U.S. Department of Transportation
Federal Aviation Administration

Aviation Environmental Design Tool (AEDT)

User Guide

Version 2a

November 2012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.
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1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
30-November-2012	Final	06/12 - 11/12

4. TITLE AND SUBTITLE

Aviation Environmental Design Tool (AEDT)
User Guide
Version 2a

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

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5d. PROJECT NUMBER
FA4TA3

5e. TASK NUMBER
KLB97

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Department of Transportation
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Cambridge, MA 02142

8. PERFORMING ORGANIZATION REPORT NUMBER
DOT-VNTSC-FAA-12-04

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

10. SPONSOR/MONITOR'S ACRONYM(S)
FAA

11. SPONSORING/MONITORING AGENCY REPORT NUMBER

12. DISTRIBUTION AVAILABILITY STATEMENT

This report is part of the AEDT 2a software release, and it is publicly available.

13. SUPPLEMENTARY NOTES
FAA Program Managers: Ralph Iovinelli, Rebecca Cointin, Fabio Grandi, and Christopher Sequeira

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

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
			UU	176	Jonathan Koopmann
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPONE NUMBER (*Include area code*)
Unclassified	Unclassified	Unclassified			(617) 494-2885

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI-Std Z39-18

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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 the ASIF Reference Guide 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 Service Pack 1 (SP1) provides step-by-step instructions on how to use AEDT2a to model aircraft noise, emissions, and fuel burn. For information on changes made in SP1, see the README file located in C:\AEDT\AEDT_Workspaces\Documents.

The organization of this User Guide is based on a typical AEDT2a work flow. To navigate this User Guide by menu item, see Appendix C.

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

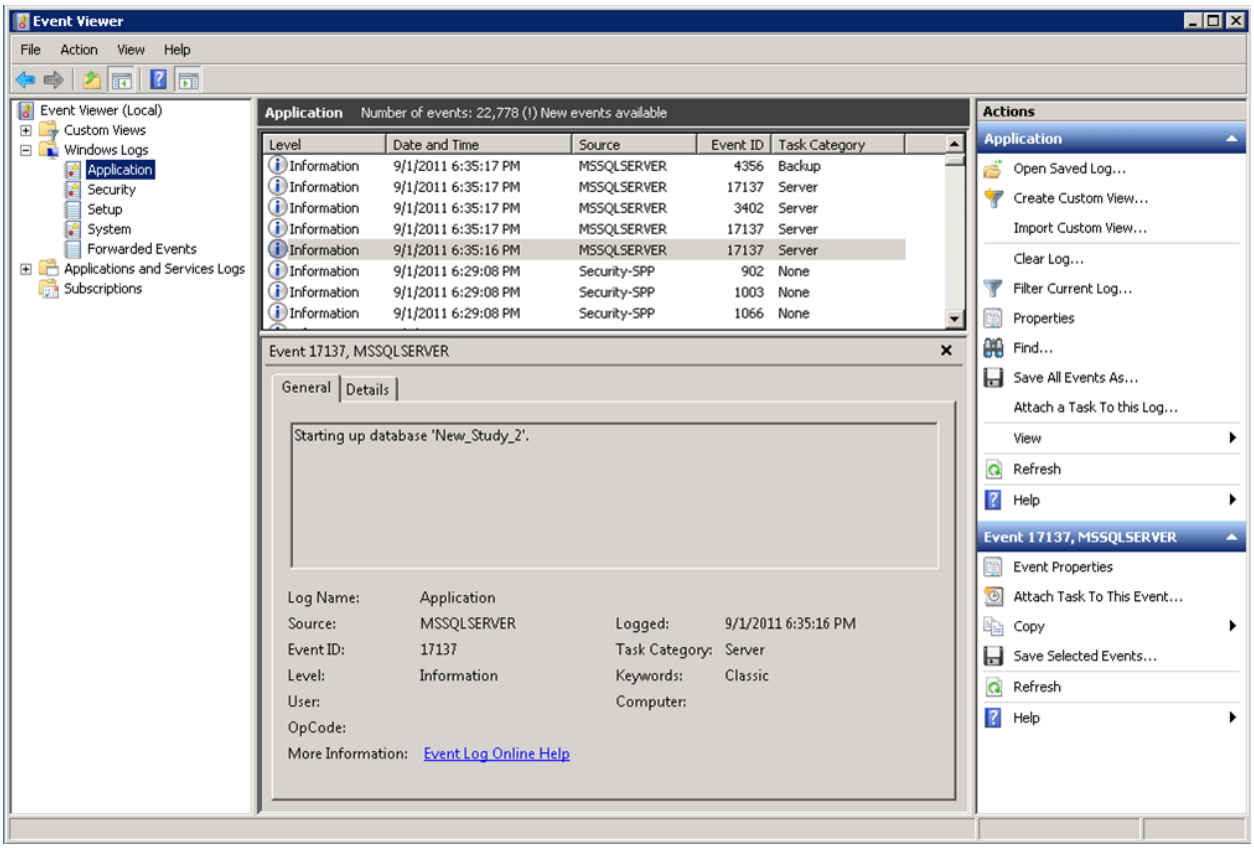


Figure 1-1 Event Viewer in Windows 7

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 (x86 or x64) or Microsoft Windows 7 x86-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 (x86 or x64) or Microsoft SQL Server 2008 R2 Express (x86 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 the 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 the C drive and select *Properties*. The *General* tab displays the capacity of the hard-disk including used and free space.

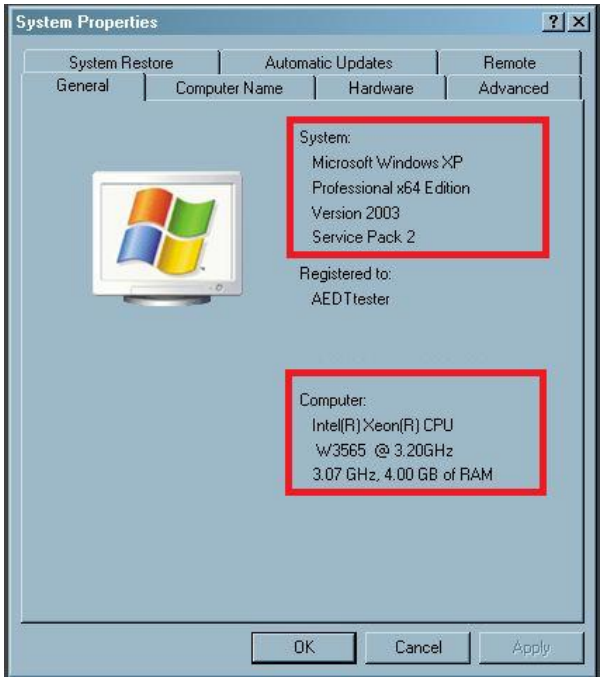


Figure 2-1 System Properties – Windows XP

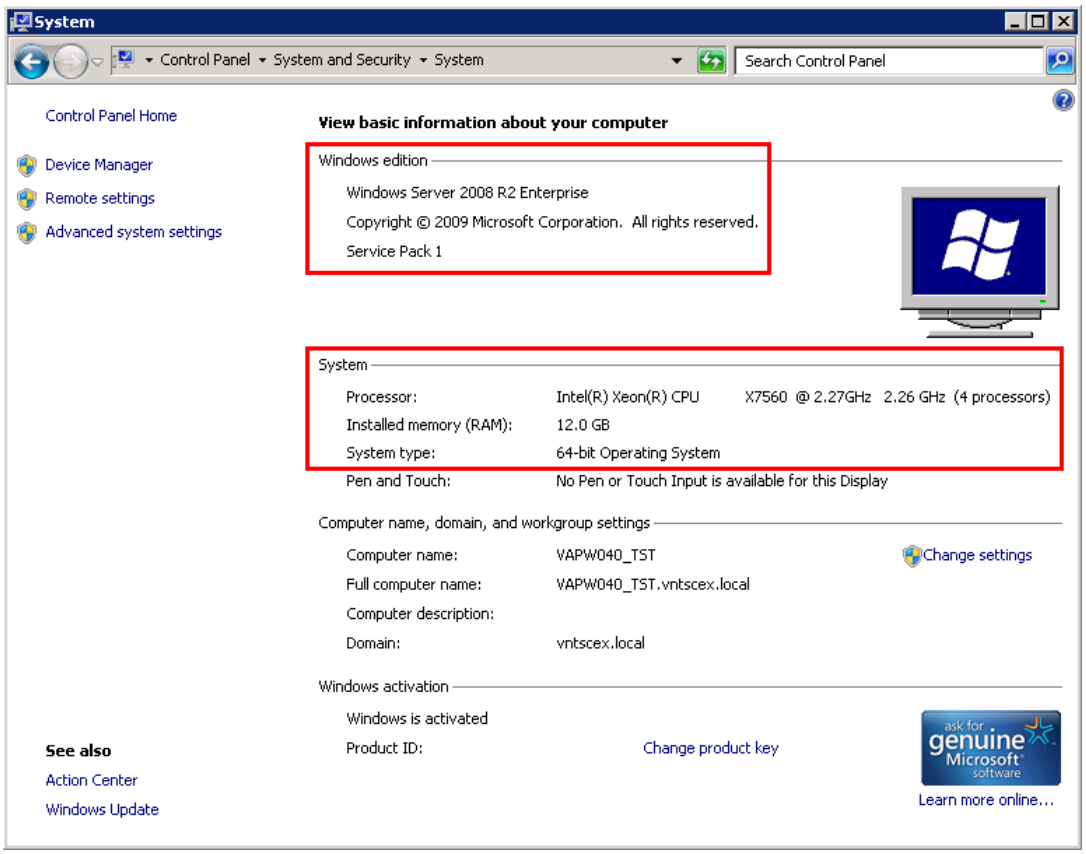


Figure 2-2 System Properties – Windows 7

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_SP1_Installer.zip** – Installer for AEDT2a
2. OPTIONAL **AEDT_2A_SP1_Distributed_Installer.zip** – This is only for servers utilizing Distributed Processing (see Section 2.2)
3. OPTIONAL **AEDT_2A_SP1_RunStudyx64_Installer.zip** – Installer for a batch study processor tool (see Section 2.2.2).
4. **AEDT_UserGuide.pdf** – AEDT2a User Guide
5. **AEDT_ASIFRefGuide.pdf** – AEDT2a ASIF Reference 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 (x86 or x64) or Microsoft SQL Server 2008 R2 Express (x86 or x64) installed prior to installing AEDT2a. See Section 2.1.1 for system requirements. Microsoft SQL Server 2008 R2 Express (x86 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.

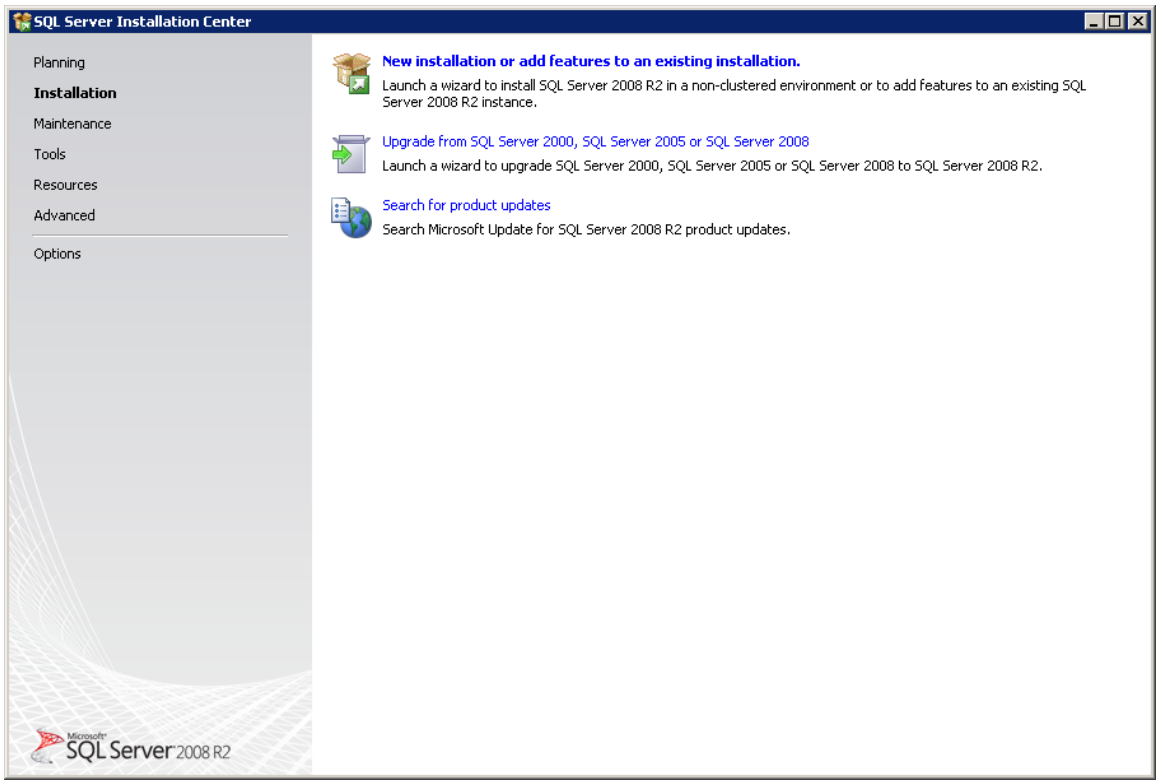


Figure 2-3 SQL Server 2008 R2 Express Installation – Installation Menu

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.

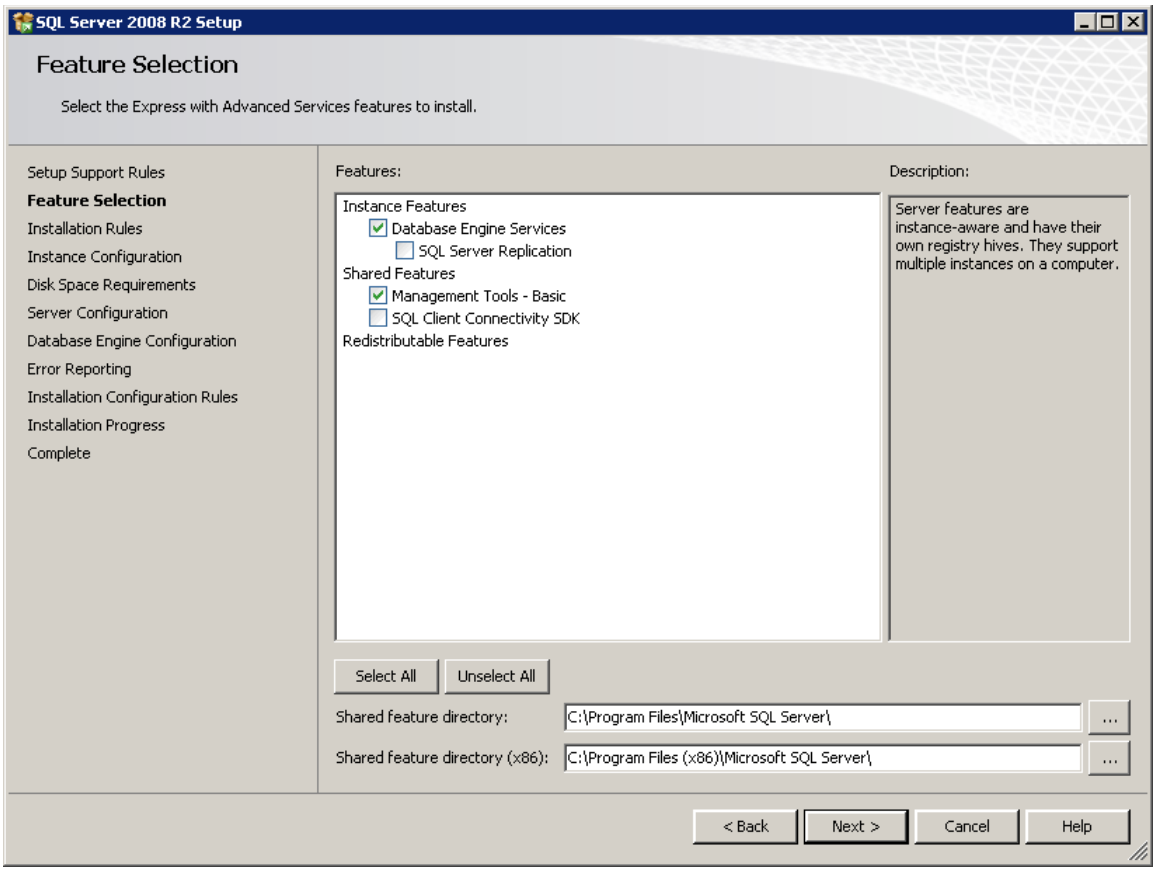


Figure 2-4 SQL Server 2008 R2 Setup – Feature Selection

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

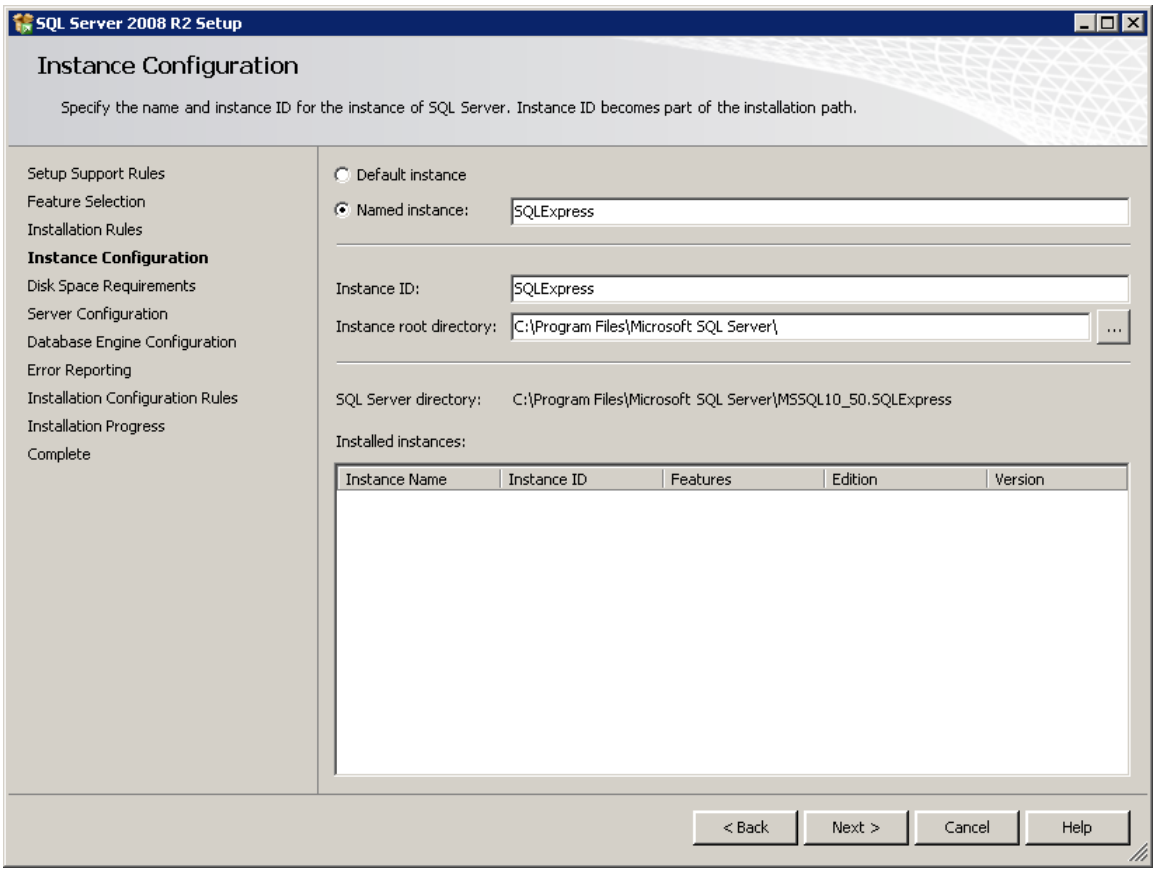


Figure 2-5 SQL Server 2008 R2 Setup – Instance Configuration

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

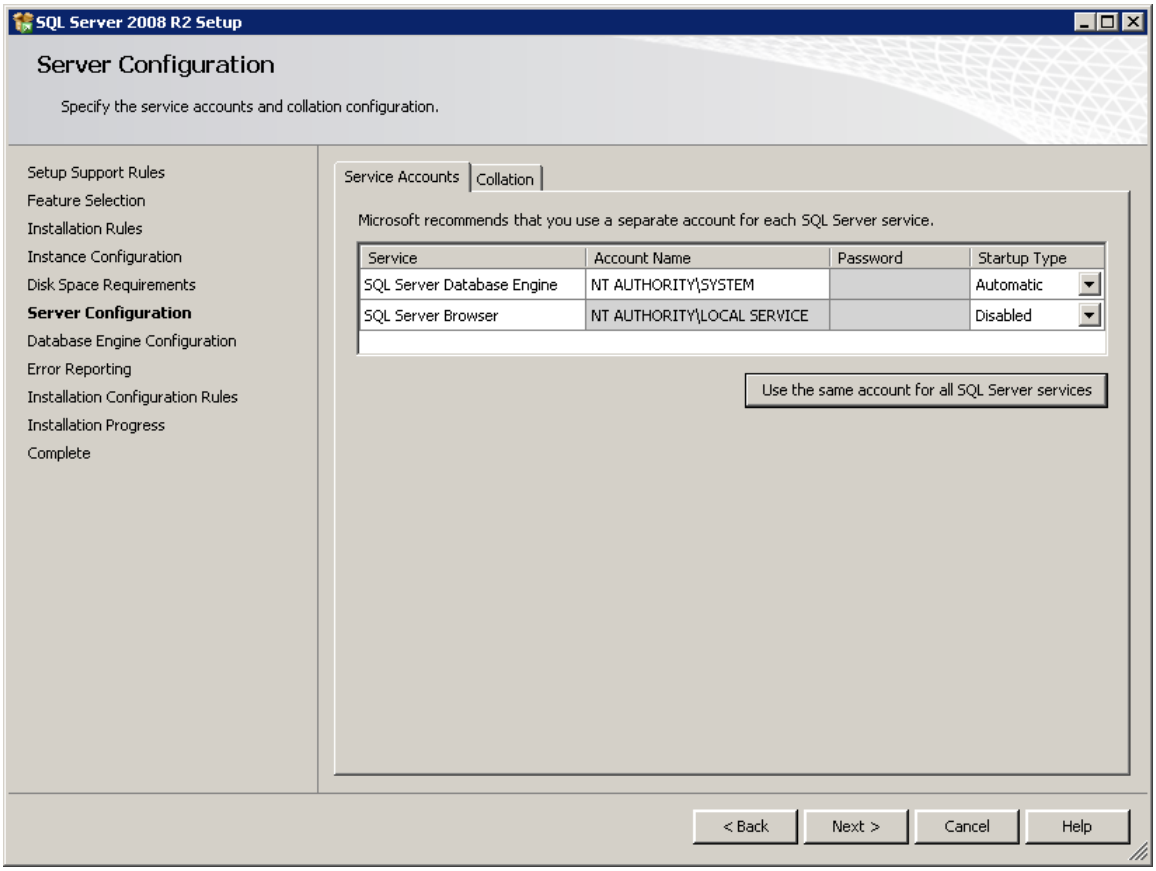


Figure 2-6 SQL Server 2008 R2 Setup – Server Configuration

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.

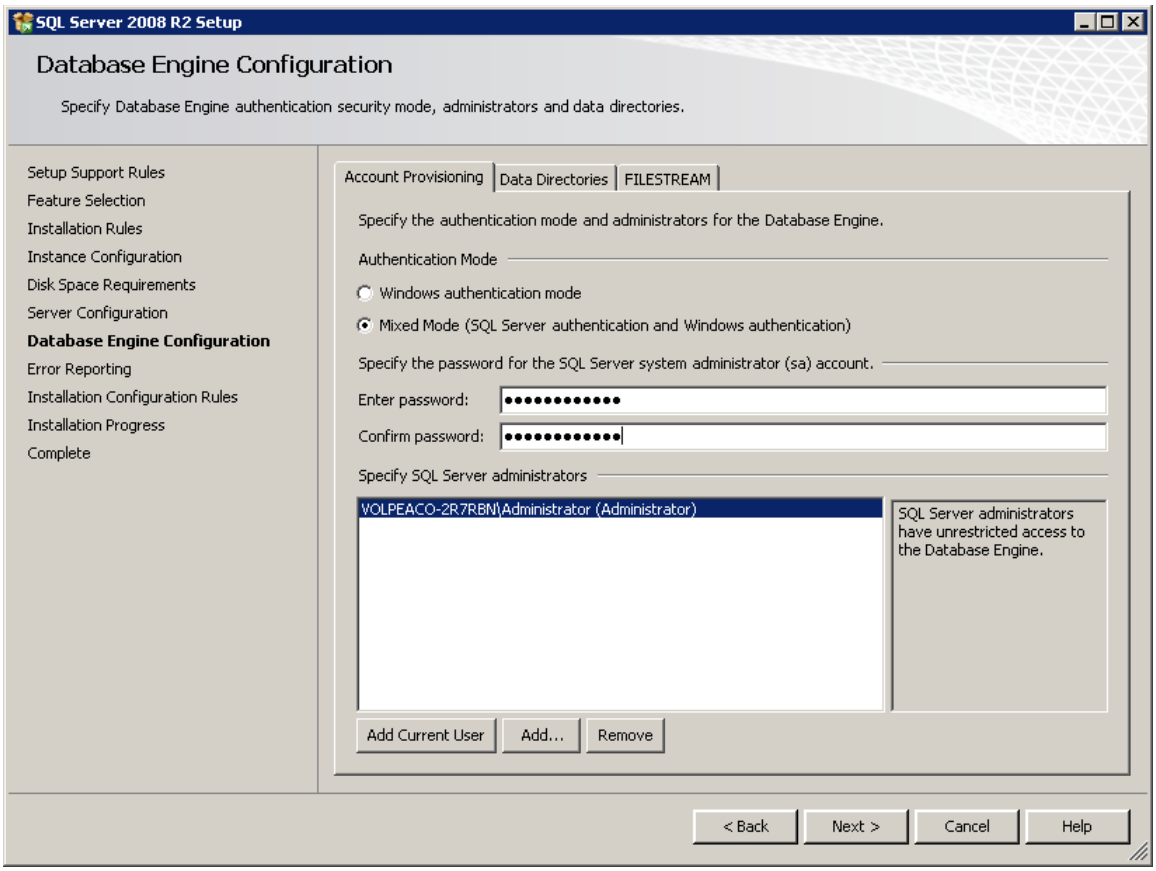


Figure 2-7 SQL Server 2008 R2 Setup – Database Engine Configuration

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).

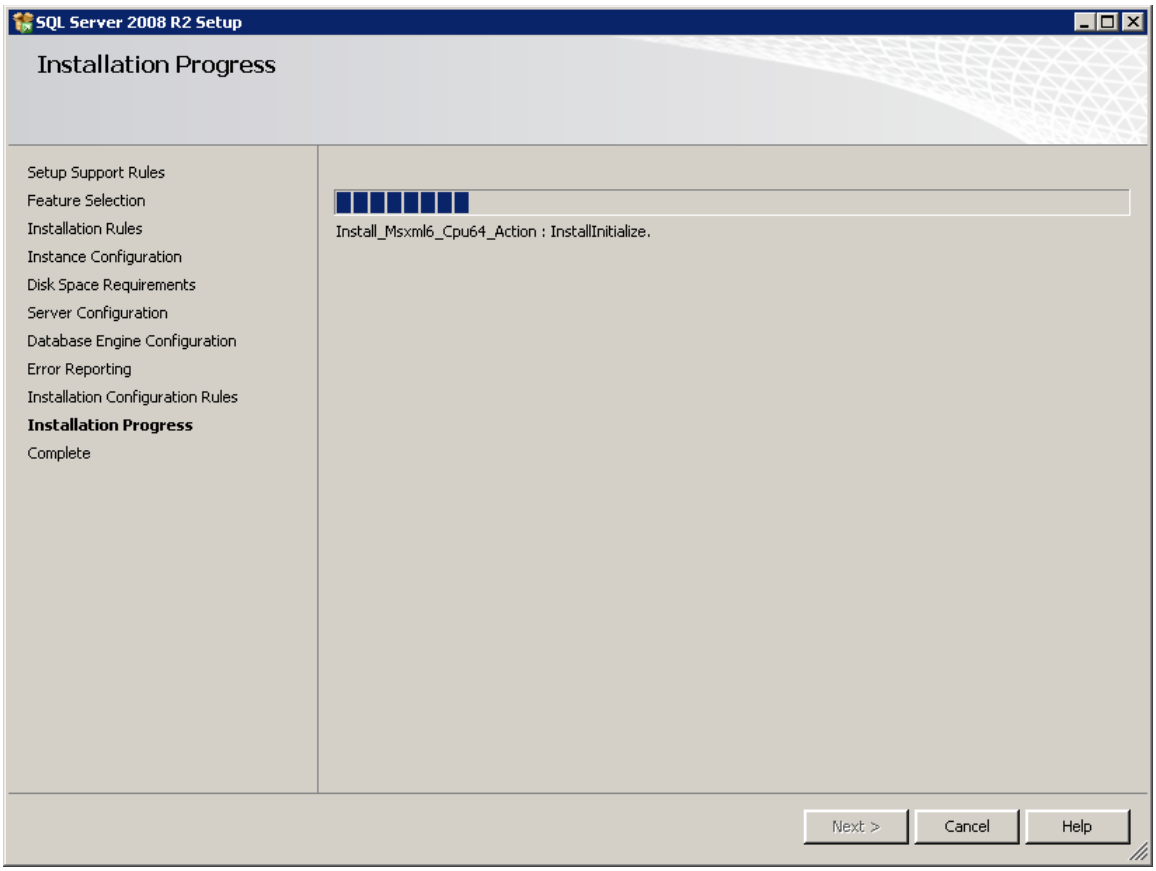


Figure 2-8 SQL Server 2008 R2 Setup – Installation Progress

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

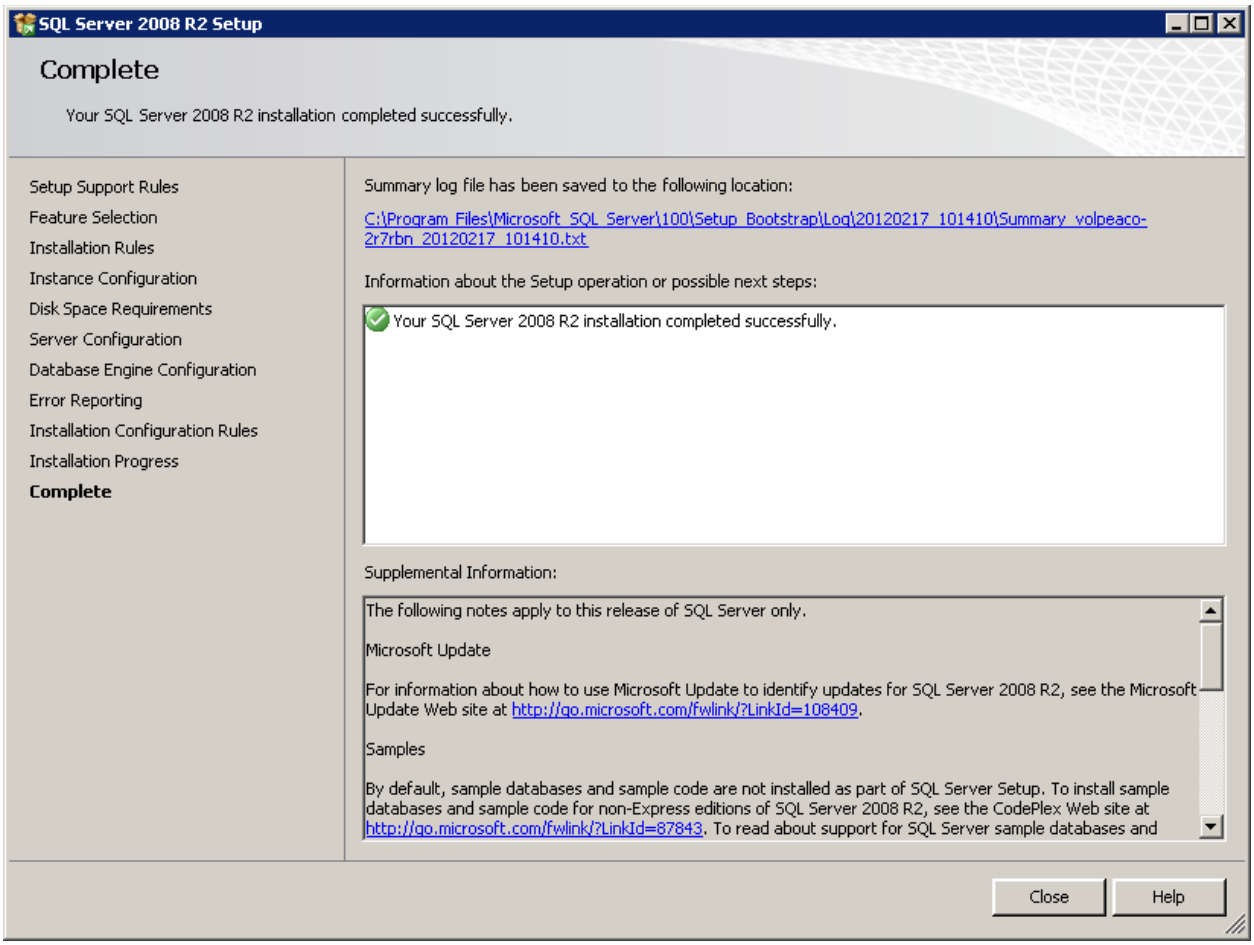


Figure 2-9 SQL Server 2008 R2 Setup – Complete

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*.

