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**Federal Aviation
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Aviation Environmental Design Tool (AEDT) 2a

User Guide

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13. SUPPLEMENTARY NOTES
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14. ABSTRACT
The Federal Aviation Administration, Office of Environment and Energy (FAA-AEE) has developed the Aviation Environmental Design Tool (AEDT) version 2a 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, Wyle Laboratories, CSSI, Inc., Foliage, MIT, and Georgia Tech. AEDT 2a is designed to dynamically model aircraft performance in space and time to compute aircraft noise, emissions, and fuel burn. AEDT 2a software runs on PCs using a minimum hardware configuration of a Microsoft Windows XP or 7 operating systems, Dual-core w/ 1.6 GHz FSB and 512KB L2 Cache processor, 4 GB RAM, and 500 GB hard disk storage. In the U.S., the model is used to evaluate aircraft noise, emissions, and fuel burn of proposed air traffic airspace actions under the current version of FAA Order 1050.1E. This document is the User Guide to setup and run analyses with AEDT 2a.

15. SUBJECT TERMS
aircraft acoustics, aircraft emissions, aircraft performance, FAA AEDT, air traffic, airspace, noise contours, impact evaluation, change analysis, environmental impact statement, environmental assessment

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Table of Contents

1 Introduction

1.1 What is AEDT?

Overview

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 burn – 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 dynamically model aircraft performance in space and time to compute fuel burn, emissions, and noise. Full flight gate-to-gate analyses are possible for study sizes ranging from a single flight at an airport to scenarios at the regional, national, and global levels[1]. For a Glossary of terms, see Appendix A.

AEDT2a is the first step in the next generation aviation environmental consequence tool, replacing the Noise Integrated Routing System (NIRS) as the official FAA compliance tool for modeling aircraft noise, emissions, and fuel burn for air traffic airspace and procedural actions. Upon release of the full AEDT 2b version, AEDT will also replace the current public-use aviation air quality and noise analysis tools such as the Integrated Noise Model (INM – single airport noise analysis) and the Emissions and Dispersion Modeling System (EDMS – single airport emissions analysis).

Software Characteristics

AEDT is built on the Microsoft .NET Framework and is capable of running on Windows XP Professional, Windows 7, and Windows Server operating systems. It is supported by extensive system databases covering airports, airspace, and fleet information that span the global nature of the aviation industry. AEDT is designed to be a data-driven model that is fully scalable, from a single operation at a specific airport to a full global inventory and everywhere in between, provided that the user provides the necessary input data[1].

All information is rendered in a geo-spatial nature given the Esri-based core of the tool, which supports the compatibility with other geo-spatial applications. State-of-the-art software technology is used to enhance the capabilities of AEDT, such as the XML-based AEDT Standard Input File (ASIF) that allows for the input of large datasets of 4D trajectories, fleet information, and event assignments.

AEDT outputs include reports, graphs, and tables that describe the fleet mix, receptor sets, flight performance, noise, contours, fuel burn, and local air quality and greenhouse gas emissions. See Appendix B for a diagram of the AEDT2a system structure.

Users

AEDT is currently used by the U.S. government for domestic planning and research analyses and in support of work within the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP). It is anticipated that the public release version of AEDT will have the same wide range of global users as the existing legacy tools on which AEDT is based, including domestic

[1] Not all functionality is available in the AEDT2a release.

and international regulatory bodies, airports, consultants, academia, environmental organizations, industry organizations, as well as airframe and engine manufacturers.

Availability
U.S. government use of AEDT is through the FAA-AEE. AEDT2a is the public use version. It is the official FAA compliance tool for modeling aircraft noise, emissions, and fuel burn for air traffic airspace and procedural actions in the United States.

Developers
The AEDT Development Team consists of: the FAA, National Aeronautics and Space Administration (NASA), U.S. Department of Transportation John A. Volpe National Transportation Systems Center, the ATAC Corp., CSSI Inc., Metron Aviation, Wyle Laboratories, Foliage, Georgia Institute of Technology, and Massachusetts Institute of Technology.

1.2 AEDT2a Key Features
Key features of AEDT2a are listed below.
- Change Analysis and Impact Evaluation: Noise change analysis and impact evaluation for airspace redesign and procedural changes.
- Partial ASIF Import: Supports adding elements to an existing study incrementally.
- Weather Processing: Users can model the results of high fidelity, average, or user defined airport weather conditions.
- Population Import Tool: Supports importing population data into AEDT2a, based on geographic boundaries.
- Distributed Processing: AEDT2a provides the ability to run jobs across a number of remote servers to reduce processing time.
- Helicopter Modeling: AEDT2a uses the same helicopter modeling methods and data utilized by both INM version 7.0c and NIRS version 7.0b. These are enhanced versions of the helicopter modeling methods and data contained in version 2.2 of the FAA's Heliport Noise Model (HNM). Enhancements relative to HNM include additional helicopter data, provisions for more types of noise directivity data, and more unique helicopter operational modes which are tied to both noise-power-distance (NPD) data sets and helicopter flight path calculations. Helicopter functionality is set up in the ASIF. Helipad latitude, longitude, and altitude must be input by the user in the ASIF. See Appendix C for more detailed information on the ASIF. AEDT 2a does not support helicopter modeling with user defined profiles, population receptors, sensor path data, or for overflight operations.

1.3 About This User Guide
This User Guide for AEDT2a provides step-by-step instructions on how to use AEDT to model aircraft noise, emissions and fuel burn. The organization of this User Guide is based on a typical AEDT2a work flow. To navigate this User Guide by menu item, see Appendix D.

Screenshots are provided throughout this User Guide. Screenshots were taken in a Windows 7 environment, and some images may look different in Windows XP. Clicking on help buttons in AEDT dialog boxes will open this AEDT User Guide in the appropriate section.

Throughout this document, information may be highlighted to make it easier to find solutions to problems or to avoid errors using the following prompts:

Warnings must be observed to avoid errors in execution or to ensure that the intended execution will occur.

Notes contain important information or tips regarding the functionality of the tool.

Questions provide answers to common questions about the tool.

OPTIONAL Certain features are optional for some study types, but are required for other study types. Features that may be optional are marked with this icon.

EMISSIONS Features specific to emissions are marked with this icon.

NOISE Features specific to noise are marked with this icon.

1.4 Technical Assistance

Please direct all technical correspondence to aedt-support@dot.gov

Error files and log files are located in the following places and may be helpful when contacting technical assistance:

- System error messages are written to the *Event Viewer*.
  - In Windows XP, open Event Viewer by navigating to the *Start* menu, *Control Panel, Administrative Tools, Event Viewer*.
  - In Windows 7, open Event Viewer by navigating to the *Start* menu, *Control Panel*, *System and Security*, *Administrative Tools*, *Event Viewer* (Figure 1-1).
- AEDT application and ASIF importer error messages are written to a log file located at *C:\AEDT\AEDT_Workspaces\Output_files\AEDT_Log.txt.* This log can be viewed in the AEDT graphical user interface (GUI), see Section 6.6 for more information.

Do not change the AEDT default directory file structure or default error log locations. W-1

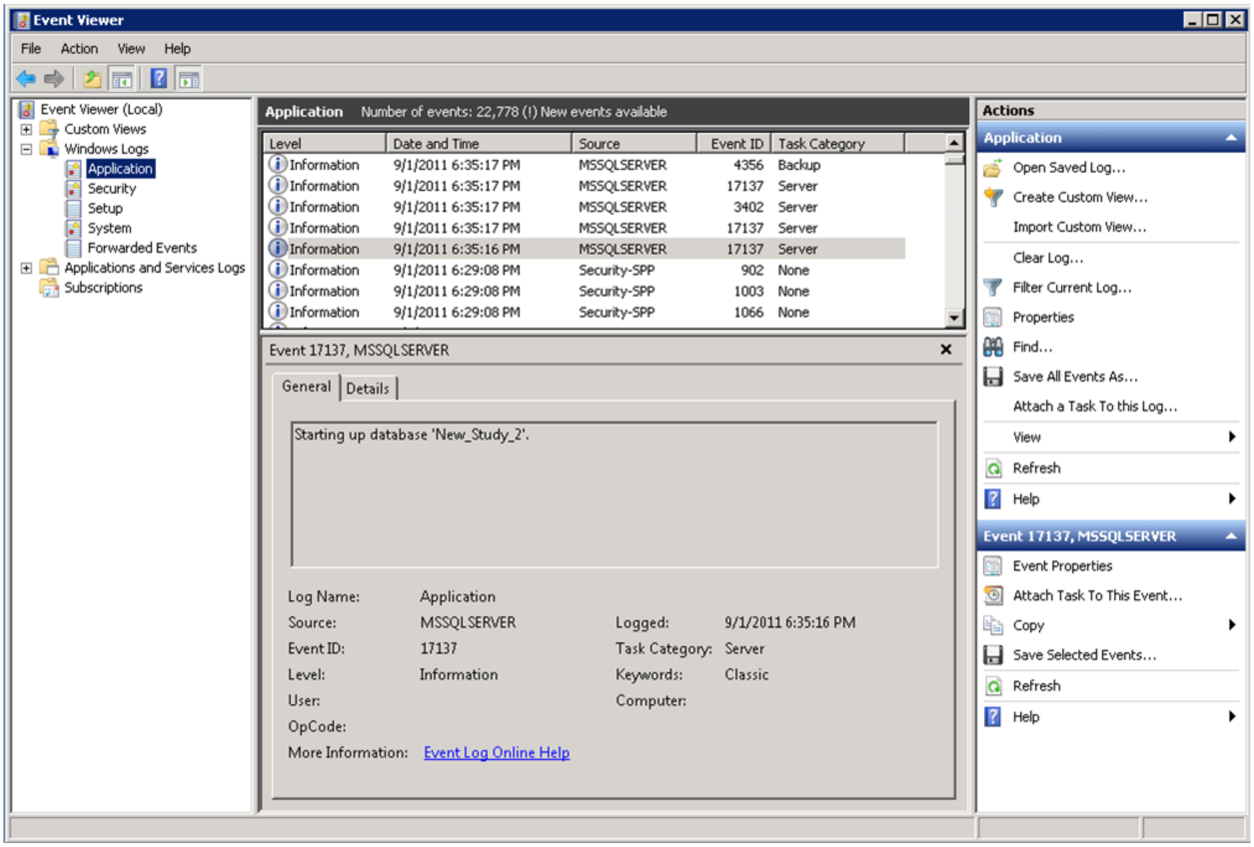


Figure 1-1 Event Viewer in Windows 7

2 Getting Started

2.1 Installation

2.1.1 System Requirements

System specifications for computers capable of hosting the AEDT application are displayed in Table 2-1. The recommended specifications are listed with suggested minimums where applicable. Through the use of SQL Server connectivity, it is possible to connect multiple computational clients to one central database server.

Table 2-1 AEDT System Requirements

	AEDT System Specifications	
	Minimum	**Preferred**
Operating Systems	Microsoft Windows XP (x32 or x64) or Microsoft Windows 7 x32-based Systems	Microsoft Windows 7 x64-based Systems[2] Microsoft Windows Server 2008 R2
Processor	Modern dual core processor with 2 GHz or higher clock	Modern many core (>2) processors with 2 GHz or higher clock
RAM	4 GB Memory for 32-bit operating systems	64 GB Memory for 64-bit operating systems
Hard-disk Space	500 GB Storage	2 TB Storage RAID
SQL Requirements	Microsoft SQL Server 2008 R2 (x32 or x64) or Microsoft SQL Server 2008 R2 Express (x32 or x64)	Microsoft SQL Server 2008 R2 (x64)
Software Requirements	• ArcGIS Engine Runtime v10.0: Included in AEDT installation package • MS Chart: Included in AEDT installation package • Adobe Reader X (v10) or higher • XML Editor: Free download available online, for example MS XML Notepad 2007 or Notepad++	• ArcGIS Engine Runtime v10.0: Included in AEDT installation package • MS Chart: Included in AEDT installation package • Adobe Reader X (v10) or higher • XML Editor: Free download available online, for example MS XML Notepad 2007 or Notepad++

[2] Microsoft Windows 7 for x64-based Systems is the preferred operating system for AEDT2a. Use Microsoft Update to ensure your computer has the latest priority updates. Visit www.update.microsoft.com.

In AEDT2a, only “English (United States)” is supported for date and time format, localization (system locale), and operating systems. N-1

Where can system specification be found?

- Windows XP
  - Navigate to *Start* menu, *Control Panel*, *System*. The *General* tab displays the operating system version, processor, and RAM (Figure 2-1). For a 32-bit version OS, it displays *Windows XP Professional Version <Year>*. For a 64-bit version OS, it displays *Windows XP Professional x64 Version <Year>*.
  - To check the hard-disk space, right-click on C drive and select *Properties*. The *General* tab displays the capacity of the disk including used and free space.

- Windows 7
  - Navigate to *Start* menu, *Control Panel*, *System and Security*, *System*. It displays the operating system version, processor, installed memory (RAM), and system type information (Figure 2-2).
  - To check the hard-disk space, right-click on C drive and select *Properties*. The *General* tab displays the capacity of the hard-disk including used and free space.

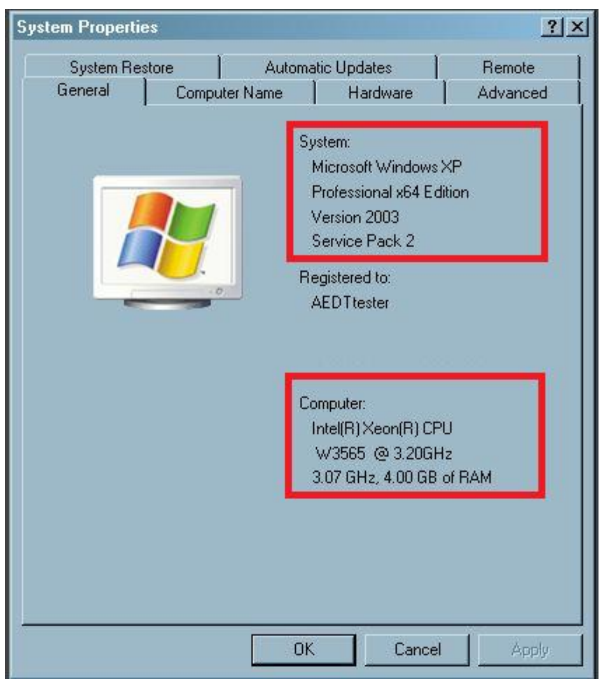


Figure 2-1 System Properties – Windows XP

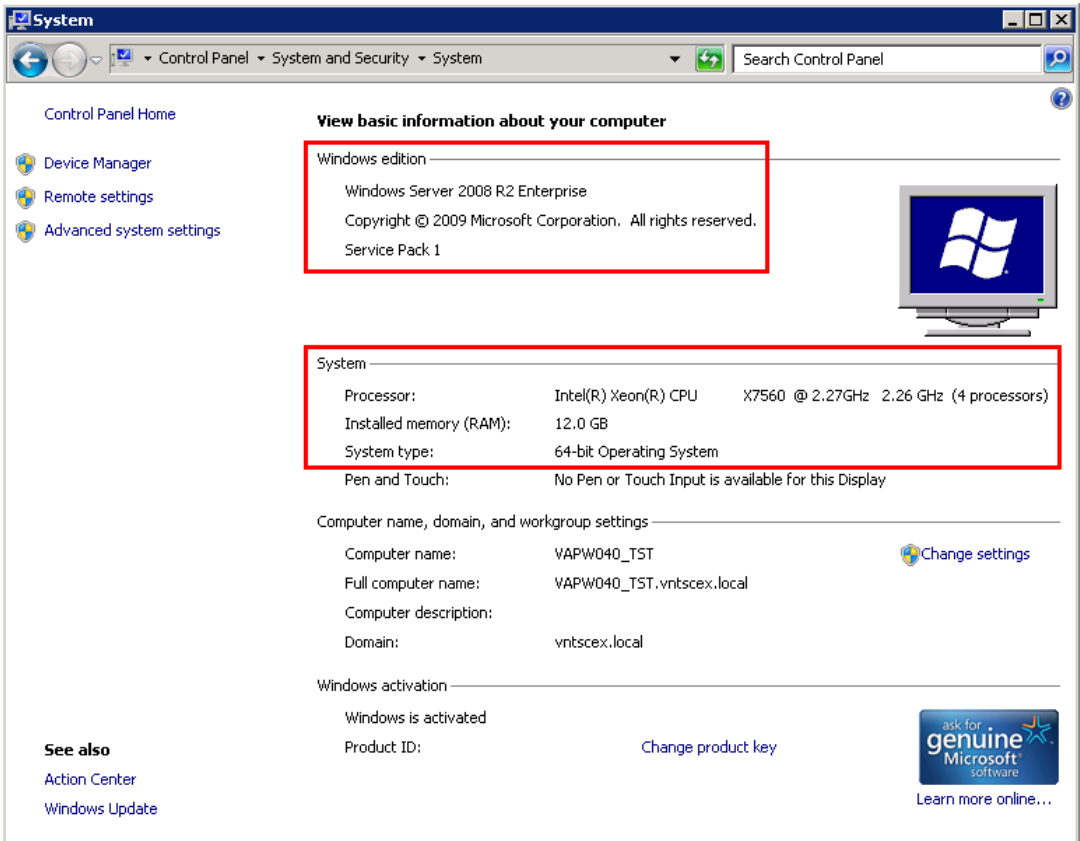


Figure 2-2 System Properties – Windows 7

? Where can installed software be viewed?

- Windows XP
  - Navigate to *Start* menu, *Control Panel*, and select *Add or Remove Programs*.
  - Check whether the *ArcGIS Engine Runtime 10* and *ArcGIS_Installer_v10* appear in the list of installed programs.
  - Check whether the *Microsoft SQL Server 2008 R2* appears in the list of installed programs.
- Windows 7
  - Navigate to *Start* menu, *Control Panel*, *Programs*, and select *Uninstall a program*.
  - Check whether the *ArcGIS Engine Runtime 10* and *ArcGIS_Installer_v10* appear in the list of installed programs.
  - Check whether the *Microsoft SQL Server 2008 R2* appears in the list of installed programs.

2.1.2 Install Package Contents

Please contact aedt-support@dot.gov to obtain the AEDT2a installation package. The AEDT2a installation package contains the AEDT2a software, including additional software listed below:

Required Software

1. **SQL_Server_2008_R2_Express_x64.exe** – Installer for Microsoft SQL Server 2008 R2 Express and SQL Server Management Studio for 64-bit operating system
2. **SQL_Server_2008_R2_Express_x86.exe** – Installer for Microsoft SQL Server 2008 R2 Express and SQL Server Management Studio for 32-bit operating system
3. **ESRI_ArcGIS_Installer_v10.zip** – Installer for ArcGIS Engine Runtime 10 with Spatial Analyst extension and for ArcGIS Engine Runtime 10, Service Pack 1
4. **MSChart.exe** – Microsoft Chart installer

AEDT Software

1. **AEDT_2A_Installer.zip** – Installer for AEDT2a
2. OPTIONAL **AEDT_2A_Distributed_Installer.zip** – This is only for servers utilizing Distributed Processing (see Section 2.2)
3. OPTIONAL **AEDT_2A_Run_Study_x64_Installer.zip** – Installer for a batch study processor tool (see Section 2.2.2).
4. **AEDT_User_Guide.pdf** – AEDT2a User Guide

Optional Tools

1. **INM_to_ASIF_Converter_User_Guide.docx** – User Guide for the INM to ASIF converter tool
2. **INMASIFConverter.zip** – Installer for INM to ASIF converter tool
3. **NIRS_to_ASIF_Converter_User_Guide.docx** – User Guide for the NIRS to ASIF converter tool
4. **NIRS2ASIF.zip** – Installer for NIRS to ASIF converter tool

2.1.3 Software Installation

This section provides detailed steps on how to install and run AEDT. It is important to follow the installation instructions in the order listed, as Microsoft SQL is a prerequisite for AEDT:

1. Install Microsoft SQL Server 2008 R2 Express
2. Install Esri ArcGIS 10.0 Engine Runtime
3. Install AEDT

Installation components must run locally.

To install software, the user must have administrative rights to the computer. W-2

To check if the user has administrative rights to the computer:

1. Navigate to *Start* menu, *Administrative Tools*, *Computer Management*.
2. Expand *Local Users and Groups*, and select the Groups folder.
3. Double-click on *Administrators.* The name of the user should be listed (the steps may be different in a Windows XP environment).

Do not change the AEDT default directory file structure or default folder names provided in the installation. W-3

If the user has a pre-existing version of the AEDT software (e.g. Alpha, Beta 1a, Beta 1b, or Beta 1c installation), it will need to be uninstalled from the system before installing AEDT2a. The user will not be able to run prior versions with the AEDT2a version on the same machine. Please consider installing the AEDT2a version on a different machine for a clean installation. See Section 2.1.5 on uninstalling AEDT. W-4

Check that all AEDT file directories or existing SQL database files (.BAK) that were supplied with prior versions are removed from the system before proceeding with the AEDT2a installation. See the end of Section 2.1.5.

2.1.3.1 Install Microsoft SQL Server 2008 R2 Express

The user must have Microsoft SQL Server 2008 R2 (x32 or x64) or Microsoft SQL Server 2008 R2 Express (x32 or x64) installed prior to installing AEDT2a. See Section 2.1.1 for system requirements. Microsoft SQL Server 2008 R2 Express (x32 or x64) is included in the AEDT2a installation package (see Section 2.1.2). Instructions on installing the SQL Server 2008 R2 Express Edition are described below. The instructions assume that the user does not have a Microsoft SQL Server product on the computer already.

Microsoft SQL Server Management Studio is also installed as part of the installation. SQL Server Management Studio is a graphical management tool that allows users to configure and manage Microsoft SQL Server, including backing up and restoring databases and running SQL queries. N-2

To install Microsoft SQL Server 2008 R2 Express Edition:

1. There are two installers for Microsoft SQL Server 2008 R2 Express.
   - For computers with 32-bit operating systems, use the *SQL Server 2008 R2 Express x86.exe*.
   - For computers with 64-bit operating systems, use the *SQL Server 2008 R2 Express x64.exe*.
2. Double-click on the appropriate executable.
3. Click *Run* when prompted to *Run* or *Cancel*.
4. The *SQL Server Installation Center* window will automatically launch when the files have finished extracting.
5. Click the *Installation* link on the left side of the window.
6. Click the appropriate installation option. Click the *New installation or add features to an existing installation* option unless upgrading from an older version. See Figure 2-3 below.

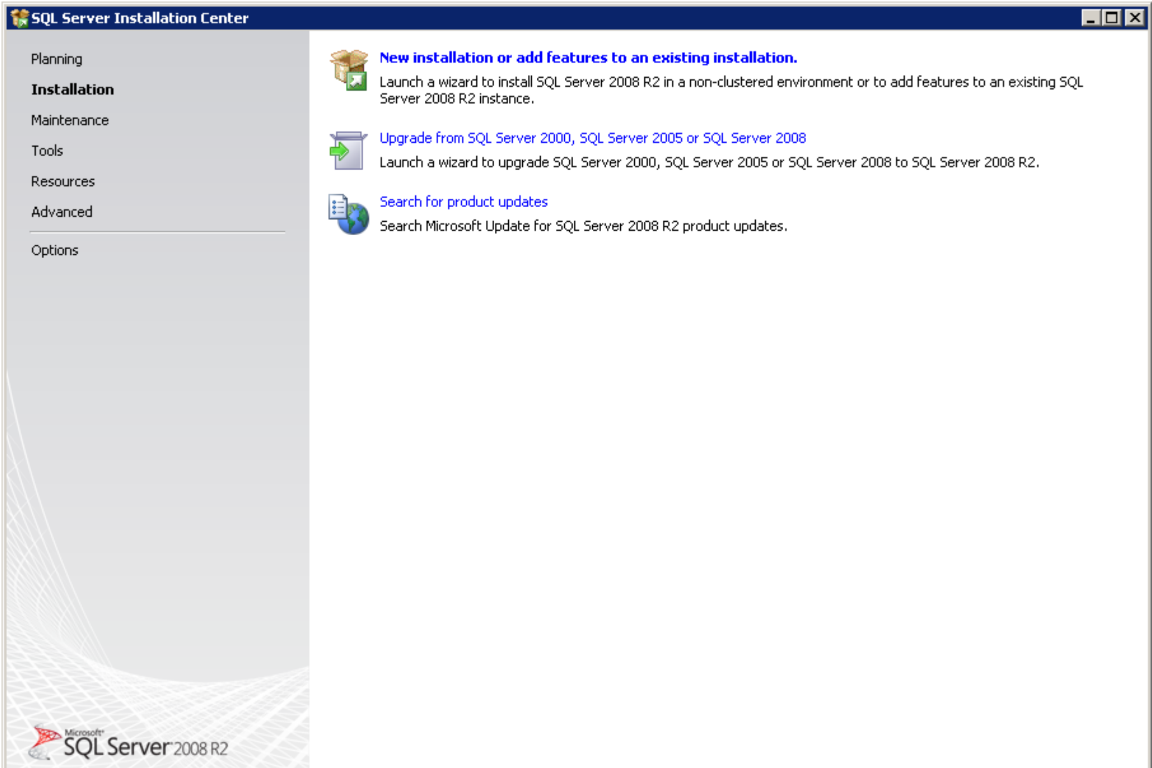


Figure 2-3 SQL Server 2008 R2 Express Installation – Installation Menu

7. SQL Server 2008 R2 Setup will automatically run *Setup Support Rules* which will identify potential installation issues.
8. *License Terms*: Read the terms and check the box that reads *I accept the license terms*. Click the *Next* button.
9. SQL Server 2008 R2 Setup will automatically run *Setup Support Files*.

10. *Feature Selection:* Select the following features: *Database Engine Services* and *Management Tools - Basic* (Figure 2-4). Click the *Next* button.

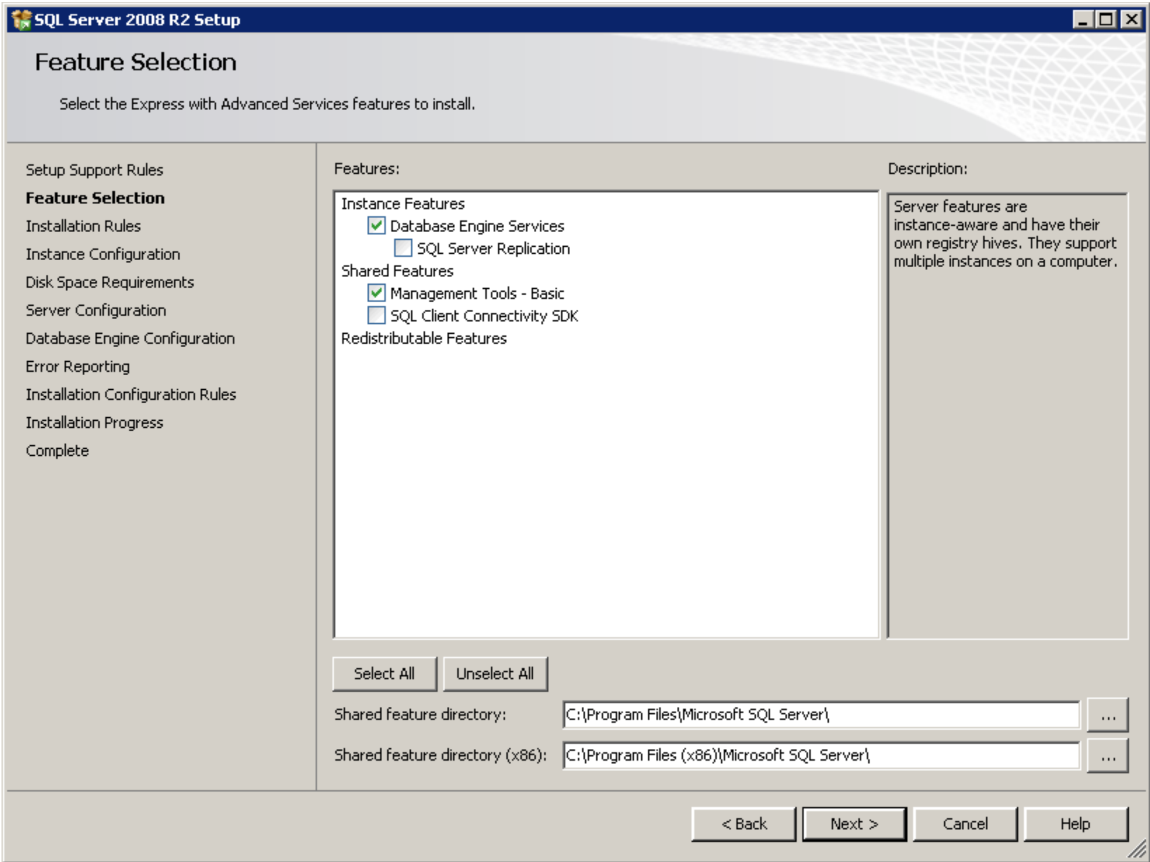


Figure 2-4 SQL Server 2008 R2 Setup – Feature Selection

11. *Instance Configuration:* Accept the default settings and click the *Next* button.

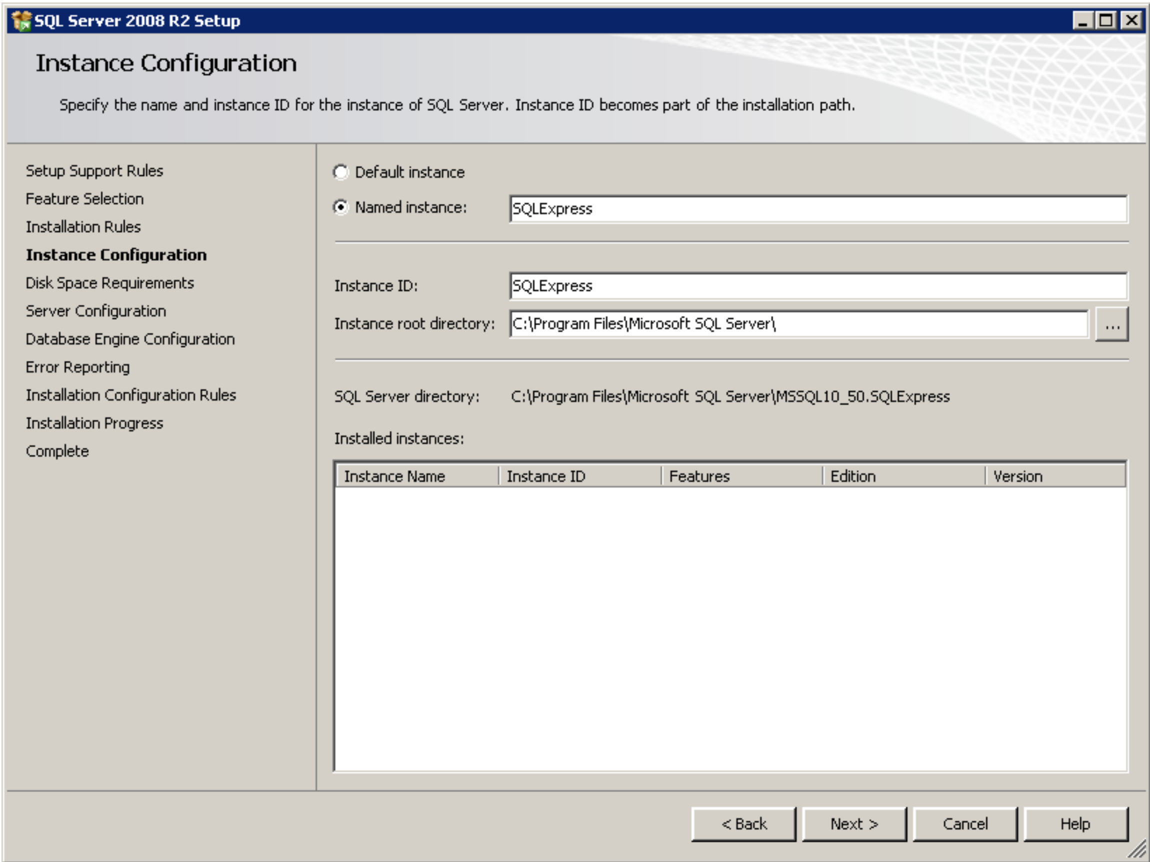


Figure 2-5 SQL Server 2008 R2 Setup – Instance Configuration

12. *Server Configuration*: For the *SQL Server Database Engine* service, select *NT AUTHORITY\SYSTEM* in the *Account Name* field. Select *Automatic* in the *Startup Type* drop-down menu (Figure 2-6). Click the *Next* button.

When possible, use the same system or local account to configure the services. Network accounts can be used when NT authentication is required to establish a “back-end” SQL Server configuration. N-3

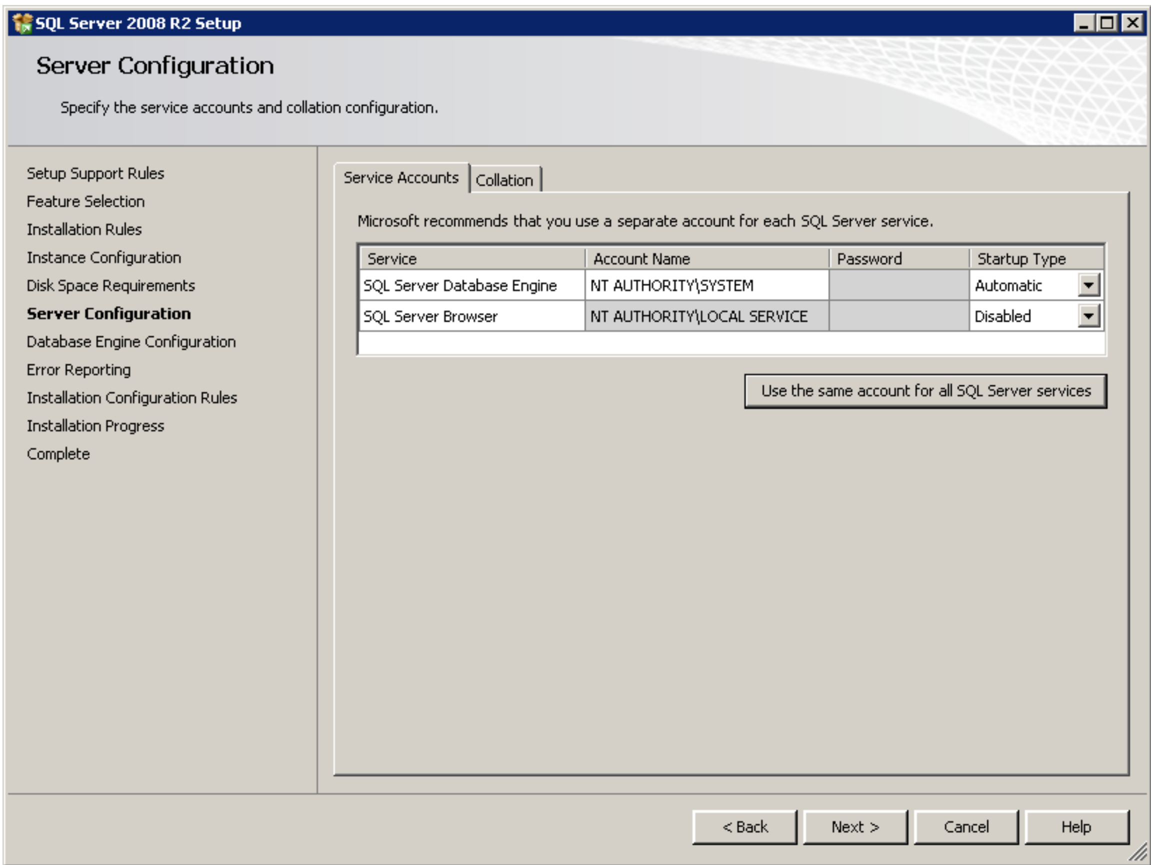


Figure 2-6 SQL Server 2008 R2 Setup – Server Configuration

13. *Database Engine Configuration*: Select the *Mixed Mode* radio button. Enter a password that is at least 10 characters long. Click the *Add Current User* button (Figure 2-7). Click the *Next* button.

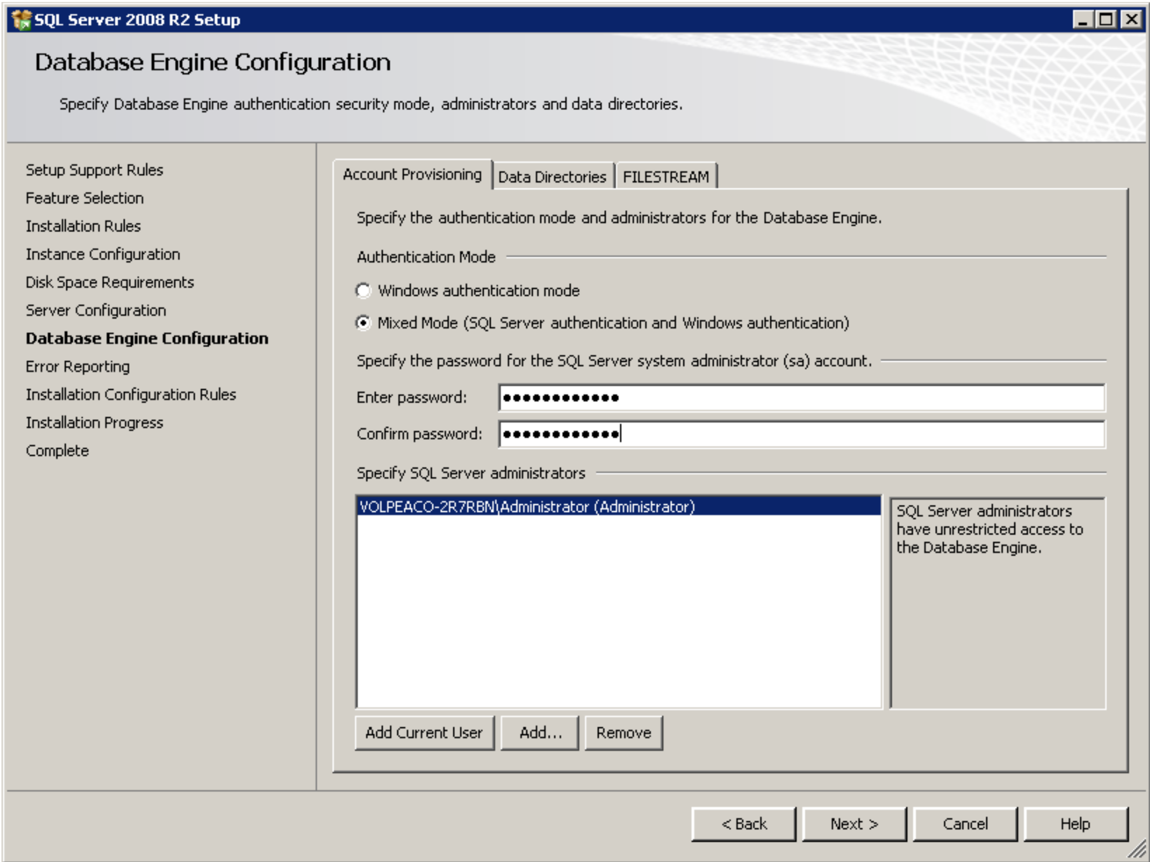


Figure 2-7 SQL Server 2008 R2 Setup – Database Engine Configuration

14. *Error Reporting:* It is not necessary to select any of the options. Click the *Next* button. *Installation Progress:* The progress bar and status will update until the installation is complete (Figure 2-8).

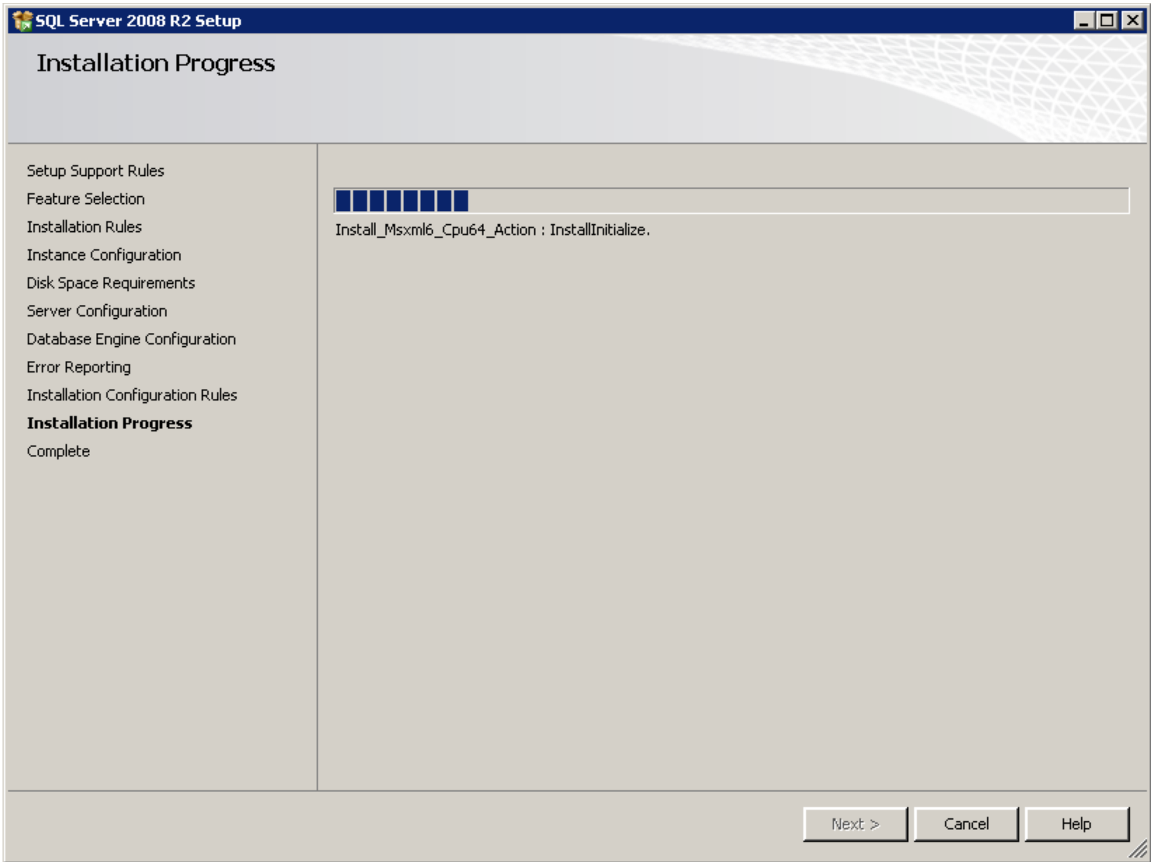


Figure 2-8 SQL Server 2008 R2 Setup – Installation Progress

15. *Complete:* The final screen will confirm that the installation was successful (Figure 2-9). Click the *Close* button to close the *Setup* window.

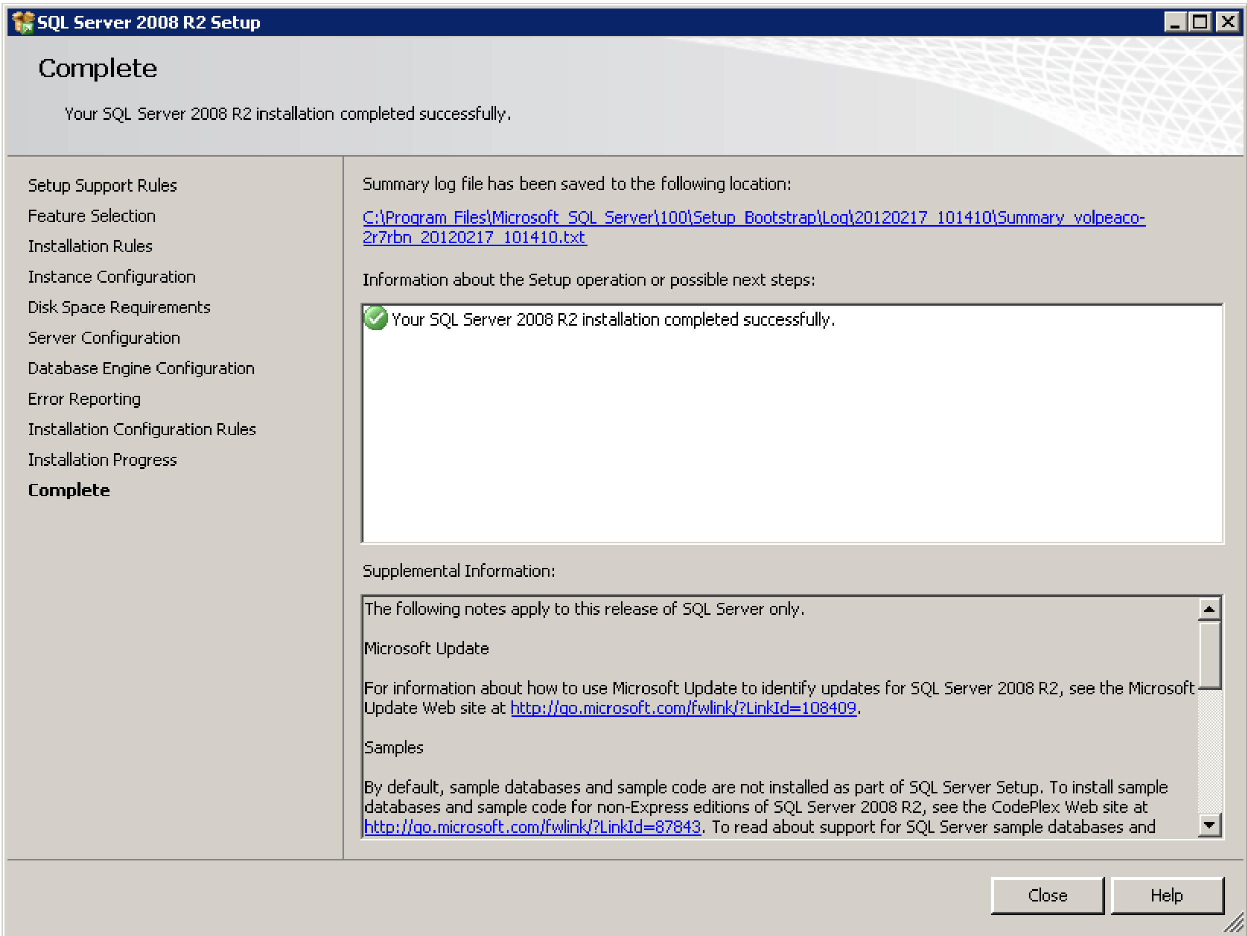


Figure 2-9 SQL Server 2008 R2 Setup – Complete

16. If prompted to restart the computer, click *OK*.
17. Close the *SQL Server Installation Center* window by clicking the *X* in the top right corner.

2.1.3.2 Install Esri ArcGIS 10.0 Engine Runtime

Skip this section if the ArcGIS 10.0 Engine Runtime was previously installed; FAA AEE Design Review Group members, see instructions below. W-5

If an older or newer version of the Esri software (e.g. 9.3.1, 10.0) exists on the machine or ArcGIS 10.0 exists but without the Spatial Analyst Extension, and should be retained, then install on another machine.

FAA AEE Design Review Group members who procured Esri ArcGIS 10.0 Engine Runtime through previous AEDT installers should uninstall the Esri ArcGIS software and install the new Esri ArcGIS Runtime software, ESRI_ArcGIS_Installer_v10, see section 2.1.2. Follow the uninstallation instructions provided below.

The Installer for the Esri ArcGIS 10.0 Engine Runtime is included in the AEDT2a installation package (see Section 2.1.2). Installation instructions are described below.

It is required to uninstall any prior versions for Esri ArcGIS Engine Runtime (e.g. 9.3.1) before installing Esri ArcGIS 10.0 Engine Runtime.

The following instructions are written for Windows 7, steps may be different in Windows XP. W-6

To uninstall Esri ArcGIS Engine Runtime:

1. Navigate to *Start* menu, *Control Panel*, and select *Uninstall a program* (Windows 7).
2. Uninstall the following two programs – ArcGIS Engine Runtime and ArcGIS Installer.
   a. First, remove the *ArcGIS Engine Runtime*. A confirmation message will be displayed if uninstallation is successful.
   b. Remove the *ArcGIS Installer*. Restart the system if the installer prompts for a restart.
3. Verify that both programs have been completely removed from the installed program list before moving on to the next step.
4. Delete any residual files in the following directory C:\Program Files\ArcGIS or C:\Program Files (x86)\ArcGIS that may remain on the system.
5. Check if the following directory exists – C:\ProgramData\FLEXnet
   This directory may be hidden. In order to show hidden folders:
   a. Open the *Folder Options* by navigating to *Start* menu, *Control Panel,* Appearance and Personalization, *Folder Options*.
   b. Click on *View* tab (Figure 2-10).
   c. Select *Show hidden files, folders, and drives* option, then click *OK*.

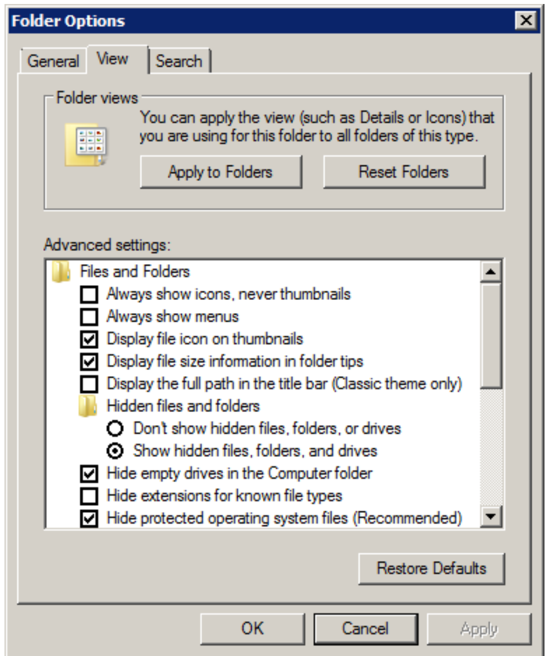


Figure 2-10 Folder Options – View Tab

6. Delete any files that begin with *ARCGIS* in the directory (C:\ProgramData\FLEXnet).

To install Esri ArcGIS Engine Runtime 10 and Service Pack 1:

1. Extract the contents of *ESRI_ArcGIS_Engine_v10.zip* file.
2. To start the installer, double-click the *setup.exe* file.
3. The ArcGIS Setup Wizard will open (Figure 2-11). Click *Next*.

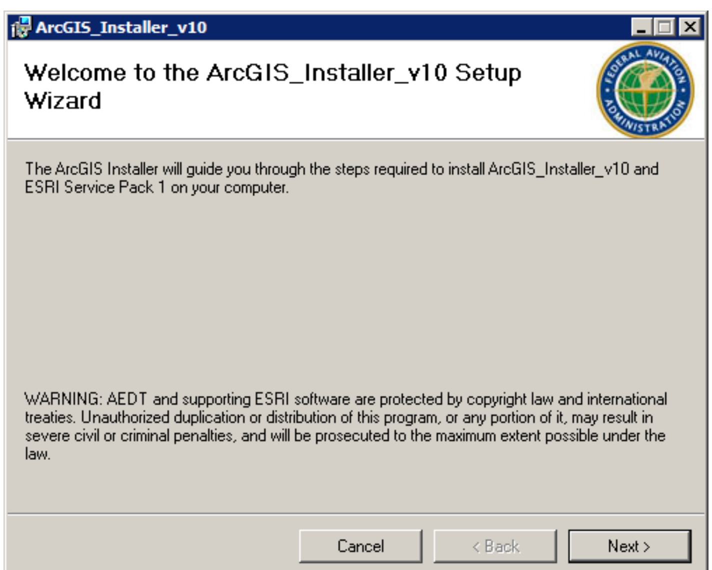


Figure 2-11 ArcGIS Setup Wizard – Welcome

4. Select the installation folder – accept the default location (Figure 2-12).

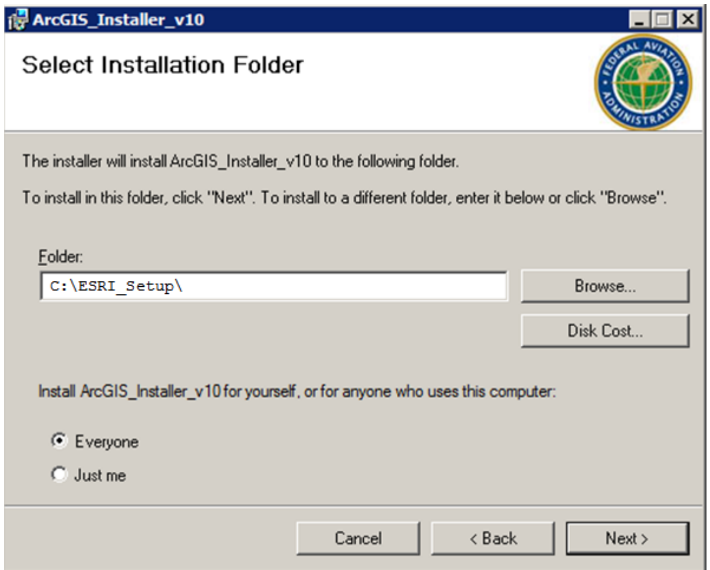


Figure 2-12 ArcGIS Setup Wizard – Select Installation Folder

5. Click *Next* to start the installation (Figure 2-13).

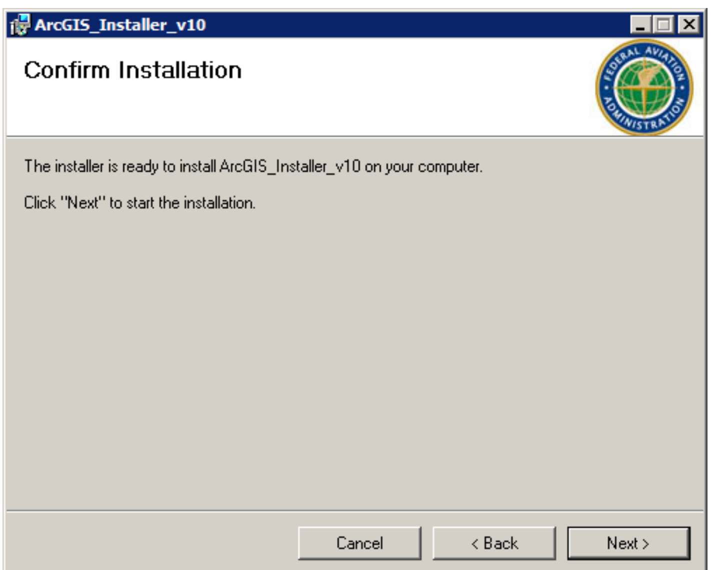


Figure 2-13 ArcGIS Setup Wizard – Confirm Installation

6. The installation progress will be displayed. Once the installation is complete, click *Close* to exit the Setup Wizard (Figure 2-14).

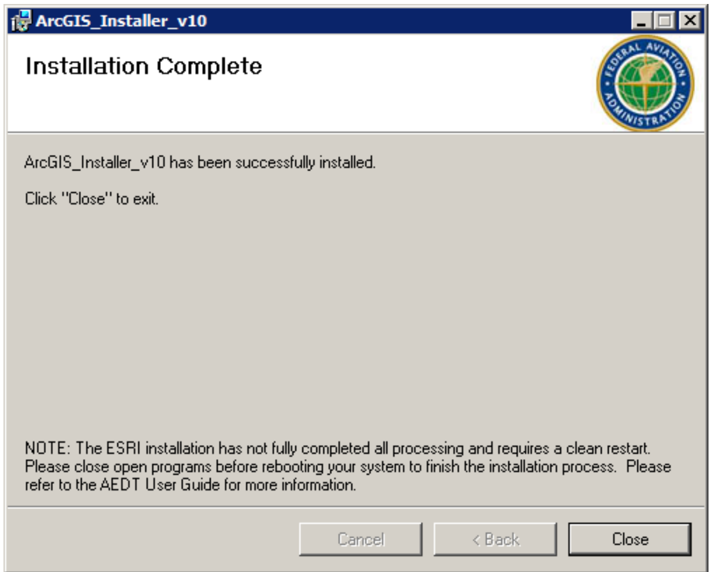


Figure 2-14 ArcGIS Setup Wizard –Installation Complete

7. The Esri installation requires a system restart to complete the installation process. Close open programs before restarting the computer. Click *Yes* to restart (Figure 2-15).

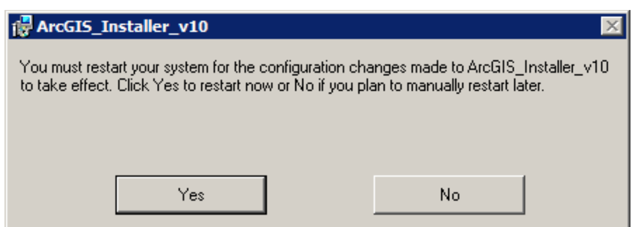


Figure 2-15 ArcGIS Setup Wizard – Restart System

8. Log back into the computer as administrator. The Esri installation will continue after the system restart (Figure 2-16). Do not change the computer name that is displayed. Click *OK* to start ArcGIS Engine Runtime 10.0 installation.

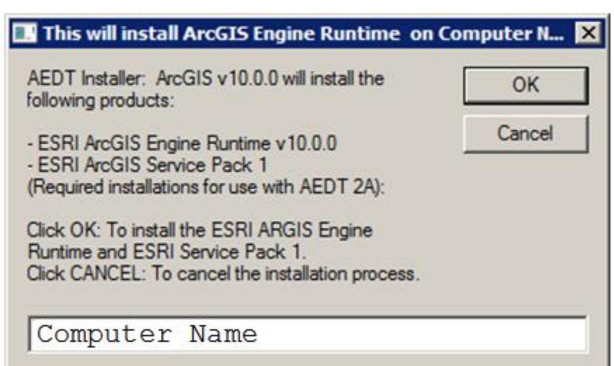


Figure 2-16 ArcGIS Engine Runtime

If the Esri installation does not automatically continue after the system restart (Figure 2-16 does not appear after restart), navigate to the *C:\ESRI_Setup* directory and double-click on *RunArcGISInstall.vbs*. N-4

If prompted to choose the use account to run the program, select *Current user*. If the *Protect my computer and data from unauthroized program activity* box is checked, uncheck it and click *OK*.

9. The user is notified when the ArcGIS Engine Runtime has completed (Figure 2-17). Click *OK* to continue installation of Esri ArcGIS 10.0 Service Pack 1.

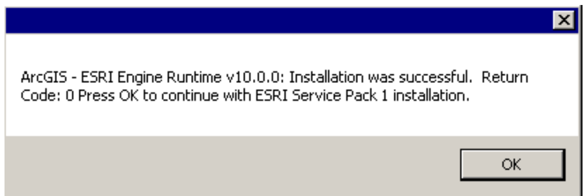


Figure 2-17 ArcGIS Engine Runtime – Installation Message

10. The installation progress will be displayed. Once the ArcGIS Service Pack 1 installation is complete, the following confirmation message will be displayed (Figure 2-18). Click *OK* to close the message.

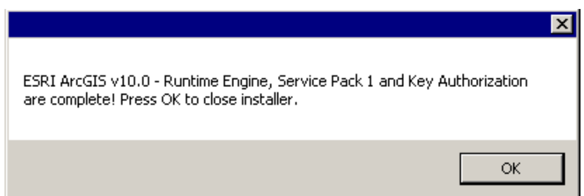
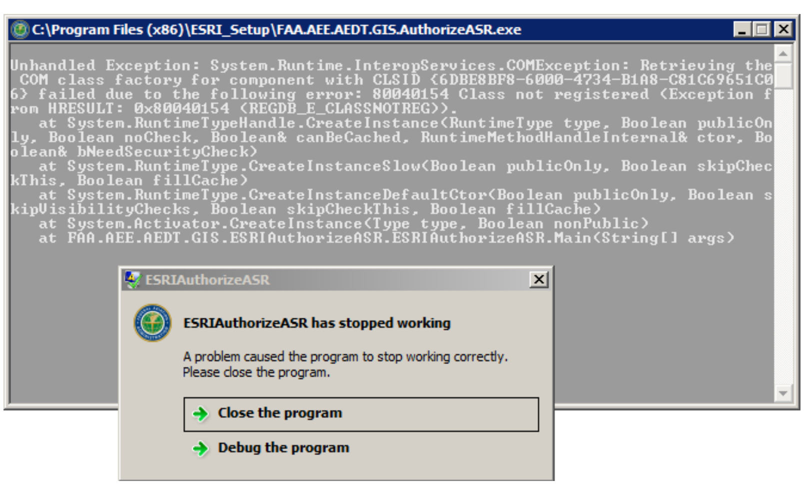
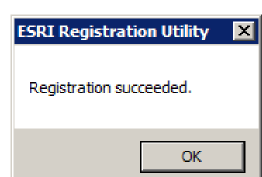


Figure 2-18 ArcGIS Engine Runtime – Installation Complete

If an error related to FAA.AEE.AEDT.GIS.AuthroizeASR.exe occurs, see error message below, navigate to the *C:\ESRI_Setup* directory and right-click on *ArcGIS_Authorize.bat*. Select the *Run as administrator* or *Run Elevated* option. The confirmation message, shown below, will appear if the Esri license registration was successful. N-5





Follow the instructions below to verify the ArcGIS Runtime Engine configuration once the installation is complete:

1. Open the *ArcGIS Administrator Wizard* by navigating to *Start* menu, *All Programs, ArcGIS, ArcGIS Administrator* (Figure 2-19).

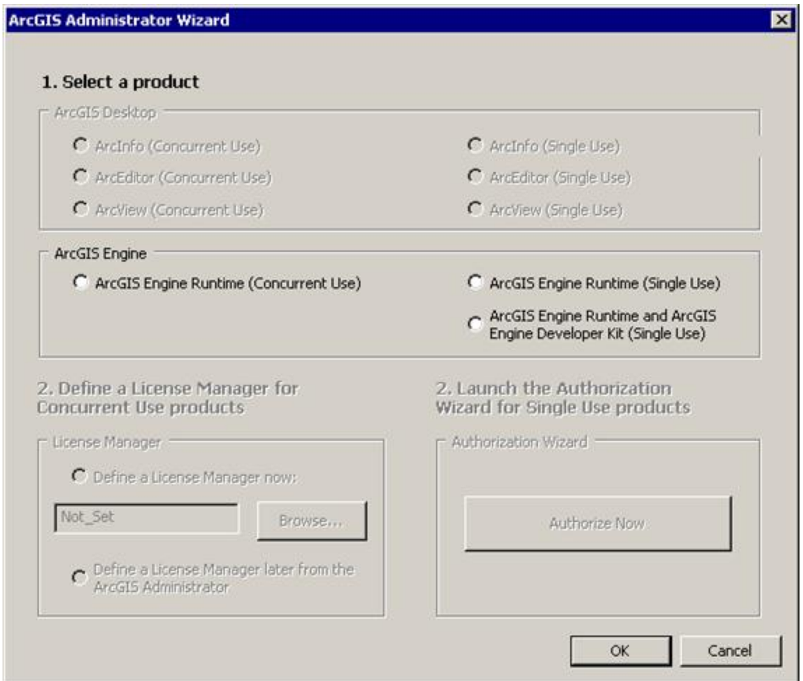


Figure 2-19 ArcGIS Administrator Wizard

2. Click the *ArcGIS Engine Runtime (Single Use)* radio button.
3. Click the *Authorize Now* button to open the *Software Authorization Wizard* window.

4. In the *Authorization Options* page, click the *Cancel* button to stop the Software Authorization Wizard, then click the *No* button in the warning message (Figure 2-20) to open the *ArcGIS Administrator* window (Figure 2-21).

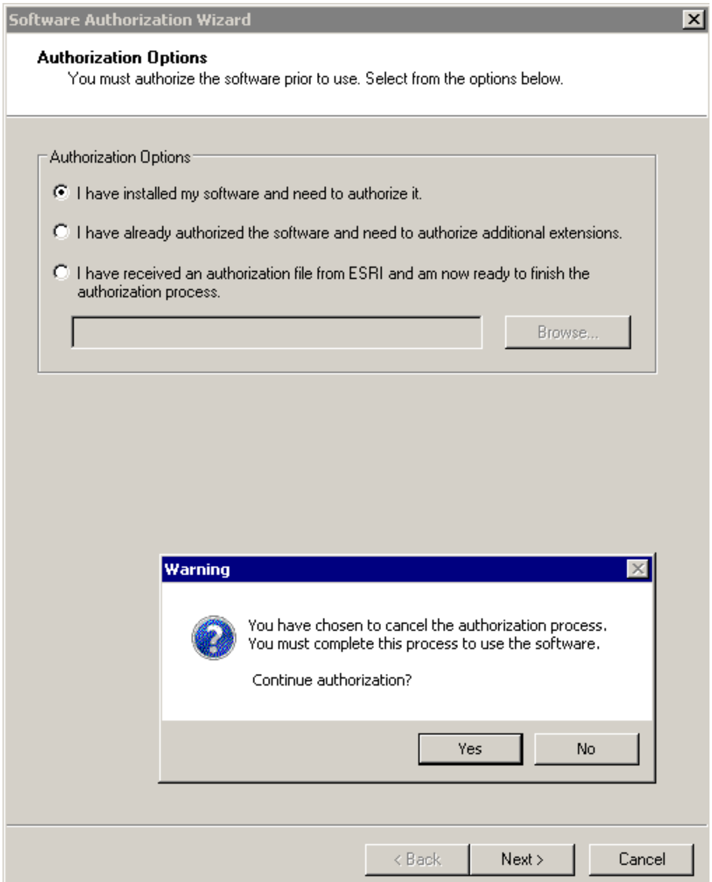


Figure 2-20 ArcGIS Software Authorization Wizard – Cancel Authorization Process

5. In the *ArcGIS Administrator* window, verify the installation information and software versions (Figure 2-21). Verify that the service pack build is 10.0.1.2800.

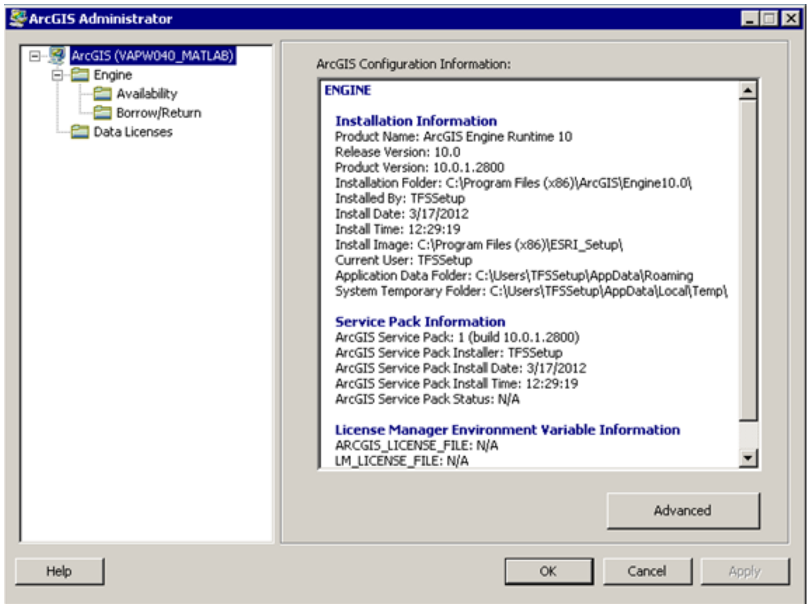


Figure 2-21 ArcGIS Administrator – Configuration Information

6. Select the *Availability* folder in the left window pane. Verify the authorization status and expiration dates for the following software (Figure 2-22).
   - ArcGIS Engine Runtime: Authorized=Yes; Expires=30-Sep-2014
   - Geodatabase Update: Authorized=Yes; Expires=30-Sep-2014
   - Spatial Analyst: Authorized=Yes; Expires=30-Sep-2014

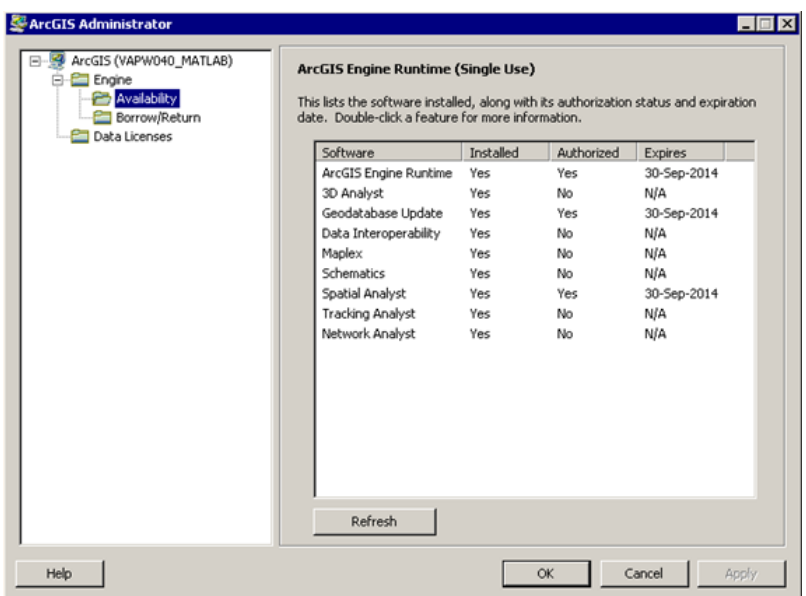


Figure 2-22 ArcGIS Administrator – Availability

If the Esri installation is not completed to include the license key configuration, the AEDT application will fail on startup due to invalid Esri license information. W-7

2.1.3.3 Install AEDT

The AEDT application installation package, AEDT_2A_Installer.zip, consists of a pair of files. The launch application wizard is called setup.exe, and FAA_AEE_AEDT_Installer.msi contains the software, databases, and registration information for the application. This package is a standard windows format for software installations.

Microsoft SQL Server 2008 R2 must be installed prior to installing AEDT; otherwise the following error will occur during AEDT installation: *Error 1001. Object reference not set to an instance of an object*. W-8

AEDT Setup will install Windows Installer 4.5 and Microsoft .NET Framework 4 if they are not already installed on the computer. N-6

To install AEDT:

1. Uninstall (see Section 2.1.5) any prior versions of AEDT before starting the installation.
2. Extract the AEDT_2A_Installer.zip file. Note the AEDT setup.exe file is different from the Esri setup.exe file. Copy the AEDT installation files to a different folder than the Esri installation files.
3. To start the installer, double-click the *setup.exe* file.
4. The AEDT Setup Wizard will open (Figure 2-23). Click *Next*.

Figure 2-23 AEDT Setup Wizard – Welcome

5. Select installation folder – accept the default location C:\AEDT\ (Figure 2-24).
6. Select the desired installation option – whether an application is installed for all users of a computer (*Everyone*) or only for the user performing the installation (*Just me*). Click *Next* (Figure 2-24).

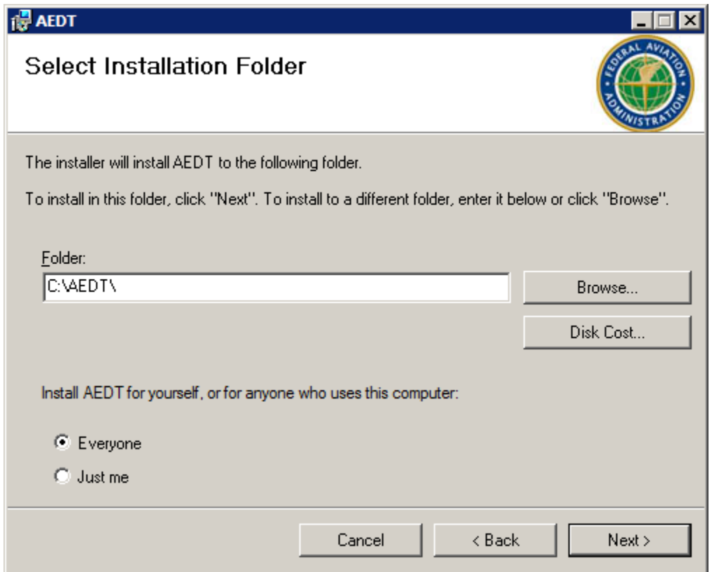


Figure 2-24 AEDT Setup Wizard – Select Installation Folder

7. Click *Next* to start the installation (Figure 2-25).

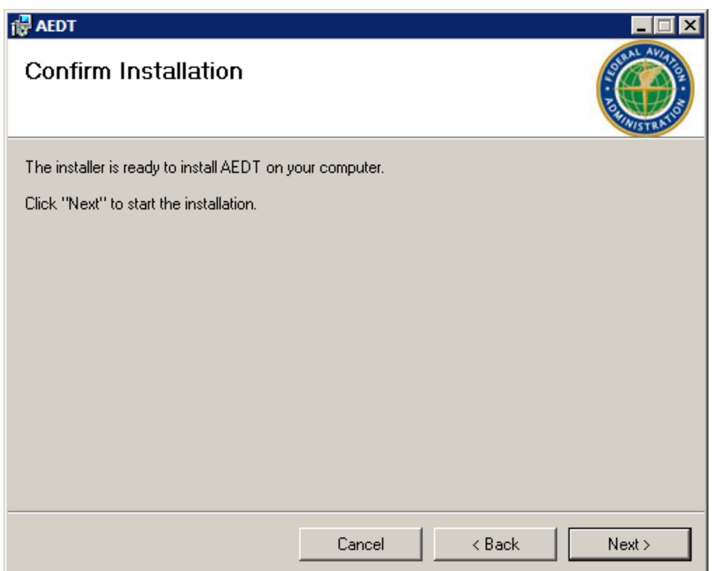


Figure 2-25 AEDT Setup Wizard – Confirm Installation

8. AEDT Setup Wizard will look for SQL Servers and display the *SQL Server Database Chooser* (Figure 2-26). Select a desired *SQL Server Database* from the drop-down menu. Click *OK*.

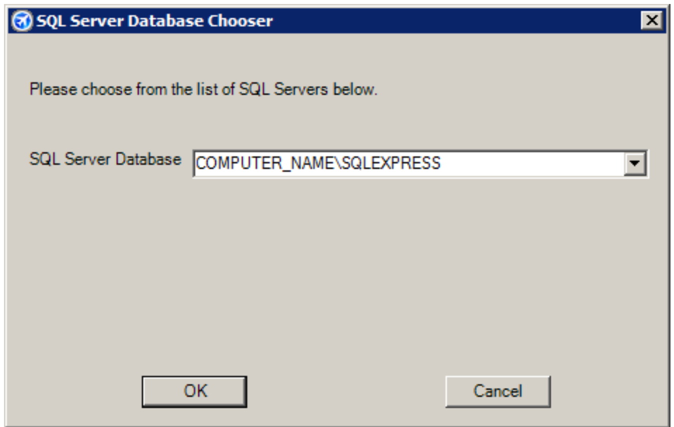


Figure 2-26 AEDT Setup Wizard – SQL Server Database Chooser

9. Click *Yes* when prompted to install the databases (Figure 2-27).

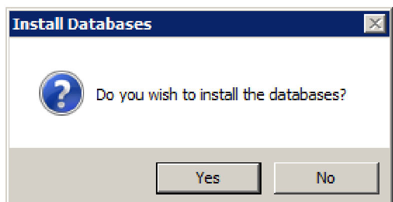


Figure 2-27 AEDT Setup Wizard – Install Databases Dialog Box

10. The AEDT database installation progress will be displayed (Figure 2-28). No action is required.

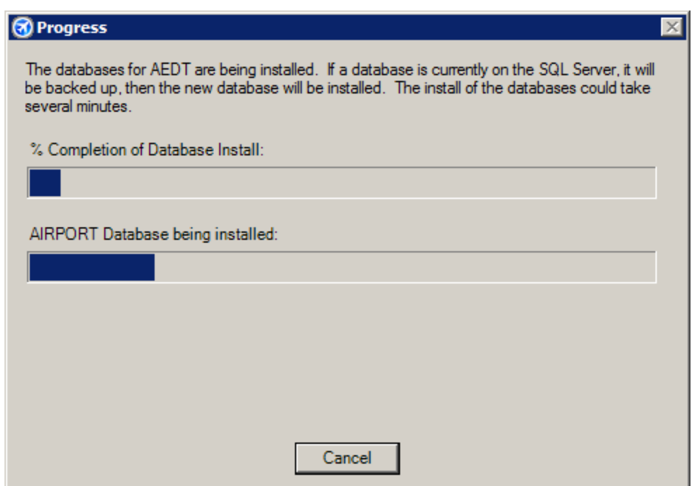


Figure 2-28 AEDT Setup Wizard – SQL Server Database Installation Progress

11. When the SQL Server database installation is complete, the *Database Installation Results* will be displayed (Figure 2-29). It displays the AEDT system databases, versions that are installed, and configuration file updates. Click *OK*.

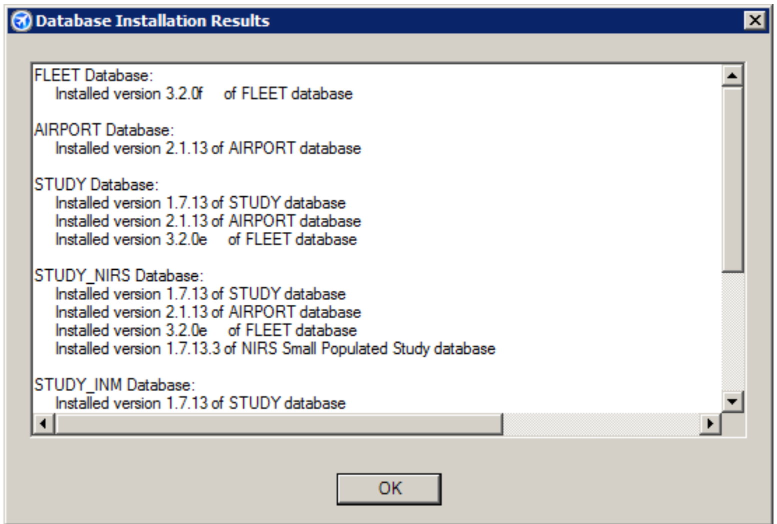


Figure 2-29 AEDT Setup Wizard – Database Installation Results

12. Click *Close* to exit the installation (Figure 2-30).

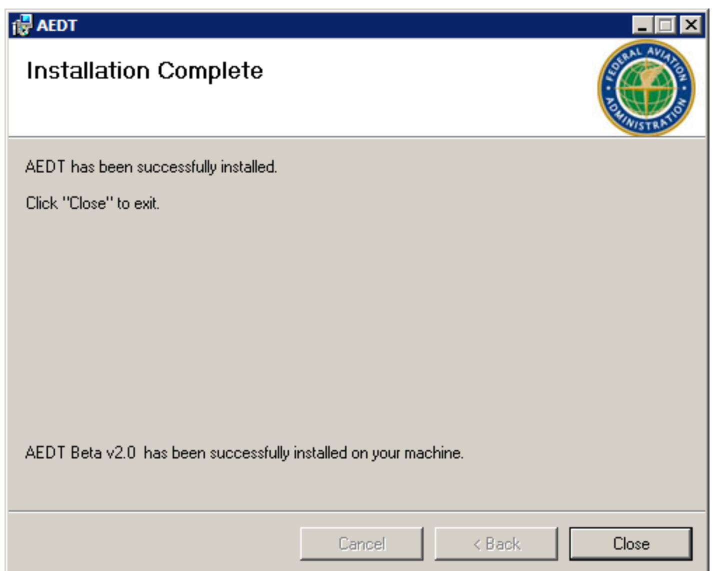


Figure 2-30 AEDT Setup Wizard – Installation Complete

AEDT System Databases

The following AEDT system databases are installed as part of the AEDT installation:

- AIRPORT: Contains a global set of airports using standard FAA and International Air Transport Association (IATA) codes.
- FLEET: Contains all the available aircraft models.
- STUDY: Baseline schema for creating and importing new studies.
- STUDY_NIRS: Sample study – Chicago regional.

- STUDY_INM: Sample study – San Francisco.
- STUDY_ROOT: Configuration settings for existing studies.

To install AEDT databases on a remote SQL Server:

1. Follow the steps (1-12) above to first install AEDT on a client machine.
2. Determine on which database server the AEDT databases will be located. The database server must contain one of the supported Microsoft SQL Server versions. See Section 2.1.1 for supported versions. It is possible to separate locations of AEDT databases on different servers.
3. Copy all files under C:\AEDT\AEDT_DB on the AEDT client machine to a remote SQL Server.
4. On the remote SQL Server, copy all .bak files to the SQL Server Backup directory: *C:\Program Files\Microsoft SQL Server\MSSQL10_50.MSSQLSERVER\MSSQL\Backup* or *C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQLEXPRESS\MSSQL\Backup*
5. On the remote SQL Server, open SQL Server Management Studio from the *Start* menu, *All Programs*, *Microsoft SQL Server 2008 R2*, *SQL Server Management Studio*
6. On the remote SQL Server, run the following script in SQL Server Management Studio: *C:\AEDT\AEDT_DB\Create_DBs_LoadData.sql*
7. On the AEDT client machine, navigate to and open the configuration file, *C:\AEDT\FAA.AEE.AEDT.AEDTApp.exe.config*
8. Locate the selection displayed in Figure 2-43:
   - Replace *[SQL Server Name]* with the appropriate server name corresponding to the location of the database.
   - If databases are located on different servers, each database location must be specified separately.

