to apply for a Special Temporary Alcoholic Beverage Auction License license(s) no later than November 2, 2024. The business to be licensed will be located at 1860 Mellwood Ave., Louisville, Kentucky, Kentucky 40206 doing business as GRAND.

The Principal Officers and Directors are as follows: Nina Scott, PO Box 6132, Louisville, Kentucky 40206. Any person, association, corporation, or body politic, may protest the granting of the license(s) by writing the Department of Alcoholic Beverage Control, 500 Mero St 2NE33, Frankfort, Kentucky, 40601, within thirty (30) days of the date of legal publication. October 30 2024 LSBN0183162

Khaili's Catering hereby declares its intention(s) to apply for a Caterer's License premises will be located at 12502 Dixie Highway Lou KY 40272. The owner and president Khaili Batshon 12502 Dixie Highway Lou KY 40272. Any person, association, corporation, or body politic may protest the granting of the license(s) by writing the Department of Alcohol Beverage Control, 500 Mero Street 2NE33, Frankfort, Kentucky 40601, within thirty (30) days of the date of legal publication.

Public Notices

Notice is hereby given that EA Complete Holding of 2001 Production Drive, Unit 6, Louisville, KY 40299, has filed an application with the Natural Resources and Environmental protection cabinet to construct a commercial athletic facility near Chenoweth Run Creek. The property is located at 10000 Grassland Drive in Jefferson-town, KY. Any comments or

Public Notices

The Louisville Regional Airport Authority has developed a draft update to its Noise Exposure Maps for the Louisville Muhammad Ali International Airport in accordance with Federal Aviation Administration guidelines, known as Part 150. Part 150 is a voluntary federal program administered by the FAA that sets guidelines for aircraft noise exposure, and in establishing programs to minimize incompatibilities with surrounding land uses. The Draft Noise Exposure Maps and accompanying documentation are being made available for public review beginning October 23, 2024 for 30 days at the following locations:

- FlyLouisville.com/NEM
- LRAA Maintenance Facility (4320 Old Park Blvd, Louisville, KY 40299)
- Main Library (301 York Street, Louisville, KY 40203)

The public is invited to review the documents and provide written comments during this review period. Written comments can be submitted to Bob Slattery at engineerina@flylouisville.com or the following address by Friday, November 22, 2024:
 Bob Slattery
 C/O LRAA Maintenance Facility
 4320 Old Park Blvd.
 Louisville, KY 40299

LRAA is inviting interested people to an open-house-style public workshop on Thursday, November 7, 2024 between 5:00 p.m. and 7:00 p.m. at Fourth Presbyterian Church (3016 Preston Highway). The public will be invited to review maps and other displays in an open house format and ask questions regarding the Part 150 process at the airport. A short presentation summarizing the process and results will take place at 5:30 p.m. The public will have the opportunity to provide any written comments or record oral comments.

Public Notices

objections concerning this application shall be directed to: Kentucky Division of Water, Surface Water Permit Branch, Flood Plain Management Section 300 Sower Blvd., Frankfort Office Park, Frankfort, Kentucky 40601. Phone: (502) 564-3410.

PUBLIC NOTICE

On October 18, 2024, Louisville Gas and Electric Company and Kentucky Utilities Company filed their 2024 Joint Integrated Resource Plan with the Public Service Commission of Kentucky. This filing includes a load forecast and resource plans of Louisville Gas and Electric Company and Kentucky Utilities Company to meet future demand with an adequate and reliable supply of electricity at the lowest possible cost for all customers within their service areas. Comments regarding the Integrated Resource Plan may be submitted to the Public Service Commission by mail to Public Service Commission, Post Office Box 615, Frankfort, Kentucky 40602, or by email to psc.info@ky.gov. All comments should reference Case No. 2024-00326. Any person interested in participating in the review of this Integrated Resource Plan should submit a motion to intervene in Case No. 2024-00326. CJ-4058472

Find your new job HERE!

Public Notices

6C | WEDNESDAY, NOVEMBER 6, 2024 | COURIER JOURNAL

Classifieds

To Advertise, visit our website: classifieds.courier-journal.com
 ■ Public Notices/Legals email: legals@courier-journal.com
 ■ Business & Services email: servicedirectory@courier-journal.com
 ■ To post job openings, visit: courier-journal.com/jobs



TO ADVERTISE
 Visit Our Website:
classifieds.courier-journal.com

All classified ads are subject to the applicable rate card, copies of which are available from our Advertising Dept. All ads are subject to approval before publication. Louisville Courier Journal reserves the right to edit, refuse, reject, classify or cancel any ad at any time. Errors must be reported in the first day of publication. Louisville Courier Journal shall not be liable for any loss or expense that results from an error in or omission of an advertisement. No refunds for early cancellation of order.

Adopt Me
Pets
 all your favorites...
Domestic Pets

Miniature Schnauzer We have AKC registered Miniature Schnauzers males and females. Our puppies are up to date on all vaccination. 812-583-5574 or quarrykennel@comcast.net

Corgi Puppies 9 weeks old, 1st shots, dewormed, \$600.00, 2 males, 2 females 502-689-8655 or 502-494-9272

Ocherese Pups Beautiful pee wee females for sale, NON-SHEDDING, smart, crate & paper training on going, raised in loving home, parents on site, great w/kids & seniors, vaccines, worming UTD. Located near Lou. Call/text for details & pics. (502)314-0125

Homes

Domestic Pets
 PUPPIES
 Twin Oaks Kennels LLC

Specifying in small breed family puppies. Maltipoo, Flb Cavaopoo, Shocapoo, Flb Cockerpoo, Shihpoo, 1 yr health contract UTD shots and much more. Located in Western KY area. FACE-BOOK: Twin Oaks Kennels of Fredonia. www.twinoaskennels.com 270-601-3210 or 815-520-3607

Assorted Stuff
 all kinds of things...

Wanted to Buy
BUYING RARE/OLD BOURBON MUST BE SEALED.CALL/TEXT 659-230-0705

LOOK!
INSTANT CASH PAID! For Baseball Cards, Sports Memorabilia, Coins, Gold, Silver, Diamonds, Antiques, Old Toys, Watches, Comics, Old Photos, Military, Trains, Autographs, Huge Collections, Many Others!
 We Pick Up. 513-295-5634

Professional Service
 all your needs...

Home Improvement
Hauling Anything Yardwork-Weeding-Trimming Lot Clearing-House Clean-Outs **Handyman Services** 502-365-7343 Louis

Professional Service
Caregiver Seeking Employment
 I am a college educated caregiver seeking live in / live out position. Excellent references. Contact Patricia 512-799-5013 502-999-3222

Automotive Wheels
 best deal for you...

Autos Wanted
A Buyer of Old Cars Classic & Antique: 1930s, 40s, 50s, 60s, 70s Running or not. Call: 513-403-7386

SUVs / Trucks

Ford F350 super duty cargo 2010 \$6,000.00, 178K miles. Side shelves, 2 parts drawer cabinets. Cab is separated from the back of the van. Ladder rack and pipe storage on roof. 502-964-8532

Your Source
Public Notices
 for the latest...

Public Notices
 In compliance with KY House Bill 351, Section 73, the City of Rolling Hills hereby gives public notice that it has completed the annual audit for the year ending 6/30/2024. The audit is available in full by calling 502.389.0963 or on the City's website: https://www.cityofrollihillsky.org/document_archive/financial/

Public Auction
PUBLIC AUCTION Saturday, November 9, 2024 @ 10:00am. @ A Another Room Self Storage 3122 Preston Hwy, Lou, KY 40213. The contents of the following units will be sold to the highest bidder to satisfy the owner's lien. Units #464, immediately following @ 11720 Dixie Hwy., Louisville, KY 40272 Units #113,206,209,120 4,420,600,631,736,920,927,1001,14

Public Notices
 16,1518(1527),1575,1605. Immediately following @ 100 W. Knox Blvd, Radcliff, KY. Unit #1's 418,828,921. Auction to be held by Kentuckiano Auctions/ Jim White Auctioneer, CASH ONLY. 24 hours to empty unit(s) DEPOSIT REQUIRED ON EACH UNIT PURCHASED UNTIL EMPTY. November 6 2024 LSN0185948

Public Notices
 Ultra Pure, LLC, with a mailing address of 50 Old Kings Highway North, Darien, CT 06820, hereby declares its intention to apply for a Rectifier's License, a Distilled Spirits Storage License, and a Transitional Wine and Distilled Spirits license not later than November 4, 2024, for premises located at 6800 Enterprise Drive, Louisville, Kentucky 40214. Ultra Pure, LLC is a Connecticut limited liability company, authorized to do business in the Commonwealth of Kentucky, which is owned by Sanihil, Inc., a Connecticut corporation, 69 Orchard Place, Greenwich, CT, 06830, and Orchard Place, LLC, 69 Orchard Place, Greenwich, CT 06830. The primary owners and officers of both Sanihil, Inc. and Orchard Place, LLC are Hans van der Kloot, 50 Old Kings Highway North, Darien, CT 06820, Saskia van der Kloot, 50 Old Kings Highway North, Darien, CT 06820, Niels van der Kloot, 50 Old Kings Highway North, Darien, CT 06820, and Hilco van der Kloot, 50 Old Kings Highway North, Darien, CT 06820. Any person, association, corporation, or body politic may protest the approval of the license by writing the Department of Alcohol Beverage Control, 500 Metro Street 2NE33, Frankfort, Kentucky, 40601, within (30) days of the date of legal publication.

Public Sale
 Public notice Notice is hereby given that (Eduardo Segura '2610 Marguerite dr Louisville ky 40216, has filed an application with the Energy & Environment Cabinet to (We would like to do an addition on a existing property). The property is located (2610 Marguerite dr Louisville ky 40216 - Any comments or objections concerning this application shall be directed in writing to: DOWfloodplain@ky.gov or Kentucky Division of Water, Floodplain Management Section, 300 Sower Blvd 3rd Floor, Frankfort, Kentucky 40601. November 5, 6, 7 2024 LSN0176275

Public Notices
NOTICE OF PUBLIC HEARING

The Kentucky Housing Corporation (the "Issuer") by its representative will hold a public hearing on Thursday, November 14, 2024, at 9:30 a.m., local time via teleconference pursuant to Revenue Procedure 2022-20. The public hearing may be accessed by dialing the Toll-free Number 1-888-633-0347, pin 52316660#.

The hearing concerns the approval of the proposed issuance in one or more series of tax-exempt revenue obligations, which may be issued as bonds, notes or other evidences of indebtedness, in an amount not to exceed \$46,129,448 (the "Bonds"), pursuant to the provisions of Chapter 198A of the Kentucky Revised Statutes, as amended. The proceeds of the Bonds will be used for the purposes provided in the Loan Agreements relating to the Bonds, including (i) the acquisition, construction, and equipping of: (A) residential rental facilities known as Emery Flats (180 units) and located at 1200 Morgantown Road, Bowling Green, Kentucky 42101, which are to be owned by Emery Flats, LLLP, a Kentucky limited liability partnership; (B) residential rental facilities known as Commonwealth Court (66 units) and located at 975 South Commonwealth Drive, Mayfield, Kentucky 42066, which are to be owned by Commonwealth Court, LLLP, a Kentucky limited liability partnership; and (C) residential rental facilities known as Marketplace Commons (48 units) and located at approximately 59 Recovery Drive, Dawson Springs, Kentucky 42408, which are to be owned by Marketplace Commons, LLLP, a Kentucky limited liability partnership (collectively, the "Project"); and (ii) the payment of costs of issuance. Each of Emery Flats, LLLP, Commonwealth Court, LLLP, and Marketplace Commons, LLLP is a "Borrower".

THE BONDS SHALL NOT REPRESENT OR CONSTITUTE A DEBT OR PLEDGE OF THE FAITH AND CREDIT OR THE TAXING POWER OF THE ISSUER, THE COMMONWEALTH OF KENTUCKY OR ANY AGENCY OR POLITICAL SUBDIVISION THEREOF. THE BONDS ARE PAYABLE SOLELY FROM FUNDS PAID BY EACH BORROWER AND SHALL BE SECURED BY COLLATERAL FURNISHED BY EACH BORROWER.

Persons wishing to express their views on the nature of the Project or the proposed issuance of the Bonds may appear at the hearing or may submit their view in writing. Any written submissions should be clearly marked "RE: SOCCAYR-BYwater Western Kentucky Portfolio" and should be sent to the Issuer at the following address: Kentucky Housing Corporation, 1231 Louisville Road, Frankfort, Kentucky 40601, Attn: Winston E. Miller, Executive Director, and should be mailed in sufficient time to be received before the date of the hearing. Any person requiring reasonable special accommodation to participate in this meeting because of a disability or physical impairment should contact Winston E. Miller at (502) 554-7630 at least five (5) days prior to the meeting. This notice is given pursuant to Section 147(f) of the Internal Revenue Code of 1986, as amended.

KENTUCKY HOUSING CORPORATION
 Tax Credit Administrator

The Louisville Regional Airport Authority has developed a draft update to its Noise Exposure Maps for the Louisville Muhammad Ali International Airport in accordance with Federal Aviation Administration guidelines, known as Part 150. Part 150 is a voluntary federal program administered by the FAA that sets guidelines for aircraft noise exposure, and in establishing programs to minimize incompatibilities with surrounding land uses. The Draft Noise Exposure Maps and accompanying documentation are being made available for public review beginning October 23, 2024 for 30 days at the following locations:
 • FlyLouisville.com/NEM
 • LRAA Maintenance Facility (4320 Old Park Blvd, Louisville, KY 40209)
 • Main Library (301 York Street, Louisville, KY 40203)
 The public is invited to review the documents and provide written comments during this review period. Written comments can be submitted to Bob Slattery at engineering@flylouisville.com or the following address by Friday, November 22, 2024:
 Bob Slattery
 C/O LRAA Maintenance Facility
 4320 Old Park Blvd,
 Louisville, KY 40209
 LRAA is inviting interested people to an open-house-style public workshop on Thursday, November 7, 2024 between 5:00 p.m. and 7:00 p.m. at Fourth Presbyterian Church (3016 Preston Highway). The public will be invited to review maps and other displays in an open house format and ask questions regarding the Part 150 process at the airport. A short presentation summarizing the process and results will take place at 5:30 p.m. The public will have the opportunity to provide any written comments or record oral comments.

PAGE B4, THE LOUISVILLE DEFENDER, THURSDAY OCTOBER 31, 2024

Classified Advertising

LEGAL ADVERTISEMENT



CITY OF OWENSBORO
Sneaks qualified applicants for the following Public Works Full-time, Non-civil service position:

MAINTENANCE EQUIPMENT OPERATOR (STREET)

Duties include but are not limited to: Performs concrete finishing operations; Monitors and maintains City streets and alleys. Sets up street closures and signs during paving operations; Operates light to heavy equipment, backhoe, front-end loaders, skid steers etc., to perform street and stormwater operations. Inspects equipment periodically to detect malfunctions. Performs routine and preventative maintenance on streets, street signs, property facilities, stormwater drainage ways, and/or equipment to ensure they are in proper condition for the public's enjoyment. Performs various construction and roadwork duties, such as working with asphalt, dirt, concrete, or other activities.

Starting pay \$22,185/yr. Provided benefits include but are not limited to health insurance, group life insurance, wellness program, and CERS retirement through Kentucky Retirement Systems. Paid time off includes vacation, sick time, and holidays (for eligible employees).

QUALIFICATIONS (Required at time of application)
High school diploma or GED, and 1 year experience as Roadworker, Equipment Operator, Concrete Finisher, or similar position. Equivalent amount of education and/or experience is acceptable. Valid driver's license required. Valid CDL, Class B or higher required within 11 months of employment.

