

PREFACE

The FAA Office of Environment and Energy supports the assessment of aircraft noise impacts by developing and maintaining noise-evaluation models and methodologies. In particular, the FAA's Integrated Noise Model (INM) is widely used by the civilian aviation community for evaluating aircraft noise impacts in the vicinity of airports. Since 1978, the FAA has made the INM model available to hundreds of U.S. and international users. Domestic use of the model includes FAR Part 150 noise compatibility planning and FAA Order 1050 environmental assessments and impact statements.

INM was originally designed for a batch-process mainframe-computer environment and evolved in the mid-1980s to the PC microcomputer environment. In Version 5, INM was rewritten to include a new graphics user interface, enhanced data preparation and data input aids, new graphics and plotting capabilities, and improved and faster noise calculation algorithms. In Version 6, INM acoustic modeling capabilities are enhanced by the introduction of average noise spectra.

The INM model is developed and maintained by:

- FAA Office of Environment and Energy (AEE-100) — project management
- Volpe National Transportation Systems Center (VNTSC) — noise model
- ATAC Corporation — system integration, user interface, and flight model.

The FAA formed a Design Review Group (DRG) as a technical advisory group of government and private sector experts in the fields of aviation, acoustics, and computer modeling. The DRG guides the FAA in INM and other noise model development. The DRG reviews functional designs and recommends how to effectively implement designs to meet FAA and industry user requirements.

The DRG consists of the INM development team (AEE-100, VNTSC, and ATAC), representatives from various FAA offices, other Federal agencies, airport authorities, industry, and international organizations:

Federal Aviation Administration:

- Office of Environment and Energy, Noise Division (AEE-100)
- Office of Systems Capacity & Requirements, Airspace Capacity Planning (ASC-200)
- Office of Airspace Management, Environmental Programs (ATA-300)
- Office of System Architecture & Program Evaluation, Program Analysis & Operations Research, Technology (ASD-430)
- Office of Airport Planning/Programming, Community/Environmental Needs (APP-600)
- Eastern Region (AEA-530), Jamaica, NY

Other Government:

- Armstrong Laboratory OEBN, Wright Patterson Air Force Base, OH
- MASSPORT, Noise Abatement Office, East Boston, MA
- Metropolitan Washington Airports Authority, Alexandria, VA
- NASA Langley Research Center, Acoustics Division, Hampton, VA
- U.S. Army Construction Engineering Research Lab, Champaign, IL

- Volpe National Transportation Systems Center, Cambridge, MA

Corporations:

- ATAC Corporation, Sunnyvale, CA
- Boeing Commercial Airplane Group, Seattle, WA
- Bolt Beranek & Newman Inc., Systems & Technologies, Canoga Park, CA
- Eldred Engineering Inc., East Boothbay, ME
- Harris Miller Miller & Hanson Inc., Burlington, MA
- Howard Needles Tammen & Bergendoff Inc., Alexandria, VA
- Landrum & Brown Inc., Lawrence, KS
- Leigh Fisher Associates Inc., San Mateo, CA
- LeTech Inc., Alexandria, VA
- Metron Inc., Reston, VA
- Ricondo & Associates, San Francisco, CA
- SAIC Inc., Falls Church, VA
- URS Greiner Engineering Sciences, Tampa, FL
- Wyle Laboratories Inc., Arlington, VA

International:

- DELTA Acoustics & Vibration, Lyngby, DENMARK
- SINTEF DELAB, Trondheim, NORWAY

ACKNOWLEDGMENTS

Many people helped make INM Version 6.0 possible. The Office of Environment and Energy (AEE) wishes to thank the FAA Contracting Officer's Technical Representative, Rich Nehl, in the Office of Systems Capacity and Requirements (ASC-200).

AEE wishes to express our appreciation to the INM development team. At the Volpe National Transportation Systems Center (VNTSC), we thank Gregg Fleming, Acoustics Facility Manager, and team members John D'Aprile and Paul Gerbi. AEE acknowledges the extensive contributions by the ATAC Corporation in providing system development and integration services. Specifically, we wish to thank John Bobick, Aviation Program Director, Jeff Olmstead, INM Project Leader, and team members Richard Bryan and Lena Mirsky.

DISCLAIMER

The contents of this report reflect the views of the ATAC Corporation, which is responsible for the facts and accuracy of the material presented herein. The contents do not necessarily reflect the official views or policy of the U.S. Department of Transportation. The INM 6.0 User's Guide does not constitute a standard, specification, or regulation. The design, production, and distribution of this manual have been paid for by user fees.

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GLOSSARY

AEE	FAA Office of Environment and Energy
AFE	Above Field Elevation (altitude)
AGL	Above Ground Level (altitude)
APP	Approach operation
ARTS	Automated Radar Terminal System (radar tracks)
ATRS	Automated Thrust Restoration System (on aircraft)
C	degrees Celsius (temperature)
CAD	Computer Aided Design (application program)
CAS	Calibrated Airspeed (corrected indicated airspeed)
CD-ROM	Compact Disk Read Only Memory (laser-encoded disk)
CIR	Circuit flight operation
CPA	Closest Point of Approach
dB	decibel, a unit of noise level or noise exposure level
DBF	dBase IV database file format
deg	degrees (angle)
DEP	Departure operation
DLL	Dynamic Link Library (supporting software)
DNL	Day Night Average Sound Level (noise metric)
DOT	U.S. Department of Transportation
DXF	Drawing Exchange Format (CAD graphics data in a text format)
EIS	Environmental Impact Statement
EPNL	Effective Perceived Tone-Corrected Noise Level (noise metric)
EPR	Engine Pressure Ratio (thrust-setting parameter)
F	degrees Fahrenheit (temperature)
FAA	Federal Aviation Administration (U.S. DOT)
FAR	Federal Aviation Regulations
ft	foot, feet
GUI	Graphical User Interface
h	hours
HNM	Helicopter Noise Model
hp	horsepower
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
in-Hg	inches of mercury (barometric pressure)
INM	Integrated Noise Model
kg	kilograms
km	kilometers
kt	knots (international nautical miles per hour)
LAMAX	Maximum A-Level (noise metric)
lb	pounds force or weight
L _{AE}	Symbol for SEL — A-weighted sound exposure level (dB)
L _{EPN}	Symbol for EPNL — perceived sound exposure level (dB)
m	meters
mi	U.S. statute miles
min	minutes

mm-Hg	millimeters of mercury (barometric pressure)
μPa	micropascal (10^{-6} newton/meter ² , unit of acoustic pressure)
MSL	Mean Sea Level (altitude above sea level)
N1	Low pressure rotor speed as a percentage of a reference speed
NADP	Noise Abatement Departure Profile (AC-91-53A)
NFDC	FAA National Flight Data Center (database)
NMBG	Noise Model Binary Grid file format for NMPlot
NMPlot	Graphics application program that processes contours
nmi	international nautical mile (1852 meters)
NPD	Noise-power-distance
OVF	Overflight operation
PC	Personal Computer (based on Intel processor architecture)
PNLTM	Maximum Perceived Tone-Corrected Noise Level (noise metric)
s	seconds
SAE	Society of Automotive Engineers
SEL	Sound Exposure Level (noise metric)
TA	Time-Above (noise metric)
TAS	True Airspeed
TCH	Threshold Crossing Height
TGO	Touch-and-go operation
USGS	U.S. Geological Survey
VFR	Visual Flight Rules
VNTSC	Volpe National Transportation Systems Center (U.S. DOT)
Vzf	Zero-flaps minimum safe maneuvering speed
WMF	Windows Metafile (a graphics format)

1. SYSTEM INSTALLATION

Install the INM 6.0 system by following the instructions in this section. First, check that your computer system meets the requirements. Then, load the INM files onto your hard disk. After INM is loaded, you can do a quick test of the software to see if it works, and then you can convert previous studies to INM 6.0 format.

1.1. Computer System Requirements

The computer system requirements for INM 6.0:

- Pentium II processor or better
- 64 Mb of RAM memory or more
- Microsoft Windows 95, Windows 98, or Windows NT 4.0 operating system.
- 640x480 16 colors VGA display or better
- Mouse input device
- CD-ROM drive
- 30 Mb of hard disk space for the INM system
- 1 to 30 Mb of hard disk space for each INM study

Although INM could run on a less capable computer than recommended above, both the graphical user interface and the noise-calculation performance would be slow. Large studies involving thousands of flight operations and/or high resolution noise contours require more real memory than 64 Mb.

Your disk drive should have enough capacity to hold the operating system, the INM system software, INM studies, and other Windows applications. The INM system requires about 30 Mb, which includes programs, dynamic link libraries, data, and examples. The size of an INM study can vary greatly, depending on how many cases there are and the amount of graphical input data used.

1.2. Software Installation Procedure

The Windows 95, Windows 98, or Windows NT 4.0 operating system is required for INM 6.0.

1.2.1. Install INM

Put the INM CD-ROM into the CD drive. From the Windows *Start* menu, select the *Run* function and enter *D:SETUP*, where *D* is the letter for the CD drive. Follow the instructions in the setup program.

The setup program creates an INM 6.0 shortcut in the Windows *Start // Programs* menu.

1.2.2. Uninstall INM

Use the Windows *Start // Settings // Control Panel // Add/Remove Programs* function to uninstall INM.

1.2.3. Installation Notes

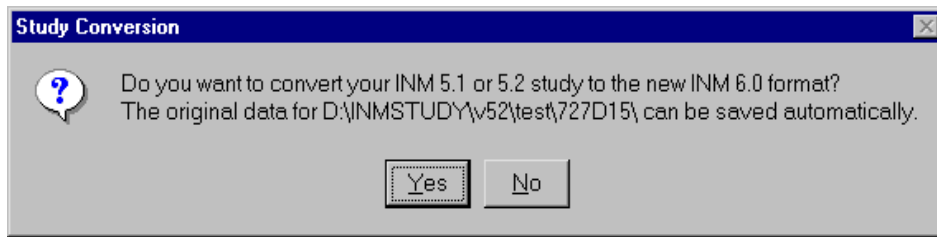
Dynamic Link Libraries: The INM setup program does not put *DLL* files into your operating system directory. The *DLL* files that are required to run INM are in the *INM60* directory.

Network users: You can put the INM system on a network server drive, and your studies on either network or local drives. However, there are some potential problems:

- INM is a single-user system. Two people cannot run INM from a network server at the same time. This is because INM writes temporary files into the system subdirectories, and one person could overwrite another person's files.
- Make sure that your network computer clocks are synchronized. INM uses file time stamps to decide whether processes need to be run again. Compared files could have their time stamps written by two different computers. If the two computer clocks are off by a minute or more, INM might run a process when it does not need to, or not run one when it does need to.

Gray-on-gray problem: Windows displays an inactive text box as dark gray text on a gray background, making it very difficult to read the text. If you wish, you can change to black text on a gray background by doing the following:

1. In the Windows system directory, run the *REGEDIT.EXE* program.
2. Click on the tree structure until you get to level *HKEY_CURRENT_USER // Control Panel // Colors*.
3. Find "GrayText" in the right panel and change its values from "128 128 128" (dark gray) to "0 0 0" (black).



1.3. Converting INM Studies to Version 6.0

Previous versions of INM can be converted into INM 6.0 format.

1.3.1. Version 5.1 or 5.2 Studies

INM 6.0 automatically converts a version 5.x (5.1, 5.1a, 5.2, or 5.2a) study into version 6.0 format. The conversion process takes place when you first load a version 5.x study. A message box asks you if you want to continue with conversion, and you can stop the process before it starts. Also, you have the option to save your old 5.x study under a different name.

1.3.2. Version 5.0 Studies

A version 5.0 study cannot be directly converted to version 6.0. Instead, convert to version 5.2a by loading the study into INM 5.2a, and then load the resulting version 5.2a study into INM 6.0.

1.3.3. Version 4.11 and Earlier

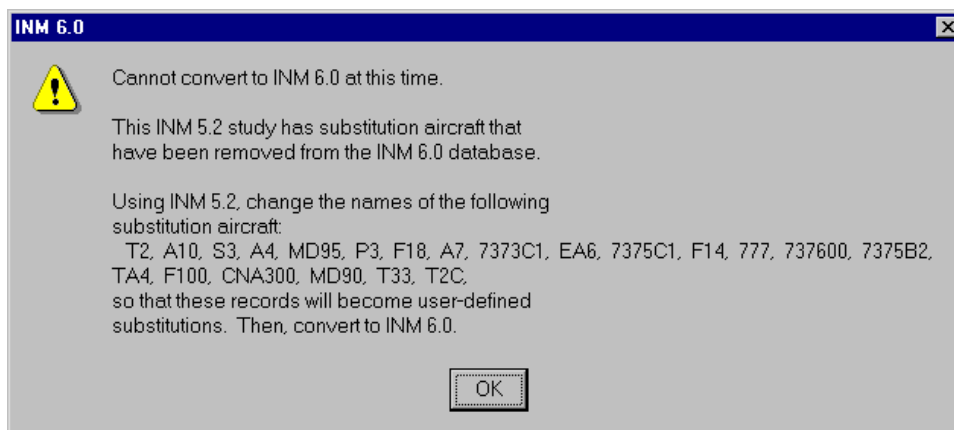
A version 4.11 study cannot be directly converted to version 6.0. Instead, convert to version 5.2a by using the *PREPROC.EXE* program provided with INM 5.2a. Then, load the resulting version 5.2a study into INM 6.0. (INM 6.0 no longer supports the 4.11 conversion processor, so the one in INM 5.2a must be used.) Version 3.10 and 3.9 studies often can be converted in a similar manner.

1.3.4. Terrain 3CD Files

INM 6.0 uses a new method to compute noise with terrain elevations. Instead of using a single INM-formatted *3CD* file centered on the airport, INM 6.0 uses one or more integer-degree *3CD* files to cover a larger area. There is no longer a need to convert four integer-degree *3CD* files into one INM-formatted *3CD* file. Instead, INM 6.0 reads one or more integer-degree *3CD* files in Micropath format.

This means that a *3CD* file that was used in an INM 5.x study cannot be converted to INM 6.0. The original four integer-degree Micropath *3CD* files that were used to make the INM-formatted *3CD* file must be used in INM 6.0 instead.

The version 5.x *_TERRAIN.BIN* file containing terrain contours can be used in INM 6.0 without conversion. For information on how to make new terrain contour files, see *File // Import Data into Study // Terrain 3CD or 3TX Files*



1.3.5. Substitution Aircraft

Several substitution aircraft have been deleted from the INM standard database. INM 6.0 detects if these substitutions are being used, stops conversion, and displays a message box explaining what to do. You will have to use INM 5.x to change the name of the substitution aircraft (for example, change 777 to 777X), and then convert the study.

After conversion, change the substitution (777X) to the INM aircraft that replaces it (777200). Below is a list of 23 deleted substitution aircraft and their replacement INM aircraft.

<u>Deleted</u>	<u>Replace with</u>	<u>Deleted</u>	<u>Replace with</u>
7373C1	7373B2	F100	F100D
7375B2	7373B2	F14	F14B
7375C1	7373B2	F18	F18EF
737600	7373B2	MD90	MD9028
737700	737400	MD95	DC95HW
737800	737400	P3	P3C
777	777200	S3	S3A&B
A10	A10A	T2	T-2C
A4	A4C	T2C	T-2C
A7	A7E	T33	T33A
CNA300	GASEPF	TA4	A4C
EA6	EA6B		

1.3.6. Conversion Errors

Usually, a valid version 5.x study will convert without any problems. A large study with many cases may take a while. You will see various messages written in a text window as conversion takes place. These messages are also written to the *VERSION.TXT* file in the study directory.

If there are problems during conversion, error messages are written to the window and to the *VERSION.TXT* file. If there is an error, INM will not convert your study to version 6.0. However, you are given the opportunity to continue checking for more errors after the first one occurs. You can either quit at the first error, or continue checking your original data for related errors. If conversion fails, your original data files will not be altered.

If there are errors, you must fix them in INM 5.x and then try again. For this reason, do not delete your INM 5.x system until after all your 5.x studies have been converted.

1.3.7. Re-Run INM

All version 5.x temporary and output files are deleted as part of the conversion process in preparation for re-running the model. After successfully converting a version 5.x study, you must re-run all cases and reprocess all output contours because of modifications in the flight path and noise computation modules.

1.4. Quick Tests

You can quickly test INM by loading one of the example studies that is distributed with the INM system. Also, you can create a simple study to experience inputting data, running the model, and displaying output data.

1.4.1. View an Existing Study

1. Use the Windows *Start // Programs* function, select INM 6.0, and click on INM 6.0.
2. After INM loads, click on *File* in the menu bar and select *Open Study* in the pull-down menu. In the Open Study directory-navigation dialog box, double-click on the *EXAMPLES* directory, and then double-click on the *TEST50* study directory. Press the OK button to load the *TEST50* study.
3. Click on *Acft* on the menu bar and select *Aircraft* in the pull-down menu. A window will pop-up showing a list of aircraft that are defined for the study. You can click on aircraft identifiers in the left-hand list box to see the data change in the right-hand section of the data-input form (this kind of form is called a "*DBF* window").

4. Try other menu items to see what happens. The one called *Acft // Procedural Profiles* (*Acft* on the menu bar, and *Procedural Profiles* in the drop-down menu) will take a while to load because there are thousands of records to check and organize as it loads.
5. Go to the *Tracks // Input Graphics* function. After the window loads, use the *View // Zoom In* function to enlarge the view. Position the mouse cursor where you want the center of the new window, click with the left mouse button, drag the mouse to create a rectangle (representing the new window border), and click once more with the left mouse button.
6. You can zoom back out by using the *View // Zoom Out* function. It works the same, except that the rectangle represents the area into which the current view will be displayed (a small rectangle causes a large zoom out).
7. You can move around on the diagram without zooming by clicking with the right mouse button, dragging the "rubber band" line to where you want the center of the new window, and then releasing the mouse button.
8. Go to the *Output // Output Graphics* function. Select OUT1 and click OK. After the window loads, select the *View // Layers On/Off* function and click the boxes next to Population Points and Terrain Contours. Then, select OK and wait for INM to load these two layers into the window. It will take a few seconds to load because of the large amount of data involved. A layer that is turned on (one that has a check mark in the box) can be turned off by clicking in the box to make the check mark disappear, and then selecting the OK button.

1.4.2. Create a New Study

After you are finished looking at the *TEST50* study, close it by using the *File // Close Study* function. Then, select the *File // New Study* function.

1. In the New Study directory-navigation dialog box, double-click on the directory where you want to create the new study, and then type *A-NEW-STUDY* in the Study Name edit box. Press OK, INM verifies your choice, click on Yes, and INM creates a new directory. All of the study files and subdirectories will go into this directory.
2. INM displays the Study Units dialog box with English units already selected. Press OK.
3. INM displays the Study Setup dialog box. Type "My first study" in the Description edit box, and then select the View Airports button. INM takes a few seconds to load a list of about 820 U.S. airports.
4. After the airport list appears, type the letter I to jump to states starting with I, and then use the Page Down and Down Arrow keys to highlight the line "IL

Chicago O'Hare ORD". Press OK and wait while INM finds ORD runways and scans U.S. nav aids and fixes that are close to ORD. When INM finishes, you will see the airport latitude, longitude, and elevation values in the Study Setup dialog. Also, two *DBF* windows are created containing location points (nav aids and fixes) and runway ends. Press OK to close the Study Setup dialog.

5. Select the *Setup // Aircraft* function, and after INM displays the dialog box, use the scroll bar on the left-hand list box to move down and highlight 767JT9. Press the Include button and then the OK button. INM displays the *Aircraft* window with 767JT9 data.
6. Select the *Setup // Cases* function. After INM displays the *Case* window, select the *Edit // Add Record* function. Click in the Case ID edit box and type CASE-ONE. Leave the airport parameters as they are. Select *Edit // Commit Record*. INM creates a subdirectory *C : \A-NEW-STUDY\CASE-ONE*, where case-related data are stored.
7. Select the *Tracks // Input Graphics* function. Zoom in on the runway system. Select the *Edit // Add Tracks* mode and click in the circle on 09R (the left end of the lower horizontal runway). Drag a line straight along the runway to the right, about two runway lengths out, and click again. In a similar manner, draw two more segments curving up to the north. Double-click to end the last segment. In the dialog box that pops-up, type DEP-001 for the track identifier and press OK. INM redraws the departure track and colors it blue.
8. Select the *Window // Close All* function to close the various open windows that have accumulated.
9. Select the *Ops // Flight Operations* function. Click on CASE-ONE and press OK. After the Flight Operations window appears, select 09R in the Runway drop-down list box. Select *Edit // Add Record*. Select profile STANDARD-6. Click inside the Day edit box and type 300. Select *Edit // Commit Record*.
10. Select the *Run // Grid Setup* function. Click on CASE-ONE and press OK. Select *Edit // Add Record* and then *Edit // Commit Record*. The default CONTOUR grid specifies a rectangle for computing noise contours.
11. Select the *Run // Run Options* function. Select Run Type MultiMetric, Noise Family A-weighted and leave the rest of the run option parameters as they are. Select *Edit // Commit Record*.

12. Select the *Run // Run Start* function. Click on CASE-ONE, press the Include button, and then press the OK button. INM displays message boxes while calculating flight operations and flight paths. Then, INM displays the Run Status window showing the percentage progress while noise is being calculated. When the Run Status window disappears, the run is done. Look at the *Run Options* window to see how long the noise calculation took.
13. Select the *Output // Output Setup* function. Select *Edit // Add Record*, click in the Output Id box, and type CASE-ONE-DNL. In the Metric drop-down list box, select DNL. Leave the contour parameters as they are (minimum 55 dB, maximum 85 dB, and increment by 5 dB). Leave the Output type OneCase and Case1 CASE-ONE parameters as they are. Select *Edit // Commit Record*.
14. Select *Edit // Add Record*, add a second output record CASE-ONE-LAMAX using the LAMAX metric, and set the contour parameters to (60 dB, 100 dB, and 10 dB). Again, use OneCase and CASE-ONE parameters. Select *Edit // Commit Record*.
15. Add a third output record CASE-ONE-TALA using the TALA metric, and set the contour parameters to (5 minutes, 45 minutes, and 10 minutes). Again, use OneCase and CASE-ONE parameters. Select *Edit // Commit Record*. You should have three committed records showing in the left-hand list box when you are finished with the *Output // Output Setup* function.
16. Select the *Output // Output Graphics* function. Click on all three output identifiers to highlight them, and press OK. INM then performs post-processing on one set of MultiMetric noise files to produce three sets of noise contours. When finished processing, INM displays three *Output Graphics* windows — one with DNL contours, one with LAMAX contours, and one with TALA contours. Double-click on the title bar of one of them to maximize the window. Zoom in to see the contours better. Then, look at the other two *Output Graphics* windows.

2. INTRODUCTION

This section introduces the INM model and software:

- General information about INM
- Version 6.0 enhancements
- Summary of software functions
- Description of the contents of the INM60 disk directory.

2.1. The INM Model

INM has many analytical uses, such as assessing changes in noise impact resulting from new or extended runways or runway configurations, assessing new traffic demand and fleet mix, assessing revised routings and airspace structures, assessing alternative flight profiles, and assessing modifications to other operational procedures.

In the United States, the model is typically used for FAR Part 150 noise compatibility planning and for FAA Order 1050 environmental assessments and environmental impact statements.

INM version 5 software releases, which began in August 1995, have been distributed to over 680 organizations in 44 countries.

2.1.1. INM Core Calculation Module

The core calculation module of INM is based on standards documents produced by the Society of Automotive Engineers (SAE) Aviation Noise Committee (A-21). This internationally represented committee is composed of research institutions, engineering firms, aircraft and engine manufacturers, government regulatory agencies, and end-users of noise modeling tools. The three relevant documents pertaining to this release of INM are:

SAE-AIR-1845	“Procedure for the Calculation of Airplane Noise in the Vicinity of Airports”
SAE-AIR-1751	“Prediction Method for Lateral Attenuation of Airplane Noise During Takeoff and Landing”
SAE-ARP-866A	“Standard Values of Atmospheric Absorption as a Function of Temperature and Humidity”

You can obtain copies of these documents through SAE, and a contact is provided in Appendix A.

Changes to INM that affect the core calculation module are often submitted to the SAE A-21 Committee for peer review. SAE independently reviews the data and modeling algorithms that are incorporated into INM.

2.1.2. INM is an Average-Value Model

INM is designed to estimate long-term average effects using average annual input conditions. Because INM is not a detailed acoustics model, differences between predicted and measured values can and do sometimes occur because important local acoustical variables are not averaged, or because complicated physical phenomena are not explicitly modeled.

INM aircraft flight profile and noise calculation algorithms are based on the methodology presented in the SAE-AIR-1845 report.

In the U.S., annual day-night average sound level (DNL or L_{dn}) is used for quantifying airport noise. The Federal Aviation Regulation (FAR) Part 150 definition of this quantity is:

Yearly day-night average sound level (Part 150 Sec. A150.205(c)): “(YDNL) means the 365-day average, in decibels, day-night average sound level. The symbol for YDNL is also L_{dn} . It is computed in accordance with the following formula:

$$L_{dn} = 10 \log((1/365) \sum 10^{L_{dni}/10})$$

where L_{dni} is the day-night average sound level for the i -th day out of the year.” The summation is from $i = 1$ to 365.

If you were to use this definition to model noise in INM, you would have to run 365 cases of the model and average the results. Instead, INM uses the concept of an “average annual day”. FAR Part 150 allows the use of average input data in INM, as follows:

Operational data (Part 150 Sec. A150.103(b)): “...the following information must be obtained for input to the calculation of noise exposure contours: ... (2) Airport activity and operational data which will indicate, on an *annual average-daily-basis*, the number of aircraft, by type of aircraft, which utilize each flight track, in both standard daytime (0700-2200 hours local) and nighttime (2200-0700 hours local) periods for both landings and takeoffs.”

An average annual day is a user-defined best representation of the typical long-term average conditions for the airport. These average conditions include the number and type of operations, routing structure, runway configuration, aircraft weight, temperature, and wind.

It may be useful to perform supplemental analysis for different times of the year to disclose the effects of the seasonal variation in traffic demand. For example, a supplemental analysis for spring as compared to fall and winter time periods may demonstrate differences in noise exposure if significant changes in fleet mix, flight operations, or flight tracks exist. For policy decisions, however, it is necessary to normalize all scenarios to the same time period (a yearly average), to insure an unbiased comparison among alternatives.

2.1.3. Developing an INM Study

1. If you are doing FAR Part 150 or FAA Order 1050 EIS studies, the FAA must approve any changes or additions that you make to the INM standard aircraft, noise, or profile data. Please refer to Appendix A for the FAA contact and Appendix B for the checklist of items needed for FAA approval.
2. Contact the FAA for AC91-53A Noise Abatement Departure Profile (NADP) approval. INM does not contain pre-approved NADPs, even though profile procedures for NADPs are presented as examples.
3. INM is not designed for single-event noise prediction, but rather for estimating long-term average noise levels using average input data. Comparisons between measured data and INM calculations must be considered in this context.
4. Make every effort to develop accurate average values for input data. In particular, flight profiles and ground tracks must be modeled realistically. If feasible, obtain actual takeoff weights and use average weight to choose profile stage numbers instead of using trip length.
5. Examine the applicability of INM standard aircraft profiles to the airport under investigation. These data are generic and in some cases may not realistically represent flight operations at your airport (see sections 8.7.12 and 8.7.13). For example, Air Traffic Control at a large airport typically directs aircraft to climb to and maintain specific altitudes before climbing further (for the purpose of threading traffic flows). However, standard INM departure profiles have aircraft climb continuously to 10,000 feet above the airport, and these generic profiles would be inappropriate to use in such a situation.
6. INM standard profiles start at 6,000 feet above the airport for approaches and end at 10,000 feet above the airport for departures. INM standard aircraft do not exist above these altitudes; consequently, no noise is produced. If you are computing noise in areas where aircraft are known to fly above these altitudes, you must modify the standard procedures by adding more procedure steps or profile points.
7. When doing a study of a high-elevation airport and/or for non-standard temperatures, check all procedural profiles, and if necessary, substitute your own realistic fixed-point profiles for those aircraft that do not seem to perform as expected. INM aircraft performance coefficients were developed from measurements at sea level for a standard-day temperature of 59°F. At higher elevations and/or temperatures, some computed profiles are not realistic.

8. Do not change or add aircraft performance coefficients unless you follow procedures in SAE-AIR-1845 and use valid source data based on measured data or flight manuals.

2.1.4. Using the INM Computer Program

1. Do not use a file manager to delete case or output subdirectories. Let INM manage these study subdirectories.
2. If you create your own procedural or fixed-point profiles, always view the profiles using the *Acft // Profile Graphs* function to check your work before trying to calculate contours.
3. Most military aircraft do not come with procedural or fixed-point profiles. You must create your own fixed-point profiles for military aircraft. These aircraft were taken from the U.S. Air Force NOISEMAP model, and they are indicated by NM at the end of the aircraft description field. Their noise groups are indicated by NOISEMAP in the model-type field.
4. If you use a spreadsheet or database management program to create your own *DBF* files for input into INM, make sure that data in key fields in related files are consistent. For example, runway end identifier, operation type, and track identifier data in the *TRK_SEGS.DBF* file must correspond exactly to data put into the same three key fields in the *TRACK.DBF* file. Use the *DBF* templates in the *SYS_DBF* subdirectory to create your files.
5. Latitude and longitude are in decimal degrees. North latitude and east longitude are positive numbers; south latitude and west longitude are negative numbers. Degrees are written to six decimal places, which provides location precision of about 10 centimeters.
6. Check the accuracy of lat/longs for airport reference points, runway end points, navaid locations, and fix locations. These INM-supplied data are taken from the FAA's NFDC database (dated 15-July-1999) and may contain errors. These data are in the *SYS_USER* subdirectory in the *SYS_APRT.DBF* and *SYS_RWY.DBF* files.

2.2. INM 6.0 Enhancements

INM 6.0 is the first full INM release since INM 5.1 (January, 1997), and it is the first in a new series of releases since INM 5.0 (August, 1995). In general terms, a full release incorporates enhancements that require a change in database definition, or includes advancements in noise assessment methodology that could result in a change in noise contours. A full release includes the distribution of a new User's Guide and Technical Manual. A minor release, such as an update to the aircraft database or a software correction, is provided as needed and is posted on the FAA Web site.

2.2.1. General Enhancements

INM enhancements are based on user experience, recommendation by the noise modeling community including SAE A-21, and advancement in computation technology.

INM 6.0 represents the beginning of a major change in noise modeling practices for the FAA, in that the data and noise computation algorithms are moving to a system that considers the spectral shape of the noise produced by aircraft. This change will eventually allow INM to incorporate state-of-the-art noise propagation algorithms that account for acoustic effects currently not modeled. These include terrain shielding, various meteorological conditions, and excess attenuation effects that are currently under review by SAE A-21 and that will eventually replace the SAE-AIR-1751 attenuation method referenced above. For INM 6.0, the spectral data enhancement will allow the model to account for actual atmospheric absorption based on airport temperature and humidity. For cases close to standard atmospheric conditions, the noise contours should change little.

INM 6.0 noise metric enhancements include a capability to employ time-above thresholds that vary with ambient noise levels from location to location. Through the use of spectral data, the model adds the ability to calculate three new metrics from the C-weighted family, along with the ability to create user-defined C-weighted cumulative exposure metrics. For detailed grid point analysis, a 100% flight contribution switch allows a user to develop externally processed metrics, such as the number-above metric.

Several computational methods that affect contours (aircraft profile calculator, NPD extrapolation limits, noise exposure fraction equation, and contouring module) have been updated based on user experience, recommendations of SAE members, and new software. The effects of these changes on noise contour shape and area are minimal.

Based on review by manufacturers, INM standard aircraft data and substitution lists have been updated. The NFDC airport data also have been updated. Other INM enhancements include improved processing of DXF files, larger terrain contour areas, and improved printing of graphics displays. Some general editing features have been streamlined, and the online help system has been updated. Finally, the latest release of the NMPlot contouring module is used so that INM can now support long directory names, rather than being limited to the old DOS eight-character naming format.

2.2.2. List of Modifications

Below is a list of INM 6.0 modifications that have been made since version 5.2a. The list is organized by INM menu and function item to facilitate referencing within the INM graphical user interface and this User's Guide.

1. INM system

- INM 6.0 automatically converts a 5.1, 5.1a, 5.2, or 5.2a study to the new *DBF* file format. Many *DBF* file formats are changed, as documented in Appendix E. If you developed a computer program to read and write INM *DBF* files, you will have to modify your software to conform to the new *DBF* format.
- Long directory names are supported. The INM system can be placed in "Program Files", if you wish. An INM study can be under any pathname. INM cases and output directories can have 30-character names including spaces.

2. *File* Menu

- *Import Data into INM* — added functions to replace the preprocessing program. Removed *PREPROC.EXE* from INM.
- Removed the OAG processor, the INM 4.11 conversion processor, and the Text-to-DBF processor from INM.
- *Import // AutoCAD DXF File* — reads line-arc-line polyline objects.
- *Import // Polyline TXT File* — added a new function to create an INM *CAD* file to display lat/long polyline data.
- *Import // Terrain 3CD or 3TX Files* — makes larger terrain contour display. Imports terrain elevation text data. Supports worldwide latitude/longitudes.
- *Import // Census PL94-171 DBF Files* — automatically creates *POP_PTS.DBF* file.
- *Import // Census TIGER Street Files* — new TIGER versions can be accommodated.
- *Import // Radar Tracks CSV File* — supports non-study X,Y coordinates.
- *Delete Non-essential Files* — added a new function to clean a study of non-essential files before zipping or archiving.
- *Export As* — exports more than 16,000 lines and can append records to existing files.
- *Export As DXF* — export all *Output Graphics* layers except *CAD*. Lat/long coordinates are supported. Polyline track objects are supported.
- *Scaled Printing* — takes decimal map units.
- *Print Output Graphics* — revised title block. Support for various contour area units.

3. *Edit* Menu

- *Copy/Paste* — copy aircraft record and all associated records (profiles, performance coefficients, etc.)
- *Copy/Paste* — copy noise record and all NPD curve records.

4. *View Menu*

- *Thrust Calculator* — added new function to compute pounds thrust using EPR or N1 input parameters. Use with fixed-point profile generation.

5. *Setup Menu*

- *Study* — added new NFDC data (15-July-1999). INM has 820 U.S. airports and 6550 nav aids and fixes.
- *Aircraft* — added DHC6QP, F18EF, JPATS, P3C.
- *Substitutions* — added CNA305, CNA17B, 717, 717ER. Changed BEC18, BEC90, C45, CNA180, CNA185, CNA205, CNA210, CNA340, CNA401, CNA425, DHC2, LA42, PA24, PA28DK, TED600, TU134. Deleted 23 substitutions as described in Section 1.3.5.
- *Aircraft and Substitutions* — added display of aircraft descriptions for easier selection.
- *Metrics* — added three new standard C-weighted noise metrics: CEXP (noise exposure), LCMAX (maximum level), and TALC (time-above a threshold level).
- *Cases* — added a function to modify NPD curves using temperature and humidity input parameters. The SAE-ARP-866A atmospheric absorption model is used.
- *Population Points* — added new window for viewing population points.
- *File Locations* — added dialog to locate 3CD terrain file directory and ambient noise file.
- *NMPlot Parameters* — added capability to set contouring parameters for size and smoothness.

6. *Tracks Menu:*

- *Track Identifiers* — track identifier increased to 8 characters.

7. *Acft Menu:*

- *Aircraft* — removed capability to change INM standard aircraft data, except for the aircraft group field.
- *Aircraft* — added capability to *Copy/Paste* aircraft.
- *Noise Identifiers* — added approach and depart spectral classes. Spectral classes are used for C-weighted and atmospheric absorption modification of NPD curves.
- *Noise Curves* — added approach and depart operational modes. Approach and depart NPD curves are separately interpolated and extrapolated. Extrapolation on thrust-setting is limited to 5 dB higher than the highest curve and 5 dB lower than the lowest curve.
- *Noise Graph* — added capability to plot all NPD curves for one aircraft on the same graph.
- *Profile Identifiers* — increased profile identifier to 8 characters.
- *Fixed-Point Profiles* — modified for approach/depart operational mode.
- *Profile Graphs* — write warning messages when procedural profile data are modified during calculation.

- *Flap Coeffs* — changed coefficients for 727D15, 727D17, 727EM2, 727Q15, 727Q9, 74720A, 74720B, 747400, 757PW, 757RR.
 - *Jet Coeffs* — changed coefficients for 727D15, 727EM2, 727Q15, 7373B2, DC870. Added coefficients for 727QF, MD9025, MD9028.
 - *Jet Coeffs* — added new coefficient types for high temperature max-takeoff and max-climb. The jet departure thrust algorithm is modified to model temperature breakpoint and reduced thrust at high altitudes and temperatures.
 - *General Coeffs* — added new window and *DBF* file to support the *View // Thrust Calculator* function.
8. *Ops* Menu:
- Removed *Use OAG* function from INM.
 - *Runup Operations* — increased runup identifier to 8 characters.
9. *Run* Menu:
- *Grid Setup* — increased grid identifier to 8 characters.
 - *Grid Setup* — moved time-above threshold from case record to grid record. Added two new grid types so time-above thresholds can be defined for population and location points.
 - *Grid Setup* — added capability for relative time-above threshold based on ambient noise data and a delta level above or below ambient.
 - *Grid Setup* — added capability to compute percent of time-above.
 - *Grid Setup* — can now rotate contour rectangle.
 - *Run Options* — removed time-above threshold.
 - *Run Options* — added function to save 100% of flight operations in *GRID_DTL.DBF* table.
 - *Run Options* — added C-weighted metric check boxes.
 - *Run Options* — increased run duration field to 999 hours.
 - *Run Start* — flight path module: Revised jet thrust equation for high temperature/altitude cases, including a default method for engines without high temperature thrust coefficient records. Revised non-standard pressure ratio equation. Revised start-roll exposure calibration speed because of new exposure fraction algorithm. Subdivided takeoff roll into 6 segments and first climb portion into 3 segments. Revised climb and acceleration step algorithm for computing procedural profiles. Generate warning messages for non-standard profiles.
 - *Run Start* — noise computation module: Added variable size base grids for large area contour processing. Added flight segment significance testing for faster run time. Revised noise exposure fraction algorithm. Revised terrain beta angle.
10. *Output* Menu:
- *Output Graphics* Contour Display Control — added width function for noise contours.
 - *Output Graphics* — calculate contours with new 32-bit NMPlot software. The *NMPLOT.GRD* file is in NMBG 2.3 format.

- *Output Graphics* — display noise level at the mouse cursor position on the main window status bar. The function can be turned on or off in the *Window // Options* function.
- *Contour Area and Population* — population computed by processing *POP_PTS.DBF* and *POP_NOIS.DBF* files, rather than by determining points inside contours.
- *Contour Area and Population* — added contour areas in square kilometers, square statute miles, millions of square feet, and acres. Removed census block area.
- *Case Echo Report* — added user-defined general thrust coefficient section.
- *Flight Path Report* — added new function to write flight path data to a text file.

11. *Window* Menu:

- *Options* — added new function to set INM system parameters: confirm record commit, confirm record delete, set auto save time, display tool bar, display status bar, display logo on startup, display noise at cursor.

12. *Help* Menu:

- *Index* — added on-line help support for new functions.

2.3. INM User Interface

You interact with the INM system when you process source data, prepare input data, execute the model, and analyze output data. To facilitate user interface tasks, INM provides various ways to work with data.

2.3.1. Data File Format

INM 6.0 can be used with other application programs. Most INM input and output files are in dBase IV format (they have a *DBF* file extension). You can use a spreadsheet or database management program to input and manage large files (especially the *OPS_FLT.DBF* file), and you can use a spreadsheet or geographical information system program to create presentation graphics from output *DBF* files.

Please be careful when using other programs so that you do not accidentally change the *DBF* format of an INM file. Some spreadsheets change the field width when you simply change the visual appearance of the data on the screen and then save the file. INM will not read a *DBF* file that has had its format changed.

Because INM mostly uses public *DBF* files (rather than secure, but inaccessible binary files), it must employ strong data validation processing to maintain the integrity of the *DBF* data in memory. Data checking is performed on each record

as *DBF* files are read from disk. This requires extra processing time, and you will notice a few seconds delay, especially for large files.

2.3.2. Input and Output Capabilities

INM input capabilities:

- Interactively enter data in various form-input windows.
- Interactively enter ground track data in a graphics window.
- Import data from specially formatted text files, including *DXF* graphics.
- Use a spreadsheet or database management program to directly edit *DBF* input files.

INM output capabilities:

- View output charts, graphics, and tables on the screen.
- Print charts, graphics, and tables on a printer or to print files (for example, Postscript).
- Copy tables and charts to the Microsoft Clipboard for use in other applications.
- Export tables to *DBF* files, or to text files in a fixed-column or comma-quote format.
- Directly access *DBF* output files using a spreadsheet or database management program.

INM does not support Object Linking and Embedding (OLE) methods of exchanging data with other programs.

2.3.3. INM Main Menu

INM displays a menu of functions that lets you manage your study, input data, run the model, and display the results. The main menu functions are introduced below, and they are discussed in detail in Sections 3 through 13.

<i>File</i>	Create a new study, open an existing study, import data, export data, print, and exit.
<i>Edit</i>	Add, delete, copy data records, and edit graphical data.
<i>View</i>	Control the appearance of tables and graphics displays, calculate lat/longs, calculate thrust values.
<i>Setup</i>	Setup study, aircraft, substitutions, metrics, cases, location-point, and population-point data. Specify file locations and contouring parameters.
<i>Tracks</i>	Input runways and ground tracks and do graphical editing.
<i>Acft</i>	Input aircraft, substitution, noise, and flight profile data.

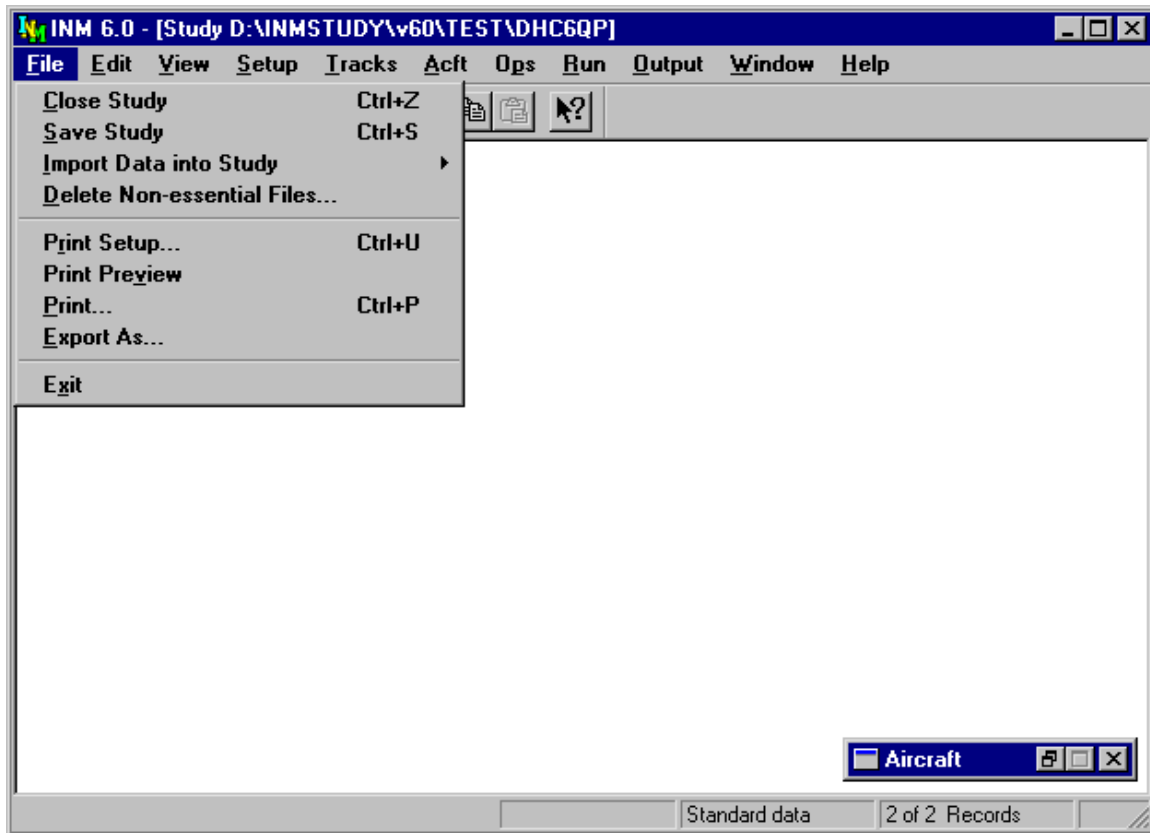
<i>Ops</i>	Input and calculate flight and runup operations.
<i>Run</i>	Setup grids of points for analysis, define run options, and execute one or more cases.
<i>Output</i>	Define output processing, view noise contours and various output tables, and create reports.
<i>Window</i>	Control the appearance of windows and set INM options.
<i>Help</i>	Access help information.

2.4. INM60 Disk Directories

The INM 6.0 system software is contained in various disk directories, as briefly described below. Appendix D lists the files contained in the INM system directory and files contained in a typical INM study directory.

1. **INM60** — This is the main INM system directory. It contains the *INM.EXE* program, supporting dynamic link library (*DLL*) files, a help file, an initialization file, and system subdirectories — everything needed to run INM. You may rename or move this directory.
2. **COMPUTE** — This system subdirectory is used as a working directory when computing noise. Do not rename or delete this subdirectory.
3. **SYS_DATA** — This system subdirectory contains the INM standard database in the *ACDB60.BIN* file and the *SPECTRA.BIN* file. The *ACDB60.BIN* file contains 12 *DBF* files in an encrypted compressed binary format. The *DBF* files are also provided for public view. The *SPECTRA.BIN* file contains data for aircraft spectral classes. Do not rename or delete this subdirectory. Do not change data in the *DBF* files. Do not delete the *BIN* files.
4. **SYS_DBF** — This system subdirectory contains 35 *DBF* template files used by INM. A template is a *DBF* file without any records. Do not rename or delete this subdirectory or any of the files.
5. **USR_DATA** — This system subdirectory contains *DBF* files that are used by INM, but you can adapt them for your own use (for example, you can add airport data). Save your modified *USR_DATA* files before you load a new version of INM. Do not rename or delete this subdirectory.
6. **PROCESS** — This system subdirectory contains software and data that support source data processing:

- The **CENSUS** subdirectory contains the *CENSUS.EXE* console program and data files that INM uses to process U.S. Census CD-ROM data and produce street map and population graphics files for display.
 - The **DXF** subdirectory contains the *CADCVRT.EXE* console program INM uses to process a *DXF* file and produce a graphics file for display.
 - The **TEXT** subdirectory contains example text files. You may delete these files.
7. **EXAMPLES** — This subdirectory contains two example studies converted to INM 6.0 format. The *EXAMPLES* subdirectory takes up a large amount of disk space. You may move or delete this subdirectory.
 8. **INM study directory** — INM creates a study directory when you create a new study using INM. An INM study consists of study-level files (for example, *RWY_END.DBF*), additions and changes to INM standard *DBF* files, case subdirectories, and output subdirectories. A study directory can be renamed, copied, and/or moved to a different place on your disk or network.
 9. **INM case subdirectories** — An INM study consists of one or more "cases" (for example, a base case and two alternatives). Both study and case directories are used to store input data. Tabular output data are put into the case subdirectory. You must create a case subdirectory inside INM. INM does not allow you to change the name of a case subdirectory once it is created. Do not rename or delete a case subdirectory outside of INM.
 10. **INM output subdirectories** — Noise contour data and output graphics data are put into "output" subdirectories. The reason for having separate output subdirectories (instead of using case subdirectories) is so that you can combine cases to form different kinds of output. For example, you can create noise contours showing the difference between two cases. You must create an output subdirectory inside INM. INM does not allow you to change the name of an output subdirectory once it is created. Do not rename or delete an output subdirectory outside of INM.

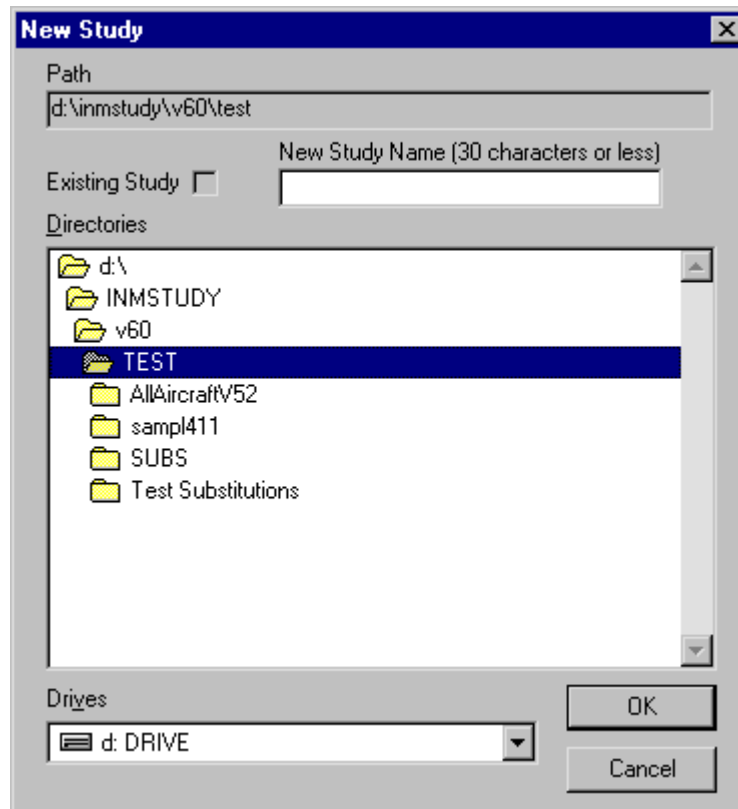


3. FILE MENU

There are three different *File* menus:

- The one shown above is used when a *DBF* window or a table window is active.
- A slightly different set of *File* functions is displayed when a graphics window is active.
- A menu with fewer functions is displayed when there is no study loaded. New Study and Open Study functions are available on this menu.

All the *File* functions are described in this section.



3.1. New Study

Menu Item: *File // New Study*

Use this function to create a new INM study. Study data are contained in a directory (folder) on a disk drive. The name of the study is the name of the directory.

To create a new study:

1. Select a disk drive.
2. Move up and down the directory tree by double clicking on directory names. Select a directory that will contain the new study (the parent directory).
3. Type a study name in the New Study Name input box. The name can be up to 30 characters long.
4. Press OK. INM displays a verification box for the study pathname.
5. After verifying that the study is where you want it, press Yes. INM creates the study directory inside the parent directory and writes a few key files.
6. INM displays a dialog box that lets you choose the kind of physical units (English or metric) for the study. Select one. Press OK.
7. INM displays the Study Setup dialog box. Fill out this box as described in *Setup // Study* in Section 6.1. Press OK.

INM lets you create a study almost anywhere on your disk, so carefully check the study pathname before selecting Yes in the verification dialog box. This extra verification step is included to protect you from creating a study in the wrong directory.

If you happen to choose a study pathname that already is an INM study (one that has the *STUDY.INM* file), INM places a check mark in the Existing Study box and does not allow a new study to be created with that pathname. However, all other directories are available for use as a new study directory, even if they have files in them. All directories can be used as a parent for a study directory, even another study.

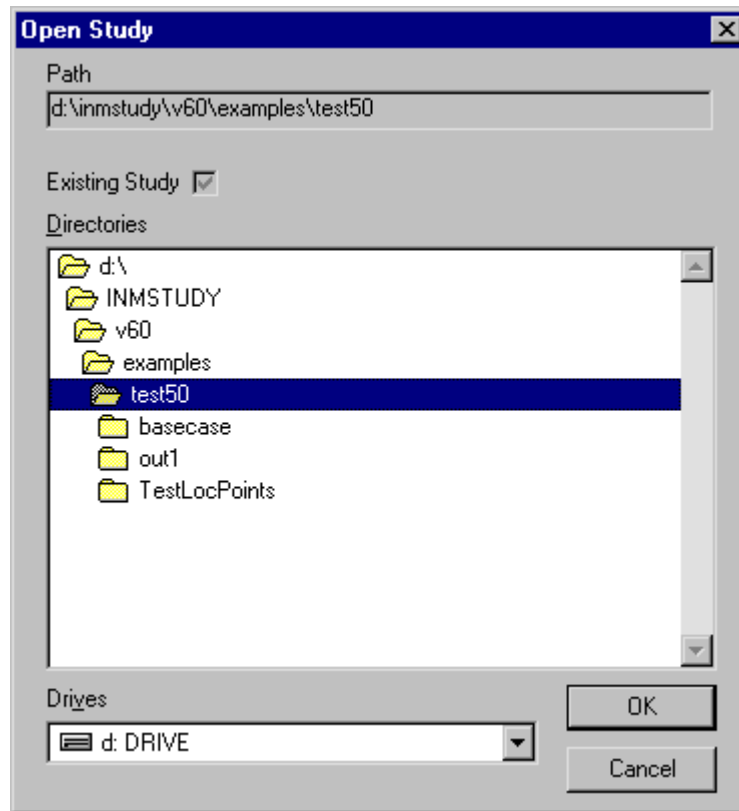
An INM study is an independent entity, meaning that the directory does not have to be in a particular place on your disk. After you create a study and close it, you can use a file manager to change the directory name and/or move the directory to some other place. Then, you can open the study again and use it. For this reason, INM does not keep an internal list of study directories.

After creating a new study, INM displays a dialog box that lets you choose the kind of physical units that will be displayed in the windows. Once you commit to a system of units, you cannot change to the other system of units. The table below shows various physical variables and their units in the two systems:

	<u>English</u>	<u>Metric</u>
X,Y coordinates	nmi	km
Track distance	nmi	km
Runway distance	ft	m
Profile distance	ft	m
Altitude	ft	m
Weight (mass)	lb	kg
Speed	knot	km/hr
Climb rate	ft/min	m/min
Temperature	°F	°C
Pressure	in-Hg	mm-Hg
Area	mi ²	km ²

INM converts units when displaying data in windows. The type of unit is shown next to the input parameter; for example, (ft) or (m).

Even though INM can accept metric input, you should be aware that INM data are stored in *DBF* files in English units, and user-created *DBF* file data must be in English units. Small round-off errors are introduced when input metric units are converted to English units, saved in *DBF* files, read back into INM, and converted back to metric for display. Some data, such as thrust values and aerodynamic coefficients, are stored and displayed only in English units.



3.2. Open Study

Menu Item: *File // Open Study*

Use this function to open an existing study:

1. Select a disk drive.
2. Move up and down the directory tree by double clicking on directory names. Select the study directory.
3. Verify that there is a check mark in the Existing Study box, and press OK to load the study.
4. INM reads a few key files and changes the main menu bar, allowing you to start an INM session. The full pathname of the current study is displayed on the title bar at the top of the INM main window.

There are two other ways to open a study:

- To load a recently opened study, go to the *File* menu and click on a study name at the bottom of the menu.
- Use a file manager to associate files that have extension *INM* with the *INM.EXE* program. Then, open a study by double clicking on the *STUDY.INM* file in the study directory.

3.3. Close Study

Menu Item: *File // Close Study*

Use this function to save all data and close the study. The INM program continues to run, and you can create or open another INM study.

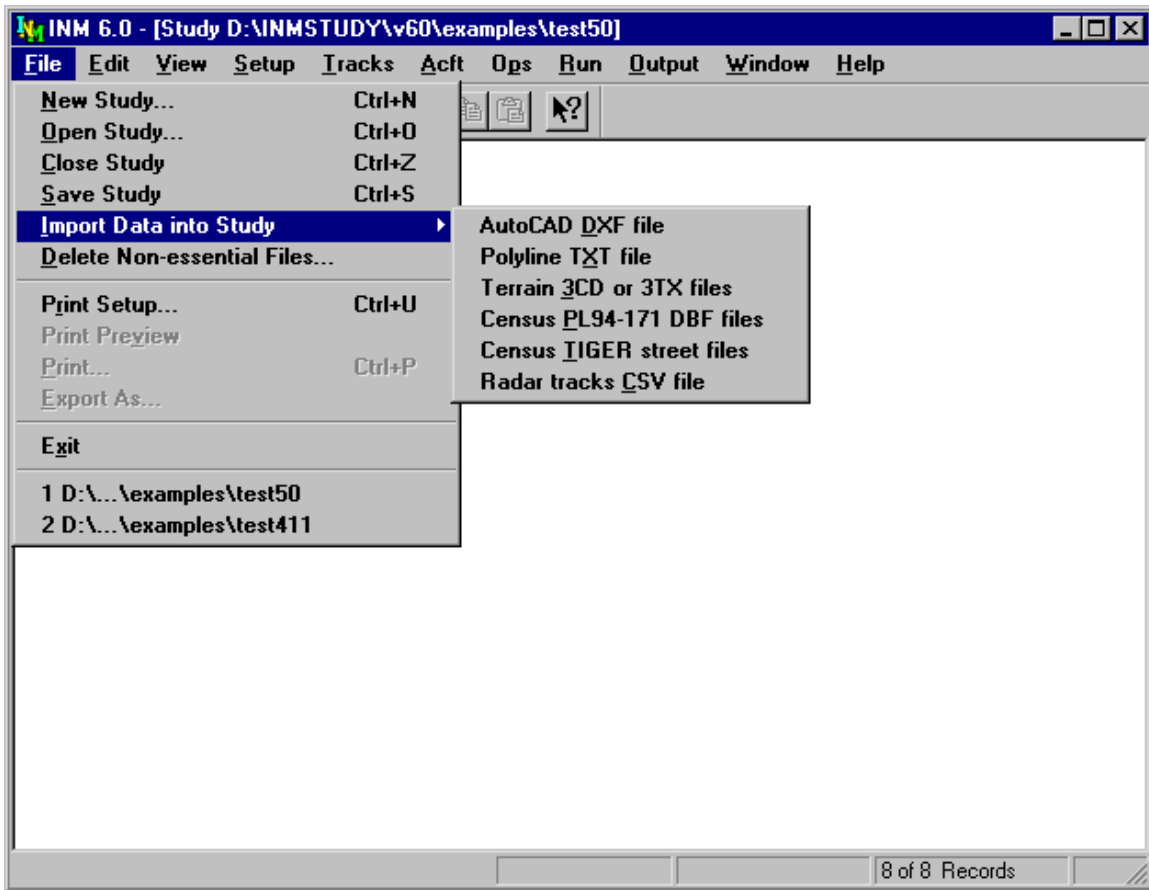
Sometimes INM will not allow you to close a study because you have forgotten to commit a new record in an open *DBF* window. Commit (or delete) the record and then close the study.

3.4. Save Study

Menu Item: *File // Save Study*

Use this function to save data in memory to disk files. When you commit a record, INM moves your data from the user interface area to another area in computer memory, but the record is not yet saved to disk. When you close a window, INM saves the associated *DBF* file. Iconifying a window does not save the file because the window is still open.

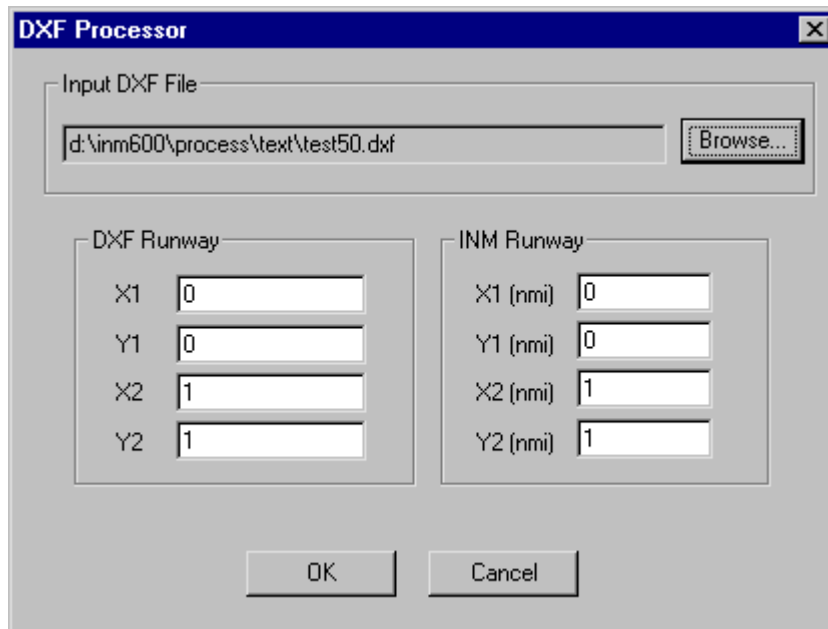
As a protection against loss of input data, INM automatically saves data that are in memory to disk files every few minutes. This time period can be changed using the *Window // Options* function.



3.5. Import Data into Study

Menu Item: *File // Import Data into Study*

Use this function to import various kinds of data files. INM processes input files and creates output files that can be used in the study.



3.5.1. Import AutoCAD DXF File

Menu Item: *File // Import Data into Study // AutoCAD DXF File*

This function imports a CAD drawing into INM. The input file must be in *DXF* format. Most CAD application programs provide a *DXF*-file export option. AutoCAD® version R13 format is supported. If a later *DXF* version does not seem to convert properly, use AutoCAD or other CAD application to create a *DXF* file in an earlier version.

Use a simple drawing of the runways, taxiways, and buildings instead of a complicated engineering drawing. A simple drawing makes the size of the *DXF* file small, keeps the converted file small, and allows INM to quickly display the airport overlay. A *DXF* file that is greater than one megabyte is probably too large.

To run the DXF Processor:

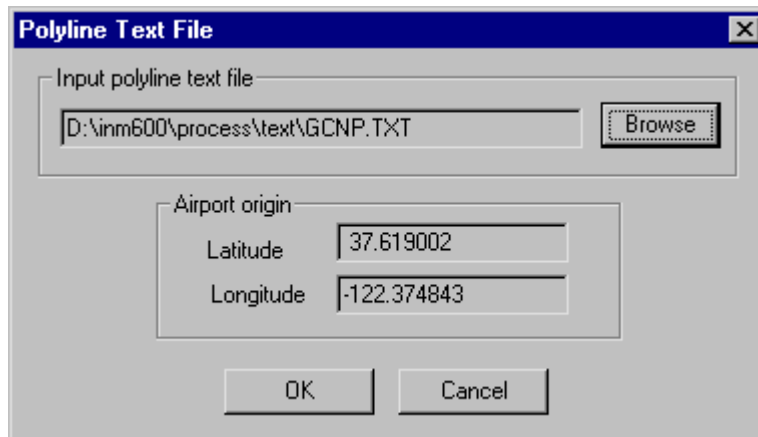
1. Use AutoCAD® or some other CAD application program. Load your *DXF* drawing and find the X,Y coordinates of two runway ends, in whatever units that are presented. For example, runway end 05L is at (376071, 176139) and 23R is at (377738, 177418).
2. In INM, create runways using the *Setup // Study View Airports* or the *Tracks // Runway Ends* window. Write down the runway end X,Y coordinates in nautical miles (converting from kilometers, if necessary). For example, runway end 05L is at (0.0, 0.0) and 23R is at (0.7451, 0.6252).

3. Use the Browse button to select the *DXF* file to convert.
4. Fill out the bottom part of the form with the X,Y data that you collected. For example:

<u>DXF Runway</u>	<u>INM Runway</u>
X1 376071	X1 0.0
Y1 176139	Y1 0.0
X2 377738	X2 0.7451
Y2 177418	Y2 0.6252

5. Press OK to start the conversion process. When the DXF Processor is finished converting the *DXF* file, a new *CAD* file will be put into the study directory. The output file is the same name as the *DXF* file, but with a *CAD* extension.
6. Use INM to look at the result in either the *Tracks // Input Graphics* or *Output // Output Graphics* window.

The CAD drawing should match the INM runway system almost exactly. If not, you may have made a mistake in the X,Y data, or the *DXF* file has complex structures that are not being properly converted, or your airport drawing may be distorted. An example *DXF* file and its *CAD* conversion are in the *INM60 \ EXAMPLES \ TEST50* subdirectory..



3.5.2. Import Polyline TXT File

Menu Item: File // Import Data into Study // Polyline TXT File

This function imports boundaries and other line-oriented graphics data that are given in latitude and longitude. The function reads a text file containing lat/long points and converts it into a binary file that is used by INM to display CAD layers. The output binary *CAD* file is in the same format as the one produced by the DXF Processor.

A polyline is a series of points that are connected together to form a continuous line. One or more polylines can be imported from a single *TXT* file. Each polyline is put into a separate *CAD* layer, and you can select and color layers in INM. The maximum is 200 layers.

To run the Polyline Processor:

1. Use the Browse button to select your input text file. Files with *TXT* extension are filtered for display, so it is convenient to name your input file with a *TXT* extension.
2. Press OK. INM converts the lat/longs into X,Ys relative to the study origin, and writes a *XXX.CAD* file to the study directory, where *XXX* is the name of your *TXT* file.

Polyline *TXT* format:

```
LAYER LayerId
Lat Long
Lat Long
...etc...
LAYER LayerId
Lat Long
Lat Long
Lat Long
...etc...
```

where,

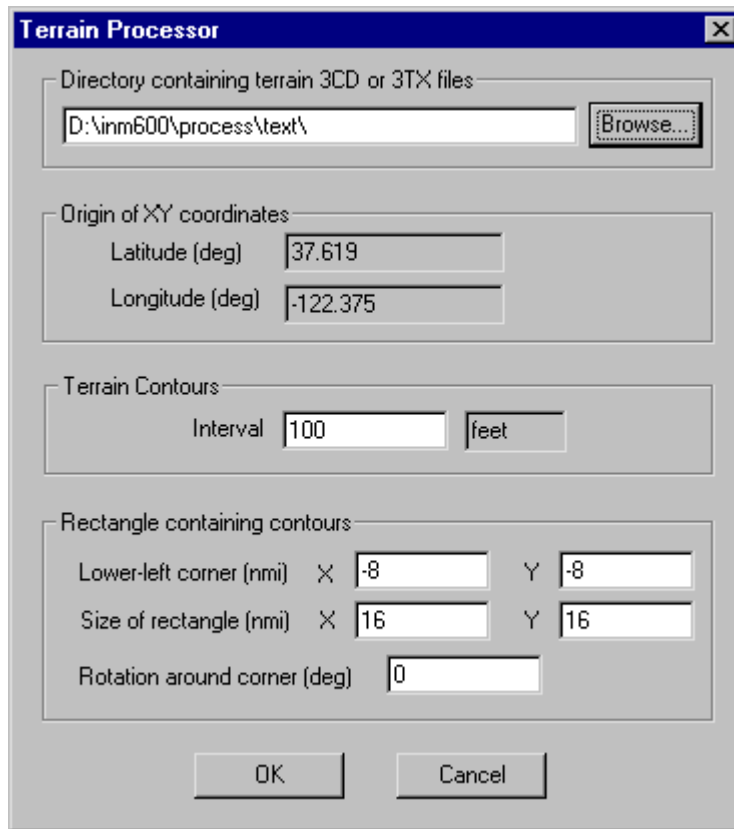
- LayerId Name of the layer (no blanks)
- Lat Latitude (decimal degrees)
- Long Longitude(decimal degrees)

The LAYER keyword is used to designate a new polyline. North latitude and east longitude are positive numbers; south latitude and west longitude are negative numbers. Latitude is first, separated from longitude by blanks. There can be any number of lat/long points per polyline.

A text line starting with the number-sign character (#) is ignored. You can use this method to document your file.

The following is an example polyline *TXT* file. The complete example is in *INM60\PROCESS\TEXT\GCNP.TXT*.

```
LAYER Colorado River
36.865307 -111.588455
36.861176 -111.594627
36.858429 -111.601608
36.853123 -111.606773
36.849697 -111.615456
```

3.5.3. Import Terrain 3CD or 3TX Files

Menu Item: *File // Import Data into Study // Terrain 3CD or 3TX Files*

This function imports terrain elevation data into INM to provide a terrain contour layer for display in *Output // Output Graphics*. The input data can be in one of two formats:

- 3CD binary format by Micropath Corporation. You can purchase a CD-ROM containing 3CD files of U.S. terrain elevations (see Appendix A).
- 3TX text format, containing terrain elevations covering a one-by-one degree area. This format can be used by non-U.S. INM users. The 3TX format is described in this section.

When 3TX files are processed, INM creates the corresponding 3CD binary files. The 3CD binary files are used by INM when the *Run // Run Options Do Terrain* box is checked. INM uses terrain elevations to adjust observer-to-aircraft distances when computing noise levels.

To run the Terrain Processor:

1. Put one or more *3CD* or *3TX* files into the study directory. Use the Browse button and select the study directory. The files must have the *3CD* or *3TX* file extensions.
2. Input the contouring interval in the Contour Interval box. If your study uses English units, terrain contour interval is in feet, otherwise the interval is in meters.
3. Input the parameters that define the rectangle in which the terrain contours will be computed. The lower-left corner X,Y is relative to the study origin. The width X and height Y define the size of the rectangle. The rectangle can be rotated around the lower-left corner. Counter-clockwise is positive degrees; clockwise is negative.
 - The rectangle definition parameters are the same as the parameters used to define the noise contour rectangle in the *Run // Grid Setup* function. Thus, you can make the terrain rectangle match the noise rectangle.
4. Press OK. The Terrain Processor reads one or more *3TX* text files, converts them to *3CD* binary format, and then produces a single *_TERRAIN.BIN* file, which contains terrain contour data that are used for display in an *Output // Output Graphics* window. The *3CD* files and the output file are put in the study directory.

3TX text format:

```
Lat Long  
Elevation  
Elevation  
Elevation  
...etc...
```

where,

- Lat Latitude of SW corner (integer degrees)
- Long Longitude of SW corner (integer degrees)
- Elevation Terrain elevation MSL (integer meters)

The first line in the file defines the southwest corner of the one-by-one degree area. North latitude and east longitude are positive integers; south latitude and west longitude are negative integers. The SW corner must be on integer degrees.

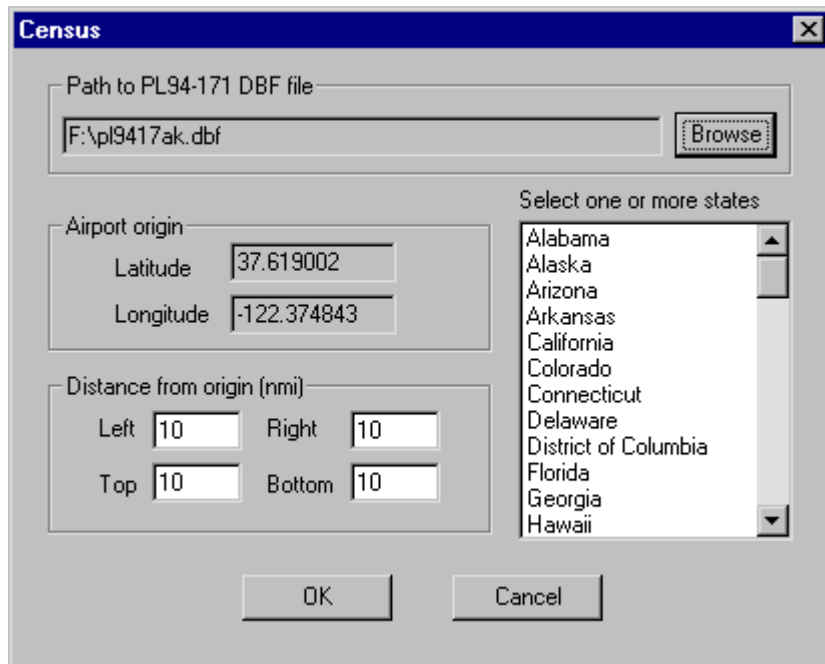
There must be exactly $1201 \times 1201 = 1442401$ lines following the first line. Each line contains one number — the elevation, in integer meters, of the terrain above mean sea level. The elevation of the SW corner is the first integer, the elevation that is 3 arc-seconds to the north is the next integer, and so on until the top edge (integer degree latitude) is reached. Then move 3 arc-seconds to the east, start at the bottom edge, put in another 1201 elevations while moving north, and so on until the file is filled.

The following is an example terrain elevation *3TX* text file. The complete example is in *INM60\EXAMPLES\TEST50\N37W123.3TX*.

```
37 -123
11
13
12
```

The *3CD* files that are created from *3TX* files use a special naming convention. The first letter is N or S, followed by two latitude digits, then E or W, followed by three longitude digits (for example, *N37W123.3CD*). The name of the *3CD* file is used by INM to locate the SW corner. Do not rename *3CD* files.

The encoded southeast corner field in a Micropath *3CD* file is no longer used by INM. However, the Micropath *3CD* file name is still valid (two digits for north latitude and three digits for west longitude of the southeast corner).



3.5.4. Import Census PL94-171 DBF Files

Menu Item: *File // Import Data into Study // Census PL94-171 DBF Files*

Use this function to import *DBF* data from a PL94-171 CD-ROM and create:

- A binary file that is used to display population points in the *Output // Output Graphics* window.
- A *DBF* file that can be used with the *Run // Run Options Do Population Points* function to calculate noise levels at population points.

You can purchase a PL94-171 CD-ROM through the U.S. Bureau of the Census (see Appendix A).

To run the Population Processor:

1. Use the Browse button to select a *PL9417xx.DBF* file, where *xx* is a U.S. state code. The file can be on a CD-ROM.
 - INM uses the file name to set the pathname to the *DBF* files; the actual state selected does not matter at this point.
2. Input the size of a rectangular box containing the streets.
 - If you want the population points to match the streets, use the same parameters as used in the TIGER Processor.
 - The dimensions of the box are left/right and top/bottom from the study origin, so that the center of the box does not have to be on the origin.

- For example, Left = 10 nmi, Right = 20 nmi, Top = 10 nmi, and Bottom = 10 nmi, makes a box that is 30 nmi wide and 20 nmi high, with the origin offset to the left of the center of the box by 5 nmi.
3. Select the U.S. state in which the airport resides. If the airport is near the state border, you can select more than one state. The program will ask you input the appropriate CD-ROM if the states are not on the same CD-ROM.
 4. Press OK to start the Population Processor. Two files will be written into the study directory: `_CP.BIN` and `POP_PTS.DBF`.
 - If you want to run the Population Processor again for the same study, delete these two files before starting, or new data will be appended to the existing `_CP.BIN` file.

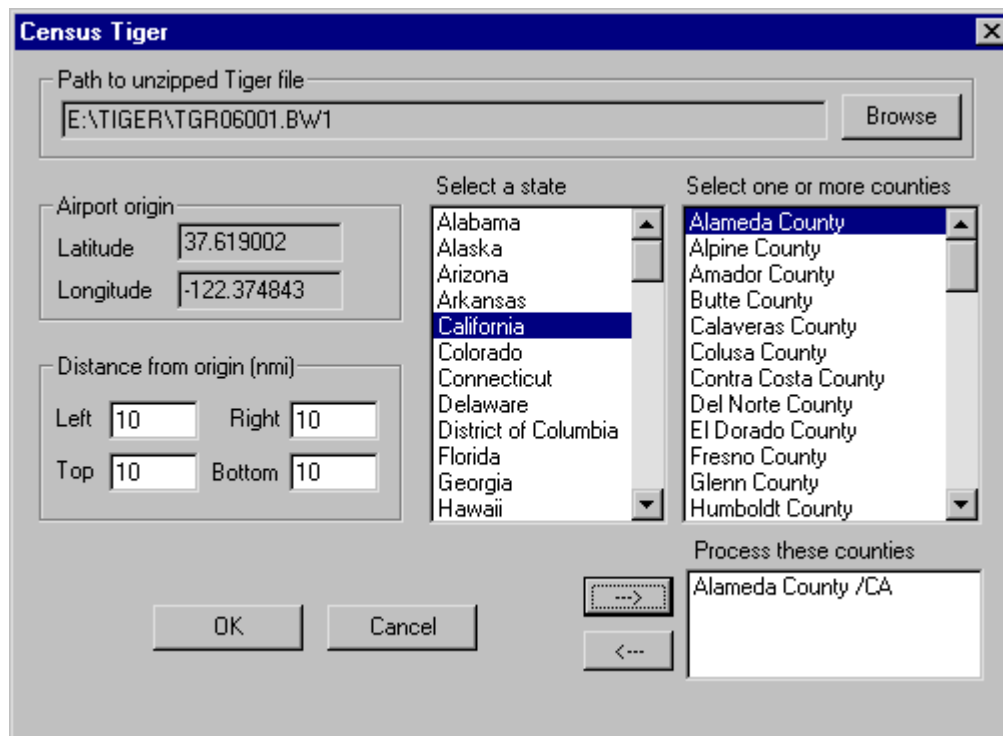
The population data on the PL94-171 CD-ROM are in dBase format, one DBF file for each U.S. state. The INM Census Processor scans a DBF file looking for records that have summary level 750, which indicates that the population count data on the record apply at the Census Block level. The following data are extracted from the record:

<u>Description</u>	<u>Field Name</u>	<u>Field</u>	<u>Size</u>
Block	BLCK	14	4
Block Numbering Area	TRACTBNA	16	6
County Code	CNTY	23	3
State FIPS Code	STATEFP	42	2
Land Area	AREALAND	56	10
Latitude	INTPLAT	62	9
Longitude	INTPLNG	63	10
Population Count	POP100	66	9

A 15-character population point identifier is used in INM. It is a concatenation of the above identifiers (including any blank characters), as follows:

INM Population Point Id = STATEFP + CNTY + TRACTBNA + BLCK

The State FIPS Code (a number) can be associated with a U.S. state by referring to the `FIPSTATE.DAT` text file in the `INM60\PROCESS\CENSUS` subdirectory.



3.5.5. Import Census TIGER Street Files

Menu Item: *File // Import Data into Study // Census TIGER Street Files*

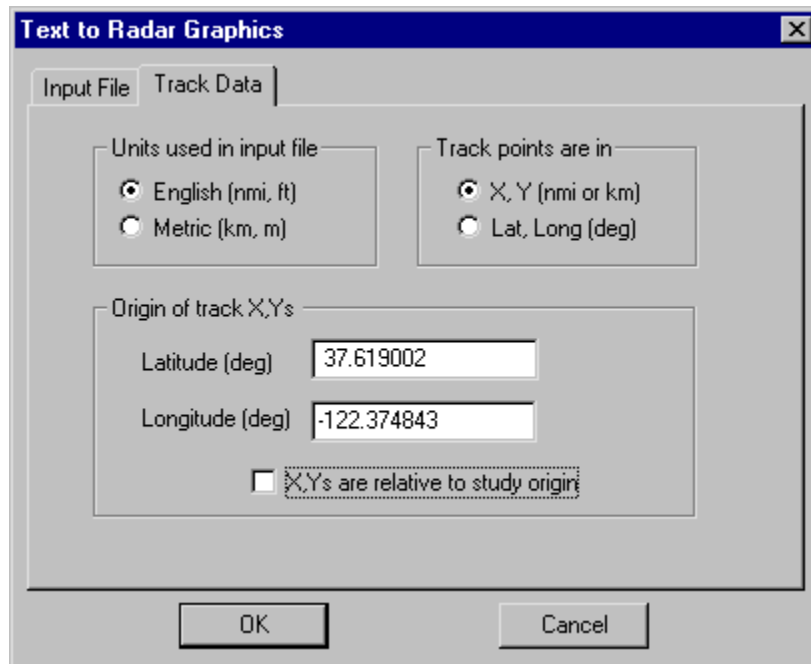
Use this function to import data from TIGER/Line street files and create two binary files that are used by INM to display streets, highways, hydrographic features, civil boundaries, etc.

You can purchase a TIGER/Line CD-ROM through the U.S. Bureau of the Census (see Appendix A). The TIGER Processor can be used with all versions of TIGER data.

To run the TIGER Processor:

1. Use a text editor to open the file *FIPSCODE.DAT*, which is in the *INM60\PROCESS\CENSUS* subdirectory. Look in this file and copy down the state numbers and county numbers that you plan to process. For example, Kansas - Ellsworth County is 20 - 053.
2. Use a utility program, such as WipZip, to unzip state/county files that are on the TIGER/Line CD-ROM. Unzip them to a disk directory.
 - The files you need are called *TGRxxyyy.ZIP*, where *xx* is the state code and *yyy* is the county code. For example, the Kansas Ellsworth County file is *TGR20053.ZIP*.