For instructions on identifying server names, see Appendix E. N-7

```
<connectionStrings>
    <add name="FLEETConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=FLEET; Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="AIRPORTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=AIRPORT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.AEDT_LOCAL_STUDYConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.STUDYConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_NIRS;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.AEDT_STUDY_ROOTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="STUDY_ROOTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="RESULTSConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_NIRS;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="ASIFConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
</connectionStrings>
```

Figure 2-31 FAA.AEE.AEDT.AEDTApp.exe.config File—Database Locations

To check AEDT database versions:

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 server name then click the *Connect* button.
3. From the *File* menu, select *Open, File…*
4. Navigate to *C:\AEDT\AEDT_DB\CheckMy_DB_version.sql*, and select *Open*.
5. Click the *Execute* button located on the toolbar.
6. Verify the versions displayed in the *Results* tab (Figure 2-32) with the listed versions below:
   - AIRPORT v 2.1.13
   - FLEET v 3.2.0.f
   - STUDY v 1.7.13
     - STUDY_NIRS v 1.7.13.3
     - STUDY_INM v 1.7.13.2
     - STUDY_ROOT v 1.7.13

Results | Messages

	SQLVersion	SPLevel	Edition
1	10.50.1600.1	RTM	Express Edition with Advanced Services (64-bit)

	NAME	VERSION	RELEASE_DATE	DB_TYPE
1	AIRPORT	2.1.13	2012-02-07 12:31:00	AIRPORT_TYPE

	NAME	VERSION	RELEASE_DATE	DB_TYPE
1	FLEET	3.2.0f	2012-02-08 13:28:00	FLEET_TYPE

	(No column name)	NAME	VERSION	RELEASE_TYPE	RELEASE_DATE	DB_TYPE
1	STUDY:	STUDY	1.7.13	FINAL	2012-01-13 09:31:00	STUDY_TYPE
2	STUDY:	AIRPORT	2.1.13	FINAL	2012-02-06 23:51:00	STUDY_TYPE
3	STUDY:	FLEET	3.2.0e	FINAL	2011-12-06 17:47:00	STUDY_TYPE

	(No column name)	NAME	VERSION	RELEASE_TYPE	RELEASE_DATE	DB_TYPE
1	STUDY_INM:	STUDY	1.7.13	FINAL	2012-01-13 11:39:00	STUDY_TYPE
2	STUDY_INM:	AIRPORT	2.1.13	FINAL	2012-02-06 23:51:00	STUDY_TYPE
3	STUDY_INM:	FLEET	3.2.0e	FINAL	2011-12-06 17:47:00	STUDY_TYPE
4	STUDY_INM:	INM Populated Study	1.7.13.2	FINAL	2012-02-06 23:51:00	STUDY_TYPE

	(No column name)	NAME	VERSION	RELEASE_TYPE	RELEASE_DATE	DB_TYPE
1	STUDY_NIRS:	STUDY	1.7.13	FINAL	2012-01-13 09:46:00	STUDY_TYPE
2	STUDY_NIRS:	AIRPORT	2.1.13	FINAL	2012-02-06 23:51:00	STUDY_TYPE
3	STUDY_NIRS:	FLEET	3.2.0e	FINAL	2011-12-06 17:47:00	STUDY_TYPE
4	STUDY_NIRS:	NIRS Small Populated Study	1.7.13.3	FINAL	2012-02-06 23:51:00	STUDY_TYPE

	(No column name)	STUDY_ID	DISPLAY_NAME	CONNECTION_STRING	LAST_MODIFIED
1	STUDY_ROOT:	2	STUDY_NIRS	Data Source=HWANGSUN02108;Initial Catalog=STUDY_NIRS;Integrated Security=True	2012-02-17 16:15:08.443
2	STUDY_ROOT:	4	STUDY_INM	Data Source=HWANGSUN02108;Initial Catalog=STUDY_INM;Integrated Security=True	2012-02-21 11:10:38.893

Figure 2-32 Database Versions

7. If the database versions do not match:
   a. Replace old AEDT database backup files from prior AEDT releases by copying all SQL Server backup files: *.bak from location *C:\AEDT\AEDT_DB* to folder *C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQLEXPRESS\MSSQL\Backup* or to *C:\Program Files\Microsoft SQL Server\MSSQL10_50.MSSQLSERVER\MSSQL\Backup*.
   b. Open SQL Server Management Studio from the *Start* menu, *All Programs*, *Microsoft SQL Server 2008 R2*, *SQL Server Management Studio*.

c. In the *Connect to Server* dialog box, enter or select the appropriate server name then click the *Connect* button.
d. From the File menu, select Open, File…
e. Navigate to *C:\AEDT\AEDT_DB\Create_DBs_LoadData.sql*, and select *Open*.
f. Click on the *Execute* button located on the toolbar.
g. The *Results* tab in the SQL Server Management Studio shows that the databases are being created. This will take several minutes. The status bar at the bottom of the window will indicate when the *Query Executed Successfully*.
h. Check the AEDT database versions by following the instructions in the previous section titled *Check AEDT Database Versions.*

2.1.3.4 Run AEDT

Before starting AEDT for the first time, check the settings of your Distributed Transaction Coordinator (DTC) Service. The DTC provides services designed to ensure successful and complete transactions, even with system failures, process failures, and communication failures. To check DTC settings on your computer: W-9

1. Navigate to Start menu, Control Panel, Administrative Tools, Services.
2. Find the service, Distributed Transaction Coordinator, and double-click on it. If the Startup type is set to Manual, change it to Automatic.
3. Click the Log On tab. The “Log on as” should be set to Network Service. To change to Network Service, select the “This account” option, then click Browse.
4. In the "Enter the object name to select" field, enter "Network Service", then click OK.
5. Restart the service.

Before running AEDT for the first time (or if the server name or workstation name changes), the user should confirm the SQL server database connection strings in the AEDT configuration file. To check the configuration settings, see Appendix E. W-10

To run AEDT:

Double-click the AEDT icon on your desktop. W-11

Saving a study is necessary in order to commit any changes to the study database. Clicking OK or Apply in dialog boxes does not save changes to the study database. It is recommended to save the study periodically. From the menu bar select *File, Save*. N-8

Users who have Microsoft SQL Server 2008 rather than SQL Express may encounter the following message when starting AEDT (Figure 2-33). To correct this error message, complete the steps in Appendix E. W-12

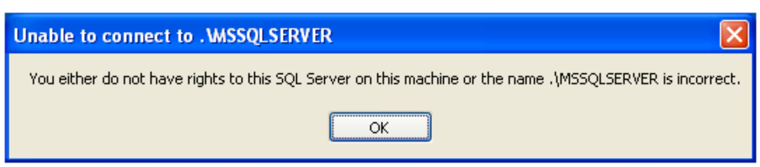


Figure 2-33 Error Message for Microsoft SQL Server 2008

2.1.4 AEDT File Structure

The AEDT installation package will create a new root directory \AEDT and install all software, supplemental files, and databases within that directory. Figure 2-34 shows a snapshot of the AEDT folder structure.

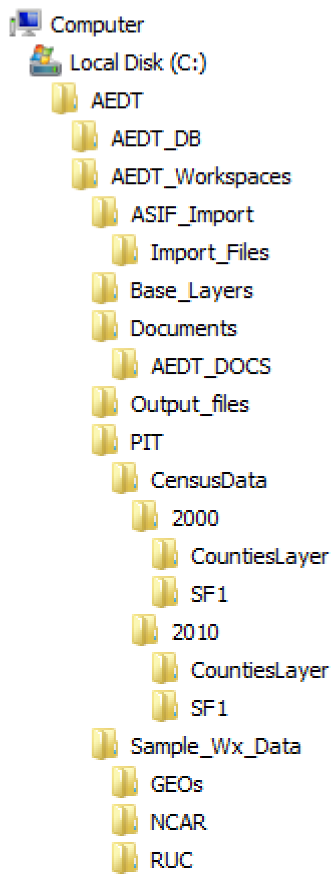


Figure 2-34 AEDT Directory

2.1.5 Steps to Uninstall AEDT

Close out of all applications on the computer before uninstalling. W-13

To uninstall AEDT:

1. Navigate to *Start* menu, *Control Panel*, and select *Uninstall a program* (The steps may be different in a Windows XP environment).
2. Select *AEDT* from the program list and click *Uninstall*.
3. A dialog box will open to confirm the uninstallation of AEDT. Click *Yes* to confirm (Figure 2-35).

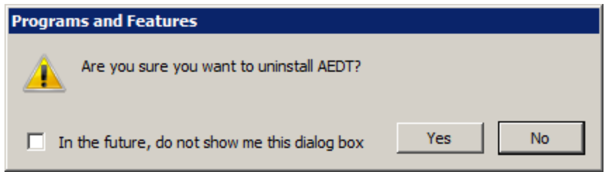


Figure 2-35 Confirm Uninstall

4. A dialog box will appear with the configuration status. It will remain open until the uninstallation is complete (Figure 2-36).

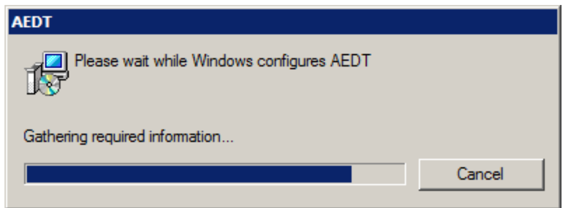


Figure 2-36 Configuration Status

5. A dialog box will open to confirm the removal of the AEDT Databases. Click *Yes* to uninstall (Figure 2-37).

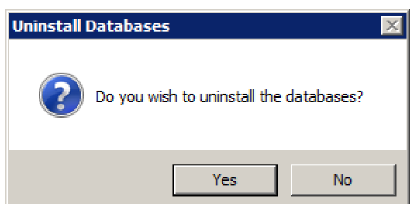


Figure 2-37 Uninstall Databases

If uninstallation seems to suspend, the dialog box shown above may be hidden behind the main AEDT uninstall window. N-9

6. A dialog box will open to confirm the removal of the STUDY_ROOT database. Click *Yes* to uninstall (Figure 2-38).

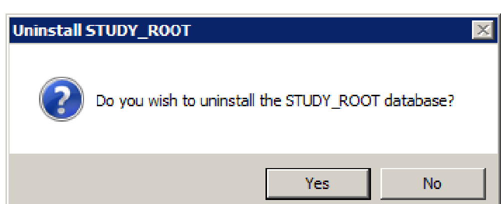


Figure 2-38 Uninstall STUDY_ROOT Database

If uninstallation seems to suspend, the dialog box shown above may be hidden behind the main AEDT uninstallation window. N-10

7. A dialog box will open as shown in Figure 2-39 below. No action is required.

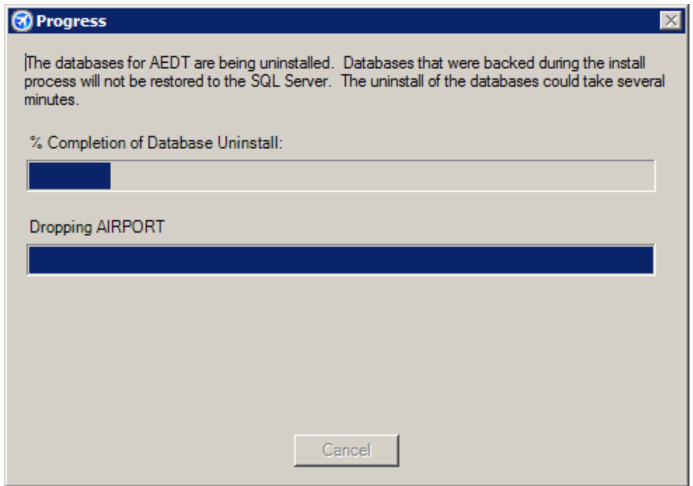


Figure 2-39 Progress Window

8. The status bar will display an estimated time to finish removing the programs. Once the installation is complete, the window will close (Figure 2-40).

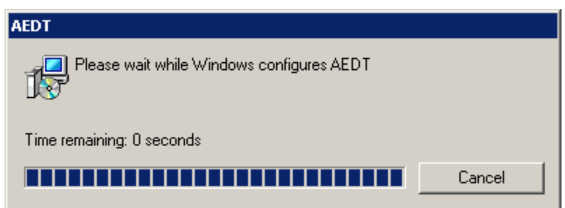


Figure 2-40 Complete Status

2.1.5.1 Confirm AEDT Database Removal

To confirm that the uninstall process was successful and removed all AEDT software and databases:

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 server name then click the *Connect* button*.*
3. In the *Object Explorer*, expand (double-click) the *Databases* folder.
4. If SQL Server Management Studio still lists databases with the prefix *Study* that were installed with the original install of AEDT (non-user-created studies), then right-click the *Databases* folder and select *Refresh*.
5. If any of the following databases are still listed in the *Databases* folder, then right-click on each database and select *Delete*: AIRPORT, FLEET, STUDY, STUDY_NIRS, STUDY_INM, or STUDY_ROOT.
6. Exit *SQL Server Management Studio*.
7. Delete the SQL Server back-up files (.BAK) that are supplied in prior AEDT releases.
   - Perform a search for .BAK to uncover any backup files from prior versions.

- Navigate to the SQL Server installation directory and delete any .BAK files that may exist (e.g. *C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQLEXPRESS\MSSQL\Backup* or *C:\Program Files\Microsoft SQL Server\MSSQL10_50.MSSQLSERVER\MSMQL\Backup*).

8. Remove the root AEDT directory (C:\AEDT) and its subfolders if any remain.

2.2 Optional Processing Setup

2.2.1 Distributed Processing Configuration

OPTIONAL

AEDT2a uses distributed computing to provide the ability to run jobs across a number of remote servers to reduce processing time. A distributed processing system is a collection of computers that communicate through a computer network. In AEDT2a, up to ten remote servers running Taskmaster (TM) service can be networked to a single AEDT client computer running AEDT. The AEDT GUI need only be installed on the AEDT client. On the remote servers a set of standard DLLs need to be installed. 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 File Paths dialog box on AEDT client. The specified file location must be exactly the same for all remote servers.

Each remote server receives a batch of flight operation information from the AEDT client, processes it, returns the resulting data, and awaits the next batch. The AEDT client assigns batches to the remote servers sequentially, as each remote server becomes available.

AEDT databases can reside on the AEDT client (see Figure 2-41 where S1, S2, S3, S4, S5, and S6 represent remote servers), or to reduce memory consumption on the AEDT client due to SQL server processing, the databases can reside on a separate database server (see Figure 2-42, where S1, S2, S3, S4, S5, and S6 represent remote servers). In the latter case, the AEDT client relays all necessary information to the remote servers. The remote servers do not communicate directly with the separate database server.

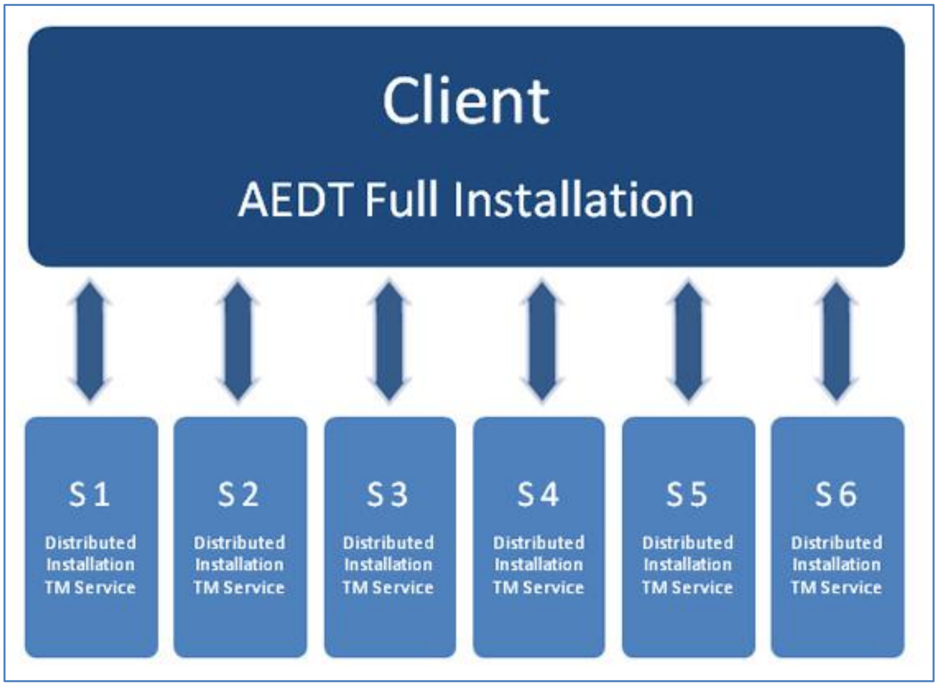


Figure 2-41 Distributed Processing

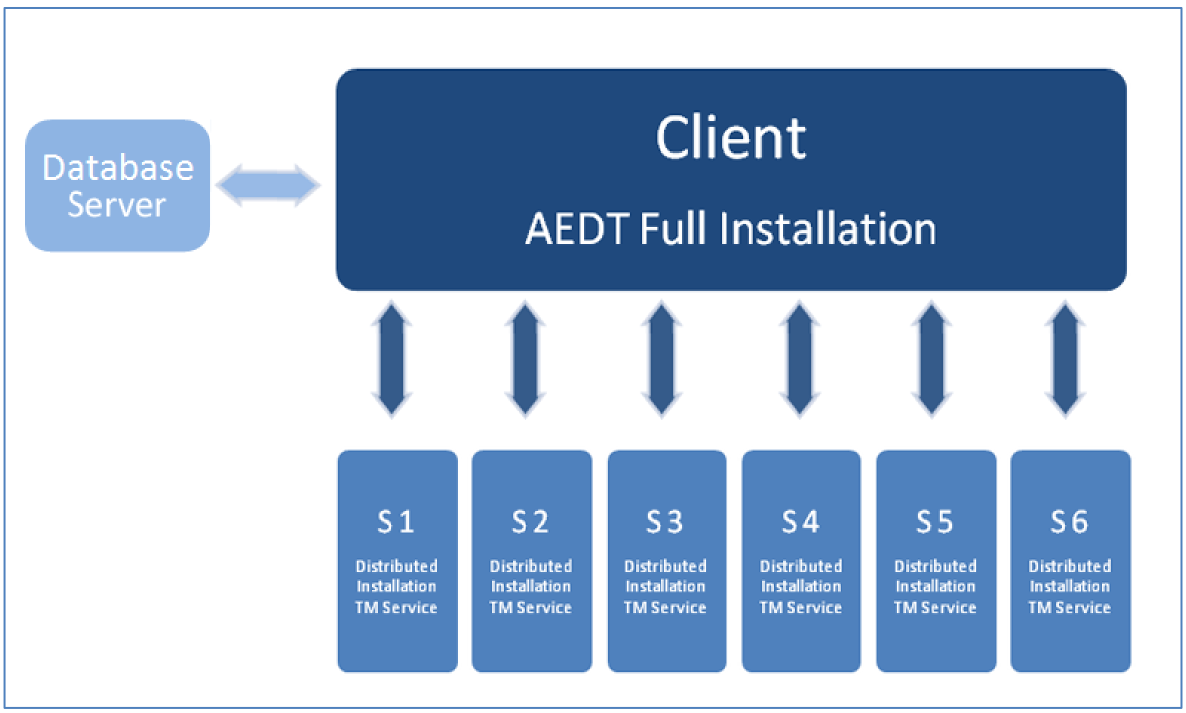


Figure 2-42 Distributed Processing with Separate Database Server

2.2.1.1 Setup AEDT Client

Install AEDT

1. Install the entire AEDT system following AEDT2a installation procedures on the AEDT client, including Microsoft SQL Server, Esri ArcGIS runtime, AEDT2a, and AEDT databases (unless located on a separate database server). See Section 2.1.3.
2. Verify that the AEDT client can run a study successfully. This is an important verification step. If AEDT is not operational on a single machine, AEDT will not operate in distributed processing mode.

Edit AEDT Database Locations in Configuration File

1. Determine on which computer AEDT databases will be located, e.g. AEDT client or a separate database server. The database server must contain one of the supported Microsoft SQL Server versions. See Section 2.1.1 for supported versions. It is possible to separate the four AEDT database locations.
   - FLEET: Contains all the available aircraft models.
   - AIRPORT: Contains a global set of airports using standard FAA and IATA codes.
   - STUDY_ROOT: Configuration settings for existing studies.
   - STUDY: Baseline schema for creating and importing new studies.
2. Navigate to and open the configuration file, C:\AEDT\FAA.AEE.AEDT.AEDTApp.exe.config.
3. Locate the selection displayed in Figure 2-43:
   - If all databases are located on the AEDT client, replace every occurrence of *[SQL Server Name]* shown in Figure 2-43 with the AEDT client server name.
   - If all databases are located on a separate database server, replace every occurrence of *[SQL Server Name]* shown in Figure 2-43 with the database server name.
   - If databases are located on different servers, each database location must be specified separately. Replace *[SQL Server Name]* with the appropriate server name corresponding to the location of each database, e.g., FLEET, AIRPORT, STUDY_ROOT, STUDY, and STUDY_NIRS.

For instructions on identifying server names, see Appendix E. N-11

```
<connectionStrings>
    <add name="FLEETConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=FLEET; Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="AIRPORTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=AIRPORT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.AEDT_LOCAL_STUDYConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.STUDYConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_NIRS;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.AEDT_STUDY_ROOTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="STUDY_ROOTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="RESULTSConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_NIRS;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="ASIFConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
</connectionStrings>
```

Figure 2-43 FAA.AEE.AEDT.AEDTApp.exe.config File—Database Locations

2.2.1.2 Setup Remote Taskmaster Servers

1. Confirm that the .NET Framework 4.0 or greater is present on all remote servers by navigating to C:\WINDOWS\Microsoft.NET\Framework and confirming the folder named *v4.0* exists.
2. Install the TmService environment on all of the remote servers (up to ten servers) that are being utilized for Distributed Processing.
   a. All of the files in the AEDT Distributed Installation Package (see Section0) must be in the same relative location (drive name and directory path name) on all of the remote servers. The remote servers must also have the directory *\AEDT\AEDT_Workspaces\Output_files* located in the same relative location (drive name and directory path name) as on the AEDT client to accept AEDT_Log.txt files.
   b. Navigate to the AEDT Distributed Installation Package and double-click the executable, *setup.exe*.
   c. The Setup Wizard will open. Follow the onscreen instructions.

TmService must be installed on all remote TM remote servers before attempting to run a job using distributed processing. N-12

2.2.2 Batch Study Processor Configuration

The Batch Study Processor, also known as the Run Study Tool, can only be installed on a 64-bit operating system. The Run Study installer will generate an error message if operating system is 32-bit. Refer to Section 2.1.1 for information on how to determine the version of operating system.

To install the Batch Study Processor:

1. Extract the contents of AEDT_2A_Run_Study_x64_Installer.zip file.

2. To start the installer, double-click the *setup.exe*.
3. The Setup Wizard will open. Follow the onscreen instructions.

Please refer to Appendix K for detailed instructions on how to run the tool once installed.

2.3 SQL Database Management

2.3.1 SQL Server Database Back-Up

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 server name then click the *Connect* button.
3. In the *Object Explorer*, select the study database of interest.
4. Right-click on the database, and select *Tasks*, *Back Up…* to open the *Back Up Database* dialog box.
5. Verify that the *Backup type* is set to *Full*.
6. If an entry has already been added to the *Destination* field, select the entry and click the *Remove* button.
7. Click the *Add* button to open the *Select Backup Destination* dialog box (Figure 2-44).

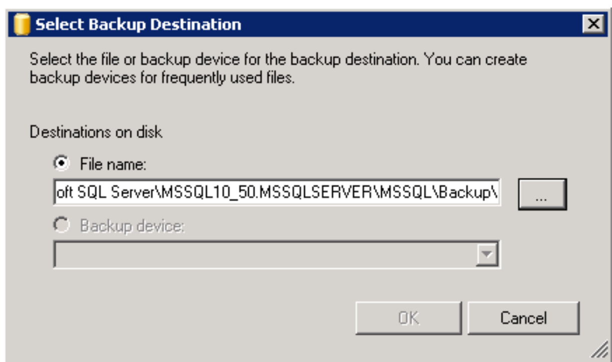


Figure 2-44 Select Backup Destination

8. Click the … button and browse to the desired location for storing the backup file.
9. Enter the desired file name in the *File Name* field, including the .bak extension. Click *OK*.
10. Click *OK* to close the *Select Backup Destination* dialog box.
11. Click *OK* to back up the database. A confirmation message will be displayed if the backup was successful.

2.3.2 SQL Server Database Restore

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 server name then click the *Connect* button.
3. In the *Object Explorer*, select the database of interest.
4. Right-click on the database, and select *Tasks, Restore*, *Database*… to open the *Restore Database* dialog box.

5. Select the *From device* radio button, then click the … button to open the *Specify Backup* dialog box (Figure 2-45).

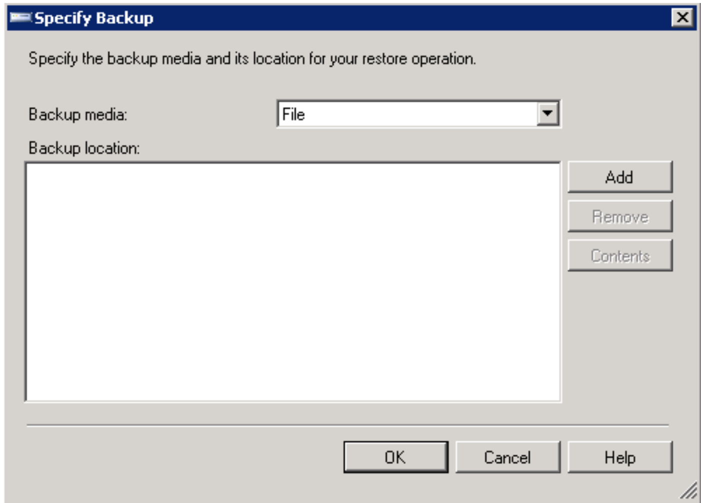


Figure 2-45 Specify Backup

6. Click the *Add* button. Browse to the location of the previously stored back-up file, and click *OK*.
7. Click *OK* to close the *Specify Backup* dialog box.
8. Select the *Restore* checkbox for the backup file.
9. Select the *Options* page from the left side of the *Restore Database* dialog box.
10. Check the *Overwrite the existing database (WITH REPLACE)* option.
11. Click *OK* to restore the database. A confirmation message will be displayed if the restore was successful.

GIS data that appear in the Tree Browser and Airport Geometry will still exist after restoring a database. To clear the GIS data (also known as clearing the cache), navigate to C:\AEDT\Data\[<SQL Server Instance>_<User name>], find the study of interest, and delete the Cache.gdb folder associated with the study of interest. W-14

2.3.3 SQL Server Memory Management

If a database server on the local machine is using too much memory, the server may need to be periodically restarted. Close out of the AEDT program and follow the steps below to restart.

1. Open *SQL Management Studio* by clicking the *Start* menu, *All Programs, Microsoft SQL Server 2008 R2, SQL Server Management Studio*.
2. Connect to the local SQL server.
3. In the *Object Explorer*, right-click on a server instance and select *Restart*.
4. Click *Yes* when prompted for confirmation.
5. The service will stop and start on the selected local server.

3 Load Study

3.1 Load Study

Upon opening the AEDT software, the *Load Study* dialog box will appear (Figure 3-1). Verify the database server name in the *Server* field and select a study from the following options:

- Import Study
- Open Existing Study

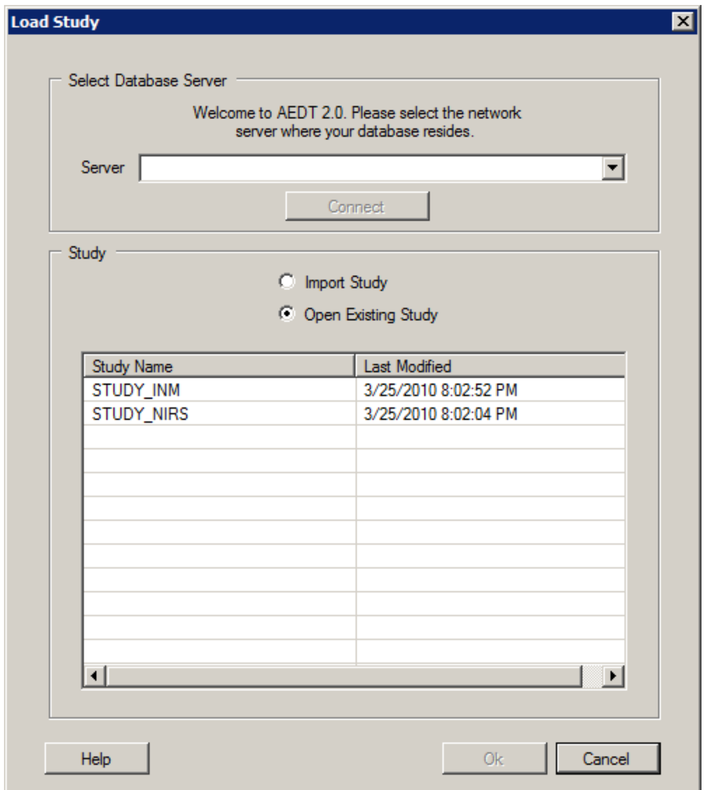


Figure 3-1 Load Study Dialog Box

If this dialog box does not open upon startup of AEDT, there are configuration setting problems. Check the configuration settings listed in Appendix E. N-13

The Last Modified column in the Load Study dialog box reflects the date the study was modified. W-15

In AEDT2a, if the computer is not connected to the network, the Load Study dialog box will not show a drop-down menu with available SQL database servers. The list will only show studies located on the local SQL database (if any). See Figure 3-2. W-16

Multiple concurrent users are not supported in AEDT2a. W-17

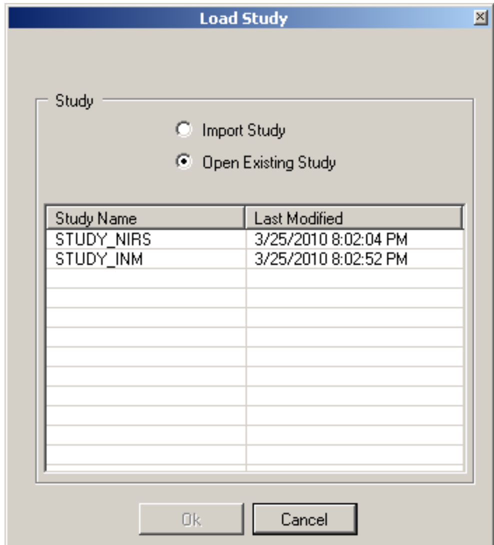


Figure 3-2 Local Studies

The computer must completely finish start-up procedures before the user opens AEDT. If AEDT is opened before networking has been established on the computer, the error shown in Figure 3-3 will appear. Close out of AEDT and restart. W-18

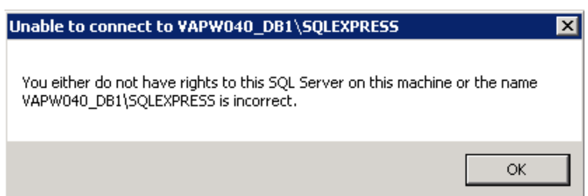


Figure 3-3 Networking Error

3.2 Import Study

In AEDT2a, the AEDT Standard Input File (ASIF) must be used to create a new study. See Appendix C for details on ASIF structure and content, including instructions on how to create an ASIF. For a sample ASIF, navigate to C:\AEDT\AEDT_Workspaces\ASIF_Import\Import_Files\asif_small.xml.

For information on how to import a partial study into an existing study, see Section 5.1.1.

Tools for converting data into the ASIF format are available for:

- INM — included in AEDT installation package, INMASIFConverter.zip, see the INM to ASIF Converter User Guide.
- NIRS — included in AEDT installation package, NIRS2ASIF.zip, see the NIRS to ASIF Converter User Guide.

Creating new studies through the GUI is not supported in AEDT2a. N-14

Default 10 minute timeout limit in .NET 4.0 may cause ASIF import to fail when importing a large ASIF file into AEDT. A workaround is to add the maximum timeout setting to the machine.config file on the AEDT workstation. The machine.config file for the 32-bit .NET Framework is located at: W-19
C:\Windows\Microsoft.NET\Framework\v4.0.30319\Config

Open the machine.config file and add the following block at the bottom of the file, right before the </configuration> tag. This sets the maximum timeout to 2 hours.

```
<system.transactions>
  <machineSettings maxTimeout="02:00:00" />
</system.transactions>
```

- Please note that the machine.config file may be overwritten after applying Microsoft updates.
- If the operating system of AEDT workstation is 64-bit, there will be another machine.config file under the Framework64 directory. Do not change this file. C:\Windows\Microsoft.NET\Framework64\v4.0.30319\Config\

Close all files relating to the ASIF import before importing. W-20

To import a study:

1. Upon startup, select *Import Study* in the *Load Study* dialog box and click the *OK* button to open the *Import* dialog box (Figure 3-4). If the *Load Study* dialog is not open, select *File*, *Open Study* from the menu bar.
2. Click the *Browse* button to select an *AEDT Standard Input File*.
3. Navigate to the appropriate file (.xml) and select *Open* (Figure 3-5).
4. Upon opening an ASIF, the *Import Checklist* panel will be populated and all boxes will be selected.
5. Enter a unique *Study Name* or accept the default name.

Spaces are not allowed in the Study Name and are automatically converted to underscore ("_"). N-15

6. Click *Import* to import the selected study and close the dialog box or click *Cancel* to close the dialog box.

AEDT validates the ASIF once the file is selected. An error message will be displayed if it fails to validate. N-16

If any error messages are generated during ASIF import, check the AEDT log file which will contain the ASIF import errors: C:\AEDT\AEDT_Workspaces\Output_files\AEDT_Log.txt. Please refer to Appendix C for details on ASIF structure and content. N-17

To load the imported study, click the *Open Existing Study* radio button. Then, select the newly imported study name from the *Study* list in the *Load Study* dialog box and click the *OK* button.

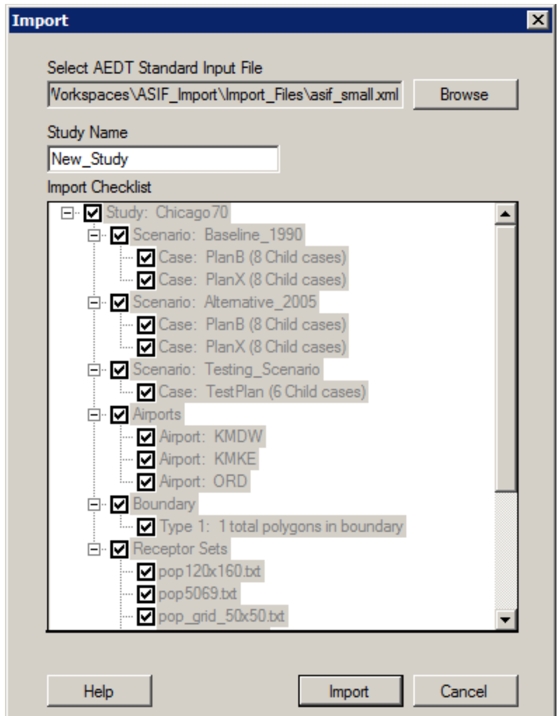


Figure 3-4 Import Dialog Box

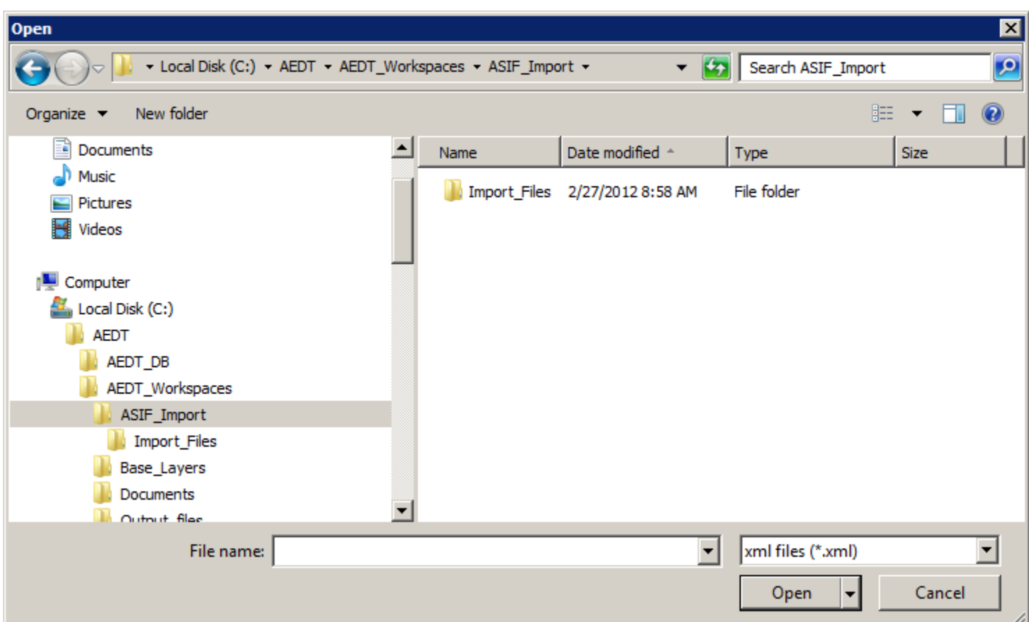


Figure 3-5 Open an ASIF

3.3 Open Existing AEDT Study

Upon opening the AEDT software, select *Open Existing Study* from the *Load Study* dialog box to open a study that has already been created or imported. Select the desired study name from the list of existing study databases. The list of study databases will include all studies available to the user on the selected server.

Loading a study with large receptor sets or many airports may take longer than expected. For example, a study containing a receptor network with 1 million points can take several W-21
minutes to load.

4 User Interface

The AEDT GUI consists of a menu bar, study hierarchy panel, tree browser panel, airport geometry, navigation bar, and information box (Figure 4-1). The following sections describe each user interface panel in more detail.

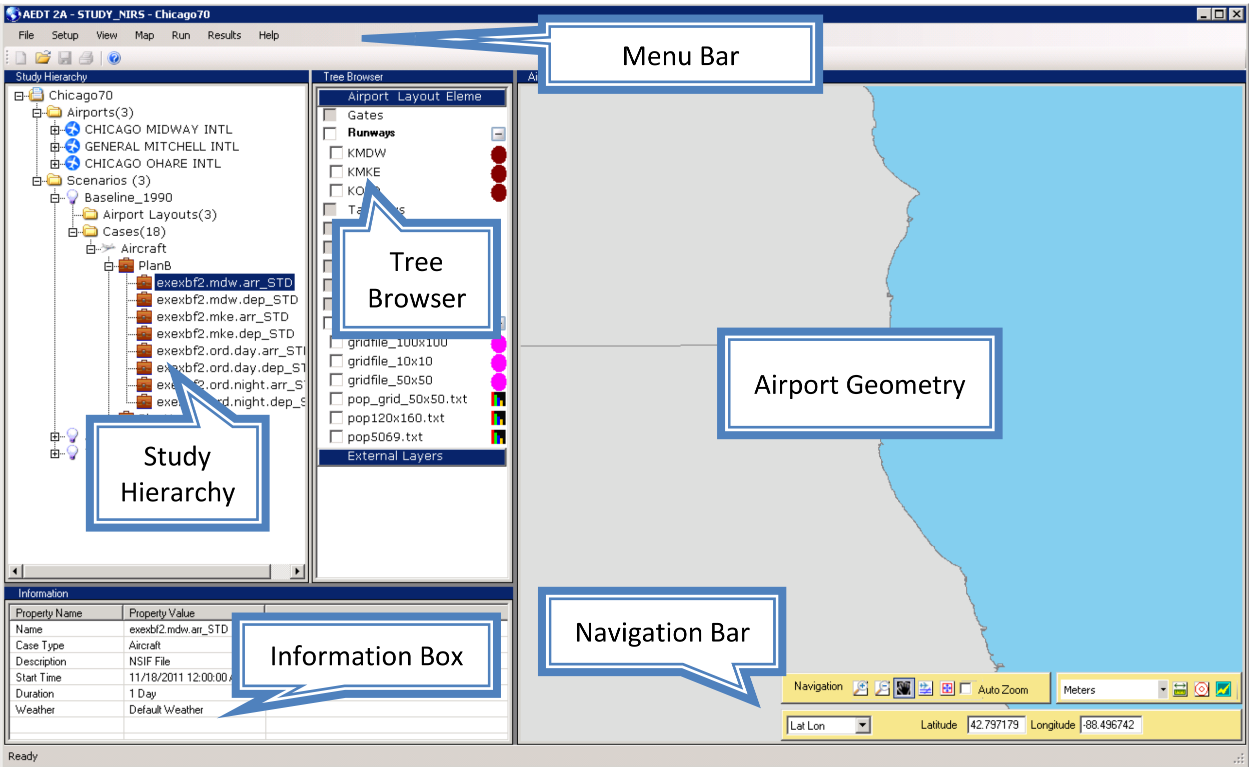


Figure 4-1 AEDT Main Window

4.1 General Navigation

Expand and Collapse Branches

Click on a (+) sign to expand branches, and click on a (-) sign to collapse branches.

Double-Click

Double-clicking on an item will open a dialog box if available.

Right-Click

Right-clicking on an item will display additional options if available.

Resize Panels in Dialog Boxes

Each panel in the AEDT user interface can be resized by sliding the divider between the panels.

Help Buttons in Dialog Boxes

A help button is available in most dialog boxes. Clicking on the help button will open this AEDT User Guide in the appropriate section.

4.2 Study Hierarchy

The study hierarchy is a tree view panel that displays a hierarchical view of the study, airports, scenarios, and cases. Each item in the tree view is called a branch. Selecting an item in the study hierarchy may change the layers shown in the tree browser.

Figure 4-2 illustrates the hierarchy of an AEDT study. An AEDT study may include multiple scenarios. A scenario must include at least one parent case; however, the use of child cases is optional. Users can apply the same case to multiple scenarios, but the user must set up the scenarios first.

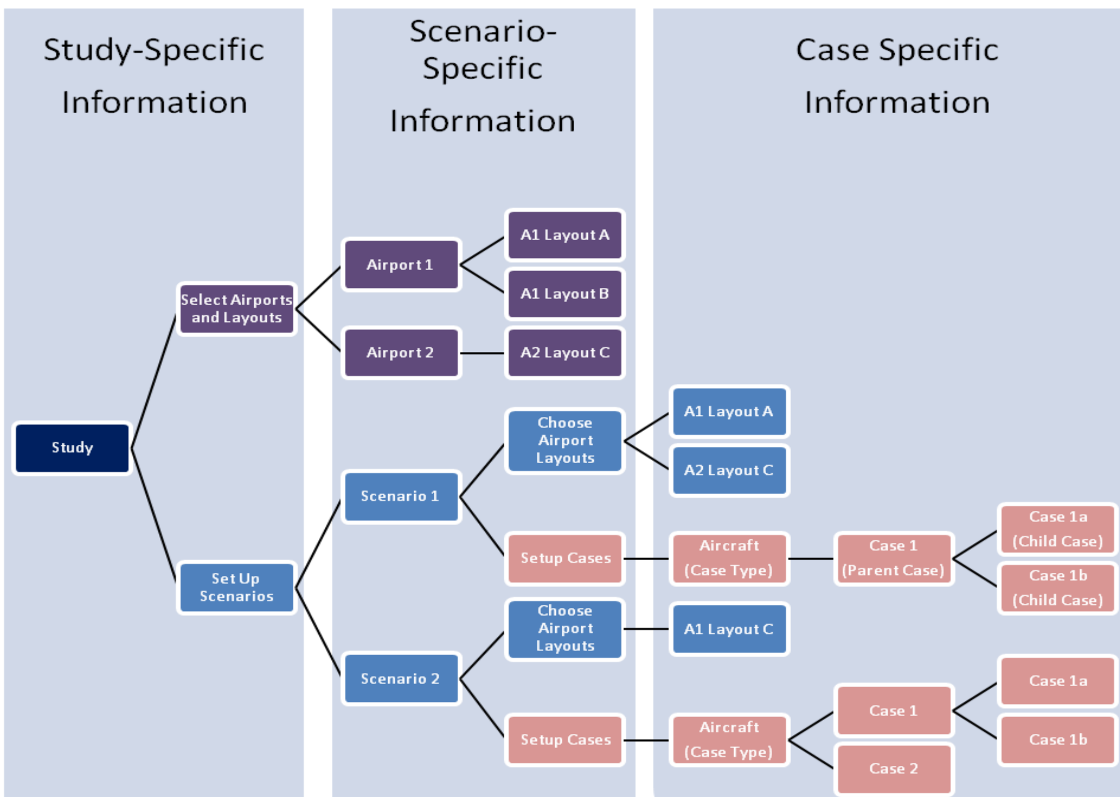


Figure 4-2 AEDT Study Hierarchy

What is a scenario?
The objective of an AEDT study is to quantify the change in noise, emissions, and fuel burn among various airspace scenarios (design alternatives). A scenario is made up of a combination of cases.

A user will typically have a scenario that represents the baseline and one or more additional scenarios that represent alternatives under evaluation. AEDT does not differentiate between baseline and alternative scenarios. The user can make this distinction in the way scenarios are named.

What is a case?
A case is the smallest building block in an AEDT study. Cases may be combined in a scenario to represent a specific set of aircraft operations. Users define the elements to analyze in a case. Cases can be organized into parent and child cases.

4.3 Tree Browser

The tree browser lists the GIS layers that can be viewed in the airport geometry. When layers are selected in the tree browser, the airport geometry will display the corresponding graphics of the selected layers.

The default study layers are listed under the *Airport Layout Elements* label. Any layers that are generated by the user including tracks, flight performance, regions, noise contours, impact sets, change zones, etc. are listed under the *External Layers* label.

Elements displayed in the Tree Browser will change depending on what is selected in Study Hierarchy. The Tree Browser will only display elements that are related to the selected item in Study Hierarchy. In order to see all the available Tree Browser items, select the study element at the top of the Study Hierarchy. N-18

Turn a Layer On or Off

Click the checkbox of the desired layer to display it in the airport geometry. Toggle the checkbox to change the visibility.

The Esri cache can be cleared in order to reset the GIS layers in Tree Browser and Airport Geometry to default settings. To clear the Esri cache, close out of AEDT then navigate to C:\AEDT\Data\[<SQL Server Instance>_<User name>], find the study of interest, and delete the Cache.gdb folder associated with the study of interest. W-22

Refresh Tree Browser

To refresh the tree browser, select a scenario in the study hierarchy, then select an airport; or vice-versa. Or, expand and collapse individual categories in Tree Browser to refresh layers in that category.

4.4 Airport Geometry and Navigation Bar

The airport geometry displays is used to present graphical display of runways, receptors, tracks, flight performance, noise contours, impact sets, and external layers such as orthophotos. As explained in Section 4.3, the tree browser lists the GIS layers that can be viewed in the airport geometry. The navigation bar provides a set of tools to interact with the airport geometry.

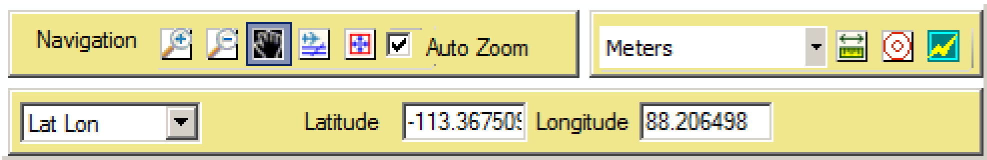


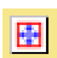
Figure 4-3 Navigation Bar

In the *Airport Geometry*, use the navigation bar (Figure 4-3) to do the following:

Zoom in and out

Pan the *Airport Geometry*

Zoom to study area



Zoom to visible

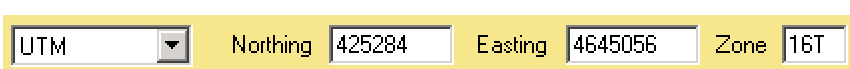
Zoom in to an area automatically when selected in the *Study Hierarchy*

Select units of measurement (*Meters, Feet, Nautical Miles, Kilometers*, or *Miles*) for the Measurement Tool and Generate Range Rings Tool.

Measurement Tool: Click a point to begin the measurement. Click another point or points to draw a path. Double-click on a point to end the measurement. To clear the measurements, navigate to *Map, Clear Measurements* from the menu bar.

Generate Range Rings Tool: Click this button to open the *Range Ring Properties* dialog box. Enter *Location Radius* and *Ring Intervals*, then click OK. Click on a point in the *Airport Geometry* to create range rings (concentric circles around a point).

Identify Tool: Click this button, then select an object in the *Airport Geometry* to view its attributes in the *Information Box*.



Select *Lat Lon* (Latitude/Longitude) or *UTM* (Universal Transverse Mercator) coordinate systems to actively display the location of the cursor in the *Airport Geometry*.

When identifying an object, the attributes in the Information Box are in English unit of measurement unless specified. W-23

When clicking in the airport geometry, the map may reposition to an unexpected location. Click the Zoom to Visible button (shown in Figure 4-3) to see the visible features on the map. W-24

The *Map* menu provides the following commands that are designed to be used with the airport geometry.

- Clear Measurements: Use this menu to clear existing measurement displays and/or range rings from the airport geometry.
- Add External GIS Layer: Use this menu to import a GIS layer into AEDT (see Section 3.9.1).
- Draw GIS Object – Generate Region: Select this command, then click once in the *Airport Geometry* and drag the mouse cursor to draw a rectangle. The new region layer will be displayed under the *Region* category in the *Tree Browser*.

4.5 Information Box

The information box displays properties of the currently selected item in the study hierarchy, tree browser, or airport geometry.

4.6 Modify Tree Browser Layers in Airport Geometry

Right-click a tree browser layer and select among the following options to modify layers in the Airport Geometry. Note that some options are only available for certain layer categories.

If the layer is not visible in the airport geometry, *Make Visible to See Layer Options* will appear in the right-click options for that layer. Check the box of the layer to make visible in the airport geometry and right-click on the layer again to view right-click options. N-19

- **Rendering Properties:** Opens the *Layer Rendering Properties* dialog box (Figure 4-4) which allows the user to customize the appearance of the selected layer.
  1. Edit the *Display Text*, *Outline*, or *Line Width*.
  2. The *Sample* graphic will update to show the current selection.
  3. The *Fill* property is applicable to layers with polygon features as opposed to points or lines.
  4. The *Color Levels* property is applicable to population based receptors and noise levels. To change *Color Levels*:
     a. Click *Color Levels* to open the *Color Level Model* dialog box (Figure 4-5).
     b. Double-click on the color cell to select a different color for that level.
     c. Enter a different range value in the currently selected level.
     d. Click the + button to add a new level. Click the – button to remove the currently selected level.
     e. To apply gradient colors, select desired levels by using Ctrl key then click the gradient button.
     f. Click *OK* to apply changes and close the dialog box. Click *Cancel* to discard changes.

5. Select desired *Current Field* and check the *Display Current Field* box to display the selected field on map.
6. Click *Field Summary Statistics* to view the data summary for the selected field.
7. The *Minimum Display Value* and *Maximum Display Value* are applicable to population based receptors and contour layers.
8. Click *OK* to apply changes and close the dialog box. Click *Cancel* to discard changes.

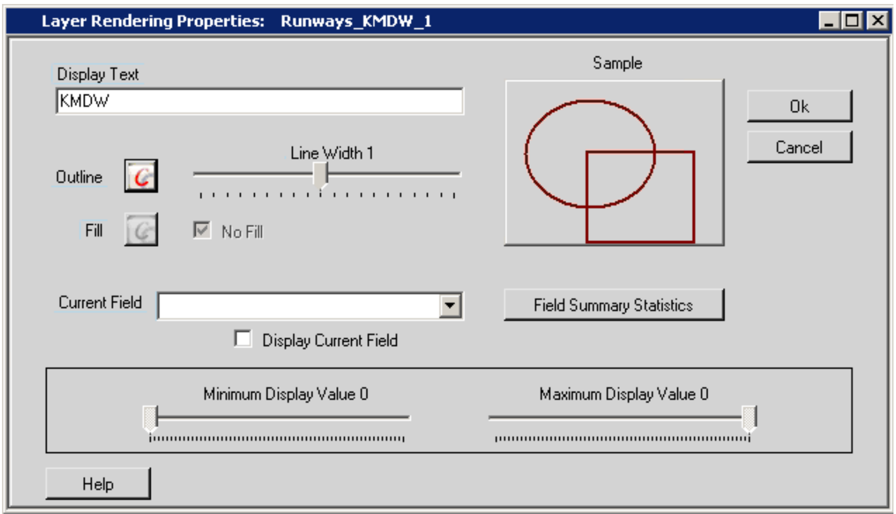


Figure 4-4 Layer Rendering Properties Dialog Box

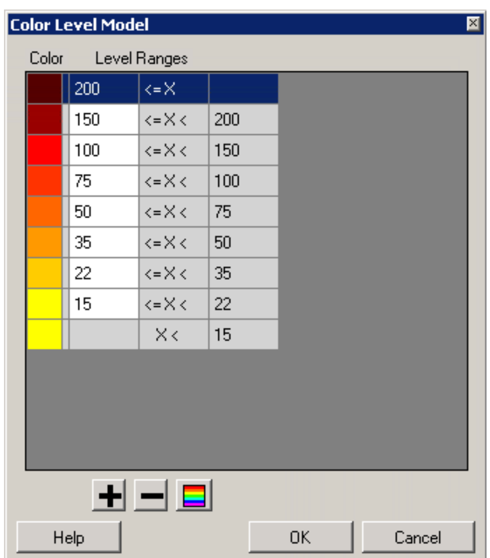


Figure 4-5 Color Level Model Dialog Box

- **Transform Layer:** Opens the *Combine Paths* dialog box which allows the user to create a new layer based on existing layers.
  1. Select an *Operation Layer*.
  2. Select a *Boolean Operation (Intersect, Union, Erase,* or *Subdivide)*.
  3. Enter a name for the new layer.
  4. Select a *Color* for the layer, or use the default.
  5. Click *OK* to create a new layer and close the dialog box. Click *Cancel* to discard changes.
  6. The new layer will be displayed under the *Derived* category in the *Tree Browser*.

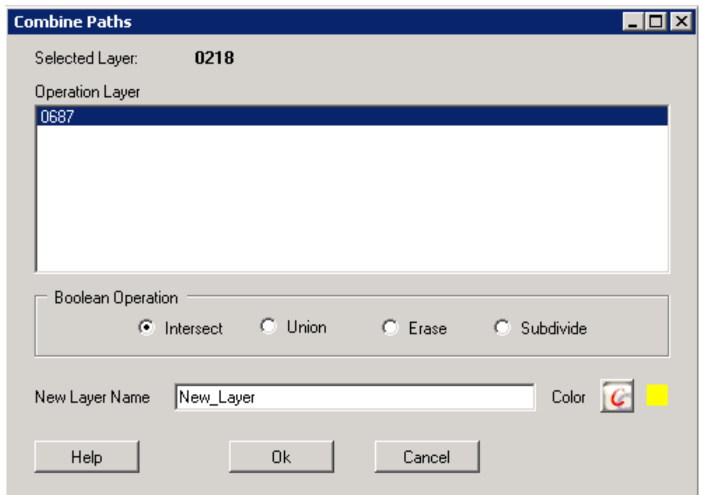


Figure 4-6 Combine Paths Dialog Box

- **Remove Layer:** Allows the user to permanently remove the selected layer from AEDT.
  1. Right-click on the layer and select *Remove Layer*.
  2. A *Confirm Delete* message will pop up to confirm whether the user wants to permanently remove this layer from the GIS. Click *OK* to remove the runway layer or click *Cancel* to keep the runway layer.

The default study layers, such as runways and receptors, cannot be removed from the study. N-20

- **Export Layer:** Allows the user to export the selected layer as a shape file format.
  1. Right-click on the layer and select *Export Layer*.
  2. Navigate to the desired directory to save the layer.
  3. Enter a unique *File name* or accept the default name.
  4. Click *Save* to export the layer as shape files. It will create a set of files with the following extensions: .shp, .shx, .dbf, .prj, .sbn, .sbx, and .xml.
  5. Click *Cancel* to discard the action.

5 Setup

Figure 5-1 depicts the relationship among all the options a user can select in AEDT and their respective refinements as the user sets up components of a study and ultimately runs a job.

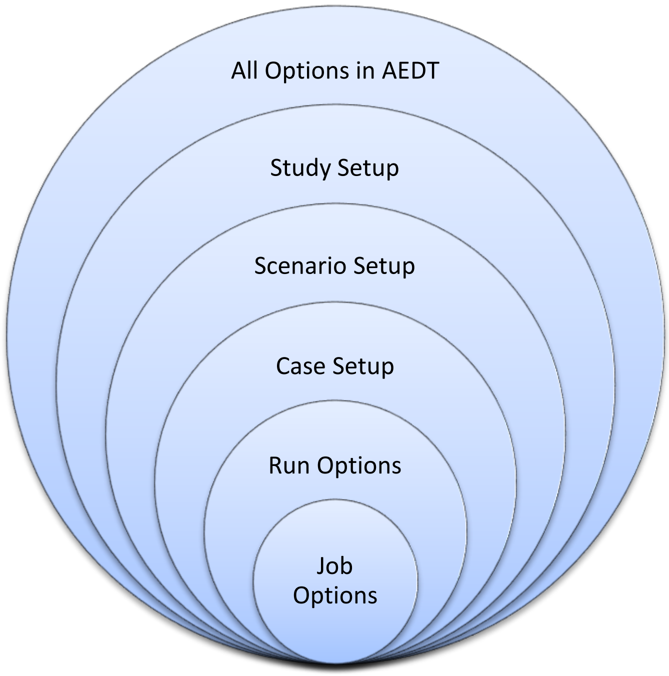


Figure 5-1 Relationship Among Setup Options

5.1 Set Up Data

5.1.1 Import Partial ASIF

AEDT supports importing a partial ASIF that contains individual components of a study which can include airport layouts, annualization, boundary, case, fleet, operation, receptor set, scenario, or track operation set. See Appendix C for more information about the ASIF.

Default 10 minute timeout limit in .NET 4.0 may cause ASIF import to fail when importing a large ASIF file into AEDT. A workaround is to add the maximum timeout setting to the machine.config file on the AEDT workstation. The machine.config file for the 32-bit .NET Framework is located at: W-25
C:\Windows\Microsoft.NET\Framework\v4.0.30319\Config

Open the machine.config file and add the following block at the bottom of the file, right before the </configuration> tag. This sets the maximum timeout to 2 hours.

```
<system.transactions>
  <machineSettings maxTimeout="02:00:00" />
</system.transactions>
```

- Please note that the machine.config file may be overwritten after applying Microsoft updates.
- If the operating system of AEDT workstation is 64-bit, there will be another machine.config file under the Framework64 directory. Do not change this file.
  C:\Windows\Microsoft.NET\Framework64\v4.0.30319\Config\

To import a partial ASIF:

1. From the menu bar select *File*, *Import* to open the *ASIF Partial Importer* dialog box (Figure 5-2).
2. Click the *Browse* button, navigate to the appropriate file (.xml) and select *Open*.
3. Depending on the content of the selected partial ASIF, AEDT may prompt the user to specify where in the study to import the data.
   - If the *Scenarios* drop-down menu is active, select the desired scenario.
   - If the *Cases* list is active, select the desired case.
4. Click *Import* to import the selected file.
5. Click *Yes* when prompted to save the study before importing.
6. Click *OK* when *Import Complete* message is displayed.
7. To view the imported data, restart AEDT by selecting *File*, *Open Study* from the menu bar.

AEDT validates the ASIF once the file is selected. An error message will be displayed if it fails to validate. N-21

If any error messages are generated during ASIF import, check the AEDT log file which will contain the ASIF import errors: C:\AEDT\AEDT_Workspaces\Output_files\AEDT_Log.txt. Please refer to Appendix C for details on ASIF structure and content. N-22

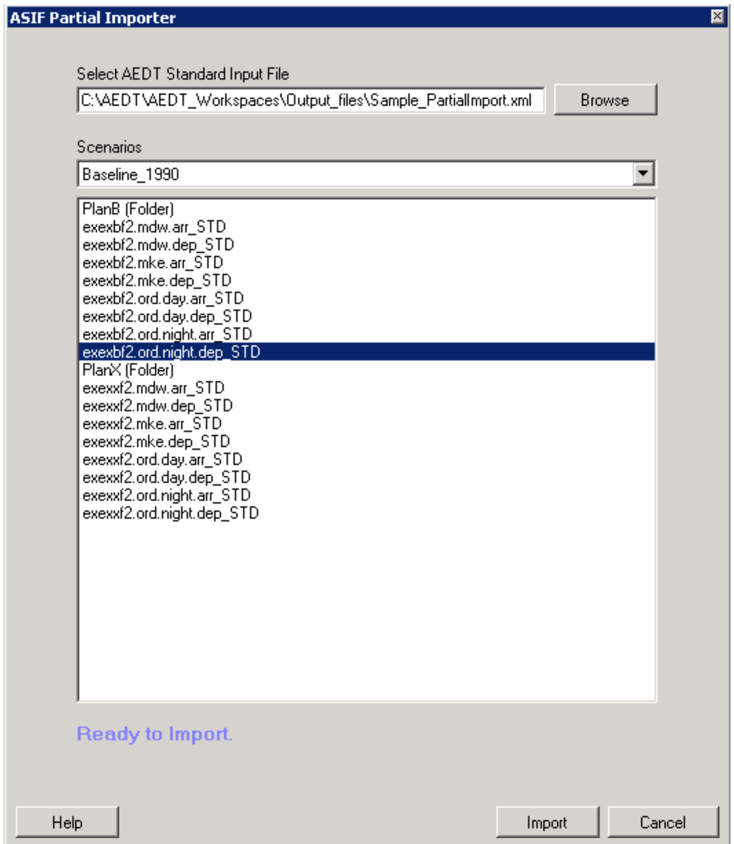


Figure 5-2 ASIF Partial Importer Dialog Box

Running reports or jobs, or importing the ASIF can cause the AEDT application to go to the background. Click on the AEDT application on the Windows Taskbar at bottom of the screen to bring AEDT back to the foreground. W-26

5.1.2 Import Population Data

Users can import population data into a study through the Population Import Tool. See Appendix F for more information on how to import population data.

5.1.3 Add GIS Layer

To import a GIS layer into AEDT:

1. From the menu bar select *Map*, *Add External GIS Layer* (Figure 5-3). The *Open External GIS Layer* dialog box will open.
2. Navigate to the appropriate shapefile (.shp) and select *Open* to add the layer.
3. The new GIS layer is added to the Tree Browser and is displayed in the Airport Geometry.

To toggle the GIS layer on and off after it has been added, check or uncheck the checkbox for the GIS layer in the Tree Browser.

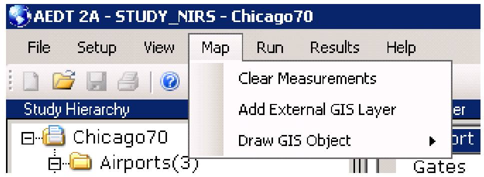


Figure 5-3 Add External GIS Layer from Map Menu

To view an image file (.tff or .img) in the Airport Geometry, place the desired file in the following directory: W-27
C:\AEDT\Data\[<SQL Server Instance>_<User name>]\[Study Name]\Backgrounds

5.1.4 Define Terrain File Path Location

See Appendix G for more information on how to download terrain data files.

Supported terrain data*types (3CD , DEM, and Grid Float) should not be put together in the same folder location. Each terrain type should have its own separate folder. Define the terrain file path correctly before running any given job. W-28

*Terrain data are only supported if they are in one of the following projections: NAD83 or WGS84.

To include terrain files in a study, point to the *Terrain File Path*:

1. In the desired study, from the menu bar select *Setup, File Paths* (Figure 5-4).
2. In the *File Paths* dialog box (Figure 5-5), click the *Change* button next to *Terrain File Path* in the top portion of the dialog box.
3. Navigate to a terrain file of the following formats: 3CD, DEM* or Grid Float (Figure 5-6).
4. Click the *OK* button to select the terrain file.
5. 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.

Select *File, Save* from the menu bar in order to commit any file path changes to the study database. W-29

In AEDT2a, running a job with 3CD terrain data may take longer than expected. The 3CD terrain data will be converted to grid float terrain data the first time 3CD is invoked. W-30

The conversion from 3CD to grid float introduces an error of a half a pixel due to conflicting reference points. It is recommended to use grid float data to eliminate this error.

AEDT2a processes terrain data with the GIS software, Esri. INM processes terrain data with the GIS software, Global Mapper. Esri and Global Mapper behave differently when a terrain coordinate (latitude and longitude) is not directly on a terrain data point. In W-31

AEDT2a, Esri uses the terrain elevation of the nearest terrain data point. In INM, Global Mapper performs a bilinear interpolation for the four nearest terrain points. In areas of substantial terrain variation, this will cause a substantial difference between AEDT and INM results, especially when line-of-sight blockage is applied.

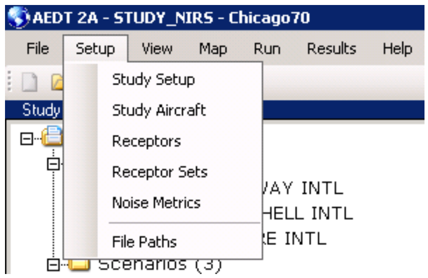


Figure 5-4 File Paths from Setup Menu

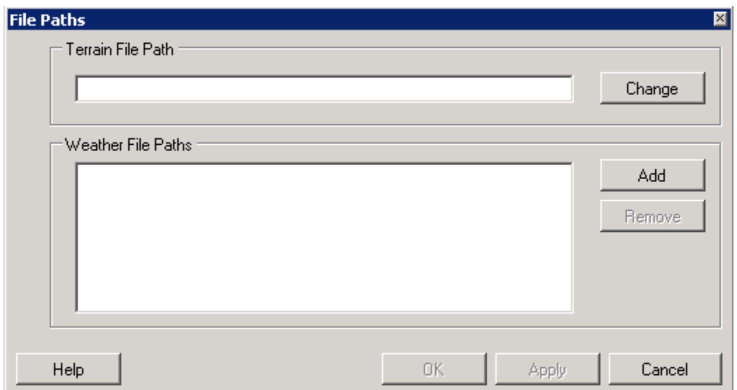


Figure 5-5 File Paths Dialog Box

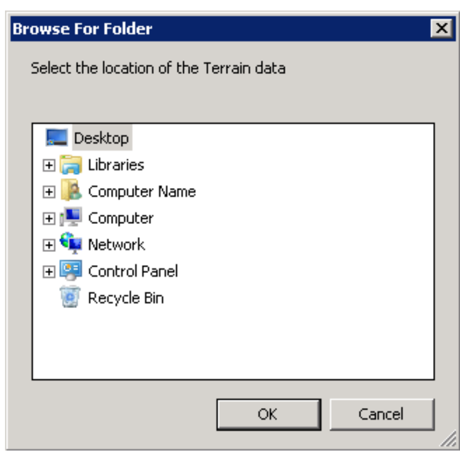


Figure 5-6 Browse for Folder Dialog Box

5.1.5 Define Weather File Path Location

In AEDT2a, weather data are applied to a study based on a hierarchy of data availability, as follows:

1. High fidelity weather data (user input), in the following order:
    a. RUC13
    b. RUC20
    c. GEOS
    d. NCAR
2. Average annual weather from the AIRPORT database.
3. International standard atmosphere (ISA) weather conditions are applied when weather data are not available.

This section provides information on how to define the weather file path location to apply high fidelity weather. See Appendix H for more information on how to download and use high-fidelity weather data in AEDT.

All acoustic propagation calculations use the airport average annual weather parameters regardless of higher fidelity weather availability. N-23

In AEDT2a, the user cannot make changes to the weather data (files or file path) between runs in a single session. The cache that stores the weather data does not update after changes are made. The workaround is to close and restart the AEDT application. This ensures that the cache will be newly created and the changes will be applied. W-32

To include or remove weather files in a study, point to the *Weather File Path*:

1. In the desired study, from the menu bar select *Setup, File Paths* (Figure 5-4).
2. To add a weather file path:
    a. In the *File Paths* dialog box (Figure 5-5), click the *Add* button next to *Weather File Paths*.
    b. Navigate to the directory where the weather files are stored (Figure 5-6). AEDT2a supports GEOS, NCAR, and RUC weather data.
        - Sample NCAR files are provided for June 1, 2010, and can be found in the following directory: C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\NCAR. These files must be pre-processed. See Appendix H for instructions on pre-processing weather data.
        - RUC and GEOS files are not provided with the AEDT2a installation. See Appendix H for information on downloading RUC weather data.
3. Click the *OK* button to select the weather file directory.
4. Repeat step 2 to add additional weather file paths, if necessary.
5. To remove a weather file:
    a. In the *File Paths* dialog box (Figure 5-5), click the weather file path of interest.
    b. Click the *Remove* button to remove the weather file directory.
6. 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.

Select *File, Save* from the menu bar in order to commit any file path changes to the study database. W-33

Studies imported from INM with the INM2ASIF converter tool will not contain study boundary information. Without this boundary information, AEDT will not process any high fidelity detailed weather information. To use detailed weather with this type of imported study, manually edit the ASIF generated by the INM2ASIF tool and enter the boundary information before importing into AEDT2a. See Appendix C for more details on <boundary> XML element. The study boundary latitude and longitudes should be larger than the largest receptor set used with any of the scenarios in the study. W-34

Average annual airport weather data can be viewed within the *Airport* dialog box in the *Weather* tab. See Section 5.3 to access the dialog box, and see example weather information in Figure 5-7.

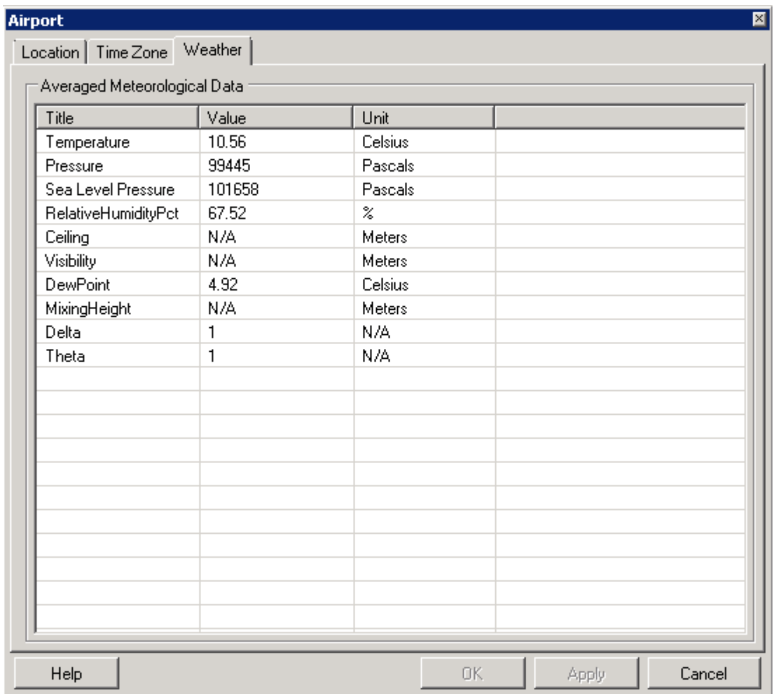


Figure 5-7 Airport Dialog Box – Weather Tab

Running jobs with weather data may take a significant amount of time and the progress bar may disappear. To verify that AEDT is running, open the Windows Task Manager by holding Ctrl + Alt and pressing the Delete key, then click the Task Manager button. The process named FAA.AEE.AEDT.AEDTApp.exe should appear in the Processes tab, shown in Figure 5-8 below. W-35

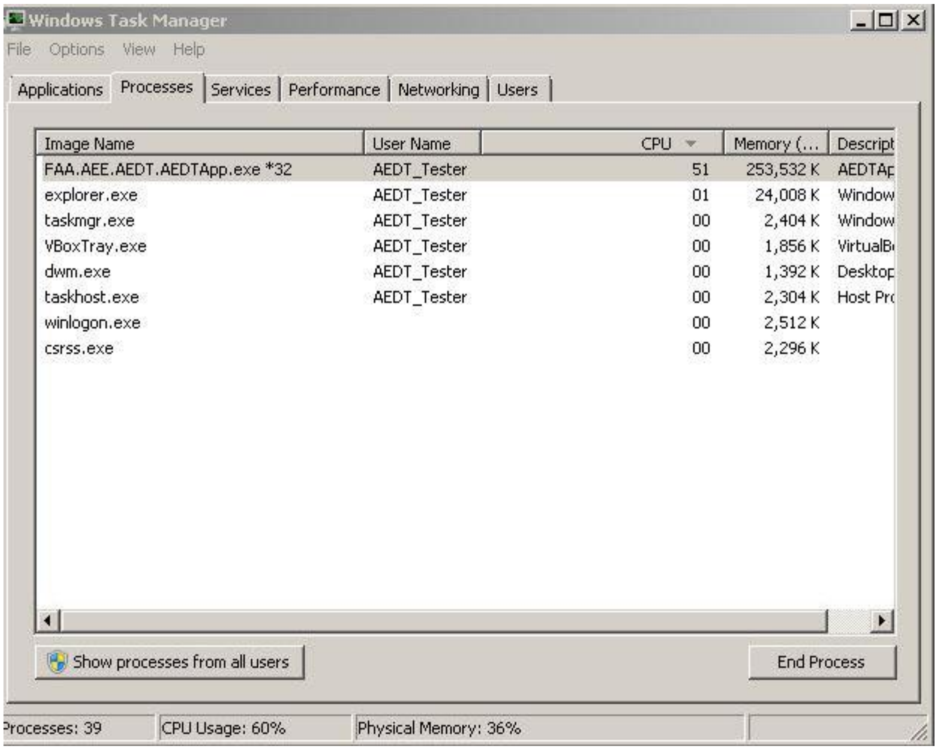


Figure 5-8 Windows Task Manager

5.1.6 Export Aircraft

The Export Aircraft functionality in AEDT allows users to export system aircraft data as an XML file. The exported XML file contains data that has been extracted from an AEDT database as a means to create new user-defined aircraft data that can subsequently be imported back into AEDT. Since this data duplicates existing data in the Study, it cannot be successfully reimported as is.

To export desired aircraft/engine combinations as an XML file:

1. From the menu bar select *File, Export Aircraft.*
2. To add an aircraft/engine combination, select the combination of interest from the *System Aircraft* list and click *Add* (Figure 5-9).
3. To remove a combination, select the combination of interest from the *Export List* and click *Remove*.
4. Navigate to the desired folder to store the file by clicking the *Browse* button, or accept the default location that appears in the *Aircraft Export File* field.
5. Enter a unique file name or accept the default name.
6. Click the *Export XML* button.

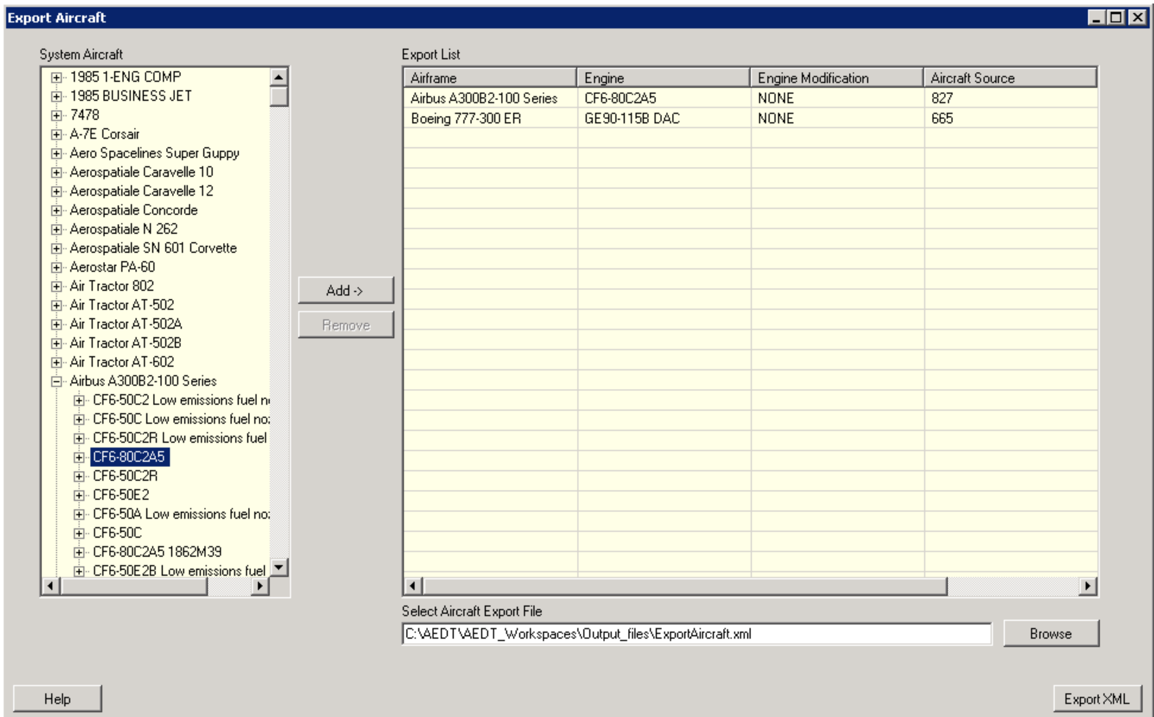


Figure 5-9 Export Aircraft Dialog Box

5.2 Set Up Study Information

Multiple concurrent users are not supported in AEDT2a. W-36

Saving a study is necessary in order to commit any changes to the study database. Clicking OK or Apply in dialog boxes does not save changes to the study database. It is recommended to save the study periodically. From the menu bar select *File, Save*. N-24

In AEDT2a, a new study must be created through the ASIF. N-25

To open the *Study* dialog box, either:

- From the menu bar select *Setup*, *Study Setup* (Figure 5-10); or
- In the *Study Hierarchy*, double-click the study name.

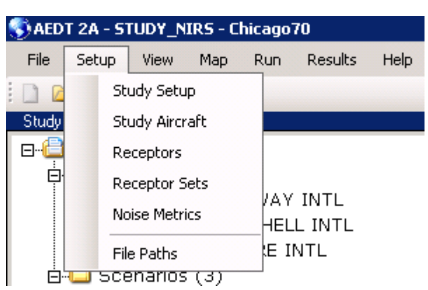


Figure 5-10 Study Setup from Setup Menu

Once the *Study* dialog box (Figure 5-11) is open:

1. Edit the study *Name* and *Description* as desired.
2. Select the *Study Type and Properties* from the drop-down menu (*Noise And Emissions)*.
3. *Edit* airports from the *Airport List*; see Section 5.3 on editing airports.
4. *Edit* scenarios from the *Scenario List*; see Section 5.4 on editing scenarios.
5. 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.

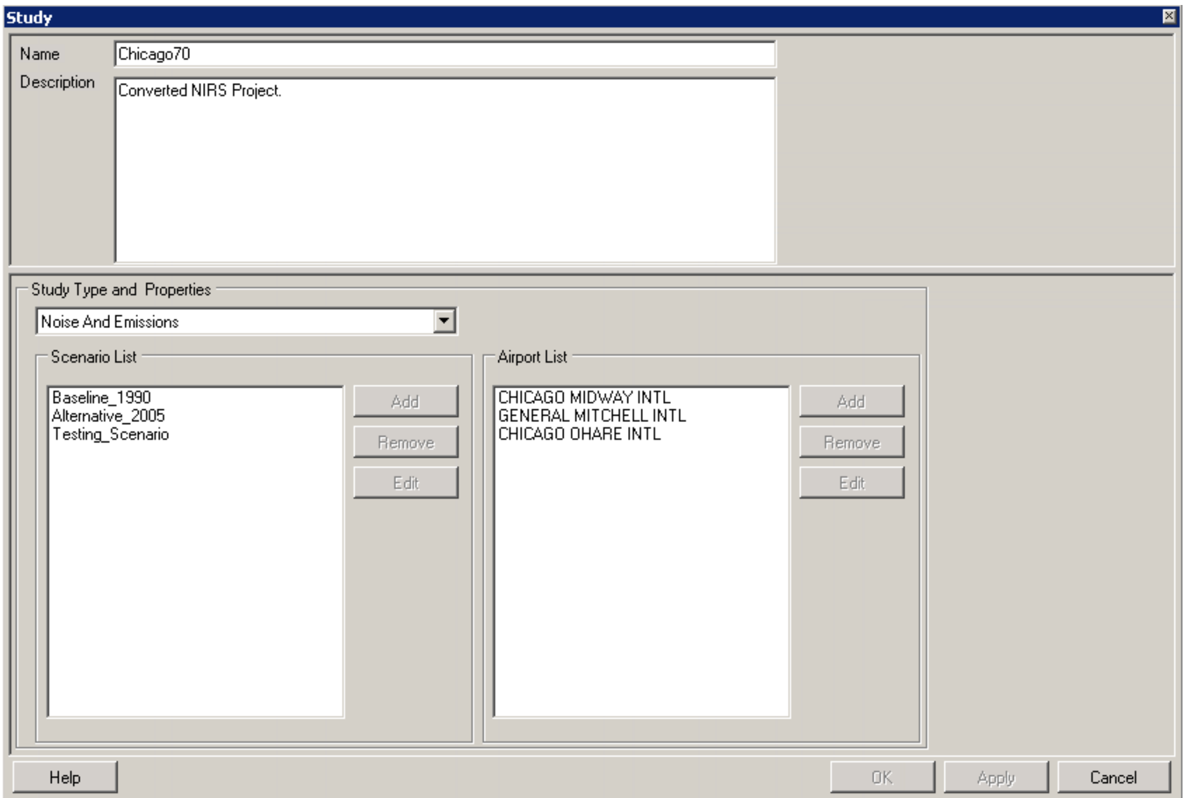


Figure 5-11 Study Dialog Box

5.3 Set Up Airports

In AEDT2a, a new airport must be created through the ASIF. N-26

To open the *Airport* dialog box (Figure 5-12), either:

- Open the *Study* dialog box by either selecting *Setup*, *Study Setup* from the menu bar or by double-clicking the study name in the *Study Hierarchy*.
  - View the *Airport List* for existing airports in the study.
  - Select an airport of interest and click *Edit* to open the *Airport* dialog box; or
- From the *Study Hierarchy*, click on the (+) sign next to the airport of interest to view the airport layouts, then double-click on the name of the airport to open the *Airport* dialog box.

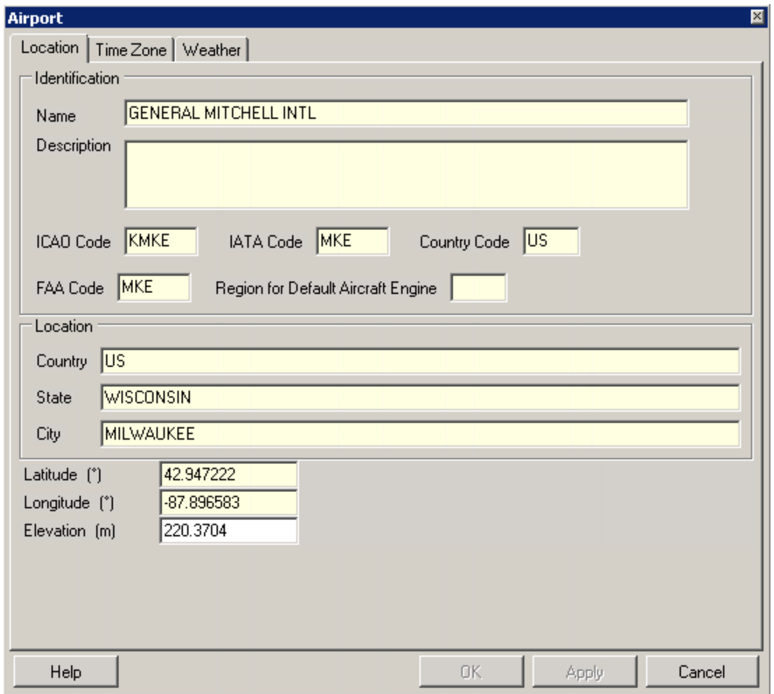


Figure 5-12 Airport Dialog Box – Location Tab

A grey or yellow background in a dialog box indicates that the content is read-only. N-27

Location Tab

- The *Location* tab (Figure 5-12) contents are read-only, except for *Elevation* field which can be edited.