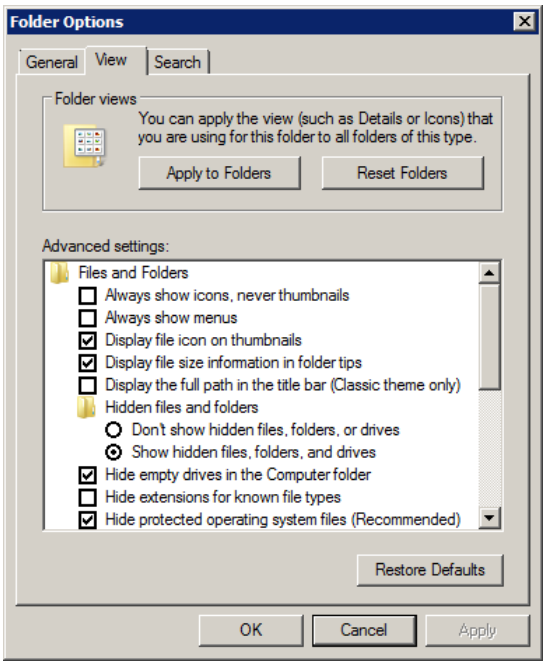


Figure 2-10 Folder Options – View Tab

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*.

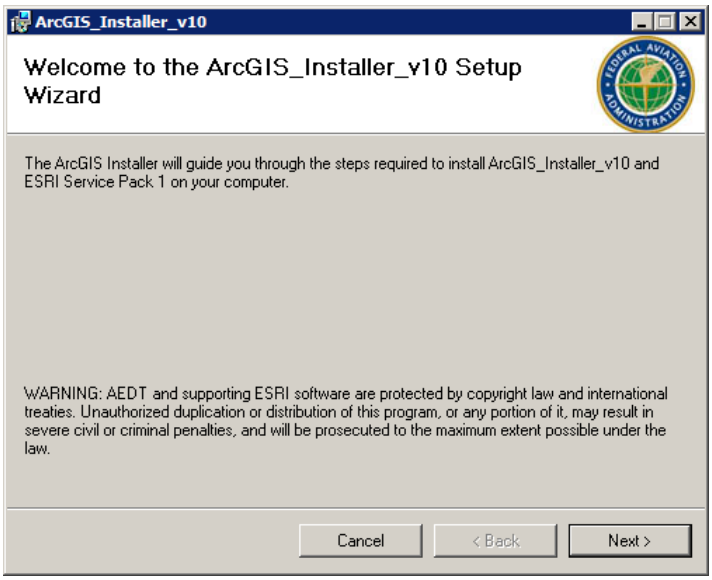


Figure 2-11 ArcGIS Setup Wizard – Welcome

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

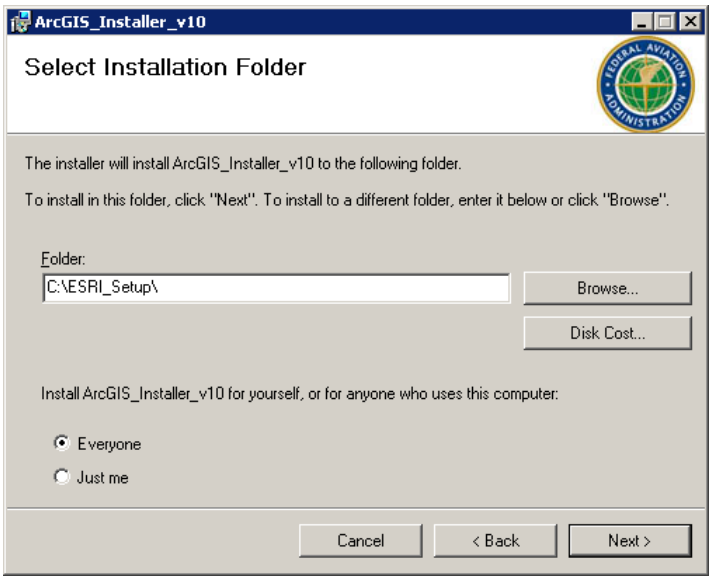


Figure 2-12 ArcGIS Setup Wizard – Select Installation Folder

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

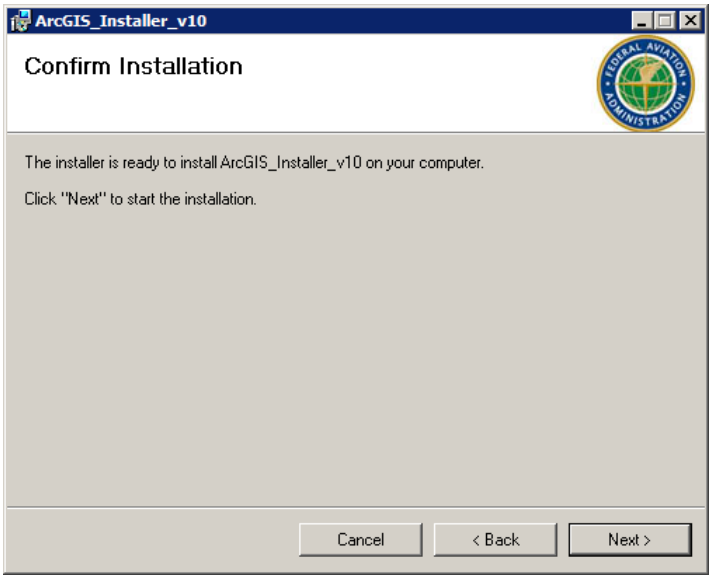


Figure 2-13 ArcGIS Setup Wizard – Confirm Installation

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

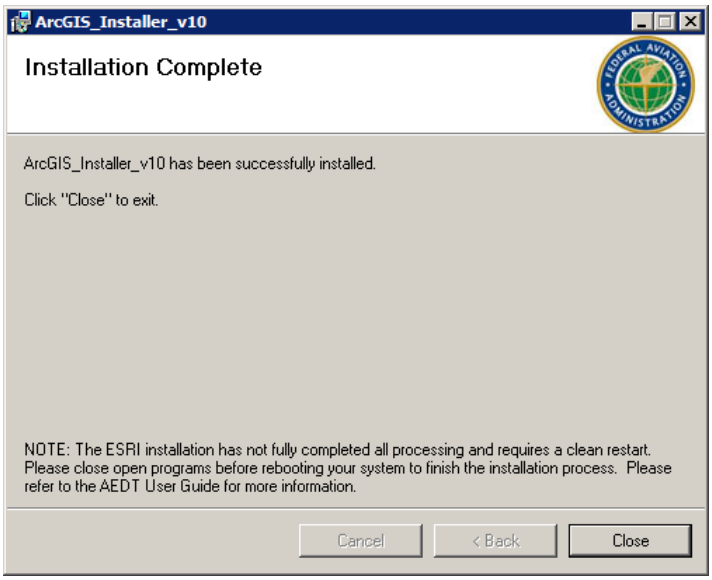


Figure 2-14 ArcGIS Setup Wizard –Installation Complete

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).

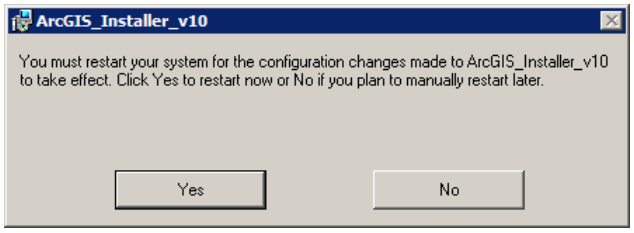


Figure 2-15 ArcGIS Setup Wizard – Restart System

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 and Service Pack 1 installation.

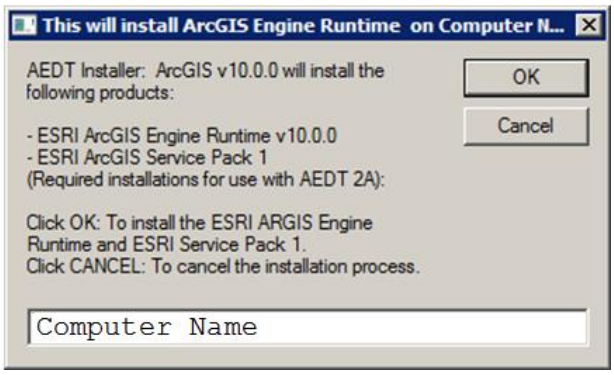


Figure 2-16 ArcGIS Engine Runtime

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 installation progress will be displayed. Once the installation and key authorization are complete, the following confirmation message will be displayed (Figure 2-17). Click *OK* to close the message.

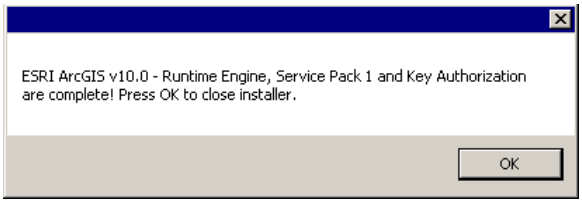
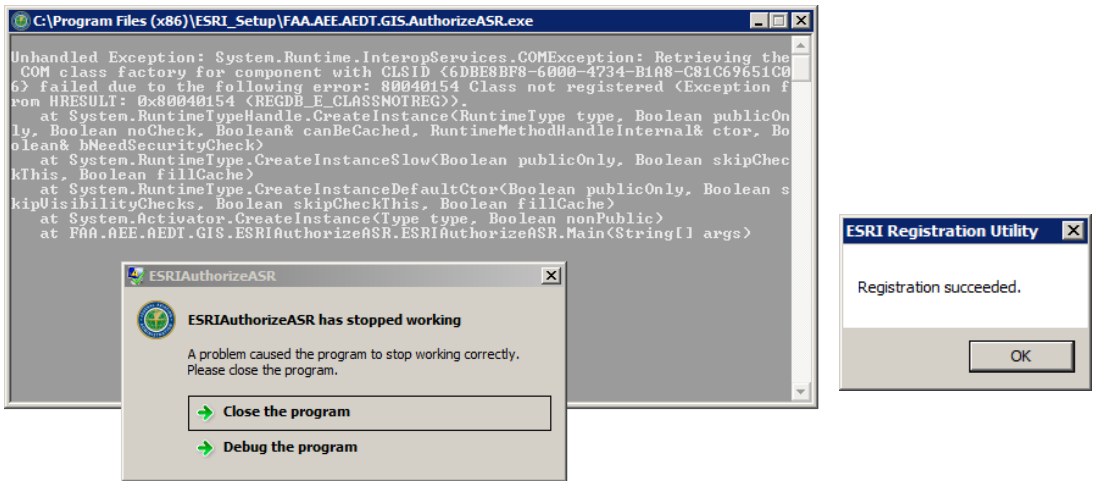


Figure 2-17 ArcGIS Engine Runtime – Installation Complete

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_AuthorizeEngine.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*.

2. In the *ArcGIS Administrator* window, verify the installation information and software versions (Figure 2-18). Verify that the service pack build is 10.0.1.2800.

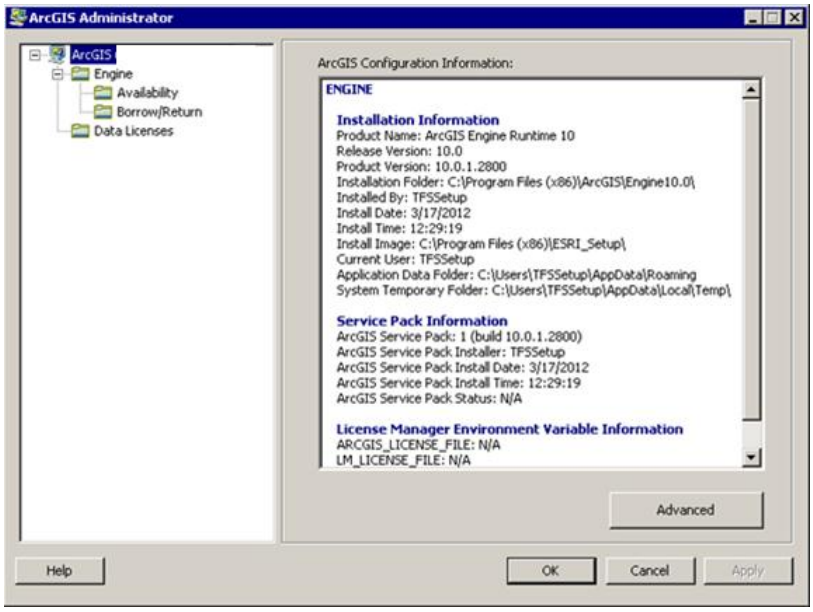


Figure 2-18 ArcGIS Administrator – Configuration Information

3. Select the *Availability* folder in the left window pane. Verify the authorization status and expiration dates for the following software (Figure 2-19).
   - 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

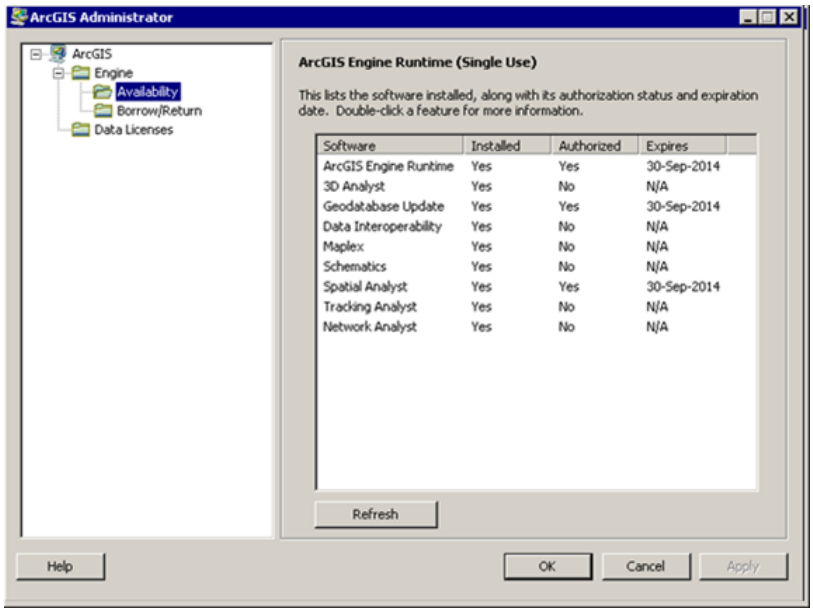


Figure 2-19 ArcGIS Administrator – Availability

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_SP1_Installer.zip, consists of a pair of files. The launch application wizard is called setup.exe, and FAA_AEE_AEDT_2A_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_SP1_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 2-20). Click *Next*.

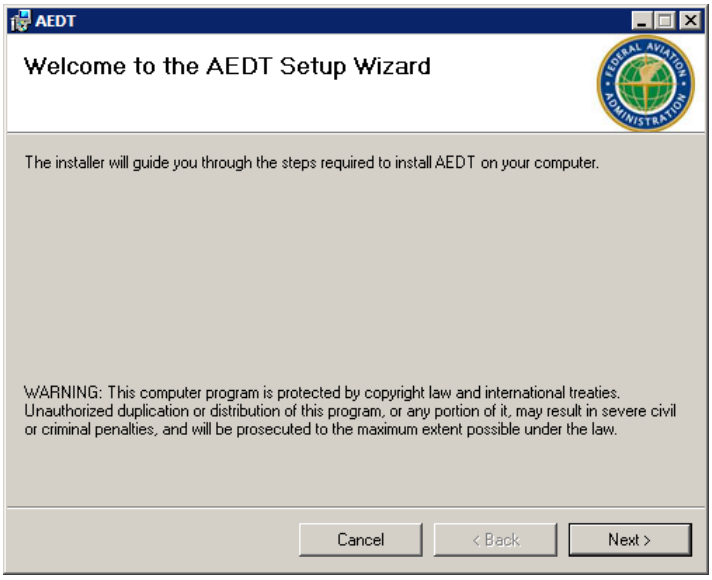


Figure 2-20 AEDT Setup Wizard – Welcome

5. License Agreement – Read the license agreement and select *I agree* (Figure 2-21). Click *Next*.

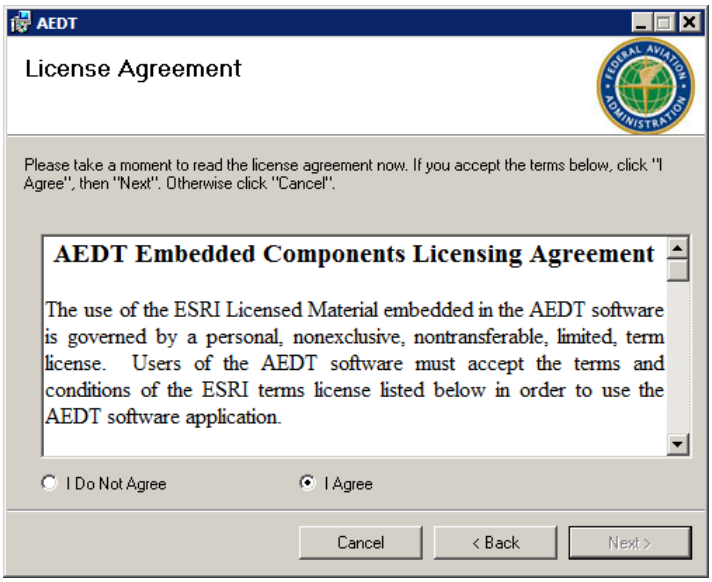


Figure 2-21 AEDT Setup Wizard – License Agreement

6. Select installation folder – accept the default location C:\AEDT\ (Figure 2-22).
7. 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*.

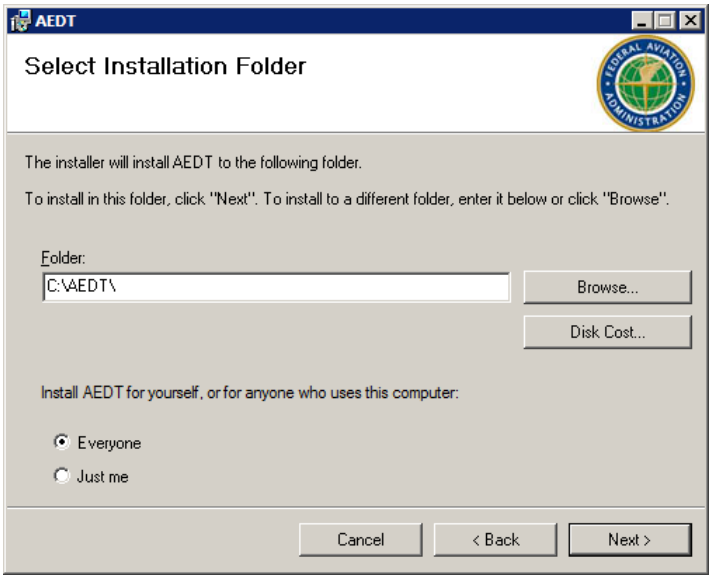


Figure 2-22 AEDT Setup Wizard – Select Installation Folder

8. Click *Next* to start the installation (Figure 2-23).

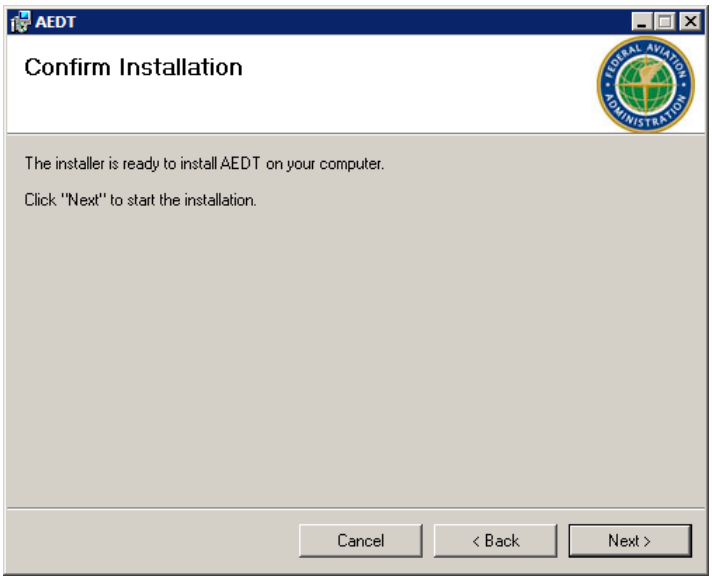


Figure 2-23 AEDT Setup Wizard – Confirm Installation

9. AEDT Setup Wizard will look for SQL Servers and display the *SQL Server Database Chooser* (Figure 2-24). Select a desired *SQL Server Database* from the drop-down menu. Click *OK*.

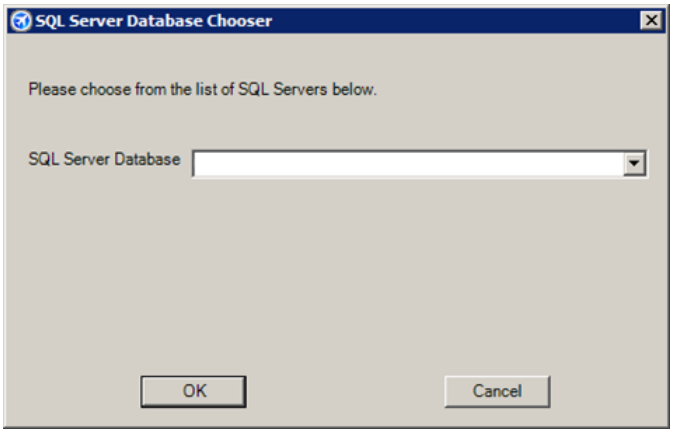


Figure 2-24 AEDT Setup Wizard – SQL Server Database Chooser

10. Click *Yes* when prompted to install the databases (Figure 2-25).

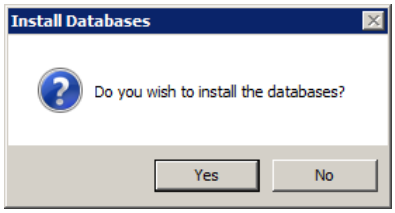


Figure 2-25 AEDT Setup Wizard – Install Databases Dialog Box

11. The AEDT database installation progress will be displayed (Figure 2-26). No action is required.

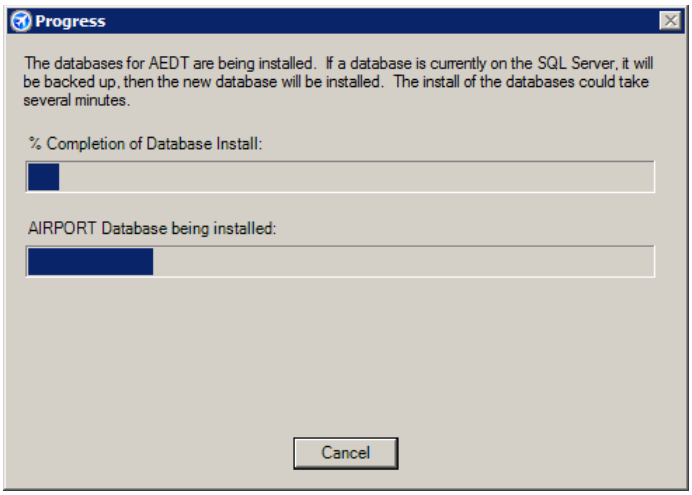


Figure 2-26 AEDT Setup Wizard – SQL Server Database Installation Progress

12. When the SQL Server database installation is complete, the *Database Installation Results* will be displayed as below. The AEDT system databases, version numbers, and configuration file updates will be shown. Click *OK*.

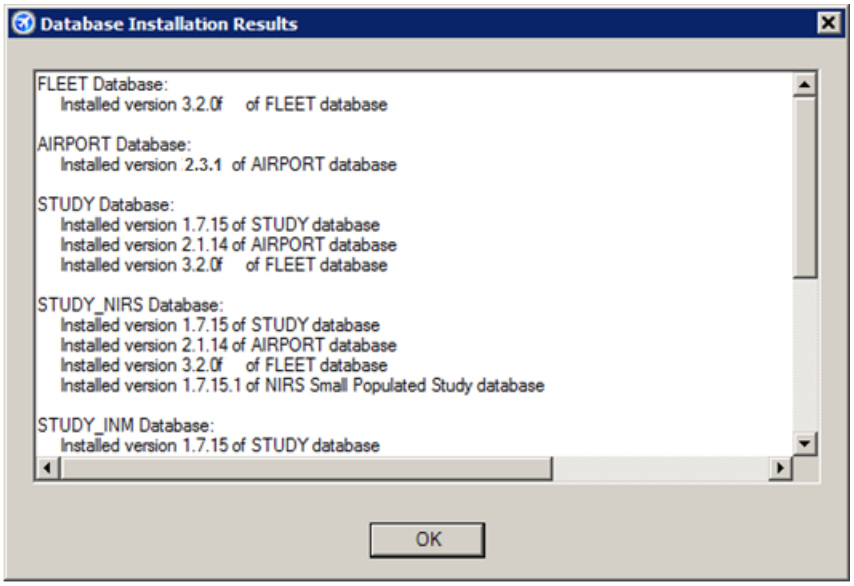


Figure 2-27 AEDT Setup Wizard – Database Installation Results

13. Click *Close* to exit the installation (Figure 2-28).

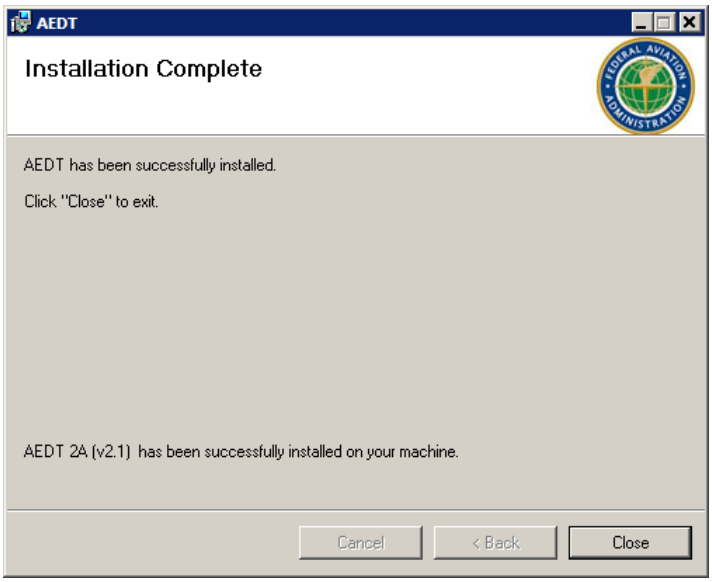


Figure 2-28 AEDT Setup Wizard – Installation Complete

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.
  - This sample study was developed in 1995 and reflects the current runway configuration of the time.
- 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 2-40:
   - Replace *[SQL Server Name]* with the appropriate SQL Server instance name containing the AEDT databases.
   - If databases are located on different servers, each database location must be specified separately.

For instructions on identifying SQL Server instance names, see Appendix D. 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 2-29 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 SQL Server instance 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 database versions displayed in the *Results* tab with the listed versions below:
   - AIRPORT v 2.3.1
   - FLEET v 3.2.0.f
   - STUDY v 1.7.15
     - STUDY_NIRS v 1.7.15.1
     - STUDY_INM v 1.7.15.1

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 SQL server instance 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 SQL Server instance 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 D. 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 2-30). To correct this error message, complete the steps in Appendix D. W-12

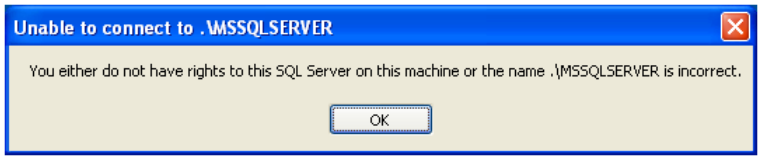


Figure 2-30 Error Message for Microsoft SQL Server 2008

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 2-31 shows a snapshot of the AEDT folder structure.

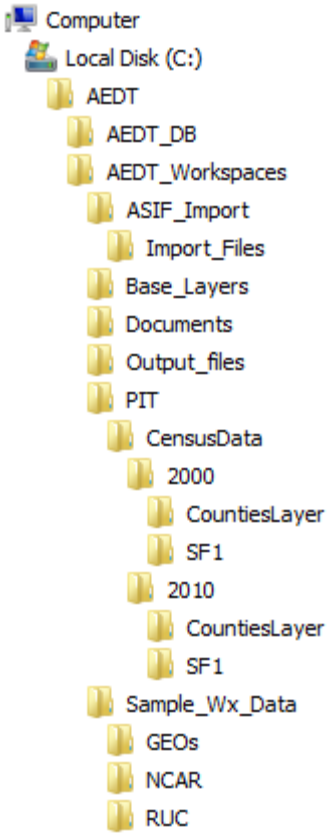


Figure 2-31 AEDT Directory

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 2-32).

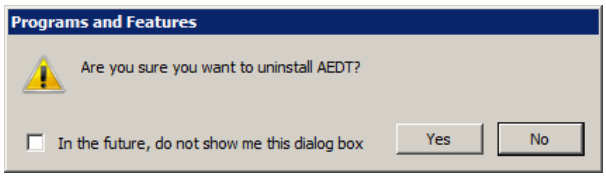


Figure 2-32 Confirm Uninstall

4. A dialog box will appear with the configuration status. It will remain open until the uninstallation is complete (Figure 2-33).

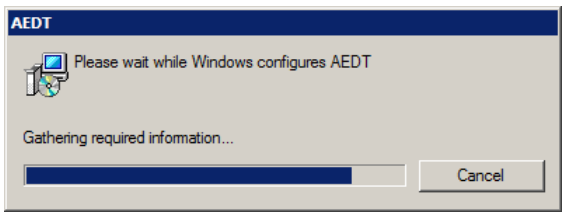


Figure 2-33 Configuration Status

5. A dialog box will open to confirm the removal of the AEDT Databases. Click *Yes* to uninstall (Figure 2-34).

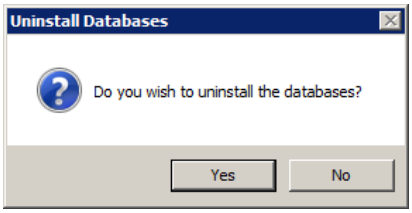


Figure 2-34 Uninstall Databases

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 2-35).

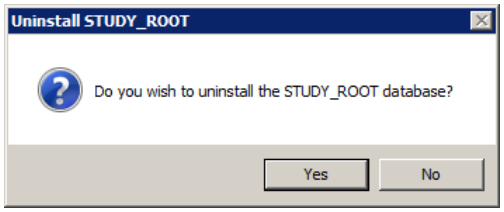


Figure 2-35 Uninstall STUDY_ROOT Database

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 2-36 below. No action is required.

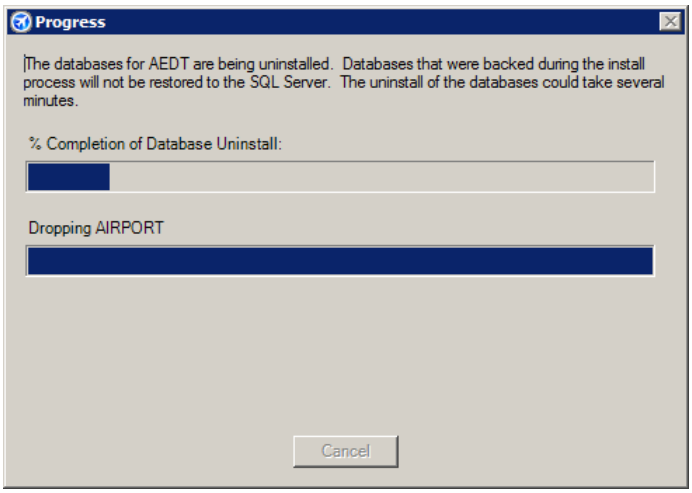


Figure 2-36 Progress Window

8. The status bar will display an estimated time to finish removing the programs. Once the installation is complete, the window will close (Figure 2-37).

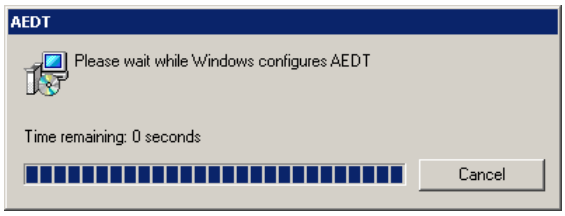


Figure 2-37 Complete Status

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 SQL Server instance 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 2-38 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 2-39, 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.