- Do not unzip all the files contained in the *ZIP* file. You need only two files, which are the ones ending in 1 and 2. In the Kansas example when using 1995 TIGER, unzip the two files called *TGR20053.BW1* and *TGR20053.BW2*.
 - The *BW* file extension part changes for each new TIGER version, but the state/county codes and the ending numbers 1 and 2 stay the same.
3. Use the Browse button. In the Open File dialog List Files of Type box, select "TIGER Files" to filter on *TGR* files. Go to the directory where you put the unzipped *TGRxxyyy.vv1* and *TGRxxyyy.vv2* files. Select an example *TGR* file.
 - INM uses this example file name to get the input directory pathname and the version extension code.
 4. Input the size of a rectangular box containing the streets. A large box will contain a large amount of data and the resulting file will take longer to load into INM when displaying streets.
 - If you want the streets to match the population points, use the same parameters as used in the Population Processor.
 - The dimensions of the box are left/right and top/bottom from the study origin, so that the center of the box does not have to be on the origin.
 - For example, Left = 10 nmi, Right = 20 nmi, Top = 10 nmi, and Bottom = 10 nmi, makes a box that is 30 nmi wide and 20 nmi high, with the origin offset to the left of the center of the box by 5 nmi.
 5. Select the state in which your airport resides. If your study is on a border, you can process multiple states. Put the required *TGR* files into the input directory first.
 6. For each state, select one or more counties by highlighting them, and then use the arrow button to move the county name into the lower list box.
 7. Press OK to start the TIGER Processor. Two output files will be put in the study directory: *_TIGER.BIN* and *_TIGER.IDX*.
 - If you want to run the TIGER Processor again for the same study, delete these two files before starting, or new data will be appended to the existing files.



3.5.6. Import Radar Tracks CSV File

Menu Item: *File // Import Data into Study // Radar Tracks CSV File*

Use this function to import a text file containing radar track data and convert it into a pair of binary graphics files that are used by INM to display radar track data.

You supply the input text file. The text file can contain any kind of track data, but the intention is that you process raw ARTS radar track data, and write the track data to a specially formatted text file. INM does not have a function that processes raw ARTS data.

To run the Radar Processor:

1. In the Input File tab, use the Browse button to select your input text file. Files with *CSV* extension are filtered for display, so it is convenient to name your input file with a *CSV* extension (although you not have to).
2. In the Track Data tab, select English if your track data are in nautical miles for distance and in feet for altitude. Select Metric if your track data are in kilometers for distance and in meters for altitude.
3. Select X,Y if the track points are distance X east and distance Y north from a given latitude and longitude origin. Type in the lat/long of the origin.
 - If the radar track X,Y origin is the study origin, use the check box to automatically insert the study lat/long.

- The radar track Y axis must be oriented on true north.
4. Select Lat,Long if the track points are given as latitude and longitude values.

Radar track *CSV* text format:

```
Code, FltId, AcType, OpType, ApFrom, ApTo, RwyId
, Time, X or Lat, Y or Long, Alt, Spd
, Time, X or Lat, Y or Long, Alt, Spd
...etc...
Code, FltId, AcType, OpType, ApFrom, ApTo, RwyId
, Time, X or Lat, Y or Long, Alt, Spd
, Time, X or Lat, Y or Long, Alt, Spd
, Time, X or Lat, Y or Long, Alt, Spd
...etc...
```

where,

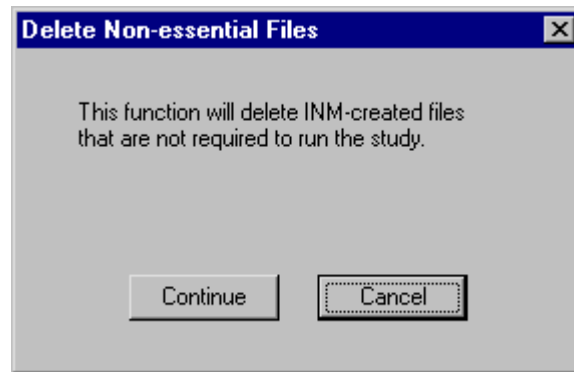
- Code Beacon or numeric code (0557) or 0000
- FltId Flight identifier (AAL1234)
- AcType FAA aircraft type id (B727)
- OpType Operation type: A = approach, D = depart, V = overflight, ? = unknown
- ApFrom From-airport (SFO) or ???
- ApTo To-airport (LAX) or ???
- RwyId Runway end (31L) or ???
- Time Time of radar return (decimal hours)
- X or Lat X value (nmi, km) or latitude (decimal deg)
- Y or Long Y value (nmi, km) or longitude(decimal deg)
- Alt Aircraft altitude MSL (ft, m)
- Spd Aircraft ground speed (kt, km/hr) or 0

Fields must be separated by commas. A comma must be in the first column of a track-point line. Blank lines and comments lines can be anywhere. There can be any number of tracks and points per track.

A line starting with the number-sign character (#) is ignored. You can use this method to document your file or to comment-out data sections.

The following is an example radar track *CSV* text file in X,Y format. The complete example is in *INM60\EXAMPLES\TEST50\TEST50.CSV*.

```
#EXAMPLE RADAR FILE TEST50.CSV
0012, SDU105, BA31, A, ???, SFO, ???
, 9.28833, 11.15063, -5.67526, 3500, 187
, 9.28972, 10.99544, -5.53952, 3500, 186
0016, UAL1287, B737, A, ???, SFO, ???
, 9.18444, 2.22314, -1.16763, 700, 169
, 9.18972, 1.67270, -0.85274, 400, 156
, 9.19222, 1.37155, -0.75014, 300, 152
, 9.19361, 1.26781, -0.60724, 300, 152
```



3.6. Delete Non-Essential Files

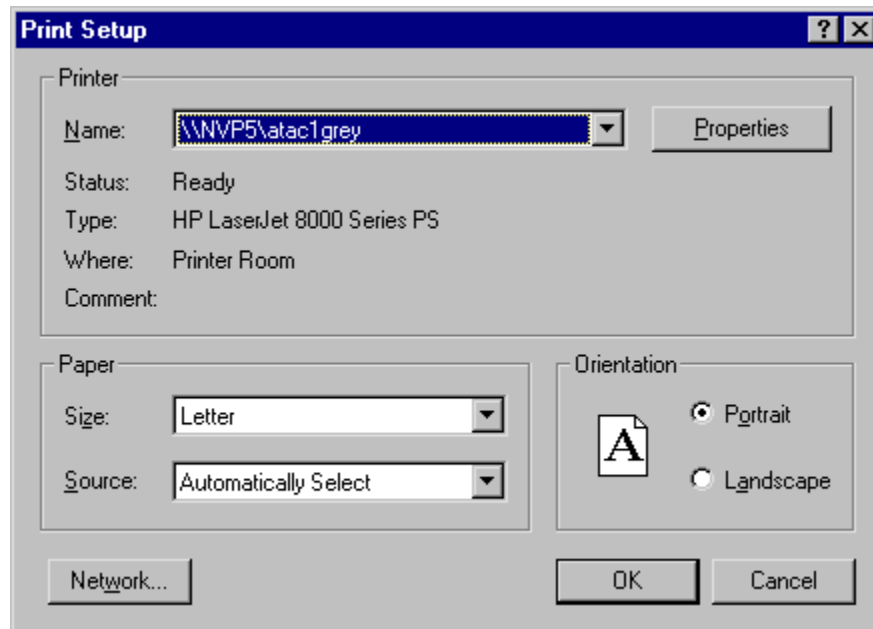
Menu Item: *File // Delete Non-essential Files*

Use this function to remove files from the active study that are not essential for computing or displaying results. This function provides a way to reduce the size of the study directory before zipping it to send to someone or to move to an archive.

The noise computation output files remain, so that the cases do not have to be re-run. Graphics options remain, so you do not have to reset colors, etc. Post-processed files are removed, so the NMPlot contouring processor does have to re-create contour-related data. Binary and text flight path files are removed. Case echo reports are removed.

The following files will be deleted in study, case, and output directories when you press Continue in the dialog box:

- *_INM.BIN*
- *CONR_PTS.DBF*
- *CONTOURS.DAT*
- *FLIGHT.PTH*
- *FLIGHT.TXT*
- *FLT_ERR.TXT*
- *NMPLOT.GRD*
- *OPS_CALC.DBF*
- *OPS_ERR.TXT*
- *POP_CONR.DBF*
- *REPORT.TXT*
- *STATUS.DAT*

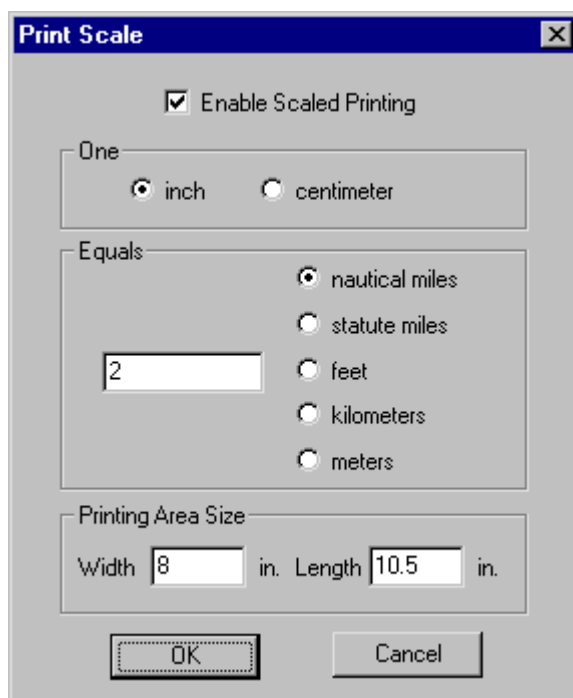


3.7. Print Setup

Menu Item: *File // Print Setup*

Use this function to select the printer that you want to use and to set various printing options (for example, portrait vs. landscape mode). This is a standard Microsoft function.

Printing a chart in landscape mode is done with this function or with the *File // Print // Properties* function.



3.8. Scaled Printing

Menu Item: *File // Scaled Printing*

Use this function to set up INM for scaled printing:

1. Check the Enable Scaled Printing box to turn on scaled printing.
2. Select a ruler unit (one inch or one centimeter)
3. Select the map distance units (for example, feet).
4. Input the map distance corresponding to the ruler unit (for example, one inch equals 1000 feet)
5. Press OK.

Scaled printing information is saved in separate files, so you have to fill out a *Scaled Printing* dialog box for *Tracks // Input Graphics* and for each *Output // Output Graphics* window.

To perform scaled printing, INM reads print area size and dots-per-inch data that are provided in your printer driver file (which is not part of INM). Usually, the printer driver provides all the data needed to do scaled printing. If so, you do not have to input data in the Printing Area Size box.

If the printer driver does not provide the required data to do scaled printing, INM displays a message box asking you to fill out the width and length of the printing area. Then, you do have to input data in the Printing Area Size box.

For example, a printer using 8.5 x 11 paper may have a print area that is only 7.98 inches wide by 10.76 inches long (it cannot print all the way to the edges).

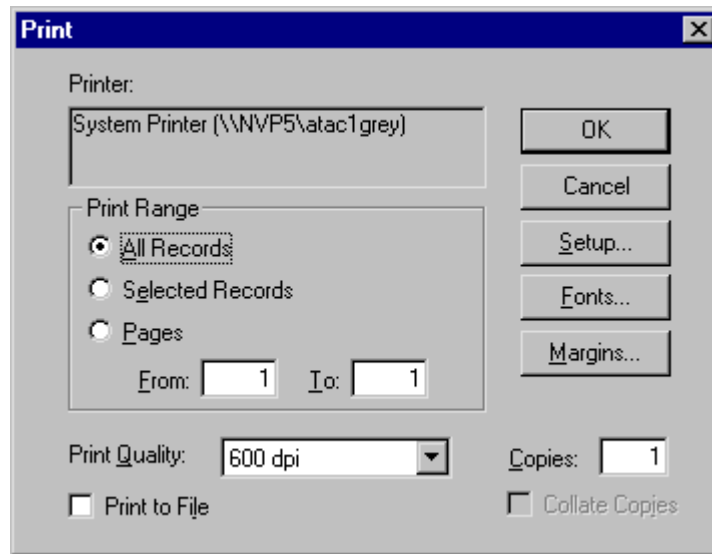
- You will have to determine these two numbers by experiment. Print a set of concentric circles, and adjust the width and length parameters until circle X and Y dimensions measure correctly with a ruler. Use the *View // Axis Ring Display* function to enable concentric circles.
- If you are printing in landscape mode, you must reverse the width and length parameters.

3.9. Print Preview

Menu Item: *File // Print Preview*

Use this function to view on the screen how text or graphics will look on a printed page. It is a good idea to use this function before printing.

If a message is displayed about setting the printing area size in the *File // Scaled Printing* dialog box, input print dimensions as discussed above.



3.10. Print

Menu Item: *File // Print*

Use the this function to print the contents of an active window, which can be any of the five types of INM windows:

- *DBF* window
- *Noise Graph* or *Profile Graphs* chart window
- *Input* or *Output Graphics* window
- *View Calculated Flights* or output table window
- *Case Echo Report* text window.

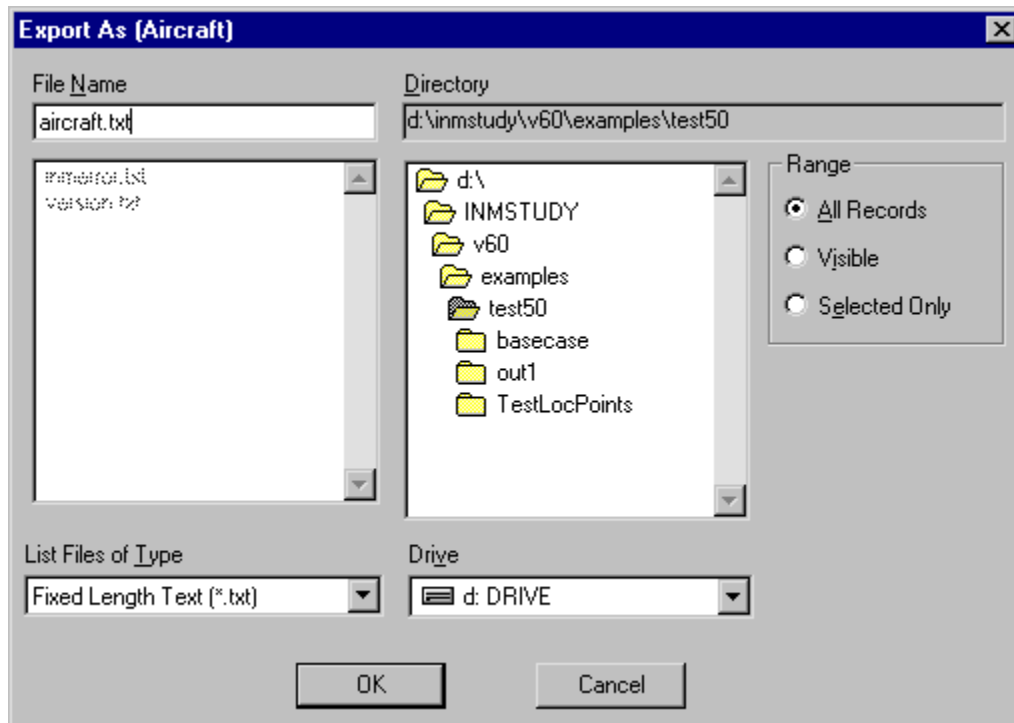
File // Print is an adaptation of the standard Microsoft *Print* function.

1. The current printer is displayed at the top of the dialog box. You can change printers by using the Setup button, which switches you to the standard Microsoft *File // Print Setup* function. Consult Microsoft documentation to connect printers to your Windows system.
2. For *DBF*, table, and report printing, the Fonts function lets you change the printer font style and point size.
3. For *DBF* and table printing, the Margins function lets you specify the top/bottom and left/right margins. These settings remain in effect until you change them.

4. Print Range options:
 - Use the All Records button to print all records in a *DBF* or table window, including non-visible records.
 - Select one or more records in the active window first, and then use the Selected Records option to print only the records you want.
 - Use the Pages option to print a specified range of pages. For example, you can set the page range to print only the first page to see a sample of the output before printing the whole job.
5. The Copies and Collate options can also be used if your printer supports them.
6. If your printer is a Postscript printer, you can check the Print to File box and create a file containing Postscript text. If your "printer" is a HPGL plotter, you can create a HPGL text file by the same method.

Printing problems:

- Some printers cannot do color fill. These printers substitute black and white or gray hatch lines for the colors. INM will print solid colors inside noise contours if the printer driver supports color fill.
- If a message is displayed about setting the printing area size in the *File // Scaled Printing* dialog box, input print dimensions as discussed above in Section 3.8.



3.11. Export As

Menu Item: *File // Export As*

Use this function to create a file in *DBF* or text format. You "export" data in an active window "as" a file. Even data that are not showing in the window can be saved into the file.

1. In the INM main window, activate:
 - A *DBF* window (for example, *Tracks // Track Segments*)
 - Or a table window (for example, *Ops // View Calculated Flights View Summary*)
 - Or a chart (for example, *Acft // Profile Graphs*).
2. If you want to export only some of the records in a data window, select them before using the *Export As* function.
 - Select records in the left-hand list box in a *DBF* window, or select rows in a table window.
 - Use the usual Microsoft mouse methods for item selection: individual Ctrl-clicks, or click-move-Shift-click.
3. In the *Export As* dialog box, select the directory where you want the file to be written by navigating the directory tree box on the right.

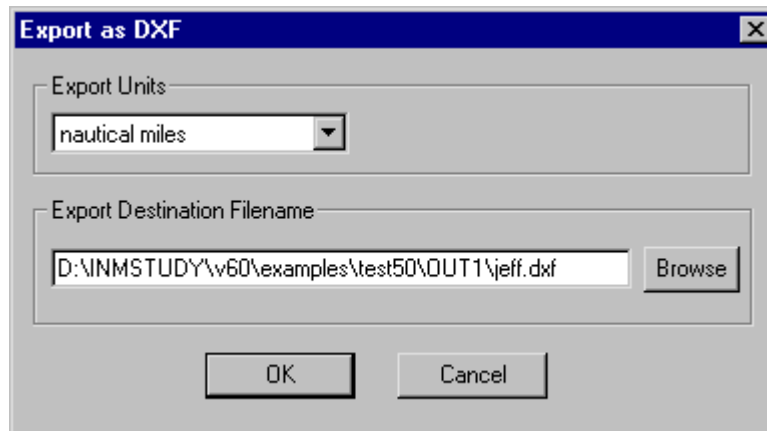
4. Select the type of file to be written by using the box in the lower-left. You have a choice of three types of export files:
 - dBase IV — standard *DBF* file format.
 - Fixed Length Text — one header line, columns separated by spaces; this is the most readable format.
 - Delimited Text — several header lines, commas between fields, quotes around strings.The fourth choice, All Files, is used to view all the files in a directory; it is not an exportable file type.
5. Input a file name or use the displayed default name. A file extension (*DBF* or *TXT*) is automatically added to the filename if you do not supply one.
6. Select a Range option:
 - All Records — write all records in memory. The number of records is on the status line at the bottom of the main window.
 - Visible — write records displayed in the data window.
 - Selected Only — write only those records that you selected in the data window.
7. Press OK after the directory, file name, file type, and range are correct.

Exporting *Acft // Noise Graph* and *Acft // Profile Graphs*:

- Use the *File // Export As* function to export data associated with the points displayed in a chart.
- Use the *Edit // Copy Records* function to copy the chart to the Clipboard in Windows Metafile format (*WMF*). You can then Paste from the Clipboard into another application.

Exporting metric units:

- If you chose metric units for your study, the exported *DBF* and *TXT* files are written in metric units, rather than English units.



3.12. Export as DXF

Menu Item: *File // Export as DXF*

Use this function to export *Output // Output Graphics* to a *DXF* file. All layers that are displayed in the active *Output Graphics* window are written into the *DXF* file, except for the *CAD* layer. Turn off graphics layers that you do not want in the *DXF* file.

To export a *DXF* file:

1. Select the X,Y distance units that you want written into the *DXF* file.
 - The units are nautical miles, statute miles, feet, kilometers, meters, and degrees.
 - If you choose degrees, the output is in decimal degrees. Longitude is in the X position and latitude is in the Y position.
2. Input the full pathname of the *DXF* file.
3. Press OK.

DXF layers:

- four kinds of points-type tracks
- four kinds of points-type sub-tracks
- three kinds of vectors-type tracks
- track labels
- four kinds of radar tracks
- runways
- runway labels
- individual noise contours
- noise contour labels
- individual overlay noise contours
- overlay noise contour labels
- eight types of streets
- street labels
- population points

- population point labels (number of people)
- location points
- location point labels
- terrain contours
- terrain labels
- individual grids
- grid labels

Tracks and contours are exported as polylines so that they can be manipulated as objects. Objects are colored by layer. INM color numbers are translated to AutoCAD color numbers.

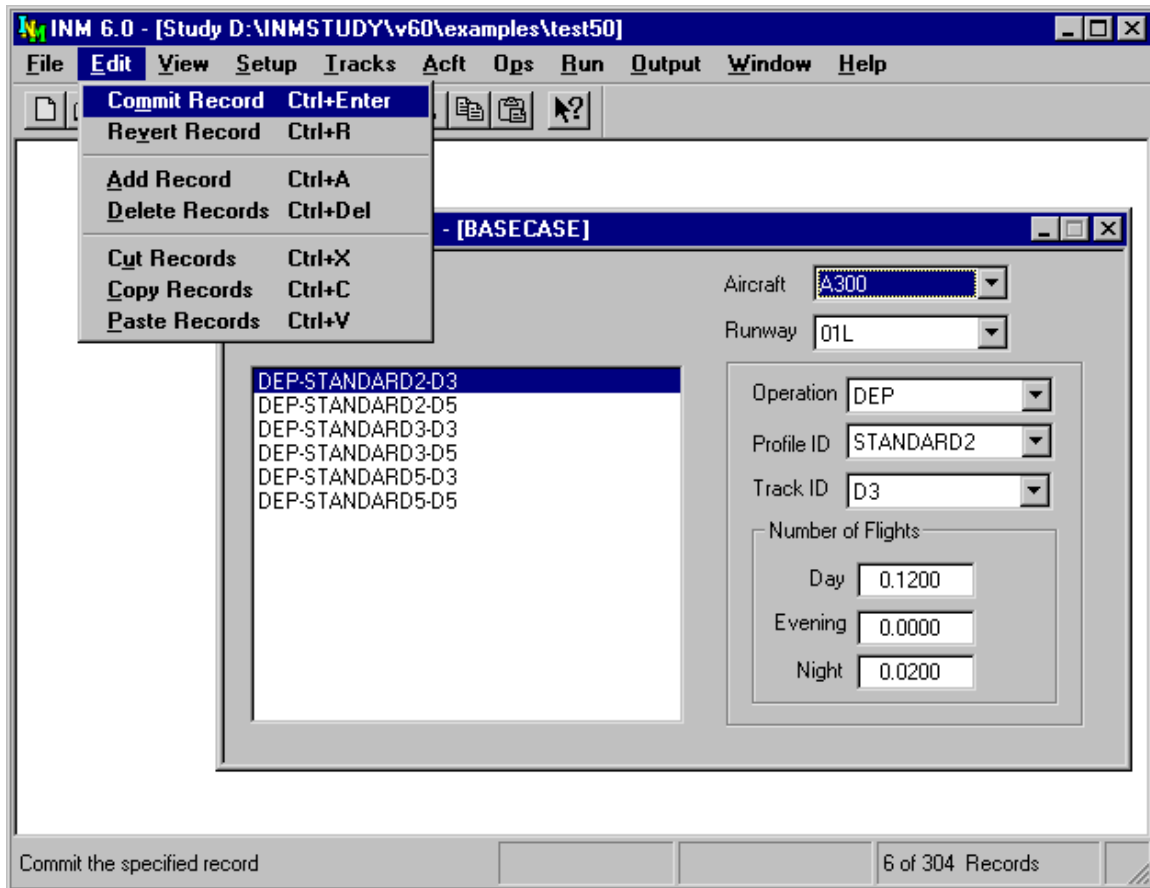
3.13. Exit

Menu Item: *File // Exit*

Use this function to save and close the current study, and then quit the INM program.

You can also exit INM by:

- Double-clicking on the Microsoft Control box in the upper left-hand corner
- Or, single-clicking on the box and selecting Close
- Or, clicking on the upper right-hand box with the X in it.



4. EDIT MENU

The *Edit* menu depends on the type of window that is active. There are three kinds of *Edit* menus:

- *DBF* or table window (the *Edit* menu shown above)
- *Tracks // Input Graphics* window
- Message window.

This Section covers *DBF* window editing and Section 7.1 covers input graphical editing. Message-window editing is based on standard Microsoft dialog boxes, and it is not covered.

Individual *Edit* menu items are sometimes disabled because the operation is not allowed in the particular window.

INM supports a standard method of cut-copy-paste of text in *DBF* forms:

- Cut — highlight the text and press key combination Shift-Delete
- Copy — highlight the text and press key combination Ctrl-Insert
- Paste — put the cursor at the insert point and press Shift-Insert.

4.1. Commit Record

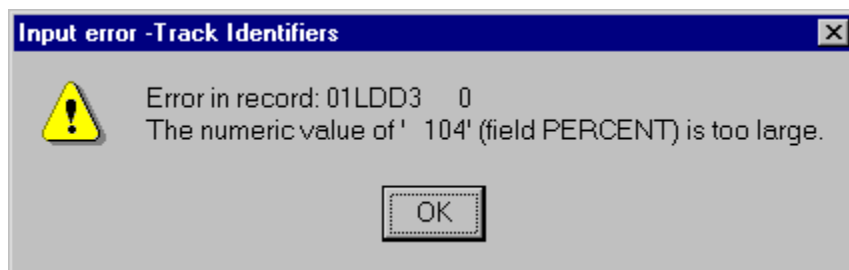
Menu Item: Edit // Commit Record

After you fill out data in a *DBF* form (the right-hand section of a *DBF* window), you must commit the record to save it in the database. There are several different ways to commit a record:

- Use the *Edit // Commit Record* function
- Press the Check-mark button on the toolbar
- Select a new record in the left-hand list box of the *DBF* window
- Select a new set of records using the filter control box above the data form
- Close the *DBF* window.

If you use one of the implicit commit commands (for example, selecting another record) INM automatically commits the record. If you want INM to display a verification dialog box before committing a record, turn on the verification feature in the *Window // Options* function.

When you commit a record, INM verifies the data before allowing the record to become a part of the study. Numerical values must lie between minimum and maximum values, character strings must have valid characters, and enumerated members must belong to their sets.



If you try to commit an invalid record, INM displays a message window indicating which field is causing the problem. The name of the field and the acceptable range of numerical values are given in Appendix E. Fix the field (usually, a numerical value is out of range) and try committing the record again.

4.2. Revert Record

Menu Item: Edit // Revert Record

Use this function to revert back to the original record. If you edit data in a *DBF* window and then change your mind, this function puts the original data back into all of the fields.

This function will work only if you have not yet committed the new record. Once a new record is committed, you have permanently replaced the old record.

If you want the old record back, you will have to input the old data, one field at a time, and then commit it.

4.3. Add Record

Menu Item: *Edit // Add Record*

Use this function to add a record to a *DBF* file:

1. Select *Edit // Add Record* or press the Add button on the toolbar. The data input area in the active *DBF* window changes to a blank or a default value.
2. Input data in the active *DBF* window
3. Select *Edit // Commit Record* or press the Check-mark button.

If you are adding one record after another, select *Add Record* again. The current record is automatically committed, and a new record with default parameters is presented for you to edit.

When you add a case or output record, INM not only adds the record to the *CASE.DBF* or *OUTPUT.DBF* file, but also creates a subdirectory in the study directory. Sometimes you will see a message saying that INM cannot create the subdirectory. This may be because you are trying to create a subdirectory with the same name as an existing subdirectory. Another reason may be that there is not enough disk space. INM checks for at least 500 kilobytes of disk space before allowing the *Add Record* operation for case or output records.

Do not create and delete directories with a file manager because the subdirectory name that is recorded in INM and the subdirectory that is really on disk will not be consistent.

4.4. Delete Records

Menu Item: *Edit // Delete Records*

Use this function to delete one or more records.

1. Select a record to delete by clicking on it in the list box on the left-hand side of a *DBF* window. Multiple records can be selected by holding down the Ctrl key while selecting the records. The highlighted records are the ones that will be deleted.
2. Select *Edit // Delete Records* or press the Minus button on the toolbar.
3. A dialog box confirms that you want to delete the record or records. This dialog box can be turned off in the *Window // Options* function.

A record can be the "parent" of many "child" records. For example, an aircraft record is the parent of profile identity, fixed-point profile, procedural profile, flaps coefficient, and thrust coefficient child records. However, noise group and noise curve records are not child records because more than one aircraft may use them.

Deleting a parent record causes all child records to be deleted. This is necessary to maintain database integrity.



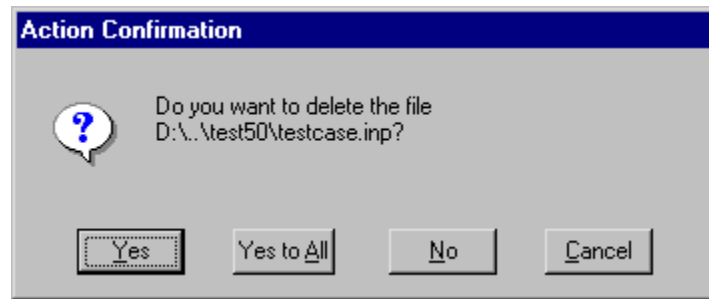
4.4.1. Record in Use

The delete operation may take a while because INM checks all files that may reference the deleted record. INM will not allow the delete operation if the record is in use. This is a safety measure to help maintain the integrity of the study database.

For example, you may want to delete aircraft 727Q15, but it is currently used in one or more flight operations records in one or more cases. INM presents a message window with a title that gives the name of the *DBF* window and the name of the case, and displays a message about "record in use". You need to delete all references to 727Q15 in *Ops // Airport Operations*, *Ops // Flight Operations*, and *Ops // Runup Operations* windows before you can delete 727Q15 itself.

4.4.2. Delete a Subdirectory

If you delete a case or output record, INM automatically deletes all INM-generated files in the associated subdirectory, deletes the case or output record in the *DBF* file, and deletes the subdirectory if it is empty.



INM does not delete the subdirectory if it contains non-INM files, such as your own special-purpose files or INM-exported files. INM asks whether you want to delete the file, and if you press Yes on each file, or press Yes to All, INM deletes the files and then deletes the subdirectory.

4.5. Cut Records

Menu Item: *Edit // Cut Records*

Use the *Cut Records* function with the *Paste Records* function to move a set of records to another place. You can select multiple records.

The *Cut Records* function is similar to *Delete Records*, except that the records are saved in two places:

- Buffer in memory waiting for a *Paste Records* command
- Microsoft Clipboard in text format.

A record that has been cut can be restored by pasting it back into the window, but this will work only if the data in the buffer have not been overwritten by another buffer operation.

INM checks all files that may reference the cut records and, like the *Delete Records* operation, INM will not allow the cut operation if one or more of the records are in use. You probably will not use the *Cut Records* function as much as *Copy Records*.

4.6. Copy Records

Menu Item: *Edit // Copy Records*

Use the *Copy Records* function with the *Paste Records* function to duplicate a set of records and put them in another place. As with the other multi-record functions, you can select several records at a time.

Instead of doing a copy/paste operation inside of INM, you may want to use the *Copy Records* function to copy a text image of the records into the Microsoft Clipboard so that you can paste them into another application.

4.7. Paste Records

Menu Item: *Edit // Paste Records*

Use this function in conjunction with *Cut Records* and *Copy Records* to complete the operation of moving or copying records to another place within INM.

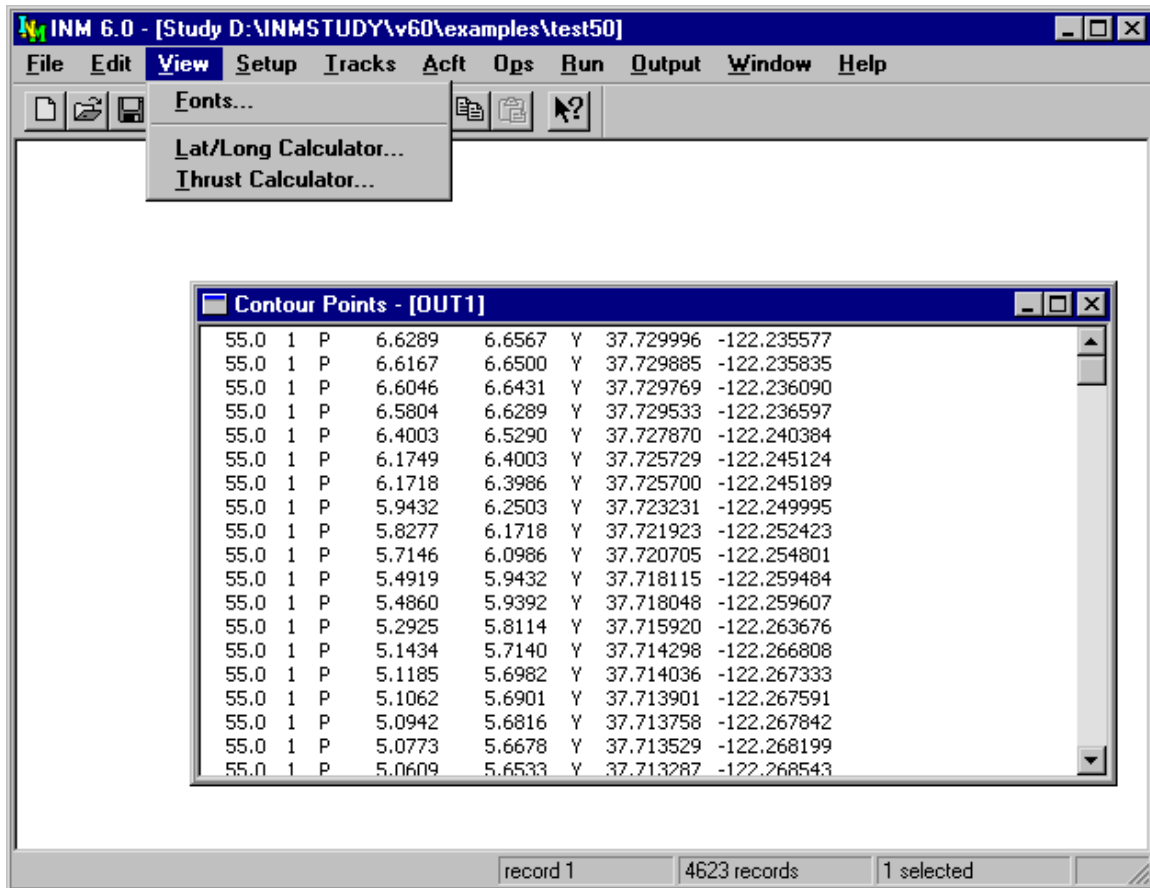
"Another place" means that you change to a different identifier or to a different case.

Some examples illustrate how to use cut/paste and copy/paste operations:

- Add a new noise identifier N23456 in the *Noise Identifiers* window. Go to the *Noise Curves* window, select 2CF650 and copy all of the NPD curve records. Select the new noise identifier N23456 in the *Noise Curves* window and paste the records. A copy of the 2CF650 NPD curves now exists under the new identifier, and you can modify the new records. Notice that each record is indicated as "User data" on the status bar at the bottom of the main window. The copy/paste function worked because you changed to a different noise identifier before pasting the records.
- Create a new profile DEP-USER-5 for aircraft 727Q15 in the *Profile Identifiers* window. Go to the *Procedural Profiles* window. Go to aircraft 727Q15, profile DEP-STANDARD-5, and copy step numbers 1 through 9. Change to the new profile DEP-USER-5 and paste the records. Now you can change the procedural profile data.
- Create a new case CASE2. Using the *Ops // Flight Operations* function, select both CASE1 and CASE2. Activate the Flight Operations-[CASE1] window and go to aircraft 727Q15 runway 09L. Copy all the flight operation records shown in the list box. Focus on the Flight Operations-[CASE2] window and go to the same aircraft and runway. Paste the records. Notice that the flight operation key identifiers did not change; however, the case subdirectory did change, and that is the reason that copy/paste worked.

Some paste operations are not possible due to programmed logic.

- You cannot paste records that would duplicate records that already exist. If you attempt this, INM displays a warning message.
- You cannot paste records containing data that are not valid in the new place.
- You cannot paste records of one type of flight operation to another type.



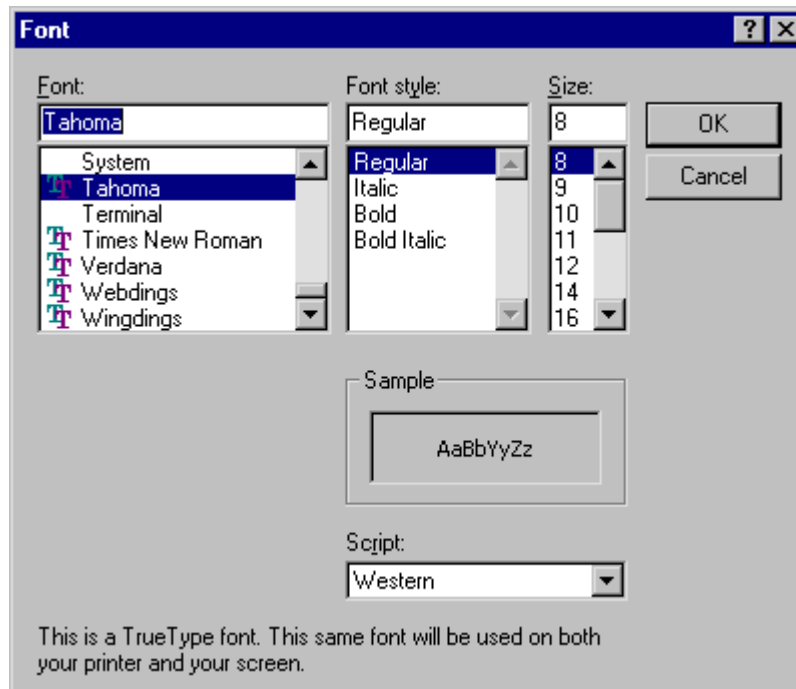
5. VIEW MENU

The *View* menu depends on the type of window that is active:

- Table window (shown above) — use the *View* function to change the displayed font style and size.
- *Input Graphics* or *Output Graphics* window — use *View* functions to zoom and change various graphics attributes. See Section 7.1 and 11.2 for details.

The *Lat/Long Calculator* and *Thrust Calculator* functions are always available on the *View* menu.

This section covers *Fonts*, *Lat/Long Calculator*, and *Thrust Calculator* functions.



5.1. Fonts

Menu Item: *View // Fonts*

Use this standard Microsoft dialog box to select one of several operating system-supplied fonts, and then select the font style and font size that is available for that particular font. These selections are saved in the *INM.INI* file, and they remain in effect until changed again via this function.

Origin of Coordinates

Latitude (deg) 37.619002

Longitude (deg) -122.374843

Input

X (nmi) 4

Y (nmi) 5.5

Latitude 37.710747

Longitude -122.290830

Cancel

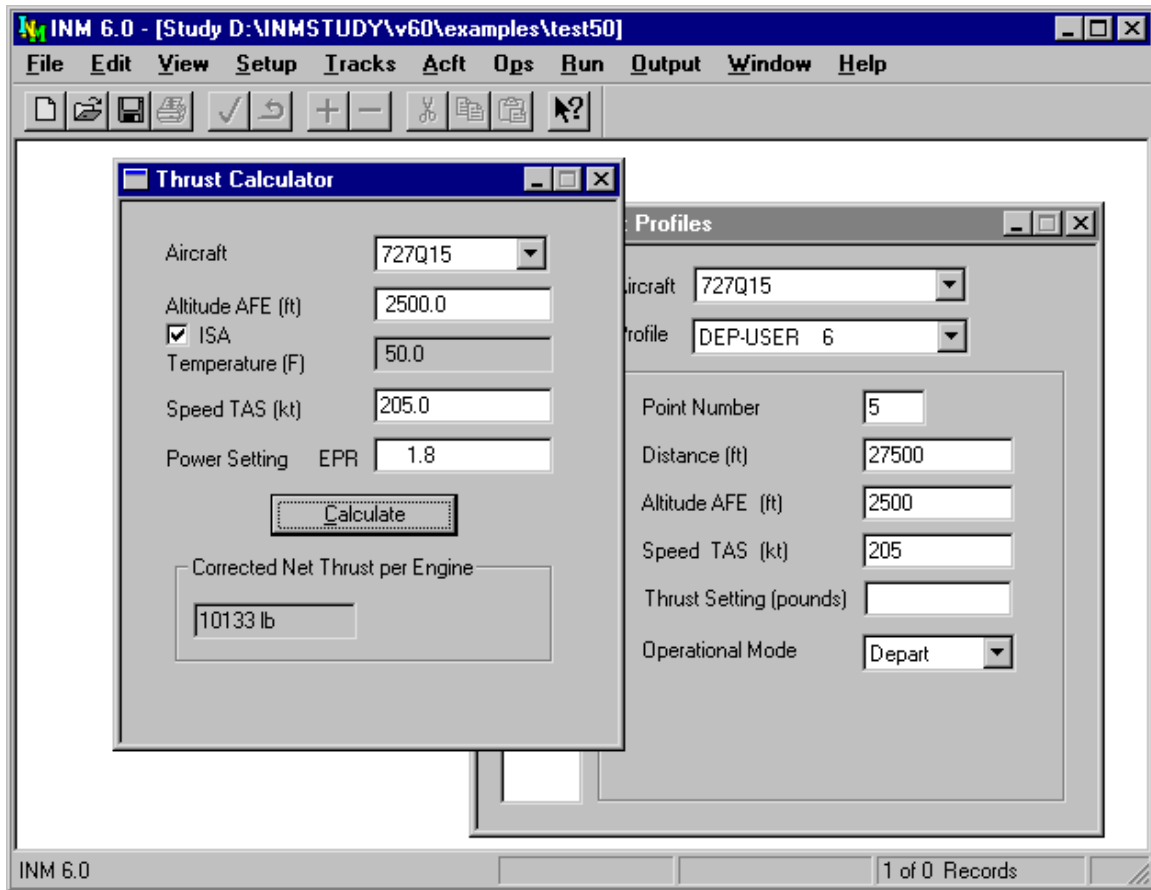
5.2. Lat/Long Calculator

Menu Item: *View // Lat/Long Calculator*

Use this function to calculate the latitude and longitude values for given X,Y values. Or, you can calculate X,Y from lat/long.

Type the position values into one pair of boxes, and press the arrow button to display the same position in the other pair of boxes.

The function automatically uses the study lat/long for the origin of the coordinate system. You can input a different origin, if you wish; this will not change the study origin.



5.3. Thrust Calculator

Menu Item: View // Thrust Calculator

Use this function when creating profile points in the *Acft // Fixed-Point Profiles* window. Fixed-point profiles are defined by a list of points. Each point has five parameters:

- Horizontal distance from an origin of an aircraft
- Altitude of the aircraft above field elevation (AFE) at the point
- True airspeed of the aircraft at the point
- Thrust setting (corrected net thrust per engine) at the point
- Operational mode (approach, depart).

Sometimes, power-setting parameter EPR or N1 is available instead of corrected net thrust per engine. The *Thrust Calculator* is used to convert from EPR or N1 to corrected net thrust per engine. The *Thrust Calculator* window can remain open while adding records in the *Fixed-Point Profiles* window.

To use the calculator, fill out the boxes and press Calculate.

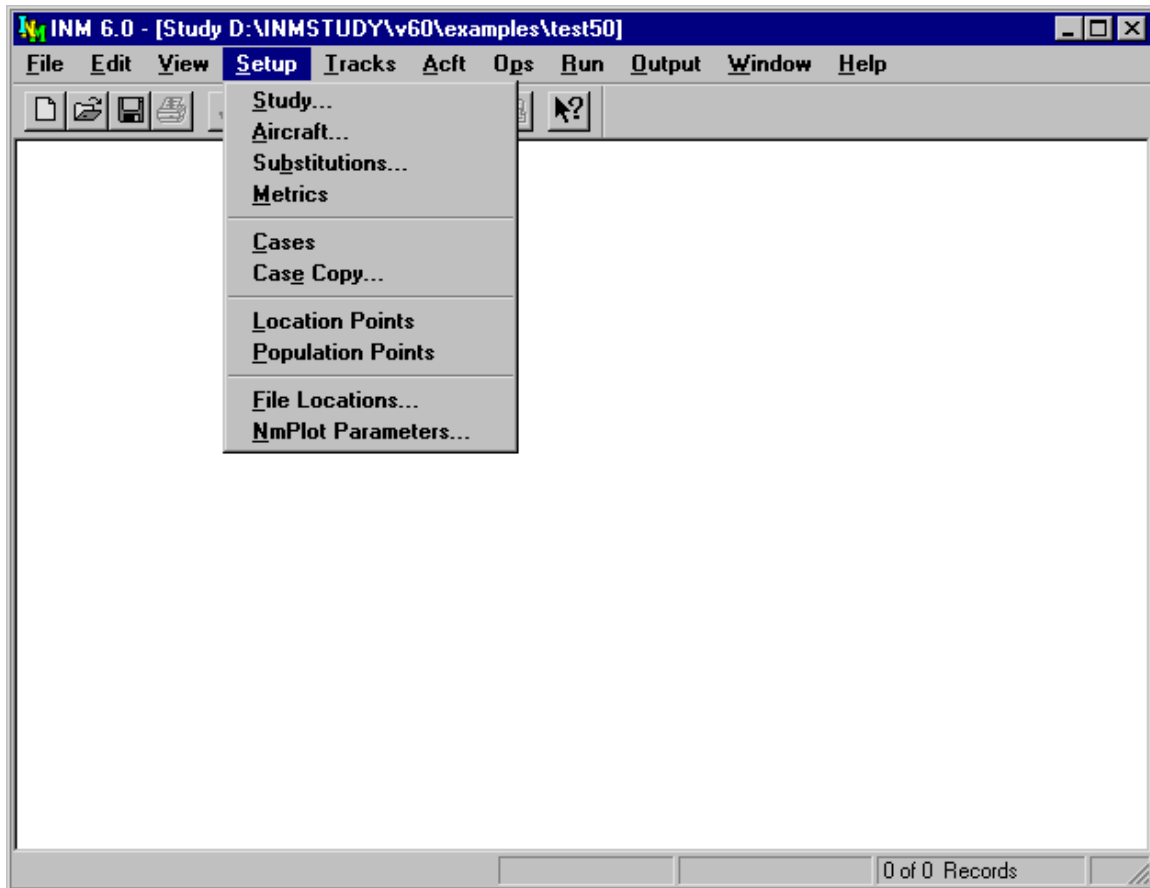
1. Aircraft — INM jet aircraft that have general thrust coefficients
2. Altitude AFE — altitude of the aircraft above the airport
3. Temperature — temperature at the aircraft
4. Speed TAS — true airspeed
5. Power Setting — EPR or N1 value.

INM calculates and displays temperature if you check the ISA box. The calculated temperature is based on the airport temperature and the International Standard Atmosphere (ISA) lapse rate of -3.566°F per 1000 feet above the airport.

For those aircraft that have noise curves parameterized by percent of static thrust, the *Thrust Calculator* displays both pounds and percentage values. Use the percentage value in the *Fixed-Point Profiles* window.

To close the *Thrust Calculator* window:

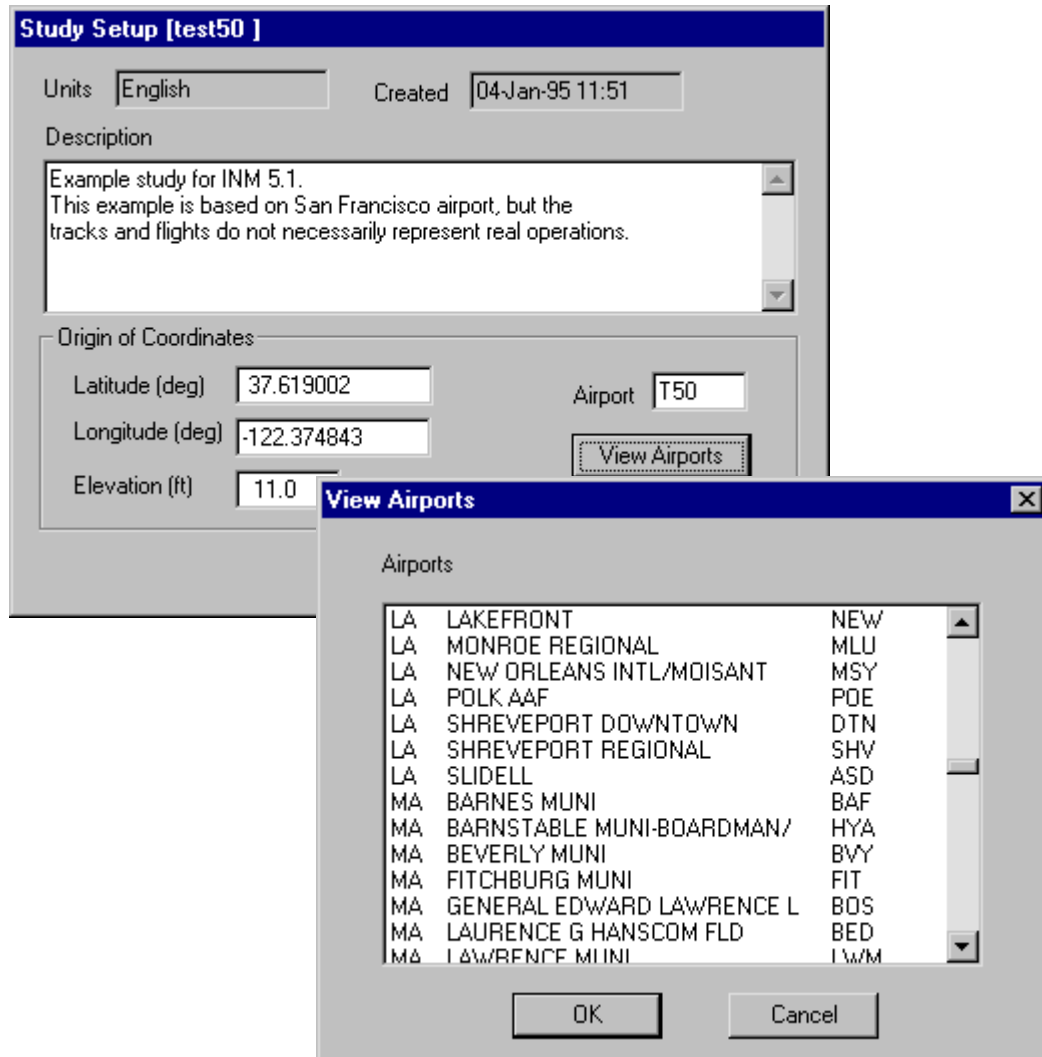
- Use the upper-left button and Close function.
- Or, press the upper-right X button.



6. SETUP MENU

Use the *Setup* menu to create a study. You can:

- Specify the study airport's latitude, longitude, and elevation
- Select INM standard aircraft to use
- Select INM standard aircraft substitutions to use
- Define your own noise metrics
- Create or copy cases for analysis
- Create location and population points for noise calculation
- Specify the terrain *3CD* directory and ambient noise file name
- Set contouring parameters.



6.1. Study Setup

Menu Item: Setup // Study

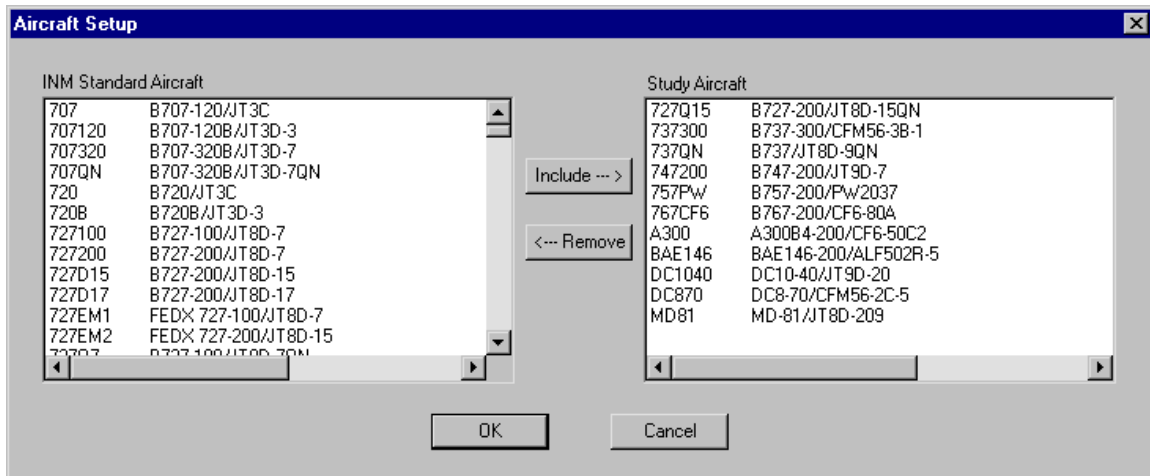
Use this function to change study setup parameters. INM automatically starts this function when you create a new study.

1. Fill out the study description.
 - The description can be up to 255 characters and span several lines.
 - The description can be edited at any time, not just when you set up the study for the first time.

2. Press the View Airports button to access a list of about 820 airports in the U.S. that have 100 operations per day or more.
 - A list of airports appears. They are arranged by state.
 - When you press OK for a particular airport, INM performs three actions.
 - a) Geographical data for the airport are copied into the latitude, longitude, and elevation fields.
 - b) Runway and runway end records are automatically created for you. It is important to check the coordinates of the runway ends because occasionally there are errors.
 - c) Nav aids and fixes that are inside a box centered on the airport are copied into the *LOC_PTS.DBF* file in the study directory. The north/south dimension of the box is 58 nmi and the east/west dimension is $58 / \cos(\text{latitude})$ nmi.
 - The airport, nav aid, and fix data are taken from the FAA's National Flight Data Center (NFDC) CD-ROM dated July 15, 1999.
3. Instead of using the View Airports function, you can input the latitude, longitude, elevation, and a four-character identifier of the airport.
 - Pick an airport lat/long that is near the center of the of the airport because INM graphical functions are centered on $X = 0, Y = 0$.
4. Press OK to save study setup data.

If you change airport lat/long, certain graphical overlays (for example, terrain) will not be aligned to the new coordinates. You will have to reprocess source data that depend on the lat/long of the X,Y origin.

INM users outside of the U.S. can change INM data files to depict airports, nav aids, and fixes in their countries. Using a spreadsheet or database management program, delete the records in the *SYS_APRT.DBF*, *SYS_RWY.DBF*, and *LOC_PTS.DBF* files, which are in the *INM60\USR_DATA* subdirectory. Then, add your own country-specific records.



6.2. Aircraft Setup

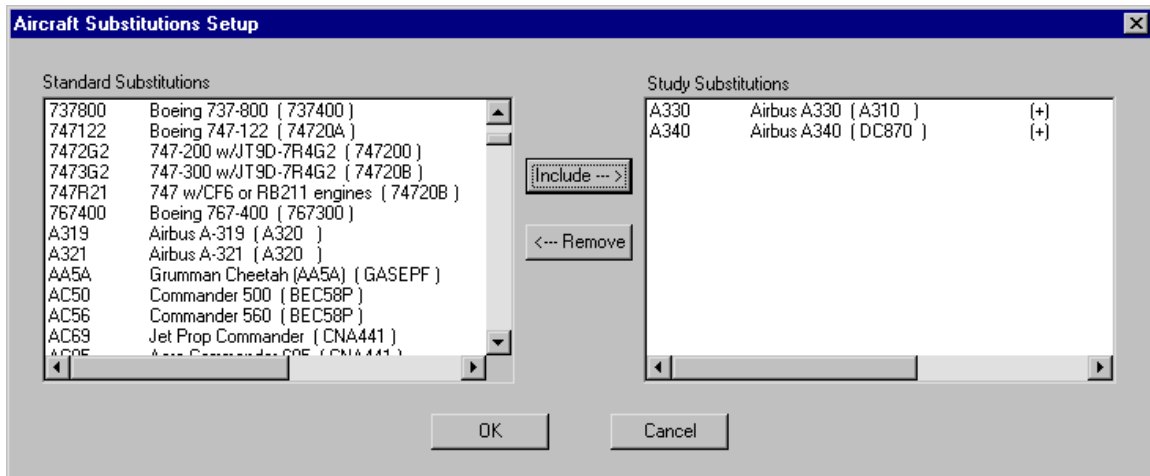
Menu Item: *Setup // Aircraft*

Use this function to select INM standard aircraft for the study.

1. Select one or more aircraft in the left-hand list box.
2. Press the Include button. INM moves the selected aircraft to the right-hand list box.
3. You can do multiple selections before pressing OK.

You can also remove Aircraft from your study by reversing the process. However, if these aircraft are being used in flight operations, you will have to delete the flight operation records first.

If you want to define your own aircraft, use the *Acft // Aircraft* function.



6.3. Aircraft Substitution Setup

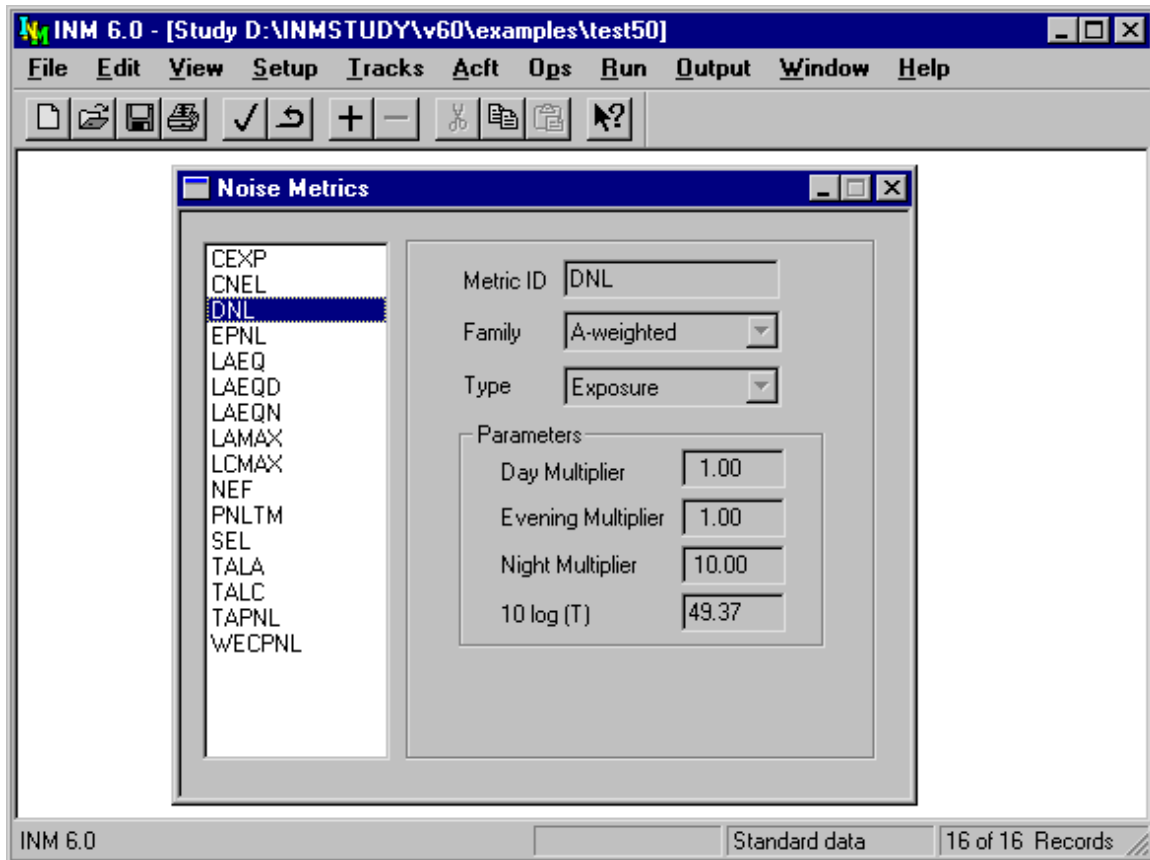
Menu Item: *Setup // Substitutions*

Use this function to add aircraft to a study when you cannot find an INM standard aircraft that you need. Aircraft in the left-hand list box are FAA-approved substitutions that are associated with INM standard aircraft.

1. Select one or more substitution aircraft. The substitution list displays the associated INM aircraft identifier and description.
2. Move the selected aircraft into the study with the Include button.
3. Press OK.

Use substitution aircraft when creating flight operations as though they were regular INM aircraft. Before calculating noise, INM automatically substitutes standard aircraft for substitution aircraft.

If you want to define your own substitutions, use the *Acft // Substitutions* function.



6.4. Noise Metric Setup

Menu Item: *Setup // Metrics*

Use this function to view INM standard noise metrics or to create your own noise metric.

Standard noise metrics cannot be changed. However, you can add your own noise metric if you need one that is not on the list:

1. Use *Edit // Add Record*.
2. Type a metric identifier that is not already on the list.
3. Select a noise family.
4. Select a noise type.
5. Input day, evening, night multipliers.
6. Input an averaging time as a decibel value (see discussion below).
7. Use *Edit // Commit Record*.

- For example, the "Australian NEF" noise metric:

Metric Id	ANEF
Family	Perceived
Type	Exposure
Day Multiplier	1.0
Evening Multiplier	4.0
Night Multiplier	4.0
10 log(T)	88.0

INM provides 16 pre-defined standard metrics in three noise families:

- A-weighted noise metrics
 - DNL Day-night average sound level
 - CNEL Community noise equivalent level (California)
 - LAEQ Equivalent sound level for 24 hours
 - LAEQD Equivalent sound level for a 15-hour day
 - LAEQN Equivalent sound level for a 9-hour night
 - SEL A-weighted sound exposure level (multi-event)
 - LAMAX Maximum A-weighted sound level
 - TALA Time-above an A-weighted sound level threshold
- C-weighted noise metrics
 - CEXP C-weighted sound exposure level (multi-event)
 - LCMAX Maximum C-weighted sound level
 - TALC Time-above a C-weighted sound level threshold
- Perceived tone-corrected noise metrics
 - NEF Noise exposure forecast
 - WECPNL Weighted equivalent continuous perceived noise level
 - EPNL Effective perceived noise level (multi-event)
 - PNLTM Maximum PNLT sound level
 - TAPNL Time-above a PNLT threshold

There are three kinds of noise families:

- A-weighted — metrics for standard noise analysis, where aircraft noise spectra are modified by A-weighting, which depresses noise levels in low and high frequency bands, approximating the frequency response of the human ear.
- C-weighted — metrics for low-frequency vibration noise analysis, where aircraft noise spectra are modified by C-weighting, which depresses noise levels in low and high frequency bands, but to a lesser degree than A-weighting.
- Perceived tone-corrected — metrics for noise analysis based on aircraft noise certification tests, where aircraft noise spectra are modified by the procedure defined in FAR Part 36, which depresses noise levels in low and high frequency bands, and elevates metric levels if there are tones in the spectra.

For A-weighted or C-weighted noise families, single-event SEL and LAMAX noise curves are used to calculate noise.

- INM replaces A-weighting that is implicit in SEL and LAMAX noise levels with C-weighting by using an average noise spectrum that is associated with the aircraft and operation.
- INM creates C-weighted NPD curves at the time noise is computed, and they therefore cannot be displayed

For the perceived tone-corrected noise family, single-event EPNL and PNLTM noise curves are used to calculate noise.

There are three types of noise metrics:

- Exposure — true noise exposure (mean-squared sound pressure multiplied by a time duration). Exposure is also used for "equivalent" or "average" noise levels that are derived from noise exposure.
- MaxLevel — maximum noise level.
- TimeAbove — the total number of minutes that noise levels are above a given threshold. The threshold value is not part of the definition of the metric. The threshold is defined in the *Run // Grid Setup* window. Noise events are assumed to be sequential and not overlap in time.

For Exposure metrics, the day, evening, and night multipliers and the time parameter are used as follows:

$$L_E = 10 \log(W_1 E_1 + W_2 E_2 + W_3 E_3) - 10 \log(T)$$

where,

L_E Noise exposure level or average noise level (dB).

W_1 W_2 W_3 Weighting factors (multipliers) for day, evening, and night time periods. These are the number of equivalent aircraft operations relative to one aircraft operation during the day time. For example, in the DNL metric, one night-time operation is worth 10 day-time operations, so the weights are $W_1 = 1$, $W_2 = 1$, and $W_3 = 10$ (for DNL, the evening period is considered daytime).

E_1 E_2 E_3 Noise exposure ratios for day, evening, and night time periods. These ratios are computed by INM. A-weighted or C-weighted sound exposure ratio is the time-integrated mean-square pressure, in units of $(\mu\text{Pa})^2\text{s}$, divided by a reference sound exposure of $(20\mu\text{Pa})^2(1\text{s})$. Perceived tone-corrected exposure ratio has a reference noise exposure of $(20\mu\text{Pa})^2(10\text{s})$.

$10 \log(T)$ Ten times the base-10 logarithm of the ratio of the averaging time over a reference time. For example, for a 24-hour averaging time in seconds and a reference time of one second,

$$10 \log(24 \times 60 \times 60 \text{ s} / 1 \text{ s}) = 49.37 \text{ dB}$$

For average-noise metrics derived from SEL, you must use a reference time of 1 second. For average-noise metrics derived from EPNL, you must use a reference time of 10 seconds. For true exposure metrics, set $10 \log(T) = 0$ dB.

For MaxLevel metrics, the day, evening, and night multipliers are used as follows:

$$L_{MAX} = \text{Max}(W_1 L_{MAX1} , W_2 L_{MAX2} , W_3 L_{MAX3})$$

where,

L_{MAX} Maximum noise level (dB).

$\text{Max}()$ Function that returns the maximum of the three numbers.

$W_1 W_2 W_3$ Parameter "switches" that include a time period ($W = 1$) or exclude a time period ($W = 0$). The weights must be either 0 or 1. Use (1, 1, 1) to calculate the maximum level during all three time periods.

$L_{MAX1,2,3}$ Maximum noise levels for day, evening, and night time periods. INM calculates these values.

For TimeAbove metrics, the day, evening, and night multipliers are used as follows:

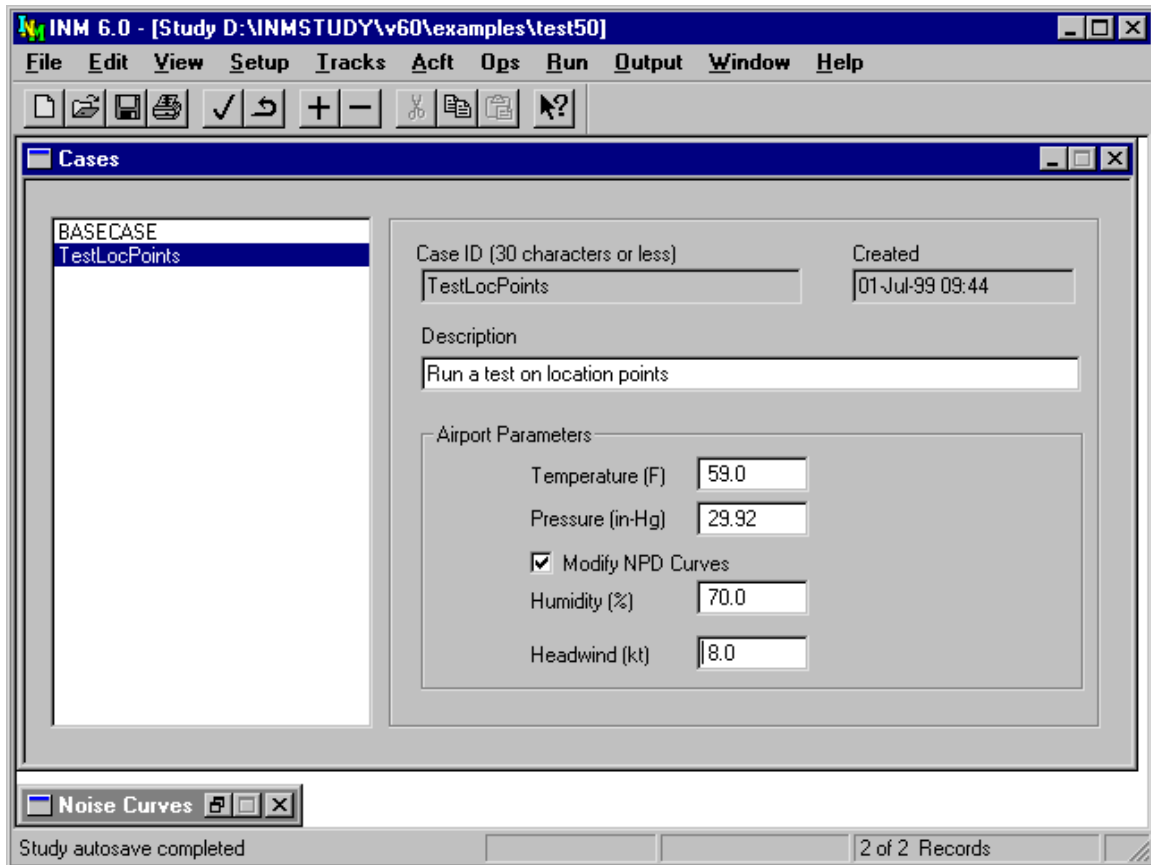
$$TA = W_1 TA_1 + W_2 TA_2 + W_3 TA_3$$

where,

TA Time-above (minutes) for the time period defined by the weights.

$W_1 W_2 W_3$ Parameter "switches" that include a time period ($W = 1$) or exclude a time period ($W = 0$). The weights must be either 0 or 1. Use (1, 1, 1) to calculate the time-above metric during all three time periods.

$TA_{1,2,3}$ Time-above (minutes) for day, evening, and night time periods. INM calculates these values.



6.5. Case Setup

Menu Item: *Setup // Cases*

Use this function to create cases and their associated subdirectories. You create a case so that there is a place to put flight operation input data. After study and case input data are in place, you can "run" a case.

Each case has its own "run options" and these data are specified in the *Run // Run Options* window. Run options are really data fields in a case record, so you deal with case records in two different windows:

- *Setup // Cases* (this function)
- *Run // Run Options*.

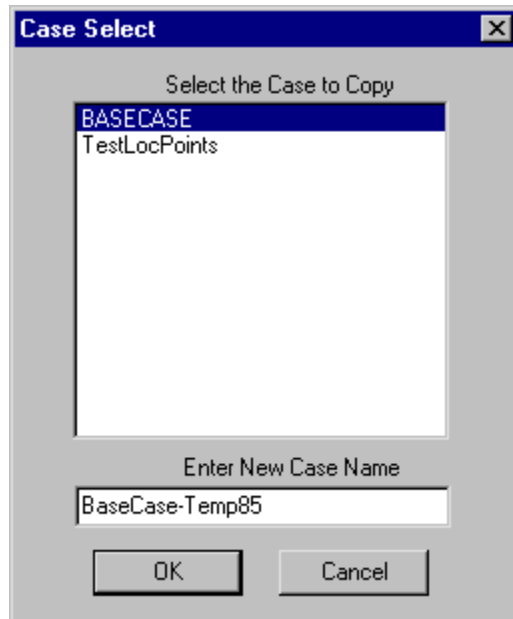
Only in the *Setup // Cases* window can you add or delete a case record and its associated subdirectory. *Add Record* and *Delete Records* are disabled in the *Run // Run Options* window.

To create a new case:

1. Use *Edit // Add Records* to make a blank record. INM automatically fills out the time and date that a case is created.
2. Input a case identifier, which is used as the subdirectory name. The subdirectory name can be up to 30 characters long and it can contain spaces.
3. Input a case description of up to 40 characters.
4. Input the average airport temperature. The default airport temperature is computed using the International Standard Atmosphere (ISA) equation for "standard-day" temperature versus altitude. ISA temperature is 59°F at mean sea level, and it gets progressively colder at higher airport elevations.
5. Input the average atmospheric pressure at the airport. The default airport pressure is 29.92 inches-Hg at all airport elevations because atmospheric pressure is referred to sea level.
6. Check the Modify NPD Curves box if you want INM to adjust noise data based on user-defined temperature and humidity.
 - The default is no check mark in the box. INM uses the NPD noise levels displayed in the *Acft // Noise Curves* window. These curves are calculated using the SAE-AIR-1845 atmospheric absorption coefficients (see Table B1 in SAE-AIR-1845).
 - If the box is checked, INM uses temperature and relative humidity parameters to calculate SAE-ARP-866A atmospheric absorption coefficients, which in turn are used to adjust INM standard NPD noise levels to user-defined airport conditions.
 - In most cases, user-defined atmospheric absorption results in slight reductions in noise levels compared to those shown in the *Acft // Noise Curves* window. These reductions tend to increase with increasing observer-to-aircraft distances and tend to be largest for low-humidity cases.
 - The NPD curves are modified at the time noise is computed, and they cannot be displayed.
7. Input the average relative humidity. If the Modify NPD Curves box is checked, the humidity edit box is displayed with a default relative humidity of 70 percent. Humidity is only used in calculating atmospheric absorption.
8. Input the average headwind on all runways. The default average headwind is 8 knots, which is the value used in the SAE-AIR-1845 equations. The average airport headwind can be modified for individual runways by specifying a percentage change from the airport average. INM uses temperature, pressure, and headwind when computing procedural profiles.

9. Use *Edit // Commit Record* to commit the case record. INM makes a new subdirectory under the study directory. You cannot change the name of the case subdirectory once it is created.

You can delete a case and the subdirectory of files by using the *Edit // Delete Record* function. If an output record references the case that you are trying to delete, INM will not allow the deletion because output post-processing functions access case data. You must first delete the output record or change the reference to the case by using the *Output // Output Setup* function. Then, you can delete the case.



6.6. Case Copy

Menu Item: *Setup // Case Copy*

Use this function to create a new case by copying input files from an old case. You may want to do this if you plan to make only small changes to the new case (for example, only the airport temperature is different).

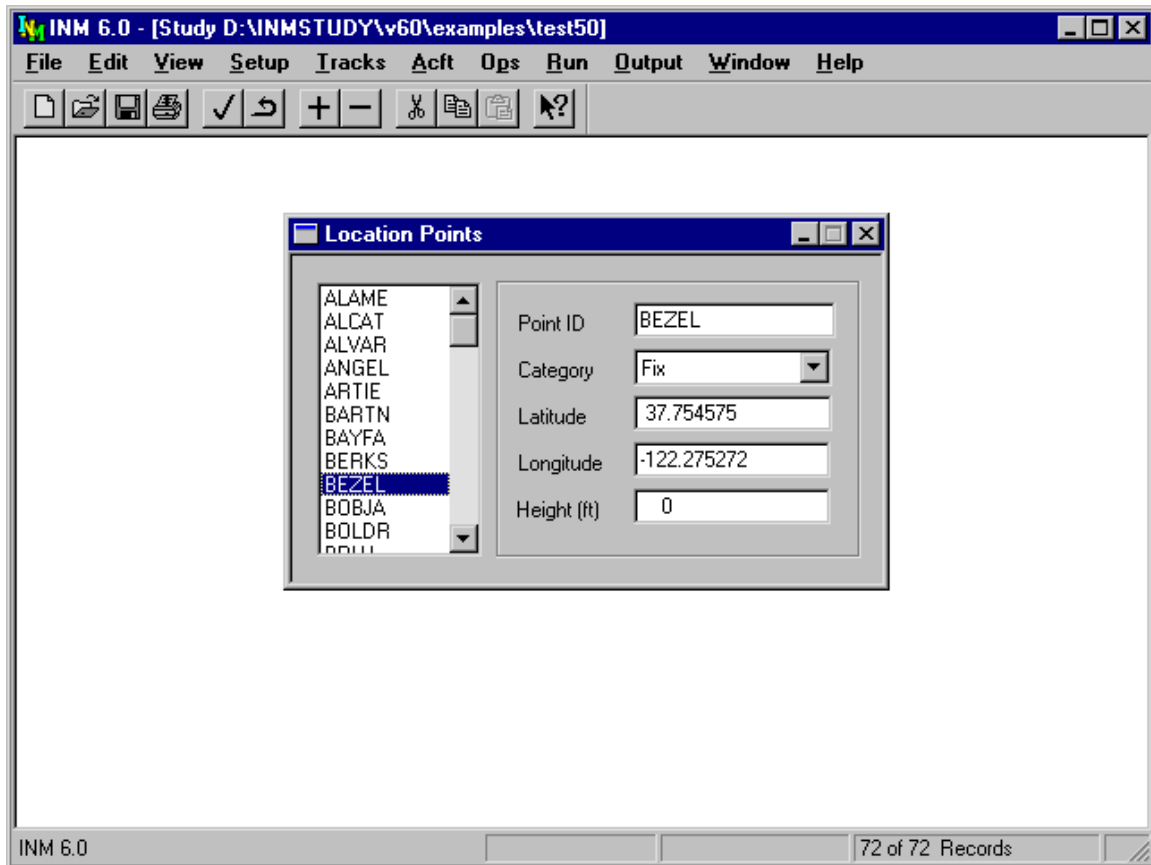
To use this function:

1. Select an existing case to copy.
2. Type in the new case name.
3. Press OK.

The *DBF* files that are copied to the new case subdirectory are:

- *OPS_APRT.DBF*
- *GRP_PCT.DBF*
- *OPS_FLT.DBF*
- *OPS_RNUP.DBF*
- *GRID.DBF*.

The case setup, grid setup, and run option data associated with the old case are copied to the new case. These data can be changed in the *Setup // Cases*, *Run // Grid Setup*, and *Run // Run Options* windows.



6.7. Location Point Setup

Menu Item: *Setup // Location Points*

Use this function to add and delete location points. Location points are special user-defined points around an airport. You may want to add location points so that you can display them in *Input Graphics* and *Output Graphics* windows, or because you may want to calculate noise at special points.

If you used the *Setup // Study View Airports* button when you created the study, nav aids and fixes probably already exist in the *Location Points* window. If you want to remove the clutter of unwanted fixes, delete them with the *Edit // Delete Records* function.

To add a location point:

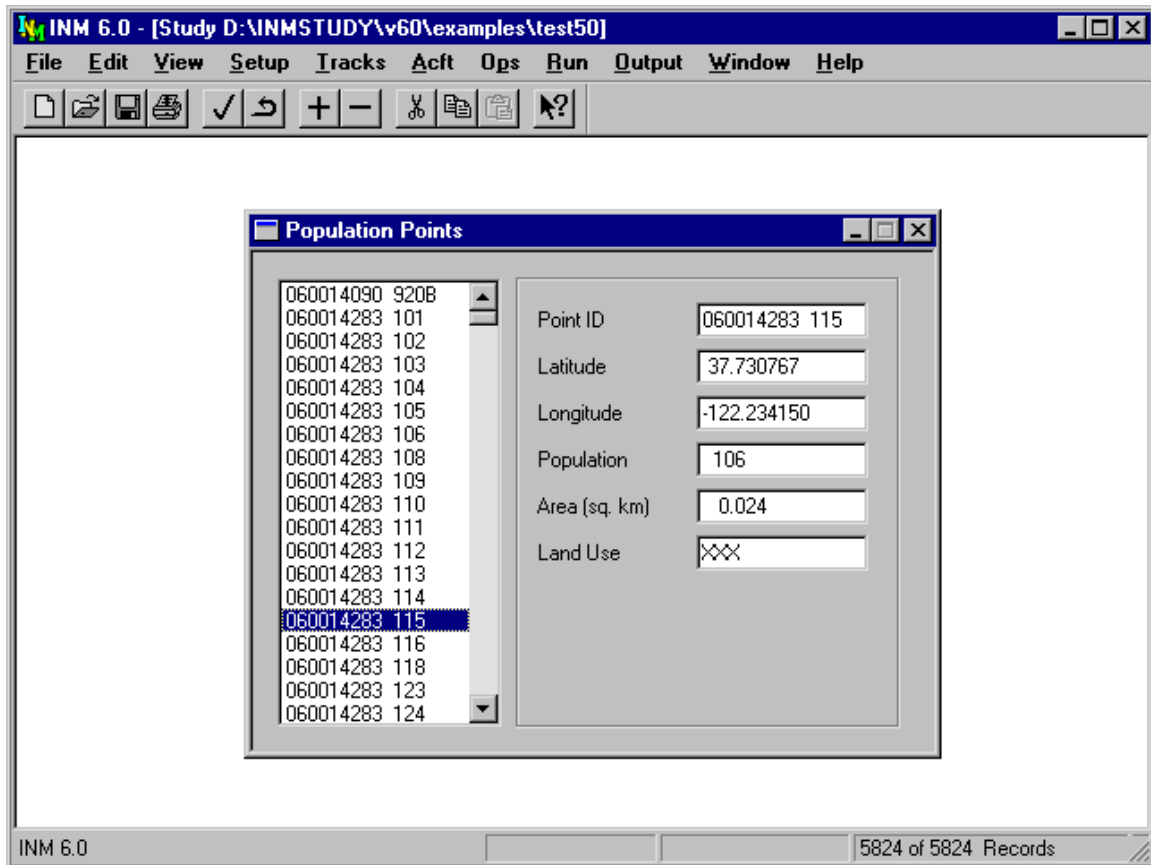
1. Use *Edit // Add Record* to make a blank record.
2. Fill out a six-character point name.
3. Input latitude and longitude of the point. Lat/longs are in decimal degrees; north and east are positive numbers and south and west are negative.

4. Input the height of the point above the ground. The height parameter is added to the terrain elevation value. If you want the noise calculated near the ground, use the default zero height value.
5. Use *Edit // Commit Record* to save the data.