Time Zone Tab

- The *Time Zone* tab (Figure 5-13) is read-only.

Weather Tab

- The *Weather* tab (Figure 5-14) is read-only.
- Select this tab to view the average annual weather data for the selected airport. In AEDT2a, a default value of 1 representative day for each airport is provided, which consists of historical weather data averaged over 30 years.

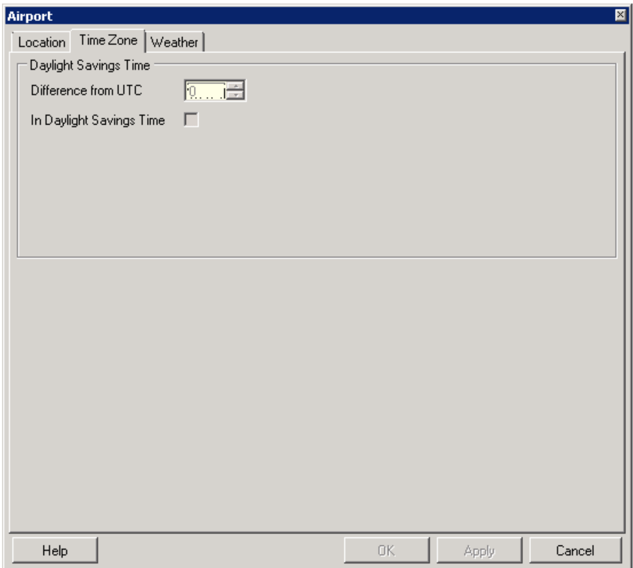


Figure 5-13 Airport Dialog Box – Time Zone Tab

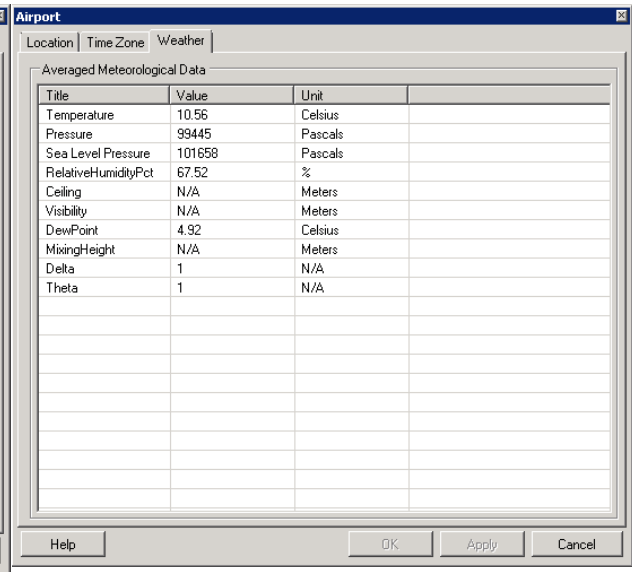


Figure 5-14 Airport Dialog Box – Weather Tab

5.3.1 Set Up Airport Layouts

To view the name and description of the airport layout:

1. In the *Study Hierarchy*, click on the (+) sign next to the airport of interest, and double-click on an airport layout. The *Airport Layout* dialog box will open (Figure 5-15).
2. Click *Close* to close the dialog box.

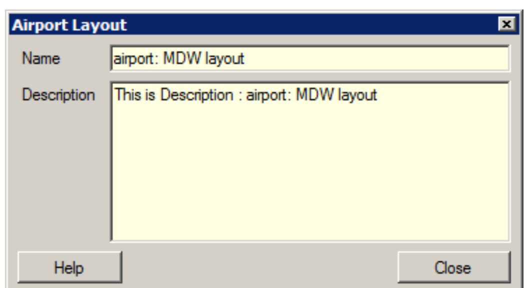


Figure 5-15 Airport Layout Dialog Box

To view airport-specific information:

1. In the *Study Hierarchy*, click on the (+) sign next to the airport of interest, and then select an airport layout.
2. In the *Tree Browser*, select the checkbox of the corresponding runway.
3. The airport geometry will update to show the selected airport layout (Figure 5-16).
4. From the *Tree Browser* (Figure 5-17), double-click on *Runways* category or a runway of interest to open the *Runways* dialog box (Figure 5-18). All information is read-only.

An airport layout must be selected in the Study Hierarchy to open the Runways dialog box. N-28

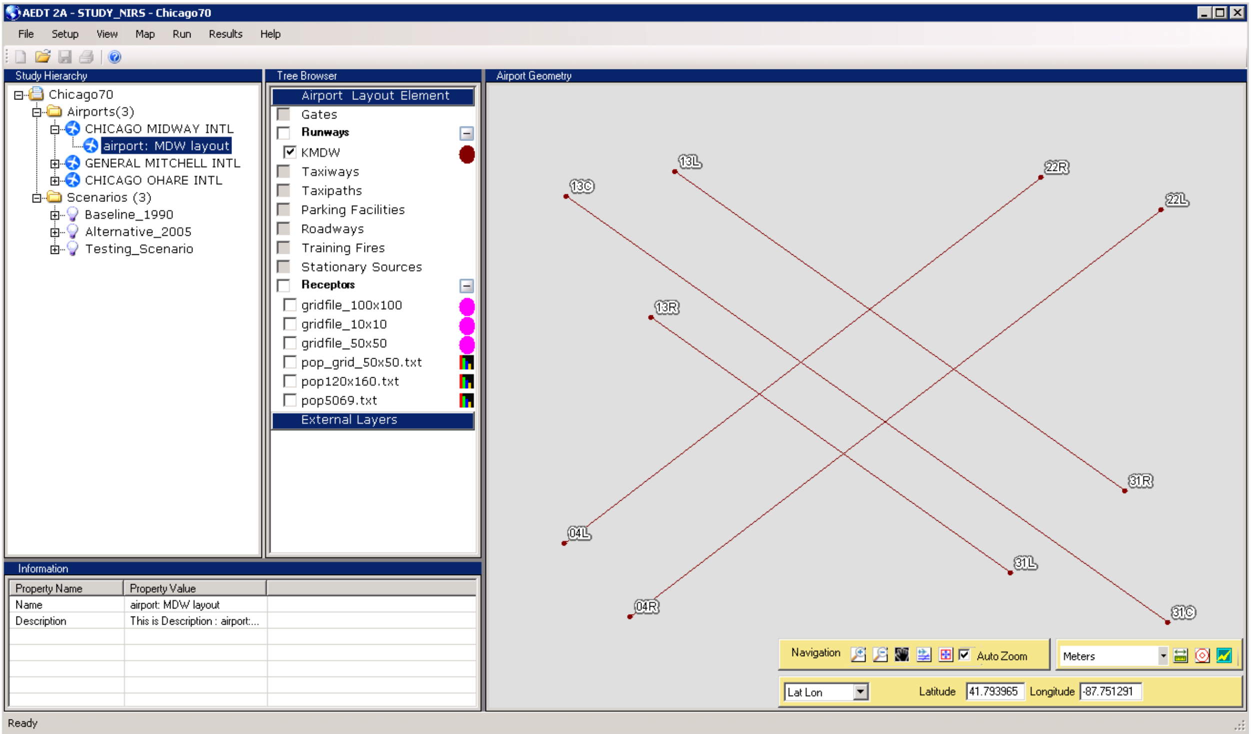


Figure 5-16 AEDT Main Window with Runways Shown in Airport Geometry

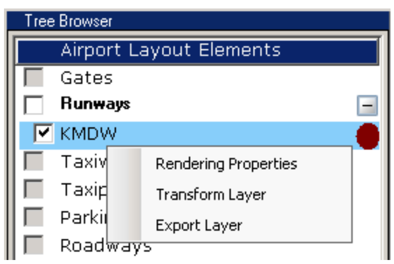


Figure 5-17 Runways in Tree Browser

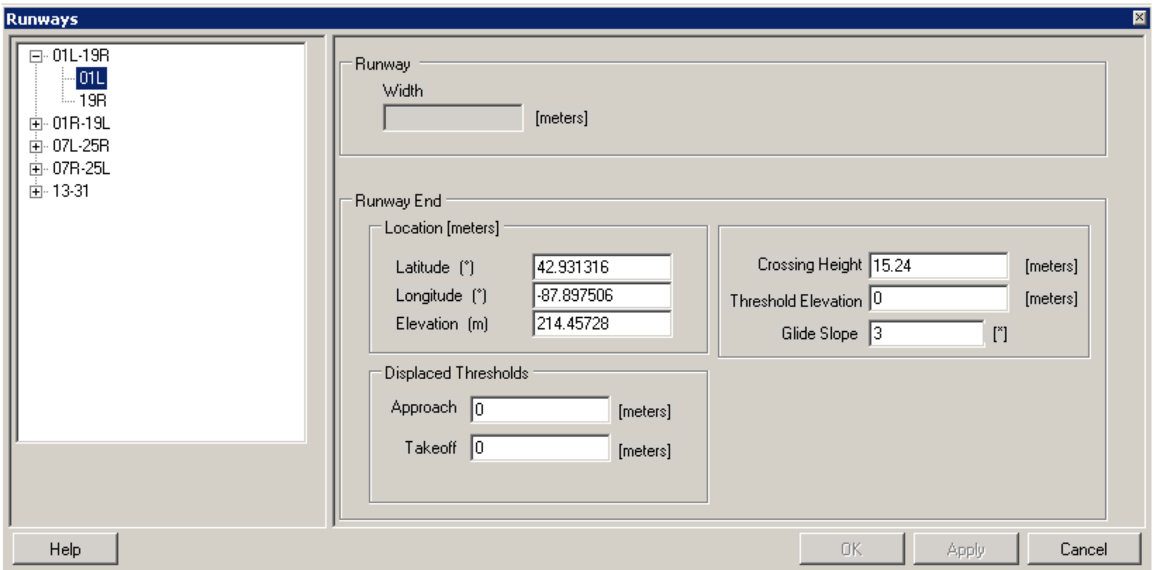


Figure 5-18 Runways Dialog Box

5.4 Set Up Scenarios

5.4.1 Set Up or Modify Scenarios

In AEDT2a, scenarios must be created and/or modified through the ASIF, not through the GUI. The user can run operations only on a scenario that was created in an ASIF and imported into a study. N-29

To modify a scenario:

1. Open the *Scenario* dialog box (Figure 5-19). To access this dialog box, either:
    a. From the menu bar select *Setup, Study Setup*. View the *Scenario List* for the existing scenarios in the study. Select the scenario of interest and click the *Edit* button; or
    b. From the *Study Hierarchy*, double-click on the scenario of interest.
2. Edit the scenario *Name* and *Description* as desired.
3. Select the *Dynamic Aircraft Performance Model*.
4. Select the *Start Time*.
5. Enter the *Sulfur to Sulfate Conversion Rate* in decimal form. The default value is 0.024 (2.4%).
6. Enter the *Fuel Sulfur Content* in decimal form. The default value is 0.0006 (0.06%).
7. Enter the *Noise & Emissions Altitude Cutoff* in feet.
8. 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.

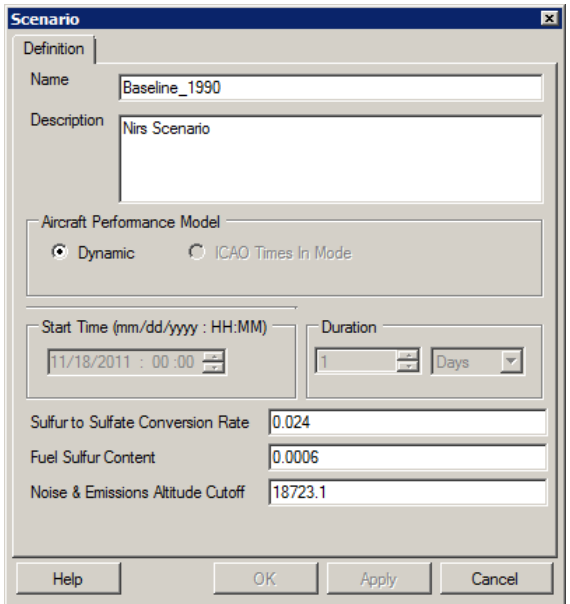


Figure 5-19 Scenario Dialog Box

5.5 Set Up Cases

5.5.1 Set Up or Modify Cases

In AEDT2a, cases must be created and/or modified through the ASIF, not through the GUI. The user can run operations only on a case that was created in an ASIF and imported into a study. N-30

To modify an existing case:

1. From the *Study Hierarchy*, click the (+) sign next to *Scenarios* folder to expand the list. Click the (+) sign next to the scenario of interest.
2. Continue to expand the cases by clicking the (+) sign, until the deepest case level of interest is visible.
3. Right-click on the child case of interest and select *Properties*.
4. A *Case* dialog box will appear (Figure 5-20).

The Case dialog box will only open after selecting Properties in the deepest case level in the Study Hierarchy. N-31

5. Edit the case *Name* and *Description* as desired.
6. The *Case Type* will be automatically filled in and shaded grey.
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.

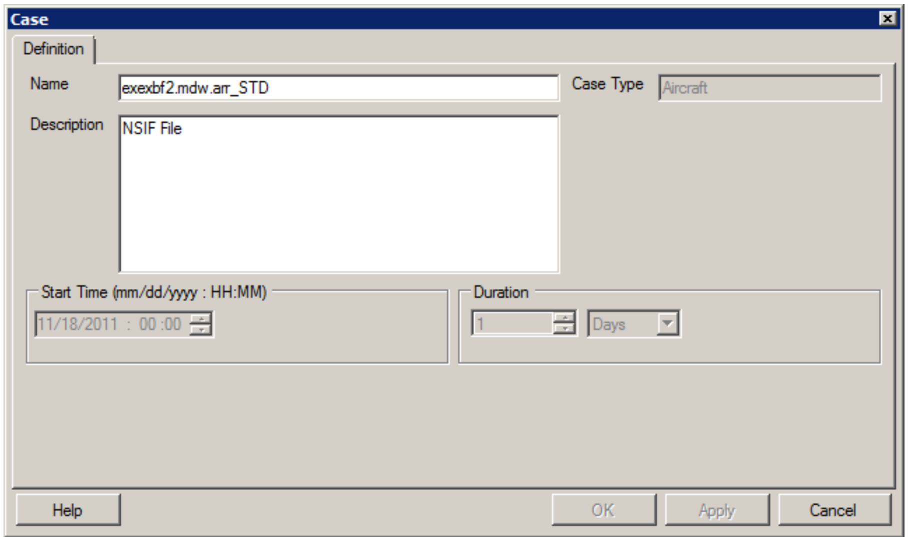


Figure 5-20 Case Dialog Box

Deletion of cases is not supported in AEDT2a. N-32

5.5.2 View Aircraft Operations

In AEDT2a, aircraft operations (called *Track Operations* in ASIF) must be created and edited through an ASIF that can be imported into a study (either as part of a full study import or partial import of aircraft operations). The user can view aircraft operations information from the GUI by opening the *Aircraft Operations* dialog box (Figure 5-21). The *Aircraft Operations* dialog box can be accessed from the Study Hierarchy and from the menu bar.

To access the *Aircraft Operations* dialog box from the Study Hierarchy:

1. In the *Study Hierarchy*, select a scenario of interest, and then click the (+) signs to expand the hierarchy until the deepest case level of interest is visible.
2. Right-click the child case and select *Edit Operations*.
3. An *Aircraft Operations* dialog box will open.
4. Select the scenario of interest from the *Scenario* drop-down menu.
5. Select the case of interest from the *Case* drop-down menu. The aircraft in the selected case are displayed.
6. Select an aircraft of interest to view its *Operations Summary*.
7. Click *Close* to close the dialog box.

To access the *Aircraft Operations* dialog box from the menu bar:

1. From the menu bar select *Setup*, *Study Aircraft* to open the *Aircraft Operations* dialog box.
2. Select the scenario of interest from the *Scenario* drop-down menu.
3. Select the case of interest from the *Case* drop-down menu. The aircraft in the selected case are displayed.
4. Select an aircraft of interest to view its *Operations Summary*.
5. Click *Close* to close the dialog box.

The *Aircraft Operations* dialog box will not open in the AEDT2a GUI if there are more than 2,100 operations. W-37

When creating overflight type operations in an ASIF (see Appendix C), the user must identify an arrival airport and runway for which the associated weather data would most closely match the conditions the user would like to see used in the modeling of the overflight. In addition, the Arrival On Time is used to determine whether the operation occurs during the day, evening, or night for approach operations. Arrival Off Time is used to determine whether the operation occurs during the day, evening, or night for all other operations.. N-33

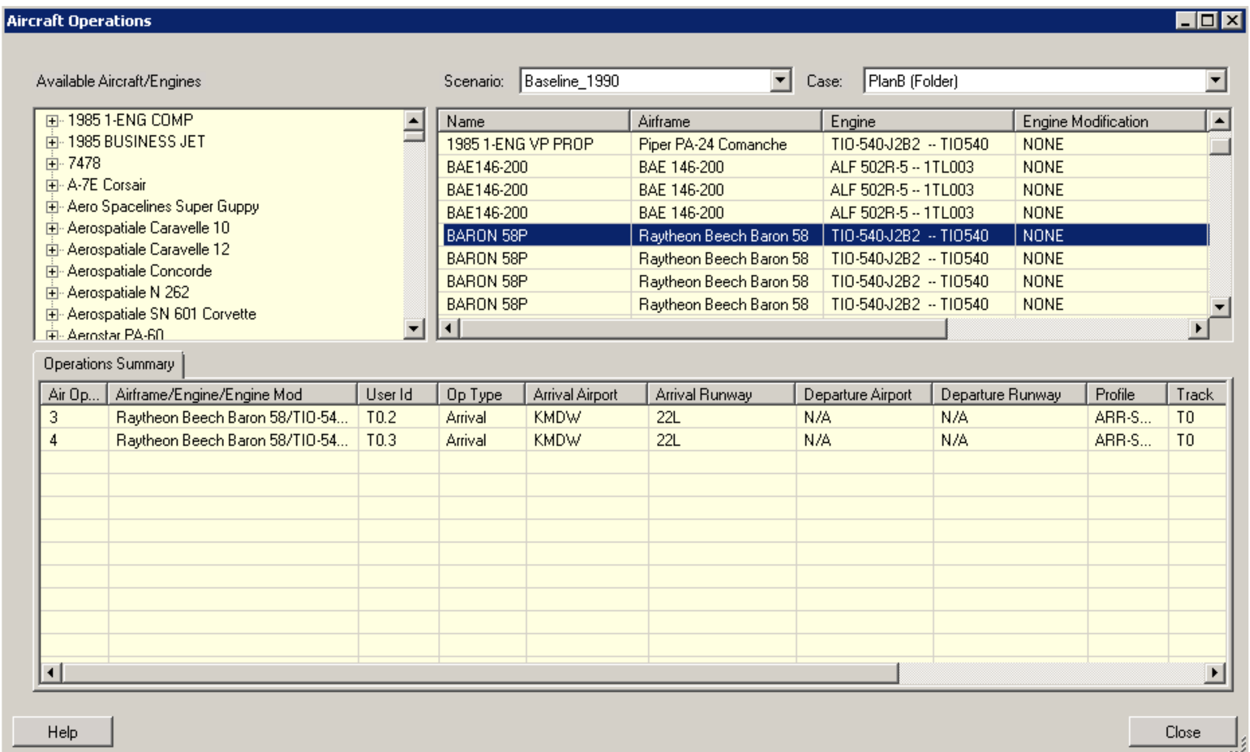


Figure 5-21 Aircraft Operations Dialog Box

A grey or yellow background in a dialog box indicates that the content is read-only. N-34

5.6 Set Up Receptors and Receptor Sets

5.6.1 Receptors

In AEDT2a, discrete receptors and receptor networks can be set up through the GUI or in the ASIF. See Appendix C for more information about the ASIF.

In AEDT2a, removing receptors in the GUI is not supported. N-35

In AEDT2a, population receptor sets can only be imported into a study through the ASIF or through the Population Import Tool (Appendix F). Population receptor sets are not displayed in the Receptors or Receptor Sets dialog boxes, however, details of such receptor sets can be viewed by generating a receptor set report (see Section 6.4.3) or by making them visible by selecting them in the Tree Browser. N-36

To set up receptors through the GUI:

1. From the menu bar select *Setup*, *Receptors* to open the *Receptors* dialog box (Figure 5-22).
2. Select the type of receptor to setup (*Receptor Network* or *Discrete Receptors* tabs).
    - A receptor network is a grid of receptors, See Figure 5-22. The user defines the grid size and location by filling in the following fields:
        - Enter a *Name*.
        - *Location*
            - *X (Long)* – lower left corner of the grid in degrees expressed as a decimal fraction
            - *Y (Lat)* – lower left corner of the grid in degrees expressed as a decimal fraction
            - *Elevation* – the elevation should be defined based on the airport elevation in meters above mean sea level (MSL). To look up the airport elevation, double click on the airport of interest to open the *Airport* dialog box and view the *Location* tab (Figure 5-12).
            - *Height* in meters
        - *Spacing* – distance between receptors
            - *X (Long)* in nautical miles
            - *Y (Lat)* in nautical miles
        - *Count*
            - *X (Long)* – number of receptors on the x-axis
            - *Y (Lat)* – number of receptors on the y-axis

      Receptors are automatically generated based on the user input (e.g., 4 nmi by 4 nmi with a point every 0.5 nmi).

Receptors imported without a defined elevation are considered to have an elevation of null in the ASIF, but is displayed as a zero value in the *Receptors* dialog box. AEDT will process the null value. W-38

- A discrete receptor is a single point (latitude/longitude), see Figure 5-23. An example is a noise-sensitive dwelling like a school or historic property. The user defines the receptor location by filling in the following fields:
    - Enter a *Name*.
    - *Location*
        - *X (Long)* – lower left corner of the grid in degrees expressed as a decimal fraction
        - *Y (Lat)* – lower left corner of the grid in degrees expressed as a decimal fraction
        - *Elevation* – the elevation should be defined based on the airport elevation in meters above mean sea level (MSL). To look up the airport elevation, double click on the airport of interest to open the *Airport* dialog box and view the *Location* tab (Figure 5-12).
        - *Height* in meters

The use of terrain may affect the receptor elevation defined when setting up receptors. The hierarchy in which receptor elevation will be used in calculation is as follows: W-39

a. If Use Terrain in the Run Options dialog is checked and terrain files are supplied, then elevations from terrain files will be applied for all receptors.
b. If Use Terrain in Run Options is not checked, but the receptor elevation has been defined when creating the receptor, then that elevation will be applied for all receptors.
c. If Use Terrain in Run Option is not checked, and the receptor elevation is not defined, then:
    - For approach operations, the elevation of the destination airport defined in the study will be used for all receptors.
    - For departure operations, the elevation of the origin airport defined in the study will be used for all receptors.
    - For overflight operations, 0 feet MSL will be used for all receptors.
    - For intra-study flight operations (both approach and departure airports are defined in the study), the elevation of the origin airport defined in the study will be used for all receptors.

Grid spacing must be the same in the x and y directions in order for contours to generate. W-40

Editing receptor sets will invalidate results of jobs that were prevIsouly run with the receptor set. To retain original results, create a new receptor set instead of modifying an existing receptor set. W-41

Receptor networks have a limit of 1 million points. N-37

3. Click *Add* to add a new receptor, or select from the list of existing receptors to edit.
4. Add or edit fields for each receptor as appropriate (see figures for each tab below).
5. Select one receptor and click the *Create Set* button to open the *Receptor Sets* dialog box.
6. Set up receptor sets according to the instructions in Section 5.6.2.
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.

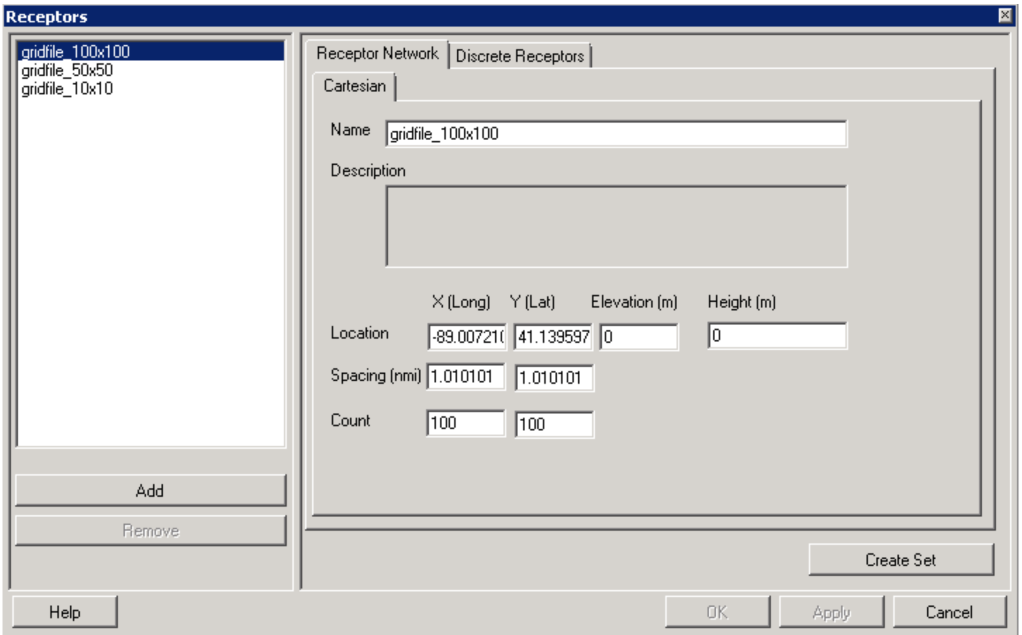


Figure 5-22 Receptors Dialog Box – Receptor Network Tab

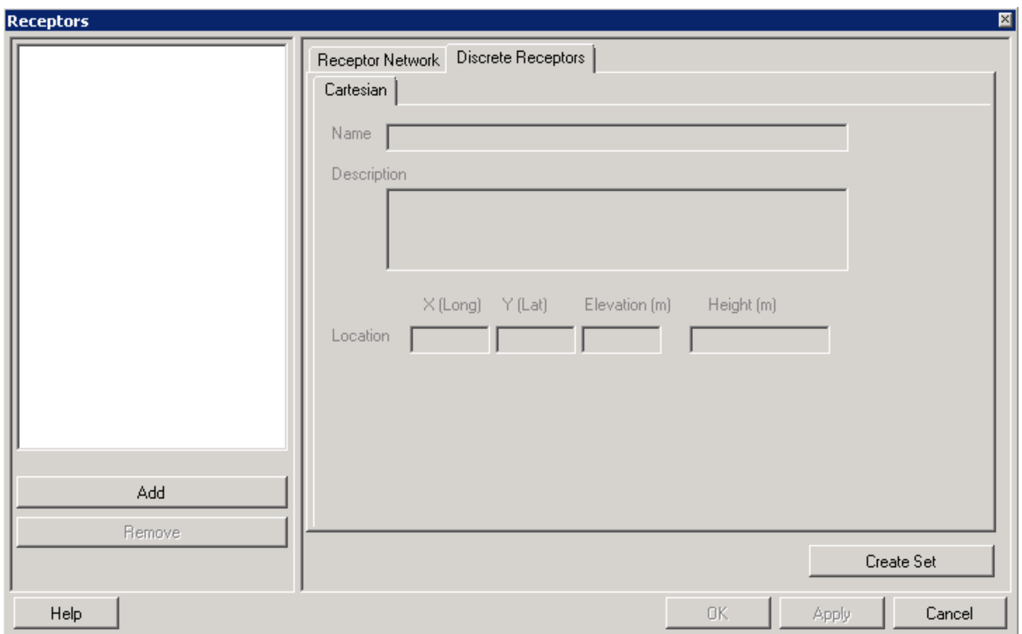


Figure 5-23 Receptors Dialog Box – Discrete Receptors Tab

To view receptors in Airport Geometry:

1. The *Tree Browser* displays all the receptors (both population and grid types) in the study under the *Receptors* category.
2. In the *Tree Browser*, check the checkbox of the desired receptor layer.
3. Population type receptors are displayed in a range of colors based on the population counts. Grid type receptors are displayed in a single color. The display properties can be modified in the *Layer Rendering Properties* dialog box (see Section 4.6).

5.6.2 Receptor Sets

A receptor set is a collection of one type of receptor. A receptor set cannot include more than one type of receptor. In AEDT2a, receptor sets can be created or edited through the ASIF or through the GUI. See Appendix C for more information about the ASIF.

In AEDT 2a, modeling overflight operations with a population receptor set is not supported. W-42

In AEDT2a, removing receptor sets in the GUI is not supported. N-38

In AEDT2a, population receptor sets can only be defined in an ASIF and imported into a study. Population receptor sets are not displayed in the Receptors or Receptor Sets dialog boxes, however, details of such receptor sets can be viewed by generating a receptor set report (see Section 6.4.3) or by making them visible by selecting them in the Tree Browser. N-39

Receptor sets must have at least one receptor or population point and have a limit of 500,000 receptors. N-40

To create or edit receptor sets through the GUI:

1. From the menu bar select *Setup*, *Receptor Sets* to open the *Receptor Sets* dialog box (Figure 5-24).
2. Click *Add* to add a new receptor set, or select from the list of existing receptor sets to edit.
3. Choose the *Receptor Type* (select *Receptor* or *Network*).
4. Edit the *Name* and *Description* fields for each receptor set as appropriate.
5. To add receptors, select the receptors of interest in the list titled *Available Receptor* and click *Add to Set*.
6. To remove receptors, select the receptors of interest in the list titled *Current Receptor* and click *Return to List*.
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.
8. From the menu bar select *File, Save* in order to commit any changes to the study database. Newly created receptor sets cannot be viewed in the Airport Geometry unless the study is saved first.

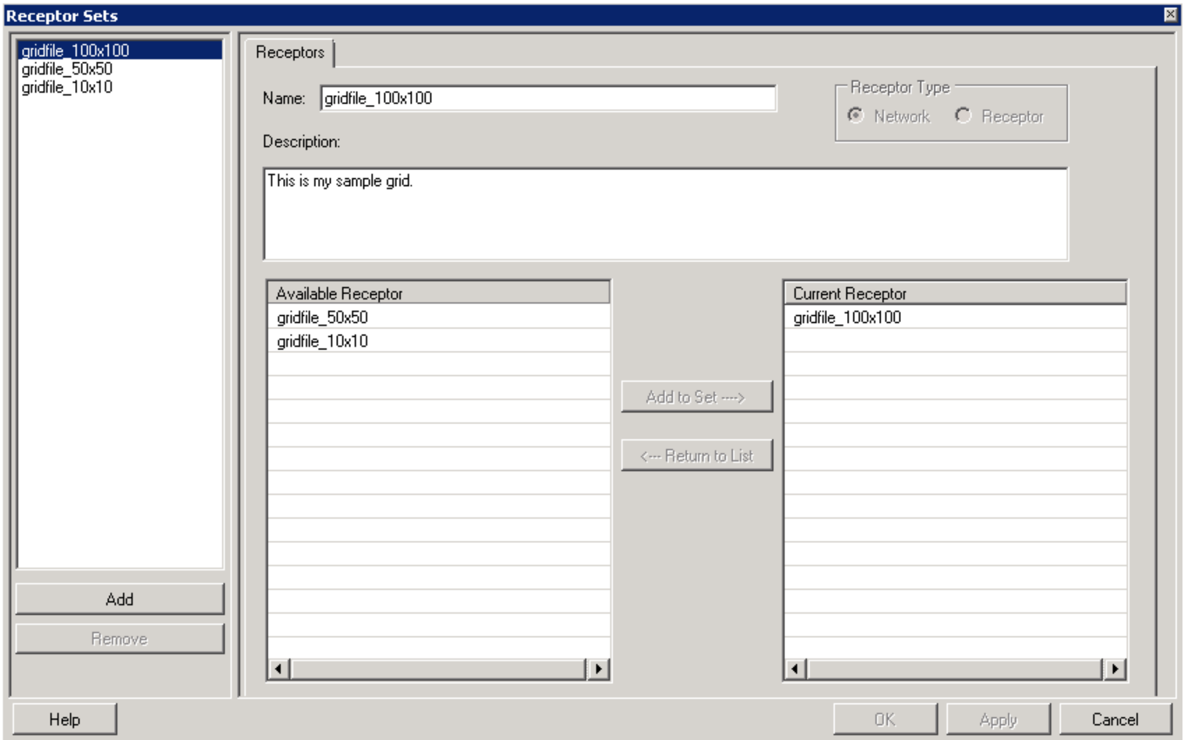


Figure 5-24 Receptor Sets Dialog Box

Consider backing-up the study at this time. See Section 2.2.2 for more information on how to back-up and restore a study. N-41

5.7 Set Up Noise Metrics

To view existing noise metric properties, from the menu bar select *Setup*, *Noise Metrics* and select the noise metric of interest (Figure 5-25).

To add user-defined noise metrics:

1. From the menu bar select *Setup*, *Noise Metrics*.
2. Click the *Add* button.
3. Enter a *Name*, *Metric Type*, *Family*, *Weight*, *Start Time*, and *End Time* for the desired user defined metric.
4. 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.

AEDT2a only supports one user-defined metric in a study. N-42

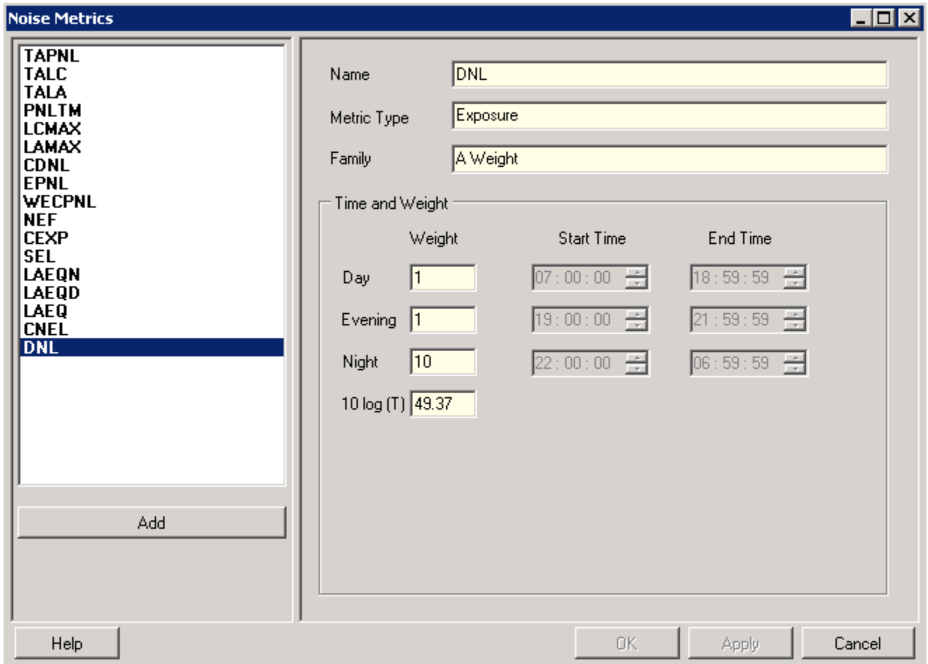


Figure 5-25 Noise Metrics Dialog Box

5.8 Save Backup Study File (Generate Administrative File)

The *Generate Administrative File* functionality in AEDT allows users to meet the NEPA requirement that mandates compilation and record keeping of all the information used in the study.

To generate administrative file:

1. From the menu bar select *File, Generate Administrative File.*
2. Navigate to the desired folder to store the report.
3. Enter a unique *File name* or accept the default name.
4. Click the *Save* button.
5. The zip file contains the following:
    - AdminFile.xml which lists the names and version information of the databases used in the study as well as weather or terrain files used in the study
    - AEDT_Log.txt
    - FAA.AEE.AEDT.AEDTApp.exe.config – AEDT application configuration file
    - SQL Server database backup file of the study database (.bak)

When running the AEDT GUI on a client machine and connecting to an AEDT study database located on a remote SQL Server, *Generate Administrative File* will not create a backup file of the study database. This is a limitation by Microsoft SQL Server. A workaround is to manually create the SQL Server database backup file and include it in the zip file. N-43

6 View

6.1 Annualization

Annualization is the process of performing a weighted summation[3] over the noise and emission results from some or all of the cases within a scenario in order to create results that represent noise and emissions exposures over the time period of interest. Depending on the data represented by the cases and the time period of the results, annualized results may be computed by applying a user defined weighting scheme. AEDT2a is flexible enough to construct any type of annualized weighting scheme desired; however, annualized results will only be produced by running all cases used by the annualization process in one job, which can be done most easily by running a full scenario. Case-level jobs will not produce annualized results. For instructions on how to run a scenario-level job with annualization, see Section 7.3.

In AEDT2a, the user can create annualization schemes through the GUI or in the ASIF. The user must identify each case referenced for annualization and specify weighting factors for each case. For more information on how to setup annualizations in the ASIF, see Appendix C.

To view annualizations in the GUI:
1. Select *View, Annualizations* from the menu bar. The *Annualizations* dialog box will open.
2. Select *Annualization* to view the annualization tree.

Figure 6-1 displays an example of an annualization tree, with a description provided below:
- The text on the left side of the blue lines displays the names of the cases being annualized within the scenario (level 1 below).
- Annualization groups are displayed as cases connected by red lines (level 2 below).
- The black numbers, above the blue lines, represent the user defined annualization factors (in decimal form representing a percent, e.g. 0.7=70%).
- The blue numbers below the blue lines represent the scale factor.
- The gray numbers with yellow background (above the blue lines on the right side) is the annualization factor multiplied by the parent case's annualization factor.
- The green number represents the final computed annualization based on the black, user defined annualization factors for each case or intermediate annualization group (in decimal form representing a percent, e.g. 0.7=70%). The final computed annualization is computed by multiplying all of the black user defined weighing factors found along the path from the top-most annualization group (level 3) down to the position of interest.

[3] The word summation is used figuratively and the actual process of correctly summing or adding together noise or emissions results depends upon the metric being used, e.g. energy metric results would not be directly added together for a result since they are logarithmic values, but would rather be log-added.

  - Example 1: If the area of interest is the first case listed in level 1 in Figure 6-1, the black value in level 3 (1.000) is multiplied by the black value in the top annualization group that contains the first case in level 2 (0.700), and finally is multiplied by the black value corresponding to the first case in *Level 1* (1.000). By this calculation, the green value for the first case is 0.700.
  - Example 2: If the area of interest is the bottom annualization group listed in level 2 in Figure 6-1, the black value in level 3 (1.000) is multiplied by the black value in the bottom annualization group in level 2 (0.300). By this calculation, the green value for the bottom annualization group is 0.300.
- The red numbers, in the bottom corner of each annualization group, represent the sum of the black, user defined annualization factors for that group.
- The right-most section of the annualization tree shows the top-most level, Level 3, containing the all of the annualization information in the tree and is given a weighting factor of 1.0, in Figure 6-1. To double the entire annualization, a weighting factor of 2.0 should be used instead of 1.0 (Level 3 in Figure 6-1).

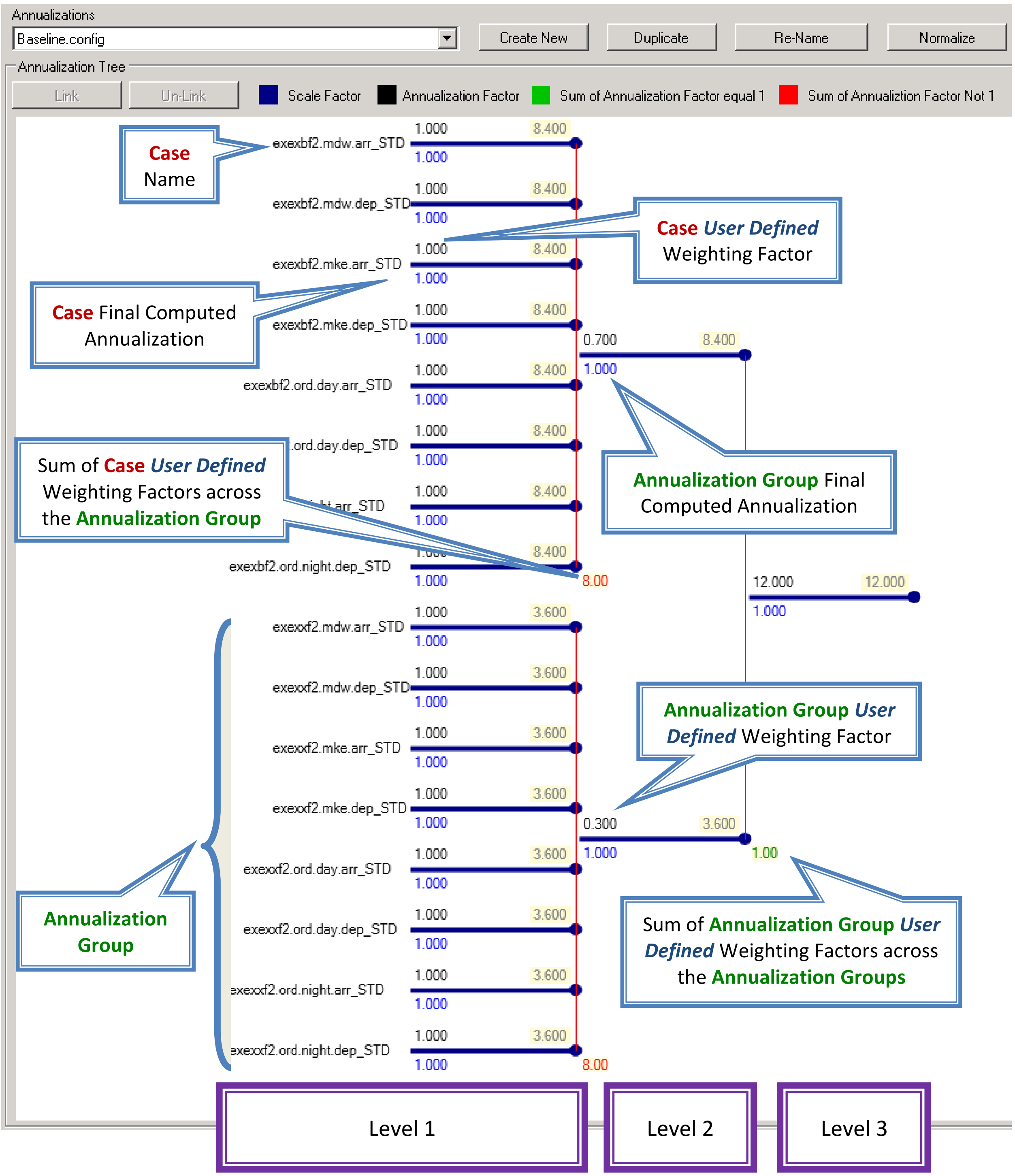


Figure 6-1 Annualization Tree

To create a new annualization or duplicate an existing annualization:

1. From the menu bar select *View, Annualizations*. The *Annualizations* dialog box will open.
2. From the *Scenarios* drop-down menu, select a desired scenario to be annualized.
3. Click *Create New* to create a new annualization or select an existing annualization from the drop-down menu and click *Duplicate*.
4. If desired, click *Re-Name* to rename the annualization. When complete, click *Done Re-Name*.
5. From the *Scenarios* drop-down menu, select a scenario of interest and the *Cases* list will update.
6. To add a case to *Annualization Tree*, select a desired case and click *ADD*.
7. To remove a case from *Annualization Tree*, click the circle node of the desired case, then click *REMOVE*.
8. Cases can be linked two at a time. Select two cases by clicking the circle nodes, then click *Link*.
9. Cases can be un-linked one at a time. To remove a link, click the circle node of the desired case, then click *Un-Link*.
10. Repeat steps 5-8 to add, link, or remove cases as appropriate.
11. Click *Normalize* to normalize the case-level annualization weights (left-most values) by the total weight in the group (sum of left-most values).
12. 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.

6.2 Tracks

To display tracks in the Airport Geometry:

1. From the menu bar select *View, Tracks*. The *Track Selection* dialog box will open (Figure 6-2).
2. Tracks can be searched using two criteria, either by selecting a scenario or by selecting airports and runways.
    a. From the *Scenario* tab, select a scenario of interest. The list will display the cases under the selected scenario. Select desired case(s). Multiple selections can be made by using Ctrl key or Shift key; or
    b. From the *Airport & Runways* tab, select desired *Airport*, *Runway End*, and *Operation Type*.
3. Tracks list will update based on the selection.
4. Select desired track(s) to display on the map and click the *Display on Map* button.
5. Close the *Track Selection* dialog box.
6. The new track layer is added to the *Tree Browser* under the *Tracks* category and is displayed in the *Airport Geometry*.

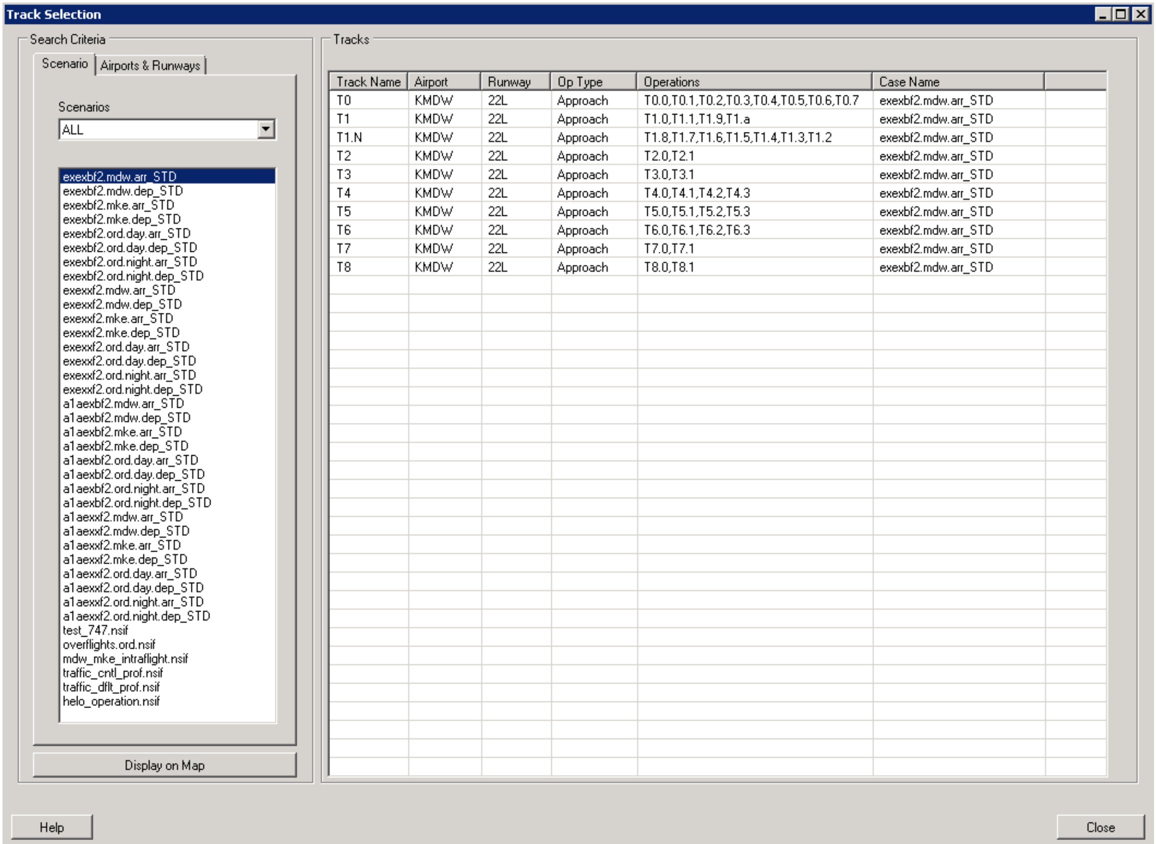


Figure 6-2 Track Selection Dialog Box

6.3 Study Boundary

When importing a new study boundary layer through partial ASIF import, the original boundary will no longer be in included in study computations, however AEDT will not remove a previously loaded boundary layer from the tree browser. It is recommended to remove the unwanted boundary layer by right clicking on the layer in the tree browser before importing a new boundary layer. W-43

When importing a new study boundary layer through partial ASIF import, it will invalidate results for all jobs that have been run with or without a study boudary. W-44

In AEDT2a, study boundary must be created and/or modified through the ASIF, not through the GUI. See Appendix C for more detailed information on the ASIF. N-44

To view the study boundary in the Airport Geometry:

1. From the menu bar select *View, Study Boundary*.
2. The study boundary is display in the Airport Geometry (Figure 6-3) and a new study boundary layer is displayed under the Region category in the Tree Browser.
3. If boundary information is missing from the study, then a “No boundary information found” message will be displayed.

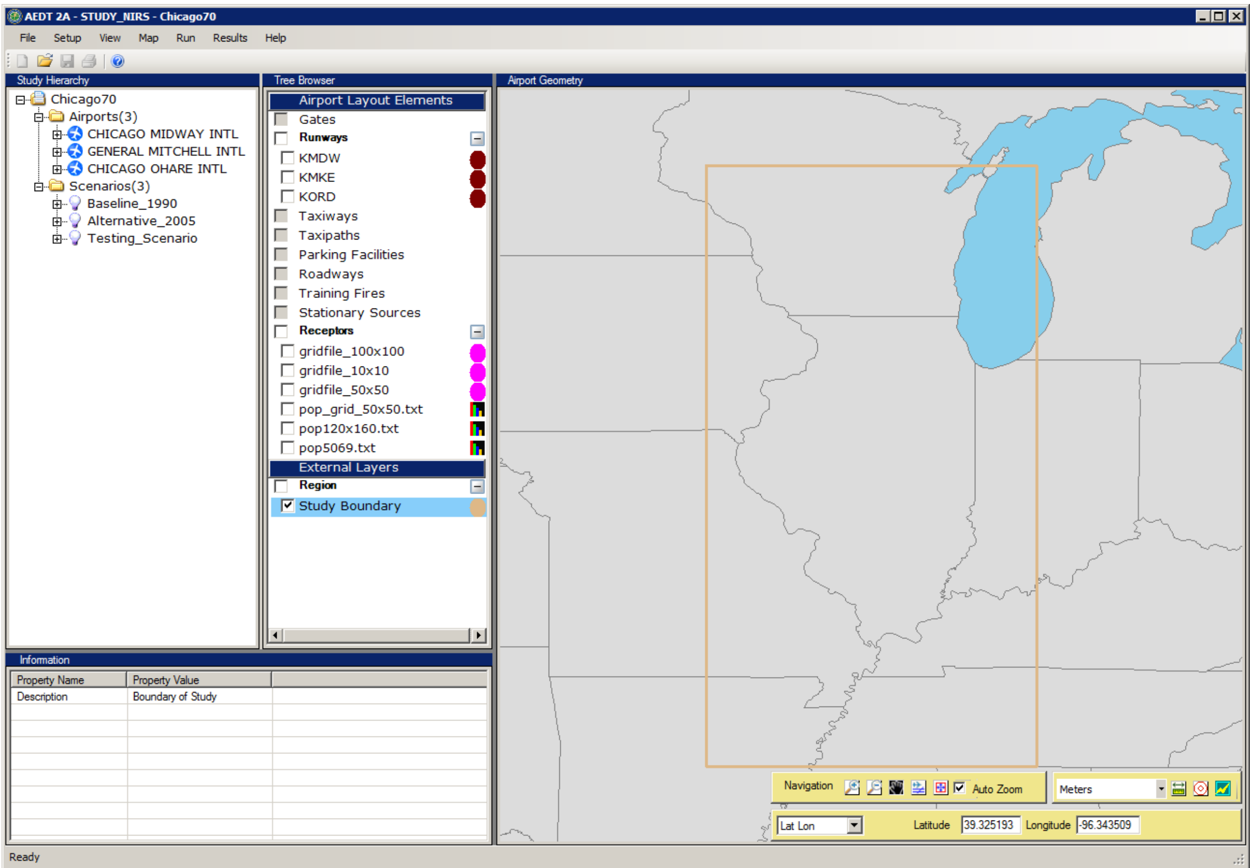


Figure 6-3 Study Boundary in Airport Geometry

6.4 Input Reports

Once a study has been imported through the ASIF importer, the study input report, fleet mix report, and receptor set report are available for viewing.

To view reports, select *View* from the menu bar (Figure 6-4). These reports can be viewed and stored external to the AEDT software, in a user-defined location. Appendix I provides snapshots of example reports.

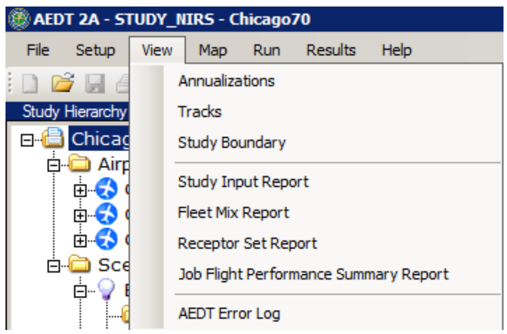


Figure 6-4 Input Reports from View Menu

Running reports or jobs, or importing the ASIF can cause the AEDT application to go to the background. Click on the AEDT application on the Windows Taskbar at bottom of the screen to bring AEDT back to the foreground. W-45

6.4.1 Study Input Report

The study input report allows the user to see all the scenarios, cases, and airports in the study along with the parameters for each of the study elements. The default file name for a study input report is [StudyName] Study Input Report.txt.

To view the study input report*:*

1. From the menu bar select *View, Study Input Report.*
2. Navigate to the desired folder to store the report.
3. Enter a unique *File name* or accept the default name.
4. Click the *Save* button.
5. A message will appear after the report generates stating the location of the file. See Appendix I for a snapshot of an example report.

Case level jobs will display All Cases in the Jobs section of the report and not the specific case that is associated with the job. To view the case associated with the job, open the *Jobs* dialog box from the *Run* menu, *Start Run…*, and view the job. N-45

6.4.2 Fleet Mix Report

The fleet mix report (Figure 6-5) allows the user to see the air operations under each scenario or case in various ways. The user can have the fleet mix report provide a summary of operations, a detailed list of all the aircraft types, a comparison of aircraft types by scenario/case, or runway counts by scenario/case. The default file name for a fleet mix report is report_fleet_mix.csv.

To view a fleet mix report:
1. From the menu bar select *View, Fleet Mix Report.*
2. Select a *Report Type* and *Report Level* from the drop-down menus.
3. Click the *Browse* button and navigate to the desired folder to store the report, or accept the default location that appears in the *File Name* field.
4. Enter a unique file name or accept the default name.
5. Click the *Run Report* button.
6. A message will appear after the report generates stating the location of the file. See Appendix I for a snapshot of an example report.
7. Units in the fleet mix report:
    - Number of operations on a user-selected report level.

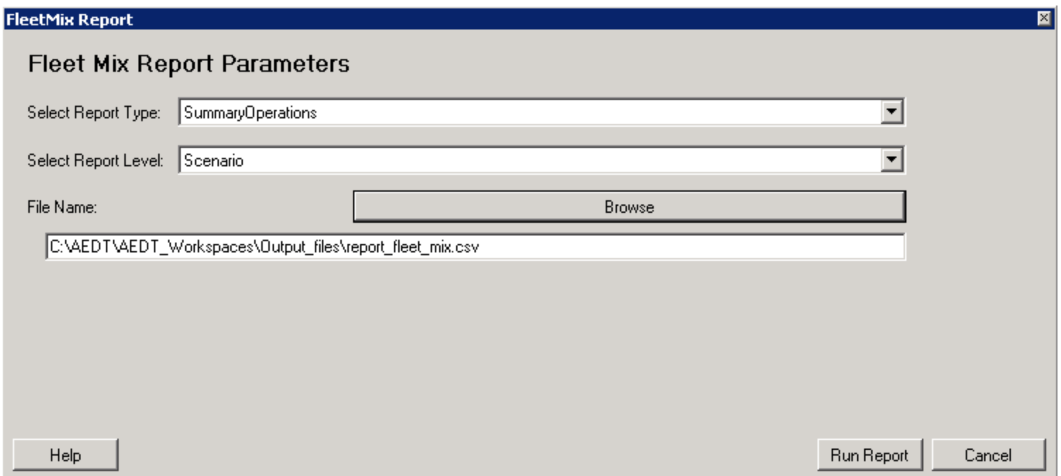


Figure 6-5 Fleet Mix Report Dialog Box

6.4.3 Receptor Set Report

The receptor set report (Figure 6-6) allows the user to see the details of a user-specified receptor set, for example a population or grid receptor set. The default file name for a receptor set report is report_receptor_set.csv.

To view a receptor set report:
1. From the menu bar select *View, Receptor Set Report.*
2. Select a *Receptor Set* from the drop-down menu.
3. Navigate to the desired folder to store the report by clicking the *Browse* button, or accept the default location that appears in the *File Name* field.
4. Enter a unique file name or accept the default name.
5. Click the *Run Report* button.
6. A message will appear after the report generates stating the location of the file. See Appendix I for a snapshot of an example report.
7. Units in the receptor set report:
    - Altitude = feet.
    - Land use = percentage of area.

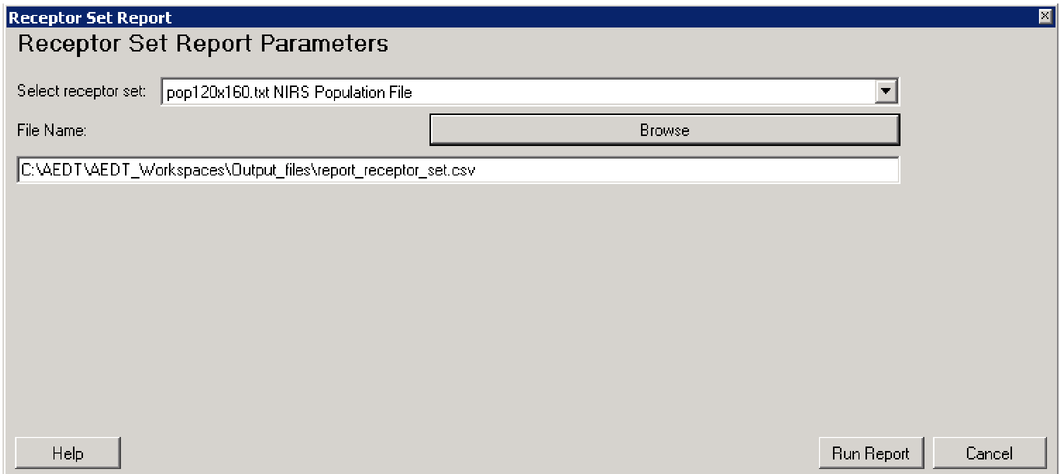


Figure 6-6 Receptor Set Report Dialog Box

6.5 Job Flight Performance Summary Report

The job flight performance summary report (Figure 6-7) allows the user to view a summary of flight performance errors from multiple log files. The errors describe why operations could not be modeled. The default file name for the report is report_log_results.txt.

To view a job flight performance summary report:

1. From the menu bar select *View, Job Flight Performance Summary Report.*
2. Click the *Select* button. Navigate to the directory where log files are stored (C:\AEDT\AEDT_Workspaces\Output_files), and select desired log files.
3. Check the *Detailed Error Reporting* checkbox if desired.
    - The report will summarize errors for each case if the detailed error reporting button is not checked.
    - The report will list each flight (air operation IDs) and associated errors if the detailed error reporting button is checked.

evt is a value used for internal processing and should be disregarded. airOp is air operation ID, and is linked to the AIR_OP_ID column in the AIR_OPERATION table. N-46

4. Navigate to the desired folder to store the report by clicking the *Browse* button, or accept the default location that appears in the *Report File Name* field.
5. Enter a unique file name or accept the default name.
6. Click the *Run Report* button.
7. A message will appear after the report generates stating the location of the file. See Appendix I for a snapshot of an example report.

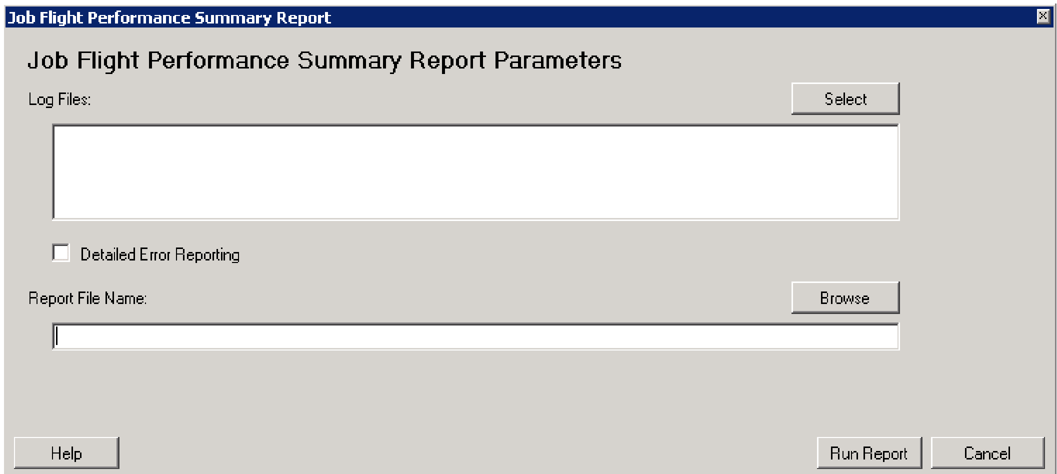


Figure 6-7 Job Flight Performance Summary Report Dialog Box

6.6 Error Log

AEDT application and ASIF importer error messages are written to a log file located in C:\AEDT\AEDT_Workspaces\Output_files\AEDT_Log.txt.

Taskmaster service logs are written to a log file located in C:\AEDT\AEDT_Workspaces\Output_files\AEDT_TMService_Log.txt.

It is recommended to review the log file(s) after every job run, then archive and keep track of log files. N-47

To access the AEDT log through the GUI:

1. From the menu bar select *View, AEDT Error Log*.
2. The *Error Log* dialog box displays the content from the most recent log file, *AEDT_Log.txt*. It shows date and time, module name, and description of each error present in the study (Figure 6-9).
3. To view a different log file, click the *Browse* button.
4. Navigate to C:\AEDT\AEDT_Workspaces\Output_Files.
5. Select the error file of interest and click the *Open* button (Figure 6-8).
6. After the file has been selected, the error log table will be populated (Figure 6-9).
7. Click *Cancel* to close the dialog box.

AEDT2a divides the log files into 100 MB partitions in ascending numerical order. Errors N-48
occurring toward the end of the processing cycle will be located in the file without a number, named *AEDT_Log.txt*; while errors occurring toward the start of the processing cycle will be located in the greatest numbered file, such as *AEDT_Log.txt.10* in the sample log files shown in Figure 6-8. The number of log files is limited to 10.

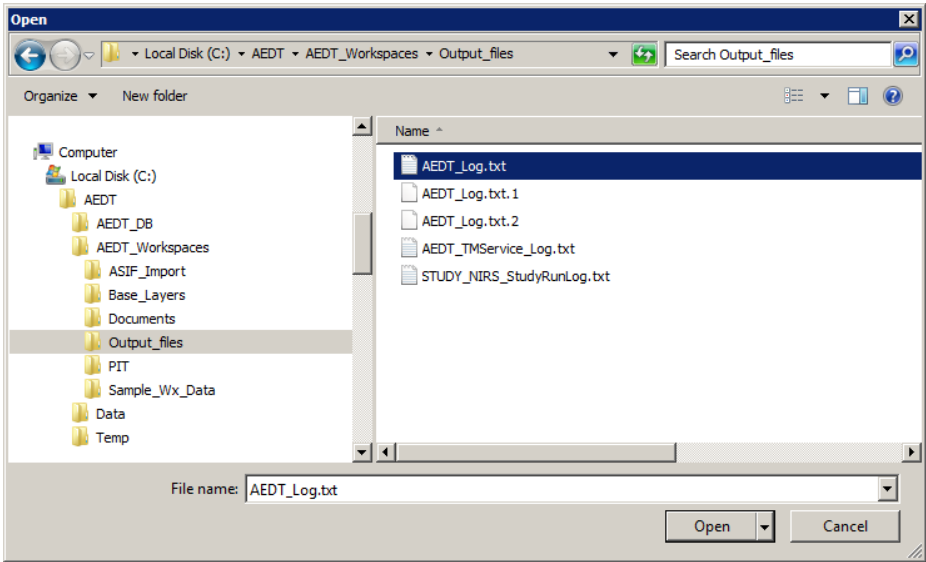


Figure 6-8 AEDT Log Files

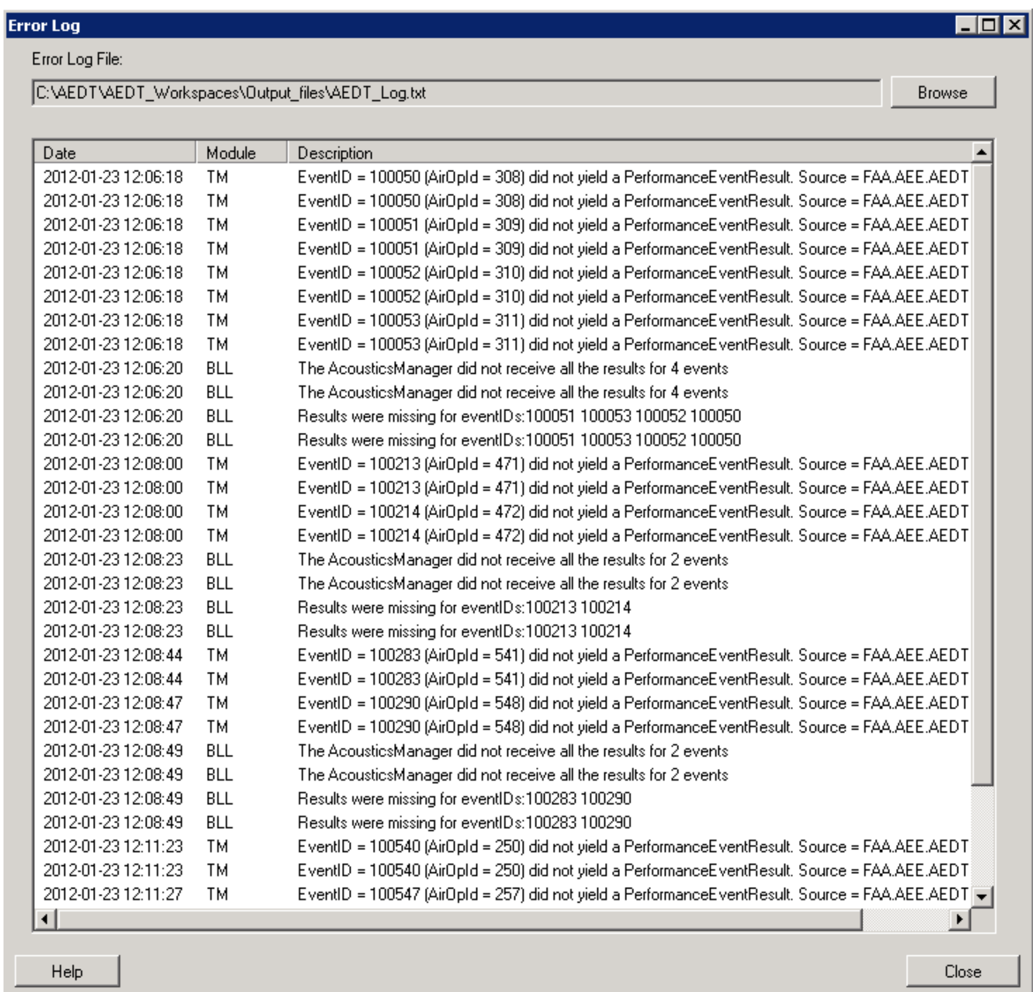


Figure 6-9 Error Log Dialog Box

7 Run Study

7.1 Define Run Options

Run options can be defined within the *Run Options* dialog box. Open the *Run Options* dialog box by selecting *Run* from the menu bar, *Run Options* (Figure 7-1).

In AEDT2a, removing run options in GUI is not supported. N-49

Figure 7-1 Run Options from Run Menu

1. In the *Run Options* dialog box (Figure 7-2), the left panel lists existing run options. To edit, select a run option from the list.
2. To create a new combination of run options, begin by clicking the *Add* button.
3. Enter a unique *Name* or accept the default name for the run option.
4. Enter *Description* if desired.
5. Select *Run Performance Only, Apply Atmospheric Absorption*, and/or *Check Track Angles*, if appropriate.

Annualization is not permitted if run performance only is selected when defining run options. N-50

When *Check Track Angles* is selected, flights on tracks where the track angle is above a certain threshold will be removed from computation as non-realistic. N-51

6. Select *Truncate and/or Extend Flight Paths to Study Boundary*, if appropriate. See notes at the end of this section for more information.
7. Select *Noise Metric* (DNL, CNEL, LAEQ, LAEQD, LAEQN, SEL, CEXP, NEF, WECPNL, EPNL, CDNL, LAMAX, LCMAX, PNLTM, TALA, TALC and TAPNL are available and are referenced to 0.0 dB in AEDT2a).
   - If time above threshold noise metric (TALA, TALC, and TAPNL) is selected, enter the desired *Time Above Threshold*.
   - To view existing noise metric properties, from the *Setup* menu, select *Noise Metrics* and select the noise metric of interest (see Section 5.7).
8. Select *Use Terrain* if appropriate. See Section 5.1.4 to use a terrain file.
   - Define terrain file type from the drop-down menu (3 CD, DEM* or Grid Float).

It is not recommended to use the Line of Sight Blockage feature in AEDT2a because terrain processing does not allow for interpolation between terrain data pixels in AEDT2a. W-46

*Terrain data are only supported if they are in one of the following projections: NAD83 or WGS84. N-52

Negative values are not supported in the fill terrain field in the *Run Options* dialog box. N-53

When running a large job with terrain and line of sight blockage, an out of memory exception may occur due to a cache size limitation. It is suggested to run the job again using fewer flights or fewer segments. N-54

9. Select *Lateral Attenuation* (*All Soft Ground* or *No Prop/Helo Attenuation*).
   - When *All Soft Ground* is selected, the lateral attenuation noise adjustment is applied to all aircraft in an AEDT scenario.
   - When *No Prop/Helo Attenuation* is selected, the lateral attenuation noise adjustment is only applied to jet-engine aircraft in an AEDT scenario, and it is not applied to the propeller-driven aircraft.
10. For studies with multiple airports, select *Use Single Airport Weather* and select the appropriate airport from the drop-down menu to apply that airport's weather data to the entire study area.
11. 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 the action.

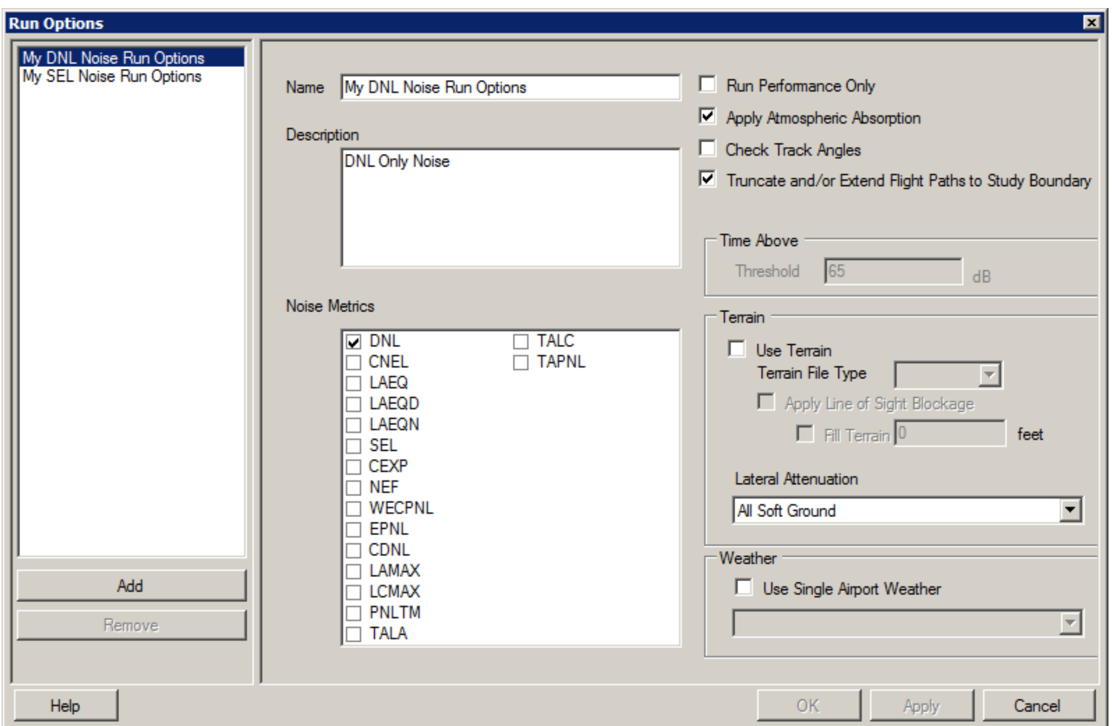


Figure 7-2 Run Options Dialog Box

When the *Truncate and/or Extend Flight Paths to Study Boundary* box is checked in the *Run Options* dialog box, the flight paths will be truncated (or extended as appropriate) to the study boundary for performance, fuel burn, emissions, and noise computations. Performance, noise, and emissions results will only be available for air operations that have at least one track point within the boundary. W-47

AEDT2a defines a study boundary as a geospatial boundary around a modeling area. A study boundary is not required in AEDT2a, but when activated, a study boundary truncates (or extends) the flight paths within the boundary, which in turn affect the performance, fuel burn, emissions, and noise computations for the aircraft operations on those affected flight paths. In AEDT2a, a study boundary must be created and/or modified through the ASIF, not through the GUI. See Appendix C for more detailed information on the ASIF.

When there is an altitude cutoff, noise above the altitude cutoff is not computed. The following matrix describes how the model responds to various boundary, profile/track altitude control, and study altitude cutoff settings when this Run Option is checked.

	No Controls	**With Controls**
No Boundary	• No altitude cutoff: all profiles/tracks are flown as defined • With altitude cutoff: all profiles/tracks have a node where performance passes through the cutoff altitude • Cruise altitude – defined but not used, null for helicopters	Controls are followed and when the controls end, the flight stops.
With Boundary	• No altitude cutoff: a. Departures or arrivals are vertically extended to cruise altitude and horizontally extended to the boundary. b. Overflights are horizontally extended to the boundary at both ends. • With altitude cutoff: same as no altitude cutoff, except there are nodes wherever the performance passes through the altitude cutoff. Noise is not computed at segments above the altitude cutoff.	• Cruise altitude: a. Above: fly level for the last control, extending to boundary b. Below: fly to cruise and level, extending to boundary • Overflights extend level in both directions (ignoring cruise altitude)

When the *Truncate and/or Extend Flight Paths to Study Boundary* box is checked in the *Run Options* dialog box and altitude controls are used, aircraft performance may not behave as expected: W-48

- Some events do not always progress forward along the defined track. Portions of the event may back-track along one segment of the track. Back-tracking may extend beyond the defined segment, which would be particularly evident when the track is not straight.
- For approach operations, the altitude and speed at the location of the first altitude control may be assigned to the location of the transition between cruise and descent modes of flight. The thrust at the location of the transition is unaffected.

When the Truncate and/or Extend Flight Paths to Study Boundary option is selected in the *Run Options* dialog box, and the cruise altitude exceeds the BADA aircraft's maximum operating altitude, the maximum operating altitude is used for cruise. If altitude controls have been defined, the maximum operating altitude will not be used and the flight will not be processed. W-49

When the Truncate and/or Extend Flight Paths to Study Boundary feature is selected in the *Run Options* dialog box, it is recommended to only use sensor path trajectory data for intra-study flights. For more information on intra-study flights and how to import sensor path trajectory data into the study, see Appendix C. W-50

7.2 Run with Distributed Processing

OPTIONAL

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 Section 2.2 for configuration instructions. After configuration is complete, follow the steps below to setup and run a job with distributed processing.

Terrain, Weather, and Population Files

1. 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 File Paths dialog box on AEDT client. The specified file location must be exactly the same for all remote servers. See sections 5.1.4 and 5.1.5 for instructions on defining file path locations.
2. Population Data: If a study includes population data, the necessary files must be imported into the AEDT client as described in Appendix F before running the study. It is not necessary to place these files on the remote machines.

7.2.1 Identify Remote Taskmaster Machines for Distributed Processing

1. From the menu bar select *File, Distributed Processing Setup* (Figure 7-3).
2. 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.
3. To remove a machine from distributed processing, delete the machine name from the *Machine Name* field, then click *Apply*.

4. Select a machine name from the list and click *Get Details* to test the connection to the machine.
5. Click *Advanced* to open the *TmService Manager (Advanced)* dialog box (Figure 7-4). 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.
6. 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.

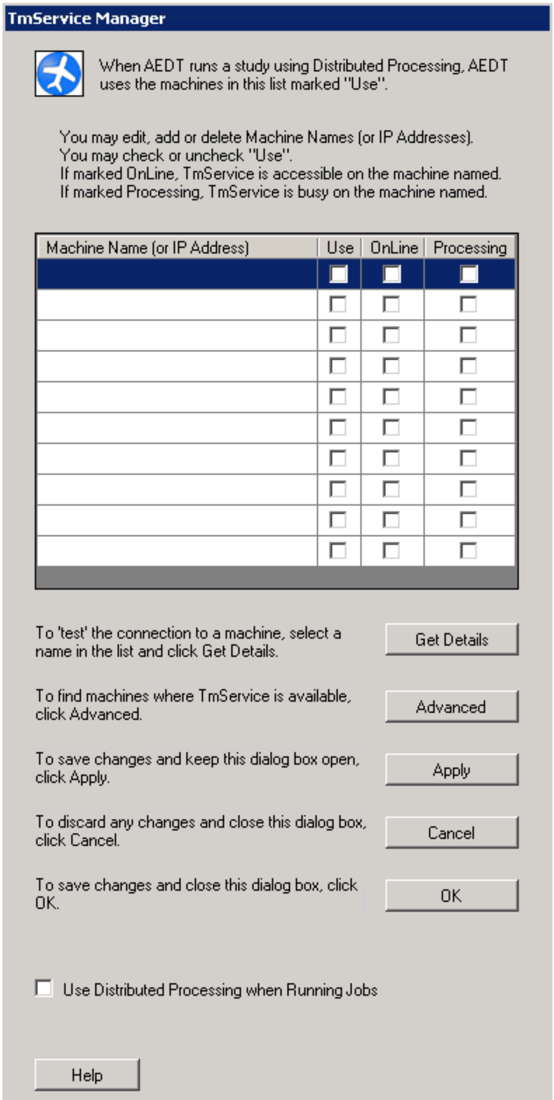


Figure 7-3 TmService Manager Dialog Box

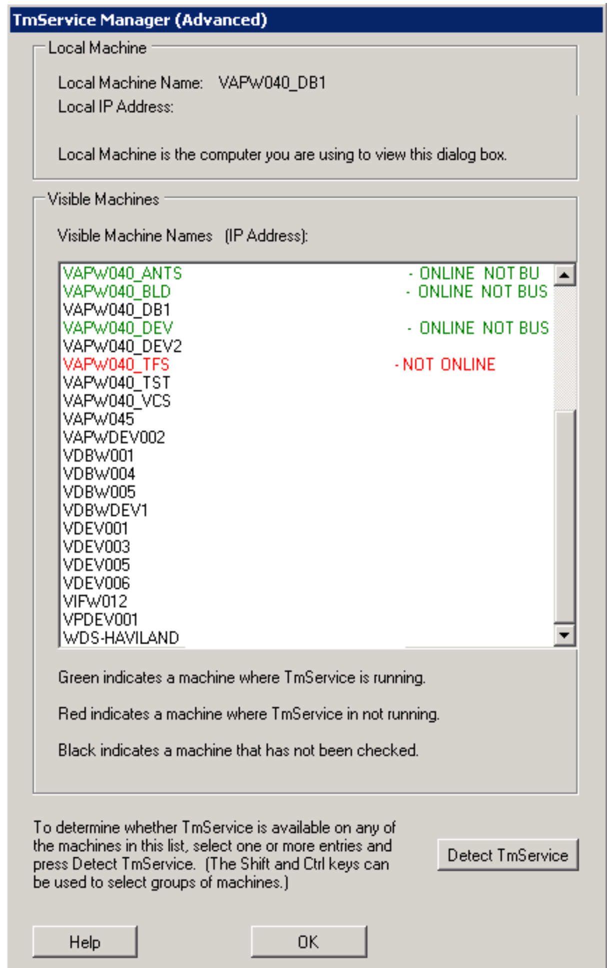


Figure 7-4 TmService Manager (Advanced) Dialog Box

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 6.5 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-55

7.2.2 Enable/Disable Distributed Processing

In the *TmService Manager* dialog box (Figure 7-3), check the *Use Distributed Processing when Running Jobs* checkbox. AEDT will run jobs in distributed processing mode when the Run button is clicked in the *Jobs* dialog box. If not checked, processing on a single computer will be the default processing method for all job runs.

7.3 Create Job

In AEDT2a, a job enables a user to run a given case or cases in different ways without altering the cases themselves.

The archival nature of the study in the AEDT2a system will require, under certain conditions, database maintenance of the record content for results storage. These event-based (operation-based) results for the data in the results archive can be reused in accumulating metrics for output reports of interest.

In many cases, events (operations) may be repeated in different cases or scenarios, provided the input parameters forming a given event are the same. The AEDT2a system determines if two results are redundant and therefore need only be saved once. This is a significant step in improving computational efficiency for many types of studies. When a job which reused results completes running, AEDT displays the message: "Job processing complete with reused results".

To setup and run a job*:*

1. From the *Run* menu, click *Start Run…* (Figure 7-5) to open the *Jobs* dialog box (Figure 7-6). The top of the *Jobs* dialog box provides summary information for each job in the study, including the job #, scenario name, cases, receptor sets, run option, run job (yes/no), and status. The user can modify job information upon selection of a particular Job.

