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Version 2d

User Guide

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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 2d software system with the support of the following development team: FAA, National Aeronautics and Space Administration (NASA), U.S. DOT Volpe National Transportation Systems Center (Volpe Center), ATAC Corporation, Metron Aviation, CSSI, Inc., Foliage, MIT, and Georgia Tech. AEDT 2d 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 Guide provides information on setting up and running analyses with AEDT 2d.

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1 Introduction

1.1 About This User Guide

This User Guide provides instruction on how to interact with the AEDT 2d application. It is organized according to the order in which the tabs appear in the AEDT 2d application, from left to right. The AEDT 2d 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.

Additional documentation is available on the AEDT Support website, including the AEDT 2d Technical Manual, AEDT 2d ASIF Reference Guide, and the AEDT NEPA Guidance document.

This document does not contain guidance or policy for regulatory analyses. Reference the AEDT NEPA Guidance document for guidance in conducting environmental modeling for FAA actions subject to NEPA.

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.

1.2 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 2d is not already installed, follow the instructions provided with the AEDT 2d Installation Guide to install the application and SQL Server 2012 software. All required software is available for download on the AEDT Support website (Section 1.3).

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 2d* shortcut and click *Run as administrator.*
   - AEDT can also be accessed by navigating to *C:\Program Files\FAA\AEDT* and right-clicking on the executable named *FAA.AEE.AEDT.GUI.View.Ribbon.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.

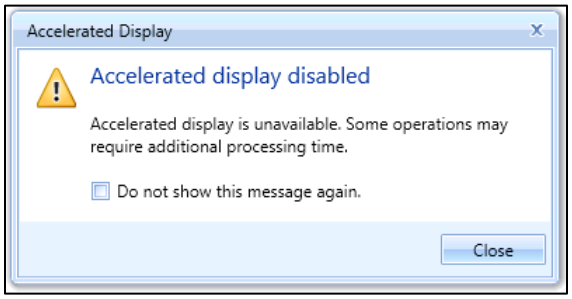


Figure 2-1 Accelerated Display Warning

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. receptor set 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 5.9).

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 2d 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).

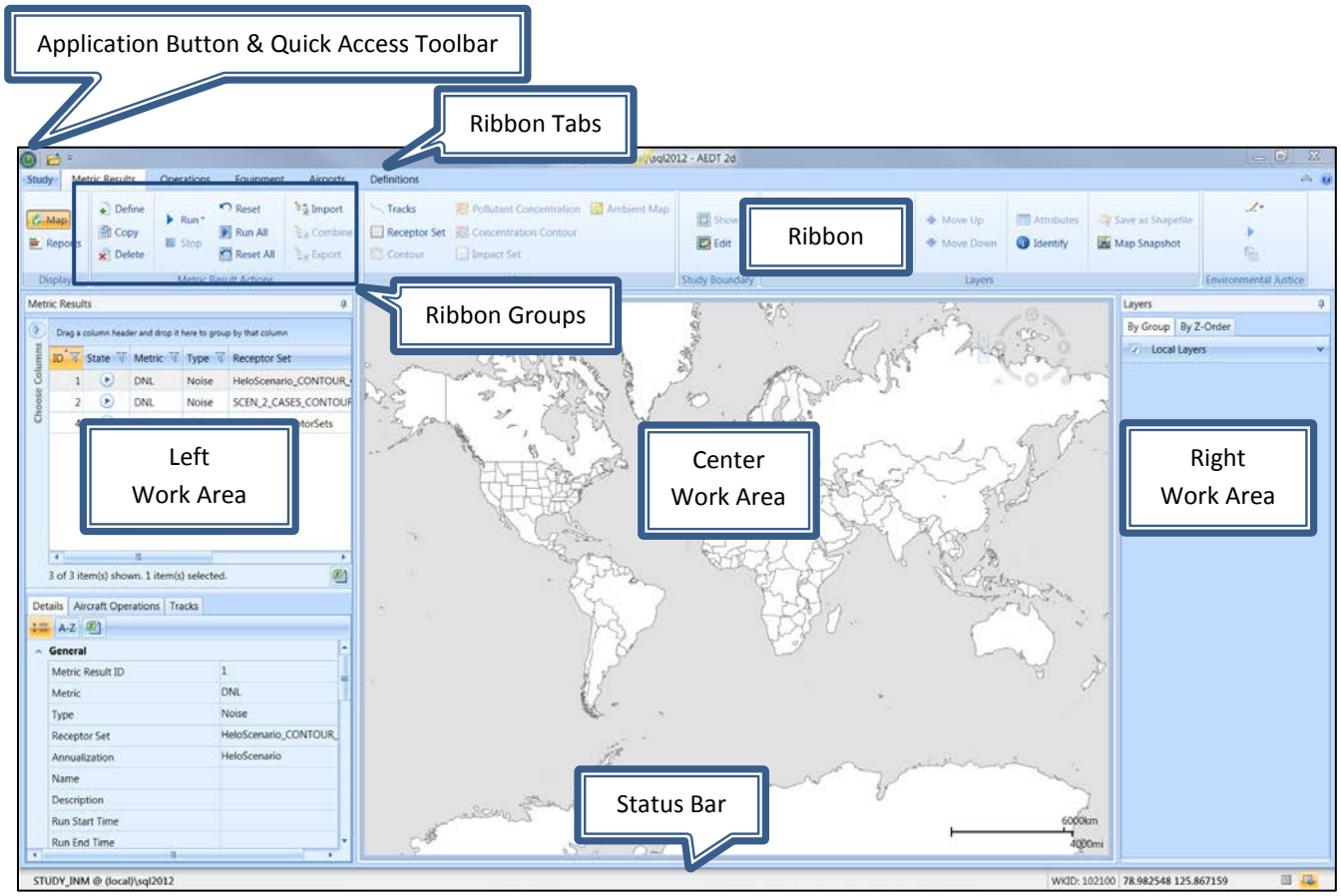


Figure 3-1 Metric Results Tab

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.

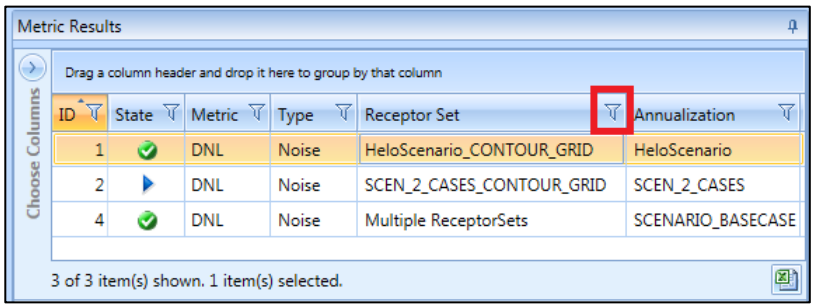


Figure 3-2 Data Grid Example with Filter Icon

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.

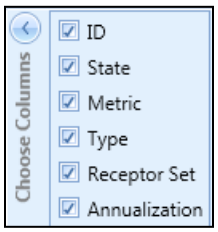


Figure 3-4 Sample Column Selector

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.

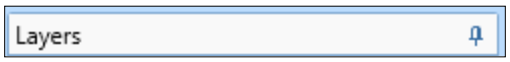


Figure 3-5 Pane with Pin Icon

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.

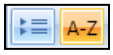


Figure 3-6 Categorize and Alphabetical Buttons

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).

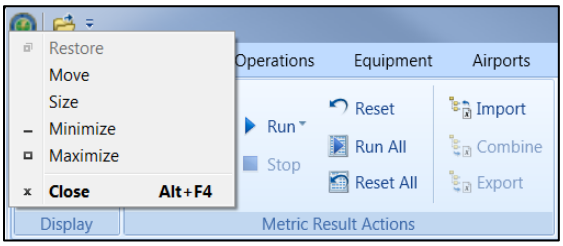


Figure 3-7 Quick Access Toolbar

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.

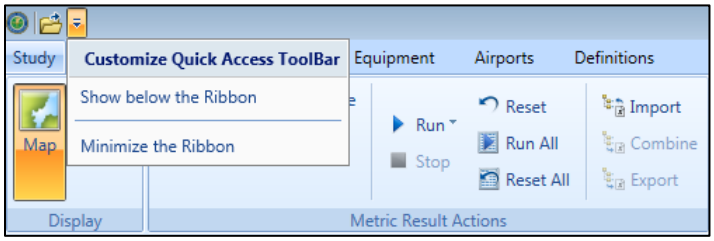


Figure 3-8 Quick Access Toolbar

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 2d features are organized by tabs as follows:

Study tab

The *Study* tab includes the following menu options:

- *Open*: opens the *Open Study* dialog.
- *Import*: opens the *Import Study* dialog.
- *Partial Import*: opens the *Import Partial ASIF* dialog.
- *New*: opens the *Create New 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.

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 2d 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.

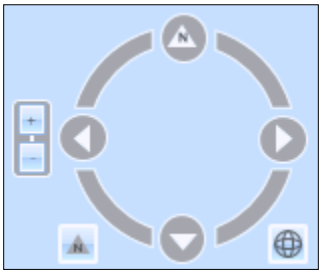


Figure 3-10 Map Control

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:

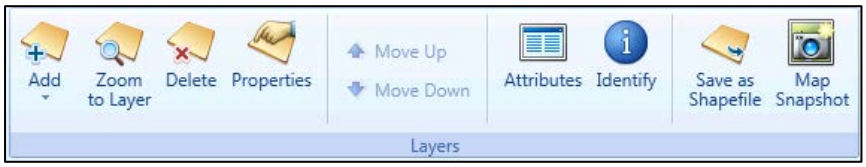


Figure 3-11 Ribbon Group – Layers

- *Add*: Displays the following sub-menu options:
  - *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
  - *Add Base Map*: Opens the *Add Base Map* dialog. See Section 3.7.5 for more information.
  - *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.

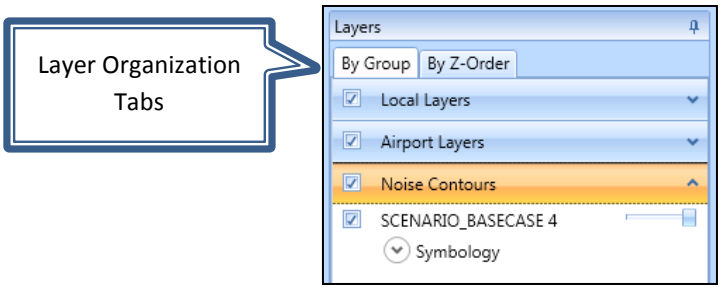


Figure 3-12 Layers Manager

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 listed in Table 3-2 can be viewed in the AEDT 2d.

Table 3-2 - Layer Categories

Layer Category	Layer Naming Convention
Tiled Map Service	Base map name (map background)
Local Layers	Local layer name
Airport Layers	Airport layout name
Noise Contours	Annualization name + Metric Result ID
Time Audible Layers	Annualization name + Metric Result ID
Metric Result Receptor Set 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
Number Above Noise Level Layers	Annualization name + "-" + receptor set name + metric result ID
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
Boundary Layers	Study name + " - Study Boundary"

Emissions Concentration Layers	Pollutant type + "_"+ average time + "_" + rank + "_J" + Metric Result ID
Environmental Justice Boundary Layers	"EJ_Circle_Boundary" or "EJ_Polygon_Boundary"
Environmental Justice Layers	"ACS_"+ year + EJ study boundary layer name

3.7.4 Add Local Map

Local layer files and raster files can be displayed on the map. Accepted formats include .mpk, .tpk, .shp, .bmp, .png, .sid, and .tif.

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. 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.

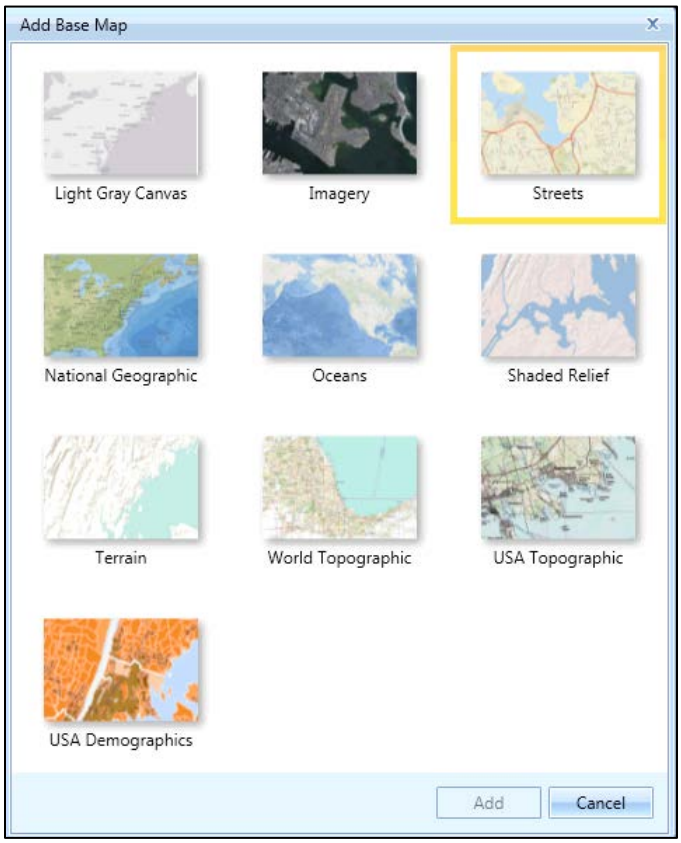


Figure 3-13 Add Base Map Dialog

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.

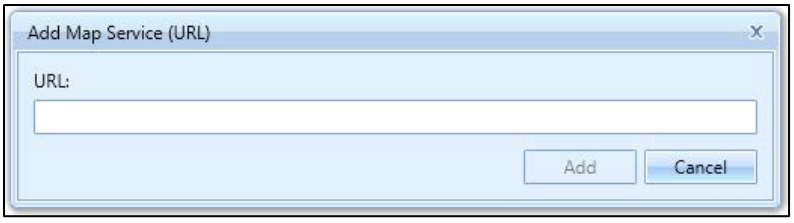


Figure 3-14 Add Map Service (URL) Dialog

3.7.7 Study Boundary

When using the RUC/RAP, GEOS, or NCAR high fidelity weather data, a rectangular study boundary is required and is used to limit the area that will be processed with high fidelity weather data. The study boundary should be larger than the flight tracks being modelled (usually 100 nmi beyond the track).

The study boundary can be created, edited, and displayed on the map. To view the study boundary on the map, click Show from the Study Boundary ribbon group.

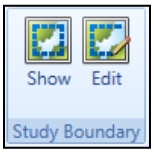


Figure 3-15 Ribbon Group – Study Boundary

To add or edit the study boundary:

1. From the *Study Boundary* ribbon group, click *Edit.*
2. Click the *+* button to add a boundary coordinate row. Enter the latitude and longitude for the study boundary point. A study 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.

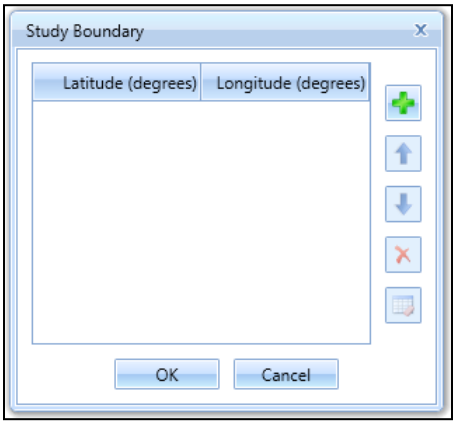


Figure 3-16 Study Boundary Dialog

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, receptor set, pollutant concentration, concentration contour, study 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.
    - Enter a new name in the *Layer Name* field.

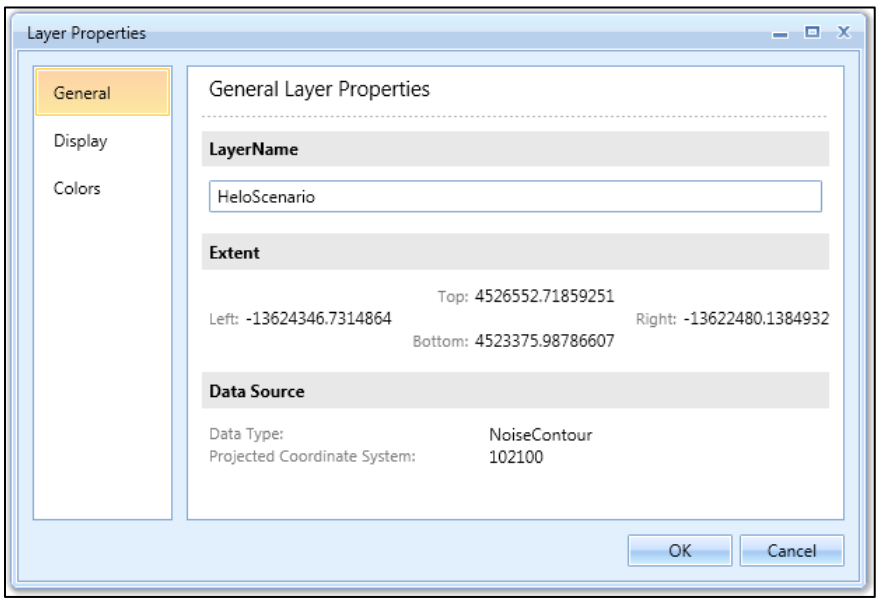


Figure 3-17 Layer Properties Dialog – General

4. Click *Display* to change opacity and show or hide labels (Figure 3-18).
    - Use the slider to change the opacity setting.
    - Check the *Show labels* checkbox to display contour dB labels on the map.
5. Click *Colors* to change color settings.
   <u>For receptor set layer and pollutant concentration layer (Figure 3-19):</u>
    - *Threshold*: Enter the desired dB value for each threshold where the lower boundary is excluded and the upper boundary is included, i.e. 55 < [purple] <= 60.
    - *Color*: Click to select the desired color for the threshold level.
    - *Thickness*: Specify the desired line thickness for the threshold level.

- *+* button: Click to insert a new threshold level before the current level.
- *X* button: Click to remove the current threshold level.
- *Reset*: Click to reset colors and threshold values to default values.

For noise contour layer and concentration contour layer (Figure 3-20):

- *Value*: Enter or select desired value for each threshold.
- *Color*: Click to select the desired color for the threshold level.
- *Thickness*: Specify the desired line thickness for the threshold level.
- *X* button: Click to remove the current threshold level.
- *Up/Down* button: Click to move the current level up or down.
- *Reset*: Click to reset colors and threshold values to default values.
- *+* button: Click to add a new level.

6. Click *OK* to apply changes or *Cancel* to discard changes.

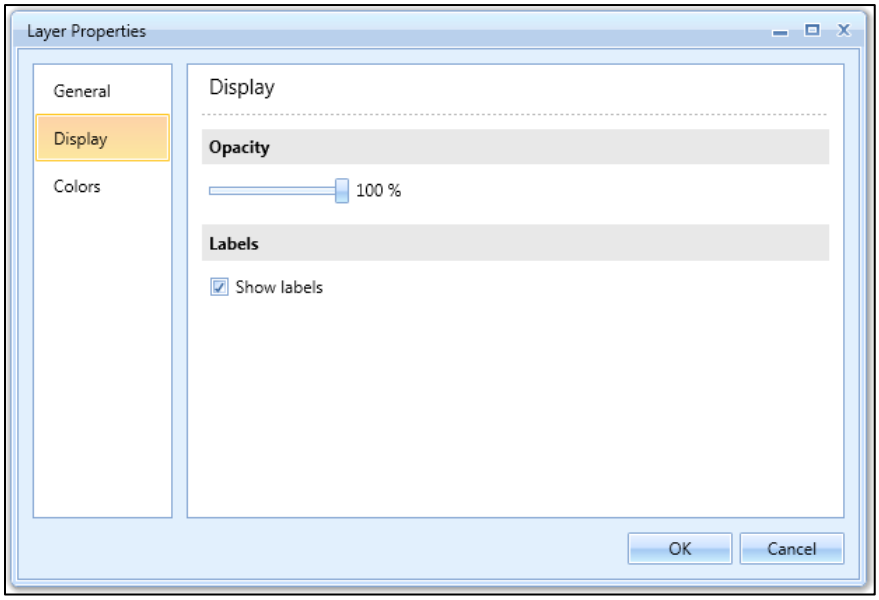


Figure 3-18 Layer Properties Dialog – Display

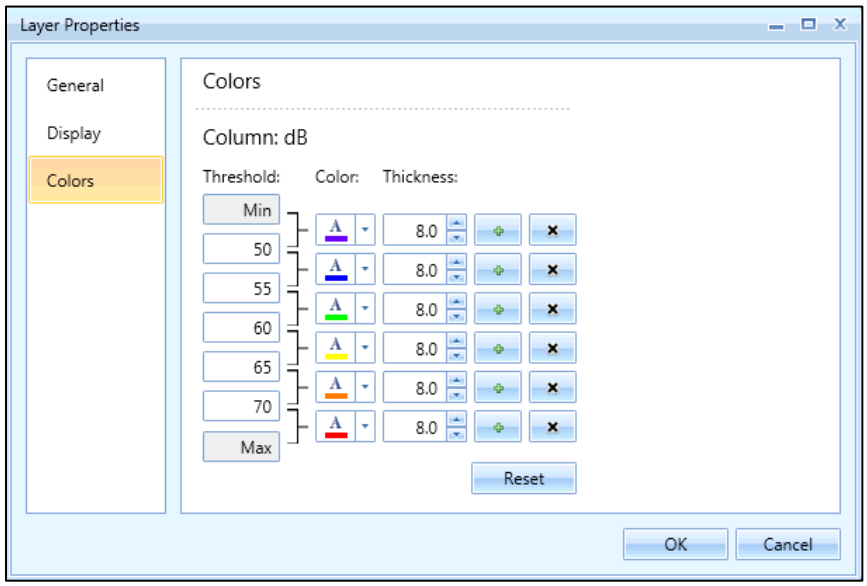


Figure 3-19 Receptor Set Layer Properties Dialog – Colors

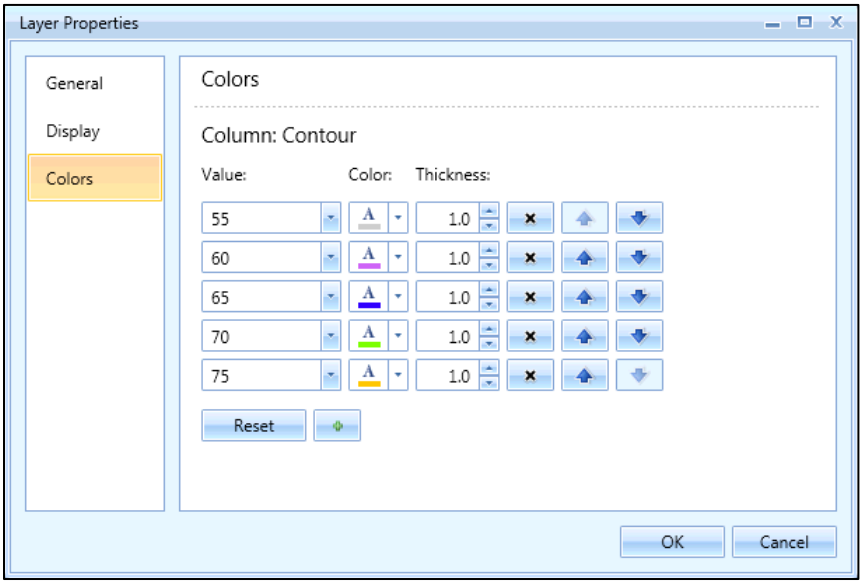


Figure 3-20 Contour Layer Properties Dialog – Colors

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.

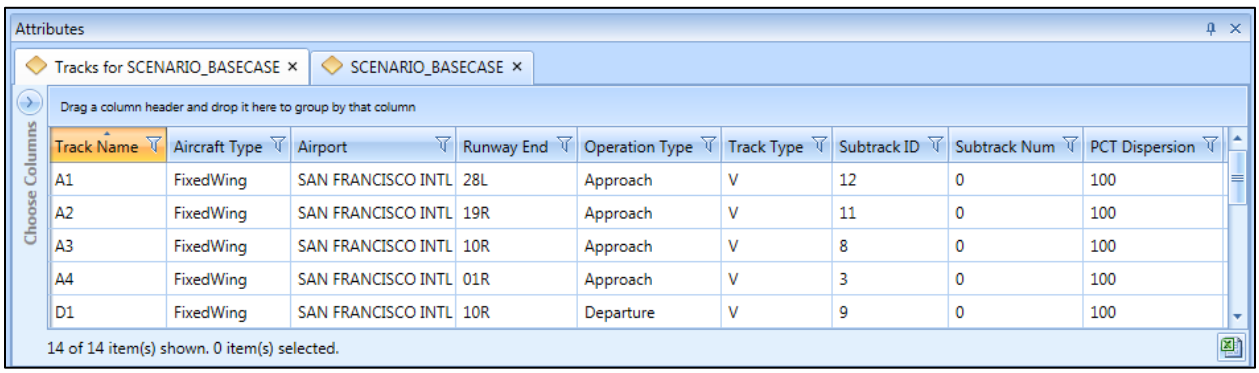
To access the Attributes Pane:

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.



Track Name	Aircraft Type	Airport	Runway End	Operation Type	Track Type	Subtrack ID	Subtrack Num	PCT Dispersion
A1	FixedWing	SAN FRANCISCO INTL	28L	Approach	V	12	0	100
A2	FixedWing	SAN FRANCISCO INTL	19R	Approach	V	11	0	100
A3	FixedWing	SAN FRANCISCO INTL	10R	Approach	V	8	0	100
A4	FixedWing	SAN FRANCISCO INTL	01R	Approach	V	3	0	100
D1	FixedWing	SAN FRANCISCO INTL	10R	Departure	V	9	0	100

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.

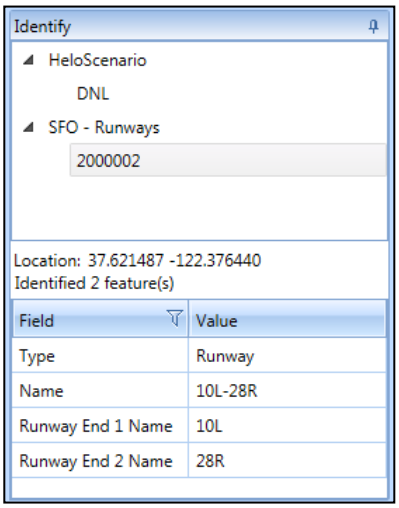


Figure 3-22 Identify Pane

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.

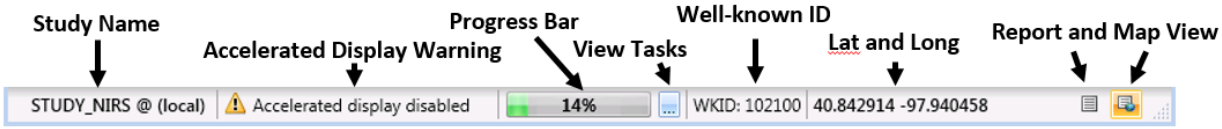


Figure 3-23 Status Bar

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 Samples 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

Study Name	STUDY _NIRS	STUDY _INM	STUDY _IFSET	STUDY _DULLES	STUDY _PVD	STUDY _WXYZ
Metric Results Definition	✓	✓	✓	✓	✓	✓
Emissions Dispersion Metric	✓	✓		✓	✓	
Dynamic Grid		✓				✓
Airport Layout Design				✓	✓	
Airport Layout Design – Operating Configuration				✓	✓	
Impact Report	✓					
Population Exposure Report		✓				
Great Circle Runway to Runway			✓			

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*.

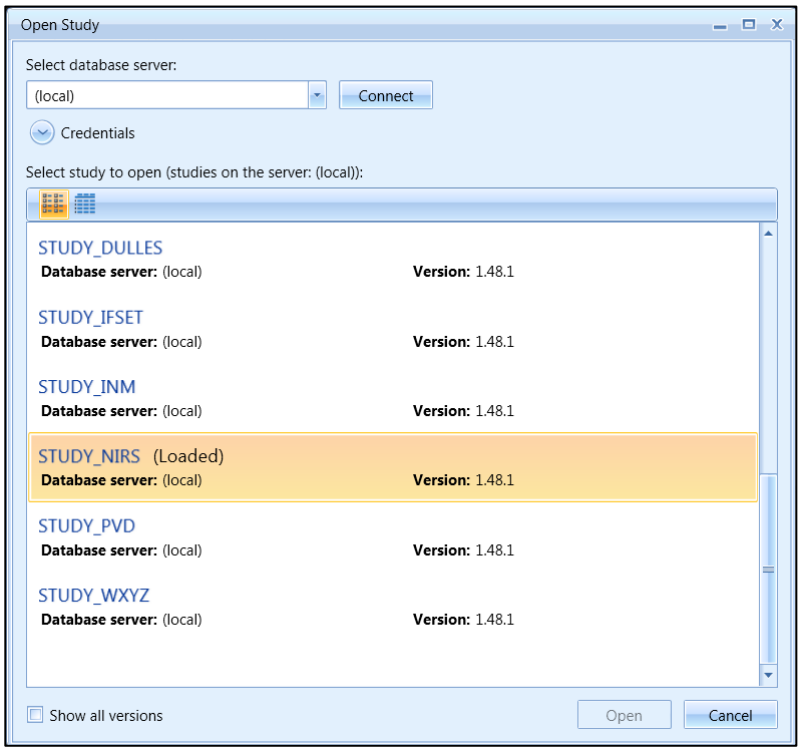


Figure 4-1 Open Study Dialog

4.1.3 Upgrade Study

AEDT 2d 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.

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:
   - *Backup study and upgrade*: creates a backup copy of the existing version of the study before upgrading. A backup file is saved to *C:\AEDT\Backups\Studies* directory.
   - *Upgrade without backup*: upgrades the study without creating a backup copy.
   - *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.

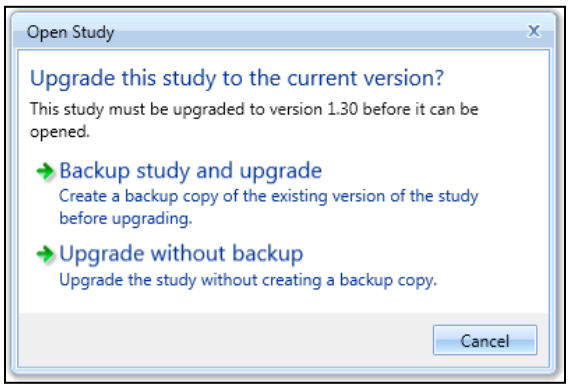


Figure 4-2 Upgrade Study Dialog

5. When the upgrade process is complete, the upgraded study is opened and the *Metric Results* tab is displayed.
6. 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 supported Microsoft SQL Server version for AEDT 2d is Microsoft SQL Server 2012. The support for Microsoft SQL Server 2008 R2 ended with the AEDT 2d release. For information on upgrading Microsoft SQL Server from 2008 R2 to 2012, see the AEDT 2d Installation Guide.

When upgrading the Microsoft SQL Server from 2008 R2 to 2012, 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 2d can be used to copy the AEDT study databases in a 2008 R2 instance to a 2012 instance. AEDT study databases in the 2008 R2 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 2008 R2 instance to a 2012 instance:

1. From the left-pane, enter the SQL Server 2008 R2 instance and click the *Connect* button.
    - All AEDT studies on the selected SQL Server 2008 R2 instance are displayed.
2. From the right-pane, enter the SQL Server 2012 instance and click the *Connect* button.
    - All AEDT studies on the selected SQL Server 2012 instance are displayed.
3. From the left-pane, select the studies that to migrate by clicking on it.

- More than one study can be selected.
- Use the *Select All/Deselect All* buttons to select all/deselect all the studies in the left-pane.
- Conflicts (i.e. identical study names) will be displayed in red.

4. 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.
    - The *Migrate Studies* dialog becomes disabled during the migration, except for the *Cancel* button.
    - When the migration is complete, the study will appear in the SQL Server 2012 migrated list; and the study name in the SQL Server 2008 R2 list will be changed to red.
5. When the migration has completed, the *Status of Migration* will indicate that the *Migration of all databases completed successfully.* Click the X in the top right corner to close the window.
6. From the *Study* menu, click *Open* and upgrade the study according to Section 4.1.3.

Click the *Cancel* button cancel migration at any time.

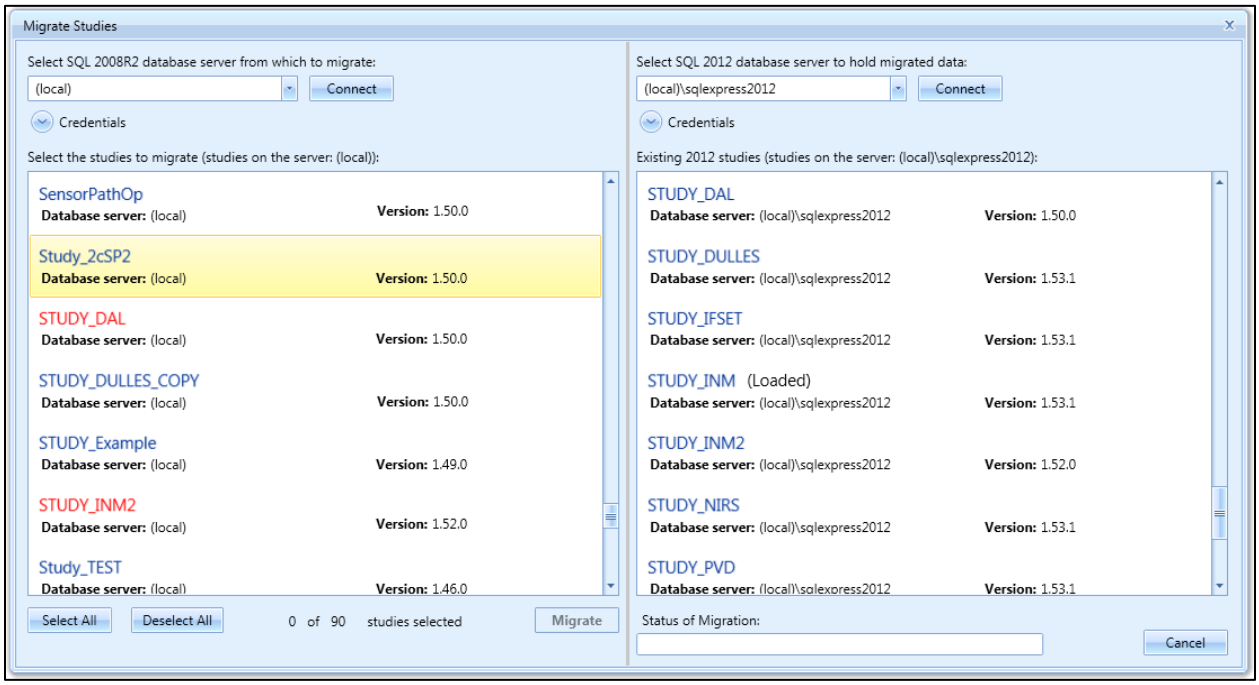


Figure 4-3 Migrate Studies Dialog

4.2.2 Conflict During Migration

If the database being migrated already exists in the SQL Server 2012 instance (i.e. study name is identical), 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 2012 instance;
2. *Don't Migrate*: do not migrate the database in the SQL Server 2008 R2 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 2012 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.

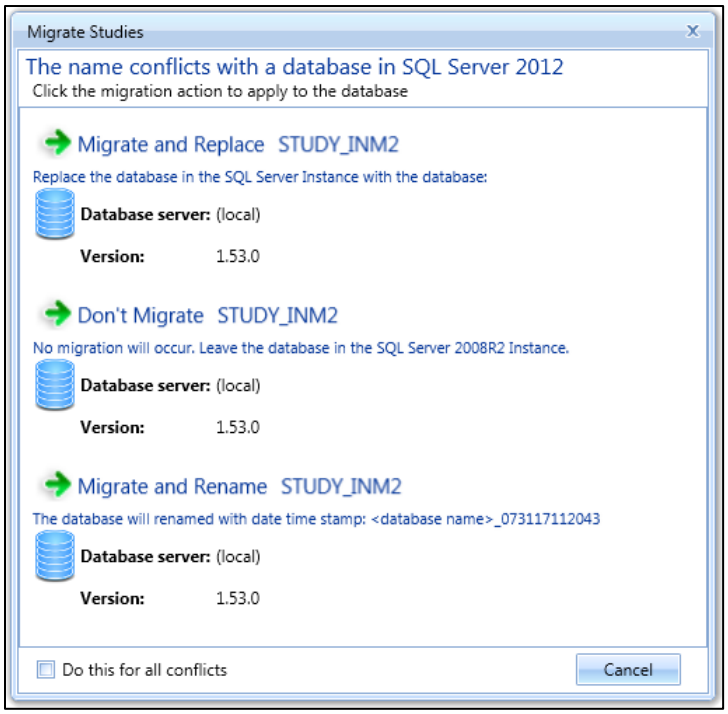


Figure 4-4 Migrate Studies Dialog – Conflict

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 *C:\Program Files\FAA\AEDT\Examples* directory.

- 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.

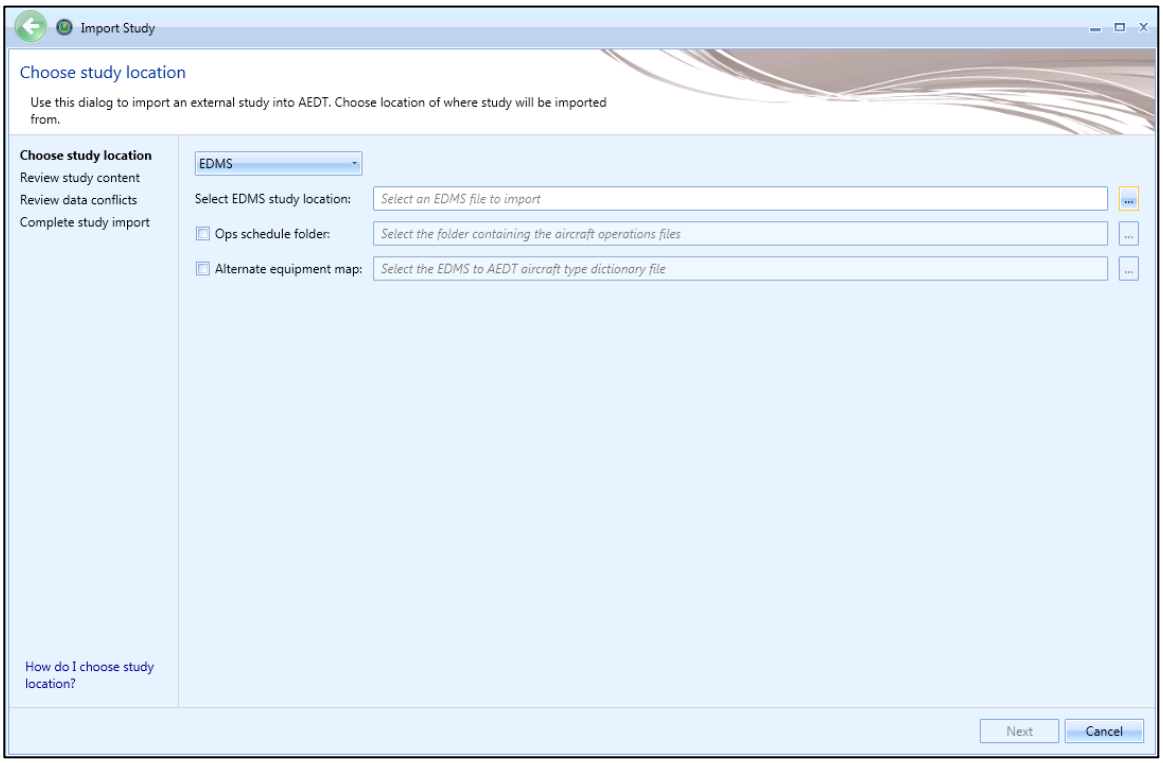


Figure 4-5 Import Study Dialog

4.4 Import Partial ASIF

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

A set of sample partial ASIF is located in *C:\Program Files\FAA\AEDT\Examples* directory. 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 study boundary data.
- 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.

AEDT validates the ASIF once the file is selected. An error message will be displayed if it fails to validate.

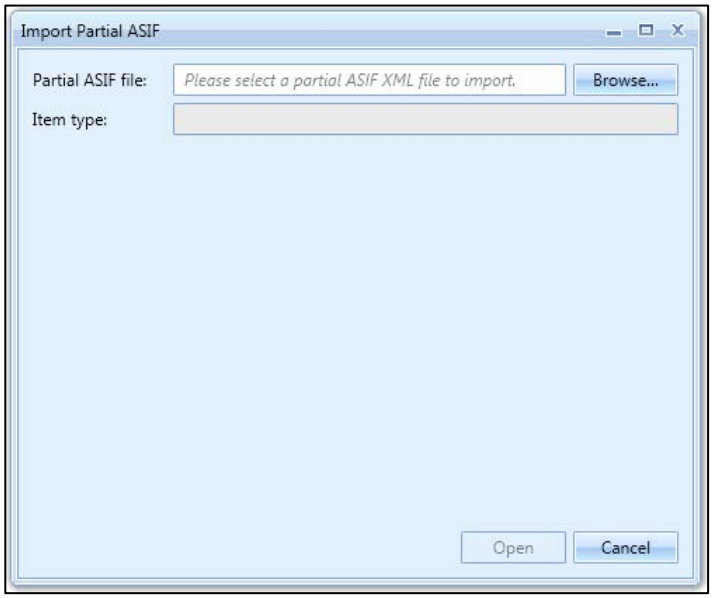


Figure 4-6 Import Partial ASIF Dialog

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.

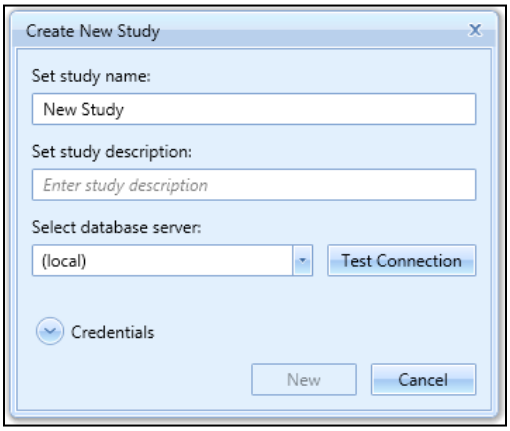


Figure 4-7 Create New Study Dialog

4.6 Close Study

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

4.7 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.

4.8 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 cancelled.
- 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).

4.9 View AEDT Log

To view system status and logged information, click on the *Study* tab and click *Log*. The information shown in the message pane is also written to the *aedt.log* file in the *C:\AEDT\Logs* folder. Study-specific logs and processing files are saved to the study output directory *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files*.

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.

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:

Table 4-2 – Message Pane Log Levels

	Information
	Warning: minor (non-critical) issues/events
	Error: a critical error or problem

To clear all messages from the message pane, click *Clear Messages*.

To open the AEDT log file, click *Open Log File*.

4.10 Delete Existing Study

AEDT study databases can be deleted in the SQL Server Management Studio. Exit the AEDT application before deleting an AEDT study database.

1. Open SQL Server Management Studio from the *Start* menu*, All Programs, Microsoft SQL Server 2008 R2, SQL Server Management Studio*.
2. In the *Connect to Server* dialog box, enter or select the appropriate SQL Server instance name then click the *Connect* button.
3. In the *Object Explorer*, select the database of interest.
4. Right-click on the database, and select *Delete* to open the *Delete Object* dialog box.
5. The "Delete backup and restore history information for databases" checkbox is selected by default. Change this setting as desired.
6. Select the "*Close existing connections*" checkbox.
7. Click *OK* to delete the database and close the dialog box.

After deleting a study database, delete the the corresponding study output directory located at *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files*.

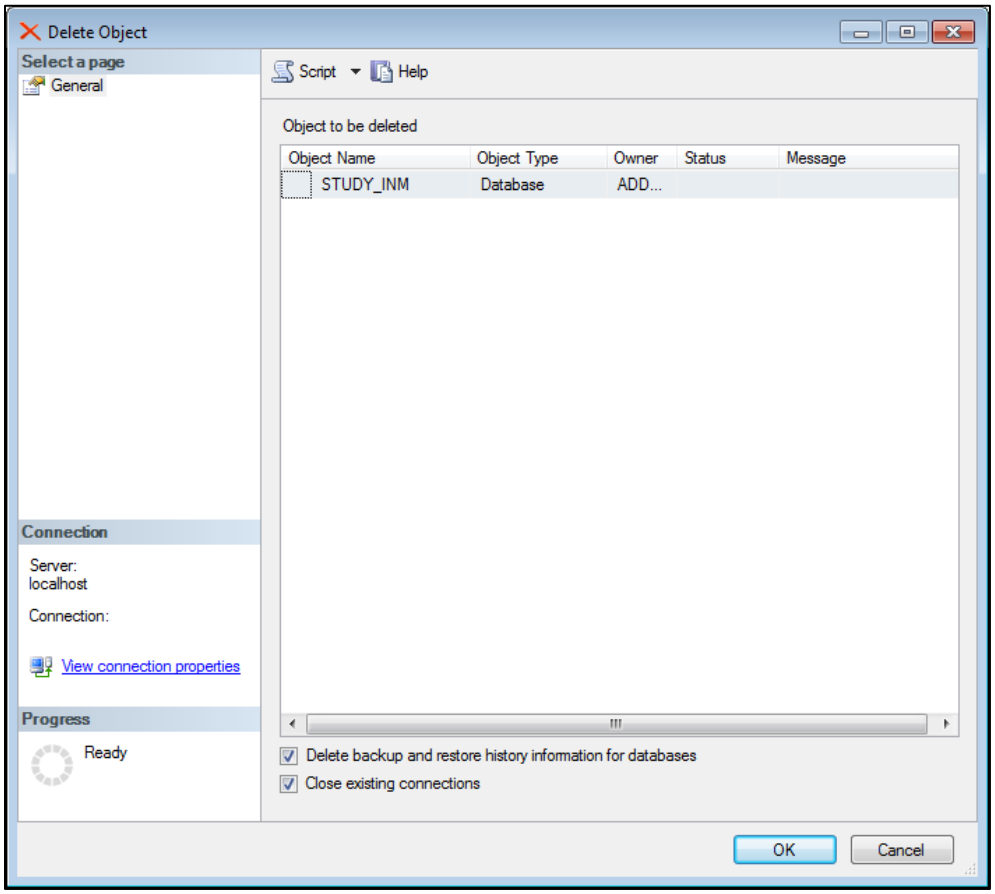


Figure 4-8 Microsoft SQL Server Management Studio - Delete Object Dialog Box

4.11 Preferences

To view and change application/study settings, click on the *Study* tab then click *Preferences*. The Preferences are organized by category. Some preferences apply to the current study, while some apply to all studies (application-wide) as described in the following sections. See Appendix B for detailed information about each field.

4.11.1 Feature Activation

The Feature Activation preferences are system-wide settings used to activate special features that require a unique identifier and hash key. In order 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	(202) 267-4746
Mohammed Majeed	(202) 267-3703

Time audible metrics (Section 4.11.14) can be activated with FAA approval in this screen. When requesting access to time audible metrics for processing with ambient and spectral data, provide the following files to the FAA, see Appendix E.2 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 *HashKey* field, enter the hash key provided by the FAA.
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.

Once the special features have been activated, corresponding preferences will be available in the *Study* tab, *Preferences* list.

4.11.2 Study

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

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 following options are used as default settings in the *Define Metric Results* wizard, *Set Processing Options* step, see Section 5.2.4.

- *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*: 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.
- *Apply Delay & Sequencing Model on Taxi:* 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. 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:* When selected, AEDT calculates the engine startup emissions for the aircraft operations in the metric results.
- *Calculate speciated organic gases:* When selected, each organic gas species will be evaluated in the emissions calculations.
- *Atmospheric absorption type*: When selected, AEDT includes the effects of atmospheric absorption on noise according to the selected option:
  - *Unadjusted (SAE-AIR-1845 atmosphere)*: When selected, noise data are unadjusted for study-specific atmospherics according to "Procedure for the Calculation of Airplane Noise in the Vicinity of Airports", SAE-AIR-1845, prepared by SAE Committee A-21, March 1986.
  - *SAE-ARP-866A*: noise data are adjusted for temperature and relative humidity values (study-specific airport conditions) according to the methods specified in "Standard Values of Atmospheric Absorption as a function of Temperature and Humidity", SAE-ARP-866A, August 1964, revised March 1975.
  - *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 "Application of Pure-Tone Atmospheric Absorption Losses to One-Third Octave Band Data", SAE-ARP-5534, prepared by SAE Committee A-21, August 2013. This is the current standard as of the date of this guide.

Annualization Options

The following settings are used as default values in the *Create Annualization* wizard, *Set Processing Options*, see Section 6.6.1.6.

- *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.
- *Noise altitude cutoff AFE (ft):* Enter the altitude above field elevation in feet above which noise calculations are no longer processed.
- *Use bank angle:* When selected, AEDT includes aircraft banking effects in noise calculations.

Contour Options

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

- *Default minimum*: Minimum contour level.
- *Default maximum*: Maximum contour level.
- *Default increment*: Contour level increment.

Units for dB-based metrics are in decibels. Units for time-based metrics are in minutes or in percent (%).

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 F for more details on using this dialog.

4.11.3 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.

Table 4-3 AEDT Log File Log Level

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 *C:\AEDT\Logs* folder. 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.

4.11.4 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.

4.11.5 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.

4.11.6 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.

4.11.7 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.

4.11.8 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.

4.11.9 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.

4.11.10 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.

4.11.11 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.

4.11.12 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.

4.11.13 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:

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

4.11.14 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.

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* field, add the path to the ambient file (.txt).
4. In the *Spectral Data* field, add the path to the spectral data file (.txt).
5. In the *HashKey* field, enter the hash key provided by the FAA.
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 displayed 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 5.4).

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);
- Log files (aedt.log) under the C:\AEDT\Logs folder;
- AmbientNoise_files.txt: lists all the files in the ambient folder directory (if specified).
- FAA.AEE.AEDT.GUI.View.Ribbon.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; and
- Weather_files.txt: lists all the files in the high fidelity weather folder directory (if specified).

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.

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 the *Generate Study Report*. The report is displayed in *Metric Results* tab, *Reports* view.
3. Click *Open in Text* to open the report in Notepad.
4. 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 guide* link which opens a PDF of the AEDT User Guide.
- 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 5.4), 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

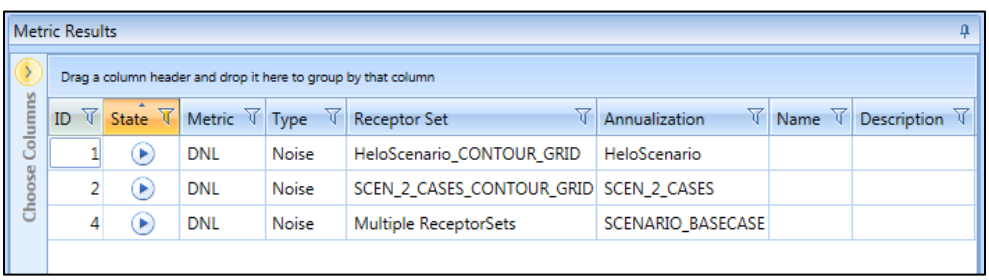
Use the buttons in the *Display* ribbon group to change the view.

- 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.



ID	State	Metric	Type	Receptor Set	Annualization	Name	Description
1		DNL	Noise	HeloScenario_CONTOUR_GRID	HeloScenario		
2		DNL	Noise	SCEN_2_CASES_CONTOUR_GRID	SCEN_2_CASES		
4		DNL	Noise	Multiple ReceptorSets	SCENARIO_BASECASE		

Figure 5-2 Metric Results Pane

The *State* column indicates the status of each metric result (Table 5-1). It does not indicate whether running the metric result produced results or not. Check the aedt.log file for any errors after running a metric result.

Table 5-1 – State Icons

	Ready to be run
14%	Run in progress
	Stopped run
	Completed
	Error

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.

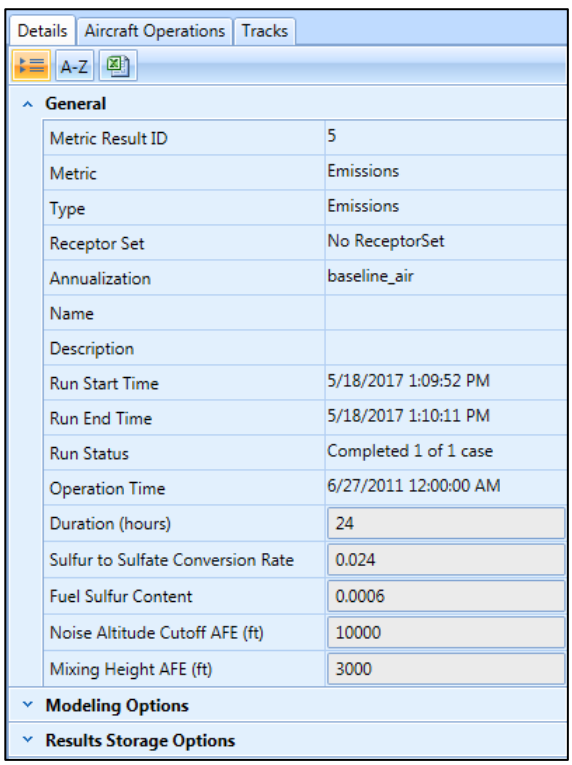


Figure 5-3 Metric Results – Details Tab

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.

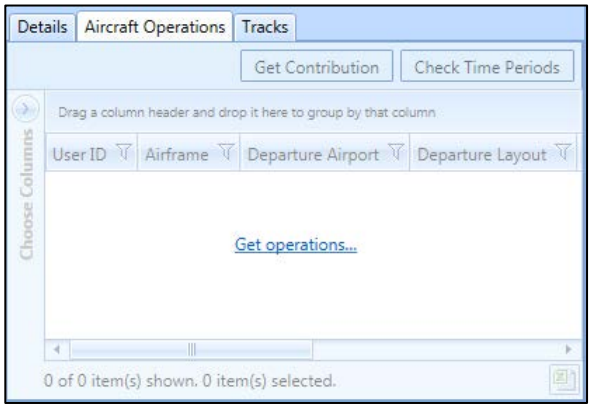


Figure 5-4 Metric Results – Aircraft Operations Tab

Get Operations

Click the *Get operations* link to prompt retrieval and display of 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 <u>per operation</u> 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 <u>per operation group</u> 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 noise metric result must have been processed with the *Apply Delay & Sequencing Model on Taxi* 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.

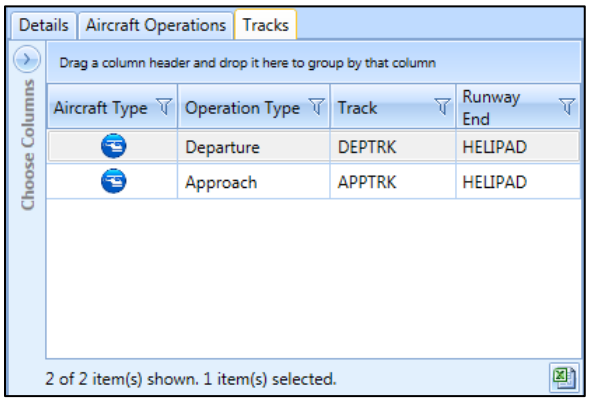


Figure 5-5 Metric Results – Tracks Tab

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.

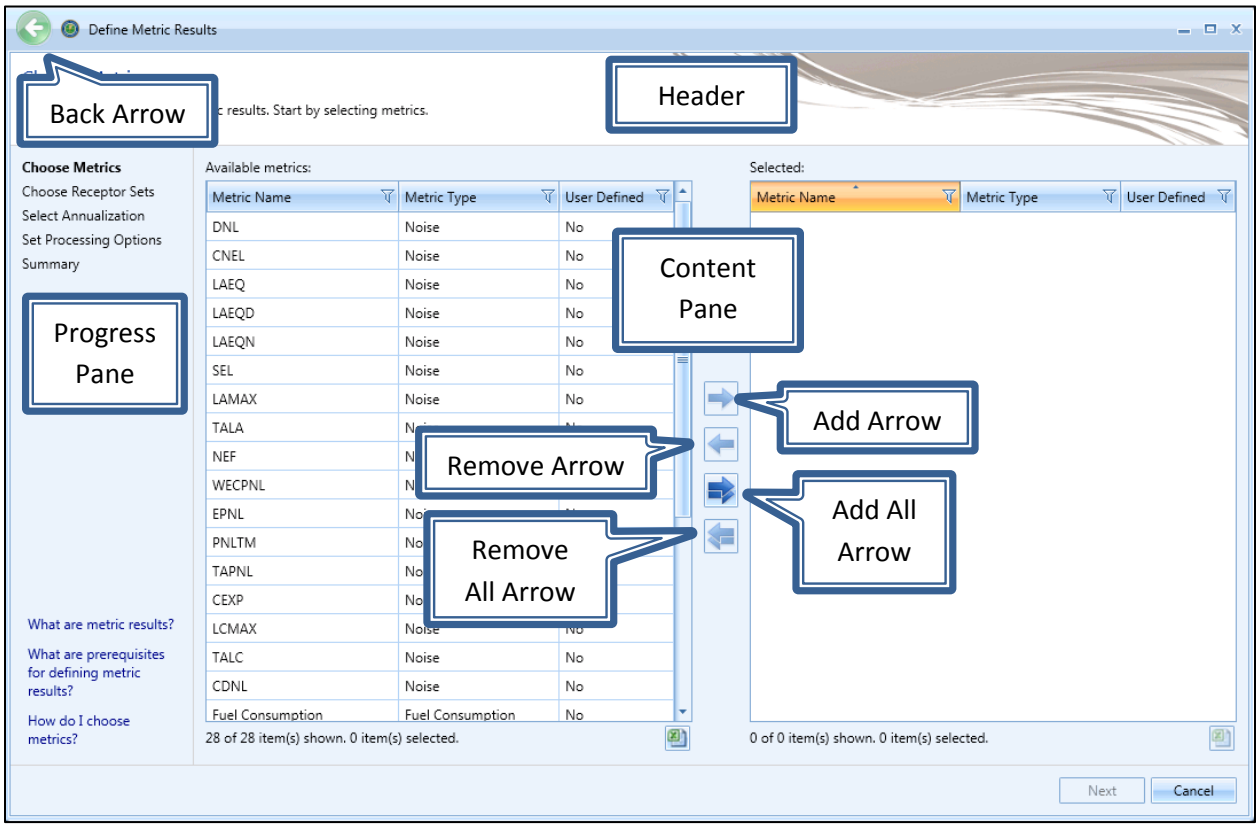


Figure 5-6 Define Metric Results Wizard

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*.

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. See Appendix E for more information.

The *Fuel Consumption* metric prescribes performance calculations only.

The $PM_{2.5}$ metric requires operations that span at least one year. Note that the PM_{10} metric includes $PM_{2.5}$ and does not have this restriction.

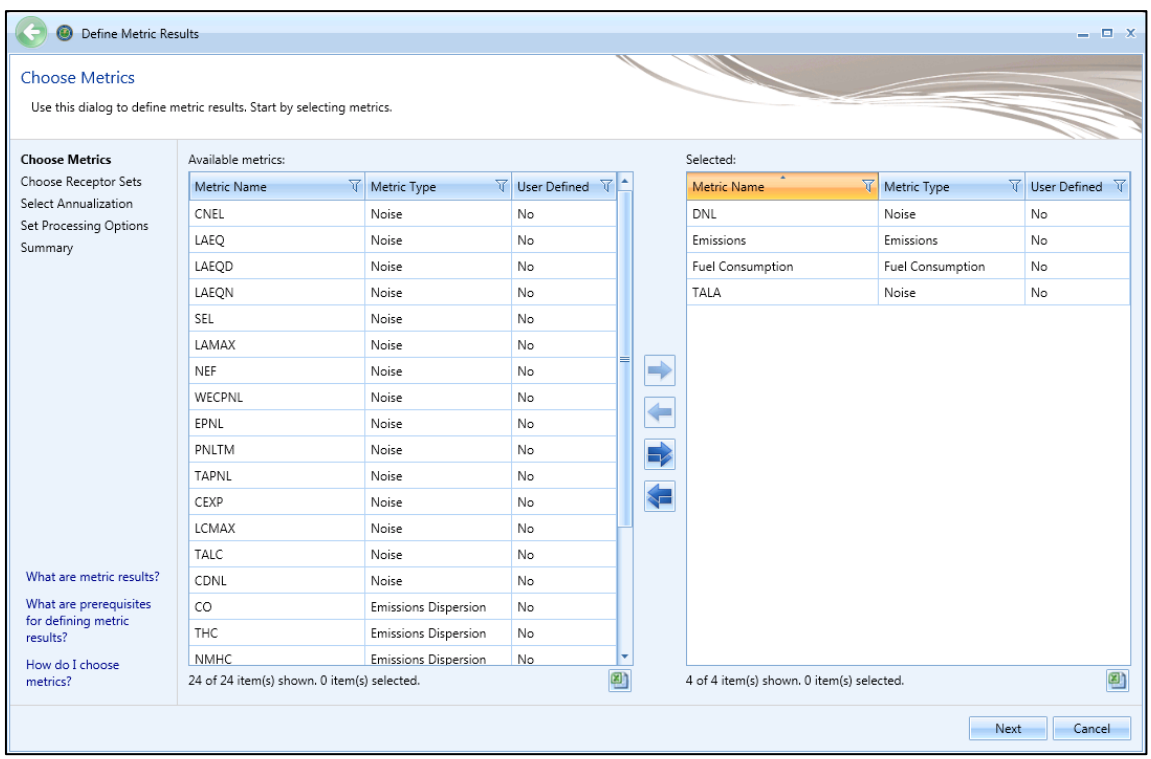


Figure 5-7 Define Metric Results – Choose Metrics

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*.

