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13. ABSTRACT (Maximum 200 words)

The Federal Aviation Administration, Office of Environment and Energy (AEE-120) has developed Version 5.0 of the Integrated Noise Model (INM) with support from the ATAC Corporation, the U.S. Department of Transportation John A. Volpe National Transportation Systems Center, and LeTech Incorporated. The FAA Integrated Noise Model is widely used by the civilian aviation community for evaluating aircraft noise impacts in the vicinity of airports. The model is typically used in the U.S. for FAR Part 150 noise compatibility planning and FAA Order 1050 environmental assessments and environmental impact statements.

Major enhancements to INM Version 5.0 include a new graphics user interface, new data preparation and data input aids, new graphics and plotting capabilities, and improved and faster noise calculation algorithms. There are many technical enhancements to the computer code which provide faster run times and more accurate noise predictions.

INM Version 5.0 software runs on PCS using a minimum hardware configuration of a 486DX 66-MHZ processor, Microsoft[7] Windows NT[J] 3.5 or Windows[J] 3.1 operating systems, 32-Mb RAM (NT) or 16-Mb RAM (Windows), 640x480 16 colors VGA display, mouse input device, 3.5-inch 1.44 Mb floppy disk drive, 300-Mb hard disk drive, and CD-ROM (optional).

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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 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-DOS microcomputer environment. In Version 5.0, INM takes advantage of recent advances in computer hardware and software technology. Major enhancements 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. INM Version 5.0 runs on PCS using the Windows J or NT J operating systems.

The INM Development Team members and their main areas of responsibility are:

FAA Office of Environment and Energy (AEE-120) -- project management
ATAC Corporation -- system integration, user interface, and flight model
John A. Volpe National Transportation Systems Center (VNTSC) -- noise model
LeTech Incorporated -- interactive graphics and preprocessing.

As part of the planning for Version 5.0, the FAA formed a noise modeling Design Review Group (DRG). The DRG is a technical advisory group of government and private sector experts in the fields of aviation, acoustics, and computer modeling who are guiding AEE-120 in noise model development. The DRG reviewed functional designs for Version 5.0 and recommended how to effectively implement these designs to meet FAA and industry user requirements.

The DRG consists of INM Development Team Members (AEE-120, ATAC, VNTSC, LeTech), representatives from various FAA offices, other Federal agencies, airport authorities, industry, and international organizations. The 26 DRG members are listed below:

Federal Aviation Administration, Washington, DC:

Office of Environment and Energy, Analysis and Evaluation Branch (AEE-120)
Office of Environment and Energy, Technology Division (AEE-100)
Office of Environment and Energy, Environmental Planning (AEE-5)
Office of Systems Capacity & Requirements, Airspace Capacity Planning (ASC-200)

Office of Air Traffic System Management, Environmental Issues (ATM-700)
Office of System Architecture & Program Evaluation, Program Analysis & Operations Research, Technology (ASD-430)
Office of Airport Planning/Programming, Community/Environmental Needs (APP-600)

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
John A. Volpe National Transportation Systems Center, Cambridge, MA

Corporations:

ATAC Corporation, Sunnyvale, CA
Bolt Beranek and Newman Inc., Systems & Technologies, Canoga Park, CA
Greiner Engineering Sciences Inc., Timonium, MD
Harris Miller Miller & Hanson Inc., Burlington, MA
Howard Needles Tammen & Bergendoff Inc., Alexandria, VA
Ken Eldred Engineering Inc., East Boothbay, ME
Landrum & Brown Inc., Lawrence, KS
Leigh Fisher Associates Inc., San Mateo, CA
LeTech Inc., Alexandria, VA
SAIC Inc., Falls Church, VA
Wyle Laboratories Inc., Arlington, VA

International Organizations:

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

The DRG members reviewed the pre-release "Beta" version of the software. Brown-Buntin Associates Inc., Visalia, CA, also assisted in the Beta review.

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. This User's Guide does not constitute a standard, specification, or regulation. The design, production, and distribution of this manual has been paid for entirely from user fees.

ACKNOWLEDGMENTS

Many people helped make INM Version 5.0 a reality. 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).

On the INM Development Team, AEE wishes to acknowledge 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, Ronald Jeng, Lena Mirsky, and Narayan Rajan. We also wish to express our appreciation to the other INM development organizations for their invaluable contributions. At the John A. Volpe National Transportation Systems Center (VNTSC), we wish to thank Gregg Fleming, Acoustics Facility Manager, and team members John D'Aprile, Paul Gerbi, Ed Rickley, and Jack Turner. At LeTech Incorporated, we wish to thank Tung Le, President, and team members Thach Le, and Xiaomin Chen.

CONTENTS

GLOSSARY

AEE	FAA Office of Environment and Energy
AEM	Area Equivalent Model
AFE	Above Field Elevation (altitude)
AGL	Above Ground Level (altitude)
APP	Approach operations
BBS	Bulletin Board Service (computer)
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)
CPA	Closest Point of Approach
dB	decibel, a unit of sound level or sound exposure level
DBF	dBase-IV database file format
DBMS	Database Management System (application program)
deg	degrees (angle)
DEP	Departure operations
DLL	Dynamic Link Library
DNL	Day Night Average Sound Level (noise metric)
DOS	Disk Operating System (PC operating system)
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)
F	degrees Fahrenheit (temperature)
FAA	Federal Aviation Administration (U.S. DOT)
FAR	Federal Aviation Regulations
ft	feet
GUI	Graphical User Interface
h	hours
HNM	Heliport 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 weight
km	kilometers

knt	knots (international nautical miles per hour)
LAMAX	Maximum A-Level (noise metric)
L_{ASmx}	Maximum A-Level
L_{AE}	Sound Exposure Level
L_{PNTSmx}	Maximum PNLT
L_{EPN}	Effective Perceived Tone Corrected Noise Level
lb	pounds force or weight
µPa	micropascal (10^{-6} newton/meter^2, unit of acoustic pressure)
m	meters
MDI	Multiple Document Interface (Windows GUI)
mi	U.S. statute miles
min	minutes
mm-Hg	millimeters of mercury (barometric pressure)
MSL	Mean Sea Level (altitude above sea level)
NADP	Noise Abatement Departure Profile (AC91-53A)
NFDC	FAA National Flight Data Center (database)
NMBG	Noise Model Binary Grid (file format for NMPLOT Program)
nmi	international nautical miles
NTFS	NT File System
OAG	Official Airlines Guides (commercial flight schedule data)
OVF	Over-Flight operations
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 operations
USGS	U.S. Geological Survey
VFR	Visual Flight Rules
VNTSC	John A. Volpe National Transportation Systems Center (U.S. DOT)

1 SYSTEM INSTALLATION

You can install the INM 5.0 system by following the instructions in this section. First, check that your computer system meets the requirements. Then, load the Win32s and INM files onto your hard disk. After INM is loaded, you can do a quick test of the software to see if it works OK.

1.1 Computer System Requirements

INM 5.0 is a completely new INM program for PCS using Microsoft7 WindowsJ operating systems. The Microsoft Windows graphical user interface (GUI) requires a much more powerful computer than was used for previous versions of INM. Although you could probably make INM run on a less capable computer than recommended, both the GUI and noise-calculation performance would suffer.

Minimum computer system:

486DX 66-MHZ processor,
Microsoft Windows NT-3.5 or later with 32-Mb RAM
or DOS/Windows-3.1 with 16-Mb RAM
640x480 16 colors VGA display
Mouse input device
3.5-inch, 1.44 Mb floppy disk drive
300-Mb hard disk drive (INM system 20 Mb, Studies 1-30 Mb each)
CD-ROM drive for terrain and census data processing (optional)

Studies involving hundreds of flight operations can be adequately handled with 16-Mb of RAM using the DOS/Window-3.1 operating system. However, larger studies (thousands of flight operations) require more real memory. Higher resolution contours also require more memory and possible use of Windows NT Version 3.5 or later.

The NT operating system can handle more memory than 16-Mb and it is considerably more robust than Windows 3.1. NT is recommended for those users planning heavy-duty INM computing. Please note that INM will not work with the old version of NT (Version 3.1).

A future version of INM is planned to run on the Windows-95J operating system, in addition to the NT and Windows operating systems. Conversion of INM to Windows-95 will begin after Windows-95 is released to the public.

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 20 Mb for 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 data used.

A CD-ROM drive is required to process terrain elevation data and street map and population data. A CD-ROM drive is not needed if you do not want to use these data in your Study, or if you obtain these data from others who provide source data processing services.

1.2 Software Installation Procedure

Either the Windows NT 3.5 operating system or the DOS/Windows 3.1 operating system is required for INM 5.0. If one of these has not been installed on your computer, you must do so before installing INM. If you are a new user of Windows, please spend some time learning the operating system first.

If you are using the NT operating system, you can go to step 9.

If you are using the DOS/Windows 3.1 operating system, you need to install Microsoft7 Win32sJ software. Win32s allows your computer to run 32-bit programs, such as INM 5.0, on the 16-bit operating system. Win32s software is on two diskettes included with the INM system.

There are two reasons for separately installing Win32s and INM. First, if you have trouble installing Win32s, you will know that the problem is a Microsoft problem and not an INM problem. Second, installing Win32s requires possible changes to your operating system (e.g., the CONFIG.SYS file), and by following these steps, you will be made aware of, and in control of, changes to your operating system.

1. Become familiar with Microsoft Program ManagerJ and File ManagerJ programs before installing Win32s. Learn how to edit small files using a text editor such as NotepadJ.

2. Start Windows. Go to the File Manager // Help // About function, and make sure that you are running Windows in 386 enhanced mode. You will see "386 Enhanced Mode", if you are setup right. If not, try checking your AUTOEXEC.BAT file to see if you are running Windows in "Standard Mode" (look for a command line like: "WIN /S"). You need to run Windows with the command "WIN" or "WIN /3".

3. Put the Win32s #1 diskette into your floppy drive A (or B) and run "A:SETUP" (or "B:SETUP") from the File Manager. SETUP is a Windows program, not a DOS program. Follow Microsoft instructions and use the suggested defaults. Also, say "Yes" to loading the Freecell**J** game so that you can run it to verify that the Win32s installation was successful.

   If you need to install Win32s again, change Setup=1 to **Setup=0** in file WINDOWS \ SYSTEM \ WIN32S.INI so that the Win32s SETUP program will run.

4. In your AUTOEXEC.BAT file, put the following line:
   SHARE
   if it is not already there.

5. In your CONFIG.SYS file, put the following lines:
   FILES=50
   BUFFERS=30
   The values can be set larger, if you wish.

6. Go to the Program Manager // Main // Control Panel // 386 Enhanced // Virtual Memory function, and check that you have your swap file set to "Permanent (using 32-bit access)". If not, go to Change>> and setup the swap file. Use the default size if you can afford the disk space. You can use a temporary swap file for virtual memory, but the system will run slower. You must have a virtual memory swap file to run 32-bit programs using Win32s.

7. Reboot your computer so that the new settings take affect. Restart Windows. Run the Freecell game to verify that Win32s was successfully installed.

8. If you see a message about a "GROWSTUB" error, you probably are using the Microsoft mouse driver version 9.01, which has a bug. You can close this message box and the one that follows it, and your 32-bit program will run OK. To permanently fix this problem, replace 9.01 version with the 9.01b or higher version of the driver. Another method that works is to comment-out a line in the WINDOWS \ WIN.INI file, section **[windows]**, thus: **;load=c:\mouse\pointer.exe** .

All users need to do the following to install INM 5.0 software. The INM 5.0 software is contained on six diskettes in compressed format.

9. Start NT or Windows. Put the INM #1 diskette into your floppy drive A (or B) and run "A:SETUP" (or "B:SETUP") from the File Manager. SETUP is a Windows program, not a DOS program. Follow the instructions. The INM setup program will create an "INM 5.0" Program Group, containing the main INM program "INM 5.0" and the Source Data Processor program "PreProc".

For NT users, the INM SETUP program puts the CTL3D32.DLL file into to your WINDOWS \ SYSTEM32 subdirectory, if the file does not already exist. For Windows users, this file goes into the WINDOWS \ SYSTEM subdirectory, if the file does not exist or if an older version exists. The operating system requires that this file be placed in the operating system subdirectory.

There are other DLLs which are used by INM that are usually considered to be part of the operating system. For NT users, the operating system DLLs are MFC30.DLL, MSVCRT20.DLL, and CFX2032.DLL. For Windows users, the operating system DLLs are the same three files plus CFXRES16.DLL. These DLLs are placed in the INM system directory for security reasons. If you prefer, you can move them from the INM system directory to the operating system subdirectory (SYSTEM32 or SYSTEM), where they can be shared with other applications. If you do move them, be careful not to overwrite newer versions of these DLLs.

Applications that you install after installing INM may automatically load different versions of CTL3D32.DLL into your operating system. INM will probably work with <u>newer</u> versions of this file (and the other files, if you move them). Just in case there is a problem, you may want to save copies of these files, so that you can put them back if you have to.