TO APPLY:
Applications must be received no later than Sunday, November 10, 2024. Visit www.owensboro.org. Click on Employment Opportunities and the position link; click Apply. First-time users need to create an account as instructed. If you have any questions or wish to confirm receipt of your application, contact the Human Resources Department at (270) 687-8545 prior to application deadline. Hearing impaired, call TDD/Voice (270) 687-4459.

The City of Owensboro is an Equal Employment Opportunity Employer. EEO/AA-M/F/V/D

ADA accommodations may be requested by calling (270) 687-8542.



ADVERTISEMENT FOR BID

METRO BID OPPORTUNITIES
www.louisvilleky.gov

ADVERTISEMENT FOR PROPOSALS

THE LOUISVILLE METRO HOUSING AUTHORITY (LMHA) IS REQUESTING COMPETITIVE PROPOSALS FOR:

PARKWAY PLACE PLANNING COORDINATOR – PROPOSAL #1639

PROPOSALS WILL BE ACCEPTED UNTIL 10:00 A.M. ON: 11/19/2024

DETAILS ON THE ABOVE REQUEST FOR PROPOSALS (RFP) MAY BE FOUND AT LMHA.ORG UNDER BID OPPORTUNITIES. ONCE THERE, FOLLOW THE LINK TO THE HOUSING AGENCY MARKETPLACE TO REGISTER YOUR COMPANY.

LMHA RESERVES THE RIGHT TO ACCEPT OR REJECT ANY OR ALL PROPOSALS AND/OR WAIVE ANY INFORMALITIES IN THE BIDDING.

LMHA IS AN EQUAL OPPORTUNITY EMPLOYER.

STEVEN WEBB
PURCHASING AGENT, L.M.H.A.

ADVERTISEMENT FOR BID


INVITATION TO BID

Jefferson County Public Schools will receive sealed bids and award contract(s) for: **NEW MIDDLE SCHOOL – WEST LOUISVILLE (HUDSON MS) BID PACKAGE 1 – DEMOLITION**, Louisville, KY.

Pre-bid meeting will be held at 9:00 a.m., November 6, 2024, at 1800 West Broadway, Lou, KY 40203.

Bids will be received until 2:00 p.m., November 19, 2024 at the Facility Planning Dept. C. B. Young, Jr. Service Ctr, 3001 Crittenden Dr. Lou, KY 40209, at which time and place bids will be opened and read aloud. Bidders must be present at the bid opening. Bid documents are prepared by Schmidt Associates and are available at Lynn Imaging, 11460 Bluegrass Pkwy, Lou, KY 40299, phone (502) 499-8400.

JCPS Board of Education has established goals and good faith effort of 15% participation for Minority Business Enterprises, and 10% for Women Business Enterprises in all construction contracting. JCPS reserves the right to accept any bid, to reject any or all bids, to waive any informality in bids received where such acceptance, rejection, or waiver is considered to be in the best interest of the Owner.



PUBLIC REVIEW

The Louisville Regional Airport Authority has developed a draft update to its Noise Exposure Maps for the Louisville Muhammad Ali International Airport in accordance with Federal Aviation Administration guidelines, known as Part 150. Part 150 is a voluntary federal program administered by the FAA that sets guidelines for aircraft noise exposure, and in establishing programs to minimize incompatibilities with surrounding land uses.

The Draft Noise Exposure Maps and accompanying documentation are being made available for public review beginning October 23, 2024 for 30 days at the following locations:

- FlyLouisville.com/NEM
- LRAA Maintenance Facility (4320 Old Park Blvd., Louisville, KY 40209)
- Main Library (301 York Street, Louisville, KY 40203)

The public is invited to review the documents and provide written comments during this review period. Written comments can be submitted to Bob Slattery at engineering@flylouisville.com or the following address by Friday, November 22, 2024:

Bob Slattery
C/O LRAA Maintenance Facility
4320 Old Park Blvd.
Louisville, KY 40209

LRAA is inviting interested people to an open-house-style public workshop on Thursday, November 7, 2024 between 5:00 p.m. and 7:00 p.m. at Fourth Presbyterian Church (3016 Preston Highway). The public will be invited to review maps and other displays in an open house format and ask questions regarding the Part 150 process at the airport. A short presentation summarizing the process and results will take place at 5:30 p.m. The public will have the opportunity to provide any written comments or record oral comments.

FOR RENT

Hurstbourne, Louisville: New Leasing
New Senior Affordable Apartments
Income based, for age 55+, 1 & 2 BR, open floor plan, fully Equipped kitchen, W/D hookup. Secured bldg. Apply Today, by calling 502-361-8000 or Email: hurstbourne@romanmanagement.com
TTY: 1-800-648-6056

Equal Housing Opportunity 



171B DIXIE HWY.

341-7088

- Expert Tire Installation
- Fast Tire Repair Service
- All General Mechanical Work
- Friendly Customer Service

Open: Monday - Saturday:
10:00 a.m. til 7:00 p.m.



Place Your Classified Advertising Today!

Make Your Vote Count
November 5

C
L
A
S
S
I
F
I
E
D
A
D
V
E
R
T
I
S
I
N
G

This page intentionally left blank.

Appendix E: Public Comments

Table of Contents

Public Comments and Responses	E-3
Public Workshop Sign-in Sheets	E-19
Copies of Public Comments Received.....	E-21

This page intentionally left blank.

Louisville Muhammad Ali International Airport (SDF)
2024 Noise Exposure Map Update
Public Comments and Responses

Comment ID	Comment Topic(s)	Comment	Response to Comment
Commenter: Karen Gahafer-Buryn Medium: email			
1.1	Sound insulation/ QuieterHome Program	I have previously communicated with you about concerns regarding the airplane noise at my home. My neighbor Shirly Prather and myself have spoken with some neighbors in our area with the same concerns. I have attached a petition with contact information of people near my address that would like to be included in the Quieter Noise program. Please add us to the list.	10/23/2023 email from Bob Slattery to commenter: Thank you for your comments. While we certainly understand that noise from aircraft operations continues to be a concern for many of our neighbors, mitigation program areas are limited to the guidelines contained in 14 CFR Part 150—Airport Noise Compatibility Planning. Current program areas were chosen because they meet Federal noise guidelines. The Federal Government has adopted a method to measure noise, called the day-night level (DNL), to determine if a community is eligible for Federal grants to reduce the impacts of aircraft noise. DNL is the average noise exposure level over the course of a year. Nighttime noise is weighted more heavily than daytime noise to reflect its proportionately greater impact on homeowners. The DNL noise levels are depicted as contours on Noise Exposure Maps (NEMs). Under current policies, areas within a 65 DNL contour may qualify for federal funds to minimize the effects of aircraft noise. Currently, your location at 975 Eastern Parkway is located outside of the DNL 60 contour on our 2021 Noise Exposure Map. As we have previously discussed, the Airport Authority is currently in the process of updating our Noise Exposure Maps. Once the maps are updated, appropriate mitigation will be based on the FAA criteria for significant noise exposure (currently DNL 65). Your area will be included in the study evaluation area for the map update. The public will have opportunity to comment on the updated maps prior to submittal to the FAA for approval. I will ensure that the petition you attached will be included in the comments section of the Noise Exposure Map report. Please let me know if you have any additional questions or concerns.

Comment ID	Comment Topic(s)	Comment	Response to Comment
1.2	Sound insulation/ QuieterHome Program	<p>Airplane Noise Petition Airplane Noise - Requesting Inclusion in the 2024 Noise Exposure Map</p> <p>The FAA recently conducted an analysis of air traffic that flew within 1 nautical mile (NM) and up to 10,000 feet above ground level (AGL) over our residences for June 24 - 30, 2023 and found:</p> <ul style="list-style-type: none"> · Our homes are in the arrival and departure corridors of runways 17R/L and 35 L/R. · Louisville Muhammad Ali International Airport (SDF) had over 175,000 flights during those 5 days, requiring simultaneous runway operations on parallel runways to accommodate the large volume. 520 of those flights were identified as passing over us. · SDF is the sixth busiest cargo airport in the world. <p>This petition is to identify to the FAA's noise compliance department our concerns about the increase in volume of air traffic above our homes. We are requesting to have our homes included in the 2024 rezoning of the Noise Exposure Map used by the QuieterHome Program. The last rezoning was done in 2021. Now is the time! QuieterHome Program offers sound-insulation improvements to reduce aircraft generated noise within the home. This may include new acoustical windows, prime doors, and in certain cases, a continuous positive ventilation system. The FAA and LRAA fund the entire cost. Only a certain number of homes will be added to the Noise Exposure Map which will get the QuieterHome Program funding. To have our area included, they must hear from us. To advocate for local change with respect to noise abatement, e-mail: BobSlattery@FlyLouisville.com with your concern so our comments are included in their monthly report. Have your voice heard - they look at the number of complaints in each area when figuring the rezoning of the Noise Exposure Map. If you missed signing the petition and want to, please contact Karen at (502) 396-6505 or Shirley at (502) 645-3525. [includes list of 26 names and contact information]</p>	See response to comment 1.1.

Comment ID	Comment Topic(s)	Comment	Response to Comment
Commenter: Unknown Medium: email			
2.1	Aircraft Noise/Flight Paths	<p>This is the noise issue that Yorktown North (the blue dot) and much of the SW region area has been dealing with for years. UPS Departures off 17R banking and turning WSW. Almost all destinations (especially ones west) UPS use this departure flight path which causes noise levels above 80 decibels in the bedroom at 2:00 AM till 5:00 AM with a flight every 1-2 minutes. After noon flights have become the same Below is the flight. To the right is the flight path points measured in distance on a google map, points along that flight path. Who needs noise data or a monitor - you do the math? I challenge anyone to sleep through this or enjoy your afternoons outside. NO WEATHER or Ft Knox</p> <p>Red - .98 mile Yellow - .6 mile Blue - .78 mile Green – 1.4 mile [images included in comment]</p>	<p>Understood. The FAA's noise model (Aviation Environmental Design Tool) used to generate the Noise Exposure Maps included these aircraft operations in the annual-average day as documented in Chapter 5 of the Noise Exposure Map document.</p>
2.2	Aircraft Noise/Flight Paths	<p>These are more examples of Early Morning (starting at 2:30 AM) flights banking and turning NO WEATHER – WHO at UPS or FAA is allowing and or making these decisions to turn early and cause very high noise levels in Yorktown North and areas to the south and west of the airport NO Weather or Ft Knox. [images included in comment]</p>	<p>Except for a short time in the late morning and early afternoon from 9 a.m. to 2 p.m., normal daytime operations at SDF call for aircraft to arrive from the north and depart to the south. During nighttime hours from 10 p.m. to 7 a.m. contraflow is the Airport's Authority's primary noise-abatement procedure. This procedure recommends that aircraft arrive from the south and depart to the south as long as wind and weather conditions permit. The FAA Air Traffic Control Tower directs aircraft based on weather, specifically wind speed and direction, among other conditions to ensure safety of flight.</p>
2.3	Aircraft Noise/Flight Paths	<p>This is just one example of the many UPS AFTERNOON flights off 17R and the noise decibel levels created by UPS banking and turning off 17 R- Note the 80 decibels level and the Vertical climb rate at 26.7 which adds to overall noise levels. These noise levels are sustained 65-70 db’c (A calibrated) for over one minute at a distance of 3.0 miles as the Explain data shows to the right. [images included in comment]</p>	<p>FAA is responsible for the safe operation of aircraft in flight and may deviate from normal procedures when required.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
2.4	Aircraft Noise/Flight Paths	<p>This slide is to show there is NO WEATHER and NO FT KNOX when UPS flights flyover or bank and turn early off 17 R. This happens every morning and afternoons causing high decibel levels (over 80 inside our homes)</p> <p>The 5:05 AM UPS flight UPS684 (Yellow desination Omaha) flightpath in the first two slides on the left - banked and turned off 17R overflying Yorktown North and much of the southwest. While the very next flight right after it UPS662 (Red destination Kansas City went straight off runway and did not bank and turn. You can see both in same slides one and two – three and four show a continued flight path with a third UPS that departed same as UPS662. This happens morning and afternoons causing high decibel levels (over 80 inside our homes) Excuse was the weather ?? Kansas and Nebraska are pretty close ??</p> <p>[images included in comment]</p>	See responses to comments 2.1, 2.2 and 2.3.
2.5	Aircraft Noise/Flight Paths	<p>This is just one example slide shows same as the previous slide except in the afternoons – Blue dot is Yorktown North Los Angeles (yellow) straight off 17R. VERY NEXT UPS departure off 17R UPS 2796 San Antonio (RED) banks and turns flyover Yorktown North at 500 feet over 90 decibels inside. This is happening several times daily morning and afternoons . 2:00 am till 5:00 am and 3:00 pm till 5:30pm .</p> <p>[images included in comment]</p>	See responses to comments 2.1, 2.2 and 2.3.
2.6	Aircraft Noise/Flight Paths	<p>This slide shows what I assume to be the proposed flight paths of the FAA airspace redesign off 17 R South taken by the UPS2784 ?? Why wait till July when they are doing it NOW and have been in the past for several years since I been taking data?? WE have always been told by Bob Slattery that UPS is allowed to fly over and or bank and turn early off 17 R causing high unacceptable noise levels in Yorktown North off 17 R. Excuses given by Bob Slattery are: Weather – Ft Knox and FAA required 20 degree separation at takeoff?? If it is weather why next or previous flights take a different path as seen in other previous slides at takeoffs, even with same area destinations (I have more examples) ? I have shown Ft Knox in past. FAA required separation of 20 degrees at takeoff?? Pictured to left straight centerline takeoff off both runways same time?? Right side you can see UPS straight off 17R with multiple UPS waiting for takeoffs – Destination Greenville ??? I will almost bet that’s South Carolina ?? This happens daily and I have more examples</p> <p>[images included in comment]</p>	Not associated with the Noise Exposure Map update, the FAA recently implemented new flight procedures at the Airport. These new flight procedures were incorporated into the noise model to produce the Forecast (2029) Noise Exposure Map contours. See responses to comments 2.1, 2.2 and 2.3.

