Aviation Environmental Design Tool (AEDT)

Version 3f

User Manual

December 2023

REPORT DOCUMENTATION PAGE

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE December-2023	3. REPORT TYPE AND DATES COVERED 012/2023

4. TITLE AND SUBTITLE Aviation Environmental Design Tool (AEDT) User Manual Version 3f	5a. FUNDING NUMBERS FC14C423

6. AUTHOR(S) U.S. DOT Volpe Center: Hansen, Andrew Ross, Jason Koopmann, Jonathan Ahearn, Meghan Lee, Cynthia Hwang, Sunje Solman, Gina Goetzinger, Steve Thrasher, Theodore Cumper, Jordan Zubrow, Alexis Simon, Matthew	5b. CONTRACT NUMBER AAR374

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Volpe National Transportation Systems Center 220 Binney Street Cambridge, MA 02142	8. PERFORMING ORGANIZATION REPORT NUMBER DOT-VNTSC-FAA-24-02

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Federal Aviation Administration Office of Environment and Energy (AEE-100) 800 Independence Ave. SW Washington, DC 20591	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES FAA Program Managers: Joseph DiPardo, Mohammed Majeed

12a. DISTRIBUTION/AVAILABILITY STATEMENT This report is part of the AEDT 3f software release, and it is publicly available.	12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

The Federal Aviation Administration, Office of Environment and Energy (FAA-AEE) has developed the Aviation Environmental Design Tool (AEDT) version 3f software system with the support of the following developers, listed as they were known at the time of contribution: FAA, National Aeronautics and Space Administration (NASA), U.S. DOT Volpe National Transportation Systems Center (Volpe Center), Acrotron, ATAC Corporation, Metron Aviation, CSSI Inc., Foliage, Altran, Senzig Engineering, JDR, MIT, and Georgia Tech. AEDT 3f is a software system that is designed to model aviation related operations in space and time to compute noise, emissions, and fuel consumption. This User Manual provides information on setting up and running analyses with AEDT 3f.

14. SUBJECT TERMS aircraft acoustics, aircraft emissions, air quality, aircraft performance, FAA AEDT, air traffic, airspace, noise contours, impact evaluation, change analysis, environmental impact statement, environmental assessment, environmental justice	15. NUMBER OF PAGES 468
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU

Aviation Environmental Design Tool
User Manual: 3f

Table of Contents

1 Introduction

1.1 About This User Manual

This User Manual provides instruction on how to interact with the AEDT 3f application. It is organized according to the order in which the tabs appear in the AEDT application, from left to right. The AEDT application interface is designed such that the ribbon tabs where users will spend the most time, such as tabs required for analysis of results, are oriented on the left side of the application while tabs that will be used less often, such as initial setup screens, are oriented to the right side of the application. Global study settings are available in the *Study* tab. High-level steps for creating a new study in AEDT are described in Section 2.2. See Appendix A for a glossary of terms.

This User Manual does not contain guidance or policy for regulatory analyses. Guidance information can be found on the FAA office of environment and energy (AEE) website (https://www.faa.gov/about/office_org/headquarters_offices/apl/aee/noise).

The following symbols will appear throughout the document to highlight important information:

Observe warnings to avoid errors in execution and ensure that the intended execution occurs.

Notes contain helpful information and tips regarding the functionality of the tool.

The right-click icon indicates that the described functionality can also be accessed by right-clicking on a selection.

The question mark icon provides answers to common questions.

1.1.1 Additional AEDT Documentation

Additional information on AEDT can be found in the following documents:
- **AEDT Release Notes**
  - **Description:** Summary of new features, improvements, and updates in the current AEDT release.
  - **Location:** AEDT Support website, *Downloads* page
- **AEDT Installation Manual**
  - **Description:** Instructions on how to install and configure Microsoft SQL Server, the AEDT application, and AEDT Distributed Processing Service.
  - **Location:** AEDT Support website, *Product Information* page
- **AEDT Technical Manual**
  - **Description:** Technical details of modeling methodologies used in AEDT.
  - **Location:** AEDT Support website, *Product Information* page
- **AEDT Supplemental Manuals**

- o **Description:** Documentation on key topic areas including, a quick start tutorial, detailed information on the AEDT Standard Input File (ASIF), using MOVES with AEDT, and modeling with background concentrations in AEDT.
        - o **Location:** AEDT Support website, *Product Information* page
- **AEDT NEPA Guidance**
    - o **Description:** Guidance on the use of AEDT to conduct environmental modeling of aircraft noise, fuel burn, and emissions for FAA actions subject to the National Environmental Policy Act (NEPA).
    - o **Location:** AEDT Support website, *Product Information* page
- **AEDT Database Description Documents (DDD) and Entity Relationship Diagrams (ERD)**
    - o **Description:** DDDs and ERDs for the AEDT Airport, Fleet, and Study databases are available.
    - o **Location:** The *Documents* folder within the AEDT installation folder (e.g. *C:\Program Files\FAA\AEDT\Documents*)

1.2 About AEDT

The Federal Aviation Administration Office of Environment and Energy (FAA-AEE) recognizes that the environmental consequences stemming from the operation of commercial aviation – primarily noise, emissions, and fuel consumption – are highly interdependent and occur simultaneously throughout all phases of flight. The Aviation Environmental Design Tool (AEDT) is a software system that is designed to model aviation related operations in space and time to compute noise, emissions, and fuel consumption.

A primary objective of AEDT is to help the analyst efficiently answer questions of interest about the environmental consequences of aviation activities. These environmental consequences are evaluated within an AEDT study through metrics, many of which are defined by regulatory standards. For AEDT purposes, answers to the questions posed for a particular study are referred to as Metric Results. While a host of supporting workflows can expose lower level details, the *Define Metric Results* workflow gives the analyst the highest level organization of data needed to answer questions of interest.

1.3 Technical Assistance

The AEDT Support website, https://aedt.faa.gov/, is the technical support hub for AEDT. Support requests, feedback on issues or bugs, and feature requests should be submitted through this website. The latest AEDT installers and support resources such as documentation and frequently asked questions (FAQ) are also available on the AEDT Support website. Register on the website to purchase products, request support, or submit feedback on AEDT. Additional options for support include:

- E-mail: aedt-support@dot.gov
- Phone: 617-494-2603

Please include the AEDT Administrative File when requesting technical support. Please refer to Section 4.12.2 for instructions on generating the Administrative File.

2   Getting Started

If AEDT is not already installed, follow the instructions in the AEDT Installation Manual to install the Microsoft SQL Server and the AEDT application. AEDT installers are available for download on the AEDT Support website (Section 1.3).

The currently supported Microsoft SQL Server versions are SQL Server 2017 and SQL Server 2022.

⚠️ AEDT requires administrative privileges for both 1) installation and 2) execution of the software.

2.1   Start AEDT

To start the AEDT application:

1.   On the Desktop, right-click on the *AEDT 3f* shortcut and click *Run as administrator.*

   - AEDT can also be accessed by navigating to the AEDT installation folder (e.g., *C:\Program Files\FAA\AEDT*) and right-clicking on the executable named *AEDT.exe* and selecting *Run as administrator.*

2.   AEDT will load the last study that was open before AEDT was closed. If there is no record of a previous study, the *Study* tab will open.

   - Click *Open* to select an existing study (see Section 4.1 for more information);
   - Click *New* to create a blank study (see Section 4.5 for more information); or
   - Click *Import* to import an EDMS or INM study into AEDT (see Section 4.2).

3.   If accelerated display is unavailable on the host platform where AEDT is launched, the following warning message will be displayed.

   - Check the *Do not show this message again* checkbox to disable this warning message if desired.
   - Click *Close* to close the dialog.
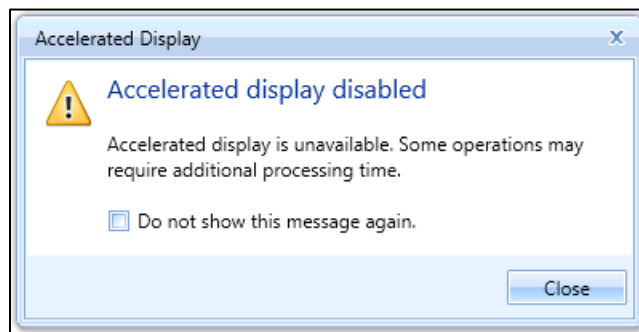
Figure 2-1 Accelerated Display Warning

📝 The accelerated display may be disabled for a variety of reasons including lack of graphics accelerator card, accessing the AEDT host platform via remote desktop, or Windows user settings disabling the graphics accelerator.

When the accelerated display is disabled, rendering map layers (e.g., Noise Exposure Layers) may require additional processing time. In some cases, map features may not be highlighted when selected on the map using Identify tool or through the layer attributes pane.

2.2   High-level Workflow for Building a New Study

1. In the *Study* tab, create a new study (Section 4.5).
2. In the *Airports* tab, add an airport (Section 8).
   a. Add tracks (optional).
   b. Add taxi network (optional).
   c. Add operating configurations (optional).
3. In the *Definitions* tab, set up supporting study data elements as desired (Section 9):
   a. Add receptor and receptor set (required for noise and emissions dispersion metric types).
   b. Add operational profiles (required for non-aircraft operations).
   c. Specify weather/terrain/ambient/MOVES files (optional).
4. In the *Operations* tab, create desired operations (Section 6).
5. In the *Operations* tab, create an annualization for the operations (Section 6.6).
6. In the *Metric Results* tab, define metric result(s) (Section 5.2).
7. In the *Metric Results* tab, run the metric result(s) and view layers and reports (Section 5.7 and 5.8).

What is a study?
- An AEDT study is a collection of user inputs and system data.
- Study data are contained in a single SQL Server database. The name of the study is the name of the database.
- A study database does not contain external files such as terrain or high fidelity weather data files.

Study progress is saved upon user action (e.g., results are saved after running a metric result, layers are saved after generating a layer, etc.) and no explicit "save" is required.

3   User Interface Navigation

The AEDT graphical interface consists of seven main components:
1. An application button & quick access toolbar
2. Ribbon tabs
3. Ribbon (hide-able)
4. Left work area
5. Center work area
6. Right work area
7. Status bar

The *Metric Results* tab opens upon application startup (Figure 3-1).

The recommended screen resolution is 1920x1080 (or full HD resolution).
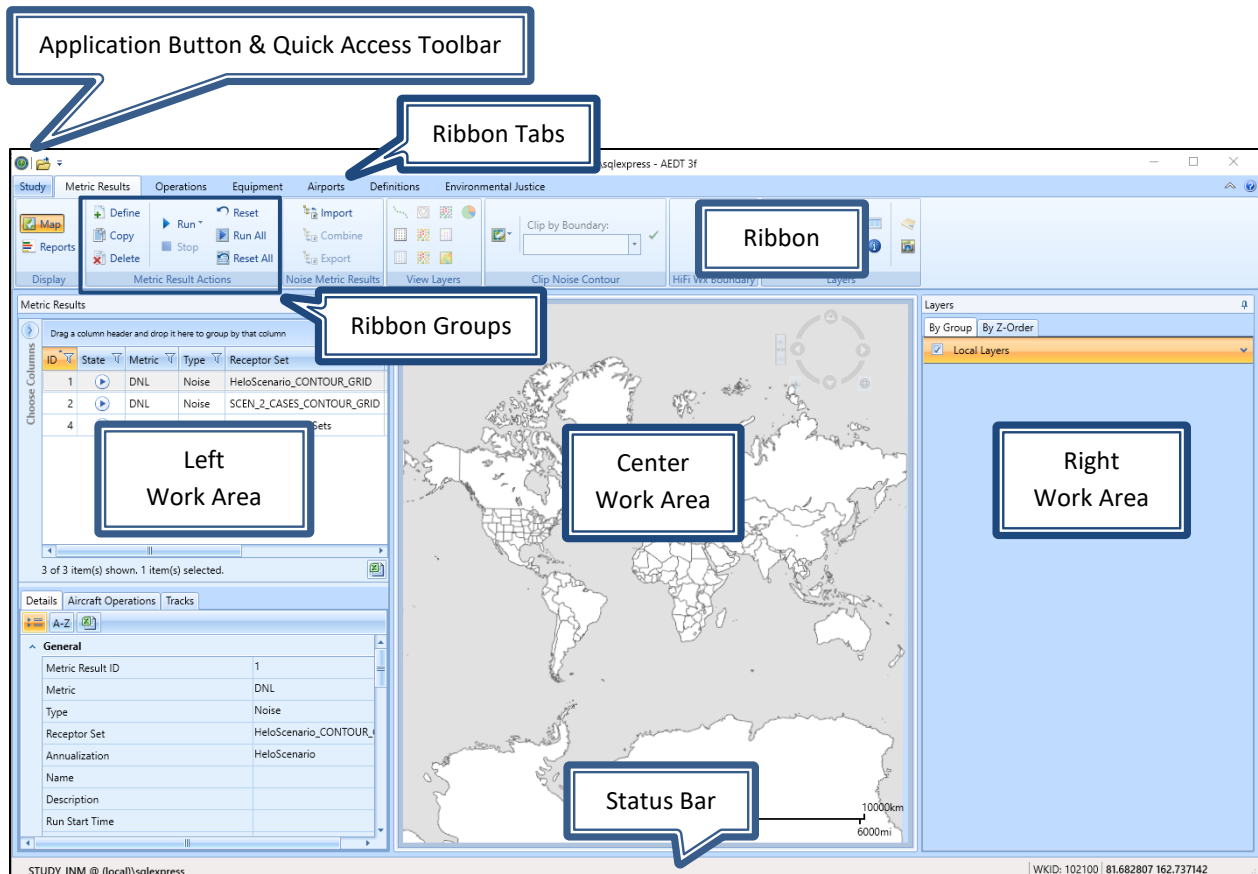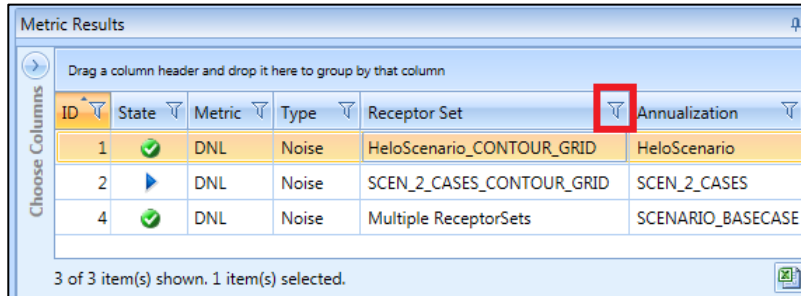
Figure 3-1 Metric Results Tab

3.1 General

Filter, Sort, and Group Grids

Data grids within panes can be sorted, filtered, or grouped (Figure 3-2).

- To sort grids, click on the desired heading name to sort by ascending or descending order.
- To filter grids, click on the filter icon next to the heading name and either select a pre-defined option to filter by or create a custom filter.
- To group records in a grid, drag a column header and drop it into the grid header.

Figure 3-2 Data Grid Example with Filter Icon

Open this Grid as a CSV File

All grids (including reports) with an Excel icon at the bottom-right corner of the grid can be exported. Click the Excel icon in the grid to open the currently displayed grid data in Microsoft Excel (if installed) or in a CSV file.

Figure 3-3 Grid with Excel Icon

Customize Columns

Grids that display multiple columns can be customized. Click the *Choose Columns* arrow to display a list of available columns for the grid. Check or uncheck the desired columns.
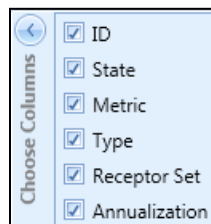
Figure 3-4 Sample Column Selector

Resize Panes and Dialog Boxes

All panes can be resized by sliding the divider between the panes. All dialog boxes can be resized by dragging the corner of the dialog box to the desired size.

Pin

Panes that contain a pin icon can be fixed in view or hidden until accessed (Figure 3-5). Panes are pinned by default.

- To minimize the pane to a header, click the pin.
- To restore the pane, click or hover over the header then click the pin.
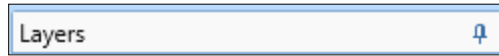
Figure 3-5 Pane with Pin Icon

Categorized or Alphabetical View

Panes that have the *Categorize* button or the *Alphabetical* button can be ordered by a categorized or alphabetical view. Switch between these two views by using the buttons.

- Click the *Categorize* button to organize the list by type.
- Click the *Alphabetical* button to order the list in alphabetical order.

Figure 3-6 Categorize and Alphabetical Buttons

3.2 Application Button

The application button contains commands to *Restore, Move, Size, Minimize, Maximize,* and *Close* the AEDT application window. The application button is located in the top right corner of the application (Figure 3-7).
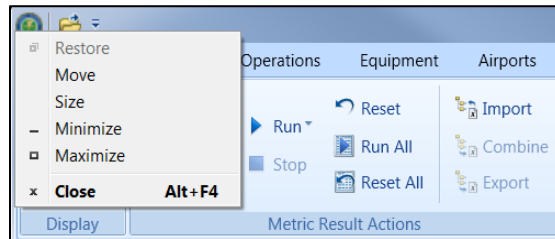
Figure 3-7 Quick Access Toolbar

3.3 Quick Access Toolbar

The quick access toolbar (Figure 3-8) allows for easy access of frequently used commands and contains the buttons described below.
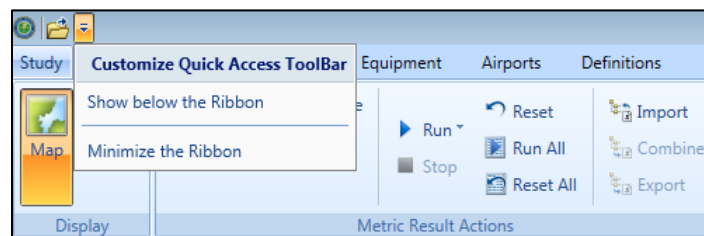
Figure 3-8 Quick Access Toolbar

Open

The *Open* button launches the *Open Study* dialog (Section 4.1).

Customize Quick Access Toolbar Arrow

The following options are available to adjust the quick access tool bar location and ribbon visibility
- *Show below the Ribbon*: The quick access toolbar is displayed below the ribbon.
- *Show above the Ribbon*: The quick access toolbar is displayed above the ribbon.
- *Minimize the Ribbon:* The ribbon is hidden from view.
- *Restore Ribbon:* The ribbon is displayed.

3.4   Tabs

AEDT features are organized by tabs as follows:

Study tab

The *Study* tab includes the following menu options:
- *Open*: Opens the *Open Study* dialog.
- *Migrate*: Opens the *Migrate Studies* dialog.
- *Import*: Opens the *Import Study* dialog.
- *Partial Import*: Opens the *Import Partial ASIF* dialog.
- *New*: Opens the *Create New Study* dialog.
- *Delete*: Opens the *Delete Study* dialog.
- *Close*: Closes the currently open study.
- *Recent:* Lists recently opened studies.
- *Tasks:* Displays active and completed tasks.
- *Log:* Displays AEDT log messages.
- *Preferences:* Contains system and study settings.
- *Study Maintenance:* Contains study maintenance options.
- *Help:* Displays AEDT version and support information.
- *Exit:* Exits the AEDT application.

See Section 4 for more information on *Study* tab functionality.

Metric Results tab

The *Metric Results* tab supports construction and processing of metric result definitions, generation of reports, and generating and viewing result layers. See Section 5 for more information.

Operations tab

The *Operations* tab supports managing aircraft operations, non-aircraft operations, runup operations, helitaxi operations, and annualizations. See Section 6 for more information.

Equipment tab

The *Equipment* tab supports managing aircraft equipment, non-aircraft equipment, and equipment groups. See Section 7 for more information.

Airports tab

The *Airports* tab supports adding airports, viewing airport layouts and editing its components, adding new components in airport layout designer, and creating operation configurations. See Section 8 for more information.

Definitions tab

The *Definitions* tab supports setting up study data elements including metrics, receptors, receptor sets, operational profiles, and weather and terrain settings. It also supports integration of emissions results from the EPA's Motor Vehicle Emission Simulator (MOVES). See Section 9 for more information.

Environmental Justice tab

The *Environmental Justice* tab provides access to the environmental justice model which uses U.S. Census, American Community Survey data to analyze low income and minority populations and limited English proficiency populations. See Section 10 for more information.

3.5 Ribbon

The ribbon provides easy access to commands that are applicable in the current tab. The command buttons are grouped together by functional categories. Buttons in the ribbon will appear as active or inactive based on applicability to the current selection.

The ribbon can be minimized or expanded by clicking on the expander control in the top right corner of the application.

Figure 3-9 Expander Control for the Ribbon

3.6 Left, Center, and Right Work Areas

The work areas in the AEDT interface are divided into three sections. While the divisions are consistent between tabs, the content changes as appropriate for each tab.

Left Work Area

The left work area contains a list of data available for use in the currently selected tab. This work area is present in every tab and view.

Center Work Area

The center work area contains map, detail, or report content, depending on the selected tab and view. This work area is present in every tab and view.

Right Work Area

The right work area provides appropriate tools to manage the content in the center work area. This work area is not present in every tab and view but is displayed for tabs with additional tools specific to the content in the center work area of that tab.

3.7 Map and Layers Manager

3.7.1 Map

The map is located in the center work area (Figure 3-1). The map view can be adjusted using the Map control (Figure 3-10) as described in Table 3-1.

Figure 3-10 Map Control

Table 3-1 Map Control Features

		Zoom In/Zoom Out	Zooms in and out
		Reset North	Resets the map orientation to North
		Full Extent	Zooms to visible
		Move North/South/East/West	Moves the map in selected direction. Spin the circle to orient the map in desired direction.

Zoom and pan features can also be accessed as follows:
- Zoom in on the map by scrolling up with the mouse scroll wheel or double-clicking.
- Zoom out on the map by scrolling down with the mouse scroll wheel or holding the shift key and double-clicking.
- Pan across the map by clicking and dragging the mouse.

3.7.2 Layers Ribbon Group

The *Layers* ribbon group (Figure 3-11) is available for every tab displaying the map view. It provides access to the following commands:
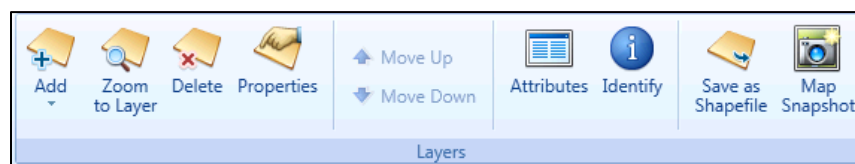
Figure 3-11 Ribbon Group – Layers

- *Add*: Displays the following sub-menu options:
  - o *Add Local Map*: Browse to open local layer files (.mpk, .tpk, .shp) and raster files (.bmp, .png, .sid, .tif). See Section 3.7.4 for more information
  - o *Add Base Map*: Opens the *Add Base Map* dialog. See Section 3.7.5 for more information.
  - o *Add Map Service (URL)*: Opens the *Add Map Service* dialog. See Section 3.7.6 for more information.
- *Zoom to Layer*: Zooms to the extent of the selected layer.
- *Delete:* Permanently deletes the selected layer.
- *Properties*: Opens the *Layer Properties* dialog for the currently selected layer. See Section 3.7.8 for more information.
- *Move Up/ Move Down Arrows*: These buttons are enabled when a layer in the *By Z-Order* tab is selected. Select a layer and click on the up or down arrow to adjust the order of visibility relative to other layers.
- *Attributes*: Opens the *Attributes* pane for the selected layer. See Section 3.7.9 for more information.
- *Save as Shapefile*: Exports the selected layer as a shapefile. All layers generated in AEDT can be exported except for the layers under the *Local Layers* and *Tiled Map Service* categories.
- *Map Snapshot:* Takes a screenshot of the current map view and gives the option to print or save as an image file.
- *Identify*: Provides attributes specific to a selection on the map. See Section 3.7.10 for more information.

A subset of the above commands is also available by right-clicking on a layer in the *Layers* manager*.*

3.7.3 Layers Manager

The *Layers* manager (Figure 3-12) is displayed in the right work area (Figure 3-1) when the map view is active. It provides tools to manage the geographic information system (GIS) layers that are available for viewing on the map. Active layers (layers that have been turned on) are displayed in the map area, while inactive layers (layers that are turned off) are not shown on the map. Inactive layers still appear in the *Layers* manager.
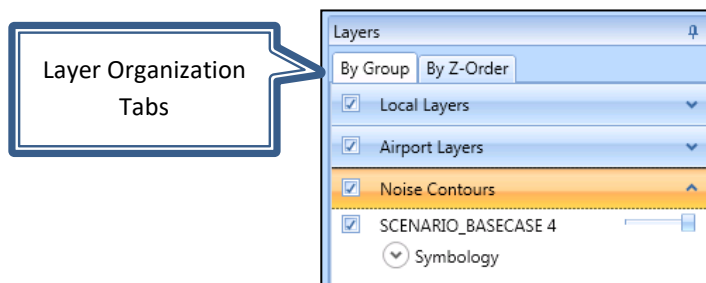
Figure 3-12 Layers Manager

Layer Organization Tabs

There are two organization tabs that provide different ways to view and manage layers.

- *By Group*: In this tab, layers are grouped by categories. All layers in a group can be turned on and off by checking or unchecking the box next to the group name. Click on the group name to expand or hide the layers within a group.
- *By Z-Order*: The presentation order of layers can be adjusted in this tab. The layers at the top of the list are visible over the layers at the bottom of the list. In general, the base map layer is placed at the bottom of the list.

Layer Features

The following features are available for all layer types:

- Turn layers on/off by checking or unchecking the box next to the layer name.
- View the symbology legend for a layer by expanding the *Symbology* arrow.
- Set the opacity of a layer with the slider on the right of the layer name. If the opacity slider is not visible, go to the *Study* tab, *Preferences, Map* and check the *Show opacity slider in the legend* option.

 A subset of commands from the *Layers* ribbon group is also available by right-clicking on a layer in the *Layers* manager.

Layer Categories

The layer categories in AEDT are listed in Table 3-2.

Table 3-2 Layer Categories

Layer Category	Layer Naming Convention
Tiled Map Service	Base map name (map background)
Local Layers	Local layer name
Layers	Boundary layers are listed under this category. For example: • Noise contour boundary: "Boundary_" + auto-generated number • High fidelity weather boundary: Study name + " - HiFi Wx Boundary" • Boundary from a local .txt file: Name of the .txt file
Airport Layers	Airport layout name
Noise Contours	Annualization name + Metric Result ID
Time Audible Layers	Annualization name + Metric Result ID
Receptor Set Layers	Receptor set name
Noise Exposure Layers	• Regular grid naming convention: Annualization name + "-" + receptor set name + metric result ID • Dynamic grid naming convention: Annualization name + "-" + Airport code + "_" + "dgrd_flat_" + database identifier

Layer Category	Layer Naming Convention
Number Above Noise Level Layers	Annualization name + "-" + receptor set name + metric result ID
AmbientMap Data Layers	Name of the ambient map data file
Impact Set Layers	"Impact Layer" + metric result ID + "_" + metric result ID
Track Features	"Tracks for" + annualization name + metric result ID
SensorPath Layers	"Sensor Path for" + annualization name + metric result ID
Emissions Concentration Layers	Pollutant type + "_"+ average time + "_" + rank + "_J" + Metric Result ID
Feature Layers	For example: • USA Census Block groups • USA Census Tract Areas
Environmental Justice Layers	"Environmental Justice Layer"
Limited English Proficiency Layers	"Limited English Proficiency Layer"

3.7.4 Add Local Map

GIS files that are stored locally on the computer (as opposed to online on the web) can be displayed on the map. Accepted formats include .mpk, .tpk, .shp, .bmp, .png, .sid, and .tif. When adding a raster image (.bmp, .png, .sid, .tif), a world file that defines the location for the raster must exist in the same folder as the raster file. For more information on world files, refer to ESRI's world file documentation.[1]

In addition, a boundary file (.txt) can be imported and displayed on the map. Refer to Section 9.3.2.1 for information on the boundary file format.

To add local map files:
1. Click the *Add* button in the *Layers* ribbon group, then select *Add Local Map*.
2. Browse to the desired file, and click *Open*.
3. The newly added local layer is displayed on the map and added to the *Layers* manager.

3.7.5 Add Base Map Dialog

Base maps provide a background of geographical context for the study content you want to display on a map. The *Add Base Map* dialog displays available base maps (Figure 3-13). A new background layer can be selected in this dialog.

To access the Add Base Map dialog:

---

[1] http://webhelp.esri.com/arcims/9.3/General/topics/author_world_files.htm

1. Click the *Add* button in the *Layers* ribbon group, then select *Add Base Map*.
2. Click on the desired base map.
3. Click *Add* to apply changes or *Cancel* to discard changes.
4. The newly added base map is added to the bottom of the layers list in the *By Z-Order* tab, *Layers* Manager.
5. In the *By Z-Order tab*, adjust the layer presentation order by using the *Move Up*/*Move Down* arrows in the *Layers* ribbon group in order to view the base map.

> The base maps are loaded from an Esri internet service and require an active internet connection.
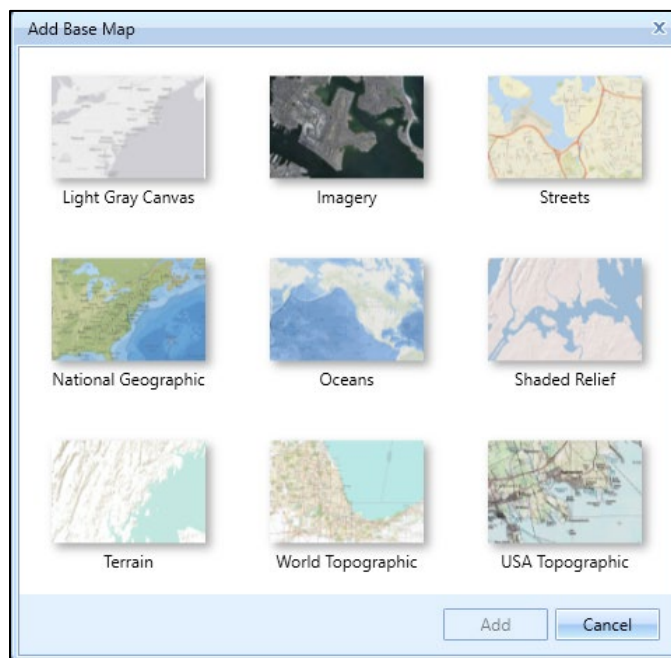
Figure 3-13 Add Base Map Dialog

3.7.6 Add Map Service Dialog

A new map service URL can be added in this dialog. A map service makes maps, features, and attribute data available to the web using Esri ArcGIS. Commonly, a map service is used to show business data on top of base map.

To access the Add Map Service dialog:
1. Click the *Add* button in the *Layers* ribbon group, then click *Add Map Service*.
2. Enter the URL for the desired map service.
3. Click *Add* to apply changes or *Cancel* to discard changes.
4. The newly added map service is added to the *Layers* manager.
5. In the *By Z-Order* tab, adjust the layer presentation order by using the *Move Up*/*Move Down* arrows in the *Layers* ribbon group to view the map service.

Figure 3-14 Add Map Service (URL) Dialog

3.7.7 High-Fidelity Weather Boundary

When using the RUC/RAP, GEOS, or NCAR high fidelity weather data, a rectangular boundary is required and is used to limit the area that will be processed with high fidelity weather data. A boundary is not required for MERRA-2 or WRF weather. For further information on high fidelity weather data, please refer to "Using Weather Data in AEDT" on the AEDT Support website, Downloads page.

The high-fidelity weather boundary should be larger than the flight tracks being modeled, usually 100 nmi beyond the track. For departures and overflights, AEDT can take weather readings up to 100 nautical miles beyond the last point in the track definition. For approaches, weather readings could be taken up to 100 nautical miles before the first point in the track.

The high-fidelity weather boundary can be created, edited, and displayed on the map. To view the boundary on the map, click *Show* from the HiFi Wx Boundary ribbon group.
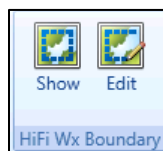
Figure 3-15 Ribbon Group – HiFi Wx Boundary

To add or edit the high-fidelity weather boundary:
1. From the *HiFi Wx Boundary* ribbon group, click *Edit.*
2. Click the + button to add a boundary coordinate row. Enter the latitude and longitude for the boundary point. A boundary requires at least three coordinate points and there is no maximum limit.
3. Click the *Up/Down Arrow* button to reorder the coordinate points.
4. Click the *X* button to delete the selected row.
5. Click the *Clear all* button to clear all rows.
6. Click *OK* to apply changes or *Cancel* to discard changes.
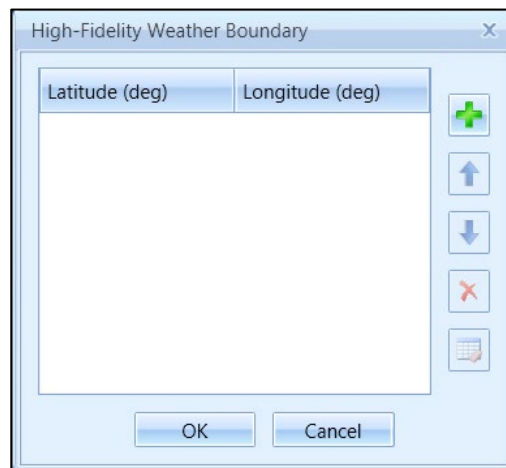
Figure 3-16 High-Fidelity Weather Boundary Dialog

3.7.8 Layer Properties Dialog

The *Layer Properties* dialog lists available properties for the selected layer. The layer name, layer opacity, and colors can be changed in this dialog.

- Color properties can only be changed for the following layer types – noise contour, noise exposure, pollutant concentration, concentration contour, high fidelity weather boundary, and imported local layers.
- The *Show labels* option is only available for noise contour and concentration contour layers.

To access the Layer Properties dialog:
1. Select a desired layer in *Layers* manager.
2. Click the *Properties* button in the *Layers* ribbon group.
3. In the *Layer Properties* dialog, click *General* to enter a name.
   o Enter a new name in the *Layer Name* field.
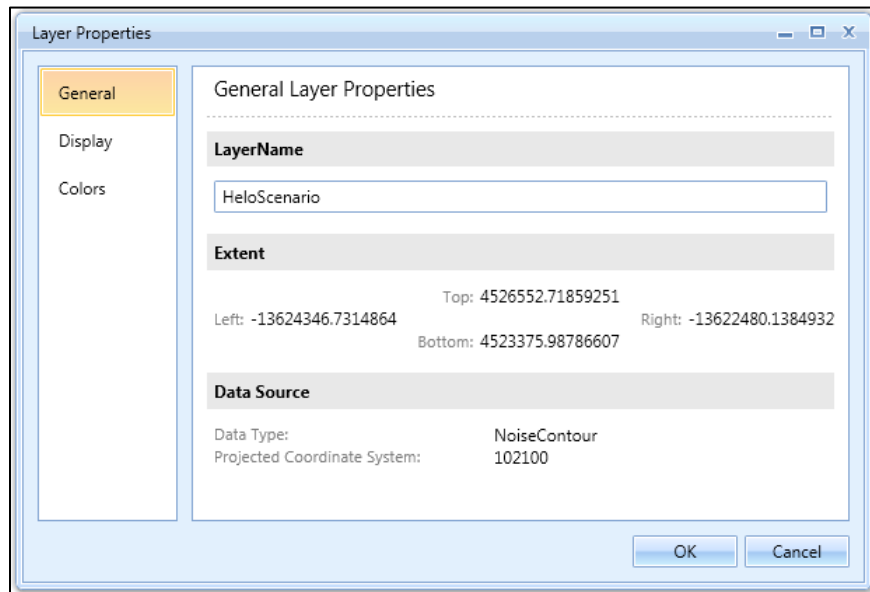
Figure 3-17 Layer Properties Dialog – General

4. Click *Display* to change opacity and show or hide labels (Figure 3-18).
   o Use the slider to change the opacity setting.
   o Check the *Show labels* checkbox to display contour dB labels on the map.
5. Click *Colors* to change color settings.
   For Noise Exposure Layers and Pollutant Concentration Layers (Figure 3-19):
   o *Threshold*: Enter the desired value for each threshold where the lower boundary is excluded and the upper boundary is included, i.e., 55 < [green] <= 60.
   o *Color*: Click to select the desired color for the threshold level.
   o *Thickness*: Specify the desired line thickness for the threshold level.
   o *+ button*: Click to insert a new threshold level before the current level.
   o *X button*: Click to remove the current threshold level.
   o *Reset*: Click to reset colors and threshold values to default values.
   For Noise Contour layers and Concentration Contour Layers (Figure 3-20):
   o *Value*: Select the desired value for each threshold.
   o *Fill Color*: Click to select the desired fill color for the threshold level.
   o *Line Color*: Click to select the desired line color for the threshold level.
   o *Line Thickness*: Specify the desired line thickness for the threshold level.
   o *X button*: Click to remove the current threshold level.
   o *Up/Down button*: Click to move the current level up or down.
   o *Reset*: Click to reset colors and threshold values to default values.
   o *+ button*: Click to add a new level.
6. Click *OK* to apply changes or *Cancel* to discard changes.
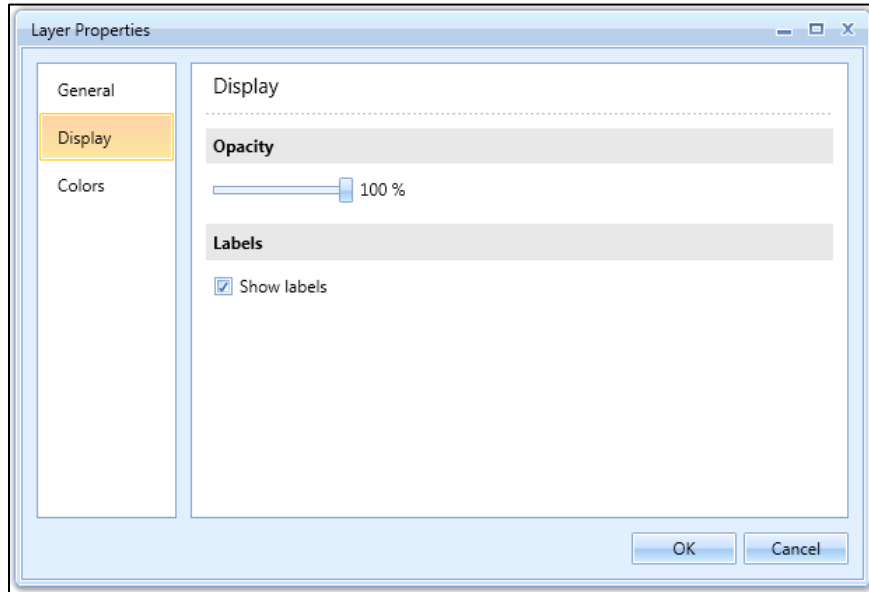
Figure 3-18 Layer Properties Dialog – Display
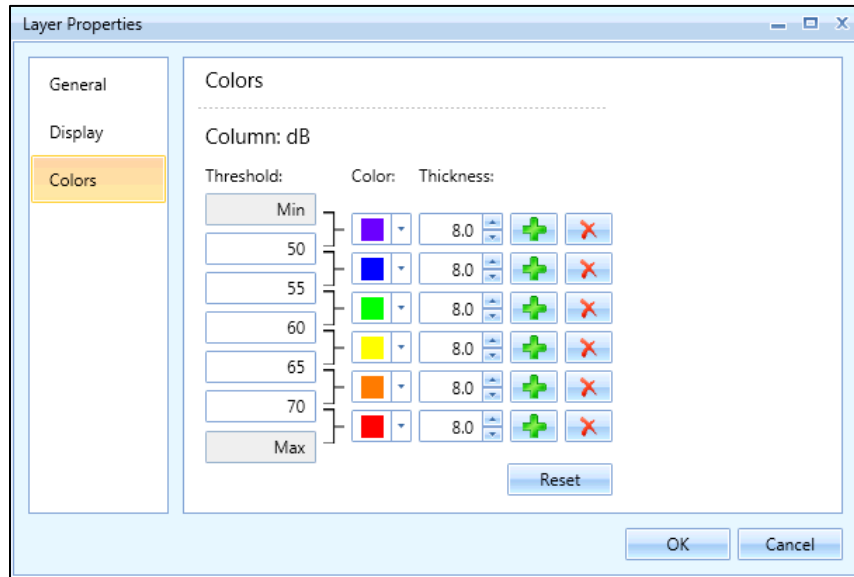
Figure 3-19 Noise Exposure Layer Properties Dialog – Colors
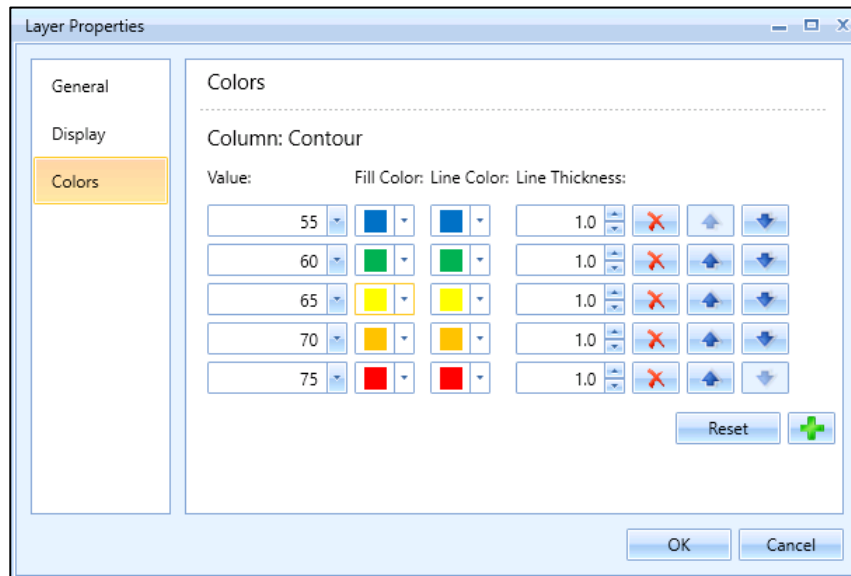
Figure 3-20 Contour Layer Properties Dialog – Colors

3.7.9 Attributes Pane

The *Attributes* pane lists available properties/data associated with any selected layer (Figure 3-21). It is displayed below the map. A tab for each layer will be shown when viewing attributes for multiple layers. Click on a row in the *Attributes* pane to highlight the corresponding object on the map. See Appendix B for detailed information about each field.

To access the Attributes Pane:
1. Select a desired layer in *Layers* manager.
2. Click the *Attributes* button in the Ribbon bar.

> The *Attributes* pane can also be accessed by right-clicking on a desired layer in the *Layers* manager.

To export the data in *Attributes* pane content to save for later use, select the desired *Attributes* tab, and click *Open in Excel* in the *Layers* ribbon group. The exported data will open in Microsoft Excel (if installed) or in a CSV text file.

To close the *Attributes* pane, click the *X* in the top right corner of the pane.

Figure 3-21 Attributes Pane

3.7.10 Identify Tool and Identify Pane

The *Identify* pane displays the attributes of the map feature that was selected using the *Identify* tool. The top portion of the pane lists each feature that has been identified. Multiple layers will be listed if features were identified from more than one layer. The bottom portion of the pane lists the attributes specific to the feature that is selected at the top of the pane.

To identify map features:
1. Click the *Identify* tool in the *Layers* ribbon group.
   - The *Identify* pane is displayed below the *Layers* manager.
   - The mouse pointer is displayed as an arrow with a question mark on the map.
2. Click on the desired map feature.
3. The *Identify* pane displays the attributes of the identified feature.

Figure 3-22 Identify Pane

3.8 Status Bar

The status bar on the bottom of the application provides the following features:

- Study Name: The name of the active study and the SQL Server instance (e.g., STUDY_NAME @ SQL_SERVER_INSTANCE_NAME) are displayed.
- Accelerated display warning: A warning is displayed if accelerated display is disabled.
- Progress bar: Displays percentage of processing completion when an active task is in progress.
- View tasks button: This button is displayed next to the Progress bar when an active task is in progress. Click to view the *Study* tab, *Tasks* page.
- WKID: The well-known ID of the currently selected projected and geographic coordinate system. In AEDT, the WKID (projection) is fixed to 102100, WGS84 Web Mercator projection.
- Latitude and longitude: Displays the current location of the mouse cursor when on the map display.
- Reports view button: Click to view reports.
- Map view button: Click to view the map.
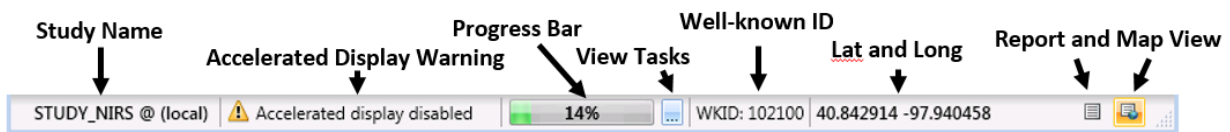
Figure 3-23 Status Bar

4 Study Tab

The *Study* tab provides access to studies and contains options and settings that are applied at the study level. See the sections below for detailed information on these features.

4.1 Open Study

To open a study, click the *Study* tab and click *Open* to display the *Open Study* dialog (Figure 4-1). For information on converting a study from INM or EDMS, see Appendix C. For information on using the ASIF Importer command line tool, see Appendix D.

4.1.1 Sample Studies

The following study databases are included in AEDT:

- STUDY_NIRS: Sample study generated from the Noise Integrated Routing System (NIRS). This Chicago-area regional study was developed in 1995 and reflects the runway configuration at that time.
- STUDY_INM: Sample study generated from the Integrated Noise Model (INM) 7.0. This study is based on the San Francisco airport, but the tracks and flights do not necessarily represent real operations.
- STUDY_IFSET: This study contains great circle runway-to-runway operations between 19 airports covering the full range of stage lengths across the full set of Aircraft Noise and Performance (ANP) modeled aircraft. Note that this study includes intentionally failing operations intended as a negative test. The included metric results focus on fuel consumption and emissions at the segment-level.
- STUDY_DULLES: Sample study generated from the Emissions and Dispersion Modeling System (EDMS). This study is based on the Washington Dulles airport, and it contains schedule-based operations (i.e., specific operation date and time).
- STUDY_PVD: Sample study generated from EDMS. This study is based on the T.F. Green (KPVD) airport, and it contains operations using operational profiles.
- STUDY_WXYZ: Sample 14 CFR Part 150 noise study around a generic airport named WXYZ.

All AEDT functionality can be explored using any study as long as data requirements are met. The sample studies contain different data sets and highlight different features of AEDT. Table 4-1 lists the AEDT features that are best demonstrated by each sample study.

Table 4-1 Study Feature Matrix

Feature Description	STUDY _NIRS	STUDY _INM	STUDY _IFSET	STUDY _DULLES	STUDY _PVD	STUDY _WXYZ
Metric Results Definition	✓	✓	✓	✓	✓	✓
Emissions Dispersion Metric				✓	✓	
Operational Profiles				✓	✓	
Dynamic Grid		✓				✓
Dispersed Tracks						✓
Airport Layout Design – Taxi Network				✓	✓	
Airport Layout Design – Operating Configuration				✓	✓	
Impact Report	✓					
Great-Circle Runway to Runway Operations			✓			
CSV Air operation and/or track import (see Appendix E)		✓		✓	✓	

4.1.2 Open Study

A study that is currently loaded will display *(Loaded)* next to the study name.

To open a study from the selected SQL Server instance:
1. Click on the name of the desired study.
2. Click *Open* to load the study.

To open a study from a different SQL Server instance:
1. Enter the name of the desired SQL Server instance in the *Select database server* field.
2. Click *Connect.* The list of available studies will update.
3. Click on the name of the desired study.
4. Click *Open* to load the study.

To change the SQL Server login credentials:
1. Click the *Credentials* arrow button.
2. Select the desired authentication mode from the *Authentication* drop-down menu options:
   - *Windows Authentication*: The *User name* is pre-populated.
   - *SQL Server Authentication*: Enter the *User name* and *Password*.

To filter the study list by study name:
1. In the *Filter by study name* text box, enter a key word to filter the available studies.
2. The study list is updated to show all studies whose name contains the key word.
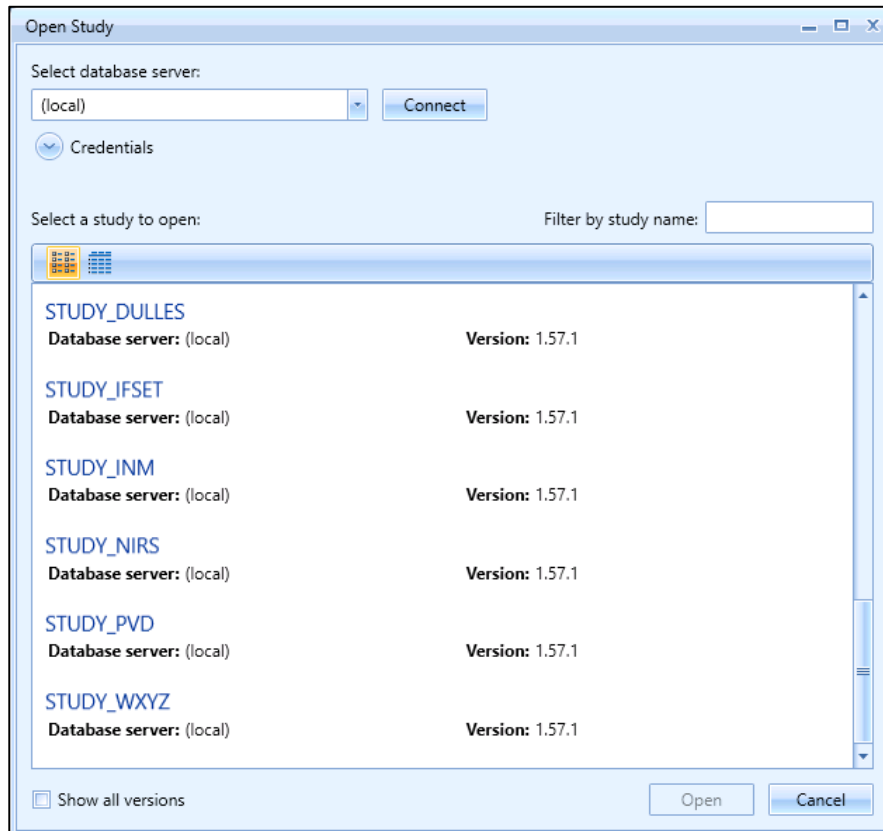
Figure 4-1 Open Study Dialog

4.1.3 Upgrade Study

AEDT 3f supports upgrading studies from database version 1.43.1 up through and including one version prior to the current version.

Show all versions checkbox: Check this option to display all the AEDT studies on the selected SQL Server instance, including studies whose database version is older than the current study database version. Only the studies that can be upgraded to the current database version are enabled for selection. Older studies that cannot be upgraded are disabled and cannot be selected.

For more information on changes from the previous version of AEDT, see the release notes. For more information on changes to available equipment, see the fleet section of the release notes. For more information on databases specific changes, see the Airport and Fleet database description documents (Airport_DDD.pdf and Fleet_DDD.pdf) in the AEDT Documents folder (e.g., *C:\Program Files\FAA\AEDT\Documents*).

⚠️ In some instances, equipment determined to not have a suitable data option a removed from the Fleet database and not reassigned. These equipment must be removed or reassigned in order to successfully update the study. See the AEDT Installation Guide for more information.

⚠️ When a study is upgraded, the airport weather will <u>not</u> be updated to the latest 10 year average.

⚠️ When upgrading an AEDT 3d study, note that the point-type receptor field "Height above terrain-offset from elevation" will be reset to 0. Note that this field has been renamed to "Height above ground – elevation offset for noise" as of AEDT 3e and can be edited in the Definitions tab. See Section 9.3.1 for more information.

To upgrade an older version of a study:

1. Check the *Show all versions* checkbox. All AEDT studies on the selected SQL Server instance are displayed.
2. Click on the name of the desired study.
3. Click *Open*.
4. In the *Open Study* confirmation dialog (Figure 4-2), select an option:
   a. *Backup study and upgrade*: Creates a backup copy of the existing version of the study before upgrading. A backup file is saved in the *Backups* directory under the AEDT data folder (e.g., *C:\AEDT\Backups\Studies*).
   b. *Upgrade without backup*: Upgrades the study without creating a backup copy.
   c. *Cancel*: Closes the dialog without upgrading the study.

⚠️ It is strongly recommended to select the *Backup study and upgrade* option to preserve a copy of the existing study database before upgrading. If the upgrade process fails, the study database could be corrupted and can only be restored from a backup file.
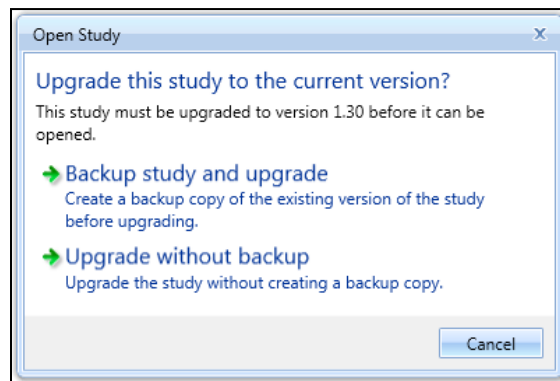
Figure 4-2 Upgrade Study Dialog

5. When the upgrade process is complete, the upgraded study is opened, and the *Metric Results* tab is displayed.
6. Update aircraft profiles for operations with modified ANP assignments, if needed.

    a.   Identify aircraft that require a new profile selection by reviewing the Fleet section of the AEDT release notes. If there have been changes to an ANP ID for an aircraft that has assigned operations (including a profile or stage length assignment) in the AEDT study, a new profile must be selected for operations containing that aircraft or a new aircraft can be selected.

    b.   Select a new profile for the affected operations by editing the operation(s) (Section 6.2.2) and selecting a new profile in the *Choose flight profile* step. Alternatively, the equipment can be changed in the *Choose Equipment* step.

7.   Review the AEDT release notes for any other updates that may be relevant to the study (e.g., GSE emission factors) and confirm or update parameters as needed.

8.   Repeat the upgrade process for other studies as necessary.

> ⚠️   After upgrading a user-defined study, reset and re-run the existing metric results in the study.

4.2   Migrate Study Databases

The currently supported Microsoft SQL Server versions are SQL Server 2017 and SQL Server 2022. For information on upgrading Microsoft SQL Server from 2017 to 2022, see the AEDT Installation Manual.

When upgrading the Microsoft SQL Server from 2017 to 2022, the AEDT study databases must be migrated to the new SQL server instance, follow the instructions in Section 4.2.1.

4.2.1 Migrate Studies

The Migrate Studies feature in AEDT can be used to copy the AEDT study databases in a 2017 instance to a 2022 instance. AEDT study databases in the 2017 instance are not removed or replaced after migration. After successfully migrating a study, open the study to upgrade to the latest AEDT study version.

To migrate studies from a SQL Server 2017 instance to a 2022 instance:
1.   Click the *Study* tab and click *Migrate* to display the *Migrate Studies* dialog (Figure 4-3).
2.   In the left pane, enter the SQL Server 2017 instance and click the *Connect* button.
      - All AEDT studies on the selected SQL Server 2017 instance are displayed.
3.   In the right pane, enter the SQL Server 2022 instance and click the *Connect* button.
      - All AEDT studies on the selected SQL Server 2022 instance are displayed.
4.   From the study list in the left pane, select the studies to migrate by clicking on them.
      - More than one study can be selected.
      - Use the *Select All/Deselect All* buttons to select all/deselect all the studies in the study list.
      - Conflicts (i.e. identical study names) will be displayed in red.
5.   Click the *Migrate* button.
      - *Status of Migration*: The total progress of the migration is displayed, along with the backup and restoration status of each study being migrated.
      - When the migration is complete, the study will appear in the SQL Server 2022 study list; and the study name font color in the SQL Server 2017 study list will change from blue to red.
6.   When the migration completes successfully, the *Status of migration* will indicate that the *Migration of all databases completed successfully.* Click the *Close* button to close the dialog.
7.   From the *Study* menu, click *Open* and upgrade the study according to Section 4.1.3.
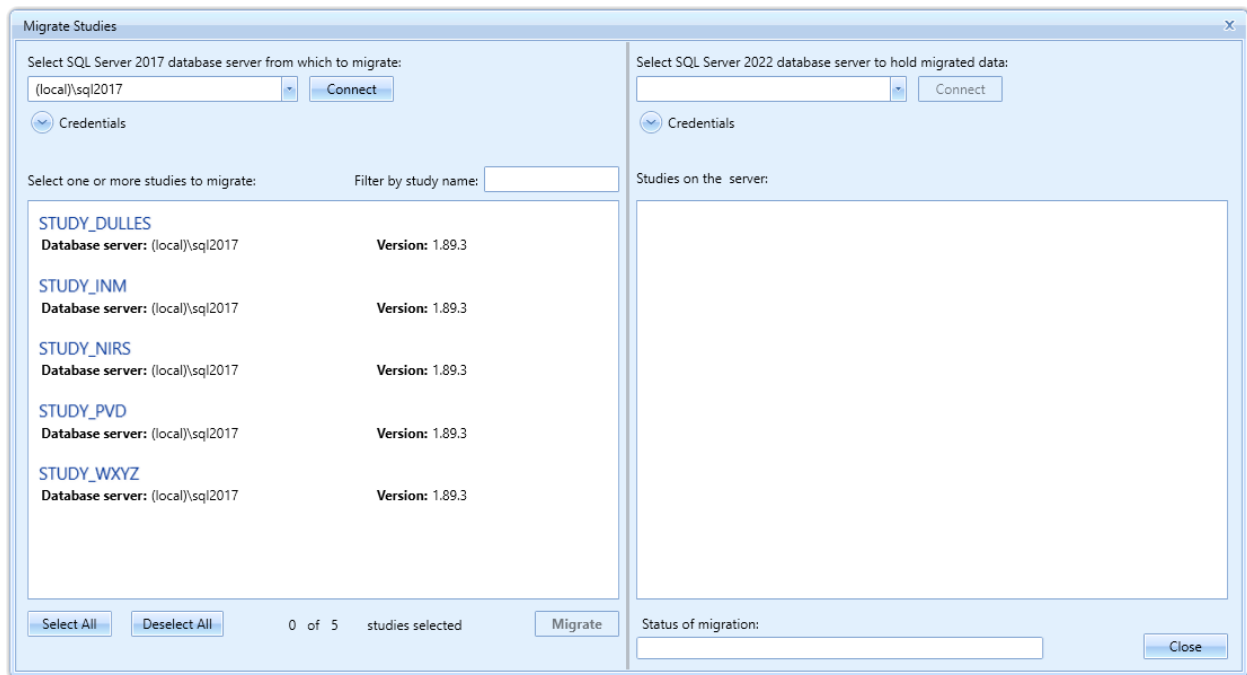
Figure 4-3 Migrate Studies Dialog

4.2.2 Conflict During Migration

If the database being migrated already exists in the SQL Server 2022 instance (study name is identical in the 2017 and 2022 instances), the user can choose which action to take for each study that has a conflict or choose to apply the same action to all conflicts.

The user can choose to:
1. *Migrate and Replace*: overwrite the database that exists in the SQL Server 2022 instance;
2. *Don't Migrate*: do not migrate the database in the SQL Server 2017 instance; or
3. *Migrate and Rename*: Migrate the database and rename it with a suffix so it does not conflict with any existing database in the SQL Server 2022 instance.

If there is more than one conflict, use the *Do this for all conflicts* checkbox to apply the same action to all conflicts.

Click the *Cancel* button to stop migrating the rest of the selected studies.
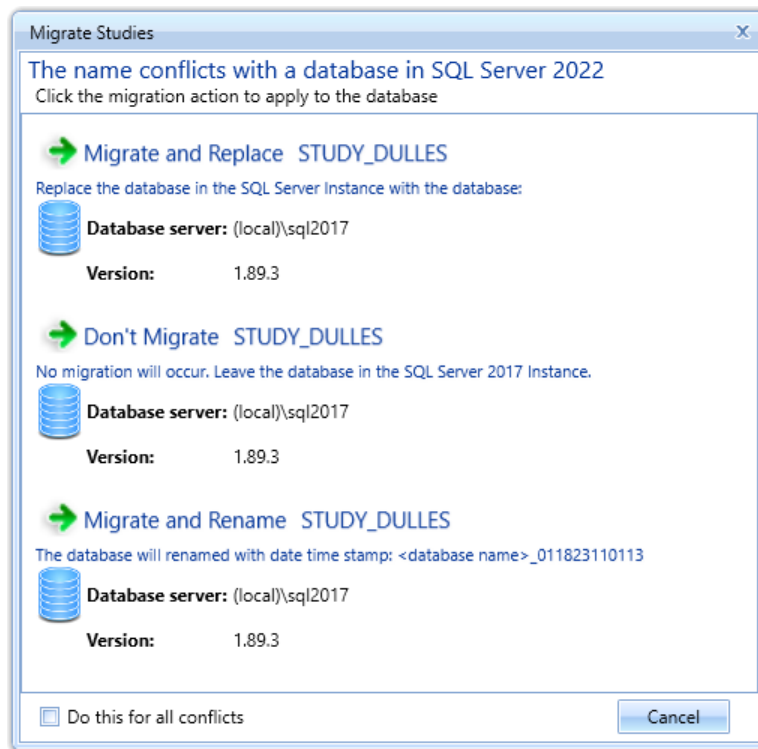
Figure 4-4 Migrate Studies Dialog – Name Conflict

4.3   Import Study

To import a full-study from ASIF, or legacy tools EDMS and INM into AEDT, click the *Study* tab and click *Import* to display the *Import Study* dialog.

> ⚠️ Not all EDMS and INM studies can be automatically imported into AEDT. Some EDMS/INM studies may require manual editing of the ASIF file and/or editing of the EDMS/INM study.

1. Select *ASIF, EDMS or INM* from the drop-down menu.
   - When *ASIF* is selected:
     - Click the *Browse* button, navigate to the ASIF file and select *Open*.
   - When *EDMS* is selected:
     - Click the *Browse* button, navigate to the EDMS study file and select *Open*.
     - Specifying the *Ops schedule folder* or the *Alternate equipment map file* is optional. If desired, check the appropriate checkbox and click the *Browse* button to navigate to the directory.
   - When *INM* is selected:
     - Click the *Browse* button, navigate to the INM study directory and select *Open*.
2. Click *Next.*
3. The *Review study content* step displays validation errors if any.
   - The *ASIF Raw* tab displays a summary view of the study.

- The *Details* tab displays a detailed view of the study content, organized by categories.
4. Click Next.
5. The *Review data conflicts* step displays any conflicts between study airport data and AEDT airport data.
   - If no data conflicts are present, AEDT displays *"No data conflicts eligible for revision were found"*.
   - If data conflicts are present, review the conflicts reported under *Airport Data Conflicts*. AEDT lists each element in conflict along with the study value and the system value. Select the appropriate option under *Airport Import Resolution* to proceed:
     - *Import file as is*: When selected, the airport data will be imported as defined.
     - *Override mismatched airport data in file with AEDT system data*: When selected, the AEDT system airport data will be used in place of the defined airport data.
   - Click *Next*.
6. In the *Complete study import* step, enter a unique *study name* or accept the default name*.
   - Enter a description in the *Study description* if desired.
7. Enter the name of the desired SQL Server instance in the *Select database server* field.
   - To change the SQL Server login credentials:
     a. Click the *Credentials* arrow button.
     b. Select desired authentication mode from the *Authentication* drop-down menu.
        - *Windows Authentication*: The *User name* is pre-populated.
        - *SQL Server Authentication*: Enter the *User name* and *Password*.
     c. Click *Test Connection* to verify that the connection to the database is successful.
8. Click *Create* to import the study.
9. When the import is complete, the imported study is opened and the *Metric Results* tab is displayed.

> Once imported, update the grid receptor origin according to Section 9.3 to match the grid definition in the legacy tool.

Sample ASIF

A set of sample ASIFs are located in the *Examples* directory under the AEDT installation folder (e.g., *C:\Program Files\FAA\AEDT\Examples*).
- asif_emissions_study.xml – contains sample emissions study data similar to STUDY_PVD.
- asif_sensor_path_study.xml – contains sample runway to runway operations using sensor path tracks.
- asif_small.xml – contains study data similar to STUDY_NIRS.
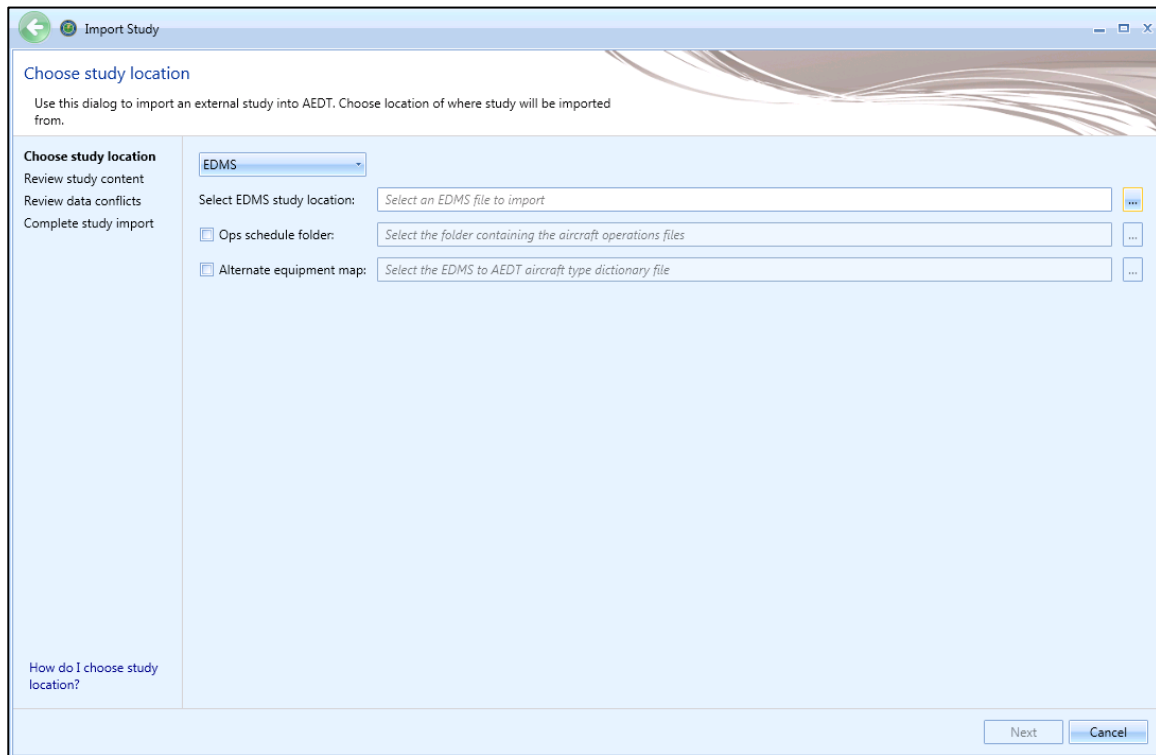
Figure 4-5 Import Study Dialog

4.4   Import Partial ASIF

AEDT supports importing a partial ASIF that contains individual components of a study. See the AEDT Supplemental Manual: ASIF Reference for more information.

A set of sample partial ASIF is located in the *Examples* directory under the AEDT installation folder (e.g., *C:\Program Files\FAA\AEDT\Examples*). These files can be imported into an existing study. The files are designed to be used with the study that is created by importing asif_small.xml.

- PartialASIF_airportLayoutSet.xml– contains airport layout data.
- PartialASIF_annualization.xml – contains annualization data. When importing this file, select "*1 – Baseline_1990*" as the existing scenario.
- PartialASIF_boundary.xml – contains high-fidelity weather boundary.
- PartialASIF_operationalProfileSet.xml – contains quarter hourly, daily, and monthly operational profiles data.
- PartialASIF_receptorSets.xml – contains receptor set data.
- PartialASIF_runup.xml – contains runup operations data.
- PartialASIF_scenario.xml – contains scenario data.
- PartialASIF_stationarySourceSet.xml – contains user-defined stationary source (non-aircraft equipment) data.
- PartialASIF_userGroundSupportEquipmentSet.xml – contains user-defined ground support equipment data.

To import a partial ASIF:

1. Click the *Study* tab then click *Partial Import* to display the *Import Partial ASIF* dialog.
2. Click the *Browse* button, navigate to the appropriate file (.xml) and select *Open*.
3. The content of the selected ASIF is displayed.
4. Click *Open* to import the selected file.
5. Close and re-open AEDT to display the imported data.

> AEDT validates the ASIF once the file is selected. An error message will be displayed if it fails to validate.
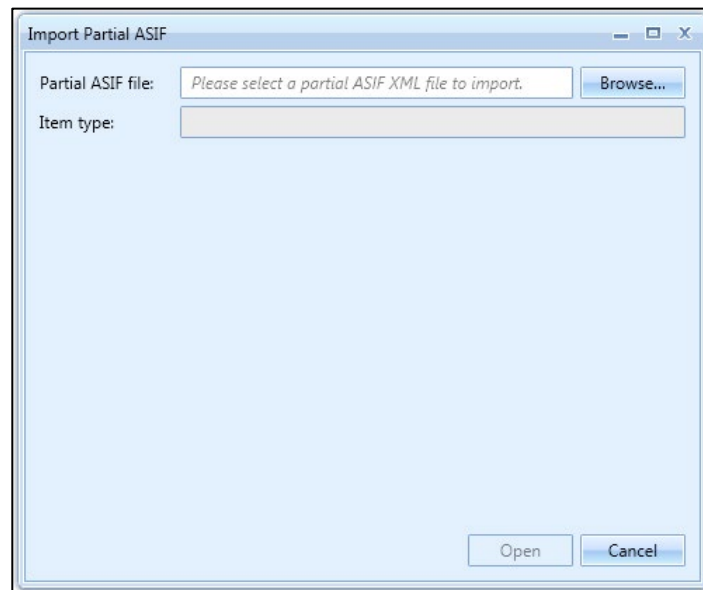
Figure 4-6 Import Partial ASIF Dialog

4.5   Create New Study

To create a new study:
1.   Click the *Study* tab then click *New* to display the *Create New Study* dialog.
2.   Enter a study name. Study description is optional.
3.   Enter the name of the desired SQL Server instance in the *Select database server* field.
     - To change the SQL Server login credentials:
          a.   Click the *Credentials* arrow button.
          b.   Select desired authentication mode from the *Authentication* drop-down menu.
               ▪   *Windows Authentication*: The *User name* is pre-populated.
               ▪   *SQL Server Authentication*: Enter the *User name* and *Password*.
          c.   Click *Test Connection* to verify that the connection to the database is successful.
4.   Click *New* to create a new study.

⚠️   Study name must be at least five characters long and must not contain periods (.).
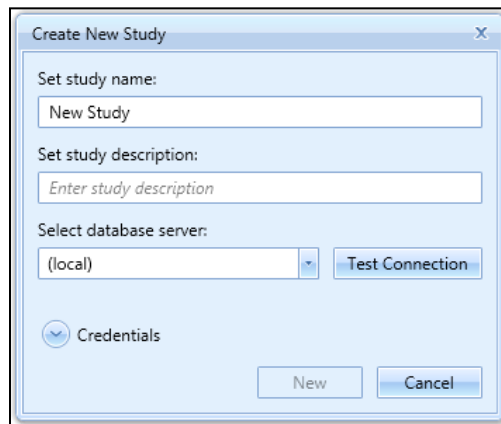
Figure 4-7 Create New Study Dialog

4.6   Delete Study

📝   A study that is currently loaded will display *(Loaded)* next to the study name.

📝   After deleting a study, delete the the corresponding study output folder (e.g.,
C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files).

Studies can be deleted from the current SQL Server instance or from a difference SQL Server instance.
SQL Server login credentials can also be changed in this dialog. To access these options, open the *Delete
Study* dialog.

To open the Delete Study dialog:
1. Click on the *Study* tab.
2. Click *Delete* to display the *Delete Study* dialog.

To delete a study from the selected SQL Server instance:
1. Click on the name of the desired study.
2. Click *Delete* to delete the study.

To delete a study from a different SQL Server instance:
1. Enter the name of the desired SQL Server instance in the *Select database server* field.
2. Click *Connect.* The list of available studies will update to display the available studies on the selected SQL Server instance.
3. Click on the name of the desired study.
4. Click *Delete* to delete the study from the selected SQL server instance.

To change the SQL Server login credentials:
1. Click the *Credentials* arrow button.
2. Select the desired authentication mode from the *Authentication* drop-down menu options:
   - *Windows Authentication*: The *User name* is pre-populated.
   - *SQL Server Authentication*: Enter the *User name* and *Password*.

To filter the study list by study name:
1. In the *Filter by study name* text box, enter a key word to filter the available studies.
2. The study list is updated to show all studies whose name contains the key word.
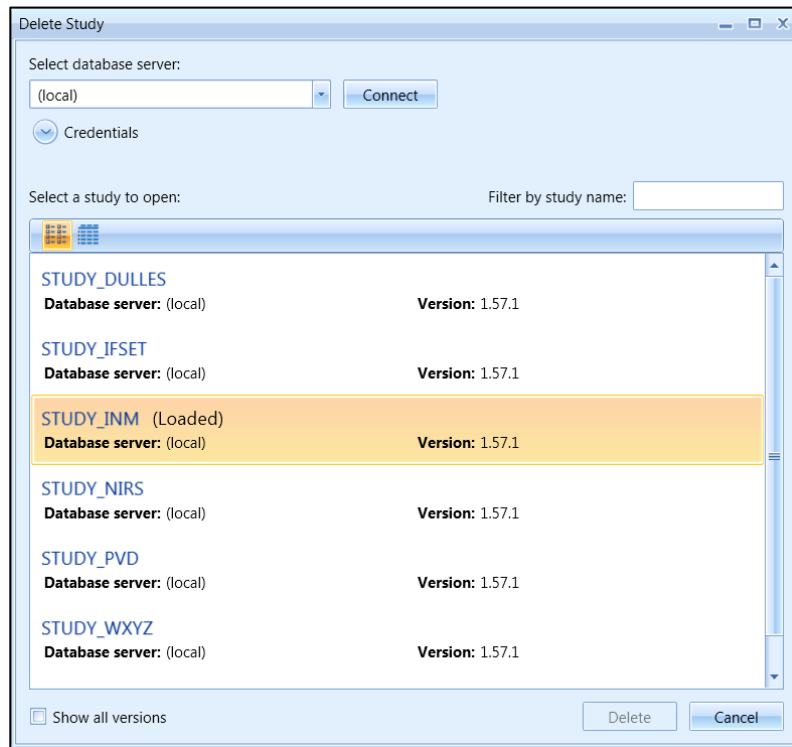
Figure 4-8 Delete Study Dialog

4.7 Close Study

To close the currently open study, click the *Study* tab then click *Close*.

4.8 Open Recent Studies

To open a recent study:
1. Click the *Study* tab then click *Recent* to display a list of recently loaded studies.
2. Select a desired study.
3. Click *Open*.

Show all versions checkbox: Check this option to display all the AEDT studies on the selected SQL Server instance, including studies whose version is older than the current study version. Only the studies that can be upgraded to the current version are enabled for selection. Older studies that cannot be upgraded are disabled and cannot be selected.

See Section 4.1.3 on upgrading older versions of study.

4.9   View Task Progress

To view task details, click the *Study* tab then click *Tasks*. The *Tasks* page displays a list of completed and/or active tasks in the current AEDT session. Details provided in this page include the task name, study name, status, task progress, start time, run time, and end time. For a currently active task, the task progress column presents the estimated completion percentage.

To perform an action on a task:
- Click *Stop Task* to cancel the processing of the selected task. This button will only be enabled for tasks that can be canceled.
- Click *Remove Task* to delete the record of the selected task from the list. A task must have completed processing or stopped before the record can be removed.
- Click *Remove All* to clear all records of completed or stopped tasks. Any records for actively processing tasks will remain.

To run all metric result definitions:
Click the *Run All Metric Results* button to run all of the metric result definitions in the current study. Metric results can also be run from the *Metric Results* tab (Section 5).

4.10 View AEDT Log

To view system status and logged information, click on the *Study* tab and click *Log*.

AEDT Log
The message pane displays the system status and messages, timestamp, and the originating AEDT module name. There are three different log levels as described in Table 4-2:

<div align="center">

Table 4-2 Message Pane Log Levels

ⓘ	Information
⚠	Warning: Minor (non-critical) issues/events
❌	Error: A critical error or problem

</div>

The information shown in the message pane is also written to the *aedt.log* file in the *Logs* directory under the AEDT data folder (e.g., *C:\AEDT\Logs*). A new AEDT log file (aedt.log) is created when the AEDT application is started. Existing log files are renamed in ascending numerical order, such as *aedt.1.log*. Up to ten log files are saved, older log files are automatically deleted.

- Click *Clear Messages* to clear all messages from the message pane
- Click *Open AEDT Log File* to open the AEDT log file (aedt.log).
- Click *Open Log Folder* to open the AEDT logs folder.

Study Run Log

Study-specific logs and processing files are saved to the study output folder (e.g., *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files*). A new StudyRunLog.txt is created when a metric result is run. Existing StudyRunLog.txt files are renamed by appending timestamp at the end of the file name.

- Click *Open Study Run Log* to open the Study Run log file (StudyRunLog.txt).
- Click *Open Study Output Folder* to open the study output folder of the currently open study.

4.11 Preferences

To view and change application/study settings, click on the *Study* tab then click *Preferences*. The Preferences are organized by category – all studies preferences, current study preferences, and activated feature preferences. See Appendix B for detailed information about each field.

4.11.1 All Studies Preferences

The All Studies Preference settings are application-wide and applies to all studies.

4.11.1.1 Feature Activation

The Feature Activation preferences are system-wide settings used to activate special features that require a unique identifier and hash key. To acquire the identifier and hash key to unlock the desired features, coordinate with the FAA Office of Environment and Energy (AEE) AEDT program managers:

Joseph DiPardo   Joseph.DiPardo@faa.gov
Mohammed Majeed   Mohammed.Majeed@faa.gov

Features that require activation include:
- Time above with statistical compression metrics
- Time audible metrics
  - When requesting access to time audible metrics for processing with ambient and spectral data, provide the following files to the FAA, see Appendix E for more information:
    - Three-digit Ambient Map: A text grid file that assigns a number, often representing the A-weighted ambient sound level, to study area grid points.
    - Ambient Spectral Data File: A text file which correlates unique spectra to the ambient sound levels specified in the ambient map.

To activate special features:
1. In the *Identifier* field, enter the identifier provided by the FAA.
2. In the *Feature hash key* field, enter the FAA provided hash key that unlocks specific advanced features in AEDT.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.
4. The *Activated features* field will display the features that have been activated by the identifier and hash key.

Activated special features:
Once the special features have been activated, the following additional features are available.

- Time above with statistical compression metrics
    - The following metrics are available in the Define Metric Results wizard, Choose Metrics screen, and in the Definitions tab, Metrics pane:
        - TALASC – Time Above A-weighted Sound Level Statistical Compression
        - TALCSC – Time Above C-weighted Sound Level Statistical Compression
        - TAPNLSC – Time Above Perceived Noise Level Statistical Compression
- Time audible metrics
    - An additional hash key, ambient map, and spectral data file must be entered in the *Study* tab, *Preferences* section (Section 4.11.3.1).
    - When additional information is correctly entered and saved, the following time audible noise metrics are available in the Define Metric Results wizard, Choose Metrics screen, and in the Definitions tab, Metrics pane:
        - TAUD – Time Audible
        - TAUDP – Time Audible Percent
        - TAUDSC – Time Audible Statistical Compression
        - TAUDPSC – Time Audible Percent Statistical Compression

4.11.1.2 Airports

The Airports preferences are system-wide settings that apply to all studies. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for Airports:
1. Click on the *Study* tab then click *Preferences, Airports*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.1.3 Database

The Database preferences are system-wide settings that apply to all studies. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for the Database:
1. Click on the *Study* tab then click *Preferences, Database*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.1.4 Detailed Grid

The Detailed Grid preferences are system-wide settings that apply to all studies. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for Detailed Grid:
4. Click on the *Study* tab then click *Preferences, Detailed Grid*.
5. Edit the desired settings.
6. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.1.5 Distributed Processing

Click the *Configure* button to open the *TmService Manager* dialog. This dialog is used to identify remote machines for distributed processing. AEDT uses distributed computing to provide the ability to run metric results across a number of remote servers to reduce processing time. This is optional and is recommended when running large studies.

Please refer to Appendix G for more details on using this dialog.

4.11.1.6 Dynamic Grid

The Dynamic Grid preferences are system-wide settings that apply to all studies. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for the Dynamic Grid:
1. Click on the *Study* tab then click *Preferences, Dynamic Grid*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.1.7 Logging

The Logging preferences is only applied to the current session, and is not saved when AEDT is restarted.

Logging Level

The logging level affects the level of messages that gets written to the aedt.log. The available log levels are described in Table 4-3 by decreasing level of detail.

To change the logging level in the current session:
1. Click on the *Study* tab and click *Preferences, Logging*.
2. Select a desired logging level.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

<p align="center">Table 4-3 AEDT Log File Log Level</p>

Log Level	Description
All	All messages
Debug	Detailed informational messages as well as messages from the info, warn, error and fatal levels
Info	Informational messages as well as messages from the warning, error, and fatal levels. Default logging level.
Warn	Minor non-critical messages as well as messages from the error and fatal levels
Error	Errors that do not cause the application to shut down as well as messages from the fatal level
Fatal	Severe errors that cause the application to shut down
Off	No messages

Acoustics Diagnostics Reporting

The Acoustics Diagnostics Reporting feature is used to produce a detailed diagnostic log file for a noise metric result. This report can be used to trace all aspects of noise level computation and would allow for confirming results by hand calculation. The diagnostics log file is generated for each flight path segment and each receptor point combination, and saved in the *Logs* directory under the AEDT data folder (e.g., *C:\AEDT\Logs*). See Appendix J for the list of displayed data in the diagnostic log file.

The Acoustics Diagnostics Reporting feature differs from storing noise results at the detailed level (Section 5.2.4.1). The diagnostic log file includes detail on all the intermediate noise computations for each flight path segment and each receptor point combination, whereas the detailed noise results include a detailed description of the overall contribution each aircraft-specific flight path segment makes to the noise level at each receptor, but does not include details on the intermediate computations.

> ⚠ It is recommended to limit the number of operations and receptor points when using this feature. The total number of generated diagnostics files can quickly overwhelm the computer's disk space.

To enable or disable the acoustics diagnostics reporting in the current session:
1. Click on the *Study* tab and click *Preferences, Logging*.
2. Check or uncheck the *Enable Acoustics Diagnostics Reporting* checkbox to enable or disable the reporting.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.1.8 Map

The Map preferences are system-wide settings that apply to all studies.

To change the map zoom factor:
1. Click on the *Study* tab then click *Preferences, Map*.
2. Select a desired map zoom factor by using the left/right arrows or by dragging the slider.

3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

To display or hide the Layer Manager Opacity slider:
1. Click on the *Study* tab then click *Preferences, Map*.
2. Check or uncheck the *Show opacity slider in legend* box to show or hide the opacity slider.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

The opacity slider is displayed by default for each layer in the *Layers* manager.

4.11.1.9 Task Master

The Task Master preferences are system-wide settings that apply to all studies. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for the Task Master:
1. Click on the *Study* tab then click *Preferences, Task Master*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.1.10 User Interface

The User Interface preferences are system-wide settings that apply to all studies. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for the User Interface:
1. Click on the *Study* tab then click *Preferences, User Interface*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.2 Current Study Preferences

The Current Study Preference settings are study-level settings that are saved for each study.

4.11.2.1 BADA Family 4

The BADA Family 4 preferences are study-level settings that are saved for each study. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for BADA Family 4:
1. Click on the *Study* tab then click *Preferences, BADA Family 4*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.2.2 Emissions

The Emissions preferences are study-level settings that are saved for each study. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for emissions:
1. Click on the *Study* tab then click *Preferences, Emissions*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.2.3 Emissions Dispersion

The Emissions Dispersion preferences are study-level settings that are saved for each study. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for emissions dispersion:
1. Click on the *Study* tab then click *Preferences, Emissions Dispersion*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.2.4 Environmental Justice Model

The Environmental Justice Model preferences are study-level settings that are saved for each study. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for the environmental justice model:
1. Click on the *Study* tab then click *Preferences, Environmental Justice Model*.
2. Edit the desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.2.5 Population Exposure Model

The Population Exposure Model preferences are study-level settings that are saved for each study. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the settings for a Population Exposure Report:
1. Click on the *Study* tab then click *Preferences, Population Exposure Model*.
2. Edit desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

4.11.2.6 Study

The Study preferences are study-level settings that are saved for each study. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

To edit the study preference settings:
1. Click on the *Study* tab then click *Preferences.*
2. Edit desired settings.
3. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

Modeling Options

The settings specified in this section are used as default settings in the *Define Metric Results* wizard, *Set Processing Options* step, see Section 5.2.4.

Default Weather Options

The settings specified in this section are used as default values in the *Define Metric Results* wizard, *Set Processing Options* step, see Section 5.2.4.

Annualization Options

The settings specified in this section are used as default values in the *Create Annualization* wizard, *Set Processing Options*, see Section 6.7.1.6.

Date & Time Options

The setting specified in this section is used to set the default operation time in the *Create Aircraft/Non-Aircraft/Runup/Helitaxi Operations* wizard (see Section 6.2.1.6, Section 6.3.1.4, Section 6.4.1.3, Section 6.5.1.3).

- *Default operation time*: Enter or select the default operation time to be used in the *Create Operations* wizard.

Noise Contour Options

The settings specified in this section are used as default values in the *Contour Settings* dialog, see Section 5.7.1.

4.11.3 Activated Feature Preferences

Once the special features have been activated, corresponding preferences will be available in this list.

4.11.3.1 Time Audible Metric

The Time Audible Metric preferences are not displayed until this feature is activated. For information on how to activate features, see Section 4.11.1.1.

The Time Audible Metric preferences are study-level settings that are saved for each study. See Appendix B.1 for a description of each setting or click on a row to view the description of the setting on the bottom of the screen.

The time audible metrics are not available for selection in the *Define Metric Result*s wizard until an identifier and hash key are obtained from FAA and added to the study in the *Study* tab, *Preferences*, *Time Audible Metric* section along with the relevant ambient data files. See Appendix E for more information.

To enable the time audible noise metrics in a study:
1. Click on the *Study* tab then click *Preferences, Time Audible Metric.*
2. In the *Identifier* field, enter the identifier provided by the FAA.
3. In the *Ambient map file* field, add the path to the ambient file (.txt).
4. In the *Spectral data file* field, add the path to the spectral data file (.txt).
5. In the *Time Audible hash key* field, enter the FAA provided hash key generated from the identifier, ambient map file, and ambient spectral data file for use with the Time Audible metric.
6. Click *Save* to apply changes or *Cancel* to discard changes. Click *Reset* to change to default settings.

When the Time Audible Metric settings are correctly entered and saved, the following time audible noise metrics are available in the Define Metric Results wizard, Choose Metrics screen; and in the Definitions tab, Metrics pane:
- TAUD – Time Audible
- TAUDP – Time Audible Percent
- TAUDSC – Time Audible Statistical Compression
- TAUDPSC – Time Audible Percent Statistical Compression

When the time audible ambient file and spectral data file are specified in the *Study* tab, *Preferences* section, they will be used in all subsequent processing of time audible metric results. If different ambient or spectral data files are desired for different time audible metrics, confirm the appropriate files are specified before processing each time audible metric.

For more information on the time audible metrics, see Appendix E.

4.12 Study Maintenance

4.12.1 Delete Obsolete Results

Results are marked as obsolete when metric results are reset in the *Metric Results* tab (Section 5.5).

To delete obsolete results from the database:
1. Click on the *Study* tab then click *Study Maintenance*.
2. Click the *Delete Obsolete Results* button.

4.12.2 Generate Administrative File

A study can be shared by creating and sharing an administrative file. An administrative file package is a zip file that contains the following contents:
- A backup of the current study database (.bak file);
- AEDT log files (aedt.log);
- AmbientNoise_files.txt: lists all the files in the ambient folder directory (if specified).
- AEDT.exe.config: AEDT application configuration file;
- manifest.txt file: lists all the contents in the package;
- Study_Input_Report.txt;
- Terrain_files.txt: lists all the files in the terrain folder directory (if specified);

- user_settings.json;
- Weather_files.txt: lists all the files in the high fidelity weather folder directory (if specified); and
- The study output folder contents including any StudyRunLog.txt files and dispersion metric results output folders.

To generate an administrative file:
1. Click on the *Study* tab then click *Study Maintenance*.
2. Click the *Generate Administrative File* button.
3. Save the zip file to a desired location.

> ⚠️ If a study database is located on a remote SQL Server, the database backup file is not included in the administrative file.

4.12.3 Generate Study Report

The study report summarizes major data elements in the study.

To view the study report:
1. Click on the *Study* tab then click *Study Maintenance*.
2. Click *Generate Study Report*. The report is displayed in *Metric Results* tab, *Reports* view.
3. Click *Save as PDF,* then browse to a location to save the report as a PDF.
4. Click *Open in Text* to open the report in a text editor. Save the report to a desired location.

4.12.4 Generate User Defined Profile Validation Log

The user defined profile validation log checks that all the steps and step progressions for fixed-wing procedural profiles are valid and reports any errors along with relevant profile information.

To view the user defined profile validation log:
1. Click on the *Study* tab then click *Study Maintenance*.
2. Click *Generate User Defined Profile Validation Log*. The log is displayed in *Metric Results* tab, *Reports* view.
3. Click *Save as PDF,* then browse to a location to save the report as a PDF.
4. Click *Open in Text* to open the report in Notepad. Save the report to a desired location.

4.13 Help

To view version information, click on the *Study* tab then click *Help*. The following information is displayed:
- The version numbers for AEDT, Telerik, ArcGIS Runtime for WPF, and .NET Runtime.
- A link to the AEDT Support website – http://aedt.faa.gov.
- A link to the FAA's website – http://www.faa.gov.
- A list of libraries (DLLs) and their version numbers.
- An *Open user manual* link which opens a PDF of the AEDT User Manual.
- A *Contact support* link to the AEDT Support website.

4.14 Exit the AEDT Application

To exit the AEDT application:
- Click on the *Study* tab then click *Exit; or*
- Click the "X" at the top right corner of the application window.

5   Metric Results Tab

For AEDT purposes, answers to the questions posed for a particular study are referred to as Metric Results. While a host of supporting workflows can expose lower level details, the *Define Metric Results* workflow gives the analyst the highest level organization of data needed to answer questions of interest.

Each metric result is representative of a metric, receptor set (for noise and emissions dispersion), and annualization (which includes operations) combination. Metric results are listed in the left work area on the map tab (Section 5.1). Metric results are defined through the use of a wizard (Section 5.1.5). The metrics results tab allows for running metric results (Section 5.3), resetting and deleting metric results (Section 5.5), importing/combining/exporting metric results (Section 5.6), generating layers (Section 5.7), and generating reports (Section 5.8).

5.1   Metric Results Pane

Features available through the *Metric Results* pane are described in the following sections. See Appendix B for detailed information about each field.

5.1.1 Display Buttons

Use the buttons in the *Display* ribbon group to change the view.
- Click *Map* to view the map in the center work area and the *Layers* manager in the right work area. This is the default view for the *Metric Results* tab.
- Click *Reports* to view the Reports workspace and the Reports manager.

Figure 5-1 Metric Results Tab – Display Ribbon Group

5.1.2 Metric Results Pane

The *Metric Results* pane lists existing metric results in the study. This pane will be empty if there are no defined metric results. See Section 5.2 to define new metric results.

Figure 5-2 Metric Results Pane

The *State* column indicates the status of each metric result (Table 5-1). Check the aedt.log file for any errors and warnings after running a metric result.

Table 5-1 State Icons

▶	Ready to be run
14%	Run in progress
✔	Completed
■	Stopped
❚▶	Stopped before AERMOD
⚠	Completed with flight error
✖	Error, run not completed

5.1.3 Metric Results – Details Tab

The *Details* tab is located below the *Metric Results* pane. It contains additional information about the selected metric result, including modeling options and results storage options.
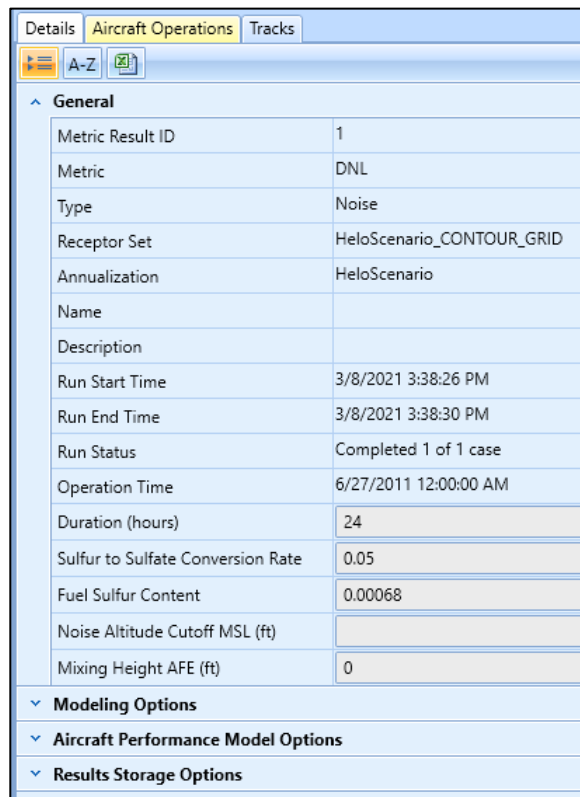
Figure 5-3 Metric Results – Details Tab

5.1.4 Metric Results – Aircraft Operations Tab

The *Aircraft Operations* tab is co-located with the *Details* tab below the *Metric Results* pane. When prompted, the aircraft operations for the selected metric result are displayed.
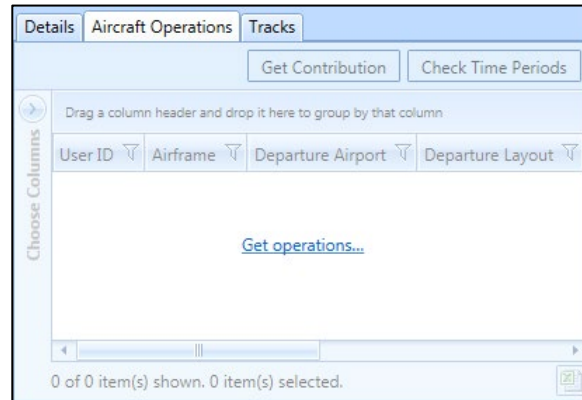
Figure 5-4 Metric Results – Aircraft Operations Tab

Get Operations

Click the *Get operations* link to retrieve and display the aircraft operations included in the selected metric result.

Get Contribution (Calculate Noise Energy Contribution)

Click the *Get Contribution* button to calculate and display the noise energy contribution per operation or per operation group over the entire receptor set as a percentage of the total energy contributed by all operations in the selected metric result.

To calculate noise energy contribution:
1. Select an existing noise metric result that has been run with the noise storage options set to *Operation* or *Operation Group*. Refer to the instructions in Section 5.2.4 on setting the noise storage option in the *Set Processing Options* step.
    - With the noise storage option set to *Operation*, the noise energy contribution is calculated per operation across the receptor set as a percentage of the selected metric result.
    - With the noise storage option set to *Operation Group*, the noise energy contribution is calculated per operation group across the receptor set as a percentage of the selected metric result.
2. Click the Aircraft *Operations* tab under the *Metric Results* pane.
3. Click the *Get operations* link.
4. Click the *Get Contribution* button. The noise energy contribution values are displayed in the *% Contribution* column.

Check Time Periods

Click the *Check Time Periods* button to determine whether the taxi delay and sequencing causes the operation to changes time periods (day, evening, and night) between the scheduled operation time and

the actual operation time. To check time periods, the metric result must have been processed with the *Apply Delay & Sequencing Model* option enabled.

In the U.S., day, evening, and night time periods are defined relative to airport local time as follows:
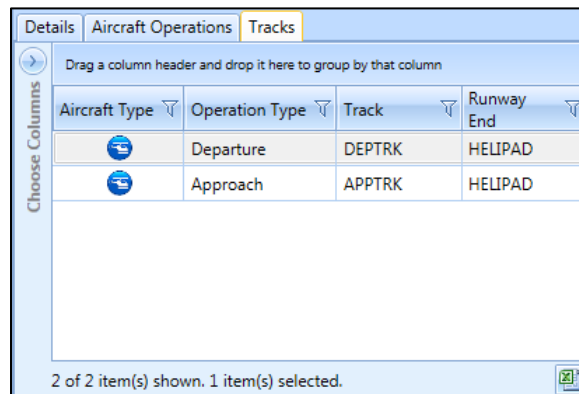
- Day 0700 – 1900 (12 hours)
- Evening 1900 – 2200 (3 hours)
- Night 2200 – 0700 (9 hours)

To check time periods:
1. Select a noise metric result.
2. Click the *Aircraft Operations* tab under the *Metric Results* pane.
3. Click the *Get operations* link.
4. Click the *Check Time Periods* button. The values are displayed in the *Crosses Time Periods* column.

5.1.5 Metric Results – Tracks Tab

The *Tracks* tab is co-located with the *Details* and *Aircraft Operations* tabs below the *Metric Results* pane. It displays the collection of tracks used by operations in the selected metric result.

Figure 5-5 Metric Results – Tracks Tab

5.2 Define New Metric Results

Metric results are defined through the use of a wizard. To complete the *Define Metric Results* workflow, the study must already contain operations (Section 6), equipment (Section 7), airport (Section 8), and where appropriate, receptor set and operational profile content (Section 9).

To access the Define Metric Results wizard:
1. Locate the *Metric Result Actions* group in the ribbon.
2. Click *Define* or select an existing metric and click *Copy* to open the *Define Metric Results* wizard (Figure 5-6).

> Editing an existing metric result is supported only through the *Copy* feature to define a new metric result based on an existing metric result. Each wizard step will display the selections of the existing metric result.

The *Define Metric Results* wizard contains a header, progress pane, and content pane:

- The header displays the title of the current step in the workflow and brief instructions.
- The progress pane lists the five steps in the wizard and displays the current step in bold font.
- The content pane displays available data on the left and selected data on the right. To move data between the available and selected lists:
  - Use the *Add Arrow/Add All Arrow* and *Remove Arrow/Remove All Arrow* buttons;
  - Use the mouse to drag and drop; or
  - Double-click on a desired row.
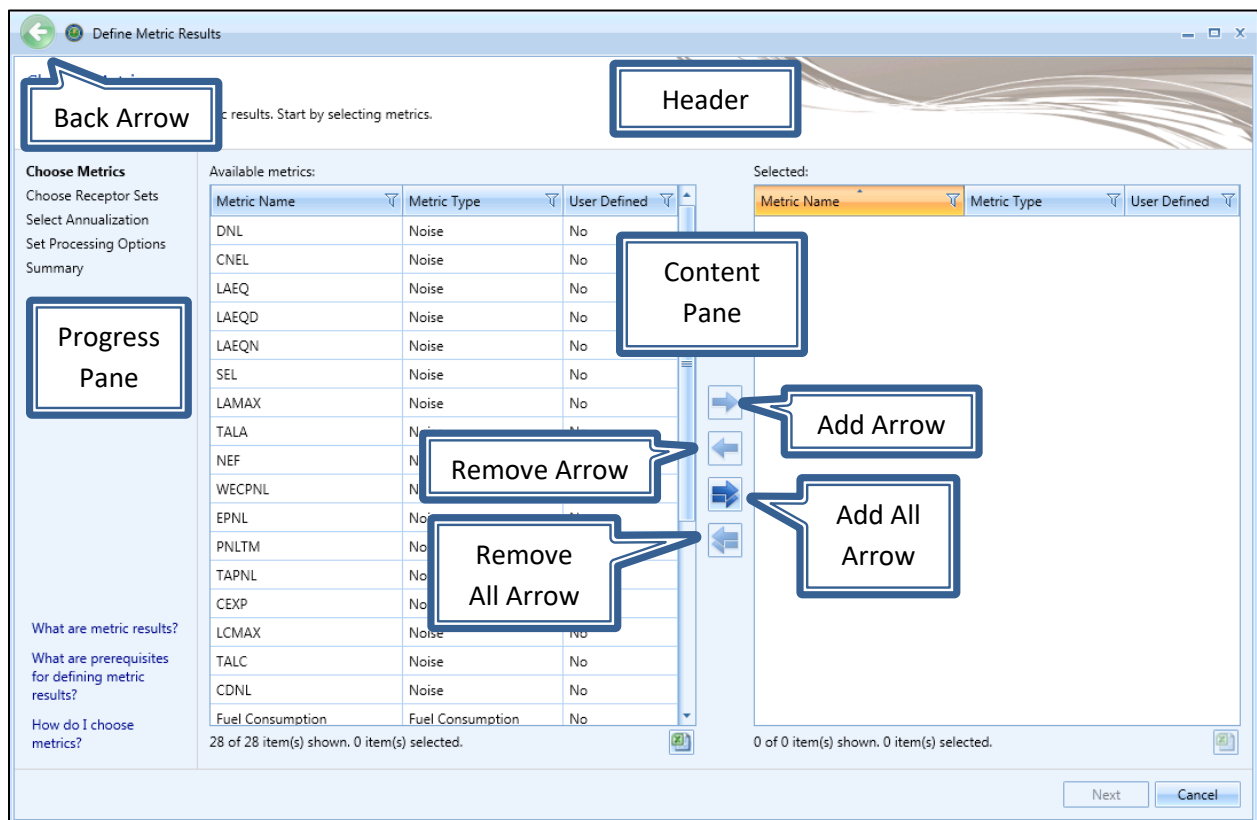
Figure 5-6 Define Metric Results Wizard

To define a metric result, follow the steps as described below. Navigate the wizard by clicking *Next* (lower right) to progress to the next step, clicking the *Back Arrow* (upper left) to return to the previous step, or clicking *Cancel* to discard changes and exit the wizard.

The *Back Arrow* for the wizard is located in the upper left corner (see Figure 5-6).

5.2.1 Step 1: Choose Metrics

Metrics are selected in this step (Figure 5-7). A list of *Available Metrics* is displayed on the left, and a list of *Selected* metrics is displayed on the right. See Section 9.2 for more information on metrics.

1. From the *Available metrics* list, highlight one or more desired metrics by clicking on the corresponding row on the left. To select multiple rows, hold the control or shift key.
2. Click the *Add Arrow* to move highlighted metric(s) to the *Selected* list.
3. To remove unwanted metrics from the *Selected* list, click to highlight the appropriate row(s) and click the *Remove Arrow*.
4. To move all metrics between the *Available Metrics* and *Selected* lists, use the *Add All* and *Remove All Arrows*.
5. Click *Next*.

⚠️ Emissions dispersion metrics should only be selected for studies that contain a single airport.

⚠️ Time Above Statistical Compression metrics are not available for selection in the *Define Metric Results* wizard until an identifier and hash key are obtained from FAA and added to the study in the *Study, Preferences, Feature Activation* section. See Appendix F for more information.

⚠️ The time audible metrics are not available for selection in the *Define Metric Results* wizard until an identifier and hash key are obtained from FAA and added to the study in the *Study* tab, *Preferences*, *Feature Activation* section, and *Time Audible Metric* section along with the relevant ambient data files. See Appendix F for more information.

📝 The *Fuel Consumption* metric prescribes performance calculations only.
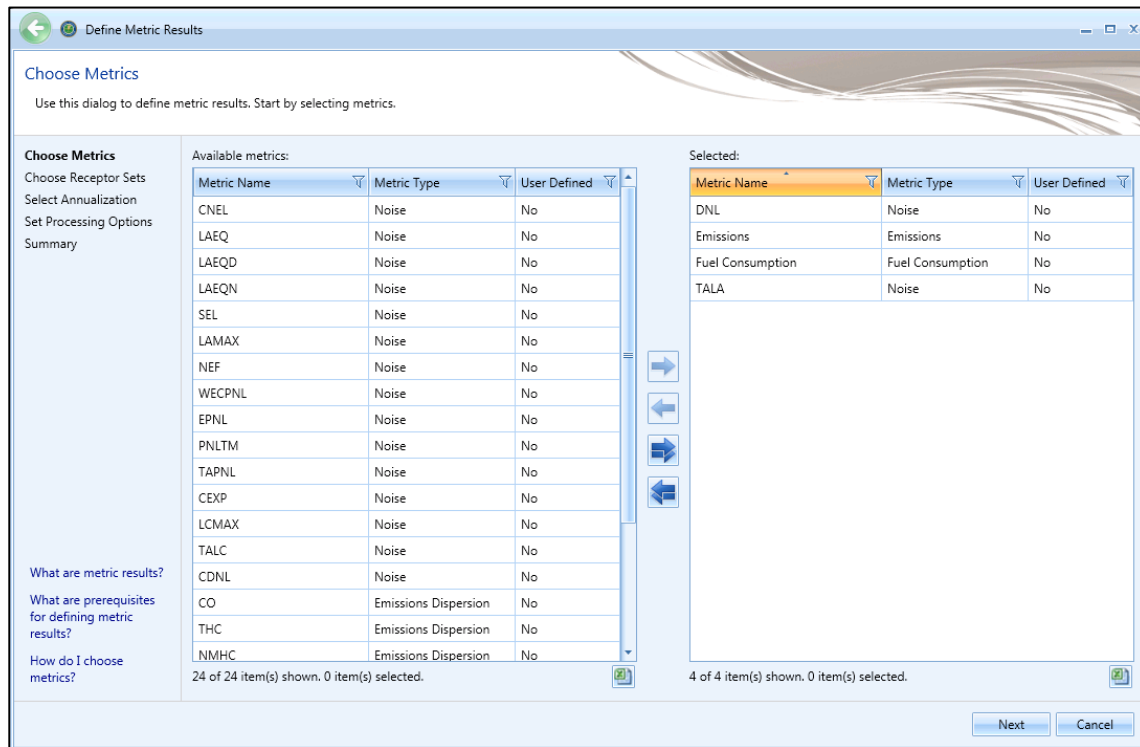
Figure 5-7 Define Metric Results – Choose Metrics

5.2.2 Step 2: Choose Receptor Sets

Receptor sets are chosen in this step (Figure 5-8). A list of *Available receptor sets* is displayed on the left, and a list of *Selected* receptor sets is displayed on the right. See Section 9.4 for more information on receptor sets.

> Receptor sets are not required to run the fuel consumption or emissions metric types.

1. From the *Available receptor sets* list, highlight the desired receptor sets(s) by clicking on the appropriate row(s). To select multiple rows, hold the control or shift key on the keyboard.
2. Click the *Add Arrow* to move highlighted receptor set(s) to the *Selected* list.
3. To remove unwanted receptor sets from the *Selected* list, click to highlight the appropriate row(s) and click the *Remove Arrow*.
4. To move all receptor sets between the available and selected lists, use the *Add All* and *Remove All Arrows*.
5. Click *Next*.
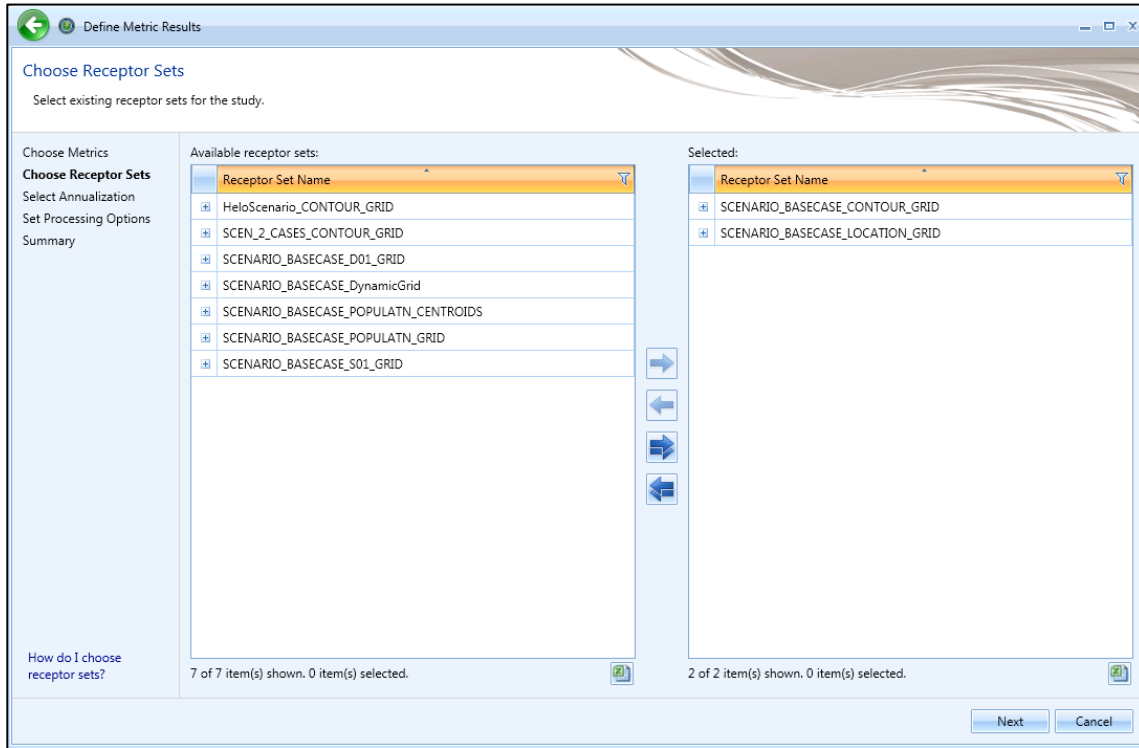
Figure 5-8 Define Metric Results – Choose Receptor Sets

5.2.3 Step 3: Select Annualization

A single annualization must be selected in this step (Figure 5-9). A list of *Available annualizations* is displayed on the left with the structure and details of the selected annualization displayed on the right. See Section 6.7 for more information on annualization.

1. From the *Available annualizations* list, select the desired annualization by clicking on the row.
2. The details of the selected annualization are displayed on the right
3. Click *Next*.
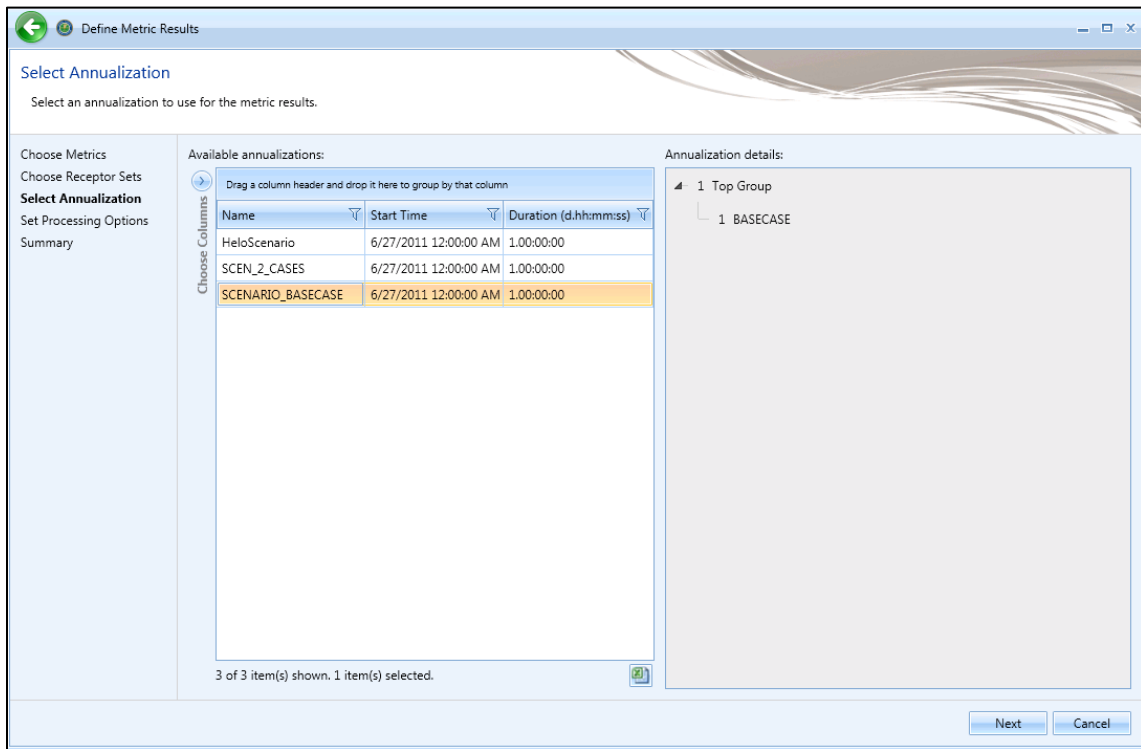
Figure 5-9 Define Metric Results – Select Annualization

5.2.4 Step 4: Set Processing Options

In this step, the results storage options and modeling options can be specified for the metric result. Additional processing options are displayed based on the metric type.

5.2.4.1 Result Storage Options

The results storage options are automatically pre-selected based on metric type. These options control the level of noise and emissions detail that is stored in the study database as described in Table 5-2. Select noise and emissions storage options as appropriate.

Table 5-2 Result Storage Options

Storage Option	Description
Noise	
Operation Group	Noise results will be accumulated and stored at the operation group level.
Operation	Noise results will be stored at the operation (individual flight) level and at the operation group level.
Detailed	When selected, detailed noise results will be computed for each grid point and every combination of aircraft, profile, and track. It is recommended to limit the number of operations to 1,000 and receptor set to 500 receptors when using this storage option due to the high number of detailed results this option produces. Otherwise, it may exceed the system capacity.
Emissions	
Operation Group	Emissions results will be stored at the operation group level.
Operation	Emissions results will be stored at the operation (individual flight) level and at the operation group level.
Segment	Emissions results will be stored at the segment level, the operation level, and the operation group level.

5.2.4.2 Metric Result Options

Enter a name and description for the metric result if desired. These fields can be used to distinguish multiple metric results and are displayed in the Metric Results pane in the *Metric Results* tab.

o *Name:* Name of the selected metric result.
o *Description:* Description of the selected metric result.

5.2.4.3 Emissions/Performance Modeling Options

The options in this category are applied to the currently selected metric (Figure 5-11). Adjust the following parameters as appropriate:

> ⚠️ Emissions dispersion analyses should only be conducted in studies that contain a single airport.

> 📝 The BADA 4 fuel burn model is always used regardless of the selected performance model if appropriate data are available.

> 📝 High fidelity weather is used in aircraft performance calculations. Since performance results are used in fuel burn, noise, and emissions calculations, high fidelity weather indirectly affects fuel burn, noise, and emissions results. Airport weather is always directly used in acoustic propagation and adjustment calculations, regardless of high fidelity weather data availability.

> 📝 See Section 9.6 for a summary of weather modeling in AEDT. Also, please refer to "Using Weather Data in AEDT" on the AEDT Support website, Downloads page, for further details.

o *Weather Fidelity*: This option is available for all metric types except emissions dispersion metrics (which use AERMOD weather) and allows for the selection of average annual airport weather (with multiple averaging period options), International Standard Atmosphere (ISA) weather, or high-fidelity weather. The choice of weather affects aircraft performance modeling. For more information on the available weather types, see Section 9.6.
  * *Use high fidelity weather data* – When this option is selected, and a high-fidelity folder is specified, AEDT will use the weather data files in the selected folder, then cascade to airport weather then to ISA weather for any missing data.
  * *Use Airport Weather* – When this option is selected, average annual airport weather based on the selected time period in the following drop-down menu is used. If the *USER* option is selected, weather data specified in *Definitions* tab, *Weather*, *Airport weather* for the *USER* option is used.
  * *Use ISA weather* – Select this option to only use the ISA weather conditions.

o *Aircraft Performance Modeling Options*
  * *Use ANP/BADA 3 only*
    o When selected, AEDT uses the SAE-AIR-1845/ECAC Doc 29/ICAO Doc 9911 (ANP) model for thrust calculations in the terminal area, the Senzig-Fleming-Iovinelli (SFI) or BADA 3 fuel burn model for all phases of flight (en-route (above 10,000 feet MSL) and the terminal area),

and the BADA 3 performance model for thrust calculations in the en-route phase (above 10,000 feet MSL) (if applicable for the operation).

- *Use BADA 4 for approved aircraft*
  - When selected, AEDT will use BADA 4 as described below for aircraft that are approved for FAA regulatory use.
- *Use BADA 4 when available*
  - When selected, the following confirmation dialog is displayed – "The annualization used in this metric result includes aircraft for which the use of BADA 4 performance is a non-standard modeling option that is offered for research purposes only. Do you want to continue creating a metric result that can be used for research purposes only?". Click *Yes* to use BADA 4 as described below or click *No* to use the standard ANP and BADA 3 models.

> The BADA 4 aircraft performance model can be used for all fixed-wing operation types, except overflights, where appropriate data are available.

When a BADA 4 option is selected, AEDT will use the BADA 4 performance model and the BADA 4 fuel burn model in the terminal area and the en-route phase, where appropriate data are available. If appropriate data are not available, the SAE-AIR-1845/ECAC Doc 29/ICAO Doc 9911 (ANP) model will be used for thrust calculations and the SFI or BADA 3 model will be used for fuel burn in the terminal area; and the BADA 3 performance and fuel burn models will be used in the en-route phase (above 10,000 feet MSL) (if applicable for the operation). See the AEDT Technical Manual for additional details on the transition from the ANP to BADA 3 performance models. Additional options that are available when a BADA 4 option is selected are described below and visually in Figure 5-10.

> When a BADA 4 option is selected, the following warning message is displayed. Click *Yes* to proceed with the BADA 4 option or click *No* to deselect BADA 4 option and return to the wizard.

⚠ The annualization used in this metric result includes aircraft for which the use of BADA 4 performance is a non-standard modeling option that is offered for research purposes only.

Do you want to continue creating a metric result that can be used for research purposes only?
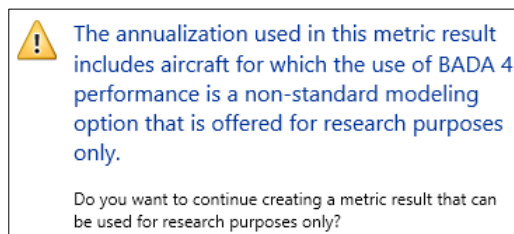
- *Use ANP and BADA 3 Fallback*
  This option is only available when a BADA 4 option is selected as the Aircraft Performance Modeling Option and only affects aircraft for which BADA 4 data are available.
  - When selected, if the BADA 4 performance model fails to process the operation, AEDT will attempt to process the operation using the SAE-AIR-1845/Doc 29 (ANP) model for thrust calculations and the SFI or BADA 3 model for fuel burn in the terminal area; and the BADA 3 performance and fuel burn models will be used for calculations in the en-route phase (if

applicable for the operation). If the operation fails any of the aforementioned modeling attempts, it will be reported in the error log.