Network users: You can put the INM system on a network disk drive and your Studies on either network or local drives. However, there are some potential problems to watch out for:

1. Two people cannot run INM from a network disk drive at the same time. This is because INM writes temporary files into the system subdirectories, and one person could overwrite another person's files. INM is a single-user system.

2. 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.

Windows for Workgroups J users: If network mail is posted or if a fax modem is running at the same time that a 32-bit program is running (e.g., INM), the system will crash if you are using Microsoft Win32s Version 1.20 or earlier. You can tell which version you have by looking at the WINDOWS \ SYSTEM \ WIN32S.INI file. The Win32s system that is shipped with INM is Win32s Version 1.25. This version has been fixed.

NT NTFS users: INM has not been tested on a NT operating system which uses the NTFS file system. You should limit your INM directory names (Study, Case, and Output) to conform to standard DOS file-naming conventions (i.e., eight characters followed by a three character extension).

1.3 De-Installation Procedure

To remove the INM system, do the following:

1. Delete the WINDOWS \ INM50.GRP file.

2. Delete the INM50 directory.

3. Delete the INM Study directories.

4. Search the file WINDOWS \ WIN.INI and delete any lines referring to INM.

5. If not used by other applications, remove CTL3D32.DLL from the operating system subdirectory (WINDOWS \ SYSTEM32 or SYSTEM).

To remove the 32-bit capability in Windows, do the following:

1. In the **[386Enh]** section in the WINDOWS \ SYSTEM.INI file, delete the line: **device=c:\windows\system\win32s\w32s.386**. Be careful when editing this file because a mistake will inhibit Windows from running. Make a backup copy of SYSTEM.INI before editing it.

2. In the **[boot]** section in the WINDOWS \ SYSTEM.INI file, change the line "drivers=mmsystem.dll winmm16.dll" to **drivers=mmsystem.dll**.

3. In the WINDOWS \ SYSTEM subdirectory, delete the WIN32S.INI, W32SYS.DLL, and WIN32S16.DLL files.

4. Delete the WINDOWS \ SYSTEM \ WIN32S subdirectory.

5. Delete the WINDOWS \ WIN32APP.GRP file.

6. Delete the WIN32APP directory.

1.4 Quick Tests

You can quickly test INM by loading one of the Studies that is distributed with the INM system. Also, you can create a simple single-event Study to experience inputting data, running the model, and displaying output data.

1.4.1 View an Existing Study

You activate INM by double-clicking on the INM5.0 icon in the INM 5.0 Program Group, or by double-clicking on the INM.EXE file name in the File Manager. If all is working well, INM will load itself, and then it will automatically load the TEST50 Study. You should see the words "INM 5.0 - [Study: TEST50]" on the title bar, the full INM menu bar under the title bar, and the INM logo will be briefly displayed.

Click on "Acft" on the menu bar, and then select "Aircraft" in the pull-down menu. INM will take a few seconds to load Aircraft data. Then, 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").

If you want to keep the TEST50 example Study the way it was when it came with INM, do not click or type in the data-input boxes on the right-hand side of the DBF windows.

Now, you can try other menu items to see what happens. The one called Acft // Procedure Steps (i.e., "Acft" on the menu bar, and "Procedure Steps" in the drop-down menu) will take about a half minute to load because there are thousands of records to check and organize as it loads.

Go to the Track // 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.

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 (e.g., a small rectangle causes a far out zoom).

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.

Go to the Output // Output Graphics function. After the window loads, select the View // Layers On/Off function and click inside the little box next to "Population Points", and click again on "Terrain Contours". Then, select "OK" and wait for INM to load these two layers into the window. It will take several minutes to load because of the large amount of data involved. A layer that is turned on (i.e., one that has an "X" in the View // Layers On/Off dialog window) can be turned off by clicking on the "X" (making it 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 "C:\", and then type "NEWSTUDY" in the Study Name edit box. Press "OK", INM verifies your choice, click on "Yes", and INM creates a new directory called "C:\ NEWSTUDY". All of the Study files and subdirectories will go in this Study directory. (Do not put your new Studies into the INM50 \ EXAMPLES 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 while to load a list of 1500 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 for a couple of minutes while INM finds ORD's runways and scans navaids and fixes in the U.S. for those 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 (navaids 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 slider 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 DBF window with 767JT9 data.

6. Select the Setup // Cases function. After INM displays the Case DBF window, select the Edit // Add Record function. In the "Case" edit box, double-click on "! NONE ! " to highlight it, type "CASE01". Leave the airport parameters as they are. Select Edit // Commit Record. INM creates a subdirectory called "C:\ NEWSTUDY \ CASE01", where case-related data are stored.

7. Select the Track // Input Graphics function. Zoom in on the runway system. Select the Edit // Add Track mode and click in the circle on 09R (the lower horizontal runway, on the left end). 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 "AA" 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 Ops function. Click on Case "CASE01" and press "OK". After the Flight Operations window appears, select "09R" in the Runway drop-down list box. Select Edit // Add Record. Select Profile "S6". Double-click inside the "Day" edit box and while the current entry is highlighted, type "300". Select Edit // Commit Record.

10. Select the Run // Grid Setup function. Click on Case "CASE01" and press "OK". Select Edit // Add Record and then Edit // Commit Record. The default "CNR" grid specifies where to compute 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 "CASE01", 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 during the noise calculation. 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 and double-click on "!NONE!" to highlight it, and then type "CASE01.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 "CASE01" parameters as they are. Select Edit // Commit Record.

14. Add a second Output record "CASE01.LMX" using the "LAMAX" Metric, and set the contour parameters to (60 dB, 100 dB, and 10 dB).

Again, use "OneCase" and "CASE01" parameters. Select Edit // Commit Record.

15. Add a third Output record "CASE01.TA" using the "TALA" Metric, and set the contour parameters to (5 minutes, 45 minutes, and 10 minutes). Again, use "OneCase" and "CASE01" 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 Setup function.

16. Select the Output // Output Graphics function. Click on all three Output identifiers to highlight them, and press "OK". INM then preforms post-processing on <u>one</u> set of MultiMetric noise files to produce <u>three</u> sets of noise contours. A DOS window appears while NMPLOT calculates. When finished post-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.

1.5 Warnings

You need to be aware of FAA requirements regarding INM applications, and you need to be careful of potential problem areas when creating INM studies. Some of the more important items to be aware of are listed below.

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 point-of-contact.

2. Contact the FAA for AC91-53A Noise Abatement Departure Profile (NADP) approval. INM 5.0 does <u>not</u> contain pre-approved NADPs, even though suggested Procedure Steps for NADPs are presented.

3. Do not change or add aerodynamic coefficients unless you follow procedures in SAE-AIR-1845 and use valid source data based on measurements or flight manuals. (See Appendix A for information on how to obtain the SAE-AIR-1845 report.)

4. Do not trust INM-supplied latitude/longitude values for the airport reference point, Runway End points, and navaid points. Always double check them.

5. Be careful when using OAG-derived data. In the OAG, a single real flight may be entered multiple times under different airline names (i.e., the practice of "code sharing"). Also, you should review warnings in the output log file, where you may find missing airports (especially non-U.S. airports), missing equipment types (especially helicopters), and/or incompatible stage lengths. Remember that OAG data represents only scheduled commercial flights, and that you need to add unscheduled commercial, general aviation, and military flights.

6. If you use a terrain file and want to compute noise at location or population points, make sure that all of the points are inside the boundaries of the terrain area.

7. Do not use the File Manager to rename or delete Case or Output subdirectories. Let INM manage these Study subdirectories.

8. Be careful if you use DBMS and spreadsheet programs to input INM data. Some programs (e.g., Quattro Pro for Windows 5.0) can very easily change DBF field formats. INM cannot read a DBF file that has had its structure changed in any way.

9. If you create your own DBF files, make sure that key fields in related DBF files are correct. For example, the key fields in the TRK_SEGS file (runway end identifier, operation type, and track identifier) must map exactly to the key fields in the TRACK file.

10. Do not input points-type sub-tracks with a DBMS program. INM must create sub-track points inside the Track // Input Graphics "Disperse Track" function, or else INM cannot read them back again. You can, however, create backbone Track points with a DBMS program (put "0" in the TRK_ID2 field).

11. INM is a single-user system. Two people cannot run INM from a network disk drive at the same time.

12. Make sure that network computer clocks are synchronized.

13. NT systems using the NTFS file system should use the DOS file-naming conventions (i.e., eight characters followed by a three character extension) for INM Studies, Cases, and Output directories.

14. All DBF files should be thought of as locked while INM is running; that is, do not attempt to add, delete, move, rename or open any files (including Case Output files) for a Study that is open in INM. This includes accessing them with a DBMS.

2 INTRODUCTION

The following sections enumerate INM 5.0 model enhancements, give an overview of the software interface between you and INM, and summarize the contents in INM disk directories.

2.1 INM 5.0 Enhancements

INM 5.0 has a completely new user interface, contains algorithmic enhancements to make it run more efficiently and accurately in comparison to previous versions, includes many new functions to extend its analytical capabilities, and uses a new database structure and engine.

2.1.1 New User Interface

INM 5.0 uses Microsoft Windows graphical user interface (GUI) system for data input, model execution, and data output. Windows provides a very different way of interacting with INM than that used in previous versions. Instead of preparing a free-form input file with a text editor, you now fill out boxes in data-input forms in windows on the screen. Often the input data are selected from lists provided by INM, making the data-entry job less error prone. INM validates data as you commit each record, so an INM Study data set is built up as an integrated whole. INM 5.0 uses color and graphics to help you visualize input data. It provides X,Y plots of Noise curves and Profile Points, and lets you input Tracks by pointing-and-clicking with a mouse.

Another important change in the user-interface is the way INM stores data. INM 5.0 reads and writes dBase-IV formatted files, which have "DBF" as their file extension. Because of this new design, you can use Database Management System (DBMS) programs and spreadsheet programs to manage INM input and output files. You can build and manage input data outside of INM, and you can process data produced by INM. These tools are not required to run INM and are not considered part of INM, but for large Studies, they will be very useful.

Because INM now uses public DBF files (rather than secure, but inaccessible binary files), it must employ strong data validation processing to maintain the integrity of the image of the DBF files 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 some delay, especially for large files.

2.1.2 Model Enhancements

INM 5.0 noise calculation algorithms are based on the SAE-AIR-1845 methodology, as were previous versions of INM. The algorithms have been rewritten in a different computer language, but they are essentially the same algorithms. There are, however, many technical enhancements to the computer code which provide faster run times and more accurate noise predictions. INM 5.0 also contains additions to the INM 4.11 Standard database. The following list highlights the major enhancements:

1. Speed -- The INM 5.0 noise calculation module is between 1.5 and 2 times faster that INM 4.11, depending on the specific input case and computer system.

2. 32-bit program -- INM is compiled as a 32-bit program, resulting in faster run time.

3. Significance testing -- a new algorithm tests flight tracks before using them in computing noise. The new algorithm is more discriminating than the old method in distinguishing significant vs. non-significant tracks.

4. New aircraft -- one new airplane type is added to the INM Standard database; it is the UPS 727QF.

5. Maximum-level input data -- many of the Standard aircraft now have maximum-level noise-power-distance tables, in addition to noise exposure tables. Regression equations are used for those aircraft without maximum-level tables.

6. Exposure fraction -- a new algorithm, which is based on both noise exposure and the new maximum-level input data, improves the accuracy of noise exposure calculations.

7. Time-above metric -- a new time-above algorithm is based on the new maximum-level input data.

8. Standard metrics -- there are now 13 pre-defined noise metrics (compared to 8 before), including multi-event noise exposures. See Section 6.4 for the list of metrics.

9. Non-standard profiles -- calculation of profiles for non-standard atmospheric conditions uses an improved algorithm. Non-standard departure profiles are somewhat higher and thrusts are somewhat smaller.

10. Environmental factors -- computed profiles now depend on airport pressure, runway headwind, and runway gradient, in addition to previous environmental factors (airport elevation and temperature).

11. Acoustic impedance term -- if the terrain elevation enhancement is invoked, it is now calculated at the terrain elevation for the observer's position.

12. Run-up operations -- input data and noise calculation methods are different; a run-up is no longer a pseudo-takeoff event.

13. Touch-and-go -- touch-and-go profiles and data input methods are different; airport pattern altitude is supported.

14. Contours -- the Air Force NMPLOT Version 3.03 program is used to construct noise contours, making INM, NOISEMAP, and the Federal Highway Administration=s Traffic Noise Model (FHWA TNM) contour input data compatible.

15. Standard grid analysis -- new user-defined noise Metric values are computed.

16. Detailed grid analysis -- new closest-point-of-approach parameters are computed; the top 97 percent contributors are reported (instead of the top 20 flights).

17. Operations-by-percent -- new user-defined aircraft groups make this function more versatile.

2.1.3 Additional INM Functions

INM 5.0 contains virtually all of the functions provided by the previous INM versions; in addition, it has many new functions:

1. Track points -- tracks can now be constructed from a set of X,Y points, in addition to a set of vectoring commands.

2. Graphical track input -- you can directly create tracks in graphics window by clicking the mouse button at the end points of linear track segments.