You can create your own table of points by using a spreadsheet or database management program. Load the *DBF* template file *INM60\SYS_DBF\LOC_PTS.DBF* and fill out the data fields. The single-letter location codes are:

- A User-defined text (no associated symbol)
- B Building
- C Church, religious building
- H Hospital, medical facility
- S School, college, university
- U VOR
- V VORTAC
- W VOR/DME
- T TACAN
- N NDB
- M NDB/DME
- F Fix (air traffic control)
- X Other

The six types U V W T N M are collectively called "navaids", meaning electronic aids to airborne navigation. Use the above capital letters because INM will not read a record that has an unknown enumerated type.



6.8. Population Point Setup

Menu Item: *Setup // Population Points*

Use this function to view, add, or delete population points.

- Population points can be created by using the *File // Import Data into Study // Census PL94-171 DBF Files* function.
- When the *Run // Run Options Do Population Point* box is checked, INM computes noise levels at population points. The noise levels are used to find the number of people inside noise contours. The results are displayed in the *Output // Contour Area and Pop* table window.
- Population points are displayed as colored dots in *Output // Output Graphics* windows.

To create a population point:

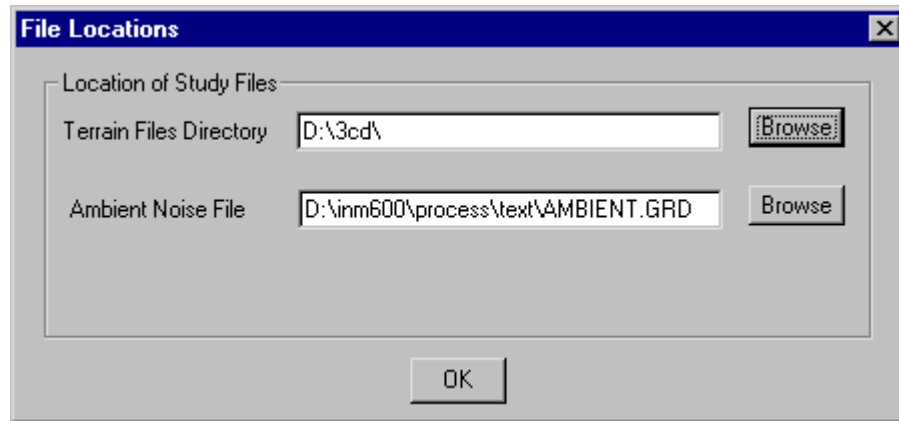
1. Use *Edit // Add Record* to create a blank record.
2. Fill out a 15-character point name. The name provided by the *Census PL94-171* processor is a concatenation of state code, county code, block numbering area, and block number.

3. Input the latitude and longitude of the point. Lat/longs are in decimal degrees; north and east are positive numbers and south and west are negative.
4. Input the number of people residing near the point.
5. The last two fields — area in square kilometers and area code — are not used by INM and their default values do not have to be changed. You can use these fields for your own purpose.
6. Use *Edit // Commit Record* to save the data.

When INM calculates the number of people inside noise contours, it reads two files:

- *POP_PTS.DBF*, which is displayed in this *Setup // Population Points* window
- *POP_NOIS.DBF*, which is computed during a case run and displayed in the *Output // Noise at Pop Points* window.

An error message will be displayed while computing population if the numbers of records in the two files are not the same or if the records are not in the same order (order is based on point identifiers). If you get this error message, run the case again.



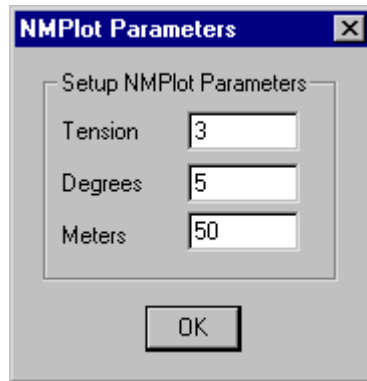
6.9. File Locations

Menu Item: Setup // File Locations

Use this function to tell INM where to find certain files. These files do not have to be inside the study directory:

- Terrain *3CD* files, which are used by INM when the *Run // Run Options Do Terrain* box is checked.
- Ambient noise file, which is used by INM when:
 - 1) A case is setup to run a time-above metric in the *Run // Run Options* window.
 - 2) The time-above run uses a grid record that has the Relative Threshold button selected in the *Run // Grid Setup* window.

File location names are saved in the *INM.INI* file, not in a study file, so you may have to change these names from study to study.



6.10. NMPlot Parameters

Menu Item: Setup // NMPlot Parameters

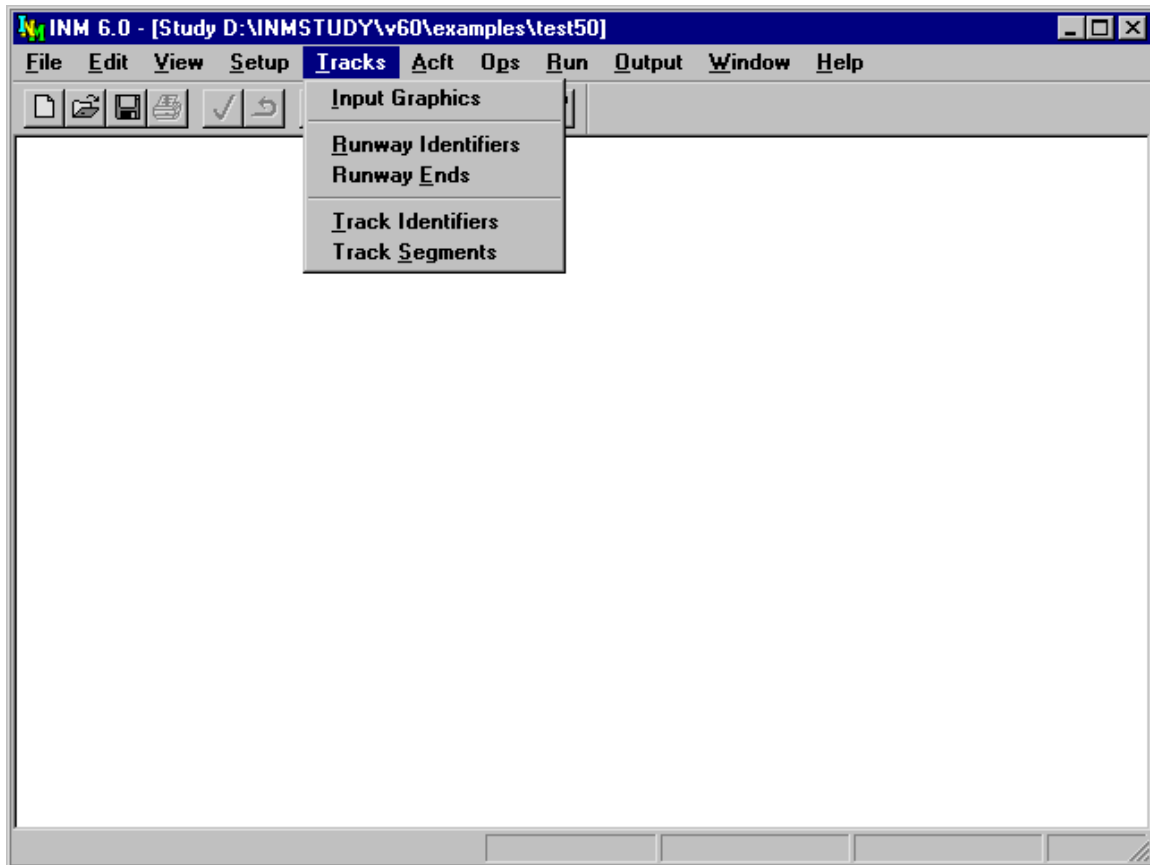
Use this function to change parameters that are used by the NMPlot module when computing noise contours. The default values shown above work well for most contouring jobs. However, if the contouring area is small, you may want more points per contour so that contours look smoother.

The NMPlot contouring parameters are:

- Tension — a measure of how aggressively NMPlot smoothes the contours. Smaller values result in greater smoothing, while larger values (above 30) result in no smoothing.
- Degrees — the maximum allowed turn angle from one contour line segment to the next. A larger value reduces the number of points per contour and makes the contours change direction more suddenly.
- Meters — the minimum length (in meters on the ground) for a contour line segment. A larger value reduces the number of points per contour. If the contours cover a large area, do not make this parameter a small number because a very large number of points will be generated and the *CONR_PTS.DBF* file will be very large.

These parameters are saved in the *INM.INI* file, not in a study file, so if you change them for one study, you may have to change them back again for another study.

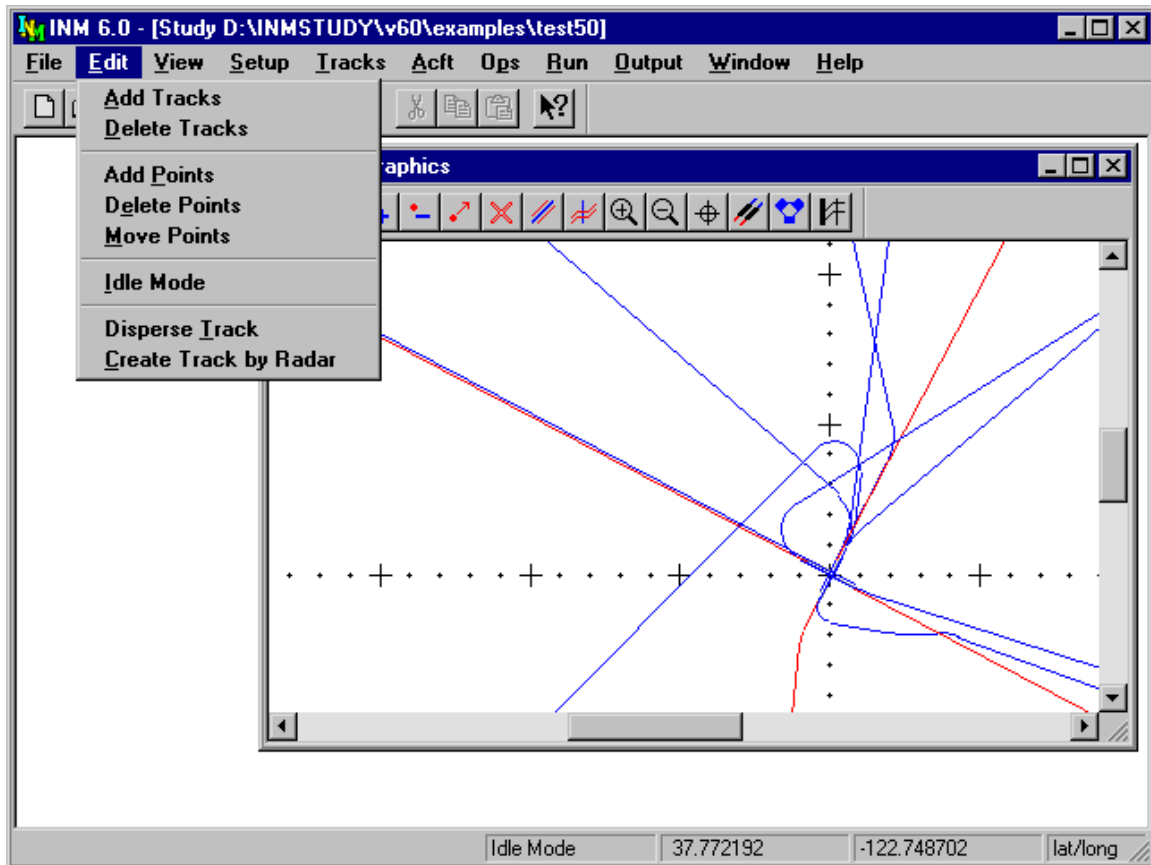
The NMPlot Windows application program can be downloaded from the Wasmer Consulting web site (see Appendix A).



7. TRACKS MENU

Use the *Tracks* menu to create runways and ground tracks for your study. Points-type tracks must be added by point-and-click graphical methods, and vector-type tracks must be added by typing data in dialog windows.

Create runways before using the *Tracks // Input Graphics* function. This is most easily done by using the *Setup // Study View Airports* function at the time you create your study. Or, you can manually create runway data in the *Runway Identifiers* and *Runway Ends* windows.



7.1. Input Graphics

Menu Item: *Tracks // Input Graphics*

Use this function to graphically create and edit points-type tracks (P-tracks). A P-track is created in the *Input Graphics* window. It is an ordered sequence of X,Y points.

The other kind of track is a vectors-type track (V-track). It is created in the *Track Identifiers* and *Track Segments DBF* windows. During the noise calculation process, INM converts V-tracks into sequences of X,Y points like P-tracks.

You cannot edit V-tracks in the *Input Graphics* window, and you cannot edit P-tracks in the *DBF* windows.

Graphics information can be entered or modified using several input modes. After the *Input Graphics* window is activated, the *Edit* menu changes to show the editing options that are available. For example, you can change to the add tracks input mode by using the *Edit // Add Tracks* function. When you change input

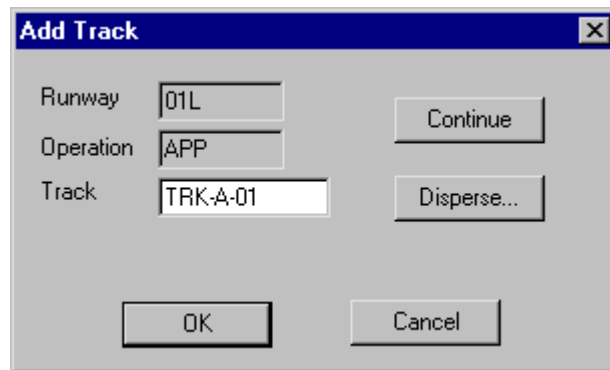
mode, the name of the new mode is displayed on the status bar at the bottom of the main window.

The mouse buttons behave differently in different input modes:

- In the add tracks input mode, a left-button click creates a track point, a double-click creates the last track point, and a right-button click brings up an Input Track Point dialog box for typing in coordinates.
- In other input modes, the right-button is used to translate the graphics scene. Press the right-button, hold it down, stretch the "rubber band", and release the button at a new position. INM translates the scene in the direction, and for the distance, that you specify.

In all input modes, you can move the graphics scene left, right, up, or down by using the scroll bars on the bottom and right side of the *Input Graphics* window.

A graphics toolbar is displayed at the top of the *Input Graphics* window. The graphics toolbar provides a short-cut method to access functions on both the *Edit* and *View* menus. The name of the function for each toolbar button is displayed under the toolbar when the mouse pointer is positioned over the on the button. The function name also appears on the status bar at the bottom of the screen.



7.1.1. Edit // Add Tracks

Use this function to create new P-tracks:

1. Select the *Edit // Add Tracks* function.
2. Start a track by clicking the left mouse button where you want the first track point.
3. Click the left mouse button for each track point. Track points should be created in the order that an airplane flies along the track. Try to keep the angle between adjacent track segments to less than 30 degrees.
4. Make the last point by double-clicking with the left mouse button.
5. INM displays the Add Track dialog box. Fill out the 8-character track identifier. The full name of the track is formed from three identifiers: the runway end identifier, the operation type, and the name that you type in.
6. Exit the Add Track dialog box by pressing one of four buttons:
 - OK — commit the new track to the study database.
 - Disperse — commit the track and immediately go to the Disperse Track function, where you can create multiple sub-tracks.
 - Continue — continue adding points (for example, you made a mistake in double-clicking to finish the track).
 - Cancel — delete the track (for example, you want to start over again).

Departure Track: Click inside the circle at the end of the runway from which the takeoff starts. For example, if runway 33L is used for departures, make the first track point in the circle designating runway end 33L. Create the next point such that the departure track goes straight down the runway. Continue clicking with the left button to define the track. Double-click to finish the track and to bring up the dialog box.

Approach Track: Start the track away from the airfield, and add points toward the touchdown end of the runway. The last line segment should line up with the runway. Make the last point on the end of the runway by double-clicking inside the circle. Fill out the dialog box as you did for departures.

Touch-and-Go Track: A touch-and-go track is a closed loop. It starts inside a runway circle and finishes inside the same circle. Make sure that the first and last track segments line up with the runway.

Overflight Track: An overflight track starts and finishes in the airspace surrounding the airfield. It must not start or end inside a runway circle. INM automatically assigns OVF as the runway identifier to all overflight tracks. The *Edit // Add Tracks* function is the only available way to create overflight tracks.

There are some special uses of the mouse and keyboard while in the *Add Tracks* function:

- When you add points to a track, the right mouse button can be used to open a dialog box to type in the point coordinates, instead of clicking on the point. When you click the right mouse button, the Input Track Point dialog box pops up with default point data. If you previously set geo-units to lat/long, fill out the latitude and longitude values that you want. If you set geo-units to nautical miles, fill out X,Y values; and similarly for kilometers.
- Use the Esc key to undo the previous step.
- Since the zoom functions are not accessible while in the *Add Tracks* function, use the + or = key to zoom in, and use the – key to zoom out. The center of the zoom is the position of the mouse.

You can stay in the add track mode and add as many tracks of different operational types as you want.

7.1.2. Edit // Delete Tracks

Use this function to delete existing P-tracks.

1. Select the *Edit // Delete Tracks* function.
2. Click on the track that you want to delete. INM changes the color of the selected track to black and presents a confirmation message box.
3. Press OK. INM checks all cases to see if the track is associated with group percent or flight operation records. This may take several seconds if flight operations are not already in memory.

If the track is associated with an operation, INM will not allow the track to be deleted. If you really want to delete the track, you must first delete all of the operations that use the track, and then delete the track.

7.1.3. Edit // Add Points

Use this function to add new points to existing P-tracks.

1. Select the *Edit // Add Points* function.
2. Select a track with the left mouse button. INM changes the color of the selected track to black and displays squares at the point positions.
3. Click on the track segment where you want to add the point. This segment becomes a triangle that is anchored by the two points defining the segment.

4. Make a new point in one of two ways. Drag the apex of the triangle to a new position, and then:
 - Click once more to release the new point. INM takes a moment to commit the new set of points.
 - Use the right mouse button to bring up a dialog box to input the coordinates of the new point.

To add points to the end of a track, add them in between the last two points, and then move the last point (see below) to where you want it.

7.1.4. Edit // Delete Points

Use this function to delete existing points in P- tracks.

1. Select the Edit // Delete Points function.
2. Select a track with the left mouse button. INM changes the color of the selected track to black and displays squares at the point positions.
3. Click on the point that you want to delete.
4. INM draws a circle around the point and then requests confirmation to delete.
5. Press Yes. INM takes a moment to commit the new set of point records.

You cannot delete a point from a track containing a single segment (only two points).

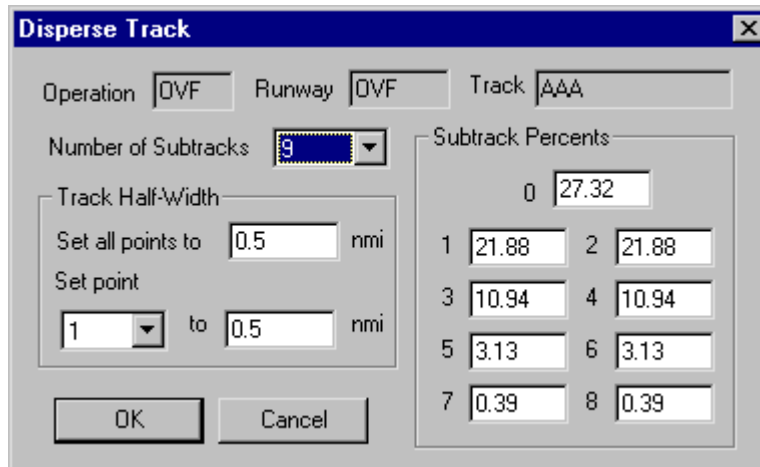
7.1.5. Edit // Move Points

Use this function to move existing points in P-tracks.

1. Select the *Edit // Move Points* function.
2. Select a track with the left mouse button. INM changes the color of the selected track to black and displays squares at the point positions.
3. Click on the point that you want to move.
4. INM creates a black triangle using the two neighboring points as anchors.
5. Define the new point by one of two methods: Drag the point to a new position, and then:
 - Click once more to release the point.
 - Use the right mouse button to bring up a dialog box to input the coordinates of the new point.

7.1.6. Edit // Idle Mode

Use this function to change to the idle input mode. This may be useful when you want to deactivate the behavior of the mouse. You do not have to go through the idle mode to change from one mode to another.



7.1.7. Edit // Disperse Track

Use this function to create sub-tracks along side of a backbone P-track. The backbone track and its sub-tracks are collectively called a "dispersed" track.

A dispersed track is used to model deviations from a nominal flight path, thus distributing noise over a larger area than provided by a single track. INM automatically distributes flight operations across sub-tracks, so all you do is assign operations to the backbone track and INM takes care of the details.

To use the *Dispersed Track* function, click on the track that you want to disperse. INM displays squares on the point positions of the track and activates the Disperse Track dialog box.

You may also disperse a new P-track directly from the Add Track dialog box. When you press the Disperse button, INM displays the same Disperse Track dialog box.

In the Disperse Track dialog box, edit the following input parameters:

1. Number of dispersed tracks — the backbone track plus sub-tracks. This is an odd number from 1 (only the backbone track) to 9 (the backbone track and 8 sub-tracks). A large number of sub-tracks will cause INM to run slower than with fewer sub-tracks, or none at all.
2. Sub-track percentages — these data are used to distribute flight operations across the backbone track and its sub-tracks. INM sets default percentages. You can change these percentages, but make sure that the new numbers add up to 100 percent.

3. Sub-tracks occur in pairs (for example, 1 and 2, 3 and 4, etc.), where sub-tracks to the left of the backbone track are odd numbers and to the right are even numbers, as shown below:

Left 7 5 3 1 0 2 4 6 8 Right

Left and right are determined by facing in the direction of flight along the backbone track. The backbone track is identified by "0".

4. Track half-width — this is the distance from the backbone track to the outside sub-track. Twice this parameter is the total width of the dispersed track.

A half-width parameter is associated with each backbone point. Therefore, you can change the shape of the dispersed track, point by point. When you first create a dispersed track, you can quickly set all of the points by using the Set All Points box. Or, you can set each point by selecting the point by number in the drop-down list box, and typing the value in the half-width box.

Once a track is dispersed and while you are still in the disperse track mode, you can change individual half-widths. Click on a backbone point (clicking on a segment produces no action). INM displays the Disperse Track dialog box with the point that you selected showing in the Set Point drop-down box. Type in a new half-width value for the point.

When you disperse an approach, departure, or touch-and-go track, you need to adjust the dispersion half-widths at each point to properly model the operation.

- Departure sub-tracks should have zero width at the first and second points so that all sub-tracks are on the runway. You need to change the half-widths on point-3 and greater.
- Approach sub-tracks should have zero width at the last point and small or zero half-width for points on final approach to the runway.
- If possible, you should disperse tracks based on radar data. If radar data are not available, you should increase the half-width in proportion to the distance from the runway.

7.1.8. Edit // Create Track by Radar

You must be able to see radar tracks in the *Input Graphics* window to use this function. Section 3.5.6 explains how to import radar track data into a study. Use the *View // Tracks* function to make the radar tracks visible.

You create a track using radar data by specifying a set of "radar windows" along a bundle of radar tracks.

- Start a departure track near the takeoff end of a runway, where radar data start, and work outward along a bundle of radar tracks.
- Start an approach track in terminal airspace and work inward toward the touch-down end of a runway. You define the type of operation (for example, approach) later.
- The radar windows must be created in the same order that an airplane would fly along the track.

To create a radar window:

1. Click to the side of a bundle of tracks.
2. Pull a line across the bundle (perpendicular to the radar tracks).
3. Click again. The line defines the horizontal extent of the radar window.

After you draw a line across a bundle of radar tracks, INM displays the Radar Window dialog box:

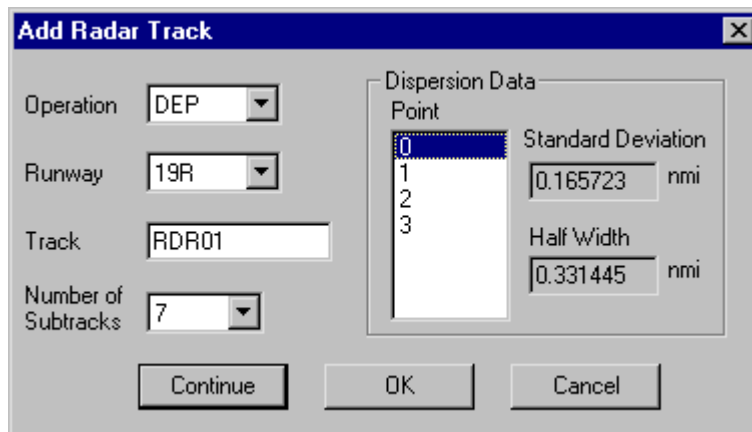
1. Altitude Values box — shows the lowest and highest altitudes of all the radar tracks that cross the line that you just specified.
2. Set Altitude box — is where you can input the vertical extent of the radar window. The default values are the lowest and highest radar track altitudes, thus allowing all radar tracks through the radar window.
3. After you reset the altitude values, press the Calculate button.
4. INM calculates the mean and standard deviation of the radar-track crossing points, which lie on the horizontal line. These statistics are displayed in the Track box. The statistics are in the geo-units that you specified in the *View // Geo Units* function. The track-point mean value is also displayed in the *Input Graphics* window as a small square.

If you do not change the altitude values, you do not need to press Calculate because the default values are already calculated.

Exit the Radar Window dialog by one of three ways:

- Continue — continue inputting points
- Add Track — finish specifying the track
- Cancel — delete the track and start over.

Continue creating points by pressing the Continue button. You create an INM track by repeating the Radar Window calculation at strategic places along the bundle of radar tracks. You should choose places where the radar-track bundle changes size or where it turns.



To finish the track, press the Add Track button. INM then displays the Add Radar Track dialog box:

1. Choose the operation that you had in mind when you specified the points (APP approach, DEP depart, TGO touch-and-go, OVF overflight).
2. Select a runway end.
3. Input a track identifier.
4. Select the number of dispersed tracks (the backbone track plus sub-tracks). Notice that when you change the point index number on the right, the dispersion half-width changes. This is because INM uses the calculated standard deviation to determine the track half-width.

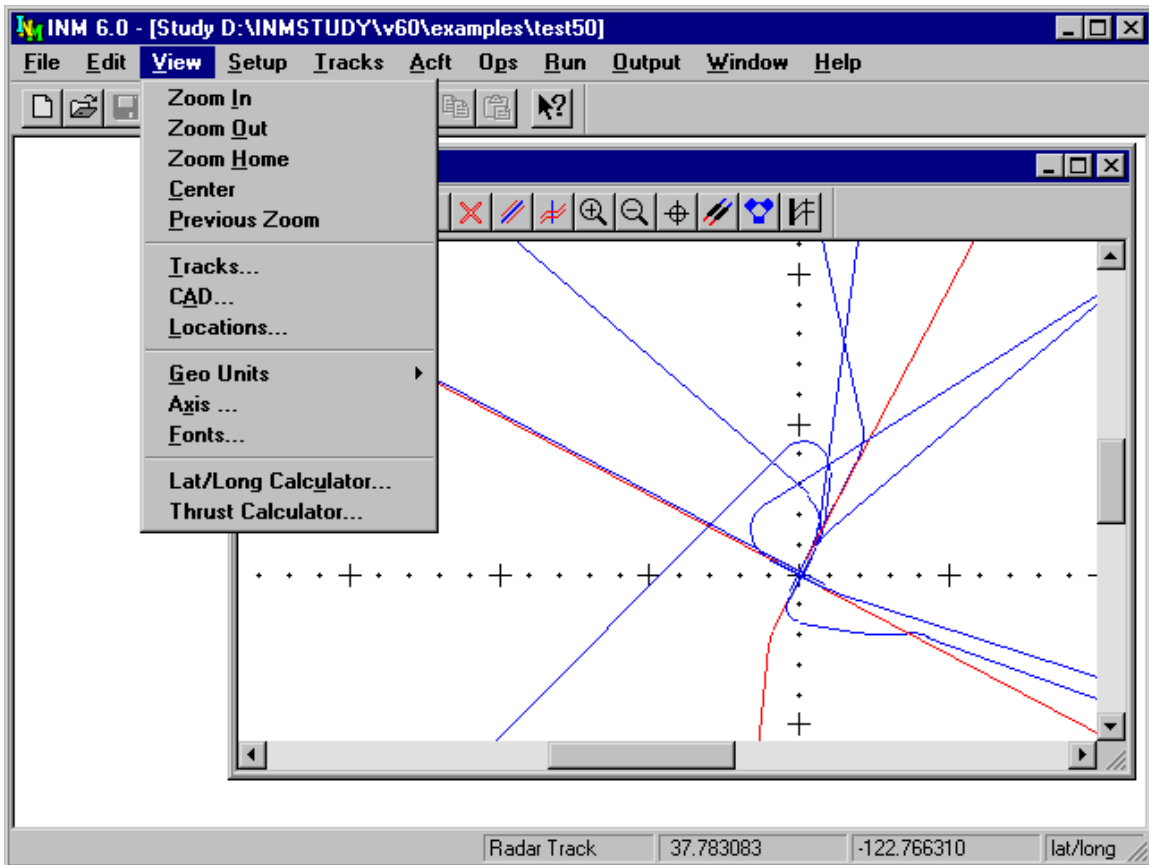
You can exit the Add Radar Track dialog box by one of three buttons:

- OK — commit the track to the database. You can change a radar-created track after it is committed by using the *Edit // Disperse Track* function.
- Continue — continue Radar Window input (for example, you made a mistake and did not want to finish the radar track).
- Cancel — delete the track and start over.

The table below shows default distances from the backbone track to individual sub-tracks. The distance is in terms of the number of standard deviations. The actual half-width is calculated by multiplying the number of standard deviations times the standard deviation at the point. For example, a 3-track half-width is 1.41 times the standard deviation at a point, and a 5-track half-width is 2 times the standard deviation.

The table also shows the default percentages that INM assigns to the sub-tracks. INM uses a binomial probability distribution for the percentages, except for the 5-track case, which uses the ICAO dispersion percentages (but they are very close to binomial). The backbone track is assigned a sub-track identifier of "0".

Number of Tracks	Sub-track Identifier	Std Dev Multiplier	Percent on Sub-track
1	0	0.00	100.00
3	0	0.00	68.26
	1 & 2	1.41	15.87
5	0	0.00	39.00
	1 & 2	1.00	24.00
	3 & 4	2.00	6.50
7	0	0.00	31.24
	1 & 2	0.67	23.44
	3 & 4	1.33	9.38
	5 & 6	2.00	1.56
9	0	0.00	27.32
	1 & 2	0.50	21.88
	3 & 4	1.00	10.94
	5 & 6	1.50	3.13
	7 & 8	2.00	0.39



7.1.9. View // Zoom In

To zoom in:

1. Click with the left mouse button at the position where you want the center of the new window.
2. Move the mouse to create a rectangle that represents the border of the new window.
3. Click with the left mouse button again to enable the zoom operation. INM redraws the scene in a larger scale, making it appear that you are closer to the airport.

You can change the center of the zoom area by holding the right mouse button down and dragging the rectangle to a new position. Do this after establishing the rectangle, but before finalizing the zoom operation with the second left-mouse-button click.

7.1.10. View // Zoom Out

To zoom out:

1. Click with the left mouse button at the position where you want the center of the new window.
2. Move the mouse to create a rectangle that represents the area into which you want the old window displayed. Make a small rectangle to zoom out a long way.
3. Click with the left mouse button again to initiate the zoom operation. INM redraws the scene in a smaller scale, making it appear that you are farther away from the airport.

You can change the center of the zoom area by holding the right mouse button down and dragging the rectangle to a new position. Do this after establishing the rectangle, but before finalizing the zoom operation with the second left-mouse-button click.

7.1.11. View // Zoom Home

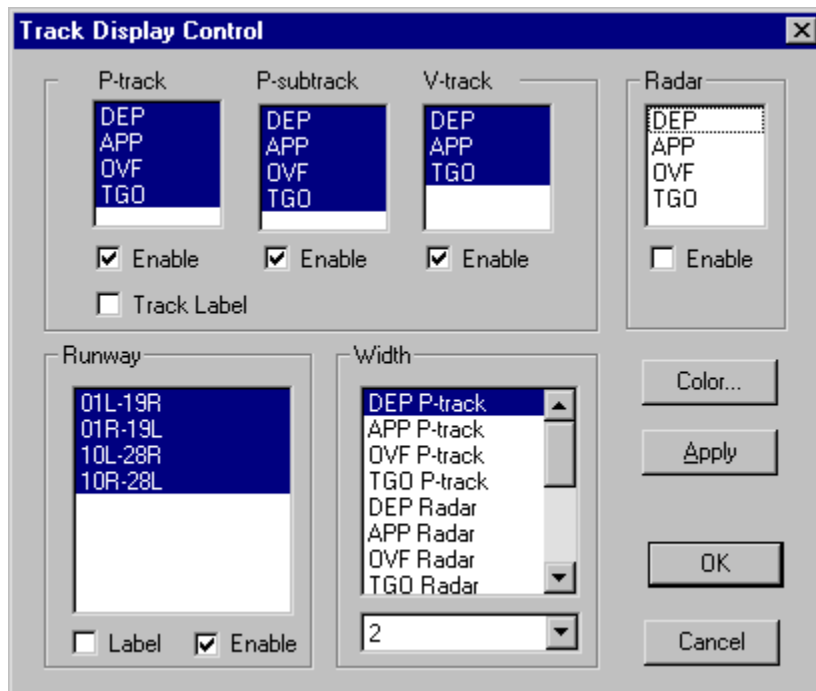
Use this function to center the display on the origin of the study coordinate system and reset the scale to the default value, which displays about ± 20 nautical miles of the X-axis.

7.1.12. View // Center

Use this function to re-center the scene so that the coordinate origin is in the center of the window. The current zoom scale is not changed.

7.1.13. View // Previous Zoom

Use this function to revert the graphics scene to the scale that was used previous to the current zoom scale.



7.1.14. View // Tracks

Use this function to turn on or turn off tracks and runways, label tracks and runways, and define colors.

Across the top of the dialog, there are four list boxes containing four categories of tracks:

- P-track points-type backbone tracks
- P-subtrack points-type sub-tracks
- V-track vector-type tracks (both backbone and sub-tracks)
- Radar radar tracks.

Each list box has three or four operation types:

- DEP departure tracks
- APP approach tracks
- TGO touch-and-go tracks
- OVF overflight tracks.

Click on an operation type to select or de-select the type of track.

A check mark in an Enable box activates the highlighted tracks in the associated list box. For example, to display only approach P-tracks:

1. Select APP in the P-track list.
2. De-select all other operation types in that list.
3. Put a check mark in the P-track Enable box.

4. Remove check marks from the other Enable boxes.

If you want to display track identifiers, put a check in the Track Label box.

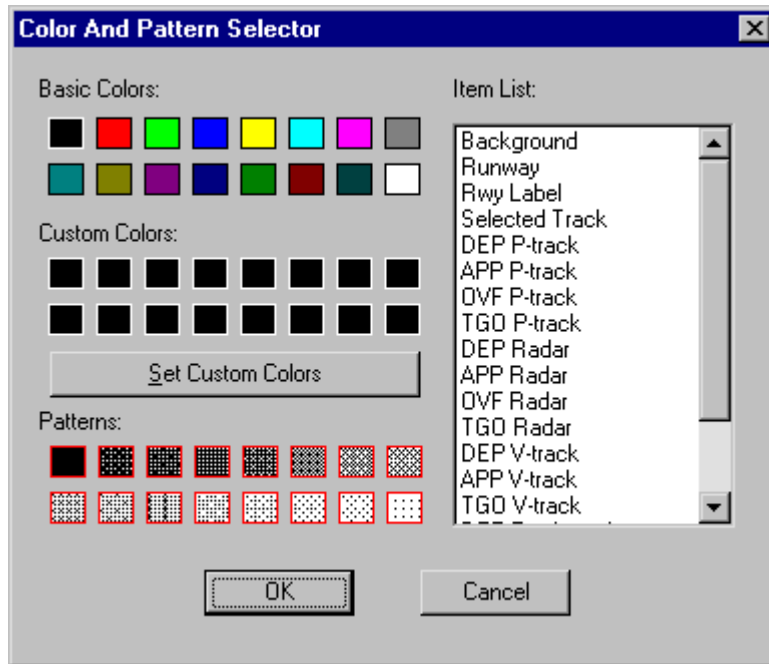
Change the width of tracks by selecting a track type (for example, DEP P-track) and then selecting a width number from the drop-down list box.

You can control runways by enabling or disabling them as a group and/or by selecting and de-selecting individual runways. If you de-select a runway, the runway and its associated tracks are not displayed. If you simply disable all runways (but leave individual runways selected), all the runways disappear but the tracks stay. Runway identifiers can be turned on or off with the associated Label box.

The four buttons operate as follows:

- Color — go to the Color dialog box
- Apply — display changes without committing them
- OK — commit the current control settings and exit the dialog box
- Cancel — quit the Track Display Control dialog box without saving changes.

If you use Apply to display your changes, remember to exit by using OK because the Cancel button reverts any display changes to their original state.

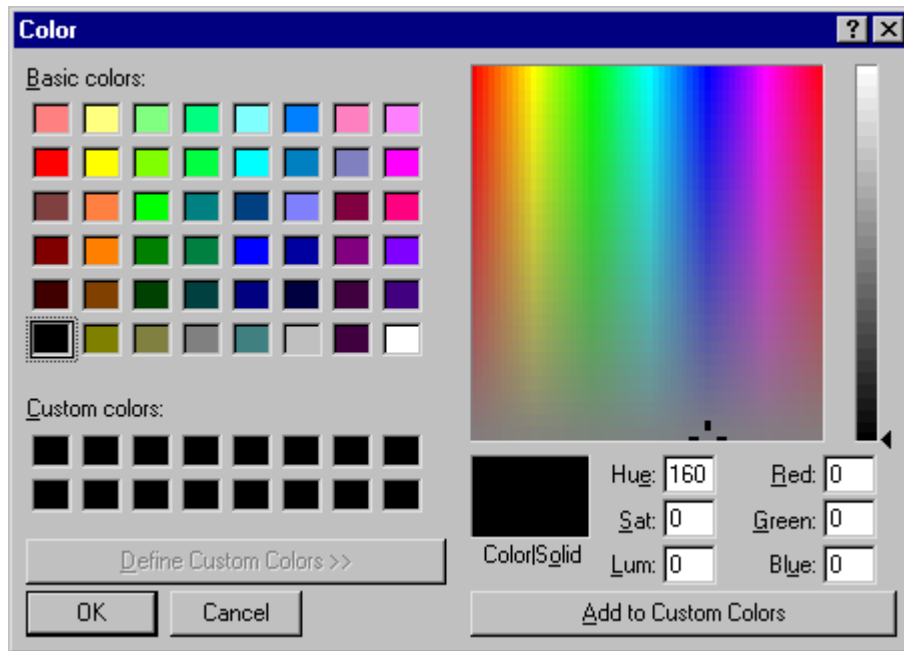


7.1.15. View // Tracks - Color

Use this function to change the colors of objects; in this case, tracks, runways, labels, and the graphics window background.

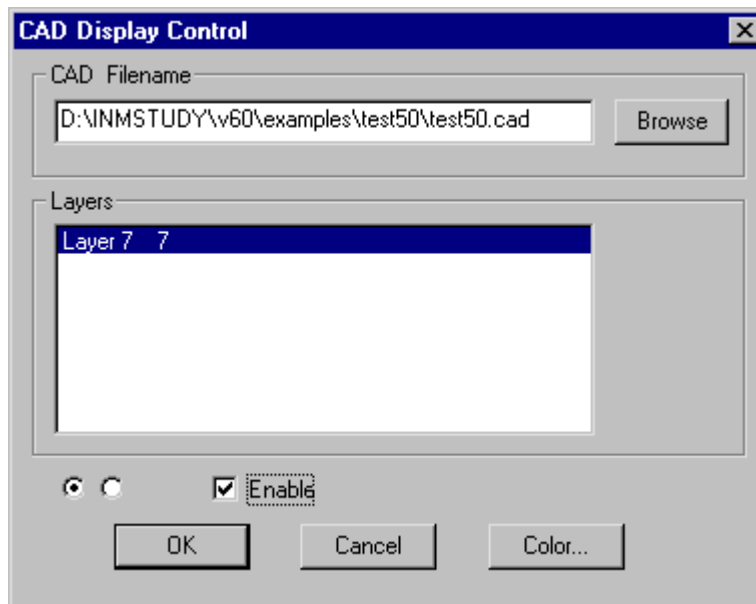
To change colors, press the Color button on the Track Display Control dialog box. The Color and Pattern Selector dialog box is displayed, letting you select an object to color.

1. Select an object from the Item List.
2. Select its color by clicking on one of the colored boxes on the left. A black square in the box designates the current color (sometimes the square is hard to see).
3. After coloring objects, press OK and then OK again in the Track Display Control dialog box to enable and save the new colors.



You can create your own colors by pressing the Set Custom Colors button. In the new dialog box:

1. Click on one of the 16 Custom Color boxes in the lower-left part of the dialog. The boxes are initially empty.
2. Select a Basic Color or click directly somewhere in the large multicolored box on the right.
3. Drag the slider-pointer on the far right to change the luminosity.
4. Press the Add to Custom Colors button.
5. Press OK to return to the Color and Pattern Selector dialog box, you will see that your new color is now in one of the boxes directly below the Basic Colors sequence. You can now select the new color.



7.1.16. View // CAD

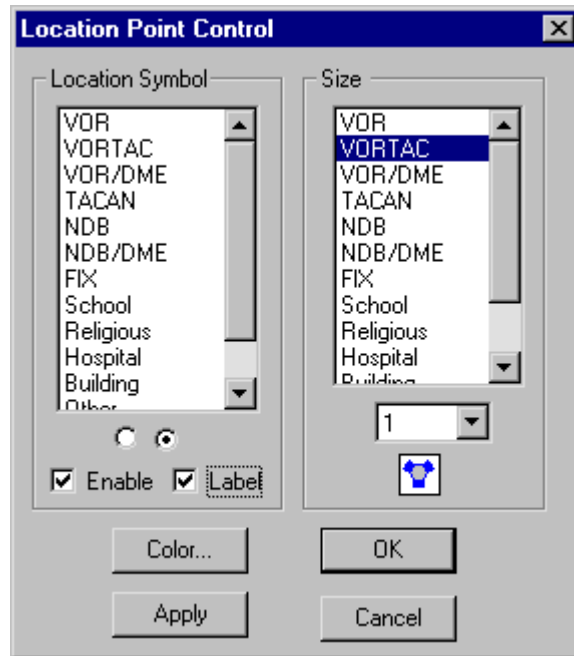
Use this function to display INM-formatted *CAD* files, typically a diagram of an airport.

You must first use the *File // Import Data into Study // AutoCAD DXF File* or the *Polyline TXT File* function to create an INM-formatted *CAD* file. Put the *CAD* files into the study directory.

To use *View // CAD Display Control* dialog:

1. Use the Browse button to select a *CAD* file from the study directory.
2. Select the *CAD* layers that you want to display. The left round button selects all layers; the right round button de-selects all layers.
3. Check Enable and press OK to display the *CAD* layers.

You can color individual *CAD* layers by using the Color function. It works the same as described above in *View // Tracks - Color*.



7.1.17. View // Locations

Use this function to display various kinds of location points, including nav aids and fixes. You must have a *LOC_PTS.DBF* file in the study directory to display location points in the *Input Graphics* or *Output Graphics* functions.

You can create a *LOC_PTS.DBF* file by a variety of methods:

- Automatically, by using the *Setup // Study Setup* function
- Interactively, by using the *Setup // Locations Points* window
- With a spreadsheet, by using the *LOC_PTS.DBF* template file in the *SYS_DBF* system subdirectory.

To use the Location Points Control:

1. Select or de-select types of locations points by clicking on items in the left list box (for example, you can turn off all fixes by de-selecting Fix). You can select all location points by clicking on the left round button, and you can de-select all by clicking on the right round button.
2. Change the size of the location point symbols by selecting a symbol item in the right list box, and then selecting a relative size number in the drop-down list box. All types of location points have preprogrammed graphic symbols, except for Text type. You can use Text type to place a six-character label on your graphic.
3. Turn on location points for display by putting a check in the Enable box.

4. Display the six-character point identifiers by putting a check in the Labels box.
5. Use one of the buttons at the bottom of the dialog:
 - Color — sets the color of text labels, but not the color of the symbols themselves.
 - Apply — applies your selections without closing the Location Point Control dialog box.
 - OK — applies your selections and closes the dialog box.
 - Cancel — reverts the display settings to the state that they were in when you opened the Location Point Control dialog box, and then closes the dialog box.

If you have a *LOC_PTS.DBF* file, and if you check the *Run // Run Options Do Location Points* box, INM calculates noise levels at all location points (not just the ones selected for display) and presents tabular results in the *Output // Noise at Loc Points* window.

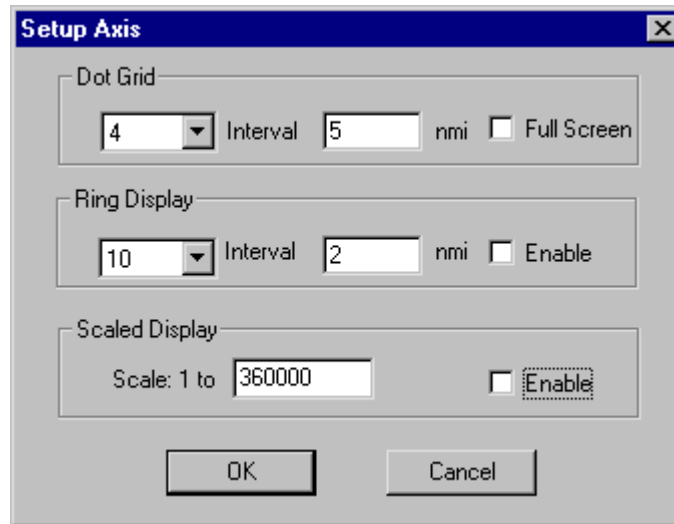
7.1.18. View // Geo Units

Use the *View // Geo Units* function to select the kind of units that appear on the right-hand part of the status bar at the bottom of the main window. INM displays the geographical position of the mouse cursor in this area.

- nmi — X and Y in nautical miles
- km — X and Y in kilometers
- lat/long — latitude and longitude in decimal degrees.

After selecting new units with this function:

- The *Edit // Add Tracks Track Input Point* dialog box uses the new units
- The *View// Axis* function uses the new units.



7.1.19. View // Axis

Use this function to display two kinds of distance-measuring marks to help define the X,Y coordinates. The functions are called Dot Grid and Ring Display. The Scaled Display function lets you set the zoom factor to a given scale.

Use **Dot Grid** to change grid marks:

1. Specify the number of dots displayed between the plus signs. For example, to make the minor division marks 0.2 nmi apart (assuming that the major divisions are 1.0 nmi apart), select 4 dots because 4 dots makes 5 intervals.
2. Input the distance between the major divisions marks (the plus signs) on the X and Y axes. For example, type 1.0 in the Interval box to make the distance between plus signs 1.0 nautical mile, if you are using geo-units of nmi.
3. Check the Full Screen box to display grid marks in all four quadrants, in addition to being displayed on the X and Y axes.

Use **Ring Display** to display range rings around the origin of coordinates:

1. Specify the number of rings to be displayed. For example, to make 5 rings (at 5, 10, 15, 20, 25 nmi), select 5 in the drop-down list box.
2. Set the distance between rings. For example, type 5.0 in the Interval box to make the distance between rings 5.0 nautical miles.
3. Check the Enable box and press OK to display the range rings. If you zoom in or out, the range rings get bigger or smaller, depending on the scale of the graphic scene.

Use **Scaled Display** to specify a given zoom factor. You might want to do this to make two graphics windows display at exactly the same scale.

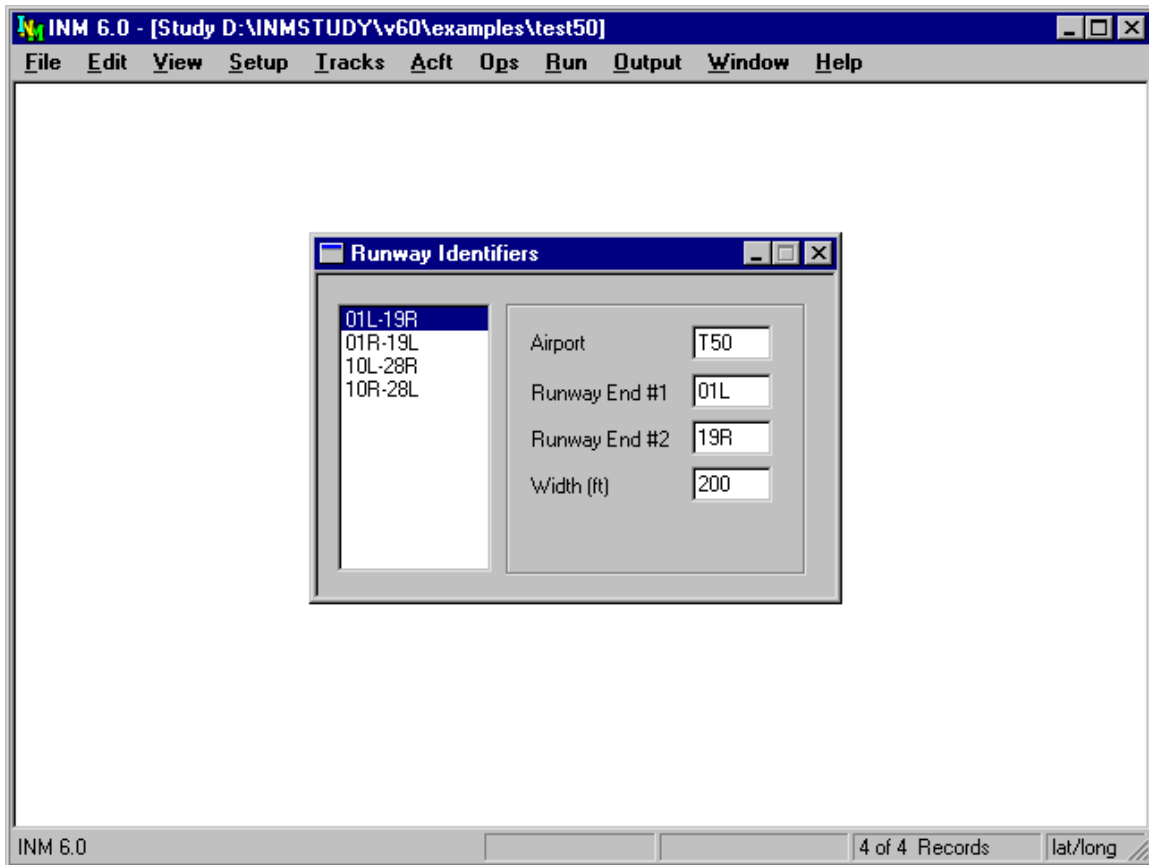
1. Type a value in the Scale 1-to-X edit box.
2. Check the Enable box.
3. Press OK. The window zooms in or out to the requested scale. The width of the INM window (typically, about 12 inches) is used in calculating the zoom factor.

If you use the Zoom function, the zoom factor will change and the 1-to-X scale will change. The current value of the 1-to-X scale is shown in the Scaled Display edit box.

7.1.20. View // Fonts

Use this function to change the font style and point size of text labels (names, identifiers) that are displayed in a graphics scene. It is the same function as described in Section 5.1.

You can experiment to see which font looks best in the *Input Graphics* window, which will depend on the screen resolution that you are using. You may have to change the font setting before printing if your printer uses a different resolution.



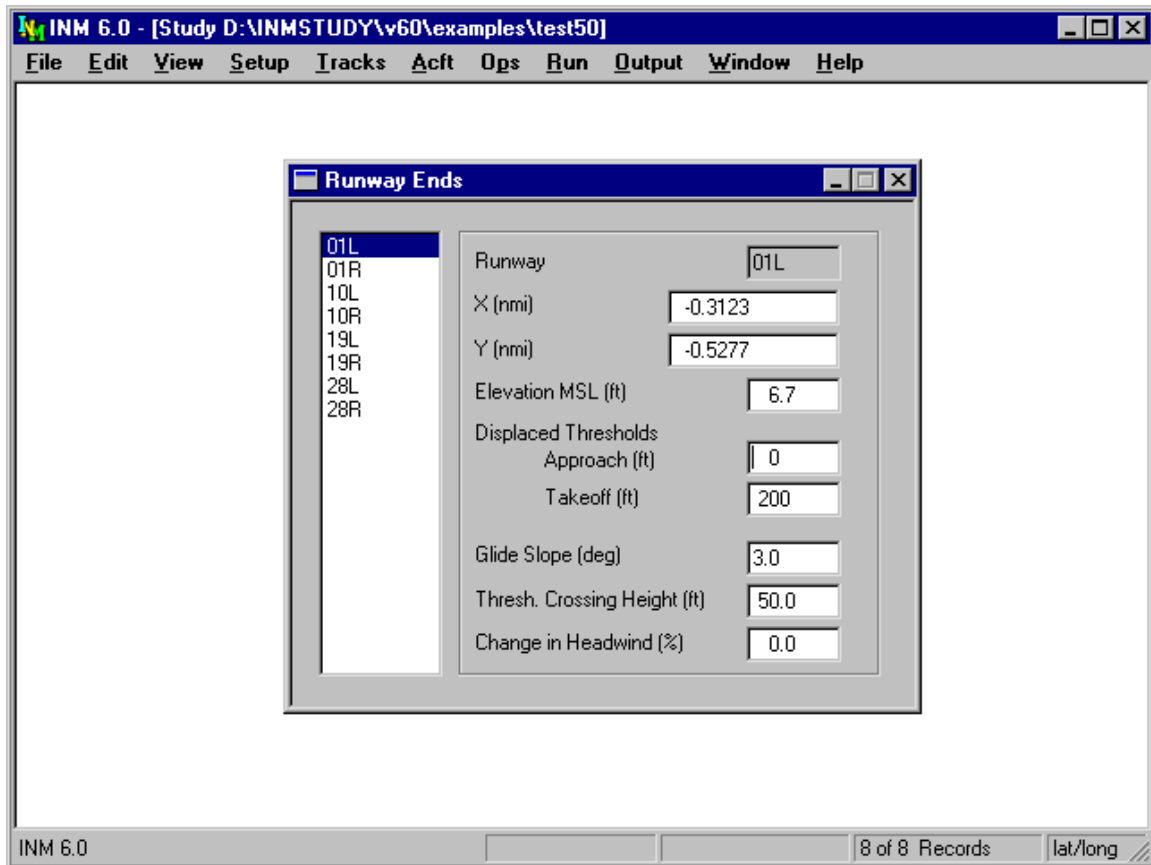
7.2. Runway Identifiers

Menu Item: *Tracks // Runway Identifiers*

Use this function to create a pair of runway end identifiers. If you use the *Setup // Study View Airports* function, runway identifiers and runway end records are automatically created for you.

To identify a runway:

1. Use *Edit // Add Record* to create a blank runway record.
2. Input an airport identifier to indicate which airport owns the runway.
3. Input the runway end identifiers. Each runway end must be uniquely named. INM does not use the airport identifier in distinguishing runway ends. If you have two identical runway end identifiers, change one of them.
4. Input the width of the runway.
 - Runway width is used when drawing the runway in the *Input Graphics* and *Output Graphics* windows.
 - Runway length is calculated using the X,Y values assigned to the runway ends. Length is shown in the *Output // Case Echo Report*.



7.3. Runway Ends

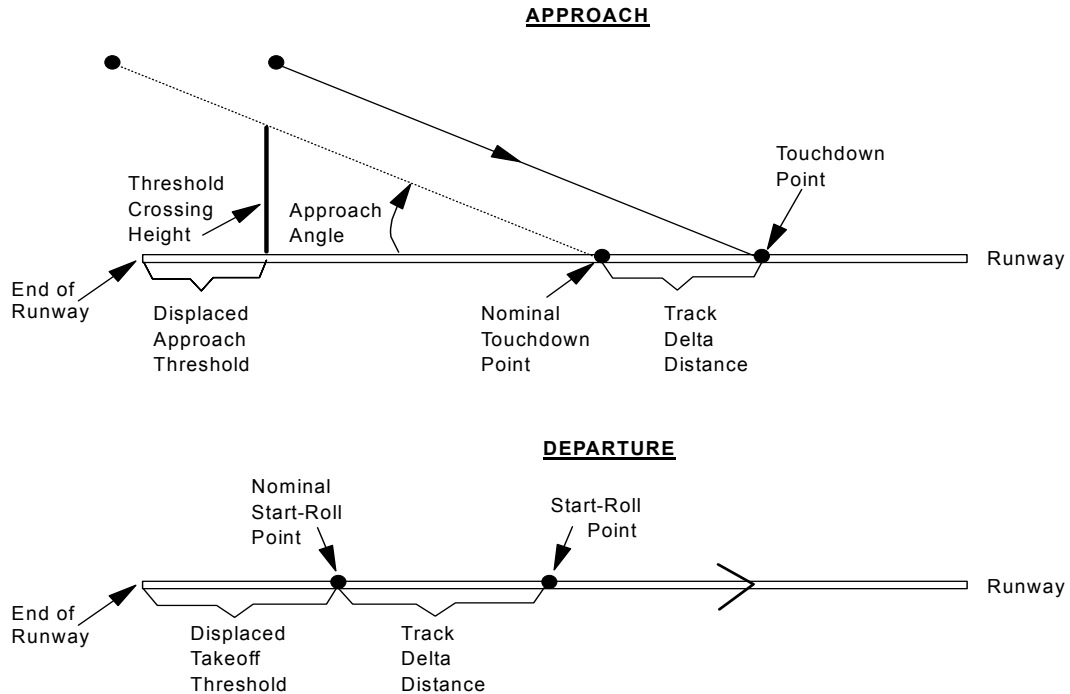
Menu Item: *Tracks // Runway Ends*

Use this function to input data relevant to one end of a runway. Runway end identifiers cannot be created or changed in this window; instead, use the *Tracks // Runway Identifiers* window.

Select a runway end in the list on the left, and then fill out the data-input form on the right:

1. Input the X,Y position of the runway end.
 - It is important to correctly input runway end points because the geometry of the study depends on them.
 - Even when INM supplies the NFDC geographical positions of the runway end points, you should check them. The lat/long values that correspond to the displayed X,Y values are in the *USR_DATA \ SYS_RWY.DBF* file.

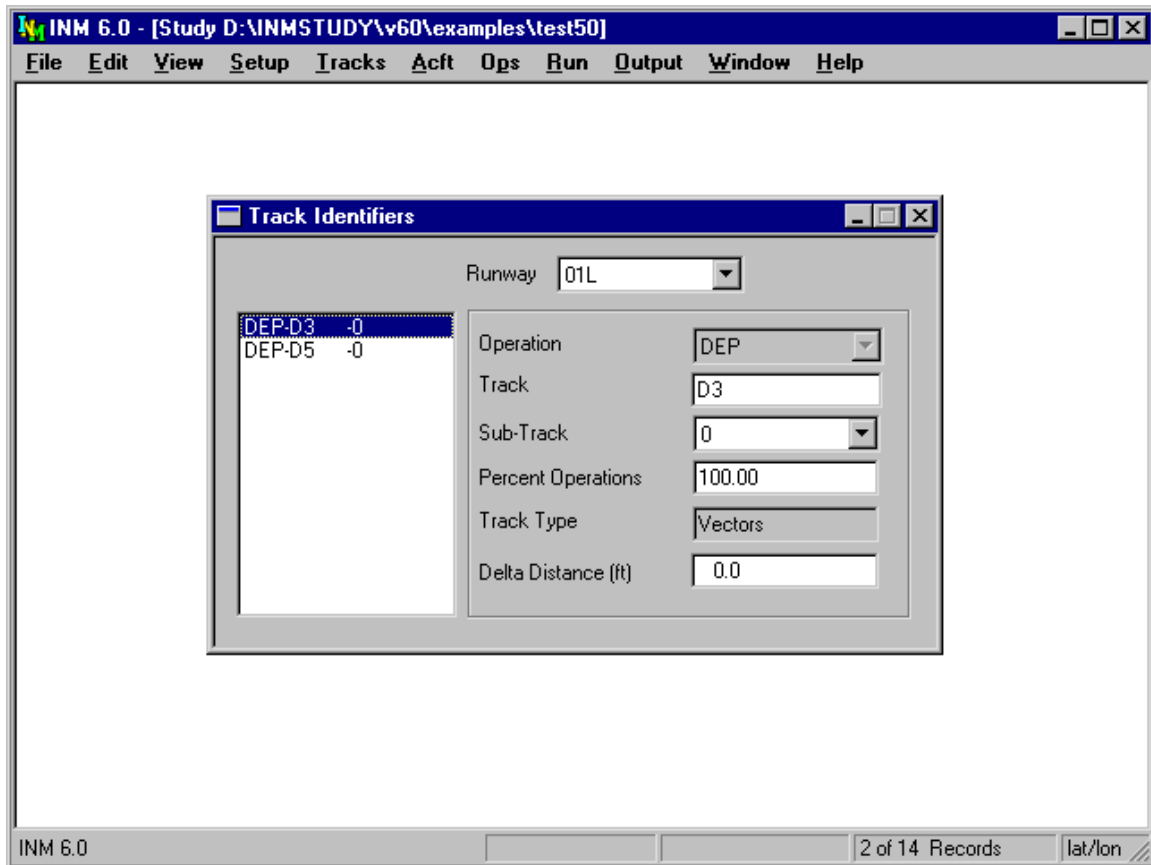
2. Input the elevation of the runway end as a height above mean sea level. If this value is different for the two ends of the runway, INM computes a runway gradient (an uphill or downhill slope) and uses it to adjust takeoff-roll distance for procedural profiles.



3. Input the distance values for displaced approach and displaced takeoff thresholds.
 - A displaced approach threshold is measured from the physical end of the runway to the threshold-crossing point (the point at which the "threshold crossing height" is measured). The threshold crossing point is usually at the end of the runway, so the displaced approach threshold is usually set to zero.
 - A displaced takeoff threshold is also measured from the physical end of the runway. It should be set to the average position of noise-producing engines at the start of takeoff roll, which is usually 100-200 feet from the physical end of the runway.
4. Input the glide slope, which is an approach angle for aircraft flying along an instrument landing system (ILS) electronic beam.
 - INM does not use this parameter in calculations; however, you can refer to it when designing approach procedure steps for aircraft that make ILS approaches.
 - Instead, INM uses a calculated approach angle that is determined by the altitude and distance of the approach descent step just prior to touchdown.

5. Input the threshold crossing height (TCH), which is the height above the runway at the runway approach threshold.
 - TCH and glide slope are ILS parameters. TCH is nominally 50 feet and glide slope is nominally 3 degrees, but a specific ILS installations may use different values.
 - INM uses the TCH parameter to calculate a nominal touchdown point, as illustrated in the diagram. An approach track can be set up to deviate from the nominal touchdown point by using “track delta distance” (see Section 7.4).

6. Input the percent change in headwind, which is used to modify the airport average headwind value to allow for a variation in average headwind for each runway end.
 - INM calculates the runway headwind by:
$$(\text{Runway headwind}) = (\text{Airport headwind})(1 + \text{Percent}/100)$$
 - The default value of 0% means the runway uses the airport average headwind.
 - The airport average headwind is a case parameter. By changing one value on a case record, the headwinds for all runway ends are changed according to their percent change parameters.
 - The percentage change value is limited to –500% to 500%, and usually you should use values between –50% and 50% .
 - A value of –100% means that there is no headwind, and a value of –200% means that there is a average tail wind equal to the airport-average headwind. Normally, no runway would operate with an average tail wind (averaged over flight operations, not time), but INM can compute a tail wind, if you wish.
 - The SAE-AIR-1845 equations that are used to calculate procedural profiles are based on a nominal headwind of 8 knots. If the runway end headwind is different than 8 knots, INM adjusts the calculated profiles accordingly. For example, climb angles are larger for a headwind greater than 8 knots.



7.4. Track Identifiers

Menu Item: *Tracks // Track Identifiers*

Use this function to name ground tracks before defining their segments. INM uses ground tracks and vertical flight profiles to compute three-dimensional flight paths.

There are two kinds of tracks in INM:

- V-track — a vectors-type track is represented by an ordered list of track segments. Track segments are flight vectoring instructions, such as "fly straight", "turn left", etc.
- P-track — a points-type track is represented by an ordered list of X,Y points. These points are also encoded as track segments.

Tracks // Track Identifiers window:

- Both V-track and P-track names are displayed in this window
- V-tracks are created and modified in this window
- P-tracks are created and modified in the *Tracks // Input Graphics* window.

To create a new V-track:

1. Select a runway end from the list.
2. Use *Edit // Add Record* to create a blank record.
3. Select the type of operation that the track is used for:

APP	A	approach
DEP	D	depart
TGO	T	touch-and-go
OVF	V	overflight

The single-letter codes are used in *DBF* files, and the three-letter identifiers are used in dialog boxes and windows.

4. Input a track identifier, which can be up to eight characters. The track identifier must be unique for tracks of the same operation type on the same runway end. A full track identifier consists of the runway end identifier, an operation type, the 8-character track identifier, and a sub-track number. For example: 16R-DEP-TRK0028-0
5. Select a sub-track number. Usually, you will leave this as 0. See below for an explanation of sub-track groups.
6. Input a percentage of flights using the group of sub-tracks. Usually, you will leave this at 100% because there is only one track in the group.
7. Input the track delta distance. Usually, you will leave this at 0 because there is no need to adjust start-roll or touchdown points. See the discussion below for situations where you would want to adjust these points.

Sub-Tracks:

- The reason for creating sub-tracks is so that you can assign flight operations to the group of sub-tracks as a whole, instead of specifying operations along each one.
- V-sub-tracks are created in this window with the same 8-character track identifier, but you should use different sub-track numbers. Sub-tracks with the same track identifier belong to the same group. V-sub-tracks do not have to be created in pairs, nor follow the left/right numbering scheme, as done for P-sub-tracks.
- V-sub-tracks are displayed in the *Input Graphics* window as normal tracks.
- P-sub-tracks are created in the *Input Graphics // Disperse Track* window.

Sub-Track Percentages:

- V-sub-tracks — the percentage of operations assigned to sub-tracks must add up to 100 percent for all sub-tracks in a group. If there is only one track in the group (with sub-track number 0), input 100 percent.
- P-sub-tracks — The *Input Graphics* function assigns default sub-track percentages, which are based on a binomial probability distribution. You can

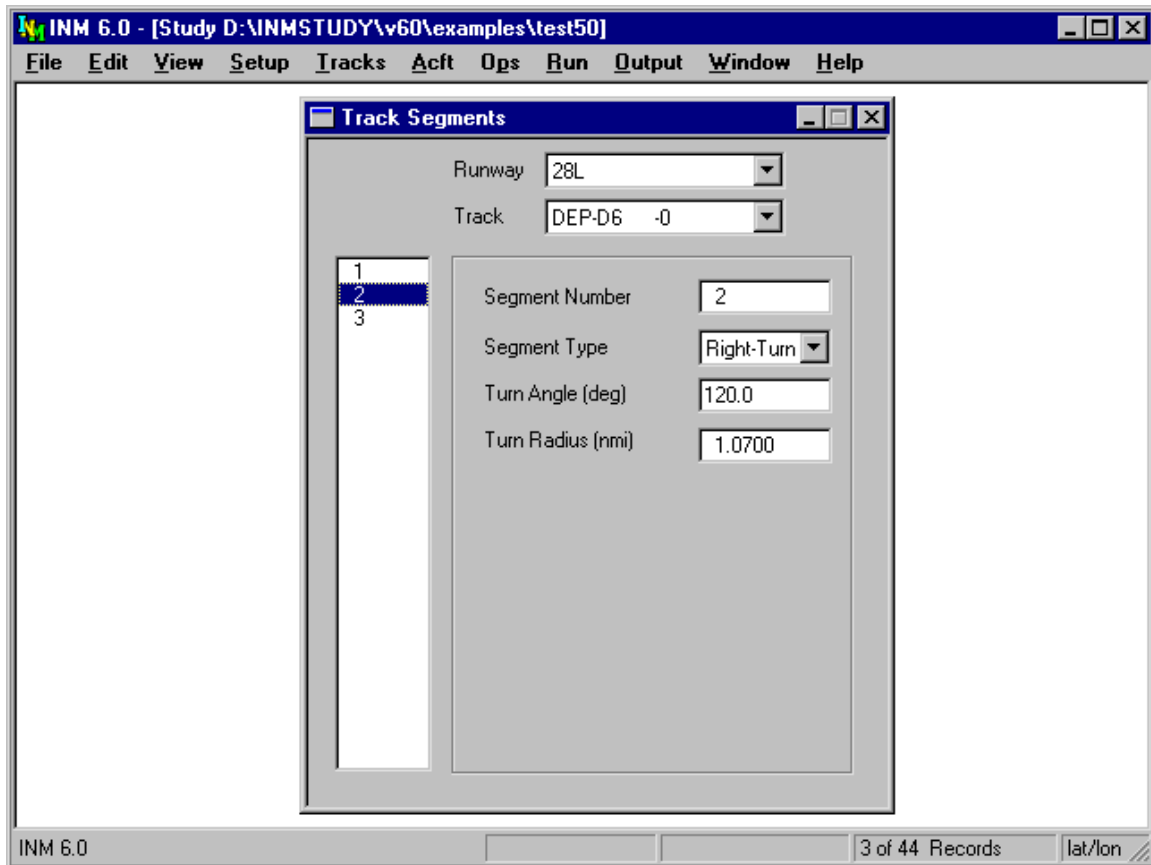
change these default values in the *Track Identifiers* window or the *Input Graphics // Disperse Track* window.

Track Delta Distance:

- Track delta distance is used to adjust the takeoff start-roll point or the touchdown point on the runway for a particular track.
- Nominal start-roll or touchdown point is determined by parameters in a runway end record. The nominal point is used by all tracks that are associated with the runway end.
- Override the nominal start-roll or touchdown point by using a non-zero track delta distance parameter.
- The start-roll or touchdown point is moved relative to the nominal point, down the runway for positive delta, and back toward the end of the runway for negative delta. Usually, you will use positive deltas.

Example uses of the track delta distance parameter are wake turbulence avoidance and intersection takeoffs:

- If light aircraft use the same runway as heavier jets, they will usually land further down the runway than the jets to avoid dangerous wake turbulence. The problem is that INM creates a nominal touchdown point before jet touchdown because light VFR aircraft use a steeper approach angle over the threshold. In this case, you would input a positive delta distance on the approach track used by light aircraft to move the touchdown point further down the runway.
- For the case of intersection takeoffs, input a positive delta distance equal to the distance from the physical end of the runway to the intersection, less the nominal start-roll distance.



7.5. Track Segments

Menu Item: *Tracks // Track Segments*

Use this function to input V-track geometry. Also, you can view (but not edit) P-track segments, which are individual X,Y points.

Input V-track geometry by adding a series of track segments:

1. Select a runway end and a V-track name, which was previously created in the *Track Identifiers* window.
2. Use the *Edit // Add Record* function to create a new track segment record. INM displays the next segment number in sequence in the Segment Number box.
3. Select the type of V-track segment: straight, left turn, or right turn. You should start and end a track with a straight segment. You can follow a turn segment with either a straight segment or a turn in the other direction.

4. For a straight segment, input the distance the aircraft moves along the segment.
5. For a left or right turn segment, input the angle and radius of the circular arc representing the turn.
6. Use *Edit // Commit Record* to save the track segment record. You can automatically commit by adding another record.

A departure track starts at the displaced takeoff threshold on the runway, and it finishes in terminal airspace. The first segment should be a straight segment, and INM automatically lines it up with the runway.

An approach track starts in terminal airspace and finishes at the displaced approach threshold on the runway. The last segment should be a straight segment, and INM automatically lines it up with the runway.

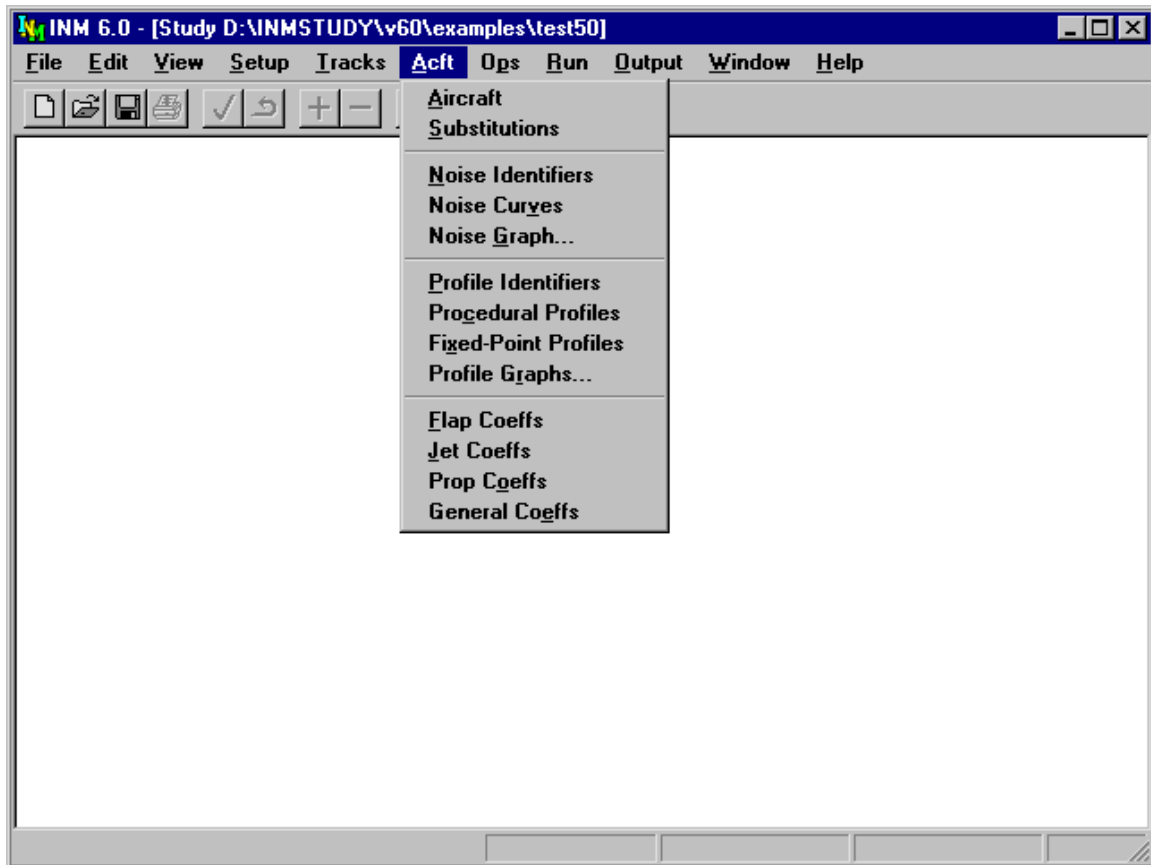
A touch-and-go track both starts and finishes at the displaced approach threshold on a runway. Usually, there are five track segments in a touch-and-go track:

1. Start with a straight segment.
2. Turn left or right 180 degrees.
3. Go downwind on a straight segment.
4. Turn again 180 degrees onto final.
5. Finish with a straight segment.

Make sure that the sum of the starting and finishing straight segment distances equals the down-wind straight segment distance, so that the touch-and-go track is a closed loop.

An overflight track starts and finishes in terminal airspace. Overflight tracks are created only in the *Input Graphics* function because they are exclusively points-type tracks.

INM adds a 100-nmi straight segment to the last defined track segment so that tracks are made long enough for calculation purposes. Typically, the last two points are used as a straight line on which a new last point is created. Thus, departure and overflight tracks are extended out of the airspace area, and approach and touch-and-go tracks are extended straight down the runway.

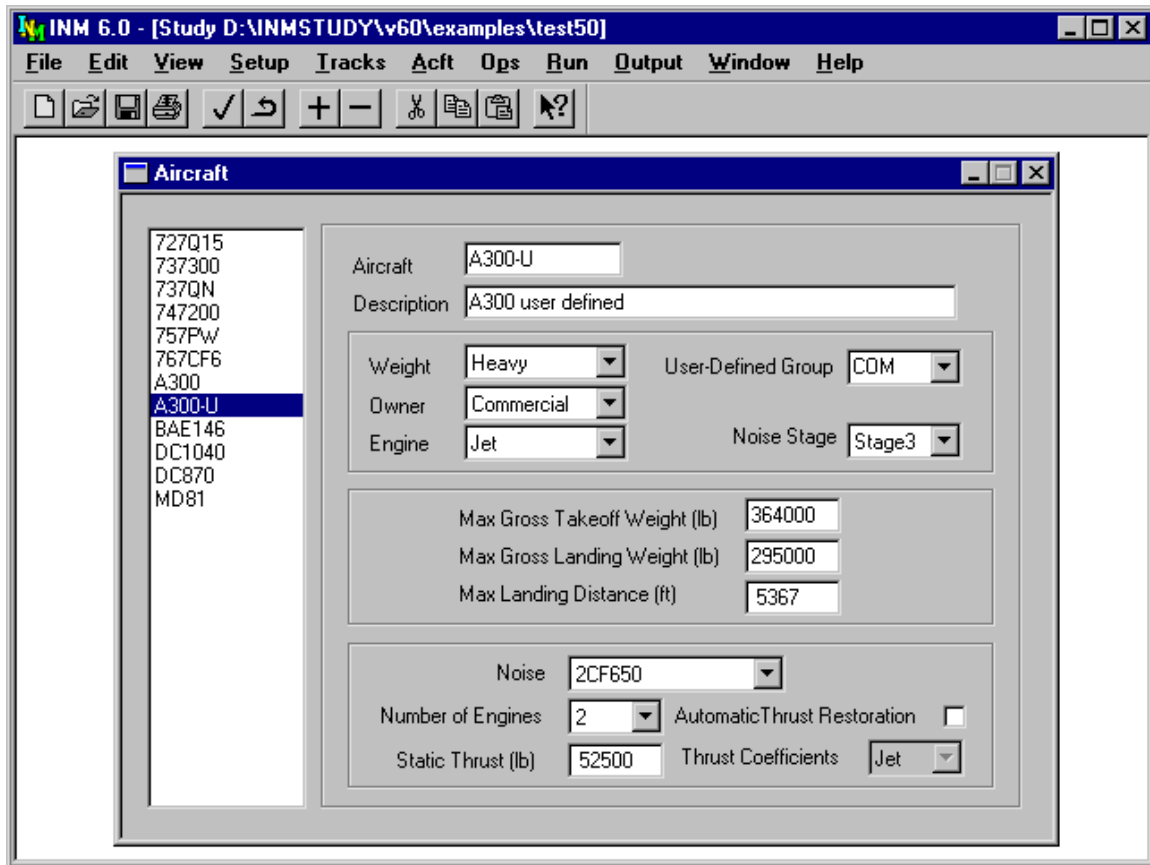


8. AIRCRAFT MENU

Use this menu to input aircraft data such as

- Aircraft definition data
- Aircraft substitutions
- Noise-power-distance noise levels
- Flight profiles
- Performance coefficients.

Aircraft are defined at the study level and are selectively used in cases according to how you specify flight operations.



8.1. Aircraft Data

Menu Item: *Acft // Aircraft*

Use this function to view and create aircraft records. The list on the left-hand side of the *Aircraft* window displays aircraft that are used in the study.