- o When unselected, if the BADA 4 model fails to process the operation, the operation will fail.
- o Aircraft for which BADA 4 data is not available will always use the SAE-AIR-1845/ECAC Doc 29/ICAO Doc 9911 (ANP) model for thrust calculations and the SFI or BADA 3 fuel burn model in the terminal area; and the BADA 3 model will be used for thrust and fuel burn calculations in the en-route phase (if applicable for the operation).

- *Enable reduced thrust taper*
  This option is only available when a BADA 4 option is selected as the Aircraft Performance Modeling Option and only affects aircraft for which BADA 4 data are available.
  - When selected and the annualization includes operations that use reduced thrust profiles, the transition between reduced takeoff thrust below 10,000 feet MSL to climb power above 10,000 feet MSL will be applied based on the *Taper upper limit*.

- *Taper upper limit MSL (ft)*
  This option is only available when a BADA 4 option is selected as the Aircraft Performance Modeling Option and only affects aircraft for which BADA 4 data are available.
  - Accept the default value of 12,000 feet MSL (edit the default value in the *Study* tab, *Preferences*, see Section 4.11.2.1) or enter an altitude between 10,500 and 40,000 feet MSL for the transition from reduced thrust to BADA 4 climb power to be achieved. The minimum and maximum values for the taper upper limit represent the minimum upper limit for a noticeable use of the taper (10,500 feet MSL), and a condition where the full power is never reached in the terminal area (40,000 feet MSL).

Profiles with a thrust reduction of 10% or greater also include a 10% reduction in climb thrust. For a departure with 5% reduced thrust or full power, the climb remains as published. Therefore, if the aircraft departs from an airport near sea level, the aircraft will be at climb thrust prior to reaching 10,000 feet MSL, and there is no need for the taper. However, a thrust taper from reduced takeoff thrust to full takeoff thrust is also implemented in AEDT, for example, in departures from airports where the field elevation is such that the aircraft is still under takeoff power at 10,000 feet MSL. In that latter scenario, a thrust taper will be observed for a 5% reduced thrust departure, as well as from reduced thrust profiles of 10% or greater.

Confirm which performance model was used to process the aircraft operation by reviewing:
- AEDT log (aedt.log);
- *Metric Results* tab, *Details* pane, *Aircraft Operations* tab, *Performance Model* column (see Appendix B.2.4); or
- Emissions report, *Operations Summary*, *Performance Model* column.
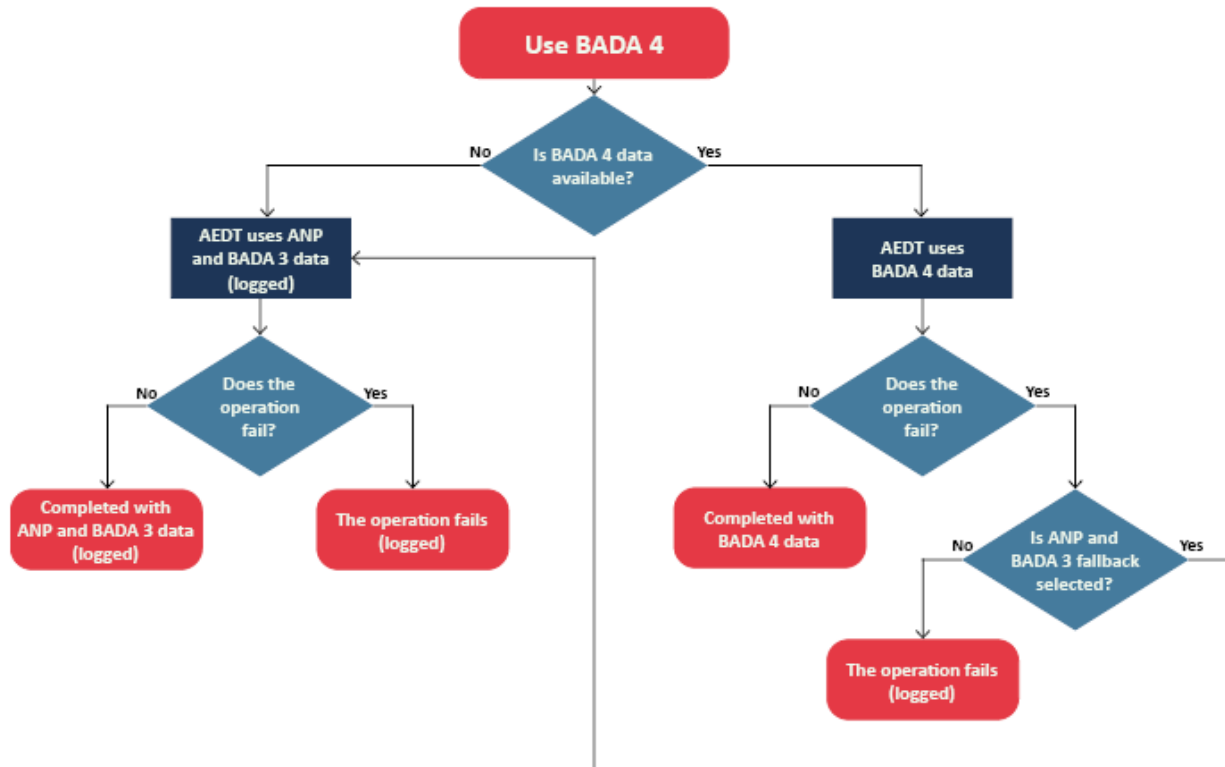
Figure 5-10 BADA 4 Options Flowchart

o *Check track angle*: When selected, AEDT discards operations on tracks with angles that exceed 90 degrees.

o *Apply Delay & Sequencing Model:* When selected, AEDT uses the delay sequence queueing modeling for taxi operations for all metric types. Operating configuration and taxi network must exist in the study airport for this option to affect the results. In addition, aircraft operations must be assigned to a gate. If this option is not selected, the operating configuration is ignored and the operations are processed for the specified time without considering delays.

⚠️ When running operational profile-based operations, the *Apply Delay & Sequencing Model* option must be selected. In addition, operating configuration and taxi network must exist in the study airport; and aircraft operations must be assigned to a gate.

⚠️ When using the *Apply Delay & Sequencing Model*, operations must be entered as whole numbers (no fractional operations).

o *Calculate aircraft engine startup emissions:* This option is enabled for Emissions and Emissions Dispersion metrics. When selected, AEDT calculates the engine startup emissions for the aircraft operations in the metric result.

o   *Analysis year:* Analysis year(s) in which this metric result will apply. For multiple analysis years, enter the years in the following format:

- <year-from-inclusive>-<year-to-inclusive> (e.g., "2010-2014"), comma-separated list of years, or the combination of such (e.g., "2010, 2012-2014, 2016").
- A metric result will be created for each analysis year entered.

What is the analysis year?
The analysis year is used in the following:

- VALE reporting (for emissions metric only); or
- When considering yearly deterioration for GSE when the manufacturer year is included (for emissions and emissions dispersion metrics).

o   *Include MOVES Inventory scenario(s):* This option is only displayed for emissions and emissions dispersion metric types. For an emissions metric result, this list is displayed as a grid; while it is displayed as a drop-down menu for an emissions dispersion metric result. When this checkbox selected, a list of appropriate MOVES Inventory scenarios (defined in the *Definitions* tab) are available for the year that matches that of the metric result. See Section 9.8.2 for information on how to create MOVES inventory scenarios in AEDT. Add MOVES inventory scenarios to include emissions from roadway, parking facility, and/or construction zone in the emissions inventory report or in the VALE Report.

- Display and select different MOVES inventory scenario by entering desired year (or years) in the *Analysis year* text box.
- Select one or more MOVES inventory scenarios to include in an emissions or emissions dispersion metric result.
- The emissions in the selected MOVES inventory scenario(s) will be displayed in the Emissions Report.

o   *Include MOVES AERMOD scenario:* This option is only displayed for emissions dispersion metric type. When selected, a list of appropriate MOVES AERMOD scenarios (defined in the *Definitions* tab) are available in the drop-down menu. The list only includes MOVES AERMOD scenarios with a pollutant type that matches that of the metric result. See Section 9.8.1 for information how to create MOVES AERMOD scenarios in AEDT. Add MOVES AERMOD scenarios to account for air quality impact (emissions dispersion) of roadway, parking facility, or construction zone emissions in the Emissions Dispersion Report.

- Select the desired MOVES scenario to include in an emissions dispersion metric result.
- The dispersion results in the MOVES AERMOD scenario will be part of the selected dispersion metric result, and will be displayed in the dispersion results.

Figure 5-11 Define Metric Results – Set Processing Options, Fuel Consumption Metric

Figure 5-12 Define Metric Results – Set Processing Options, Emissions Inventory Metric

5.2.4.4 Noise Modeling Options

o *Use hard ground attenuation for helicopters and propeller aircraft*: By default, the lateral attenuation noise adjustment (i.e., all soft ground) is applied to all aircraft. When this checkbox is selected, the lateral attenuation noise adjustment is only applied to jet-engine aircraft and it is not applied to helicopters and propeller-driven aircraft.

o *Dynamic grid contour expansion level:* This option is only displayed when the selected receptor set is a dynamic grid. The lowest closed contour level that a dynamic grid will evaluate. Units are in decibels, minutes, or percent (%) depending on the selected noise metric type.

o *Atmospheric absorption type*: When selected, AEDT includes the effects of atmospheric absorption on noise according to the selected option:

- *Unadjusted (SAE-AIR-1845 atmosphere)*: AEDT uses the atmospheric absorption according to SAE-AIR-1845 and noise data are unadjusted for study-specific atmospherics.

- *SAE-ARP-866A*: Noise data are adjusted for temperature and relative humidity values (study-specific airport conditions) according to the methods specified in SAE-ARP-866A.

- *SAE-ARP-5534*: Noise data are adjusted for temperature, relative humidity, and atmospheric pressure values (study-specific airport conditions) according to the methods specified in SAE-ARP-5534.

See Section 9.6.1 for more information on airport temperature and relative humidity.

5.2.4.5 Terrain

The following terrain options are displayed when any noise metric is selected (Figure 5-13). Select the following options as appropriate:

- *Use terrain data*: When selected, AEDT uses the terrain data specified in the *Definitions* tab in noise calculations. See Section 9.6.3.1 for more information.
    - If selected, AEDT computes the distance from a ground-based observer to an airplane using terrain elevation data from one or more terrain files.
    - If not selected, AEDT computes observer-to-airplane distance based on flat ground around the airport at the airport elevation.
- *Apply line of sight blockage*: When selected, AEDT computes the distance from a ground-based observer to an airplane while accounting for the added attenuation due to line of sight blockage from terrain features. The computation time dramatically increases when the *Apply line of sight blockage* option is selected.
- *Fill terrain MSL (ft)*: If desired, enter terrain elevation in feet MSL to be used to fill gaps in the terrain data.

> ⚠ To produce noise results when using terrain data, the terrain data must cover the same areas as the receptor set used for the noise metric result. If line of sight blockage is used, the terrain data must cover the trajectories of the included aircraft operations.

Figure 5-13 Define Metric Results – Set Processing Options, DNL Noise Metric

5.2.4.6 Number Above Noise Level

The following number above noise level options are displayed when SEL, LAMAX, LCMAX, CEXP, or user-defined noise metrics are selected (Figure 5-14). The Number Above Noise Level (NANL) option will calculate the number of operations that exceed the specified threshold. Select the appropriate option:

- *Calculate Number Above Noise Level*:
    - When selected, AEDT will output the number of operations above the threshold in the Noise Report and receptor set attributes. Noise levels will not be reported.
    - When unselected, AEDT will calculate the noise metric decibel results and will not compare the noise levels to any threshold.
- *Number Above Threshold (dB)*: Enter the threshold level (in decibels) in which to compare noise level results. Only a single threshold level can be provided for each metric result.

⚠️ When running Number Above Noise Level, the noise storage setting must be set to *Operation Group* or *Operation* (not *Detailed)*.

Processing with dynamic grids and generating contours are not supported for the Number Above Noise Level metric.

Figure 5-14 Define Metric Results – Set Processing Options, SEL Noise Metric

5.2.4.7 Ambient

The following ambient threshold options are displayed when a time above threshold noise metric (TALA, TALC, or TAPNL) is selected (Figure 5-15). Select the appropriate option:

- *Uniform ambient:* Enter the desired Time Above Threshold value. When selected, AEDT uses the threshold value to calculate the number of minutes when noise levels are above that threshold at each receptor.
- *Geospatially referenced ambient:* When selected, AEDT uses the ambient values from the ambient directory specified in the *Definitions* tab (see Section 9.7). The accepted format for the ambient file is a three-digit ambient map described further in Appendix F.3.
    - o Offset value (dB): This offset value is added to the ambient values in the selected file. It can be positive, zero, or negative.

When an ambient file is specified in the *Definitions* tab, it will be used in all subsequent processing of time above metric results. If different ambient files are desired for different time above metrics, confirm the appropriate ambient file is specified in the *Definitions* tab before processing each time above metric.

Figure 5-15 Define Metric Results – Set Processing Options, TALA Noise Metric

5.2.4.8 Emission Dispersion Output

The following emission dispersion output options are displayed for any emissions dispersion metric (Figure 5-16). See Appendix B for detailed information about each field.

- *NO2 Modeling Tier*: This option is disabled for every emissions dispersion metric except NO_2. See Section 5.2.4.8.1 for information on NO_2 modeling options.
- *Source Groups*: Select the desired source groups to include in the emissions dispersion report. Available source groups include *All, Aircraft, Airborne, Runup preflight, Runup maintenance, Taxiways, Runways, Gates, Stationary, Training fires, Background, Takeoff ground roll, Takeoff airborne, Climb-out, Airborne approach, Landing ground roll, Taxi-out, Taxi-in, Parking facilities, Roadways,* and *Construction*.

> All source groups include background concentrations (if provided by the user) as well as results for the selected source (except the Background group, which only includes results from the Background group).

- *Allow computation of all averaging times without EPA's PM2.5 modeling requirements:* This option is available when a PM2.5 metric is selected. This checkbox allows for the selection of any averaging time rather than only allowing the selection of the 24-hour averaging times permitted by the U.S. Environmental Protection Agency's (EPA's) PM2.5 National Ambient Air Quality Standards (NAAQS) special processing requirements. This option will be selected by default if less than a full year of data is included in the selected annualization as a complete year of data is one of the special processing requirements. See the EPA's AERMOD User Guide for more information[2].

- *Averaging Times and Rankings*: Use the drop-down menus or type in the field to select the desired rankings for the corresponding averaging times for emissions dispersion calculations. Note that rankings are not limited to values between 1-8. See Appendix H for more information on selecting NAAQS.
    - *Period:* Select the *Period* option to average emissions results over the entire period of the metric result.
    - *Annual:* Select the *Annual* option to average emissions results over a year.

> ⚠ If modeling a regulatory pollutant for a regulatory averaging period (e.g.,NO2, 1-hour) and the full dataset for the required time period is unavailable (e.g. less than one year), an error will occur and the rest of the wizard is unavailable until additional selections are made. The pollutant can be processed following a non-regulatory procedure by selecting multiple averaging periods (1-hour, 2-hour, 3- hour, etc.) and rankings. For more information, see the AEDT Technical Manual.

> If less than one month of data is provided, the *Monthly* averaging time will be disabled. Similarly, if less than one year of data is provided, the *Annual* averaging time will be disabled.

- *Compute 1-hour Max Daily averages at each receptor for use in assessing NAAQS*: This option is enabled for SOx and SO2 metrics that contain a minimum of four days of operations data as well as for NOx and NO2 metrics that contain a minimum of eight days of operations data.
    - For SOx (4th highest), a minimum of four days of operations data is required
    - For SO_2 (4th highest), a minimum of four days of operations data is required
    - For NOx (8th highest), a minimum of eight days of operations data is required
    - For NO_2 (8th highest), a minimum of eight days of operations data is required

If this option is selected, the Emissions Dispersion Report and Pollutant Concentration Layer attributes will contain the 4th highest (SOx and SO_2 metrics) or 8th highest (NOx and NO_2 metrics) emissions value at each receptor derived from the Daily Maximum of 1-hour averages.

Concentration files with "MAXDAILY" in the file name will be generated with the maximum daily values in the AERMOD job output folder.

Where is the AERMOD job output folder?
After running an emissions dispersion metric result, AEDT generates and saves the AERMOD input files (.INP, .HRE, .INC) and output files to the AERMOD job output folder which is under the study output folder (e.g., *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files*). Files are named based on study name + "_J"+ Metric Result ID + "_"+ pollutant type.

AERMOD job output folder is named with the pollutant name and the metric result ID, e.g., Nox_J1, CO_J2.

Figure 5-16 Define Metric Results – Set Processing Options, PM.5 Metric

5.2.4.8.1 NO₂ Modeling Tier

The *NO2 Modeling Tier* emission dispersion output option is enabled for the NO₂ emissions dispersion metric (Figure 5-17) in addition to the emission dispersion output options described in Section 5.2.4.8. AEDT supports four methods and two alpha methods for converting NOx to NO₂. Select the desired *NO2 Modeling Tier* option and additional emissions dispersion output options and click *Next*.

- *Tier 1*: Full conversion of NOx into NO₂
- *Tier 2 (ARM2)*: Ambient Ratio Method Version 2
- *Tier 3 (OLM):* Ozone Limiting Method
- *Tier 3 (PVMRM):* Plume Volume Molar Ratio Method
- *ALPHA (TTRM)*: Travel Time Reaction Method
- *ALPHA (TTRM2):* Travel Time Reaction Method paired with OLM, PVMRM, or ARM2
- *BETA (GRSM)*: Generic Reaction Set Method

These methods are described in the AEDT Technical manual as well as in the U.S. Environmental Protection Agency's AERMOD User Guide[2].

---

[2] https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf

Figure 5-17 Define Metric Results – Set Processing Options, NO₂ Metric

5.2.4.9 Background Concentrations

The following background concentration options are displayed when a CO, NOx, NO₂, SOx, SO₂, PM10, or PM2.5 emissions dispersion metric is selected (Figure 5-16). When selected, uniform or temporally varying background concentrations can be specified to estimate cumulative ambient concentration impacts.

When modeling the NO₂ metric using Tier 3 modeling (OLM or PVMRM), ALPHA (TTRM or TTRM2), or BETA (GRSM), background ozone and NOx (for BETA GRSM) concentrations can be defined in addition to background NO₂ concentrations. Background ozone and NOx concentrations are defined using the same parameters described in this section.

Adjust the following options as appropriate:
- *Enable background concentrations*: Enable or disable modeling of background concentrations. This is not an option for NO₂ Tier 3 or ALPHA modeling options because specifying background ozone concentrations is required.
- *Add Wind Sector*: Add an additional wind sector, up to a maximum of six sectors (Table 5-3).
- *Units:* For CO, NO₂, and SO₂ pollutant, the input units may be specified as ppm, ppb, or μg/m³. Background concentrations for all other pollutants must be specified in μg/m³.
- Wind Sectors*:* Select the wind sector for which to specify background concentration values. The icon shows the angle covered by the selected wind sector (Table 5-3).

Table 5-3 Wind Sector Icons

	Add Wind Sector
	Delete Wind Sector
	Selected Wind Sector (highlighted)
	Unselected Wind Sector (not highlighted)

- *Start:* Set the starting angle for the wind sector. The ending angle for a wind sector is automatically set to be the starting angle of the next wind sector. The minimum wind sector area is 30 degrees.
- *Delete Wind Sector:* Delete the selected wind sector.

> Changing intermediate wind sector definitions after they have all been defined can lead to overlapping sectors which will generate AERMOD errors. It is recommended to sequentially define contiguous sectors starting with the last or bottom-most sector and not attempt to change intermediate sector start angles after they have all been defined.

> All wind sector angles must be between 0 and 359. Negative values are not allowed. If the *Start* angle field does not respond or does not accept text input, the minimum angle between the sector and the following sector is too small. Adjust the angle of the adjacent sector first.

- *Use hourly background concentrations file:* If selected, an hourly background concentrations file must be specified in the box below.
    - The hourly background concentrations file must be a comma-delimited text file, where each line specifies the year, month, day, hour, and background concentration value for that hour. The entire study time period must be covered by the file, although an unknown background concentration can be specified for an hour with the value -99. If unknown background concentrations exist in the hourly file, either an annual background concentration or a non-hourly file must be provided to cover the unknown values. For additional information, see the section on background concentrations in the AERMOD User's Guide[3] available on the Environmental Protection Agency (EPA) website.
    - Sample hourly background concentrations file:
      ```
      # hourly background concentration sample
      # year, month, day, hour, background concentration value
      88,3,1,1,15
      88,3,1,2,15
      88,3,1,3,15
      ```

---

[3] U.S. Environmental Protection Agency, U̲s̲e̲r̲'̲s̲ ̲G̲u̲i̲d̲e̲ ̲f̲o̲r̲ ̲t̲h̲e̲ ̲A̲M̲S̲/̲E̲P̲A̲ ̲R̲e̲g̲u̲l̲a̲t̲o̲r̲y̲ ̲M̲o̲d̲e̲l̲ ̲(̲A̲E̲R̲M̲O̲D̲)̲, Report No. EPA-454/B-23-008, October 2023.
https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf

- *Use non-hourly settings:* If selected, specify an annual background concentration value or specify a non-hourly background concentration file. Only a single non-hourly background concentration file can be applied per model run. Refer to the AEDT Supplemental Manual: Background Concentrations in AEDT on the AEDT Support website for more information.
  - *Annual:* The background concentration value for the entire year.
  - *Use file:* Browse to the non-hourly background concentrations file.
    - The background concentrations file is a text file with comma-delimited values on a single line or space-delimited values on a single line or column representing background concentration values. Short-form values of the form n*VAL where n is the number of values and VAL is the value to be used can be to specify repeated values, see the examples below.
    - Depending on the time period for the background concentrations, the number of required values is different. AEDT parses the input file and lists the expected time period in the *Type* field. For a list of time periods and values required, see Bgflag parameters in the background concentrations section in the AERMOD User's Guide.
    - Sample non-hourly background concentrations file (seasonal), comma-delimited:
      ```
      # seasonal background concentration sample
      # background concentration value for winter, spring, summer, fall
      15, 10, 25, 75
      ```
    - Sample non-hourly background concentrations file (seasonal), space-delimited, single line:
      ```
      # seasonal background concentration sample
      # background concentration value for winter, spring, summer, fall
      15 10 25 75
      ```
    - Sample non-hourly background concentrations file (seasonal), space-delimited, single column:
      ```
      # seasonal background concentration sample
      # background concentration value for winter, spring, summer, fall
      15
      10
      25
      75
      ```
    - Sample non-hourly background concentrations file (monthly), space-delimited, single column:
      ```
      # monthly background concentration sample
      # background concentration value for each month
      15 10 10 10 10 10 10 10 10 20 30 30
      ```
    - Sample non-hourly background concentrations file (monthly), space-delimited, short-form values:
      ```
      # monthly background concentration sample
      # background concentration value for each month
      15 8*10 20 2*30
      ```

⚠️ When using non-hourly background concentrations in AEDT, the non-hourly background concentration values that are specified by the user will be applied to all averaging periods being modeled.

- *Wind Speed Categories:* If the WSPEED background concentration period is specified in the non-hourly background concentration file for any wind sector, the wind speed category bounds will be displayed.

❓ What are Wind Speed Categories?
Wind speed categories are ranges of wind speeds that AERMOD uses to classify the actual wind speed at a given point in time. There are always six categories; the maximum value for each of the first five categories is specified, and the sixth is considered to have no upper bound. The AERMOD wind speed categories can be changed in *Definitions* tab, *Weather* screen (Section 9.6.3.1).

For additional information on using background concentrations, refer to the AEDT Supplemental Manual: Background Concentrations in AEDT on the AEDT Support website.

5.2.4.10 Aircraft Source Characterization

The Aircraft Source Characterization options are displayed when any emissions dispersion metric is selected (Figure 5-18). This feature allows for the option of characterizing aircraft sources as either volume sources or area sources. The default selection can be modified in *the Study Tab, Preferences, Emissions Dispersion section, Use volume characterization for aircraft sources* (uncheck to use area sources) parameter.
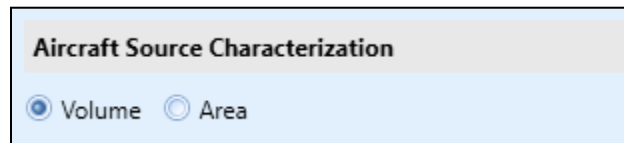
Figure 5-18 Define Metric Results – Aircraft Source Characterization

5.2.4.11 Aircraft Plume Rise Modeling (ALPHA)

The following aircraft plume rise modeling option is displayed when any emissions dispersion metric is selected (Figure 5-16, Figure 5-19). This feature allows for the inclusion of plume rise effects (the effects of buoyancy and horizontal momentum of exhaust gases from aircraft engines) in the AERMOD files generated by AEDT for emissions dispersion modeling with aircraft sources.
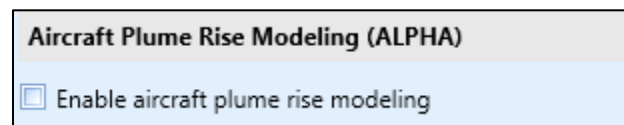
Figure 5-19 Define Metric Results – Aircraft Plume Rise Modeling (ALPHA)

5.2.4.12 Area Source Plume Meander (ALPHA)

The following plume meander option is displayed when any emissions dispersion metric is selected (Figure 5-16, Figure 5-18, Figure 5-20). This feature allows for the inclusion of plume meander effects (the effects of slow, lateral back and forth shifting of the plume from low frequency, non-diffusing eddies) in the AERMOD files generated by AEDT for emissions dispersion modeling with area sources. Plume meander is already included when modeling volume sources.
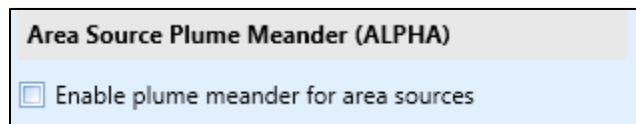
Figure 5-20 Define Metric Results – Area Source Plume Meander (ALPHA)

5.2.4.13 Urban Modeling Option

The following urban modeling options are displayed when any emissions dispersion metric is selected (Figure 5-16 and Figure 5-21). This feature allows for the option of incorporating increased surface heating effects from urban areas on emissions dispersion during stable atmospheric conditions. Adjust the following options as appropriate:

- *Enable Urban Modeling Option:* When selected, the Urban Modeling Option will be used in emissions dispersion calculations and the user must specify the population in the Urban Area Population field.
- *Urban Area Population:* Enter the population for the area.
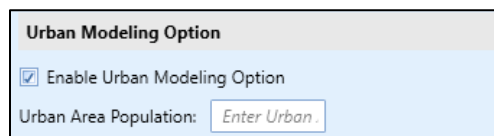
Figure 5-21 Define Metric Results – Urban Modeling Option

5.2.4.14 Low Wind Parameters (ALPHA)

The following ALPHA version, low-wind options are displayed when any emissions dispersion metric is selected (Figure 5-16 and Figure 5-22). This feature allows for the option of adjusting parameters that can affect model performance under low-wind conditions.

Click *Enable Low Wind Option* for AERMOD to use the specified values for the parameters in Table 5-4 in emissions dispersion modeling. Click *Reset Parameter Values* to change reset to default values for all parameters.

Table 5-4 Low Wind Parameters (ALPHA) Descriptions

Option Name	Alternate description	Minimum Value	Maximum Value	Default Value
Minimum sigma-v value (m/s)	Svmin	0.01	1.0	0.2
Minimum sigma-w value m/s	Swmin	0.01	3.0	0.02
Minimum wind speed value (m/s)	Wsmin	0.01	1.0	0.2828
Minimum value for the meander factor	FRANmin	0.0	1.0	0.0
Maximum value for the meander factor	FRANmax	0.0	1.0	1.0
TRAN time period (hrs)	Time period (BigT) used to calculate the time scale	0.5	48	24.0
Balance approach	Energy or momentum (PBAL) balance approach for determining plume meander	n/a	n/a	Energy

Only the Svmin parameter is required to use this feature, the remaining parameters are optional as long as the preceding parameters have been defined (e.g., FRANmax requires Svmin and Wsmin to be specified). For more information on this feature and these parameters, see the LOW_WIND parameter description in the AERMOD User's Guide.

Figure 5-22 Define Metric Results – Low Wind Parameters (ALPHA)

5.2.5 Step 5: NO2 Options

This step is only enabled when the NO$_2$ emissions dispersion metric is selected in the *Choose Metrics* step (Section 5.2.4.8.1).

When the NO$_2$ metric is selected, the *NO2 Options* step contains additional settings that correspond to the tier selection.

- Tier 1 (Figure 5-23):
    - A confirmation that NOx is all converted to NO2 is displayed.
    - Click *Next.*
- Tier 2 (ARM2) (Figure 5-24):
    - *Lower Limit:* Uncheck the *Use Default* box and enter a value or check the *Use Default* box to use the default value
    - *Upper Limit*: Uncheck the *Use Default* box and enter a value or check the *Use Default* box to use the default value
    - Click *Next*
- Tier 3 (OLM), Tier 3 (PVMRM), or ALPHA (TTRM) (Figure 5-25):
    - *Ambient Equilibrium NO2/NOx Ratio*: Uncheck the *Use Default* box and enter a ratio or check the *Use Default* box to use the default ratio
    - *In-Stack NO2/NOx Ratios*: Edit NO$_2$ ratios (for all source types) and Thrust % Max (for aircraft) as desired. See the AEDT Technical Manual for more information on these parameters. AEDT will use the NO$_2$ ratio entered when the aircraft's thrust is less than or equal to the Thrust % Max for that row and greater than Thrust % Max entered in the preceding row. AEDT requires that the Thrust % Max values be entered in increasing order.
    - *Background Ozone Concentrations*:
        - *Remove minimum ozone restriction*: Check this box to remove the minimum ozone value of 40 ppb during stable, nighttime conditions. If this box is not checked, a minimum value of 40 ppb during stable, nighttime conditions will be applied. See the [AERMOD user guide](#)[2], keyword NOMINO3, for more information.
        - Define the background ozone concentrations as described in Section 5.2.4.9
- ALPHA (TTRM2) (Figure 5-26)
    - *NO2 conversion option to be combined with TTRM*: Select one of the additional conversion options (OLM, PVMRM, ARM2)
        - If *ARM2* is selected:
            - *Lower Limit:* Uncheck the *Use Default* box and enter a value or check the *Use Default* box to use the default value
            - *Upper Limit*: Uncheck the *Use Default* box and enter a value or check the *Use Default* box to use the default value
    - *Ambient Equilibrium NO2/NOx Ratio*: Uncheck the *Use Default* box and enter a ratio or check the *Use Default* box to use the default ratio
    - *In-Stack NO2/NOx Ratios*: Edit NO$_2$ ratios (for all source types) and Thrust % Max (for aircraft) as desired. See the AEDT Technical Manual for more information on these parameters. AEDT will use the NO$_2$ ratio entered when the aircraft's thrust is less than

or equal to the Thrust % Max for that row and greater than Thrust % Max entered in the preceding row. AEDT requires that the Thrust % Max values be entered in increasing order.

- o *Background Ozone Concentrations*:
  - ▪ *Remove minimum ozone restriction*: Check this box to remove the minimum ozone value of 40 ppb during stable, nighttime conditions. If this box is not checked, a minimum value of 40 ppb during stable, nighttime conditions will be applied. See the [AERMOD user guide](#)[2], keyword NOMINO3, for more information.
  - ▪ Define the background ozone concentrations as described in Section 5.2.4.9

- BETA (GRSM) (Figure 5-27)
  - o *In-Stack NO2/NOx Ratios*: Edit NO_2 ratios (for all source types) and Thrust % Max (for aircraft) as desired. See the AEDT Technical Manual for more information on these parameters. AEDT will use the NO_2 ratio entered when the aircraft's thrust is less than or equal to the Thrust % Max for that row and greater than Thrust % Max entered in the preceding row. AEDT requires that the Thrust % Max values be entered in increasing order.
  - o *Background Ozone Concentrations*:
    - ▪ *Remove minimum ozone restriction*: Check this box to remove the minimum ozone value of 40 ppb during stable, nighttime conditions. If this box is not checked, a minimum value of 40 ppb during stable, nighttime conditions will be applied. See the [AERMOD user guide](#)[2], keyword NOMINO3, for more information.
    - ▪ Define the background ozone concentrations as described in Section 5.2.4.9
  - o *Background NOx Concentrations*: Define the background NOx concentrations as described in Section 5.2.4.9

? What are stable conditions?
Meteorological conditions where the Monin-Obukhov length is positive (this parameter is calculated when running AERMET).

Figure 5-23 Define Metric Results – NO2 Modeling, Tier 1

Figure 5-24 Define Metric Results – NO2 Modeling, Tier 2 (ARM2)

Figure 5-25 Define Metric Results – NO2 Modeling, Tier 3 (OLM), Tier 3 (PVMRM), and ALPHA (TTRM)

Figure 5-26 Define Metric Results – NO2 Modeling, ALPHA (TTRM2)

Figure 5-27 Define Metric Results – NO2 Modeling, BETA (GRSM)

5.2.6 Step 6: Summary

The summary step lists each of the metric result definitions that will be created from the selections made in the workflow. The *Define Metric Results* wizard will place each record listed on the *Summary* pane (Figure 5-28) into the *Metric Results* tab. To commit the metric result definitions, follow the steps below or click *Cancel* to discard changes and exit the wizard.

> For emissions dispersion metrics, there is an additional option in the summary step to combine metrics which saves processing time because the aircraft performance and source characterization for AERMOD steps are only run once.

To define metric results:

1. Click *Create* to complete defining metric results.
2. A confirmation is displayed, click *Close.* The defined metric result is listed in the *Metric Results* pane.
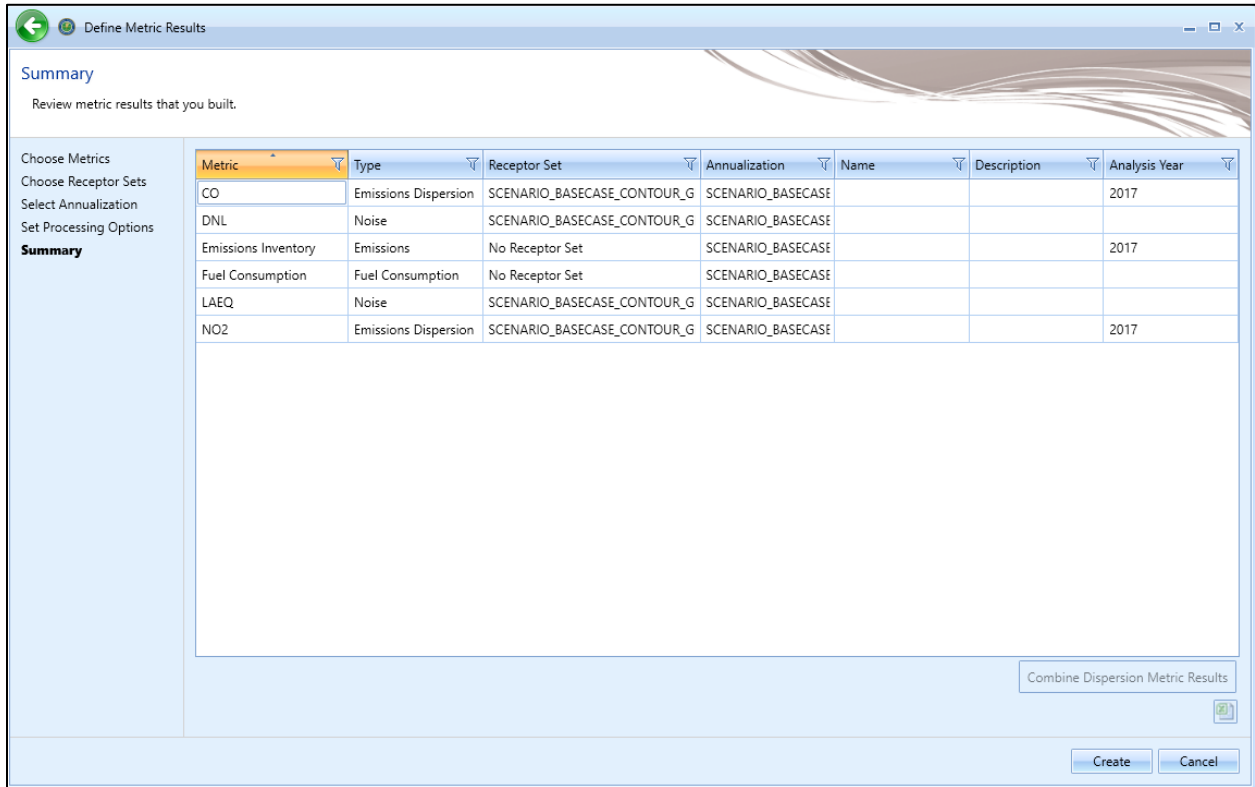
Figure 5-28 Define Metric Results – Summary

To combine emissions dispersion metric results:
1. Click to select the first emissions dispersion metric.
2. Hold the Ctrl key and click to select additional emissions dispersion metrics to combine.
3. Click *Combine Dispersion Metric Results* to combine the selected metric results into a single metric result.
4. Click *Create* to complete defining metric results.
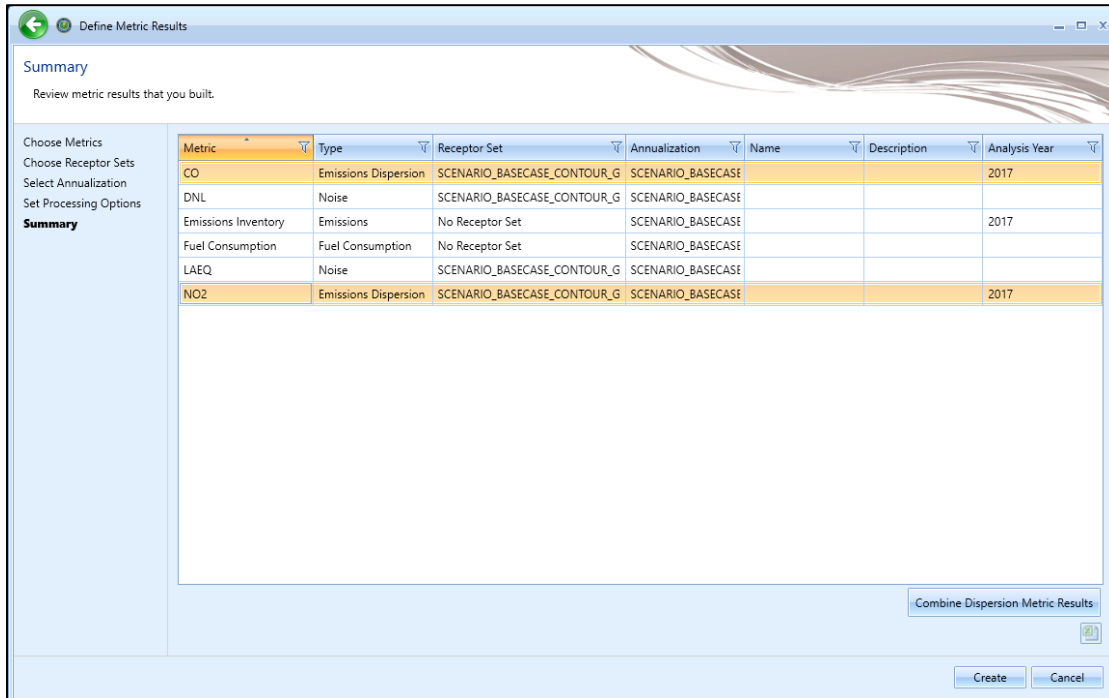
Figure 5-29 Define Metric Results – Summary, Combine Dispersion Metric Results Part 1
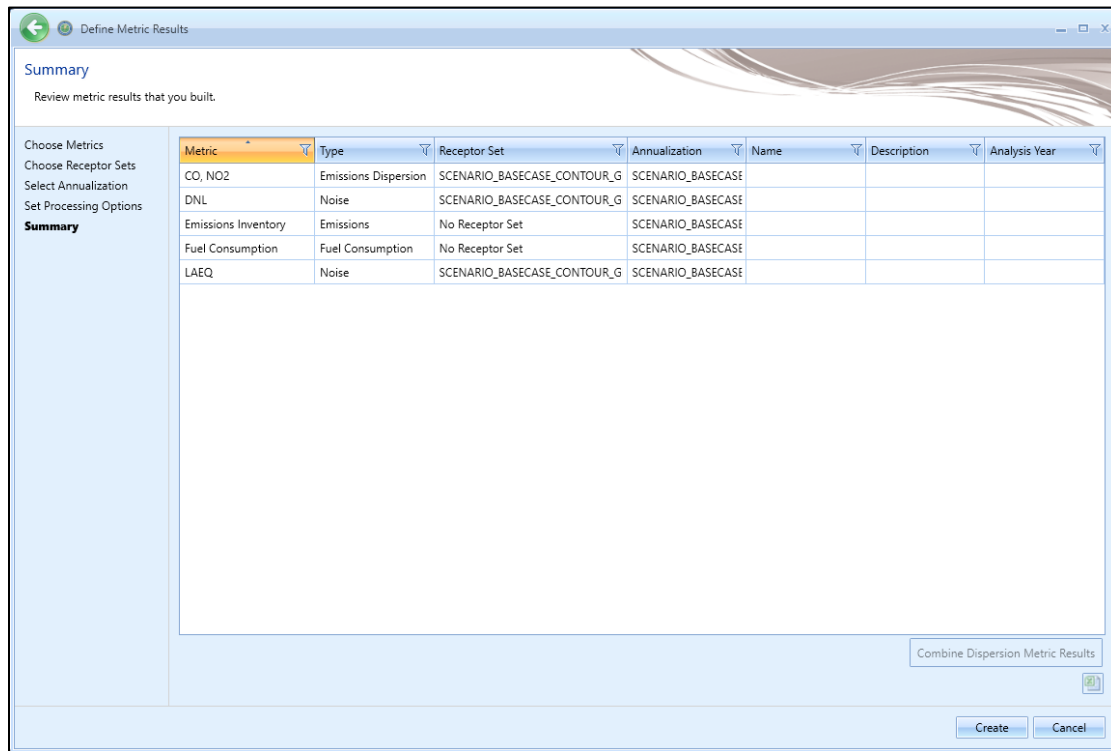
Figure 5-30 Define Metric Results – Summary, Combine Dispersion Metric Results Part 2

5.3 Run Metric Results

Metric result definitions that have been defined through the metric result wizard (Section 5.2) can be processed to generate the specified environmental results. Metric result definitions can be run individually, in groups, or in total from the *Metric Results* tab. Likewise, all metric result definitions can be run simultaneously from the *Study* tab (Section 4.9). For information on running the metric results using the external RunStudy command line tool, see Appendix I.
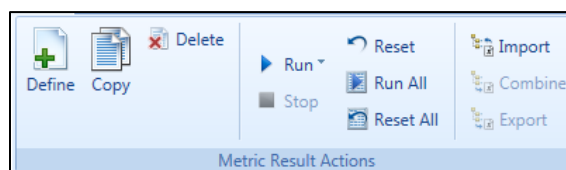
Figure 5-31 Ribbon Group – Metric Result Actions

To process metric result definitions listed in the Metric Results pane:
1. Select desired metric result(s) and click *Run* from the *Metric Results Actions* ribbon group.
   - To run a metric result, click *Run to Completion*.
   - To reset a completed or stopped run and immediately run again, click *Reset and Run to Completion*.
   - To run an emissions dispersion metric result until the AERMOD processing step, click *Run until AERMOD*. This option may be useful if it is desired to edit the AERMOD.INP file (e.g., to turn on

additional options that are currently not exposed in the AEDT interface) before the AERMOD processing. To initiate the AERMOD run, click *Run to Completion*.
- To run all metric result definitions, click *Run All.*

2. The *State* icon of selected metric results will display a progress bar indicating the percentage of processing completion. Once the run is complete, the *State* icon will change (Table 5-5).
3. Check the aedt.log file for any errors and warnings after running a metric result.

Table 5-5 State Icons

Icon	Description
▶	Ready to be run
14%	Run in progress
✔	Completed
■	Stopped
❚❚	Stopped before AERMOD
⚠	Completed with flight error
✖	Error, run not completed

⚠ When running an annual emission or emissions dispersion locally it is important to limit the SQL Server's Maximum server memory. It is recommended to limit the memory to 25% to 50% of the RAM. For more information see the AEDT Installation Manual.

🖱 Metric result definitions can also be run by right-clicking on desired metric result(s) in the *Metric Results* pane.

📝 Use the shift or ctrl key to select multiple metric results.

5.3.1 Running an Emissions Dispersion Metric Result

An emissions dispersion metric result consists of three distinct computational steps:
1. Step E (Emissions) – Computation of hourly emissions for each source, which are stored in the database as they are computed.
2. Step H (HRE files) – Generation of AERMOD input files, of which HRE file generation is the most time-consuming.
3. Step A (AERMOD) – Processing input files using AERMOD.

When running an emissions dispersion metric result, the current step (E, H, or A) is displayed in the *State* column.

Figure 5-32 Emissions Dispersion Metric Result – Run State

To edit the AERMOD.INP file before running AERMOD, click the *Run until AERMOD* button.

AEDT generates and saves the AERMOD input files (.INP, .HRE, .INC) to the AERMOD job output folder (named with the pollutant and the metric result ID) under the study output folder (e.g., *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files*).

To initiate the AERMOD run, click *Run to Completion*.

> When an emissions dispersion metric result fails to run, navigate to the study output folder and find the sub-folder with the pollutant and the metric result ID. In the *aermod.out* file, and search for "FATAL ERROR MESSAGES" to view the details of the error message.

> When an emissions dispersion metric result with aircraft sources characterized as volume sources is run and a yellow warning triangle is displayed in the *State* column of the Metric Results data grid, check the AEDT log to view the warning message. If the message indicates that a receptor or multiple receptors are within the exclusion zone, the receptors are too close to the source.

5.4 Stop Metric Result

A metric result can be stopped during processing. Once a metric result has begun processing, the *Stop* button will be enabled in the *Metric Result Actions* ribbon group. A stopped metric result will be halted at the closest transition point in calculation. A stopped metric result will retain its progress even after AEDT is closed for later continuation.

5.5 Reset/Delete Metric Results

The following actions are available for metric results and accessible from the *Metric Result Actions* ribbon group:
- *Reset*: Resets the selected metric result(s) and marks those results as obsolete.
- *Reset All*: Resets all the metric results listed in *Metric Results* pane and marks results as obsolete.
- *Delete*: Deletes the selected metric result(s).
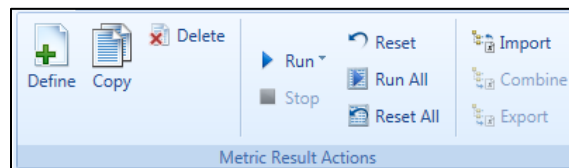
Figure 5-33 Ribbon Group – Metric Result Actions

Reset or *Delete* of a metric result definition releases any associated processed results data but does not clear those results from the database. Use the *Delete Obsolete Results* function in the *Study* tab, *Study Maintenance* screen (Section 4.12.1) to clear the results.

5.6 Import/Combine/Export Noise Metric Results

The following actions are available for noise results calculated outside of AEDT and are accessible from the *Noise Metric Results* ribbon group:

- *Import*
- *Combine*
- *Export*

These features are supported for all noise metrics except Number Above.

5.6.1 Import Noise Metric Results

This feature allows users to import the noise results contained in a Noise Model Grid Format (NMGF) file into AEDT. The process of importing metric result creates a metric result and receptor set for each unique grid file. After the noise metric result has been imported, a Receptor Set Layer, a Noise Exposure Layer, and Noise Contour Layer can be generated from the metric result.

The AEDT grid file is based on the ASCII version of the NMGF (Noise Model Grid Format). Please note that not all the NMGF specifications are supported by AEDT. AEDT supports the following NMGF data point specifications: DPAL, GRID, and SUBG. In the DPAL section, locations must be specified in longitude and latitude. AEDT does not support using Cartesian coordinates to specify locations for the DPAL data point specification. For information on the NMGF format, see the "NMGF Format Documentation Package" on the AEDT Support website, Downloads page.

To import noise metric result:
1. In the *Metric Results* tab, locate the *Noise Metric Results* group in the ribbon.
2. Click the *Import* button to open the *Import Noise Metric Results* dialog.
3. Click the *Browse* button and select one or multiple .grd files.
4. Select a target noise metric from the list.
5. Enter a name for the receptor set in the *Receptor set base name* field.
   - To create a new receptor set, enter a unique name. When importing multiple receptor sets, a number will be appended to the base name.
   - To override an existing receptor set, enter the name of the existing receptor set. When a warning message is displayed about the existing receptor set name, click *No* in order to override and continue the import process.
6. Click *OK* to import the grid file(s).
7. When the import process is complete, the new noise metric result is displayed in the *Metric Results* pane. The new receptor set is displayed in the *Definitions* tab, *Receptor Sets* view.

8. Select the new noise metric result and click the *Noise Exposure* button to view the Noise Exposure Layer on the map.

> The imported metric result only contains noise results; thus generating Flight Performance Report, Emissions and Fuel report, or Tracks Layer is not supported.

Figure 5-34 Import Noise Metric Results Dialog

5.6.2 Combine Noise Metric Results

This feature allows for the noise levels of selected metric results to be combined into one metric result. To enable the *Combine* button, select two or more metric results with the same noise metric of type exposure or maximum level.

After the noise metric results have been combined, a Noise Exposure Layer and noise contour layer can be generated from the new metric result.

> Noise metrics with the same noise metric, but different receptor sets can be combined.
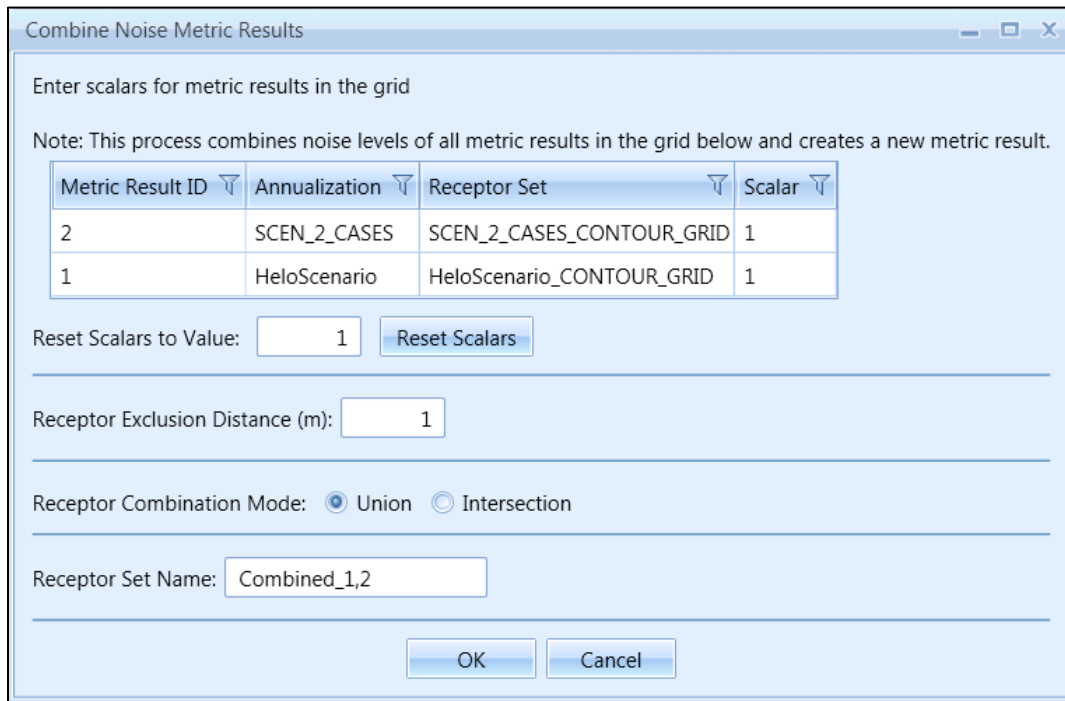
Figure 5-35 Combine Noise Metric Results Dialog

To combine noise metric results:
1. In the *Metric Results* tab, select two or more metric results with the same noise metric type (exposure or maximum level).
2. In the *Noise Metric Results* group in the ribbon, click the *Combine* button to open the *Combine Noise Metric Results* dialog.
3. Edit the following fields as necessary:
   - *Scalar* column in the grid: Edit the weighting factors for the metric results as appropriate.
   - *Reset Scalars to Value*: When clicking *Reset Scalars*, the value specified in the *Reset Scalars to Value* field will be applied to all metric results in the grid (*Scalar* column).
   - *Receptor Exclusion Distance (m)*: Receptors from different receptor sets that fall within the specified distance will be considered to be at the same location. The noise levels will be combined from the different receptor sets and will be considered to be at the location of the receptor of the first receptor set in the grid.
   - *Receptor Combination Mode:* Receptors from different receptor sets can be combined by a union or intersection.
     - Combining by *union* will combine all receptors from each receptor set.
     - Combining by *intersection* will consider the area covered by each receptor set and will combine receptors only in the areas that overlap. The receptors that fall outside of the overlapping area are not included in the resulting receptor set.
   - *Receptor Set Name:* Enter the name for the new receptor set that will be created by combining receptor sets.

Receptor Grid 1	Receptor Grid 2

Combine: Union	Combine: Intersection
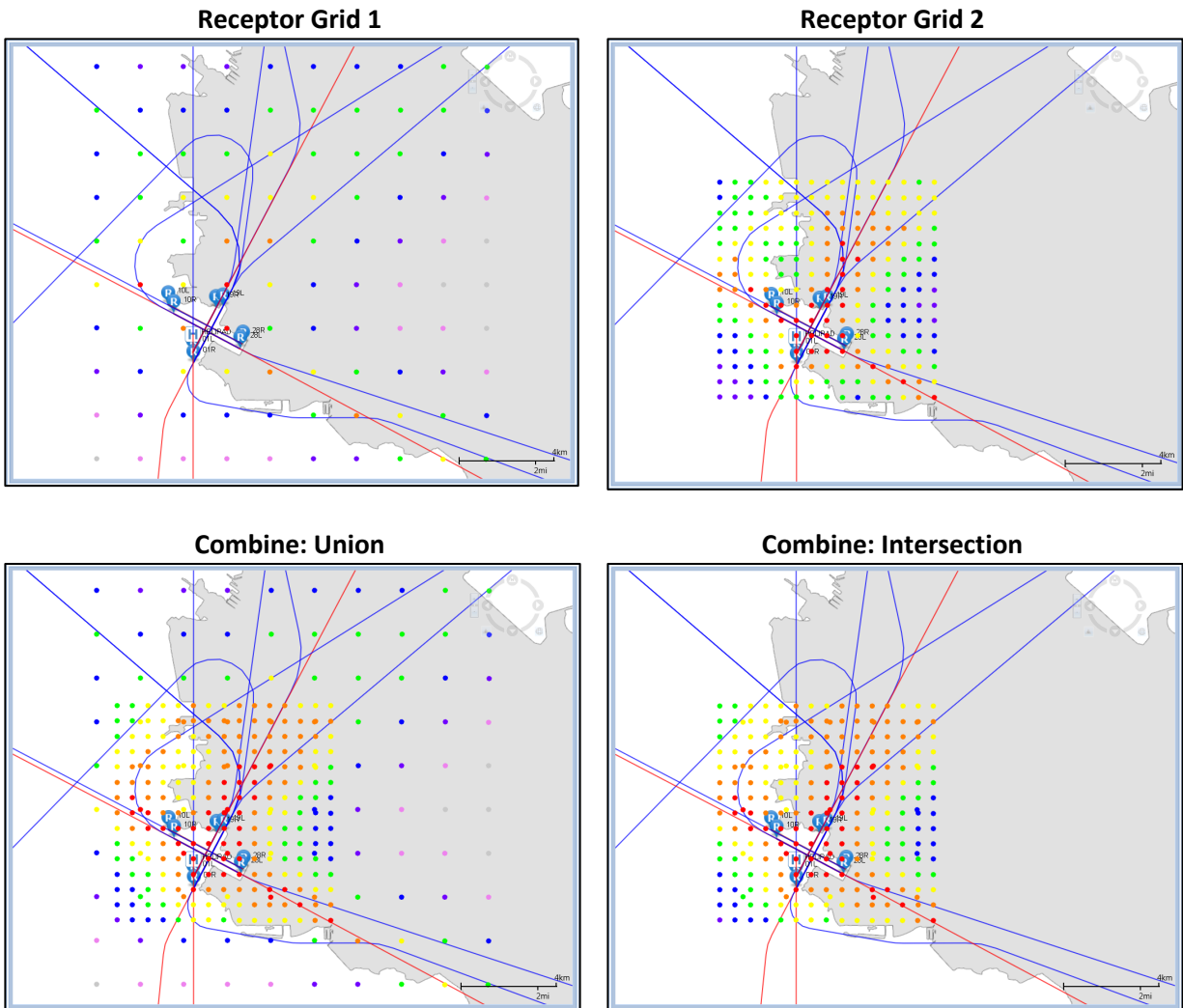
4. Click *OK*.
5. The new combined noise metric result is displayed in the *Metric Results* pane.
6. Select the new noise metric result and click the *Noise Exposure* button to view the Noise Exposure Layer on the map or click the *Contour* button to view the contour layer on the map.

5.6.3 Export Noise Metric Result

To enable the *Export* button, select a completed noise metric result (any noise metric except Number Above). This button allows users to export the selected noise metric result in a Noise Model Grid Format (NMGF) file. NGMF files are not supported as standard output in AEDT, but are provided for use with external programs subject to all appropriate requirements.

The AEDT grid file is based on the ASCII version of the NMGF (Noise Model Grid Format). Please note that not all the NMGF specifications are supported by AEDT. AEDT supports the following NMGF data point specifications: DPAL, GRID, and SUBG. In the DPAL section, locations must be specified in longitude and latitude. AEDT does not support using Cartesian coordinates to specify locations for the DPAL data point specification. For information on the NMGF format, see "NMGF Format Documentation Package" on the AEDT Support website, Downloads page.

To export noise metric result:
1. In the *Metric Results* pane, select a completed noise metric result.
2. In the *Noise Metric Results* group in the ribbon, click the *Export* button.
3. Enter the file name and click *Save*.
4. A grid file is saved to the selected location.

5.7 Generate Layers

Data can be visualized on the map by generating GIS layers. The *View Layers* ribbon group (Figure 5-36) in the *Metric Results* tab supports generating the following types of layers on the map:

- Tracks – tracks included in the metric result, color coded by track type
- Receptor set – receptors that are included in the metric result
- Receptor set boundary – the boundary used in the *Restrict Dynamic Grid By Boundary* feature
- Noise exposure – receptors that are included in the metric result, color coded by noise level
- Noise contours – lines on a map that represent specific noise levels, color coded by noise level
- Pollutant concentration – receptors that are included in the metric result, color coded by concentration level
- Concentration contours – lines on a map that represent specific pollutant concentration levels, color coded by concentration level
- Impact set – a graphical comparison of noise results at receptors for the selected metric results
- Ambient map – a map of ambient noise data used in TAUD metrics
- Surface Sector – visualization of the selected AERSURFACE output file which represents land surface characteristics for the study area

This Section describes how to generate each of layers described above.

Properties and data (attributes) are available for each layer through the *Attributes* pane, see Section 3.7.9. The attributes that are associated with each layer type are described in this Section.
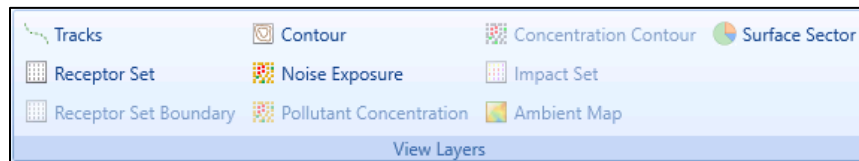
Figure 5-36 Ribbon Group – View Layers

Additional layers are available through other areas of the interface:

- Dynamic Grid Visualization – displays the dynamic grid generation on the map during Metric Result processing. This layer is generated by enabling *Visualize Dynamic Grid during processing* preference in the *Study* tab, *Dynamic Grid* preferences. See Appendix B.1.6.
- High-fidelity weather boundary – displays the rectangular boundary for RUC/RAP, GEOS, or NCAR high fidelity weather data. This layer is generated in the *Metric Results* tab, *HiFi Wx Boundary* ribbon group, see Section 3.7.7.
- Environmental Justice layers, see Section 10.

Noise exposure, noise contour, pollutant concentration, concentration contour, and impact set layers require metric results to be run with the appropriate metric prior to generating layers. Tracks, receptor set, ambient map, and high-fidelity weather boundary layers can be generated without running metric results in advance.

Contour layers are displayed in the Web Mercator projection, but are stored in their original Lambert conformal conic projection (LCC). When layers are exported (Save as shapefile), the layers will be in the LCC projection. The contours are reprojected to Web Mercator (from LCC) for display.

The *Attributes* pane can be accessed by right-clicking on a desired layer in the *Layers* manager, see Section 3.7.9.

Layers can also be generated by right-clicking on a desired metric result in the *Metric Results* pane.

5.7.1 View Tracks Layer

1. In the *Metric Results* pane, select a desired metric result.
2. From the *View Layers* ribbon group, click the *Tracks* button.
3. The Tracks Layer is displayed on the map (Figure 5-37) and in the *Layers* manager.

> Some metric results do not have associated tracks (e.g., imported metric result and runup operations). For such metric results, an empty Tracks Layer will be generated.

Tracks Layer Attributes

The following attributes are available for the Tracks Layer: track name, aircraft type, airport, runway end, operation type, track type, subtrack ID, subtrack number, and percent dispersion (Figure 5-37). See Appendix B.3 for descriptions of the attributes.
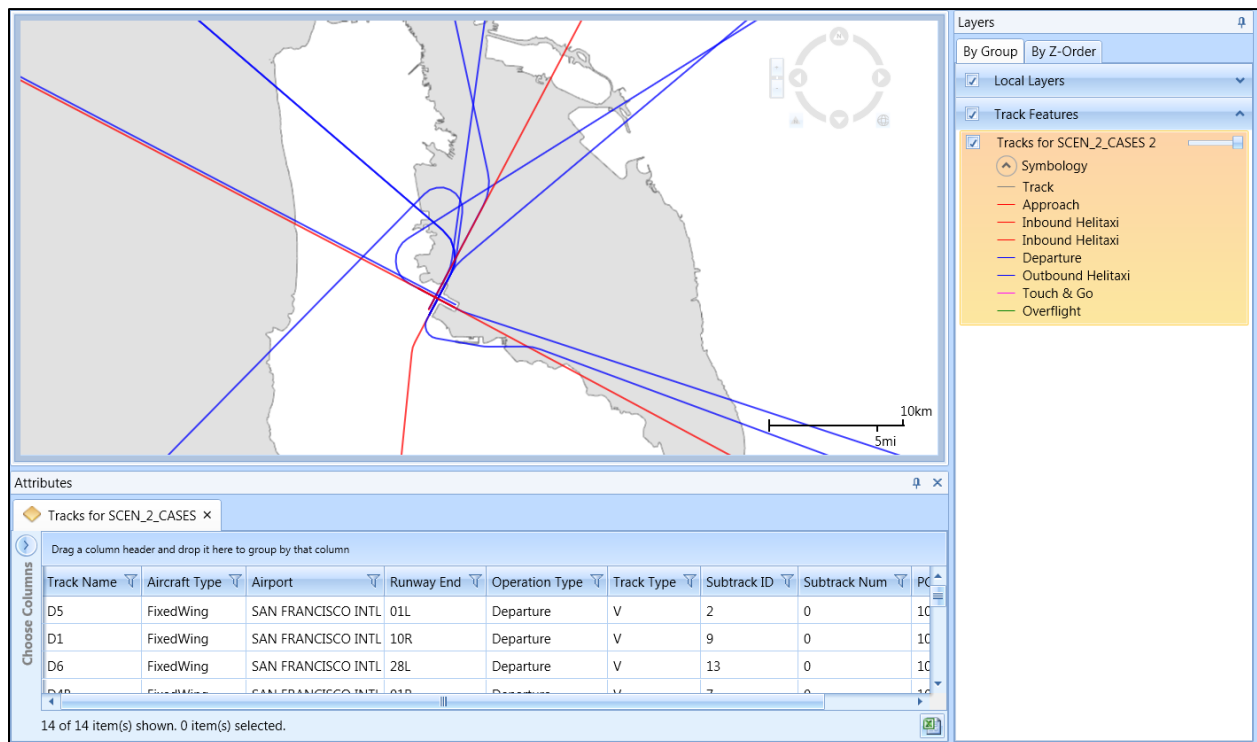
Figure 5-37 Sample Tracks Layer with Attributes

5.7.2 View Receptor Set Layer

1. In the *Metric Results* pane, select a desired metric result.
2. From the *View Layers* ribbon group, click the *Receptor Set* button.
3. The Receptor Set Layer is displayed on the map (Figure 5-38) and in the *Layers* manager.

> The receptor set that is assigned to either a noise metric result or a dispersion metric result can be viewed on map prior to running a metric result in the Metric Results tab or in the Definitions tab (Section 9.4). To view the layer with results after running the metric result, use the *Noise Exposure* button or the *Pollutant Concentration* button.

Receptor Set Layer Attributes

The following attributes are available for all Receptor Set Layers: receptor ID, receptor name, receptor index, receptor set ID, receptor set name, latitude, longitude, elevation (Figure 5-38). See Appendix B.3 for descriptions of the attributes.
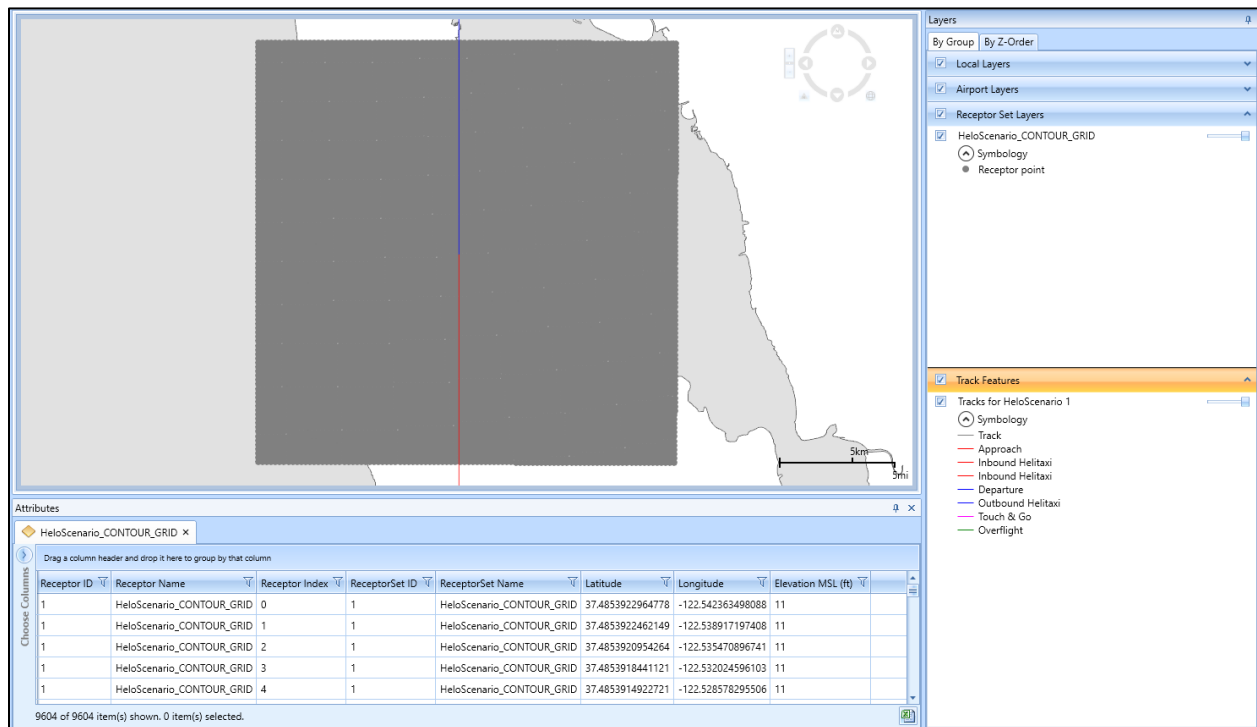
Figure 5-38 Sample Receptor Set Layer with Attributes – shown with Tracks

5.7.3 View Receptor Set Boundary Layer

1. In the *Metric Results* pane, select a metric result that uses a dynamic grid restricted by boundary.
2. From the *View Layers* ribbon group, click the *Receptor Set Boundary* button.
3. The Receptor Set Boundary Layer is displayed on the map (Figure 5-39) and in the *Layers* manager.

> This layer is only available for dynamic grid receptor sets that utilize the *Restrict Dynamic Grid By Boundary* feature.

Receptor Set Boundary Layer Attributes

The following attributes are available for the Receptor Set Boundary Layers: Object ID, and Type (Figure 5-39). See Appendix B.3 for descriptions of the attributes.
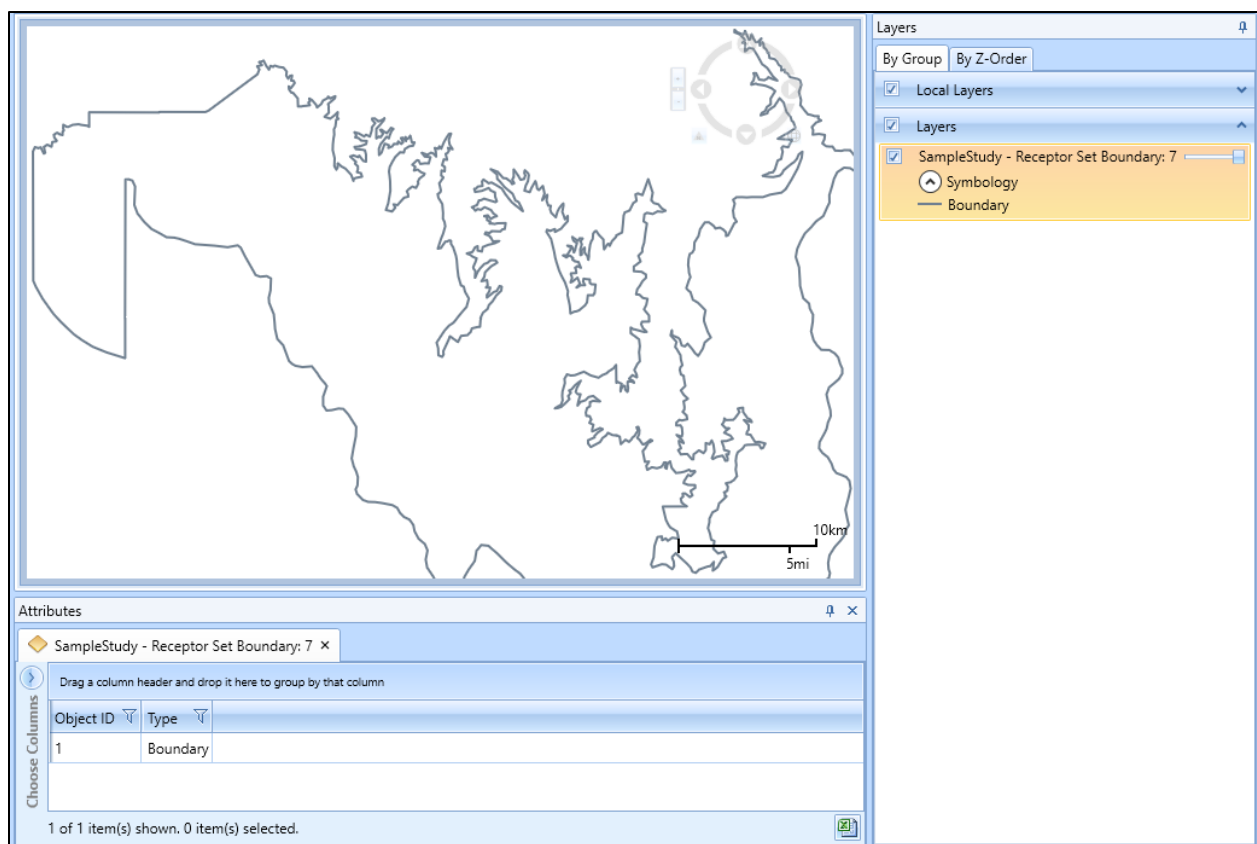
Figure 5-39 Sample Receptor Set Boundary Layer with Attributes

5.7.4 View Noise Exposure Layer

1. In the *Metric Results* pane, select a desired metric result.
2. From the *View Layers* ribbon group, click the *Noise Exposure* button.
   - For metric results processed with the Number Above Noise Level option, the *Receptor Set Settings* dialog is displayed (Figure 5-40).
   - Use the reported average, minimum, maximum, and standard deviation of the results to determine an appropriate display interval.
   - Enter the desired interval or accept the default interval which is the average.
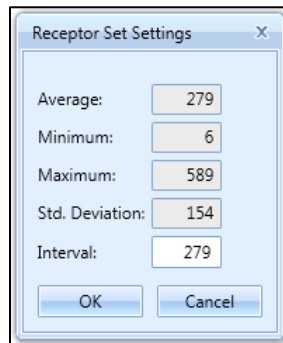
Figure 5-40 Receptor Set Settings Dialog for Number Above Noise Level

3. The Receptor Set Layer is displayed on the map (Figure 5-38) and in the *Layers* manager.
4. If desired, change the color properties of the Noise Exposure Layer in the *Layer Properties* dialog (see Section 3.7.8).

Noise Exposure Layer Attributes

The following attributes are available for all Noise Exposure Layers: receptor ID, receptor name, receptor index, receptor set ID, receptor set name, latitude, longitude, elevation, noise results (dB, Minutes, %, or Operation count), metric type, and metric name (Figure 5-38). See Appendix B.3 for descriptions of the attributes.

For metric results processed with the Number Above Noise Level option, the Noise Exposure Layer attributes will display the number of operations at or above the threshold at each grid point.

The area and percent area are displayed at the bottom of the *Attributes* pane. The area and percent area is calculated based on the visible records in the *Attributes* pane. For example, in order to calculate the area and percent area for all locations above 1 minute, filter the *Time (min)* column to display entries greater than 1. The area and percent area displays will update according to the filtered data.
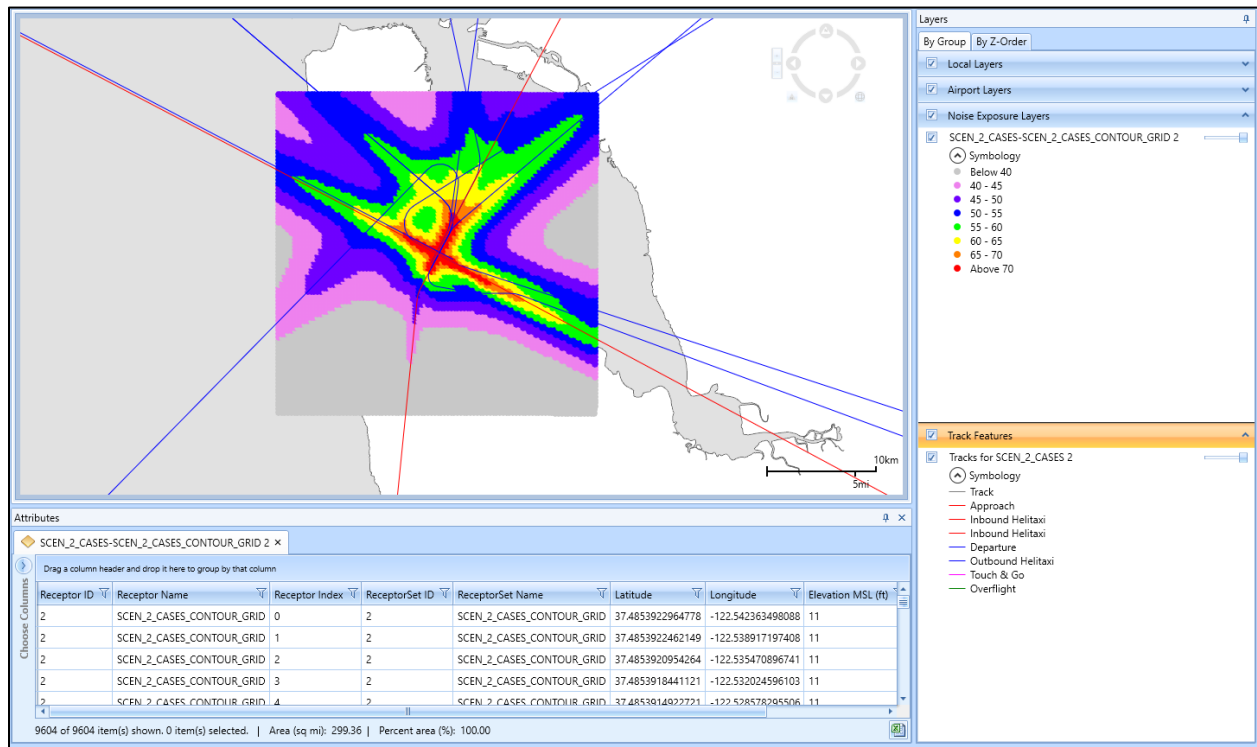
Figure 5-41 Sample Noise Exposure Layer with Attributes – Shown with Tracks

5.7.5 View Noise Contour Layer

1. In the *Metric Results* pane, select a desired noise metric result that has been processed with a point, grid or dynamic grid receptor set.

   📝 This feature is supported for all noise metrics except Number Above.

2. From the *View Layers* ribbon group, click the *Contour* button.
3. The *Contour Settings* dialog is displayed (Figure 5-42).
4. Either accept the default minimum, maximum, and increment values; or enter new settings.
   - Check the *Make these settings the defaults* checkbox to save the new settings as the default values.
5. Click *OK*.
6. The contour layer is displayed on the map (Figure 5-43) and in the *Layers* manager.
7. If desired, change the color properties of the contour layer in the *Layer Properties* dialog (see Section 3.7.8).
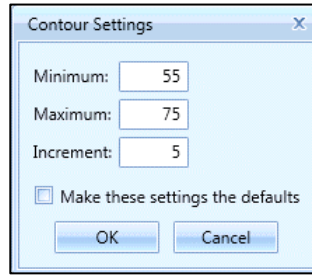
Figure 5-42 Contour Settings Dialog

Contour Layer Attributes

The following attributes are available for contour layers: object ID, contour, closed, area percent, cumulative percent, shape length, shape area, metric type, and metric name (Figure 5-43). See Appendix B.3 for descriptions of the attributes. Perc. Area (%) and Cum. Perc. Area (%) columns are calculated based on the receptor set area or boundary (if used).
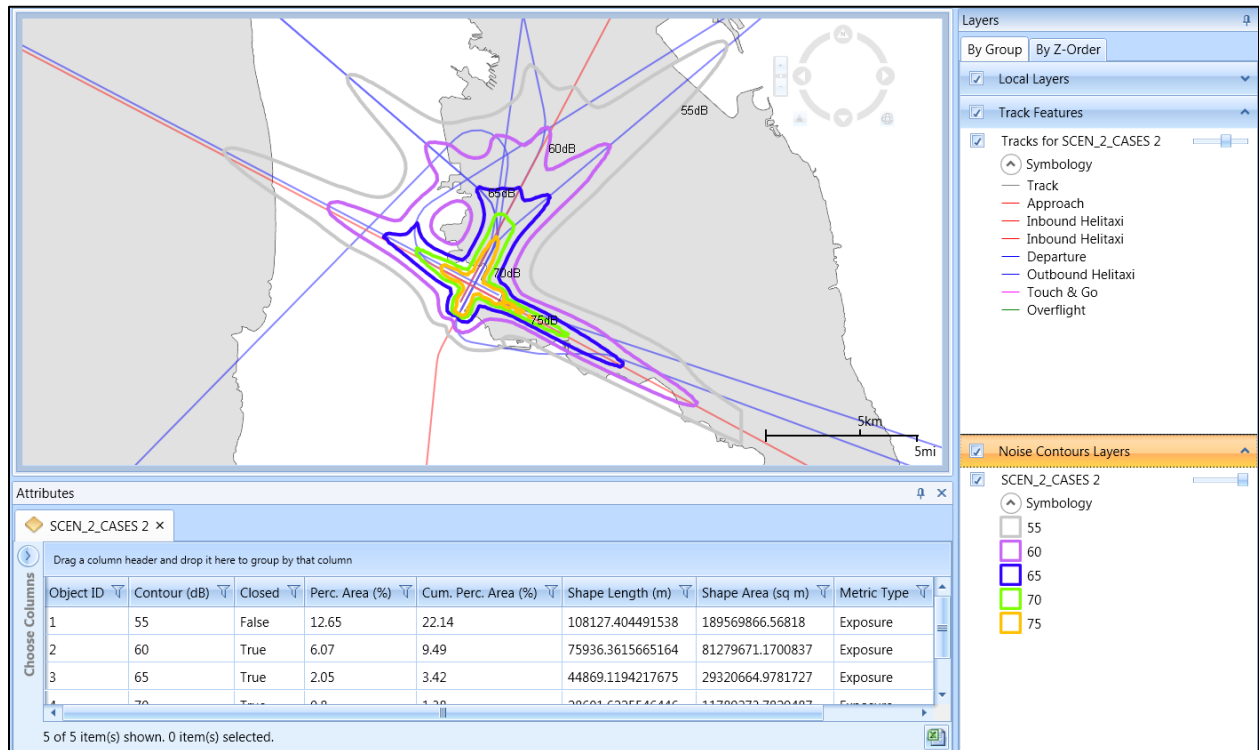
Figure 5-43 Sample Contour Layer with Attributes – Shown with Tracks

5.7.6 View Pollutant Concentration Layer

1. In the *Metric Results* pane, select an emissions dispersion metric result that has been processed.
2. From the *View Layers* ribbon group, click the *Pollutant Concentration* button.
3. The *Select Pollutant Concentration Results* dialog (Figure 5-44) is displayed.
4. Select the appropriate results to view on the map. Use the shift or ctrl key to select multiple results.
5. Select the appropriate scaling method for the values. The color display of the Concentration Contour Layer will be based on the selected *Scaling method.* It is recommended to use L*og10* scaling when concentration values are either very small or large.
6. Click *OK* to generate and display the concentration layers on the map (Figure 5-45) and in the *Layers* manager.
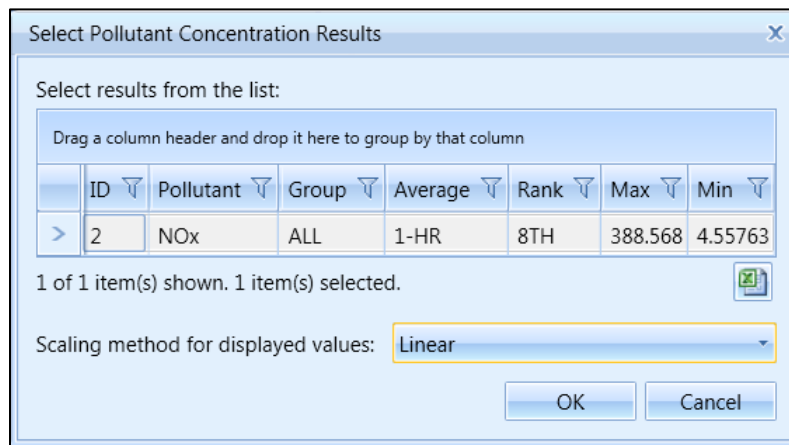
Figure 5-44 Select Pollutant Concentration Results Dialog

Pollutant Concentration Layer Attributes
The following attributes are available for all Pollutant Concentration Layers: latitude, longitude, symbology index, pollutant, measured date, average, rank, and group (Figure 5-45). See Appendix B.3 for descriptions of the attributes.

For metric results processed with the background concentration processing option, the following additional attributes will be displayed: Pollutant:Src, Pollutant:BG, and Pollutant: BGPeak.
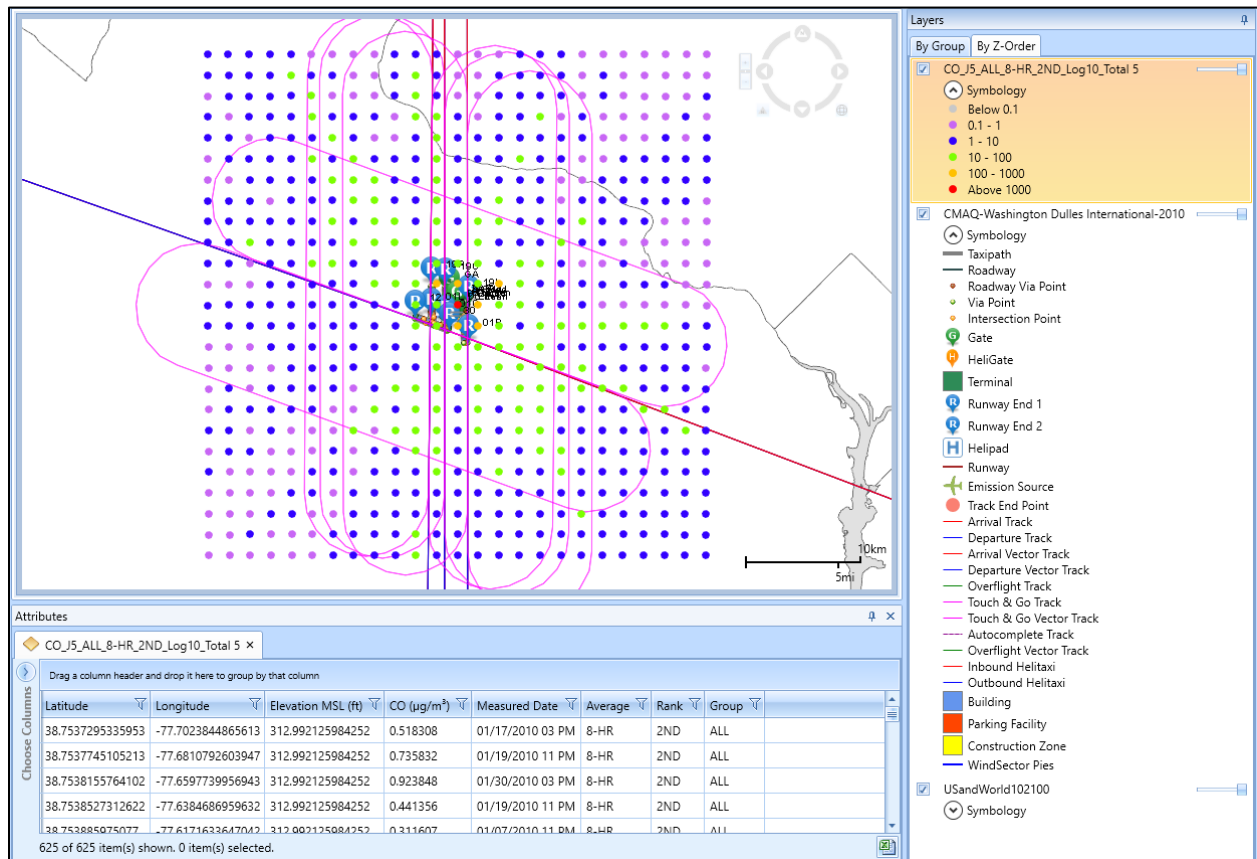
Figure 5-45 Sample Pollutant Concentration Layer with Attributes- Shown with Airport Layers

5.7.7 View Concentration Contour Layer

1. In the *Metric Results* pane, select an emissions dispersion metric result that has been processed.
2. From the *View Layers* ribbon group, click the *Concentration Contour* button.
3. The *Select Pollutant Concentration Results* dialog (Figure 5-44) is displayed.
4. Select the appropriate results to view on the map. Use the shift or ctrl key to select multiple results.
5. Select the appropriate scaling method *Log10* or *Linear* for the results. The color display of the Concentration Contour Layer will be based on the selected *Scaling method.* It is recommended to use L*og10* scaling when concentration values are small.
6. Click *OK* to generate and display the Concentration Contour Layers on the map (Figure 5-46) and in the *Layers* manager.

> Both open (Lines) and closed (Contours) emissions dispersion contours are displayed in the Concentration Contour Layers.

Concentration Contour Layer Attributes
The following attributes are available for all Concentration Contour Layers: object ID, concentration, shape length, shape area, group, average, rank, scaling method, and concentration (Figure 5-46). See Appendix B.3 for descriptions of the attributes.
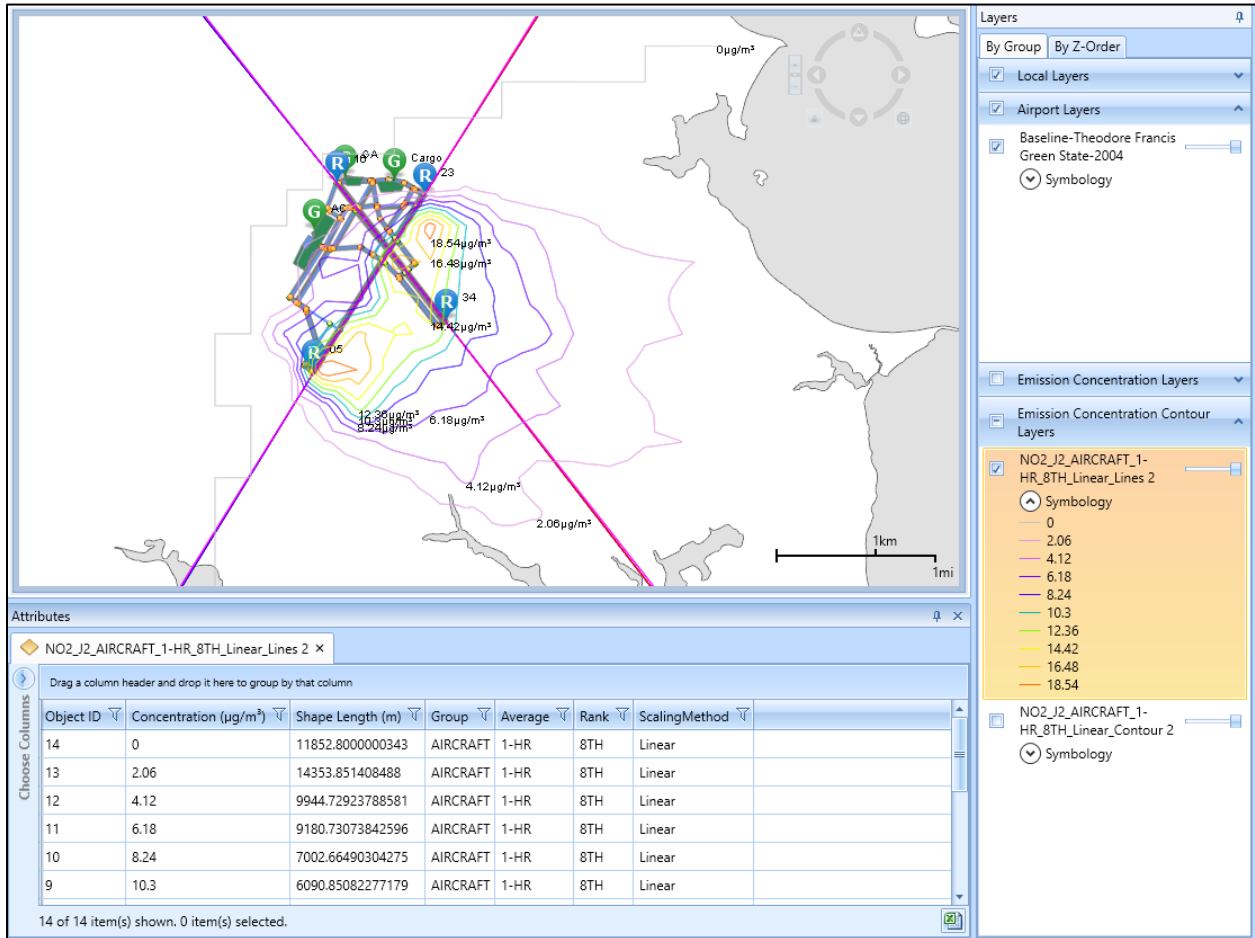
Figure 5-46 Sample Concentration Contour Layer with Attributes – Shown with Airport Layers

5.7.8 View Impact Set Layer

The Impact Set Layer displays a graphical comparison of noise results for the selected metric results.

An Impact Set Layer requires two processed metric results with:
- The DNL noise metric and the same receptor set; and
- Two different annualizations.

1. In the *Metric Results* pane, select two DNL noise metric results with different annualizations.
2. From the *View Layers* ribbon group, click the *Impact Set* button.
3. The Impact Set Layer is displayed on the map (Figure 5-47) and in the *Layers* manager.

Impact Set Layer Attributes

The following attributes are available for Impact Set Layers: latitude, longitude, base noise, alternative noise, change in noise, impact color, and impact range (Figure 5-47). See Appendix B.3 for descriptions of the attributes.
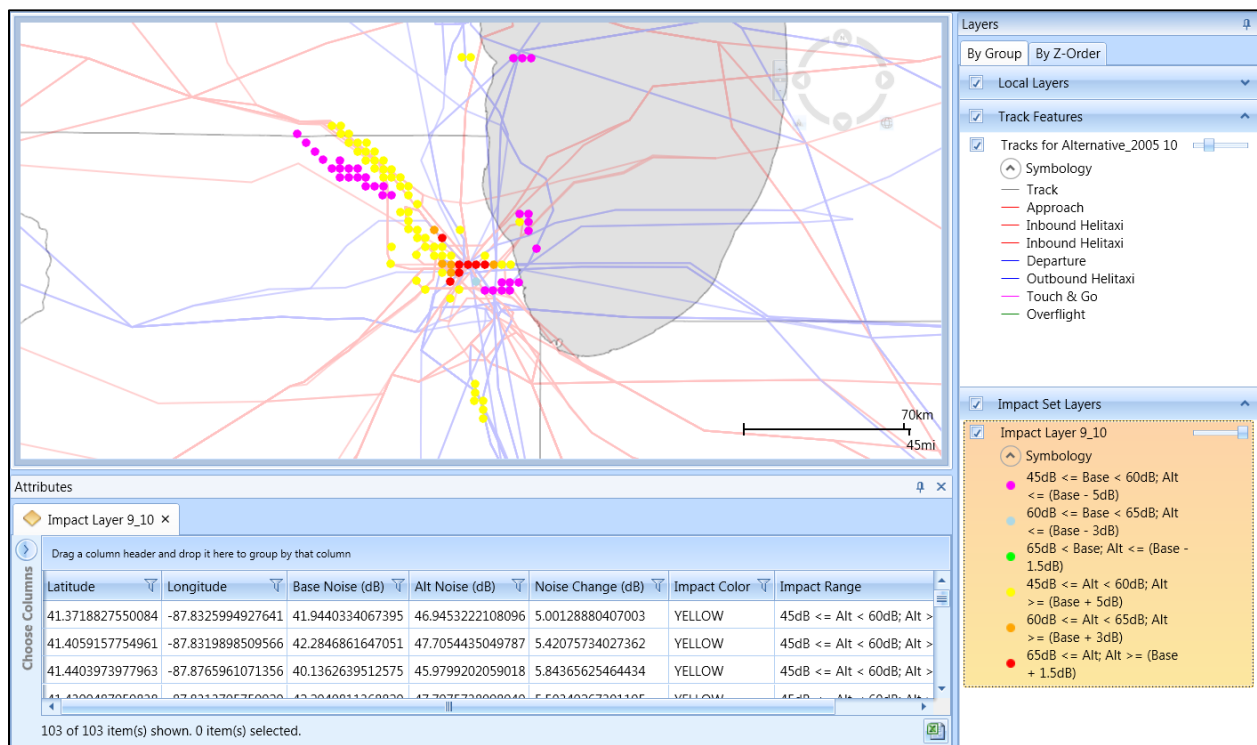
Figure 5-47 Sample Impact Set Layer with Attributes – Shown with Tracks

5.7.9 View Time Audible Ambient Map

Ambient maps used for time audible metrics can be viewed on the map when an identifier, ambient map file, spectral data file, and hash key are defined in the *Study* tab, *Preferences* section. See Appendix E for more information on how to obtain the required information and for details on the ambient file.

1. In the *Metric Results* pane, select a time audible noise metric result.
2. From the *View Layers* ribbon group, click the *Ambient Map* button.
3. The ambient map layer is displayed on the map (Figure 5-48) and in the *Layers* manager.

Time Audible Ambient Map Attributes

The following attributes are available for Time Audible Ambient Map Layer: latitude, longitude, ambient noise level, and x and y coordinates (Figure 5-48). See Appendix B.3 for descriptions of the attributes.
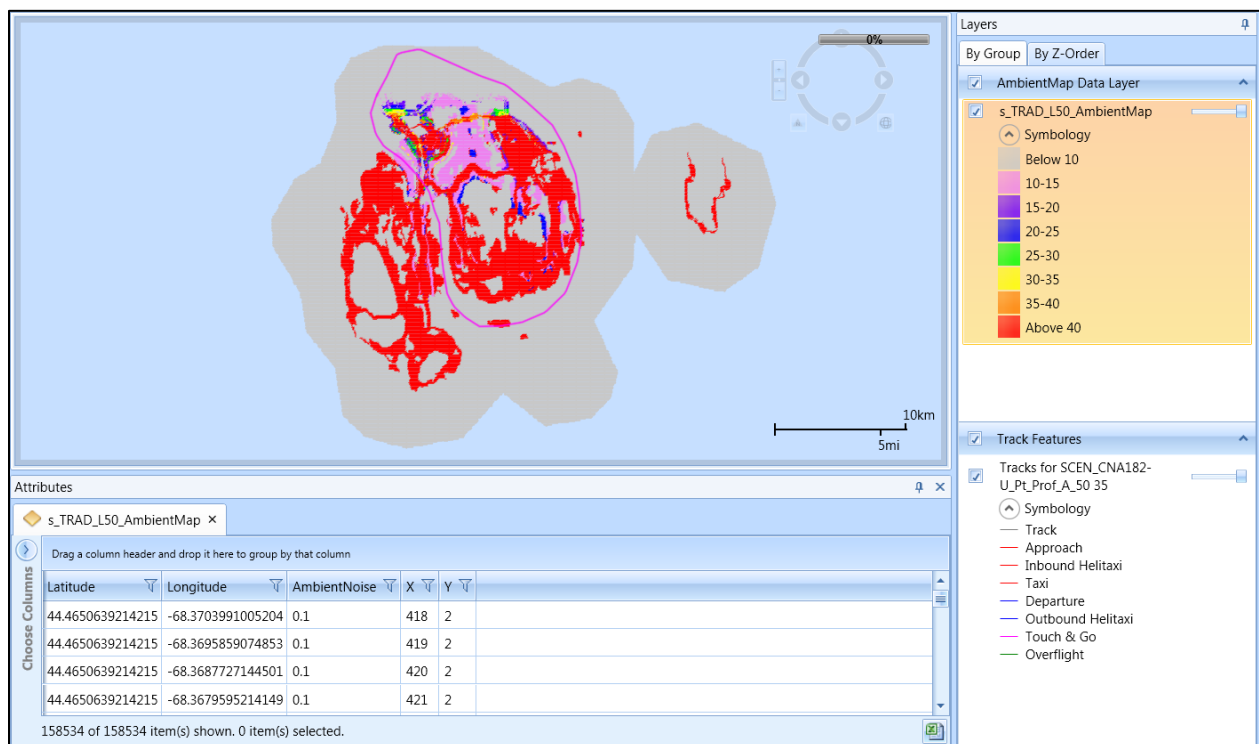
Figure 5-48 Sample Ambient Map Layer with Attributes – Shown with Tracks

5.7.10 View Surface Sector

For emission dispersion analyses, emissions dispersion weather data must be provided, see Section 9.6.3. Surface characteristics can be entered or imported from an AERSURFACE output file from EPA's AERSURFACE program. Sector data contained in the AERSURFACE output file can be visualized on the map using this feature.

1. From the *View Layers* ribbon group, click the *Surface Sector* button.
2. Select an AERSURFACE output file.
3. The Surface Sector Layer is displayed on the map (Figure 5-49) and in the *Layers* manager.

Surface Sector Layer Attributes

The following attributes are available for Surface Sector Layers: Airport/Non-Airport, Latitude, Longitude, Radius, Start, End, Freq. Index, Albedo, Bowen Ratio, and Roughness. See Appendix B.3 for descriptions of the attributes.
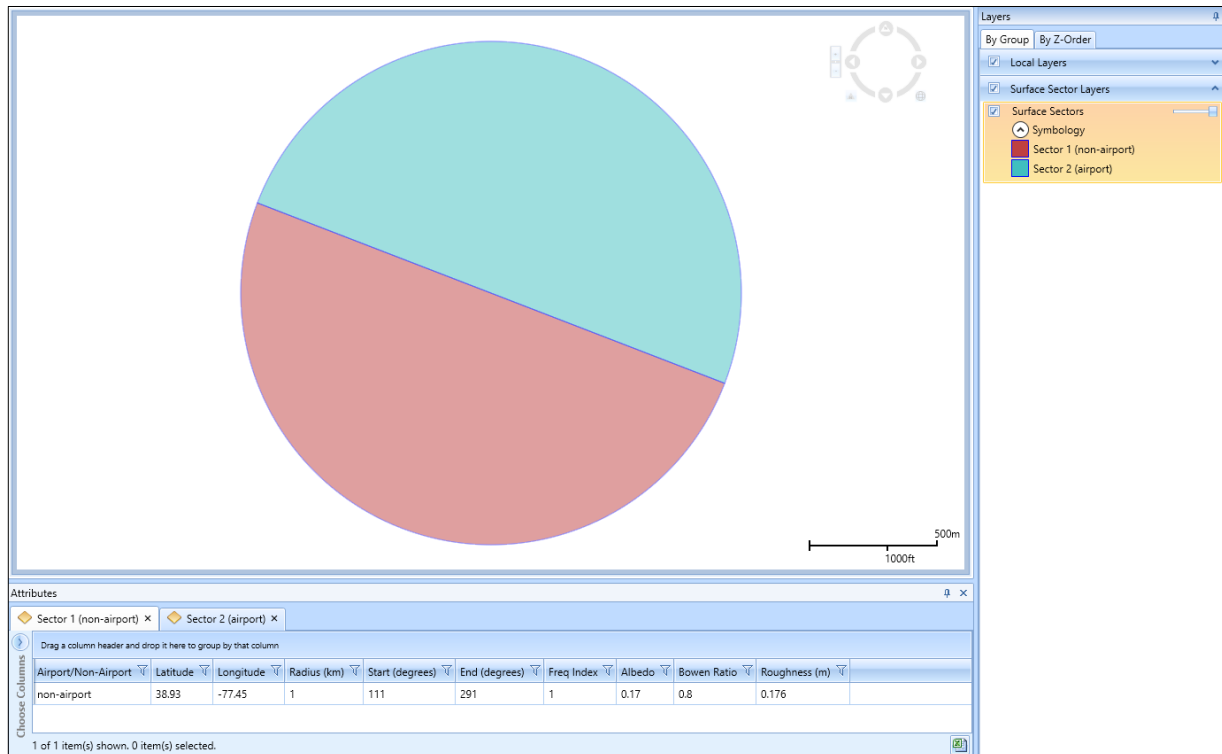
Figure 5-49 Sample Surface Sector Layer with Attributes

5.8 Clip Noise Contour

A Noise Contour Layer can be clipped by creating and selecting a boundary layer to be clipped against.
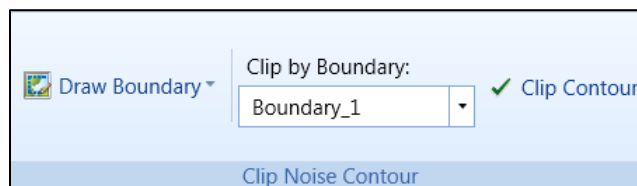
Figure 5-50 Clip Noise Contour

To clip a noise contour by a boundary layer:
1. Generate the desired Noise Contour Layer.
2. Draw a boundary according to the instructions below.
3. In the *Layers* manager, select the noise contour to clip.
4. In the *Clip Noise Contour* ribbon group, select the boundary from the *Clip by Boundary* drop-down menu.
5. In the *Clip Noise Contour* ribbon group, click the *Clip Contour* button to clip the selected noise contour by the selected boundary. A new clipped Noise Contour Layer will be created with the "_Clipped" in the layer name. The original (unclipped) contour layer will remain in the *Layers* manager.

There are multiple ways to define a boundary layer to clip a contour against. To create a boundary layer for clipping, follow the instructions below.

To create a boundary as a circle based on a radius:
1. In the *Metric Results* tab, *Clip Noise Contour* ribbon group, click *Draw boundary circle based on radius*.
2. Click on the desired location for the center of the circle on the map to open the *Draw Circle Boundary* dialog.
3. Enter the desired radius for the circle and select the units from the drop-down menu.
4. Click *OK.* The layer is created and displayed on the map and in the *Layers* manager.

To create a boundary as a circle:
1. In the *Metric Results* tab, *Clip Noise Contour* ribbon group, click *Draw boundary circle.*
2. Click once and hold the mouse button down on the desired location for the center of the circle on the map.
3. Drag the mouse on the map to define the size of the circle. Release the mouse button to complete the circle. The layer is created and displayed on the map and in the *Layers* manager.

To create a boundary as a box:
1. In the *Metric Results* tab, *Clip Noise Contour* ribbon group, click *Draw boundary box*.
2. Click once and hold the mouse button down on the desired location for the top left corner of the box on the map.
3. Drag the mouse on the map to define the size of the box. Release the mouse button to complete the box. The layer is created and displayed on the map and in the *Layers* manager.

To create a boundary as a polygon:
1. In the *Metric Results* tab, *Clip Noise Contour* ribbon group, click *Draw boundary polygon*.
2. Click on the desired location on the map for the starting point of the polygon.
3. Click on other areas of the map to create corners for the polygon. Double-click on the last location to complete the polygon. The layer is created and displayed on the map and in the *Layers* manager.

5.9   Reports View

Reports can be generated in the reports view of the *Metric Results* tab. The available reports are described in the sections below. See Appendix B.4 for detailed information about each field.

To switch to the Reports view:
1. Click the *Reports* button in the *Display* ribbon group (Figure 5-51).
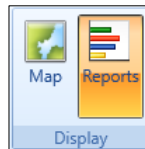
Figure 5-51 Metric Results Tab – Display Ribbon Group

2. The Reports workspace (center work area) and the Reports manager (right work area) are displayed.
3. The *Reports* ribbon group is displayed (Figure 5-52).
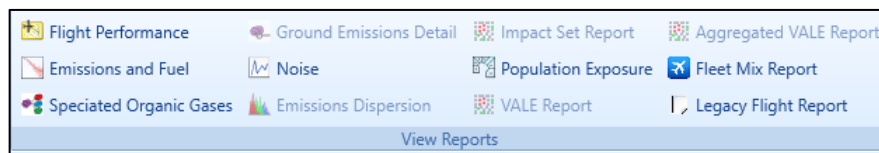
Figure 5-52 Ribbon Group – View Reports

Reports Manager

The Reports manager is displayed in the right work area when the reports view is active and lists open reports. By default, the metric result ID number is added at the end of the report name. Reports can be renamed by double-clicking on the report name. Reports can be deleted by clicking the *Delete* icon next to the report name.

5.9.1 View Flight Performance Report

The Flight Performance Report contains two tabs. The *Flight Operations* tab displays shows the flight performance of the aircraft operations for the selected metric result. The *Flight Segments* tab displays detailed segment-level results for a selected flight operation.

To view the Flight Performance Report:
1. Select the desired metric result from the *Metric Results* pane.
2. From the *View Reports* ribbon group, click *Flight Performance* (Figure 5-52). The graph is displayed.
3. Select events to view using either the *Flight Operations* or *Flight Segments* tab as described below.

Flight Operations Tab:
1. Select a desired row from the table to view the corresponding graph. Select up to 10 rows at one time.
2. Select the desired X *axis* and Y *axis* parameters from the drop-down menus.
3. Select the desired *X unit* and *Y unit* from the drop-down menus.
4. Click the *Excel* icon to export the report data.

Flight Segments Tab:

1. Select operation(s) in the *Flight Operations Tab* as described above.
2. Click *Flight Segments* tab.
3. Select an event from the *Event ID* drop-down menu.
4. Each row in the table represents a segment in the selected event. Select a row from the table to view the segment on the map.
5. Click the *Excel* icon to export the report data.
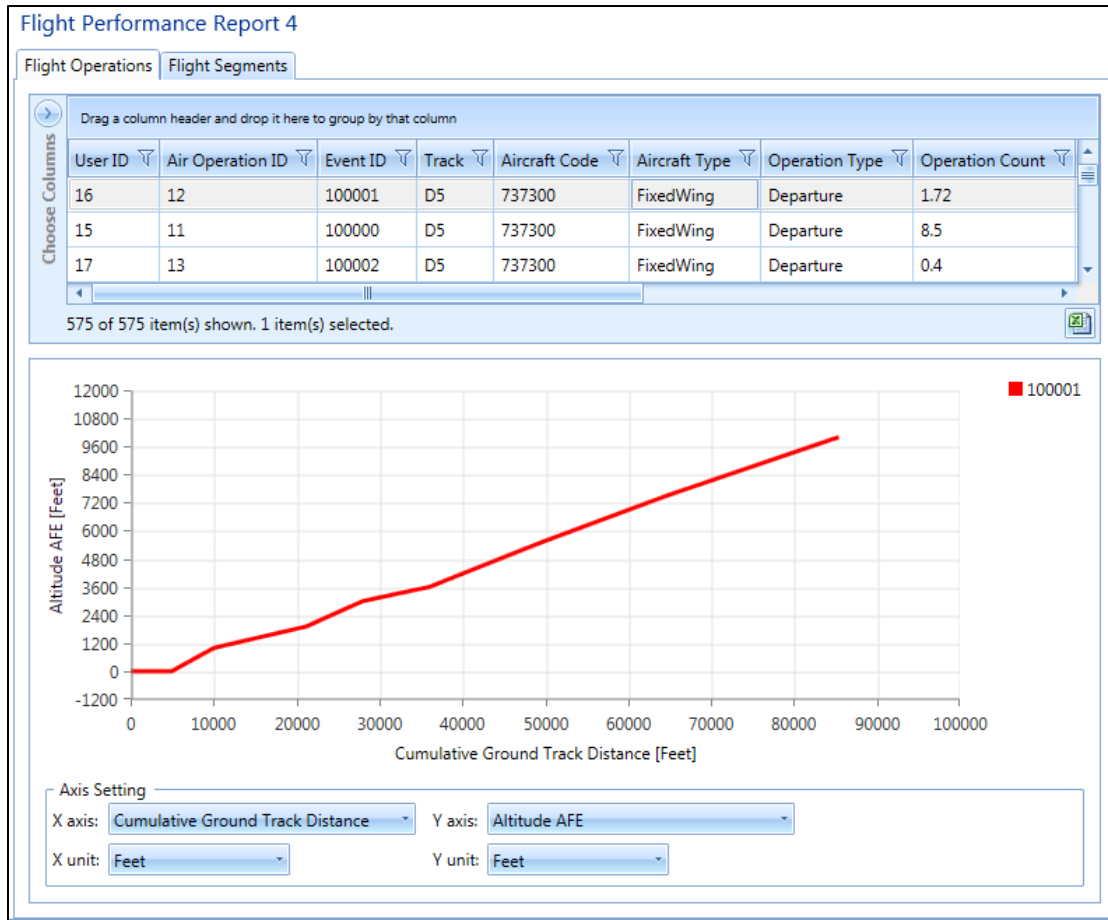
Figure 5-53 Sample Flight Performance Report

5.9.2 View Emissions and Fuel Report

The Emissions and Fuel Report contains emissions and fuel results for the selected metric result, operation group(s), and grouped by the selected summary option.

When metric results are run with Emissions Result Storage Options set to Segment, the results can be very large. Rather than generating the Emissions and Fuel Report, users may wish to view these results in SQL Server Management Studio. While the results are stored in the RSLT_EMISSIONS_SEGMENT SQL table, it is recommended to use the Rslt_Emissions_Segment_View_J# companion view which is create per metric result where the J# in the view name corresponds to the metric result ID. To access this view, in SQL Server Management Studio, expand the Study Database (e.g., STUDY_INM), *Views* folder.

To generate the Emissions and Fuel Report:
1. Select the desired metric result from the *Metric Results* pane.
2. From the *View Reports* ribbon group, click *Emissions and Fuel* (Figure 5-52) to open the report.
3. Select the *Operation Group, Group by, and Units* options from the drop-down menus.
4. Click *Generate Report*.
5. Click the *Excel* icon to export the report data.

What are the *Group by* options in the Emissions and Fuel Report?

- Annualized Operations Group Summary: Summarizes annualized results by operation group and mode; and displays results that reflect the operation count and the annualization weightings

- Annualized Operations Summary: Summarizes annualized results by events; displays results that assume an operation count of one (1) and the annualization weightings

- Annualized Operations Mode: Summarizes annualized results by event and mode; displays results that assume an operation count of one (1) and the annualization weightings

- Annualized Operations Detail: Summarizes annualized results by events at the segment level; displays results that assume an operation count of one (1) and the annualization weightings

- Operation Group Summary (Not Annualized): Summarizes results by operation group and mode; and displays results that reflect the operation count of each operation

- Operations Summary (Not Annualized): Summarizes results by events (individual flights); displays results that assume an operation count of one (1)

- Operations Mode (Not Annualized): Summarizes results by event and mode; displays results that assume an operation count of one (1)

- Operations Detail (Not Annualized): Summarizes results by events at the segment level; displays results that assume an operation count of one (1)

What are the *Mode* categories in the Emissions and Fuel Report?

- Startup: Startup emissions if *Calculate aircraft engine startup emissions* is selected when defining a metric result. Startup emissions only exists for departure operations.
- Taxi out: Taxi emissions when taking off. Taxi out does not include startup emissions. Taxi emissions could include contributions from the following taxi modes if selected when defining /copying a metric result:
    - Flight-based taxi in/out mode (*Study* tab, *Prefrences, Emissions*, *Enable flight-based taxi times*)
    - Airport layout-based taxi in/out mode (*Airports* tab, *Edit Airport Layout* dialog, *Taxi-in time* and *Taxi-out time*)
    - Delay and sequencing modeling taxi (*Metric Results* tab, *Define* or *Copy* metric result, *Set Processing Options, Apply Delay & Sequencing Model*)
- Climb Ground: Includes summary of the takeoff ground roll, Taxi out, and Startup emissions.
- Climb Below 1000 ft AFE: Includes summary of the Climb Ground emissions and emissions from the takeoff airborne flight segments below 1000 feet AFE.
- Climb Below Mixing Height (3000 ft AFE)[4]: Includes summary of the Climb Below 1000 emissions and emissions of the takeoff airborne and climb flight segments below the mixing height, which is typically approximately 3000 feet AFE.
- Climb Below 10000 ft AFE: Includes summary of the Climb Below Mixing Height (3000 ft AFE)[4] and the emissions from climb and departure cruise flight segments below 10000 feet AFE.
- Above 10000 ft AFE: Emissions from the flight segments above 10000 feet AFE.
- Descend Below 10000 ft AFE, Descend Below Mixing Height (3000 ft AFE)[4], Descend Below 1000 ft AFE, Descend Ground, Taxi In: The arrival modes which are reciprocal to the departure modes. For example, Descend Ground includes summary of the landing ground roll emissions and arrival taxi emissions.
- Full Flight: Full flight emissions. Stationary, GSE, and APU emissions are not included.
- Stationary Sources: Emissions from stationary sources.
- APU: Emissions from the auxiliary power units equipment associated with aircraft operations (1 or 0 per operation).
- GSE LTO: Emissions from the ground support equipment associated with aircraft operations (many to 0 per operation).
- GSE Population: Emissions from the ground support equipment not directly associated with aircraft operation.
- Runup Preflight Check: Emissions from preflight runups in the preflight category (Section 6.4.1.4), if a preflight runup operation is included in the annualization.

---

[4] 3000 ft AFE or as specified in the annualization definition. Note that NvPM calculations always use a mixing height of 3000 ft AFE regardless of specified mixing height in the annualization definition.

- Runup Engine Maintenance: Emissions from engine maintenance runups (Section 6.4.1.4), if an engine maintenance runup operation is included in the annualization.

- MOVES Roadways: Emissons from roadway operations evaluated externally with MOVES and imported using the MOVES inventory file on the *Definitions* tab.

- MOVES Parking Facilities: Emissons from parking facility operations evaluated externally with MOVES and imported using the MOVES inventory file on the *Definitions* tab.

- MOVES Construction: Emissons from construction operations evaluated externally with the MOVES and imported using the MOVES inventory file on the *Definitions* tab.

Figure 5-54 Sample Emissions and Fuel Report

5.9.3 View Speciated Organic Gases Report

The Speciated Organic Gases (SOG) Report contains annualized, modal-level results (below the mixing height only) grouped by airports when the Emissions Results Storage Option is set to Operation or Segment. Only the applicable hazardous air pollutants (HAPs) are displayed.

> To limit the output to only those organic gases listed in EPA's Integrated Risk Information System (IRIS), check the box next to the *Only Include IRIS-Listed Pollutants in SOG Output* option in the *Study* tab, *Preferences, Emissions* section (see Appendix B.1.13).

> When metric results are run with Emissions Result Storage Options set to Segment, the results can be very large. Rather than generating the Speciated Organic Gases Report, users may wish to view these results in SQL Server Management Studio. The results are stored in the SOGReport# table where '#' is the metric result ID.

To generate the Speciated Organic Gases report:
1. Select the desired metric result from the *Metric Results* pane.
2. From the *View Reports* ribbon group, click *Speciated Organic Gases* (Figure 5-52) to open the report.
3. Select the desired units from the *Units* drop-down menu.
4. Click *Generate Report.*
5. Click the *Excel* icon to export the report data.

Figure 5-55 Sample Speciated Organic Gases Report

5.9.4 View Ground Emissions Detail Report

The Ground Emissions Detail Report emissions results from ground equipment such as APU, ground support equipment (GSE) linked to aircraft operation, GSE population, and stationary sources. The results in this report are not annualized and assume an operation count of one (1).

> When metric results are run with Emissions Result Storage Options set to Segment, the results can be very large. Rather than generating the Ground Emissions Detail Report, users may wish to view these results in SQL Server Management Studio. The results are stored in the GroundEmissionsDetail# table where '#' is the metric result ID.