3. Dispersed tracks -- you can create a backbone track and then generate sub-tracks, which can be graphically edited. You input the percentage values for sub-tracks. INM automatically distributes flight operations across sub-tracks.

4. Radar tracks -- you can use radar-derived data to create INM dispersed tracks. You select a bundle of radar tracks and INM computes the average position of the track point and other data that is used to make sub-tracks.

5. Aircraft substitutions -- FAA approved aircraft substitutions are included in the INM Standard database. You can use substitution identifiers in flight operations. You can create substitutions that map to INM aircraft.

6. OAG input -- a preprocessing program reads OAG data and creates an input file for use in the operations-by-percent function.

7. User-defined noise metrics -- you can define your own noise metric; it can be exposure-based, maximum noise level, or time-above a threshold.

8. Multi-metric run -- INM has a new contour execution mode that computes and saves noise data in a format such that several metrics can be calculated without running the model several times.

9. Population -- you can run a preprocessing program to produce U.S. Census block-level population data. INM calculates the noise at the population points and the number of people inside each noise contour.

10. Contour processing -- contour levels can be defined after making a run. Also, you can add, difference, and merge contours using NMPLOT functions.

11. Noise charts -- noise-power-distance data are graphed.

12. Profile charts -- profile data are graphed; altitude, speed, and thrust are shown as a function of distance.

13. Rotated grids -- standard and detailed grids can be rotated; grids are displayed in the output graphics window.

14. Overlays -- output graphics functions can overlay tracks, runways, contours, population points, locations points, airport CAD drawings, and terrain contours.

15. Overflights -- a new operation type can be defined without reference to runways.

16. Non-standard atmospheric conditions for approach -- approach profiles now depend on airport environmental factors.

17. Build profiles -- you create approach and departure profiles by specifying flight procedures, such as "climb to 1000 feet"; INM computes the profiles, adjusting for airport environmental factors.

18. Airport setup data -- INM contains geographical data for hundreds of U.S. airports and runways.

19. Navaids and fixes -- INM contains location data for navaids and fixes in the U.S.

20. Special locations -- you can define location points around the airport, and INM calculates noise at those points.

21. Study management -- INM manages directories and files so that multiple cases can use common data. Data not created by the user are borrowed from the INM Standard database. This will permit automatic updating of studies when new INM Standard data are distributed.

22. DXF output -- you can convert INM output graphics (runways, tracks, and contours) into CAD drawings in DXF file format.

2.1.4 Plans for the Future

INM will continue to evolve. Some plans for future versions of INM are listed below.

1. Integrate the Heliport Noise Model (HNM) into INM.

2. Add U.S. Air Force NOISEMAP military aircraft into the INM Standard database.

3. Add more commuter and general aviation aircraft into the database.

4. Add the capability to compute multiple TA-thresholds for grids of points within a single run.

5. Enhance the significance-testing algorithm to test segments within a track before using the segments in computing noise.

6. Enhance the noise-at-takeoff algorithm so that the noise reference speed is adjusted for the length of the first takeoff segment.

7. Change the segment-subdividing algorithm so that speed values at segment subdivision points are based on an acceleration equation, instead of linear interpolation.

8. Add the capability to specify both airline and OAG equipment-type in the OAG_SUB file used for OAG processing.

9. Add the capability to input data into multi-record tables, in addition to individual-record data-input forms.

10. Implement better multi-record data cross checking (data in one record affect data in another).

11. Support Microsoft Clipboard[J] and Object Linking and Embedding (OLE[J]) methods for exchanging data with other programs.

12. Make INM compatible with the Microsoft Windows 95J operating system.

2.2 User/System Interface Overview

You interact with the INM system when you preprocess source data, prepare input data, execute the model, and analyze output data. To facilitate user/system interface tasks, INM provides various ways to work with data, including two menu-driven Windows computer programs.

2.2.1 Data Interface

INM 5.0 is designed to be used with other software tools. Most of the input and output files are in dBase-IV format (DBF file extension). This is very useful because you can use DBMS programs to input and manage large files (especially the Flight Operations file), and you can use spreadsheet programs to create presentation graphics of output data. Some example programs that directly read and write DBF files are:

Borland7 dBase for Windows7 DBMS
Borland7 Paradox for Windows7 DBMS
Microsoft7 Access for Windows7 DBMS
Microsoft7 Fox Pro for Windows7 DBMS
Microsoft7 Excel for Windows7 spreadsheet
Novell7 Quattro Pro for Windows7 spreadsheet
Lotus7 1-2-3 for Windows7 spreadsheet

Please be careful when using these programs so that you do not accidentally change the DBF format of an INM file, in particular the field width. Some spreadsheets change the field width when you simply change the visual appearance of the data on the screen and then save the file.

You should become familiar with Microsoft File Manager program. The File Manager can be used at the same time as INM. The File Manager is useful for copying files from one place to another, and for looking at the contents of DBF files. You can easily run a program to see the contents of DBF files by "associating" the DBF file extension with your DBMS program, or lacking a DBMS program, with one of the two INM-supplied utility programs (see Appendix Q).

INM does not fully support the Microsoft Clipboard, and INM does not support any Object Linking and Embedding (OLE) methods of exchanging data with other programs. Future versions of INM may incorporate these features. For now, INM provides the following ways to input data:

Enter data interactively in various DBF form-input windows.
Enter Track data interactively in the Input Graphics window.
Use an old INM input text file and convert it with an INM-supplied program.
Create text files and use an INM-supplied text conversion program.
Use a DBMS or spreadsheet program and directly create DBF files.

INM output capabilities include:

View output X,Y-plots, 2D-graphics, and tables on the screen.
Print plots, graphics, and tables on a printer or to print files (e.g., Postscript).
Copy tables and charts to the Microsoft Clipboard for use in other applications.
Export tables to a text file using a fixed-column or comma-quote format.
Directly access DBF output files using a DBMS or spreadsheet program.

2.2.2 INM Main Menu

The INM.EXE program 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.

File	Create new Study, open old Study, export, print, and exit.
Edit	Add, delete, copy data records, and edit graphics data.
View	Control the appearance of graphics displays.
Setup	Setup Aircraft, Substitutions, Metrics, Cases, and Locations.
Track	Input Runways and Tracks, and do graphical editing.
Acft	Input Aircraft, Substitution, Noise, and Profile data.
Ops	Input and calculate Flight and Run-up Operations.
Run	Setup Grids and run options, execute, and control batch

runs.

Output Setup output data, view contours and tables, make an echo report.
Window Control the appearance of windows.
Help Access help information.

2.2.3 Source Data Processing Menu

The PREPROC.EXE program displays a menu of INM functions that calls modules within the program or calls separate computer programs. These modules/programs are used to process source data into INM format. The Source Data Processing menu functions are introduced below, and they discussed in detail in Section 14.

INM4.11 Convert a "FOR02" input file into INM format.
Text Convert a user's text file of data into INM DBF files.
Terrain Make an airport-centered file of terrain data and create terrain contours.
Census Make a street map file, population file, and do various file conversions.
OAG Make an input file of scheduled flight operations using OAG data.
Radar Convert a user's text file of radar data into INM format.
CAD Convert a DXF file into INM format, and convert tracks and contours to DXF.
System Create a set of INM Standard data files.
Help Access help information.
Exit Quit the program.

2.3 Disk Directory Summary

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

1. INM50 -- This is the main system directory. It contains user-interactive programs, their supporting dynamic link libraries (DLLs), help files, and system subdirectories -- everything needed to run INM. You interact with two Windows programs: INM.EXE is the main input-run-output program; and PREPROC.EXE is the supporting source-data-processing program. You can rename this directory, if you wish.

2. COMP50 -- This system subdirectory contains the noise calculation module, which is essentially equivalent to COMPUTE.EXE in previous versions of INM. COMP50 produces recursive-grid noise files which are processed by CONVERT. CONVERT creates a "GRD" file, which is processed by a special version of the NMPLOTX.EXE program (Version 3.03). The resulting CONTOURS.DAT binary file contains noise contour data that are read and displayed in INM. Do not rename or delete this subdirectory.

3. NMPLOT -- This system subdirectory contains software relating to the NMPLOT program, which is a part of the U.S. Air Force NOISEMAP airport noise model. In addition, NMPLOTX.EXE Version 3.03, which is used by INM, can also be used as an interactive program to directly manipulate GRD files. Do not rename or delete this subdirectory.

4. SYS_DATA -- This system subdirectory contains the INM Standard database binary and DBF files. INM Standard data are maintained in the ACDB50.BIN file. It contains 10 DBF files in an encrypted compressed binary format. If you see a message when INM loads about a "archive" error, it means that the ACDB50.BIN file is missing or corrupt. If you want to see the DBF files, use the Source Data Processing program System // Extract Files function. This function creates the Standard DBF files and puts them into this subdirectory. Standard data are secure because INM reads the binary file, not the DBF files. Do not rename or delete this subdirectory. Do not delete the ACDB50.BIN file.

5. SYS_DBF -- This system subdirectory contains templates for all of the DBF files that are used by INM. A DBF template is a DBF file without any records. Do not rename or delete this subdirectory or any of the files it contains.

6. USR_DATA -- This system subdirectory contains DBF files that are used by INM, but you can adapt them for your own use (e.g., you can add airport data). Remember to save your modified USR_DATA files if you load a new version of INM. Do not rename or delete this subdirectory.

7. PREPROC -- This system subdirectory contains software that support the Source Data Processor program: TXT2DBF.EXE reads a text file and creates selected DBF files; CENSUS.EXE processes U.S. Census data and produces street map and population files; and CADCVRT.EXE converts a DXF file into binary graphics file that can be displayed in INM. Do not rename or delete this subdirectory.

8. CONV411 -- This system subdirectory contains software that converts an INM-4.11 input text file into INM-5.0 DBF files. The DOS batch file CONV411.BAT calls a trio of programs: INPUT50.EXE is a special version of the previous INPUT.EXE program; TRANSFER.EXE rewrites the output DAT file as DBF files; and MSTUDY.EXE writes a Study initialization file and fixes a variety of details inside the DBF files. Do not rename or delete this subdirectory.

9. TERRAIN -- This system subdirectory contains software that creates a binary file of terrain elevation data. The DOS batch file MAKE3CD.BAT calls a trio of programs: MAKEFILE.EXE, which creates an airport-centered terrain file; TERRAIN.EXE, which creates a file for input to NMPLOT; and DAT2BIN.EXE, which creates a file that is used to display terrain contours. Do not rename or delete this subdirectory.

10. UTILITY -- This system subdirectory contains utility programs. They are <u>not</u> used by INM, but you may find them useful. The utility programs include: PRN_HDR.EXE, which displays DBF header information; PRN_DBF.EXE, which prints a text file of DBF data; PRN_FLT.EXE, which prints a text file of flight-path data; and XY_TO_LL.EXE, which converts X,Y coordinates into latitude/longitude values. You can delete this subdirectory, if you wish.

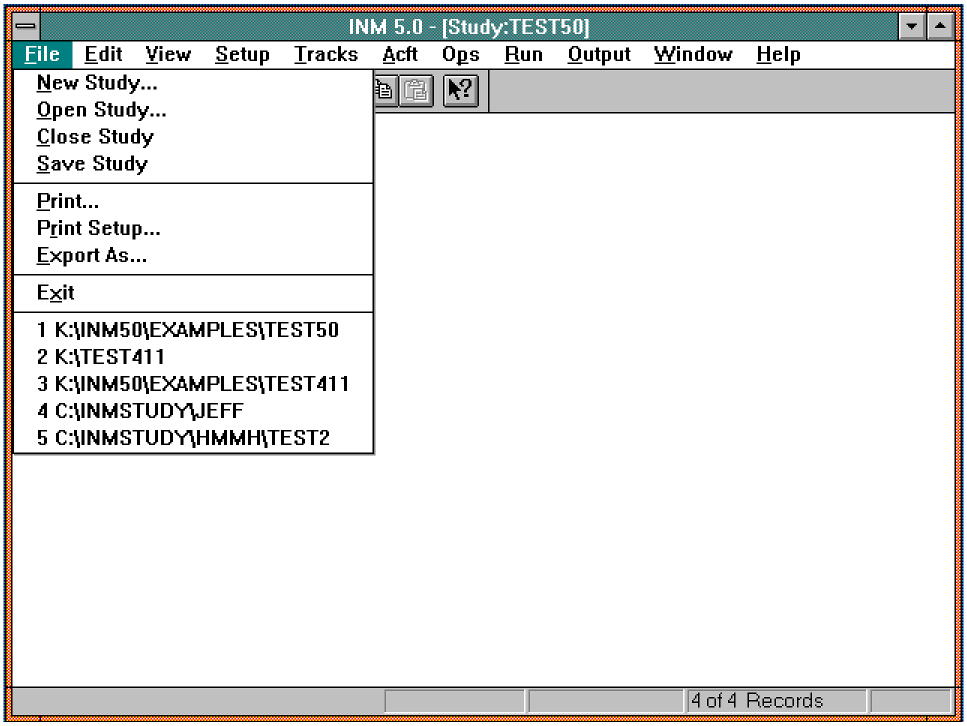
11. EXAMPLES -- This subdirectory contains two example Studies. The TEST411 Study contains practically the same test case as was in the INM-4.11 TESTCASE.INP file. The TEST50 Study demonstrates new features in INM 5.0. This subdirectory takes up a large amount of disk space. You can move or delete this subdirectory, if you wish.