To put an aircraft into your study:

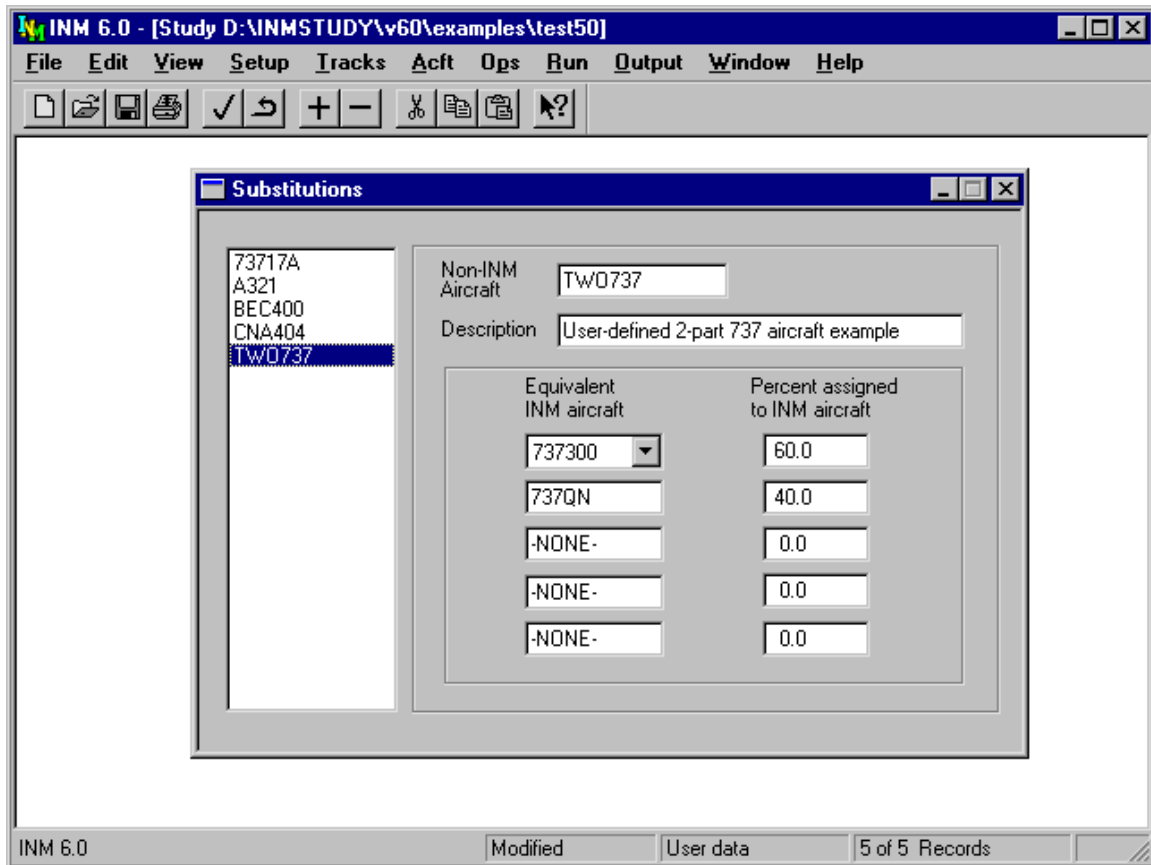
- Use the *Setup // Aircraft* function to bring an INM standard aircraft into the study. This is the easiest and most usual way.
- Or, select an existing aircraft to copy. Use *Edit // Copy Records* then *Paste Records*. INM displays a pop-up dialog box. Type a new aircraft identifier and press OK to create a copy of the aircraft record and all its related records. Then, you can modify the new aircraft record and related records.
- Or, use *Edit // Add Record* to create a new aircraft record, fill out the data, and then use *Commit Record*. Go to *Acft // Profile Identifiers* and *Acft // Fixed-Point Profiles* windows and create new records there too.

Some aircraft parameters are essential for computing noise contours and others are not. In the following list of 15 parameters, essential parameters are underlined.

1. Aircraft identifier is used to associate an aircraft with its profile identifiers, procedural profiles, fixed-point profiles, engine coefficients, and aerodynamic coefficients. Also, the identifier is used by aircraft substitutions and various kinds of flight operations.
2. A forty-character description of the aircraft and its engines is used to provide additional information.
3. Weight class is based on maximum gross takeoff weight:
 - Small — 12,500 pounds or less
 - Large — heavier than 12,500 but less than 300,000 pounds
 - Heavy — 300,000 pounds and heavier.
4. Owner category is Commercial, General Aviation, or Military.
5. Engine type is
 - Jet — turbojets
 - Turboprop — turbojet propeller-driven aircraft
 - Piston — piston-engine propeller-driven aircraft.
6. User-defined group identifier is the name of a group of aircraft. Aircraft group identifiers are used when creating flight operations with the *Ops // Group Percents* function.
 - INM standard groups are COM (commercial), GA (general aviation), and MIL (military). You can add to these or change them. There is no limit to the number of aircraft groups.
 - An aircraft can belong to only one group.
 - If using the *Ops // Group Percents* function, aircraft in a group must have the same profile identifiers. The INM standard database contains only STANDARD profiles, so this condition is automatically met for studies based on standard data.
7. Noise stage is the FAR Part 36 noise classification number. Since some INM standard aircraft types are composed of several real aircraft types, noise stage is only representative of type and is presented here as a point of reference. This parameter is not used by INM.
8. Maximum gross takeoff weight is used to check for errors in profile weight when calculating procedural profiles.
9. Maximum gross landing weight is used to check for errors in profile weight when calculating procedural profiles.

10. Maximum landing distance is the FAR Part 25 field length required for maximum gross landing weight.
 - The distance is measured from the approach threshold (usually, the edge of the runway) and includes the in-air portion of the flight path before touchdown.
 - The in-air portion is nominally 954 feet for a 3-degree approach, and it is 572 feet for a 5-degree approach for a threshold crossing height of 50 feet. The distance parameters needed in the *Procedural Profiles* window for a deceleration step can be computed by using this maximum landing distance.
11. Noise identifier associates an aircraft with its noise data. One or more aircraft can be associated with one set of noise data.
12. Number of engines is used to calculate engine-out thrust values for certain kinds of procedure steps. This is the only use of number of engines.
 - Noise levels associated with an aircraft do not change if the number of engines is changed. This parameter is not connected to the noise data. Noise data implicitly account for the number of engines.
13. Static thrust is used to compute thrust for procedural profiles. Static thrust must be in pounds, even when working in the metric system. Static thrust is for sea level standard-day conditions. Two uses are made of this parameter, depending on the type of thrust setting:
 - Pounds — static thrust is used to compute pounds thrust from percentage values on deceleration procedure step records. For example, INM standard jet aircraft use 60% static thrust for reverse thrust and 10% static thrust for taxi.
 - Percent — static thrust is used to convert percent thrust to pounds thrust when calculating procedural profiles.
 - If an aircraft exclusively uses fixed-point profiles, then static thrust is not used.
14. Automated Thrust Restoration System (ATRS) parameter is used in calculating procedural profiles. If the box has a check mark in it, it means that the aircraft has ATRS. An ATRS aircraft uses zero-gradient engine-out thrust on the thrust-cutback segment, whereas a non-ATRS aircraft uses positive-gradient thrust, which depends on the number of engines. All INM standard aircraft are set to non-ATRS.
15. Thrust coefficient type:
 - Jet — jet thrust coefficients (and the associated SAE-AIR-1845 jet-thrust equation) are used to calculate the corrected net thrust per engine, which is the parameter used to access noise data.
 - Prop — prop thrust coefficients are used instead.
 - Many INM standard aircraft do not have thrust coefficients and their profiles cannot be computed. They are set to Jet or Prop, depending on their engine type, but the parameter is not used.

- Most INM standard turboprop aircraft are classified Prop, but there are two that are classified Jet (DHC8 and DHC830).



8.2. Aircraft Substitutions

Menu Item: *Acft // Substitutions*

Use this function to view and create aircraft substitutions. The list on the left-hand side of the *Substitutions* window contains the substitutions in the study.

To put an aircraft substitution into your study:

- Use *Setup // Substitutions* function to bring in INM standard substitutions. You cannot modify these records.
- Use *Edit // Add Record* to create a new substitution record, input data, and then use *Commit Record* to save it.

Substitution identifiers are similar to aircraft identifiers. Substitution identifiers appear in aircraft lists when you construct flight operations. You can select substitutions as though they were regular aircraft types.

INM standard substitutions (the ones on the *Setup // Substitutions* list) are approved by the FAA for use in INM studies. If you are unable to find an aircraft in the substitution database, refer to the contact provided in Appendix A for INM aircraft substitutions.

To create a new aircraft substitution:

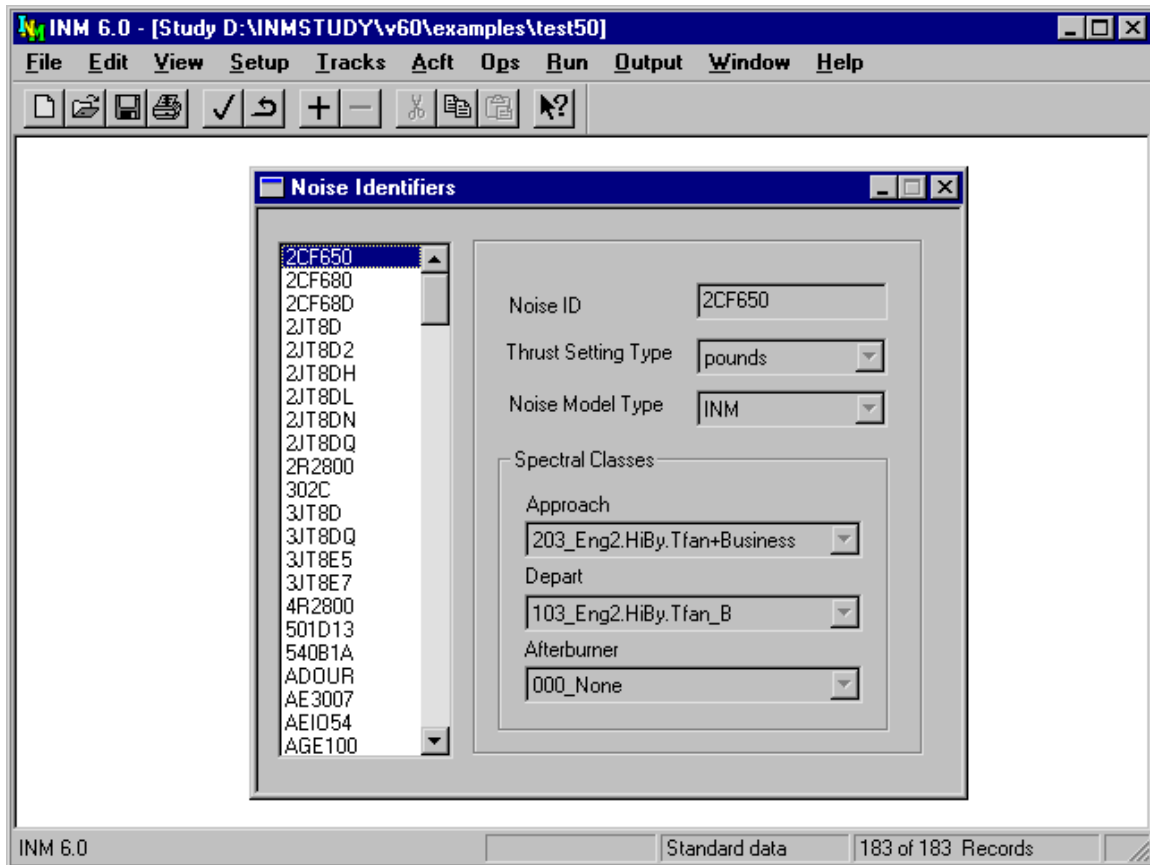
1. Use *Edit // Add Record* to create a blank record.
2. Input a six-character identifier and a 40-character description. The substitution identifier must be different from any aircraft identifier or other substitution identifier in the study.
3. Select from one to five study aircraft that will be used in place of the substitution aircraft. If an aircraft you need is not on the list, you can bring it into the study using the *Setup // Aircraft* function.
4. If you want the substitution aircraft to be represented by just one study aircraft, select it in the top box, enter 100 in the percent box, and leave the other boxes with -NONE- and 0 in them.
5. If you want the substitution aircraft to be represented by two or more (up to five) study aircraft, fill out the boxes accordingly and in order. Make sure that the percentages add up to 100 percent.

INM uses the specified study aircraft in place of the substitution aircraft when calculating numbers of operations. The numbers of operations are assigned according to the percentage values.

- For example, if you create a substitution aircraft TWO737 equal to 60% 737300 and 40% 737QN, then 100 TWO737 operations are expanded to 60 737300 operations and 40 737QN operations. You can display the expanded operations using the *Ops // View Calculated Flights* function.

All study aircraft associated with a given substitution aircraft must have the same profile identifiers, or else INM cannot correctly expand the operations.

- For example, if you create a DEP-CLOSE-1 flight operation for the TWO737 substitution, both 737300 and 737QN must have DEP-CLOSE-1 profiles. You can check the *FLT_ERR.TXT* file in the case subdirectory for this kind of problem.



8.3. Noise Identifiers

Menu Item: *Acft // Noise Identifiers*

Use this function to view and create noise identifiers. A noise identifier is the name of a set of noise-power-distance (NPD) curves.

A noise identifier record contains:

- Six-character noise identifier
- Type of thrust setting used to identify the noise curves
- Type of noise model to apply
- Spectral classes for approach, depart, and afterburner operational modes.

8.3.1. Thrust-Setting Type

The types of thrust setting are Pounds, Percent, and Other. Only those aircraft associated with pounds or percent can have procedural profiles. This is because the equations for corrected net thrust per engine use coefficients related to pounds or percent of static thrust in pounds.

Aircraft associated with thrust-setting type Other (via the noise identifier field on the aircraft record) do not show in the aircraft display list in the *Acft // Procedural Profiles* window. These aircraft must use fixed-point profiles.

8.3.2. Lateral Attenuation Model

INM uses noise model type INM or NOISEMAP when computing lateral attenuation:

- The INM lateral attenuation model is documented in SAE-AIR-1751 and SAE-AIR-1845:

When the airplane is on the ground:

$$G = 15.09(1 - \exp(-0.00274 D)) \quad 0 \leq D \leq 914 \text{ m}$$

$$G = 13.86 \quad D > 914 \text{ m}$$

Where G is ground-to-ground attenuation (dB), and D is the horizontal lateral distance to the airplane (meters).

When the airplane is airborne:

$$L = (G/13.86) (3.96 - 0.066 \beta + 9.9 \exp(-0.13 \beta)) \quad 0 \leq \beta \leq 60$$

$$L = 0.0 \quad 60 < \beta \leq 90$$

Where L is the total lateral attenuation (dB), and β is the elevation angle to the airplane (degrees).

- The NOISEMAP lateral attenuation model:

When the airplane is on the ground:

$$G = 15.09(1 - \exp(-0.00274 D)) \quad 0 \leq D \leq 401 \text{ m}$$

$$G = 10.06 \quad D > 401 \text{ m}$$

Where G is ground-to-ground attenuation (dB), and D is the horizontal lateral distance to the airplane (meters).

When the airplane is airborne:

$$L = G \quad 0 \leq \beta \leq 2$$

$$L = (G/10.06) ((21.056/\beta) - 0.468) \quad 2 < \beta \leq 45$$

$$L = 0.0 \quad 45 < \beta \leq 90$$

Where L is the total lateral attenuation (dB), and β is the elevation angle to the airplane (degrees).

8.3.3. Maximum-Level Model

INM uses input data for LAMAX and PNLTM when they are available. However, when these maximum noise level data do not exist, INM uses equations to compute maximum levels. The equations were derived from linear regression analyses of standard noise data.

INM uses noise model type, INM or NOISEMAP, when computing maximum noise levels:

- The INM maximum-level model:
$$\begin{aligned} \text{LAMAX} &= \text{SEL} - 7.19 - 7.73 \log(D / 1000) \\ \text{PNLTM} &= \text{EPNL} + 1.12 - 9.34 \log(D / 1000) \end{aligned}$$
- The NOISEMAP maximum-level model:
$$\begin{aligned} \text{LAMAX} &= \text{SEL} - 7.48 - 6.06 \log(D / 1000) \\ \text{PNLTM} &= \text{EPNL} + 2.51 - 5.84 \log(D / 1000) \end{aligned}$$

Where $\log(x)$ is the base-10 logarithm function, and D is the distance to the airplane (feet).

Because of the derived relationship between maximum noise level and exposure level, you do not have to create both LAMAX and SEL curves (or PNLTM and EPNL curves). Instead, you can create one set of curves and INM will compute the other. For example, you can input PNLTM values and INM will compute the EPNL values.

The maximum-level model is also known as an “effective time-duration correction” relative to 160 knots reference speed.

8.3.4. Spectral Classes

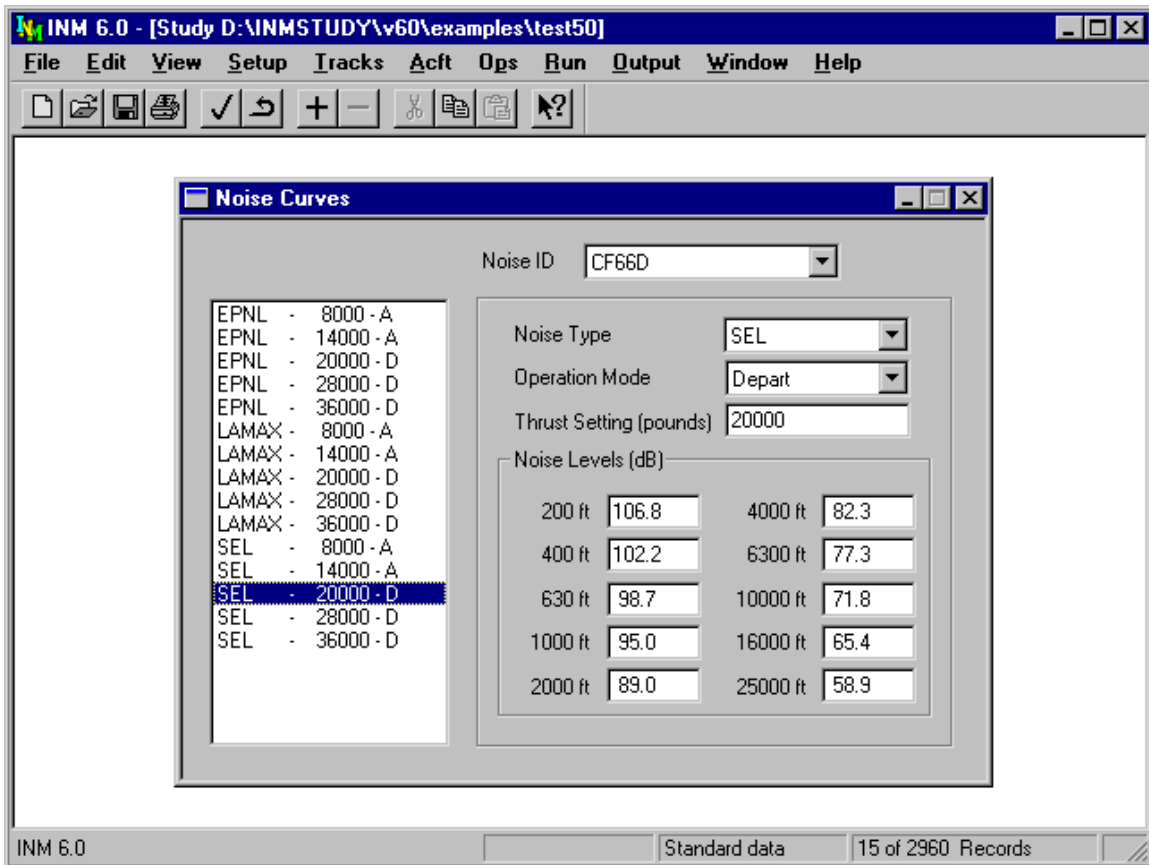
INM has a database of 34 approach noise spectra and 31 departure noise spectra, which are listed in Appendix H and contained in the *SPECTRA.BIN* file in the *SYS_DATA* subdirectory.

These noise spectra are called "spectral classes", because they are average noise spectra from aircraft that have similar spectral shapes.

- An INM aircraft is assigned a noise identifier
- A noise identifier is assigned approach and departure spectral class identifiers
- Some military aircraft noise identifiers are assigned an afterburner spectral class, which is usually the departure spectral class identifier.

Spectral classes are used to:

- Modify noise level curves for different atmospheric absorption models
- Modify A-weighted noise level curves to represent C-weighting
- Develop a new lateral attenuation model for future versions of INM.



8.4. Noise Curves

Menu Item: *Acft // Noise Curves*

Use this function to view and create noise-power-distance (NPD) curves.

Appendix J cross references noise identifiers to the aircraft that use them. Note that more than one aircraft can use a given set of NPD curves.

8.4.1. Noise Type

Noise types are:

- SEL — single-event Sound Exposure Level at a reference speed of 160 knots. It belongs to the A-weighted noise family. It is measured in decibels relative to $(20 \mu\text{Pa})^2(1 \text{ s})$.
- LAMAX — maximum sound level. It belongs to the A-weighted noise family. It is measured in decibels relative to $(20 \mu\text{Pa})^2$.

- EPNL — single-event Effective Perceived Noise Level at a reference speed of 160 knots. It belongs to the perceived, tone-corrected noise family. It is measured in decibels relative to $(20\mu\text{Pa})^2(10\text{ s})$.
- PNLTM — maximum perceived noise level. It belongs to the perceived, tone-corrected noise family. It is measured in decibels relative to $(20\mu\text{Pa})^2$.

"A-weighting" and "perceived tone-corrected weighting" are two common methods of adjusting (weighting) a measured noise spectrum so that it better represents human perception of noise.

SEL and EPNL exposure levels are for aircraft flying at a reference speed of 160 knots, at a fixed thrust setting, along a straight and level overhead flight path. INM adjusts the exposure levels for the actual speed flown.

You do not have to create both SEL/LAMAX and EPNL/PNLTM sets. For example, if all you are interested in is A-weighted noise metrics, you can just create the SEL/LAMAX set of NPD curves.

- However, if you do this, only A-weighted noise metrics are valid, even though perceived-noise metrics may be computed. The reason is that aircraft that are associated with SEL-only noise identifier are missing EPNL-related data. Therefore, the perceived-noise metrics will not have noise contributions from those aircraft.

8.4.2. Operational Mode

Noise operational modes are:

- Approach — NPD curves are based on a noise spectra representative of approach and landing phase of flight. Gear and flaps are deployed and thrust settings are generally low.
- Depart — NPD curves are based on a noise spectra representative of takeoff and departure phase of flight. Thrust settings are generally high.
- Afterburner — high thrust mode for military aircraft. INM currently uses departure spectra for afterburner operations.

Operational mode is used by INM to select which of three spectral classes (approach, depart, afterburner) to employ with the NPD curve.

Only approach and departure NPD curves are used in procedural profiles. This is not too restrictive because NOISEMAP aircraft (for which there are afterburner curves) do not have performance coefficients, and therefore they do not have procedural profiles. If you want to model afterburner noise for a military aircraft, you must create fixed-point profiles.

8.4.3. Thrust Setting

Thrust setting is used to parameterize the NPD curves. The thrust-setting parameter is "corrected net thrust per engine", whether it is in pounds thrust or percent of static thrust.

- “Corrected” means that the actual thrust setting at the aircraft altitude and ambient temperature is divided by the ratio of the ambient atmospheric pressure to the sea-level standard pressure. Thus, thrust is "corrected" back to sea-level standard day.
- Even though the NPD curves are identified by “thrust per engine”, the noise levels include the contribution from all the engines.

Thrust-setting type for NPD curves determine thrust-setting values for procedure step records and profile point records.

- For example, if the NPD curves are in percent, then a fixed-point profile must use percent, not pounds.
- For thrust-setting type Other, thrust-setting values must be commensurate with the NPD curves.
- For example, if NPD curves are parameterized by 2, 4, 6, then a fixed-point profile would use thrust-setting values in a range of about 1.5 to 6.5.

Thrust settings for approach, depart, or afterburner operational mode can have the same numerical value.

8.4.4. Noise Levels

The NPD curves are defined by 10 noise levels at 10 fixed distances.

- Exposure level distance — the distance from an observer to the closest point of approach along a straight flight path.
- Maximum level distance — the distance at which the maximum noise level is generated.

The 10 fixed distances are chosen so that they are approximately evenly spaced on a logarithmic scale:

200 ft	=	61.0 m
400 ft	=	121.9 m
630 ft	=	192.0 m
1000 ft	=	304.8 m
2000 ft	=	609.6 m
4000 ft	=	1219.2 m
6300 ft	=	1920.2 m
10000 ft	=	3048.0 m
16000 ft	=	4876.8 m
25000 ft	=	7620.0 m

Noise level must decrease as distance increases. If not, you will see a message about “monotonic decreasing” levels when you try to commit the record.

Noise levels for NPD curves are based on SAE-AIR-1845 atmospheric absorption coefficients. If you check the *Setup // Cases Modify NPD Curves* box, INM adjusts the NPD noise levels:

- The spectral class associated with the noise identifier and operational mode is used in the adjustment process.
- SAE-AIR-1845 atmospheric absorption losses are removed from the curves.
- SAE-ARP-866A atmospheric absorption losses are employed in the curves. Absorption is a function of temperature and relative humidity.

- INM cannot display SAE-ARP-866A NPD curves.

If you select C-weighted noise metrics in the *Run // Run Options* window, INM changes SEL curves to CEXP and LAMAX curves to LCMAX:

- The spectral class associated with the noise identifier and operational mode is used in the adjustment process.
- A-weighting losses are removed from the curves.
- C-weighting losses are employed in the curves. The C-weighted curves are generally higher than the A-weighted curves.
- INM cannot display C-weighted NPD curves.

8.4.5. Interpolation and Extrapolation

A computational set of NPD curves have the same noise identifier, noise type, and operational mode.

- For example, the CF66D-SEL-DEP computational set of curves consists of three records with thrust-setting parameters 20000, 28000, and 36000 pounds.
- INM interpolates or extrapolates noise levels at thrust settings on flight paths and at distances from flight paths to observers.
- There must be at least two records (curves) per computational set so that noise levels can be interpolated or extrapolated.

INM uses straight-line interpolation between points to calculate noise level at a given thrust setting and at a given distance.

- Noise level and thrust setting are on linear scales
- Distance is on a logarithmic scale.

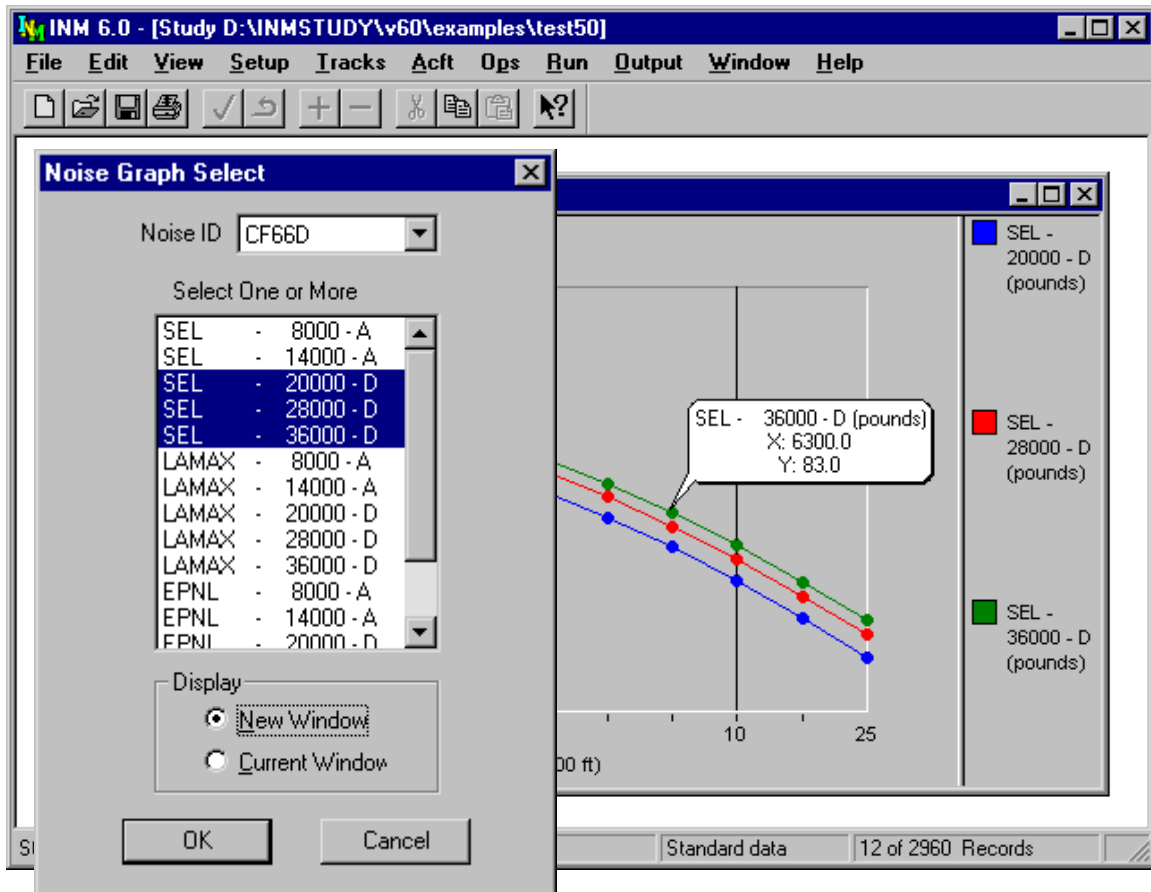
INM uses straight-line extrapolation from the two nearest curves to calculate thrust setting.

- For example, noise level at 36850 pounds is extrapolated from noise levels on curves 28000 and 36000.
- Extrapolated noise level is not allowed to be higher than the noise level of the highest curve plus 5 dB.
- Extrapolated noise level is not allowed to be lower than the noise level of the lowest curve minus 5 dB.

For distances less than 200 feet, INM uses -10 dB/decade for extrapolating exposure noise levels (for example, SEL decreases 10 dB when going from 20 feet to 200 feet). INM uses -20 dB/decade for extrapolating maximum noise levels.

For distances beyond 25,000 feet, INM uses the last two points (at 16,000 and 25,000 feet) for straight-line extrapolation on a logarithmic scale.

INM does not interpolate afterburner curves. Instead, thrust values along an afterburner flight segment are read directly off the NPD curve. Afterburner curves do not belong to computational sets.



8.5. Noise Graph

Menu Item: *Acft // Noise Graph*

Use this function to view a graph of noise levels versus distance:

1. In the Noise Graph Select dialog, select a noise identifier.
2. Select one or more noise curves. Noise curves are identified by noise type (SEL, LAMAX, EPNL, PNLTM), thrust setting, and operational mode (A = approach, D = depart, X = afterburner).
3. Select New Window to create another *Noise Graph* window.
4. Select Current Window to overwrite data in the current *Noise Graph* window.

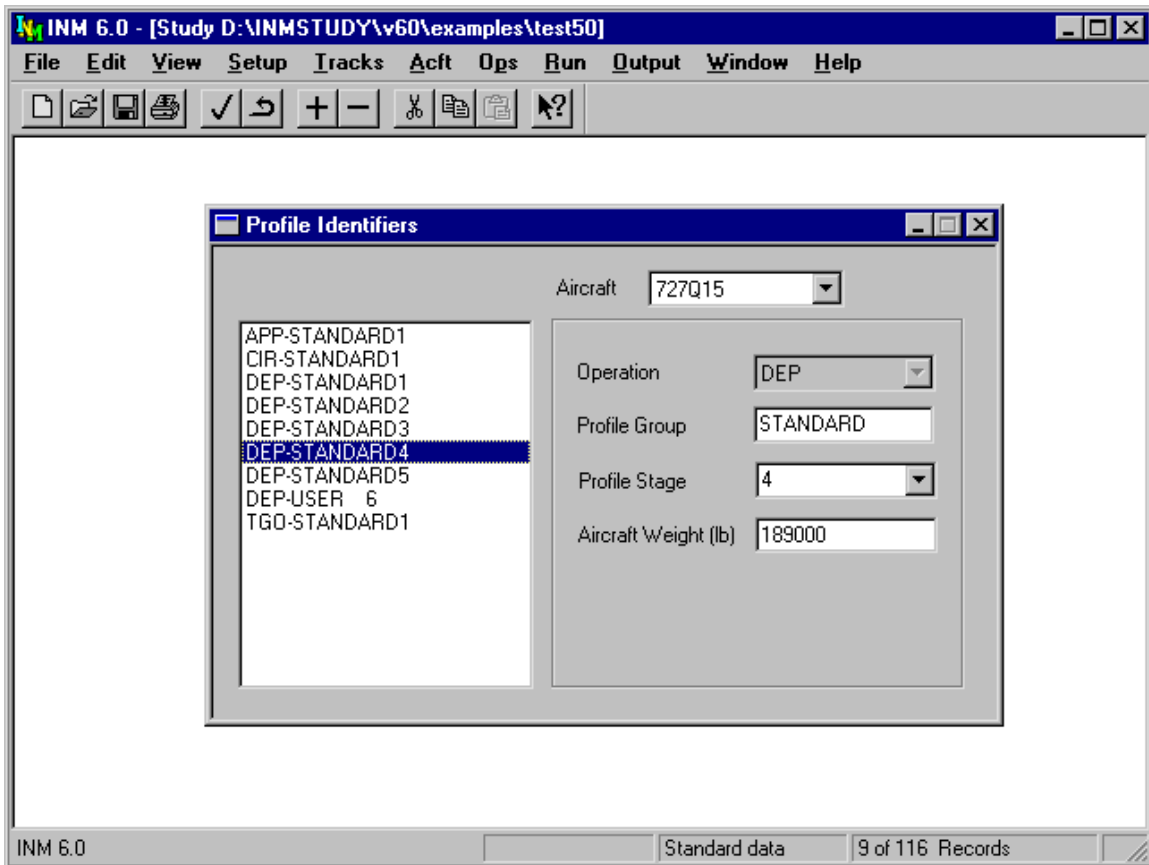
In a *Noise Graph* window, you can view the distance (X value) and the noise level (Y value) by double-clicking on a dot on the graph. A pop-up message bubble displays the X,Y values. You can remove the pop-up by clicking once anywhere.

You can watch noise curves being plotted as you commit each new NPD curve record. To do this, setup two windows side by side; first the *Noise Curve DBF*

window and then the *Noise Graph* window. Each time you commit a new record from the *Noise Curve* window, a curve is plotted on the graph in the *Noise Graph* window.

There are three ways to export NPD data:

- While the *Noise Curve* window is active, use *File // Export As* to print a text file or *DBF* file of NPD data points.
- Or, while the *Noise Graph* window is active, use *File // Print* to print the NPD graph to a printer or to a file.
- Or, while the *Noise Graph* window is active, use *Edit // Copy* to copy the graphic to Windows Clipboard as a metafile (*WMF* format). The resulting data can be saved to disk, or directly pasted into another application that supports the Paste function.



8.6. Profile Identifiers

Menu Item: *Acft // Profile Identifiers*

Use this function to view existing profile identifiers or to create a profile identifier before adding procedure steps or profile points.

To create a profile identifier:

1. Select an aircraft.
2. Use *Edit // Add Record* to create a new record.
3. Select a type of operation for the profile.
4. Input an eight-character profile group name.
5. Select single-digit profile stage number.
6. Input the weight of the aircraft during the operation.

You can use the profile stage numbers that are already defined by selecting them from the drop-down list, or you can create your own by typing a single digit (0 to 9) in the box.

8.6.1. Profile Operation Type

There are five types of flight profile operations:

- APP A approach
- DEP D departure
- TGO T touch-and-go
- CIR F circuit flight
- OVF V overflight.

INM has a circuit flight profile but no corresponding circuit flight track. A circuit flight profile uses a touch-and-go track.

8.6.2. Profile Group

The profile group name identifies profiles that belong to a group of similar procedures but of different weights or some other profile parameter. For example:

- DISTANT group may have four departure profiles of varying aircraft weights.
- LEVELAPP group may have two approach profiles using different level segments.

All INM standard profiles are identified by the name STANDARD. To reduce confusion about what is standard and what is not, do not use this word to name your profiles.

8.6.3. Profile Stage Number

Profile stage is a one-digit number that distinguishes members in a profile group. It is called "stage" because it is used to identify stage lengths for departure profiles. Stage length is a range of trip distances. Stage lengths are defined as follows:

1	0	to	500	nmi
2	500	to	1000	nmi
3	1000	to	1500	nmi
4	1500	to	2500	nmi
5	2500	to	3500	nmi
6	3500	to	4500	nmi
7		over	4500	nmi

The idea behind using stage length is that the longer the trip, the heavier the average takeoff weight due to increased fuel requirements. Historically, it has been easier to obtain trip length data than average aircraft weight data, so stage length has been used as a surrogate for aircraft takeoff weight. However, given that aircraft weight directly affects the departure profile, you are encouraged to obtain *average takeoff weight if it is feasible*. The reason is that a short-haul flight could carry a full load of passengers and ferry extra fuel, and you would under predict noise by using stage length.

Approach stage numbers are not related to trip distance. Approach stage numbers are just a way of distinguishing members in a group. For example, approach stage can mean different kinds of approaches.

- There is only one standard approach profile for most standard aircraft, and its stage number is set to 1.
- Some standard general aviation aircraft have both stage 1 and 2 approach profiles. Stage 1 is for 3-degree descent and stage 2 is for 5-degree descent.

8.6.4. Profile Weight

Profile weight is the weight of the aircraft during the operation.

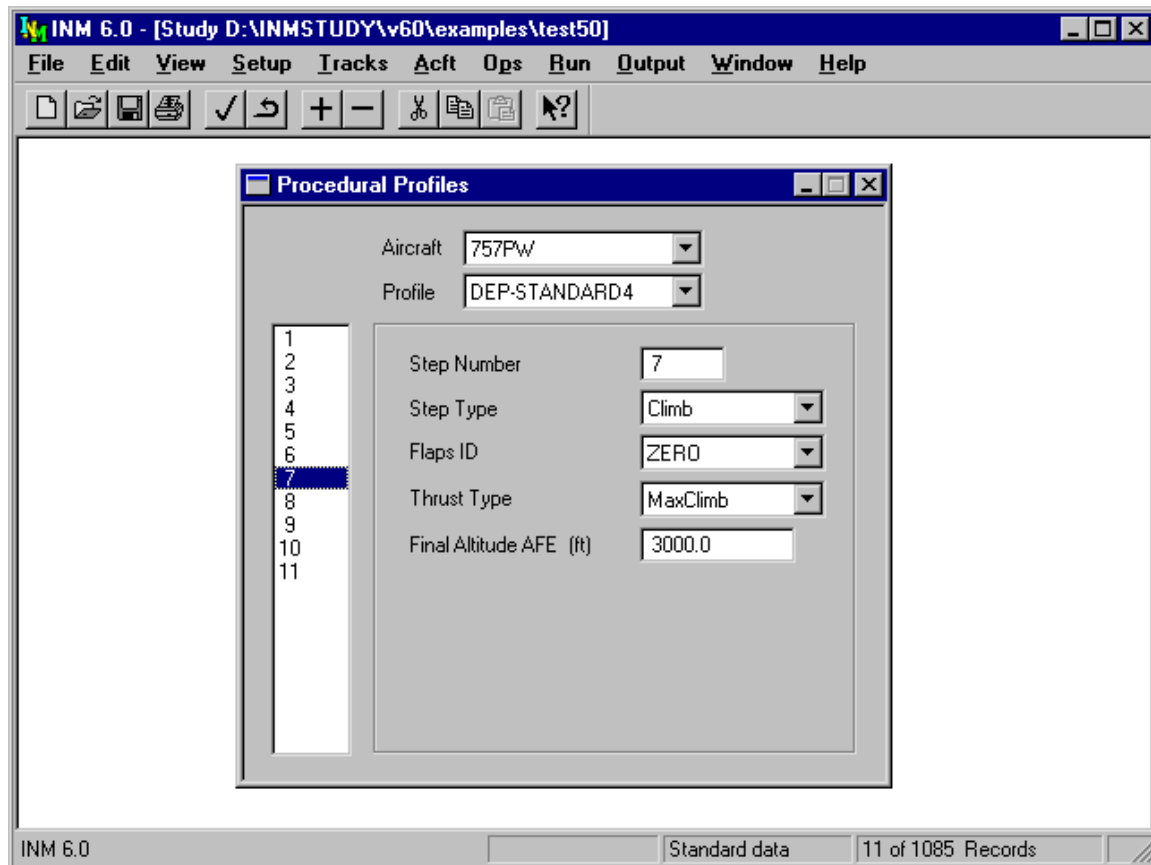
- If procedural profiles are used, departure profile weight influences the altitude that can be attained in a given amount of ground distance, thus affecting the noise produced by the airplane.
- Approach profile weight influences the thrust required to maintain a descent profile, thus affecting the noise produced by the airplane.
- For fixed-point profiles, altitude and thrust are pre-computed and the weight parameter is used only for reference.

Approach and touch-and-go profile weight:

- To pass error-checking tests, weight must be less than maximum gross landing weight and must be greater than 75% of the maximum gross landing weight.
- Weight must be the same for TGO and CIR profiles that are used together in a touch-and-go operation.

Departure profile weight:

- To pass error-checking tests, weight must be less than the maximum gross takeoff weight and must be greater than 75% of the maximum gross landing weight.



8.7. Procedural Profiles

Menu Item: *Acft // Procedural Profiles*

Use this function to build procedural profiles by defining operational procedures for various phases of the flight.

Aircraft profiles that are defined using procedural profiles (instead of fixed-point profiles) can adapt to study and case setup data (airport elevation, temperature, pressure, runway headwind and gradient). However, the development of procedural profiles is involved and requires knowledge of flight procedures. If the development of procedural profiles also includes new performance coefficients, data will have to be obtained from a manufacturer or operator having knowledge of aircraft performance and SAE-AIR-1845.

A review of user-created procedural profiles is required for Federally funded INM noise analyses, as described in Appendix B "FAA Profile Review Checklist".

Most of the INM standard profiles are procedural profiles. The best way to learn how to create your procedural profiles is to view and study these standard profiles.

Aircraft must have performance coefficient data before building procedural profiles. Also, you need to create a profile identifier in the *Acft // Profile Identifiers* window. Then, in the *Procedural Profiles* window, select the aircraft and profile that you plan to use.

General rules for the *Procedural Profiles* window:

- Altitude is in feet (or meters) above field elevation (AFE).
- Distance is in feet (or meters) measured on the horizontal plane.
- Speed is in knots (or km/h) and is calibrated airspeed (CAS), not true airspeed (TAS), or ground speed. Speed is used in calculating sound exposure. You must input realistic speed values, based on the operational situation being modeled.
- Descent and climb angles are in degrees and are both positive.

Always check a newly created profile by using the *Acft // Profile Graphs* function. If there is a problem with the profile, you can usually see it on the chart much more easily than by examining the numerical data in the *Procedural Profiles* window. You can change procedure steps data and see the profile change in the chart window.

You can export a text file or *DBF* file of computed procedural profiles data by first using the *Acft // Profile Graphs* function to display the profile. Then, use the *File // Export As* function to create a file of profile point data.



8.7.1. Error and Warning Messages

INM displays an error message about “not enough thrust” and stops computing profiles when climb and acceleration equations fail.

- The problem is mainly caused by a negative G_b -coefficient multiplying the altitude-squared term in the jet thrust equation. For a few problem aircraft, computed thrust is too small at high altitude (measured from sea level), or at high temperature (beyond the engine breakpoint temperature).
- The INM standard aircraft performance coefficients used to calculate profiles were developed for a sea-level airport and standard-day temperature profile

(59°F at sea level). They can be used in higher/hotter conditions, but with increasing chance of degraded accuracy.

- If your airport is at high elevation, or if you have a hot temperature case (regardless of airport elevation), you need to check all procedural profiles, even the INM-standard ones. Unrealistic profiles can be replaced with fixed-point profiles.

Even if INM does not display an error message and stop computing profiles, there still may be problems. Non-fatal warning messages are written to the *FLT_ERR.TXT* file in the case subdirectory.

Three kinds of warnings usually happen:

- PROFILE WARNING: A300 -D-STANDARD-5
Accelerate step 3: climb rate 1688 fpm reset to 1518 fpm
- PROFILE WARNING: DC1040-D-STANDARD-5
Climb step 8: climb-to altitude 5500.0 ft reset to 6201.9 ft
- FLIGHT PATH WARNING: 747200
Profile D-STANDARD-4 takeoff 7684 ft is too long for runway
01L available 6800 ft

Look in the text file to see the warning messages. Then, using the *Acft // Profile Graphs* function, look at the profiles that have warning messages and decide if they are acceptable to use.

8.7.2. Procedure Step Types

The five types of flight operations (APP, DEP, TGO, CIR, OVF) are created by using nine types of procedure steps:

- Takeoff — start-roll to takeoff rotation, or touch-and-go power-on point to takeoff rotation
- Climb — departure climb to final altitude at constant calibrated airspeed
- Accelerate — departure climb and accelerate to final speed
- Level — maintain altitude and speed
- Level Stretch — special step used to designate where to stretch a circuit flight profile to fit a touch-and-go track
- Cruise Climb — climb at constant angle to final altitude
- Descend — descend at constant angle to final altitude
- Land — land and roll a given distance
- Decelerate — brake with starting thrust for a given distance

Appendix J shows the allowed transitions from one type of procedure step to the next, for each of the five types of flight profiles.

8.7.3. Takeoff Step

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

You should usually select MaxTakeoff thrust for takeoff, but other thrust types are available:

- MaxClimb thrust means that an aircraft takes off using reduced thrust, thus requiring a longer runway. If INM detects that a takeoff roll exceeds the runway length, a warning message is written to the *FLT_ERR.TXT* file in the case subdirectory.
- UserValue thrust means that you supply the takeoff thrust value. The thrust value is the "corrected net thrust per engine" in pounds or in percent of static thrust. INM uses the input value at both the start-roll point and at the rotation point.

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

8.7.4. Climb Step

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

INM computes the climb angle and the ground distance based on the aircraft weight and average thrust that can be generated for the given conditions. If the computed climb gradient is too small (1%), INM stops with an error message.

Usually, you would select MaxTakeoff thrust for initial climb segments and MaxClimb thrust for later climb segments, but other thrust types are available:

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

input thrust is "corrected net thrust per engine", and INM does not adjust this value for airport conditions.

- ReduceThrust can be used when building Noise Abatement Departure Profiles (NADPs). This thrust type works the same as UserCutback, except that INM computes the cutback value instead of you supplying it:
 - 1) If the *Aircraft* window has the Automatic Thrust Restoration System (ATRS) box checked, thrust value is computed for a zero-climb gradient with one engine inoperative.
 - 2) If ATRS is not checked, the thrust value is computed for one engine inoperative and a climb gradient in accordance with FAR Section 25.111(c)(3): 1.2% gradient for 2 engines, 1.5% for 3 engines, and 1.7% for 4 engines.

The aircraft for which you are building a ReduceThrust profile must have two or more engines. NADPs are used for turbojet aircraft with maximum gross takeoff weight of more than 75,000 pounds. INM does not produce error messages for engine type or aircraft weight not meeting these criteria because you may want to use the ReduceThrust option for other aircraft.

8.7.5. Accelerate Step

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

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

The climb rate should be consistent with a sea-level standard-day profile. If necessary, INM adjusts the climb rate to account for the actual airport elevation, temperature, and pressure. If this happens, a warning message is written in the *FLT_ERR.TXT* file.

Zero climb rate is a valid input. INM computes a zero change in altitude, and the thrust is used to accelerate the airplane more quickly.

The five climb thrust types discussed above for the Climb step are also available for an acceleration segment.

8.7.6. Level Step

For a Level step, select a flaps identifier and input the altitude, speed, and distance flown along the segment. The flaps identifier should be ZERO, or perhaps one with a U prefix (meaning that the landing gear is up).

Make sure that altitude and speed parameters make sense for segments before and after a Level segment.

- For example, a previous Climb final altitude must equal the Level altitude.

- Also, the Level altitude must equal the next Descend start altitude. INM catches most of these kinds of problems when it tries to compute the profile. For each such problem, INM writes a warning message or, in some cases, displays an error message box and stops the run.

INM computes the amount of thrust needed to maintain level flight at constant speed for the given flaps configuration.

The difference between a Level step and a zero-climb Accelerate step is that the Level step uses a constant speed on the segment, and it uses a smaller value of thrust (and thus, lower noise level) than the Accelerate step. If speed changes during level flight, use a zero-climb Accelerate step.

8.7.7. Level Stretch Step

For a LevelStretch step, select a flaps identifier. A Level Stretch step is used to create circuit flight profiles. Its purpose is to define where to put a variable-length segment so that a CIR profile fits on top of a TGO track.

- There can be only one Level Stretch step in a CIR profile.
- A Level Stretch step must have a Level step before it and after it. This pair of Level steps should have the same altitude and speed values.

8.7.8. Cruise Climb Step

For a CruiseClimb step, select a flaps identifier (usually ZERO), and input the final altitude, the climb speed, and the climb angle for the segment.

INM calculates the distance flown, based on the change in altitude and the climb angle. INM calculates the corrected net thrust per engine by using the SAE-AIR-1845 descent equation with a positive angle, rather than a negative angle.

The difference between Climb and CruiseClimb is that you select the thrust for Climb (by selecting MaxTakeoff, MaxClimb, etc.), whereas INM calculates thrust for CruiseClimb based on the input climb angle. Climb thrust is larger than CruiseClimb thrust. Climb steps are used after takeoff when near-maximum thrust is applied. During cruise, less thrust is used in climbing from one altitude to another.

8.7.9. Descend Step

For a Descend step, select a flaps identifier and input the starting altitude, starting speed, and the descent angle for the segment.

If a Level or Descend step follows the Descend step, it must have a lower altitude. The following step can have the same or a different speed.

8.7.10. Land Step

For the Land step, select a flaps identifier and input the touchdown rolling distance, which is the distance that the aircraft moves before reversing thrust and/or braking.

The last Descend step and the Land step must both use a flaps identifier that has a D prefix (meaning that the landing gear is down).

INM computes the touchdown speed by using a SAE-AIR-1845 equation.

8.7.11. Decelerate Step

For a Decelerate step, input the segment distance, the starting speed, and the percent of static thrust at the start of the segment.

INM uses the percent value and the aircraft static thrust to compute a thrust-setting value for accessing the NPD curves. For those aircraft that use percent-type noise, the percent value is used to access the NPD curves.

8.7.12. How to Build an Approach Profile

You can use the *Procedural Profiles* window to view standard approach procedures to see how to build new ones.

INM standard approach procedures have four Descend steps, a Land step, and two Decelerate steps, as follows:

1. The four Descend steps start at 6000, 3000, 1500, and 1000 feet AFE. They bring an aircraft from zero-flaps configuration, terminal-area entrance speed, down to landing-gear/flaps configuration, final-approach speed.
2. For most INM aircraft, a 3-degree descent angle is used to model IFR approaches. For single-engine piston aircraft and for BEC58P, a 5-degree descent angle is used to model VFR approaches.
3. For the Land step, the touchdown-roll distance is 10% of the total roll-out distance. For those aircraft using 3-degree approaches, the relationship between the total roll-out distance and the input parameter in the *Aircraft* window is:
$$(\text{Roll-out distance}) = 0.9 (\text{Max landing distance}) - 954$$
For those aircraft using 5-degree approaches, the 954-foot value is replaced with 572 feet (the angle is steeper, so the in-air portion of the flight path after crossing the end of the runway is shorter).
4. The first Decelerate distance is 90% of the total roll-out distance. The starting speed is less than the touchdown speed. The starting percentage thrust is 60% for jets and 40% for props. The first deceleration segment represents reverse thrust action.
5. The second Decelerate distance is zero, indicating the end of the profile. The starting speed is 30 knots, representing taxi speed. The starting percentage thrust is 10% of static thrust, representing taxi thrust.

8.7.13. How to Build a Departure Profile

You can use the *Procedural Profiles* window to view standard departure procedures to see how to build new ones.

INM standard departure procedures for jet aircraft tend to follow a pattern (but there are exceptions). A typical jet departure profile consists of the following procedure steps:

1. Takeoff using MaxTakeoff thrust and extended flaps.
2. Climb to 1000 feet using MaxTakeoff thrust and takeoff flaps.
3. Accelerate 10-20 knots using MaxTakeoff thrust, takeoff flaps, and 2/3 of the initial climb rate.
4. Accelerate 15-30 knots using MaxTakeoff thrust, reduced flaps, and 1/2 of the initial climb rate.
5. Accelerate to Vz_f (zero-flaps minimum safe maneuvering speed) using MaxClimb thrust, minimal flaps, and 1000-fpm climb rate.
6. Climb to 3000 feet using MaxClimb thrust and zero flaps.
7. Accelerate to 250 knots using MaxClimb thrust, zero flaps, and 1000-fpm climb rate.
8. Climb to 5500 feet using MaxClimb thrust and zero flaps.
9. Climb to 7500 feet using MaxClimb thrust and zero flaps.
10. Climb to 10000 feet using MaxClimb thrust and zero flaps.

A standard departure profile for propeller-driven aircraft also tends to follow a pattern of procedure steps:

1. Takeoff using MaxTakeoff thrust and takeoff flaps.
2. Accelerate 10-15 knots using MaxTakeoff thrust, takeoff flaps, and a standard rate of climb.
3. Climb to 1000 feet using MaxTakeoff thrust and takeoff flaps.
4. Accelerate to Vz_f using MaxTakeoff thrust, takeoff flaps, and a standard climb rate.
5. Climb to 3000 feet using MaxClimb thrust and zero flaps.
6. Climb to 5500 feet using MaxClimb thrust and zero flaps.
7. Climb to 7500 feet using MaxClimb thrust and zero flaps.
8. Climb to 10000 feet using MaxClimb thrust and zero flaps.

An INM standard aircraft usually has more than one departure profile. INM profiles are distinguished by profile stage numbers from 1 to 7. Departure procedure steps are almost the same for all profile stages. Usually, the change is in the Accelerate step where the final speed value increases for heavier aircraft and the climb rate decreases for heavier aircraft.

8.7.14. How to Build NADPs

An INM standard departure procedure can be used to create Close-in and Distant Noise Abatement Departure Profiles that conform to FAA Order AC91-53A. The following methods are not official and they utilize the absolute minimums allowed for under the advisory circular. Actual airline NADPs will be at or

above these minimums and will most likely be defined in terms of EPR reductions rather than engine-out gradient specifications. It is your responsibility to coordinate with the FAA before using NADP profiles for environmental impact studies. Appendix I shows examples of Close-in and Distant NADPs.

Close-in NADP:

1. Create a new departure profile identifier CLOSEIN. Use standard stage and weight.
2. Copy standard departure procedure step records and paste them into the new profile (usually 9 or 10 records).
3. In the new profile, change step-2 altitude from 1000 to 800 feet.
4. For step 3, Climb to 3000 feet using ReduceThrust and takeoff flaps.
5. For steps 4, 5, and 6, Accelerate in increments to V_zf using MaxClimb thrust. Use the same schedule for flaps and climb rate as used in the standard procedure steps. You may have to reduce the first two climb rates because MaxClimb thrust may not be large enough to accelerate and climb at the given rate.
6. For steps 7, 8, and 9, Climb in increments to 10000 feet using MaxClimb thrust. Use the same altitude schedule as in the standard procedure steps (5500, 7500, 10000 feet).

Distant NADP:

1. Create a new departure profile identifier DISTANT. Use standard stage and weight.
2. Copy standard departure procedure step records and paste them into the new profile (usually 9 or 10 records).
3. In the new profile, change step-2 altitude from 1000 to 800 feet.
4. Change step-6 (sometimes step-5) MaxClimb to ReduceThrust, and Climb to 3000 feet using ReduceThrust and zero flaps.
5. Leave all other steps as they are.

8.7.15. How to Build Touch-and-Go Profiles

You build a complete touch-and-go flight operation by creating five objects:

- TGO track
- TGO profile
- CIR profile
- Flight operation using the TGO track and TGO profile
- Flight operation using the TGO track and the CIR profile.

You can use INM standard TGO and CIR profiles as examples of how to model touch-and-gos.

How to build a TGO profile:

1. The first step is Level at the pattern altitude and at a speed consistent with your choice of flaps. Use a small value for the distance parameter (for example, 500 feet).

2. Add one or more Descend steps using a flaps/speed schedule that ends with landing flaps, gear down, and final approach speed.
3. Land using a touchdown roll distance that represents the distance traveled before power is applied to takeoff again.
4. Takeoff using MaxTakeoff thrust, takeoff flaps, and a starting power-on speed that is 10-20 knots less than the touchdown speed. INM computes the distance needed to accelerate from power-on speed to takeoff speed.
5. Climb (or Accelerate and Climb) to pattern altitude in a manner similar to a departure procedure.
6. If necessary, Accelerate with zero climb rate at pattern altitude to the speed used in the first step.
7. The last step is Level at the pattern altitude at the speed used in the first step. Make this segment 1000 feet long (it will be divided into two 500-foot segments when INM detects the discontinuous change in thrust from the Accelerate step to the Level step). INM creates a Level segment on the down-wind leg that connects the Level departure segment (this last step) to the Level approach segment (the first step).

How to build a CIR profile:

1. Takeoff using MaxTakeoff thrust and takeoff flaps.
2. Climb (or Accelerate and Climb) to pattern altitude in a manner similar to a departure procedure.
3. If necessary, Accelerate with zero climb rate at pattern altitude to the speed used in the first step of the TGO procedure.
4. Add a Level step using pattern altitude, speed, and flaps that were used in the TGO procedures. Use a small value for the distance parameter (for example, 500 feet).
5. Add a LevelStretch step using the TGO flaps identifier. INM calculates the distance that is added to the profile so it fits the TGO track.
6. Again add a Level step at pattern altitude and speed. Use a small value for the distance parameter.
7. Add one or more Descend steps using a flaps/speed schedule that ends with landing flaps and final approach speed.
8. Land using a touchdown distance that represents the distance traveled before reverse thrust is applied.
9. Add two Decelerate steps in a manner similar to the approach procedure.

A circuit flight must have one, and only one, Level–LevelStretch–Level sequence of steps. The two Level steps must be at the same altitude and speed. All three steps should use the same flaps identifier.

Always check your TGO and CIR profile by using the *Acft // Profile Graphs* function. When you try to do this, you may see an error message about the profile being too long for the TGO track. If you are sure that the ground track is realistically sized, you need to change the profile.

Options for shortening a TGO or CIR profile:

- Make the two Level-step distance parameters smaller.

- Make the descent angle slightly larger (for example, change 3.0 to 3.5 degrees).
- Use MaxTakeoff thrust in later climb segments instead of MaxClimb thrust.
- Reduce the airplane weight so that it climbs to pattern altitude in less distance (make sure that both TGO and CIR weights are the same).
- Lower the pattern altitude, if operationally realistic.

The INM database contains touch-and-go and circuit flight profiles for almost all aircraft that have approach and departure performance coefficients. These TGO and CIR database profiles are not considered standard. Instead, they are generic profiles that you should modify for specific airport operational conditions.

The INM database touch-and-go and circuit flight profiles were developed using the following rules:

- Profiles are designated TGO-STANDARD-1 and CIR-STANDARD-1.
- TGO and CIR profile weight is standard stage-1 departure weight.
- Pattern altitude for small piston aircraft is 900 feet and for all other aircraft is 1500 feet AFE.
- Pattern speed is the standard stage-1 departure accelerate-to speed for the first acceleration segment.
- Pattern flaps are the standard stage-1 departure flaps for the first acceleration segment.
- Descent angle for small piston aircraft is 5 degrees and for all other aircraft is 3 degrees.
- Approach speeds are scaled to profile weight.
- TGO landing roll distance, before applying takeoff power, is twice the standard approach roll distance before applying reverse thrust.
- TGO power-on speed is the smallest of: 95% of the landing speed, the standard approach decelerate speed, or 90% of the takeoff speed.
- CIR deceleration steps are the same as standard approach steps.

8.7.16. How to Build an Overflight Profile

An overflight profile can be built with one procedure step. For example:

1. Level using ZERO flaps, at 5000-foot altitude, at 250 knots, for a distance of 300,000 feet (about 50 nmi).

Make sure that an overflight profile is long enough to extend across the noise calculation area because INM does not extend profiles (INM does extend ground tracks). An aircraft flight path starts at the beginning of an overflight track and continues until the profile ends. Noise is not produced before the start of the track or after the end of the profile, even though the ground track may continue on.

8.7.17. Flight Path Construction

INM calculates profile points using procedure step data and SAE-AIR-1845 equations. After profile points are calculated, a three-dimensional flight path is constructed.

INM constructs a three-dimensional flight path by merging a two-dimensional profile (a set of distance vs. altitude points) with a two-dimensional ground track (a set of X,Y points) using the following method:

- Wherever there is a track point, a Z-value is computed by interpolating between two points on the profile.
- Wherever there is a profile point, X,Y values are computed on the ground-track segment under the profile point.

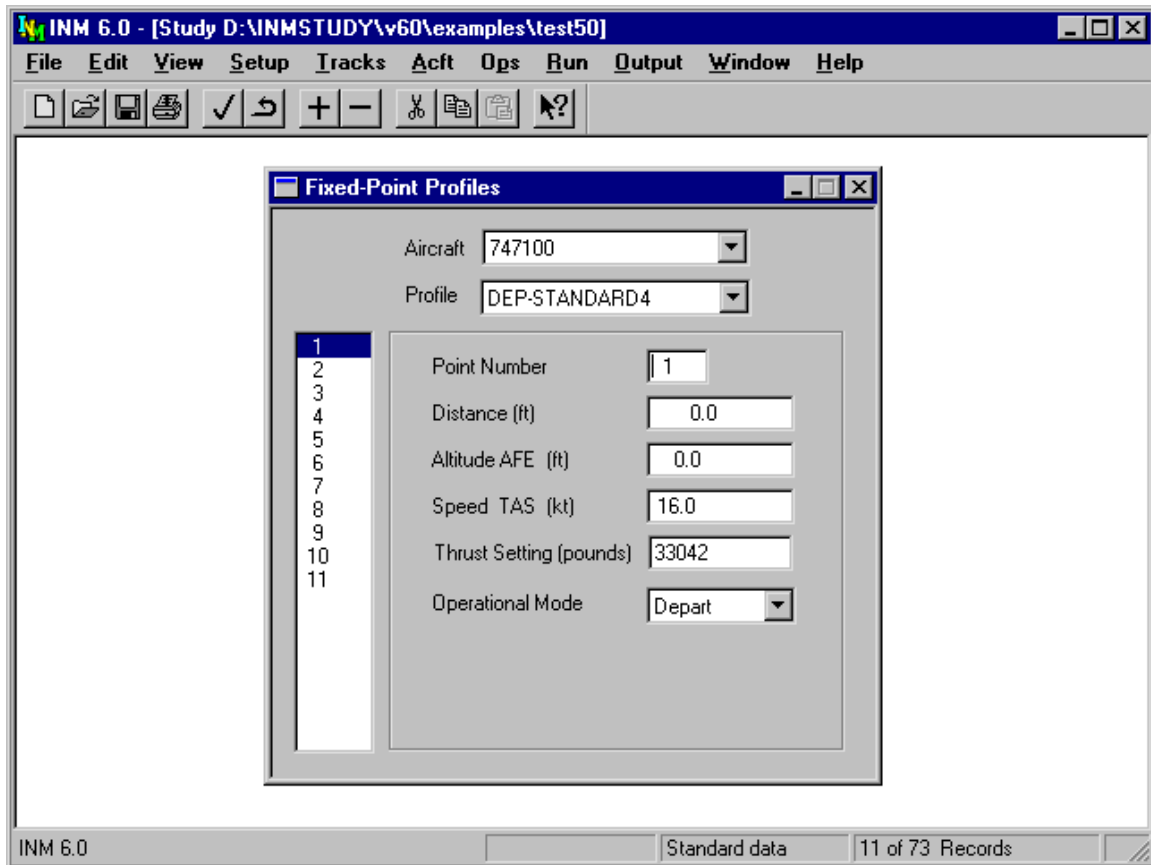
The result of this construction is an ordered set of X,Y,Z points and associated data describing the flight path. Thus, a flight path is a set of flight path segments, and each segment contains the following data:

- Segment starting point (X,Y,Z)
- Unit vector pointing along the segment in the direction of flight
- Segment length
- Segment starting speed, and change in speed
- Segment starting thrust setting, and change in thrust setting.

During flight path construction, INM automatically extends ground tracks so that a profile has a track under it. However, INM does not extend profiles, so the airplane “disappears” after the last profile segment, and does not contribute to the noise calculation after that.

The last flight path segment is constructed by using the last profile point and the second-to-last segment. The last segment length is set to one foot.

The *Output // Flight Path Report* function writes a text file of flight path data to a case subdirectory.



8.8. Fixed-Point Profiles

Menu Item: *Acft // Fixed-Point Profiles*

Use this function to create a fixed-point profile in terms of distance, altitude, speed, and thrust-setting values at multiple points.

Aircraft profiles that are defined using fixed-point profiles (instead of procedural profiles) can be controlled in detail. However, fixed-point profiles remain static and do not adapt to changes in study and case setup data (airport elevation, temperature, pressure, runway headwind and gradient).

A review of user-created fixed-point profiles is required for Federally funded INM noise analyses, as described in Appendix B "FAA Profile Review Checklist".

When developing fixed-point profiles, make sure that:

- Thrust-setting values are consistent with aircraft altitude and temperature at altitude.
- Altitude vs. distance represents realistic climb or descent performance under assumed thrust, altitude, temperature, and wind conditions.

To create a fixed-point profile:

1. Select an aircraft and a profile identifier.
2. Use the *Edit // Add Record* function to create a new profile point record.
3. Tab through the fields, entering data as you go.
4. Continue adding profile points until the profile is finished.

The point numbers keep the records in order. The point number should start with 1 and increment by 1 for each new record. A given fixed-point profile can have as many as 999 profile point records. After a record is completed, use the *Edit // Commit Record* function. You can also commit a record by adding another new one.

Fifteen INM standard aircraft use fixed-point profiles:

707	727EM2	F16PW0
707120	747100	F16PW9
720	DC820	MD11GE (approach only)
727200	F16A	MD11PW (approach only)
727EM1	F16GE	SABR80

You can use these profiles as examples for how to build fixed-point approach and departure profiles.

Always check a newly created profile by using the *Acft // Profile Graphs* function. If there is a problem with the profile, you can usually see it in the chart window much more easily than by examining the numerical data in the *Fixed-Point Profiles* window. You can change profile point data and see the profile change in the chart window.

If a profile identifier is defined as both a fixed-point profile and as a procedural profile, then the fixed-point profile takes precedence and is used in constructing the flight path.

8.8.1. Distance X

Distance x-coordinate is the horizontal distance value from a reference point.

- Distance x is a value on an arbitrary axis, and the reference point is at $x = 0$.
- Distance x can be positive or negative.
- Distance x increases as the aircraft flies the profile.

The coordinate reference point depends on the type of operation:

APP $x = 0$ at the touchdown point. Before touchdown, x is negative. At touchdown x is zero. After touchdown, x is positive.

DEP $x = 0$ at the start-roll point. Distance values start at zero and become more positive.

TGO $x = 0$ at the touchdown point. As with APP, the profile starts with negative x. At touchdown x is zero. After touchdown, x is positive.

CIR $x = 0$ at the start-roll point. Distance values start at zero and become more positive.

OVF $x = 0$ at the starting point. Distance values start at zero and become more positive.

8.8.2. Altitude

Altitude is altitude above field elevation (AFE), not altitude above sea level, and not altitude above ground level. The altitude value should be operationally realistic for the aircraft weight and airport temperature being modeled.

Changes in altitude depend on type of operation:

APP Altitude starts positive, then decreases to zero at the touchdown point, and remains zero thereafter.

DEP Altitude starts at zero, remains zero until takeoff, and increases thereafter.

TGO Altitude starts at the pattern altitude, decreases to zero at touchdown, remains zero until takeoff, and increases to the original pattern altitude.

CIR Altitude starts at zero, increases to pattern altitude, remains at pattern altitude, decreases to zero at the touchdown point, and remains zero thereafter.

OVF Altitude usually remains constant for the entire profile, although it is not required.

8.8.3. Speed

Speed is true airspeed (TAS), not calibrated or indicated airspeed. The speed values must be operationally realistic so that sound exposures are properly modeled.

8.8.4. Operational Mode

Noise operational modes are Approach, Depart, and Afterburner.

- If you select Approach or Depart, enter a thrust-setting value.
- If you select Afterburner, choose an afterburner thrust-setting value from a drop-down list of available afterburner values per NPD data for the aircraft.

Thrust setting versus distance is calculated differently for the two cases:

- Approach or Depart — INM draws straight lines from point to point. Thrust setting is linearly interpolated between points.
- Afterburner — INM inserts profile points to make thrust-setting values remain constant while the afterburner is on. For example, if you define a Depart–Afterburner–Depart sequence of points, INM inserts two points:
 - 1) A Depart point just before the Afterburner point
 - 2) An Afterburner point just before the second Depart point.

The thrust setting versus distance graph shows a sudden increase due to the afterburner, and further on, a sudden decrease to the normal setting.

8.8.5. Thrust Setting

Thrust-setting value is used to compute noise from NPD curves. For INM aircraft, this parameter usually is corrected net thrust per engine in pounds, but some aircraft use percent of static thrust. NOISEMAP aircraft use all three types of thrust setting (Pounds, Percent, Other).

Thrust-setting values must be operationally realistic for the aircraft weight, altitude, temperature, and pressure being modeled. Make sure that the input value and the thrust-setting parameters on the aircraft NPD curves are compatible. For example, a thrust-setting value of 3.5 is compatible if the NPD curves range from 1 to 4.

When the operational mode is set to Afterburner, select the afterburner curve from the drop-down list box, rather than typing in the thrust-setting value.

8.8.6. How to Build Touch-and-Go Profiles

You build a complete touch-and-go flight operation by creating five objects:

- TGO track
- TGO profile
- CIR profile
- Flight operation using the TGO track and TGO profile
- Flight operation using the TGO track and the CIR profile.

If a fixed-point profile is created properly, INM can adjust the points to fit them onto an arbitrary TGO track. This means that TGO and CIR profiles can be applied to different TGO tracks (just as an APP profile can be applied to different APP tracks).

The following list of profile points is an example of how to build a fixed-point TGO profile:

	DISTANCE	ALTITUDE	SPEED	THRUST	OP
1	-11287.0	900.0	116.5	50.22	D
2	-10287.0	900.0	110.4	23.43	D
3	-6858.0	600.0	99.9	27.20	A
4	0.0	0.0	99.0	26.61	A
5	377.6	0.0	85.5	122.85	A
6	678.7	0.0	95.0	122.85	D
7	2883.1	226.6	115.4	101.98	D
8	7355.6	900.0	116.5	103.48	D
9	7605.6	900.0	116.5	50.22	D

The following list of profile points is an example of how to build a fixed-point CIR profile:

	DISTANCE	ALTITUDE	SPEED	THRUST	OP
1	0.0	0.0	16.0	122.85	D
2	1584.5	0.0	95.0	122.85	D
3	3788.9	226.6	115.4	101.98	D
4	8261.4	900.0	116.5	103.48	D

5	8761.4	900.0	116.5	50.22	D
6	8761.4	900.0	116.5	50.22	D
7	10261.4	900.0	110.4	23.43	D
8	13690.4	600.0	99.9	27.20	A
9	20548.5	0.0	99.0	26.61	A
10	20737.3	0.0	93.9	40.00	A
11	22436.5	0.0	30.0	10.00	A

For a TGO profile, make the first and last points identical in altitude, speed, thrust, and operational mode. INM can then insert extra distance between the last and first points to complete the TGO track.

For a CIR profile, make two identical points somewhere in the middle of the profile (for example, points 5 and 6, above). INM can then insert extra distance to complete the TGO track between these two points.

The distance around a TGO track must be larger than the flying distance implied by the fixed-point profile.

- In the TGO profile example, the TGO track must be longer than $11287.0 + 7605.6 = 18892.6$ feet.
- In the CIR profile example, the TGO track must be longer than the distance from start roll to touchdown = 20548.5 feet.

8.8.7. How to Build a Taxi Profile

INM does not explicitly support taxi noise modeling. However, a taxi path can be approximated by an overflight track and a fixed-point overflight profile.

1. Use *Tracks // Input Graphics* to create an OVF taxi track.
2. Measure the length of the track.
3. Use *Fixed-Point Profiles* to create a two-point OVF taxi profile. For example:

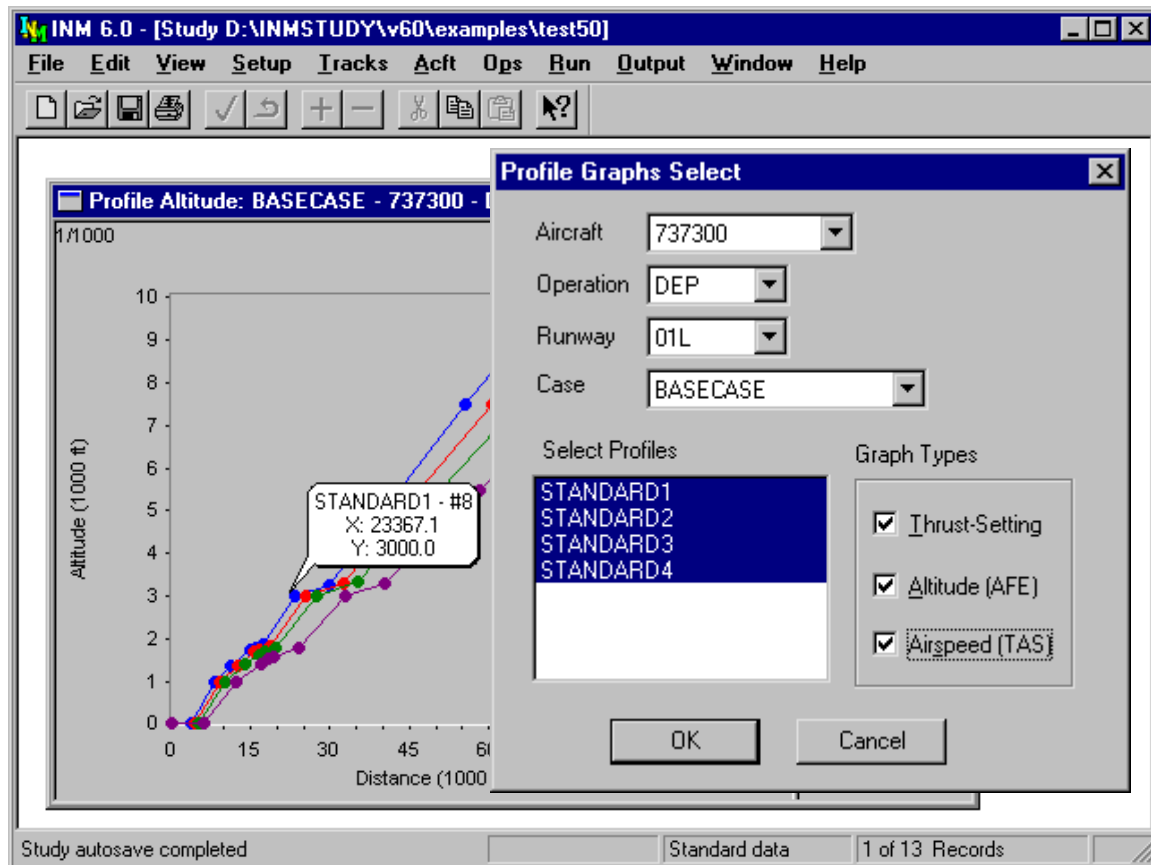
DISTANCE	ALTITUDE	SPEED	THRUST	OP
0.0	10.0	25.0	2000.0	A
4584.0	10.0	25.0	2000.0	A

Profile distance is the measured taxi track length. Altitude is the average engine-installation height. Speed is the average taxi speed. Thrust setting is the average taxi thrust, such as 10% of static thrust. Use Approach mode NPD curves.

4. Use *Ops // Flight Operations* to create a taxi operation that combines the OVF taxi track with the OVF taxi profile.

More complicated taxi models can be developed with additional profile points. Additional points represent runway intersections where aircraft slow or wait to cross the runway. Low average speed and high average thrust at these points represent acceleration across the runway.

Do not put zero speed in a fixed-point profile. If you want to model long duration at idle thrust setting, use the *Ops // Runup Operations* function to define a static noise source at the X,Y position of the queue.



8.9. Profile Graphs

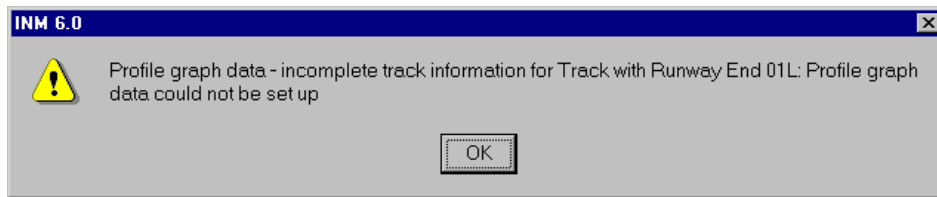
Menu Item: *Acft // Profile Graphs*

Use this function to view three kinds of profile graphs:

- Altitude vs. distance
- Speed vs. distance
- Thrust setting vs. distance.

Select an aircraft, operation type, runway end, and case. INM pre-selects all the profile records for the given aircraft and operation type. Press OK to see all three graphs.

- Runway end — procedural profiles are adjusted for runway gradient and runway headwind.
- Case — procedural profiles are adjusted for airport temperature, pressure, and average headwind
- Limit the number of curves on the graphs by de-selecting them before pressing OK
- Limit the number of graphs by de-selecting them before pressing OK.



Occasionally, you will see an error message about “profile graph data could not be set up”. To fix the problem, change to a runway end that has a track defined for the given operation type.

- For example, if you created a TGO track on runway 17L, then to graph TGO or CIR profiles, you must select 17L, not some other runway.

Occasionally, you will see an error message about “TGO track distance must be greater than TGO (or CIR) profile distance”. To fix the problem, make the TGO track larger, or change the profile so there is enough room for the airplane to fly at pattern altitude.

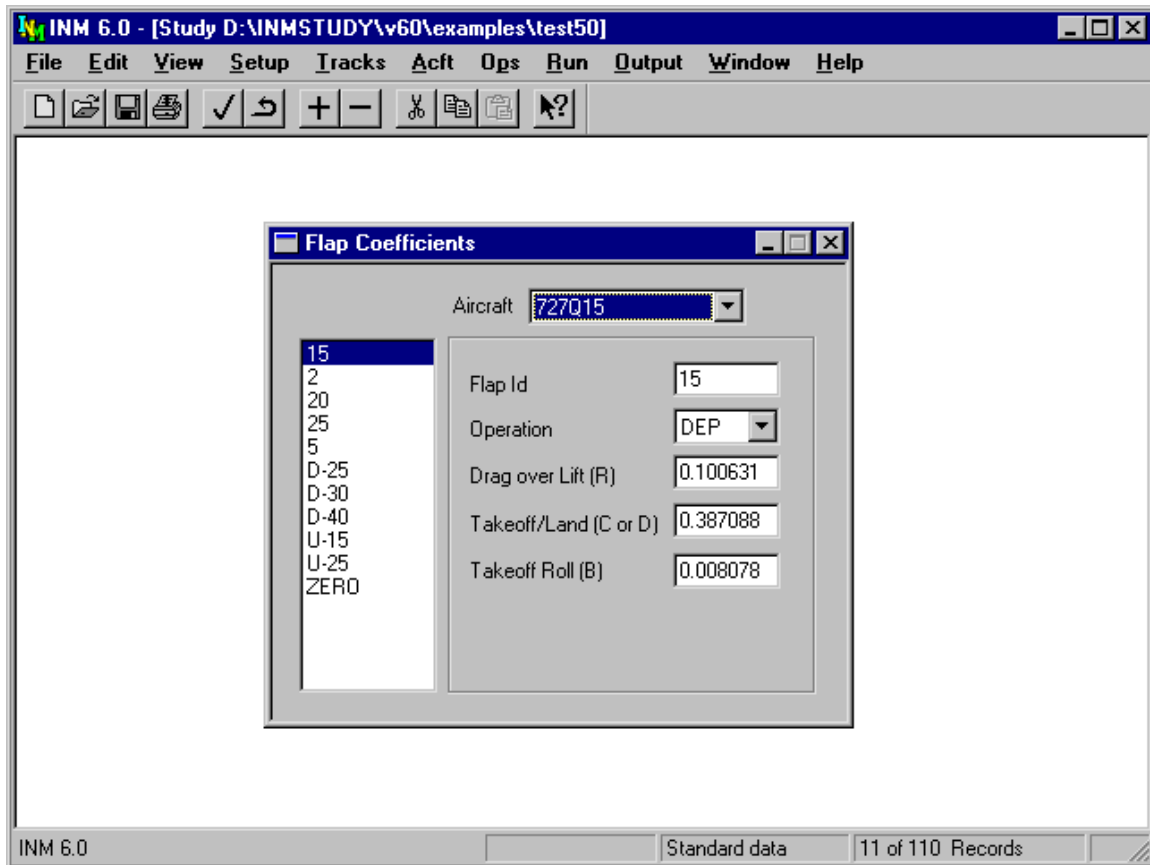
The “TGO track distance” error message can display for a track/profile combination that you do not intend to use in flight operations.

- For example, you plan to put piston aircraft in a 900-ft pattern on a small TGO track, and jets in a 1500-ft pattern on a large TGO track, and both tracks are on the same runway end.
- The problem is that INM computes all profiles against all tracks for a given runway before displaying the graphs. So, a jet aircraft fails to compute on the small TGO track, and you see the error message. To display the graphs, temporarily make the small TGO track bigger.
- When running a case of flight operations, this problem does not occur because flight operations determine track/profile combinations.

When you commit a record in the *Procedural Profiles* window or the *Fixed-Point Profiles* window, you can immediately see the effect on the profile in the *Profile Graphs* window. This feature is useful in debugging user-created profiles.

There are three ways to export *Profile Graphs* data:

- Use *File // Export As* to write profile-point data to a text file or *DBF* file.
- Or, use *File // Print* to send the graph to a printer.
- Or, use *Edit // Copy* to send a graphics metafile (*WMF* format) to the Windows Clipboard.



8.10. Flap Coefficients

Menu Item: *Acft // Flap Coeffs*

Do not change or add flap coefficient records. These coefficients are derived from measurements of actual aircraft flight dynamics or from manuals and handbooks containing measured data, usually by the manufacturer. If you want to derive coefficients, you need to follow the procedure described in SAE-AIR-1845 (see Appendix A for how to obtain this document).