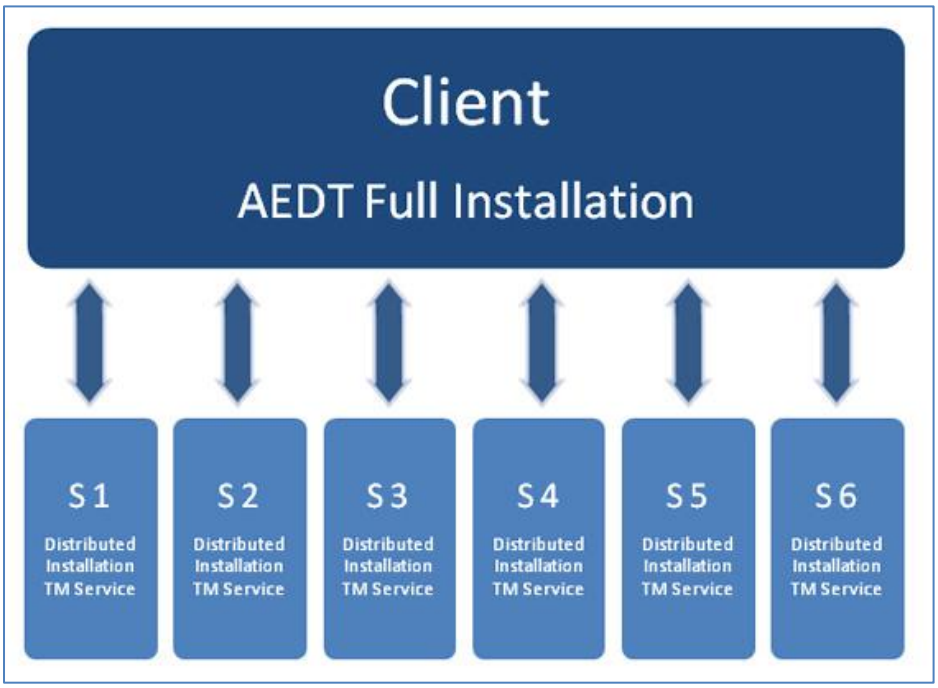


Figure 2-38 Distributed Processing

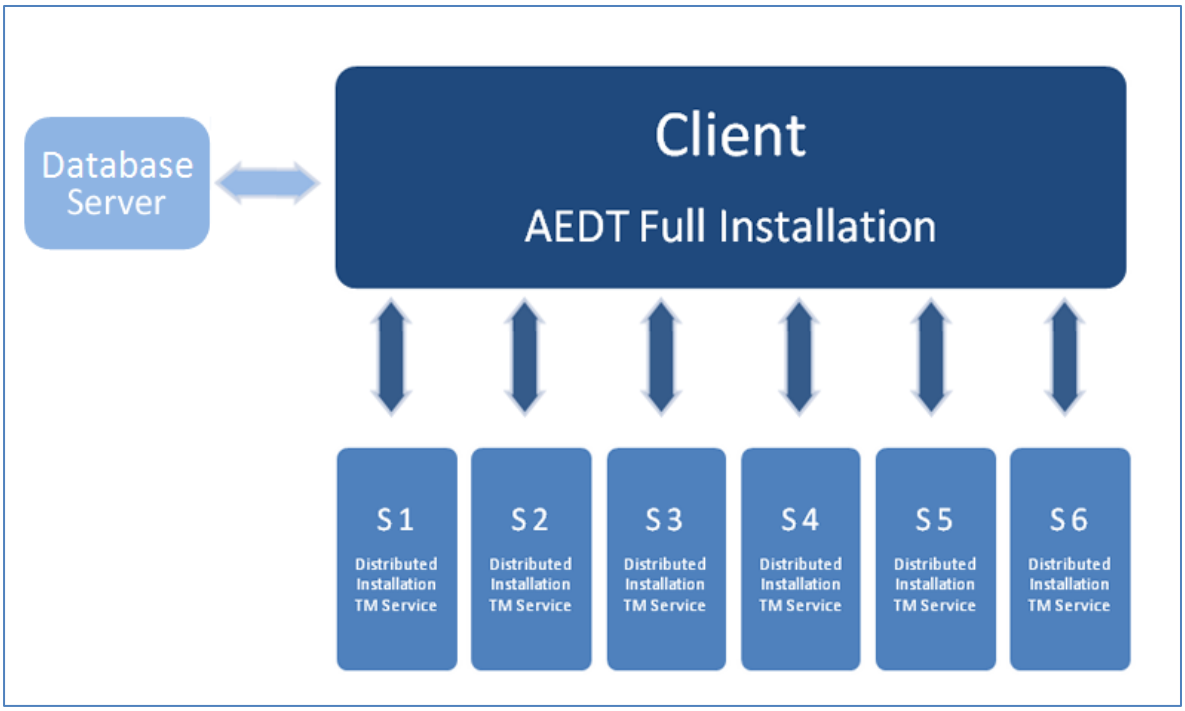


Figure 2-39 Distributed Processing with Separate Database Server

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 2-40:
   - If all databases are located on the AEDT client, replace every occurrence of *[SQL Server Name]* shown in Figure 2-40 with the AEDT client SQL server instance name.
   - If all databases are located on a separate database server, replace every occurrence of *[SQL Server Name]* shown in Figure 2-40 with the SQL server instance name containing the databases.
   - If databases are located on different servers, each database location must be specified separately. Replace *[SQL Server Name]* with the appropriate SQL server instance name corresponding to the location of each database, e.g., FLEET, AIRPORT, STUDY_ROOT, STUDY, and STUDY_NIRS.