    Do not put your own Studies under the EXAMPLES system subdirectory because when you install another version of INM, you may forget and delete the old INM directory, possibly destroying your Studies.

12. Study directory -- You create a Study directory when you start a new Study using INM. A Study consists of Study-level files (e.g., Runway Ends), additions and changes to INM Standard data, Case subdirectories of files, and Output subdirectories of files. The Study directory can be renamed, copied, and/or moved to a different place on your disk. Do not put your Study directories under INM50 \ EXAMPLES.

13. Case subdirectories -- A Study consists of one or more "Cases" (e.g., a base case and two alternatives). Both Study and Case data are used as input data for the noise calculation module. Tabular output data from a run are written into the Case subdirectory. You name the Case subdirectory, and INM manages it. Currently, INM does not allow you to change the name of a Case subdirectory once it is created. Do not delete a Case subdirectory outside of INM; use INM instead.

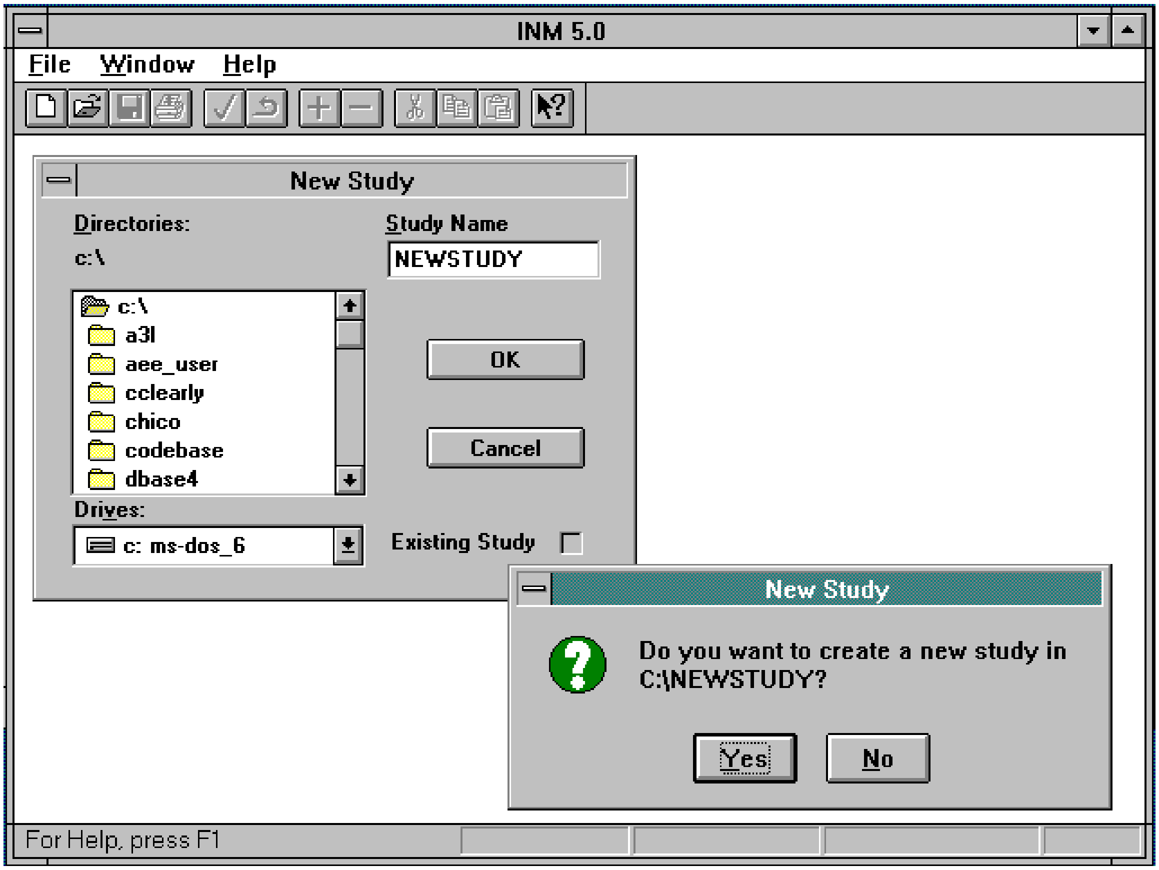
14. Output subdirectories -- Noise contour data and output graphics data are placed in "Output" subdirectories. The reason for having Output subdirectories separate from Case subdirectories is that you can define how to combine data from several runs (e.g., you can create noise contours of the difference of two Cases). You define and name the Output subdirectory, and INM manages it. Currently, INM does not allow you to change the name of an Output subdirectory once it is created. Do not delete an Output subdirectory outside of INM; use INM instead.



3 FILE MENU

This menu is called "File" to conform to standard Windows interface design. For the most part, however, the menu deals with a group of files at once, rather than one file at a time.

There are two different File menus. The one that is shown above is used in conjunction with DBF and table windows. A somewhat different set of File functions is displayed when a graphics window is in focus.



3.1 New Study

Menu Item: <u>File // New Study</u>
Toolbar: <u>Page with folded corner</u>

You use this function to create a new Study. An INM Study is a <u>directory path name</u> on a disk drive. The New Study dialog box allows you to select a disk drive and directory name for your new Study. By selecting a directory name and pressing "OK", or by double clicking on the directory name, you can move up and down directories on a particular disk drive. This window works like the usual Microsoft directory-navigating windows.

After selecting the <u>parent</u> directory for your Study directory, go to the Study Name input box and type a name for your new Study. When you press "OK" and verify that you really want the new directory path, INM creates the directory and writes a few key files into it. For example, if you want your new Study to be "C:\ NEWSTUDY", double click on "c:\", type "NEWSTUDY", and press "OK". Please note that INM lets you create a Study anywhere (including inside of another Study), so double check the Study path name before selecting "OK" in the verification dialog.

You also can create a new Study directory by using the Microsoft File Manager File // Create Directory function, and then select the new directory name using the INM File // New Study function. In this case you do not type a name in the Study Name input box; instead, you simply press "OK" and verify the new directory.

The extra verification step is included to protect you from creating a Study in the wrong directory. If you happen to choose a path name that already is an INM Study directory (one that has a STUDY.INM file), INM places an "X" in the Existing Study box and does not allow a new Study to be created with that path name. However, all other directories are available for use as a new Study directory (even if they have files in them), and all directories can be used as a parent for a Study directory.

An INM Study is an independent entity -- 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 Microsoft File Manager to change the directory name and/or move it 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 directory, INM displays a dialog box which lets you choose the kind of physical units (English or metric) that will be displayed on 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:

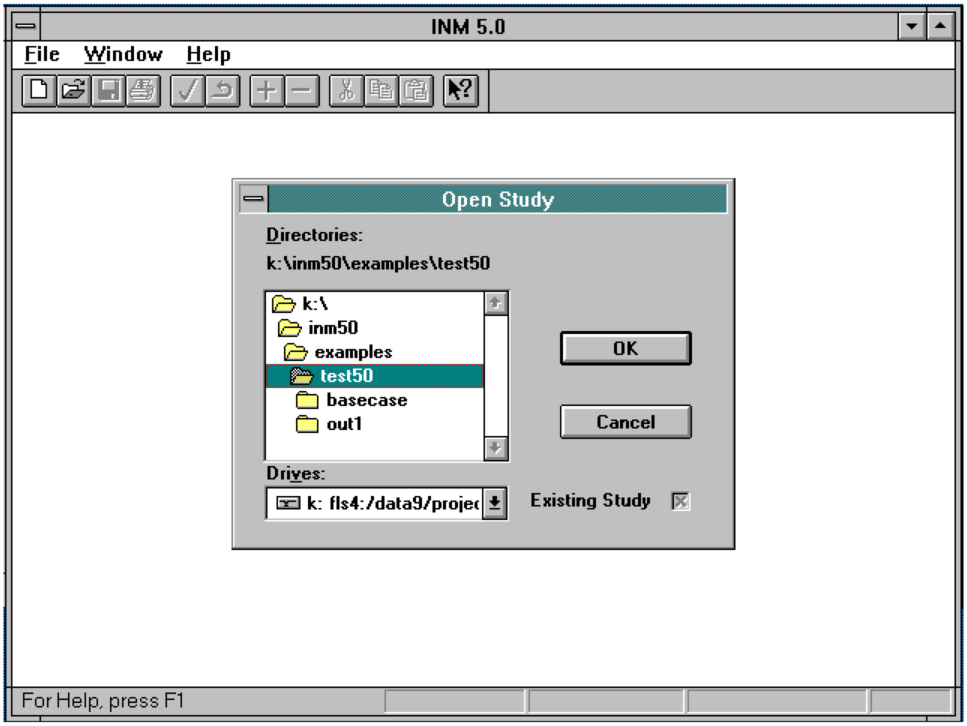
	English	Metric
X-Y coordinates	nmi	km
Track distance	nmi	km
Runway distance	ft	m
Profile distance	ft	m
Altitude	ft	m
Weight	lb	kg
Speed	knot	km/hr
Climb rate	ft/min	m/min
Temperature	EF	EC
Pressure	in-Hg	mm-Hg

Area	mi^2	km^2

INM changes units when presenting data in DBF windows. The type of unit is displayed next to the input parameter (e.g., "(ft)" or "(m)").

Even though INM can accept metric input, you should select the English system if you can. INM Standard data are stored in the English system because Standard data were copied from the previous INM database. User-defined data are stored in the English system because they need to be compatible with the Standard data. Some input data, such as noise thrust-setting parameters and aerodynamic coefficients, are stored and displayed only in English units. INM internal units use the English system. Output tabular data, such as detailed grid tables, are computed only in English units. However, exported input data (see the File // Export As function in Section 3.5) can be written out in metric units. As you can see, it would be less complicated to use the English system. Future versions of INM will be more symmetric between English and metric units.

After you commit to a system of units, INM automatically brings up the Study Setup dialog box. This dialog is actually a function under the Setup menu -- Setup // Study Setup. Please refer to Section 6.1 for information on how to fill out this dialog box.



3.2 Open Study

Menu Item: File // Open Study
Toolbar: Open folder

You use this function to open an existing Study. As with the New Study function, you can select a disk drive and directory path name. Double click on a directory name to navigate into that directory.

When your Study path name appears in the grey area under the "Directories:", and there is an "X" in the Existing Study box, press "OK" to load the Study. INM then reads a few key files and changes the main menu bar, allowing you to start an INM session. The name of the current Study is displayed on the title bar at top of the INM window.

If you want to load a recently used Study, you can go to the File menu and simply click on the Study name. The Study list under the File menu contains the five most recently opened Studies.

You can use the File Manager to "Associate" files with extension "INM" with the INM.EXE program. You can then run INM and open a particular Study by double clicking on the STUDY.INM file in a Study directory.

3.3 Close Study

Menu Item: File // Close Study

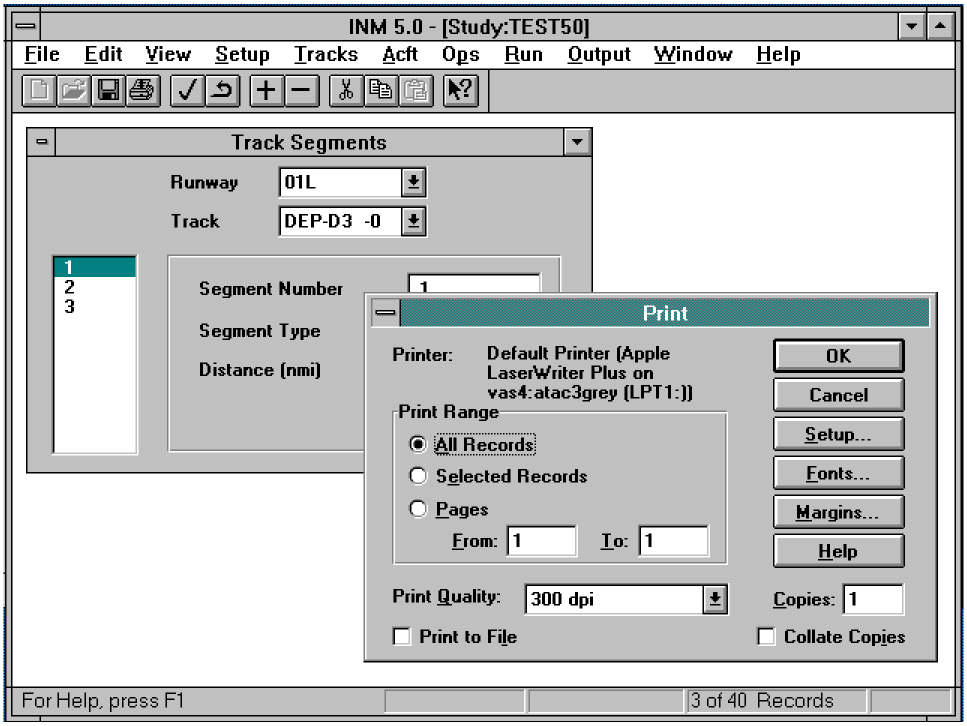
Use this function to save all data and close the Study. The INM program remains running, and you can create or open another INM Study. Sometimes INM will not allow you to close the Study until you have committed a new record in an open DBF window.