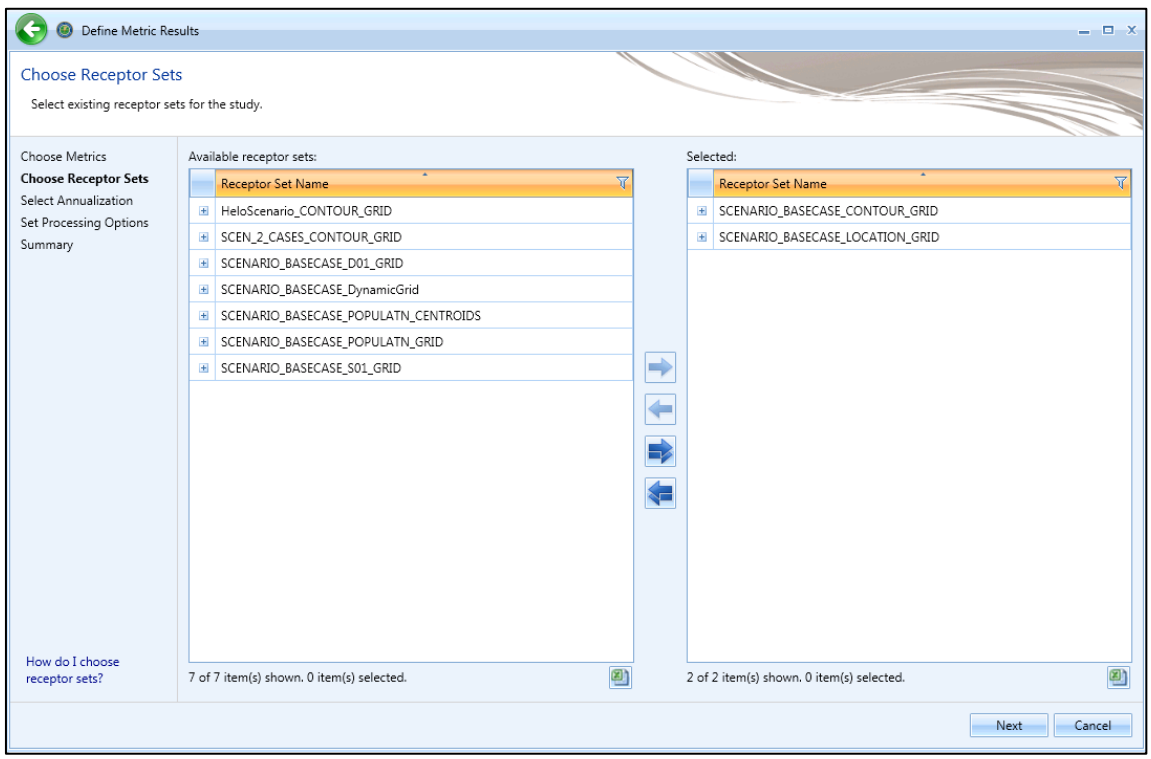


Figure 5-8 Define Metric Results – Choose Receptor Sets

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 9.46.6 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*.

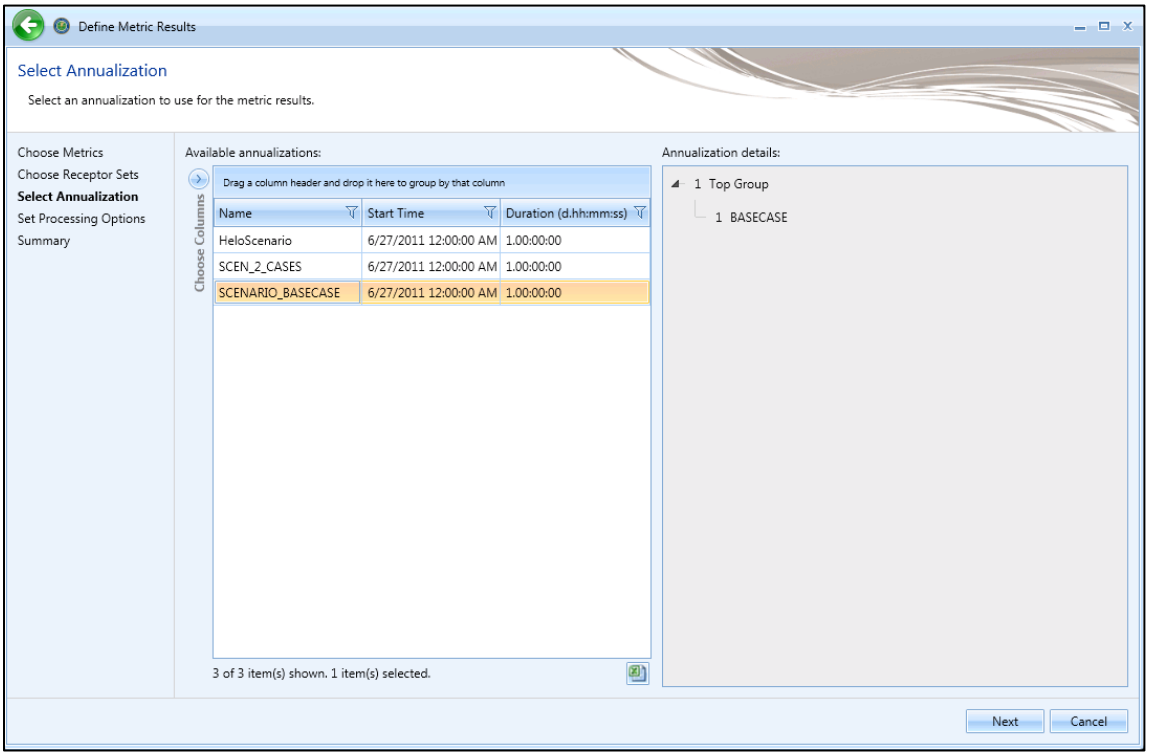


Figure 5-9 Define Metric Results – Select Annualization

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.

- *Name:* Name of the selected metric result.
- *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 5-10). Adjust the following parameters as appropriate:

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 average annual 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 modelling in AEDT. Also, please refer to "Using Weather Data in AEDT" on the AEDT Support website, Downloads page for further details.

- *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, 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* – this option is selected by default. When this option is selected, weather data is used according to the following priority:
    - When no high fidelity folder is specified, AEDT will use airport weather then use ISA weather airport for any missing data.
    - When 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 (specified in the *Definitions* tab, *Weather*, *Airport weather*) is used. If any weather data is missing, AEDT will not substitute the missing data with ISA weather.
  - *Use ISA weather* – select this option to only use the ISA weather conditions.
- *Check track angle*: When selected, AEDT discards operations on tracks with angles that exceed 90 degrees.
- *Apply Delay & Sequencing Model on Taxi:* 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. 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 on Taxi* option must be selected, and operating configuration and taxi network must exist in the study airport layouts included in the metric result.

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

- *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.
- *Calculate speciated organic gases:* When selected, each organic gas species will be evaluated in the emissions calculations.
- *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).

- *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.
- *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.

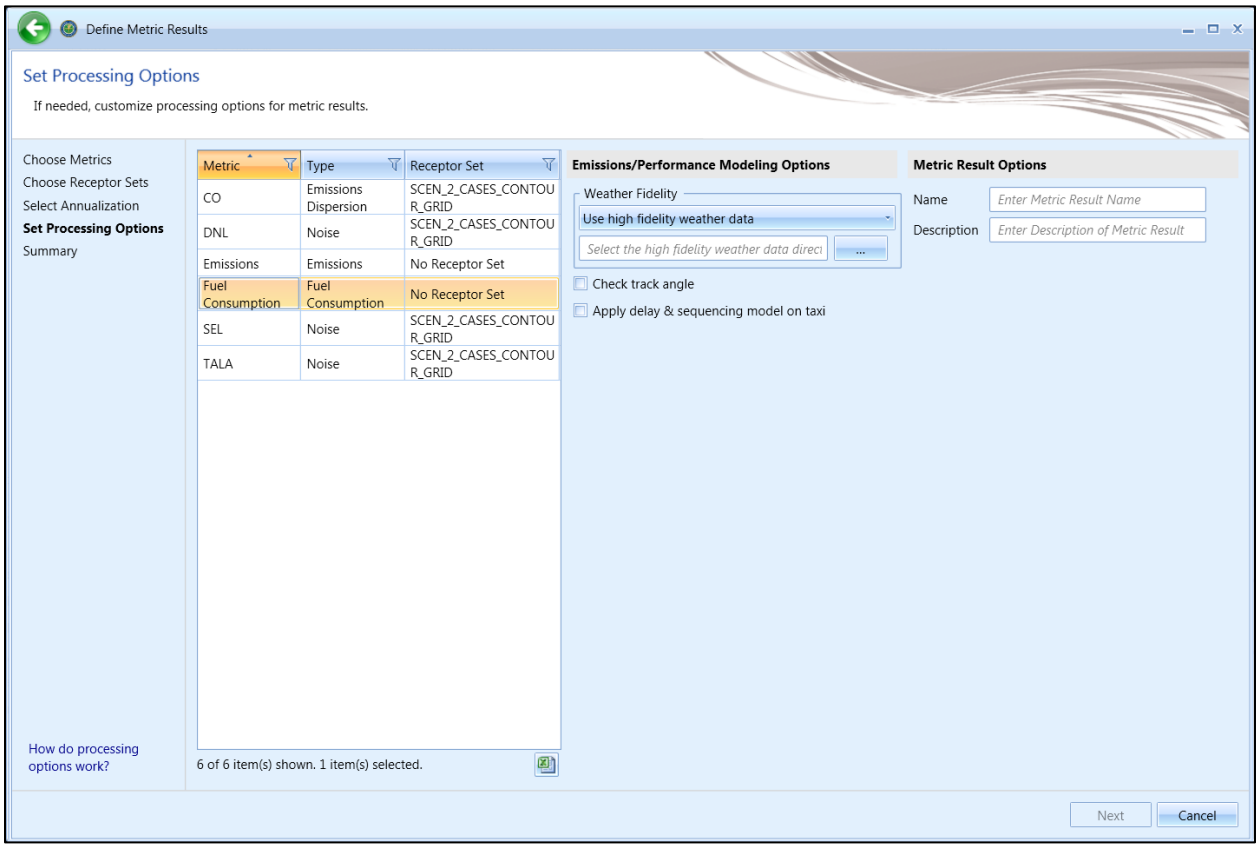


Figure 5-10 Define Metric Results – Set Processing Options, Fuel Consumption Metric

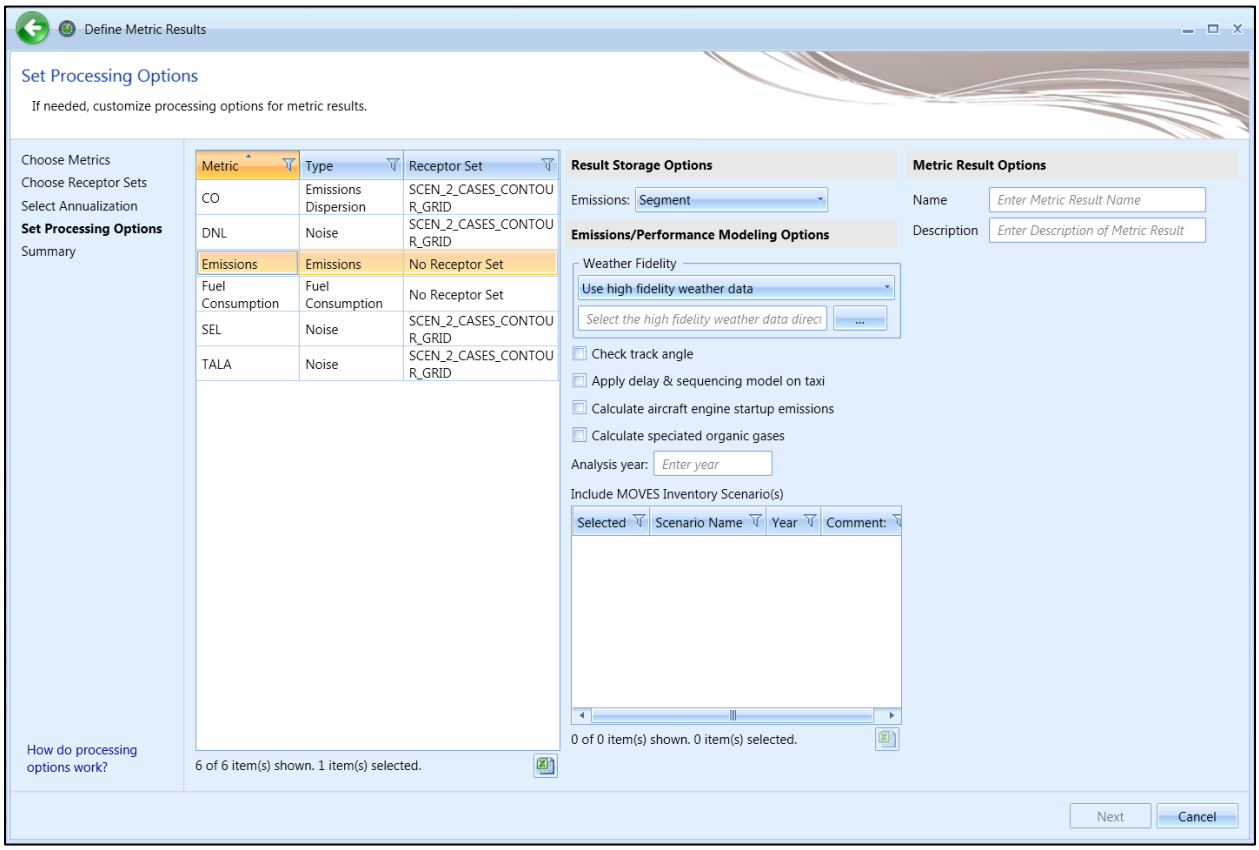


Figure 5-11 Define Metric Results – Set Processing Options, Emissions Metric

5.2.4.4 Noise Modeling Options

- *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.
- *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.
- *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 5-12). 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 9.6.4 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 (ft)*: If desired, enter terrain elevation in feet 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.

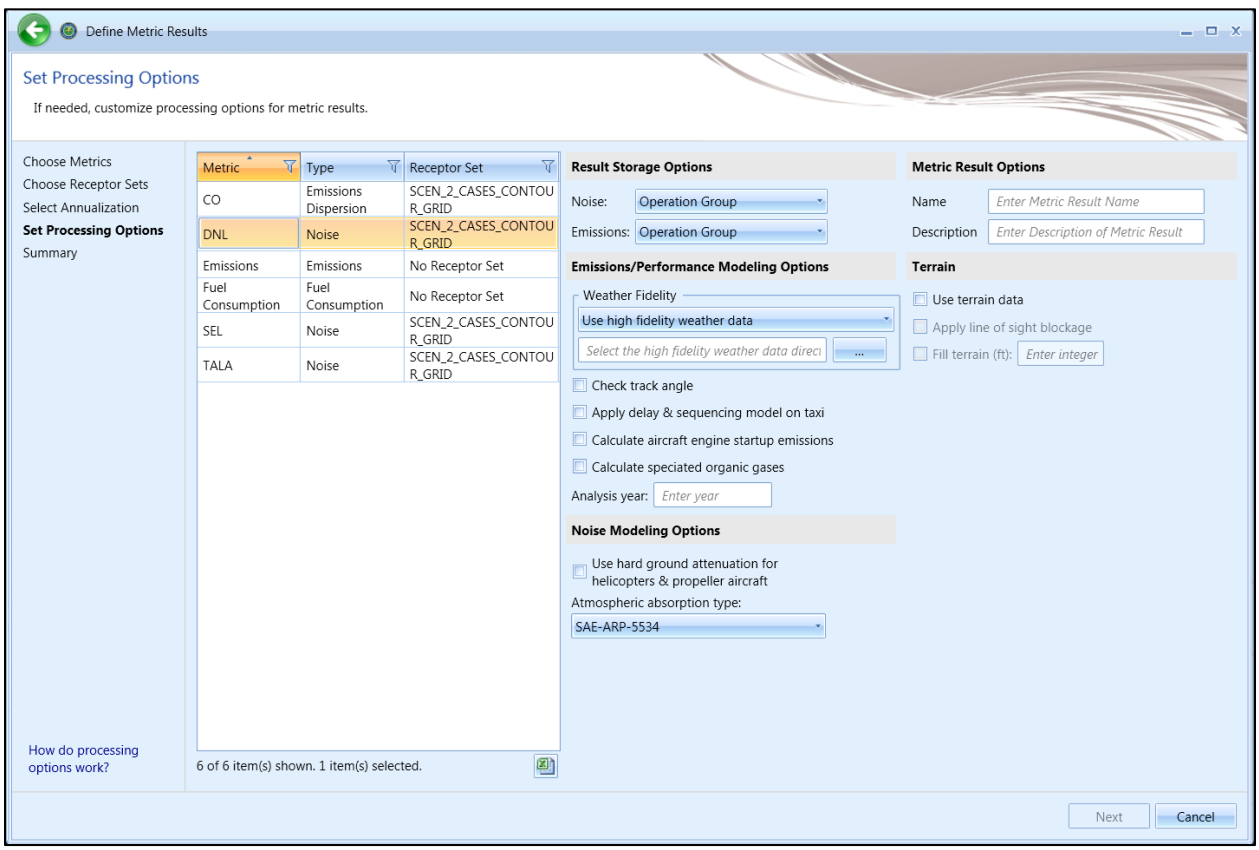


Figure 5-12 Define Metric Results – Set Processing Options, DNL Noise Metric

5.2.4.6 Number Above Noise Level

The following number above noise level options are displayed when a LAMAX, LCMAX, SEL, or CEXP noise metric is selected (Figure 5-13). 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)*.

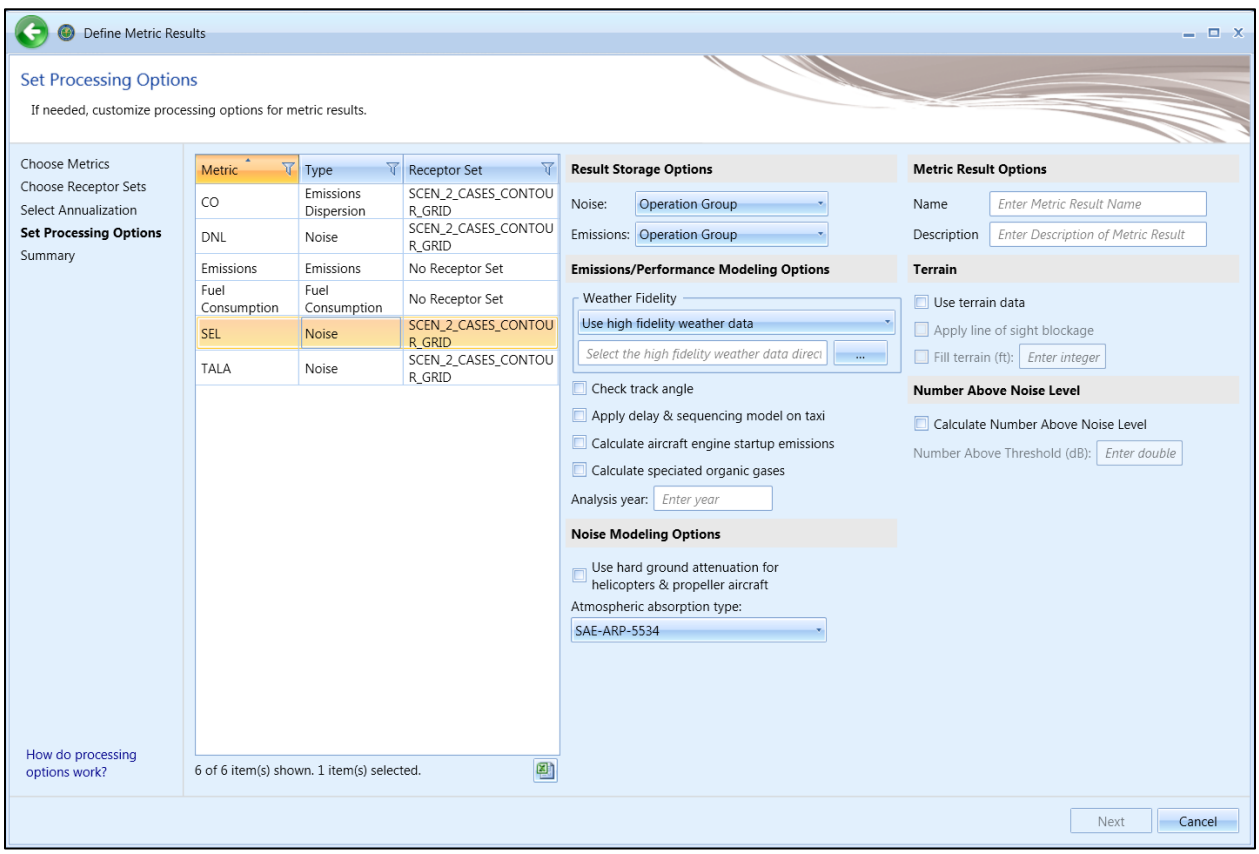


Figure 5-13 Define Metric Results – Set Processing Options, SEL Noise Metric

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 5-14). 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 9.6.4).
    - Offset value (dB): This offset value is added to the ambient values in the selected file. It can be positive, zero, or negative.

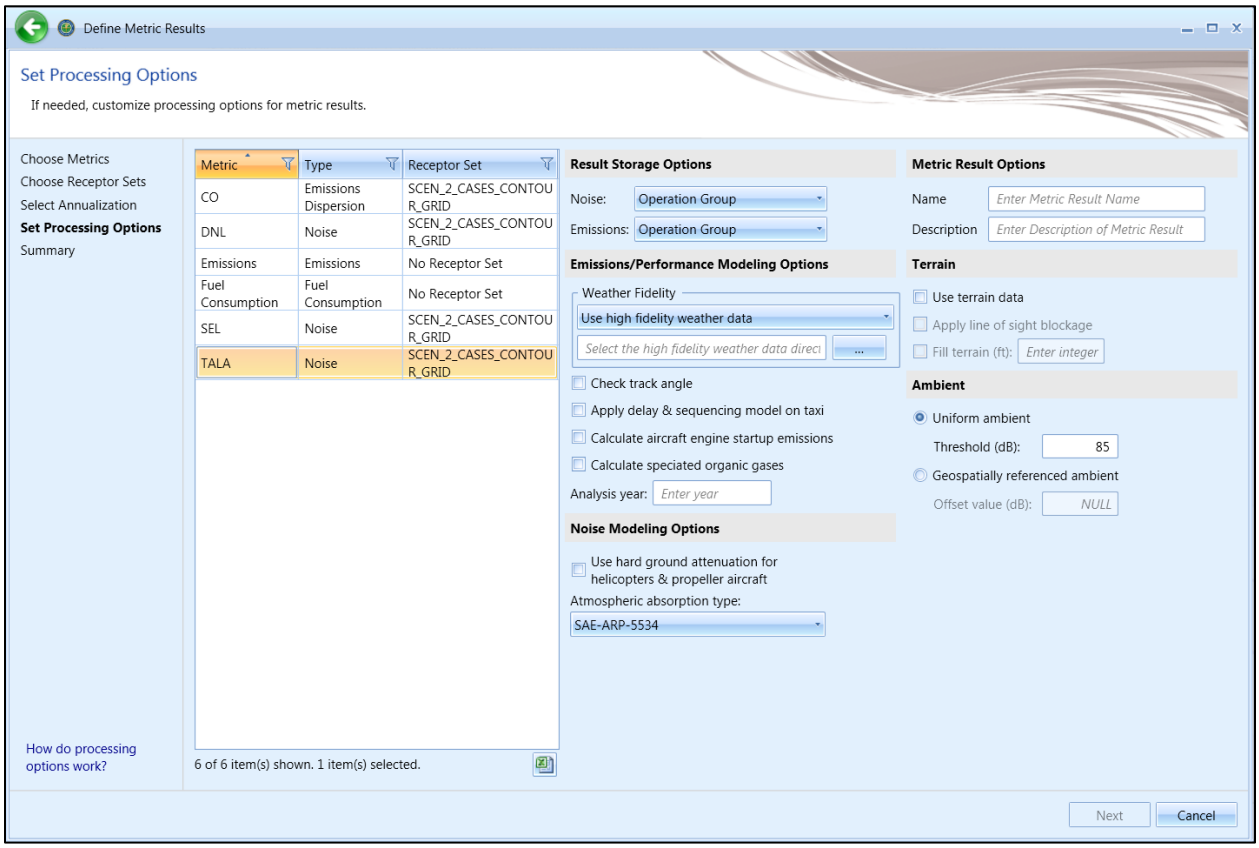


Figure 5-14 Define Metric Results – Set Processing Options, TALA Noise Metric

5.2.4.8 Time Audible Noise Metric Settings

The following time audible options are displayed when a time audible noise metric (TAUD, TAUDP, TAUDSC, or TAUDPSC) is selected (Figure 5-15). Select the appropriate option:

- *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 4.11.14).
    - *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.

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.

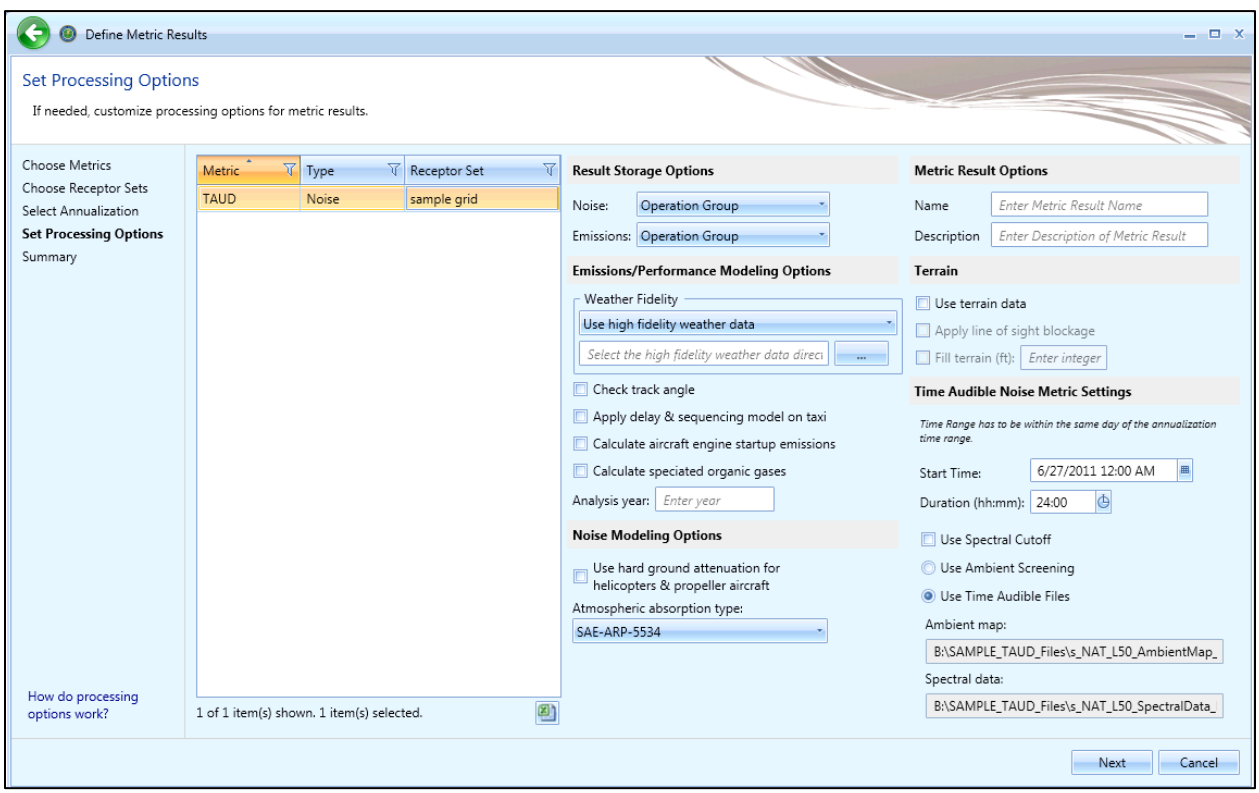


Figure 5-15 Define Metric Results – Set Processing Options, TAUD Noise Metric

5.2.4.9 Emission Dispersion Output

The following emission dispersion output options are displayed for any emissions dispersion metric (Figure 5-16).

- *Source Groups*: Select the desired source groups to include in the emissions dispersion output. Available source groups include aircraft, all airborne sources, taxiways, gates, parking facilities, roadways, stationary sources, training fires, and background only. Selected source groups will appear in the emissions dispersion report after running the metric result.
- *Averaging Times and Rankings*: Use the drop-down menus to select the desired averaging times and rankings for emissions dispersion calculations. 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.
- *Compute 1-hour Max Daily averages at each receptor for use in assessing NAAQS*: enable this setting to compute the 1-hour averaged Max Daily value at each receptor for SOx and NOx pollutants.

  If this option is selected, the emissions dispersion report and concentration layer attributes will contain the 4th highest (SOx metric) or 8th highest (NOx metric) emissions value at each receptor derived from the Daily Maximum of 1-hour averages. A concentration file will also be generated with the maximum daily values in the AERMOD run directory *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files*\[<pollutant_ID>_J <metric result ID>.
    - For SOx (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

When selecting source groups, select groups that are present in the operations data. If any source group is not represented in the operations data it will be absent in the output results.

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.

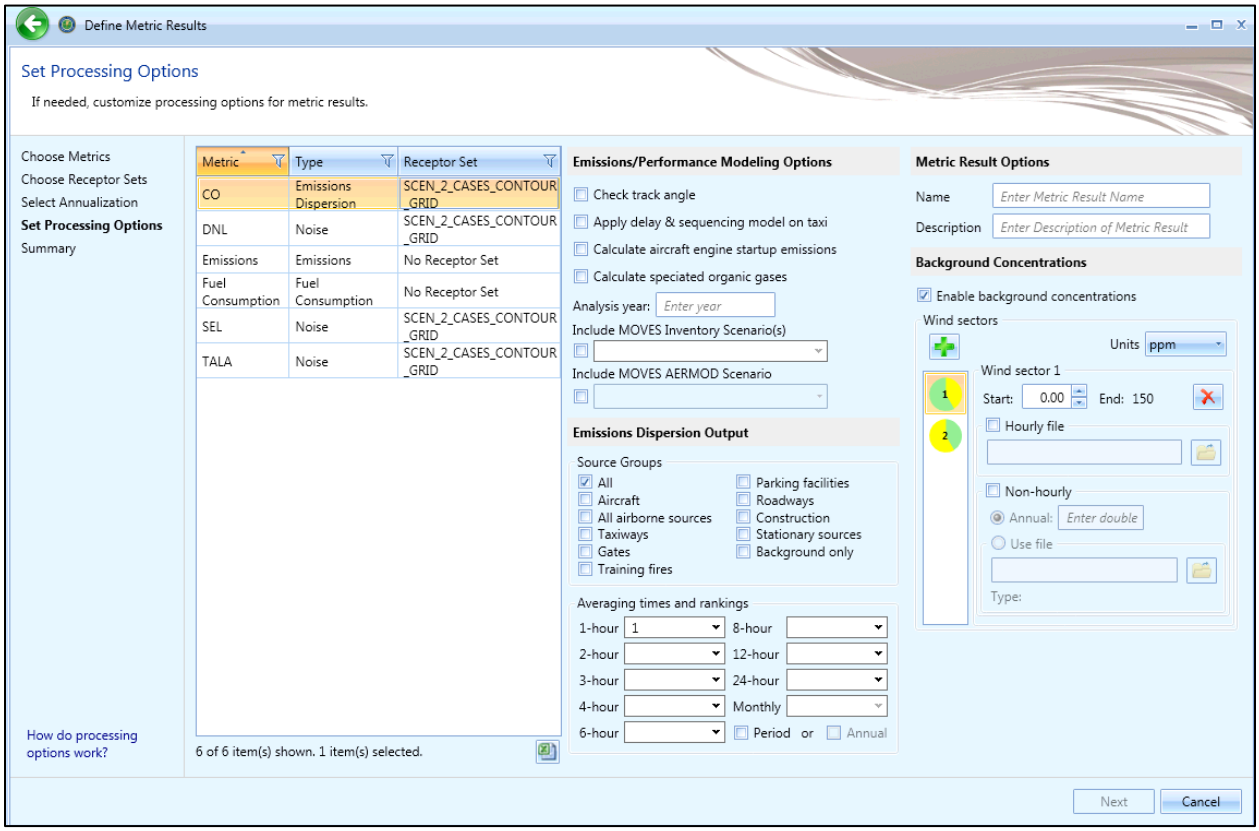


Figure 5-16 Define Metric Results – Set Processing Options, CO emissions dispersion metric

5.2.4.10 Background Concentrations

The following background concentration options are displayed when a CO, NOx, SOx, 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. Adjust the following options as appropriate:

- *Enable background concentrations*: Enable or disable modeling of background concentrations.
- *Add Wind Sector*: Add an additional wind sector, up to a maximum of six sectors (Table 5-3).
- *Units:* For CO pollutant, the input units may be specified as ppm, ppb, or $\mu g/m^3$. All other pollutants must be specified in $\mu g/m^3$.
- 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 *Section 3.3.8.2: Specifying Background Concentration* in the AERMOD User's Guide[1] 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
```

- *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

[1] U.S. Environmental Protection Agency, User's Guide for the AMS/EPA Regulatory Model (AERMOD), Report No. EPA-454/B-16-011, December 2016. https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf

can be applied per model run. Refer to the "*Background Concentrations in AEDT*" document 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 *Section 3.3.8.2: Specifying Background Concentration* 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 9.6.4).

For additional guidance on using background concentrations, refer to the "*Background Concentrations in AEDT*" document on the AEDT Support website.

5.2.5 Step 5: 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 5-17) 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.

To define metric results:

1. Click *Define* to complete defining metric results.
2. A confirmation is displayed, click *Close.* The defined metric result is listed in the *Metric Results* pane.

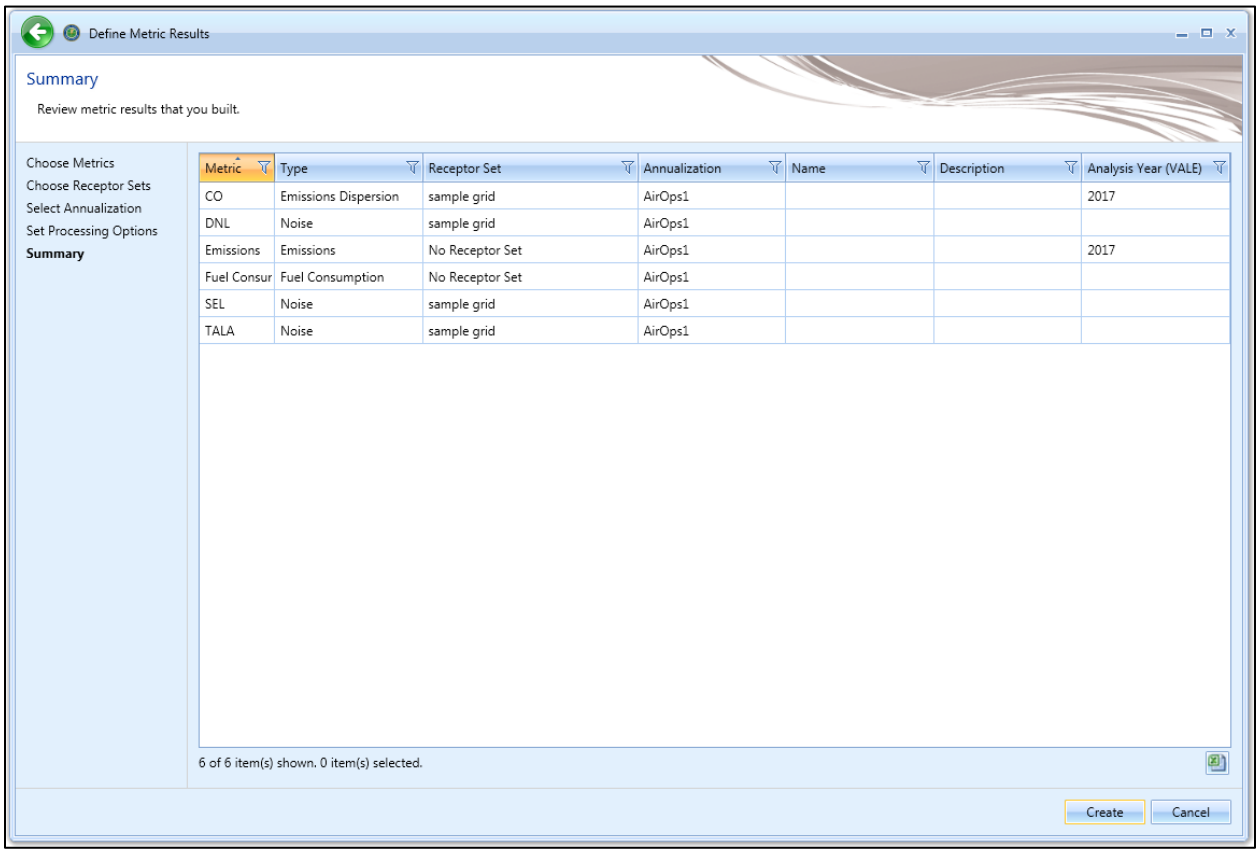


Figure 5-17 Define Metric Results – Summary

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 4.8). For information on running the metric results using the external RunStudy command-line tool, see Appendix I.

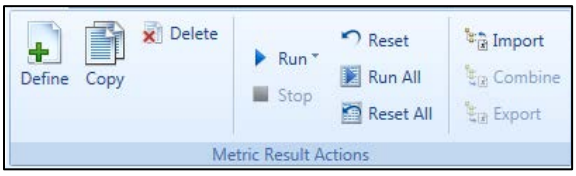


Figure 5-18 Ribbon Group – Metric Result Actions

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 display a check mark.
   - The *State* icon does not indicate whether running the metric result produced results or not. Check the aedt.log file for any errors after running a metric result.

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 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.

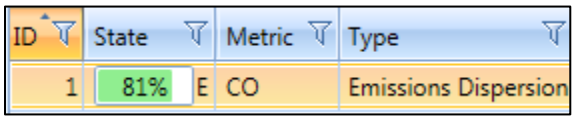


Figure 5-19 Emissions Dispersion Metric Result – Run State

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 directory (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 directory 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.

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).

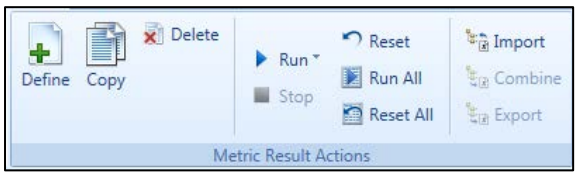


Figure 5-20 Ribbon Group – Metric Result Actions

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 *Metric Result Actions* ribbon group:

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

5.6.1 Import Noise Metric Result

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 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). The NMGF format is documented on the following website: http://wasmerconsulting.com/nmgf.htm 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.

To import metric result:

1. In the *Metric Results* tab, locate the *Metric Result Actions* group in the ribbon.
2. Click the *Import* button to open the *Import Metric Result* 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 *Receptor Set* button to view the receptor set layer on the map.

The imported metric result only contains noise results; thus it cannot generate a flight performance report, or emissions report.

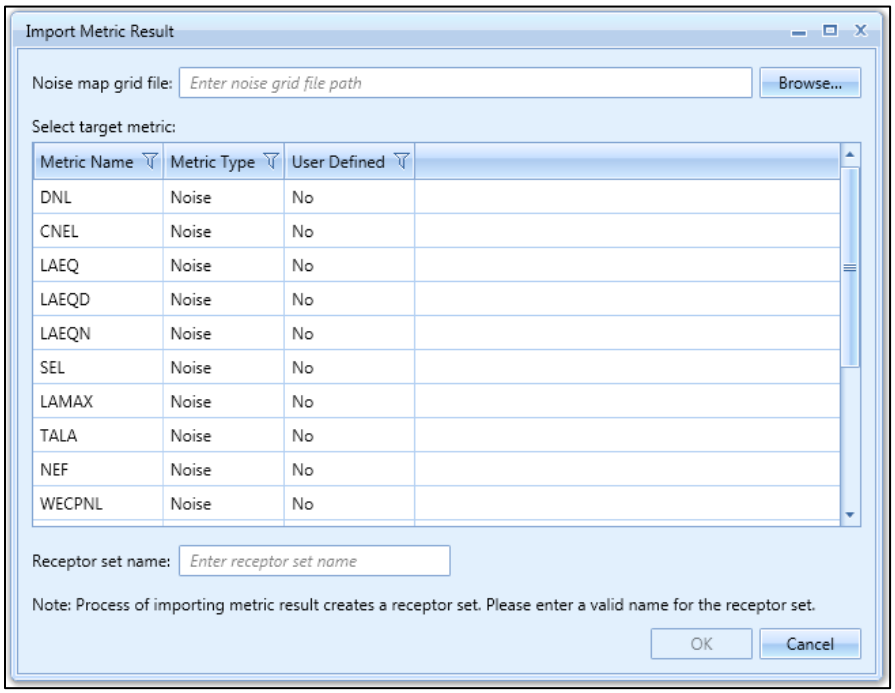


Figure 5-21 Import Metric Result Dialog

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 receptor set layer and noise contour layer can be generated from the new metric result.

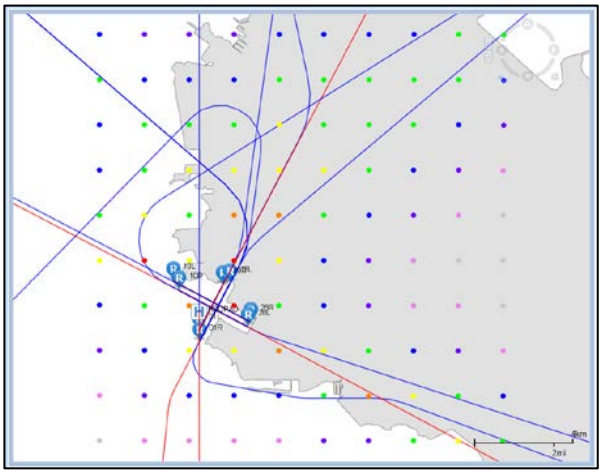
Noise metrics with the same noise metric, but different receptor sets can be combined.

To combine noise metric results:

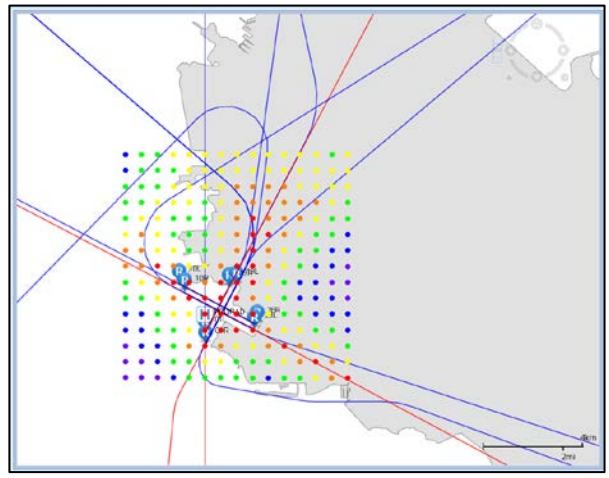
1. In the *Metric Results* tab, select two or more metric results with the same noise metric type (exposure or maximum level).
2. In the *Metric Result Actions* group in the ribbon, click the *Combine* button to open the *Linear Combiner* dialog.
3. Edit the following fields as necessary:
   - *Scalar* 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.

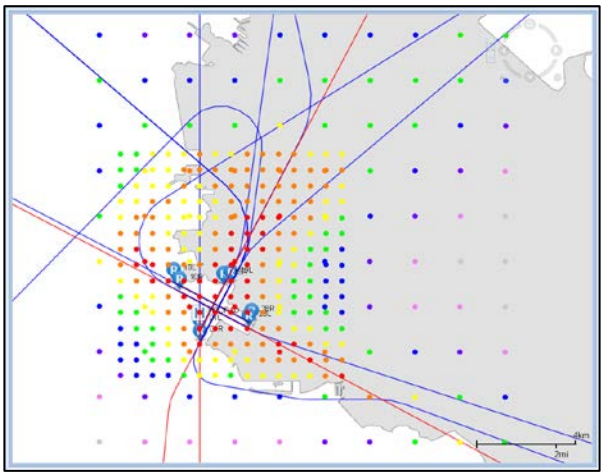
Receptor Grid 1



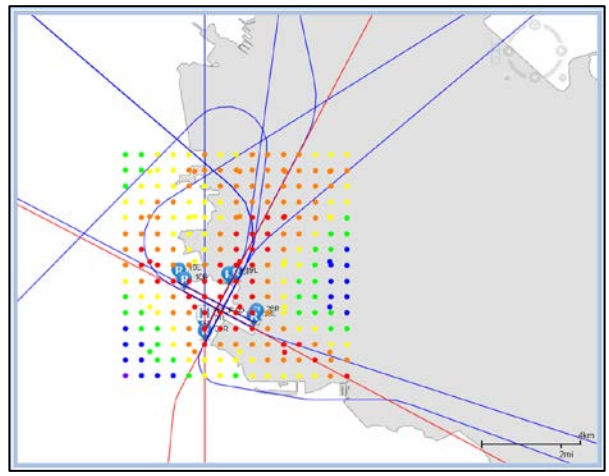
Receptor Grid 2



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 *Receptor Set* button to view the receptor set layer on the map or click the *Contour* button to view the contour layer on the map.

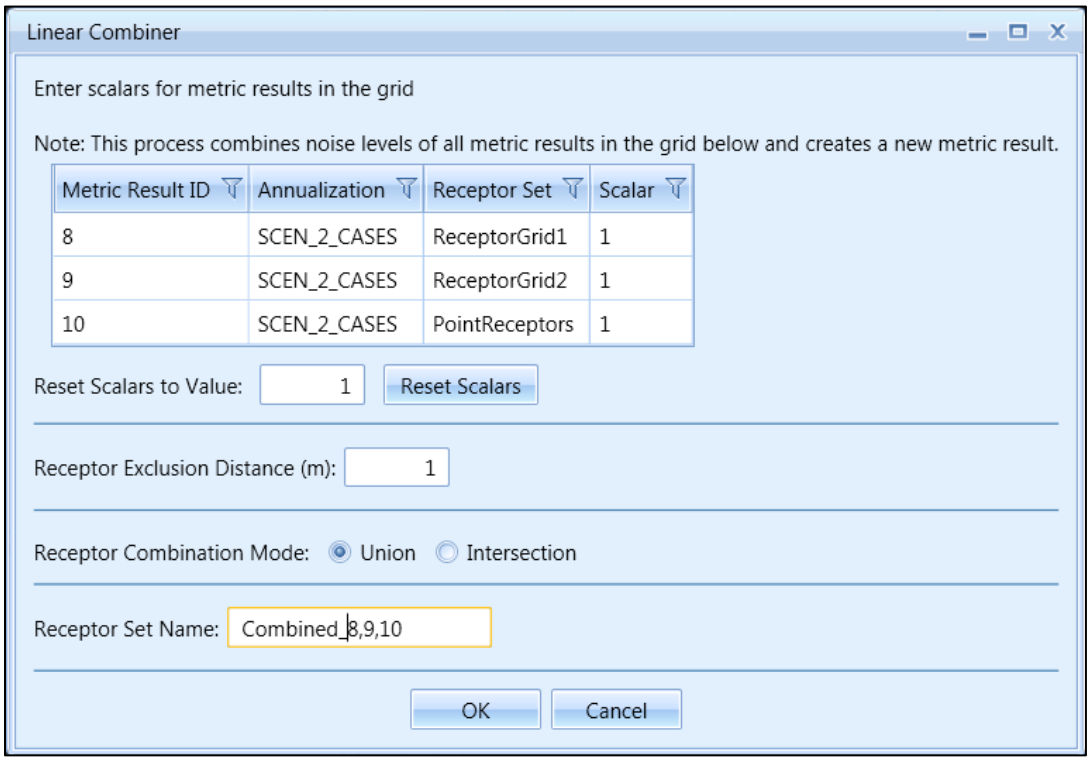


Figure 5-22 Combine Metric Results Dialog

5.6.3 Export Noise Metric Result

To enable the *Export* button, select a completed noise metric result. This button allows users to export the selected noise metric result in a Noise Model Grid Format (NMGF) file, for use in external programs such as NMPlot.

The AEDT grid file is based on the ASCII version of the NMGF (Noise Model Grid Format). The NMGF format is documented on the following website: http://wasmerconsulting.com/nmgf.htm 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.

To export noise metric result:

1. In the *Metric Results* pane, select a completed noise metric result.
2. In the *Metric Result Actions* 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* ribbon group (Figure 5-23) in the *Metric Results* tab supports generating the following types of layers on the map:

- Noise contours – lines on a map that represent specific noise levels, color coded by noise level
- Receptor set – receptors that are included in the metric result, color coded by noise level
- Tracks – tracks included in the metric result, color coded by track type
- 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

This Section describes how to generate each of those layers. Viewing the study boundary is available through the *Study Boundary* ribbon group (see Section 3.7.7).

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.

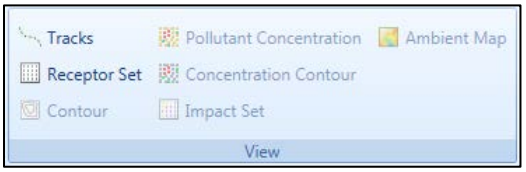


Figure 5-23 Ribbon Group – View

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 study boundary layers can be generated without running metric results in advance.

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* ribbon group, click the *Tracks* button.
3. The tracks layer is displayed on the map (Figure 5-24) 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 tracks layers: track name, aircraft type, airport, runway end, operation type, track type, subtrack ID, subtrack number, and percent dispersion (Figure 5-24). See Appendix B.3 for descriptions of the attributes.

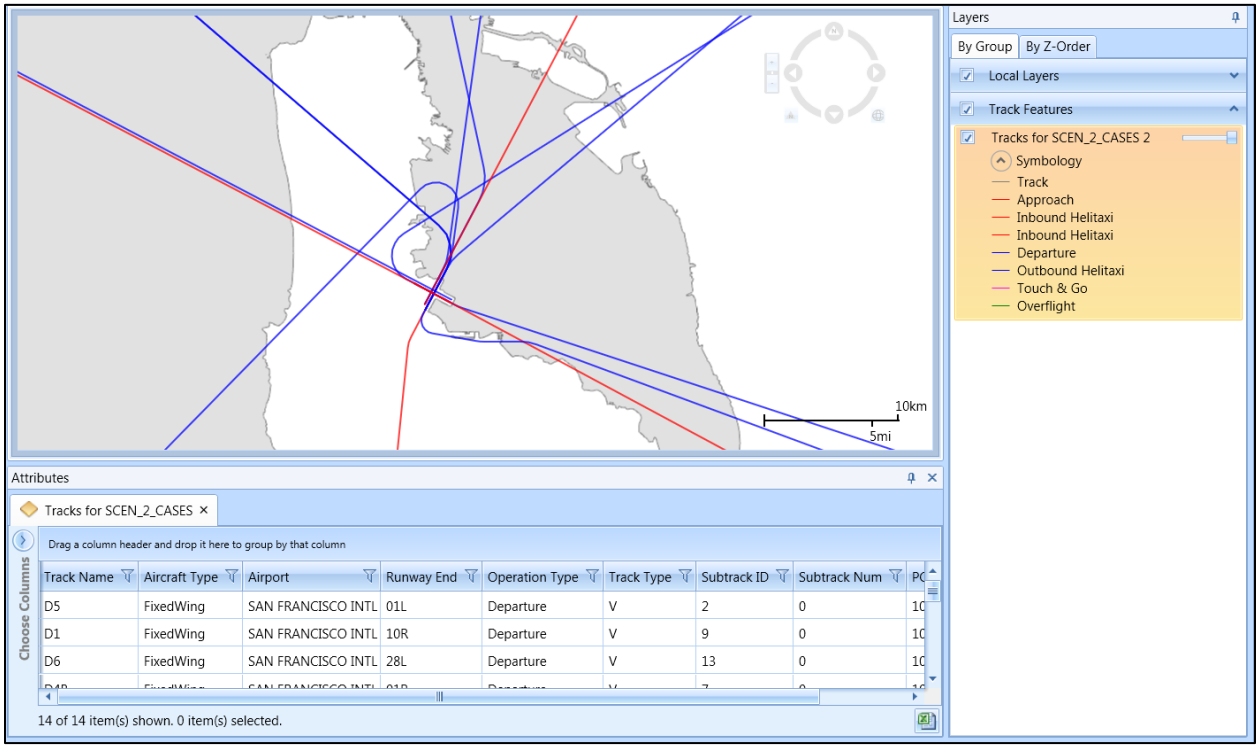


Figure 5-24 Sample Tracks Layer with Attributes

5.7.2 View Receptor Set Layer

1. In the *Metric Results* pane, select a desired metric result.
2. From the *View* ribbon group, click the *Receptor Set* button.
    - For metric results processed with the Number Above Noise Level option, the *Receptor Set Settings* dialog is displayed (Figure 5-25).
    - 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.

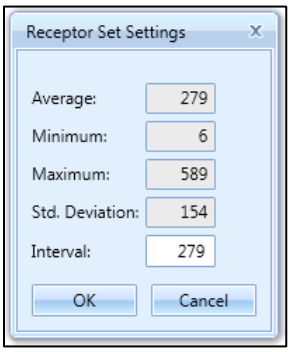


Figure 5-25 Receptor Set Settings Dialog for Number Above Noise Level

3. The receptor set layer is displayed on the map (Figure 5-26) and in the *Layers* manager.
4. If desired, change the color properties of the contour layer in the *Layer Properties* dialog (see Section 3.7.8).

Receptor set layers can be generated without results prior to running a metric result. To view the layer with results after running the metric result, delete the layer without results and generate the receptor set layer with the processed metric result.

Receptor Set Layer Attributes

The following attributes are available for all receptor set layers: receptor ID, noise result index, latitude, longitude, elevation, noise results (dB, Minutes, %, or Operation count), metric type, and metric name (Figure 5-26). See Appendix B.3 for descriptions of the attributes.

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

The area and percent area will be 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.

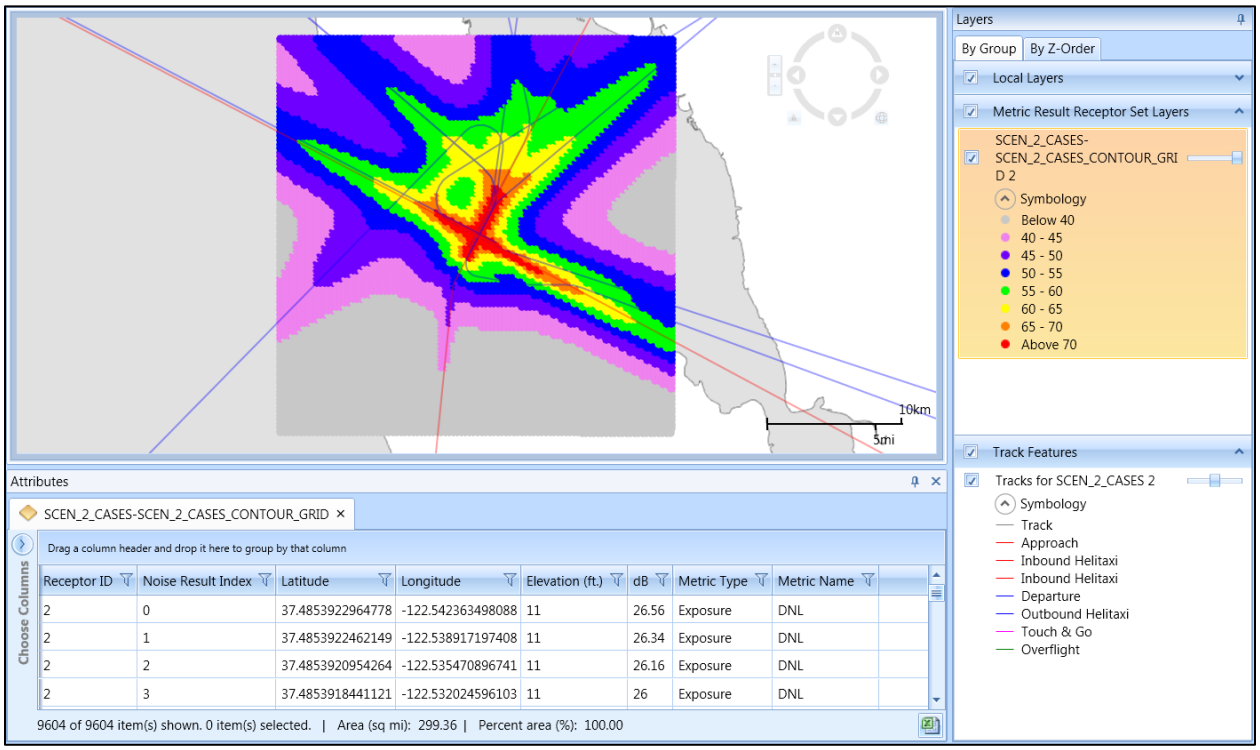


Figure 5-26 Sample Receptor Set Layer with Attributes – shown with Tracks

5.7.3 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.
2. From the *View* ribbon group, click the *Contour* button.
3. The *Contour Settings* dialog is displayed (Figure 5-27).
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 5-28) 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).

Only contours that can be closed will be displayed on the map.

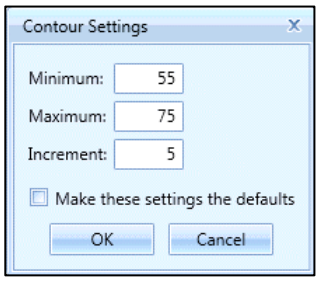


Figure 5-27 Contour Settings Dialog

Contour Layer Attributes

The following attributes are available for contour layers: object ID, contour, shape length, shape area, metric type, and metric name (Figure 5-28). See Appendix B.3 for descriptions of the attributes.

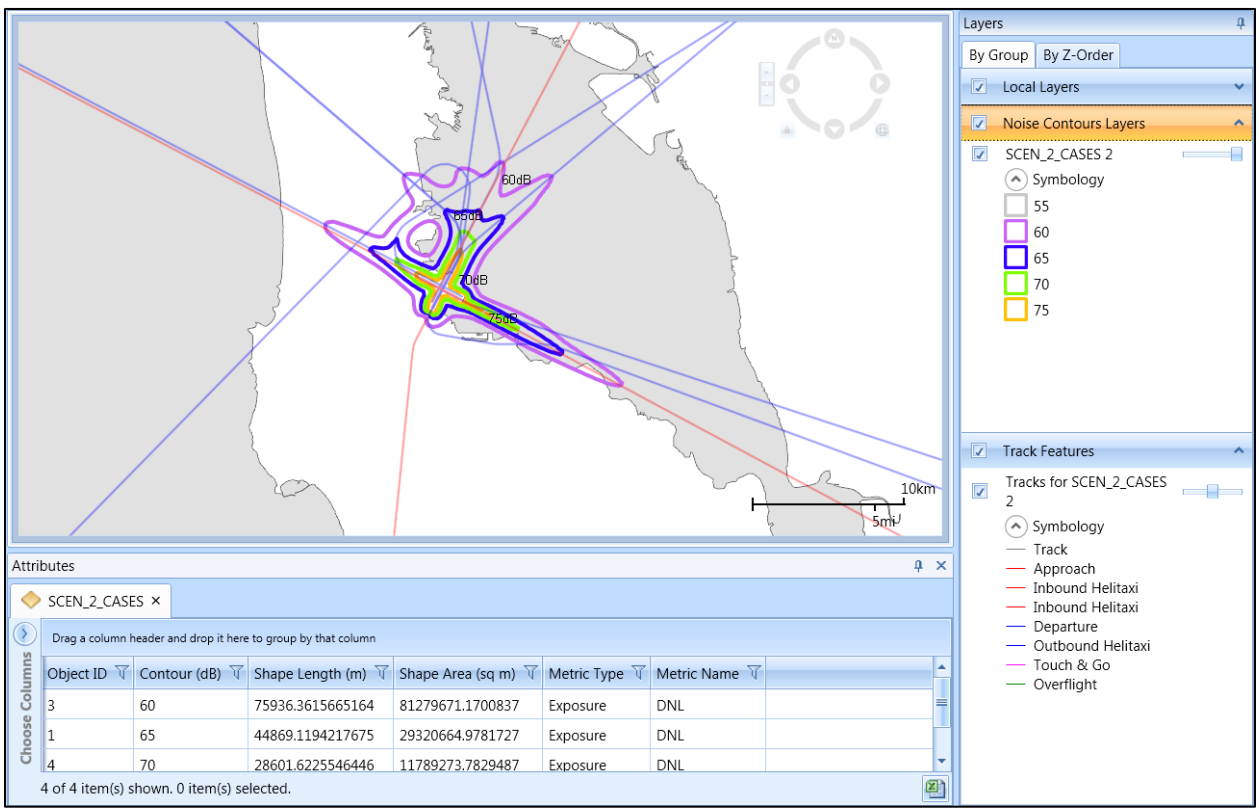


Figure 5-28 Sample Contour Layer with Attributes – shown with Tracks

5.7.4 View Pollutant Concentration Layer

1. In the *Metric Results* pane, select an emissions dispersion metric result that has been processed.
2. From the *View* ribbon group, click the *Pollutant Concentration* button.
3. The *Select Pollutant Concentration Results* dialog (Figure 5-29) 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 5-30) and in the *Layers* manager.

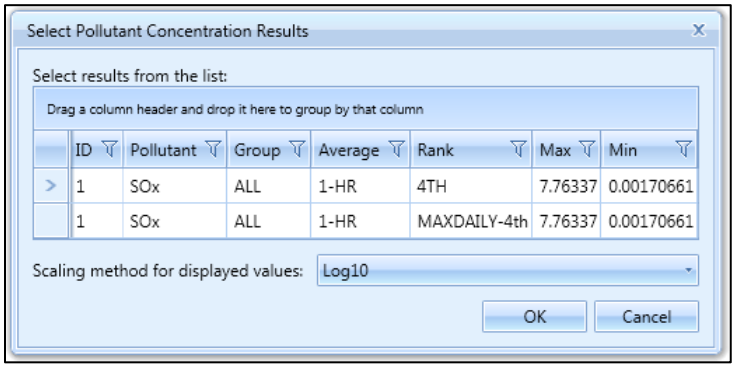


Figure 5-29 Select Pollutant Concentration Results Dialog

Pollutant Concentration Layer Attributes

The following attributes are available for all pollutant concentration layers: latitude, longitude, concentration index, pollutant, measured date, average, rank, and group (Figure 5-30). 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.

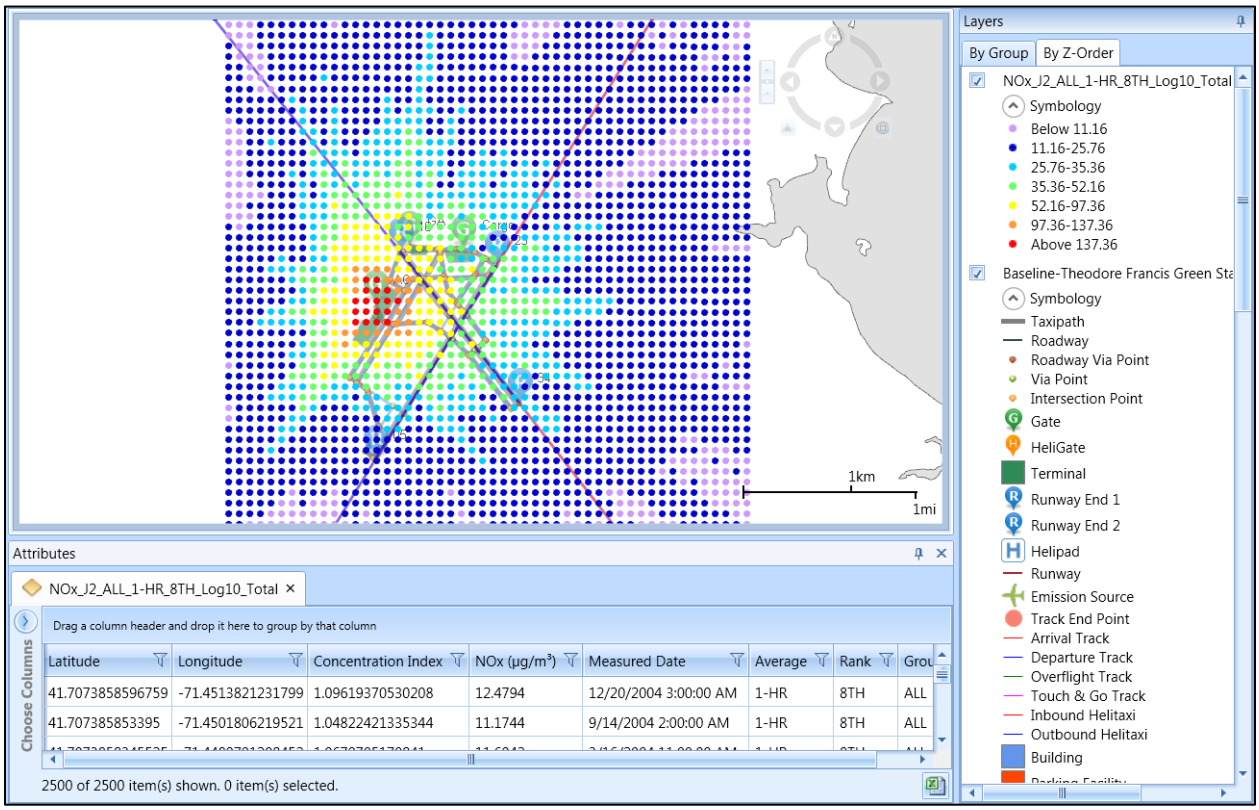


Figure 5-30 Sample Pollutant Concentration Layer with Attributes- shown with Airport layers

5.7.5 View Concentration Contour Layer

1. In the *Metric Results* pane, select an emissions dispersion metric result that has been processed.
2. From the *View* ribbon group, click the *Concentration Contour* button.
3. The *Select Pollutant Concentration Results* dialog (Figure 5-29) 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 *Log10* scaling when concentration values are small.
6. Click *OK* to generate and display the concentration contour layers on the map (Figure 5-31) and in the *Layers* manager.

Both open and closed emissions dispersion contours are displayed in the concentration contour layer.

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 5-31). See Appendix B.3 for descriptions of the attributes.

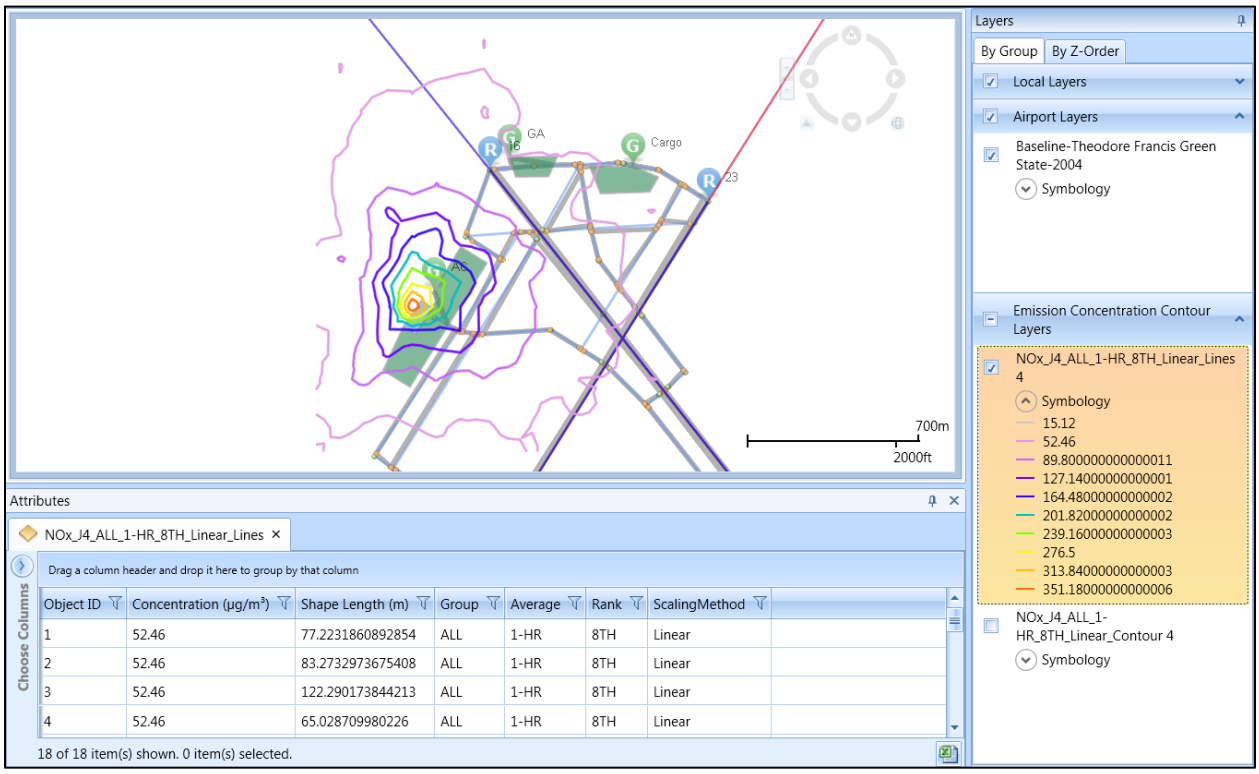


Figure 5-31 Sample Concentration Contour Layer with Attributes – shown with Airport layers

5.7.6 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* ribbon group, click the *Impact Set* button.
3. The impact set layer is displayed on the map (Figure 5-32) 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 5-32). See Appendix B.3 for descriptions of the attributes.

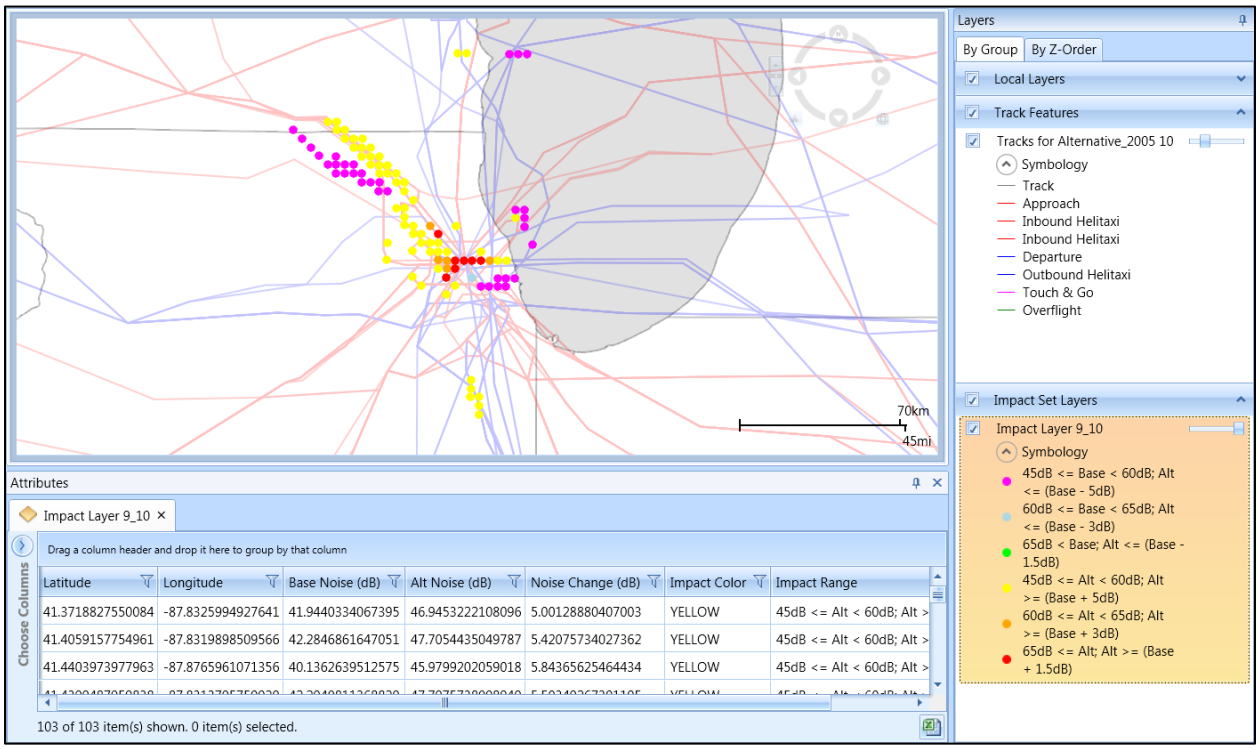


Figure 5-32 Sample Impact Set Layer with Attributes – shown with Tracks

5.7.7 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* ribbon group, click the *Ambient Map* button.
3. The ambient map layer is displayed on the map (Figure 5-33) and in the *Layers* manager.

Time Audible Ambient Map Attributes

The following attributes are available for time audible ambient map layers: latitude, longitude, ambient noise level, and x and y coordinates (Figure 5-33). See Appendix B.3 for descriptions of the attributes.

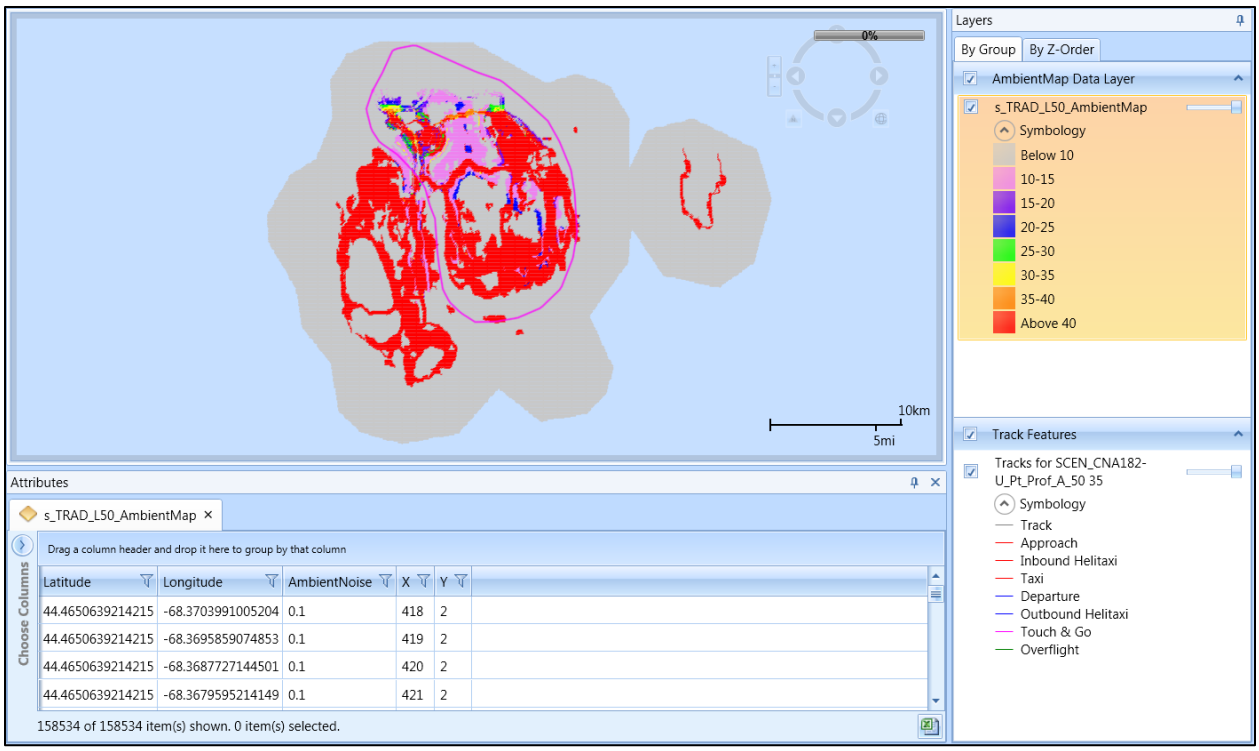


Figure 5-33 Sample Ambient Map Layer with Attributes – shown with Tracks

5.8 Environmental Justice

The AEDT Environmental Justice 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 US Census Bureau, American Community Survey (ACS) [2] data in conjunction with or without other metric results (including noise, fuel burn, and emissions) produced by AEDT over various maps. The environmental justice analysis results can be exported to geospatial (Shapefile) and spreadsheet (CSV) formats for use outside of AEDT.

The *Environmental Justice* ribbon group (Figure 5-34) provides access to the environmental justice model which uses an environmental justice boundary (EJ boundary) and the U.S. Census data (ACS data) to identify potential environmental justice populations.

The only requirements for running the Environmental Justice Model are the ACS data and an EJ study boundary. A metric result is not required in order to generate the EJ results.

The environmental justice boundary differs from the AEDT study boundary.

Figure 5-34 Ribbon Group – Environmental Justice

5.8.1 The American Community Survey Data

The environmental justice model requires data from the US Census Bureau, American Community Survey (ACS) product[2]. Download and extract the ACS data and store in the following locations for use in AEDT as described below. Supported ACS data includes 2011, 2012, 2013 and 2014 ACS 5 year estimate data.

The ACS dataset is large (approximately 7 GB).

The following data are required in order to run the environmental justice model.

1. <u>Full Census Geodatabase</u>

Download the full GDB, for example the 2014 ACS data can be obtained from:
http://www2.census.gov/geo/tiger/TIGER_DP/2014ACS/ACS_2014_5YR_BG.gdb.zip

When storing the data, use the data directory structure as presented by the Census. For example:

[2] For more information on the ACS, please visit: https://www.census.gov/programs-surveys/acs/.
For more specific information on the ACS data structure, see for example
http://www2.census.gov/geo/tiger/TIGER_DP/2013ACS/Metadata/

C:\AEDT\environmentaljustice_module\datasets\www2.census.gov\geo\tiger\TIGER_DP\2014ACS\ACS_2014_5YR_BG.gdb

2. State File

Download the state file, for example the 2014 state file can be obtained from:
http://www2.census.gov/geo/tiger/TIGER2014/STATE/tl_2014_us_state.zip

When storing the data, use the data directory structure as presented by the Census. For example:

C:\AEDT\environmentaljustice_module\datasets\www2.census.gov\geo\tiger\TIGER2014\state

3. Census National County File

Download the county file from:
http://www2.census.gov/geo/docs/reference/codes/files/national_county.txt

Store the file, "national_county.txt", under C:\AEDT\environmentaljustice_module.

5.8.2 Create Environmental Justice Boundary

The EJ boundary defines the environmental justice study area and can be defined as a polygon, by specifying a point and a defining radius (circle), or by importing a shapefile.

The EJ boundary will include any census block group that the boundary touches. Thus, the EJ study area will include the entire population of a census block group in the determination of the average minority and low-income populations, even if the study area boundary only includes a small portion of the census block group.

Multiple EJ boundaries can exist in AEDT. Select the desired EJ boundary layer in the *Layers* manager before running the environmental justice model.

To define an environmental justice boundary with a circle:

1. From the *Environmental Justice* ribbon group, select *Define Boundary*, *Circle*.
2. The mouse pointer changes to a + icon and the Cancel Boundary button (Figure 5-35) is displayed in the upper left-hand corner of the map.
3. Click once on the desired location for the center of the circle on the map.
4. The *Environmental Justice Circle Boundary* dialog is displayed (Figure 5-36).
5. Enter the radius of the circle boundary and select a desired unit.
6. Click *OK*.
7. The boundary layer is displayed on the map and in the *Layers* manager.

Figure 5-35 Cancel Boundary Icon

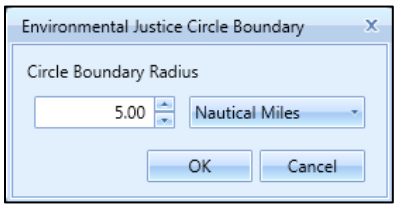


Figure 5-36 Environmental Justice Circle Boundary Dialog

To define an environmental justice boundary with a polygon:

1. From the *Environmental Justice* ribbon group, select *Define Boundary*, *Polygon*.
2. The mouse pointer changes to a pen icon and the Cancel Boundary button (Figure 5-35) is displayed in the upper left-hand corner of the map.
3. Click once on a desired map location to define the first point of the polygon.
4. Move the mouse and click again to define the second point of the polygon.
5. Continue creating points by clicking on the map. Double-click to finish creating the polygon.
6. The boundary layer is displayed on the map and in the *Layers* manager.

To define an environmental justice boundary with a shapefile:

1. Click the *Add* button in the *Layers* ribbon group, then select *Add Local Map.*
2. Browse to the desired shapefile, and click *Open.*
3. The shapefile is displayed on the map and in the *Layers* manager.

When using a shapefile to define an environmental justice boundary, the shapefile must be of the type polygon. Polylines and multi-points are not supported as environmental justice boundaries.

5.8.3 Run Environmental Justice Model

When the environmental justice model is run, an environmental justice layer is displayed on the map and in the *Layers* manager.

Running the environmental justice model may be time consuming, especially if conducted over a large area (e.g. metroplex).

To run the environmental justice model and view results:

1. View and edit the *Environmental Justice Model* study preferences (Section 4.11.10).
2. Select the desired EJ study area boundary created in Section 5.8.2 in the *Layers Manager.*
3. From the *Environmental Justice* ribbon group, click *Run*.
4. When complete, the environmental justice layer is displayed on the map and in the *Layers* manager and the *Environmental Justice Analysis* pane will be displayed.

The log messages specific to the Environmental Justice Model processing are saved to the *ej.txt* file in the *C:\AEDT\Logs* folder.

5.8.4 Environmental Justice Analysis Pane

The *Environmental Justice Analysis* pane displays the average, min, and max values for the specified ACS variable and allows changing the threshold for each variable. The threshold will affect the color coding (symbology) of the EJ layer.

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 4.11.10).

To change threshold for an ACS variable:

1. Check the box next to the ACS variable 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 layer on the map will be updated.

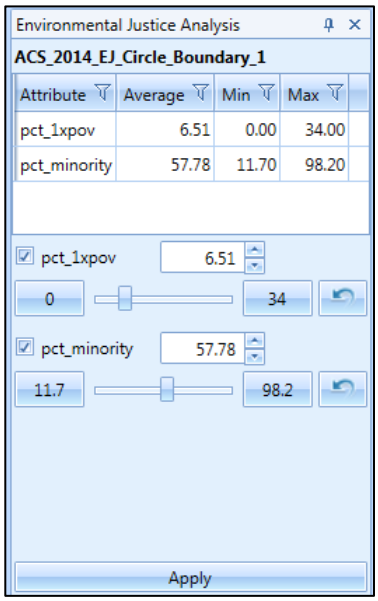


Figure 5-37 Environmental Justice Analysis Pane

5.8.5 Environmental Justice Layer

The environmental justice layer displays census block groups in multiple colors according to the values specified in the *Environmental Justice Analysis* dialog. 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, see Section 5.8.4.
- 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.

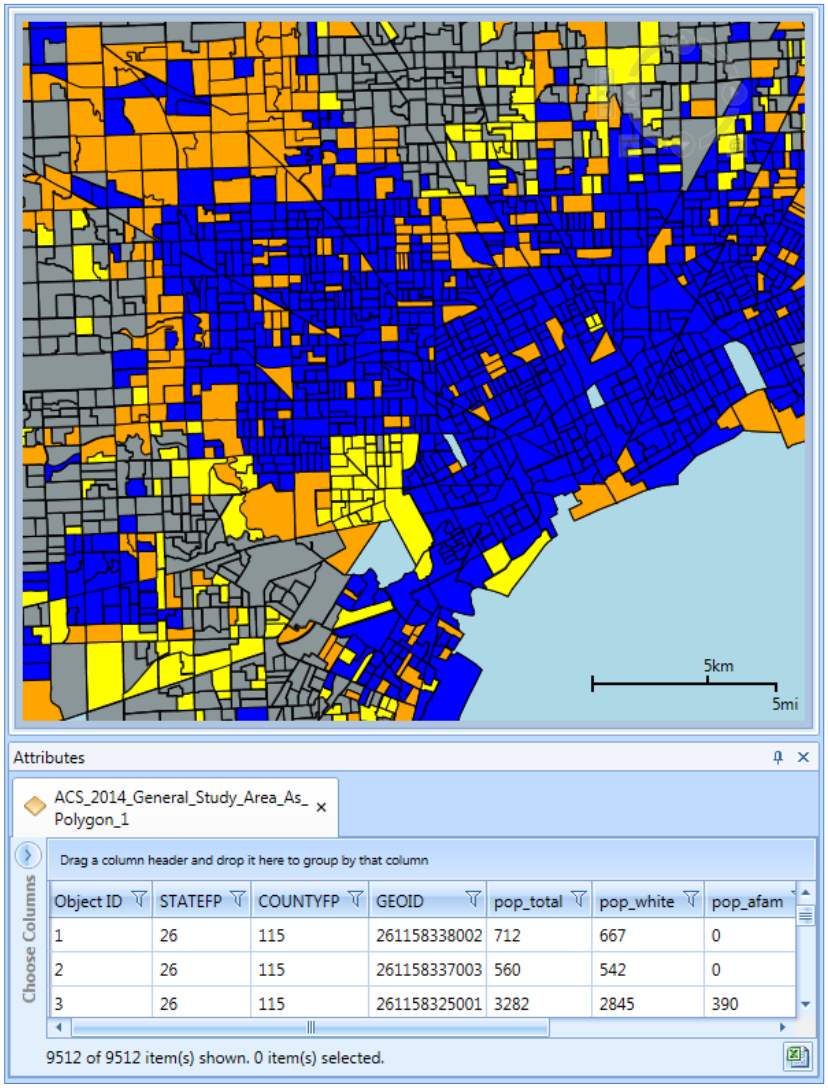


Figure 5-38 Environmental Justice Analysis Layer and Attributes

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.

To switch to the Reports view:

1. Click the *Reports* button in the *Display* ribbon group (Figure 5-39).

Figure 5-39 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 5-40).

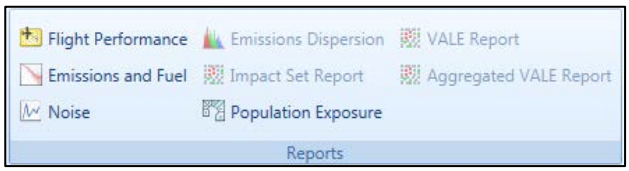


Figure 5-40 Ribbon Group – Reports

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 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 a desired metric result from the *Metric Results* pane.
2. From the *Reports* ribbon group, click *Flight Performance* (Figure 5-40). 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.

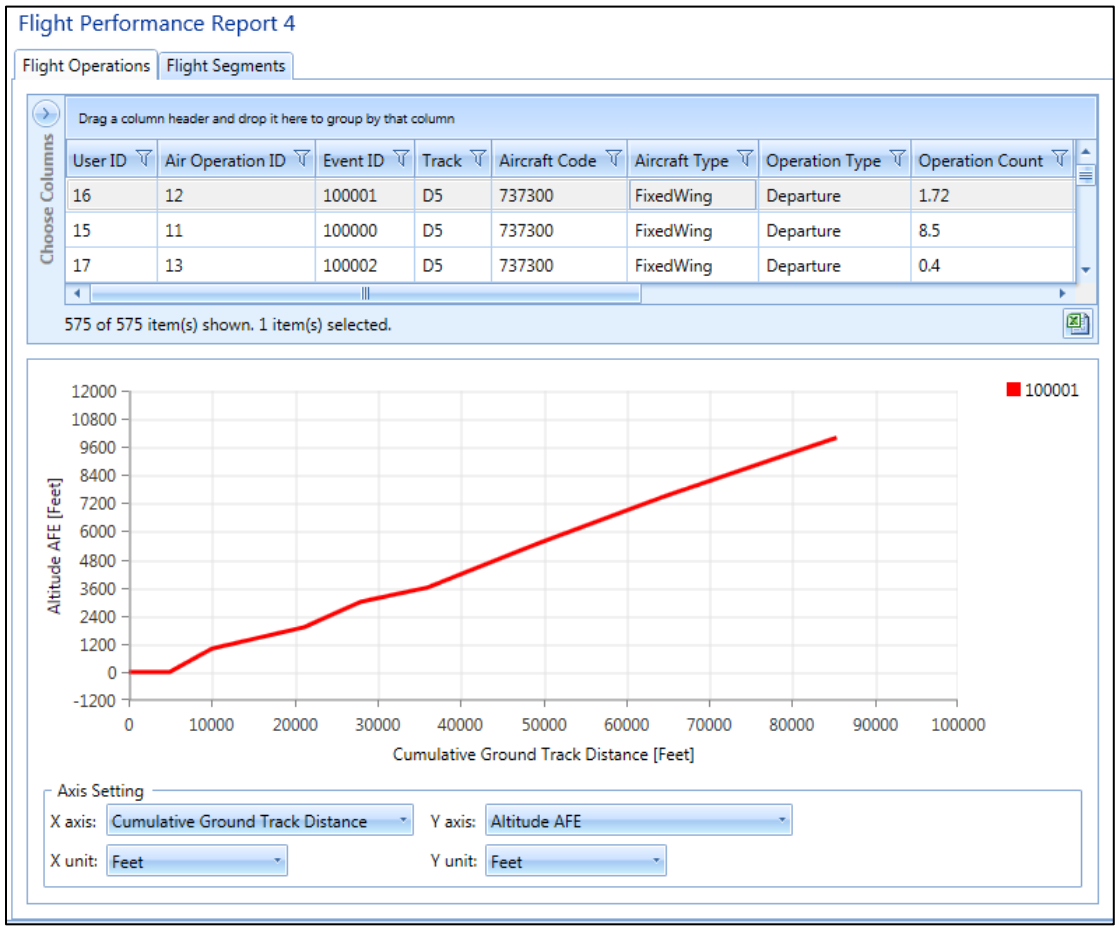


Figure 5-41 Sample Flight Performance Report

5.9.2 View Emissions and Fuel Report

To generate the emissions and fuel report:

1. Select a desired metric result from the *Metric Results* pane.
2. From the *Reports* ribbon group, click *Emissions and Fuel* (Figure 5-40) to open the report.
3. Select the *Operation Group, Group by, and Units* options from the drop-down menus.
4. Click *Generate Report*.
    - The *Emissions* tab displays the emissions results and fuel burn.
    - The *Speciated Organic Gases* tab is only enabled if the "*Calculate speciated organic gases*" option was selected for this metric result.
5. Click the *Excel* icon to export the report data.

What are the *Group by* options in the emissions and fuel report?

- Operation Group Summary: Summarizes results by operation group and mode
- Operations Summary: Summarizes results by events (individual flights)
- Operations Mode: Summarizes results by event and mode
- Operations Detail : Summarizes results by events at the segment level
- Annualized Operations Group Summary: Summarizes annualized results by operation group and mode
- Annualized Operations Summary: Summarizes annualized results by events
- Annualized Operations Mode: Summarizes annualized results by event and mode
- Annualized Operations Detail: Summarizes annualized results by events at the segment level

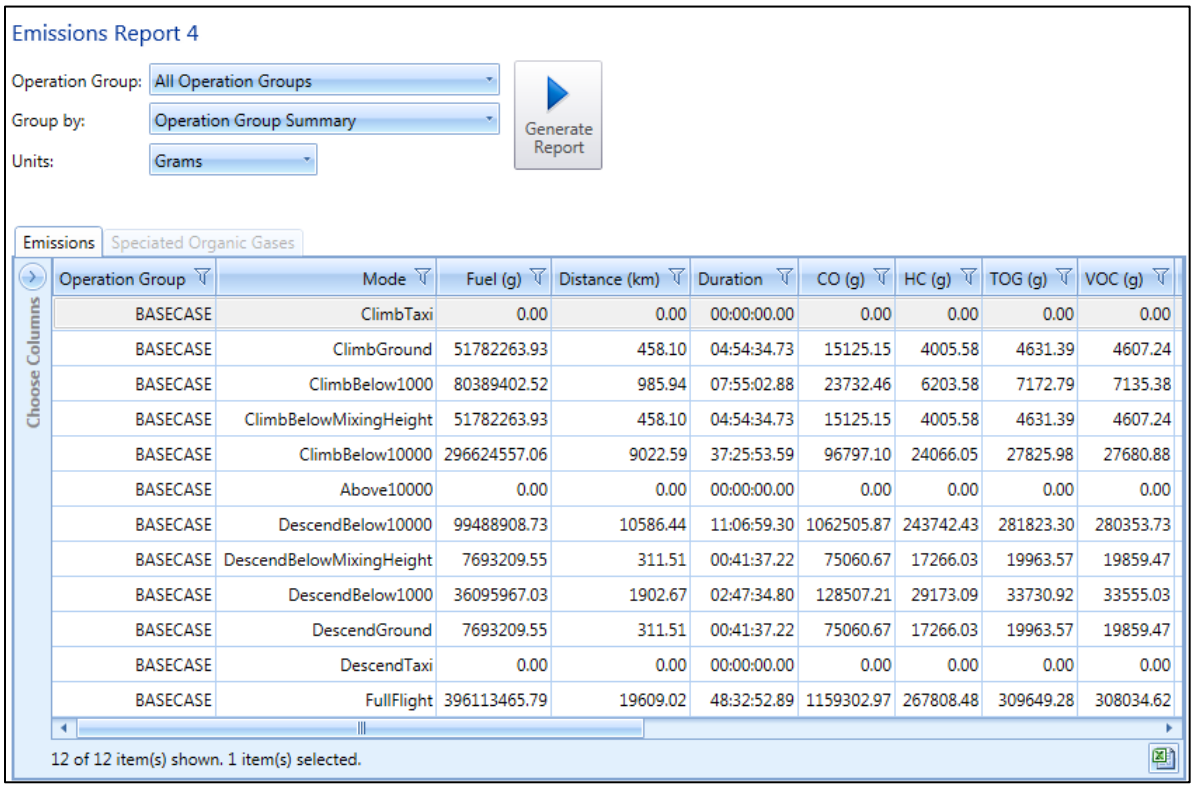
Emissions tab results:

- The *Operations Group Summary* report displays results that reflect the operation count.
- The *Annualized Operations Group Summary* report displays results that reflect the operation count and the annualization weightings.
- Other reports with the "*Annualized*" prefix display results that assume an operation count of one (1) and the annualization weight.
- The remaining reports assume an operation count of one (1)
- *Speciated Organic Gases* tab results: The results in the *Speciated Organic Gases* tab always reflect 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/copying a metric result. Startup emissions only exists for departure operations.
- Climb Taxi: Taxi emissions when taking off. Climb Taxi 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 on Taxi*
- Climb Ground: Includes summary of the takeoff ground roll, Climb Taxi, and Startup emissions.
- Climb Below 1000: Includes summary of the Climb Ground emissions and emissions from the takeoff airborne flight segments below 1000 feet.

- Climb Below Mixing Height: 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.
- Climb Below 10000: Includes summary of the Climb Below Mixing Height and the emissions from climb and departure cruise flight segments below 10000 feet.
- Above 10000: Emissions from the flight segments above 10000 feet.