For instructions on identifying SQL Server instance names, see Appendix D. N-11

```xml
<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 2-40 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_SP1_RunStudyx64_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 J 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 SQL Server instance 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 2-41).

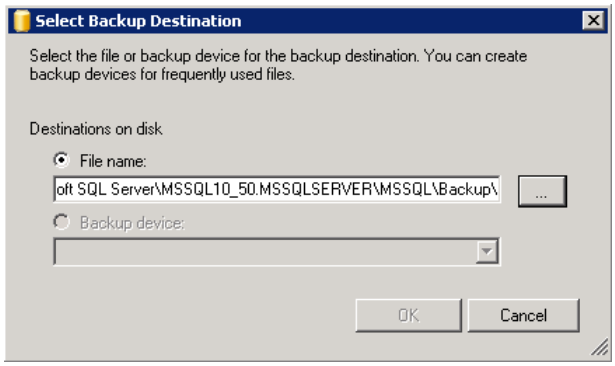


Figure 2-41 Select Backup Destination

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 SQL Server instance name then click the *Connect* button.
3. In the *Object Explorer*, select the database of interest.
4. Right-click on the database, and select *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 2-42).

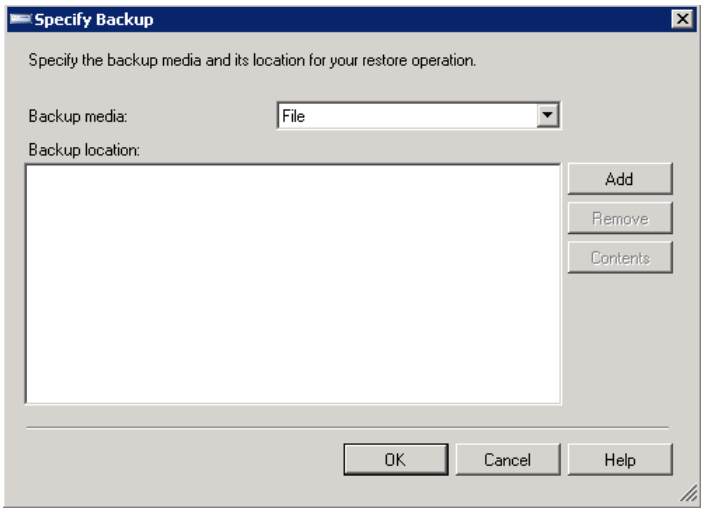


Figure 2-42 Specify Backup

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 SQL Server instance name containing the AEDT databases is in the *Server* field and select a study from the following options:

- Import Study
- Open Existing Study

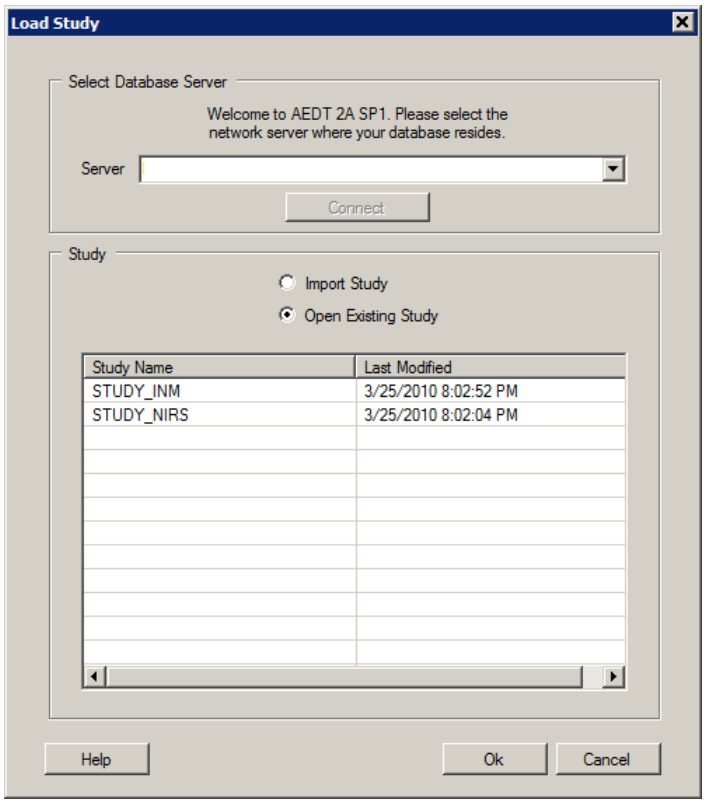


Figure 3-1 Load Study Dialog Box

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

The Last Modified column in the Load Study dialog box reflects the date the study was modified. N-14

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-15

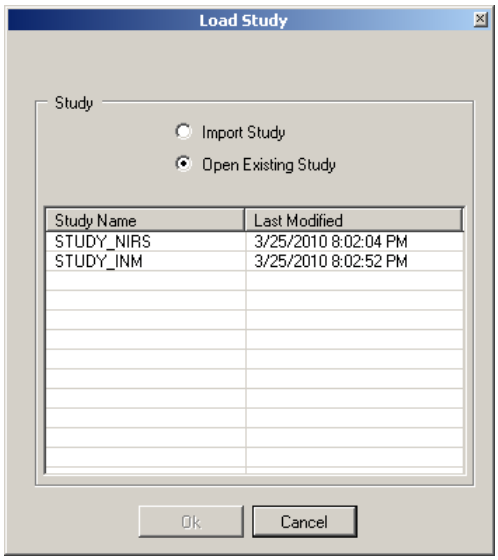


Figure 3-2 Local Studies

Multiple concurrent users are not supported in AEDT2a. W-16

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-17

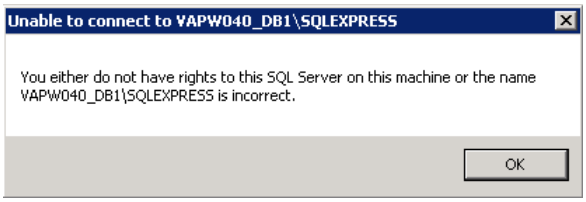


Figure 3-3 Networking Error

3.2 Import Study

In AEDT2a, the AEDT Standard Input File (ASIF) must be used to create a new study. See the ASIF Reference Guide 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-15

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: C:\Windows\Microsoft.NET\Framework\v4.0.30319\Config W-18

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-19

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-16

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-17

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 the ASIF Reference Guide for details on ASIF structure and content. N-18

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.

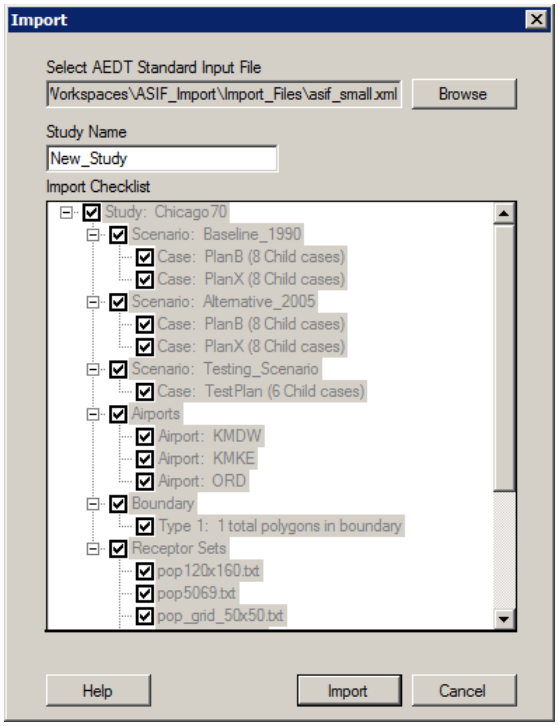


Figure 3-4 Import Dialog Box

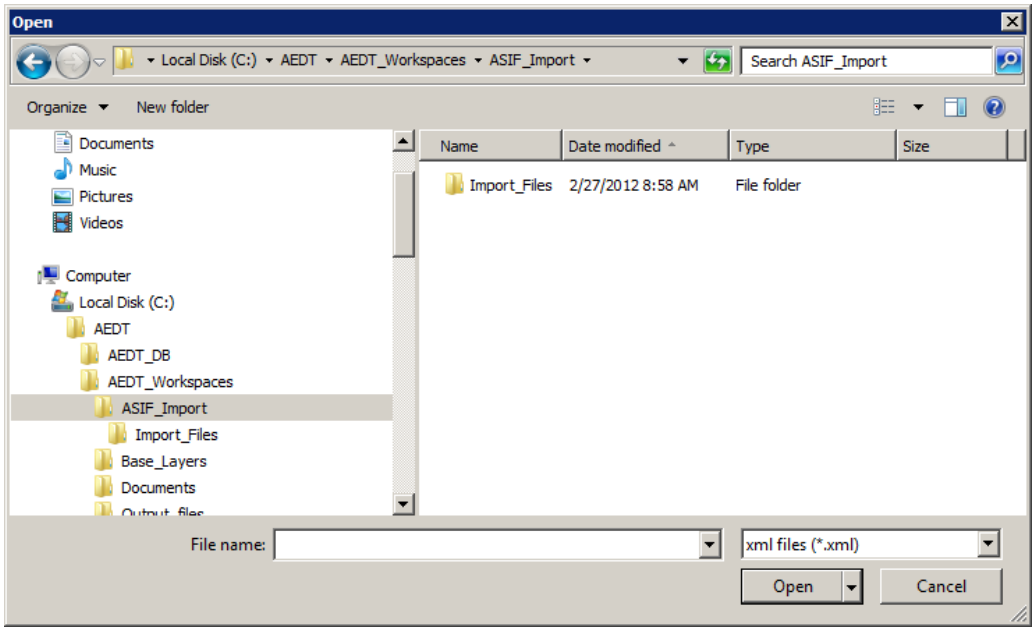


Figure 3-5 Open an ASIF

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 minutes to load. W-20

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.

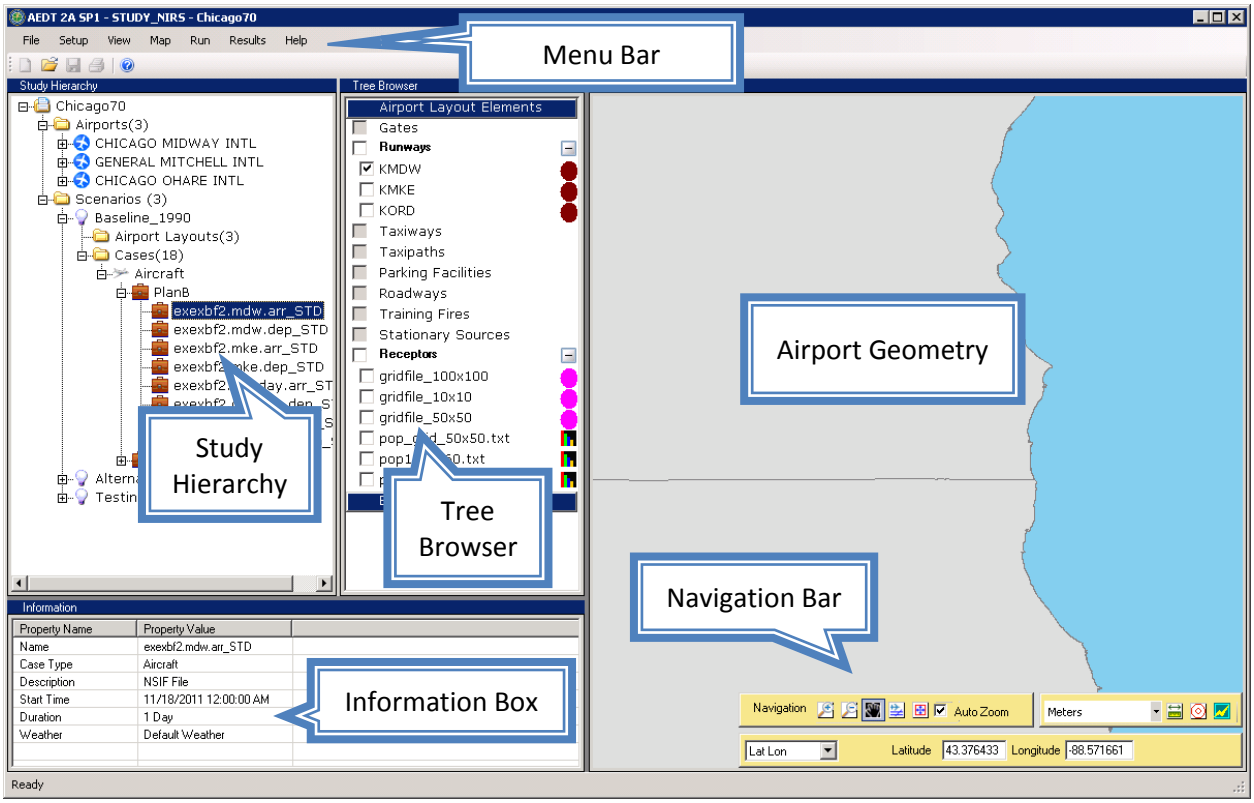


Figure 4-1 AEDT Main Window

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.

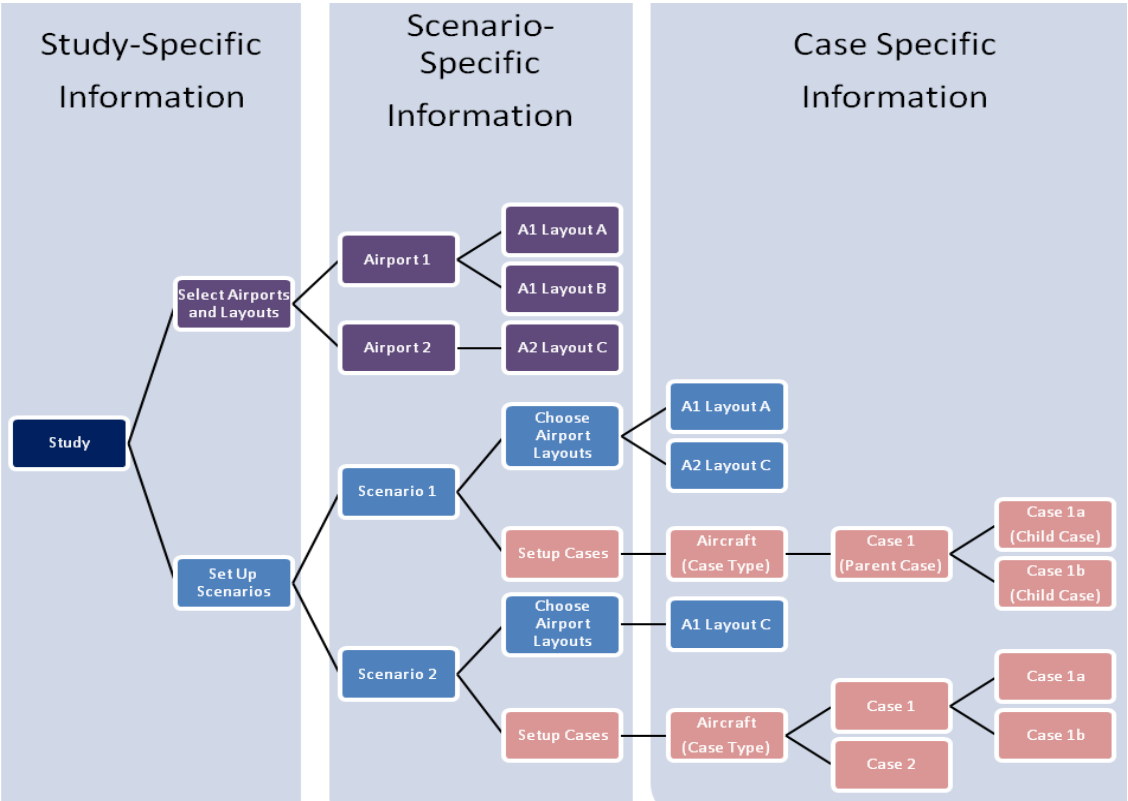


Figure 4-2 AEDT Study Hierarchy

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-19

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-21

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 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.

If differences in runway configuration between the study database (or ASIF) and the airport database exist, the runway configuration defined in the study database (or ASIF) will be used.

W-22

The airport database refelects current runway configurations at the time of release which may not be appropriate for all studies. It is important to use runway configurations that are consistent with operations modeled in the study.

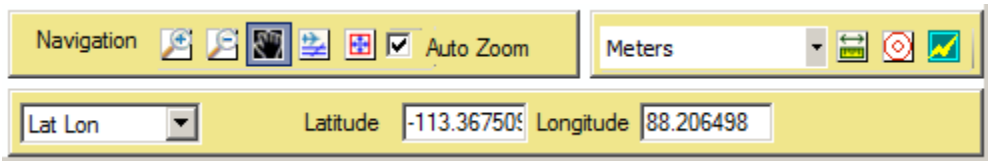


Figure 4-3 Navigation Bar

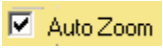
In the *Airport Geometry*, use the navigation bar (Figure 4-3) to do the following:

Zoom in and out

Pan the *Airport Geometry*

Zoom to study area

Zoom to visible



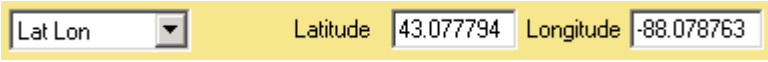
Zoom in to an area automatically when selected in the *Study Hierarchy*

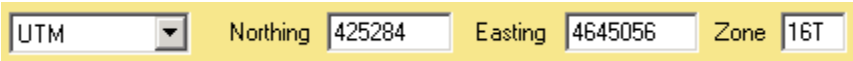
Select units of measurement (*Meters, Feet, Nautical Miles, Kilometers*, or *Miles*) for the Measurement Tool and Generate Range Rings Tool.

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*, and 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-20

- **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.

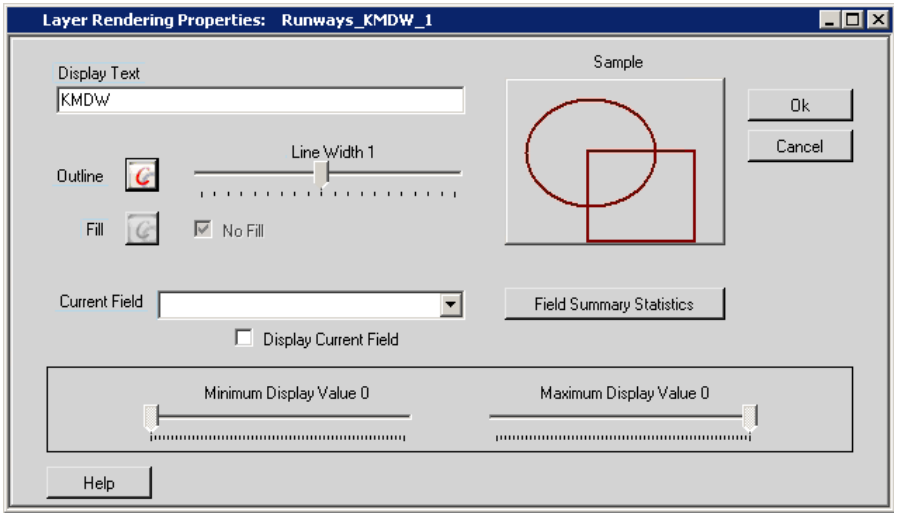


Figure 4-4 Layer Rendering Properties Dialog Box

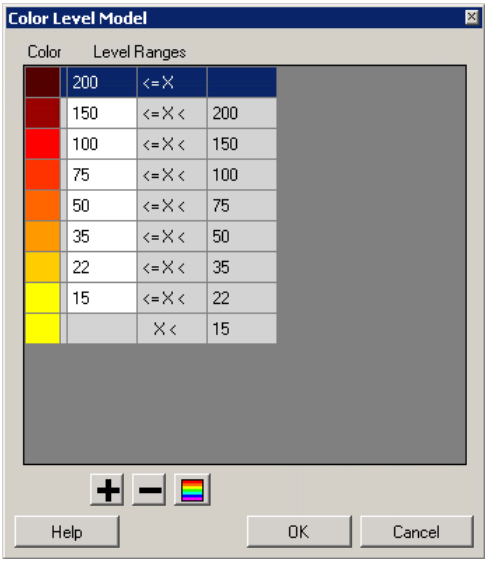


Figure 4-5 Color Level Model Dialog Box

- **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*.

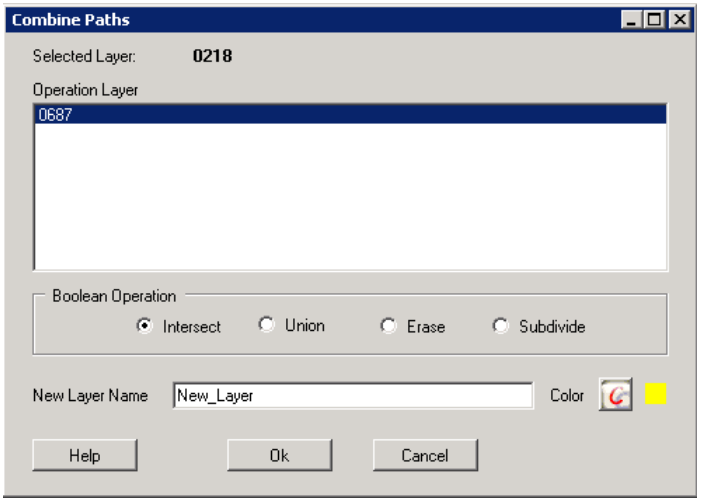


Figure 4-6 Combine Paths Dialog Box

- **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-21

- **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.

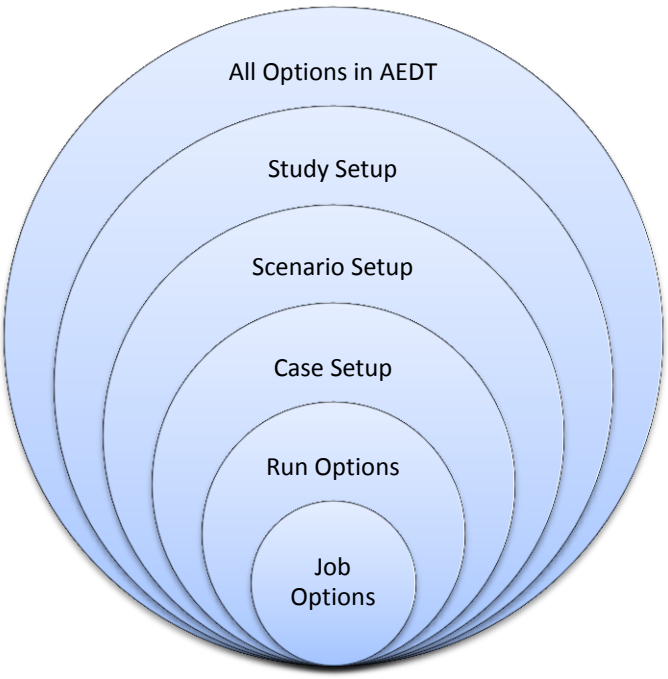


Figure 5-1 Relationship Among Setup Options

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 the ASIF Reference Guide 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: C:\Windows\Microsoft.NET\Framework\v4.0.30319\Config W-25

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-22

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 the ASIF Reference Guide for details on ASIF structure and content. N-23

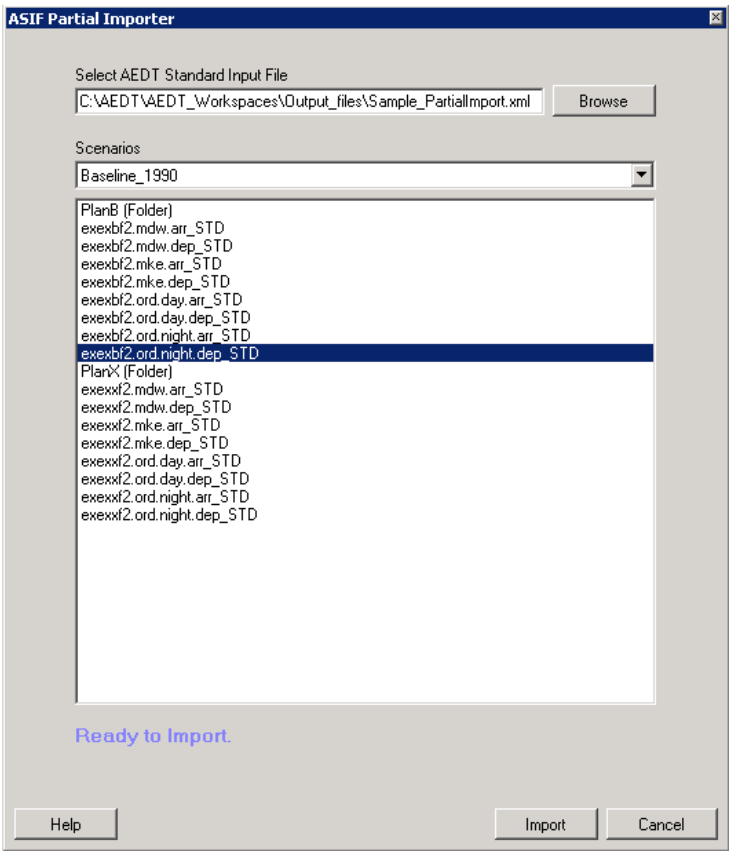


Figure 5-2 ASIF Partial Importer Dialog Box

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 E 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.

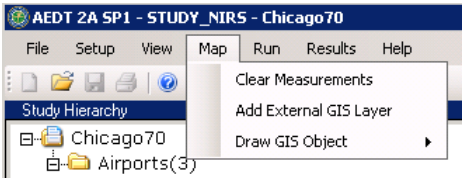


Figure 5-3 Add External GIS Layer from Map Menu

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 F 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.

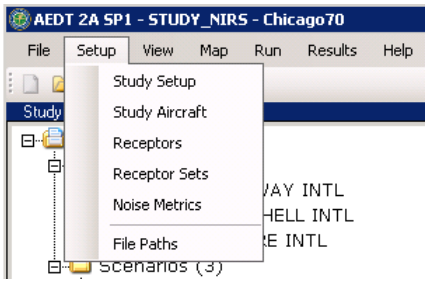


Figure 5-4 File Paths from Setup Menu

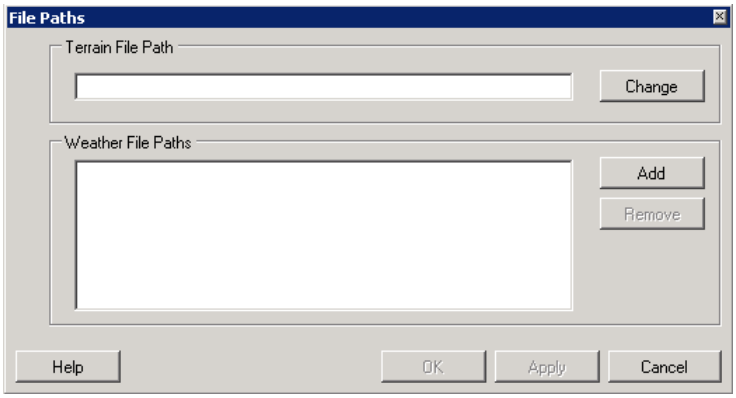


Figure 5-5 File Paths Dialog Box

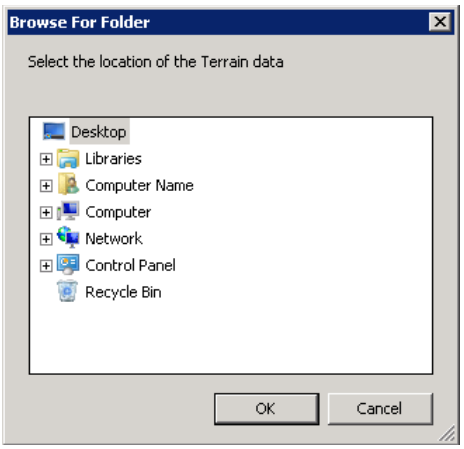


Figure 5-6 Browse for Folder Dialog Box

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 G 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-24

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

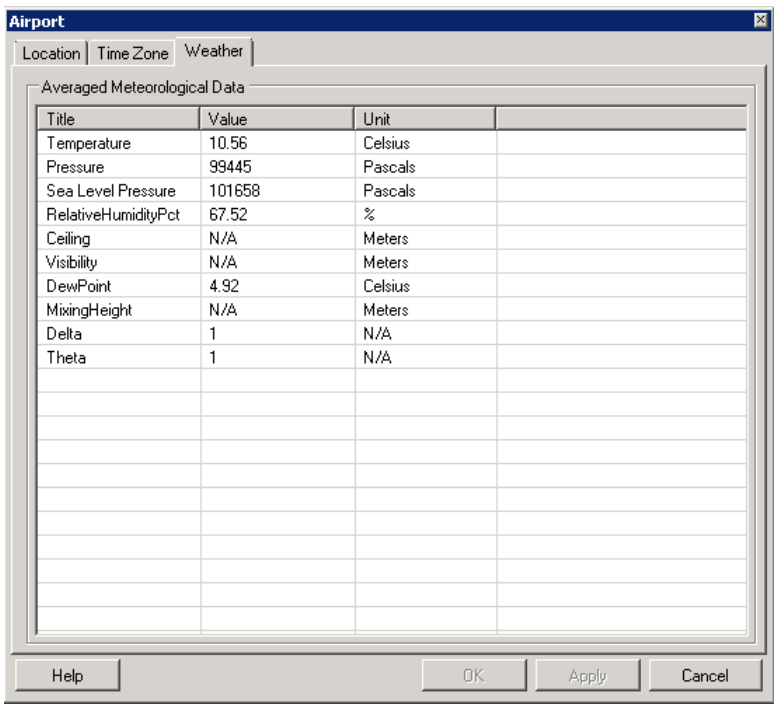
To include or remove weather files in a study, point to the *Weather File Path*:

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 G for instructions on pre-processing weather data.
        - RUC and GEOS files are not provided with the AEDT2a installation. See Appendix G 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 the ASIF Reference Guide for more details on the <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.



Title	Value	Unit
Temperature	10.56	Celsius
Pressure	99445	Pascals
Sea Level Pressure	101658	Pascals
RelativeHumidityPct	67.52	%
Ceiling	N/A	Meters
Visibility	N/A	Meters
DewPoint	4.92	Celsius
MixingHeight	N/A	Meters
Delta	1	N/A
Theta	1	N/A

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

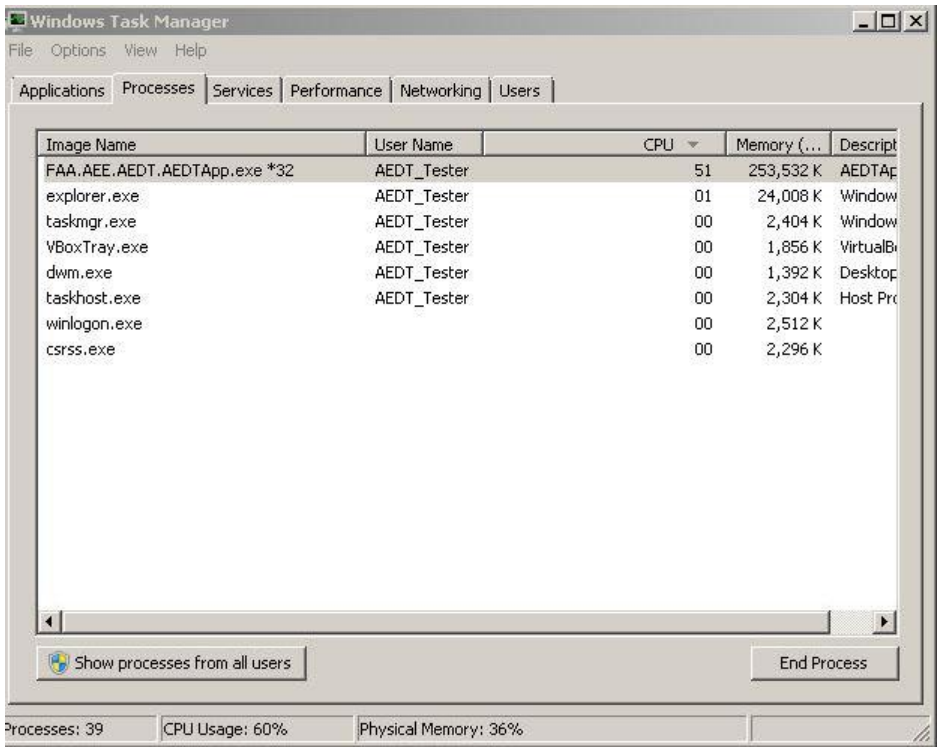


Figure 5-8 Windows Task Manager

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.

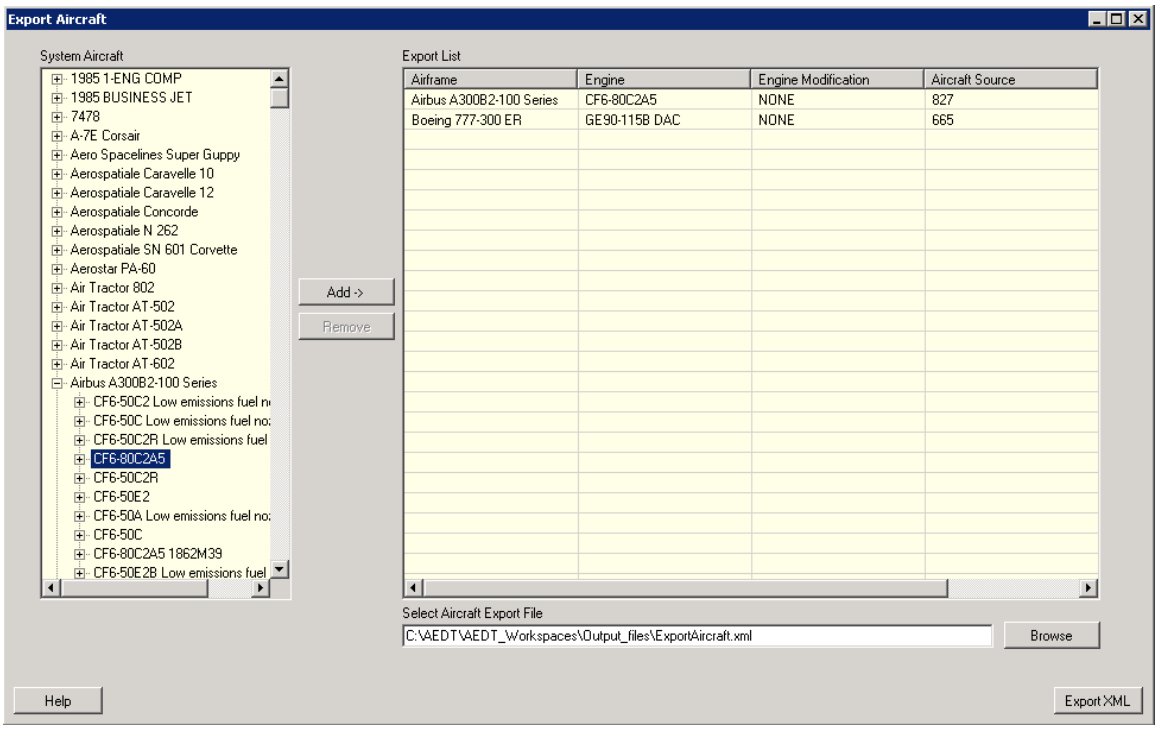


Figure 5-9 Export Aircraft Dialog Box

5.2 Set Up Study Information

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-25

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

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.

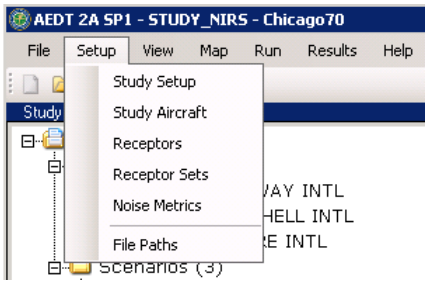


Figure 5-10 Study Setup from Setup Menu

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.

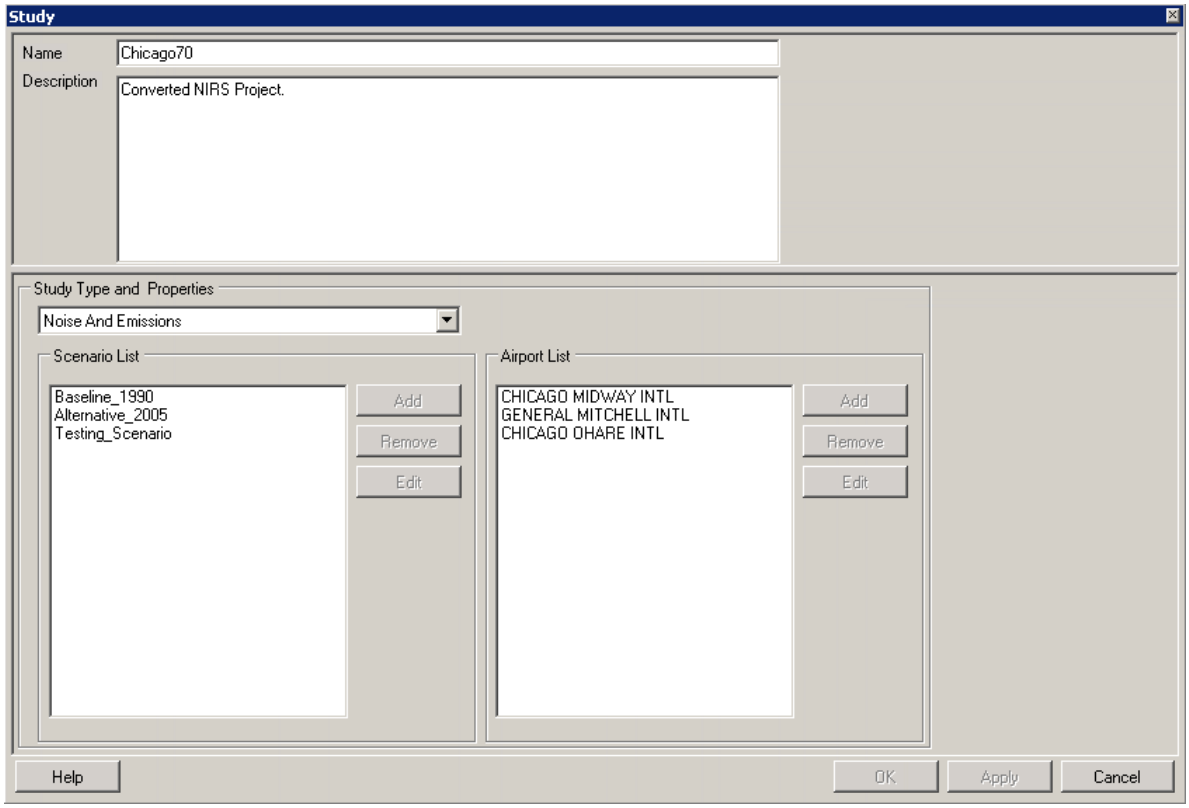


Figure 5-11 Study Dialog Box

5.3 Set Up Airports

In AEDT2a, a new airport must be created through the ASIF. N-27

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.

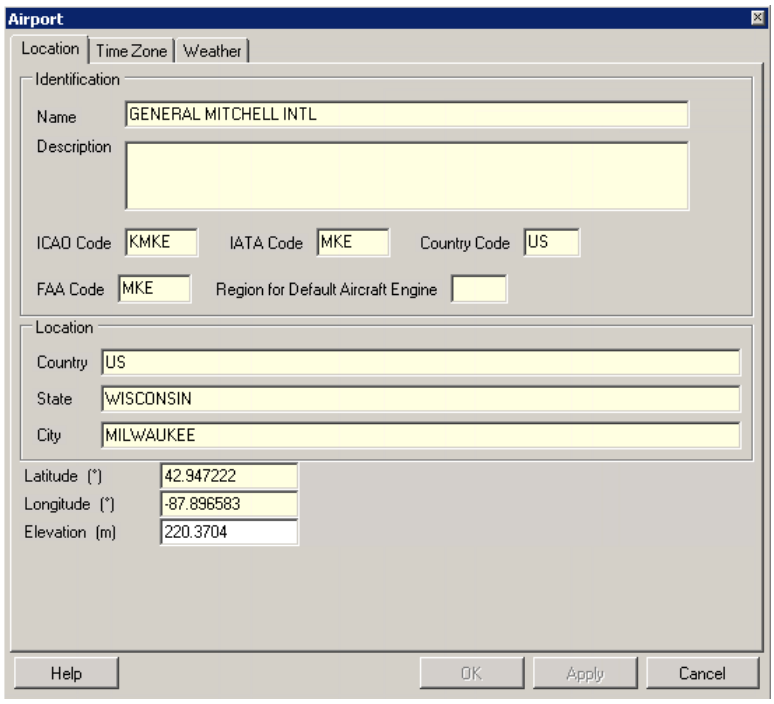


Figure 5-12 Airport Dialog Box – Location Tab

A grey or yellow background in a dialog box indicates that the content is read-only. N-28

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.

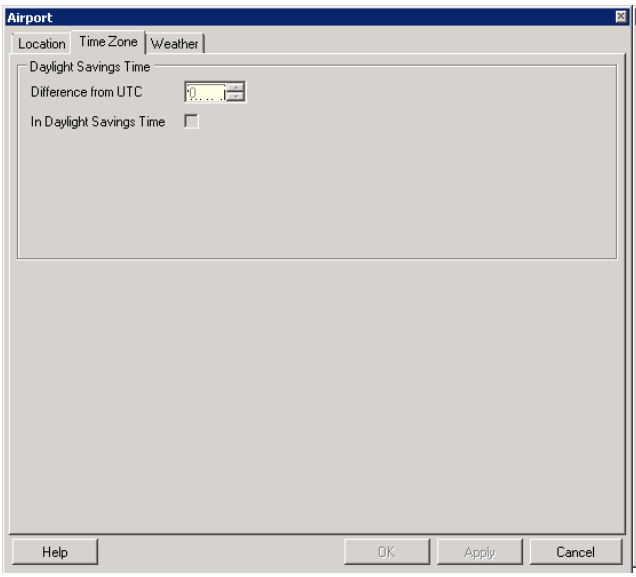
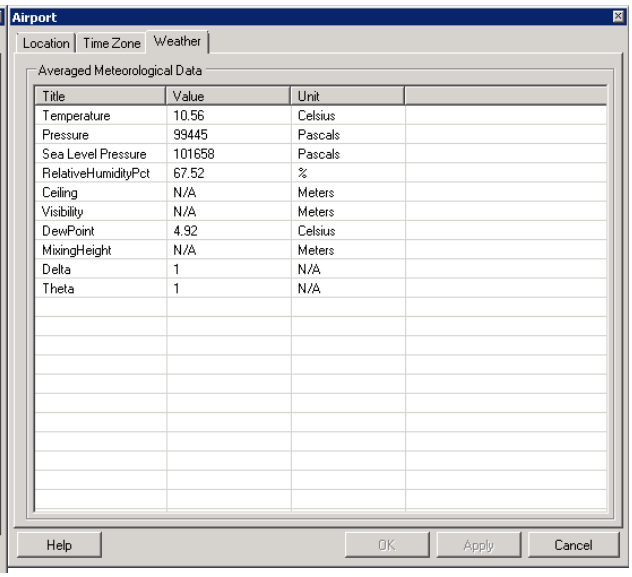


Figure 5-13 Airport Dialog Box – Time Zone Tab



Title	Value	Unit
Temperature	10.56	Celsius
Pressure	99445	Pascals
Sea Level Pressure	101658	Pascals
RelativeHumidityPct	67.52	%
Ceiling	N/A	Meters
Visibility	N/A	Meters
DewPoint	4.92	Celsius
MixingHeight	N/A	Meters
Delta	1	N/A
Theta	1	N/A

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.

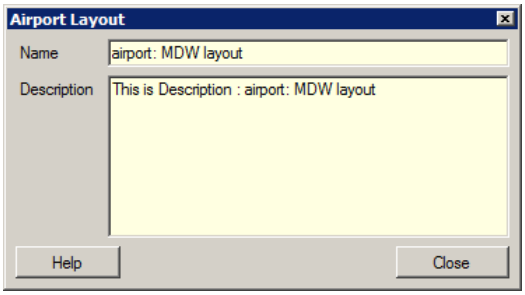


Figure 5-15 Airport Layout Dialog Box

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-29

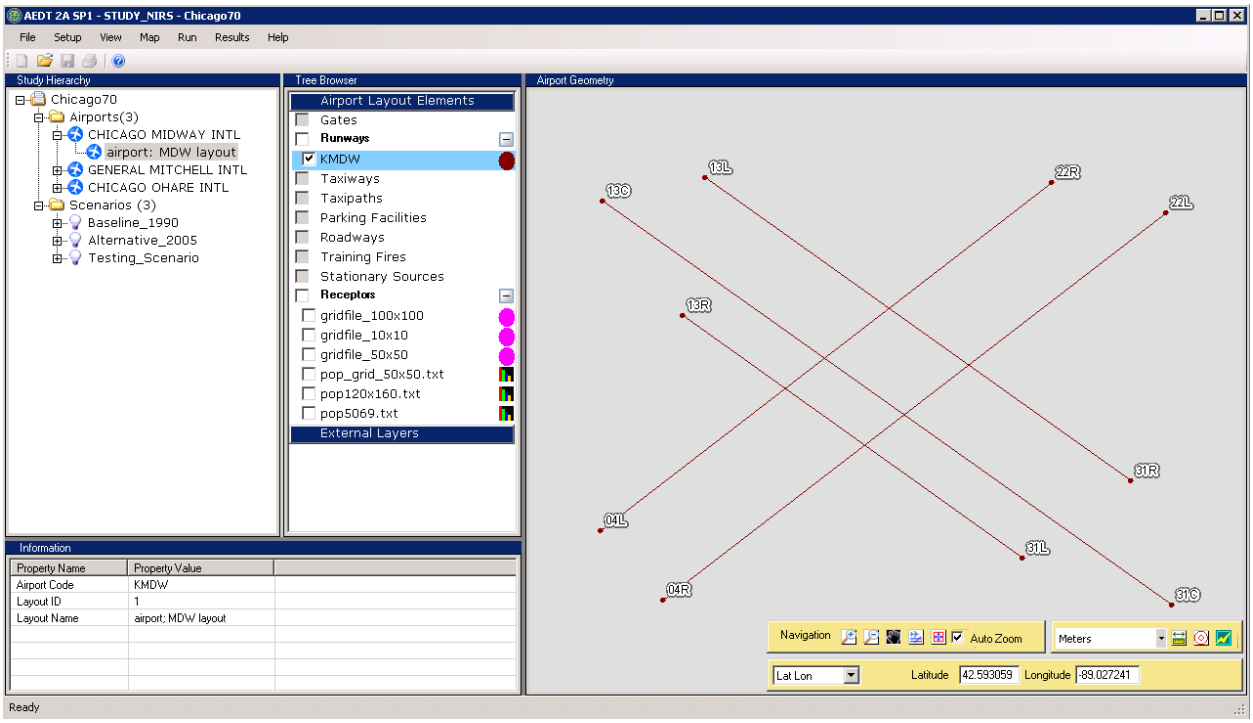


Figure 5-16 AEDT Main Window with Runways Shown in Airport Geometry

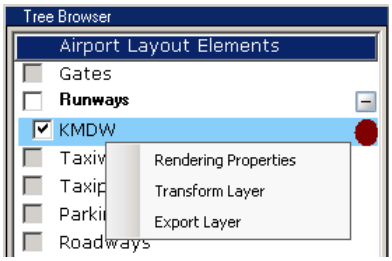


Figure 5-17 Runways in Tree Browser

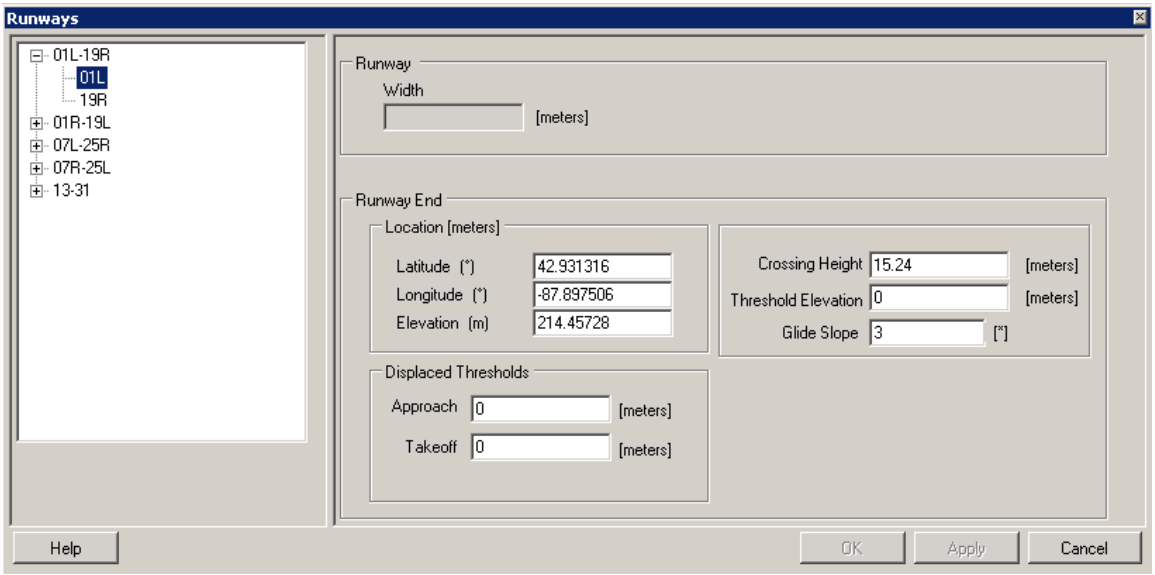


Figure 5-18 Runways Dialog Box

5.4 Set Up Scenarios

5.4.1 Set Up or Modify Scenarios

In AEDT2a, scenarios must be created 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-30

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.

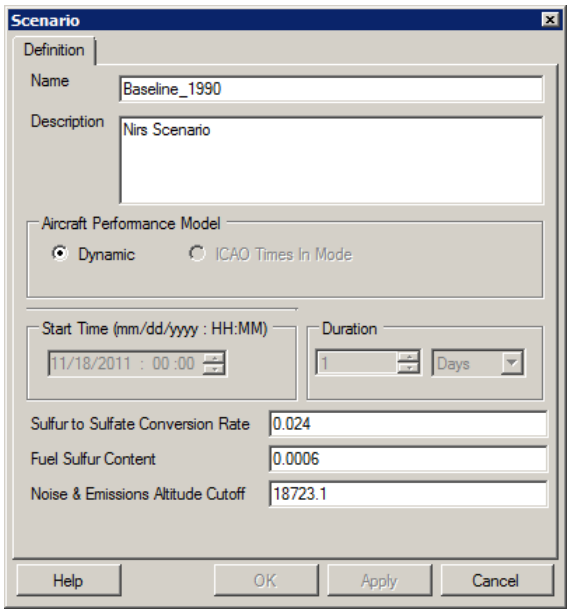


Figure 5-19 Scenario Dialog Box

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-31

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-32

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.

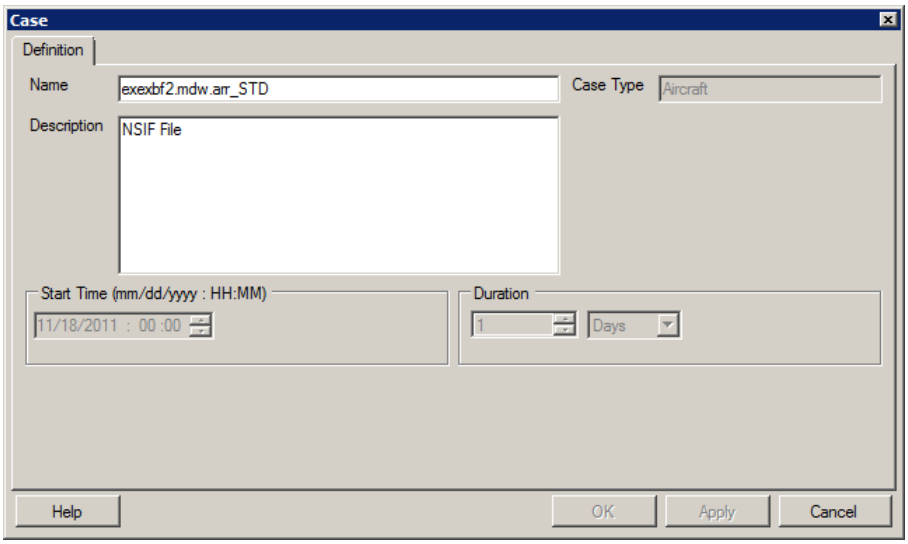


Figure 5-20 Case Dialog Box

Deletion of cases is not supported in AEDT2a. N-33

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-36

When creating overflight type operations in an ASIF (see the ASIF Reference Guide), 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-34

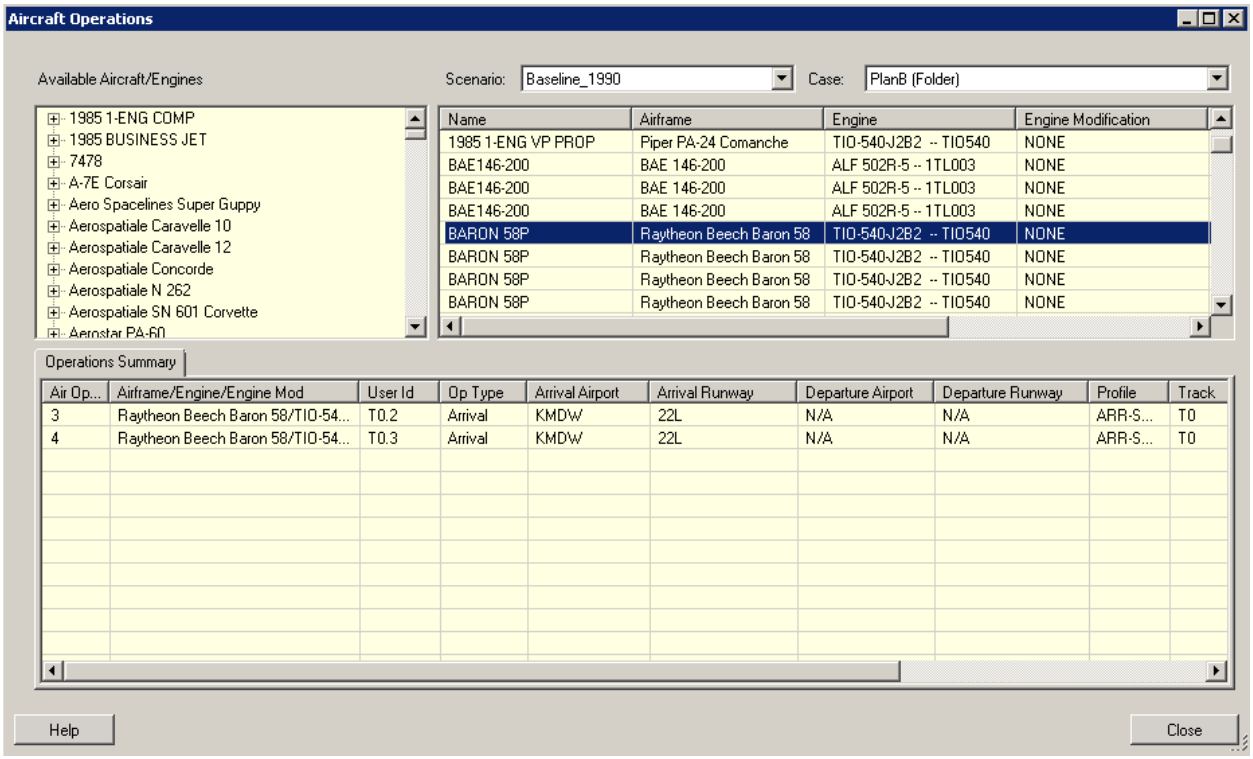


Figure 5-21 Aircraft Operations Dialog Box

A grey or yellow background in a dialog box indicates that the content is read-only. N-35

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 the ASIF Reference Guide for more information about the ASIF.

In AEDT2a, removing receptors in the GUI is not supported. N-36

In AEDT2a, population receptor sets can only be imported into a study through the ASIF or through the Population Import Tool (Appendix E). 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-37

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-37

   - 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-38

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-39

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-40

Receptor networks have a limit of 1 million points. N-38

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.

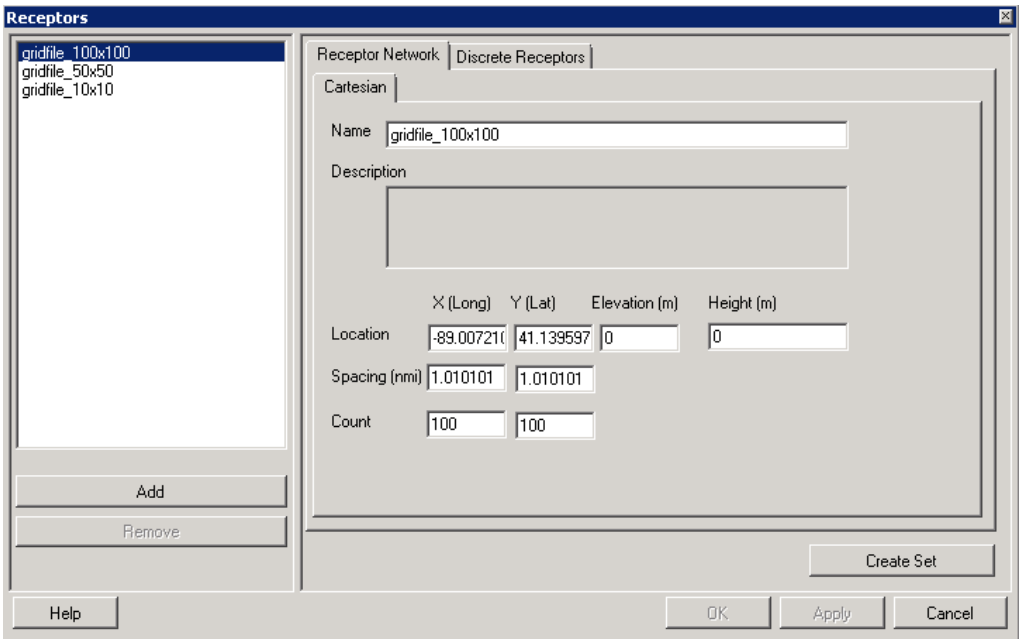


Figure 5-22 Receptors Dialog Box – Receptor Network Tab

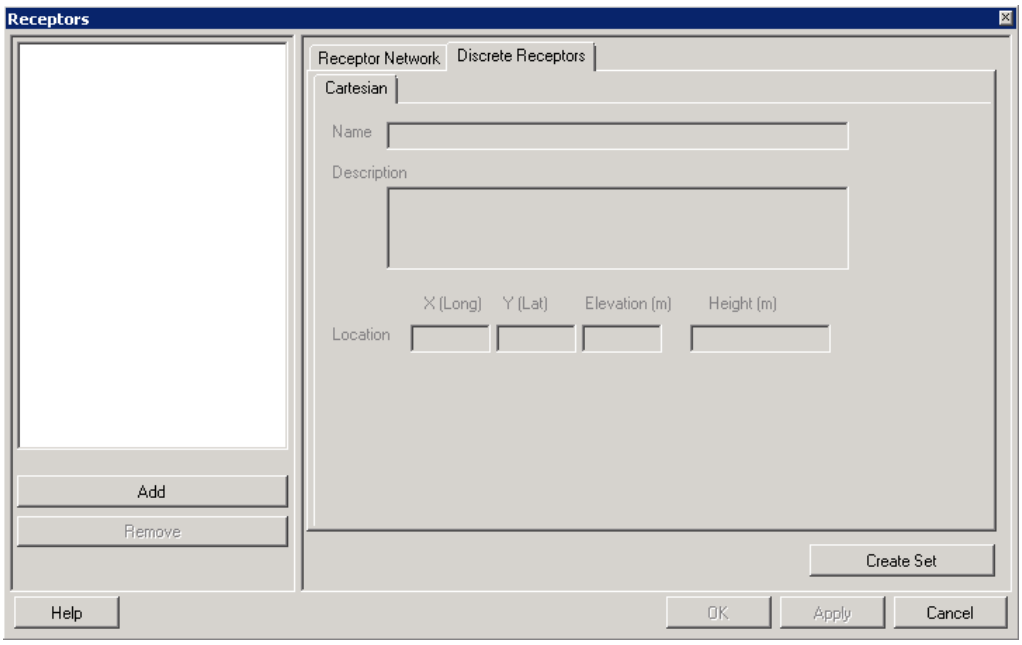


Figure 5-23 Receptors Dialog Box – Discrete Receptors Tab

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 the ASIF Reference Guide for more information about the ASIF.

In AEDT2a, removing receptor sets in the GUI is not supported. N-39

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-40

Receptor sets must have at least one receptor or population point and have a limit of 500,000 receptors. N-41

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.

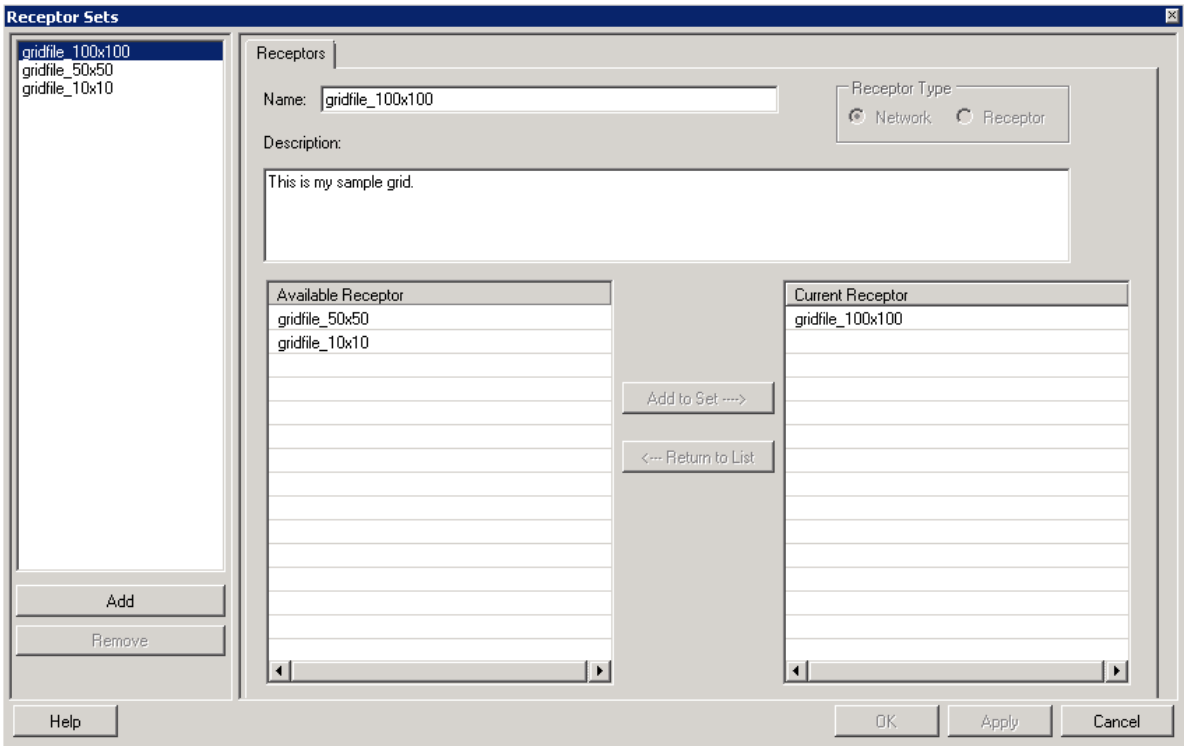


Figure 5-24 Receptor Sets Dialog Box

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-42

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-43

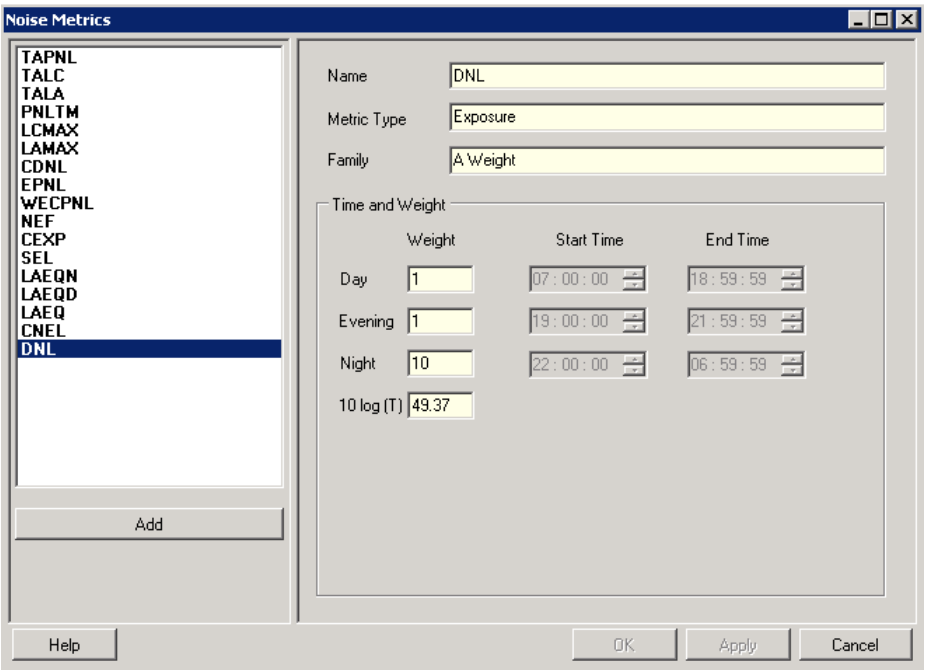


Figure 5-25 Noise Metrics Dialog Box

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-44

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 the ASIF Reference Guide.

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).

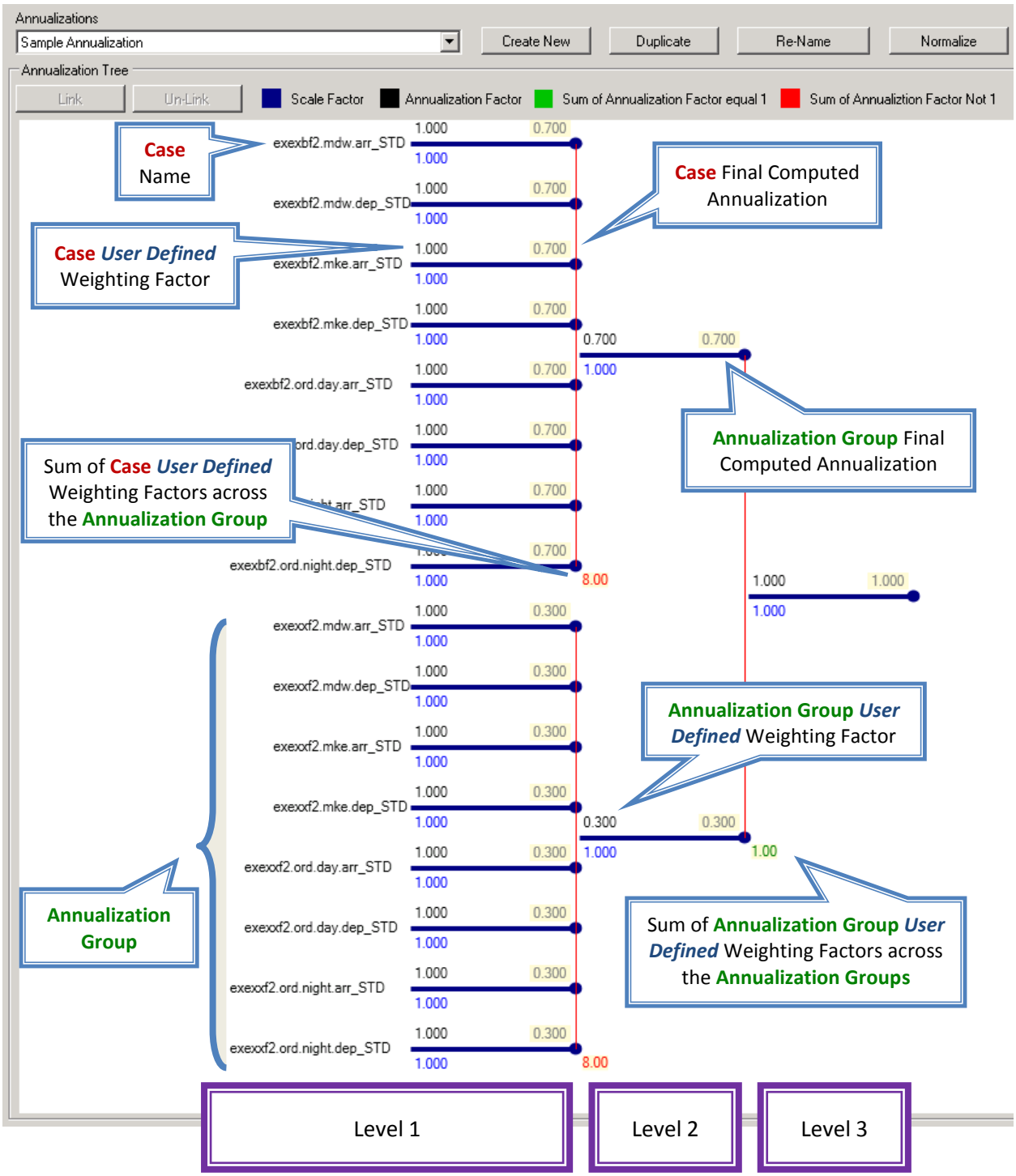


Figure 6-1 Annualization Tree

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*.

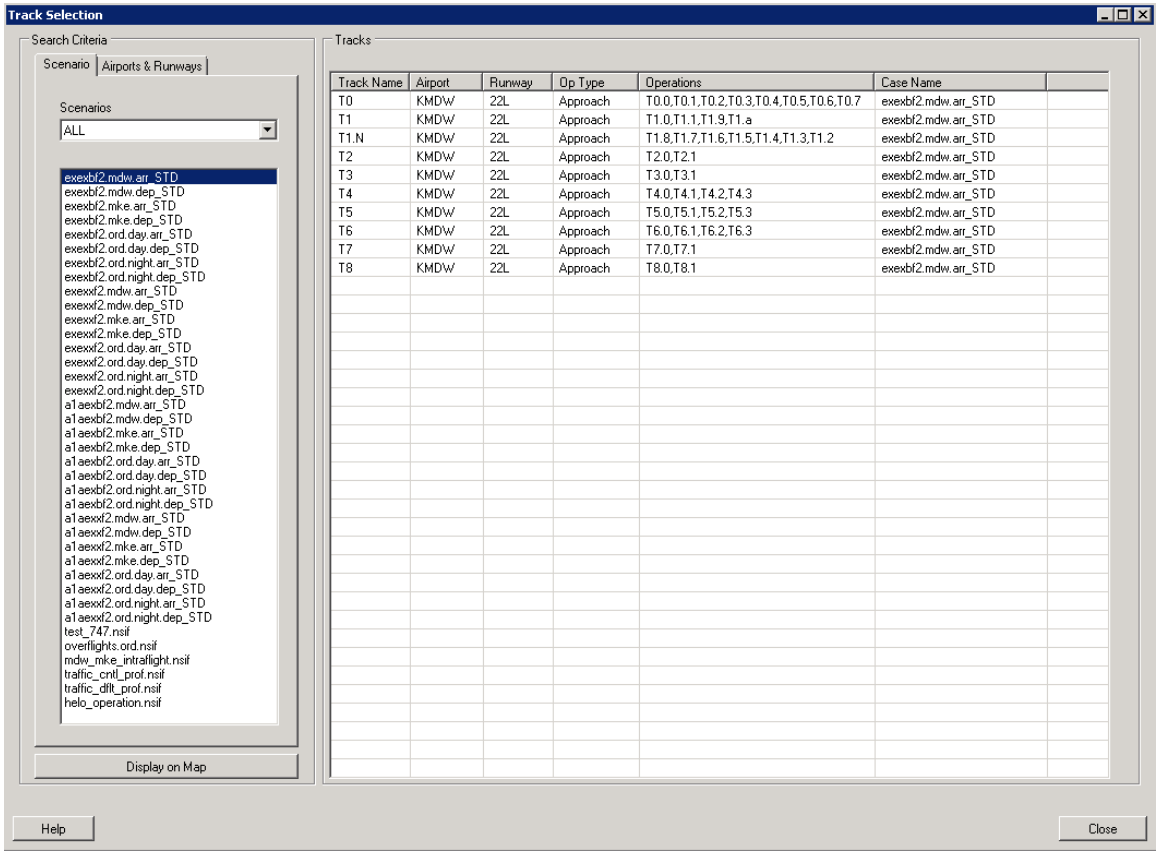


Figure 6-2 Track Selection Dialog Box