To generate the Ground Emissions Detail Report:
1. Select the desired metric result from the *Metric Results* pane.
2. From the *View Reports* ribbon group, click *Ground Emissions Detail* (Figure 5-52) to open the report.
3. Select the desired units from the *Units* drop-down menu.
4. Click *Generate Report.*

> Check the *Generate Speciated Organic Gas Table* box to generate the GroundEmissionSOGDetail# table in the study database where the # in the name corresponds to the metric result ID.

Figure 5-56 Sample Ground Emissions Detail Report

5.9.5 View Noise Report

The Noise Report contains noise results for the selected metric result.

To generate the Noise Report:
1. Select the desired noise metric result from the *Metric Results* pane.
2. From the *View Reports* ribbon group, click *Noise* (Figure 5-52) to open the report.
3. Click the *Excel* icon to export the report data.

> For metric results processed with the Number Above Noise Level option, the Noise Report will display the count of operations above the threshold. The noise levels in dB will not be displayed.

> When the results storage option is set to *Detailed*, detailed noise results will be computed for each grid point and every combination of aircraft, profile, and track and displayed in the Noise Report. See Appendix G for the list of displayed data.

Figure 5-57 Sample Noise Report

5.9.6 View Emissions Dispersion Report

The Emissions Dispersion Report contains emissions dispersion results for the selected metric result.

To generate the Emissions Dispersion Report:
1. Select the desired emissions dispersion metric result from the *Metric Results* pane.
2. From the *Reports* ribbon group, click *Emissions Dispersion* (Figure 5-52) to open the report.
3. Select the appropriate results to view in the report. Use the shift or ctrl key to select multiple results.
4. Click *Generate Report*.
5. Click the *Excel* icon to export the report data.

Figure 5-58 Sample Emissions Dispersion Report – Single Pollutant Metric Result

Figure 5-59 Sample Emissions Dispersion Report – Combined Metric Result with Multiple Pollutants

5.9.7 View Impact Set Report

The Impact Set Report displays tabular and graphical noise results for the selected metric results.

An Impact Set Report requires two processed metric results with:
*   The DNL noise metric and the same receptor set; and
*   Two different annualizations.

To generate an Impact Set Report:

1. Select the two processed metric results from the *Metric Results* pane.
2. From the *View Reports* ribbon group, click *Impact Set Report* (Figure 5-52). The Impact Set Report will open, displaying tabular and graphical noise results.
3. Click the *Reverse Baseline and Alternative* arrow button to reverse baseline and alternative metric results.
4. If the selected metric results were assigned population receptors (as opposed to grid receptors), then the following radio buttons will be displayed:
    - Show receptor counts
    - Show population counts

Impact Set Table

The impact set table shows the number of receptors or population count exposed to specific ranges of noise for both the baseline and alternative scenarios depending on the selected receptor set. Each column corresponds to an exposure range under the baseline scenario and each row corresponds to an exposure range under the alternative scenario. Changes in distribution of exposures between the baseline and alternative scenarios can be viewed by looking at a specific column and row in the matrix.

The green color in the impact table (Figure 5-60) represents a decrease in noise level from the baseline to the alternative, while red shows an increase in the noise level from the baseline to the alternative.

Impact Report 9_10

Report Info
Baseline: Baseline.config
Alternative: Alternative.config
Receptor Set: gridfile_50x50

Reverse Baseline and Alternative

Impact Set Table

Baseline

Noise Range	0 to 45 dB	45 to 50 dB	50 to 55 dB	55 to 60 dB	60 to 65 dB	65 to 70 dB	>= 70 dB	Total
0 to 45 dB	2192	29	3	0	0	0	0	2224
45 to 50 dB	88	62	5	3	1	0	0	159
50 to 55 dB	8	27	32	0	0	0	0	67
55 to 60 dB	0	3	11	14	1	0	0	29
60 to 65 dB	0	0	2	3	8	0	0	13
65 to 70 dB	0	0	1	0	2	2	0	5
>= 70 dB	0	0	0	0	0	1	2	3
Total	2288	121	54	20	12	3	2	2500

8 of 8 item(s) shown. 0 item(s) selected.

Noise Legend
Increase
Decrease

Total Above 65 dB
Baseline: 5
Alternative: 8

Figure 5-60 Sample Impact Set Table

Impact Set Graph

The impact set graph shows detailed comparative data for receptors exposed to specific ranges of noise. Data are color-coded as described below. The *Change Summary* table provides a summary of the number of receptors or the population count that has either entered or exited the 65 dB or greater criteria for a comparison of two scenarios.

To read an impact set graph:

1. By reading the graph as a matrix, the user can determine the population count or number of receptors that have changed category between the baseline scenario and the alternative scenario.
2. The color coding of warm (red, orange, and yellow) and cool (purple, blue, and green) colors allows easy reference when there has been a reduction or an increase in noise (Figure 5-61).
3. Example (Figure 5-61):
   a. Locate the circled area on the graph.
   b. Trace up to the *Baseline DNL (dB)* noise level ranges. For this case, the range is 60-65 dB.
   c. Trace over to the *Alternative DNL (dB)* noise level ranges. For this case, the range is 65-70 dB.
   d. In this example, one receptor has changed from 60-65 dB to 65-70 dB from the baseline to alternative scenarios, so the circled area is colored red.
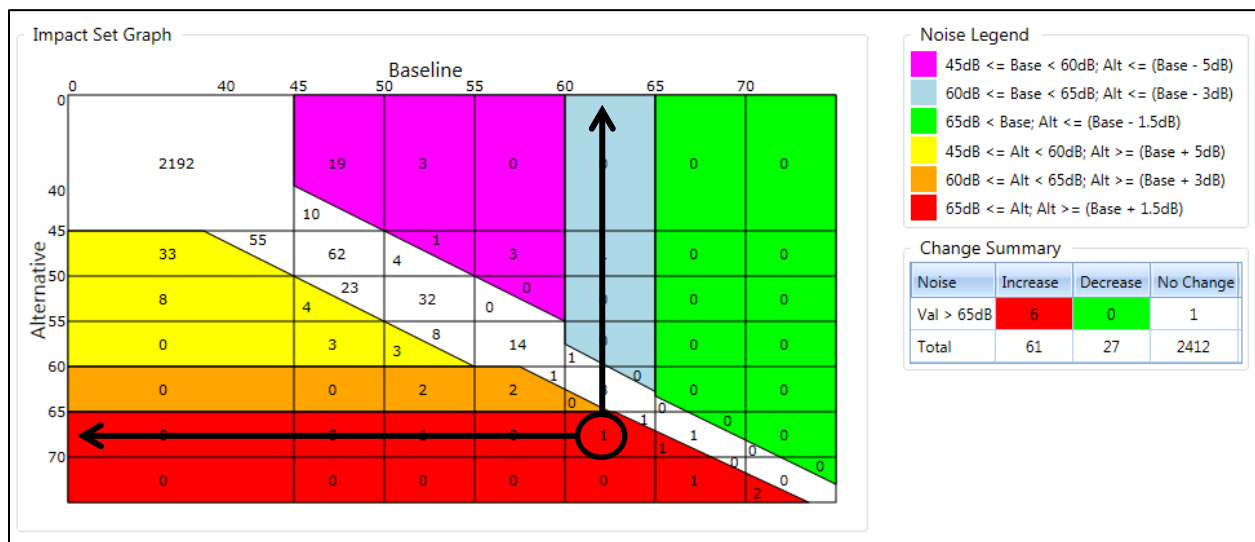
Figure 5-61 Sample Impact Set Graph

Color Coding

Color coding is utilized in viewing changes in noise levels between two metric results in an impact set graph. The colors visually represent an increase or decrease in noise level between two metric results, e.g., baseline scenario vs. alternative scenario.

Table 5-6 shows the criteria for the color coding. The color coding is defined according to FAA Order 1050.1F. The warm colors (red, orange, and yellow) represent an increase in noise level from the baseline scenario to the alternative scenario. The cool colors (purple, blue, and green) represent a decrease in noise level from the baseline to the alternative scenario. No color or white represents no change in noise level from the baseline scenario to the alternative scenario.

Table 5-6 Color Coding Based on Change in DNL

Baseline DNL	Change in Noise Level from Baseline to Alternative	
	Increase	**Decrease**
< 45 dB	No color	No color
45-<50 dB	+ 5 dB (yellow)	- 5 dB (purple)
50-<55 dB		
55-<60 dB		
60-<65 dB	+ 3 dB (orange)	- 3 dB (blue)
> 65 dB	+ 1.5 dB (red)	- 1.5 dB (green)

5.9.8 View Population Exposure Report

The Population Exposure Report can be generated for an existing Noise Contour Layer. In order to view this report, first generate a Noise Contour Layer that will be used to calculate population exposure.

AEDT 3f requires 2020 U.S. Census data in order to generate the Population Exposure Report and must exist in the directory specified in the *Census data folder* setting in the *Study* tab, *Preferences*, *Population Exposure Model* screen. For information on downloading 2020 U.S. Census data, see "Using US Census Bureau Data in AEDT" on the AEDT Support website, Downloads page.

> ⚠️ The *Census data folder* must be located in a folder path without any spaces. The Population Exposure Report will not generate if Census data are located in a directory with spaces.

> ⚠️ The *Census geodatabase cache folder* setting must be unique per study.

To generate the Population Exposure Report:
1. From the *View Reports* ribbon group, click *Population Exposure* (Figure 5-52) to open the Population Exposure Report.
2. Select the desired Noise Contour Layer from the drop-down menu. If no layers are listed in the drop-down menu, generate a Noise Contour Layer.
3. Click *Calculate Population Exposure*.
4. Click the *Excel* icon to export the report data.
5. Click the *Detailed Logs* arrow icon to view the log messages. The log messages are also written to the *PopulationExposureModule.txt* file in the AEDT Logs folder (e.g., *C:\AEDT\Logs*).

> 📝 Generating the Population Exposure Report can take several minutes (e.g., more than 10 minutes) depending on the input data and the computer performance.

Figure 5-62 Sample Population Exposure Report

5.9.9 View VALE Report

A Voluntary Airport Low Emissions (VALE) reduction Report shows net differences in emissions between a baseline and an alternative (VALE) metric result for a single analysis year. The baseline scenario simulates existing conditions while the alternative scenario conveys hypothetical equipment replacements. VALE analysis years are specified in the *Define Metric Result* wizard, *Set Processing Options* step. In order to create metric results to use in VALE reporting, define a metric result that represents the baseline and another metric result that represents the alternative. The VALE Report will display the change in emissions for the two metric results that are selected. For more information on defining metric results, see Section 5.2.

> In order to include emissions from MOVES sources (roadway, parking facility, and/or construction) in the VALE Report, select desired MOVES Inventory Scenario(s) in the *Define Metric Result* wizard, *Set Processing Options* step. See Section 5.2.4.3. Each of the MOVES sources included in the metric results will be displayed in the *VALE Report Settings* dialog as an operation group.

Users can generate a single VALE Report for a particular VALE analysis year using the *VALE Report* button. Additionally, users can use the *Aggregated VALE Report* button to generate an Aggregated VALE Report that spans a set of analysis years, by selecting a set of metric results that share a common pair of baseline and alternative scenarios. The *Aggregated VALE Report* button should be used for aggregating single VALE Reports where each single VALE Report does not necessarily have the same baseline-alternative annualization pair as another VALE Report with which it is being aggregated, see Section 5.9.10.

To generate an individual VALE Report:
1. Select two processed Emissions metric results from the *Metric Results* pane. The two metric results must have different annualizations and a common analysis year.
2. From the *View Reports* ribbon group, click *VALE Report* to open the *VALE Report Settings* dialog (Figure 5-63).

3. The *Baseline* list displays operation groups in the first metric result. The *VALE* list displays operations groups in the second metric result. Select desired operation groups to compare from each list then click *Match*.
   - It is possible to match multiple baseline operation groups to one *VALE* operation group.
   - Select an entry in the *Matched Items* list and click *Unmatch* to unmatch the operation groups.
   - Operation groups must have distinct names.
4. To switch the Baseline and VALE metric results, click the swap arrow button.
5. Click *OK* to generate the VALE Report (Figure 5-64).
6. To change the units of the report, select the desired unit from the *Pollutant (Unit)* drop-down menu.
7. Click the *Print Preview* button to view the report in print preview mode.

> **?** What is the End-of-Life Year?
> An end-of-life year denotes the last year in which the emissions from an operation group will stop being included in the report. This field allows users to evaluate the impact of various scenarios by including or excluding emissions from the report.
>
> If a manufacture year has been defined for GSE and the end-of-life year specified in this field is earlier than that of the end-of-life of the GSE as determined by the manufacture year and useful life assumption, the end-of-life year specified in this field will be used.
>
> If a manufacture year has been defined for GSE and the end-of-life year specified in this field is beyond the end-of-life for the GSE as determined by the manufacture year and useful life assumption, emissions from the associated GSE are not included in the calculations. GSE excluded from the VALE Report are logged in the AEDT log.

> Annualization names are reported in the *Scenario* column of the VALE Report, and operation group names along with end-of-life year are reported in the *Source Group* column of the VALE Report.

To generate aggregated VALE Report (common baseline-alternative annualization pairs) using the VALE Report button:

1. Select a set of baseline and alternative emissions metric result definition pairs from the *Metric Results* pane for each desired analysis year.
   - All selected metric results must be processed.
   - Each analysis year in the metric result selection requires exactly two emissions metric results.
   - Half of the selected metric results must have the same baseline annualization and the other half must have the same alternative annualization.
   - If these conditions are satisfied, the *VALE Report* button will become enabled. If the required conditions are not satisfied, a tooltip error message explaining why the VALE Report button is disabled can be viewed by hovering over the *VALE Report* button.
2. From the *View Reports* ribbon group, click *VALE Report*. The *VALE Report Settings* dialog will open (Figure 5 -26).

3. The *Baseline* list displays operation groups in the first metric result. The *VALE* list displays operations groups in the second metric result. Select desired operation groups to compare from each list then click *Match*.
   - It is possible to match multiple baseline operation groups to one VALE operation group.
   - Select an entry in the *Matched Items* list and click *Unmatch* to unmatch the operation groups.
   - Operation groups must have distinct names.
4. To switch the *Baseline* and *VALE* metric results, click the swap arrow button.
5. To enter an End-of-Life Year for an operation group, click on the field and choose an available year from the combo box. An End-of-Life Year denotes the year in which the emissions from an operation group will stop being included in the report.
6. Click *OK* to generate the Aggregated VALE Report.
7. To change the units of the report, select the desired unit from the *Pollutant* (*Unit*) drop-down menu.
8. Click the *Print Preview* button to view the report in print preview mode.
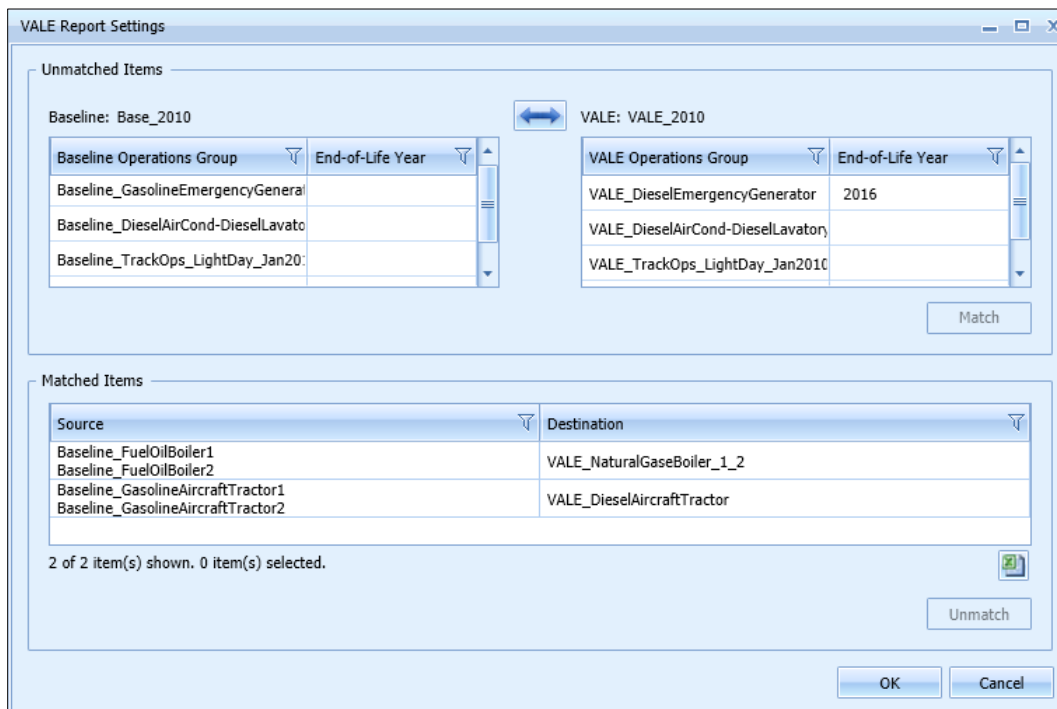
Figure 5-63 Sample VALE Report Settings Dialog

Figure 5-64 Sample VALE Report

5.9.10 View Aggregated VALE Report

The Aggregated VALE report combines single year VALE Reports into a consolidated report for life cycle reporting. The *Aggregated VALE Report* button can be used to combine VALE Reports for analysis years with dissimilar baseline-alternative annualization pairs or for multiple analysis years with the same baseline and alternative (VALE) annualization.

To generate aggregated VALE report using the Aggregated VALE Report button:
1. Generate individual VALE Reports from multiple years to include in the Aggregated VALE Report.
2. From the *View Reports* ribbon group, click *Aggregated VALE Report* to open the *Aggregated VALE Report* dialog will (Figure 5-65).
3. The *Available VALE reports* list displays the individual VALE Reports generated in step 1.
4. Select the *Include* checkbox of the desired VALE Reports to include in the aggregated report. The checked VALE Report is displayed in the *Baseline operation groups* list and in the *Alternative operation groups* list.
5. Select the *End of Life* checkbox to indicate that the specified year represents end of life for the equipment included in the operation group.
6. Click *OK* to generate the VALE Report (Figure 5-66).
7. To change the units of the report, select the desired unit from the *Pollutant* (*Unit)* drop-down menu.
8. Click the *Print Preview* button to view the report in print preview mode.
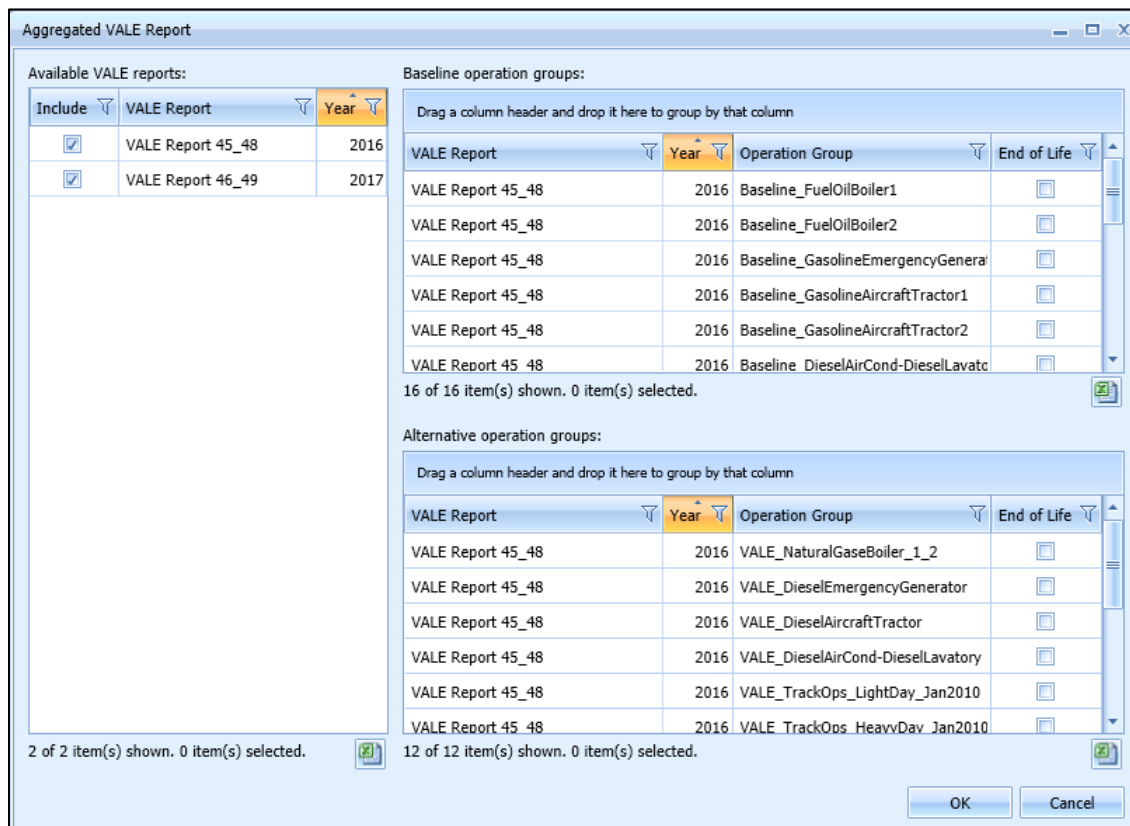
Figure 5-65 Sample Aggregated VALE Report Dialog

VALE Report 2010 - 2012   🖨 Print Preview

Baseline (Source): Base_2010

Alternative (Destination): VALE_2010

Pollutant (Unit): Grams

No.	Year	Scenario	Source Group	CO	VOC	NOx	SOx	PM-10	PM-2.5
			VALE_2010 Total	3,182,874.460	328,352.100	10,663,770.150	711,992.360	298,811.770	298,403.220
			2011 Net ER	*-8,417,248.980*	*-260,917.330*	*-198,998.620*	*-1,813,830.410*	*-9,010.670*	*-1,386.160*
3	2012	Base_2010							
			Baseline_FuelOilBoiler1 (Stationary Sources)	17,280.000	7,320.000	109,440.000	1,615,680.000	16,992.000	12,444.840
			Baseline_FuelOilBoiler2 (Stationary Sources)	18,432.000	1,808.470	89,088.000	179,712.000	3,686.400	884.740
			Baseline_GasolineEmergencyGenerator (Stationary Sources)	3,071,923.200	134,073.680	77,184.000	14,356.220	4,137.060	4,137.060
			Baseline_GasolineAircraftTractor1 (GSE Population)	798,249.920	22,571.490	34,144.370	5,567.220	289.730	266.550
			Baseline_GasolineAircraftTractor2 (GSE Population)	798,249.920	22,571.490	34,144.370	5,567.220	289.730	266.550
			Baseline_DieselAirCond-DieselLavatory (GSE Population)	8,962.180	946.600	23,795.910	36.810	1,495.720	1,450.840
			Baseline_TrackOps_LightDay_Jan2010	627,167.380	69,971.610	4,756,336.720	313,149.450	113,029.700	113,029.700
			Baseline_TrackOps_LightDay_Jan2010 (GSE LTO)	1,753,862.070	57,662.850	158,949.140	4,329.380	5,281.450	5,031.670
			Baseline_TrackOps_LightDay_Jan2010 (APU)	173,473.630	12,694.600	157,025.770	21,228.860	19,366.070	19,366.070
			Baseline_TrackOps_HeavyDay_Jan2010	1,537,954.680	163,929.750	5,120,136.660	354,735.790	129,741.250	129,741.250
			Baseline_TrackOps_HeavyDay_Jan2010 (GSE LTO)	2,192,604.810	72,751.590	205,381.940	5,442.490	6,743.780	6,427.070
			Baseline_TrackOps_HeavyDay_Jan2010 (APU)	55,166.920	3,887.520	41,839.430	5,878.940	5,869.530	5,869.530
			Base_2010 Total	11,053,326.710	570,189.650	10,807,466.310	2,525,684.380	306,922.420	298,915.870
		VALE_2010							
			VALE_NaturalGasBoiler_1_2 (Stationary Sources)	33,331.200	26,331.130	133,324.800	595.200	2,856.960	2,856.960
			VALE_DieselEmergencyGenerator (Stationary Sources)	46,773.500	15,063.850	216,115.200	14,356.220	15,405.930	15,405.930
			VALE_DieselAircraftTractor (GSE Population)	17,420.050	1,285.920	44,491.560	71.200	2,996.870	2,906.960
			VALE_DieselAirCond-DieselLavatory (GSE Population)	8,962.180	946.600	23,795.910	36.810	1,495.720	1,450.840
			VALE_TrackOps_LightDay_Jan2010	627,167.380	69,971.610	4,756,336.720	313,149.450	113,029.700	113,029.700
			VALE_TrackOps_LightDay_Jan2010 (GSE LTO)	182,750.270	10,966.470	60,819.160	627.970	3,170.370	3,065.820
			VALE_TrackOps_LightDay_Jan2010 (APU)	173,473.630	12,694.600	157,025.770	21,228.860	19,366.070	19,366.070
			VALE_TrackOps_HeavyDay_Jan2010	1,537,954.680	163,929.750	5,120,136.660	354,735.790	129,741.250	129,741.250
			VALE_TrackOps_HeavyDay_Jan2010 (GSE LTO)	439,935.470	20,089.680	90,771.010	1,283.170	4,171.020	4,023.050
			VALE_TrackOps_HeavyDay_Jan2010 (APU)	55,166.920	3,887.520	41,839.430	5,878.940	5,869.530	5,869.530
			VALE_2010 Total	3,122,935.280	325,167.130	10,644,656.220	711,963.610	298,103.420	297,716.110
			2012 Net ER	*-7,930,391.430*	*-245,022.520*	*-162,810.090*	*-1,813,720.770*	*-8,819.000*	*-1,199.760*
		Base_2010		34,825,870.080	1,768,762.120	32,590,572.430	7,580,166.530	924,006.340	899,890.990
		VALE_2010		9,549,053.830	985,058.280	31,991,042.710	2,138,337.130	896,676.640	895,443.780
		Net Change		-25,276,816.250	-783,703.840	-599,529.720	-5,441,829.400	-27,329.700	-4,447.210
		Base_2010		34,825,870.080	1,768,762.120	32,590,572.430	7,580,166.530	924,006.340	899,890.990
		VALE_2010		9,549,053.830	985,058.280	31,991,042.710	2,138,337.130	896,676.640	895,443.780
		Net Change		-25,276,816.250	-783,703.840	-599,529.720	-5,441,829.400	-27,329.700	-4,447.210

Figure 5-66 Sample Aggregated VALE Report in Print Preview Mode
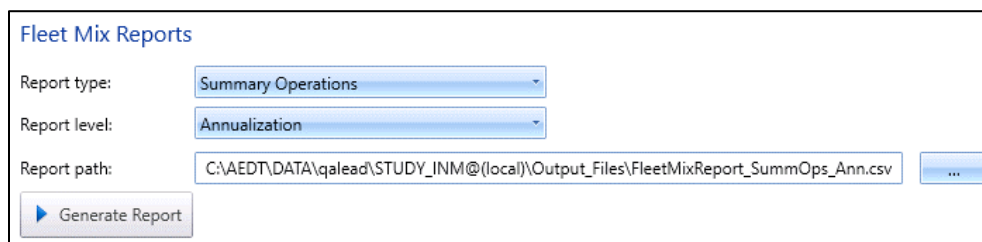
5.9.11 View Fleet Mix Report

The Fleet Mix Report summarizes the aircraft operations in the study. It can provide a summary of operations, a detailed list of all the aircraft types, a comparison of aircraft types, or runway counts by annualization or by operation group.

To generate the Fleet Mix Report:
1. From the *View Reports* ribbon group, click *Fleet Mix Report* (Figure 5-52) to open the report.
2. Select the *Report type and Report level* options from the drop-down menus.
3. In the *Report path*, set the location and name for the report file.
4. Click *Generate Report*. The report file is saved to the specified location.

Figure 5-67 Sample Fleet Mix Report

5.9.12 View Legacy Flight Report

The Legacy Flight Report provides detailed information on airplane noise, airplane operations, grid points, population points, location points, and screening points, as appropriate for the selected metric result.

To generate the Legacy Flight Report:
1. Select the desired noise metric result from the *Metric Results* pane.
2. From the *View Reports* ribbon group, click *Legacy Flight Report* (Figure 5-52) to open the report.
3. Select the *Report type and Report level* options from the drop-down menus.
4. In the *Report path*, set the location and name for the report file.
5. Click *Generate Report*. The report file is saved to the specified location.

6 Operations Tab

The *Operations* tab supports managing aircraft operations, non-aircraft operations, runup operations, helitaxi operations, and annualizations. The differences in operations categories is as follows:

- The aircraft operations category in AEDT includes airplane and helicopter operations. Aircraft operation types include arrival, departure, circuit, touch and go, overflight, and ground support equipment (GSE) that are tied to aircraft operations.
- The non-aircraft operations category in AEDT represents activity from GSE, stationary sources (boiler/space heaters, emergency generators, incinerators, aircraft engine testing, fuel tanks, surface coating/painting, deicing area, solvent degreasers, sand/salt piles and other), and training fires.
- The runup operations category in AEDT only includes aircraft runup type operations.
- The helitaxi operations category in AEDT only includes helicopter taxi operations.

> GSE can be modeled both by assignment to an aircraft and by population. GSE that are assigned to an aircraft will have their operations depend on the activity of that aircraft and are defined through the aircraft operations wizard. GSE that are modeled as population operate independently from aircraft activity and are defined through the non-aircraft operations wizard. Since APUs are onboard the aircraft, they are always modeled based on aircraft activity.

> Aircraft taxi operations are implicitly defined with aircraft operations.

See Appendix B for detailed information about each field that appears in the *Operations* tab.

6.1 Display Buttons and Operations Pane

Use the buttons in the *Display* ribbon group (Figure 6-1) to view different types of operations.
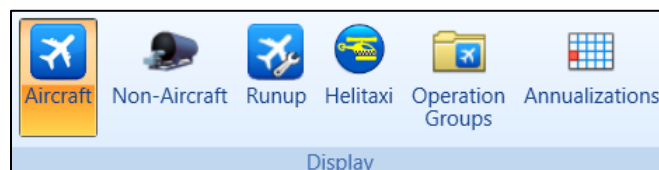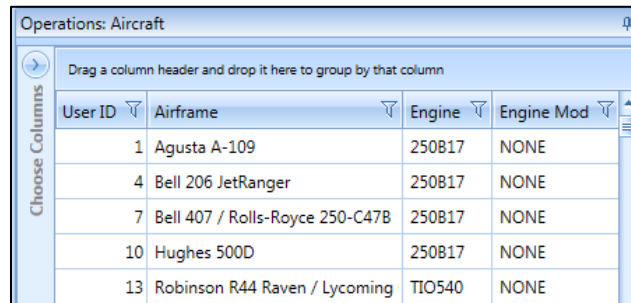
Figure 6-1 Operations Tab – Display Ribbon Group

- Click *Aircraft* to view existing aircraft operations.
  - The aircraft operations are not displayed by default – click the *Get operations* link to load the aircraft operations into the display.
- Click *Non-Aircraft* to view existing non-aircraft operations.
- Click *Runup* to view existing runup operations.
- Click *Helitaxi* to view existing helitaxi operations.
- Click *Operation Groups* to view existing operation groups.
- Click *Annualizations* to view existing annualizations.

The *Operations* pane (left work area) displays aircraft operations, non-aircraft operations, runup operations, helitaxi operations, or annualizations depending on the selected display button (Figure 6-2). The *Operations* pane will be empty if there are no existing operations/annualizations.

Figure 6-2 Operations Pane

6.2 Aircraft Operation

Use the buttons in the *Aircraft Actions* ribbon group to create, copy, or delete aircraft operations (Figure 6-3).

- Click *New* to open the *Create Aircraft Operations wizard*.
- Click *Import* to open the *Import Aircraft Operations from CSV file* dialog.
- Click *Edit* to open the *Edit Operations Process* wizard.
- Click *Copy* to open the *Create Aircraft Operations wizard* for the currently selected operation. Each step in the wizard will display the values from the original operation.
- Click *Delete* to delete the currently selected operation.

The *Edit*, *Copy,* and *Delete* actions can also be accessed by right-clicking on an operation in the *Operations* pane.
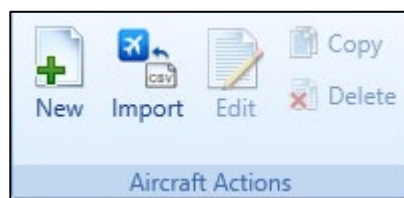
Figure 6-3 Operations Tab – Aircraft Actions Ribbon Group

6.2.1 Create Single or Multiple Aircraft Operations

Aircraft operations are created through the use of a wizard. To complete the *Create Aircraft Operations* workflow, the study must already contain equipment (Section 7) and airport (Section 8) content commensurate with the example studies provided in the AEDT installer.

Aircraft operations can be created in bulk for the same airport layout and operation type. When creating operations in bulk, an operation will be created for each aircraft and track combination.

Begin creating single or multiple aircraft operations the same way by opening the *Create Aircraft Operations* wizard.

To access the Create Aircraft Operations wizard:
1. In the *Display* ribbon group, click *Aircraft*.
2. In the *Aircraft Actions* ribbon group, click *New* to open the *Create Aircraft Operations* wizard (Figure 6-4).

The *Create Aircraft Operations* wizard contains a header, progress pane, and content pane:
- The header displays the current step title and brief instructions.
- The progress pane lists the steps in the wizard and displays the current step in bold font.
- The content pane displays the settings and options available in the current step.
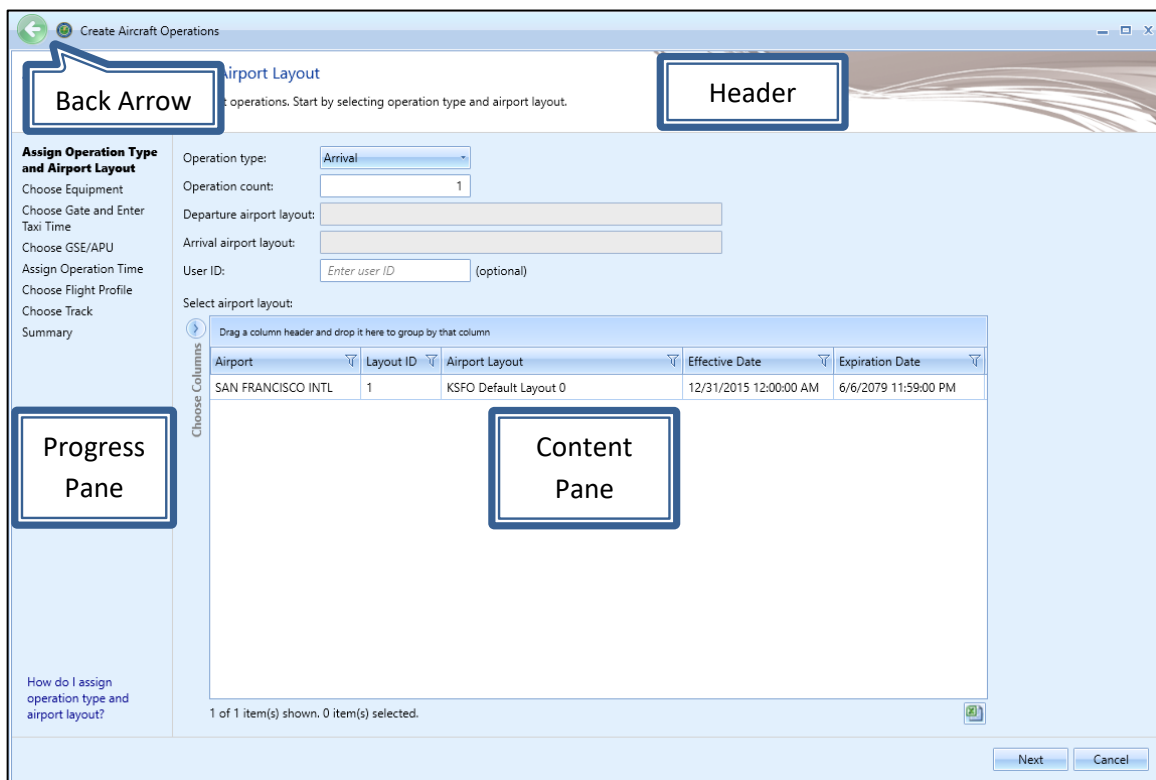
Figure 6-4 Create Aircraft Operations

To create new aircraft operations, follow the steps as described below. Navigate the wizard by clicking *Next* (lower right) to progress to the next step, clicking the *Back Arrow* (upper left) to return to the previous step, or clicking *Cancel* to discard changes and exit the wizard.

6.2.1.1 Step 1: Assign Operation Type and Airport Layout

Operation type and airport layouts are assigned in this step (Figure 6-5). This step is the same for both single and bulk operation creation.

1. Select an operation type.
2. Select the desired airport layout. Depending on the selected operation type, the departure and/or arrival airport layout field will be updated.
3. Enter the desired operation count. For an operation based on operational profile, this represents total annual count.
4. Enter a custom *User ID* for the new operation if desired.
5. Click *Next*.

> Creating a runway to runway operation type is not supported in AEDT user interface. Runway to runway operations can be imported using ASIF.

Figure 6-5 Create Aircraft Operation – Assign Operation Type and Airport Layout

6.2.1.2 Step 2: Choose Equipment

Aircraft equipment is selected in this step. The selections made in Step 1 are displayed in the *Current Selection* section.

1. Select the desired aircraft from the *Choose equipment* list (Figure 6-6). Multiple aircraft can be selected in this step for bulk operation creation (Figure 6-7). To deselect equipment, click on the highlighted entry again.
2. Click *Next*.
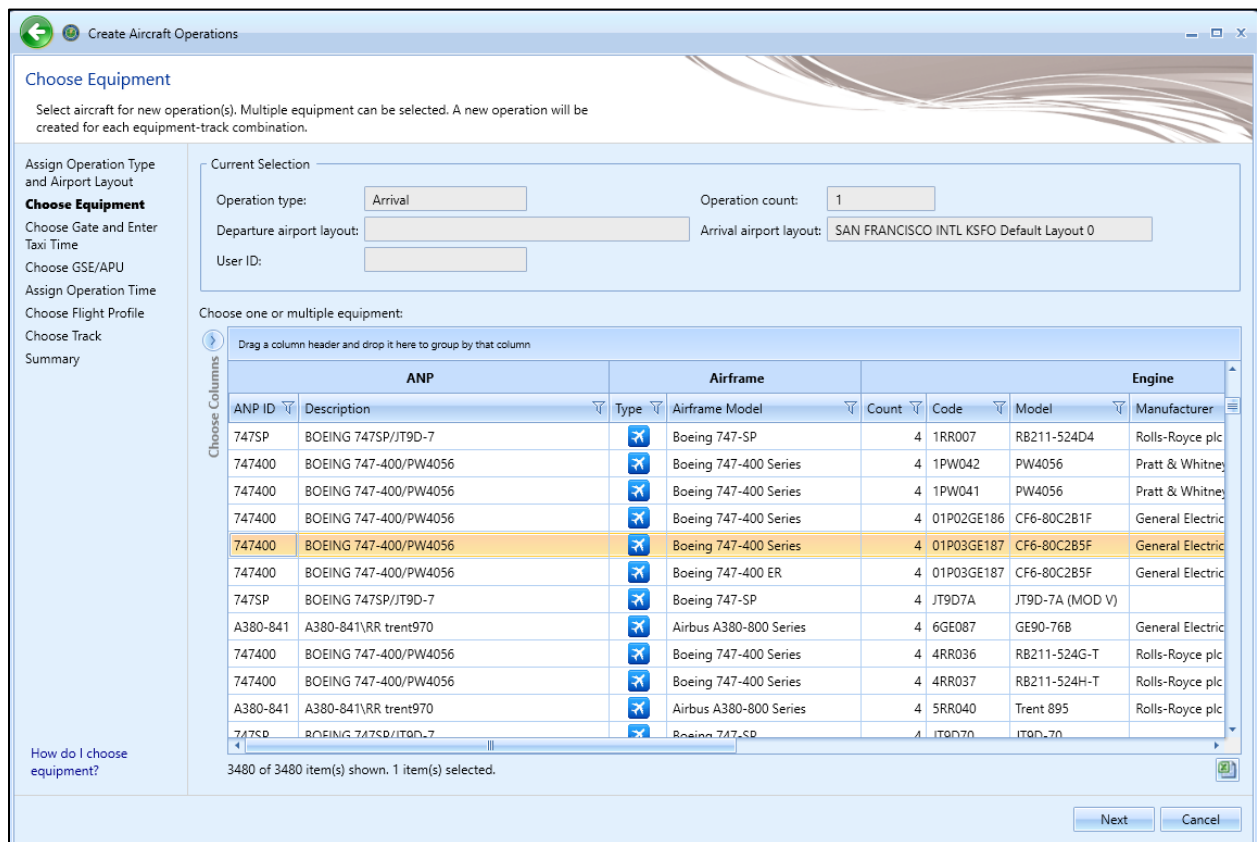
Figure 6-6 Create Aircraft Operation – Choose Equipment (Single)
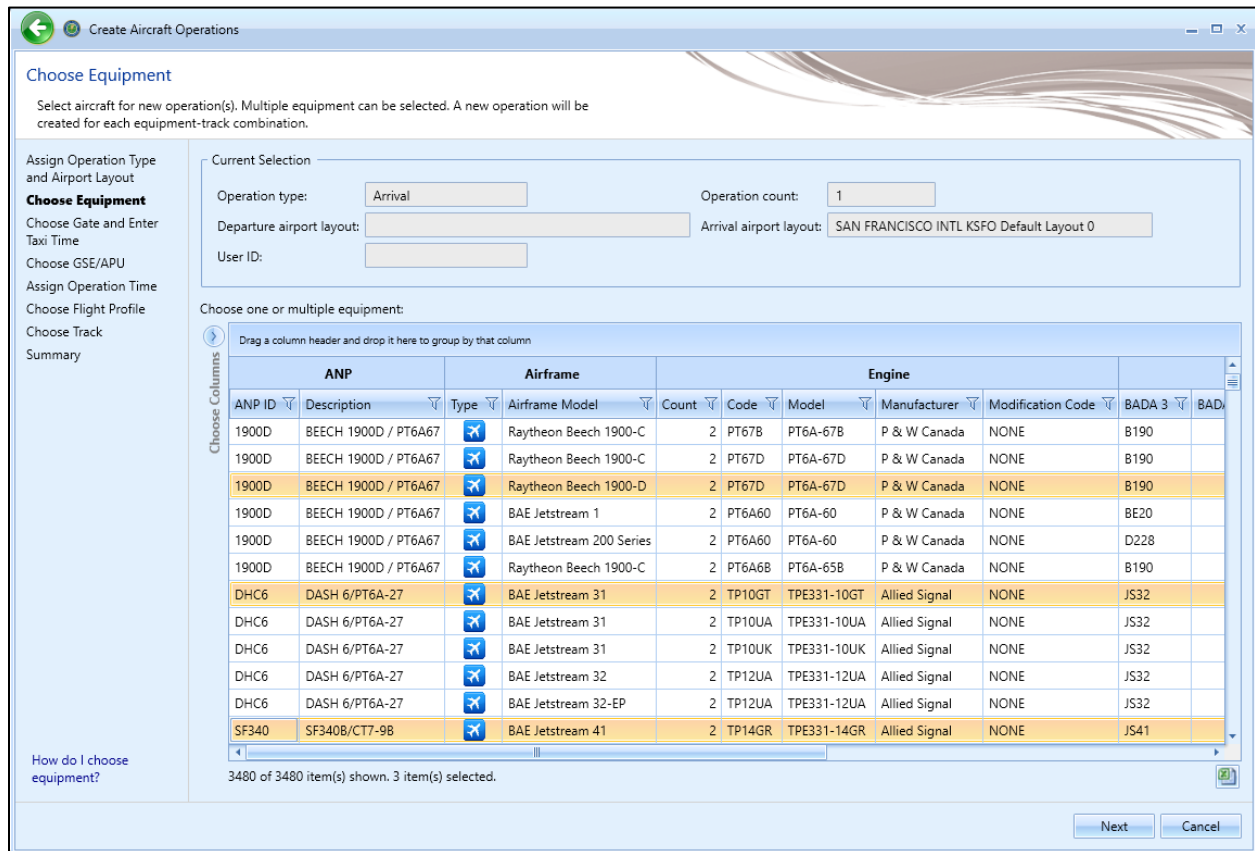
Figure 6-7 Create Aircraft Operation – Choose Equipment (Bulk)

6.2.1.3 Step 3: Choose Gate and Enter Taxi Time

The gate for the operation is assigned in this step (Figure 6-8). The gates in the selected airport layout are displayed (if any). The selections made in the previous steps are displayed in the *Current Selection* section. This step is the same for both single and bulk operation creation.

Gate assignment is required when performing a dispersion analysis. Dispersion of GSE and APUs occurs at the assigned gate. To skip this step, click *Next*.

This step is not displayed for an overflight operation.

1. Select the *Use Gate* checkbox.
2. Select the desired gate.
3. Enter a Taxi in/out time for approach/departure operations, if desired.
4. Click *Next*.
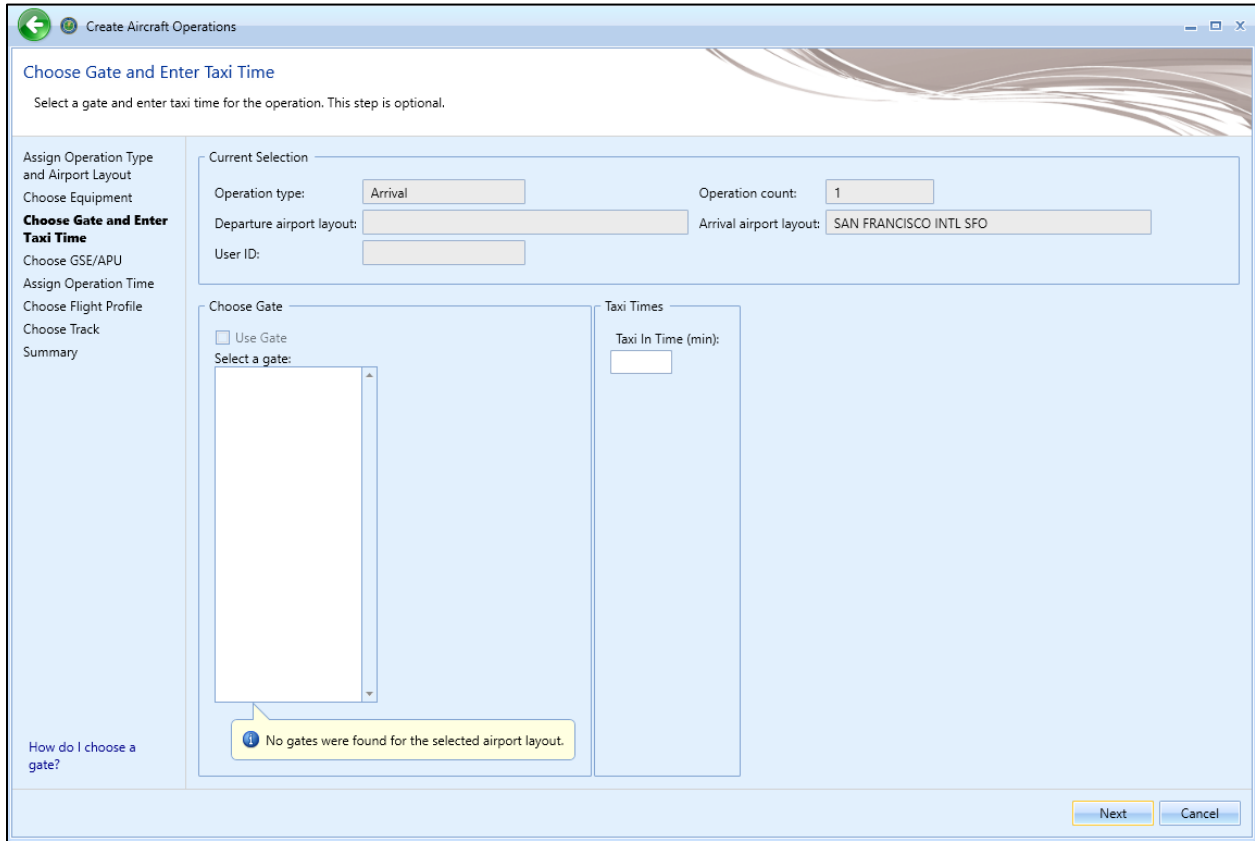
Figure 6-8 Create Aircraft Operation – Choose Gate

6.2.1.4 Step 4: Choose GSE/APU

If an associated auxiliary power unit exists for the selected aircraft, a duration field and the APU name will be displayed next to the *Use Auxiliary Power Unit (APU)* checkbox.

If default ground support equipment (GSE) exist for the selected aircraft, they will be pre-selected in this step. These default assignments are based upon categories of aircraft types (e.g., wide body jets, cargo planes, commuter aircraft, general aviation, military jets, military transports, business jets, etc.). If site-specific information is available for GSE (assignments and operational times), it is recommended that these data be used in place of the default values.

Select GSE and the auxiliary power unit (APU) for the aircraft operation in this step (Figure 6-9) if desired. The selections made in the previous steps are displayed in the *Current Selection* section.

This step is optional, adding GSE and APU equipment is not required to continue in the wizard. To skip this step, click *Next*.

What GSE are assigned to aircraft operations?
Upon arrival at a gate, aircraft are met by ground support equipment (GSE) to unload baggage and service the lavatory and cabin. While an aircraft is parked at a gate, mobile generators and air conditioning units may be in operation to provide electricity and conditioned air. Prior to aircraft departure, GSE are present to load baggage, food and fuel. When an aircraft departs from a gate, a tug may be used to push or tow the aircraft away from the gate and to the taxiway. GSE that are assigned to an aircraft are given times (minutes per arrival, minutes per departure) based upon the type of service.

This step is not displayed for an overflight operation.

For single aircraft operation, the details for the GSE selected in the previous step are displayed (Figure 6-9). For bulk aircraft operations, select the equipment from the equipment list to display the corresponding GSE details (Figure 6-10).

Single Aircraft Operation
1. Select the *Use Auxiliary Power Unit (APU)* checkbox if desired.
2. Enter *Duration* in minutes.

The *Use Auxiliary Power Unit (APU)* checkbox is only enabled for aircraft with APU assigned. Default APU assignment for an aircraft is displayed in the *Equipment* tab, *Aircraft* view.
3. Select the *Use Ground Support Equipment (GSE)* checkbox if desired. If default GSEs exist for the selected aircraft, they will be pre-selected (Figure 6-9). Uncheck the box to deselect.
4. Check the box to select the desired GSE from the list. Multiple selections are allowed. Uncheck the box to deselect.
5. Click *Next*.
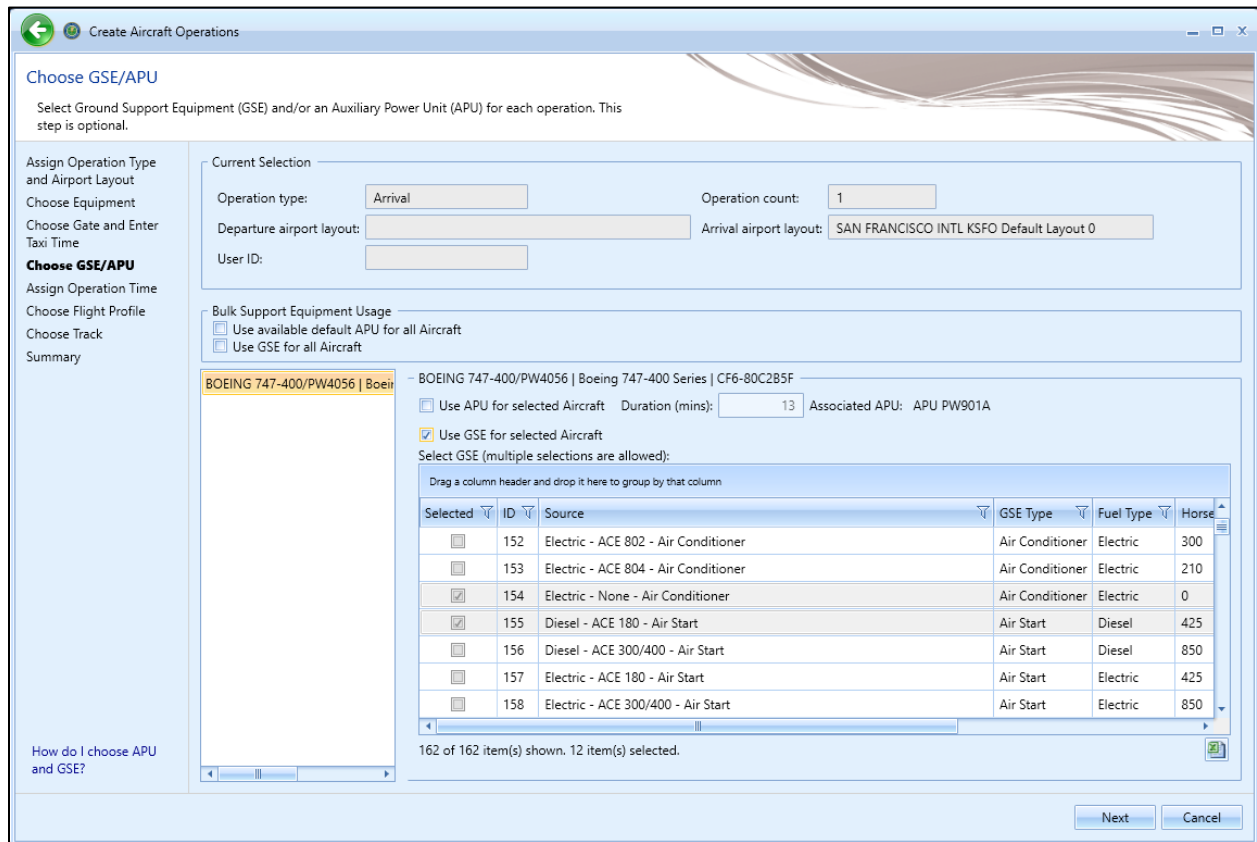
Figure 6-9 Create Aircraft Operation – Choose GSE/APU (Single)

Bulk Aircraft Operations
In the *Bulk Support Equipment Usage* section, select:
- *Use available default APU for all Aircraft* – to use default APUs when available for each aircraft
- *Use GSE for all Aircraft* – to use default GSE selections for each aircraft

To manually select APUs or GSEs for each aircraft (Figure 6-10):
1. Select the aircraft from the aircraft list.
2. Check the *Use APU for selected Aircraft* if desired.
3. Check the *Use GSE for selected Aircraft* if desired and select the desired GSEs from the *Select GSE* list as described for a single aircraft operation.
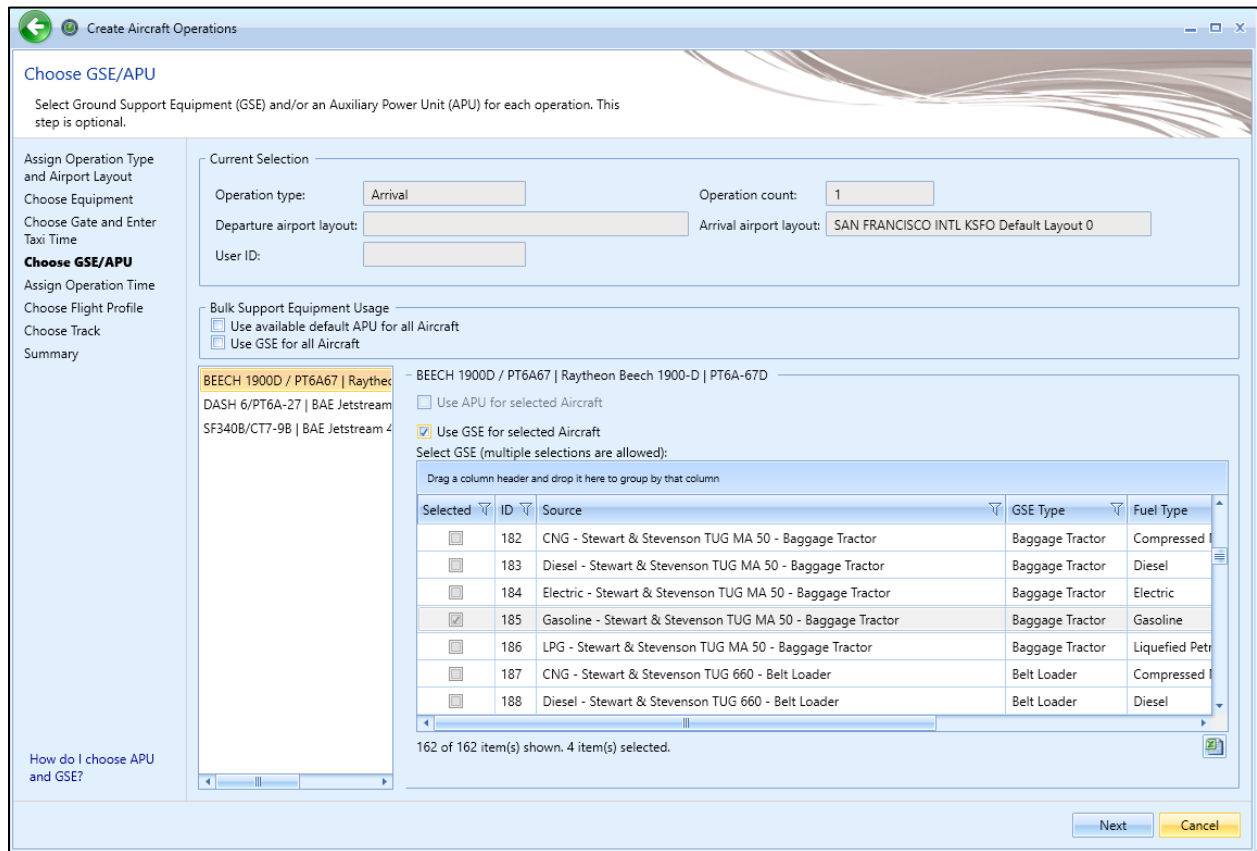
Figure 6-10 Create Bulk Aircraft Operations – Choose GSE/APU (Bulk)

6.2.1.5 Step 5: Provide GSE Details

This step is displayed if ground support equipment (GSE) was selected in the previous step. The selections made in the previous steps are displayed in the *Current Selection* section.

For single aircraft operation, the details for the GSE selected in the previous step are displayed (Figure 6-11). For bulk aircraft operations, select the equipment from the equipment list to display the corresponding GSE details (Figure 6-12).

Default values are provided for duration, horsepower, and load factor (if available). Click in the cells to edit the values.

To edit the GSE details for each aircraft:
1. Enter *Duration* in minutes.
2. Edit *Horsepower*.
3. Edit *Load Factor*.
4. Select *Manufacture Year*.
5. Click *Next*.

? Is Manufacture Year optional?
Entering manufacture year for GSE operations is optional but recommended for use with the VALE Report.

When the manufacture year for GSE is provided, deterioration is included in calculations and an end-of-life date is determined for the GSE based on the manufacture year and useful life assumption. If an operation date is beyond the end-of-life date for the GSE, emissions from the associated GSE are not included in the calculations. Excluded GSEs are logged in the study run log. The associated useful life assumption for a GSE can be viewed in the *Equipment* tab.

If a manufacture year is not provided, deterioration is not calculated and emissions from the equipment are always included in calculations.

For user-defined GSEs and electric GSEs, the Manufacture Year field is disabled for editing.

Please refer to Technical Manual for more information.
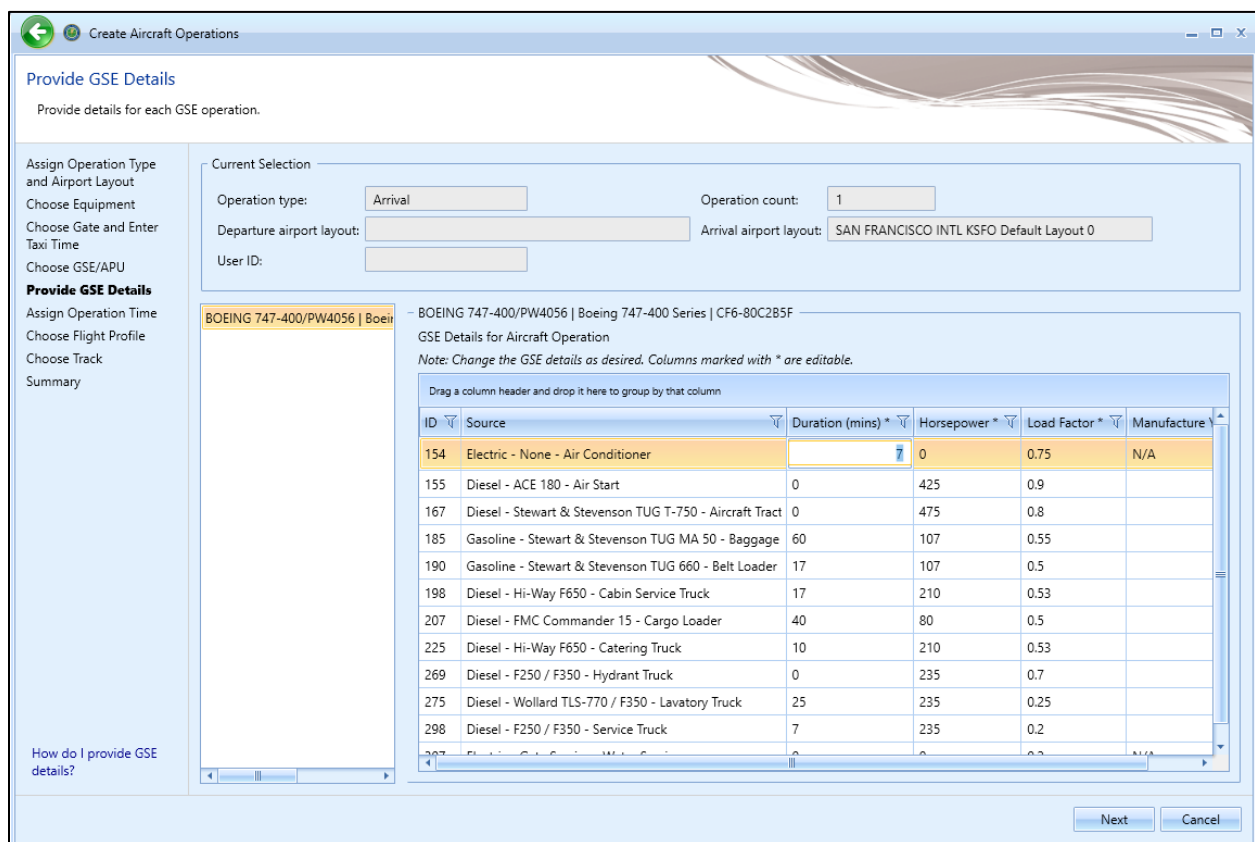
Figure 6-11 Create Aircraft Operation – Provide GSE Details (Single)
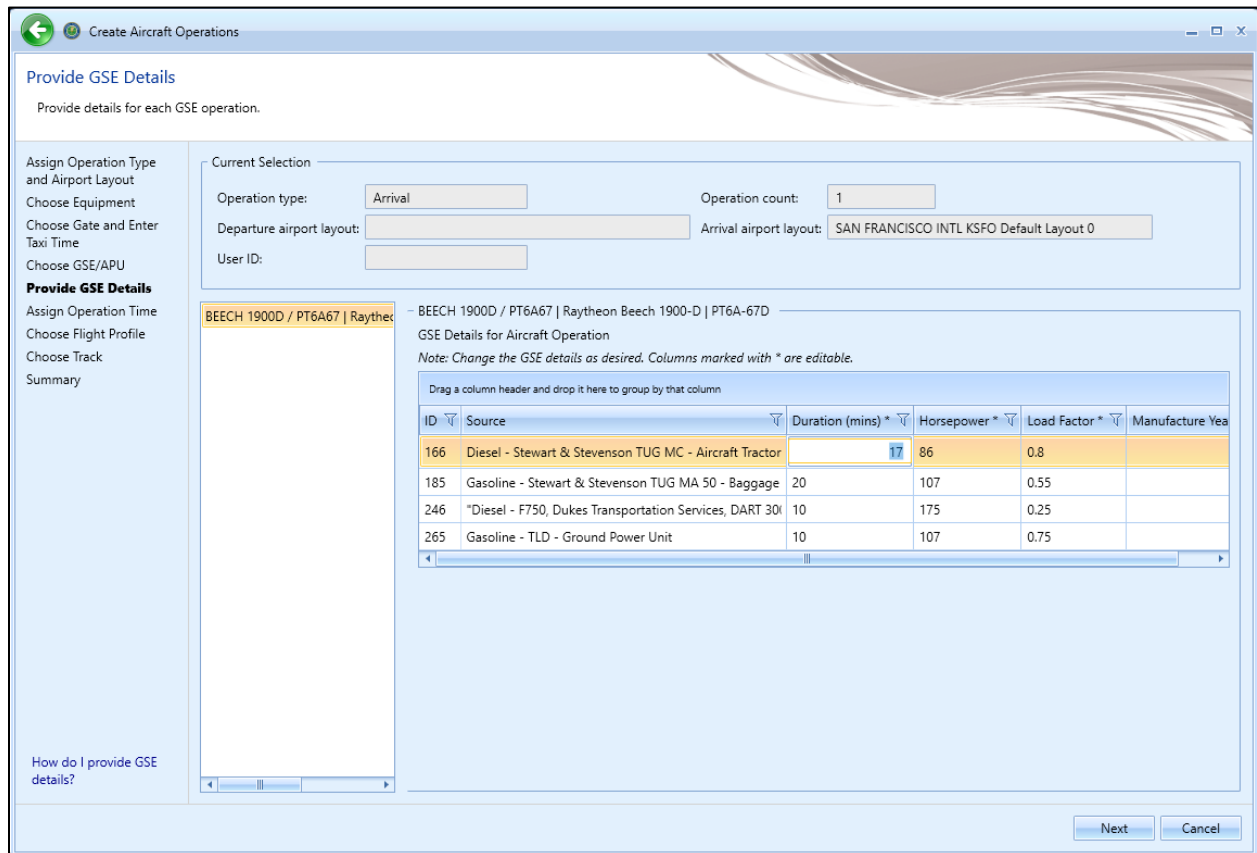
Figure 6-12 Create Aircraft Operation – Provide GSE Details (Bulk)

6.2.1.6 Step 6: Assign Operation Time

The time and date for the operation are assigned in this step (Figure 6-13). The selections made in the previous steps are displayed in the *Current Selection* section. This step is the same for both single and bulk operation creation.

To assign a specific date and time for the operation:
1. Select the *Assign operation time* option.
2. Select the desired date and time for the operation.
3. Click *Next*.

The default operation time can be assigned in the *Study* tab, *Preferences*, *Study* screen (see Section 4.11.2.6).

AEDT assumes that date time values for operations are in local times, not UTC (Universal Time Coordinated).

To assign operational profiles for the operation:

1. Select the *Assign operational profiles* option.
2. Select the desired year.
3. Select the quarter-hourly, daily, and monthly operation profiles.
4. Click *Next*.

To add or edit operational profiles, see Section 9.5.

Figure 6-13 Create Aircraft Operation – Assign Operation Time

6.2.1.7 Step 7: Choose Flight Profile

A flight profile for the operation is assigned in this step. The selections made in the previous steps are displayed in the *Current Selection* section. The *Choose flight profile* list displays available flight profiles based on the selected operation type and aircraft equipment, including any user-defined BADA 4 flight profiles.

> AEDT does not provide system-defined BADA 4 profiles. A user-defined BADA 4 profile must be created before it can be assigned to an operation (Section 7.2.4).
>
> A BADA 4 profile is not required in order to use the *Use BADA Family 4* processing option. The BADA 4 performance model can process either ANP or BADA 4 procedural profiles in addition to fixed point profiles.

For single aircraft operation, the available flight profiles are displayed in the table (Figure 6-14). For bulk aircraft operations, select the aircraft from the equipment list to display the corresponding flight profiles (Figure 6-15).

To assign a flight profile:
1. Select the desired flight profile from the *Choose flight profile* list for each aircraft.
2. Click *Next*.

> What does the *Workflow* column indicate?
>
> The *Workflow* column displays *ANP Only* if the selected aircraft does not have BADA 4 Model assigned. It displays *ANP/BADA4*, if the selected aircraft has a BADA 4 Model assigned.
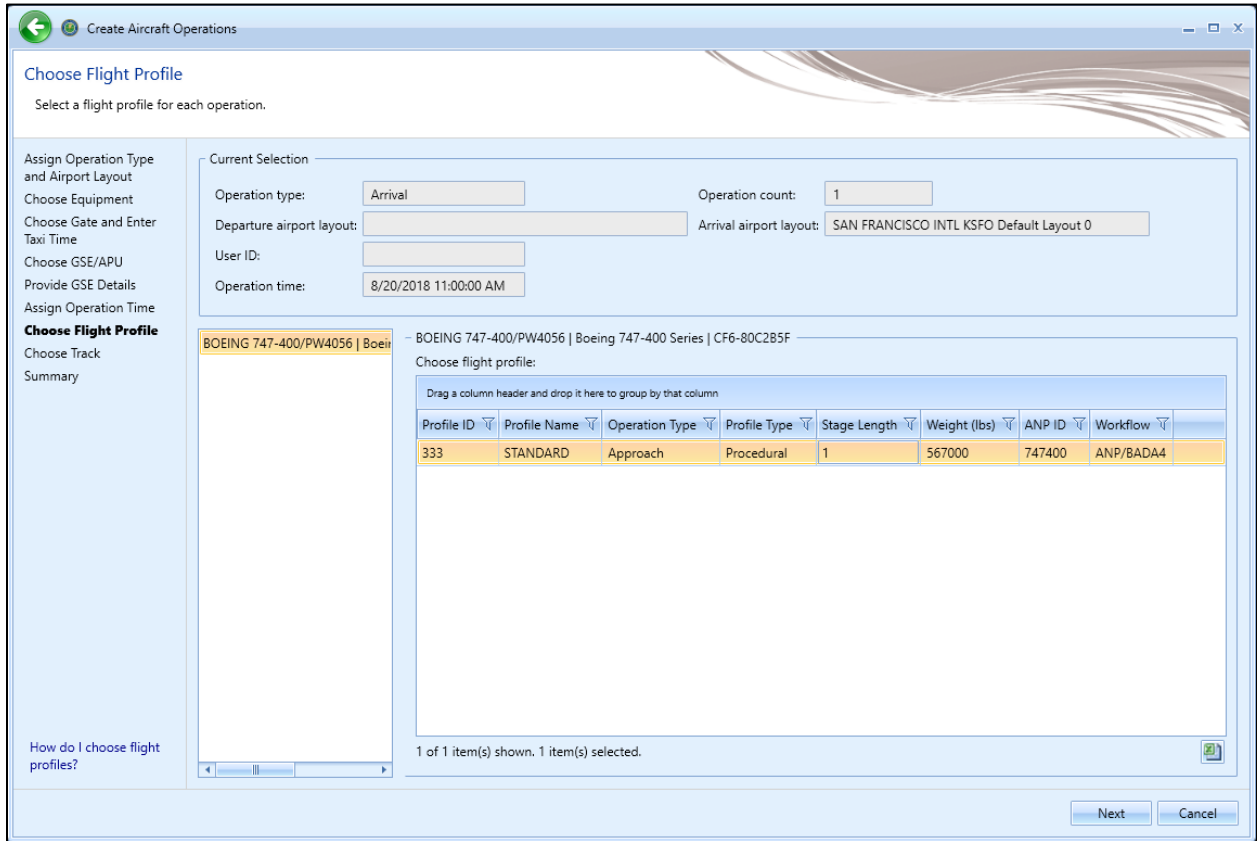
Figure 6-14 Create Aircraft Operation – Choose Flight Profile (Single)
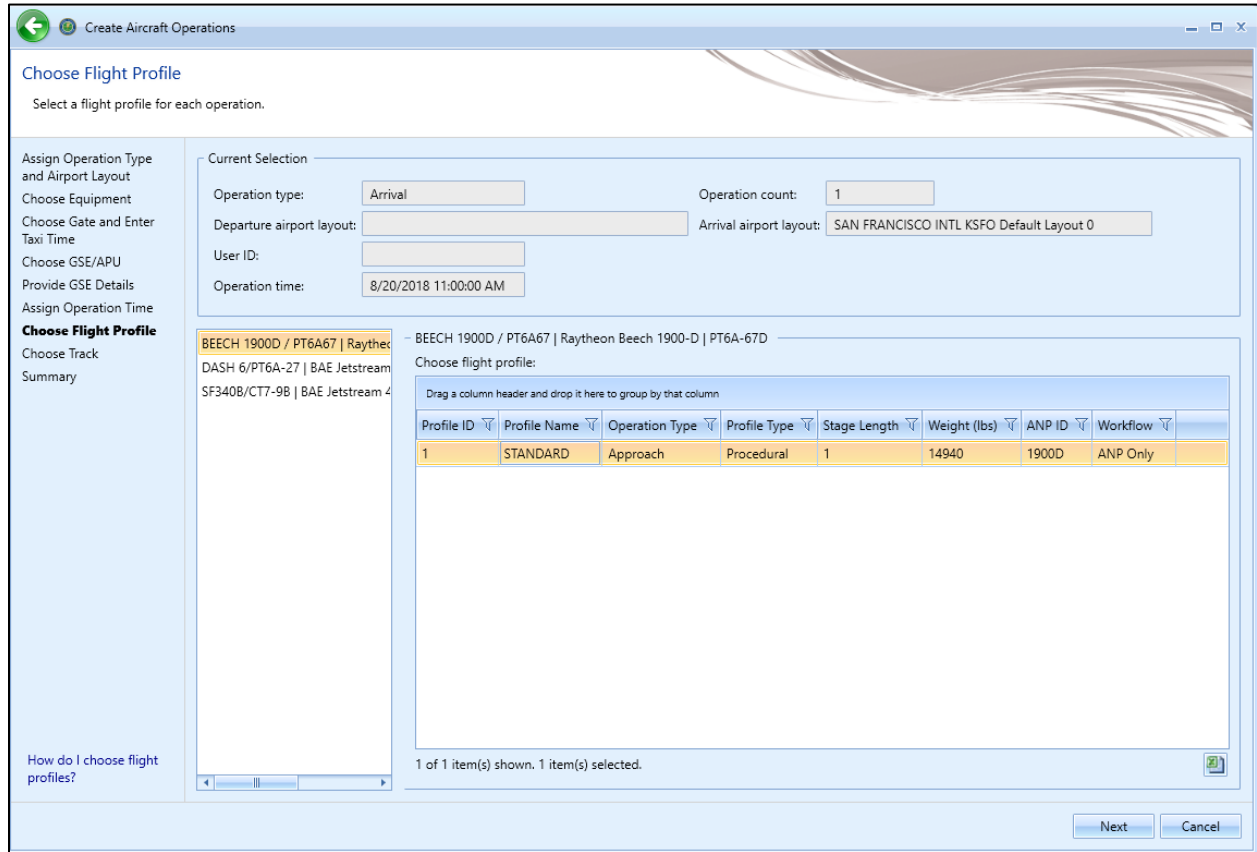
Figure 6-15 Create Aircraft Operation – Choose Flight Profile (Bulk)

?   What is a stage length?

The stage length represents the flight distance from takeoff to landing and is a proxy for the aircraft weight. The weight associated with the stage length is based on the assumed amount of fuel that is needed for the flight distance.

Stage Number	Trip Length (nmi)
1	0-500
2	500-1,000
3	1,000-1,500
4	1,500-2,500
5	2,500-3,500
6	3,500-4,500
7	4,500-5,500
8	5,500-6,500
9	6,500-11,000
M	Maximum range at maximum takeoff weight

?   What are the different flight profile types?

AEDT provides fixed and/or procedural profiles for all aircraft in AEDT with the exception of some military aircraft. A range of profile types are available depending on the selected aircraft as listed in Table 6-1. AEDT includes both default profiles, which users may use at their discretion; and non-default profiles, which for review of FAA federal actions or other FAA regulatory purposes, require prior approval by the FAA office of Environment and Energy (AEE). Further information on requesting approval for use of non-default profiles specified in Table 6-1 is provided in Appendix K.

For modeling not requiring FAA review, users should still seek adequate justification to support whether these non-default profiles are appropriate. Where adequate justification is not available, users should continue to use default profiles.

Table 6-1 Profile Naming Convention

Profile Type	Profile Naming Convention	Comments
Default Profiles		
STANDARD	STANDARD	Departure, Approach, Circuit or Touch and Go operations
NOISEMAP	NOISEMAP	Departure, Approach Military Aircraft Profiles
ICAOA	ICAO A, ICAO_A, ICAOA, ICAO-A	Departure operations only
ICAOB	ICAO B, ICAO_B, ICAOB, ICAO-B	Departure operations only
CNA510/CNA55B Specific	FLAPS_0, FLAPS_15	Departure operations only
CNA750 Specific	FLAP_5,FLAP_15	Departure and Approach operations
ECLIPSE500 Specific	HI_ALT	Departure operations only
GII/GIIB Specific	QF_FLEX, QF_FULL	Departure operations only
Non-Default Profiles*		
Alternative Weight	MODIFIED_AW	Departure operations only
Reduced Thrust	MODIFIED_ + percent reduced thrust (e.g., "MODIFIED_RT05")	Departure operations only. Typical reduced thrust values are 5%, 10% and 15%
Alternative Weight and Reduced Thrust	MODIFIED_AW_ + percent reduced thrust (e.g., "MODIFIED_AW_RT15")	Departure operations only. Typical reduced thrust values are 5%, 10% and 15%

* See Appendix K for further information on appropriate justification for use of Non-Default Profiles

Alternative Weight Profiles:

Alternative weight procedures use a heavier weight than the corresponding STANDARD profile in the same stage length bins. At each stage length, the higher weight option is determined by taking the average of the current stage length weight and the weight of the next-highest stage length. For the highest stage length procedure, alternative weight procedures use the current stage length weight. As such, STANDARD and MODIFIED_AW procedures for the maximum stage length have the same weight and thrust specifications. AEDT does not provide information to support whether an alternative aircraft weight is appropriate, therefore supplemental information is needed to make a determination prior to the use of these profiles in AEDT.

Reduced Thrust Profiles:

STANDARD profiles assume 100% thrust on takeoff followed by maximum climb thrust. Reduced thrust profiles are based on STANDARD profiles, but have their takeoff thrust and climb thrust reduced on the following schedule:

Table 6-2 Reduced Thrust Schedule

Profile Suffix	Takeoff Thrust Reduction	Climb Thrust Reduction
RT05	5%	0%
RT10	10%	10%
RT15	15%	10%

These thrust reductions are relative to the maximum rated takeoff thrust of the engine. The user is cautioned that the data provided by aircraft operators may relate to other measures of aircraft engine operation, such as low-pressure compressor speed (N1), engine pressure ratio (EPR), etc. AEDT does not provide information to support whether aircraft are departing with reduced thrust or the level of thrust reduction being applied. Supplemental information is therefore needed to make a determination prior to use of these profiles in AEDT.

Both Alternative Weight and Reduced Thrust departure profiles use acceleration percentages (similar in concept to the energy share methods in BADA) in the acceleration steps, rather than fixed rates of climb typically used in the STANDARD procedures. For more information on profile types, see the AEDT Technical Manual.

6.2.1.8 Step 8: Choose Track

A track for the operation is assigned in this step (Figure 6-16). The selections made in the previous steps are displayed in the *Current Selection* section. The *Choose Track* list displays tracks based on the selected operation type, airport layout, and aircraft equipment type. The map displays all the tracks in the list.

1. Select the desired track from the *Choose Track* list. The track is highlighted on the map view. Multiple tracks can be selected when creating operations in bulk.
2. Click *Next*.

An operation will be created for each aircraft and track combination.

> The selected track will not be highlighted if accelerated display is disabled.
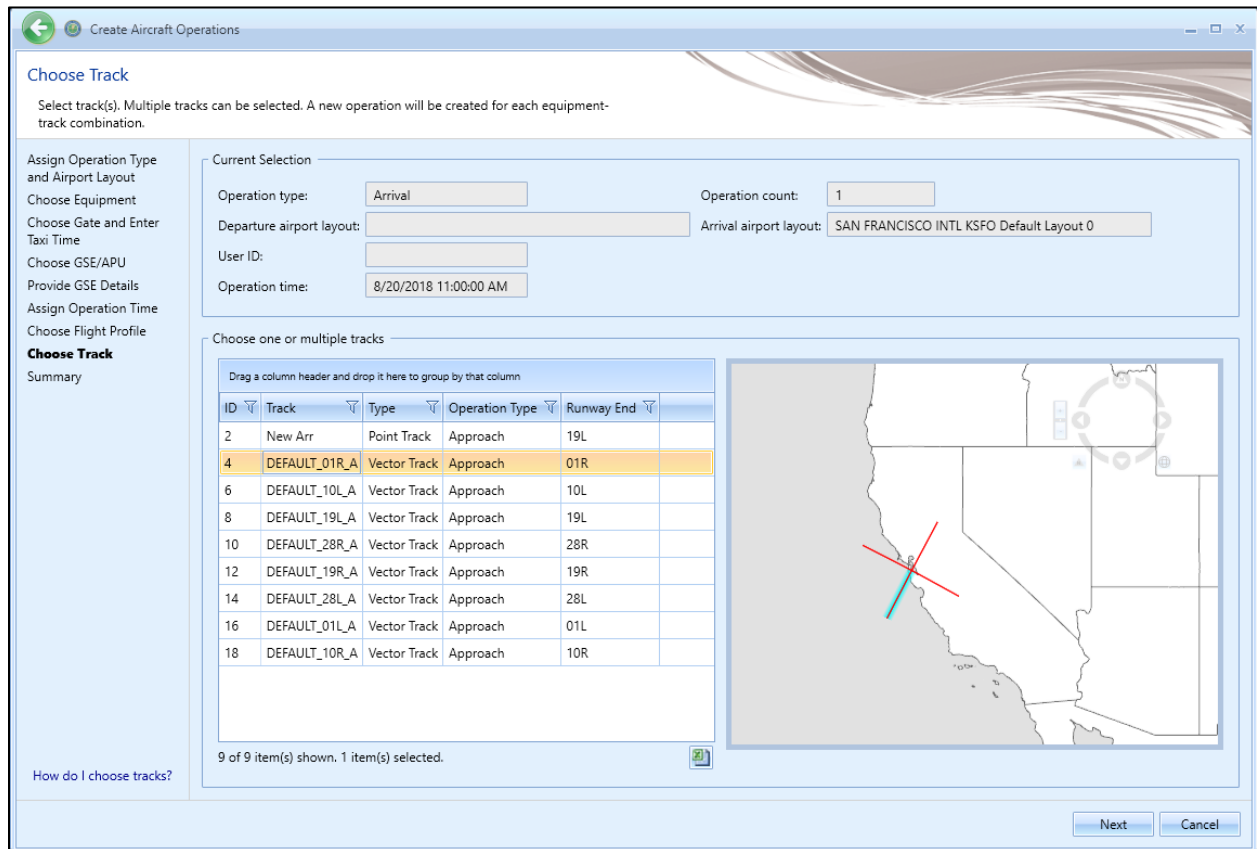
Figure 6-16 Create Aircraft Operation – Choose Track

6.2.1.9 Step 9: Summary

The summary step provides a summary of options selected in the *Create Aircraft Operations wizard* (Figure 6-17 and Figure 6-18). To create the operation(s), follow the steps below or *Cancel* to discard changes and exit the wizard.

1. Click *Create* to create the new aircraft operation(s).
2. A confirmation is displayed and the new aircraft operation(s) are listed at the bottom of the *Operations* pane.

> An operation will be created for each aircraft and track combination.
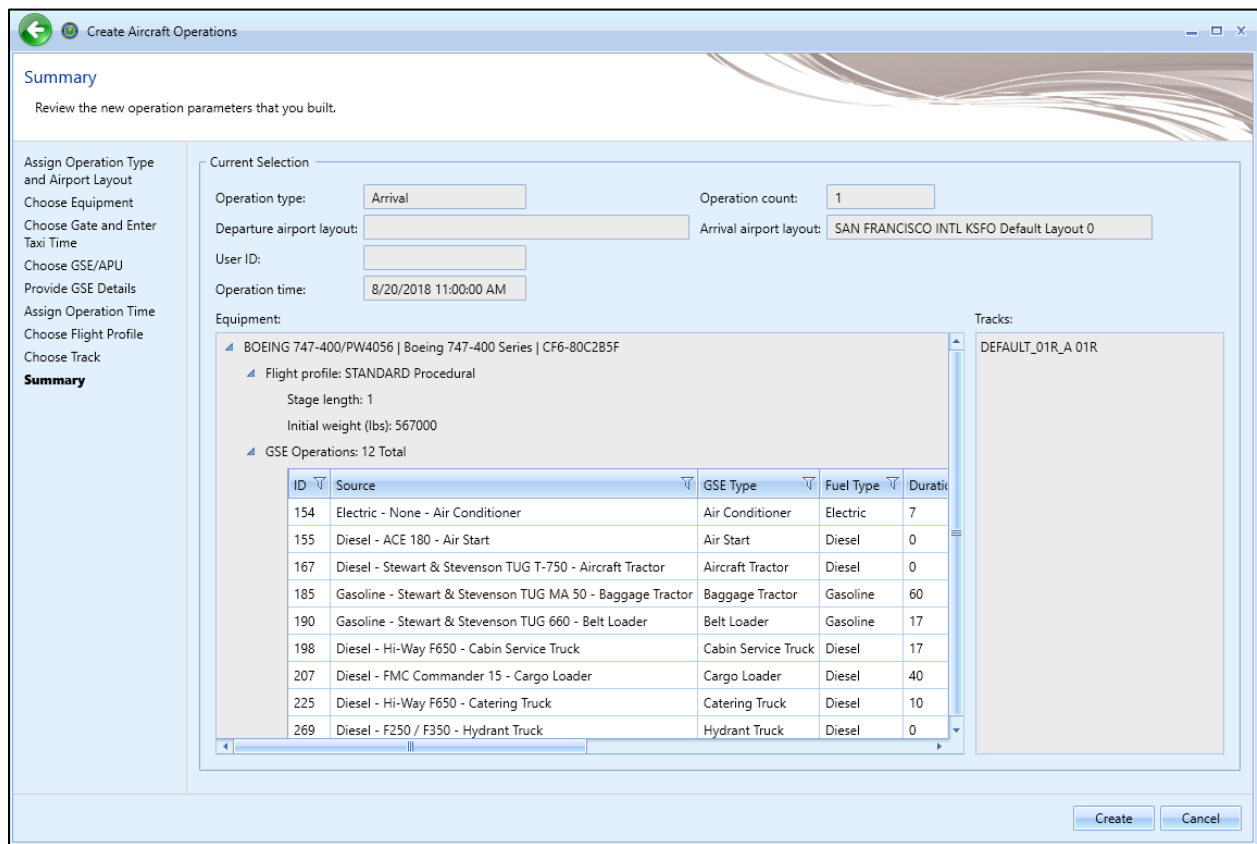
Figure 6-17 Create Aircraft Operation – Summary (Single)
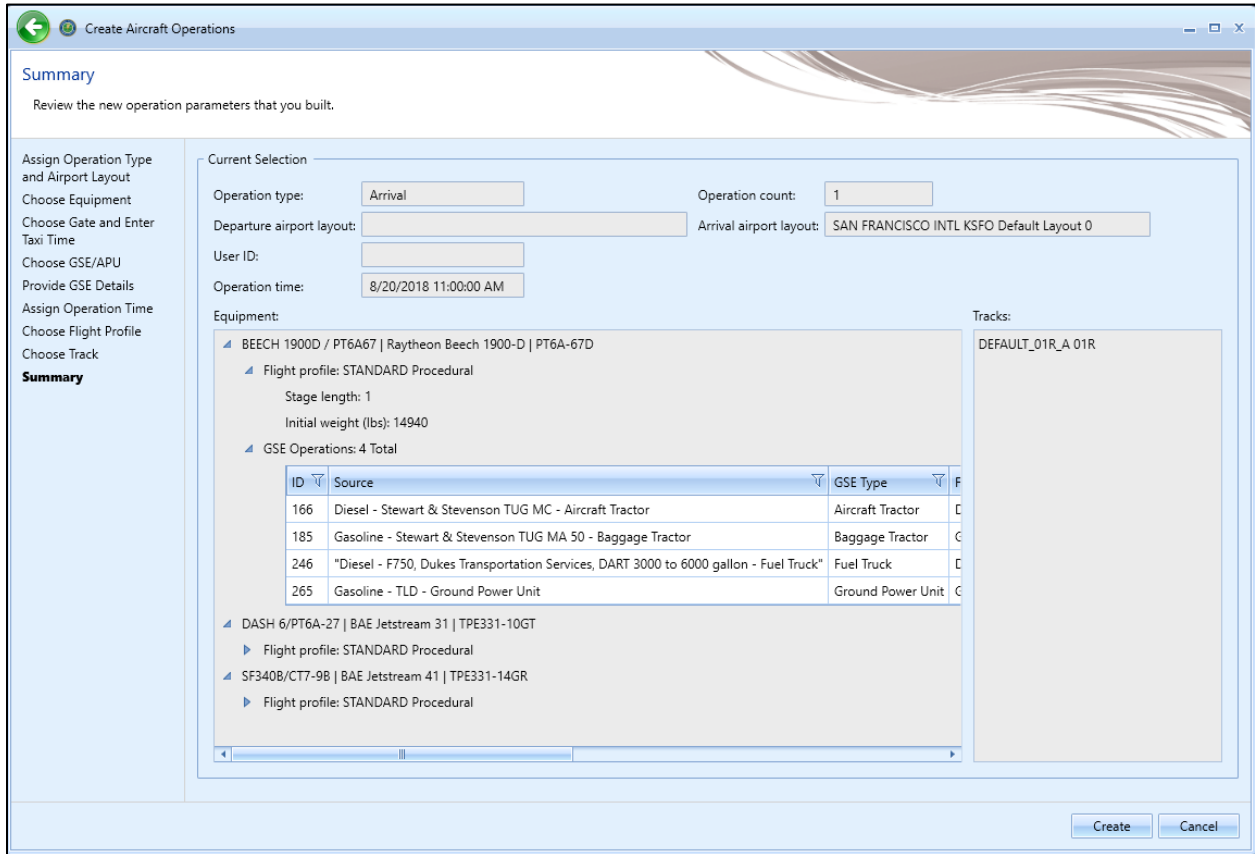
Figure 6-18 Create Aircraft Operation – Summary (Bulk)

6.2.2 Import Aircraft Operations

Aircraft operations and associated auxiliary power unit (APU) and ground support equipment (GSE) operations during landing and takeoff (LTO) can be imported into the current AEDT study from Comma Separated Value (CSV) input files through the AEDT user interface and by command line (Appendix E). The format of the data within the CSV file(s) is described in Appendix E.2. A set of sample CSV files are included with the AEDT installation, see Appendix E for more information. Create all airport layout elements used by the operations (e.g. tracks, gates, etc.) prior to importing.

> ⚠️ Only one airport layout may exist in the study to import operations from CSV files. Delete all other airport layouts before importing operations in this manner.

> ⚠️ If importing both tracks and aircraft operations, import tracks first (Section 8.3.9).

To import aircraft operations through the AEDT user interface:
1. In the *Operations* tab, *Aircraft Actions* ribbon group, click *Import* to open the *Import Aircraft Operations from CSV file* dialog.
2. Click the *Aircraft operation file, Browse* button and navigate to the CSV file with the aircraft operation data.
3. Optionally, click the *Browse* buttons associated with *Aircraft operation APU file* and *Aircraft operation GSE file* fields to specify APUs and GSEs for the aircraft.
4. Select *All CSV files contain a header row* if all files (aircraft, APU, and GSE) contain a header row or select *No CSV files contain a header row* if the files do not contain a header row and the columns are ordered as specified in Appendix E.2.
5. Click *Import* to begin the import process. Progress, including import initialization, number of imported operations and completion status are displayed above the *Errors* field. Error messages are displayed in the *Errors* field as they are encountered and reported in the AEDT log.

> 📝 Errors messages displayed in the *Errors* field can be copied directly within the field further assistance or analysis.

6. Click *Cancel Import* to stop the import process and revert changes.
7. Click *Close* to close the dialog.
8. Click *Get Operations* in the *Aircraft Operations* data grid or *Refresh* in the top right of the data grid to update the *Aircraft Operations* data grid and view the imported operations.

Figure 6-19 Operations Tab – Import Ribbon Group
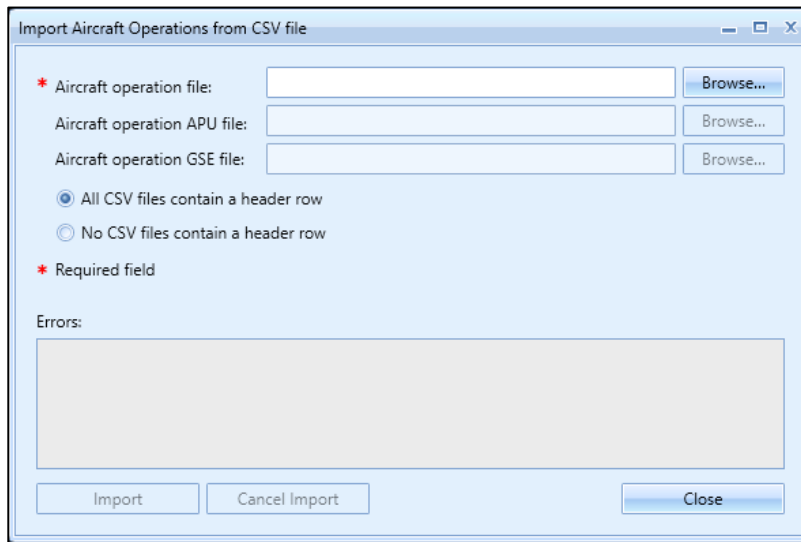
Figure 6-20 Import Aircraft Operation from CSV

6.2.3 Edit Single Aircraft Operation

Use the *Edit Aircraft Operations* wizard to edit a single or multiple existing aircraft operations. Follow the instructions below to edit a single aircraft operation. See Section 6.2.4 for instructions on editing multiple aircraft operations (bulk-edit). Edits are not saved until the entire edit process has been completed.

To edit a single aircraft operation:
1. In the *Display* ribbon group, click *Aircraft*.
2. In the *Operations* pane, select a desired operation to edit.
3. In the *Aircraft Actions* ribbon group, click *Edit* to open the *Edit Operations Process* wizard.
4. Edit the desired steps. See Section 6.2.1 for more information on each step.
5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the edited operation is tied to any existing metric results, the metric results will be reset.
7. The edited aircraft operation is listed in the *Operations* pane.

> ⚠ A change in airport layout will invalidate gate, track, and operational profile selections (if any) for the selected operation since these features are tied to an airport layout.

> ⚠ A change in aircraft equipment may necessitate a change in flight profile.

> ⚠ For an aircraft operation defined using an explicit operation time, the operation time may be edited to another specific date and time; operational profiles may not be used. For an aircraft operation defined using operational profiles, the profile selection may be edited; explicit operation times may not be used.

6.2.4 Bulk Aircraft Operations Edit

Use the *Edit Aircraft Operations* wizard to edit a single or multiple existing aircraft operations. Follow the instructions below to edit multiple aircraft operations at one time (bulk edit). See Section 6.2.2 for instructions on editing a single aircraft operation. Edits are not saved until the entire edit process has been completed.

Bulk editing uses additional controls which allow for careful targeting of fields to edit. The three bulk editing controls present for each editable field are as follows:
- Edit: Click the pencil icon to enable editing of the associated field.
- Save: Click the checkmark icon to save the changes.
- Cancel: Click the no-symbol icon to discard changes.

Figure 6-21 Bulk Editing Controls

Three-state checkboxes are also used in bulk editing. The three states represent the following:
- When all operations have the associated setting in common, the checkmark will show as checked.
- When none of the operations use the associated setting, the checkmark will show as unchecked.
- When some but not all operations use the associated setting, the checkmark will show as a dash. If the checkmark is left in the third state, the setting will not be edited.

Fields that cannot be edited through the bulk editing process are disabled for selection.

To edit multiple aircraft operations concurrently:
1. In the *Display* ribbon group, click *Aircraft*.
2. Select multiple operations of the same operation and aircraft type by holding the control or shift key on the keyboard while clicking on the desired rows. The *Edit Operations* process classifies aircraft operations as follows:
    - Arrival (with operation time)
    - Arrival (with operational profiles)
    - Departure (with operation time)
    - Departure (with operational profiles)
    - Touch-and-go (with operation time)
    - Touch-and-go (with operational profiles)
    - Circuit (with operation time)
    - Circuit (with operational profiles)
    - Overflight (with operation time)
    - Overflight (with operational profiles)
3. In the *Aircraft Actions* ribbon group, click *Edit* to open the *Edit Operations Process* wizard (Figure 6-22).

4. Edit the desired steps. See Section 6.2.1 for more information on each step.
5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the selected operation is tied to any metric results, confirmation window with the metric results to be reset is displayed.
7. A confirmation is displayed and the edited aircraft operations are listed in the *Operations* pane.

⚠️ A change in airport layout will invalidate gate, track, and operational profile selections (if any) for the selected operation since these features are tied to an airport layout.

⚠️ If the selection of operations contains dissimilar equipment, their selected equipment will not be displayed in the wizard.

⚠️ A change in aircraft equipment may necessitate a change in flight profile. If equipment was edited in the *Edit Equipment* step, the following error message may appear. This message occurs when a mismatch between edited equipment and un-edited flight profiles is detected. Select an aircraft profile from the list to proceed.
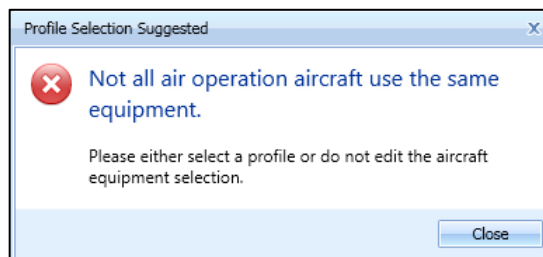
⚠️ For an aircraft operation defined using an explicit operation time, the operation time may be edited to another specific date and time; operational profiles may not be used. For an aircraft operation defined using operational profiles, the profile selection may be edited; explicit operation times may not be used.

⚠️ A change in airport layout may necessitate a change in track. If the airport layout was edited in the *Edit Airport Layout* step, the following error message may appear. Select a track from the list to proceed.

Aviation Environmental Design Tool

User Manual: 3f
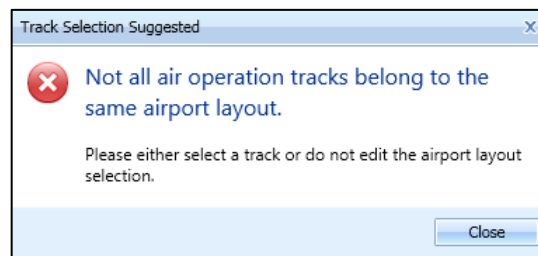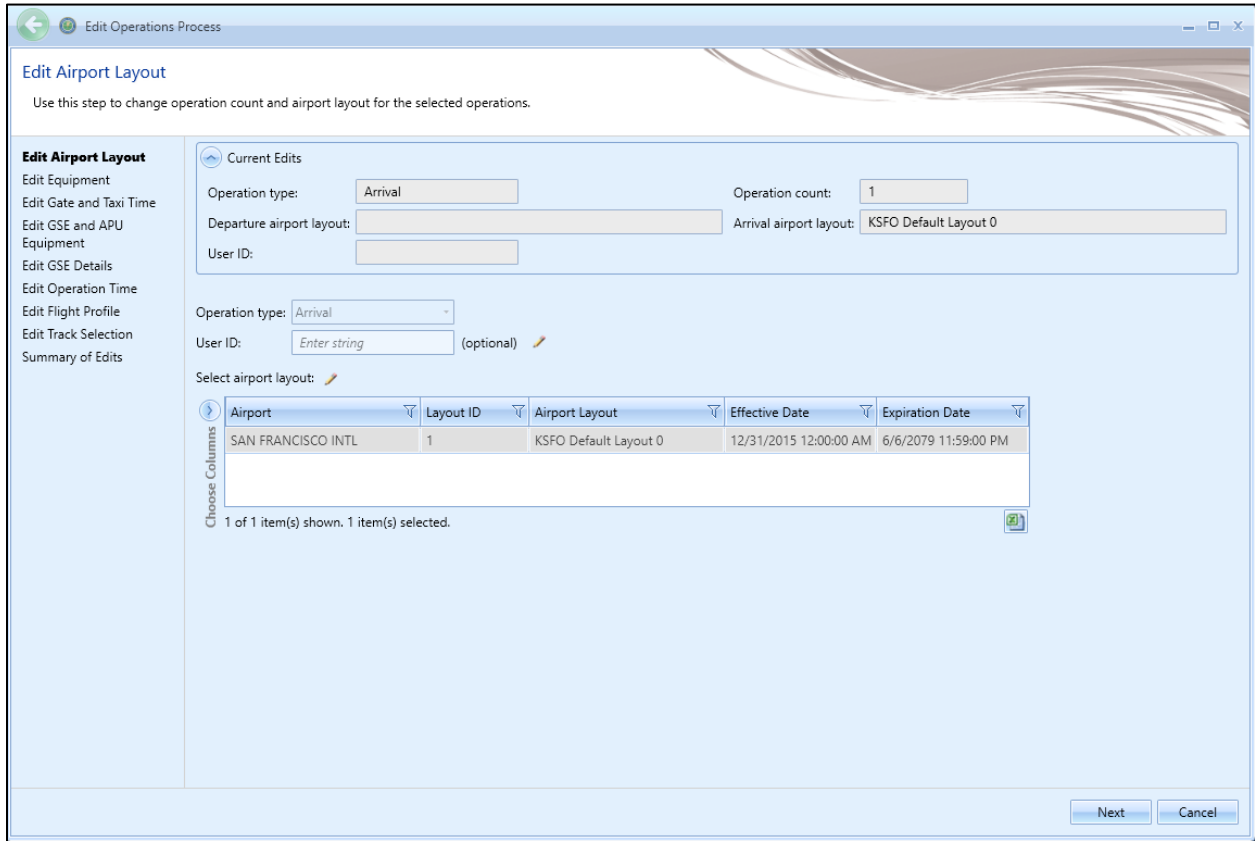
Figure 6-22 Bulk Aircraft Operations Edit

6.2.5 Copy Aircraft Operation

The *Copy* option allows users to create a new operation based on an existing operation.

To copy aircraft operation:
1. In the *Display* ribbon group, click *Aircraft*.
2. In the *Operations* pane, select a desired operation to copy.
3. Click *Copy* to open the *Create Aircraft Operations wizard*. Each step in the wizard will display the values from the original operation.
4. Edit the desired steps or retain the original selections. See Section 6.2.1 for more information on each step.
5. Click *Create* to create the new aircraft operation.
6. A confirmation is displayed and the new aircraft operation is listed at the bottom of the *Operations* pane.

6.2.6 Delete Aircraft Operation

Click *Delete* in the *Aircraft Actions* ribbon group to delete the currently selected operation.

6.3   Non-Aircraft Operation

Use the buttons in the *Non-Aircraft Actions* ribbon group to create, copy, or delete non-aircraft operations.

- Click *New* to open the *Create Non-Aircraft Operations wizard*.
- Click *Edit* to open the *Edit Operations Process* wizard.
- Click *Copy* to open the *Create Non-Aircraft Operations wizard* for the currently selected operation. Each step in the wizard will display the values from the original operation.
- Click *Delete* to delete the currently selected operation.

> The *Edit*, *Copy,* and *Delete* actions can also be accessed by right-clicking on an operation in the *Operations* pane.
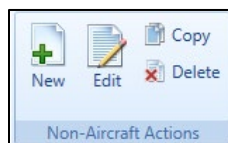
Figure 6-23 Operations Tab – Non-Aircraft Actions Ribbon Group

6.3.1 Create Single or Multiple Non-Aircraft Operations

Non-aircraft operations are created through the use of a wizard. To complete the *Create Non-Aircraft Operation* workflow, the study must already contain:
- Quarter-hourly, daily, and monthly operational profiles (Section 9.5);
- Airport content, including gate (Section 8); and
- User-defined non-aircraft equipment (Section 7.3.1).

⚠️ In order to create non-aircraft operations for non-aircraft equipment other than Ground Support Equipment, first create user-defined equipment in the *Equipment* tab, *Non-Aircraft* screen by copying and editing an existing non-aircraft equipment template.

Non-aircraft operations can be created in bulk for the same airport layout. Begin creating single or multiple non-aircraft operations the same way by opening the *Create Non-Aircraft Operations* wizard.

To access the Create Non-Aircraft Operations wizard:

1. In the *Display* ribbon group, click *Non-Aircraft*.
2. In the *Non-Aircraft Actions* ribbon group, click *New* to open the *Create Non-Aircraft Operations* wizard (Figure 6-24).

6.3.1.1 Step 1: Assign Airport Layout

The airport layout is assigned in this step (Figure 6-24). This step is the same for both single and bulk operation creation.

1. Select the desired airport layout.
2. Click *Next*.
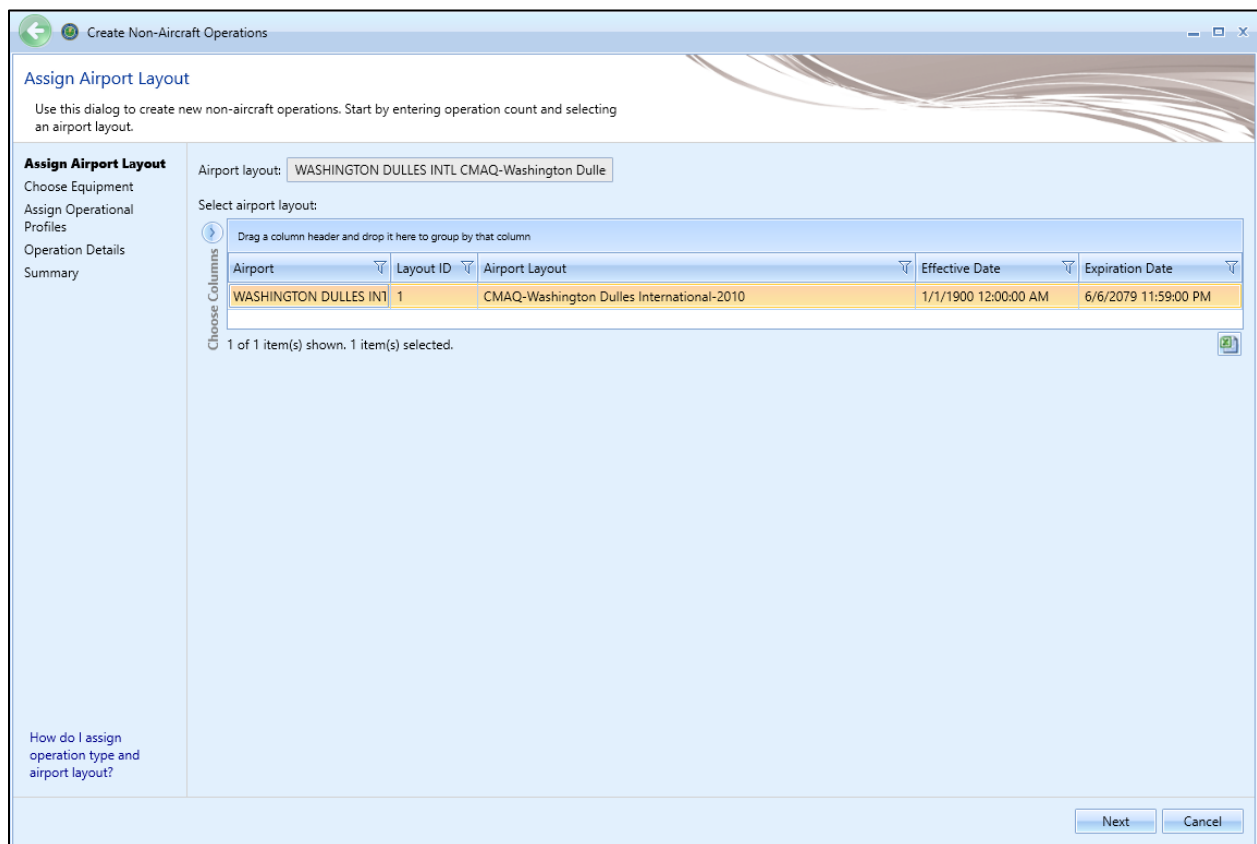
Figure 6-24 Create Non-Aircraft Operation – Assign Airport Layout

6.3.1.2 Step 2: Choose Equipment

Non-Aircraft equipment is selected in this step (Figure 6-25). The selection made in Step 1 is displayed in the *Current Selection* section. Multiple non-aircraft equipment can be selected in this step for bulk operation creation (Figure 6-26). To deselect equipment, click on the highlighted entry again.

⚠️ In order to create non-aircraft operations for non-aircraft equipment other than Ground Support Equipment, first create user-defined equipment in the *Equipment* tab, *Non-Aircraft* screen by copying and editing an existing non-aircraft equipment template.

1. Select the desired non-aircraft equipment from the *Choose equipment* list.
2. Click *Next*.

Figure 6-25 Create Non-Aircraft Operation – Choose Equipment (Single)

Figure 6-26 Create Non-Aircraft Operation – Choose Equipment (Bulk)

6.3.1.3 Step 3: Provide GSE Details (GSE only)

This step is displayed if ground support equipment was selected in the *Choose Equipment* step. The selections made in previous steps are displayed in the *Current Selection* section.

The *Gate Assignments* table displays all the gates in the selected airport layout. GSE operations must be assigned to a gate.

For single non-aircraft operation, the details for the GSE selected in the previous step are displayed (Figure 6-27). For bulk non-aircraft operations, select the equipment from the equipment list to display the corresponding GSE details (Figure 6-28).

Default values are provided for duration, horsepower, and load factor (if available). Click in the cells to edit the values.

1. Enter the *Number of units*. This quantity represents the discrete number of GSE units.
2. Edit the *Horsepower* value if desired. This value is only pertinent to non-electric GSE.
3. Edit *Load factor* value if desired.
4. Select the *Manufacture year*. This value is only pertinent to non-electric GSE.

5. In the *Gate Assignments* table, enter fraction values representing the GSE operation for each gate. Total fraction value must be equal to 1.
6. Click *Next*.

Is Manufacture Year optional?
Entering the manufacture year for GSE is optional, but recommended for use with the VALE Report.

When the manufacture year for GSE is provided, deterioration is included in calculations and an end-of-life date is determined for the GSE based on the manufacture year and useful life assumption. If an operation date is beyond the end-of-life date for the GSE, emissions from the associated GSE are not included in the calculations. Excluded GSEs are logged in the study run log. The associated useful life assumption for a GSE can be viewed in the *Equipment* tab.

If a manufacture year is not provided, deterioration is not calculated and emissions from the equipment are always included in calculations.

For user-defined GSEs, the Manufacture Year field is disabled for editing.

Please refer to Technical Manual for more information.

Figure 6-27 Create Non-Aircraft Operation – Provide GSE Details (Single)

Figure 6-28 Create Non-Aircraft Operation – Provide GSE Details (Bulk)

6.3.1.4 Step 4: Assign Operational Profiles

Operational profiles are selected in this step (Figure 6-29). The selections made in previous steps are displayed in the *Current Selection* section. This step is the same for both single and bulk operation creation.

1. Select the year.
2. Select the quarter-hourly, daily, and monthly operation profiles.
3. Click *Next*.

> The default operation time can be assigned in the *Study* tab, *Preferences*, *Study* screen (see Section 4.11.2.6).
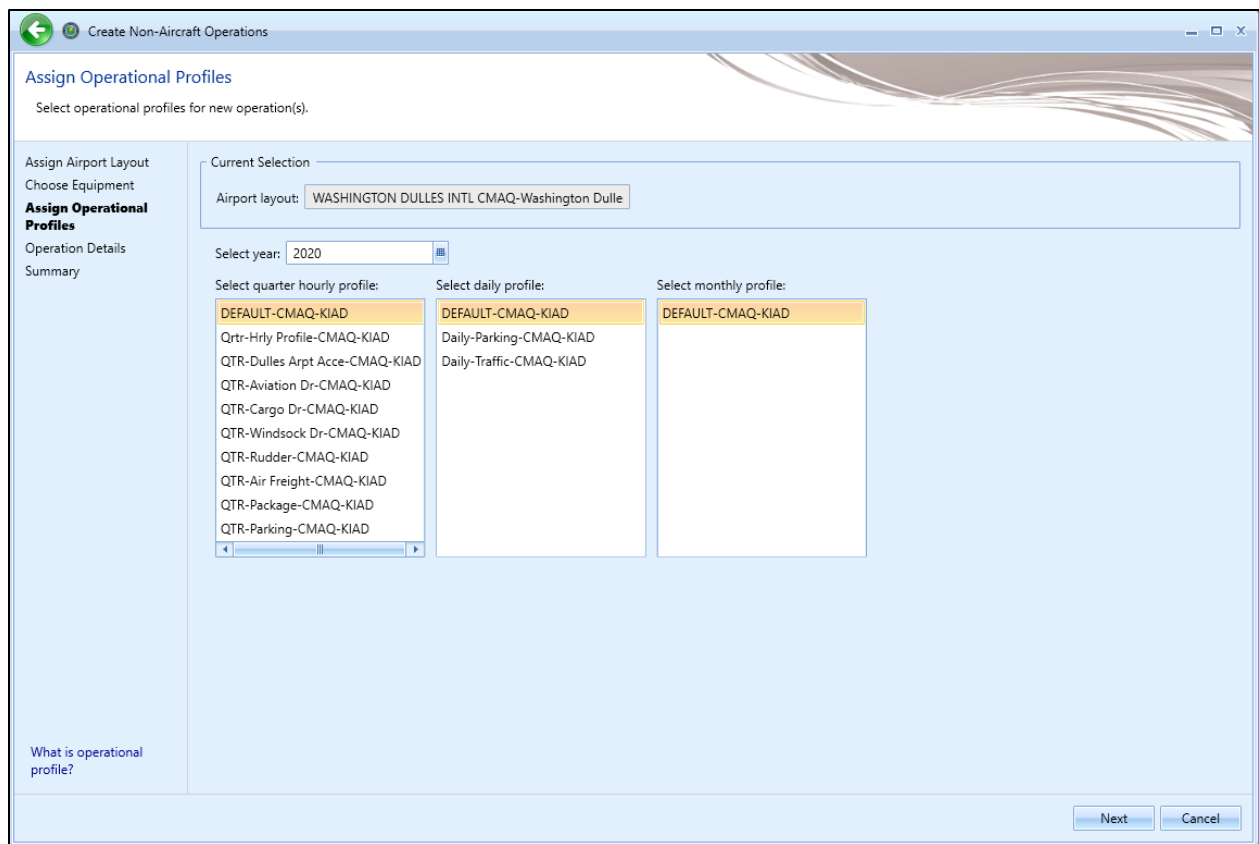
Figure 6-29 Create Non-Aircraft Operation – Assign Operational Profiles

6.3.1.5 Step 5: Provide Location Details (non-GSE only)

This step is displayed if non-aircraft equipment other than ground support equipment was selected in the *Choose Equipment* step. Location details of the non-aircraft operation are entered in this step (Figure 6-30).

For single non-aircraft operation, the details for the equipment selected in the previous step are displayed (Figure 6-30). For bulk non-aircraft operations, select the equipment from the equipment list to display the corresponding details (Figure 6-31).

1. Enter the latitude and longitude. Or, zoom into the desired location on the map and click on the map to select the latitude and longitude.
2. Enter height above field elevation (AFE) in feet.
3. Click *Next*.

Figure 6-30 Create Non-Aircraft Operation – Provide Location Details (Single)

Figure 6-31 Create Non-Aircraft Operation – Provide Location Details (Bulk)

6.3.1.6 Step 6: Summary

The summary step provides a summary of options selected in the *Create Non-Aircraft Operations wizard* (Figure 6-32 and Figure 6-33). To create the operation, follow the steps below or *Cancel* to discard changes and exit the wizard.