Comment ID	Comment Topic(s)	Comment	Response to Comment
Commenter: Sharon Smiley Medium: Comment form			
3.1	Noise monitor	With new contour more flights go directly over my house. I would like for monitor to be placed at my house for comparison to model.	Part 150 does not require the use of noise monitors. Part 150 requires the use of the FAA's noise model, the Aviation Environmental Design Tool, to determine the noise exposure contours provided in the NEM.
Commenter: E.M. Medium: email			
4.1	Public participation	<p>Initial Draft of LRAA 2024 NEM Update Comments</p> <p>I. Residents adversely affected by aircraft flights that have been excluded from the 65-decibel noise contour and the Quieter Homes Program are dismayed by the Louisville Regional Airport Authority (LRAA), and specifically it's the Community Noise Forum, cautious approach to lending the community alternate pre review data to evaluate the modeling of the 2024 5 Year Noise Exposure Map (NEM) during the FAA submission for approval.</p>	<p>Section 5 of the Noise Exposure Map document describes the development of the noise exposure contours including all of the inputs into the FAA's noise model (Aviation Environmental Design Tool). The FAA considers all land uses to be compatible with aircraft-related DNL Levels below 65 dB (i.e., outside the DNL 65 contour). As described in Section 4.2 of the NEM, the existing Noise Compatibility Program at SDF includes multiple land use measures which address compatibility in areas of high noise exposure. Noise sensitive land uses which have received noise abatement treatment (such as sound insulation) are then considered compatible. The Airport Authority coordinated with the Community Noise Forum throughout development of the 2024 NEM document.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
4.2	Noise modeling	<p>1. Data Accuracy: The LRAA lacks actual verifiable and independent recording of decibel noise at the 65-decibel contour peripheral boundaries; acknowledging and incorporating flight paths that may deviate from prescribed flight plans for comparison to HMMH's (the contractor modeling) model decibel noise prediction to generate a statistical scatter plot of the residuals (differences between the predicted decibels and the actual decibels) to assess the presence or lack thereof modeling bias. A Google search of community issues with the FAA NEM modeling points out that "[t]he FAA needs a large number of noise monitors to ensure the accuracy of the data generated by noise models." To the contrary, a minimum number of monitors would be needed using scientific sampling methods.</p> <p>a. Mr. Doug Black, a resident who resides on the southwest quadrant community, has requested the Community Noise Forum representative to conduct a side-by-side comparison of an independent ANOM decibel noise meter data output and the LRAA mobile NOM decibel noise meter output which was received belatedly in the model development.</p> <p>b. According to the Government Accountability Office, see exhibit A1 and A2, states the DNL "metric does not provide a clear picture of the flight activity or noise levels at a given location.... Because of this, the same DNL may be associated with vastly different numbers of flights above that location. Small numbers of relatively loud operations, ..., can result in the same DNL as large numbers of quieter operations.</p>	<p>Measurement data has no influence on the development of the noise contours use for purposes of noise compatibility planning at an airport in accordance with 14 CFR Part 150. Noise monitoring results cannot be used to determine the shape, size, or extent of the 65 DNL contour used for land use compatibility analysis; the contour must be determined through the FAA's noise model (Aviation Environmental Design Tool). Additionally, noise monitoring results cannot be used to determine sound insulation program eligibility, which is also based on the 65 DNL contour based on FAA-accepted NEMs.</p>

<p>4.3</p>	<p>Noise modeling</p>	<p>2. Data Analysis: In addition, there is no provisions within the modeling to allow for "what if" scenarios or sensitivity analysis along the various parameters (e.g. flight time above in second, weighted average DNL, daily average quadrant aircraft flights, flight path deviations, etc.) that influences the outcomes of which communities qualify within the 65-decibel contour. Factors affecting annoyance include "how loud the aircraft flight is", "how long the flight last", "how often aircraft flight occur over a specific community", and "when the aircraft flight occurs". A. Data presentation offering community alternate means of understanding to gain insights are needed in the Noise Exposure Map (NEM) modeling, such as exhibits B1 and B2 which displays the average time in seconds for various average DNL levels, day or night, to qualify inclusion into the 65-decibel contour. Giving residents independently variable metrics residents will acquire a platform to begin to infer the average daily number of aircraft overhead flights for their area for the 65 DNL contour inclusion assuming different average times above: Example: With Day 100% No Penalty Time Above Seconds Avg 75 DNL, 8640 Avg 80 DNL, 2733 Avg 85 DNL, 865</p> <table border="1"> <tr><td>10</td><td>864</td><td>273</td><td>86</td></tr> <tr><td>15</td><td>576</td><td>182</td><td>58</td></tr> <tr><td>20</td><td>432</td><td>136</td><td>43</td></tr> </table> <p>Example: With Night 100% 10dbl Penalty Time Above Seconds Avg 75 DNL, 864 Avg 80 DNL, 274 Avg 85 DNL, 87</p> <table border="1"> <tr><td>10</td><td>86</td><td>27</td><td>9</td></tr> <tr><td>15</td><td>58</td><td>18</td><td>6</td></tr> <tr><td>20</td><td>43</td><td>14</td><td>4</td></tr> </table> <p>Example: WGT. 2024 Day (53.165%)/Night (46.834%) 10dbl Penalty Flight Plans Time Above Seconds Avg 75 DNL ,4634 Avg 80 DNL, 1,581 Avg 85 DNL, 501</p> <table border="1"> <tr><td>10</td><td>463</td><td>158</td><td>50</td></tr> <tr><td>15</td><td>309</td><td>105</td><td>33</td></tr> <tr><td>20</td><td>232</td><td>79</td><td>25</td></tr> </table> <p>Based on Exhibit C5: 2024 Runway Quadrants Flight Projections: 17L, 117.4/220.82= .53165 : 35R, 103.42/220.82= .46834 (8,640 x .53165) + (864 x .46834) = 4,634 (2,733 x .53165) + (274 x .46834) = 1,581 (865 x .53165) + (87 x .46834) = 501 Construction of the NEM should reflect that the average SEL times above will vary respectively to the aircraft altitude and velocity and the time above is not a given fix constant influencing the average daily number of flights needed to meet the average 65 DNL contour.</p>	10	864	273	86	15	576	182	58	20	432	136	43	10	86	27	9	15	58	18	6	20	43	14	4	10	463	158	50	15	309	105	33	20	232	79	25	<p>All noise modeling was completed in accordance with 14 CFR Part 150 for airport noise compatibility planning. AEDT produces contours based on inputs reviewed by the Airports Authority, airport operators, and the Community Noise Forum and shared with the public in the Draft NEM. Sections 5.1 through 5.8 of the Draft NEM report describe the required AEDT inputs, which include:</p> <ul style="list-style-type: none"> • Physical Description of the Airport Layout • Aircraft Noise and Performance Characteristics • Annual aircraft flight operations • Runway use • Aircraft flight tracks • Aircraft engine runup operations • Meteorological Data • Terrain Data <p>These inputs capture the concerns listed in the comment. Additionally, the Day-Night Average Sound Level (DNL) represents noise as it occurs annually over a 24-hour period, treating noise events occurring at night (10 p.m. to 7 a.m.) with a 10 dB weighting. This 10 dB weighting is applied to account for greater sensitivity to nighttime noise because events at night are often perceived to be more intrusive than daytime. The DNL noise exposure contours includes the Sound Exposure Level (SEL) of each annual-average daily aircraft operation.</p>
10	864	273	86																																				
15	576	182	58																																				
20	432	136	43																																				
10	86	27	9																																				
15	58	18	6																																				
20	43	14	4																																				
10	463	158	50																																				
15	309	105	33																																				
20	232	79	25																																				

<p>4.4</p>	<p>Noise modeling</p>	<p>a. Louisville airport is the third busiest cargo hub and third fastest growing airport in north America according to recent local news reporting. Soon the United States Postal Service (USPS) mail will be augmented to the Unites Parcel Service (UPS) existing traffic. USPS will elevate the predicted increase flights in the Louisville Muhammad Noise Exposure Map Update Community Noise Forum Meeting January 22, 2024 issued by Louisville airport, page 12. See attached exhibits C1 through C4, which shows the total by aircraft type and C5, which shows the average daily aircraft flights highlighted in yellow. Similar 2029 data breakdown by day and night was requested but not available.</p> <p>b. Enlisting the calculation power of EXCEL to demonstrate the exponential A weighted average day-night noise level (DNL) formulation, see Exhibits D1 and D2, a resident of interest can recreate the daily time in seconds at various Avg DNL it takes to qualify for the 65-decibel contour, see Exhibit D1, which displays the continuous formula, B1 which displays the 7 AM to 10 PM non 10 decibel penalty, B2 which displays the 10 PM to 7 AM 10 decibel penalty.</p> <p>c. Over the year and a half to two years surrounding residents participating in the runup to the HMMH modeling of the new 2024 5 Year NEM, the Community Noise Forum board members have persistently been introduced to lower and lower time above Sound Equivalent Level (SEL) metrics from 20 seconds reflected in the referenced GAO report, 15 seconds in the referenced Louisville Muhammad Noise Exposure Map Update Community Noise Forum Meeting January 22, 2024, and recently 10 seconds announced in the September 2024 Community Noise Forum meeting. The modifying of a lower SEL time above number leads to higher number of aircraft flights needed for 65-decibel contour inclusion. If objective independent ANOM decibel measures would be sampled and the average daily aircraft flights by quadrant are determined, it would be permissible to infer which areas are likely in the actual 65-decibel contour by dividing by the average time above for the targeted area.</p> <p>d. The draft maps, pages 116 to 124, of the latest draft of Louisville Muhammad Ali International Airport Noise Exposure Map Update are based on the average SEL of 75 DNL for the NEM to distinguish from ambient noise. During my use of the Explane app, 90% of decibels measured for the Merriweather community exceeded 77 decibels. Relative higher average DNL would need less average daily flights overhead to meet the average 65 DNL metric compared to the latest 2024 version SDF Part 150 NEM Update Draft at 75 DNL.</p>	<p>As described in Section 6.2 of the Draft NEM document, the main differences contributing to changes in the contours from the 2024 to the 2029 conditions are the level and mix of aircraft operations and the introduction of the FAA’s new departure PBN procedures. The comparison shows noise increases at the northern and southern extents of the contours attributable to the additional operations expected in the Forecast Condition and changes in the contour shape along the western side, particularly to the southwest, attributable to the airspace changes. As described in Section 5.3 of the Draft NEM document, to determine the forecast operations data, the Study Team collected information from LRAA and aircraft operators, including cargo carriers, at SDF to examine recent trends and expected schedule changes in the future. The Study Team concluded that the growth realized at the Airport over the past five years, taken together with new activity in cargo operations, parallels the Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) projections. Therefore, the TAF serves as the basis for aircraft operations in 2024 and 2029 for the NEM Update.</p> <p>Table 5-3 shows the number of average annual daily aircraft arrivals and departures by aircraft type for the 2024 Existing Condition. The table breaks the operations into the day and nighttime periods required for DNL calculation (7 a.m. to 10 p.m. and 10 p.m. to 7 a.m., respectively). The day/night breakdown is critical because the calculation of DNL weights night operations by a factor of 10 (mathematically equivalent to adding 10 decibels to the noise level produced by aircraft operating at night).</p> <p>Table 5-4 shows the number of average annual daily aircraft arrivals and departures for the 2029 forecast, again listed by the day or nighttime period. Detailed aircraft assignments were based on several sources, including discussions with operators. In the absence of operator information, growth in operations was assumed to be applied uniformly across the current aircraft fleet mix. The split between day/night operations was assumed to be the</p>
------------	-----------------------	---	---