- Descend Below 10000, Descend Below Mixing Height, Descend Below 1000, Descend Ground, Descend Taxi: 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.
- 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.



Operation Group	Mode	Fuel (g)	Distance (km)	Duration	CO (g)	HC (g)	TOG (g)	VOC (g)
BASECASE	ClimbTaxi	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00
BASECASE	ClimbGround	51782263.93	458.10	04:54:34.73	15125.15	4005.58	4631.39	4607.24
BASECASE	ClimbBelow1000	80389402.52	985.94	07:55:02.88	23732.46	6203.58	7172.79	7135.38
BASECASE	ClimbBelowMixingHeight	51782263.93	458.10	04:54:34.73	15125.15	4005.58	4631.39	4607.24
BASECASE	ClimbBelow10000	296624557.06	9022.59	37:25:53.59	96797.10	24066.05	27825.98	27680.88
BASECASE	Above10000	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00
BASECASE	DescendBelow10000	99488908.73	10586.44	11:06:59.30	1062505.87	243742.43	281823.30	280353.73
BASECASE	DescendBelowMixingHeight	7693209.55	311.51	00:41:37.22	75060.67	17266.03	19963.57	19859.47
BASECASE	DescendBelow1000	36095967.03	1902.67	02:47:34.80	128507.21	29173.09	33730.92	33555.03
BASECASE	DescendGround	7693209.55	311.51	00:41:37.22	75060.67	17266.03	19963.57	19859.47
BASECASE	DescendTaxi	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00
BASECASE	FullFlight	396113465.79	19609.02	48:32:52.89	1159302.97	267808.48	309649.28	308034.62

Figure 5-42 Sample Emissions and Fuel Report

5.9.3 View Noise Report

To generate the noise report:

1. Select a desired noise metric result from the *Metric Results* pane.
2. From the *Reports* ribbon group, click *Noise* (Figure 5-40) 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.

Noise Exposure Report 4

Noise Result Index	Latitude (deg)	Longitude (deg)	Elevation (ft)	Noise Level (dB)	Metric Type	Metric Name
1	37.619002	-122.374843	11	83.2087207054228	Exposure	DNL
2	37.619002	-122.374843	11	47.9554571033282	Exposure	DNL
3	37.619002	-122.374843	11	48.2874560594059	Exposure	DNL
4	37.619002	-122.374843	11	48.0508674434043	Exposure	DNL
5	37.619002	-122.374843	11	48.1470982086295	Exposure	DNL
6	37.619002	-122.374843	11	48.7273364212666	Exposure	DNL
7	37.619002	-122.374843	11	48.2645960610975	Exposure	DNL
8	37.619002	-122.374843	11	48.4460394069591	Exposure	DNL
9	37.619002	-122.374843	11	47.7413427497052	Exposure	DNL
10	37.619002	-122.374843	11	47.7162581739803	Exposure	DNL

8106 of 8106 item(s) shown. 1 item(s) selected.

Figure 5-43 Sample Noise Report

5.9.4 View Emissions Dispersion Report

To generate the emissions dispersion report:

1. Select a desired emissions dispersion metric result from the *Metric Results* pane.
2. From the *Reports* ribbon group, click *Emissions Dispersion* (Figure 5-40) 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.

Drag a column header and drop it here to group by that column

ID	Pollutant	Group	Average	Rank	Max	Min
2	SOx	ALL	1-HR	1ST	0.931298	0.0100366
2	SOx	AIRCRAFT	1-HR	1ST	0.931156	0.00542397
2	SOx	GATES	1-HR	1ST	0.0584834	0.0100366

Generate Report

Choose Columns

Latitude	Longitude	Elev.	Conc	SOx (μg/m³)	SOx background	SOx source	Measured Date	Average	Rank	Group
38.9424765	-77.46177251	0	4	0.281222	0	0.281222	1/19/2010 6:00:00 I	1-HR	1ST	ALL
38.9246372	-77.44204186	0	4	0.153168	0	0.153168	1/7/2010 5:00:00 PI	1-HR	1ST	ALL
38.9268823	-77.43512783	0	6	0.931298	0	0.931298	1/1/2010 2:00:00 PI	1-HR	1ST	ALL
38.9469823	-77.49374598	0	0	0.0100366	0	0.0100366	1/21/2010 4:00:00 I	1-HR	1ST	ALL
38.9304277	-77.44635349	0	5	0.32097	0	0.32097	1/7/2010 5:00:00 PI	1-HR	1ST	ALL

5 of 5 item(s) shown. 0 item(s) selected.

Figure 5-44 Sample Emissions Dispersion Report

5.9.5 View Impact Set Report

The impact set reports 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 *Reports* ribbon group, click *Impact Set Report* (Figure 5-40). 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 5-45) 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

Alternative: 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 5-45 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 5-46).
3. Example (Figure 5-46):
   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.

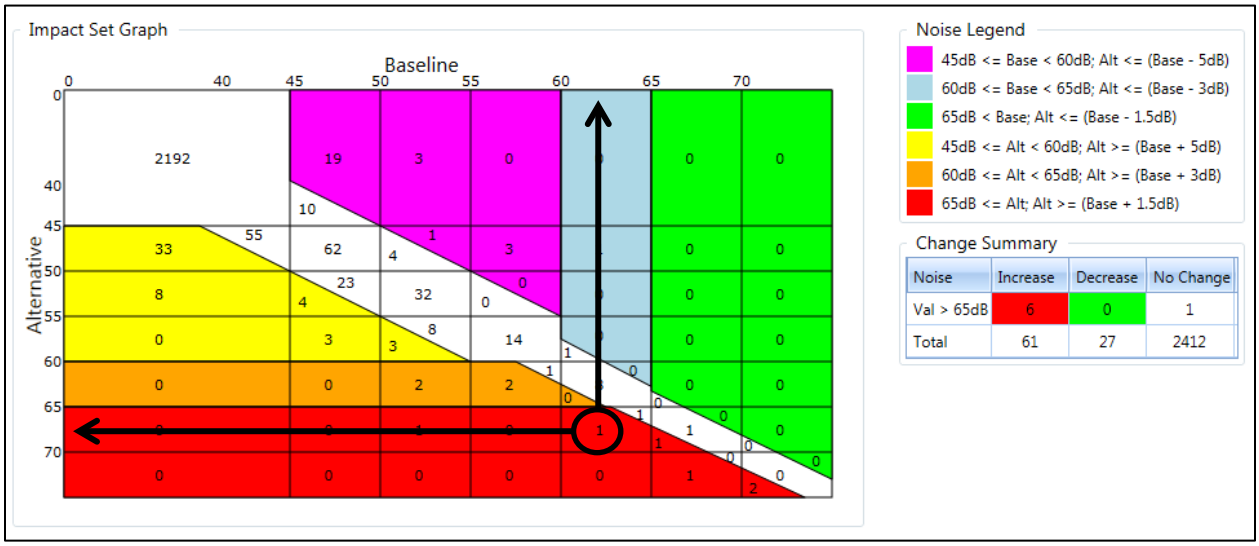


Figure 5-46 Sample Impact Set Graph

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 5-4 shows the criteria for the color coding. The color coding is defined according to FAA Order 1050.1E. 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 5-4 – 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)

5.9.6 View Population Exposure Report

The population exposure report can be generated for noise metric results with a grid receptor set or with a dynamic grid receptor set. It is recommended to generate contours on the map to aid in interpreting the report.

U.S. Census data are required 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.

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.

For information on downloading 2010 U.S. Census data, see "Using US Census Bureau Data in AEDT" on the AEDT Support website, Downloads page.

Sample census data are provided for STUDY_INM in the *C:\AEDT\demographics_module\source_data\Census_2010* folder.

To generate the population exposure report:

1. Select a desired noise metric result from the *Metric Results* pane.
2. From the *Reports* ribbon group, click *Population Exposure* (Figure 5-40) to open the Population Exposure Report.
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 *C:\AEDT\Logs* folder.

The population exposure report uses the *Contour Options* settings (minimum, maximum, and increment levels) specified in the *Study* tab, *Preferences*, *Study* screen.

Generating the population exposure report can take several minutes (e.g. more than 10 minutes) depending on the input data and the computer performance.

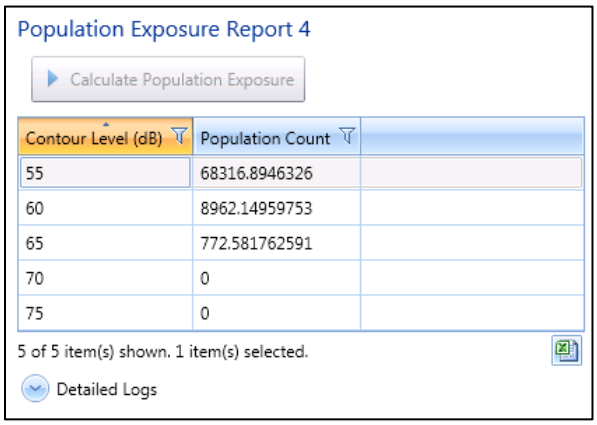


Figure 5-47 Sample Population Exposure Report

5.9.7 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 baseline metric result and an alternative metric result, 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 *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 5.9.8.

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 *Reports* ribbon group, click *VALE Report* to open the *VALE Report Settings* dialog (Figure 5-48).
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 5-49).
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 year in which the emissions from an operation group will stop being included in the report. This field is used in generating aggregated VALE reports.

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 *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.

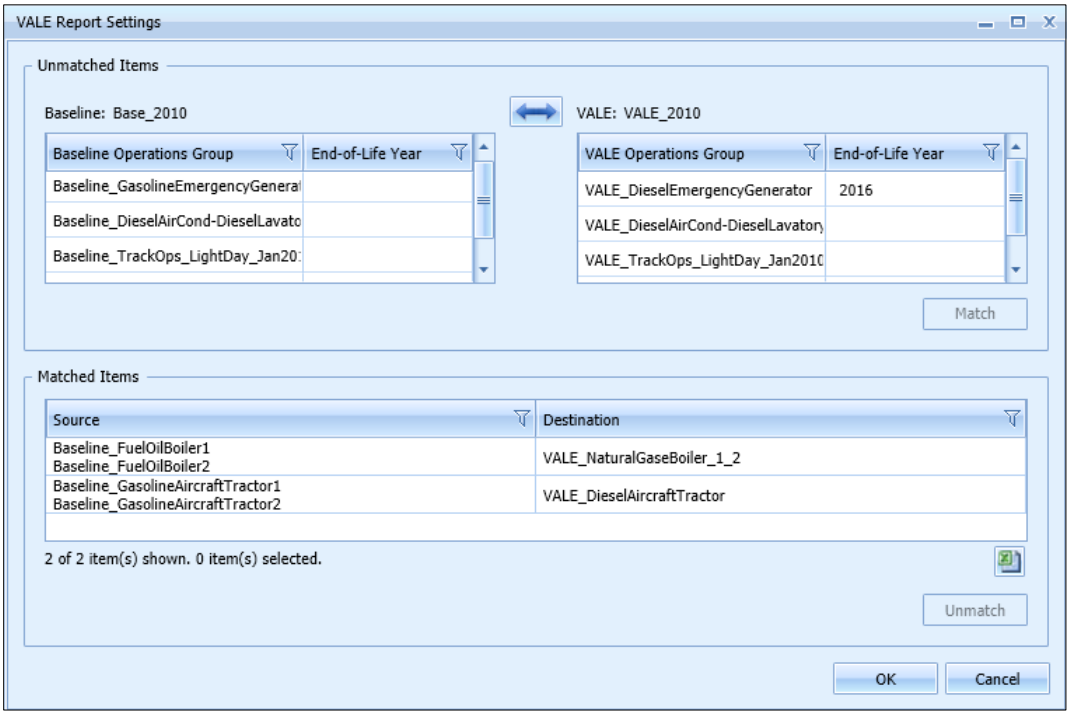


Figure 5-48 Sample VALE Report Settings Dialog

VALE Report 45_48

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
1	2016	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)	828,951.840	23,257.070	34,287.040	5,567.220	298.530	274.650
			Baseline_GasolineAircraftTractor2 (GSE Population)	828,951.840	23,257.070	34,287.040	5,567.220	298.530	274.650
			Baseline_DieselAirCond-DieselLavatory (GSE Population)	8,945.850	942.490	23,721.340	10.580	1,493.480	1,448.680
			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)	902,221.160	29,920.290	83,852.180	4,002.450	3,842.070	3,635.710
			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)	1,156,498.830	38,577.360	109,169.520	5,028.130	4,878.290	4,617.870
			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	**9,226,967.330**	**509,639.910**	**10,636,367.700**	**2,524,916.860**	**303,632.910**	**295,724.750**
		VALE_2010							
			VALE_NaturalGaseBoiler_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)	17,651.370	1,292.330	44,641.030	20.420	3,140.950	3,046.730
			VALE_DieselAirCond-DieselLavatory (GSE Population)	8,945.850	942.490	23,721.340	10.580	1,493.480	1,448.680
			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)	116,302.270	7,355.740	34,906.850	480.850	1,940.560	1,872.930
			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)	279,579.070	12,963.330	52,087.290	1,085.300	2,629.500	2,527.830
			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	**2,896,345.870**	**314,432.350**	**10,580,135.090**	**711,541.610**	**295,473.930**	**295,165.610**
			2016 Net ER	***-6,330,621.460***	***-195,207.560***	***-56,232.610***	***-1,813,375.250***	***-8,158.980***	***-559.140***

Figure 5-49 Sample VALE Report

5.9.8 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 aggregate 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 *Reports* ribbon group, click *Aggregated VALE Report* to open the *Aggregated VALE Report* dialog will (Figure 5-50).
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 5-51).
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.

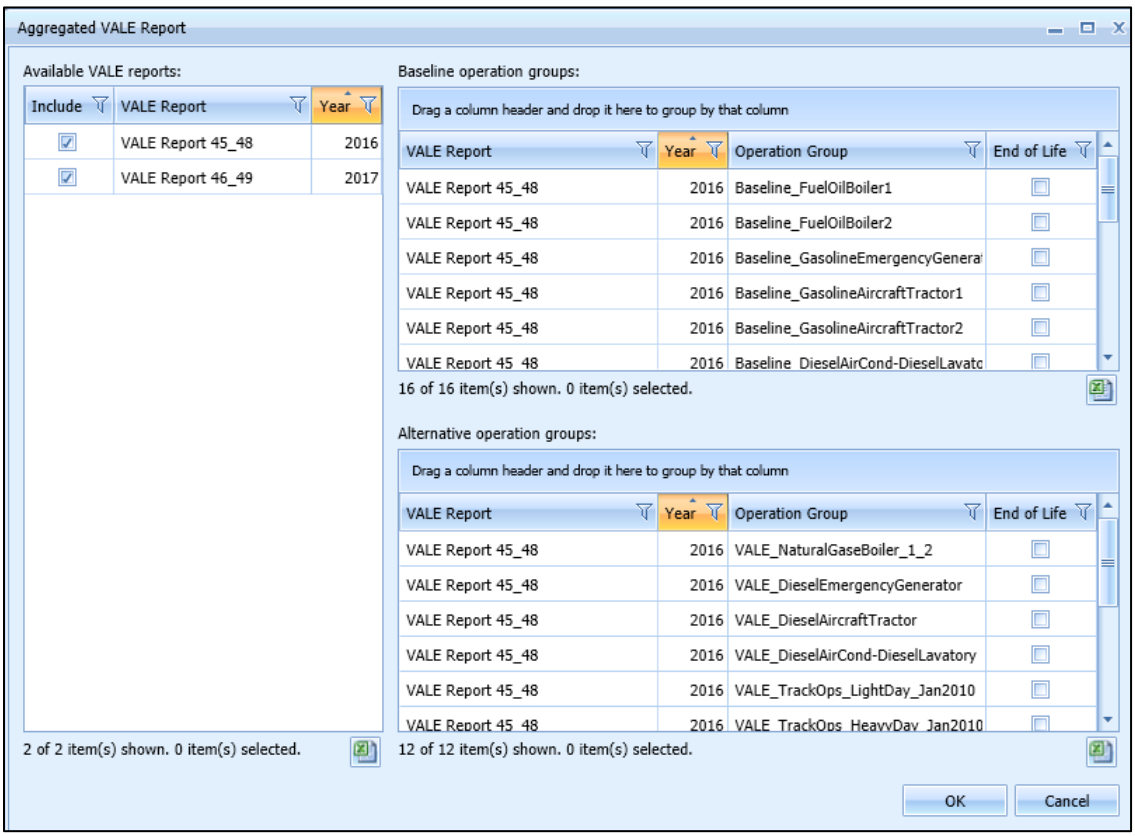


Figure 5-50 Sample Aggregated VALE Report Dialog

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_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)	524,910.170	24,236.030	113,205.130	2,307.310	5,153.000	4,975.590
			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	**3,243,244.090**	**331,539.050**	**10,682,616.340**	**714,381.160**	**299,761.450**	**299,324.450**
			2010 Net ER	***-8,929,175.840***	***-277,763.990***	***-237,721.010***	***-1,814,278.220***	***-9,500.030***	***-1,861.290***
2	2011	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)	782,898.960	22,228.700	34,073.040	5,567.220	285.330	262.500
			Baseline_GasolineAircraftTractor2 (GSE Population)	782,898.960	22,228.700	34,073.040	5,567.220	285.330	262.500
			Baseline_DieselAirCond-DieselLavatory (GSE Population)	8,967.010	947.820	23,816.880	36.820	1,496.480	1,451.580
			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)	2,016,057.530	66,591.710	103,535.440	4,391.060	5,679.250	5,417.550
			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)	2,507,903.170	83,586.870	236,219.790	5,519.190	7,254.040	6,922.060
			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	**11,600,123.440**	**589,269.430**	**10,862,768.770**	**2,525,822.770**	**307,822.440**	**299,789.380**
		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)	17,304.390	1,282.710	44,416.820	71.200	2,924.830	2,837.080
			VALE_DieselAirCond-DieselLavatory (GSE Population)	8,967.010	947.820	23,816.880	36.820	1,496.480	1,451.580
			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)	200,588.750	12,087.230	68,677.700	638.190	3,517.450	3,402.490
			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)	482,147.000	22,155.880	102,080.170	1,301.690	4,603.570	4,442.630
			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	**3,182,874.460**	**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	205,381.840	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 5-51 Sample Aggregated VALE Report in Print Preview Mode

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.

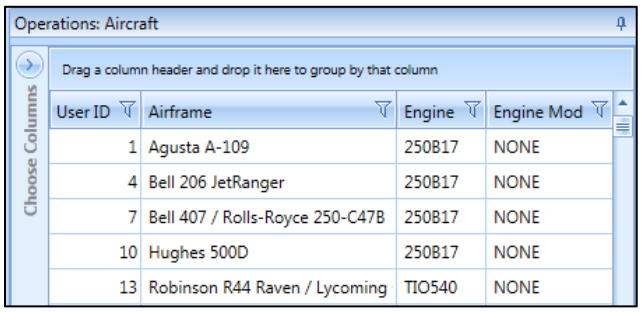
6.1 Display Buttons and Operations Pane

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 *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.



User ID	Airframe	Engine	Engine Mod
1	Agusta A-109	250B17	NONE
4	Bell 206 JetRanger	250B17	NONE
7	Bell 407 / Rolls-Royce 250-C47B	250B17	NONE
10	Hughes 500D	250B17	NONE
13	Robinson R44 Raven / Lycoming	TIO540	NONE

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 *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.

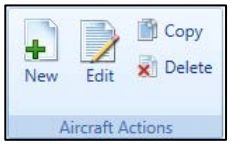


Figure 6-3 Operations Tab – Aircraft Actions Ribbon Group

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.

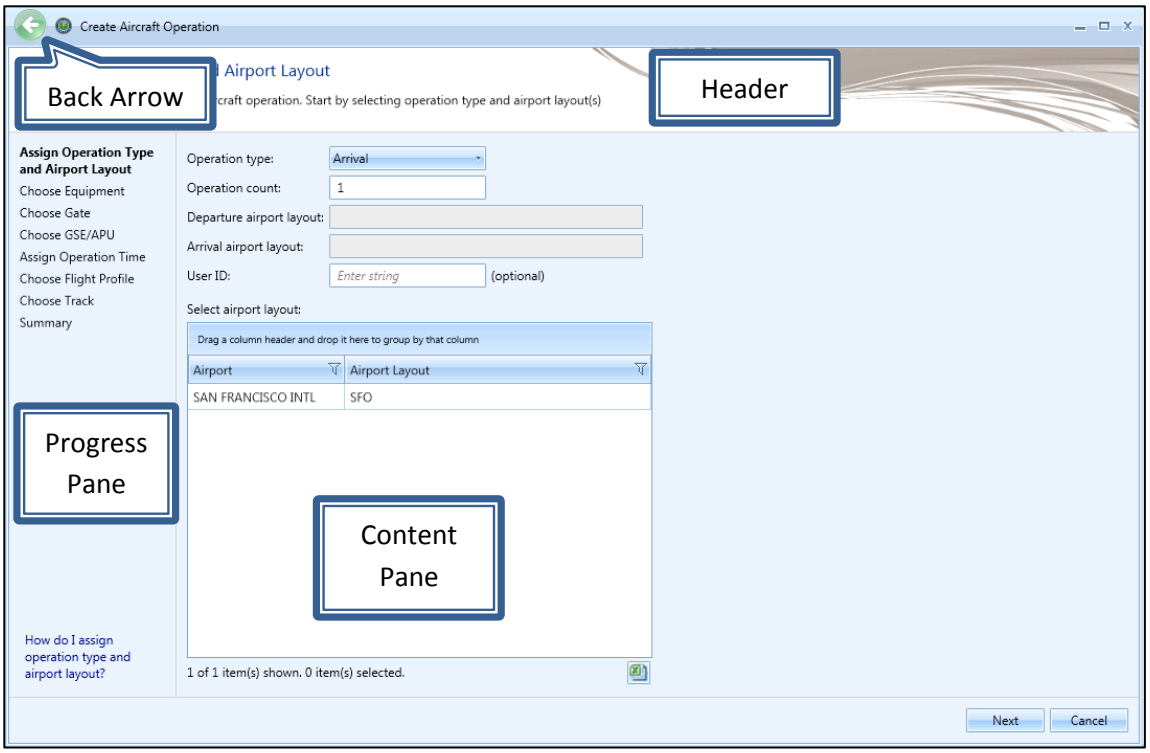


Figure 6-4 Create Aircraft Operations

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.

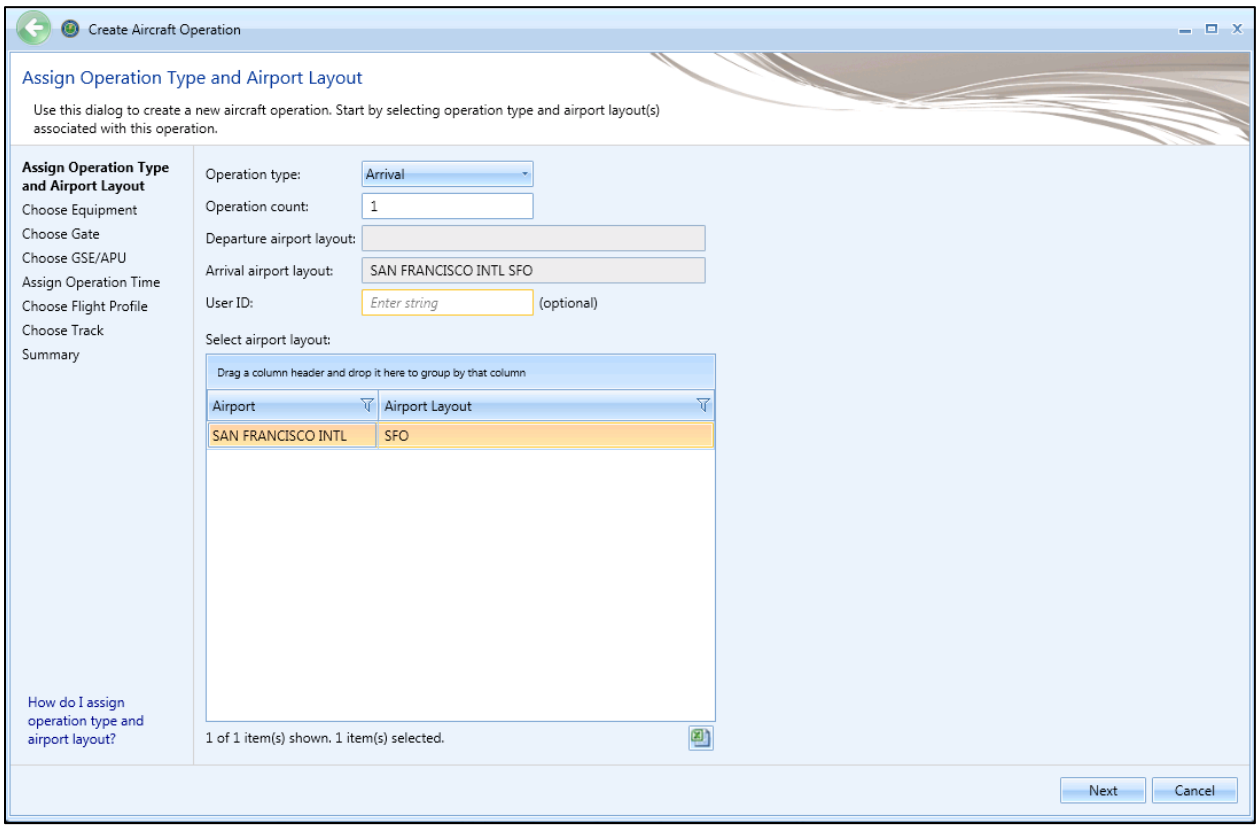


Figure 6-5 Create Aircraft Operation – Assign Operation Type and Airport Layout

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*.

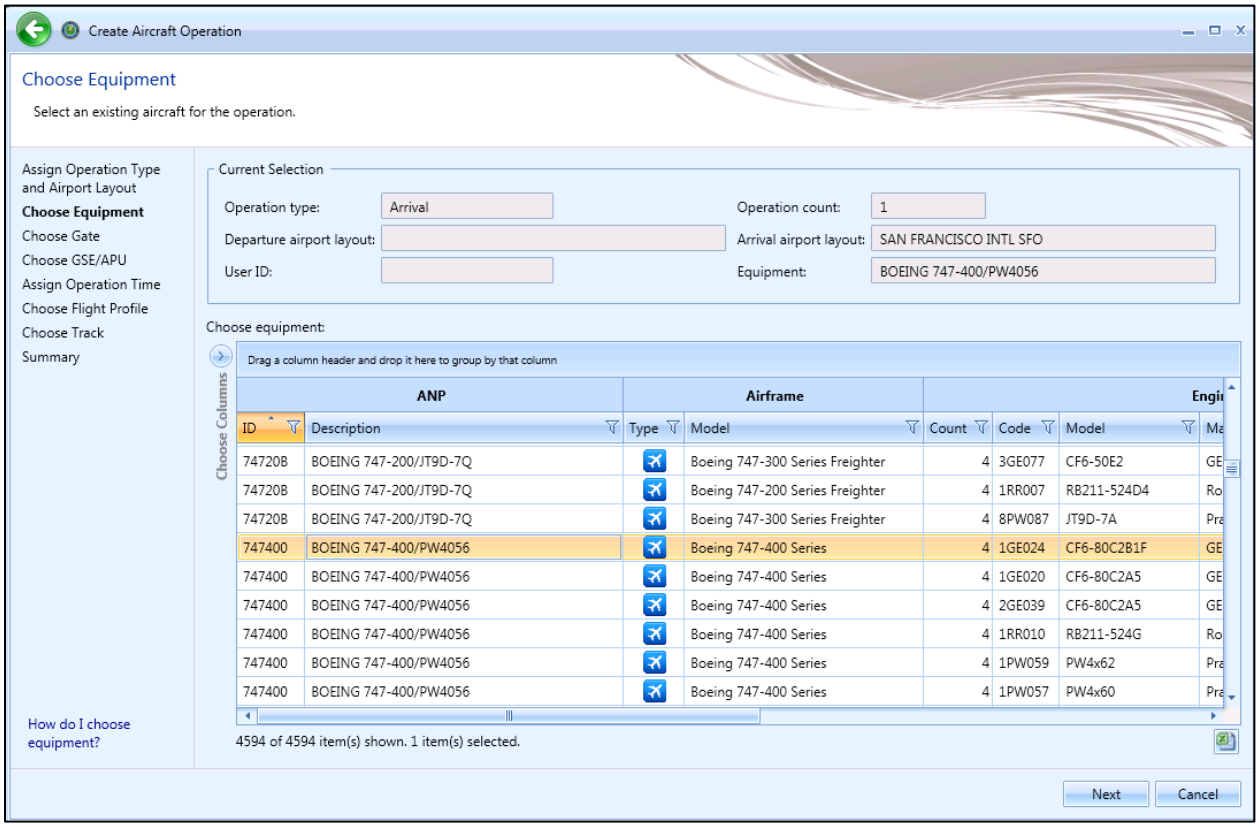


Figure 6-6 Create Aircraft Operation – Choose Equipment (Single)

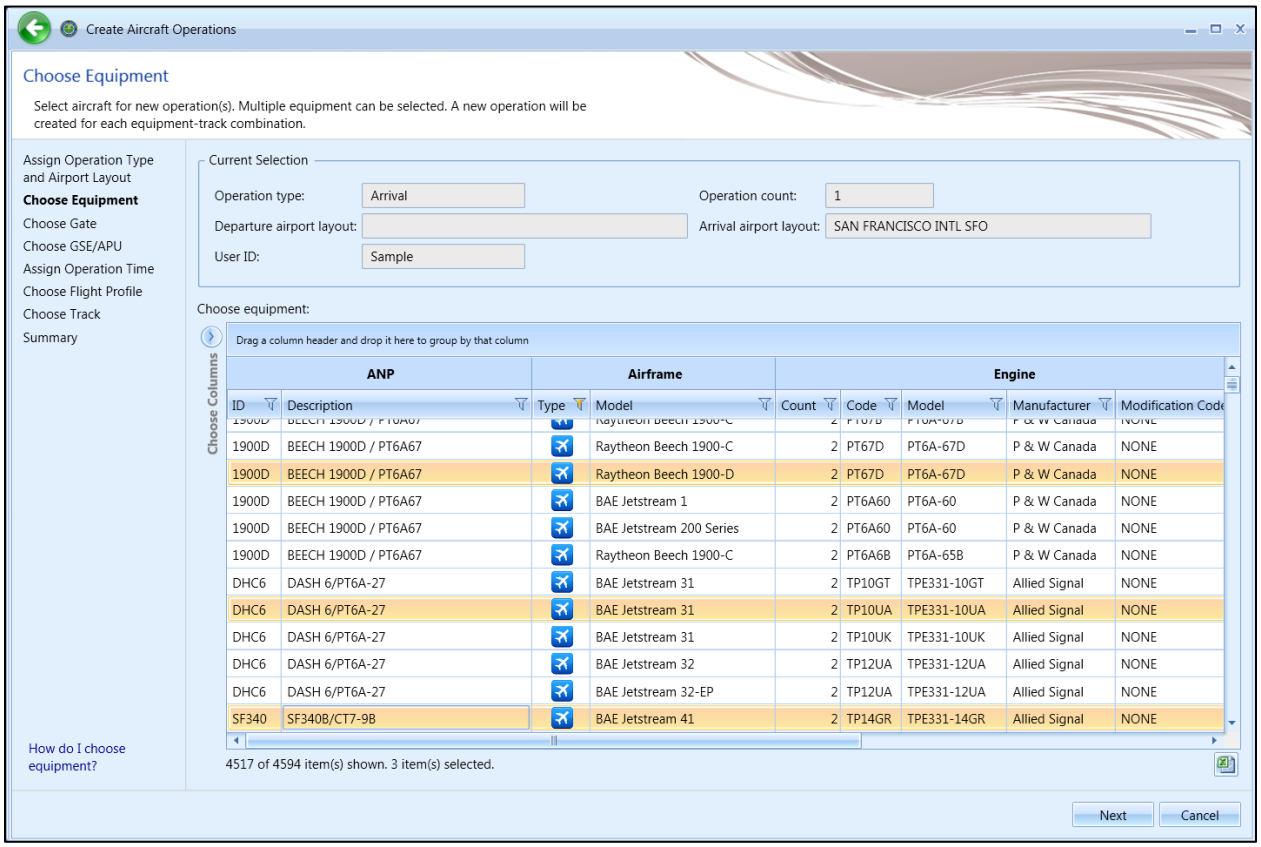


Figure 6-7 Create Aircraft Operation – Choose Equipment (Bulk)

6.2.1.3 Step 3: Choose Gate

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.

This step is only required for emissions dispersion. 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. Click *Next*.

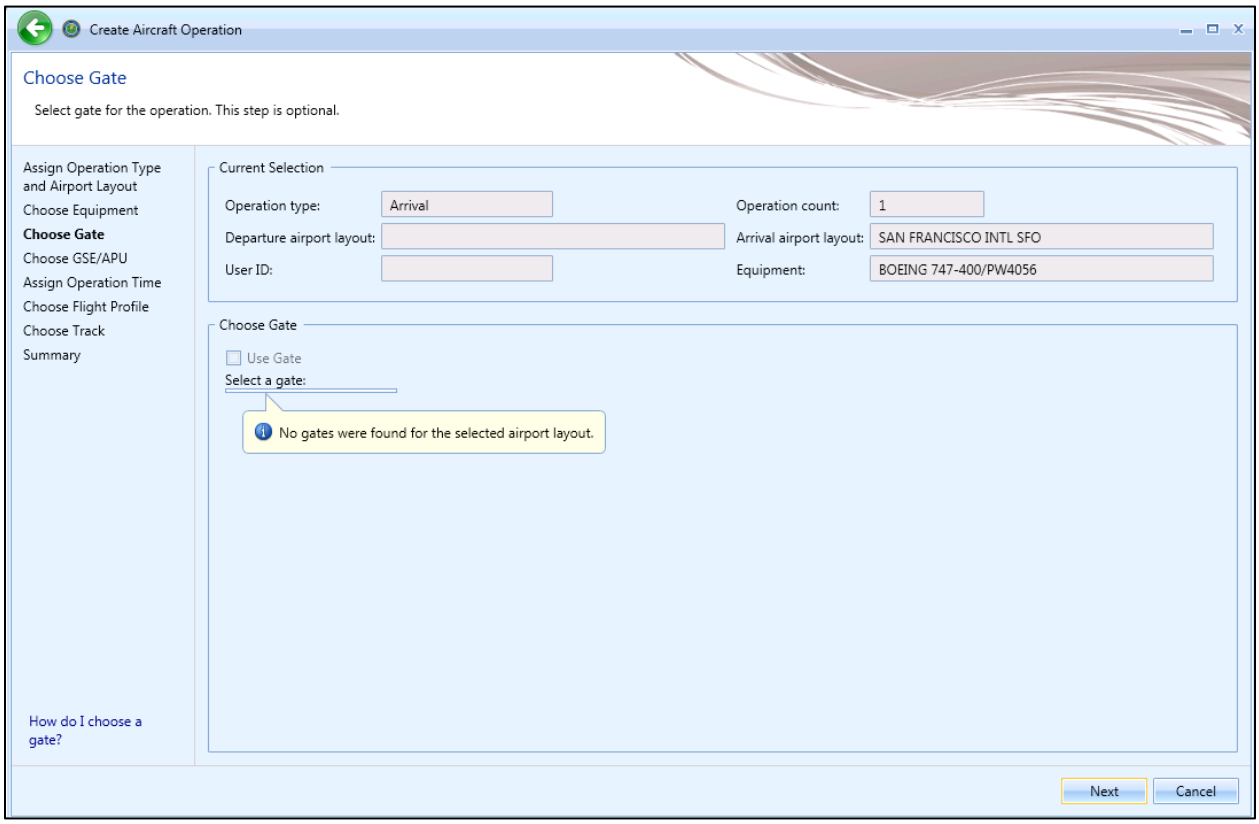


Figure 6-8 Create Aircraft Operation – Choose Gate

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*.

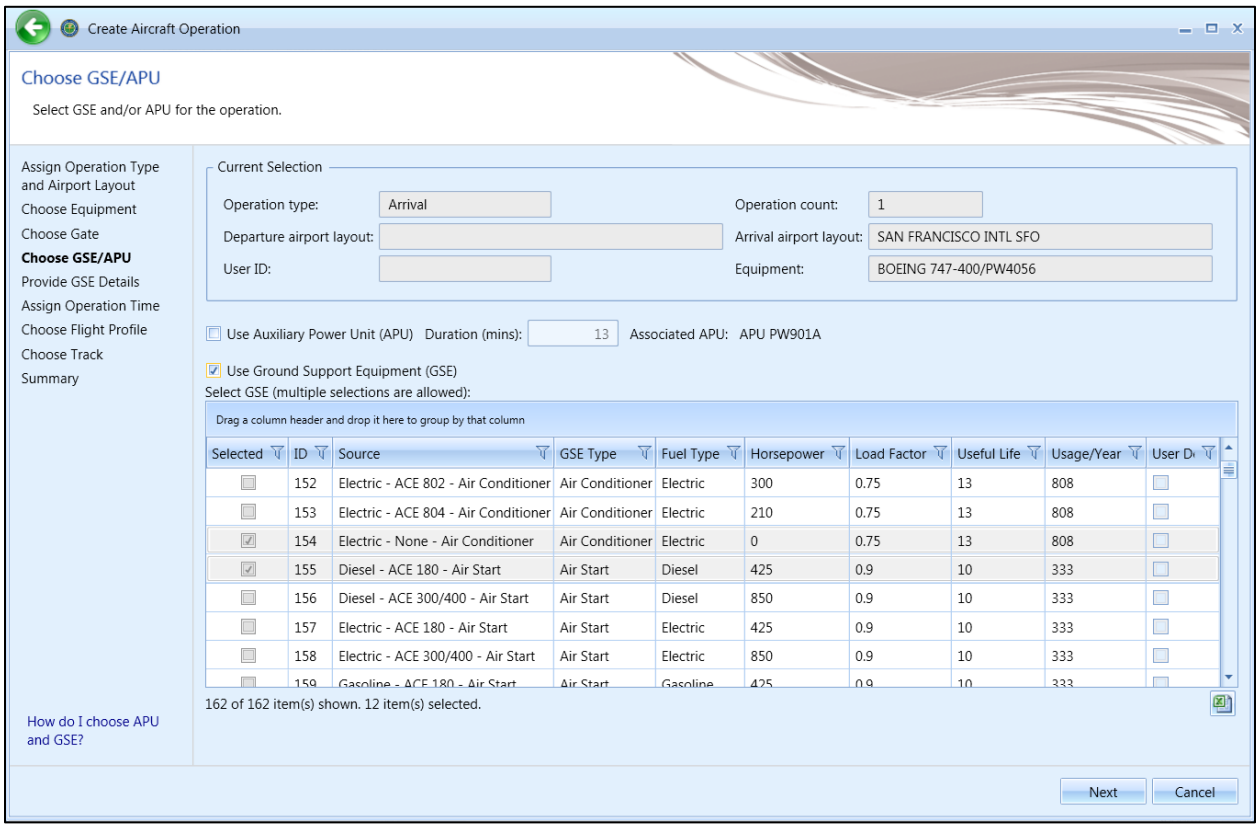


Figure 6-9 Create Aircraft Operation – Choose GSE/APU (Single)

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.

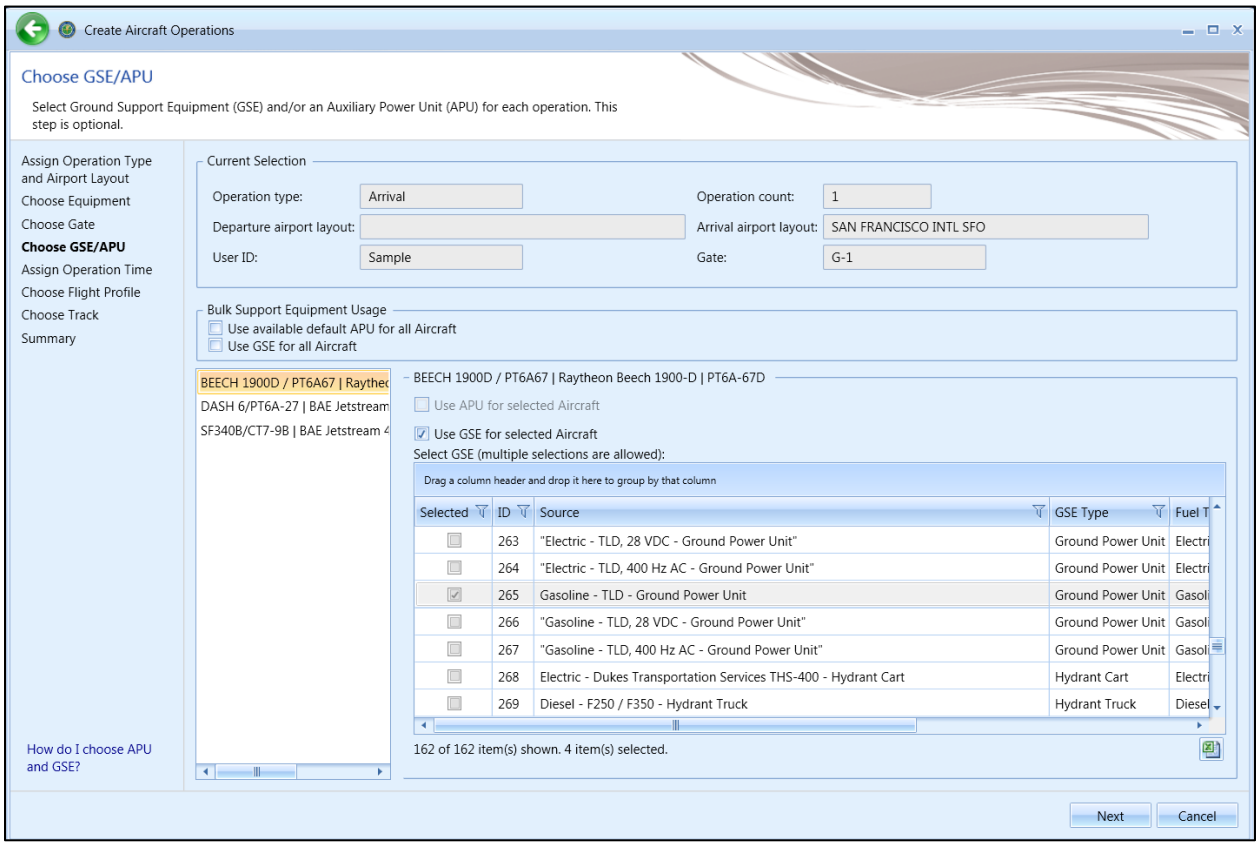


Figure 6-10 Create Bulk Aircraft Operations – Choose GSE/APU (Bulk)

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. When manufacture year of GSE operation is provided, emissions factors from the STN_GSE_NONROAD_COEFF table is used and deterioration is calculated; otherwise, the STN_GSE_EF table is used and deterioration is not calculated. Please refer to Technical Manual for more information.

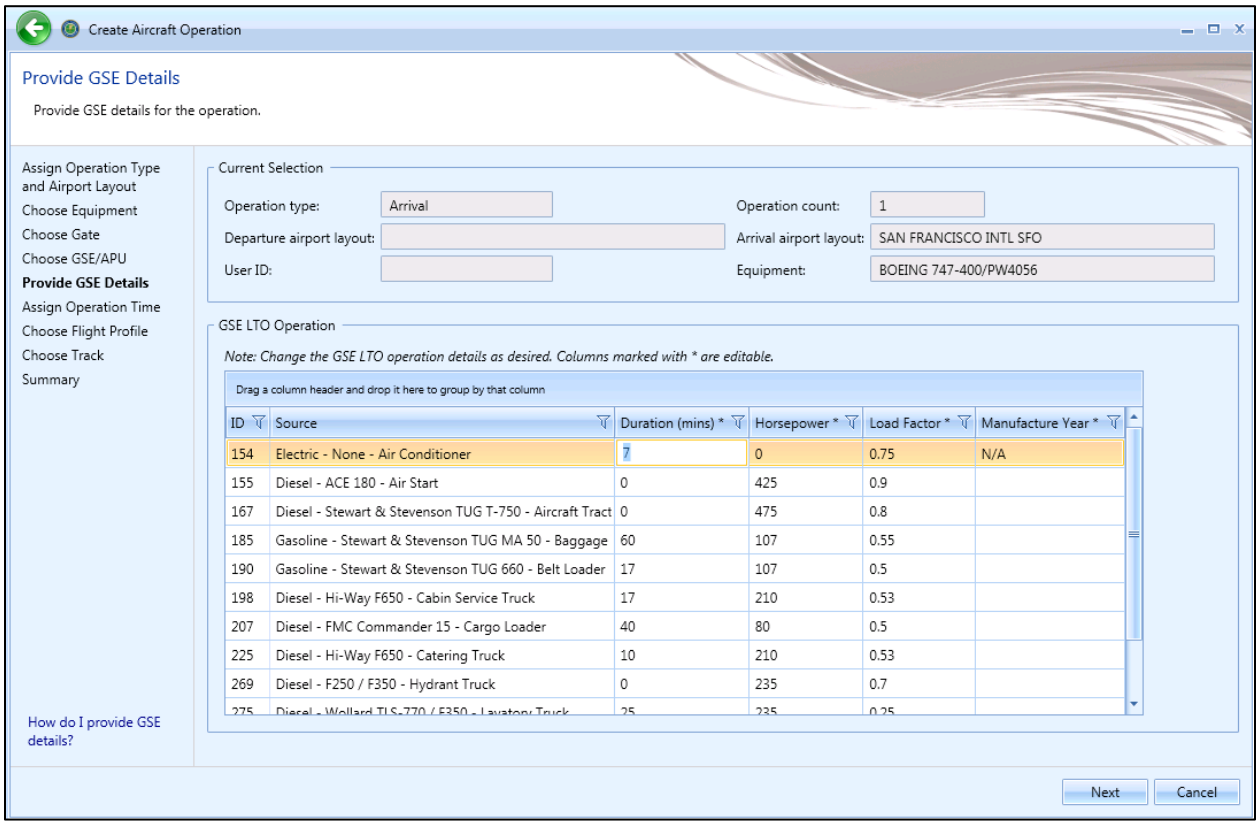


Figure 6-11 Create Aircraft Operation – Provide GSE Details (Single)

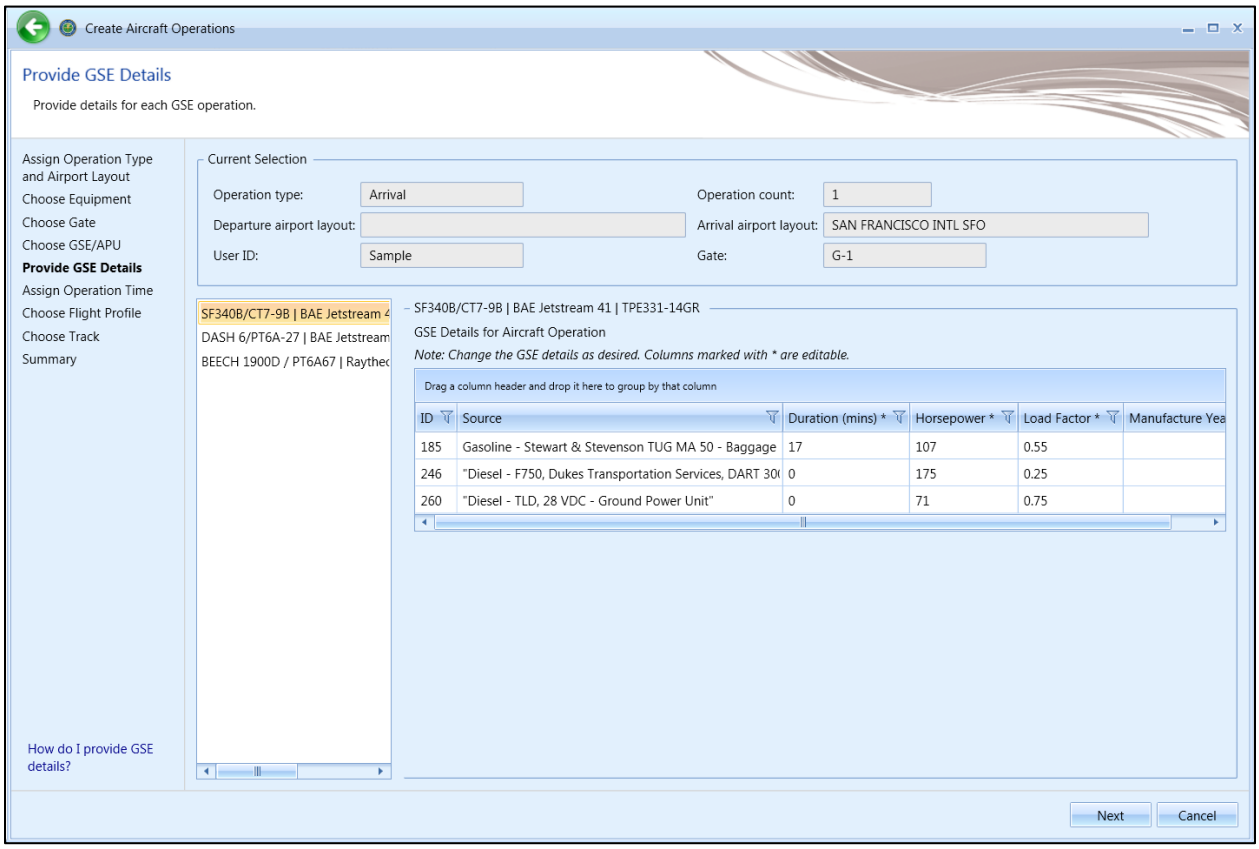


Figure 6-12 Create Aircraft Operation – Provide GSE Details (Bulk)

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*.

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.

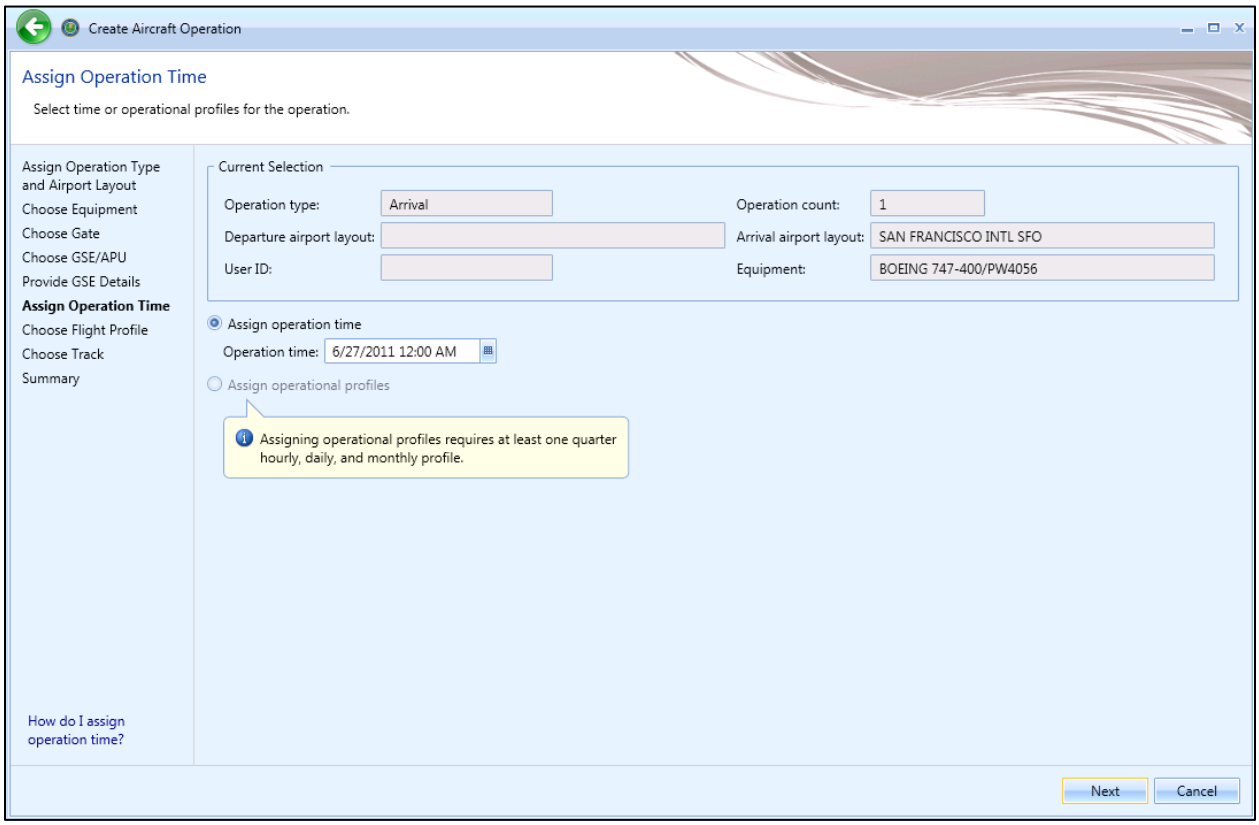


Figure 6-13 Create Aircraft Operation – Assign Operation Time

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.

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).

AEDT provides fixed and/or procedural profiles for all aircraft in AEDT with the exception of some military aircraft.

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

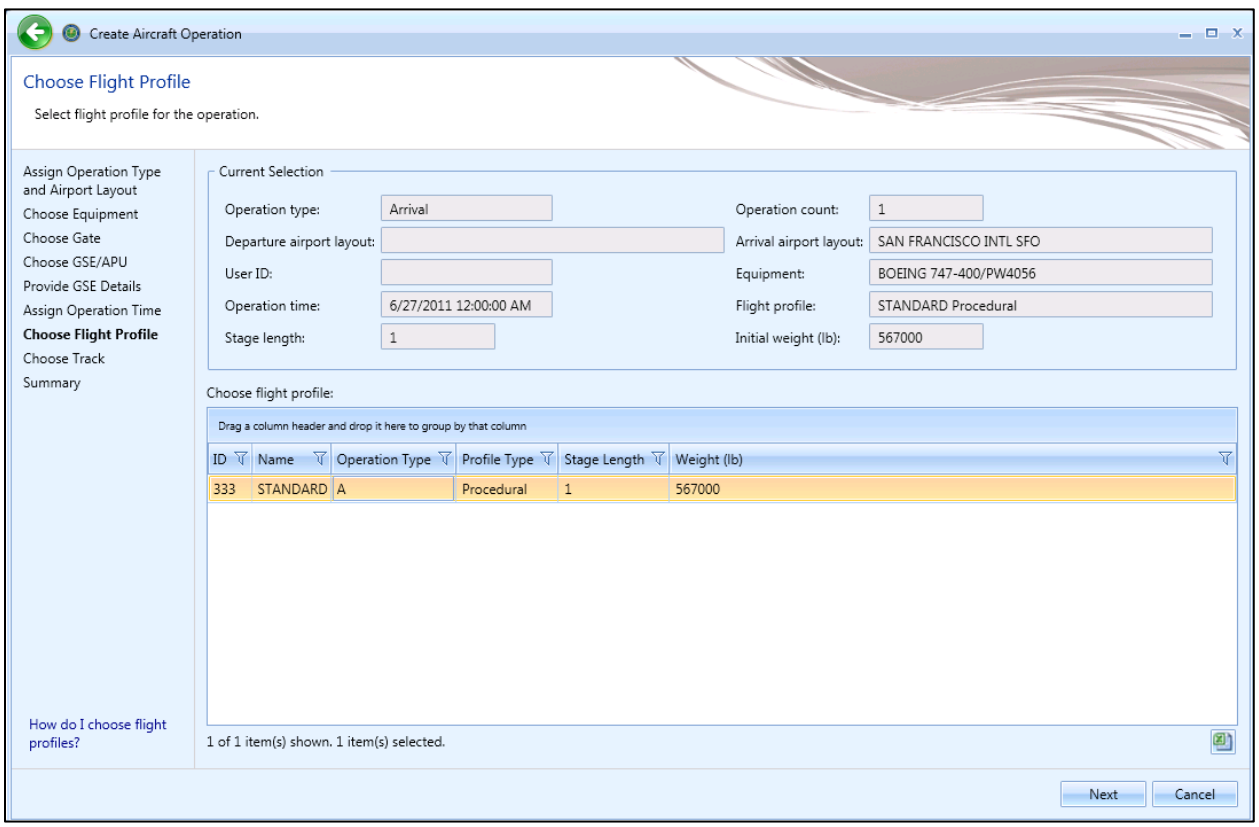


Figure 6-14 Create Aircraft Operation – Choose Flight Profile (Single)

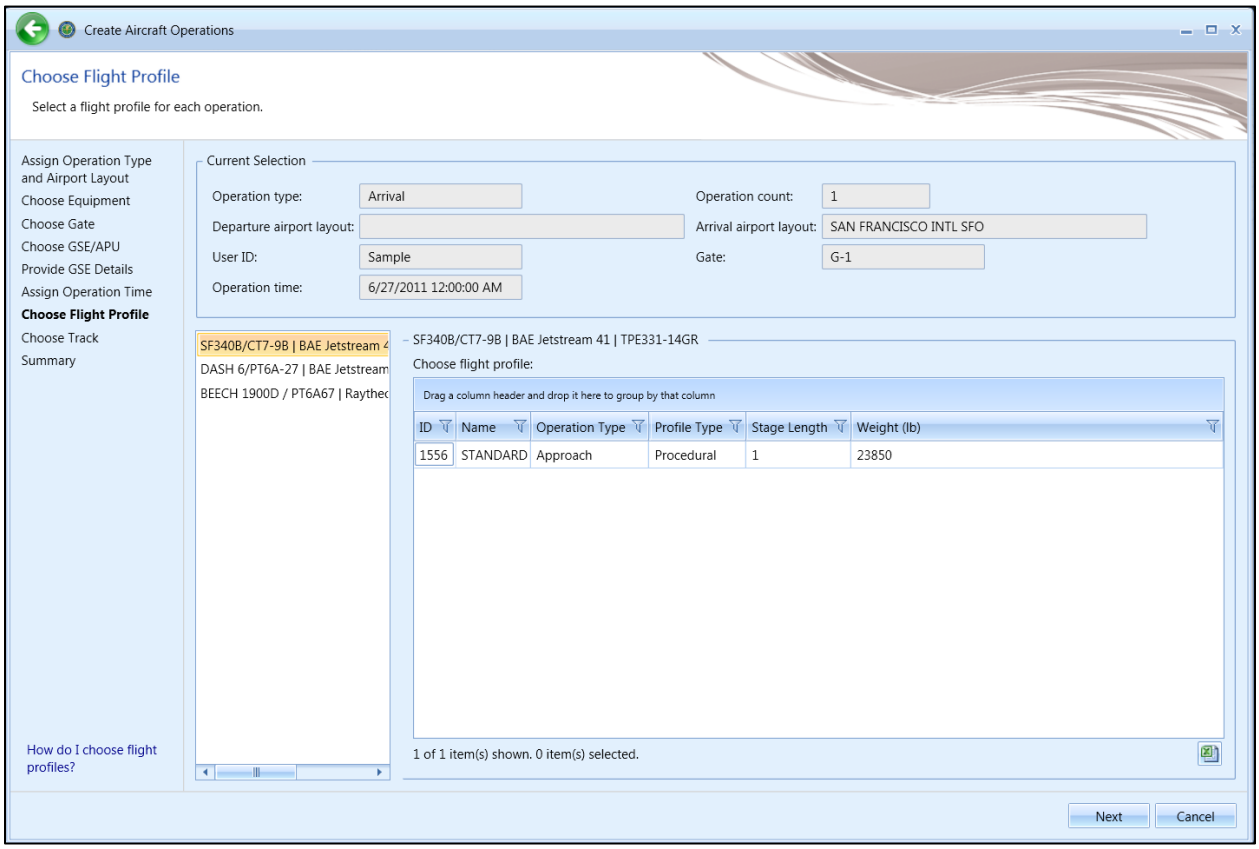


Figure 6-15 Create Aircraft Operation – Choose Flight Profile (Bulk)

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.

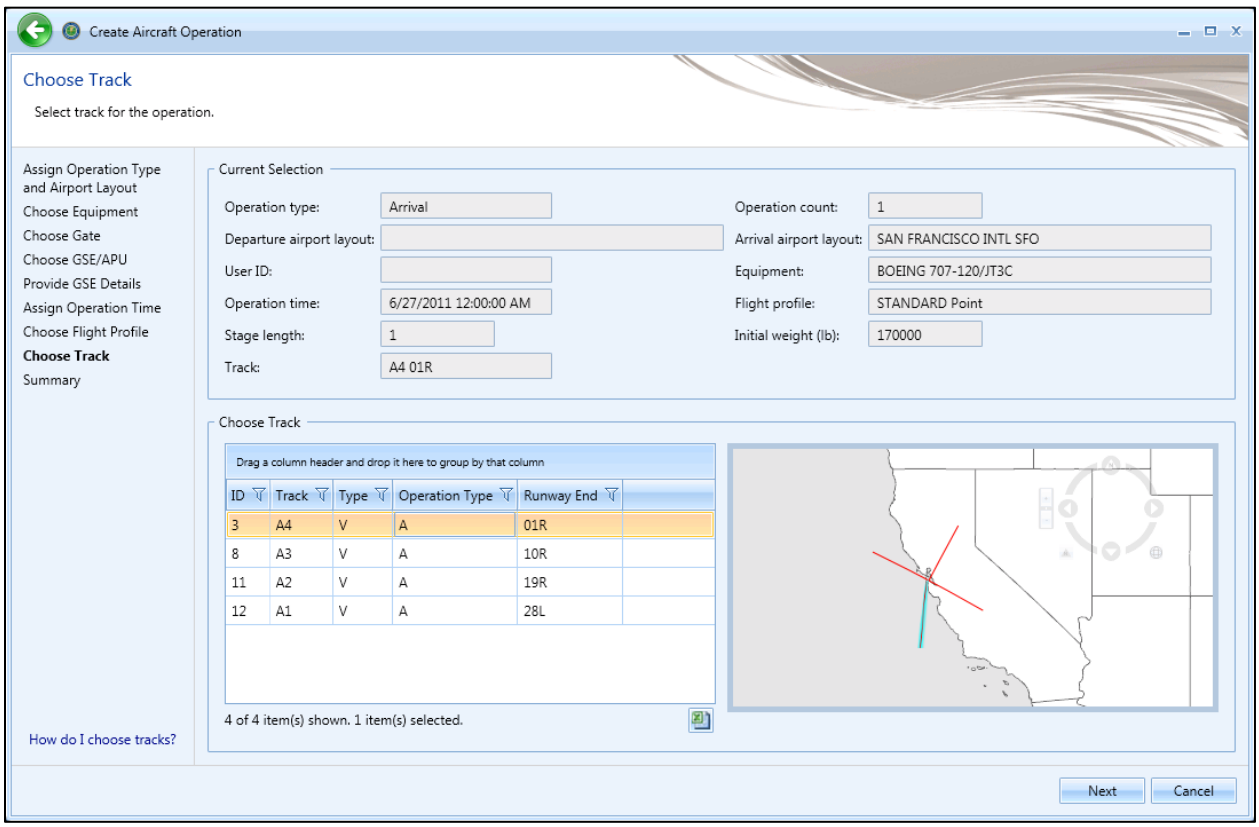


Figure 6-16 Create Aircraft Operation – Choose Track

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.

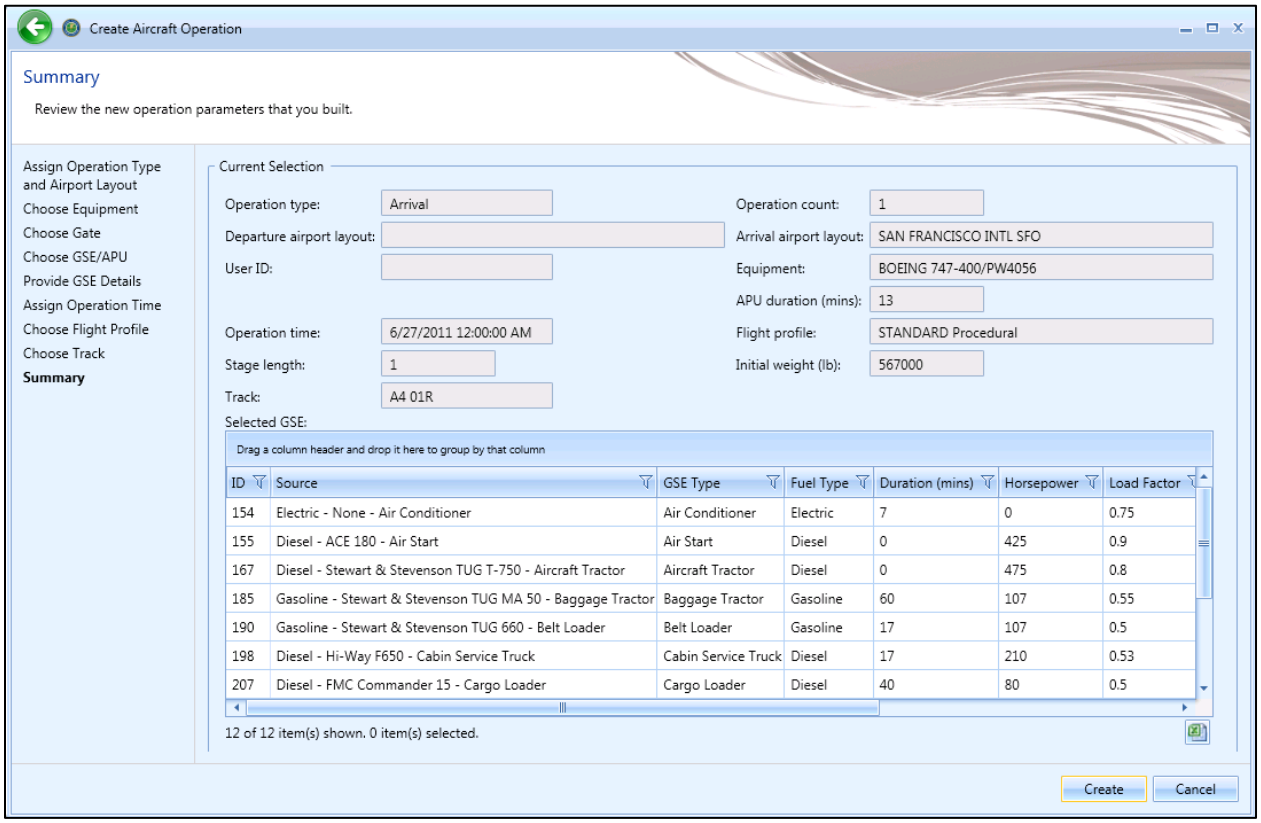


Figure 6-17 Create Aircraft Operation – Summary (Single)

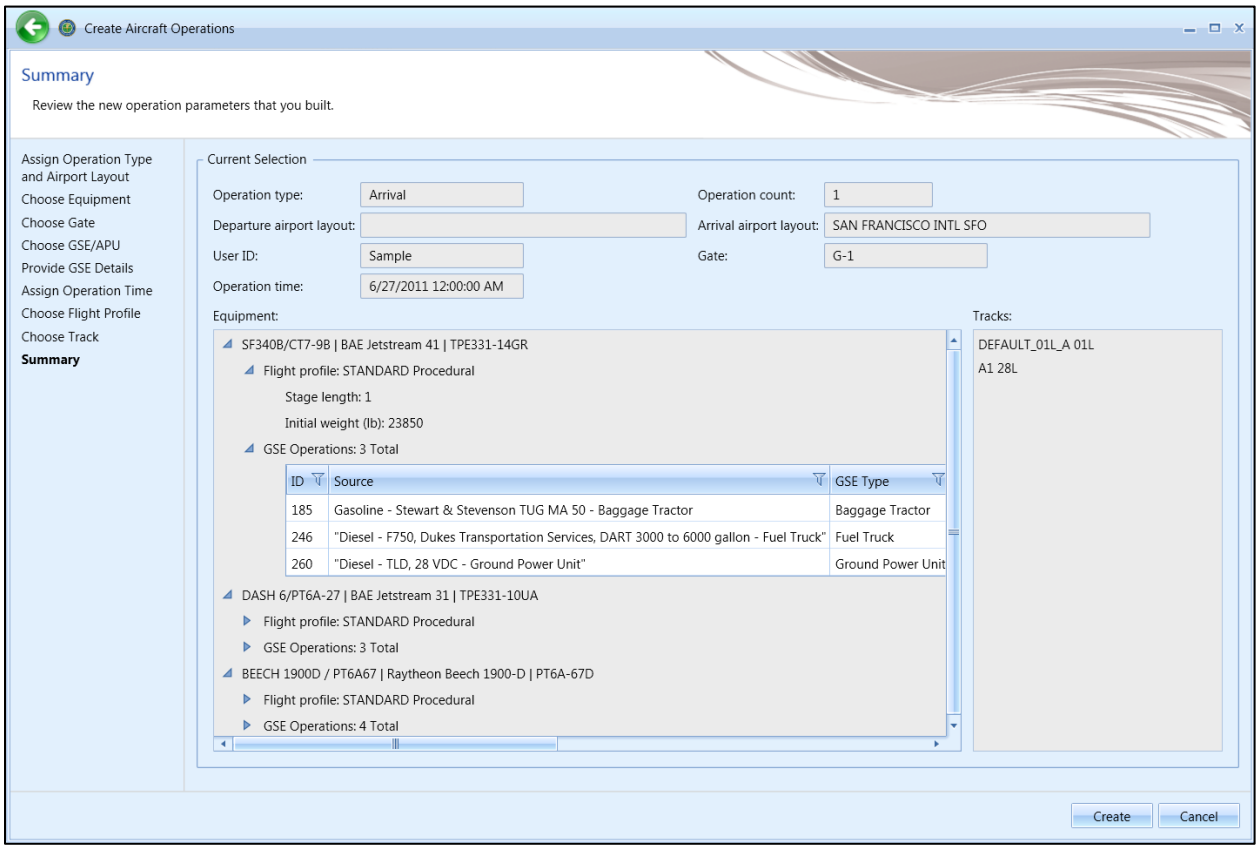


Figure 6-18 Create Aircraft Operation – Summary (Bulk)

6.2.2 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 6.2.3 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.

6.2.3 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 6-19 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:

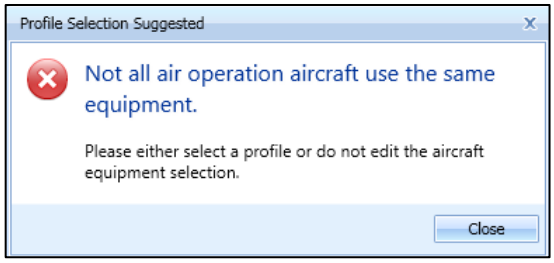
1. In the *Display* ribbon group, click *Aircraft*.
2. Select multiple operations of the same operation and aircraft type by holding the control or shift key on the keyboard while clicking on the desired rows. The *Edit Operations* process classifies aircraft operations as follows:
    - Arrival (with 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 6-20).
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.

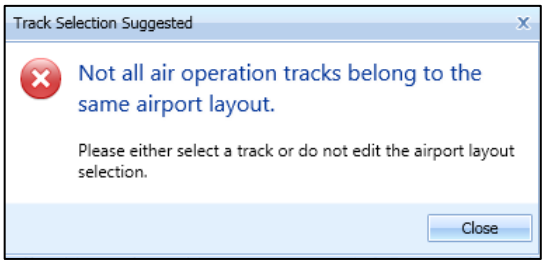
If the selection of operations contains dissimilar equipment, their selected equipment will not be displayed in the wizard.

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.



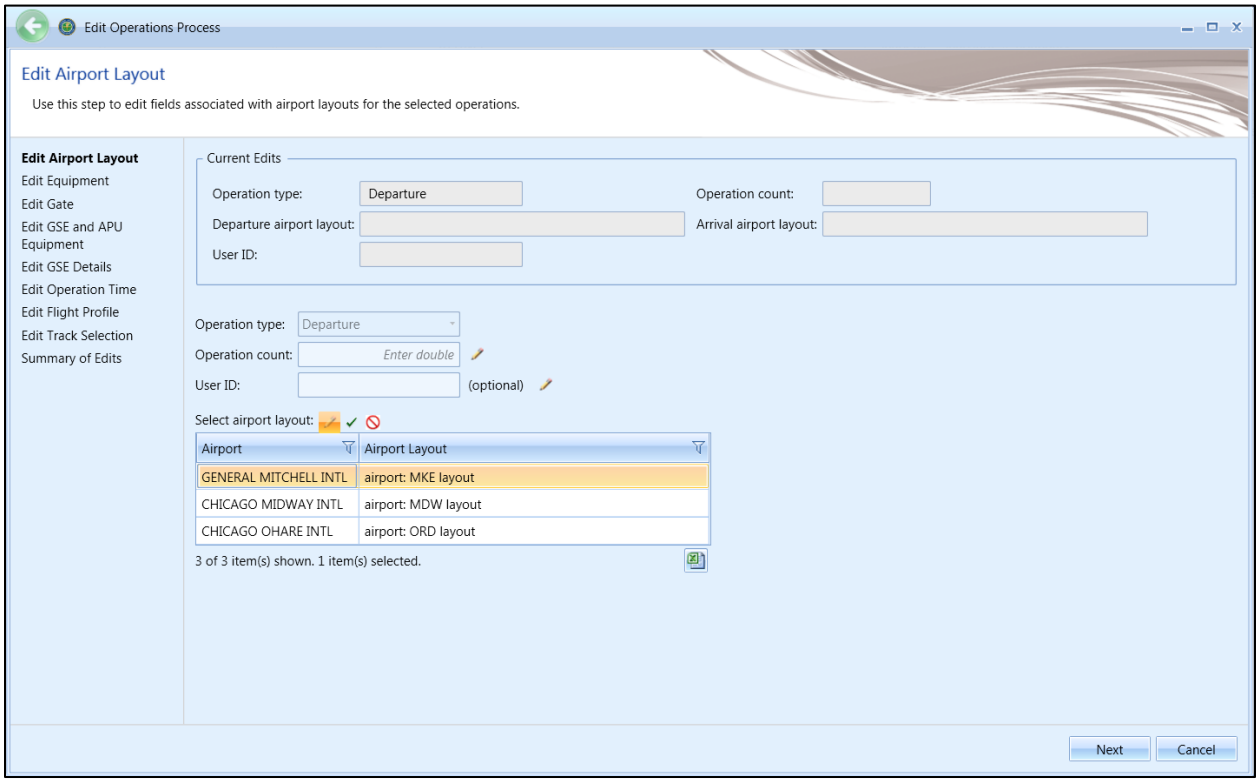


Figure 6-20 Bulk Aircraft Operations Edit

6.2.4 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.

6.2.5 Delete Aircraft Operation

Click *Delete* 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.

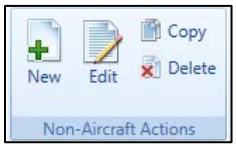


Figure 6-21 Operations Tab – Non-Aircraft Actions Ribbon Group

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) and airport content (Section 8).

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 6-22).

6.3.1.1 Step 1: Assign Airport Layout

The airport layout is assigned in this step (Figure 6-22). This step is the same for both single and bulk operation creation.

1. Select the desired airport layout.
2. Enter the desired operation count. This represents total annual number of operations in the appropriate operation unit (e.g. hours/year for ground support equipment, kiloliters for fuel tank).
3. Enter a custom *User ID* for the new operation if desired.
4. Click *Next*.

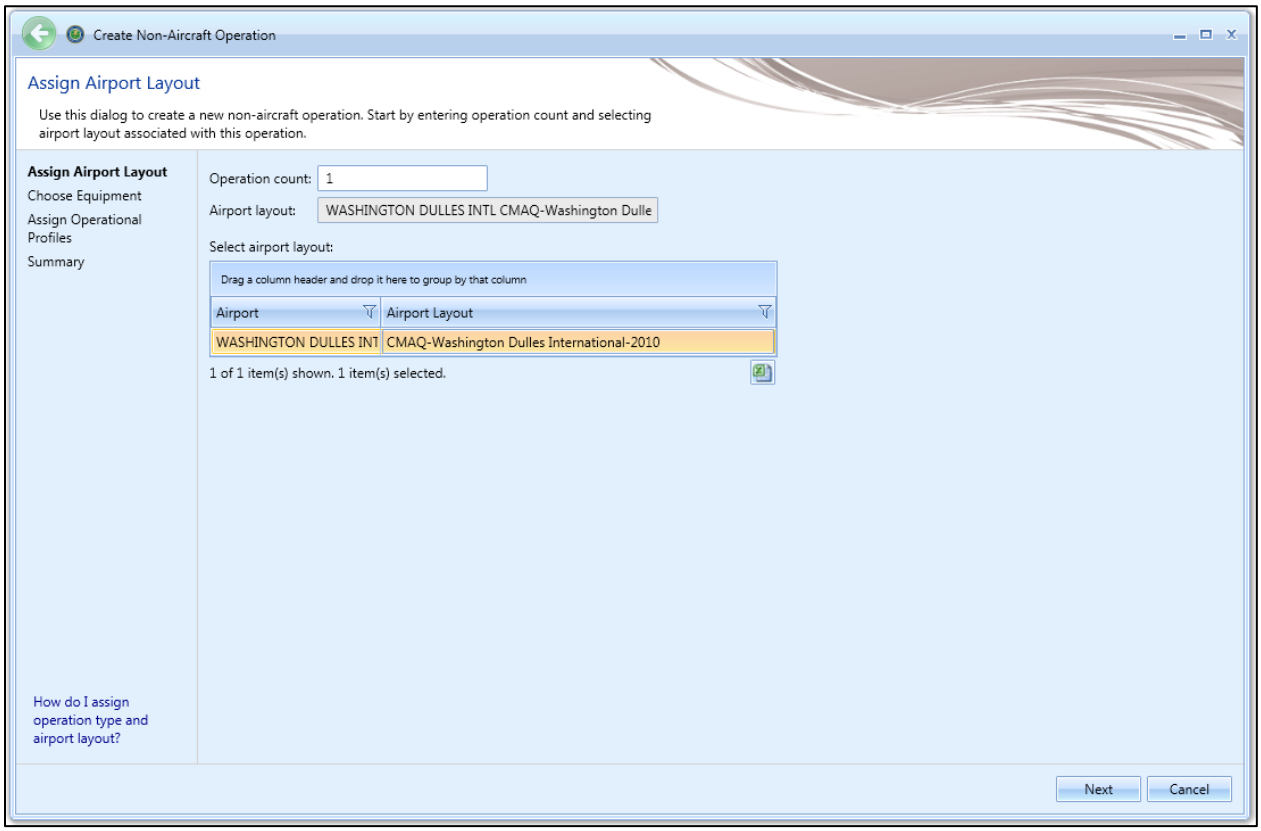


Figure 6-22 Create Non-Aircraft Operation – Assign Airport Layout

What does the operation count for non-aircraft equipment represent?

- Ground Support Equipment = Hours Operated
- Boiler/Space Heater = Metric Tons Used
- Emergency Generator = Hours Operated
- Incinerator = Metric Tons Used
- Aircraft Engine Testing = Test Cycles Run
- Fuel Tank = Kiloliters Used
- Surface Coating/Painting = Kiloliters Used
- Deicing Area = Kiloliters Used
- Solvent Degreaser = Kiloliters Used
- Sand/Salt Pile = Metric Tons Used
- Other = Metric Tons Used

6.3.1.2 Step 2: Choose Equipment

Non-Aircraft equipment is selected in this step (Figure 6-23). The selections made in Step 1 are displayed in the *Current Selection* section. Multiple non-aircraft equipment can be selected in this step for bulk operation creation (Figure 6-24). To deselect equipment, click on the highlighted entry again.

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

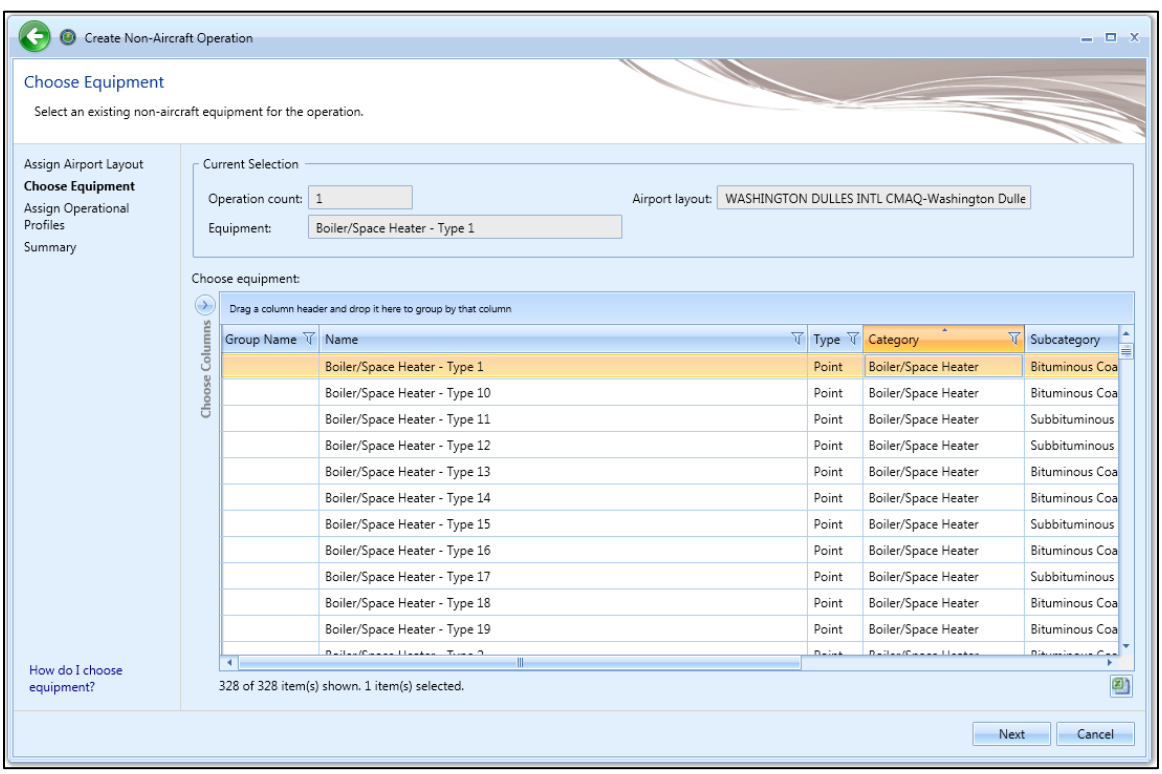


Figure 6-23 Create Non-Aircraft Operation – Choose Equipment (Single)

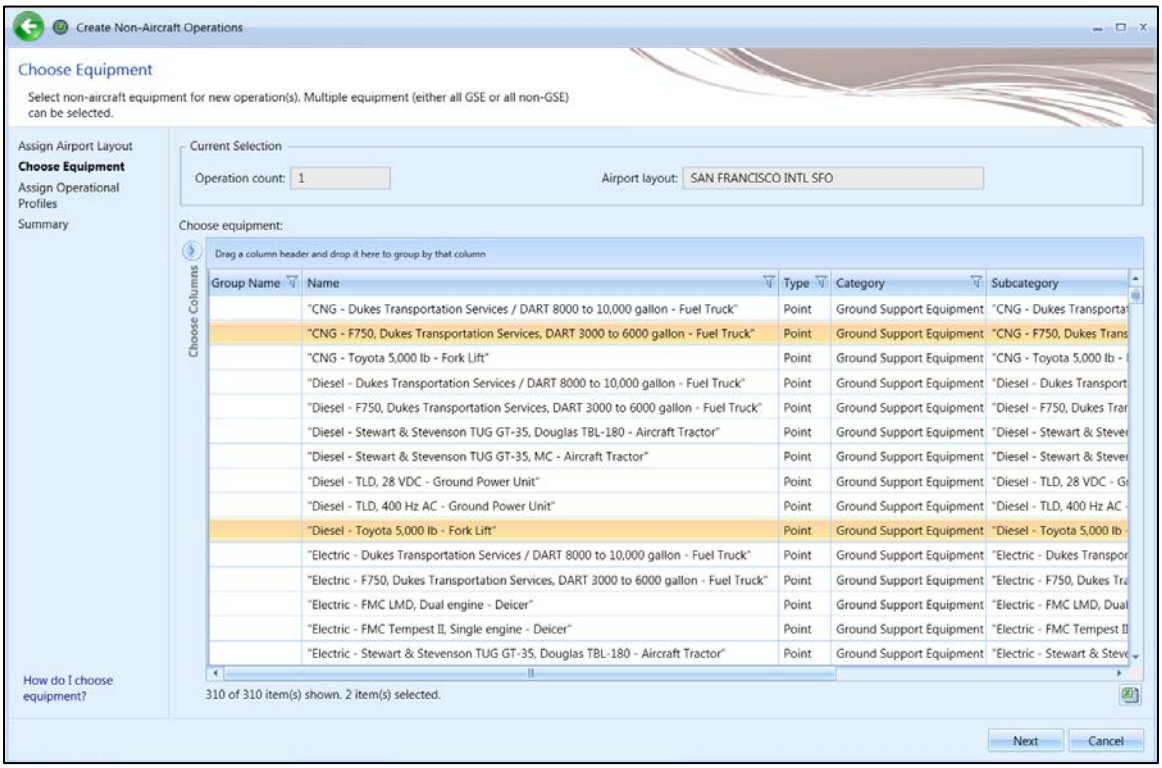


Figure 6-24 Create Non-Aircraft Operation – Choose Equipment (Bulk)

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 6-25). For bulk non-aircraft operations, select the equipment from the equipment list to display the corresponding GSE details (Figure 6-26).

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 manufacture year for GSE operations is optional. When manufacture year of GSE operation is provided, emissions factors from the STN_GSE_NONROAD_COEFF table is used and deterioration is calculated; otherwise, the STN_GSE_EF table is used and deterioration is not calculated. Please refer to Technical Manual for more information.

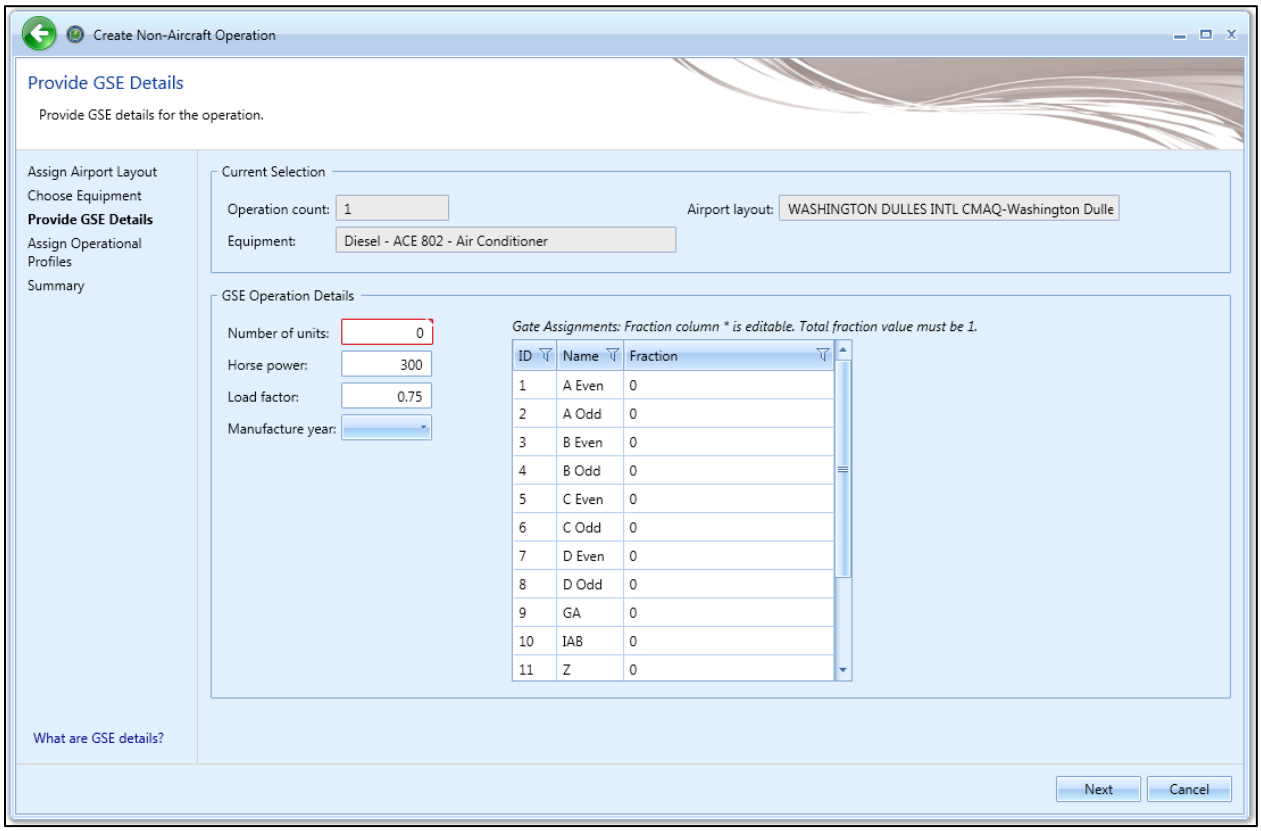


Figure 6-25 Create Non-Aircraft Operation – Provide GSE Details (Single)

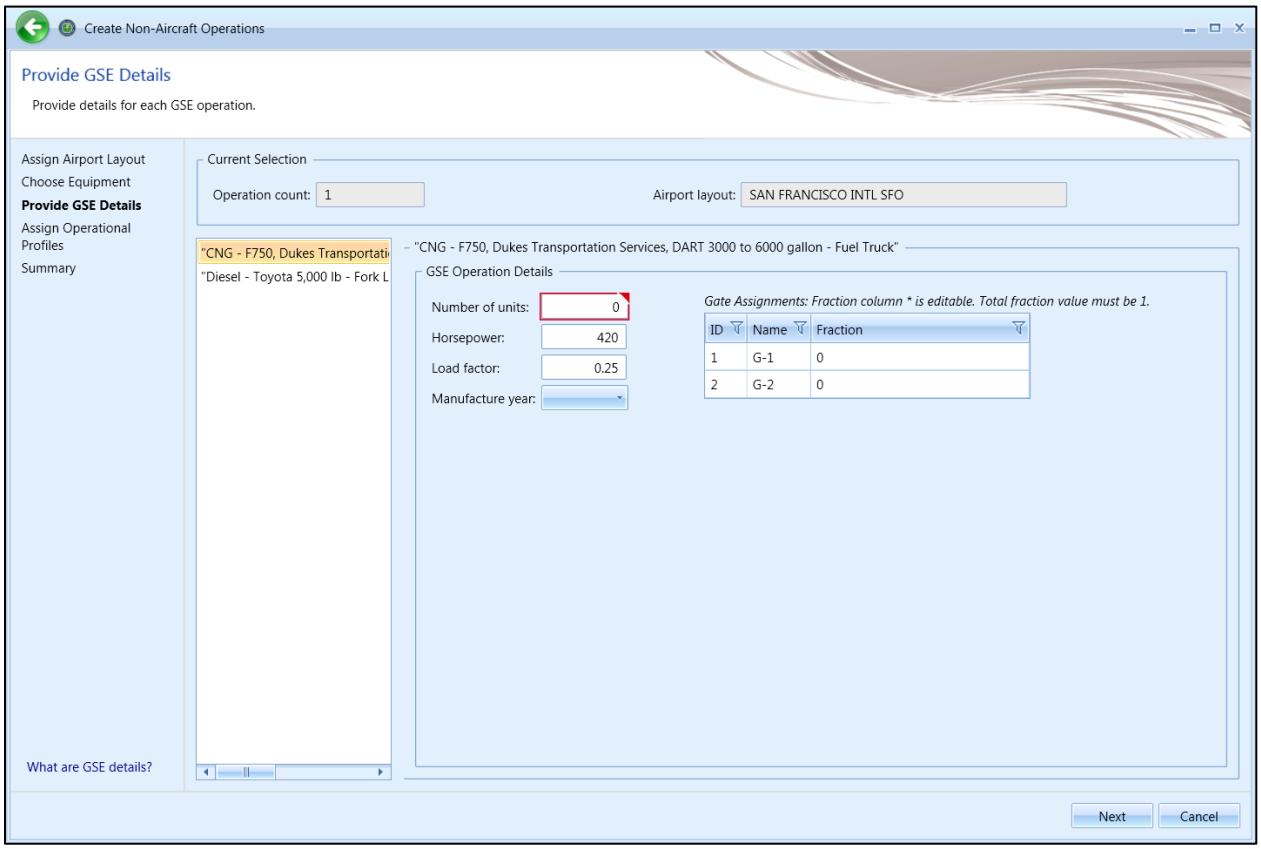


Figure 6-26 Create Non-Aircraft Operation – Provide GSE Details (Bulk)

6.3.1.4 Step 4: Assign Operational Profiles

Operational profiles are selected in this step (Figure 6-27). 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*.

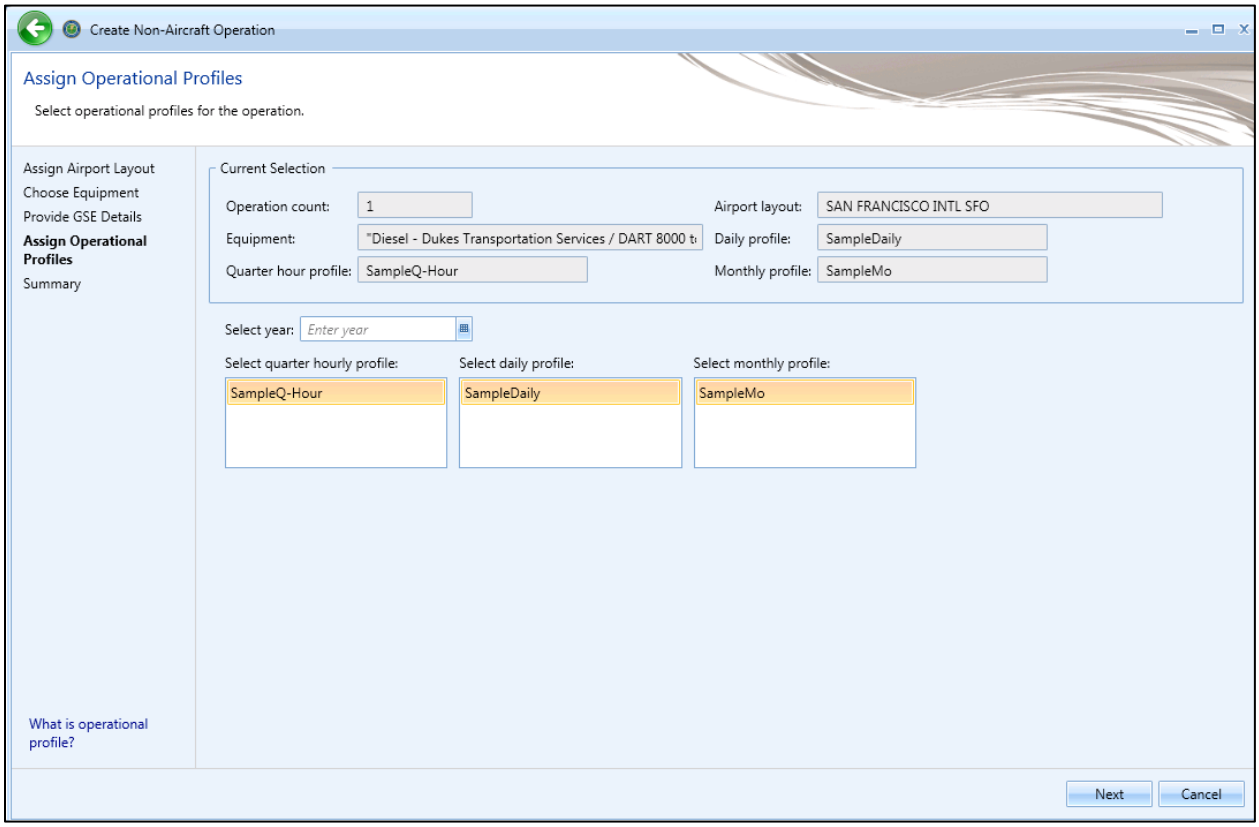


Figure 6-27 Create Non-Aircraft Operation – Assign Operational Profiles

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 6-28).

For single non-aircraft operation, the details for the equipment selected in the previous step are displayed (Figure 6-28). For bulk non-aircraft operations, select the equipment from the equipment list to display the corresponding details (Figure 6-29).

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*.

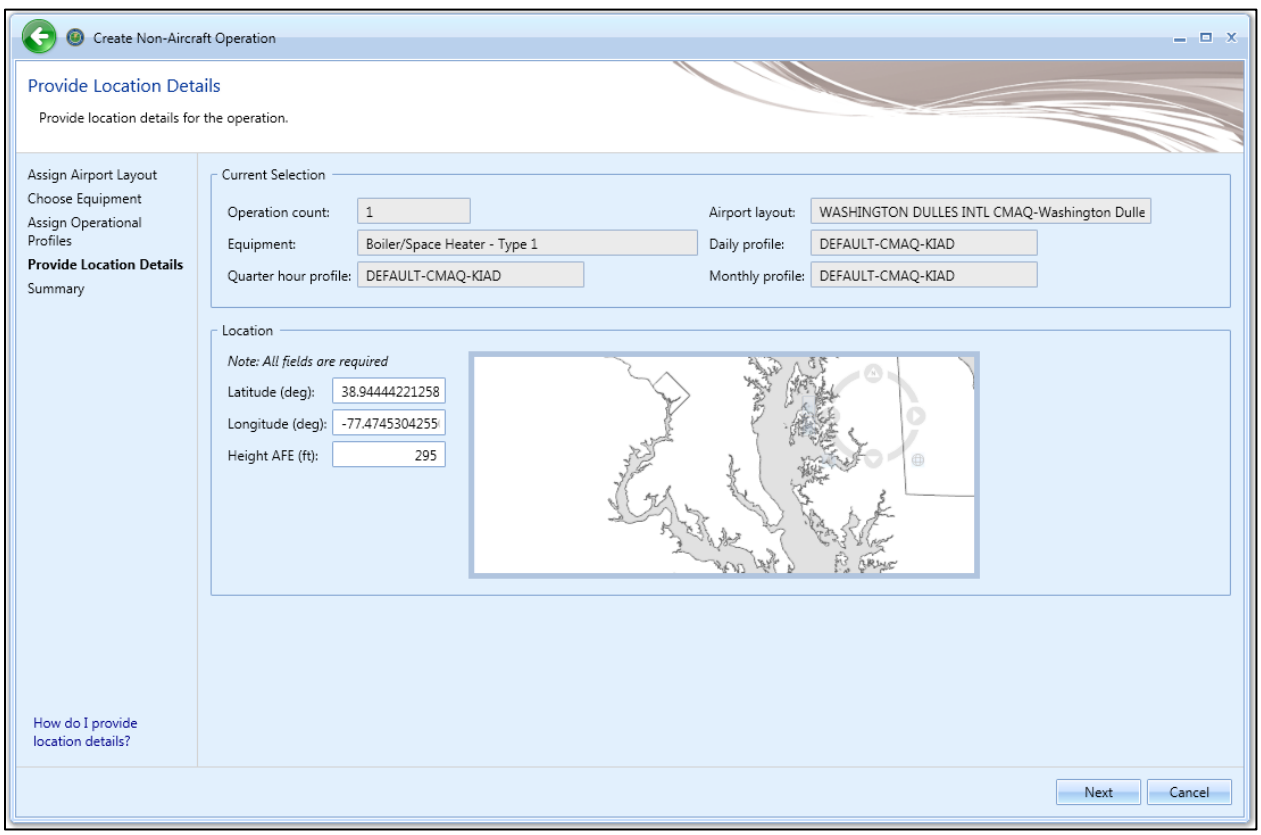


Figure 6-28 Create Non-Aircraft Operation – Provide Location Details (Single)

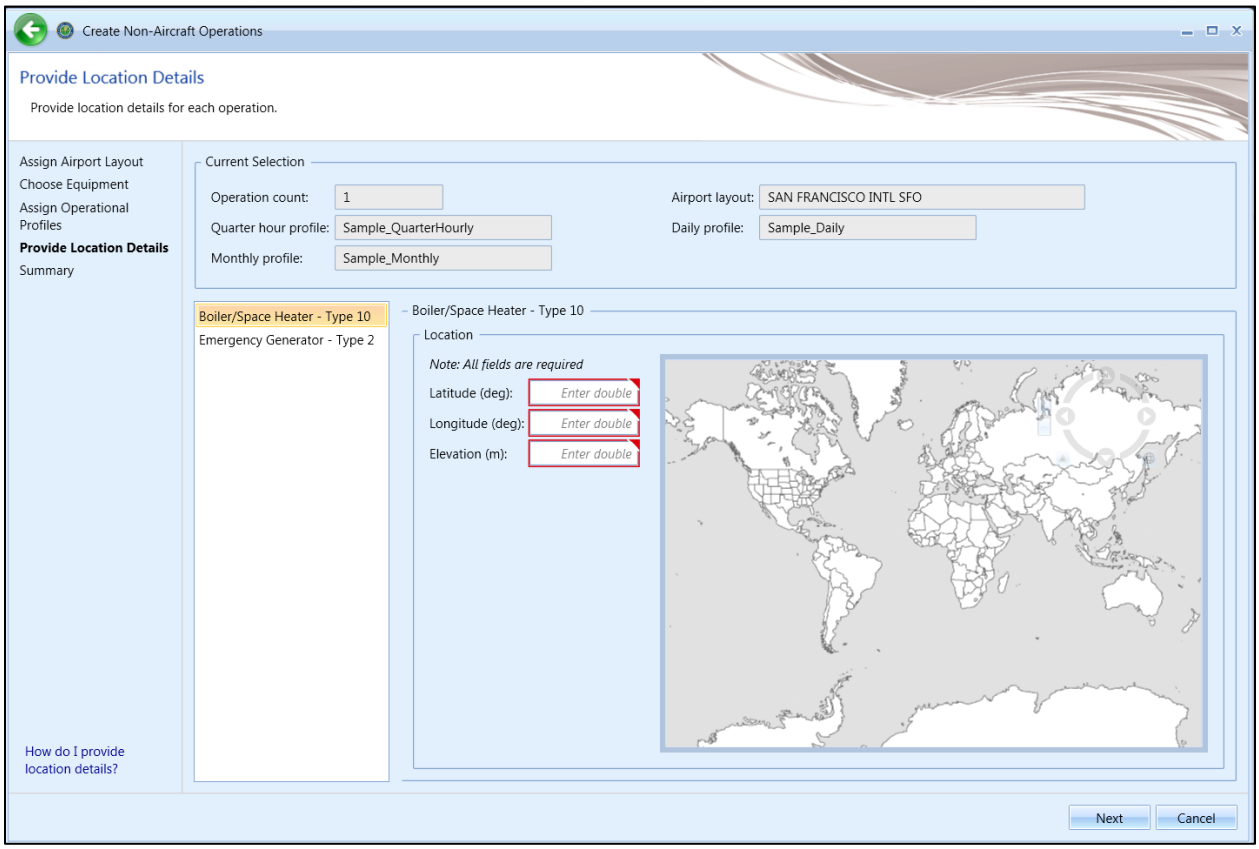


Figure 6-29 Create Non-Aircraft Operation – Provide Location Details (Bulk)

6.3.1.6 Step 6: Summary

The summary step provides a summary of options selected in the *Create Non-Aircraft Operations wizard* (Figure 6-30 and Figure 6-31). 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.

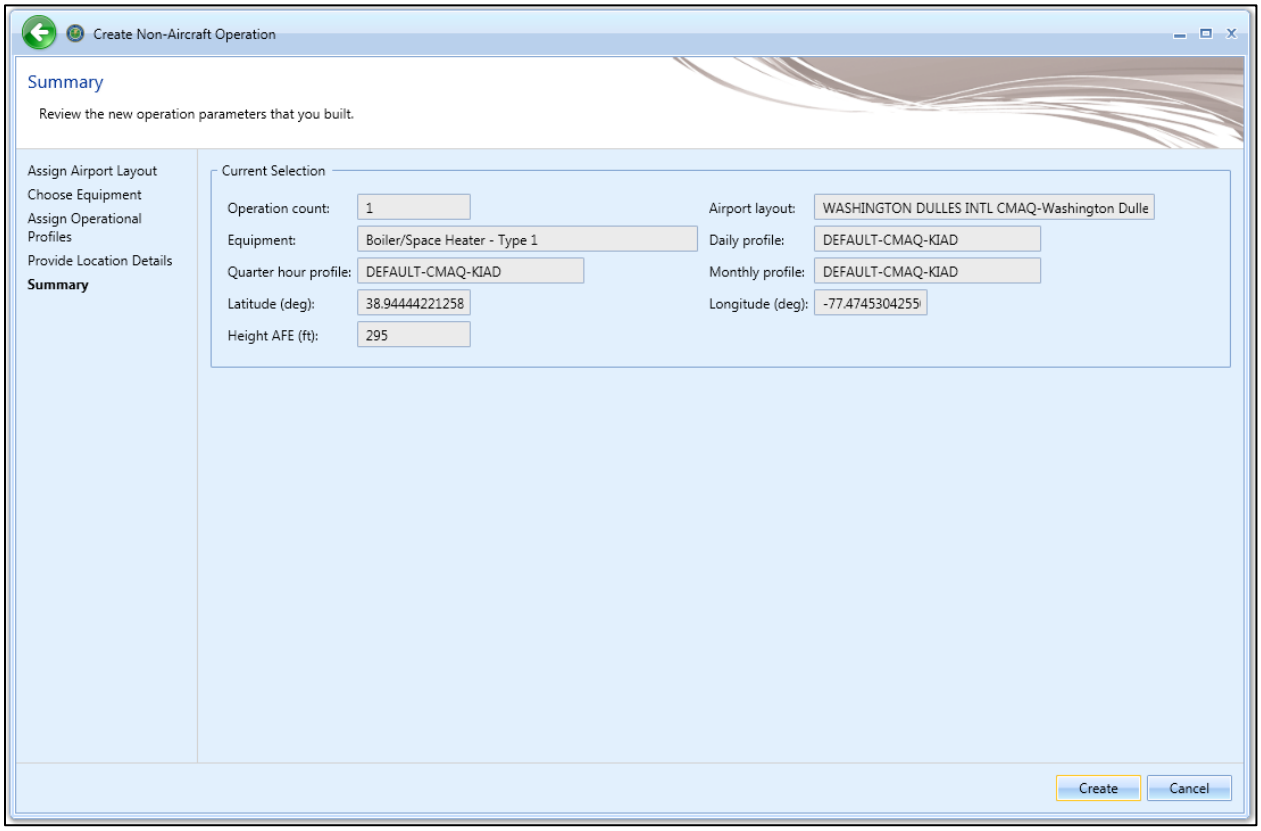


Figure 6-30 Create Non-Aircraft Operation – Summary (Single)

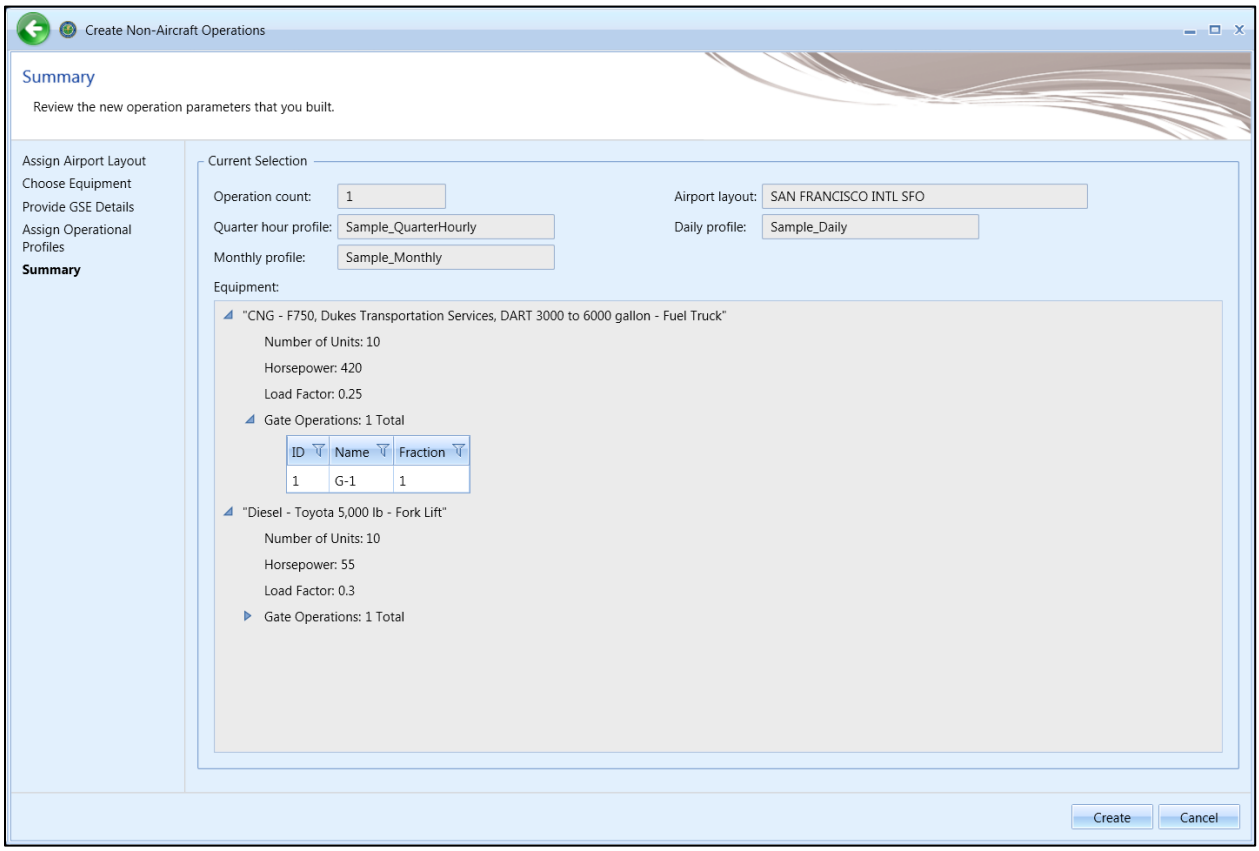


Figure 6-31 Create Non-Aircraft Operation – Summary (Bulk)

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 at one time (bulk edit). 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 6-32 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 type. The *Edit Operations* process classifies non-aircraft operations in the following manner:
    - Stationary Source (non-GSE) operations
    - GSE Population operations
3. In the *Non-Aircraft Actions* ribbon group, click *Edit* to open the *Edit Operations Process* wizard (Figure 6-33).
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.

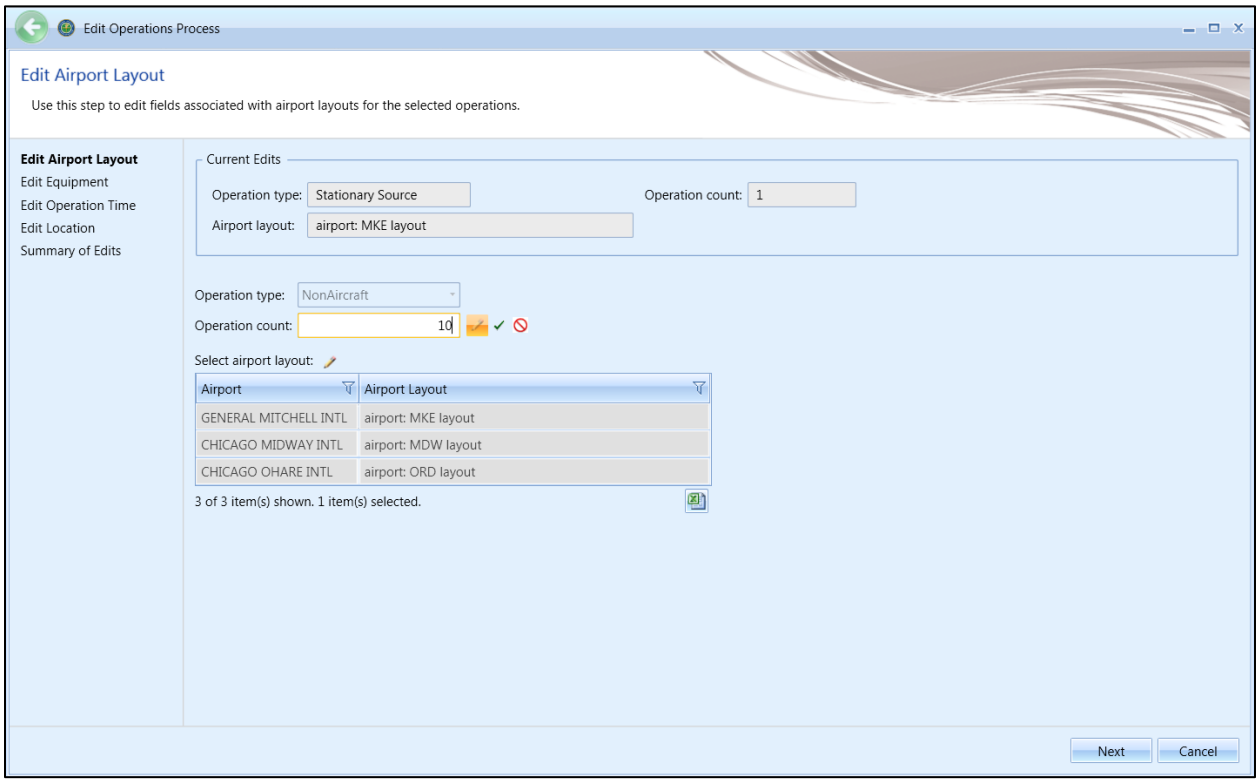


Figure 6-33 Bulk Non-Aircraft Operations Edit

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* to delete the currently selected operation.

6.4 Runup Operation

Runup operations only generate noise results. Flight performance results and emissions results are not generated for runup operations. Runup operations are only applicable for fixed-wing aircraft and not for helicopters, and they are not associated with tracks.
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.

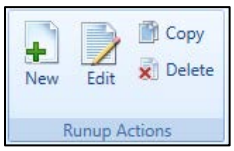


Figure 6-34 Operations Tab – Runup Actions Ribbon Group

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 6-35). 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*.

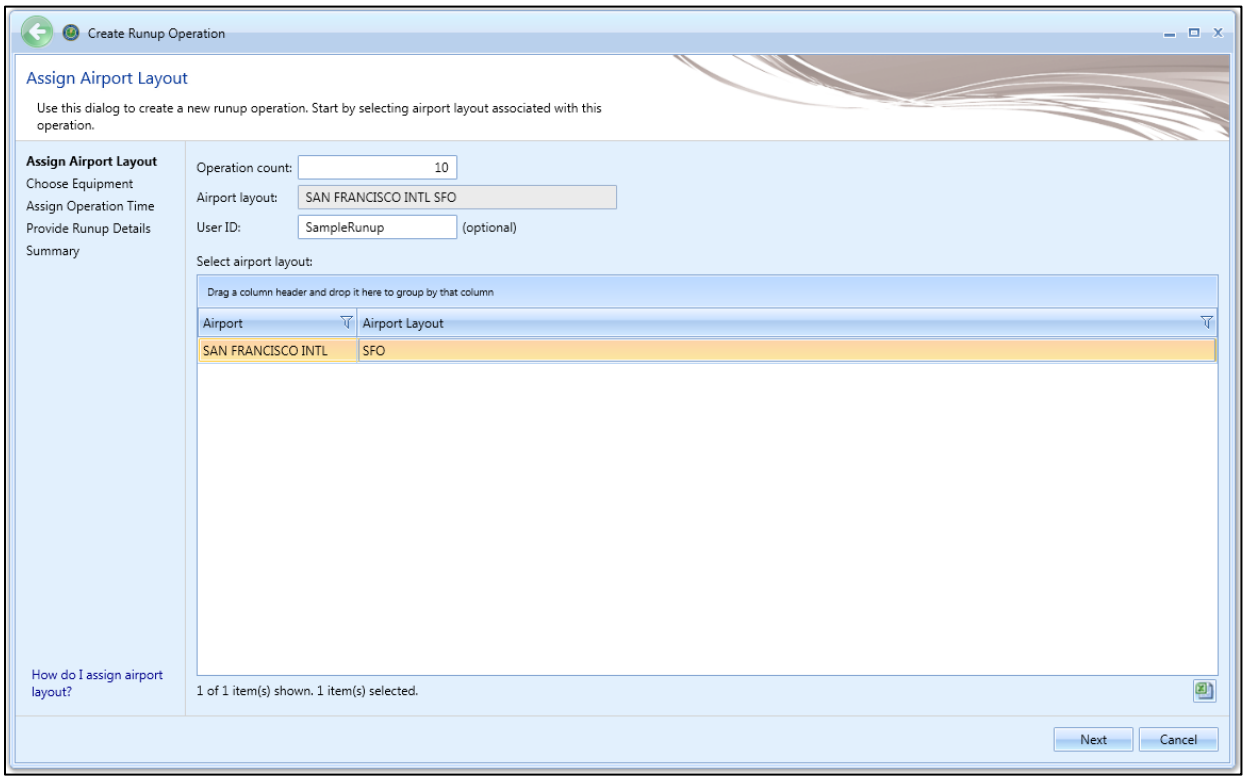


Figure 6-35 Create Runup Operation – Assign Airport Layout

6.4.1.2 Step 2: Choose Equipment

Aircraft equipment is selected in this step (Figure 6-36). 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 6-37). To deselect aircraft, click on the highlighted entry again.

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

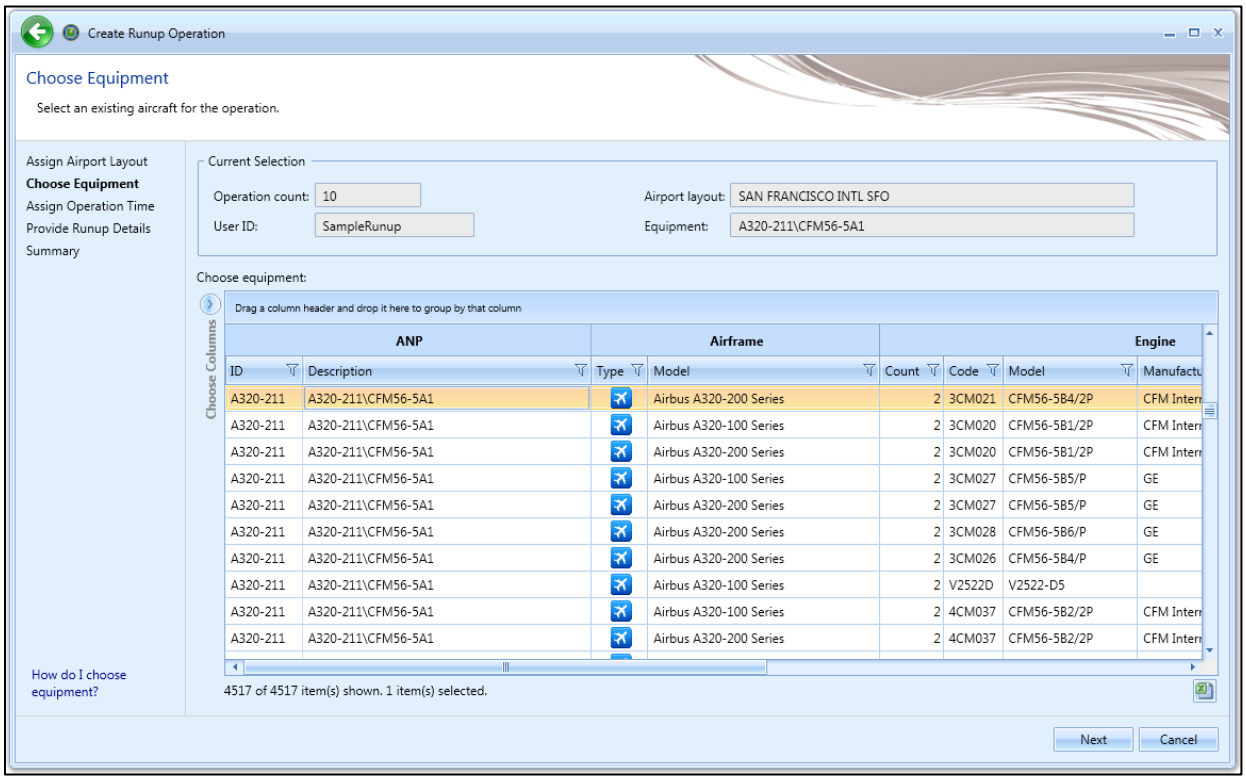


Figure 6-36 Create Runup Operation – Choose Equipment (Single)

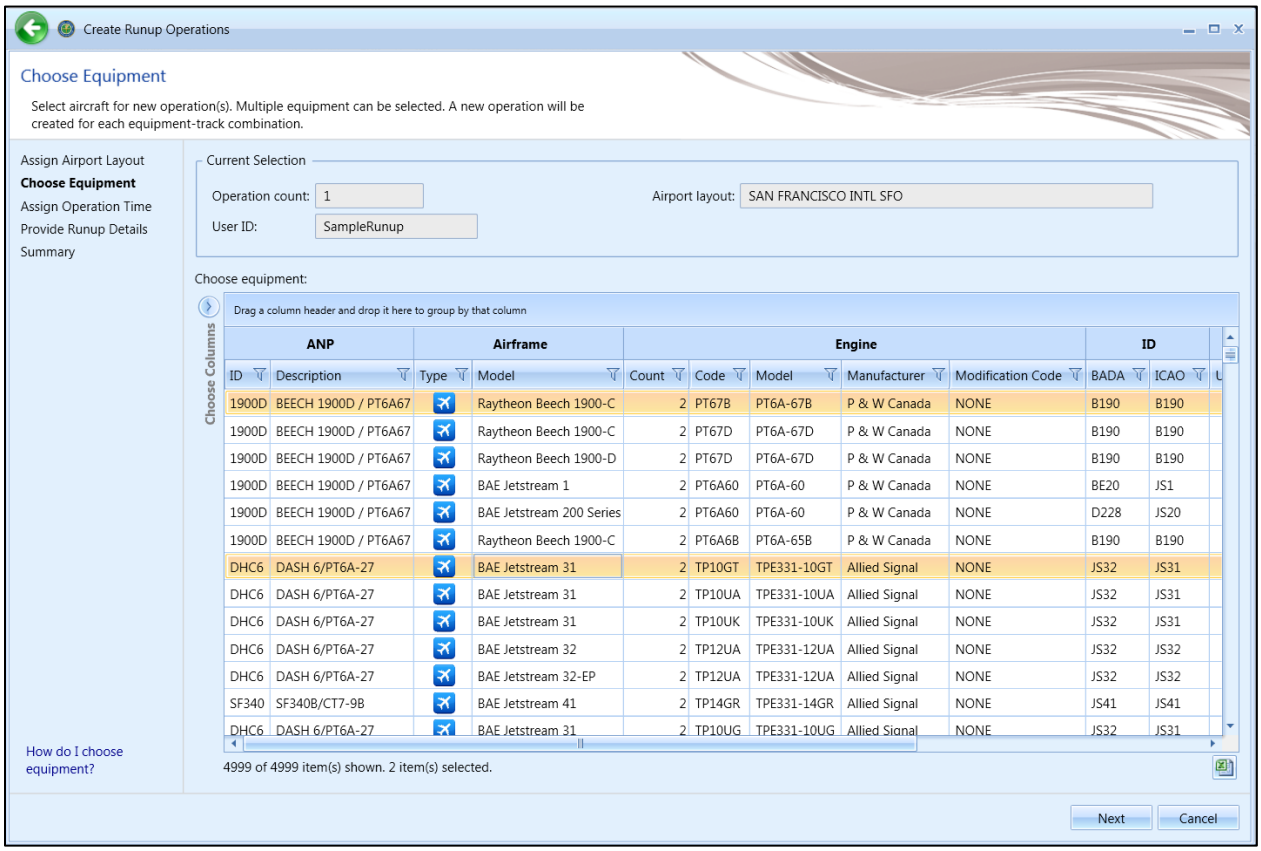


Figure 6-37 Create Runup Operation – Choose Equipment (Bulk)

6.4.1.3 Step 3: Assign Operation Time

The time and date for the runup operation are assigned in this step (Figure 6-38). 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*.

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

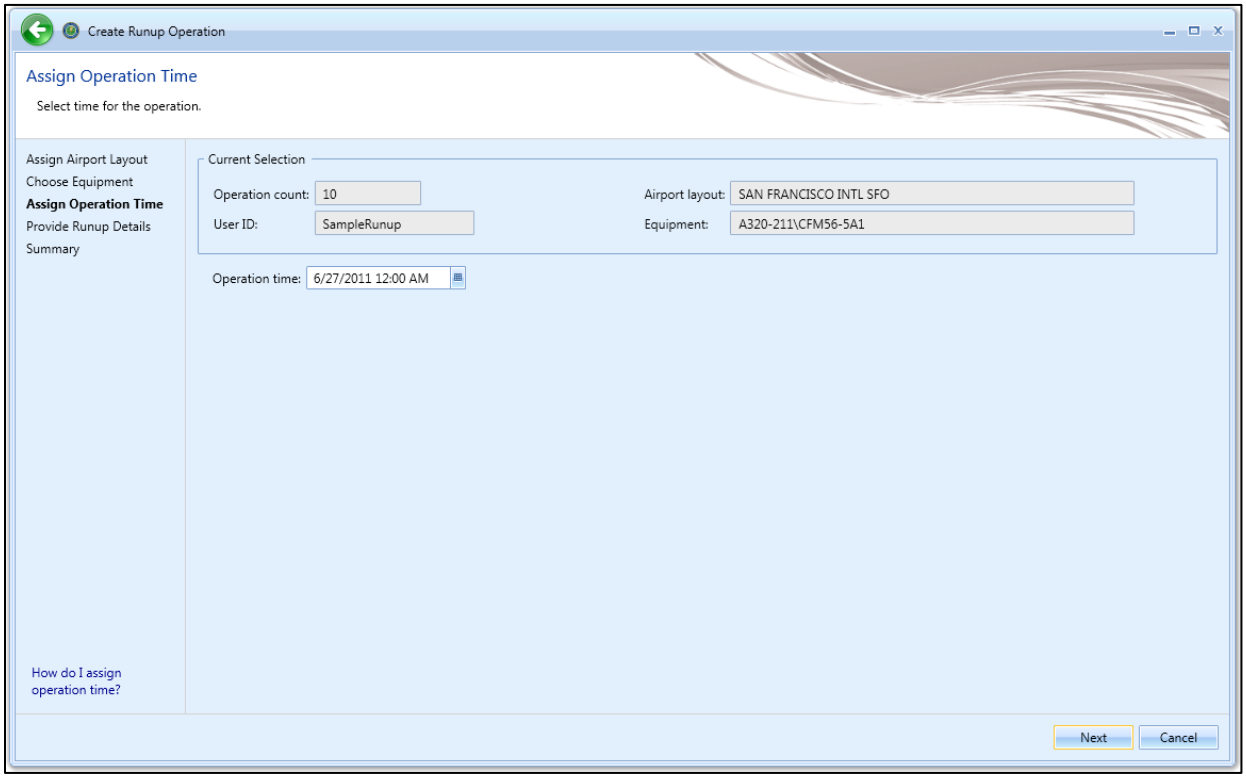


Figure 6-38 Create Runup Operation – Assign Operation Time

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.

For single runup operation, the details for the aircraft selected in the previous step are displayed (Figure 6-39). For bulk runup operations, select the equipment from the equipment list to display the corresponding details (Figure 6-40).

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, thrust, and duration.
3. Click *Next*.

1. To model runups that operate on all engines:
   a. For aircraft with NPD curves in Pounds, enter the max sea level static thrust (displayed in the *Equipment* tab, *Aircraft*, *ANP Airplane*, *Basic* screen).