3.4 Save Study

Menu Item: File // Save Study
Toolbar: Diskette

You use this function to save data in memory to disk files. When you commit a record (see Section 4.1), INM moves your data from the user interface area to another area in computer memory, but the record is not saved to disk. When you close a window, INM usually saves the associated DBF file. Please note that 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 in memory to disk files every two minutes.



3.5 Print

Menu Item: File // Print
Toolbar: Printer

You use the Print function to print the contents of the window that has the "focus" (i.e., has a colored title bar). The window in focus can be any one of the five types of INM windows:

DBF window
Chart window (Noise or Profile X,Y graphs)
Input or Output Graphics window
Operations or Output table window
Case Echo Report.

File // Print is an adaptation of the standard Microsoft Print function. 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. You can consult Microsoft documentation to connect printers to your Windows system.

For DBF, table, and Echo Report printing, the "Fonts" function lets you change the printer font style and point size.

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.

Use the "All Records" radio button to print all records in a DBF or table window (including non-visible records). Or, you can select one or more records in the window first and then use the "Selected Records" option to print only the records you want.

The "Pages" options is not particularly useful, but if you know where the page breaks occur (because you printed it once before) you can use this function 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; page range is also useful for resuming an interrupted print job.

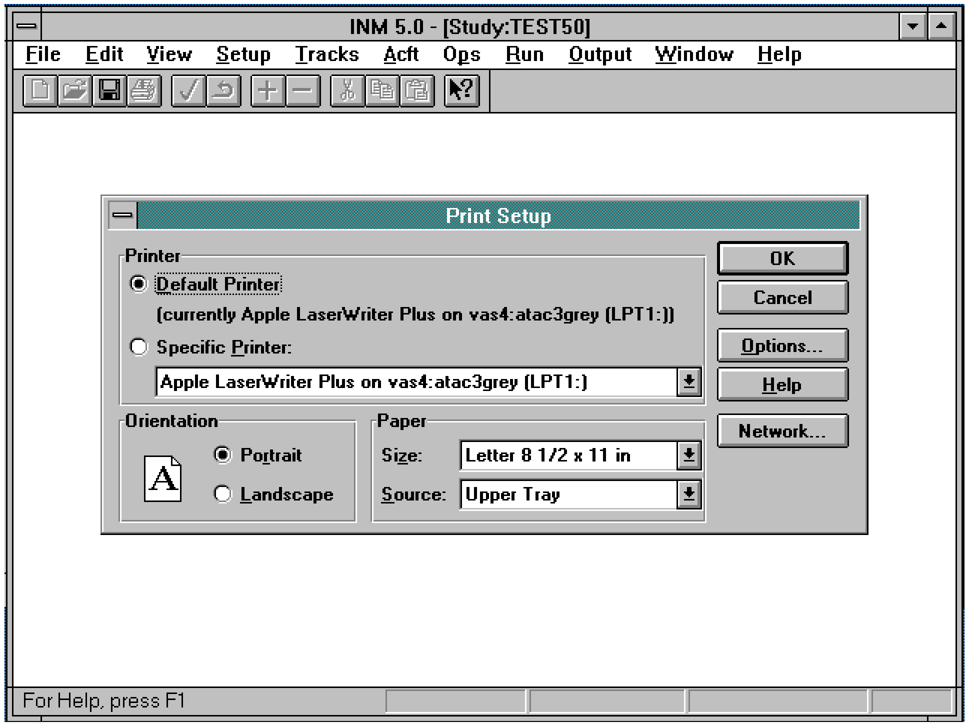
The "Copies" and "Collate" options can also be used if your printer supports them.

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 a chart (e.g., a noise graph) in landscape mode is possible, but you have to change the Windows system Print Setup default to landscape mode instead of using the local Print Setup function. This problem will be fixed in later versions of INM.

3.6 Print Preview

When focused on a Track // Input Graphics or Output // Output Graphics window, you can use this function to preview how the graphics will look on a printed page.



3.7 Print Setup

Menu Item: File // Print Setup

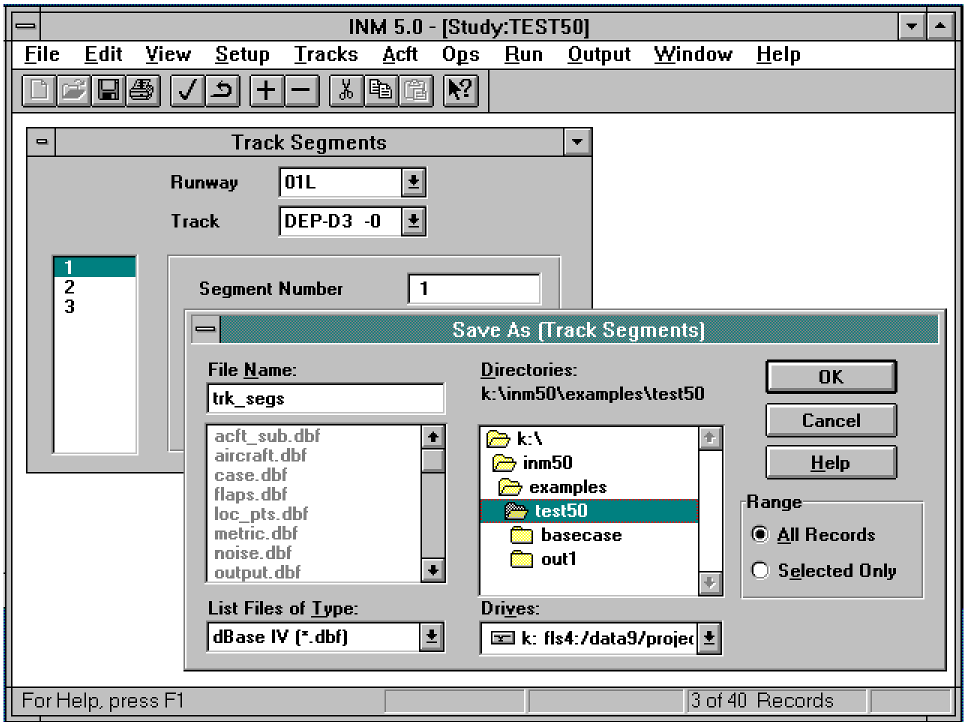
You use this function to select the printer that you want to use, and to set various printing options (e.g., portrait vs. landscape mode). You can learn how to use this standard Microsoft function by consulting documentation on the Windows operating system. There is a small amount of information on the "Help" button.

3.8 Scaled Printing

You can set up INM for scaled printing by using this function. The popup dialog window allows you to set a ruler unit equal to a map distance (e.g., one inch equals 1,000 feet). You can turn on the scaled printing capability by putting an "X" in the "Enable" box. Use the Width and Length adjustments if the scale is not exactly right. For example, if a horizontal 10-km line measures 9.7 cm when the scale is supposed to be 1 cm =
1 km, then put 0.97 in the Width box.

You can check the scale by using the File // Print Preview function. To actually print an Input or Output Graphics window, use the File // Print function.

Most printer drivers return valid parameters that allow scaled printing to work properly, but some drivers do not. If you have trouble, please consult Windows documentation and try different or upgraded printer drivers.



3.9 Export As

Menu Item: <u>File // Export As</u>

Use the Export As function to create an export file -- you "export" DBF data in a window "as" a file. Even data that are not showing in the window can be saved into the file.

To use this function, you need to focus on a DBF window (e.g., Tracks // Track Segments), or on one of the table windows (e.g., Ops // View Ops "View Summary"). Then, select File // Export As. A standard Microsoft dialog box appears. Select the directory where you want the file to be written by using the directory-tree box on the right. Then, select the <u>type</u> of file by using the box in the lower-left.

You have a choice of three types of export files:

dBase IV (*.dbf)	Standard DBF format
Fixed Length Text (*.txt)	Columns separated by spaces, one header line
Delimited Text (*.txt)	Comma-quote format, several header lines

The fourth choice, "All Files (*.*)", is used to view all of the files in a directory; it is not an exportable file type (but it does default to the Fixed Length Text).

Once the directory, name, and the file type are correct, press "OK". A file extension (.txt or .dbf) is automatically added to the filename. You are free to enter a file name different from the displayed default. After INM writes the file, you can use the File Manager to check the directory to see the file.

If you want to save only some of the records in a data window, you must select them before using the Export As function. You can select records in the left-hand list box in a DBF window, or you can select rows in a Operations window. Use the usual Microsoft mouse methods for item selection: individual Ctrl-clicks, or click / move / Shift-click. Then, in the Export As dialog, press the lower-right option "Selected Only", instead of "All Records". INM writes out only those records that you selected in the data window.

If you chose metric units for your Study, your exported DBF files are written in metric units, rather than English units.

Exporting charts. You cannot use the File // Export As function to export a Noise or Profile Graph; however, you can use the Edit // Copy Records function. This function copies the chart to the Clipboard in Windows Metafile format (WMF). You can then Paste from the Clipboard into another application. Also, you can access the chart via the Clipboard Viewer program and then save the chart in a file.

3.10 Export as DXF

You can use this function to export Output Graphics to a DXF file. Runways, tracks, and noise contours are written into the file, but other output graphics layers are not.

In the popup dialog window you specify the export file name and the X,Y units (e.g., feet) that are to be written into the DXF file. Nautical miles are the default units. Press "OK" to write the DXF file.

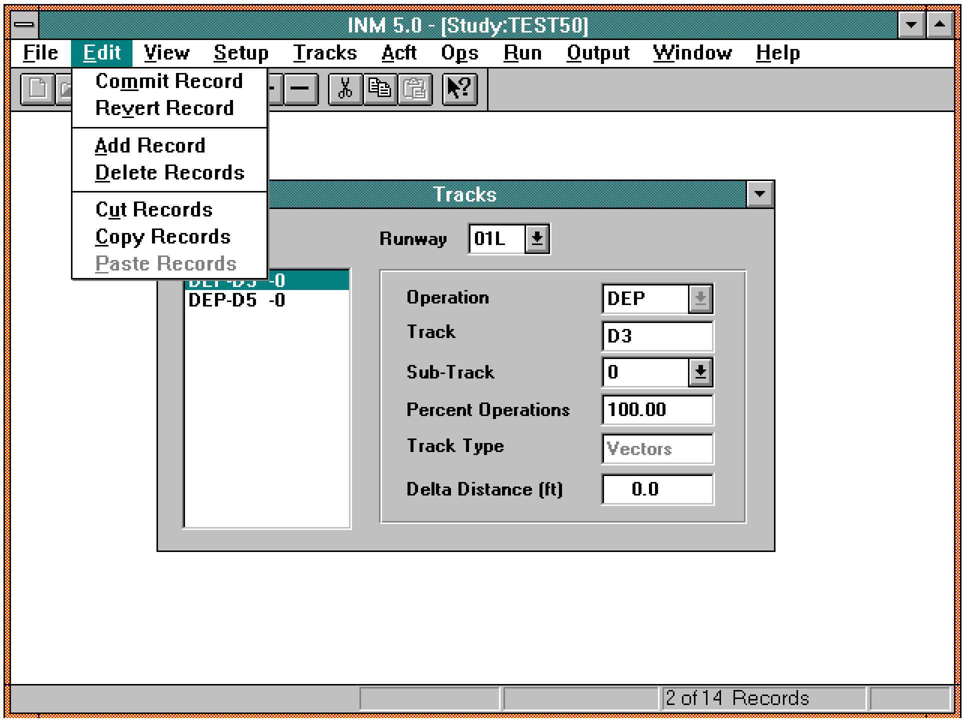
You can also use NMPLOT to write a DXF file. Please refer to the NMPLOT on-line help system. NMPLOT input files are called ANMPLOT.GRD@, and they are located in Output subdirectories.

The advantage of using NMPLOT is that you can interactively manipulate noise contours before sending them to a DXF file (or to a HPGL file). The disadvantage is that only noise contours are available in the NMPLOT.GRD file -- there are no runways or tracks.

3.11 Exit

Menu Item: File // Exit

This function saves and closes the current Study and then the INM program is closed down. You can also exit INM by double-clicking on the Microsoft Control box in the upper left- hand corner, or by single-clicking on the box and selecting "Close" (i.e., close INM).