Comment ID	Comment Topic(s)	Comment	Response to Comment
			<p>same as the existing operations, except where additional operator information was available.</p> <p>As described in Chapter 7 of the Draft NEM, the CNF requested supplemental noise analyses beyond the Day-Night Average Sound Level (DNL) metric required under Part 150. The supplemental analysis includes determining the Sound Exposure Level (SEL), which is the noise “dose” from an individual aircraft overflight that takes both the magnitude (loudness) and the duration of the noise event into account. In the calculation of SEL, the noise energy from every second is summed; longer duration events have higher SELs.</p> <p>Figure 6-1 and Figure 6-2 represent the formal NEMs as submitted for FAA acceptance as compliant with Part 150. The regulation requires that NEMs depict the 65, 70, and 75 DNL noise contours.</p>
4.5	Draft NEM	<p>3. Economic Factors:</p> <p>There is no accountability of the negative economic impact on communities adjacent to the modeling 65-decibel contour. Some of these communities may experience less assessed home values and reduced mobility as a result of the constant aircraft startup operations and near overhead flights.</p>	<p>Title 14 of the Code of Federal Regulation Part 150 does not consider home value as it is focused on land use compatibility planning.</p>
4.6	DNL metric	<p>II. United States Government Accountability Office Testimony</p> <p>Before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives, GAO-22-105844, date of release March 17, 2022, titled Aircraft Noise: FAA Should Improve Efforts to Address Community Concerns states the "FAA uses the Day-Night Average Sound Level (DNL) metric Does not provide a clear picture of the flight activity or noise levels at a given location.</p> <p>... Because of this, the same DNL may be associated with vastly different numbers of flights above that location. Small numbers of relatively loud operations, for example, can result in the same DNL as large numbers of quieter operations, ..." With the implementation of the Performance Base Navigation protocol, it's not unreasonable to expect previously excluded communities to find encouragement to be included in the average 65 DNL contour.</p>	<p>The FAA requires the use of the DNL metric and a 65 dB threshold for land use compatibility assessment in accordance with Title 14 of the Code of Federal Regulation Part 150. The FAA guidelines indicate that all land uses are compatible with aircraft noise exposure less than 65 dB DNL. As described in Section 5.5.3, the Study Team built departure model tracks for each of the new FAA procedures implemented in 2024. The new FAA procedures are reflected in the Future 2029 Draft NEM. To model forecast conditions, all existing departure flights which follow existing PBN procedures, and all UPS nighttime departure flights were assigned to one of the sets of flight tracks representing the new PBN procedures. The remaining departure flights were modeled for the 2029 Forecast Condition using the same actual tracks as the Existing Condition.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
4.7	Noise modeling	<p>Conclusion: Inclusion of flexible metrics are needed to satisfy the "what if" data analysis of and construction of the Noise Exposure Map to assist area residents' ability to identify how aircraft noise impacts their placement in the noise contour. Hypothetically, if the Burnett Avenue corridor of the Merriweather community was deemed experiencing an average 80 DNL and the average above flight time was 15 seconds, 105 (versus the average 101 flight built into the 2024 NEM modeling, a difference of 4 flights per day) average daily flights would qualify the corridor for the 65-decibel contour. [Attachments included in comment]</p>	The Airport Authority acknowledges this comment.
Commenter: Adam Thomas Medium: email			
5.1	Noise abatement measures	<p>Please see comments pertaining to the 2024 draft noise exposure map update for SDF.</p> <p>1. Section 4.1 Noise Abatement Measures (https://www.flylouisville.com/wpcontent/uploads/2024/10/SDF_Part150_NEM_Draft_20241011_watermarkreduced_web-posting.pdf)</p> <p>a. Number NA-1. The measure to maintain south flow runway preference is indicated as approved as voluntary. I understand that provided that runway is dry and there is not a tailwind component in excess of 7 knots, SDF should operate in south flow conditions (daytime reverse flow and contraflow notwithstanding). Is that still accurate? Also, a general comment is that nighttime contraflow conditions typically begin before 10:00 p.m. Contraflow conditions previously commenced at 10:30 p.m.; however was changed to 10:00 p.m. In practicality, it seems contraflow has been commencing at 9:00 p.m. which results in additional departures to the north.</p>	<p>The LRAA supports updating the 20-year-old NCP. This update will require FAA approval and funding. At this time, the Airport is only undertaking an update to their official NEM document accepted by the FAA for purposes of federal funding of noise compatibility measures, e.g., the Quieter Home Program. Any changes to the currently approved NCP, which includes the noise abatement measures, will require an update to the NCP. Refer to response to comment 2.2.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
5.2	Noise abatement measures	<p>b. Number NA-2. It appears there was a previous request to reverse the East-West Preference (Day and Night). In lieu of reversing the East-West Preference (Day and Night), I'd request the preference be eliminated in its entirety. Due to the daytime north flow preference (and extended hours, now 5 hours per day Monday - Friday), the east runway experiences essentially the same amount of operations as there would be in south flow operations; however, those operations are now departures which are more disruptive to the more densely populated areas northeast of the airport. Eliminating the East-West preference would permit departures to be allocated more appropriately between both runways. Moreover, when in south flow operations, the passenger carriers routinely use the west runway; however, when in north flow operations, passenger carriers overwhelmingly use the east runway. Further, the daytime north flow hours are not routinely adhered to. Frequently, the daytime reverse flow begins prior to 9:00 a.m. and ends after 2:00 p.m. Eliminating the East-West preference would ease the burden on the more densely populated areas northeast of the airport.</p>	<p>See response to comment 5.1. As described in Section 4.1.2 of the Draft NEM document, Measure NA-2 was disapproved by FAA and is not currently implemented in the SDF Noise Compatibility Program.</p>
5.3	Noise abatement measures	<p>c. Number NA-3. It appears that the FAA disapproved the morning north flow preference; however, it was implemented locally. I'd request consideration that the daytime north flow preference (daytime north flow) be eliminated in its entirety. With the increased operations at SDF, eliminating the daytime switch would ease the burden of ATC from having to reverse flows throughout the day. Further, departures to the south over less densely populated areas are more desirable.</p>	<p>Comment is noted and could be reviewed locally with the Community Noise Forum. See response to comment 5.1.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
Commenter: Doug Black Medium: email			
6.1	Draft NEM	<p>There are several comments I have for the new NEM's</p> <ol style="list-style-type: none"> 1. Why are areas to the south and southwest of 17R not in the 65 DNL in the past present or future and not been allowed to receive noise abatement if they wanted? The old and new and projected NEM's DO NOT reflect the UPS departures early morning 2:30am - 6:00am (60-70 flights 1-2 minutes apart-most 70-85 db's measured verified with the 10 times penalty for nighttime noise that 600 flights !! Same as above for afternoon UPS departures off 17R noise (noise levels of 70-85 db's while trying to enjoy the out of doors in the afternoons is just unacceptable. All of this UPS noise has and is still causing health and safety issues in Yorktown North and neighborhoods to the South and Southwest of runway 17 R. I voted against using HMMH as a consultant to develop the new maps and was promised to see the data inputs and provide a reason why ? 2. Areas that were NOT AS CLOSE to end of runway and have the same side exposure's are able to get noise abatement while areas to the south and southwest are not ? 	See responses to comments 1.1, 4.3 and 4.6.
6.2	Noise modeling	<ol style="list-style-type: none"> 3. Why HMMH and the new noise exposure maps ARE NOT using the FAA AEDT SEL model data standard inputs for CARGO (UPS) BUT Instead are using "user defined profiles " - (see pics) This is a critical data input especially as you notice the difference from Brake to 2 miles out - This is where and when most of the UPS noise we experience here in the southwest comes from. Notice the noise SEL signature difference with just 2 of the A-300 Cargo pics between the AEDT standard and the "user defined profile" signature profile at the bottom of the pic. It over double especially on the sides. When 10 times the noise for nighttime DNL the SEL sound signature profile would be even greater. This just one thing I found the night of the NEM review. BUT wait there's more. 4. What other AEDT standard model inputs are not being used and instead "Defined user inputs "or not following the FAA AEDT model standards ? What are some of the other AEDT data inputs that have been proposed in the model that the FAA is pushing back on as mentioned by the HMMH staff at the the NEM's "workshop" . 	<p>As described in Section 5.2.2 of the Draft NEM document, to determine the most appropriate modeling approach, the Study Team investigated the current profiles being flown by cargo aircraft (Boeing 757-200, Boeing 767-300, and MD-11) because their flight profiles differed from the standard profiles within the FAA's database. Flight profiles for the other common cargo aircraft types (the Boeing 747-400/747-800 and the Airbus 300) were also investigated with input from the aircraft operators. The recommended model profiles were verified by comparison to actual climb performance data at SDF from the airport's Noise and Operations Monitoring System (NOMS) data.</p> <p>To ensure accuracy of the AEDT model, user-defined flight profiles are utilized to address non-standard departure weight. HMMH provided documentation of the user-defined profiles and requested FAA approval for their use in development of the NEM update via a memorandum. A copy of the memorandum with the aircraft operator's concurrence and FAA's written approval, is included in Appendix C.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
6.3	Noise modeling	<p>5. Where is the AEDT data that shows the impact of the vertical climb rate for each plane - data should be the same as pictured but show different SEL as aircraft are climbing straight up instead of going straight down range (which are almost 2 times as much that normal aircraft). This too is a critical impact as each degree of climb rate translates into 6 times the amount of time the noise stays at a LMAX level and is much louder as engine turbines reach “buzzsaw” level which we experience in a daily basis and I have complained about numerous time.</p>	<p>Section 5.2.1 of the Draft NEM document describes the noise and performance profile assignment within AEDT. Within the AEDT database, it is standard for aircraft takeoff or departure profiles to be defined by a range of trip distances called “stage lengths.” AEDT uses departure stage lengths (the flight distance between the departure and arrival airport) as a surrogate for aircraft departure weight, since fuel load is the largest factor affecting variation in aircraft weight and therefore climb performance. Consistent with the methodology for previous NEM updates at SDF and because cargo flights typically take off with an increased average takeoff weight, the Study Team used operator-provided takeoff weight data for the majority of the cargo flights (instead of city pair distances) to select the appropriate departure profiles.</p>
6.4	Noise modeling	<p>6. The time period that the data for the AEDT model input should be changed and future models should not be based on the time period that the data was gathered from 8/23 to 7/24 Way to much happen during that time period and after to reflect accurate NEM’s During - I have been monitoring UPS departures for several years now and during the data time gathering period almost every weekend and sometimes for a whole month UPS flights departed north and NOT south per the southbound contra part 150 - NO weather no other reason. While this may seem like any big deal it does have an impact on data for NEM’S and Mr. Slattery response to me during an inquiry was “ Well if you want noise abatement then they have to fly over your house “ Well they have and they STILL DO. After - HOW convenient “ That the airspace redesign and the announcement that UPS got the USPS package contract a few months after the time period for the cutoff of the CRITICAL time period for the data inputs. Why not wait till AFTER the airspace redesign and after USPS to do the study ? The redesign HAS NOT WORKED and we still get UPS flying over our house and since the USPS the UPS departures especially on weekends has almost tripled in last month - when before we used to be able enjoy the weekends now - It’s just another day UPS “bombing run” UPS wakes us up in the early morning (2:30 am - 5:00am) and we come home from work to UPS noise (3:00pm-7pm)</p>	<p>Airspace and operational changes are accounted for in the 2029 NEM. Per current FAA guidance airports are required to update their noise exposure maps if there is substantial increase or significant decrease in the noise contour over noncompatible land uses. 14 CFR Part 150 defines a DNL 1.5 dB change or more as substantial. If the maps are more than five years old, the FAA requires by policy that the airport confirm in writing that the noise exposure maps continue to be a reasonable representation of current and/or forecast conditions at the airport. Therefore, it is commonplace for airports to regularly update their noise exposure maps upon which noise compatibility projects, e.g., Quieter Home Program, are based.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
6.5	Draft NEM	<p>7. Where is the supporting noise monitor data to support the NEM’s Referenced below. Please read the FAA guidelines below as they are from the handouts posted when this all began It says that this is suppose to be simple and simple to understand - It is everything but that !! AGAIN - Why not follow what FAA says - Bob - I am reminded they are funding noise abatement - why not follow there rules ? Why is it this way and what is being hidden?? Trust yet verify</p> <p>2.4 Day Night Average Sound Level (DNL) Virtually all studies of aircraft noise rely on a slightly more complicated measure of noise exposure that describes cumulative noise exposure during an average annual day: the DNL. (EPA identified DNL as the most appropriate means of evaluating airport noise based on the following considerations:</p> <ol style="list-style-type: none"> 1. The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods. 2. The measure should correlate well with known effects of the noise environment and on individuals and the public. 3. The measure should be simple, practical, and accurate. In principal, it should be useful for planning as well as for enforcement or monitoring purposes. 4. The required measurement equipment, with standard characteristics, should be commercially available. 5. The measure should be closely related to existing methods currently in use. 6. The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise. 7. The measure should lend itself to small, simple monitors, which can be left unattended in public areas for long periods. <p>Most federal agencies dealing with noise have formally adopted DNL. The DNL represents noise as it occurs over a 24-hour period, with one important exception: DNL treats nighttime noise differently from daytime noise. In determining DNL, it is assumed that the A-weighted levels occurring at night (defined as 10:00 PM to 7:00 AM) are 10 dB louder than they really are. This 10-dB weighting is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive because nighttime ambient noise is less than daytime ambient noise. [Images included in comment]</p>	<p>The 2024 NEM update did not include any noise measurement data. The Draft NEM contours were developed in accordance with Title 14 of the Code of Federal Regulations Part 150 and FAA guidance, which includes the use of the FAA’s noise model (Aviation Environmental Design Tool) rather than the use of actual noise measurements to generate the noise exposure contours to assess noise compatibility. The FAA is reviewing their national noise policy.</p>

Comment ID	Comment Topic(s)	Comment	Response to Comment
Commenter: Dorn Crawford Medium: email			
7.1	Draft NEM	It's my understanding from commentary at the LRAA's recent workshop that the FAA is expecting this NEM update to provide cues as to the necessity of a full, updated Part 150 study. Given the obvious logic, this is a welcome development. But with no evidence of such linkage in previous NEM updates (and conversely, no such updates supporting the two previous Part 150 studies conducted here), the current report requires refocusing to provide the basis for informed judgment on the road ahead.	The LRAA agrees the current NCP is 20 years old and requires an update. See to response to comment 5.1.
7.2	Noise abatement measures	<p>At the most general level, the report's recounting of NCP measures (Chapter 4 and Appendix B) demands assessment of their applicability to current and projected circumstances. Such an assessment must weigh the degree of net noise relief to date provided by measures implemented based on FAA approval; estimate relief foregone by measures previously disapproved; note the rationale and impact of measures implemented over FAA disapproval; and project the suitability of this measure set (approved or not) to conditions forecast for 2029. The most compelling raw material to support such a comparative assessment is of course the respective contour maps and impacted population tables of the 2003 NCP forecast and the current NEM update. An overlay of the 2009 and 2029 projected contours alone provides a contrast so stunning as to demand immediate action:</p> <ul style="list-style-type: none"> -The overall growth of the 2024 and 2029 contours since the last NCP challenges the relevance of mitigation measures devised in 2003 – predominantly home and institutional insulation programs already severely downsized due to increased areas of application, and unlikely to survive the further expenses of order-of-magnitude expansion. -Current and projected contours north of the airfield place a huge premium on unadopted operational measures of the 2003 NCP – most obviously the introduction of a minimally offset approach corridor avoiding all the most noise-sensitive areas north of the airport's west runway, now overrun by DNL 65 or higher contours. -Radical changes in the shapes and sizes of the northern lobes defeat the efficacy of the runway preference still in effect in the airport's Runway Use Agreement (RUA), casting a further long shadow over key proposed operational measures rejected under 2003 conditions. 	See to response to comment 5.1.

Comment ID	Comment Topic(s)	Comment	Response to Comment
7.3	Noise abatement measures	The required comparative approach might also shed light on other enduring disparities in current operations, such as the adoption (and subsequent expansion) of a daytime reverse flow measure the FAA disapproved on operational grounds, based on its dependence on the other two operational measures rejected above – as cited, but not explained, in the current draft.	See to response to comment 5.1.
7.4	Noise abatement measures	Another operational anomaly not well represented in the current draft, but amenable to further study in a future NCP, is the impact of deviations from agreed flight procedures such as conformance to designated corridors. Some of these, like routing military turboprop aircraft to divergent departure paths, are explicitly inconsistent with existing NCP measures; others, like the use of nonpreferred runway flow without supporting weather conditions, are more directly shortfalls from procedures specified in the RUA. But all would benefit greatly from revisitation in an updated Part 150 study, with particular attention to their representation in future modelling.	See response to comment 5.1.
7.5	Draft NEM	<p>A further disparity to be explored arises in comparing the current and projected contours presented in the draft. These are somewhat longer in the future case, as expected from assumed growth in operations – but also wider, contrary to expectations of the improved flight procedures represented in the future case. These deserve either explanation in the current draft, or revisiting in a more fully articulated Part 150 update.</p> <p>Recognizing that these are generalized comments composed in a short timeline, all are certainly open to elaboration and further discussion in the course of improving this draft report, which is essential to meet the FAA’s stated purpose. With its apparent reluctance to accept the simple fact of a 20-year lapse in updating the existing NCP, the FAA’s assigned task is clear and unambiguous. I stand ready to assist in any way I can.</p>	See responses to comments 4.4, 4.6 and 5.1.

Public Information Workshop
Sign-in Sheet

Date/ Time: Thursday, November 7, 2024; 5:00-7:00 p.m.

 Location: Fourth Presbyterian Church
 3016 Preston Hwy

Name	Email Address	Address/Affiliation (optional)
Jackie Graviss	js9556@gmail.com	
Edward Mansfield	emansfield7@gmail	
Jacob Hodges	Jacob.Hodges@ FlyLouisville.com	
Sharon Smiley	sistersib@AOL.com	

**Public Information Workshop
Sign-in Sheet**

Date/ Time: Thursday, November 7, 2024; 5:00-7:00 p.m.

Location: Fourth Presbyterian Church
3016 Preston Hwy

Name	Email Address	Address/Affiliation (optional)
Don Crawford	Don Crawford @KLM-DEM	932 Audubon Park
Rebecca Katz	rebecca.katz @louisville-ky.gov	Mayor's office
Mary Rose Evans	mary.rose.evans @MKIC.COM	

Slattery, Bob

From: Slattery, Bob
Sent: Monday, October 9, 2023 11:54 AM
To: Karen Gahafer-Buryn
Subject: RE: List of neighbors - Quieter Air

Categories: NO-COMPLAINT

Ms. Gahafer-Buryn,

Thank you for your comments. While we certainly understand that noise from aircraft operations continues to be a concern for many of our neighbors, mitigation program areas are limited to the guidelines contained in 14 CFR Part 150—Airport Noise Compatibility Planning. Current program areas were chosen because they meet Federal noise guidelines.

The Federal Government has adopted a method to measure noise, called the day-night level (DNL), to determine if a community is eligible for Federal grants to reduce the impacts of aircraft noise. DNL is the average noise exposure level over the course of a year. Nighttime noise is weighted more heavily than daytime noise to reflect its proportionately greater impact on homeowners. The DNL noise levels are depicted as contours on Noise Exposure Maps (NEMs). Under current policies, areas within a 65 DNL contour may qualify for federal funds to minimize the effects of aircraft noise.

Currently, your location at 975 Eastern Parkway is located outside of the DNL 60 contour on our 2021 Noise Exposure Map. As we have previously discussed, the Airport Authority is currently in the process of updating our Noise Exposure Maps. Once the maps are updated, appropriate mitigation will be based on the FAA criteria for significant noise exposure (currently DNL 65). Your area will be included in the study evaluation area for the map update.

The public will have opportunity to comment on the updated maps prior to submittal to the FAA for approval. I will ensure that the petition you attached will be included in the comments section of the Noise Exposure Map report. Please let me know if you have any additional questions or concerns.

Sincerely,
Bob Slattery
Louisville Regional Airport Authority
Manager Environmental Programs
4320 Park Blvd
Louisville KY 40209
502-363-8516

From: Karen Gahafer-Buryn <info@kgb-branding.com>
Sent: Friday, October 6, 2023 07:09
To: Slattery, Bob <bob.slattery@flylouisville.com>
Subject: List of neighbors - Quieter Air

1.1

Hello Mr. Satterly,
I have previously communicated with you about concerns regarding the airplane noise at my home.
My neighbor Shirly Prather and myself have spoken with some neighbors in our area with the same concerns.

I have attached a petition with contact information of people near my address that would like to be included in the Quieter Noise program. Please add us to the list.

Best Regards,

Karen Gahafer
975 Eastern Parkway,
Louisville, KY. 40217

--

Karen Gahafer-Buryn
KGB-Branding | Creative
Louisville, KY
(502) 396.6505
kgb-branding.com

Airplane Noise Petition

1.2

Airplane Noise - Requesting Inclusion in the 2024 Noise Exposure Map

The FAA recently conducted an analysis of air traffic that flew within 1 nautical mile (NM) and up to 10,000 feet above ground level (AGL) over our residences for June 24 - 30, 2023 and found:

- Our homes are in the arrival and departure corridors of runways 17R/L and 35 L/R.
- Louisville Muhammad Ali International Airport (SDF) had over 175,000 flights during those 5 days, requiring simultaneous runway operations on parallel runways to accommodate the large volume. 520 of those flights were identified as passing over us.
- SDF is the sixth busiest cargo airport in the world.