To create a new non-aircraft operation:
1. Click *Create* to create the new operation(s).
2. A confirmation is displayed and the new operation(s) are listed at the bottom of the *Operations* pane.
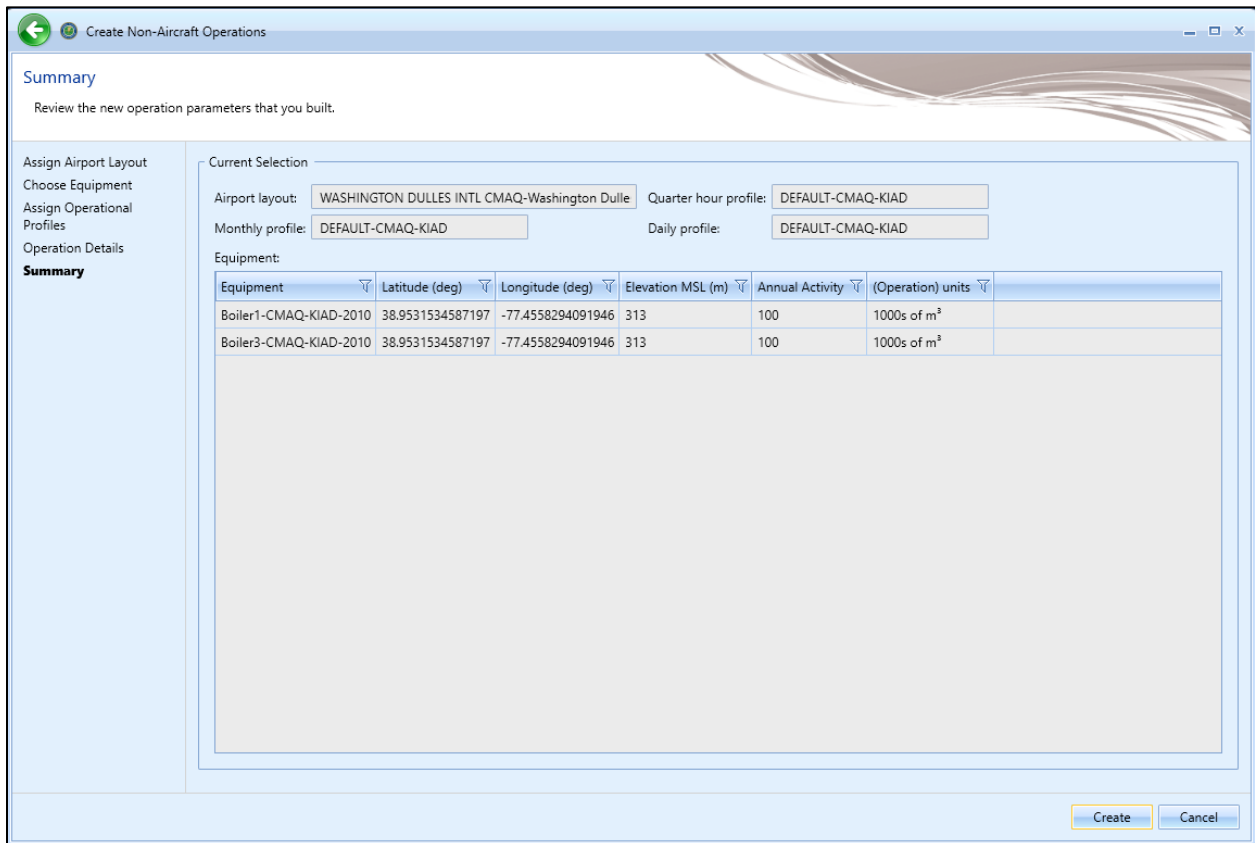
Figure 6-32 Create Non-Aircraft Operation – Summary (Single)
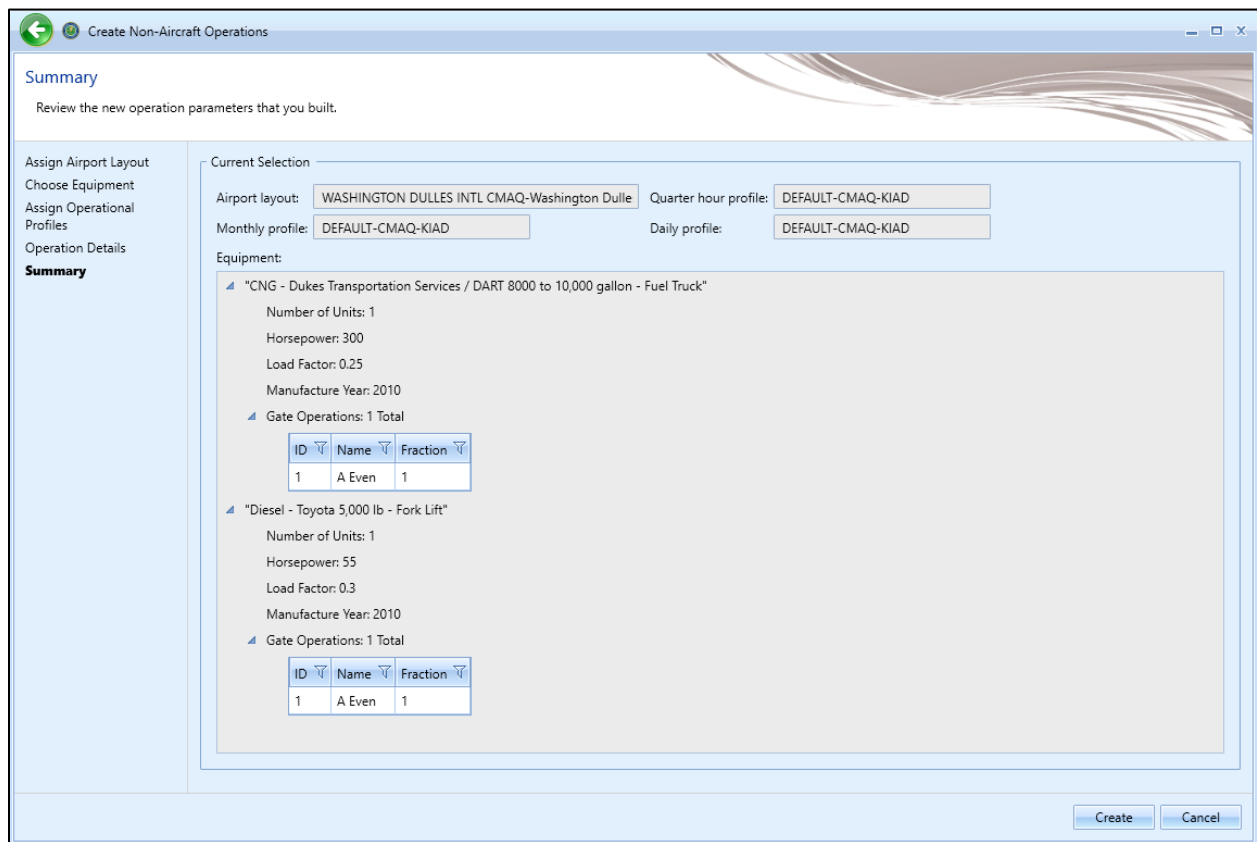
Figure 6-33 Create Non-Aircraft Operation – Summary (Bulk)

6.3.2 Edit Single Non-Aircraft Operation

Use the *Edit Non-Aircraft Operations* wizard to edit a single or multiple existing non-aircraft operations. Follow the instructions below to edit a single non-aircraft operation. See Section 6.3.3 for instructions on editing multiple non-aircraft operations (bulk-edit). Edits are not saved until the entire edit process has been completed.

To edit a single non-aircraft operation:
1. In the *Display* ribbon group, click *Non-Aircraft*.
2. In the *Operations* pane, select a desired operation to edit.
3. In the *Non-Aircraft Actions* ribbon group, click *Edit* to open the *Edit Operations Process* wizard.
4. Edit the desired steps. See Section 6.3.1 for more information on each step.
5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the edited operation is tied to any existing metric results, the metric results will be reset.
7. The edited non-aircraft operation is listed in the *Operations* pane.

When editing non-GSE stationary source operations, only non-GSE stationary source equipment will appear in the list of available equipment. Similarly, when editing GSE population operations, only GSE equipment will be available in the list.

For every airport layout/GSE combination, the sum of the *Fraction* must (nominally) equal one. If the sum of fraction is not equal to one, a warning message will be displayed.

6.3.3 Bulk Non-Aircraft Operations Edit

Use the *Edit Non-Aircraft Operations* wizard to edit a single or multiple existing non-aircraft operations. Follow the instructions below to edit multiple non-aircraft operations of the same category (for GSE operations) or category and subcategory (for non-GSE operations) at one time (bulk edit). A subset of data are available for bulk editing including equipment, operation time, annual activity, and elevation. See Section 6.3.2 for instructions on editing a single non-aircraft operation. Edits are not saved until the entire edit process has been completed.

Bulk editing has additional controls which allow for careful targeting of fields to edit. The three bulk editing controls present for each editable field are as follows:
- Edit: Click the pencil icon to enable editing of the associated field.
- Save: Click the checkmark icon to save the changes.
- Cancel: Click the no-symbol icon to discard changes.

Figure 6-34 Bulk Editing Controls

Three-state checkboxes are also used in bulk editing. The three states represent the following:

When all operations have the associated setting in common, the checkmark will show as checked.

When none of the operations use the associated setting, the checkmark will show as unchecked.

When some but not all operations use the associated setting, the checkmark will show as a dash. If the checkmark is left in the third state, the setting will not be edited.

Fields that cannot be edited through the bulk editing process are disabled for selection.

To edit multiple non-aircraft operations concurrently:
1. In the *Display* ribbon group, click *Non-Aircraft*.
2. Select multiple operations of the same *Category* (for GSE operations) or *Category* and *Subcategory* (for non-GSE operations).
3. In the *Non-Aircraft Actions* ribbon group, click *Edit* to open the *Edit Operations Process* wizard (Figure 6-35).
4. Edit the desired steps. See Section 6.3.1 for more information on each step.

5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the selected operation is tied to any metric results, confirmation window with the metric results to be reset is displayed.
7. A confirmation is displayed and the edited non-aircraft operations are listed in the *Operations* pane.

> ⚠ The steps in the wizard will vary for stationary source operations and GSE population operations.

> ⚠ When editing non-GSE stationary source operations, only non-GSE stationary source equipment will appear in the list of available equipment. Similarly, when editing GSE population operations, only GSE equipment will be available in the list.

> ⚠ For every airport layout/GSE combination, the sum of the *Fraction* must (nominally) equal one. If the sum of fraction is not equal to one, a warning message will be displayed.
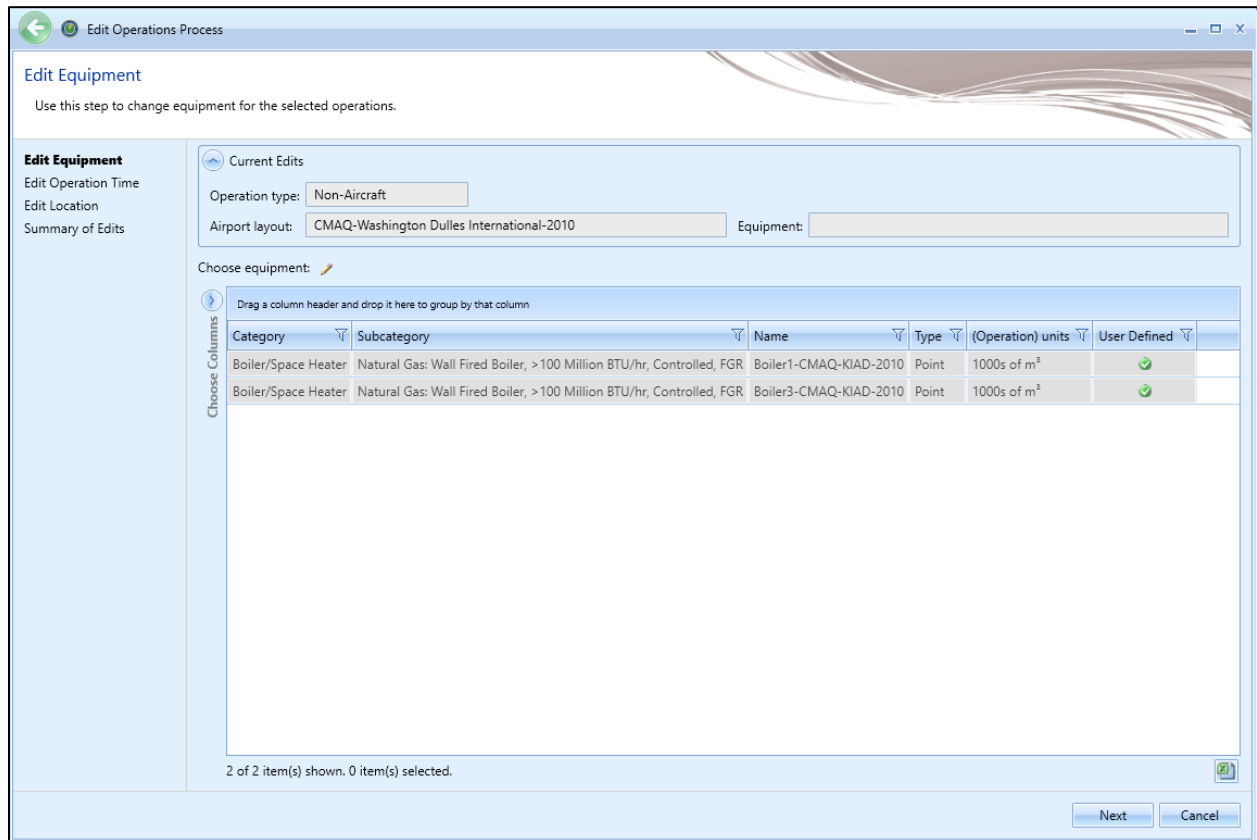
Figure 6-35 Bulk Non-Aircraft Operations Edit

6.3.4 Copy Non-Aircraft Operation

The *Copy* option allows users to create a new operation based on an existing operation.

To copy non-aircraft operation:
1. In the *Display* ribbon group, click *Non-Aircraft*.
2. In the *Operations* pane, select a desired operation to copy.
3. Click *Copy* to open the *Create Non-Aircraft Operations wizard*.
4. Each step in the wizard will display the values from the original operation.
5. Edit the desired steps or retain the original selections. See Section 6.3.1 for more information on each step.
6. Click *Create* to create the new non-aircraft operation.
7. A confirmation is displayed and the new non-aircraft operation is listed at the bottom of the *Operations* pane.

6.3.5 Delete Non-Aircraft Operation

Click *Delete* in the *Non-Aircraft Actions* ribbon group to delete the currently selected operation.

6.4   Runup Operation

Runup operation is an activity in which a fixed-wing aircraft is in a stationary position on the ground, with aircraft thrust held constant for a time period. AEDT supports modeling noise, emissions, and emissions dispersion for runup operations.

Use the buttons in the *Runup Actions* ribbon group to create, copy, or delete runup operations.

*   Click *New* to open the *Create Runup Operations wizard*.
*   Click *Edit* to open the *Edit Operations Process* wizard.
*   Click *Copy* to open the *Create Runup Operations wizard* for the currently selected operation. Each step in the wizard will display the values from the original operation.
*   Click *Delete* to delete the currently selected operation.

The *Edit*, *Copy* and *Delete* actions can also be accessed by right-clicking on an operation in the *Operations* pane.
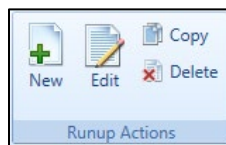
Figure 6-36 Operations Tab – Runup Actions Ribbon Group

6.4.1 Create Single or Multiple Runup Operations

Runup operations are created through the use of a wizard. To complete the *Create Runup Operation* workflow, the study must already contain airport content (Section 8).

Runup operations can be created in bulk for the same airport layout. Begin creating single or multiple runup operations the same way by opening the *Create Runup Operations wizard*.

To access the Create Runup Operations wizard:
1. In the *Display* ribbon group, click *Runup*.
2. In the *Runup Actions* ribbon group, click *New* to open the *Create Runup Operations wizard*.

6.4.1.1 Step 1: Assign Airport Layout

Airport layouts are assigned in this step (Figure 6-37). This step is the same for both single and bulk operation creation.
1. Enter the desired operation count.
2. Select the desired airport layout.
3. Enter a custom *User ID* for the new runup operation if desired.
4. Click *Next*.
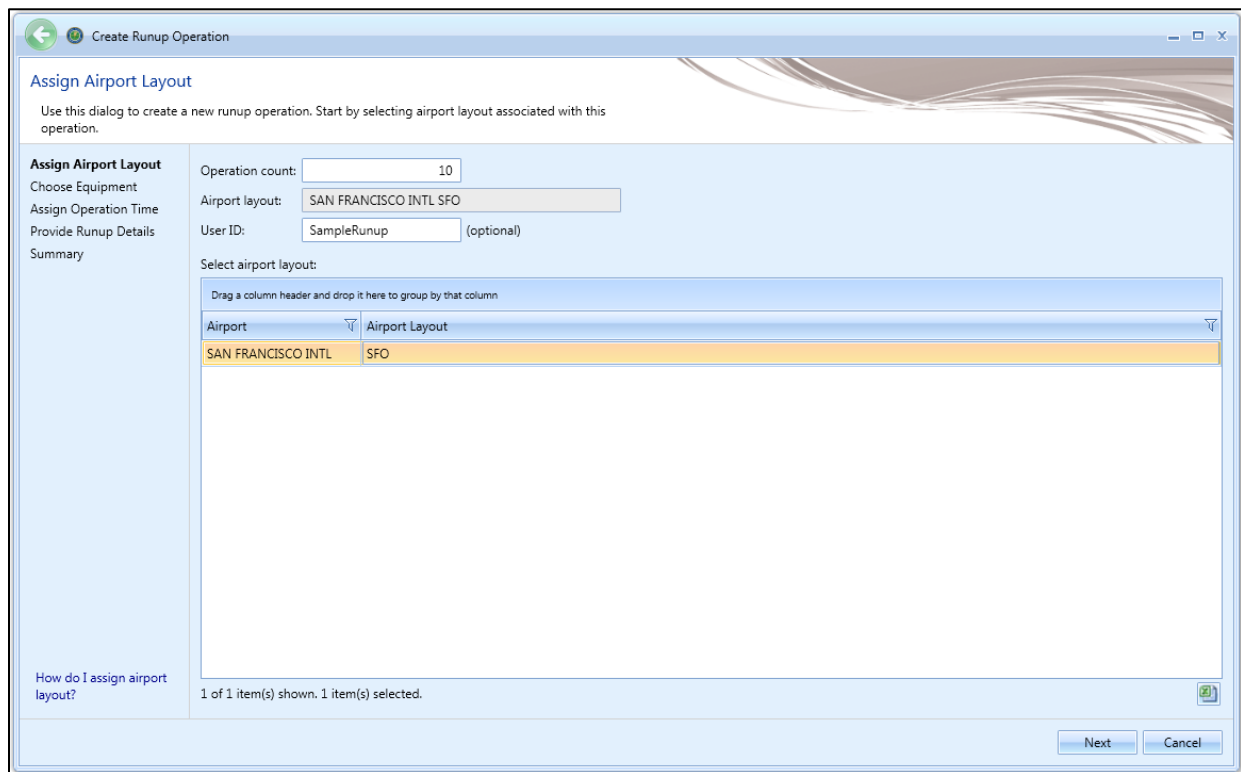
Figure 6-37 Create Runup Operation – Assign Airport Layout

6.4.1.2 Step 2: Choose Equipment

Aircraft equipment is selected in this step (Figure 6-38). The selections made in Step 1 are displayed in the *Current Selection* section. Multiple aircraft can be selected in this step for bulk operation creation (Figure 6-39). To deselect aircraft, click on the highlighted entry again.

1. Select the desired aircraft from the *Choose equipment* list.
2. Click *Next*.

Figure 6-38 Create Runup Operation – Choose Equipment (Single)

Figure 6-39 Create Runup Operation – Choose Equipment (Bulk)

6.4.1.3 Step 3: Assign Operation Time

The time and date for the runup operation are assigned in this step (Figure 6-40). The selections made in previous steps are displayed in the *Current Selection* section. This step is the same for both single and bulk operation creation.

1. Select the desired date and time for the operation.
2. Click *Next*.

> The default operation time can be assigned in the *Study* tab, *Preferences*, *Study* screen (see Section 4.11.2.6).

> AEDT assumes that date time values for operations are in local times, not UTC (Universal Time Coordinated).

Figure 6-40 Create Runup Operation – Assign Operation Time

6.4.1.4 Step 4: Provide Runup Details

Details of the runup aircraft operation are entered in this step. The selections made in previous steps are displayed in the *Current Selection* section.

Select the equipment from the equipment list to display the corresponding details (Figure 6-41).

1. Enter the latitude and longitude for each aircraft. Or, zoom into the desired location on the map and click on the map to select the latitude and longitude.
2. Enter heading, number of operative engines, thrust per engine (units are Pounds, Percent, or Other depending on the aircraft), and duration.
3. Specify if the runup operation (*Runup Type)* is intended to model a preflight check or engine maintenance test.
4. Click *Next*.

The *Number of operative engines* and *Thrust setting per engine* fields are disabled for editing when an aircraft's thrust setting is *Other*.

The *Preflight check* runup type assumes that the engine is already running and does not include startup emissions.

The *Engine maintenance* runup type includes startup emissions if the *Calculate Aircraft Engine Startup Emissions* option is selected when defining the metric result (Section 5.2.4.3) and provides results for all engines specified in the runup operation definition. For example, if two engines are specified in the runup operation definition, the startup emissions results are for two engines.
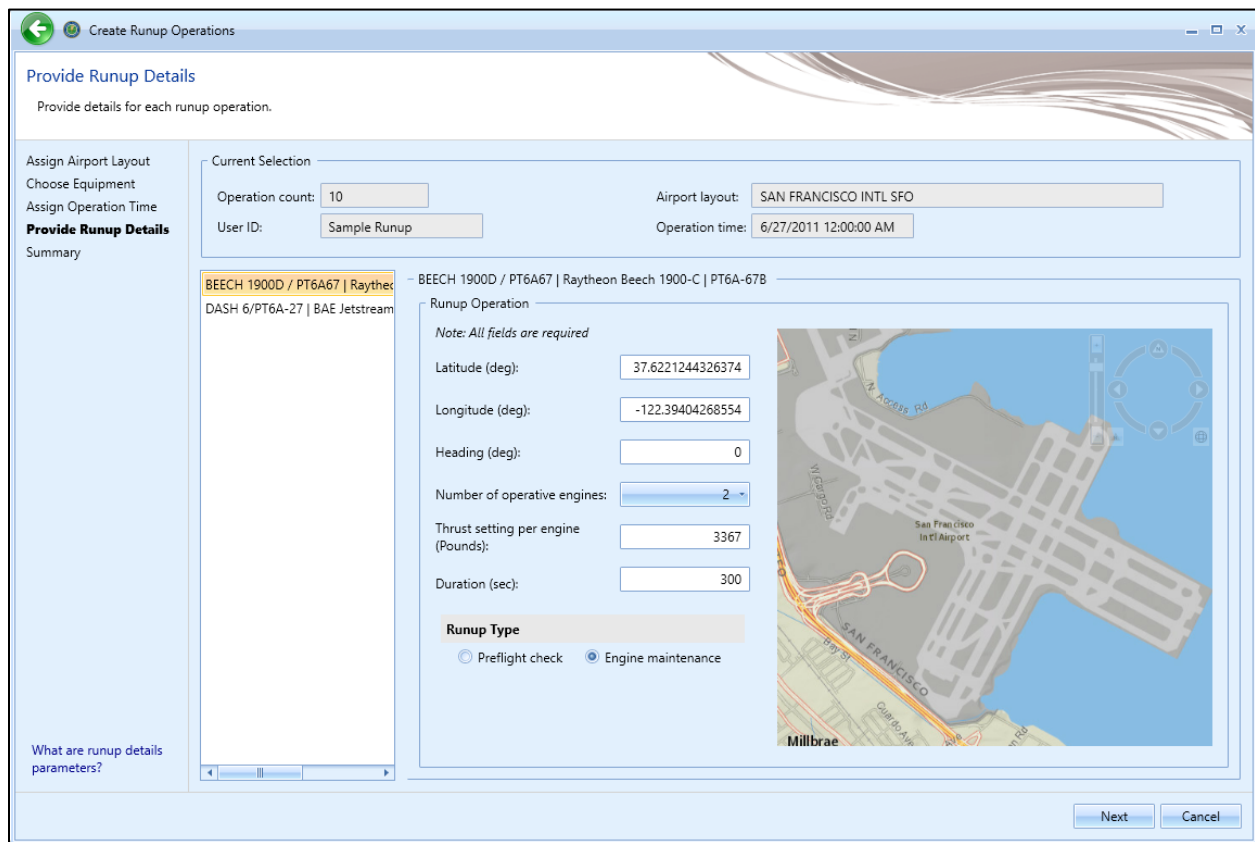
Figure 6-41 Create Runup Operation – Provide Runup Details

6.4.1.5 Step 5: Summary

The summary step provides a summary of options selected in the *Create Runup Operations wizard* (Figure 6-42). To create the operation, follow the steps below or *Cancel* to discard changes and exit the wizard.

To create a new runup operation:

1. Click *Create* to create the new runup operation(s).
2. A confirmation is displayed, click *Close.*
3. The new runup operation(s) are listed at the bottom of the *Operations* pane.
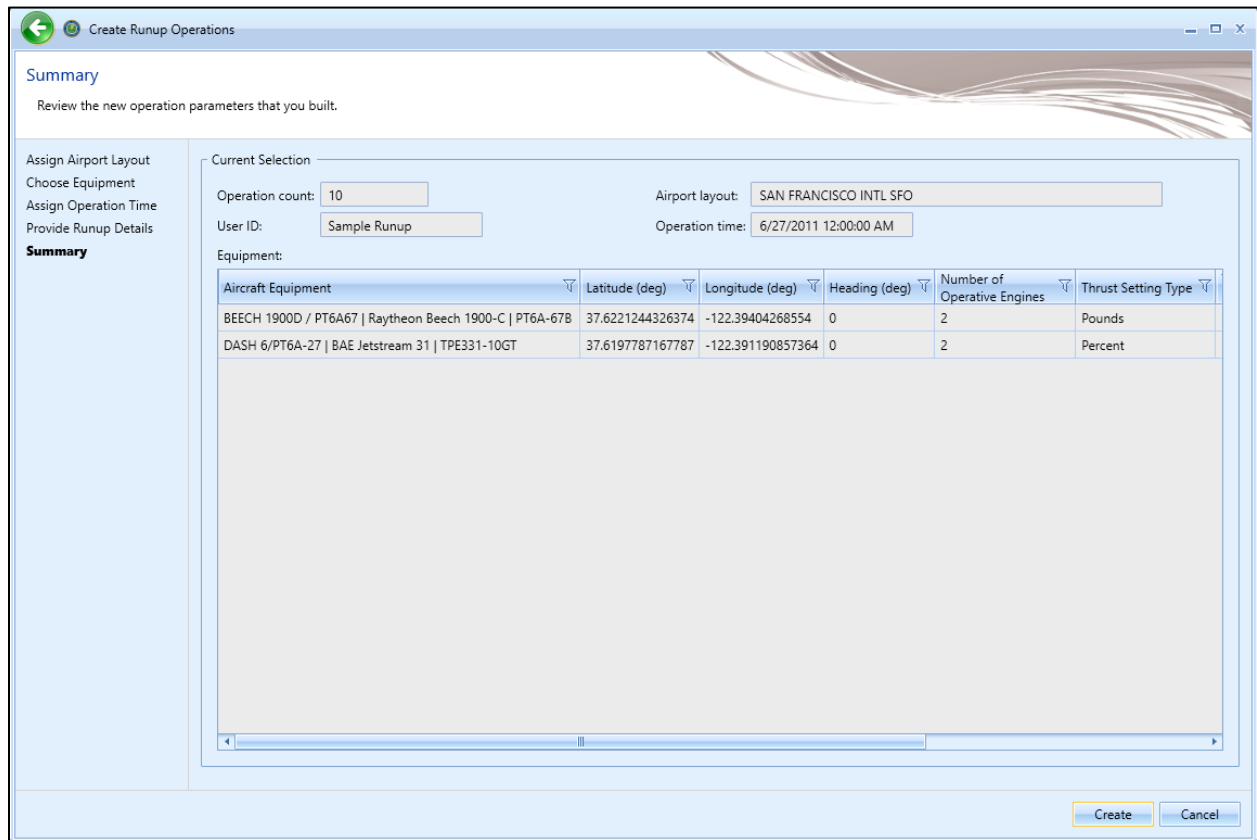
Figure 6-42 Create Runup Operation – Summary (Bulk)

6.4.2 Edit Single Runup Operation

Use the *Edit Runup Operations* wizard to edit a single or multiple existing runup operations. Follow the instructions below to edit a single runup operation. See Section 6.4.3 for instructions on editing multiple runup operations (bulk-edit).

To edit a single runup operation:
1. In the *Display* ribbon group, click *Runup*.
2. In the *Operations* pane, select a desired operation to edit.
3. In the *Runup Actions* ribbon group, click *Edit* to open the *Edit Operations Process* wizard.
4. Edit the desired steps. See Section 6.4.1 for more information on each step.
5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the edited operation is tied to any existing metric results, the metric results will be reset.
7. The edited runup operation is listed in the *Operations* pane.

6.4.3 Bulk Runup Operations Edit

Use the *Edit Runup Operations* wizard to edit a single or multiple existing runup operations. Follow the instructions below to edit multiple runup operations at one time (bulk edit). See Section 6.3.2 for

instructions on editing a single runup operation. Edits are not saved until the entire edit process has been completed.

To edit multiple runup operations concurrently:
1. In the *Display* ribbon group, click *Runup*.
2. Select one or more runup Operations.
3. In the *Runup Actions* ribbon group, click *Edit* to open the *Edit Runup Operations wizard* (Figure 6-43).
4. Edit the desired steps. See Section 6.4.1 for more information on each step.
5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the selected operation is tied to any metric results, confirmation window with the metric results to be reset is displayed.
7. A confirmation is displayed and the edited runup operations are listed in the *Operations* pane.

Figure 6-43 Bulk Runup Operations Edit

6.4.4 Copy Runup Operation

The *Copy* option allows users to create a new operation based on an existing operation.

To copy runup operation:
1. In the *Display* ribbon group, click *Runup*.
2. In the *Operations* pane, select a desired operation to copy.
3. Click *Copy* to open the *Create Runup Operations wizard*.
4. Each step in the wizard will display the values from the original operation.
5. Edit the desired steps or retain the original selections. See Section 6.4.1 for more information on each step.
6. Click *Create* to create the new runup operation.
7. A confirmation is displayed and the new runup operation is listed at the bottom of the *Operations* pane.

6.4.5 Delete Runup Operation

Click *Delete* in the *Runup Actions* ribbon group to delete the currently selected operation.

6.5 Helitaxi Operation

Helitaxi operations are applicable to helicopters only, and operations move either from heligate to helipad (outbound) or from helipad to heligate (inbound).

Use the buttons in the *Helitaxi Actions* ribbon group to create, copy, or delete helitaxi operations.

- Click *New* to open the *Create Helitaxi Operations wizard*.
- Click *Edit* to open the *Edit Operations Process* wizard.
- Click *Copy* to open the *Create Helitaxi Operations wizard* for the currently selected operation. Each step in the wizard will display the values from the original operation.
- Click *Delete* to delete the currently selected operation.

The *Edit*, *Copy* and *Delete* actions can also be accessed by right-clicking on an operation in the *Operations* pane.
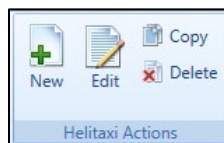
Figure 6-44 Operations Tab – Helitaxi Actions Ribbon Group

6.5.1 Create Single or Multiple Helitaxi Operations

Helitaxi operations are created through the use of a wizard. To complete the *Create Helitaxi Operation* workflow, the study must already contain helitaxi tracks (Section 8).

Helitaxi operations can be created in bulk for the same airport layout. When creating operations in bulk, an operation will be created for each helicopter and track combination.

Begin creating single or multiple aircraft operations the same way by opening the *Create Helitaxi Operations wizard*.

To access the Create Helitaxi Operations wizard:
1. In the *Display* ribbon group, click *Helitaxi*.
2. In the *Helitaxi Actions* ribbon group, click *New* to open the *Create Helitaxi Operations wizard*.

6.5.1.1 Step 1: Assign Airport Layout

Airport layouts are assigned in this step (Figure 6-45). This step is the same for both single and bulk operation creation.

1. Enter the desired operation count.
2. Select the desired airport layout.
3. Enter a custom *User ID* for the new helitaxi operation if desired.
4. Click *Next*.
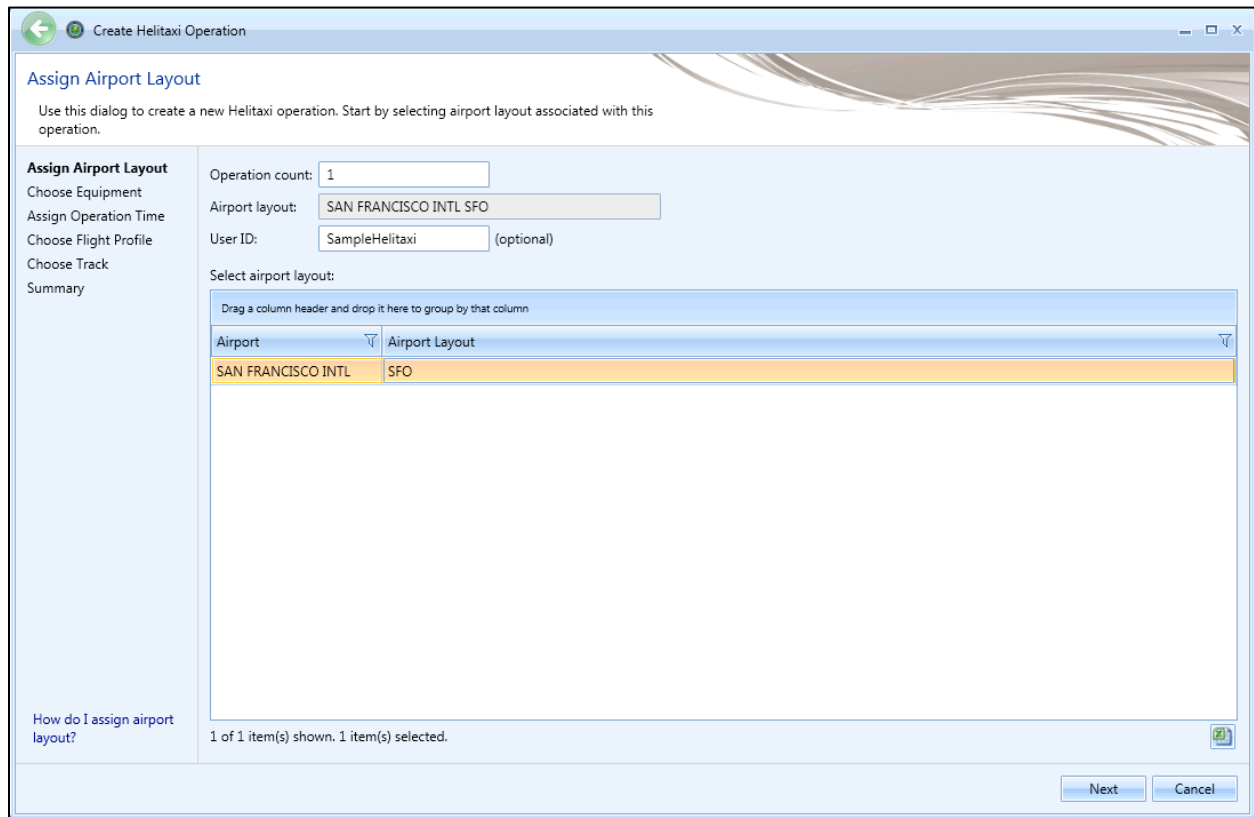
Figure 6-45 Create Helitaxi Operation – Assign Airport Layout

6.5.1.2 Step 2: Choose Equipment

Helicopter equipment is selected in this step. The selections made in Step 1 are displayed in the *Current Selection* section.

1. Select the desired helicopter from the *Choose equipment* list (Figure 6-46). Multiple helicopters can be selected in this step for bulk operation creation (Figure 6-47). To deselect equipment, click on the highlighted entry again.
2. Click *Next*.
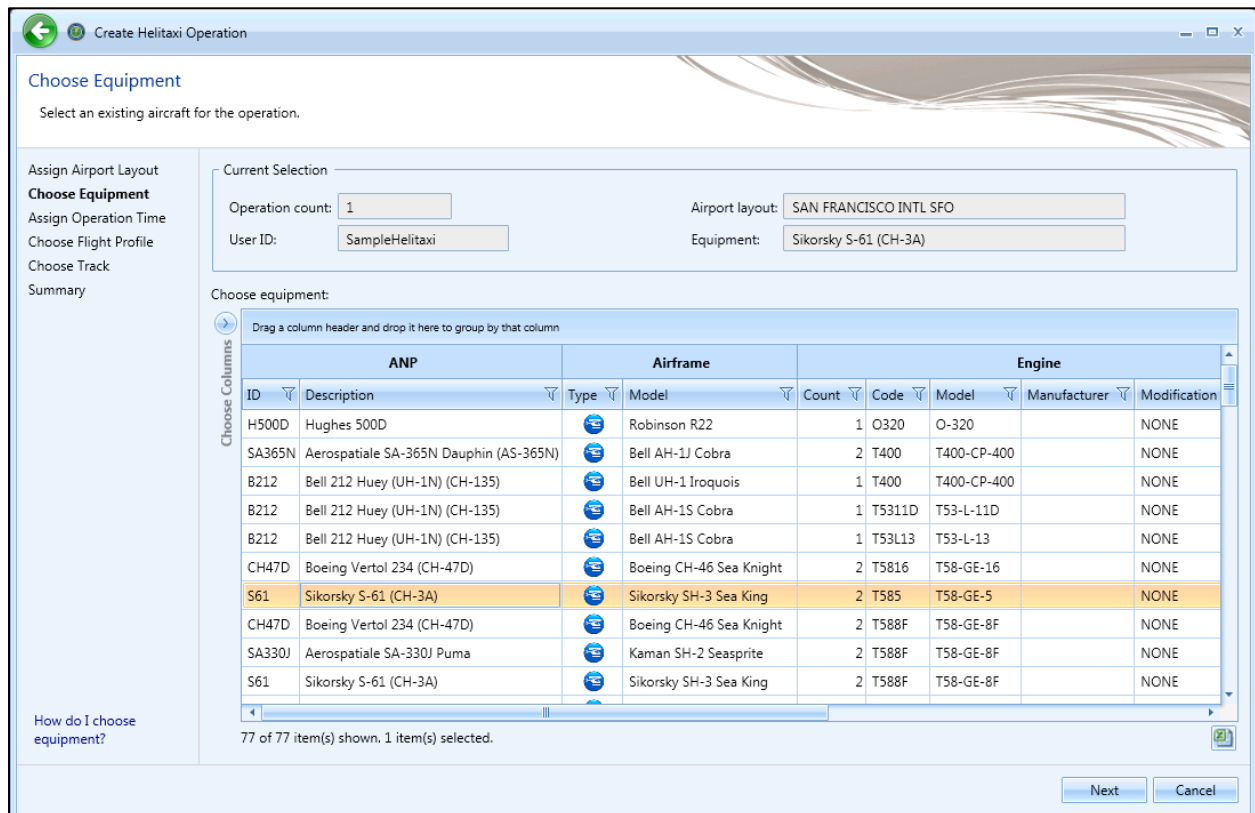
Figure 6-46 Create Helitaxi Operation – Choose Equipment (Single)
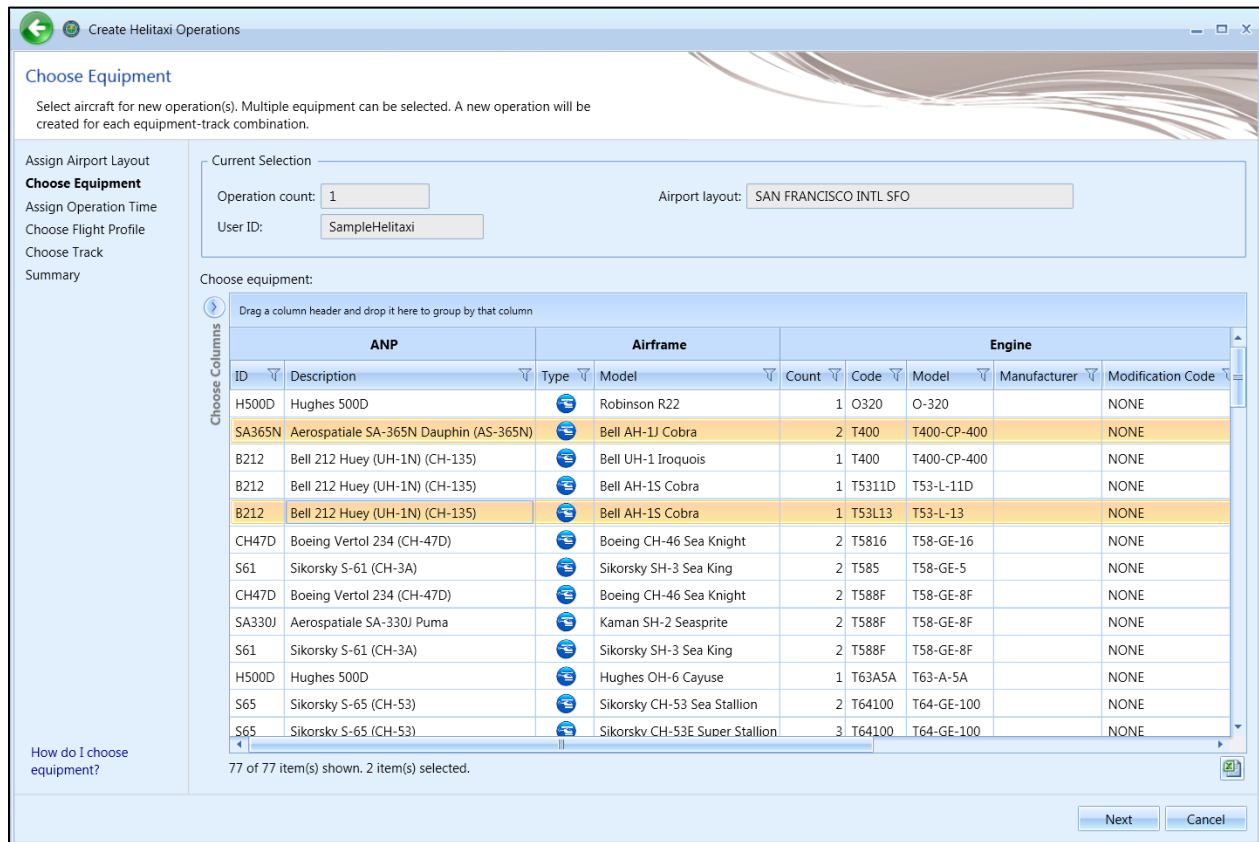
Figure 6-47 Create Helitaxi Operation – Choose Equipment (Bulk)

6.5.1.3 Step 3: Assign Operation Time

The time and date for the helitaxi operation are assigned in this step (Figure 6-48). The selections made in the previous steps are displayed in the *Current Selection* section. This step is the same for both single and bulk operation creation.

1. Select the desired date and time for the operation.
2. Click *Next*.

> The default operation time can be assigned in the *Study* tab, *Preferences*, *Study* screen (see Section 4.11.2.6).

> AEDT assumes that date time values for operations are in local times, not UTC (Universal Time Coordinated).

Figure 6-48 Create Helitaxi Operation – Assign Operation Time

6.5.1.4 Step 4: Choose Flight Profile

A flight profile for the helitaxi operation is assigned in this step. The selections made in previous steps are displayed in the *Current Selection* section. The *Choose flight profile* list displays helitaxi flight profiles based on the selected helicopter.

For single helitaxi operation, the available flight profiles are displayed in the table (Figure 6-49). For bulk helitaxi operations, select the helicopter from the equipment list to display the corresponding flight profiles (Figure 6-50).

1. Select the desired flight profile from the *Choose flight profile* list for each aircraft.
2. Click *Next*.

Figure 6-49 Create Helitaxi Operation – Choose Flight Profile (Single)

Figure 6-50 Create Helitaxi Operation – Choose Flight Profile (Bulk)

6.5.1.5 Step 5: Choose Track

A track for the helitaxi operation is assigned in this step (Figure 6-51). The selections made in previous steps are displayed in the *Current Selection* section. The *Choose Track* list displays helitaxi tracks in the selected airport layout. The map displays all the tracks in the list.

1. Select the desired track from the *Choose Track* list. The track is highlighted on the map view. Multiple tracks can be selected when creating operations in bulk.
2. Click *Next*.

> An operation will be created for each helicopter and track combination.

> The track will not be highlighted or displayed in color if accelerated display is disabled.

Aviation Environmental Design Tool

User Manual: 3f
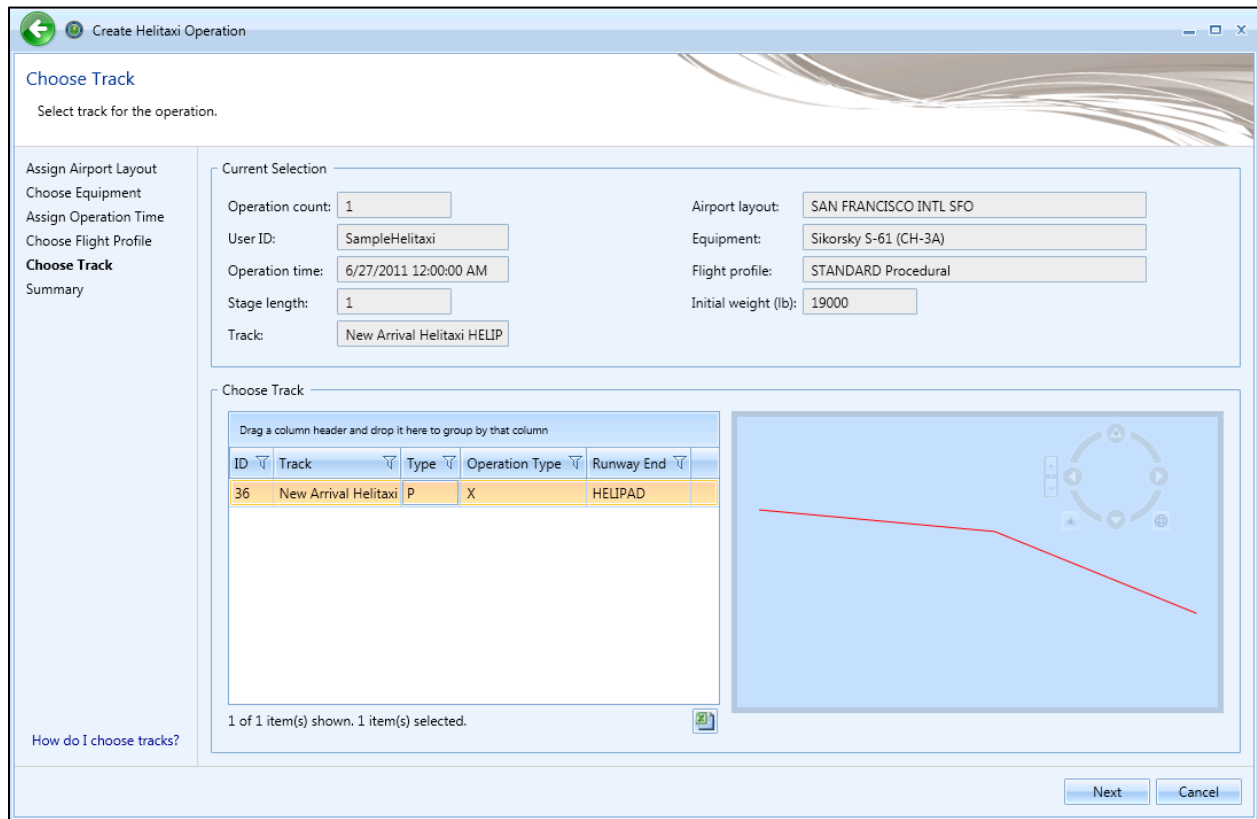
Figure 6-51 Create Helitaxi Operation – Choose Track

6.5.1.6 Step 6: Summary

The summary step provides a summary of options selected in the *Create Helitaxi Operations wizard* (Figure 6-52 and Figure 6-53). To create the operation, follow the steps below or *Cancel* to discard changes and exit the wizard.

To create a new helitaxi operation:

1. Click *Create* to create the new helitaxi operation(s).
2. A confirmation is displayed, click *Close.*
3. The new helitaxi operation(s) are listed at the bottom of the *Operations* pane.

> An operation will be created for each aircraft and track combination.

Figure 6-52 Create Helitaxi Operation – Summary (Single)
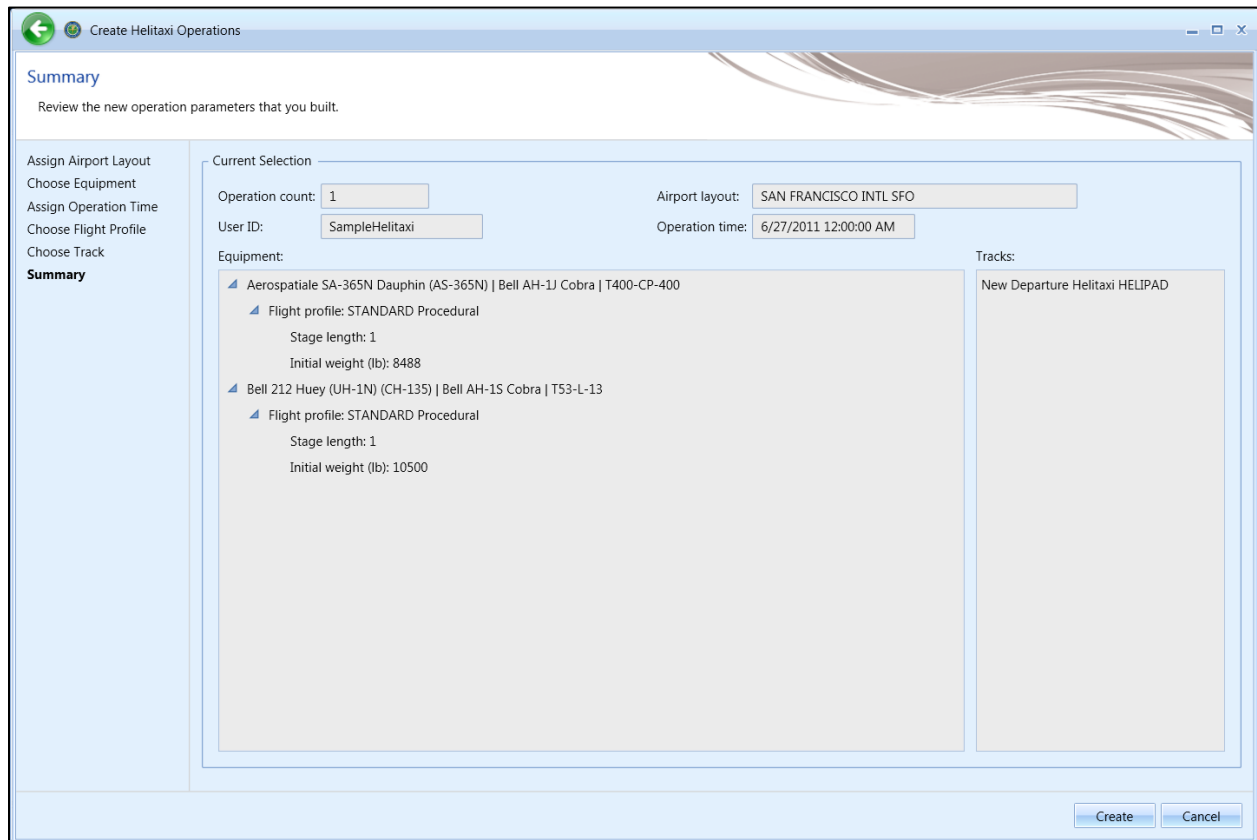
Figure 6-53 Create Helitaxi Operation – Summary (Bulk)

6.5.2 Edit Single Helitaxi Operation

Use the *Edit Helitaxi Operations* wizard to edit a single or multiple existing helitaxi operations. Follow the instructions below to edit a single helitaxi operation. See Section 6.5.3 for instructions on editing multiple helitaxi operations (bulk-edit).

To edit a single helitaxi operation:
1. In the *Display* ribbon group, click *Helitaxi*.
2. In the *Operations* pane, select a desired operation to edit.
3. In the *Helitaxi Actions* ribbon group, click *Edit* to open the *Edit Operations Process* wizard.
4. Edit the desired steps. See Section 6.5.1 for more information on each step.
5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the edited operation is tied to any existing metric results, the metric results will be reset.
7. The edited helitaxi operation is listed in the *Operations* pane.

6.5.3 Bulk Helitaxi Operations Edit

Use the *Edit Helitaxi Operations* wizard to edit a single or multiple existing helitaxi operations. Follow the instructions below to edit multiple helitaxi operations at one time (bulk edit). See Section 6.5.2 for instructions on editing a single helitaxi operation. Edits are not saved until the entire edit process has been completed.

To edit multiple helitaxi operations concurrently:
1. In the *Display* ribbon group, click *Helitaxi*.
2. Select one or more helitaxi Operations.
3. In the *Helitaxi Actions* ribbon group, click *Edit* to open the *Edit Helitaxi Operations wizard* (Figure 6-54).
4. Edit the desired steps. See Section 6.5.1 for more information on each step.
5. Click *Save* to complete the editing process.
6. A confirmation window is displayed, click *Yes*. If the selected operation is tied to any metric results, confirmation window with the metric results to be reset is displayed.
7. A confirmation is displayed and the edited helitaxi operations are listed in the *Operations* pane.

⚠️ A change in helitaxi equipment may necessitate a change in flight profile.

Figure 6-54 Bulk Helitaxi Operations Edit

6.5.4 Copy Helitaxi Operation

The *Copy* option allows users to create a new operation based on an existing operation.

To copy helitaxi operation:
1. In the *Display* ribbon group, click *Helitaxi*.
2. In the *Operations* pane, select a desired operation to copy.
3. Click *Copy* to open the *Create Helitaxi Operations wizard*.
4. Each step in the wizard will display the values from the original operation.
5. Edit the desired steps or retain the original selections. See Section 6.5.1 for more information on each step.
6. Click *Create* to create the new helitaxi operation.
7. A confirmation is displayed and the new helitaxi operation is listed at the bottom of the *Operations* pane.

6.5.5 Delete Helitaxi Operation

Click *Delete* in the *Helitaxi Actions* ribbon group to delete the currently selected operation.

6.6   Operation Group

6.6.1 Operation Groups Pane

The *Operation Groups* pane lists existing operation groups in the study. This pane will be empty if no operation groups have been created for the study. A new operation group is created when a new annualization is created using the *Create Annualization* wizard. See Section 6.7.1 for instructions on how to create a new annualization.
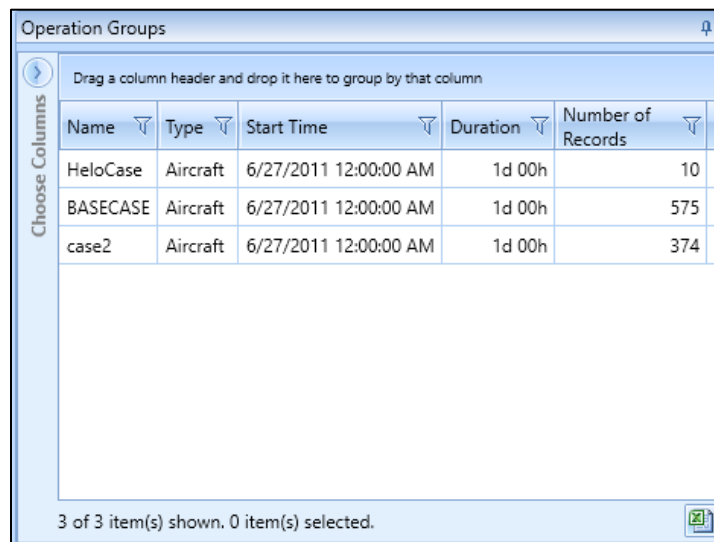
There are three types for operation groups – aircraft, non-aircraft, and runups. Helitaxi operations are part of the aircraft operation group.

6.6.2 Details Pane

The *Details* pane is located under the *Operation Groups* pane (Figure 8-2). When prompted, the operations for the selected operation group are displayed.

Get Operations

Click the *Get operations* link to retrieve and display the operations included in the selected operation group.

Figure 6-55 Operations Tab – Operation Groups Details Pane

6.6.3 Delete Operation Group

Click *Delete* in the *Operation Group Actions* ribbon group to delete the currently selected operation group. In order to delete an operation group, first delete any annualization that use the operation group.

6.7 Annualization

What is annualization?

In AEDT, an annualization is a hierarchical grouping of operations associated with the following parameters:

- Time period to be analyzed
- Operations included in the time period
- Weighted groupings of the included operations
- Modeling options for the included operations

Annualization provides a convenient way to create reusable operation groups and apply an appropriate weighting scheme to efficiently model a variety of scenarios (e.g., baseline and alternatives).

In the AEDT workflow, operations of interest are organized into reusable groups called operation groups. Operation groups can be defined in various ways, for example by aircraft type, operating configuration, tracks, carriers, time of day (day, evening, night), etc.

When these groups are used in an annualization, an annualization weighting (typically used to represent the percentage of time the operation group is in use) and a scaling factor (used to scale operations up and down) can be assigned to each operation group as desired. The operations are scaled by the annualization weight, scaling factor, and by the operation count specified in the original definition of the operation. When defining an annualization through the AEDT Graphical User interface, the product of the annualization weighting and scaling factor must be entered as the weighting factor when building the annualization (Section 6.7.1.5). Annualization weighting and scaling factor can be entered separately when defining an annualization through the AEDT Standard Input File (see the AEDT Supplemental Manual: ASIF Reference) or through the SQL databases.

For more detailed information on annualization weight and scaling factors, see the AEDT Technical Manual.

Use the buttons in the *Annualization Actions* ribbon group to create, copy, import, or delete annualization.

- Click *New* to open the *Create Annualization* wizard.
- Click *Import All Scenarios* to create annualization by using existing scenarios.
- Click *Copy* to open the *Create Annualization* wizard for the currently selected annualization. Each step in the wizard will display the values from the original annualization.
- Click *Delete* to delete the currently selected annualization.

Editing an existing annualization is supported only through the *Copy* feature to create a new annualization based on an existing one and edit the parameters.
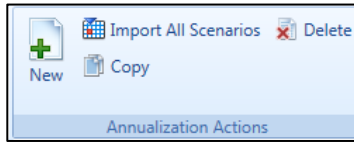
Figure 6-56 Operations Tab – Annualization Actions Ribbon Group

6.7.1 Create Annualization

To complete the *Create Annualizations* workflow, the study must already contain aircraft operations, non-aircraft operations, runup operations, or helitaxi operations.

 Helitaxi operations are displayed with the aircraft operations. To include helitaxi operations in an annualization, select the *Add new aircraft operation groups* checkbox.

To access the Create Annualization wizard:
1. In the *Display* ribbon group, click *Annualizations*.
2. In the *Annualization Actions* ribbon group, click *New* to open the *Create Annualization* wizard.

6.7.1.1 Step 1: Assign Existing Operation Groups

The first step of the *Create Annualization* wizard is organized into two areas: 1) Select wizard options at the top half of the screen; and 2) Assign existing operation groups at the bottom of the screen if the Assign existing operation group(s) option is selected.

Select Wizard Option(s)

First, select at least one option from the list of checkboxes:
1) Assign existing operation groups – check this option to enable the bottom half of the screen – *Existing Operation Groups* area;
2) Add new aircraft operation groups;
3) Add new non-aircraft operation groups; and/or
4) Add new runup operation groups.

The subsequent wizard steps will change depending on which options are selected. The Create Aircraft Operation Groups step (Section 6.7.1.2), the Create Non-Aircraft Operation Groups step (Section 6.7.1.3), and/or the Create Runup Operation Groups step (Section 6.7.1.4) are accessed by clicking Next.

Assign Existing Operation Group(s)

Existing operation groups are assigned in the current step.

A list of existing operation group(s) is displayed on the left, and a list of operation groups assigned to the annualization is displayed on the right.

To assign an existing operation group:
1. Select the desired operation group(s) from the *Available operation groups* list and click the *Add Arrow*.
2. To remove existing group(s) from the *Assigned operation groups* list, click the *Remove Arrow.*

3. To move all groups between the *Available* and *Assigned* lists, use the *Add All* and *Remove All Arrows*.
4. *When finished with this step, click Next.*

> The first day field displays the date of the first operation in the study and the last day field displays the date of the last operation in the study.

> Existing operation groups cannot be edited. Operations cannot be assigned or removed from these groups and they cannot be renamed.
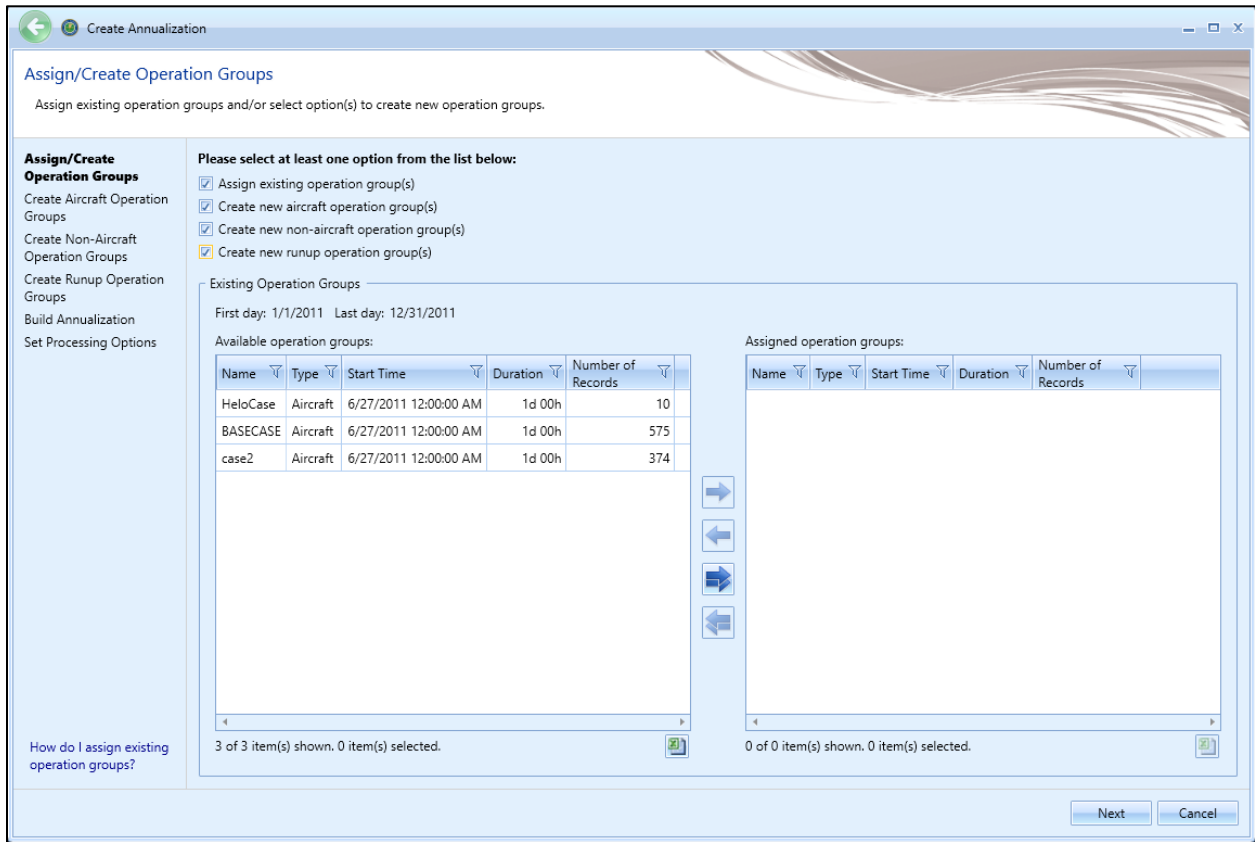
Figure 6-57 Create Annualization – Assign Existing Operation Groups

6.7.1.2 Step 2: Create Aircraft Operation Groups

In this step, aircraft operations can be organized into groups and assigned to the annualization. A list of available aircraft operations is displayed on the left, and a list of operation groups assigned to the annualization is displayed on the right.

To create a new aircraft operation group:
1. Enter a name in the *Add new operation group* field and click *Add*.
2. The new group is displayed in the *Assigned operation groups* list with an unlocked icon indicating that the group can be edited.
3. From the *Available operations* list on the left side of the content pane, select the desired operation(s) by clicking on the appropriate row(s). To select multiple rows, hold the control or shift key on the keyboard while clicking rows.
4. Drag and drop the selected row(s) into the desired group in the *Assigned operation groups* list.
   - The number of operations next to the operation group name is updated.
   - The selected operations are removed from the *Available operations* list.
5. To remove the group from the *Assigned operation groups* list, click the *X* button next to the operation group name.

When finished grouping operations, click *Next.*

⚠️ Each operation group must have a unique name.

📝 Operations can be assigned and removed from new operation groups identified with the unlocked icon.

Menu Options

The *Organize Operations* and *Organize Operation Groups* drop-down menus in the toolbar provide additional options to organize the *Available operations list* and the *Assigned operation groups* list.

- *Organize Operations* menu options:
  - *Cut*: Removes the selected operations from the *Available operations* list. Note that the text of selected operations will change to italic font after *Cut* is selected.
  - *Cancel Cut:* Discards the cut operation and restores them from the *Available operations* list.
  - *Select All:* Selects all operations in the *Available operations* list.
  - *Clear Selection:* clears the current selection in the *Available operations list.*

- *Organize Operation Groups* menu options:
  - *Paste*: Adds operations that were cut from the *Available operations* list into the selected group in the *Assigned operation groups* list.
  - *Remove Assignments*: Removes the selected operation(s) from the group(s) and returns the operations to the *Available operations* list.
  - *Rename Operation Group*: Modifies the name of the selected group.

- o *Delete Operation Group:* Deletes the selected group and returns the assigned operations to the *Available operations* list.
- o *Select Group Operations:* Selects all operations under the selected group in the *Assigned operation groups* list.
- o *Select All*: Selects all groups and operations in the *Assigned operation groups* list.
- o *Clear Selection*: Clears the current selection in the *Available operations* list.

Figure 6-58 Create Annualization – Create Aircraft Operation Groups

6.7.1.3 Step 3: Create Non-Aircraft Operation Groups

In this step, non-aircraft operations can be organized into groups and assigned to the annualization. A list of available non-aircraft operations is displayed on the left, and a list of operation groups assigned to the annualization is displayed on the right.

To create a new non-aircraft operation group:
1. Enter a name in the *Add new operation group* field and click *Add*.
2. The new group is displayed in the *Assigned operation groups* list with an unlocked icon indicating that the group can be edited.
3. From the *Available operations* list on the left side of the content pane, select the desired operation(s) by clicking on the appropriate row(s). To select multiple rows, hold the control or shift key on the keyboard while clicking rows.
4. Drag and drop the selected row(s) into the desired group in the *Assigned operation groups* list.
   - The number of operations next to the operation group name is updated.
   - The selected operations are removed from the *Available operations* list.
5. To remove the group from the *Assigned operation groups* list, click the *X* button next to the operation group name.

When finished grouping operations, click *Next.*

⚠️   Each operation group must have a unique name.

📝   Operations can be assigned and removed from new operation groups identified with the unlocked icon.

Menu Options
The *Organize Operations* and *Organize Operation Groups* menus in the toolbar provide additional options to organize the *Available operations list* and the *Assigned operation groups* list.

- *Organize Operations* menu options:
  o *Cut*: Removes the selected operations from the *Available operations* list. Note that the text of selected operations will change to italic font after *Cut* is selected.
  o *Cancel Cut:* Discards the cut operation and restores operations cut from the *Available operations* list.
  o *Select All:* Selects all operations in the *Available operations* list.
  o *Clear Selection:* clears the current selection in the *Available operations list.*

- *Organize Operation Groups* menu options:
  o *Paste*: Adds operations that were cut from the *Available operations* list into the selected group in the *Assigned operation groups* list.
  o *Remove Assignments*: Removes the selected operation(s) from the group(s) and returns the operations to the *Available operations* list.
  o *Rename Operation Group*: Modifies the name of the selected group.

- o *Delete Operation Group:* Deletes the selected group and returns the assigned operations to the *Available operations* list.
- o *Select Group Operations:* Selects all operations under the selected group in the *Assigned operation groups* list.
- o *Select All*: Selects all groups and operations in the *Assigned operation groups* list.
- o *Clear Selection*: Clears the current selection in the *Available operations* list*.*

Figure 6-59 Create Annualization – Create Non-Aircraft Operation Groups

6.7.1.4 Step 4: Create Runup Operation Groups

In this step, runup operations can be organized into groups and assigned to the annualization. A list of available runup operations is displayed on the left, and a list of operation groups assigned to the annualization is displayed on the right.

To create a new runup operation group:
1. Enter a name in the *Add new operation group* field and click *Add*.
2. The new group is displayed in the *Assigned operation groups* list with an unlocked icon indicating that the group can be edited.
3. From the *Available operations* list on the left side of the content pane, select the desired operation(s) by clicking on the appropriate row(s). To select multiple rows, hold the control or shift key on the keyboard while clicking rows.
4. Drag and drop the selected row(s) into the desired group in the *Assigned operation groups* list.
   - The number of operations next to the operation group name is updated.
   - The selected operations are removed from the *Available operations* list.
5. To remove the group from the *Assigned operation groups* list, click the *X* button next to the operation group name.

When finished grouping operations, click *Next.*

⚠️ Each operation group must have a unique name.

📝 Operations can be assigned and removed from new operation groups identified with the unlocked icon.

Menu Options

The *Organize Operations* and *Organize Operation Groups* menus in the toolbar provide additional options to organize the *Available operations list* and the *Assigned operation groups* list.

- *Organize Operations* menu options:
  - *Cut*: Removes the selected operations from the *Available operations* list. Note that the text of selected operations will change to italic font after *Cut* is selected.
  - *Cancel Cut:* Discards the cut operation and restores operations cut from the *Available operations* list.
  - *Select All:* Selects all operations in the *Available operations* list.
  - *Clear Selection:* clears the current selection in the *Available operations list.*

- *Organize Operation Groups* menu options:
  - *Paste*: Adds operations that were cut from the *Available operations* list into the selected group in the *Assigned operation groups* list.
  - *Remove Assignments*: Removes the selected operation(s) from the group(s) and returns the operations to the *Available operations* list.
  - *Rename Operation Group*: Modifies the name of the selected group.

- o *Delete Operation Group:* Deletes the selected group and returns the assigned operations to the *Available operations* list.
- o *Select Group Operations:* Selects all operations under the selected group in the *Assigned operation groups* list.
- o *Select All*: Selects all groups and operations in the *Assigned operation groups* list.
- o *Clear Selection*: Clears the current selection in the *Available operations* list*.*

Figure 6-60 Create Annualization – Create Runup Operation Groups

6.7.1.5 Step 5: Build Annualization

Annualization allows for user defined weighting of noise and emissions results over the time period of interest. An annualization weighting hierarchy can be created in this step for the operation groups defined in the previous steps (Figure 6-61). A list of available operation groups is displayed on the left, and the assigned annualization is displayed on the right of the content pane.

The list of *Defined operation groups* can be filtered by entering criteria (e.g., arrival) in the *Filter* text box. The list will automatically update to only display the operation groups that meet the criteria. Click the *X* to remove the filter and view all available operation groups.

> When defining an annualization through the AEDT Graphical User Interface, the product of the annualization weighting and scaling factor must be entered as the weighting factor. Annualization weighting and scaling factor can be entered separately when defining an annualization through the AEDT Standard Input File (see the AEDT Supplemental Manual: ASIF Reference) or through the SQL databases.

To create an annualization weighting hierarchy:
1. Select an existing group from the *Assigned annualization* list (e.g., *Root)* to create a child group under that group.
2. From the toolbar, click *Add Child Group*.
3. Enter a name for the new group and click *Add*.

> The top annualization name is used in GIS layer names that correspond to the metric results.

To assign operation groups to annualization groups:
1. From the *Defined operation groups* list, highlight the desired operation group(s) by clicking on the desired row(s).
2. Drag and drop the selected row(s) into the desired group in the *Assigned annualization* tree.

> By default, the scaling factor for all annualization groups is 1. This represents the unit weighting (no change). Change the scaling factor for annualizations groups as desired.

First and last day

This information specifies the time period for the annualization. If existing operation groups have been added in the previous step, the first day and the last day date range cannot be edited. If only new operation groups have been created in the previous step, the date range can be edited as desired.

- *First day*: Displays the date of the first operation in the defined operation groups.
- *Last day*: Displays the date of the last operation in the defined operation groups.
- *Duration*: Displays the duration (in days and hours) between the *First day* and the *Last day*. Always read-only.

⚠️ For a profile-based emissions dispersion study, make sure to enter the correct year and date range in the associated weather files in the *First day* and *Last day* fields.

When finished building the annualization, click *Next.*

Menu Options

The *Organize Operation Groups* and *Organize Annualization* menus in the toolbar provide additional options to organize the *Defined operation groups* list and the *Assigned annualization* list.

- *Organize Operation Groups* menu options:
    - o *Cut:* Removes the selected operations from the *Defined operation groups* list. The operation group name will change to italic font after *Cut* is selected.
    - o *Cancel Cut:* Discards the cut operation and restores operations cut from the *Defined operation groups* list.
    - o *Select All*: Selects all operation groups in the *Defined operation groups* list.
    - o *Clear Selection*: Clears the current selection in the *Defined operation groups list.*

- o *Organize Annualization* menu options*:*
    - o *Paste*: Adds operation groups that were cut from the *Defined operation groups* list into the selected group in the *Assigned annualization* tree.
    - o *Remove Assignments*: Removes the selected operation group(s) and returns them to the *Defined operation groups* list.
    - o *Set Weight:* Modifies the weight of the selection in the *Assigned annualization* tree.
    - o *Rename Annualization Group*: Modifies the name of the selected annualization group.
    - o *Delete Annualization Group:* Deletes the selected annualization group and returns the assigned operation group(s) to the *Available operation groups* list.
    - o *Select Annualization Elements*: Selects all operation groups and annualization groups under the selected annualization group in the *Assigned annualization tree*.
    - o *Select All*: Selects all annualization and operation groups in the *Assigned annualization* tree.
    - o *Clear Selection:* Clears the current selection in the *Assigned annualization tree.*

Aviation Environmental Design Tool

User Manual: 3f
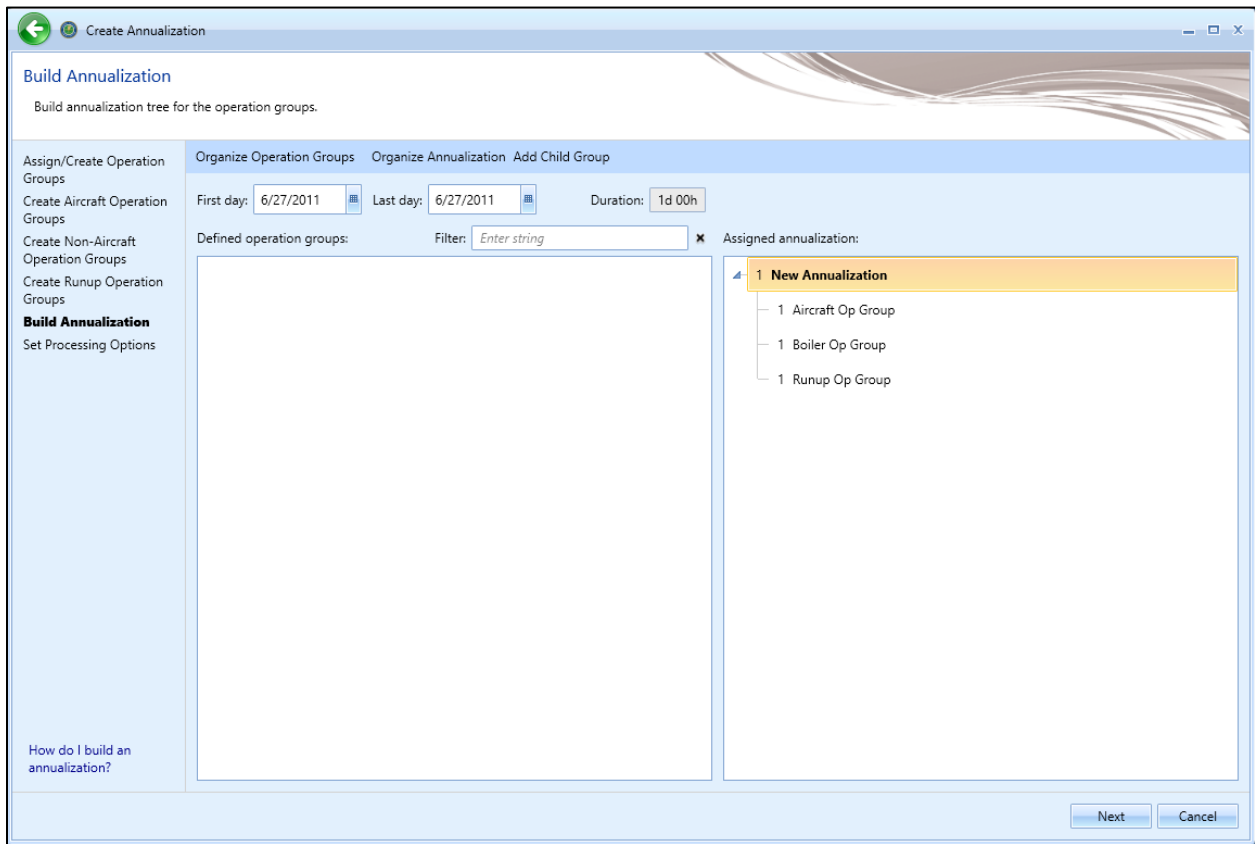
Figure 6-61 Create Annualization – Build Annualization, All Weightings = 1
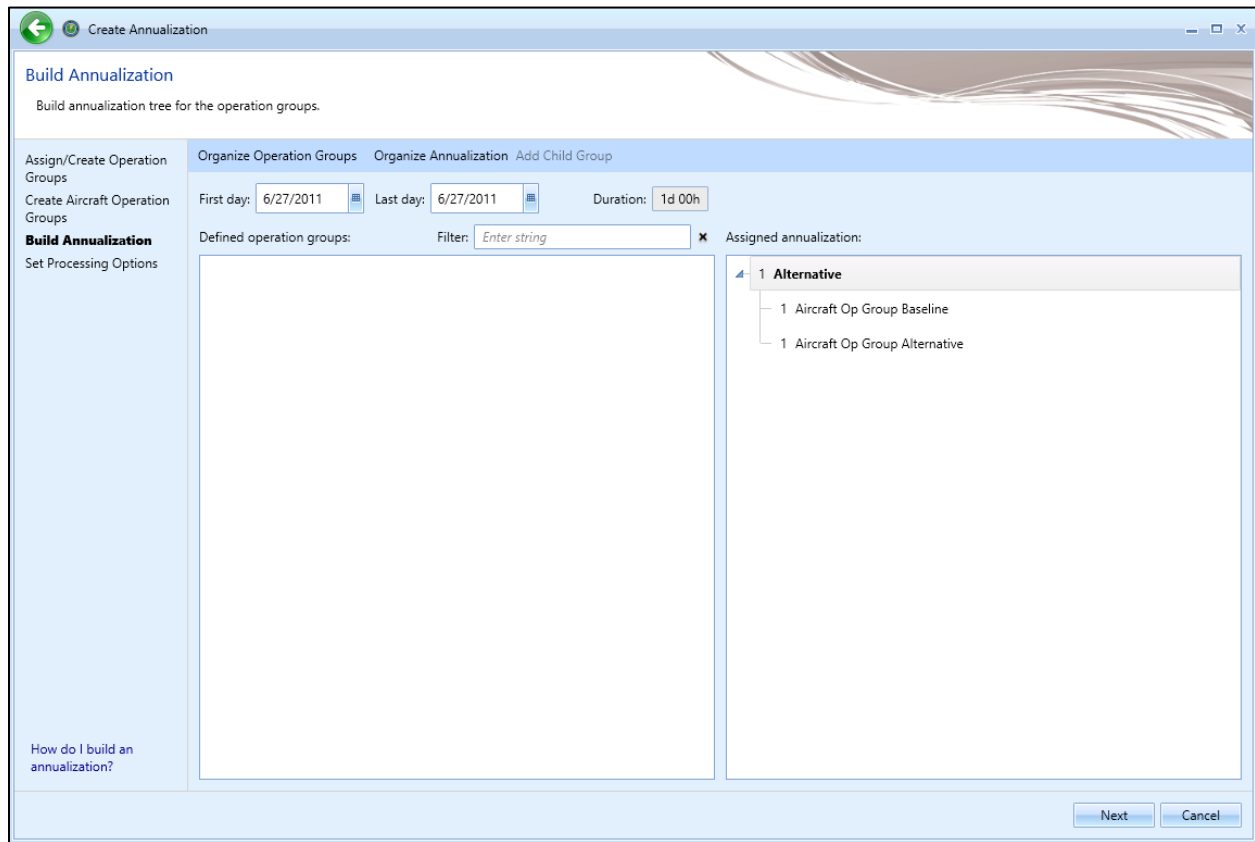
Figure 6-62 Create Annualization – Build Annualization, Sample where Aircraft Operations in an Alternatives Scenario Are Doubled

6.7.1.6 Step 6: Set Processing Options

In this step, processing options can be specified for the annualization.

Annualization Processing Options:

Adjust the following options as appropriate for the annualization being created. The default values of the options are defined in the *Study* tab, *Preferences* screen (Section 4.11).

- *Noise altitude cutoff MSL (ft):* Enter the altitude in feet MSL above which noise calculations are no longer processed. Note that the unit is in MSL, not AGL. To disable noise altitude cutoff, leave this option blank.

- *Mixing height AFE (ft):* Enter the altitude above field elevation in feet. This is used in the Emissions Report, Climb Below Mixing Height mode and Descend Below Mixing Height mode. The nvPM calculations always use a mixing height of 3000 ft AFE regardless of the value entered in this field.

- *Fuel sulfur content:* Default value is 0.00068 (0.068%).

- *Sulfur to sulfate conversion rate:* Default value is 0.024 (2.4%).
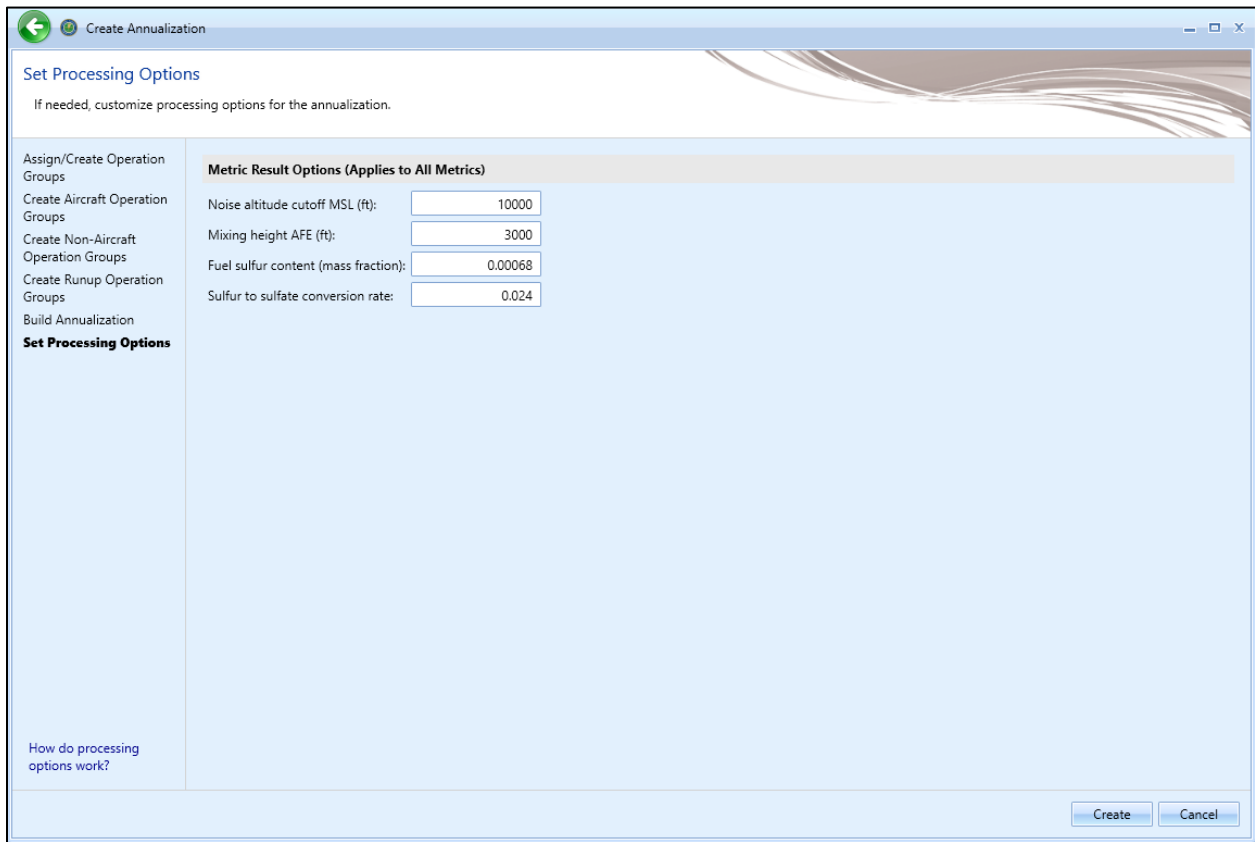
Figure 6-63 Create Annualization – Set Processing Options

6.7.2 Import All Scenarios

The *Import All Scenarios* button creates a new annualization for existing scenarios contained in the study that do not have an associated annualization. The "scenario" term is used in INM, EDMS, and AEDT 2a studies. When these studies are converted into AEDT, the scenarios from legacy studies are stored in the study database but are not displayed in the AEDT user interface.

To import all scenarios:
1. In the *Display* ribbon group, click *Annualizations*.
2. In the *Annualization Actions* ribbon group, click the *Import All Scenarios* button.
3. If any existing scenario without annualization is found, a confirmation message displays the name of the scenario(s), and new annualization(s) is displayed in the *Annualization* pane.
4. If there are no existing scenarios without annualization, then "*No scenarios are available to import*" message is displayed.

6.7.3 Copy Annualization

The *Copy* option allows users to create a new annualization based on an existing annualization.

To copy an aircraft operation:
1. In the *Display* ribbon group, click *Annualization*.
2. In the *Operations* pane, select a desired annualization to copy.
3. Click *Copy* to open the *Create Annualization* wizard.
4. Each step in the wizard will display the values from the original annualization.

6.7.4 Delete Annualization

Click *Delete* in the *Annualization Actions* ribbon group to delete the currently selected annualization. In order to delete an annualization, first delete any metric results that use the annualization and delete obsolete results from the study, see Section 4.12.1.

7 Equipment Tab

The *Equipment* tab supports managing the aircraft equipment, non-aircraft equipment, and equipment groups. See Appendix B for detailed information about each field.

> Coordination with FAA is not required to use the equipment available in the AEDT application.

7.1 Display Buttons and Equipment Pane

Use the buttons in the *Display* ribbon group to view different equipment categories. The *Equipment* pane displays the aircraft equipment, non-aircraft equipment, or equipment group list depending on the selected display button.

Figure 7-1 Equipment Tab – Display Ribbon Group

- Click *Aircraft* to view airplanes and helicopters.
- Click *Non-Aircraft* to view non-aircraft equipment.
- Click *Equipment Groups* to view equipment groups.

7.2 Airplanes and Helicopters

To view all AEDT system and user-defined aircraft/engine/engine modification combinations in the current study, click the *Aircraft* display button in the *Equipment* tab. Click on an aircraft in the *Equipment* pane to view the detailed data in the *Detail* pane.

The aircraft data in the *Detail* pane are organized by category – ANP (Aircraft Noise and Performance), Airframe, APU (Auxiliary Power Unit), BADA (Base of Aircraft Data), and Engine, where applicable. The categories are specific to fixed-wing aircraft and helicopters. Click on each category to view corresponding data.

> The details in the BADA category are for the Base of Aircraft Data version 3 (BADA 3) model.
>
> Base of Aircraft Data version 4 (BADA 4) includes performance data from the European Organization for the Safety of Air Navigation (EUROCONTROL). The license agreement between FAA and EUROCONTROL permits BADA 4 to be used by AEDT, but prohibits AEDT from making the data visible to the user. As a result, the BADA 4 data tables used by AEDT are encrypted and BADA 4-related information are not displayed through the user interface.

7.2.1 Create New Aircraft

A user-defined aircraft can be created by copying data from an existing aircraft and modifying the data for the new aircraft. Begin by selecting an aircraft that most closely resembles the new user-defined aircraft.

To create a new user-defined aircraft:
1. In the *Equipment* tab, click the *Aircraft* display button.
2. Select an aircraft from the *Equipment* pane that will be used as a basis for the new aircraft.
3. From the *Aircraft Actions* ribbon group, click *Copy*.
4. The *Equipment* pane will become disabled and the detail pane will be enabled for editing.
5. Enter a value in the *Suffix* field to differentiate the new aircraft from the existing.

> The text in the *Suffix* field is added to the end of the ANP ID, Airframe Model, BADA ID (where applicable), Engine Code, and Noise ID of the new aircraft.

6. Modify the data in each category in the *Detail* pane as appropriate for the new user-defined aircraft.
7. Click *Save* to create the new aircraft or *Cancel* to discard changes.

> Invalid data types that are entered in a field will be highlighted with a red border and exclamation point next to the field.

7.2.2 Import Aircraft

User-defined aircraft can be imported into the study using a partial ASIF. Refer to the AEDT Supplemental Manual: ASIF Reference for details on ASIF structure and content.

To import aircraft from an XML file:
1. From the *Aircraft Actions* ribbon group, click *Import*. The *Import Equipment - Open File* dialog is displayed.
2. Navigate to the appropriate file (.xml) and click *Open* to import the selected file. A confirmation is displayed.
3. In the *Equipment: Aircraft* pane, view the imported equipment.

> AEDT validates the ASIF once the file is selected for import. An error message will be displayed if it fails to validate. If the ASIF import does not succeed, an error message will be displayed. Click the link to view the AEDT log in the *Study* tab, *Log* page.

> Filter by the *User-Defined* column in the *Equipment* pane to locate imported equipment.

7.2.3 Export Aircraft

Aircraft data can be exported to a partial ASIF. The exported partial ASIF can be used as a template to create new user-defined aircraft. The exported partial ASIF cannot be successfully re-imported into AEDT without first making changes to the data.

To export aircraft as a partial ASIF:
1. Select desired equipment from the *Equipment* pane.
2. From the *Aircraft Actions* ribbon group, click *Export*.
3. In the *Export Equipment – Save File* dialog, enter a unique file name or accept the default name.
4. Click *Save*. "The ASIF equipment export was successful" message is displayed.

7.2.4 Delete User-Defined Aircraft

User-defined aircraft can be deleted. System aircraft cannot be deleted.

To delete a user-defined aircraft:
1. Select the user-defined aircraft from the *Equipment* pane.
2. From the *Aircraft Actions* ribbon group, click *Delete*.
3. Click *Yes* when prompted for confirmation. A confirmation is displayed in the status bar.

7.2.5 Edit Profiles

User-defined ANP and user-defined BADA 4 procedural type profiles can be added to system aircraft. There are currently three ways of creating and adding such profiles:
- By using the profile editor in the AEDT Equipment tab;
- Creating and importing ASIF partial; and
- Direct database injection.

Of these methods, the first two are preferred because they include application-provided constraint and error checking. However, it is expected that users who create and use user-defined profiles are knowledgeable about the physics of flight performance modeling and understand the significance and use of individual profile elements. It is also expected that users are responsible for entering valid values that are within the expected ranges for each type of parameter. For detailed explanations of flight profiles, please refer to the AEDT Technical Manual. For details of the relevant ASIF format, please refer to the AEDT Supplemental Manual: ASIF Reference. Information on using the profile editor is provided in this section.

To open the Profile Editor:
1. In the *Equipment* tab, click the *Aircraft* display button.
2. Select the desired aircraft from the *Equipment* pane.
3. From the *Aircraft Actions* ribbon group, click *Edit Profiles* to open the Profile Editor.
4. The Profile Editor consists of two tabs – ANP Profiles and BADA 4 Profiles.
   a. The ANP Profiles tab displays the ANP profiles of the selected aircraft. The system profiles are disabled for editing. Adding/editing fixed-point ANP profiles is currently not supported.
   b. The BADA 4 Profiles tab is enabled if the selected aircraft has a BADA 4 Model.

7.2.5.1 Add/Edit User-Defined ANP Profiles
Follow the instructions below to add user-defined ANP profiles. After user-defined profiles have been created, enabled fields can be edited by selecting a different option or entering a different value.

To add new user-defined ANP profiles to an aircraft:
1. In the profile editor, click on the *ANP Profiles* tab.
2. Click the "*Click here to add new item*" to add a new profile.
3. For the new profile, enter a *Name*, *Weight*, *Stage Length,* and select an *Operation Type.*
4. Click the (+) icon next to the name to expose the procedure step grid.
5. Click the "*Click here to add new item*" to add a new procedure step.
   a. Select the desired *Step Type*.
   b. Depending on the selected *Step Type*, a subset of the following parameters will be displayed. Select *Flap ID, Thrust Level, Altitude AFE (ft), Calibrated Airspeed (kt), Climb Rate (ft/min), Distance (ft), Accel Energy Share (%), Static Thrust (%),* and *Angle (⁰)* parameters as appropriate. Only the parameters applicable for the selected Step Type will be editable. See Appendix K for more information on these dependencies.
   c. When all appropriate parameters have been set, use the Enter key on the keyboard, or click on a different area in the user interface.
6. Repeat this process as necessary to create additional procedure steps.
   a. To insert a new procedure step between existing steps, right-click on a step and click *Insert Above* or *Insert Below*.
7. To delete a procedure step, click on the Delete button (red X icon) next to the Step Number. Use the mouse to hover over a row to display the Delete button.
8. To delete a profile, click on the Delete button (red X icon) next to the Profile Name.
9. Click *Save* to save the changes or *Cancel* to discard changes.

> After user-defined profiles have been created for an aircraft, click the *Show User Defined Profiles Only* box to filter the profiles to display the user-defined profiles.

> If an aircraft has a BADA 4 model assigned, the *Show BADA 4 Modeling Properties* box will be enabled. Click the box to display additional columns for properties used in BADA 4 modeling to compare against the ANP properties.

> The names of system profiles are reserved and cannot be used as a name for user-defined profiles.

To create a user-defined profile based on an existing ANP profile:
1. In the profile editor, click on the *ANP Profiles* tab.
2. Right-click on an existing profile and click *Copy* to create a new profile.
3. Enter the name for the new profile, and make changes to the profile and step parameters as needed.
4. Click *Save* to save the changes or *Cancel* to discard changes.
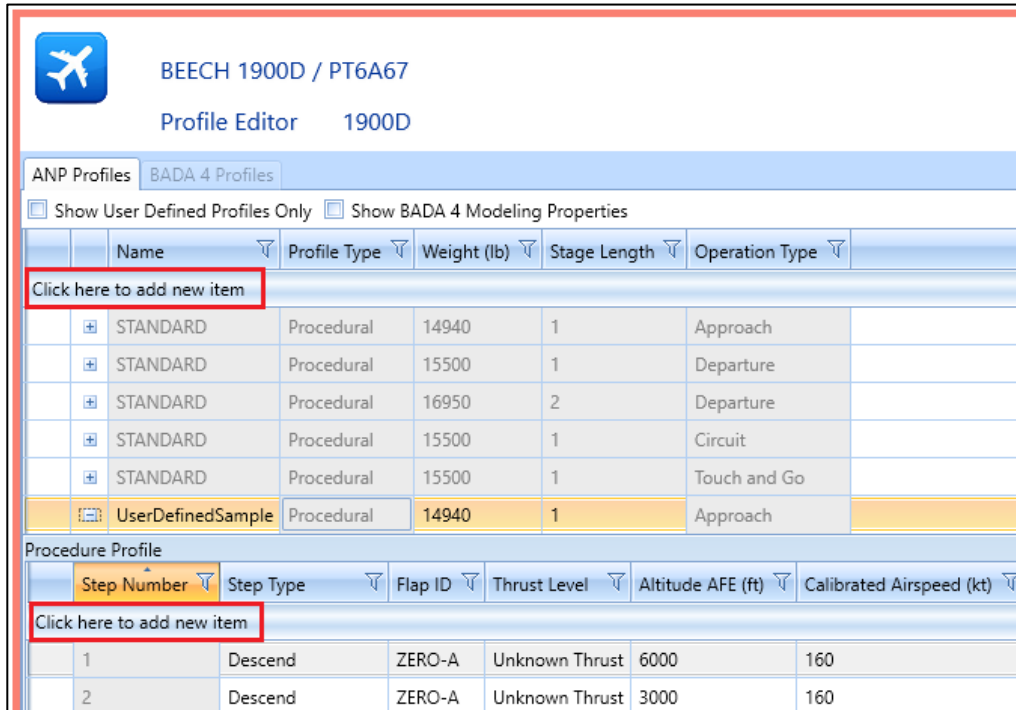
Figure 7-2 Equipment Tab, Profile Editor - ANP Profiles Tab

7.2.5.2 Add/Edit User-Defined BADA 4 Profiles

In order to add user-defined BADA 4 profiles, select equipment with BADA 4 Model data available. Follow the instructions below to add or edit user-defined BADA 4 profiles.

> To confirm that the desired aircraft has BADA 4 Model data available, confirm that a model is identified in the Equipment pane, *BADA 4* column.

To add new user-defined BADA 4 profiles to an aircraft:
1. In the profile editor, Click on the *BADA 4 Profiles* tab.
2. Click the "*Click here to add new item"* to add a new profile.
3. For the new profile, enter a *Name*, *Weight*, *Stage Length,* and select an *Operation Type.*
4. Click the (+) icon next to the name to expose the procedure step grid.
5. Click the "*Click here to add new item*" to add a new procedure step.
   a. Select the desired *Step Type*. Depending on the selected *Step Type*, some parameters will be displayed vs. hidden.
   b. Select ANP *Flap ID, BADA4 Configuration, Landing Gear, Thrust Level, Altitude AFE (ft), Calibrated Airspeed (kt), Climb Rate (ft/min), Distance (ft), Accel Energy Share (%), Static Thrust (%), Angle (º),* and *Thrust Calculation Method* parameters as appropriate. Only the parameters applicable for the selected Step Type will be editable. See Appendix K for more information on these dependencies.
   c. When all appropriate parameters have been set, use the Enter key on the keyboard, or click on a different area in the user interface.

6.   Repeat this process as necessary to create additional procedure steps.
     a.   To insert a new procedure step between existing steps, right-click on a step and click *Insert Above* or *Insert Below*.
7.   To delete a procedure step, click on the Delete button (red X icon) next to the Step Number. Use the mouse to hover over a row to display the Delete button.
8.   To delete a profile, click on the Delete button (red X icon) next to the Profile Name.
9.   Click *Save* to save the changes or *Cancel* to discard changes.

To create a user-defined BADA 4 profile based on an existing ANP profile:
1.   In the *ANP Profiles* tab, right-click on an existing profile and click *Create BADA 4 Profile.* A new BADA 4 profile is created in the *BADA 4 Profiles* tab.
2.   Enter the name for the new profile, and make changes to the profile and step parameters as needed.
3.   Click *Save* to save the changes or *Cancel* to discard changes.

Figure 7-3 Equipment Tab, Profile Editor - BADA 4 Profiles Tab

7.3   Non-Aircraft Equipment

To view all the system and user-defined non-aircraft equipment in the current study, click the *Non-Aircraft* display button in the *Equipment* tab. Click on equipment in the *Equipment: Non-Aircraft* pane to view the detailed data in the *Detail* pane.

7.3.1 Create New Non-Aircraft Equipment

User-defined non-aircraft equipment can be created by copying data from existing non-aircraft equipment and modifying the data. Begin by selecting equipment that most closely resembles the new user-defined equipment.

In order to create non-aircraft operations for non-aircraft equipment other than Ground Support Equipment, first create user-defined equipment in the *Equipment* tab, *Non-Aircraft* screen by copying and editing an existing equipment template.

To create new user-defined non-aircraft equipment:
1. In the *Equipment* tab, click the *Non-Aircraft* display button.
2. Select non-aircraft equipment from the *Equipment: Non-Aircraft* pane that will be used as a template for the new equipment.
3. From the *Non-Aircraft Actions* ribbon group, click *Copy*.
4. The *Equipment* pane will become disabled and the *Detail* pane will be enabled for editing.
5. Enter a unique name in the *Name* field.
6. Modify the data in the *Detail* pane as appropriate for the new non-aircraft equipment.
7. Click *Save* to create the new non-aircraft equipment or *Cancel* to discard changes.

7.3.2 Edit User-Defined, Non-Aircraft Equipment

User-defined, non-aircraft equipment can be edited. System non-aircraft equipment cannot be edited.

To edit user-defined, non-aircraft equipment:
1. Select the user-defined non-aircraft from the *Equipment* pane.
2. From the *Non-Aircraft Actions* ribbon group, click *Edit*.
3. Edit the fields as desired.
4. Click *Save* to save the changes or *Cancel* to discard changes.

7.3.3 Delete User-Defined, Non-Aircraft Equipment

User-defined, non-aircraft equipment can be deleted. System non-aircraft equipment cannot be deleted.

To delete user-defined, non-aircraft equipment:
5. Select the user-defined non-aircraft from the *Equipment* pane.
6. From the *Non-Aircraft Actions* ribbon group, click *Delete*.
7. Click *Yes* when prompted for confirmation. A confirmation is displayed in the status bar.

7.4   Equipment Groups

To view equipment groups in the current study, click the *Equipment Groups* display button in the *Equipment* tab. There are two types of equipment groups:
- Aircraft equipment group
  - An aircraft can only belong to one aircraft equipment group.
- Non-aircraft group
  - A non-aircraft equipment can only belong to one non-aircraft equipment group.

What are equipment groups?

Equipment groups allow for the organization of aircraft and non-aircraft equipment.

Equipment groups can be used during track assignment and for report organization.

7.4.1 Aircraft Equipment Group

To create an aircraft equipment group:
1. In the *Equipment* tab, click the *Equipment Groups* display button.
2. Click *New* then click *Aircraft Group*.
3. The detail pane will be enabled for editing.
4. In the *Aircraft* tab:
    a. Enter the *Equipment group name*.
    b. To add equipment, select the equipment of interest from the left list and click the *Add Arrow*.
    c. To remove equipment, select equipment from the right list and click the *Remove Arrow*.
    d. To move all equipment between the left and right lists, use the *Add All* and *Remove All Arrows*.
5. In the *Tracks* tab:
    a. To add track(s), select the track(s) of interest from the left list and click the *Add Arrow*.
    b. To remove track(s), select track(s) from the right list and click the *Remove Arrow*.
    c. To move all tracks between the left and right lists, use the *Add All* and *Remove All Arrows*.
    d. In the right list, enter the desired *Day*, *Evening*, and *Night* percentage distribution. The total percentage for the Day, Evening, and Night columns must each individually add up to 100%.
6. Click *Save* to apply changes or *Cancel* to discard changes.

⚠️ Helicopter and fixed-wing aircraft must be placed in separate aircraft equipment groups.

To edit an aircraft equipment group:
1. Select the desired equipment group from the *Equipment: Equipment Groups* pane.
2. From the *Equipment Group Actions* ribbon group, click *Edit*.
3. Edit the group and click *Save.*

To delete an aircraft equipment group:
1. Select the desired equipment group from the *Equipment: Equipment Groups* pane.
2. From the *Equipment Group Actions* ribbon group, click *Delete*.
3. Click *Yes* when prompted for confirmation.

7.4.2 Non- Aircraft Equipment Group

The non-aircraft equipment group can be used to filter the equipment list.

To create a non-aircraft equipment group:
1. In the *Equipment* tab, click the *Equipment Groups* display button.
2. Click *New* then click *Non-Aircraft Group*.
3. The detail pane will be enabled for editing.
4. Enter the *Equipment group name*.
5. To add equipment, select the equipment of interest from the left list and click the *Add Arrow*.
6. To remove equipment, select equipment from the right list and click the *Remove Arrow*.
7. To move all equipment between the left and right lists, use the *Add All* and *Remove All Arrows*.
8. Click *Save* to apply changes or *Cancel* to discard changes.

To edit a non-aircraft equipment group:

1.   Select the desired equipment group from the *Equipment: Equipment Groups* pane.
2.   From the *Equipment Group Actions* ribbon group, click *Edit*.
3.   Edit the group and click *Save.*

To delete a non-aircraft equipment group:

1.   Select the desired equipment group from the *Equipment: Equipment Groups* pane.
2.   From the *Equipment Group Actions* ribbon group, click *Delete*.
3.   Click *Yes* when prompted for confirmation.

8 Airports Tab

The *Airports* tab supports adding airports, viewing airport layouts, editing airport layout components, adding new components in the airport layout designer, creating operation configurations, as well as exporting certain airport layout components as MOVES links. See Appendix B for detailed information about each field.

Coordination with FAA is not required to use the airports available in the AEDT application.

8.1 Airports Pane

The *Airports* pane lists the existing airports, airport layouts, and operating configurations in the study (Figure 8-1). Each airport can have multiple airport layouts (e.g., current and future configurations), and each airport layout can have multiple operating configurations. Click the (+) icon next to the airport to view the layouts for that airport. Click the arrow icon next to the airport layout to view operating configurations for that airport layout.
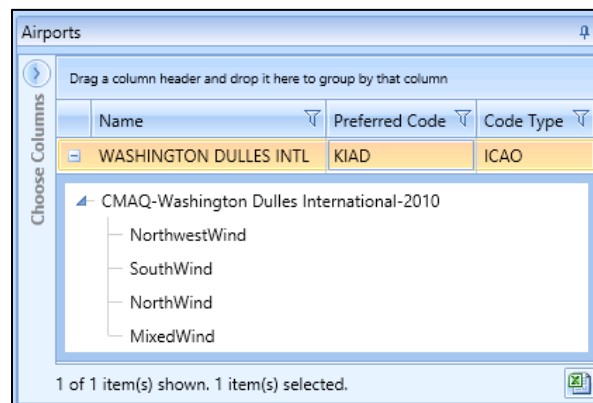
Figure 8-1 Airports Pane

8.1.1 Details Pane

The *Details* pane is located under the *Airports* pane (Figure 8-2). This pane contains additional information about the selected airport, airport layout, or operating configuration.

8.1.1.1 Details Pane – Airport

Select an airport in the *Airports* pane to view the properties of the selected airport.

Figure 8-2 Details Pane – Airport

8.1.1.2 Details Pane – Airport Layout

Select an airport layout in the *Airports* pane to view the components of the selected airport layout. The airport layout components are grouped into two categories – Ground Elements and Tracks. Ground elements include buildings, gates, terminals, helipads, heligates, runway ends, runways, taxiways, taxipaths, roadways, parking facilities, and construction zones.

To display the airport layout layer on the map, see Section 8.3.1.
- Click the (+) icon to view the properties of each component.
- Select a component in the *Details* pane to highlight the corresponding item on the map.
- Click the *Show Layout Components* arrow, then use the checkboxes to show/hide the components on the map. The *Show Layout Components* checkboxes are only enabled when the airport layout layer is displayed on the map.
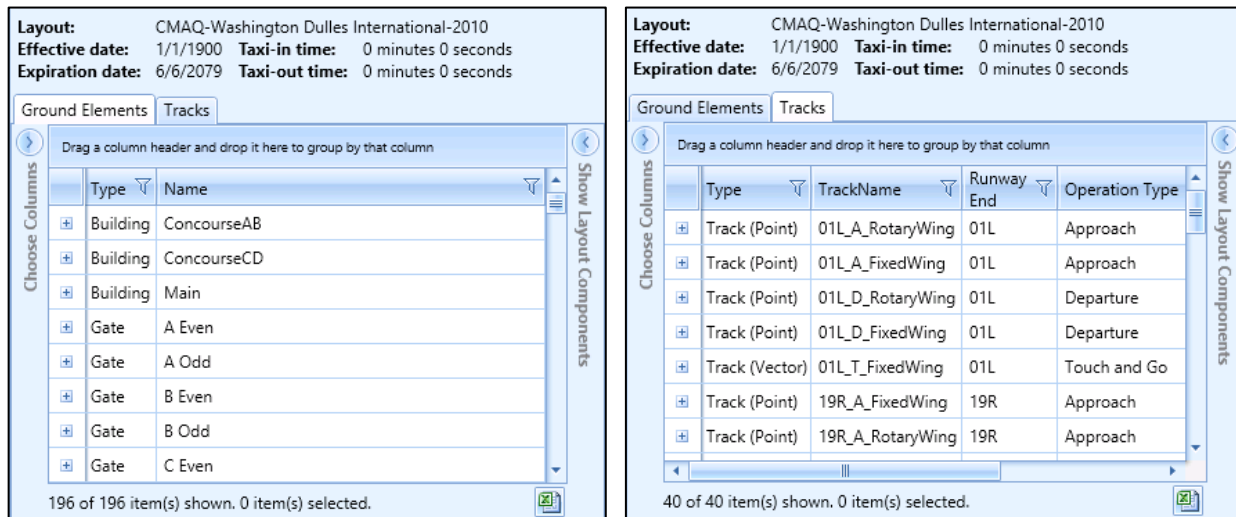
Figure 8-3 Details Pane – Airport Layout

> The selected airport layout component will not be highlighted on the map if accelerated display is disabled.

8.1.1.3 Details Pane – Operating Configuration

Select an operating configuration in the *Airports* pane to view the details in the following tabs:

- *Runway Assignments*: Displays the operations distribution percentage for an aircraft size category distributed by runway. Selecting a row in this tab highlights the corresponding runway on the map if the airport layout layer is displayed.
- *Activation Parameters*: Displays the weather conditions and times under which the operating configuration is active.
- *Capacity*: Displays the maximum number of arrivals and departures for the operating configuration.
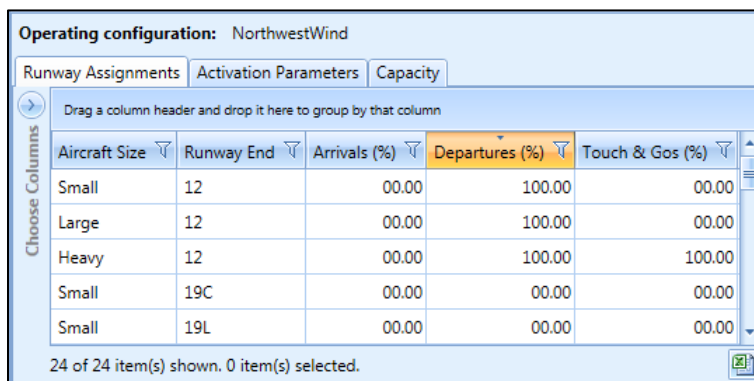
Figure 8-4 Details Pane – Operating Configuration

8.2   Airport Actions

The following actions are available for airports (Figure 8-5):

- *Add*: Displays the following sub-menu options:
  - o   *Add Existing Airport*: Click to display the *Add Existing Airport* dialog.
  - o   *Add New Airport*: Click to display the *Create New Airport in this Study* dialog.
- *Edit Airport*: Click to open the *Edit Airport* dialog.
- *Add Layout*: Click to open the *Create Airport Layout* dialog.
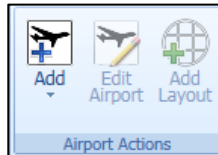
Figure 8-5 Ribbon Group – Airport Actions

8.2.1 Add Existing Airport

To add existing airports:

1. Click *Add*, then click *Existing Airport*.
2. In the *Add Existing Airport* dialog, select one or more desired airports.
3. Click *Add* to add selected airport(s) in the study, or *Cancel* to close the dialog.

⚠️   If an existing airport that has extended runways or renamed runways (e.g., KPVD, KORD) is added to the study, multiple airport layouts will be listed for that airport with different effective-expiration date ranges. When creating operations, select the appropriate airport layout.

📝   If runways exist for the selected airport, they will be displayed under airport layout. It is important to check the coordinates of the airport and the runway ends because they may not reflect the most current data. See Section 8.3.6 on how to view and edit the airport layout component properties. See Section 8.3.1 on how to view the airport layout on the map.

📝   After adding an existing airport, check the airport weather data in *Definitions* tab, *Weather* for missing values. See Section 9.6.1 on how to view and edit the airport weather.
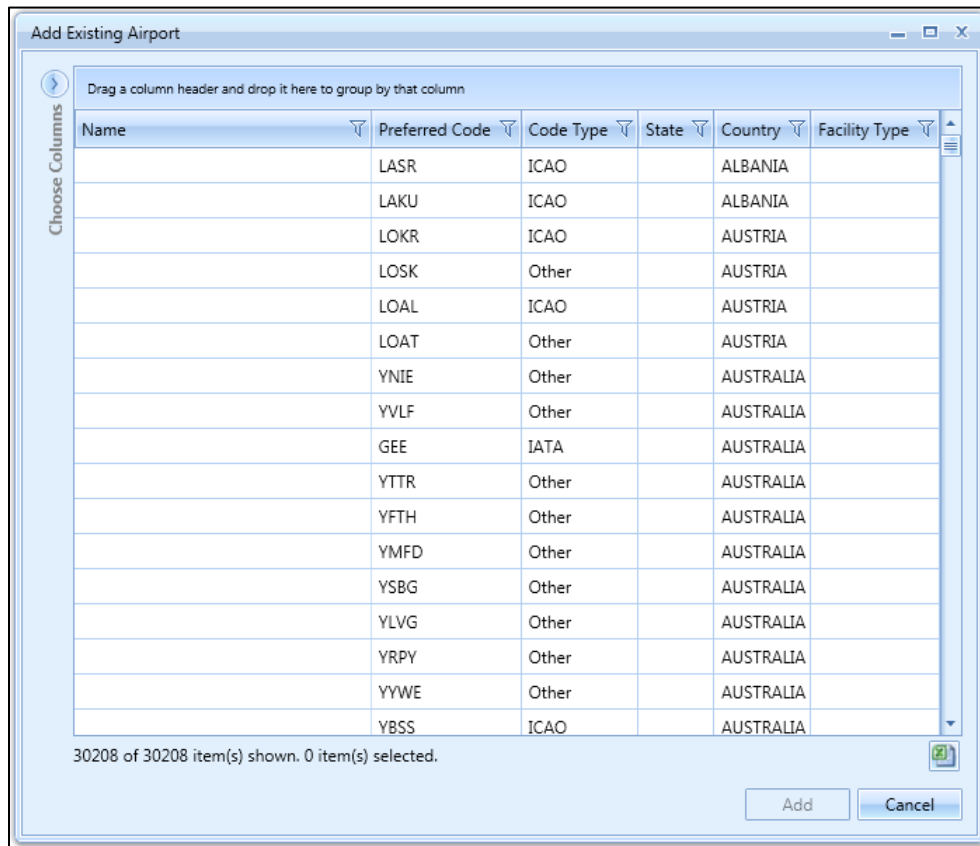
Figure 8-6 Add Existing Airport Dialog

8.2.2 Create New Airport

To create a new user-defined airport:
1. Click *Add*, then click *New Airport*.
2. In the *Create New Airport in this Study* dialog, enter the appropriate data in the required fields. Required fields are marked with an asterisk (*).
3. Click *OK* to create a new user-defined airport in the study, or *Cancel* to discard changes.
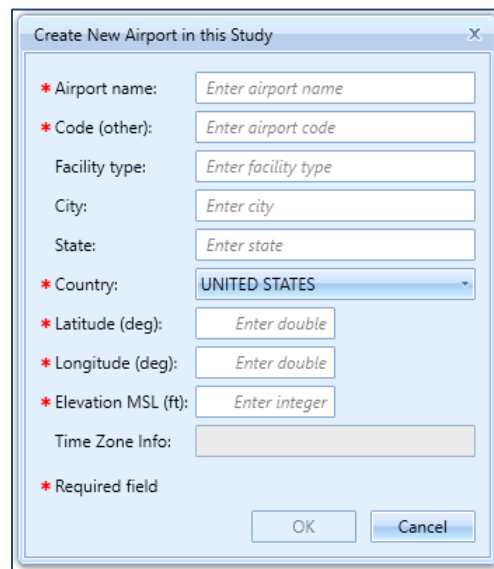
Figure 8-7 Create New Airport Dialog

After creating a new airport, add an airport layout. See Section 8.2.4. At least one layout must exist for an airport.

After creating a new airport, enter airport weather data in *Definitions* tab, *Weather*. See Section 9.6.1 on how to view and edit the airport weather.

8.2.3 Edit Airport

To edit an airport in the current study:
1. In the *Airports* pane, select the airport of interest.
2. Click *Edit Airport*.
3. In the *Edit Airport* dialog, edit the desired fields. Required fields are marked with an asterisk (*).
4. Click *OK* to apply changes or *Cancel* to discard changes.

Figure 8-8 Edit Airport Dialog

8.2.4 Add Layout

To add a layout for an airport:
1.   In the *Airports* pane, select the airport of interest.
2.   From the *Airport Actions* ribbon group, click the *Add Layout* button.
3.   Enter a layout name, effective date, and expiration date for the layout. The effective date must be earlier than the expiration date. Required fields are marked with an asterisk [*].
4.   Enter taxi-in and taxi-out time (optional).
5.   Click *Save* to create the new layout or *Cancel* to discard changes.

Figure 8-9 Create Airport Layout Dialog

8.3   Airport Layout Actions

The actions available through the *Airport Layouts* ribbon group (Figure 8-10) are described in the sections below.
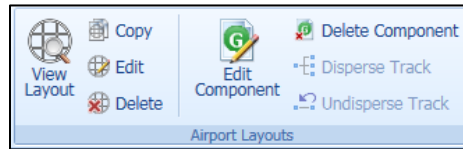
Figure 8-10 Ribbon Group – Airport Layouts

8.3.1 View Airport Layout

The airport layout components include buildings, gates, terminals, helipads, heligates, runway ends, runways, taxiways, taxipaths, roadways, parking facilities, construction zones, tracks (both point and vector types), and helitaxi tracks.

The airport layout components can be visualized in full (i.e., ground elements and all tracks), with ground elements only, or with only ground elements and selected tracks.

⚠️ If an existing airport that has extended runways or renamed runways (e.g., KPVD, KORD) is added to the study, multiple airport layouts will be listed for that airport with different effective-expiration date ranges. When creating operations, select the appropriate airport layout.

📝 For a study with a large number of tracks, viewing the full airport layout may take a long time to load and render all of the tracks. For such a case, it is recommended to use the *View Layout – Ground & Selected Tracks* option.
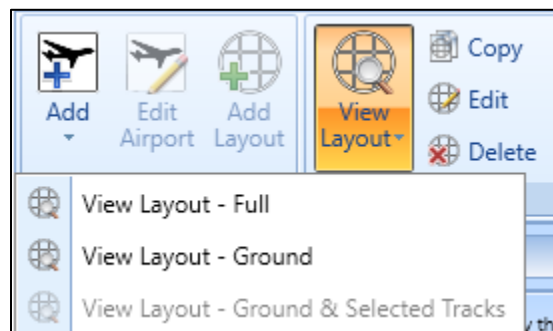
Figure 8-11 View Airport Layout Button

To view the full airport layout on the map:
1. In the *Airports* pane, click the (+) icon next to the airport of interest to display the layout(s) for the airport.
2. Select the desired airport layout.

3. From the *Airport Layouts* ribbon group, click the *View Layout* button, then select *View Layout - Full*. The components in the selected airport layout are displayed on the map. The corresponding layer is created in the *Airport Layers* category of the *Layers* manager.

> ⚠️ If a study has greater than 500 tracks, a warning message will be displayed indicating that a maximum of 500 tracks can be displayed at one time. This track limit is suggested in order to maximize computer performance and AEDT responsiveness for most users, however performance of individual machines will vary based on computer specifications. The maximum number of tracks to be displayed can be edited in the Study tab, Preferences, Airports section if a different track limit is preferred.
>
> It is generally recommended to use the *View Layout - Ground & Selected Tracks* option for studies that have more than 500 tracks for users with standard workstations.

To view only the airport layout ground elements on the map:
1. In the *Airports* pane, click the (+) icon next to the airport of interest to display the layout(s) for the airport.
2. Select the desired airport layout.
3. From the *Airport Layouts* ribbon group, click the *View Layout* button, then select *View Layout – Ground*. The components in the selected airport layout are displayed on the map. The corresponding layer is created in the *Airport Layers* category of the *Layers* manager.