Figure 7-5 Run Menu

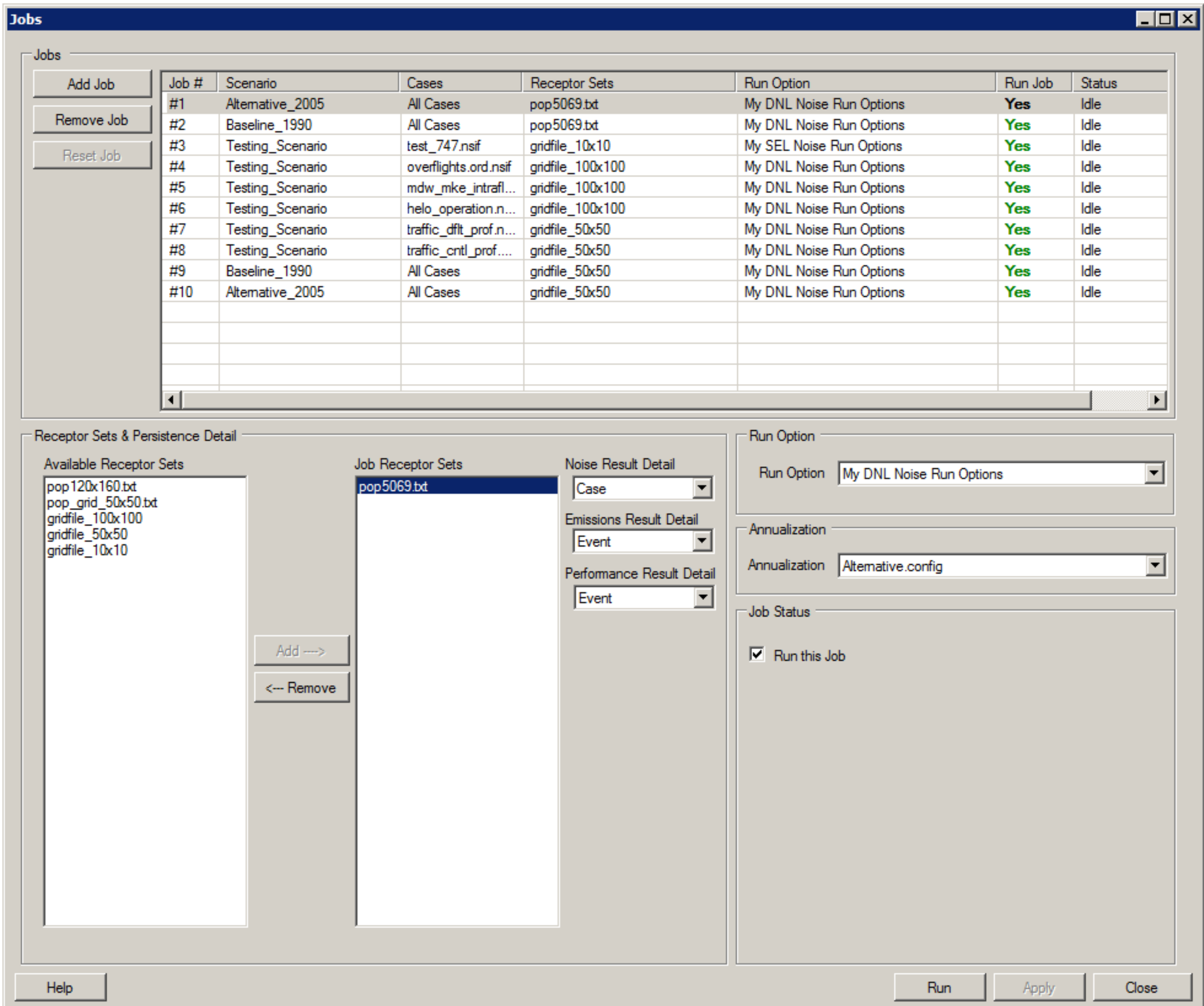


Figure 7-6 Jobs Dialog Box

2. Add jobs
   a. Click the *Add Job* button to add a new job, and the *Job – Select Scenarios/Cases* dialog box will open (Figure 7-7).
   b. Select the scenarios/cases of interest. Aircraft refers to the case type; selecting aircraft will include all cases within that scenario and case type in the job.
   c. Click the *OK* button to accept the selections and close the dialog box, or click the C*ancel* button to discard the action.

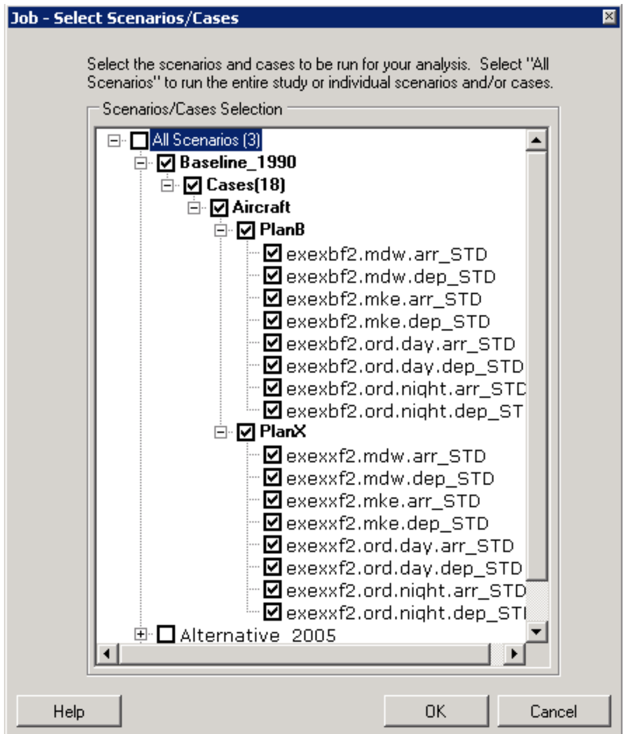


Figure 7-7 Job – Select Scenarios/Cases Dialog Box

3. Click on the job of interest in the *Jobs* list and follow steps 4 to 9 to setup or edit a job that has not been processed.
4. Apply available receptor sets to the job (see Section 5.6.2 to setup receptor sets).
   - Select an *Available Receptor Set* and click *Add* to include it in the job receptor sets.
   - Select a *Job Receptor Set* and click *Remove* to remove it from the job.
5. Define the persistence detail for each job receptor set by selecting the job receptor set:
   a. Select a *Noise Result Detail* from the drop-down menu (*None*, *Case*, or *Event*).
      - This selection controls whether noise data are saved to the study database, which is required to generate contours.
      - When set to *None,* no data will be available for contours.
      - When set to *Case,* case level noise accumulations will be available for contours.
      - When set to *Event,* both individual flight level noise data and case level noise accumulations will be available for contours.

Individual flight level noise data require a significant amount of space in the database, and will affect run time. N-56

In AEDT2a, setting the noise result detail to None will produce the same results as setting the noise result detail to Case. Results will be available on the case level. N-57

Annualization contours are constructed from the database using case level noise accumulations across a scenario. N-58

b. Select an *Emissions Result Detail* from the drop-down menu (*None*, *Case*, *Event,* or *Segment*).
   - This selection controls the level of emissions detail that is stored in the study database.
   - When set to *None,* no emissions data are saved in the database and no data are available for emissions reports.
   - When set to *Case,* case level emissions accumulations are stored in the study database.
   - When set to *Event*, individual flight level emissions data and case level emissions accumulations are stored in the study database.
   - When set to *Segment*, detailed segment emissions data, individual flight level emissions data and case level emissions accumulations are all stored in the study database.

In AEDT2a, setting the emisssions result detail to None will produce the same results as setting the emissions result detail to Case. Results will be available on the case level. N-59

c. Select a *Performance Result Detail* from the drop-down menu (*None* or *Event*).
   - This selection controls whether the individual flight level performance result details are saved to the study database.
   - When set to *None*, individual flight level performance result details are not saved.
   - When set to *Event*, individual flight level performance result details are saved and are available for reporting.

If a performance only run option is selected, a receptor set must be added to the job in order to define performance result detail. The receptor set will not be used in the calculation. If no receptor set is added, the default performance results detail is set to the event level.The receptor set may not always appear in the Jobs Receptor Set list, but the results detail set will persist. W-51

Noise data are not computed if run performance only is selected when defining run options. N-60

6. Select a *Run Option* from the drop-down menu (see Section 7.1 on run options).
7. Select an *Annualization* from the drop-down menu (see Section 6.1 on annualizations).

Annualization is not permitted if run performance only is selected when defining run options. N-61

8. For each job in the *Jobs* list, the *Run this Job* box must be checked in order to run the job.

7.4 Run Job

Jobs can be run in the GUI or using the Batch Study Processor (also referred to as the Run Study tool). Please refer to Appendix K for instructions on using the Batch Study Processor.

7.4.1 Run Job in the AEDT GUI

To run a job:

1. From the *Run* menu, click *Start Run…* to open the *Jobs* dialog box.
2. Click *Run* to run the jobs. Click *Apply* to apply changes and keep the dialog box open. Click *Close* to save and close the dialog box.

Jobs may display a status of idle, processing, incomplete, complete, or invalid.

- Idle – the job has not been run
- Processing – the job is currently running
- Incomplete – the job has run in part but has not completed; jobs with an incomplete status will resume running after the last completed case when the run is reinitiated
- Complete – the job has finished running
- Invalid – a setting associated with a completed job has been changed, i.e. a component of the run option associated with the job, and the job should be rerun

Running reports or jobs, or importing the ASIF can cause the AEDT application to go to the background. Click on the AEDT application on the Windows Taskbar at bottom of the screen to bring AEDT back to the foreground. W-52

It is not recommended to change any settings associated to a job while it is running. W-53

AEDT has the ability to reuse previously calculated results when running a new job. The smallest unit of results that can be reused for noise and emissions is a set of air operations in a case. The smallest unit of results that can be reused for performance results is on the event level. N-62

If the computer goes into sleep mode while processing a job, the AEDT2a application may quit, but appear to continue processing in the task manager. It is recommended to cancel the process in the task manager, reopen AEDT, and check the status of the job. N-63

To view persistence detail of a completed job, select the desired job, then select the job receptor set of interest. N-64

Terrain Troubleshooting

A number of exceptions could occur if terrain files are not setup properly. Possible exceptions and fixes are listed below:

Exception: Unable to initialize terrain. <<Folder_Name>> folder doesn't exist.
Fix: Check the terrain file path location and update to the appropriate file path.
See section 5.1.4 for more information on terrain file path locations.

Exception: Unable to initialize terrain. No terrain data layers were found.
Fix: Check the defined terrain file path location and either move terrain data to that directory or update the terrain file path to the appropriate directory.
See section 5.1.4 for more information on terrain file path locations.

Exception: Unable to initialize terrain. More than one spatial reference type was associated with the terrain data.
OR

Exception: Unable to initialize terrain. No spatial reference type was associated with the terrain data.
OR
Exception: Unable to initialize terrain. Terrain data spatial reference is not defined.
OR
Exception: Unable to initialize terrain. Terrain data only supports GCS_WGS_1984 and GCS_North_American_1983 spatial references.
Fix: Update the terrain folder contents so that it only contains one type of spatial reference type which is either GCS_WGS_1984 or GCS_North_American_1983. One way to do this is to download terrain directly from USGS as described in Appendix G.

7.4.2 Reset Job

To reset job results:

1. From the *Run* menu, click *Start Run…* to open the *Jobs* dialog box.
2. Select the job of interest.
3. Click the *Reset Job* button to mark the results as invalid.

Before resetting results, close all dialog boxes related to change analysis and impact evaluation, including reports. W-54

Users should regularly remove invalid results from the Study database by selecting *Results, Clear Invalid Results* from the menu bar. See Section 8.7. W-55

When the completed job results have been reset, the change analysis and impact sets associated with that job will be deleted. N-65

7.4.3 Remove Job

To remove a job:

1. Select the job of interest.
2. Click the *Remove Job* button to remove the job.

Noise contours cannot be viewed for scenarios without annualization. Case-level contours can be viewed without annualization. W-56

The status in the Jobs dialog box will not always update to idle when a job is running. Do not run the same job twice. W-57

The progress bar may not advance in the Processing Jobs Status dialog box; the case names will update. W-58

In AEDT2a, jobs will save upon exiting the program and the change will be reflected in the last modified date field in the Load Study dialog box. N-66

8 Results

The results reports are available after the user runs a job.

8.1 Flight Performance Information

The flight performance information shows the flight performance of the operations for a user-specified case.

If the user looks at a large number of results in flight performance, the user may encounter an error message indicating that the application has run out of memory. Exit W-59
the application and restart, after which the user should be able to resume viewing performance results.

The terminal-area approach portions of sensor-path intra-study flight (runway to runway) W-60
air operations are modeled according to the standard profile defined for the stage length appropriate for the length of the sensor path. This includes that approach profile's weight specification. Therefore, performance results will usually include a sudden change in weight at the beginning of the terminal-area approach, reflecting the difference between the approach profile's weight, and the weight calculated by decrementing fuel burn from the departure profile's weight.

Results from intra-study flight (runway to runway) air operations that are based on sensor W-61
path data (rather than profiles and/or tracks) will include some segments between the terminal area portion (10,000 ft or higher above field elevation) and the cruise portion (above the nominal cruise altitude of the sensor path data) that are modeled as though they were part of the cruise portion. That is, the trajectory mode listed in flight performance reports for such segments will be Cruise, rather than EnrouteClimb or EnrouteDescent. The fuel burn for these segments will be based on the BADA fuel burn model for cruise, rather than the model for climb or descent, and emissions results that depend on fuel burn are affected accordingly.

To access the *Flight Performance Detail* dialog box, from the menu bar select *Results, Flight Performance Information* (Figure 8-1).

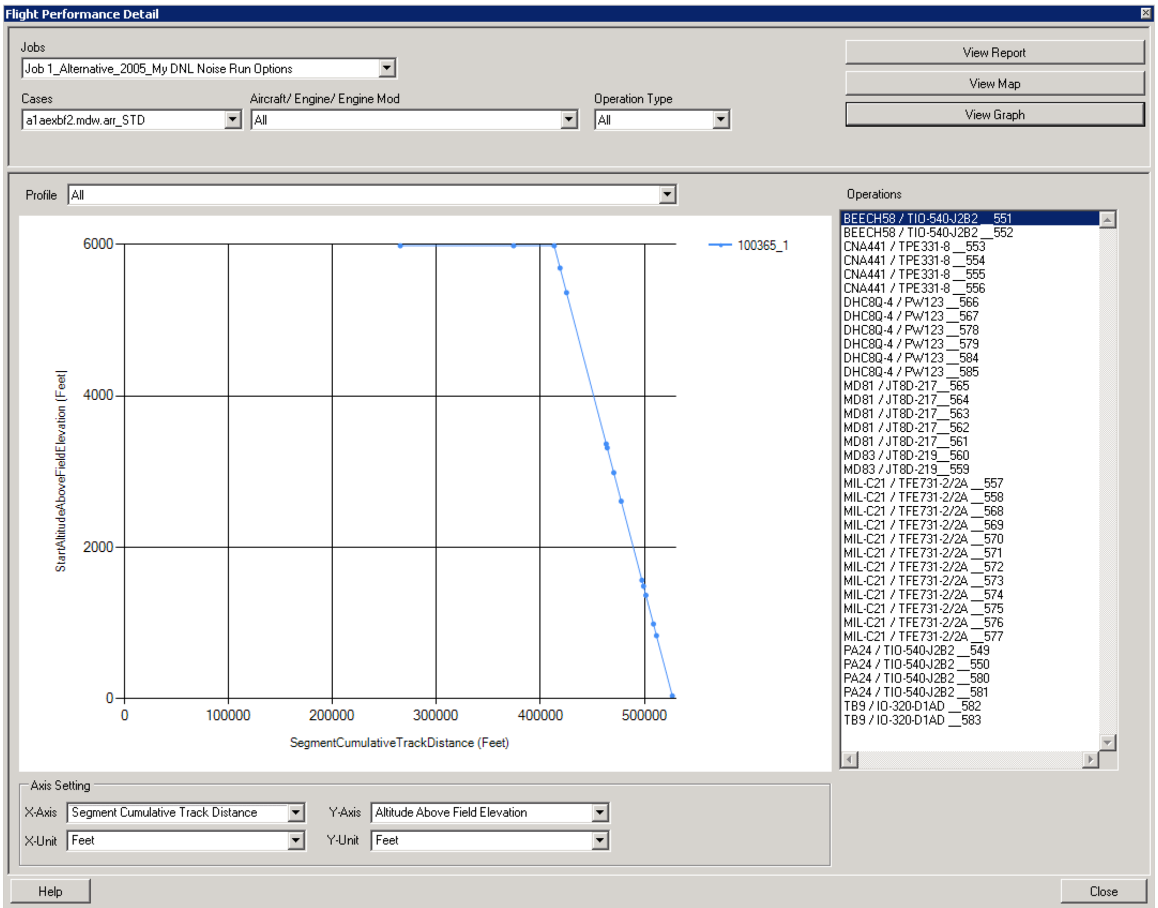


Figure 8-1 Flight Performance Detail Dialog Box

8.1.1 View Flight Performance Report

The flight performance report provides detailed information for a user-specified case. This report can be viewed and stored external to the AEDT software, in a user-defined location.

To run a flight performance report:

1. In the *Flight Performance Detail* dialog box (Figure 8-1), click the *View Report* button.
2. The *Flight Performance Report dialog* box will open (Figure 8-2).
3. Select the *Scenario*, *Job*, and *Case* of interest from the drop-down menus.
4. Navigate to the desired folder to store the report by clicking the *Browse* button, or accept the default location that appears in the *File Name* field.
5. Enter a unique *File Name* or accept the default file name, report_flight_perf.txt.
6. Click the *Run Report* button.
7. A message will appear after the report generates stating the location of the file. See Appendix I for a snapshot of an example report.
8. Units in the flight performance report:
    - z-pos AFE = feet

- segment length = feet
- grnd-trk distance = feet
- speed = knots
- delta speed = knots
- net-corr thrust = pounds
- noise thrust = pounds
- delta thrust = pounds
- bank angle = angle in degrees
- duratn = seconds

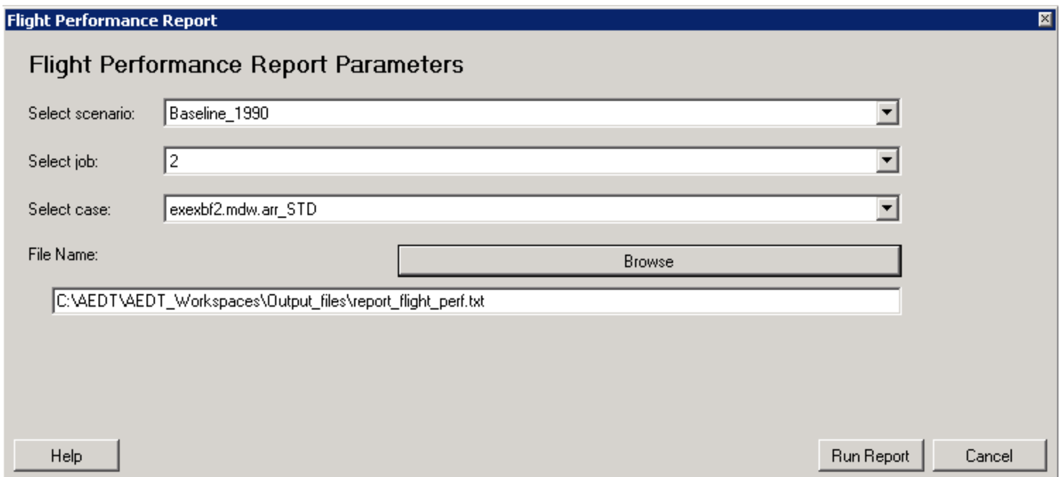


Figure 8-2 Flight Performance Report Dialog Box

The flight performance report may not be able to generate results for a flight with a significantly large number of segments. This most commonly occurs with sensor path operations. If this occurs, an exception will appear during the generation of the flight performance report. It will indicate that an error has occurred and the message will begin with the following two lines: W-62

An error has occurred in Report.GenerateReport().
FAA.AEE.AEDT.DataAccessModule.Exceptions.DamException: Exception type of 'System.OutOfMemoryException' was thrown.

Reducing the page size of the results iterator may allow for the report to be generated. This can be done in the AEDT configuration file.

1. Close out of AEDT.
2. Open the configuration file C:\AEDT\FAA.AEE.AEDT.AEDTApp.exe.config.
3. Locate the *ResultsIteratorPageSize* section.
   <add key ="ResultsIteratorPageSize" value ="1000"/>
4. Reduce the number of pages.
   <add key ="ResultsIteratorPageSize" value ="10"/>
5. Save the changes and close out of the configuration file.

The following error may occur when generating the flight performance report for a study with 1,500,000 or more performance results: W-63

Timeout expired. The timeout period elapsed prior to completion of the operation or the server is not responding.

It is recommended to do one or more of the following:
1. Clear invalid results (see Section 8.7 on clearing invalid results)
2. Remove unnecessary jobs containing performance results.
3. Create multiple studies to run portions of the job.

8.1.2 View Flight Performance Map

To view a flight performance on map:

1. In the *Flight Performance Detail* dialog box, select the *Job* of interest.
2. Select the *Case, Aircraft/Engine/Engine Mod*, and *Operation Type*.
3. Click the *View Map* button.
4. The dialog box will close and the flight performance data will appear in the *Airport Geometry*.

In the absence of altitude controls (defined in the ASIF, see Appendix C for more information on the ASIF) on the corresponding track, profiles are flown in their entirety, regardless of track length. In situations where profile length exceeds track length, the track is extended along its final course for the balance of the flight path. However, if altitude controls are present in the track, the profile is often abandoned in order to satisfy such constraints. In these cases, the profile no longer drives the simulation, and flight path ends with the final constrained track point. N-67

If the flight performance map does not appear in the Airport Geometry, navigate to the relevant airport layout in the Study Hierarchy. N-68

The user can display more than one set of flight performance data in the Airport Geometry. Toggle the display and select colors through the Tree Browser. N-69

Flight paths generated from the Results menu, Flight Performance Information, and ground tracks that can be viewed from the View menu, Tracks Selection dialog box, may appear as different lengths when viewed in the Airport Geometry. N-70

- Results menu, Flight Performance Information “flight paths” can only be generated after a job has been run. The flight paths display the calculated flight path based on the 3D vertical flight profile projected on the ground.
- View menu, Tracks Selection “ground tracks” show a 2D line defined by the track data input with the study and can be viewed at any time.

8.1.3 View Flight Performance Graph

To view a flight performance graph:

1. From the *Flight Performance Detail* dialog box, select a *Job* from the drop-down menu.
2. Select a *Case, Aircraft/Engine/Engine Mod*, and *Operation Type.*
3. Click the *View Graph* button.
4. The graph will appear in the same window.
5. Select a *Profile* category from the drop-down menu, and then select an operation ID from the *Operations* legend to the right of the graph.

The values in the Operations legend consists of <Aircraft Type ID> / <Engine Mod>_<Air Operation ID>. Air Operation ID is a generically generated identification number derived from the operations in the Aircraft Operations dialog box. N-71

The flight performance graph does not show the first trajectory segment. If an operation consists of only one segment (e.g. a one-segment overflight), the graph will display a single point. W-64

6. Select the *X-Axis* and *Y-Axis* settings (*Time, Segment Cumulative Track Distance, Altitude Above Field Elevation, Altitude Above Mean Sea Level, Weight*, *Net Corrected Thrust*, *Noise Thrust*, or *Speed*).

For elevation (altitude above field elevation, altitude above mean sea level) the only meaningful option is to select altitude above field elevation. Selecting altitude above mean sea level appears the same as altitude above field elevation. N-72

7. Select the *X-Unit* and *Y-Unit.*
8. Click the *Close* button to exit the dialog box.

8.2 Noise Graph

NOISE

To view a noise graph:

1. From the menu bar select *Results*, *Noise Graph*. The *Noise Power Distance Graph* dialog box will open (Figure 8-3).
2. Select a *Noise ID* from the drop-down menu.
3. Select the noise metric(s) of interest from the legend to the right of the graph.
4. Click the *Close* button to exit the dialog box.

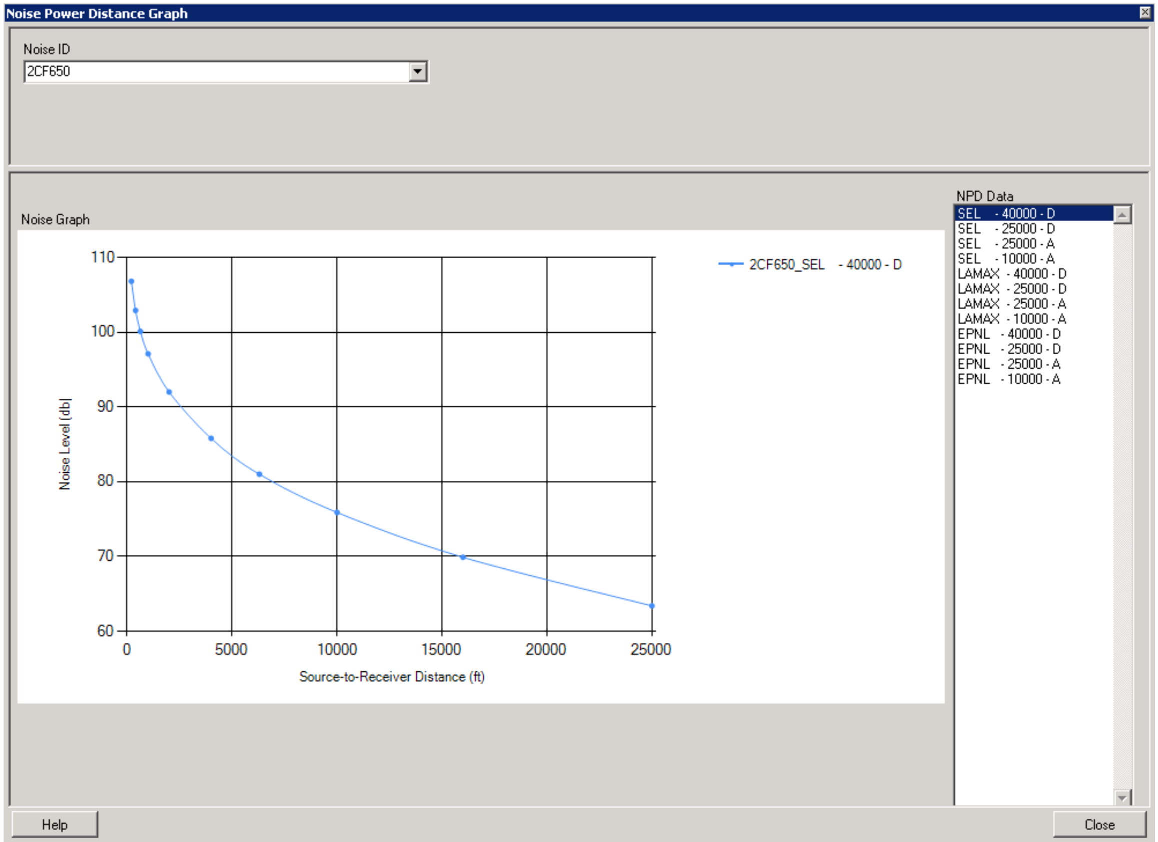


Figure 8-3 Noise Power Distance Graph Dialog Box

8.3 Change Analysis and Impact Evaluation

NOISE

In AEDT2a, the change analysis feature compares day-night-average (DNL) noise levels between two scenarios e.g. baseline and alternative at specified locations. In conjunction with impact set definitions and the results of the change analysis, the impact evaluation feature supports the investigation of noise level based on operation and track assignment.

8.3.1 Color Coding

Color coding is utilized in viewing changes in noise levels between two scenarios in an impact graph to define change zones and in viewing receptors on the *Airport Geometry*. Color coding visually represents an increase or decrease in noise level between two scenarios e.g. baseline scenario and alternative scenario.

Table 8-1 shows the criteria for the color coding. 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 represents no change in noise level from the baseline scenario to the alternative scenario.

Table 8-1 Color Coding Based on Change in DNL

Baseline DNL	Change in Noise Level from Baseline to Alternative		References
	Increase	Decrease	
< 45 dB	No color	No color	Air Traffic Noise Screening Procedure EECP EIS
45-<50 dB	+ 5 dB (yellow)	- 5 dB (purple)	Air Traffic Noise Screening Procedure EECP EIS
50-<55 dB			
55-<60 dB			
60-<65 dB	+ 3 dB (orange)	- 3 dB (blue)	FICON
> 65 dB	+ 1.5 dB (red)	- 1.5 dB (green)	FAA Order 1050.1E and FICON

8.3.2 Impact Set

Impact sets are defined to compare noise levels between two different scenarios. The impact data is tabulated and displayed in three forms described in Section 8.3.2.1 Impact Set Reports.

An impact set requires:
Two different annualizations run with the same receptor set.
Jobs must be run with the DNL noise metric.
Jobs used must show a complete status in the Jobs dialog box.

N-73

To create an impact set:

1. From the menu bar select *Results, Change Analysis*. The *Change Analysis & Impact Evaluation* dialog box will open (Figure 8-3).
2. Click the *Create New Impact Set* button. A new *Impact Set Creation* dialog box will open (Figure 8-4).

An impact set can be created with jobs containing invalid results. It is recommended to check the status and rerun jobs with invalid results with desired settings before creating an impact set.

W-65

3. Select the *Baseline Annualization Job* and *Alternative Annualization Job* from the drop-down menus.
4. Enter an *Impact Set Name*.
5. Click *Create* to create the impact set. Click *Cancel* to discard the action.
6. The color coded receptor points will display on the Airport Geometry.

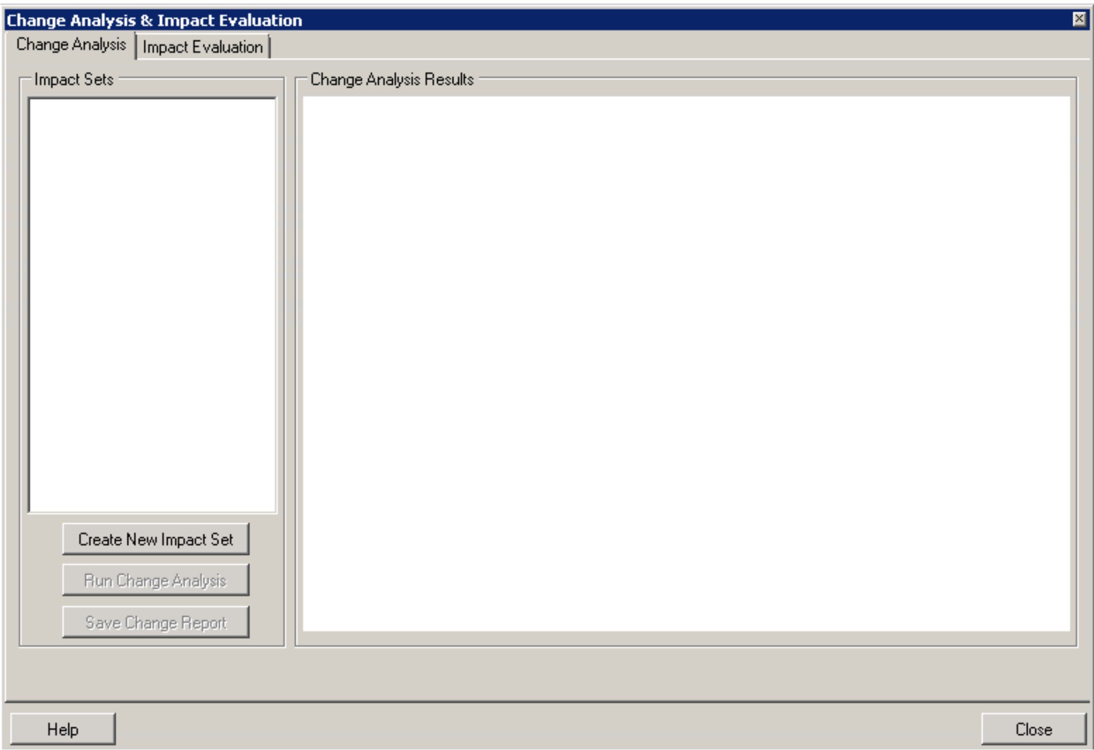


Figure 8-4 Change Analysis & Impact Evaluation Dialog Box

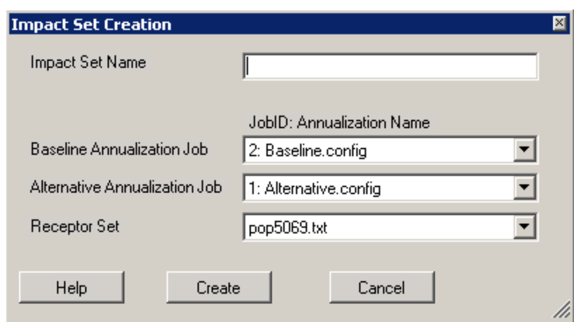


Figure 8-5 Impact Set Creation Dialog Box

8.3.2.1 Impact Set Reports

NOISE

Impact set reports allow the user to generate graphical or tabular noise results for an impact set.

To generate impact set reports:

1. From the menu bar select *Results*, *Change Analysis*.
2. Select an *Impact Set* from the list.
3. Right-click the *Impact Set,* select *Impact Set Reports,* then select *Impact Set Graph or Impact Set Table* (Figure 8-6).
4. The report (graph or table) will appear in a new dialog box.

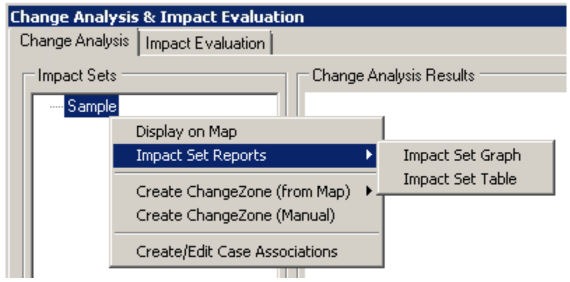


Figure 8-6 Impact Set Reports Options

8.3.2.1.1 Impact Set Graph

NOISE

The impact graph shows detailed comparative data for receptors exposed to specific ranges of noise. Data are color-coded according to the scoring criteria discussed in Section 8.3.1. 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 view an impact set graph:

1. From the menu bar select *Results*, *Change Analysis*.
2. Select an *Impact Set* from the list or click *Create New Impact Set* (see Section 8.3.2).
3. Right-click the *Impact Set,* select *Impact Set Reports, Impact Set Graph.* A new dialog box will open (Figure 8-7).
4. If the selected jobs for impact evaluation were run with population receptors, then select either *Show Population Counts* or *Show Internal Points.* If the jobs were run with grid receptors, then the impact report displays grid points.
5. The impact set graph (Figure 8-7) illustrates either the population or number of receptors that fall into each of the categories described in Section 8.3.1.

To read an impact set graph:

1. By reading the graph as a matrix, the user can determine the population or number of receptors that have changed category between the baseline scenario and the alternative scenario.
2. The color coding of warm and cool colors allows easy reference when there has been a reduction of noise or an increase in noise (see Section 8.3.1).
3. Example (Figure 8-7):
   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, the circled receptor has changed from 60-65 dB to 65-70 dB from the baseline to alternative scenarios.

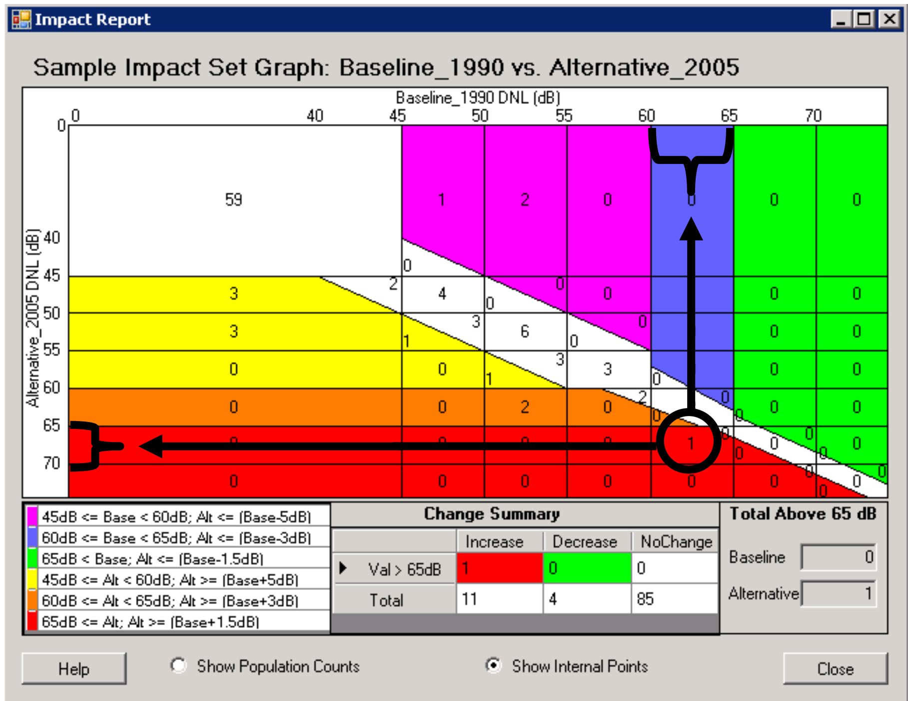


Figure 8-7 Impact Set Graph

8.3.2.1.2 Impact Set Table

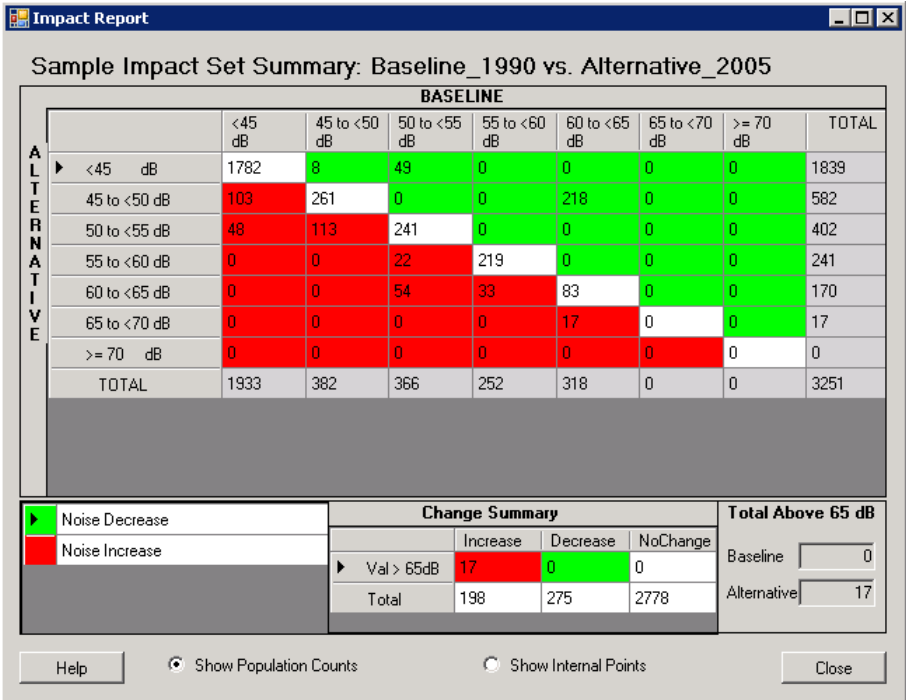
NOISE

The impact set table shows the population exposed to specific ranges of noise for both the baseline and alternative scenarios. By considering that 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.

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 view an impact set table:

1. From the menu bar select *Results*, *Change Analysis*.
2. Select an *Impact Set* from the list or click *Create New Impact Set* (see Section 8.3).
3. Right-click the *Impact Set,* select *Impact Set Reports, Impact Set Table*. A new dialog box will open (Figure 8-8).
4. If the selected jobs for impact evaluation were run with population receptors, then select either *Show Population Counts* or *Show Internal Points.* If the jobs were run with grid receptors, then the impact report displays grid points.
5. The green color in the impact set table 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

Sample Impact Set Summary: Baseline_1990 vs. Alternative_2005

BASELINE

ALTERNATIVE

	<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
<45 dB	1782	8	49	0	0	0	0	1839
45 to <50 dB	103	261	0	0	218	0	0	582
50 to <55 dB	48	113	241	0	0	0	0	402
55 to <60 dB	0	0	22	219	0	0	0	241
60 to <65 dB	0	0	54	33	83	0	0	170
65 to <70 dB	0	0	0	0	17	0	0	17
>= 70 dB	0	0	0	0	0	0	0	0
TOTAL	1933	382	366	252	318	0	0	3251

Noise Decrease
Noise Increase

Change Summary

	Increase	Decrease	NoChange
Val > 65dB	17	0	0
Total	198	275	2778

Total Above 65 dB

Baseline	0
Alternative	17

Help | Show Population Counts | Show Internal Points | Close

Figure 8-8 Impact Set Table

8.3.3 Change Analysis

The change analysis feature compares the change in day-night-average (DNL) noise levels between two scenarios at specified locations. Magnitude and location of change can be viewed within impact set reports and on the airport geometry.

To run a change analysis:

1. Right-click the impact set of interest to specify options for computing a change analysis (Figure 8-9). The impact set of interest must be right-clicked for each of the steps outlined in a - d below.
    a. Select *Display on Map* to show the impact set receptor points on the *Airport Geometry*. Adjust the zoom in the *Airport Geometry* to view the color coded receptor points.
    b. A change zone defines the area of interest for the change analysis. It can be created either from the map or manually.
        i. Select *Create Change Zone (from Map)* and select a change zone color: *Red*, *Orange*, *Yellow*, *Green*, *Blue*, or *Purple.* The colors correspond to the color coding described in Section 8.3.1.
            a) Select a change zone color based on the colors of the receptor points viewed in step 1a (e.g., select the color red if it is desired to create a change zone and further investigate the noise levels around the red receptor points).
            b) Click and drag the cursor to select an area on the map containing receptor points with the color matching the change zone color in step i.
            c) A *Change Zone Information* dialog box will open (Figure 8-10) with information populated on the zone name, center latitude, center longitude, width (nmi), height (nmi), and zone color. Only the zone name can be edited.

d) Click *Create* to create the change zone. Click *Cancel* to discard the action. The new change zone name will appear under the selected impact set.

ii. Select *Create Change Zone (Manual)*. A *Change Zone Information* dialog box will open (Figure 8-10).

a) Enter information for *Zone Name*, *Center Altitude*, *Center Longitude*, *Width* (nmi), *Height* (nmi), and select *Zone Color*.

b) Click *Create* to create the change zone. Click *Cancel* to discard the action. The new change zone name will appear under the selected impact set.

c. Select *Create/Edit Case Associations*. A *Case Assoc Editor* dialog box will open (Figure 8-11).

i. Case associations are setup between the baseline (left) and alternative (right) lists of cases. Change the alignment of cases by using the arrows below the lists to move cases up or down.

ii. Click *Save* to save changes. Click *Reset* to discard changes. Click *Cancel* to discard changes and close the dialog box. Click *Defaults* to reset the baseline and alternative lists to the default order.

2. Right-click the change zone of interest and select *Show/Update ChangeZone Info* to open the *Change Zone Information* dialog box (Figure 8-10).
3. To compute change analysis, select the change zone of interest and click *Run Change Analysis*. The results will display in the *Change Analysis Results* panel.
4. Once the change analysis has been run, the *Save Change Report* button will be active.
   a. Click the *Save Change Report* button.
   b. Navigate to the desired folder to store the report or accept the default location.
5. Click *Close* to close the *Change Analysis & Impact Evaluation* dialog box.

The change analysis color coding (red, orange, yellow, green, blue, or purple) corresponds to the color coding of the impact graph, described in Section 8.3.1. The cool colors (purple, blue, and green) show decreases in noise level for the alternative, while the warm colors (red, orange, and yellow) show increases in the noise level for the alternative. N-74

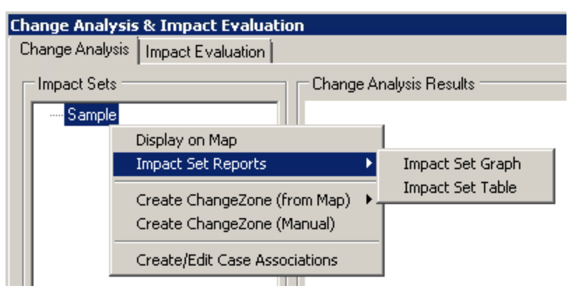


Figure 8-9 Change Analysis Impact Set Options

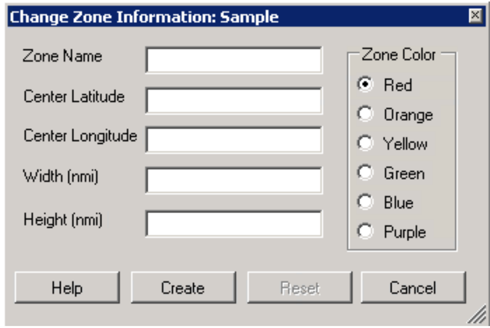


Figure 8-10 Change Zone Information Dialog Box

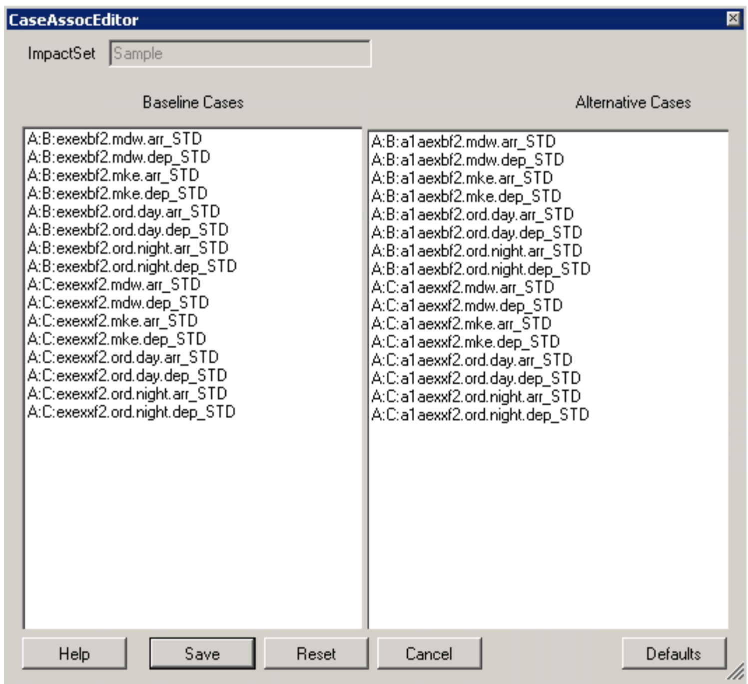


Figure 8-11 Case Association Editor Dialog Box

8.3.3.1 Change Analysis Results

To view change analysis results:

1. From the menu bar select *Results*, *Change Analysis*.
2. In the *Change Analysis* tab, *Impact Sets* panel, select the change zone of interest that has run change analysis.
3. View the results in the *Change Analysis Results* panel.

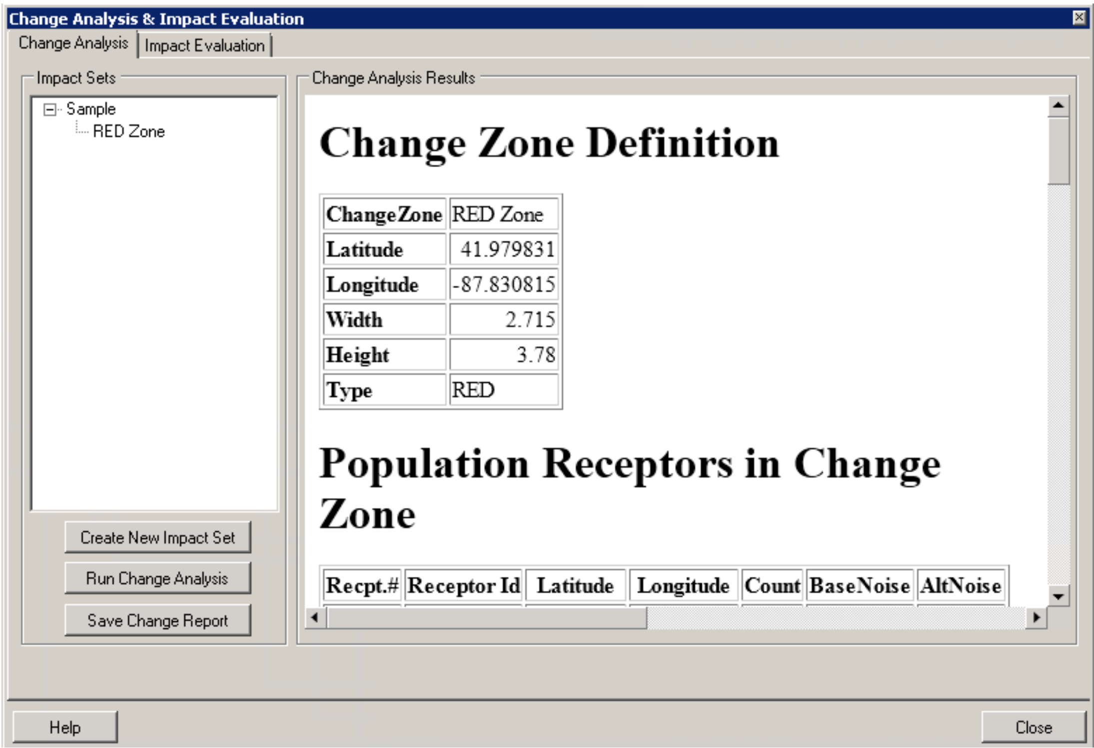


Figure 8-12 Change Analysis Results

Each section of the change analysis report is described below:

- **Change Zone Definition**
  The change zone name, center latitude and longitude, width and height (in nautical miles), and the zone type or color are displayed.

- **Receptors in Change Zone**
  This section is labeled *Grid Receptors in Change Zone* if the impact set was created with jobs run with grid receptors. This section is labeled *Population Receptors in Change Zone* if the impact set was created with jobs run with population receptors.
  - All of the grid receptors of the same color as the change zone that are contained within the boundary of the change zone are listed. The table displays the receptor ID, latitude, longitude, and baseline and alternative noise values.
  - All of the population receptors of the same color as the change zone that are contained within the boundary of the change zone are listed. The table displays the receptor ID, latitude, longitude, total population count, and baseline and alternative noise values.

If no receptors are displayed in this section, then no receptor points were captured in the change zone area selection that matched the change zone color; therefore, the change W-66
analysis is not relevant for that change zone.

- **Case Associations**
  The baseline and alternative case associations that were created in step 1.c are listed with annualization weighting and an assigned association number. The association number is referenced

throughout the remaining change analysis results representing the pair of cases defined in the association.

- **Ranked Case Associations by Contributions**
  This section contains one or more tables, depending on analysis results, that display the case associations in order of most change within the change zone. Each table displays:
  - A single case association with an average percent change[4] from the baseline to alternative scenarios;
  - The lowest and highest percent change from the baseline to the alternative scenarios of any individual receptor within the change zone; and
  - The number of affected receptors (hits) and the total number of receptors (max) in the change zone.

  The number of unaffected receptor points is reported at the end of this section.

- **Groups**
  Groups are created based on case associations with similar causes of change between the baseline and alternative. Each group contains two tables. The first table contains the association number(s) and the case names for the baseline and alternative cases included in the association(s). The second table lists the receptor number(s) and ID(s) that the associations in the first table correspond to.
  - If only one group exists, the change in noise level for the change zone is caused solely by the case associations listed under the group for all listed receptor points within the change zone.
  - If more than one group exists, the change in noise level for the change zone may have different case associations contributing the most change to different receptor points within the change zone.

- **Summary Percent Raw Change Scores**
  The percent change for each case association is given at each case association. Columns containing bold numbers are considered to be notable case associations for the given receptors. The notable case associations are divided into groups and appear in the groups section of the change analysis results report. The mean percent change is tabulated across all receptors within the case association. The mean percent change for groups is displayed in parentheses for each case association.

- **Main Statistics Tables**
  This section contains DNL and raw noise levels from the change analysis computation. A table is given for each receptor in the change zone. The data are presented by case association for:
  - DNL noise levels for each scenario and the change in noise level between the two scenarios;
  - Raw (unweighted) data for each scenario, the change in raw noise level between the two scenarios and the percent raw change.

[4] The percent change is the percent contribution of raw noise values [10^(DNL/10)] averaged over the number of receptors in the change zone.

- Additionally, the mean percent change, standard deviation (sigma/2), and percent change threshold for the raw noise values are computed and displayed in the table.

8.3.4 Impact Evaluation

The impact evaluation capability in AEDT2a allows the user to model different scenarios with the change analysis feature, with the goal of lessening significant noise impacts discovered by moving operations to different tracks. The impact evaluation capability can compute detailed noise information for each flight/operation in a case over an impact set (a collection of significantly impacted points derived in change analysis). This detailed information shows the user which flights/operations in the case are contributing the most noise. Impact evaluation allows the user to switch operations to new tracks in order to reduce noise in heavily impacted areas. Different comparisons can be created and analyzed.

A change analysis must be completed before applying impact evaluation. N-75

To access impact evaluation:

1. From the menu bar select *Results*, *Change Analysis* to open the *Change Analysis & Impact Evaluation* dialog box.
2. Select the *Impact Evaluation* tab.

The operations and tracks panels in the Change Analysis & Impact Evaluation dialog box can be resized by sliding the divider between the panels. The order of the columns in both the operations and tracks panels can be changed by dragging the column headings to the desired location. N-76

To load data for impact evaluation analyses:

1. Select an *Impact Set* and a *Change Zone* from the drop-down menus (Figure 8-13).
2. If change analysis has been run on the selected change zone, the resulting cases will be displayed in the alternative cases panel.
3. To run detailed noise, select a case from the *Alternative Cases* panel and click the *Run Detailed Noise* button. Repeat for additional cases.
   - The numbers listed before the case name in the alternative cases panel represent the total case percent contribution of noise in the impact set for the specified change zone.
   - The percent contribution in the operations panel represents the contribution of noise from each operation in the case.
   - Cases for which detailed noise have not been run will be shaded grey in the alternative cases panel, and results will be displayed only in the tracks panel.
   - Cases for which detailed noise have been run will appear in black font in the alternative cases panel, and results will be displayed in both the operations and tracks panels.
4. Select one or more cases from the *Alternative Cases* panel to view results in the *Operations* and *Tracks* panels. To select multiple cases, hold down the *Ctrl* key and select all desired cases.

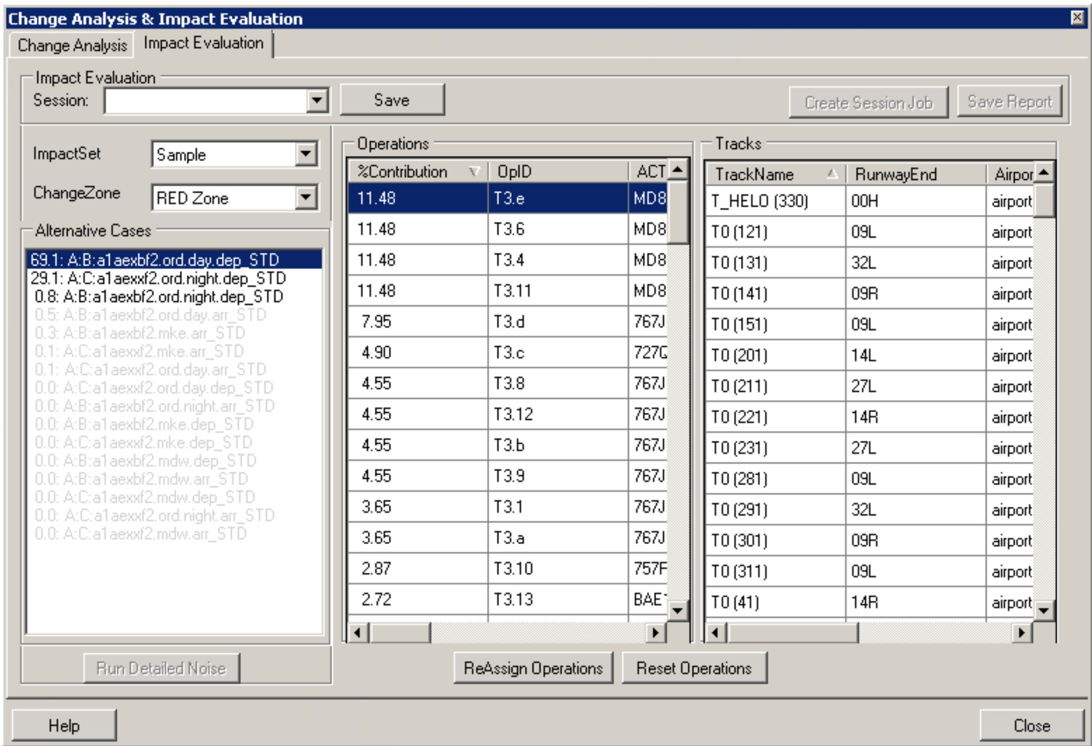


Figure 8-13 Change Analysis & Impact Evaluation Dialog Box

5. To display tracks graphically in the *Airport Geometry*, right-click within the *Tracks* panel and select *Display Tracks on Map*.
   - To confirm which data correspond to each graphical track in the *Airport Geometry*, select any track(s) in the *Tracks* panel. The corresponding graphical track(s) in the *Airport Geometry* will be highlighted.

The highlight feature is available for point-based tracks only. This feature is not available for vector tracks. Both types of tracks can be viewed in the Airport Geometry. N-77

To re-assign an operation from one track to another:

1. From the *Operations* panel, select the operation to be re-assigned (view the *Track Name* column to see the track to which it was originally assigned).
2. From the *Tracks* panel, select the track to which the operation will be reassigned.
3. Click the *ReAssign Operations* button located beneath the *Operations* panel.
4. Confirm the re-assignment by viewing the *New Track* column in the *Operations* panel and the *New Ops* column in the *Tracks* panel.
5. To reset operations that have been re-assigned to new tracks, click the *Reset Operations* button.
6. Save the changes as a new impact evaluation session by entering a name in the *Session* field, and clicking the *Save* button.

To create an impact evaluation session job:

1. If an impact evaluation session is not already loaded, load a previously saved session by selecting the desired session name from the *Session* drop-down menu.

2. If any modifications are made to a previously saved session, save as a new session.
3. To create a job out of the session, click the *Create Session Job* button.
4. A message will appear confirming that the session job was created (Figure 8-14).

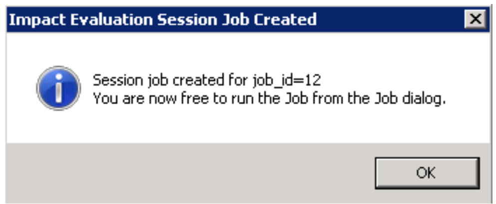


Figure 8-14 Impact Evaluation Session Job Created Message Box

To save an impact evaluation session report:

1. If an impact evaluation session is not already loaded, load a previously saved session by selecting the desired session name from the *Session* drop-down menu.
2. To save an impact evaluation session report, click the *Save Report* button.
3. Navigate to the desired folder to store the report.
4. Enter a unique *File name* or accept the default name.
5. Click the *Save* button.

If change analysis has been completed using jobs with invalid results, after a session job has been created through impact evaulation, the status of the invalid jobs may appear as complete although the results are actually invalid. It is suggested to check the status and rerun jobs with invalid results with desired settings before creating an impact set. W-67

AEDT will create a new receptor set with the prefix ImpEval_ which contains the receptor points of the change zone (i.e. receptor points of certain color category that were used to create the change zone). N-78

To run an impact evaluation session job:

1. From the menu bar select *Run, Start Run* to display the *Jobs* dialog box.
2. Select the impact evaluation session job.
   - The session job name, which is listed in the scenario column, will contain the prefix "ImpEvalScenario_", followed by the impact evaluation session name.
3. The appropriate impact evaluation annualization will automatically populate, do not change the annualization setting.
   - The annualization name will contain the prefix "ImpEvalAnnualization_", followed by the impact evaluation session name.
4. Click the *Run* button.

To view impact evaluation results:

1. After the running the session job, select *Results, Change Analysis* from the menu bar to open the *Change Analysis & Impact Evaluation* dialog box.
2. Create a new impact set for the impact evaluation job. Follow the instructions in Section 8.3.2 to complete the change analysis and include the modifications below.

   a. In the *Baseline Annualization Job* drop-down menu, select the same *Job ID* and *Baseline Annualization* as the impact set that was used to create the session job.
   b. In the *Alternative Annualization Job* drop-down menu, select the *Job ID* with the corresponding impact evaluation annualization. The impact evaluation annualization will contain the prefix "ImpEvalAnnualization_", followed by the impact evaluation session name.
3. Compare the results of impact evaluation with the original impact set by comparing each impact set report. Right-click the impact set and select *Impact Set Reports* to view impact set reports. See Section 8.3.2.1 for more information on impact set reports.

8.4 Contours

NOISE

Contours in AEDT2a are used to perform an analysis of an area (often in the vicinity of an airport) encompassed by a graphical plot consisting of a smooth curve that is statistically regressed through points of equal noise level or time duration.

Noise contours can only be generated from jobs run with grid receptors and not with population receptors. W-68

Grid spacing must be the same in the x and y directions in order for contours to generate. W-69

It is not recommended to generate contours covering more than 100 miles in any direction. W-70

Generating contour graphic in Airport Geometry may take longer than expected. W-71

To set up and view contour graphics in AEDT:

1. From the menu bar select *Results*, *Contours* to open the *Contour Setup* dialog box (Figure 8-15).
2. Choose a *Scenario*, *Completed Job, Metric, and Annualization* (if appropriate).
3. To view a contour graphic:
   a. From the *Contour Setup* dialog box select a *Scenario*, *Completed Job*, *Metric*, and *Annualization* (if appropriate). The *View Contour Graphic* button will be active.
   b. Select the *Min, Max,* and *Int* (Interval) parameters and the *Color* that contours will be represented on the map, or use the default settings.
   c. Click the *View Contour Graphic* button.
   d. The dialog box will close. The contour graphic will appear in the *Airport Geometry* (Figure 8-16), and a new layer will be added to the *Tree Browser* under the *Noise Contour* category.
4. Click the *Cancel* button to close the dialog box without viewing the contour graphic.

To render noise contours on a scenario level with events on multiple airports with disjointed receptor sets, create and run individual case-level jobs that associate the appropriate receptor set with each airport and view the contours simultaneously. N-79

Low resolution receptors, either location points or grids, are not commensurate with plotting of contours. W-72

If unexpected contour results appear in the Airport Geometry, it is recommended to clear the Esri cache, clear job results, and re-run the job. W-73

- To clear the Esri cache, close out of AEDT then navigate to C:\AEDT\Data\[<SQL Server Instance>_<User name>], find the study of interest ,and delete the Cache.gdb folder associated with the study of interest.
- To clear job results, open the *Run Options* dialog box, select the job of interest, and click *Reset Job* (see Section 7.4).

Turning on receptors and viewing flight performance information on the map can help the user understand what the contours are representing. N-80

- View receptors on the map by selecting an airport layout in the Study Hierarchy and checking the desired Receptors box in the Tree Browser.
- View the flight performance information on the map by selecting from the menu bar Results, Flight Performance Information. In the Flight Performance Detail dialog box, choose the appropriate Job, Case, Aircraft, and Operation Type, and click the View Map button.

If no noise results are available for the selected combination in the Contour Setup dialog box, an informational message will appear. N-81

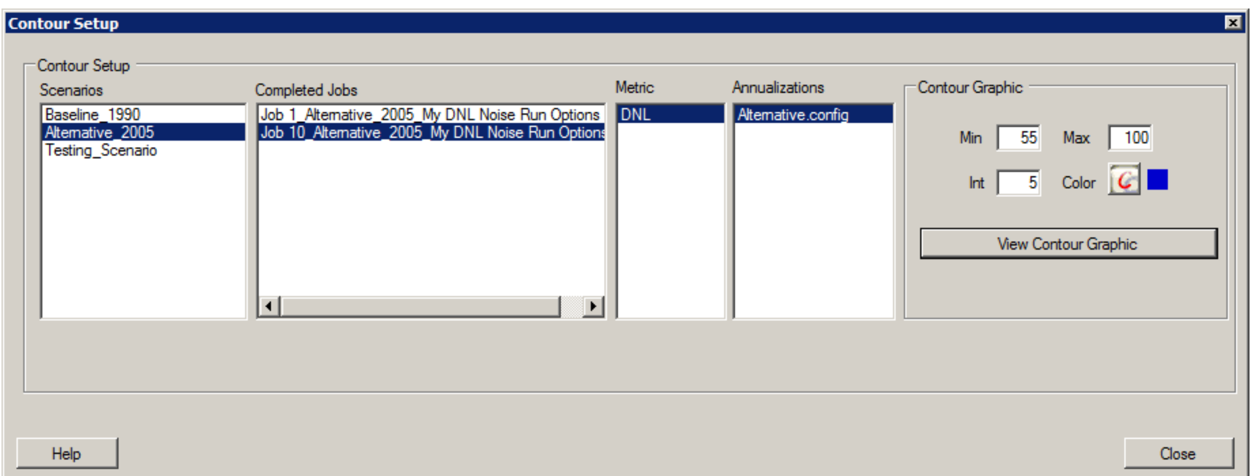


Figure 8-15 Contour Setup Dialog Box

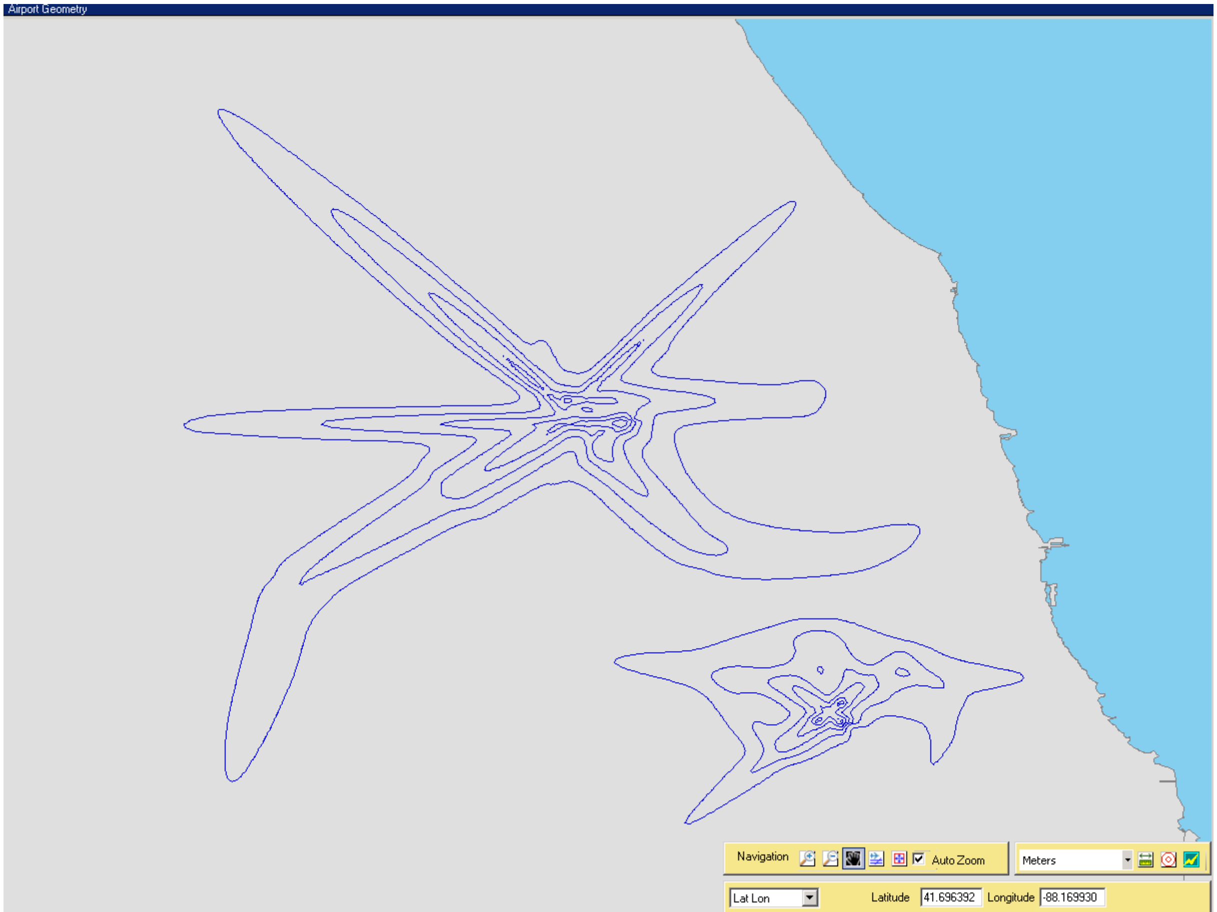


Figure 8-16 Noise Contour Shown in the Airport Geometry

To view a contour report:

1. In the *Tree Browser* right-click on the desired noise contour layer under the *Noise Contour* category, and select *Contour Report*. The *Contour Population and Exposure Report* dialog box will open (Figure 8-17).
2. Select *Exposure Type* (*Areas* or *Populations*).
3. When *Populations* is selected, the *Available Population Receptors* drop-down menu will be active. Select a population receptor of interest.
4. To save the report, click the *Export* button.
5. Navigate to the desired folder to store the report or accept the default location.
6. Enter a unique file name or accept the default file name, report_contour.txt.
7. Click *Close* to close the dialog box.

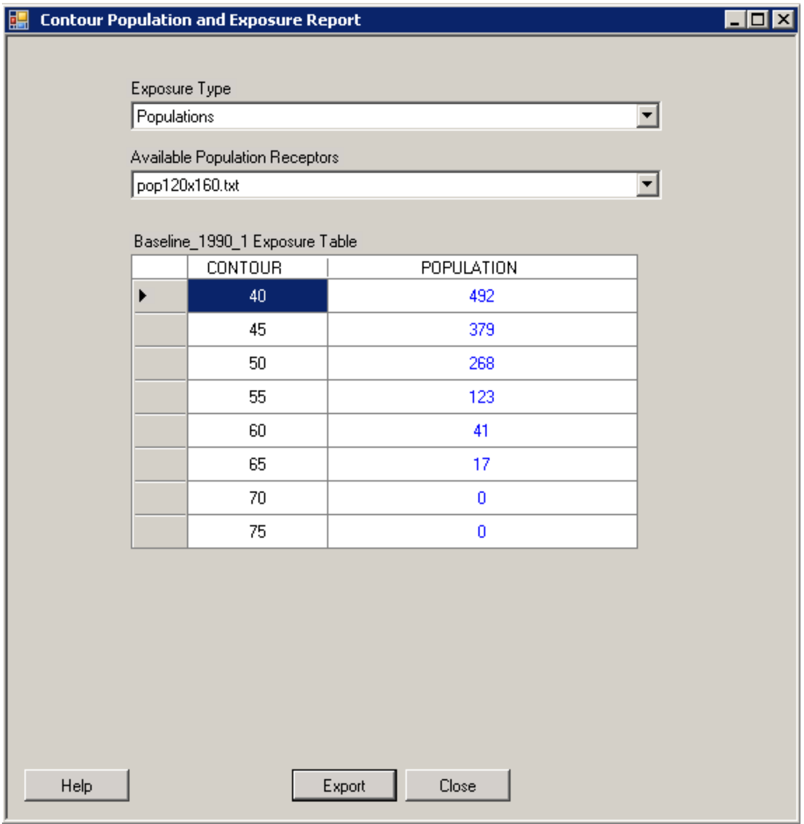


Figure 8-17 Contour Population and Exposure Report Dialog Box

8.5 Emissions

EMISSIONS

To view the emissions report:

1. From the menu bar select *Results, Emissions Report*.
2. In the *Emissions Report* dialog box (Figure 8-18), select a *Job* and *Case* from the drop-down menus.
3. Select the *Group by* option (*Modal Case Summary*, *Flight Summary*, *Flight Mode*, or *Flight Detail*).

The flight detail group by option is only available if the emissions result detail was set to segment in the Jobs dialog box. N-82

4. Select the appropriate *PMAD* option (*None, PMAD, or Annual*).
5. Click the *Run* button to generate the report.
6. Select desired unit from the *Units* drop-down menu (*Grams*, *Kilograms*, *Metric Tons*, *Pounds*, or *Short Tons*) to change the unit in the report.
7. To save the report, click the *Export* button.
8. Enter a unique file name or accept the default file name, EmissionsReport.csv.
9. A message will appear after the report generates stating the location of the file. Appendix I provides a snapshot of an example report.

OPTIONAL

Generate a speciated hydrocarbon emissions report:

1. Open the exported emissions report of interest.
2. Navigate to C:\AEDT\AEDT_Workspaces\Documents and open the workbook named *SpatiatedHydroCarbon_report(TOG,VOC, NMHC).xlsx*
3. Click on the *Emission Report* tab in the workbook.
4. Copy the entire contents of the emissions report opened in step 1 and paste into the *Emissions Report* worksheet of the *SpatiatedHydroCarbon_report(TOG,VOC, NMHC)* workbook in cell A1.
5. Total Organic Gases (TOG), Volatile Organic Compounds (VOC), and Non-methane Hydro Carbon (NMHC) measures will be automatically generated* on the *VOC* worksheet in columns E, F, and G. The units are equivalent to the units selected in the emissions report from step 1.
6. Save the workbook with a unique name and in a desired location.

*All factors and equations applied from the Federal Aviation Administration Office of Environment and Energy and U.S. Environmental Protection Agency Office of Transportation and Air Quality. *Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines Version 1.0.* May 27, 2009.

Emission results may not be available for jobs containing helicopter operations. An error message stating *Cannot convert a TypedNumeric value* may appear when attempting to generate an emissions report for jobs containing helicopter operations. W-74

The emissions report duration column is displayed differently in the GUI and in the exported report. The duration column when viewed in the GUI displays days, hours, minutes, and seconds. The duration column when viewed in the exported emissions report displays hours, minutes, and seconds. For example, a duration of 1 day, 2 hours, 3 min, 4 seconds would appear as 1:02:03:04 in the GUI and 02:03:04 in the exported report. W-75

The emissions report may not be able to generate results for a flight with a significantly large number of segments. This most commonly occurs with sensor path operations. If this occurs, an exception will appear during the generation of the flight performance report. It will indicate that an error has occurred and the message will begin with the following two lines: W-76

An error has occurred in Report.GenerateReport().
FAA.AEE.AEDT.DataAccessModule.Exceptions.DamException: Exception type of 'System.OutOfMemoryException' was thrown.

Reducing the page size of the results iterator may allow for the report to be generated. This can be done in the AEDT configuration file.

1. Close out of AEDT.
2. Open the configuration file C:\AEDT\FAA.AEE.AEDT.AEDTApp.exe.config.
3. Locate the *ResultsIteratorPageSize* section.
   <add key ="ResultsIteratorPageSize" value ="1000"/>

4. Reduce the number of pages.
   <add key ="ResultsIteratorPageSize" value ="10"/>
5. Save the changes and close out of the configuration file.

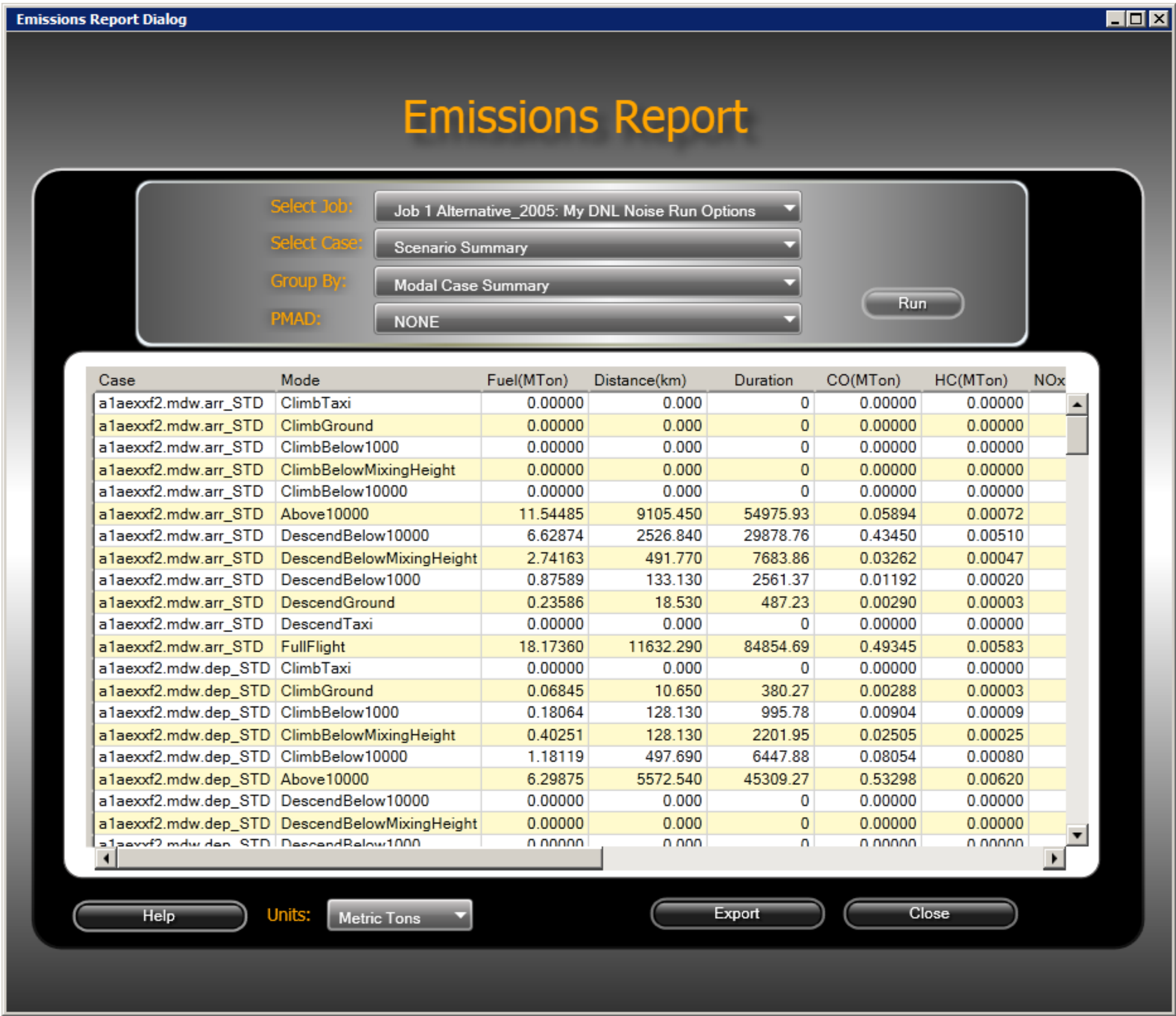


Figure 8-18 Emissions Report Dialog Box

What is the PMAD option?

- None: No scaling factor – emissions and fuel burn results are representative of an average annual day.
- PMAD: Peak Month Average Day scaling factor (also known as Design Day Ratio).
- Annual: Annual scaling factor (average annual day multiplied by 365 days per year).

Please refer to Appendix J for more information on annual schedules.

8.6 Noise Exposure Report

NOISE

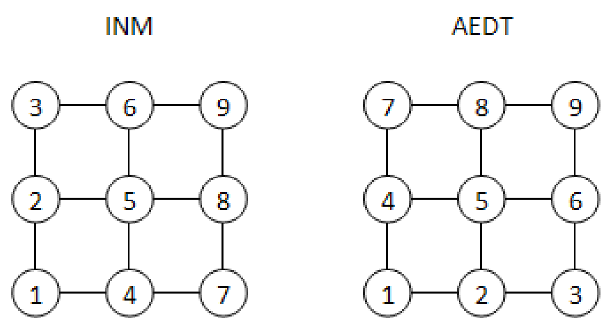
To view the noise exposure report:

1. From the menu bar select *Results, Noise Report*.
2. In the *Noise Exposure Report* dialog box (Figure 8-19) select a *Job*, *Case*, and *Metric* from the drop-down menus.
3. Select an *Annualization* if appropriate.

The Annualization drop-down menu will not be active when a case-level job is selected. N-83

4. Click the *Run* button to generate the report.
5. To save the report, click the *Export* button.
6. Enter a unique file name or accept the default file name, NoiseExposureReport.csv.
7. A message will appear after the report generates stating the location of the file. Appendix I provides a snapshot of an example report.
8. To map the noise results to airport geometry, click the *Map to GIS* button.
9. The noise results are displayed in the *Airport Geometry*, and a new layer is added to the *Tree Browser* under the *Noise Level* category.