This petition is to identify to the FAA's noise compliance department our concerns about the increase in volume of air traffic above our homes. We are requesting to have our homes included in the 2024 rezoning of the Noise Exposure Map used by the QuieterHome Program. The last rezoning was done in 2021.

Now is the time!

QuieterHome Program offers sound-insulation improvements to reduce aircraft generated noise within the home. This may include new acoustical windows, prime doors, and in certain cases, a continuous positive ventilation system. The FAA and LRAA fund the entire cost.

Only a certain number of homes will be added to the Noise Exposure Map which will get the QuieterHome Program funding. To have our area included, they must hear from us. To advocate for local change with respect to noise abatement, e-mail: Bob.Slatery@FlyLouisville.com with your concern so our comments are included in their monthly report. Have your voice heard - they look at the number of complaints in each area when figuring the rezoning of the Noise Exposure Map. If you missed signing the petition and want to, please contact Karen at (502) 396-6505 or Shirley at (502) 645-3525.

Name	Address	Phone	email
Karen Graham	975 Eastern Pkwy Lou. Ky 4027	(502) 396-6505	bill.pugh.karen@ gmail.com
Shirley Prater	977 Eastern Pkwy.	(502) 645-3525	shirleyprater01 @gmail.com
Jana Ree	1205 Delor Ave Lou. Ky 40217	502-759-5851	taralee837@ gmail.com
Dana Krett	1274 Lydia St. Lou, KY 40217	502-472-3059	dana.krett@ me.com
William Tevis	LOANN St. 40217	502-654-2762	williamtevis@ gmail.com
Tisha	1023 mayer Ave Lou. KY 40217		realmhealingarts@ gmail.com
Mike Suttles	948 Eastern Pkwy	502.214.0517	mikesuttles@me.com
Donna McMiller	955 Eastern Pkwy	502-641-8381	downnamcmiller70 @gmail.com

Airplane Noise Petition

Airplane Noise - Requesting Inclusion in the
2024 Noise Exposure Map

Name	Address	Phone	email
Carol Kuhn	907 Reesor Ave	502-403-7442	
Royce Noose	909 Reesor Ave	502-989-0109	
Blake Mitchell	1976 Lydia Street	907 978 5002	
Dana Krett	1274 Lydia Street	502 472 3059	
Gwynson Stinger	932 Reesor Ave	270-501-2305	
Will Hale	910 Reesor ave	606 913 3502	
Theresa French	912 Reesor Ave	502 633-5224	
Linda Dodson	963 Eastern Pky	502-968-6420	
Leah Callahan	1037 Eastern Pkwy	724-858-8570	
Jerri Paul	1039 Eastern Pkwy	502-656-5399	
Marion Holdcraft	1039 Eastern Pkwy	502-634-3495	
Robert Schroeder	1274 Ash St.	502 594 8760	
Cris Mullen	1036 Reesor Ave	502 260 8188	
Taylor Thomas	1016 Reesor Ave	407-0868	
Ryan Hutton	1252 Lydia St	502-741-2401	
Bill Kamber	1248 Lydia St	502 637 6257	
Larry Bullock	1236 Lydia St	502-548-7936	
Pamela Gauthier	965 Eastern Pkwy Levi, Ky 40217	502-5316454	Pamela.gauthier 1953@gmail.com



2.1

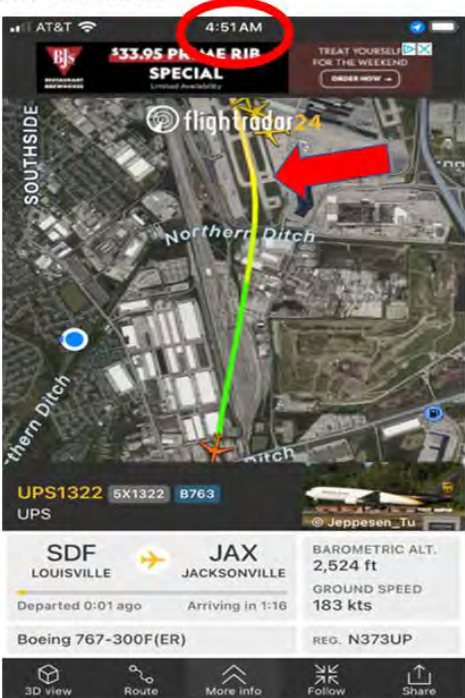
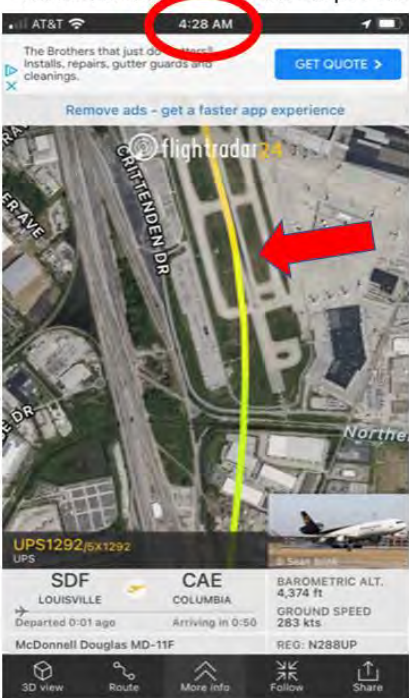
This is the noise issue that Yorktown North (the blue dot) and much of the SW region area has been dealing with for years. UPS Departures off 17R banking and turning WSW. Almost all destinations (especially ones west) UPS use this departure flight path which causes noise levels above 80 decibels in the bedroom at 2:00 AM till 5:00 AM with a flight every 1-2 minutes. After noon flights have become the same. Below is the flight path points measured in distance on a google map, points along that flight path. Who needs noise data or a monitor - you do the math? I challenge anyone to sleep through this or enjoy your afternoons outside. NO WEATHER or Ft Knox

Red - .98 mile Yellow - .6 mile Blue - .78 mile Green - 1.4 mile



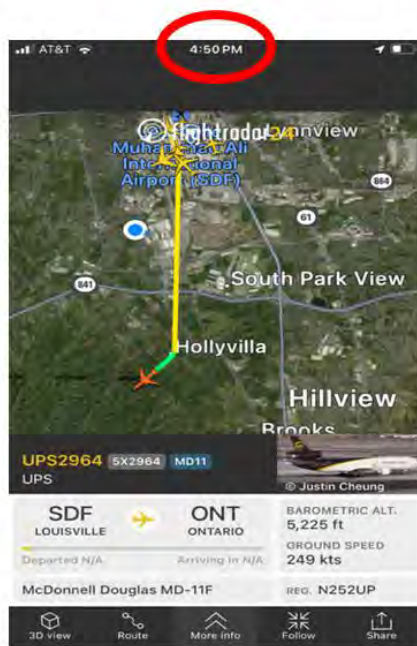
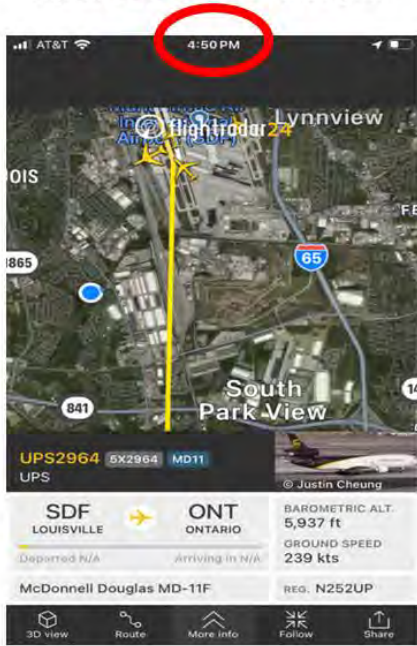
2.2

These are more examples of Early Morning (starting at 2:30 AM) flights banking and turning NO WEATHER – WHO at UPS or FAA is allowing and or making these decisions to turn early and cause very high noise levels in Yorktown North and areas to the south and west of the airport NO Weather or Ft Knox.



2.3

This is just one example of the many UPS AFTERNOON flights off 17R and the noise decibel levels created by UPS banking and turning off 17 R- Note the 80 decibels level and the Vertical climb rate at 26.7 which adds to overall noise levels. These noise levels are sustained 65-70 db'c (A calibrated) for over one minute at a distance of 3.0 miles as the Explain data shows to the right.



A screenshot of the 'Registration details' page in the flight radar app. The time is 4:53 PM. The page contains the following data:

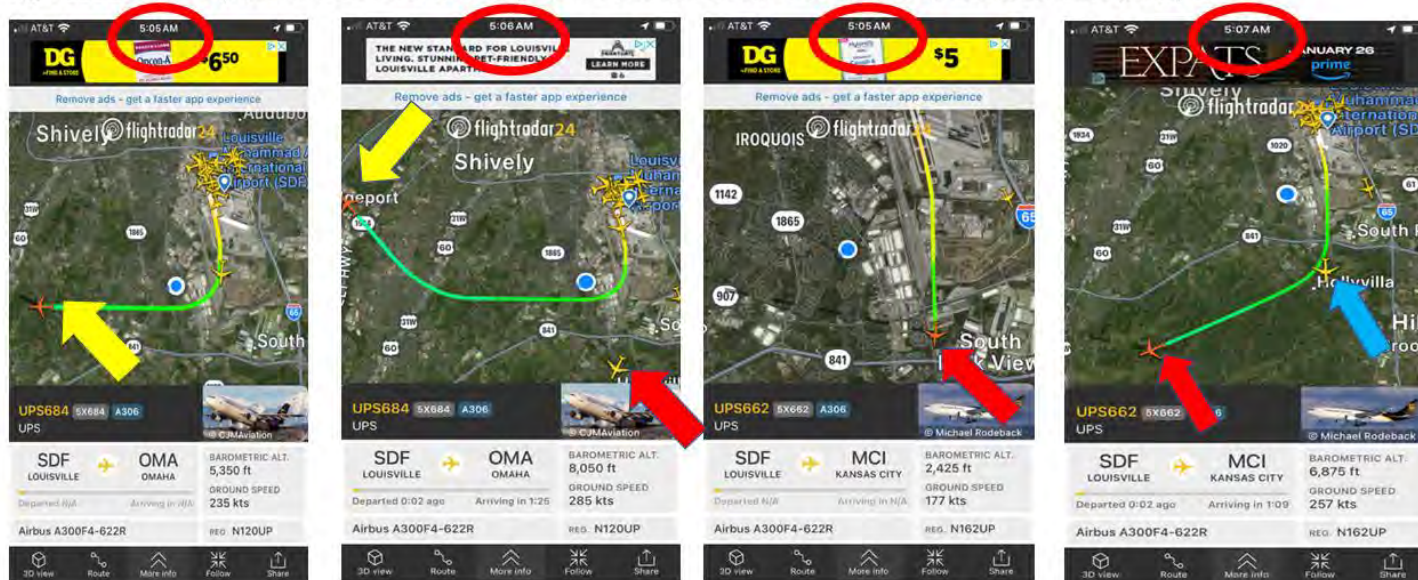
Measurement	
Date	20240325
Time	16:50:08
Airplane	a260bc UPS2964
Country	United States
Decibels	80
Height (m)	1,052
Velocity (km/h)	437
Distance (km)	3.9
Vertical rate (m/s)	26.7

Your location and device	
Latitude	38.14
Longitude	-85.76
iPhone12,8 / 17.3.1	
Serial# 9CDDC415-BB2C-48CB-A1B1-3ADEB28FB2AB	

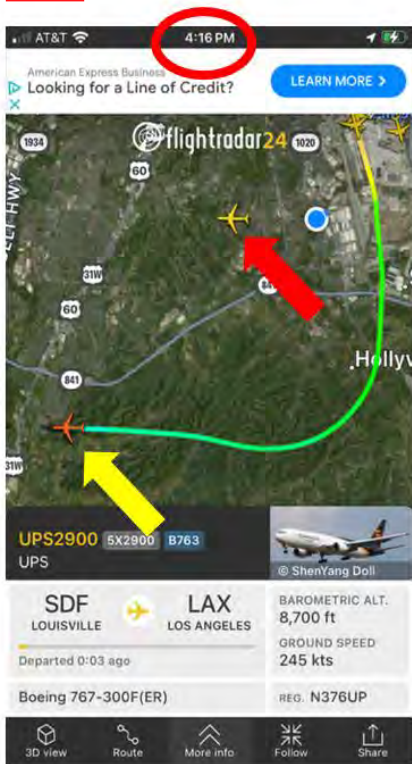
At the bottom, there is a navigation bar with icons for 'Explain', 'Submitted', 'News', 'Contact', and 'About'.

2.4

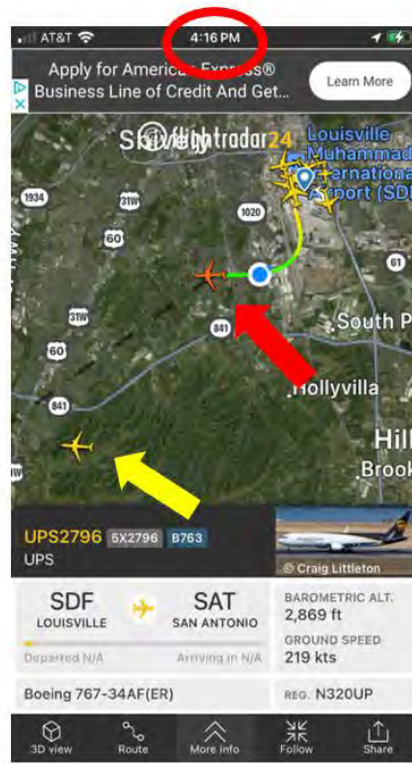
This slide is to show there is NO WEATHER and NO FT KNOX when UPS flights flyover or bank and turn early off 17 R. This happens every morning and afternoons causing high decibel levels (over 80 inside our homes)
The 5:05 AM UPS flight UPS684 (Yellow desination Omaha) flightpath in the first two slides on the left - banked and turned off 17R overflying Yorktown North and much of the southwest. While the **very next** flight right after it UPS662 (Red destination Kansas City) went straight off runway and did not bank and turn. You can see both in same slides one and two – three and four show a continued flight path with a third UPS that departed same as UPS662. This happens morning and afternoons causing high decibel levels (over 80 inside our homes) Excuse was the weather ?? Kansas and Nebraska are pretty close ??



2.5

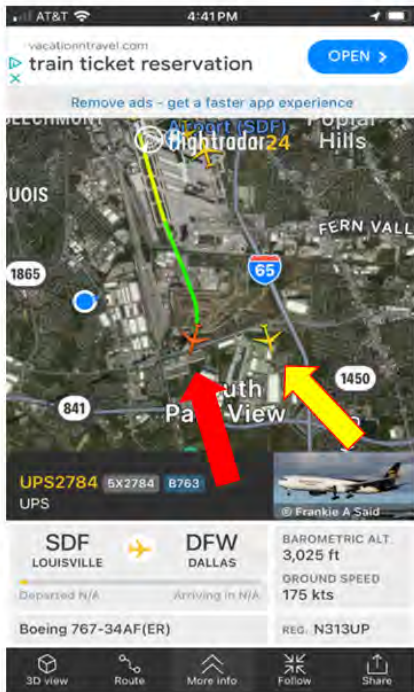


This is just one example slide shows same as the previous slide except in the afternoons – Blue dot is Yorktown North
Los Angeles (yellow) straight off 17R. VERY NEXT UPS departure off 17R UPS 2796 San Antonio (RED) banks and turns flyover Yorktown North at 500 feet over 90 decibels inside. This is happening several times daily morning and afternoons . 2:00 am till 5:00 am and 3:00 pm till 5:30pm .