Many INM standard aircraft do not have flap coefficients. INM supplies standard fixed-point profiles for some of these aircraft. NOISEMAP aircraft do not have flap coefficients or fixed-point profiles.

Flap coefficients depend on the type of operation (approach or departure) and the flaps and gear configuration of the aircraft.

- The number in the flaps identifier usually means the number of degrees that the flaps are extended.
- Some approach identifiers have the prefix U, meaning that the gear is up during descent. The prefix D means that the gear is down.

- The ZERO flaps identifier is often used in both departure and approach procedures, even though it is categorized as a departure identifier. ZERO means that the flaps are retracted.

The drag-over-lift R-coefficient is used in SAE-AIR-1845 equations involving departure climb and acceleration.

The takeoff-speed C-coefficient and the landing-speed D-coefficient are used to calculate speed as a function of the aircraft weight:

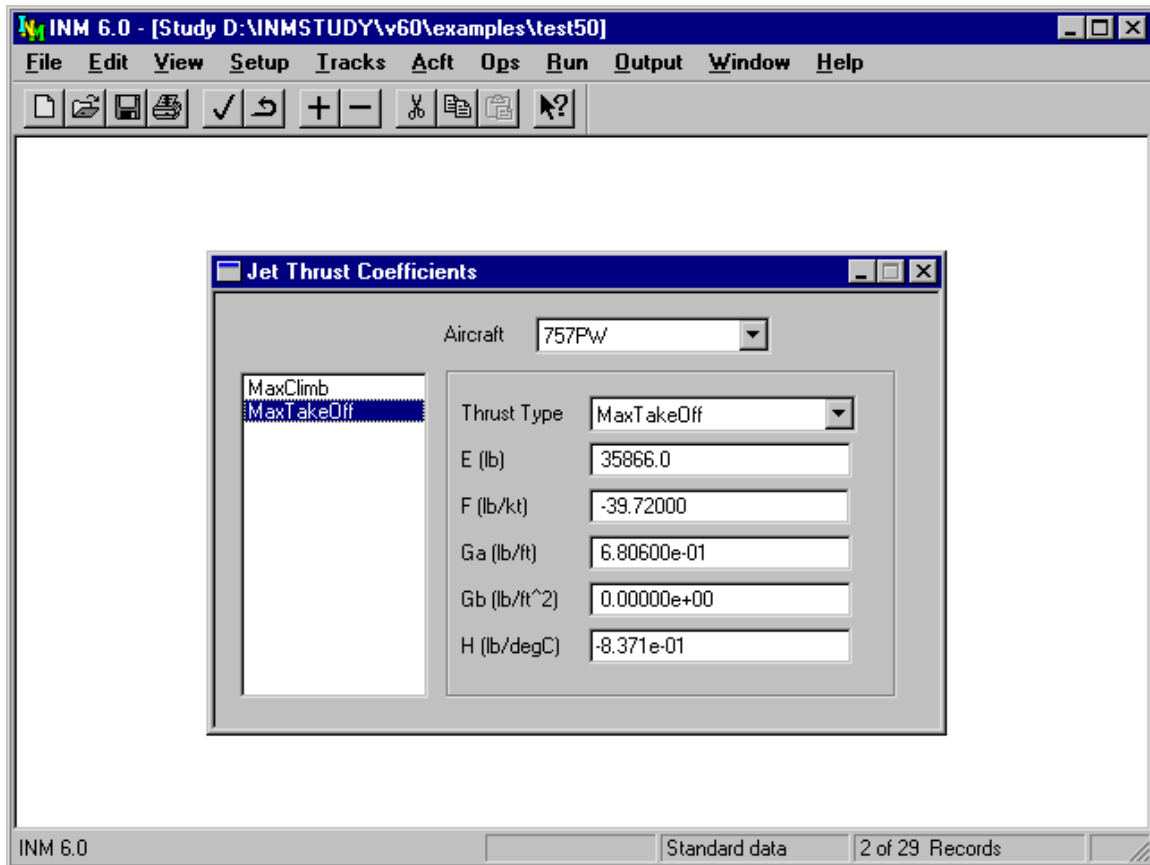
$$\text{Takeoff } V_c = C \sqrt{W}$$

$$\text{Landing } V_c = D \sqrt{W}$$

Where V_c is the calibrated airspeed in knots, \sqrt{x} is the square root function, and W is the aircraft weight in pounds.

Flap records with operation type DEP contain C-coefficients, and records with operation type APP contain D-coefficients. Notice that some of the C/D coefficients are zero. This means the flaps identifier cannot be used for takeoff or landing procedure steps.

The takeoff-roll B-coefficient is used to calculate the takeoff distance using an SAE-AIR-1845 equation. The B-coefficient is in units of feet per pound. A variation of the SAE equation is used for touch-and-go takeoff distance.



8.11. Jet Thrust Coefficients

Menu Item: *Acft // Jet Coeffs*

Do not change or add jet thrust coefficient records. These coefficients are derived from measurements of actual aircraft flight dynamics. If you want to derive coefficients, you need to follow the procedure described in SAE-AIR-1845.

Many INM standard aircraft do not have jet thrust coefficients. INM supplies standard fixed-point profiles for some of these aircraft. NOISEMAP aircraft do not have jet thrust coefficients or fixed-point profiles.

There are usually two jet thrust coefficient records per aircraft:

- MaxTakeoff — coefficients used to compute takeoff thrust
- MaxClimb — coefficients used to compute departure climb thrust.

One aircraft (727QF) has three records; the third thrust type is called MaxContinue for "maximum continuous" thrust.

Three of the coefficients (G_a , G_b , H) are in scientific notation (for example, $1.223e-5$, meaning $1.223 \cdot 10^{-5}$) because their values are either very small or cover a large range.

Jet thrust coefficients (E , F , G_a , G_b , H) are used to calculate corrected net thrust per engine by using the equation:

$$F_n / \delta = E + F V_c + G_a A + G_b A^2 + H T$$

Where F_n is net thrust per engine in pounds, δ is the ratio of the atmospheric pressure at the aircraft to the sea-level standard value, V_c is calibrated airspeed in knots, A is pressure altitude in feet MSL, and T is temperature in degrees Celsius.

The $G_b A^2$ -term is not specified in SAE-AIR-1845. This quadratic term was added to the INM equation to better approximate corrected net thrust as a function of altitude from 0 to 10,000 feet MSL, which was the original range of values for INM. When aircraft altitude is higher than 10,000 feet MSL, a negative quadratic term may cause thrust to be under predicted.

A few INM standard aircraft have high-temperature jet thrust coefficient records indicated by:

- S HighTempTakeoff
- B HighTempClimb
- M HighTempContinuous.

If the temperature at the aircraft is higher than the engine breakpoint temperature, INM uses the high-temperature coefficients to compute thrust. If the high-temperature coefficients do not exist, INM uses a default procedure that sets the sea-level breakpoint temperature to 86°F and calculates the high-temperature H coefficient.

8.12. Prop Thrust Coefficients

Menu Item: *Acft // Prop Coeffs*

Prop thrust coefficients are used to calculate corrected net thrust per engine by using the SAE-AIR-1845 equation:

$$F_n / \delta = (325.87 E P / V_T) / \delta$$

Where F_n is net thrust per engine in pounds, δ is the ratio of the atmospheric pressure to the sea-level standard value, E is propeller efficiency, P is net propulsive (shaft) power per engine at sea level in horsepower, and V_T is true airspeed in knots.

8.13. General Thrust Coefficients

Menu Item: *Acft // General Coeffs*

General coefficients are used to compute corrected net thrust per engine for jets as a function of power-setting parameters EPR or N1.

- Not all INM standard jet aircraft have general thrust coefficient data, even though they have thrust coefficient data for two power states (MaxTakeoff and MaxClimb).
- Procedural profiles cannot use EPR or N1 as input parameters.
- General coefficients are used only in the *View // Thrust Calculator*.
- There are no high-temperature general thrust coefficients available, and INM does not contain default values, so thrust computed from general coefficients cannot account for high temperature conditions.

General thrust coefficients are used to calculate corrected net thrust per engine for EPR power-setting:

$$F_n/\delta = E + F V_C + G_a A + G_b A^2 + H T + K_{1a} EPR + K_{1b} EPR^2$$

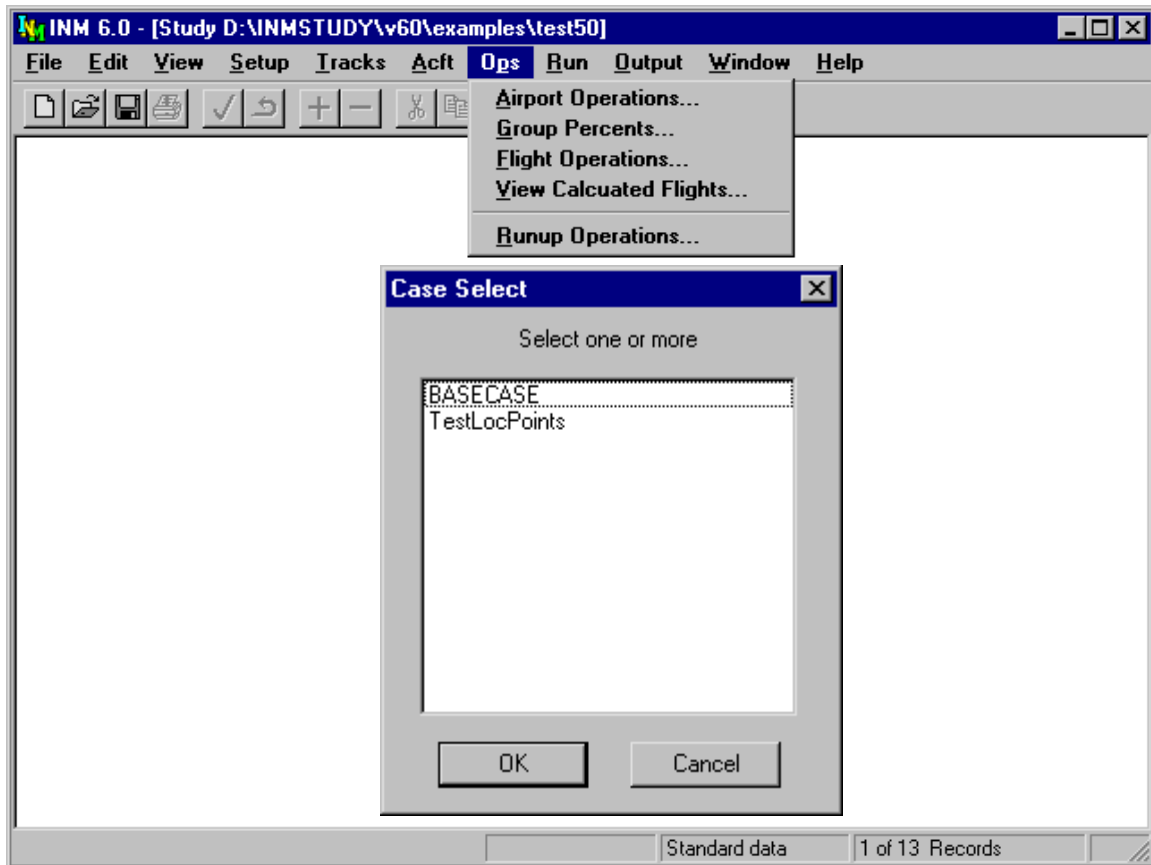
Where F_n is net thrust per engine in pounds, δ is the ratio of the atmospheric pressure at the aircraft to the sea-level standard value, V_C is calibrated airspeed in knots, A is pressure altitude in feet MSL, T is temperature in degrees Celsius, and EPR is engine pressure ratio.

For N1 power-setting:

$$F_n/\delta = E + F V_C + G_a A + G_b A^2 + H T + K_2 N1_c + K_3 N1_c^2$$

$$N1_c = N1/\text{sqrt}(\theta)$$

Where $N1$ is the percent low pressure rotor speed, and θ is the ratio of the temperature at the aircraft to the sea-level standard value.

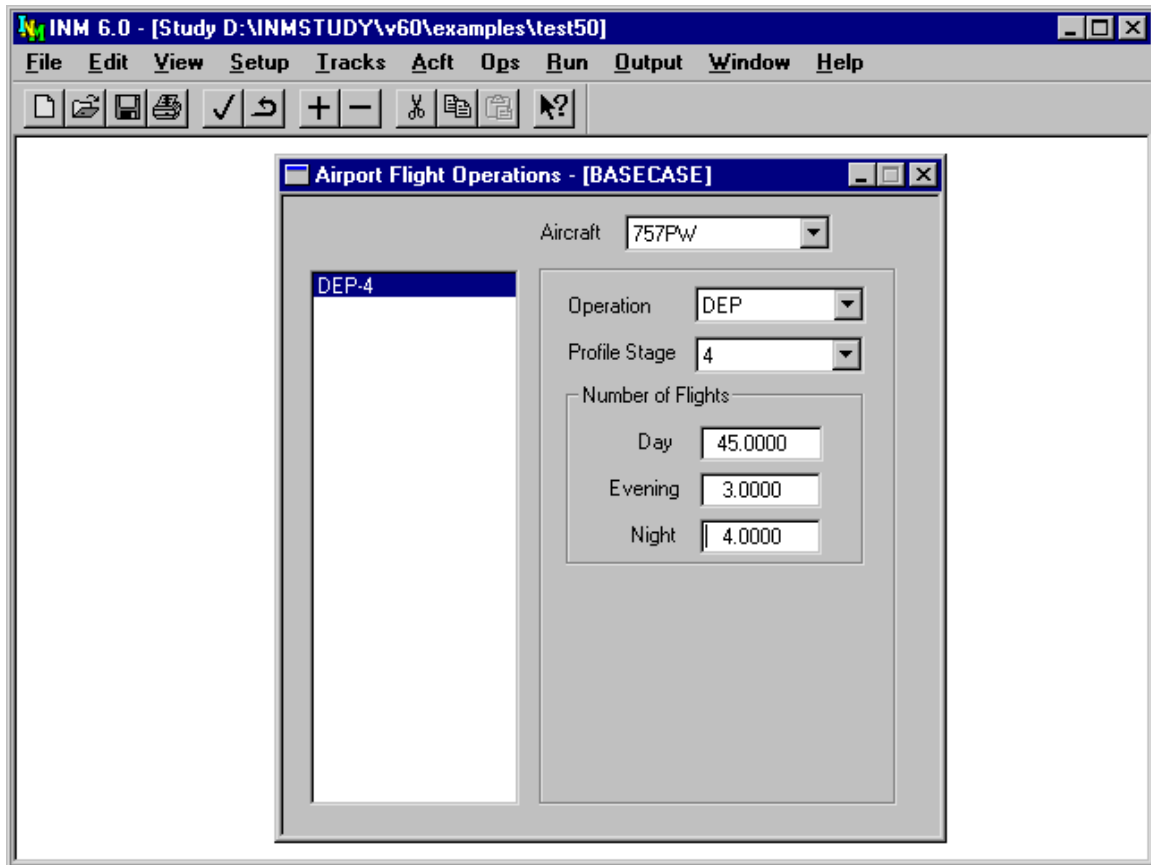


9. OPERATIONS MENU

Use this menu to

- Input airport flight operations.
- Distribute airport operations over tracks.
- Input flight operations on tracks.
- Calculate flight operations using distributed airport operations, aircraft substitution operations, and sub-track operations.
- View filtered and summary flight operations.
- Input runup operations.

After selecting a menu item, pick a case in the Case Select dialog box.



9.1. Airport Flight Operations

Menu Item: *Ops // Airport Operations*

Use this function in conjunction with the *Ops // Group Percents* function to create flight operations for a given case.

To create an airport operation record:

1. Select an aircraft.
2. Use *Edit // Add Record* to create a blank record.
3. Select the type of flight operation.
4. Select a profile stage number. For departures, the stage number defines takeoff weight.
5. Input the number of day, evening, and night-time flight operations for this aircraft, operation, and profile stage. Flight operations are specified for the airport as a whole, meaning that they are not assigned to individual runways and tracks.

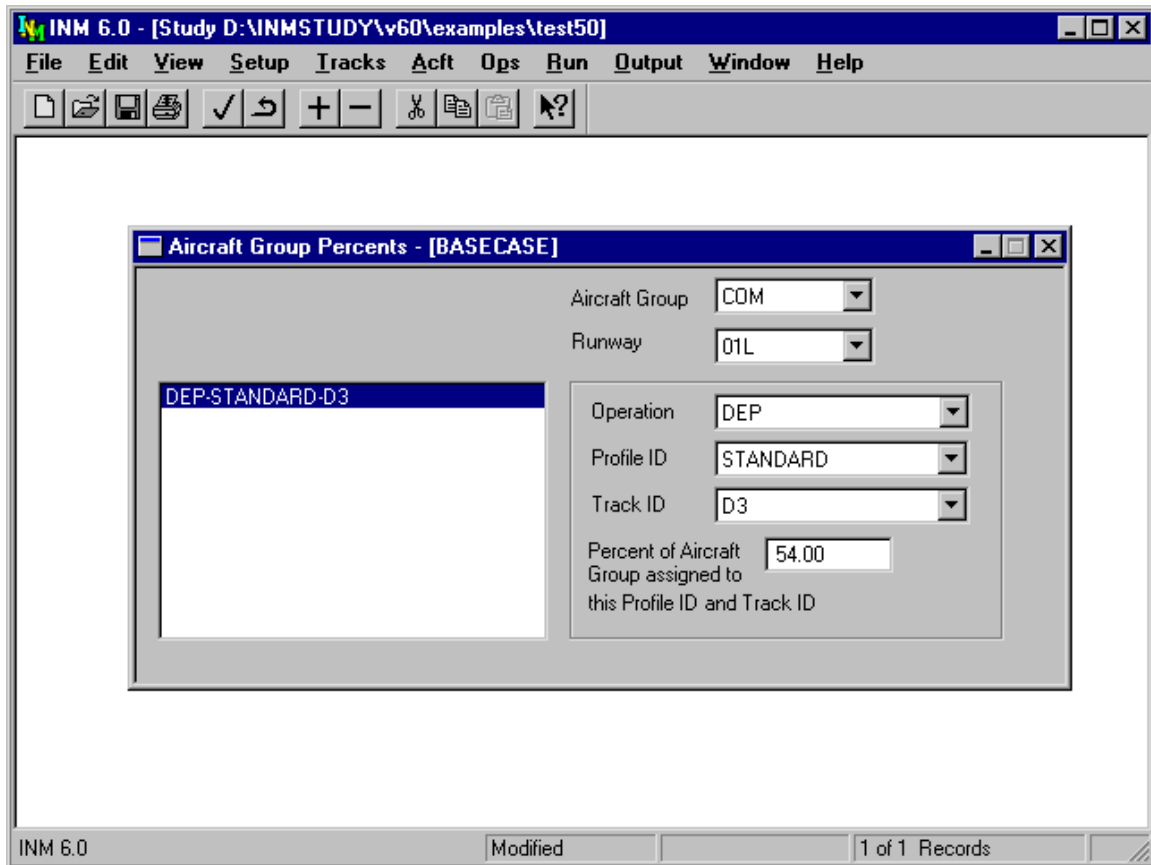
The standard noise metrics within INM, such as DNL, assume that flight operations are developed for a 24-hour day. Average daily flight operations are divided into three time periods: day, evening, and night. In the U.S., these time periods are defined relative to airport local time:

- Day 0700 - 1900 (12 hours)
- Evening 1900 - 2200 (3 hours)
- Night 2200 - 0700 (9 hours)

INM standard and user-defined noise metrics are associated with three metric weights (day, evening, and night multipliers). The metric weights multiply the number of flight operations in the day, evening, and night fields on flight operation records (see section 6.4).

You are not constrained by the U.S. definition of hourly time periods. Day, evening, and night are simply the names of three time periods. The number of flights and the metric weight are what really gives a time period meaning. If you want the three time periods to represent different numbers of hours, you may have to create new noise metrics in *Setup // Metrics*. For example, you should create a new night equivalent noise level metric, LAEQN, if you have a 10-hour night instead of a 9-hour night.

When performing analysis containing both user-defined and standard metrics, keep a consistent definition between the time averaging time parameter of the metric and the time period implicitly assumed in the development of the flight operations.



9.2. Aircraft Group Percents

Menu Item: *Ops // Group Percents*

Use this function in conjunction with the *Ops // Airport Operations* function to create flight operations for a given case. Data in group percent records specify how operations for the airport as a whole are distributed across runways and tracks.

To create a group percent record:

1. Select an aircraft group identifier. These identifiers are under your control, but they cannot be changed in the *Group Percents* window. Instead, aircraft group identifiers are assigned to individual aircraft in the *Acft // Aircraft* window. The default set of identifiers is COM, GA, MIL.
2. Select the runway end to work on. INM filters the group percent records and presents those records that are currently defined for the selected aircraft group and runway end. You can then edit current records or add new ones.

3. Use *Edit // Add Record* to create a blank record.
4. Select a flight operation.
5. Select a profile group identifier. The reason for defining a profile group is so that you have control over the kind of profile flown on a track. For example, you may want only distant NADPs on a particular track.
6. Select a track identifier.
7. Enter the percent of aircraft in the aircraft group that use this profile/track. Group percent records that have the same aircraft group identifier and operation type should add up to 100%. INM normalizes the percentage values before computing, but you should also make sure that they add to 100% for your own information.

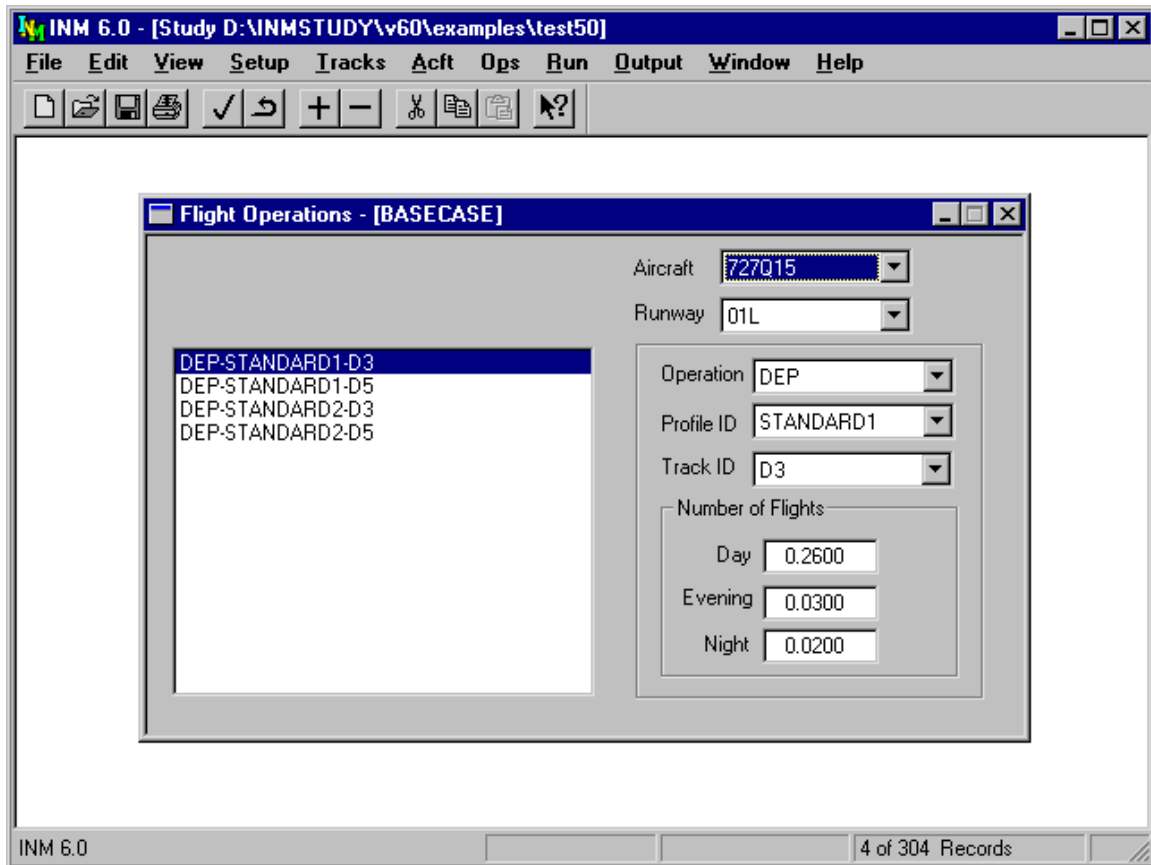
A problem with specifying the profile group on a track is that when INM calculates airport operations, some aircraft in the group may not have the required profiles.

- For example, you put a 747200 into aircraft group HVY, and you assigned 30% of HVY to profile group DISTANT and track 33L-BEZEL. But what if the 747200 does not have DISTANT profiles defined? INM cannot detect this problem until it calculates flight operations.
- If you use only INM standard data, the above problem does not occur because there is only one kind of profile group — STANDARD.

When INM does detect the problem:

- No record is produced for the 747200-33L-DISTANT-BEZEL operation
- A message is written to the error file *OPS_ERR.TXT* file in the case subdirectory.

The message in the error file alerts you to the problem. You need to take care of the problem by creating DISTANT profiles for 747200, or by defining aircraft group HVY such that it contains aircraft of like profiles. If you do not take care of the error, the number of flights that are computed is less than the number of flights defined in the *Airport Operations* window.



9.3. Flight Operations

Menu Item: *Ops // Flight Operations*

Use this function to assign numbers of aircraft to individual runways and tracks. Flight operation data are at a detailed level, rather than for the airport as a whole.

To create a flight operation record:

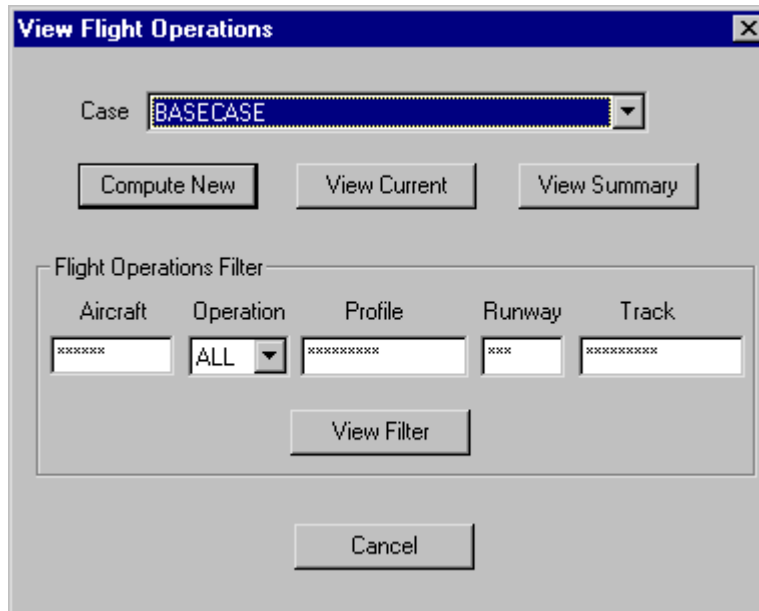
1. Select an aircraft.
2. Select a runway end.
3. Use *Edit // Add Record*.
4. Select a type of flight operation. You must have profiles and tracks already defined for the selected operation.
5. Select a profile group+stage identifier. For departures, the stage number defines takeoff weight.
6. Select a track identifier.
7. Input the number day, evening, and night-time flight operations for this aircraft, operation, profile, and track.

You can create both airport operation records and flight operation records for the same type of operation. Usually, you would use this feature to distribute one group of aircraft by group percentages, while detailing another group.

- For example, you could create general aviation departures using *Airport Operations* and create commercial departures using *Flight Operations*. In this case, you are not specifying the same aircraft-runway-profile-track combination by two different methods because different aircraft groups contain different aircraft.

Do not define the same aircraft-runway-profile-track combination by both *Airport Operations* and *Flight Operations* functions because you will have too many flights.

If you use both methods, check the final count in the *Ops // View Calculated Flights* View Summary window to make sure that the total numbers of operations are correct.



9.4. View Calculated Flights

Menu Item: *Ops // View Calculated Flights*

Use this function to obtain summary information of all defined flight operations. Operations may be summed by aircraft, operation type, profile definition, runway, or track. The data may be viewed within INM, saved to disk, or copied to another application. This function is most useful for verifying that INM input data match user's intention.

INM calculates flight operations by:

- Distributing airport operations across tracks, as specified by group percent records.
- Distributing flight operations across INM aircraft, as specified by aircraft substitution records.
- Distributing flight operations across sub-tracks, as specified by track records.
- Adding flight operations records.

INM saves the calculated flight operations in the *OPS_CALC.DBF* file in the case subdirectory. If errors are generated during calculation, INM writes them to the *OPS_ERR.TXT* file, which is also in the case subdirectory.

To use this function, select a case and then use one the four function buttons.

ACFT	OP	PROFILE	S	RWY	TRACK	S	GRP	DAY	EVENING	NIGHT
727Q15	A	STANDARD	1	01R	A4	0	COM	0.0500	0.0300	0.0100
727Q15	A	STANDARD	1	10R	A3	0	COM	0.1600	0.0900	0.0300
727Q15	A	STANDARD	1	19R	A2	0	COM	2.1600	1.1800	0.4300
727Q15	A	STANDARD	1	28L	A1	0	COM	23.6800	12.8900	4.6900
727Q15	D	STANDARD	1	01L	D3	0	COM	0.2600	0.0300	0.0200
727Q15	D	STANDARD	1	01L	D5	0	COM	0.6600	0.0800	0.0400
727Q15	D	STANDARD	2	01L	D3	0	COM	1.3000	0.2700	0.0600
727Q15	D	STANDARD	2	01L	D5	0	COM	3.2300	0.6600	0.1400
727Q15	D	STANDARD	2	01R	D2	0	COM	8.5800	1.7600	0.3800
727Q15	D	STANDARD	2	01R	D4	0	COM	2.8000	0.5700	0.1200
727Q15	D	STANDARD	2	01R	D4A	0	COM	2.8000	0.5700	0.1200
727Q15	D	STANDARD	2	01R	D4B	0	COM	2.8000	0.5700	0.1200
727Q15	D	STANDARD	2	10R	D1	0	COM	2.3600	0.4800	0.1000
727Q15	D	STANDARD	2	19L	D8	0	COM	0.2100	0.0400	0.0100
727Q15	D	STANDARD	2	28L	D6	0	COM	2.5700	0.5300	0.1100
727Q15	D	STANDARD	2	28R	D7	0	COM	3.5600	0.7300	0.1600
727Q15	D	STANDARD	3	01R	D2	0	COM	1.7400	0.2200	0.1100
727Q15	D	STANDARD	3	01R	D4	0	COM	0.5700	0.0700	0.0400
727Q15	D	STANDARD	3	01R	D4A	0	COM	0.5700	0.0700	0.0400
727Q15	D	STANDARD	3	01R	D4B	0	COM	0.5700	0.0700	0.0400
727Q15	D	STANDARD	3	10R	D1	0	COM	0.5000	0.0600	0.0300
727Q15	D	STANDARD	3	19L	D8	0	COM	0.0400	0.0100	0.0000
727Q15	D	STANDARD	3	28L	D6	0	COM	0.6400	0.0800	0.0400
727Q15	D	STANDARD	3	28R	D7	0	COM	0.8800	0.1100	0.0600

9.4.1. Compute New Flight Operations

Menu Item: *Ops // View Calculated Flights // Compute New*

Press the Compute New button to view a new set of calculated flight operation records. For example, you can change data in the *Group Percents* window, and then see the change it makes in the calculated flight operation records.

INM automatically calls the Compute New function before computing noise or writing an echo report, so that the calculated flight operations are up to date.

9.4.2. View Current Flight Operations

Menu Item: *Ops // View Calculated Flights // View Current*

Press the View Current button to view the current set of calculated flight operation records for a given case.

You can export calculated flight operations:

- Print the records, or a subset of the records, by using the *File // Print* function.
- Export the records, or a subset of the records, to a file by using the *File // Export As* function.
- Copy the records to the Windows Clipboard as text with the *Edit // Copy* function.

9.4.3. View Filtered Flight Operations

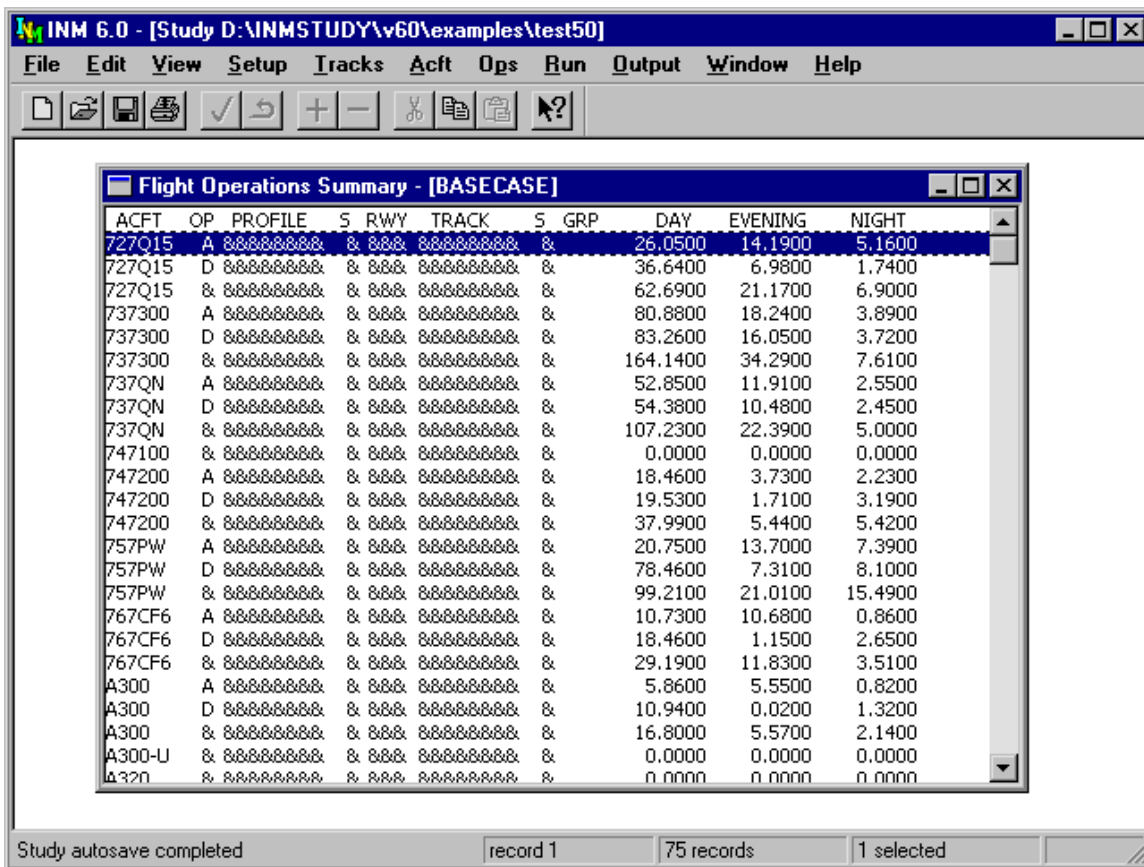
Menu Item: *Ops // View Calculated Flights // View Filter*

There may be a very large number of calculated flight operation records. You can view a subset of these records by first editing the filter input boxes, and then pressing the View Filter button.

The filter command is has the following input boxes:

- Aircraft identifier (for example, DC930)
- Type of operation (APP, DEP, TGO, CIR, OVF)
- Profile identifier (group+stage identifiers; for example, STANDARD5)
- Runway end identifier (for example, 27R)
- Track identifier (8 characters) and sub-track identifier (1 digit).

Use an asterisk to indicate a "wild card" that will match any character. For example, 737*** displays all aircraft starting with 737.



9.4.4. View Flight Operations Summary

Menu Item: *Ops // View Calculated Flights // View Summary*

After calculating flight operations, press the View Summary button to view aggregates of day, evening, and night operations.

Each row in the *Flight Operations Summary* window represents a summation across a set of calculated flight operation records.

Aggregated fields are indicated with an ampersand "&". Flight operations are aggregated in the following ways:

- Aircraft operations are summed across profiles, runway ends, and tracks. Examples: the total number of 727Q15 departures; and the total number of 727Q15 operations of any kind.
- Operations on runway ends and tracks are summed across aircraft and profiles. Examples: the total number of departures on 09L using TR01; the total number of departures on 09L; and the total number of operations of any kind on 09L.

- Operations are summed across aircraft, profiles, runway ends, and tracks.
Examples: the total number of departures; and the total number of operations of any kind.

Flight operation summary data are useful for checking your input data. For example:

- Does the average number of approaches to a given runway match the real operational data?
- Does the average number of departures equal the average number of approaches?

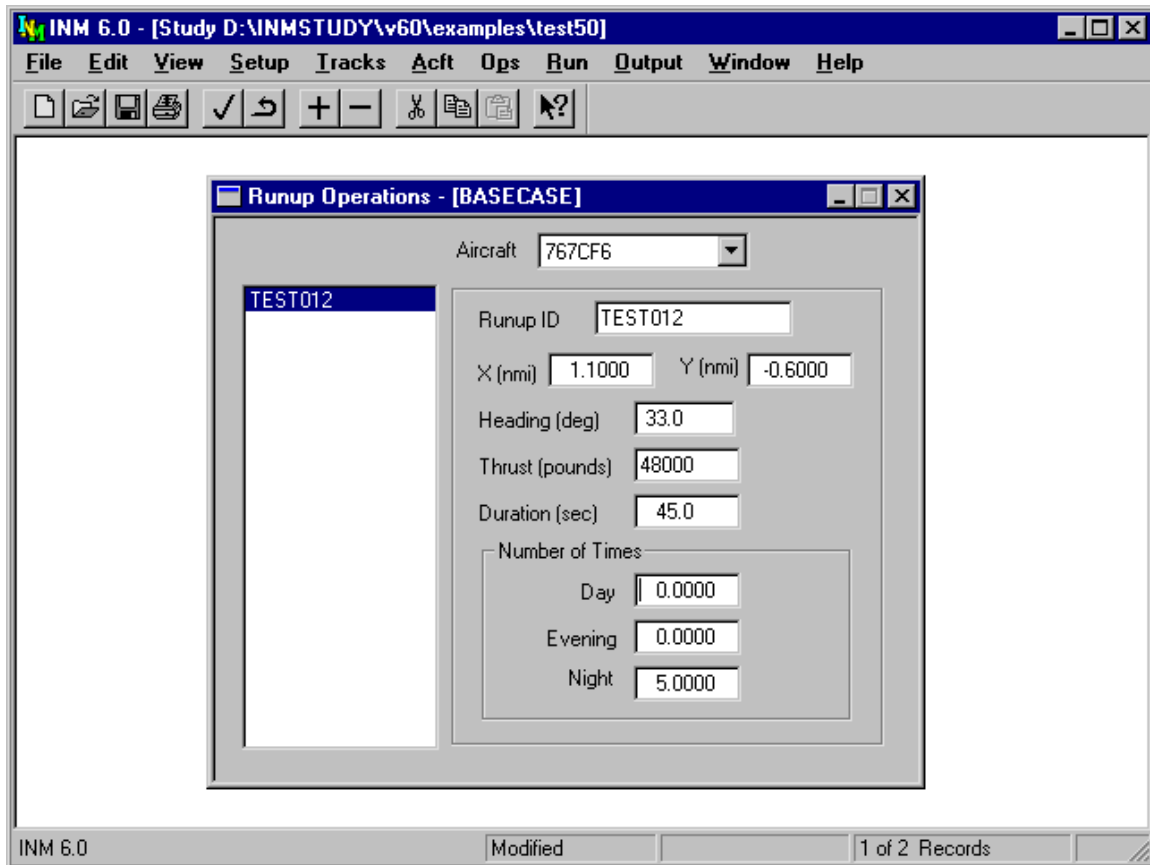
Airport landing/takeoff operations are counted differently than shown in the flight operations summary table. You can calculate landing/takeoff operations by using the INM summary data:

$$\begin{aligned}\text{Airport Landings} &= N_{\text{APP}} + N_{\text{TGO}} + N_{\text{CIR}} \\ \text{Airport Takeoffs} &= N_{\text{DEP}} + N_{\text{TGO}} + N_{\text{CIR}}\end{aligned}$$

Where,

$$\begin{aligned}N_{\text{APP}} &= \text{sum of all approaches (A)} \\ N_{\text{DEP}} &= \text{sum of all departures (D)} \\ N_{\text{TGO}} &= \text{sum of all touch-and-go operations (T)} \\ N_{\text{CIR}} &= \text{sum of all circuit flights (F)}\end{aligned}$$

A TGO or CIR flight operation is counted twice because it has both a landing event and a takeoff event.



9.5. Runup Operations

Menu Item: *Ops // Runup Operations*

Use this function to input run-up operations for a specific Case.

1. Select an aircraft identifier.
2. Use *Edit // Add Record* to create a blank record.
3. Input an 8-character runup pad identifier.
4. Input the X,Y position of the pad. If you do not know the coordinates:
 - Use *Tracks // Input Graphics // View // Geo Units* to change to nautical miles (or kilometers)
 - Position the mouse pointer on the runup pad, and read the X,Y values on the status bar in the lower-right part of the main window.
5. Input the heading of the airplane on the runup pad. Heading is measured in degrees clockwise from the Y-axis (true north).

6. Input the average thrust-setting.
 - For aircraft NPD curves in Pounds, you can use static thrust, which is displayed on the aircraft record in the *Acft // Aircraft* window.
 - For aircraft NPD curves in Percent, you can use 100%.
 - To model runups that do not operate on all engines, calculate and use the thrust-setting that would diminish the noise level by $10\log(N/N_T)$ dB, where N is the number of operative engines, and N_T is the total number of engines.
7. Input the average duration of the runup event. Duration is the time that the average thrust setting is in effect, and it is measured in seconds. The maximum duration is 24 hours.
8. Input the number of times the runup event occurs during the day, evening, and night time periods.

INM uses a single directivity pattern to calculate noise around an airplane on a runup pad. This is the same SAE-AIR-1845 directivity pattern function that is used to compute noise behind takeoff. The directivity pattern is symmetric around the longitudinal axis of the airplane.

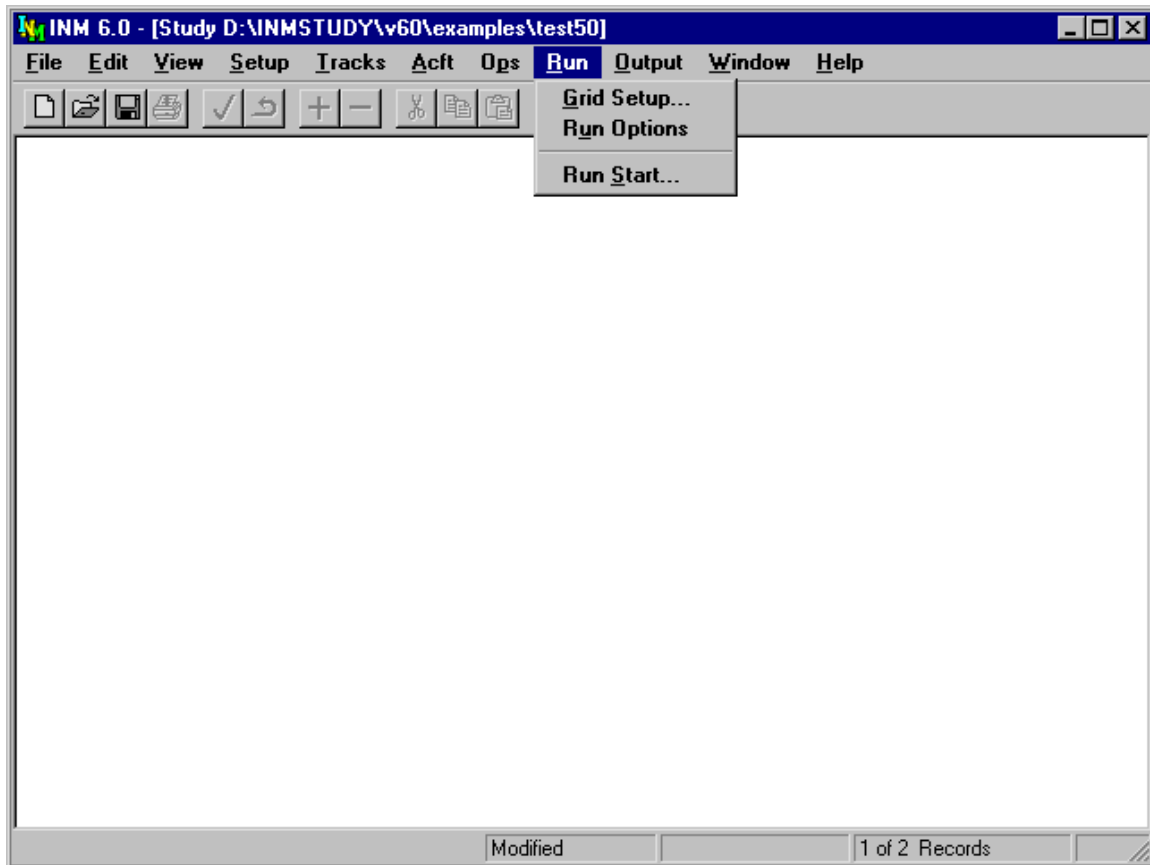
The INM directivity pattern function is given by:

$$\begin{aligned} P &= 0.0 && 0 \leq \theta \leq 90 \\ P &= 51.44 - 1.553 \theta + 0.015147 \theta^2 - 0.000047173 \theta^3 && 90 < \theta \leq 148.4 \\ P &= 339.18 - 2.5802 \theta - 0.0045545 \theta^2 + 0.000044193 \theta^3 && 148.4 < \theta \leq 180 \end{aligned}$$

$$\begin{aligned} L &= P && 0 < D \leq 2500 \\ L &= P / 2500 && D > 2500 \end{aligned}$$

Where

- L is the number of decibels added to the maximum noise level.
- D is the distance from the airplane to the observer (feet).
- θ is the angle from the nose of the airplane to an observer behind the airplane (degrees).



10. RUN MENU

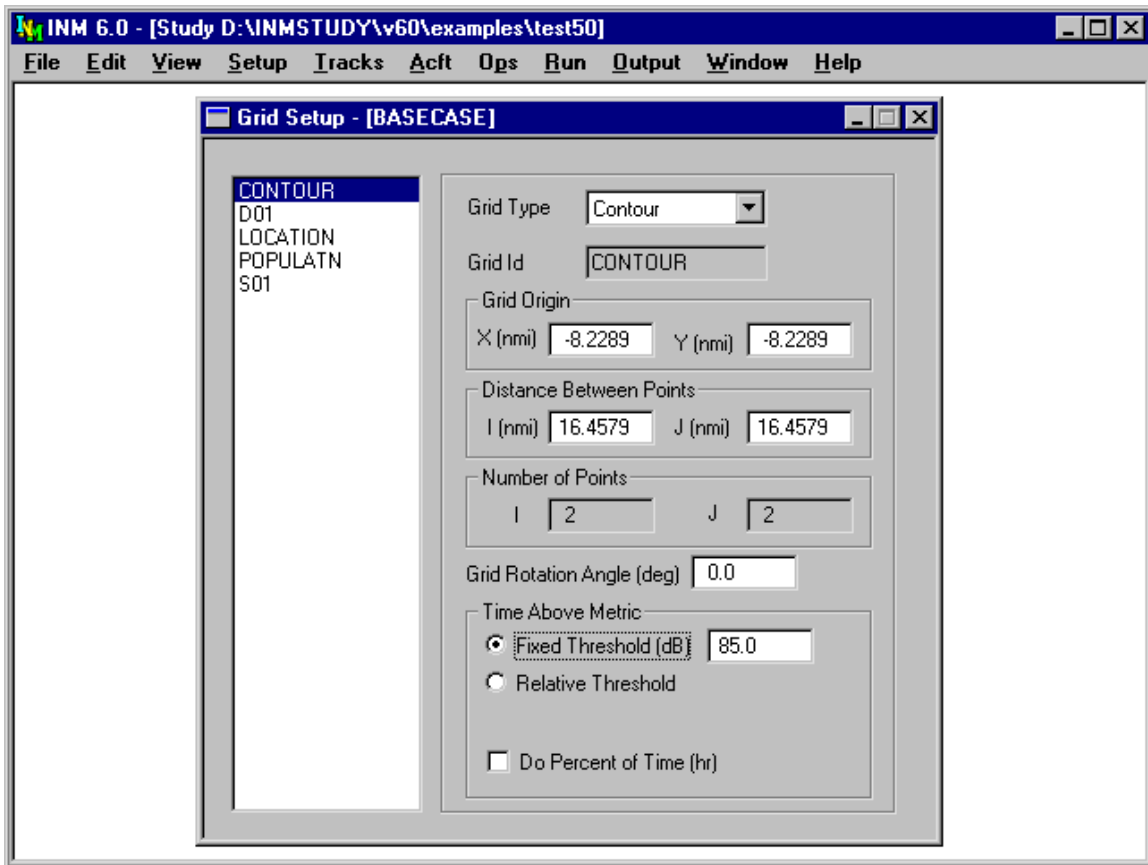
Use this menu to setup and run a case. INM calculates noise metrics at specific locations according to your definition of grid points and saves the results in the case subdirectory. Grid definition includes a special rectangular grid called a contour grid. There is only one contour grid per case.

The setup functions include:

- Defining a contour grid or grids for specific points
- Specifying the metrics and other noise calculation options.

The execution functions include:

- Launching one or more cases
- Managing runs in progress.



10.1. Grid Setup

Menu Item: *Run // Grid Setup*

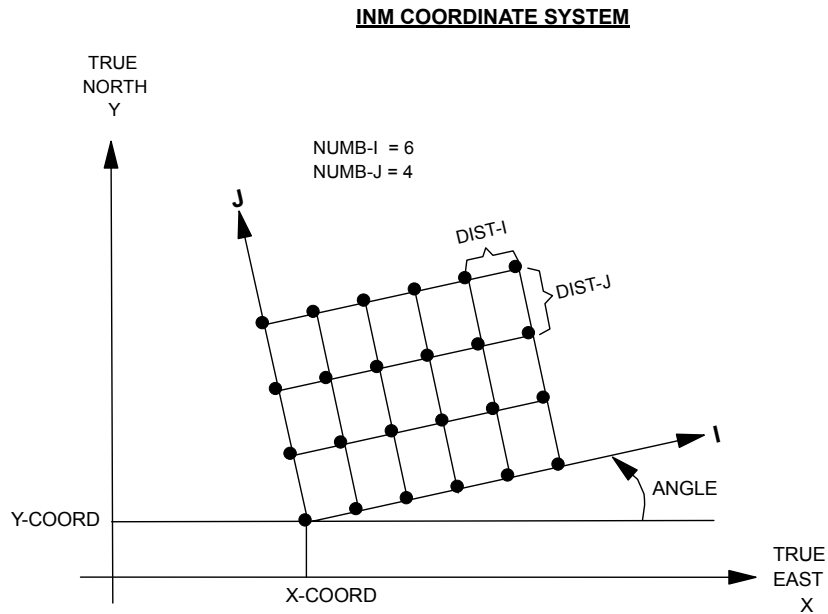
Use this function to define various kinds of grids.

- Grid points define locations where noise is calculated. The definition requires an origin, the number of points in the grid array, and the distance between the points.
- A single location is defined by a 1x1 grid array.
- The rectangle in which INM computes contours is defined by a 2x2 grid array.

Each case has its own set of grid records, which are contained in the *GRID.DBF* file. If you want to use the same grid records for several cases:

- Use *Setup // Case Copy* function to copy the *GRID.DBF* file to a new case subdirectory when you create a new case.
- Or, use *Edit // Copy Records* and *Paste Records* functions to copy records in one case and paste them to another case.
- Or, use a file manager to copy a *GRID.DBF* file from one case to another. Close INM before using this method.

A grid is a rectangular array of points. A grid can be rotated relative to the X,Y coordinate system. Because it can be rotated, grid coordinates I,J are used instead of X,Y coordinates. When the rotation angle is zero, the I-axis is parallel to the X-axis, and the J-axis is parallel to the Y-axis.



To create a grid record:

1. Use *Edit // Add Record* to create a new record. INM creates a default, unrotated, square contour grid, 16 nmi on a side, and centers it on the X,Y coordinate origin. You can change these default parameters.
2. Select the type of grid:
 - Contour — define four corners of a rectangle. INM produces noise contours inside this rectangle.
 - Standard — define observer locations. INM produces a concise noise analysis for these grid points.
 - Detailed — define observer locations. INM produces an extensive noise analysis at these grid points. INM computes and saves various geometric and acoustic measures for each flight operation.
 - Location — define the threshold noise level for computing time-above at location points.
 - Population — define the threshold noise level for computing time-above at population points.
3. Input a grid identifier (up to eight characters) for a standard or detailed grid. INM provides the grid identifier for contour, location, or population grids, and it cannot be changed.

4. Input the X,Y values of the lower-left corner point for contour, standard, and detailed grids. Location and population points are defined in the *Setup // Location Points* and the *Setup // Population Points* windows.
5. Input the distances between neighboring grid points along the I and J axes.
6. Input the numbers of points along the I and J axes for standard and detailed grids. A contour grid rectangle has four points.
7. Input the rotation angle relative to the X-axis (maximum ± 90 degrees). Rotation is counter-clockwise around the lower-left corner.
8. For time-above analyses, select the type of threshold to use and input a threshold parameter:
 - Fixed Threshold — INM uses a fixed time-above threshold that is the same for all points in the grid.
 - Relative Threshold — INM uses a relative time-above threshold that is determined by an ambient noise level at a grid point plus a delta level. Delta is the same for all points in the grid. Delta can be positive, zero, or negative.
 - Ambient noise levels are defined in a text file (see below). You create the text file and tell INM where to find it using the *Setup // File Locations* function.
9. Put a check mark in the Do Percent of Time box if you want INM to compute time-above as a percentage of a given time duration in hours.
 - For example, if you check this box and enter 8 hours, INM calculates percent time-above as $TA\% = 100 TA / (8 \cdot 60)$, where TA is time-above in minutes.
 - Without a check mark, INM computes time-above in minutes. In either case, the result is referred to as "time-above".

You can have only one contour grid record, one location grid record, and one population grid record.

You can have any number of standard and/or detailed grids per case. However, the output from a detailed grid analysis can be very large, and you should limit the number of detailed grids, the number of points in them, and the number of standard metrics calculated.

Below is an example ambient noise file. The complete file, *AMBIENT.TXT*, is in the *PROCESS\TEXT* subdirectory.

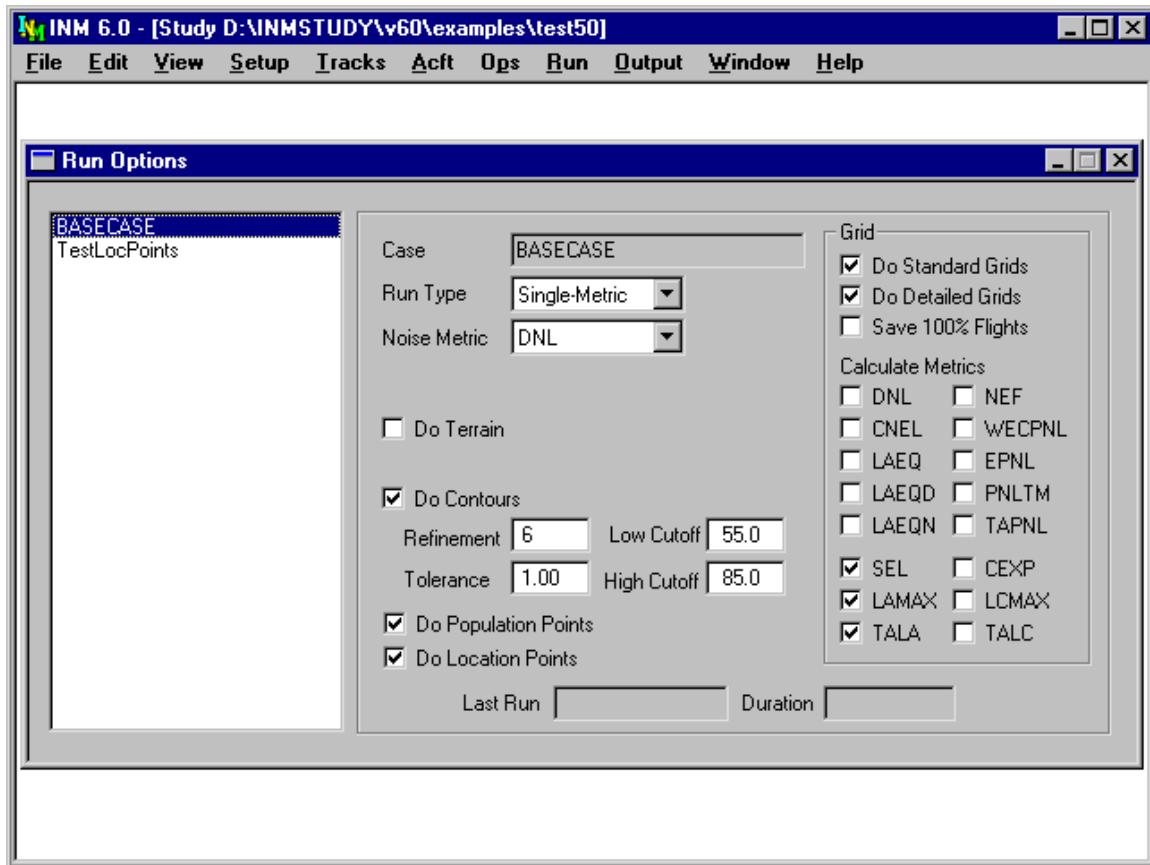
```
ncols 1193
nrows 1099
xllcorner -81.518889
yllcorner 24.848698
cellsize 0.00094917923
nodata_value 99
99 99 99 99 99 42 42 42 ... (1193 two-digit integers, then line-return)
42 42 42 42 43 43 43 44 ...
41 40 40 40 40 39 39 39 ...
....
(1099 rows)
```

Ambient noise file format:

- `ncols` — number of columns (longitudes).
- `nrows` — number of rows (latitudes).
- `xllcorner` — longitude of the southwest corner (decimal degrees).
- `yllcorner` — latitude of the southwest corner (decimal degrees).
- `cellsize` — spacing between latitude and longitude points (decimal degrees).
- `nodata_value 99` — integer used to indicate that no ambient level is available at the lat/long point. Do not change this value.
- Ambient noise levels (two-digit integer decibels)
 - 1) Start at the northwest corner.
 - 2) The first row of ambient noise levels is along north latitude, starting with west longitude, and incrementing longitude `cellsize` degrees.
 - 3) The next row is at north latitude minus `cellsize` degrees, etc.
 - 4) The last row is along the southern-most latitude.
 - 5) The integers must be two digits, starting in the first column of a line, and separated by one space. The last integer in a row must be followed by line-feed carriage-return to end the line.

Ambient noise file errors:

- Calculating contours — when 99 is encountered, INM stops the time-above computation and displays an error message. The ambient noise area must cover the entire contouring rectangle with valid ambient noise levels.
- Calculating standard grid points, detailed grid points, location points, or population points — when 99 is encountered, INM sets time-above to -99.0, and continues running. Tables may contain both valid and invalid (-99.0) time-above values.



10.2. Case Run Options

Menu Item: *Run // Run Options*

Use this function to specify run options before running a case.

1. Select a case from the list on the left. (You can add cases in the *Setup // Cases* window)
2. Select a type of run:
 - SingleMetric — one noise metric is computed. Using this metric, you can compute contours, standard grids, detailed grids, population points, and location points, all in one run. Select this run mode if you want to calculate grids or if you need only one kind of contour.
 - MultiMetric — noise data are computed for a noise family, and specific noise metrics are computed at the time contours are processed. The advantage of the multi-metric mode is that you do not have to run INM over and over to get different kinds of contours (for example, DNL, LAMAX, and TALA). A multi-metric run can save computing time if you need several different kinds of contours.

3. Select a noise metric or a noise family:
 - SingleMetric — the noise metric list contains 16 standard metrics and any others that you may have created.
 - MultiMetric — the noise family list contains three types of frequency weighting (A-weighted, C-weighted, or Perceived).

4. Check the Do Terrain box (Optional):
 - INM computes the distance from a ground-based observer to an airplane using terrain elevation data from one or more terrain files.
 1. Purchase or create terrain elevation files. Use the *File // Import Data into Study // Terrain 3CD Files* function.
 2. You tell INM where to find these terrain files via the *Setup // File Locations* function.
 - Terrain file errors:
 1. Contours — INM stops with an error message if a required terrain file is missing. Look in the *TERRAIN_ERR.TXT* file in the terrain directory for information on which *3CD* file is missing.
 2. Standard grid point, detailed grid point, population point, or location point — INM sets the metric at the point to -98.0 and continues running. Tables may contain both valid and invalid (-98.0) values.
 - Box unchecked — INM computes observer-to-airplane distance based on flat ground around the airport at the airport elevation. No terrain errors are generated.
 - INM runs faster without the terrain option.

5. Check the Do Contours box:
 - INM calculates contouring data. The box is automatically checked for a multi-metric run.
 - Tell INM where to compute contours by creating a contour grid record in the *Run // Grid Setup* window.

6. Input a refinement number (if doing contours):
 - INM uses a recursively subdivided-grid method to calculate data for contours. Areas where the noise changes substantially are divided into small grids; areas where there is little change in noise are left undivided.
 - You control the size of the smallest contouring grid with the refinement number. The size *d* in nautical miles of the smallest grid is:

$$d = (1/2^{N-3})(D/2)/(1 + \text{int}(D/2))$$
 where *N* is the refinement number, *D* is the distance between corner points in nautical miles, and *int*(*x*) is the integer part of *x*. The table below shows the largest value of *d* as a function of refinement.

N	d (feet)	N	d (feet)
4	3038	7	380
5	1519	8	190
6	760	9	95

7. Input a tolerance value (if doing contours):
 - You control the process of subdividing a contouring grid with the tolerance value. If the tolerance is small, INM is more sensitive to changes in the noise metric over an area, and is more likely to divide a grid.
 - The units for the tolerance value are decibels for noise level metrics, and minutes for time-above metrics.
 - The combination of a large refinement number and a small tolerance value causes INM to calculate more contouring grid points, resulting in a longer run time, but producing higher-fidelity contours.

8. Input low and high cutoff values (if doing contours):
 - Contouring grids that have noise values lower than the low cutoff level are not subdivided.
 - Contouring grids that have noise values higher than the high cutoff level are not subdivided.
 - SingleMetric run — the valid noise area lies between the low-cutoff and high-cutoff contour levels. Noise levels outside the valid noise area are not accurately calculated.
 - MultiMetric run — does not use the cutoff test, and the valid noise area for contours encompasses the whole area around the airport.

9. Check the Do Population Points box (for single-metric run mode):
 - INM computes noise at population points. Population points are located at the centers of census blocks, which for densely populated areas, correspond to city blocks.
 - You need to have a *POP_PTS.DBF* file in the study directory to run population points. Use the *File // Import Data into Study // Census PL94-171 DBF Files* function.
 - You must have a population grid record defined in the *Run // Grid Setup* window, even when not computing a time-above metric.
 - A *POP_PTS.DBF* file can be very large, and it may take a long time to compute noise.

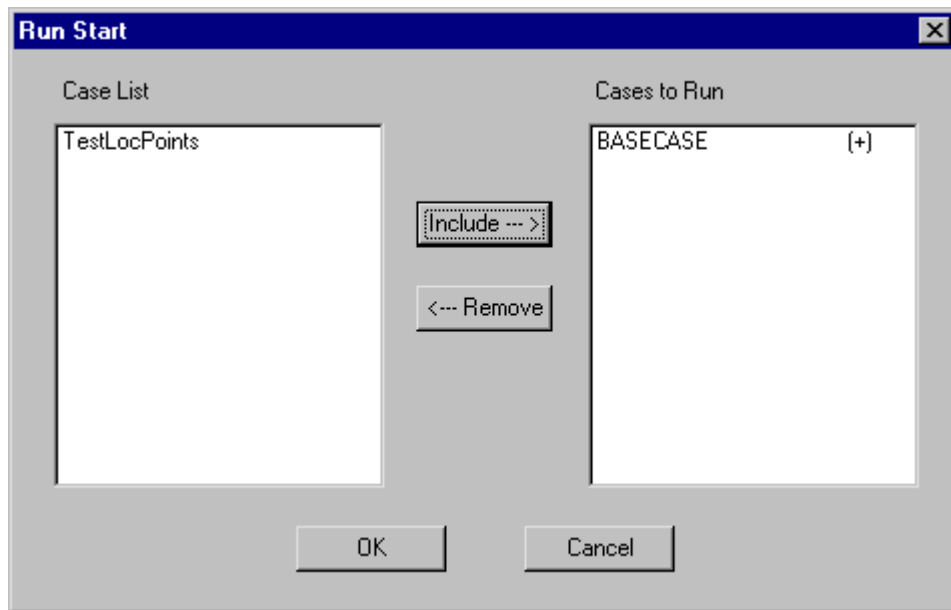
10. Check the Do Location Points box (for single-metric run mode):
 - INM computes noise at location points. Location points are at nav aids, fixes, and special noise-sensitive locations around an airport, such as schools, hospitals, etc.
 - You must have a *LOC_PTS.DBF* file in the study directory to run location points.
 - 1) Create the file in *Setup // Study View Airports*.
 - 2) Add location points in *Setup // Location Points* window.
 - You must have a location grid record defined in the *Run // Grid Setup* window, even when not computing a time-above metric.

11. Check the Do Standard Grids box (for single-metric run mode):
 - INM computes noise at standard grid points.
 - You must have one or more standard grid records defined in *Run // Grid Setup*.
 - INM calculates up to 17 noise metrics at standard grid points:
 - 1) INM calculates your selected metric. It is called METRIC in the output table.
 - 2) INM calculates standard metrics that are checked.
 - 3) If one or more of your aircraft is missing a family of NPD curves (for example, EPNL/PNTLM curves are missing), then you should turn off all of the standard metrics in that noise family because they will not calculate correctly.

12. Check the Do Detailed Grids box (for single-metric run mode):
 - INM computes noise at detailed grid points.
 - You must have one or more detailed grid records defined in *Run // Grid Setup*.
 - Save 100% Flights box — check this box if you want INM to save all flight operations in the *GRID_DTL.DBF* file. Otherwise, INM saves only those flight operations that contribute 97% of the noise at the grid point. This is a way to reduce the amount of output data.
 - INM always calculates your selected metric. Uncheck most of the 16 standard metric boxes or you will get an extremely large amount of output data.
 - If you select a standard metric and also put a check mark in the box, the metric is written twice to the detailed grid file.
 - INM creates a *GRID_STD.DBF* file in addition to the *GRID_DTL.DBF* file so that you can determine grid point X,Y,Z and lat/long from I,J values.

INM fills out the Last Run and Duration boxes after you run the case. The date and time of the run and the duration of the noise computation are displayed in these boxes.

- Once you edit and commit a record in the *Run Options* window, these two boxes are cleared in preparation for a new run.
- If you make a run, compute and view the contours, change the run options (the run time is cleared), and then you try to look at the output again, INM displays a warning message saying that that the case should be run again. The warning message is because you changed the run options and the changes may affect the output; however, INM will still display the *Output Graphics* window.



10.3. Batch Runs

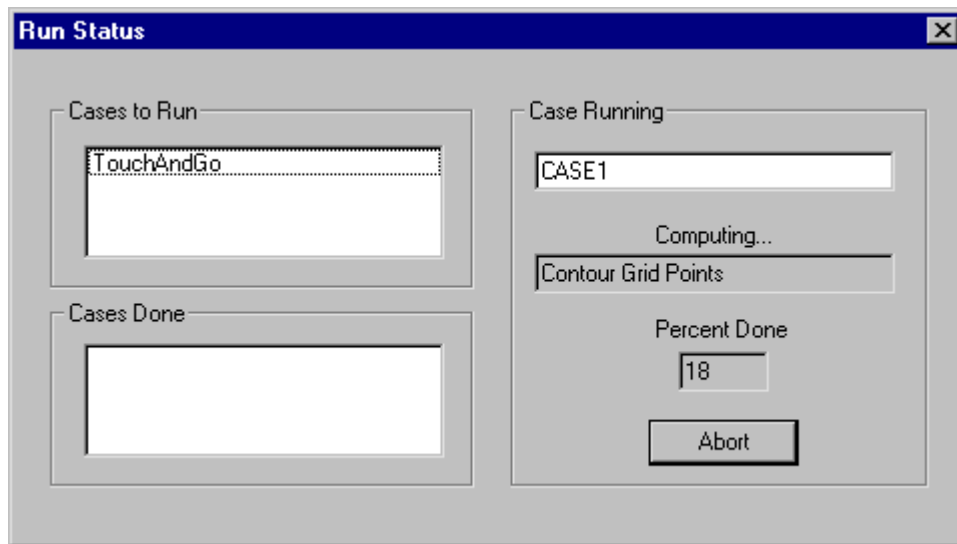
Menu Item: Run // Run Start

Use this function to select cases to run:

1. Select one or more cases in the left-hand box.
2. Press the Include button.
3. INM moves the selected cases to the right-hand box.
4. Press OK to start the batch of runs.

For each case, INM:

- Reads study and standard data from disk, if the data are not already in memory.
- Calculates two-dimensional profiles and three-dimensional flight paths.
- Writes noise metric, flight path, and grid location data to the *FLIGHT.PTH* file in the case subdirectory.
- Writes runway and track graphical data to the *_RWY_TRK.BIN* file in the case subdirectory.
- Displays the Run Status dialog box and starts the noise computation module.

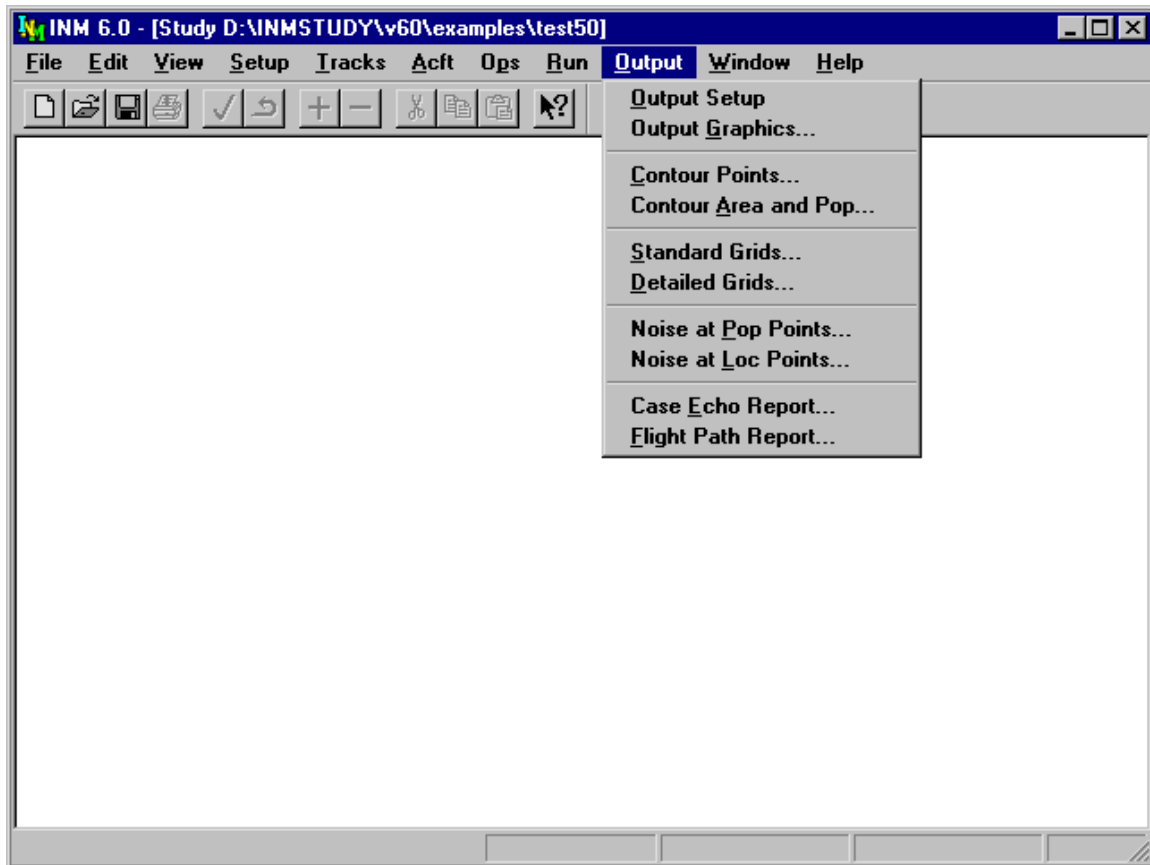


The Run Status dialog box shows:

- Cases to Run — cases queued up to run in the future
- Cases Done — cases that have already finished
- Case Running — the case that is currently computing
- Computing box — the type of grid currently computing
- Percent Done box — the progress of the run:
 - 1) Standard, detailed, population, and location points — the value shown is the percent of total number of points that are finished, which is approximately the percent of total run time.
 - 2) Contour grid points — the value shown is the percent of total number base grids that are finished. The number of base grids depends on the size of the contouring area. The percent of total run time cannot be predicted because each base grid is subdivided to different levels, and the number of points computed varies from one base grid to another.
- Abort button — use this to stop the currently running case. The abort event is processed when the INM updates the Percent Done box, so you may have to wait for INM to stop the run.

After a batch of runs is finished, INM removes the Run Status dialog box and unlocks the INM user interface. Go to the *Output* menu to view the results:

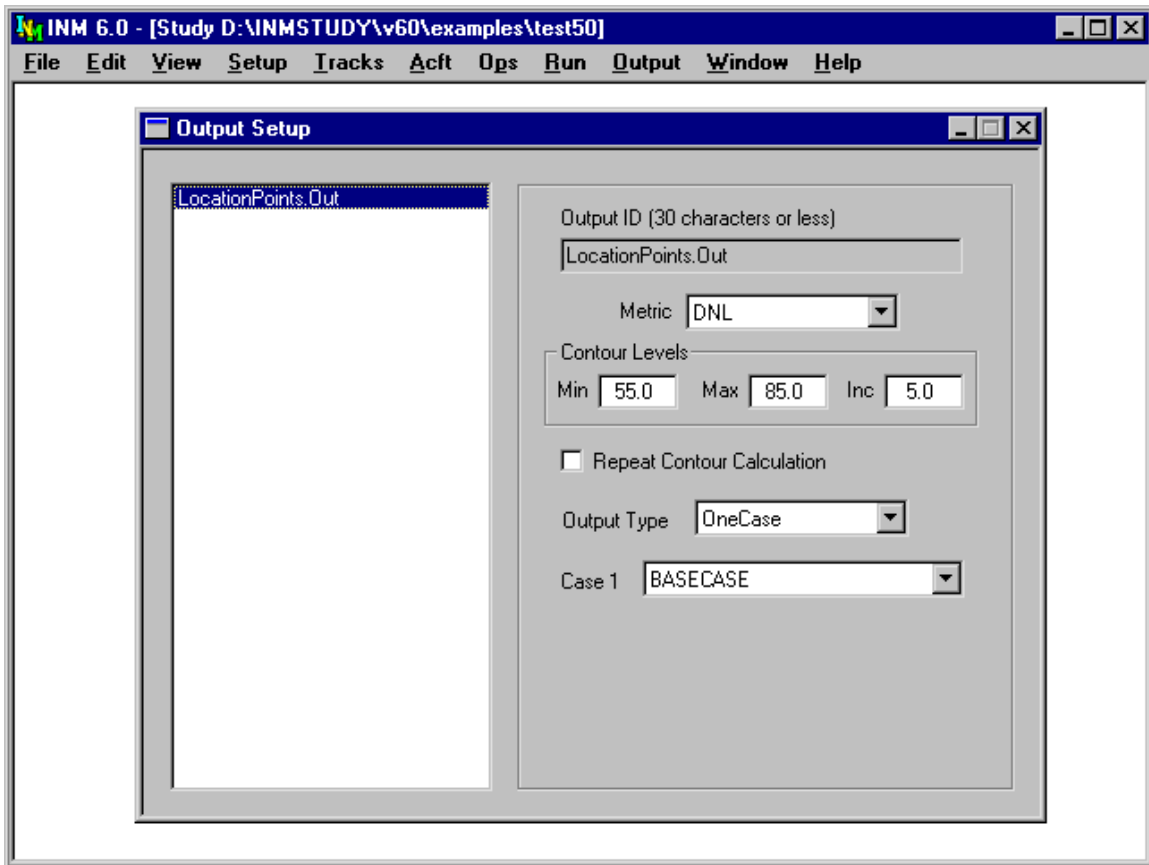
- Standard, detailed, population, and location point results are stored in the case subdirectory. These output tables are available for immediate viewing.
- Contours require more processing. Contour post-processing occurs when you access the *Output // Output Graphics* function.



11. OUTPUT MENU

Use the *Output* menu to:

- Setup output subdirectories for graphics post-processing
- Display output graphics showing noise contours
- Display a table of contour points
- Display a table of areas and people inside contour levels
- Display a table of standard grid point data
- Display a table of detailed grid point data
- Display a table of noise levels at populations points
- Display a table of noise levels at location points
- Display a summary report of case input parameters
- Write a text file of flight path data.



11.1. Output Setup

Menu Item: Output // Output Setup

Use this function to create an output record before opening an *Output Graphics* window. An output record associates contour calculation parameters with one or more cases. An output record must be added and committed before you can calculate and view noise contours.

To create an output record:

1. Use *Edit // Add Record* to display a blank record.
2. Type an output identifier, which is the name of the output subdirectory where noise-contour data are stored.
3. Select the noise metric that you want to display.

4. Input the minimum, maximum, and incremental contour level (dB or minutes) for display.
 - The maximum number of contours is 14.
 - The maximum less the minimum should be a positive integer number of increments.
 - When you specify one-case output for a single-metric run, make sure that the minimum contour level is equal to or greater than the low cutoff level, and the maximum contour level is equal to or less than the high cutoff level, as specified in the *Run // Run Options* window.
 - Example of levels for difference contours: (-3.0, 3.0, 1.5) specifies 5 difference contours from -3 dB to 3 dB in increments of 1.5 dB.

5. Check the Repeat Contour Calculation box if you want to make INM calculate contours when you open the *Output Graphics* window. You may want to do this if you change the contour level data. Usually INM calculates contours only once and then re-displays them.

6. Select the type of output processing:
 - OneCase — standard output processing for a single case
 - Difference — one case is subtracted from another (noise level or time-above)
 - LogAdd — power-sum dB level of two or more cases (noise level only, does not apply to time-above metrics)
 - Merge — combine two or more cases to cover a larger area (noise level or time-above)

Do one-case processing on individual cases (see Section 11.1.1) before using the difference, log-add, or merge functions.

7. Select the case or cases to be processed. The cases that are available for selection in the list boxes depend on the noise metric and the type of output processing.

8. Use *Edit // Commit Record* to save the output record.

11.1.1. One-Case Output Processing

One-case processing creates contours for the selected noise metric. The selected metric determines the cases that are available in the Case1 list box. For example, if you select DNL, then all single-metric DNL cases and all multi-metric A-weighted cases are displayed in the list box.

You will probably want to create several output records for a case that was setup as a multi-metric run. Each output record should use different metrics but process the same case.

- For example, you can create four output records:

DNL metric	<i>BASECASE-AMM.DNL</i>
SEL metric	<i>BASECASE-AMM.SEL</i>
LAMAX metric	<i>BASECASE-AMM.LAMAX</i>

- TALA metric `BASECASE-AMM.TALA`
- All four records use `BASECASE-AMM`, which is an A-weighted multi-metric-run case.
- When you use the *Output Graphics* function to display these four outputs, INM accesses multi-metric data stored in `BASECASE-AMM`, computes the specified contours, and stores them in the four output subdirectories.

When you open an *Output Graphics* window for one-case output:

- INM reads noise data files in the selected case and writes the `NMPLOT.GRD` file
- INM calls the NMPLOT module to calculate contours and write the `CONTOURS.DAT` file.
- INM computes the area inside contours and writes the `POP_CONR.DBF` file. If both population points `POP_PTS.DBF` and noise at population points `POP_NOIS.DBF` exist, INM also computes the numbers of people inside contours.

You must display one-case output in *Output Graphics* windows before trying to display multi-case output. This is because the contouring module (NMPLOT) uses the one-case `NMPLOT.GRD` files for multi-case output processing.

11.1.2. Difference Output Processing

Difference processing creates contours that represent the difference between two noise surfaces (decibels or minutes).

Case 2 is subtracted from Case 1 (for example, CASE01 – CASE02).

- If a grid point in Case 1 is 62 dB and the same point in Case 2 is 60 dB, the difference is +2 dB.
- Negative values mean that the area in Case 2 is louder than in Case 1.
- Ordinarily, an alternative case is compared to a base case using a convention where delta noise is positive when the alternative is louder. For this convention, set Case 1 to the alternative and set Case 2 to the base case.