4 EDIT MENU

There are two different Edit menus -- one is used when a DBF window is in focus, and the other one is used when the Tracks // Input Graphics window is in focus. This Section covers DBF editing, and Section 7.1 covers graphical editing. Sometimes, individual Edit menu items are disabled because the operation is not allowed in the particular DBF window.

4.1 Commit Record

Menu Item: Edit // Commit Record
Toolbar: Check mark

After you fill out data in a DBF form (the right-hand section of a DBF window), you need to commit the record. There are several different ways to commit a record. One way is to use this function or, equivalently, press the Check-mark button on the toolbar. Another way is to select a new record in the left-hand list box of the DBF window, or select a new set of records using a filter control above the data form. And the final way is to close the DBF window. If you use one of the implicit commit commands (e.g., selecting another record) INM presents a commit-verification dialog box.

Whichever method you use to commit a record, INM processes 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 is its DBF-definition name, which is given in Appendix B. The acceptable range of numerical values is given in the INM Help system, which can be accessed by using the Question-mark-arrow button on the toolbar. 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
Toolbar: U-turn

You can 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 returns the original data in 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 to input the old data, one field at a time, to get the old record back again.

4.3 Add Record

Menu Item: Edit // Add Record
Toolbar: Plus sign

Use this function to add a record to a DBF file. First, you focus on a DBF window and then select Edit // Add Record (usually the Add button on the toolbar is easier to use). The data input area changes to default values, which you can change. Commit the record when you are done filling out the parameters. If you are adding one record after another, you can just select Add again, the current record is committed (after confirmation), 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 DBF file, but it also creates a subdirectory in the Study directory. Sometimes you may get 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 Output 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 operation.

Because INM automatically manages (creates and deletes) subdirectories within a Study directory, it is recommended that you do not create and delete these directories with Microsoft File Manager, because the subdirectories that are recorded in INM and the subdirectories that are really on your disk drive may be in conflict.

4.4 Delete Records

Menu Item: Edit // Delete Records
Toolbar: Minus sign

One or more records can be deleted by using this function. First, 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 high-lighted records are the ones that will be deleted when you press Edit // Delete Records (or the Minus sign button on the toolbar). A dialog box confirms that you want to delete the record or records.

When you try to delete a record, INM performs Study management actions, as discussed below.

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 to precede if a record is in use. For example, you may want to delete Aircraft "ABC", 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 (e.g., Flight Operations) and the name of the Case, and displays a message about "record in use". You need to delete all references to "ABC" in Ops // Airport Ops, Flight Ops, and RunUp Ops windows before you can delete "ABC" itself. This is a safety measure to help maintain the integrity of the Study database.

Some records "own" other records. For example, the "ABC" Aircraft record owns Profiles, Profile Points, Procedure Steps, Flap Coefficients, and Thrust Coefficients. All records in "child" DBF files that have "ABC" as an Aircraft identifier are automatically deleted when you delete "ABC". In other words, deleting a "parent" record causes all "children" records to be deleted. This is necessary for maintaining database integrity. Noise records associated with "ABC" are not deleted because another Aircraft may be using them.

4.4.2 Delete Subdirectory

If you delete a Case or Output record, INM will delete all "INM files" in the associated subdirectory, delete the subdirectory itself if it is empty, and then delete the record in the DBF file. This is a rather extreme operation, and INM warns you with a message asking for confirmation before deleting INM files.

INM does not delete the subdirectory if it contains "non-INM files", such as your own special-purpose files, or INM-exported files. You should check the files remaining in the subdirectory, delete them, and then delete the subdirectory.

4.5 Cut Records

Menu Item: Edit // Cut Records
Toolbar: Scissors

The Cut Records function is usually used with Paste Records 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: (1) a buffer in memory waiting for a Paste Records command, and (2) in the Microsoft Clipboard (in text format). A record that has been Cut can be restored by Pasting it back into the window, but this will only work if the data in the buffer has not been overwritten by another buffer operation.

INM checks all files that may reference the cut records and, like the Delete operation, INM will not allow a 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
Toolbar: Two pages

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

Instead of doing a Copy/Paste Records 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
Toolbar: Clipboard and page

This function is used 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 one of the key fields in the records in the buffer, or you Paste them into a different Case. Some examples illustrate how to use Cut/Paste and Copy/Paste operations:

1. Create a new Noise identifier called "123456". Change to Noise "2CF650". Copy all of the records. Switch back to Noise "123456". Paste the records. A copy of the 2CF650 noise tables now exists under a 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 works because you changed a key field (the Noise identifier) before pasting the records.

2. Create a new Profile "DEP-S6" for Aircraft "727Q15". Go to the Procedure Steps window. Go to Aircraft "727Q15", Profile "DEP-S5", and Copy step numbers 1 through 9. Change to the new Profile "DEP-S6" and Paste the records. Now you can change the procedure data.

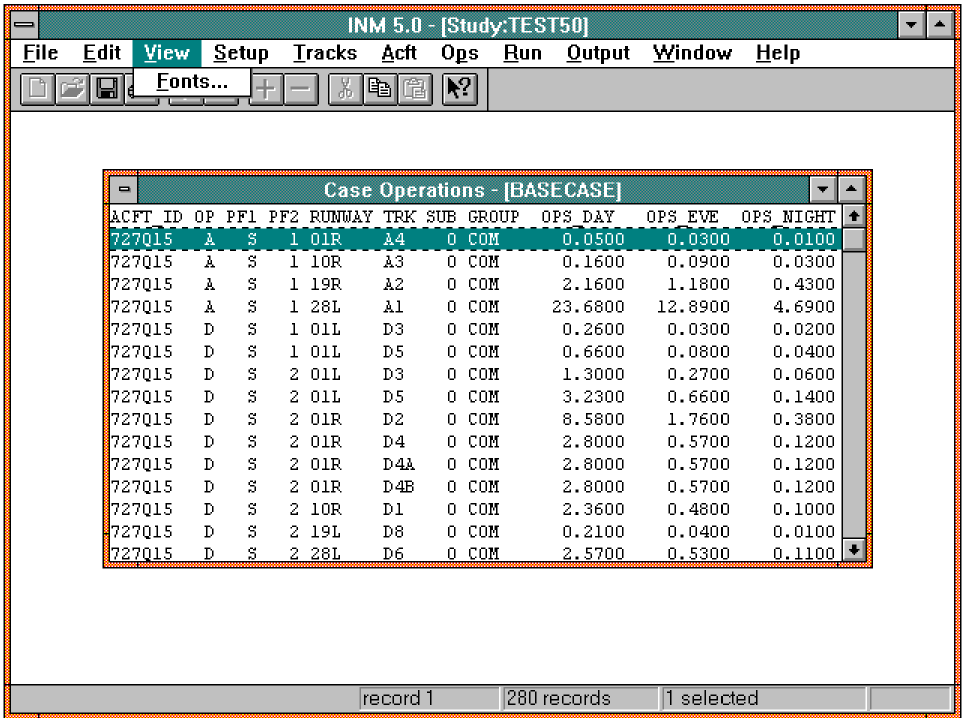
3. Create a new Case "CASE1". Using the Ops // Flight Ops function, select both "BASECASE" and "CASE1". Focus on the "Flight Operations - [BASECASE]" window and go to Aircraft "727Q15" Runway "09L". Copy Flight Operation records shown in the list box. Focus on the "Flight Operations - [CASE1]" window and go to the same Aircraft and Runway End. Paste the records. Notice that the Flight Operations key values 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 internal logic; for example, it does not make sense to Paste Procedure or Profile Point data between Profiles with different operation types. Similarly, a set of Departure Track Segments cannot be Pasted to an Approach Track.

Of course, you cannot Paste in records that would duplicate data that already exist; if you attempt this, INM will warn you about the error.

A Paste operation can also fail if some field in the records that have been copied to the buffer have no valid value for the new Aparent@. For example, a Flight Operation record cannot be pasted between Runways if the target Runway has no Track declared with the same key (name and operation) as the Runway being pasted.

Sometime, INM can detect situations where pasting would be inappropriate, in which case, the Paste menu item is disabled; in situations where this cannot be determined in advance, some (or all of the records) that you attempt to Paste to a new Aparent@ will simply not be added, and will not appear in the window.



5 VIEW MENU

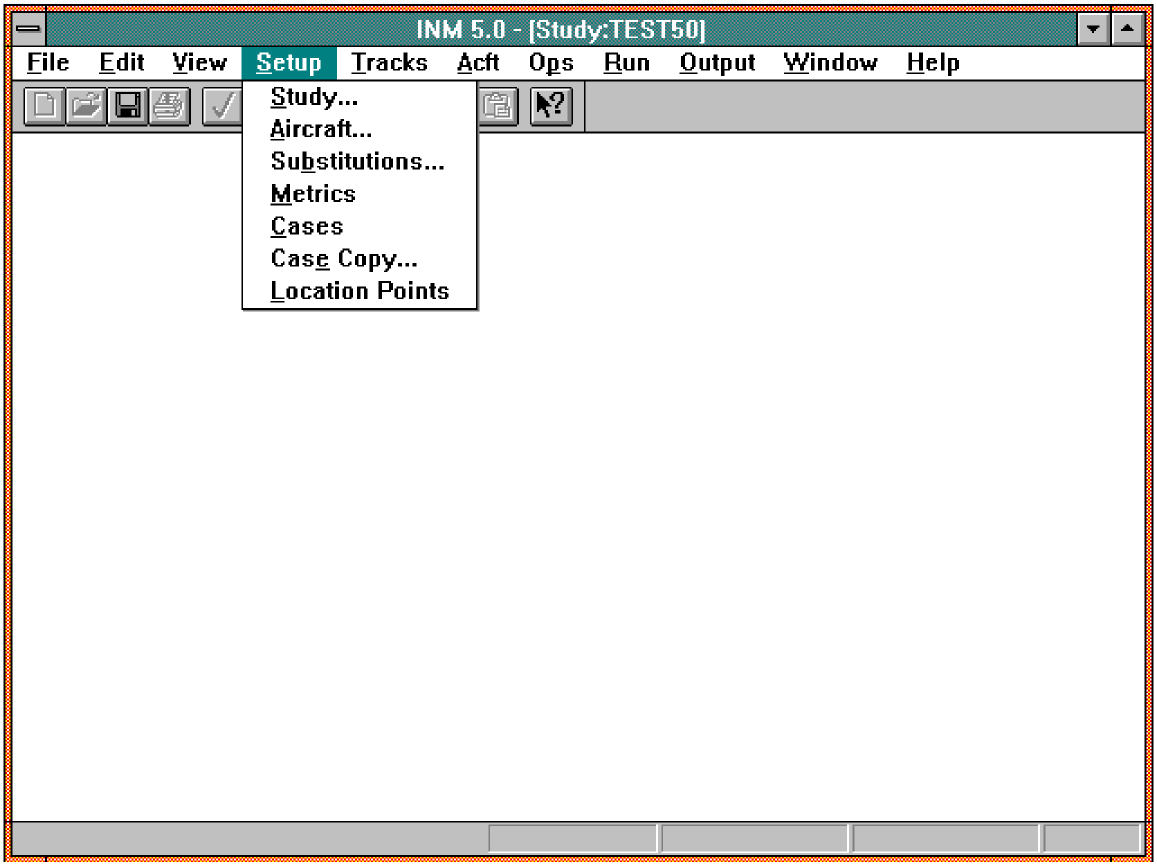
Functions that are listed in the View menu depend on the type of window that is currently in focus:

1. If an output-table window is in focus (e.g., Output // Detailed Grids), or if a window that is associated with the Ops // View Ops function is in focus (as shown above), you can use the View // Fonts function to change the font style and point size.

2. If the Input Graphics window is in focus, you can use View functions to zoom and change Track and Location Point attributes. See Section 7.1 for details.

3. If an Output Graphics window is in focus, you can use View functions to zoom and change graphics layer attributes. See Section 11.2 for details.