2.6

This slide shows what I assume to be the proposed flight paths of the FAA airspace redesign off 17 R South taken by the UPS2784 ?? Why wait till July when they are doing it NOW and have been in the past for several years since I been taking data??



WE have always been told by Bob Slattery that UPS is allowed to fly over and or bank and turn early off 17 R causing high unacceptable noise levels in Yorktown North off 17 R.

Excuses given by Bob Slattery are:

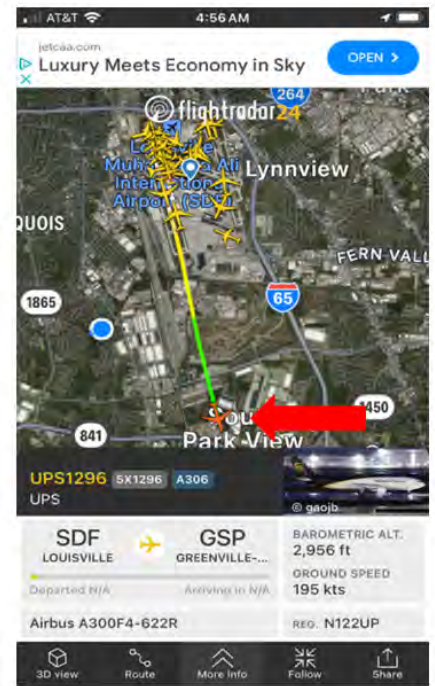
Weather – Ft Knox and FAA required 20 degree separation at takeoff??

If it is weather why next or previous flights take a different path as seen in other previous slides at takeoffs, even with same area destinations (I have more examples) ? I have shown Ft Knox in past.

FAA required separation of 20 degrees at takeoff?? Pictured to left straight centerline takeoff off both runways same time??

Right side you can see UPS straight off 17R with multiple UPS waiting for takeoffs – Destination Greenville ??? I will almost bet that's South Carolina ??

This happens daily and I have more examples





Please use the space below to provide your questions and comments regarding the 14 CFR Part 150 Noise Compatibility Planning Study for Louisville International Airport. Your comments and/or questions will be reviewed and considered during the Study. Your participation in the process is appreciated.

3.1

With new contour more flights
 go directly over my house
 I would like for monitor to be
 placed @ my house for comparison
 to model.

Name: Sharon Smiley Organization: _____
 Street Address: 718 E Burnett City: Louisville State: Ky Zip: 40217
 Tel: 502-931-8748 Email: SISTERSIB@AOL.COM

Please email completed comment forms to:
Engineering@flylouisville.com

or

Mail comments to:
 4320 Park Blvd Louisville, KY 40209
 C/O Bob Slattery

All comments received will be included in the final draft of the Noise Exposure Map documentation which will be submitted to the Federal Aviation Administration.

THANK YOU FOR YOUR PARTICIPATION

Initial Draft of LRAA 2024 NEM Update Comments

- I. Residents adversely affected by aircraft flights that have been excluded from the 65-decibel noise contour and the Quieter Homes Program are dismayed by the Louisville Regional Airport Authority (LRAA), and specifically it's the Community Noise Forum, cautious approach to lending the community alternate pre review data to evaluate the modeling of the 2024 5 Year Noise Exposure Map (NEM) during the FAA submission for approval.
 1. Data Accuracy:

The LRAA lacks actual verifiable and independent recording of decibel noise at the 65-decibel contour peripheral boundaries; acknowledging and incorporating flight paths that may deviate from prescribed flight plans for comparison to HMMH's (the contractor modeling) model decibel noise prediction to generate a statistical scatter plot of the residuals (differences between the predicted decibels and the actual decibels) to assess the presence or lack thereof modeling bias. A Google search of community issues with the FAA NEM modeling points out that "[t]he FAA needs a large number of noise monitors to ensure the accuracy of the data generated by noise models." To the contrary, a minimum number of monitors would be needed using scientific sampling methods.

 - a. Mr. Doug Black, a resident who resides on the southwest quadrant community, has requested the Community Noise Forum representative to conduct a side-by-side comparison of an independent ANOM decibel noise meter data output and the LRAA mobile NOM decibel noise meter output which was received belatedly in the model development.
 - b. According to the Government Accountability Office, see exhibit A1 and A2, states the DNL "metric does not provide a clear picture of the flight activity or noise levels at a given location.... Because of this, the same DNL may be associated with vastly different numbers of flights above that location. Small numbers of relatively loud operations, ..., can result in the same DNL as large numbers of quieter operations.
 2. Data Analysis:

In addition, there is no provisions within the modeling to allow for "what if" scenarios or sensitivity analysis along the various parameters (e.g. flight time above in second, weighted average DNL, daily average quadrant aircraft flights, flight path deviations, etc.) that influences the outcomes of which communities qualify within the 65-decibel contour. Factors affecting annoyance include "how loud the aircraft flight is", "how long the flight last", "how often aircraft flight occur over a specific community", and "when the aircraft flight occurs".

 - A. Data presentation offering community alternate means of understanding to gain insights are needed in the Noise Exposure Map (NEM) modeling, such as exhibits B1

4.1

4.2

4.3

and B2 which displays the average time in seconds for various average DNL levels, day or night, to qualify inclusion into the 65-decibel contour. Giving residents independently variable metrics residents will acquire a platform to begin to infer the average daily number of aircraft overhead flights for their area for the 65 DNL contour inclusion assuming different average times above:

Example: **With Day 100% No Penalty**

Time Above Seconds Avg 75 DNL, 8640 Avg 80 DNL, 2733 Avg 85 DNL, 865

10	864	273	86
15	576	182	58
20	432	136	43

Example: **With Night 100% 10dbL Penalty**

Time Above Seconds Avg 75 DNL, 864 Avg 80 DNL, 274 Avg 85 DNL, 87

10	86	27	9
15	58	18	6
20	43	14	4

Example: **WGT. 2024 Day (53.165%)/Night (46.834%) 10dbL Penalty Flight Plans**

Time Above Seconds Avg 75 DNL ,4634 Avg 80 DNL, 1,581 Avg 85 DNL, 501

10	463	158	50
15	309	105	33
20	232	79	25

Based on Exhibit C5: 2024 Runway Quadrants Flight Projections: 17L, 117.4/220.82= .53165 : 35R, 103.42/220.82= .46834

$$(8,640 \times .53165) + (864 \times .46834) = 4,634$$

$$(2,733 \times .53165) + (274 \times .46834) = 1,581$$

$$(865 \times .53165) + (87 \times .46834) = 501$$

Construction of the NEM should reflect that the average SEL times above will vary respectively to the aircraft altitude and velocity and the time above is not a given fix constant influencing the average daily number of flights needed to meet the average 65 DNL contour.

- a. Louisville airport is the third busiest cargo hub and third fastest growing airport in north America according to recent local news reporting. Soon the United States Postal Service (USPS) mail will be augmented to the Unites Parcel Service (UPS) existing traffic.

USPS will elevate the predicted increase flights in the Louisville Muhammad Noise Exposure Map Update Community Noise Forum Meeting January 22, 2024 issued by Louisville airport, page 12. See attached exhibits C1 through C4, which shows the total by aircraft type and C5, which shows the average daily aircraft flights highlighted in yellow. Similar 2029 data breakdown by day and night was requested but not available.

b. Enlisting the calculation power of EXCEL to demonstrate the exponential A weighted average day-night noise level (DNL) formulation, see Exhibits D1 and D2, a resident of interest can recreate the daily time in seconds at various Avg DNL it takes to qualify for the 65-decibel contour, see Exhibit D1, which displays the continuous formula, B1 which displays the 7 AM to 10 PM non 10 decibel penalty, B2 which displays the 10 PM to 7 AM 10 decibel penalty.

c. Over the year and a half to two years surrounding residents participating in the runup to the HMMH modeling of the new 2024 5 Year NEM, the Community Noise Forum board members have persistently been introduced to lower and lower time above Sound Equivalent Level (SEL) metrics from 20 seconds reflected in the referenced GAO report, 15 seconds in the referenced Louisville Muhammad Noise Exposure Map Update Community Noise Forum Meeting January 22, 2024, and recently 10 seconds announced in the September 2024 Community Noise Forum meeting. The modifying of a lower SEL time above number leads to higher number of aircraft flights needed for 65-decibel contour inclusion. If objective independent ANOM decibel measures would be sampled and the average daily aircraft flights by quadrant are determined, it would be permissible to infer which areas are likely in the actual 65-decibel contour by dividing by the average time above for the targeted area.

d. The draft maps, pages 116 to 124, of the latest draft of Louisville Muhammad Ali International Airport Noise Exposure Map Update are based on the average SEL of 75 DNL for the NEM to distinguish from ambient noise. During my use of the Explain app, 90% of decibels measured for the Merriweather community exceeded 77 decibels. Relative higher average DNL would need less average daily flights overhead to meet the average 65 DNL metric compared to the latest 2024 version SDF Part 150 NEM Update Draft at 75 DNL.

3. Economic Factors:

There is no accountability of the negative economic impact on communities adjacent to the modeling 65-decibel contour. Some of these communities may experience less assessed home values and reduced mobility as a result of the constant aircraft startup operations and near overhead flights.

4.5

- II. United States Government Accountability Office Testimony Before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives, GAO-22-105844, date of release March 17, 2022, titled Aircraft Noise: FAA Should Improve Efforts to Address Community Concerns states the "FAA uses the Day-Night Average Sound Level (DNL) metric Does not provide a clear picture of the flight activity or noise levels at a given location.

4.6

... Because of this, the same DNL may be associated with vastly different numbers of flights above that location. Small numbers of relatively loud operations, for example, can result in the same DNL as large numbers of quieter operations, ...” With the implementation of the Performance Base Navigation protocol, it’s not unreasonable to expect previously excluded communities to find encouragement to be included in the average 65 DNL contour.

Conclusion:

Inclusion of flexible metrics are needed to satisfy the “what if” data analysis of and construction of the Noise Exposure Map to assist area residents’ ability to identify how aircraft noise impacts their placement in the noise contour. Hypothetically, if the Burnett Avenue corridor of the Merriweather community was deemed experiencing an average 80 DNL and the average above flight time was 15 seconds, 105 (versus the average 101 flight built into the 2024 NEM modeling, a difference of 4 flights per day) average daily flights would qualify the corridor for the 65-decibel contour.

Figure 1: Different Numbers of Flights and Sound Exposure Levels Result in a Day-Night Average Sound Level (DNL) of 65 Decibels

Number of flights per day and sound exposure level in decibels (dB) ^a			Day-Night Average Sound Level (DNL) ^b
Scenario A:	<p>1 flight per day at 114.4 dB</p>		65 dB
Scenario B:	<p>10 flights per day at 104.4 dB</p>		
Scenario C:	<p>100 flights per day at 94.4 dB</p>		
Scenario D:	<p>1,000 flights per day at 84.4 dB</p>		

Source: GAO analysis of Federal Aviation Administration information. | GAO-22-105844

Note: Sound exposure level (SEL) is a measure of the acoustic energy (that is, the sound pressure) of an individual noise event as if that event had occurred within a one-second time period.

^aDecibel (dB): A measure of sound intensity, or loudness.

^bDay-Night Average Sound Level (DNL): A cumulative measure of aircraft noise exposure at a particular location.

This analysis as well as recent research published by FAA demonstrate the limitations of FAA relying solely on DNL to identify potential noise impacts. In January 2021, FAA issued the results of a survey showing a substantial increase in the percentage of people who are highly annoyed by aircraft noise, including at lower DNL levels, as compared to earlier survey results. According to FAA, one factor that may have contributed to this increase is changes to the nature of noise exposure, such as changes to the number of flights overhead. Since no single metric can convey different noise effects, using additional metrics—such as changes in number of flights overhead—in designing proposed flight paths could help FAA identify and address potential noise concerns and better facilitate PBN implementation. We recommended that FAA identify appropriate supplemental noise metrics and circumstances for their use

Average Time in Seconds to Achieve Weighted Average DNL 65 Contour									
WithOut 10 PM to 7 AM 10 Decibel Penalty									
-----Time In Seconds to Reach the Weighted Average DNL-----									
									Pct. Of Time
AVG. 65 Decibal								54000 + (A)	66.25
AVG. 70 Decibel							27323		31.624
AVG. 75 Decibel						8640			10
AVG. 80 Decibel					2733				3.163
AVG. 85 Decibel				865					1.001
AVG. 90 Decibel			275						0.318
(A) Plus 3,240 Seconds at the 10 Decibel Penalty Time									

Exhibit B

Average Time in Seconds to Achieve Weighted Average DNL 65 Contour With 10 PM to 7 AM 10 Decibel Penalty										Pct. Of Time
-----Time In Seconds to Reach the Weighted Average 65 DNL-----										
AVG. 65 Decibal									8648	10
AVG. 70 Decibel								2725		3.163
AVG. 75 Decibel							864			1
AVG. 80 Decibel					274					0.3171
AVG. 85 Decibel				87						0.10069
AVG. 90 Decibel			28							0.0324

Exhibit B2

NOISE MODELING OVERVIEW

Operational Input Requirements

Annual Average Day Operations	Existing Year 2024 Forecast Year 2029	
Aircraft Type	Jet Turboprop Helicopter Piston	<i>Matched to specific AEDT Aircraft Types</i>
Day-Night Split	Day: 7 AM – 10 PM Night: 10 PM – 7 AM	
Runway Use, Flight Tracks, Track Use	<i>Represents where the flight operations occur</i>	
Stage Length	Surrogate for aircraft weight; determined by distance from departure to destination airport	

Year	Air Carrier	Air Taxi	General Aviation	Military	Total
2024	150,554	15,502	10,031	1,771	177,858
2029	161,569	16,569	10,721	1,771	190,098

Note 1: Forecast Pending FAA Approval.

Note 2: Operations sums may appear to be off due to rounding.