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-41

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-42

In AEDT2a, the study boundary must be created and/or modified through the ASIF, not through the GUI. See the ASIF Reference Guide for more detailed information on the ASIF. N-45

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.

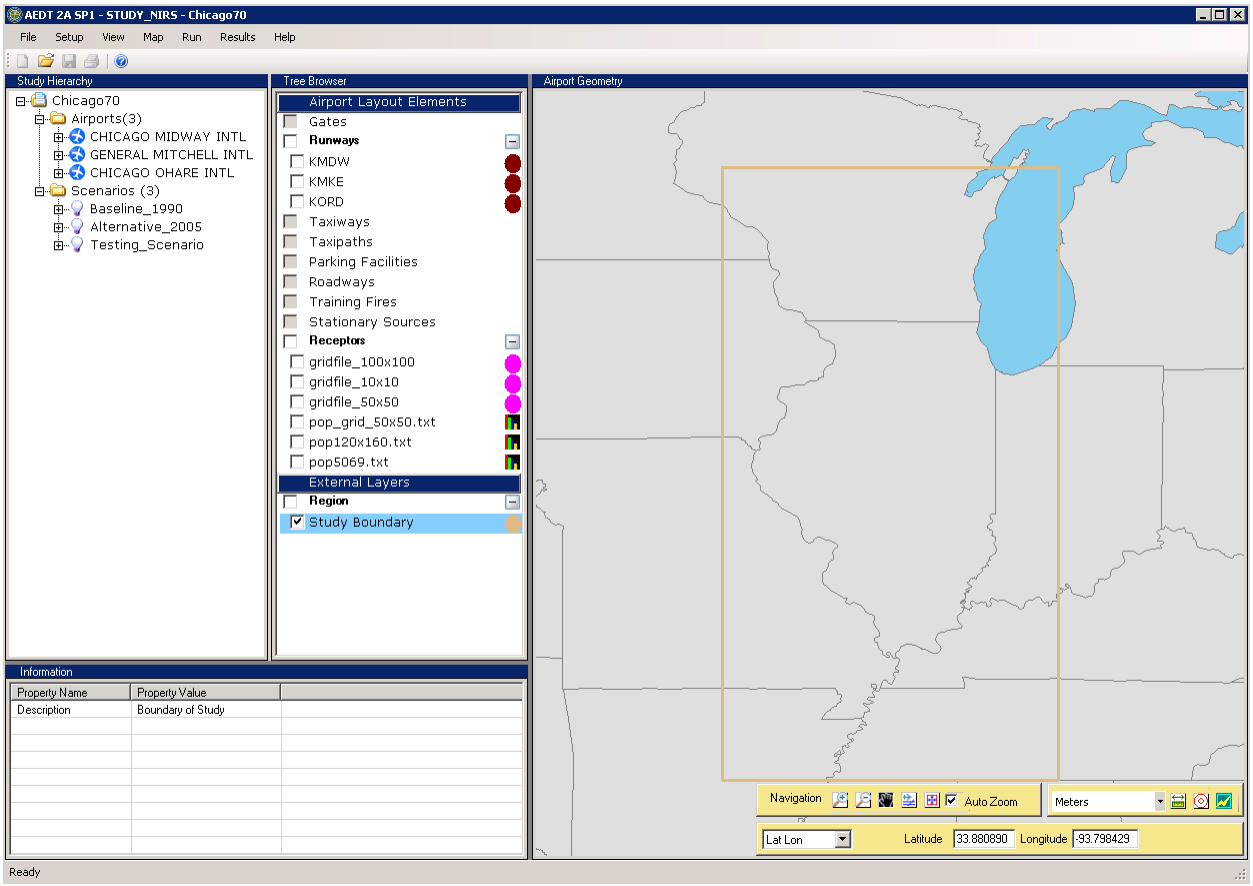


Figure 6-3 Study Boundary in Airport Geometry

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 H provides snapshots of example reports.

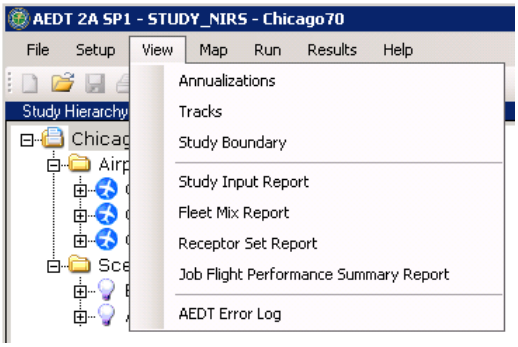


Figure 6-4 Input Reports from View Menu

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-43

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 H 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-46

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 H for a snapshot of an example report.
7. Units in the fleet mix report:
   - Number of operations on a user-selected report level.

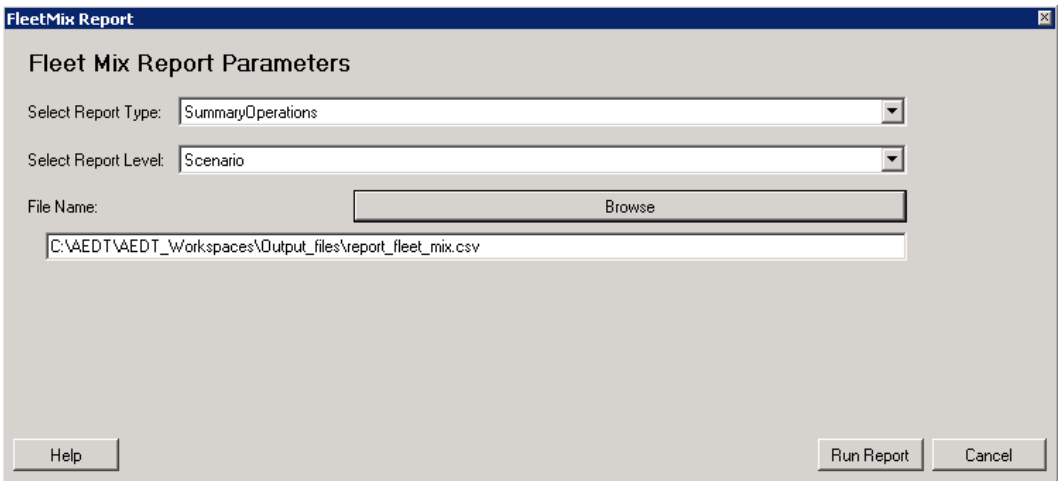


Figure 6-5 Fleet Mix Report Dialog Box

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 H for a snapshot of an example report.
7. Units in the receptor set report:
   - Altitude = feet.
   - Land use = percentage of area.

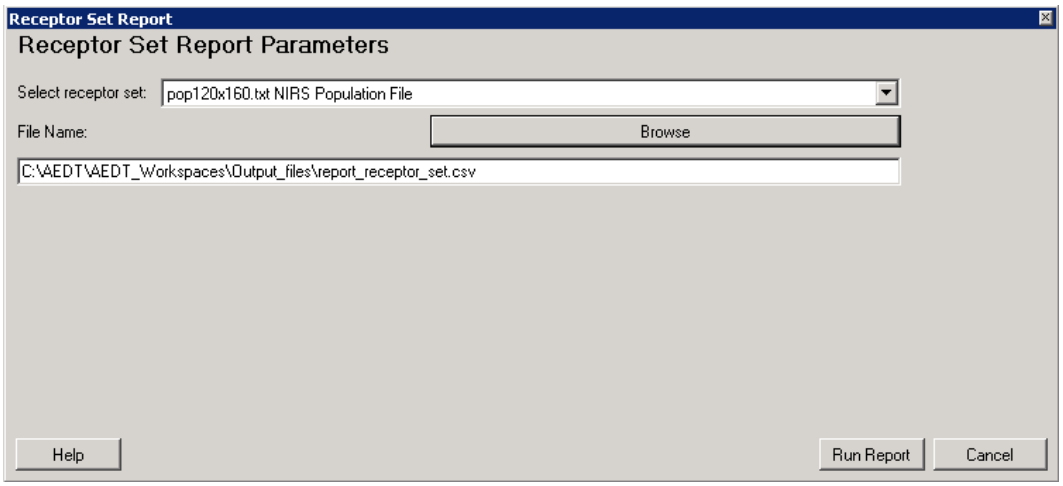


Figure 6-6 Receptor Set Report Dialog Box

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-47

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 H for a snapshot of an example report.

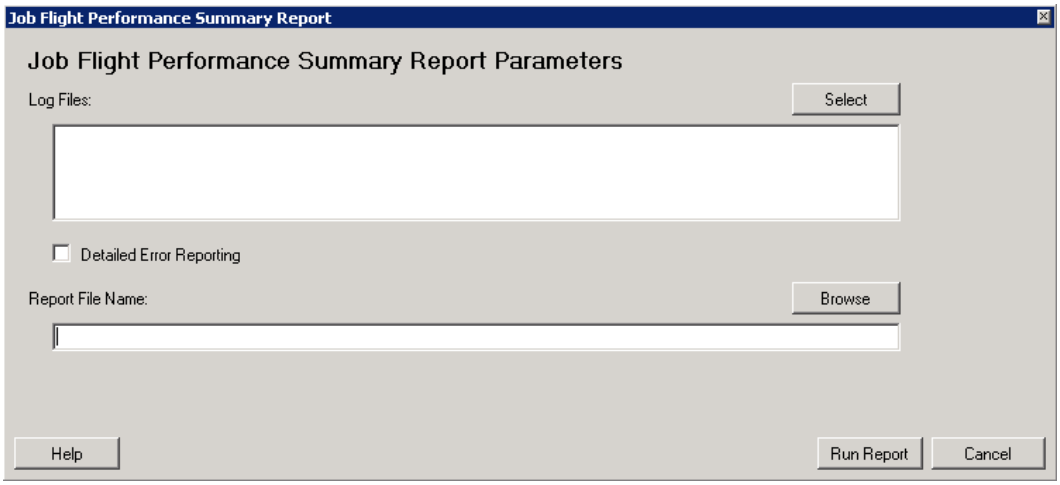


Figure 6-7 Job Flight Performance Summary Report Dialog Box

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-48

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 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. N-49

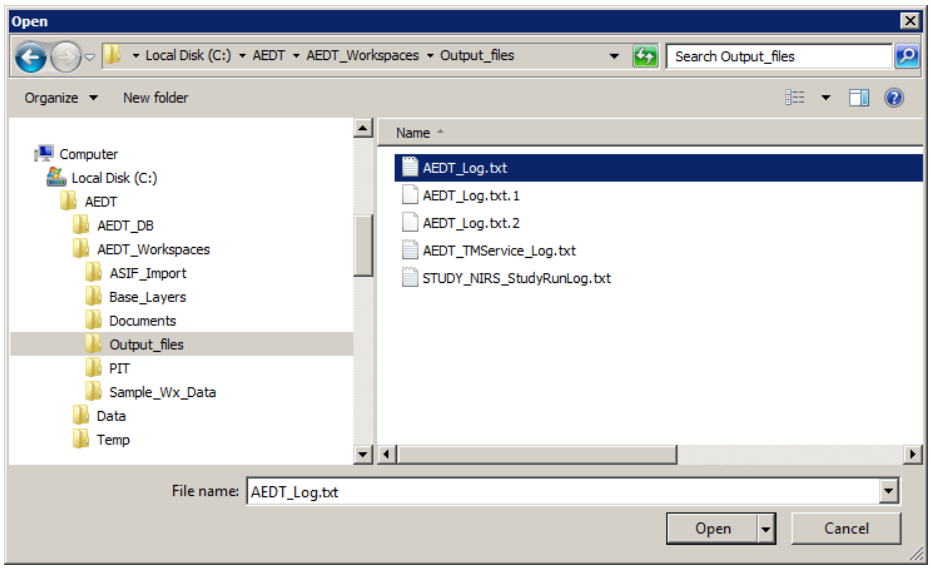
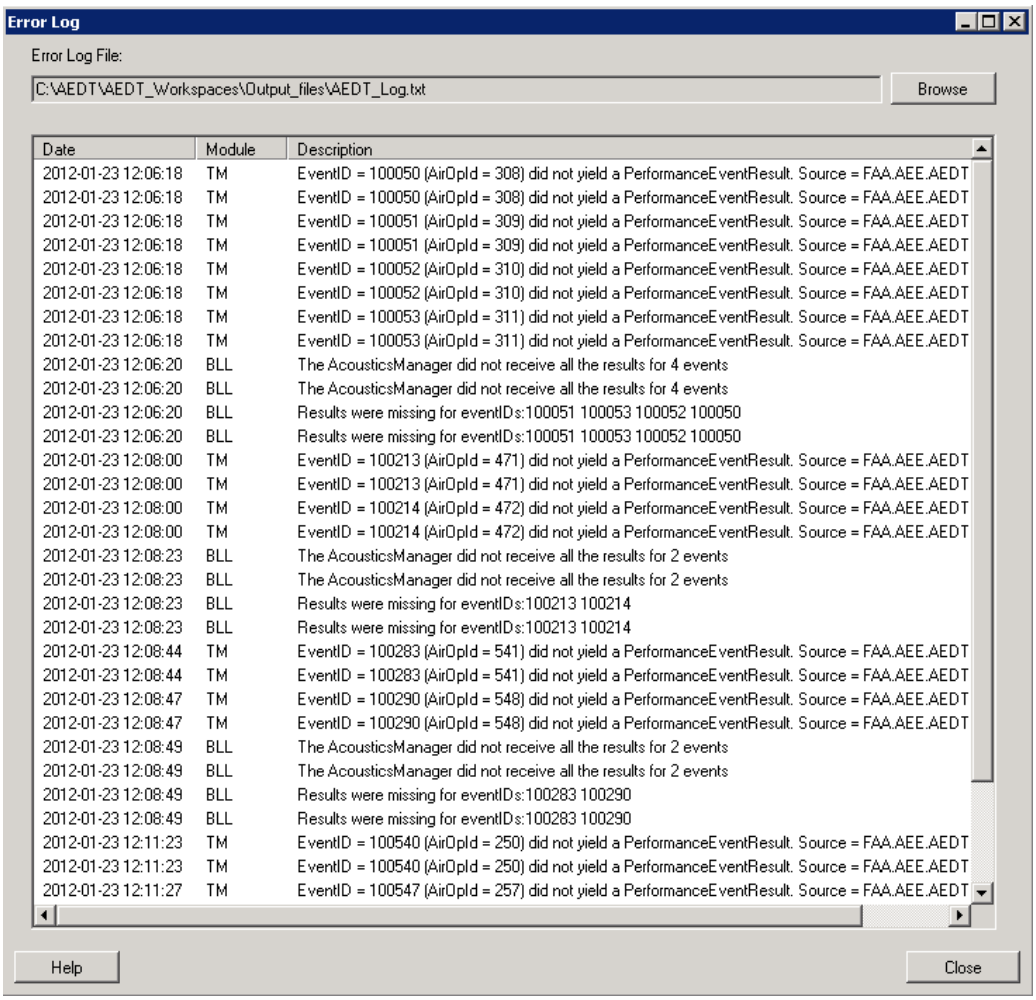


Figure 6-8 AEDT Log Files



Date	Module	Description
2012-01-23 12:06:18	TM	EventID = 100050 (AirOpId = 308) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:18	TM	EventID = 100050 (AirOpId = 308) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:18	TM	EventID = 100051 (AirOpId = 309) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:18	TM	EventID = 100051 (AirOpId = 309) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:18	TM	EventID = 100052 (AirOpId = 310) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:18	TM	EventID = 100052 (AirOpId = 310) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:18	TM	EventID = 100053 (AirOpId = 311) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:18	TM	EventID = 100053 (AirOpId = 311) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:06:20	BLL	The AcousticsManager did not receive all the results for 4 events
2012-01-23 12:06:20	BLL	The AcousticsManager did not receive all the results for 4 events
2012-01-23 12:06:20	BLL	Results were missing for eventIDs:100051 100053 100052 100050
2012-01-23 12:06:20	BLL	Results were missing for eventIDs:100051 100053 100052 100050
2012-01-23 12:08:00	TM	EventID = 100213 (AirOpId = 471) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:00	TM	EventID = 100213 (AirOpId = 471) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:00	TM	EventID = 100214 (AirOpId = 472) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:00	TM	EventID = 100214 (AirOpId = 472) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:23	BLL	The AcousticsManager did not receive all the results for 2 events
2012-01-23 12:08:23	BLL	The AcousticsManager did not receive all the results for 2 events
2012-01-23 12:08:23	BLL	Results were missing for eventIDs:100213 100214
2012-01-23 12:08:23	BLL	Results were missing for eventIDs:100213 100214
2012-01-23 12:08:44	TM	EventID = 100283 (AirOpId = 541) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:44	TM	EventID = 100283 (AirOpId = 541) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:47	TM	EventID = 100290 (AirOpId = 548) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:47	TM	EventID = 100290 (AirOpId = 548) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:08:49	BLL	The AcousticsManager did not receive all the results for 2 events
2012-01-23 12:08:49	BLL	The AcousticsManager did not receive all the results for 2 events
2012-01-23 12:08:49	BLL	Results were missing for eventIDs:100283 100290
2012-01-23 12:08:49	BLL	Results were missing for eventIDs:100283 100290
2012-01-23 12:11:23	TM	EventID = 100540 (AirOpId = 250) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:11:23	TM	EventID = 100540 (AirOpId = 250) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT
2012-01-23 12:11:27	TM	EventID = 100547 (AirOpId = 257) did not yield a PerformanceEventResult. Source = FAA.AEE.AEDT

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-50

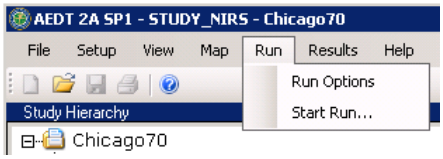


Figure 7-1 Run Options from Run Menu

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-51

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-52

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-44

*Terrain data are only supported if they are in one of the following projections: NAD83 or WGS84. N-53

Negative values are not supported in the fill terrain field in the *Run Options* dialog box. N-54

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-55

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.

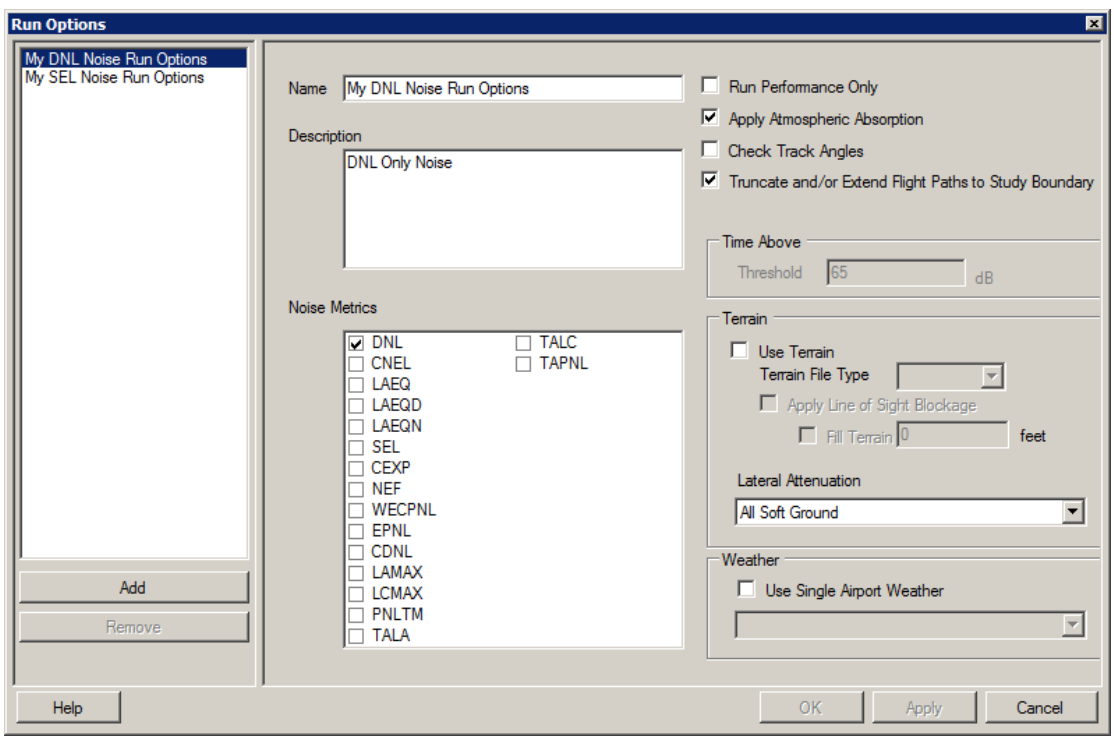


Figure 7-2 Run Options Dialog Box

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-45

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 the ASIF Reference Guide 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 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-46

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 W-47

intra-study flights. For more information on intra-study flights and how to import sensor path trajectory data into the study, see the ASIF Reference Guide.

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 E 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.

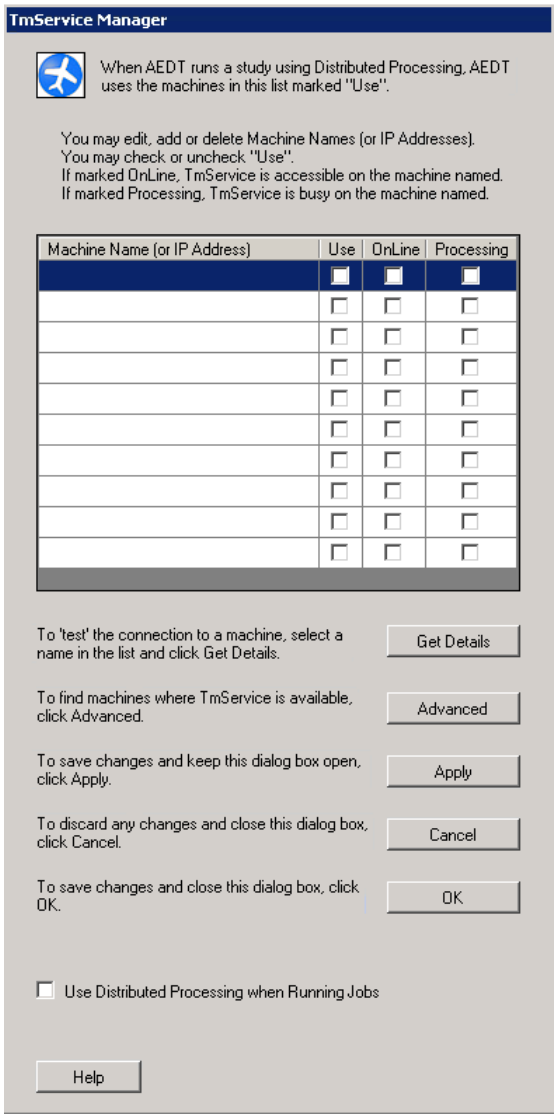


Figure 7-3 TmService Manager Dialog Box

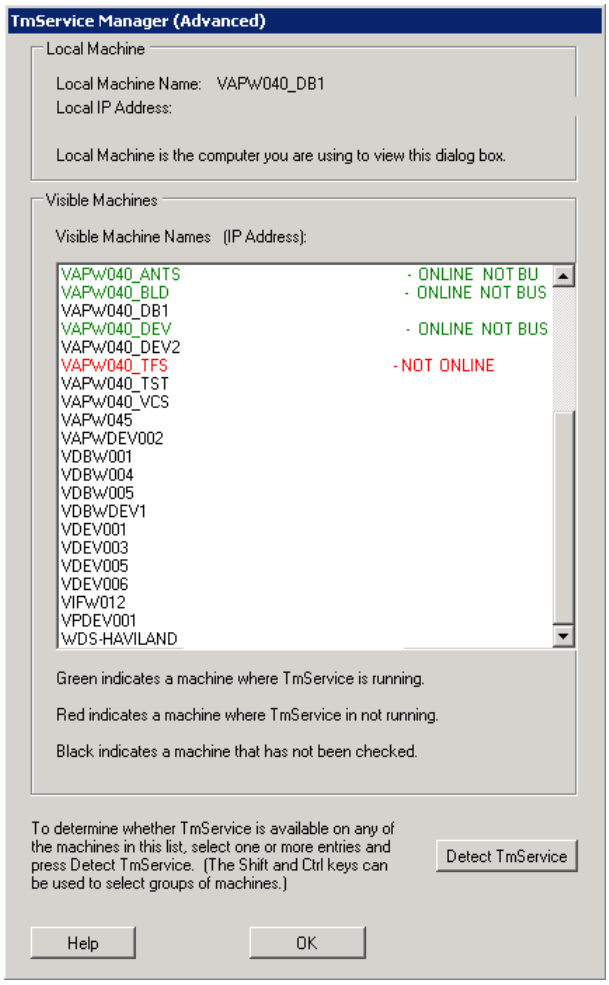


Figure 7-4 TmService Manager (Advanced) Dialog Box

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-56

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.

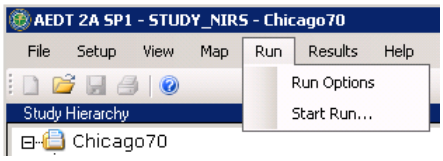


Figure 7-5 Run Menu

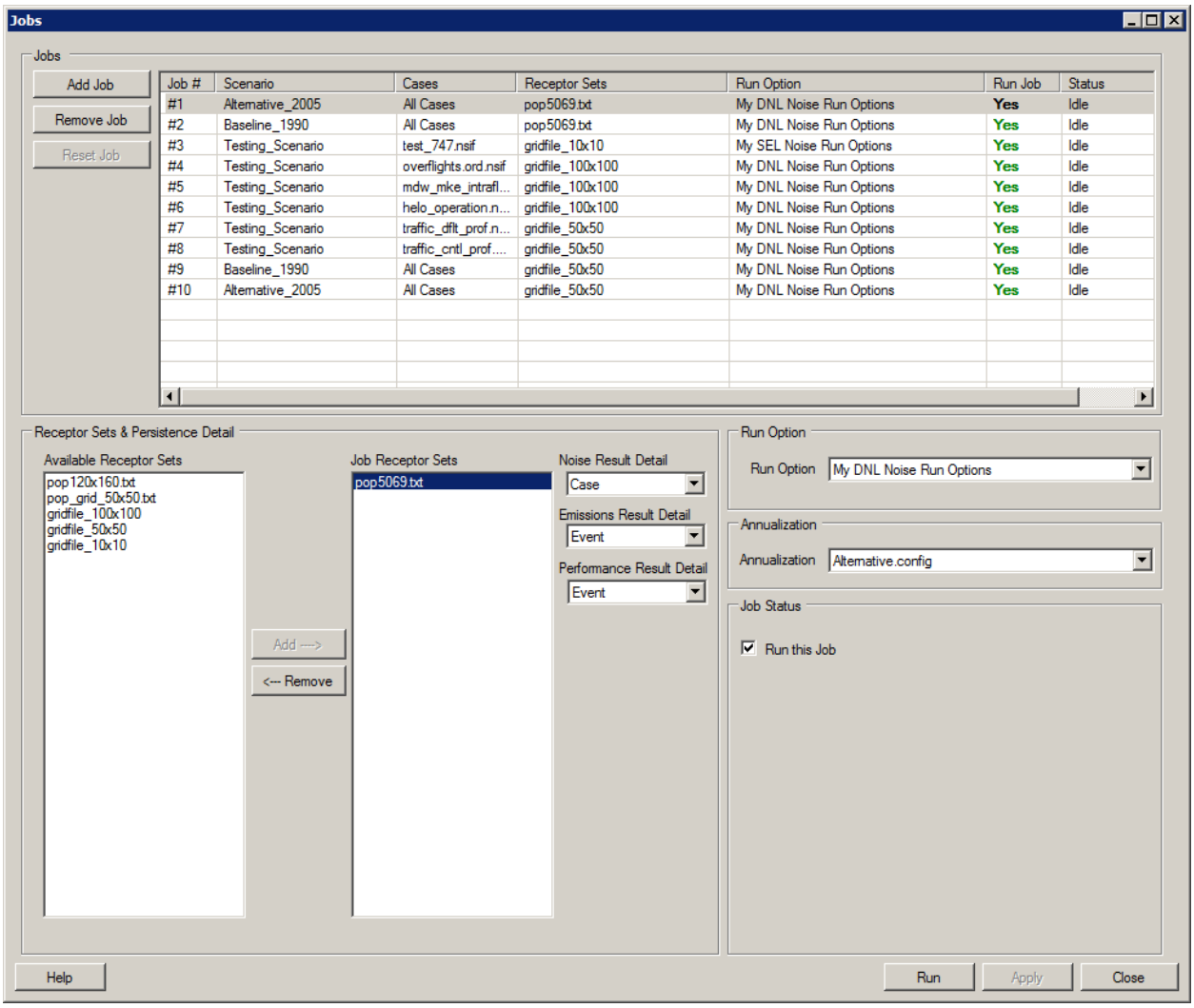


Figure 7-6 Jobs Dialog Box

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.

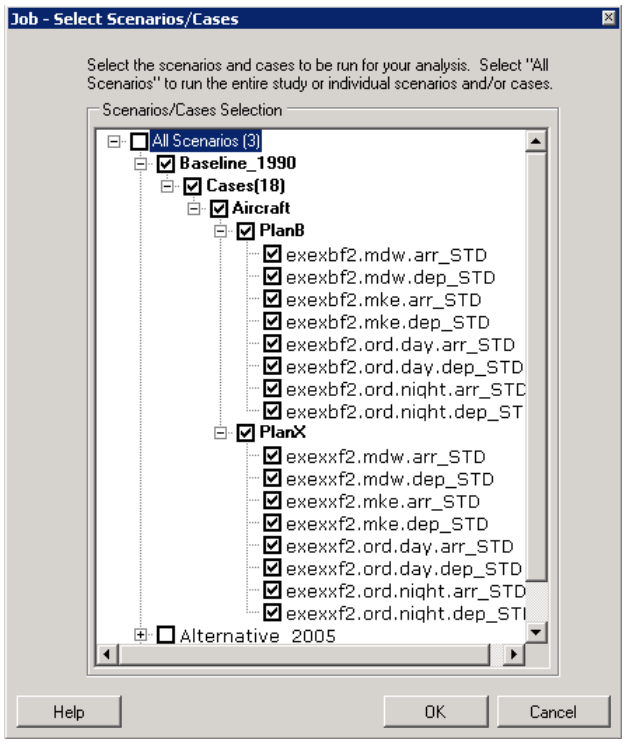


Figure 7-7 Job – Select Scenarios/Cases Dialog Box

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,* individual flight level noise data and case level noise accumulations are stored in the study database. Only the 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-57

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-58

Annualization contours are constructed from the database using case level noise accumulations across a scenario. N-59

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-60

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.

Noise data are not computed if run performance only is selected when defining run options. N-61

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-62

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 J 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

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-48

The progress bar may not advance in the Processing Jobs Status dialog box; the case names will update. W-49

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-50

It is not recommended to change any settings associated to a job while it is running. W-51

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-63

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-64

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-65

To view persistence detail of a completed job, select the desired job, then select the job receptor set of interest. N-66

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 F.

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-52

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-53

When the completed job results have been reset, the change analysis and impact sets associated with that job will be deleted. N-67

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.

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 views 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 the application and restart, after which the user should be able to resume viewing performance results. W-54

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

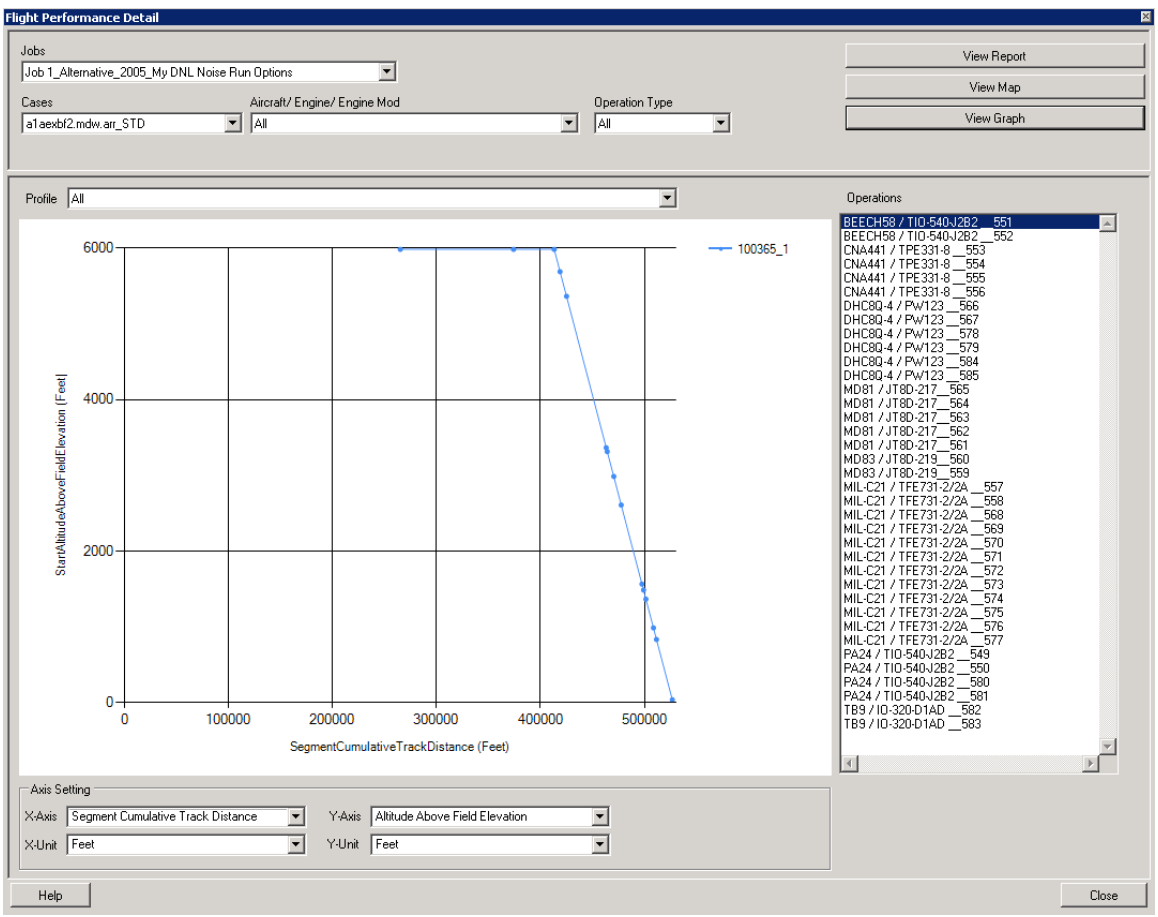


Figure 8-1 Flight Performance Detail Dialog Box

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 H 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 (per engine)
   - noise thrust = pounds (per engine)
   - delta thrust = pounds (per engine)
   - bank angle = angle in degrees
   - duratn = seconds
   - AAD fuel-burn = kg (per airframe)

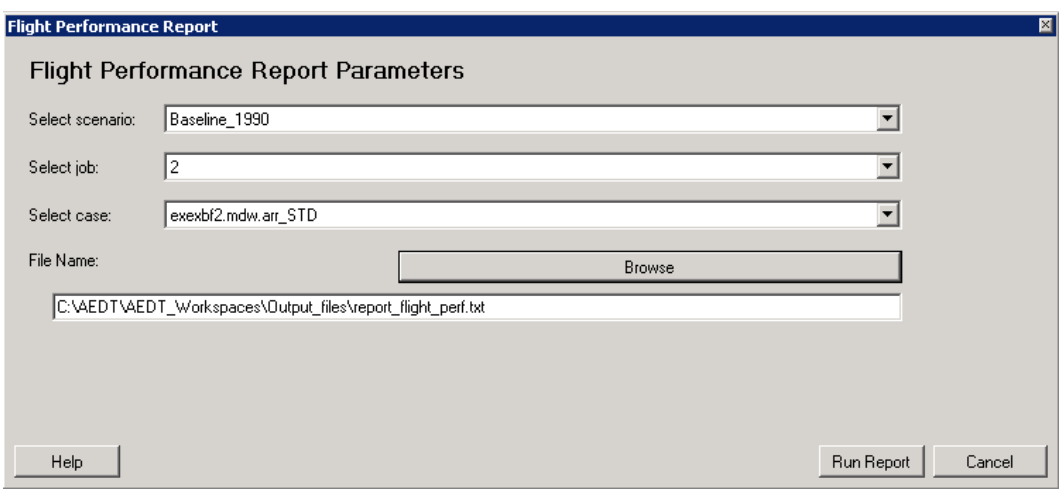


Figure 8-2 Flight Performance Report Dialog Box

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 operations on tracks defined by sensor path data. If this occurs, an exception will appear during the W-55

generation of the flight performance report. It will indicate that an error has occurred and the message will begin with the following two lines:

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. Locate the *PerformanceResultsPageSize* section.

   <add key="PerformanceResultsPageSize" value="5000"/>
6. Reduce the number of pages.

   <add key="PerformanceResultsPageSize" value="100"/>
7. 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-56

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 the ASIF Reference Guide 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 N-68

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.

If the flight performance map does not appear in the Airport Geometry, navigate to the relevant airport layout in the Study Hierarchy. N-69

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-70

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-71

- 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-72

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-57

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-73

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.

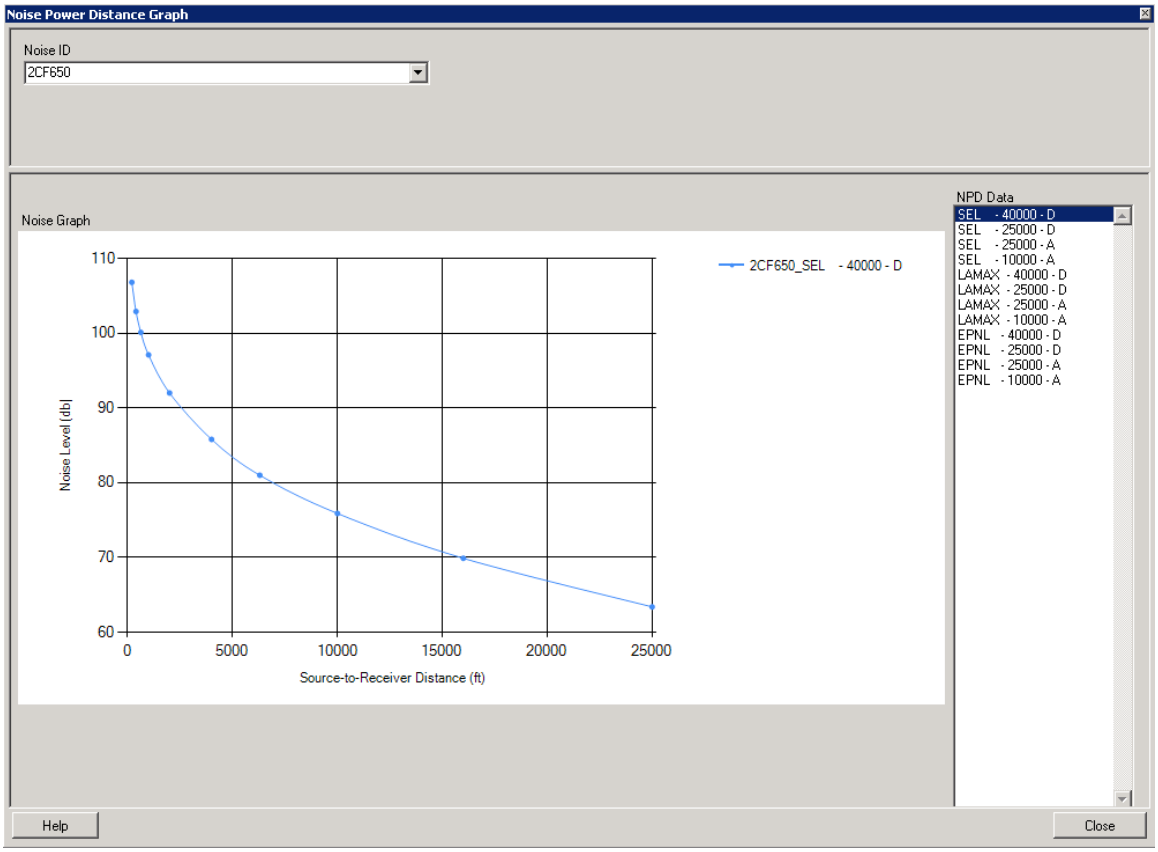


Figure 8-3 Noise Power Distance Graph Dialog Box

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-74

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-58

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.

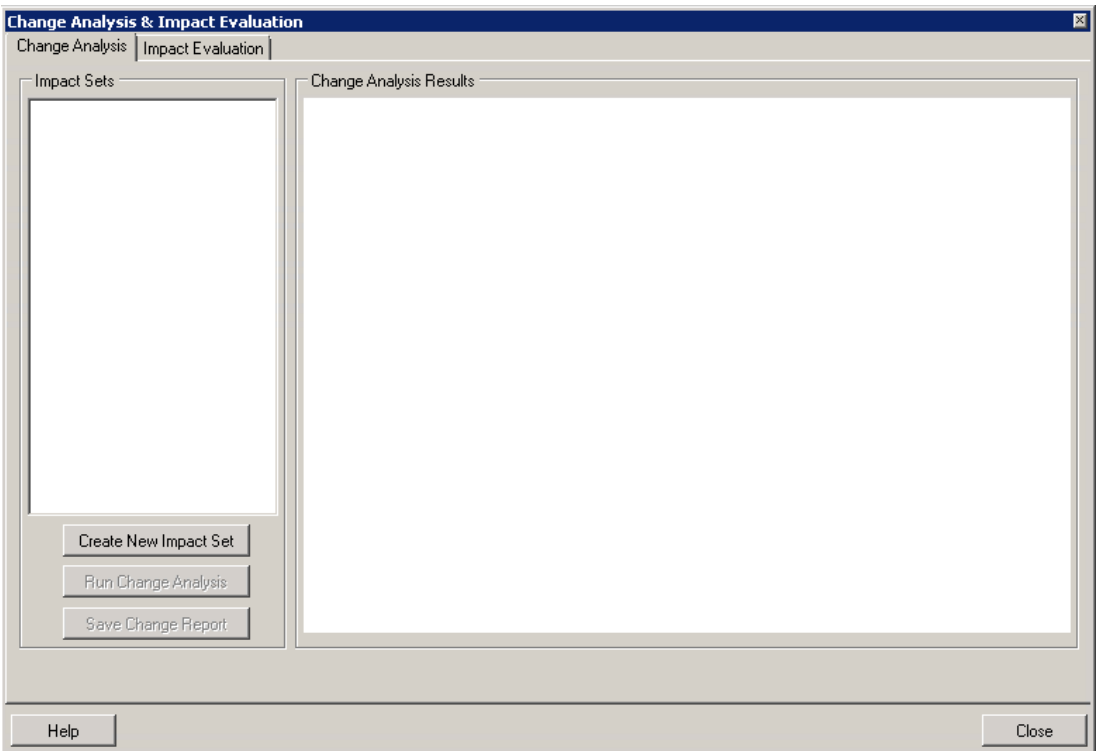


Figure 8-4 Change Analysis & Impact Evaluation Dialog Box

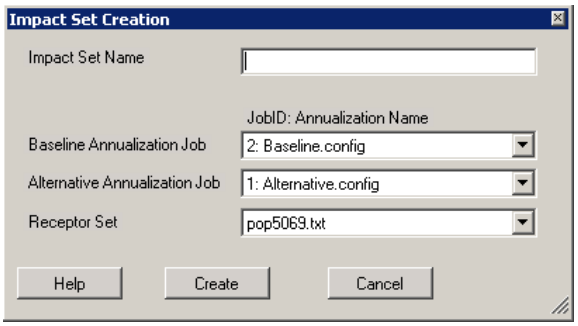


Figure 8-5 Impact Set Creation Dialog Box

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.

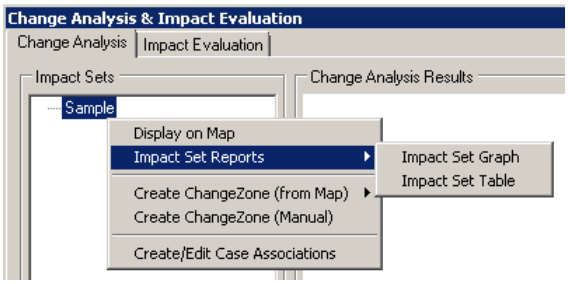


Figure 8-6 Impact Set Reports Options

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.

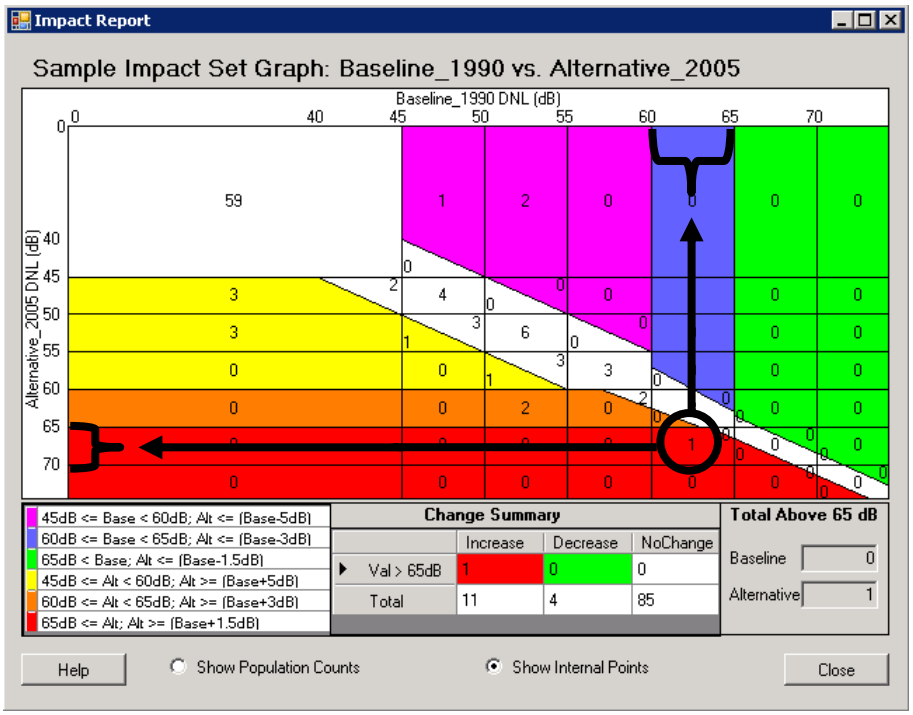


Figure 8-7 Impact Set Graph

8.3.2.1.2 Impact Set Table

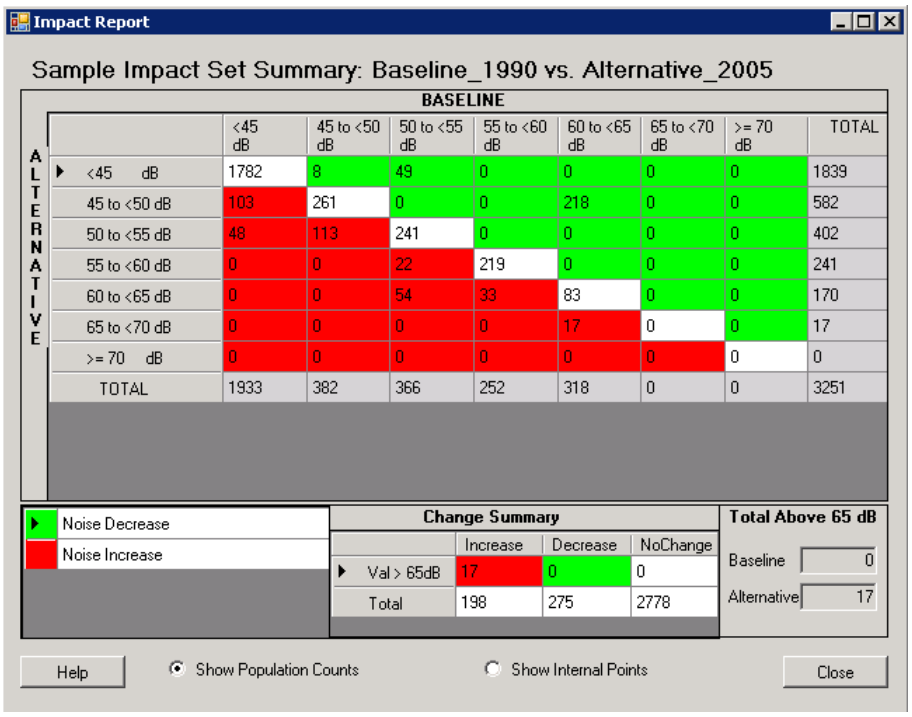
NOISE

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.



ALTERNATIVE \ BASELINE	<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

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

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-75

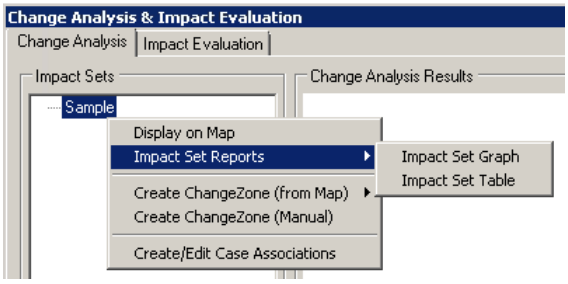