If you use single-metric runs to build difference contours, do not use contours that are outside of either valid noise area.

- The valid noise area for a single-metric run is the area that lies between the low-cutoff and high-cutoff contour levels.
- When two single-metric runs are used, the valid noise area for difference contours is the union of the two valid-noise areas.

11.1.3. Log-Add Output Processing

Log-add processing creates contours that represent the sum of noise from two or more cases. Decibels are converted to their power (or energy) representations before adding, and then they are converted back to decibels. For example, $60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB}$.

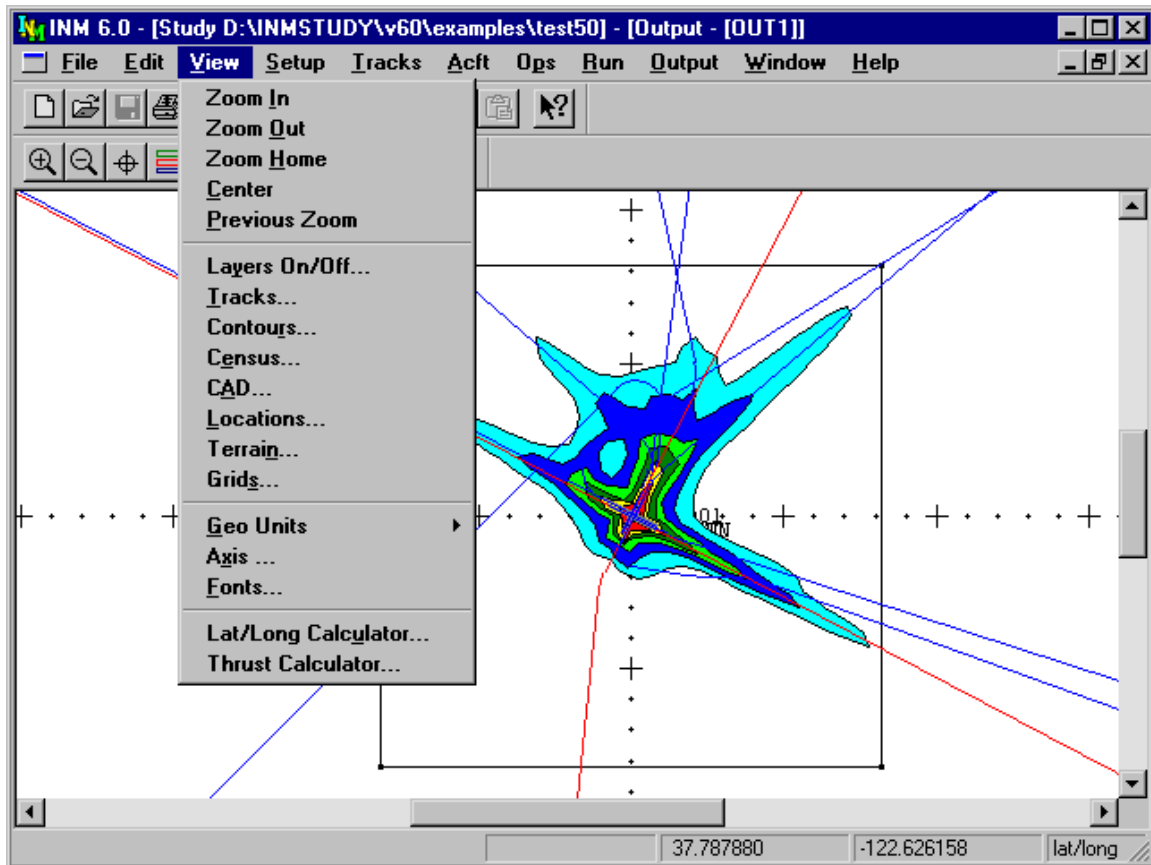
Only areas that are common to all cases are summed, so make sure that your cases use the same contouring grid definition.

You cannot use the log-add function for time-above metrics because their values should be added without logarithmic conversion.

11.1.4. Merge Output Processing

Merge processing creates contours that extend across two or more contouring rectangles.

- Cases can have different contouring rectangles.
- Only one case metric value is used at a grid point.
- When contouring rectangles overlap, the case with the higher resolution (smaller subdivided grid) determines the metric value.



11.2. Output Graphics

Menu Item: *Output // Output Graphics*

Use the *Output Graphics* function to view:

- Noise contours
- Flight tracks
- Radar tracks
- Runways
- Street maps
- Population points
- Location points
- Airport drawings
- Terrain contours.

To display graphical output from one or more cases, you must first define what you want in the *Output // Output Setup* window. Then, open an *Output Graphics* window by selecting an output identifiers in the Output Select dialog box. An *Output Graphics* window is associated with an output subdirectory.

11.2.1. Output Processing

Before displaying one-case output contours, INM checks files and dates in the case and output subdirectories. If new run-result data are present in the case subdirectory (a new *GRID* or *GRID.MN* file), or if the Repeat Contour Calculation box is checked in the *Output Setup* window, INM computes contour points, contour areas, and population inside contours (if both population points and noise at population points exist).

Before displaying multi-case contours, INM checks for current *NMPLOT.GRD* files in output subdirectories.

- One-case *GRD* files must be up-to-date and accessible before INM can compute difference contours, etc.
- INM may display a message asking you to run NMPlot again to update one-case contour data. If this happens, close the multi-case window, open the requested *Output Graphics* windows (thereby re-computing contours), and then open the multi-case window again.

11.2.2. View Functions in Common

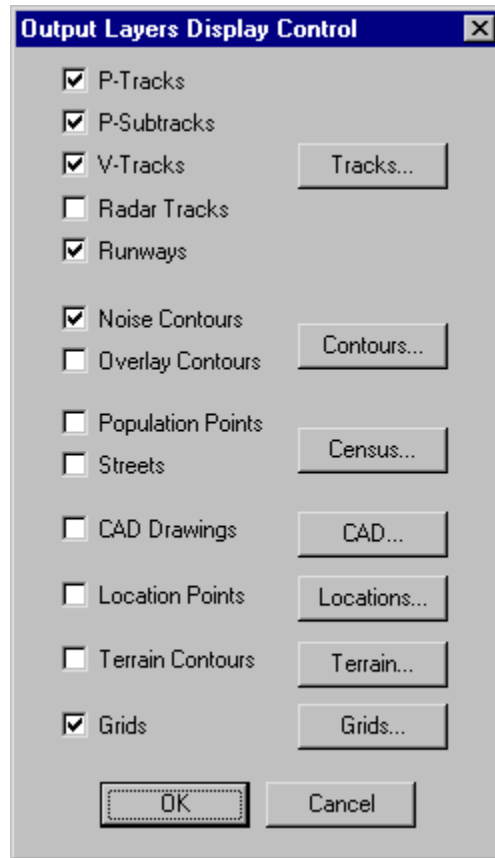
When an *Output Graphics* window is active, the *View* menu on the main menu bar changes to provide various functions that allow you to manage the appearance of graphics layers. These functions are discussed below in separate sections.

Many of the layer control functions have a Color button, which activates the Color and Pattern Selector dialog box. Please refer to *Input Graphics - View // Tracks - Color* for information about operating the color dialog box.

Many of the layer control functions have a pair of unlabeled circular buttons. When you click in the left circle, INM selects (highlights) all items in the associated list box, which is usually directly above the pair of buttons. When you click in the right circle, INM deselects all items.

The following *Output Graphics* functions operate the same as they do for *Input Graphics*:

<i>View // Zoom In</i>	<i>View // Tracks</i>	<i>View // Geo Units</i>
<i>View // Zoom Out</i>	<i>View // CAD</i>	<i>View // Axis</i>
<i>View // Zoom Home</i>	<i>View // Locations</i>	<i>View // Fonts</i>
<i>View // Center</i>		
<i>View // Previous Zoom</i>		

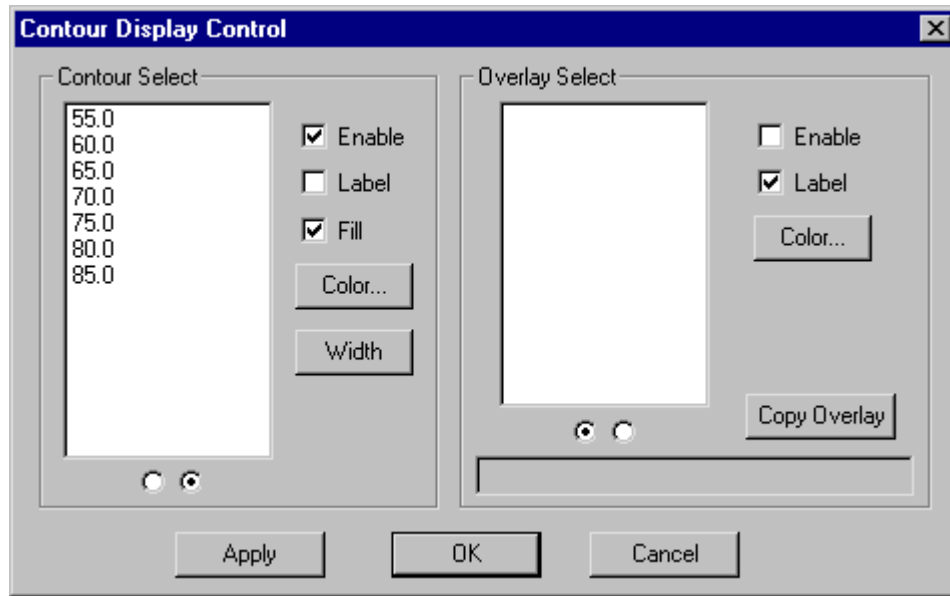


11.2.3. View // Layers On/Off

Use this function to turn on and off various output graphics layers. You can enable or disable a layer by clicking in the box next to layer name. A check mark in the box means that the layer is on.

In addition to enabling layers, you can go directly to a Display Control dialog box by selecting the button associated with a layer.

- For example, selecting the Tracks button, puts you in the same dialog box as selecting *Tracks* from the *View* menu.



11.2.4. View // Contours

Use this function to select and manage noise contours for display.

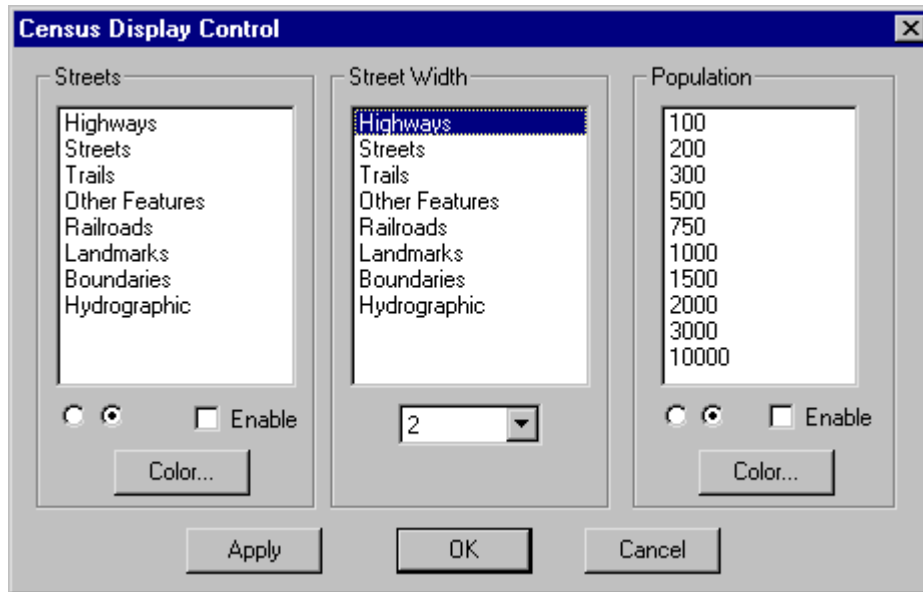
1. Select individual contours with the mouse, or select or deselect all contours with the pair of small round buttons.
2. Check the Enable box to turn on the noise contour layer.
3. Check the Label box to display the numeric values of selected contours.
4. Check the Fill box to color the area between contours. For example, the color of the 65-contour fills the area to the 70-contour.
5. Press the Color button to display a dialog box that allows you to change the color of the contours.
6. Press the Width button to display a dialog box that allows you to change the width of the contours.

Also, use this function to overlay contours from another output subdirectory for direct comparison with this output.

1. Press the Copy Overlay button to select an `_INM.BIN` contour file. It is copied into this output subdirectory and renamed `_OVERLAY.BIN`.
2. Select which overlay contours to display.
3. Enable, label, and color selected contours.

Dialog buttons:

- Apply — display changes without committing to them
- OK — apply and save changes and exit the dialog box
- Cancel — discard changes and exit the dialog box.



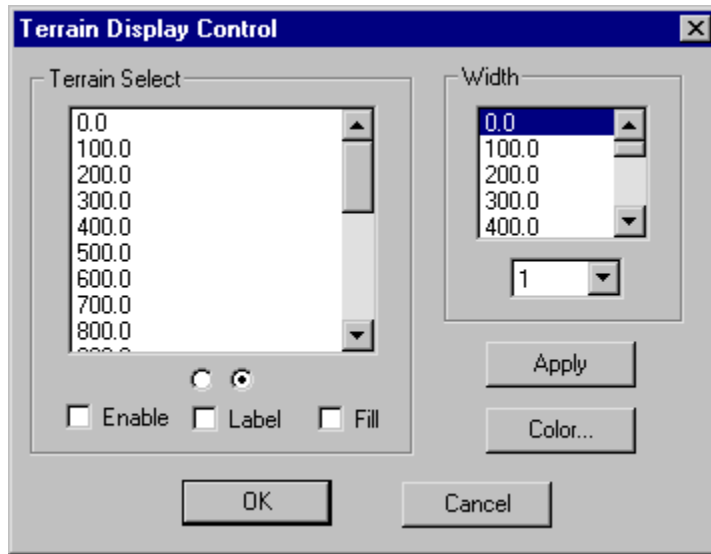
11.2.5. View // Census

Use this function to display street maps and population points.

1. You must obtain and process U.S. Census data before this function will work. Use the two *File // Import Data into INM* functions:
 - *Census TIGER Street Files*
 - *Census PL94-171 DBF Files*.
2. Select types of map objects for display.
3. Check the Enable box to turn on the map layer.
4. Press the street Color button to change their color.
5. Select a map object and change its width.
6. Select population levels and enable the population layer.
 - Population points are color coded to represent the number of people living in a census block, which is usually a city block in densely populated areas.
 - For example, population level 200 means that 100 to 200 people live in census block.
7. Press the population color button to change population point color.

Dialog buttons:

- Apply — display changes without committing to them
- OK — apply and save changes and exit the dialog box
- Cancel — discard changes and exit the dialog box.



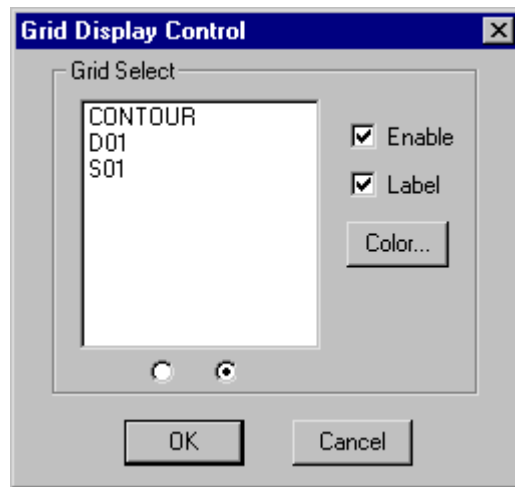
11.2.6. View // Terrain

Use this function to display terrain contours.

1. You must obtain and process terrain source data before this function will work. Use the *File // Import Data into INM // Terrain 3CD or 3TX Files* function.
2. Select terrain contours for display.
3. Check the Enable box to turn on the terrain layer.
4. Check the Label box to display terrain contour values.
5. Check the Fill box to fill the terrain contours with color.
6. Press the Color button to change the terrain contour colors.

Dialog buttons:

- Apply — display changes without committing to them
- OK — apply and save changes and exit the dialog box
- Cancel — discard changes and exit the dialog box.



11.2.7. View // Grids

Use this function to display grids of points:

1. INM copies a case *GRID.DBF* file to the output subdirectory. Data in this file is available for display.
 - The file comes from the case subdirectory that is shown in the *Output Setup Case-1* box.
 - You can put a different file in the output subdirectory using a file manager program. Close the *Output Graphics* window before doing this.
2. Select grids for display. Three kinds of grids can be displayed (contour, standard, and detailed). The grid points are shown as small squares with connecting lines.
3. Check the Enable box to turn on the grid layer.
4. Check the Label box to display the names of the grids.

Dialog buttons:

- OK — apply and save changes and exit the dialog box
- Cancel — discard changes and exit the dialog box.

LEVEL	IS	PN	X-COORD	Y-COORD	OK	LATITUDE	LONGITUDE
55.0	1	P	7.0861	6.8389	Y	37.733024	-122.225967
55.0	1	P	6.8575	6.7569	Y	37.731662	-122.230772
55.0	1	P	6.7424	6.7075	Y	37.730841	-122.233191
55.0	1	P	6.6852	6.6831	Y	37.730434	-122.234394
55.0	1	P	6.6289	6.6567	Y	37.729996	-122.235577
55.0	1	P	6.6167	6.6500	Y	37.729884	-122.235835
55.0	1	P	6.6046	6.6431	Y	37.729769	-122.236090
55.0	1	P	6.5804	6.6289	Y	37.729533	-122.236597
55.0	1	P	6.4003	6.5290	Y	37.727870	-122.240383
55.0	1	P	6.1749	6.4003	Y	37.725729	-122.245124
55.0	1	P	6.1718	6.3986	Y	37.725700	-122.245189
55.0	1	P	5.9432	6.2503	Y	37.723231	-122.249995
55.0	1	P	5.8277	6.1718	Y	37.721922	-122.252423
55.0	1	P	5.7146	6.0986	Y	37.720705	-122.254801
55.0	1	P	5.4919	5.9432	Y	37.718115	-122.259484
55.0	1	P	5.4860	5.9392	Y	37.718048	-122.259607
55.0	1	P	5.2925	5.8114	Y	37.715920	-122.263676
55.0	1	P	5.1434	5.7140	Y	37.714298	-122.266808
55.0	1	P	5.1185	5.6982	Y	37.714036	-122.267333
55.0	1	P	5.1062	5.6901	Y	37.713901	-122.267591
55.0	1	P	5.0942	5.6816	Y	37.713758	-122.267842
55.0	1	P	5.0773	5.6678	Y	37.713529	-122.268199
55.0	1	P	5.0609	5.6533	Y	37.713287	-122.268543
55.0	1	P	5.0289	5.6233	Y	37.712787	-122.269217
55.0	1	P	4.9528	5.5529	Y	37.711614	-122.270816

11.3. Contour Points

Menu Item: *Output // Contour Points*

Use this function to view the contour points table. You have to open an *Output Graphics* window first to calculate the contour points, then you can view the points.

A contour points table (*CONR_PTS.DBF*) has the following fields:

1. LEVEL — contour level (dB or minutes).
2. IS — island number (an island is a single closed curve).
3. PN — indicator whether the island is positive (P), meaning that noise inside the curve is louder than on the curve, or negative (N).
4. X-COORD, Y-COORD — coordinates of the contour point (nmi or km).
5. OK — indicator whether the point is inside the contouring grid border (Y = yes) or on the border (N = no).
6. LATITUDE, LONGITUDE — latitude and longitude of the contour point (decimal degrees).

LEVEL	OK	POPULATION	SQ.KM	SQ.MI	M.SQ.FT	ACRES
55.0	Y	116878	161.524	62.365	1738.63	39913.5
60.0	Y	21647	72.343	27.932	778.69	17876.3
65.0	Y	5130	30.189	11.656	324.95	7459.9
70.0	Y	1380	15.472	5.974	166.54	3823.2
75.0	Y	0	7.140	2.757	76.85	1764.3
80.0	Y	0	3.417	1.319	36.78	844.2
85.0	Y	0	1.583	0.611	17.04	391.2

11.4. Contour Area and Population

Menu Item: *Output // Contour Area and Pop*

Use this function to view areas and numbers of people inside contour levels. Contour areas are calculated when the *Output Graphics* window is first opened.

Population is also calculated when the *Output Graphics* window is first opened, providing that:

- There is a *POP_PTS.DBF* file in the study directory (use the *Files // Import Data into INM // Census PL94-171 DBF Files* function)
- There is a *POP_NOIS.DBF* file in the case subdirectory associated with the output (use the *Run // Run Options - Do Population* function)
- Both files have the same number of records and both files are in the same order. Do not edit in the *Setup // Population Points* window after making a population run because the *POP_PTS.DBF* records will be alphabetized and saved in a different order.

A contour area/population table (*POP_CONR.DBF*) has the following fields:

1. LEVEL — contour level (dB or minutes).
2. OK — indicator for whether all islands are inside the contouring rectangle (Y = yes), or if one or more islands are cut by the border (N = no). If OK = N, area and population data are not accurately represented.
3. POPULATION — sum of the numbers of people inside all islands of the contour level.
4. SQ.KM — area inside all islands of the contour level (square kilometers).
5. SQ.MI — area inside all islands of the contour level (square statute miles).
6. M.SQ.FT — area inside all islands of the contour level (millions of square feet).
7. ACRES — area inside all islands of the contour level (acres).

Contour area includes the area inside the airport boundary.

The screenshot shows the INM 6.0 software interface. The main window title is 'INM 6.0 - [Study D:\INMSTUDY\60\examples\test50]'. The menu bar includes File, Edit, View, Setup, Tracks, Acft, Ops, Run, Output, Window, and Help. A toolbar with various icons is visible below the menu bar. The main content area displays a window titled 'Standard Grids - [BASECASE]' containing a table with the following data:

GRID	I	J	X-COORD	Y-COORD	ELEV	LATITUDE	LONGITUDE	USER	DNL	CNEL	LAEQ	LAEQD	LAE
D01	1	1	1.8104	0.4937	11.0	37.627234	-122.336861	56.8	0.0	0.0	0.0	0.0	
S01	1	1	-0.4937	0.2469	11.0	37.623121	-122.385200	91.7	0.0	0.0	0.0	0.0	
S01	1	2	-0.4937	0.3621	11.0	37.625044	-122.385200	80.6	0.0	0.0	0.0	0.0	
S01	1	3	-0.4937	0.4773	11.0	37.626966	-122.385201	75.5	0.0	0.0	0.0	0.0	
S01	2	1	-0.3291	0.2469	11.0	37.623122	-122.381747	80.8	0.0	0.0	0.0	0.0	
S01	2	2	-0.3291	0.3621	11.0	37.625044	-122.381747	77.2	0.0	0.0	0.0	0.0	
S01	2	3	-0.3291	0.4773	11.0	37.626966	-122.381747	71.9	0.0	0.0	0.0	0.0	

At the bottom of the window, there is a status bar showing 'INM 6.0', 'record 1', '7 records', and '1 selected'.

11.5. Standard Grid Analysis

Menu Item: *Output // Standard Grids*

Use this function to view standard grid results for a case, providing that:

- The case was run in the single-metric mode
- You specified either a standard or a detailed grid analysis in the *Run // Setup Run* function before running the case.

A standard-grid table (*GRID_STD.DBF*) has the following fields:

1. GRID — grid identifier.
2. I, J — grid numbers which serve to name the point.
3. X-COORD, Y-COORD — coordinates of the grid point (nmi or km).
4. ELEV — elevation of the grid point (feet or meters MSL).
5. LATITUDE, LONGITUDE — latitude and longitude of the grid point (decimal degrees).
6. USER — computed value of the noise metric that you selected for the case (dB or minutes). This can be either a user-defined metric or a standard metric, depending on how you setup the case.

7. DNL, CNEL, LAEQ, etc. — computed values for 16 standard noise metrics (dB or minutes).

If you created noise curves using *Acft // Noise Identifiers* and *Noise Curves*, but did not define both kinds of noise families (SEL/LAMAX and EPNL/PNLTM), then the results shown for those metrics belonging to the missing noise family are not valid.

The screenshot shows the INM 6.0 software interface. The main window is titled 'Detailed Grids - [BASECASE]' and contains a table with the following columns: METRIC, GRID, I, J, ACFT, OP, PROFILE, S, RWY, TRACK, S, DISTANCE, ALT, ANG, SPEED, THRUST. The table lists 28 rows of data for various flight scenarios, including aircraft type (MD81), profile (D STANDARD), runway (e.g., 3 28L, 3 19L), track (e.g., D7, D6, D1), distance, altitude, angle, speed, and thrust.

METRIC	GRID	I	J	ACFT	OP	PROFILE	S	RWY	TRACK	S	DISTANCE	ALT	ANG	SPEED	THRUST
TALA	D01	1	1	MD81	D	STANDARD	3	28R	D7	0	7783.5	0	0.0	35.0	17902.20
TALA	D01	1	1	MD81	D	STANDARD	3	28L	D6	0	8477.9	0	0.0	35.0	17902.20
TALA	D01	1	1	MD81	D	STANDARD	3	19L	D8	0	8758.5	0	0.0	35.0	17902.20
TALA	D01	1	1	MD81	D	STANDARD	3	10R	D1	0	7737.4	1221	9.1	167.0	15687.11
TALA	D01	1	1	MD81	D	STANDARD	3	01R	D4B	0	7866.4	910	6.6	159.3	15726.30
TALA	D01	1	1	MD81	D	STANDARD	3	01R	D4A	0	7866.4	937	6.8	159.4	15731.58
TALA	D01	1	1	MD81	D	STANDARD	3	01R	D4	0	7866.4	910	6.6	159.3	15726.30
TALA	D01	1	1	MD81	D	STANDARD	3	01R	D2	0	7741.4	1082	8.0	162.3	15722.99
TALA	D01	1	1	MD81	D	STANDARD	3	01L	D5	0	8555.9	838	5.6	159.2	15711.88
TALA	D01	1	1	MD81	D	STANDARD	3	01L	D3	0	8644.9	745	4.9	159.0	15693.31
TALA	D01	1	1	MD81	D	STANDARD	2	28R	D7	0	7783.5	0	0.0	35.0	17902.20
TALA	D01	1	1	MD81	D	STANDARD	2	28L	D6	0	8477.9	0	0.0	35.0	17902.20
TALA	D01	1	1	MD81	D	STANDARD	2	19L	D8	0	8758.5	0	0.0	35.0	17902.20
TALA	D01	1	1	MD81	D	STANDARD	2	10R	D1	0	7769.9	1413	10.5	170.9	15675.07
TALA	D01	1	1	MD81	D	STANDARD	2	01R	D4B	0	7895.3	1133	8.3	157.7	15803.63
TALA	D01	1	1	MD81	D	STANDARD	2	01R	D4A	0	7893.2	1154	8.4	158.4	15797.71
TALA	D01	1	1	MD81	D	STANDARD	2	01R	D4	0	7895.3	1133	8.3	157.7	15803.63
TALA	D01	1	1	MD81	D	STANDARD	2	01R	D2	0	7774.2	1292	9.6	163.2	15759.30
TALA	D01	1	1	MD81	D	STANDARD	2	01L	D5	0	8582.7	1078	7.2	155.7	15819.19
TALA	D01	1	1	MD81	D	STANDARD	2	01L	D3	0	8671.2	1005	6.7	153.2	15839.40
TALA	D01	1	1	MD81	A	STANDARD	1	28L	A1	0	7907.6	200	1.4	136.7	4672.15
TALA	D01	1	1	MD81	A	STANDARD	1	19R	A2	0	8518.6	282	1.9	136.9	4686.33

11.6. Detailed Grid Analysis

Menu Item: *Output // Detailed Grids*

Use this function to view detailed grid results for a case, providing that:

- The case was run in the single-metric mode
- You specified a detailed grid analysis in the *Run // Run Options* window before you ran the case.

INM computes a detailed grid record for:

- Each grid point of every detailed grid defined in the *Run // Grid Setup* window
- The selected metric and all metrics checked in the *Run // Run Options* window
- Every combination of aircraft, profile, and track. If you checked the Save 100% Flights box in *Run // Run Options*, all flights are saved. If the box is unchecked, the those flights that contribute 97% of the noise are saved.

Because of all the possible combinations, a detailed grid file can become very large. You should limit the number of detailed grids, number of points per grid, and number of metrics when you setup a detailed grid run.

Unwanted double records are generated if you check the standard metric that is also your selected metric.

- For example, you run a grid analysis on DNL and you put a check mark in the DNL box. Then, you will get a set of DNL records for the user metric and an identical set of DNL records for the checked standard metric. To avoid this problem, do not put a check mark in the standard DNL box.

A detailed grid table (*GRID_DTL.DBF*) has the following fields:

1. METRIC — noise metric identifier.
2. GRID — grid identifier.
3. I, J — grid numbers that name the point. You can obtain X,Y coordinates for detailed grid points from the standard grid file.
4. ACFT — aircraft identifier.
5. OP — type of flight operation (A = approach, D = departure, T = touch-and-go, F = circuit flight, V = overflight, R = runup).
6. PROFILE — profile group identifier.
7. S — profile stage number.
8. RWY — runway end identifier.
9. TRACK — track identifier.
10. S — sub-track number.
11. DISTANCE — distance (feet or meters) from the grid point on the ground to the aircraft at closest-point-of-approach.
12. ALT — altitude above airport elevation (feet or meters) of the aircraft at closest-point-of-approach.
13. ANG — elevation angle (degrees) from the horizontal ground plane to the aircraft at closest-point-of-approach.
14. SPEED — true airspeed (knots or m/s) of the aircraft at closest-point-of-approach.
15. THRUST — thrust-setting (pounds, percent, or other) of the aircraft at closest-point-of-approach. This is corrected net thrust per engine, not total net thrust.
16. EQUIV — equivalent number of operations (weighted day, evening, and night operations) for the given flight operation.
17. ONE — metric value (dB or minutes) for a single operation of the given flight.
18. ALL — metric value (dB or minutes) for all weighted operations of the given flight).
19. PERCENT — percent of the total metric value that is caused by the flight operation. For noise levels, percent is based on energy or power ratios, not decibels.

The methods used to compute the equivalent number of operations, the metric for all operations, and the percentage value are detailed below:

For exposure-related metrics:

- $OPS_EQUIV = WGT_DAY * OPS_DAY + WGT_EVE * OPS_EVE + WGT_NIGHT * OPS_NIGHT$
- $METRIC_ALL = METRIC_ONE + 10 \log(OPS_EQUIV)$
- $PERCENT = 100 * 10^{METRIC_ALL/10} / SUM(10^{METRIC_ALL/10})$

For maximum-level metrics:

- $OPS_EQUIV = 1.0$
- $METRIC_ALL = METRIC_ONE$
- $PERCENT = 100.0$

Only one flight operation is saved, the one that is the loudest at the grid point.

For time-above metrics:

- $OPS_EQUIV = OPS_DAY + OPS_EVE + OPS_NIGHT$
- $METRIC_ALL = METRIC_ONE * OPS_EQUIV$
- $PERCENT = 100 * METRIC_ALL / SUM(METRIC_ALL)$

POPULATN-POINT	METRIC
060014283 108	54.5
060014283 109	55.0
060014283 111	54.9
060014283 123	54.3
060014283 130	54.3
060014283 156	54.3
060014283 942	54.2
060014283 928	51.1
060014283 929	51.0
060014283 930	51.3
060014283 931	51.8
060014283 932	51.7
060014283 938	52.0
060014283 939	52.6
060014283 940	51.4
060014283 941	51.8
060014283 201	52.6
060014283 202	52.8
060014283 203	52.9
060014283 204	53.0
060014283 205	52.4
060014283 206	52.2
060014283 207	52.4

11.7. Noise at Population Points

Menu Item: *Output // Noise at Pop Points*

Use this function to view the results of a population points run, providing that:

- There is a *POP_PTS.DBF* file in the study directory (use the *Files // Import Data into INM // Census PL94-171 DBF Files* function)
- You checked the Do Population Points box in the *Run // Run Options* window.

A population noise table (*POP_NOIS.DBF*) has the following fields:

1. POPULATION-POINT — population point identifier, a concatenation of:
 - State code (2 digits)
 - County code (3 digits)
 - Tract/BNA code (6 characters)
 - Block code (4 characters).
2. METRIC — noise metric value at the point (dB or minutes).

POINT	METRIC
ALAME	45.4
ALCAT	36.5
ALVAR	26.5
ANGEL	24.9
ARTIE	30.3
BARTN	44.2
BAYFA	48.4
BERKS	35.2
BEZEL	43.9
BOBJA	6.0
BOLDR	4.4
BRIJJ	60.0
BRINY	8.7
CCR	3.8
CHABO	18.4
COLLI	34.8
COMMO	25.6
CROIT	5.4
DATTS	36.0
DECOT	25.2
DOKKS	33.1
DUMBA	47.2
DYKEE	8.0

11.8. Noise at Location Points

Menu Item: *Output // Noise at Loc Points*

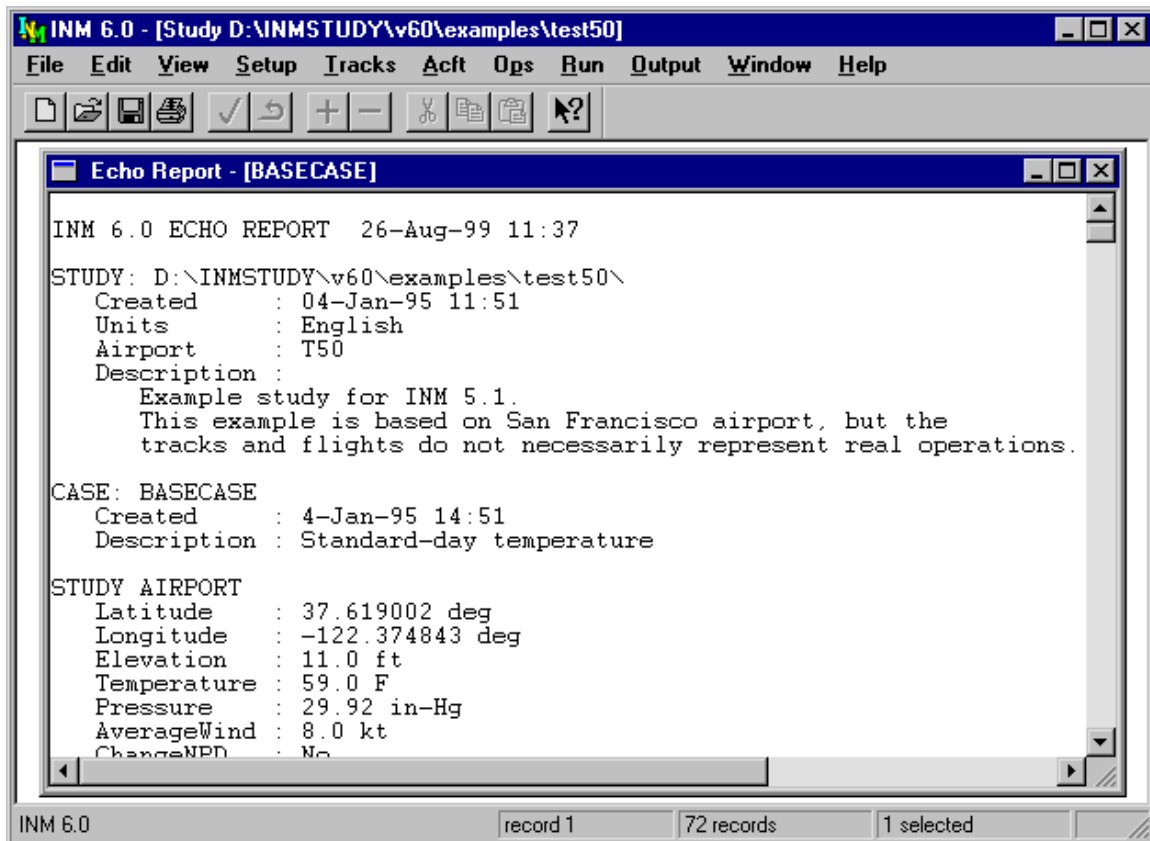
Use this function to view the results of a location points run, providing that:

- There is a *LOC_PTS.DBF* file in the study directory (use the *Setup // Location Points* function)
- You checked the Do Location Points box in the *Run // Run Options* window.

A location noise table (*LOC_NOIS.DBF*) has the following fields:

1. POINT — location point identifier.
2. METRIC — noise Metric value at the point (dB or minutes).

Rather than repeating latitude, longitude, and height data for every case, INM lists only the location point identifier and the computed metric. The location point identifier in the *LOC_PTS.DBF* file in the study directory gives you access to these other location-point data.



11.9. Case Echo Report

Menu Item: *Output // Case Echo Report*

Use this function to view the case echo report. The case echo report documents user-created study and case data.

- The data shown in the echo report window are also written to the *REPORT.TXT* file in the case subdirectory.
- The echo report contains units specified for the study (English or metric).

If you edit an INM standard data record, the change will show in the echo report. If you find an unintentional change to a standard record, delete the record, close the study, open it, and run the case. The standard record will be read in, and the change will not show in the report.



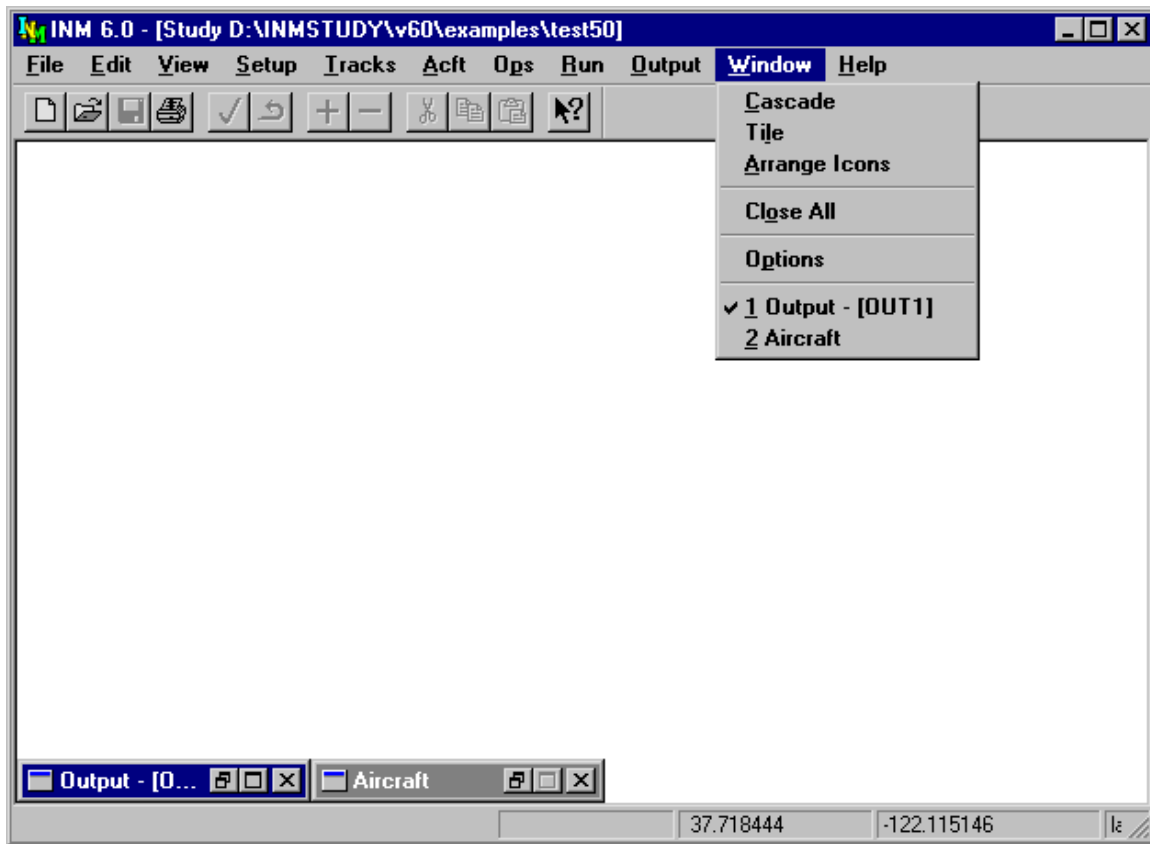
11.10. Flight Path Report

Menu Item: Output // Flight Path Report

Use this function to create a text file containing detailed data used to compute noise for a case.

- The *FLIGHT.PTH* file must exist in the case subdirectory. This binary file is created during a run.
- The *FLIGHT.TXT* file is written to the case subdirectory.

You can view the file with a text editor. It is too large to display in an INM window.



12. WINDOW MENU

The *Window* menu contains a variety of standard Microsoft windows-management functions. Also, you can set INM system options.

12.1. Cascade

Menu Item: *Window // Cascade*

Use this function to rearrange the set of visible (non-iconified) windows.

- Cascade means that the visible windows are stacked on top of each other, starting in the upper left-hand corner. Each succeeding window is placed on top of the preceding window and offset to the right and down.
- If a window is maximized (thus covering all of the other windows), this function restores the window to its previous size before cascading.

12.2. Tile

Menu Item: *Window // Tile*

Use this function to rearrange the visible windows.

- Tile means that the windows are arranged side-by-side without overlapping.
- The Tile function does not work very well when there are DBF windows open. The reason is that the DBF windows are fixed in size and therefore they cannot be resized to fit side-by-side.
- The Tile function is more useful for arranging graphics windows and output windows.

12.3. Arrange Icons

Menu Item: *Window // Arrange Icons*

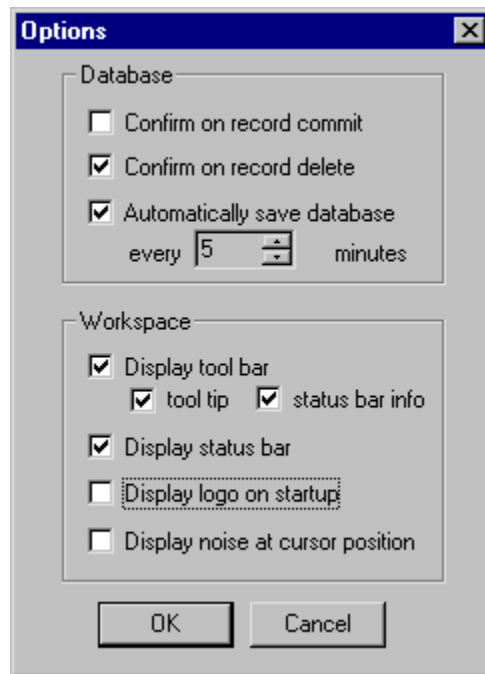
Use this function to line up icons across the bottom of the main window.

- Sometimes this function is useful for finding an icon that is hidden under a window.

12.4. Close All Windows

Menu Item: *Window // Close All*

This function is used to close all open windows, including minimized (iconified) windows.



12.5. INM Options

Menu Item: Window // Options

Use this function to turn on or turn off various INM system options. Put a check mark in a box to turn on an option.

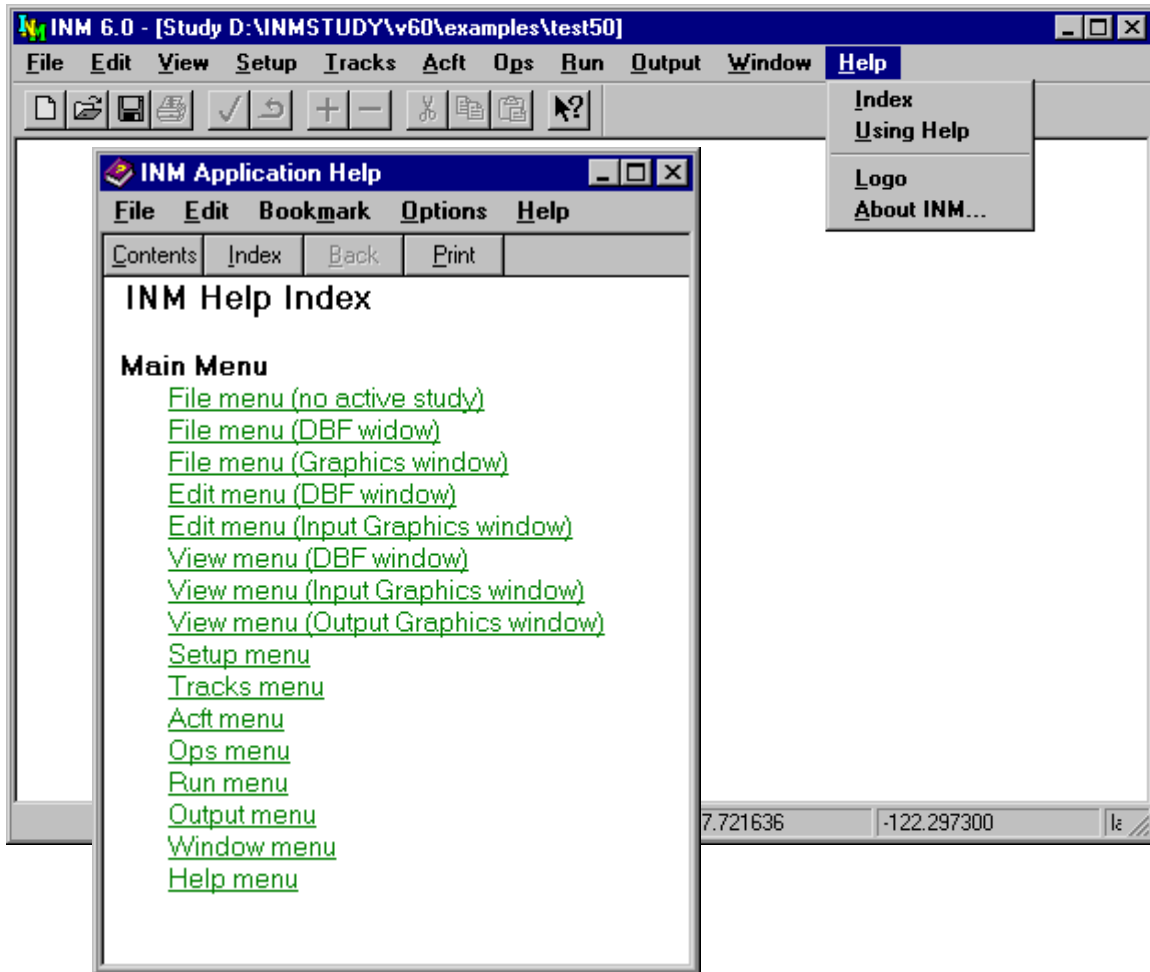
1. Confirm on record commit — INM displays a message box asking to continue committing the record.
2. Confirm on record delete — INM displays a message box asking to continue deleting the record or group of records.
3. Automatically save database — INM saves data every few minutes so that changes made while working in INM are not lost in case of a power failure. You can set the time between saves.
4. Display toolbar — INM displays icon buttons on a toolbar under the main window title. The toolbars on *Input Graphics* and *Output Graphics* windows are displayed all the time.
 - Tool tip — a help box appears when you leave the mouse cursor on the icon for a second.
 - Status bar info — a short help phrase appears on left part of the status bar when you put the mouse cursor on menu items.
5. Display status bar — INM displays a bar of information at the bottom of the main window. Status items are:
 - A short help phrase
 - DBF file that is currently being read from disk
 - Origin of the current record (standard or user-generated data)

- Number of records in a table
 - Noise metric value at the mouse cursor position
 - X,Y or lat/long at the mouse cursor position.
6. Display logo on startup — shows the world bitmap after first starting INM. The logo disappears after a few seconds.
 7. Display noise at cursor position — INM displays on the status bar the noise metric value at the mouse cursor position.
 - INM reads the output *NMPLOT.GRD* file when an *Output Graphics* window is activated.
 - INM displays the hourglass wait cursor while the file is being read and processed.
 - You may want to turn off this option if your *GRD* files are large and the wait time is too long.

12.6. Window List

The window list shows all open windows, including those that are minimized.

- Activate a window in the list by clicking on the name of the window.
- When there are too many windows to fit on the list, Windows provides a scroll box filled with window titles.



13. HELP MENU

The *Help* menu contains functions that provide information about the INM system.

13.1. Index

Menu Item: *Help // Index*

Use this function to run the Microsoft Help program and INM help file. You can also run the Help system by double clicking on the *INM.HLP* file name in the INM system directory.

Accessing this function puts you into the Index window of the Help system. You can learn how to use the Help system by accessing the *Help // Using Help* function.

Toolbar question-mark button — allows you to jump directly to a Help section of interest.

1. Click on the button and get the question-mark cursor to follow the mouse.
2. Click on a menu item of interest. You will go directly to the menu item help text.

Another way to jump directly to a Help section is to select (highlight) a menu item and then press the F1 key.

13.2. Using Help

Menu Item: *Help // Using Help*

Use this function to run the standard Microsoft module for learning how to use the Microsoft Help program. This function is not part of the INM system, other than being on the menu.

13.3. INM Logo

Menu Item: *Help // Logo*

Use this function to turn on the INM start-up logo. Click on the logo or press the Enter key to turn it off.

13.4. About INM

Menu Item: *Help // About INM*

Use this function to see sponsoring agency name, program name, version number, and program author credits.

APPENDICES

A. SOURCES AND CONTACTS

A.1. Federal Aviation Administration

The INM program is managed in the Office of Environment and Energy (AEE), Noise Division (AEE-100) at the following address:

Federal Aviation Administration
Office of Environment and Energy, AEE-100
Noise Division, Room 900W
800 Independence Ave. SW
Washington, DC 20591
FAX (202) 267-5594
WEB <http://www.aee.faa.gov/aee-100/inm>

You may also contact the AEE Noise Division at (202) 267-8933 for questions concerning INM.

The use of non-standard INM input for Part 150 studies and FAA Order 1050 environmental assessments (EA) and environmental impact statements (EIS) requires prior written approval by the FAA. Please contact the AEE Noise Division.

A.2. Technical Assistance

- Mr. Jeffrey R. Olmstead
ATAC Corporation
757 N. Mary Ave.
Sunnyvale, CA 94086-2909
PHN (408) 736-2822
FAX (408) 736-8447
Email jeffolmstead@atac.com
System integration,
Source data processing,
Flight profiles, Flight paths,
User interface, User's Guide,
Technical Manual,
INM orders
- Mr. Gregg G. Fleming
U.S. Department of Transportation
Research and Special Programs Administration
John A. Volpe National Transportation Systems Center
Acoustics Facility DTS-75
Kendall Square
Cambridge, MA 02142-1093
PHN (617) 494-2876
FAX (617) 494-2497
Email fleming@volpe2.dot.gov
Noise model,
Technical Manual

- FAA/AEE staff
Noise Division (AEE-100)
PHN (202) 267-8933

A.3. U.S. Terrain Elevation Data

You can purchase U.S. terrain elevation data from Micropath Corporation. Formatted USGS 3-arc-second elevation data are distributed on seven CD-ROMs. The price of a CD-ROM is \$500. The entire set is \$1250. Each CD-ROM contains data for several U.S. states, as follows:

CD#1	CT DE DC IN MA MD ME MI NH NJ NY OH PA RI VA VT WV
CD#2	AL AR FL GA LA MS NC PR TN SC VI
CD#3	IA IL MN MO ND SD WI
CD#4	KS NE NM OK TX
CD#5	AZ CO MT UT WY
CD#6	CA HI ID NV OR WA
CD#7	AK

Contact:

Mr. Marc Miller
Micropath Corporation
2023 Montane Drive East
Golden, CO 80401-8099
PHN (303) 526-5454
FAX (303) 233-4026
Email micrinfo@micropath.com
WEB <http://www.micropath.com>

A.4. U.S. Census Data

Population data for the U.S. are distributed on 10 CD-ROMs, each one containing data for several states. Order "Public Law 94-171 file for the United States, and Public Law Data for Puerto Rico". The price of each CD-ROM is \$100, or \$550 for a complete set of 10 discs.

Street map data for the U.S. are distributed on 7 CD-ROMs, each containing data for a several states. The price of each CD-ROM is \$70, or the complete set of seven is \$490.

1. CD-TGR98-01: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Puerto Rico, Rhode Island, Vermont, Virgin Islands, West Virginia
2. CD-TGR98-02: Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina
3. CD-TGR98-03: Illinois, Indiana, Kentucky, Michigan, Ohio, Tennessee, Wisconsin
4. CD-TGR98-04: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota

5. CD-TGR98-05: Arkansas, Louisiana, Oklahoma, Texas
6. CD-TGR98-06: Arizona, Colorado, Idaho, Montana, New Mexico, Utah, Wyoming
7. CD-TGR98-07: Alaska, American Samoa, California, Guam, Hawaii, Northern Mariana Islands, Nevada, Oregon, Midway, Washington
8. CD-TGR98-ALL-KIT: All States (7 CD-ROMs)

Contact:

U.S. Department of Commerce
Bureau of the Census
Customer Service
P.O. Box 277943
Atlanta GA, 30384-7943
PHN (301) 457-4100
FAX (888) 249-7295 (toll-free) or (310) 457-3842
Email webmaster@census.gov
WEB <http://www.census.gov/mp/www/rom/msrom.html>

A.5. SAE Reports

Three SAE reports are the basis for the INM 6.0 noise model:

- "Procedure for the Calculation of Airplane Noise in the Vicinity of Airports", SAE-AIR-1845, prepared by SAE Committee A-21, March 1986. The price is \$59.
- "Prediction Method for Lateral Attenuation of Airplane Noise During Takeoff and Landing", SAE-AIR-1751, March 1981, reaffirmed March 1991. The price is \$59.
- "Standard Values of Atmospheric Absorption as a Function of Temperature and Humidity", SAE-ARP-866A, August 1964, revised March 1975. The price is \$59.

Contact:

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A.6. NMPlot Software

INM uses the NMPlot contouring engine to produce terrain and noise contours. The contouring engine is part of the NMPlot computer program.

- NMPlot 4.3 is a 32-bit Microsoft Windows application designed to manipulate georeferenced scalar data sets. NMPlot can produce contour and color gradient plots, apply mathematical transformations to the data, combine two or more data sets, and interface with GIS systems.

- INM *NMPlot.GRD* files are in NMPlot format. Using NMPlot, you can read a *GRD* file and see the underlying array of subdivided grid points that are used to construct the contours.

NMPlot software is available as acknowledgement-ware — it may be freely downloaded, used, and distributed, provided that Wasmer Consulting is acknowledged as the author.

Contact:

Dr. Fred Wasmer

Wasmer Consulting

Email wasmer@wasmerconsulting.com

WEB <http://www.wasmerconsulting.com>

B. FAA PROFILE REVIEW CHECKLIST

The Office of Environment and Energy (AEE) requires prior written approval for all user changes to the Integrated Noise Model (INM) standard profiles for **FAR Part 150** studies. A similar requirement under National Environmental Policy Act (NEPA) will take effect with pending **FAA Order 1050.1E**.

The ability for users to modify standard INM aircraft profiles to more uniquely model an airline's noise abatement profiles or other air traffic procedures influencing noise exposure has been expanded in Version 5 of the INM. User-specified modifications to standard INM profiles affect both the estimated thrust of the engine and the distance from source to receiver, critical parameters in the final computation of noise for contours and grid point analysis.

This checklist is intended to streamline and expedite the approval process. It should save substantial time for all parties and provide assurance that user-specified profiles conform to actual aircraft performance and INM procedures.

Complete information for items listed below is necessary for AEE to initiate its review. Please submit your checklist package to: Analysis and Evaluation Branch (AEE-120), Federal Aviation Administration, Rm. 900W, 800 Independence Ave., SW, Washington, DC 20591.

Section 1 Background

Briefly describe the project for which user-specified INM profiles are required. State if the project is for a Part 150 study, an Environmental Assessment (EA), an Environmental Impact Statement (EIS), or other type of analysis. List the sponsoring agency of the study.

Section 2 Statement of Benefit

State why the new profiles are needed for this project and describe how the new profiles more accurately model the aircraft performance in terms of altitude, speed, and thrust.

Section 3 Analysis Demonstrating Benefit

For departure tracks, provide SEL values for a series of grid points spaced 0.5 nautical miles apart underneath the flight track, beginning at the start of takeoff roll and ending at the end of the profile, or at 10 nautical miles from the start of takeoff roll (whichever is shorter). For arrival tracks, place the grid points 0.5 nautical miles apart underneath the flight track, beginning at the start of the profile, or at 10 nautical miles away from the runway threshold (whichever is shorter), and ending at the last point of the landing roll-out on the runway. Also include grid points for any noise sensitive areas. Interpret the results of the

analysis and explain how the results correlate with the “Statement of Benefit” in Section 2. For each profile, provide a table with the following information.

INM Aircraft Model _____ Profile Weight _____

Grid Points (nmi)	INM Standard Profile (SEL dB)	User Defined Profile (SEL dB)	Difference (dB)
0.5			
1.0			
1.5			
2.0			
...			
10.0			
Noise Sensitive Areas (nmi)			
x1, y1			
x2, y2			
...			
xn, yn			

Submit a diskette containing the INM files needed to perform the above analysis. These files include all input DBF files contained in the study and case directories.

Section 4 Concurrence on Aircraft Performance

In this section, verification is needed from an airline operator or aircraft manufacturer familiar with the performance characteristics of the aircraft. This verification could be either:

1. A description of the performance characteristics of the aircraft, such as a profile description copied from a flight manual. Define all abbreviations and terms used on the copied material. Or,
2. A statement by the operator or manufacturer certifying that the proposed profile falls within reasonable bounds of the aircraft's performance for the modeled airport location.

Section 5 Certification of New Parameters

State that the aircraft performance characteristics submitted by the operator or manufacturer (Section 4) have been correctly translated into the INM formatted profile or procedure. Specifically, certify that:

If the new profiles are in terms of profile points:

1. Altitude is above field elevation in feet.
2. Speed is true airspeed in knots.
3. State the units of thrust-setting (for example, pounds). State that the units match the units of the thrust-setting parameter used in the aircraft's associated noise-power-distance curves.

If the new profiles are defined in terms of procedure steps:

1. If new aircraft performance coefficient data were developed, they were developed in full accordance with the procedures specified in SAE-AIR-1845 (information about obtaining SAE-AIR-1845 is in the INM User's Guide, Appendix A).
2. The procedure step data conform to the rules given in the INM User's Guide.
3. If percent units are used for thrust-setting, give the value of the aircraft's static thrust parameter used in the denominator when calculating percents. State that this value is in units of pounds.

Section 6 Graphical and Tabular Comparison

Provide three graphics for each proposed change in profile:

1. Altitude vs. Distance
2. Speed vs. Distance
3. Thrust vs. Distance

Plot the standard profile and the proposed profile on the same graph. Also, submit tables of numbers used to plot the graphs.

C. NPD DATA DEVELOPMENT CRITERIA

The noise-power-distance (NPD) data currently in INM were developed according to a rigid set of field measurement and data reduction criteria. In the most general terms, these criteria include the following:

1. Soft ground under the measurement microphone, similar to the terrain around the microphone during aircraft certification tests.
2. For L_{AE} and L_{EPN} values, an integrated calculation procedure (involving time integration over the full spectrum time history) for airplanes where adequate field data are available.
3. Atmospheric absorption coefficients as specified by SAE, rather than standard-day conditions of 59 degrees Fahrenheit and 70 percent relative humidity, which was used prior to INM Version 3.9.
4. L_{AE} and L_{EPN} values time-integrated over the upper 10 dB of the noise event as prescribed by FAA and SAE. (The time interval from t_1 to t_2 designates the time in seconds, from the beginning to the end of the integration period for the sound produced by an airplane. The duration (t_2-t_1) should be long enough to include all significant contributions to the total sound exposure. Sufficient accuracy is usually achieved by integration over the time interval during which the frequency-weighted sound level is within 10 dB of its maximum value.)
5. L_{AE} and L_{EPN} values normalized to a reference ground speed of 160 knots.
6. Maximum sound levels and exposure-based sound levels specified as a function power per engine.
7. The FAA's position is to adhere closely to the above criteria, both for the development and the validation of the INM NPD data. Diligent compliance is needed to ensure confidence in having consistent and comparable aircraft NPD and performance data.

D. INM DIRECTORIES

INM60 INM system directory

inm.exe	INM main program
inm.hlp	help file
inm.ini	initialization file (text)
*.dll	dynamic link libraries

SYS_DATA INM standard data subdirectory

acdb60.bin	compressed file of dbf files (binary)
spectra.bin	average noise spectra data (binary)
aircraft.dbf	aircraft data
acft_sub.dbf	aircraft substitutions
nois_grp.dbf	noise groups
npd_curv.dbf	noise-power-distance curves
profile.dbf	profile definition & weight data
prof_pts.dbf	profile points data for acft w/o procedures
procedur.dbf	profile procedure steps
flaps.dbf	approach & departure flap coefficients
thr_jet.dbf	jet thrust coefficients
thr_prop.dbf	propeller power coefficients
thr_gnrl.dbf	general jet thrust coefficients
metric.dbf	default noise metric parameters

SYS_DBF System dbf-template subdirectory

*.dbf	dbf file headers
-------	------------------

USR_DATA User data subdirectory

sys_aprt.dbf	NFDC airport data
sys_rwy.dbf	NFDC runway data
loc_pts.dbf	NFDC nav aids and fixes

COMPUTE Noise computation subdirectory

PROCESS\CENSUS Census CD conversion subdirectory

census.exe	program to extract census data
census.cfg	population configuration file (text)
tiger.cfg	tiger configuration file (text)
fipstate.dat	list of state codes (text)
fipscode.dat	list of county codes (text)

PROCESS\DXF DXF file conversion subdirectory

cadcvrt.exe	program to convert dxf to cad format
cadcvrt.cfg	configuration file (text)

PROCESS\TEXT Example text files

gcnp.txt	example polyline lat/long file
ambient.txt	example ambient noise file

TEST50 Study directory (user-assigned name)
(user input data)
study.inm study configuration info (binary)
case.dbf case setup & run options
output.dbf output setup definitions
runway.dbf runways for all cases
rwy_end.dbf runway end data for defined runways
track.dbf tracks for all cases
trk_segs.dbf track segment data for each track
*.dbf changes & additions to standard data
(source data)
*.3cd terrain elevation data (binary)
pop_pts.dbf population-point data
loc_pts.dbf location-point data
(source graphics data)
_fp.bin radar-track file 1 of 2 (binary)
_tk.bin radar-track file 2 of 2 (binary)
_tiger.bin street-map file 1 of 2 (binary)
_tiger.idx street-map file 2 of 2 (binary)
_cp.bin population-point data (binary)
_terrain.bin terrain contours (binary)
*.cad drawing of airport (binary)
track.opt recent input graphics display settings (binary)
lut.dat recent look-up table of display settings (binary)
(other)
inmerror.txt temporary error file
version.txt info on conversion from 5.x to 6.0 (text)

CASE1 Case subdirectory (user-assigned name)
(user input data)
grp_pct.dbf aircraft group percentages
ops_aprt.dbf airport operations
ops_flt.dbf flight operations
ops_rnup.dbf run-up operations
grid.dbf grid definitions
(input calculated)
ops_calc.dbf calculated flight operations
ops_err.txt ops calc error file (text)
flight.pth flight paths (binary)
flt_err.txt flight path error file (text)
_rwy_trk.bin runway/track graphics data (binary)
(output intermediate)
grid single-metric noise file 1 (binary)
contour single-metric noise file 2 (binary)
(or)
grid.mn multi-metric noise file 1 (binary)
grid.mx multi-metric noise file 2 (binary)
grid.ta multi-metric noise file 3 (binary)
contour.mn multi-metric noise file 4 (binary)
contour.mx multi-metric noise file 5 (binary)
contour.ta multi-metric noise file 6 (binary)
status.dat comp50 status file (text)
(output tables)
grid_std.dbf standard analysis of grids
grid_dtl.dbf detailed analysis of grids
pop_nois.dbf noise at population points
loc_nois.dbf noise at location points
report.txt case echo report (text)
flight.txt flight path data (text)

CASE1.OUT Output subdirectory (user-assigned name)
 (output intermediate)
 nmplot.grd nmplot input file (NMBG binary)
 contours.dat nmplot output file (binary)
 (output tables)
 conr_pts.dbf noise contour points
 pop_conr.dbf area and population inside contours
 (output graphics)
 _inm.bin contour graphics data (binary)
 _rwy_trk.bin runway/track graphics data (binary)
 _overlay.bin overlay contour graphics data (_inm.bin)
 grid.dbf copy of grid data for graphics presentation
 output.opt recent output graphics display settings (binary)
 *.dxf contour/runway/track graphics (dxf)

CASE2 Another case subdirectory

CASE2.OUT Another output subdirectory

E. DBF FILE FORMATS

This Appendix documents INM 6.0 *DBF* file formats in terms of:

- Name of the *DBF* file
- Names of the fields
- Type of field
- Size of field
- Description of field, including minimum and maximum values.

Two types of fields are used: C = character, and N = number.

The size of the field and the size of the decimal portion of a number field are indicated by integers following C and N. For example,

- "C 20" is a 20-byte string
- "N 8 3" is an 8-byte number (including the minus sign, decimal point, and all digits), and there are 3 digits after the decimal point (for example, "-234.678").

When an N-type field has "0" digits after the decimal point, the decimal point is not stored (for example, "N 3 0" designates a 3-byte integer, such as "123").

When a number is given in exponential notation, a C-type field is used instead of a N-type field.

An asterisk (*) next to a field name means that the field is part of the record key. If there are two or more key fields, they are concatenated to make a unique identifier for a record.

AIRCRAFT.DBF

```

Aircraft Table
* 1 ACFT_ID      C 6
    INM Aircraft identifier
  2 ACFT_DESCR  C 40
    Aircraft type and engine type names
  3 GROUP_ID    C 3
    Aircraft group identifier (default: COM, GA, MIL)
  4 WGT_CAT     C 1
    Weight class (S = Small, L = Large, H = Heavy)
  5 OWNER_CAT   C 1
    Owner category (C = Commercial, G = GenAviation, M = Military)
  6 ENG_TYPE    C 1
    Engine type (J = Jet, T = Turboprop, P = Piston)
  7 NOISE_CAT   C 1
    Noise stage number (0=none, 1, 2, 3)
  8 NOISE_ID    C 6
    Noise identifier
  9 NUMB_ENG    N 1.0
    Number of engines
    Min= 1  Max= 8
 10 THR_RESTOR  C 1
    Aircraft has Automated Thrust Restoration System (Y = Yes, N = No)
 11 MX_GW_TKO  N 6.0
    Maximum gross takeoff weight (lb)
    Min= 0  Max= 999999
 12 MX_GW_LND  N 6.0

```

Maximum gross landing weight (lb)
Min= 0 Max= 999999
13 MX_DS_STOP N 5.0
FAR landing field length at maximum landing weight (ft)
Min= 0 Max= 20000
14 COEFF_TYPE C 1
Type of departure thrust coefficients (J = Jet, P = Prop)
15 THR_STATIC N 6.0
Static rated thrust or 100% thrust (lb)
Min= 0 Max= 200000

ACFT_SUB.DBF

Aircraft Substitution Table
* 1 SUB_ID C 6
Substitution identifier
2 SUB_DESCR C 40
Description of the substitution aircraft type
3 ACFT_ID1 C 6
First INM aircraft identifier
4 PERCENT1 N 5.1
Percent of SUB_ID that is assigned to ACFT_ID1
Min= 0.0 Max= 100.0
5 ACFT_ID2 C 6
Second INM aircraft identifier
6 PERCENT2 N 5.1
Percent of SUB_ID that is assigned to ACFT_ID2
Min= 0.0 Max= 100.0
7 ACFT_ID3 C 6
Third INM aircraft identifier
8 PERCENT3 N 5.1
Percent of SUB_ID that is assigned to ACFT_ID3
Min= 0.0 Max= 100.0
9 ACFT_ID4 C 6
Fourth INM aircraft identifier
10 PERCENT4 N 5.1
Percent of SUB_ID that is assigned to ACFT_ID4
Min= 0.0 Max= 100.0
11 ACFT_ID5 C 6
Fifth INM aircraft identifier
12 PERCENT5 N 5.1
Percent of SUB_ID that is assigned to ACFT_ID5
Min= 0.0 Max= 100.0

NOIS_GRP.DBF

Noise Identification Table
* 1 NOISE_ID C 6
Noise identifier
2 THRSET_TYP C 1
Type of thrust setting (L = Pounds, P = Percent, X = Other)
3 MODEL_TYPE C 1
Type of distance-duration model (I = INM, N = NoiseMap)
4 SPECT_APP N 3.0
Spectral class number for approach
Min= 0 Max= 999
5 SPECT_DEP N 3.0
Spectral class number for departure
Min= 0 Max= 999
6 SPECT_AFB N 3.0
Spectral class number for afterburner
Min= 0 Max= 999

NPD_CURV.DBF

Noise-Power-Distance Curve Table
* 1 NOISE_ID C 6

```

    Noise identifier
* 2 NOISE_TYPE C 1
    Type of noise (S = SEL, M = LAMAX, E = EPNL, P = PNLTM)
* 3 OP_MODE C 1
    Operational mode (A = Approach, D = Depart, X = AfterBurner)
* 4 THR_SET N 8.2
    Corrected net thrust per engine (lb, %, other)
    Min= 0.10 Max= 99999.00
 5 L_200 N 5.1
    Level for 200 feet (dB)
    Min= -50.0 Max= 999.9
 6 L_400 N 5.1
    Level for 400 feet (dB)
    Min= -50.0 Max= 999.9
 7 L_630 N 5.1
    Level for 630 feet (dB)
    Min= -50.0 Max= 999.9
 8 L_1000 N 5.1
    Level for 1000 feet (dB)
    Min= -50.0 Max= 999.9
 9 L_2000 N 5.1
    Level for 2000 feet (dB)
    Min= -50.0 Max= 999.9
10 L_4000 N 5.1
    Level for 4000 feet (dB)
    Min= -50.0 Max= 999.9
11 L_6300 N 5.1
    Level for 6000 feet (dB)
    Min= -50.0 Max= 999.9
12 L_10000 N 5.1
    Level for 10,000 feet (dB)
    Min= -50.0 Max= 999.9
13 L_16000 N 5.1
    Level for 16,000 feet (dB)
    Min= -50.0 Max= 999.9
14 L_25000 N 5.1
    Level for 25,000 feet (dB)
    Min= -50.0 Max= 999.9

```

PROFILE.DBF

```

    Profile Identification Table
* 1 ACFT_ID C 6
    Aircraft identifier
* 2 OP_TYPE C 1
    A = Approach, D = Depart, T = Touch&Go, F = CircuitFlt, V = OverFlt
* 3 PROF_ID1 C 8
    Profile group identifier (STANDARD = INM standard data)
* 4 PROF_ID2 C 1
    Profile stage number (1..9)
 5 WEIGHT N 6.0
    Aircraft weight during this operation (lb)
    Min= 0 Max= 999999

```

PROF_PTS.DBF

```

    Profile Points Table -- fixed-point profiles
* 1 ACFT_ID C 6
    Aircraft identifier
* 2 OP_TYPE C 1
    Type of operation (A, D, T, F, V)
* 3 PROF_ID1 C 8
    Profile group identifier (STANDARD = INM standard data)
* 4 PROF_ID2 C 1
    Profile stage number (1..9)
* 5 PT_NUM N 3.0

```

Point number of the profile
Min= 1 Max= 999
6 DISTANCE N 10.1
Distance along the ground relative to start (ft)
Min= -9999999.9 Max= 9999999.9
7 ALTITUDE N 7.1
Altitude of aircraft AFE (ft)
Min= -9999.0 Max= 60000.0
8 SPEED N 5.1
Ground speed at this point (knots)
Min= 0.0 Max= 600.0
9 THR_SET N 8.2
Corrected net thrust per engine at this point (lb, %, other)
Min= 0.10 Max= 99999.00
10 OP_MODE C 1
Operational mode (A, D, X)

PROCEDUR.DBF

Procedure Steps Table -- procedural profiles
* 1 ACFT_ID C 6
Aircraft identifier
* 2 OP_TYPE C 1
Type of operation (A, D, T, F, V)
* 3 PROF_ID1 C 8
Profile group identifier (STANDARD = INM standard data)
* 4 PROF_ID2 C 1
Profile stage number (1..9)
* 5 STEP_NUM N 2.0
Step number of the procedure
Min= 1 Max= 99
6 STEP_TYPE C 1
Type of step (T, C, A, M, V, S, D, L, B) see User's Guide
7 FLAP_ID C 6
Flap-setting identifier
8 THR_TYPE C 1
Type of thrust (T = MaxTakeoff, C = MaxClimb, N = MaxContinuous)
9 PARAM1 N 7.1
Parameter for this step type (see User's Guide)
Min= -9999.0 Max= 60000.0
10 PARAM2 N 5.1
Parameter for this step type (see User's Guide)
Min= 0.0 Max= 600.0
11 PARAM3 N 9.1
Parameter for this step type (see User's Guide)
Min= 0.0 Max= 9999999.9

FLAPS.DBF

Flaps Table -- aerodynamic coefficients
* 1 ACFT_ID C 6
Aircraft identifier
2 OP_TYPE C 1
Type of operation (A, D, T, F, V)
* 3 FLAP_ID C 6
Flap-setting identifier
4 COEFF_R N 8.6
Drag-over-lift ratio
Min= 0.000000 Max= 1.340000
5 COEFF_C_D N 8.6
Takeoff and landing calibrated airspeed coefficient (knt/lb^{1/2})
Min= 0.000000 Max= 1.340000
6 COEFF_B N 8.6
Takeoff distance coefficient (ft/lb)
Min= 0.000000 Max= 1.340000

THR_JET.DBF

```

Jet Thrust Table -- engine coefficients
* 1 ACFT_ID      C 6
   Aircraft identifier
* 2 THR_TYPE     C 1
   T = MaxTkoff, S = HiTempTkoff, C = MaxClimb, B = HiTempClim,
   N = MaxCont, M = HiTempCont
3 COEFF_E       N 8.1
   Corrected net thrust per engine coefficient (lb)
   Min= 0.0 Max= 99999.9
4 COEFF_F       N 10.5
   Speed adjustment coefficient (lb/knot TAS sea level 59F)
   Min= -200.00000 Max= 1.00000
5 COEFF_GA      C 12
   Altitude adjustment coefficient (lb/ft MSL)
6 COEFF_GB      C 12
   Altitude-squared adjustment coefficient (lb/ft^2 MSL)
7 COEFF_H       C 10
   Temperature adjustment coefficient (lb/degC)

```

THR_GNRL.DBF

```

General Thrust Table -- convert EPR or N1 to pounds thrust
* 1 ACFT_ID      C 6
   Aircraft identifier
2 GNRL_TYPE     C 1
   Type of generalized thrust-setting (E = EPR, N = N1)
3 COEFF_E       N 9.1
   Corrected net thrust per engine coefficient (lb)
   Min= -199999.9 Max= 99999.9
4 COEFF_F       N 10.5
   Speed adjustment coefficient (lb/knot TAS sea level 59F)
   Min= -200.00000 Max= 1.00000
5 COEFF_GA      C 12
   Altitude adjustment coefficient (lb/ft MSL)
6 COEFF_GB      C 12
   Altitude-squared adjustment coefficient (lb/ft^2 MSL)
7 COEFF_H       C 10
   Temperature adjustment coefficient (lb/degC)
8 COEFF_K1      C 12
   EPR or N1/sqrt(theta) adjustment coefficient (lb/EPR)
9 COEFF_K2      C 12
   EPR- or N1/sqrt(theta)-squared adjustment coefficient (lb/EPR^2)

```

THR_PROP.DBF

```

Propeller Thrust Table -- engine coefficients
* 1 ACFT_ID      C 6
   Aircraft identifier
* 2 THR_TYPE     C 1
   Type of thrust (T = MaxTakeoff, C = MaxClimb)
3 EFFICIENCY    N 4.2
   Propeller efficiency ratio
   Min= 0.50 Max= 1.00
4 POWER         N 6.1
   Net propulsive power per engine (hp) for this type of thrust
   Min= 0.0 Max= 9999.9

```

RUNWAY.DBF

```

Runway Identifier Table
* 1 RWY_ID1     C 3
   Runway end identifier
* 2 RWY_ID2     C 3
   Runway end identifier
3 APRT_ID      C 4

```

Airport identifier
4 WIDTH N 3.0
Physical runway width (ft)
Min= 0 Max= 500

RWY_END.DBF

Runway End Table
* 1 RWY_ID C 3
Runway end identifier
2 X_COORD N 9.4
X coordinate of end (nmi)
Min= -999.0000 Max= 999.0000
3 Y_COORD N 9.4
Y coordinate of end (nmi)
Min= -999.0000 Max= 999.0000
4 ELEVATION N 6.1
Elevation of end MSL (ft)
Min= -500.0 Max= 9999.9
5 DIS_TH_TKO N 4.0
Takeoff displaced threshold (ft)
Min= 0 Max= 9999
6 DIS_TH_APP N 4.0
Approach displaced threshold (ft)
Min= 0 Max= 9999
7 GLIDE_SL N 3.1
Glide slope for runway end (deg)
Min= 0.0 Max= 9.9
8 TH_CR_HGT N 5.1
Approach threshold crossing height AGL (ft)
Min= 0.0 Max= 100.0
9 PCT_WIND N 6.1
Percent change (%) in airport average headwind
Min= -500.0 Max= 500.0

TRACK.DBF

Track Identifier Table
* 1 RWY_ID C 3
Runway end identifier
* 2 OP_TYPE C 1
Type of operation (A, D, T, V)
* 3 TRK_ID1 C 8
Track identifier
* 4 TRK_ID2 C 1
Sub-track identifier (0..8) 0 = backbone track
5 PERCENT N 6.2
Percent of dispersed track operations on this sub-track
Min= 0.10 Max= 100.00
6 TRK_TYPE C 1
Type of track (V = Vectors, P = Points)
7 DISTANCE N 6.1
Delta distance from nominal start-roll or touch-down point (ft)
Min= -999.9 Max= 9999.9

TRK_SEGS.DBF

Track Segments Table
* 1 RWY_ID C 3
Runway end identifier
* 2 OP_TYPE C 1
Type of operation (A, D, T, V)
* 3 TRK_ID1 C 8
Track identifier
* 4 TRK_ID2 C 1
Sub-track identifier (0..8)
* 5 SEG_NUM N 3.0

Segment or point number of the track
 Min= 1 Max= 999
 6 SEG_TYPE C 1
 Type of track segment (S = Straight, L = Left, R = Right, P = Point)
 7 PARAM1 N 9.4
 Parameter S= distance(nmi), L/R= angle(deg), P= x-coord(nmi)
 Min= -999.0000 Max= 999.0000
 8 PARAM2 N 9.4
 Parameter S= (blank), L/R= radius(nmi), P= y-coord(nmi)
 Min= -999.0000 Max= 999.0000

GRP_PCT.DBF

Group Percentage Table
 * 1 GROUP_ID C 3
 User-defined aircraft group identifier
 * 2 RWY_ID C 3
 Runway end identifier
 * 3 OP_TYPE C 1
 Type of operation (A, D, T, F, V)
 * 4 TRK_ID1 C 8
 Track identifier
 * 5 PROF_ID1 C 8
 Profile group identifier
 6 PERCENT N 6.2
 Percent of flights of this aircraft group using this track & prof.group
 Min= 0.00 Max= 100.00

OPS_APRT.DBF

Airport Operations Table
 * 1 ACFT_ID C 6
 INM or substitution aircraft identifier
 * 2 OP_TYPE C 1
 Type of operation (A, D, T, F, V)
 * 3 PROF_ID2 C 1
 Profile stage number (1..9)
 4 OPS_DAY N 9.4
 Number of day operations on all tracks
 Min= 0.0000 Max= 9999.9999
 5 OPS_EVE N 9.4
 Number of evening operations on all tracks
 Min= 0.0000 Max= 9999.9999
 6 OPS_NIGHT N 9.4
 Number of night operations on all tracks
 Min= 0.0000 Max= 9999.9999

OPS_FLT.DBF

Flight Operations Table
 * 1 ACFT_ID C 6
 INM or substitution aircraft identifier
 * 2 OP_TYPE C 1
 Type of operation (A, D, T, F, V)
 * 3 PROF_ID1 C 8
 Profile group identifier
 * 4 PROF_ID2 C 1
 Profile stage number (1..9)
 * 5 RWY_ID C 3
 Runway end identifier
 * 6 TRK_ID1 C 8
 Track identifier
 7 OPS_DAY N 9.4
 Number of day operations
 Min= 0.0000 Max= 9999.9999
 8 OPS_EVE N 9.4
 Number of evening operations

Min= 0.0000 Max= 9999.9999
9 OPS_NIGHT N 9.4
Number of night operations
Min= 0.0000 Max= 9999.9999

OPS_CALC.DBF

Flight Operations Calculation Table
* 1 ACFT_ID C 6
INM or substitution aircraft identifier
* 2 OP_TYPE C 1
Type of operation (A, D, T, F, V)
* 3 PROF_ID1 C 8
Profile group identifier
* 4 PROF_ID2 C 1
Profile stage number
* 5 RWY_ID C 3
Runway end identifier
* 6 TRK_ID1 C 8
Track identifier
* 7 TRK_ID2 C 1
Sub-track identifier (0..8)
8 GROUP_ID C 3
User-defined aircraft group identifier
9 OPS_DAY N 9.4
Number of day operations
Min= 0.0000 Max= 9999.9999
10 OPS_EVE N 9.4
Number of evening operations
Min= 0.0000 Max= 9999.9999
11 OPS_NIGHT N 9.4
Number of night operations
Min= 0.0000 Max= 9999.9999