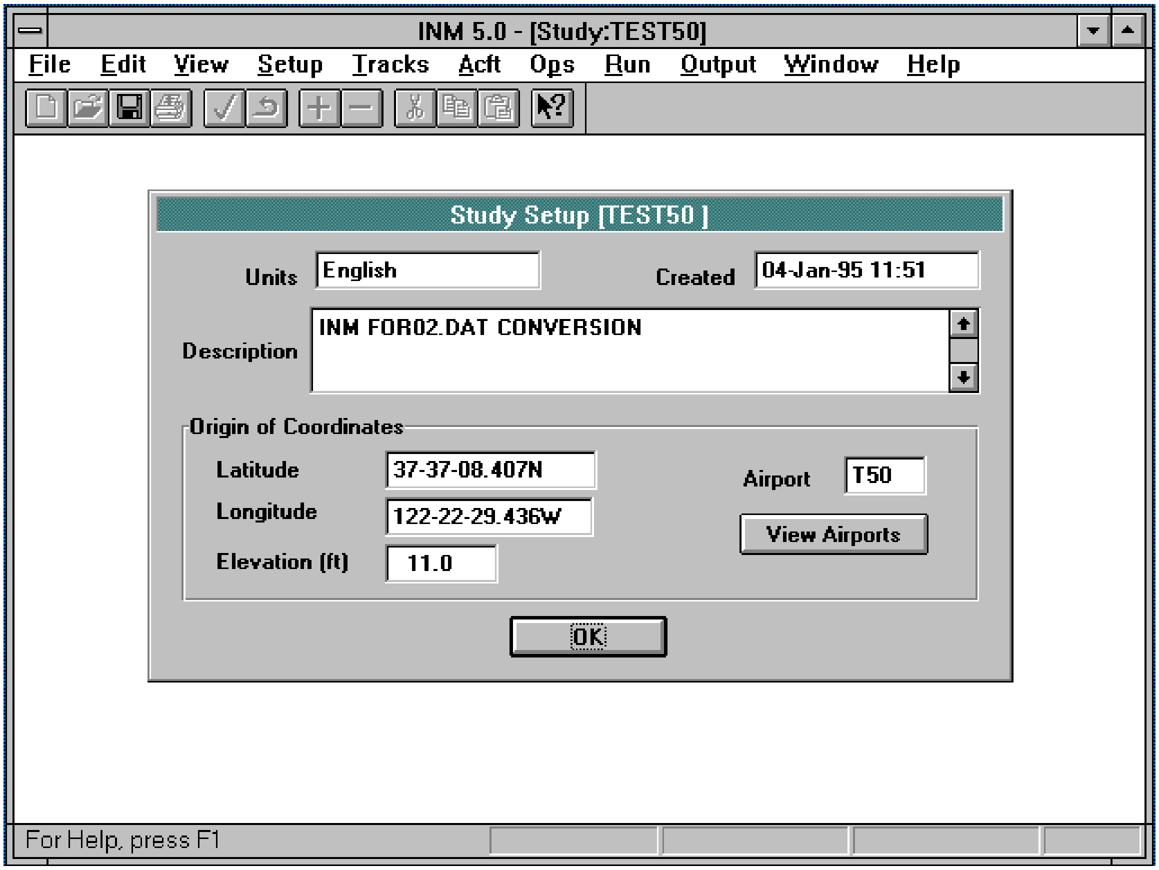
4. If an input DBF window, Noise Graph window, of Profile Graph window is in focus, there are no active menu items on the View function.



6 SETUP MENU

The Setup menu contains functions that help you create a Study. You can:

Specify the Study latitude, longitude, and elevation
Specify INM Standard Aircraft to use
Specify INM Standard aircraft Substitutions to use
Define your own noise Metrics
Create Case subdirectories
Create Location Points for noise calculation.



6.1 Study Setup

Menu Item: Setup // Study

INM automatically starts this function when you create a new Study. First, fill out the Study description. The description of your Study can be up to 255 characters and span several lines. The description can be edited at any time, not just when you setup the Study for the first time.

The latitude, longitude, and elevation of the origin of coordinates for the Study can be entered by hand, or you can have INM fill in the data by using the Setup // Study "View Airports" function. If you enter an origin by hand, pick one that is near the center of the of the airport because INM graphical functions are centered on X=0, Y=0. You can change the latitude/longitude coordinates, but please be aware that if you used the old latitude/longitude coordinates when you processed source data, certain graphical overlays (e.g., terrain) will not be aligned to the new coordinates. You will have to reprocess source data that depend on the X,Y origin.

INM contains latitude, longitude, and elevation data for over 1,500 airports in the U.S. You access these airports by pressing the "View Airports" button. A list of airports appears. They are arranged by state, and you can quickly move through the list by typing the first letter of the state. When you press "OK" for a particular airport, INM preforms three actions.

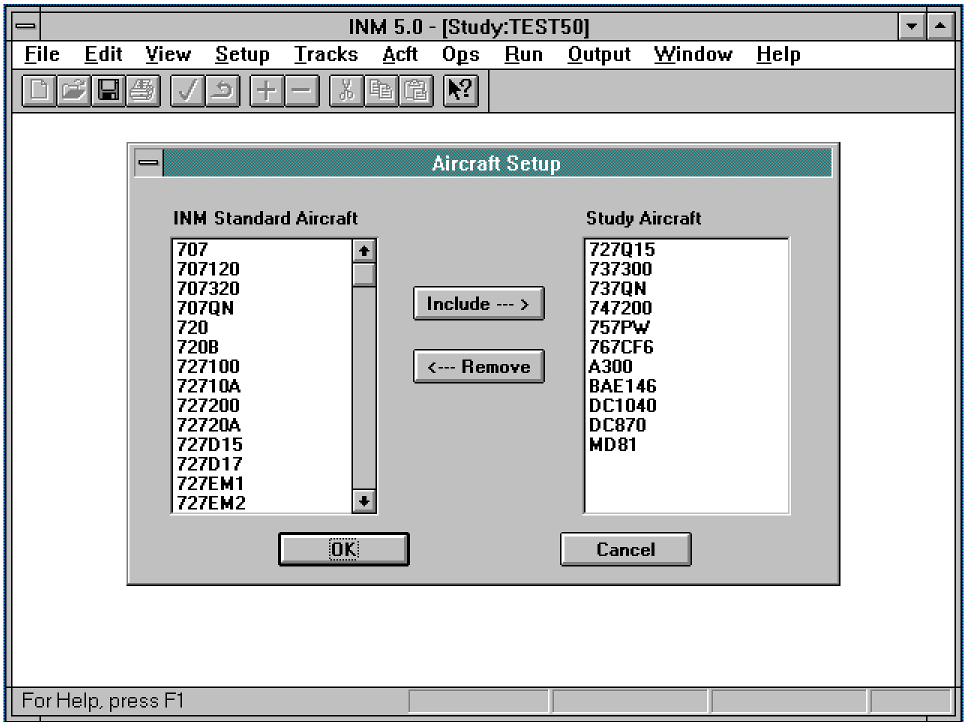
1. The geographical data for the airport are copied into the latitude, longitude, and elevation fields.

2. Runway and Runway End records are automatically created for you, providing that the airport's runways are in the database. INM contains runway data for about 500 of the 1,500 airports. It is important to check the latitude/longitude values inserted by INM because they occasionally are in error.

3. INM finds all U.S. navaids and fixes that are within 50 nmi of the airport. These points are copied into a LOC_PTS file in the Study directory. You can view them using the Setup // Location Points function, and see them displayed in the Track // Input Graphics and Output // Output Graphics windows.

You can have more than one airport in your Study. Select one airport in the "View Airports" function, and then do it again. The second airport's geographical data will become the origin of coordinates, or you can change (by hand) the origin to a position between the two airports. The second airport's runway data will be appended to the first set of runways. If the second airport has a runway of the same name as the first airport, the runway data will not be appended. In this case you need to input Runway and Runway End data by hand, and assign different runway identifiers.

Users outside of the U.S. may want to change the airport, runway, and location points files to depict airports, navaids, and fixes in their countries. Using a DBMS program, you can delete the records in the SYS_APRT, SYS_RWY, and LOC_PTS files, which are in the system USR_DATA subdirectory. You can then add your own records. Please do not change the definition of the fields in these files, however.

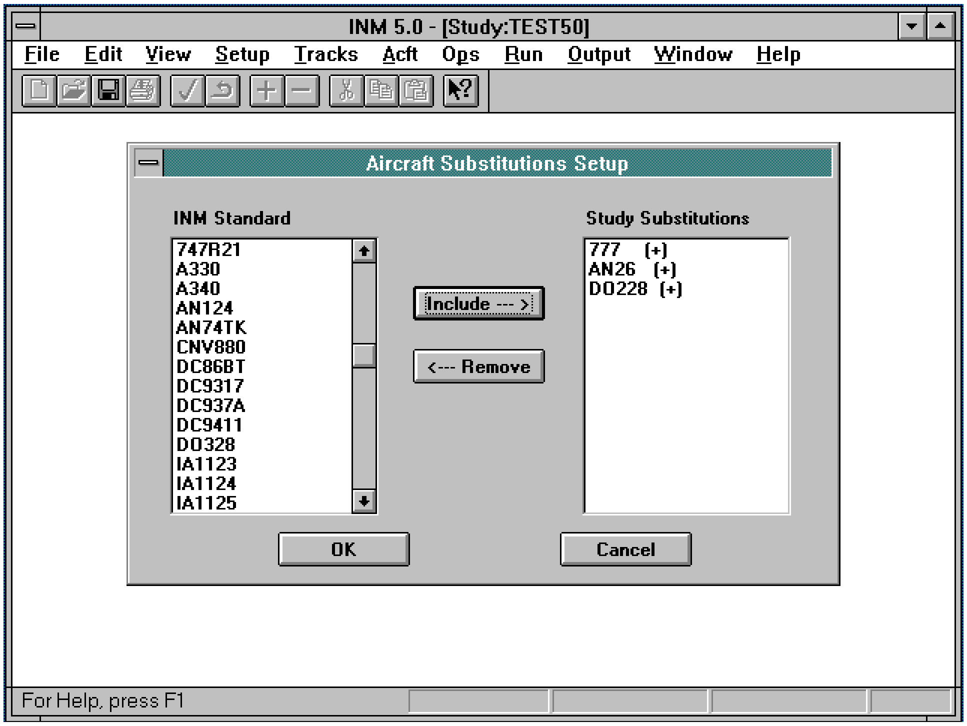


6.2 Aircraft Setup

Menu Item: Setup // Aircraft

The next step in setting up a Study is to pick Standard Aircraft that are to be used. You do this by selecting one or more Aircraft in the left-hand list box, and then press the "Include" button. INM moves the selected Aircraft to the right-hand list box. You can do multiple selections before pressing "OK". You can also remove Aircraft from your Study by reversing the process.

If you want to define your own Aircraft, use the Acft // Aircraft window and the Edit // Add Record function (see Section 8.1).



6.3 Aircraft Substitution Setup

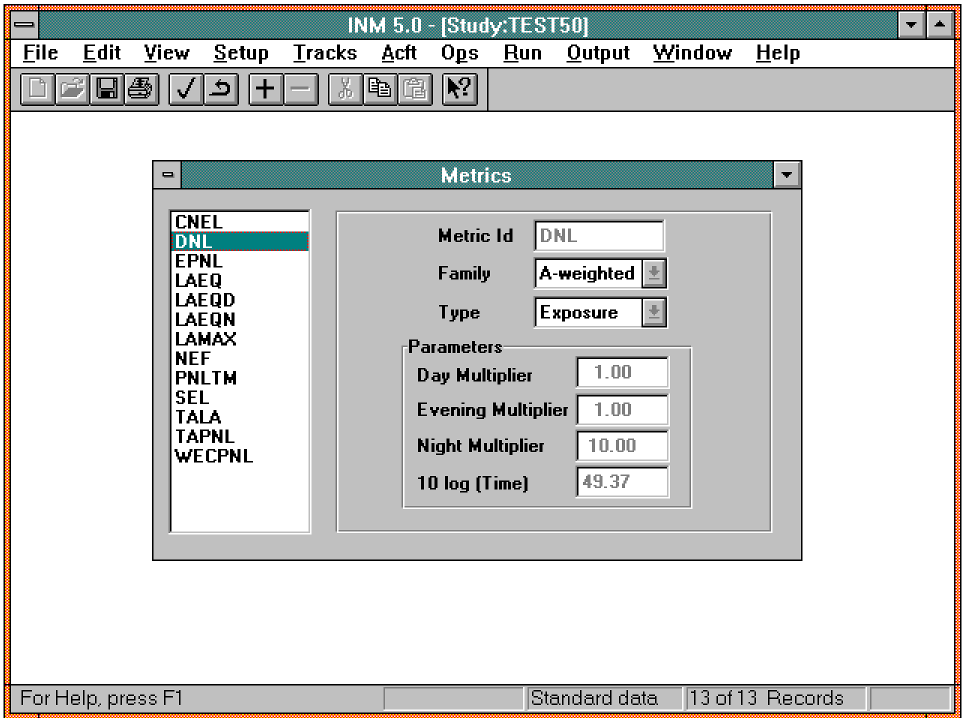
Menu Item: Setup // Substitutions

If you cannot find a particular aircraft that you need, try looking on the Substitution list. Aircraft in the left-hand list box are FAA-approved substitutions. They are associated with INM Standard Aircraft. You select Substitution aircraft and then move them into the Study with the "Include" button.

The INM Standard database will be updated periodically to include new Substitution aircraft.

You can use Substitution aircraft when creating Flight Operation data, just as though they were regular Aircraft. Before calculating noise, INM automatically substitutes Study Aircraft for Substitution aircraft.

You can view the definition of Substitution aircraft by using the Acft // Substitution function (see Section 8.2) or by consulting Appendix C. You can also create your own Substitution aircraft using the Acft // Substitution function.