   b. For aircraft with NPD curves in Percent, enter 100%.

2. To model runups that do not operate on all engines, enter the thrust setting that reduces the noise level by 10log(N/Nt) dB, where N is the number of operative engines and Nt is the total number of engines.

   For example, in a case of two engine aircraft which is running up a single engine, thrust should be reduced by an amount which will give a 3 dB decrease in the noise.

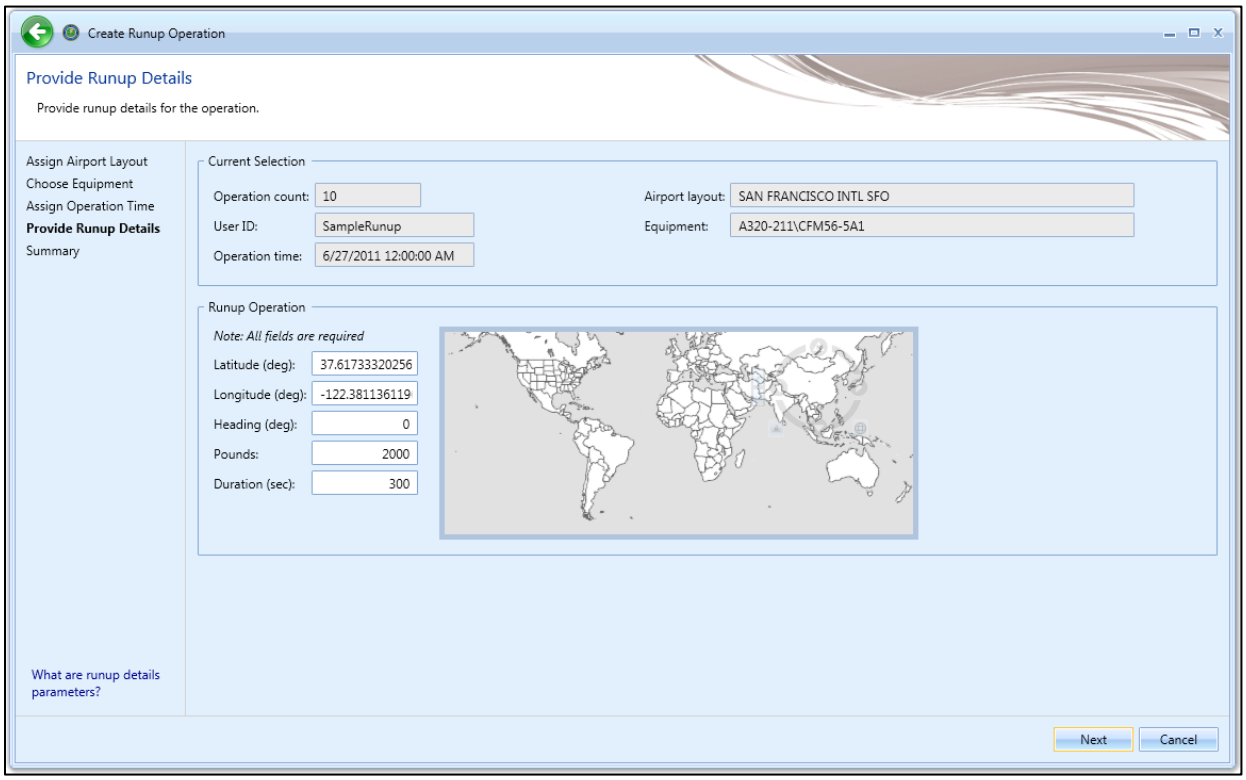


Figure 6-39 Create Runup Operation – Provide Runup Details (Single)

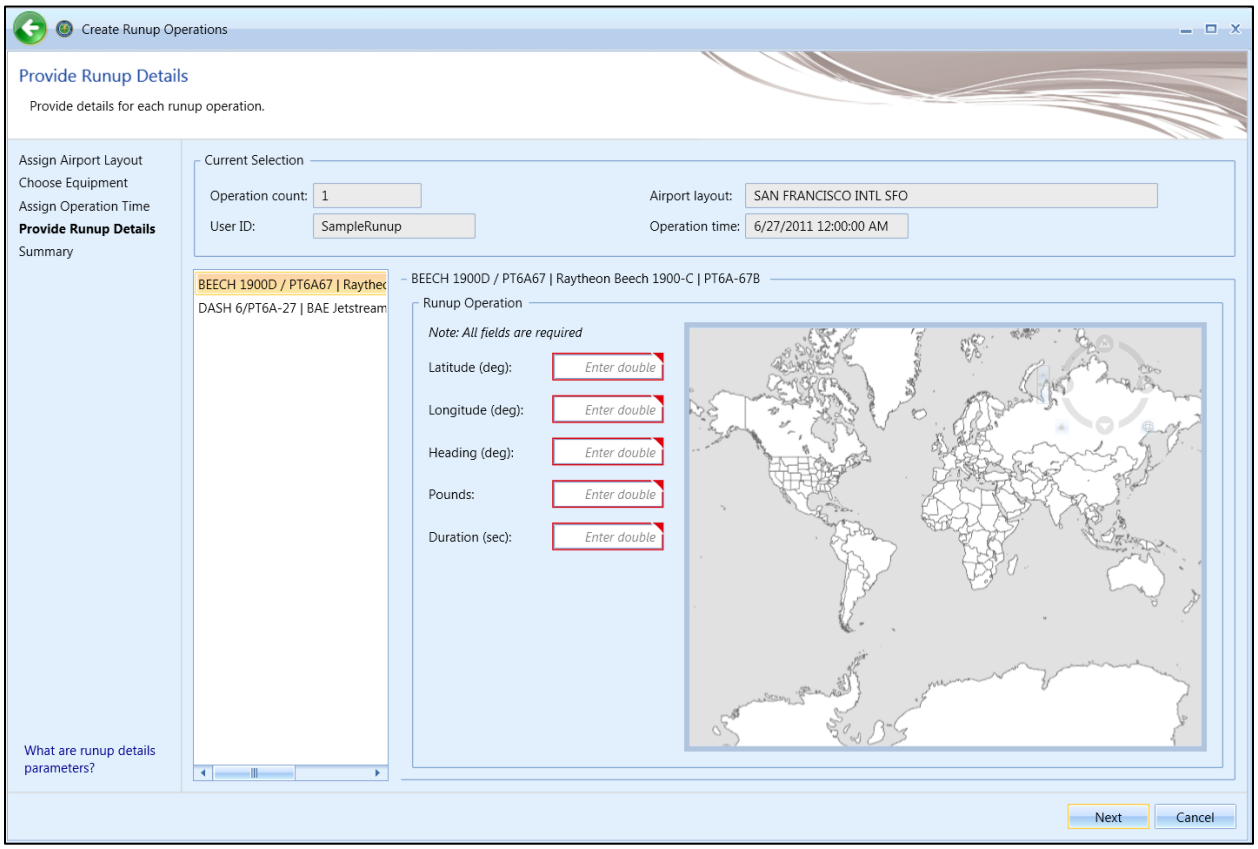


Figure 6-40 Create Runup Operation – Provide Runup Details (Bulk)

6.4.1.5 Step 5: Summary

The summary step provides a summary of options selected in the *Create Runup Operations wizard* (Figure 6-41 and 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.

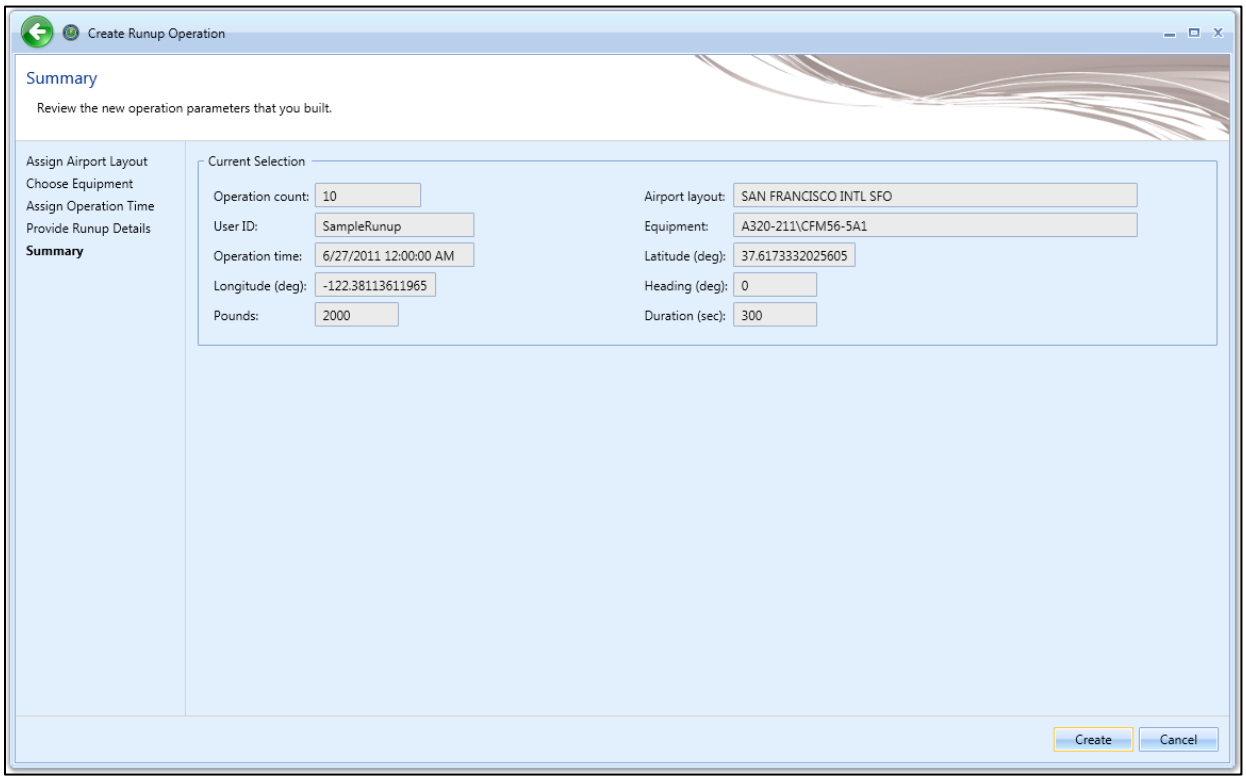


Figure 6-41 Create Runup Operation – Summary (Single)

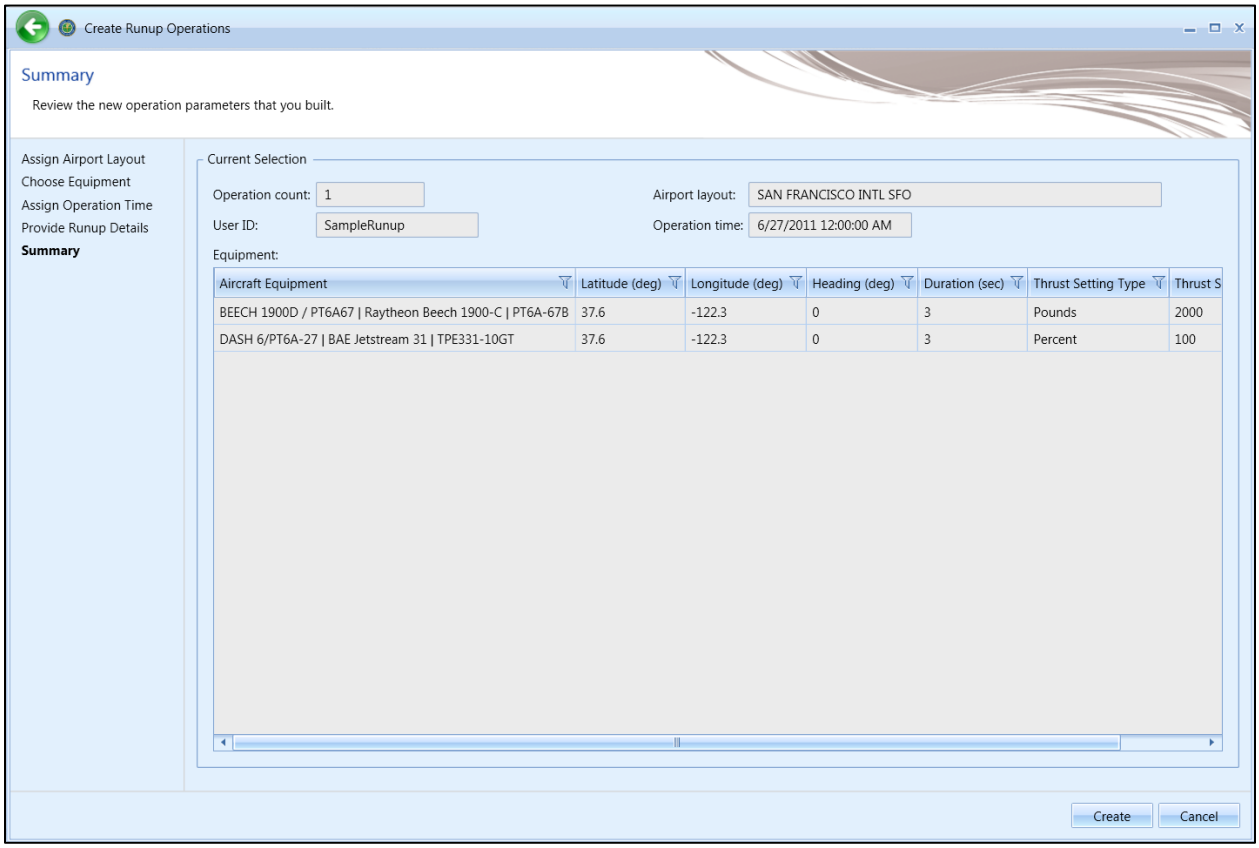


Figure 6-42 Create Runup Operation – Summary (Bulk)

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.

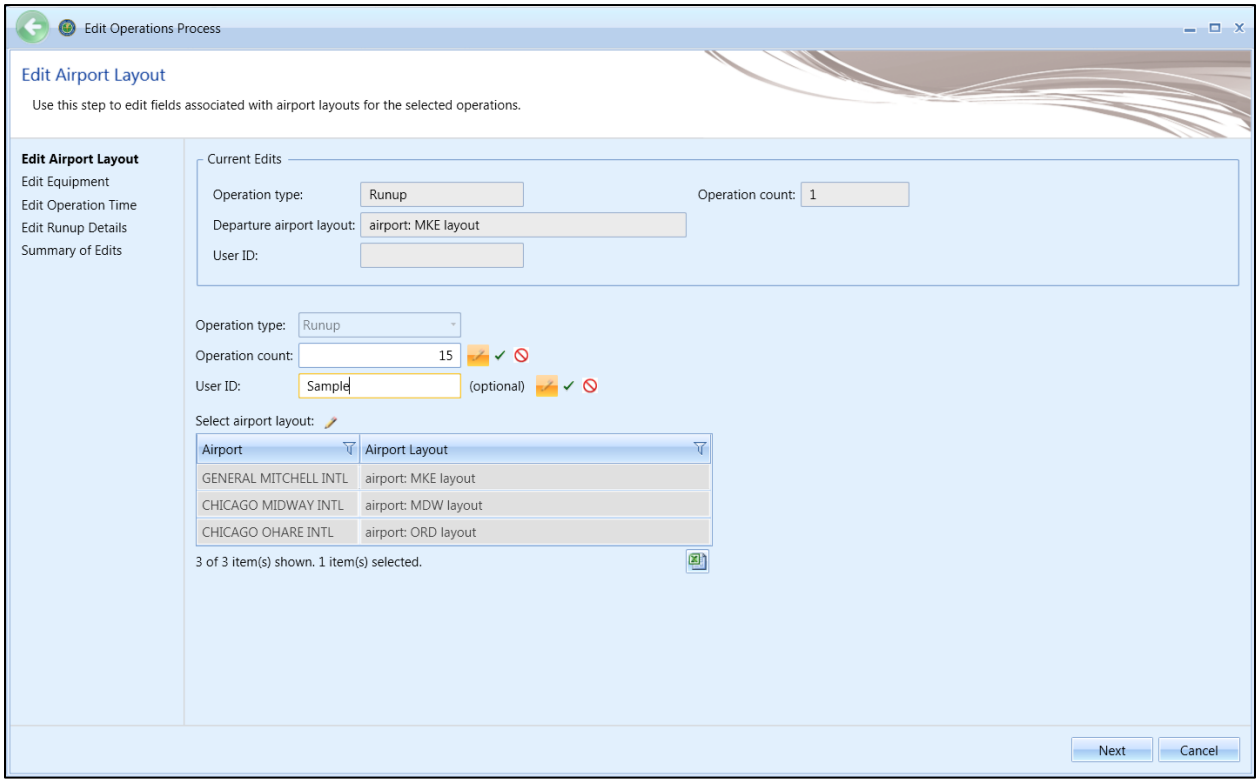


Figure 6-43 Bulk Runup Operations Edit

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* 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.

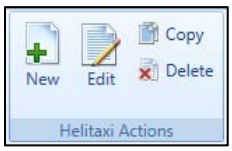


Figure 6-44 Operations Tab – Helitaxi Actions Ribbon Group

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*.

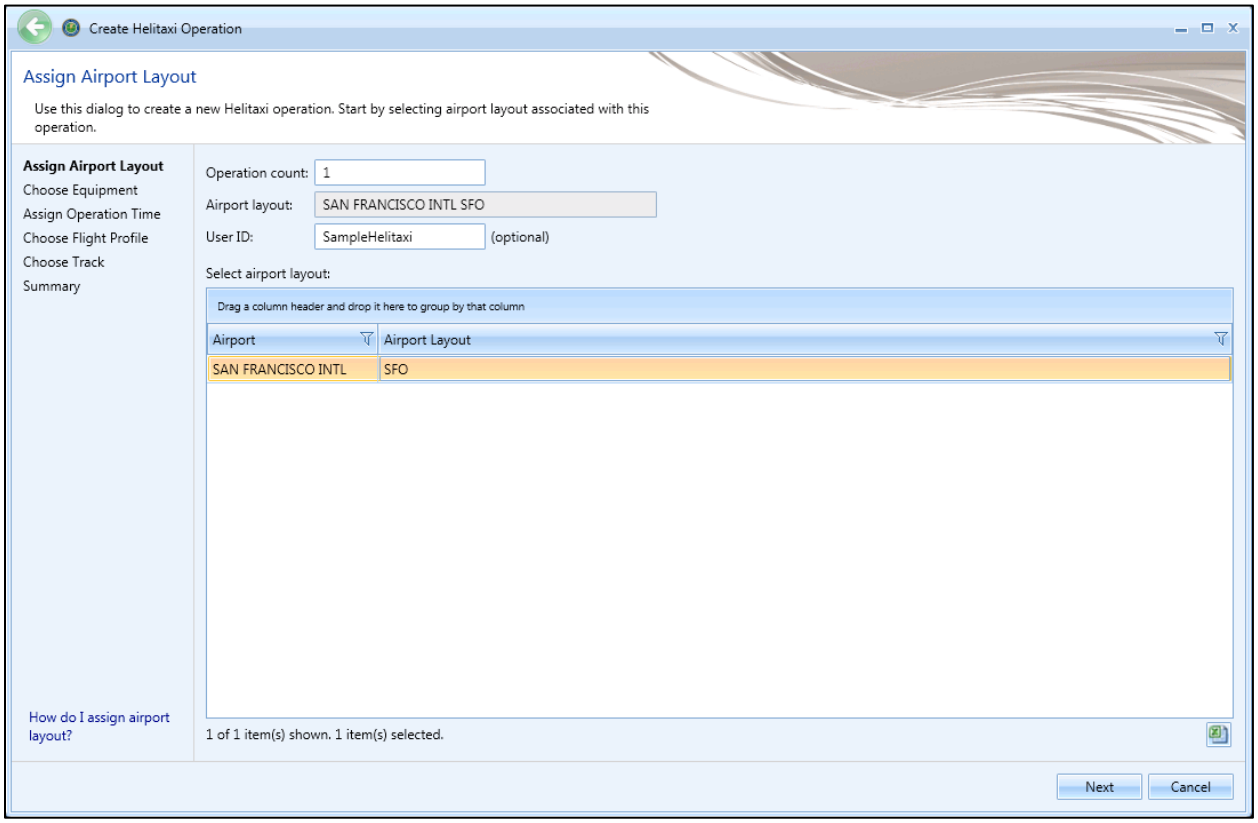


Figure 6-45 Create Helitaxi Operation – Assign Airport Layout

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*.

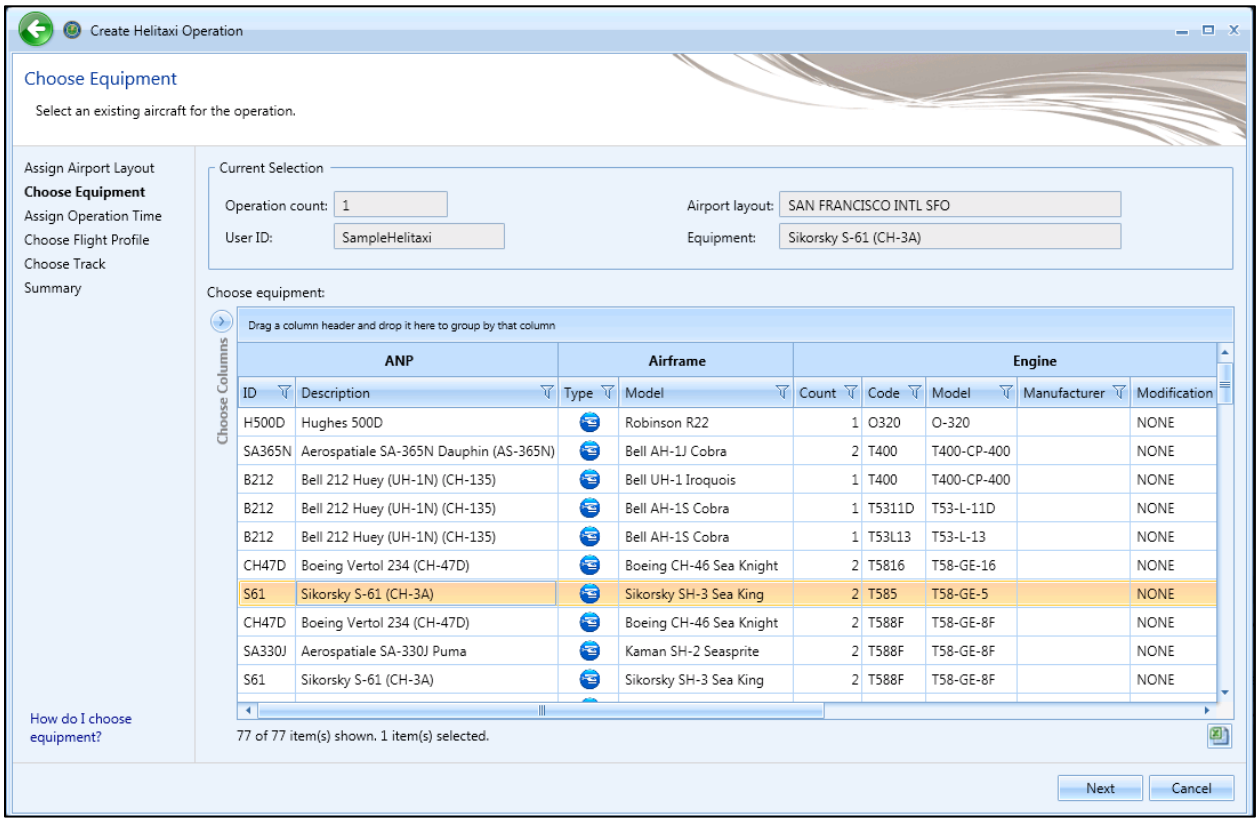


Figure 6-46 Create Helitaxi Operation – Choose Equipment (Single)

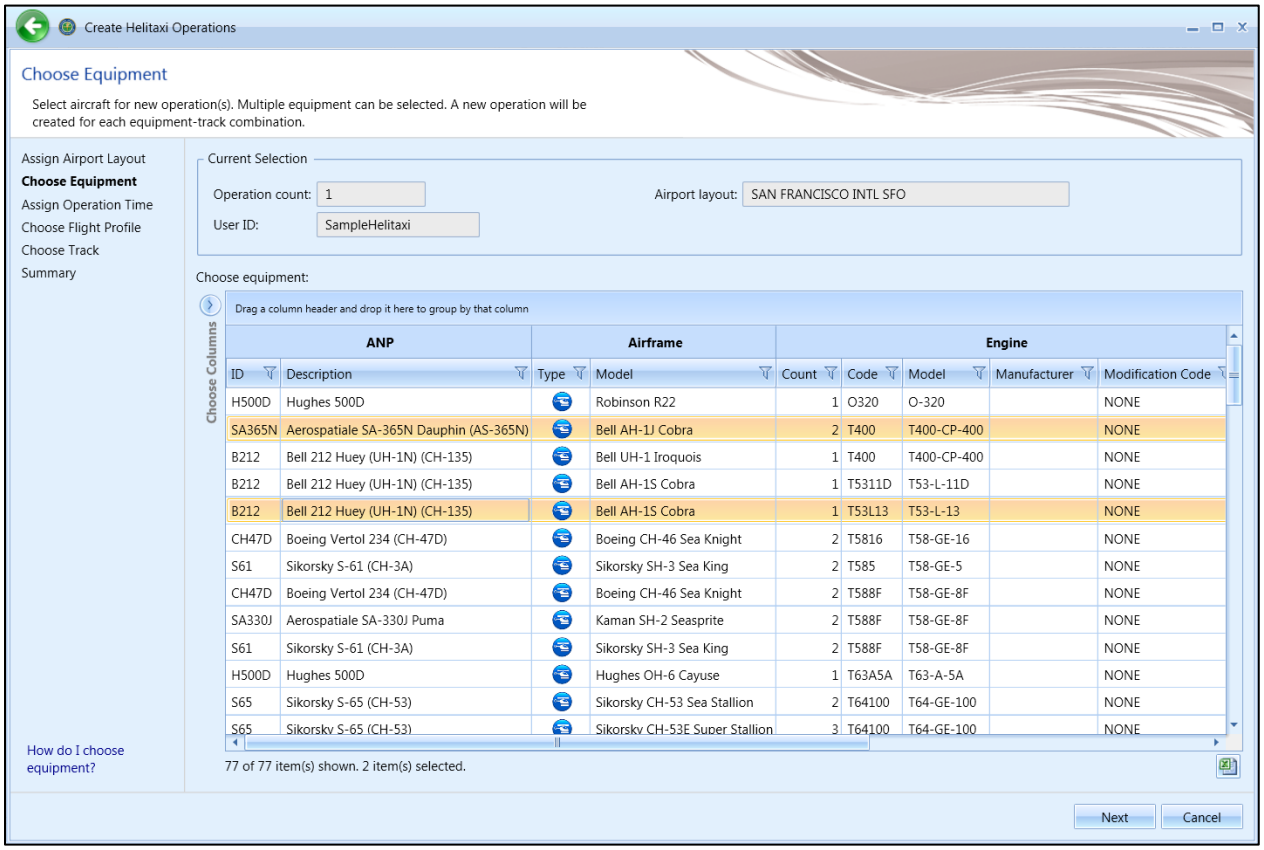


Figure 6-47 Create Helitaxi Operation – Choose Equipment (Bulk)

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*.

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

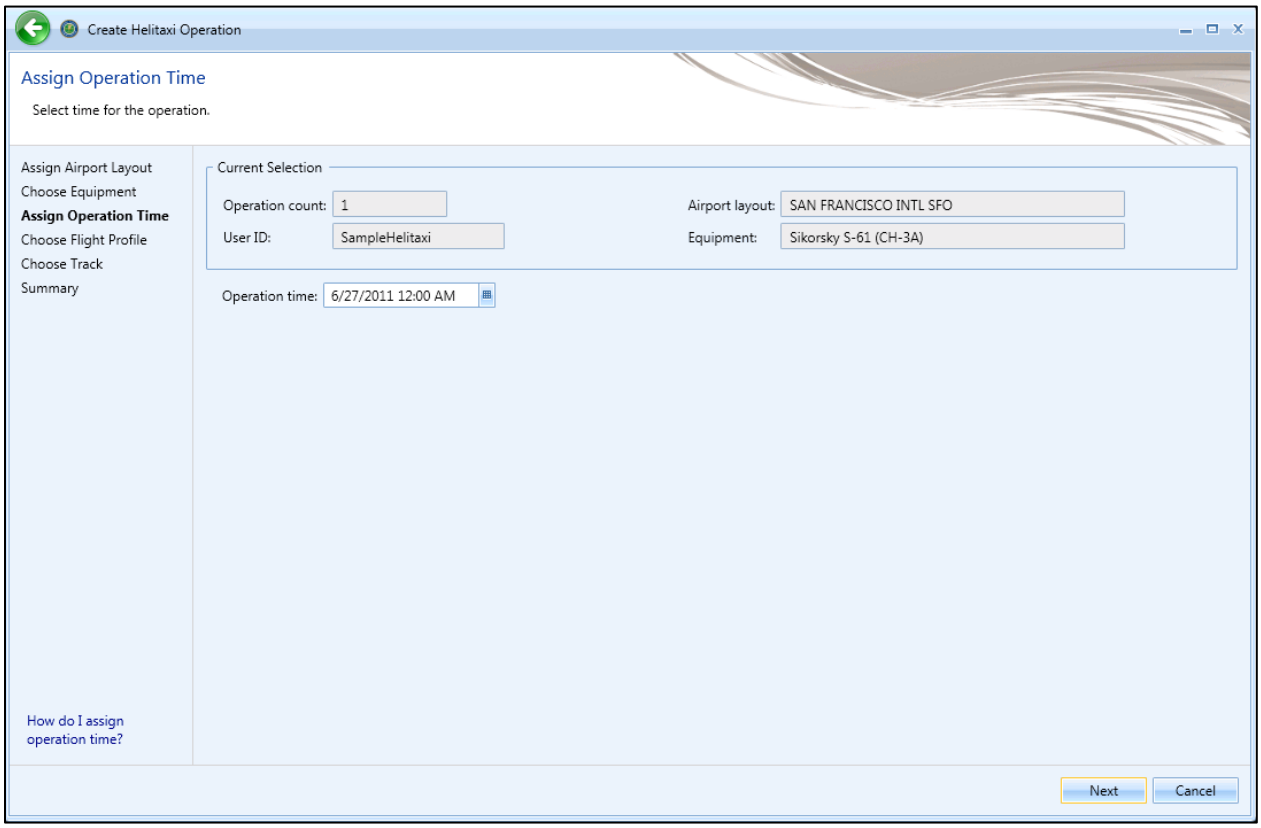


Figure 6-48 Create Helitaxi Operation – Assign Operation Time

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*.

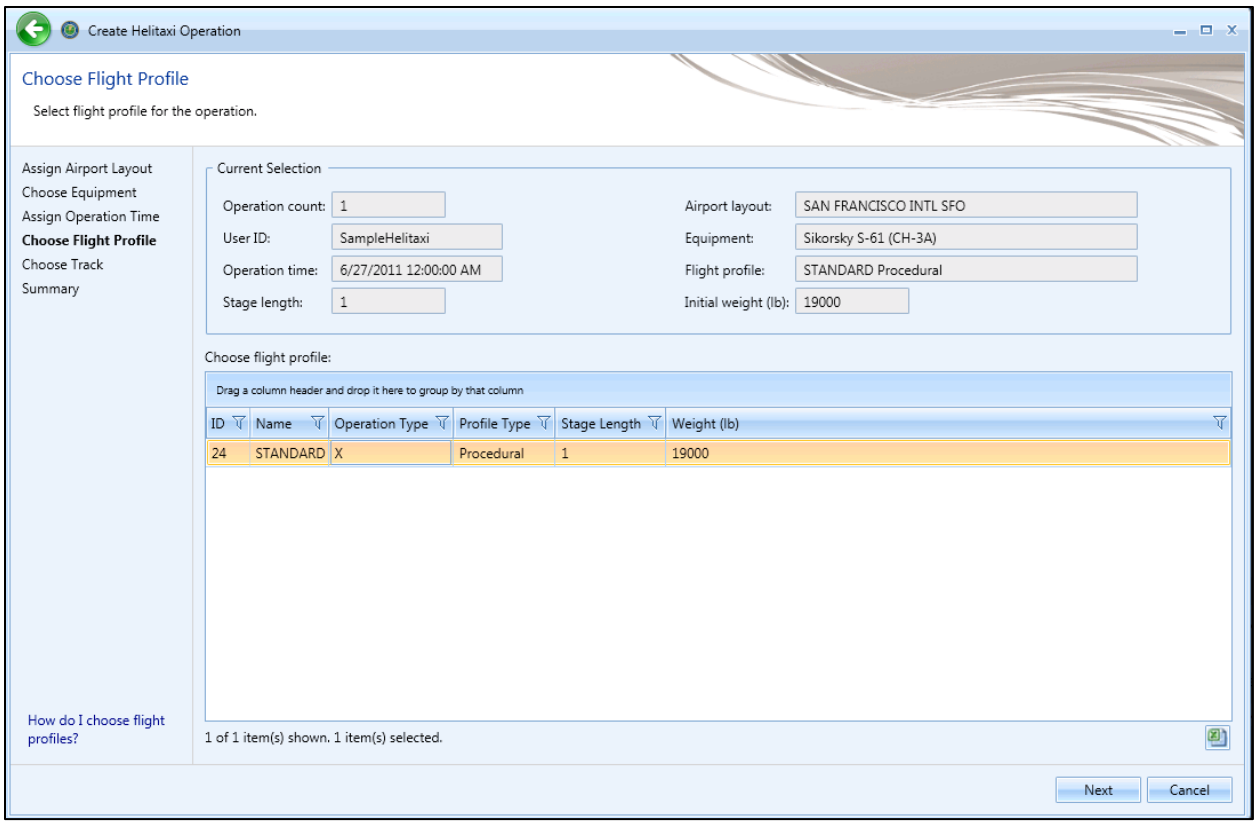


Figure 6-49 Create Helitaxi Operation – Choose Flight Profile (Single)

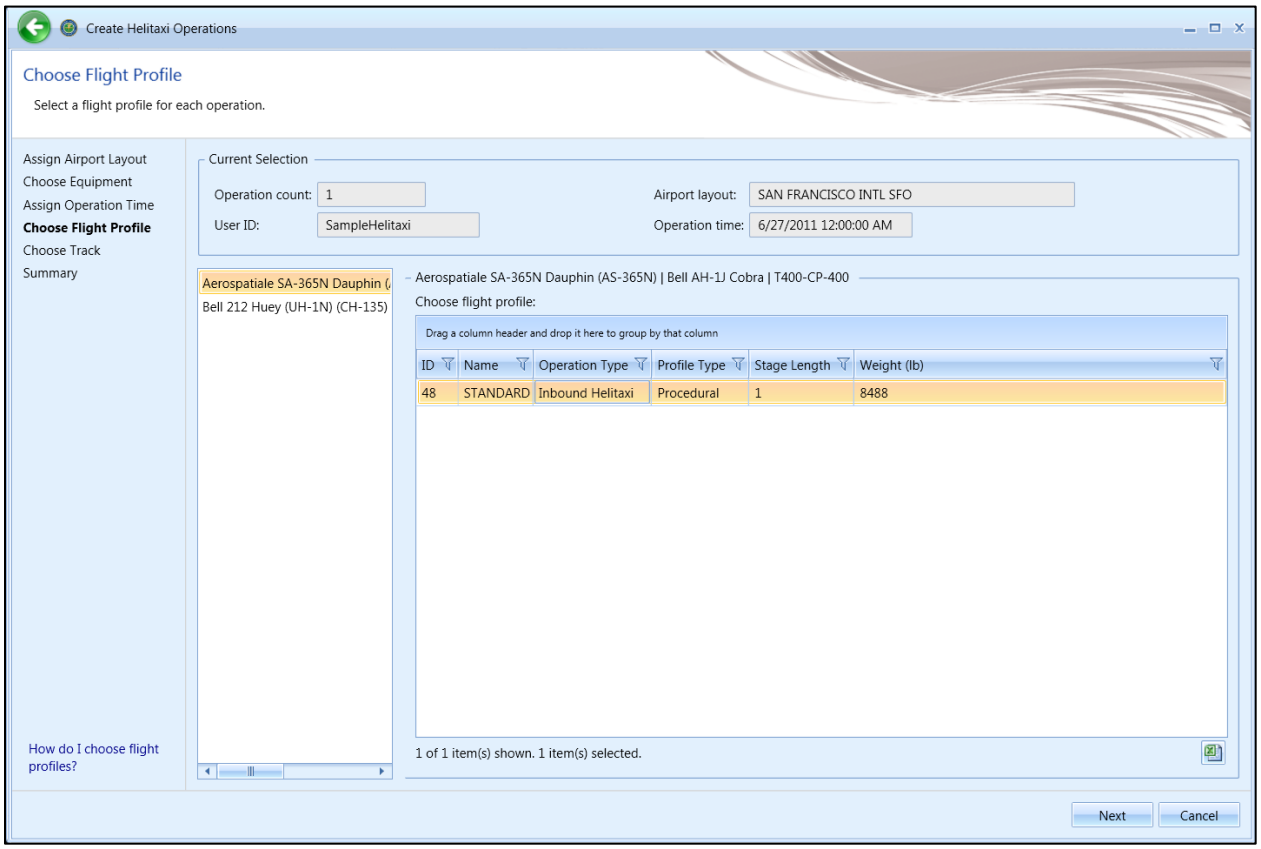


Figure 6-50 Create Helitaxi Operation – Choose Flight Profile (Bulk)

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.

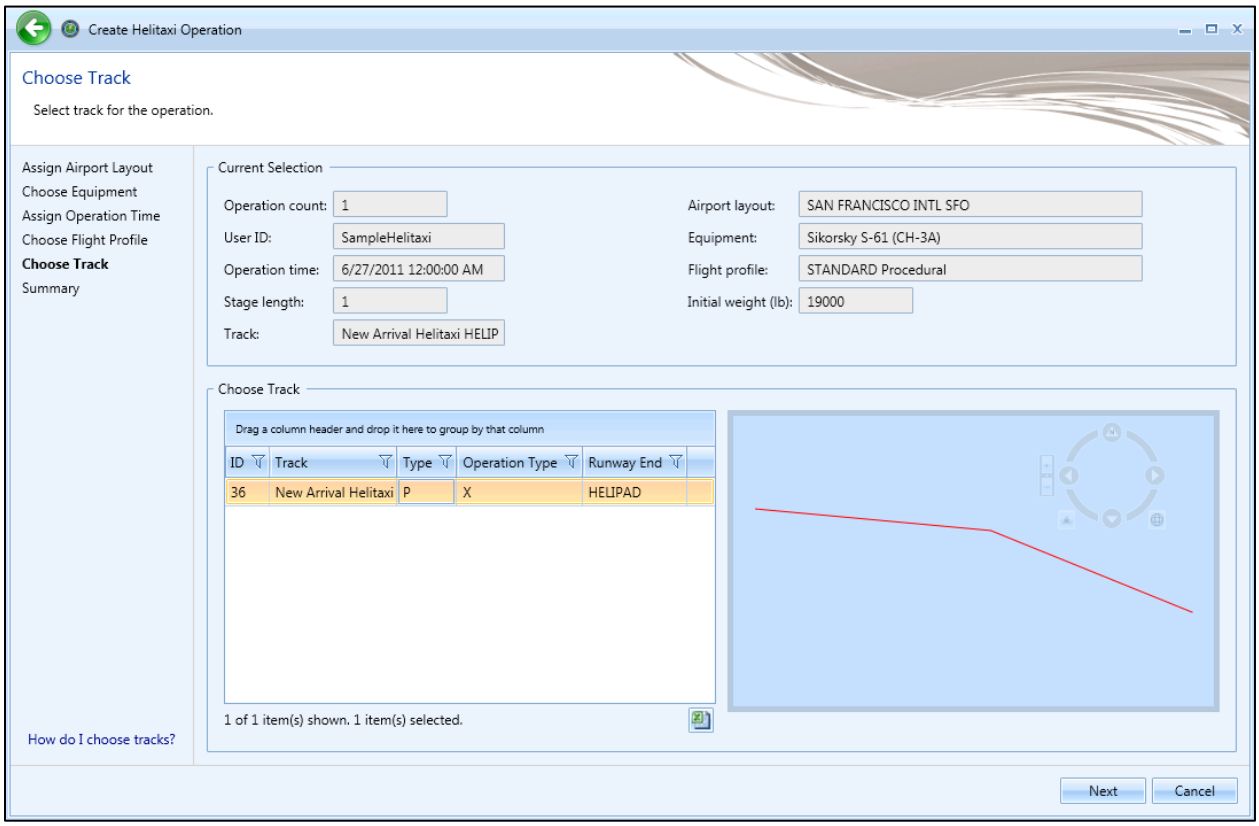


Figure 6-51 Create Helitaxi Operation – Choose Track

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.

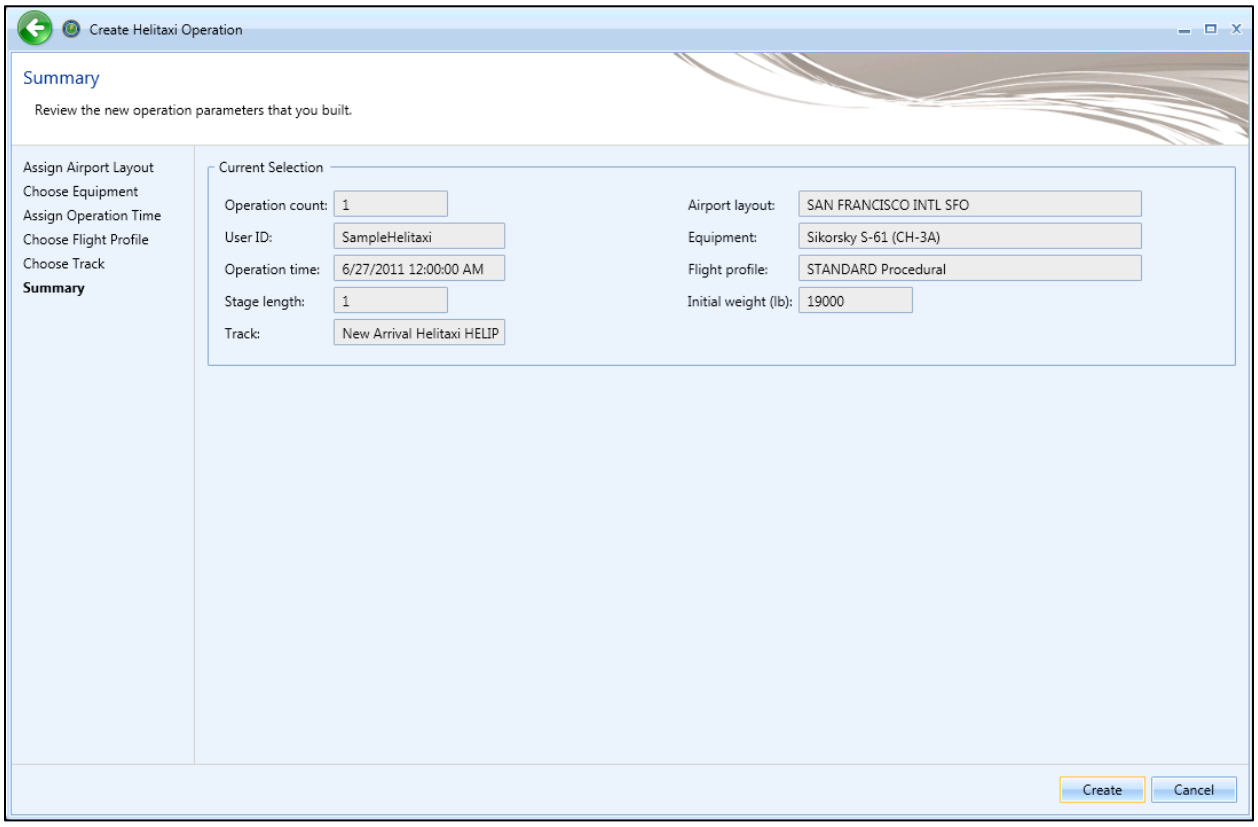


Figure 6-52 Create Helitaxi Operation – Summary (Single)

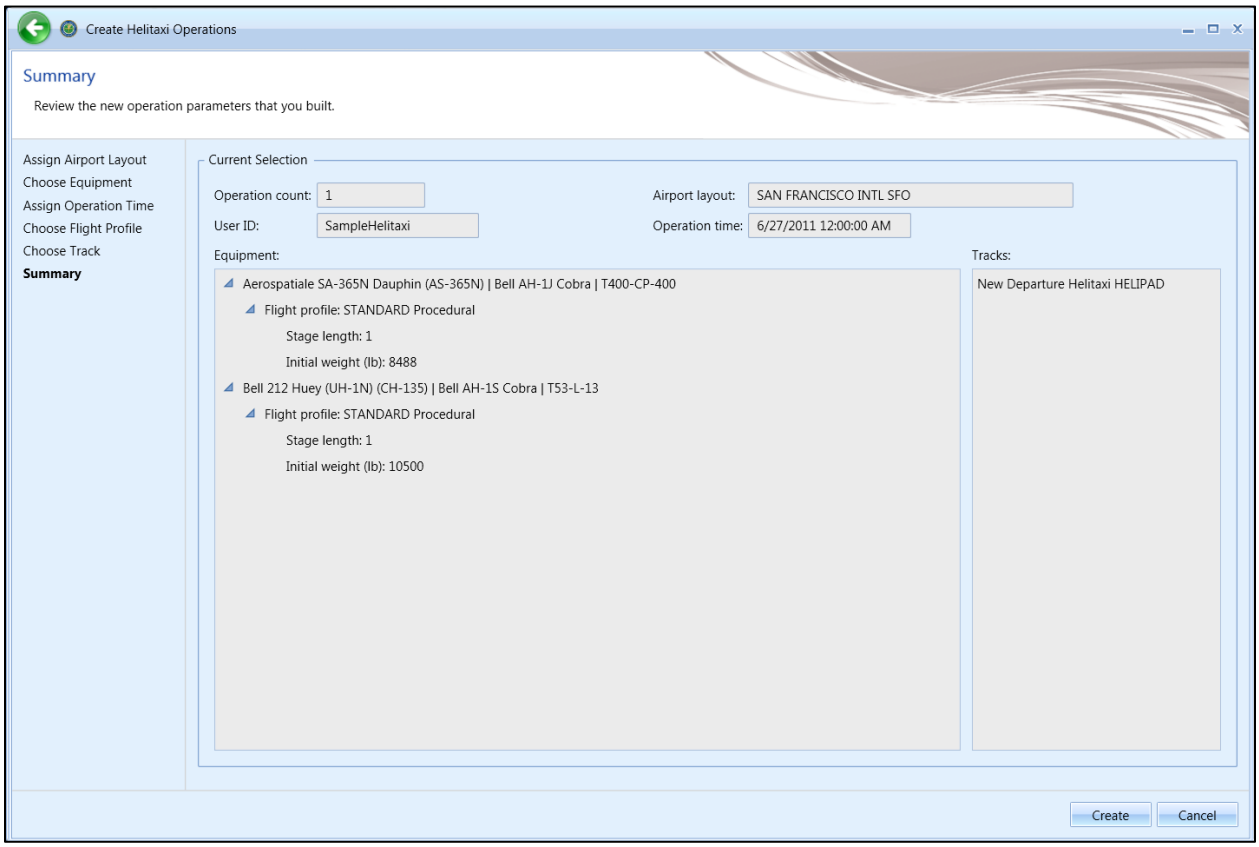


Figure 6-53 Create Helitaxi Operation – Summary (Bulk)

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.

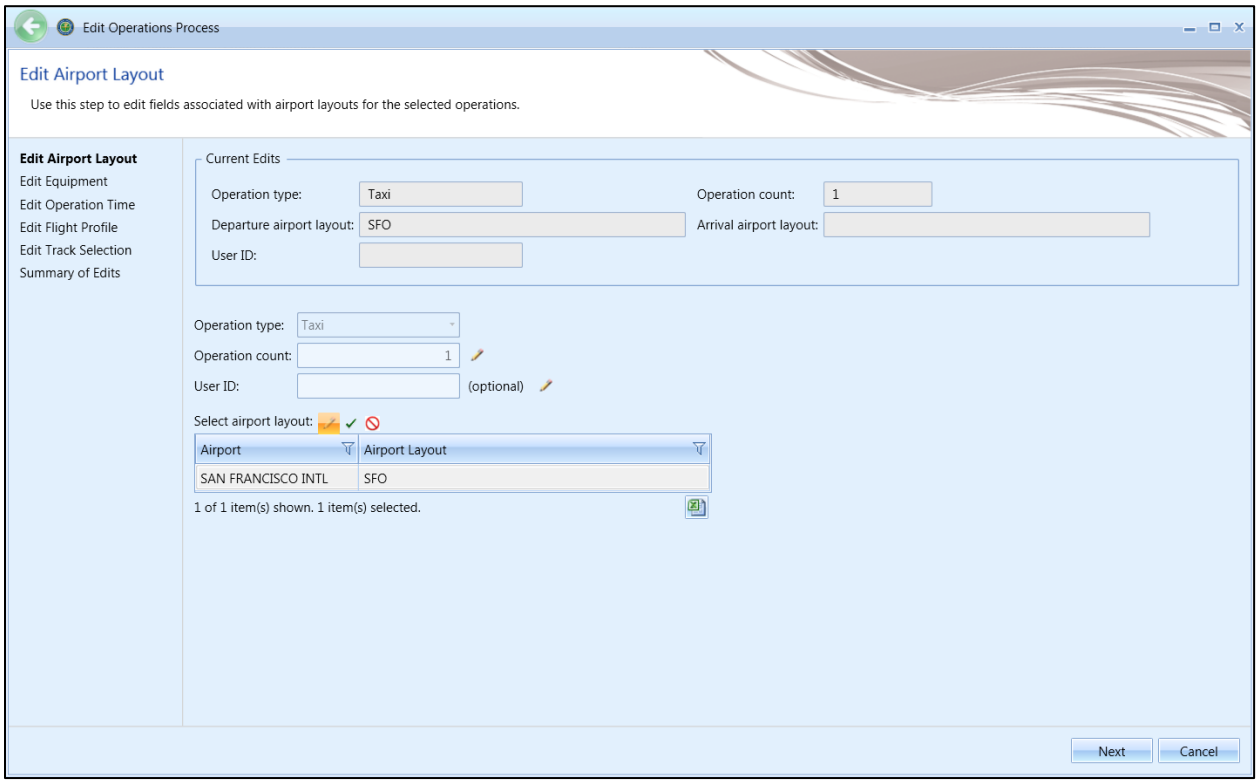


Figure 6-54 Bulk Helitaxi Operations Edit

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* to delete the currently selected operation.

6.6 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 adjust contributions of individual operation groups by scaling operations up or down using weightings and model alternative scenarios from a baseline scenario.

In the AEDT workflow, operations of interest are organized into reusable 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, different weighting can be assigned to each operation group as desired. The operations are scaled by the annualization weight and by the operation count specified in the original definition of the operation.

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. Each wizard step will display the selections of the existing operation.

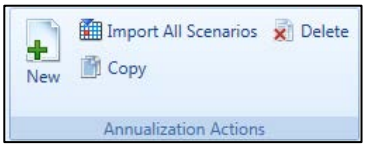


Figure 6-55 Operations Tab – Annualization Actions Ribbon Group

6.6.1 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.

6.6.1.1 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.

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 6.6.1.2), the Create Non-Aircraft Operation Groups step (Section 6.6.1.3), and/or the Create Runup Operation Groups step (Section 6.6.1.4) 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.

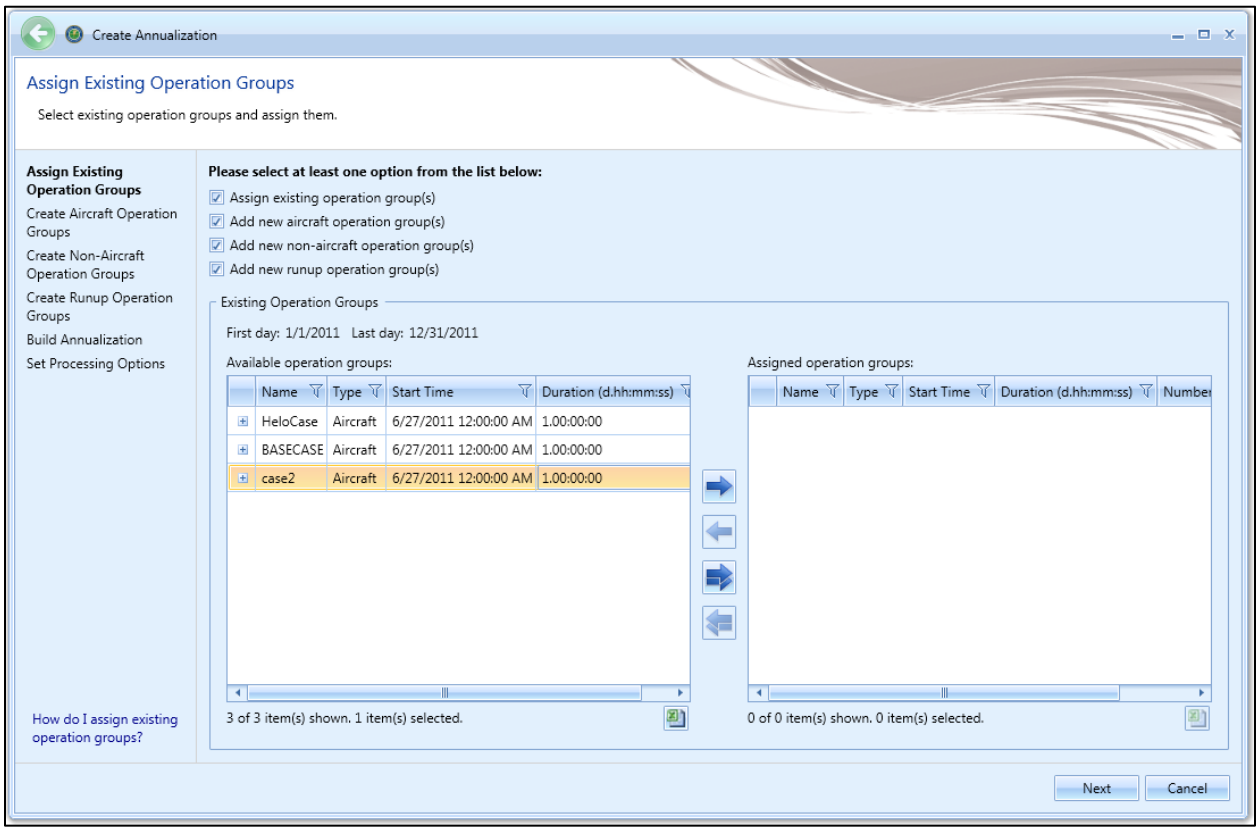


Figure 6-56 Create Annualization – Assign Existing Operation Groups

6.6.1.2 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.

- *Delete Operation Group:* Deletes the selected group and returns the assigned operations to the *Available operations* list.
- *Select Group Operations:* Selects all operations under the selected group in the *Assigned operation groups* list.
- *Select All*: Selects all groups and operations in the *Assigned operation groups* list.
- *Clear Selection*: Clears the current selection in the *Available operations* list.

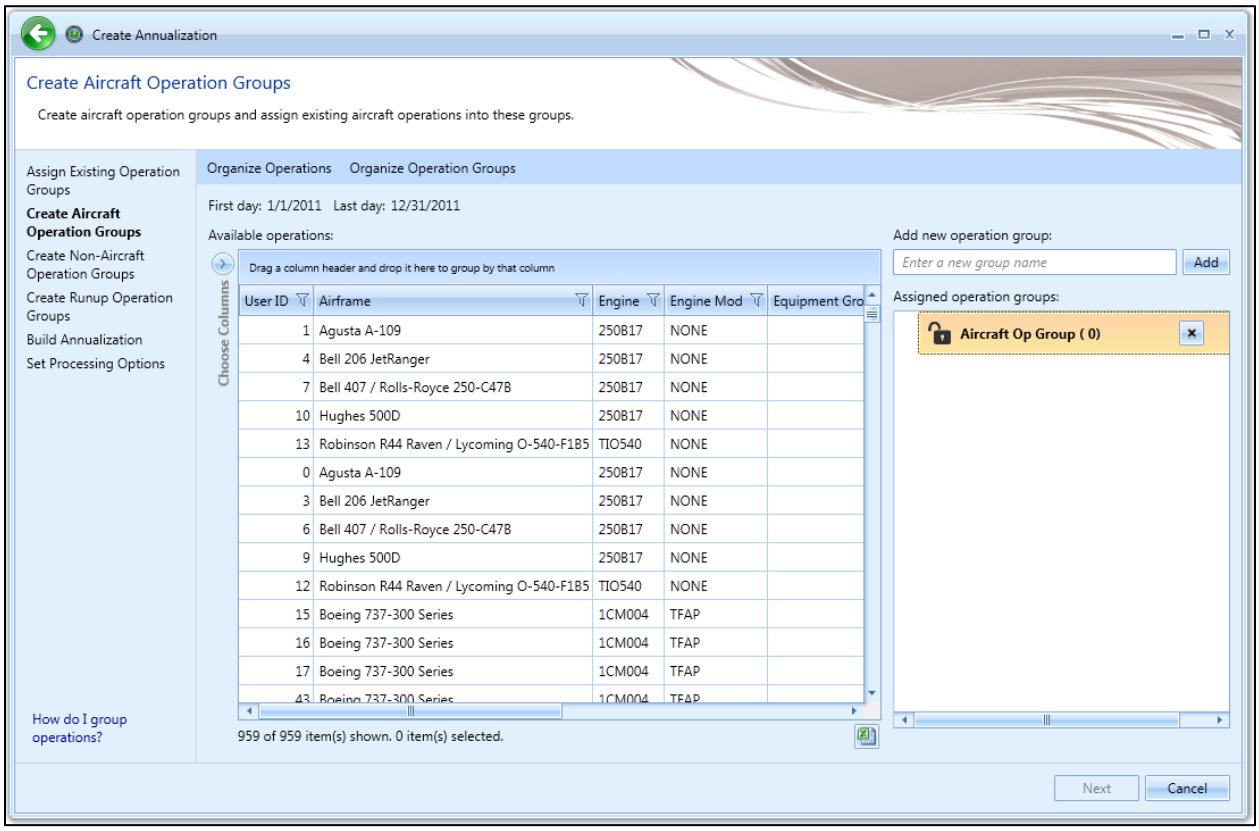


Figure 6-57 Create Annualization – Create Aircraft Operation Groups

6.6.1.3 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:
    - *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.

- *Delete Operation Group:* Deletes the selected group and returns the assigned operations to the *Available operations* list.
- *Select Group Operations:* Selects all operations under the selected group in the *Assigned operation groups* list.
- *Select All*: Selects all groups and operations in the *Assigned operation groups* list.
- *Clear Selection*: Clears the current selection in the *Available operations* list.

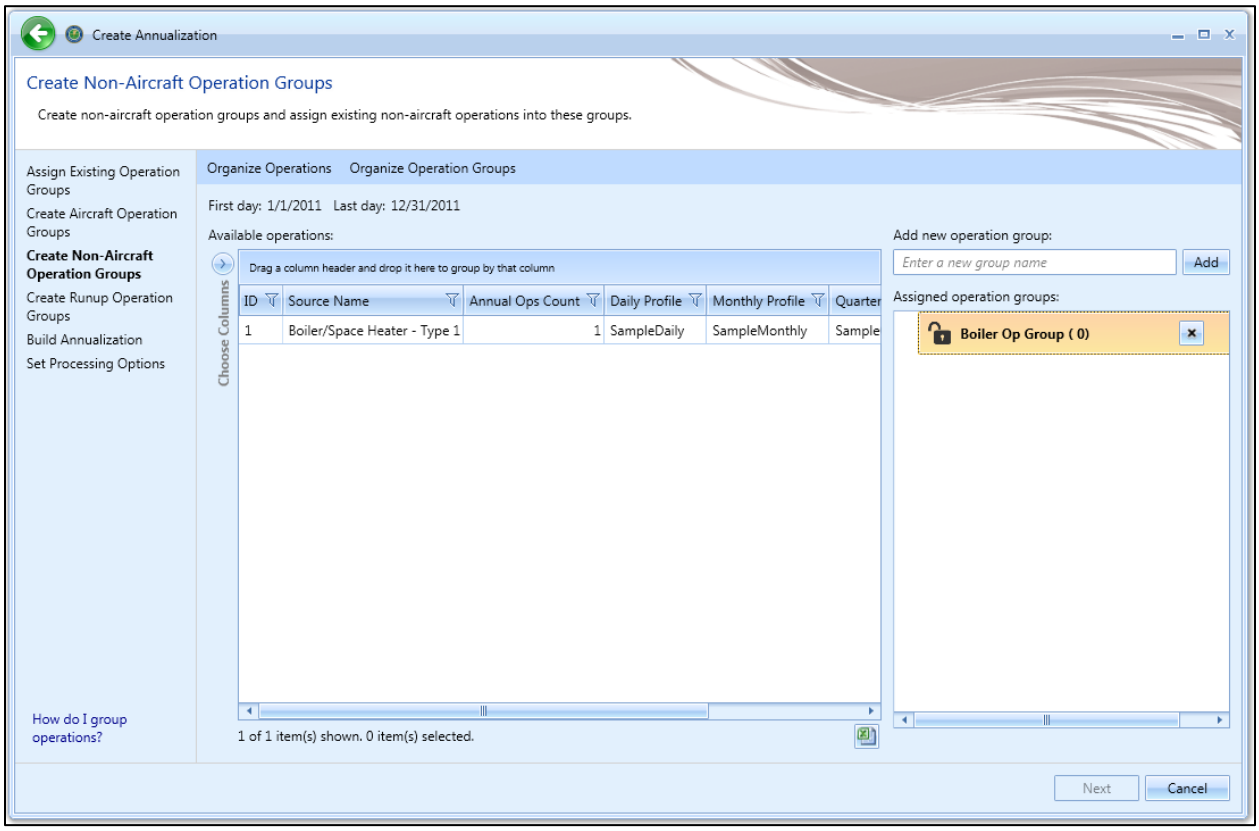


Figure 6-58 Create Annualization – Create Non-Aircraft Operation Groups

6.6.1.4 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.

- *Delete Operation Group:* Deletes the selected group and returns the assigned operations to the *Available operations* list.
- *Select Group Operations:* Selects all operations under the selected group in the *Assigned operation groups* list.
- *Select All*: Selects all groups and operations in the *Assigned operation groups* list.
- *Clear Selection*: Clears the current selection in the *Available operations* list.

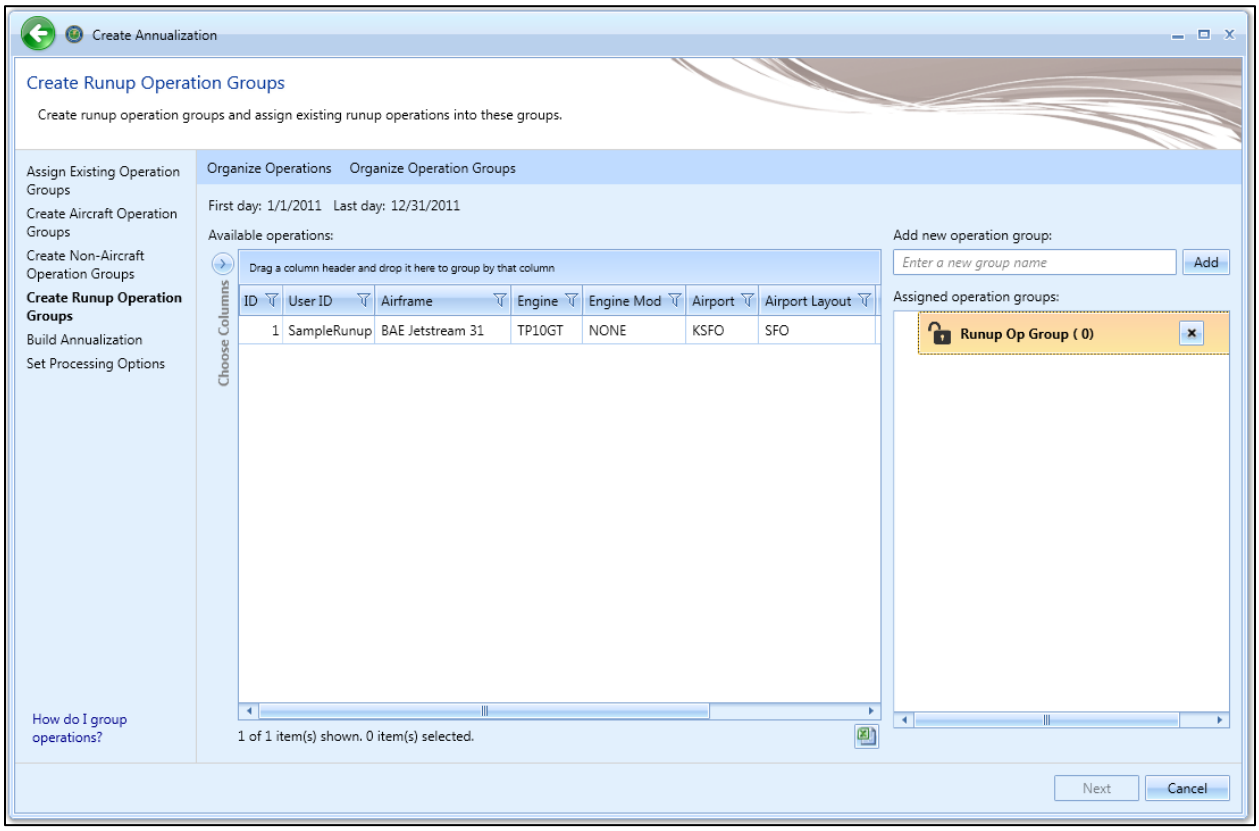


Figure 6-59 Create Annualization – Create Runup Operation Groups

6.6.1.5 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 6-60). 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.

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 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:
  - *Cut:* Removes the selected operations from the *Defined operation groups* list. The operation group name will change to italic font after *Cut* is selected.
  - *Cancel Cut:* Discards the cut operation and restores operations cut from the *Defined operation groups* list.
  - *Select All*: Selects all operation groups in the *Defined operation groups* list.
  - *Clear Selection*: Clears the current selection in the *Defined operation groups list.*
- *Organize Annualization* menu options*:*
  - *Paste*: Adds operation groups that were cut from the *Defined operation groups* list into the selected group in the *Assigned annualization* tree.
  - *Remove Assignments*: Removes the selected operation group(s) and returns them to the *Defined operation groups* list.
  - *Set Weight:* Modifies the weight of the selection in the *Assigned annualization* tree.
  - *Rename Annualization Group*: Modifies the name of the selected annualization group.
  - *Delete Annualization Group:* Deletes the selected annualization group and returns the assigned operation group(s) to the *Available operation groups* list.
  - *Select Annualization Elements*: Selects all operation groups and annualization groups under the selected annualization group in the *Assigned annualization tree*.
  - *Select All*: Selects all annualization and operation groups in the *Assigned annualization* tree.
  - *Clear Selection:* Clears the current selection in the *Assigned annualization tree.*

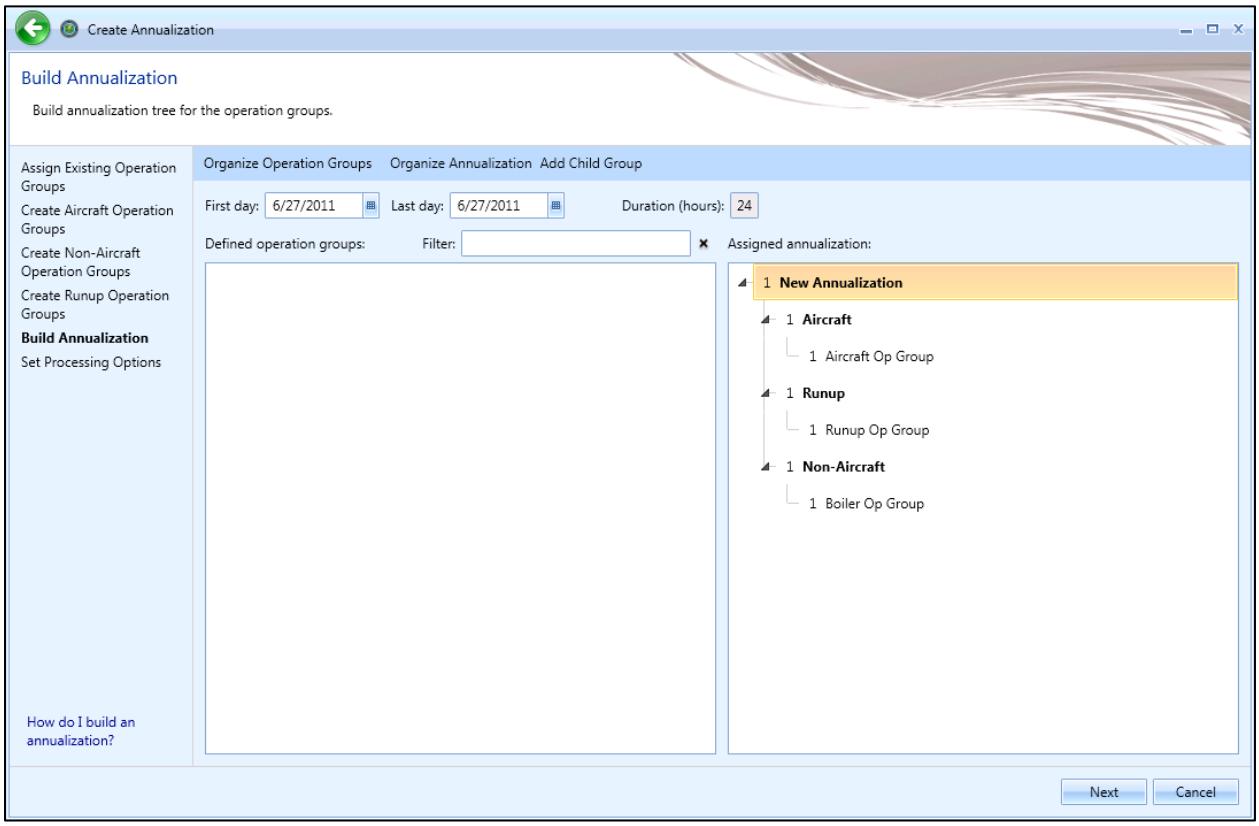


Figure 6-60 Create Annualization – Build Annualization

6.6.1.6 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 4.10).

- *Noise altitude cutoff (ft):* Enter the altitude above field elevation in feet above which noise calculations are no longer processed.
- *Mixing height (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.
- *Fuel sulfur content:* Default value is 0.0006 (0.06%).
- *Sulfur to sulfate conversion rate:* Default value is 0.024 (2.4%).

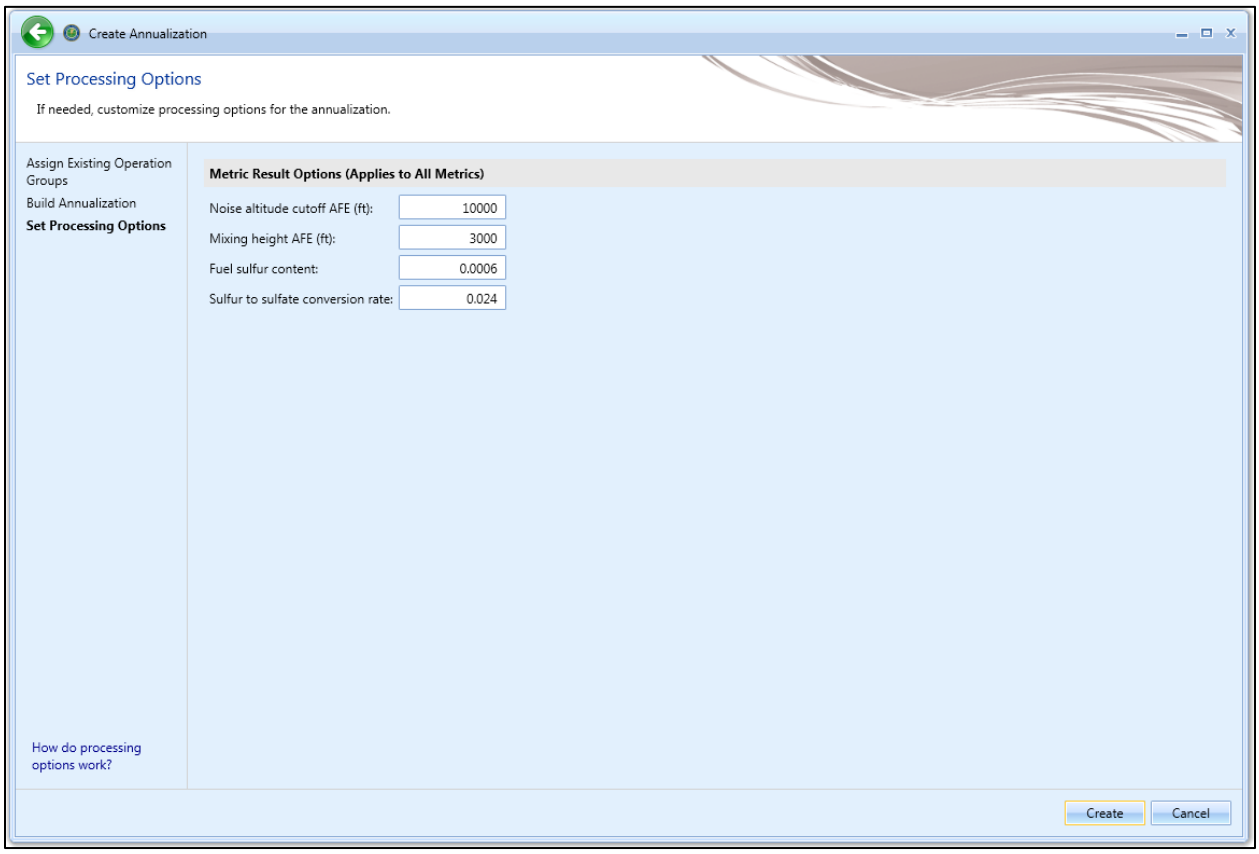


Figure 6-61 Create Annualization – Set Processing Options

6.6.2 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.

6.6.3 Copy Annualization

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

To copy 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.

6.6.4 Delete Annualization

Click *Delete* 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.

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.

Editing flight profiles in the *Equipment* tab, *Aircraft* view is currently not supported. Use the ASIF import feature in order to create a new aircraft with different flight profiles.

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 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.

7.2.3 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 *ASIF* ribbon group, click *Export Aircraft*.
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 Import Aircraft

User-defined aircraft can be imported into the study using a partial ASIF. Refer to the ASIF Reference Guide for details on ASIF structure and content.

To import aircraft from an XML file:

1. From the *ASIF* ribbon group, click *Import Aircraft*. 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.

7.3 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.

Editing GSE emissions factors is not supported through the *Copy* feature. User-defined GSE can be imported as a partial ASIF. See Section 4.4 for more information.

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 basis 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 Delete User-Defined Non-Aircraft Equipment

User-defined non-aircraft equipment can be deleted. System non-aircraft equipment cannot be deleted.

To delete a 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 *Delete*.
3. 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.

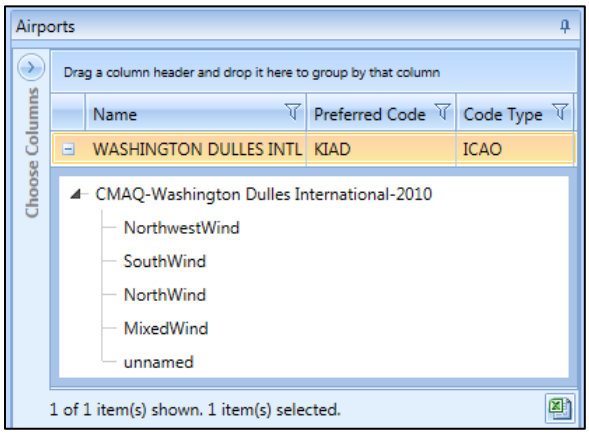


Figure 8-1 Airports Pane

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.

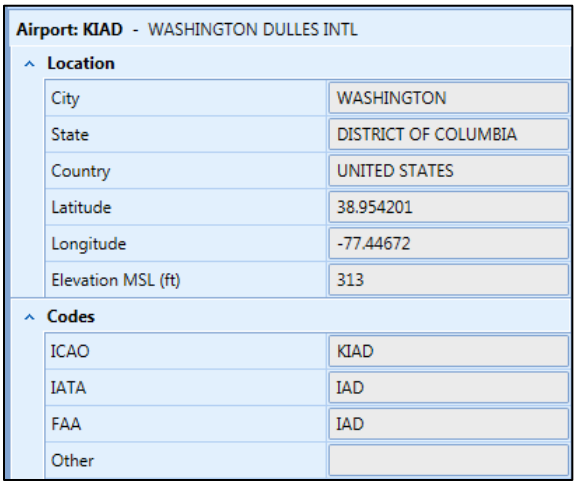


Figure 8-2 Details Pane – Airport

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 include buildings, gates, terminals, helipads, heligates, runway ends, runways, taxiways, taxipaths, roadways, parking facilities, construction zones, tracks, and helitaxi tracks. To display the airport layout layer on the map, see to Section 8.3.2.

- Click the (+) icon to view latitude, longitude, and elevation 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.

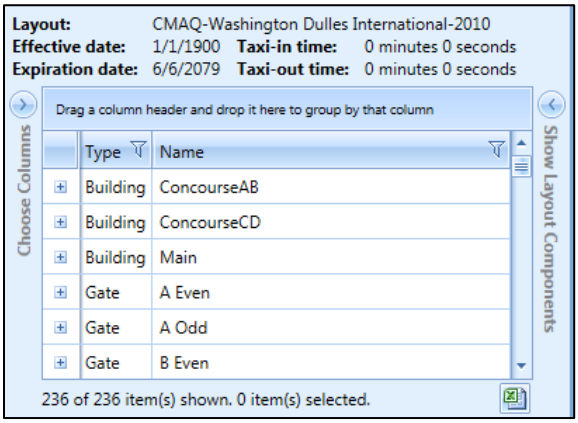


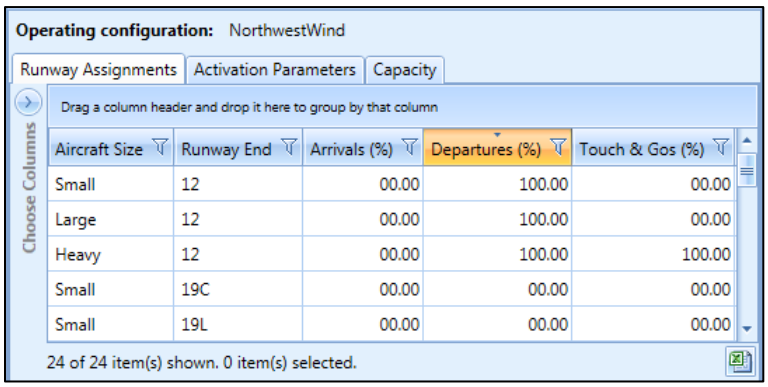
Figure 8-3 Details Pane – Airport Layout

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.



Aircraft Size	Runway End	Arrivals (%)	Departures (%)	Touch & Gos (%)
Small	12	00.00	100.00	00.00
Large	12	00.00	100.00	00.00
Heavy	12	00.00	100.00	100.00
Small	19C	00.00	00.00	00.00
Small	19L	00.00	00.00	00.00

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:
  - *Add Existing Airport*: Click to display the *Add Existing Airport* dialog.
  - *Add New Airport*: Click to display the *Create New Airport in this Study* dialog.
- *Edit*: Click to open the *Edit Airport* dialog.

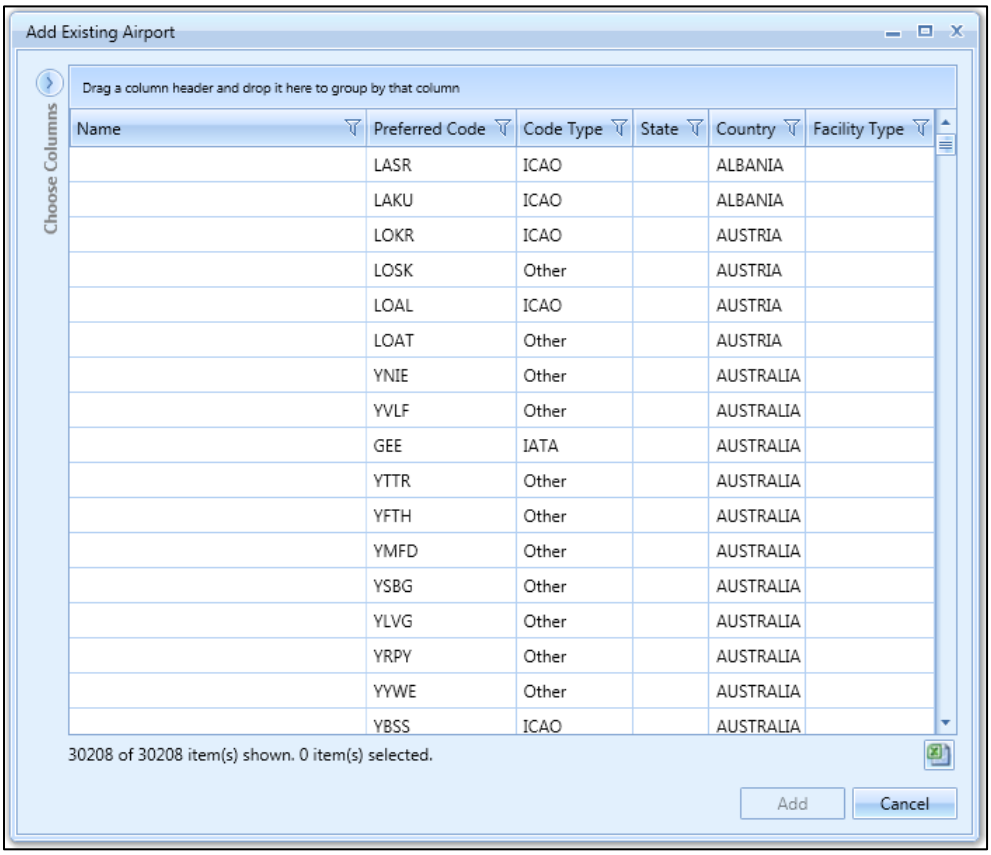
Figure 8-5 Ribbon Group – Airport Actions

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 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 8.3.7 on how to view and edit the airport layout component properties. See Section 8.3.2 on how to view the airport layout on the map.



Name	Preferred Code	Code Type	State	Country	Facility Type
	LASR	ICAO		ALBANIA	
	LAKU	ICAO		ALBANIA	
	LOKR	ICAO		AUSTRIA	
	LOSK	Other		AUSTRIA	
	LOAL	ICAO		AUSTRIA	
	LOAT	Other		AUSTRIA	
	YNIE	Other		AUSTRALIA	
	YVLF	Other		AUSTRALIA	
	GEE	IATA		AUSTRALIA	
	YTTR	Other		AUSTRALIA	
	YFTH	Other		AUSTRALIA	
	YMFD	Other		AUSTRALIA	
	YSBG	Other		AUSTRALIA	
	YLVG	Other		AUSTRALIA	
	YRPY	Other		AUSTRALIA	
	YYWE	Other		AUSTRALIA	
	YBSS	ICAO		AUSTRALIA	

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.

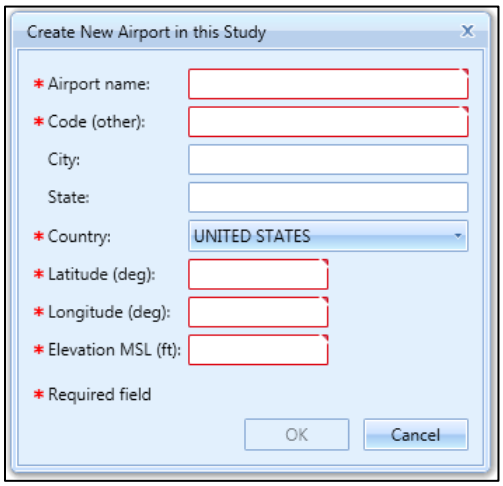


Figure 8-7 Create New Airport Dialog

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.

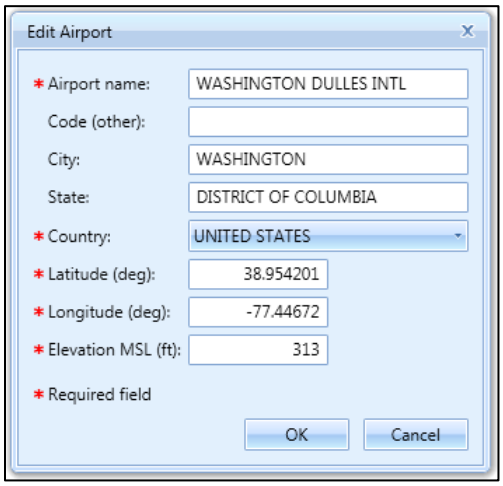


Figure 8-8 Edit Airport Dialog

8.3 Airport Layout Actions

The actions available through the *Airport Layouts* ribbon group (Figure 8-9) are described in the sections below.

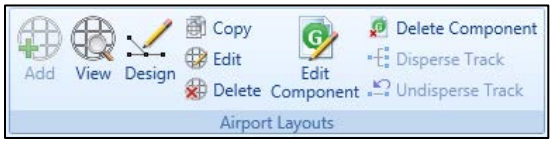


Figure 8-9 Ribbon Group – Airport Layouts

8.3.1 Add Layout

To add a layout for an airport:

1. In the *Airports* pane, select the airport of interest.
2. From the *Airport Layouts* ribbon group, click the *Add* 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.

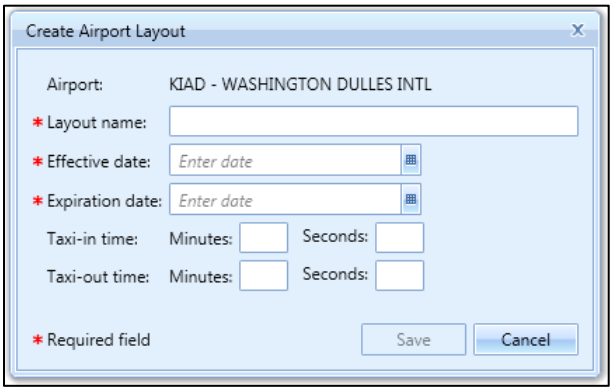


Figure 8-10 Create Airport Layout Dialog

8.3.2 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.

To view an 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* button. 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.

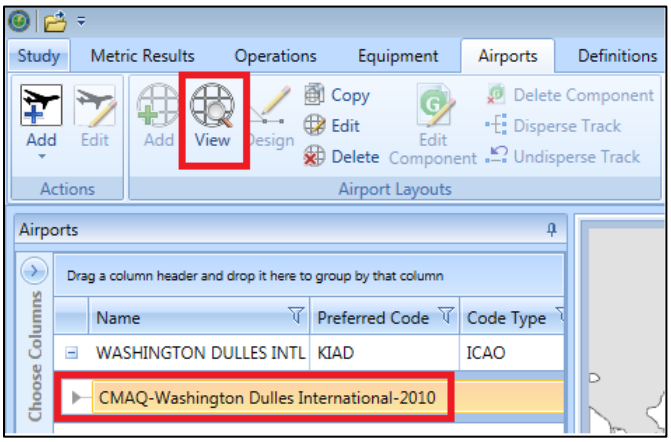


Figure 8-11 View Airport Layout Button

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.

Sensor path type tracks are not displayed on the map as part of the airport layout in the *Airports* tab.

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.

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.

8.3.3 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.

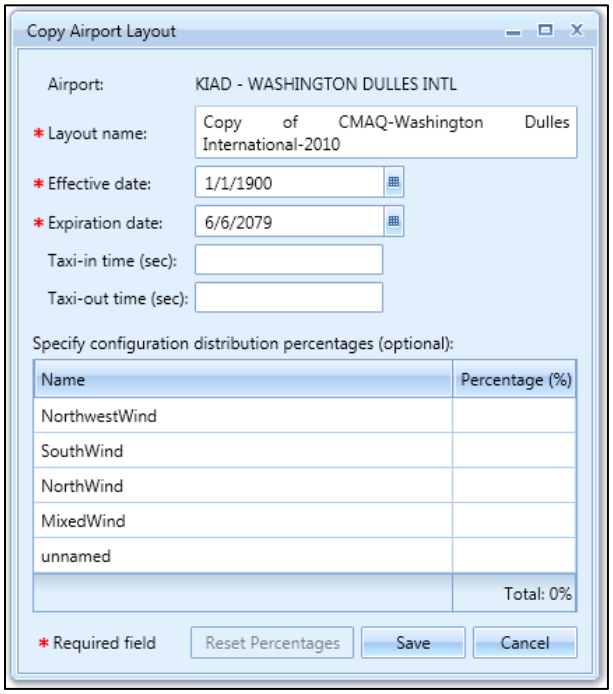


Figure 8-12 Copy Airport Layout Dialog

8.3.4 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.

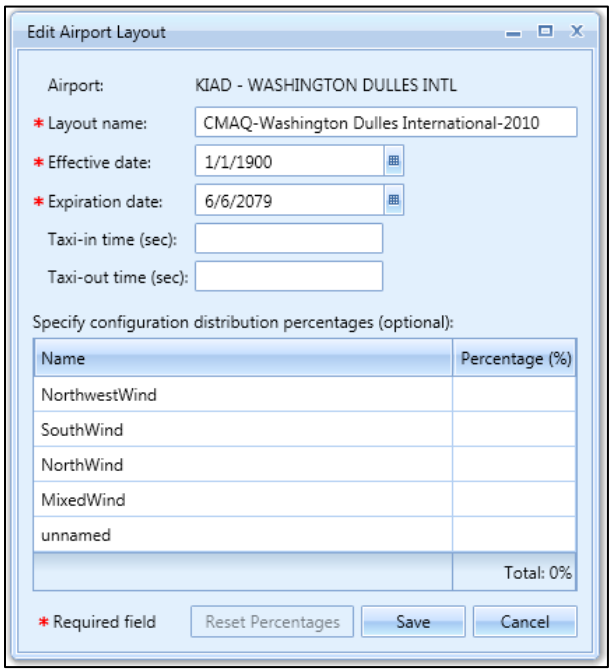


Figure 8-13 Edit Airport Layout Dialog

8.3.5 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.

8.3.6 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 8.3.7.

Figure 8-14 San Francisco Airport with Imagery Base Map

8.3.6.1 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 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 click *View* in the *Airport Layouts* ribbon group to view the airport layout layer (Section 8.3.2).
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.

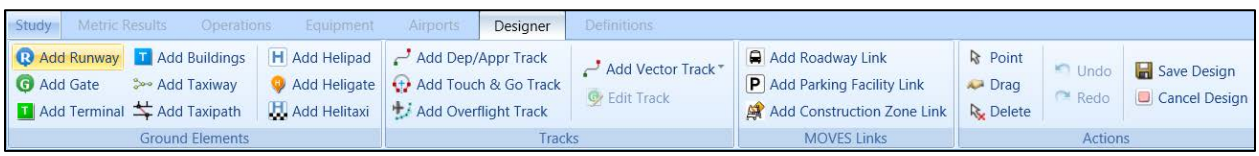


Figure 8-15 Airport Layout Designer Tab

8.3.6.2 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.
- *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.

8.3.6.3 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.

<u>Add Point-Type Tracks</u>

- *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. 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.

<u>Edit Track</u>

- *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.
  - *+* button: Click the *+* button to add a new coordinate row.
  - *Up/Down Arrow* buttons: Use the *Up/Down Arrow* buttons to move the selected row up or down.
  - *X* button: Click the *X* button to delete the selected row.
  - *Clear all* button: Click *Clear all* button to delete all rows.
  - *Save:* Click *Save* to save changes and exit the *Edit Track* pane.
  - *Cancel:* Click *Cancel* to discard changes and exit the *Edit Track* pane.

8.3.6.4 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 "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 8.3.8.10 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 8.3.8.11 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 8.3.8.12 to edit the type of roadway and other properties. Please see "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.

8.3.6.5 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.

8.3.7 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* 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* 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.

8.3.7.1 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. 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.

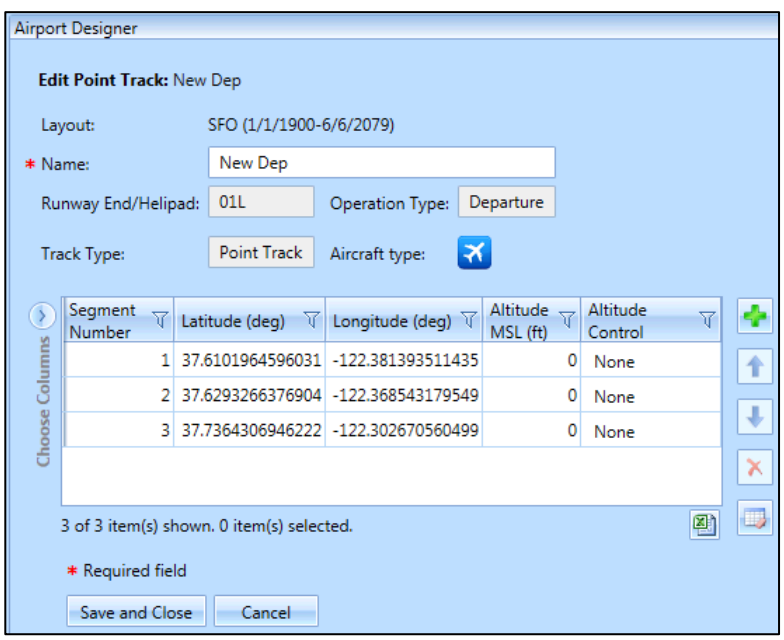


Figure 8-16 Edit Point Track Pane

8.3.7.2 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.

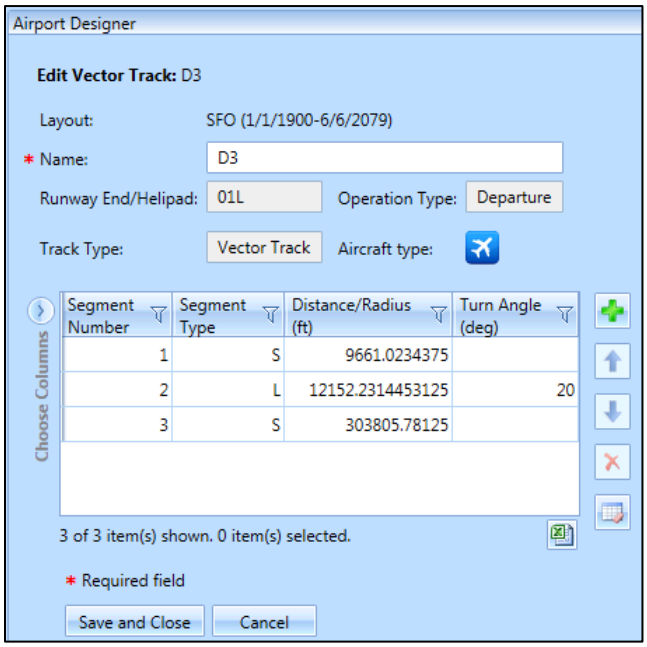


Figure 8-17 Edit Vector Track Pane

8.3.8 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.

8.3.8.1 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.

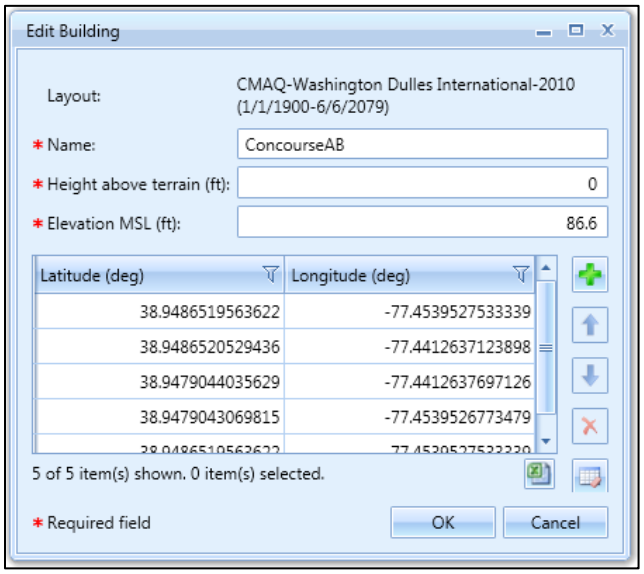


Figure 8-18 Edit Building Dialog

8.3.8.2 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.

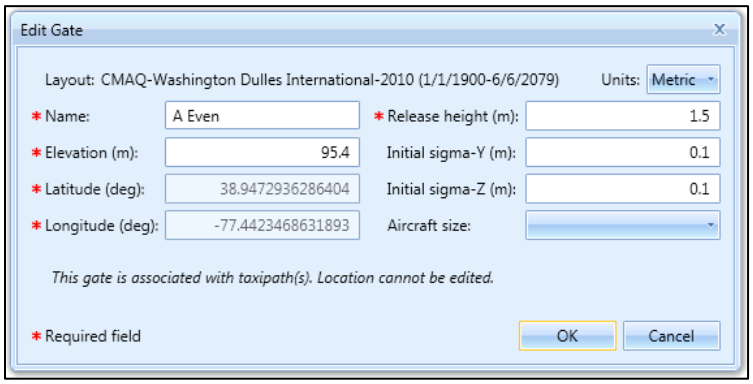


Figure 8-19 Edit Gate Dialog

8.3.8.3 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.

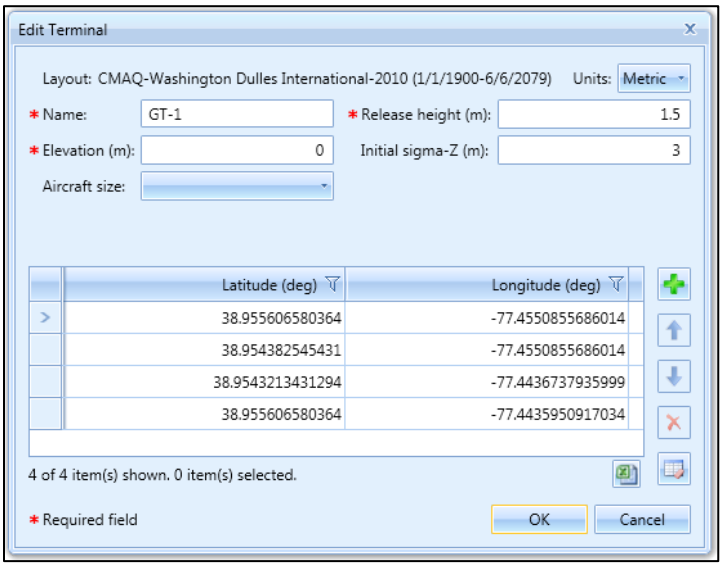


Figure 8-20 Edit Terminal Dialog

8.3.8.4 Edit Runway

The *Edit Runway* dialog displays the details of the selected runway. The width of the runway can be edited.

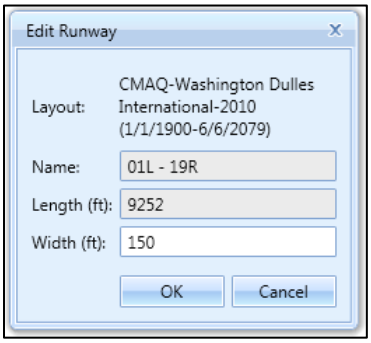


Figure 8-21 Edit Runway Dialog

8.3.8.5 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.

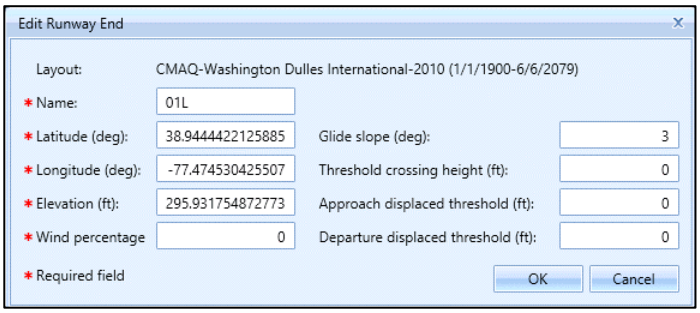


Figure 8-22 Edit Runway End Dialog

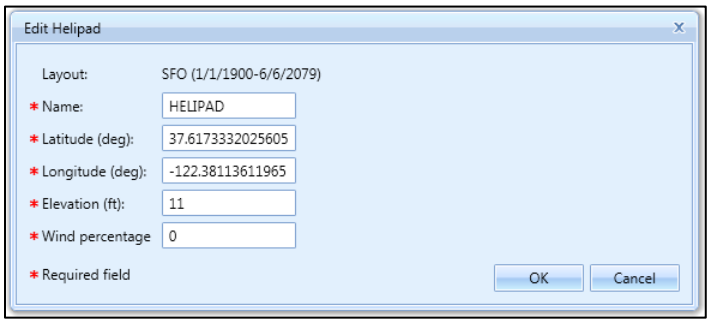


Figure 8-23 Edit Helipad Dialog

8.3.8.6 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.

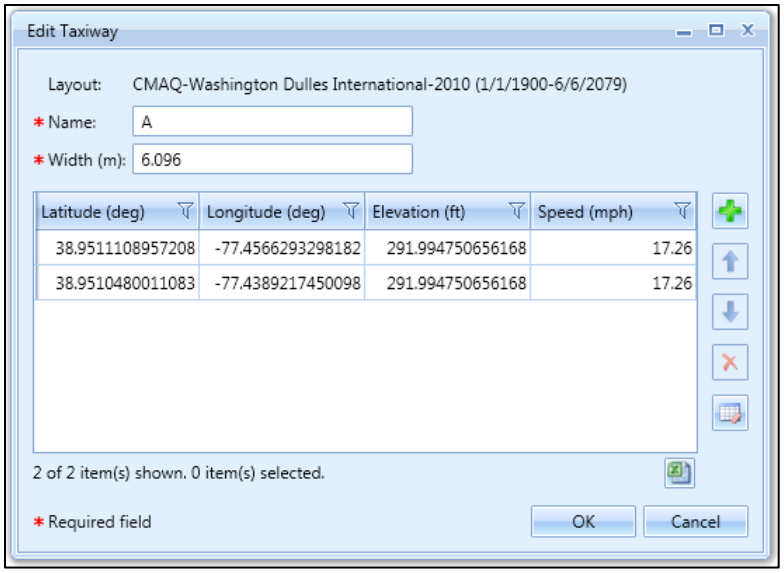


Figure 8-24 Edit Taxiway Dialog

8.3.8.7 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 (*).

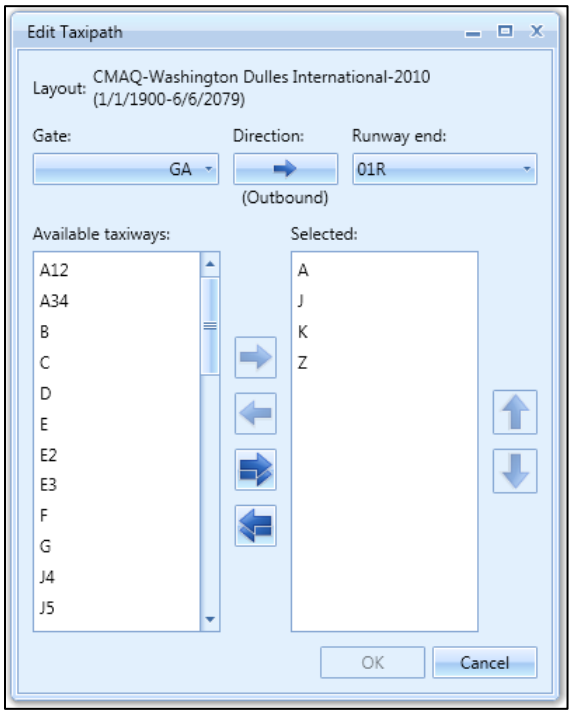


Figure 8-25 Edit Taxipath Dialog

8.3.8.8 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.

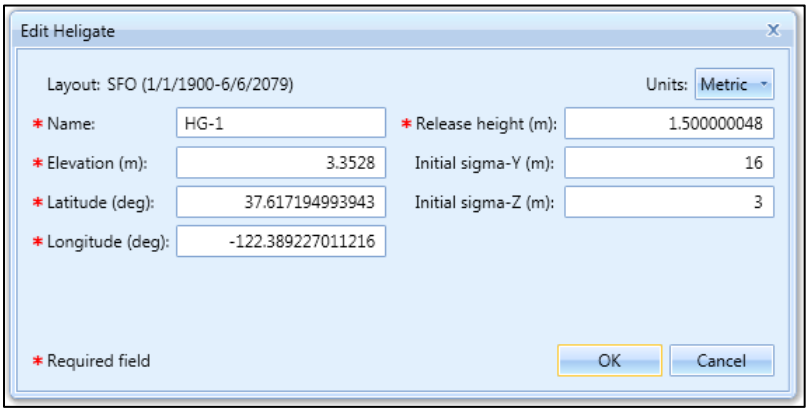


Figure 8-26 Edit Heligate Dialog

8.3.8.9 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.

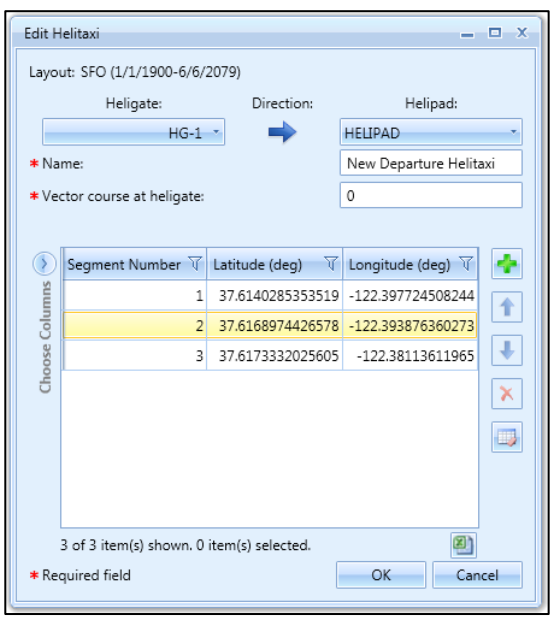


Figure 8-27 Edit Helitaxi Dialog

8.3.8.10 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.

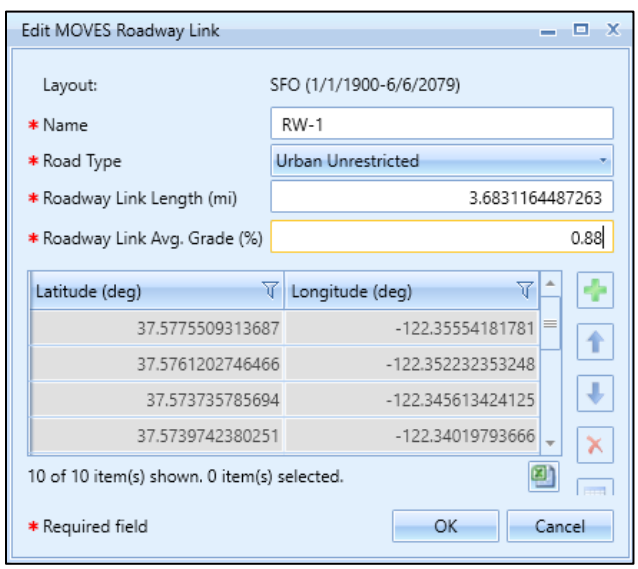


Figure 8-28 Edit MOVES Roadway Link Dialog

8.3.8.11 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.

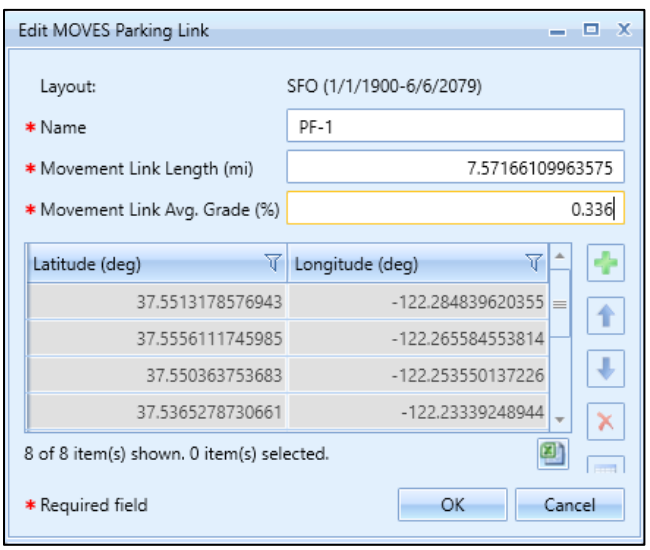


Figure 8-29 Edit MOVES Parking Link Dialog

8.3.8.12 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.

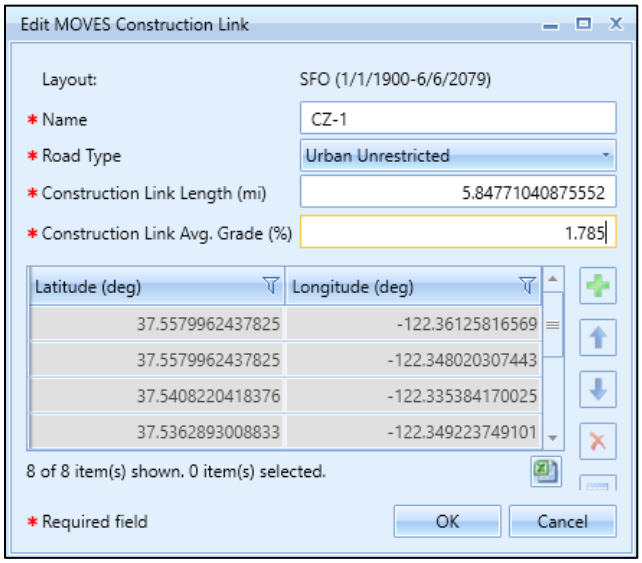


Figure 8-30 Edit MOVES Construction Zone Link Dialog

8.3.9 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.

8.3.10 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.

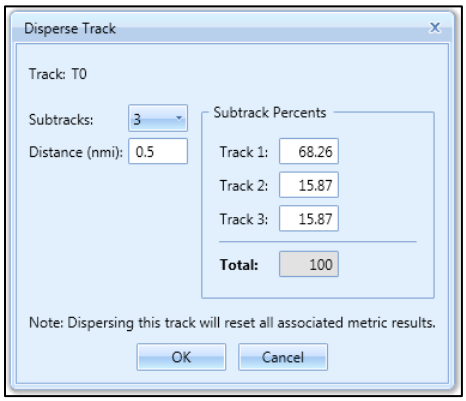


Figure 8-31 Disperse Track Dialog

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* 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* 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.*

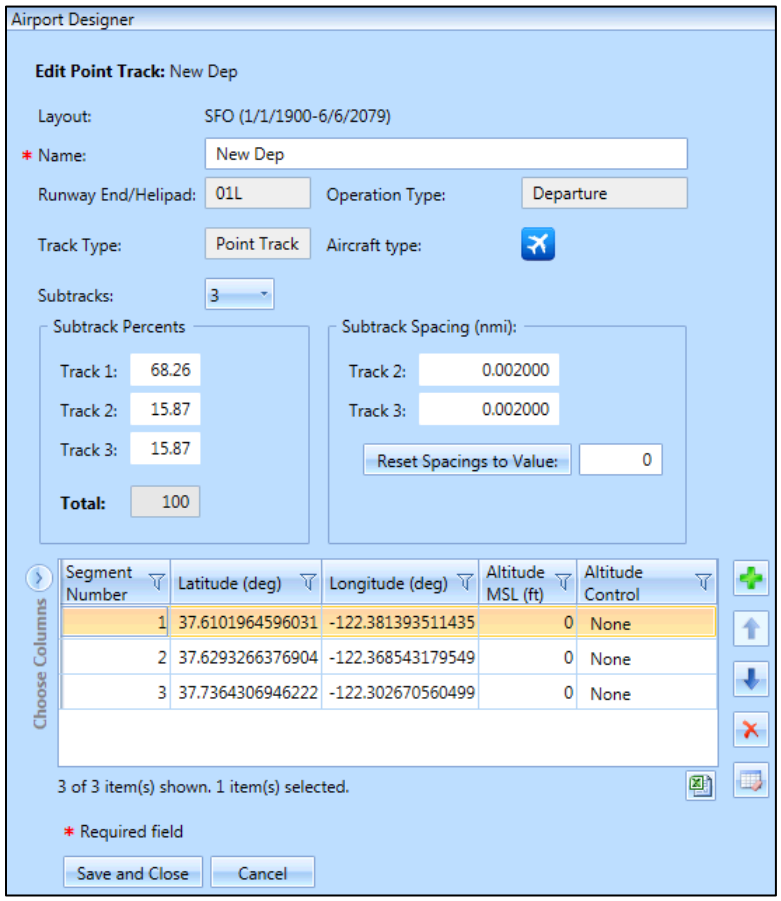


Figure 8-32 Edit Point Track Pane – For Dispersed Track

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 8-9) are described in the sections below. Operating configurations are used in calculations when the Delay & Sequencing modeling option is enabled, see Section 5.2.3.

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.

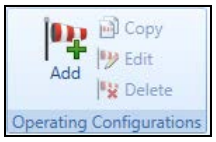


Figure 8-33 Ribbon Group – Operating Configurations

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.

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*.

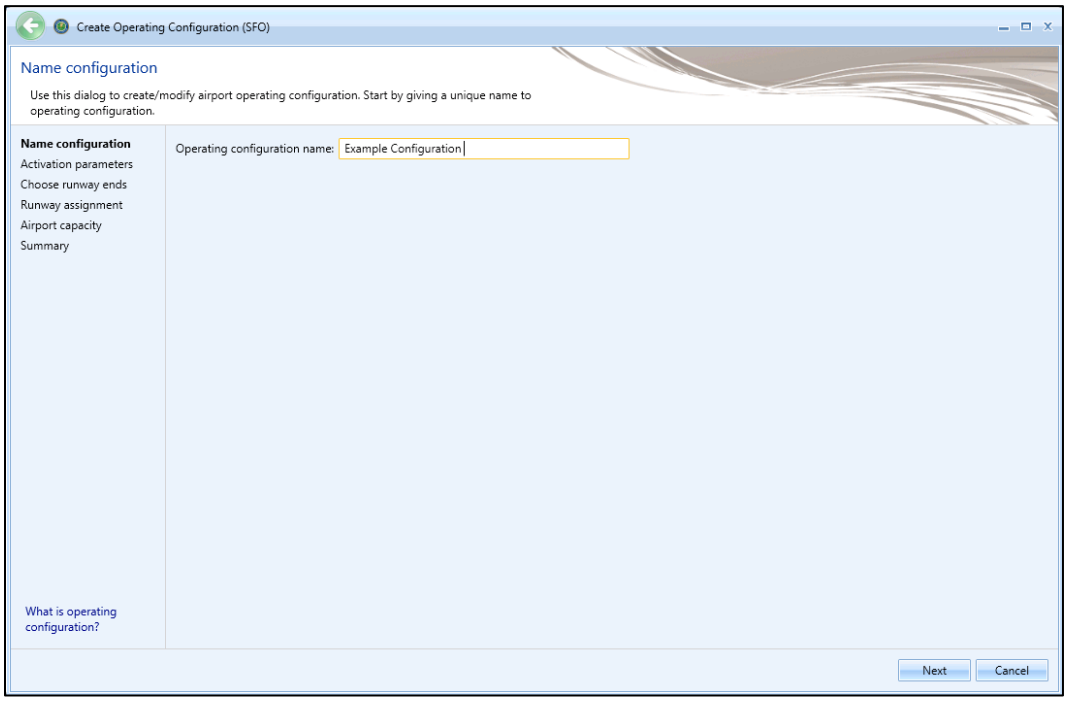


Figure 8-34 Create Operating Configuration Wizard – Name Configuration

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*.

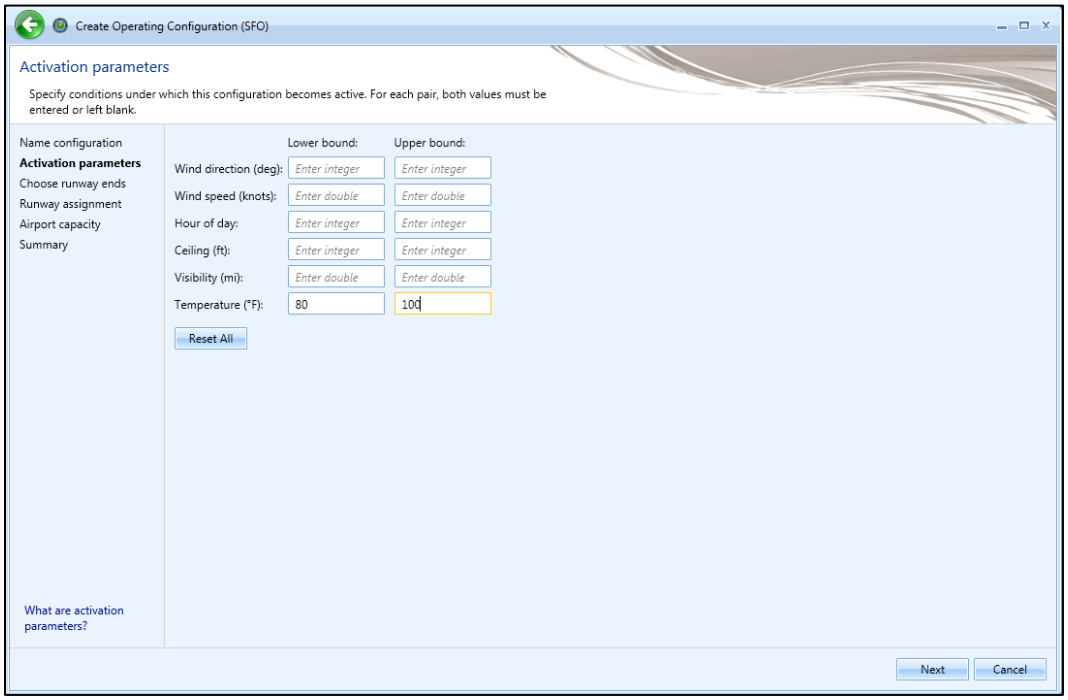


Figure 8-35 Create Operating Configuration Wizard – Activation Parameters

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*.

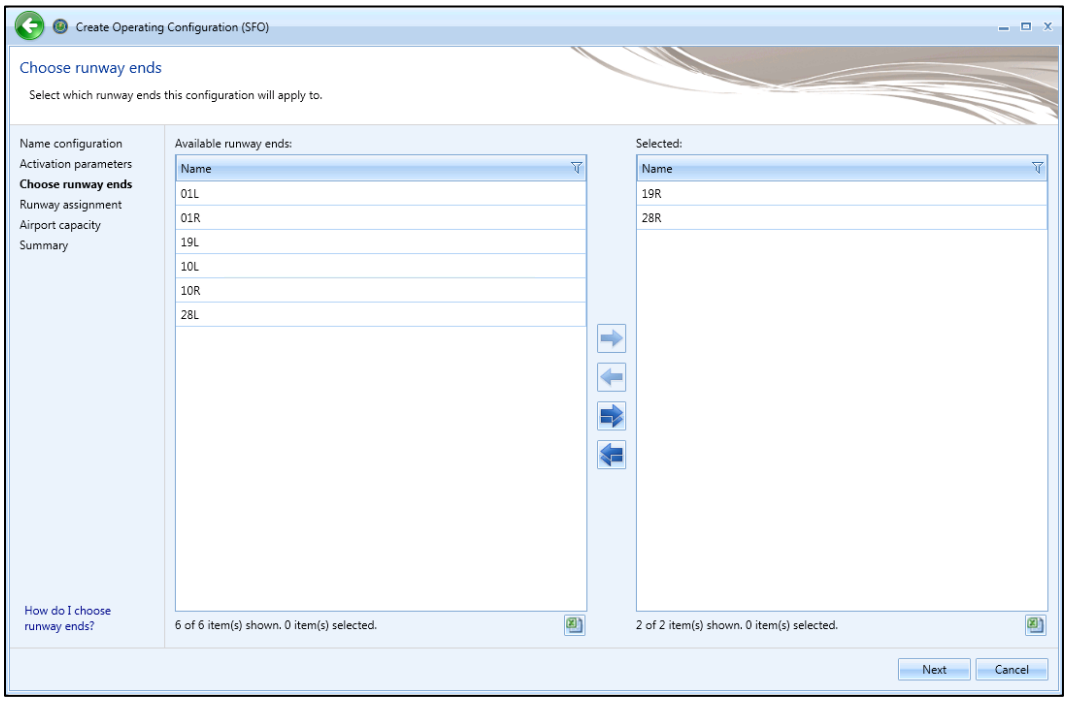


Figure 8-36 Create Operating Configuration Wizard – Choose Runway Ends

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*.

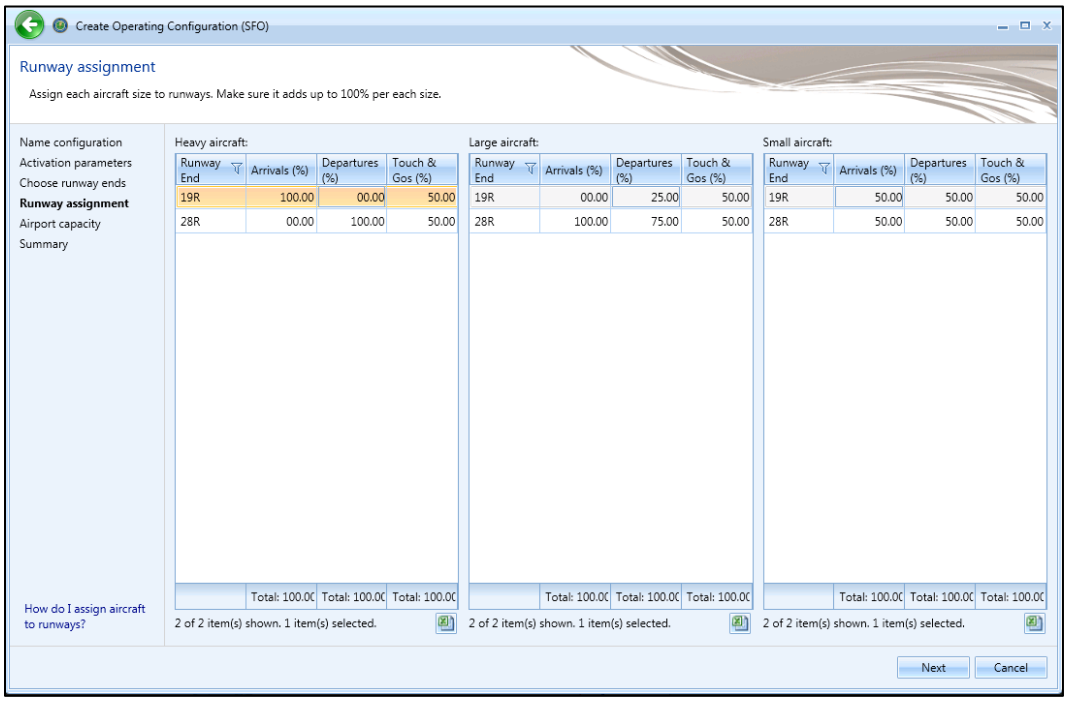


Figure 8-37 Create Operating Configuration Wizard – Runway Assignment

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*.

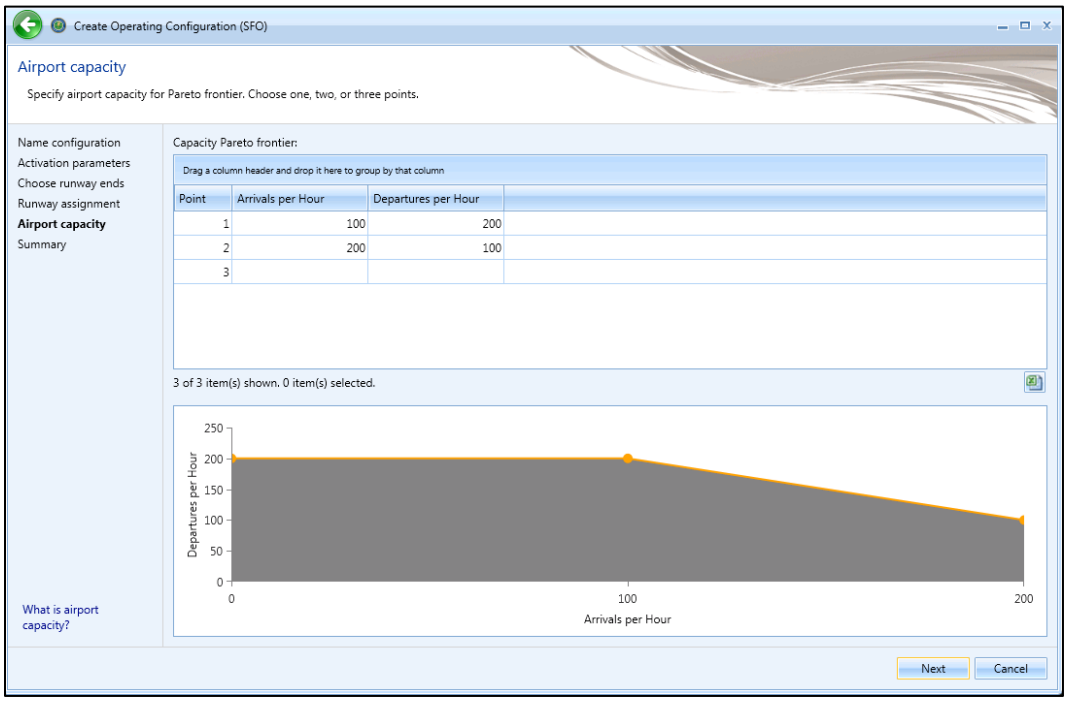


Figure 8-38 Create Operating Configuration Wizard – Airport Capacity

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.

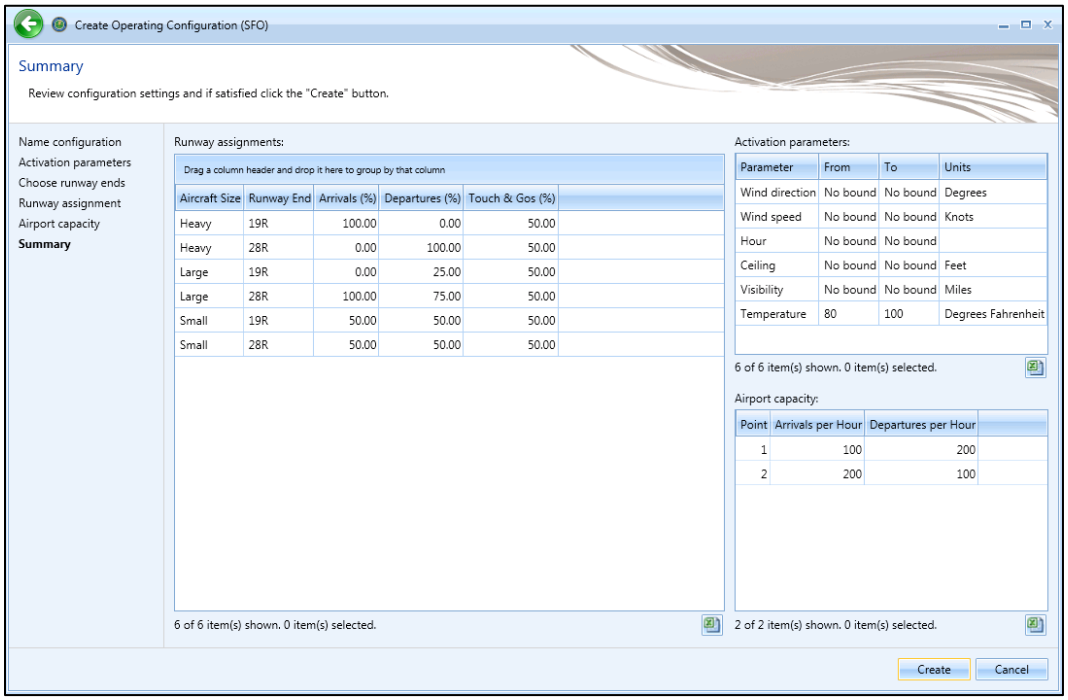


Figure 8-39 Create Operating Configuration Wizard – Summary

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 8.3.6) 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 "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 8-40 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 8.3.8.10)
- 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 8.3.8.10).

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 8.3.8.11).
- 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 8.3.8.11).

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 8.3.8.12).
- 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 8.3.8.12).

9 Definitions Tab

The *Definitions* tab supports setting up study data elements including metrics, receptors, receptor sets, operational profiles, weather, 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 setting for metrics, receptors, receptor sets, operational profiles, weather, and 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 the *Time-averaging constant* option is selected, AEDT will use time averaging correction factor input in the decibels field. See the AEDT 2d 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. From the *Type* drop-down menu, select *Point.*
4. From the *Units* drop-down menu, select a unit.
5. 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.
6. 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.

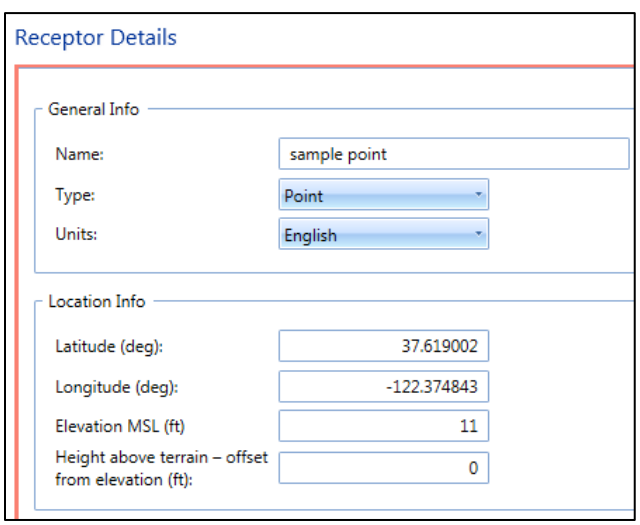


Figure 9-2 Point-type Receptor Definition

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. 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.

Height above terrain – offset from elevation: This height corresponds to the height of the receptor, for example, the height of a microphone or person. This value is only used for point-type receptors and only when terrain files are used.

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. 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. The *Location Info* section is set to the airport origin by default. Use one of the following methods to specify the grid location:
    - Method 1 – use latitude and longitude:
        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 – use offsets:
        1) Confirm that the *Location Info* represents the desired airport location (i.e. airport origin) or desired point of origin.
        2) In the *Grid Origin Info* section, specify the location of the lower left (southwest) corner of the grid as an offset from the airport origin by specifying the *X offset* and *Y offset* parameters. Consider that for the lower left corner of the grid to be to the southwest of the airport (or point of origin), the offsets must be entered as negative values.

8. If desired, select the *Restrict by Boundary* checkbox to create a multi-point receptor set restricted by a polygon (Section 9.3.2.1).
9. 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.

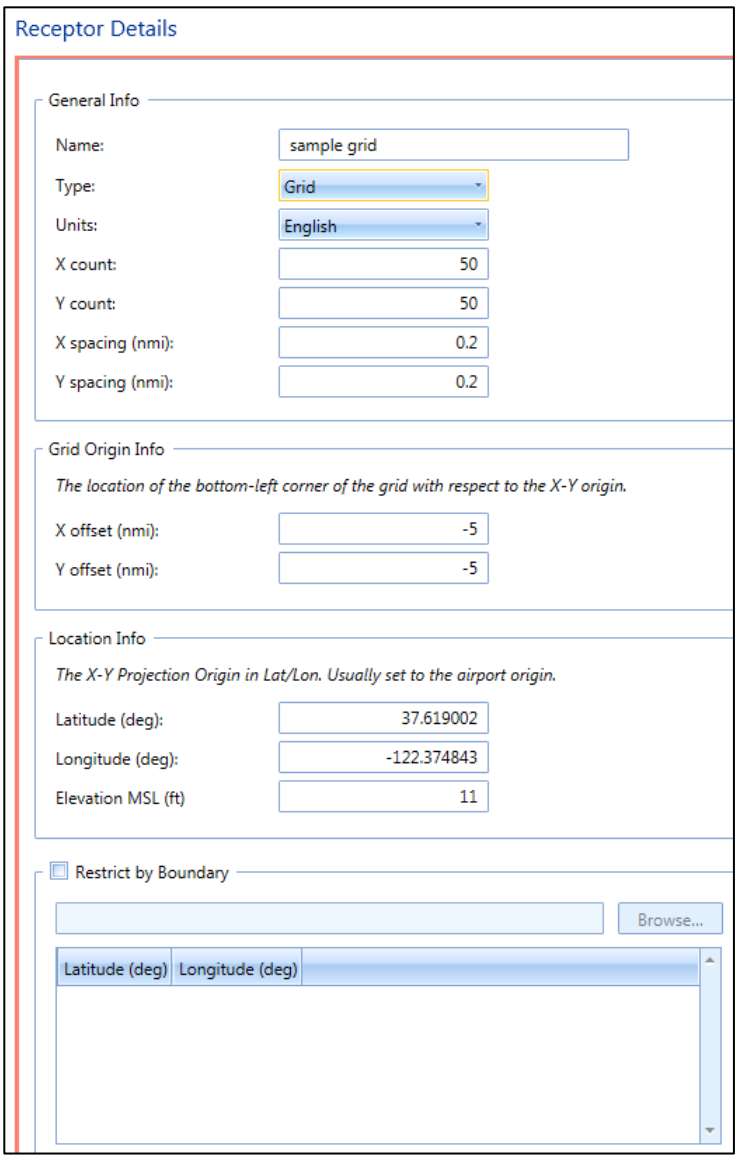


Figure 9-3 Grid-type Receptor Definition

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.

- Click *Update Grid Origin* to change the *Location Info* to the airport origin and to update the *Grid Origin Info* to the lower left corner of the grid as an offset from the airport origin. The *Update Grid Origin* button is only enabled when both *X offset* and *Y offset* fields are set to 0.
- Click *Reset Grid Origin* to return to the previous values (Figure 9-4).

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.

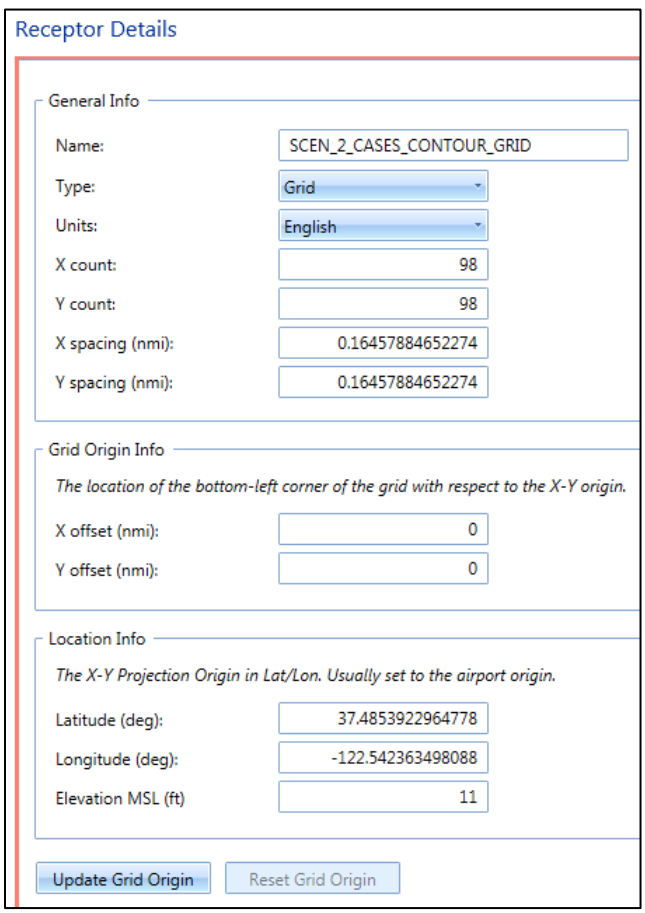


Figure 9-4 Grid-type Receptor Definition – Update Grid Origin

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.

The *Restrict by Boundary* feature is only available for grid-type receptors.

Different boundary files can be used to restrict different receptors.

The *Restrict by Boundary* feature is independent of the study boundary feature (Section 3.7.7). If a study boundary is defined, the receptors in a restricted receptor set are subject to the study boundary as any other receptor set.

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 processed, 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 format 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 lat/long 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.

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.

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 system noise metrics (not user-defined noise metrics).

Annualization weightings are not applied to noise metrics processed with dynamic grids.

Distributed processing is not supported for running metric result with a dynamic grid.

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*.
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.

d. From the *Available Receptors* list, select the receptor created in the step 1, and click *Add Arrow*.
e. Click *Save* to create the dynamic grid receptor set or *Cancel* to discard changes.

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
- Minimum closed contour value = 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 runtime. 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 runtime 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 profile-based operations, the "*Apply Delay & Sequencing Model on Taxi*" option must be selected, and operating configuration and taxi network must exist in the study airport layout.

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 modelling. An overview of the available data types are described in this section.

Airport Weather Data

By default, AEDT uses the airport average annual weather from the AEDT Airport database for the aircraft performance modeling. Average annual weather can be used as follows:

- To only use airport weather for aircraft performance modeling (i.e. no substitution for missing data), select the Use Airport Weather in Set Processing Options screen (Section 5.2.4.3).
- To use airport weather and substitute any missing data with ISA weather, select the Use High Fidelity Weather in Set Processing Options screen (Section 5.2.4.3). The high fidelity weather folder does not need to be specified.

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.

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, Downloads page 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[3] 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 for 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.

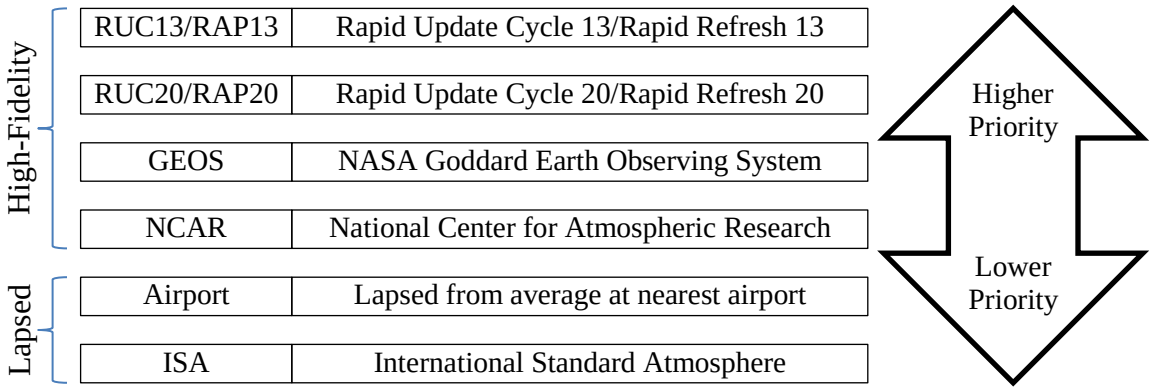


Figure 9-5 Cascade of Weather Data Sources

When using the RUC/RAP, GEOS, or NCAR high fidelity weather data, a rectangular study boundary is required and is used to limit the area that will be processed with high fidelity weather data. The study boundary should be larger than the flight tracks being modelled (usually 100 nmi beyond the track). See Section 3.7.7 for information on the study boundary.

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.

Both WRF and MERRA-2 weather data types must be stored in their own folders.

[3] RAP data is the next-generation version of the RUC and officially replaced RUC in May 2012.

Emissions Dispersion Weather

Emissions dispersion requires special weather data files as described Section 9.6.3.

9.6.1 Airport Weather

To view the average annual weather data of 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. Make desired edits.
4. Click *Save* to apply changes or *Cancel* to discard changes.

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:

Copy the emissions dispersion weather files in the AERMOD format to the displayed directory, *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files.*

9.6.3 Generate Emissions Dispersion Weather Files

To generate emissions dispersion weather files in the AERMOD format, click the *Weather* display button in the *Definitions* tab then select *Generate emissions dispersion weather files*.

To generate emission dispersion weather files:

1. From the *Actions* ribbon group, click the *Edit* button to enable the data fields.
2. Select the First day and Last day.
3. 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.
4. Select or enter desired settings:
   - Randomize NWS wind directions (+/- 5 degrees)
   - Substitute missing data

- File name prefix
- Wind height
- Roughness
- Bowen ratio
- Albedo

5. Click *Process*. The emissions dispersion weather files (~SFQAFILE.MET, ~UAQAFILE.MET, ~.SFC, and ~.PFL) are generated and saved to the following directory *C:\AEDT\DATA\[User name]\[Study name]@[SQL Server Instance Name]\Output_Files.*
6. 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, TD3280
- Upper air weather: FSL ASCII, TD6201

AERMOD weather files are described in the AERMET user guide (http://www.epa.gov/scram001/7thconf/aermod/aermetugb.pdf).

- SFQAFILE.MET file is produced from the raw hourly surface weather file, independent of the raw surface weather format.
- UAQAFILE.MET file is produced from the raw upper air weather file, independent of the raw upper air weather format.
- .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 following directory *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

9.6.4 Wind Categories for Emissions Dispersion

To edit wind speed categories for emissions dispersion modeling, click the *Weather* display button in the *Definitions* tab then select *AERMOD wind categories for emissions dispersion.*

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 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 4.11.14.

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 “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 5.2.4.2).

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.

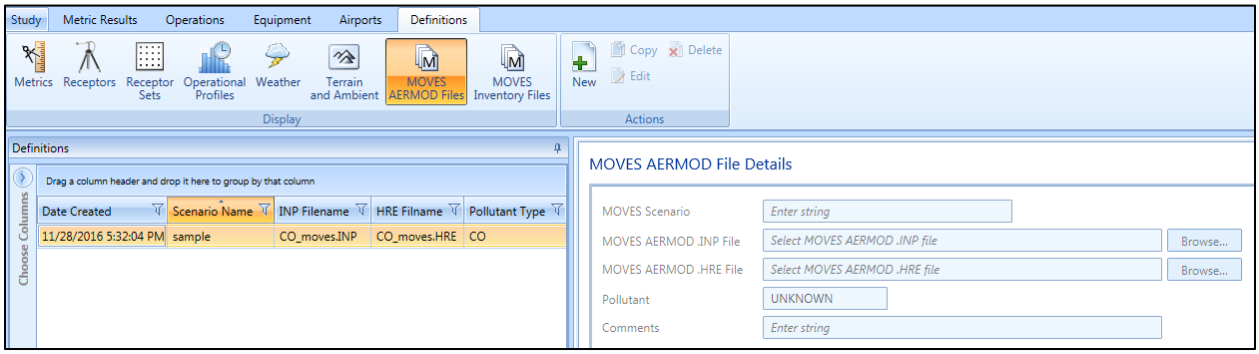


Figure 9-6 MOVES AERMOD Input Files and Scenarios

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 9-7). The list will only include MOVES AERMOD Scenarios with a pollutant type that matches that of the metric result.
4. Run the metric result.

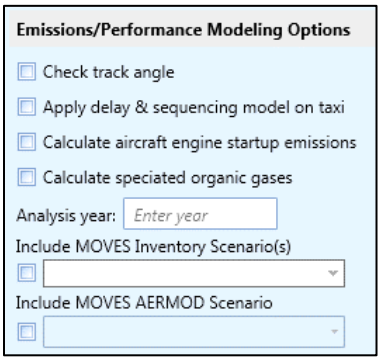


Figure 9-7 Emissions/Performance Modeling Options

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 "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 File* 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 "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 CO2 90 PM10 100 PM2.5 110 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 9-8). 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.

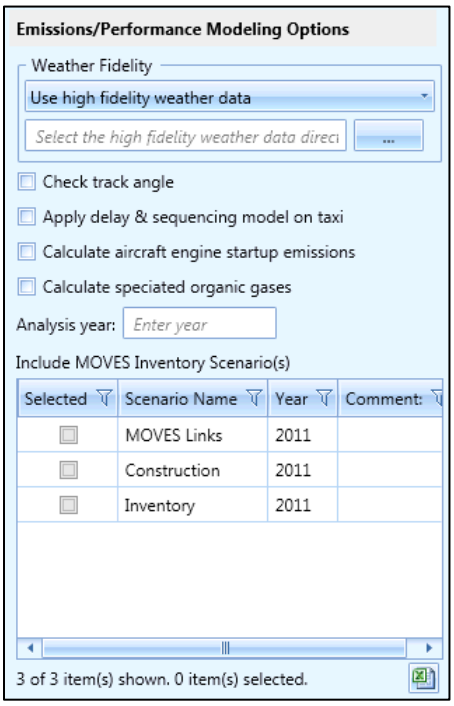
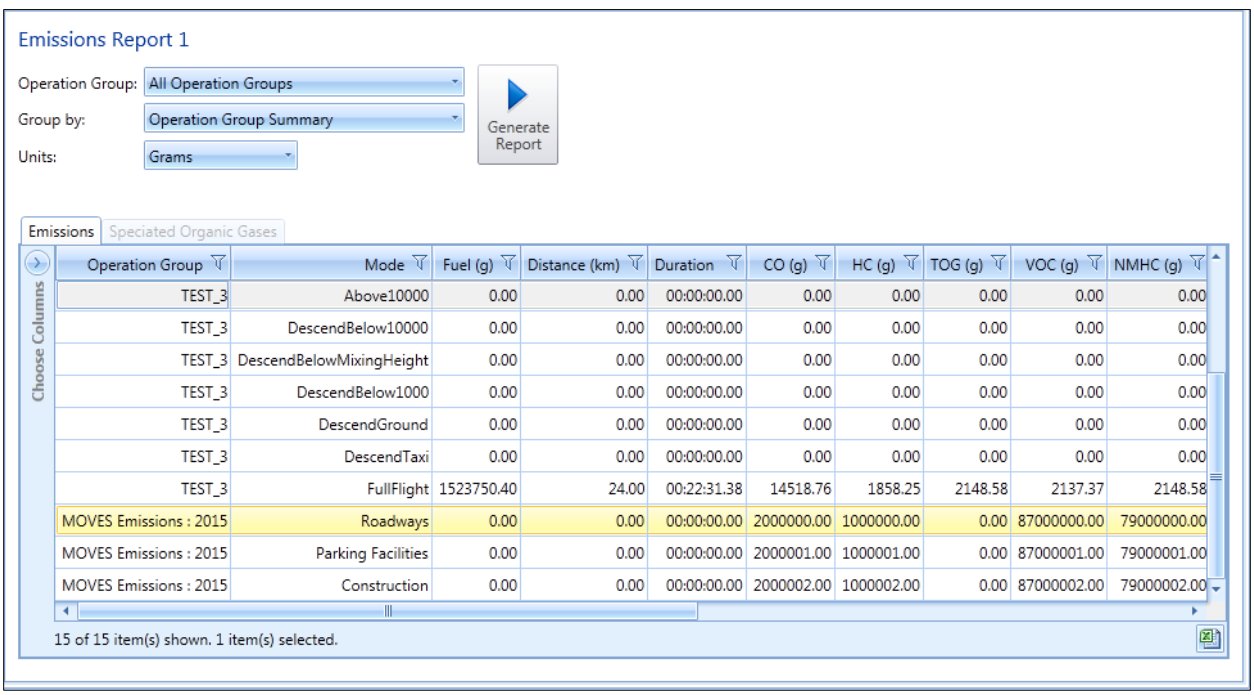


Figure 9-8 Emissions/Performance Modeling Options



Operation Group	Mode	Fuel (g)	Distance (km)	Duration	CO (g)	HC (g)	TOG (g)	VOC (g)	NMHC (g)
TEST_3	Above10000	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00	0.00
TEST_3	DescendBelow10000	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00	0.00
TEST_3	DescendBelowMixingHeight	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00	0.00
TEST_3	DescendBelow1000	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00	0.00
TEST_3	DescendGround	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00	0.00
TEST_3	DescendTaxi	0.00	0.00	00:00:00.00	0.00	0.00	0.00	0.00	0.00
TEST_3	FullFlight	1523750.40	24.00	00:22:31.38	14518.76	1858.25	2148.58	2137.37	2148.58
MOVES Emissions : 2015	Roadways	0.00	0.00	00:00:00.00	2000000.00	1000000.00	0.00	87000000.00	79000000.00
MOVES Emissions : 2015	Parking Facilities	0.00	0.00	00:00:00.00	2000001.00	1000001.00	0.00	87000001.00	79000001.00
MOVES Emissions : 2015	Construction	0.00	0.00	00:00:00.00	2000002.00	1000002.00	0.00	87000002.00	79000002.00

Figure 9-9 Emissions Report with MOVES Results

Appendix A: Glossary

3CD	Terrain File Format
AEDT	Aviation Environmental Design Tool
AEE	FAA Office of Environment and Energy
AFE	Above Field Elevation
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 sea 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
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 and length) description of an aircraft's trajectory represented by a series of straight-line segments.
ft	Foot, feet
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.
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
kg	Kilograms
km	Kilometers
kt	Knots (international nautical miles per hour)
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
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

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 mean sea level 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)
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 Boundary	Geospatial boundary around a modeling area.
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)
TALC	Time Above a C-weighted Sound Level Threshold (noise metric)
TAPNL	Time Above a Perceived Noise Level Threshold (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	Parameter from the AIRPORTS Database; identifies the magnitude of time that it takes for an aircraft to maneuver from the runway to the terminal after landing.
Taxi Out Time	Parameter from the AIRPORTS Database; identifies the magnitude of time that it takes for an aircraft to maneuver from the terminal to the runway just before takeoff.
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

B.1.1 Preferences – Feature Activation

Parameter	Description
Identifier	Identifier provided by the FAA that is associated with the hash key and approved features.
HashKey	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.

B.1.2 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 30 seconds. If a timeout error occurs, increase the Datacontext Timeout and/or decrease the Results Iterator Page Size.
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.

B.1.3 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.

B.1.4 Preferences – Dynamic Grid

Parameter	Description
Refine Level Limit	Used to control the size of the smallest contouring grid in dynamic grid processing.
Minimum closed contour value	Minimum contour level for closing a contour. This setting is used as the default value in the *Define Metric Results* wizard, *Set Processing Options* step, see Section 5.2.4. Units for dB-based metrics are in decibels. Units for time-based metrics are in minutes or in percent (%).
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.

B.1.5 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 are specified by flight operation (inserted to each operation). When unselected, taxi times are specified by airport average (specified on each airport layout). This option only applies to metric results that do not use delay and sequence modeling on taxi operations.
Fuel sulfur content	Sulfur content in fuel. Default value is 0.0006 (0.06%).
Sulfur to sulfate conversion rate	Sulfur to sulfate conversion rate. Default value is 0.024 (2.4%).

B.1.6 Preferences – Emissions Dispersion

Parameter	Description
Standard Settings	
Airborne source X spacing override	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	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	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

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.
Runway source X spacing override	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	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.
Advanced Settings	
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.
Area release height (ft)	Emissions release height of the runway and airborne area sources, in feet.
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.
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.
Make the Receptor Grid EDMS Compatible	When selected, AEDT will use the receptor grid in EDMS format.
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). • 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.

B.1.7 Preferences – Environmental Justice Model

Parameter	Description
ACS Census data folder	Root directory for the ACS Census data. Create the following directories to store the full census geodatabase (.gdb) and the state data for the desired year **Full census geodatabase** C:\AEDT\environmentaljustice_module\datasets\www2.census.gov\geo\tiger\TIGER_DP\[YEAR]ACS\[FileName].gdb **State file** C:\AEDT\environmentaljustice_module\datasets\www2.census.gov\geo\tiger\TIGER[YEAR]\state
ACS Census year	The last year of the 5-year dataset (e.g. "2014", which represents the 2010-2014 ACS dataset).
Census National County file	The Census National County file provides a lookup table that matches the Census place code with the proper name.

	This field specifies the name of the file and the directory where the file must be stored.
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[4]. By default, only the most commonly needed variables are visible. The user can 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"
Delete zero population polygons	When checked, polygons with zero population (e.g., bodies of water) will be deleted from the result.

B.1.8 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 C:\AEDT\Logs folder. 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.

B.1.9 Preferences – Map

Parameter	Description
Zoom	
Map zoom factor	Setting for step size for zooming in or out. 1 = smaller steps 2 = bigger steps
Legend	

[4] All other variables in the ACS data will be visible in the layer attributes pane. Note the invisible variables are still accessible through the column chooser. See http://www2.census.gov/geo/tiger/TIGER_DP/2013ACS/Metadata/ for a description of all the ACS variables.

Show opacity slider in legend	When selected, an opacity slider will be shown with the result layer in the *Layers manager.*

B.1.10 Preferences – Population Exposure Model

Parameter	Description
Census data folder	The directory where the 2010 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.

B.1.11 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 on Taxi	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. 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	When selected, AEDT calculates the engine startup emissions for the aircraft operations in the metric result.
Calculate speciated organic gases	When selected, speciated organic gases will be included in emissions calculations.
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.
Annualization Options	
Mixing height AFE (ft)	This is used in the Emissions Report, Climb Below Mixing Height mode and Descend Below Mixing Height mode.
Noise altitude cutoff AFE (ft)	Altitude above which noise calculations are no longer processed, in feet above field elevation.
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.
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 (%).
Distributed Processing	
Configure button	Opens the *TmService Manager* dialog.

B.1.12 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.

B.1.13 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.
GIS temporary files directory	Directory where temporary files are stored.
Identify tool show bounding box	When selected, a bounding box will be shown when making a selection with the identify tool.
Identify tool size	Identify tool bounding box size.
Supported study database version	The version of the study database supported by the currently installed version of AEDT.

Transaction scope timeout (sec)	Database related time-out in seconds before the transaction is rolled back.
User guide file name	Name of the user guide 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.
Environmental Justice	A file name of the Environmental Justice GPK.
JSON to feature	A file that AEDT uses to convert a JSON file to feature.

B.1.14 Preferences – Time Audible Metric

Parameter	Description
Identifier	Unique identifier for Time Audible files
Ambient Map	File path where the ambient map file is located
Spectral Data	File path where the spectral data file is located
HashKey	FAA provided hash key generated from the identifier, ambient map, and spectral data.

Appendix B.2 : Metric Results Tab

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).

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 AFE (ft)	Noise altitude cutoff in feet above field elevation for the metric result.
Mixing Height AFE (ft)	Mixing height in feet above field elevation 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 on Taxi	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.

Calculate Speciated Organic Gases	Check box indicating if the speciated organic gases are calculated for in the metric result.
Analysis Year	Analysis year of the metric result.
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 (%).
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 (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.
Used 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 metric, a spatially uniform offset applied to the modeled noise levels before comparison to the ambient.
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.
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 of emissions to report.
Averaging Times and Rankings	Selected averaging times and rankings.

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).
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.

B.2.4 Details Pane – Tracks Tab

Parameter	Description
Aircraft Type	Type of aircraft for the operation.
Operation Type	Type of operation associated with the track.
Track	Track name.
Runway End	Runway end associated with the operation.
Track ID	AEDT generated track ID.

B.2.5 Metric Results Wizard – Processing Options

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, International Standard Atmosphere (ISA) weather, or high fidelity weather.
Check track angle	When selected, AEDT discards operations on tracks with angles that exceed 90 degrees.
Apply Delay & Sequencing Model on Taxi	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. 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.
Calculate Speciated Organic gases	When selected, speciated organic gases will be included in emissions calculations.
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 (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	
Source Groups	Source groups of emissions to 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.
Compute 1-hour Max Daily averages at each receptor for use in assessing NAAQS	This option is displayed for SOx metrics that contain a minimum of four days of operations data and NOx 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, AEDT outputs the 4th highest value for each receptor, and for NOx, AEDT outputs the 8th highest value.
Background 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.

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
Shape Length (m)	Length of the contour, in meters.
Shape Area (sq m)	Area of the contour, in square meters.
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.
Receptor Set Layer	
Receptor ID	AEDT generated receptor ID.
Noise Result Index	AEDT generated noise index.
Latitude	Latitude of the grid point, in degrees.
Longitude	Longitude of the grid point, in degrees.
Elevation (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	Elevation of the emissions concentration receptor point, in feet.
Color Value	
Concentration Index	An index into the concentration pollutant level color map.
Pollutant (µg/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.
Concentration Contour Layer	
Object ID	AEDT generated object ID.
Concentration (µg/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
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
Airport Layers – Buildings	
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 viapoint—vp.
Latitude	Latitude for this runway end, in degrees.
Longitude	Longitude for this runway end, in degrees.

Appendix B.4: Operations Tab

B.4.1 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.
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).

B.4.2 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 (m)	Elevation of non-aircraft source in meters.

B.4.3 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.
Thrust Setting Type	Thrust setting for the operation (pounds or percent).
Thrust Setting Value (lb)	Thrust level of the runup operation.
Duration (sec)	Duration of the runup operation, in seconds.

B.4.4 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.

B.4.5 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.5: Equipment Tab

B.5.1 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	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 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.

B.5.2 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.

B.5.3 Equipment Groups Pane

Parameter	Description
ID	AEDT generated equipment group ID.
Name	Name of equipment group.
Equipment Count	Number of equipment in the group.