OPS_RNUP.DBF

Runup Operations Table
* 1 ACFT_ID C 6
INM aircraft identifier
* 2 RUNUP_ID C 8
Runup identifier
3 X_COORD N 9.4
X coordinate at runup position (nmi)
Min= -999.0000 Max= 999.0000
4 Y_COORD N 9.4
Y coordinate at runup position (nmi)
Min= -999.0000 Max= 999.0000
5 HEADING N 5.1
Aircraft heading (deg from true North)
Min= 0.0 Max= 359.9
6 THR_SET N 8.2
Corrected net thrust per engine (lb, %, other)
Min= 0.10 Max= 99999.00
7 DURATION N 7.1
Duration of runup event (seconds)
Min= 0.0 Max= 86400.0
8 OPS_DAY N 9.4
Number of day operations
Min= 0.0000 Max= 9999.9999
9 OPS_EVE N 9.4
Number of evening operations
Min= 0.0000 Max= 9999.9999
10 OPS_NIGHT N 9.4
Number of night operations
Min= 0.0000 Max= 9999.9999

METRIC.DBF

Noise Metric Definition Table

```

* 1 METRIC_ID C 6
    Noise metric identifier
  2 METRIC_TYP C 1
    Type of metric (E = Exposure, M = MaxLevel, T = TimeAbove)
  3 FREQ_TYPE C 1
    Type of frequency weighting (A = A-Weighted, P = Perceived)
  4 WGT_DAY N 6.2
    Weight multiplying day operations (0 or 1 for M and T types)
    Min= 0.00 Max= 999.99
  5 WGT_EVE N 6.2
    Weight multiplying evening operations
    Min= 0.00 Max= 999.99
  6 WGT_NIGHT N 6.2
    Weight multiplying night operations
    Min= 0.00 Max= 999.99
  7 DB_MINUS N 5.2
    Decibel amount subtracted from exposure level
    Min= 0.00 Max= 99.99

```

CASE.DBF

Case Definition Table

```

* 1 CASE_ID C 30
    Case identifier (subdirectory under the study directory)
  2 CASE_DESC C 80
    Case description
  3 DATE C 15
    Date and time that the subdirectory was created
  4 TEMPERATUR N 5.1
    Average temperature on the airport runways (deg F)
    Min= -30.0 Max= 120.0
  5 PRESSURE N 6.2
    Average atmospheric pressure on the airport runways (in-Hg)
    Min= 27.00 Max= 33.00
  6 DO_HUMID C 1
    Use ARP866A atmospheric absorption (Y, N)
  7 HUMIDITY N 5.1
    Average relative humidity on the airport runways (%)
    Min= 0.0 Max= 100.0
  8 HEADWIND N 4.1
    Average headwind on the airport runways (knots)
    Min= -9.9 Max= 40.0
  9 RUN_TYPE C 1
    Type of run (S = SingleMetric, M = MultiMetric)
 10 FREQ_TYPE C 1
    Type of frequency weighting (A, P)
 11 METRIC_ID C 6
    Noise metric identifier for single-metric run
 12 DO_CONTOUR C 1
    Contours computed (Y, N)
 13 DO_GRD_STD C 1
    Standard grid analysis (Y, N)
 14 DO_GRD_DTL C 1
    Standard & detailed grid analysis (Y, N)
 15 DO_100PCT C 1
    Output 100% of flights in detailed analysis (Y, N)
 16 DO_POP_PTS C 1
    Population points computed (Y, N)
 17 DO_LOC_PTS C 1
    Location points computed (Y, N)
 18 RS_REFINE N 2.0
    Maximum number of refinement levels for subdividing grid
    Min= 4 Max= 18

```

19 RS_TOLER N 5.2
Tolerance test value used in the subdivided grid method (dB)
Min= 0.01 Max= 10.00

20 CUTOFF_LOW N 6.1
Low cutoff for SingleMetric noise calculation (dB or minutes)
Min= 0.0 Max= 1440.0

21 CUTOFF_HI N 6.1
High cutoff for SingleMetric noise calculation (dB or minutes)
Min= 1.0 Max= 1440.0

22 RUN_DATE C 15
Date and time that the case was last run

23 RUN_DURATN C 9
Execution time for the Noise Calculation Program for the last run

24 DO_TERRAIN C 1
Terrain elevation calculation (Y, N)

25 GROUND_TYP C 1
Type of ground resistivity (S = Soft, H = Hard, F = File, N = None)

26 DO_DNL C 1
Day-Night Level (Y, N)

27 DO_CNEL C 1
Community Noise Equivalent Level (Y, N)

28 DO_LAEQ C 1
Equivalent A-Level for 24h (Y, N)

29 DO_LAEQD C 1
Equivalent A-Level for Day 0700-2200 (Y, N)

30 DO_LAEQN C 1
Equivalent A-Level for Night 2200-0700 (Y, N)

31 DO_SEL C 1
Sound Exposure Level (Y, N)

32 DO_LAMAX C 1
Maximum A-Level (Y, N)

33 DO_TALA C 1
Time-Above an A-level threshold (Y, N)

34 DO_NEF C 1
Noise Exposure Forecast (Y, N)

35 DO_WECPNL C 1
Weighted Equivalent Continuous Perceived Noise Level (Y, N)

36 DO_EPNL C 1
Effective Perceived Noise Level (Y, N)

37 DO_PNLTM C 1
Maximum perceived noise level (Y, N)

38 DO_TAPNL C 1
Time-Above a perceived level threshold (Y, N)

39 DO_CEXP C 1
C-weighted exposure level (Y, N)

40 DO_LCMAX C 1
Maximum C-level (Y, N)

41 DO_TALC C 1
Time-Above a C-level threshold (Y, N)

OUTPUT.DBF

Output Definition Table

* 1 OUTPUT_ID C 30
Subdirectory used to store the output files

2 METRIC_ID C 6
Metric identifier

3 OUT_TYPE C 1
Type of output (S = OneCase, D = Difference, A = LogAdd, M = Merge)

4 CASE_ID1 C 30
Case identifier (types S, D, A, and M)

5 CASE_ID2 C 30
Case identifier (types D, A, and M)

6 CASE_ID3 C 30
Case identifier (types A and M)

7 CASE_ID4 C 30

```

      Case identifier (types A and M)
8 CASE_ID5   C 30
      Case identifier (types A and M)
9 CONR_MIN   N 6.1
      Minimum contour level (dB or minutes)
      Min= -999.9 Max= 1440.0
10 CONR_MAX  N 6.1
      Maximum contour level (dB or minutes)
      Min= -999.9 Max= 1440.0
11 CONR_INC  N 6.1
      Increment level (dB or minutes)
      Min= 0.1 Max= 1440.0
12 CONR_CALC C 1
      Do contour calculations again (Y, N)

```

GRID.DBF

```

      Grid Definition Table
* 1 GRID_ID   C 8
      Grid identifier
2 GRID_TYPE  C 1
      C = Contour, S = Standard, D = Detailed, L = Location, P = Population
3 X_COORD    N 9.4
      X coordinate of the lower-left corner of the grid (nmi)
      Min= -999.0000 Max= 999.0000
4 Y_COORD    N 9.4
      Y coordinate of the lower-left corner of the grid (nmi)
      Min= -999.0000 Max= 999.0000
5 ANGLE      N 5.1
      Grid rotation angle (deg) from the X-axis to the I-axis
      Min= -90.0 Max= 90.0
6 DIST_I     N 8.4
      Distance between points in the I direction (nmi)
      Min= 0.0000 Max= 999.0000
7 DIST_J     N 8.4
      Distance between points in the J direction (nmi)
      Min= 0.0000 Max= 999.0000
8 NUMB_I     N 3.0
      Number of points in the I direction
      Min= 1 Max= 999
9 NUMB_J     N 3.0
      Number of points in the J directions
      Min= 1 Max= 999
10 TA_THRESH N 5.1
      Noise-level threshold for time-above metric (dB)
      Min= 0.0 Max= 150.0
11 DO_AMBIENT C 1
      Use ambient noise levels from a file (Y, N)
12 DELTA_AMB N 5.1
      Time-above threshold is ambient plus this delta value (dB)
      Min= -10.0 Max= 20.0
13 DO_PERCENT C 1
      Output percent of reference time instead of time-above (Y, N)
14 REF_TIME  N 5.2
      Time duration used in percent of time above threshold (hr)
      Min= 0.10 Max= 48.00

```

GRID_STD.DBF

```

      Standard Grid Analysis Table
* 1 GRID_ID   C 8
      Grid identifier
* 2 I_INDEX   N 3.0
      I index of the grid point
      Min= 1 Max= 999
* 3 J_INDEX   N 3.0

```

J index of the grid point
Min= 1 Max= 999

4 X_COORD N 9.4
X coordinate value (nmi)
Min= -999.0000 Max= 999.0000

5 Y_COORD N 9.4
Y coordinate value (nmi)
Min= -999.0000 Max= 999.0000

6 Z_COORD N 7.1
Z coordinate value MSL (ft)
Min= -9999.0 Max= 60000.0

7 LATITUDE N 10.6
Latitude of the point (degrees)
Min= -89.999999 Max= 89.999999

8 LONGITUDE N 11.6
Longitude of the point (degrees)
Min= -180.000000 Max= 180.000000

9 METRIC N 6.1
User-defined metric value (dB or minutes)
Min= -99.9 Max= 9999.9

10 DNL N 5.1
Day-night average sound level (dB)
Min= -99.9 Max= 999.9

11 CNEL N 5.1
Community noise equivalent level (dB)
Min= -99.9 Max= 999.9

12 LAEQ N 5.1
Equivalent sound level for 24 hours (dB)
Min= -99.9 Max= 999.9

13 LAEQD N 5.1
Equivalent sound level for day 0700-2200 (dB)
Min= -99.9 Max= 999.9

14 LAEQN N 5.1
Equivalent sound level for night 2200-0700 (dB)
Min= -99.9 Max= 999.9

15 SEL N 5.1
Sound exposure level (dB)
Min= -99.9 Max= 999.9

16 LAMAX N 5.1
Maximum A-weighted sound level (dB)
Min= -99.9 Max= 999.9

17 TALA N 6.1
Time above an A-weighted sound level threshold (minutes or % of time)
Min= -99.9 Max= 9999.9

18 NEF N 5.1
Noise exposure forecast (dB)
Min= -99.9 Max= 999.9

19 WECPNL N 5.1
Weighted equivalent continuous perceived noise level (dB)
Min= -99.9 Max= 999.9

20 EPNL N 5.1
Effective perceived tone-corrected noise level (dB)
Min= -99.9 Max= 999.9

21 PNLTM N 5.1
Maximum perceived tone-corrected noise level (dB)
Min= -99.9 Max= 999.9

22 TAPNL N 6.1
Time above a perceived tone-corrected noise level threshold (minutes or %)
Min= -99.9 Max= 9999.9

23 CEXP N 5.1
C-weighted exposure level (dB)
Min= -99.9 Max= 999.9

24 LCMAX N 5.1
Maximum C-weighted level (dB)
Min= -99.9 Max= 999.9

25 TALC N 6.1
Time above a C-weighted threshold (minutes or % of time)
Min= -99.9 Max= 9999.9

GRID_DTL.DBF

Detailed Grid Analysis Table

- * 1 METRIC_ID C 6
Metric Identifier
- * 2 GRID_ID C 8
Grid identifier
- * 3 I_INDEX N 3.0
I index of the grid point
Min= 1 Max= 999
- * 4 J_INDEX N 3.0
J index of the grid point
Min= 1 Max= 999
- * 5 ACFT_ID C 6
Aircraft identifier
- * 6 OP_TYPE C 1
Type of operation (A, D, T, F, V)
- * 7 PROF_ID1 C 8
Profile group identifier
- * 8 PROF_ID2 C 1
Profile stage number (1..9)
- * 9 RWY_ID C 3
Runway end identifier
- *10 TRK_ID1 C 8
Track identifier
- *11 TRK_ID2 C 1
Sub-track identifier (0..8)
- 12 DISTANCE N 9.1
Distance to aircraft at CPA (ft)
Min= 0.0 Max= 9999999.0
- 13 ALTITUDE N 5.0
Altitude of aircraft at CPA AFE (ft)
Min= -9999 Max= 60000
- 14 ELEV_ANG N 4.1
Elevation angle at CPA (deg above ground plane)
Min= 0.0 Max= 90.0
- 15 SPEED N 5.1
Speed of aircraft at CPA TAS (knots)
Min= 0.0 Max= 600.0
- 16 THR_SET N 8.2
Corrected net thrust per engine (lb, %, other)
Min= 0.10 Max= 99999.00
- 17 OPS_EQUIV N 9.4
Equivalent number of operations for this flight
Min= 0.0000 Max= 9999.9999
- 18 METRIC_ONE N 6.1
Metric value caused by one operation (dB or minutes)
Min= -99.9 Max= 9999.9
- 19 METRIC_ALL N 6.1
Metric value caused by all operations (dB or minutes)
Min= -99.9 Max= 9999.9
- 20 PERCENT N 7.3
Percent of total metric due to this aircraft's operations
Min= 0.000 Max= 100.000

CONR_PTS.DBF

Contour Points Table

- * 1 LEVEL N 6.1
Contour level (dB or minutes)
Min= -99.9 Max= 9999.9
- * 2 ISLAND_NUM N 2.0

Island number (for multiple contours at same level)
Min= 1 Max= 99
3 ISLAND_TYP C 1
Type of island (P = Positive, N = Negative)
* 4 X_COORD N 9.4
X coordinate on contour (nmi)
Min= -999.0000 Max= 999.0000
* 5 Y_COORD N 9.4
Y coordinate on contour (nmi)
Min= -999.0000 Max= 999.0000
6 POINT_OK C 1
This point is on the contour and not on the border (Y, N)
7 LATITUDE N 10.6
Latitude of the point (degrees)
Min= -89.999999 Max= 89.999999
8 LONGITUDE N 11.6
Longitude of the point (degrees)
Min= -180.000000 Max= 180.000000

POP_CONR.DBF

Contour Area and Population Table
* 1 LEVEL N 6.1
Contour level (dB or minutes)
Min= -99.9 Max= 9999.9
2 CONR_OK C 1
Contour completely contained inside grid boundary (Y, N)
3 POPULATION N 6.0
Number of people inside all islands of this contour
Min= 0 Max= 999999
4 SQ_KM N 9.3
Square kilometers inside all islands of this contour (km^2)
Min= 0.000 Max= 99999.999
5 SQ_MILE N 9.3
Square statute miles inside all islands of this contour (mi^2)
Min= 0.000 Max= 99999.999
6 M_SQ_FEET N 9.2
Millions of square feet inside all islands of this contour (M ft^2)
Min= 0.00 Max= 999999.99
7 ACRES N 9.1
Acres inside all islands of this contour (acres)
Min= 0.0 Max= 9999999.9

POP_PTS.DBF

Population Points Table -- US Census PL94-171 CD data
* 1 POINT_ID C 15
Point identifier (state + county + census block identifier)
2 LATITUDE N 10.6
Latitude of the center of the block (degrees)
Min= -89.999999 Max= 89.999999
3 LONGITUDE N 11.6
Longitude of the center of the block (degrees)
Min= -180.000000 Max= 180.000000
4 POPULATION N 5.0
Number of people in the census block
Min= 0 Max= 99999
5 AREA_BLOCK N 8.3
Census block area (km^2) -- not used
Min= 0.000 Max= 9999.999
6 LAND_USE C 3
User-defined land-use identifier (XXX) -- not used

POP_NOIS.DBF

Population Point Noise Table
* 1 POINT_ID C 15

Point identifier (defined in POP_PTS)
 2 METRIC N 6.1
 Metric value (dB or minutes)
 Min= -99.9 Max= 9999.9

LOC_PTS.DBF

Location Points Table
 * 1 POINT_ID C 6
 User-defined point identifier
 2 POINT_CAT C 1
 User-defined point category (S = school, ...)
 3 LATITUDE N 10.6
 Latitude of the point (degrees)
 Min= -89.999999 Max= 89.999999
 4 LONGITUDE N 11.6
 Longitude of the point (degrees)
 Min= -180.000000 Max= 180.000000
 5 HEIGHT N 5.0
 Height above the ground of the point (ft)
 Min= -9999 Max= 60000

LOC_NOIS.DBF

Location Point Noise Table
 * 1 POINT_ID C 6
 Point identifier (defined in LOC_PTS)
 2 METRIC N 6.1
 Metric value (dB or minutes)
 Min= -99.9 Max= 9999.9

SYS_APRT.DBF

System Airport Table -- NFDC data
 * 1 APRT_ID C 4
 Airport identifier
 2 NAME C 25
 City/airport name
 3 STATE C 2
 U.S. state
 4 LATITUDE N 10.6
 Latitude of airport reference point (degrees)
 Min= -89.999999 Max= 89.999999
 5 LONGITUDE N 11.6
 Longitude of airport reference point (degrees)
 Min= -180.000000 Max= 180.000000
 6 ELEVATION N 4.0
 Elevation of highest point on any runway MSL (ft)
 Min= -500 Max= 9999
 7 PATTRN_ALT N 4.0
 Pattern altitude AFE (ft)
 Min= 0 Max= 5000
 8 YR_OPS_ALL N 6.0
 Yearly operations (Commercial + GenAviation + Military)
 Min= 0 Max= 999999

SYS_RWY.DBF

System Runway Table -- NFDC data
 * 1 APRT_ID C 4
 Airport identifier
 2 RWY_LENGTH N 5.0
 Physical runway length (ft)
 Min= 0 Max= 30000
 3 RWY_WIDTH N 3.0
 Physical runway width (ft)
 Min= 0 Max= 500

```
* 4 A_RWY_ID   C 3
    Runway identifier for end A
5 A_LAT       N 10.6
    Latitude of end A (degrees)
    Min= -89.999999 Max= 89.999999
6 A_LONG      N 11.6
    Longitude of end A (degrees)
    Min= -180.000000 Max= 180.000000
7 A_ELEVATN   N 6.1
    Elevation of end A MSL (ft)
    Min= -500.0 Max= 9999.9
8 A_DIS_APP   N 4.0
    Approach displaced threshold for end A (ft from end)
    Min= 0 Max= 9999
9 A_GLIDE_SL  N 3.1
    Glide slope for end A (deg)
    Min= 0.0 Max= 9.9
10 A_TCH      N 5.1
    Threshold crossing height at end A AGL (ft)
    Min= 0.0 Max= 100.0
*11 B_RWY_ID   C 3
    Runway identifier for end B
12 B_LAT      N 10.6
    Latitude of end B (degrees)
    Min= -89.999999 Max= 89.999999
13 B_LONG     N 11.6
    Longitude of end B (degrees)
    Min= -180.000000 Max= 180.000000
14 B_ELEVATN  N 6.1
    Elevation of end B MSL (ft)
    Min= -500.0 Max= 9999.9
15 B_DIS_APP  N 4.0
    Approach displaced threshold for end B (ft from end)
    Min= 0 Max= 9999
16 B_GLIDE_SL N 3.1
    Glide slope for end B (deg)
    Min= 0.0 Max= 9.9
17 B_TCH     N 5.1
    Threshold crossing height for end B AGL (ft)
    Min= 0.0 Max= 100.0
```

F. INM STANDARD DATA

This Appendix documents the INM standard database. The *DBF* files that are contained in the standard database are listed below, including an indication as to whether the printed files are complete or not.

1.	<i>AIRCRAFT.DBF</i>	Complete
2.	<i>ACFT_SUB.DBF</i>	Complete
3.	<i>NOIS_GRP.DBF</i>	Complete
4.	<i>NPD_CURV.DBF</i>	Partial
5.	<i>PROFILE.DBF</i>	Partial
6.	<i>PROF_PTS.DBF</i>	Partial
7.	<i>PROCEDUR.DBF</i>	Partial
8.	<i>FLAPS.DBF</i>	Partial
9.	<i>THR_JET.DBF</i>	Partial
10.	<i>THR_PROP.DBF</i>	Complete
11.	<i>THR_GNRL.DBF</i>	Complete
12.	<i>METRIC.DBF</i>	Complete

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File: D:\inm600\sys_data\aircraft.dbf

Last update: 13-Sep-1999

Fields(15):

1	ACFT_ID	C	6
2	ACFT_DESCR	C	40
3	GROUF_ID	C	3
4	WGT_CAT	C	1
5	OWNER_CAT	C	1
6	ENG_TYPE	C	1
7	NOISE_CAT	C	1
8	NOISE_ID	C	6
9	NUMB_ENG	N	1.0
10	THR_RESTOR	C	1
11	MX_GW_TKO	N	6.0
12	MX_GW_LND	N	6.0
13	MX_DS_STOP	N	5.0
14	COEFF_TYPE	C	1
15	THR_STATIC	N	6.0

Records(226):

707	, B707-120/JT3C	, COM	, H	, C	, J	, 1	, JT4A	, 4	, N	, 302400	, 188900	, 6682	, J	, 10120
707120	, B707-120B/JT3D-3	, COM	, H	, C	, J	, 1	, JT3D	, 4	, N	, 302400	, 188900	, 6893	, J	, 14850
707320	, B707-320B/JT3D-7	, COM	, H	, C	, J	, 1	, JT3D	, 4	, N	, 334000	, 247000	, 5622	, J	, 19000
707QN	, B707-320B/JT3D-7QN	, COM	, H	, C	, J	, 2	, JT3DQ	, 4	, N	, 334000	, 247000	, 5622	, J	, 19000
720	, B720/JT3C	, COM	, L	, C	, J	, 1	, JT4A	, 4	, N	, 223500	, 155600	, 4871	, J	, 10120
720B	, B720B/JT3D-3	, COM	, L	, C	, J	, 1	, JT3D	, 4	, N	, 234000	, 175000	, 5717	, J	, 18000
727100	, B727-100/JT8D-7	, COM	, L	, C	, J	, 1	, 3JT8D	, 3	, N	, 169500	, 142500	, 4867	, J	, 14000
727200	, B727-200/JT8D-7	, COM	, L	, C	, J	, 1	, 3JT8D	, 3	, N	, 217600	, 163300	, 5571	, J	, 11895
727D15	, B727-200/JT8D-15	, COM	, L	, C	, J	, 1	, 3JT8D	, 3	, N	, 208000	, 169000	, 4922	, J	, 15500
727D17	, B727-200/JT8D-17	, COM	, L	, C	, J	, 2	, 3JT8DQ	, 3	, N	, 208000	, 169000	, 5444	, J	, 16000
727EM1	, FEDX 727-100/JT8D-7	, COM	, L	, C	, J	, 3	, 3JT8E7	, 3	, N	, 169500	, 142500	, 4867	, J	, 14000
727EM2	, FEDX 727-200/JT8D-15	, COM	, L	, C	, J	, 3	, 3JT8E5	, 3	, N	, 208000	, 169000	, 4922	, J	, 15500
727Q15	, B727-200/JT8D-15QN	, COM	, L	, C	, J	, 2	, 3JT8DQ	, 3	, N	, 208000	, 169000	, 4922	, J	, 15500
727Q7	, B727-100/JT8D-7QN	, COM	, L	, C	, J	, 2	, 3JT8DQ	, 3	, N	, 169500	, 142500	, 4867	, J	, 14000
727Q9	, B727-200/JT8D-9	, COM	, L	, C	, J	, 2	, 3JT8DQ	, 3	, N	, 191000	, 160000	, 5444	, J	, 14500
727QF	, UPS 727100 22C 25C	, COM	, L	, C	, J	, 3	, TAY651	, 3	, N	, 169000	, 142500	, 4448	, J	, 15380
737	, B737/JT8D-9	, COM	, L	, C	, J	, 1	, 2JT8D	, 2	, N	, 109000	, 98000	, 3900	, J	, 14500
737300	, B737-300/CFM56-3B-1	, COM	, L	, C	, J	, 3	, CFM563	, 2	, N	, 135000	, 114000	, 4580	, J	, 20000
7373B2	, B737-300/CFM56-3B-2	, COM	, L	, C	, J	, 3	, CFM563	, 2	, N	, 139000	, 114000	, 4580	, J	, 22000
737400	, B737-400/CFM56-3C-1	, COM	, L	, C	, J	, 3	, CFM563	, 2	, N	, 150000	, 124000	, 5062	, J	, 23500
737500	, B737-500/CFM56-3B-1	, COM	, L	, C	, J	, 3	, CFM563	, 2	, N	, 138500	, 111000	, 4551	, J	, 20000
737D17	, B737-200/JT8D-17	, COM	, L	, C	, J	, 2	, 2JT8DQ	, 2	, N	, 124000	, 107000	, 4244	, J	, 16000
737N17	, B737-200/JT8D-17 Nordam B737 LGW Hushkit	, COM	, L	, C	, J	, 3	, 2JT8DN	, 2	, N	, 124000	, 107000	, 4244	, J	, 16000
737N9	, B737/JT8D-9 Nordam B737 LGW Hushkit	, COM	, L	, C	, J	, 3	, 2JT8DN	, 2	, N	, 109000	, 98000	, 3900	, J	, 14500
737QN	, B737/JT8D-9QN	, COM	, L	, C	, J	, 2	, 2JT8DQ	, 2	, N	, 109000	, 98000	, 3900	, J	, 14500
747100	, B747-100/JT9DBD	, COM	, H	, C	, J	, 2	, JT9DBD	, 4	, N	, 733000	, 516600	, 5727	, J	, 33042
74710Q	, B747-100/JT9D-7QN	, COM	, H	, C	, J	, 3	, JT9DFL	, 4	, N	, 733000	, 564000	, 6200	, J	, 45500
747200	, B747-200/JT9D-7	, COM	, H	, C	, J	, 3	, JT9DFL	, 4	, N	, 775000	, 564000	, 6200	, J	, 45500
74720A	, B747-200/JT9D-7A	, COM	, H	, C	, J	, 3	, JT9D7Q	, 4	, N	, 785000	, 564000	, 6200	, J	, 46300
74720B	, B747-200/JT9D-7Q	, COM	, H	, C	, J	, 3	, JT9D7Q	, 4	, N	, 800000	, 630000	, 6200	, J	, 53000
747400	, B747-400/PW4056	, COM	, H	, C	, J	, 3	, PW4056	, 4	, N	, 870000	, 630000	, 6989	, J	, 56800
747SP	, B747SP/JT9D-7	, COM	, H	, C	, J	, 3	, JT9DFL	, 4	, N	, 702000	, 475000	, 5911	, J	, 45500
757PW	, B757-200/PW2037	, COM	, L	, C	, J	, 3	, PW2037	, 2	, N	, 240000	, 198000	, 4790	, J	, 38300

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NIMROD , RR SPEY MK511	NM , MIL , L , M , J , 0 , SPEY , 4 , N , 191748 , 0 , 0 , J , 10947
OV10A , ROCKWELL BRONCO T76	NM , MIL , L , M , T , 0 , T76 , 2 , N , 14466 , 10721 , 0 , J , 715
P3A , LOCKHEED ORION T56-A-14	NM , MIL , L , M , T , 0 , T56A14 , 4 , N , 142000 , 104000 , 0 , J , 4910
P3C , LOCKHEED ORION / T56-A-14	NM , MIL , L , M , T , 0 , T56-14 , 4 , N , 135000 , 104000 , 0 , J , 4910
PHANTO , MCDONNELL DOUGLAS PHANTOM F-4	NM , MIL , L , M , J , 0 , PHANTO , 2 , N , 0 , 0 , 0 , J , 0
PROVOS , BRISTON SIDDELEY VIPER 11	NM , MIL , S , M , J , 0 , VIP11 , 1 , N , 7295 , 4654 , 0 , J , 2454
S3A&B , LOCKHEED VIKING TF34-6E-2	NM , MIL , L , M , J , 0 , TF346E , 2 , N , 52539 , 45914 , 1600 , J , 9275
SABR80 , NA SABRELINER 80	, GA , L , G , J , 2 , CF700 , 2 , N , 33720 , 27290 , 2490 , J , 3962
SD330 , SD330/PT6A-45AR	, COM , L , C , T , 3 , PT6A45 , 2 , N , 22900 , 22600 , 3650 , P , 2670
SF340 , SF340B/CT7-9B	, COM , L , C , T , 3 , CT75 , 2 , N , 27300 , 26500 , 3470 , P , 4067
SR71 , JT11D-20B	NM , MIL , L , M , J , 0 , JT11D2 , 2 , N , 170000 , 60000 , 2600 , J , 32500
T1 , LOCKHEED SEA STAR JT15D-5	NM , MIL , L , M , J , 0 , JT15DM , 1 , N , 16100 , 15700 , 0 , J , 2965
T29 , GENERAL DYNAMICS CV34 PW R-2800-99W	NM , MIL , L , M , P , 0 , T-29 , 2 , N , 41740 , 0 , 0 , P , 0
T-2C , ROCKWELL BUCKEYE J85-6E-4	NM , MIL , L , M , J , 0 , J856E4 , 2 , N , 13284 , 12646 , 0 , J , 2950
T3 , AEIO-540-D4A5	NM , MIL , S , M , J , 0 , AEIO54 , 1 , N , 2525 , 2738 , 0 , J , 260
T33A , LOCKHEED T-33A J33-35	NM , MIL , L , M , J , 0 , J3335 , 2 , N , 0 , 0 , 0 , J , 5203
T34 , BEECH MENTOR (BE45) PT6A-25	NM , MIL , S , M , P , 0 , PT6A25 , 1 , N , 4300 , 4300 , 0 , P , 715
T37B , CESSNA 318 J69-T-25	NM , MIL , S , M , J , 0 , J69T25 , 2 , N , 6625 , 0 , 0 , J , 1025
T-38A , NORTHROP TALON T-38A	NM , MIL , S , M , J , 0 , TJ85 , 2 , N , 12093 , 0 , 0 , J , 3850
T39A , ROCKWELL SABRELINER GEJ85	NM , MIL , L , M , J , 0 , GEJ85 , 2 , N , 0 , 0 , 0 , J , 0
T41 , CESSNA 172 O-320-E2D	NM , MIL , S , M , P , 0 , O320E2 , 1 , N , 0 , 0 , 0 , P , 110
T42 , BEECH BARON (BE55)	NM , MIL , S , M , P , 0 , IO-550 , 2 , N , 5500 , 5400 , 2450 , P , 300
T-43A , BOEING 737 T43A	NM , MIL , L , M , J , 0 , T-43A , 2 , N , 0 , 0 , 0 , J , 0
T44 , T44	NM , MIL , L , M , J , 0 , T-44 , 2 , N , 0 , 0 , 0 , J , 0
T45 , PT6A-45AG	NM , MIL , L , M , J , 0 , F405RR , 2 , N , 14081 , 15129 , 0 , J , 5450
TORNAD , RB199-34R	NM , MIL , L , M , J , 0 , RB1993 , 2 , N , 45000 , 30620 , 1215 , J , 16075
TR1 , J75-P-13B	NM , MIL , L , M , J , 0 , J75P1B , 1 , N , 40000 , 0 , 0 , J , 17000
U2 , LOCKHEED U2 J75-P-13	NM , MIL , L , M , J , 0 , J75P13 , 1 , N , 40000 , 10000 , 0 , J , 11000
U21 , BEECH UTE PW PT6A-20	NM , MIL , S , M , T , 0 , PT6A20 , 2 , N , 12500 , 12500 , 1760 , P , 850
U4B , ROCKWELL SUPER COMMANDER 1G0-540B1A	NM , MIL , S , M , P , 0 , 540B1A , 2 , N , 0 , 0 , 0 , P , 350
U6 , DEHAVILLAND BEAVER PW R-985 DHC-2	NM , MIL , S , M , P , 0 , R985 , 1 , N , 0 , 0 , 0 , P , 330
U8F , BEECH SEMINOLE 0-480-1 D50	NM , MIL , S , M , P , 0 , C480 , 2 , N , 0 , 0 , 0 , P , 254
VC10 , RR CONWAY RC0-42	NM , MIL , H , M , J , 0 , CONWY , 4 , N , 311912 , 147875 , 0 , J , 20996
VICTOR , BRITISH AEROSPACE VICTOR	NM , MIL , L , M , J , 0 , VICTO , 4 , N , 0 , 0 , 0 , J , 0
VULCAN , BRITTEN NORMAN VULCAN RR OLYMPUS 301	NM , MIL , H , M , J , 0 , RROLYM , 4 , N , 200564 , 0 , 0 , J , 20007
YC14 , GE CF6-50D	NM , MIL , L , M , J , 0 , CF650D , 2 , N , 237000 , 181000 , 0 , J , 51000
YC15 , PWJT8D-17	NM , MIL , L , M , J , 0 , JT8D17 , 4 , N , 0 , 0 , 0 , J , 16000

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Last update: 14-Sep-1999

Fields(12):

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1 SUB_ID          C    6
2 SUB_DESCR      C   40
3 ACFT_ID1       C    6
4 PERCENT1       N   5.1
5 ACFT_ID2       C    6
6 PERCENT2       N   5.1
7 ACFT_ID3       C    6
8 PERCENT3       N   5.1
9 ACFT_ID4       C    6
10 PERCENT4      N   5.1
11 ACFT_ID5      C    6
12 PERCENT5      N   5.1

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Records(263):

7073SH	, 707-300 ADV/C w/Shannon H/K	, 707QN	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
707C56	, 707 w/CFM56	, DC870	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
717	, BOEING 717-200 (MD-95) 114000 LBS	, DC93LW	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
717ER	, BOEING 717-200 (MD-95) 121000 LBS	, DC95HW	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
720TJ	, B720 Turbojet	, DC820	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
727RR1	, 727-100 with RR TAY 650 eng.	, 727EM1	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
727RR2	, 727-200 with RR TAY 650 eng.	, 727EM2	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
73717A	, 737-100 w/JT8D-7A	, 737QN	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
737215	, 737-200 ADV w/JT15QN	, 737D17	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
737222	, Boeing 737-222	, 737QN	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
747122	, Boeing 747-122	, 74720A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
7472G2	, 747-200 w/JT9D-7R4G2	, 747200	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
7473G2	, 747-300 w/JT9D-7R4G2	, 74720B	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
747R21	, 747 w/CF6 or RB211 engines	, 74720B	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
767400	, Boeing 767-400	, 767300	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
A319	, Airbus A-319	, A320	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
A321	, Airbus A-321	, A320	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
A330	, Airbus A330	, A310	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
A340	, Airbus A340	, DC870	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AA5A	, Grumman Cheetah (AA5A)	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AC50	, Commander 500	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AC56	, Commander 560	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AC69	, Jet Prop Commander	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AC95	, Aero Commander 695	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AEROJT	, Aero Commander Jet Commander	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AN124	, Antonov-124	, 74720B	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AN26	, Antonov-26	, CVR580	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
AN74TK	, Antonov-74	, DC9Q9	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
ATR42	, Avions de Transport Regional ATR-42	, DHC8	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
ATR72	, Avions de Transport Regional ATR-72	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BAEATP	, British Aerospace Advanced Turboprop ATP	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BAEJ31	, British Aerospace BAe Jetsream 31	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BAEJ41	, British Aerospace Bae Jetstream 41	, SF340	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC100	, Beech King Air 100	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC18	, Beechcraft Model 18	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC190	, Beech 1900	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0

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BEC200	, Beech Super King Air 200	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC20A	, Beech Starship 2000	, SD330	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC23	, Beechcraft Model 23 Musketeer	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC24	, Beechcraft Model 24 Sierra	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC300	, Beech Super King Air 300	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC30B	, Beech Super King Air 300B	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC33	, Beechcraft Model 33 Debonair/Bonanza	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC400	, Beechcraft Beechjet 400	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC45	, Beechcraft Model 45 Mentor (T34A & T34B)	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC50	, Beechcraft Model 50 Twin Bonanza	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC55	, Beechcraft Model 55 Barron	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC58	, Beechcraft Model 58 Barron	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC60	, Beechcraft Model 60 Duke	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC65	, Beechcraft Model 65 Queen Air	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC76	, Beechcraft Model 76 Duchess	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC80	, Beechcraft Model Queen Air 80 series	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC90	, Beech King Air C90	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC95	, Beechcraft Model 95 Travel Air	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC99	, Beech Airliner Model 99	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BEC9F	, Beech F90 Super King Air	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BECM35	, Beechcraft Model M35 Bonanza	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BL14	, Bellanca Cruisair	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BL26	, Bellanca Super Viking Model 17-30A	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BLCH10	, Bellanca Champion Citabria CH10	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BN2A	, Britten-Norman BN-2A Islander	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
BN3	, Britten-Norman BN-3 Nymph	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C141	, Lockheed C-141 Starlifter	, 707320	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C17A	, Globemaster III C-17	, DC870	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C20	, US Military Gulfstream III	, GIIB	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C20A	, US Military Gulfstream III	, GIIB	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C26	, Military Metro/Merlin	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C45	, Military Twin Beech 18	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C5	, Lockheed Galaxy	, 74720B	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C8	, US Army DHC-5 Buffalo	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
C9B	, Navy DC9-30 SkyTrain	, DC9Q9	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CA212	, CASA C-212 Aviocar	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CAN235	, CACA-Nurtanio CN-235 Airtech	, SF340	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CC138	, Canadian Air Force DHC-6 Twin Otter	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CL610	, Canadair CL-610 Challenger E	, CL601	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CLREGJ	, Canadair Regional Jet	, CL601	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA150	, Cessna 150	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA152	, Cessna 152	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA170	, Cessna 170	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA172	, Cessna 172 Skyhawk	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA177	, Cessna 177 Cardinal	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA17B	, Cessna 177B or RG Cardinal	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA180	, Cessna Skywagon	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA182	, Cessna 182 Skylane	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA185	, Cessna Skywagon	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA205	, Cessna 205 Super Skywagon	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA207	, Cessna 207 Turbo Stationair	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA208	, Cessna 208 Caravan I	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0

CNA210	, Cessna 210 Centurion/II	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA303	, Cessna 303 Crusader	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA305	, Cessna 305/L-19 or O-1 Bird Dog	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA310	, Cessna 310	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA320	, Cessna 320 Skynight	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA335	, Cessna 335	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA336	, Cessna 336 Skymaster	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA337	, Cessna 337 Super Skymaster	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA340	, Cessna 340	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA401	, Cessna 401	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA402	, Cessna 402	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA404	, Cessna 404 Titan	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA414	, Cessna 414 Chancellor	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA421	, Cessna 421 Golden Eagle	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA425	, Cessna 425 Corsair/Conquest I	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA501	, Cessna Citation I Single Pilot (SP)	, CNA500	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA525	, Cessna Citation Jet	, CNA500	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA550	, Cessna Model 550 Citation II	, MU3001	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA551	, Cessna Citation II Single Pilot (SP)	, MU3001	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA560	, Cessna 560 Citation V	, MU3001	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA650	, Cessna 650 Citation VII	, CIT3	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNA750	, Cessna Citation X	, CL600	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNACAR	, Cessna AGCARRYALL	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNATRK	, Cessna AGTRUCK	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNAWAG	, Cessna AGWAGON	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNV240	, Convair 240	, DC3	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNV600	, Convair 600	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNV640	, Convair 640	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNV880	, Convair 880	, DC820	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CNV990	, Convair 990	, 707	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
CONSTE	, Lockheed Constellation	, DC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DALPHA	, Dassault Alpha Jet	, FAL20	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DBMERC	, Dassault Mercure	, 737D17	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DC4	, Douglas DC-4	, DC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DC7	, Douglas DC-7	, DC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DC86BT	, DC8-62/63 w/Burbank Treatment	, DC8QN	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DC9317	, DC930 w/JT8D-17 &15	, DC9Q9	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DC937A	, DC930 w/JT8D-7 & 7A	, DC9Q9	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DC9411	, DC940 w/JT8D-11	, DC9Q9	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DHC2	, De Havilland DHC-2 Beaver	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DHC4	, De Havilland DHC-4 Caribou	, DC3	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DO228	, Dornier-228	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
DO328	, Dornier-328	, DHC8	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
EMB110	, Embraer Bandeirante 110	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
EMB120	, Embraer Bandeirante 120	, DHC8	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
EMB135	, Embraer EMB-135	, CL600	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
F10	, Douglas Skyknight	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
F90	, Beech Super King Air	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
FAL10	, Falcon 10	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
FAL200	, Falcon 200	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
FAL20A	, Falcon 2000	, CL600	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
FH227	, Fairchild-Hiller F-227 (Fokker 27 Elong)	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0

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FH27	, Fairchild-Hiller F-27 (Fokker 27)	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
FK27	, Fokker F.27	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
FK50	, Fokker 50	, DHC830	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
FK70	, Fokker 70	, F10062	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
G164AG	, GrummanAmerican Super Agcat	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GA7	, Grumman Cougar (GA7)	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GC1	, Vought Swift	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GROB15	, Burkhart Grob G 115	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GSPORT	, Great Lakes Sport	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GULF1	, Gulfstream I (G159)	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GULF2	, Gulfstream II	, GIIB	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GULF3	, Gulfstream III	, GIIB	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
GULFCO	, Gulfstream Commander	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
HS125	, Hawker-Siddeley 125	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
HS1258	, Bae (Hawker-Siddeley) 125-800	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IA1123	, IAI 1123 Westwind	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IA1124	, IAI 1124 Westwind	, IA1125	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IARAVA	, IAI Arava	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IL114	, Ilyushin-114	, CVR580	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IL62	, Ilyushin-62	, 707QN	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IL76	, Ilyushin-76	, DC8QN	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IL86	, Ilyushin-86	, DC8QN	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
IL96	, Ilyushin-96	, 747200	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
JST1TF	, Jetstar 1 Turbofan	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
JST1TJ	, Jetstar 1 Turbojet	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
JST2TF	, Lockheed Jetstar 2	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
KC135E	, Boeing KC135 Stratotanker (Re-engined)	, 707320	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LA42	, Lake LA-4-200 Buccaneer	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LEAR23	, Learjet 23	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LEAR24	, Learjet 24	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LEAR31	, Learjet 31	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LEAR36	, Learjet 36	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LEAR45	, Learjet 45	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LEAR55	, Learjet 55	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LEAR60	, Learjet 60	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
LOADMS	, Ayres LoadMaster	, SD330	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
M20J	, Mooney 201LM and 205 (M20J)	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
M20K	, Mooney 252TSE (M20K)	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
M20L	, Mooney Pegasus (M20L)	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
MB339C	, Aeromacchi M.B. 339-C	, A7D	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
MD80	, McDonnell-Douglas MD80	, MD81	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
MD87	, McDonnell-Douglas MD87	, MD81	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
MD88	, McDonnell-Douglas MD88	, MD83	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
MD8819	, MD88 w/JT8D-119	, MD81	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
MU2	, Mitsubishi MU-2	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
MU300	, Mitsubishi Diamond MU-300	, CNA500	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
N24	, Gov. Aircraft Factories N24	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
NRD262	, Nord-Aviation NORD-262	, SD330	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
OV1	, Grumman Mohawk OV-1	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA17	, Piper PA-17 Vagabond	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA18	, Piper PA-18 Super Cub	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA22CO	, Piper PA-22 Colt	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0

PA22TR	, Piper PA-22 Tripacer	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA23AP	, Piper PA-23-235 Apache	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA23AZ	, Piper PA-23 Aztec	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA24	, Piper PA-24 Comanche	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA25	, Piper PA-25 Pawnee	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA28AR	, Piper PA-28-181 Archer II	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA28C2	, Piper PA-28-235E Cherokee 235E	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA28CA	, Piper PA-28R-200 Cherokee Arrow II	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA28CC	, Piper PA-28-180 Cherokee Challenger	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA28CH	, Piper PA-28-140 Cherokee 140	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA28DK	, Piper PA-28-236 Dakota	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA28WA	, Piper PA-28-161 Warrior II	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA30	, Piper PA-30 Twin Comanche	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA31	, Piper PA-31 Navajo	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA31CH	, Piper PA-31-350 Chieftain	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA31T	, Piper PA-31T Cheyenne	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA32C6	, Piper PA-32 Cherokee Six	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA32LA	, Piper PA-32R-300 Lance	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA32SG	, Piper PA-32 Saratoga	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA34	, Piper PA-34 Seneca	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA36	, Piper 36 Brave	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA38	, Piper PA-38-112 Tomahawk	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA39	, Piper PA-39 Twin Comanche C/R	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA42	, Piper PA-42 Cheyenne III	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA44	, Piper 44 Seminole	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA46	, Piper PA-46 Malibu	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA60	, Piper Aerostar Model 600/700	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PA61	, Piper PA-61 Aerostar Model 601	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PC6	, Pilatus PC-6	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
PITTS1	, Pitts S-1 Special	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
RJ70	, RJ70	, BAE146	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
RWCM12	, Rockwell Commander 112 (Alpine)	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
RWCM14	, Rockwell Commander 114 (Gram Turismo)	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
RWCM50	, Rockwell Shrike Commander 500S	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
RWCM69	, Rockwell Turbo Commander 690	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
RWCMTH	, Rockwell Thrust Commander (SR2)	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
S2	, Grumman S-2 Tracker	, DC3	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
S212	, Siai Marchetti S212	, CNA500	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SA226	, Swearingen Metro II	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SA227	, Swearingen Metro III	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SAAB20	, SAAB 2000	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SABR40	, Sabreliner 40	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SABR60	, Sabreliner 60	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SABR65	, Sabreliner 65	, LEAR35	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SABR70	, Sabreliner 70	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SABR75	, Sabreliner 75	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SAMER2	, Swearingen Merlin II	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SAMER3	, Swearingen Merlin III	, CNA441	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SAMER4	, Swearingen Merlin IV	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SD360	, Shorts 360	, SD330	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SE210	, Aerospatiale Caravelle	, 737	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
SF260M	, Siai Marchetti SF260M	, GASEPV	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0

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SN600	, Aerospatiale SN 600 Corvette	, CNA500	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
T37	, USAF Cessna T37 or 318	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
T38	, USAF Northrop T38	, LEAR25	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
T43A	, USAF 737-200	, 737	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
T47A	, US Navy Cessna Citation S/II	, CNA500	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
TAYF19	, Taylorcraft Sprtsman 100 (F19)	, GASEPF	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
TED600	, Ted Smith Aerostar 600	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
TU134	, Tupolev-134	, DC930	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
TU154	, Tupolev-154	, 727D17	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
TU204	, Tupolev-204	, 757RR	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
TU334	, Tuploev-334	, F10065	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
U3	, USAF Cessna Model 310	, BEC58P	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
UV18	, US Military DHC-6 Twin Otter	, DHC6	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
VC10TF	, Vickers VC10 TurboFan	, 707	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
VC10TJ	, Vickers VC10 TurboJet	, DC820	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
VC2	, Vickers VC2 Viscount	, L188	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
YAK42	, Yakolev Yak-42	, 727100	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
YS11	, Nihon Aeroplane (NAMC) YS-11	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0
YS11C	, Nihon Aeroplane (NAMC) YS-11 Cargo	, HS748A	, 100.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0	, -NONE-	, 0.0

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Last update: 13-Sep-1999

Fields(6):

1	NOISE_ID	C	6
2	THRSET_TYP	C	1
3	MODEL_TYPE	C	1
4	SPECT_APP	N	3.0
5	SPECT_DEP	N	3.0
6	SPECT_AFB	N	3.0

Records (184):

2CF650	, L , I ,	203 , 103 ,	0
2CF680	, L , I ,	203 , 103 ,	0
2CF68D	, L , I ,	203 , 103 ,	0
2JT8D	, L , I ,	201 , 101 ,	0
2JT8D2	, L , I ,	204 , 104 ,	0
2JT8DH	, L , I ,	201 , 101 ,	0
2JT8DL	, L , I ,	201 , 101 ,	0
2JT8DN	, L , I ,	202 , 104 ,	0
2JT8DQ	, L , I ,	201 , 101 ,	0
2R2800	, P , I ,	213 , 110 ,	0
302C	, P , N ,	230 , 125 ,	125
3JT8D	, L , I ,	201 , 101 ,	0
3JT8DQ	, L , I ,	201 , 101 ,	0
3JT8E5	, L , I ,	201 , 101 ,	0
3JT8E7	, L , I ,	201 , 101 ,	0
4R2800	, P , I ,	213 , 110 ,	0
501D13	, P , I ,	214 , 112 ,	0
540B1A	, X , N ,	228 , 126 ,	0
ADOUR	, P , N ,	231 , 127 ,	0
AE3007	, L , I ,	216 , 113 ,	0
AEIO54	, P , N ,	225 , 123 ,	0
AGE100	, X , N ,	223 , 128 ,	0
AL502L	, L , I ,	216 , 113 ,	0
AL502R	, L , I ,	206 , 108 ,	0
AV-8A	, X , N ,	231 , 128 ,	0
AVON	, P , N ,	230 , 127 ,	0
B-52H	, L , N ,	223 , 130 ,	0
C-119	, X , N ,	225 , 125 ,	0
C-121	, X , N ,	225 , 125 ,	0
C-130A	, X , N ,	234 , 112 ,	0
C-130H	, X , N ,	234 , 112 ,	0
C480	, P , N ,	225 , 123 ,	0
CF34	, L , I ,	216 , 113 ,	0
CF650D	, X , N ,	225 , 122 ,	0
CF650E	, L , N ,	224 , 126 ,	0
CF66D	, L , I ,	203 , 101 ,	0
CF700	, L , I ,	203 , 113 ,	0
CFG50C	, X , N ,	224 , 126 ,	0
CFM562	, L , I ,	206 , 106 ,	0
CFM563	, L , I ,	202 , 102 ,	0
CFM565	, L , I ,	203 , 103 ,	0
CFM56A	, L , I ,	233 , 124 ,	0
CGAJ	, P , I ,	216 , 113 ,	0
CGASEP	, P , I ,	215 , 109 ,	0
CJ610	, L , I ,	202 , 113 ,	0
CONWY	, P , N ,	231 , 126 ,	0
CT75	, P , I ,	211 , 110 ,	0
DART	, X , N ,	224 , 127 ,	0
F108CF	, X , N ,	233 , 124 ,	0
F111D	, X , N ,	229 , 127 ,	127
F111F	, X , N ,	229 , 127 ,	127
F18EF	, X , N ,	232 , 126 ,	126
F405RR	, X , N ,	227 , 124 ,	0
FB111A	, X , N ,	229 , 126 ,	126
GE-10	, P , N ,	227 , 127 ,	127
GE100	, X , N ,	232 , 126 ,	126
GE-102	, P , N ,	229 , 126 ,	126
GE-110	, X , N ,	224 , 127 ,	0
GE11A	, P , N ,	231 , 127 ,	127
GE-13	, P , N ,	228 , 131 ,	131
GE21B	, P , N ,	228 , 131 ,	131
GE400	, X , N ,	232 , 128 ,	128

GE404	, X , N ,	232 , 126 ,	126
GE-8	, P , N ,	230 , 128 ,	0
GE9076	, L , I ,	205 , 105 ,	0
GEF1D2	, P , N ,	233 , 127 ,	0
GEJ85	, X , N ,	230 , 127 ,	0
IO-550	, P , N ,	225 , 123 ,	0
J3335	, P , N ,	231 , 127 ,	0
J52P8A	, X , N ,	230 , 127 ,	0
J52P8B	, P , N ,	233 , 128 ,	0
J57	, L , I ,	233 , 124 ,	0
J5759	, P , N ,	223 , 130 ,	0
J5759W	, P , N ,	230 , 126 ,	126
J57P17	, P , N ,	233 , 127 ,	127
J57P19	, X , N ,	230 , 127 ,	127
J57P20	, P , N ,	230 , 127 ,	127
J57P21	, P , N ,	230 , 127 ,	127
J57P23	, X , N ,	230 , 127 ,	127
J57P43	, P , N ,	230 , 127 ,	127
J57P5	, P , N ,	230 , 126 ,	0
J57P55	, X , N ,	230 , 128 ,	128
J69T25	, P , N ,	232 , 126 ,	0
J75P13	, P , N ,	233 , 128 ,	0
J75P19	, X , N ,	233 , 128 ,	128
J75P1B	, P , N ,	233 , 128 ,	0
J79	, L , I ,	233 , 127 ,	0
J79651	, P , N ,	233 , 127 ,	127
J8517A	, P , N ,	231 , 128 ,	0
J856E4	, P , N ,	230 , 128 ,	0
JAGUA	, X , N ,	230 , 127 ,	127
JT11D2	, X , N ,	226 , 121 ,	121
JT15D1	, L , I ,	216 , 113 ,	0
JT15D5	, L , I ,	203 , 113 ,	0
JT15DM	, X , N ,	224 , 124 ,	0
JT3D	, L , I ,	208 , 107 ,	0
JT3D3	, X , N ,	224 , 130 ,	0
JT3D3B	, P , N ,	223 , 130 ,	0
JT3DQ	, L , I ,	208 , 106 ,	0
JT4111	, X , N ,	224 , 130 ,	0
JT4A	, L , I ,	208 , 107 ,	0
JT8D17	, X , N ,	231 , 127 ,	0
JT8D9	, X , N ,	224 , 126 ,	0
JT9D7Q	, L , I ,	207 , 107 ,	0
JT9DBD	, L , I ,	209 , 107 ,	0
JT9DFL	, L , I ,	207 , 107 ,	0
MK6118	, L , N ,	229 , 125 ,	0
O320E2	, P , N ,	226 , 123 ,	0
OLY593	, L , I ,	206 , 106 ,	0
P4A	, P , N ,	233 , 128 ,	0
PEGAS	, P , N ,	231 , 127 ,	0
PHANTO	, X , N ,	229 , 125 ,	125
PT6A20	, P , N ,	228 , 111 ,	0
PT6A25	, P , N ,	226 , 123 ,	0
PT6A27	, P , I ,	210 , 109 ,	0
PT6A41	, P , N ,	228 , 111 ,	0
PT6A45	, P , I ,	211 , 109 ,	0
PT6A50	, P , I ,	213 , 112 ,	0
PT6A68	, P , N ,	211 , 109 ,	0
PT6R65	, P , N ,	228 , 111 ,	0
PW100	, X , N ,	228 , 126 ,	126
PW-100	, X , N ,	224 , 126 ,	0
PW100A	, X , N ,	224 , 126 ,	0
PW120	, P , I ,	213 , 112 ,	0
PW123	, X , N ,	225 , 125 ,	0
PW200	, X , N ,	229 , 126 ,	126
PW2037	, L , I ,	203 , 103 ,	0
PW220	, X , N ,	229 , 126 ,	126
PW2205	, X , N ,	228 , 126 ,	126
PW229	, X , N ,	232 , 126 ,	126
PW2295	, X , N ,	228 , 126 ,	126
PW4056	, L , I ,	207 , 107 ,	0
PW4460	, L , I ,	203 , 103 ,	0
R2800	, X , N ,	227 , 122 ,	0

R43659	,	X	,	N	,	225	,	121	,	0
R985	,	P	,	N	,	226	,	123	,	0
R99W	,	X	,	N	,	227	,	122	,	0
RA28	,	P	,	N	,	230	,	127	,	0
RAISQP	,	P	,	I	,	210	,	109	,	0
RB168	,	P	,	N	,	230	,	128	,	0
RB183	,	L	,	I	,	216	,	104	,	0
RB183P	,	L	,	I	,	216	,	104	,	0
RB1993	,	P	,	N	,	233	,	128	,	128
RB2112	,	L	,	I	,	203	,	101	,	0
RCB17	,	X	,	N	,	227	,	122	,	0
RDA532	,	P	,	I	,	212	,	110	,	0
RR-408	,	P	,	N	,	231	,	128	,	0
RR535E	,	L	,	I	,	203	,	103	,	0
RROLYM	,	P	,	N	,	233	,	125	,	0
SEPPFP	,	P	,	I	,	215	,	109	,	0
SEPPVP	,	P	,	I	,	215	,	109	,	0
SP5118	,	L	,	I	,	216	,	104	,	0
SPEY	,	P	,	N	,	233	,	128	,	0
T-29	,	X	,	N	,	227	,	122	,	0
T-43A	,	X	,	N	,	224	,	126	,	0
T-44	,	X	,	N	,	228	,	111	,	0
T56-14	,	X	,	N	,	225	,	121	,	0
T56-15	,	X	,	N	,	234	,	112	,	0
T56A14	,	X	,	N	,	225	,	121	,	0
T56A15	,	P	,	I	,	234	,	112	,	0
T56A7	,	P	,	I	,	234	,	112	,	0
T76	,	P	,	N	,	228	,	123	,	0
TAY620	,	L	,	I	,	201	,	101	,	0
TAY650	,	L	,	I	,	201	,	101	,	0
TAY651	,	L	,	I	,	201	,	101	,	0
TF30P1	,	X	,	N	,	229	,	127	,	127
TF30P4	,	X	,	N	,	223	,	127	,	127
TF33P7	,	X	,	N	,	223	,	127	,	0
TF346E	,	X	,	N	,	223	,	129	,	0
TF39GE	,	X	,	N	,	224	,	131	,	0
TF41	,	L	,	I	,	230	,	126	,	0
TF41A2	,	X	,	N	,	230	,	126	,	0
TF7312	,	L	,	I	,	216	,	113	,	0
TF7313	,	L	,	I	,	216	,	113	,	0
TFE731	,	P	,	N	,	230	,	127	,	0
TFE73B	,	X	,	N	,	228	,	126	,	0
TJ85	,	P	,	N	,	231	,	128	,	128
TPE331	,	P	,	I	,	210	,	111	,	0
TRS181	,	X	,	N	,	224	,	126	,	0
TSIO52	,	P	,	I	,	215	,	109	,	0
V2525	,	L	,	I	,	205	,	105	,	0
VICTO	,	X	,	N	,	230	,	126	,	0
VIP11	,	P	,	N	,	230	,	124	,	0
VIPER	,	P	,	N	,	231	,	128	,	0

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Last update: 13-Sep-1999

Fields(14):

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1 NOISE_ID      C      6
2 NOISE_TYPE   C      1
3 OP_MODE      C      1
4 THR_SET      N      8.2
5 L_200        N      5.1
6 L_400        N      5.1
7 L_630        N      5.1
8 L_1000       N      5.1
9 L_2000       N      5.1
10 L_4000      N      5.1
11 L_6300      N      5.1
12 L_10000    N      5.1
13 L_16000    N      5.1
14 L_25000    N      5.1

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Records (2980):

JT9D7Q	, E, A	, 8560.00	, 106.3	, 102.9	, 99.8	, 96.2	, 89.8	, 83.9	, 78.9	, 70.6	, 61.6	, 51.0
JT9D7Q	, E, A	, 14000.00	, 110.2	, 106.7	, 103.5	, 99.7	, 92.9	, 86.0	, 81.2	, 73.1	, 64.8	, 55.4
JT9D7Q	, E, D	, 24370.00	, 111.1	, 108.0	, 105.0	, 101.6	, 95.0	, 87.9	, 82.1	, 75.5	, 67.9	, 59.8
JT9D7Q	, E, D	, 34850.00	, 115.8	, 112.8	, 109.9	, 106.5	, 100.0	, 92.4	, 86.4	, 80.2	, 72.9	, 65.4
JT9D7Q	, E, D	, 40240.00	, 119.1	, 116.1	, 113.1	, 109.6	, 102.8	, 95.3	, 90.1	, 83.9	, 77.1	, 70.2
JT9D7Q	, E, D	, 44940.00	, 121.7	, 118.6	, 115.6	, 112.0	, 105.5	, 99.1	, 93.7	, 88.5	, 82.4	, 76.2
JT9D7Q	, S, A	, 8560.00	, 103.6	, 99.5	, 96.6	, 93.5	, 88.1	, 81.7	, 77.0	, 71.6	, 65.5	, 58.9
JT9D7Q	, S, A	, 14000.00	, 105.1	, 100.9	, 97.8	, 94.3	, 88.7	, 82.3	, 77.6	, 72.4	, 66.4	, 59.9
JT9D7Q	, S, D	, 24370.00	, 108.1	, 103.9	, 100.9	, 97.5	, 92.1	, 86.0	, 81.5	, 76.5	, 70.7	, 64.4
JT9D7Q	, S, D	, 34850.00	, 111.8	, 107.9	, 105.0	, 101.9	, 96.7	, 90.5	, 86.1	, 80.9	, 75.1	, 68.8
JT9D7Q	, S, D	, 40240.00	, 114.3	, 110.4	, 107.6	, 104.5	, 99.4	, 93.2	, 88.7	, 83.5	, 77.7	, 71.4
JT9D7Q	, S, D	, 44940.00	, 117.1	, 113.2	, 110.4	, 107.2	, 102.1	, 96.0	, 91.4	, 86.3	, 80.4	, 74.1
JT8D9	, E, A	, 1.35	, 112.4	, 106.7	, 102.6	, 97.8	, 88.9	, 78.2	, 71.4	, 63.9	, 55.8	, 46.3
JT8D9	, E, A	, 1.70	, 116.8	, 111.3	, 107.1	, 102.2	, 93.5	, 85.3	, 79.0	, 72.0	, 64.6	, 55.7
JT8D9	, E, D	, 1.70	, 116.8	, 111.3	, 107.1	, 102.2	, 93.5	, 85.3	, 79.0	, 72.0	, 64.6	, 55.7
JT8D9	, E, D	, 1.97	, 122.4	, 116.8	, 112.5	, 107.7	, 100.6	, 92.6	, 86.2	, 78.9	, 71.4	, 62.3
JT8D9	, M, A	, 1.35	, 104.4	, 97.0	, 91.7	, 85.9	, 76.5	, 66.7	, 60.1	, 53.1	, 45.2	, 36.3
JT8D9	, M, A	, 1.70	, 108.0	, 101.1	, 96.1	, 90.9	, 82.5	, 73.5	, 66.9	, 59.6	, 51.4	, 42.2
JT8D9	, M, D	, 1.70	, 108.0	, 101.1	, 96.1	, 90.9	, 82.5	, 73.5	, 66.9	, 59.6	, 51.4	, 42.2
JT8D9	, M, D	, 1.97	, 114.0	, 107.2	, 102.4	, 97.3	, 89.2	, 80.0	, 73.1	, 65.4	, 56.7	, 47.0
JT8D9	, P, A	, 1.35	, 120.8	, 113.3	, 107.9	, 101.9	, 91.2	, 78.8	, 70.7	, 62.0	, 52.7	, 42.0
JT8D9	, P, A	, 1.70	, 123.2	, 116.0	, 110.5	, 104.5	, 94.0	, 84.0	, 76.6	, 68.5	, 59.9	, 49.8
JT8D9	, P, D	, 1.70	, 123.2	, 116.0	, 110.5	, 104.5	, 94.0	, 84.0	, 76.6	, 68.5	, 59.9	, 49.8
JT8D9	, P, D	, 1.97	, 127.7	, 120.4	, 114.9	, 108.9	, 100.0	, 90.2	, 82.8	, 74.4	, 65.7	, 55.4
JT8D9	, S, A	, 1.35	, 106.6	, 101.1	, 96.9	, 92.3	, 84.7	, 76.7	, 71.3	, 65.5	, 58.8	, 51.1
JT8D9	, S, A	, 1.70	, 111.7	, 106.6	, 102.8	, 98.8	, 92.2	, 85.0	, 79.6	, 73.5	, 66.5	, 58.5
JT8D9	, S, D	, 1.70	, 111.7	, 106.6	, 102.8	, 98.8	, 92.2	, 85.0	, 79.6	, 73.5	, 66.5	, 58.5
JT8D9	, S, D	, 1.97	, 117.7	, 112.7	, 109.1	, 105.2	, 98.8	, 91.5	, 85.8	, 79.2	, 71.7	, 63.3
GE100	, E, A	, 85.00	, 100.9	, 95.6	, 91.5	, 86.8	, 78.2	, 67.7	, 61.1	, 53.1	, 43.9	, 28.6
GE100	, E, A	, 87.00	, 105.7	, 100.3	, 96.1	, 91.3	, 84.0	, 76.1	, 69.9	, 62.9	, 54.4	, 43.2
GE100	, E, D	, 97.00	, 123.0	, 117.2	, 112.7	, 107.9	, 100.8	, 92.8	, 87.0	, 80.3	, 72.4	, 62.4
GE100	, E, D	, 104.00	, 129.4	, 123.8	, 119.3	, 114.1	, 106.4	, 98.4	, 92.7	, 86.4	, 78.9	, 69.7
GE100	, E, X	, 105.00	, 138.0	, 132.5	, 128.1	, 123.1	, 115.1	, 107.5	, 102.1	, 96.2	, 89.6	, 81.7

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File:D:\inm51\sys_data\profile.dbf
 File: D:\inm600\sys_data\profile.dbf
 Last update: 13-Sep-1999

Fields(5):

1	ACFT_ID	C	6
2	OP_TYPE	C	1
3	PROF_ID1	C	8
4	PROF_ID2	C	1
5	WEIGHT	N	6.0

Records(741):

727100	, A	, Standard	, 1	, 128250
727100	, D	, Standard	, 1	, 136000
727100	, D	, Standard	, 2	, 143000
727100	, D	, Standard	, 3	, 150000
727100	, D	, Standard	, 4	, 158000
727200	, A	, Standard	, 1	, 147000
727200	, D	, Standard	, 1	, 152000
727200	, D	, Standard	, 2	, 163000
727200	, D	, Standard	, 3	, 174000
727200	, D	, Standard	, 4	, 185000
727D15	, A	, Standard	, 1	, 152100
727D15	, D	, Standard	, 1	, 156000
727D15	, D	, Standard	, 2	, 164000
727D15	, D	, Standard	, 3	, 175000
727D15	, D	, Standard	, 4	, 189000
727D15	, D	, Standard	, 5	, 204000
727D17	, A	, Standard	, 1	, 152100
727D17	, D	, Standard	, 1	, 157000
727D17	, D	, Standard	, 2	, 169000
727D17	, D	, Standard	, 3	, 180000
727D17	, D	, Standard	, 4	, 189000
727Q15	, A	, Standard	, 1	, 152100
727Q15	, D	, Standard	, 1	, 156000
727Q15	, D	, Standard	, 2	, 164000
727Q15	, D	, Standard	, 3	, 175000
727Q15	, D	, Standard	, 4	, 189000
727Q15	, D	, Standard	, 5	, 204000
727Q7	, A	, Standard	, 1	, 128250
727Q7	, D	, Standard	, 1	, 136000
727Q7	, D	, Standard	, 2	, 143000
727Q7	, D	, Standard	, 3	, 150000
727Q7	, D	, Standard	, 4	, 158000
727Q9	, A	, Standard	, 1	, 152100
727Q9	, D	, Standard	, 1	, 156000
727Q9	, D	, Standard	, 2	, 168000
727Q9	, D	, Standard	, 3	, 180000
727Q9	, D	, Standard	, 4	, 191000
727QF	, A	, Standard	, 1	, 128250
727QF	, D	, Standard	, 1	, 136000
727QF	, D	, Standard	, 2	, 143000
727QF	, D	, Standard	, 3	, 150000
727QF	, D	, Standard	, 4	, 158000
737	, A	, Standard	, 1	, 88200
737	, D	, Standard	, 1	, 82000
737	, D	, Standard	, 2	, 85000
737	, D	, Standard	, 3	, 92000
737	, D	, Standard	, 4	, 100000
737300	, A	, Standard	, 1	, 102600
737300	, D	, Standard	, 1	, 96000
737300	, D	, Standard	, 2	, 102000
737300	, D	, Standard	, 3	, 108000
737300	, D	, Standard	, 4	, 119000
7373B2	, A	, Standard	, 1	, 102600
7373B2	, D	, Standard	, 1	, 98000
7373B2	, D	, Standard	, 2	, 105000
7373B2	, D	, Standard	, 3	, 111000
7373B2	, D	, Standard	, 4	, 122000
737400	, A	, Standard	, 1	, 111600
737400	, D	, Standard	, 1	, 107000
737400	, D	, Standard	, 2	, 115000
737400	, D	, Standard	, 3	, 121000
737400	, D	, Standard	, 4	, 133000
737500	, A	, Standard	, 1	, 99900
737500	, D	, Standard	, 1	, 98000

737500	, D	, Standard	, 2	, 105000
737500	, D	, Standard	, 3	, 111000
737500	, D	, Standard	, 4	, 122000
737D17	, A	, Standard	, 1	, 96300
737D17	, D	, Standard	, 1	, 90000
737D17	, D	, Standard	, 2	, 95000
737D17	, D	, Standard	, 3	, 100000
737D17	, D	, Standard	, 4	, 105000
737QN	, A	, Standard	, 1	, 88200
737QN	, D	, Standard	, 1	, 82000
737QN	, D	, Standard	, 2	, 85000
737QN	, D	, Standard	, 3	, 92000
737QN	, D	, Standard	, 4	, 100000
747100	, A	, Standard	, 1	, 465000
747100	, D	, Standard	, 1	, 475000
747100	, D	, Standard	, 2	, 495000
747100	, D	, Standard	, 3	, 520000
747100	, D	, Standard	, 4	, 550000
747100	, D	, Standard	, 5	, 625000
747100	, D	, Standard	, 6	, 635000
74710Q	, A	, Standard	, 1	, 507600
74710Q	, D	, Standard	, 1	, 475000
74710Q	, D	, Standard	, 2	, 495000
74710Q	, D	, Standard	, 3	, 520000
74710Q	, D	, Standard	, 4	, 550000
74710Q	, D	, Standard	, 5	, 625000
74710Q	, D	, Standard	, 6	, 635000
747200	, A	, Standard	, 1	, 507600
747200	, D	, Standard	, 1	, 525000
747200	, D	, Standard	, 2	, 545000
747200	, D	, Standard	, 3	, 565000
747200	, D	, Standard	, 4	, 610000
747200	, D	, Standard	, 5	, 665000
747200	, D	, Standard	, 6	, 725000
747200	, D	, Standard	, 7	, 775000
74720A	, A	, Standard	, 1	, 507600
74720A	, D	, Standard	, 1	, 475000
74720A	, D	, Standard	, 2	, 500000
74720A	, D	, Standard	, 3	, 520000
74720A	, D	, Standard	, 4	, 560000
74720A	, D	, Standard	, 5	, 610000
74720A	, D	, Standard	, 6	, 675000
74720A	, D	, Standard	, 7	, 725000
74720B	, A	, Standard	, 1	, 567000
74720B	, D	, Standard	, 1	, 525000
74720B	, D	, Standard	, 2	, 545000
74720B	, D	, Standard	, 3	, 565000
74720B	, D	, Standard	, 4	, 610000
74720B	, D	, Standard	, 5	, 665000
74720B	, D	, Standard	, 6	, 725000
74720B	, D	, Standard	, 7	, 775000
747400	, A	, Standard	, 1	, 567000
747400	, D	, Standard	, 1	, 571000
747400	, D	, Standard	, 2	, 593000
747400	, D	, Standard	, 3	, 614000
747400	, D	, Standard	, 4	, 663000
747400	, D	, Standard	, 5	, 723000
747400	, D	, Standard	, 6	, 788000
747400	, D	, Standard	, 7	, 843000
747SP	, A	, Standard	, 1	, 427500
747SP	, D	, Standard	, 1	, 400000
747SP	, D	, Standard	, 2	, 422000
747SP	, D	, Standard	, 3	, 443000
747SP	, D	, Standard	, 4	, 475000
747SP	, D	, Standard	, 5	, 518000
747SP	, D	, Standard	, 6	, 560000
747SP	, D	, Standard	, 7	, 625000
757PW	, A	, Standard	, 1	, 178200
757PW	, D	, Standard	, 1	, 165000
757PW	, D	, Standard	, 2	, 171000
757PW	, D	, Standard	, 3	, 178000
757PW	, D	, Standard	, 4	, 190000
757PW	, D	, Standard	, 5	, 206000

File: D:\inm600\sys_data\prof_pts.dbf

Last update: 22-Oct-1998

Fields(10):

1	ACFT_ID	C	6
2	OP_TYPE	C	1
3	PROF_ID1	C	8
4	PROF_ID2	C	1
5	PT_NUM	N	3.0
6	DISTANCE	N	10.1
7	ALTITUDE	N	7.1
8	SPEED	N	5.1
9	THR_SET	N	8.2
10	OP_MODE	C	1

Records(501):

727200	, A	, Standard	, 1	, 1	, -114487.0	, 6000.0	, 250.0	, 809.00	, A
727200	, A	, Standard	, 1	, 2	, -57243.0	, 3000.0	, 142.0	, 4490.00	, A
727200	, A	, Standard	, 1	, 3	, -28622.0	, 1500.0	, 142.0	, 4490.00	, A
727200	, A	, Standard	, 1	, 4	, -19081.0	, 1000.0	, 142.0	, 4490.00	, A
727200	, A	, Standard	, 1	, 5	, 0.0	, 0.0	, 142.0	, 4490.00	, A
727200	, A	, Standard	, 1	, 6	, 406.0	, 0.0	, 142.0	, 7135.00	, A
727200	, A	, Standard	, 1	, 7	, 4060.0	, 0.0	, 30.0	, 1190.00	, A
727200	, D	, Standard	, 1	, 1	, 0.0	, 0.0	, 16.0	, 11895.00	, D
727200	, D	, Standard	, 1	, 2	, 5968.0	, 0.0	, 153.0	, 11895.00	, D
727200	, D	, Standard	, 1	, 3	, 13346.0	, 1000.0	, 153.0	, 11895.00	, D
727200	, D	, Standard	, 1	, 4	, 34849.0	, 2886.0	, 210.0	, 11895.00	, D
727200	, D	, Standard	, 1	, 5	, 35849.0	, 3011.0	, 210.0	, 10712.00	, D
727200	, D	, Standard	, 1	, 6	, 50495.0	, 3893.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 1	, 7	, 66155.0	, 5511.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 1	, 8	, 87813.0	, 7511.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 1	, 9	, 119224.0	, 10011.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 2	, 1	, 0.0	, 0.0	, 16.0	, 11895.00	, D
727200	, D	, Standard	, 2	, 2	, 6863.0	, 0.0	, 157.0	, 11895.00	, D
727200	, D	, Standard	, 2	, 3	, 15215.0	, 1000.0	, 157.0	, 11895.00	, D
727200	, D	, Standard	, 2	, 4	, 35663.0	, 2501.0	, 210.0	, 11895.00	, D
727200	, D	, Standard	, 2	, 5	, 36663.0	, 2613.0	, 210.0	, 10712.00	, D
727200	, D	, Standard	, 2	, 6	, 40124.0	, 3000.0	, 210.0	, 10712.00	, D
727200	, D	, Standard	, 2	, 7	, 55648.0	, 3801.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 2	, 8	, 74053.0	, 5500.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 2	, 9	, 98482.0	, 7500.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 2	, 10	, 134190.0	, 10000.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 3	, 1	, 0.0	, 0.0	, 16.0	, 11895.00	, D
727200	, D	, Standard	, 3	, 2	, 7821.0	, 0.0	, 162.0	, 11895.00	, D
727200	, D	, Standard	, 3	, 3	, 17257.0	, 1000.0	, 162.0	, 11895.00	, D
727200	, D	, Standard	, 3	, 4	, 38791.0	, 2395.0	, 210.0	, 11895.00	, D
727200	, D	, Standard	, 3	, 5	, 39791.0	, 2495.0	, 210.0	, 10712.00	, D
727200	, D	, Standard	, 3	, 6	, 44869.0	, 3000.0	, 210.0	, 10712.00	, D
727200	, D	, Standard	, 3	, 7	, 62604.0	, 3838.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 3	, 8	, 82774.0	, 5500.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 3	, 9	, 110265.0	, 7500.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 3	, 10	, 150808.0	, 10000.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 4	, 1	, 0.0	, 0.0	, 16.0	, 11895.00	, D
727200	, D	, Standard	, 4	, 2	, 8841.0	, 0.0	, 166.0	, 11895.00	, D
727200	, D	, Standard	, 4	, 3	, 19481.0	, 1000.0	, 166.0	, 11895.00	, D
727200	, D	, Standard	, 4	, 4	, 41927.0	, 2296.0	, 210.0	, 11895.00	, D
727200	, D	, Standard	, 4	, 5	, 42927.0	, 2386.0	, 210.0	, 10712.00	, D
727200	, D	, Standard	, 4	, 6	, 49824.0	, 3000.0	, 210.0	, 10712.00	, D
727200	, D	, Standard	, 4	, 7	, 69803.0	, 3858.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 4	, 8	, 92071.0	, 5500.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 4	, 9	, 122969.0	, 7500.0	, 250.0	, 10712.00	, D
727200	, D	, Standard	, 4	, 10	, 168992.0	, 10000.0	, 250.0	, 10712.00	, D
747100	, A	, Standard	, 1	, 1	, -114487.0	, 6000.0	, 250.0	, 1000.00	, A
747100	, A	, Standard	, 1	, 2	, -57243.0	, 3000.0	, 143.0	, 7440.00	, A
747100	, A	, Standard	, 1	, 3	, -28622.0	, 1500.0	, 143.0	, 7550.00	, A
747100	, A	, Standard	, 1	, 4	, -19081.0	, 1000.0	, 143.0	, 7550.00	, A
747100	, A	, Standard	, 1	, 5	, 0.0	, 0.0	, 143.0	, 7550.00	, A
747100	, A	, Standard	, 1	, 6	, 420.0	, 0.0	, 143.0	, 19825.00	, A
747100	, A	, Standard	, 1	, 7	, 4200.0	, 0.0	, 30.0	, 3305.00	, A
747100	, D	, Standard	, 1	, 1	, 0.0	, 0.0	, 16.0	, 33042.00	, D
747100	, D	, Standard	, 1	, 2	, 4358.0	, 0.0	, 147.0	, 33042.00	, D
747100	, D	, Standard	, 1	, 3	, 9719.0	, 1000.0	, 147.0	, 33042.00	, D
747100	, D	, Standard	, 1	, 4	, 15129.0	, 1607.0	, 172.0	, 33042.00	, D

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Last update: 13-Sep-1999

Fields(11):

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1 ACFT_ID      C    6
2 OP_TYPE     C    1
3 PROF_ID1    C    8
4 PROF_ID2    C    1
5 STEP_NUM    N    2.0
6 STEP_TYPE   C    1
7 FLAP_ID     C    6
8 THR_TYPE    C    1
9 PARAM1      N    7.1
10 PARAM2     N    5.1
11 PARAM3     N    9.1

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Records (6249):