To view a subset of tracks and airport layout ground elements on the map:
1. In the *Airports* pane, click the (+) icon next to the airport of interest to display the layout(s) for the airport.
2. Select the desired airport layout.
3. Select the *Tracks* tab in the *Details* pane.
4. Click the "Get Tracks..." link and click *Yes* when prompted by the track loading time warning to load the list of tracks in the study.

> 📝 Loading the track list may take a long time if the study includes a large number of tracks. The track loading time warning message may be turned off in the *Study* tab, *Preferences*, *Airports* section.

5. Click to select the desired track within the table.
    a. Hold the Ctrl key and click to select up to 499 additional tracks as desired.
6. From the *Airport Layouts* ribbon group, click the *View Layout* button, then select *View Layout – Ground & Selected Tracks*. The selected tracks are displayed on the map. The corresponding layer is created in the *Airport Layers* category of the *Layers* manager.

> 📝 The default maximum number of tracks that can be displayed at one time is 500 tracks. This track limit is suggested in order to maximize computer performance and AEDT responsiveness for most users, however performance of individual machines will vary based on computer specifications. The maximum number of tracks can be edited in the *Study* tab, *Preferences*, *Airports* section if a different track limit is preferred.

To show/hide specific layout components on the map:
1. In the *Airports* pane, select the desired airport layout.
2. In the *Details* pane, click the *Show Layout Components* arrow.
3. Use the checkboxes to show/hide the components on the map.

> ⚠ Some existing AEDT airports do not have latitude and longitude location for runway ends. Use of the layout, including viewing the airport layout on the map for such airports is not supported due to missing location values. Use the *Edit Component* button to enter the missing data for runway ends.

> ⚠ Touch & go tracks that do not have a runway end as the first point are not displayed on the map as part of the airport layout in the *Airports* tab. This is logged as a warning in the aedt.log file.

> ⚠ Before generating an airport layout layer, AEDT performs validation of the taxiways and taxipaths (taxi network). AEDT will remove taxipaths if connectivity errors are found (e.g., no connection exists between the specified taxiway and runway end). This is logged as warning in the aedt.log file.

> 📝 Sensor path type tracks are not displayed on the map as part of the airport layout in the *Airports* tab.

8.3.2 Copy Airport Layout

To copy an airport layout:
1. In the *Airports* pane, click the (+) icon next to the airport of interest to display the layout(s) for the airport.
2. Select the desired airport layout.
3. From the *Airport Layouts* ribbon group, click the *Copy* button. The *Copy Airport Layout* dialog is displayed.
4. Edit the desired fields.
    *   Required fields are marked with an asterisk (*).
    *   The list of operating configurations is displayed if the selected airport layout includes multiple operating configurations. Specifying distribution percentages for operating configurations is optional. See Section 8.4 for more information.
5. Click *Save* to apply changes or *Cancel* to discard changes.

Figure 8-12 Copy Airport Layout Dialog

8.3.3 Edit Airport Layout

To edit an airport layout:

1. In the *Airports* pane, click the (+) icon next to the airport of interest to display the layout(s) for the airport.
2. Select the desired airport layout.
3. From the *Airport Layouts* ribbon group, click the *Edit* button. The *Edit Airport Layout* dialog is displayed.
4. Edit the desired fields.
   - Required fields are marked with an asterisk (*).
   - The list of operating configurations is displayed if the selected airport layout includes multiple operating configurations. Specifying distribution percentages for operating configurations is optional. See Section 8.4 for more information.
5. Click *Save* to apply changes or *Cancel* to discard changes.

Figure 8-13 Edit Airport Layout Dialog

8.3.4 Delete Airport Layout

To delete an airport layout:

1. In the *Airports* pane, click the (+) icon next to the airport of interest to display the layout(s) for the airport.
2. Select the desired airport layout.
3. From the *Airport Layouts* ribbon group, click the *Delete* button.
4. Click *Yes* to delete the layout or *No* to cancel the action.

> Deleting an airport layout is only supported if no operations are assigned to the airport layout.

8.3.5 Design Airport Layout

Airport layout elements can be designed graphically with the airport layout designer. The airport layout designer allows for the addition of runways, gates, terminals, buildings, taxiways, taxipaths, helipads, heligates, helitaxis, point and vector type tracks, and MOVES roadway, parking facility, and construction zone links.

When designing an airport layout, it is helpful to have airport runways displayed on the map, such as the *Imagery* base map layer which has the highest resolution images for the existing runway layer. Figure 8-14 shows the *Imagery* base map and the runways for San Francisco (SFO) airport. For more information on how to add a map layer, see Section 3.7.4.

Properties of the airport layout components can be edited after creation, see Section 8.3.6.
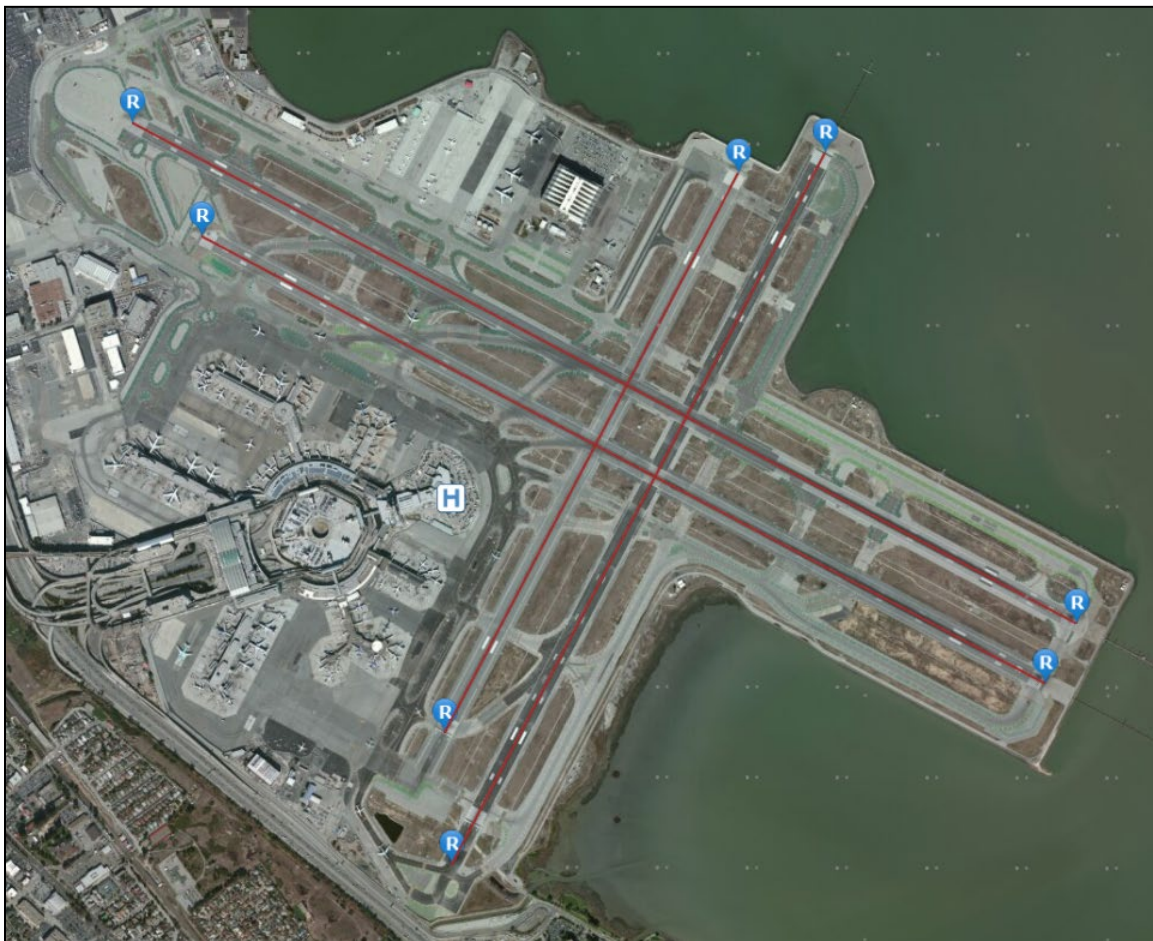
Figure 8-14 San Francisco Airport with Imagery Base Map

8.3.5.1 Designer Tab

The *Designer* tab contains buttons for creating airport layout components. Upon clicking the *Designer* tab, AEDT enters design mode.

The *Designer* tab is disabled by default. In order to enable it, first generate the full airport layout layer of desired airport then select the airport layout from the *Airports* pane. Detailed instructions are provided below.

To enter the airport layout design mode:
1. Select an airport layout in the *Airports* pane and generate the airport layout layer (Section 8.3.1).

> For a study with a large number of tracks, it is recommended to use the *View Layout – Ground & Selected Tracks* option to work with a subset of tracks at a time in the Designer.

2. Adjust the zoom level as desired.
3. Click the *Designer* tab to enter design mode.
4. The Airport Layout *Designer* tab is displayed (Figure 8-15), and a red border around the map indicates that the airport design mode is active.
5. Add the airport layout components by using the buttons from the *Designer* tab.
6. From the *Actions* ribbon group, click the *Cancel Design* button to exit the design mode and discard any changes. The map will display the last saved version of the airport layout layer.
7. From the *Actions* ribbon group, click the *Save Design* button to save changes and exit design mode. The final layer with edited elements will be displayed.

Figure 8-15 Airport Layout Designer Tab

8.3.5.2 Ground Elements

This section describes the elements available through the *Designer tab, Ground Elements* ribbon group.

- *Add Runway*: Click on the map to add the first runway end and click again to add the second runway end and to complete the runway.

> When adding a runway, confirm or update the airport elevation to be equal to or higher than the highest runway end, see Section 8.2.3.

- *Add Gate*: Add a gate by clicking on the map in the desired location.
- *Add Terminal*: A terminal is defined as a polygon. Click on the map to add the first point, then add at least two other points to create a polygon. Double-click on the last point to complete the terminal.
- *Add Buildings*: Click on the map to add the first point, then add at least one additional point to create a building. Double-click on the last point to complete the building.

- *Add Taxiway*: Add a taxiway by clicking on the map, drawing a path by adding more points, and complete the taxiway by double-clicking on the last point.
- *Add Taxipath*: Before adding a taxipath, create a series of taxiways that connects a runway end and a gate.
  - To create an inbound taxipath:
    1. Click on a runway end to highlight it.
    2. Click on the runway.
    3. Build a path by selecting taxiway(s) between the runway end and gate.
    4. Complete the taxipath by clicking on a gate.
    5. The taxipath will be generated by connecting the taxiways.
  - To create an outbound taxipath:
    1. Click on a gate to highlight it.
    2. Build a path by selecting taxiway(s) between the gate and runway end.
    3. Click on the runway.
    4. Complete the taxipath by clicking on a runway end. The taxipath will be generated by connecting the taxiways.

> What are taxiways and taxipaths?
> Taxiways and taxipaths are needed for delay and sequence modeling:
> - A taxiway is a road within an airport. In AEDT, a taxiway is defined as a series of connected location points. Taxiways are displayed as blue lines on the map.
> - A taxipath is a sequence of taxiways that connects a gate to a runway. Taxipaths are displayed as gray lines on the map.

- *Add Helipad*: Click on the map in the desired location to add a helipad.
- *Add Heligate*: Click on the map in the desired location to add a helicopter gate.
- *Add Helitaxi*:
  - To add an outbound helitaxi track, click on a heligate, draw a path by creating points, and complete the track by clicking on a helipad.
  - To add an inbound helitaxi track, click on a helipad, draw a path by creating points, and complete the track by clicking on a heligate.

> Helitaxi tracks are displayed on the map in color based on track operation type: outbound helitaxi track = blue, inbound helitaxi track = red.

8.3.5.3 Tracks

This section describes the elements available through the *Designer tab, Tracks* ribbon group.

> Tracks are displayed on the map in color based on track operation type: departure track = blue, arrival track = red, overflight track = green, touch & go track = magenta.

> Point type tracks and vector type tracks can be created in the AEDT user interface. Creating sensor path tracks is supported through ASIF import.

Add Point-Type Tracks

- *Add Dep/Appr Track*:
    1. To add a departure track, click on a runway end, draw a path by creating points moving away from the airport, and complete the track by double-clicking on the last point.
    2. To add an approach track, click on the map away from the airport to create a starting point, draw a path by creating points into the airport, and complete the track by double-clicking on a runway end.
- *Add Touch & Go Track*: Touch & go tracks must start and end at the same runway end. Start by clicking on a runway end, draw a path by creating points, and click on the same runway end to complete the track.
- *Add Overflight Track*: Click on the map to create a starting point, draw a path by creating additional points, and complete the track by double-clicking on the last point.

Add Vector-Type Tracks

What is the difference between the *Turn* and the *Turn To Heading* track segment type?

- The angle in a left/right *Turn* segment is the change in heading. For example, if the current heading of the segment is 90 degrees (heading East) and you add a right turn segment of 45 deg, then the heading after the new segment will be 135 degrees.

- The heading in a *Turn to Heading* segment is the absolute or new heading instead of a change in heading. For example, if the current heading of the segment is 90 degrees (East) and you add a new turn to heading segment of 180 deg, then a new turning segment whose final heading is 180 degrees (heading South) will be created.

For both types, radius is the radius of the circle on which the turning arc is constructed (e.g., how tight or expansive you want the turn to be).

- *Add Vector Track – Approach*:
    1. To add an arrival vector track, from the *Tracks* ribbon group, click *Add Vector Track*, then *Approach* to open the *Create Vector Track* pane.
    2. An approach track starts in airspace and finishes at a runway end/helipad. On the map, click on a runway end/helipad where the new track will end.
    3. In the *Create Vector Track* pane, enter a name for the new track.
    4. Select the *Entry Mode*: *Normal order*, *Reverse order*, or *From point in space*.
        - Normal order: When this entry mode is selected, enter the segments for the track in order starting from airspace and finishing at the runway end. Each new segment is inserted between the previous segment and the runway end/helipad such that the newly added segment connects to the runway end/helipad.
        - Reverse order: This is the default option. When this entry mode is selected, enter the segments for the track in reverse order starting from the runway end/helipad and finishing in airspace.
        - From point in space: When this entry mode is selected. The *Origin* and *Heading* text boxes are displayed. Double-click on the map to designate a point in airspace and enter

heading. Then build the approach track by adding segments into the runway end/helipad.

5. Select the type of vector track segment: *Straight* or *Turn*
   - For a straight segment, enter the distance.
   - For a left/right turn segment, enter the angle and radius of the circular arc representing the turn.
6. Click *Add* to add the segment.
7. Continue adding segments as needed.
   - *Undo:* Click *Undo* to remove the last added segment.
   - *Redo:* Click *Redo* to reinstate the last segment that was previously removed using the *Undo* button.
   - *Add Autocomplete Track:* If the selected entry mode is *From point in space*, when an autocomplete solution is possible it will be shown as a dashed line. Clicking on the *Add Autocomplete Track* button will automatically complete the track by adding the last two final segments such that the track will end at the approach runway end/helipad.
8. Click *Save* to create the new vector track and close the *Create Vector Track* pane. Click *Cancel* to discard any changes.

> AEDT automatically adds two segments to approach vector tracks so that the tracks are made long enough for calculation purposes. The first added segment is a 100-nmi straight segment to the first defined track segment (away from the runway end). The second added segment is a straight segment overlying the runway from the arrival threshold to the end of the runway.

- *Add Vector Track – Departure*:
  1. To add a departure vector track, from the *Tracks* ribbon group, click *Add Vector Track*, then *Departure* to open the *Create Vector Track* pane.
  2. A departure track starts at a runway end/helipad and finishes in airspace. On the map, click on a runway end/helipad where the new track will start from.
  3. In the *Create Vector Track* pane, enter a name for the new track.
  4. Select the type of vector track segment: *Straight*, *Turn*, or *Turn to Heading*.
     - For a departure vector track, the first segment should be a straight segment.
     - For a straight segment, enter the distance.
     - For a left/right turn segment, enter the angle and radius of the circular arc representing the turn.
     - For a turn to heading segment, enter the radius and heading.
  5. Click *Add* to add the segment.
  6. Continue adding segments as needed.
     - *Undo:* Click *Undo* to remove the last added segment.
     - *Redo:* Click *Redo* to reinstate the last segment that was previously removed using the *Undo* button.
  7. Click *Save* to create the new vector track and close the *Create Vector Track* pane. Click *Cancel* to discard any changes.

AEDT automatically adds a 100-nmi straight segment to the last defined track segment so that tracks are made long enough for calculation purposes.

- *Add Vector Track – Touch & Go*:
  1. To add a touch & go vector track, from the *Tracks* ribbon group, click *Add Vector Track*, then *Touch & Go* to open the *Create Vector Track* pane.
  2. A touch & go track starts and ends at the same runway end/helipad. Start by clicking on a runway end/helipad on the map.
  3. In the *Create Vector Track* pane, enter a name for the new track.
  4. Select the type of vector track segment: *Straight*, *Turn*, or *Turn to Heading*.
     - For a straight segment, enter the distance.
     - For a left/right turn segment, enter the angle and radius of the circular arc representing the turn.
     - For a turn to heading segment, enter the radius and heading.
  5. To have the application assist in completing the track, click the *Show autocomplete track* box. When an autocomplete solution is possible, it will be shown as a dashed line. Clicking on the *Add Autocomplete Track* button will automatically complete the track by adding two final segments such that the track ends at the runway end where it started from.
  6. Click *Add* to add the segment.
  7. Continue adding segments as needed.
     - *Undo:* Click *Undo* to remove the last added segment.
     - *Redo:* Click *Redo* to reinstate the last segment that was previously removed using the *Undo* button.
     - *Add Autocomplete Track:* If the *Show autocomplete track* option is selected, when an autocomplete solution is possible it will be shown as a dashed line. Clicking on the *Add Autocomplete Track* button will automatically complete the track by adding the last two final segments such that the track will end at the approach runway end/helipad.
  8. Click *Save* to create the new vector track and close the *Create Vector Track* pane. Click *Cancel* to discard any changes.

Edit Track
- *Edit Track:* The *Edit Track* pane displays the details of the selected track. Both point type and vector type tracks can be edited. The segments that make up the track can be edited, added, or deleted; and the order of segments can be changed.
  o *+ button:* Click the *+* button to add a new coordinate row.
  o *Up/Down Arrow* buttons: Use the *Up/Down Arrow* buttons to move the selected row up or down.
  o *X button:* Click the *X* button to delete the selected row.
  o *Clear all* button: Click *Clear all* button to delete all rows.
  o *Save:* Click *Save* to save changes and exit the *Edit Track* pane.
  o *Cancel:* Click *Cancel* to discard changes and exit the *Edit Track* pane.

8.3.5.4 MOVES Links

This section describes the elements available through the *Designer tab, MOVES Links* ribbon group.

Roadways, parking facilities, and construction zones can be created in AEDT with the specific purpose of classifying links to be used in MOVES for emissions inventories only. This feature does not currently support use with air quality dispersion analyses, please refer to AEDT Supplemental Manual: Using MOVES with AEDT for details. Also, see Section 8.5 for additional information.

- *Add Roadway Link*: A roadway link is a one or more roadway segments that have the same roadway characteristics. Click on the map to draw the first point, click on other locations on the map to add more points. Double-click on the last point to complete the roadway link. Roadway links must consist of anywhere from 2 to 100 points, inclusive. The default road type for new roadway links is Urban Unrestricted. See Section 8.3.7.10 to edit the type of roadway and other properties.
- *Add Parking Facility Link*: A parking facility link is defined as a two-dimensional polygon and represents one level of a parking facility. Click on the map to add the first point, then add at least two other points to create a polygon. Double-click on the last point to complete the parking facility. See Section 8.3.7.11 to edit properties.
- *Add Construction Zone Link*: A construction zone link is defined as a two-dimensional polygon and represents a construction zone. Click on the map to add the first point, then add at least two other points to create a polygon. Double-click on the last point to complete the construction zone. The road type for new construction zones is Urban Unrestricted. See Section 8.3.7.12 to edit the type of roadway and other properties. Please see AEDT Supplemental Manual: Using MOVES with AEDT on the AEDT Support website for more information on the usage of construction zones with AEDT.

> Roadways, parking facilities, and construction zones have properties (e.g., road type, average grade) which are not assigned graphically. The user assigns these properties by editing the airport layout component.

8.3.5.5 Actions

This section describes the elements available through the *Designer tab, Actions* ribbon group.

- *Point*: Select or multi-select airport layout components.
- *Drag:* Move airport layout component.
- *Delete*: Delete airport layout component.
- *Undo*: Undo the last action. Keyboard shortcut for undo is CTRL+Z.
- *Redo*: Redo the last action that was undone. Keyboard shortcut for redo is CTRL+Y.
- *Save Design*: Saves the changes made in the airport layout designer and exits the design mode.
- *Cancel Design*: Discards any changes made in the airport layout designer and exits the design mode.

8.3.6 Edit Track

Point-type and vector-type tracks can be edited in the *Edit Track* pane. There are two ways to access the *Edit Track* pane. The airport layout layer must be generated first in order to access the Edit Track.

To open the Edit Track pane via the Airports tab, Edit Component button:
1. In the *Airports* tab, select an airport layout in the *Airports* pane and click *View Layout, View Layout - Full* in the *Airport Layouts* ribbon group to view the airport layout layer.
2. Select a track in the *Details* pane then click *Edit Component* from the *Airport Layouts* ribbon group to enter design mode in the *Designer* tab and to open the *Edit Track* pane.
3. In the *Edit Track* pane, edit the desired fields.
4. Click *Save and Close* to apply changes and close the pane. Click *Cancel* to discard changes.

To open the Edit Track pane via the Designer tab, Edit Track button:
1. In the *Airports* tab, select an airport layout in the *Airports* pane and click *View Layout, View Layout - Full* in the *Airport Layouts* ribbon group to view the airport layout layer.
2. Click the *Designer* tab to enter design mode.
3. Select a track in the *Details* pane then click *Edit Track* from the *Tracks* ribbon group to open the *Edit Track* pane.
4. In the *Edit Track* pane, edit the desired fields.
5. Click *Save and Close* to apply changes and close the pane. Click *Cancel* to discard changes.

8.3.6.1 Edit Point Track

Open the *Edit Track* pane. For point type tracks, the pane displays details of the selected point-type track.

For point-type tracks, the location points of segments that make up the track can be edited, added, or deleted; and the order of points can be changed. Altitude and speed controls can also be added in this screen, see Section 8.3.6.1.1. See Section 8.3.11 for instructions on editing a dispersed track.

- *+ button*: add a new segment row.
- *Up/Down Arrow* buttons: move the selected row up or down.
- *X button*: deletes the selected row.
- *Clear all* button: deletes all rows.
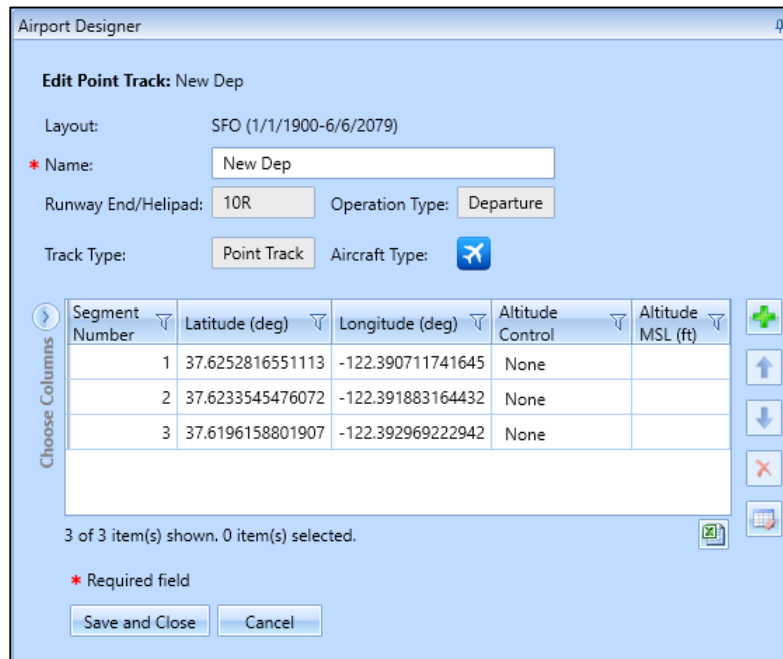
Figure 8-16 Edit Point Track Pane

8.3.6.1.1   Control codes

The altitude (feet MSL) and/or speed (KCAS) of an airplane as it passes over a track node can be controlled to some extent for point-type tracks by assigning track controls to that track node. Track controls are an optional feature that are used to specify targets and restrictions on altitude and/or speed on tracks – altitude controls affect airplane altitude (feet MSL); and speed controls affect airplane speed (KCAS). Speed controls are only supported for BADA4 aircraft.

Each track control has two components: a value and a code. The value establishes a reference altitude or speed (appropriate to the control type), and the code specifies how that value should be interpreted in flight analysis.

Note that no control is defined if any of the following are true:
- A value is not provided;
- A code is not provided; or
- The code provided has a value of "0" or "None".

Furthermore, AEDT will ignore the following controls:
- Altitude controls with altitude values below 500 feet AFE.
- All speed controls, if using the Doc 29/BADA 3 performance model.
- All speed controls, if the operation is an overflight.
- All controls, if the operation is a circuit or touch-and-go.

Also note that if there are any controls defined on an overflight, there must be controls defined (and observed, per the control-ignoring rules above) on the first and last nodes of the track.

AEDT computes performance to the following extents:
- Departure and approach performance is computed between ground roll and the observed control that is trackwise furthest from ground roll.
- Overflight performance is computed from the first track point to the last track point (both of which must have observed controls).

Performance is computed as close as possible to the observed control values, subject to the airplane's performance capabilities, as described in the AEDT Technical Manual. The computed best effort to achieve these targeted values is checked against the restrictions implied by the control codes.
- Control code "1" or "At or Below": The airplane is not allowed above the value
- Control code "2" or "Match": The airplane is not allowed above or below the value
- Control code "3" or "At or Above": The airplane is not allowed below the value.

If the best effort fails to comply with the restriction, the flight's performance is discarded by AEDT, logged in the error log, and its impact is excluded from environmental metrics. For more information on track controls, refer to the AEDT Technical Manual.
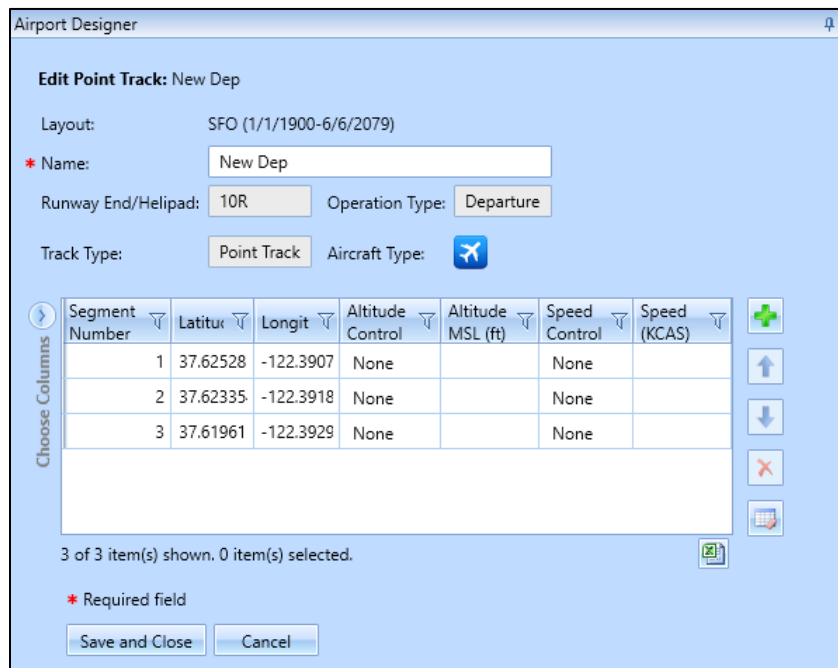
Figure 8-17 Control Codes

8.3.6.2 Edit Vector Track

Open the *Edit Track* pane. For vector-type tracks, the pane displays details of the selected vector-type track.

For vector-type tracks, the segment can be edited, added, or deleted; and the order of segments can be changed.

- *+* button: add a new segment row.
- *Up/Down Arrow* buttons: move the selected row up or down.
- *X* button: deletes the selected row.
- *Clear all* button: deletes all rows.

Figure 8-18 Edit Vector Track Pane

8.3.7 Edit Component

An airport layout can include the following components: building, gate, terminal, runway end, runway, taxiway, taxipath, track, heligate, helipad, helitaxi, roadway, parking facility, or construction zone. Each component can be edited except for vector-type tracks.

To edit an airport layout component:
1. Select an airport layout in the *Airports* pane.
2. Select the desired airport layout component in the *Details* pane.
3. Click *Edit Component* in the *Airport Layouts* ribbon group. The *Edit* dialog is displayed.
4. Edit the desired fields.
5. Click *OK* to apply changes or *Cancel* to discard changes.

8.3.7.1 Edit Building

The *Edit Building* dialog displays the details of the selected building. Edit the desired fields. Edit the desired fields. Required fields are marked with an asterisk (*).

- *+* button: add a new coordinate row.
- *Up/Down Arrow* buttons: move the selected row up or down.
- *X* button: deletes the selected row.
- *Clear all* button: deletes all rows.

Figure 8-19 Edit Building Dialog

8.3.7.2 Edit Gate

The *Edit Gate* dialog displays the details of the selected gate. Edit the desired fields. Required fields are marked with an asterisk (*). Use the *Units* drop-down menu to select a unit.

When a gate is associated with a taxipath(s), its location cannot be edited.

Figure 8-20 Edit Gate Dialog

8.3.7.3 Edit Terminal

A terminal is defined as a polygon. The *Edit Terminal* dialog displays the details of the selected terminal. Edit the desired fields. Required fields are marked with an asterisk (*). Use the *Units* drop-down menu to select a unit.

- *+* button: Add a new coordinate row.
- *Up/Down Arrow* buttons: Move the selected row up or down.
- *X* button: Deletes the selected row.
- *Clear all* button: Deletes all rows.

When a terminal is associated with a taxipath(s), its location cannot be edited.

Figure 8-21 Edit Terminal Dialog

8.3.7.4 Edit Runway

The *Edit Runway* dialog displays the details of the selected runway. The width of the runway can be edited.

Figure 8-22 Edit Runway Dialog

8.3.7.5 Edit Runway End / Edit Helipad

The *Edit Runway End* dialog displays the details of the selected runway end. The *Edit Helipad* dialog displays the details of the selected helipad. Edit the desired fields. Required fields are marked with an asterisk (*).

When a runway end is associated with a taxipath(s), its location cannot be edited.

Figure 8-23 Edit Runway End Dialog

Figure 8-24 Edit Helipad Dialog

8.3.7.6 Edit Taxiway

The *Edit Taxiway* dialog displays the name of taxiway, width, and the location points that make up the taxiway. Edit the desired fields. Required fields are marked with an asterisk (*).

- *+ button*: Add a new coordinate row.
- *Up/Down Arrow* buttons: Move the selected row up or down.
- *X* button: Deletes the selected row.
- *Clear all* button: Deletes all rows.
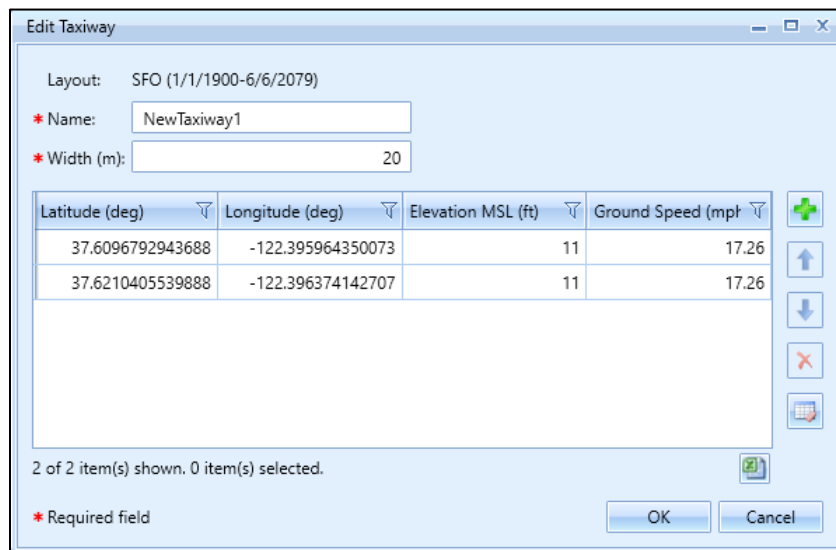
Figure 8-25 Edit Taxiway Dialog

8.3.7.7 Edit Taxipath

The *Edit Taxipath* dialog displays the gate, inbound/outbound direction, runway end, and a list of taxiways that make up the taxipath. Edit the desired fields. Required fields are marked with an asterisk (*).
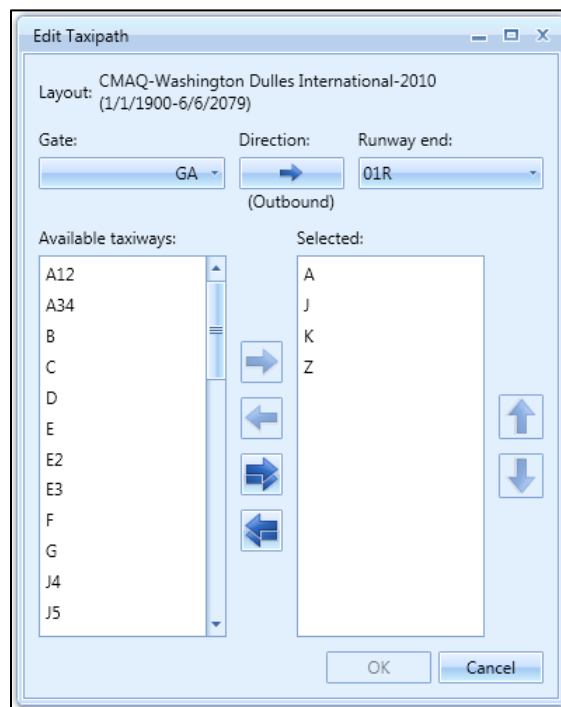
Figure 8-26 Edit Taxipath Dialog

8.3.7.8 Edit Heligate

The *Edit Heligate* dialog displays the details of the selected helicopter gate. Edit the desired fields. Required fields are marked with an asterisk (*). Use the *Units* drop-down menu to select a unit.

Figure 8-27 Edit Heligate Dialog

8.3.7.9 Edit Helitaxi

The *Edit Helitaxi* dialog displays the details of the selected helicopter-taxi track, including heligate, direction, and helipad. Edit the desired fields. Required fields are marked with an asterisk (*).

- *+* button: Add a new coordinate row.
- *Up/Down Arrow* buttons: Move the selected row up or down.
- *X* button: Deletes the selected row.
- *Clear all* button: Deletes all rows.

Figure 8-28 Edit Helitaxi Dialog

8.3.7.10 Edit Roadway

A roadway in AEDT is a defined as a polyline composed of consecutive points, with each point connected by a one-dimensional, straight-line segment. The *Edit MOVES Roadway Link* dialog displays details of the selected roadway. Edit the desired fields. Required fields are marked with an asterisk (*). Average Grade is not assigned by default, populate this field with a desired initial value. Roadway points are not editable.

The four available road types for roadways include:
- Rural Restricted: A rural roadway to which access is restricted by onramps (e.g., a rural highway/freeway)
- Rural Unrestricted: A rural roadway to which access is not restricted by onramps (e.g., a rural road)
- Urban Restricted: An urban roadway to which access is restricted by onramps (e.g., an urban highway/freeway)
- Urban Unrestricted: An urban roadway to which access is not restricted (e.g., city streets)

Editing the *Link Length* does not change the locations or quantity of the roadway points. Editing this field is meant to numerically scale the length over which vehicle activity occurs on the roadway. For example, the user can draw a subset of roadways required by the analysis and edit the link length to the appropriate level of activity for the roadways that the roadway represents. For instance, if 20 miles of roads should be modeled for a vehicle emissions analysis, the user can draw a subset of the roads, i.e., 1.5 miles, and scale the length to 20 miles rather than drawing all 20 miles of roadway.

Figure 8-29 Edit MOVES Roadway Link Dialog

8.3.7.11 Edit Parking Facility

A parking facility in AEDT is defined as a closed polygon composed of consecutive points, with each point connected by a one-dimensional, straight-line segment. The *Edit MOVES Parking Link* dialog displays details of the selected parking facility. Edit the desired fields. Required fields are marked with an asterisk (*). Average Grade is not assigned by default, populate this field with a desired initial value. Parking facility points are not editable.

Editing the *Link Length* does not change the locations or quantity of the parking facility polygon vertices. Editing this field is meant to numerically scale the length over which vehicle activity occurs on the parking facility. For example, the user can draw a subset of parking facilities required by the analysis and edit the link length to the appropriate level of activity for the parking facilities that the parking facility represents. Note that AEDT calculates the length associated with a parking facility as the perimeter of the parking facility. In the event that the perimeter is not a representative length over which vehicle activity occurs on the parking facility, edit the *Link Length* to provide a better approximation for this value.

Figure 8-30 Edit MOVES Parking Link Dialog

8.3.7.12 Edit Construction Zone

A construction zone in AEDT is defined as a closed polygon composed of consecutive points, with each point connected by a one-dimensional, straight-line segment with no width or height. The *Edit MOVES Construction Link* displays details of the selected construction zone. Edit the desired fields. Required fields are marked with an asterisk (*). Average Grade is not assigned by default, populate this field with a desired initial value. Construction zone points are not editable.

The available road types for construction zones are the same as those available for roadways (i.e., rural restricted, rural unrestricted, urban restricted, and urban unrestricted).

Editing the *Link Length* does not change the locations or quantity of the construction zone polygon vertices. Editing this field is meant to numerically scale the length over which vehicle activity occurs on the construction zone. For example, the user can draw a subset of construction zones required by the analysis and edit the link length to the appropriate level of activity for the construction zone that the zone represents. Note that AEDT calculates the length associated with a construction zone as the perimeter of the construction zone. In the event that the perimeter is not a representative length over which vehicle activity occurs on the construction zone, edit the *Link Length* to provide a better approximation for this value.

Figure 8-31 Edit MOVES Construction Zone Link Dialog

8.3.8 Delete Component

Deleting an airport layout component is not supported if the component has been used in operation or is associated with a different component (e.g., cannot delete a gate associated with a taxipath; cannot delete a runway end associated with a track, etc.).

To delete an airport layout component:
1. Select an airport layout in the *Airports* pane.
2. Select the desired airport layout component in the *Details* pane.
3. Click *Delete Component* in the *Airport Layouts* ribbon group.
4. In the confirmation dialog, click *Yes* to delete or *No* to cancel.

8.3.9 Import Tracks

Tracks data can be imported into the current AEDT study from Comma Separated Value (CSV) input files through the AEDT user interface and by command line (Appendix E.3). The format of the data within the CSV file is described in Appendix E.1. A set of sample CSV files are included with the AEDT installation, see Appendix E for more information.

⚠️ Only one airport layout may exist in the study to import tracks from CSV files. Delete all other airport layouts before importing tracks in this manner.

⚠️ All track names in the study and in the CSV file must be unique to import tracks by CSV file.

To import tracks through the AEDT user interface:
1. In the *Airports* tab, *Airport Layouts* ribbon group, click *Import Tracks* to open the *Import Tracks by CSV* dialog.
2. Click the *Browse* button and navigate to the CSV file with the tracks data.
3. Check the *CSV file contains a header row* box if the file contains a header row. Uncheck the box if the file does not contain a header row and the columns are ordered as specified in Appendix E.1.
4. Click *Import* to begin the import process. Progress, including import initialization, number of imported tracks and completion status are displayed above the *Errors* field. Error messages are displayed in the *Errors* field as they are encountered and reported in the AEDT log.

📝 Errors messages displayed in the *Errors* field can be copied directly within the field further assistance or analysis.

5. Click *Cancel Import* to stop the import process and revert changes.
6. Click *Close* to close the dialog.
7. Select the airport layout and click *Get Tracks* in the *Tracks* tab data grid or the *Refresh* in the top right of the data grid to update the *Tracks* data grid and view the imported operations.
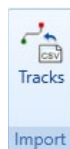
Figure 8-32 Airports Tab – Import Ribbon Group
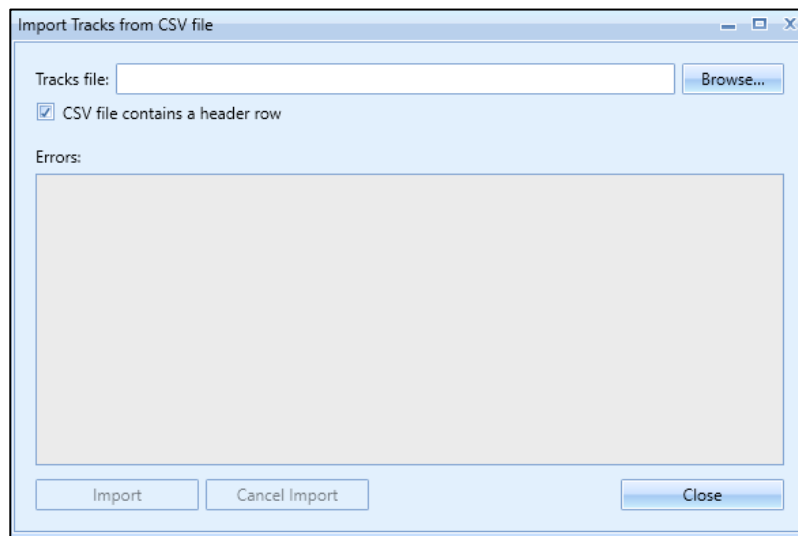
Figure 8-33 Import Tracks from CSV file

8.3.10 Disperse Track

The disperse track option allows for creating multiple sub-tracks from the original, "backbone" track and can be used to capture realistic deviations from the nominal flight path. Operations can be distributed across the dispersed tracks as described in this section.

Only point-type tracks can be dispersed. Dispersing vector tracks is not supported.

⚠️ Dispersed tracks are not supported for emissions dispersion modeling.

⚠️ Dispersing or undispersing tracks will invalidate results of metric results that were previously run with the affected track.

To disperse a point-type track:
1. Select an airport layout in the *Airports* pane.
2. Select the desired point-type track in the *Details* pane.
3. Click *Disperse Track* in the *Airport Layouts* ribbon group. The *Disperse Track* dialog is displayed.
4. From the *Subtracks* drop-down-menu, select the desired number of dispersed track which include the original track plus subtracks. This is an odd number from 3 (the original track and two subtracks) to 9 (the original track and eight subtracks).
5. The *Subtrack Percents* are automatically distributed.
   These data are used to distribute flight operations across the original track and its subtracks. Edit the default percentages as desired. The total subtrack percentages must add up to 100 percent.
6. Edit the distance between the subtracks as desired.
7. Click *OK* to disperse tracks or *Cancel* to discard changes.

> Track 1 is always the backbone track and has the highest percentage by default. Tracks 2 and 3 are on either side of track 1 and have the next highest percentages of operations by default. Additional tracks are positioned to the outside of the lower number tracks (further from the backbone). The farther the subtrack is from the backbone track, the lower the default percentage of operations.
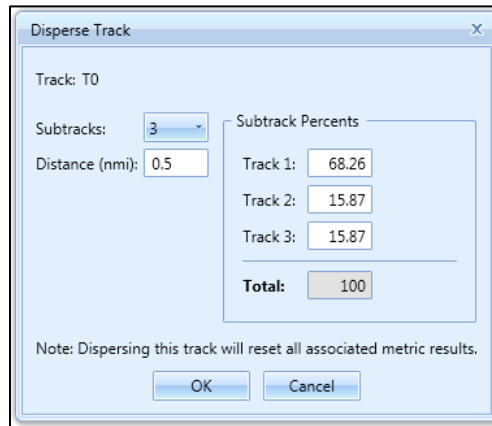
Figure 8-34 Disperse Track Dialog

8.3.11 Edit a Dispersed Track

Dispersed tracks can be edited graphically in the map or in the *Edit Track* pane.

To edit dispersed tracks in the map:
1. In the *Airports* tab, select an airport layout in the *Airports* pane and click *View Layout, View Layout - Full* in the *Airport Layouts* ribbon group to view the airport layout layer.
2. Select the dispersed point-type track in the *Details* pane to highlight the track in map. This step is especially important when there are multiple tracks are overlapped on the map.
3. Click the *Designer* tab to enter design mode.
4. In the *Designer* tab, *Actions* ribbon group, click *Drag*.
5. Click and drag the points that make up the backbone track to change the location of the backbone track and subtracks.
6. From the *Actions* ribbon group, click *Save Design* to save changes and exit design mode or *Cancel Design* to discard changes and exit design mode.

To edit dispersed tracks in Edit Track pane:
1. In the *Airports* tab, select an airport layout in the *Airports* pane and click *View Layout, View Layout - Full* in the *Airport Layouts* ribbon group to view the airport layout layer.
2. Select the dispersed point-type track in the *Details* pane then click *Edit Component* from the *Airport Layouts* ribbon group to enter design mode in the *Designer* tab.
3. From the *Subtracks* drop-down menu, select the desired number of subtracks.
4. Distribute operations to each track by specifying the appropriate percentages in the *Subtrack Percents* fields. Click in the field next to the track to edit. The total percentages from all subtracks must add up to 100.

5. Edit the spacing between subtracks by clicking on an entry in the table that represents the segments or points that make up the original backbone track. The *Subtrack Spacing* fields are enabled.
6. The spacing between subtracks can be edited individually at that point in the track by clicking in the field next to the track number and editing to the desired value. The Spacing between all subtracks at that point in the track can be edited to the same value, all at once by entering the desired value in the *Reset Spacing to Value* field and clicking the *Reset Spacing to Value* button.
7. Click *Save and Close* in the *Edit Point Track* pane to save the changes and close the pane. To exit design mode, click either the *Save Design* or the *Cancel Design* button in the *Actions* ribbon group. Since the changes to the track are saved in the *Edit Track* pane, clicking *Cancel Design* does not discard the edits made in the *Edit Track Pane.*

Figure 8-35 Edit Point Track Pane – For Dispersed Track

8.3.12 Undisperse Track

For tracks that have been dispersed into multiple tracks, the dispersed tracks can be removed and 100 percent of the operations can be returned to the original track through the *Undisperse Track* option.

To undisperse a track:
1. Select an airport layout in the *Airports* pane.
2. In the *Details* pane, select the dispersed track to be undispersed.
3. Click *Undisperse Track* in the *Airport Layouts* ribbon group.
4. Click *Yes* in the confirmation dialog.

8.4 Operating Configurations Actions

The actions available through the *Operating Configurations* ribbon group (Figure 8-10) are described in the sections below. Operating configurations are used in calculations when the Delay & Sequencing modeling option is enabled, see Section 5.2.4.

Operating configurations specify the pattern of aircraft arrivals and departures on specific runways over the course of a year depending on the weather and airport capacity. Specifying configurations allows the user to assign aircraft to runways based on aircraft weight category criteria that is similar to those employed in an actual airport operating environment.
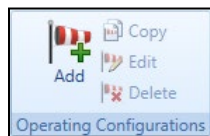
Figure 8-36 Ribbon Group – Operating Configurations

8.4.1 Add Configuration

The *Create Operating Configuration* wizard allows users to dynamically assign aircraft to different runways at run-time based upon weather conditions, time of day, and aircraft weight category.

To access the Create Operating Configuration wizard:
1. In the *Airports* pane, click the (+) icon next to the airport of interest. The layout(s) for the airport are displayed.
2. Select the desired airport layout.
3. From the *Operating Configurations* ribbon group, click the *Add* button to open the *Create Operating Configuration* wizard.

The *Create Operating Configuration* wizard contains a header, progress pane, and content pane:
• The header displays the current step title and brief instructions.
• The progress pane lists the steps in the wizard and displays the current step in bold font.
• The content pane displays the settings and options available in the current step.

To create a new operating configuration, follow the steps as described below. Navigate the wizard by clicking *Next* (lower right) to progress to the next step, clicking the *Back Arrow* (upper left) to return to the previous step, or clicking *Cancel* to discard changes and exit the wizard.

8.4.1.1 Step 1: Name configuration

In this step, create a name for the new operating configuration.

1. Enter a unique name for the new operating configuration.
2. Click *Next*.
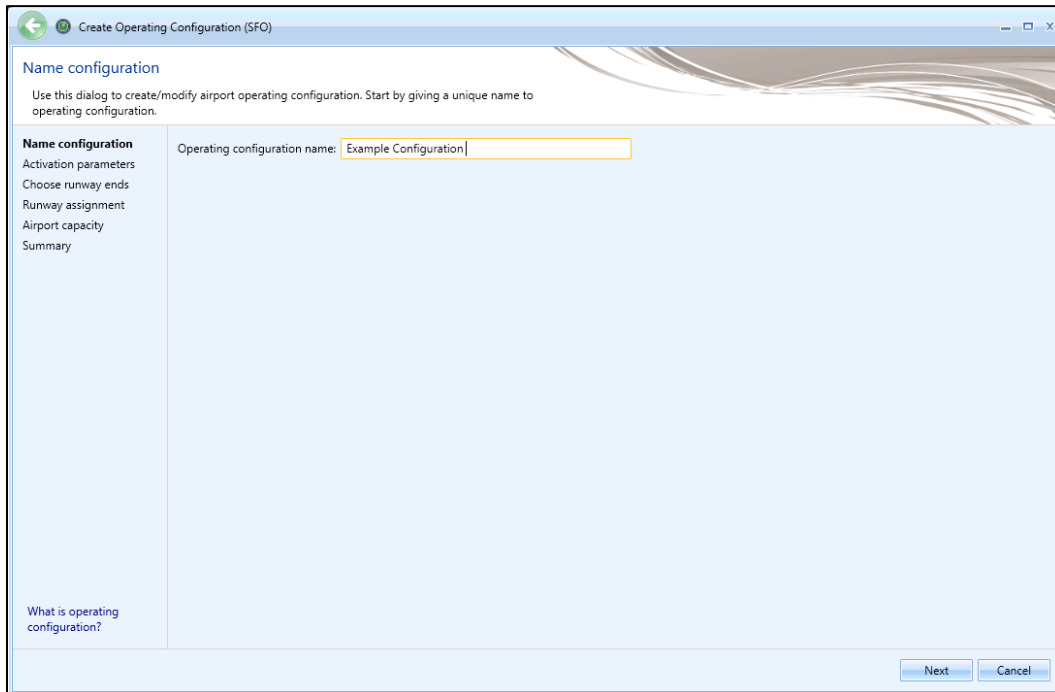
Figure 8-37 Create Operating Configuration Wizard – Name Configuration

8.4.1.2 Step 2: Activation parameters

In this step, specify the parameters under which the new operating configuration will be active. The parameters include wind direction, wind speed, hour of the day, ceiling, visibility, and temperature.

1. Enter the lower bound and upper bound values for desired activation parameter.
   - None of the activation parameter fields are required. Empty lower bound and/or upper bound values indicate no limit.
   - For the *Wind direction* and *Hour of day,* the lower bound value can exceed the upper bound value, because angles and hours are circular quantities.
   - If only one of the *Lower bound/Upper bound* pair is entered, that bound with the value will be evaluated and the other bound ignored.
   - Click *Reset All* to reset all the activation parameters.
2. Click *Next*.

Figure 8-38 Create Operating Configuration Wizard – Activation Parameters

8.4.1.3 Step 3: Choose runway ends

In this step, select the runway ends to be used in this operating configuration.

1. To add runway end(s), select the runway end(s) of interest in the *Available runway ends* list and click the *Add Arrow*.
2. To remove runway end(s), select desired runway end(s) in the *Selected* list and click the *Remove Arrow*.
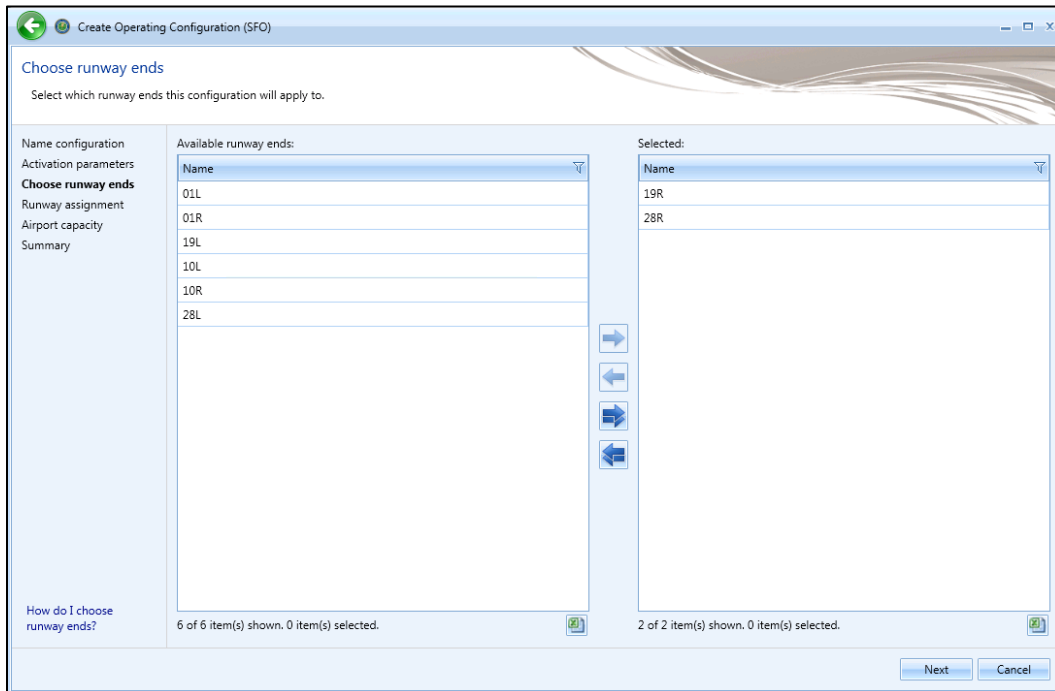
Figure 8-39 Create Operating Configuration Wizard – Choose Runway Ends

8.4.1.4 Step 4: Runway assignment

In this step, distribute operations by percentages for each aircraft size category and operation type by runway end(s) selected in previous step. The percentage total over the runway ends for each aircraft size-operation combination must equal 100%.

1. Enter the operations distribution percentage for each aircraft size category.
2. Click *Next*.

Figure 8-40 Create Operating Configuration Wizard – Runway Assignment

8.4.1.5 Step 5: Airport capacity

In this step, enter the maximum number of arrivals and departures that define the Pareto frontier of the airport capacity. The Pareto frontier for the airport capacity is the curve where no increase in arrivals per hour can be made without a decrease in departures per hour and vice versa.

1. Enter the maximum number of arrivals per hour and departures per hour.
   - At least one point must be entered.
   - The range for departures and arrivals at each point is 0 to 400.
   - The graph automatically refreshes to display the updated capacity Pareto frontier.
2. Click *Next*.
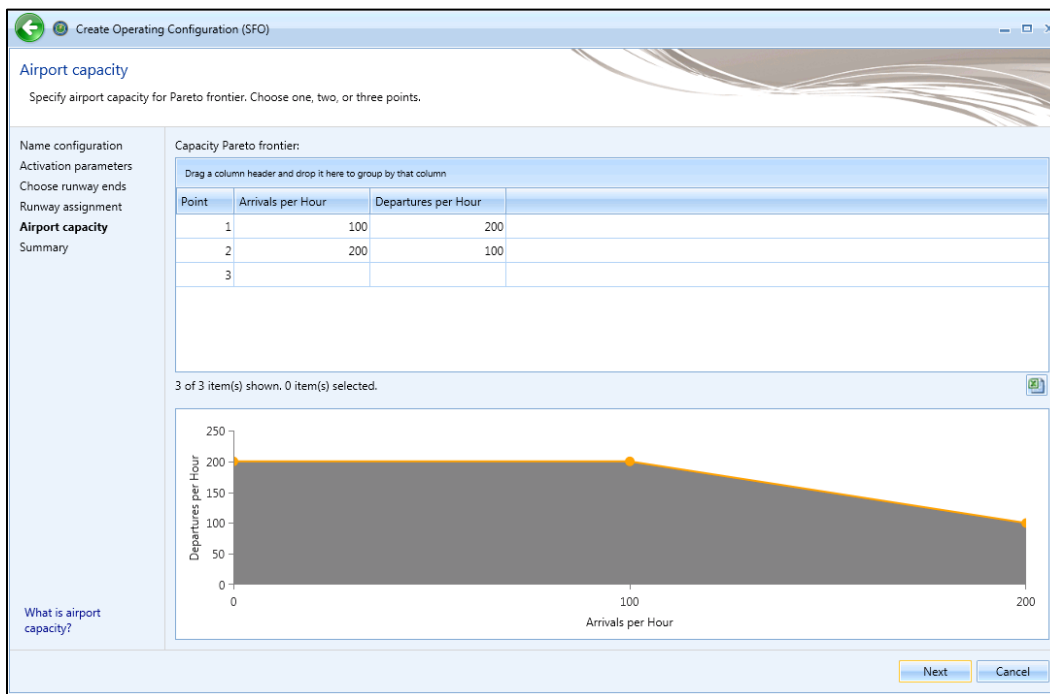
Figure 8-41 Create Operating Configuration Wizard – Airport Capacity

8.4.1.6 Step 6: Summary

The summary step provides a summary of options selected in the *Create Operating Configuration* wizard.

To create a new operating configuration:
1. Click *Create* to create the new operation configuration.
2. The new operating configuration is listed in the *Airports* pane.
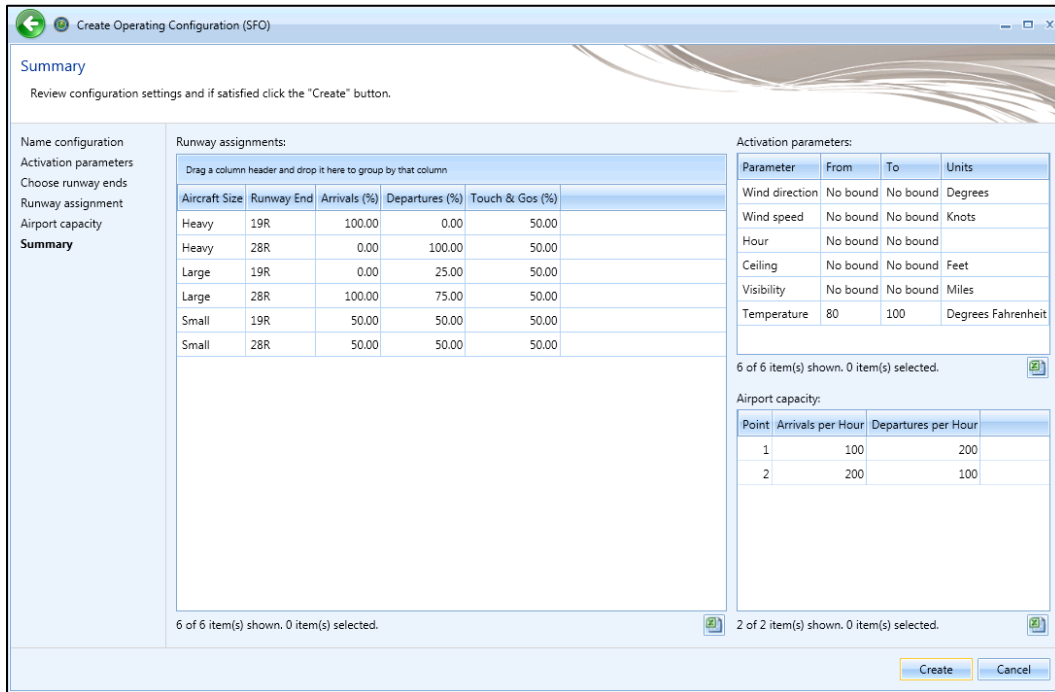
Figure 8-42 Create Operating Configuration Wizard – Summary

8.4.2 Copy Configuration

To create a new operating configuration based on an existing configuration:
1. In the *Airports* pane, select a desired operating configuration.
2. From the *Operating Configurations* ribbon group, click the *Copy* button to open the *Copy Operating Configuration* wizard.
3. Each step in the wizard shows the settings of the existing configuration. Review the selections and edit as appropriate.
4. In the *Review* step, click *Create*.
5. A confirmation is displayed, click *Close.*
6. The new operating configuration is listed in the *Airports* pane.

8.4.3 Edit Configuration

To edit an operating configuration:
1. In the *Airports* pane, select a desired operating configuration.
2. From the *Operating Configurations* ribbon group, click the *Edit* button to open the *Edit Operating Configuration* wizard.
3. Each step in the wizard shows the settings of the configuration. Review the selections and edit as appropriate.
4. In the *Review* step, click *Save* to apply changes or *Cancel* to discard changes.

8.4.4 Delete Configuration

To delete an operating configuration:
1. In the *Airports* pane, a desired operating configuration.
2. From the *Operating Configurations* ribbon group, click the *Delete* button.
3. Click *Yes* when prompted for confirmation.

8.5   MOVES Links Action

EPA's Motor Vehicle Emissions Simulator (MOVES) must be used to generate emissions inventories and/or AERMOD input files for onroad or off-road mobile sources. Mobile-source emissions from MOVES are localized in the following three mobile-source airport layout components: roadways, parking facilities, and construction zones.

AEDT facilitates creating mobile-source layout components by using the Airport Layout Design feature (see Section 8.3.5) and editing the properties of each component with the specific purpose of exporting in the MOVES link format, these components are not modeled in AEDT. The Export MOVES links feature allows for the AEDT definitions of roadway links, parking facility links, and construction zone links to be exported and used as inputs into MOVES.

After the links are exported and imported into MOVES utilizing the project-level domain, the mobile-source emissions inventory can be generated for the imported links. The MOVES emissions output for each link can then be imported back into AEDT. For more information on integrating MOVES results, see AEDT Supplemental Manual: Using MOVES with AEDT on the AEDT Support website.

The *Export* button located in the *MOVES Links* ribbon group exports roadway, parking facility, and construction zone in the selected airport layout as MOVES links.
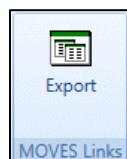
Figure 8-43 Export MOVES Link button

To export MOVES links:
1. Select an airport layout in the *Airports* pane.
2. Click *Export* in the *MOVES Links* ribbon group.
3. In the *Browse For Folder* dialog, navigate to a folder to export the file(s) to and click *OK*.

This export functionality allows AEDT users to translate their airport layout components into a format that can be imported into the EPA's mobile-source emissions tool, MOVES. Once imported into a MOVES project-level analysis, the user can generate a mobile-source emissions inventory for their imported links.

Each MOVES link has a set of fields which must be populated prior to import into MOVES. AEDT populates a subset of these fields; populate the remaining fields with the appropriate values. The fields exported by AEDT are described in Table 8-1.

Table 8-1 Exported MOVES Link Properties

Link Property	Populated by AEDT	Required by MOVES	Description
linkID	Yes	Yes	An ID for each exported link, unique within an airport layout.
countyID	**No**	Yes	The ID of the county in which the link is located (from MOVES default data in the *county* table of the *movesdb* database).
zoneID	**No**	Yes	A user-generated ID used to subdivide counties into zones.
roadTypeID	Yes	Yes	The corresponding integer value of the link's road type. (1) Off-network (2) Rural Restricted (3) Rural Unrestricted (4) Urban Restricted (5) Urban Unrestricted
linkLength	Yes	Yes	The length of the link (in miles).
linkVolume	**No**	Yes	The quantity of vehicles operating on the link (number of vehicles per hour).
linkAvgSpeed	**No***	Yes	The average speed of vehicles operating on the link (in miles per hour).
linkDescription	Yes	Yes	A description for the link.
linkAvgGrade	Yes	Yes	The average grade of the link (in percent, calculated as $\frac{vertical\ displacement}{horizontal\ displacement} * 100$).
aedtFeatureID	Yes	**No**	The AEDT FEATURE_ID (in the APTLAYOUT_MOVES_FEATURE table) of the airport layout component.
airportLayoutID	Yes	**No**	The AEDT airport layout ID.

*The linkAvgSpeed field is populated for the parking facility Vehicle Idling Link only.

In order to import links into a MOVES analysis, the "Onroad" model and the "Project" scale must be selected.

8.5.1 Roadway Links

Each AEDT roadway link is exported as a single link to be imported into MOVES.

- linkID: Roadway link IDs range from 1 to 599999, inclusive.
- roadTypeID: Roadway links can have Rural Restricted (2), Rural Unrestricted (3), Urban Restricted (4), and Urban Unrestricted (5) as their road type.
- linkLength: The default value for a roadway is set to the sum of the lengths of the roadway's segments. The user can override this default value by editing roadway's *Roadway Link Length* field (Section 8.3.7.10).
- linkAvgGrade: The average grade of the roadway link is set to the value provided by the user in the *Roadway Link Avg. Grade* field (Section 8.3.7.10).

8.5.2 Parking Facility Links

Each AEDT parking facility link is exported as three separate links to be imported into MOVES. Three separate links are required to fully model the types of mobile-source emissions which occur within parking facilities. One link is required for vehicle start-ups, another for vehicle movement, and a third for vehicle idling.

Parking Facility Off-Network Link
The Parking Facility Off-Network Link accounts for vehicle starts and soak emissions.

- linkID: Vehicle start-up links utilize link IDs from 600001 to 699999 (inclusive).
- roadTypeID: Vehicle start-up links have the Off-Network (1) road type.
- linkAverageSpeed: The average speed on the start-up link is left blank for the user to populate.
- linkLength: The length of the start-up link is set to 0.
- linkAvgGrade: The average grade of the start-up link is set to 0.

Parking Facility Movement Link
The Parking Facility Movement link models the vehicle movement within the parking facility.

- linkID: Vehicle movement links utilize link IDs from 700001 to 799999 (inclusive).
- roadTypeID: Vehicle movement links have the Urban Unrestricted (5) road type.
- linkAverageSpeed: The average speed on the movement link is left blank for the user to populate.
- linkLength: The default value for a movement link is set to the perimeter of the parking facility. The user can override this default value by editing the parking facility's *Movement Link Length* field (Section 8.3.7.11).
- linkAvgGrade: The average grade of the movement link is set to the value provided by the user in the *Movement Link Avg. Grade* field (Section 8.3.7.11).

Parking Facility Idling Link
The Vehicle Idling Link utilizes an average speed of 0 miles-per-hour to obtain idle emissions for the parking facility.

- linkID: Vehicle idling links utilize link IDs from 800001 to 899999 (inclusive).

- roadTypeID: Vehicle idling links have the Urban Unrestricted (5) road type.
- linkAverageSpeed: The idling links have an average speed of 0 (miles per hour).
- linkLength: The length of the idling link is set to 0.1 miles.
- linkAvgGrade: The average grade of the idling link is set to 0.

8.5.3 Construction Zone Links

Each AEDT construction zone link is exported as a single link to be imported into MOVES. The "Nonroad" model is used in order to generate construction mobile-source emissions in MOVES. The "Nonroad" model does not allow the "Project" scale for MOVES analyses. Therefore, construction links cannot be used when modeling construction mobile-source emissions. Construction links can however be imported in the same manner as roadway links and be used to model roadway mobile-source emissions that occur on a construction zone (e.g., heavy trucks).

- linkID: Construction link IDs range from 900001 to 999999, inclusive.
- roadTypeID: Construction links can have Rural Restricted (2), Rural Unrestricted (3), Urban Restricted (4), and Urban Unrestricted (5) as their road type.
- linkLength: The default value for a construction zone is set to the perimeter of the construction zone's segments. The user can override this default value by editing the construction zone's *Construction Link Length* field (Section 8.3.7.12).
- linkAvgGrade: The average grade of the construction link is set to the value provided by the user in the *Construction Link Avg. Grade* field (Section 8.3.7.12).

9 Definitions Tab

The *Definitions* tab supports setting up study data elements including metrics, receptors, receptor sets, operational profiles, weather, and terrain and ambient settings. It also supports integration of emissions results from the EPA MOVES (Motor Vehicle Emission Simulator) software. See Appendix B for detailed information about each field.

9.1 Definitions Pane and Display Buttons

The *Definitions* pane displays current settings for metrics, receptors, receptor sets, operational profiles, weather, terrain and ambient, and MOVES emissions results. Use the buttons in the *Display* ribbon group to view different categories.
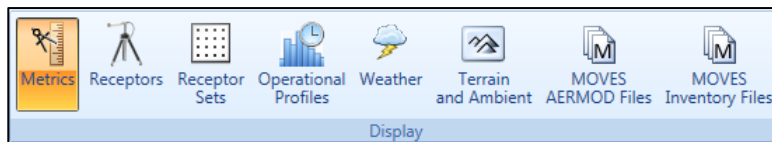
Figure 9-1 Definitions Tab – Display Ribbon Group

9.2 Metrics

To view metric properties, click the *Metrics* button and select the metric of interest. Noise metrics can be created and copied. User-defined noise metrics can also be edited or deleted. System metrics cannot be edited or deleted.

To add or edit a user-defined noise metric:
1. In the *Definitions* pane, click the *Metrics* display button.
    - To create a new noise metric, click *New*.
    - To create a new noise metric by copying an existing metric, select a desired noise metric then click *Copy*.
    - To edit an existing user-defined noise metric, select the desired metric then click *Edit.*
2. Edit the following fields as appropriate: *Metric Name*, *Metric Type*, *Frequency Type*, *Weight*, *Start Time*, *End Time*, *Time-averaging constant*, and *Decibels* for the user-defined metric.
3. Click *Save* to apply changes or *Cancel* to discard changes.

> When creating a user-defined noise metric, specify all day, evening, night time periods and the respective weights (i.e., do not leave any of the time periods and weights blank).

> When the *Time-averaging constant* option is selected, AEDT will use time averaging correction factor input in the decibels field. See the AEDT Technical Manual for more information on time averaging constants.

To delete a user-defined noise metric:
1. Select a desired user-defined noise metric then click *Delete.*
2. Click *Yes* when prompted for confirmation.

9.3 Receptors

Receptors define locations where noise or pollutant concentration levels is calculated. There are two receptor types in AEDT, point and grid. Receptors can be created, copied, edited, and deleted. To view receptors in the current study, click the *Receptors* display button in the *Definitions* tab. Receptors that are assigned to a receptor set cannot be deleted.

Population receptors are not displayed in the *Definitions* tab.
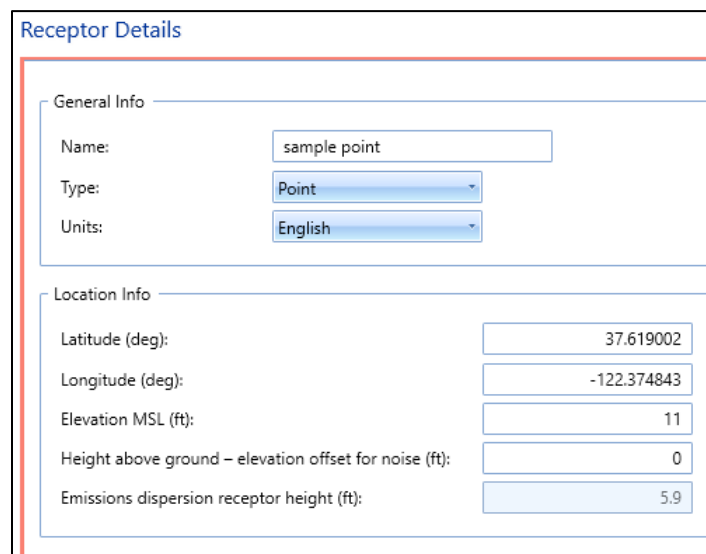
9.3.1 Point Type Receptor

To create a point-type receptor:
1. In the *Definitions* pane, *Display* ribbon group, click the *Receptor*.
2. From the *Actions* ribbon group, click *New*, or select an existing receptor from the *Definitions* pane and click *Copy* in the *Actions* ribbon group to create a new receptor from an existing receptor.
3. Enter a name for the receptor in the *Name* field.
4. From the *Type* drop-down menu, select *Point.*
5. From the *Units* drop-down menu, select a unit.
6. Enter the *Location Info* data.
    *   The *Latitude* and *Longitude* are set to the airport origin by default.
    *   Update the location information of the location of interest.
7. Click *Save* to apply changes or *Cancel* to discard changes.

If multiple airports exist in the study, confirm the latitude and longitude is appropriate for the airport of interest.

Figure 9-2 Point-type Receptor Definition

To edit a point-type receptor:
1. Select the desired receptor from the *Definitions* pane and click *Edit* in the *Actions* ribbon group.
2. Edit the desired fields.
3. Click *Save* to apply changes or *Cancel* to discard changes.

> *Elevation MSL*: This elevation corresponds to the elevation of the area, for example, the elevation of the airport.
>
> *Height above ground – elevation offset for noise (ft)*: This field offsets the ground level by the height specified (e.g., to model noise on a hospital rooftop). This value is only used for point-type receptors for noise calculations. The receptor height is assumed to be 4 ft above ground (or above this offset height) for noise calculations.

> The receptor height for emissions dispersion calculations is always assumed to be 1.8 m (5.9 ft).

9.3.2 Grid Type Receptor

In AEDT, the location of a grid type receptor is specified by the lower left (southwest) corner of the grid. The location of the lower left corner can be defined by specifying the latitude and longitude of the point or as an offset from a location (typically the airport origin).

Grid-type receptor heights are set to 4 ft for noise calculations and 1.8 m (5.9 ft) for emissions dispersion calculations.

> It is recommended to use different grid receptors for noise and emissions dispersion modeling. Emissions concentrations drop off more rapidly with distance than noise.

To create a grid-type receptor:
1. In the *Definitions* pane, click the *Receptor* display button.
2. From the *Actions* ribbon group, click *New*, or select an existing receptor from the *Definitions* pane and click *Copy* in the *Actions* ribbon group to create a new receptor from an existing receptor.
3. Enter a name for the receptor in the *Name* field.
4. From the *Type* drop-down menu, select *Grid.*
5. From the *Units* drop-down menu, select a unit.
6. Enter *X/Y count* values.
7. Enter *X/Y spacing* values.
8. The *Location Info* section is set to the airport origin by default. Click *Set Location to Airport Origin* to change the *Location Info* to be the airport latitude, longitude, and elevation.

> ⚠ If multiple airports exist in the study, confirm the latitude and longitude is appropriate for the airport of interest.

9. Use one of the following methods to specify the grid location:

- Method 1 – set the latitude/longitude to be the lower left corner of the grid and set X/Y offset to 0:
    1) In the *Location Info* section, change the *Latitude* and *Longitude* to the desired location of the lower left (southwest) corner of the grid.
    2) Leave the *Grid Origin Info* set to 0.
- Method 2 – set the latitude/longitude to be the airport/projection origin and set X/Y offset so that grid is centered at the airport:
    1) Confirm that the *Location Info* represents the desired airport location (i.e., airport origin) or desired point of origin. Click the *Set Location to Airport Origin* button to set the latitude, longitude, and elevation to airport.
    2) In the *Grid Origin Info* section, click the *Match Grid Center to Projection Origin* button to automatically adjust the *X/Y offset* values to be the lower left corner of the grid as an offset from the airport/projection origin. This will make the grid centered at the airport origin.

10. If desired, select the *Restrict by Boundary* checkbox to create a multi-point receptor set restricted by a polygon (Section 9.3.2.1).
11. Click *Save* to apply changes or *Cancel* to discard changes.

Figure 9-3 Creating a Grid-type Receptor

To edit a grid-type receptor:
1. Select the desired receptor from the *Definitions* pane and click *Edit* in the *Actions* ribbon group.
2. Edit the desired fields (Figure 9-4).
   - Click *Match Grid Center to Projection Origin* to automatically adjust the *X/Y offset* values to be the lower left corner of the grid as an offset from the projection origin. This will center the grid at the airport origin.
   - Click *Set Location to Airport Origin* to change the *Location Info* to be the airport origin.
3. Click *Save* to apply changes or *Cancel* to discard changes.

Elevation MSL: This elevation corresponds to the elevation of the area, for example, the elevation of the airport. If the receptors are at a different elevation than the airport, the appropriate elevation should be used. This field is not used for emissions dispersion metric results; all receptors are considered to be 1.8 m above ground level.

X and Y spacing must be the same in order to generate contours.

Figure 9-4 Editing a Grid-type Receptor

To delete a receptor:
1. To edit an existing receptor, select the desired receptor from the *Definitions* pane.
2. From the *Actions* ribbon group, click *Delete.*
3. Click *Yes* when prompted for confirmation.

9.3.2.1 Restrict by Boundary

The *Restrict by Boundary* feature creates multiple point-type receptors and a multi-point receptor set within a specified polygon defined in a boundary file. The set of receptor points to be evaluated against the polygon are defined using the *Grid* receptor input. Once processed, the multi-point receptor set is listed under the *Definitions* tab, *Receptor Set* pane, and it is available for use with any metric.

> ⚠️ Restricting a (fixed) grid receptor by a boundary is different from using a boundary to limit the dynamic grid. For information on limiting a dynamic grid by a boundary, see Section 9.4.1.

> 📝 The *Restrict by Boundary* feature is only available for grid-type receptors and should only be used for noise modeling.

> 📝 Different boundary files can be used to restrict different receptors.

> 📝 The *Restrict by Boundary* feature is independent of the high-fidelity weather boundary feature (Section 3.7.7) and of the Environmental Justice boundary feature (Section 10.2).

To restrict the grid receptor by a boundary:
Define a grid type receptor with at least two points, then specify the boundary file.
1. In the *Definitions* tab, click the *Receptor* display button.
2. Click *New* and enter the name for the new receptor(s). The same name will be also used for the new multi-point receptor set.
3. From the *Type* drop-down menu, select *Grid*.
4. From the *Units* drop-down menu, select a unit.
5. Enter *X/Y count* values.
6. Enter *X/Y spacing* values.
7. Enter the *Location Info* and the *Grid Origin Info.*
8. Check *Restrict by Boundary*.
9. Use the *Browse* button to select a boundary file.
10. Once the boundary file is selected, the Latitude and Longitude values will display.
11. Click *Save* to apply changes. A set of point-type receptors will be created and listed in the *Receptor* pane; and a receptor set that contains those point receptors will be created and listed in the *Definitions* tab, *Receptor Set* pane.

Boundary File Format

The boundary file is a text file (.txt) which consists of a header row and a list of latitude and longitude coordinates (separated by spaces).The header row must contain the "LAYER" keyword followed by the name of the layer as follows:

```
LAYER LayerId
Lat Long
Lat Long
...etc...
```

where

`LayerId` Name of the layer (no blanks)

`Lat` Latitude (decimal degrees)

`Long` Longitude (decimal degrees)

> North latitude and east longitude are positive numbers; south latitude and west longitude are negative numbers. Latitude is first, separated from longitude by spaces. There is no limit to the number of latitude/longitude points in the boundary file.

9.4   Receptor Sets

To view receptor sets in the current study, click the *Receptor Sets* display button in the *Definitions* tab. Point or grid type receptor sets can be copied, edited or deleted. Receptor sets that are already assigned to a metric result cannot be deleted.

> Population receptors sets are not displayed in the *Definitions* tab.

To create or edit a receptor set:

1. In the *Definitions* pane, click the *Receptor Sets* display button:
    1. To create a new receptor set, click *New*.
    2. To create a new receptor set by copying from an existing one, select the desired receptor set then click *Copy*.
    3. To edit an existing receptor set, select the desired receptor set then click *Edit*.
2. Edit the *Name* and *Description* for the receptor set.
3. If desired, select the *Dynamic Grid* checkbox to set the receptor set type as dynamic grid (Section 9.4.1).
4. To add receptor(s), select the receptor(s) of interest in the *Available Receptors* list and click *Add Arrow*.
5. To remove receptor(s), select desired receptor(s) in the *Assigned Receptors* list and click *Remove Arrow*.
6. To move all receptor sets between the available and assigned lists, use the *Add All* and *Remove All Arrows*.
7. Click *Save* to apply changes or *Cancel* to discard changes.

> Receptor networks have a limit of 1 million points.

⚠️ While it is possible to assign grid type and point type receptors into one receptor set, using such a receptor set for a noise metric result is not supported.

⚠️ Editing a receptor set will invalidate results of metric results that were previsouly run with the receptor set. To retain original results, create a new receptor set (*New* or *Copy*) instead of modifying an existing receptor set.

To delete a receptor set:
1. Select the desired receptor set then, click *Delete.*
2. Click *Yes* when prompted for confirmation.

To view a receptor set on the map:
1. Click the *Map* button in the *Display* ribbon group to switch to the Map view.
2. Select the desired receptor set*.*
3. From the *View* ribbon group, click the *Receptor Set* button.
4. The Receptor Set Layer is displayed on the map and in the *Layers* manager.

9.4.1 Dynamic Grid

The dynamic grid feature automatically adjusts the size of the receptor grid to achieve a completely closed contour for the lowest contour level specified in the *Dynamic grid contour expansion level* setting (50 dB is the default) in the *Define Metric Results* wizard, *Set Processing Options* screen.

Noise levels are first computed for the starting receptor grid and then compared to the specified expansion level. If any noise level exceeds the minimum expansion level, the dynamic grid expands in that direction by adding a new grid which is exactly the same size as the starting grid. This is done for all four sides of the starting grid. This process continues until no noise levels on the edges of the grids exceed the expansion level and the contour is closed. The dynamic grid feature is supported for both system and user-defined noise metrics.

📝 Features not supported when processing with dynamic grids:
- Annualization weightings are not applied to noise metrics processed with dynamic grids.
- Distributed processing is not supported for running metric results with a dynamic grid.
- RunStudy batch tool cannot be used to run metric results with a dynamic grid.

📝 Dynamic grid generation can be viewed while processing a metric result, see Appendix B.1.6.

To create a dynamic grid receptor set:
1. Create a grid type receptor with at least two points. Define the grid so that it is just large enough to include the runways of the airport of interest.
    a. In the *Definitions* tab, click the *Receptor* display button.
    b. Click *New* and enter the name for the new receptor.

    c.   From the *Type* drop-down menu, select *Grid*.

    d.   From the *Units* drop-down menu, select a unit.

    e.   Enter *X/Y count* values (e.g., X Count=2, Y Count=2).

    f.   Enter *X/Y spacing* values. The *X/Y Spacing* values must be the same in order for contours to generate.

    g.   Enter the *Grid Origin Info* and the *Location Info.*

    h.   Click *Save*.

> Restricting a (fixed) grid receptor by a boundary is different from using a boundary to limit the dynamic grid. To limit the dynamic grid by a boundary, do not define a Grid boundary in the when defining a receptor. Instead, define the dynamic grid boundary when defining the receptor set, as described in the next step.

> By default, AEDT will check for a minimum of 0.5 nmi spacing between the lower left and upper right starting grid points. If this spacing is less than 0.5 nmi, AEDT will use 0.5 nmi rather than the defined spacing. This minimum spacing check can be turned off in the *Study* Tab by checking the *Override minimum spacing requirement* and the spacing will be used as defined, see Appendix B.1.6.
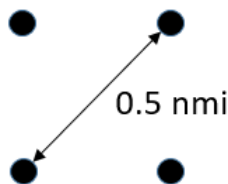
2. Create a dynamic grid receptor set.

    a.   In the *Definitions* tab, click the *Receptor Sets* display button.

    b.   Click *New* and enter a name and description.

    c.   Check the *Dynamic Grid* checkbox. The *Available Receptors* list is filtered to only show grid type receptors.

    d.   If desired, check the *Restrict Dynamic Grid By Boundary* checkbox to limit the dynamic grid processing by a specific geographic area, even if the minimum contour level has not been reached. See Section 9.3.2.1 for information on the boundary file format.

        •   Use the *Browse* button to select a boundary file.

        •   Once the boundary file is selected, the Latitude and Longitude values will display.

    e.   From the *Available Receptors* list, select the receptor created in the step 1, and click *Add Arrow*.

    f.   Click *Save* to create the dynamic grid receptor set or *Cancel* to discard changes.

> When restricting a dynamic grid by a boundary, it is suggested to extend the boundary 2 miles beyond the needed boundary on each side of the grid.

? What is the best practice for using a dynamic grid?

Improperly chosen starting grid and dynamic grid preferences can produce unexpected results and/or long run time. Below are general guidelines.

For starting grid:
- Use a 2x2 grid (X/Y count = 2)
- Set the resolution to 0.5 nmi (X/Y spacing = 0.5 nmi)
- Place the grid in the airport origin (or centered on runways)

If more points are used to define the starting grid, the four outer corners will be used.

For dynamic grid preference settings:
- Refine level limit = 1
- Dynamic grid contour expansion level = 65 dB
- Dynamic grid algorithm = LinearINMLegacy
- Refine tolerance = 0.2 dB

Running the dynamic grid metric result with the above guidelines will produce a low resolution contour, but will provide a starting point for contour size and run time. It is recommended to review results and adjust the settings as necessary to produce the desired resolution contour. For example, the Refine level limit could be increased to 2 or 3. Note that the run time increases as the resolution of receptor set increases.

9.5 Operational Profiles

Operational profiles are used to vary the operational usage of a source according to the month of the year, day of the week, and quarter hour of the day. The profiles are typically used with non-aircraft operations to more accurately gauge the emissions rates, and thus to more accurately model the resulting concentrations in dispersion. Operational profiles can also be used with aircraft operations to generate a "pseudo-schedule" from the annual operations for any metric type.

Operational profiles are based on the concept of peak activity. A peak quarter hour, day or month is defined as the quarter hour, day, or month at which the most or maximum activity occurs. Peak activity (regardless of how high or low it is in absolute terms) is always represented by a 1 (signifying maximum activity) and anything other than a peak is represented as a fraction of that activity as a value between 0 and 1, inclusive. There can be one or more peaks in a profile.

In order to use operational profiles, create at least one profile for each profile type (Quarter Hourly, Daily, and Monthly).

⚠ When running operational profile-based operations, the *Apply Delay & Sequencing Model* option must be selected. In addition, operating configuration and taxi network must exist in the study airport; and aircraft operations must be assigned to a gate.

To add or edit an operational profile:

1. In the *Definitions* tab, click the *Operational Profiles* display button:
    - To create a new operational profile, click *New*.
    - To create a new operational profile by copying an existing profile, select a desired profile then click *Copy*.
    - To edit an existing operational profile, select the desired profile then click *Edit.*
2. Edit the *Name*, *Type*, and *Weight*.
3. Click *Save* to apply changes or *Cancel* to discard changes.

To delete an operational profile:

1. In the *Definitions* tab, click the *Operational Profiles* display button.
2. Select a desired profile then click *Delete.*
3. Click *Yes* when prompted for confirmation.

9.6   Weather

AEDT accepts a variety of weather data sources for aircraft performance modeling. An overview of the available data types are described in this section. Weather parameters are defined in the Definitions Tab; however, weather data is selected for inclusion in a metric result through the Define Metric Results wizard (Section 5.2).

Airport Weather Data

The AEDT Airport database stores average airport weather data for the most recent 10+ years as single year averages along with a rolling 10-year average, if the data are available for an airport. For example, the weather station ID 724940 (SAN FRANCISCO INTL ARPT) in the Airport database has average weather data for the individual years 2010 through 2021 and for the 10-year average weather data from 2012-2021. The source for the airport weather data included in the AEDT Airport database is the most recent data from the Integrated Surface Database (ISD) from the National Oceanic and Atmospheric Administration (NOAA) at the time of the AEDT release.

> ⚠️ 10 year average data is an average of available data within a 10-year period. Data may not be available for a full 10 years or for every airport.

When the user selects airport average annual weather for aircraft performance modeling, users can select the 10-year average weather or a single year average weather. Users also have the option of creating user-defined airport weather data which consists of temperature, pressure, sea level pressure, relative humidity, dew point, and wind speed.

If weather data for the selected airport weather year (either an individual year or 10-year average, selected in the Set Processing Options screen of the Define Metric Result wizard) is missing for aircraft performance modeling, AEDT will substitute the missing data according to the following hierarchy.
1. Analysis weather year (i.e., operation/event time)
2. 10-year average weather data
3. ISA weather

International Standard Atmosphere (ISA)

When ISA weather is used in AEDT, internationally standardized functions of air temperature, pressure, and density versus aircraft altitude above mean sea level are applied to aircraft performance calculations. A default temperature of 59°F (at sea level) is assumed. Additionally, 60% relative humidity is assumed for atmospheric absorption calculations when the ISA weather option is used.

High Fidelity Weather – Overview

When high fidelity weather data are provided, that weather data is used in aircraft performance calculations. Since performance results are used in fuel burn, noise, and emissions calculations, high fidelity weather indirectly affects fuel burn, noise, and emissions results. Airport average annual weather is always directly used in acoustic propagation and adjustment calculations, regardless of high fidelity weather data availability.

AEDT supports the following high fidelity weather data types:
- Rapid Refresh (RAP20/RAP13) and Rapid Update Cycle (RUC20/RUC13)

- National Center for Atmospheric Research (NCAR)
- Goddard Earth Observing System Model (GEOS)
- Modern-Era Retrospective Analysis for Research and Applications, version 2 (MERRA-2)
- Weather Research and Forecasting (WRF)

> High fidelity weather data files must be pre-processed to convert the raw data into a format that AEDT can use.

Please refer to "Using Weather Data in AEDT" on the AEDT Support website (https://aedt.faa.gov/), Downloads page (login required) for additional information on:
- Where to download and how to pre-process high fidelity weather data types used for aircraft performance modeling.
- Where to download surface and upper air weather data used for emissions dispersion.

High Fidelity Weather – RUC/RAP, GEOS, and NCAR
For RUC/RAP, GEOS, and NCAR weather data types, AEDT processes available sources in a prioritized cascade from highest fidelity to lower fidelity to find the highest fidelity weather source that covers the desired location and time.

The hierarchy of weather data sources is traversed for every required location and time. When a location and time is specified, AEDT first checks if RUC13/RAP13 data[5] are available at the requested location and time. If there are, then the weather at that location and time is taken from that dataset. If not, AEDT checks for RUC20/RAP20 data. The cycle continues for GEOS data, then NCAR data, and finally the Airport database. If no data are available for the given location and time from any of these sources, ISA weather is used. This cascade of weather data sources is illustrated in Figure 9-5.
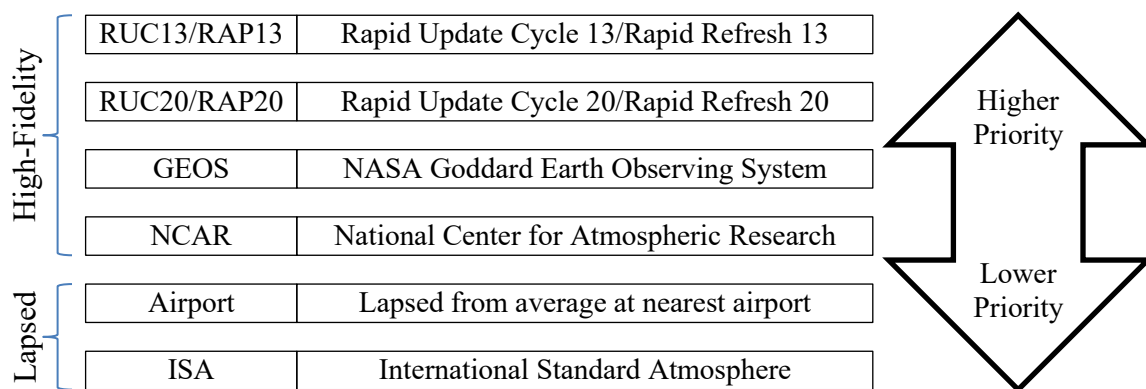
Figure 9-5 Cascade of Weather Data Sources

When using the RUC/RAP, GEOS, or NCAR high fidelity weather data, a rectangular boundary is required and is used to limit the area that will be processed with high fidelity weather data. See Section 3.7.7 for information on the high-fidelity weather boundary.

---

[5] RAP data is the next-generation version of the RUC and officially replaced RUC in May 2012.

High Fidelity Weather – WRF and MERRA-2

AEDT also supports the Weather Research and Forecasting (WRF) and the Modern-Era Retrospective analysis for Research and Applications version 2 (MERRA-2) weather data types.

WRF and MERRA-2 high fidelity weather data are handled differently compared to RUC/RAP, GEOS, and NCAR. The cascade of weather data sources method is not applied to WRF and MERRA-2. This means that if there are no WRF/MERRA-2 data available at the requested location and time, then AEDT will stop processing the affected aircraft operation and will log an error. AEDT does not substitute missing WRF/MERRA 2 data with average annual airport weather. To model failed aircraft operations, either accept lower fidelity weather data or supply the appropriate WRF/MERRA-2 data.

Both WRF and MERRA-2 weather data types must be stored in their own folders.

Emissions Dispersion Weather

Emissions dispersion requires special weather data files as described Section 9.6.3.

9.6.1 Airport Weather

To view and edit the average annual weather data options for the airports in the current study, click the *Weather* display button in the *Definitions* tab then select *Airport weather*.

To edit airport weather:
1. From the *Actions* ribbon group, click the *Edit* button to enable the data fields.
2. From the *Airport* drop-down menu, select the desired airport.
3. From the *Select year* drop-down menu, select the appropriate time period or select *USER | No* data to enter user-defined weather data.
4. Make desired edits.
5. Click *Save* to apply changes or *Cancel* to discard changes.

> The Relative humidity (%) and Dew point (°F) fields are interdependent because humidity is a function of dew point.

9.6.2 Weather Data Directory

This pane displays the directories for high fidelity weather and emissions dispersion weather files. Users can specify the directory for high fidelity weather files here or when defining a metric result, see Section 5.2.4.3. The directory for emissions dispersion weather files is pre-determined by the currently open study.

To specify high fidelity weather data folder:
1. Click the *Weather* display button in the *Definitions* tab and select *Weather data directory*.
2. Click the *Edit* button to enable the data fields.
   • Click the *Browse* button and navigate to the directory where the weather files are stored.
3. Click *Save* to apply changes or *Cancel* to discard changes.

The high-fidelity weather data folder specified in the *Definitions* tab will be displayed as the default high fidelity weather folder in the *Define Metric Results* wizard, *Set Processing Options* screen.

To include existing emissions dispersion weather files in the study:
1. Click the *Open Study Output Folder* button to open the study output folder location.
2. Copy the emissions dispersion weather files in the AERMOD format to the study output folder.

Study output folder is located under the AEDT data folder (e.g., *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files)*

9.6.3 Generate Emissions Dispersion Weather Files

To generate weather files in the format required by the AERMOD emissions dispersion model, click the *Weather* display button in the *Definitions* tab then select *Generate emissions dispersion weather files* and follow the instructions below. See Appendix B for detailed information about each field.

To generate emission dispersion weather files:
1. From the *Actions* ribbon group, click the *Edit* button to enable the data fields.
2. Specify surface and upper air files:
   - Click the *Browse* button and navigate to the directory where the surface file is stored.
   - Click the *Browse* button and navigate to the directory where the upper air file is stored.
3. [Optional] If desired, check the box next to ASOS 1-minute files and/or ASOS 5-minute files, then click the *Browse* button and navigate to the directory where the files are stored. For additional information on ASOS data, see the "Using Weather Data in AEDT" on the AEDT Support website (aedt.faa.gov), Downloads page (login required). This option should only be used in conjunction with ASOS weather stations.
4. Select or enter desired options:
   - Apply default adjustment to truncated ASOS wind speeds (+½ knot)
   - Randomize NWS wind directions (+/- 5 degrees)
   - Substitute missing data
   - Adjust U* (adjust low friction velocity for stable low wind speed)
   - Wind height
   - *Surface Characteristics: Use one of the following options to provide surface characteristics:*
     - Select *Fixed (single sector, annual),* then enter *Albedo, Bowen ratio,* and *Roughness (m)*
     - Select *Use AERSURFACE output file*, click *Browse* and select an output file produced by AERSURFACE[6]

---

[6] AERSURFACE calculates albedo, Bowen Ratio, and surface roughness based on the U.S. Geological Survey (USGS) National Land Cover Data (NLCD) and outputs them in a format for AERMET processing. AEDT 3f can read an AERSURFACE output file generated by the AERSURFACE version 02060 and by the AERSURFACE draft version 19039. For more information, see the AERSURFACE User's Guide, U.S. Environmental Protection Agency, AERSURFACE User's Guide, Report No. EPA-454/B-20-008, February 2020. https://gaftp.epa.gov/Air/aqmg/SCRAM/models/related/aersurface/aersurface_ug_v20060.pdf

o   Select *Use AERSURFACE output file*, click *Generate AERSURFACE Output,* then specify the parameters in the *Generate AERSURFACE Output* dialog, see Section 9.6.3.1

> AERSURFACE data can be visualized on the map, see Section 5.7.10.

5.   Specify the date range – Start date and End date.
6.   Enter the File name prefix.
7.   Click *Generate AERMOD Weather Files*. The emissions dispersion weather files (~SFQAFILE.MET, ~UAQAFILE.MET, ~.SFC, and ~.PFL) are generated and saved to the study output folder*.
8.   Click *Save* to apply changes or *Cancel* to discard changes.

> Supported surface and upper air files include:
> *   Hourly surface weather : CD144, HUSWO, ISHD, SAMSON, SCRAM
> *   Upper air weather: FSL ASCII, TD6201, IGRA

> AERMOD weather files are described in the AERMET User's Guide
> (https://gaftp.epa.gov/Air/aqmg/SCRAM/models/met/aermet/aermet_userguide.pdf).
>
> *   SFQAFILE.MET file is an intermediate file produced by AERMET from the raw hourly surface weather file that is used in additional stages of AERMET processing. It is not used as direct input to AERMOD, but it is used as input to AEDT's aircraft performance model.
> *   UAQAFILE.MET file is an intermediate file produced by AERMET from the raw upper air weather file that is used in additional stages of AERMET processing. It is not used as direct input to AERMOD nor is it used by AEDT.
> *   .SFC is the file produced for AERMOD (mainly surface weather data with boundary layer information)
> *   .PFL is the file produced for AERMOD (mainly upper air weather data with profile data)

> Hourly meteorological weather files in the AERMOD format are required in order to run the emissions dispersion metric type.
>
> A sample set of emissions dispersion weather files are provided for STUDY_NIRS, STUDY_INM, STUDY_DULLES, and STUDY_PVD; and they are located in the *Aermod* directory under the AEDT installation folder (e.g., *C:\Program Files\FAA\AEDT\Aermod*).

STUDY_NIRS	AERMET_STUDY_NIRS.PFL AERMET_STUDY_NIRS.SFC STUDY_NIRS_SFQAFILE.MET STUDY_NIRS_UAQAFILE.MET
STUDY_INM	AERMET_STUDY_INM.PFL AERMET_STUDY_INM.SFC STUDY_INM_SFQAFILE.MET STUDY_INM_UAQAFILE.MET

STUDY_DULLES	STUDY_DULLES_JAN2010.PFL
	STUDY_DULLES_JAN2010.SFC
	STUDY_DULLES_JAN2010_SFQAFILE.MET
	STUDY_DULLES_JAN2010_UAQAFILE.MET
STUDY_PVD	STUDY_PVD_2004.PFL
	STUDY_PVD_2004.SFC
	STUDY_PVD_SFQAFILE.MET
	STUDY_PVD_UAQAFILE.MET

9.6.3.1 Generate AERSURFACE Output

The U.S. Environmental Protection Agency's (EPA) AERSURFACE model can be run from within AEDT to produce the AERSURFACE output file that can be used to define surface characteristics.

To generate an AERSURFACE output file click the *Weather* display button in the *Definitions* tab then select *Generate emissions dispersion weather files* and follow the instructions below. For more information about accepted file types and parameter definitions, see the AERSURFACE User's Guide[7].

To generate an AERSURFACE output file within AEDT:
1. From the *Actions* ribbon group, click the *Edit* button to enable the data fields.
2. In the *Options* section, under *Surface* Characteristics, click the *Use AERSURFACE output file* radio button.
3. Click the *Generate AERSURFACE output* button to open the *Generate AERSURFACE* output dialog.
4. In the *Land Cover File* section, select the file type from the drop-down menu, then click *Browse* and navigate to the directory where the land cover file is stored.
5. In the *Percent Tree Canopy File* section, select the file type from the drop-down menu, then click *Browse* and navigate to the directory where the land cover file is stored.
6. In the *Percent Impervious File* section, select the file type from the drop-down menu, click *Browse* and navigate to the directory where the land cover file is stored.
7. Define Weather Station *Location* parameters
   a. Enter the *Latitude (deg)* and *Longitude (deg)* for the weather station
   b. Select the *NAD83* or *NAD27* radio button that reflects the appropriate geodetic *Datum* on which the coordinates are based.
8. Define *Surface Roughness Length Wind Sectors*
   a. In the *Start* field, enter a starting angle for the wind sector. The ending angle for a wind sector is automatically set to the starting angle of the next wind sector. The minimum wind sector area is 30 degrees.

---

[7] AERSURFACE User's Guide:
https://gaftp.epa.gov/Air/aqmg/SCRAM/models/related/aersurface/aersurface_ug_v20060.pdf

b.   Edit the *Zone Radius (km)* field or accept the default radius of 1 km.

c.   Select the *Airport* radio button if the selected sector is at the airport or *Non-Airport* if the selected sector is not at the airport.

d.   Add additional wind sectors as needed by clicking the plus button, see Table 5-3 for a description of the wind sector icons.

e.   Remove wind sectors as needed by clicking the red "x" button, see Table 5-3 for a description of the wind sector icons.

9.   Click the *Preview on Map* button to view the location of the wind sectors on the map. Adjust the *Weather Station Location* and sector parameters as necessary.

10. Select the *Annual, Seasonal, or Monthly Temporal Resolution* radio button to select the temporal representative averaging period. The default associations between months and seasons are displayed in the table below.

11. The *Override Default Seasons* checkbox is available when the *Annual* or *Monthly Temporal Resolution* radio buttons are selected. Check this box to edit the default seasonal assignments or accept the default assignments. Select the radio button for the desired month – season combinations in the table below. Only one season may be associated with each month.

12. Check the *Enable Climate Options* to enable additional climate specifications.

a.   From the *Surface Moisture* drop-down menu, select *Wet, Dry,* or *Average*.

b.   Check the *Arid Region* checkbox to indicate that no winter months with periods of continuous snow cover or the *Snow* checkbox to indicate continuous snow cover during the winter months.

13. Preview the file and adjust inputs as needed.

a.   Click the *Preview Control File* button to preview the inputs for AERSURFACE. Update parameters as needed and update the control file preview by clicking the *Preview Control File* button again.

b.   Click the *Control File Preview* arrow to show or hide the Control File preview after a preview has been displayed.

c.   Click *Reset Inputs* to clear all inputs in the dialog.

14. Click *Run AERSURFACE* to generate the AERSURFACE output file.

15. When AERSURFACE output file has been created, the *View Output* button is enabled. Click *View Output* to view the AERSURFACE output file in a text editor.
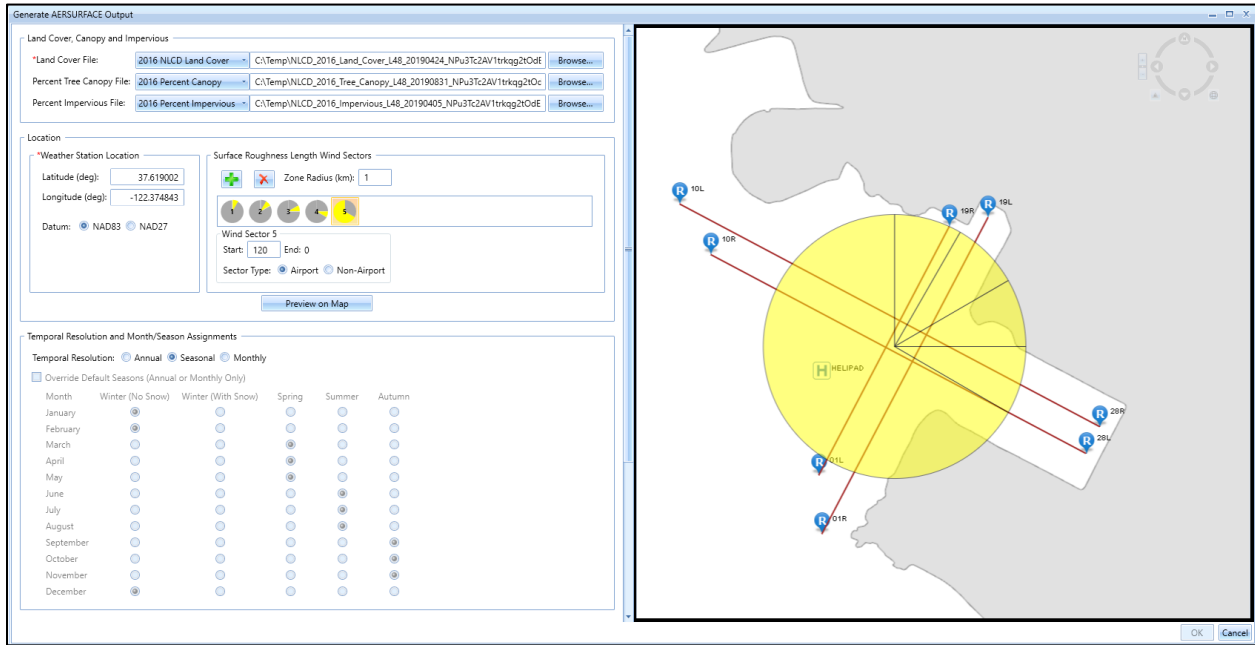
Figure 9-6 Generate AERSURFACE Output Dialog Part 1
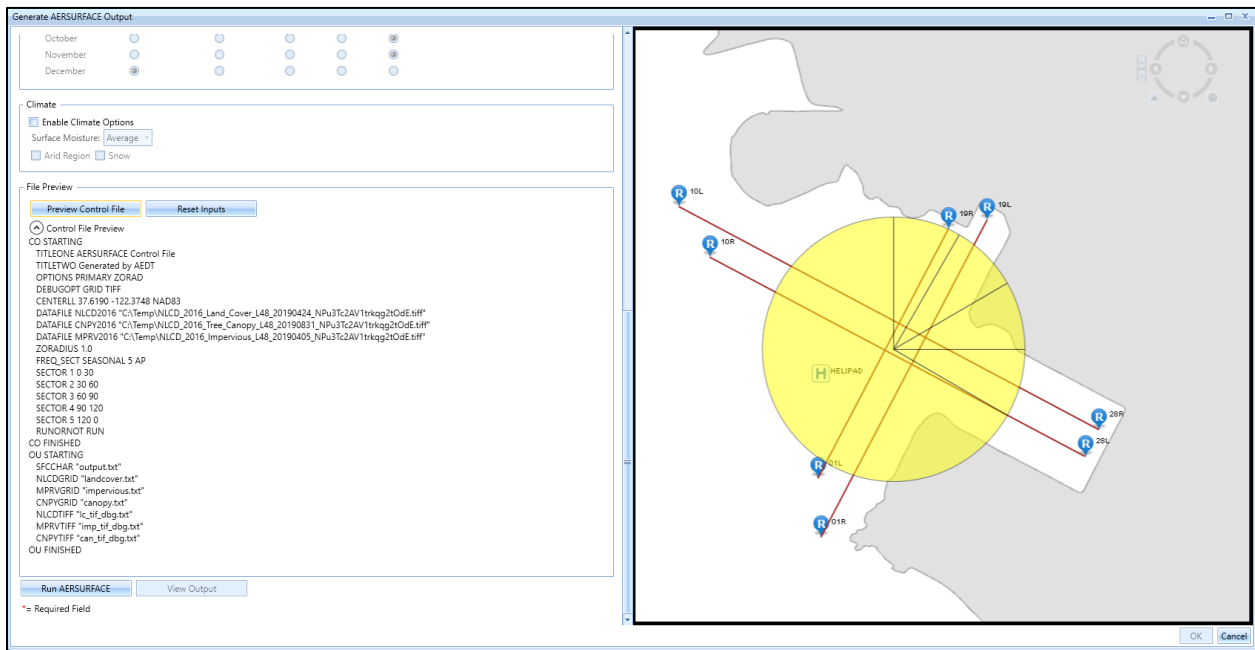
Figure 9-7 Generate AERSURFACE Output Dialog Part 2

9.6.4 Wind Categories for Emissions Dispersion

To edit wind speed categories for background concentrations defined using the WSPEED option, click the *Weather* display button in the *Definitions* tab then select *AERMOD wind categories for emissions dispersion.* For more information on the options available for including background concentrations in emissions dispersion modeling, refer to Section 5.2.4.11.

To use user-defined wind speed categories:
1. From the *Actions* ribbon group, click the *Edit* button to enable the data fields.
2. Select the *User-defined* radio button.
3. Enter the upper bound of wind speed for each category.
   - All values must be monotonically increasing.
   - All values must be greater than or equal to one (1) m/s.
4. Click *Save* to apply changes, *Cancel* to discard changes, or *Reset* to revert to the previously-saved values.

To user default wind speed categories:
1. From the *Actions* ribbon group, click the *Edit* button to enable the data fields.
2. Select the *Default* radio button.
3. Click *Save* to apply changes or *Cancel* to discard changes.

9.7 Terrain and Time Above Ambient Files

To specify terrain and/or ambient files in the current study, click the *Terrain and Ambient* display button in the *Definitions* tab.

To specify the terrain directory:
1. Click the *Edit* button to enable the data fields.
2. Click the *Browse* button then navigate to the directory where the terrain files are stored.
3. Click the *Save* button to apply changes or *Cancel* to discard changes.

Accepted terrain file types include GeoTIFF, National Elevation Dataset (NED) GridFloat, 3CD, and Digital Elevation Model (DEM).

Terrain data files are used by AEDT when the *Use terrain data* checkbox is checked in *Define Metric Results* wizard, *Set Processing Options* screen. AEDT uses terrain elevations to adjust observer-to-aircraft distances when computing noise levels.

Terrain is used in noise calculations in AEDT. It is not supported for emissions dispersion.

Only include terrain files in the terrain file directory.

> To produce noise results when using terrain data, the terrain data must cover the same area as the receptor set used for the noise metric result. If line of sight blockage is used, the terrain data must cover the trajectories of the included aircraft operations.

To specify the ambient directory for time above noise metrics:
1. Click the *Edit* button to enable the data fields.
2. Click the *Browse* button then navigate to the directory where the ambient files are stored.
3. Click the *Save* button to apply changes or *Cancel* to discard changes.

Time Above metrics (TALA, TAPNL, and TALC) utilize the three-digit ambient map (.txt), see Appendix E for more information. For settings related to time audible noise metrics, refer to Section 4.11.3.1.

> When an ambient file is specified in the *Definitions* tab, it will be used in all subsequent processing of time above metric results. If different ambient files are desired for different time above metrics, confirm the appropriate ambient file is specified in the definitions tab before processing each time above metric.

9.8   MOVES Files

Emissions inventory and emissions dispersion results from the EPA MOVES (Motor Vehicle Emission Simulator) software can be integrated into AEDT according to the following sections.

> For more information on integrating MOVES results, see AEDT Supplemental Manual: Using MOVES with AEDT on the AEDT Support website.

9.8.1 MOVES AERMOD Files

This pane supports creating MOVES scenarios by selecting the AERMOD input files derived from MOVES. Each set of .INP and .HRE files included in a MOVES scenario correspond to one pollutant.

The MOVES scenarios created in this pane are displayed in the *Define Metric Results* wizard, *Set Processing Options* step when defining an emissions dispersion metric result (Section 5.2.4.3).

To specify the MOVES AERMOD input files:
1. In the *Definitions* tab click on the *MOVES AERMOD Files* button.
2. Click the *New* button.
3. Enter the MOVES scenario name.
4. Click the *Browse* button to navigate and select the MOVES .INP file.
5. Click the *Browse* button to navigate and select the MOVES .HRE file.
6. The pollutant will be identified from the input files.
7. Enter any additional comments.
8. Click *Save* to apply changes or *Cancel* to discard changes.
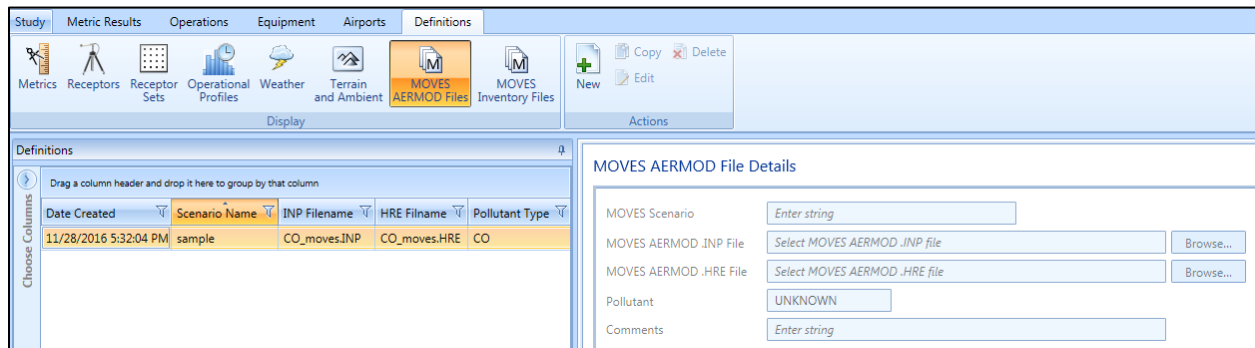
Figure 9-8 MOVES AERMOD Input Files and Scenarios

To integrate the MOVES AERMOD scenario with an emissions dispersion metric result:

1. In the *Definitions* tab, specify the MOVES AERMOD input files.
2. In the *Metric Results* tab, define an emissions dispersion metric result.
3. In the *Define Metric Results* wizard, *Set Processing Options* step, check the *Include MOVES AERMOD scenario* checkbox and use the drop-down list to select a MOVES scenario (Figure 9-9). The list will only include MOVES AERMOD scenarios with a pollutant type that matches that of the metric result.
4. Run the metric result.
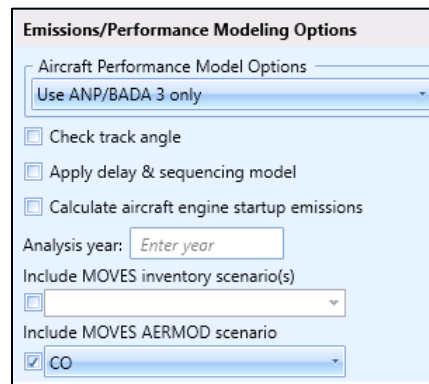
Figure 9-9 Emissions/Performance Modeling Options

9.8.2 MOVES Inventory Files

When the MOVES emissions inventory result file is specified in the *Definitions* tab, the roadway, parking facility, and/or construction operations emissions inventory calculated externally with the MOVES tool will be included in the emissions report for all metric results. Please refer to AEDT Supplemental Manual: Using MOVES with AEDT for more details on the importing the MOVES Inventory Files into AEDT.

To specify the MOVES Emissions Inventory Results files:

1. In the *Definitions* tab, click on the *MOVES Inventory Files* button.
2. Click the *New* button.
3. Enter the MOVES scenario name.

4. Click the *Browse* button then navigate to the directory where the MOVES emissions inventory file with .csv extension is stored.
5. Enter comments if desired.
6. Click *Save* to apply changes or *Cancel* to discard changes.

Upon saving, the *Scenario year* and *Pollutant*(s) are identified from the input file.

See Table 9-1 for the MOVES emissions inventory results file format for the columns in the .csv file. AEDT can import annualized MOVES results for Roadway, Parking Facilities, and Construction categories or annualized link level results. Please refer to AEDT Supplemental Manual: Using MOVES with AEDT for more information on MOVES file format that can imported into AEDT.

Table 9-1 MOVES Emissions Inventory Results File Format

Year ID	Source	Pollutant ID	Emission Quant
Year – YYYY (example 2015)	Roadways Parking Facilities Construction	Matches the MOVES pollutant ID. THC 1 CO 2 VOC 87 NMHC 79 TOG 86 NOx 3 SOx 31 CH4 5 CO2 90 CO2e 98 PM10 100 PM10 Brakewear 106 PM10 Tirewear 107 PM2.5 110 PM2.5 Brakewear 116 PM2.5 Tirewear 117 H2O 119	Total emissions in the units of Grams.

To integrate the MOVES inventory scenario with an emissions metric result:

1. In the *Definitions* tab, specify the MOVES Inventory file(s).
2. In the *Metric Results* tab, define an emissions metric result.
3. In the *Define Metric Results* wizard, *Set Processing Options* step, select MOVES inventory scenario(s) from the list (Figure 9-10). The list will only include MOVES inventory scenarios with year that matches that of the metric result or the value entered in the *Analysis year* text box.
4. Run the metric result and generate emissions report.

Figure 9-10 Emissions/Performance Modeling Options

Emissions Report 4

Operation Group: All Operation Groups

Group by: Operation Group Summary

Units: Metric Tons

Generate Report

Emissions

Operation Group	Mode	Fuel (t)	Distance (km)	Duration	CO (t)	THC (t)	TOG (t)	VOC (t)
AirOps	Startup	0.00000	0.00	00:00:00.000	0.0000E+000	2.7447E-001	3.1735E-001	3.1569E-001
AirOps	Taxi Out	0.00000	0.00	00:00:00.000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000
AirOps	Climb Ground	93.05197	1499.03	10:51:17.660	5.9930E-002	2.8217E-001	3.2624E-001	3.2452E-001
AirOps	Climb Below 1000 ft AFE	139.29751	3159.18	17:11:23.690	1.0344E-001	2.8637E-001	3.3107E-001	3.2930E-001
AirOps	Climb Below Mixing Height	278.79899	10675.26	39:22:51.410	2.2988E-001	2.9915E-001	3.4575E-001	3.4384E-001
AirOps	Climb Below 10000 ft AFE	596.32022	38315.56	100:38:01.620	6.4644E-001	3.3078E-001	3.8192E-001	3.7950E-001
AirOps	Above 10000 ft AFE	0.01744	4.61	00:00:29.300	2.0000E-005	0.0000E+000	1.0000E-005	1.0000E-005
AirOps	Descend Below 10000 ft AFE	213.54522	43348.09	151:50:40.810	1.4845E+000	1.4431E-001	1.6646E-001	1.6528E-001
AirOps	Descend Below Mixing Height	170.04533	23320.78	98:02:40.720	8.3244E-001	8.6670E-002	1.0000E-001	9.9310E-002
AirOps	Descend Below 1000 ft AFE	57.09497	6122.32	31:08:19.310	2.1859E-001	2.4930E-002	2.8740E-002	2.8530E-002
AirOps	Descend Ground	13.10592	880.53	06:03:43.460	5.5470E-002	4.7100E-003	5.4400E-003	5.4000E-003
AirOps	Taxi In	0.00000	0.00	00:00:00.000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000
AirOps	Full Flight	809.88288	81668.26	252:29:11.730	2.1310E+000	4.7509E-001	5.4838E-001	5.4478E-001
Boilers	Stationary Sources	0.00000	0.00	00:00:00.000	9.6770E-002	1.5984E-001	1.7374E-001	7.6450E-002
AirOps	GSE LTO	0.00000	0.00	2867:56:18.000	7.5396E+000	0.0000E+000	2.7678E-001	2.5017E-001
AirOps	APU	0.00000	0.00	370:56:30.000	3.1276E-001	2.0980E-002	2.4250E-002	2.4130E-002
MOVES Emissions: 2010	Roadways	0.00000	0.00	00:00:00.000	2.0800E-002	3.2000E-003	0.0000E+000	3.3900E-003
MOVES Emissions: 2010	Parking Facilities	0.00000	0.00	00:00:00.000	2.0800E-002	3.2000E-003	0.0000E+000	3.3900E-003
MOVES Emissions: 2010	Construction	0.00000	0.00	00:00:00.000	2.2810E-002	5.2100E-003	9.0000E-005	6.7800E-003

19 of 19 item(s) shown. 1 item(s) selected.