The noise values written to the AEDT2a contour points report are not given in the same order as the INM standard or detailed DBF files. For example, if an INM standard or detailed grid size is 3 x 3, the points would be output as follows compared to AEDT2a: W-77



When viewing the noise exposure report for jobs containing both population and grid type receptor sets, an error message may occur indicating there is an error with the Column Internal Point. Click OK and view the results. W-78

View the noise exposure report in tandem with the receptor set definitions in order to associate the specific location of each point with the noise exposure value in report form. N-84

The Internal Point column in the noise exposure report is applicable to jobs run with population receptors. It consists of state FIPS, county FIPS, block ID, and BNA ID (block numbering area). N-85

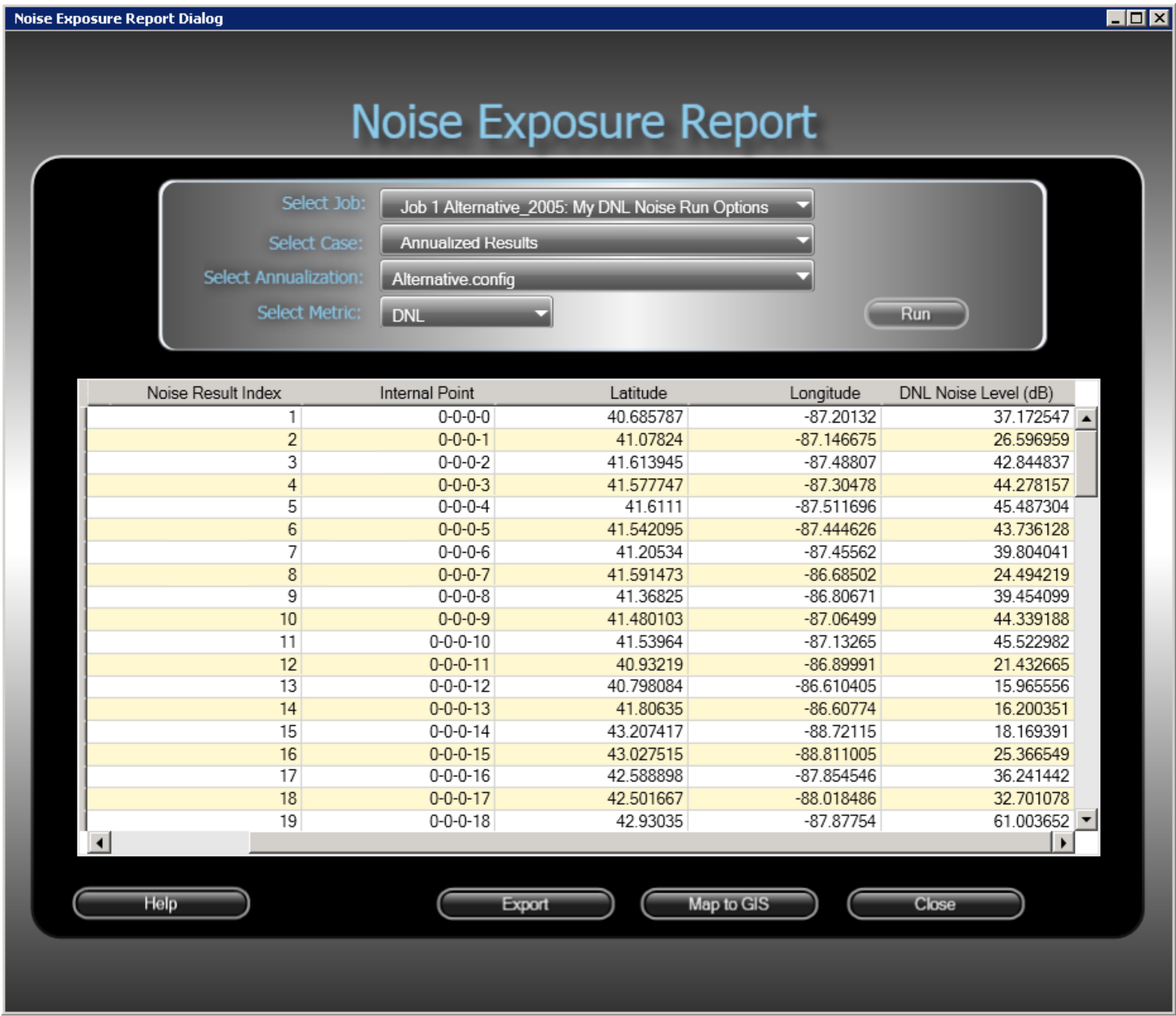


Figure 8-19 Noise Exposure Report Dialog Box

8.7 Clear Invalid Results

Results marked as invalid can be removed from the study database in the AEDT2a GUI or with a command-line tool. See Section 7.4.2 Reset Job for instructions on how to mark results as invalid. See Appendix K for more information on the command-line tool named Remove Results.

To remove invalid results in the AEDT2a GUI:

1. From the menu bar select *Results, Clear Invalid Results*.
2. The *Clear Invalid Results* button will be active if there are invalid results. Click the *Clear Invalid Results* button.
3. Click the *Cancel* button to close the dialog box.

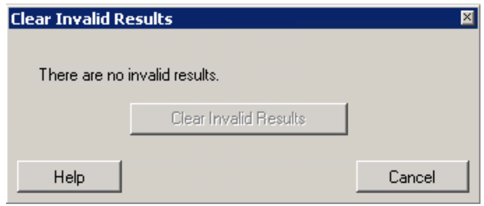


Figure 8-20 Clear Invalid Results Dialog Box – No Invalid Results

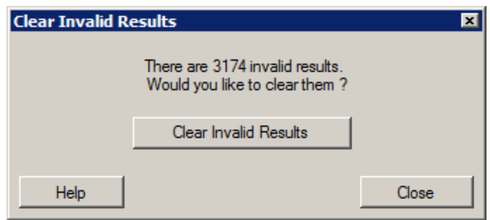


Figure 8-21 Clear Invalid Results Dialog Box

8.8 Access Output Files

Users can define the location to store output files, or accept the default location of the documents folder. The output files are in .txt, .csv, and Esri-compatible formats as appropriate.

The Microsoft Windows file name and directory definition is limited to 260 characters for all output files. N-86

9 Delete Study

To delete a study:

1. From the menu bar select *File*, *Open Study* to access the *Load Study* dialog box.
2. In the *Load Study* dialog box, Right-click on the study to delete and select *Remove*.
3. Click *Yes* when prompted for confirmation.
4. The Study Name will be removed from the list.
5. Clear the Esri cache of the deleted study. Navigate to C:\AEDT\Data\[<SQL Server Instance>_<User name>], find the study of interest, and delete the Cache.gdb folder associated with the study of interest.

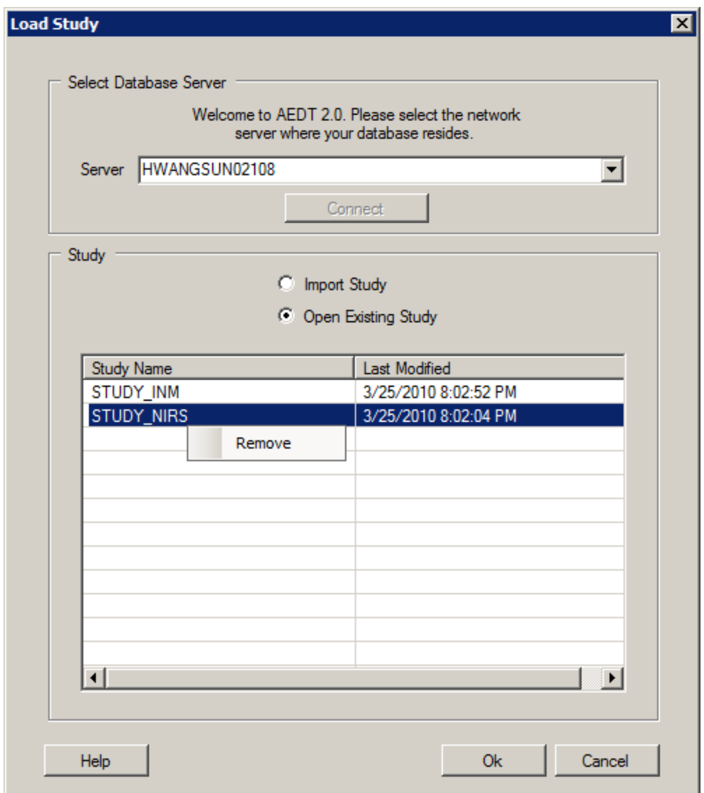


Figure 9-1 Load Study Dialog Box – Remove Study

Appendix A Glossary

3CD	Terrain File Format
AAD	Average Annual Day
AEDT	Aviation Environmental Design Tool
AEE	FAA Office of Environment and Energy
AFE	Above Field Elevation
AGL	Above Ground Level
Aircraft Operation	A single flight of an aircraft.
Altitude	The vertical distance of any particular object from sea level.
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.
APP	Approach Operation
ASIF	AEDT Standard Input File
CAD	Computer Aided Design (application program)
CAEP	Committee for Aviation Environmental Protection. This committee within the International Civil Aviation Organization (ICAO) is responsible for promoting any environmental work that ICAO undertakes. The group includes two working groups on noise reduction and mitigation, three working groups dealing with aircraft emissions, and one support group that provides cost and environmental benefit analyses on noise and aircraft emissions options
Case	A set of operations assigned to each aircraft or other type of emissions source within a given scenario. Each case is source type specific (Aircraft, GSE, APU, Stationary Sources, Parking Facilities, Roadway, Training Fires), and may contain sub-cases or “child cases”. Each case may have its own weather settings or inherit weather from a parent case or scenario.
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. AEDT can be used to generate viewable contours through the *Results* tab on the menu bar.
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.
DAFIF	U.S. Department of Defense Digital Aeronautical Flight Information Files
dB	Decibel, a unit of noise level or noise exposure level
DBF	dBase IV database file format
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.
DEP	Departure operation
DLL	Dynamic Link Library (supporting software)
DNL	Day Night Average Sound Level (noise metric)
DST	Daylight Savings Time
DTC	Distributed Transaction Coordinator
EDMS	Emissions and Dispersion Modeling System. This system is the current FAA-approved model for assessing the air quality impacts of proposed airport development projects. AEDT is being developed to replace this modeling system.
EIS	Environmental Impact Statement
Elevation	Parameter from the AIRPORTS Database; identifies the altitude of the airport above mean sea level.
EMC	Environmental Modeling Center
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 user-selected Scenario, Case, and Job.
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
FAR	Federal Aviation Regulations
Fleet Mix Report	This report from AEDT shows a summary of operations, a detailed list of aircraft types, a comparison of aircraft types over different scenarios, and a runway count by scenario depending on the settings of the report. This report can be found in the menu bar by selecting “View” and then “Fleet Mix Report”.
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 information for a user-specified case. The Scenario, Case, and Job of interest must be defined by the user in order to generate this report.
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
Geopotential height	Vertical coordinate referenced to Earth's mean sea level. Geopotential height can be in reference to a certain pressure level, which would correspond to the geopotential height necessary to reach the given pressure.
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.
GSFC	NASA Goddard Space Flight Center
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
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization. The ICAO is a specialized agency of the United Nations that was created on December 7, 1944. It is the permanent international body that works to enhance global safety and security, minimize the environmental effect, increase efficiency, maintain continuity, and strengthen the laws within the international civil aviation community.
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)
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)
m	Meters
mi	U.S. statute miles
min	Minutes
Mixing Height	Parameter from the AIRPORTS Database; identifies the height at the top layer of atmosphere where relatively vigorous mixing of pollutants and other gases will take place for the airport in a given month. The mixing height varies both diurnally and seasonally.

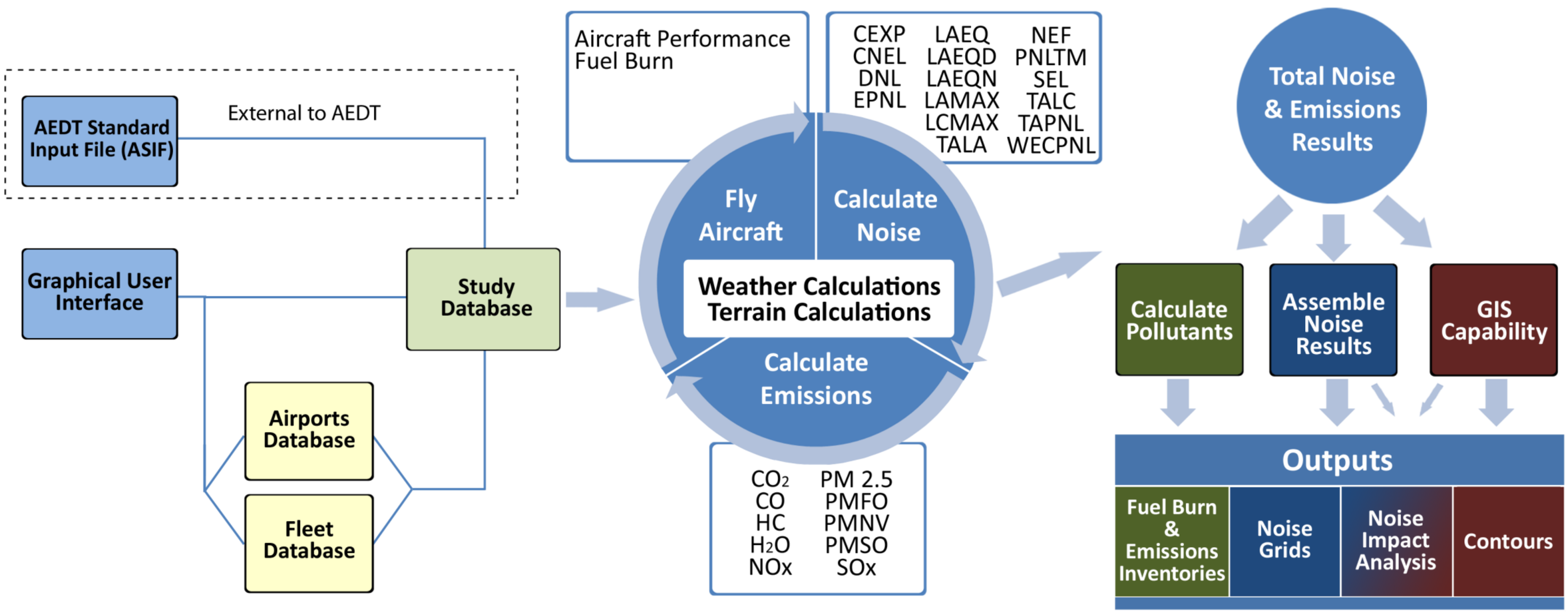
msi	Microsoft Installer (standard windows installation format)
MSL	Mean Sea Level
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCAR	NCEP/NCAR Reanalysis Project weather files
NCDC	National Climatic Data Center
NCEP	National Centers for Environmental Prediction
NED	GridFloat format that covers both U.S. and International land areas (Terrain File Format).
NEF	Noise Exposure Forecast (noise metric)
NFDC FAA	National Flight Data Center (database)
NIRS	Noise Integrated Routing System
NMHC	Non-methane Hydro Carbon
nmi	International nautical mile (1852 meters)
NMPlot	Graphics application program that processes contours
NOAA	National Oceanic and Atmospheric Administration
NOx	Nitrogen oxides
NPD	Noise-power-distance
NWS	National Weather Service
Orthophoto	Aerial photograph geometrically corrected such that the scale is uniform.
OVF	Overflight operation
Pattern Altitude	Parameter from the AIRPORTS database, identifies height at which pilots are required to fly above ground level while around a particular airfield.
PC	Personal Computer (based on Intel processor architecture)
PM	Particulate matter
PMAD	Peak Month Average Day
PNLTM	Maximum Perceived Noise Level (multi-event) (noise metric)
Range Ring	Concentric circles around a point on a map
Receiver	A specified point in INM at which noise levels were computed. This term is being replaced by *Receptor* in the AEDT model.
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.

Receptor Set Report	This report in AEDT shows the details of a user-specified Receptor Set. This report can be found in the menu bar by selecting "View" and then "Receptor Set Report."
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 and to avoid confusion among multiple runways.
Runway Latitude	Parameter from the AIRPORTS Database; identifies the latitude of each unique runway end in order to clearly express the runway location.
Runway Longitude	Parameter from the AIRPORTS Database; identifies the longitude of each unique runway end in order to clearly express the runway location.
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 cases that must have common time durations and run/output properties. A scenario may contain multiple airports but each airport may only have a single layout assigned to it within a scenario.
Sea Level Pressure	Parameter from the AIRPORTS Database; identifies the local station air pressure after it has been reduced to sea level assuming an isothermal layer at the station temperature. This parameter is an average monthly value for the month indicated in the MONTH field and is used in various weather calculations.
SEL	A-weighted Sound Exposure Level (multi-event) (noise metric)
SOx	Sulfur oxides

Station Pressure	Parameter from the AIRPORTS Database; identifies the force exerted against a location at the airport by the column of air above it or air pressure. This parameter is an average monthly value for the month indicated in the MONTH field and is used in various weather calculations.
Study	A collection of scenarios and supporting data. A study can contain multiple airports with multiple layouts at each airport.
Study Aircraft	The aircraft to which operations are assigned within a given scenario.
Study Boundary	Geospatial boundary around a modeling area. See section 7.1 for more information on how boundaries can be applied in AEDT2a.
Study Input Report	This report in AEDT allows the user to view all of the Scenarios, Cases, and Airports in the study as well as the parameters of each of the study elements. This report can be found in the menu bar by selecting "View" and then "Study Input Report."
Takeoff 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)
TAX	Taxi
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 Evaluation	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
VNTSC	Volpe National Transportation Systems Center (U.S. DOT)
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.
WMF	Windows Metafile (a graphics format)
XML	Extensible Markup Language

Appendix B AEDT2a System Structure



Appendix C AEDT Standard Input File (ASIF)

1. Introduction

The AEDT Standard Input File (ASIF) provides a standard file format to allow import of data into an AEDT study. An ASIF can be used to create new AEDT studies and to update existing AEDT studies.

This guide provides a description of the ASIF format. It also provides an overview of ASIF usage and an annotated sample study. The guide is aimed at analysts and programmers who wish to create ASIFs. It is organized into following main sections:

- Section 1 – Overview of the ASIF format and annotated sample ASIF
- Section 2 – ASIF design considerations
- Section 3 – ASIF requirements for study creation and update
- Section 4 – ASIF XML elements reference guide
- Section 5 – Building aircraft and helicopter procedural profiles
- Section 6 – Entire XML schema

1.1 Overview

The ASIF format allows users to import a complete AEDT study, including airports, scenarios, cases, flights, tracks, and operations. Users can also use ASIF to make partial updates to existing AEDT studies.

ASIF is based on the XML file format. XML is a text-based file format that is readable by both humans and computers. Data values are tagged with elements and organized in a hierarchical manner such that the elements can contain other elements or data. XML elements can also have attributes which provide metadata that affect how the ASIF importer processes the data in the XML file. This appendix assumes users have basic familiarity with the XML file format. For a refresher or additional information about XML, see http://xmlfiles.com/xml/.

An ASIF can be created and edited in a standard xml editor. Notepad++ is free software available for download online that can be used to create and edit XML files. A free download of Notepad++ is available at http://notepad-plus-plus.org/. The AEDT install package includes a sample ASIF you can use as a starting point to create your own ASIFs. You can find the sample ASIF at C:\AEDT\AEDT_Workspaces\ASIF_Import\Import_Files\asif_small.xml.

The FAA also supports INM and NIRS study importers to convert studies from these legacy tools directly into an ASIF.

1.2 Create New Study via ASIF

The steps to create an ASIF file in order to create a new AEDT study are as follows:

1. Create empty study file
2. Populate airport layout section
3. Create receptor set (required for studies with noise analysis)
4. Create study scenario and case hierarchy
5. Populate scenario's cases with tracks and air operations
6. Create scenario's annualization scheme

The following sections provide examples of each the above steps. For a complete explanation of the ASIF structure, see sections 3 and 4.

Please note that this is one example of an ASIF file. The naming convention used for identifiers comes from the Chicago legacy NIRS study. Each study will have its own naming convention that may differ from names used in the sample study. The ASIF sample below is provided to give context to the individual ASIF elements related to each other in an actual input file.

Step 1: Create empty study file

At a minimum, an ASIF consists of the standard XML declaration, a study section, and study metadata. In the example below, the brown text represent XML tags, and the black text represents the sample study information (which can be set by the user). Comments appear in green. For a more complete description of the ASIF elements, see section 4.

```
<?xml version="1.0" encoding="utf-8"?>
<AsifXml xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.1.10"
content="study">
  <study>
    <!-- User defined study name -->
    <name>SingleFlightDeparture</name>

    <!-- Noise and Emissions is the only supported study type in AEDT2a. -->
    <type>Noise and Emissions</type>

    <!-- Indicate the usage of metric or imperial units within the study -->
    <metricUnits>false</metricUnits>

    <!-- Emissions units to be used for the study: MetricTonnes, -->
    <!-- Kilograms, Grams, ImperialTons, or Pounds -->
```

```
    <emissionsUnits>Kilograms</emissionsUnits>

    <!-- User defined study description -->
    <description>A sample study with a single departure.</description>

    <!-- Add airport layouts here -->

    <!-- Add receptors here -->

    <!-- Add scenarios here -->

  </study>
</AsifXml>
```

Step 2: Populate airport layouts section

AEDT requires all airports in the study area to be declared. Users can import airport runway definitions from the AEDT system data or via ASIF runway tags. In the example below, KORD is defined using system runways, and KMDW is defined using user-defined runways.

User-defined runways can only be created via ASIF. N-87

```
<airportLayouts>
  <layout>
    <!-- Airport with no runway tags will import runways from -->
    <!-- the AEDT system data. -->
    <airportCode type="ICAO">KORD</airportCode>
  </layout>
  <layout>
    <!-- User can specify an airport with user defined runway -->
    <airportCode type="ICAO">KMDW</airportCode>
    <!-- Airports can have one or more runways defined -->
    <runway>
      <!-- Runway length (in feet) -->
      <length>5932</length>

      <!-- Runway width (in feet) -->
      <width>150</width>

      <!-- One or more runway ends -->
      <runwayEnd>
        <!-- user defined name for runway end -->
        <name>04R</name>

        <!-- latitude and longitude of runway end -->
        <latitude>41.779496</latitude>
        <longitude>-87.75876</longitude>
```

```xml
        <!-- elevation in nautical miles -->
        <elevation>0.0</elevation>

        <!-- threshold crossing height -->
        <threshCrossHeight>50.0</threshCrossHeight>

        <!-- glide slope for an approach to this runway end -->
        <glideSlope>3.0</glideSlope>

        <!-- displaced threshold for departure-->
        <depDispThresh>0.0</depDispThresh>

        <!-- displaced threshold for approach -->
        <appDispThresh>0.0</appDispThresh>

        <!-- Percent change in airport average headwind -->
        <percentWind>0.0</percentWind>
      </runwayEnd>
      <runwayEnd>
        <name>22L</name>
        <latitude>41.791167</latitude>
        <longitude>-87.743554</longitude>
        <elevation>0.0</elevation>
        <threshCrossHeight>50.0</threshCrossHeight>
        <glideSlope>3.0</glideSlope>
        <depDispThresh>0.0</depDispThresh>
        <appDispThresh>0.0</appDispThresh>
        <percentWind>0.0</percentWind>
      </runwayEnd>
    </runway>
  </layout>
</airportLayouts>
```

Step 3: Create receptor set

If the study includes noise analysis, then one or more <receptorSet> elements must be created. AEDT2a provides two types of receptors: grid and population.

Grid receptors are used to capture environmental impacts over a large rectangular area. Receptor points are distributed evently across the grid as defined by the user.

```
<receptorSet>
  <!-- User defined name -->
  <name>gridfile_100x100</name>

  <!-- Receptor definition – either grid of centroid -->
  <grid>
    <!-- Latitude and longitude of southwest corner of grid -->
    <latitude>41.97872</latitude>
    <longitude>-87.90439</longitude>

    <!-- Width and height of grid (in nautical miles) -->
    <width>100.0</width>
    <height>100.0</height>

    <!-- Number of points across height and width of grid -->
    <numWidth>100</numWidth>
    <numHeight>100</numHeight>
  </grid>
</receptorSet>
```

Population receptors are used to capture environmental impacts at one or discrete points associated with a population count, such as US Census data.

```
<receptorSet>
  <!-- User defined name -->
  <name>pop120x160.txt</name>

  <!-- User can provide one or more population locations -->

  <centroid>
    <!-- centroid meta data, sample from US census data -->
    <stateFips>1</stateFips>
    <countyFips>1</countyFips>
    <blockId>0</blockId>
    <bnaId>0</bnaId>

    <!-- centroid location -->
    <latitude>40.642384</latitude>
    <longitude>-87.29556</longitude>
```

```
    <!-- population count at location -->
    <count>3</count>
  </centroid>

  <!-- User can add additional centroid elements here. -->

</receptorSet>
```

Step 4: Create study scenario and case hierarchy

An AEDT study is organized into scenarios. Scenarios contain a set of cases that are used to perform baseline or alternative analyses. Cases are used to group aircraft tracks and operations. Cases are used in annualization of results and during Change Analysis and Impact Evaluation.

This sample demonstrates a simple case structure similar to legacy NIRS studies. In more sophisticated studies, a case can also contain one or more cases to provide a more robust annualization tree or set of AEDT jobs.

The start time and duration of a scenario must conform to **case** start time and **air** operation time; otherwise simulation results will be invalid. W-79

```
<scenario>
  <!-- User defined scenario name and description -->
  <name>Baseline_1990</name>

  <!-- User defined start time for scenario -->
  <startTime>2009-11-10T15:02:00</startTime>

  <!-- Duration of scenario (in hours) -->
  <duration>24</duration>

  <!-- Taxi model for scenario -->
  <taxiModel>UserSpecified</taxiModel>

  <!-- Aircraft performance model -->
  <acftPerfModel>SAE1845</acftPerfModel>

  <!-- Enable/disable bank angle calculations for -->
  <!-- aircraft performance modeling -->
  <bankAngle>true</bankAngle>

  <!-- Sulfur related settings -->
  <sulfurConversionRate>0.05</sulfurConversionRate>
  <fuelSulfurContent>6.8E-4</fuelSulfurContent>

  <description>A NIRS scenario</description>

  <airportLayouts>
    <layout>KMDW</layout>
    <layout>KORD</layout>
  </airportLayouts>

  <cases>
```

```
    <!-- One or more case elements -->
    <case>
      <!-- sequential case number unique in this scenario -->
      <caseId>0</caseId>

      <!-- User defined case name -->
      <name>PlanB</name>

      <!-- Noise emissions source -->
      <source>Aircraft</source>

      <!-- Case start time and duration -->
      <startTime>2009-11-10T15:02:00</startTime>
      <duration>24</duration>

      <!-- Add trackOpSet elements here -->

    </case>
  </cases>
</scenario>
```

Step 5: Populate cases with tracks and air operations

The <trackOpSet> element defines a single track and any number of air operations to be flown on that track.

```
<!-- Add trackOpSet elements here -->
<trackOpSet>
  <!-- Single track element -->
  <track>
    <!-- User defined track id -->
    <id>T9</id>
    <!-- User defined track name -->
    <name>DJM04R_EON.10803</name>
    <!-- Track operation type: A=Arrival, D=Departure, V=Overflight -->
    <optype>D</optype>

    <!-- Airport and runway for this track -->
    <airport type="ICAO">KMDW</airport>
    <runway>04R</runway>
    <vectorCourseHelipad>0</vectorCourseHelipad>

    <!-- The sum of the dispersionWeights for -->
    <!-- all subtracks within a given track must equal 1 -->
    <subtrack>
      <id>0</id>
      <dispersionWeight>1</dispersionWeight>
      <!-- Set of trackNode or trackVector elements, -->
      <!-- all must be the same for each subtrack -->

      <trackNodes>
        <trackNode>
          <latitude>40.65640</latitude>
          <longitude>-73.71322</longitude>
        </trackNode>
```

```xml
        <trackNode>
          <latitude>40.65640</latitude>
          <longitude>-53.71322</longitude>
        </trackNode>
      </trackNodes>
    </subtrack>
  </track>

  <!--operation element represents one or more flights on a track-->
  <operations>
    <operation>
      <!-- User defined operation id -->
      <id>T9.1</id>

      <!-- AEDT aircraftType for this operation -->
      <aircraftType>
        <airframeModel>Raytheon Beech 1900-C</airframeModel>
        <engineCode>PT67B</engineCode>
        <engineModCode>NONE</engineModCode>
      </aircraftType>

      <!-- number of times to fly this operation -->
      <numOperations>1.0</numOperations>

      <!-- User defined flight number -->
      <flightNumber>CKE545</flightNumber>

      <!-- user defined operation type -->
      <userType>MU3001</userType>
      <!-- user defined parameter data -->
      <userParam>J</userParam>

      <!-- Arrival or departure airport and runway -->
      <departureAirport type="ICAO">KMDW</departureAirport>
      <departureRunway>04R</departureRunway>
      <arrivalAirport type="FAA">LIT</arrivalAirport>

      <!-- offTime for departures or onTime for arrivals -->
      <offTime>2009-11-10T15:02:00</offTime>

      <!-- aircraft profile for this operation -->
      <saeProfile>STANDARD</saeProfile>
    </operation>
  </operations>
</trackOpSet>
```

Step 6: Create scenario's annualization tree

Annualization is the process of performing a weighted summation[5] over the noise and emission results from some or all of the cases within a scenario in order to create results that represent noise and emissions exposures over a time period of interest. Each scenario element may contain an annualization element describing the weighted annualization scheme.

```
<annualization>
  <!-- User defined scenario annualization name -->
  <name>Baseline.config</name>
  <!-- Define one or more groups of cases and groups -->
  <annualizationGroup>
    <weight>0.7</weight>
    <!-- Associate scenario case with this annualization group -->
    <annualizationCase>
      <!-- Specify case name to include -->
      <name>PlanB</name>
      <!-- Define rollup weight for this case -->
      <weight>1.0</weight>
    </annualizationCase>
  </annualizationGroup>
</annualization>
```

Final sample ASIF

When the previously described ASIF samples are assembled, the final version will be as follows:

```
<?xml version="1.0" encoding="utf-8"?>
<AsifXml xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.1.10"
content="study">
  <study>
    <!-- User defined study name -->
    <name>SingleFlightDeparture</name>
    <!-- Noise and Emissions is the only supported study type in AEDT2a. -->
    <type>Noise and Emissions</type>
    <!-- Indicate the usage of metric or imperial units within the study  -->
    <metricUnits>false</metricUnits>
    <!-- Emissions units to be used for the study: MetricTonnes, -->
    <!-- Kilograms, Grams, ImperialTons, or Pounds -->
    <emissionsUnits>Kilograms</emissionsUnits>
    <!-- User defined study description -->
    <description>A sample study with a single departure.</description>
    <airportLayouts>
      <layout>
```

[5] The word 'summation' is used figuratively and the actual process of correctly summing or adding together noise or emissions results depends upon the metric being used. For example: energy metric results would not be directly added together for a result since they are logarithmic values, but would rather be log-added.

```
      <!-- Airport with no runway tags will import runways from -->
      <!-- the AEDT system data. -->
      <airportCode type="ICAO">KORD</airportCode>
    </layout>
    <layout>
      <!-- User can specify an airport with user defined runway -->
      <airportCode type="ICAO">KMDW</airportCode>
      <!-- Airports can have one or more runways defined -->
      <runway>
        <!-- Runway length (in feet) -->
        <length>5932</length>
        <!-- Runway width (in feet) -->
        <width>150</width>
        <!-- One or more runway ends -->
        <runwayEnd>
          <!-- user defined name for runway end -->
          <name>04R</name>
          <!-- latitude and longitude of runway end -->
          <latitude>41.779496</latitude>
          <longitude>-87.75876</longitude>
          <!-- elevation in nautical miles -->
          <elevation>0.0</elevation>
          <!-- threshold crossing height -->
          <threshCrossHeight>50.0</threshCrossHeight>
          <!-- glide slope for an approach to this runway end -->
          <glideSlope>3.0</glideSlope>
          <!-- displaced threshold for departure-->
          <depDispThresh>0.0</depDispThresh>
          <!-- displaced threshold for approach -->
          <appDispThresh>0.0</appDispThresh>
          <!-- Percent change in airport average headwind -->
          <percentWind>0.0</percentWind>
        </runwayEnd>
        <runwayEnd>
          <name>22L</name>
          <latitude>41.791167</latitude>
          <longitude>-87.743554</longitude>
          <elevation>0.0</elevation>
          <threshCrossHeight>50.0</threshCrossHeight>
          <glideSlope>3.0</glideSlope>
          <depDispThresh>0.0</depDispThresh>
          <appDispThresh>0.0</appDispThresh>
          <percentWind>0.0</percentWind>
        </runwayEnd>
      </runway>
    </layout>
  </airportLayouts>
  <receptorSet>
```

```
      <!-- User defined name -->
      <name>gridfile_100x100</name>
      <!-- Receptor definition – either grid of centroid -->
      <grid>
        <!-- Latitude and longitude of southwest corner of grid -->
        <latitude>41.97872</latitude>
        <longitude>-87.90439</longitude>
        <!-- Width and height of grid (in nautical miles) -->
        <width>100.0</width>
        <height>100.0</height>
        <!-- Number of points across height and width of grid -->
        <numWidth>100</numWidth>
        <numHeight>100</numHeight>
      </grid>
    </receptorSet>
    <receptorSet>
      <!-- User defined name -->
      <name>pop120x160.txt</name>

      <!-- User can provide one or more population locations -->

      <centroid>
        <!-- centroid meta data, sample from US census data -->
        <stateFips>1</stateFips>
        <countyFips>1</countyFips>
        <blockId>0</blockId>
        <bnaId>0</bnaId>

        <!-- centroid location -->
        <latitude>40.642384</latitude>
        <longitude>-87.29556</longitude>

        <!-- population count at location -->
        <count>3</count>
      </centroid>

      <!-- User can add additional centroid elements here. -->

    </receptorSet>

    <scenario>
      <!-- User defined scenario name and description -->
      <name>Baseline_1990</name>
      <!-- User defined start time for scenario -->
      <startTime>2009-11-10T15:02:00</startTime>
      <!-- Duration of scenario (in hours) -->
      <duration>24</duration>
      <!-- Taxi model for scenario -->
```

```
<taxiModel>UserSpecified</taxiModel>
<!-- Aircraft performance model -->
<acftPerfModel>SAE1845</acftPerfModel>
<!-- Enable/disable bank angle calculations for aircraft -->
<!-- performance modeling -->
<bankAngle>true</bankAngle>
<!-- Sulfur related settings -->
<sulfurConversionRate>0.05</sulfurConversionRate>
<fuelSulfurContent>6.8E-4</fuelSulfurContent>
<description>A NIRS scenario</description>
<airportLayouts>
  <layout>KMDW</layout>
  <layout>KORD</layout>
</airportLayouts>
<cases>
  <!-- One or more case elements -->
  <case>
    <!-- -->
    <caseId>0</caseId>
    <!-- User defined case name -->
    <name>PlanB</name>
    <!-- Noise emissions source -->
    <source>Aircraft</source>
    <!-- Case start time and duration -->
    <startTime>2009-11-10T15:02:00</startTime>
    <duration>24</duration>
    <!-- Add trackOpSet elements here -->
    <trackOpSet>
      <!-- Single track element -->
      <track>
        <!-- User defined track id -->
        <id>T9</id>
        <!-- User defined track name -->
        <name>DJM04R_EON.10803</name>
        <!-- Track operation type: A = Arrival, D = Departure, -->
        <!-- V = Overflight -->
        <optype>D</optype>
        <!-- Airport and runway for this track -->
        <airport type="ICAO">KMDW</airport>
        <runway>04R</runway>
        <vectorCourseHelipad>0</vectorCourseHelipad>
        <!-- All subtracks within a given track must have a -->
        <!-- dispersionWeight sum of 1 -->
        <subtrack>
          <id>0</id>
          <dispersionWeight>1</dispersionWeight>
          <!-- Set of trackNode or trackVector elements, -->
          <!-- all must be the same for each subtrack-->
```

```xml
          <trackNodes>
            <trackNode>
              <latitude>40.65640</latitude>
              <longitude>-73.71322</longitude>
            </trackNode>
            <trackNode>
              <latitude>40.65640</latitude>
              <longitude>-53.71322</longitude>
            </trackNode>
          </trackNodes>
        </subtrack>
      </track>
      <!-- operations represents one or more flights on a track -->
      <operations>
        <operation>
          <!-- User defined operation id -->
          <id>T9.1</id>
          <!-- aircraftType for this operation -->
          <aircraftType>
            <airframeModel>Raytheon Beech 1900-C</airframeModel>
            <engineCode>PT67B</engineCode>
            <engineModCode>NONE</engineModCode>
          </aircraftType>
          <!-- number of times to fly this operation -->
          <numOperations>1.0</numOperations>
          <!-- User defined flight number -->
          <flightNumber>CKE545</flightNumber>
          <!-- user defined operation type -->
          <userType>MU3001</userType>
          <!-- user defined parameter data -->
          <userParam>J</userParam>
          <!-- Arrival or departure airport and runway -->
          <departureAirport type="ICAO">KMDW</departureAirport>
          <departureRunway>04R</departureRunway>
          <arrivalAirport type="FAA">LIT</arrivalAirport>
          <!-- offTime for departures or onTime for arrivals -->
          <offTime>2009-11-10T15:02:00</offTime>
          <!-- aircraft profile for this operation -->
          <saeProfile>STANDARD</saeProfile>
        </operation>
      </operations>
    </trackOpSet>
  </case>
</cases>
<annualization>
  <!-- User defined scenario annualization name -->
  <name>Baseline.config</name>
  <!-- Define one or more groups of cases and groups -->
```

```
        <annualizationGroup>
          <weight>0.7</weight>
          <!-- Associate scenario case with this annualization group -->
          <annualizationCase>
            <!-- Specify case name to include -->
            <name>PlanB</name>
            <!-- Define rollup weight for this case -->
            <weight>1.0</weight>
          </annualizationCase>
        </annualizationGroup>
      </annualization>
    </scenario>
  </study>
</AsifXml>
```

2. ASIF Design Considerations

2.1 Event Consolidation

AEDT calculates noise for all air operations (e.g. all instances of an aircraft and track) in a given case, which differs from the legacy tool, NIRS. In order to optimize noise modeling performance in AEDT it is suggested to combine like operations in a case into a representative single air operation for entry into the ASIF. See Appendix A for instructions on how to combine like entries from an annual schedule.

Sample ASIF using discrete air operations:

```
<?xml version="1.0" encoding="utf-8" ?>
<AsifXml xmlns:AsifXml="http://www.faa.gov/ASIF"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.1.10" content="study">
  <study xmlns:asif="http://www.faa.gov/ASIF">
    <name>Chicago70</name>
    <type>Noise and Emissions</type>
    <metricUnits>false</metricUnits>
    <emissionsUnits>Kilograms</emissionsUnits>
    <description>A sample NIRS study</description>
    <boundary>
      <polygon>
        <vertex>
          <latitude>40.636993970695244</latitude>
          <longitude>-89.21758333055047</longitude>
        </vertex>
        <vertex>
          <latitude>40.636993970695244</latitude>
          <longitude>-86.59119444944956</longitude>
        </vertex>
        <vertex>
          <latitude>43.3047921364604</latitude>
          <longitude>-86.53522348936178</longitude>
        </vertex>
        <vertex>
          <latitude>43.3047921364604</latitude>
          <longitude>-89.27355429063823</longitude>
        </vertex>
      </polygon>
    </boundary>
    <airportLayouts>
      <layout>
        <airportCode>ORD</airportCode>
        <runway>
          <length>7878</length>
          <width>150</width>
          <runwayEnd>
            <name>09L</name>
```

```xml
            <latitude>41.984329</latitude>
            <longitude>-87.918854</longitude>
            <elevation>659.7</elevation>
            <threshCrossHeight>50.0</threshCrossHeight>
            <glideSlope>3.0</glideSlope>
            <depDispThresh>0.0</depDispThresh>
            <appDispThresh>0.0</appDispThresh>
            <percentWind>0.0</percentWind>
          </runwayEnd>
          <runwayEnd>
            <name>27R</name>
            <latitude>41.984406</latitude>
            <longitude>-87.889786</longitude>
            <elevation>650.0</elevation>
            <threshCrossHeight>50.0</threshCrossHeight>
            <glideSlope>3.0</glideSlope>
            <depDispThresh>0.0</depDispThresh>
            <appDispThresh>0.0</appDispThresh>
            <percentWind>0.0</percentWind>
          </runwayEnd>
        </runway>
      </layout>
    </airportLayouts>
    <scenario>
      <name>Baseline_1990</name>
      <startTime>2011-10-25T00:00:00</startTime>
      <duration>24</duration>
      <taxiModel>UserSpecified</taxiModel>
      <acftPerfModel>SAE1845</acftPerfModel>
      <bankAngle>true</bankAngle>
      <altitudeCutoff>18723.1</altitudeCutoff>
      <sulfurConversionRate>0.05</sulfurConversionRate>
      <fuelSulfurContent>6.8E-4</fuelSulfurContent>
      <description>Sample Scenario – discrete air ops </description>
      <airportLayouts>
        <layout>ORD</layout>
      </airportLayouts>
      <cases>
        <case>
          <caseId>0</caseId>
          <name>PlanB</name>
          <source>Aircraft</source>
          <startTime>2011-10-25T00:00:00</startTime>
          <duration>24</duration>
          <case>
            <caseId>6</caseId>
            <name>exexbf2.ord.day.dep_STD</name>
            <source>Aircraft</source>
```

```xml
<startTime>2011-10-25T00:00:00</startTime>
<duration>24</duration>
<description>Sample Case – discrete air operations</description>
<trackOpSet>
  <track>
    <id>T0.N</id>
    <name>D9LJ_GIJ_and_No_route_name</name>
    <optype>D</optype>
    <airport>ORD</airport>
    <runway>09L</runway>
    <subtrack>
      <id>0</id>
      <dispersionWeight>1.0</dispersionWeight>
      <trackNodes>
        <trackNode>
          <id>RWY_09L</id>
          <latitude>41.984329</latitude>
          <longitude>-87.918854</longitude>
        </trackNode>
        <trackNode>
          <id>DORD_09L@0</id>
          <latitude>41.984406</latitude>
          <longitude>-87.889786</longitude>
        </trackNode>
        <trackNode>
          <id>DORD9L2@20</id>
          <latitude>41.984043</latitude>
          <longitude>-87.801483</longitude>
        </trackNode>
        <trackNode>
          <id>DORD9L3@30</id>
          <latitude>41.984043</latitude>
          <longitude>-87.724838</longitude>
        </trackNode>
        <trackNode>
          <id>DORD22L9L@50</id>
          <latitude>41.982971</latitude>
          <longitude>-87.592621</longitude>
        </trackNode>
        <trackNode>
          <id>DGIJJ@80</id>
          <latitude>41.976048</latitude>
          <longitude>-87.303543</longitude>
        </trackNode>
        <trackNode>
          <id>DGIJJ2@150</id>
          <latitude>41.974567</latitude>
          <longitude>-86.741348</longitude>
```

```
        </trackNode>
        <trackNode>
          <id>GIJLB@210</id>
          <latitude>42.03212</latitude>
          <longitude>-87.152512</longitude>
        </trackNode>
        <trackNode>
          <id>GIJ@210</id>
          <latitude>41.76833</latitude>
          <longitude>-86.318329</longitude>
        </trackNode>
        <trackNode>
          <id>MODEM@270</id>
          <latitude>41.7225</latitude>
          <longitude>-84.89917</longitude>
        </trackNode>
        <trackNode>
          <id>GERBS@270</id>
          <latitude>41.7775</latitude>
          <longitude>-84.425003</longitude>
        </trackNode>
        <trackNode>
          <id>CETUS@270</id>
          <latitude>41.703609</latitude>
          <longitude>-82.81694</longitude>
        </trackNode>
      </trackNodes>
    </subtrack>
  </track>
  <operations>
    <operation>
      <id>T1.0</id>
      <aircraftType>
        <anpAircraftId>757PW</anpAircraftId>
      </aircraftType>
      <numOperations>1.0</numOperations>
      <flightNumber>UA_1231</flightNumber>
      <userType>757PW</userType>
      <userParam>J</userParam>
      <departureAirport>ORD</departureAirport>
      <departureRunway>09L</departureRunway>
      <arrivalAirport>DTW</arrivalAirport>
      <offTime>2011-10-25T11:00:00</offTime>
      <saeProfile>STANDARD</saeProfile>
    </operation>
    <operation>
      <id>T1.2</id>
      <aircraftType>
```

```xml
                    <anpAircraftId>757PW</anpAircraftId>
                  </aircraftType>
                  <numOperations>1.0</numOperations>
                  <flightNumber>CD_2282</flightNumber>
                  <userType>757PW</userType>
                  <userParam>J</userParam>
                  <departureAirport>ORD</departureAirport>
                  <departureRunway>09L</departureRunway>
                  <arrivalAirport>DTW</arrivalAirport>
                  <offTime>2011-10-25T12:00:00</offTime>
                  <saeProfile>STANDARD</saeProfile>
                </operation>
                <operation>
                  <id>T1.3</id>
                  <aircraftType>
                    <anpAircraftId>757PW</anpAircraftId>
                  </aircraftType>
                  <numOperations>1.0</numOperations>
                  <flightNumber>CD_2283</flightNumber>
                  <userType>757PW</userType>
                  <userParam>J</userParam>
                  <departureAirport>ORD</departureAirport>
                  <departureRunway>09L</departureRunway>
                  <arrivalAirport>DTW</arrivalAirport>
                  <offTime>2011-10-25T13:00:00</offTime>
                  <saeProfile>STANDARD</saeProfile>
                </operation>
              </operations>
            </trackOpSet>
          </case>
        </case>
      </cases>
    </scenario>
  </study>
</AsifXml>
```

Consolidated version of above ASIF:

```xml
<?xml version="1.0" encoding="utf-8" ?>
<AsifXml xmlns:AsifXml="http://www.faa.gov/ASIF"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.1.10" content="study">
  <study xmlns:asif="http://www.faa.gov/ASIF">
    <name>Chicago70</name>
    <type>Noise and Emissions</type>
    <metricUnits>false</metricUnits>
    <emissionsUnits>Kilograms</emissionsUnits>
    <description>Example of rolled up air operations</description>
    <boundary>
      <polygon>
```

```xml
        <vertex>
          <latitude>40.636993970695244</latitude>
          <longitude>-89.21758333055047</longitude>
        </vertex>
        <vertex>
          <latitude>40.636993970695244</latitude>
          <longitude>-86.59119444944956</longitude>
        </vertex>
        <vertex>
          <latitude>43.3047921364604</latitude>
          <longitude>-86.53522348936178</longitude>
        </vertex>
        <vertex>
          <latitude>43.3047921364604</latitude>
          <longitude>-89.27355429063823</longitude>
        </vertex>
      </polygon>
    </boundary>
    <airportLayouts>
      <layout>
        <airportCode>ORD</airportCode>
        <runway>
          <length>7878</length>
          <width>150</width>
          <runwayEnd>
            <name>09L</name>
            <latitude>41.984329</latitude>
            <longitude>-87.918854</longitude>
            <elevation>659.7</elevation>
            <threshCrossHeight>50.0</threshCrossHeight>
            <glideSlope>3.0</glideSlope>
            <depDispThresh>0.0</depDispThresh>
            <appDispThresh>0.0</appDispThresh>
            <percentWind>0.0</percentWind>
          </runwayEnd>
          <runwayEnd>
            <name>27R</name>
            <latitude>41.984406</latitude>
            <longitude>-87.889786</longitude>
            <elevation>650.0</elevation>
            <threshCrossHeight>50.0</threshCrossHeight>
            <glideSlope>3.0</glideSlope>
            <depDispThresh>0.0</depDispThresh>
            <appDispThresh>0.0</appDispThresh>
            <percentWind>0.0</percentWind>
          </runwayEnd>
        </runway>
      </layout>
```

```
    </airportLayouts>
    <scenario>
      <name>Baseline_1990</name>
      <startTime>2011-10-25T00:00:00</startTime>
      <duration>24</duration>
      <taxiModel>UserSpecified</taxiModel>
      <acftPerfModel>SAE1845</acftPerfModel>
      <bankAngle>true</bankAngle>
      <altitudeCutoff>18723.1</altitudeCutoff>
      <sulfurConversionRate>0.05</sulfurConversionRate>
      <fuelSulfurContent>6.8E-4</fuelSulfurContent>
      <description>Sample Scenario – rolled up air ops</description>
      <airportLayouts>
        <layout>ORD</layout>
      </airportLayouts>
      <cases>
        <case>
          <caseId>0</caseId>
          <name>PlanB</name>
          <source>Aircraft</source>
          <startTime>2011-10-25T00:00:00</startTime>
          <duration>24</duration>
          <case>
            <caseId>6</caseId>
            <name>exexbf2.ord.day.dep_STD</name>
            <source>Aircraft</source>
            <startTime>2011-10-25T00:00:00</startTime>
            <duration>24</duration>
            <description>Rolled up operations</description>
            <trackOpSet>
              <track>
                <id>T0.N</id>
                <name>D9LJ_GIJ_and_No_route_name</name>
                <optype>D</optype>
                <airport>ORD</airport>
                <runway>09L</runway>
                <subtrack>
                  <id>0</id>
                  <dispersionWeight>1.0</dispersionWeight>
                  <trackNodes>
                    <trackNode>
                      <id>RWY_09L</id>
                      <latitude>41.984329</latitude>
                      <longitude>-87.918854</longitude>
                    </trackNode>
                    <trackNode>
                      <id>DORD_09L@0</id>
                      <latitude>41.984406</latitude>
```

```
    <longitude>-87.889786</longitude>
  </trackNode>
  <trackNode>
    <id>DORD9L2@20</id>
    <latitude>41.984043</latitude>
    <longitude>-87.801483</longitude>
  </trackNode>
  <trackNode>
    <id>DORD9L3@30</id>
    <latitude>41.984043</latitude>
    <longitude>-87.724838</longitude>
  </trackNode>
  <trackNode>
    <id>DORD22L9L@50</id>
    <latitude>41.982971</latitude>
    <longitude>-87.592621</longitude>
  </trackNode>
  <trackNode>
    <id>DGIJJ@80</id>
    <latitude>41.976048</latitude>
    <longitude>-87.303543</longitude>
  </trackNode>
  <trackNode>
    <id>DGIJJ2@150</id>
    <latitude>41.974567</latitude>
    <longitude>-86.741348</longitude>
  </trackNode>
  <trackNode>
    <id>GIJLB@210</id>
    <latitude>42.03212</latitude>
    <longitude>-87.152512</longitude>
  </trackNode>
  <trackNode>
    <id>GIJ@210</id>
    <latitude>41.76833</latitude>
    <longitude>-86.318329</longitude>
  </trackNode>
  <trackNode>
    <id>MODEM@270</id>
    <latitude>41.7225</latitude>
    <longitude>-84.89917</longitude>
  </trackNode>
  <trackNode>
    <id>GERBS@270</id>
    <latitude>41.7775</latitude>
    <longitude>-84.425003</longitude>
  </trackNode>
  <trackNode>
```

```
                      <id>CETUS@270</id>
                      <latitude>41.703609</latitude>
                      <longitude>-82.81694</longitude>
                    </trackNode>
                  </trackNodes>
                </subtrack>
              </track>
              <operations>
                <operation>
                  <id>T1.0-3.0</id>
                  <aircraftType>
                    <anpAircraftId>757PW</anpAircraftId>
                  </aircraftType>
                  <numOperations>3.0</numOperations>
                  <flightNumber>Rollup1</flightNumber>
                  <userType>757PW</userType>
                  <userParam>J</userParam>
                  <departureAirport>ORD</departureAirport>
                  <departureRunway>09L</departureRunway>
                  <arrivalAirport>DTW</arrivalAirport>
                  <offTime>2011-10-25T11:00:00</offTime>
                  <saeProfile>STANDARD</saeProfile>
                </operation>
              </operations>
            </trackOpSet>
          </case>
        </case>
      </cases>
    </scenario>
  </study>
</AsifXml>
```

2.2 Event Dates for Average Annual Day Study

For a study with average annual day data events, scenarios, and cases must all be entered with the same date.

2.3 Aircraft Tagging with User Defined Aircraft

Tracking a specific aircraft type can be done by creating a duplicate of the aircraft of interest and naming it with a unique name. An example ASIF fragment that can be added to the <fleet> element of an ASIF is provided below:

```
<airplane>
  <description>B737-200/JT8D-17 NORDAM B737 LGW HUSHKIT</description>
  <baseAirplane>
    <anpAirplaneId>737N17</anpAirplaneId>
    <badaAirplaneId>B732</badaAirplaneId>
    <airframeModel>Boeing 737-200 Series</airframeModel>
    <engineCode>1PW010</engineCode>
    <engineModCode>NORH</engineModCode>
  </baseAirplane>
  <anpAirplaneInfo>
    <anpAirplane>
      <!-- Create a unique anpAirplaneId to use for targeted air operations -->
      <anpAirplaneId>737N17-U</anpAirplaneId>
      <!-- Create a unique description to use for targeted air operations -->
      <description>Targeted B737-200/JT8D-17</description>
      <maxGrossWeightTakeoff>124000</maxGrossWeightTakeoff>
      <maxGrossWeightLand>107000</maxGrossWeightLand>
      <maxDsStop>4244</maxDsStop>
      <thrustStatic>16000</thrustStatic>
      <noiseId>2JT8DN</noiseId>
    </anpAirplane>
  </anpAirplaneInfo>
  <airframeInfo>
    <airframeModel>Boeing 737-200 Series</airframeModel>
  </airframeInfo>
</airplane>
```

2.4 Number of Operations in a Case and Results Reuse

AEDT has the ability to reuse previously calculated results when running a new job. The smallest unit of results that can be reused is a set of air operations in a case. Run time can be optimized by designing the ASIF with this capability in mind.

2.5 Control Codes in AEDT

AEDT will fly AtOrBelow control codes as close to the specified altitude as possible, which differs from the legacy tool NIRS that accepts any altitude at or below the specified altitude. Similarly, AEDT will fly AtOrAbove control codes as close to the specified altitude as possible while NIRS accepts any altitude at or above the specified altitude.

AEDT will not use control codes below 500 ft. AFE. Since NIRS does not use control codes below 3000 ft. AFE, any NIRS control codes that are converted to ASIF that are at or below 3000 feet should be changed to the AEDT AtOrBelow control code.

If modeling radar data, users can use the sensor path track type instead of the ground track type. Sensor paths provide more direct control of altitude for an aircraft trajectory.

AEDT will fly the length of ground tracks without requiring altitude control codes at the beginning and end of the tracks. See 4.2.50 on defining control codes (nodeControlType).

If an air operation has an altitude control higher than 10,000ft above the runway end, but does not have an altitude control at 10,000ft, and its procedural profile does not describe flight between the ground to 10,000ft without violating altitude controls, then the speed at 10,000ft in the resulting flight profile will be set to the profile speed that precedes it, as calculated by the ECAC Doc 29 performance model in compliance with all altitude controls. Performance results in such cases can therefore include unrealistically large changes in speed over short distances, however thrusts and distances at 10,000ft are properly interpolated from modeled values. W-80

If an air operation includes altitude controls that are at or above the cutoff altitude, performance will not be calculated for that operation and it will not contribute to noise or emissions results. W-81

2.6 Modeling Intra-Study Flights (Runway to Runway)

Intra-Study flights have arrival and departure airports that are inside the study area. These flights are modeled in the legacy tool NIRS as a pair of arrival and departure operations touching in the middle (e.g. the non-runway ends meet). AEDT supports this modeling technique.

However, when the "Truncate and/or Extend Flight Paths to Study Boundary" checkbox in the *Run Options* dialog box is checked in AEDT, AEDT will extend the non-runway end of these tracks to intersect the study boundary. This can cause AEDT to add undesired trajectory segments for intra-study flights modeled with a pair of operations.

When the "Truncate and/or Extend Flight Paths to Study Boundary" run option is turned on, a sensor path trajectory type, which models runway-to-runway operations, should be used.

Results from intra-study flight (runway to runway) air operations that are based on sensor path data (rather than profiles and/or tracks) will include some segments between the terminal area portion (10,000ft or higher above field elevation) and the cruise portion (above the nominal cruise altitude of the sensor data) that are modeled as though they were part of the cruise portion. That is, the trajectory mode listed in flight performance reports for such segments will be Cruise, rather than EnrouteClimb or EnrouteDescent. The fuel burn for these segments will be based on the BADA fuel burn model for cruise, rather than the model for climb or descent, and emissions results that depend on fuel burn are affected accordingly.

The terminal-area approach portions of sensor-path intra-study flight (runway to runway) W-82
air operations are modeled according to the standard profile defined for the stage length appropriate for the length of the sensor path. This includes that approach profile's weight specification. Therefore, performance results will usually include a sudden change in weight at the beginning of the terminal-area approach, reflecting the difference between the approach profile's weight, and the weight calculated by decrementing fuel burn from the departure profile's weight.

3. XML Hierarchy

There are two types of ASIF import files: a full-study import and a partial-study import. The following sections describe each type of import file.

3.1 Create New Study with ASIF

AEDT supports the creation of new studies via ASIF. For a full-study import, the *content* attribute of the <AsifXML> element must be set to “study”.

The table below illustrates the hierarchical relationship of structural XML elements within the ASIF import file; some elements are optional. For detailed information about a particular element, refer to the corresponding listed element reference.

XML Hierarchy for Full Study Import

ASIF Element	Element Reference
<AsifXml>	Section 4.2.22
<options>	Section 4.2.37
<utmZoneDefault>	Section 4.2.37
<study>	Section 4.2.47
<name>	Section 4.2.47
<type>	Section 4.2.47
<metricUnits>	Section 4.2.47
<emissionsUnits>	Section 4.2.47
<description>	Section 4.2.47
<boundary>	Section 4.2.28
<polygon>	Section 4.2.38
<vertex>	Section 4.2.57
<latitude>	Section 4.3.3
<latitudeDMS>	Section 4.3.3
<longitude>	Section 4.3.3

ASIF Element	Element Reference
<longitudeDMS>	Section 4.3.3
<utmN>	Section 4.3.6
<utmE>	Section 4.3.6
<utmZone>	Section 4.3.6
<climate>	Section 4.2.32
<identifier>	Section 4.2.32
<temperature>	Section 4.2.32
<pressure>	Section 4.2.32
<humidity>	Section 4.2.32
<headWind>	Section 4.2.32
<seaLevelPressure>	Section 4.2.32
<dewPoint>	Section 4.2.32
<windDirection>	Section 4.2.32
<visibility>	Section 4.2.32
<airportLayouts>	Section 4.2.7
<layout>	Section 4.2.6
<name>	Section 4.2.6
<airportCode>	Section 4.2.5
<type>	Section 4.2.5
<country>	Section 4.2.5
<startDate>	Section 4.2.6
<runway>	Section 4.2.42
<length>	Section 4.2.42
<width>	Section 4.2.42
<runwayEnd>	Section 4.2.43
<name>	Section 4.2.43
<latitude>	Section 4.3.3
<latitudeDMS>	Section 4.3.3
<longitude>	Section 4.3.3
<longitudeDMS>	Section 4.3.3
<utmN>	Section 4.3.6
<utmE>	Section 4.3.6
<utmZone>	Section 4.3.6

ASIF Element	Element Reference
<elevation>	Section 4.2.43
<threshCrossHeight>	Section 4.2.43
<threshElevation>	Section 4.2.43
<glideSlope>	Section 4.2.43
<intAltitude>	Section 4.2.43
<depDispThresh>	Section 4.2.43
<appDispThresh>	Section 4.2.43
<percentWind>	Section 4.2.43
<isHelipad>	Section 4.2.43
<tracks>	Section 4.2.54
<terrainFiles>	Section 4.2.47
<receptorSet>	Section 4.2.40
<name>	Section 4.2.40
<latitude>	Section 4.3.3
<latitudeDMS>	Section 4.3.3
<longitude>	Section 4.3.3
<longitudeDMS>	Section 4.3.3
<centroid>	Section 4.2.31
<stateFips>	Section 4.2.31
<countyFips>	Section 4.2.31
<blockId>	Section 4.2.31
<bnaId>	Section 4.2.31
<latitude>	Section 4.3.3
<latitudeDMS>	Section 4.3.3
<longitude>	Section 4.3.3
<longitudeDMS>	Section 4.3.3
<utmN>	Section 4.3.6
<utmE>	Section 4.3.6
<utmZone>	Section 4.3.6
<elevation>	Section 4.2.31
<count>	Section 4.2.31
<grid>	Section 4.2.34
<latitude>	Section 4.3.3

ASIF Element	Element Reference
<latitudeDMS>	Section 4.3.3
<longitude>	Section 4.3.3
<longitudeDMS>	Section 4.3.3
<utmN>	Section 4.3.6
<utmE>	Section 4.3.6
<utmZone>	Section 4.3.6
<elevation>	Section 4.2.34
<width>	Section 4.2.34
<height>	Section 4.2.34
<numWidth>	Section 4.2.34
<numHeight>	Section 4.2.34
<fleet>	Section 4.2.33
<anpNoiseGroup>	Section 4.2.15
<noiseId>	Section 4.2.15
<spectralClassApproach>	Section 4.2.15
<spectralClassDeparture>	Section 4.2.15
<spectralClassAfterburner>	Section 4.2.15
<thrustSetType>	Section 4.2.15
<modelType>	Section 4.2.15
<npdCurves>	Section 4.2.15
<airplane>	Section 4.2.4
<description>	Section 4.2.4
<baseAirplane>	Section 4.2.27
<anpAirplaneInfo>	Section 4.2.12
<anpAirplaneId>	Section 4.2.12
<anpAirplane>	Section 4.2.11
<scenario>	Section 4.2.44
<name>	Section 4.2.44
<startTime>	Section 4.2.44
<duration>	Section 4.2.44
<taxiModel>	Section 4.2.44
<acftPerfModel>	Section 4.2.44
<bankAngle>	Section 4.2.44

ASIF Element	Element Reference
<altitudeCutoff>	Section 4.2.44
<sulfurConversionRate>	Section 4.2.44
<fuelSulfurContent>	Section 4.2.44
<description>	Section 4.2.44
<airportLayouts>	Section 4.2.7
<name>	Section 4.2.6
<airportCode>	Section 4.2.5
<type>	Section 4.2.5
<country>	Section 4.2.5
<startDate>	Section 4.2.6
<runway>	Section 4.2.42
<length>	Section 4.2.42
<width>	Section 4.2.42
<runwayEnd>	Section 4.2.43
<name>	Section 4.2.43
<latitude>	Section 4.3.3
<latitudeDMS>	Section 4.3.3
<longitude>	Section 4.3.3
<longitudeDMS>	Section 4.3.3
<utmN>	Section 4.3.6
<utmE>	Section 4.3.6
<utmZone>	Section 4.3.6
<elevation>	Section 4.2.43
<threshCrossHeight>	Section 4.2.43
<threshElevation>	Section 4.2.43
<glideSlope>	Section 4.2.43
<intAltitude>	Section 4.2.43
<depDispThresh>	Section 4.2.43
<appDispThresh>	Section 4.2.43
<percentWind>	Section 4.2.43
<isHelipad>	Section 4.2.43
<cases>	Section 4.2.30
<case>	Section 4.2.29

ASIF Element	Element Reference
<caseId>	Section 4.2.29
<name>	Section 4.2.29
<source>	Section 4.2.29
<startTime>	Section 4.2.29
<duration>	Section 4.2.29
<climateId>	Section 4.2.29
<hourlyWxFile>	Section 4.2.29
<hourlyWxMD5>	Section 4.2.29
<description>	Section 4.2.29
<case>	Section 4.2.29
<trackOpSet>	Section 4.2.52
<operation>	Section 4.2.35
<reference>	Section 4.2.41
<annualization>	Section 4.2.8
<name>	Section 4.2.8
<annualizationGroup>	Section 4.2.10
<weight>	Section 4.2.10
<scaleFactor>	Section 4.2.10
<annualizationGroup>	Section 4.2.10
<annualizationCase>	Section 4.2.9
<name>	Section 4.2.9
<weight>	Section 4.2.9
<scaleFactor>	Section 4.2.9

3.2 Update Existing Study via ASIF

ASIFs can be used to update existing studies. An ASIF study update file contains a portion of an AEDT study; the remaining required elements must already exist in the project to which you are importing the file.

The table below illustrates the hierarchical relationship of structural XML elements within a partial import ASIF. Partial-study import ASIFs may contain an optional `<options>` element and can only contain a single content element type from the table below. In addition, the *content* attribute of the <AsifXML> element must be set to the corresponding element type. A sample partial ASIF shown below contains only the receptor set data. Note that the *content* attribute of the <AsifXML> element is set to “receptorSets”.

Each study update element has an assigned import context. AEDT will use the ASIF import context to determine where to add the new data in the existing study. An import context can be one of the following:

- Study—element is a study-level element and does not require prompting the user for an import context
- Scenario—element must be associated with an existing scenario in the study, and the user is prompted to select a scenario
- Case—element must be associated with an existing case in the study, and the user is prompted to select a scenario and related case

For detailed information about a particular element, click on the associated link.

XML Hierarchy for Partial Study Import

ASIF Element	Import Context	Element Reference
<AsifXml>	n/a	Section 4.2.22
<options>	study	Section 4.2.37
<airportLayouts>	study	Section 4.2.6
<annualization>	scenario	Section 4.2.8
<boundary>	study	Section 4.2.28
<case>	scenario	Section 4.2.29
<fleet>	study	Section 4.2.33
<operation>	case	Section 4.2.35
<receptorSet>	study	Section 4.2.40
<scenario>	study	Section 4.2.44
<trackOpSet>	case	Section 4.2.52

Sample Partial ASIF – Receptor Set

```
<?xml version="1.0" encoding="utf-8"?>
<AsifXml version="1.1.10" content="receptorSets" xmlns:AsifXml="http://www.faa.gov/ASIF"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <receptorSet>
    <name>Partial ASIF Receptor Set</name>
    <centroid>
      <stateFips>17</stateFips>
      <countyFips>031</countyFips>
      <blockId>1</blockId>
      <bnaId>0</bnaId>
      <latitude>40.642384</latitude>
      <longitude>-87.29556</longitude>
      <count>3</count>
    </centroid>
    <centroid>
      <stateFips>17</stateFips>
      <countyFips>031</countyFips>
```

```
      <blockId>2</blockId>
      <bnaId>1</bnaId>
      <latitude>41.074768</latitude>
      <longitude>-87.259346</longitude>
      <count>11</count>
    </centroid>
  </receptorSet>
</AsifXml>
```

4. XML Schema

4.1 Terminology Used in the Schema

This section describes notation used in the schema. The next two tables describe the notation for XML tag types and the notation for required number of elements.

Notation for ASIF XML Tag Types

Type	Description
integer, float, double, boolean	The standard numeric types
boolean	T, true, or 1 for TRUE values, and F, false, or 0 for FALSE values.
string*N*	A string with up to *N* characters.
datetime	A date and time string of the format YYYY-MM-DD HH:mm:SS.sss **YYYY** : four digit year **MM** : two digit month (from 01-12) **DD** : two digit day of the month (from 01 to last day) **HH** : two digit hour (from 00-23) **mm** : two digit minutes (from 00-59) **SS** : (optional) seconds (from 00-59) **sss** : (optional) milliseconds (from 000-999)
enum	An enumeration. See the element's description for valid values.
G	A group type. This type indicates that the actual element tag is really a placeholder for a group of element tags. XML tags with the group type will be italicized.
S	Special. See the element description for details.
-	A complex type that contains other elements.

Notation for the Required Number of Elements

Num	Description
+	1 or more instances are required.
*	0 or more instances are required, implying the element is optional if 0 elements are desired.
?	0 or 1 instance is required, again implying an optional element.
N	*N* instances are required, where N is a positive integer.
N+	*N* or more instances are required, where *N* is a positive integer.

Num	Description
S	In some cases, the requirement of an element (or group of elements) may depend on special circumstances, in which case the element (or group of elements) will be marked with an S and the specific requirements will be detailed in the description section.

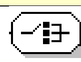
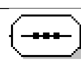
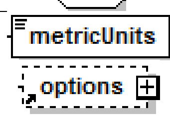
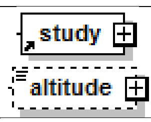
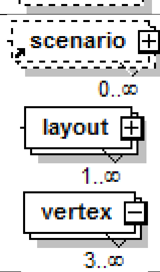
Some element descriptions include a Choice column. This column indicates you need to choose between one of the elements associated with the same choice letter. For example, referring to the table in section 4.3.3, choice `'a'` refers to a choice between the `latitude` and `latitudeDMS` elements, and choice `'b'` refers to the `longitude` and `longitudeDMS` elements. When creating a tag of type `latlonCoordGroup`, you can include one element from choice `'a'`, and one element from choice `'b'`.

Some ASIF elements contain attributes. For example, when specifying an airport, you can include the `airportCode` element. This element has a `type` attribute which indicates the type of airport code. In the example below, the `type` attribute indicates that the type of airport code is ICAO:

```
<airportCode type="ICAO">KMDW</airportCode>
```

Section 4.2 describes attributes when they are defined for a particular element.

Notation for Schema Diagram
The schema diagram illustrates the structure and contents of each XML element. It facilitates understanding the relationship between XML elements, and the rules and properties of each element. The following table lists the notations used in the diagrams.

Notation	Sample Icon	Description
Choice indicator		Only one of the elements contained in the selected group can be present
Sequence indicator		Child elements must appear in the specified sequence
Element		Represented by a rectangle with solid or dotted border – Solid rectangle – required element – Dotted rectangle – optional element
Element with (+) sign		Indicates that the element has child element(s) and/or attribute(s)
Element with min and max bound		Specifies the min/max number of times an element can occur in the parent element

XML elements in ASIF must be in the order as specified in the ASIF schema. N-88

4.2 Element Descriptions

4.2.1 aircraftType

Characterizes an aircraft.

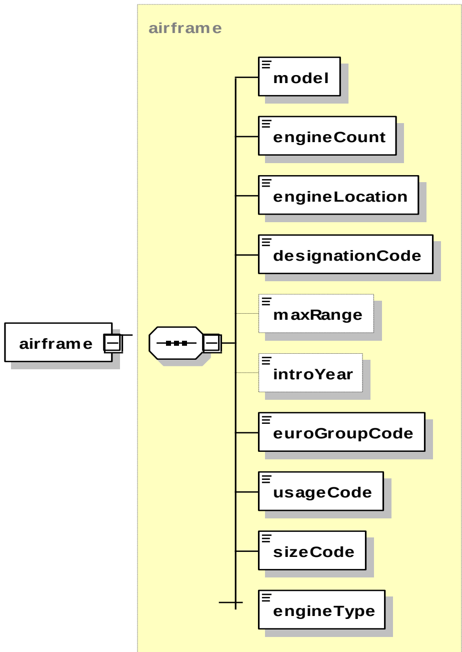
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
anpAircraftId	-	1	a	Record identifier.
airFrameModel	string50	1	a	Air frame model.
engineCode	string50	1		Engine code. Valid values: E (Electric), J (Jet), P (Piston), T (Turboprop).
engineModCode	string50	?		Engine modification code. (AEDT database reference table FLEET.FLT_ENGINE_MODS column ENGINE_MOD_CODE.)

Attributes: None

4.2.2 airframe



Specifies a new airframe.

Structure

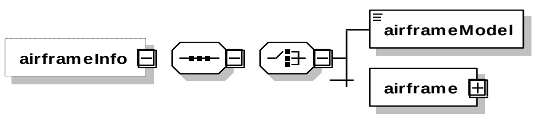
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
model	string50	1	Description of airframe. This must be a new, unique model value.
engineCount	int	?	Number of engines on airframe.
engineLocation	enum	?	Position of engine on airframe. Valid values: F (Fuselage/Tail), W (Wing).
designationCode	string1	?	Type of aviation. Valid values: C (Civil), G (General Aviation), M (Military).
maxRange	int	?	Number of miles airframe can fly fully fueled.
introYear	int	?	Year airframe was introduced.
euroGroupCode	string2	?	European group code for this airframe. Valid values: H1 (Helicopter Light), H2 (Helicopter Heavy), JB (Jet Business), JL (Jet Large), JM (Jet Medium), JR (Jet Regional), JS (Jet Small), PP (Propeller), SS (Supersonic), TP (Turboprop).

usageCode	string1	?	Usage code for this airframe. Valid values: H (Heavy), L (Large), M (Medium), S (Small), T (Light), V (Very Light).
sizeCode	string1	?	Size code for this airframe. Valid values: H (Heavy), L (Large), M (Medium), S (Small), T (Light), V (Very Light).
engineType			Type of engine on this airframe. Valid values: E (Electric), J (Jet), P (Piston), T (Turboprop).

Attributes: None

4.2.3 airframeInfo



Specifies airframe information.

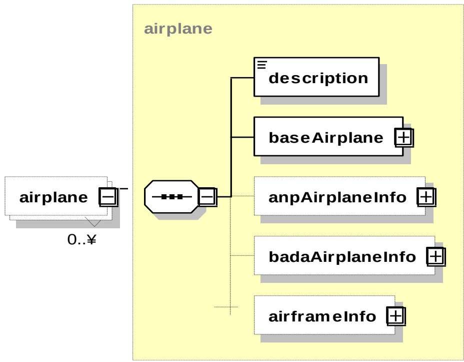
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
airframeModel	string50	1	a	Indicates the airframe model.
airframe	-	1	a	Specifies the airframe. See section 4.2.2.

Attributes: None

4.2.4 airplane



Characterizes an airplane.

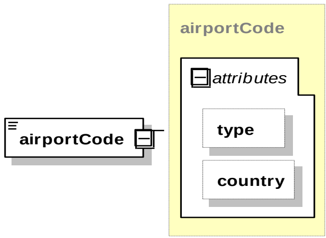
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
description	string255	1	Airplane's description.
baseAirplane	-	1	Base description of an airplane. See section 4.2.27.
anpAirplaneInfo	-	*	ANP modifications to the airplane's base description. See section 4.2.12.
badaAirplaneInfo	-	*	BADA modifications to the airplane's base description. See section 4.2.24.
airframeInfo	-	*	Specifies the airframe model. See section 4.2.3.

Attributes: None

4.2.5 airportCode



Contains an airport's code.

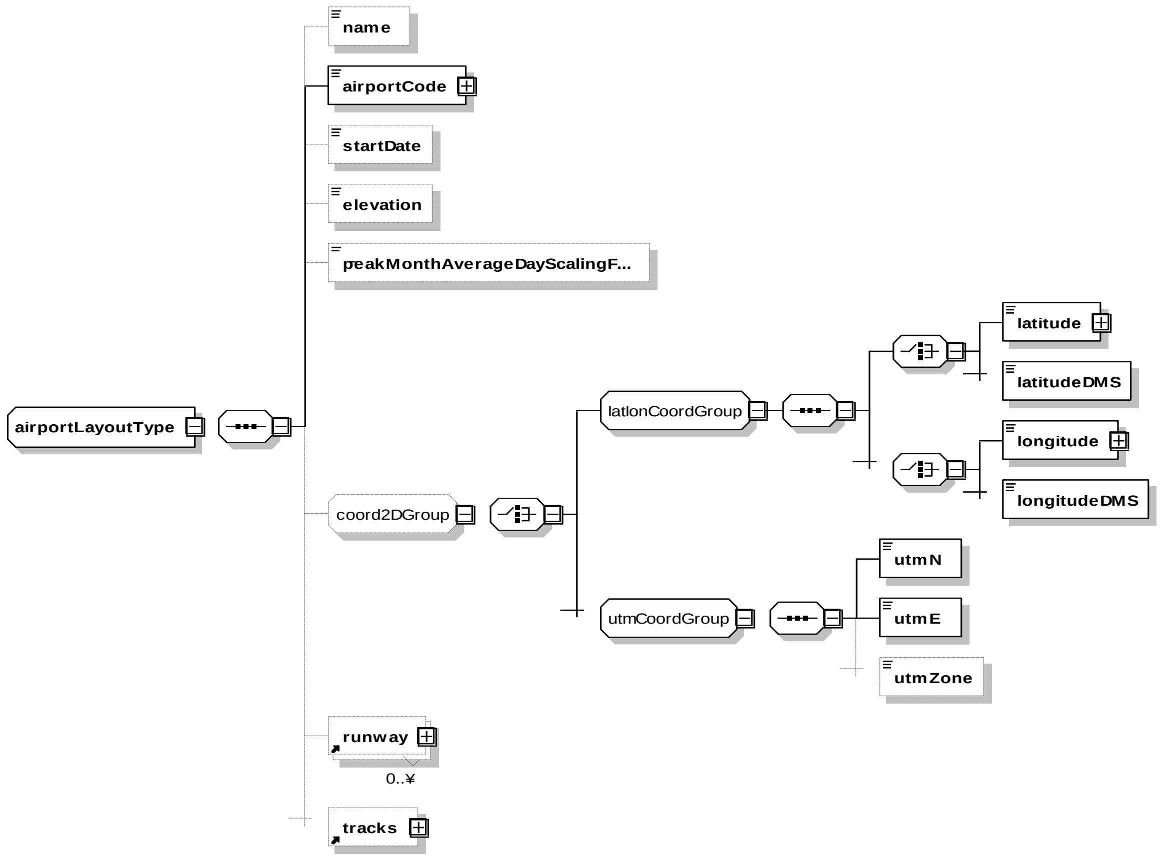
Structure: No children elements.

Attributes

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
type	enum	?	Type of airport code. Valid values for new studies: ICAO, IATA, FAA, OTHER. Legacy studies may use ANY and OTHER. Accepted airport codes can be confirmed in the dbo.APT_CODE table in the AEDT Airport database.
country	string3	?	Standard ISO 316601 two-letter country codes. For a list of these codes, see http://unstats.un.org/unsd/methods/m49/m49alpha.htm. Database reference: Airport.APT_CNTRY_CODE.CNTRY_CODE

4.2.6 airportLayoutType



Defines an airport's layout.

Structure

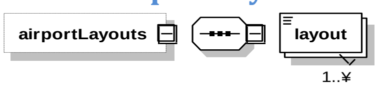
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
name	string255	1	ID of the layout. Must be unique.
airportCode	-	1	ICAO code of airport in the layout. See section 4.2.5.
startDate	date	1	Date airport is included in the study.
elevation	float	?	Elevation of the layout in feet above MSL.
coord2Dgroup	-	1	Type of 2-D coordinates specifying this airport layout. See section 4.3.2.

peakMonthAverageDayScalingFactor	double	1	This scale factor is applied to convert Average Annual Day operations to Peak Month Average Day operations. This is to comply with regulatory reporting requirements for the Peak Month Average Day emissions and fuel burn totals at individual airports.
runway	-	*	Runways included in the layout. See section 4.2.42.
tracks	-	*	Set of flight tracks. See section 4.2.54.

Attributes: None

4.2.7 airportLayouts



Container for one or more airport layouts.

Structure

See section 4.1 for terminology assistance.

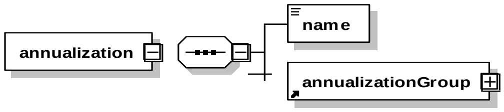
XML Tag	Type	Num	Description
layout	-	?	Describes an airport layout. See section 4.2.6.

Attributes

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
dummy	int	?	Not used.

4.2.8 annualization



Container for one or more annualization groups.

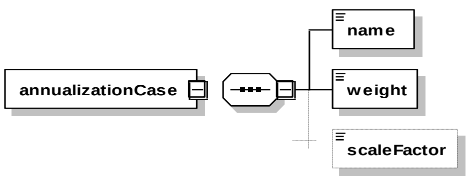
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
name	string255	1	Name of annualization.
annualizationGroup	-	+	Describes an annualization group. See section 4.2.10.

Attributes: None

4.2.9 annualizationCase



An annualization case is a collection of study cases whose results will be weighted in the scenario annualization rollup.

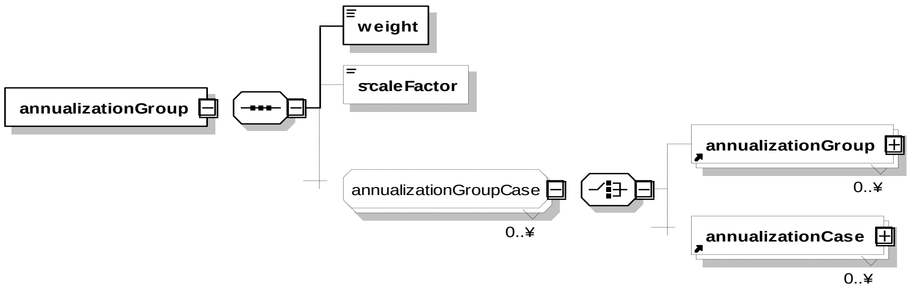
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
name	string255	1	Description of the case.
weight	double	1	Weight associated with the case.
scaleFactor	float	?	Scale factor applied to results for the case.

Attributes: None

4.2.10 annualizationGroup



Contains one or more weighted annualization group cases.

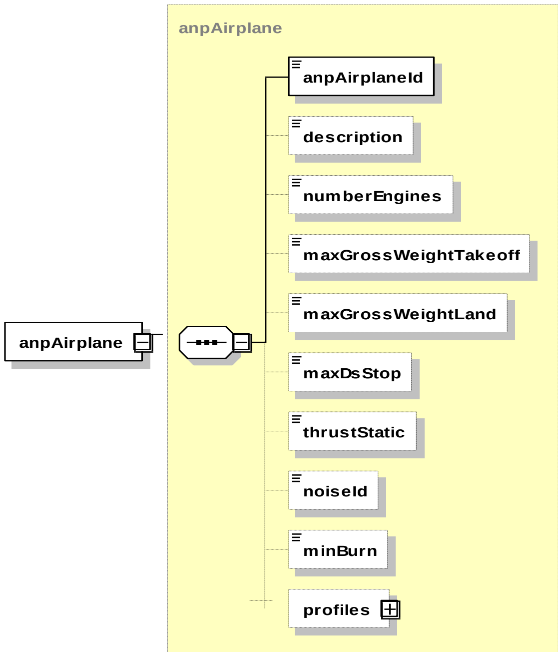
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
Weight	double	1	Weight associated with the annualization group.
scaleFactor	float	?	Scale factor applied to results for the annualization group.
annualizationGroupCase	-	+	A list of annualization groups or cases. See section 4.3.1.

Attributes: None

4.2.11 anpAirplane



Detailed characteristics of a new user-defined ANP airplane.

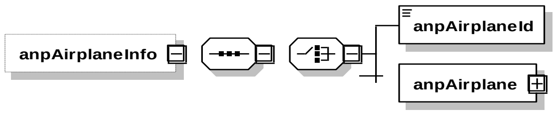
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
anpAirplaneId	string12	1	ID of ANP airplane. Must be a new, unique value.
description	string40	?	Description of ANP airplane.
numberEngines	int	?	Number of engines on this airplane.
maxGrossWeightTakeoff	int	?	Maximum gross weight on takeoff (min = 0, max = 999999, lbs).
maxGrossWeightLand	int	?	Maximum gross weight on landing (min = 0, max = 999999, lbs).
maxDsStop	int	?	FAR landing field length at maximum landing weight (min =0, max = 20000, feet).
thrustStatic	int	?	Static rated thrust or 100% thrust (lb, min =0, max = 200000).
noiseId	string12	?	ID of a Noise Group.
minBurn	double	?	Minimum fuel burn rate. (kg/sec)
profiles	-	?	ANP Profiles associated with this airplane. See section 4.2.21.

Attributes: None

4.2.12 anpAirplaneInfo



Detailed characteristics of an airplane.