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737300 , A , Standard , 1 , 1 , D , ZERO , , , 6000.0 , 250.0 , , 3.0
737300 , A , Standard , 1 , 2 , D , 5 , , , 3000.0 , 170.0 , , 3.0
737300 , A , Standard , 1 , 3 , D , D-15 , , , 1500.0 , 148.6 , , 3.0
737300 , A , Standard , 1 , 4 , D , D-30 , , , 1000.0 , 139.0 , , 3.0
737300 , A , Standard , 1 , 5 , L , D-30 , , , 316.8 , 139.0 , , 0.0
737300 , A , Standard , 1 , 6 , B , , , , 2851.2 , 131.9 , , 60.0
737300 , A , Standard , 1 , 7 , B , , , , 0.0 , 30.0 , , 10.0
737300 , D , Standard , 1 , 1 , T , 5 , , T , 0.0 , 147.9 , , 0.0
737300 , D , Standard , 1 , 2 , C , 5 , , T , 1000.0 , 0.0 , , 0.0
737300 , D , Standard , 1 , 3 , A , 5 , , T , 1949.0 , 168.0 , , 0.0
737300 , D , Standard , 1 , 4 , A , 1 , , T , 1949.0 , 190.0 , , 0.0
737300 , D , Standard , 1 , 5 , A , ZERO , , C , 1000.0 , 210.0 , , 0.0
737300 , D , Standard , 1 , 6 , C , ZERO , , C , 3000.0 , 0.0 , , 0.0
737300 , D , Standard , 1 , 7 , A , ZERO , , C , 1000.0 , 250.0 , , 0.0
737300 , D , Standard , 1 , 8 , C , ZERO , , C , 5500.0 , 0.0 , , 0.0
737300 , D , Standard , 1 , 9 , C , ZERO , , C , 7500.0 , 0.0 , , 0.0
737300 , D , Standard , 1 , 10 , C , ZERO , , C , 10000.0 , 0.0 , , 0.0
737300 , D , Standard , 2 , 1 , T , 5 , , T , 0.0 , 152.4 , , 0.0
737300 , D , Standard , 2 , 2 , C , 5 , , T , 1000.0 , 0.0 , , 0.0
737300 , D , Standard , 2 , 3 , A , 5 , , T , 1829.0 , 172.0 , , 0.0
737300 , D , Standard , 2 , 4 , A , 1 , , T , 1829.0 , 190.0 , , 0.0
737300 , D , Standard , 2 , 5 , A , ZERO , , C , 1000.0 , 210.0 , , 0.0
737300 , D , Standard , 2 , 6 , C , ZERO , , C , 3000.0 , 0.0 , , 0.0
737300 , D , Standard , 2 , 7 , A , ZERO , , C , 1000.0 , 250.0 , , 0.0
737300 , D , Standard , 2 , 8 , C , ZERO , , C , 5500.0 , 0.0 , , 0.0
737300 , D , Standard , 2 , 9 , C , ZERO , , C , 7500.0 , 0.0 , , 0.0
737300 , D , Standard , 2 , 10 , C , ZERO , , C , 10000.0 , 0.0 , , 0.0
737300 , D , Standard , 3 , 1 , T , 5 , , T , 0.0 , 156.8 , , 0.0
737300 , D , Standard , 3 , 2 , C , 5 , , T , 1000.0 , 0.0 , , 0.0
737300 , D , Standard , 3 , 3 , A , 5 , , T , 1720.0 , 177.0 , , 0.0
737300 , D , Standard , 3 , 4 , A , 1 , , T , 1720.0 , 190.0 , , 0.0
737300 , D , Standard , 3 , 5 , A , ZERO , , C , 1000.0 , 210.0 , , 0.0
737300 , D , Standard , 3 , 6 , C , ZERO , , C , 3000.0 , 0.0 , , 0.0
737300 , D , Standard , 3 , 7 , A , ZERO , , C , 1000.0 , 250.0 , , 0.0
737300 , D , Standard , 3 , 8 , C , ZERO , , C , 5500.0 , 0.0 , , 0.0
737300 , D , Standard , 3 , 9 , C , ZERO , , C , 7500.0 , 0.0 , , 0.0
737300 , D , Standard , 3 , 10 , C , ZERO , , C , 10000.0 , 0.0 , , 0.0
737300 , D , Standard , 4 , 1 , T , 5 , , T , 0.0 , 164.6 , , 0.0
737300 , D , Standard , 4 , 2 , C , 5 , , T , 1000.0 , 0.0 , , 0.0
737300 , D , Standard , 4 , 3 , A , 5 , , T , 1544.0 , 185.0 , , 0.0
737300 , D , Standard , 4 , 4 , A , 1 , , T , 1544.0 , 190.0 , , 0.0
737300 , D , Standard , 4 , 5 , A , ZERO , , C , 1000.0 , 220.0 , , 0.0
737300 , D , Standard , 4 , 6 , C , ZERO , , C , 3000.0 , 0.0 , , 0.0
737300 , D , Standard , 4 , 7 , A , ZERO , , C , 1000.0 , 250.0 , , 0.0
737300 , D , Standard , 4 , 8 , C , ZERO , , C , 5500.0 , 0.0 , , 0.0
737300 , D , Standard , 4 , 9 , C , ZERO , , C , 7500.0 , 0.0 , , 0.0
737300 , D , Standard , 4 , 10 , C , ZERO , , C , 10000.0 , 0.0 , , 0.0
7373B2 , A , Standard , 1 , 1 , D , ZERO , , , 6000.0 , 250.0 , , 3.0
7373B2 , A , Standard , 1 , 2 , D , 5 , , , 3000.0 , 170.0 , , 3.0
7373B2 , A , Standard , 1 , 3 , D , D-15 , , , 1500.0 , 148.6 , , 3.0
7373B2 , A , Standard , 1 , 4 , D , D-30 , , , 1000.0 , 139.0 , , 3.0
7373B2 , A , Standard , 1 , 5 , L , D-30 , , , 316.8 , 139.0 , , 0.0
7373B2 , A , Standard , 1 , 6 , B , , , , 2851.2 , 131.9 , , 60.0
7373B2 , A , Standard , 1 , 7 , B , , , , 0.0 , 30.0 , , 10.0
7373B2 , D , Standard , 1 , 1 , T , 5 , , T , 0.0 , 149.8 , , 0.0
7373B2 , D , Standard , 1 , 2 , C , 5 , , T , 1000.0 , 0.0 , , 0.0

```

File: D:\inm600\sys_data\flaps.dbf

Last update: 13-Sep-1999

Fields(6):

1	ACFT_ID	C	6
2	OP_TYPE	C	1
3	FLAP_ID	C	6
4	COEFF_R	N	8.6
5	COEFF_C_D	N	8.6
6	COEFF_B	N	8.6

Records (722):

737	, A	, D-25	, 0.113106	, 0.452885	, 0.000000
737	, A	, D-30	, 0.124898	, 0.442783	, 0.000000
737	, A	, D-40	, 0.155057	, 0.432682	, 0.000000
737	, A	, U-15	, 0.088617	, 0.000000	, 0.000000
737	, A	, U-25	, 0.097687	, 0.000000	, 0.000000
737	, D	, 10	, 0.093192	, 0.457438	, 0.010935
737	, D	, 25	, 0.109993	, 0.436124	, 0.010293
737	, D	, 5	, 0.085235	, 0.475473	, 0.011593
737	, D	, INT	, 0.074770	, 0.000000	, 0.000000
737	, D	, ZERO	, 0.064300	, 0.000000	, 0.000000
737300	, A	, D-15	, 0.110300	, 0.463900	, 0.000000
737300	, A	, D-30	, 0.124700	, 0.434000	, 0.000000
737300	, A	, D-40	, 0.147100	, 0.421500	, 0.000000
737300	, D	, 1	, 0.076100	, 0.495800	, 0.012600
737300	, D	, 15	, 0.087200	, 0.457200	, 0.011100
737300	, D	, 5	, 0.079100	, 0.477200	, 0.012000
737300	, D	, ZERO	, 0.062000	, 0.000000	, 0.000000
7373B2	, A	, D-15	, 0.110300	, 0.463900	, 0.000000
7373B2	, A	, D-30	, 0.124700	, 0.434000	, 0.000000
7373B2	, A	, D-40	, 0.147100	, 0.421500	, 0.000000
7373B2	, D	, 1	, 0.076100	, 0.495800	, 0.012400
7373B2	, D	, 15	, 0.087200	, 0.457500	, 0.011000
7373B2	, D	, 5	, 0.079400	, 0.478400	, 0.011700
7373B2	, D	, ZERO	, 0.062000	, 0.000000	, 0.000000
737400	, A	, D-15	, 0.107900	, 0.477900	, 0.000000
737400	, A	, D-30	, 0.125100	, 0.433800	, 0.000000
737400	, A	, D-40	, 0.151000	, 0.423000	, 0.000000
737400	, D	, 1	, 0.071300	, 0.000000	, 0.000000
737400	, D	, 15	, 0.092400	, 0.459600	, 0.010900
737400	, D	, 5	, 0.079800	, 0.483400	, 0.011700
737400	, D	, ZERO	, 0.062800	, 0.000000	, 0.000000
737500	, A	, D-15	, 0.108400	, 0.453800	, 0.000000
737500	, A	, D-30	, 0.125300	, 0.428100	, 0.000000
737500	, A	, D-40	, 0.151000	, 0.416600	, 0.000000
737500	, D	, 1	, 0.071200	, 0.000000	, 0.000000
737500	, D	, 15	, 0.092500	, 0.454100	, 0.010900
737500	, D	, 5	, 0.080300	, 0.477100	, 0.011700
737500	, D	, ZERO	, 0.062000	, 0.000000	, 0.000000
737D17	, A	, D-25	, 0.113169	, 0.451848	, 0.000000
737D17	, A	, D-30	, 0.125252	, 0.443779	, 0.000000
737D17	, A	, D-40	, 0.156502	, 0.434096	, 0.000000
737D17	, A	, U-15	, 0.106085	, 0.000000	, 0.000000
737D17	, A	, U-25	, 0.097127	, 0.000000	, 0.000000
737D17	, D	, 10	, 0.096364	, 0.456114	, 0.010956
737D17	, D	, 25	, 0.108780	, 0.436124	, 0.010406
737D17	, D	, 5	, 0.087424	, 0.473007	, 0.011677
737D17	, D	, INT	, 0.075860	, 0.000000	, 0.000000
737D17	, D	, ZERO	, 0.064300	, 0.000000	, 0.000000
737QN	, A	, D-25	, 0.113106	, 0.452885	, 0.000000
737QN	, A	, D-30	, 0.124898	, 0.442783	, 0.000000
737QN	, A	, D-40	, 0.155057	, 0.432682	, 0.000000
737QN	, A	, U-15	, 0.088617	, 0.000000	, 0.000000
737QN	, A	, U-25	, 0.097687	, 0.000000	, 0.000000
737QN	, D	, 10	, 0.093192	, 0.457438	, 0.010935
737QN	, D	, 25	, 0.109993	, 0.436124	, 0.010293
737QN	, D	, 5	, 0.085235	, 0.475473	, 0.011593
737QN	, D	, INT	, 0.074770	, 0.000000	, 0.000000
737QN	, D	, ZERO	, 0.064300	, 0.000000	, 0.000000
74710Q	, A	, D-20	, 0.109467	, 0.217555	, 0.000000
74710Q	, A	, D-25	, 0.116953	, 0.210537	, 0.000000
74710Q	, A	, D-30	, 0.142564	, 0.202116	, 0.000000

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File: D:\inm600\sys_data\thr_jet.dbf

Last update: 6-Sep-1999

Fields(7):

1	ACFT_ID	C	6
2	THR_TYPE	C	1
3	COEFF_E	N	8.1
4	COEFF_F	N	10.5
5	COEFF_GA	C	12
6	COEFF_GB	C	12
7	COEFF_H	C	10

Records(185):

707320	, T,	18044.7	, -15.79760	, +1.89300e-01	, +6.45950e-06	, +0.000e+00
707320	, C,	15943.8	, -13.95840	, +1.67200e-01	, +5.70740e-06	, +0.000e+00
707QN	, T,	18044.7	, -15.79760	, +1.89300e-01	, +6.45950e-06	, +0.000e+00
707QN	, C,	15943.8	, -13.95840	, +1.67200e-01	, +5.70740e-06	, +0.000e+00
720B	, T,	16768.6	, -15.47100	, +1.40178e-01	, +2.05590e-06	, +0.000e+00
720B	, C,	14540.1	, -13.41490	, +1.21548e-01	, +1.78264e-06	, +0.000e+00
727100	, T,	13218.9	, -8.78972	, -5.71710e-02	, +5.98480e-06	, +0.000e+00
727100	, C,	12029.2	, -7.99864	, -5.20250e-02	, +5.44617e-06	, +0.000e+00
727D15	, T,	14935.3	, -7.45900	, 3.33700e-01	, 0.00000e+00	, -1.478e+01
727D15	, S,	15524.3	, -7.06600	, 0.00000e+00	, 0.00000e+00	, -3.238e+01
727D15	, C,	14249.6	, -8.10300	, -4.36000e-02	, 0.00000e+00	, -1.030e+02
727D17	, T,	15519.8	, -8.46009	, +2.33373e-01	, -2.91450e-05	, +0.000e+00
727D17	, C,	13812.7	, -7.52948	, +2.07702e-01	, -2.59390e-05	, +0.000e+00
727EM1	, T,	13218.9	, -8.78972	, -5.71710e-02	, 5.98480e-06	, 0.000e+00
727EM1	, C,	12029.2	, -7.99864	, -5.20250e-02	, 5.44617e-06	, 0.000e+00
727EM2	, T,	14935.3	, -7.45900	, 3.33700e-01	, 0.00000e+00	, -1.478e+01
727EM2	, S,	15524.3	, -7.06600	, 0.00000e+00	, 0.00000e+00	, -3.238e+01
727EM2	, C,	14249.6	, -8.10300	, -4.36000e-02	, 0.00000e+00	, -1.030e+02
727Q15	, T,	14935.3	, -7.45900	, 3.33700e-01	, 0.00000e+00	, -1.478e+01
727Q15	, S,	15524.3	, -7.06600	, 0.00000e+00	, 0.00000e+00	, -3.238e+01
727Q15	, C,	14249.6	, -8.10300	, -4.36000e-02	, 0.00000e+00	, -1.030e+02
727Q7	, T,	13218.9	, -8.78972	, -5.71710e-02	, +5.98480e-06	, +0.000e+00
727Q7	, C,	12029.2	, -7.99864	, -5.20250e-02	, +5.44617e-06	, +0.000e+00
727Q9	, T,	12075.6	, -8.72702	, -5.27000e-04	, -4.87510e-06	, +0.000e+00
727Q9	, C,	12746.2	, -8.11613	, -4.90000e-04	, -4.53384e-06	, +0.000e+00
727QF	, T,	14100.0	, -12.25000	, +1.49500e-01	, -1.17500e-05	, +0.000e+00
727QF	, S,	16800.0	, -12.25000	, +0.00000e+00	, +0.00000e+00	, -9.000e+01
727QF	, N,	11987.0	, -9.33500	, +1.58001e-01	, -4.70391e-06	, +0.000e+00
727QF	, M,	14687.0	, -9.33500	, +0.00000e+00	, +0.00000e+00	, -9.000e+01
727QF	, C,	11266.0	, -9.33500	, +1.69297e-01	, -4.70391e-06	, +0.000e+00
727QF	, B,	13966.0	, -9.33500	, +0.00000e+00	, +0.00000e+00	, -9.000e+01
737	, T,	13847.9	, -8.62596	, -2.89390e-02	, -4.64800e-07	, +0.000e+00
737	, C,	12740.1	, -7.93589	, -2.66230e-02	, -4.27620e-07	, +0.000e+00
737300	, T,	18745.0	, -20.12000	, +4.04300e-01	, +0.00000e+00	, +0.000e+00
737300	, C,	17448.0	, -17.32000	, +1.55700e-01	, +0.00000e+00	, +0.000e+00
7373B2	, T,	20758.0	, -20.65000	, +2.17300e-01	, +0.00000e+00	, -2.418e+00
7373B2	, C,	18859.0	, -17.91000	, +1.95300e-01	, +0.00000e+00	, -2.034e+00
737400	, T,	21610.0	, -20.83000	, +2.27400e-01	, +0.00000e+00	, +0.000e+00
737400	, C,	19695.0	, -18.15000	, +2.08000e-01	, +0.00000e+00	, +0.000e+00
737500	, T,	18745.0	, -20.12000	, +4.04300e-01	, +0.00000e+00	, +0.000e+00
737500	, C,	17448.0	, -17.32000	, +1.55700e-01	, +0.00000e+00	, +0.000e+00
737D17	, T,	15519.8	, -8.46009	, +2.33373e-01	, -2.91450e-05	, +0.000e+00
737D17	, C,	13083.2	, -7.13185	, +1.96733e-01	, -2.45690e-05	, +0.000e+00
737N17	, T,	15519.8	, -8.46009	, +2.33373e-01	, -2.91450e-05	, 0.000e+00
737N17	, C,	13083.2	, -7.13185	, +1.96733e-01	, -2.45690e-05	, 0.000e+00
737N9	, T,	13847.9	, -8.62596	, -2.89390e-02	, -4.64800e-07	, 0.000e+00
737N9	, C,	12740.1	, -7.93589	, -2.66230e-02	, -4.27620e-07	, 0.000e+00
737QN	, T,	13847.9	, -8.62596	, -2.89390e-02	, -4.64800e-07	, +0.000e+00
737QN	, C,	12740.1	, -7.93589	, -2.66230e-02	, -4.27620e-07	, +0.000e+00
74710Q	, T,	42780.7	, -50.59000	, +3.49279e-01	, -1.06970e-05	, +0.000e+00
74710Q	, C,	36791.4	, -43.50740	, +3.00400e-01	, -9.20000e-06	, +0.000e+00
747200	, T,	42780.7	, -50.59000	, +3.49279e-01	, -1.06970e-05	, +0.000e+00
747200	, C,	36791.4	, -43.50740	, +3.00400e-01	, -9.20000e-06	, +0.000e+00
74720A	, T,	40870.0	, -40.11000	, +4.43500e-01	, +0.00000e+00	, +0.000e+00
74720A	, C,	34860.0	, -35.00000	, +4.96200e-01	, +0.00000e+00	, +0.000e+00
74720B	, T,	48866.0	, -43.68000	, +6.64100e-01	, +0.00000e+00	, +0.000e+00
74720B	, C,	39594.0	, -38.08000	, +5.26200e-01	, +0.00000e+00	, +0.000e+00
747400	, T,	53670.0	, -54.30000	, +5.15000e-01	, +0.00000e+00	, +0.000e+00
747400	, C,	43601.0	, -42.70000	, +7.26000e-01	, +0.00000e+00	, +0.000e+00
747SP	, T,	42780.7	, -50.59000	, +3.49279e-01	, -1.06970e-05	, +0.000e+00

747SP	C	36791.4	-43.50740	+3.00400e-01	-9.20000e-06	+0.000e+00
757PW	T	35866.0	-39.72000	+6.80600e-01	+0.00000e+00	-8.371e-01
757PW	C	28765.0	-32.00000	+4.01500e-01	+0.00000e+00	+1.471e-01
757RR	T	37092.0	-33.50000	+3.99800e-01	+0.00000e+00	+0.000e+00
757RR	C	29350.0	-29.50000	+4.15300e-01	+0.00000e+00	+0.000e+00
767300	T	56370.0	-53.00000	+2.51000e-01	+0.00000e+00	+0.000e+00
767300	C	45480.0	-41.90000	+5.59000e-01	+0.00000e+00	+0.000e+00
767CF6	T	44769.0	-48.34000	+5.00000e-01	+0.00000e+00	+0.000e+00
767CF6	C	38057.0	-43.24000	+7.05000e-01	+0.00000e+00	+0.000e+00
767JT9	T	43190.0	-38.30000	+8.76000e-01	+0.00000e+00	+0.000e+00
767JT9	C	38700.0	-34.50000	+4.90000e-01	+0.00000e+00	+0.000e+00
777200	T	79673.0	-106.73000	-3.55000e-01	0.00000e+00	0.000e+00
777200	C	61298.0	-56.00000	6.44600e-01	0.00000e+00	0.000e+00
A300	T	49336.9	-39.82430	-1.42311e-01	+7.12738e-07	+0.000e+00
A300	C	43416.5	-35.00000	-1.25234e-01	+6.27209e-07	+0.000e+00
A310	T	49459.6	-48.64640	+1.30258e+00	-2.72082e-05	+0.000e+00
A310	C	43524.4	-42.80000	+1.14627e+00	-2.39432e-05	+0.000e+00
A320	T	23740.2	-21.09210	-7.22000e-02	+3.59700e-07	+0.000e+00
A320	C	20891.4	-18.56110	-6.36000e-02	+3.16980e-07	+0.000e+00
A7D	T	13961.1	-5.79744	+1.66790e-01	+3.77961e-06	+0.000e+00
A7D	C	12844.2	-5.33364	+1.53447e-01	+3.47724e-06	+0.000e+00
BAC111	T	11168.1	-6.70084	-2.23360e-02	+0.00000e+00	+0.000e+00
BAC111	C	9827.9	-5.89674	-1.96560e-02	+0.00000e+00	+0.000e+00
BAE146	T	6542.4	-9.95850	+5.60570e-02	-3.50000e-06	+0.000e+00
BAE146	C	6339.4	-9.95850	+5.60570e-02	-3.50000e-06	+0.000e+00
BAE300	T	6542.4	-9.95850	+5.60570e-02	-3.50000e-06	+0.000e+00
BAE300	C	6339.4	-9.95850	+5.60570e-02	-3.50000e-06	+0.000e+00
CIT3	T	3319.3	-3.88800	+6.80320e-02	-1.29600e-06	+0.000e+00
CIT3	C	2987.4	-3.49920	+6.12300e-02	-1.16640e-06	+0.000e+00
CL600	T	6159.2	-6.28240	+9.38000e-02	+0.00000e+00	+0.000e+00
CL600	C	5543.3	-5.65420	+8.44200e-02	+0.00000e+00	+0.000e+00
CL601	T	7241.4	-7.38620	+1.08620e-01	+0.00000e+00	+0.000e+00
CL601	C	6517.3	-6.64760	+9.77600e-02	+0.00000e+00	+0.000e+00
CNA500	T	2132.8	-2.21793	+6.83330e-02	-2.67224e-06	+0.000e+00
CNA500	C	1919.5	-1.99614	+6.15000e-02	-2.40502e-06	+0.000e+00
COMJET	T	3366.0	-3.88800	+6.90000e-02	-1.31400e-06	+0.000e+00
COMJET	C	3029.4	-3.49920	+6.21000e-02	-1.18260e-06	+0.000e+00
CONCRD	T	39653.0	-31.72200	+2.77600e-01	+0.00000e+00	+0.000e+00
CONCRD	C	33252.1	-26.60000	+2.32800e-01	+0.00000e+00	+0.000e+00
DC1010	T	35985.4	-30.99090	-1.10745e-01	+5.54650e-07	+0.000e+00
DC1010	C	30596.0	-28.44160	-1.01635e-01	+5.09020e-07	+0.000e+00
DC1030	T	49310.0	-42.42000	+6.10000e-01	+0.00000e+00	+0.000e+00
DC1030	C	38520.0	-29.38000	+4.90000e-01	+0.00000e+00	+0.000e+00
DC1040	T	41594.9	-22.30710	-7.97140e-02	+3.99230e-07	+0.000e+00
DC1040	C	34087.9	-12.98590	-4.64050e-02	+2.32410e-07	+0.000e+00
DC850	T	15670.3	-5.89550	-2.10670e-02	+1.05510e-07	+0.000e+00
DC850	C	14243.5	-5.65650	-2.02130e-02	+1.01230e-07	+0.000e+00
DC860	T	16740.5	-4.93940	-1.76500e-02	+8.84010e-08	+0.000e+00
DC860	C	15558.7	-7.23390	-2.58500e-02	+1.29470e-07	+0.000e+00
DC870	T	20758.0	-20.65000	+2.17300e-01	+0.00000e+00	+0.000e+00
DC870	C	18859.0	-17.91000	+1.95300e-01	+0.00000e+00	-2.034e+00
DC8QN	T	16740.5	-4.93940	-1.76500e-02	+8.84010e-08	+0.000e+00
DC8QN	C	15558.7	-7.23390	-2.58500e-02	+1.29470e-07	+0.000e+00
DC910	T	12308.2	-0.47800	+1.70800e-03	+8.55000e-09	+0.000e+00
DC910	C	11194.3	-3.02740	-1.08180e-02	+5.41810e-08	+0.000e+00
DC930	T	12972.0	-2.31038	-8.25600e-03	+4.13490e-08	+0.000e+00
DC930	C	11561.8	-2.94773	-1.05340e-02	+5.27560e-08	+0.000e+00
DC93LW	T	12972.0	-2.31038	-8.25600e-03	4.13490e-08	0.000e+00
DC93LW	C	11561.8	-2.94773	-1.05340e-02	5.27560e-08	0.000e+00
DC950	T	14698.5	-2.13511	-7.62980e-03	+3.82120e-08	+0.000e+00
DC950	C	12365.4	-2.54939	-9.11020e-03	+4.56270e-08	+0.000e+00
DC95HW	T	14698.5	-2.13511	-7.62980e-03	3.82120e-08	0.000e+00
DC95HW	C	12365.4	-2.54939	-9.11020e-03	4.56270e-08	0.000e+00
DC9Q7	T	12308.2	-0.47800	+1.70800e-03	+8.55000e-09	+0.000e+00
DC9Q7	C	11194.3	-3.02740	-1.08180e-02	+5.41810e-08	+0.000e+00
DC9Q9	T	12972.0	-2.31038	-8.25600e-03	+4.13490e-08	+0.000e+00
DC9Q9	C	11561.8	-2.94773	-1.05340e-02	+5.27560e-08	+0.000e+00
DHC8	T	7026.2	-23.82720	+9.80360e-02	+0.00000e+00	+0.000e+00
DHC8	C	6323.6	-21.44450	+8.82324e-02	+0.00000e+00	+0.000e+00
DHC830	T	7421.1	-24.43540	+1.00339e-01	+0.00000e+00	+0.000e+00
DHC830	C	6679.0	-21.99190	+9.03051e-02	+0.00000e+00	+0.000e+00
EMB145	T	7499.5	-9.12812	+4.55632e-02	0.00000e+00	-2.289e+01
EMB145	C	5554.3	-6.86092	+6.54157e-02	0.00000e+00	-4.036e+00
F10062	T	13551.0	-16.56000	+2.80400e-01	+0.00000e+00	+0.000e+00

```

F10062 , C , 10472.0 , -9.57000 , +1.37000e-01 , +0.00000e+00 , +0.000e+00
F10065 , T , 14814.0 , -16.72000 , +6.50000e-02 , +0.00000e+00 , +0.000e+00
F10065 , C , 10970.0 , -10.52000 , +1.23800e-01 , +0.00000e+00 , +0.000e+00
F28MK2 , T , 9851.0 , -7.68000 , +8.89000e-02 , +0.00000e+00 , +0.000e+00
F28MK2 , C , 8408.0 , -4.72000 , +1.04800e-01 , +0.00000e+00 , +0.000e+00
F28MK4 , T , 9905.0 , -7.44500 , +7.65000e-02 , +0.00000e+00 , +0.000e+00
F28MK4 , C , 8459.0 , -4.87400 , +9.97000e-02 , +0.00000e+00 , +0.000e+00
F4C , T , 16368.2 , -6.79700 , +1.95500e-01 , +4.43130e-06 , +0.000e+00
F4C , C , 10494.9 , -4.35810 , +1.25380e-01 , +2.84120e-06 , +0.000e+00
FAL20 , T , 4017.4 , -3.45670 , +5.80240e-02 , -2.49247e-06 , +0.000e+00
FAL20 , C , 4102.0 , -2.38310 , -1.14653e-01 , +1.02126e-05 , +0.000e+00
GIIB , T , 11168.1 , -6.70084 , -2.23360e-02 , +0.00000e+00 , +0.000e+00
GIIB , C , 9827.9 , -5.89674 , -1.96560e-02 , +0.00000e+00 , +0.000e+00
GIV , T , 13180.5 , -14.87600 , +5.78000e-02 , +0.00000e+00 , +0.000e+00
GIV , C , 11598.8 , -13.09090 , +5.08640e-02 , +0.00000e+00 , +0.000e+00
IA1125 , T , 3460.5 , -3.88800 , +4.58340e-02 , -3.13320e-06 , +0.000e+00
IA1125 , C , 3114.4 , -3.49920 , +4.12500e-02 , -2.81988e-06 , +0.000e+00
KC135 , T , 10783.7 , -4.47802 , +1.28830e-01 , +2.91940e-06 , +0.000e+00
KC135 , C , 9199.2 , -3.80630 , +1.09505e-01 , +2.48150e-06 , +0.000e+00
KC135B , T , 18007.5 , -14.97710 , +1.79432e-01 , +6.12400e-06 , +0.000e+00
KC135B , C , 15306.4 , -12.73050 , +1.52517e-01 , +5.20540e-06 , +0.000e+00
KC135R , T , 20758.0 , -20.65000 , +2.17300e-01 , +0.00000e+00 , -2.418e+00
KC135R , C , 18859.0 , -17.91000 , +1.95300e-01 , +0.00000e+00 , -2.034e+00
L1011 , T , 40720.0 , -52.16330 , +3.21659e-01 , +2.39920e-06 , +0.000e+00
L1011 , C , 34204.8 , -43.81720 , +2.70193e-01 , +2.01530e-06 , +0.000e+00
L10115 , T , 46840.0 , -52.16330 , +3.21659e-01 , +2.39920e-06 , +0.000e+00
L10115 , C , 39532.9 , -44.02580 , +2.71480e-01 , +2.02494e-06 , +0.000e+00
LEAR25 , T , 2845.4 , -2.03911 , -1.67680e-02 , +2.17680e-06 , +0.000e+00
LEAR25 , C , 2560.9 , -1.83520 , -1.50910e-02 , +1.95912e-06 , +0.000e+00
LEAR35 , T , 3412.2 , -3.88800 , -4.41000e-03 , +1.54350e-06 , +0.000e+00
LEAR35 , C , 3071.0 , -3.49920 , -3.97000e-03 , +1.38915e-06 , +0.000e+00
MD11GE , T , 57156.0 , -42.73000 , +3.03000e-01 , +0.00000e+00 , -3.575e+02
MD11GE , C , 47037.0 , -45.71000 , +8.54000e-01 , +0.00000e+00 , -3.681e+02
MD11PW , T , 57661.0 , -51.30000 , +5.13000e-01 , +0.00000e+00 , -4.266e+02
MD11PW , C , 51197.0 , -59.27000 , +4.16000e-01 , +0.00000e+00 , -3.570e+02
MD81 , T , 17900.0 , -15.00000 , +2.00000e-01 , +0.00000e+00 , +0.000e+00
MD81 , C , 16018.0 , -6.25000 , +1.67000e-01 , +0.00000e+00 , -1.050e+02
MD82 , T , 19350.0 , -15.00000 , +2.00000e-01 , +0.00000e+00 , +0.000e+00
MD82 , C , 18010.0 , -9.00000 , +1.95000e-01 , +0.00000e+00 , -1.093e+02
MD83 , T , 20400.0 , -15.00000 , +1.00000e-01 , +0.00000e+00 , +0.000e+00
MD83 , C , 17742.0 , -7.20000 , +2.60000e-01 , +0.00000e+00 , -7.750e+01
MD9025 , T , 23066.0 , -23.57690 , +3.14700e-01 , +0.00000e+00 , +0.000e+00
MD9025 , S , 28697.1 , -23.57690 , 0.00000e+00 , 0.00000e+00 , -2.252e+02
MD9025 , C , 23881.0 , -30.62500 , +2.55100e-01 , +0.00000e+00 , +0.000e+00
MD9025 , B , 27078.4 , -30.62500 , 0.00000e+00 , 0.00000e+00 , -2.132e+02
MD9028 , T , 25656.0 , -25.34180 , +2.41900e-01 , +0.00000e+00 , +0.000e+00
MD9028 , S , 30520.0 , -25.34180 , 0.00000e+00 , 0.00000e+00 , -1.946e+02
MD9028 , C , 23421.0 , -26.54530 , +2.59900e-01 , +0.00000e+00 , +0.000e+00
MD9028 , B , 26678.6 , -26.54530 , 0.00000e+00 , 0.00000e+00 , -2.172e+02
MU3001 , T , 2132.8 , -2.21793 , +6.83330e-02 , -2.67224e-06 , +0.000e+00
MU3001 , C , 1919.5 , -1.99614 , +6.15000e-02 , -2.40502e-06 , +0.000e+00

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File: D:\inm600\sys_data\thr_prop.dbf

Last update: 13-Sep-1999

Fields (4) :

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1 ACFT_ID      C      6
2 THR_TYPE     C      1
3 EFFICIENCY   N     4.2
4 POWER        N     6.1

```

Records (34) :

```

BEC58P , T , 0.90 , 310.0
BEC58P , C , 0.90 , 261.3
C130 , T , 0.85 , 4205.0
C130 , C , 0.85 , 3575.0
C130E , T , 0.85 , 3700.0
C130E , C , 0.85 , 3200.0
CNA441 , T , 0.90 , 635.5
CNA441 , C , 0.90 , 620.0
COMSEP , T , 0.85 , 165.0
COMSEP , C , 0.85 , 154.0
CVR580 , T , 0.85 , 3800.0

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CVR580 , C , 0.85 , 3344.0
DC3 , T , 0.85 , 1302.0
DC3 , C , 0.85 , 1130.0
DC6 , T , 0.90 , 1900.0
DC6 , C , 0.90 , 1750.0
DHC6 , T , 0.90 , 587.0
DHC6 , C , 0.90 , 557.5
DHC6QP , T , 0.90 , 587.0
DHC6QP , C , 0.90 , 557.5
DHC7 , T , 0.90 , 940.0
DHC7 , C , 0.90 , 846.0
GASEPF , T , 0.85 , 142.0
GASEPF , C , 0.85 , 133.0
GASEPV , T , 0.85 , 260.0
GASEPV , C , 0.85 , 242.0
HS748A , T , 0.90 , 2006.0
HS748A , C , 0.90 , 1805.0
L188 , T , 0.90 , 3460.0
L188 , C , 0.90 , 3180.0
SD330 , T , 0.90 , 1080.0
SD330 , C , 0.90 , 972.0
SF340 , T , 0.90 , 1763.0
SF340 , C , 0.90 , 1587.0
    
```

File: D:\inm600\sys_data\thr_gnrl.dbf

Last update: 14-Jan-1999

Fields (9):

```

1 ACFT_ID      C      6
2 GNRL_TYPE    C      1
3 COEFF_E      N     9.1
4 COEFF_F      N    10.5
5 COEFF_GA     C     12
6 COEFF_GB     C     12
7 COEFF_H      C     10
8 COEFF_K1     C     12
9 COEFF_K2     C     12
    
```

Records (63):

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707320 , E , -25447.4 , -6.79039 , -1.77500e-02 , +0.00000e+00 , +0.000e+00 , +3.32998e+04 , -5.81700e+03
707QN , E , -25447.4 , -6.79039 , -1.77500e-02 , +0.00000e+00 , +0.000e+00 , +3.32998e+04 , -5.81700e+03
720B , E , -27419.9 , -5.81791 , -1.17500e-02 , +0.00000e+00 , +0.000e+00 , +3.56545e+04 , -6.56090e+03
727100 , E , -14205.5 , -4.53212 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.66028e+04 , -1.40302e+03
727D15 , E , -14773.7 , -5.09534 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.77173e+04 , -1.84507e+03
727D17 , E , -14773.7 , -5.09534 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.77173e+04 , -1.84507e+03
727EM2 , E , -14773.7 , -5.09534 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.77173e+04 , -1.84507e+03
727Q15 , E , -14773.7 , -5.09534 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.77173e+04 , -1.84507e+03
727Q7 , E , -14205.5 , -4.53212 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.66028e+04 , -1.40302e+03
727Q9 , E , -14095.4 , -4.77532 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.66662e+04 , -1.49042e+03
727QF , E , -10908.0 , -23.35710 , -7.23000e-02 , -1.38000e-06 , +0.000e+00 , +1.09298e+04 , +2.38086e+03
737 , E , -14095.4 , -4.77532 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.66662e+04 , -1.49042e+03
737300 , N , 11106.0 , -10.09000 , -4.09000e-02 , +0.00000e+00 , +0.000e+00 , -3.69800e+02 , +4.83500e+00
7373B2 , N , 11106.0 , -10.09000 , -4.09000e-02 , +0.00000e+00 , +0.000e+00 , -3.69800e+02 , +4.83500e+00
737400 , N , 21384.0 , -13.79000 , -4.35000e-02 , +0.00000e+00 , +0.000e+00 , -6.15800e+02 , +6.40900e+00
737500 , N , 11106.0 , -10.09000 , +4.09000e-02 , +0.00000e+00 , +0.000e+00 , -3.69800e+02 , +4.83500e+00
737D17 , E , -14773.7 , -5.09534 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.77173e+04 , -1.84507e+03
737N17 , E , -14773.7 , -5.09534 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.77173e+04 , -1.84507e+03
737N9 , E , -14095.4 , -4.77532 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.66662e+04 , -1.49042e+03
737QN , E , -14095.4 , -4.77532 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +1.66662e+04 , -1.49042e+03
74710Q , E , -141079.0 , -11.72980 , -2.83300e-02 , +0.00000e+00 , +0.000e+00 , +2.01105e+05 , -5.38430e+04
747200 , E , -141079.0 , -11.72980 , -2.83300e-02 , +0.00000e+00 , +0.000e+00 , +2.01105e+05 , -5.38430e+04
74720A , E , -32370.0 , -7.83000 , -2.10500e-02 , +0.00000e+00 , +0.000e+00 , +4.75900e+04 , +0.00000e+00
74720B , E , -28110.0 , -10.05000 , -3.54300e-02 , +0.00000e+00 , +0.000e+00 , +4.63750e+04 , +0.00000e+00
747400 , E , -49250.0 , 0.00000 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +6.22100e+04 , +0.00000e+00
747SP , E , -141079.0 , -11.72980 , -2.83300e-02 , +0.00000e+00 , +0.000e+00 , +2.01105e+05 , -5.38430e+04
757PW , E , -44951.0 , -0.83000 , +1.98000e-02 , +0.00000e+00 , +0.000e+00 , +5.29720e+04 , +0.00000e+00
757RR , E , -44907.0 , -21.97000 , -5.89000e-02 , +0.00000e+00 , +0.000e+00 , +4.69990e+04 , +0.00000e+00
767300 , E , -49250.0 , 0.00000 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +6.22100e+04 , +0.00000e+00
767CF6 , N , 62790.0 , -35.03000 , -1.17700e-01 , +0.00000e+00 , +0.000e+00 , -1.61037e+03 , +1.40000e+01
767JT9 , E , -39777.0 , -17.36700 , -4.67000e-02 , +0.00000e+00 , +0.000e+00 , +5.65500e+04 , +0.00000e+00
777200 , N , 32710.0 , 0.00000 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , -1.25800e+03 , +1.61600e+01
A300 , N , -132687.0 , -30.40920 , -1.07958e-01 , +4.02686e-07 , +0.000e+00 , +2.53575e+03 , -8.23842e+00
A310 , N , -32053.2 , -37.45740 , -1.32545e-01 , +4.08841e-07 , +0.000e+00 , +5.30300e+02 , +2.65197e+00
A320 , N , 27453.9 , -20.46200 , -6.98000e-02 , +3.01250e-07 , +0.000e+00 , -7.37784e+02 , +7.43320e+00
BAE146 , N , -13783.0 , -9.95850 , +5.60570e-02 , -1.23124e-05 , +0.000e+00 , +3.04295e+02 , -8.43270e-01
BAE300 , N , -13783.0 , -9.95850 , +5.60570e-02 , -1.23124e-05 , +0.000e+00 , +3.04295e+02 , -8.43270e-01
CNA500 , N , 1743.1 , -1.64678 , -2.01400e-03 , -1.56420e-07 , +0.000e+00 , -4.96794e+01 , +5.45000e-01
DC1010 , N , 25027.6 , -27.43130 , -7.82774e-02 , +0.00000e+00 , +0.000e+00 , -6.94556e+02 , +8.02362e+00
DC1040 , E , -143602.0 , -14.49960 , -5.02560e-02 , +0.00000e+00 , +0.000e+00 , +2.04567e+05 , -5.47619e+04
DC850 , E , -22582.8 , -6.58409 , -2.08084e-02 , +0.00000e+00 , +0.000e+00 , +2.90709e+04 , -4.34184e+03
DC860 , E , -27959.5 , -6.35297 , -1.83499e-02 , +0.00000e+00 , +0.000e+00 , +3.58503e+04 , -6.15774e+03
DC870 , N , 11106.0 , -10.09000 , -4.09000e-02 , +0.00000e+00 , +0.000e+00 , -3.69800e+02 , +4.83500e+00
    
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INM 6.0 User's Guide

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DC8QN , E , -27959.5 , -6.35297 , -1.83499e-02 , +0.00000e+00 , +0.000e+00 , +3.58503e+04 , -6.15774e+03
DC910 , E , -10596.5 , -1.51369 , -5.24660e-03 , +0.00000e+00 , +0.000e+00 , +1.15417e+04 , +1.62698e+02
DC930 , E , -13523.2 , -2.66888 , -9.25050e-03 , +0.00000e+00 , +0.000e+00 , +1.58036e+04 , -1.25794e+03
DC93LW , E , -13523.2 , -2.66888 , -9.25050e-03 , +0.00000e+00 , +0.000e+00 , +1.58036e+04 , -1.25794e+03
DC950 , E , -13523.2 , -2.66888 , -9.25050e-03 , +0.00000e+00 , +0.000e+00 , +1.58036e+04 , -1.25794e+03
DC95HW , E , -13523.2 , -2.66888 , -9.25050e-03 , +0.00000e+00 , +0.000e+00 , +1.58036e+04 , -1.25794e+03
DC9Q7 , E , -10596.5 , -1.51369 , -5.24660e-03 , +0.00000e+00 , +0.000e+00 , +1.15417e+04 , +1.62698e+02
DC9Q9 , E , -13523.2 , -2.66888 , -9.25050e-03 , +0.00000e+00 , +0.000e+00 , +1.58036e+04 , -1.25794e+03
DHC8 , N , 2010.7 , -19.40900 , +7.74300e-02 , +0.00000e+00 , +0.000e+00 , +5.46666e+01 , -8.28000e-02
DHC830 , N , 1623.1 , -18.41100 , +7.51040e-02 , +0.00000e+00 , +0.000e+00 , +7.26356e+01 , -1.79510e-01
KC135 , E , -6592.3 , 0.51613 , +1.79780e-03 , +0.00000e+00 , +0.000e+00 , +6.73534e+03 , +3.78396e-01
KC135B , E , -25447.4 , -6.79039 , -1.77500e-02 , +0.00000e+00 , +0.000e+00 , +3.32998e+04 , -5.81700e+03
KC135R , N , 11106.0 , -10.09000 , -4.09000e-02 , +0.00000e+00 , +0.000e+00 , -3.69800e+02 , +4.80000e+00
L1011 , E , -80222.2 , -25.02630 , +0.00000e+00 , +0.00000e+00 , +0.000e+00 , +9.28935e+04 , -1.01861e+04
MD81 , E , -15384.0 , -10.00000 , +1.90000e-02 , +0.00000e+00 , +0.000e+00 , +1.79170e+04 , +0.00000e+00
MD82 , E , -13488.0 , -10.00000 , +2.50000e-02 , +0.00000e+00 , +0.000e+00 , +1.67500e+04 , +0.00000e+00
MD83 , E , -13845.0 , -13.33000 , +1.90000e-02 , +0.00000e+00 , +0.000e+00 , +1.75000e+04 , +0.00000e+00
MD9025 , E , -31899.0 , -8.57180 , -2.76000e-02 , +0.00000e+00 , +0.000e+00 , +3.72060e+04 , +0.00000e+00
MD9028 , E , -31899.0 , -8.57180 , -2.76000e-02 , +0.00000e+00 , +0.000e+00 , +3.72060e+04 , +0.00000e+00
MU3001 , N , 1743.1 , -1.64678 , -2.01400e-03 , -1.56420e-07 , +0.000e+00 , -4.96794e+01 , +5.45000e-01

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File: D:\inm600\sys_data\metric.dbf

Last update: 6-May-1998

Fields (7):

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1 METRIC_ID C 6
2 METRIC_TYP C 1
3 FREQ_TYPE C 1
4 WGT_DAY N 6.2
5 WGT_EVE N 6.2
6 WGT_NIGHT N 6.2
7 DB_MINUS N 5.2

```

Records (16):

```

CEXP , E , C , 1.00 , 1.00 , 1.00 , 0.00
CNEL , E , A , 1.00 , 3.00 , 10.00 , 49.37
DNL , E , A , 1.00 , 1.00 , 10.00 , 49.37
EPNL , E , P , 1.00 , 1.00 , 1.00 , 0.00
LAEQ , E , A , 1.00 , 1.00 , 1.00 , 49.37
LAEQD , E , A , 1.00 , 1.00 , 0.00 , 47.32
LAEQN , E , A , 0.00 , 0.00 , 1.00 , 45.11
LAMAX , M , A , 1.00 , 1.00 , 1.00 , 0.00
LCMAX , M , C , 1.00 , 1.00 , 1.00 , 0.00
NEF , E , P , 1.00 , 1.00 , 16.67 , 88.00
PNLTM , M , P , 1.00 , 1.00 , 1.00 , 0.00
SEL , E , A , 1.00 , 1.00 , 1.00 , 0.00
TALA , T , A , 1.00 , 1.00 , 1.00 , 0.00
TALC , T , C , 1.00 , 1.00 , 1.00 , 0.00
TAPNL , T , P , 1.00 , 1.00 , 1.00 , 0.00
WECPNL , E , P , 1.00 , 3.00 , 10.00 , 39.37

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G. NOISE IDENTIFIER CROSS REFERENCE

Use this Appendix to look up a noise identifier and find the aircraft that use it.

	<u>Noise Id</u>	<u>Aircraft Id</u>
1.	2CF650	A300, A310
2.	2CF680	767300, 767CF6, 767JT9
3.	2CF68D	MD11GE
4.	2JT8D	737, BAC111, DC910, DC930
5.	2JT8D2	MD81, MD82, MD83
6.	2JT8DH	DC95HW
7.	2JT8DL	DC93LW
8.	2JT8DN	737N17, 737N9
9.	2JT8DQ	737D17, 737QN, DC950, DC9Q7, DC9Q9
10.	2R2800	DC3
11.	302C	LIGHTN
12.	3JT8D	727100, 727200, 727D15
13.	3JT8DQ	727D17, 727Q15, 727Q7, 727Q9
14.	3JT8E5	727EM2
15.	3JT8E7	727EM1
16.	4R2800	DC6
17.	501D13	CVR580
18.	540B1A	U4B
19.	ADOUR	HAWK
20.	AE3007	EMB145
21.	AEIO54	T3
22.	AGE100	A10A
23.	AL502L	CL600
24.	AL502R	BAE146, BAE300
25.	AV-8A	AV8A
26.	AVON	CANBER
27.	B-52H	B52H
28.	C-119	C119L
29.	C-121	C121
30.	C-130A	C130AD
31.	C-130H	C130HP
32.	C480	U8F
33.	CF34	CL601
34.	CF650D	YC14
35.	CF650E	E4
36.	CF66D	DC1010, DC1030, DC1040
37.	CF700	FAL20, SABR80
38.	CFG50C	KC10A
39.	CFM562	DC870
40.	CFM563	737300, 7373B2, 737400, 737500
41.	CFM565	A320
42.	CFM56A	KC135R
43.	CGAJ	COMJET
44.	CGASEP	COMSEP
45.	CJ610	LEAR25
46.	CONWY	VC10
47.	CT75	SF340
48.	DART	HS748
49.	F108CF	KC-135
50.	F111D	F111D
51.	F111F	F-111F
52.	F18EF	F18EF
53.	F405RR	T45
54.	FB111A	FB111A
55.	GE-10	A5C
56.	GE100	F16GE

57.	GE-102	B1
58.	GE-110	B2A
59.	GE11A	F104G
60.	GE-13	F5AB
61.	GE21B	F5E
62.	GE400	F14B
63.	GE404	F-18
64.	GE-8	A3
65.	GE9076	777200
66.	GEF1D2	F117A
67.	GEJ85	T39A
68.	IO-550	T42
69.	J3335	T33A
70.	J52P8A	A4C
71.	J52P8B	A6A
72.	J57	KC135
73.	J5759	C135B
74.	J5759W	C135A
75.	J57P17	F106
76.	J57P19	B52BDE
77.	J57P20	F8
78.	J57P21	F100D
79.	J57P23	F102
80.	J57P43	B52G
81.	J57P5	B57E
82.	J57P55	F101B
83.	J69T25	T37B
84.	J75P13	U2
85.	J75P19	F105D
86.	J75P1B	TR1
87.	J79	F4C
88.	J79651	F-4C
89.	J8517A	A37
90.	J856E4	T-2C
91.	JAGUA	JAGUAR
92.	JT11D2	SR71
93.	JT15D1	CNA500
94.	JT15D5	MU3001
95.	JT15DM	T1
96.	JT3D	707120, 707320, 720B, DC850, DC860, KC135B
97.	JT3D3	E8A
98.	JT3D3B	C137
99.	JT3DQ	707QN, DC8QN
100.	JT4111	C18A
101.	JT4A	707, 720, DC820
102.	JT8D17	YC15
103.	JT8D9	C9A
104.	JT9D7Q	74720A, 74720B
105.	JT9DBD	747100
106.	JT9DFL	74710Q, 747200, 747SP
107.	MK6118	C-20
108.	O320E2	T41
109.	OLY593	CONCRD
110.	P4A	EA6B
111.	PEGAS	HARRIE
112.	PHANTO	PHANTO
113.	PT6A20	U21
114.	PT6A25	T34
115.	PT6A27	DHC6
116.	PT6A41	C12
117.	PT6A45	SD330
118.	PT6A50	DHC7
119.	PT6A68	JPATS
120.	PT6R65	C23
121.	PW100	F15A

122.	PW-100	C17
123.	PW100A	E3A
124.	PW120	DHC8, DHC830
125.	PW123	C7A
126.	PW200	F16A
127.	PW2037	757PW
128.	PW220	F16PW0
129.	PW2205	F15E20
130.	PW229	F16PW9
131.	PW2295	F15E29
132.	PW4056	747400
133.	PW4460	MD11PW
134.	R2800	C123K
135.	R43659	KC97L
136.	R985	U6
137.	R99W	C131B
138.	RA28	HUNTER
139.	RAISQP	DHC6QP
140.	RB168	BUCCAN
141.	RB183	F28MK2
142.	RB183P	F28MK4
143.	RB1993	TORNAD
144.	RB2112	L1011, L10115
145.	RCB17	C118
146.	RDA532	HS748A
147.	RR-408	AV8B
148.	RR535E	757RR
149.	RROLYM	VULCAN
150.	SEPPF	GASEPF
151.	SEPVP	GASEPV
152.	SP5118	GIIB
153.	SPEY	NIMROD
154.	T-29	T29
155.	T-43A	T-43A
156.	T-44	T44
157.	T56-14	P3C
158.	T56-15	C-130E
159.	T56A14	P3A
160.	T56A15	C130
161.	T56A7	C130E, L188
162.	T76	OV10A
163.	TAY620	F10062, GIV
164.	TAY650	F10065
165.	TAY651	727QF
166.	TF30P1	F111AE
167.	TF30P4	F14A
168.	TF33P7	C141A
169.	TF346E	S3A&B
170.	TF39GE	C5A
171.	TF41	A7D
172.	TF41A2	A7E
173.	TF7312	LEAR35
174.	TF7313	CIT3, IA1125
175.	TFE731	C140
176.	TFE73B	C21A
177.	TJ85	T-38A
178.	TPE331	CNA441
179.	TRS181	C22
180.	TSIO52	BEC58P
181.	V2525	MD9025, MD9028
182.	VICTO	VICTOR
183.	VIP11	PROVOS
184.	VIPER	DOMIN

H. SPECTRAL CLASSES

DEPART		
Class Id	Description	Aircraft
101	Two and three engine low bypass ratio turbofan aircraft	727 / 737 / 727q / 737q (3JT8D / 3JT8DQ / 3JT8E7 / 3JT8E5 / TAY651 / 2JT8D / 2JT8DQ / TAY620 / TAY650) DC10 / L1011 (CF66D / RB2112) DC-9-30, 40, 50 (2JT8DH / 2JT8DL)
102	Two engine high bypass ratio turbofan aircraft	737300 (CFM563)
103	Two engine high bypass ratio turbofan aircraft	757200 / 767 / A300 (PW2037 / RR535E / 2CF680 / 2CF650 / CFM565 / 2CF68D / PW4460)
104	Two engine high bypass ratio turbofan aircraft	MD80 (2JT8D2) F28/GIIB (RB183 / RB183P / SP5118) 737N (2JT8DN)
105	Two engine high bypass ratio turbofan aircraft	MD90 (V2525) 777200 (GE9076)
106	Four engine turbofan aircraft and supersonic turbojet aircraft	DC8-70 (CFM562) DC8-60 (JT3DQ) SST (OLY593)
107	Four engine turbofan aircraft	747200 (JT9DFL / JT9D7Q / PW4056) 747 (JT9DBD) JT3D (JT3D) JT4A (JT4A)
108	Four engine turbofan aircraft	BAE146 (AL502R)
109	Two engine turboprop and one or two engine piston aircraft	DHC6 (PT6A27) DHC6QP (RAISQP) SD330/JPATS (PT6A45 / PT6A68) GASEPF / GASEPV / BEC58P (TSIO52 / SEFPF / SEPVP)
110	Two engine turboprop and two or four engine piston aircraft	SF340 (CT75) HS748A (RDA532) DC6/CV340 (4R2800 / 2R2800)
111	Two engine turboprop aircraft	CNA441 (TPE331) C12/C23/T44/U21 (MIL) (PT6A41 / PT6R65 / T-44 / PT6A20)
112	Two and four engine turboprop aircraft	L188/CV580 (501D13 / T56A7)

DEPART		
Class Id	Description	Aircraft
		DHC7 (<i>PT6A50 / PW120</i>) C130 A/E/H (<i>T56A15 / C-130A / T56-15 / C-130H / T56A7</i>)
113	Two engine turbojet and turbofan business aircraft	LEAR25 (<i>CJ610</i>) LEAR35 (<i>TF7312</i>) S80 (<i>CF700</i>) CNA500 (<i>JT15D1</i>) MU300 (<i>JT15D5</i>) IA1125 (<i>TF7313</i>) CL600 (<i>AL502L</i>) CL601 (<i>CF34</i>) EMBRAER (<i>AE3007</i>)
114	Helicopter	B212 BO150 S70
115	Helicopter	B222 A109 SA350
116	Helicopter	SA355 S65 H500D
117	Helicopter	SA365 SA341
118	Helicopter	SA330 S61
119	Helicopter	CH47D S76
120	Helicopter	B206L
121	Military aircraft	P3C (<i>T56-14</i>) P3A (<i>T56A14</i>) KC97L (<i>R43659</i>) SR71 (<i>JT11D2</i>)
122	Military aircraft	C118/C123K/C131B (<i>RCB17 / R2800 / R99W</i>) T29 (<i>T-29</i>) YC14 (<i>CF650D</i>)
123	Military aircraft	OV10A (<i>T76</i>) T3/T34/T41/T42/U6/U8 (<i>AEIO54 / PT6A25 / O320E2 / IO-550 / R985 / C480</i>)

DEPART		
Class Id	Description	Aircraft
124	Military aircraft	KC135R/KC135 (J57 / F108CF / CFM56A) PROVOST (VIP111) T1 (JT15DM) T45 (F405RR)
125	Military aircraft	C119L (C-119)C121 (C-121) C7A (PW123) C20 (MK6118) VULCAN (RROLYM) PHANTOM (PHANTO) LIGHTNING (302C)
126	Military aircraft	C22/C9A (TRS181 / JT8D9) U4B (540B1A) FB111A (FB111A) C135A (J5759W) B1 (GE-102) T43A (T-43A) B57E (J57P5) E4 (CF650E) F15A/F15E220/F15E229 (PW100 / PW2205 / PW2295) F16P229 (PW229) F16G100 (GE100) C17 (PW-100) F16P220 (PW220) A7E/A7D(INM) (TF41 / TF41A2) VC10 (CONWY) KC10A (CFG50C) VICTOR (VICTO) F18A (GE404) F18EF (F18EF) F16A (PW200) C21A (TF373B) E3A (PW100A) T37B (JT69T25)
127	Military aircraft	F106 (J57P17) F111A/F111D/F111F (F111F / TF30P1 / F111D) CANBERRA (AVON) C140/T39A (TF3731 / GEJ85) T33A (J3335) A4C (J52P8A) HAWK (ADOUR) F104G (GE11A) F100D/F102/F8 (J57P21 / J57P23 / J57P20) A5C (GE-10) YC15 (JT8D17)

DEPART		
Class Id	Description	Aircraft
		B52B/G (<i>J57P19 / J57P43</i>) C141A (<i>TF33P7</i>) F117A (<i>GEF1D2</i>) F14A (<i>TF30P4</i>) HS748 (<i>DART</i>)JAGUAR (<i>JAGUA</i>) HUNTER (<i>RA28</i>) B2A (<i>GE-110</i>) F4C (<i>J79651 / J79</i>) HARRIER (<i>PEGAS</i>)
128	Military aircraft	NIMROD (<i>SPEY</i>) A10A (<i>AGE100</i>) A3 (<i>GE-8</i>) F101B (<i>J57P55</i>) TORNADO (<i>RB1993</i>) F105D/TR1/U2 (<i>J57P19 / J75P1B / J75P13</i>) F14B (<i>GE400</i>) A6A/EA6B (<i>J52P8B / P4A</i>) BUCANER (<i>RB168</i>) DOMIN (<i>VIPER</i>) AV8B (<i>RR-408</i>) T38A (<i>TJ85</i>) A37 (<i>J8517A</i>) AV8A (<i>AV-8A</i>) T2C (<i>J856E4</i>)
129	Military aircraft	S3A/S3B (<i>TF346E</i>)
130	Military aircraft	C135B/C137B (<i>J5759 / JT3D3B</i>) B52H (<i>B-52H</i>) C18A/E8A (<i>JT4111 / JT3D3</i>)
131	Military aircraft	F5A/B/E (<i>GE-13 / GE21B</i>) C5A (<i>TF39GE</i>)

APPROACH		
Class Id	Description	Aircraft
201	Two and Three engine low bypass ratio turbofan aircraft	727 / 737 / 727q / 737q (3JT8D / 3JT8DQ / 3JT8E7 / 3JT8E5 / TAY651 / 2JT8D / 2JT8DQ / TAY620 / TAY650) DC-9-30, 40, 50 (2JT8DH / 2JT8DL)
202	Two engine high bypass ratio turbofan aircraft and two engine turbojet business aircraft	737300 (CFM563) LEAR25 (CJ610)
203	Two engine high bypass ratio turbofan aircraft and two engine turbofan business aircraft	757200 / 767 / A300 (PW2037 / RR535E / 2CF680 / 2CF650 / CFM565 / 2CF68D / PW4460) DC10 / L1011 (CF66D / RB2112) S80 (CF700) MU300 (JT15D5)
204	Two engine high bypass ratio turbofan aircraft	MD80 (2JT8D2)
205	Two engine high bypass ratio turbofan aircraft	MD90 (V2525) 777200 (GE9076)
206	Four engine turbojet and four engine turbofan aircraft	DC8-70 (CFM562) BAE146 (AL502R) SST (OLY593)
207	Four engine turbofan aircraft	747200 (JT9DFL / JT9D7Q / PW4056)
208	Four engine turbojet and four engine turbofan aircraft	DC8-60 (JT3DQ) JT3D (JT3D) JT4A (JT4A)
209	Four engine turbofan aircraft	747 (JT9DBD)
210	Two engine turboprop aircraft	DHC6/CNA441 (PT6A27/TPE331) DHC6QP (RAISQP)
211	Two engine turboprop aircraft	SF340 (CT75) SD330/JPATS (PT6A45/PT6A68)
212	Two engine turboprop aircraft	HS748A (RDA532)
213	Four engine turboprop and four engine piston aircraft	DC6/CV340 (4R2800 / 2R2800) DHC7 (PT6A50 / PW120)
214	Two and four engine turboprop aircraft	L188/CV580 (501D13 / T56A7)
215	One and two engine piston aircraft	GASEPF / GASEPV / BEC58P (TSIO52 / SEPFP / SEPVP)

APPROACH		
Class Id	Description	Aircraft
216	Two engine turbojet and two engine turbofan business aircraft	F28/GIIB (<i>RB183 / RB183P / SP5118</i>) LEAR35 (<i>TF7312</i>) CNA500 (<i>JT15D1</i>) IA1125 (<i>TF7313</i>) CL600 (<i>AL502L</i>) CL601 (<i>CF34</i>) EMBRAER (<i>AE3007</i>)
217	Helicopter	A109 BO150 H500D
218	Helicopter	SA330 B222 S70
219	Helicopter	S76 SA350 SA341 S61 S65
220	Helicopter	SA365 SA355
221	Helicopter	CH47D B212
222	Helicopter	B206L
223	Military Aircraft	A10A (<i>AGE100</i>) B52H (<i>B-52H</i>) C135B (<i>J5759</i>) C137 (<i>JT3D3B</i>) C141A (<i>TF33P7</i>) F14A (<i>TF30P4</i>) S3A / S3B (<i>TF346E</i>)
224	Military Aircraft	B2A (<i>GE-110</i>) C17 (<i>PW-100</i>) C18A/E8A (<i>JT4111 / JT3D3</i>) C5A (<i>TF39GE</i>) C22 / C9 (<i>TRS181 / JT8D9</i>) E3A (<i>PW100A</i>) E4 (<i>CF650E</i>) T43A (<i>T-43A</i>) HS748 (<i>DART</i>) T1 (<i>JT15DM</i>) KC10A (<i>CFG50C</i>)
225	Military Aircraft	C119L (<i>C-119</i>)

APPROACH		
Class Id	Description	Aircraft
		C121 (C-121) C7A (PW123) KC97L (R43659) P3A (T56A14) P3C (T56-14) T3/T42/U8 (AEIO54 / IO-550 / C480) YC14 (CF650D)
226	Military Aircraft	SR71 (JT11D2) T34/T41/U6 (PT6A25 / O320E2 / R985)
227	Military Aircraft	A5C (GE-10) C118/C123K/T29 (RCB17 / R2800 / T-29) C131B (R99W) T45 (F405RR)
228	Military Aircraft	C12/C23/T44/U21 (PT6A41 / PT6R65 / T-44 / PT6A20) C21A (TF373B) F15A/F15E220/F15E229 (PW100 / PW2205 / PW2295) OV10A (T76) U4B (540B1A)
229	Military Aircraft	B1 (GE-102) F16P220A (PW220) C20 (MK6118) F111A/F111D/F111F (TF30P1 / F111D / F11F) F16A (PW200) FB111A (FB111A) PHANTOM (PHANTO)
230	Military Aircraft	A3/F100D/F101B/F102/F8 (GE-8 / J57P21 / J57P55 / J57P23 / J57P20) A4C (J52P8A) A7E (TF41/TF41A2) B52B/B52G (J57P19 / J57P43) B57E (J57P5) BUCANER (RB168) C135A (J5759W) C140/T39 (TF3731 / GEJ85) CANBERA (AVON) HUNTER (RA28) JAGUAR (JAGUA) LIGHT (302C) PROVOST (VIP111) T2C (J856E4) VICTOR (VICTO)

APPROACH		
Class Id	Description	Aircraft
231	Military Aircraft	A37 (<i>J8517A</i>) AV8A (<i>AV-8A</i>) AV8B (<i>AV-8B</i>) DOMIN (<i>VIPER</i>) F104G (<i>GE11A</i>) F5A/F5E (<i>GE13 / GE21B</i>) HARRIER (<i>PEGAS</i>) HAWK (<i>ADOUR</i>) T33A (<i>J3335</i>) T38A (<i>TJ85</i>) VC10 (<i>CONWY</i>) YC15 (<i>JT8D17</i>)
232	Military Aircraft	F18A (<i>GE404</i>) F18EF (<i>F18EF</i>) T37B (<i>JT69T25</i>) F16P229 (<i>PW229</i>) F16G100 (<i>GE100</i>) F14B (<i>GE400</i>)
233	Military Aircraft	A6A/EA6B (<i>J52P8B / P4A</i>) F105D/TR1 (<i>J57P19 / J75P1B</i>) F106 (<i>J57P17</i>) F117A (<i>GEF1D2</i>) F4C (<i>J79651 / J79</i>) KC135R (<i>J57</i>) NIMROD (<i>SPEY</i>) TORNADO (<i>RB1993</i>) VULCAN (<i>RROLYM</i>) U2 (<i>J57P13</i>)
234	Military Aircraft	C130A/C130E/C130H (<i>T56A15 / C-130A / T56-15 / C-130H / T56A7</i>)

FLYOVER		
Class Id	Description	Aircraft
301	Helicopter	A109 SA355 SA350 BO150
302	Helicopter	S76 SA341 SA365
303	Helicopter	S61 SA330
304	Helicopter	H500D B222 B212
305	Helicopter	S65 S70
306	Helicopter	CH47D

I. EXAMPLE NADP PROFILES

The following two *DBF* files show example data for Close-in and Distant Noise Abatement Departure Profiles. The NADP procedure steps were derived from INM standard data by using the methods in Section 8.7.14. The standard data are also shown for comparison.

File: C:\INM\CPP\TEST\SAVE\PROFILE.DBF

Last update: 13-Sep-1994

Fields(5):

1	ACFT_ID	C	6
2	OP_TYPE	C	1
3	PROF_ID1	C	1
4	PROF_ID2	C	1
5	WEIGHT	N	6.0

Records(3):

747200	,	D	,	C	,	4	,	610000		{ C = Close-in NADP }
747200	,	D	,	D	,	4	,	610000		{ D = Distant NADP }
747200	,	D	,	S	,	4	,	610000		{ S = standard profile }

File: C:\INM\CPP\TEST\SAVE\PROCEDUR.DBF

Last update: 14-Sep-1994

Fields(11):

1	ACFT_ID	C	6
2	OP_TYPE	C	1
3	PROF_ID1	C	1
4	PROF_ID2	C	1
5	STEP_NUM	N	2.0
6	STEP_TYPE	C	1
7	FLAP_ID	C	6
8	THR_TYPE	C	1
9	PARAM1	N	7.1
10	PARAM2	N	5.1
11	PARAM3	N	7.1

Records(27):

747200	,	D	,	C	,	4	,	1	,	T	,	10	,	T	,	0.0	,	0.0	,	0.0
747200	,	D	,	C	,	4	,	2	,	C	,	10	,	T	,	800.0	,	0.0	,	0.0
747200	,	D	,	C	,	4	,	3	,	C	,	10	,	R	,	3000.0	,	0.0	,	0.0
747200	,	D	,	C	,	4	,	4	,	A	,	10	,	C	,	1000.0	,	195.1	,	0.0
747200	,	D	,	C	,	4	,	5	,	A	,	5	,	C	,	750.0	,	235.1	,	0.0
747200	,	D	,	C	,	4	,	6	,	A	,	ZERO	,	C	,	750.0	,	255.1	,	0.0
747200	,	D	,	C	,	4	,	7	,	C	,	ZERO	,	C	,	5500.0	,	0.0	,	0.0
747200	,	D	,	C	,	4	,	8	,	C	,	ZERO	,	C	,	7500.0	,	0.0	,	0.0
747200	,	D	,	C	,	4	,	9	,	C	,	ZERO	,	C	,	10000.0	,	0.0	,	0.0
747200	,	D	,	D	,	4	,	1	,	T	,	10	,	T	,	0.0	,	0.0	,	0.0
747200	,	D	,	D	,	4	,	2	,	C	,	10	,	T	,	800.0	,	0.0	,	0.0
747200	,	D	,	D	,	4	,	3	,	A	,	10	,	T	,	1508.0	,	195.1	,	0.0
747200	,	D	,	D	,	4	,	4	,	A	,	5	,	C	,	750.0	,	235.1	,	0.0
747200	,	D	,	D	,	4	,	5	,	C	,	ZERO	,	R	,	3000.0	,	0.0	,	0.0
747200	,	D	,	D	,	4	,	6	,	A	,	ZERO	,	C	,	750.0	,	255.1	,	0.0
747200	,	D	,	D	,	4	,	7	,	C	,	ZERO	,	C	,	5500.0	,	0.0	,	0.0
747200	,	D	,	D	,	4	,	8	,	C	,	ZERO	,	C	,	7500.0	,	0.0	,	0.0
747200	,	D	,	D	,	4	,	9	,	C	,	ZERO	,	C	,	10000.0	,	0.0	,	0.0
747200	,	D	,	S	,	4	,	1	,	T	,	10	,	T	,	0.0	,	165.3	,	0.0
747200	,	D	,	S	,	4	,	2	,	C	,	10	,	T	,	1000.0	,	0.0	,	0.0
747200	,	D	,	S	,	4	,	3	,	A	,	10	,	T	,	1508.0	,	195.1	,	0.0
747200	,	D	,	S	,	4	,	4	,	A	,	5	,	C	,	750.0	,	235.1	,	0.0
747200	,	D	,	S	,	4	,	5	,	C	,	ZERO	,	C	,	3000.0	,	0.0	,	0.0
747200	,	D	,	S	,	4	,	6	,	A	,	ZERO	,	C	,	750.0	,	255.1	,	0.0
747200	,	D	,	S	,	4	,	7	,	C	,	ZERO	,	C	,	5500.0	,	0.0	,	0.0
747200	,	D	,	S	,	4	,	8	,	C	,	ZERO	,	C	,	7500.0	,	0.0	,	0.0
747200	,	D	,	S	,	4	,	9	,	C	,	ZERO	,	C	,	10000.0	,	0.0	,	0.0

J. PROCEDURE STEP DETAILS

The table below shows the types of data values that are placed in the last three fields of a procedure step record. These fields are called PARAM1, PARAM2, and PARAM3. They take on a different meaning for each combination of operation type, procedure step type, and thrust type.

- A missing entry in a flap-identifier or thrust-type field means that blanks should be put in that field.
- For example, a departure operation (D) level step (V) should have a valid flaps identifier, a blank thrust type, altitude, speed, and distance-flown values.

OP_TYPE	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
A, D, T, F, V	V	ID		ALT	SPD	DIST
A, T, F, V	D	ID		ALT	SPD	ANG
A, T, F	L	ID		DIST	0	0
A, F	B			DIST	SPD	PCT
D, F	T	ID	T, C, N	0	0	0
D, F	T	ID	U	0	0	THR
T	T	ID	T, C, N	0	SPD	0
T	T	ID	U	0	SPD	THR
D, T, F	C	ID	T, C, N, R	ALT	0	0
D, T, F	C	ID	K, U	ALT	0	THR
D, T, F	A	ID	T, C, N, R	CLM	SPD	0
D, T, F	A	ID	K, U	CLM	SPD	THR
V	M	ID		ALT	SPD	ANG
F	S	ID		0	0	0

OP_TYPE

A = Approach
 D = Depart
 T = Touch&Go
 F = CircuitFlight
 V = OverFlight

THR_TYPE

T = MaxTakeoff
 C = MaxClimb
 N = MaxContinue
 R = ReduceThrust
 K = UserCutback
 U = UserValue

STEP_TYPE

V = Level
 D = Descend
 L = Land
 B = Decelerate
 T = Takeoff
 C = Climb
 A = Accelerate
 M = CruiseClimb
 S = LevelStretch

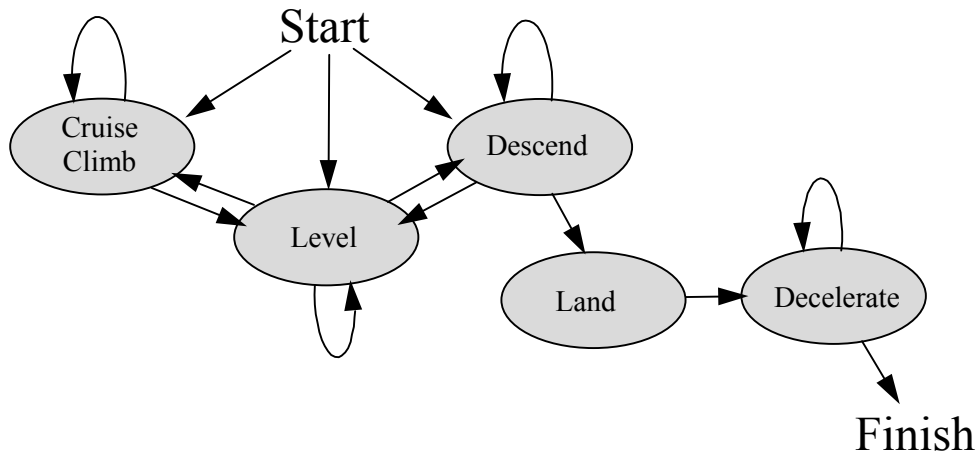
PARAM

THR = Thrust
 ALT = Altitude
 SPD = Speed
 DIST = Distance
 ANG = Angle
 PCT = Percent
 CLM = Climb Rate

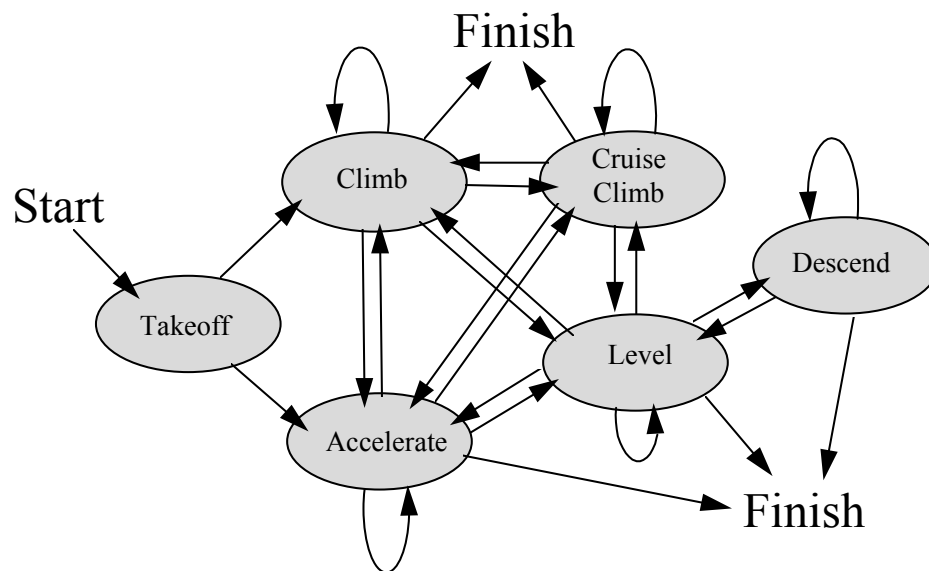
The five diagrams on the following pages show the allowed transitions from one type of procedure step to another for each of the five kinds of flight operations. In these step transitions diagrams:

- Ellipse — a procedure step (STEP_TYPE)
- Arrow — an allowed transition from one step to another

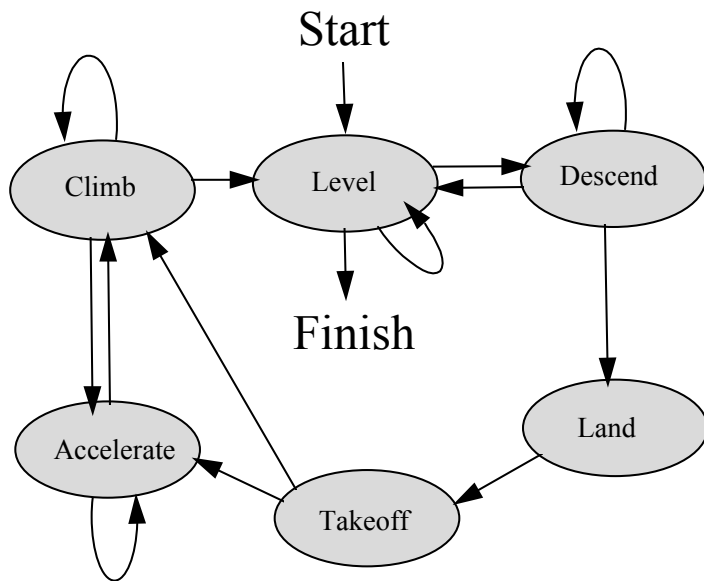
Approach Operation Procedure Step Transition Diagram



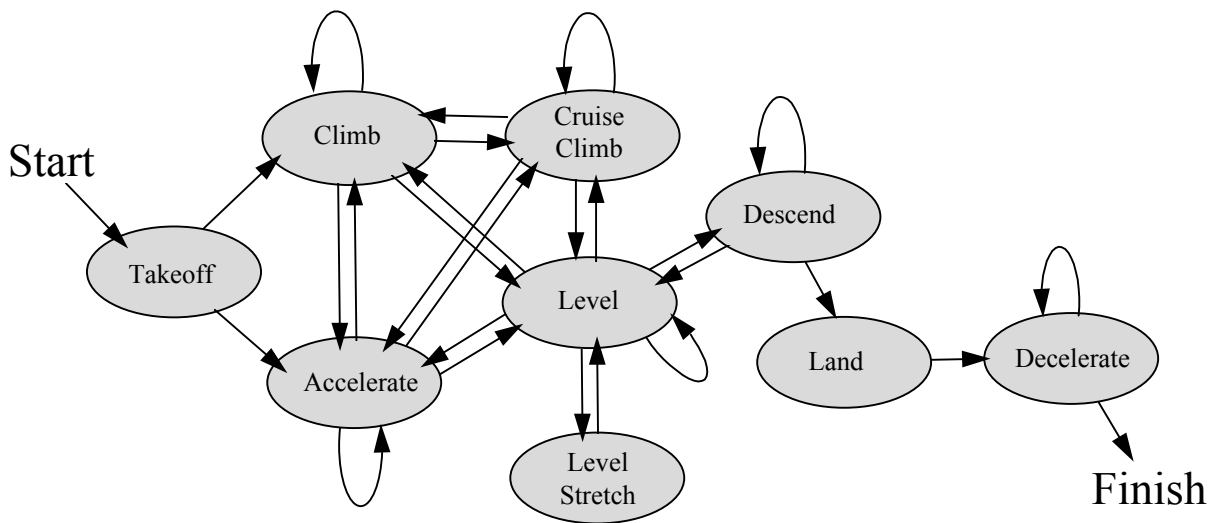
Departure Operation Procedure Step Transition Diagram



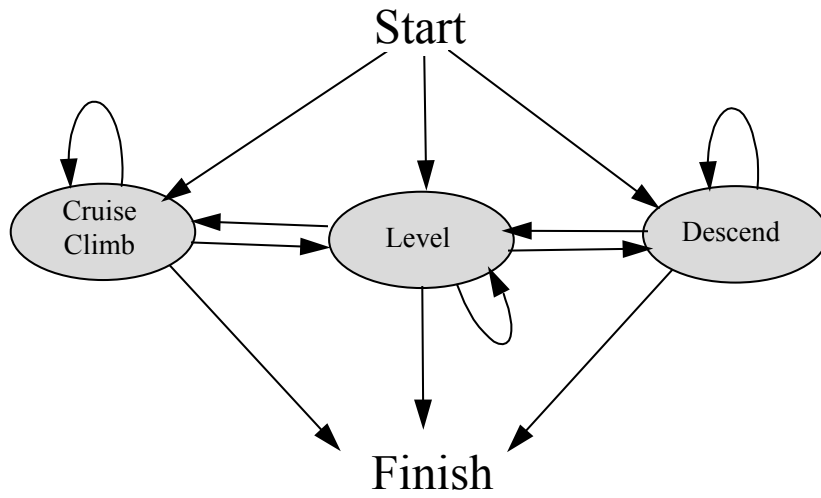
Touch and Go Operation Procedure Step Transition Diagram



Circuit Flight Operation Procedure Step Transition Diagram



Overflight Operation
Procedure Step Transition Diagram



K. INM MAP PROJECTION METHOD

The mapping of latitude-longitude coordinates to and from INM x,y coordinates is accomplished by projecting a small portion of the earth's surface onto a cone. The transformation equations are outlined below.

Let $A = 6378137.000$ m = radius of the equator circle (WGS-84 spheroid).
 $B = 6356752.314$ m = distance from earth center to a pole (WGS-84 spheroid).

$\phi_o \lambda_o$ = latitude and longitude of the origin of the x,y coordinate system (radians).
 $\phi \lambda$ = latitude and longitude of a point on the earth (radians, $180/\pi$ degrees/radian).
 $x \ y$ = coordinate values of the same point (meters, 1852 m/nmi).

North latitude is positive and south latitude is negative. East longitude is positive and west longitude is negative. Positive x is toward the east, and positive y is toward the north.

The two principal radii of curvature at latitude ϕ_o are:

$$R_p = A^2 / \text{sqrt}(A^2 \cos^2 \phi_o + B^2 \sin^2 \phi_o)$$

$$R_m = R_p^3 B^2 / A^4$$

where,

R_p = radius of curvature (m) in a plane perpendicular to a meridian plane
 R_m = radius of curvature (m) in a meridian plane.

A cone is constructed with its vertex on the line of poles, tangent to the earth spheroid along a latitude circle at ϕ_o . The cone is cut from edge to vertex and unfolded so that it lies flat. An x,y coordinate system is constructed on the unfolded cone. The x-axis is tangent to the latitude circle at ϕ_o , and the y-axis is tangent to the longitude ellipse at λ_o .

For conic projections, latitude circles (parallels) map into circles centered on the vertex of the unfolded cone, and longitude ellipses (meridians) map into straight lines that converge at the vertex of the unfolded cone.

For points on the y-axis, the y-coordinate is accurately approximated by the meridian arc-distance:

$$x = 0$$

$$y = R_m (\phi - \phi_o)$$

For points off the y-axis, the $y = \text{constant}$ coordinates lie on a conic circle centered at the vertex of the unfolded cone. For this case, the x-coordinate is approximated by the arc-distance along a conic circle; and the y-coordinate is approximated by the y-value at $x=0$ plus a parabolic correction:

$$\begin{aligned}x &= (R_p \cos\phi_o - y_o \sin\phi_o) (\lambda - \lambda_o) \\y &= y_o + E_o x^2\end{aligned}$$

where,

$$\begin{aligned}y_o &= R_m (\phi - \phi_o) \\E_o &= \frac{1}{2} \tan\phi_o / R_p\end{aligned}$$

An exact inverse transformation is provided by the following equations:

$$\begin{aligned}\phi &= \phi_o + y_o / R_m \\ \lambda &= \lambda_o + x / (R_p \cos\phi_o - y_o \sin\phi_o)\end{aligned}$$

where,

$$y_o = y - E_o x^2$$

The above conic projection method provides a simple and very quick transformation between latitude-longitude and x,y coordinates. (The radii of curvature R_p R_m , the sine and cosine terms $\cos\phi_o$ $\sin\phi_o$, and the off-axis correction coefficient E_o are constants that are calculated only once.) A computationally quick transformation is required because lat/long values are calculated and displayed for every movement of the mouse pointer when in lat/long mode in an INM graphics window.

The INM conic projection method is not exactly conformal (angles on the earth do not exactly map into the same angles in the x,y coordinate system). However, the method is very accurate within an area of approximately one hundred miles around the origin of coordinates.

For example, if the origin is at 45°N 90°E, a 1-km square on the earth's surface located at 46°N 91°E (about 73 nmi from the origin), when mapped into INM x,y coordinates, is 23 cm longer in the east-west direction and 25 cm shorter in the north-south direction. By comparison, the same 1-km square mapped by the standard Mercator projection method is 1786 cm larger in both directions.

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