Figure 9-11 Emissions Report with MOVES Results

10 Environmental Justice Tab

The *Environmental Justice* tab provides access to the environmental justice (EJ) model which uses the US Census, American Community Survey (ACS) [8] to identify and analyze potential minority and/or low-income populations and populations with limited English proficiency.

The AEDT EJ Model is implemented as a workflow that the analyst can exercise as part of any study modeling US airports and/or airspace. In AEDT, the analyst can explore select ACS data with or without other metric results (including noise, fuel burn, and emissions) over various maps. An internet connection is necessary to use the EJ model. The EJ analysis results can be exported to geospatial (shapefile) and spreadsheet (CSV) formats for use outside of AEDT.

> A metric result is not required in order to generate the EJ results.

There are two types of EJ analyses that can be performed, Environmental Justice and Limited English Proficiency. The two types of analyses use different data resolutions based on the US Census Bureau API endpoint data. For the EJ analysis, the data is available at block group level. For limited English proficiency analysis, the data is only available at the tract level.

- Environmental Justice Analysis – analysis of low income and minority populations at the census block group level.
- Limited English Proficiency Analysis – analysis of population that "speaks English less than very well" at the census tract level.

> Generally, census block groups contain between 600 and 3,000 people; census tracks contain a population between 2,500 to 8,000 people. A block group has a higher resolution (more detail) than a tract.

10.1 The US Census Bureau Data

The following data from the US Census Bureau are required in order to run the EJ model:
- US Census ACS API End Point
- US Census Block group
- US Census Tract data

---

[8] For more information on the ACS, please visit: https://www.census.gov/programs-surveys/acs/.

10.1.1 USA Census ACS API End Point

AEDT 3f supports 2020 American Community Survey (ACS) 5-year data for the Environmental Justice analysis and 2020 ACS 5-year data for the Limited English Proficiency analysis. 2015 ACS 5-year data is also supported for Limited English Proficiency analyses which includes more language categories than the 2020 dataset.

The following API Endpoint is provided as the default ACS Census API end point for Environmental Justice analyses in the *Study* tab, *Preferences*, *Environmental Justice Model* screen.
https://api.census.gov/data/2020/acs/acs5/

The following API Endpoint is provided as the default ACS Census API end point for Limited English Proficiency analyses in the *Study* tab, *Preferences*, *Environmental Justice Model* screen.
https://api.census.gov/data/2020/acs/acs5

The following API Endpoint is provided as the 2015 ACS Census API end point for Limited English Proficiency analyses in the *Study* tab, *Preferences*, *Environmental Justice Model* screen. The 2015 API Endpoint is used instead of the 2020 API Endpoint when the *Enable 2015 Census Language Categories* option is selected.
https://api.census.gov/data/2015/acs/acs5

> ⚠️ To use the US Census API Endpoints, apply for an API key through
> https://api.census.gov/data/key_signup.html.
> For additional information, visit https://www.census.gov/data/developers/about.html

Figure 10-1 Environmental Justice Model Study Preferences

10.1.2 Block Group Feature Layer

The following URL is provided as the default "Block group feature layer" in the *Study* tab, *Preferences*, *Environmental Justice Model* screen.
https://tigerweb.geo.census.gov/arcgis/rest/services/TIGERweb/tigerWMS_Census2020/MapServer/8

Another (advanced) option is to host a Block group feature layer. To host a Block group feature layer, expose the following four properties:

- OBJECTID *(type: esriFieldTypeOID, alias: OBJECTID, SQL Type: sqlTypeOther, length: 0, nullable: false)*
- GEOID *(type: esriFieldTypeString, alias: GEOID, SQL Type: sqlTypeOther, length: 12, nullable: true)*
- COUNTY *(type: esriFieldTypeString, alias: COUNTY, SQL Type: sqlTypeOther, length: 32, nullable: true)*
- STATE *(type: esriFieldTypeString, alias: STATE, SQL Type: sqlTypeOther, length: 2, nullable: true)*
- TRACT *(type: esriFieldTypeString, alias: TRACT, SQL Type: sqlTypeOther, length: 6, nullable: true)*
- BLKGRP *(type: esriFieldTypeString, alias: BLKGRP, SQL Type: sqlTypeOther, length: 1, nullable: true)*

10.1.3 Tract Feature Layer

The following URL is provided as the default "Tract feature layer" in the *Study* tab, *Preferences*, *Environmental Justice Model* screen.
https://tigerweb.geo.census.gov/arcgis/rest/services/TIGERweb/tigerWMS_Census2020/MapServer/6
Another (advanced) option is to host a Tract group feature layer. To host a Tract group feature layer, expose the following four properties:

- OBJECTID *(type: esriFieldTypeOID, alias: OBJECTID, SQL Type: sqlTypeOther, length: 0, nullable: false)*
- GEOID *(type: esriFieldTypeString, alias: GEOID, SQL Type: sqlTypeOther, length: 11, nullable: true)*
- COUNTY *(type: esriFieldTypeString, alias: COUNTY, SQL Type: sqlTypeOther, length: 32, nullable: true)*
- STATE *(type: esriFieldTypeString, alias: STATE, SQL Type: sqlTypeOther, length: 2, nullable: true)*
- TRACT *(type: esriFieldTypeString, alias: TRACT, SQL Type: sqlTypeOther, length: 6, nullable: true)*

10.2 Environmental Justice Study Area

After setting the EJ preferences in the *Study* tab, *Preferences*, *Environmental Justice Model* screen, the data must be loaded and a bounding area (study area) must be created for the desired type of analysis. Instructions for loading the data and creating bounding areas are described in this section. Specific information for the two types of analyses is described in Sections 10.3 and 10.4.

To load EJ data:
- In Environmental Justice tab, *Environmental Justice* ribbon group, click the *Load Block Group Layer* button to load the block group feature layer; or
- In Environmental Justice tab, *Limited English Proficiency* ribbon group, click the *Load Tract Layer* button to load the tract feature layer.

After loading the desired census feature layer, define an EJ study area by creating a bounding area. A bounding area can be defined as a circle, a rectangle, a polygon, or by using an existing layer. The existing layer must be a polygon based graphics layer.

⚠️ A limit of 2,000 records can be retrieved in a single request from the US Census API. To conduct an EJ analysis that covers more than 2,000 blocks, divide the areas into smaller reasons so that fewer than 2,000 blocks are requested at once.

The EJ study area will include any census group that the boundary touches. Thus, the EJ study area will include the entire population of a census group in the determination of the average minority and low-income populations or Limited English Proficiency, even if the study area only includes a small portion of the census group.
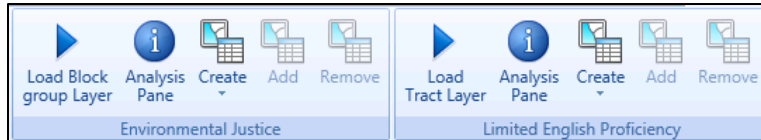
Figure 10-2 Environmental Justice Tab

To define an EJ study area as a circle:
1. In the *Environmental Justice* tab, *Environmental Justice* or *Limited English Proficiency* ribbon group, click *Create*, *Draw boundary circle*.
2. Click once and hold the mouse button down on the desired location for the center of the circle on the map.
3. Drag the mouse on the map to define the size of the circle. Release the mouse button to complete the circle.
4. Data is retrieved from the ACS endpoint and the study area layer is created and displayed on the map and in the *Layers* manager.

To define an EJ study area with a box:
1. In the *Environmental Justice* tab, *Environmental Justice* or *Limited English Proficiency* ribbon group, click *Create, Draw boundary box*.
2. Click once and hold the mouse button down on the desired location for the top left corner of the box on the map.
3. Drag the mouse on the map to define the size of your box. Release the mouse button to complete the box.
4. Data is retrieved from the ACS endpoint and the study area layer is created and displayed on the map and in the *Layers* manager.

To define an EJ study area with a polygon:
1. In the *Environmental Justice* tab, *Environmental Justice* or *Limited English Proficiency* ribbon group, click *Create, Draw boundary polygon*.
2. Click on the desired location on the map for the starting point of the polygon.
3. Click on other areas of the map to create corners for the polygon. Double-click on the last location to complete the polygon.
4. Data is retrieved from the ACS endpoint and the study area layer is created and displayed on the map and in the *Layers* manager.

To define an EJ study area using an existing layer:
1. Select an existing layer from the *Layers* Manager to be used as a boundary.

2. In the *Environmental Justice* tab, *Environmental Justice* or *Limited English Proficiency* ribbon group, click *Create, From layer*. This option will be disabled if the selected layer is not supported.
3. Data is retrieved from the ACS endpoint and the study area layer is created and displayed on the map and in the *Layers* manager.

> ⚠️ When using an existing layer to define an environmental justice study area, the layer must be of the type polygon. Polylines and multi-points are not supported as EJ study area.

To extend or reduce an EJ study area:
1. Select the environmental justice study area layer from the *Layers* Manager.
2. Confirm the associated feature layer has been loaded, either the Block Group or Tract layer. Once the data has been loaded, the load button in the *Environmental Justice* or *Limited English Proficiency* ribbon group will be disabled.
3. From the *Environmental Justice* or *Limited English Proficiency* ribbon group, select *Add* or *Remove* as appropriate.
5. Adding or removing is done by drawing rectangle around the area to add or remove. Click once and hold the mouse button down on the desired location for the top left corner of the rectangle on the map.
6. Drag the mouse over the map to define the size of the rectangle. Release the mouse button to complete the rectangle.
7. The groups are either added or removed based on the selected action. If added, data is retrieved from the ACS endpoint. The study area layer is updated.

> ⚠️ When adding or removing groups from the EJ study area, the statistics in the Analysis pane are not automatically updated. Switch between layers or close and reopen the analysis pane to reload the data and get the latest statistics on the EJ study area layer.

10.3 Environmental Justice Analysis

10.3.1 Workflow

To perform an analysis of the EJ study area:
1. In the *Study* tab, *Preferences*, *Environmental Justice Model* section, update the settings as appropriate.
2. In the *Environmental Justice* tab, *Environmental Justice* ribbon group, click the *Load Block Group Layer* button, see Section 10.2 for more information on loading data.
3. From the *Environmental Justice* ribbon group, click the *Create* button and create an EJ study area, see Section 10.2 for more information on creating a study area.
4. From the *Layers* Manager, *Environmental Justice Layers* category, select the desired EJ study area.
5. From the *Environmental Justice* ribbon group, click the *Analysis Pane* button.
6. In the Analysis pane, change the threshold for ACS variables as desired and click *Apply*. See Section 10.3.2 for more information on the Analysis pane.

10.3.2 Environmental Justice Analysis Pane

The *Environmental Justice Analysis* pane displays the average, min, and max values for the specified ACS variable percent low-income (pct_1xpov) and percent minority (pct_minority). The thresholds that determine the color coding (symbology) of the EJ layer can be changed for each variable in this pane according to the instructions below.

The ACS variable(s) for the analysis are defined using the "*Columns to use for threshold*" setting in the *Study* tab, *Preferences*, *Environmental Justice Model* section (Section 4.11.2.4).

To change threshold for an ACS variable:
1. Check the box next to the ACS variable (pct_1xpov or pct_minority) and enter a threshold value. The slider can be used to adjust the threshold value.
2. Click the *Undo* arrow to reset the threshold back to the average.
3. Click *Apply* to apply the changes.
4. The EJ study area layer on the map will be updated.
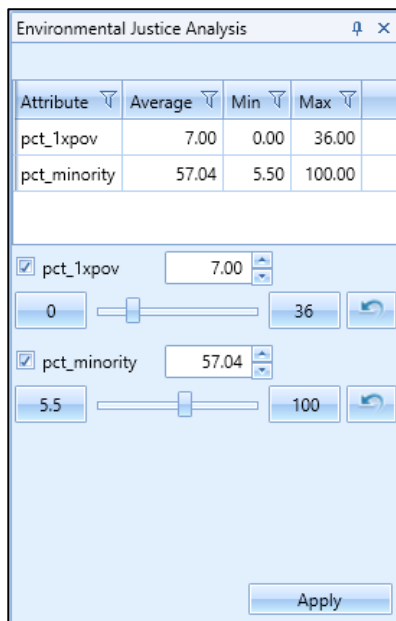
Figure 10-3 Environmental Justice Analysis Pane

10.3.3 Environmental Justice Layer

The Environmental Justice Layer displays census block groups in multiple colors according to the values specified in the *Analysis* pane. The color coding of the layer is as follows:
- Orange: Census block groups that exceed either the average minority population of the study area, or the user-defined threshold specified in the EJ Analysis pane.
- Yellow: Census block groups that exceed either the average low-income population or the user-defined threshold specified in the EJ Analysis pane.

- Blue: Census block groups that exceed either the averages or user-defined threshold of all the population types included in the EJ study area.
- Gray: Census block groups where none of the specified population types exceed the average or user defined threshold of the EJ study area.

> The *Attributes* pane can be accessed by right-clicking on the layer in the *Layers* manager, see Section 3.7.9.

> For more information on the variables that are displayed in the Attributes pane for Environmental Justice Layers, visit the 2020 ACS Census data API website.
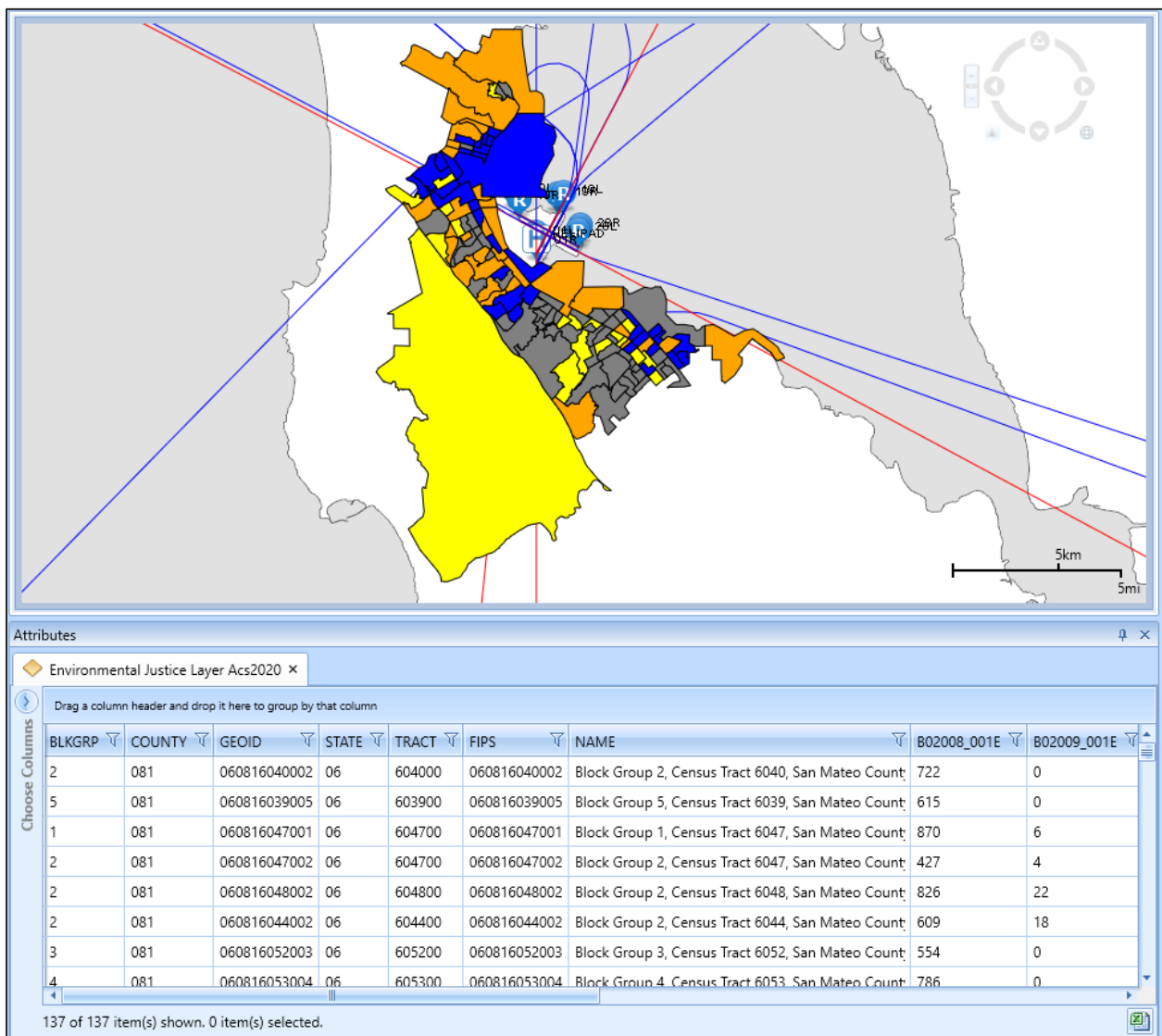
Figure 10-4 Environmental Justice Analysis Layer and Attributes

10.4 Limited English Proficiency Analysis

10.4.1 Workflow

To perform an analysis of an LEP study area:
1. In the *Study* tab, *Preferences*, *Environmental Justice Model* section, update the settings as appropriate.
2. In the *Environmental Justice* tab, *Limited English Proficiency* ribbon group, click the *Load Tract Layer* button, see Section 10.2 for more information on loading data.
3. From the *Limited English Proficiency* ribbon group, click the *Create* button and create an LEP study area, see Section 10.2 for more information on creating a study area.
4. From the *Layers* Manager, *Limited English Proficiency* category, select the desired LEP study area.
5. From the *Limited English Proficiency* ribbon group, click the *Analysis Pane* button.

10.4.2 Limited English Proficiency Analysis Pane

The *Limited English Proficiency* pane displays the following:
- The total population count included in the analysis
- The population count and percentage that speaks English less than very well based on the total population in the analysis
- A table with groups of the population that speak English less than very well by language categories as defined by the US Census Bureau
  - The language category description
  - The population count for the corresponding language category included in the analysis
  - The percentage of the population in the corresponding language category included in the analysis based on the total population included in the analysis
  - The percentage of the population in the corresponding language category included in the analysis that speaks English less than very well

In the *Limited English Proficiency* pane, select a language category in order to update the color coding (symbology) of the LEP study area layer for the selected language category.

Figure 10-5 Limited English Proficiency Analysis Pane

10.4.3 Limited English Proficiency Layer

The Limited English Proficiency Layer displays census tracts in a color range from white to blue (from low to high), indicating the density of the population that Speaks English less than very well for the selected language category.

> The *Attributes* pane can be accessed by right-clicking on the layer in the *Layers* manager, see Section 3.7.9.

> For more information on the variables that are displayed in the Attributes pane for Limited English Proficiency Layers, visit https://api.census.gov/data/2020/acs/acs5/variables.html.
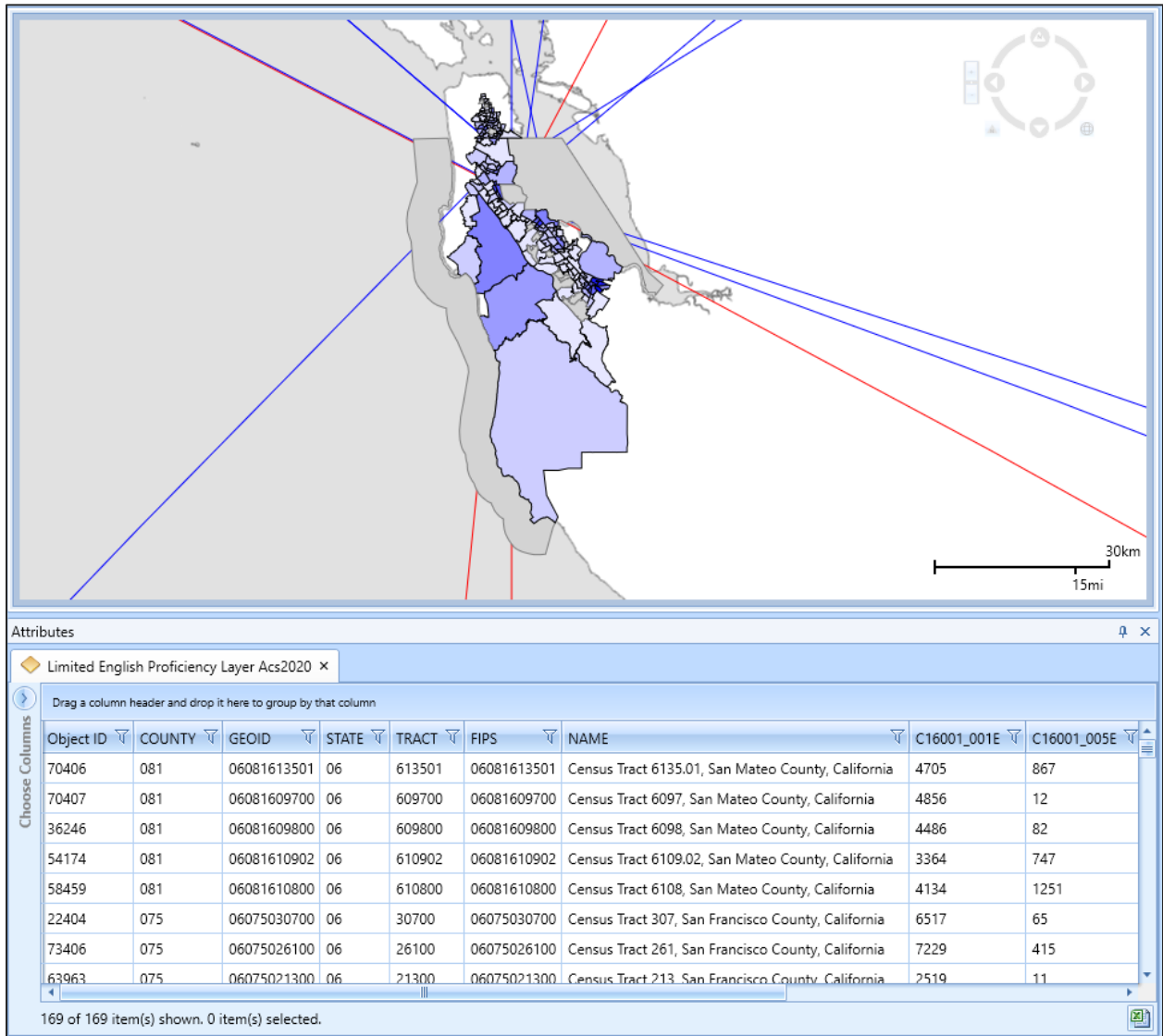
Figure 10-6 Limited English Proficiency Layer and Attributes

Appendix A Glossary

3CD	Terrain File Format
AEDT	Aviation Environmental Design Tool
AEE	FAA Office of Environment and Energy
AFE	Above Field Elevation
AGL	Above Ground Level
Aircraft Operation	A single flight of an aircraft. Aircraft operation types include arrival, departure, circuit, touch and go, and overflight.
Altitude	The vertical distance of any particular object from the reference level.
Annualization	A group of operations that is associated with the following: • Time period to be analyzed • Operations included in the time period • Weighted groupings of the included operations • Subset of processing options for the included operations. Annualization is a convenient way to evaluate environmental consequences that represent noise and emissions over the time period of interest with potentially different weighting of individual operations or operation groups.
Approach	The 2-D or 3-D path that the aircraft takes as it descends toward an airport for landing. This term is also used to describe the subset of arriving flights at an airport.
Approached Displaced Threshold	Parameter from the AIRPORTS Database, identifies the displaced threshold for each approach. Displaced Threshold is defined as a spot on the runway that is not either endpoint but that is used as the point for touchdown; this exists due to local restrictions (e.g., noise restrictions, runway strength) that make the actual runway end unsuitable for approaches.
ASIF	AEDT Standard Input File
BADA	Base of Aircraft Data
Boundary	Geospatial boundary around a modeling area.
Case	This term is replaced by *Operation Group* in AEDT.
CEXP	C-weighted Sound Exposure Level (multi-event) (noise metric)
CDNL	C-weighted day, night average sound level (noise metric)
CNEL	Community Noise Equivalent Level (California) (noise metric)
CO	Carbon monoxide
CO_2	Carbon dioxide

Contour	A smooth curve or line that is statistically regressed through points of equal noise level of time duration.
Crossing Height	Parameter from the AIRPORTS Database; identifies the height above ground level where the normal glide path crosses the landing threshold for each unique runway end.
dB	Decibel, a unit of noise level or noise exposure level
deg	Degrees (angle)
DEM	Digital Elevation Model format that covers both U.S. and International land areas (terrain data format)
Departure	The 2-D or 3-D path that the aircraft takes as it ascends from an airport after taking off. This term is also used to describe the subset of flights taking off at an airport.
DLL	Dynamic Link Library (supporting software)
DNL	Day Night Average Sound Level (noise metric)
EDMS	Emissions and Dispersion Modeling System
Elevation	Parameter from the AIRPORTS Database; identifies the altitude of the airport above mean sea level.
Emission Factors	The rates at which pollutants are emitted into the atmosphere per unit of consumption. Emission Factors are used to calculate the pollutant emissions from the various source categories in AEDT.
Emissions Report	This report in AEDT gives the pollutant emissions and fuel consumption amounts for a selected metric result.
EPA	Environmental Protection Agency
EPNL	Effective Perceived Noise Level (multi-event) (noise metric)
Esri	Software development and services company providing GIS software and geodatabase management applications.
Event	A uniquely modeled operation or an individual flight
FAA	Federal Aviation Administration (U.S. DOT)
FAA-AEE	The Federal Aviation Administration Office of Environment and Energy
Flight Path	The 4-dimensional (length, width, altitude and time) description of an aircraft's trajectory represented by a series of straight-line segments. The flight path could be seen as a combination of the Ground Track and the Flight Profile. The four flight path parameters include distance along a ground track, altitude, speed, and thrust per flight profile segment.

Flight Performance Report	This report in AEDT shows the flight performance results for the selected metric result.
Flight Profile	The 2-dimensional (altitude feet AFE and length) description of an aircraft's trajectory represented by a series of straight-line segments.
Ft	Foot, feet
GeoTIFF	Terrain file format
GIS	Geographic Information System
Glide Slope	Parameter from the AIRPORTS Database; identifies the vertical guidance line used by aircraft for an approach to each unique runway end. Glide slope only changes where the aircraft lands on the runway, and it does not change the angle at which the aircraft approaches the runway. The aircraft descent angle can be changed in the flight profile.
GRIB	Grid in Binary, which is a World Meteorological Organization standard file format.
GridFloat	Terrain file format
Ground Track	The 2-dimensional (length and width) trace of the flight path on the horizontal plane. This represents the geographical ground location over which an aircraft flies.
GUI	Graphical User Interface
h	Hours
H_2O	Water vapor
HAPs	Hazardous Air Pollutants. Pollutants that are known or suspected to cause cancer or other serious health effects. The Environmental Protection Agency determines which chemicals are considered HAPs.
HC	Hydrocarbon
Impact Set Graph	See *Impact Set Report*
Impact Set Report	AEDT allows the user to show noise results that compare two different annualizations in graphical (Impact Set Graph) or tabular (Impact Set Table) form.
Impact Set Table	See *Impact Set Report*
INM	Integrated Noise Model
KCAS	Calibrated airspeed, in knots
kg	Kilograms
km	Kilometers
kt	Knots (international nautical miles per hour)

KTAS	True airspeed, in knots
L_{AE}	Symbol for SEL − A-weighted sound exposure level (dB) (noise metric)
LAEQ	Equivalent Sound Level for 24 Hours (noise metric)
LAEQD	Equivalent Sound Level for a 15-Hour Day (noise metric)
LAEQN	Equivalent Sound Level for a 9-Hour Night (noise metric)
LAMAX	Maximum A-weighted Sound Level (noise metric)
lb	Pounds force or weight
LCMAX	Maximum C-weighted Sound Level (multi-event) (noise metric)
L_{EPN}	Symbol for EPNL − perceived sound exposure level (dB) (noise metric)
m	Meters
Metric Result	Each metric result is representative of a metric, receptor set (for noise and emissions dispersion), and annualization (which includes operations) combination. The metric result is run to obtain results.
Mi	Miles
min	Minutes
Mixing Height	The height of the atmosphere where relatively vigorous mixing of pollutants and other gases takes place. Directly above the mixing height, the atmosphere is fairly stable and there is limited upward dispersion of polluted air. The mixing height varies both diurnally and seasonally.
MOVES	Motor Vehicle Emission Simulator. EPA's emission modeling system that estimates emissions for mobile sources.
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NCAR	NCEP/NCAR Reanalysis Project weather files, from NOAA National Centers for Environmental Prediction (NCEP) and National Center for Atmospheric Research
NED	National Elevation Dataset from U.S. Geological Survey. GridFloat format that covers both U.S. and International land areas (Terrain File Format).
NEF	Noise Exposure Forecast (noise metric)
NFDC FAA	FAA National Flight Data Center (database)
NIRS	Noise Integrated Routing System
NMHC	Non-methane Hydro Carbon
nmi	International nautical mile (1852 meters)
NMGF	Noise Model Grid Format

NMPlot	Graphics application program that processes contours
NOAA	National Oceanic and Atmospheric Administration
Non-aircraft operation	A single operation by a non-aircraft source. Non-aircraft sources in AEDT include ground support equipment, stationary sources (boiler/space heaters, emergency generators, incinerators, aircraft engine testing, fuel tanks, surface coating/painting, deicing area, solvent degreasers, sand/salt piles and other), and training fires.
NOx	Nitrogen oxides
NPD	Noise-power-distance
NWS	National Weather Service
Operating Configuration	Operating configurations specify the pattern of aircraft arrivals and departures on specific runways depending on the weather conditions and airport capacity. Specifying configurations allows the user to assign aircraft to runways based on aircraft weight category criteria that is similar to those employed in an actual airport operating environment. Airport operating configurations are only used when the Delay and Sequencing modeling option is enabled.
Operation Group	A set of operations assigned based on source type (aircraft operations, non-aircraft operations, or runup operations).
PM	Particulate matter
PMAD	Peak Month Average Day
PNLTM	Maximum Perceived Noise Level (multi-event) (noise metric)
Receptor	A specified point in space or on the ground at which modeled metrics are computed. Receptors can be setup in AEDT through the GUI or imported through the ASIF.
Relative Humidity	Parameter from the AIRPORTS Database; identifies the mean amount of water vapor in the air as expressed in a ratio between the partial pressure of water vapor in the mixture to the saturated vapor pressure of water. This parameter is identified as an average monthly value for the month indicated in the MONTH field.
Rose Station	Parameter from the AIRPORTS Database; identifies location of the wind rose, which is used to collect the airfield's wind meteorological data.
RUC	Rapid Update Cycle weather files
Runway Elevation	Parameter from the AIRPORTS Database; identifies the elevation or altitude above in feet MSL at each unique runway end.
Runway End Name	Parameter from the AIRPORTS Database; identifies the two endpoints of each runway with names in order to clearly express their location.
Runway ID	Parameter from the AIRPORTS Database; identifies each runway with a unique ID in order to clearly express its location.

Runway Latitude	Parameter from the AIRPORTS Database; identifies the latitude of each unique runway end.
Runway Longitude	Parameter from the AIRPORTS Database; identifies the longitude of each unique runway end.
Runway Length	Parameter from the AIRPORTS Database; gives the distance between the two runway ends or length of a particular runway on the airfield.
Runway Width	Parameter from the AIRPORTS Database; gives the shorter dimension or width of a particular runway on the airfield.
S	Seconds
SAE	Society of Automotive Engineers
Scenario	A collection of one or more operation groups that must have common time durations and run/output properties. This term is replaced by *Annualization* in AEDT.
Sea Level Pressure	Average monthly sea level pressure.
SEL	A-weighted Sound Exposure Level (multi-event) (noise metric)
SFI	Senzig-Fleming-Iovinelli fuel consumption model. Referred to as Terminal Area Model in SAE-AIR-6183.
SOx	Sulfur oxides
Station Pressure	Average monthly station pressure.
Study	A collection of metric results and supporting data. A study can contain multiple airports with multiple layouts at each airport.
Study Report	This report in AEDT summarizes major data elements in the study, including airports, receptor sets, annualization, and metric results.
Departure Displaced Threshold	Parameter from the AIRPORTS Database; identifies the area at the end of a runway that may be used for takeoff but never for landing in order to provide more clearance for departing aircraft. This area is typically located just beyond one of the runway ends.
TALA	Time Above an A-weighted Sound Level Threshold (noise metric)
TALASC	Time Above an A-weighted Sound Level with Overlapping Events Method (Statistical Compression) (noise metric)
TALC	Time Above a C-weighted Sound Level Threshold (noise metric)
TALCSC	Time Above a C-weighted Sound Level with Overlapping Events Method (Statistical Compression) (noise metric)
TAPNL	Time Above a Perceived Noise Level Threshold (noise metric)
TAPNLSC	Time Above a Perceived Noise Level with Overlapping Events Method (Statistical Compression) (noise metric)
TAUD	Time-Audible (noise metric)

TAUDSC	Time-Audible with Overlapping Events Method (Statistical Compression) (noise metric)
TAUDP	Time-Audible Percent (noise metric)
TAUDPSC	T Time-Audible Percent with Overlapping Events Method (Statistical Compression) (noise metric)
Taxi In Time	Identifies the magnitude of time that it takes for an aircraft to maneuver from the runway to the terminal after landing. In AEDT, this can be determined by either a computed taxi trajectory or a taxi-in time-in-mode. Taxi-in time-in-mode can either be entered as taxi-in duration for a particular flight or a default taxi-in duration for aircraft in an airport layout.
Taxi Out Time	Identifies the magnitude of time that it takes for an aircraft to maneuver from the terminal to the runway just before takeoff. In AEDT, this can be determined by either a computed taxi trajectory or a taxi-out time-in-mode. Taxi-out time-in-mode can either be entered as taxi-out duration for a particular flight or a default taxi-out duration for aircraft in an airport layout.
Temperature	Parameter from the AIRPORTS Database; identifies the mean kinetic energy of the molecules or temperature at a site on the airport. This value is an average monthly value for the month indicated in the MONTH field.
Threshold Elevation	Parameter from the AIRPORTS Database; identifies the feet above mean sea level or elevation above the displaced threshold of an aircraft at a particular point in time.
TGO	Touch-and-go operation
TOG	Total Organic Gases
UCAR	University Corporation for Atmospheric Research
U.S. DOT	United States Department of Transportation
UTC	Coordinated Universal Time
UTM	Universal Transverse Mercator coordinate system
VOC	Volatile organic compound
Weather Station ID	Parameter from the AIRPORTS Database; identifies the Identification Number/Name of the National Oceanic and Atmospheric Administration (NOAA) weather station closest to the airport.
WECPNL	Weighted Equivalent Continuous Perceived Noise Level (noise metric)
Wind Speed	Parameter from the AIRPORTS Database; identifies the measured movement of air or wind speed at a site on the airport. This value is an average monthly value for the month indicated in the MONTH field.
XML	Extensible Markup Language

Appendix B Screen-Level Help (Field-Level Help)

This appendix includes tables that describe each field in the AEDT interface by tab.

Appendix B.1 Study Tab

Appendix B.1.1 Preferences – Feature Activation

Parameter	Description
Identifier	Identifier provided by the FAA that is associated with the hash key and approved features.
Hash key	Hash key provided by the FAA that is associated with the identifier and approved features.
Activated features	Features associated with the FAA provided identifier and hash key that are activated and available for use in AEDT.

Appendix B.1.2 Preferences – Airports

Parameter	Description
Maximum number of tracks to display	The maximum number of tracks (includes dispersed tracks) to display in the airport layout at a time. A maximum of 500 tracks is suggested in order to maximize computer performance and AEDT responsiveness for most users, however performance of individual machines will vary based on computer specifications.
Display track load time warning	When this option is checked, a track load time warning message will be displayed when clicking the Get Tracks… link in the Airports tab. When this option is unchecked, the warning message will not be displayed.

Appendix B.1.3 Preferences – Database

Parameter	Description
Datacontext timeout (sec)	This value controls the timeout when retrieving results and accessing data tables from the database. The default is set to 300 seconds. If a timeout error occurs, increase the Datacontext Timeout and/or decrease the Results Iterator Page Size.
Disable MSDTC for Airport Layout Insertion	This option determines whether MSDTC and TransationScope should be enabled or disabled when adding a new airport layout to the Study through the graphical user interface and is applicable when using a remote database server. If an error occurs when attempting to add a new airport layout while using a remote database server, check this box.
Results iterator page size	This value controls the maximum number of items returned by the results iterator. The default is set to 1000. Increasing the page size to a large value can affect performance and may cause a timeout error. If a timeout error occurs, increase the Datacontext Timeout and/or decrease the Results Iterator Page Size.
Transaction scope timeout (sec)	This value controls the timeout in database transaction. The default is set to 400 seconds. If a transaction scope timeout occurs, increase this value.

Appendix B.1.4 Preferences – Detailed Grid

Parameter	Description
Maximum Number of Individual Receptors	Limit on the number of receptors for detailed noise. This limit is enforced in the Define Metric Results wizard. Default is 500.
Maximum Number of Air Operations	Limit on the number of aircraft operations for detailed noise. This limit is enforced in the Define Metric Results wizard. Default is 1000.

Appendix B.1.5 Preferences – Distributed Processing

Parameter	Description
Configure button	Opens the *TmService Manager* dialog.

Appendix B.1.6 Preferences – Dynamic Grid

Parameter	Description
Refine Level Limit	Used to control the size of the smallest contouring grid in dynamic grid processing. This setting puts a limit on the density of the grid. The grid may or may not reach this density.
Dynamic grid contour expansion level	Minimum/lowest level contour of interest. The dynamic grid will expand to the extents required to completely close the contours for the specified level and higher levels (dB for decibel-based metrics; minutes or percent for time-based metrics).This setting is used as the default value in the Define Metric Results wizard, Set Processing Options step, see Section 5.2.4.
Dynamic grid algorithm	Select which algorithm to use for dynamic grid process – Linear INM Legacy or Second Order Laplacian. The default algorithm is Linear INM Legacy. • Linear INM Legacy is the algorithm for a first order fit (difference between the noise value at a grid point and the noise value of a linear fit between two neighbors of the same grid point). • Second Order Laplacian is the algorithm for a second order fit (difference between the noise value at a grid point and noise values of a second order fit between the nine neighbors of the same grid point).
Refine Tolerance for Linear INM Legacy	The tolerance is threshold value (in decibels) for the difference between the noise value and the noise value of the linear fit between the neighboring points. If the absolute value of the difference is above the tolerance, the grid is divided in half (refined) and noise is evaluated at those new (interior) points.
Curvature Difference Fraction for Second Order Laplacian	Curvature difference fraction used for the Second Order Laplacian algorithm.
Override minimum spacing requirement	When selected, the requirement for a minimum 0.5 nmi spacing between the lower left and upper right points in the dynamic grid starting grid will be turned off and the spacing will be used as defined in the Definitions tab.
Visualize Dynamic Grid during processing	When selected, the dynamic grid generation will be displayed on the map during metric result processing.

Appendix B.1.7 Preferences – Logging

Parameter	Description
Logging Level	
All	All messages.
Debug	Detailed informational messages as well as messages from the info, warn, error and fatal levels.

Info	Informational messages as well as messages from the warning, error, and fatal levels.
Warn	Minor non-critical messages as well as messages from the error and fatal levels.
Error	Errors that do not cause the application to shut down as well as messages from the fatal level.
Fatal	Severe errors that cause the application to shut down
Off	No messages.
Acoustics Diagnostics Reporting	
Enable Acoustics Diagnostics Reporting	When selected, a diagnostics log file will be generated for each flight path segment and each receptor point combination and saved in the AEDT Logs folder (e.g., *C:\AEDT\Logs*). It is recommended to limit the number of operations and receptor points when using this feature. The total number of generated diagnostics files can quickly overwhelm the computer's disk space.

Appendix B.1.8 Preferences – Map

Parameter	Description
Zoom	
Map zoom factor	Setting for step size for zooming in or out. 1 = smaller steps 2 = bigger steps
Legend	
Show opacity slider in legend	When selected, an opacity slider will be shown with the result layer in the *Layers manager.*

Appendix B.1.9 Preferences – Modeling Preferences

Parameter	Description
Emissions	
CH4 GWP Value for Conversion to CO2e	The Global Warming Potential (GWP) value for Methane (CH4) used in the calculation of carbon dioxide equivalence (CO2e). This value is consistent with the Sixth Assessment Report (AR6) of the United Nations (UN) Intergovernmental Panel on Climate Change (IPCC).

Appendix B.1.10 Preferences – Task Master

Parameter	Description
Use event level weather module	When selected, AEDT will use the weather data associated with the closest airport of the airports in the operation. When unselected, AEDT will use the weather data associated with the closest airport of all airports included in the metric result.
Filter sensor paths	When selected, AEDT will filter sensor path input trajectories for performance calculations. When unselected, filtering will not be applied on the sensor path inputs.
Smooth sensor paths	When selected, AEDT will smooth sensor path input trajectories for performance calculations. When unselected, smoothing will not be applied on the sensor path inputs.
Supersegment sensor paths	When selected, AEDT will simplify sensor path input trajectories for performance calculations. When unselected, simplification will not be applied on the sensor path inputs.
Thrust smoothing level	Thrust smoothing on terminal-area approaches can be interpolated (most aggressive) or non-interpolated.

Appendix B.1.11 Preferences – User Interface

Parameter	Description
Application	
ArcGIS baselayer storage	Directory where application provided base layers (maps) are stored.
ArcGIS Runtime supporting GPKs	Directory where geopocessing packages are stored.
ArcGIS Runtime supporting MPKs	Directory where Mpk files are stored.
ArcGIS Runtime supporting Mxd files	Directory where Mxd files are stored.
Default zoom level (nautical miles)	Default zoom level in nautical miles.
GIS temporary files directory	Directory where temporary files are stored.
Identify tool: selection area size (Statute miles)	Length of the sides of the selection area for the identify tool in statute miles.
Identify tool: show selection area	When selected, the selection area will be shown on the map when using the identify tool.
Supported study database version	The version of the study database supported by the currently installed version of AEDT.
User manual file name	File name of the AEDT User Manual that is referenced by the help buttons.
ArcGIS Runtime Settings	
ArcGIS Runtime application data path	Directory where the application data is stored.
ArcGIS Runtime application data path name	Folder name for application data.
ArcGIS Runtime temporary files path	Directory where temporary files are stored.
ArcGIS Runtime temporary files path name	Folder name for temporary files.
Ignore accelerated display warning	When selected, the accelerated display warning message will be disabled at startup.
Use Accelerated Display	The accelerated display increases the performance of the map. When selected, AEDT will use the accelerated display according to the selected option: • *Auto:* AEDT will determine if the accelerated display should be used. • *True:* AEDT will use the accelerated display. • *False:* AEDT will not use the accelerated display.
ESRI Supporting Files	
Contour generation	A file that AEDT uses to generate contours.
Create population GBD from Census data	A file that AEDT uses to create the population geodatabase.
Empty MPK WGS84	A file that AEDT uses to visualize shapefiles.

Parameter	Description
JSON to feature	A file that AEDT uses to convert a JSON file to feature.

Appendix B.1.12 Preferences – BADA Family 4

Parameter	Description
Use ANP and BADA 3 fallback	
Use ANP and BADA 3 Fallback	This option controls the default setting for the *Use ANP and BADA 3 Fallback* in the *Define Metric Results* wizard, *Set Processing Options* step. The selection made in the *Define Metric Results* wizard is the option that will be used in calculations. Confirm which performance model was used to process the aircraft operation in the AEDT error log or from the *Metric Results* tab, details pane, *Aircraft Operations* tab *Performance Model* column (see Appendix B.2.4).
Airport-to-Airport Workflow	
Sensor Path	When selected, airport-to-airport (runway-to-runway) operations will use: • Sensor path data (from 500 ft AFE and above) to model flight ground coordinates (lat/long), ground speed (in knots), and altitude targets for the BADA 4 performance model. • The ANP performance model is used for runway ground roll during takeoff and landing. • If sensor path data are not available and this option is selected, the BADA 4 modeling of the operations will fail and be recorded in the log file. The ANP performance model is used below 10,000 feet AFE for the departure part of the flight, and below 6,000 feet AFE for the arrival part of the flight.
Sensor Path – Speed type	When importing sensor path data into AEDT, if no information is provided on the type of airspeed that has been imported, it can be specified by this setting. If information on the type of air speed was specified during import, that classification will be used and this setting will be ignored. Speed type options: • Ground speed (knots) • True air speed (knots) • Calibrated air speed (knots)
Procedural	When selected, airport-to-airport (runway-to-runway) operations will use a great circle ground track using the lat/long coordinates from runway-to-runway. The BADA 4 performance model is used above 10,000 feet AFE for the departure part of the flight, and above 6,000 feet AFE for the arrival part of the flight. The BADA 4 performance model uses the BADA 4 altitude and speed schedules for altitude and speed targets. The ANP performance model is used below 10,000 feet AFE for the departure part of the flight, and below 6,000 feet AFE for the arrival part of the flight.
Procedural – Cruise	Step Climb • When selected, the cruise altitude incrementally increases when possible as aircraft weight decreases due to fuel burn.
Procedural – Descent	The *Descent* option controls the estimate of the distance when the cruise stops and descent starts depending on the different modes of descent:

	• Use Idle – specifies descent at the idle thrust setting.
	• Use Angle – defines descent at a constant angle relative to the horizon.
	• Use Rate – defines descent with a constant rate of altitude change.
Procedural Terminal Workflow	
Add arrival flap transition segment	This setting is applicable to both reduced and non-reduced thrust profiles in the BADA 4 workflow.
	When selected, an arrival transition segment will be added to ensure that thrust from one flap setting to another changes over the distance of 1,000 ft. Without the flap transition segment, the thrust change could occur over a much larger distance, which may result in inaccurate noise calculations.
Reduced thrust taper	The following settings are applicable to reduced thrust operations that are associated with a single runway (no airport-to-airport or overflight operations). Since the BADA 4 performance model requires that the aircraft engines use BADA 4 climb power during climb segments above 10,000 feet MSL, use the settings in this category to smooth the transition between reduced thrust below 10,000 feet MSL to BADA 4 climb power above 10,000 feet MSL.
	• Enable reduced thrust taper
	○ When selected and the annualization includes operations that use reduced thrust profiles, the transition between reduced takeoff thrust below 10,000 ft MSL to climb power above 10,000 ft MSL will be applied based on the *Reduced thrust taper upper limit*.
	• Reduced thrust taper upper limit MSL (ft)
	Enter an altitude between 10,500 and 40,000 feet MSL for the transition from reduced thrust to BADA 4 climb power to be achieved.

Appendix B.1.13 Preferences – Emissions

Parameter	Description
Enable engine multiplier for flight-based taxi times	When selected, taxi fuel and emissions modeling is done for all engine taxi (number of engines is specific to each aircraft). When unselected, taxi fuel and emissions modeling is done for single engine taxi.
Enable flight-based taxi times	When selected, taxi times of individual flight operations are used to calculate taxi time. When unselected, average taxi times of airport layout are used This option only applies to metric results that do not use delay and sequence modeling.
Only Include IRIS-Listed Pollutants in SOG Output	When selected, only EPA Integrated Risk Information System (IRIS)-listed pollutants will be included in the speciated organic gas output.
Optimize hourly emissions generation for ground sources	When this option is selected, stationary and ground support equipment hourly emissions results are not saved to the database, but rather calculated when generating reports or for emissions dispersion which results in faster processing time.

Appendix B.1.14 Preferences – Emissions Dispersion

Parameter	Description
AERMOD Area Source Characterization for Aircraft	
Aircraft area source release height (meters)	Emissions release height of the runway and airborne area sources, in meters.
Override airborne source spacing	When selected, AEDT will use the user defined voxel grid spacing for emissions dispersion airborne source calculations.
Override runway source spacing	When selected, AEDT will use the user defined voxel grid spacing for emissions dispersion runway source calculations.
Airborne source X spacing override (meters)	AEDT will use the provided spacing for the X direction voxel grid spacing used in emissions dispersion airborne source calculations if the following options are selected as follows: • Override airborne source spacing: selected. • Align airborne sources: unselected. The default X spacing without alignment is equal to 200 m.
Airborne source Y spacing override (meters)	AEDT will use the provided spacing for the Y direction voxel grid spacing used in emissions dispersion airborne source calculations if the following options are selected as follows: • Override airborne source spacing: selected. • Align airborne sources: unselected. The default Y spacing without alignment is equal to 200 m.
Airborne source Z spacing override (meters)	AEDT will use provided spacing for the Z direction voxel grid spacing used in emissions dispersion airborne source calculations if the following options are selected as follows: • Override airborne source spacing: selected. • Align airborne sources: unselected. The default Z spacing without alignment is equal to 20 m
Runway source X spacing override (meters)	AEDT will use the input spacing for the X direction spacing of runway sources if the following options are selected as follows: • Override runway source spacing: selected. • Align runway sources: unselected. The default X spacing without alignment is equal to 20 m.
Runway source Y spacing override (meters)	AEDT will use the input spacing for the Z direction spacing of runway sources if the following options are selected as follows: • Override runway source spacing: selected. • Align runway sources: unselected. The default Z spacing without alignment is equal to 20 m.

Parameter	Description
AERMOD Volume Source Characterization for Aircraft	
Use volume source characterization for aircraft sources (uncheck to use area sources)	When selected, AEDT will use the volume sources instead of area sources, by default, to characterize aircraft sources and will enable the other parameters in this section. Otherwise, AEDT will use area sources, by default, to characterize aircraft sources and the parameters in the section above will apply. The parameters in this section will be used when volume source characterization is selected in the Define Metric Results wizard.
Aircraft volume source release height (meters)	Emissions release height of the runway and airborne volume sources, in meters.
Volume source side length for airborne sources (meters)	Volume source side length for airborne aircraft sources, in meters.
Volume source side length for surface sources (meters)	Volume source side length for surface aircraft sources, in meters.
Airborne volume source X spacing (meters)	AEDT will use the provided spacing for the X direction voxel grid spacing used in emissions dispersion airborne source calculations.
Airborne volume source Y spacing (meters)	AEDT will use the provided spacing for the Y direction voxel grid spacing used in emissions dispersion airborne source calculations.
Airborne volume source Z spacing (meters)	AEDT will use provided spacing for the Z direction voxel grid spacing used in emissions dispersion airborne source calculations.
Surface volume source X spacing (meters)	AEDT will use the input spacing for the X direction spacing of surface aircraft sources.
Surface volume source Y spacing (meters)	AEDT will use the input spacing for the Z direction spacing of surface aircraft sources.
Advanced Settings	
Random number seed (int > 0) for aircraft schedule for every run	This setting controls the random algorithm seed value used by DSQM for the assignment of operation time for profile-based operations. • When it is set to -1, seed value initialization is done only once when AEDT is first started. In other words, re-running the same metric result (with DSQM) in same AEDT session will produce different results every time. • In order to have repeatable results with DSQM, enter a positive integer for this setting. Please refer to the AEDT Technical Manual for further information.
Random number seed (int > 0) for ground delay sequencing for every run	This setting controls the random algorithm seed value used by DSQM for the assignment of runway end for aircraft operations. • When it is set to -1, seed value initialization is done only once when AEDT is first started. In other words, re-running the same metric result (with DSQM) in same AEDT session will produce different results every time. • In order to have repeatable results with DSQM, enter a positive integer for this setting. Please refer to AEDT Technical Manual for further information.

Parameter	Description
Maximum delay hour for Scheduling	This setting allows user to limit the maximum amount of delay calculated for each aircraft operation by the Delay and Sequencing Model (DSQM). • -1 means the DSQM will be used to calculate delay. This is the default. • 0 means no delay will be applied so that all flights depart in the time originally assigned. A positive number means the maximum delay calculated by the DSQM will be limited to that number of hours (e.g., a value of 3 means the maximum delay of 3 hours).
Align runway sources	When selected, AEDT will align the Y axis of the surface voxel grid with the runway. The X spacing of the surface voxel grid is set to 20m and corresponds to the width of each area source. The Y spacing of the voxel grid is calculated based on the runway length and corresponds to the length of each area source. Recommended for metric results with all operations on one runway.
Align airborne sources	When selected, AEDT will align the Y axis of three-dimensional voxel grid with the runway. The X spacing of the three-dimensional voxel grid is set to 20m and corresponds to the width of each airborne area source. The Y spacing of the three-dimensional voxel grid is set to 200m and corresponds to the length of each airborne area source. Recommended for metric results with all operations on one runway.
Output CON file	When selected, AEDT will produce separate CON files (raw hourly emissions concentrations) for air operations, taxi operations, ground (runways) operations, gate (APU, GSE) operations, and stationary operations.
Use BADA fuel model	When selected, AEDT will use the BADA nominal fuel flow formula. If unselected, AEDT will use the Senzig-Fleming-Iovinelli (SFI) fuel flow model.
Make the receptor grid EDMS compatible	When selected, AEDT will use the receptor grid in EDMS format.
Use EDMS results	Select this option to use the EDMS APM/AEM result in csv format to calculate CO emissions. This setting is used in conjunction with "File with EDMS results" setting.
File with EDMS results	Applicable when the "Use EDMS results" setting is selected. Directory where the EDMS APM/AEM result files are stored. File must have a CSV extension.
Use AERMOD receptor grid	When selected, the receptor grid specified in the *File with AERMOD receptor grid* field will override the assigned receptor set of an emissions dispersion metric result. Results generated from the *View Pollutant Concentrations* and *Emissions Dispersion* Report options will reflect the AERMOD receptor grid.
File with AERMOD receptor grid	Applicable when the "Use AERMOD receptor grid" setting is selected. Directory where the receptor grid in AERMOD format is stored. File must have an INC extension.
Extract emissions results in subsets	Extract emissions dispersion results from the database in discrete time-based chunks (chunking) as determined by the *Subset data size (days)* value, rather than all at once. Checking this option is recommended for improving performance on machines with limited memory (e.g., 8 GB of RAM). By default, the *Extract emissions results in subsets* setting is checked, and *Subset data size* is set to 30 days. • When this setting is not selected, hourly emissions results are retrieved from the database and aggregated in a single step. This can be very memory intensive, and the emissions dispersion process could fail in machines with smaller amounts of memory (< 8 GB).

Parameter	Description
	• When this setting is selected, hourly emissions results are retrieved in subsets, aggregating the non-zero emissions, and subsequently releasing all the memory associated with each subset after it has been processed and added to the aggregate emissions. If sufficient memory is available to process all the emissions without chunking, then the HRE file generation step will execute faster than with chunking. However, the difference in execution speed between "no chunking" and "with chunking" runs will get smaller the larger the subset size. Adjust the subset data size as appropriate considering available memory and study size. This setting must be checked in order to use the Stop & Resume for HRE File Generation.
Subset data size (days)	This setting is applicable when the "Extract emissions results in subsets" is selected. Set the number of days of data to extract in each subset. Smaller subset data size will take longer time in the HRE file generation step, but will use less memory.
Save interim results during HRE generation	This setting is applicable only when the "Extract emissions results in subsets" is selected. Checking this setting allows for recovery and resume of the HRE file generation process either if the Stop button was pressed during the run or if the power goes out or similar.
Retrieve emissions results without paging	When this option is checked, emissions dispersion results are retrieved from the database without paging. Checking this option is recommended when running dispersion modeling to speed up retrieving results to create AERMOD input files. With increased speed, the memory consumption increases as well. It is recommended to exercise this option on a computer with 64 GB of RAM or more.
NO2 conversion method from NOx	This setting determines which NO2 conversion method is selected by default in the Define Metric Results wizard.
Create Release Height Source Groups	When selected, AEDT will create source groups by release height within the AERMOD files when AERMOD files are generated by AEDT. The release heights for the additional source groups are as follows: 22, 42, 62, 82, 102, 122, …, 302, 619.2 meters. The naming convention for the release height source groups is "AIR", followed by the release height, e.g., airborne sources for a release height of 62 meters is named AIR062.
Split Aircraft Sources by Aircraft Engine Type	This option is intended to be run with the Create Release Height Source Groups option also selected. When selected, AEDT will create source groups by aircraft engine type within the AERMOD files when AERMOD file are generated by AEDT. The subgroups are as follows: • Fixed Wing with Jet Engine (AFJ) • Fixed Wing with Turboprop Engine (AFT) • Fixed Wing with Piston Engines (AFP) • Helicopter with Turboprop Engine (AHT) • Helicopter with Piston Engine (AHP) The naming convention for the aircraft engine type source groups will include the subgroup abbreviation. Also, the release height source group, or the "AIR" group, for

Parameter	Description
	each release height could be recreated by combining the applicable aircraft engine type subgroups. For example, the AFJ302, AFT302, AFP302, AHT302, and AHP302 source would be equal to the AIR302 source group.

Appendix B.1.15 Preferences – Environmental Justice Model

Parameter	Description
General	
Census API Key	Census API key
Delete zero population polygons	When checked, polygons with zero population (e.g., bodies of water) will be deleted from the result.
Environmental Justice Settings	
2020 ACS Census API	The 2020 American Community Survey (ACS) API end point for Environmental Justice.
2020 Block group feature layer	The feature layer used to determine which block groups (FIPS) are affected by the selected environmental justice study area, which is used to download the data from the 2020 ACS API endpoint.
Columns to make invisible	This setting is used to reduce the large number of ACS variables to the variables of interest. This is a comma separated list of columns to make invisible in the Environmental Justice Layer attributes pane. All other variables in the ACS data will be visible in the layer attributes pane. By default, only the most commonly needed variables are visible. Note the invisible variables are still accessible through the column chooser. Reference the Census lookup table to determine which columns should be used in AEDT.
Columns to use for threshold	The ACS variables for which AEDT uses to determine the average and identifies those which exceed that average. Multiple entries should be separated by a comma (no spaces). • Minority: "pct_minority" • Low-Income: "pct_1xpov" • Linguistic Isolation: "pct_lang"
Limited English Proficiency	
2020 ACS Census API	The 2020 American Community Survey (ACS) API end point for Limited English Proficiency.
2020 Tract feature layer	The feature layer used to determine which tracts (FIPS) are affected by the selected environmental justice study area, which is used to download the data from the 2020 ACS API endpoint.
Enable 2015 Census Language Categories	When checked, census language categories will be used for Limited English Proficiency analyses instead of 2020 language categories. The 2020 Census has fewer language categories than 2015.
2015 ACS Census API	The 2015 American Community Survey (ACS) API end point for Limited English Proficiency.
2015 Tract feature layer	The feature layer used to determine which tracts (FIPS) are affected by the selected environmental justice study area, which is used to download the data from the 2015 ACS API endpoint.

Appendix B.1.16 Preferences – Population Exposure Model

Parameter	Description
Census data folder	The directory where the Census data is stored. The Census data must be located in a folder path without any spaces; otherwise the Population Exposure Report will not be generated.
Census geodatabase cache folder	The directory for the Census gdb cache to be maintained. This folder should be unique per study.

Appendix B.1.17 Preferences – Study

Parameter	Description
Modeling Options	
Check track angle	When selected, AEDT discards operations on tracks with angles that exceed 90 degrees.
Use hard ground attenuation for helicopters and propeller aircraft	When selected, lateral attenuation is turned off for helicopters and propeller aircraft. When this option is not selected, AEDT uses SAE-ARP-5662 lateral attenuation for all aircraft types. Jet aircraft always use SAE-ARP-5662 for lateral attenuation.
Apply delay & sequencing model	When selected, AEDT uses the delay sequence queueing modeling for taxi operations for all metric types. Operating configuration and taxi network must exist in the study airport for this option to affect the results. In addition, aircraft operations must be assigned to a gate. If this option is not selected, the operating configuration is ignored and the operations are processed for the specified time without considering delays.
Exclude departure operations that overrun runway	This setting allows the user to control whether to exclude departure operations whose ground roll exceeds the runway length during takeoff. ▪ This setting is unchecked by default. When it is unchecked, then AEDT will log such operations as a warning but still process them. When this occurs, users are advised to take corrective action to their input by assigning aircraft to a longer runway, selecting a shorter stage length, or ensuring that the aircraft are not attempting to depart with a tailwind. ▪ When it is checked, AEDT will drop such operations and log them as an error. It is important to note that excluding operations will result in differences in results.
Calculate aircraft engine startup emissions	When selected, AEDT calculates the engine startup emissions for the aircraft operations in the metric result.
Atmospheric absorption type	When selected, AEDT includes the effects of atmospheric absorption on noise according to the selected option: ○ *Unadjusted (SAE-AIR-1845 atmosphere)*: AEDT uses the inherent atmospheric absorption according to SAE-AIR-1845 and noise data are unadjusted for study-specific atmospherics. ○ *SAE-ARP-866A*: noise data are adjusted for user-defined temperature and relative humidity values (study-specific airport conditions) according to the methods specified in SAE-ARP-866A. ○ *SAE-ARP-5534*: noise data are adjusted for user-defined temperature, relative humidity, and atmospheric pressure values (study-specific airport conditions) according to the methods specified in SAE-ARP-5534.
Default Weather Options	
Weather Type	Defines the type of weather data to be selected in the Define Metric Results workflow by default.

Parameter	Description
Weather Year	Defines the time period to be selected in the Define Metric Results workflow by default.
Annualization Options	
Use bank angle	When selected, AEDT includes aircraft banking effects in noise calculations. Bank angle affects are not applied to helicopters or aircraft without thrust defined in pounds or percent maximum thrust. Bank angle is calculated based on ground track curvature and an airplane speed. Due to the strong effects of ground track curvature, it is recommended to use this setting only when tracks are defined as vector-type tracks.
Noise altitude cutoff MSL (ft)	Altitude above which noise calculations are no longer processed, in feet MSL (not AGL). Valid range: 0 – 100,000 To disable noise altitude cutoff, leave this option blank.
Mixing height AFE (ft)	This is used in the Emissions Report, Climb Below Mixing Height mode and Descend Below Mixing Height mode.
Fuel sulfur content	Sulfur content in fuel. Default value is 0.00068 (0.068%).
Sulfur to sulfate conversion rate	Sulfur to sulfate conversion rate. Default value is 0.024 (2.4%).
Date & Time Options	
Default operation time	Specifies the default operation time in the *Create Aircraft/Non-Aircraft/Runup/Helitaxi Operations* wizards.
Noise Contour Options	
Default minimum	Minimum contour level. Units for dB-based metrics are in decibels. Units for time-based metrics are in minutes or in percent (%).
Default maximum	Maximum contour level. Units for dB-based metrics are in decibels. Units for time-based metrics are in minutes or in percent (%).
Default increment	Decibel level increment. Units for dB-based metrics are in decibels. Units for time-based metrics are in minutes or in percent (%).

Appendix B.1.18 Preferences – Time Audible Metric

Parameter	Description
Identifier	Unique identifier for Time Audible files
Ambient map file	File path where the ambient map file is located
Spectral data file	File path where the spectral data file is located
Time Audible hash key	FAA provided hash key generated from the identifier, ambient map, and spectral data.

Appendix B.2 Metric Results Tab

Appendix B.2.1 Metric Results Pane

Parameter	Description
ID	Unique ID for the metric result.
State	Run status of the metric result.
Metric	Metric included in the metric result.
Type	Type of metric result.
Receptor Set	Receptor set included in the metric result.
Annualization	Annualization for the metric result.
Name	Name of the metric result.
Description	Description of the metric result.
Analysis Year	The analysis year is used in VALE reporting (for emissions metric only) or when considering yearly deterioration for GSE when the manufacturer year is included (emissions and emissions dispersion metrics).

Appendix B.2.2 Details Pane – Details Tab

Parameter	Description
General	
Metric Result ID	Unique ID for the metric result.
Metric	Metrics included in the metric result.
Type	Type of metric result.
Receptor Set	Receptor sets included in the metric result.
Annualization	Annualization for the metric result.
Name	Name of the metric result.
Description	Description of the metric result.
Run Start Time	Date and start time of when the metric result was last run.
Run End Time	Date and end time of when the metric result was last run.
Run Status	Name of last completed calculation step in the metric result.
Operation Time	Date and time of the first/earliest operation in the metric result.
Duration (hours)	Duration of the metric result in hours.
Sulfur to Sulfate Conversion Rate	Sulfur to sulfate conversion rate for the metric result.
Fuel Sulfur Content	Fuel sulfur content for the metric result.
Noise Altitude Cutoff MSL (ft)	Noise altitude cutoff in feet MSL for the metric result.
Mixing Height AFE (ft)	Mixing height in feet AFE for the metric result.
Modeling Options	
Check Track Angle	Check box indicating if the check track angle option is selected for the metric result.
Apply Delay & Sequencing Model	Check box indicating if delay and sequence modeling is selected for the metric result.
Calculate Aircraft Engine Startup Emissions	Check box indicating if aircraft engine startup emissions are calculated for the metric result.
Analysis Year	Analysis year of the metric result.

Parameter	Description
MOVES Inventory Scenario(s)	MOVES inventory scenario(s) selected for the metric result.
MOVES AERMOD Scenario	MOVES AERMOD scenario selected for the metric result. Applicable to emissions dispersion metric results.
Atmospheric Absorption	Type of atmospheric absorption used in the noise calculations in the metric result.
Lateral Attenuation	Type of lateral attenuation used in the noise calculations in the metric result.
Dynamic grid contour expansion level	The lowest closed contour level that the dynamic grid will achieve. Units for dB-based metrics are in decibels. Units for time-based metrics are in minutes or in percent (%).
Weather Fidelity	Weather fidelity used in the metric result.
Use Terrain	Check box indicating if terrain is used in the noise calculations in the metric result.
Fill Terrain	Check box indicating if gaps in terrain data are filled with a user-defined terrain elevation for the metric result.
Fill Terrain Elevation MSL (ft)	User-defined terrain elevation used to fill gaps in terrain data in the metric result.
Noise Line of Sight Blockage	Check box indicating if line of sight blockage is included in the noise calculations for the metric result.
Use Fixed Ambient Threshold	Check box indicating if a fixed ambient threshold is used in the noise calculations in the metric result.
Fixed Ambient Threshold (dB)	Fixed ambient noise level threshold that is applied across all receptors for the noise calculations in the metric result, in decibels.
Delta Ambient	For the time above noise metrics, a spatially uniform offset applied to the modeled noise levels before comparison to the ambient.
Time Above SC Start Time	Start time for the time above noise metrics with statistical compression.
Time Above SC Duration (hh:mm)	Duration for the time above noise metrics with statistical compression.
Use Ambient	Check box indicating if ambient files are used in the time audible noise metric result.
Ambient Screening	For the TAUD noise metric, indicates if ambient screening is used. For the time above noise metric, indicates if geospatially referenced ambient is used.
Use Spectral Cutoff	Check box indicating if spectral cutoff is used to minimize the audibility computations for distances which would not result in audible sound levels, therefore maximizing run-time efficiency.
TAUD Start Time	Start time for the time audible noise metric.
TAUD Duration (hh:mm)	Duration for the time audible noise metric.
Number Above Noise Level	
Enabled	Check box indicating if the number of operations above the threshold is reported in the Noise Report and receptor set attributes.
Threshold (dB)	Threshold level (in decibels) in which to compare noise level results.
NO2 Conversion Options	
Conversion Method	NO2 conversion method used for the NO2 metric result.
Min Ambient Ratio	ARM2 option – lower limit of ambient ratio
Max Ambient Ratio	ARM2 option – upper limit of ambient ratio
Ambient Equilibrium NO2/NOx Ratio	Tier 3 and ALPHA (TTRM) option – ambient equilibrium ratio

Parameter	Description
In-Stack NO2/NOx Ratio	Tier 3, ALPHA (TTRM), ALPHA (TTRM2), and BETA (GRSM) option – in-stack ratios for all source types and thrust % Max for aircraft
Background Ozone Concentrations	Tier 3, ALPHA (TTRM), ALPHA (TTRM2), and BETA (GRSM) option – background ozone concentrations information.
Background NOx Concentrations	BETA (GRSM) option – background NOx concentrations information.
Aircraft Performance Modeling Options	
Performance Model	Description of the selected performance model
Use ANP and BADA 3 Fallback	Check box indicating if BADA 4 model data are not available, then the SAE-AIR-1845/ECAC Doc 29/ICAO Doc 9911 (ANP) model will be used for thrust calculations and the BADA 3 model will be used for fuel burn in the terminal area; and the BADA 3 model will be used for both thrust and fuel burn calculations in the en-route phase (above 10,000 ft) (if applicable for the operation).
Enable reduced thrust taper	Check box indicating if reduced thrust taper is enabled for the selected metric result.
Reduced thrust taper upper limit MSL (ft)	Upper limit value of the reduced thrust taper in feet MSL.
Background Concentrations	
Units	Units of the background concentrations.
Wind sector – Angle range	Starting and ending angle of the wind sector.
Wind sector – Value type	Type of the specified background concentration (Hourly, Non-hourly, ANNUAL, MONTHLY, WSPEED, etc.) and the background values.
Results Storage Options	
Dispersion Results	Pollutant included in the metric result.
Emissions Results	Level of emissions results included in the metric result.
Noise Results	Level of noise results included in the metric result.
Emission Dispersion Output	
Source Groups	Source groups that are available for inclusion in the emissions dispersion report are described below. All source groups include background concentrations (if provided by the user) as well as results for the selected source (except the Background group, which only includes results from the Background group). **All:** All source groups combined **Aircraft:** All aircraft sources including taxiways, runways, and airborne sources, combined **Airborne:** All airborne aircraft sources including Takeoff ground roll, Takeoff airborne, Climb-out, Airborne approach, and Landing ground roll, combined **Runup preflight check:** Runup – preflight check sources **Runup engine maintenance:** Runup – engine maintenance sources **Taxiways:** All aircraft sources in taxi mode including Taxi-out and Taxi-in, combined **Runways:** All aircraft movements on the runway including aircraft sources in takeoff ground roll and landing ground roll modes **Gates:** All sources assigned to gates including Startup, GSE, and APU sources, combined **Stationary:** All stationary sources including boiler/space heaters, emergency generators, incinerators, aircraft engine testing, fuel tanks, surface coating/painting, deicing area, solvent degreasers, sand/salt piles and other, combined

Parameter	Description
	Training fires: Training fire sources
	Background: Background concentrations provided by the user
	Takeoff ground roll: Aircraft sources in takeoff ground roll mode
	Takeoff airborne: Aircraft sources in takeoff airborne mode
	Climb-out: Aircraft sources in climb-out mode
	Airborne approach: Aircraft sources in airborne approach mode
	Landing ground roll: Aircraft sources in landing ground roll mode
	Parking facilities: Parking facility emissions provided by the user
	Roadways: Roadway emissions provided by the user
	Construction: Construction emissions provided by the user
[Averaging Time]	Selected averaging times and rankings.
Disable NAAQs Restrictions for PM2.5	This field is displayed when the PM2.5 metric has been selected. This field indicates if the Allow computation of all averaging times without EPA's PM2.5 modeling requirements option has been enabled or not enabled.
Multiple Pollutants – [Pollutant]	
Source Groups	This field is displayed when emissions dispersion metrics have been combined. The is the same as the source group in the Emission Dispersion Output category above, but for the corresponding pollutant.
[Averaging time]	This field is displayed when emissions dispersion metrics have been combined. The is the same as the [Averaging time] in the Emission Dispersion Output category above, but for the corresponding pollutant.
AERMOD Options	
Aircraft Source Characterization	This field indicates if aircraft sources are characterized as volume sources or area sources.
Aircraft Plume Rise Modeling (ALHPA)	This field indicates if Aircraft Plume Rise Modeling (ALPHA) is enabled or not enabled.
Area Source Plume Meander (ALPHA)	This field indicates if Area Source Plume Meander (ALPHA) is enabled or not enabled.
Urban Modeling Option	This field indicates if the Urban Modeling Option is enabled or not enabled.
Urban Area Population	This field is displayed if the Urban Modeling Option is enabled and displays the population.
Low Wind Options (ALPHA)	This field is displayed if the Enable Low Wind Options (ALPHA) option is enabled and displays the values for the parameters.

Appendix B.2.3 Details Pane – Aircraft Operations Tab

Parameter	Description
Air Operation ID	AEDT generated air operation ID.
User ID	User defined ID.
Operation Group	Operation group name.
Airframe	Airframe description.
Engine	Engine code.
Engine Mod	Engine modification code.
Departure Airport	Name of the departure airport for the operation (departure operations).
Departure Layout	Name of the departure airport layout for the operation (departure operations).
Arrival Airport	Name of the arrival airport for the operation (arrival operations).

Parameter	Description
Arrival Layout	Name of the arrival airport layout for the operation (arrival operations).
Operation Type	Type of operation.
Operation Time	Date and time of the operation.
Operation Count	Number of operations over the duration of the annualization under which the operation is included.
Stage Length	Stage length category for the operation.
Aircraft Type	Type of aircraft for the operation.
Track	Track name for the operation.
% Contribution	Noise energy contribution to the overall noise in the metric result per operation (if noise storage level is set to operation) or per operation group (if the noise storage level is set to operation group).
Arrival Runway End	Name of the arrival runway end for the operation (departure operations).
Departure Runway End	Name of the departure runway end for the operation (departure operations).
Crosses Time Periods	When delay & sequence modeling is enabled, the scheduled operation time will be compared to the actual operation time. If an operation occurs in a different time period (day, evening, or night) than scheduled, it will be identified in this field.
Performance Model	Performance model that was used to process the aircraft operation. Valid values are: ANP and BADA 3, BADA 4, or ANP and BADA 3 Fallback. ○ *ANP and BADA 3* indicates that SAE-AIR-1845/ECAC Doc 29/ICAO Doc 9911 (ANP) model was used for thrust calculations and the BADA 3 model was used for fuel burn in the terminal area; and the BADA 3 model was used for both thrust and fuel burn calculations in the en-route phase (above 10,000 ft) (if applicable for the operation). ○ *BADA 4* indicates that the BADA 4 model was used for both thrust and fuel burn calculations in the terminal area and the en-route phase, where appropriate data were available. ○ *ANP and BADA 3 Fallback* indicates that using the BADA 4 model failed and ANP and BADA 3 was used instead.
Errors and Warnings	Any ANP and BADA 3performance errors generated from processing the aircraft operation.
BADA 4 Model	Identifier for the BADA 4 aircraft assigned to the operation, if appropriate.

Appendix B.2.4 Details Pane – Tracks Tab

Parameter	Description
Track ID	AEDT generated track ID.
Track	Track name.
Runway End	Runway end associated with the operation.
Operation Type	Type of operation associated with the track.
Aircraft Type	Type of aircraft for the operation.
Track Type	Type of track – Point or Vector.

Appendix B.2.5 Metric Results Wizard – Processing Options

Parameter	Description
Results Storage Options	

Noise	Level of results to report. Operation Group, Operation, and Detailed in order of refinement. Operation or Operation Group must be selected in order to calculate noise energy contributions. Detailed must be selected in order to view the detailed noise results.
Emissions	Level of results to report. Operation Group, Operation, and Segment in order of refinement.
Emissions/Performance Modeling Options	
Weather Fidelity	This option is available for all metric types except emissions dispersion metrics (which use AERMOD weather) and allows for the selection of average annual airport weather (with multiple averaging period options), International Standard Atmosphere (ISA) weather, or high fidelity weather.

Aircraft Performance Modeling Options	The following options are available from this menu.
	 • *Use ANP/BADA 3 only*
	      o When selected, AEDT uses the SAE-AIR-1845/ECAC Doc 29/ICAO Doc 9911 (ANP) model for thrust calculations in the terminal area, the Senzig-Fleming-Iovinelli (SFI) or BADA 3 fuel burn model for all phases of flight (en-route (above 10,000 feet MSL) and the terminal area), and the BADA 3 performance model for thrust calculations in the en-route phase (above 10,000 feet MSL) (if applicable for the operation).
	 • *Use BADA 4 for approved aircraft*
	      ▪ When selected, AEDT will use BADA 4 as described below for aircraft that are approved for FAA regulatory use.
	 • *Use BADA 4 when available*
	      ▪ When selected, the following confirmation dialog is displayed – "The annualization used in this metric result includes aircraft for which the use of BADA 4 performance is a non-standard modeling option that is offered for research purposes only. Do you want to continue creating a metric result that can be used for research purposes only?". Click *Yes* to use BADA 4 as described below or click *No* to use the standard ANP and BADA 3 models.

Use ANP and BADA 3 fallback	When selected, if the BADA 4 model fails to process the operation, AEDT will attempt to process the operation using SAE-AIR-1845/Doc 29 (ANP) model for thrust calculations and the BADA 3 model for fuel burn in the terminal area; and the BADA 3 model will be used for both thrust and fuel burn calculations in the en-route phase (above 10,000 ft) (if applicable for the operation). If the operation fails using either or both models, it will be reported in the error log. When unselected, if the BADA 4 model fails to process the operation, the operation will fail. If BADA 4 data is not available for the particular aircraft, it will use SAE-AIR-1845/Doc 29 (ANP) model for thrust calculations and the BADA 3 model for fuel burn in the terminal area; and the BADA 3 model will be used for both thrust and fuel burn calculations in the en-route phase (above 10,000 ft) (if applicable for the operation).
Enable reduced thrust taper	When selected and the annualization includes operations that use reduced thrust profiles, the transition between reduced takeoff thrust below 10,000 ft MSL to climb power above 10,000 ft MSL will be applied based on the *Taper upper limit*.
Taper upper limit MSL (ft)	Enter an altitude between 10,500 and 40,000 feet MSL for the transition from reduced thrust to BADA 4 climb power to be achieved.
Check track angle	When selected, AEDT discards operations on tracks with angles that exceed 90 degrees.

Apply Delay & Sequencing Model	When selected, AEDT uses the delay sequence queueing modeling for taxi operations for all metric types. Operating configuration and taxi network must exist in the study airport for this option to affect the results. In addition, aircraft operations must be assigned to a gate. If this option is not selected, the operating configuration is ignored and the operations are processed for the specified time without considering delays.
Calculate aircraft engine startup emissions	This option is enabled for Emissions and Emissions Dispersion metrics. When selected, AEDT calculates the startup emissions for the aircraft operations in the metric result.
Analysis year	The analysis year is used in VALE reporting (for emissions metric only) or when considering yearly deterioration for GSE when the manufacturer year is included (emissions and emissions dispersion metrics)
Include MOVES Inventory Scenario(s)	This option is only displayed for emissions and emissions dispersion metric type. This list will contain the MOVES Inventory scenarios with a year that matches that of the metric result. Users have the option to display and select different MOVES inventory scenario by entering desired year (or years) in the *Analysis year* text box.
Include MOVES AERMOD Scenario	This option is only displayed for emissions dispersion metric type. When selected, a list of MOVES AERMOD scenarios with a pollutant type that matches that of the metric result will be available in the drop-down menu.
Noise Modeling Options	
Use hard ground attenuation for helicopters and propeller aircraft	When selected, lateral attenuation is turned off for helicopters and propeller aircraft. When this option is not selected, AEDT uses SAE-ARP-5662 lateral attenuation for all aircraft types. Jet aircraft always use SAE-ARP-5662 for lateral attenuation.
Dynamic grid contour expansion level	This option is only displayed when a dynamic grid receptor set is selected. The lowest closed contour level that the dynamic grid will achieve. Units for dB-based metrics are in decibels. Units for time-based metrics are in minutes or in percent (%).
Atmospheric absorption type	When selected, AEDT includes the effects of atmospheric absorption on noise according to the selected option: ○ *Unadjusted (SAE-AIR-1845 atmosphere)*: AEDT uses the inherent atmospheric absorption according to SAE-AIR-1845 and noise data are unadjusted for study-specific atmospherics. ○ *SAE-ARP-866A*: noise data are adjusted for user-defined temperature and relative humidity values (study-specific airport conditions) according to the methods specified in SAE-ARP-866A. ○ *SAE-ARP-5534*: noise data are adjusted for user-defined temperature, relative humidity, and atmospheric pressure values (study-specific airport conditions) according to the methods specified in SAE-ARP-5534.
Metric Result Options	
Name	(Optional) Name of the metric result.
Description	(Optional) Description of the metric result.
Ambient	
Uniform Ambient	When selected, AEDT uses the specified ambient noise threshold as a threshold to calculate the number of minutes that noise levels are above that threshold at each receptor. When unselected, AEDT uses the threshold of human hearing as the ambient threshold for these metrics.
Threshold (dB)	A fixed ambient noise level threshold in decibels that is applied across all receptors in the metric result.
Geospatially referenced ambient	When selected, AEDT uses the ambient values from the ambient directory specified in the *Definitions* tab.

Offset value (dB)	When selected, the offset value defined in this field is added to the ambient values in selected file.
Terrain	
Use terrain data	When selected, AEDT uses the specified terrain elevation data in noise calculations.
Apply line of sight blockage	When selected, AEDT accounts for the added attenuation due to line of sight blockage from terrain features.
Fill terrain MSL (ft)	When selected, AEDT will use the input elevation in feet as the terrain elevation for any areas not covered by terrain file data.
Number Above Noise Level	
Calculate Number Above Noise Level	When selected, AEDT will output the number of operations above the threshold in the Noise Report and receptor set attributes. Noise levels will not be reported.
Number Above Threshold (dB)	Enter the threshold level (in decibels) in which to compare noise level results. Only a single threshold level can be provided for each metric result.
Emission Dispersion Output	
NO2 Modeling Tier	NO2 to NOx conversion method.
Source Groups	Source groups included in the emissions dispersion report.
Averaging Times and Rankings	Averaging times and ranking of values to report. Empty averaging times will report nothing. Month and Annual averaging times require a minimum study length of a month or a year, respectively, to complete.
Allow computation of all averaging times without EPA's PM2.5 modeling requirements	This option is available when a PM2.5 metric is selected. This checkbox allows for the selection of any averaging time rather than only allowing the selection of the 24-hour averaging times permitted by the U.S. Environmental Protection Agency's (EPA's) PM2.5 National Ambient Air Quality Standards (NAAQS) special processing requirements. This option will be selected by default if less than a full year of data is included in the selected annualization as a complete year of data is one of the special processing requirements. See the EPA's AERMOD User Guide for more information2.
Compute 1-hour Max Daily averages at each receptor for use in assessing NAAQS	This option is enabled for SOx/SO2 metrics that contain a minimum of four days of operations data and for NOx/NO2 metrics that contain a minimum of eight days of operations data. When selected, AEDT computes the 1-hour averaged maximum daily emission value for each receptor to use in assessing NAAQS. For SOx/SO2, AEDT outputs the 4th highest value for each receptor, and for NOx/NO2, AEDT outputs the 8th highest value.
Background Concentrations / Background Ozone Concentrations	
Enable background concentrations	When selected, enables background concentration modeling.
Add wind sector	Add a new wind sector definition to the end of the current set of wind sectors.
Units	The units of a provided hourly or non-hourly background concentrations file.
Start	The starting angle of the selected wind sector.
Delete wind sector	Delete the currently selected wind sector
Hourly file	When enabled, allows definition of an hourly background concentration file for the currently selected wind sector. Not mutually exclusive with non-hourly definitions.
Non-hourly	When enabled, allows definition of non-hourly background concentrations for the currently selected wind sector. Not mutually exclusive with hourly definitions.
Annual	When enabled, AEDT calculates background concentrations using a single background value specified by the user.
Use file	When enabled, AEDT calculates background concentrations using a non-hourly background concentration file specified by the user.

Type	The temporal type of the specified non-hourly background concentration file, as determined by AEDT. (ANNUAL, MONTHLY, WSPEED, etc.)
Wind Speed Categories (m/s)	If the non-hourly file is of the type WSPEED, lists the wind speed categories.
Aircraft Source Characterization	
Volume	When selected, AEDT will characterize aircraft sources as volume sources.
Area	When selected, AEDT will characterize aircraft sources as area sources.
Area Source Plume Meander (ALPHA)	
Enable plume meander for area sources	When selected, AEDT will include plume meander effects (the effects of slow, lateral back and forth shifting of the plume from low frequency, non-diffusing eddies) in emissions dispersion modeling for area sources. Plume meander is already included when modeling volume sources.
Aircraft Plume Rise Modeling (ALPHA)	
Enable aircraft plume rise modeling	When selected, AEDT will include plume rise effects (the effects of buoyancy and horizontal momentum of exhaust gases from aircraft engines) in emissions dispersion modeling for aircraft sources.
Urban Modeling Option	
Urban Modeling Option	When selected, AEDT will incorporate increased surface heating effects from urban areas on emissions dispersion based on population entered in the Urban Area Population field.
Urban Area Population	The population for the study area. This option is enabled when the Urban Modeling Option is selected.
Low Wind Options (ALPHA)	
Low Wind Options (ALPHA)	When selected, this ALPHA feature allows for the option of adjusting parameters that can affect model performance under low-wind conditions. This option is available for emissions dispersion metrics.
Minimum sigma-v value (m/s)	Minimum sigma-v value or Svmin (Min = 0.01, Max = 1.0, Default = 0.2) This parameter is available when the Low Wind Options (ALPHA) is selected.
Minimum sigma-w value (m/s)	Minimum sigma-w value or Swmin (Min = 0.01, Max = 3.0, Default = 0.02) This parameter is available when the Low Wind Options (ALPHA) is selected.
Minimum wind speed value (m/s)	Minimum wind speed value or Wsmin (Min = 0.01, Max = 1.0, Default = 0.2828) This parameter is available when the Low Wind Options (ALPHA) is selected.
Minimum value for the meander factor	Minimum value for the meander factor or FRANmin (Min = 0.0, Max = 1.0, Default = 0.0) This parameter is available when the Low Wind Options (ALPHA) is selected.
Maximum value for the meander factor	Maximum value for the meander factor or FRANmax (Min = 0.0, Max = 1.0, Default = 1.0) This parameter is available when the Low Wind Options (ALPHA) is selected.
TRAN time period (hrs)	Time period (BigT) used to calculate the time scale (Min= 0.5, Max = 48, Default = 24.0) This parameter is available when the Low Wind Options (ALPHA) is selected.
Balance approach	Energy or momentum (PBAL) balance approach for determining plume meander (Default = Energy) This parameter is available when the Low Wind Options (ALPHA) is selected.
NO2 Options	
Lower Limit	ARM2 option – lower limit of ambient ratio
Upper Limit	ARM2 option – upper limit of ambient ratio
Ambient Equilibrium NO2/NOx Ratio	Tier 3, ALPHA (TTRM), ALPHA (TTRM2) options – ambient equilibrium ratio
In-Stack NO2/NOx Ratio	Tier 3, ALPHA (TTRM) ALPHA (TTRM2), and BETA (GRSM) option – in-stack ratios for all source types and thrust % Max for aircraft

Background Ozone Concentrations	Tier 3, ALPHA (TTRM), ALPHA (TTRM2), and BETA (GRSM) option – background ozone concentrations information.
Background NOx Concentrations	BETA (GRSM) option – background NOx concentrations information.

Appendix B.3 Metric Results Tab – Layer Attributes

Parameter	Description
Contour Layer	
Object ID	AEDT generated object ID.
Contour (dB)	Contour noise level, in decibels.
Time Audible (min)	Amount of time (in minutes) aircraft is audible above given ambient file
Time Audible (%)	Percentage of time aircraft is audible above given ambient file
Closed	Indicates whether the contour is closed or not
Perc. Area (%)	Percent area is the area % covered by the given contour level that does not include the next higher contour level. For example, for a 70 dB contour level, this value represents the 70 dB contour area minus the 75 dB area. In other words: Percent Area for 70 dB = Cumulative % area for 70 dB – Cumulative % area for 75 dB
Cum. Perc. Area (%)	Percentage of total area covered by the given contour level and higher. For example, for a 70 dB contour level, this value represents the area percentage for 70 dB and higher. The cumulative percent area is calculated by dividing the Shape Area by the receptor set area or boundary area.
Shape Length (m)	Length (perimeter) of the contour(s) for the given contour level, in meters. If there are multiple contours for the given contour level, then this value represents the combined length of multiple contours. For example, if multiple contours exist for 75 dB level, the shape length is the sum of the length of those contours.
Shape Area (sq m)	Area of the contour for the given contour level and higher, in square meters. For example, for a 70 dB contour level, this value represents the area for 70 dB and higher.
Metric Type	Type of metric.
Metric Name	Name of the metric.
Track Layer	
Track Name	Name of the track.
Aircraft Type	Type of aircraft assigned to the track.
Airport	Airport associated with the track.
Runway End	Runway end associated with the track.
Operation Type	Type of operation associated with the track.
Track Type	Type of track.
Subtrack ID	Subtrack identifier.
Subtrack Num	Ordinal number of the subtrack.
PCT Dispersion	Percentage of a given operations to be applied on the subtrack.
Sensor Path Layer	
Sensor Type	Type of sensor path data.
Departure Airport Name	Departure airport associated with the track.
Departure Airport Layout ID	Departure airport layout associated with the track.

Parameter	Description
Departure Runway End ID	Departure runway end associated with the track.
Arrival Airport Name	Arrival airport associated with the track.
Arrival Airport Layout ID	Arrival airport layout associated with the track.
Arrival Runway End ID	Arrival runway end associated with the track.
Receptor Set Layer	
Receptor ID	AEDT generated receptor ID.
Receptor Name	Receptor name.
Receptor Index	AEDT generated receptor index.
Receptor Set ID	AEDT generated receptor set ID.
Receptor Set Name	Receptor set name.
Latitude	Latitude of the grid point, in degrees.
Longitude	Longitude of the grid point, in degrees.
Elevation MSL (ft)	Elevation of the grid point, in feet above mean sea level.
Noise Exposure Layer	
Receptor ID	AEDT generated receptor ID.
Receptor Name	Receptor name.
Receptor Index	AEDT generated receptor index.
Receptor Set ID	AEDT generated receptor set ID.
Receptor Set Name	Receptor set name.
Latitude	Latitude of the grid point, in degrees.
Longitude	Longitude of the grid point, in degrees.
Elevation MSL (ft)	Elevation of the grid point, in feet above mean sea level.
Noise (dB)	Noise level at the grid point, in decibels.
Minutes	Amount of time (in minutes) aircraft is audible.
Metric Type	Type of metric.
Metric Name	Name of the metric.
Pollutant Concentration Layer	
Latitude	Latitude of the emissions concentration receptor point, in degrees.
Longitude	Longitude of the emissions concentration receptor point, in degrees.
Elevation MSL (ft)	Elevation of the emissions concentration receptor point, in feet.
Pollutant ($\mu g/m^3$)	The total level of the pollutant (sum of the source concentrations and the background concentrations).
Pollutant Src	The portion of the total pollutant level contributed by source concentrations, at the same location and time.
Pollutant BG	The portion of the total pollutant level contributed by background concentrations, at the same location and time.
Pollutant BG Peak	The highest value of background concentrations level, during the entire period at the same location.
Measured Date	The date of the pollutant measurement.
Average	Averaging period applied to the layer.
Rank	The rank applied to the layer where each averaging period at the given receptor for the duration of the annualization is ranked by concentration level.
Group	Source group.

Parameter	Description
Concentration Contour Layer	
Object ID	AEDT generated object ID.
Concentration ($\mu g/m^3$)	The total level of the pollutant.
Shape Length (m)	Length of the contour, in meters.
Shape Area (m^2)	Area of the contour, in square meters.
Group	Source group.
Average	Averaging period applied to the layer.
Rank	The rank applied to the layer where each averaging period at the given receptor for the duration of the annualization is ranked by concentration level.
Scaling Method	Selected scaling method – Log10 or Linear
Closed	True or False to indicate if the contour is closed (True) or open (False).
Perc. Area (%)	Percent area is the area % covered by the given contour level that does not include the next higher contour level.
Cum. Perc. Area (%)	Percentage of total area covered by the given contour level and higher.
Impact Set Layer	
Latitude	Latitude of the grid point, in degrees.
Longitude	Longitude of the grid point, in degrees.
Base Noise (dB)	Baseline noise level, in decibels.
Alt Noise (dB)	Alternative noise level, in decibels.
Noise Change (dB)	Change in noise from the baseline to the alternative, in decibels.
Impact Color	Color of the grid point on the map that corresponds to the impact range and the Impact Set Layer symbology.
Impact Range	The category for the change in noise from baseline to alternative.
Time Audible Ambient Map Layer	
Latitude	Latitude of the ambient map point, in degrees.
Longitude	Longitude of the ambient map point, in degrees.
Ambient Noise	Ambient noise level as specified in the ambient map file divided by 10.
X	X coordinate
Y	Y coordinate
Surface Sector Layer	
Airport/Non-Airport	Denotes if the pi-sector belongs to the airport side or non-airport side.
Latitude	Latitude, in degrees.
Longitude	Longitude, in degrees.
Radius (km)	Wind sector radius
Start (degrees)	Wind sector start angle, in degrees.
End (degrees)	Wind sector end angle, in degrees.
Freq Index	Frequency index where 1 = Annual, 4 = seasonal, and 12 = monthly
Albedo	The fraction of total incident solar radiation reflected by the surface back to space without absorption. U.S. Environmental Protection Agency, <u>AERSURFACE User's Guide</u>, Report No. EPA-454/B-08-001, January 2008.
Bowen Ratio	An indicator of the surface moisture, is the ratio of sensible heat flux to latent heat flux. U.S. Environmental Protection Agency, <u>AERSURFACE User's Guide</u>, Report No. EPA-454/B-08-001, January 2008.
Roughness (m)	Surface roughness length.

Parameter	Description
Airport Layers – Buildings	
ID	AEDT generated building ID.
Type	Airport layout component type—Building.
Name	Name of building.
Airport Layers – Construction Zones	
Type	Airport layout component type—Construction Zone.
Name	Name of construction zone.
Airport Layers – Gates	
Type	Airport layout component type—Gate.
Name	Name of gate.
Longitude	Longitude for this gate, in degrees.
Latitude	Latitude for this gate, in degrees.
Airport Layers – Parking Facilities	
Type	Airport layout component type—Parking Facility.
Name	Name of parking facility.
Airport Layers – Roadways	
Type	Airport layout component type—Roadway.
Name	Name of roadway.
Airport Layers – Runways	
Type	Airport layout component type – Runway.
Name	Name of runway.
Runway End 1 Name	Name of runway end 1.
Runway End 2 Name	Name of runway end 2.
Width (m)	Width of the runway, in meters.
Airport Layers – Runway Ends	
Type	Airport layout component type—Runway End 1 or Runway End 2.
Name	Name of the runway end.
Latitude	Latitude for this runway end in degrees.
Longitude	Longitude for this runway end in degrees.
Airport Layers – Taxipaths	
Type	Airport layout component type—Taxipath.
Name	Name of the taxipath—consists of gate name, direction, and runway end name.
Inbound	Checked if the taxipath is inbound; uncheck for outbound.
Taxiway ID	Set of taxiway IDs in the taxipath.
Airport Layers – Taxiways	
Type	Airport layout component type—Taxiway.
Name	Name of the taxiway.
Width (m)	Width of the taxiway. (m)
Airport Layers –Tracks	
Type	Airport layout component type —Track.
Name	Name of track.
Airport Layers – Via Points	
Type	Airport layout component type—Via Point.
Name	Name of the via point—vp.
Latitude	Latitude for this runway end, in degrees.
Longitude	Longitude for this runway end, in degrees.

Parameter	Description
Environmental Justice Layer	
Object ID	AEDT generated object ID.
BLKGRP	Census block group number.
COUNTY	County name.
GEOID	Census geographic identifier.
STATE	State code.
FIPS	Federal Information Processing Standards (FIPS) code for the geographic area.
TRACT	Census tract number.
Name	Description of the block group, census tract, county, and state.
Variable columns (e.g., B02008_001E, B02009_001E, etc.)	See https://api.census.gov/data/2020/acs/acs5/variables.html for variable definitions.
Limited English Proficiency Layer	
Object ID	AEDT generated object ID.
COUNTY	County name.
GEOID	Census geographic identifier.
STATE	State code.
TRACT	Census tract number.
FIPS	Federal Information Processing Standards (FIPS) code for the geographic area
Name	Description of the census tract, county, and state.
Variable columns (e.g., B02008_001E, B02009_001E, etc.)	See the https://api.census.gov/data/2020/acs/acs5/variables.html for variable definitions.

Appendix B.4 Metric Results Tab – Report Details

Appendix B.4.1 Flight Performance Report

Parameter	Description
Flight Operations Tab – Data Grid	
User ID	User Defined ID.
Operation ID	AEDT generated aircraft operation ID.
Event ID	AEDT generated event ID.
Track	Track name for the operation.
Aircraft Code	ANP ID for the aircraft.
Aircraft Type	Type of aircraft (rotary or fixed wing).
Operation Type	Type of operation.
Operation Count	Number of operations over the duration of the annualization under which the operation is included.
Flight Trajectory Type	Type of profile (procedural or fixed-point)
Profile Name	Name of profile.
Stage Length	Stage length category for the operation.
Departure Airport	Name of the departure airport for the operation.
Departure Runway End	Name of the departure runway end for the operation.
Arrival Airport	Name of the arrival airport associated with the operation.

Parameter	Description
Arrival Runway End	Name of the arrival runway end for the operation.
Noise Altitude Cutoff MSL (ft)	Altitude above which noise calculations are no longer processed, in feet mean sea level. Note that the unit is in MSL, not AGL. Valid range: 0 – 100,000
Flight Segments Tab	
Segment Index	Segment number.
Time Stamp	Date and time for the flight segment.
Latitude (°)	Latitude location of the receptor, in degrees.
Longitude (°)	Longitude location of the receptor, in degrees.
Altitude AFE (ft)	Altitude Above Field Elevation, in feet.
Heading (°)	Heading direction of the segment, in degrees.
Operation Mode	Segment noise mode which determines the set of NPD curves used to calculate noise for that segment. Runup, Approach, Departure, Afterburner, Circuit, Overflight, Touch and Go, Taxi, or Null.
Trajectory Mode	Trajectory mode of the segment used in performance calculations. TaxiOut, TakeoffGroundRoll, TakeoffAirborne, TerminalClimb, EnrouteClimb, Cruise, EnrouteDescent, Approach, LandingGroundRoll, LandingGroundRollWithReverseThrust, TaxiIn, Idle, None* *"None" is the last segment of an operation.
Step Type	The step type of the flight procedure used to model this segment.
Segment Duration (h:mm:s)	Duration of the flight segment in hours, minutes, and seconds.
Segment Length (nmi)	The length of the flight segment in nautical miles.
Ground Track Distance (nmi)	The distance of individual flight segment's path on the horizontal plane in nautical miles.
Cumulative Ground Track Distance (nmi)	The sum of the flight segment and the previous flight segments' paths on the horizontal plane in nautical miles.
Bank Angle (°)	The roll angle about the aircraft's longitudinal axis. By convention a left turn has a positive bank angle and a right turn has a negative bank angle.
Altitude MSL (ft)	Altitude Above Mean Sea Level, in feet.
Ground Speed (kts)	Starting speed of the segment; including all spatial components, from a frame of reference of an observer on the ground in knots.
Delta Ground Speed (kts)	Change in speed in knots from the previous flight segment.
Mach Number	The ratio of the true airspeed of the aircraft to the speed of sound in the surrounding air.
Unit X	Unit vector representing the x component of the segment's direction.
Unit Y	Unit vector representing the y component of the segment's direction.
Unit Z	Unit vector representing the z component of the segment's direction.
Weight (lbs)	Starting weight of the segment.
Fuel Model Type	Fuel model used for the segment – SFI, BADA3, BFFM2, BADA4, EDB or Unknown. See the AEDT Technical Manual for more information on fuel mode types.
Fuel Flow per Engine (lb/s)	Fuel flow per engine in pounds of fuel per second.
Fuel Burn (lbs)	Total fuel burned across all engines over the duration of the segment.

Parameter	Description
Cumulative Fuel Burn (lbs)	Total fuel burned across all engines over the duration of the segment and all previous flight segments.
Noise Thrust Per Engine (lbs)	The value of an airplane's power setting per engine in pounds.
Corrected Net Thrust Per Engine (lbs)	Net thrust divided by the ratio of ambient pressure at aircraft altitude (feet MSL) to standard atmospheric pressure at mean sea level. Net corrected thrust describes the net thrust at standard sea-level conditions.
Airplane Thrust Type	The thrust type of the flight procedure used to model this segment.
Include Segment for Noise Calculations	Indicator for whether the segment should be used in noise calculations. A segment may be removed from noise calculation if for example it is a taxi segment or if the segment altitude is above the noise cutoff altitude.

Appendix B.4.2 Emissions and Fuel Report

Available fields differ depending on the options selected prior to generating the report.

Parameter	Description
Operation Group	Name of the operation group.
Mode	Description of aircraft state.
Event ID	AEDT generated event ID.
Equipment Type	Description of aircraft equipment.
Departure Airport	Name of the departure airport for the operation (departure operations).
Arrival Airport	Name of the arrival airport for the operation (arrival operations).
Fuel (g)	Fuel in the selected units.
Distance (km)	Distance in kilometers.
Duration	Duration in (hh:mm.ss).
CO	Carbon monoxide in the selected units.
THC	Total hydrocarbons in the selected units.
TOG	Total organic gases in the selected units.
VOC	Volatile organic compounds in the selected units.
NMHC	Non-methane hydrocarbons in the selected units.
NOx	Oxides of nitrogen in the selected units.
SOx	Sulfur oxides in the selected units.
PMSO	Volatile sulfate particulate matter in the selected units.
PMFO	Volatile organic particulate matter in the selected units.
PM10	Particulate matter less than 10 micrometers aerodynamic diameter.
PM2.5	Particulate matter less than 2.5 micrometers aerodynamic diameter.
nvPM Mass	Nonvolatile particulate matter expressed in the selected mass units.
nvPM Number	Nonvolatile particulate matter expressed in total number.
CO2	Carbon dioxide in the selected units.
CH4	Methane in the selected units.
CO2e	Carbon dioxide equivalent in the select units.
H2O	Water in the selected units.
Performance Model	Performance model that was used to process the aircraft operation. Valid values are: ANP and BADA 3, BADA 4, or ANP and BADA 3 Fallback. o *ANP and BADA 3* indicates that SAE-AIR-1845/ECAC Doc 29/ICAO Doc 9911 (ANP) model was used for thrust calculations and either the SFI or the BADA 3 fuel burn model was used in the terminal area; and the

Parameter	Description
	BADA 3 model was used for both thrust and fuel burn calculations in the en-route phase (above 10,000 ft MSL) (if applicable for the operation). ○ *BADA 4* indicates that the BADA 4 model was used for both thrust and fuel burn calculations in the terminal area and the en-route phase, where appropriate data were available. ○ *ANP and BADA 3 Fallback* indicates that using the BADA 4 model failed and ANP and BADA 3 was used instead.
Operation ID	AEDT generated operation ID.
User ID	User defined ID.
Airport	Airport that corresponds to the operation.
Operation Time	Date and time of the operation (beginning of segment).
Op Type	Type of operation.
Num Ops	Number of operations.
Segment#	Segment number
Latitude	Latitude location of the beginning of the segment, in degrees.
Longitude	Longitude location of the beginning of the segment, in degrees.
Altitude AFE (ft)	Altitude of the beginning of the segment in feet AFE.
Altitude MSL (ft)	Altitude of the beginning of the segment in feet MSL.
Unit-x	Unit vector representing the x component of the segment's direction (beginning of segment).
Unit-y	Unit vector representing the y component of the segment's direction (beginning of segment).
Unit-z	Unit vector representing the z component of the segment's direction (beginning of segment).
Segment Length (ft)	The length of the flight segment in feet.
Ground Track Distance (ft)	The distance of individual flight segment's path on the horizontal plane in nautical miles.
Ground Speed (kt)	Starting speed of the segment; including all spatial components, from a frame of reference of an observer on the ground in knots.
Delta Speed (kt)	Change in speed in knots from the previous flight segment.
Trajectory Mode	Trajectory mode of the segment used in performance calculations. TaxiOut, TakeoffGroundRoll, TakeoffAirborne, TerminalClimb, EnrouteClimb, Cruise, EnrouteDescent, Approach, LandingGroundRoll, LandingGroundRollWithReverseThrust, TaxiIn, Idle, None* *"None" is the last segment of an operation (emissions and fuel burn are zero).
Corrected Net Thrust Per Engine (lb)	Net thrust divided by the ratio of ambient pressure at aircraft altitude (feet MSL) to standard atmospheric pressure at mean sea level. Net corrected thrust describes the net thrust at standard sea-level conditions.

Appendix B.4.3 Speciated Organic Gases Report

Available fields differ depending on the metric type and IRIS setting options.

Parameter	Description
Id	AEDT generated ID for the record (row).
JobId	Metric result ID.

Parameter	Description
Airport	Name of the airport associated with the metric result.
AptLayout	Name of the airport layout associated with the metric result.
Mode	Description of aircraft state.
Formaldehyde (IRIS, CAA)	Formaldehyde in the selected units.*
Methyl alcohol (IRIS, CAA)	Methyl alcohol (methanol) in the selected units.*
C-4 Benzene + C-3 Aroald	C-4 Benzene + C-3 Aroald in the selected units.
C-5 Benzene + C-4 Aroald	C-5 Benzene + C-4 Aroald in the selected units.
Benzene (IRIS, CAA)	Benzene in the selected units.*
Acetaldehyde (IRIS, CAA)	Acetaldehyde in the selected units.*
Naphthalene (IRIS, CAA)	Naphthalene in the selected units.*
O-xylene (IRIS, CAA)	o-Xylene in the selected units.*
Isopropylbenzene (cumene) (IRIS, CAA)	Isopropylbenzene (cumene) in the selected units.*
Ethylbenzene (IRIS, CAA)	Ethyl benzene in the selected units.*
Styrene (IRIS, CAA)	Styrene in the selected units.*
M & P-xylene (IRIS, CAA)	m- & p-Xylene in the selected units.*
1,3-butadiene (IRIS, CAA)	1,3-Butadiene in the selected units.*
Acrolein (IRIS, CAA)	Acrolein (2-propenal) in the selected units.*
Toluene (IRIS, CAA)	Toluene in the selected units.*
Phenol (carbolic acid) (IRIS, CAA)	Phenol (carbolic acid) in the selected units.*
Propionaldehyde (CAA)	Propionaldehyde in the selected units.*
Acetone (IRIS)	Acetone in the selected units.*
2-methylnaphthalene (IRIS)	2-Methylnaphthalene in the selected units.*
Benzaldehyde (IRIS)	Benzaldehyde in the selected units.*
N-heptane (IRIS)	n-Heptane in the selected units.*
Ethane	Ethane in the selected units.
Ethylene	Ethylene in the selected units.
Acetylene	Acetylene in the selected units.
Propane	Propane in the selected units.
2-methyl-2-propenal (methacrolein)	2-Methyl-2-propenal (methacrolein) in the selected units.
Methylglyoxal	Methylglyoxal in the selected units.
1-Methylnaphthalene	1-Methylnaphthalene in the selected units.
1,2,4-trimethylbenzene (1,3,4-trimethylbenzene)	1,2,4-Trimethylbenzene (1,3,4-trimethylbenzene) in the selected units.
N-propylbenzene	n-Propylbenzene in the selected units.
p-Tolualdehyde	p-Tolualdehyde in the selected units.
2-methyl-1-butene	2-Methyl-1-butene in the selected units.
3-methyl-1-butene	3-Methyl-1-butene in the selected units.
1-butene	1-Butene in the selected units.
Glyoxal	Glyoxal in the selected units.
2-methylpentane	2-Methylpentane in the selected units.
1,3,5-trimethylbenzene	1,3,5-Trimethylbenzene in the selected units.
N-pentane	n-Pentane in the selected units.
2-methyl-1-pentene	2-Methyl-1-pentene in the selected units.
4-methyl-1-pentene	4-Methyl-1-pentene in the selected units.

Parameter	Description
1-pentene	1-Pentene in the selected units.
Valeraldehyde	Valeraldehyde in the selected units.
N-octane	n-Octane in the selected units.
1-octene	1-Octene in the selected units.
N-nonane	n-Nonane in the selected units.
N-dodecane	n-Dodecane in the selected units.
Propylene	Propylene in the selected units.
Butyraldehyde	Butyraldehyde in the selected units.
1-nonene	1-Nonene in the selected units.
N-decane	n-Decane in the selected units.
2-methyl-2-butene	2-Methyl-2-butene in the selected units.
1,2,3-trimethylbenzene	1,2,3-Trimethylbenzene in the selected units.
o-Tolualdehyde	o-Tolualdehyde in the selected units.
N-Hexadecane	n-Hexadecane in the selected units.
Cis-2-butene	cis-2-Butene in the selected units.
Isovaleraldehyde	Isovaleraldehyde in the selected units.
1-hexene	1-Hexene in the selected units.
1-Methyl-2-ethylbenzene (o-ethyltoluene)	1-Methyl-2-ethylbenzene (o-ethyltoluene) in the selected units.
1-Methyl-3-ethylbenzene (m-ethyltoluene)	1-Methyl-3-ethylbenzene (m-ethyltoluene) in the selected units.
Tolualdehyde	Tolualdehyde in the selected units.
1-Methyl-4-ethylbenzene (p-ethyltoluene)	1-Methyl-4-ethylbenzene (p-ethyltoluene) in the selected units.
Cis-2-pentene	cis-2-Pentene in the selected units.
N-tridecane	n-Tridecane in the selected units.
N-Tetradecane	n-Tetradecane in the selected units.
N-Pentadecane	n-Pentadecane in the selected units.
N-heptadecane	n-Heptadecane in the selected units.
Trans-2-pentene	trans-2-Pentene in the selected units.
1-decene	1-Decene in the selected units.
N-undecane	n-Undecane in the selected units.
Trans-2-hexene	trans-2-Hexene in the selected units.
Crotonaldehyde	Crotonaldehyde in the selected units.
Heptene	Heptene in the selected units.
Dimethyl napthalene	Dimethyl naphthalene in the selected units.
C-10 Olefins	C-10 Olefins in the selected units.
C-10 Paraffins	C-10 Paraffins in the selected units.
C-14 Alkane	C-14 Alkane in the selected units.
C-15 Alkane	C-15 Alkane in the selected units.
C-16 Alkane	C-16 Alkane in the selected units.
C-18 Alkane	C-18 Alkane in the selected units.
Decanol	Decanol in the selected units.
Dodecanol	Dodecanol in the selected units.

*Identified as a hazardous air pollutant in the Clean Air Act (CAA) or IRIS databases at the time of the software release.

Appendix B.4.4 Ground Emissions Detail Report

Parameter	Description
Operation Group	Name of the operation group.
Operation ID	AEDT generated operation ID
Event ID	AEDT generated event ID.
Equipment Type	Description of aircraft equipment.
Mode	Description of aircraft state.
DateTime	Date and time of the operation.
THC	Total hydrocarbon in the selected units.
CO	Carbon monoxide in the selected units.
NOx	Oxides of nitrogen in the selected units.
TOG	Total organic gases in the selected units.
VOC	Volatile organic compounds in the selected units.
NMHC	Non-methane hydrocarbons in the selected units.
SOx	Sulfur oxides in the selected units.
PM10	Particulate matter less than 10 micrometers aerodynamic diameter.
PM2.5	Particulate matter less than 2.5 micrometers aerodynamic diameter.

Appendix B.4.5 Noise Report

Parameter	Description
Noise Result Index	AEDT generated noise result index.
Latitude (deg)	Latitude location of the receptor, in degrees.
Longitude (deg)	Longitude location of the receptor, in degrees.
Elevation MSL (ft)	Elevation of the receptor, in feet MSL.
Noise Level (dB) or Time (min)	Noise level at the grid point, in decibels or in minutes
Metric Type	Type of metric.
Metric Name	Name of the metric.
Receptor ID	AEDT generated receptor ID.
Receptor Name	Receptor name.
Receptor Set ID	AEDT generated receptor set ID.
Receptor Set Name	Receptor set name.

Appendix B.4.6 Detailed Noise Report

Parameter	Description
Metric Result ID	ID of the metric result used in report
Scenario	Name of scenario
Case	Name of case
Annualization	Name of annualization
Noise Metric	Noise metric used in report calculation
Noise Level (dB), Time (min), Time Audible (min) or Time Audible (%)	Total noise level for all flights, in decibels, minutes or in %
Receptor ID	AEDT generated receptor ID.
Receptor Name	Receptor name.
Receptor Set ID	AEDT generated receptor set ID.
Receptor Set Name	Receptor set name.

Parameter	Description
Receptor Count	Total number of receptor points in the receptor set
Receptor Index	Index of receptor point in the receptor set
Latitude (deg)	Latitude of receptor point, in degrees.
Longitude (deg)	Longitude of receptor point, in degrees.
Elevation MSL (ft)	Elevation of the receptor point, in feet MSL.
Air Operation ID	Air operation ID
Air Operation Type	Type of operation.
ANP Airplane	ANP ID of the aircraft.
BADA 3 Airplane	BADA 3 ID of the aircraft.
BADA 4 Airplane	BADA 4 ID of the aircraft.
Helicopter	Only applicable to helicopters. ANP Helicopter ID.
Helo Duration (sec)	Only applicable to helicopters.
Helo Heading (deg)	Only applicable to helicopters. Heading in degrees.
Helo NPD Mode	Only applicable to helicopters. NPD mode.
Profile	Flight profile group name.
Stage length	Stage length number.
Track	Track name.
Track Type	Type of track (V = vector, P = point).
Runway End Name	Runway end name.
Altitude AFE (ft)	Altitude above airport elevation of the aircraft at closest-point-of-approach (CPA).
Distance (ft)	Distance from the grid point on the group to the aircraft at closest-point-of-approach.
Ground speed (kt)	Average groundspeed across the entire segment.
Corrected Net Thrust Per Engine	Thrust setting of the aircraft at closest-point-of-approach. This is corrected net thrust per engine, not total net thrust in Newtons, percent, or other. Not applicable to helicopters.
Thrust Type	Type of thrust used by aircraft. Not applicable to helicopters.
Elevation Angle at CPA (deg)	Elevation angle from the horizontal ground plane to the aircraft at closest-point-of-approach, in degrees.
Equivalent Operations	Equivalent number of operations (weighted day, evening, and night operations) for the given flight operation.
Metric Value All	Metric value for all weighted operations of the given flight, in decibels or minutes.
Metric Value One	Metric value for a single operation of the given flight, in decibels or minutes.
Percent Total	Percent of the total metric value that is caused by the operation. For noise levels, percent is based on energy or power ratios, not decibels.
Segment CPA	Segment number at CPA.

Appendix B.4.7 Emissions Dispersion Report

Parameter	Description
Pollutant	The pollutant name abbreviation that corresponds to the data in that row.
Group	Source group.
Average	Averaging period applied to the layer.
Rank	The rank applied to the layer where each averaging period at the given receptor for the duration of the annualization is ranked by concentration level.
Total Concentration ($\mu g/m^3$)	The total level of the pollutant (sum of the source concentrations and the background concentrations).
Source Concentration ($\mu g/m^3$)	The portion of the total pollutant level contributed by source concentrations, at the same location and time.
Background Concentration ($\mu g/m^3$)	The portion of the total pollutant level contributed by background concentrations, at the same location and time.
Measured Date	The date of the pollutant measurement.
Latitude (deg)	Latitude of the emissions concentration receptor point, in degrees.
Longitude (deg)	Longitude of the emissions concentration receptor point, in degrees.
Elevation MSL (ft)	Elevation of the emissions concentration receptor point, in feet MSL.
Symbology Index	An index into the concentration pollutant level color map.

Appendix B.4.8 Impact Set Report

Parameter	Description
Baseline	Name of the baseline annualization.
Alternative	Name of the alternative annualization.
Receptor Set	Name of the receptor set.

Appendix B.4.9 Population Exposure Report

Parameter	Description
Contour Level	Noise contour level in decibels.
Population Count	Number of people within the contour.

Appendix B.4.10 VALE Report

Parameter	Description
No.	VALE Report number, consists of the two metric results IDs that were used to generate the VALE Report.
Year	Analysis year.
Source group	Operation group name.
CO	Carbon monoxide in the selected units.
VOC	Volatile organic compounds in the selected units.
NOx	Oxides of nitrogen in the selected units.
SOx	Sulfur oxides in the selected units.
PM10	Particulate matter less than 2.5 micrometers aerodynamic diameter.
PM2.5	Particulate matter less than 10 micrometers aerodynamic diameter.

Appendix B.4.11 Aggregated VALE Report

Parameter	Description
No.	VALE Report number, consists of the two metric results IDs that were used to generate the VALE Report.
Year	Analysis year.
Source group	Annualization name.
CO	Carbon monoxide in the selected units.
VOC	Volatile organic compounds in the selected units.
NOx	Oxides of nitrogen in the selected units.
SOx	Sulfur oxides in the selected units.
PM10	Particulate matter less than 2.5 micrometers aerodynamic diameter.
PM2.5	Particulate matter less than 10 micrometers aerodynamic diameter.

Appendix B.4.12 Fleet Mix Report

Available fields differ depending on the options selected prior to generating the report.

Parameter	Description
Annualization	Annualization name.
Operation Group	Operation group name.
Airport	Airport code.
Runway	Name of the runway end.
Aircraft	Name of the aircraft.
Engine	Engine code associated with the aircraft.
Airport-Approach-Day	Number of approach operations that occur during the day.
Airport-Approach-Evening	Number of approach operations that occur during the evening.
Airport-Approach-Night	Number of approach operations that occur during the night.
Airport-Departure-Day	Number of departure operations that occur during the day.
Airport-Departure-Evening	Number of departure operations that occur during the evening.
Airport-Departure-Night	Number of departure operations that occur during the night.