Figure 8-9 Change Analysis Impact Set Options

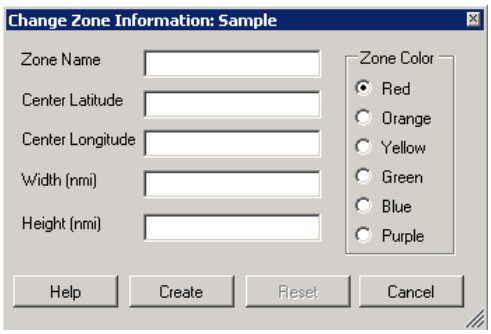


Figure 8-10 Change Zone Information Dialog Box

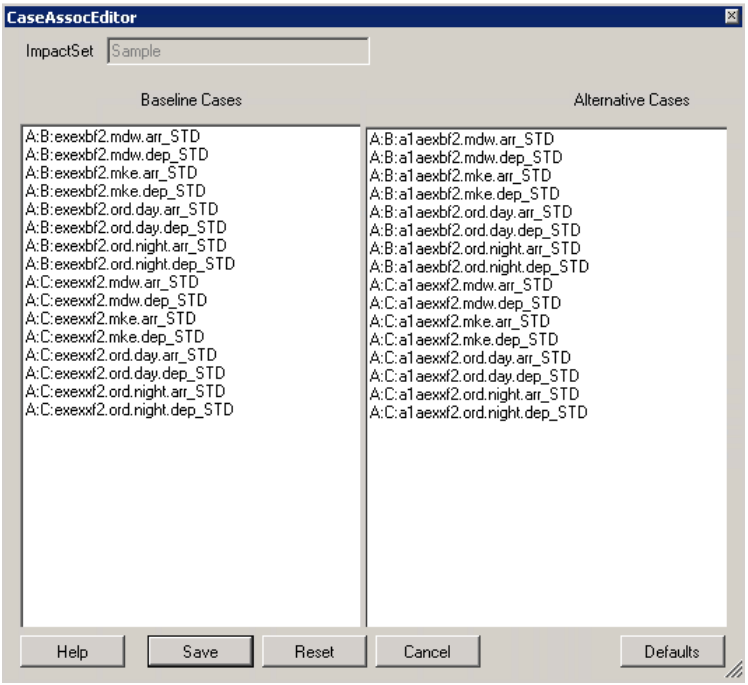


Figure 8-11 Case Association Editor Dialog Box

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.

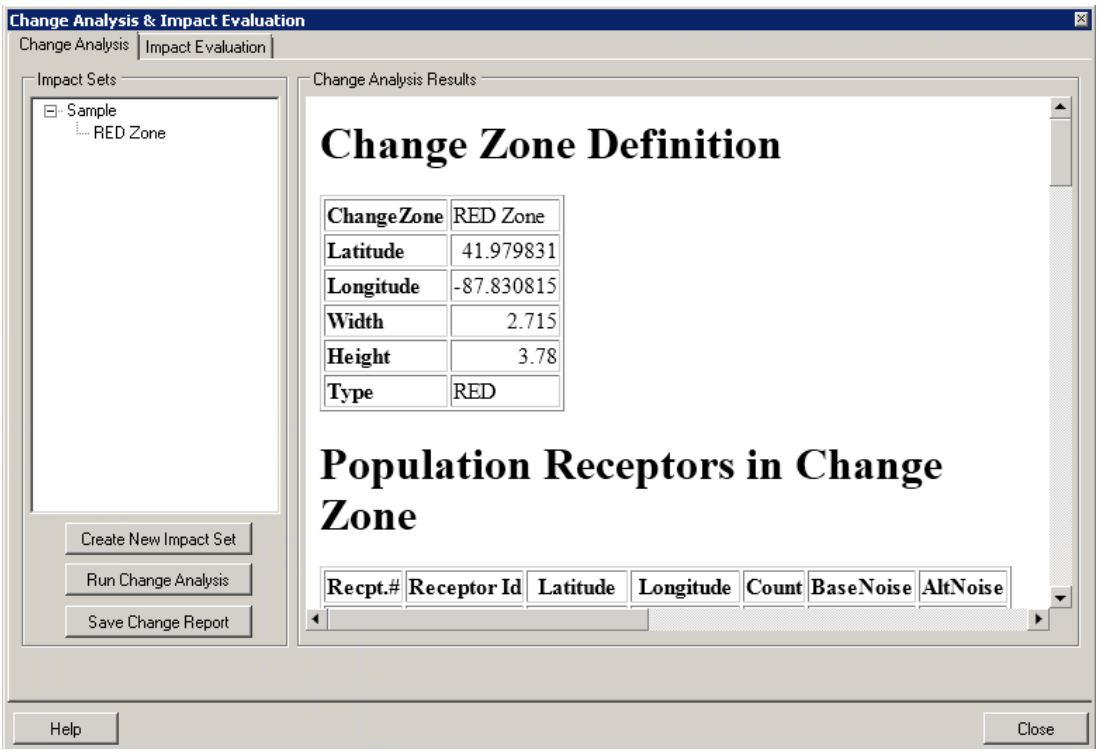


Figure 8-12 Change Analysis Results

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 analysis is not relevant for that change zone. W-59

- **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-76

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-77

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.

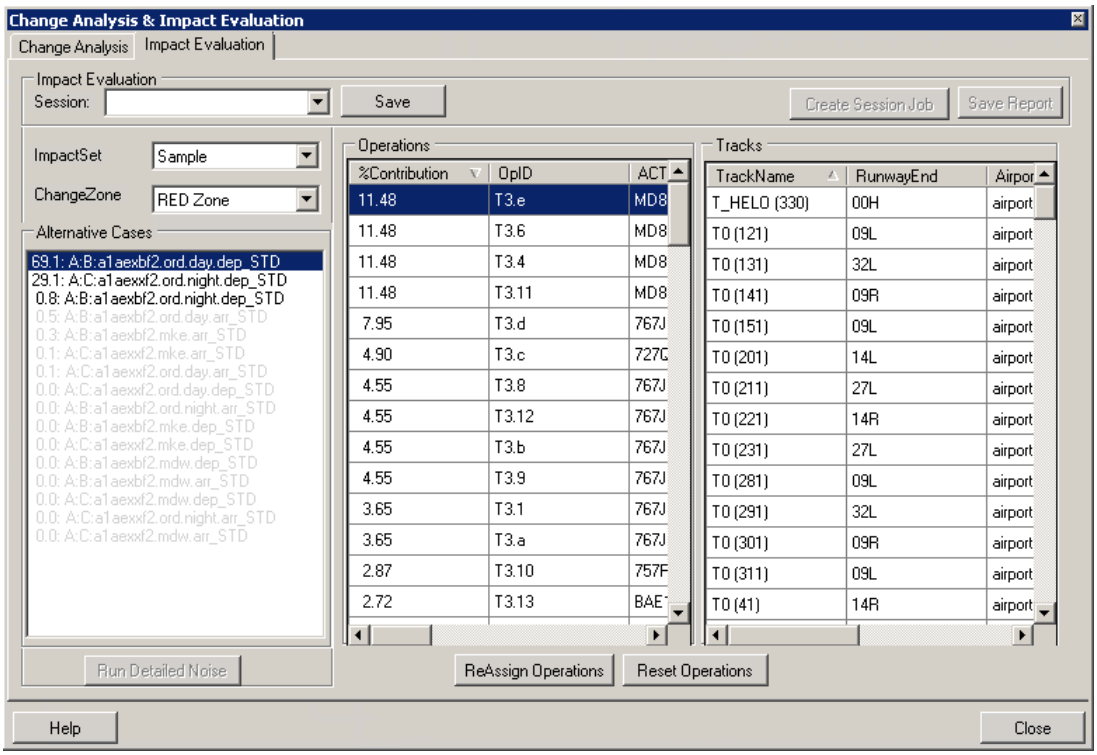


Figure 8-13 Change Analysis & Impact Evaluation Dialog Box

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-78

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).

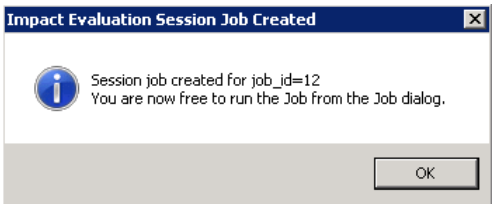


Figure 8-14 Impact Evaluation Session Job Created Message Box

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.

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-79

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.

Scenario-level noise contours can only be viewed for scenarios with annualization. Case-level noise contours can be viewed without annualization. W-60

Noise contours can only be generated from jobs run with grid receptors and not with population receptors. W-61

Grid spacing must be the same in the x and y directions in order for contours to generate. W-62

It is not recommended to generate contours covering more than 100 miles in any direction. W-63

Generating contour graphic in Airport Geometry may take longer than expected. W-64

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-80

Low resolution receptors, either location points or grids, are not commensurate with plotting of contours. W-65

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-66

- 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-81

- 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-82

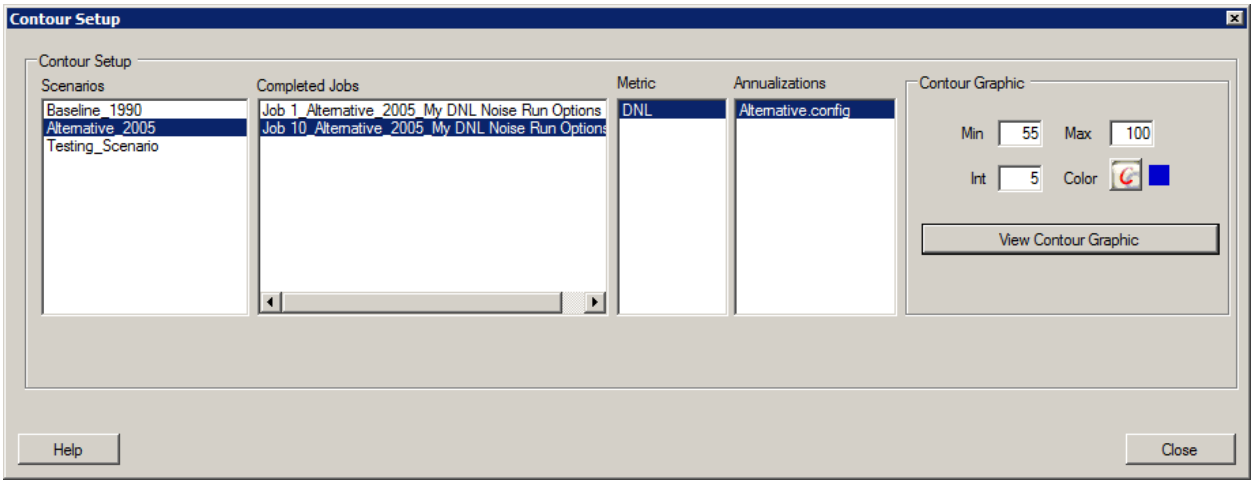


Figure 8-15 Contour Setup Dialog Box

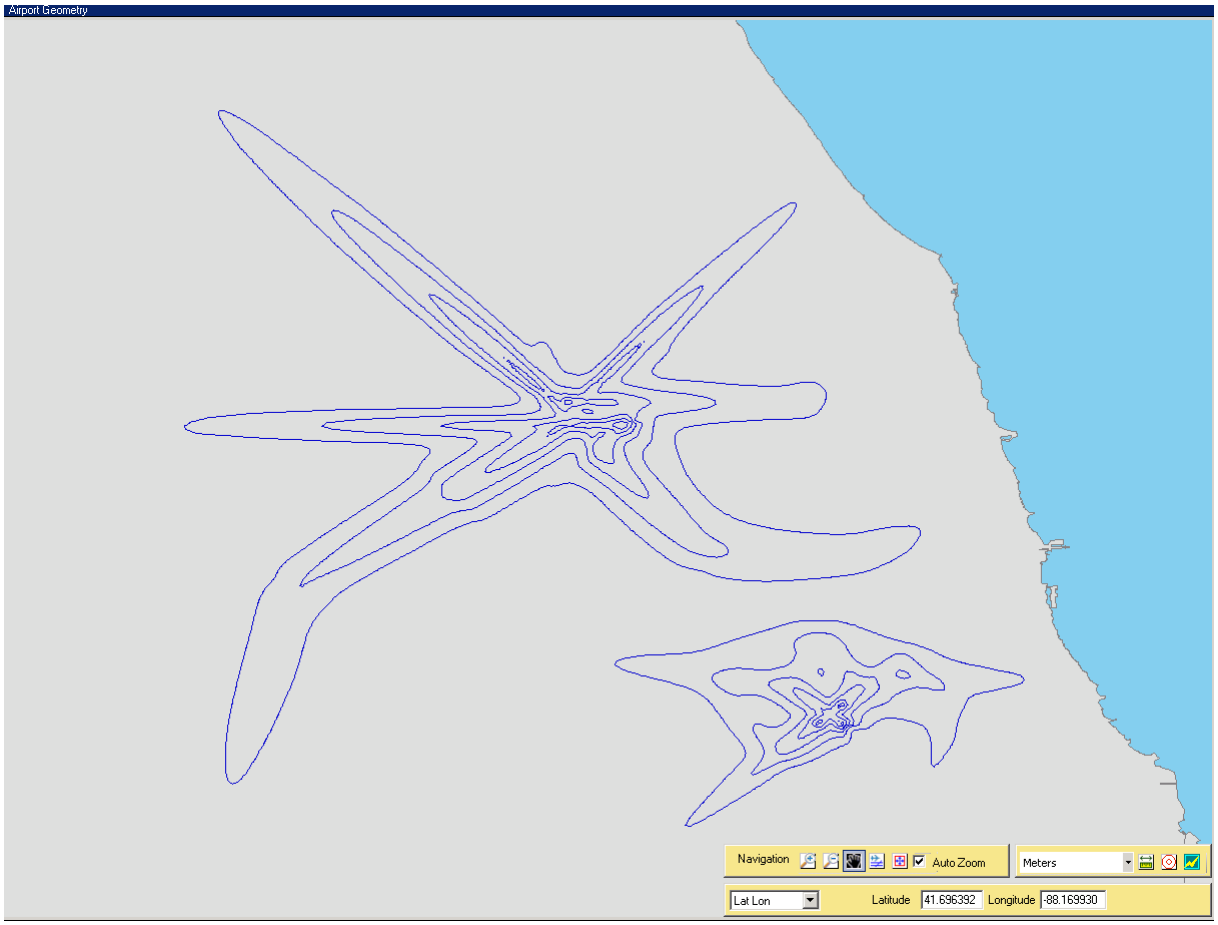


Figure 8-16 Noise Contour Shown in the Airport Geometry

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.

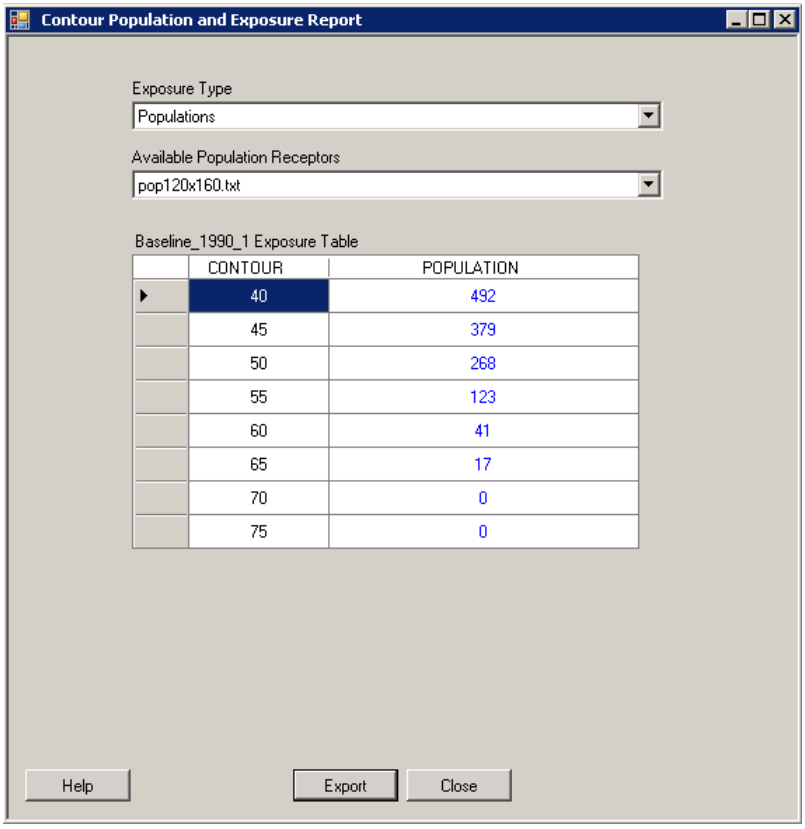


Figure 8-17 Contour Population and Exposure Report Dialog Box

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-83

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 H provides a snapshot of an example report.

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 operations on tracks defined by sensor path data. If this occurs, an exception will appear during the generation of the emissions report. It will indicate that an error has occurred and the message will begin with the following two lines: W-67

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.

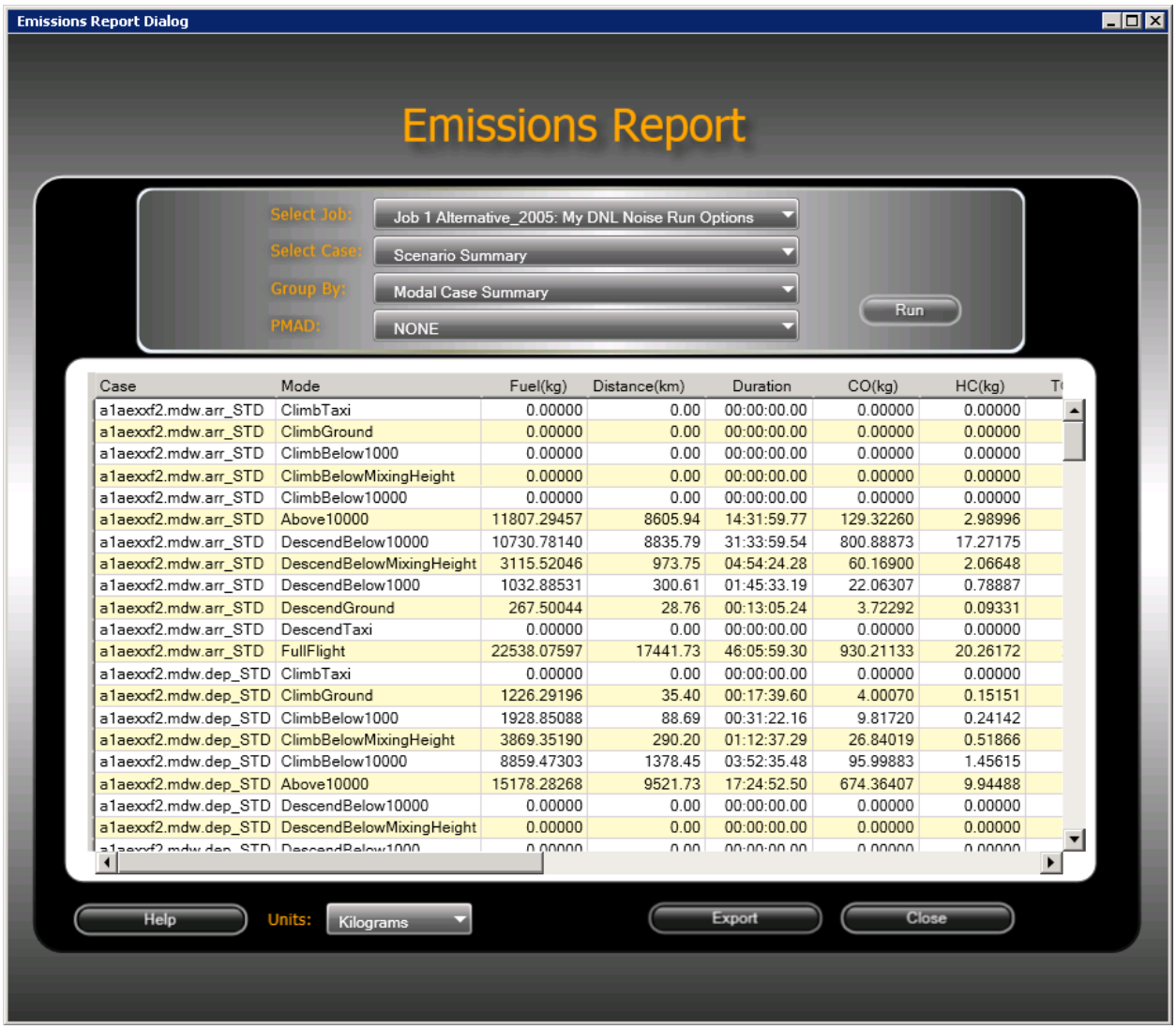
1. Close out of AEDT.
2. Open the configuration file C:\AEDT\FAA.AEE.AEDT.AEDTApp.exe.config.
3. Locate the *ResultsIteratorPageSize* section.

   <add key ="ResultsIteratorPageSize" value ="1000"/>
4. Reduce the number of pages.

   <add key ="ResultsIteratorPageSize" value ="10"/>
5. Locate the *PerformanceResultsPageSize* section.

   <add key="PerformanceResultsPageSize" value="5000"/>
6. Reduce the number of pages.

   <add key="PerformanceResultsPageSize" value="100"/>
7. Save the changes and close out of the configuration file.



Case	Mode	Fuel(kg)	Distance(km)	Duration	CO(kg)	HC(kg)
a1aexxf2.mdw.arr_STD	ClimbTaxi	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.arr_STD	ClimbGround	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.arr_STD	ClimbBelow1000	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.arr_STD	ClimbBelowMixingHeight	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.arr_STD	ClimbBelow10000	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.arr_STD	Above10000	11807.29457	8605.94	14:31:59.77	129.32260	2.98996
a1aexxf2.mdw.arr_STD	DescendBelow10000	10730.78140	8835.79	31:33:59.54	800.88873	17.27175
a1aexxf2.mdw.arr_STD	DescendBelowMixingHeight	3115.52046	973.75	04:54:24.28	60.16900	2.06648
a1aexxf2.mdw.arr_STD	DescendBelow1000	1032.88531	300.61	01:45:33.19	22.06307	0.78887
a1aexxf2.mdw.arr_STD	DescendGround	267.50044	28.76	00:13:05.24	3.72292	0.09331
a1aexxf2.mdw.arr_STD	DescendTaxi	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.arr_STD	FullFlight	22538.07597	17441.73	46:05:59.30	930.21133	20.26172
a1aexxf2.mdw.dep_STD	ClimbTaxi	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.dep_STD	ClimbGround	1226.29196	35.40	00:17:39.60	4.00070	0.15151
a1aexxf2.mdw.dep_STD	ClimbBelow1000	1928.85088	88.69	00:31:22.16	9.81720	0.24142
a1aexxf2.mdw.dep_STD	ClimbBelowMixingHeight	3869.35190	290.20	01:12:37.29	26.84019	0.51866
a1aexxf2.mdw.dep_STD	ClimbBelow10000	8859.47303	1378.45	03:52:35.48	95.99883	1.45615
a1aexxf2.mdw.dep_STD	Above10000	15178.28268	9521.73	17:24:52.50	674.36407	9.94488
a1aexxf2.mdw.dep_STD	DescendBelow10000	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.dep_STD	DescendBelowMixingHeight	0.00000	0.00	00:00:00.00	0.00000	0.00000
a1aexxf2.mdw.dep_STD	DescendBelow1000	0.00000	0.00	00:00:00.00	0.00000	0.00000

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 I for more information on annual schedules.

8.6 Noise Exposure Report

NOISE

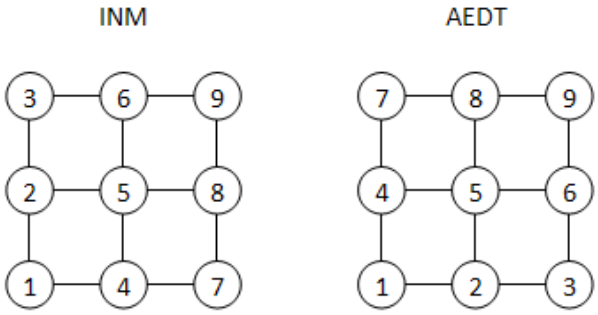
To view the noise exposure report:

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.

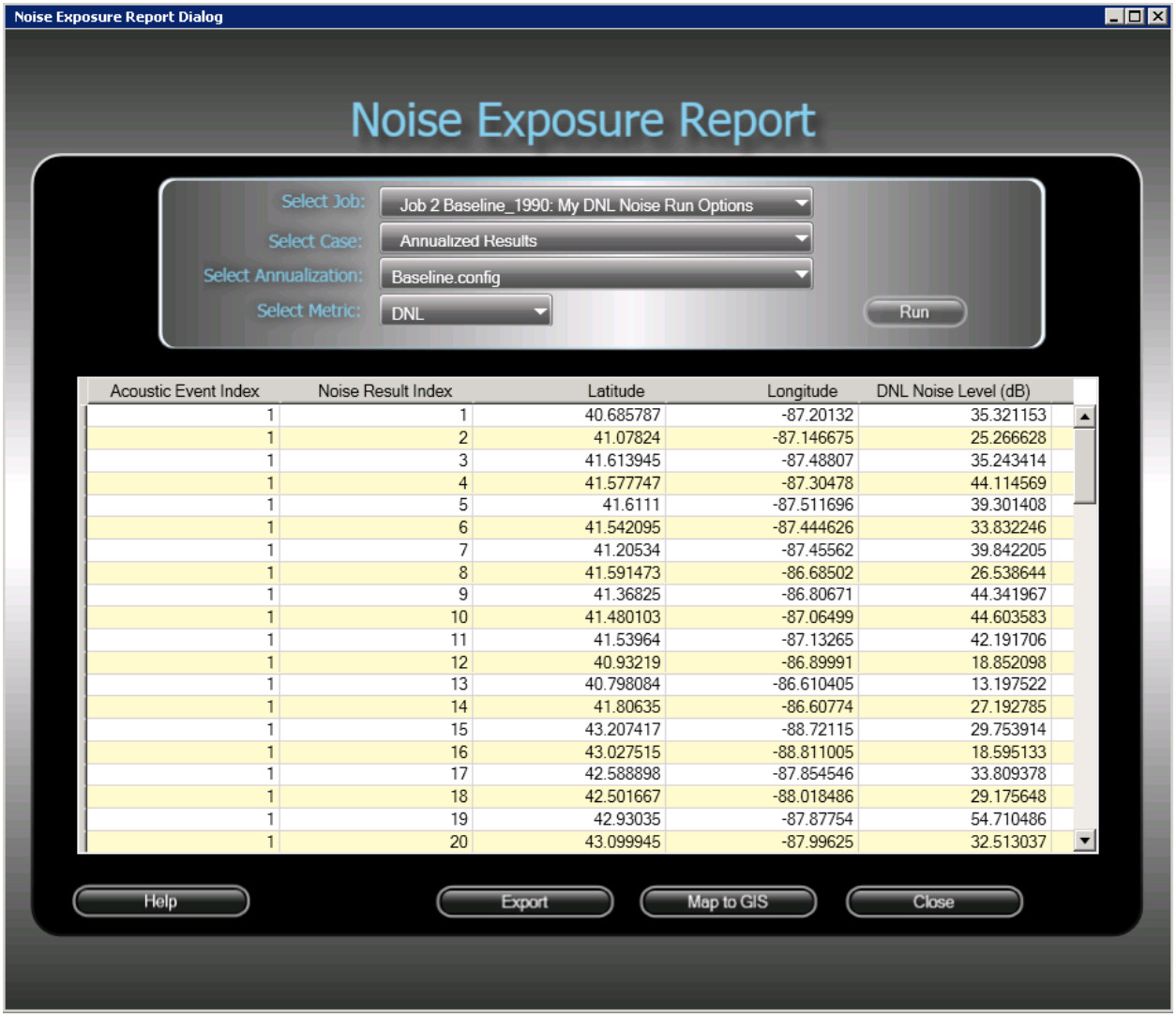
The Annualization drop-down menu will not be active when a case-level job is selected. N-84

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 H 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-68



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-85



Acoustic Event Index	Noise Result Index	Latitude	Longitude	DNL Noise Level (dB)
1	1	40.685787	-87.20132	35.321153
1	2	41.07824	-87.146675	25.266628
1	3	41.613945	-87.48807	35.243414
1	4	41.577747	-87.30478	44.114569
1	5	41.6111	-87.511696	39.301408
1	6	41.542095	-87.444626	33.832246
1	7	41.20534	-87.45562	39.842205
1	8	41.591473	-86.68502	26.538644
1	9	41.36825	-86.80671	44.341967
1	10	41.480103	-87.06499	44.603583
1	11	41.53964	-87.13265	42.191706
1	12	40.93219	-86.89991	18.852098
1	13	40.798084	-86.610405	13.197522
1	14	41.80635	-86.60774	27.192785
1	15	43.207417	-88.72115	29.753914
1	16	43.027515	-88.811005	18.595133
1	17	42.588898	-87.854546	33.809378
1	18	42.501667	-88.018486	29.175648
1	19	42.93035	-87.87754	54.710486
1	20	43.099945	-87.99625	32.513037

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 J 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.

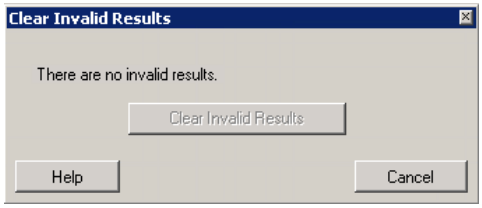


Figure 8-20 Clear Invalid Results Dialog Box – No Invalid Results

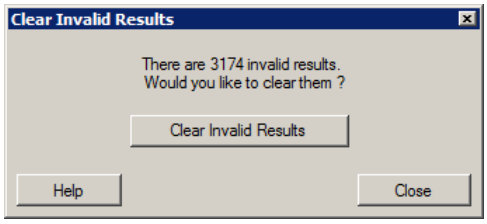


Figure 8-21 Clear Invalid Results Dialog Box

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.

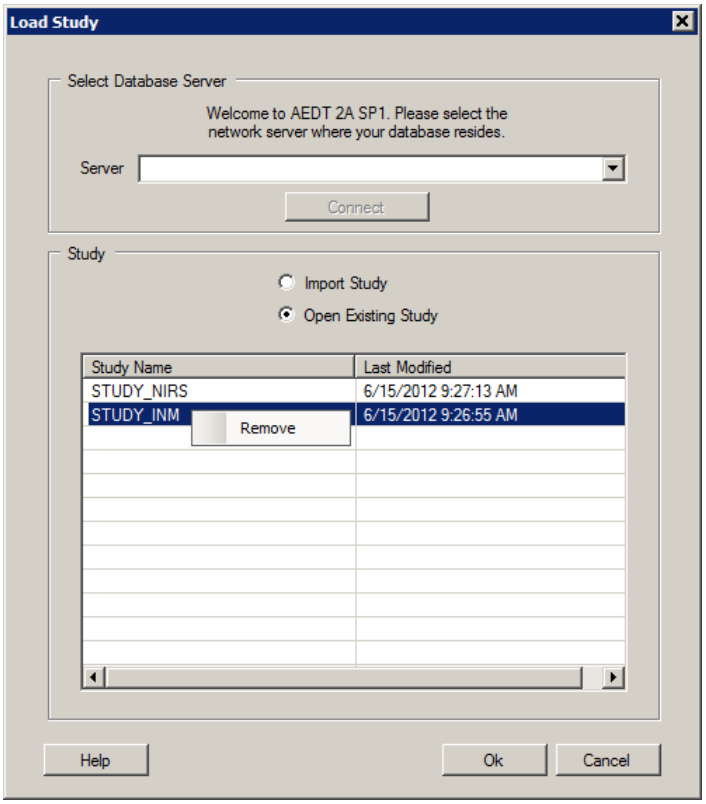


Figure 9-1 Load Study Dialog Box – Remove Study

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.
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	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

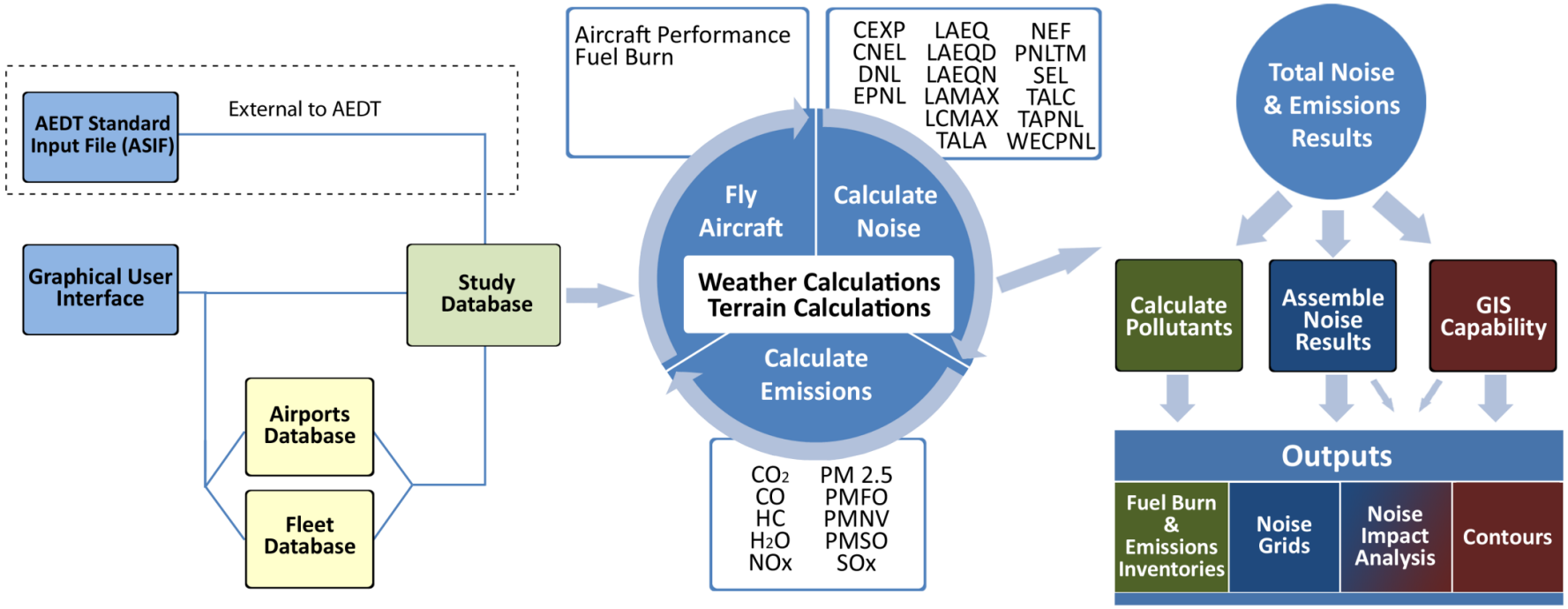
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCAR	NCEP/NCAR Reanalysis Project weather files
NCDC	National Climatic Data Center
NCEP	National Centers for Environmental Prediction
NED	GridFloat format that covers both U.S. and International land areas (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.

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 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 D 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 for matching SQL Server instance names. Instructions on how to confirm these settings for a basic SQL Server Express installation as described in Section 2.1.3.1 are provided below.

If running jobs with distributed processing, see Section 2.2 for instructions on how to identify appropriate SQL Server instance names. N-87

To confirm that the appropriate SQL Server instance name is defined in the AEDT configuration file:

1. Identify the SQL Server instance 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 D-1).
     c. The *Full computer name* consists of computer name and domain. The computer name without the *Domain* at the end is the desired SQL Server instance name (e.g. in Figure D-1 only COMPUTER NAME is needed, not *.vntscex.local*).

   - Windows 7
     a. Navigate to *Start* menu, *Control Panel*, *System and Security*, *System* (Figure D-2).
     b. The name in the *Computer name* field is the desired SQL Server instance name. Do not use the *Full computer name*.

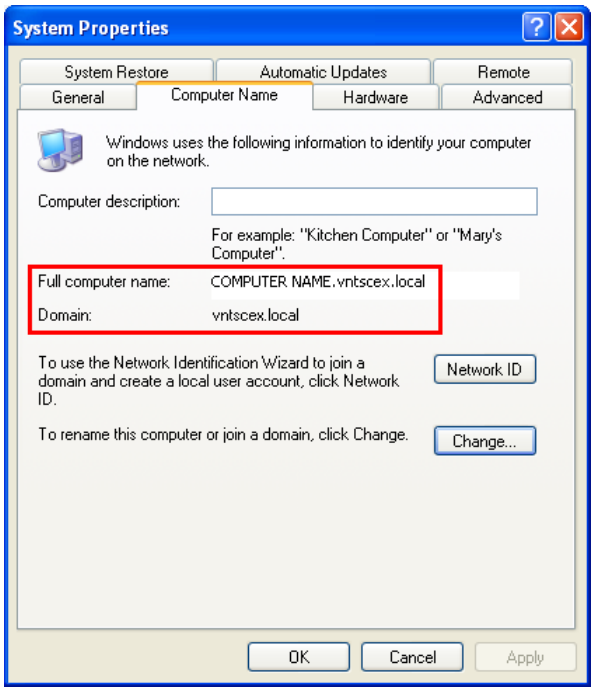


Figure D-1 System Properties in Windows XP

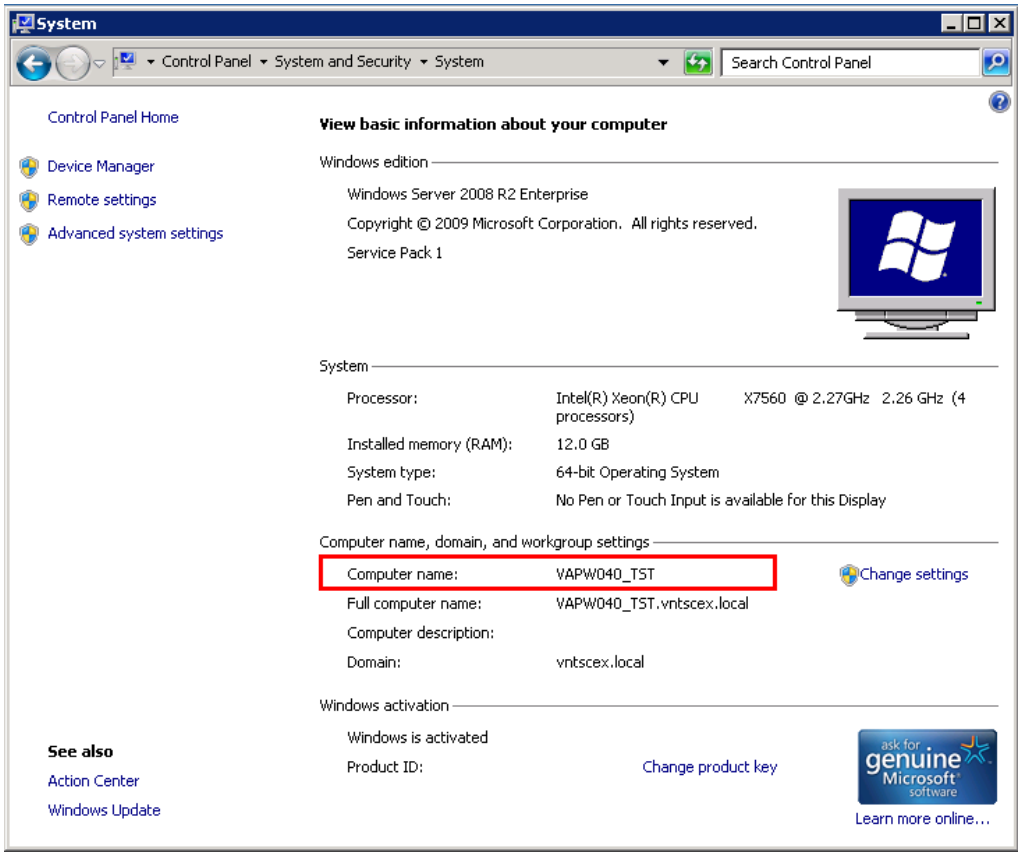


Figure D-2 System Properties in Windows 7

2. Open the configuration file C:\AEDT\FAA.AEE.AEDT.AEDTApp.exe.config. Confirm the SQL Server instance name in the highlighted locations in Figure D-3 matches the SQL Server instance 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 D-3 FAA.AEE.AEDT.AEDTApp.exe.config File—Database Locations

3. If the SQL Server instance name in the configuration file does not match the SQL Server instance name identified in Step 1, replace the SQL Server instance name in the configuration file with the correct SQL Server instance name.

The connection string is case sensitive; enter the SQL Server instance name in the same case as shown. W-69

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 SQL Server instance name can be invalid for some SQL connections and should be deleted. However, other SQL connections will accept the inclusion of \MYSQLServer. N-88

To check the SQL Server instance 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 SQL Server instance 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 SQL Server instance name in the *CONNECTION_STRING* column and confirm that it matches the SQL Server instance name in the AEDT configuration file.

8. If the SQL Server instance name matches, no additional action is needed.
9. If the SQL Server instance 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 SQL Server instance name. Likewise, any value entered where *localhost* is entered, will be searched for and replaced with the correct SQL Server instance name. Do not change "*@@SERVERNAME*" as it returns the name of the local server that is running SQL Server.

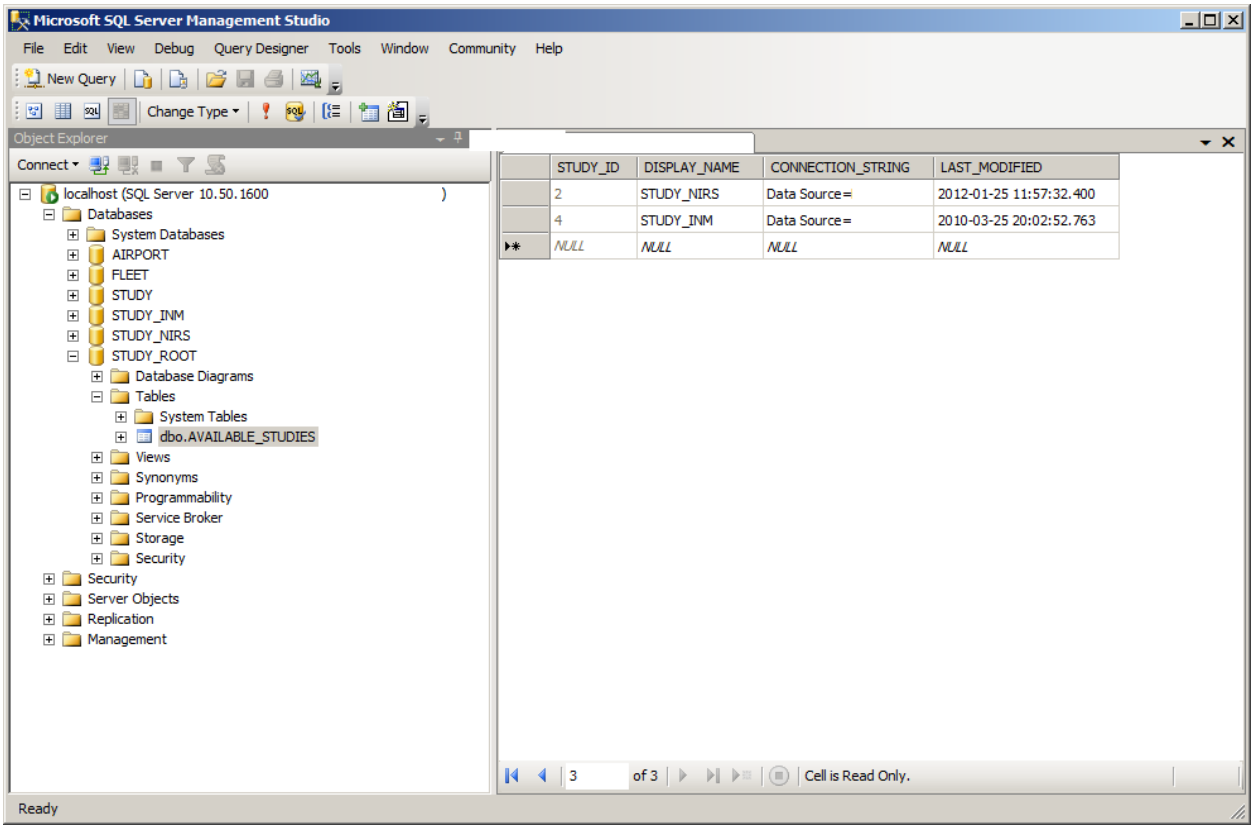


Figure D-4 Sample STUDY_ROOT Database

Appendix E 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-70

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-89

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 E-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-90

700,000 points will take approximately up to an hour to process in the Population Import Tool. N-91

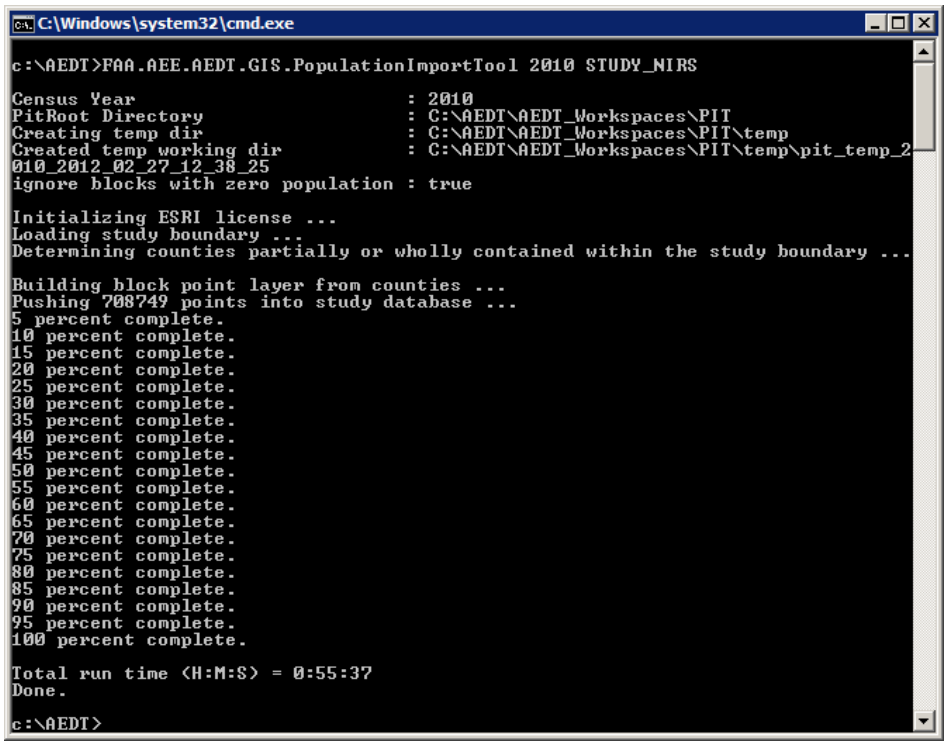


Figure E-1 PIT Console Finish Window

6. Since census data does not contain elevation information, the elevation in the imported population receptor set must be updated:
   a. Open SQL Server Management Studio from the *Start* menu, *All Programs*, *Microsoft SQL Server 2008 R2*, *SQL Server Management Studio.*
   b. In the *Connect to Server* dialog box, enter or select the appropriate SQL Server instance name, then click the *Connect* button.
   c. Click on the *New Query* button.
   d. Copy or type the following code into the new query window:

```
USE [databaseName]
UPDATE dbo.[POPULATION]
SET LOCATION = 'POINT('+
CAST(CAST([LOCATION].Long AS numeric(20,12))AS nvarchar(20))+' '+
CAST(CAST([LOCATION].Lat AS numeric(20,12))AS nvarchar(20))+' '+
CAST (0 AS nvarchar(20))+')'
WHERE LOCATION.Z IS NULL
COMMIT
```

   e. Replace [databaseName] with the name of desired study in the first command (e.g., [STUDY_NIRS]).
      Update the elevation in the command, CAST (0 AS nvarchar(20))+')' by replacing the "0" with the primary airport elevation in feet – e.g. CAST *(668* AS nvarchar(20))+')'
   f. Click the *Execute* button to run the query and update the population receptor elevation.

g. To save the script for future use, click the *Save* button, name and store in a desired loaction.

If the elevation is not updated after importing census data to create a population receptor set, the default elevation will be set to null and generate an error if an overflight scenario is run using the population receptor set. W-71

Appendix F 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 F-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 F-2 USGS Seamless Data Warehouse – Navigation Tools

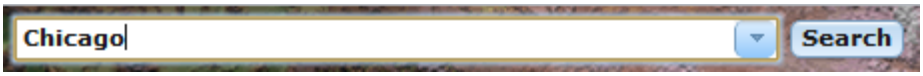


Figure F-3 USGS Seamless Data Warehouse – Search Function

6. The cursor position is displayed in lat/long in the bottom left corner of the map.

Figure F-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.

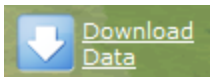


Figure F-5 USGS Seamless Data Warehouse – Download Data

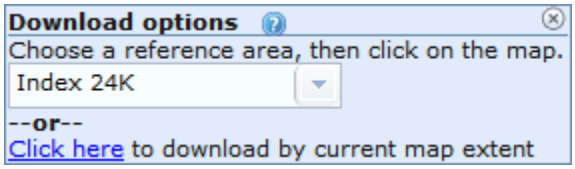


Figure F-6 USGS Seamless Data Warehouse – Download Options

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.

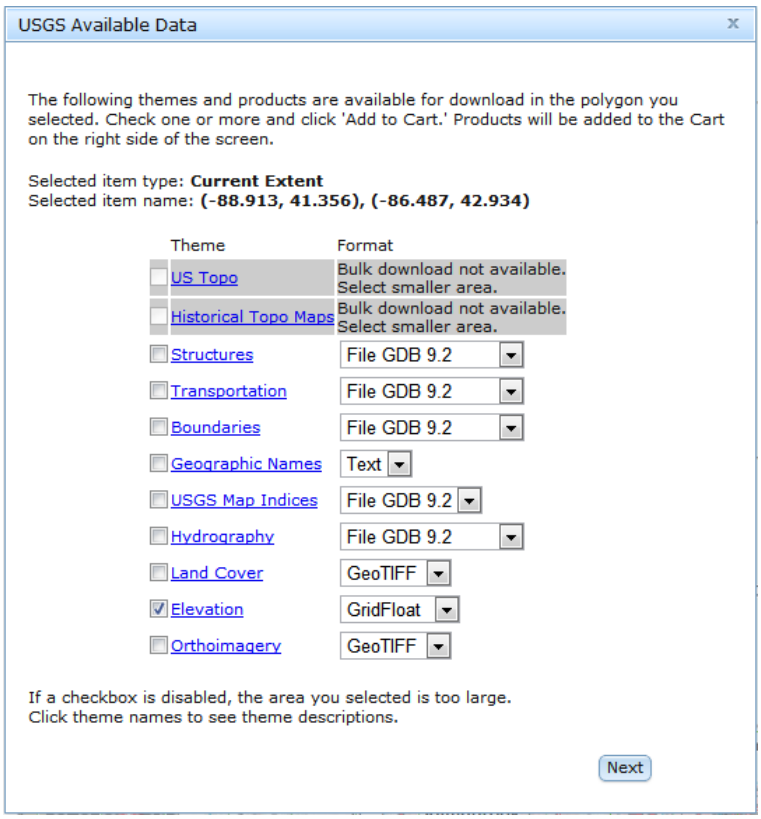


Figure F-7 USGS Seamless Data Warehouse – USGS Available Data

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-92

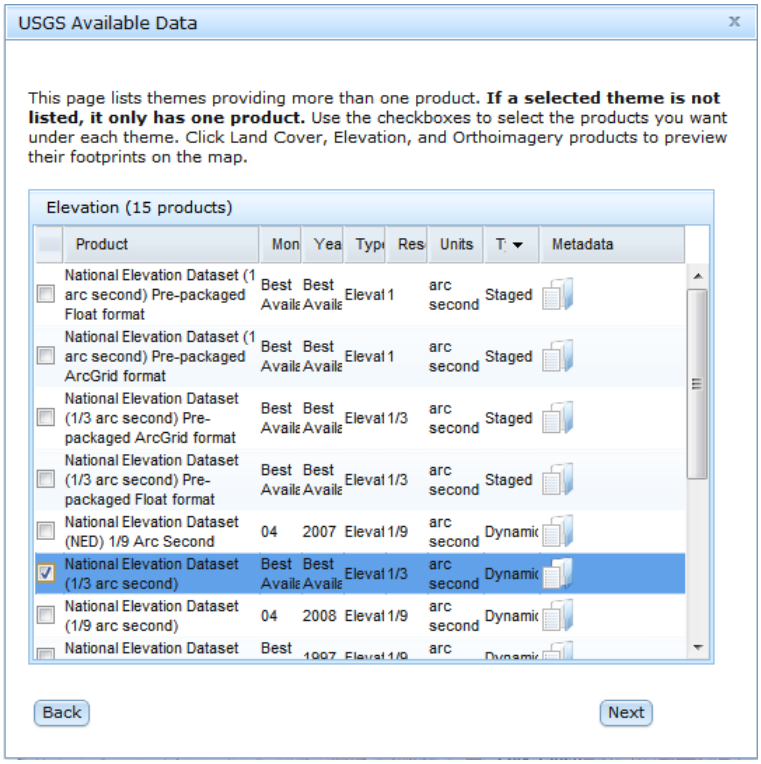


Figure F-8 USGS Seamless Data Warehouse – USGS Available Data

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.

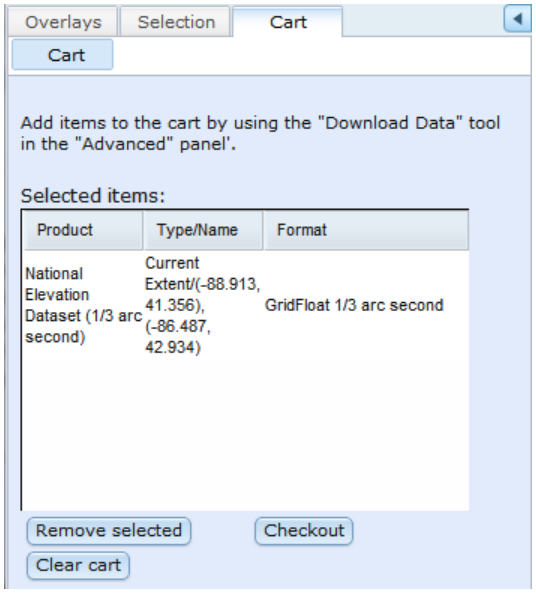


Figure F-9 USGS Seamless Data Warehouse – TNM Download Cart

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. See Section 5.1.4 on how to define terrain file path location in the AEDT GUI.

Appendix G 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.

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 geopotential height are as follows: W-72

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-73

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-74

All weather data must be downloaded with UTC time. W-75

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-76