Source: Kimley-Horn and Associates, Inc.; C&S Engineers, Inc.; ATADS



AVIATION FORECAST

2024 Annual Aircraft Operations

Category	Type		Arrivals		Departures		Total Operations
			Day	Night	Day	Night	
Air Carrier	Jets	Passenger	15,598	30,408	17,160	28,846	92,012
		Cargo	22,641	6,630	23,380	5,891	58,541
Air Taxi	Jets	Passenger	4,132	680	4,231	581	9,625
	Non-jets	Passenger	561	984	690	855	3,090
		Cargo	-	1,394	20	1,374	2,788
GA	Helicopters		41	57	46	52	195
	Jets		3,776	254	3,773	258	8,062
	Non-jets		819	68	798	90	1,774
Military	KYANG	C-130s	550	-	550	-	1,100
	Transient		336	-	297	39	671
Totals			48,454	40,475	50,944	37,958	177,831

177,831
27

Note 1: Forecast Pending FAA Approval

Note 2: Operations sums may appear to be off due to rounding

Source: C&S Engineers, Inc.; ATADS

NOISE MODELING OVERVIEW

Runway Use

Runway End	11	17L	17R	29	35L	35R	Total
Day							
Departure	0.0%	24.4%	32.4%	3.1%	15.8%	24.3%	100%
Arrival	<0.1%	26.9%	20.4%	2.8%	26.3%	23.5%	100%
Night							
Departure	0.0%	32.6%	47.9%	0.2%	10.8%	8.5%	100%
Arrival	<0.1%	13.3%	17.6%	0.5%	42.0%	26.4%	100%
Overall ✓							
Departure	0.0%	28.2%	39.6%	1.8%	13.5%	17.0%	100%
Arrival	<0.1%	20.3%	19.0%	1.7%	34.0%	24.9%	100%

Source: SDF NOMS data 9/1/2022 – 8/31/2023 and HMMH, 2024



AVIATION FORECAST

2029 Annual Aircraft Operations

Category	Type		Arrivals		Departures		Total Operations
			Day	Night	Day	Night	
Air Carrier	Jets	Passenger	16,799	32,031	18,476	30,355	97,661
		Cargo	24,511	7,177	25,311	6,377	63,376
Air Taxi	Jets	Passenger	4,416	727	4,522	621	10,287
	Non-jets	Passenger	599	1,052	737	914	3,303
		Cargo	-	1,490	21	1,469	2,980
GA	Helicopters		43	61	49	55	208
	Jets		4,036	272	4,032	276	8,616
	Non-jets		876	72	852	96	1,896
Military	KYANG	C-130s	550	-	550	-	1,100
	Transient		335	-	297	39	671
Totals			52,167	42,882	54,848	40,201	190,098

Note 1: Forecast Pending FAA Approval

Note 2: Operations sums may appear to be off due to rounding

Source: C&S Engineers, Inc.; ATADS

Louisville Airport Departures and Arrivals Flights 2024 Noise Exposure Map Update: January 22, 2024 Data								
-----RUNWAY QUADRANTS-----								
	<u>11</u>	<u>17L</u>	<u>17R</u>	<u>29</u>	<u>35L</u>	<u>35R</u>	-----TOTAL-----	
							PCT.	QTY.
DAY								
Departures	-	12,430	16,506	1,579	8,049	12,379		50,944
	0.0%	24.4%	32.4%	3.1%	15.8%	24.3%	100.0%	
Avg, Daily Flights	-	34.06	45.22	4.33	22.05	33.92		
Arrivals	48	13,034	9,885	1,357	12,743	11,387		48,454
	0.1%	26.9%	20.4%	2.8%	26.3%	23.5%	100.0%	
Avg, Daily Flights	0.13	35.71	27.08	3.72	34.91	31.20		
NIGHT								
Departures	-	12,374	18,182	76	4,099	3,226		37,958
	0.0%	32.6%	47.9%	0.2%	10.8%	8.5%	100.0%	
Avg, Daily Flights	-	33.90	49.81	0.21	11.23	8.84		
Arrivals	40	5,383	7,124	202	17,000	10,685		40,475
	0.1%	13.3%	17.6%	0.5%	42.0%	26.4%	99.9%	
Avg, Daily Flights	0.11	14.75	19.52	0.55	46.57	29.28		
OVERALL TOTALS								
Departures	-	24,804.6	34,687.7	1,655.2	12,148.6	15,605.8		88,902
	0.0%	28.2%	39.6%	1.8%	13.5%	17.0%	100.1%	
Avg, Daily Flights	-	67.96	95.03	4.53	33.28	42.76		
Arrivals	88.93	18,052.59	16,896.51	1,511.79	30,235.86	22,143.32		88,929
	0%	20%	19%	2%	34%	25%		
Avg, Daily Flights	0.24	49.46	46.29	4.14	82.84	60.67		
ANNUAL TOTALS	89	42,857	51,584	3,167	42,384	37,749		177,831
AVG. DAILY FLIGHTS	0.24	117.42	141.33	8.68	116.12	103.42		487.21

Exhibit C5

5.8.2.2

The cumulative metric, whether DNL or CNEL in California, must be used to analyze and characterize multiple aircraft noise events as well as to determine the cumulative noise exposure that individuals experience. Part 150 Section A150.205(c) defines DNL as the 365-day average day-night sound level in decibels. The symbol used to represent the DNL calculation is L_{dn} . It is computed with following formula:

$$L_{dn} = 10 \log_{10} \frac{1}{365} \sum_{i=1}^{365} 10^{L_{dni}/10}$$

Where L_{dni} is the day-night average sound level for the i^{th} day out of one year, and the summation is from $i=1$ to 365.

Exhibit D-1

DNL
DATA
I
V/
V

Minimum 65 Decibel Flights Flight24Radar Metric Measurements

Past Sample Data For Illustration Purposes Only

Date: 12-Jun-24

Assumptions: 1) flyover time in seconds; 15

Assumptions: 2) 10 PM to 7 AM Penalty; 10

Assumptions: 3) Constant Sound Noise Pressure

Sample Flights Per Hour

Time HH:MM:SS			DNL	10 PM to 7 AM 10 db Penalty	DNL + 10 db Penalty	Logarithmic Conversion		Total Sum of Col. M	SUM(COL M) / Sample Size	10*LogP8 A Wgt Avg	Total Time In Seconds	Total Flight Seconds	Total Flights Col.W/20	Pct. Of Flight Time/Total Time
Hour	Minutes	Seconds	DNL	10 db Penalty	10 db Penalty	Col. J / 10	Col. M = 10^Col. L							
						2.73221E+11	=	2.7322E+11	3162278.65	65.000001	86400	864	43.2	1
0	0	0	0	0	0	0		1						
0	0	1	0	0	0	0		1						
0	0	2	0	0	0	0		1						
0	0	3	0	0	0	0		1						
0	0	4	0	0	0	0		1						
0	0	5	0	0	0	0		1						
0	0	6	0	0	0	0		1						
0	0	7	0	0	0	0		1						
0	0	8	0	0	0	0		1						
0	0	9	0	0	0	0		1						
0	0	10	0	0	0	0		1						
0	0	11	0	0	0	0		1						

Exhibit D2

three cumulative measures are important: *Equivalent Sound Level* (L_{eq}), *Day-Night Average Sound Level* (DNL or L_{dn}), and *Community Noise Equivalent Level* (CNEL). However, to understand a cumulative measure, it is helpful to first describe another single-event measure, *Sound Exposure Level* (SEL) in addition to the L_{max} described above because SEL is a metric accounts for duration in addition to the maximum pressure level that L_{max} quantifies.

A.3.2. Sound Exposure Level (SEL)

Research has established that annoyance of an intrusive noise event increases with both the level (magnitude) and the duration of the intrusion. Thus, a long-duration, lower-level event can be as annoying as a higher-level, shorter event. The SEL captures both variables in a single numerical quantity. The SEL (as illustrated in Figure A-6) is defined as the total acoustic energy in an event from background to background (typically computed or defined as a level that is 10 to 20 dB lower than the event peak) that is then normalized or compressed into a one-second interval. This single number, SEL, represents all the acoustic energy of an event as if that event had occurred within a one-second time period. In the example presented below, the several second duration event having a L_{max} of 103 dB would have a SEL of 108 dB. By definition, if the event duration is greater than one second, the SEL would be greater than the L_{max} of the same event.

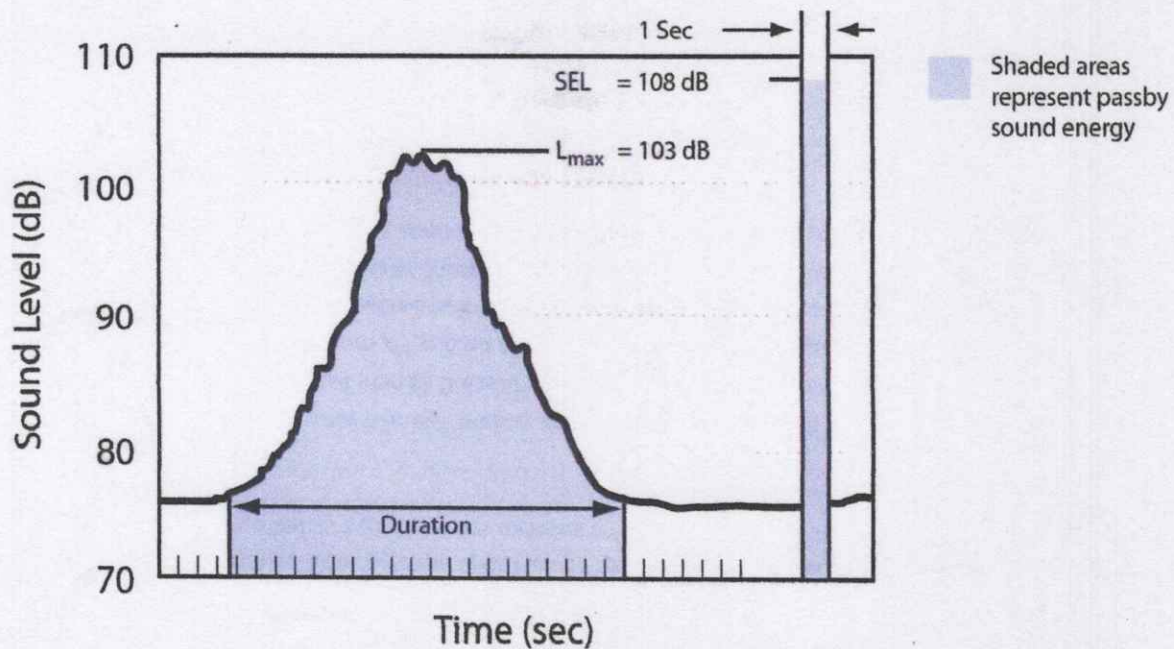
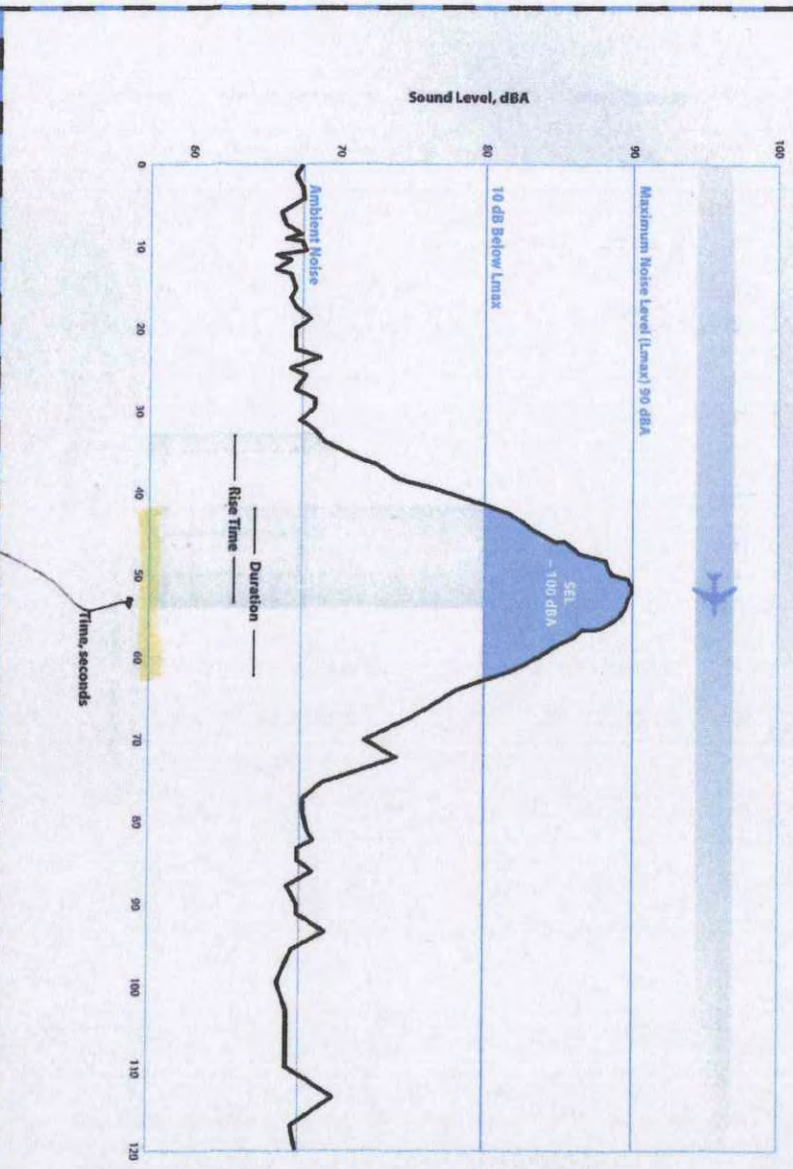


Figure A-6. Sound Exposure Level of a Noise Event

A.3.3. Equivalent Sound Level (L_{eq})

Annoyance also increases with the number of separate times an intrusive sound is experienced during a given period of time. The equivalent sound level (L_{eq}) captures the number of intrusions by measuring the average acoustic energy over a period of time in order to assess the cumulative effect of several events occurring over a period of time. The period can be of any length but it usually is a meaningful block of time such as an eight-hour L_{eq} for the office setting or a one-hour L_{eq} for a classroom environment. The L_{eq} is defined as the level of continuous sound over a given period that would deliver the same amount of energy as the actual time-varying sound exposure. Figure A-7 illustrates how the variation in sound exposure can be summarized in terms of a single, cumulative, value of a one-hour L_{eq} .

Sound Exposure Level (SEL), Maximum Noise Level (Lmax) and Duration



Notes: This project was prepared by the Westfield/Johnson part of a master plan by Oakland International Airport. The master plan contained more project details and project context. This project is a summary of the master plan project details and project context. For project details and project context, please refer to the master plan document. The master plan was prepared by the Westfield/Johnson part of a master plan by Oakland International Airport.

Figure 6.5

Oakland International Airport Master Plan March 2006

Sound Exposure Level, Maximum Noise Level and Duration

LEGEND
 Acronym
 dB Decibel
 SEL Sound Exposure Level
 Lmax Maximum Noise Level
 10 dB 10 decibels below the maximum noise level



SUPPLEMENTAL NOISE METRICS FAA Recommended

Maximum Sound Level (L_{max})

- Flight track/procedure analyses
- Speech/sleep interference assessments

Sound Exposure Level (SEL)

- Flight track/procedure analyses

Time Above a Threshold (TA)

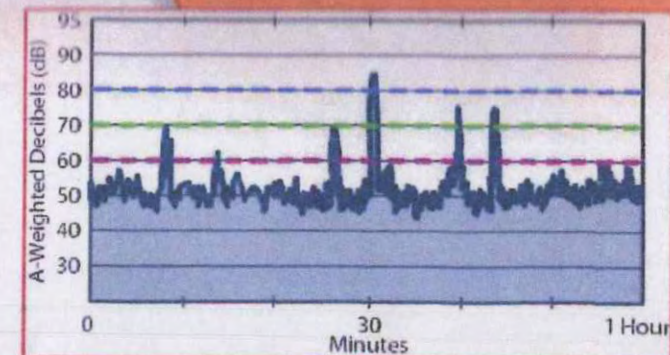
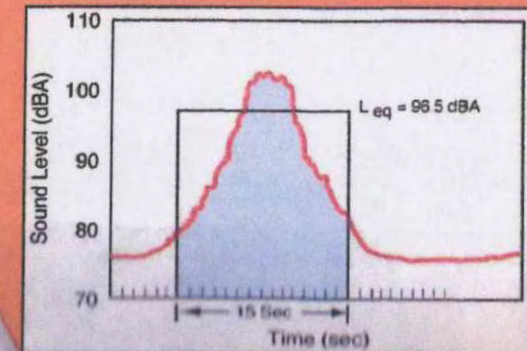
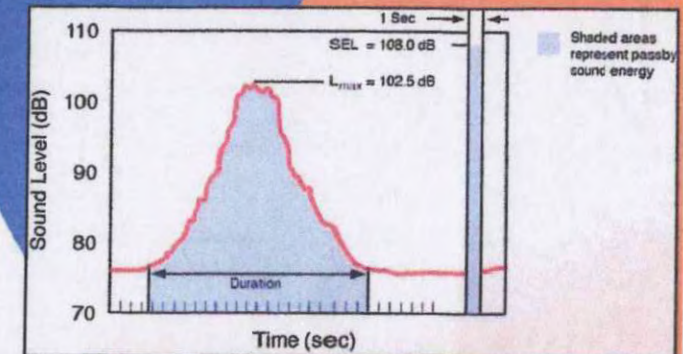
- Informational purposes

Equivalent Noise Level (L_{eq})

- School/learning assessments

Number of Events Above a Threshold (NA)

- Informational purposes



From: [Adam Thomas](#)
To: [Engineering](#)
Subject: 2024 Draft NEM Written Comments
Date: Thursday, November 21, 2024 19:04:20

Please see comments pertaining to the 2024 draft noise exposure map update for SDF.