Appendix B.4.13 Legacy Flight Report

Parameter	Description
Airplane Noise	
index	AEDT generated index.
Id	Aircraft ID.
Fq_type	Metric weighting type (A=A-weighted, P=PNL weighted).
Thrust	Thrust in pounds.
Op_type	Operation type (A = approach, D = departure, V = overflight).
10 SEL/EPNL @ 160 kt	SEL/EPNL NPD data at the 10 standard distances (200 ft – 25,000 ft).
10 LAMAX/PNLTM	LAMAX/PNLT NPD data at the 10 standard distances (200 ft – 25,000 ft).
Airplane Operations	
acft_id	Aircraft noise and performance (ANP) ID.
Eng_type	Engine type (J = Jet, T= Turboprop, P = piston).
Stat_thrust	Static thrust in pounds.
Thrust_type	Thrust type (P=Percent, L=Pounds, X=Other).
Owner_cat	Owner category (C= Commercial, G = GenAviation, M = Military).
Op_type	Operation type (A=appr,D=dep,T=touch&go,F=circuit,V=overflight,R=runup).

Parameter	Description
Numb_ops	Number of ops in the day, evening, night.
Frst_a_nois	Starting Index of the first A – weighted Curve according to index under Airplane Noise.
Numb_a_nois	The number of A-weighted curves counted from frst_a_nois.
Frst_p_nois	Starting Index of the first P – weighted Curve according to index under Airplane Noise.
Numb_p_nois	The number of P-weighted curves counted from frst_p_nois.
Model_type	INM = From ANP database, Noisemap = from military database.
Spect_nums	Assigned spectral class.
Flt_path	Assigned flight path and profile.
Numb_segs	Number of segments.
Seg	An ordinal number for that segment. Each point in the list defines the starting point of a flight path segment.
Start-x	x-position in feet relative to the study's origin.
start-y	y-position in feet relative to the study's origin.
start-z	z-position in feet relative to the study's origin.
Unit-x	Unit vector representing the x component of the segment's direction.
Unit-y	Unit vector representing the y component of the segment's direction.
Unit-z	Unit vector representing the z component of the segment's direction.
Length	Length of the segment in feet.
Speed	Starting speed (airspeed) of the segment in knots.
d.spd	Change in speed over the segment in knots.
Thrust	Starting thrust for the segments, units dependent upon aircraft type.
d.thr	Change in thrust over the segment, units dependent upon aircraft type.
Op	NPD curve operation type A = Approach D = Departure X = Afterburner
flaps	Flap setting used for the segment.
Bank	Bank angle at the beginning of the segment in degrees, positive in a left turn and negative in a right turn.
Duration	Time spent on the segment in seconds.
Helicopter Noise	
helo_id	Helicopter noise and performance (ANP) ID.
Helo_index	AEDT generated index.
Rotor_diam	Main rotor diameter in feet.
Rotor_rpm	Main rotor speed in rpm.
Ref_weight	Reference weight in pounds.
Ref_speeds	Reference speed (airspeed) of the noise data in knots (approach, departure, and overflight).
B_left	Helicopter-specific coefficients for Source Noise Adjustment Due to Advancing Tip Mach Number, left.
B_center	Helicopter-specific coefficients for Source Noise Adjustment Due to Advancing Tip Mach Number, center.
B_right	Helicopter-specific coefficients for Source Noise Adjustment Due to Advancing Tip Mach Number, right.
Spect_nums	Assigned spectral class.

Parameter	Description
Numb_npd_a	Number of NPD datasets, A-weighted.
Numb_npd_p	Number of NPD datasets, P-weighted.
Numb_direc	Number of Static Directivity Adjustment datasets.
Helicopter Operations	
helo_id	Helicopter noise and performance (ANP) ID.
Helo_index	AEDT generated index.
Op_type	Operation type (A = approach, D = departure, T = taxi, V = overflight).
Weight	Helicopter weight in pounds.
Numb_ops	Number of ops in the day, evening, night.
Flight_path	Assigned flight path and profile.
Use_direc	Use directivity adjustment (0=no, 1=yes).
Numb_segs	Number of segments.
Seg	An ordinal number for that segment. Each point in the list defines the starting point of a flight path segment.
Start -x	x-position in feet relative to the study's origin.
Start -y	y-position in feet relative to the study's origin.
Start -z	z-position in feet relative to the study's origin.
Unit-x	Unit vector representing the x component of the segment's direction.
Unit-y	Unit vector representing the y component of the segment's direction.
Unit-z	Unit vector representing the z component of the segment's direction.
Length	Length of the segment in feet.
Speed	Starting speed (airspeed) of the segment in knots.
d.spd	Change in speed over the segment in knots.
Time	Time spent on the segment in seconds.
Head	Heading of a helicopter while on the ground or in hover relative to its ground track in degrees.
Npd	Helicopter operations mode index 0 = Approach 1 = Departure 2 = LevelFly 3 = GndIdle 4 = FltIdle 5 = HovInGE 6 = HovOutGE 7 = DepVertInGE 8 = DepVertOutGE 9 = AppVertInGE 10 = AppVertOutGE 11 = AppHorDec 12 = AppDesDec 13 = DepHorAcc 14 = DepClmAcc 15 = Taxi

Appendix B.5 Operations Tab

Appendix B.5.1 Aircraft Operations Pane

Parameter	Description
Air Operation ID	AEDT generated air operation ID.
User ID	User defined ID.
Airframe	Airframe description.
Engine	Engine code.
Engine Mod	Engine modification code.
Equipment Group	Name of aircraft equipment group.
Departure Airport	Name of the departure airport for the operation (departure operations).
Departure Layout	Name of the departure airport layout for the operation (departure operations).
Arrival Airport	Name of the arrival airport associated with the operation (arrival operations).
Arrival Layout	Name of the arrival airport layout associated with the operation (arrival operations).
Operation Type	Type of operation.
Operation Time	Date and time of the operation.
Operation Count	Number of operations over the duration of the annualization under which the operation is included.
Stage Length	Stage length category for the operation.
Aircraft Type	Type of aircraft for the operation.
Profile	Profile name for the operation.
Profile Id	Profile identifier.
Profile Type	Type of profile (ANP or BADA 4) assigned for the operation.
Profile Op Type	Type of operation associated with the profile.
Track	Track name for the operation.
Departure Runway End	Name of the departure runway end for the operation (departure operations).
Arrival Runway End	Name of the arrival runway end for the operation (arrival operations).
Departure Runway End	Name of the departure runway end for the operation (departure operations).
Departure Gate Name	Name of the departure gate for the operation (departure operations with gates).
Arrival Gate Name	Name of the arrival gate for the operation (arrival operations with gates).
BADA 4	Identifier for the BADA 4 aircraft assigned to the operation, if appropriate.
Taxi-out Time (min)	Taxi-out time of the operation.
Taxi-in Time (min)	Taxi-in time of the operation.

Appendix B.5.2 Non-Aircraft Operations Pane

Parameter	Description
ID	AEDT generated non-aircraft operation ID.
Source Name	Name of non-aircraft source.
Category	Category description of non-aircraft source.
Subcategory	Subcategory description of non-aircraft source.
Gate	Gate associated with non-aircraft source.
Annual Ops Count	Number of annual operations.
Quarter Hourly Profile	Quarter hourly profile associated with the non-aircraft source.
Daily Profile	Daily hourly profile associated with the non-aircraft source.
Monthly Profile	Monthly hourly profile associated with the non-aircraft source.
Year	Year associated with the non-aircraft source.
Latitude (deg)	Latitude location of non-aircraft source, in degrees.
Longitude (deg)	Longitude location of non-aircraft source, in degrees.
Elevation MSL (m)	Elevation of non-aircraft source in meters.

Appendix B.5.3 Runup Operations Pane

Parameter	Description
ID	AEDT generated runup operation ID.
User ID	User defined ID.
Airframe	Airframe description.
Engine	Engine code.
Engine Mod	Engine modification code.
Airport	Name of the airport associated with the runup operation.
Airport Layout	Name of the airport layout associated with the runup operation.
Operation Time	Date and time of the operation.
Operation Count	Number of operations over the duration of the annualization under which the operation is included.
Latitude (deg)	Latitude location of the runup operation, in degrees.
Longitude (deg)	Longitude location of the runup operation, in degrees.
Heading (deg)	Heading direction of the runup operation, in degrees.
Number of Operative Engines	Number of operative engines on the aircraft.
Thrust Setting per Engine	Thrust level for each engine.
Thrust Setting Type	Units for the thrust setting level (Pounds, Percent, Other).
Duration (sec)	Duration of the runup operation, in seconds.
Runup Type	Type of runup, preflight check or engine maintenance.

Appendix B.5.4 Helitaxi Operations Pane

Parameter	Description
ID	AEDT generated helicopter taxi operation ID.
User ID	User defined ID.
Airframe	Airframe description.
Engine	Engine code.
Engine Mod	Engine modification code.
Airport	Name of the airport associated with the helicopter operation.
Airport Layout	Name of the airport layout associated with the helicopter operation.
Operation Time	Date and time of the operation.
Operation Count	Number of operations over the duration of the annualization under which the operation is included.
Stage Length	Stage length category for the operation.
Track	Track associated with the helicopter taxi operation.

Appendix B.5.5 Operation Groups Pane

Parameter	Description
ID	AEDT generated operation group ID.
Name	Name of the operation group.
Type	Type of operation group: Aircraft, Non-Aircraft, or Runup.
Start Time	Start time of the operation group.
Duration	Duration of the operation group, in d.hh:mm:ss.
Number of Records	Number of operations included in the operation group.

Appendix B.5.6 Annualizations Pane

Parameter	Description
ID	AEDT generated annualization ID.
Name	Name of annualization.
Description	Description of annualization.
Start Time	Start time for annualization.
Duration (d.hh:mm:ss)	Duration of annualization, in d.hh:mm:ss.

Appendix B.6 Equipment Tab

Appendix B.6.1 Aircraft Equipment Pane

Parameter	Description
ANP—ID	Aircraft noise and performance (ANP) ID.
ANP—Description	Description of the aircraft.
Airframe—ID	AEDT generated airframe ID.
Airframe—Type	Type of aircraft.
Airframe—Model	Airframe model description.
Engine—ID	AEDT generated engine ID.
Engine—Count	Number of engines.
Engine—Code	Engine code.

Engine—Model	Engine model.
Manufacturer	Engine manufacturer.
Engine—Modification Code	Engine modification code.
Engine—Mod ID	Engine modification ID.
ID—BADA 3	Base of aircraft data (BADA) 3 ID.
ID – BADA 4	Identifier for the BADA 4 aircraft assigned to the operation, if applicable.
ID—ICAO	International Civil Aviation Organization (ICAO) ID.
ID—IATA	International Air Transport Association (IATA) ID.
ID—Equipment	AEDT generated equipment ID.
User Defined	User defined aircraft indicator.
Custom Tag	User defined description.
Assigned—Operations	Indicator if the aircraft is assigned to an operation in the study.
Assigned—Equipment Group	Indicator if the aircraft is assigned to an equipment group in the study.
Assigned—Group Name	Group name if assigned to an equipment group.

Appendix B.6.2 Non-Aircraft Equipment Pane

Parameter	Description
ID	AEDT generated non-aircraft ID.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
Name	Name of the non-aircraft equipment.
Type	Type of source.
(Operation) units	Units of the non-aircraft equipment source when in operation.
User Defined	Indicator if the non-aircraft equipment is user defined.

Appendix B.6.3 Equipment Groups Pane

Parameter	Description
ID	AEDT generated equipment group ID.
Name	Name of equipment group.
Equipment Count	Number of equipment in the group.

Appendix B.6.4 Helicopter – ANP Helicopter

Parameter	Description	Range
Basic		
Description	Description of the helicopter and engines.	
Accelerating climbing departure adjustment	Offset in decibels, added to NPD levels for departure operations with climbing acceleration.	Min= -50 Max=50
Accelerating horizontal departure adjustment	Offset in decibels, added to NPD levels for departure operations with horizontal acceleration.	Min= -50 Max=50

Parameter	Description	Range
Decelerating descending approach adjustment	Offset in decibels, added to NPD levels for approach operations with descending deceleration.	Min=-50 Max=50
Decelerating horizontal approach adjustment	Offset in decibels, added to NPD levels for approach operations with horizontal deceleration.	Min=-50 Max=50
Engine type	Model type of helicopter.	
Has wheels	Check box indicating if the helicopter has wheels.	
Maximum takeoff weight (lb)	Max takeoff weight, in pounds.	Min=0 Max=50000
Number of rotors	Number of rotors.	Min=1 Max=9
Rotor diameter (ft)	Rotor diameter, in feet.	Min=0 Max=1000
Rotor speed (RPM)	Rotor speed. , in revolutions per minute.	Min=0 Max=1000
Vertical ascent adjustment	Offset in decibels, added to NPD levels for operations with vertical ascent.	Min=-50 Max=50
Vertical decent adjustment	Offset in decibels, added to NPD levels for operations with vertical decent.	Min=-50 Max=50
Profiles		
Profile ID	Profile identifier.	
Name	Profile name.	
Operation Type	Type of operation.	
Weight (lbs)	Aircraft weight during this operation, in pounds.	
Takeoff Ground Heading	Takeoff ground heading in degrees relative to the ground track or true north.	
Takeoff Hover Heading	Takeoff hover heading in degrees relative to the ground track or true north.	
Land Ground Heading	Land ground heading in degrees relative to the ground track or true north.	
Land Hover Heading	Land hover heading in degrees relative to the ground track or true north.	
Use Directivity	Option to use any available directivity patterns for the Ground Idle, Flight Idle, Hover-In-Ground-Effect, and Hover-Out-Of-Ground-Effect flight operational modes during noise calculations for this profile if those operational modes are included in the profile.	
Use Track	Option to define the reference direction from which the input headings for the helicopter while on the ground or in hover are measured. If the Use Track box is checked, the headings are calculated relative to the direction of the ground track as it approaches or departs the helipad. If the box is not checked, the headings are calculated relative to the direction of true north.	

Parameter	Description	Range
Noise		
Noise ID	Noise identifier.	
Spectral class approach	AEDT spectral class number for approach.	Min = 0 Max = 999
Spectral class departure	AEDT spectral class number for departure.	Min = 0 Max = 999
Spectral class level flight	AEDT spectral class number for overflight.	Min = 0 Max = 999
Approach speed (KTAS)	Approach reference true air speed, in knots.	Min = 0.0 Max = 250
Departure speed (KTAS)	Departure reference true air speed, in knots.	Min = 0.0 Max = 250
Level speed (KTAS)	Overflight reference true air speed, in knots.	Min = 0.0 Max = 250

Appendix B.6.5 Helicopter – Airframe

Parameter	Description	Range
Basic		
Designation	Descriptive name of the category.	
Engine location	Description of engine location.	
Eurocontrol group	Descriptive name of the category.	
Maximum range (nmi)	Maximum range airframe can achieve without payload.	
Usage	Descriptive name of the category.	
Weight class	Weight class category.	

Appendix B.6.6 Helicopter – Engine

Parameter	Description	Range
Basic		
Bypass ratio	Bypass Ratio.	
Combustor	Combustor name or version.	
Data source	Data source.	
Engine out of service	Check box indicating if the engine is no longer in service.	TRUE/FALSE
Engine UID	Engine identifier specified by International Civil Aviation Organization (ICAO) European Aviation Safety Agency (EASA) Engine Data Bank.	
Engine type	Descriptive name of the category.	
Manufacturer	Manufacturer name.	
Pressure ratio	Pressure ratio.	
Emissions Coefficients		
Indices Group	Type of Emissions.	
Takeoff Emissions Index	Raw Emissions Index (Takeoff).	
Climbout Emissions Index	Raw Emissions Index (Climb Out).	

Approach Emissions Index	Raw Emissions Index (Approach).	
Idle Emissions Index	Raw Emissions Index (Idle).	
Max Emissions Index	Maximum/Peak Emissions Index used in non-volatile particulate matter computations and used to derive mode specific smoke numbers using scaling factors when mode specific smoke numbers are not directly available.	

Appendix B.6.7 Airplane: Equipment Details

Parameter	Description
ANP ID	Aircraft noise and performance (ANP) ID.
Airframe Model	Airframe model.
Engine code	Engine code.
Engine modification	Engine modification code.
BADA ID	Base of aircraft data (BADA) ID.
Custom tag	User-defined description of the equipment.

Appendix B.6.8 Airplane – ANP Airplane

Parameter	Description	Range
Basic		
Description	Description of the airplane and engines.	
Engine type	Descriptive name of the category.	
Noise Stage	Noise stage number.	
Automatic thrust restoration system	Check box indicating if the airplane an automatic thrust restoration system.	Y = Yes N = No
Max gross landing weight (lb)	Maximum gross landing weight, in pounds.	Min=0 Max=9999999
Max landing distance (ft)	Federal Acquisition Regulation (FAR) PART 135 certification landing field length at maximum landing weight, in feet.	Min=0 Max=20000
Max gross takeoff weight (lb)	Maximum gross takeoff weight, in pounds.	Min=0 Max=9999999
Min arrival fuel flow (kg/s/engine)	Minimum fuel burn rate, in kilograms per second per engine.	
Number of engines	Number of engines.	Min=1 Max=8
Aircraft size	Aircraft size category.	
Max seal level static thrust (lbs/engine)	Static rated thrust or 100% thrust in pounds per engine.	Min=0 Max=200000
Jet Thrust		
Power State	Net propulsive power per engine for this type of thrust in horsepower.	Min= 0.0 Max= 9999.9
Temperature State	Indicates whether the associated thrust coefficients are calibrated to describe thrust at high ambient temperatures or at normal ambient	

Parameter	Description	Range
	temperatures. Note that, for a given power state, a high-temperature coefficient set should not be defined unless a normal-temperature set is also defined.	
Activated	An indicator of defined thrust coefficients for the ANP airplane at the given combination of power state and temperature state. If unchecked, the thrust coefficients do not exist.	
Altitude Coefficient (lb/ft)	Altitude adjustment coefficient, in pounds per feet above mean sea level.	
Altitude Squared Coefficient (lb/ft^2)	Altitude-squared adjustment coefficient, in pounds per square foot above mean sea level.	
Net Corrected thrust Per Engine Coefficient (lb)	Corrected net thrust per engine coefficient, in pounds.	Min= 0 Max= 500000
Speed Coefficient (lb/kt)	Speed adjustment coefficient, in pounds per knot TAS sea level 59F.	Min= -2000 Max= 1000
Temperature Coefficient (lb/^{o}C)	Temperature adjustment coefficient, in pounds per degree Celsius.	
General Thrust		
Net corrected thrust per engine coefficient (lb)	Corrected net thrust per engine coefficient, in pounds.	Min= - 99999.9 Max= 99999.9
Speed coefficient (lb/kt)	Speed adjustment coefficient in, pounds per knot TAS sea level 59F.	Min= -2000 Max= 1000
Altitude coefficient (lb/ft)	Altitude adjustment coefficient, in pounds per feet above mean sea level.	
Altitude squared coefficient (lb/ft2)	Altitude-squared adjustment coefficient, in pounds per square foot above mean sea level.	
Temperature coefficient (lb/^{o}C)	Temperature adjustment coefficient, in pounds per degree Celsius.	
Engine pressure ratio coefficient or Percent corrected rotor speed coefficient	EPR or N1/sqrt (theta) adjustment coefficient in pounds per EPR.	
Engine pressure ratio squared coefficient or Percent corrected rotor speed squared coefficient	EPR or N1/sqrt (theta) squared adjustment coefficient, in pounds per EPR^2.	
Propeller Thrust		
Power State	Net propulsive power per engine for this type of thrust.	Min= 0.0 Max= 999.9

Parameter	Description	Range
Net Propulsive Power Coefficient (hp)	Net propulsive power coefficient, in horsepower.	
Prop Efficiency Ratio Coefficient	Propeller efficiency ratio.	Min= 0.50 Max= 1.00
Terminal Fuel Coefficients		
K1	Departure thrust specific fuel consumption constant coefficient.	
K2	Departure thrust specific fuel consumption Mach number coefficient.	
K3	Departure thrust specific fuel consumption altitude coefficient.	
K4	Departure thrust specific fuel consumption thrust coefficient.	
Beta1	Arrival thrust specific fuel consumption Mach number coefficient.	
Beta2	Arrival thrust specific fuel consumption thrust term coefficient.	
Beta3	Arrival thrust specific fuel consumption thrust coefficient.	
Alpha	Arrival thrust specific fuel consumption constant coefficient.	
Flight Profiles		
Profile ID	Profile identifier.	
Name	Profile name.	
Profile Type	Type of flight profile.	
Weight (lbs)	Aircraft weight during this operation, in pounds.	Min = 0 Max = 999999
Stage Length	Stage length.	
Operation Type	Type of operation.	A = Approach D = Departure T = Touch & Go F = Circuit V = Overflight
Procedural Flight Profiles		
Profile ID	Profile identifier.	
Step Number	Procedural flight profile step number.	
Step Type	Step type for the procedure step. The fourteen types of procedures steps are: Takeoff, Climb, Cruise-Climb, Accelerate, Accel-Percent, Level, Level-Decel, Level-Idle, Level-Stretch, Descend, Descend- Decel, Decend-Idle, Land, and Decelerate.	
Flap ID	Flaps identifier	
Thrust Level	Thrust type.	
Altitude AFE (ft)	Altitude above field elevation.	
Calibrated Airspeed (kt)	Calibrated airspeed in knots (KCAS).	
Distance (ft)	Distance is in feet measured on the horizontal plane.	
Static Thrust (%)	Percent of static thrust. Applicable for the Landing Decelerate step.	
Accel Energy Share (%)	Acceleration energy share as a percentage. Applicable for the Percent Accelerate step type. Energy-share comes from the notion that all available thrust is divided between acceleration and climbing. For example, 70 means 70% of thrust going to acceleration and the remaining 30% (100%-70%) of thrust going to climbing.	

Parameter	Description	Range
Angle (deg)	Descent/climb angles in degrees; both are positive.	
Climb Rate (ft/m)	Climb rate	
Fixed Point Flight Profiles		
Point Number	Fixed-point profile point number.	
Operational Mode	Noise operational modes – Approach, Departure, or Afterburner.	
Altitude AFE (ft)	Altitude above field elevation.	
Track Distance (ft)	Horizontal distance value from a reference point (where the reference point is at track distance=0). Track distance can be positive or negative, and increases as the airplane flies the profile.	
Speed TAS (kt)	True airspeed (KTAS).	
Thrust Setting	For most civil airplanes, this parameter is corrected net thrust per engine in pounds; but some civil airplanes use percent of static thrust. For the thrust unit, refer to ANP Airplane – Noise – Thrust type value.	
Flaps		
Flap ID	Flap-setting identifier.	
Operation Type	Type of operation.	
Drag to Lift Coefficient	Drag-over-lift ratio.	Min= 0.000000 Max= 9.999999
Takeoff Distance Coefficient	Takeoff distance coefficient, feet per pounds.	Min= 0.000000 Max= 9.999999
Takeoff Landing Calibrated Airspeed Coefficient	Takeoff and landing calibrated airspeed coefficient in $kts/lb^{1/2}$.	Min= 0.000000 Max= 9.999999
Noise		
Noise ID	Noise identifier.	
Spectral class approach	AEDT spectral class number for approach.	Min = 0 Max = 999
Spectral class departure	AEDT spectral class number for departure.	Min = 0 Max = 999
Spectral class afterburner	AEDT spectral class number for afterburner.	Min= 0 Max= 999
Thrust type	C 1 Type of thrust setting. L = Pounds, P = Percent, X = Other	
Acoustic model type	C 1 Type of distance-duration model. I = INM, N = NoiseMap	

Appendix B.6.9 Airplane – Airframe

Parameter	Description	Range
Basic		
Designation	Descriptive name of the category	
Engine location	Description of engine location	
Eurocontrol group	Descriptive name of the category	
Maximum range (nmi)	Maximum range airframe can achieve without payload	

| Usage | Descriptive name of the category | |
| Weight class | Weight class category. | |

Appendix B.6.10 Airplane – APU

Parameter	Description	Range
Basic		
APU	Auxiliary Power Unit.	

Appendix B.6.11 Airplane – BADA Family 3

The details in this section are for the Base of Aircraft Data version 3 (BADA 3) model.

Base of Aircraft Data version 4 (BADA 4) includes performance data from the European Organization for the Safety of Air Navigation (EUROCONTROL). The license agreement between FAA and EUROCONTROL permits BADA 4 to be used by AEDT, but prohibits AEDT from making the data visible to the user. As a result, the BADA 4 data tables used by AEDT are encrypted and BADA 4-related information are not displayed through the user interface.

Parameter	Description	Range
Basic		
Weight gradient on max altitude (ft/kg)	Weight gradient on maximum altitude, in feet per kilogram.	
Temperature gradient on max altitude (ft/Kelvin)	Temperature Gradient on Maximum altitude in feet per Kelvin.	Min= -1000 Max= 10
Max operating speed (KCAS)	Maximum operating speed, in KCAS.	Min= 0 Max= 600
Max operating Mach number	Maximum operating Mach Number.	Min= 0 Max= 10
Max operating altitude (Pressure Altitude ft)	Maximum operating altitude, in feet, pressure altitude.	Min= -9999 Max= 60000
Max altitude at max takeoff weight (Pressure Altitude ft)	Maximum altitude at maximum takeoff weight and ISA, in feet, pressure altitude.	Min= -9999 Max= 60000
Buffeting gradient (dimensionless)	Buffeting gradient (Jet only).	Min= 0.0 Max= 10.0
Wing surface area (m^2)	Wing Surface Area in square meters.	Min= 0 Max= 1000
Wake category	Descriptive name of the category.	
Number of engines	Number of engines.	
Mass reference (metric tons)	Reference Aircraft Mass, in metric ton.	Min= 0.0 Max= 455.0

Parameter	Description	Range
Mass payload (metric tons)	Maximum Payload Mass, in metric ton.	Min= 0.0 Max= 455.0
Mass min (metric tons)	Minimum Aircraft Mass, in metric ton.	Min= 0.0 Max= 455.0
Mass max (metric tons)	Maximum Aircraft Mass, in metric ton.	Min= 0.0 Max= 455.0
Mach drag coefficient (dimensionless)	Mach drag coefficient.	Min= 0.0 Max= 10.0
BADA engine type	Descriptive name of the category. Jet, Turboprop, Piston, Unknown	
Description	EUROCONTROL description.	
Fuel		
Cruise fuel flow coefficient	Cruise fuel flow correction coefficient.	Min= 0.0 Max= 10.0
Descent fuel flow 1 (kg/min)	1st descent fuel flow coefficient, in kilograms per minute.	Min= 0.0 Max= 100.0
Descent fuel flow 2(ft)	2nd descent fuel flow coefficient, in feet.	Min= 0.0 Max= 1
Thrust specific fuel consumption 1 (kg/min-kN-knot)	1st thrust specific fuel consumption coefficient, in kilograms per min-kN-knot.	Min= 0.0 Max= 10.0
Thrust specific fuel consumption 2	2nd thrust specific fuel consumption coefficient.	Min= 0.0 Max= 1
Thrust		
Thrust temperature coefficient 1 (Kelvin)	1st thrust temperature coefficient, in Kelvin.	Min= -45.0 Max= 50.0
Thrust temperature coefficient 2 (Kelvin -1)	2nd thrust temperature coefficient, in K^{-1}.	Min= 0.0 Max= 10.0
Reference descent speed (KCAS)	Reference descent speed, in KCAS.	Min= 0.0 Max= 600.0
Reference descent mach number	Reference descent Mach number.	Min= 0.0 Max= 10.0
Maximum climb thrust coefficient 1 [unit]	1st max climb thrust coefficient, in N for jets and piston engine, and in kt-N for turboprops.	Min= 0.0 Max= 1
Maximum climb thrust coefficient 2 (ft)	2nd max climb thrust coefficient, in ft for all aircraft types.	Min= 0.0 Max= 1 E 9

Parameter	Description	Range
Maximum climb thrust coefficient 3 [unit]	3rd max climb thrust coefficient in N for turboprops, in 1/ft^2 for jets, and in kt-N for piston engines.	Min= 0.0 Max= 1 E 9
Low altitude descent thrust coefficient	Low altitude descent thrust coefficient.	Min= 0.0 Max= 10.0
Landing thrust coefficient	Landing thrust coefficient.	Min= 0.0 Max= 10.0
High altitude descent thrust coefficient	High altitude descent thrust coefficient.	Min= 0.0 Max= 10.0
Descent thrust calculation transition altitude (Pressure Altitude ft)	Transition altitude for calculation of descent thrust, in feet, pressure altitude.	Min= -9999.0 Max= 60000.0
Approach thrust coefficient	Approach thrust coefficient.	Min= 0.0 Max= 10.0
Notes	EUROCONTROL notes.	
Profile		
Mass Range Value	Mass range.	LO = low AV = average HI = high
Aircraft Version	Aircraft corresponding to the procedure.	
Climb Mach number	Standard climb Mach number above Mach transition altitude (feet MSL).	Min= 0.0 Max= 10.0
Climb Speed above Transition Altitude	Standard climb speed between 10,000 feet MSL and Mach transition altitude (feet MSL), in knots calibrated airspeed.	Min= 0.0 Max= 600.0
Climb Speed below Transition Altitude (KCAS)	Standard climb speed between 3,000 feet ARE and 10,000 feet MSL, in knots calibrated airspeed.	Min= 0.0 Max= 600.0
Company Code 1	3 letter company code.	
Company Code 2	2 letter company code.	
Company Name	Name of company (airline) that uses this procedure.	
Cruise Mach Number	Standard cruise Mach number above transition altitude (feet MSL).	Min= 0.0 Max= 10.0
Cruise Speed above Transition Altitude (KCAS)	Standard cruise speed above 10,000 feet MSL until Mach transition altitude (feet MSL), in knots calibrated airspeed.	Min= 0.0 Max= 600.0
Cruise Speed below Transition Altitude	Standard cruise speed between 3,000 and 10,000 feet MSL, in knots calibrated airspeed.	Min= 0.0 Max= 600.0
Descent Mach Number	Standard descent Mach number above transition altitude (feet MSL).	Min= 0.0 Max= 10.0

Parameter	Description	Range
Descent Speed above Transition Altitude	Standard descent speed above 10,000 feet MSL until Mach transition, in knots calibrated airspeed.	Min= 0.0 Max= 600.0
Descent Speed below Transition Altitude	Standard descent speed between 3,000 / 6,000 and 10,000 feet MSL, in knots calibrated airspeed.	Min= 0.0 Max= 600.0
Engine	Engine Identifier.	
Configuration		
BADA Flap Configuration	Flap configuration for the phase of flight.	IC = initial climb TO = take-off AP = approach LD = landing
Name	Configuration identifier.	
Induced Drag Configuration	Induced drag coefficient.	Min= 0.0 Max= 10.0
Parasitic Drag Configuration	Parasitic drag coefficient.	Min= 0.0 Max= 10.0
Stall Speed	Stall Speed, in knots calibrated airspeed.	Min= 0.0 Max= 600.0

Appendix B.6.12 Airplane – BADA Family 4

Parameter	Description	Range
Basic		
Description	Description.	
Profiles		
Name	Profile name	
Profile Type	Type of flight profile. Always set to "Procedural" for BADA 4 user-defined profiles.	
Weight (lb)	Aircraft weight during this operation, in pounds.	Min = 0 Max = 999999
Stage Length	Stage length number.	
Operation Type	Type of operation.	A = Approach D = Departure T = Touch & Go F = Circuit
Procedure Steps		
Step Number	Procedural flight profile step number.	
Step Type	Step type for the procedure step. The fourteen types of procedures steps are: Takeoff, Climb, Accelerate, Percent Accelerate, Cruise-Climb, Level, Idle Thrust Level, Decelerating Thrust Level, Descend, Idle Thrust Descend, Decelerating Thrust, Land, Landing Decelerate, and Fit to Track Distance.	
Flap ID	Flaps identifier	

Parameter	Description	Range
BADA4 Configuration	Configuration of airplane high-lift devices position and landing gear position. The configuration is associated with coefficients used in aerodynamic modeling.	
Thrust Level	Thrust type.	
Altitude AFE (ft)	Altitude above field elevation.	
Calibrated Airspeed (kt)	Calibrated airspeed in knots.	
Climb Rate (ft/m)	Climb rate.	
Distance (ft)	Distance is in feet measured on the horizontal plane.	
Static Thrust (%)	Percent of static thrust. Applicable for the Landing Decelerate step.	
Accel Energy Share (%)	Acceleration energy share as a percentage. Applicable for the Percent Accelerate step type.	
Angle (deg)	Descent/climb angles in degrees; both are positive.	

Appendix B.6.13 Airplane – Engine

Parameter	Description	Range
Basic		
Bypass ratio	Bypass Ratio.	
Combustor	Combustor name or version.	
Data source	Data source.	
Engine out of service	Check box indicating if the engine is no longer in service.	
Engine UID	Engine identifier specified by International Civil Aviation Organization (ICAO) European Aviation Safety Agency (EASA) Engine Data Bank.	
Engine type	Descriptive name of the category.	
Manufacturer	Manufacturer name.	
Pressure ratio	Pressure ratio.	
Emission Coefficients		
Indices Group	Type of Emissions.	
Takeoff Emissions Index	Raw Emissions Index (Takeoff).	
Climbout Emissions Index	Raw Emissions Index (Climb Out).	
Approach Emissions Index	Raw Emissions Index (Approach).	
Idle Emissions Index	Raw Emissions Index (Idle).	
Max Emissions Index	Maximum/Peak Emissions Index used in non-volatile particulate matter computations and used to derive mode specific smoke numbers using scaling factors when mode specific smoke numbers are not directly available.	

Appendix B.6.14 Aircraft Engine Testing

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.

Parameter	Description
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Exhaust velocity (m/sec)	The velocity in meters per second at which exhaust emissions enter the atmosphere.
Exhaust Temperature (°F)	The temperature in degrees Fahrenheit of the exhaust emissions when they enter the atmosphere.
Temperature above ambient	Given in degrees Fahrenheit, this represents the difference of the temperature of the exhaust emissions when they enter the atmosphere and the ambient air temperature of the atmosphere. The temperature above ambient feature is not supported in AEDT.
Diameter (m)	The diameter of the emissions source at the point the emissions enter the atmosphere. For a smokestack, this is the physical diameter of the opening at its top. In this application, the physical diameter of the training fire is appropriate.
Time at 7% power (min/cycle)	Number of minutes at 7% engine power.
Time at 30% power (min/cycle)	Number of minutes at 30% engine power.
Time at 85% power (min/cycle)	Number of minutes at 85% engine power.
Time at 100% power (min/cycle)	Number of minutes at 100% engine power.
Engine model	Model of the engine used for the particular aircraft engine test.

Appendix B.6.15 Auxiliary Power Unit

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Emission Factors	
CO emissions factor (kg/hour)	Carbon monoxide emissions factor in terms of kilograms of CO emitted per hour of APU use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
NOx emissions factor (kg/hour)	Nitrogen oxides emissions factor in terms of kilograms of NOx emitted per hour of APU use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.

PM10 emissions factor (kg/hour)	Particulate matter (less than 10 micrometers in diameter) emissions factor in terms of kilograms of PM10 emitted per hour of APU use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
SOx emissions factor (kg/hour)	Sulfur oxides emissions factor in terms of kilograms of SOx emitted per hour of APU use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
THC emissions factor (kg/hour)	Total hydrocarbons emissions factor in terms of kilograms of THC emitted per hour of APU use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.

Appendix B.6.16 Boiler/Space Heater

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Exhaust velocity (m/sec)	The velocity in meters per second at which exhaust emissions enter the atmosphere.
Exhaust Temperature (°F)	The temperature in degrees Fahrenheit of the exhaust emissions when they enter the atmosphere.
Temperature above ambient	Given in degrees Fahrenheit, this represents the difference of the temperature of the exhaust emissions when they enter the atmosphere and the ambient air temperature of the atmosphere. The temperature above ambient feature is not supported in AEDT.
Diameter (m)	The diameter of the emissions source at the point the emissions enter the atmosphere. For a smokestack, this is the physical diameter of the opening at its top. In this application, the physical diameter of the training fire is appropriate.
Emission Indices	
CO emissions index (kg/[unit])	Amount of carbon monoxide in kilograms emitted per specified unit of fuel consumed. The unit on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
NOx emissions index (kg/[unit])	Amount of nitrogen oxides in kilograms emitted per specified unit of fuel consumed. The unit of fuel consumed is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
PM10 emissions index (kg/[unit])	Amount of particulate matter in kilograms emitted per specified unit of fuel consumed. The unit of fuel consumed is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3

Parameter	Description
PM10 emissions index const term (kg/[unit])	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per specified unit of fuel consumed – constant term. The unit of fuel consumed is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
PM10 emissions index sulfur term (kg/[unit] - %Sulfur)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per specified unit of fuel consumed accounting for % sulfur in fuel source. The unit of weight is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
SOx emissions index sulfur term (kg/[unit]-%Sulfur)	Amount of sulfur oxides in kilograms emitted per specified unit of fuel consumed, accounting for % sulfur in fuel. The unit of weight is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
THC emission index (kg/[unit])	Amount of total hydrocarbon in kilograms emitted per specified unit of fuel consumed. The unit of fuel consumed is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
TNMOC emission index (kg/[unit])	Amount of total non-methane organic compounds in kilograms emitted per specified unit of fuel consumed. The unit of fuel consumed is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
TOC emission index (kg/[unit])	Amount of total organic carbon in kilograms emitted per specified unit of fuel consumed. The unit of fuel consumed is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
VOC emission index (kg/[unit])	Amount of volatile organic compounds in kilograms emitted per specified unit of fuel consumed. The unit of fuel consumed is dependent on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
CH4 emission index (kg/[unit])	Amount of methane in kilograms emitted per specified unit of fuel consumed. The unit on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
CO2 emission index (kg/[unit])	Amount of carbon dioxide in kilograms emitted per specified unit of fuel consumed. The unit on the type of fuel used, as follows: Coal: metric ton, Fuel oil: kiloliters, LPG: kiloliters, Natural gas: km^3
Other Emission Parameters	
Fuel ash content (%)	The percentage by weight of ash in the fuel.
Fuel sulfur content (%)	The percentage by weight of sulfur in the fuel.
PM2.5 to PM10 ratio (0-1)	Ratio (expressed as a fraction) of fine particulate matter (less than 2.5 micrometers in diameter) to course particulate matter (less than 10 micrometers in diameter).
Pollution Control Factors	
CO pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
NOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
PM10 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Parameter	Description
SOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
THC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
TNMOC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
HC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
TOC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
VOC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
CH4 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
CO2 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Appendix B.6.17 Deicing Area

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Sigma Z0 (m)	The vertical concentration distribution at the source.
Sigma Y0 (m)	The horizontal concentration distribution at the source.
Emission Indices	
VOC emission index (kg/kL)	Amount of volatile organic compounds in kilograms emitted per kiloliter of deicing fluid.
Other Emission Parameters	
Ethylene glycol density (g/L)	Amount of ethylene glycol in grams per liter of deicing fluid.
Propylene glycol density (g/L)	Amount of propylene glycol in grams per liter of deicing fluid.
Concentration by mass (%)	The concentration (% by mass) of the deicing chemical dissolved in solution for source.

Appendix B.6.18 Emergency Generator

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Exhaust velocity (m/sec)	The velocity in meters per second at which exhaust emissions enter the atmosphere.
Exhaust Temperature (°F)	The temperature in degrees Fahrenheit of the exhaust emissions when they enter the atmosphere.
Temperature above ambient	Given in degrees Fahrenheit, this represents the difference of the temperature of the exhaust emissions when they enter the atmosphere and the ambient air temperature of the atmosphere. The temperature above ambient feature is not supported in AEDT.
Diameter (m)	The diameter of the emissions source at the point the emissions enter the atmosphere. For a smokestack, this is the physical diameter of the opening at its top. In this application, the physical diameter of the training fire is appropriate.
Power rating (hp)	The maximum power input allowed to flow through the equipment, in horsepower.
Emission Indices	
CO emissions index (kg/h)	Amount of carbon monoxide in kilograms emitted per hour that the emergency generator runs.
NOx emissions index (kg/h)	Amount of nitrogen oxides in kilograms emitted per hour that the emergency generator runs.
PM10 emissions index (kg/h)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per hour that the emergency generator runs.
SOx emissions index (kg/h - %Sulfur)	Amount of nitrogen oxides in kilograms emitted per hour that the emergency generator runs based upon the % of sulfur in the fuel. E.g., If sulfur is 6% and 1,000 kg of fuel is burned per hour, then 60 kg/hr of sulfur is burned.
VOC emissions index (kg/h)	Amount of volatile organic compounds in kilograms emitted per hour that the emergency generator runs.
CH4 emissions index (kg/h)	Amount of methane in kilograms emitted per hour that the emergency generator runs.
CO2 emissions index (kg/h)	Amount of carbon dioxide in kilograms emitted per hour that the emergency generator runs.
Emission Factors	
CO emissions factor (g/hp-hr)	Carbon monoxide emissions factor in terms of grams of CO emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
NOx emissions factor (g/hp-hr)	Nitrogen oxides emissions factor in terms of grams of NOx emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of

Parameter	Description
	that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
PM10 emissions factor (g/hp-hr)	Particulate matter (less than 10 micrometers in diameter) emissions factor in terms of grams of PM10 emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
SOx emissions factor (g/hp-hr)	Sulfur oxides emissions factor in terms of grams of SOx emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
TOC emissions factor (g/hp-hr)	Total organic carbon emissions factor in terms of grams of TOC emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
CH4 emissions factor (g/hp-hr)	Methane emissions factor in terms of grams of CH4 emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
CO2 emissions factor (g/hp-hr)	Carbon dioxide emissions factor in terms of grams of CO2 emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
Other Emission Parameters	
Fuel sulfur content (%)	The percentage by weight of sulfur in the fuel.
PM2.5 to PM10 ratio (0-1)	Ratio (expressed as a fraction) of fine particulate matter (less than 2.5 micrometers in diameter) to course particulate matter (less than 10 micrometers in diameter).
Pollution Control Factors	
CO pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
NOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
PM10 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
SOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Parameter	Description
TOC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
VOC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
CH4 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
CO2 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Appendix B.6.19 Fuel Tank

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Sigma Z0 (m)	The vertical concentration distribution at the source.
Sigma Y0 (m)	The horizontal concentration distribution at the source.
Tank diameter (m)	The diameter of the fuel tank in meters.
Tank length (m)	The length of the fuel tank in meters.
Tank height (m)	The height of the fuel tank in meters.
Maximum liquid height (m)	The maximum height of liquid fuel that can be contained in the fuel tank in meters.
Average liquid height (m)	The average height of liquid fuel in the fuel tank in meters.
Annual sum of increases in liquid level (ft)	The annual sum of the increases in tank liquid level in ft/yr.
Reid vapor pressure (psi)	The absolute vapor pressure in psi of volatile crude oil and volatile non-viscous petroleum liquids, as determined by ASTM D 323.
Mean wind speed (m/sec)	The average ambient wind speed at the tank site in meters per second.

Appendix B.6.20 Ground Support Equipment

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
Equipment Specifications	

Fuel type	The type of fuel utilized by the ground support equipment, includes compressed natural gas (CNG), diesel, electricity, gasoline and liquefied petroleum gas (LPG).
Default horsepower (hp)	The default rated brake horsepower for the engine of a given type of ground support equipment. The default value is equipment-type dependent.
Default load factor	The default average operational horsepower output of the engine divided by its rated brake horsepower. The default value is equipment-type dependent. Value is between 0 and 1.
Useful life (years)	The median life (in years) of the vehicle.
Default usage (hours/year)	The number of hours in a year that one unit of the specified ground support equipment operates. The default value is equipment-type dependent.
Emission Factors	
CO emissions factor (g/hp-hr)	Carbon monoxide emissions factor in terms of grams of CO emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
NOx emissions factor (g/hp-hr)	Nitrogen oxides emissions factor in terms of grams of NOx emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
PM10 emissions factor (g/hp-hr)	Particulate matter (less than 10 micrometers in diameter) emissions factor in terms of grams of PM10 emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
PM2.5 emissions factor (g/hp-hr)	Particulate matter (less than 2.5 micrometers in diameter) emissions factor in terms of grams of PM2.5 emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
THC emissions factor (kg/hour)	Total hydrocarbon emissions factor in terms of kilograms of THC emitted per hour of APU use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
CH4 emissions factor (g/hp-hr)	Methane emissions factor in terms of grams of CH4 emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.
CO2 emissions factor (g/hp-hr)	Carbon dioxide emissions factor in terms of grams of CO2 emitted per horsepower-hour of generator use. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. The emission factor is used to calculate the total emissions from a source as an input for the emission inventory.

Appendix B.6.21 Incinerator

Parameter	Description
Name	Name of the non-aircraft equipment.

Parameter	Description
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Exhaust velocity (m/sec)	The velocity in meters per second at which exhaust emissions enter the atmosphere.
Exhaust Temperature (°F)	The temperature in degrees Fahrenheit of the exhaust emissions when they enter the atmosphere.
Temperature above ambient	Given in degrees Fahrenheit, this represents the difference of the temperature of the exhaust emissions when they enter the atmosphere and the ambient air temperature of the atmosphere. The temperature above ambient feature is not supported in AEDT.
Diameter (m)	The diameter of the emissions source at the point the emissions enter the atmosphere. For a smokestack, this is the physical diameter of the opening at its top. In this application, the physical diameter of the training fire is appropriate.
Emission Indices	
CO emissions index (kg/ton)	Amount of carbon monoxide in kilograms emitted per ton of fuel consumed.
NOx emissions index (kg/ton)	Amount of nitrogen oxides in kilograms emitted per ton of fuel consumed.
PM10 emissions index (kg/ton)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per ton of fuel consumed.
SOx emissions index (kg/ton)	Amount of sulfur oxides in kilograms emitted per ton of fuel consumed.
VOC emissions index (kg/ton)	Amount of volatile organic compounds in kilograms emitted per ton of fuel consumed.
CH4 emissions index (kg/ton)	Amount of methane in kilograms emitted per ton of fuel consumed.
CO2 emissions index (kg/ton)	Amount of carbon dioxide in kilograms emitted per ton of fuel consumed.
Other Emission Parameters	
PM2.5 to PM10 ratio (0-1)	Ratio (expressed as a fraction) of fine particulate matter (less than 2.5 micrometers in diameter) to course particulate matter (less than 10 micrometers in diameter).
Pollution Control Factors	
CO pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
NOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
PM10 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Parameter	Description
SOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
VOC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
CH4 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
CO2 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Appendix B.6.22 Other

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Exhaust velocity (m/sec)	The velocity in meters per second at which exhaust emissions enter the atmosphere.
Exhaust Temperature (°F)	The temperature in degrees Fahrenheit of the exhaust emissions when they enter the atmosphere.
Temperature above ambient	Given in degrees Fahrenheit, this represents the difference of the temperature of the exhaust emissions when they enter the atmosphere and the ambient air temperature of the atmosphere. The temperature above ambient feature is not supported in AEDT.
Diameter (m)	The diameter of the emissions source at the point the emissions enter the atmosphere. For a smokestack, this is the physical diameter of the opening at its top. In this application, the physical diameter of the training fire is appropriate.
Emission Indices	
CO emissions index (kg/ton)	Amount of carbon monoxide in kilograms emitted per unit of fuel consumed.
NOx emissions index (kg/ton)	Amount of nitrogen oxides in kilograms emitted per specified unit of fuel consumed.
PM10 emissions index (kg/ton)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per specified unit of fuel consumed.
PM2.5 emissions index (kg/ton)	Amount of particulate matter (less than 2.5 micrometers in diameter) in kilograms emitted per specified unit of fuel consumed.
SOx emissions index (kg/ton)	Amount of sulfur oxides in kilograms emitted per specified unit of fuel consumed.
THC emissions index (kg/ton)	Amount of total hydrocarbons in kilograms emitted per specified unit of fuel consumed.

Parameter	Description
CH4 emissions index (kg/ton)	Amount of methane in kilograms emitted per specified unit of fuel consumed.
CO2 emissions index (kg/ton)	Amount of carbon dioxide in kilograms emitted per specified unit of fuel consumed.
Pollution Control Factors	
CO pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
NOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
PM10 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions
PM2.5 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions
SOx pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
THC pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.
CH4 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions
CO2 pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions

Appendix B.6.23 Sand/Salt Pile

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Sigma Z0 (m)	The vertical concentration distribution at the source.
Sigma Y0 (m)	The horizontal concentration distribution at the source.
Other Emission Parameters	
Eroded surface area (m^2)	The surface area of the exposed material subject to erosion, in square meters.
Mass disturbed per disturbance (metric tons)	For each occurrence of disturbance of the source, this is the measure of the mass that is affected (eroded) in metric tons.
Moisture content (%)	The percent of moisture in the source by mass.

Mean wind speed (m/sec)	The mean wind speed at the location of the source, in meters per second
Fastest mile of wind (m/sec)	The highest measured wind speed at which air is measured by an anemometer to travel one mile, in meters per second
Friction velocity (m/sec)	The friction velocity is the wind velocity at which wind shear stress is great enough to cause particles to be released from the material surface, in meters per second.
Surface roughness (cm)	A measure of the resistance to wind flow near the surface of the material caused by unevenness or roughness of the material, in centimeters.
Surface wind speed fraction	The fraction of surface wind speed to the approach wind speed of the source, or a normalized surface speed.

Appendix B.6.24 Solvent Degreaser

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Sigma Z0 (m)	The vertical concentration distribution at the source.
Sigma Y0 (m)	The horizontal concentration distribution at the source.
Other Emission Parameters	
Solution density (g/L)	Amount of evaporative chemical in grams per liter of solvent degreaser.
Percent of solvent disposed (%)	The percentage of liquid recovered and properly disposed for solvent degreasers.
Pollution control factor (0-100%)	Percentage to reduce the emissions of the specified pollutant. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Appendix B.6.25 Surface Coating/Painting

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Sigma Z0 (m)	The vertical concentration distribution at the source.
Sigma Y0 (m)	The horizontal concentration distribution at the source.
Emission Indices	
VOC emissions index (kg/kL)	Amount of volatile organic compounds in kilograms emitted per kiloliter of coating/painting substance used.
Pollution Control Factors	

Pollution control factor (0-100%)	Percentage to reduce pollutant emissions. Air pollutant control factors are typically part of specific abatement measures, management practices, or control technologies intended to reduce emissions.

Appendix B.6.26 Training Fire

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
(Operation) units	Units of the non-aircraft equipment source when in operation.
Source type	Type of source: Polygon area, point-vertical, point-capped, point-horizontal, or volume.
Equipment Specifications	
Release height AGL (m)	The distance above the ground elevation at the point the emissions are released.
Exhaust velocity (m/sec)	The velocity in meters per second at which exhaust emissions enter the atmosphere.
Exhaust Temperature (°F)	The temperature in degrees Fahrenheit of the exhaust emissions when they enter the atmosphere.
Temperature above ambient	Given in degrees Fahrenheit, this represents the difference of the temperature of the exhaust emissions when they enter the atmosphere and the ambient air temperature of the atmosphere. The temperature above ambient feature is not supported in AEDT.
Diameter (m)	The diameter of the emissions source at the point the emissions enter the atmosphere. For a smokestack, this is the physical diameter of the opening at its top. In this application, the physical diameter of the training fire is appropriate.
Emission Indices	
CO emissions index (kg/gallon)	Amount of carbon monoxide in kilograms emitted per gallon of fuel consumed.
NOx emissions index (kg/gallon)	Amount of nitrogen oxides in kilograms emitted per gallon of fuel consumed.
PM10 emissions index (kg/gallon)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per gallon of fuel consumed.
PM2.5 emissions index (kg/gallon)	Amount of particulate matter (less than 2.5 micrometers in diameter) in kilograms emitted per gallon of fuel consumed.
SOx emissions index (kg/gallon)	Amount of sulfur oxides in kilograms emitted per gallon of fuel consumed.
VOC emissions index (kg/gallon)	Amount of volatile organic compounds in kilograms emitted per gallon of fuel consumed.
CH4 emissions index (kg/gallon)	Amount of methane in kilograms emitted per gallon of fuel consumed.
CO2 emissions index (kg/gallon)	Amount of carbon dioxide in kilograms emitted per gallon of fuel consumed.

Appendix B.6.27 Aircraft Equipment Groups

Parameter	Description
Aircraft	
Equipment group name	Name of the equipment group.
ANP—ID	Aircraft noise and performance (ANP) ID.

Parameter	Description
ANP—Description	Description of the aircraft.
Airframe—ID	AEDT generated airframe ID.
Airframe—Type	Type of aircraft.
Airframe—Model	Model description.
Engine—ID	AEDT generated engine ID.
Engine—Count	Number of engines.
Engine—Code	Engine code.
Engine—Model	Engine model.
Manufacturer	Engine manufacturer.
Engine—Modification Code	Engine modification code.
Engine—Mod ID	Engine modification ID.
ID—BADA	Base of aircraft data (BADA) ID.
ID—ICAO	International Civil Aviation Organization (ICAO) ID.
ID—Equipment	AEDT generated equipment ID.
User Defined	User defined aircraft indicator.
Custom Tag	User defined name.
Assigned—Operations	Indicator if the aircraft is assigned to an operation in the study.
Assigned—Equipment Group	Indicator if the aircraft is assigned to an equipment group in the study.
Assigned—Group Name	Group name if assigned to an equipment group.
Tracks	
Day (%)	Distribution percentage of daytime operations for the group to be assigned to the track.
Evening (%)	Distribution percentage of evening operations for the group to be assigned to the track.
Night (%)	Distribution percentage of nighttime operations for the group to be assigned to the track.
Airport	Name of the airport associated with the track.
Airport Layout	Name of the airport layout associated with the track.
ID	AEDT generated track ID.
Track	Name of the track.
Type	Type of track. V = Vector, P = Point.
Operation Type	Type of operation associated with the track. A = Approach, D = Depart, T = Touch & Go, V = Overflight, X = Inbound Helitaxi, O = Outbound Helitaxi
Runway End	Runway end associated with the track.

Appendix B.6.28 Non-Aircraft Equipment Groups

Parameter	Description
ID	AEDT generated non-aircraft ID.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
Name	Name of the non-aircraft equipment.
Type	Type of source.

(Operation) units	Units of the non-aircraft equipment source when in operation.
User Defined	Indicator if the non-aircraft equipment is user defined.

Appendix B.7 Airports/Designer Tabs

Appendix B.7.1 Airports Pane

Parameter	Description
Name	Name of airport.
Preferred Code	Airport code.
Code Type	Type of code.
City	City where the airport is located.
State	State where the airport is located.
Country	Country where the airport is located.
Facility Type	Facility description (airport, balloonport, gliderport, heliport, seaplane base, stolport, or ultralight).
Latitude	Latitude where the airport is located, in degrees.
Longitude	Longitude where the airport is located, in degrees.
Elevation MSL (ft)	Elevation of airport in feet above mean sea level.

Appendix B.7.2 Create New Airport and Edit Airport

Parameter	Description
Airport Name	Name of the new airport.
Code (Other)	Airport code.
City	Name of city as defined by FAA NAS-R.
State	State name where the airport is located.
Country	Country name where the airport is located.
Latitude	Latitude where the airport is located, in degrees.
Longitude	Longitude where the airport is located, in degrees.
Elevation MSL (ft)	Highest point of an airport's usable runways in feet above mean sea level.
Time Zone Info	Airport time zone.

Appendix B.7.3 Add Existing Airport

Parameter	Description
Name	Name of airport.
Preferred Code	Airport code.
Code Type	Type of code.
City	City where the airport is located.
State	State where the airport is located.
Country	Country where the airport is located.
Facility Type	Facility description (airport, balloonport, gliderport, heliport, seaplane base, stolport, or ultralight).
Latitude	Latitude where the airport is located, in degrees.
Longitude	Longitude where the airport is located, in degrees.
Elevation MSL (ft)	Elevation of airport in feet above mean sea level.

Appendix B.7.4 Create Airport Layout and Edit Airport Layout

Parameter	Description
Airport	Name of the airport.

Layout name	Name if the new layout.
Effective date	Start date for the layout.
Expiration date	End date for the layout.
Taxi-in time	Taxi-in time in minutes and seconds.
Taxi-out time	Taxi-out time in minutes and seconds.

Appendix B.7.5 Airport Details Pane

Parameter	Description
Location	
City	City where the airport is located.
State	State where the airport is located.
Country	Country where the airport is located.
Facility Type	Facility description (airport, balloonport, gliderport, heliport, seaplane base, stolport, or ultralight).
Latitude	Latitude where the airport is located, in degrees.
Longitude	Longitude where the airport is located, in degrees.
Elevation MSL (ft)	Elevation of airport in feet above mean sea level.
Codes	
ICAO	International Civil Aviation Organization (ICAO) code.
IATA	International Air Transport Association (IATA) code.
FAA	Federal Aviation Administration Code.
Other	User defined code.

Appendix B.7.6 Airport Layout Details Pane

Parameter	Description
Ground Elements	
Type	Type of layout component.
ID	AEDT generated ID.
Name	Name of layout component.
Tracks	
Type	Track type (vector, point, or helitaxi)
ID	AEDT generated ID.
Track	Track name.
Runway End	Name of the runway end associated with the track.
Operation Type	Type of operation associated with the track (approach, departure, touch and go, taxi outbound, taxi inbound)
Aircraft Type	Fixed wing or helicopter.
Dispersed	Indicator if the track is dispersed or not.

Appendix B.7.7 Operating Configuration Details Pane

Parameter	Description
Runway Assignments	
Aircraft Size	Category of aircraft.
Runway End	Name of the runway end associated with the operating configuration.
Arrivals (%)	Percentage of arrival operations for the aircraft size on the corresponding runway end for the operating configuration.

Parameter	Description
Departures (%)	Percentage of departure operations for the aircraft size on the corresponding runway end for the operating configuration.
Touch & Gos (%)	Percentage of touch and go operations for the aircraft size on the corresponding runway end for the operating configuration.
Activation Parameters	
Wind Direction Min (deg)	Minimum of the wind direction range for the operating configuration, in degrees.
Wind Direction Max (deg)	Maximum of the wind direction range for the operating configuration, in degrees.
Wind Speed Min (knots)	Minimum of the wind speed range for the operating configuration, in knots.
Wind Speed Max (knots)	Maximum of the wind speed range for the operating configuration, in knots.
Start Hour (hh:00)	Start time in hours for the operating configuration.
End Hour (hh:00)	End time in hours for the operating configuration.
Ceiling Min AGL (ft)	Minimum of the altitude range for visibility to the ground for the operating configuration (feet AFE).
Ceiling Max AGL (ft)	Maximum of the altitude range for visibility to the ground for the operating configuration (feet AFE).
Visibility Min (statute miles)	Minimum of the visibility range for the operating configuration, in statute miles.
Visibility Max (statute miles)	Maximum of the visibility range for the operating configuration, in statute miles.
Temperature Min (F)	Minimum of the temperature range for the operating configuration, in degrees Fahrenheit.
Temperature Max (F)	Maximum of the temperature range for the operating configuration, in degrees Fahrenheit.
Capacity	
Point	Capacity Pareto frontier point number.
Arrivals per Hour	Number of arrival operations per hour for the operating configuration.
Departures per Hour	Number of departure operations per hour for the operating configuration.

Appendix B.7.8 Edit Tracks

Parameter	Description
Layout	Airport layout name.
Name	Custom track name.
Runway End/Helipad	Runway end or helipad ID
Operation type	Type of operation associated with the track.
Track type	Type or track.
Aircraft type	Type of aircraft.
Point Type Tracks	
Segment Number	Track segment number.
Segment Name	Track segment name.
Latitude (deg)	Latitude of track point, in degrees.
Longitude (deg)	Longitude of track point, in degrees.
Altitude MSL (ft)	Altitude control target altitude for the track point.

Altitude Control	Altitude control code for the track point.
Message Time	*Message Time* is not used.
Speed (KCAS)	Speed control target calibrated airspeed in knots for the track point. Used only with the BADA 4 Model.
Speed Control	Speed control code for the track point. Used only with the BADA 4 Model and if there are altitude controls on the track,
Vector Type Tracks	
Segment Number	Track segment number.
Segment Type	Description of segment type, straight (S), left (L), or right (R).
Distance/Radius (nmi)	The distance of the segment or the radius for the segment, in nmi.
Turn Angle (deg)	The angle of the turn in degrees.

Appendix B.7.9 Edit Building

Parameter	Description
Layout	Airport layout name.
Name	Name of the building.
Elevation MSL (m)	Elevation above mean sea level (in meters) from which the building height is measured.
Height (m)	The height of the highest significant part of the building above ground level (in meters).
Latitude (deg)	Latitude of building points, in degrees.
Longitude (deg)	Longitude of building points, in degrees.

Appendix B.7.10 Edit Gate

Parameter	Description
Layout	Airport layout name.
Units	Unit of measurement – English or Metric.
Name	Name of the gate.
Elevation MSL	Elevation of the gate, above mean sea level.
Latitude (deg)	Latitude of gate, in degrees.
Longitude (deg)	Longitude of gate, in degrees.
Release height AGL	Emissions release height of the runway and airborne area sources.
Initial sigma-Y	The initial lateral dispersion parameter, Sigma-Y describes the horizontal concentration distribution at the source. The initial distribution is a Gaussian "bell-curve" whose mean is the center of the volume and whose standard deviation is equal to the *Initial Sigma-Y*. In dispersion, this provides the model with an initial finite concentration of pollutant. *Initial Sigma-Y* defaults to 16 meters (52.49 feet).
Initial sigma-Z	The initial vertical dispersion parameter, Sigma-Z describes the vertical concentration distribution at the source. The initial distribution is a Gaussian "bell-curve" whose mean is the release height and whose standard deviation is equal to the Initial *Sigma-Z*. In dispersion, this provides the model with an initial finite concentration of pollutant. *Initial Sigma-Z* defaults to 3 meters (9.84 feet).
Aircraft size	Size of the aircraft appropriate for the gate.

Appendix B.7.11 Edit Terminal

Parameter	Description
Layout	Airport layout name.
Units	Unit of measurement – English or Metric.
Name	Name of the terminal.
Elevation MSL	Elevation of the terminal, above mean sea level.
Aircraft size	Size of the aircraft appropriate for the terminal.
Release height AGL	Emissions release height of the runway and airborne area sources.
Initial sigma-Z	The initial vertical dispersion parameter, Sigma-Z describes the vertical concentration distribution at the source. The initial distribution is a Gaussian "bell-curve" whose mean is the release height and whose standard deviation is equal to the Initial *Sigma-Z*. In dispersion, this provides the model with an initial finite concentration of pollutant. *Initial Sigma-Z* defaults to 3 meters (9.84 feet).
Latitude (deg)	Latitude, in degrees.
Longitude (deg)	Longitude, in degrees.

Appendix B.7.12 Edit Runways

Parameter	Description
Layout	Airport layout name.
Name	Name of runway, usually includes two runway end names.
Length (ft)	Length of the runway, automatically calculated based on the runway ends, in feet.
Width (ft)	Width of the runway, in feet.

Appendix B.7.13 Edit Runway Ends / Helipad

Parameter	Description
Layout	Airport layout name.
Name	Name of the runway end.
Latitude (deg)	Latitude for this runway end, in degrees.
Longitude (deg)	Longitude for this runway end, in degrees.
Elevation MSL (ft)	Elevation of the runway end, in feet above mean sea level.
Change in headwind (%)	Percent change in airport average headwind. This is used to modify the airport average headwind value to allow for a variation in average headwind for each runway end. AEDT calculates the runway headwind by: (Runway headwind) = (Airport headwind)*(1 + Percent/100) - If no value is provided (NULL), then it will default to 0%. - The default value of 0% means the runway uses the airport average headwind. A value of -100% means that there is no headwind. - The percentage change value is limited to -500% to 500%; in general, values between -50% and 50% are used.
Glide Slope (deg)	Glide slope for an approach to this runway end, in degrees. Glideslope only changes where the aircraft lands on the runway, and it does not change the angle at which the aircraft approaches the runway. The aircraft descent angle can be changed in the flight profile.
Threshold crossing height AGL (ft)	Height above ground level where the normal glide path crosses the landing threshold for the runway end.

Approach Displaced Threshold (ft)	Distance from the runway end to the landing location
Departure Displaced Threshold (ft)	Distance from the runway end to the takeoff location

Appendix B.7.14 Edit Taxiway

Parameter	Description
Layout	Airport layout name.
Name	Name of the taxiway.
Width (m)	Width of the taxiway, in meters.
Latitude (deg)	Latitude, in degrees.
Longitude (deg)	Longitude, in degrees.
Elevation MSL (ft)	Elevation of the taxiway, in feet above mean sea level.
Ground Speed (mph)	Speed of travel on the taxiway, in mph.

Appendix B.7.15 Edit Taxipath

Parameter	Description
Layout	Airport layout name.
Gate	Name of the gate associated with the taxipath.
Direction	Direction of travel between the gate and the runway end.
Runway end	Name of the runway end associated with the taxipath.
Available taxiways	Defined taxiways that are available for inclusion in the taxipath.
Selected	Taxiways that are included in the taxipath.

Appendix B.7.16 Edit Heligate

Parameter	Description
Layout	Airport layout name.
Units	Unit of measurement – English or Metric.
Name	Name of the Heligate.
Elevation MSL	Elevation of the Heligate, above mean sea level.
Latitude (deg)	Latitude of Heligate, in degrees.
Longitude (deg)	Longitude of Heligate, in degrees.
Release height	Emissions release height of the runway and airborne area sources.
Initial sigma-Y	The initial lateral dispersion parameter, Sigma-Y describes the horizontal concentration distribution at the source. The initial distribution is a Gaussian "bell-curve" whose mean is the center of the volume and whose standard deviation is equal to the *Initial Sigma-Y*. In dispersion, this provides the model with an initial finite concentration of pollutant. *Initial Sigma-Y* defaults to 16 meters (52.49 feet).
Initial sigma-Z	The initial vertical dispersion parameter, Sigma-Z describes the vertical concentration distribution at the source. The initial distribution is a Gaussian "bell-curve" whose mean is the release height and whose standard deviation is equal to the Initial *Sigma-Z*. In dispersion, this provides the model with an initial finite concentration of pollutant. *Initial Sigma-Z* defaults to 3 meters (9.84 feet).

Appendix B.7.17 Edit Helitaxi

Parameter	Description
Layout	Airport layout name.
Heligate	Name of the heligate associated with the helitaxi operation.

Direction	Direction of travel between the heligate and helipad.
Helipad	Name of the helipad associated with the helitaxi.
Name	Name of the helitaxi operation.
Vector course at helipad	Initial direction of flight for a helicopter departure.
Segment Number	Helitaxi segment number.
Segment Name	Helitaxi segment name.
Latitude (deg)	Latitude of helitaxi points, in degrees.
Longitude (deg)	Longitude of helitaxi points, in degrees.

Appendix B.7.18 Edit MOVES Roadway Link

Parameter	Description
Layout	Airport layout name.
Name	Name of the roadway.
Road Type	Road type of the roadway link (Rural Restricted, Rural Unrestricted, Urban Restricted, or Urban Unrestricted).
Roadway Link Length (mi)	Total length of the roadway in miles.
Roadway Link Avg. Grade (%)	Average grade of the roadway link in percent. Valid range is between -45 and 45.
Latitude (deg)	Latitude of the roadway points, in degrees.
Longitude (deg)	Longitude of roadway points, in degrees.

Appendix B.7.19 Edit MOVES Parking Link

Parameter	Description
Layout	Airport layout name.
Name	Name of the parking facility.
Movement Link Length (mi)	Total length of the movement link in miles.
Movement Link Avg. Grade (%)	Average grade of the movement link in percent. Valid range is between -45 and 45.
Latitude (deg)	Latitude of the parking facility points, in degrees.
Longitude (deg)	Longitude of parking facility points, in degrees.

Appendix B.7.20 Edit MOVES Construction Link

Parameter	Description
Layout	Airport layout name.
Name	Name of the construction zone.
Road Type	Road type of the construction link (Rural Restricted, Rural Unrestricted, Urban Restricted, or Urban Unrestricted).
Construction Link Length (mi)	Total length of the construction zone in miles.
Construction Link Avg. Grade (%)	Average grade of the construction link in percent. Valid range is between -45 and 45.
Latitude (deg)	Latitude of the construction zone points, in degrees.
Longitude (deg)	Longitude of construction zone points, in degrees.

Appendix B.7.21 Disperse Track

Parameter	Description

Track	Name of the selected track.
Subtracks	Number of dispersed tracks – the backbone track plus subtracks (3, 5, 7, or 9).
Distance (nmi)	Distance from the backbone track to the outside subtrack in nmi.
Subtrack Percents	Used to distribute flight operations across the backbone track and subtracks.
Total	Total of subtrack percentages – must add up to 100 %.

Appendix B.7.22 Edit Dispersed Track

Parameter	Description
Layout	Airport layout name.
Name	Name of the track.
Runway End/Helipad	Name of the selected runway end or helipad.
Operation Type	Type of operation.
Track Type	Type of track (point or vector).
Aircraft Type	Type of aircraft.
Subtracks	Number of dispersed tracks – the backbone track plus subtracks (3, 5, 7, or 9).
Distance (nmi)	Distance from the backbone track to the outside subtrack in nmi.
Subtrack Percents	Used to distribute flight operations across the backbone track and subtracks.
Total	Total of subtrack percentages – must add up to 100%.
Subtrack Spacing	Spacing between subtracks, in nmi.
Reset Spacings to Value	All subtrack spacings are set to the value in this field when the button is clicked.
Segment Number	Track segment number.
Latitude (deg)	Latitude of track point, in degrees.
Longitude (deg)	Longitude of track point, in degrees.
Altitude Control	Altitude control code for the track point.
Altitude MSL (ft)	Altitude of track point.

Appendix B.8 Definitions Tab

Appendix B.8.1 Metrics

Parameter	Description	Range
Metrics		
Metric Name	Name of the metric.	
Metric Type	Type of the metric.	
User Defined	Indicator for a user-defined metric.	
Noise Metrics – Details		
Metric name	Name of metric.	
Metric kind	Type of metric.	Noise Emissions Fuel Consumption Emissions Dispersion
User defined	Indicator for a user-defined metric.	Yes or No

Parameter	Description	Range
Metric type	Type of noise metric.	Exposure Maximum Level Time Above Time Audible
Frequency type	Type of frequency weighting.	A-Weight P-Weight C-Weight
Time and weight for Day, Evening, and Night	The start and end time for the time period and the weight to be associated with the time period.	
Time-averaging constant	When selected, AEDT will use time averaging correction factor input in the decibels field.	
Decibels	10 times the base-10 logarithm of the ratio of the averaging time over a reference time, in decibels. The default value of 49.39 dB is for a 24-hour averaging time in seconds and a reference time of one second. $$10\log\left(\frac{24*60*60s}{1s}\right) = 49.37 \text{ dB}$$ For average-noise metrics derived from SEL, use a reference time of 1 sec. For average-noise metrics derived from EPNL, use a reference time of 10 sec. For true exposure metrics, enter 0 dB in this field. (dB)	

Appendix B.8.2 Receptors

Parameter	Description	Range
Receptors		
ID	AEDT generated receptor ID.	
Name	Name of receptor.	
Receptor Type	Type of receptor—point or grid.	
Receptor Details		
Name	Name of receptor.	
Type	Type of receptor—point or grid.	Point Grid
Units	Unit of measurement	English Metric
X count	Total count of the receptors in the x direction.	
Y count	Total count of the receptors in the y direction.	
X spacing	Spacing of receptor points in a grid in the x direction.	
Y spacing	Spacing of receptor points in a grid in the y direction.	
X offset	Location of the bottom-left corner of the grid with respect to the X origin	
Y offset	Location of the bottom-left corner of the grid with respect to the Y origin	
Latitude (deg)	Location of receptor, in degrees.	
Longitude (deg)	Location of receptor, in degrees.	
Elevation MSL	Elevation of receptor, above mean sea level.	

Height above ground – elevation offset for noise	This field offsets the ground level by the height specified (e.g., to model noise on a hospital rooftop). This value is only used for point-type receptors for noise calculations. The receptor height is assumed to be 4 ft above ground (or above this offset height) for noise calculation.	
Emissions dispersion receptor height	The default receptor height for emissions dispersion calculations is 1.8 m (5.9 ft). To specify different receptor height, use the Use *AERMOD receptor grid* and the *File with AERMOD receptor grid* options in the Study tab, Preferences, Emissions Dispersion, See Appendix B.1.14.	

Appendix B.8.3 Receptor Sets

Receptor Sets		
Receptor Set Name	Name of receptor set.	
Receptor Set Details		
Receptor Set Name	Name of receptor set.	
Receptor Set Description	Description of receptor set.	
Receptor set type	Type of the receptor.	Receptor Dynamic Grid
Type	Type of the receptor.	Grid Point
Receptor total	Total number of receptors in the receptor set.	
Point total	Total number of receptor points in the receptor set.	
Bounding box	Latitude and longitude of the left-bottom corner and the top-right corner of the receptor set.	
Dynamic grid	Check box indicating if the dynamic grid functionality is assigned to the receptor set.	
ID	ID of the receptor assigned to the receptor set.	
Name	Name of the receptor assigned to the receptor set.	
Receptor Type	Type of the receptor assigned to the receptor set.	Grid Point
Latitude (deg)	Location of receptor, in degrees.	
Longitude (deg)	Location of receptor, in degrees.	

Appendix B.8.4 Operational Profiles

Operational Profiles	
Name	Name of operational profile.
Profile Type	Type of operational profile.
Operational Profile Details	
Quarter Hour	Applicable quarter hour for the associated weighting.
Day of the week	Applicable day of the week for the associated weighting.
Monthly	Applicable Month for the associated weighting.
Weight	Weighting between 0 and 1 to indicate no activity (0) and peak activity (1) during the associated time period.

Appendix B.8.5 Weather

Weather Details – Airport Weather	
Airport	Name of airport.
Temperature (°F)	Temperature in degrees Fahrenheit.
Pressure (millibars)	Station pressure, in millibars.

Sea level pressure (millibars)	Sea level pressure, in millibars.
Relative humidity (%)	Relative humidity percentage.
Dew point (°F)	Dew point in degrees Fahrenheit.
Wind speed (knots)	Wind speed, in knots.
Weather Details – Weather data directory	
High fidelity weather data directory	Directory where high fidelity weather files are stored.
Emissions dispersion weather data directory	Directory where emissions dispersion weather files are stored.
Weather Details – Generate emissions dispersion weather files	
Upper air file	Directory where the upper air weather file is stored.
Surface file	Directory where the surface weather file is stored.
ASOS 1-minute files	Directory where the ASOS 1-minute files are stored.
ASOS 5-minute files	Directory where the ASOS 5-minute files are stored.
Apply default adjustment to truncated ASOS wind speeds (+½ knot)	When selected, ½ knot is added to all ASOS-based wind speeds to compensate for truncated (versus rounded) wind speeds that are collected at ASOS sites. This approach is consistent with the default AERMET behavior.
Randomize NWS wind direction (+/- 5°)	AERMET option. Randomizes the National Weather Service (NWS) wind directions between +/- 5° of the reported wind value.
Substitute missing data	AERMET option. Substitutes missing on-site data with the NWS surface weather data. Checking this option is required if only surface and profile data are used (without on-site observations). On-site data can be merged in manually by running AERMET independently of AEDT. For more information, please see the AERMET User's Guide.
Adjust U* (adjust low friction velocity for stable low wind speed)	AERMET option. ADJ_U* is a meteorological refinement option that can be applied in conjunction with the use of 1-minute and 5-minute ASOS data using EPA's AERMINUTE utility.
Wind height	AERMET option. Height above ground at which surface wind observations are made, in meters.
Roughness	AERMET option. Surface roughness, in meters. This is related to the height of obstacles to the wind flow.
Bowen ratio	AERMET option. Bowen ratio
Albedo	AERMET option. Reflection coefficient
Date Range – Start and End	AERMET option. Date range for the weather data to be merged and generated for AERMOD (i.e., the date range for AERMOD run).
File name prefix	Prefix for the AERMOD weather file names to be generated.
Weather Details – Generate emissions dispersion weather files – Generate AERSURFACE Output	
Land Cover File	Directory where the land cover file is stored.

Percent Tree Canopy File	Directory where the percent tree canopy file is stored.
Percent Impervious File	Directory where the percent impervious file is stored.
Latitude (deg)	Latitude of the weather station, in degrees.
Longitude (deg)	Longitude of the weather station, in degrees.
Datum	Geodetic datum on which the specified coordinates are based. NAD27: North America 1927 datum NAD83: North America 1983 datum
Zone Radius (km)	The radius for the selected wind sector, in km.
Start	Starting angle for the selected wind sector.
Sector Type	There are two options, Airport or Non-airport that describe the type of surface characteristics that is included in the sector. Airport sectors are assumed to be dominated by surface characteristics similar to that at an airport (e.g., airport runways, roadways, and parking lots). Non-airport sectors are assumed to be dominated by rougher surface characteristics (e.g., buildings).
Preview on Map	When this button is clicked, the wind sectors are displayed on the map within the dialog.
Temporal Resolution	Temporal representative averaging options which include Annual, Seasonal, or Monthly.
Override Default Seasons (Annual or Monthly Only)	Checkbox to enable user-defined associations between months and season for annual and monthly temporal resolutions.
Enable Climate Options	Checkbox to enable additional the Surface Moisture drop-down menu, Arid Region checkbox, and Snow checkbox.
Surface Moisture	Drop-down menu to specify the climate as Wet, Dry, or Average.
Arid Region	Checkbox to indicate no winter months with periods of continuous snow cover.
Snow	Checkbox to indicate continuous snow cover during winter months.
Preview Control File	Button to preview AERSURFACE inputs.
Reset Inputs	Button to reset all inputs in the dialog.
Weather Details – AERMOD wind categories for emissions dispersion	
Use Default Values	Use the AERMOD default set of wind categories.
Use User-Defined Values	Use a custom set of wind categories.
Category A	Upper bound of the wind speed for category A.
Category B	Upper bound of the wind speed for category B.
Category C	Upper bound of the wind speed for category C.
Category D	Upper bound of the wind speed for category D.
Category E	Upper bound of the wind speed for category E.
Reset	Reset the wind speed category bounds to the previously-saved values.
Use Default Values	Use the AERMOD default set of wind categories.

Appendix B.8.6 Terrain and Ambient

Terrain and Ambient – General	
Terrain	Directory where terrain files are stored.
Ambient	Directory where ambient files are stored.

Appendix B.8.7 MOVES AERMOD Files

MOVES AERMOD Files	

MOVES AERMOD scenario	Name of the MOVES AERMOD scenario
MOVES AERMOD .INP file	File path where MOVES .INP file is stored.
MOVES AERMOD .HRE file	File path where MOVES .HRE file is stored.
Pollutant	Pollutant that is specified in the selected MOVES AERMOD input files. Automatically populated.
Comment	(Optional) Description of the MOVES AERMOD scenario.

Appendix B.8.8 MOVES Inventory Files

MOVES Inventory Files – General	
MOVES inventory scenario	Name of the MOVES inventory scenario
MOVES inventory file	File path of the MOVES emissions inventory file (.csv).
Scenario year	Year specified in the MOVES emissions inventory file. Automatically populated.
Pollutant	Pollutant(s) that are specified in the selected MOVES inventory file. Automatically populated.
Comment	(Optional) Description of the MOVES inventory scenario.

Appendix C External Converter Tools

This appendix describes the external INM and EDMS converter tools which are included with the AEDT installation package. These tools support import of INM and EDMS studies by converting the legacy studies into ASIF format.

Appendix C.1 INM to ASIF Converter

The log file for the INM to ASIF Converter is located in the AEDT Logs folder (e.g., *C:\AEDT\Logs\INMASIFConverterLog.txt*).

Conversion notes:
- The INM to ASIF Converter recognizes system aircraft with user-modified profiles in an INM study and converts them in ASIF. It also supports converting user-defined helicopter profiles in an INM study.
- The INM to ASIF Converter requires between 4 and 24 files[9] that define study elements to exist in the INM study folder even if they are all not used in the INM study. The four files that are required at a minimum include study.inm, study.csv, scenario.dbf, and case.dbf. Additional files may also be required depending on the study. Note that some of these files are not automatically created by INM; they are created by interacting with various options within INM. If any of these files are missing, AEDT will produce an error "Could not open "xxxxxx.dbf". To resolve these errors, open each relevant window in INM to create a blank version of the files listed in the error message. For example, to resolve the error "Could not open "prof_helo.dbf", open the study in INM and navigate to the *Helicopter/Profile Identifiers* menu item and open the *Helicopter Profile Identifiers* window to prompt INM to create this file. Note that INM will create the "prof_helo.dbf", even if a new record is not created.
- Airport codes in the converted ASIF file may need to be manually updated to the standard AEDT airport codes in order to be successfully imported into AEDT.
- INM studies can contain incomplete study data. The following INM elements will be skipped if they are missing data:
  o Tracks without track segments
  o Noise identifiers without NPD curves
  o Aircraft profiles without steps or procedures
- The INM to ASIF Converter will assign the following default values:
  o Fuel sulfur content = 0.0006
  o Sulfur to sulfate conversion rate = 0.024

To convert an INM study to ASIF format:
1. Navigate to the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT*).
2. Double-click the *INM2ASIF.exe* to open the *INM to ASIF Converter*.
3. In the *INM Study Path* field, click *Browse* and navigate to the directory containing the INM study.

---

[9] A complete list of the dbf files that the INM to ASIF converter may require depending on study elements include: study.inm, study.csv, scenario.dbf, case.dbf, noise_grp.dbf, npd_curv.dbf, aircraft.dbf, profile.dbf, procedur.dbf, prof_pts.dbf, prof_helo.dbf, proc_helo.dbf, flaps.dbf, thr_jet.dbf, thr_prop.dbf, thr_gnrl.dbf, runway.dbf, rwy_end.dbf,, grid.dbf, pop_pts.dbf, loc_pts.dbf, scen_par.dbf, ops_calc.dbf, ops_rnup.dbf, track.dbf ,trk_segs.dbf.

4. In the *ASIF File Path* field, click *Browse,* and navigate to the directory to store the new ASIF file, and type a file name. The file name must end in ".xml".
5. Click *Generate ASIF file* to convert the INM study to an ASIF.
6. The conversion is complete when the following message is displayed: *Your study was successfully converted.*
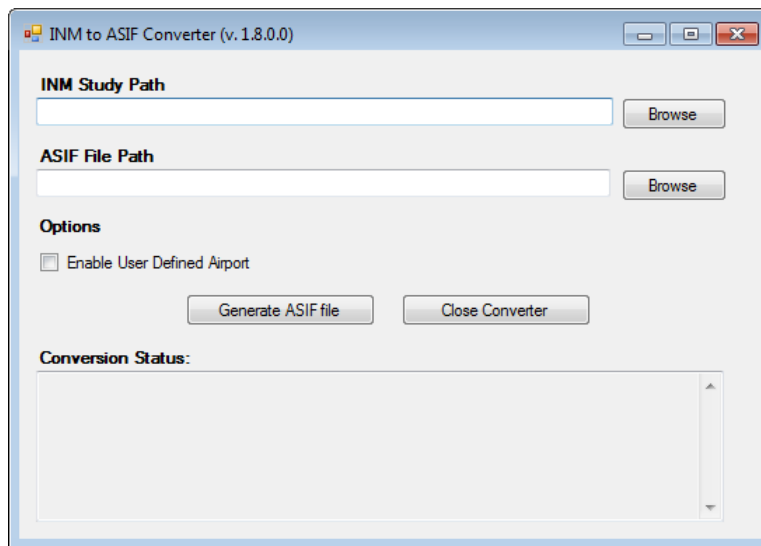
Figure C-1 INM to ASIF Converter Tool

Appendix C.2 EDMS to ASIF Converter

The log file for the EDMS to ASIF Converter is located in the AEDT Logs folder (e.g., *C:\AEDT\Logs\EDMS2ASIFConverterLog.txt*).

Conversion notes:
- If the EDMS export file contains internally inconsistent or invalid data elements such as invalid GSE assignments with invalid fuel types or duplicate instances of the DEFAULT operational profile, the converter will generate an ASIF, but the ASIF file may not import into AEDT. The EDMS export file or the ASIF may need to be manually corrected to address the errors.

To convert an EDMS study to ASIF format:
1. Navigate to the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT*).
2. Double-click the *EDMS2ASIFv2.exe* to open the *EDMS to ASIF Converter*.
3. In the *EDMS Export File Path*, click *Browse* and navigate to the directory containing the EDMS export file.
4. In the *ASIF File Path* field, click *Browse,* and navigate to the directory to store the new ASIF file, and type a file name. The file name must end in ".xml".
5. [Optional] If the EDMS study is schedule-based, the operations schedule file is required. To include the operations schedule, check the *Ops Schedule Folder* checkbox. If the schedule file is in the same directory as the EDMS export file, the directory does not need to be specified. If the schedule file is

in a different directory, click *Browse,* and navigate to the directory containing the aircraft schedule file.

6. [Optional] To include the alternate equipment map, check the *Alt. Equipment Map* checkbox and click *Browse,* and navigate to the directory containing the file.

7. Select the appropriate origin from the following options:

    - Use EDMS Airport Lat/Lon Coordinates as the origin (0,0): When selected, the EDMS airport coordinates given in the EDMS export file will be used as the origin to project/transform all the EDMS x/y coordinates to coordinates in latitude/longitude.

    - Automatically Deduce Lat/Lon Coordinates for EDMS (0,0) Point: When selected, the converter will automatically deduce the latitude/longitude coordinates that were used as the basis for the origin (0,0) of the EDMS coordinate system. The converter uses the known latitude/longitude coordinates of runway ends that can be matched to existing AEDT runway ends to determine the EDMS origin.

    - User-Specified Coordinates for (0,0): When selected, AEDT will use the entered latitude/longitude coordinates of the point that represents the origin (0,0) of the EDMS coordinate system for this study.

8. Click *Generate ASIF file* to convert the EDMS study to an ASIF.

9. The conversion is complete when the following message is displayed: *Your study was successfully converted.*
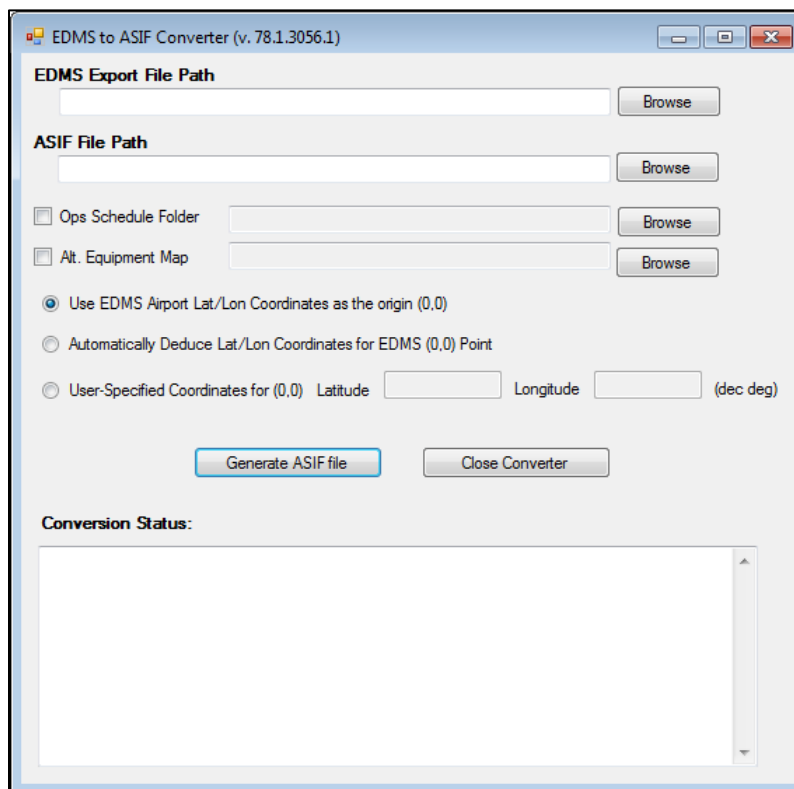
Figure C-2 EDMS to ASIF Converter

Appendix D ASIF Importer Command Line Tool

This appendix describes how to use the ASIF Importer command line tool.
(FAA.AEE.AEDT.ASIFImporterApp.exe). The ASIF Importer tool supports the following functions:

- Create a new study by importing a full-study ASIF file; and
- Update an existing study by importing a partial ASIF file.

ASIF Importer Command Line Options

```
FAA.AEE.AEDT.ASIFImporterApp ASIF_file_path [-xsd ASIF.xsd_file_path] [-
connectionstring connection_string] [-study study_name] [-parentscenario
parent_scenario] [-parentcase parent_case]
```

Command	Description
ASIF File path	(Required) Path to the ASIF file to import.
-connectionstring	(Optional) Database connection string for the study database. This value overwrites the connection string in the configuration file.
-study	Name of new study to create or name of existing study to update. To create a new study, import a full study ASIF file and specify the new study name. To import data into an existing study, import a partial ASIF file and specify the existing study name.
-parentscenario	(Optional) Used for partial import. Name of parent scenario in an existing study into which the ASIFImporter imports data.
-parentcase	(Optional) Used for partial import. Name of parent case in an existing study into which the ASIFImporter imports data.
-xsd	(Optional) ASIF.xsd file path

ASIF Importer Command Line Patterns

Import Type	Command Line
Full study import	FAA.AEE.AEDT.ASIFImporterApp [ASIF file path] –study [study name]
Partial import – airportLayoutSet, boundary, receptorSets, scenario, stationarySourceSet, userGroundSupportEquipmentSet	FAA.AEE.AEDT.ASIFImporterApp [ASIF file path] –study [study name]
Partial import – case, annualization	FAA.AEE.AEDT.ASIFImporterApp [ASIF file path] –study [study name] –parentscenario [parent scenario name]
Partial import – runup, trackOpSet	FAA.AEE.AEDT.ASIFImporterApp [ASIF file path] –study [study name] –parentscenario [parent scenario name] –parentcase [parent case name]

To run the ASIF Importer tool:

1. Open the Command Prompt.
2. Change the directory to the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT*). For example:

   ```
   cd C:\Program Files\FAA\AEDT
   ```

3. Type in the command. For example, the following line will import PartialASIF_boundary.xml file into STUDY_INM database on the "(local)" SQL Server instance.

   ```
   FAA.AEE.AEDT.ASIFImporterApp "C:\Program
   Files\FAA\AEDT\Examples\PartialASIF_boundary.xml" -connectionstring "Data
   Source=(local);Initial Catalog=STUDY_INM;Integrated Security=True"
   ```

4. Press the enter key to run the tool.
5. The ASIF Importer loads and validates the ASIF file, connects to the study database, and imports the file.
6. After the import completes, open the new or updated study in the AEDT application.
7. Any errors are displayed in the command window and also saved to a log file under the AEDT Logs folder (e.g., *C:\AEDT\Logs\ASIFImporterApp_Log.txt*).

Appendix E CSV Import Format and Command Line Tool

Tracks and aircraft operations (and associated APU and GSEs) can be imported by CSV file(s) when formatted as described in this appendix.

In addition to importing the CSV file(s) through the AEDT user interface (Section 6.2.2, Section 8.3.9), they can be imported through the command line, using the AEDT CSV Import tool (Appendix E.3).

A set of sample CSV files is located in the *Examples* directory under the AEDT installation folder (e.g., *C:\Program Files\FAA\AEDT\Examples*). These files can be imported into the sample studies provided with the AEDT installation as described below and contain a variety of examples of input options.

- STUDY_DULLES
    - Example files for all track and operation csv import files options including aircraft operation associated APU and GSE operations during landing and takeoff are provided for use with STUDY_DULLES.
        - CsvImport_STUDY_DULLES_Tracks.csv
        - CsvImport_STUDY_DULLES_AirOps.csv
        - CsvImport_STUDY_DULLES_ApuLto.csv
        - CsvImport_STUDY_DULLES_GseLto.csv
- STUDY_INM
    - An aircraft operations example file which includes schedule-based helicopter and fixed-wing aircraft operations is provided for use with STUDY_INM.
        - CsvImport_STUDY_INM_AirOps.csv
- STUDY_PVD
    - An aircraft operations example file which includes profile-based operations is provided for use with STUDY_PVD.
        - CsvImport_STUDY_PVD_AirOps.csv

Before importing operations, use the AEDT user interface to create and prepare an AEDT study. This includes adding airport(s), configuring a single airport layout (per airport) with all desired elements including runway ends, gates, tracks (unless tracks will be imported), and operational profiles (if appropriate). If tracks already exist in the AEDT study, confirm that the track names are unique.

If importing both tracks and aircraft operations, import tracks first.

Appendix E.1 Tracks CSV Import Format

The tracks input file must be in CSV format and include a header row with column names. All columns described in Table E-1 must exist and are listed in the recommended column order.

The input file data format is designed to accommodate multiple workflows, therefore it is not required to input data in every column, however all columns (column headers) must exist in the input file. Columns where data input is optional are identified as "optional" in Table E-1.

The tracks input file must be sorted by the Track Name column so all segments of the tracks are in consecutive order. If the file is sorted by a different column and the track segments are not in consecutive order, each time the importer encounters a Track Name, it will assume it is a new track with a nonunique name and the import will fail.

Table E-1 Tracks CSV Input File Columns

Column Name	Format	Column Description	Notes
APT_CODE	nvarchar(5)	Airport code, e.g., KSFO	This airport must exist in the study prior to importing
RWY_END_NAME	nvarchar(8)	Runway end name, e.g., 10L	This runway end must exist in the study prior to importing Not required for overflight tracks
TRACK_NAME	nvarchar(255)	Track name	Track names in the study must be unique
TRACK_TYPE	nchar(1)	Track type (P) point-type, (V) vector	This field is case sensitive
OP_TYPE	nchar (1)	Operation type (A) Approach, (D) Departure/Runway to Runway, (T) Touch and Go, (V) Overflight	This field is case sensitive
RUNWAY_END_DELTA_DISTANCE	int	Track property that allows for a departure or approach flight to depart or touch down at a given distance from the end of the runway, in feet	Typically set to 0
AIRCRAFT_TYPE	int	0 for fixed-wing, 1 for helicopter	
VECTOR_COURSE_AT_HELIPAD	float	Direction (angle from North) for helicopter operations of vector type	Enter 0 if not a helipad
SUBTRACK_NUM	smallint	Sub-track number	Typically 0 for backbone or non-dispersed track

Column Name	Format	Column Description	Notes
			and 1-8 for dispersed tracks
PCT_DISPERSION	real	Percent of flights dispersed to the particular sub-track	Enter 100 for a non-dispersed track
SEGMENT_NUM	int	Number of the current segment	
SEGMENT_TYPE	nchar(1)	Segment type Point-type track: P (point) Vector-type track: S (straight), L (left turn), or R (right turn)	
PARAM_1	float	Point-type track: latitude coordinate, in decimal degrees. Vector-type track: distance/radius, in feet	
PARAM_2	float	Point-type track: longitude coordinate, in decimal degrees. Vector-type track: the angle, in degrees	
ALTITUDE [Optional]	float	Altitude, in feet MSL	
SPEED [Optional]	float	Speed control target calibrated airspeed, in knots.	Speed control is only used in BADA 4 workflow
ALTITUDE_CONTROL [Optional]	int	(1) At or below, (2) Match, (3) At or above	See Section 8.3.6.1.1.
SPEED_CONTROL [Optional]	int	(1) At or below, (2) Match, (3) At or above	Speed control is only used in BADA 4 workflow See Section 8.3.6.1.1.
SEGMENT_NAME [Optional]	nvarchar(255)	Name of segment	
MESSAGE_TIME [Optional]	datetime	Expected delta time for this segment from the start of the track	

Column Name	Format	Column Description	Notes
HALF_WIDTH [Optional]	float	Track half-width, or the distance from the backbone track to the outside sub-track, in nmi.	For dispersed tracks
ELEVATION [Optional]	float	Altitude of the segment, in feet MSL	

Appendix E.2 Operations CSV Import Format

Aircraft operations and associated auxiliary power unit (APU) and ground support equipment (GSE) operations during landing and takeoff (LTO) can be imported into AEDT by separate CSV files. The data format for each type of operation is described in the following sections.

Appendix E.2.1 Aircraft Operation Input File Format

The aircraft operations input file must be in CSV format and include a header row with column names. All columns described in Table E-2 must exist and are listed in the recommended column order.

The input file data format is designed to accommodate multiple workflows, therefore it is not required to provide data in every column; however all columns (column headers) must exist in the input file. Since aircraft operations can be defined in a variety of ways, Table E-3 and Table E-4 describe columns where data must be input by operation type for schedule-based (Table E-3) and operational profile-based (Table E-4) operations. The tables also include category descriptions to aid in understanding how the data are used.

Aircraft can be specified by the entering data in the following combinations of columns. These data can be found in the Equipment tab, Equipment: Aircraft data grid.
- AirframeModel and EngineCode; or
- EquipId; or
- AcType and EngineCode.

In the event that multiple aircraft/equipment meet the criteria specified in the input file or there are conflicts within the input file, the following hierarchy will be applied.
- EquipId overrides all other indicators
- AirframeModel + EngineCode overrides AcType + EngineCode

In the event that AirframeModel and EngineCode or AcType and EngineCode pair is used to specify an aircraft, and multiple aircraft/equipment meet the criteria:
- If the ANP ID and the BADA3 ID are all identical and therefore performance model is not ambiguous, then the lowest equipment ID will be selected.
- If the ANP ID and the BADA3 ID are different and therefore performance model is ambiguous, then the import will fail and users will be notified that the provided AirframeModel and EngineCode or AcType and EngineCode pair is ambiguous and that Equipment ID should be used instead.

To facilitate user-created, aircraft look-up automation, consider exporting the data contained in the Equipment tab, Equipment: Aircraft data grid by clicking on the Excel icon in the bottom-right corner of the grid.

When specifying profiles, provide either:
- Profile_ID; or
- ProfileName and StageLength

If the profile ID, profile name, and stage length are specified, but do not agree, the profile ID takes precedence and a warning will be written to the log file.

Table E-2 Aircraft Operation CSV Input File Columns

Column Name	Format	Column Description	Notes
AirOp_UserID	nvarchar(255)	User-defined operation ID	
AcType	nchar(4)	ICAO/IATA aircraft type Used to map ICAO/IATA aircraft types to an airframe model, e.g., B738	Can be found in the AEDT Equipment tab, Equipment: Aircraft data grid, ICAO or IATA columns.
AirframeModel	nvarchar(255)	Airframe model name, e.g., Boeing 737-800 Series	Can be found in the AEDT Equipment tab, Equipment: Aircraft data grid, Airframe Model column.
EngineCode	nvarchar(255)	Engine ID, e.g., 203	Can be found in the AEDT Equipment tab, Equipment: Aircraft data grid, Code column.
EquipId	int	Equipment ID	Can be found in the AEDT Equipment tab, Equipment: Aircraft data grid, Equipment column. If both EquipId and AcType and/or AnpID are specified, but are inconsistent, the EquipID will take precedence and a warning will be written to the log file.
AssignDefaultAPU	bit	Flag (0 or 1) to indicate whether to assign a default APU (APU LTO operation) to this aircraft operation Use 1 to assign a default APU or 0 to decline this option	Default APU mappings are based on airframe model; only 277 airframes have a default APU assignment. If this flag is set to 1, then a default duration as defined in the DefaultAPUInMinutes field is assigned. If a duration is not specified in the DefaultAPUInMinutes field, a default duration of 13 minutes is assigned. If this flag is set to 1, but the aircraft equipment does not

Column Name	Format	Column Description	Notes
			have a default APU, then APU operation will not be created.
DefaultAPUDurationInMinutes	float	Input the amount of time in minutes the default auxiliary power unit is used in the aircraft operation Must be a positive number	If the AssignDefaultAPU flag is set to 1, the duration in this field will be assigned to the default APUs.
AssignDefaultGSELTO	bit	Flag (0 or 1) to indicate whether to assign a set of default GSE (GSE LTO operations) to this aircraft operation Use 1 to assign a default GSE or 0 to decline this option	Default GSE mappings are based on airframe model; only 552 airframes have default GSE assignment. If this flag is set to 1, but the aircraft equipment does not have default GSE, then GSE operation will not be created.
OpType	nchar (1)	Operation type (A) Arrival, (D) Departure, (T) Touch and Go, (C) Circuit, (V) Overflight, (5) Runway to Runway (great circle)	
OpCount	float	Operation count	This value can represent an average annual day, distinct operation count (i.e., 1), or annual number of operations.
OpTime	datetime	Operation time	Examples of formats include: 2010-01-06 08:24:00.000 2018-06-01T10:00:00 2019-01-13 05:30 PM 1/19/2010 11:28:00 PM 1/19/2010 23:28 1/19/10 1/19/10 23:28 1/19/10 11:28 PM
DepApt	nvarchar(5)	Departure airport ICAO code, e.g., KSFO	Can be found in the Airports tab, Add Existing Airport dialog. This airport must exist in the study prior to importing.
DepRwyEndName	nvarchar(8)	Departure runway end name, e.g., 10L	This runway end must exist in the study prior to importing.

Column Name	Format	Column Description	Notes
ArrApt	nvarchar(5)	Arrival airport ICAO code, e.g., KSFO	Can be found in the Airports tab, Add Existing Airport dialog. The airport must exist in the study prior to importing.
ArrRwyEndName	nvarchar(8)	Arrival runway end name, e.g., 10L	This runway end must exist in the study prior to importing.
ProfileID	int	Aircraft's profile ID, e.g., 253	If not provided, the ProfileName and StageLength parameters will be used to determine the profile. If the profile ID, profile name, and stage length are specified, but do not agree, the profile ID takes precedence and a warning will be written to the log file.
ProfileName	nvarchar(255)	Name of flight performance profile, e.g., STANDARD, ICAO_A, ICAO_B	If the profile ID, profile name, and stage length are specified, but do not agree, the profile ID takes precedence and a warning will be written to the log file.
TrackName	nvarchar(255)	Track name from the tracks input file or an existing track name	Track name is option for operational profile based operations. Track names in the study must be unique.
StageLength	nchar(1)	Stage length, 1-9 or M	If the profile ID and profile name and stage length are specified, but do not agree, the profile ID takes precedence and a warning will be written to the log file. See Section 6.2.1.7 for more information about stage lengths.
TaxiOut_sec	float	Taxi-out time in seconds	
TaxiIn_sec	float	Taxi-in time in seconds	

Column Name	Format	Column Description	Notes
CruiseAltitude_feet	float	Cruise altitude of the aircraft, in feet	
ArrGateName	nvarchar(40)	Arrival gate name	This gate must exist in the study prior to importing.
DepGateName	nvarchar(40)	Departure gate name	This gate must exist in the study prior to importing.
QuarterHourlyProfile Name	nvarchar(100)	Name of quarter-hourly operational profile	Used to define a profile-based operation. When defining profile-based operations, all three profile types must be defined (quarter hour, daily, and monthly) and the operational profiles must exist in the study prior to importing.
DailyProfileName	nvarchar(100)	Name of daily operational profile	Used to define a profile-based operation. When defining profile-based operations, all three profile types must be defined (quarter hour, daily, and monthly) and the operational profiles must exist in the study prior to importing.
MonthlyProfileName	nvarchar(100)	Name of monthly operational profile	Used to define a profile-based operation. When defining profile-based operations, all three profile types must be defined (quarter hour, daily, and monthly) and the operational profiles must exist in the study prior to importing.

Table E-3 CSV Input File Requirements by Operation Type for Schedule-based Operations

Column Name	Arrival and Departure	Touch & Go and Circuit	Overflight	Runway to Runway
Air Operation ID Definition				
AirOp_UserID	Required	Required	Required	Required
Aircraft Definition				
AcType	AirframeModel and EngineCode; or EquipId; or AcType and EngineCode	AirframeModel and EngineCode; or EquipId; or AcType and EngineCode	AirframeModel and EngineCode; or EquipId; or AcType and EngineCode	AirframeModel and EngineCode; or EquipId; or AcType and EngineCode
AirframeModel				
EngineCode				
EquipId				
APU/GSE Definitions				
AssignDefaultAPU	Required	Required	Required	Required
AssignDefaultGSELTO	Required	Required	Required	Required
Operation Type and Count				
OpType	Required	Required	Required	Required
OpCount	Required	Required	Required	Required
Activity (Schedule-Based Operations)				
OpTime	Required	Required	Required	Required
Airport Definition				
DepApt	Arr: N/A Dep: Required	Circuit: Required Touch & Go: N/A	N/A	Required
DepRwyEndName	Arr: N/A Dep: Required	N/A	N/A	Required
ArrApt	Arr: Required Dep: N/A	Circuit: N/A Touch & Go: Required	N/A	Required
ArrRwyEndName	Arr: Required Dep: N/A	N/A	N/A	Required
Flight Profile Definitions				
ProfileID	Optional	Optional	Optional	Optional
ProfileName	Recommended	Recommended	Recommended	Recommended
TrackName	Optional	Optional	Optional	Optional
StageLength	Recommended	Recommended	Recommended	Recommended
Taxi Time Definitions				
TaxiOut_sec	Arr: N/A Dep: Optional	N/A	N/A	Optional
TaxiIn_sec	Arr: Optional Dep: N/A	N/A	N/A	Optional
Cruise Altitude Definition				

Column Name	Arrival and Departure	Touch & Go and Circuit	Overflight	Runway to Runway
CruiseAltitude_feet	N/A	N/A	N/A	Required for BADA4 Performance Model
Gate Definitions				
ArrGateName	Arr: Optional Dep: N/A	N/A	N/A	Optional
DepGateName	Arr: N/A Dep: Optional	N/A	N/A	Optional
Activity (Operational Profile-Based Operations)				
QuarterHourlyProfileName	N/A	N/A	N/A	N/A
DailyProfileName	N/A	N/A	N/A	N/A
MonthlyProfileName	N/A	N/A	N/A	N/A

Table E-4 CSV Input File Requirements by Operation Type for Operational Profile-based Operations

Column Name	Arrival and Departure	Touch & Go and Circuit
Air Operation ID Definition		
AirOp_UserID	Required	Required
Aircraft Definition		
AcType	AirframeModel and EngineCode; or EquipId; or AcType and EngineCode	AirframeModel and EngineCode; or EquipId; or AcType and EngineCode
AirframeModel		
EngineCode		
EquipId		
APU/GSE Definitions		
AssignDefaultAPU	Required	Required
AssignDefaultGSELTO	Required	Required
Operation Type and Count		
OpType	Required	Required
OpCount	Required	Required
Activity (Schedule-Based Operations)		
OpTime	N/A	N/A
Airport Definition		
DepApt	Arr: N/A Dep: Required	Circuit: Required Touch & Go: N/A
DepRwyEndName	N/A	N/A
ArrApt	Arr: Required Dep: N/A	Circuit: N/A Touch & Go: Required
ArrRwyEndName	N/A	N/A
Flight Profile Definitions		

Column Name	Arrival and Departure	Touch & Go and Circuit
ProfileID	Optional	Optional
ProfileName	Recommended	Recommended
TrackName	N/A	N/A
StageLength	Recommended	Recommended
Taxi Time Definitions		
TaxiOut_sec	Arr: N/A Dep: Optional	N/A
TaxiIn_sec	Arr: Optional Dep: N/A	N/A
Cruise Altitude Definition		
CruiseAltitude_feet	N/A	N/A
Gate Definitions		
ArrGateName	Arr: Required Dep: N/A	N/A
DepGateName	Arr: N/A Dep: Required	N/A
Activity (Operational Profile-Based Operations)		
QuarterHourlyProfileName	Required	Required
DailyProfileName	Required	Required
MonthlyProfileName	Required	Required

Appendix E.2.2 APU LTO Input File Format

The APU LTO operations input file must be in CSV format and include a header row with column names. All columns described in Table E-5 must exist and are listed in the recommended column order.

Table E-5 APU LTO Operation Input File Columns

Column Name	Format	Column Description	Notes
AirOp_UserID	nvarchar(255)	User-defined aircraft operation ID specified in the aircraft operations input file	This value is used to link to a specific aircraft operation in the aircraft operations input file.
APU_Name	nvarchar(255)	APU name, e.g., APU 131-9	Can be found in the AEDT Equipment tab, Equipment: Non-Aircraft data grid, Name column.
APU_Duration	float	Duration of APU operation for the air operation, in minutes	

Appendix E.2.3 GSE LTO Input File Format

The GSE LTO operations input file must be in CSV format and include a header row with column names. All columns described in Table E-6 must exist and are listed in the recommended column order.

The input file data format is designed to accommodate multiple workflows, therefore it is not required to provide data in every column; however all columns (column headers) must exist in the input file. Columns where data input is optional are identified as "optional" in Table E-6.

Table E-6 GSE LTO Operation Input File Columns

Column Name	Format	Column Description	Notes
AirOp_UserID	nvarchar(255)	User-defined aircraft operation ID specified in the aircraft operations input file	This value is used to link to a specific aircraft operation in the aircraft operations input file.
GSE_Name	nvarchar(255)	GSE equipment name If the name includes quotation marks (e.g., "Diesel - Stewart & Stevenson TUG GT-35, Douglas TBL-180 - Aircraft Tractor") use three sets of quotation marks in this field (e.g., """Diesel - Stewart & Stevenson TUG GT-35, Douglas TBL-180 - Aircraft Tractor""").	Can be found in the AEDT Equipment tab, Equipment: Non-Aircraft data grid, Name column.
GSE_Op_Duration [Optional]	float	The time/duration for which this GSE is operating, in minutes	If this field is left blank, then the default duration from AEDT will be used.
Horsepower [Optional]	float	Horsepower for the associated GSE equipment	If this field is left blank, then the default horsepower from AEDT will be used.
Load_Factor [Optional]	float	Load factor for the associated GSE equipment	If this field is left blank, then the default load factor from AEDT will be used.
Manufacture_Year [Optional]	int	Manufacture year of the associated GSE equipment	

Appendix E.3 AEDT CSV Import Tool

As an alternative to using the AEDT user interface, aircraft operations (and associated APU and GSE LTO operations) as well as tracks can be imported through the AEDT CSV command line import tool.

AEDT CSV assumes that AEDT is fully installed and operational. The tool is located in the AEDT installation directory, CsvImport folder (e.g., *C:\Program Files\FAA\AEDT\CsvImport\AEDTCsv.exe)* and assumes all input files are stored in the same directory.

> Before importing operations, use the AEDT user interface to create and prepare an AEDT study. This includes adding airport(s), configuring a single airport layout (per airport) with all desired elements including runway ends, gates, tracks (unless tracks will be imported), and operational profiles (if appropriate). If tracks already exist in the AEDT study, confirm that the track names are unique.

Operations Import Command Line Options

Command(s)	Description)
Aedtcsv --help import	Display help screen
-s, --server <server_name>	Required. Specify the database server
-d, --database <study_name>	Required. Specify the database (AEDT study) name
-p or --port <port_number>	Specify the port to the server
-u or -- username <user_id>	Specify the user name to connect to the database Note: the user will be prompted to enter their password
-t, --track <tracks_file_name>	Specify the tracks CSV file
-n, --no header	Declare no header in CSV files
-a, --airop <acft_file_name>	Specify the aircraft operations CSV file
-q, --apu <apu_file_name>	Specify the APU LTO CSV file Must specify aircraft operation file to use this option
-g, --gse <gse_file_name>	Specify the GSE LTO CSV file Must specify aircraft operation file to use this option
--version	Display version information

To import operations or tracks using the AEDT CSV tool:

1. Open the Command Prompt.
2. Change the directory to the AEDT installation directory, CsvImport folder. For example:

```
cd C:\Program Files\FAA\AEDT\CsvImport
```

3. Type in the appropriate command. For example,

```
aedtcsv –s <server_name> –d <database_name> -t <tracks_file_name> –a
<acft_file_name> --apu <apu_file_name> --gse <gse_file_name>
```

In the following example, tracks, aircraft operations and associated APU and GSE LTO operations will be imported into the study database named STUDY_Import located on the localhost SQL Server instance.

```
aedtcsv -s localhost -d STUDY_Import -t tracks.csv -a ops.csv --apu
apu.csv --gse gse.csv
```

4. Press the enter key to run the tool.

Initialization, progress, and completion messages are displayed in the command prompt dialog. Error messages are displayed in the command prompt dialog as they are encountered and reported in the AEDT log.

> If the input files are stored in a directory other than C:\Program Files\FAA\AEDT\CsvImport, specify the file path along with the file name in the command.

Appendix F Time Above and Time Audible Noise Metrics

This appendix provides detailed information on the time above and audibility noise metrics.

⚠️ The time audible metrics are not available for selection in the *Define Metric Results* wizard until an identifier and hash key are obtained from FAA and added to the study in the *Study* tab, *Preferences*, *Time Audible Metric* section along with the relevant ambient data files. More information on data requirements and how to request access are described in this Appendix.

Appendix F.1 Time Above Metrics

Time above metrics measure the total time or percentage of time a weighted aircraft noise level exceeds the specified sound level threshold over the desired time period. The time above metrics available in AEDT include:

- TALA: Time-above an A-weighted sound level threshold
- TALC: Time-above a C-weighted sound level threshold
- TAPNL: Time-above a PNLT threshold
- TALASC: Time-above an A-weighted sound level threshold with Statistical Compression*
- TALCSC: Time-above a C-weighted sound level threshold with Statistical Compression*
- TAPNLSC: Time-above a PNLT threshold with Statistical Compression*

*In order to acquire the identifier and hash key that unlocks the time above metrics with statistical compression, coordinate with the FAA Office of Environment and Energy (AEE) AEDT program managers:

Joseph DiPardo   Joseph.DiPardo@faa.gov
Mohammed Majeed   Mohammed.Majeed@faa.gov

Time above metrics can be processed with a uniform ambient by defining a fixed threshold (no ambient file) or by defining noise thresholds by location with an ambient file, see Section 5.2.4.7.

The following processing options are displayed in the Define Metric Result wizard when a time above with statistical compression noise metric (TALASC, TALCSC, or TAPNLSC) is selected. Select the appropriate options:

- *Start Time*: Enter the start time for the time above with statistical compression noise metric.
- *Duration*: Enter the duration for the time above with statistical compression noise metric, the default duration is 24 hours.

⚠️ The Start Time and Duration must be within the annualization time range.

Appendix F.2 Time Audible Metrics

Time audible noise metrics compare aircraft noise against background noise to determine if noise may be detected by a human observer with normal hearing who is actively listening for aircraft noise. The process is based on detectability theory along with research that has assessed human detectability

under different environments that have different background noise levels. Accounting for background noise requires an ambient file.

The time audible metrics available in AEDT include the following and are described in more detail in Appendix F.2.1:
- TAUD: Time Audible
- TAUDP: Time Audible Percent
- TAUDSC: Time Audible with Statistical Compression
- TAUDPSC: Time Audible Percent with Statistical Compression

Audibility requires highly detailed inputs and results may be very sensitive to the quality of input data. Time audible metrics can be used to run ambient screening (no ambient levels higher than the Equivalent Auditory System Noise (EASN) threshold) or processed with ambient and spectral data. The option to run a time audible metric result using ambient screening is located in the *Define Metric Result* wizard, see Section 5.2.4.

In order to access the ambient screening functionality, an identifier, hash key, ambient map, and spectral data files are required. The necessary information to access the time audible metrics in order to run ambient screening is available on the AEDT Support website, Downloads page. No coordination with the Federal Aviation Administration (FAA) is required for running ambient screening.

In order to acquire the identifier and hash key that unlocks the time audible metrics for processing with ambient and spectral data, coordinate with the FAA Office of Environment and Energy (AEE) AEDT program managers:

Joseph DiPardo   Joseph.DiPardo@faa.gov
Mohammed Majeed   Mohammed.Majeed@faa.gov

When requesting access to time audible metrics for processing with ambient and spectral data, provide the following files to the FAA:
- Three-digit Ambient Map: A text grid file that assigns a number, often representing the A-weighted ambient sound level, to study area grid points.
- Ambient Spectral Data File: A text file which correlates unique spectra to the ambient sound levels specified in the ambient map.

The formats for these two ambient files are described in more detail in Appendix F.3. After reviewing the two ambient files, the FAA will generate the corresponding hash key and send it to the user. Only by using this FAA generated hash key and associated identifier along with the ambient map and spectral data files may time audible metrics be utilized in AEDT. Once the ambient map and spectral data file have been specified in the *Study* tab, *Preferences* section (Section 4.11.3.1), and the time audible metrics become available for use in AEDT, the user may calculate audibility based on spectral ambient data.

When the time audible ambient file and spectral data file are specified in the *Study* tab, *Preferences* section, they will be used in all subsequent processing of time audible metric

results. If different ambient or spectral data files are desired for different time audible metrics, confirm the appropriate files are specified before processing each time audible metric.

Time-based metrics are potentially sensitive to the length of aircraft track segments because AEDT uses conditions at the closest point in a track segment and applies them to the entire segment. Users should consider creating track segments fine enough (i.e., short enough) so that the time an aircraft flies on a segment approximates the desired accuracy of the time-based metric.

For example, an aircraft flying 100 knots along a track with segments on the order of 2000 feet, results in 12-second segment lengths. The maximum error for any one segment would similarly be 12 seconds. Users should consider that run time will increase approximately linearly with the number of segments, so segment size should not be made smaller than that length required to give the desired accuracy.

The following processing options are displayed in the Define Metric Result wizard when a time audible noise metric (TAUD, TAUDP, TAUDSC, or TAUDPSC) is selected. Select the appropriate options:
- *Start Time*: Enter the start time for the time audible noise metric.
- *Duration*: Enter the duration for the time audible noise metric, the default duration is 24 hours.
- *Use Spectral Cutoff:* Select this option to use spectral cutoff.
- *Use Ambient Screening:* Select this option to use ambient screening.
- *Use Time Audible Files:* Select this option to use the Time Audible files specified in *Study* tab, *Preferences*, *Time Audible Metric* screen (see Section 4.11.3.1).
  - *Ambient Map*: Displays the ambient map file path specified in the Study Preferences.
  - *Spectral Data*: Displays the spectral data file path specified in the Study Preferences.

The Start Time and Duration must be within the annualization time range.

What is Spectral Cutoff?
The spectral distance cutoff is a pre-processing step which computes the maximum propagation distances (source to receiver) over which to calculate the time aircraft noise is audible (TAUD). The function is intended to minimize the audibility computations for distances which would not result in audible sound levels and therefore maximize run-time efficiency. The cutoff distance is calculated by determining the distance at which a given aircraft noise source would no longer be audible according to the ISO threshold of human hearing.