B.5.4 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
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
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 (knots)	Approach reference speed, in knots.	Min = 0.0 Max = 250
Departure speed (knots)	Departure reference speed, in knots.	Min = 0.0 Max = 250
Level speed (knots)	Overflight reference speed, in knots.	Min = 0.0 Max = 250

B.5.5 Helicopter – Airframe

Parameter	Description	Range
Basic		
Average number of seats	Average number of seats in the aircraft.	
Designation	Descriptive name of the category.	

Engine location	Description of engine location.	
Minimum number of seats	Minimum number of seats in the aircraft.	
Maximum number of seats	Maximum number of seats in the aircraft.	
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.	

B.5.6 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	Raw Emissions Index (Takeoff) in grams per kilogram.	
Climbout	Raw Emissions Index (Climb Out) in grams per kilogram.	
Approach	Raw Emissions Index (Approach) in grams per kilogram.	
Idle	Raw Emissions Index (Idle) in grams per kilogram.	

B.5.7 Airplane: Equipment Details

Parameter	Description
ANP ID	Aircraft noise and performance (ANP) ID.
Model	Airframe model.
Engine code	Engine code.
Engine mod	Engine modification code.
BADA ID	Base of aircraft data (BADA) ID.
Custom tag	User-defined description of the equipment.

B.5.8 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 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/°C)	Temperature adjustment coefficient, in pounds per degree Celsius.	
Engine pressure ratio coefficient	EPR or N1/sqrt (theta) adjustment coefficient in pounds per EPR.	
Engine pressure ratio 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
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		
Name	Unique Identifier.	
Profile Type	Type of flight profile.	
Weight (lb)	Aircraft weight during this operation, in pounds.	Min = 0 Max = 999999
Stage Length	Takeoff stage length.	
Operation Type	Type of operation.	A = Approach D = Departure T = Touch & Go F = Circuit V = Overflight
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	

B.5.9 Airplane – Airframe

Parameter	Description	Range
Basic		
Average number of seats	Average number of seats in the aircraft	
Designation	Descriptive name of the category	
Engine location	Description of engine location	
Minimum number of seats	Minimum number of seats in the aircraft	
Maximum number of seats	Maximum number of seats in the aircraft	
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.	

B.5.10 Airplane – APU

Parameter	Description	Range
Basic		
APU	Auxiliary Power Unit.	

B.5.11 Airplane – BADA

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 (knots)	Maximum Operating speed, in knots.	Min= 0 Max= 600
Max operating Mach number	Maximum Operating Mach Number.	Min= 0 Max= 10
Max operating altitude (ft)	Maximum Operating Altitude, in feet.	Min= -9999 Max= 60000
Max altitude at max takeoff weight (ft)	Maximum Altitude at Maximum Takeoff Weight and ISA, in feet.	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
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	1st thrust temperature coefficient, in Kelvin.	Min= -45.0 Max= 50.0

coefficient 1 (Kelvin)		
Thrust temperature coefficient 2 (Kelvin -1)	2nd thrust temperature coefficient, in K^{-1}.	Min= 0.0 Max= 10.0
Reference descent speed (knots)	Reference descent speed, in knots.	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
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 (ft)	Transition altitude for calculation of descent thrust, in feet.	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.	Min= 0.0 Max= 10.0
Climb Speed above Transition Altitude	Standard climb speed between 10,000 ft and Mach transition altitude, 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.	Min= 0.0 Max= 10.0
Cruise Speed above Transition Altitude	Standard cruise speed above 10,000 feet until Mach transition altitude, 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, in knots calibrated airspeed.	Min= 0.0 Max= 600.0
Descent Mach Number	Standard descent Mach number above transition altitude.	Min= 0.0 Max= 10.0
Descent Speed above Transition Altitude	Standard descent speed above 10,000 feet 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, 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

B.5.12 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	Raw Emissions Index (Takeoff) in grams per kilogram.	

Climbout	Raw Emissions Index (Climb Out) in grams per kilogram.	
Approach	Raw Emissions Index (Approach) in grams per kilogram.	
Idle	Raw Emissions Index (Idle) in grams per kilogram.	

B.5.13 Aircraft Engine Testing

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, or volume.
Release height (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

B.5.14 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.
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.

HC emissions factor (kg/hour)	Hydrocarbon emissions factor in terms of kilograms of HC 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.
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.
PM-10 emissions factor (kg/hour)	Particulate matter (less than 10 micrometers in diameter) emissions factor in terms of kilograms of PM-10 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.

B.5.15 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, or volume.
Release height (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.
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
TNMOC emissions 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

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
SOx emissions index const term (kg/[unit])	Amount of sulfur oxides 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
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
PM-10 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
PM-10 emissions index ash term (kg/[unit]-%Ash)	The fuel ash content (% by weight) for 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
PM-10 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
Fuel sulfur content (%)	The percentage by weight of sulfur in the fuel.
Fuel ash content (%)	The percentage by weight of ash in the fuel.
Fuel calcium to sulfur ratio	The fuel molar calcium-to-sulfur ratio (dimensionless) for source.
CO pollution control factor	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	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	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	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.
PM-10 pollution control factor	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	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	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	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.
PM-2.5 to PM-10 ratio	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).

B.5.16 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, or volume.
Release height (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.
VOC emission index (kg/kL)	Amount of volatile organic compounds in kilograms emitted per kiloliter of deicing fluid.
Ethylene glycol density (g/L)	Amount of ethylene glycol in grams per liter of deicing fluid.
Concentration by mass (%)	The concentration (% by mass) of the deicing chemical dissolved in solution for source.

B.5.17 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, or volume.
Release height (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.
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.

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.
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.
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.
PM-10 emissions factor (g/hp-hr)	Particulate matter (less than 10 micrometers in diameter) emissions factor in terms of grams of PM-10 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.
CO pollution control factor (%)	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 (%)	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 (%)	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 (%)	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.
PM-10 pollution control factor (%)	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 (%)	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.
CO emissions index (kg/h)	Amount of carbon monoxide in kilograms emitted per hour that the emergency generator runs.
VOC emissions index (kg/h)	Amount of volatile organic compounds 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.
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.
PM-10 emissions index (kg/h)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per hour that the emergency generator runs.

Fuel sulfur content (%)	The percentage by weight of sulfur in the fuel.
PM-2.5 to PM-10 ratio	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).

B.5.18 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, or volume.
Release height (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 in meters of the fuel tank.
Tank length (m)	The length in meters of the fuel tank.
Maximum liquid height (m)	The maximum height in meters of liquid fuel that can be contained in the fuel tank.

B.5.19 Ground Support Equipment

Parameter	Description
Name	Name of the non-aircraft equipment.
Category	Non-aircraft category description.
Subcategory	Non-aircraft subcategory description.
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.

B.5.20 Incinerator

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, or volume.
Release height (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.
CO emissions index (kg/ton)	Amount of carbon monoxide 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.
NOx emissions index (kg/ton)	Amount of nitrogen oxides 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.
PM-10 emissions index (kg/ton)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per ton of fuel consumed.
PM-2.5 to PM-10 ratio	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).
CO pollution control factor (%)	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 (%)	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 (%)	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 (%)	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.
PM-10 pollution control factor (%)	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.

B.5.21 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, or volume.

Release height (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.
CO emissions index (kg/[unit])	Amount of carbon monoxide in kilograms emitted per unit of fuel consumed.
THC emissions index (kg/[unit])	Amount of total hydrocarbons in kilograms emitted per unit (e.g., ton, kiloliter) of fuel consumed.
PM-2.5 to PM-10 ratio	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).
CO pollution control factor (%)	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 (%)	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 (%)	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 (%)	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.
Source type	Type of source: Polygon area, point, or volume.
Release height (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.

B.5.22 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, or volume.
Release height (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.
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.

B.5.23 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, or volume.
Release height (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.
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.

B.5.24 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, or volume.
Release height (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.
VOC emissions index (kg/kL)	Amount of volatile organic compounds in kilograms emitted per kiloliter of coating/painting substance used.
Pollution control factor (%)	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.

B.5.25 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, or volume.
Release height (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.
CO emissions index (kg/gallon)	Amount of carbon monoxide 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.
NOx emissions index (kg/gallon)	Amount of nitrogen oxides 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.
PM-10 emissions index (kg/gallon)	Amount of particulate matter (less than 10 micrometers in diameter) in kilograms emitted per gallon of fuel consumed.

B.5.26 Aircraft Equipment Groups

Parameter	Description
Aircraft	
Equipment group name	Name of the equipment group.
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	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.

B.5.27 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.6: Airports/Designer Tabs

B.6.1 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.

B.6.2 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	Highest point of an airport's usable runways in feet above mean sea level.

B.6.3 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.

B.6.4 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.

B.6.5 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.

B.6.6 Airport Layout Details Pane

Parameter	Description
Type	Type of layout component.
ID	AEDT generated ID.
Name	Name of layout component.

B.6.7 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.
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 (ft)	Minimum of the altitude range for visibility to the ground for the operating configuration.
Ceiling Max (ft)	Maximum of the altitude range for visibility to the ground for the operating configuration.
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.

B.6.8 Edit Building

Parameter	Description
Layout	Airport layout name.
Name	Name of the building.
Height above terrain (ft)	Building height above ground, in feet.
Elevation MSL (ft)	Elevation of the building, in feet above mean sea level.
Latitude (deg)	Latitude of building points, in degrees.
Longitude (deg)	Longitude of building points, in degrees.

B.6.9 Edit Gate

Parameter	Description
Layout	Airport layout name.
Units	Unit of measurement – English or Metric.
Name	Name of the gate.
Elevation	Elevation of the gate, above mean sea level.
Latitude (deg)	Latitude of gate, in degrees.
Longitude (deg)	Longitude of gate, 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).
Aircraft size	Size of the aircraft appropriate for the gate.

B.6.10 Edit Heligate

Parameter	Description
Layout	Airport layout name.
Units	Unit of measurement – English or Metric.
Name	Name of the Heligate.
Elevation	Elevation of the Heligate, above mean sea level.
Latitude (deg)	Latitude of Heligate, in degrees.
Longitude (deg)	Longitude of Heligate, in degrees.
Release height (ft)	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).

B.6.11 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.

B.6.12 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.

B.6.13 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.

B.6.14 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.

B.6.15 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.

B.6.16 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 (ft)	Elevation of the runway end, in feet above mean sea level.
Wind Percentage	Percent change in airport average headwind.
Glide Slope (deg)	Glide slope for an approach to this runway end, in degrees.
Threshold crossing height (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

B.6.17 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.

B.6.18 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 (ft)	Elevation of the taxiway, in feet above mean sea level.
Speed (mph)	Speed of travel on the taxiway, in mph.

B.6.19 Edit Terminal

Parameter	Description
Layout	Airport layout name.
Units	Unit of measurement – English or Metric.
Name	Name of the terminal.
Elevation	Elevation of the terminal, above mean sea level.
Aircraft size	Size of the aircraft appropriate for the terminal.
Release height	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.

B.6.20 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.
Latitude (deg)	Latitude of track point, in degrees.
Latitude (deg)	Latitude of track point, in degrees.
Longitude (deg)	Longitude of track point, in degrees.
Altitude MSL (ft)	Altitude of track point.
Message Time	*Message Time* is not used.
Altitude Control	Altitude control code for the track point.
Vector Type Tracks	
Segment Number	Track segment number.
Segment Type	Description of segment type, straight (S), left (L), or right (R).
Distance/Radius (ft)	The distance of the segment or the radius for the segment, in feet.
Turn Angle (deg)	The angle of the turn in degrees.

B.6.21 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 %.

B.6.22 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 MSL (ft)	Altitude of track point.
Altitude Control	Altitude control code for the track point.

Appendix B.7: Definitions Tab

B.7.1 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
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. $$10\log(\frac{24 * 60 * 60s}{1s}) = 49.37 \text{ dB}$$ 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)	

B.7.2 Receptors

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, in nautical miles.	
Y spacing	Spacing of receptor points in a grid in the y direction, in nautical miles.	
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 terrain – offset from elevation	Receptor height above ground.	

B.7.3 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.	

B.7.4 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 (0) during the associated time period.

B.7.5 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	
First day	First day of weather data.
Last day	Last day of weather data.
Surface file	Directory where the surface weather file is stored.
Upper air file	Directory where the upper air weather file is stored.
Randomize NWS wind direction (+/-5°)	Randomizes the National Weather Service (NWS) wind directions.
Substitute missing data	Substitutes missing data with the NWS data.
File name prefix	Prefix for the AERMOD weather file names to be generated.
Wind height	Height of wind, in meters.
Roughness	Roughness, in meters.
Bowen ratio	Bowen ratio
Albedo	Reflection coefficient
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.

B.7.6 Terrain and Ambient

Terrain and Ambient – General	
Terrain	Directory where terrain files are stored.
Ambient	Directory where ambient files are stored.

B.7.7 MOVES AERMOD Files

MOVES AERMOD Files	
MOVES 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.
Comments	(Optional) Description of the MOVES AERMOD scenario.

B.7.8 MOVES Inventory File

MOVES Inventory Files – General	
MOVES 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.
Comments	(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 following directory:
C:\AEDT\Logs\INMASIFConverterLog.txt

Conversion notes:

- The conversion of user defined aircraft and profiles in INM studies are not supported. The INM to ASIF Converter will populate the <aircraft> element with stub data that will cause ASIF import to fail. It will also populate the <anpAirplane> element data to include flaps, thrust, and profiles. Once an INM study has been converted to ASIF, the user must edit the converted study to either replace the INM user defined aircraft with a system AEDT aircraft, or create new user defined AEDT aircraft. See the ASIF Reference guide for more information on ASIF schema and syntax.
- 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:
  - Tracks without track segments
  - Noise identifiers without NPD curves
  - Aircraft profiles without steps or procedures
- The INM to ASIF Converter will assign the following default values:
  - Fuel sulfur content = 0.0006
  - Sulfur to sulfate conversion rate = 0.024

To convert an INM study to ASIF format:

1. Navigate to *C:\Program Files\FAA\AEDT* directory.
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.
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.*

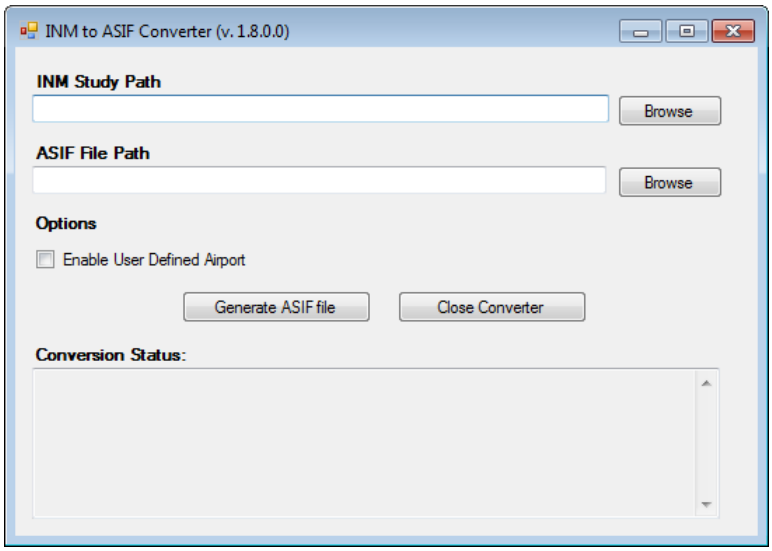


Figure C- 1 INM to ASIF Converter Tool

Appendix C.2: EDMS to ASIF Converter

The log file for the EDMS to ASIF Converter is located in the following directory:
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 *C:\Program Files\FAA\AEDT* directory.
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.*

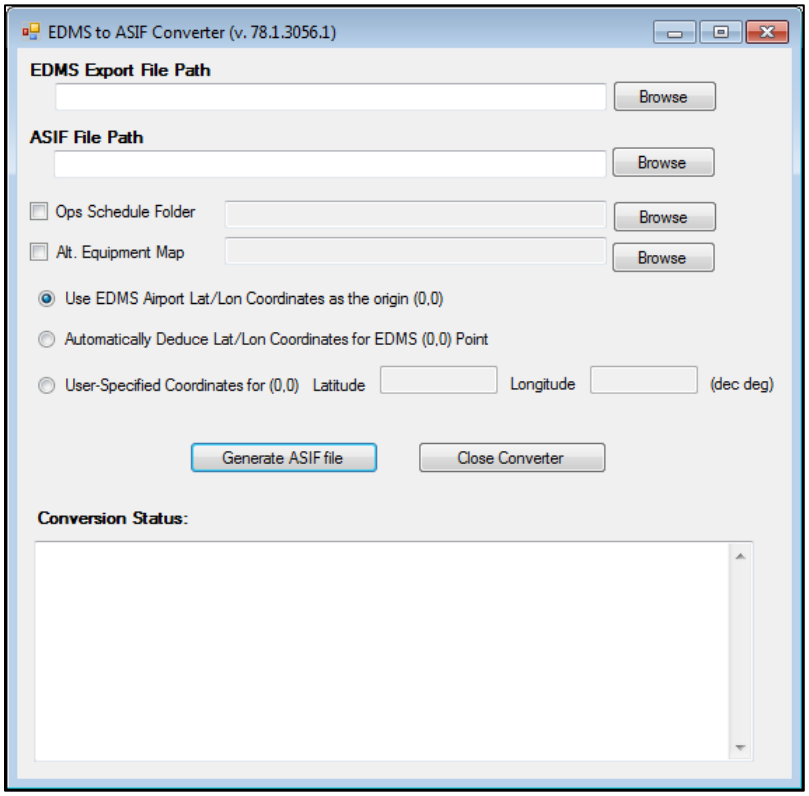


Figure C- 2 EDMS to ASIF Converter

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. From the *Start* menu, go to *All Programs, FAA, AEDT 2d, Tools*, then click *AEDT 2d Command Prompt*.
2. A command prompt window opens in the AEDT directory – 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 the log file located under *C:\AEDT\Logs\ASIFImporterApp_Log.txt*.

Appendix E: 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 E.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

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.

- To process with a uniform ambient, specify the threshold through the *Define Metric Result Wizard*, see Section 5.2.4.
- To process using an ambient file, specify the ambient file in the *Definitions* tab, see Section 9.6.4. The accepted format for the ambient file is a three-digit ambient map described further in Appendix E.3.

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.

Appendix E.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 E.2.1:

- TAUD Time Audible
- TAUDP Time Audible Percent
- TAUDSC Time Audible Statistical Compression
- TAUDPSC Time Audible Percent 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	(202) 267-4746
Mohammed Majeed	(202) 267-3703

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 E.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 4.11.14), 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 2,000 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 flight segments in the flight.txt file should be examined to ensure that further sub-segmenting has not occurred.

E.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 2d 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 E.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.

Metric	Ambient Files		
	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

E.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
```