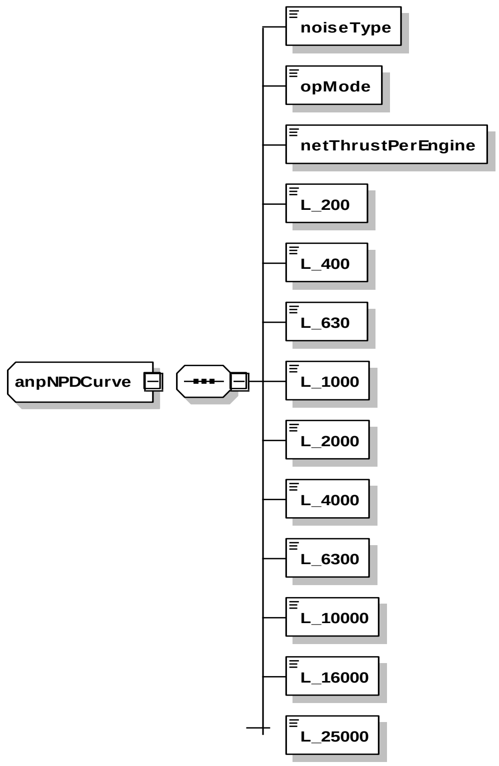
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	choice	Description
anpAirplaneId	string12	1	a	ID of an existing ANP airplane model. Database reference: FLEET.FLT_ANP_AIRPLANES.ACFT_ID
anpAirplane	-	1	a	Description of a new user-defined ANP airplane. See section 4.2.11.

Attributes: None

4.2.13 anpNPDCurve



Creates a new user-defined Noise-Power-Distance (ANP) curve.

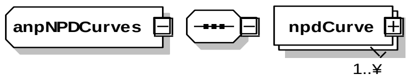
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
noiseType	string12	1	Type of noise described by this curve. Must be a new, unique value.
opMode	string10	?	Operation mode. (A = Approach, D = Depart, X = AfterBurner)
netThrustPerEngine	float	?	Net thrust per engine (min = 0.10, max = 99999.00, lbs. or percentage depending on parent noise group THRUST_SET_TYPE value).
L_200 through L_25000	double	?	Decibels at frequency 200 Hz through 25,000 Hz.

Attributes: None

4.2.14 anpNPDCurves



Creates a new set of user-defined ANP curves.

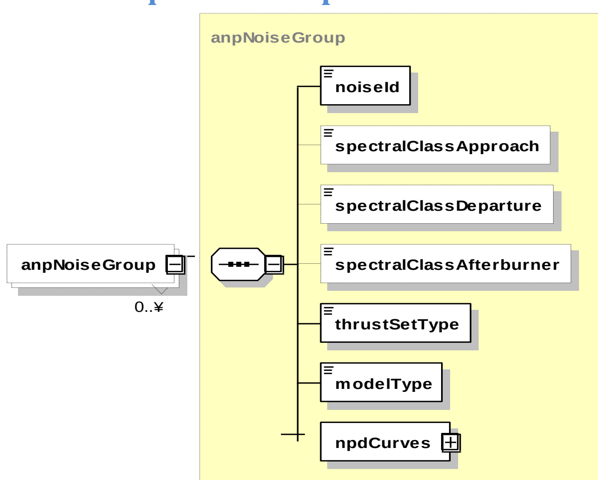
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
npdCurve	-	+	Base noise data interpolated/extrapolated upon according to slant range distance and thrust setting for aircraft. See section 4.2.13.

Attributes: None

4.2.15 anpNoiseGroup



Describes an ANP noise group.

Structure

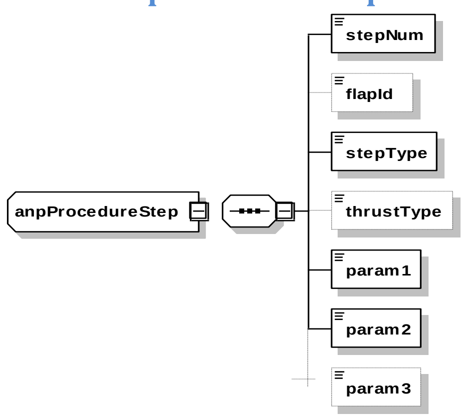
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
noiseId	string12	1	Noise group's ID.
spectralClassApproach	short	?	Spectral class number for approach (min = 0, max = 999).
spectralClassDeparture	short	?	Spectral class number for departure (min = 0, max = 999).

spectralClassAfterburner	short	?	Spectral class number for afterburner (min = 0, max = 999).
thrustSetType	string1	?	Type of thrust setting. Valid values: L (pounds), P (percent), Y (other).
modelType	string1	?	Type of distance-duration model. Valid values: I (INM), N (NoiseMap).
npdCurves	-	?	See section 4.2.14.

Attributes: None

4.2.16 anpProcedureStep



Describes an ANP procedure step.

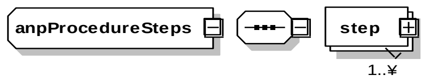
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
stepNum	int	1	Step number of the procedure. Must be unique in a sequence.
flapId	string6	?	Flap-setting identifier. Database reference: STUDY.FLT_ANP_AIRPLANE.FLAPS.FLAP_ID
stepType	string1	?	Type of step.
thrustType	string	?	Type of thrust.
param1 through param3	float	?	Parameters particular for this step type (min = -9999.0, max = 60000.0),

Attributes: None

4.2.17 anpProcedureSteps



Container for a set of ANP procedure steps.

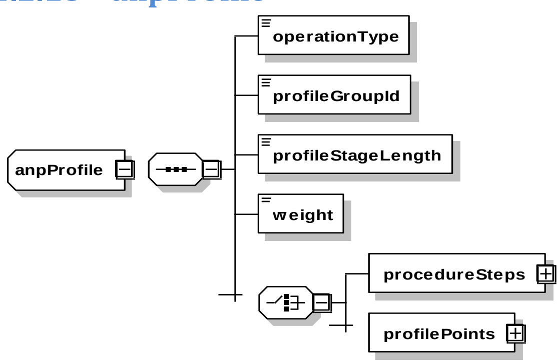
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
step	-	+	An ANP procedure step. See section 4.2.16.

Attributes: None

4.2.18 anpProfile



Describes an ANP profile.

Structure

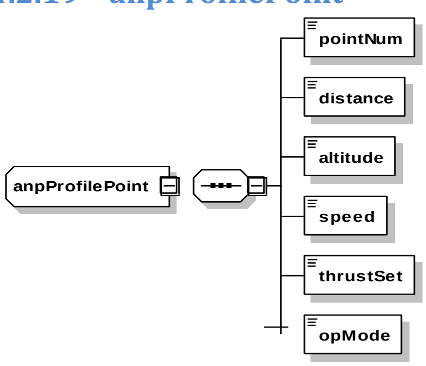
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
operationType	string1	1		Operation associated with this profile. Valid values: A (Approach), D (Depart), T (Touch&Go), F (CircuitFlt), V (OverFlt)
profileGroupId	string8	?		Profile group identifier. Valid values: STANDARD, NOISEMAP (INM standard data).

profileStageLength	string1	?		Profile stage number (min = 1, max = 9). Approach stage numbers are not related to trip distance. There is only one standard approach profile for most standard aircraft and its stage number is set to 1. Approach stage numbers are used to distinguish members of a group. For example, approach stage can mean different kinds of approaches (e.g. 1 = 3 degree approach, 2 = 5 degree approach).
weight	int			Aircraft weight during this operation type (min = 0, max = 999999, lbs).
procedureSteps	-	?	a	Set of procedure steps associated with this profile. See section 4.2.17.
profilePoints	-	?	a	Set of points associated with this profile. See section 4.2.20.

Attributes: None

4.2.19 anpProfilePoint



Individual point along an ANP profile.

Structure

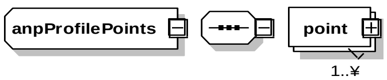
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
pointNum	short	1	Point index number. Must be sequential and unique, starting at 1.
distance	float	1	Distance along the ground relative to start (min = -9999999.9, max = 9999999.9, feet).
altitude	float	1	Altitude of aircraft (min = -9999, max = 60000, feet).

speed	float	1	Ground speed at this point (min = 0, max = 600, knots).
thrustSet	float	?	Corrected net thrust per engine at this point (min = 0.1, max = 99999, klbs or % max thrust).
opMode	string1	?	Operational mode. Valid values: A (Approach), D (Departure), X (Overflight).

Attributes: None

4.2.20 anpProfilePoints



Container of ANP profile points.

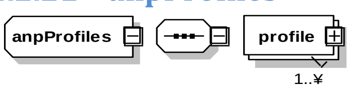
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
point	-	+	An ANP profile point. See section 4.2.19.

Attributes: None

4.2.21 anpProfiles



Container for a set of ANP profiles.

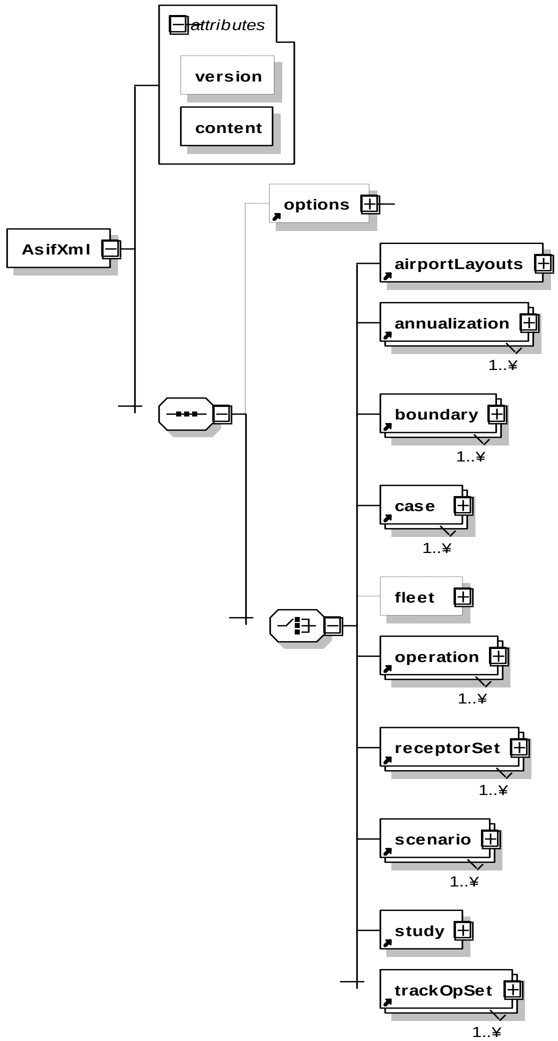
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
profile	-	+	One or more ANP profiles. See section 4.2.18.

Attributes: None

4.2.22 AsifXml



Root node of the ASIF tree.

Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
options	-	?		Contains options applied to the study. See section 4.2.37.
airportLayouts	-	+	a	Contains layouts for ASIF partial import into an existing study. See section 4.2.7.
annualization	-	*	a	Contains annualizations for ASIF partial import into existing study. See section 4.2.8.

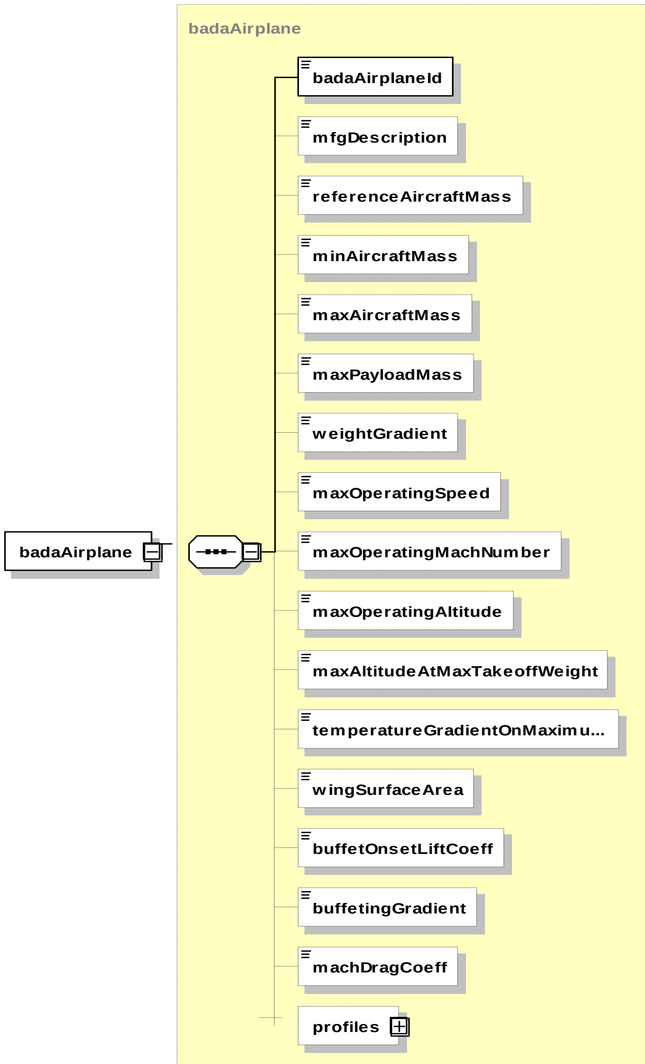
boundary	-	*	a	Contains study area boundaries for ASIF partial import into existing study. See section4.2.28.
case	-	+	a	Contains scenario cases for ASIF partial import into existing study. See section 4.2.29.
fleet	-	?	a	Contains study fleet data for ASIF partial import into existing study.
operation	-	*	a	Contains operations data for ASIF partial import into existing study. 4.2.35
receptorSet	-	*	a	Contains receptor sets for ASIF partial import into existing study. See section 4.2.40.
scenario	-	+	a	Contains scenarios for ASIF partial import into existing study. See section 4.2.44.
study	-	1	a	Contains a full ASIF study. See section 4.2.47.
trackOpSet	-	+	a	Contains trackOpSets for ASIF partial import into existing study. See section 4.2.52,

Attributes

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
version	string16	?	Study version. Used for revision control of a study.
content	enum	1	Describes general content of the study. Valid values: airportLayouts, annualization, boundary, case, fleet, receptorSet, scenario, study, trackOpSet.

4.2.23 badaAirplane



Describes a new user-defined BADA airplane.

Structure

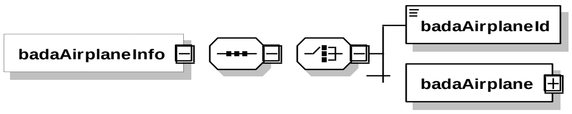
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
badaAirplaneId	string12	1	ID of a BADA airplane model. Must be unique.
mfgDescription	string255	?	Manufacturer description.
referenceAircraftMass	float	?	Minimum aircraft mass (min = 0.0, max = 455.0, metric ton).

XML Tag	Type	Num	Description
minAircraftMass	float	?	Minimum aircraft mass (min = 0.0, max = 455.0, metric ton).
maxAircraftMass	float	?	Maximum aircraft mass (min = 0.0, max = 455.0, metric ton).
maxPayloadMass	float	?	Maximum payload mass (min = 0.0, max = 455.0, (metric ton).
weightGradient	float	?	Weight gradient on maximum altitude (min = 0.0, max = 10.0, feet/kg).
maxOperatingSpeed	float	?	Maximum operating speed (min = 0.0, max = 600.0, knots cas).
maxOperatingMachNumber	float	?	Maximum operating Mach number (min = 0.0, max = 10.0, mach).
maxOperatingAltitude	float	?	Maximum operating altitude (min = -9999.0, max = 60000.0, feel MSL).
maxAltitudeAtMaxTakeoffWeight	float	?	Maximum altitude at maximum takeoff weight and ISA (min = -9999.0, max = 60000.0, feel MSL).
temperatuerGradientOnMaximalAltitude	float	?	Temperature gradient on maximum altitude (min = -1000.0, max = 10.0), feet/degrees C).
wingSurfaceArea	float	?	Wing surface area (min = 0.0, max = 1000.0, square meters).
buffetOnsetLiftCoeff	float	?	Buffet onset lift coefficient (jet only) (min = 0.0, max = 10.0).
buffetGradient	float	?	Buffeting gradient (jet only) (min = 0.0, max = 10.0 ($mach^{-1}$).
machDragCoeff	float	?	Mach drag coefficient (min = 0.0, max = 10.0).
profiles	-	?	A set of BADA profiles for this airplane. See section 4.2.26.

Attributes: None

4.2.24 badaAirplaneInfo



Specifies the BADA information to be used.

Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	choice	Description
badaAirplaneId	string12	1	a	ID of an BADA airplane model to use for this aircraft.
badaAirplane	-	1	a	Description of a new user-defined BADA airplane. See section 4.2.23.

Attributes: None

4.2.25 badaProfile

Describes a BADA profile.

Structure

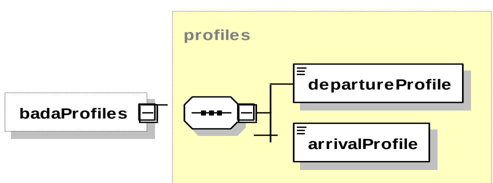
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
massRangeValue	string2	1	Mass range. Valid values: LO (low range), AV (average range), HI (high range).
companyCode1	string3	?	Three-letter company code.
companyCode2	string2	?	Two-letter company code.
companyName	string15	?	Name of airline that uses this procedure.
aircraftVersion	string12	?	Aircraft version to which this procedure applies.
engine	string12	?	Engine identifier.
climbSpeedBelowTransitionAltitude	short	?	Standard climb speed between 1,500/6,000 and 10,000 feet (min = 0.0, max = 600.0), knots cas).
climbSpeedAboveTransitionAltitude	short	?	Standard climb speed between 10,000 feet and Mach transition altitude (min = 0.0, max = 600.0, knots cas).

climbMachNumber	double	?	Standard climb Mach number above Mach transition altitude (min = 0.0, max = 10.0, mach).
cruiseSpeedBelowTransitionAltitude	short	?	Standard cruise speed between 3,000 and 10,000 feet (min = 0.0, max = 600.0, knots cas).
cruiseSpeedAboveTransitionAltitude	short	?	Standard cruise speed above 10,000 feet until Mach transition altitude (min = 0.0, max = 600.0, knots cas).
cruiseMachNumber	double	?	Standard cruise Mach number above transition altitude (min = 0.0, max = 10.0, mach).
descentMachNumber	double	?	Standard descent Mach number above transition altitude (min = 0.0, max = 10.0, mach).
descentSpeedUnderTransitionAltitude	short	?	Standard descent speed between 3,000/6,000 and 10,000 feet (min = 0.0, max = 600.0, knots cas).
descentSpeedOverTransitionAltitude		?	Standard descent speed above 10,000 feet until Mach transition (min = 0.0, max = 600.0, knots cas).

Attributes: None

4.2.26 badaProfiles



Container for a set of BADA profiles.

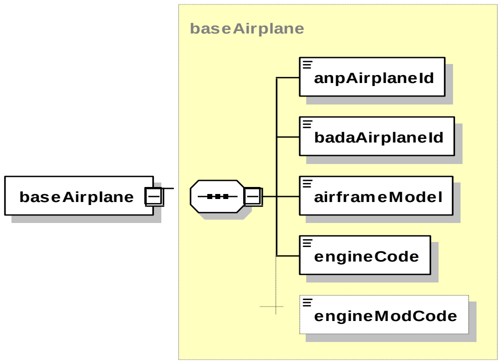
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
profile	-	+	One or more BADA profiles. See section 4.2.25.

Attributes: None

4.2.27 baseAirplane



Base configuration for an airplane.

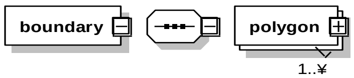
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
anpAirplaneId	string12	?	Airplane's ANP ID. Database reference: STUDY.FLT_ANP_AIRPLANE.ACFT_ID
badaAirplaneId	string10	?	Airplane's BADA ID. Database reference: STUDY_FLT_BADA_AIRPLANE.BADA_ID
airframeModel	string50	?	Airplane's airframe model. Database reference: STUDY.FLT_AIRFRAMES.MODEL
engineCode	string50	?	Airplane's engine code. Database reference: STUDY.FLT_ENGINES.ENGINE_CODE
engineModCode	string50	?	Airplane's engine modification code. Database reference: STUDY.FLT_ENGINE_MODS.ENGINE_MOD_CODE

Attributes: None

4.2.28 boundary



Specifies the boundaries of a study or other element contained within a study.

When a study boundary is specified, all flight paths resulting from departure, arrival, and overflight operations are calculated to and/or from the study boundary.

Structure

See section 4.1 for terminology assistance.

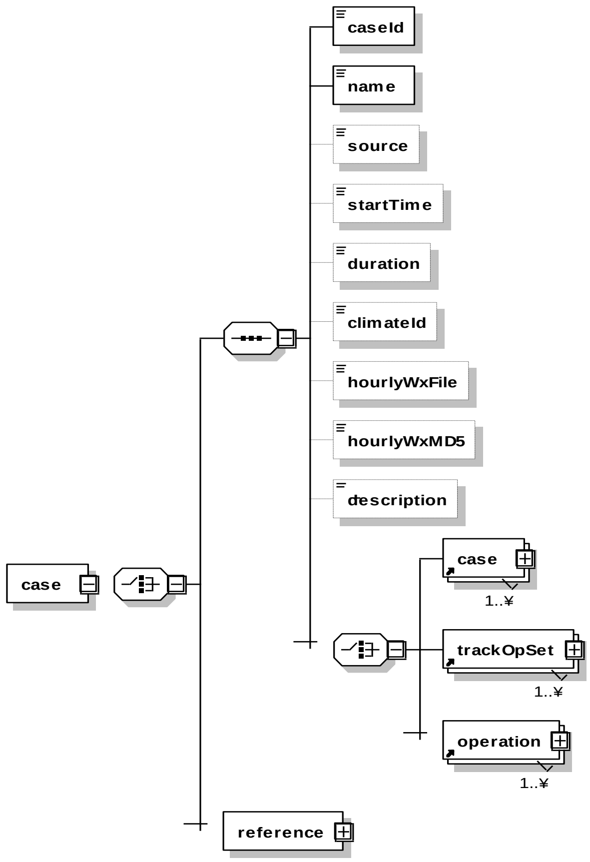
XML Tag	Type	Num	Description
polygon	-	+	Set of coordinates defining the boundary. See section 4.2.38.

Attributes

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
dummy	int	?	Not used.

4.2.29 case



Describes general parameters for a case.

Structure

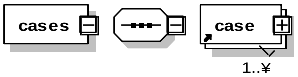
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
caseid	int	1	a	Case ID.
name	string255	1		The name of the case (must be unique within the scenario).
source	enum	1		Emissions source for this case. Valid values: Container, Aircraft, GSE Population, Parking Facilities, Roadways, Stationary Sources, Training Fires.
startTime	datetime	1		Case's start time. If not defined, the value specified in the scenario element will be used. Must match the value for startTime for the scenario (see section 4.2.44).

XML Tag	Type	Num	Choice	Description
duration	int	1		Case's duration. If not defined, the value specified in the scenario element will be used. Must match the value for duration for the scenario (see section 4.2.44). For AEDT2a this is restricted to 24 hours (1 day). All cases within a scenario must have the same duration as the scenario (hours).
climateId	string8	1		ID of a climate condition. See section 4.2.32.
hourlyWxFile	string255	?		The file containing the hourly weather data used for emissions calculations. This element is not supported in AEDT2a.
hourlyWxMD5	string16	?		The weather file's MD5 checksum. If not present, the MD5 checksum will be computed for the user at the time of importing the ASIF. This element is not supported in AEDT2a.
description	string255	?		Description of the case.
case	-		b	Case used in this case.
trackOpSet	-	+	b	Tracks and operations for the case. See section 4.2.52.
operation	-		b	Operation used in this case. See section 4.2.35.
reference	-	S	a	This element is used to reference another case by the scenario and case names. If used, then no other case elements can be used (this element block must be used all by itself inside the case element). See section 4.2.41.

Attributes: None

4.2.30 cases



Placeholder for one or more cases.

Structure

See section 4.1 for terminology assistance.

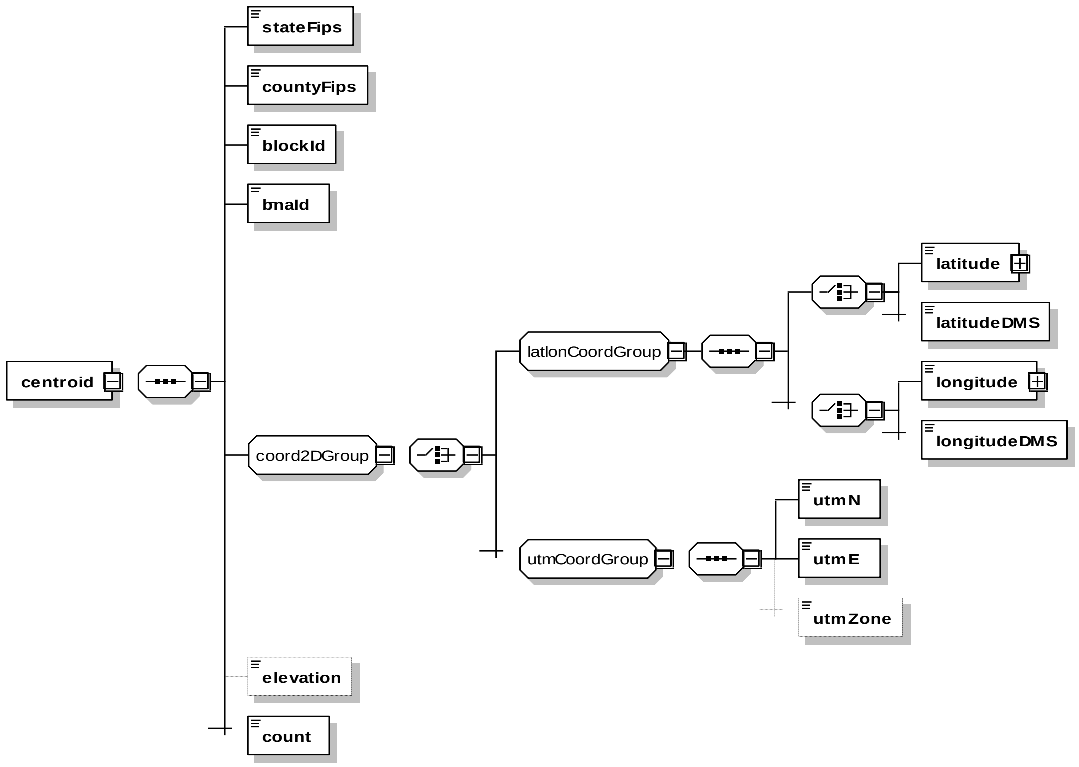
XML Tag	Type	Num	Description
case	-	*	A case Set of coordinates defining the boundary. See section 4.2.29.

Attributes

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
dummy	int	?	Not used.

4.2.31 centroid



Describes the geometric center of a polygon.

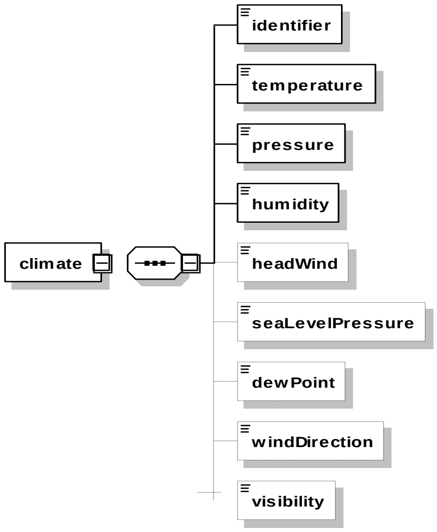
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
stateFips	int	?	Optional census state identifier.
countyFips	int	?	Optional census county identifier.
blockId	int	?	Optional census BLOCK ID.
bnaId	string6	?	Optional census BNA ID.
coord2DGroup	-	1	Type of 2-D coordinates specifying the runway's endpoint. See section 4.3.2.
elevation	float	?	The centroid's elevation above MSL (ft) if terrain not used. If not specified, AEDT2a will use elevation of operation airport.
count	int	?	The population count of the centroid.

Attributes: None

4.2.32 climate



Characterizes the climate during the study.

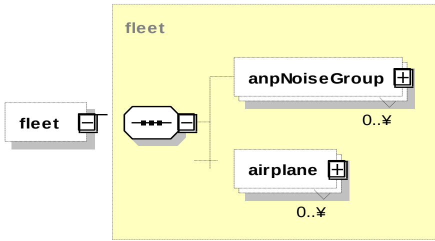
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
identifier	string8	1	Identifier of the climate condition.
temperature	float	?	Temperature in the climate condition. (degress F)
pressure	float	?	Atmospheric pressure in the climate condition (mmHg)
humidity	float	?	Humidity in the climate condition. (mmHg)
headWind	float	?	Velocity of headwind. (knots)
seaLevelPressure	float	?	Atmospheric pressure at sea level. (mmHg)
dewPoint	float	?	Dew point in the climate condition. (degrees F)
windDirection	float	?	Wind direction (degrees)
visibility	float	?	Visibility in the climate condition. (nMi)

Attributes: None

4.2.33 fleet



Describes a fleet of aircraft.

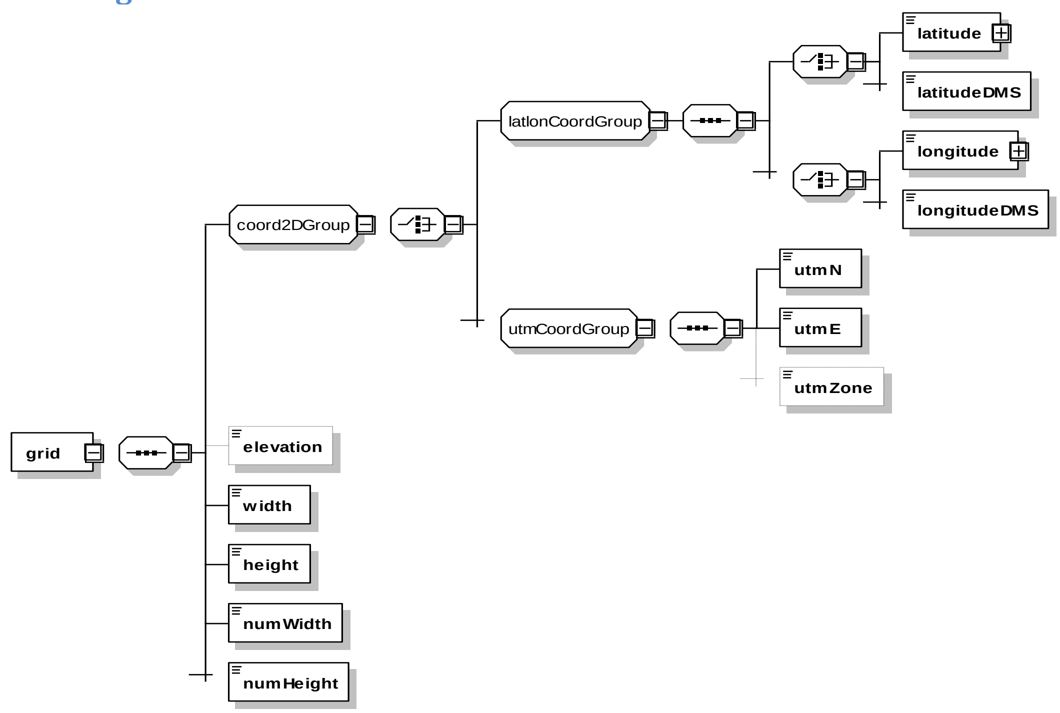
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
anpNoiseGroup	-	*	Contains parameters for Airplane Noise Prediction. See section 4.2.15.
airplane	-	*	Describes an airplane. See section 4.2.4.

Attributes: None

4.2.34 grid



Describes rectangular impact receptor with regularly spaced points.

Structure

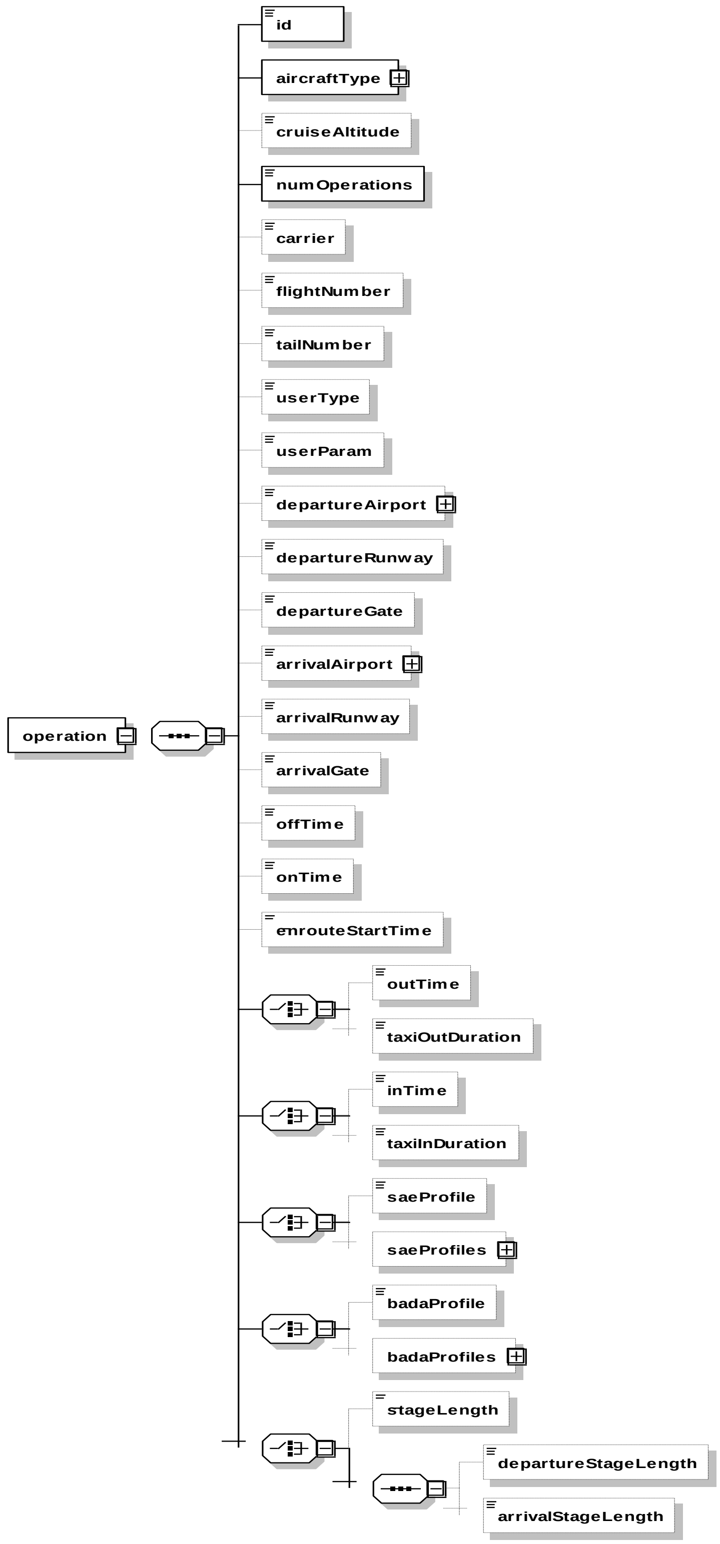
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
coord2DGroup	-	1	Type of 2-D coordinates specifying the grid's origin (southwest corner). See section 4.3.2.
elevation	float	?	The grid's elevation above MSL (ft) if terrain not used. If not specified, AEDT2a will use elevation of operation airport.
width	float	1	Width of the grid (nmi).
height	float	1	Height of the grid (nmi).
numWidth	int	1	Number of points to spread across the width of the grid. The total number of points in the grid is numWidth × numHeight. Points will be located along width of grid using the formula i × (width/numWidth) where i is the index of the point (0 … numWidth − 1).

numHeight	int	1	Number of points to spread across the height of the grid. The total number of points in the grid is numWidth × numHeight. Points will be located along height of grid using the formula: *i* × (width/numHeight) where *i* is the index of the point (0 … numHeight − 1).

Attributes: None

4.2.35 operation



Describes an aircraft flight operation.

Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
id	string16	1		User specified identifier for the operation. This field allows the user to create their own identifier for each AirOperation. This field can be unique, degenerate, or even left blank/empty. One purpose served by this field is to allow the user to tie the AEDT AirOperations back to some original data source by setting the id field to an identifing identifier from the original data source. Another purpose could be to set each id to a project specific value for each AirOperation. The id field is used in several AEDT lists and reports that print out the AirOperations. In addition, the Impact Evaluation dialog uses the id as its main method of distinguishing AirOperations when allowing the user to pick and choose operations to be moved to alternative flight tracks. If, however, the user has no outside data sources that need to be tied to the AEDT AirOperations, or if each AirOperation is identical in the sense that no specific AirOperation is more valuable than another or that there will be no intent to distinguish one AirOperation over another, then the suggested approach is to just set the UserID field to unique number or set of characters. This will allow the user to distinguish the AirOperations if the need ever arises. Nevertheless, one can leave all the id fields empty or non-unique set of ids; however, in doing so, the user will be forced to use other identifying fields of the AirOperation if they should ever want to distinguish between AirOperations.

XML Tag	Type	Num	Choice	Description
aircraftType	-	1		Type of aircraft in the flight. See section 4.2.1.
cruiseAltitude	double	1		Override aircraft cruise altitude for this operation (ft).
numOperations	double	1		Number of operations comprising this operation.
carrier	string4	?		Carrier flying the flight. Not fully supported in AEDT2a.
flightNumber	string16	?		Flight number. Not fully supported in AEDT2a.

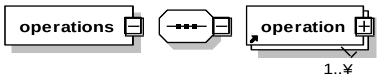
XML Tag	Type	Num	Choice	Description
tailNumber	string8	?		Flight's tail number. Not fully supported in AEDT2a.
userType	string12	?		User-defined aircraft type. Cannot be an aircraftType. Not fully supported in AEDT2a.
userParam	string16	?		User-defined parameter associated with the operation. Not fully supported in AEDT2a.
departureAirport	-	S		Departure airport's ICAO code. Required if the operation is used with a <flight> or <operation> element. Also required if used with a <trackOpSet> modeling departures, circuits, runups, or touch-and-goes. See section 4.2.5.
departureRunway	string8	S		Airport's departure runway ID. Required if the operation is used with a <flight> or a <trackOpSet> modeling departures, circuits, runups, or touch-and-goes.
departureGate	string4	S		Airport's departure gate. Not fully supported in AEDT2a.
arrivalAirport	-	S		Arrival airport's ICAO code. Required if the operation is used with a <flight> or <operation> element. Also required if used with a <trackOpSet> modeling arrivals, circuits, runups, or touch-and-goes. See section 4.2.5.
arrivalRunway	string8	S		Airport's arrival runway ID. Required if the operation is used with a <flight> or a <trackOpSet> modeling arrivals, circuits, runups, or touch-and-goes.
arrivalGate	string4	S		Airport's arrival gate. Not fully supported in AEDT2a.
offTime	datetime	S		Wheels-off time. Required for any departure or runup, circuit, runup, or touch-and-go operation.
onTime	datetime	S		Wheels on time. Required for any arrival operation.
enrouteStartTime	datetime	S		Time aircraft reaches the first en route node. Required for en route or overflight flights. Not fully supported in AEDT2a
outTime	datetime	S	a	Time aircraft pushed back from the gate for a departure. When present, taxiOutDuration = (offTime − outTime). Not fully supported in AEDT2a.
taxiOutDuration	int	S	a	Number of seconds during taxi-out. Required for emissions modeling, optional for noise modeling. Not fully supported in AEDT2a.
inTime	datetime	S	b	Time aircraft arrives at arrival gate. When present, taxiInDuration = (onTime – inTime).
taxiInDuration	int	S	b	Number of seconds during taxi-in. Required for emissions modeling, optional for noise modeling.
saeProfile	string8	*	c	Overrides default profile assignment for a flight's arrival and departure phases using characteristics specified by SAE International. Applicable when the override is unambiguously arrival or departure.

XML Tag	Type	Num	Choice	Description
saeProfiles	-	*	c	Overrides default profile assignment for a flight's arrival and departure phases using characteristics specified by SAE International. Applicable when it is necessary to specify both the arrival and departure profiles. See section 4.2.39.
badaProfile	string8	*	d	Overrides default profile assignment for a flight's arrival and departure phases using characteristics specified by BADA. Applicable when the override is unambiguously arrival or departure.
badaProfiles	-	*	d	Overrides default profile assignment for a flight's arrival and departure phases using characteristics specified by BADA. Applicable when it is necessary to specify both the arrival and departure profiles. See section 4.2.39.
stageLength	string1	?	e	Overrides default departure and arrival stage length values. Applicable when the override is unambiguously arrival or departure. If operation type is Arrival, then AEDT will always use 1 for stage length.
departureStageLength	string1	?	e	Overrides default departure stage length. Applicable if the phase is a departure phase.
arrivalStageLength	string1	?		Overrides default arrival stage length. Applicable if the phase is an arrival phase. If operation type is Arrival, then AEDT will always use 1 for stage length.

Stage length "M" does not define a specific trip distance, but rather specifies the maximum weight profile for the given aircraft type. In the absence of any distance information, default cruise altitudes for stage "M" profiles are set based on a trip distance of 500 nautical miles, which may result in a lower default cruise altitude than is appropriate for that aircraft weight. Users are advised to assign their own cruise altitude to any operation using stage "M" profiles. N-89

Attributes: None

4.2.36 operations



Contains a list of aircraft flight operations.

Structure

See section 4.1 for terminology assistance.

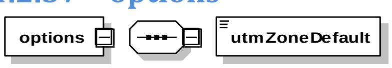
XML Tag	Type	Num	Description
operation	-	+	A flight operation. See section 4.2.35.

Attributes

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
dummy	int	?	Not used.

4.2.37 options



Contains default option values applied to the study.

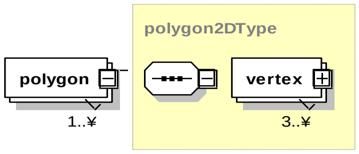
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
utmZoneDefault	int	1	Default UTM zone number.

Attributes: None

4.2.38 polygon



Specifies the shape of a polygon.

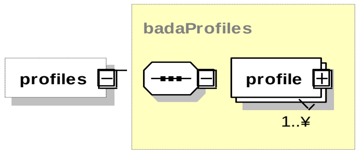
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
vertex	-	3+	A list of vertices defining the polygon. See section 4.2.57.
dummy	int	?	Not used.

Attributes: None

4.2.39 profiles



Contains an arrival and departure profile.

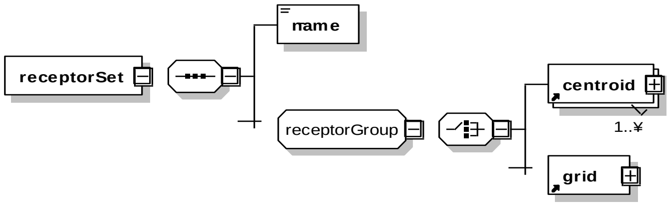
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
departureProfile	string8	1	A flight's departure profile.
arrivalProfile	string8	1	A flight's arrival profile.

Attributes: None

4.2.40 receptorSet



Contains one or more receptor sets at various locations.

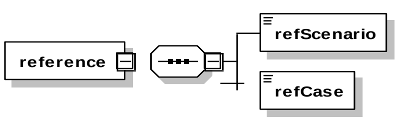
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
name	string255	+	Descriptive name of the receptor set.
receptorGroup	-	+	Description of receptor group at this location. See section 4.3.5.

Attributes: None

4.2.41 reference



Refers to a case by its scenario name and case name.

Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
scenarioRef	string255	1	Name of an existing scenario
caseRef	String255	1	Name of an existing case directly linked to the referenced scenario.

Attributes: None

Conditions required:

- All airport layouts in the referenced scenario must be assigned to the target scenario.
- The referenced case must have a unique name in the new scenario.

4.2.42 runway

Describes dimensions of a runway.

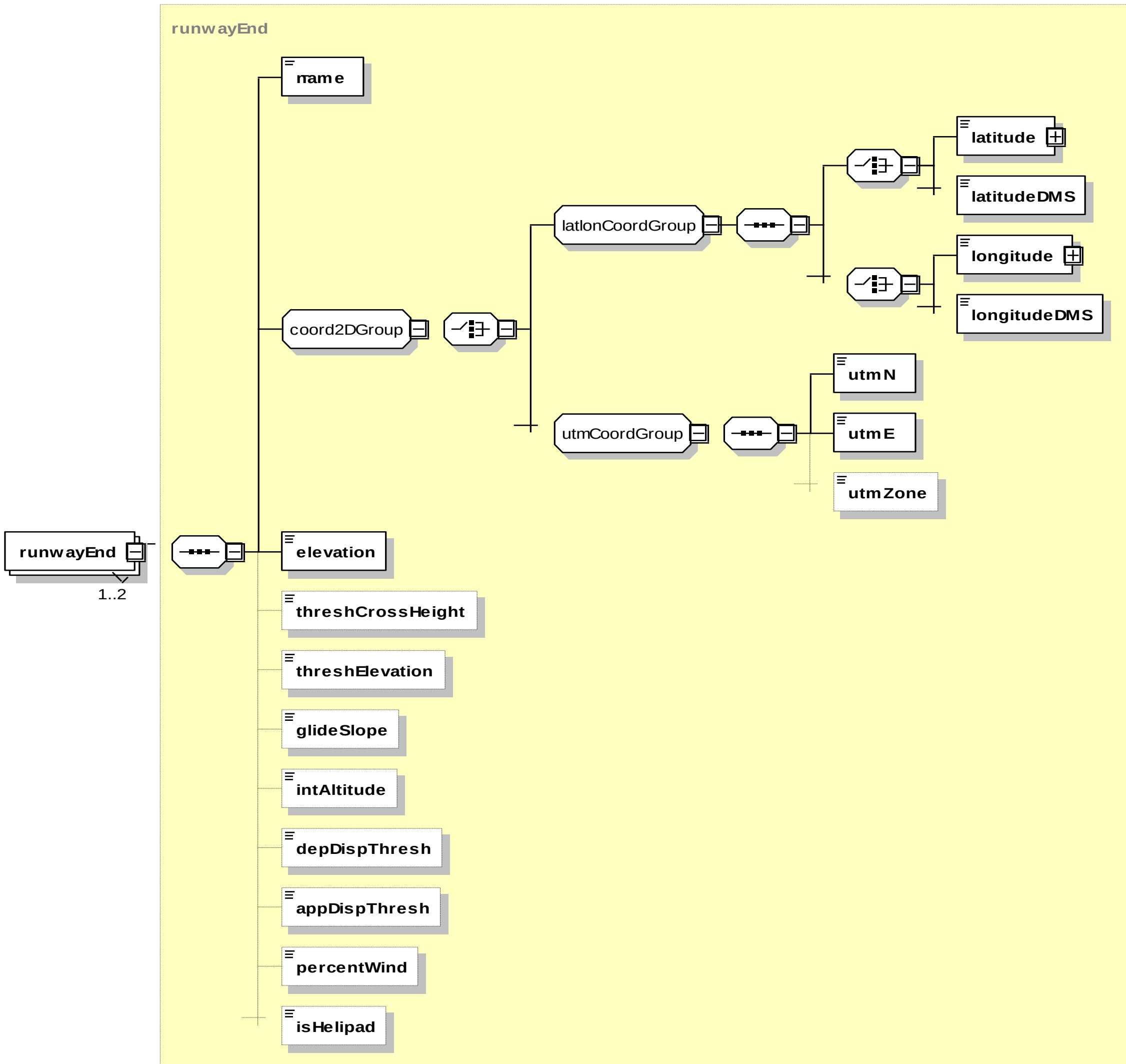
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
length	int	1	Length of runway (feet).
width	int	1	Width of runway (feet).
runwayEnd	-	1-2	Characterizes the runway’s endpoint. See section 4.2.43.

Attributes: None

4.2.43 runwayEnd



Characterizes a runway's endpoint.

Structure

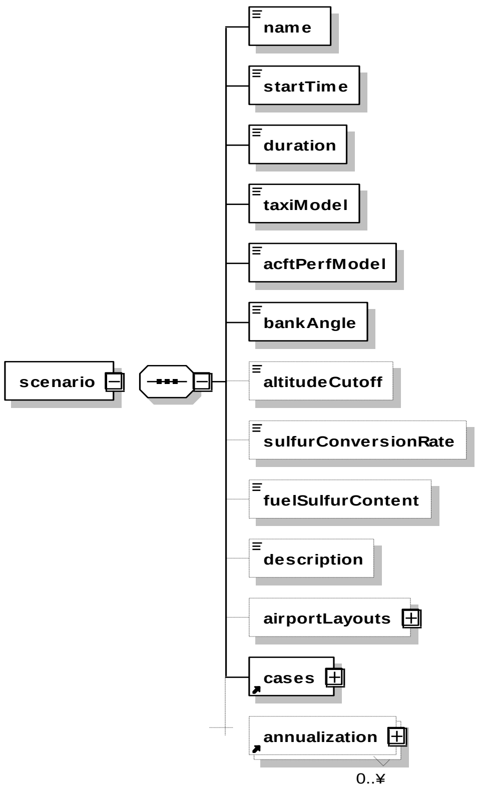
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
name	string8	1	ID of the runway's endpoint.
coord2DGroup	enum	?	Type of 2-D coordinates specifying the runway's endpoint. See section 4.3.2.
elevation	float	?	Runway endpoint's elevation above MSL in feet.
threshCrossHeight	float	?	Approach threshold crossing height AGL (feet).

threshElevation	float	?	Elevation of runway's endpoint (feet MSL).
glideSlope	float	?	Glide slope for runway's endpoint (degrees).
intAltitude	float	?	Runway endpoint's elevation in hundreds of feet.
depDispThresh	float	?	Takeoff displaced threshold (feet).
appDispThresh	float	?	Approach displaced threshold (feet).
percentWind	float	?	Percent change in airport average headwind.
isHelipad	string	?	Indicates if this end of the runway is also a helipad.

Attributes: None

4.2.44 scenario



Describes a flight scenario.

Structure

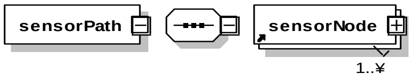
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
name	string255	1	Description of scenario.
startTime	datetime	1	Start time of scenario.
duration	int	1	Scenario's duration (hours).
taxiModel	enum	1	Type of taxi modeling. Valid values: UserSpecified, Sequencing.
acftPerfModel	enum	1	Type of aircraft performance model. Valid values: ICAO, SAE1845.
bankAngle	Boolean	1	Indicates if bank angle calculations should be included in calculations. NOTE: AEDT2A ignores this value and treats all scenarios as if their bank angle value was set to true.

altitudeCutoff	float	1	Altitude to cutoff trajectory modeling for this scenario (nMi MSL). The scenario altitude cutoff only affects noise impact calculation in AEDT2a. Fuel burn and emissions will be calculated until a flight reaches the study boundary.
sulfurConversionRate	float	1	Portion of sulfur in the fuel that, when combusted, becomes sulfuric acid used for emissions calculations. Default Values: 0.05 (5%) for US airports (FOA3a), and 0.024 (2.4%) for non-US airports (FOA3). This value cannot be edited for US airports as mandated by the EPA-approved FOA 3.0a methodology.
fuelSulfurContent	float	1	Percentage, by weight, of sulfur in the fuel used for emissions calculations. Default Values: 0.00068 (0.068%) for US airports (FOA3a), (0.0006) 0.06% for non-US airports (FOA3). This value cannot be edited for US airports as mandated by the EPA-approved FOA 3.0a methodology.
description	string255	?	A description of the scenario.
airportLayouts	-	*	Description of airport layouts used in the scenario. See section 4.2.7.
cases	-	*	The set of cases used in the scenario. See section 4.2.30.
annualization	-	*	Contains annualization for this scenario. See section 4.2.8.

Attributes: None

4.2.45 sensorPath



Describes a flight path based on radar data.

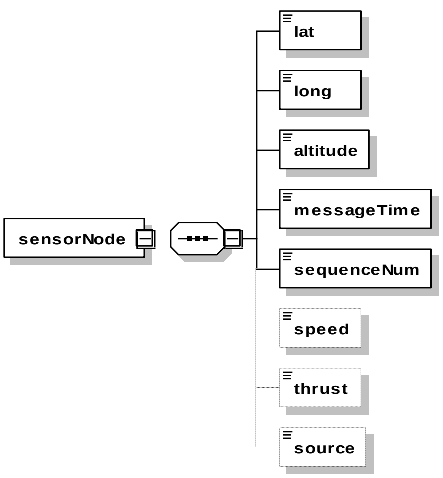
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
sensorNode	-	+	Collection of sensorNodes describing a runway to runway track based on radar data. See section 4.2.46.

Attributes: None

4.2.46 sensorNode



Describes a single node of a radar flight path.

Structure

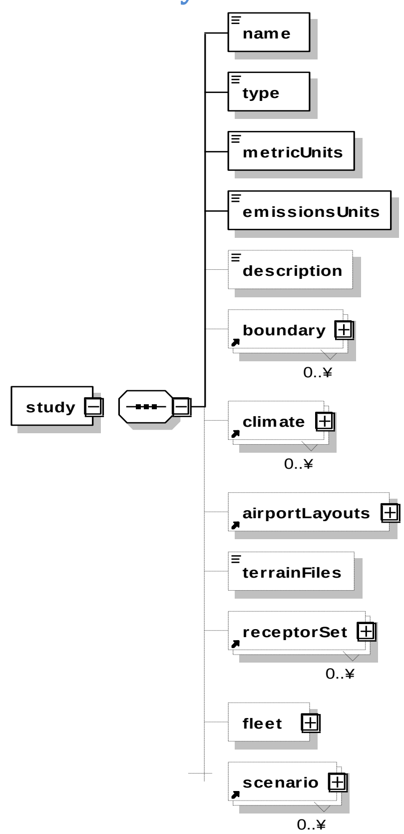
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
lat	double	1	Latitude for this location (decimal degrees).
long	double	1	Longitude for this location (decimal degrees).
altitude	double	1	Altitude at this location (feet)

messageTime	dateTime	1	Time aircraft reaches this location. NOTE: Not used in AEDT2a.
sequenceNum	int	1	Order of this location in node list.
speed	float	?	Ground speed of aircraft at this location (knots).
thrust	float	?	Thrust of aircraft at this location (lbs). NOTE: Not used in AEDT2a.
source	string255	?	Source of the data for this node. NOTE: Not used in AEDT2a.

Attributes: None

4.2.47 study



Contains specific information about a study.

Structure

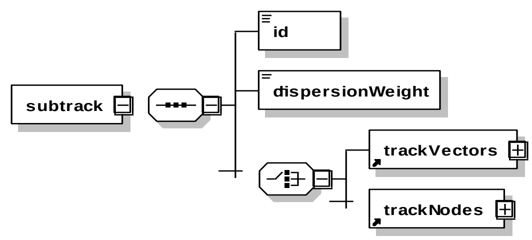
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
name	string255	1	Name of the study.
type	enum	1	Type of study. Valid values: Emissions, Dispersion, Noise and Emissions, Noise and Dispersion. NOTE: AEDT2A only supports the "Noise and Emissions" value.
metricUnits	boolean	1	Indicates if units of measure are metric. TRUE indicates metric units, and FALSE indicates imperial units.
emissionsUnits	enum	1	Emissions units to be used for the study. Valid values: MetricTonnes, Kilograms, Grams, ImperialTons, or Pounds.
description	string255	?	Optional description of the study.

boundary	-	*	Boundaries of areas included in the study. See section4.2.28.
climate	-	*	Prevailing climate during the study. See section 4.2.32.
airportLayouts	-	+	Contains layouts for airports included in the study. See section 4.2.7.
terrainFiles	string255	*	List of files containing descriptions of terrain.
receptorSet	-	*	Define receptor sets for the study. See section 4.2.40.
fleet	-	?	Defines aircraft fleet participating in the study. See section 4.2.33.
scenario	-	+	Defines scenarios for the study. See section 4.2.44.

Attributes: None

4.2.48 subtrack



A segment of a flight track.

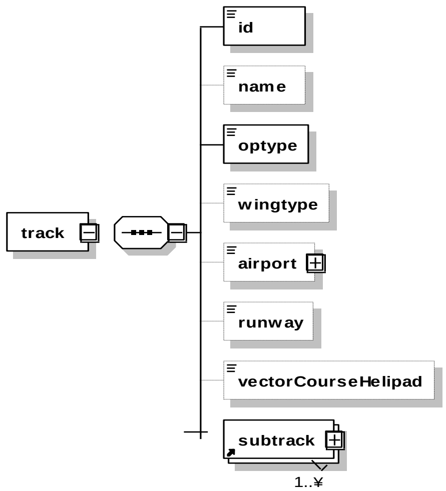
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
id	string16	1		Subtrack ID.
dispersionWeight	float	1		Dispersion weight associated with this track. All dispersion weights for sibling subtracks must add to one.
trackVectors	-	*	a	A set of vectors describing the subtrack. See section 4.2.56.
trackNodes	-	*	a	A set of nodes describing the subtrack. See section 4.2.51.

Attributes: None

4.2.49 track



A flight's track.

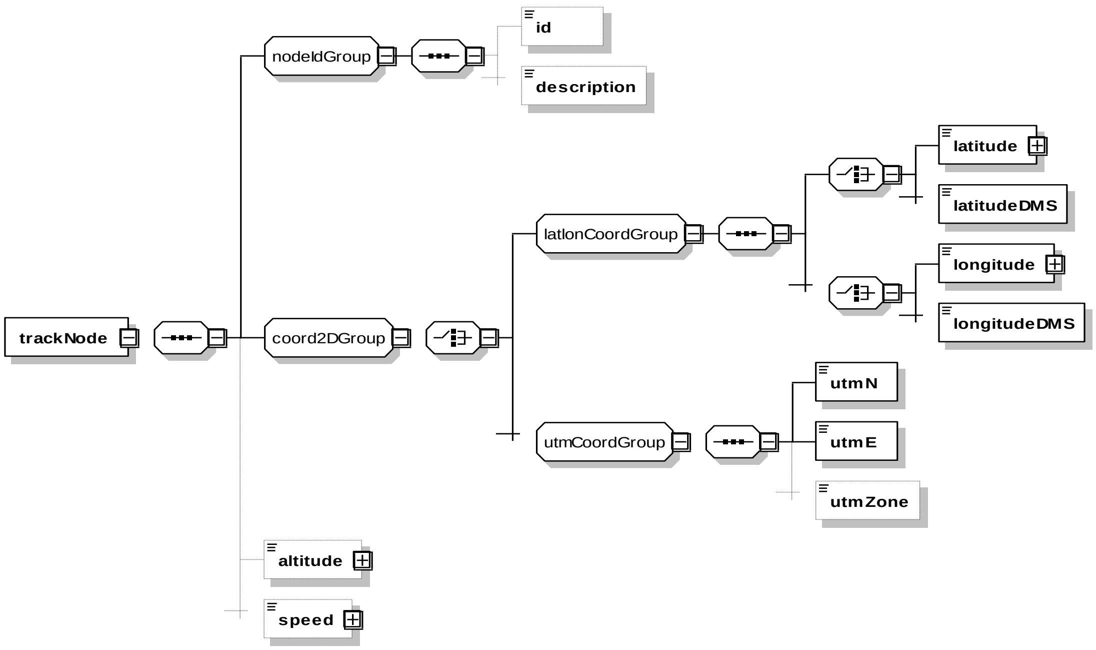
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
id	string16	1	Track ID.
name	string64	?	Descriptive name of the track.
optype	enum	?	Type of operation. Valid values: A, Arrival, D, Departure, V, Overflight, C, Circuit, T, TouchAndGo, R, Runup, W, RunwayToRunway.
wingtype	enum	?	Type of wing. Valid values: F, FixedWing, R, RotaryWing. If not specified, AEDT attempts to determine the wing type based on the optype.
airport	-	?	Airport code associated with the track. See section 4.2.5.
runway	string8	?	Runway identifier.
vectorCourseHelipad	double	?	Initial course heading of helicopter departing from helipad (degrees).
subtrack	-	+	List of subtracks that are part of this track. See section 4.2.48.

Attributes: None

4.2.50 trackNode



A flight track node.

Structure

See section 4.1 for terminology assistance.

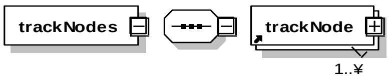
XML Tag	Type	Num	Description
nodeIdGroup	-	*	A list of nodes and their descriptions. See section 4.3.4.
coord2DGroup	-	*	Type of 2D coordinates specifying the node. See section 4.3.2.
altitude	float	*	Node's altitude. Includes attribute node. (nMi MSL)
speed	float	*	Speed of aircraft at node. Includes attribute node. (knots)

Attributes: None

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
nodeControlType	enum	*	0, None, 1, AtOrBelow, 2, Match, 3, AtOrAbove.

4.2.51 trackNodes



A set of flight track nodes.

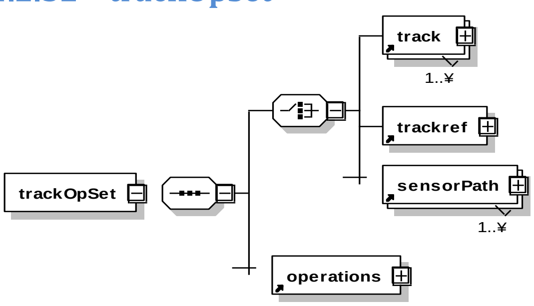
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
trackNode	-	*	A flight track node. See section 4.2.50.

Attributes: None

4.2.52 trackOpSet



Lists tracks and associated operations.

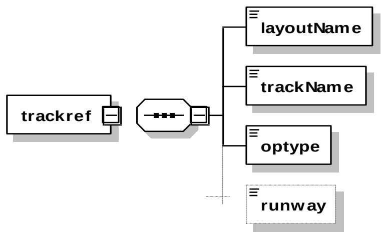
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
track	-	+	a	A flight's track. See section 4.2.49.
trackref	-	+	a	Reference to a flight track. See section 4.2.53.
sensorPath	-	+	a	A flight's path based on radar data. See section 4.2.45.
operations	-	+		A container listing one or more operations. See section 4.2.36.

Attributes: None

4.2.53 trackref



Reference to a flight track.

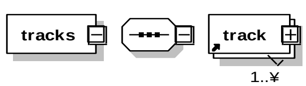
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
layoutName	string255	1	Airport layout associated with this track.
trackName	string64	?	Name of flight track.
optype	enum	?	Type of operation. Valid values: A, Arrival, D, Departure, V, Overflight, C, Circuit, T, TouchAndGo, R, Runup, W, RunwayToRunway.
runway	string8	*	Name of runway on the flight track.

Attributes: None

4.2.54 tracks



A set of flight tracks.

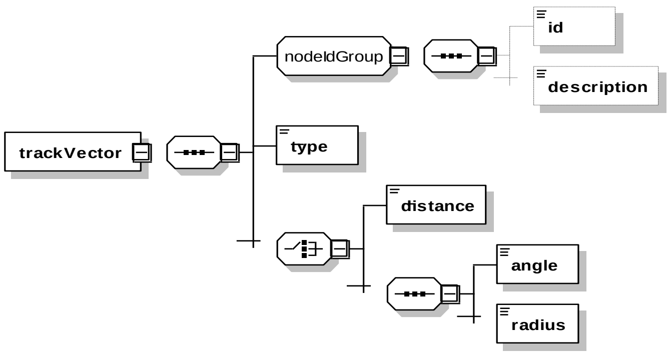
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
track	-	+	A flight track. See section 4.2.49.

Attributes: None

4.2.55 trackVector



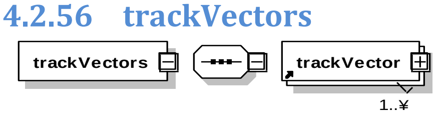
A flight track vector.

Structure
See section 4.1 for terminology assistance.

XML Tag	Type	Num	choice	Description
nodeIdGroup	-	*		A list of nodes and their descriptions. See section 4.3.4.
type	enum	*		Type of vector. Valid values: S, Straight, L, LeftTurn, R, RightTurn.
distance	float	1	a	Distance flown along this (nMi).
angle	float	1	a	Angle of the vector (degrees).
radius	float	1		Radius of the vector (nMi).

Attributes: None

4.2.56 trackVectors



A list of flight track vectors.

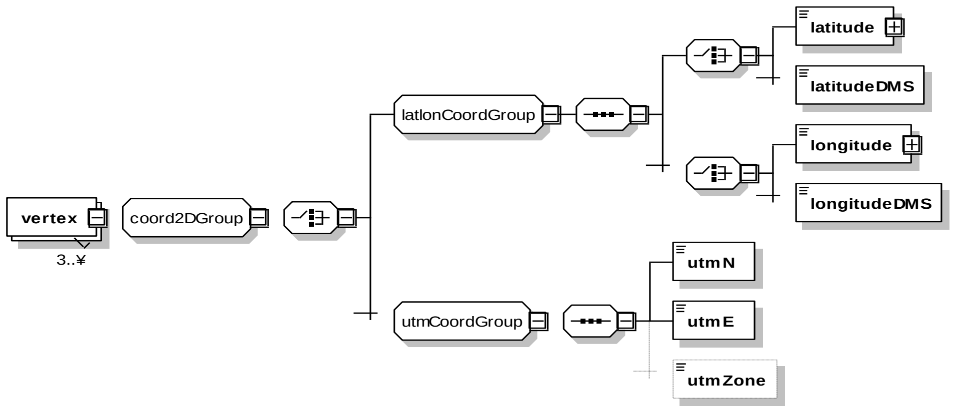
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
trackVector	-	*	A flight track vector. See section 4.2.55.

Attributes: None

4.2.57 vertex



Contains the coordinates of a polygon's vertex.

Structure

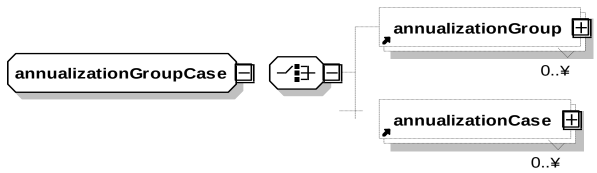
See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
coord2DGroup	enum	1	Type of 2D coordinates specifying the node. See section 4.3.2.

Attributes: None

4.3 Group Descriptions

4.3.1 annualizationGroupCase



A container indicating if a child annualization is done as a group or as a case.

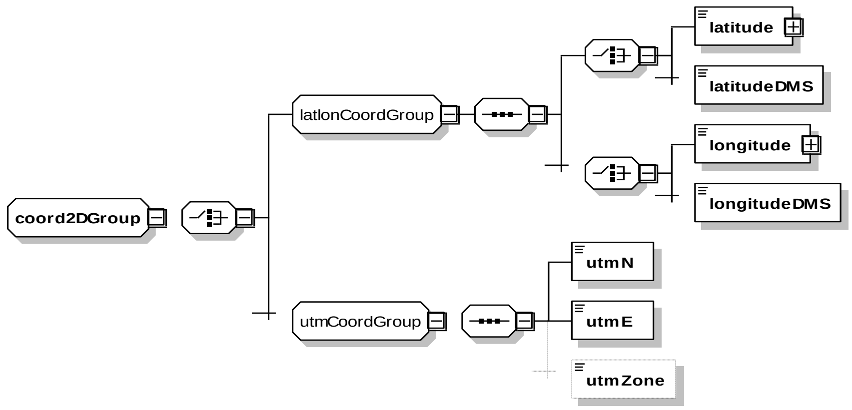
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
annualizationGroup	-	*	a	Indicates child element is annualized as a group. See section 4.2.10.
annualizationCase	-	*	a	Indicates child element is annualized as a case. See section 4.2.9.

Attributes: None

4.3.2 coord2dGroup



Indicates how a 2D coordinate is specified.

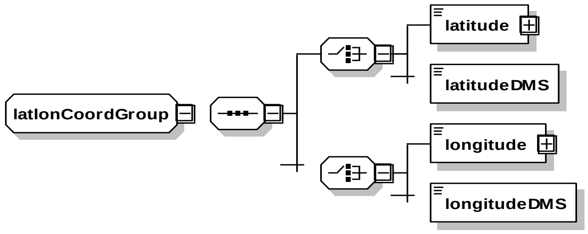
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
latlonCoordGroup	-	1	a	2D coordinate is specified by latitude and longitude. See section 4.3.3.
utmCoordGroup	-	1	a	2D coordinate is specified by latitude and longitude. See section 4.3.6.

Attributes: None

4.3.3 latlonCoordGroup



Specifies a coordinate using latitude and longitude.

Structure

See section 4.1 for terminology assistance.

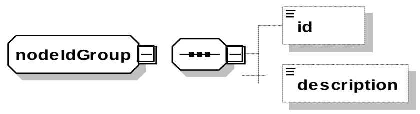
XML Tag	Type	Num	Choice	Description
latitude	-	1	a	Latitude specified as degrees in decimal format. Can include optional attribute positive.
latitudeDMS	-	1	a	Latitude expressed as dd"mm'sss with optional indicator N, n, S, s.
longitude	-	1	b	Longitude specified as degrees in decimal format.
longitudeDMS	-	1	b	Longitude expressed as dd"mm'sss with optional indicator E, e, W, w.

Attributes: None

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
positive	enum	1	For the latitude element, indicates if latitude is north or south of the equator. Valid values: N, n, S, s. For the longitude element, indicates if longitude is east or west of the prime meridian. Valid values: E (default), e, W, w.

4.3.4 nodeIdGroup



Describes a node ID group.

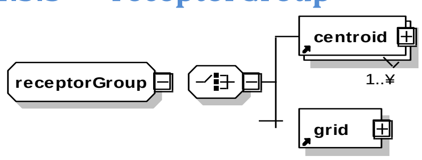
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
id	string16	1	Node group's ID.
description	string16	1	Node group's description.

Attributes: None

4.3.5 receptorGroup



Contains either a centroid or a grid to indicate a location.

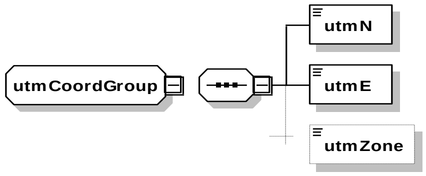
Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Choice	Description
centroid	-	1	a	Describes the location of a centroid. See section 4.2.31.
grid	-	1	a	Describes a grid of points. See section 4.2.34.

Attributes: None

4.3.6 utmCoordGroup



Contains the Universal Transverse Mercator coordinates of a point.

Structure

See section 4.1 for terminology assistance.

XML Tag	Type	Num	Description
utmN	double	1	UTM Northing of the point in decimal meters north of the equator.
utmE	double	1	UTM Easting of the point in decimal meters east from a central meridian.
utmZone	Int	?	UTM Zone of the point. A default zone can be set in the <options> tag.

Attributes: None

5. Procedural Profiles

This section describes procedural profiles for civil aircraft and helicopters. Military aircraft utilize fixed point profiles. For more information on how to setup an anp profile in the ASIF, see section 4.2.18.

5.1 Civil Airplane Procedures

The following sections describe civil aircraft procedure steps and how they are combined into procedural profiles.

5.1.1 Aircraft Profile Operation Types

There are five types of flight operations for aircraft. The valid ASIF identifier is listed in the operation type column of the table.

Operation Type	Full Name	Note
A	Approach	
D	Departure	
T	Touch and go	Touch and go not supported in AEDT2a
F	Circuit flight	Circuit flight not supported in AEDT2a
V	Overflight	

5.1.2 Aircraft Procedure Step Types

The procedure step types available in AEDT2a are listed in the table below. The valid ASIF identifier is listed in the step type column of the table.

Step Type	Full Name	Description
T	Takeoff	Start-roll to takeoff rotation, or touch-and-go power-on point to takeoff rotation
C	Climb	Departure climb to final altitude at constant calibrated airspeed
M	Cruise-Climb	Climb at constant angle to final altitude and speed
A	Accelerate	Departure climb and accelerate to final speed
P	Accel-Percent	Departure climb and accelerate using a constant energy split between acceleration and climbing
V	Level	Maintain altitude and speed
U	Level-Decel	Maintain altitude and reduce speed
W	Level-Idle	Maintain altitude over a given distance with engines at idle
S	Level-Stretch	Special step used to designate where to stretch a circuit flight profile to fit a touch-and-go track
D	Descend	Descend at constant angle to final altitude
E	Descend- Decel	Descend while reducing airspeed
F	Decend-Idle	Descend at a constant angle with engines at idle
L	Land	Land and roll a given distance
B	Decelerate	Used on approach after touchdown, brake with starting thrust for a given distance

5.1.2.1 Takeoff Step

For a takeoff step, input a flaps identifier and a thrust type. The flaps identifier should not have a U or D prefix because these coefficients were measured on descending flight paths.

MaxTakeoff thrust is typically used for takeoff, but other thrust types are available:

- MaxClimb thrust means that an airplane takes off using reduced thrust, thus requiring a longer runway.
- UserValue thrust means that the user supplies the takeoff thrust value. The thrust value is the corrected net thrust per engine in pounds or in percent of static thrust. AEDT2a uses the input value at both the start-roll point and at the rotation point.

For MaxTakeoff and MaxClimb thrust, AEDT2a uses jet or prop coefficients and SAE-AIR-1845 equations to compute thrust values. For jets, the start-roll thrust is computed at 0 knots, and the rotation thrust is computed using the takeoff speed, which comes from another SAE equation. For jets, the thrust is larger at start-roll than at rotation. For props, the thrust is the same at both points and equal to the thrust computed at the rotation point.

5.1.2.2 ClimbStep

For a Climb step, enter a flaps identifier, thrust type, and input the final altitude (the "climb-to" altitude). The final altitude must be higher than the initial altitude. The calibrated air speed on a climb segment is constant, and it is equal to the final speed used on the previous step.

AEDT2a computes the climb angle and the ground distance based on the airplane weight and average thrust that can be generated for the given conditions. If the computed climb gradient is too small (1%), AEDT2a processing will stop and log it in the log file.

Typically, MaxTakeoff thrust is used for initial climb segments and MaxClimb thrust for later climb segments, but other thrust types are available:

- UserValue thrust can be assigned to the final climb-to point. AEDT2a does not adjust this input value for airport elevation, temperature, and pressure.
- UserCutback thrust can be assigned to the whole segment. The difference between UserValue and UserCutback is that AEDT2A applies the user-value-thrust to a point, whereas user-cutback-thrust is applied to a segment. For the cutback case, AEDT2A reduces the thrust over a 1000-foot segment, keeps it constant at the user-cutback value over the climb distance (less 1000 feet), and then returns it to normal thrust over a second 1000-foot segment. The input thrust is corrected net thrust per engine. AEDT2a does not correct for airport conditions.

5.1.2.3 Accelerate Step

For an Accelerate step, input a flaps identifier, thrust type, climb rate, and final speed (the "accelerate-to" speed). The final speed must be larger than the initial speed.

AEDT2a uses these input parameters and the SAE-AIR-1845 equations to compute the change in altitude and the distance flown.

The climb rate should be consistent with a sea-level standard-day profile. If necessary, AEDT2a adjusts the climb rate to account for the actual airport elevation, temperature, and pressure.

Zero climb rate is a valid input. AEDT2a computes a zero change in altitude, and the thrust is used to accelerate the airplane more quickly.

The five climb thrust types discussed above for the Climb step are also available for an acceleration segment.

5.1.2.4 Accel-Percent Step

For an AccelPercent step, input a flaps identifier, thrust type, energy-share percentage, and final airspeed.

Energy-share comes from the notion that all available thrust is divided between acceleration and climbing. Unlike steps that maintain a constant airspeed while climbing, this step holds the energy-share constant for a given amount of thrust. Enter the percent thrust dedicated to acceleration in the Accelerate Percent box. An input of 70, for example, would result in 70% of thrust going to acceleration and the remaining 100%-70% = 30% of thrust going to climbing.

5.1.2.5 Cruise-Climb Step

For a CruiseClimb step, input a flaps identifier (usually ZERO), final altitude, climb speed, and the climb angle for the segment.

AEDT2a calculates the distance flown based on the change in altitude and the climb angle. AEDT2a calculates the corrected net thrust per engine by using the SAE-AIR- 1845 descent equation with a positive angle, rather than a negative angle.

The difference between Climb and CruiseClimb is that thrust for Climb is user defined, whereas AEDT2a calculates thrust for CruiseClimb based on the input climb angle. Climb thrust is larger than CruiseClimb thrust. Climb steps are used after takeoff when near-maximum thrust is applied. During cruise, less thrust is used in climbing from one altitude to another.

5.1.2.6 Level-Stretch Step

For a LevelStretch step, input a flaps identifier. A Level Stretch step is used to create circuit flight profiles. Its purpose is to define where to put a variable length segment so that a CIR profile fits on top of a TGO track.

- There can be only one Level Stretch step in a CIR profile.
- A Level Stretch step must have a Level step before it and after it. This pair of Level steps should have the same altitude and speed values.

5.1.2.7 Level Step

For a Level step, input a flaps identifier, altitude, speed, and distance flown along the segment. The flaps identifier should be ZERO, or perhaps one with a U prefix (meaning that the landing gear is up).

Input the altitude and speed parameters logically:

- A previous Climb final altitude must equal the Level altitude.
- Also, the Level altitude must equal the next Descend start altitude.
- AEDT2a computes the amount of thrust needed to maintain level flight at constant speed for the given flaps configuration.

The difference between a Level step and a zero-climb Accelerate step is that the Level step uses a constant speed on the segment, and it uses a smaller value of thrust (and thus, lower noise level) than the Accelerate step. If speed changes during level flight, use a zero-climb Accelerate step.

5.1.2.8 Level-Decel Step

For a Level-Decel step, select input a flaps identifier, altitude, initial airspeed, and distance flown along the segment. Unlike the Level step, airspeed is not held constant but allowed to decrease over the segment. AEDT2a computes the amount of thrust needed to maintain level flight while decelerating.

The Level-Decel step is subject to the same airspeed and altitude considerations as the Level step, e.g. a preceding climb segment has to end at the same altitude as the Level-Decel step.

5.1.2.9 Level-Idle Step

For a Level-Idle step, input the altitude, initial airspeed, and distance flown along the segment. Airspeed is allowed to decrease over the segment. Unlike Level and Level-Decel steps, thrust is calculated using idle thrust coefficients rather than a force balance.

The Level-Idle step is subject to the same airspeed and altitude considerations as the Level step, e.g. a preceding climb segment has to end at the same altitude as the Level-Idle step.

5.1.2.10 Descend Step

For a Descend step, input a flaps identifier, the starting altitude, starting speed, and the descent angle for the segment.

If a Level or Descend step follows the Descend step, it must have a lower altitude. The following step can have the same or a different speed.

5.1.2.11 Descend-Decel Step

For a DescendDecel step, input a flaps identifier,the starting altitude, starting speed, and the descent angle for the segment. The DescendDecel step differs from the Descend step in that it more explicitly accounts for deceleration effects during thrust calculations.

If a Level or Descend step follows the DescendDecel step, it must have a lower altitude. The following step can have the same or a different speed.

5.1.2.12 Descend-Idle Step

For a DescendIdle step, input the initial airspeed, initial altitude, and descent angle. The DescendIdle step does not require that a flap setting be specified. The other Descend steps that require flap settings utilize a force balance equation to calculate thrust, but this step calculates the aircraft idle thrust directly from engine idle thrust coefficients

5.1.2.13 Land Step

For the Land step, select a flaps identifier and input the touchdown rolling distance, which is the distance that the airplane moves before reversing thrust and/or braking.

The last Descend step and the Land step must both use a flaps identifier that has a D prefix (meaning that the landing gear is down).

AEDT2a computes the touchdown speed by using a SAE-AIR-1845 equation.

5.1.2.14 Decelerate Step

For a Decelerate step, input the segment distance, the starting speed, and the percent of static thrust at the start of the segment. When applicable, the percent of static thrust at the start of the segment represents the level of reverse thrust.

AEDT2a uses the percent value and the airplane static thrust to compute a thrustsetting value for accessing the NPD curves. For those airplanes that use percent type noise, the percent value is used to access the NPD curves.

5.1.3 Aircraft Thrust Types and Parameters

The thrust types available in AEDT2a are listed in the table below. The valid ASIF identifier is listed in the thrust type column of the table.

Thrust Type	Full Name
T	MaxTakeoff
C	MaxClimb
N	MaxContinuous
H	ReduceTakeoff
Q	ReduceClimb
S	MaxTakeoffHiTemp
B	MaxClimbHiTemp
M	MaxContinuousHiTemp
G	ReduceClimbHiTemp
P	ReduceClimbHiTemp
I	IdleApproach
J	IdleApproachHiTemp
R	MinimumThrust
K	UserCutback
U	UserValue

The following table shows the remaining parameters needed to create a procedural profile. These fields are called PARAM1, PARAM2, and PARAM3. They take on a different meaning for each combination of operation type, procedure type, and thrust type, see the two tables below.

PARAM	Full Name
THR	Thrust (lbs)
ALT	Altitude (ft AFE)
SPD	Speed (kts)
DIST	Distance (ft)
ANG	Angle (deg)
PCT	Percent
CLM	ClimbRate (ft/min)

Op Type	Step Type	Flap ID	Thrust Type	PARAM1	PARAM2	PARAM3
A,D,T,F,V	V	ID		ALT	SPD	DIST
A,T,F,V	D	ID		ALT	SPD	ANG
A,T,F,	L	ID	T,C,H,Q	DIST	0	0
A,F	B		U	DIST	SPD	PCT
D,F	T	ID	T,C,H,Q	0	0	0
D,F	T	ID	U	0	0	THR
T	T	ID	T,C,H,Q,R	0	SPD	0
T	T	ID	K,U	0	SPD	THR
D,T,F	C	ID	T,C,H,Q,R	ALT	0	0
D,T,F	C	ID	K,U	ALT	0	THR
D,T,F	A	ID		CLM	SPD	0
D,T,F	A	ID		CLM	SPD	THR
A,D,F,V	M	ID		ALT	SPD	ANG
F	S	ID		0	0	0
A	U	ID		ALT	SPD	DIST
A	W			ALT	SPD	DIST
A	E	ID		ALT	SPD	ANG
A	F			ALT	SPD	ANG
D,T,F	P		T,C,H,Q,R	PCT	SPD	0
D,T,F	P		K,U	PCT	SPD	THR

5.1.4 How to Build an Approach Profile

Standard approach procedures generally have four Descend steps, a Land step, and two Decelerate steps, as follows:

- The four Descend steps start at 6000, 3000, 1500, and 1000 feet AFE. They bring an airplane from zero-flaps configuration, terminal-area entrance speed, down to landing-gear/flaps configuration, final-approach speed.