What is Ambient Screening?
This is typically used to measure if any operations for a given scenario are audible in the study area in order to determine the need for ambient data collection. It assumes no ambient noise (i.e., no ambient levels higher than the Equivalent Auditory System Noise (EASN) threshold) for the evaluation of TAUD. If the ambient screening indicates that aircraft sound levels are not audible in the study area and no other ambient-dependent

metrics (e.g., TALA) are required in the analysis, then ambient sound level measurements are not needed.

Appendix F.2.1 Time Audible Metric Definitions
This section describes the time audible metrics in detail.

TAUD

Time audible (TAUD) is the amount of time in minutes that aircraft noise is audible at a receptor above the defined threshold. The default duration of the measurement is for 24 hours (1440 minutes), and it is capped at 24 hours in computed audibility. A duration less than 24 hours can be specified by the user in the Define Metric Result workflow and will be capped (for contour and noise output) at 100% in accordance with that time period.

When calculating TAUD, the audibility calculations do not directly account for overlapping aircraft operations. If all or a portion of the audibility of two unique aircraft overlap in time the model will over-predict audibility. Over-prediction is likely in busy operational environments where multiple aircraft are audible simultaneously. For this reason TAUD is capped for both contour and grid output at 100% using a default of 24 hours (or 1440 minutes).

TAUDP

Percent time audible (TAUDP) is the percentage of time that aircraft noise is audible at a receptor above the defined threshold. By default, it is based on the TAUD base metric and a time period of 24 hours. User-specified time periods may also be specified, in which case the percent time audible will be based on the user-specified time period.

TAUDSC

Time audible with statistical compression (TAUDSC) is based on the TAUD metric and adjusted by the overlapping events method as described in the AEDT Technical Manual to account for the effects of simultaneously occurring aircraft events on audibility. Like TAUD, the default duration of the measurement is for 24 hours (1440 minutes), and it is capped at 24 hours in computed audibility. For user-specified time periods other than 24 hours, TAUD will be capped (for contour and noise output) at 100% in accordance with that time period.

TAUDPSC

Percent time audible with statistical compression (TAUDPSC) is the percentage of time that aircraft noise is audible above the defined threshold, adjusted by the overlapping events method. It is based on the TAUDSC metric, and a time period of 24 hours. User-specified time periods may also be specified, in which case the percent time audible will be based on the user-specified time period.

Appendix F.3 Ambient Files

This Appendix describes the required ambient files for the associated metrics.

The time above and time audible metrics require input data files that contain estimates of ambient sound levels. There are three types of files:

1. Ambient map for Time Above: contains representative A-weighted sound levels assigned to a regularly spaced grid, referred to as the ambient map.
2. Ambient map for Time Audible: The ambient map used for calculating the time audible metric has the same format as the ambient map used to calculate the time above metrics, however the levels in the file used for time audible metrics act as a reference to the corresponding spectra in the ambient spectral file.
3. Ambient spectral data file: The ambient spectral file contains representative one-third octave band data that are assigned to a regularly spaced grid through an indexing convention described below. It is required for the time audible metrics.

Each file format is described in more detail in the following sections.

	Ambient Files		
Metric	**3-digit ambient map for Time Above (.txt)**	**3-digit ambient map for Time Audible (.txt)**	**Ambient spectral data file (.txt)**
Time Above	Yes	No	No
Time Audible	No	Yes	Yes

Appendix F.3.1 Ambient Map

The purpose of the ambient map is to assign a number, representing the A-weighted ambient sound level, to study area grid points. This file is a space delimited, ASCII text file with format and use illustrated with an example file at the end of this section. The first five rows contain header information that specifies the dimensions of the grid, which is referenced to a geodetic coordinate system.

- Row 1: "ncols" followed by a real number specifies the number of columns (Y) in the regular grid
- Row 2: "nrows" followed by a real number specifies the number of rows (X) in the regular grid
- Row 3: "xllcorner" followed by a real number specifies the longitude (x-coordinate) of the lower left (southwest) corner of the grid in decimal degrees
- Row 4: "yllcorner" followed by a real number specifies the latitude (y-coordinate) of the lower left (southwest) corner of the grid in decimal degrees
- Row 5: "cellsize" followed by a real number specifies the spacing between both latitude and longitude points in decimal degrees
- Row 6: "NODATA_value" followed by an integer specifies the value that indicates that no ambient map data are available for one or more locations within the grid
- Row 7 and beyond: contain three-digit integers that represent A-weighted sound levels and are stored as ten times the value they represent (i.e., '347' represents 34.7 dB).

The same file format is used for both time above and time audible metrics, however the meaning of rows 7 and beyond change between the two applications.

- For time above metrics, the values in rows 7 and beyond represent the a-weighted sound levels in the locations as defined in the ambient map file.
- For time audible metrics, the values in rows 7 and beyond are placeholders in the locations defined in the ambient map file. The placeholder values correspond to values in the spectral data file

> When computing TAUD for locations specified as having no data, by default AEDT assigns the ISO threshold of human hearing spectral data to those locations. For time above metrics, NODATA values are used explicitly as ambient levels, which are subject to 0.0 to 150.0 dB threshold limitations.

In the example below, the final grid will contain a 15 column by 12 row array of points, evenly spaced 0.1 decimal degrees apart referenced to a lower-left (southwest) corner of -114.03464052 longitude and 35.61089089 latitude.

Sample Ambient Map Text File

```
ncols 15
nrows 12
xllcorner -114.03464052
yllcorner 35.61089089
cellsize 0.1
NODATA_value -99
347 347 347 347 347 347 347 347 347 347 347 347 347 347 347
347 347 347 347 347 347 347 347 215 347 347 347 347 347 347
347 347 347 347 347 347 347 347 215 215 215 347 347 347 347
347 347 347 347 347 345 345 345 215 347 347 347 347 215 215
347 345 345 345 345 345 345 345 347 347 347 347 347 215 215
347 345 345 345 345 345 345 347 347 347 347 347 347 215 215
347 347 347 345 347 347 347 347 347 347 347 347 347 347 347
347 347 347 347 347 347 347 347 347 347 347 347 347 347 347
347 347 347 347 347 347 347 347 347 347 228 347 347 347 347
347 347 214 347 347 205 205 205 347 347 347 228 228 228 228
347 347 214 214 347 205 205 205 347 347 347 228 228 228 228
347 347 347 347 205 205 205 347 347 347 347 228 228 228 228
```

Appendix F.3.2 Ambient Spectral Data File

The calculation of the time audible metrics require both the ambient map with A-weighted noise levels (Appendix F.3.1) and the ambient spectral data file information described in this section. The time audible metrics are based on spectral information; however the A-weighted levels are used as an index to assign 24 one-third octave band levels to grid locations. Both files must be consistent for use in AEDT.

The ambient spectral data map is a comma-delimited, ASCII text file, which assigns spectral data to the grid points contained in the ambient map outlined above.

- Row 1: contains an integer specifying the number of data rows which follow.
- Rows 2 and beyond:
  - Field 1: User-ID, for informational purposes only.
  - Field 2: User description such as spectrum or site name, for informational purposes only.
  - Field 3: Index to the ambient map.
  - Fields 4-27: Sound pressure levels for one-third octave bands 17 (50 Hz) through 40 (10,000 Hz).

Field 3 is the value which is indexed with the ambient map for specifying grid-based ambient spectra. For example, a column 3 value of 34.7 in the spectra data file will map the one-third octave band spectrum associated with this record to all values of 347 in the ambient map.

It is useful for documentation purposes for the index value to be equivalent to the A-weighted sum of the spectrum, however this is not required and the convention may not hold for the unique case where different spectra have identical A-weighted values. Regardless of convention, the values of column 3 must be unique across all rows. Prior to use of the TAUD metric, the FAA will perform a verification check on the data to insure uniqueness of mappings and consistency of spectra to reported A-weighted values.

Sample Ambient Spectral Data Text File

```
6
1,3A-1,34.7,45,39.7,35.7,32.7,30.9,30.8,30.8,29.9,29.6,29.6,29.2,28.6,27.8,27.2,26.4,24.6,21.9,19,14.5,9.9,8,7.2,14.8,23.6
2,3A-2,34.5,45,39.5,35.2,32.1,30.3,30.3,30.4,29.5,29.5,29.2,28.7,28,27.2,26.1,24,21,17.5,12.8,8.7,8,9.4,14.8,23.6
3,3B-2,22.8,44.9,39.2,34.3,30.5,27.7,25.5,23.6,22.2,21,20,18.5,17.5,16,15.2,14.7,13.6,12.3,10.6,8.5,6.7,7,7.2,14.8,23.6
4,3B-2,21.4,44.9,39.1,34.1,29.9,27,24.8,22.7,21.4,20.1,19,17.6,16.5,15.2,14.4,13.9,12.9,11.6,10,8.1,4.6,4.4,7.2,14.8,23.6
5,3D-1,21.5,44.9,39.1,33.9,29.2,25.8,22.6,19.6,17.7,16,14.8,14.3,14.2,14.6,15,15.4,14.9,14.1,12.6,10.1,7.4,4.4,7.2,14.8,23.6
6,3D-2,20.5,44.9,39.1,33.9,29.3,25.9,22.6,19.6,17.6,16,14.7,14.2,14,14.3,14.6,14.9,14.4,13.3,11.6,9.1,4.6,4.4,7.2,14.8,23.6
```

Appendix G Distributed Processing

In AEDT, running metric results on a single computer is the default processing mode. It is optional to run metric results with distributed processing on multiple computers. The AEDT client and remote machines must be configured to run with distributed processing, see the AEDT Installation Manual for configuration instructions. After configuration is complete, follow the steps below to setup and run with distributed processing.

Distributed processing is not supported for:
- Running noise metric result with a dynamic grid;
- Running emissions dispersion metric result; and
- Running metric results with the "*Apply the Delay & Sequencing Model*" option enabled.

How does distributed processing work?

Each remote task master will get an opportunity to process an operation if the number of operations in an operations group is greater than or equal the number of remote task masters.

Each remote task master machine has a fixed size of operations which can be placed in its event queue by the host machine. The size of the remote task master's event queue is equal to the number of processors in its CPU multiplied by the number 5 (e.g., a four core CPU which has 8 processors can hold 40 events at a time). Events are divided up (dispatched) by the host machine to the remote task master machines in a non-deterministic fashion.

The event dispatching algorithm in the host machine queries a remote task master in order to determine whether that remote task master has space in its event queue to receive an operation:
- If it does, the host machine sends the event to that same remote task master machine.
- If it does not, the algorithm moves on and queries the next machine in the list of remote task master machines regarding whether this next machine has space in its event queue.

The cycle repeats until all events in an operation group have been sent to the remote task masters.

Terrain and Weather Files

If a study references terrain and/or weather files, the necessary files must be placed on all remote servers in the same location specified in the *Definitions* tab on AEDT client. The specified file location must be exactly the same for all remote servers. See Sections 9.6.2 and 9.7 for instructions on defining file path locations.

Appendix G.1 Identify Remote Taskmaster Machines for Distributed Processing

1. Go to the *Study* tab, *Preferences*, *Study* screen.
2. Under the *Distributed Processing* section, click *Configure* button to open the *TmService* Manager dialog opens
3. To add a remote machine to distributed processing, enter the desired machine name or IP address in the *Machine Name* field and check the *Use* checkbox. Click *Apply*. The *OnLine* and *Processing* checkboxes will update automatically.
4. To remove a machine from distributed processing, delete the machine name from the *Machine Name* field, then click *Apply*.
5. Select a machine name from the list and click *Get Details* to test the connection to the machine.
6. Click *Advanced* to open the *TmService Manager (Advanced)* dialog box (Figure G-2). The *Visible Machines* list displays computers and their IP addresses that are accessible to the local machine over the network.
   a. To determine whether TmService is available on any of the machines in the list, select one or more entries and click *Detect TmService*.
   b. The machine name will be displayed in either green or red font, and the status will be displayed next to it.
      – Green (*ONLINE BUSY*) indicates that TmService is currently processing on the machine and is not available to be used.
      – Green (*ONLINE NOT BUSY*) indicates that TmService is available on the machine.
      – Red (*NOT ONLINE*) indicates that TmService is not available as a Windows Service on the machine. It could mean that TmService is not installed on the machine, or that it was stopped or paused.
   c. Click *OK* to close the dialog box.
7. Click *OK* to apply changes and close the dialog box. Click *Apply* to apply changes and keep the dialog box open. Click *Cancel* to discard changes and close the dialog box.
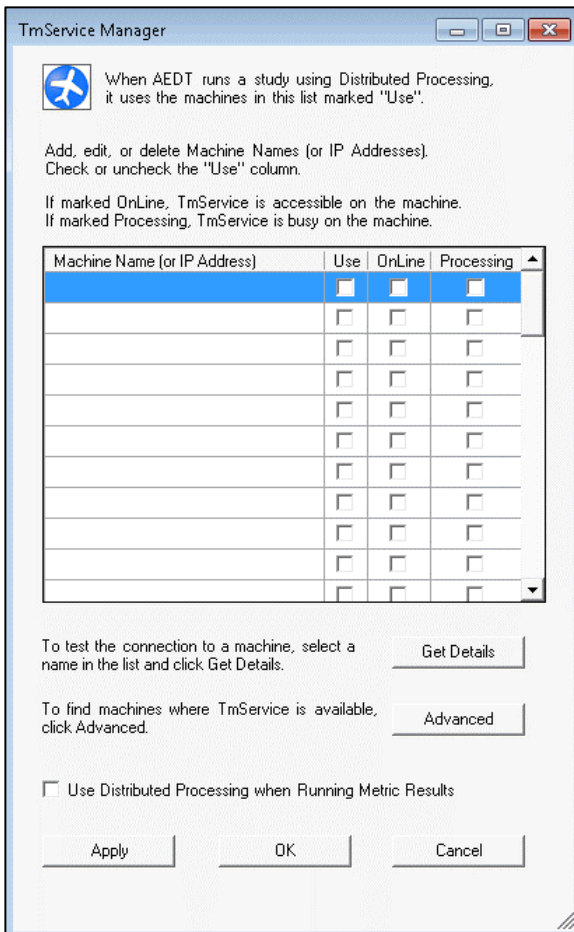
Figure G-1 TmService Manager Dialog Box
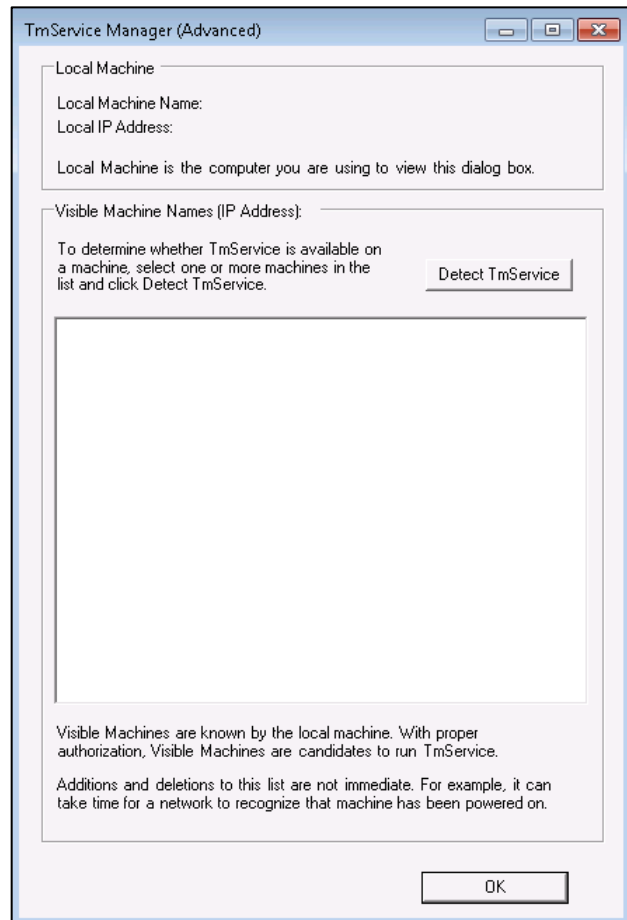
Figure G-2 TmService Manager (Advanced) Dialog Box

Errors detected by TmService are reported back to the AEDT client and are logged to files on the AEDT client so all information pertaining to a study is in a central location; see Section 4.10 for Error Log information. However, if there is a communication error such that TmService cannot deliver information back to the AEDT client, TmService logs information to its local AEDT_TMService_Log.txt files on the server.

Appendix G.2 Enable/Disable Distributed Processing

In the *TmService Manager* dialog box (Figure G-1), check the *Use Distributed Processing when Running Metric Results* checkbox. AEDT will run jobs in distributed processing mode when the *Run* button is clicked in the *Metric Results* tab. If not checked, processing on a single computer will be the default processing method for all metric result runs.

Appendix G.3 Running Large Studies with Distributed Processing

This section provides additional information on running large studies using distributed processing in AEDT.

? **Is there a recommended approach to designing AEDT study for distributed processing?**
As a risk mitigation strategy, it is recommended to break down large metric results into "medium" sized operation groups (cases). For example, with four remote computers, a medium sized case would contain roughly 1,000 to 10,000 events (not aircraft operations). By designing studies this way, you avoid the risk that comes with encountering errors during a large operation group while also avoiding the computational resource inefficiencies that result from making operation groups that are too small.

What happens if one of the remote computers is accidentally shut down while running a large metric result across several remote computers using distributed processing?
Whenever a remote machine fails to be able to communicate with a host machine (e.g., the remote machine got shut down or its connection timed out), the host machine has methods of excluding the failing machine from further computations and will keep processing the current metric result with whatever remote machines are available to do so. When this condition occurs, the host machine scraps whatever results had been computed for the current operation group (case) in the current metric result and restarts processing the current operation group (all previously completed operation groups have already had their results saved into the database and there is no need to re-compute).

Whenever processing seems to slow down or halt entirely, check up on the status of the remote machines (i.e., use Windows Task Manager to query whether a remote machine's distributed processing functionality is still consuming CPU or whether it still has a TCP connection to the host machine).

Appendix G.3.1 Install AEDT and Change Configuration Settings on the Host Machine

1. Install AEDT on the host machine.
2. In the AEDT user interface, go to *Study* tab > *Preferences* > *Database*. Change the **Results Iterator Page Size** value from 1000 to **5**.

   📝 Results Iterator Page Size controls the input/output data transfer sizes. Large studies perform better with a smaller page size.

3. Go to the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT*) and open **log4net.config**. Navigate to line with the **maximumFileSize** entry. Change the value to **250MB** (or any desired larger log size).

Appendix G.3.2 Create an AEDT Study on the Host Machine
1. Start AEDT on the host machine.
2. Create a new AEDT study either by clicking the *Study* tab, *New Study* or by clicking the *Study* tab, *Import* to import an ASIF file.
3. After a study is created, configure the study as desired – e.g., setup terrain folder, create receptor set, create annualizations, and define metric results.

Refer to the following sections before running the study.

Appendix G.3.3 Install Distributed Processing Service on Remote Taskmaster Machine(s)
Install AEDT Distributed Processing Service on the remote taskmaster machines.

Appendix G.3.4 Change the Timeout Settings
If there are cases in a study that run for a longer time than the default timeout values, remote taskmasters can time out and cause the AEDT user interface to hang. Follow the instructions below to increase the default timeout values to **12 hours** in machine.config and in FAA.AEE.AEDT.TaskMaster.Service.exe.config on each of the remote taskmaster machines and also increase the timeout values to **12 hours** in machine.config and AEDT.exe.config of the host machine.

Increase the default timeout values in machine.config
1. Navigate to C:\Windows\Microsoft.NET\Framework64\v4.0.30319\Config and open **machine.config** in both the host machine and on each of the remote taskmaster machines.
2. Search for the term "</system.servicemodel>" and add the following section right after it (and prior to the beginning of the <system.web> section):

<system.transactions>
<machineSettings maxTimeout="12:00:00"/>
<defaultSettings timeout="12:00:00"/>
</system.transactions>

3. Search for the term "System.Transactions.Configuration.MachineSettingsSection" to locate the following line. Change the **allowExeDefinition** property from "MachineOnly" to "**MachineToApplication**".

    <section name="machineSettings" type="System.Transactions.Configuration.MachineSettingsSection, System.Transactions, Version=4.0.0.0, Culture=neutral, PublicKeyToken=b77a5c561934e089, Custom=null" allowDefinition="MachineOnly" allowExeDefinition="MachineToApplication" />

4. Save the file.

Increase the default timeout values in FAA.AEE.AEDT.TaskMaster.Service.exe.config
1. In each of the remote taskmaster machines, go to the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT Distributed Processing*) and open **FAA.AEE.AEDT.TaskMaster.Service.exe.config**.
2. Add the same <system.transactions> section added to the machine.config file. Add the new section after the </system.servicemodel>.

<system.transactions>
<machineSettings maxTimeout="12:00:00"/>
<defaultSettings timeout="12:00:00"/>
</system.transactions>

3. Modify the following line in FAA.AEE.AEDT.TaskMaster.Service.exe.config:

    <binding name="NetTcpBinding_IWcfTMRI" closeTimeout="12:00:00" openTimeout="12:00:00" receiveTimeout="12:00:00" sendTimeout=" 12:00:00" ….

4. Save the file.

Increase the default timeout values in AEDT.exe.config
1. In the host machine, go to the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT*) and open **AEDT.exe.config**.
2. Add the same <system.transactions> section added to the machine.config file. Add the new section after the </system.servicemodel>.

<system.transactions>
<machineSettings maxTimeout="12:00:00"/>
<defaultSettings timeout="12:00:00"/>
</system.transactions>

3. Modify the following line in AEDT.exe.config:

    <binding name="NetTcpBinding_IWcfTMRI" closeTimeout="12:00:00" openTimeout="12:00:00" receiveTimeout="12:00:00" sendTimeout=" 12:00:00" ….

4. Save the file.

Prevent security-related timeout issues
Typically, the security element of the taskmaster connection binding is enabled in the application's configuration file (**FAA.AEE.AEDT.TaskMaster.Service.exe.config**).

When using resource-constrained remote taskmaster machines (e.g., CPUs < Intel Core i5 2.5 GHz and RAM < 8GB), users may encounter security-related timeouts. These types of security-related timeouts usually take the form:

"System.TimeoutException: Sending to via http://www.w3.org/2005/08/addressing/anonymous *timeout out after 00:01:00. The time allotted to this operation may have been a portion of a longer timeout."*

The above error message indicates that message-security was enabled on the TCP connection between the remote taskmaster machine and the host machine; and that an action required by that type of connection could not complete within the default allotted time of one minute.

Since distributed processing is designed to function within a closed computer network, it is acceptable for users encountering this type of error message to disable connection security. This can be done by changing the security element of the taskmaster connection binding to read:

```
<security mode="None">
    <transport clientCredentialType="None" protectionLevel="None" />
    <message clientCredentialType="None" />
</security>
```

This change must be performed on both the host machine's **AEDT.exe.config** file and on each of the remote taskmaster machines' **FAA.AEE.AEDT.TaskMaster.Service.exe.config** files. Mismatched configuration files result in the connection using default settings.

Appendix G.3.5 Configure Distributed Processing on the Host Machine

1. Open the AEDT user interface on the host machine, and navigate to *Study* tab, *Preferences > Study*.

2. Click the *Configure* button under the Distributed Processing menu to open the *TmService Manager* dialog.

3. Under "Machine Name", enter the name of the taskmaster service machine(s) (not the service itself).

4. Check the box next to "Use Distributed Processing when Running Metric Results".

5. Click OK.

6. Re-open the *TmService Manager* dialog. The "OnLine" box should be checked for all remote taskmaster machines.

7. For each remote machine, check the *"***Use***"* box as well.

8. Click OK.
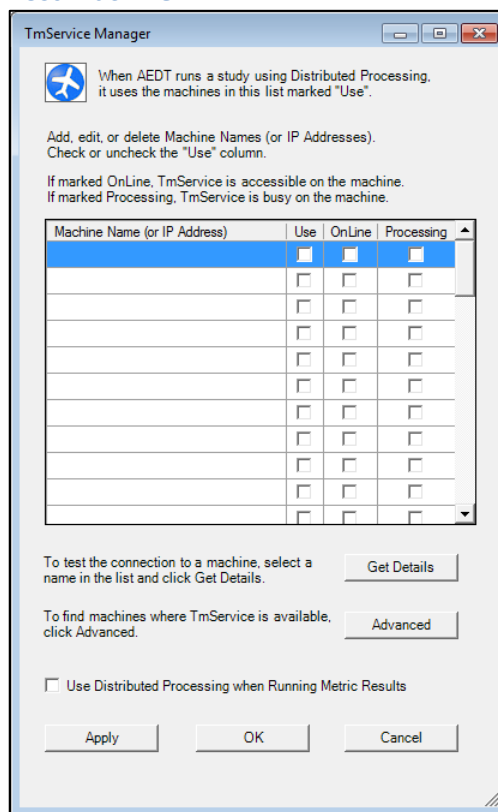
Appendix G.3.6 Change the Autogrowth Setting in SQL Server Database

Timeouts can occur when SQL Server database autogrowth settings are not correctly set. To view autogrowth settings:

1) In SQL Server Management Studio, right-click on the desired database and click Properties to open the *Database Properties* window
2) Click *Files* from the left-hand pane.
3) To change the autogrowth settings, click the ... button in the *Autogrowth* column.
4) To change the initial size, enter a new value in the *Initial Size* column.
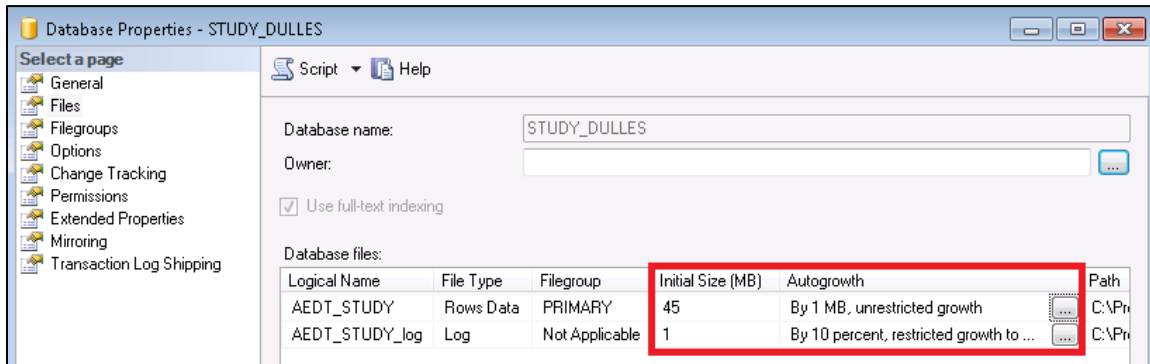
Default autogrowth settings are:
- Primary data file – autogrowth by 1 MB
- Transaction log file – autogrowth by 10 percent

Recommended autogrowth settings for large study databases are:
- Primary data file – initial size of 100000 MB (100 GB), autogrowth by 1000 MB, unrestricted growth
- Transaction log file – initial size of 1000 MB (1 GB), autogrowth by 256 MB, unrestricted growth

> It may not always be possible to manually set the maximum file size for the log. It's OK if it reverts to the default file size.

In the event that the SQL data files or associated log files begin growing too large:
- Back up the existing database. Once the backup is complete, delete the primary data file and associated transaction log file.
- Check the database recovery model – if the recovery model is set to "Full", set it to "Simple".

Appendix G.3.7 Configure Terrain
Use the following steps to run a study with terrain. Ensure that all terrain files are correctly localized for the study in question.
1. Gather all required terrain files into one location on the hard drive of the host machine.
2. **Place the same set of terrain files in the same directory on each remote taskmaster machine**. For example, if the files are placed in C:\Terrain on the host machine, they should also be placed in C:\Terrain on the remote machines.
3. Open the AEDT user interface on the host machine, and navigate to *Definitions* tab > *Terrain and Ambient*.
4. Click *Edit* to define the directory where terrain files are located and click *Save*.

5. The study is now ready to be run.

Appendix G.3.8 Checklist Before Running a Large Study

- Before starting any large study run using distributed processing, complete the following steps:
  - Restart the host machine and end all non-essential background processes via the Windows Task Manager.
  - On the remote machines, reset (stop then start) the remote taskmaster service(s) if they have been previously used.
  - On the remote machines, ensure that no non-essential background processes are taking place.
- If a distributed processing run is disturbed for any reason, restart the host machine and reset the remote taskmaster services.
- Run each metric result individually. Do not select multiple metric results and run them in succession.

Appendix G.3.9 Review Run Output

After running the study, examine the run output which primarily consists of the following:

- Emissions, Flight Performance, and Noise Exposure reports generated from the AEDT user interface; and
- AEDT log file provides a high-level accounting of run settings and activity. The level of logging can be set in the AEDT user interface under *Study* tab > *Preferences > Logging*.

AEDT Log File

- Check the log file (e.g., *C:\AEDT\Logs\aedt.log*) for flight performance errors – a high number of flight performance errors indicates an issue in the input data that should be addressed prior to the validation of a large study.
- Search for the term "ERROR" within the log file to determine where errors are logged and details about each specific error.
- Logs should ideally be constructed on a per-study basis. A good practice is to completely isolate logging prior to running a new AEDT study to prevent aggregation or analysis errors.
- Taskmaster session statistics, consisting of event-level and case-level statistics, are logged as each case completes.
  - Key event-level statistics:
    - IEventsSubmitted = the number of events submitted to the taskmaster
    - IEventResultsDispatched = the number of total performance/acoustic/emissions events dispatched, consisting of the following elements:
      - IPerformanceEventResultsDispatched
      - IAcousticsEventResultsDispatched
      - IEmissionsEventResultsDispatched

- o Key case-level statistics:
  - – OperationsInThisCase (Flights) = the number of operations (flights) the case contains
  - – EventsGeneratedByTheseOperations = total number of events generated by operations in the case
  - – Total Events submitted to TM for this case consists of:
    - ▪ TotalIPerformanceEventResults received from VDispatcher
    - ▪ TotalIEmissionsEventResults received from VDispatcher
    - ▪ TotalIAcousticsEventResults received from VDispatcher

Appendix H National Ambient Air Quality Standards (NAAQS) Selection

The table below lists the primary standards for the NAAQS pollutants and the appropriate user selections that should be made in the AEDT Metric Result wizard when conducting a NAAQS assessment. AEDT uses EPA's AERMOD model (version 21112) to calculate emissions dispersion for all Metric Types listed as *Emissions Dispersion* in the Metric Result wizard. (Note the *Emissions* Metric Type does not calculate emissions dispersion and should not be used for NAAQS assessments.) Section 8.4.2(e) of 40 CFR Part 51, Appendix W requires either the use of at least one year of site-specific metrological data or five years of adequately representative National Weather Service (NWS) or comparable meteorological data for estimating pollutant concentrations with an air quality model. If the analyst is modeling with either more than one year of site-specific meteorological data or five years of representative meteorological data, it is recommended that each year be modeled separately with AEDT. Currently, AEDT does not utilize the MULTIYEAR functionality within AERMOD to obtain modeled Design Values (DVs) based upon multiple years of modeling. Modeled DV concentrations based upon multiple years of modeling need to be post-processed outside of AEDT. Refer to the instructions below for obtaining modeled DVs for each of the NAAQS using AEDT. When modeling $PM_{2.5}$, NO_2, or SO_2, the analyst must provide a full year of meteorological data for AERMOD to execute.

NAAQS Primary Standards				AEDT User Selections for NAAQS Assessment from Emissions Dispersion Output
Pollutant	**Averaging Time**	**Level**	**Form of the Standard**	
Carbon Monoxide (CO)	1-hour	9 ppm	Not to be exceeded >1 per year	Select the 2nd ranking of 1-hour averaging time
	8-hour	35 ppm		Select the 2nd ranking of 8-hour averaging time
Nitrogen Dioxide (NO_2)	1-hour	100 ppb	98th percentile of the annual 1-hour daily maximums	Check the box for *Compute 1-hour Max Daily values at each receptor for use in assessing NAAQS*
	1-year	53 ppb	Annual mean	Check the box for *Annual*
Particulate Matter ≤2.5 µm diameter ($PM_{2.5}$)	1-year	12.0 µg/m^3	Annual mean	Check the box for *Annual*
	24-hour	35 µg/m^3	98th percentile	Select the 8th ranking of 24-hour averaging time
Particulate Matter ≤10 µm diameter (PM_{10})[1]	24-hour	150 µg/m^3	Not to be exceeded >1 per year on average	With 1 year MET data: select the 2nd ranking of 24-hour averaging time; With 5 years MET data: select the 6th ranking of 24-hour averaging time; With *n* years MET data: select the (*n*+1)th ranking of 24-hour averaging time
Sulfur Dioxide (SO_2)	1-hour	75 ppb	99th percentile of the annual 1-hour daily maximums	Check the box for *Compute 1-hour Max Daily values at each receptor for use in assessing NAAQS*

[1] When conducting a NAAQS assessment for the PM_{10} 24-hour standard using more than one year of meteorological data, please refer to the PM_{10} 24-Hour Standard Instruction (below) for more information.

The AEDT rankings corresponding to NAAQS that have standards in the form of percentiles are considered unbiased surrogates according to EPA.[10] For example, the 4th-highest of the annual

---

[10] https://www.epa.gov/sites/production/files/2015-07/documents/appwno2_2.pdf

distribution of 1-hour maximum daily concentration for SO_2 is a surrogate for the 99th percentile. Similarly, the 8th-highest of the annual distribution of 1-hour maximum daily concentration is a surrogate for the 98th percentile. These rankings are used to represent the percentiles. It is recommended that users include all relevant emissions sources in their AEDT study before conducting a dispersion analysis rather than running separate dispersion analyses on different sources. On-road vehicle emissions can be imported into AEDT via the MOVES-AERMOD import function. For information on determining DVs when using background concentrations with modeled concentrations for NAAQs determinations, see AEDT Supplemental Manual: Background Concentrations in AEDT on the AEDT Support website.

CO 1-Hour Standard Instruction: Obtain the 2nd highest ranked 1-hour CO concentration for each year modeled. For example, the 2nd highest ranked 1-hour CO concentration for Year 1, Year 2, Year 3, Year 4, and Year 5 if using five years of representative meteorological data. The modeled DV concentration will be the concentration associated with the year that has highest 2nd ranked 1-hour CO concentration.

CO 8-Hour Standard Instruction: Obtain the 2nd highest ranked 8-hour concentration for each year modeled. For example, the 2nd highest ranked 8-hour CO concentration for Year 1, Year 2, Year 3, Year 4, and Year 5 if using five years of representative meteorological data. The modeled DV concentration will be the concentration associated with the year that has highest 2nd ranked 8-hour CO concentration.

Modeling NO_2: As described in Section 4.2.3.4(b) of 40 CFR Part 51, Appendix W, "due to the complexity of NO_2 modeling, a multi-tiered screening approach is required to obtain hourly and annual average estimates of NO_2. Since these methods are considered screening techniques, their usage shall occur in agreement with the appropriate reviewing authority." AEDT provides an interface to all three NO_2 modeling tiers available through AERMOD.

Beginning with AEDT 3b, the user should select the NO_2 metric result and select the appropriate modeling tier, as opposed to modeling NOX.

NO_2 1-Hour Standard Instruction: Obtain the 98th percentile (i.e., 8th-highest) of the 1-hour daily maximum NO_2 concentrations from the Daily Max output file for each year that was modeled. The Daily Max output files are located in the AEDT study directory. Calculate the average of the 8th-highest 1-hour daily maximum NO_2 concentrations of all the years modeled using the modeling tier appropriate for the analysis:

$$Hourly\ NO_2\ DV = \frac{1}{n}\sum_{i=1}^{n} 8^{th} highest\ 1hr\ daily\ maximum\ NO_2\ for\ Year\ i$$

where *n* is the number of years being averaged. For example, if using five years of meteorological data, the modeled hourly NO_2 DV is the sum of the 8th-highest (i.e., 98th percentile) 1-hour daily maximums (by year) of NO_2 for each of Years 1-5, divided by five.

NO_2 Annual Standard Instruction: Obtain the annual average NO_2 concentration for each year that was modeled. For example, the annual average NO_2 concentration for Year 1, Year 2, Year 3, Year 4, and Year

5 if using five years of meteorological data. The modeled DV concentration will be the concentration associated with the year that has highest annual average NO_2 concentration.

$PM_{2.5}$ Annual Standard Instruction: Obtain the annual average $PM_{2.5}$ concentration for each year that was modeled. Calculate the average of the annual average $PM_{2.5}$ concentrations for all the years modeled to obtain the modeled annual average $PM_{2.5}$ concentration:

$$Annual\ PM_{2.5}\ DV = \frac{1}{n} \sum_{i=1}^{n} Annual\ Avg.\ PM_{2.5}\ for\ Year\ i$$

where *n* is the number of years being averaged. For example, if using five years of meteorological data, the modeled annual $PM_{2.5}$ DV is the sum of the annual average $PM_{2.5}$ for each of Years 1-5, divided by five.

$PM_{2.5}$ 24-Hour Standard Instruction: Obtain the 98th percentile (i.e., 8th-highest) of the 24-hour $PM_{2.5}$ concentrations at each receptor for each year that was modeled. First, calculate the average of the 8th-highest 24-hour $PM_{2.5}$ concentrations at each receptor for all the years modeled:

$$Average\ 8^{th}\ highest\ daily\ PM_{2.5}(by\ receptor) = \frac{1}{n} \sum_{i=1}^{n} 8^{th} highest\ 24hr\ PM_{2.5}\ for\ Year\ i$$

where *n* is the number of years being averaged. Then, select the highest of these averages. For example, if using five years of meteorological data, the average 8th highest daily $PM_{2.5}$ is the sum of the 8th-highest (i.e., 98th percentile) 24-hour $PM_{2.5}$ concentration (by year) for each of Years 1-5 for each receptor, divided by five. The modeled daily $PM_{2.5}$ DV is then the highest, across all receptors, of the 8th-highest values.

To be clear, AEDT will generate an annual report with the 8th-highest 24-hour $PM_{2.5}$ concentration by receptor (identified by the unique latitude, longitude, and elevation of the receptor). For analyses requiring >1 year of data, the analyst will need to merge the multiple years of 8th-highest 24-hour $PM_{2.5}$ data by receptor and calculate the average of these concentrations *for each receptor*. The analyst will then need to identify the highest of these multi-year averages. This highest value is considered the modeled daily $PM_{2.5}$ DV for the NAAQS assessment.

PM_{10} 24-Hour Standard Instruction: The PM_{10} NAAQS is defined as an exceedance threshold that shall not be surpassed more than once per year on average over one year with site-specific meteorology data or over five years with adequately representative NWS data. When modeling only a single year for a PM_{10} NAAQS determination, the analyst should select the 2nd-highest 24-hour PM_{10} concentration. For determinations based on more than one modeling year, the relevant 24-hour rank is based on the number of modeling years considered. The relevant 24-hour rank for any number of modeling years is equal to the number of modeling years, plus one; specifically, the highest (*n*+1)-highest 24-hour PM_{10} concentration across all *n* years.

To illustrate why, consider the case of two modeling years (note: EPA requires one year of site-specific meteorology data or five years of NWS data). Since the NAAQS are based on exceeding a threshold *on average*, the analyst should select the 3rd-highest 24-hour PM_{10} concentration for the two-modeling-years case. This is because it is possible Year 1 may have two non-compliant days (i.e., exceeds the threshold) and Year 2 may have zero non-compliant days, but the threshold was not exceeded more than once per year on average (across the two years). Thus for this example, the 3rd-highest 24-hour PM_{10} concentration across both years is the concentration from which the PM_{10} NAAQS determination should be made. In the last example, because two modeling years were used the (n+1) value was (2+1), or 3 (or H3H). In the case of five years of NWS meteorological data, the relevant 24-hour rank would be the highest 6th-highest (H6H) 24-hour PM_{10} concentration across all five years.

Modeling SO₂: Beginning with AEDT 3b, the user can select the SO_2 metric result instead of SOX for modeling SO_2 concentrations. AEDT 3b (and newer) has implemented a Tier 1 (full conversion) methodology for SO_2, meaning that the SOX and SO_2 concentrations modeled are equivalent.

SO₂ 1-Hour Standard Instruction: Obtain the 99th percentile (i.e., 4th-highest) of the 1-hour daily maximum SO_2 concentrations from the Daily Max output file for each year that was modeled. The Daily Max output files are located in the AEDT study directory. Calculate the average of the 4th-highest 1-hour daily maximum SO_2 concentrations of all the years modeled:

$$Hourly\ SO_2\ DV = \frac{1}{n}\sum_{i=1}^{n} 4^{th} highest\ 1hr\ daily\ maximum\ SO_2\ for\ Year\ i$$

where *n* is the number of years being averaged. For example, if using five years of meteorological data, the modeled hourly SO_2 DV is the sum of the 4th-highest (i.e., 99th percentile) 1-hour daily maximums (by year) of SO_2 for each of Years 1-5 divided by five.

Appendix I RunStudy Command Line Tool

This appendix describes the Run Study tool, which is an optional command line tool for running metric results.

RunStudy is a command line tool that allows a user to run metric results in an AEDT study as an alternative to running metric results in the AEDT user interface. See Section 5.3 for instructions on running metric result definitions in the AEDT user interface. RunStudy assumes that AEDT is fully installed and operational. The RunStudy tool is located in the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT\FAA.AEE.AEDT.RunStudy.exe).*

Before using RunStudy, use the AEDT user interface to build an AEDT study and to set up metric results.

RunStudy Command Line Options

Command	Description
--help	Display help screen
-s <study_name>	Required. STUDY database name to be run
-d <data_source>	Required. Data source for STUDY database connection string By default, localhost is used
-u <user_id>	User ID for STUDY database connection string By default, Integrated Security is used.
-p <password>	Password for STUDY database connection string
-j	Metric Result ID number (job number)
-g	Generates the Speciated Organic Gases Report in a table in the study database (e.g., dbo.SOGReport)
-l <log_file_path>	Run Study log file directory (default is AEDT Logs folder)
-y	Run with support for distributed processing
-x	Quit without user confirmation

To run metric results using the RunStudy tool:
5. Open the Command Prompt.
6. Change the directory to the AEDT installation directory (e.g., *C:\Program Files\FAA\AEDT*). For example:

```
cd C:\Program Files\FAA\AEDT
```

7. Type in the following command:

```
RunStudy –s <StudyDbName> –d <DataSource>
```

Where <StudyDbName> is the name of the AEDT study database containing the desired metric results to be run; and <DataSource> is the SQL Server instance name where the study database is located.

For example, the following line will run all metric result definitions marked <Run Job = Yes> in the study database named STUDY_INM located on the (local)\sqlexpress[11] SQL Server instance.

```
RunStudy -s STUDY_INM -d (local)\sqlexpress
```

8. Press the enter key to run the tool.

Figure I-1 RunStudy Command Prompt

9. Check the status of the run in the *StudyRunLog.txt* located in the AEDT Logs folder (e.g., *C:\AEDT\Logs*).

The RunStudy command line tool does not support processing the metric results which use dynamic grid receptor sets.

Metric results are processed sequentially. If a run fails, it will be logged in the error log and will proceed with processing the next metric result.

---

[11] Enter the SQL Server instance name as it appears in SQL Server Management Studio/the Open Study dialog in AEDT.

Appendix J Acoustics Diagnostics Report

The acoustics diagnostics report includes the following data depending on the selected noise metric type:

- SrcX (ft), SrcY (ft), SrcZ (ft): Start of the flight segment X,Y,Z coordinates in feet, referenced to study origin.
- Unit-dx, Unit-dy, Unit-dz: Unit vector from APM. This is unit less.
- RecX (ft), RecY (ft), RecZ (ft): Receptor coordinates in feet referenced to study origin.
- acnum: A string that contains identifying information including Aircraft ID, Air Operation ID, Event ID, and Aircraft name.
- segmentnum: The segment number of a subset of segments that contain performance event results.
- PerfSegNum: The flight segment number that corresponds to the Segment Index in the Flight Performance Report.
- acousticimpedance (dB): See the AEDT Technical Manual section on Acoustic Impedance Adjustment. In dB.
- q (ft): See the AEDT Technical Manual section on Flight Path Segment Parameters, in ft.
- directivity (dB): See the AEDT Technical Manual section on Ground-Based Directivity Adjustment. In dB.
- ctheta (deg): See the AEDT Technical Manual section on Ground-Based Directivity Adjustment Eq. 4-53. This is the theta value in degrees.
- singleeventnoiselevelsel (dB): The sound exposure level corrected for atmospheric absorption, in dB.
- Max (dB): The maximum noise level corrected for atmospheric absorption, in dB.
- slant_distance or SlantDistance: This is the slant distance in feet. Slant distance is defined as the distance from the receptor to the closest-point-of-approach on the flight segment, or extended flight segment depending on the geometry. See the AEDT Technical Manual section on Flight Path Segment Parameters for more information.
- logSlantDistance: The log of the slant distance (see above).
- Thrust: Thrust units being used for the aircraft, units are variable.
- Interpthrust: Interpolated Thrust. Thrust that is interpolated over distance to be used in noise curve look up.
- beta: Degrees. See the AEDT Technical Manual section on Lateral Attenuation Adjustment for Civil Aircraft.
- aircraft_velocity (groundspeed_kts): Aircraft velocity at the point of closest approach on the segment, in knots.
- aircraft_altitude (AFE_ft): Aircraft altitude at the point of closest approach on the segment, in feet AFE.
- velocity_correction (dB): See the AEDT Technical Manual section on Noise Fraction Adjustment for Behind Start of Takeoff Role, in dB.
- overground_attenuation (dB): See the AEDT Technical Manual section on Lateral Attenuation Adjustment for Civil Aircraft, in dB.
- long_range_air_to_ground_attenuation (dB): See the AEDT Technical Manual section on Lateral Attenuation Adjustment for Civil Aircraft, in dB.
- engine_installation (dB): See the AEDT Technical Manual section on Lateral Attenuation for Civil Aircraft, in dB

- overall_lateral_attenuation (dB): The combination of overground_attenuation, long_range_air_to_ground_attenuation, and engine_installation. See the AEDT Technical Manual section on Lateral Attenuation Adjustment for Civil Aircraft, in dB.
- attenuation (dB): The combination of overall_lateral_attenuation, acoustic impedance, directivity, and velocity correction, in dB.
- duration (sec): Duration, in seconds.
- noise_fraction: The fraction of noise exposure associated with a finite-length flight path segment. See the AEDT Technical Manual section on Noise Fraction Adjustment for Flight Path Segments, this is unit less.
- fraction_noise_exposure (energy): Sound exposure level in energy multiplied by the noise fraction, in energy.
- Weightedfractionalnoise (energy): Sound exposure level in energy multiplied by the noise fraction, in energy (same as fraction_noise_exposure).
- weightedfractionalnoise(dB): fraction_noise_exposure converted to decibels, in dB.
- totalE: Running total in energy up to this segment number. In energy.
- Decibels: totalE expressed as decibels.
- Lexp: Sound exposure level
- Lmax: Maximum sound level for the flight segment, in dB.
- PER Time (min): Performance event result time, or the time it take the aircraft to cross the segment.
- TAthreshold (dB): Time Above threshold, user input, in dB.
- TAsegTime (min): Segment duration if above threshold, in minutes.
- TotalTATime (min): Running total time above threshold up to this segment number, in minutes.

Appendix K Approval for Use of Reduced Thrust and Alternative Weight Profiles

This appendix provides information specific to the use of reduced thrust[12] departures and alternative takeoff weight aircraft flight profiles included for use with the FAA Aviation Environmental Design Tool (AEDT)[13] when conducting environmental modeling of aircraft noise, emissions, and fuel burn for federal actions subject to FAA review[14]. This appendix complements but does not replace or supersede existing guidance on the use of non-default methods[15] for AEDT.

The use of reduced thrust and alternative weight profiles is considered "non-default" and requires written approval from the FAA Office of Environment and Energy (FAA-AEE). To avoid any potential project delay, approval should be sought as early as possible in the environmental analysis process and prior to the start of environmental modeling.

Once approval for use has been granted, these options will allow users to:
- Model aircraft departures at less than 100% takeoff thrust; and
- Select alternate takeoff weights for each stage length that is higher than the default value.

These options may be applied independently or used together, however an independent justification for use of each option is needed. Justifications that seek to use purely analytical methods to create a "best-fit" of observed altitude flight profiles are not appropriate, due to the potential for observed similarities between these operational characteristics. If use of both options are desired, appropriate independent justifications should be determined and submitted to FAA-AEE for approval when needed.

Additional background including potential reference data sources and other information needed to submit a request for use of these options is provided in Appendix K.1 and Appendix K.2 for Reduced Thrust and Alternative Takeoff Weight respectively. Appendix K.3 describes procedures for FAA-AEE review of requests to use the options.

A full description of how to access and use these options is provided in the Section 6.2.1.7 of this User Manual.

---

[12] In this description, the term "thrust" should be considered interchangeable with the term "power" in the context of turboprop operations.

[13] These options were first introduced in the release of AEDT3a.

[14] For example the National Environmental Policy Act (NEPA) and Airport Noise Compatibility Planning under 14 CFR Part 150.

[15] Detailed in Section 5: Non-Default Methods and Data Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA. This guidance is applicable to all modeling conducted using AEDT subject to FAA review including NEPA and 14 CFR Part 150. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/guidance_aedt_nepa.pdf

Appendix K.1 Reduced Thrust Departures

Appendix K.1.1 Background

By default, AEDT assumes that all aircraft departure operations are conducted using 100% takeoff thrust. However, as described in FAA Advisory Circular 25-13 (1988)[16], takeoff operations conducted at thrust settings less than the maximum rated takeoff thrust may provide substantial benefits in terms of engine reliability, maintenance, and operating costs. Aircraft operators at the discretion of their pilots may apply reduced thrust under the conditions specified in AC 25-13.

While reduced engine wear is the primary driver for use of reduced thrust, changes in modeled aircraft noise, emissions and fuel burn are expected. For noise, both the levels and distribution of noise on the ground may change. Similarly, differences in pollutant emissions totals, pollutant speciation, and pollutant distribution may result; as well as fuel burn totals may change. As this modeling capability is applied more broadly, FAA is working to gain a better understanding of how it may influence outcomes from an environmental perspective.

Reduced thrust modeling capability in AEDT allows users to select the departure thrust for an operation from among a set of pre-defined values; 0% reduction (100% of full thrust), 5% reduction (95% thrust), 10% reduction (90% thrust) and 15% reduction (85% thrust)[17]. When a reduced thrust departure value of 10% or 15% reduction is selected, AEDT also applies a 10% climb thrust reduction. When applied appropriately, this option allows for greater accuracy in representing the actual operational conditions flown. Users should also note however, that temperature, elevation, winds, runway condition, and other operational considerations might influence the amount of thrust reduction that can be applied.

As part of the approval process, users must provide sufficient justification to support the extent to which reduced thrust operations will be included in the modeling. To avoid modeling failures, reduced thrust options must be applied in a manner consistent with the in-service operating conditions for each modeled aircraft type. Inappropriate selection of reduced thrust may result in errors being reported to the AEDT error log, which must be rectified before the modeling is finalized.

Appendix K.1.2 Data Sources

No publicly available data sources specifying the takeoff thrust used by aircraft operators are currently available. Therefore, opportunities to obtain reasonable documentation to support the use of reduced thrust in a regulatory context may be limited. It is advisable to consult with and obtain documentation from aircraft operators whose operations will be included in the analysis; however, FAA anticipates that this may not always be possible.

---

[16] https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC25-13.pdf

[17] The reductions in thrust in AEDT are relative to the maximum rated takeoff thrust of the engine. The user is cautioned that the data provided by aircraft operators may relate to other measures of aircraft engine operation, such as low pressure compressor speed (N1), engine pressure ratio (EPR), etc. If the data obtained do not relate directly to a reduction from maximum rated takeoff thrust, then documentation to describe how the data were transformed by the user for use in AEDT should be provided for review by FAA.

Users may potentially look to infer the occurrence and magnitude of reduced thrust departure operations by reviewing radar-based flight trajectory data, however these data typically do not reliably record the near-ground portion of the operation and only become viable once the aircraft starts its initial climb. While the user may be tempted to assume that an aircraft climbing at a rate slower than expected for the assumed departure weight is using reduced thrust, it is equally possible that the climb rate is being influenced by the aircraft being heavier than expected. Therefore, the use of radar data alone as a means to determine departure thrust level is not recommended.

Appendix K.1.3 Information to Provide when Requesting Use of Reduced Thrust

The following information should be made available to AEE for to consideration of non-default methods or data:

1. *Background.*
   Briefly describe the project, including location, for which the use of reduced thrust is needed. State the type of analysis (e.g., Environmental Assessment (EA), Environmental Impact Statement (EIS), or other type of regulatory analysis). Include which version of AEDT the analysis will be conducted with as well as any additional relevant background information.

2. *Statement of Benefit.*
   Briefly describe why the use of reduced thrust is recommended for the project, including why modeling departures using reduced thrust would be more appropriate than using the standard default assumption of 100% thrust on takeoff and climb.

In addition, the following specific information is also required when requesting use of reduced thrust:

3. *Statement of when reduced thrust is used and the selected thrust reduction value.*
   Describe the criteria used for determining the reduced thrust value to be applied; identify the operations that are modeled using reduced thrust; and list explicitly the thrust reduction values that were selected.

4. *Document the data used to justify the use of reduced thrust.*
   Documentation from the operator(s) included in the analysis or other information sources consulted should be presented for review.

Appendix K.2: Alternative Takeoff Weight

Appendix K.2.1 Background

In AEDT, stage lengths based on the expected trip distance have been defined and used as surrogates for aircraft takeoff weight. A higher stage length represents a greater distance flown, and assumes a heavier average takeoff weight due to increased fuel requirements. However, built into this association is an assumed aircraft load factor (the ratio of payload weight on board to the maximum available payload weight) of 65%. Recent trends observed by the US Department of Transportation Bureau of Transportation Statistics (BTS) show that load factors have been increasing over time. As such, the default weight assumptions in AEDT may be underestimating the actual departure weight for a given

stage length. Note that the load factor definition used in AEDT is based on the actual payload capabilities of the aircraft, not the percentage of passenger seats filled.

Aircraft weight directly affects the departure flight profile, so it is important to have an appropriate representation of aircraft weight. The alternative takeoff weight option in AEDT provides the opportunity for users to select alternative, higher, takeoff weights for some stage lengths. For each stage length, the higher weight option is the average of the current stage length weight and the immediate higher stage length weight[18]. Selecting a higher departure weight will have a direct effect on aircraft climb rate, fuel consumption, and noise.

Appendix K.2.2 Data Sources

When considering use of amended weights, it is advisable to validate any assumptions being made with the aircraft operator directly. If this is not possible, then other data sources may be considered where appropriate. However, limitations in accuracy of any data sources should be discussed in the request.

As with the use of reduced thrust departures, the use of radar-based trajectory data alone to estimate an aircraft's takeoff weight is not recommended.

Appendix K.2.3 Information to Provide when Requesting Use of Alternative Takeoff Weight

The following information should be made available for consideration of non-default methods or data:

1. *Background*.
   Briefly describe the project, including location, for which the use of alternative takeoff weight is needed. State the type of analysis (e.g., Environmental Assessment (EA), Environmental Impact Statement (EIS), or other type of regulatory analysis). Include which version of AEDT the analysis will be conducted with as well as any additional relevant information.

2. *Statement of Benefit.*
   Briefly describe why the use of alternative takeoff weights is recommended for the project, including why modeling departures using alternative takeoff weights would be more appropriate than using the standard default weights.

In addition, the following specific information is also required when requesting use of alternative takeoff weights:

3. *Statement of when alternative takeoff weight is used and the selected weight.*
   Describe the criteria used for determining the alternative takeoff weight to be applied; identify the operations that are modeled using alternative takeoff weight; and list explicitly the weights that were selected.

4. *Document the data used to justify the use of alternative takeoff weight.*
   Documentation from information sources consulted should be presented for review.

---

[18] An increased alternative weight is not assigned for an aircraft's highest available stage length.

Appendix K.3 Procedures for FAA-AEE Review

The procedures for review requests for use of non-standard inputs and non-default methods in AEDT are maintained by FAA-AEE[19]. The supplemental information for use of reduced thrust and alternative takeoff weight provided in this appendix should therefore be used in conjunction with all existing guidance and procedures.

However, due to the added complexity and expected need for consultation when reviewing requests for use of reduced thrust departure and alternative takeoff weights, standard timelines for granting approval may not apply. Additionally, approval for use of these options may not be possible in some situations where adequate justification is not available. Use of these options with FAA approved screening tools or relevant screening methodologies is not appropriate.

---

[19] The AEDT non-default modeling procedures outlined in this document apply to environmental analyses conducted to evaluate FAA NEPA actions, as well as those required under 14 CFR Part 150, Part 161 or any FAA-reviewed regulatory purpose requiring use of AEDT https://aedt.faa.gov/Documents/guidance_aedt_nepa.pdf or any superseding documentation.

Appendix L Procedural Profiles

A flight profile defines all aspects of the desired behavior of an aircraft for an air operation, except for the ground track that the aircraft is to follow. A procedural flight profile defines this behavior as a series of steps, each of which imposes a set of constraints on the aircraft state during and at the end of the step, leaving the unconstrained aspects of the aircraft state to be computed by a flight performance model within AEDT. In order to use procedural profiles, aerodynamics and thrust data must be available for the aircraft.

> Datasets for military airplanes provided by AEDT do not include aerodynamics and thrust data, so they are not compatible with procedural profiles.

AEDT contains two main flight performance models referred to as ANP and BADA 4 and allows for two types of procedural profiles, ANP and BADA 4, which are intended to be used with the corresponding flight performance model. However, it is possible to process ANP and BADA 4 profiles using the opposite flight performance model. For more information on the flight performance models, see Section 5.2.4.3.

This Appendix provides an overview of the data involved in modeling using procedural profiles, the differences between the ANP and BADA 4 procedural profiles, and how to create the profiles.

Appendix L.1 Data Overview

This section describes the data used in modeling with procedural profiles.

Appendix L.1.1 AEDT Aircraft Data

AEDT aircraft equipment are composed such that they always contain an ANP airplane (an ANP dataset based on a specific equipment combination) and optionally, contain a BADA 4 airplane (a BADA 4 dataset based on a specific equipment combination). The ANP and BADA 4 airplanes are based on respective equipment combinations that are similar to (but not generally the same as) each other, and to the equipment combination the AEDT airplane is meant to model. Even in cases where they are both based on the same exact equipment combination, the two datasets do not necessarily capture aerodynamics-modeling data for the same set of configurations. In general, there is not a one-to-one correspondence between configurations captured by the ANP airplane and the BADA 4 airplane.

Appendix L.1.2 Aerodynamics-modeling Data

An airplane's configuration refers to the collective positions of all movable components that impact aerodynamic forces on the airplane. In AEDT, configurations for ANP profiles are represented as *Flap IDs*. Configurations for BADA 4 configurations are referred to as *BADA 4 Configurations* and represent flap settings as well as landing gear settings.

Configurations covered by an ANP or BADA 4 airplane for an equipment combination are distinguished from each other by identifiers that are unique within that dataset. General naming conventions for ANP and BADA 4 configurations are as follows (note that they are not always observed).

ANP configuration identifiers (Flap IDs):

- A number to indicate the number of degrees that the flaps are extended.
- "ZERO" to indicate that flaps are fully retracted. ZERO is often used in both departure and approach procedures, even though it is categorized as a departure identifier.
- For approach identifiers, the prefix "U" is used to indicate that the gear is up (retracted), and the prefix "D" indicates that the gear is down (extended).

BADA 4 configuration identifiers follow similar conventions:
- A number to indicate the number of degrees that the flaps are extended
- "0" to indicate that flaps are fully retracted
- The suffix "LGUP" to indicate that the gear is up (retracted), and the suffix "LGDN" to indicate that the gear is down (extended)

Appendix L.1.3 Thrust-modeling Data
An airplane's thrust setting refers to the collective settings and throttle positions that impact the amount of thrust produced by the airplane's engines.

Thrust settings covered by an ANP or BADA 4 airplane for an equipment combination are distinguished from each other by identifiers that are common across all datasets and performance models:
- Maximum Takeoff
- Maximum Takeoff 5% Reduced
- Maximum Takeoff 10% Reduced
- Maximum Takeoff 15% Reduced
- Maximum Climb
- Maximum Climb 10% Reduced
- Idle Approach

Appendix L.2 ANP Profiles and BADA 4 Profiles

AEDT allows for two types of procedural profiles, ANP and BADA 4, which are intended to be used with their corresponding flight performance models. However, it is possible to process ANP and BADA 4 profiles using the opposite flight performance model as described in the table below.

Procedural Profile	Flight Performance Model	Description
ANP	ANP	An ANP profile is created and processed with the ANP performance model or An ANP profile attempts to process using the BADA 4 flight performance model, but lacks data so is processed with the ANP performance model
ANP	BADA 4	An ANP profile is created, AEDT determines the BADA 4 configuration (flaps/landing gear setting), and processes with the BADA 4 performance model For AEDT airplanes that have both ANP and BADA 4 airplanes assigned, AEDT is able to determine the corresponding BADA 4 configuration for an ANP flap configuration
BADA 4	ANP	A BADA 4 profile is created and processed using the ANP performance model based on the ANP configuration (flap ID) that was defined during the BADA 4 profile creation Or A BADA 4 profile attempts to process using the BADA 4 flight performance model, but lacks data; so is processed with the ANP performance model based on the ANP configuration (flap ID) that was defined during the BADA 4 profile creation
BADA 4	BADA 4	A BADA 4 profile is created and processed using the BADA 4 performance model

The primary difference between these two types of profiles is the degree of flexibility in specifying airplane configuration for a procedure step. When defining an ANP profile, only an ANP configuration (flap setting) can be specified for a procedure step. When defining a BADA 4 profile, an ANP configuration (flap setting) can be specified as well as a BADA 4 configuration (flaps/landing gear setting). This means that when an ANP profile is run using the BADA 4 performance model, AEDT determines the BADA 4 configuration (flaps/landing gear setting) based on the ANP configuration (flap setting); but when a BADA 4 profile is used with the BADA 4 performance model, the BADA 4 configuration is specified directly. In addition, if a BADA 4 profile is processed using the ANP performance model, the ANP configuration can also be specified directly through the BADA 4 profile.

ANP airplane flight profiles can be viewed in AEDT by:
1. In the *Equipment* tab, click the *Aircraft* display button.
2. Select an aircraft from the *Equipment: Aircraft* pane.
3. In the *Details* pane, under the *ANP Airplane* heading, select *Flight profiles.*

AEDT does not provide system-defined BADA 4 profiles. A user-defined BADA 4 profile must be created before it can be assigned to an operation. Once the profiles have been created, the BADA 4 airplane flight profiles can be viewed in AEDT by:

1. In the *Equipment* tab, click the *Aircraft* display button.
2. In the *Equipment: Aircraft* pane, click on the *Choose Columns* button and select *BADA 4 Model.*
3. Select an aircraft that has a BADA 4 profile from the *Equipment: Aircraft* pane.
4. In the *Details* pane, under the *BADA Family 4* heading, select *Profiles.*

Appendix L.2.1 Defining ANP and BADA 4 Profiles

The creation of ANP profiles is currently supported through the AEDT Standard Input File (ASIF), however BADA 4 profiles can be created within the AEDT interface.

The requirements for defining ANP and BADA 4 profiles are very similar, with the exception of the configuration identifiers. This section describes the requirements for both ANP and BADA 4 profiles, however the information related to the AEDT interface outlined in this section is only for the reference in creation of BADA 4 profiles. For information on how to create ANP profiles using the ASIF, see Appendix L.2.2. For step by step instruction on defining a BADA 4 profile within the AEDT interface, see Section 7.2.4.

Appendix L.2.1.1 *Airplane Profile Operation Types*

There are five types of flight operations for airplanes:

- Approach
- Departure
- Touch-and-go
- Circuit
- Overflight (Currently supported for ANP profiles only)

Appendix L.2.1.2 *Airplane Procedure Step Types*

Flight operations are created by using fourteen types of procedure steps. Procedural profiles are composed of procedure steps, of which there are fourteen types. The procedure step types available in AEDT are listed and described in the table below. The Step Type in AEDT column represents the name of the step as shown in the AEDT interface for BADA 4 profile creation along with the full name and description.

Step Type in AEDT	Full Name	Description
Takeoff	Takeoff	On the ground, in configuration Z and thrust setting Y, accelerate to initial climb CAS.
Climb	Climb	In the air, in configuration Z and thrust setting Y, maintain CAS and climb to altitude X feet AFE.
Not used for BADA 4	Cruise-Climb	In the air, in configuration Z, maintain CAS and climb at angle Y to altitude X feet AFE.
Accelerate	Accelerate	In the air, in configuration Z and thrust setting Y, climb at climb rate X to higher CAS W.
Percent Accelerate	Accel-Percent	In the air, in configuration Z and thrust setting Y, climb at acceleration energy share X to higher CAS W.
Level	Level	In the air, in configuration Z, maintain CAS and altitude over distance Y.
Decelerating Thrust Level	Level-Decel	In the air, in configuration Z, maintain altitude over distance Y to reduced CAS X.
Idle Thrust Level	Level-Idle	In the air, in configuration Z and at (idle) thrust setting Y, maintain altitude over distance Y to CAS X.
Fit to Track Distance	Level-Stretch	In the air, in a circuit operation, maintain altitude, CAS, and thrust over the distance required to make the profile fill the track.
Descend	Descend	In the air, in configuration Z, maintain CAS and descend at angle Y to altitude X feet AFE.
Decelerating Thrust	Descend- Decel	In the air, in configuration Z, descend at angle Y to altitude X feet AFE and reduced CAS W.
Idle Thrust Decend	Decend-Idle	In the air, in configuration Z and at (idle) thrust setting Y, descend at angle X to altitude W feet AFE and CAS V.
Land	Land	On the ground, immediately following touch-down, roll over distance Z to CAS Y and thrust X.
Landing Decelerate	Decelerate	On the ground, roll over distance Z to CAS Y and thrust X.

Appendix L.2.1.3 shows the allowed transitions from one type of procedure step to the next, for each of the five types of flight profiles.

Appendix L.2.1.3 *Airplane Procedure Step Transitions*

Procedure steps are combined in prescribed sequences. Certain sequences are not allowed. For example, a climb step may not be followed by a descend step. Procedures must comply with the step transition diagrams provided here.

> The overflight operation type is only supported for ANP profiles.

The step transition diagrams use a simple convention to represent procedures:
- Ellipses represent procedure steps.
- Arrows represent a valid transition from one step to another.
- Arrows point in the direction of the allowed transition – e.g., Land to Decelerate is accepted, but Decelerate to Land is not.
- A double sided arrow means that the transition is valid in both directions.
- An arrow looping back to a step indicates that the step can be repeated.
- A box surrounding two or more steps is used to simplify the diagram.
- Arrows connected to the box apply to each step within.
- Each step within the box can transition to any other within the box.
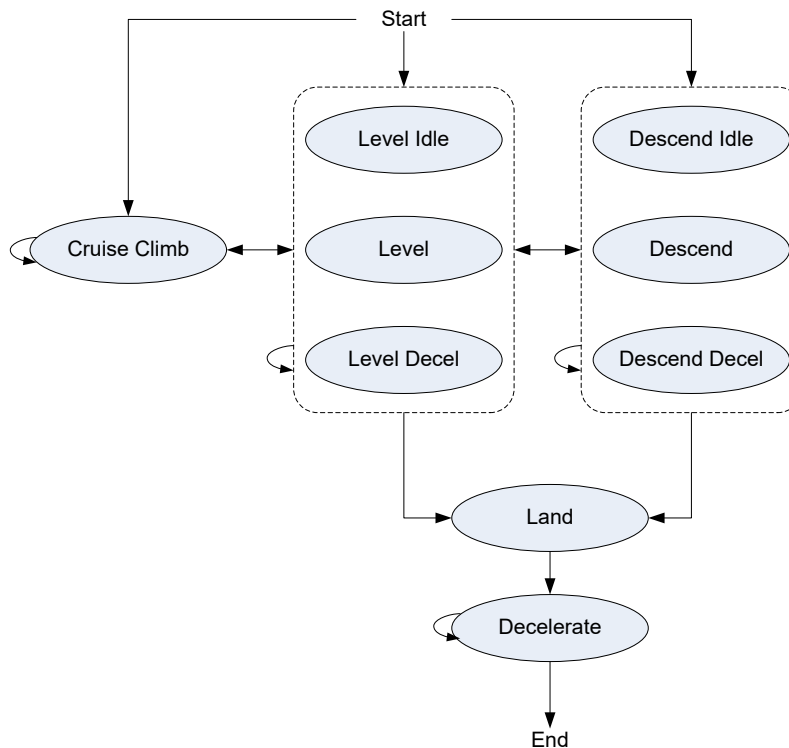
Figure L-1 Airplane Approach Step Transition Diagram
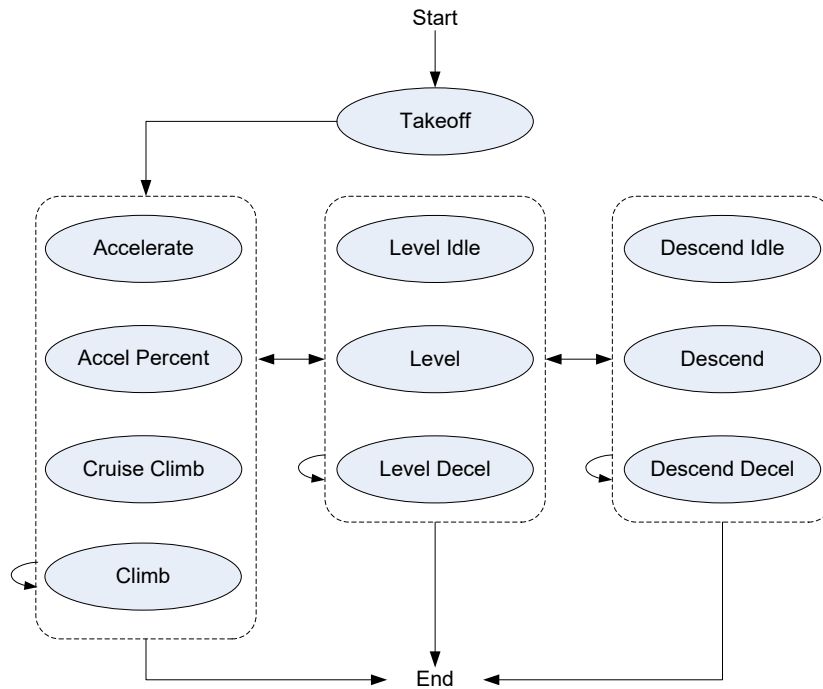
Figure L-2 Airplane Departure Step Transition Diagram
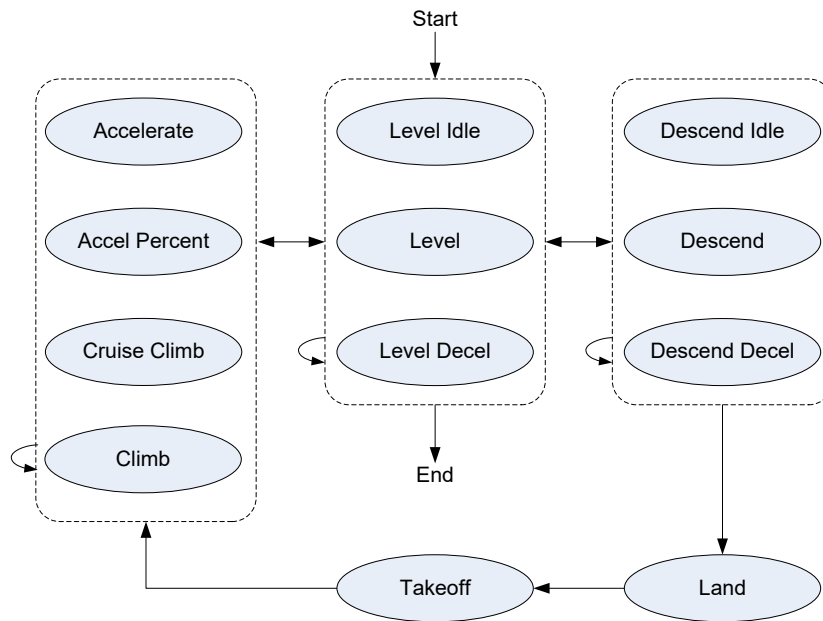
Figure L-3 Airplane Touch and Go Step Transition Diagram
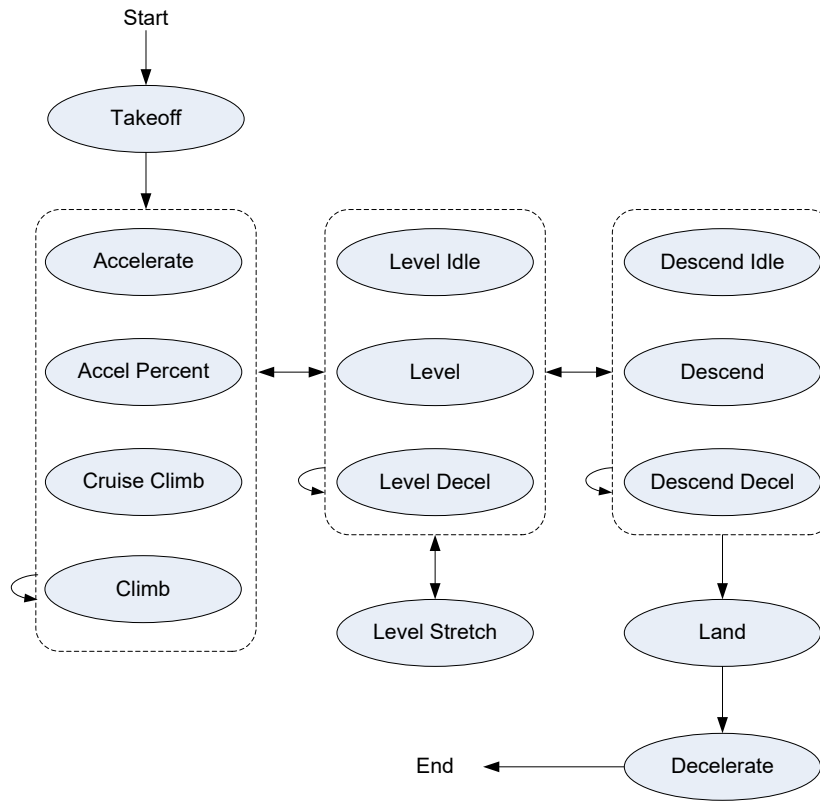
Figure L-4 Airplane Circuit Step Transition Diagram
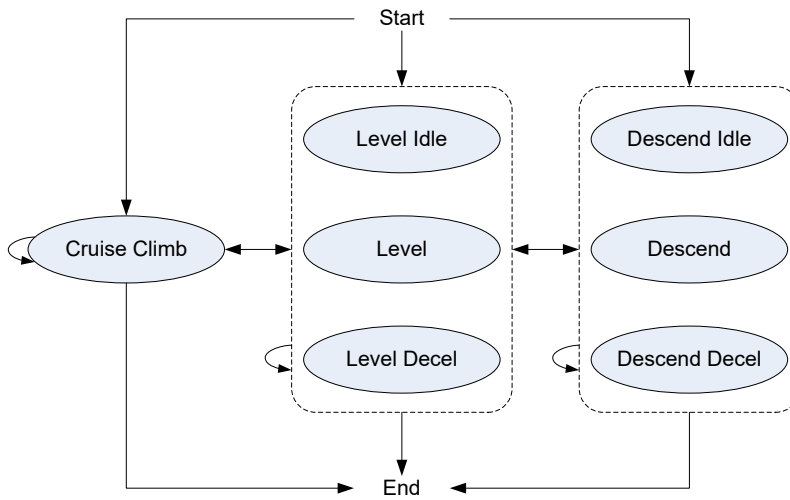
Figure L-5 Airplane Overflight Step Transition Diagram

Appendix L.2.1.4 *Airplane Procedure Step Thrust Types*

One parameter on a procedure step is its thrust type. The thrust types available in AEDT for a procedure step type that imposes thrust as a constraint are listed in the table below, along with brief descriptions of what thrust values are imposed for the step when the thrust type is selected, for each type of profile analysis. This listing is restricted to the types that are available for BADA 4 profiles, for information on ANP thrust types and parameters, see Appendix L.2.2.

Full Name	SAE-AIR-1845/Doc 29 Imposed Thrust	BADA 4 Imposed Thrust
Max Takeoff	Standard Doc 29	Standard BADA 4
Max Takeoff 5% Reduced	Standard Doc 29	Modified BADA 4
Max Takeoff 10% Reduced	Standard Doc 29	Modified BADA 4
Max Takeoff 15% Reduced	Standard Doc 29	Modified BADA 4
Max Climb	Standard Doc 29	Standard BADA 4
Max Climb 10% Reduced	Standard Doc 29	Modified BADA 4
Idle Approach	Standard Doc 29	Standard BADA 4

The more complete meanings of the imposed thrusts are as follows:
- Standard Doc 29: Thrust per engine is computed, accounting for local conditions, by using the SAE-AIR-1845/Doc 29 rated thrust equations with the ANP airplane's thrust modeling data corresponding to the thrust setting implied by the name.
- Standard BADA 4: Thrust is computed, accounting for local conditions, by using BADA 4 rated thrust modeling equations with the BADA 4 airplane's thrust modeling data, both corresponding to the thrust setting implied by the name.
- Modified BADA 4: Same as the Standard BADA 4, except that corrections are made to reduce thrust to the extent implied by the name.

Other thrust types are used for steps that do not impose thrust as a constraint:
- Reversed Thrust: This is for Deceleration steps (except for the last one).
- Normal Thrust: This is for the last Deceleration step.
- Unknown Thrust: This is for any other step that doesn't impose thrust (cruise-climb, and non-idle descents and levels).

Appendix L.2.1.5 *Airplane Procedure Step Parameters*

The following table shows which configurations are needed and/or used for each type of profile analysis, as well as which thrust types should be used for each step type:

Step Type	Configs needed/used for SAE-AIR-1845/Doc 29 analysis	Configs needed/used for BADA 4 analysis	Usable Thrust Types
Takeoff	A	A	T, C
Climb	A	N-A-B	T, C
Accelerate	A	N-A-B	T, C
Accel-Percent	A	N-A-B	T, C
Descend	A	N-A-B	Z
Descend-Decel	A	N-A-B	Z
Descend-Idle	N	N	I
LevelStretch	A	N-A-B	Z
Level	A	N-A-B	Z
Level-Decel	A	N-A-B	Z
Level-Idle	N	N	I
Cruise-Climb	A	N-A-B	Z
Land	A	A	Z
Decelerate	N	N	X, Y

For the configurations:
- N: No configuration needs to be specified
- A: An ANP configuration must be specified
- N-A-B: No configuration needs to be specified, but if any are, they will be used, with preference given to the BADA 4 configuration when both are specified.

For the Thrust Types:
- T, C: MaxTakeoff, Max Climb, and all Reduced versions thereof.
- Z: Unknown Thrust
- I: Idle Approach
- X, Y: Reversed Thrust or Normal Thrust (see above)

Not all BADA 4 configurations are necessarily made available for selection. For each high-lift device position represented in the BADA 4 airplane's set of modeled configurations, if there are aerodynamics-modeling datasets for both the gear-up and gear-down positions, AEDT makes available only the configuration that is most likely to be used. This determination is made using the BADA 4 airplane's default configuration schedule (see the BADA 4 documentation for more information).

The following table shows which other parameters need to be specified for each step type. The entries provide some additional information to resolve ambiguities in the scope or meaning of each parameter in that case.

Step Type	Altitude (feet AFE)	KCAS	Distance	Angle	Energy Share	Thrust	ROC
Takeoff		initial					
Climb	final						
Accelerate		final					step
Accel-Percent		final			step		
Descend	initial	initial		descent			
Descend-Decel	initial	initial		descent			
Descend-Idle	initial	initial		descent			
Level	initial	initial	length				
Level-Decel	initial	initial	length				
Level-Idle	initial	initial	length				
Cruise-Climb	final	final		climb			
Land			length				
Decelerate		initial	length			initial	
LevelStretch							

Appendix L.2.2 Typical Profile Patterns
This section provides information on the patterns that typical profiles follow for approach, departure, overflight, touch and go, and circuit operations for reference.

Appendix L.2.2.1 *How to Build an Approach Profile*
Standard approach procedures generally have four Descend steps, a Land step, and two Decelerate steps, as follows:
- The four Descend steps start at 6000, 3000, 1500, and 1000 feet AFE. They bring an airplane from zero-flaps configuration, terminal-area entrance KCAS, down to landing-gear/flaps configuration, final-approach KCAS.
- For most AEDT airplanes, a 3-degree descent angle is used to model IFR approaches. For single-engine piston airplanes and for BEC58P, a 5- degree descent angle is used to model VFR approaches.
- For the Land step, the touchdown-roll distance is 10% of the total rollout distance. For those airplanes using 3-degree approaches, the relationship between the total roll-out distance and the max landing distance is:

    (Roll-out distance) = 0.9 (Max landing distance) – 954 feet

- For those airplanes using 5-degree approaches, the 954-foot distance is replaced with 572 feet (the angle is steeper, so the in-air portion of the flight path after crossing the end of the runway is shorter).

- The first Decelerate distance is 90% of the total roll-out distance. The starting speed is less than the touchdown speed. The starting percentage thrust is 40% for narrow-body jets, 10% for wide-body jets, and 40% for props. The first deceleration segment represents reverse thrust action.
- The second Decelerate distance is zero, indicating the end of the profile. The starting speed is 30 KCAS, representing taxi speed. The starting percentage thrust is 10% of static thrust, representing taxi thrust.

Appendix L.2.2.2 *How to Build a Departure Profile*

AEDT standard departure procedures for civil jet airplanes tend to follow the patterns described in this section (but there are exceptions).

A typical civil jet departure profile consists of the following procedure steps:
1. Takeoff using MaxTakeoff thrust and extended flaps.
2. Climb to 1000 feet AFE using MaxTakeoff thrust and takeoff flaps.
3. Accelerate 10-20 KCAS using MaxTakeoff thrust, takeoff flaps, and 2/3 of the initial climb rate.
4. Accelerate 15-30 KCAS using MaxTakeoff thrust, reduced flaps, and ½ of the initial climb rate.
5. Accelerate to Vzf (zero-flaps minimum safe maneuvering KCAS) using MaxClimb thrust, minimal flaps, and 1000-fpm climb rate.
6. Climb to 3000 feet AFE using MaxClimb thrust and zero flaps.
7. Accelerate to 250 KCAS using MaxClimb thrust, zero flaps, and 1000-fpm climb rate.
8. Climb to 5500 feet AFE using MaxClimb thrust and zero flaps.
9. Climb to 7500 feet AFE using MaxClimb thrust and zero flaps.
10. Climb to 10000 feet AFE using MaxClimb thrust and zero flaps.

A standard departure profile for propeller-driven civil airplanes also tends to follow a pattern of procedure steps:
1. Takeoff using MaxTakeoff thrust and takeoff flaps.
2. Accelerate 10-15 KCAS using MaxTakeoff thrust, takeoff flaps, and a standard rate of climb.
3. Climb to 1000 feet AFE using MaxTakeoff thrust and takeoff flaps.
4. Accelerate to Vzf using MaxTakeoff thrust, takeoff flaps, and a standard climb rate.
5. Climb to 3000 feet AFE using MaxClimb thrust and zero flaps.
6. Climb to 5500 feet AFE using MaxClimb thrust and zero flaps.
7. Climb to 7500 feet AFE using MaxClimb thrust and zero flaps.
8. Climb to 10000 feet AFE using MaxClimb thrust and zero flaps.

The above examples reflect how the profiles would be flown at an airport located at sea level. It is important to note that once the aircraft reaches 10,000 feet MSL an acceleration step is automatically added so that the aircraft will accelerate above 250 KCAS following the speed schedule defined in the BADA 3 data while continuing to climb to the AFE altitudes defined in the profile.

An AEDT standard airplane usually has more than one departure profile. AEDT profiles are distinguished by profile stage numbers from 1 to 9. Departure procedure steps are almost the same for all profile stages. Usually, the change is in the Accelerate step where the final speed value increases for heavier airplanes and the climb rate decreases for heavier airplanes.

Appendix L.2.2.3 *How to Build an Overflight Profile*

The overflight operation type is only supported for ANP profiles.

An overflight profile can be built with one procedure step. For example: Level using ZERO flaps, at 5000-foot altitude AFE, at 250 KCAS, for a distance of 300,000 feet (about 50 nmi).

Appendix L.2.2.4 *How to Build a Touch and Go Profile*

A user-defined touch-and-go profile consists of the following steps:

1. Start in level flight at airport pattern altitude (feet AFE).
2. Descend.
3. Touch down on the runway.
4. Roll out.
5. Take off.
6. Climb.
7. End after leveling off at pattern altitude (feet AFE).

After associating a touch-and-go profile with a touch-and-go track, but before calculating flight path points, AEDT reorders and modifies the set of profile points so that the profile starts and ends at the touchdown point. While reordering the points, AEDT inserts an extra level segment in the downwind portion of the profile (between the last departure point and first approach point), so that the profile distance is the same as the track distance. Also, a final touchdown point is added at the end. When finished, the new profile starts at touchdown, ends at touchdown, and has horizontal coordinate distance equal to the touch-and-go ground track distance.

Appendix L.2.2.5 *How to Build a Circuit Profile*

A user-defined circuit profile consists of the following steps:

1. Start on the runway as a standard departure.
2. Take off.
3. Climb to pattern altitude (feet AFE).
4. Level out.
5. Descend from pattern altitude (feet AFE).
6. Land.
7. Decelerate to taxi speed.

After associating a circuit profile with a touch-and-go track (there are no circuit tracks in AEDT), AEDT inserts an extra level segment in the downwind portion of the profile, so that the profile distance is the same as the track distance. The place where the extra segment is inserted is determined by the "Level-Stretch" procedure step, which is provided by the user. After modifying a touch-and-go or circuit profile, AEDT merges the new profile points and the ground track points to compute a three-dimensional flight path.

Appendix M ANP Procedural Profiles - ASIF Definition

This section describes how to create ANP procedural profiles for civil aircraft and helicopters using the AEDT Standard Input File (ASIF). ANP profiles cannot be created within the AEDT interface.

This appendix references ASIF elements and valid identifiers or values for the element. For more information on these elements or on the ASIF in general, see the AEDT Supplemental Manual: ASIF Reference. View the ***anpProfile*** element in the ASIF schema documentation section for more information on the structure and elements for procedural profiles.

Appendix M.1 Civil Airplane Procedures

The following sections describe civil aircraft procedure steps and how they are combined into procedural profiles. Flap identifiers referred to in this section are created using the ***anpFlaps*** element. See the AEDT Supplemental Manual: ASIF Reference for more information on the anpFlaps element and ASIF structure.

The recommended naming conventions for flap identifiers is as follows:
- Include a number in the flaps identifier to indicate the number of degrees that the flaps are extended.
- For approach identifiers, use the prefix "U", to indicate that the gear is up during descent and the prefix "D" to indicate that the gear is down.
- Use "ZERO" to indicate that flaps are retracted. ZERO is often used in both departure and approach procedures, even though it is categorized as a departure identifier.

Appendix M.1.1 Aircraft Profile Operation Types

There are five types of flight operations for aircraft. The valid ASIF identifier is listed in the Operation Type column.

Operation Type	Full Name
A	Approach
D	Departure
T	Touch and go
F	Circuit flight
V	Overflight

Appendix M.1.2 Aircraft Procedure Step Types

The procedure step types available in AEDT are listed in the table below. The valid ASIF identifier is listed in the Step Type column.

Step Type	Full Name	Description
T	Takeoff	Start-roll to takeoff rotation, or touch-and-go power-on point to takeoff rotation
C	Climb	Departure climb to final altitude (feet AFE) at constant calibrated KCAS
M	Cruise-Climb	Climb at constant angle to final altitude (feet AFE) and KCAS
A	Accelerate	Departure climb and accelerate to final KCAS
P	Accel-Percent	Departure climb and accelerate using a constant energy split between acceleration and climbing
V	Level	Maintain altitude and speed
U	Level-Decel	Maintain altitude and reduce KCAS
W	Level-Idle	Maintain altitude over a given distance with engines at idle
S	Level-Stretch	Special step used to designate where to stretch a circuit flight profile to fit a touch-and-go track
D	Descend	Descend at constant angle to final altitude (feet AFE)
E	Descend- Decel	Descend while reducing KCAS
F	Decend-Idle	Descend at a constant angle with engines at idle
L	Land	Land and roll a given distance
B	Decelerate	Used on approach after touchdown, brake with starting thrust for a given distance

Appendix M.1.2.1 *Aircraft Profile Operation Types*

The procedure step types available in AEDT are listed in the table below. The valid ASIF identifier is listed in the Step Type column.

Step Type	Full Name	Description
T	Takeoff	Start-roll to takeoff rotation, or touch-and-go power-on point to takeoff rotation
C	Climb	Departure climb to final altitude (feet AFE) at constant KCAS
M	Cruise-Climb	Climb at constant angle to final altitude (feet AFE) and KCAS
A	Accelerate	Departure climb and accelerate to final KCAS
P	Accel-Percent	Departure climb and accelerate using a constant energy split between acceleration and climbing
V	Level	Maintain altitude and KCAS
U	Level-Decel	Maintain altitude and reduce KCAS
W	Level-Idle	Maintain altitude over a given distance with engines at idle
S	Level-Stretch	Special step used to designate where to stretch a circuit flight profile to fit a touch-and-go track
D	Descend	Descend at constant angle to final altitude(feet AFE)
E	Descend- Decel	Descend while reducing airspeed (KCAS)

Step Type	Full Name	Description
F	Decend-Idle	Descend at a constant angle with engines at idle
L	Land	Land and roll a given distance
B	Decelerate	Used on approach after touchdown, brake with starting thrust for a given distance

Appendix M.1.2.2 *Takeoff Step*

For a takeoff step, input a flaps identifier and a thrust type. The flaps identifier should not have a U or D prefix because these coefficients are appropriate for descending flight paths.

MaxTakeoff thrust is typically used for takeoff, but other thrust types are available:
- MaxClimb thrust means that an airplane takes off using reduced thrust, thus requiring a longer runway.
- UserValue thrust means that the user supplies the takeoff thrust value. The thrust value is the corrected net thrust per engine in pounds or in percent of static thrust. AEDT uses the input value at both the start-roll point and at the rotation point.

For MaxTakeoff and MaxClimb thrust, AEDT uses jet or prop coefficients and SAE-AIR-1845 equations to compute thrust values. For jets, the start-roll thrust is computed at 0 knots, and the rotation thrust is computed using the takeoff KCAS, which comes from another SAE equation. For jets, the thrust is larger at start-roll than at rotation. For props, the thrust is the same at both points and equal to the thrust computed at the rotation point.

Appendix M.1.2.3 *Climb Step*

For a Climb step, enter a flaps identifier, thrust type, and input the final altitude (the "climb-to" altitude in feet AFE). The final altitude must be higher than the initial altitude. The calibrated air speed on a climb segment is constant, and it is equal to the final speed used on the previous step.

AEDT computes the climb angle and the ground distance based on the airplane weight and average thrust that can be generated for the given conditions. If the computed climb gradient is too small (1%), AEDT processing will stop and log it in the log file.

Typically, MaxTakeoff thrust is used for initial climb segments and MaxClimb thrust for later climb segments, but other thrust types are available:
- UserValue thrust can be assigned to the final climb-to point. AEDT does not adjust this input value for airport elevation, temperature, and pressure.
- UserCutback thrust can be assigned to the whole segment. The difference between UserValue and UserCutback is that AEDT applies the user-value-thrust to a point, whereas user-cutback-thrust is applied to a segment. For the cutback case, AEDT reduces the thrust over a 1000-foot segment, keeps it constant at the user-cutback value over the climb distance (less 1000 feet), and then returns it to normal thrust over a second 1000-foot segment. The input thrust is corrected net thrust per engine. AEDT does not correct for airport conditions.

Appendix M.1.2.4 *Accelerate Step*

For an Accelerate step, input a flaps identifier, thrust type, climb rate, and final speed (the "accelerate-to" speed). The final speed must be larger than the initial speed.

AEDT uses these input parameters and the SAE-AIR-1845 equations to compute the change in altitude and the distance flown.

The climb rate should be consistent with a sea-level standard-day profile. If necessary, AEDT adjusts the climb rate to account for the actual airport elevation, temperature, and pressure.

Zero climb rate is a valid input. AEDT computes a zero change in altitude, and the thrust is used to accelerate the airplane more quickly.

The five climb thrust types discussed above for the Climb step are also available for an acceleration segment.

Appendix M.1.2.5 *Accel-Percent Step*

For an Accel-Percent step, input a flaps identifier, thrust type, energy-share percentage, and final airspeed.

Energy-share comes from the notion that all available thrust is divided between acceleration and climbing. Unlike steps that maintain a constant airspeed while climbing, this step holds the energy-share constant for a given amount of thrust. For the energy-share percentage, enter the percent thrust dedicated to acceleration. An input of 70, for example, would result in 70% of thrust going to acceleration and the remaining 30% of thrust going to climbing.

Appendix M.1.2.6 *Cruise-Climb Step*

For a Cruise-Climb step, input a flaps identifier (usually ZERO), final altitude (feet AFE), climb speed KCAS, and the climb angle for the segment.

AEDT calculates the distance flown based on the change in altitude and the climb angle. AEDT calculates the corrected net thrust per engine by using the SAE-AIR- 1845 descent equation with a positive angle, rather than a negative angle.

The difference between Climb and Cruise-Climb is that thrust for Climb is user-defined, whereas AEDT calculates thrust for Cruise-Climb based on the input climb angle. Climb thrust is larger than Cruise-Climb thrust. Climb steps are used after takeoff when near-maximum thrust is applied. During cruise, less thrust is used in climbing from one altitude to another.

Appendix M.1.2.7 *Level-Stretch Step*

For a Level-Stretch step, input a flaps identifier. A Level-Stretch step is used to create circuit flight profiles. Its purpose is to define where to put a variable length segment so that a CIR profile fits on top of a TGO track.
- There can be only one Level-Stretch step in a CIR profile.

- A Level-Stretch step must have a Level step before it and after it. This pair of Level steps should have the same altitude and speed values.

Appendix M.1.2.8 *Level Step*

For a Level step, input a flaps identifier, altitude in feet AFE, speed KCAS, and distance flown along the segment. The flaps identifier should be ZERO, or perhaps one with a U prefix (indicating that the landing gear is up).
Input the altitude and speed parameters logically:
- A previous Climb final altitude must equal the Level altitude in feet AFE.
- Also, the Level altitude must equal the next Descend start altitude in feet AFE.
- AEDT computes the amount of thrust needed to maintain level flight at constant KCAS for the given flaps configuration.

The difference between a Level step and a zero-climb Accelerate step is that the Level step uses a constant speed on the segment, and it uses a smaller value of thrust (and thus, lower noise level) than the Accelerate step. If speed changes during level flight, use a zero-climb Accelerate step.

Appendix M.1.2.9 *Level-Decel Step*

For a Level-Decel step, input a flaps identifier, altitude in feet AFE, initial KCAS, and distance flown along the segment. Unlike the Level step, airspeed is not held constant but allowed to decrease over the segment. AEDT computes the amount of thrust needed to maintain level flight while decelerating.

The Level-Decel step is subject to the same airspeed and altitude considerations as the Level step, e.g., a preceding climb segment has to end at the same altitude as the Level-Decel step.

Appendix M.1.2.10 *Level-Idle Step*

For a Level-Idle step, input the altitude in feet AFE, initial KCAS, and distance flown along the segment. Airspeed is allowed to decrease over the segment. Unlike Level and Level-Decel steps, thrust is calculated using idle thrust coefficients rather than a force balance.

The Level-Idle step is subject to the same airspeed and altitude considerations as the Level step, e.g., a preceding climb segment has to end at the same altitude as the Level-Idle step.

Appendix M.1.2.11 *Descend Step*

For a Descend step, input a flaps identifier, the starting altitude in feet AFE, initial KCAS, and the descent angle for the segment.

If a Level or Descend step follows the Descend step, it must have a lower altitude. The following step can have the same or a different speed.

Appendix M.1.2.12 *Descend-Decel Step*

For a Descend-Decel step, input a flaps identifier, the starting altitude in feet AFE, initial KCAS, and the descent angle for the segment. The Descend-Decel step differs from the Descend step in that it more explicitly accounts for deceleration effects during thrust calculations.

If a Level or Descend step follows the Descend-Decel step, it must have a lower altitude. The following step can have the same or a different speed.

Appendix M.1.2.13 *Descend-Idle Step*

For a Descend-Idle step, input the initial KCAS, initial altitude in feet AFE, and descent angle. The Descend-Idle step does not require that a flap setting be specified. The other Descend steps that require flap settings utilize a force balance equation to calculate thrust, but this step calculates the aircraft idle thrust directly from engine idle thrust coefficients.

Appendix M.1.2.14 *Land Step*

For the Land step, select a flaps identifier and input the touchdown rolling distance, which is the distance that the airplane moves before reversing thrust and/or braking.

The last Descend step and the Land step must both use a flaps identifier that has a D prefix (meaning that the landing gear is down).

AEDT computes the touchdown speed by using a SAE-AIR-1845 equation.

Appendix M.1.2.15 *Decelerate Step*

For a Decelerate step, input the segment distance, the starting speed, and the percent of static thrust at the start of the segment. When applicable, the percent of static thrust at the start of the segment represents the level of reverse thrust.

AEDT uses the percent value and the airplane static thrust to compute a thrust setting value for accessing the NPD curves. For those airplanes that use percent type noise, the percent value is used to access the NPD curves.

Appendix M.1.3 Aircraft Thrust Types and Parameters

The thrust types available in AEDT are listed in the table below. The valid ASIF identifier is listed in the Thrust Type column.

Thrust Type	Full Name
T	MaxTakeoff
C	MaxClimb
N	MaxContinuous
H	ReduceTakeoff
Q	ReduceClimb
S	MaxTakeoffHiTemp
B	MaxClimbHiTemp
M	MaxContinuousHiTemp
G	ReduceTakeoffHiTemp
P	ReduceClimbHiTemp
I	IdleApproach

Thrust Type	Full Name
J	IdleApproachHiTemp
R	MinimumThrust
K	UserCutback
U	UserValue

The following table shows the remaining parameters needed to create a procedural profile. These fields are called PARAM1, PARAM2, and PARAM3. They take on a different meaning for each combination of operation type, procedure type, and thrust type, see the two tables below.

PARAM	Full Name
THR	Thrust (lbs)
ALT	Altitude (feet AFE)
SPD	Speed (KCAS)
DIST	Distance (ft)
ANG	Angle (deg)
PCT	Percent
CLM	Climb Rate (ft/min)

Op Type	Step Type	Flap ID	Thrust Type	PARAM1	PARAM2	PARAM3
A,D,T,F,V	V	ID		ALT	SPD	DIST
A,T,F,V	D	ID		ALT	SPD	ANG
A,T,F,	L	ID	T,C,H,Q	DIST	0	0
A,F	B		U	DIST	SPD	PCT
D,F	T	ID	T,C,H,Q	0	0	0
D,F	T	ID	U	0	0	THR
T	T	ID	T,C,H,Q,R	0	SPD	0
T	T	ID	K,U	0	SPD	THR
D,T,F	C	ID	T,C,H,Q,R	ALT	0	0
D,T,F	C	ID	K,U	ALT	0	THR
D,T,F	A	ID		CLM	SPD	0
D,T,F	A	ID		CLM	SPD	THR
A,D,F,V	M	ID		ALT	SPD	ANG
F	S	ID		0	0	0
A	U	ID		ALT	SPD	DIST
A	W			ALT	SPD	DIST
A	E	ID		ALT	SPD	ANG
A	F			ALT	SPD	ANG
D,T,F	P		T,C,H,Q,R	PCT	SPD	0
D,T,F	P		K,U	PCT	SPD	THR

Appendix M.2 Helicopter Procedures

The following sections describe helicopter procedure steps and how they are combined into procedural profiles.

Appendix M.2.1 Helicopter Profile Operation Types

There are four types of flight operations for helicopters:

Abbreviation	Single-Letter Identifier	Description	Begin	End
APP	A	Approach	In Air	Helipad
DEP	D	Departure	Helipad	In Air
TAX	X	Taxi (outbound)	Heligate	Helipad
TAX	X	Taxi (inbound)	Helipad	Heligate
OVF	V	Overflight	In Air	In Air

Appendix M.2.2 Helicopter Procedure Step Types

The following table describes the procedure steps that are used to define helicopter profiles. The first seven types are the primary NPD operating modes. The next nine are secondary NPD operating modes which can be derived from the primary modes or defined as separate curves. The last step (start altitude) facilitates profile creating as is not associated with an NPD operating mode. AEDT does not modify helicopter procedure steps for winds or atmospheric conditions. Users should assume the procedure steps represent the zero wind condition so that true airspeed is equal to ground speed when the helicopter is in level flight.

Step Type	Description	State	Parameters
A	Approach at constant KTAS	Move	Dist Alt
D	Depart at constant KTAS	Move	Dist Alt
L	Level flyover at constant KTAS	Move	Dist
G	Ground idle	Static	Dur
H	Flight idle	Static	Dur
I	Hover in ground effect	Static	Dur
J	Hover out of ground effect	Static	Dur
V	Vertical ascent in ground effect	Static	Dur Alt
W	Vertical ascent out of ground effect	Static	Dur Alt
Y	Vertical descent in ground effect	Static	Dur Alt
Z	Vertical descent out of ground effect	Static	Dur Alt
B	Approach with horizontal deceleration	Move	Dist Spd
C	Approach with descending deceleration	Move	Dist Alt Spd
E	Depart with horizontal acceleration	Move	Dist Spd
F	Depart with climbing acceleration	Move	Dist Alt Spd
X	Taxi at constant speed	Move	Spd
S	Start altitude (feet AFE) at constant KTAS	--	Alt spd

Parameter values are defined as below:

PARAM	Full Name
Dist	Distance (feet)
Dur	Duration (sec)
Alt	Altitude (feet AFE)
Spd	Airspeed (KTAS)

Appendix M.2.2.1 *Additional Helicopter Step Type Information*

Step Type	Description
Start Altitude	This step is used to start a profile at a given altitude and speed. Input the starting altitude and speed.
Level Fly	This step is used to maintain altitude and speed for a given distance. Input the track distance covered by the step. Altitude and speed are defined by the previous step.
App Const Speed	This step is used to descend at constant speed to a given altitude over a given distance. Input the track distance covered by the step and the final altitude. The initial altitude and speed are defined by the previous step.
App Desc Decel	This step is used to descend and decelerate to a final altitude and speed over a given distance. Input the track distance covered by the step, the final altitude, and the final speed. The initial altitude and speed are defined by the previous step.
App Horiz Decel	This step is used to decelerate to a final speed at constant altitude over a given distance. Input the track distance covered by the step and the final speed. The altitude and initial speed are defined by the previous step.
App Vertical	This step is used to maintain horizontal position while descending to a final altitude over a given duration. Input the duration of the step and the final altitude. The horizontal position of the step is calculated from the previous step and the horizontal speed is zero.
Hover	This step is used to maintain altitude and horizontal position for a given duration. Input the duration of the step. The altitude is defined by the previous step, the horizontal position of the step is calculated from the previous step, and the horizontal speed is zero.
Ground Idle	This step is used to maintain ground idle for a given duration. Input the duration of the step. The altitude is zero, the horizontal position of the step is calculated from the previous step, and the horizontal speed is zero.
Flight Idle	This step is used to maintain flight idle for a given duration. Input the duration of the step. The altitude is zero, the horizontal position of the step is calculated from the previous step, and the horizontal speed is zero.
Dep Vertical	This step is used to maintain horizontal position while ascending to a final altitude over a given duration. Input the duration of the step and the final altitude. The horizontal position of the step is calculated from the previous step and the horizontal speed is zero.

Step Type	Description
Dep Horiz Accel	This step is used to accelerate to a final speed over a given distance. Input the track distance covered by the step and the final speed. The altitude and initial speed are defined by the previous step.
Dep Climb Accel	This step is used to climb and accelerate to a final altitude and speed over a given distance. Input the track distance covered by the step, the final altitude, and the final speed. The initial altitude and speed are defined by the previous step.
Dep Const Speed	This step is used to climb at constant speed to a given altitude over a given distance. Input the track distance covered by the step and the final altitude. The initial altitude and speed are defined by the previous step.
Taxi	This step is used to taxi at a given speed. Input the speed. The track distance is calculated based on the assigned taxi ground track, and the altitude is defined by the previous step. Helicopters defined as not having wheels must taxi at an altitude greater than zero.

Helicopter procedure steps explicitly define a helicopter's flight path. There are no thrust calculations for helicopter flight paths as there are for fixed-wing aircraft. Rather, each procedure step correlates with a helicopter flight operational mode and each mode has its own set of NPD data.

Some helicopter procedure steps correlate with different helicopter flight operational modes (and therefore different NPD and directivity data) depending on their altitude. When constructing flight paths with the Hover, DepVertical, and App Vertical procedure steps, AEDT calculates a ground effect altitude (feet AFE) as follows:

Ground Effect Altitude = 1.5 x Main Rotor Diameter

If the procedure step stays below the ground effect altitude, the procedure step correlates with the corresponding In Ground Effect flight operational mode. If the step stays at or above the ground effect altitude the procedure correlates with the corresponding Out of Ground Effect flight operational mode. If a given Dep Vertical or App Vertical procedure step crosses the ground effect altitude, AEDT automatically divides the step into two at the ground effect altitude and assigns flight operational modes to the two steps as appropriate.

Appendix M.2.3 How to Build a Helicopter Approach Profile
Helicopter approach profiles can be much more dynamic than fixed-wing airplane approach profiles. There are many more ways to operate a helicopter than there are to operate an airplane. AEDT provides a standard approach profile for each helicopter in the database, however these standard profiles may not be appropriate for all helicopter modeling. Additionally, general guidelines are not as appropriate for helicopter approach operations as they are for fixed-wing airplanes. It is strongly recommended to evaluate the helicopter flight operations being modeled to determine if using the standard AEDT helicopter procedures is appropriate. In most cases consulting with helicopter operators to design helicopter profiles that are appropriate for your study is needed. All helicopter approach profiles must start with a Start Altitude step.

For reference, AEDT standard helicopter approach procedures consist of the following procedure steps:
1. Start Altitude, with altitude set to 1000 feet AFE and speed set equal to the helicopter's level reference speed (KTAS).
2. Level Fly, with distance set to 87250.0 ft (approximately 14 nautical miles).
3. App Horiz Decel, maintaining an altitude of 1000 feet AFE while decelerating to the helicopter's approach reference KTAS over a distance of 5000 feet.
4. App Const Speed, maintaining the helicopter's approach reference KTAS while descending to an altitude of 500 feet AFE over a track distance of 4800 feet.
5. App Desc Decel, descending to an altitude of 15 feet AFE while decelerating to a speed of 0 knots over a distance of 2850 feet.
6. App Vertical, maintaining horizontal position while descending to 0 feet AFE over a duration of 3 seconds.
7. Flight Idle for a duration of 30 seconds.
8. Ground Idle for a duration of 30 seconds.

Appendix M.2.4 How to Build a Helicopter Departure Profile

Helicopter approach profiles can be much more dynamic than fixed-wing airplane approach profiles. There are many more ways to operate a helicopter than there are to operate an airplane. AEDT provides a standard approach profile for each helicopter in the database, however these standard profiles may not be appropriate for all helicopter modeling. Additionally, general guidelines are not as appropriate for helicopter approach operations as they are for fixed-wing airplanes. It is strongly recommended to evaluate the helicopter flight operations being modeled to determine if using the standard AEDT helicopter procedures is appropriate. In most cases consulting with helicopter operators to design helicopter profiles that are appropriate for your study is needed.

For reference, AEDT standard helicopter departure procedures consist of the following procedure steps:
1. Ground Idle for a duration of 30 seconds.
2. Flight Idle for a duration of 30 seconds.
3. Dep Vertical, maintaining horizontal position while ascending to an altitude of 15 feet AFE over a duration of 3 seconds.
4. Dep Horiz Accel, maintaining altitude while accelerating to a speed of 30 KTAS over a distance of 100 feet.
5. Dep Climb Accel, climbing to an altitude of 30 feet AFE while accelerating to the helicopter's depart reference KTAS over a distance of 500 feet.
6. Dep Const Speed, maintaining speed while climbing to an altitude of 1000 feet AFE over a track distance of 3500 feet.
7. Dep Horizontal Accel, maintaining altitude while accelerating to the helicopter's level reference KTAS over a track distance of 2800 feet.
8. Level Fly, with distance set to 93100 feet (approximately 15 nautical miles).

Appendix M.2.5 How to Build a Helicopter Overflight Profile

A typical helicopter overflight profile begins in the air at the start of an overflight track, follows the track, and ends in the air. Overflight profiles may include any of the steps defined in section Appendix M.2.2 except for the Taxi step, and it must start with a Start Altitude step.

Appendix M.2.6 How to Build a Helicopter Taxi Profile

A typical helicopter taxi profile consists of the following steps:

1. Start with Ground Idle
2. Flight Idle
3. Departure Vertical
4. Taxi
5. Approach Vertical
6. Flight Idle
7. Ground Idle

Appendix M.2.7 Helicopter Procedure Step Transitions

Procedure steps are combined in prescribed sequences. However, certain sequences are not allowed. For example, an approach profile cannot use an ascent step. Procedures must comply with the step transition diagrams provided here.

The step transition diagrams use a simple convention to represent procedures:

- Ellipses represent procedure steps.
- Arrows represent a valid transition from one step to another.
- Arrows point in the direction of the allowed transition – e.g., you can go from Flight, Idle to Ground, Idle on an approach, but not back.
- A double sided arrow means that the transition is valid in both directions.
- An arrow looping back to a step indicates that the step can be repeated.
- A box surrounding two or more steps is used to simplify the diagram.
- Arrows connected to the box apply to each step within.
- Each step within the box can transition to any other within the box. However, speeds and altitudes must be compatible. For example, on an approach a transition from an App.Horiz.Decel step to a Hover step is valid only when the App.Horiz.Decel step has a speed of 0 knots.
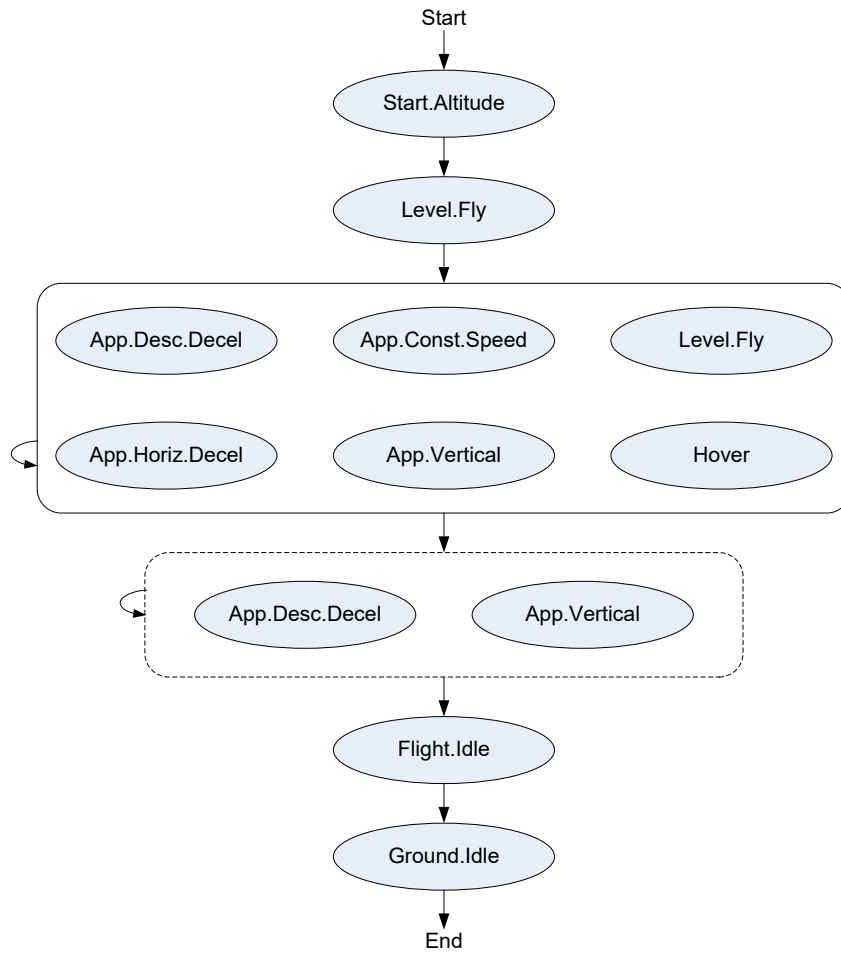
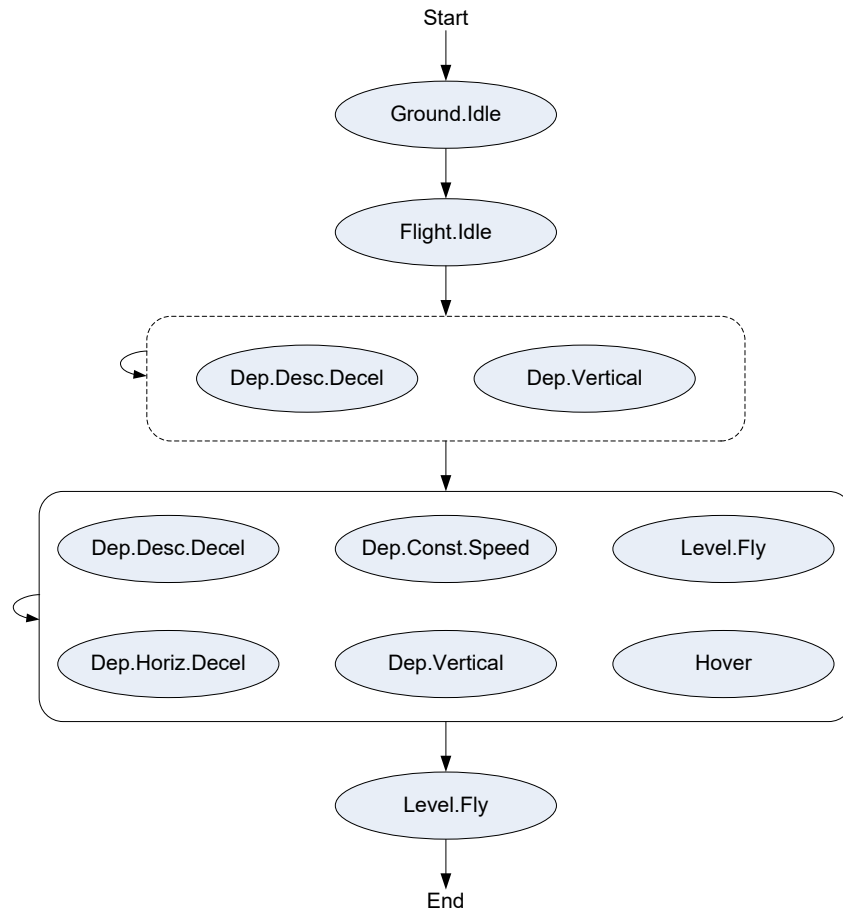**Figure M- 1 Helicopter Approach Step Transition Diagram**

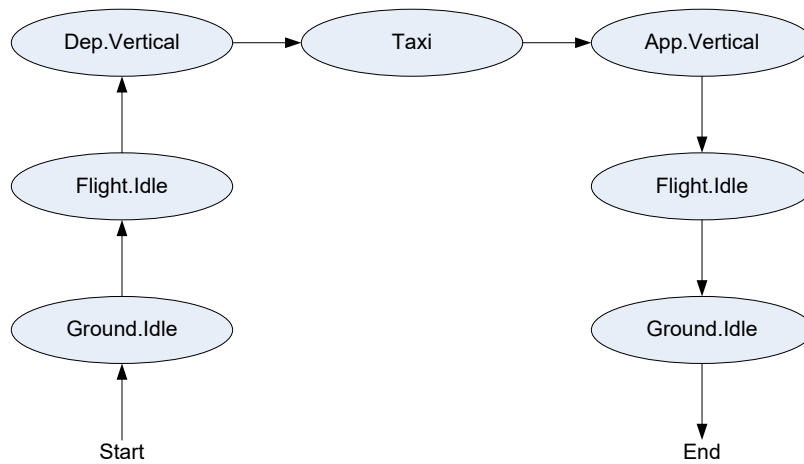**Figure M- 2 Helicopter Departure Step Transition Diagram**
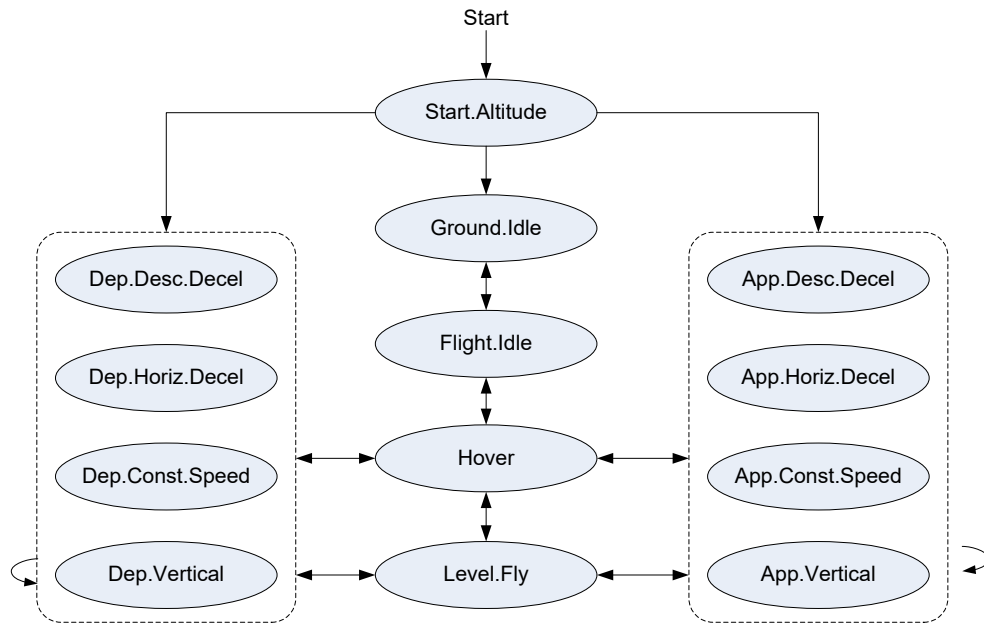

Figure M- 3 Helicopter Taxi Step Transition Diagram

Figure M- 4 Helicopter Overflight Step Transition Diagram