5.1

1. Section 4.1 Noise Abatement Measures (https://www.flylouisville.com/wp-content/uploads/2024/10/SDF_Part150_NEM_Draft_20241011_watermark-reduced_web-posting.pdf)

- a. Number NA-1. The measure to maintain south flow runway preference is indicated as approved as voluntary. I understand that provided that runway is dry and there is not a tailwind component in excess of 7 knots, SDF should operate in south flow conditions (daytime reverse flow and contraflow notwithstanding). Is that still accurate? Also, a general comment is that nighttime contraflow conditions typically begin before 10:00 p.m. Contraflow conditions previously commenced at 10:30 p.m.; however was changed to 10:00 p.m. In practicality, it seems contraflow has been commencing at 9:00 p.m. which results in additional departures to the north.
- b. Number NA-2. It appears there was a previous request to reverse the East-West Preference (Day and Night). In lieu of reversing the East-West Preference (Day and Night), I'd request the preference be eliminated in its entirety. Due to the daytime north flow preference (and extended hours, now 5 hours per day Monday - Friday), the east runway experiences essentially the same amount of operations as there would be in south flow operations; however, those operations are now departures which are more disruptive to the more densely populated areas northeast of the airport. Eliminating the East-West preference would permit departures to be allocated more appropriately between both runways. Moreover, when in south flow operations, the passenger carriers routinely use the west runway; however, when in north flow operations, passenger carriers overwhelmingly use the east runway. Further, the daytime north flow hours are not routinely adhered to. Frequently, the daytime reverse flow begins prior to 9:00 a.m. and ends after 2:00 p.m. Eliminating the East-West preference would ease the burden on the more densely populated areas northeast of the airport.
- c. Number NA-3. It appears that the FAA disapproved the morning north flow preference; however, it was implemented locally. I'd request consideration that the daytime north flow preference (daytime north flow) be eliminated in its entirety. With the increased operations at SDF, eliminating the daytime switch would ease the burden of ATC from having to reverse flows throughout the day. Further, departures to the south over less densely populated areas are more desirable.

5.2

5.3

Slattery, Bob

From: Doug Black <dougblack@twc.com>
Sent: Friday, November 22, 2024 20:28
To: Slattery, Bob
Cc: Mary Rose Evans; John Sistarenik; DornCrawford@aol.com; Slattery, Bob; Rachel Roarx; Betsy Ruhe; Dan Seum JR; Sharon Smiley; Raymond Smith; Michael Wilson; OBannonAlfonzo@gmail.com; Lyndell D. Johnson; Edward Mansfield
Subject: Comment period for NEM's
Categories: NO-2023 NEM UPDATE C23s14

Mr Slattery,

There are several comments I have for the new NEM's

1. Why are areas to the south and southwest of 17R not in the 65 DNL in the past present or future and not been allowed to receive noise abatement if they wanted ?

The old and new and projected NEM's DO NOT reflect the UPS departures early morning 2:30am - 6:00 am (60-70 flights 1-2 minutes apart- most 70-85 db's measured verified with the 10 times penalty for nighttime noise that 600 flights !! Same as above for afternoon UPS departures off 17R noise (noise levels of 70-85 db's while trying to enjoy the out of doors in the afternoons is just unacceptable. All of this UPS noise has and is still causing health and safety issues in Yorktown North and neighborhoods to the South and Southwest of runway 17 R. I voted against using HMMH as a consultant to develop the new maps and was promised to see the data inputs and provide a reason why ?

2. Areas that were NOT AS CLOSE to end of runway and have the same side exposure's are able to get noise abatement while areas to the south and southwest are not ?

3. Why HMMH and the new noise exposure maps ARE NOT using the FAA AEDT SEL model data standard inputs for CARGO (UPS) BUT Instead are using "user defined profiles " - (see pics)

This is a critical data input especially as you notice the difference from Brake to 2 miles out - This is where and when most of the UPS noise we experience here in the southwest comes from. Notice the noise SEL signature difference with just 2 of the A-300 Cargo pics between the AEDT standard and the "user defined profile" signature profile at the bottom of the pic. It over double especially on the sides. When 10 times the noise for nighttime DNL the SEL sound signature profile would be even greater. This just one thing I found the night of the NEM review. BUT wait there's more.

4. What other AEDT standard model inputs are not being used and instead "Defined user inputs "or not following the FAA AEDT model standards ?

What are some of the other AEDT data inputs that have been proposed in the model that the FAA is pushing back on as mentioned by the HMMH staff at the the NEM's "workshop" .

5. Where is the AEDT data that shows the impact of the vertical climb rate for each plane - data should be the same as pictured but show different SEL as aircraft are climbing straight up instead of going straight down range (which are almost 2 times as much that normal aircraft) .

This too is a critical impact as each degree of climb rate translates into 6 times the amount of time the noise stays at a LMAX level and is much louder as engine turbines reach "buzzsaw" level which we experience in a daily basis and I have complained about numerous time.

6.1

6.2

6.3

6. The time period that the data for the AEDT model input should be changed and future models should not be based on the time period that the data was gathered from 8/23 to 7/24
Way to much happen during that time period and after to reflect accurate NEM's

During - I have been monitoring UPS departures for several years now and during the data time gathering period almost every weekend and sometimes for a whole month UPS flights departed north and NOT south per the southbound contra part 150 - NO weather no other reason. While this may seem like any big deal it does have an impact on data for NEM'S and Mr. Slattery response to me during an inquiry was " Well if you want noise abatement then they have to fly over your house "

Well they have and they STILL DO.

After - HOW convenient " That the airspace redesign and the announcement that UPS got the USPS package contract a few months after the time period for the cutoff of the CRITICAL time period for the data inputs.

Why not wait till AFTER the airspace redesign and after USPS to do the study ?

The redesign HAS NOT WORKED and we still get UPS flying over our house and since the USPS the UPS departures especially on weekends has almost tripled in last month - when before we used to be able enjoy the weekends now - It's just another day UPS "bombing run"

UPS wakes us up in the early morning (2:30 am - 5:00am) and we come home from work to UPS noise (3:00pm-7pm)

7. Where is the supporting noise monitor data to support the NEM's

Referenced below

Please read the FAA guidelines below as they are from the handouts posted when this all began

It says that this is suppose to be simple and simple to understand - It is everything but that !! AGAIN -

Why not follow what FAA says -

Bob - I am reminded they are funding noise abatement - why not follow there rules ?

Why is it this way and what is being hidden ?? Trust yet verify

2.4 Day Night Average Sound Level (DNL)

Virtually all studies of aircraft noise rely on a slightly more complicated measure of noise exposure that describes cumulative noise exposure during an average annual day: the DNL. (EPA identified DNL as the most appropriate means of evaluating airport noise based on the following considerations:2

1. The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods.
2. The measure should correlate well with known effects of the noise environment and on individuals and the public.
3. The measure should be simple, practical, and accurate. In principal, it should be useful for planning as well as for enforcement or monitoring purposes.
4. The required measurement equipment, with standard characteristics, should be commercially available.
5. The measure should be closely related to existing methods currently in use.
6. The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.
7. The measure should lend itself to small, simple monitors, which can be left unattended in public areas for long periods.

Most federal agencies dealing with noise have formally adopted DNL. The DNL represents noise as it

6.4

6.5

occurs over a 24-hour period, with one important exception: DNL treats nighttime noise differently from daytime noise. In determining DNL, it is assumed that the A-weighted levels occurring at night (defined as 10:00 PM to 7:00 AM) are 10 dB louder than they really are. This 10-dB weighting is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive because nighttime ambient noise is less than daytime ambient noise.

Table A-3. SELs for A300-622R Departure

AEDT Air Profile Weight User PROF.	
Distance from Brake Release (nmi)	AEDT Stand SEL (dBA)
0.0	133.1
0.5	122.1
1.0	105.1
1.5	99.6
2.0	94.5
2.5	90.4
3.0	88.6
3.5	87.2
4.0	86.0
4.5	84.9
5.0	83.9
5.5	83.0
6.0	82.1
6.5	81.3
7.0	80.5

July 19, 2024
 2024 Noise Contingency Study - Appendix
 Figure A-14

Table A-2. SELs for A300-622R Departures at 290,300 Pounds: AEDT Standard and User-defined Profiles

AEDT Aircraft Model: A300-622R Profile Weight: 290,300 lbs. (PROF_ID2 = 2) User PROF_ID1: SDF_NAOP_2_RT15			
Distance from Brake Release (nm)	AEDT Standard, SEL (dB(A))	User-Defined Profile, SEL (dB(A))	Difference SEL (dB(A))
0.0	133.2	130.1	-3.1
0.5	121.8	119.9	-1.9
1.0	103.8	104.5	0.6
1.5	99.0	97.9	-1.1
2.0	92.5	93.4	0.8
2.5	89.9	91.4	1.5
3.0	88.1	89.7	1.6
3.5	86.8	88.4	1.6
4.0	85.5	87.0	1.5
4.5	84.5	85.8	1.3
5.0	83.4	84.7	1.2
5.5	82.5	83.6	1.2
6.0	81.5	82.6	1.0
6.5	80.8	81.7	1.0
7.0	80.0	80.8	0.8
7.5	79.3	79.9	0.7
8.0	78.7	79.3	0.6
8.5	78.0	78.5	0.5
9.0	77.5	77.9	0.4
9.5	76.9	77.3	0.5
10.0	76.4	76.8	0.4

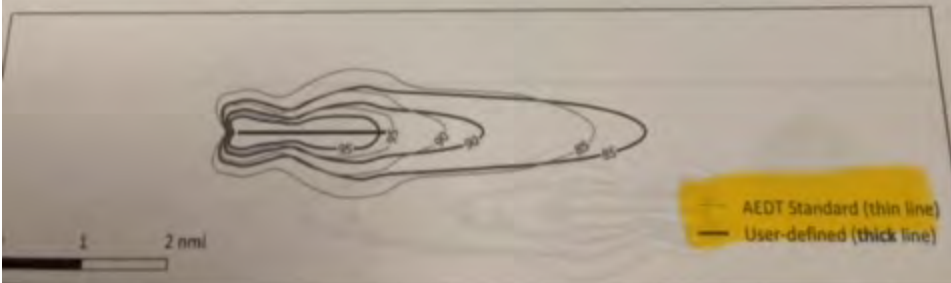


Figure A-16. SEL Contours for A300-622R Departures at Take-Off Weight 290,300 Pounds

Sent from my iPhone

On Nov 21, 2024, at 1:34 PM, Edward Mansfield <emansfield7@gmail.com> wrote:

CNF Board Members

Attached is a link explaining the definition and calculation nuances of sound metrics. Over the last couple of weeks, I have pondered what the various histograms of an aircraft noise event was conveying. Several of these histograms attached to my 2024 NEM Update Comments depict the Lmax value as less than the SEL (Sound Equivalent Level) value. Other reference texts suggest otherwise. Why? So, I began a search for the actual formulations of both which I found but then lost. The link does a "what if" at various time

intervals and decibels that displays at lower time intervals and decibels the Lmax may be higher than the SEL if used to define the Noise Exposure Contour: but, then the two sound metrics relationships reverse at higher time intervals and decibel noises.

More consideration should be given to these two noise metrics. The Explain app uses the Lmax over a 10 second interval period which I have incorporated in comment concerns regarding the new 2024-2029 NEM Update.

<https://anima-project.eu/noise-platform/lamax-sel-and-leq-for-aviation-noise>

Edward L. Mansfield
712 East Burnett Avenue
Louisville, KY. 40217-1124
(502) 509-8006

7

From: [Dorn Crawford](#)
To: [Engineering](#)
Cc: [Mary Rose Evans](#); [John Sistarenik](#); [Edward Mansfield](#); [Doug Black](#)
Subject: Comments on 2024 Draft NEM Update
Date: Friday, November 22, 2024 23:16:49

It's my understanding from commentary at the LRAA's recent workshop that the FAA is expecting this NEM update to provide cues as to the necessity of a full, updated Part 150 study. Given the obvious logic, this is a welcome development. But with no evidence of such linkage in previous NEM updates (and conversely, no such updates supporting the two previous Part 150 studies conducted here), the current report requires refocusing to provide the basis for informed judgment on the road ahead.

7.1

At the most general level, the report's recounting of NCP measures (Chapter 4 and Appendix B) demands assessment of their applicability to current and projected circumstances. Such an assessment must weigh the degree of net noise relief to date provided by measures implemented based on FAA approval; estimate relief foregone by measures previously disapproved; note the rationale and impact of measures implemented over FAA disapproval; and project the suitability of this measure set (approved or not) to conditions forecast for 2029.

The most compelling raw material to support such a comparative assessment is of course the respective contour maps and impacted population tables of the 2003 NCP forecast and the current NEM update. An overlay of the 2009 and 2029 projected contours alone provides a contrast so stunning as to demand immediate action:

7.2

<!--[if !supportLists]-->- <!--[endif]-->The overall growth of the 2024 and 2029 contours since the last NCP challenges the relevance of mitigation measures devised in 2003 – predominantly home and institutional insulation programs already severely downsized due to increased areas of application, and unlikely to survive the further expenses of order-of-magnitude expansion.

<!--[if !supportLists]-->- <!--[endif]-->Current and projected contours north of the airfield place a huge premium on unadopted operational measures of the 2003 NCP – most obviously the introduction of a minimally offset approach corridor avoiding all the most noise-sensitive areas north of the airport's west runway, now overrun by DNL 65 or higher contours.

- <!--[endif]-->Radical changes in the shapes and sizes of the northern lobes defeat the efficacy of the runway preference still in effect in the airport's Runway Use Agreement (RUA), casting a further long shadow over key proposed operational measures rejected under 2003 conditions.

The required comparative approach might also shed light on other enduring disparities in current operations, such as the adoption (and subsequent expansion) of a daytime reverse flow measure the FAA disapproved on operational grounds, based on its dependence on the other two operational measures rejected above – as cited, but not explained, in the current draft.

7.3

Another operational anomaly not well represented in the current draft, but amenable to further study in a future NCP, is the impact of deviations from agreed flight procedures such as conformance to designated corridors. Some of these, like routing military turboprop aircraft to divergent departure paths, are explicitly inconsistent with existing NCP measures; others, like the use of non-preferred runway flow without supporting weather conditions, are more directly shortfalls from procedures specified in the RUA. But all would benefit greatly from revisitation in an updated Part 150 study, with particular attention to their representation in future modelling.

7.4

A further disparity to be explored arises in comparing the current and projected contours presented in the draft. These are somewhat longer in the future case, as expected from assumed growth in operations – but also wider, contrary to expectations of the improved flight procedures represented in the future case. These deserve either explanation in the current draft, or revisiting in a more fully articulated Part 150 update.

7.5

Recognizing that these are generalized comments composed in a short timeline, all are certainly open to elaboration and further discussion in the course of improving this draft report, which is essential to meet the FAA’s stated purpose. With its apparent reluctance to accept the simple fact of a 20-year lapse in updating the existing NCP, the FAA’s assigned task is clear and unambiguous. I stand ready to assist in any way I can.