- For most AEDT2a airplanes, a 3-degree descent angle is used to model IFR approaches. For single-engine piston airplanes and for BEC58P, a 5- degree descent angle is used to model VFR approaches.
- For the Land step, the touchdown-roll distance is 10% of the total rollout distance. For those airplanes using 3-degree approaches, the relationship between the total roll-out distance and the input parameter in the *Airplane Data* window is:
  (Roll-out distance) = 0.9 (Max landing distance)-954
- For those airplanes using 5-degree approaches, the 954-foot value is replaced with 572 feet (the angle is steeper, so the in-air portion of the flight path after crossing the end of the runway is shorter).
- The first Decelerate distance is 90% of the total roll-out distance. The starting speed is less than the touchdown speed. The starting percentage thrust is 40% for narrow-body jets, 10% for wide-body jets, and 40% for props. The first deceleration segment represents reverse thrust action.
- The second Decelerate distance is zero, indicating the end of the profile. The starting speed is 30 knots, representing taxi speed. The starting percentage thrust is 10% of static thrust, representing taxi thrust.

5.1.5 How to Build a Departure Profile

AEDT2a standard departure procedures for civil jet airplanes tend to follow a pattern (but there are exceptions). A typical civil jet departure profile consists of the following procedure steps:

1. Takeoff using MaxTakeoff thrust and extended flaps.
2. Climb to 1000 feet using MaxTakeoff thrust and takeoff flaps.
3. Accelerate 10-20 knots using MaxTakeoff thrust, takeoff flaps, and 2/3 of the initial climb rate.
4. Accelerate 15-30 knots using MaxTakeoff thrust, reduced flaps, and ½ of the initial climb rate.
5. Accelerate to Vzf (zero-flaps minimum safe maneuvering speed) using MaxClimb thrust, minimal flaps, and 1000-fpm climb rate.
6. Climb to 3000 feet using MaxClimb thrust and zero flaps.
7. Accelerate to 250 knots using MaxClimb thrust, zero flaps, and 1000-fpm climb rate.
8. Climb to 5500 feet using MaxClimb thrust and zero flaps.
9. Climb to 7500 feet using MaxClimb thrust and zero flaps.
10. Climb to 10000 feet using MaxClimb thrust and zero flaps.

A standard departure profile for propeller-driven civil airplanes also tends to follow a pattern of procedure steps:

1. Takeoff using MaxTakeoff thrust and takeoff flaps.
2. Accelerate 10-15 knots using MaxTakeoff thrust, takeoff flaps, and a standard rate of climb.
3. Climb to 1000 feet using MaxTakeoff thrust and takeoff flaps.
4. Accelerate to Vzf using MaxTakeoff thrust, takeoff flaps, and a standard climb rate.
5. Climb to 3000 feet using MaxClimb thrust and zero flaps.
6. Climb to 5500 feet using MaxClimb thrust and zero flaps.
7. Climb to 7500 feet using MaxClimb thrust and zero flaps.
8. Climb to 10000 feet using MaxClimb thrust and zero flaps.

An AEDT2a standard airplane usually has more than one departure profile. AEDT2a profiles are distinguished by profile stage numbers from 1 to 9. Departure procedure steps are almost the same for all profile stages. Usually, the change is in the Accelerate step where the final speed value increases for heavier airplanes and the climb rate decreases for heavier airplanes.

5.1.6 How to Build and Overflight Profile

An overflight profile can be built with one procedure step. For example: Level using ZERO flaps, at 5000-foot altitude, at 250 knots, for a distance of 300,000 feet (about 50 nmi).

5.1.7 Airplane Procedure Step Transitions

Procedure steps are combined in prescribed sequences. Certain sequences are not allowed. For example, a climb step may not be followed by a descend step. Procedures must comply with the step transition diagrams provided here.

The step transition diagrams use a simple convention to represent procedures:

- Ellipses represent procedure steps.
- Arrows represent a valid transition from one step to another.
- Arrows point in the direction of the allowed transition – e.g. Land to Decelerate is accepted, but Decelerate to Land is not.
- A double sided arrow means that the transition is valid in both directions.
- An arrow looping back to a step indicates that the step can be repeated.
- A box surrounding two or more steps is used to simplify the diagram.
- Arrows connected to the box apply to each step within.
- Each step within the box can transition to any other within the box.

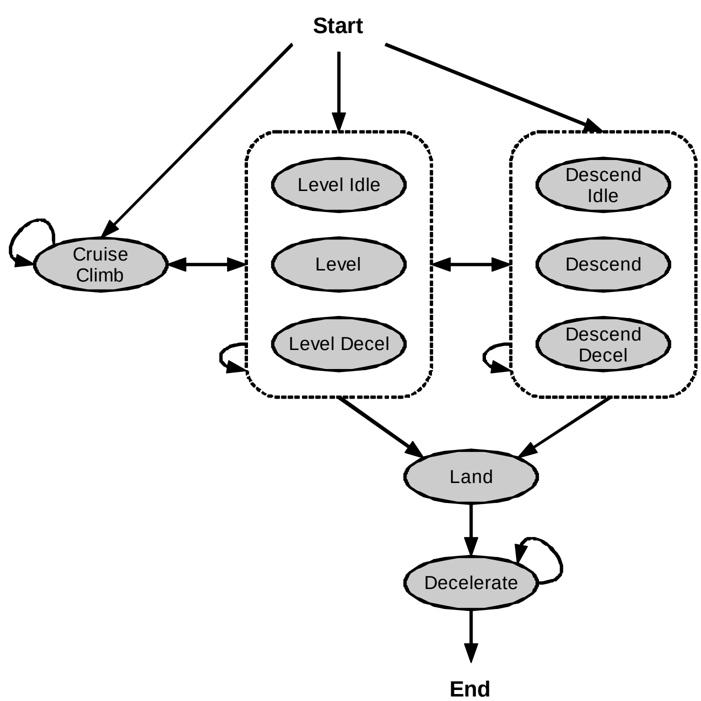


Figure C-1 Airplane Approach Step Transition Diagram

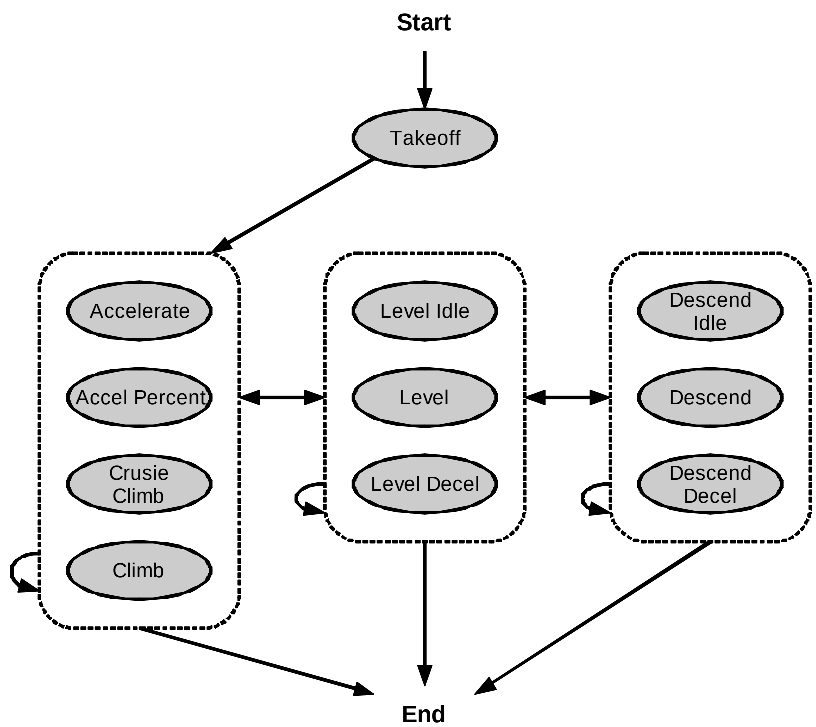


Figure C-2 Airplane Departure Step Transition Diagram

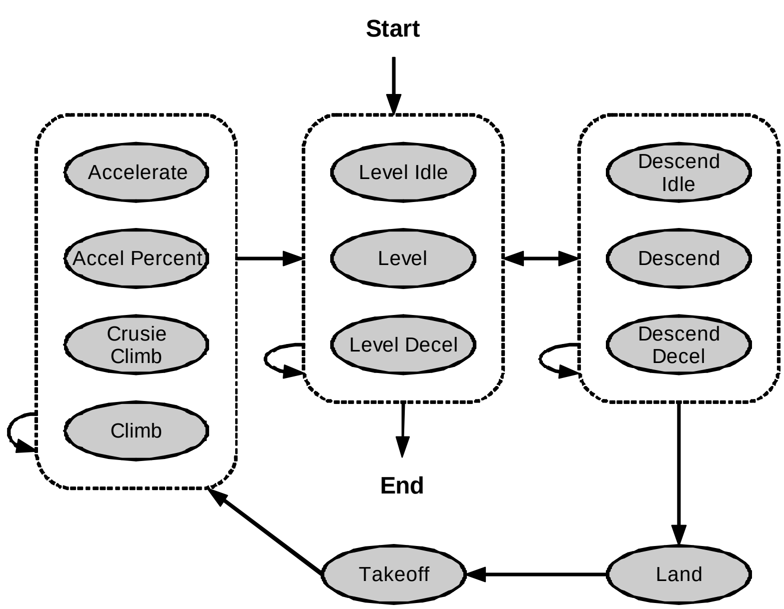


Figure C-3 Airplane Touch and Go Step Transition Diagram (not supported in AEDT2a)

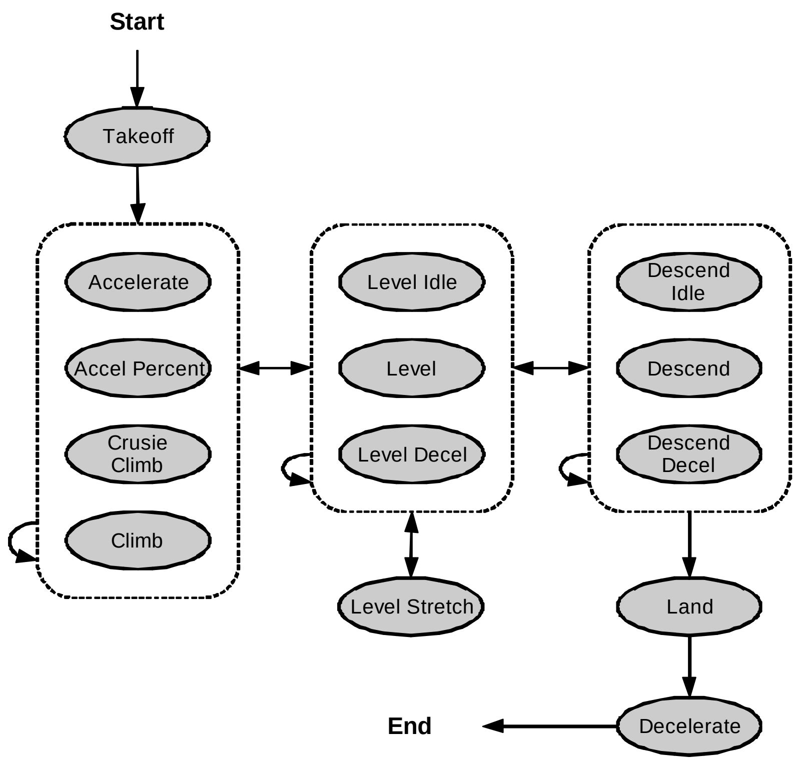


Figure C-4 Airplane Circuit Step Transition Diagram (not supported in AEDT2a)

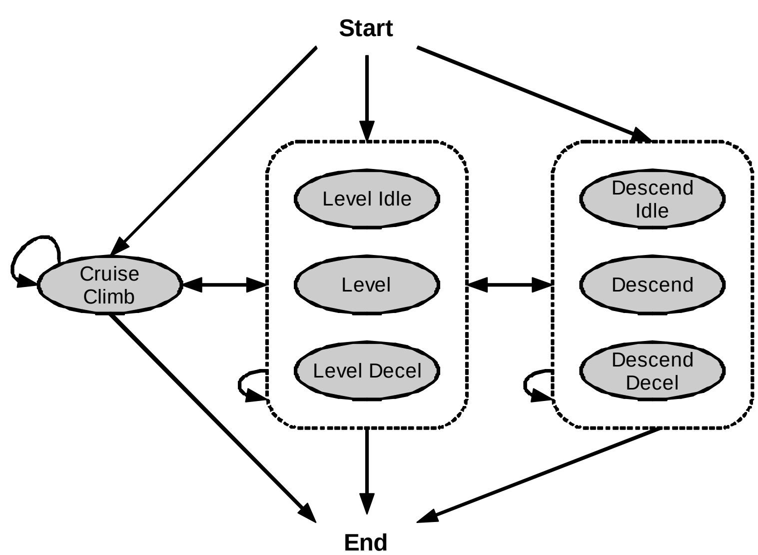


Figure C-5 Airplane Overflight Step Transition Diagram

5.2 Helicopter Procedures

The following sections describe helicopter procedure steps and how they are combined into procedural profiles.

Modeling helicopter operations with user defined profiles is not supported in AEDT2a. W-83

5.2.1 Helicopter Profile Operation Types

There are four types of flight operations for helicopters:

Abbreviation	Single Letter Identifier	Description	Begin	End	Note
APP	A	Approach	In air	Helipad	
DEP	D	Departure	Helipad	In air	
TAX	T	Taxi	Helipad	Helipad	Taxi not supported in AEDT2a
OVF	V	Overflight	In Air	In air	

5.2.2 Helicopter Procedure Step Types

The following table describes the procedure steps that are used to define helicopter profiles. The first seven types are the primary NPD operating modes. The next nine are secondary NPD operating modes which can be derived from the primary modes or defined as separate curves. The last step (start altitude) facilitates profile creating as is not associated with an NPD operating mode.

Step Type	Description	State	Parameters
A	Approach at constant speed	Move	Dist Alt
D	Depart at constant speed	Move	Dist Alt
X	Level flyover at constant speed	Move	Dis
G	Ground idle	Static	Dur
H	Flight idle	Static	Dur
I	Hover in ground effect	Static	Dur
J	Hover out of ground effect	Static	Dur
V	Vertical ascent in ground effect	Static	Dur Alt
W	Vertical ascent out of ground effect	Static	Dur Alt
Y	Vertical descent in ground effect	Static	Dur Alt
Z	Vertical descent out of ground effect	Static	Dur Alt
B	Approach with horizontal deceleration	Move	Dis Spd
C	Approach with descending deceleration	Move	Dis Alt Spd
E	Depart with horizontal acceleration	Move	Dis Spd
F	Depart with climbing acceleration	Move	Dis Alt Spd
T	Taxi at constant speed	Move	Spd
S	Start altitude at constant speed	--	Alt spd

Parameter values are defined as below:

PARAM	Full Name
DIST	Distance (ft)
DUR	Duration (s)
ALT	Altitude (ft AFE)
Spd	Airspeed (kts)

5.2.2.1 Additional Helicopter Step Type Information

- Start Altitude – This step is used to start a profile at a given altitude and speed. Input the starting altitude and speed.
- Level Fly – This step is used to maintain altitude and speed for a given distance. Input the track distance covered by the step. Altitude and speed are defined by the previous step.
- App Const Speed – This step is used to descend at constant speed to a given altitude over a given distance. Input the track distance covered by the step and the final altitude. The initial altitude and speed are defined by the previous step.
- App Desc Decel – This step is used to descend and decelerate to a final altitude and speed over a given distance. Input the track distance covered by the step, the final altitude, and the final speed. The initial altitude and speed are defined by the previous step.
- App Horiz Decel – This step is used to decelerate to a final speed at constant altitude over a given distance. Input the track distance covered by the step and the final speed. The altitude and initial speed are defined by the previous step.
- App Vertical – This step is used to maintain horizontal position while descending to a final altitude over a given duration. Input the duration of the step and the final altitude. The horizontal position of the step is calculated from the previous step and the horizontal speed is zero.
- Hover – This step is used to maintain altitude and horizontal position for a given duration. Input the duration of the step. The altitude is defined by the previous step, the horizontal position of the step is calculated from the previous step, and the horizontal speed is zero.
- Ground Idle – This step is used to maintain ground idle for a given duration. Input the duration of the step. The altitude is zero, the horizontal position of the step is calculated from the previous step, and the horizontal speed is zero.
- Flight Idle – This step is used to maintain flight idle for a given duration. Input the duration of the step. The altitude is zero, the horizontal position of the step is calculated from the previous step, and the horizontal speed is zero.
- Dep Vertical – This step is used to maintain horizontal position while ascending to a final altitude over a given duration. Input the duration of the step and the final altitude. The horizontal position of the step is calculated from the previous step and the horizontal speed is zero.
- Dep Horiz Accel – This step is used to accelerate to a final speed over a given distance. Input the track distance covered by the step and the final speed. The altitude and initial speed are defined by the previous step.
- Dep Climb Accel – This step is used to climb and accelerate to a final altitude and speed over a given distance. Input the track distance covered by the step, the final altitude, and the final speed. The initial altitude and speed are defined by the previous step.

- Dep Const Speed – This step is used to climb at constant speed to a given altitude over a given distance. Input the track distance covered by the step and the final altitude. The initial altitude and speed are defined by the previous step.
- Taxi – This step is used to taxi at a given speed. Input the speed. The track distance is calculated based on the assigned taxi ground track, and the altitude is defined by the previous step. Helicopters defined as not having wheels must taxi at an altitude greater than zero.

Helicopter procedure steps explicitly define a helicopter's flight path. There are no thrust calculations for helicopter flight paths as there are for fixed-wing aircraft. Rather, each procedure step correlates with a helicopter flight operational mode and each mode has its own set of NPD data.

Some helicopter procedure steps correlate with different helicopter flight operational modes (and therefore different NPD and directivity data) depending on their altitude. When constructing flight paths with the Hover, DepVertical, and App Vertical procedure steps, AEDT2a calculates a ground effect altitude as follows:

Ground Effect Altitude = 1.5 x Main Rotor Diameter

If the procedure step stays below the ground effect altitude, the procedure step correlates with the corresponding In Ground Effect flight operational mode. If the step stays at or above the ground effect altitude the procedure correlates with the corresponding Out of Ground Effect flight operational mode. If a given Dep Vertical or App Vertical procedure step crosses the ground effect altitude, AEDT2a automatically divides the step into two at the ground effect altitude and assigns flight operational modes to the two steps as appropriate.

5.2.3 How to Build a Helicopter Approach Profile

Helicopter approach profiles can be much more dynamic than fixed-wing airplane approach profiles. There are many more ways to operate a helicopter than there are to operate an airplane. AEDT2a provides a standard approach profile for each helicopter in the database, however these standard profiles may not be appropriate for all helicopter modeling. Additionally, general guidelines are not as appropriate for helicopter approach operations as they are for fixed-wing airplanes. It is strongly recommended to evaluate the helicopter flight operations being modeled to determine if using the standard AEDT2a helicopter procedures is appropriate. In most cases consulting with helicopter operators to design helicopter profiles that are appropriate for your study is needed. All helicopter approach profiles must start with a Start Altitude step.

For reference, AEDT2a standard helicopter approach procedures consist of the following procedure steps:

1. Start Altitude, with altitude set to 1000 feet AFE and speed set equal to the helicopter's level reference speed.
2. Level Fly, with distance set to 87250.0 ft (approximately 14 nautical miles).
3. App Horiz Decel, maintaining an altitude of 1000 ft while decelerating to the helicopter's approach reference speed over a distance of 5000 ft.
4. App Const Speed, maintaining the helicopter's approach reference speed while descending to an altitude of 500 feet AFE over a track distance of 4800 feet.

5. App Desc Decel, descending to an altitude of 15 feet AFE while decelerating to a speed of 0 knots over a distance of 2850 feet.
6. App Vertical, maintaining horizontal position while descending to 0 feet AFE over a duration of 3 seconds.
7. Flight Idle for a duration of 30 seconds.
8. Ground Idle for a duration of 30 seconds.

5.2.4 How to Build a Helicopter Departure Profile

Helicopter approach profiles can be much more dynamic than fixed-wing airplane approach profiles. There are many more ways to operate a helicopter than there are to operate an airplane. AEDT2a provides a standard approach profile for each helicopter in the database, however these standard profiles may not be appropriate for all helicopter modeling. Additionally, general guidelines are not as appropriate for helicopter approach operations as they are for fixed-wing airplanes. It is strongly recommended to evaluate the helicopter flight operations being modeled to determine if using the standard AEDT2a helicopter procedures is appropriate. In most cases consulting with helicopter operators to design helicopter profiles that are appropriate for your study is needed.

For reference, AEDT2a standard helicopter departure procedures consist of the following procedure steps:

1. Ground Idle for a duration of 30 seconds.
2. Flight Idle for a duration of 30 seconds.
3. Dep Vertical, maintaining horizontal position while ascending to an altitude of 15 ft AFE over a duration of 3 seconds.
4. Dep Horiz Accel, maintaining altitude while accelerating to a speed of 30 knots over a distance of 100 feet.
5. Dep Climb Accel, climbing to an altitude of 30 feet AFE while accelerating to the helicopter's depart reference speed over a distance of 500 feet.
6. Dep Const Speed, maintaining speed while climbing to an altitude of 1000 feet AFE over a track distance of 3500 feet.
7. Dep Horizontal Accel, maintaining altitude while accelerating to the helicopter's level reference speed over a track distance of 2800 feet.
8. Level Fly, with distance set to 93100 feet (approximately 15 nautical miles).

5.2.5 How to Build a Helicopter Overflight Profile

A typical helicopter overflight profile begins in the air at the start of an overflight track, follows the track, and ends in the air. Overflight profiles may include any of the steps defined in section 5.2.2 except for the Taxi step, and it must start with a Start Altitude step.

5.2.6 Helicopter Procedure Step Transitions

Procedure steps are combined in prescribed sequences. However, certain sequences are not allowed. For example, an approach profile cannot use an ascent step. Procedures must comply with the step transition diagrams provided here.

- The step transition diagrams use a simple convention to represent procedures:
- Ellipses represent procedure steps.
- Arrows represent a valid transition from one step to another.

- Arrows point in the direction of the allowed transition – e.g. you can go from Flight, Idle to Ground, Idle on an approach, but not back.
- A double sided arrow means that the transition is valid in both directions.
- An arrow looping back to a step indicates that the step can be repeated.
- A box surrounding two or more steps is used to simplify the diagram.
- Arrows connected to the box apply to each step within.
  Each step within the box can transition to any other within the box. However, speeds and altitudes must be compatible. For example, on an approach a transition from an App.Horiz.Decel step to a Hover step is valid only when the App.Horiz.Decel step has a speed of 0 knots.

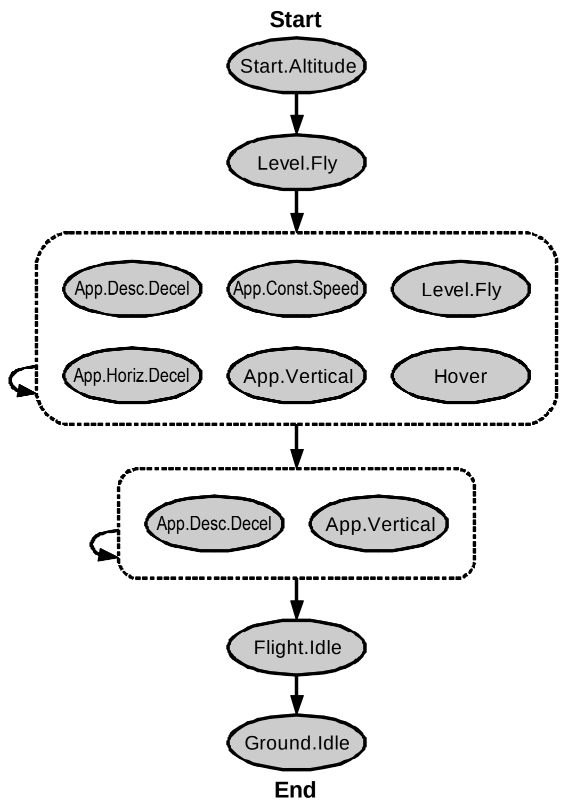


Figure C-6 Helicopter Approach Step Transition Diagram

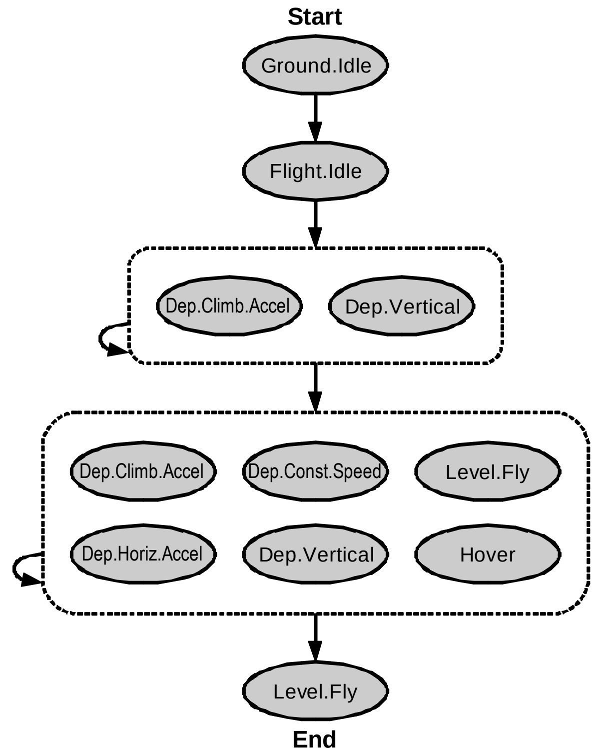


Figure C-7 Helicopter Departure Step Transition Diagram

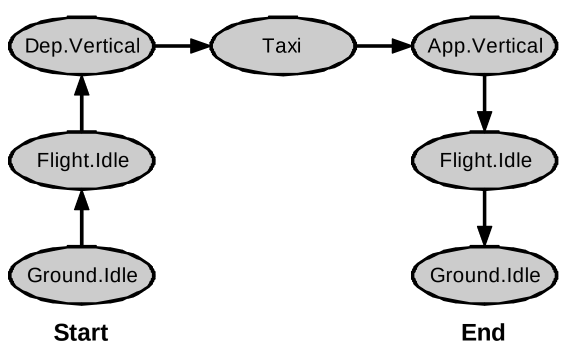


Figure C-8 Helicopter Taxi Transition Diagram (not supported in AEDT2a)

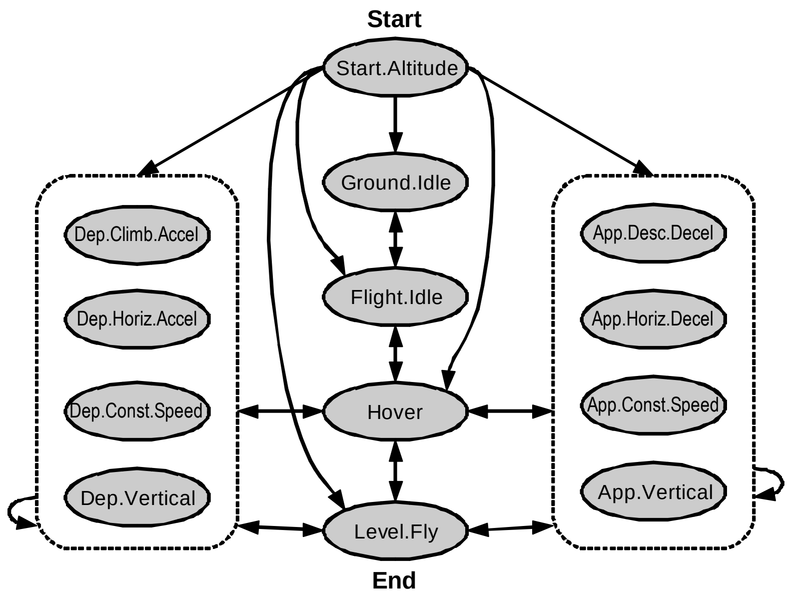


Figure C-9 Helicopter Overflight Step Transition Diagram

6. XML Schema – ASIF.xsd

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="xs3p.xsl"?>

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" att
ributeFormDefault="unqualified" version="1.1.10">
  <!-- CHANGES
    - Version 1.1.10
        - removed rotation from grid
        - removed aircraft substitutions
    - Version 1.1.9
        - added cruiseAltitude to operation
        - fixed type: opType value ToughAndGo renamed to TouchAndGo
        - updated <runway> length and width types to short from the double type
        - added airport_layout/peakMonthAverageDayScalingFactor
    - Version 1.1.8
        - added elevation and coord2DGroup to airportLayoutType
        -
 removed xyReference (and related x,y elements), trajectory, trajNode and flight elements
        - updated <runwayEnd> name to string8 from string4
        -
 added <tracks> to airport layout to allow tracks to be specified at the layout level to
avoid duplicate track generation
        -
 added <trackref> to trackOpSet which allows an operation set to reference an existing tr
ack
```

```
        - added <cases> to scenario to contain the top level <case> element
        - added airportLayouts to scenario
        - added airportLayouts and airportLayout elements to study
        - renamed icaoCode in airportLayout to airportCode
        -
updated all airport element references to reference airportCode which allows the ability
to specify an airport type through a "type" attribute
           (defaults to ANY airport code to support LEGACY studies)
        - removed blockPartFlag from population
        - added value to opType pattern (W - RunwayToRunway)
        - dropped arrival/departure airport info from track (not needed in 2A)
        - changed runwayEnd to runwayEndType
        - added altitude to trackSensor
        -
added aircraftSubstitution, airport and studyBoundary content attribute enumerations
        - removed anpAirplane.thrustRestore
        - renamed aircraft.studyDescription to aircraft.description
        - renamed anpNoiseGroup.netThrustPerEngine to anpNoiseGroup.thrustSettingType
        - renamed anpAirplane.anpProfiles to profiles, anpProfiles.anpProfile to profile
        -
renamed badaAirplane.badaProfiles to profiles, badaProfiles.badaProfile to profile
        - changed anpProcedureStep type from int to string1
        - renamed aircraft to airplane
        - renamed baseAircraft to baseAirplane
        - removed non-supported fields in anpAirplane and badaAirplane
        - moved profiles into anpAirplane and badaAirplane
        - moved anpNoiseGroup into fleet
        - deleted airframe and airframeModel from aircraft
        - moved user defined aircraft elements to before Types section
        - moved fleet element into user defined aircraft section
        - added additional string types
        - moved user defined references to types
        - refactored aircraft block to handle anp and bada airplanes in separate blocks
        - changed badaAirplane.minPayloadMass to badaAirplane.maxPayloadMass
        - added case, scenario, fleet and trackOpSet to content attribute enumerations
        - changed airoperation/flightNumber from string8 to string16
    - Version 1.1.8 changes from 1.1.7
        - moved options up one level
        - removed asif: namespace in XSD - not needed
         - Version 1.1.6 changes from 1.1.5
                 - added 'aircraft' element
        - added support for copying system runways
        - added support for helicopter flight
         - Version 1.1.5 changes from 1.1.4
                 - made runway a required element of airport.
                 -
fixed nodeControlType attribute restriction from "integer" to "string" since it's allowi
```

```
ng string values "None/Match/etc.." in addition to the numericode control code of "0/2/et
c.."

         - Version 1.1.4 changes from 1.1.3
                  - changed the top level element from 'asif' to 'AsifXml'.
                  - removed the 'jobId' element from the annualizationCase block.

         - Version 1.1.3 changes from 1.1.2
                  - added 'content' required enumerated attribute to 'asif' element.
                  - added 'caseId' to 'case' element
                  - modified case references to point to case id.
                           - changes 'refCase' to 'refCaseId'
                           - removed 'refScenario' as it's no longer needed

         - Version 1.1.2 changes from 1.1.1
                  -
 switched order of 'startTime' and 'duration' in 'scenario' and 'case' elements.
                  - added 'blockPartFlag' to 'centroid' element.
                  - added 'climate' element and added 'climateId' sub-
element to 'case' element.
                  - added 'runway' and 'runwayEnd' sub-elements to the 'airport' element.
                  - added 'jobId' element to the 'annualizationCase' block.
                  -
 added SAE and BADA profile types: 'saeProfile', 'saeProfiles', 'badaProfile', and 'badaP
rofiles' elements.

         - Version 1.1.1 changes from 1.1
                  -
 all the string types now have minOccurs=0 for the number of characters (was 1 before).
                  -
 the 'userType' element in the 'operation' element now has 'minOccurs=0'.
                  -
 the 'reference' element within the 'case' element had it's subelement names changed
                           - 'scenario' to 'refScenario'
                           - 'case' to 'refCase'
                  -
 the 'case' element can now contain 'case' elements (i.e. cases within cases.)
                  -
 scenario element has 'startTime' type changed from 'date' to 'dateTime'.
                  - removed support for dispersed tracks
                  - changed track.name from string16 to string64
                  - annualization can be a top level block.
                  -
 added annualizationGroupCase group and made that the main sub element of annualizationGr
oup
                  - changed 'weight' attribute of annualizationGroup to an element.
                  -
 change 'weight' and 'name' attributes of annualizationCase to elements.
```

```
                 -
 removed receptor 'boundaryGrid' and 'location' elements, do these later on.
                 -
 changed 'centroid' element to have 'stateFips', 'countyFips', 'blockId', and 'bnaId' ins
tead of just a plain 'id' field.
-->
  <!--===============================================================-->
  <!-- Elements                                                      -->
  <!--===============================================================-->
  <xs:element name="AsifXml">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="options" minOccurs="0" maxOccurs="1"/>
        <xs:choice>
          <xs:element ref="airportLayouts" />
          <xs:element ref="annualization" maxOccurs="unbounded"/>
          <xs:element ref="boundary" maxOccurs="unbounded"/>
          <xs:element ref="case" maxOccurs="unbounded"/>
          <xs:element name="fleet" type="fleet" minOccurs="0" maxOccurs="1"/>
          <xs:element ref="operation" maxOccurs="unbounded"/>
          <xs:element ref="receptorSet" maxOccurs="unbounded"/>
          <xs:element ref="scenario" maxOccurs="unbounded"/>
          <xs:element ref="study"/>
          <xs:element ref="trackOpSet" maxOccurs="unbounded"/>
        </xs:choice>
      </xs:sequence>
      <xs:attribute name="version" type="string16" use="optional"/>
      <xs:attribute name="content" use="required">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="airportLayouts" />
            <xs:enumeration value="annualization"/>
            <xs:enumeration value="case"/>
            <xs:enumeration value="fleet"/>
            <xs:enumeration value="receptorSets"/>
            <xs:enumeration value="scenario"/>
            <xs:enumeration value="study"/>
            <xs:enumeration value="studyBoundary" />
            <xs:enumeration value="trackOpSet"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:attribute>
    </xs:complexType>
  </xs:element>
  <xs:element name="study">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="name" type="string255"/>
```

```
      <xs:element name="type" type="studyType"/>
      <xs:element name="metricUnits" type="xs:boolean"/>
      <xs:element name="emissionsUnits" type="emissionsUnitsType"/>
      <xs:element name="description" type="string255" minOccurs="0"/>
      <xs:element ref="boundary" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="climate" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="airportLayouts" minOccurs="0" />
      <xs:element name="terrainFiles" type="string255" minOccurs="0"/>
      <xs:element ref="receptorSet" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="fleet" type="fleet" minOccurs="0" maxOccurs="1"/>
      <xs:element ref="scenario" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="options">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="utmZoneDefault" type="xs:int" default="-1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="boundary">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="polygon" type="polygon2DType" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="climate">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="identifier" type="string8"/>
      <xs:element name="temperature" type="xs:float"/>
      <xs:element name="pressure" type="xs:float"/>
      <xs:element name="humidity" type="xs:float"/>
      <xs:element name="headWind" type="xs:float" minOccurs="0"/>
      <xs:element name="seaLevelPressure" type="xs:float" minOccurs="0"/>
      <xs:element name="dewPoint" type="xs:float" minOccurs="0"/>
      <xs:element name="windDirection" type="xs:float" minOccurs="0"/>
      <xs:element name="visibility" type="xs:float" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:complexType name="airportCode">
  <xs:simpleContent>
    <xs:extension base="string4">
      <xs:attribute name="type" type="airportCodeType" use="optional" default="ANY"/>
```

```
        <xs:attribute name="country" type="string3" use="optional" default="ANY"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>

  <xs:element name="tracks">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="track" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="airportLayoutType" >
    <xs:sequence>
      <xs:element name="name" type="string255" minOccurs="0" />
      <xs:element name="airportCode" type="airportCode"/>
      <xs:element name="startDate" type="xs:date" minOccurs = "0" />
      <xs:element name="elevation" type="xs:float" minOccurs="0" />
      <xs:element name="peakMonthAverageDayScalingFactor" type="xs:double" minOccurs="0"
default="1.0" />
      <xs:group ref="coord2DGroup" minOccurs="0" />
      <xs:element ref="runway" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="tracks" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>


  <xs:element name="runway">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="length" type="xs:short"/>
        <xs:element name="width" type="xs:short"/>
        <xs:element name="runwayEnd" type="runwayEnd"  minOccurs="1" maxOccurs="2" />
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="runwayEnd">
    <xs:sequence>
      <xs:element name="name" type="string8"/>
      <xs:group ref="coord2DGroup"/>
      <xs:element name="elevation" type="xs:float"/>
      <xs:element name="threshCrossHeight" type="xs:float" minOccurs="0"/>
      <xs:element name="threshElevation" type="xs:float" minOccurs="0"/>
      <xs:element name="glideSlope" type="xs:float" minOccurs="0"/>
      <xs:element name="intAltitude" type="xs:float" minOccurs="0"/>
      <xs:element name="depDispThresh" type="xs:float" minOccurs="0"/>
```

```
      <xs:element name="appDispThresh" type="xs:float" minOccurs="0"/>
      <xs:element name="percentWind" type="xs:float" minOccurs="0"/>
      <xs:element name="isHelipad" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:element name="airportLayouts">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="layout" type="airportLayoutType" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>


  <xs:element name="scenario">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="name" type="string255"/>
        <xs:element name="startTime" type="xs:dateTime"/>
        <xs:element name="duration" type="xs:int"/>
        <xs:element name="taxiModel" type="taxiModelType"/>
        <xs:element name="acftPerfModel" type="aircraftPerformanceModelType"/>
        <xs:element name="bankAngle" type="xs:boolean"/>
        <xs:element name="altitudeCutoff" type="xs:float" default="18000" minOccurs="0"/>
        <xs:element name="sulfurConversionRate" type="xs:float" minOccurs="0"/>
        <xs:element name="fuelSulfurContent" type="xs:float" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="airportLayouts" minOccurs="0" >
          <xs:complexType>
            <xs:sequence>
              <xs:element name="layout" type="string255" maxOccurs="unbounded" />
            </xs:sequence>
          </xs:complexType>
        </xs:element>
        <xs:element ref="cases"/>
        <xs:element ref="annualization" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="case">
    <xs:complexType>
      <xs:choice>
        <xs:sequence>
          <xs:element name="caseId" type="xs:int"/>
          <xs:element name="name" type="string255"/>
          <xs:element name="source" type="emissionsSourceType" minOccurs="0"/>
          <!--  TODO: does ASIF need climate records defined for a Case?
```

```
                                    <xs:element name="climate" minOccurs="0"/>
                  -->
          <xs:element name="startTime" type="xs:dateTime" minOccurs="0"/>
          <xs:element name="duration" type="xs:int" minOccurs="0"/>
          <xs:element name="climateId" type="string8" minOccurs="0"/>
          <xs:element name="hourlyWxFile" type="string255" minOccurs="0"/>
          <xs:element name="hourlyWxMD5" type="string16" minOccurs="0"/>
          <xs:element name="description" type="string255" minOccurs="0"/>
          <xs:choice>
            <xs:element ref="case" maxOccurs="unbounded"/>
            <xs:element ref="trackOpSet" maxOccurs="unbounded"/>
            <xs:element ref="operation" maxOccurs="unbounded"/>
          </xs:choice>
        </xs:sequence>
        <xs:element name="reference">
          <!--  This represents a reference to a previously defined case name. -->
          <xs:complexType>
            <xs:sequence>
              <xs:element name="refScenario" type="string255"/>
              <xs:element name="refCase" type="string255"/>
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:choice>
    </xs:complexType>
  </xs:element>
  <xs:element name="cases">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="case" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:element name="annualization">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="name" type="string255"/>
        <xs:element ref="annualizationGroup"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="annualizationGroup">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="weight" type="xs:double"/>
        <xs:element name="scaleFactor" type="xs:float" default="1" minOccurs="0"/>
        <xs:group ref="annualizationGroupCase" minOccurs="0" maxOccurs="unbounded"/>
```

```
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="annualizationCase">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="name" type="string255"/>
        <xs:element name="weight" type="xs:double"/>
        <xs:element name="scaleFactor" type="xs:float" default="1" minOccurs="0"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="trackOpSet">
    <xs:complexType>
      <xs:sequence>
        <xs:choice>
          <xs:element ref="track" maxOccurs="unbounded"/>
          <xs:element ref="trackref"/>
          <xs:element ref="sensorPath" maxOccurs="unbounded"/>
        </xs:choice>
        <xs:element ref="operations" />
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="operation">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="id" type="string16"/>
        <xs:element name="aircraftType" type="aircraftType"/>
        <xs:element name="cruiseAltitude" type="xs:double" minOccurs="0" />
        <xs:element name="numOperations" type="xs:double"/>
        <xs:element name="carrier" type="string4" minOccurs="0"/>
        <xs:element name="flightNumber" type="string16" minOccurs="0"/>
        <xs:element name="tailNumber" type="string8" minOccurs="0"/>
        <xs:element name="userType" type="string12" minOccurs="0"/>
        <xs:element name="userParam" type="string16" minOccurs="0"/>
        <xs:element name="departureAirport" type="airportCode" minOccurs="0"/>
        <xs:element name="departureRunway" type="string8" minOccurs="0"/>
        <xs:element name="departureGate" type="string4" minOccurs="0"/>
        <xs:element name="arrivalAirport" type="airportCode" minOccurs="0"/>
        <xs:element name="arrivalRunway" type="string8" minOccurs="0"/>
        <xs:element name="arrivalGate" type="string4" minOccurs="0"/>
        <xs:element name="offTime" type="xs:dateTime" minOccurs="0"/>
        <xs:element name="onTime" type="xs:dateTime" minOccurs="0"/>
        <xs:element name="enrouteStartTime" type="xs:dateTime" minOccurs="0"/>
        <xs:choice>
          <xs:element name="outTime" type="xs:dateTime" minOccurs="0"/>
          <xs:element name="taxiOutDuration" type="xs:int" minOccurs="0"/>
```

```
      </xs:choice>
      <xs:choice>
        <xs:element name="inTime" type="xs:dateTime" minOccurs="0"/>
        <xs:element name="taxiInDuration" type="xs:int" minOccurs="0"/>
      </xs:choice>
      <xs:choice>
        <xs:element name="saeProfile" type="profileType" minOccurs="0"/>
        <xs:element name="saeProfiles" type="profiles" minOccurs="0"/>
      </xs:choice>
      <xs:choice>
        <xs:element name="badaProfile" type="profileType" minOccurs="0"/>
        <xs:element name="badaProfiles" type="profiles" minOccurs="0"/>
      </xs:choice>
      <xs:choice>
        <xs:element name="stageLength" type="string1" minOccurs="0"/>
        <xs:sequence>
          <xs:element name="departureStageLength" type="string1" minOccurs="0"/>
          <xs:element name="arrivalStageLength" type="string1" minOccurs="0"/>
        </xs:sequence>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="operations">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="operation" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>


<xs:element name="trackref">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="layoutName" type="string255"/>
      <xs:element name="trackName" type="string64"/>
      <xs:element name="optype" type="opType"/>
      <xs:element name="runway" type="string8" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

 <xs:element name="track">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="id" type="string16"/>
```

```
      <xs:element name="name" type="string64" minOccurs="0"/>
      <xs:element name="optype" type="opType"/>
      <xs:element name="wingtype" type="wingType" minOccurs="0"/>
      <xs:element name="airport" type="airportCode" minOccurs="0"/>
      <xs:element name="runway" type="string8" minOccurs="0"/>
      <xs:element name="vectorCourseHelipad" type="xs:double" minOccurs="0"/>
      <xs:element ref="subtrack" minOccurs="1" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="subtrack">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="id" type="xs:int"/>
      <!-- NOTE: logic check to make sure all subtrack weights add up to 1 -->
      <xs:element name="dispersionWeight" type="xs:float"/>
      <xs:choice>
        <xs:element ref="trackVectors"/>
        <xs:element ref="trackNodes"/>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="trackVectors">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="trackVector" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="trackNodes">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="trackNode" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="sensorPath">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="sensorNode" minOccurs="1" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

```
<xs:element name="sensorNode">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="lat" type="xs:double"/>
      <xs:element name="long" type="xs:double" />
      <xs:element name="altitude" type="xs:double" />
      <xs:element name="messageTime" type="xs:dateTime" />
      <xs:element name="sequenceNum" type="xs:int" />
      <xs:element name="speed" type="xs:float" minOccurs="0"/>
      <xs:element name="thrust" type="xs:float" minOccurs="0"/>
      <xs:element name="source" type="string255" minOccurs="0" />
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="trackVector">
  <xs:complexType>
    <xs:sequence>
      <xs:group ref="nodeIdGroup"/>
      <xs:element name="type" type="vectorTrackType"/>
      <xs:choice>
        <xs:element name="distance" type="xs:float"/>
        <xs:sequence>
          <xs:element name="angle" type="xs:float"/>
          <xs:element name="radius" type="xs:float"/>
        </xs:sequence>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="trackNode">
  <xs:complexType>
    <xs:sequence>
      <xs:group ref="nodeIdGroup"/>
      <xs:group ref="coord2DGroup"/>
      <xs:element name="altitude" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:float">
              <xs:attribute name="control" type="nodeControlType" use="optional"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="speed" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:float">
```

```
              <xs:attribute name="control" type="nodeControlType" use="optional"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="receptorSet">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="name" type="string255"/>
      <xs:group ref="receptorGroup"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="centroid">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="stateFips" type="xs:int"/>
      <xs:element name="countyFips" type="xs:int"/>
      <xs:element name="blockId" type="xs:int"/>
      <xs:element name="bnaId" type="string6"/>
      <xs:group ref="coord2DGroup"/>
      <xs:element name="elevation" type="xs:float" minOccurs="0"/>
      <xs:element name="count" type="xs:int"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="grid">
  <xs:complexType>
    <xs:sequence>
      <xs:group ref="coord2DGroup"/>
      <xs:element name="elevation" type="xs:float" minOccurs="0"/>
      <xs:element name="width" type="xs:float"/>
      <xs:element name="height" type="xs:float"/>
      <xs:element name="numWidth" type="xs:int"/>
      <xs:element name="numHeight" type="xs:int"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- User Defined Aircraft elements -->
<xs:complexType  name="fleet">
  <xs:sequence>
    <xs:element name="anpNoiseGroup" type="anpNoiseGroup" minOccurs="0" maxOccurs="unbo
unded"/>
    <xs:element name="airplane" type="airplane"  minOccurs="0" maxOccurs="unbounded"/>
```

```
    </xs:sequence>
  </xs:complexType>

  <xs:complexType  name="airplane">
    <xs:sequence>
      <!-- description field should go in AIR_OPERATION_AIRCRAFT.Description -->
      <xs:element name="description" type="string255"/>

      <xs:element name="baseAirplane" type="baseAirplane"/>

      <xs:element name="anpAirplaneInfo" minOccurs="0">
        <xs:complexType>
          <xs:sequence>
            <xs:choice>
              <!-- anpAirplaneId - link to another existing anpAirplane -->
              <xs:element name="anpAirplaneId" type="anpAirplaneId" />
              <!-- anpAirplane - create a new anpAirplane -->
              <xs:element name="anpAirplane" type="anpAirplane"/>
            </xs:choice>
          </xs:sequence>
        </xs:complexType>
      </xs:element>

      <xs:element name="badaAirplaneInfo" minOccurs="0">
        <xs:complexType>
          <xs:sequence>
            <xs:choice>
              <!-- badaAirplaneId - link to another existing badaAirplane -->
              <xs:element name="badaAirplaneId" type="badaAirplaneId" />
              <!-- badaAirplane - create a new badaAirplane -->
              <xs:element type="badaAirplane" name="badaAirplane" />
            </xs:choice>
          </xs:sequence>
        </xs:complexType>
      </xs:element>

      <xs:element name="airframeInfo" minOccurs="0">
        <xs:complexType>
          <xs:sequence>
            <xs:choice>
              <!-- airframeModel: link to an existing airframe -->
              <xs:element name="airframeModel" type="airframeModel" />
              <!-- airframe: create a new airframe -->
              <xs:element name="airframe" type="airframe" />
            </xs:choice>
          </xs:sequence>
        </xs:complexType>
      </xs:element>
```

```
    </xs:sequence>
  </xs:complexType>

  <xs:element name="anpNoiseId" type="string12"/>

  <xs:simpleType name="anpAirplaneId">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="12"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="badaAirplaneId">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="10"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="airframeModel">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="50"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="engineCode">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="50" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="engineModCode">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="50" />
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="baseAirplane">
    <xs:sequence>
      <xs:element name="anpAirplaneId" type="anpAirplaneId" />
      <xs:element name="badaAirplaneId" type="badaAirplaneId" />
      <xs:element name="airframeModel" type="airframeModel" />
      <xs:element name="engineCode" type="engineCode"/>
      <xs:element name="engineModCode" type="engineModCode" default="NONE" minOccurs="0"
/>
```

```
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="anpNoiseGroup">
    <xs:sequence>
      <xs:element name="noiseId" type="string12" />
      <xs:element name="spectralClassApproach" type="xs:short" minOccurs="0"/>
      <xs:element name="spectralClassDeparture" type="xs:short" minOccurs="0"/>
      <xs:element name="spectralClassAfterburner" type="xs:short"  minOccurs="0"/>
      <xs:element name="thrustSetType" type="string1" />
      <xs:element name="modelType" type="string1" />
      <xs:element name="npdCurves" type="anpNPDCurves" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="anpNPDCurves">
    <xs:sequence>
      <xs:element maxOccurs="unbounded" name="npdCurve" type="anpNPDCurve"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="anpNPDCurve">
    <xs:sequence>
      <xs:element name="noiseType" type="string12"/>
      <xs:element name="opMode" type="string10"/>
      <xs:element name="netThrustPerEngine" type="xs:float"/>
      <xs:element name="L_200" type="xs:double" />
      <xs:element name="L_400" type="xs:double"  />
      <xs:element name="L_630" type="xs:double"  />
      <xs:element name="L_1000" type="xs:double" />
      <xs:element name="L_2000" type="xs:double" />
      <xs:element name="L_4000" type="xs:double" />
      <xs:element name="L_6300" type="xs:double" />
      <xs:element name="L_10000" type="xs:double" />
      <xs:element name="L_16000" type="xs:double" />
      <xs:element name="L_25000" type="xs:double" />
    </xs:sequence>
  </xs:complexType>


  <xs:complexType name="aircraftType">
    <xs:choice>
      <xs:element name="anpAircraftId" type="anpAirplaneId"/>
      <xs:sequence>
        <xs:element name="airframeModel" type="string50"/>
        <xs:element name="engineCode" type="string25"/>
        <xs:element name="engineModCode" type="engineModCode" default="NONE" minOccurs="0
"/>
      </xs:sequence>
```

```
    </xs:choice>
  </xs:complexType>

  <xs:complexType name="airframe">
    <xs:sequence>
      <xs:element name="model" type="string50"/>
      <xs:element name="engineCount" type="xs:int"/>
      <xs:element name="engineLocation" type="string1"/>
      <xs:element name="designationCode" type="string1"/>
      <xs:element name="maxRange" type="xs:int" minOccurs="0"/>
      <xs:element name="introYear" type="xs:int" minOccurs="0"/>
      <xs:element name="euroGroupCode" type="string2" />
      <xs:element name="usageCode" type="string1" />
      <xs:element name="sizeCode" type="string1"/>
      <xs:element name="engineType" type="string1"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="anpAirplane">
    <xs:sequence>
      <xs:element name="anpAirplaneId" type="anpAirplaneId" />
      <xs:element name="description" type="string40"  minOccurs="0"/>
      <xs:element name="numberEngines" type="xs:int"  minOccurs="0"/>
      <xs:element name="maxGrossWeightTakeoff" type="xs:int"  minOccurs="0"/>
      <xs:element name="maxGrossWeightLand" type="xs:int"  minOccurs="0"/>
      <xs:element name="maxDsStop" type="xs:int"  minOccurs="0" />
      <xs:element name="thrustStatic" type="xs:int"  minOccurs="0"/>
      <xs:element name="noiseId" type="string12"  minOccurs="0"/>
      <xs:element name="minBurn" type="xs:double"  minOccurs="0"/>
      <xs:element name="profiles" type="anpProfiles" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="anpProfiles">
    <xs:sequence>
      <xs:element maxOccurs="unbounded" name="profile" type="anpProfile"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="anpProfile">
    <xs:sequence>
      <xs:element name="operationType" type="string1" />
      <xs:element name="profileGroupId" type="string8"/>
      <xs:element name="profileStageLength" type="string1"/>
      <xs:element name="weight" type="xs:int"/>
      <xs:choice>
        <xs:element type="anpProcedureSteps" name="procedureSteps" />
        <xs:element type="anpProfilePoints" name ="profilePoints" />
      </xs:choice>
```

```
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="anpProfilePoints">
    <xs:sequence>
      <xs:element maxOccurs="unbounded" name="point" type="anpProfilePoint"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="anpProfilePoint">
    <xs:sequence>
      <xs:element name="pointNum" type="xs:short" />
      <xs:element name="distance" type="xs:float" />
      <xs:element name="altitude" type="xs:float"/>
      <xs:element name="speed" type="xs:float" />
      <xs:element name="thrustSet" type="xs:float" />
      <xs:element name="opMode" type="string1" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="anpProcedureSteps">
    <xs:sequence>
      <xs:element maxOccurs="unbounded" name="step" type="anpProcedureStep"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="anpProcedureStep">
    <xs:sequence>
      <xs:element name="stepNum" type="xs:int" />
      <xs:element name="flapId" type="string6"  minOccurs="0"  />
      <xs:element name="stepType" type="string1" />
      <xs:element name="thrustType" type="xs:string"  minOccurs="0" />
      <xs:element name="param1" type="xs:float"/>
      <xs:element name="param2" type="xs:float"/>
      <xs:element name="param3" type="xs:float"  minOccurs="0"  />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="badaAirplane">
    <xs:sequence>
      <xs:element name="badaAirplaneId" type="badaAirplaneId"/>
      <xs:element name="mfgDescription" type="string255" minOccurs="0"/>
      <xs:element name="referenceAircraftMass" type="xs:float" minOccurs="0"/>
      <xs:element name="minAircraftMass" type="xs:float" minOccurs="0"/>
      <xs:element name="maxAircraftMass" type="xs:float" minOccurs="0"/>
      <xs:element name="maxPayloadMass" type="xs:float" minOccurs="0"/>
      <xs:element name="weightGradient" type="xs:float" minOccurs="0"/>
      <xs:element name="maxOperatingSpeed" type="xs:float" minOccurs="0"/>
      <xs:element name="maxOperatingMachNumber" type="xs:float" minOccurs="0"/>
      <xs:element name="maxOperatingAltitude" type="xs:float" minOccurs="0"/>
```

```
      <xs:element name="maxAltitudeAtMaxTakeoffWeight" type="xs:float" minOccurs="0"/>
      <xs:element name="temperatureGradientOnMaximumAltitude" type="xs:float" minOccurs="
0"/>
      <xs:element name="wingSurfaceArea" type="xs:float" minOccurs="0"/>
      <xs:element name="buffetOnsetLiftCoeff" type="xs:float" minOccurs="0"/>
      <xs:element name="buffetingGradient" type="xs:float" minOccurs="0"/>
      <xs:element name="machDragCoeff" type="xs:float" minOccurs="0"/>
      <xs:element name="profiles" type="badaProfiles" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="badaProfiles">
    <xs:sequence>
      <xs:element maxOccurs="unbounded" name="profile" type="badaProfile"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="badaProfile">
    <xs:sequence>
      <xs:element name="massRangeValue" type="string2"/>
      <xs:element name="companyCode1" type="string3"  minOccurs="0"/>
      <xs:element name="companyCode2" type="string2"  minOccurs="0"/>
      <xs:element name="companyName" type="string15"  minOccurs="0"/>
      <xs:element name="aircraftVersion" type="string12" />
      <xs:element name="engine" type="string12"   />
      <xs:element name="climbSpeedBelowTransitionAltitude" type="xs:short" />
      <xs:element name="climbSpeedAboveTransitionAltitude" type="xs:short" />
      <xs:element name="climbMachNumber" type="xs:double" />
      <xs:element name="cruiseSpeedBelowTransitionAltitude" type="xs:short" />
      <xs:element name="cruiseSpeedAboveTransitionAltitude" type="xs:short" />
      <xs:element name="cruiseMachNumber" type="xs:double" />
      <xs:element name="descentMachNumber" type="xs:double" />
      <xs:element name="descentSpeedUnderTransitionAltitude" type="xs:short" />
      <xs:element name="descentSpeedOverTransitionAltitude" type="xs:short" />
    </xs:sequence>
  </xs:complexType>

  <!--============================================================-->
  <!-- Groups                                                      -->
  <!--============================================================-->
  <xs:group name="annualizationGroupCase">
    <xs:choice>
      <xs:element ref="annualizationGroup" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="annualizationCase" minOccurs="0" maxOccurs="unbounded"/>
    </xs:choice>
  </xs:group>
  <xs:group name="receptorGroup">
    <xs:choice>
      <xs:element ref="centroid" maxOccurs="unbounded"/>
```

```
      <xs:element ref="grid"/>
    </xs:choice>
  </xs:group>
  <xs:group name="nodeIdGroup">
    <xs:sequence>
      <xs:element name="id" type="string16" minOccurs="0"/>
      <xs:element name="description" type="string16" minOccurs="0"/>
    </xs:sequence>
  </xs:group>
  <xs:group name="coord2DGroup">
    <xs:choice>
      <xs:group ref="latlonCoordGroup"/>
      <xs:group ref="utmCoordGroup"/>
    </xs:choice>
  </xs:group>
  <xs:group name="latlonCoordGroup">
    <xs:sequence>
      <xs:choice>
        <xs:element name="latitude" type="latitudeDecimalType"/>
        <xs:element name="latitudeDMS" type="latitudeDMSType"/>
      </xs:choice>
      <xs:choice>
        <xs:element name="longitude" type="longitudeDecimalType"/>
        <xs:element name="longitudeDMS" type="longitudeDMSType"/>
      </xs:choice>
    </xs:sequence>
  </xs:group>
  <xs:group name="utmCoordGroup">
    <xs:sequence>
      <xs:element name="utmN" type="xs:double"/>
      <xs:element name="utmE" type="xs:double"/>
      <xs:element name="utmZone" type="xs:int" default="-1" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
  </xs:group>
  <xs:group name="aircraftTypeGroup">
    <xs:choice>
      <xs:element name="aircraftType" type="anpAirplaneId"/>
      <xs:element name="badaAircraftId" type="badaAirplaneId" />
      <xs:sequence>
        <xs:element name="aircraftAirframe" type="string50"/>
        <xs:element name="aircraftEngine" type="string25"/>
        <xs:element name="aircraftEngineMod" type="string50" />
      </xs:sequence>
    </xs:choice>
  </xs:group>
  <!--============================================================-->
  <!-- Types                                                       -->
  <!--============================================================-->
```

```
<xs:simpleType name="studyType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Emissions"/>
    <xs:enumeration value="Dispersion"/>
    <xs:enumeration value="Noise and Emissions"/>
    <xs:enumeration value="Noise and Dispersion"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="emissionsUnitsType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="MetricTonnes"/>
    <xs:enumeration value="Kilograms"/>
    <xs:enumeration value="Grams"/>
    <xs:enumeration value="ImperialTons"/>
    <xs:enumeration value="Pounds"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="polygon2DType">
  <xs:sequence>
    <xs:element name="vertex" minOccurs="3" maxOccurs="unbounded">
      <xs:complexType>
        <xs:group ref="coord2DGroup"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="polygon3DType">
  <xs:complexContent>
    <xs:extension base="polygon2DType">
      <xs:sequence>
        <xs:element name="ceiling" type="xs:float"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
<xs:simpleType name="taxiModelType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="UserSpecified"/>
    <xs:enumeration value="Sequencing"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="airportCodeType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ICAO"/>
    <xs:enumeration value="IATA"/>
    <xs:enumeration value="FAA"/>
    <xs:enumeration value="OTHER"/>
    <xs:enumeration value="ANY"/>
```

```
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="aircraftPerformanceModelType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="ICAO"/>
      <xs:enumeration value="SAE1845"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="emissionsSourceType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="Container"/>
      <xs:enumeration value="Aircraft"/>
      <xs:enumeration value="GSE Population"/>
      <xs:enumeration value="Parking Facilities"/>
      <xs:enumeration value="Roadways"/>
      <xs:enumeration value="Stationary Sources"/>
      <xs:enumeration value="Training Fires"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="latitudeDecimalType">
    <xs:simpleContent>
      <xs:extension base="xs:double">
        <xs:attribute name="positive" use="optional" default="N">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:pattern value="N|n|S|s"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:attribute>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
  <xs:simpleType name="latitudeDMSType">
    <xs:restriction base="xs:string">
      <xs:pattern value="[0-9]{2}[\-|:|&quot;][0-9]{2}[\-|:|&apos;][0-9]{2}(.[0-
9]{3})?[N|n|S|s]"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="longitudeDecimalType">
    <xs:simpleContent>
      <xs:extension base="xs:double">
        <xs:attribute name="positive" use="optional" default="E">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:pattern value="E|e|W|w"/>
            </xs:restriction>
          </xs:simpleType>
```

```
        </xs:attribute>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
  <xs:simpleType name="longitudeDMSType">
    <xs:restriction base="xs:string">
      <xs:pattern value="[0-9]?[0-9]{2}[\-|:|&quot;][0-9]{2}[\-|:|&apos;][0-9]{2}(.[0-
9]{3})?[E|e|W|w]"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="profiles">
    <xs:sequence>
      <xs:element name="departureProfile" type="profileType"/>
      <xs:element name="arrivalProfile" type="profileType"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="profileType">
    <xs:restriction base="string8"/>
  </xs:simpleType>
  <xs:simpleType name="opType">
    <xs:restriction base="xs:string">
      <xs:pattern value="A|Arrival|D|Departure|V|Overflight|C|Circuit|T|TouchAndGo|R|Runu
p|W|RunwayToRunway"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="wingType">
    <xs:restriction base="xs:string">
      <xs:pattern value="F|FixedWing|R|RotaryWing"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="vectorTrackType">
    <xs:restriction base="xs:string">
      <xs:pattern value="S|Straight|L|LeftTurn|R|RightTurn"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="nodeControlType">
    <xs:restriction base="xs:string">
      <xs:pattern value="0|None|1|AtOrBelow|2|Match|3|AtOrAbove"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string255">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="255"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string64">
    <xs:restriction base="xs:string">
```

```
      <xs:minLength value="0"/>
      <xs:maxLength value="64"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string50">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="50"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string40">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="40"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string25">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="25"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string16">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="16"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string15">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="15"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string12">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="12"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string10">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="10"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string8">
    <xs:restriction base="xs:string">
```

```
      <xs:minLength value="0"/>
      <xs:maxLength value="8"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string6">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="6"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string4">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="4"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string3">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="3"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string2">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="2"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="string1">
    <xs:restriction base="xs:string">
      <xs:minLength value="0"/>
      <xs:maxLength value="1"/>
    </xs:restriction>
  </xs:simpleType>
</xs:schema>
```

7. Splitting ASIF Files

AEDT comes with a utility to split ASIF files into smaller files. These files can be imported into AEDT using the ASIF import functions described in the User Guide. The ASIF Spliiter utility takes a full study ASIF file (e.g. an ASIF file used to create a new study, with the ASIFXml content attribute type of "study") and creates a set of output files. These output files include:

- A base file containing the study data and first scenario data. This file can be used to create a study with the first scenario.
- A set of scenario files containing scenario data for the remaining scenarios.
- If the *Top Level Case* setting is selected for *Split level*, then each scenario file will have the first top level case and each additional case will be split into a separate file.
- If the *Split Receptors* setting is set to *Yes*, then the receptors from the input file will be split into a separate file.

To split an ASIF file using the ASIF Splitter utility:

1. Double-click the *FAA.AEE.AEDT.ASIF.SplitAsif.exe* located in the AEDT installation directory.
2. ASIF Splitter application will open (Figure C-10).
3. Enter the directory where you want your split XML files to be written under *Output Directory*.
4. Enter the path to the ASIF file you would like to split under *ASIF File Path*.
5. Select the *Split level*:
   a. Scenario: This partitions the file by scenario.
   b. Top Level Case: This partitions the file by the top level case when parent\child cases are present.
6. Select whether or not to split your receptors by choosing *Yes* or *No* under *Split Receptors*.
7. Click the *Split ASIF File* button.

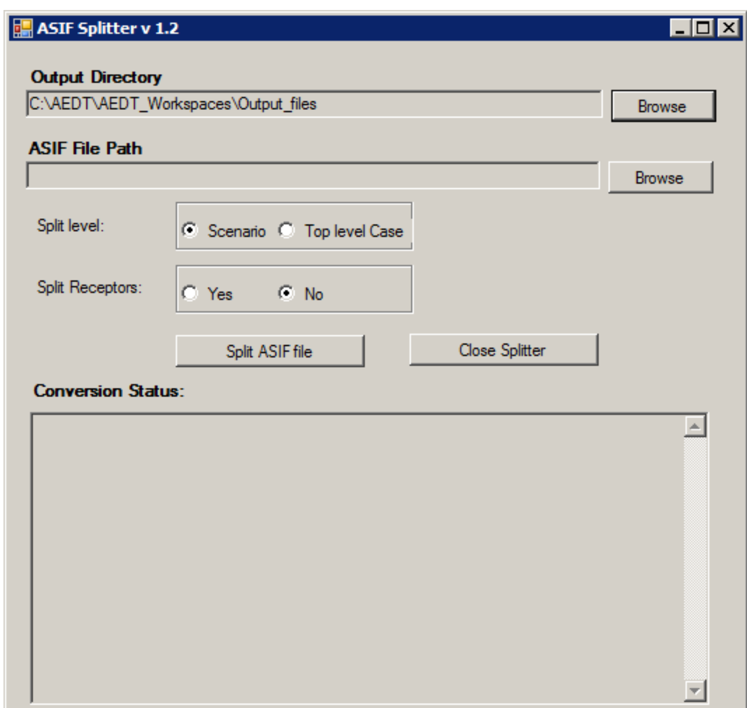


Figure C-10 ASIF Splitter

8. The conversion status will be updated in the *Conversion Status* section (Figure C-11). This will provide information about any errors or problems the ASIF Splitter encounters as well as alerting when the processing is complete.

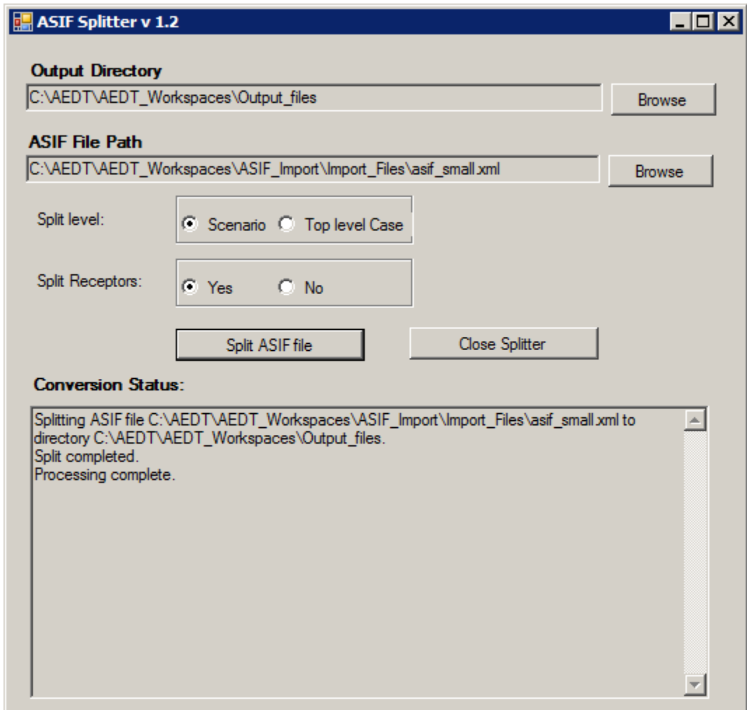


Figure C-11 ASIF Splitter – Conversion Status

9. Click the *Close Splitter* button to close the ASIF Splitter application.
10. The split files will be located in the specified output directory. The file labeled "…_base_..." is the STUDY level file and must be imported first.

Appendix D Menu Reference

File Menu

File Menu Commands	Section Reference/Description
New Study	Creating new studies through the GUI is not supported in AEDT2a.
Open Study	Use this menu to save and close current study, then open another study. It opens the *Load Study* dialog box which allows the user to import a new study or open existing study. See section 3.3.
Save	Use this menu to commit any changes that have been made to the current study database.
Print	Not supported in AEDT2a.
Print Preview	Not supported in AEDT2a.
Import	Section 5.1.1
Export Aircraft	Section 6.5
Distributed Processing Setup	Section 2.2
Generate Administrative File	Section 5.8
Exit	Use this menu to save and close the current study, then quit AEDT.

Setup Menu

Setup Menu Commands	Section Reference/Description
Study Setup	Section 4.6
Study Aircraft	Section 5.5.2
Receptors	Section 5.6.1
Receptor Sets	Section 5.6.2
Noise Metrics	Section 5.7
File Paths	Sections 5.1.4 and 5.1.5

View Menu

View Menu Commands	Section Reference/Description
Annualizations	Section 6.1
Tracks	Section 6.2
Study Boundary	Section 6.3
Study Input Report	Section 6.4.1
Fleet Mix Report	Section 6.4.2
Receptor Set Report	Section 6.4.3
Job Flight Performance Summary Report	Section 6.5
AEDT Error Log	Section 6.6

Map Menu

Map Menu Commands	Section Reference/Description
Clear Measurements	Section 4.4
Add External GIS Layer	Section 5.1.1
Draw GIS Object – Generate Region	Section 4.4

Run Menu

Run Menu	Section Reference/Description
Run Options	Section 7.1
Start Run…	Section 7.2

Results Menu

Results Menu Commands	Section Reference/Description
Flight Performance Information	Section 8.1
Noise Graph	Section 8.2
Change Analysis	Section 8.3
Contours	Section 8.4
Emissions Report	Section 8.5
Noise Report	Section 8.6
Clear Invalid Results	Section 8.7

Help Menu

Help Menu Commands	Section Reference/Description
Contents	Use this menu to open the AEDT User Guide.
About…	User this menu to open the About box which contains AEDT version information.

Appendix E SQL Server Configuration Settings

To confirm AEDT and Microsoft SQL Server configuration settings, the user must check the AEDT configuration file and the STUDY_ROOT database by following the steps described below.

If running jobs with distributed processing, see Section 2.2 for instructions on how to identify appropriate server names. N-90

To check the server name in the AEDT configuration file:

1. Identify the database server name.
   - Windows XP
     a. Navigate to *Start* menu, *Control Panel*, *System*.
     b. The *Systems Properties* dialog box will open. Select the *Computer Name* tab (Figure E-1).
     c. The *Full computer name* consists of computer name and domain. The computer name without the *Domain* at the end is the desired server name (e.g. in Figure E-1 only COMPUTER NAME is needed, not *.vntscex.local*).

   - Windows 7
     a. Navigate to *Start* menu, *Control Panel*, *System and Security*, *System*.
     b. The name in the *Computer name* field is the desired server name. Do not use the *Full computer name*.

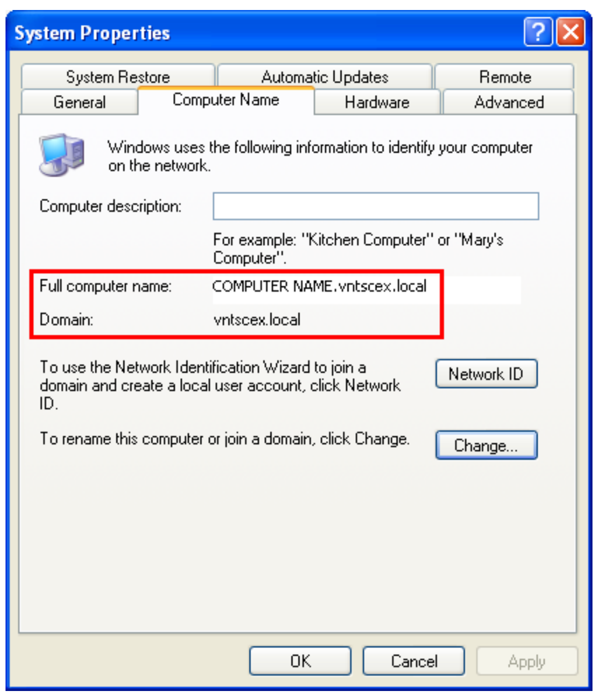


Figure E-1 System Properties in Windows XP

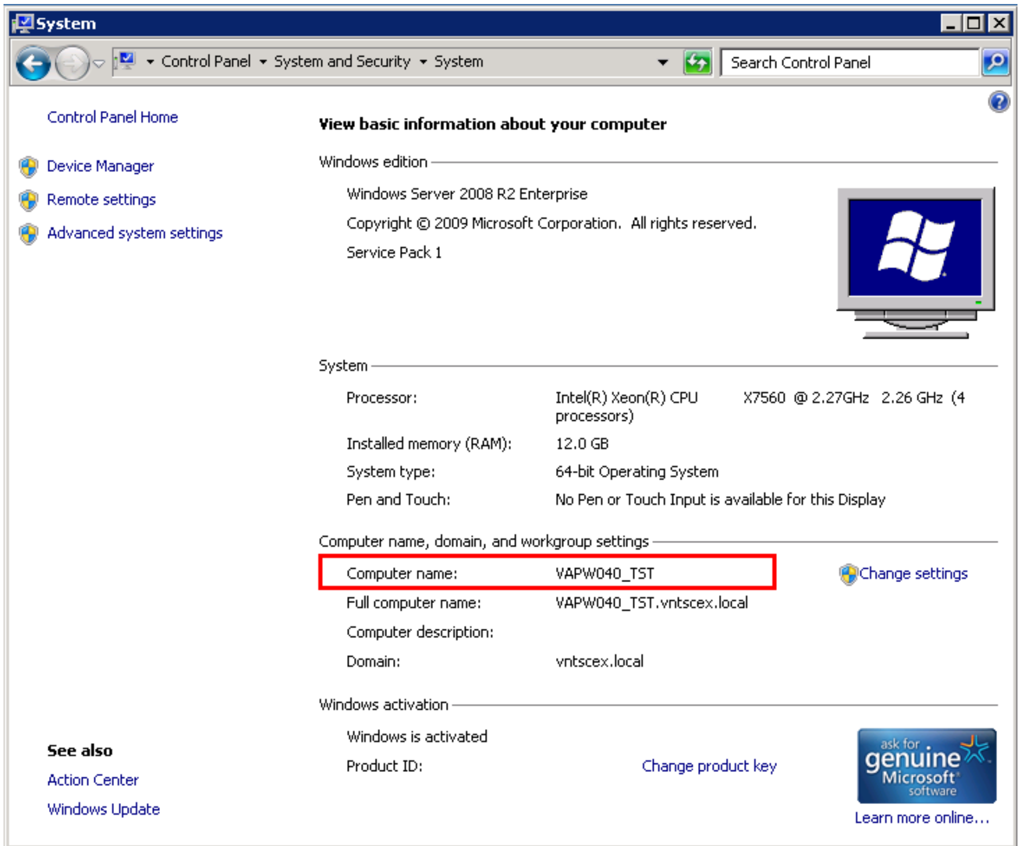


Figure E-2 System Properties in Windows 7

2. Open the configuration file C:\AEDT\FAA.AEE.AEDT.AEDTApp.exe.config. Confirm the server name in the highlighted locations in Figure E-3 matches the server name identified in previous step.

```
<connectionStrings>
    <add name="FLEETConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=FLEET; Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="AIRPORTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=AIRPORT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.AEDT_LOCAL_STUDYConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.STUDYConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_NIRS;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="FAA.AEE.AEDT.DataAccessModule.Properties.Settings.AEDT_STUDY_ROOTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="STUDY_ROOTConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_ROOT;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="RESULTSConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY_NIRS;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
    <add name="ASIFConnectionString"
       connectionString="Data Source=[SQL Server Name];Initial Catalog=STUDY;Integrated Security=True"
       providerName="System.Data.SqlClient"/>
</connectionStrings>
```

Figure E-3 FAA.AEE.AEDT.AEDTApp.exe.config File—Database Locations

3. If the server name in the configuration file does not match the server name identified in Step 1, replace the server name in the configuration file with the correct server name.

The connection string is case sensitive; enter the server name in the same case as shown. W-84

If the Load Study dialog box does not open upon startup of AEDT, the issue may be due to the incorrect value for the Data Source in the FAA.AEE.AEDT.AEDTApp.exe.config file. Sometimes "ServerName\MYSQLServer;" appears after "Data Source=" (e.g. "Data Source=localhost\MYSQLServer;"). The inclusion of \MYSQLServer in the server name can be invalid for some SQL connections and should be deleted. However, other SQL connections will accept the inclusion of \MYSQLServer. N-91

To check the server name in the STUDY_ROOT database:

1. Close out of AEDT if it is open.
2. Open SQL Server Management Studio from the *Start* menu, *All Programs*, *Microsoft SQL Server 2008 R2*, *SQL Server Management Studio*.
3. In the *Connect to Server* dialog box, enter or select the appropriate server name then click the *Connect* button.
4. Open the database hierarchy in the *Object Explorer*.
5. Expand (double-click) the database named *STUDY_ROOT* and expand the folder named *Tables*.
6. Right-click on *dbo.AVAILABLE_STUDIES* and select *Edit Top 200 Rows*. See Figure D-4 below, for a sample screen shot of the STUDY_ROOT database.
7. In the table, look at the server name in the *CONNECTION_STRING* column and confirm that it matches the server name in the AEDT configuration file.

8. If the server name matches, no additional action is needed.
9. If the server name does not match:
   a. Open a *Query* window by clicking the *New Query* button and type or copy and paste the following SQL query:

```
UPDATE [STUDY_ROOT].[dbo].[AVAILABLE_STUDIES]
SET CONNECTION_STRING = replace(CONNECTION_STRING, 'localhost', @@SERVERNAME)
GO
```

   b. Click the *Execute* button.
   c. The SQL query will update the column *CONNECTION_STRING* by searching for the value *localhost* in the column data and automatically set it to the correct server name. Likewise, any value entered where *localhost* is entered, will be searched for and replaced with the correct server name. Do not change "*@@SERVERNAME*" as it returns the name of the local server that is running SQL Server.

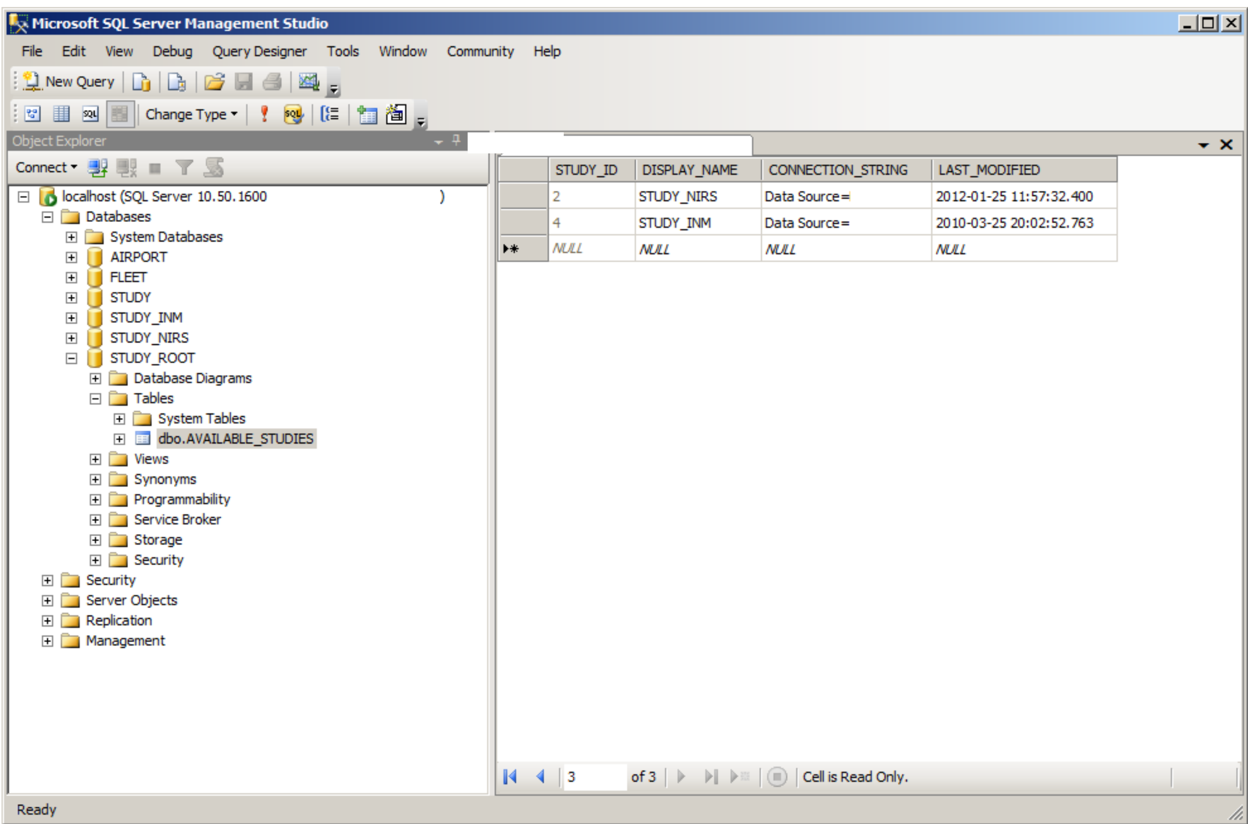


Figure E-4 Sample STUDY_ROOT Database

Appendix F Population Import Tool

The Population Import Tool (PIT) is a console application that allows the user to import population data into AEDT, based on geographic boundaries. The PIT imports population data and associated boundaries from census and county layer data files. Note that PIT only supports 2000 and 2010 census data.