E.3.2 : Ambient Spectral Data File

The calculation of the time audible metrics require both the ambient map with A-weighted noise levels (E.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-2,34.5,45,39.5,35.2,32.1,30.3,30.3,30.4,29.5,29.5,29.5,29.2,28.7,28,27.2,26.1,24,21,17.5,12.8,8.7,8,9.4,14.8,23.6
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 F: TmService Manager Dialog for Distributed Processing

In AEDT, running jobs on a single computer is the default processing mode. It is optional to run jobs with distributed processing on multiple computers. The AEDT client and remote machines must be configured to run with distributed processing, see the AEDT Installation Guide for configuration instructions. After configuration is complete, follow the steps below to setup and run a job with distributed processing.

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 F.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 F-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.

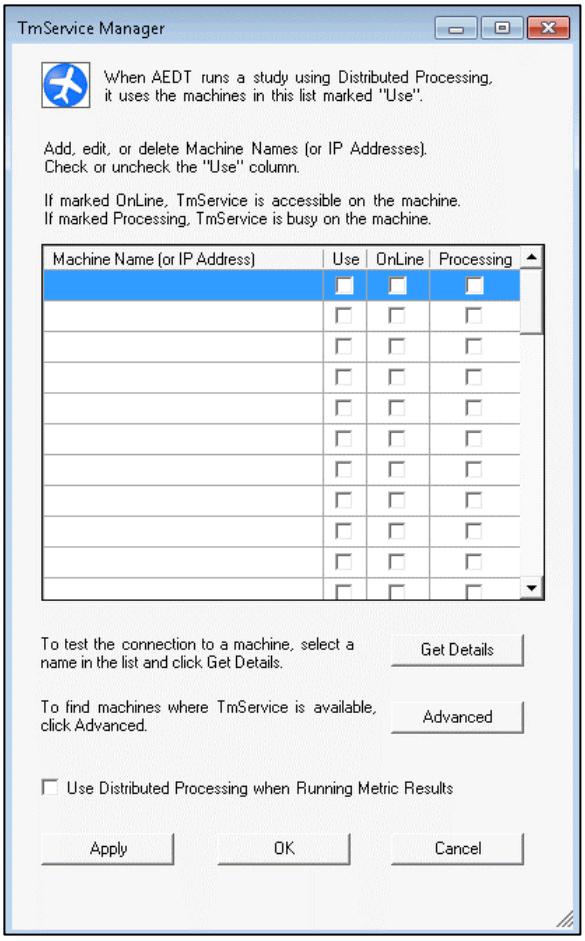


Figure F-1 TmService Manager Dialog Box

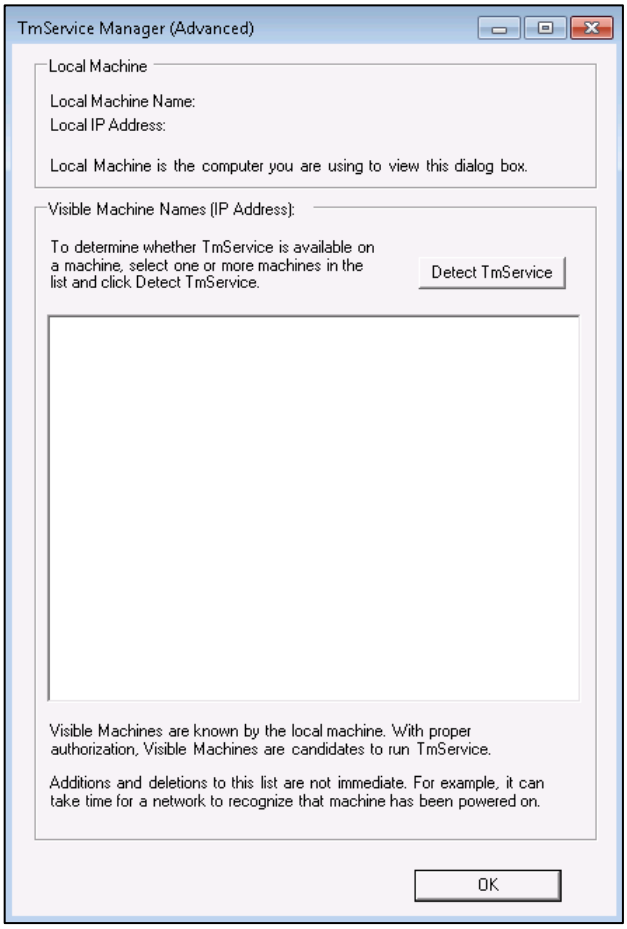


Figure F-2 TmService Manager (Advanced) Dialog Box

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 4.9 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. N-1

Appendix F.2: Enable/Disable Distributed Processing

In the *TmService Manager* dialog box (Figure F-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 F.3 : Running Large Studies with Distributed Processing

This section provides additional information on running large studies using distributed processing in AEDT.

F.3.1 : Install AEDT and Change Configuration Settings on the Host Machine

1. Install AEDT on the host machine.
2. In the AEDT GUI, 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 C:\Program Files\FAA\AEDT directory and open **log4net.config**. Navigate to line with the **maximumFileSize** entry. Change the value to **250MB** (or any desired larger log size).

F.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.

F.3.3 : Install Distributed Processing Service on Remote Taskmaster Machine(s)

Install AEDT Distributed Processing Service on the remote taskmaster machines.

F.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 GUI 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 FAA.AEE.AEDT.GUI.View.Ribbon.exe 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. Open **FAA.AEE.AEDT.TaskMaster.Service.exe.config** located under C:\Program Files\FAA\AEDT in each of the remote taskmaster machines.
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 FAA.AEE.AEDT.GUI.View.Ribbon.exe.config

1. Open **FAA.AEE.AEDT.GUI.View.Ribbon.exe.config** located under C:\Program Files\FAA\AEDT in the host machine.
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.GUI.View.Ribbon.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.

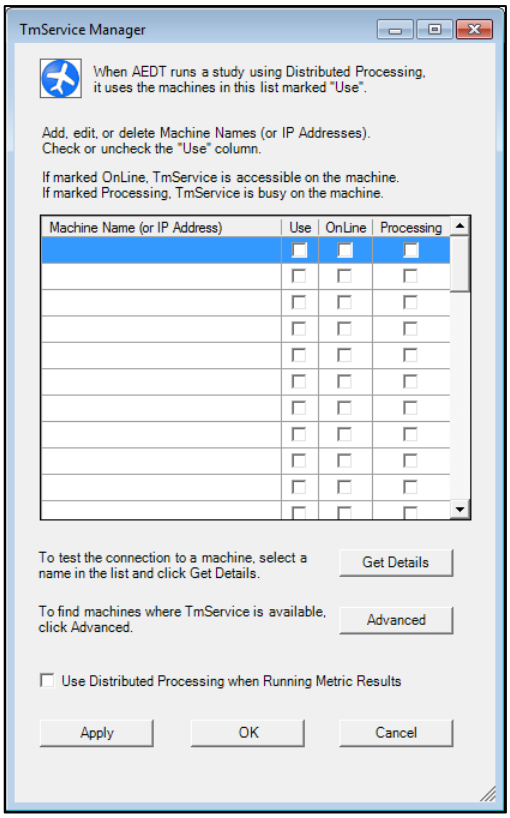
Since distributed processing is designed to function within a closed computer network, it is acceptable for users encountering this type of error message to disable connection security. This can be done by changing the security element of the taskmaster connection binding to read:

```
<security mode="None">
   <transport clientCredentialType="None" protectionLevel="None" />
   <message clientCredentialType="None" />
</security>
```

This change must be performed on both the host machine's **FAA.AEE.AEDT.GUI.View.Ribbon.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.

F.3.5 : Configure Distributed Processing on the Host Machine

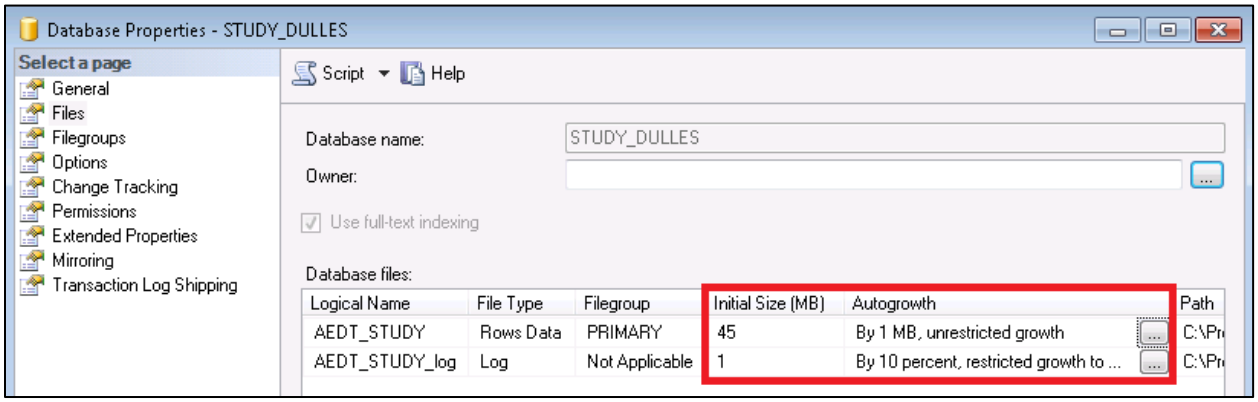
1. Open the AEDT GUI on the host machine, and navigate to *Study* tab, *Preferences* > *Study*.
2. Click the *Configure* button under the Distributed Processing menu to open the *TmService Manager* dialog.
3. Under "Machine Name", enter the name of the taskmaster service machine(s) (not the service itself).
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.



F.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".

F.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 GUI 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.

F.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.

F.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 GUI; and
- AEDT log file (located in C:\AEDT\Logs) provides a high-level accounting of run settings and activity. The level of logging can be set in the AEDT GUI under *Study* tab > *Preferences* > *Logging*.

AEDT Log File

- Check the log file (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
  - 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 G: Detailed Noise Results Report

When the results storage option is set to *Detailed*, the detailed noise results are displayed in the noise report. The results are computed for each grid point and aircraft operation combination.

Detailed noise results report includes the following columns:

- 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) or Time Audible (min) or Time Audible (%)– total noise level for all flights, in decibels, minutes or in %
- Receptor Name – name of the receptor set used
- 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
- Longitude (deg) – longitude of receptor point
- Elevation (ft) – elevation of receptor point
- Air Operation ID – air operation ID
- Air Operation Type – type of operation
- ANP Airplane – ANP ID of the aircraft
- BADA Airplane – BADA airplane ID of the aircraft
- Helicopter – Only applicable to helicopters. ANP Helicopter ID
- Duration – Only applicable to helicopters.
- Heading – Only applicable to helicopters. Heading in degrees
- 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 (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
- Speed (knots) – true airspeed of the aircraft at closest-point-of-approach
- 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 – 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 H: NAAQS Selection

The table below lists the NAAQS pollutants and the appropriate AEDT averaging time and ranking selections when conducting a NAAQS assessment based on modeling with a single year of site specific meteorological data (i.e., modeling a single year). It is important to note that AEDT currently does not model NO_2 directly. The analyst must choose the NOx emissions dispersion metric type and assume full conversion of NOx to NO_2. Similarly, AEDT does not model SO_2 directly. The analyst must choose the SOx emissions dispersion metric type and assume full conversion of SOx to SO_2. When modeling $PM_{2.5}$, the analyst must provide a full year of meteorological data for AERMOD to execute.

NAAQS		AEDT Selections for NAAQS Assessments			
Pollutant	**Primary or Secondary**	**AEDT Metric Name**	**AEDT Metric Type**	**Averaging Time**	**Ranking**
Carbon Monoxide (CO)	Primary	CO	Emissions Dispersion	1 Hour	2nd
				8 Hour	2nd
Nitrogen Dioxide (NO_2)	Primary	NOx	Emissions Dispersion	1 Hour	8th highest of 1-hour daily maximum concentrations
	Primary and Secondary	NOx	Emissions Dispersion	Annual	Annual
Particulate Matter 2.5 ($PM_{2.5}$)	Primary and Secondary	PM25	Emissions Dispersion	Annual	Annual
	Primary and Secondary	PM25	Emissions Dispersion	24 Hour	8th
Particulate Matter 10 (PM_{10})	Primary and Secondary	PM10	Emissions Dispersion	24 Hour	2nd[1]
Sulfur Dioxide (SO_2)	Primary	SOx	Emissions Dispersion	1 Hour	4th highest of 1-hour daily maximum concentrations
	Secondary	SOx	Emissions Dispersion	3 Hour	2nd

1 When conducting a NAAQS assessment for the PM10 24-hour standard using more than one year of meteorological data, please refer to the PM_{10} 24-Hour Standard Instruction for more information.

Section 8.3.1.2 of 40 CFR Appendix W to Part 51 requires either the use of at least one year of site specific metrological data or five years of representative metrological 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 meteoroidal 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.

CO 1-Hour Standard Instruction: Obtain the 2nd highest ranked 1-Hour CO concentration for each year modeled. For example, the 2nd highest ranked CO 1-Hour concentration for year 1, year 2, year 3, year 4, and year 5. 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. The modeled DV concentration will be the concentration associated with the year that has highest 2nd ranked 8-Hour CO concentration.

NO_2 1-Hour Standard Instruction: Obtain the 98th percentile of the 1-Hour daily maximum NOx 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 98th percentile 1-Hour NOx daily maximum concentrations of all the years modeled.

Example using five years of metrological to obtain the average of the 98th percentile 1-Hour NOx daily maximum concentration data is provided below. The modeled NOx concentration is used for determining the modeled DV NO2 concentration because AEDT assume full conversion of NOx to NO_2 (i.e., Tier I method).

Modeled NO_2 1-Hour DV (Assuming full conversion of NOx to NO_2) = [(Year:1 98th percentile 1-Hour NOx daily max Concentration) + (Year 2: 98th percentile 1-Hour NOx daily max Concentration) + (Year 3: 98th percentile 1-Hour NOx daily max Concentration) + (Year 4: 98th percentile 1-Hour NOx daily max Concentration) + (Year 5: 98th percentile 1-Hour NOx daily max Concentration)]/(5 Years)]

NO_2 Annual Standard Instruction (Assuming full conversion of NOx to NO_2): Obtain the annual average NOx concentration for each year that was modeled. For example, the annual average NOx concentration for year 1, year 2, year 3, year 4, and year 5. The modeled DV concentration will be the concentration associated with the year that has highest annual average NOx 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. Example using five years of meteorological data is provided below.

Modeled $PM_{2.5}$ Annual Average DV = [(Year 1: Annual $PM_{2.5}$ Concentration) + (Year 2: Annual $PM_{2.5}$ Concentration) + (Year 3: Annual $PM_{2.5}$ Concentration) + (Year 4: Annual $PM_{2.5}$ Concentration) + (Year 5: Annual $PM_{2.5}$ Concentration)/(5 Years)].

$PM_{2.5}$ 24-Hour Standard Instruction: Obtain the 98th percentile 24-Hour $PM_{2.5}$ concentration for each year that was modeled. Calculate the average of the 98th percentile 24-Hour $PM_{2.5}$ concentrations for all the year modeled to obtain the modeled $PM_{2.5}$ concentration. Example using five years of meteorological data is provided below.

Modeled $PM_{2.5}$ Annual Average DV = [(Year 1: 98th percentile 24-Hour $PM_{2.5}$ Concentration) + (Year 2: 98th percentile 24-Hour $PM_{2.5}$ Concentration) + (Year 3: 98th percentile 24-Hour $PM_{2.5}$ Concentration) + (Year 4: 98th percentile 24-Hour $PM_{2.5}$ Concentration) + (Year 5: 98th percentile 24-Hour $PM_{2.5}$ Concentration)/(5 Years)].

PM_{10} 24-Hour Standard Instruction: The form of the PM_{10} NAAQS is defined as *"Not to be exceeded more than once per year on average over 3 years"*. Therefore, when modeling a single year for a PM_{10} NAAQS determination, the analyst should choose the 2nd highest 24-hour PM_{10} concentration. The AERMOD User Guide states that modeling demonstrations of compliance with the PM_{10} NAAQS are based on the High-N+1-High value over N years, or in the case of five years of NWS meteorological data, the High-6th-High (H6H) value over five years.

For example, an analyst is modeling for the 24-Hour PM_{10} standard using five years of NWS meteorological data. Because the 24-Hour PM_{10} standard cannot be exceeded more than once per year on average, the analyst will obtain the six highest 24-Hour PM_{10} rankings for each year being modeled. Because the analyst is using five years of metrological data, the High N+1 High value over N years is equal to 6. The analyst will obtain the six highest 24-Hour PM_{10} rankings for each individual year being modeled because it is possible that a single year has the six highest 24-Hour PM_{10} rankings. For this example, the analyst will obtain the top six 24-Hour PM_{10} concentrations of each year that was modeled (total of thirty 24-Hour PM_{10} values across the five years). The 24-Hour PM_{10} modeled DV will be the sixth highest 24-Hour PM_{10} concentration out of the thirty modeled.

SO_2 1-Hour Standard Instruction: Obtain the 99th percentile of the 1-Hour daily maximum SOx 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 99th percentile 1-Hour SOx daily maximum concentrations of all the years modeled.

Example using five years of metrological to obtain the average of the 99th percentile 1-Hour SOx daily maximum concentration data is provided below.

Modeled SO_2 1-Hour DV (Assuming full conversion of SOx to SO_2) = [(Year:1 99th percentile 1-Hour SOx daily max Concentration) + (Year 2: 99th percentile 1-Hour SOx daily max Concentration) + (Year 3: 99th percentile 1-Hour SOx daily max Concentration) + (Year 4: 99th percentile 1-Hour SOx daily max Concentration) + (Year 5: 99th percentile 1-Hour SOx daily max Concentration)]/(5 Years)]

SO_2 3-Hour Standard Instruction (Assuming full conversion of SOx to SO_2): Obtain the 2nd highest ranked 3-Hour SOx concentration for each year modeled. For example, the 2nd highest ranked 3-Hour SOx concentration for year 1, year 2, year 3, year 4, and year 5. The modeled DV concentration will be the concentration associated with the year that has the highest 2nd ranked 3-Hour SOx concentration.

For information on determining Design Values (DVs) when using background concentrations with modeled concentrations for NAAQs determinations, see "Background Concentrations in AEDT" on the AEDT Support website.

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 AEDT is fully installed and operational. The RunStudy tool is provided with the installation of AEDT and is located in the following directory *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	Displays this help screen.
-s [study_name]	Required. STUDY database name to be run.
-d [data_source]	(Default: localhost) Data source for STUDY database connection string.
-u [user_id]	User ID for STUDY database connection string. By default, Integrated Security is used.
-p [password]	Password for STUDY database connection string.
-l [log_file_path]	(Default: C:\AEDT\Logs) Run Study log file directory
-y	Run with support for distributed processing.
-x	Quit without user confirmation.

To run metric results using the RunStudy tool:

1. From the *Start* menu, go to *All Programs, FAA, AEDT 2d, Tools*, then click *AEDT 2d Command Prompt*.

2. A command prompt window opens in the AEDT directory – C:\Program Files\FAA\AEDT.

3. Type in the following command:

   ```
   FAA.AEE.AEDT.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 loacated.

   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 localhost SQL Server instance. .

   ```
   FAA.AEE.AEDT.RunStudy -s STUDY_INM –d localhost
   ```

4. Press the enter key to run the tool.

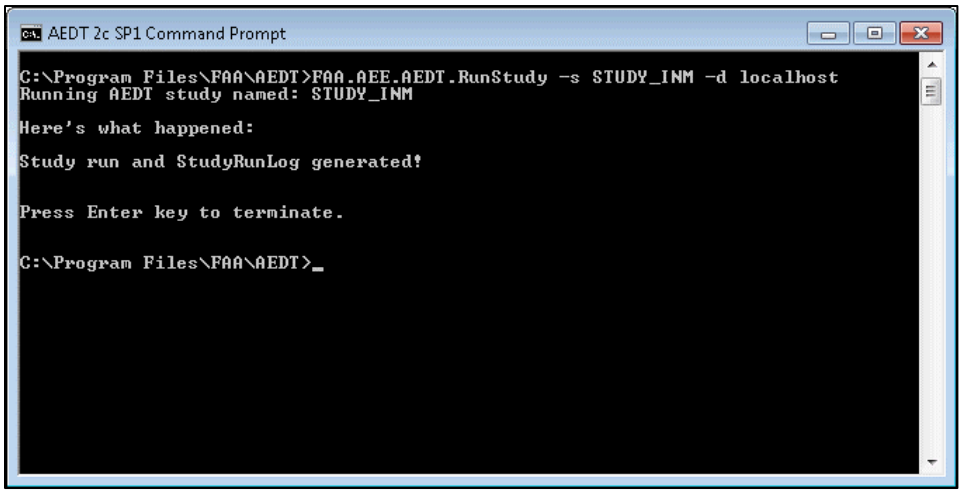


Figure I- 1 RunStudy Command Prompt

5. Check the status of the run in the *StudyRunLog.txt* located in the following directory: *C:\AEDT\Logs*

The RunStudy command-line tool does not support processing the metric results which use dynamic grid receptor sets.

Appendix J: Acoustics Diagnostics Report

The acoustics diagnostics report includes the following data:

- SrcX, SrcY, SrcZ: 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, RecY, RecZ: 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: An ordinal that indicates segment number.
- acousticimpedance: See the AEDT 2d Technical Manual, Section 4.3.2 Acoustic Impedance Adjustment. In dB.
- q: See the AEDT 2d Technical Manual, Section 4.1 Flight Path Segment Parameters, in ft.
- directivity: See the AEDT 2d Technical Manual, Section 4.4.2 Ground-Based Directivity Adjustment. In dB.
- ctheta: See the AEDT 2d Technical Manual, Section 4.4.2 Ground-Based Directivity Adjustment Eq. 4-53. This is the theta value in degrees.
- Singleeventnoiselevelsel: The sound exposure level corrected for atmospheric absorption, in dB.
- Max: The maximum noise level corrected for atmospheric absorption, in dB.
- slant_distance: This is the log of 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; depends on geometry. See the AEDT 2d Technical Manual, Section 4.1 Flight Path Segment Parameters.
- 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 2d Technical Manual, Section 4.3.5.1 Lateral Attenuation Adjustment for Civil Aircraft.
- aircraft_velocity: Aircraft velocity at the point of closest approach on the segment, in knots.
- aircraft_altitude: Aircraft altitude at the point of closest approach on the segment, in knots.
- velocity_correction: See the AEDT 2d Technical Manual, Section 4.3.3.2 Noise Fraction Adjustment for Behind Start of Takeoff Role. Eq. 4-26, in dB.
- overground_attenuation: See the AEDT 2d Technical Manual, Section 4.3.5.1 Lateral Attenuation Adjustment for Civil Aircraft Eq. 4-34, in dB.
- long_range_air_to_ground_attenuation: See the AEDT 2d Technical Manual, Section 4.3.5.1 Lateral Attenuation Adjustment for Civil Aircraft Eq. 4-35, in dB.
- engine_installation: See the AEDT 2d Technical Manual, Section 4.3.5.1 Lateral Attenuation for Civil Aircraft Eq. 4-30 - 4-33, in dB
- overall_lateral_attenuation: The combination of overground_attenuation, long_range_air_to_ground_attenuation, and engine_installation. See the AEDT 2d Technical Manual, Section 4.3.5.1 Lateral Attenuation Adjustment for Civil Aircraft Eq. 4-36, in dB.
- Attenuation: The combination of overall_lateral_attenuation, acoustic impedance, directivity, and velocity correction, in dB.
- Duration: In seconds.

- noise_fraction: The fraction of noise exposure associated with a finite-length flight path segment. See the AEDT 2d Technical Manual, Section 4.3.3.1 Noise Fraction Adjustment for Flight Path Segments, this is unit less
- fraction_noise_exposure: Sound exposure level in energy multiplied by the noise fraction, in energy.
- weightedfractionalnoise: 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.

Appendix K: Sensor Path Import Tool

This appendix describes the Sensor Path Import (SPI) tool, which is an optional command-line tool that reads aircraft flight trajectory data, then adjusts speed, altitude, latitude and longitude using smoothing and filtering algorithms in order to reduce flight failures. The processed trajectory data is imported into the SENSOR_PATH table in AEDT study database.

The **SPI** tool assumes AEDT is fully installed and operational. SPI is provided with the installation of AEDT and is located in the following directory *C:\Program Files\FAA\AEDT\SensorPathImport\SPI.exe*

Prerequisite – Install R Engine

The smoothing and filtering algorithm used in the SPI tool is implemented in R language. The R package must be installed in order to run the SPI tool.

To install R Engine:

1. Download the R package for Windows from here: https://cran.cnr.berkeley.edu/
2. Install with all defaults (including both 32 and 64 bit installations)
3. Start the **R x64** program as administrator.
4. In the R console command window, execute the following commands:
```
install.packages('pspline')
install.packages('sp')
install.packages('geosphere')
```

Prepare Input Files

Trajectory File Format

The input trajectory file contains trajectory data for multiple flights in CSV format. It contains individual point data, one line at a time, that are grouped by flight (FID). Within a given FID grouping, the point data must be sorted by **Time** in ascending order; duplicate Time entries will be skipped; otherwise, the SPI tool will exit with error message unless user specifies **–n** (no smoothing) as command-line argument. The input columns are described below.

Column Name	Column Description
FID	Flight ID. Must be unique for individual flights. If duplicate flight ids (FID) exist in the file, the SPI tool will exit with error message.
SeqId	Sequence Id
Long	Longitude
Lat	Latitude
GpsAlt	GPS Altitude (Feet) Note: Only the GPS Altitude field can be used in AEDT performance modeling. Because users will typically only have pressure altitude data, users may want to use pressure altitude data as a surrogate for GPS altitude.

Time	Time. Must be in the following format: YYYY-MM-DDThh:mm:ss.fff (UTC)
One of the following speed types: • GS – Ground speed (Knots); • KTAS – True air speed (Knots); • KCAS – Calibrated air speed (Knots); or • MACH – MACH number (unitless)	Only one speed type can be present in the file.
AltP	Pressure Altitude (Feet) Note: Only the GPS Altitude field can be used in AEDT performance modeling. Because users will typically only have pressure altitude data, users may want to use pressure altitude data as a surrogate for GPS altitude.

Notes

- The SPI tool is able to process a single trajectory file with data on 30 million flights.
- The date part of a time stamp is required for MESSAGE_TIME column in the SENSOR_PATH table and also for creating a unique flight ID – which is done by combining FID with integer part of Longitude, Latitude, and full value of a Time column (e.g. "S562_-105_46_2017-04-03T06:33:28.137").

Trajectory File Example

```
FID,SeqId,Long,Lat,GpsAlt,Time,GS,AltP
383662,1,-73.7726517,40.6283989,26.1,2006-10-27T03:53:17.999 , 9.4,-212.0
383662,2,-73.7726974,40.6284180,26.4,2006-10-27T03:53:19.000 ,12.1,-212.0
383662,3,-73.7727737,40.6284485,26.2,2006-10-27T03:53:20.001 ,15.1,-210.0
.........................
.......TRUNCATED...........
.........................
383662,1023,54.6660309,24.4225178,105.1,2006-10-27T15:49:43.000 ,139.6,34.0
383662,1024,54.6654854,24.4229240,99.9,2006-10-27T15:49:44.000 ,139.1,18.0
383662,1025,54.6649399,24.4233303,89.6,2006-10-27T15:49:45.004 ,138.4,14.0
383810,1,-73.7654495,40.6477928,34.2,2006-10-28T03:30:24.998 , 9.4,34.0
383810,2,-73.7654724,40.6477547,34.2,2006-10-28T03:30:25.999 ,11.1,33.0
383810,3,-73.7655182,40.6477013,34.2,2006-10-28T03:30:27.000 ,14.2,41.0
```

Operation File Format

The input operation file contains data for a single operation per each flight in trajectory file, i.e. one operation per one flight. The input columns are described below.

Column Name	Column Description
FID	Flight id from the input trajectory file.
OpID	User-defined Operation ID.
AircraftType	ICAO aircraft type from FLT_ACTYPES table. Used to map it to Equipment ID. User can override default mapping with an explicit value in the optional **EquipId** column.
EquipId	[Optional] Equipment ID from FLT_EQUIPMENT table.

NumOps	Number of times to fly this operation.
DepApt	Departure airport ICAO code from APT_CODE table. The airport must be already in the study and have at least one airport layout and at least one runway.
DepRwy	Departure runway end name from APT_RWY_END table
ArrApt	Arrival airport ICAO code from APT_CODE table. The airport must be already in the study and have at least one airport layout and at least one runway.
ArrRwy	Arrival runway end name from APT_RWY_END table.
OffTime	Wheels-off time. Required for full flight and partial departure operation types. Empty for partial arrivals.
OnTime	Wheels-on time. Required for full flight and partial arrival operation types. Empty for partial departures.
Profile	[Optional] Aircraft's profile ID from FLT_ANP_AIRPLANE_PROFILES table.
StageLen	[Optional] Stage length.
TaxiIn	[Optional] Taxi-in time (in minutes – will be converted and stored in seconds).
TaxiOut	[Optional] Taxi-out time (in minutes – will be converted and stored in seconds).
CruiseAlt	[Optional] Cruise altitude of the aircraft (Feet).
DepGate	[Optional] Departure gate name from APTLAYOUT_GATE table.
ArrGate	[Optional] Arrival gate name from APTLAYOUT_GATE table.
Operator	[Optional] Operator – future use.
RegNum	[Optional] Registration number – future use.
FlightNum	[Optional] Flight number – future use.
BeaconCode	[Optional] Beacon Code (octal number, treated as string) – future use.
ModeSCode	[Optional] Mode-S Code - future use

Notes

- OffTime and OnTime fields must be in the following format: YYYY-MM-DDThh:mm:ss
- If both **OffTime** and **OnTime** are present for the operation, the Operation type is set to Full Flight - Runway-to-Runway.
- If only **OffTime** is present, the Operation type is set to Partial Departure.
- If only **OnTime** is present, the Operation Type is set to Partial Arrival.

Operation File Example

```
FID,OpID,AircraftType,EquipId,NumOps,DepApt,DepRwy,ArrApt,ArrRwy,OffTime,OnTime,Profile,StageLen,
TaxiIn,TaxiOut,CruiseAlt,DepGate,ArrGate,Operator,RegNum,FlightNum,BeaconCode,ModeSCode
383662,383662,B712,,1,KJFK,31L,OMAA,31L,2006-10-27T03:53:17,2006-10-27T15:49:45,,,,,,,,,,,
383810,383810,B712,,1,KJFK,22R,OMAA,13R,2006-10-28T03:30:25,2006-10-28T15:21:36,,,,,,,,,,,
384001,384001,B712,,1,KJFK,31L,OMAA,31L,2006-10-29T03:31:32,2006-10-29T15:02:50,,,,,,,,,,,
385136,385136,B712,,1,KJFK,31L,OMAA,31L,2006-10-30T03:45:43,2006-10-30T15:43:10,,,,,,,,,,,
385698,385698,B712,,1,KJFK,22R,OMAA,31L,2006-10-31T03:48:36,2006-10-31T16:00:09,,,,,,,,,,,
```

Edit the SPI Configuration File

Change the TargetStudy and Fleet Database Connection Strings

1. Open the SPI.exe.config file located in C:\Program Files\FAA\AEDT\SensorPathImport
2. Change the **TargetStudy** connection string. The resulting trajectories and operations will be stored in this study.
3. Change the **Fleet** connection string. The Fleet database is used by SPI.

```
<connectionStrings>
    <add name="TargetStudy" connectionString="Data Source=(local);Initial
Catalog=MyStudy;Integrated Security=True" providerName="System.Data.SqlClient" />
    <add name="FLEET" connectionString="Data Source=(local);Initial
Catalog=FLEET;Integrated Security=True" providerName="System.Data.SqlClient"/>
</connectionStrings>
```

Smoothing & Filtering Settings

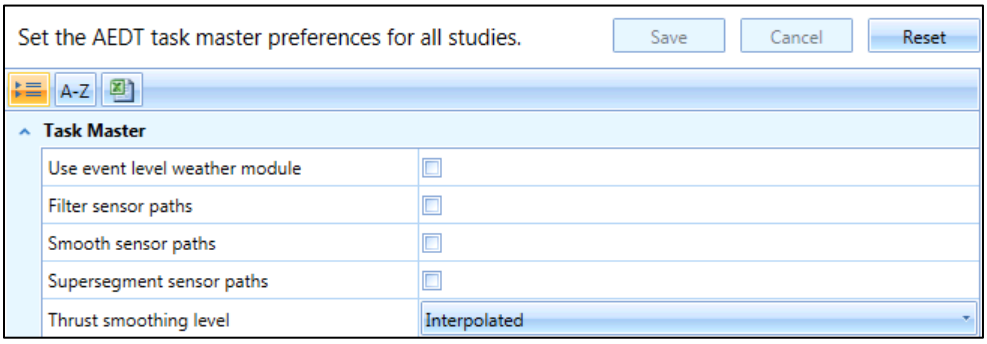
Smoothing and filtering settings can be fine-tuned by editing the SPI.exe.config file. Full list of the settings are listed below.

Setting	Default	Description
altWindow	11	Altitude smoothing: Hampel filter window width. Expected integer > 0 Value is half width: 11 points corresponds to 11+11+1=23 total points
altOutlier	3	Altitude smoothing: outlier criterion. Expected float > 0 Units are in terms of σ
altTol	200	Altitude smoothing: RDP tolerance. Expected float > 0 Tolerance in feet
spdWindow	11	Speed smoothing: Hampel filter window width. Expected integer > 0 Value is half width: 11 points corresponds to 11+11+1=23 total points
spdOutlier	3	Speed smoothing: outlier criterion. Expected float > 0 Units are in terms of σ
spdAveWindow	5	Speed smoothing: averaging window width / point reduction ratio Expected integer > 0. Ratio of N:1 retains every Nth point
distTol	0.10	Ground track filtering: RDP tolerance. Expected float >= 0 Tolerance in nmi
filtFlag	true	Boolean switch for down-sampling. Expected Boolean (true/false) true activates downsampling

Configure the AEDT Study

Use the AEDT user interface to create a study and add airports.

Additional filtering in AEDT may be desired beyond what **SPI** provides. The *Filter sensor paths* (described in the AEDT Technical Manual in Section 3.7.2.1) is available in the AEDT *Study* tab, *Preferences*, *Task Master* screen.



Run the SPI Tool

To invoke the SPI tool, open a command prompt window, navigate to the *SensorPathImport* folder, and type **SPI.exe** (or just SPI) with the argument list. If no arguments are given or they cannot be parsed, the tool will print the usage message and exit.

Command Line Options

The list of valid switches with arguments:

-t `trajectoryFilename`	Use this switch to specify a trajectory file.
-o `operationFilename`	Use this switch to specify an operation file.
-n	Use this switch for no smoothing (aka "pass-through mode"). The option is provided mainly for and debugging and for getting high fidelity data (e.g., Cockpit Flight Data Recorder (CFDR) data) through the AEDT-BADA sensor path workflow.
-r	Use this switch if you want the smoothing algorithm for speed to recalculate speed after lat/long and altitude smoothing. **–r** switch has no effect if **–n** (no smoothing) switch is also used.
-c	Use this switch to save output of the processing to a CSV file. The file will be saved in the same folder where SPI.exe is located. The option is provided mainly for debugging and currently has a limit of 1,048,576 trajectory points. For every 2,000 flights, their trajectories will be saved in the separate file with chunk number appended. SPI tool reads flight trajectories and processes them in chunks of 2,000 (because of memory and R environment limitations).

There are two main use cases for the SPI tool:

1. Read sensor path data from a CSV trajectory file and create records in the SENSOR_PATH table as well as matching records in the AIR_OPERATION table using information from the CSV operation file. For this use case, user has to provide at least two switches: –t and –o.
   `SPI –t c:\traj.csv –o c:\oper.csv`

2. Read sensor path data from the MVT_RAW_ETMS_POSITIONS table in a database. In this case, it only creates records in the SENSOR_PATH table, and not in the AIR_OPERATION as there is no matching operation data. Database server and database name are listed after the **–d** switch and must be separated by a colon. This use case is not applicable to the public AEDT version.
   `SPI –d SQLServerName:DBname`

–d and **–t/–o** switches are mutually exclusive; if provided together the tool will exit with usage message.

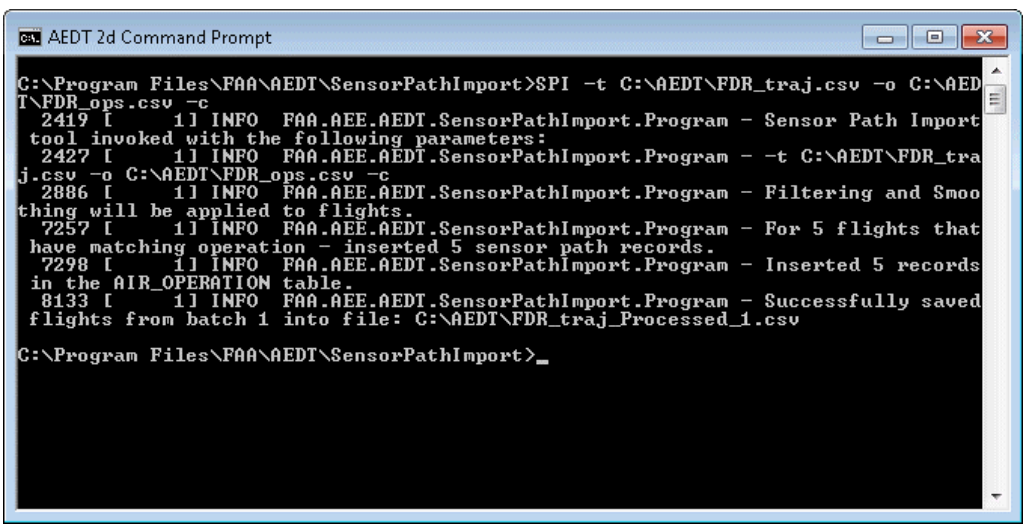
If trajectories are read without errors, the SPI tool will start smoothing and filtering them unless **–n** (no smoothing) switch is given on command line.

Example 1

`SPI –t c:\traj.csv –o c:\oper.csv –c`

will save results to:

- c:\traj_Processed_1.csv (for smoothed trajectories from the first chunk); ***or***
- c:\traj_Raw_1.csv (if **–n** switch was applied)



Example 2

```
SPI –d SQLServerName:DBname
```

will save results to:

- SQLServerName_DBname _Processed_1.csv (for smoothed trajectories from the first chunk); ***or***
- SQLServerName_DBname _Raw_1.csv (if **–n** switch was applied)

Notes

- During runtime, the console will automatically output the definition of the Smoothing/Filtering Function, but the user can ignore this output (as it does not necessarily reflect the actual settings that the user provided). Instead, see the log file.