```
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 G-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 G-1 Supported Weather Data File Types

Dataset	Download URL
Rapid Update Cycle (RUC20/RUC13)	RUC 20: http://nomads.ncdc.noaa.gov/data/ruc/ RUC 13: http://nomads.ncdc.noaa.gov/data/ruc13/
NCEP/NCAR (NCAR)	NCAR data are not publically available, and may be retrieved only with permission from NASA. For more information, visit http://acdb-ext.gsfc.nasa.gov/Data_services/accounts/accounts.html
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.

Download URLs for weather data may change without notice. W-77

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 G-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

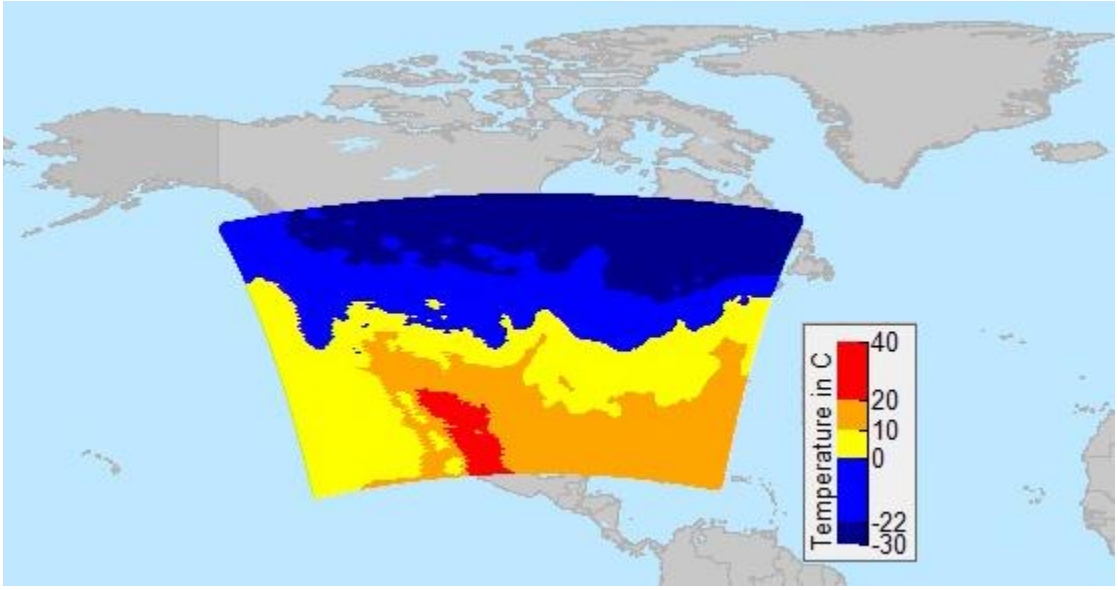


Figure G-1 RUC Weather Data Coverage

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-78

Due to the large file size, downloading 24 hours of RUC data can take an extended amount of time to complete. W-79

To download RUC weather files:

1. In a web browser, navigate to one of the download websites listed in Table G-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-93

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-80

process named FAA.AEE.AEDT.AEDTApp.exe should appear in the Processes tab, shown in Figure G-2 below.

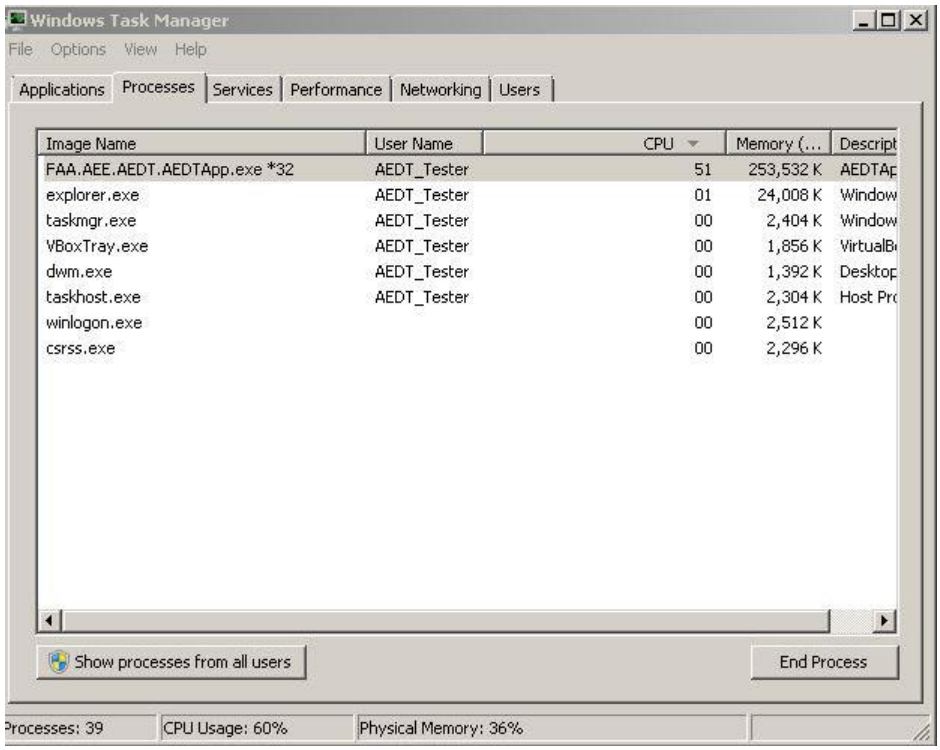


Figure G-2 Windows Task Manager

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 recommended to only use GEOS data where it has full coverage in AEDT2a. W-81

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: http://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-94

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. 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 NCAR data are not publically available, and may be retrieved only with permission from NASA. To obtain the NCAR dataset, visit http://acdb-ext.gsfc.nasa.gov/Data_services/accounts/accounts.html.

1. NCAR 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.f00050928 18* contains data for September 28, 2005 18:00 UTC.

2. Each file contains data for a 6-hour period of the specified day. Download all four files for the date selected to obtain data for full 24 hours of the day.
3. 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-95

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.

The weather data files must contain 24 hours of data for the specified day. The Weather Data Loader will generate an error message "could not download weather data file" if the data are not complete for full 24 hours of the day. W-82

To run the 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 G-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 weather data type: RUC13, RUC20, or NCAR.
- 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”.

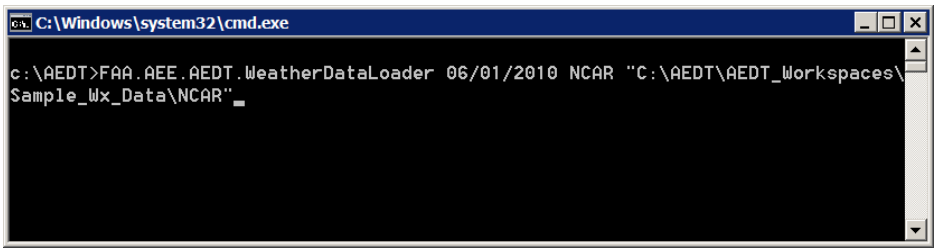
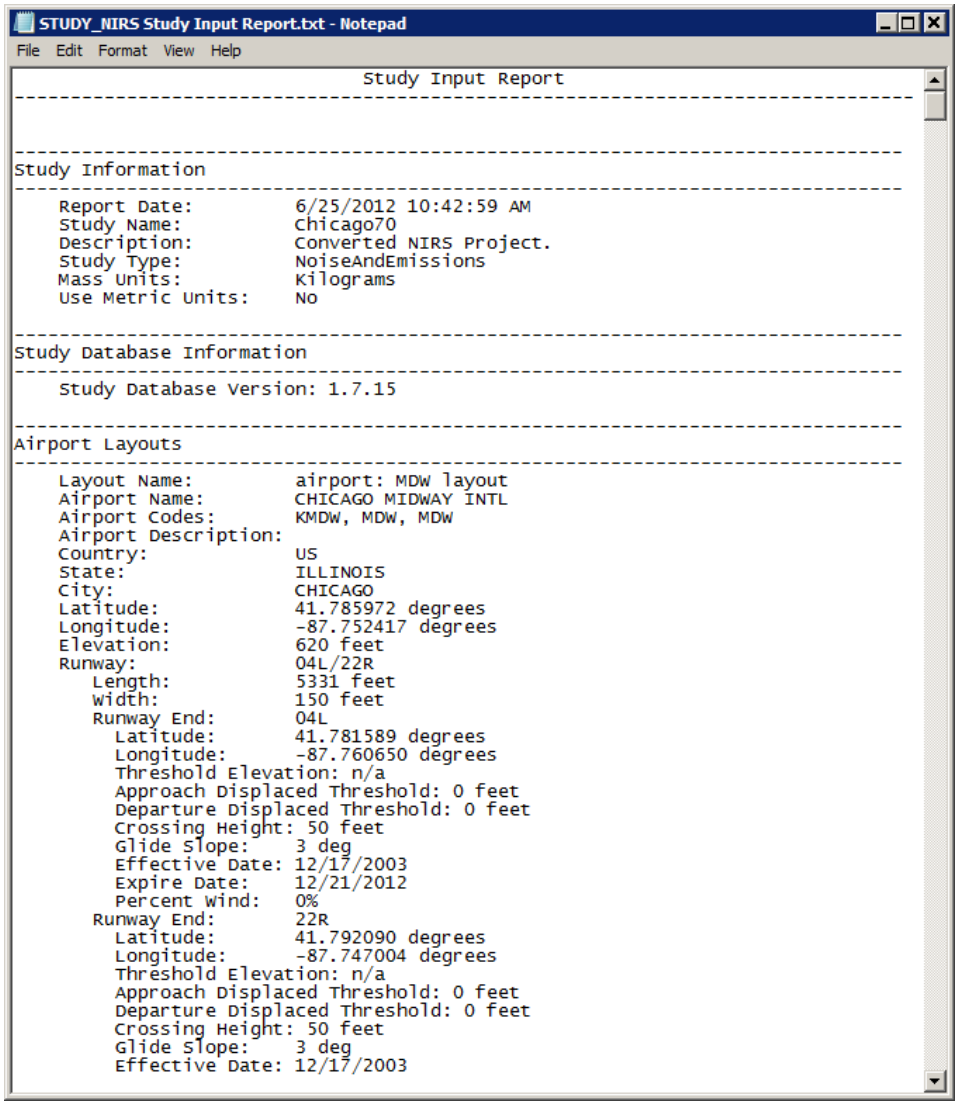


Figure G-3 Command Window — Weather Data Loader

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 H 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:          6/25/2012 10:42:59 AM
    Study Name:           Chicago70
    Description:          Converted NIRS Project.
    Study Type:           NoiseAndEmissions
    Mass Units:           Kilograms
    Use Metric Units:     No

--------------------------------------------------------------------------------
Study Database Information
--------------------------------------------------------------------------------
    Study Database Version: 1.7.15

--------------------------------------------------------------------------------
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
```

Figure H-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 H-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 H-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 H-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 H-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 H-6 Sample Flight Performance Report

	A	B	C	D	E
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	Latitude	Longitude	DNL Noise Level (dB)
8	1	1	40.685787	-87.20132	36.901458
9	1	2	41.07824	-87.146675	26.730962
10	1	3	41.613945	-87.48807	40.198354
11	1	4	41.577747	-87.30478	39.317518
12	1	5	41.6111	-87.511696	43.302575
13	1	6	41.542095	-87.444626	41.073275
14	1	7	41.20534	-87.45562	40.381328
15	1	8	41.591473	-86.68502	27.377506
16	1	9	41.36825	-86.80671	38.577228
17	1	10	41.480103	-87.06499	37.80951

Figure H-7 Sample Noise Exposure Report

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
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(kg)	Distance(km)	Duration	CO(kg)	HC(kg)	TOG(kg)	VOC(kg)	NMHC(kg)	NOx(kg)	PMNV(kg)	PMSO(kg)	PMFO(kg)	CO2(kg)	H20(kg)	SOx(kg)	PM 2.5(kg)
7	a1aexxf2.(	ClimbTaxi	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	a1aexxf2.(	ClimbGround	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	a1aexxf2.(	ClimbBelow1000	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	a1aexxf2.(	ClimbBelowMixingHeight	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	a1aexxf2.(	ClimbBelow10000	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	a1aexxf2.(	Above10000	11235.12843	8605.94	31:59.8	129.20813	2.97474	3.33589	3.23639	3.27293	146.73392	2.24703	0.78646	8.9881	35446.8302	13897.85387	13.15858	12.02159
13	a1aexxf2.(	DescendBelow10000	10691.42328	8537.37	54:23.9	747.72575	16.03517	16.68956	15.13583	15.56477	116.53398	1.84399	0.659	6.08995	33731.44044	13225.29059	12.52179	8.59293
14	a1aexxf2.(	DescendBelowMixingHeight	3112.62232	956.15	45:03.6	56.49039	1.94444	2.12254	2.01187	2.04616	29.50332	0.32823	0.12848	0.02691	9820.32343	3850.31381	3.6455	0.48362
15	a1aexxf2.(	DescendBelow1000	1031.83337	294.66	42:11.4	20.74572	0.74506	0.81343	0.77112	0.78424	10.38961	0.12997	0.04174	0.01079	3255.43429	1276.37788	1.20848	0.18251
16	a1aexxf2.(	DescendGround	267.45672	28.63	12:59.4	3.66892	0.09214	0.10182	0.09755	0.09895	2.52866	0.01944	0.01042	0.0016	843.82596	330.84397	0.31325	0.03146
17	a1aexxf2.(	DescendTaxi	0	0	00:00.0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	a1aexxf2.(	FullFlight	21926.55171	17143.32	26:23.7	876.93388	19.00991	20.02545	18.37222	18.8377	263.2679	4.09101	1.44546	15.07805	69178.27063	27123.14446	25.68038	20.61452

Figure H-8 Sample Emissions Report

Appendix I 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 J 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.

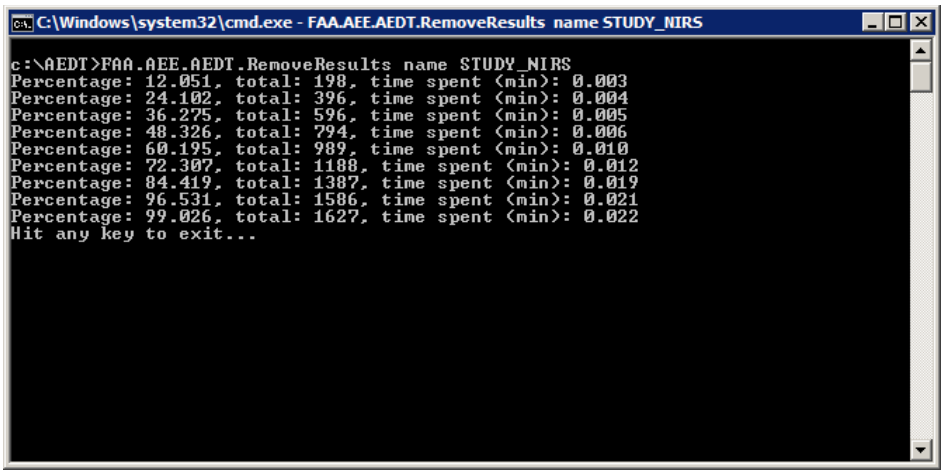


Figure J-1 RemoveResults Command Prompt

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-96

```
FAA.AEE.AEDT.RemoveResults help
```

The full functionalities will appear as below.

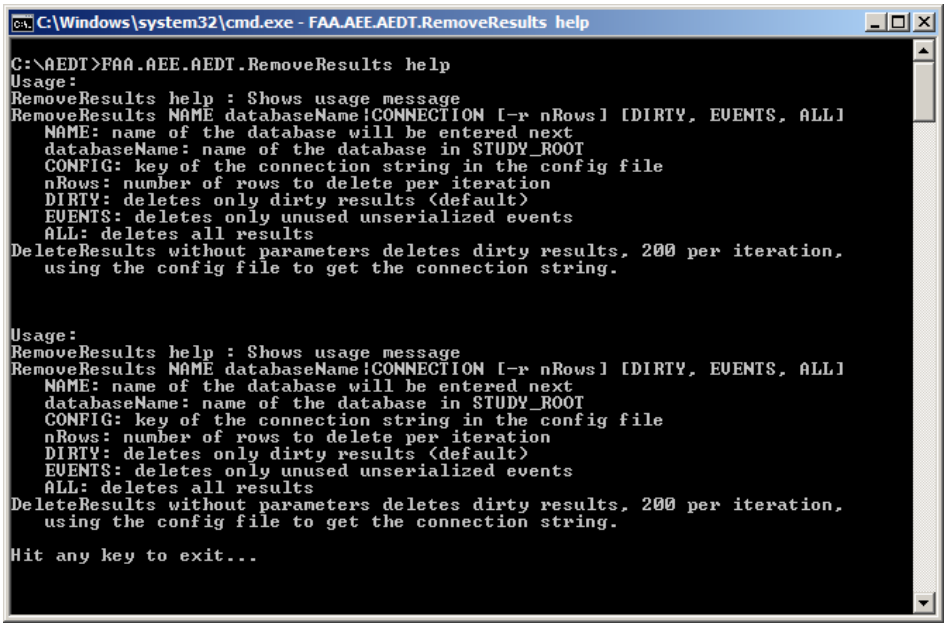


Figure J-2 RemoveResults Help

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.

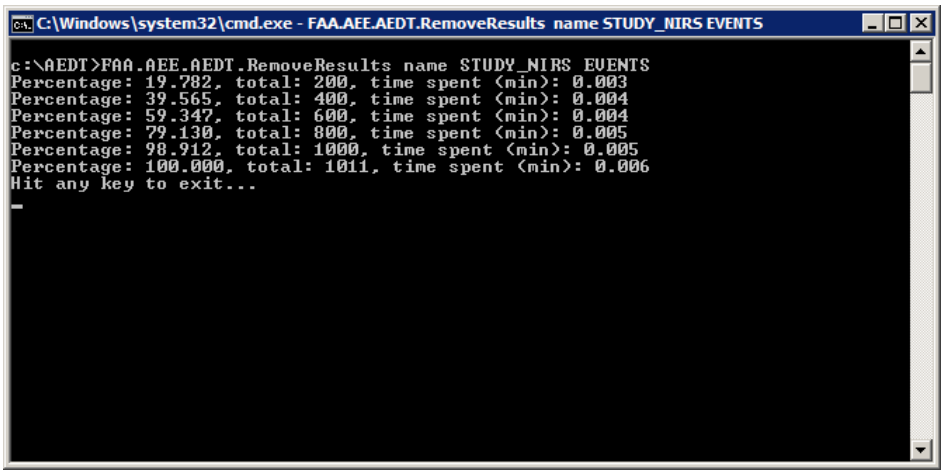


Figure J-3 RemoveResults Command Prompt

To count the number of unused events before removing, follow the instructions below: N-97

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.

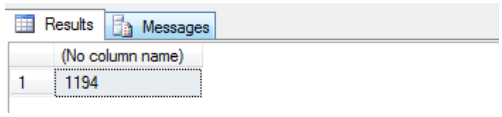


Figure J-4 Query Results

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.

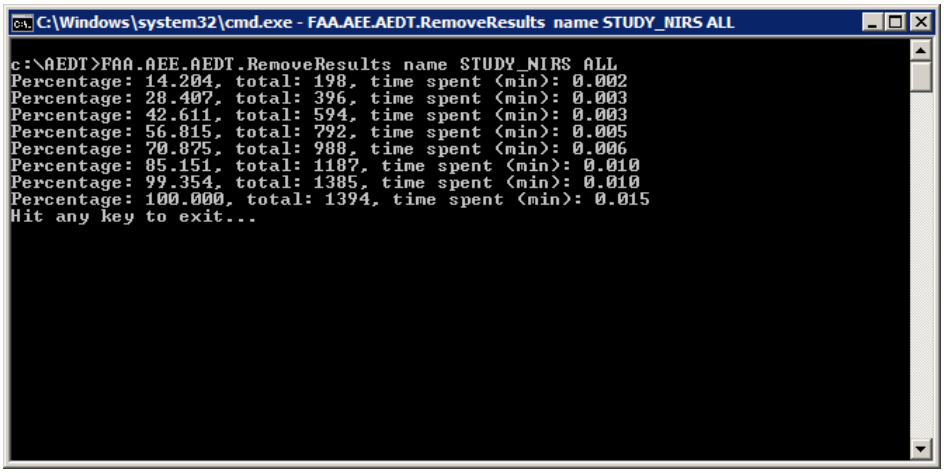


Figure J-5 RemoveResults Command Prompt

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.

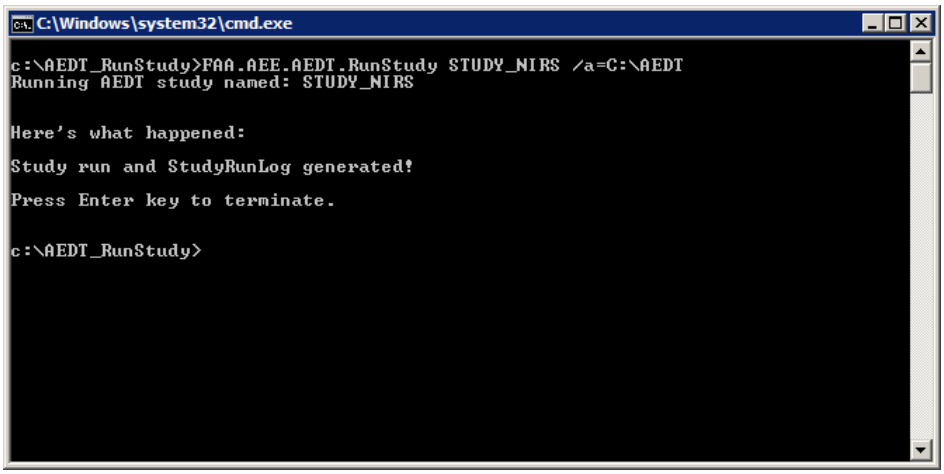


Figure J-6 RunStudy Command Prompt

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-83

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-98

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-84

```
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-99

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 J-7 displays the command prompt window when the processing has finished.

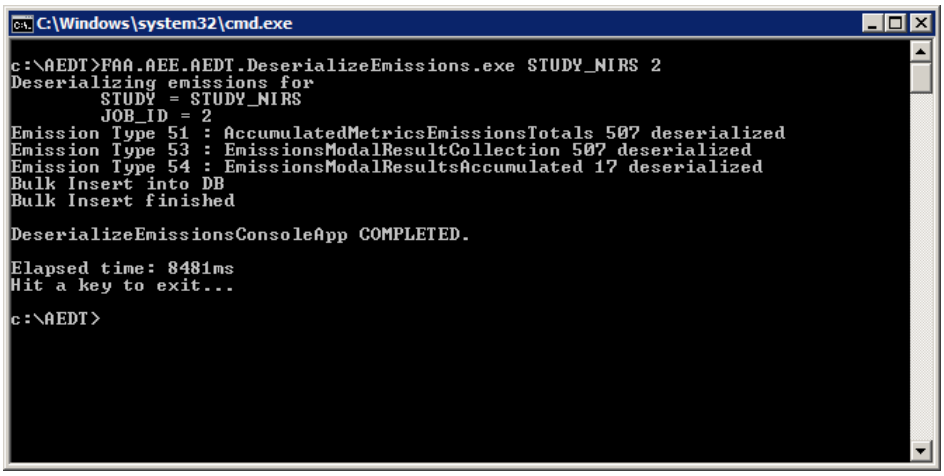


Figure J-7 Deserialize Emissions Console Finish Window

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 Cessna 441 Conquest II aircraft (CNA441) in 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'
```