A study boundary must exist in order to import population data. For more information on study boundary see Section 6.3. W-85

To download 2000 Census data:

1. Download county layer data files:
   a. Visit: http://www.census.gov/cgi-bin/geo/shapefiles2010/main
   b. Select *Counties (and equivalent)* for the layer type, and click *submit*.
   c. From the *County and Equivalent (2000)* drop-down menu, select *All states in one national file*. Click *Download*.
   d. Extract the zip file which contains the following county layer files. Move the files into the following directory, C:\AEDT\AEDT_Workspaces\PIT\CensusData\2000\CountiesLayer
      - Tl_2010_us_county00.dbf
      - Tl_2010_us_county00.prj
      - Tl_2010_us_county00.shp
      - Tl_2010_us_county00.shp.xml
      - Tl_2010_us_county00.shx
2. Download census data files:
   a. Visit: http://www2.census.gov/census_2000/datasets/Summary_File_1
   b. Click on the U.S. State of interest.
   c. Click on the zip file for the U.S. State to download the census data (e.g. for Illinois, select ilgeo_uf1.zip).
   d. If the area of interest covers more than one State, download census data for all States of interest.
   e. Unzip the census data file(s) and move all files into the following directory, C:\AEDT\AEDT_Workspaces\PIT\CensusData\2000\SF1

To download 2010 Census data:

Unlike the 2000 census data, downloading 2010 census data takes longer because SF1 files cannot be downloaded individually. This results in slower downloads and unnecessary data. N-92

1. Download county layer data files:
   a. Visit: http://www.census.gov/cgi-bin/geo/shapefiles2010/main
   b. Select *Counties (and equivalent)* for the layer type, and click *submit*.
   c. From the *County and Equivalent (2010)* drop-down menu, select *All states in one national file*. Click *Download*.
   d. Extract the zip file which contains the following county layer files. Move the files into the following directory, C:\AEDT\AEDT_Workspaces\PIT\CensusData\2010\CountiesLayer
      - Tl_2010_us_county10.dbf

- Tl_2010_us_county10.prj
- Tl_2010_us_county10.shp
- Tl_2010_us_county10.shp.xml
- Tl_2010_us_county10.shx

2. Download census data files:
   a. Visit: http://www2.census.gov/census_2010/04-Summary_File_1
   b. Click on the U.S. State of interest.
   c. Click on the zip file for the U.S. State to download the census data (e.g. for Illinois, select il2010.sf1.zip).
   d. If the area of interest covers more than one State, download census data for all States of interest.
   e. Unzip the census data file(s) and move all files into the following directory, C:\AEDT\AEDT_Workspaces\PIT\CensusData\2010\SF1
   f. [Optional] Delete all files except the geo files (e.g. ilgeo2010.sf1)

To import population data using the PIT:

1. From the Start menu type *cmd* in the *Open* field to open a command prompt window (or select *Run* in Windows XP).
2. Type in the following command to change the directory and press the enter key.

```
cd C:\AEDT
```

3. Type in the following command:

```
FAA.AEE.AEDT.GIS.PopulationImportTool [censusYear] [databaseName]
```

   Where:
   - [censusYear] is the year of the census data to import. Valid values are 2000 and 2010, do not enter the year in brackets.
   - [databaseName] is one of the Study names from the Load Study dialog of AEDT, do not enter the database name in brackets.

4. Press the enter key.
5. Figure F-1 displays the command prompt window when the processing has finished.

PIT will generate a warning message if census data files are missing for states that are within the study boundary. N-93

700,000 points will take approximately up to an hour to process in the Population Import Tool. N-94

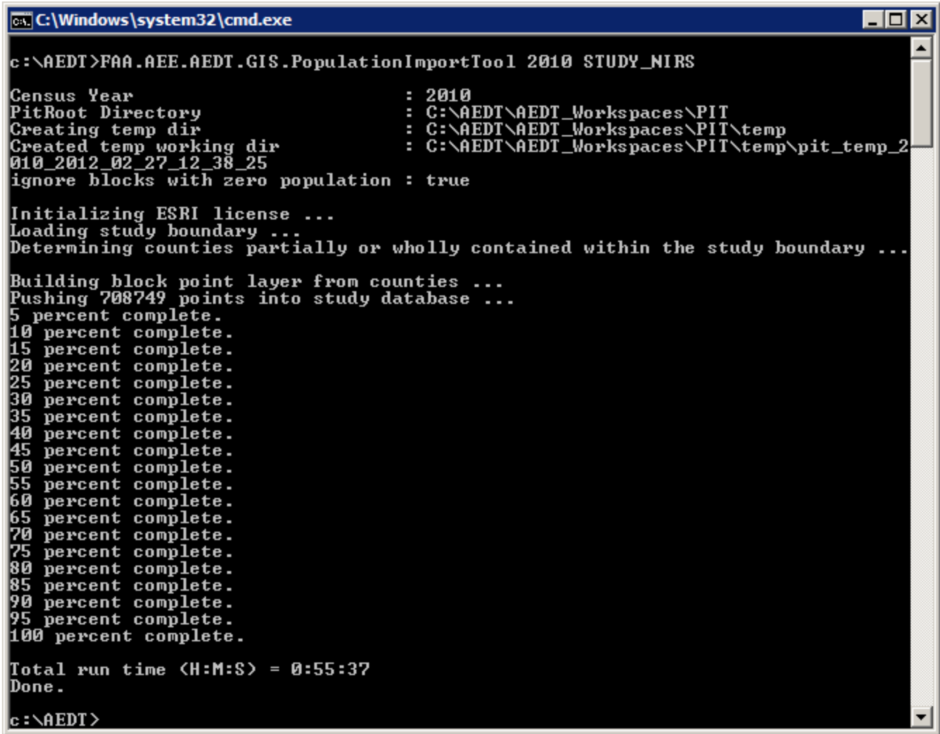


Figure F-1 PIT Console Finish Window

Appendix G Terrain

This appendix provides instructions on the recommended way to obtain terrain data files from the internet.

To obtain Gridfloat (NED) terrain data from the U.S. Geological Survey (USGS) graphically:

1. Go to http://seamless.usgs.gov/index.php
2. Click on the link named *TNM Viewer* in the *Tools to Access Data* category.

Figure G-1 USGS Seamless Data Warehouse – Tools to Access Data

3. A new window will open. Click the link, *Click Here to Open Viewer* under the heading that reads *The National Map Viewer and Download Platform.*
4. A new window will open and a map will load.
5. Use the navigation tools and/or the search function to zoom into the area of interest.

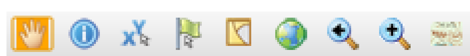


Figure G-2 USGS Seamless Data Warehouse – Navigation Tools

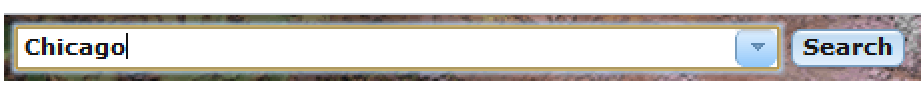


Figure G-3 USGS Seamless Data Warehouse – Search Function

6. The cursor position is displayed in lat/long in the bottom left corner of the map.

Figure G-4 USGS Seamless Data Warehouse – Cursor Position

7. When the extent of the terrain that is desired is within view on the screen:
   a. Click on the *Download Data* arrow.
   b. Click on the *Click here* link to download terrain data based on the current map extent.

Figure G-5 USGS Seamless Data Warehouse – Download Data

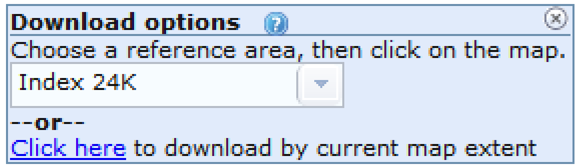


Figure G-6 USGS Seamless Data Warehouse – Download Options

8. The USGS Available Data dialog box will open.
   a. Under the Theme heading, check the *Elevation* box.
   b. Under the Format heading, select *Gridfloat*.
   c. Click the *Next* button.

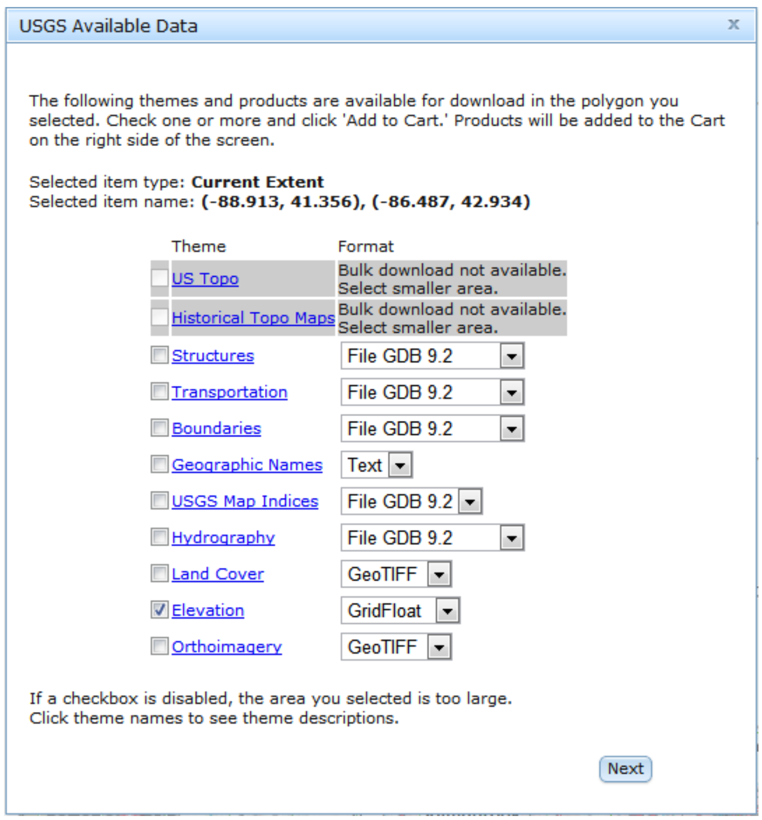


Figure G-7 USGS Seamless Data Warehouse – USGS Available Data

9. The dialog box will update and provide options for elevation data.
   a. Check the desired resolution.
   b. Click the *Next* button.

It is recommended that 1/3 Arc Second data (nominally 30 meters) data is used. Alternatively the lower resolution 1 Arc Second data (nominally 90 meters) can be used. Avoid the 1/9 Arc Second NED data as coverage is not complete and such high resolution data could adversely affect processing times.

N-95

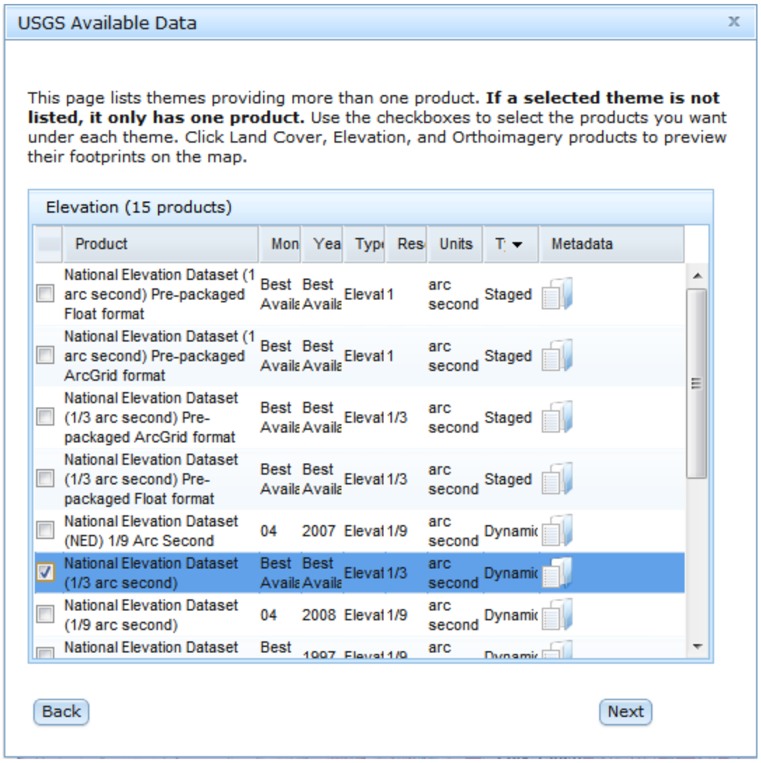


Figure G-8 USGS Seamless Data Warehouse – USGS Available Data

10. The TNM Download Cart will appear on the right side of the webpage.
    a. Review the terrain in the cart and select the Checkout button.
    b. Enter an e-mail address and click the Place Order button.

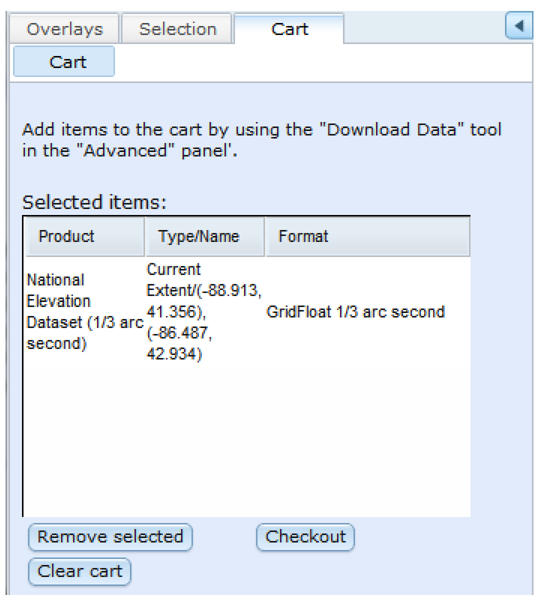


Figure G-9 USGS Seamless Data Warehouse – TNM Download Cart

11. An e-mail from the National Map Viewer with a link (or links) to download the ordered data will be sent to the e-mail address provided.

    Note: Depending on the size of the data, more than one file may need to be downloaded.

12. Click on the link (or links) and follow the prompts to complete the download.
13. Unzip the downloaded file(s) and stored them in the location that will be specified in the AEDT terrain file path. Please refer to Section 5.1.4 on how to define terrain file path location in the AEDT GUI.

Appendix H Weather

This appendix provides:

- Overview of weather in AEDT2a
- Instructions on how to download the supported types of high fidelity weather data files
- Instructions on how to pre-process weather data prior to using high fidelity weather in AEDT2a

Overview of Weather in AEDT2a

In AEDT2a, weather data are applied to a study based on a hierarchy of data availability, as follows:

1. High fidelity weather data (user input), in the following order:
    a. RUC13
    b. RUC20
    c. GEOS
    d. NCAR
2. Average annual weather from the AIRPORT database.
3. International standard atmosphere (ISA) weather conditions are applied when weather data are not available.

AEDT2a extracts atmospheric parameters (temperature, pressure, wind and relative humidity) for any given latitude, longitude, altitude, and time from a given meteorological dataset. The meteorological dataset can consist of airport data from the AIRPORT database (which can be overwritten) and/or user-provided GRIB (Grid in Binary, which is a World Meteorological Organization standard file format) files. The specific GRIB-formatted files can include Rapid Update Cycle (RUC) files, NCEP/NCAR Reanalysis Project (NCAR) ds090.0 files, or Geostationary Operational Environmental Satellite (GEOS) files. The user-provided GRIB files must be pre-processed as described below, before use. High Fidelity Weather utilizes user obtained data if present in the directories listed below. In the absence of user-obtained weather data in the specified directories, average annual weather from the AIRPORT database is utilized and adiabatic lapse rates are used to represent meteorological changes with altitude. In the event that there is no weather data in the AIRPORT database, international standard atmosphere (ISA) weather conditions are used.

In AEDT2a, 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.

If weather data files are incomplete when downloaded, inaccuracies will persist when pre-processing the files. When a job is run with incomplete weather data, out of memory exceptions will occur. To ensure weather data files are complete, confirm that the file sizes are consistent between the downloaded files and the source. W-86

High fidelity weather data are obtained in terms of pressure (milibar). AEDT2a uses geopotential height associated with the obtained data in high fidelity weather processing; height in MSL is not used in calculations. This may result in an underprediction of height. Inaccuracies will increase with height. Maximum differences between height (in MSL) and W-87

geopotential height are as follows:
1000 feet (305 m) max difference ~ 1 m
10000 feet (3048 m) max difference ~ 10 m
20000 feet (6096 m) max difference ~ 20 m

Due to a non-linear relationship between pressure and geopotential height, inaccuracies of interpolated height will increase with height for a given slice of high fidelity weather data.

When High Fidelity Weather files are run as part of a study, data discrepancies may occur for some operations. When these errors occur, the affected operations are removed from analysis and written to the error log. See Section 6.6 to access the error log. W-88

Downloading Weather Data

If weather data files are incomplete when downloaded, inaccuracies will persist when pre-processing the files. When a study is run with incomplete weather data, out of memory exceptions will occur. To ensure weather data files are complete, confirm that the file sizes are consistent between the downloaded files and the source. W-89

All weather data must be downloaded with UTC time. W-90

The weather data downloaded must be for the same dates as the air operations that are run or it will not be used. The weather is looked up based on the date of the air operation and the latitude/longitude. Dates are encoded in the name of the binary files. For example, the file _11192011-000__11192011-05959.RUC13.bin is for RUC13 data for the day 11/19/2011. If the file name is manually changed to _01012012-000__01012012-05959.RUC13.bin, the application would think it was RUC13 data for 01/01/2012. The file names can be edited to "trick" the application into using any data that you have available. The following query can be run on the AIR_OPERATION table to see what dates exist in the data: W-91

```
SELECT DISTINCT year([OPERATION_TIME]) as Year,
       month([OPERATION_TIME]) as Month,
       day([OPERATION_TIME]) as Day
  FROM [AIR_OPERATION]
```

The following sections provide instructions on downloading weather data from RUC or NCAR data types as well as obtaining GEOS data. After downloading a file, add the data to the study by following the steps below:

1. Copy the weather file to the following directory, see Table H-1 for download URLs:
   a. Copy RUC files into C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\RUC
   b. Copy NCAR files into C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\NCAR
   c. Copy GEOS files into C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\GEOS

Table H-1 Supported Weather Data File Types

Dataset	Download URL
Rapid Update Cycle (RUC20/RUC13)	RUC 20: http://nomads.ncdc.noaa.gov/thredds/catalog/ruc/ RUC 13: http://nomads.ncdc.noaa.gov/thredds/catalog/ruc13/
NCEP/NCAR (NCAR)	http://acdb-ext.gsfc.nasa.gov/Data_services/controlled/ncep/data/rean/raw
GEOS	GEOS-5 data are not publically available, and may be retrieved only with permission from NASA. See contact information in the GEOS section below.

Rapid Update Cycle (RUC)

The National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) website hosts RUC data files. The RUC locations listed above as RUC13 and RUC20 are archived data for the different resolution types. The data to be used in AEDT must contain 24 hours of data for a particular day. For technical information, visit http://ruc.noaa.gov/.

In AEDT2a, two RUC file data types are supported – RUC13 and RUC20 (signifying 13 kilometer and 20 kilometer resolution respectively).

RUC20 and RUC13 data cover the continental U.S. and parts of Mexico and Canada only as below and as shown in Figure H-1 .

RUC 13 (13Km Grid)
Grid: 451 (X) x 337 (Y) x 37(Z) = 5.6 million points (equidistance mb height data)
Coords: Lambert-Conformal-Conic (touching at 25 degree N)
Area covered: W -139.856122, E: -57.430877, N: 58.365355, S: 16.28100

RUC 20 (20Km Grid)
Grid: 301 (X) x 225 (Y) x 37 (Z) (equidistance mb height data)
Coords: Lambert-Conformal-Conic (touching at 25 degree N)
Area covered: W -139.856122, E: -57.430877, N: 58.365355, S: 16.28100

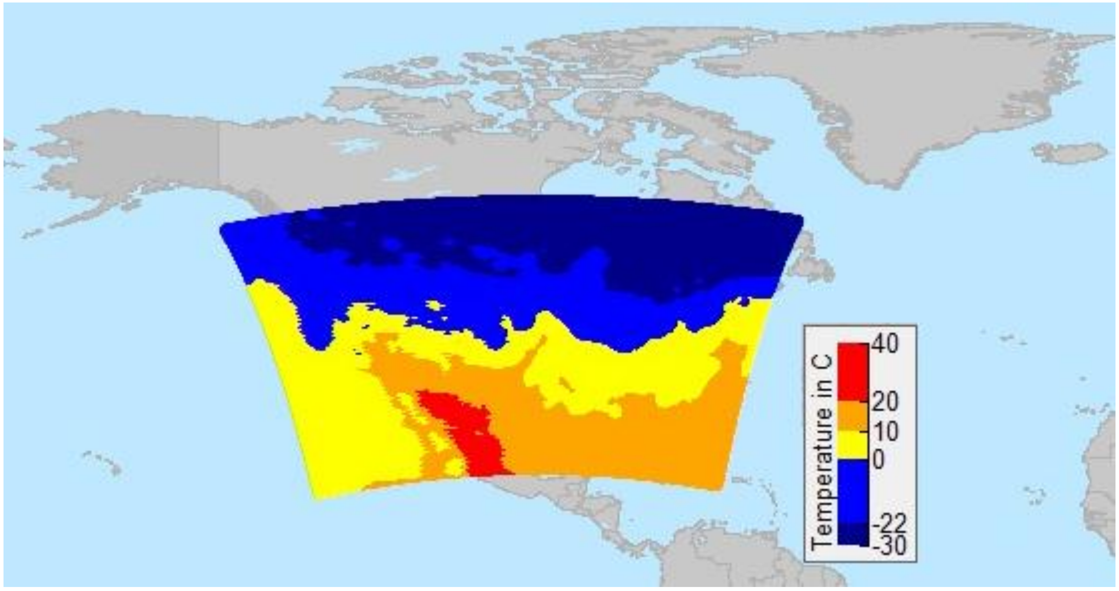


Figure H-1 RUC Weather Data Coverage

When utilizing RUC weather data, jobs running with a total of more than 1500 operations may experience out of memory exceptions. Please review the AEDT error log for jobs of this magnitude. W-92

Due to the large file size, downloading 24 hours of RUC data can take an extended amount of time to complete. W-93

To download RUC weather files:

1. In a web browser, navigate to one of the download websites listed in Table H-1, above for RUC.
2. Find the year-month directory and then the year-month-day directory to proceed to the actual data files.
3. Select only the files that end in the .grb2 (RUC13) or .grb (RUC20) extension and that have the form as follows: *ruc2_???_yyyymmdd_hh00_000* where:
   - *???* - represents RUC file data type, either 130 or 252.
   - *yyyymmdd* - represents a 4-digit year, 2-digit month, and a 2-digit day.
   - *hh00* - represents a 4-digit hour. The hours run between 0000 and 2300.
   - Only select files that contain the three zeroes, *000,* at the end of the file name.
4. Each file contains 1 hour of data for the specified day. Download all 24 files for the date selected to obtain data for 24 hours of the day.
5. Place the RUC files into the following directory C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\RUC.

Each RUC file is between 20 MB and 30 MB in size. Therefore, 24 hours of RUC data total between 480 and 720 MB. N-96

Running jobs with weather data may take a significant amount of time and the progress bar may disappear. To verify that AEDT is running, open the Windows Task Manager by holding Ctrl + Alt and pressing the Delete key, then select the Start Task Manager. The W-94 process named FAA.AEE.AEDT.AEDTApp.exe should appear in the Processes tab, shown in Figure H-2 below.

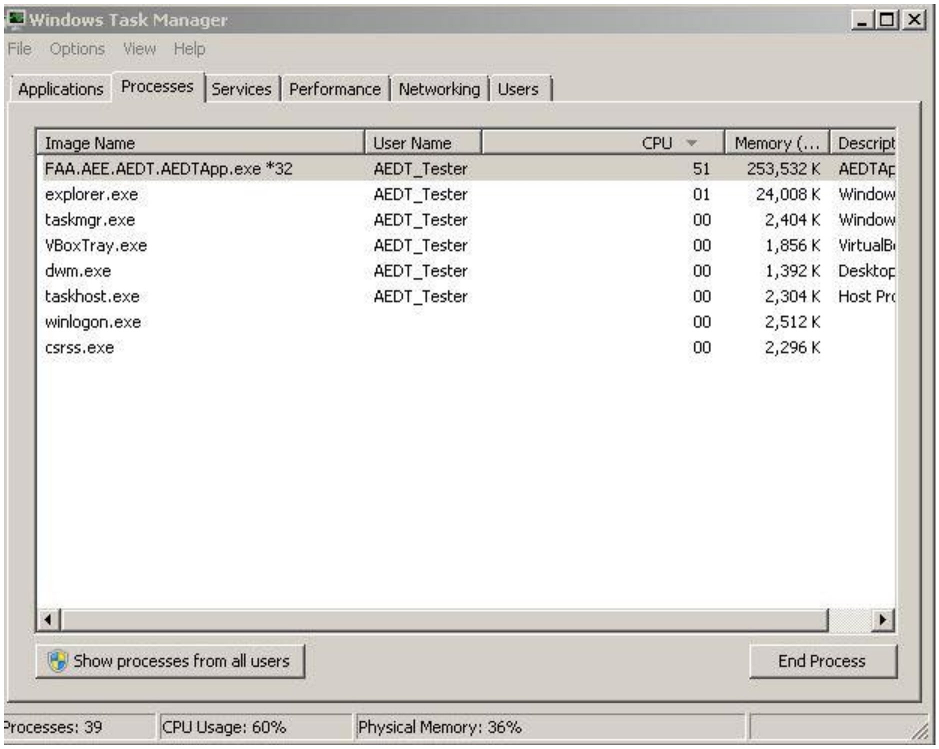


Figure H-2 Windows Task Manager

GEOS 5.2 Dataset (Goddard Earth Observing System Data Assimilation System Gridded Output)

The NASA Goddard Global Modeling and Assimilation Office (GMAO) produces GEOS-5 data four times per day, approximately 12 hours behind real-time.

GEOS data cover the entire earth in a latitude-longitude grid as below:
Grid: 540 (X) x 361 (Y) x 36 (Z) (non-equidistance mb height data)
Coords: Lat Lon (delta Lon = 0.66... degrees, delta Lat = 0.5 degrees)
Area Covered: Lat (-90 degrees to 90 degrees), Lon (-180 degrees to 179.33... degrees)

At lower altitudes, GEOS data coverage has many gaps and uses the value 10.E+15 where data is missing. Unrealistic results may appear in AEDT2a weather processing. It is W-95
recommended to only use GEOS data where it has full coverage in AEDT2a.

The GEOS-5 data are not publically available, and may be retrieved only with permission from NASA. To obtain the current GEOS-5 dataset:

1. Contact either of the following NASA staff via email:
   a. Data M. Ostrenga (data.m.ostrenga@nasa.gov)
   b. Gi-Kong Kim (gi-kong.kim-1@nasa.gov)

2. In the email, provide the following information:
   a. State that the data will be used as inputs to the Aviation Environmental Design Tool.
   b. Request the GEOS-5 variables that are listed below. They are provided in the following format, Variable Name—Description (Unit):
      - H—Geopotential height (m)
      - RH—Relative Humidity (percent)
      - T—Air Temperature (K)
      - U—Eastward Wind Component (m s^{-1})
      - V—Northward Wind Component (m s^{-1})

Data use permission will be granted subject to the following conditions:
1. The GEOS-5 data may not be distributed outside of the AEDT project team.
2. User(s) will provide GMAO feedback on the GEOS-5 data.
3. Use of GEOS-5 data will be acknowledged in any resulting publications.

Once permission is granted, downloading instructions will be provided.
1. File format specification for GEOS-5 data is described in the following pdf file: gmao.gsfc.nasa.gov/operations/GEOS5_V1_File_Specification.pdf
2. Each file contains data for a 6-hour period of the specified day. Download all 4 files for the date selected to obtain data for full 24 hours of the day.
3. Place the GEOS files into the following directory C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\GEOS.

Each GEOS file is approximately 80 MB in size. Therefore, 24 hours of GEOS data total approximately 320 MB. N-97

NCEP/NCAR Reanalysis Project Dataset 090.0 (ds090.0): referred here as "NCAR"
The National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) website hosts data from September 2003 onward and does not require registration. The full NCAR ds090.0 contains data from the calendar year 1948 onward and can be downloaded for free after completing registration on the home page.

The University Corporation for Atmospheric Research's (UCAR) National Center for Atmospheric Research's (NCAR) and the National Weather Service's (NWS) National Centers for Environmental Prediction (NCEP) provide the data. For technical information, visit http://dss.ucar.edu/datasets/ds090.0/.

NCAR data cover the entire Earth as below:
Grid: 144 (X) x 73 (Y) x 17 (Z)
Coords: Lat Lon (delta lat = delta lon = 2.5 degrees)
Area Covered: Lat (90 degrees to -90 degrees), Lon (0 degrees to 360 degrees)

The Weather Data Loader program described in the next section will automatically search the internet and download the NCAR files. The manual download steps listed below are optional. N-98

To download NCAR weather files:

1. In a web browser, navigate to the download website listed in Table H-1, for NCAR.
2. Find and select the appropriate year and month (e.g., Y2005 for 2005, M09 for September).
3. Select the file to download.
4. File names are formatted as *pgb.f00yymmddhh* where:
   - *00yymmdd* - represents a 2-digit year, 2-digit month, and a 2-digit day.
   - *hh* - represents the UTC hour of the day.

   For example, file *pgb.f0005092818* contains data for September 28, 2005 18:00 UTC.
5. Each file contains data for a 6-hour period of the specified day. Download all 4 files for the date selected to obtain data for full 24 hours of the day.
6. Place the NCAR files into the following directory C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\NCAR.

Each NCAR file is approximately 3 MB in size. Therefore, 24 hours of NCAR data total approximately 12 MB. N-99

Pre-Processing Weather Data

Once downloaded, weather data files must be pre-processed into a binary format before they can be used for high-fidelity weather in AEDT. A separate program, *Weather Data Loader* must be run to perform this pre-processing. The Weather Data Loader is located at C:\AEDT\FAA.AEE.AEDT.WeatherDataLoader.exe, however the application must be accessed by entering a command line specifying the parameters described below.

To run Weather Data Loader*:*

1. From the Start menu type *cmd* in the *Open* field to open a command prompt window (or select *Run* in Windows XP).
2. Type in the following command to change the directory and press the enter key.

   ```
   cd C:\AEDT
   ```

3. Type in the following command, omitting the brackets as shown in Figure H-3:

   ```
   FAA.AEE.AEDT.WeatherDataLoader [Date of Data to be Processed]
   [Weather Data Type] [”Directory of Data”]
   ```

   Where:
   - Date of Data to be Processed: Enter the date in mm/dd/yyyy format
   - Weather Data Type: Enter the italicized below:
     - *NCAR* (NCAR data). Note that NCAR data files do not have to be pre-loaded. The Weather Data Loader will search for and download the requested files from the internet, then will perform the translation on the downloaded files.

- Directory of Data: Enter a path to the directory where the weather data are stored in quotes, “C:\AEDT\AEDT_Workspaces\Sample_Wx_Data\NCAR”.

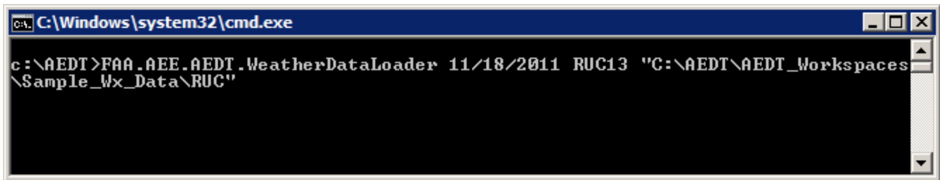
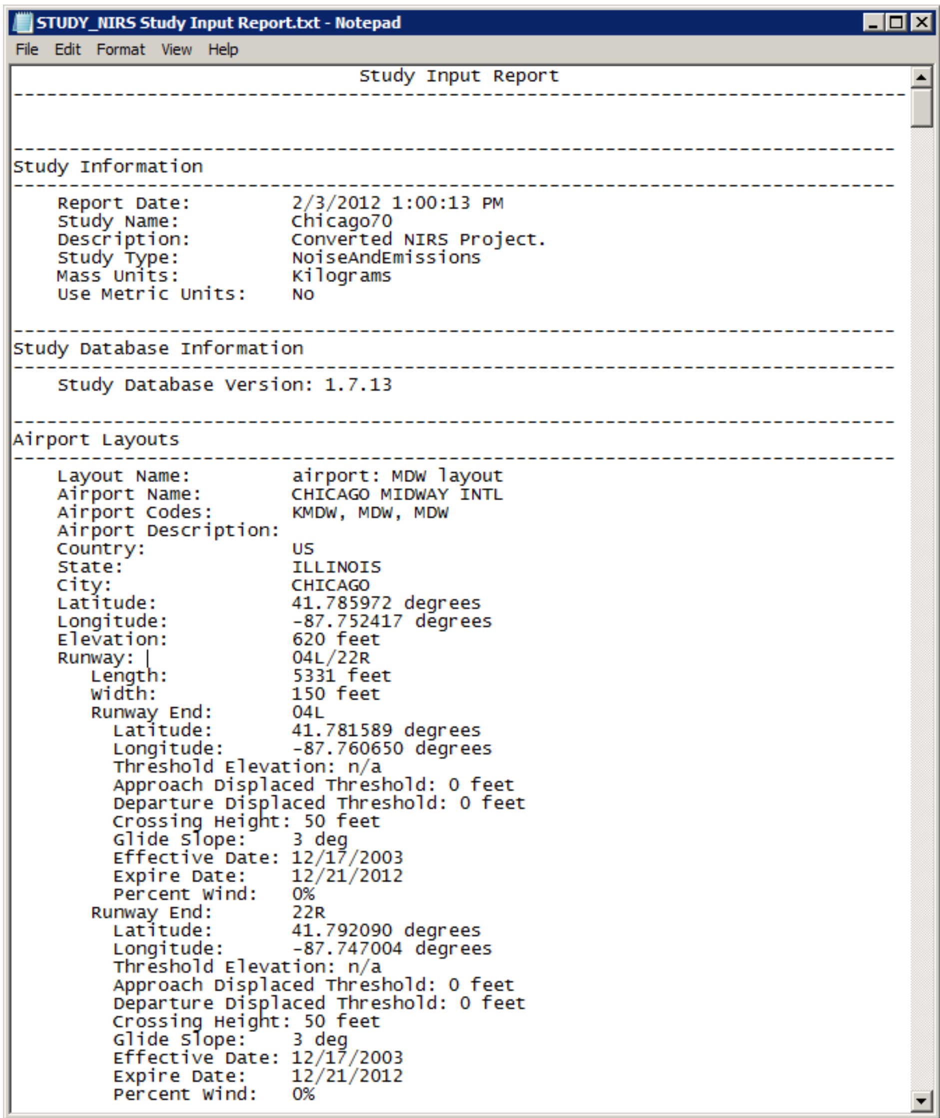


Figure H-3 Command Window — Weather Data Loader

4. Press the enter key.
5. After the weather data have been pre-processed, see Section 5.1.5 for instructions on importing weather data by specifying the weather file path locations.

Appendix I Reports

This appendix provides snapshots of sample report output files.


STUDY_NIRS Study Input Report.txt - Notepad

File Edit Format View Help

```
                              Study Input Report
-------------------------------------------------------------------------------


-------------------------------------------------------------------------------
Study Information
-------------------------------------------------------------------------------
    Report Date:         2/3/2012 1:00:13 PM
    Study Name:          Chicago70
    Description:         Converted NIRS Project.
    Study Type:          NoiseAndEmissions
    Mass Units:          Kilograms
    Use Metric Units:    No

-------------------------------------------------------------------------------
Study Database Information
-------------------------------------------------------------------------------
    Study Database Version: 1.7.13

-------------------------------------------------------------------------------
Airport Layouts
-------------------------------------------------------------------------------
    Layout Name:         airport: MDW layout
    Airport Name:        CHICAGO MIDWAY INTL
    Airport Codes:       KMDW, MDW, MDW
    Airport Description:
    Country:             US
    State:               ILLINOIS
    City:                CHICAGO
    Latitude:            41.785972 degrees
    Longitude:           -87.752417 degrees
    Elevation:           620 feet
    Runway:              04L/22R
       Length:           5331 feet
       Width:            150 feet
       Runway End:       04L
         Latitude:       41.781589 degrees
         Longitude:      -87.760650 degrees
         Threshold Elevation: n/a
         Approach Displaced Threshold: 0 feet
         Departure Displaced Threshold: 0 feet
         Crossing Height: 50 feet
         Glide Slope:    3 deg
         Effective Date: 12/17/2003
         Expire Date:    12/21/2012
         Percent Wind:   0%
       Runway End:       22R
         Latitude:       41.792090 degrees
         Longitude:      -87.747004 degrees
         Threshold Elevation: n/a
         Approach Displaced Threshold: 0 feet
         Departure Displaced Threshold: 0 feet
         Crossing Height: 50 feet
         Glide Slope:    3 deg
         Effective Date: 12/17/2003
         Expire Date:    12/21/2012
         Percent Wind:   0%
```

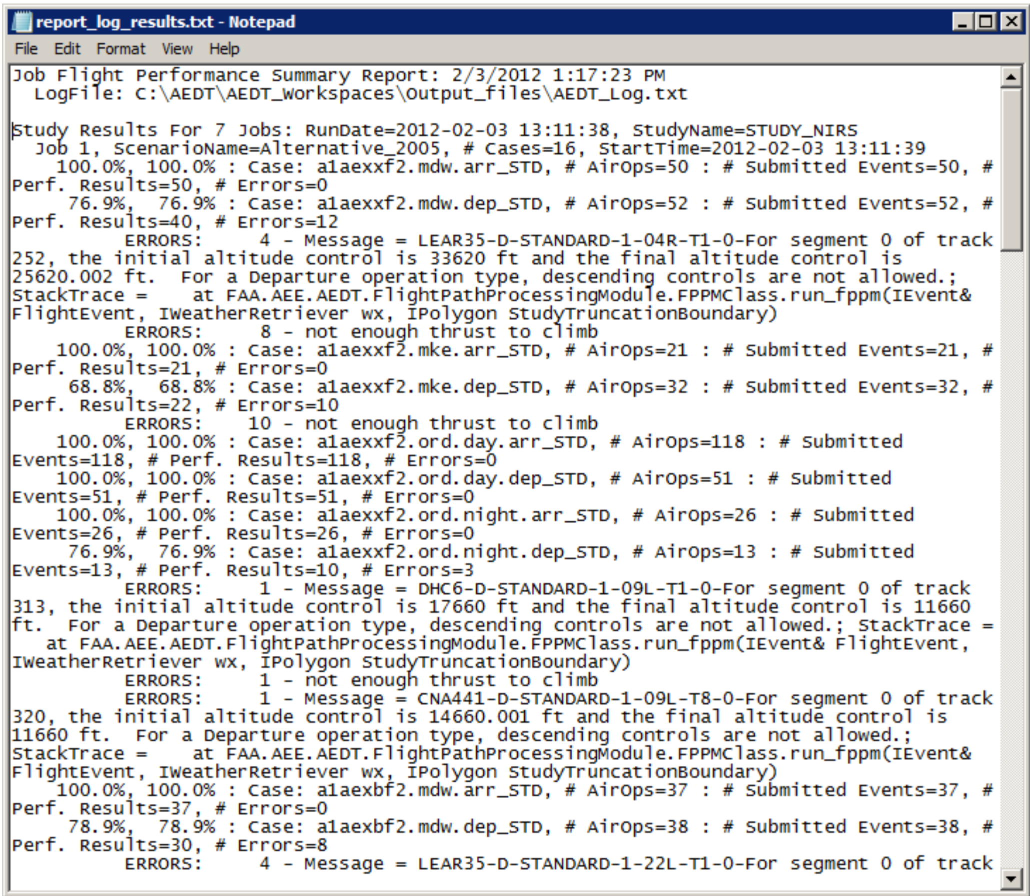
Figure I-1 Sample Study Input Report

	A	B	C	D	E	F	G	H
1	% FleetMix Report: Type=SummaryOperations	Level=Case						
2	% Study Name: Chicago70							
3	Scenario	Cases	KMDW-Approach-Day	KMDW-Approach-Evening	KMDW-Approach-Night	KMDW-Departure-Day	KMDW-Departure-Evening	KMDW-Departure-Night
4	Alternative_2005	PlanB__a1aexbf2.mdw.arr_STD	13	0	24	0	0	0
5	Alternative_2005	PlanB__a1aexbf2.mdw.dep_STD	0	0	0	6	0	32
6	Alternative_2005	PlanB__a1aexbf2.mke.arr_STD	0	0	0	0	0	0
7	Alternative_2005	PlanB__a1aexbf2.mke.dep_STD	0	0	0	0	0	0
8	Alternative_2005	PlanB__a1aexbf2.ord.day.arr_STD	0	0	0	0	0	0
9	Alternative_2005	PlanB__a1aexbf2.ord.day.dep_STD	0	0	0	0	0	0
10	Alternative_2005	PlanB__a1aexbf2.ord.night.arr_STD	0	0	0	0	0	0
11	Alternative_2005	PlanB__a1aexbf2.ord.night.dep_STD	0	0	0	0	0	0
12	Alternative_2005	PlanX__a1aexxf2.mdw.arr_STD	22	0	28	0	0	0
13	Alternative_2005	PlanX__a1aexxf2.mdw.dep_STD	0	0	0	16	0	36
14	Alternative_2005	PlanX__a1aexxf2.mke.arr_STD	0	0	0	0	0	0
15	Alternative_2005	PlanX__a1aexxf2.mke.dep_STD	0	0	0	0	0	0
16	Alternative_2005	PlanX__a1aexxf2.ord.day.arr_STD	0	0	0	0	0	0
17	Alternative_2005	PlanX__a1aexxf2.ord.day.dep_STD	0	0	0	0	0	0
18	Alternative_2005	PlanX__a1aexxf2.ord.night.arr_STD	0	0	0	0	0	0
19	Alternative_2005	PlanX__a1aexxf2.ord.night.dep_STD	0	0	0	0	0	0
20	Baseline_1990	PlanB__exexbf2.mdw.arr_STD	13	0	26	0	0	0
21	Baseline_1990	PlanB__exexbf2.mdw.dep_STD	0	0	0	6	0	32
22	Baseline_1990	PlanB__exexbf2.mke.arr_STD	0	0	0	0	0	0
23	Baseline_1990	PlanB__exexbf2.mke.dep_STD	0	0	0	0	0	0

Figure I-2 Sample Fleet Mix Report

	A	B	C	D	E	F	G	H	I	J	K
1	% ReceptorSet Report										
2	% Name : pop5069.txt										
3	% Description: NIRS Population File										
4	% Type : Population										
5	% Num Records: 100										
6	Index	Latitude	Longitude	Altitude	StateFIPS	CountyFIPS	BlockID	BNA_ID	Households	PopCount	LandUse
7	1	40.685787	-87.20132	0	0	0	0	0		5	
8	2	41.07824	-87.146675	0	0	0	0	1		25	
9	3	41.613945	-87.48807	0	0	0	0	2		13	
10	4	41.577747	-87.30478	0	0	0	0	3		7	
11	5	41.6111	-87.511696	0	0	0	0	4		4	
12	6	41.542095	-87.444626	0	0	0	0	5		6	
13	7	41.20534	-87.45562	0	0	0	0	6		10	
14	8	41.591473	-86.68502	0	0	0	0	7		3	
15	9	41.36825	-86.80671	0	0	0	0	8		4	
16	10	41.480103	-87.06499	0	0	0	0	9		62	

Figure I-3 Sample Receptor Set Report



report_log_results.txt - Notepad

File Edit Format View Help

```
Job Flight Performance Summary Report: 2/3/2012 1:17:23 PM
  LogFile: C:\AEDT\AEDT_Workspaces\Output_files\AEDT_Log.txt

Study Results For 7 Jobs: RunDate=2012-02-03 13:11:38, StudyName=STUDY_NIRS
  Job 1, ScenarioName=Alternative_2005, # Cases=16, StartTime=2012-02-03 13:11:39
    100.0%, 100.0% : Case: a1aexxf2.mdw.arr_STD, # AirOps=50 : # Submitted Events=50, #
Perf. Results=50, # Errors=0
     76.9%,  76.9% : Case: a1aexxf2.mdw.dep_STD, # AirOps=52 : # Submitted Events=52, #
Perf. Results=40, # Errors=12
          ERRORS:      4 - Message = LEAR35-D-STANDARD-1-04R-T1-0-For segment 0 of track
252, the initial altitude control is 33620 ft and the final altitude control is
25620.002 ft.  For a Departure operation type, descending controls are not allowed.;
StackTrace =     at FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent&
FlightEvent, IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
          ERRORS:      8 - not enough thrust to climb
    100.0%, 100.0% : Case: a1aexxf2.mke.arr_STD, # AirOps=21 : # Submitted Events=21, #
Perf. Results=21, # Errors=0
     68.8%,  68.8% : Case: a1aexxf2.mke.dep_STD, # AirOps=32 : # Submitted Events=32, #
Perf. Results=22, # Errors=10
          ERRORS:     10 - not enough thrust to climb
    100.0%, 100.0% : Case: a1aexxf2.ord.day.arr_STD, # AirOps=118 : # Submitted
Events=118, # Perf. Results=118, # Errors=0
    100.0%, 100.0% : Case: a1aexxf2.ord.day.dep_STD, # AirOps=51 : # Submitted
Events=51, # Perf. Results=51, # Errors=0
    100.0%, 100.0% : Case: a1aexxf2.ord.night.arr_STD, # AirOps=26 : # Submitted
Events=26, # Perf. Results=26, # Errors=0
     76.9%,  76.9% : Case: a1aexxf2.ord.night.dep_STD, # AirOps=13 : # Submitted
Events=13, # Perf. Results=10, # Errors=3
          ERRORS:      1 - Message = DHC6-D-STANDARD-1-09L-T1-0-For segment 0 of track
313, the initial altitude control is 17660 ft and the final altitude control is 11660
ft.  For a Departure operation type, descending controls are not allowed.; StackTrace =
   at FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent& FlightEvent,
IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
          ERRORS:      1 - not enough thrust to climb
          ERRORS:      1 - Message = CNA441-D-STANDARD-1-09L-T8-0-For segment 0 of track
320, the initial altitude control is 14660.001 ft and the final altitude control is
11660 ft.  For a Departure operation type, descending controls are not allowed.;
StackTrace =     at FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent&
FlightEvent, IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
    100.0%, 100.0% : Case: a1aexbf2.mdw.arr_STD, # AirOps=37 : # Submitted Events=37, #
Perf. Results=37, # Errors=0
     78.9%,  78.9% : Case: a1aexbf2.mdw.dep_STD, # AirOps=38 : # Submitted Events=38, #
Perf. Results=30, # Errors=8
          ERRORS:      4 - Message = LEAR35-D-STANDARD-1-22L-T1-0-For segment 0 of track
```

Figure I-4 Sample Job Flight Performance Summary Report

report_log_results_detail.txt - Notepad

File Edit Format View Help

```
Job Flight Performance Summary Report: 2/3/2012 1:20:01 PM
  LogFile: C:\AEDT\AEDT_Workspaces\Output_files\AEDT_Log.txt

Study Results For 7 Jobs: RunDate=2012-02-03 13:11:38, StudyName=STUDY_NIRS
  Job 1, ScenarioName=Alternative_2005, # Cases=16, StartTime=2012-02-03 13:11:39
    100.0%, 100.0% : Case: a1aexxf2.mdw.arr_STD, # AirOps=50 : # Submitted Events=50, #
Perf. Results=50, # Errors=0
     76.9%,  76.9% : Case: a1aexxf2.mdw.dep_STD, # AirOps=52 : # Submitted Events=52, #
Perf. Results=40, # Errors=12
          ERRORS:     4 - Message = LEAR35-D-STANDARD-1-04R-T1-0-For segment 0 of track
252, the initial altitude control is 33620 ft and the final altitude control is
25620.002 ft.  For a Departure operation type, descending controls are not allowed.;
StackTrace =    at FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent&
FlightEvent, IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
            evt=100054, airOp=946, msg=Message = LEAR35-D-STANDARD-1-04R-T1-0-For
segment 0 of track 252, the initial altitude control is 33620 ft and the final altitude
control is 25620.002 ft.  For a Departure operation type, descending controls are not
allowed.; StackTrace =    at
FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent& FlightEvent,
IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
            evt=100055, airOp=947, msg=Message = LEAR35-D-STANDARD-1-04R-T1-0-For
segment 0 of track 252, the initial altitude control is 33620 ft and the final altitude
control is 25620.002 ft.  For a Departure operation type, descending controls are not
allowed.; StackTrace =    at
FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent& FlightEvent,
IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
            evt=100056, airOp=948, msg=Message = LEAR35-D-STANDARD-1-04R-T1-0-For
segment 0 of track 252, the initial altitude control is 33620 ft and the final altitude
control is 25620.002 ft.  For a Departure operation type, descending controls are not
allowed.; StackTrace =    at
FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent& FlightEvent,
IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
            evt=100057, airOp=949, msg=Message = LEAR35-D-STANDARD-1-04R-T1-0-For
segment 0 of track 252, the initial altitude control is 33620 ft and the final altitude
control is 25620.002 ft.  For a Departure operation type, descending controls are not
allowed.; StackTrace =    at
FAA.AEE.AEDT.FlightPathProcessingModule.FPPMClass.run_fppm(IEvent& FlightEvent,
IWeatherRetriever wx, IPolygon StudyTruncationBoundary)
          ERRORS:     8 - not enough thrust to climb
            evt=100088, airOp=980, msg=LEAR35-D-STANDARD-1-04R-T6-0-
            evt=100089, airOp=981, msg=LEAR35-D-STANDARD-1-04R-T6-0-
            evt=100091, airOp=983, msg=LEAR35-D-STANDARD-1-04R-T6-0-
            evt=100090, airOp=982, msg=LEAR35-D-STANDARD-1-04R-T6-0-
            evt=100093, airOp=985, msg=LEAR35-D-STANDARD-1-04R-T6-0-
            evt=100092, airOp=984, msg=LEAR35-D-STANDARD-1-04R-T6-0-
```

Figure I-5 Sample Job Flight Performance Summary Report – Detailed Error Reporting

report_flight_perf.txt - Notepad

File Edit Format View Help

```
Flight Performance Report
Scenario: Baseline_1990
Case: exexbf2.mdw.arr_STD
* AAD = Average Annual Day
** AFE = Above Field Elevation

Flight: 0
  airframe/engine/engine mod : Boeing 727-100 Series / TAY 651 / FDX
  operaton type     : A
  profile           : STANDARD-1
  cruise_alt (ft)   : 39000
  arrival airport   : KMDW
  arrival runway    : 22L
  departure airport  : -NA-
  departure runway   : -NA-
  time               : Night
  number of operations  : 1
  operation name     : T1.9
  track              : T1
  number of segments : 43
```

seg num	latitude	longitude	z-pos AFE**	unit-x	unit-y	unit-z	segment length	grnd-trk distance	speed	delta speed	net-corr thrust	noise thrust	delta thrust	op	bank angle	duratn	AAD* fuel-burn	trajectory-mode
1	37.415001	-85.385002	34970.3	-0.243053	0.970013	0.000000	256774.6	0.0	460.3	0.0	14358.6	14358.6	2680.7	D	0.0	330.5	419.663	EnrouteDescent
2	38.103329	-85.577499	34970.3	-0.476745	0.878980	-0.010376	195845.1	256774.6	460.3	-14.4	17039.3	17039.3	-2495.4	D	1.6	256.1	51.209	EnrouteDescent
3	38.582100	-85.888215	32938.1	-0.476745	0.878980	-0.010376	189635.8	452619.7	445.9	-14.4	14543.9	14543.9	-2499.4	D	1.5	256.1	55.213	EnrouteDescent
4	39.044720	-86.193329	30970.3	-0.407252	0.913316	0.000000	379939.3	642255.5	431.5	0.0	12044.5	12044.5	8138.3	D	0.0	521.7	779.515	EnrouteDescent
5	40.003609	-86.722778	30970.3	-0.441741	0.896238	-0.040286	77939.9	1022194.8	431.5	-19.1	20182.8	20182.8	-2529.3	D	0.0	109.5	25.798	EnrouteDescent
6	40.196551	-86.843063	27827.9	-0.441741	0.896238	-0.040286	74407.1	1100134.7	412.4	-19.1	17653.5	17653.5	-2529.3	D	0.0	109.5	28.428	EnrouteDescent
7	40.380618	-86.958555	24827.9	-0.441741	0.896238	-0.040286	70874.2	1174541.8	393.3	-19.1	15124.2	15124.2	-2526.1	D	0.0	109.5	30.935	EnrouteDescent
8	40.555828	-87.069168	21970.3	-0.374208	0.925849	-0.052651	73347.7	1245416.0	374.1	-8.8	12598.1	12598.1	-3268.2	D	-1.1	118.5	37.625	EnrouteDescent
9	40.743012	-87.166388	18103.1	-0.374208	0.925849	-0.052651	42497.6	1318763.7	365.4	-5.1	9329.9	9329.9	-1893.6	D	-1.1	68.7	21.800	EnrouteDescent
10	40.851425	-87.222967	15862.5	-0.374208	0.925849	-0.052651	47362.5	1361261.3	360.3	-5.9	7436.2	7436.2	-2191.9	D	0.0	78.6	27.612	EnrouteDescent
11	40.972214	-87.286248	13365.3	-0.374208	0.925849	-0.052651	37933.2	1408623.8	354.4	-4.7	5244.4	5244.4	-1755.5	D	0.0	63.9	23.572	EnrouteDescent
12	41.068929	-87.337101	11365.3	-0.374208	0.925849	-0.052651	26173.9	1446557.0	349.7	-3.3	3488.9	3488.9	-1211.3	D	0.0	44.6	17.040	EnrouteDescent
13	41.135649	-87.372278	9985.3	-0.374206	0.925846	-0.052715	10305.8	1472731.0	346.4	-18.2	2277.6	2277.6	54.9	A	0.0	18.1	7.059	Approach
14	41.161916	-87.386148	9441.3	-0.374206	0.925846	-0.052715	1439.1	1483036.7	328.2	-2.7	2332.5	2332.5	8.1	A	0.0	2.6	1.023	Approach

Figure I-6 Sample Flight Performance Report

	A	B	C	D	E	F
1	Job:	Job 1 Alternative_2005: My DNL Noise Run Options				
2	Case:	Annualized Results				
3	Type:	Points				
4	Metric:	DNL				
5	Annualization:	Alternative.config				
6						
7	Acoustic Event Index	Noise Result Index	Internal Point	Latitude	Longitude	DNL Noise Level (dB)
8	1	1	0-0-0-0	40.685787	-87.20132	37.044519
9	1	2	0-0-0-1	41.07824	-87.146675	26.660127
10	1	3	0-0-0-2	41.613945	-87.48807	42.616316
11	1	4	0-0-0-3	41.577747	-87.30478	44.003161
12	1	5	0-0-0-4	41.6111	-87.511696	45.158738
13	1	6	0-0-0-5	41.542095	-87.444626	43.443841
14	1	7	0-0-0-6	41.20534	-87.45562	39.668579
15	1	8	0-0-0-7	41.591473	-86.68502	24.505788
16	1	9	0-0-0-8	41.36825	-86.80671	39.224085
17	1	10	0-0-0-9	41.480103	-87.06499	44.115823

Figure I-7 Sample Noise Exposure Report

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Job:	Job 1 Alternative_2005: My DNL Noise Run Options													
2	Case:	Scenario Summary													
3	Group By:	Modal Case Summary													
4	Scaling:	NONE													
5															
6	Case	Mode	Fuel(MTon)	Distance(km)	Duration	CO(MTon)	HC(MTon)	NOx(MTon)	PMNV(MTon)	PMSO(MTon)	PMFO(MTon)	CO2(MTon)	H20(MTon)	SOx(MTon)	PM 2.5(MTon)
7	a1aexxf2.mdw.arr_STD	ClimbTaxi	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0
8	a1aexxf2.mdw.arr_STD	ClimbGround	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0
9	a1aexxf2.mdw.arr_STD	ClimbBelow1000	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0
10	a1aexxf2.mdw.arr_STD	ClimbBelowMixingHeight	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0
11	a1aexxf2.mdw.arr_STD	ClimbBelow10000	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0
12	a1aexxf2.mdw.arr_STD	Above10000	11.68551	8937.87	03:05.0	0.12968	0.00296	0.15527	0.00234	0.00082	0.00935	36.86778	14.45498	0.01369	0.0125
13	a1aexxf2.mdw.arr_STD	DescendBelow10000	10.59381	8835.79	05:44.5	0.78924	0.0171	0.1151	0.00182	0.00065	0.00601	33.42349	13.10455	0.01241	0.00849
14	a1aexxf2.mdw.arr_STD	DescendBelowMixingHeight	3.11552	973.75	54:24.3	0.06017	0.00207	0.0295	0.00033	0.00013	0.00003	9.82947	3.8539	0.00365	0.00049
15	a1aexxf2.mdw.arr_STD	DescendBelow1000	1.03289	300.61	45:33.2	0.02206	0.00079	0.01039	0.00013	0.00004	0.00001	3.25875	1.27768	0.00121	0.00018
16	a1aexxf2.mdw.arr_STD	DescendGround	0.2675	28.76	13:05.2	0.00372	0.00009	0.00253	0.00002	0.00001	0	0.84396	0.3309	0.00031	0.00003
17	a1aexxf2.mdw.arr_STD	DescendTaxi	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0
18	a1aexxf2.mdw.arr_STD	FullFlight	22.27932	17773.66	08:49.4	0.91892	0.02005	0.27037	0.00416	0.00147	0.01536	70.29127	27.55952	0.02609	0.02099
19	a1aexxf2.mdw.dep_STD	ClimbTaxi	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0
20	a1aexxf2.mdw.dep_STD	ClimbGround	1.27061	39.29	18:41.9	0.0044	0.00016	0.0227	0.00004	0.00005	0.00001	4.00878	1.57175	0.00149	0.0001
21	a1aexxf2.mdw.dep_STD	ClimbBelow1000	2.12732	326.01	37:54.1	0.01164	0.00028	0.03761	0.00009	0.00009	0.00002	6.71171	2.6315	0.00249	0.0002
22	a1aexxf2.mdw.dep_STD	ClimbBelowMixingHeight	4.15812	326.01	19:10.4	0.03008	0.00056	0.07231	0.00019	0.00017	0.00004	13.11888	5.1436	0.00487	0.0004
23	a1aexxf2.mdw.dep_STD	ClimbBelow10000	9.38473	1502.07	08:46.5	0.09941	0.00153	0.14312	0.00123	0.00054	0.00422	29.60882	11.60891	0.01099	0.00599

Figure I-8 Sample Emissions Report

Appendix J Annual Schedule

This appendix describes how average annual day (AAD) and peak month average day (PMAD) can be calculated from an annual schedule.

For certain analyses, operations must be entered in the ASIF based on an average annual day (AAD). To determine the AAD from an annual schedule:

1. Add the number of operations for the like entries in the annual schedule. Like entries are determined by type of aircraft, operation type, track, and time of day (daytime 0700-2200 hours local and nighttime 2200-0700 hours local).
2. After like entries are added, the total must be divided by 365 for each remaining entry to represent an average day of operations in the year.

A Design Day Ratio (also known as PMAD scaling factor) is needed to create an aircraft emissions inventory. To identify the Design Day Ratio:

1. Determine the month with the most operations (i.e. peak flights) for the year.
2. Compute the average daily operations for that month (i.e., the PMAD operations):
   PMAD = # Operations in the month with the Most Operations / # Days in that Month
3. Compute the AAD number of operations for the year:
   AAD = Total # Operations in the Year / # Days in that Year
4. Compute the Design Day Ratio:
   Design Day Ratio = PMAD/AAD

Appendix K Advanced User Tools

OPTIONAL

This appendix describes external command-line tools that the advanced user may find useful. All tools described in this section are optional and are included with the AEDT installation package. The tools in this appendix include:

- Remove Results Tool: Remove invalid results from the study database
- Batch Study Processor (Run Study Tool): Command-line tool for running jobs
- Deserialize Emissions Tool: Deserialize emissions results into the relational form

Remove Results Tool

Remove Results is a command-line tool that allows a user to remove invalid results from the study database as an alternative to clearing the results in the AEDT2a GUI. See Section 7.3 for instructions on marking results as invalid. See Section 8.7 for instructions on clearing invalid results in the AEDT2a GUI. The Remove Results tool can be used to remove unused events in the relational form, and to remove all of the results from the study if desired. The Remove Results tool is provided with the installation of AEDT and is located in the following directory C:\AEDT\FAA.AEE.AEDT.RemoveResults.

Removing invalid results using the Remove Results tool can be done any time, even while working in the AEDT2a application. The Remove Results tool process can be aborted at any time without affecting the integrity of the database.

The AEDT2a application must be closed when removing unused events or removing all results.

To remove results marked as invalid:

1. From the Start menu type *cmd* in the *Open* field to open a command prompt window (or select *Run* in Windows XP).
2. Type in the following command to change the directory and press the enter key.

   ```
   cd C:\AEDT
   ```

3. Type in the command:

   ```
   FAA.AEE.AEDT.RemoveResults name [StudyName]
   ```

   where [StudyName] represents the study name of interest, for example STUDY_NIRS.

4. Press the enter key.

5. The Remove Results tool will run and report the percentage complete, the total number of results removed and the time that it took to remove the results.

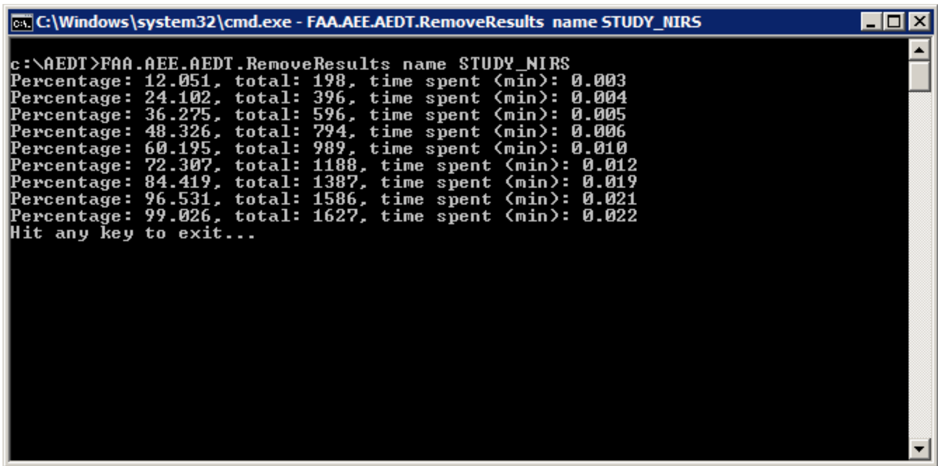


Figure K-1 RemoveResults Command Prompt

For a complete description of the Remove Results tool functionalites, type in the following command at the command prompt and press the enter key. N-100

```
FAA.AEE.AEDT.RemoveResults help
```

The full functionalities will appear as below.

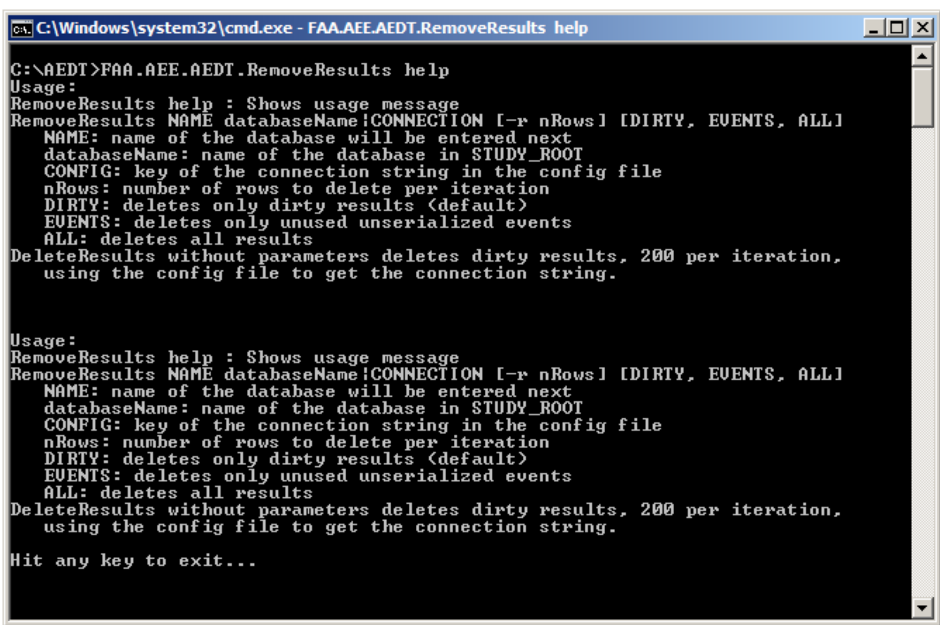


Figure K-2 RemoveResults Help

When results marked as invalid are removed, the respective events stored in the relational form will be removed as well. However, events that do not have the associated results due to modeling failures will stay in the database.

To remove unused events in the relational form:

1. Close AEDT if the application is open.
2. From the Start menu, type cmd in the Open field to open a command prompt window (or select Run in Windows XP).
3. Type in the following command to change the directory and press the enter key.

```
cd C:\AEDT
```

4. Type in the command:

```
FAA.AEE.AEDT.RemoveResults name [StudyName] EVENTS
```

where [StudyName] represents the study name of interest, for example STUDY_NIRS.

5. Press the enter key.
6. The Remove Results tool will run and report the percentage complete, the total number of results removed and the time that it took to remove the results.

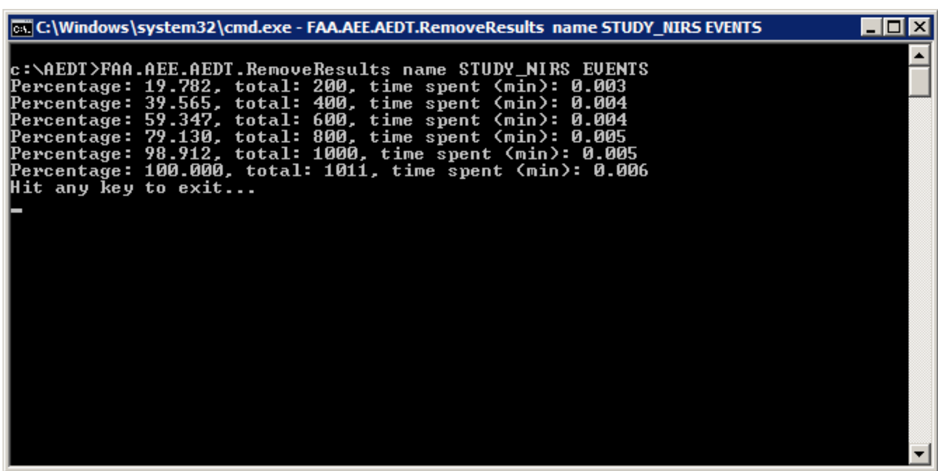


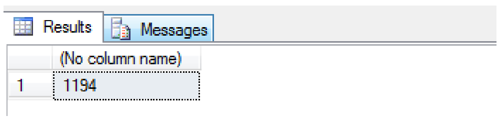
Figure K-3 RemoveResults Command Prompt

To count the number of unused events before removing, follow the instructions below: N-101

1. Open SQL Server Management Studio.
2. Create the query as below to count the records in the RSLT_EVENTS table. The RSLT_EVENTS table contains the unused events in the relational form that remain in the database.

```
SELECT COUNT(*) FROM [STUDY_NIRS].[dbo].[RSLT_EVENTS]
```

3. Click the *Execute* button.
4. The query results will appear in the Results window as shown below.



To remove all results:

1. Close AEDT if the application is open.
2. From the Start menu type *cmd* in the *Open* field to open a command prompt window (or select *Run* in Windows XP).
3. Type in the following command to change the directory and press the enter key.

```
cd C:\AEDT
```

4. Type in the command:

```
FAA.AEE.AEDT.RemoveResults name [StudyName] ALL
```

   where [StudyName] represents the study name of interest, for example STUDY_NIRS.

5. Press the enter key.
6. The Remove Results tool will run and report the percentage complete, the total number of results removed and the time that it took to remove the results.

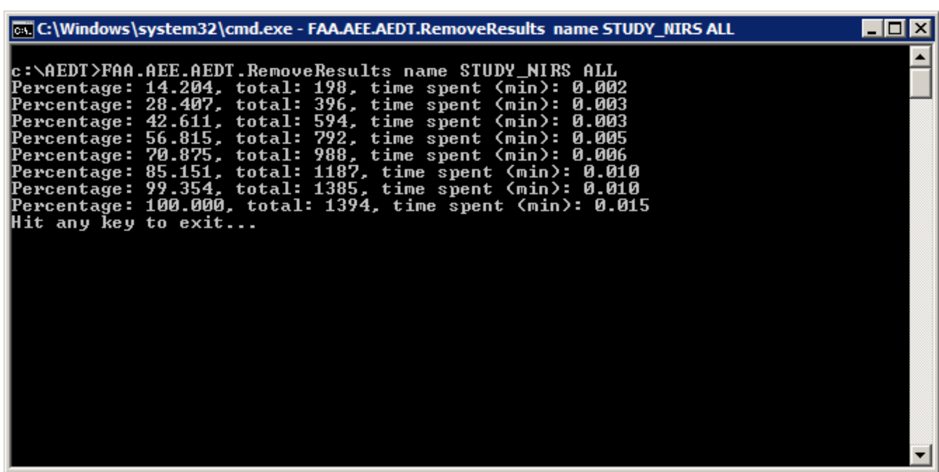


Figure K-4 RemoveResults Command Prompt

Batch Study Processor (Run Study Tool)

RunStudy is a 64-bit command-line tool that allows a user to run jobs in an AEDT Study as an alternative to running jobs in the AEDT2a GUI. See Section 7 for instructions on running jobs in the AEDT2a GUI. RunStudy assumes AEDT2a is fully installed and operational, and that the machine supports the 64-bit system architecture. The RunStudy tool is provided with the installation of AEDT and is located in the following directory C:\AEDT_RunStudy\FAA.AEE.AEDT.RunStudy.exe

Before using RunStudy, the AEDT GUI can be used to build an AEDT study (via ASIF import) and to set up receptor sets, run options, jobs, etc.

To run jobs using the RunStudy processor:

1. From the Start menu type *cmd* in the *Open* field to open a command prompt window (or select *Run* in Windows XP).
2. Navigate to the subdirectory where RunStudy is installed. For this example, the following command assumes that the RunStudy is installed under C:\AEDT_RunStudy.

   ```
   cd C:\AEDT_RunStudy
   ```

3. Type in the following command:

   ```
   FAA.AEE.AEDT.RunStudy <AedtStudyDbName> /a=<pathname>
   ```

   Where
   - `<AedtStudyDbName>` is the name of the AEDT Study database containing the desired jobs to be run.
   - `<pathname>` is a fully qualified subdirectory pathname where FAA.AEE.AEDT.AEDTApp.exe.config is located.

   For example, the following line will run all jobs marked <Run Job = Yes> in the AEDT Study database named STUDY_INM using the AEDT GUI's application configuration settings (assuming the GUI is installed in the C:\AEDT directory).

   ```
   FAA.AEE.AEDT.RunStudy STUDY_INM /a=C:\AEDT
   ```

4. Press the enter key to run the processor.

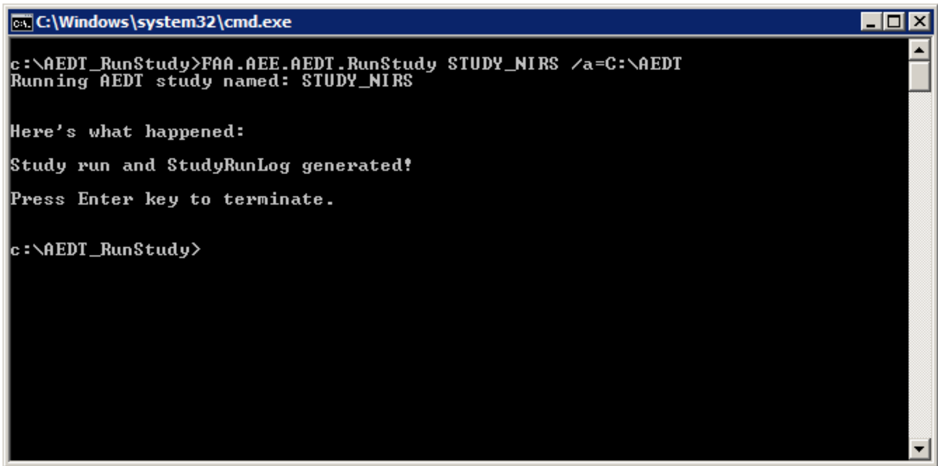


Figure K-5 RunStudy Command Prompt

Command Line Options

```
FAA.AEE.AEDT.RunStudy <AedtStudyDbName> [/a=<pathname>]
```

- When /a=<pathname> is present, RunStudy copies <pathname>\FAA.AEE.AEDT.AEDTApp.exe.config to FAA.AEE.AEDT.RunStudy.exe.config, and uses those settings. Users are recommended to always use the /a option.
- When /a=<pathname> is not present, RunStudy copies DefaultRunStudy.exe.config (located in the AEDT_RunStudy directory) to FAA.AEE.AEDT.RunStudy.exe.config, and uses those settings. To force the use of settings that are different from those used by the GUI, adjust the contents of DefaultRunStudy.exe.config.

Additional configuration may be required in order for the Run Study Tool to run with terrain. Check the status of the run in the [StudyName]StudyRunLog.txt located in the following directory: C:\AEDT\AEDT_Workspaces\Output_files. W-96

If the terrain jobs did not run, an error will be logged beginning with the text below:
No Jobs Run. Problem setting up for Terrain: Exception creating the Terrain Object. Source = FAA.AEE.AEDT.Terrain; Message = Unable to initialize terrain.Could not load file or assembly 'FAA.AEE.AEDT.TerrainServer, Version=2.0.2.0, Culture=neutral, PublicKeyToken=null' or one of its dependencies. The system cannot find the file specified.

If this occurs, an environment variable for the Windows User account may need to be added. The steps below assume a Windows 7 envrionment, steps may be different in Windows XP.

1. Navigate to the *Start* menu, *Control Panel, System and Security, Advanced System Settings.*
2. Select the *Advanced* tab and click on *Environmnet Variables*.
3. In the top section under *User variables*, click *New*.
4. In the *Variable Name* field, enter *AEDTPATH*.

5. In the *Variable Value* field, enter *C:\AEDT* .
6. Click *Ok* three times to save the settings and close the dialog boxes.
7. Log off of the computer and log back in for the new user variable to take effect.

Command Line Options

```
FAA.AEE.AEDT.RunStudy <AedtStudyDbName> [/a=<pathname>]
```

- When /a=<pathname> is present, RunStudy copies <pathname>\FAA.AEE.AEDT.AEDTApp.exe.config to FAA.AEE.AEDT.RunStudy.exe.config, and uses those settings. Users are recommended to always use the /a option.
- When /a=<pathname> is not present, RunStudy copies DefaultRunStudy.exe.config (located in the AEDT_RunStudy directory) to FAA.AEE.AEDT.RunStudy.exe.config, and uses those settings. To force the use of settings that are different from those used by the GUI, adjust the contents of DefaultRunStudy.exe.config.

Note that because FAA.AEE.AEDT.RunStudy.exe.config is always overwritten by RunStudy upon start up, edits made directly to FAA.AEE.AEDT.RunStudy.exe.config are never used. N-102

Deserialize Emissions Tool

The Deserialize Emissions Tool is a command-line application which allows a user to view serialized results of the following types of emissions results into the relational form: IAccumulatedMetricsEmissionsTotals, IEmissionsModalResultCollection, and IEmissionsModalResultAccumulated, result types 51, 53, and 54 respectively. The deserialized results are stored in the RSLT_EMISSIONS table in the Study database. Users can then query the RSLT_EMISSIONS table for detailed data mining.

Command Line Options

```
FAA.AEE.AEDT.DeserializeEmissions.exe <STUDY_NAME> [JOB_ID] [SCENARIO_ID]
[CASE_ID]
```

Where

- <STUDY_NAME> is the study name of interest
- [JOB_ID] – Look up the Job ID in the [JOBS] table.
- [SCENARIO_ID] – Optional. Look up the Scenario ID in the [SCENARIO] table.
- [CASE_ID] – Optional. Look up the Case ID in the [CASE] table.

The Deserialize Emissions Tool may hang if the user submits a request for a whole job for a large study (e.g., `FAA.AEE.AEDT.DeserializeEmissions.exe LARGE_STUDY 1`). When using with a large study, it is suggested to submit deserialization request on a per case bases using the optional [SCENARIO_ID] and [CASE_ID] arguments. For example, in the following command, the first parameter is the study database name, the second parameter is the job ID, the third parameter is the scenario ID, and the last parameter is the case ID. W-97

```
FAA.AEE.AEDT.DeserializeEmissions.exe LARGE_STUDY 1 1 4
```

To deserialize emissions results:

1. [Optional] In AEDT, reset all the jobs and clear the invalid results. This step ensures that the RSLT_EMISSOINS table is empty.
2. In AEDT, run desired jobs in *Jobs* dialog box.

It is recommended to set the persistence detail of Emissions Results to *Event*. When set to Event, then the Deserialize Emissions tool can deserialize all types of the emissions results it is designed for. If the persistence is set to *Segment*, it will deserialize only up to the Event Modal results. If the persistence is set to the *Case*, then it will deserialize everything, but less compared to the Event persistence setting. N-103

3. In AEDT, run desired jobs in the *Jobs* dialog box.
4. From the Start menu type *cmd* in the *Open* field to open a command prompt window (or select *Run* in Windows XP).
5. Type in the following command to change the directory and press the enter key.

```
cd C:\AEDT
```

6. Type in the command:

```
FAA.AEE.AEDT.DeserializeEmissions.exe <STUDY_NAME> [JOB_ID]
```

Where

- <STUDY_NAME> is the study name of interest
- [JOB_ID] – Job ID in the [JOBS] table

5. Press the enter key.
6. The tool will run and report the number of records that are deserialized by emissions type.
7. Figure K-1 displays the command prompt window when the processing has finished.

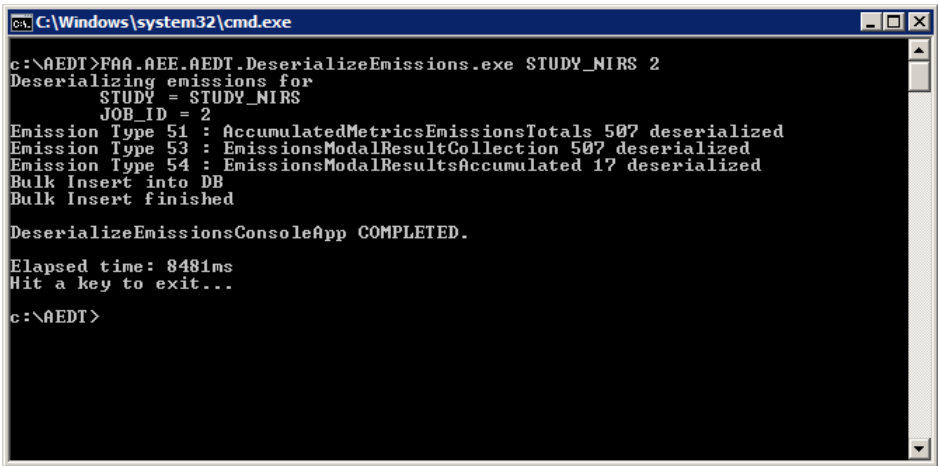


Figure K-6 Deserialize Emissions Console Finish Window

Sample Usage of Deserialize Emissions Tool

The following instructions uses default jobs #2 and job#9 in STUDY_NIRS as an example. A sample SQL query is provided for the user to start data mining.

1. Open STUDY_NIRS in AEDT. In the Jobs dialog box, reset all the jobs and clear the invalid results. This step ensures that the RSLT_EMISSOINS table is empty.
2. In the Jobs dialog box, change the *Emissions Result Detail* to *Event* for default jobs #2 and #9.
3. Run jobs #2 and #9.
4. From the Start menu type *cmd* in the *Open* field to open a command prompt window (or select *Run* in Windows XP).
5. Type in the following command to change the directory and press the enter key.

```
cd C:\AEDT
```

6. Type in the following command, and press the enter key. This will deserialize emissions results for the job ID 2 in STUDY NIRS. The tool will run and report the number of records that are deserialized by emission type.

```
FAA.AEE.AEDT.DeserializeEmissions.exe STUDY_NIRS 2
```

7. Type in the following command, and press the enter key. This will deserialize emissions results for the job ID 9 in STUDY NIRS. The tool will run and report the number of records that are deserialized by emission type.

```
FAA.AEE.AEDT.DeserializeEmissions.exe STUDY_NIRS 9
```

8. The following SQL query will return the emissions results for job ID 2. The WHERE clause “WHERE s.JOB_ID =” can be changed to return results for job ID 9. For each job, the query should return 264 records. If the user resets one of the jobs, then the query will return no records.

```
SELECT e.[RSLT_EMISSION_ID]
      ,e.[EVENT_RESULTS_SOURCE_ID]
      ,e.[ANNUALIZATION_ID]
      ,e.[EMISSIONS_TYPE]
      ,e.[MODE]
      ,e.[CO2]
      ,e.[CO]
      ,e.[THC]
      ,e.[NMHC]
      ,e.[VOC]
      ,e.[TOG]
      ,e.[NOX]
      ,e.[SOX]
      ,e.[PM]
      ,e.[PMNV]
      ,e.[PMSO]
      ,e.[PMFO]
      ,e.[PMLO]
      ,e.[H20]
      ,e.[FUEL_BURN]
  FROM [STUDY_NIRS].[dbo].[RSLT_EMISSIONS] e
  JOIN [STUDY_NIRS].[dbo].[EVENT_RESULTS_SOURCE] s
  ON e.EVENT_RESULTS_SOURCE_ID = s.EVENT_RESULTS_SOURCE_ID
  JOIN [STUDY_NIRS].[dbo].[AIR_OPERATION] o
  ON s.AIR_OP_ID = o.AIR_OP_ID
  JOIN [STUDY_NIRS].[dbo].[AIR_OPERATION_AIRCRAFT] a
  ON o.AIRCRAFT_ID = a.AIRCRAFT_ID
  JOIN [STUDY_NIRS].[dbo].[FLT_EQUIPMENT] f
  ON a.EQUIPMENT_ID = f.EQUIP_ID
  WHERE s.JOB_ID = 2
  AND e.EMISSIONS_TYPE = 53
  AND f.ANP_AIRPLANE_ID = 'CNA441'
```