6.4 Noise Metric Setup

Menu Item: Setup // Metrics

This function allows you to view Standard noise Metrics and to create your own Metrics. INM provides 13 pre-defined Standard Metrics, which are:

A-weighted noise Metrics:

DNL	L_{dn}	Day-Night average sound Level
CNEL	L_{den}	Community Noise Equivalent Level
LAEQ	$L_{Aeq24hr}$	Equivalent sound level (24 hours)
LAEQD	L_d	Equivalent sound level for day time (0700-2200)
LAEQN	L_n	Equivalent sound level for night time (2200-0700)
SEL	L_{AE}	Sound Exposure Level (multi-event)
LAMAX	L_{ASmx}	Maximum sound level
TALA	TAL_A	Time-Above a sound level threshold

Tone-corrected perceived-noise Metrics:

NEF	L_{NEF}	Noise Exposure Forecast
WECPNL	L_{WECPN}	Weighted Equivalent Continuous Perceived Noise Level
EPNL	L_{EPN}	Effective Perceived Noise Level (multi-event)
PNLTM	L_{PNTSmx}	Maximum PNLT sound level
TAPNL	TAL_{PNT}	Time-Above a PNLT threshold

Standard Metric records cannot be changed. However, you can add your own Metrics if you need a Metric that is not on the list.

When adding a Metric, you first type in a identifier, which can be up to six characters long. If you choose the "A-Weighted" noise family, single-event SEL and LAMAX noise tables are used to calculate noise; if you choose the "Perceived" noise family, single-event EPNL and PNLTM noise tables are used (see Section 8.3).

The Metric type is "Exposure", "MaxLevel", or "TimeAbove". Use "Exposure" for true noise exposure (i.e., mean-squared sound pressure multiplied by a time duration). Also, use "Exposure" for "equivalent" or "average" noise levels that are derived from noise exposure. Use "MaxLevel" when you want the maximum noise level. Use "TimeAbove" for the total number of minutes that noise levels are above a given threshold. The value of the threshold is not part of the definition of the Metric. The threshold is defined in the Run // Run Options function (see Section 10.2).

For example, the "Australian NEF" Metric is set up as follows:

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

For "Exposure" Metrics, the day, evening, and night multipliers and the 10 log(Time) parameter are used as follows:

$$L_E = 10 \log_{10}(W_d E_d + W_e W_e + W_n E_n) \; ! \; 10 \log(T) ,$$

where

L_E — Noise exposure level or equivalent noise level (dB).

W_d W_e W_n — 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 $W_d = 1$, $W_e = 1$, and $W_n = 10$ (in this case, the evening period is considered "day" time).

E_d E_e E_n — Noise exposure <u>ratios</u> for day, evening, and night time periods. These ratios are computed by INM. A-weighted sound exposure ratio is the time-integrated mean-square pressure, in units of $(\mu Pa)^2 s$, divided by a reference sound exposure of $(20\ \mu Pa)^2(1\ s)$. Perceived tone-corrected exposure ratio uses a reference noise exposure of $(20\ \mu Pa)^2(10\ s)$.

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

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

<u>Important</u>: For average-noise Metrics derived from SEL (e.g., DNL), you must use a reference time of 1 s. For average-noise Metrics derived from EPNL (e.g. WECPNL), you must use a reference time of 10 s. For true exposure Metrics (e.g., SEL and EPNL), set

$$10 \log(T) = 0 .$$

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

$$L_{max} = \mathrm{Max}(\ W_d\, L_{dmax}\ ,\ W_e\, L_{emax}\ ,\ W_n\, L_{nmax}\ )\ ,$$

where

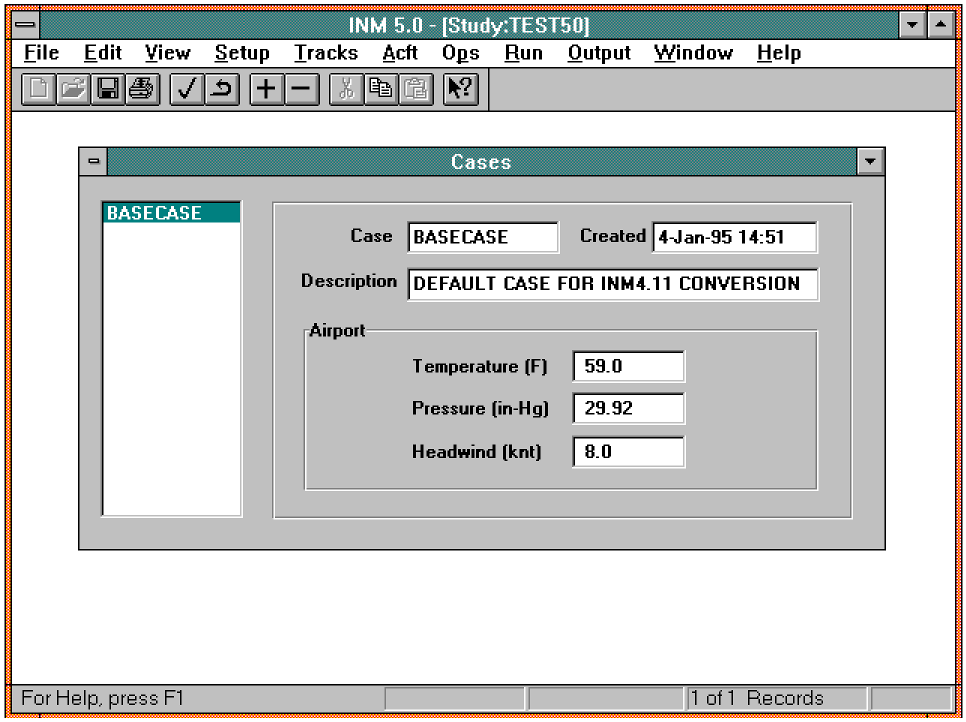
L_{max}	Maximum noise level.
Max(x, y, z)	Function that returns the maximum of the three numbers.
$W_d\ W_e\ W_n$	Parameter "switches" that include a time period (W = 1) or exclude a time period (W = 0). The weights must be either 0 or 1. Use (1, 1, 1) to calculate the maximum level during all three time periods.
$L_{dmax}\ L_{emax}\ L_{nmax}$	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:

$$TA = W_d\, TA_d + W_e\, TA_e + W_n\, TA_n$$

where

TA	Time-above (minutes) for the time period defined by the weights.
$W_d\ W_e\ W_n$	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.
$TA_d\ TA_e\ TA_n$	Time-above (minutes) for day, evening, and night time periods. INM calculates these values.



6.5 Case Setup

Menu Item: <u>Setup // Cases</u>

You create Case records and their associated subdirectories with this function. You need to input various Case setup data:

> Case identifier (which is used as the subdirectory name)
> 40-character description (more information can be put in the Study description field in Setup // Study)
> Airport temperature
> Airport atmospheric pressure
> Airport average headwind.

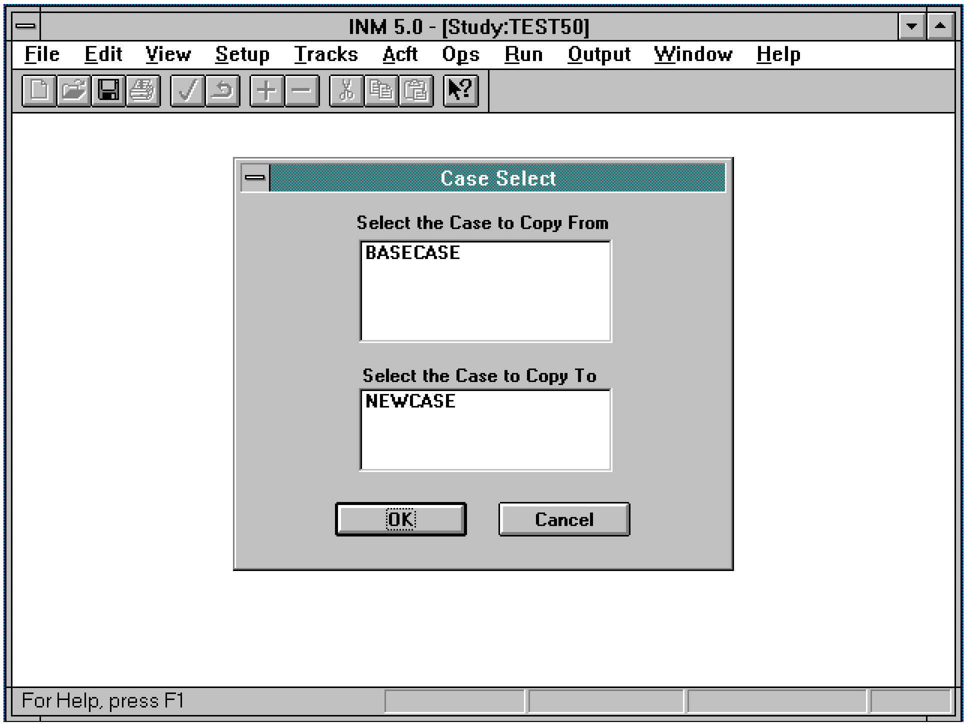
INM records the time and date that the Case was created.

INM uses temperature, pressure, and headwind when computing Profiles that are defined by Procedure Steps (see Section 8.8). The default airport temperature is computed by using the International Standard Atmosphere equation for "standard-day" temperature versus altitude <u>at the airport elevation</u> (e.g., 59EF at mean sea level). The default airport pressure is 29.92 in-Hg (760 mm-Hg) at all elevations because pressure is referred to sea-level. The default average headwind is 8 knots because that is the value used in the SAE-AIR-1845 equations. The average headwind can be modified for each Runway End by specifying a percentage change from the average (see Section 7.3). You can change these three Case default values, if you wish.

When you commit a new Case record, a new subdirectory is created under the Study directory. You cannot change the name of the Case subdirectory in INM because the Case name is used by Output records.

You can delete a Case (and its subdirectory of files) by using the Edit // Delete Record function, but please be sure that is what you really want to do. If an Output record references the Case that you are trying to delete, INM will not allow the deletion. (Output post-processing functions access Case data, see Section 11.1.) 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.

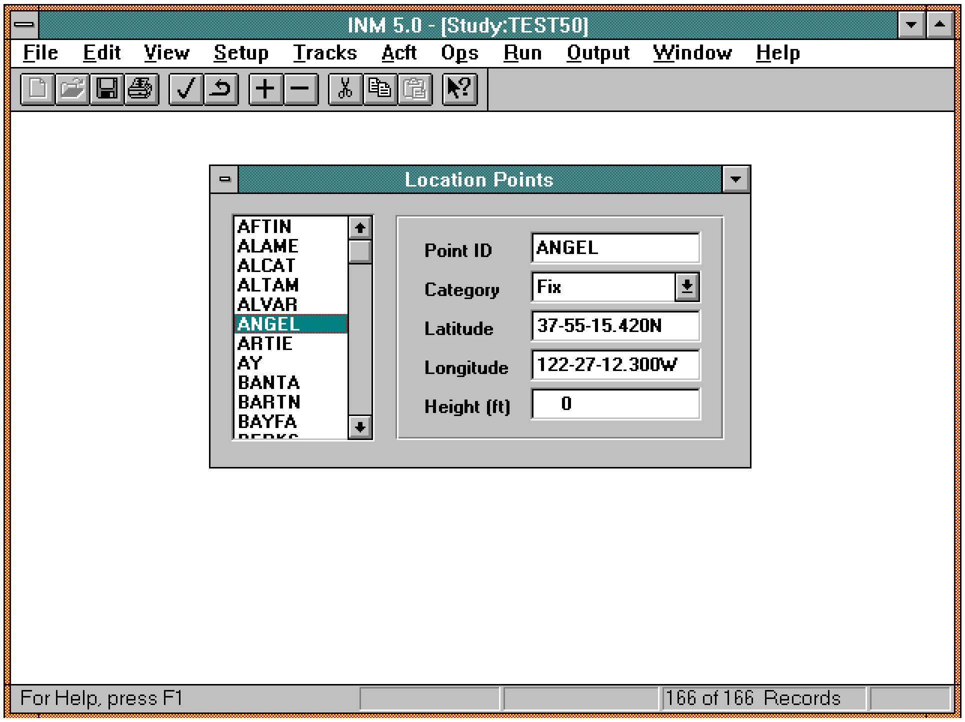
Part of the INM input setup task is to create a Case so that there is a place to put the Flight Operations input data. After Study and Case input data are in place, you can "run" a Case. Each Case has its own "run options" and these data are specified in the Run // Run Options function (see Section 10.2). Run options are really data fields on a Case record, so you deal with Case records under two different menus: Setup // Cases (this function), and Run // Run Options. Only in the Setup // Cases function can a record and its subdirectory be added and deleted. Add and delete are disabled in the Run // Run Options function.



6.6 Case Copy

Menu Item: Setup // Case Copy

After you add and commit a new Case record, you can use the Setup // Copy Case function to copy input DBF files from an old Case subdirectory into the new (empty) Case subdirectory. You may want do this if you plan to make only small changes in the new Case (e.g., only the airport temperature is changed). This function saves you the trouble of using the Copy and Paste functions (or the File Manager) to create new Case files. The DBF files that are copied are: OPS_APRT, GRP_PCT, OPS_FLT, OPS_RNUP, and GRID.



6.7 Location Points Setup

Menu Item: Setup // Locations

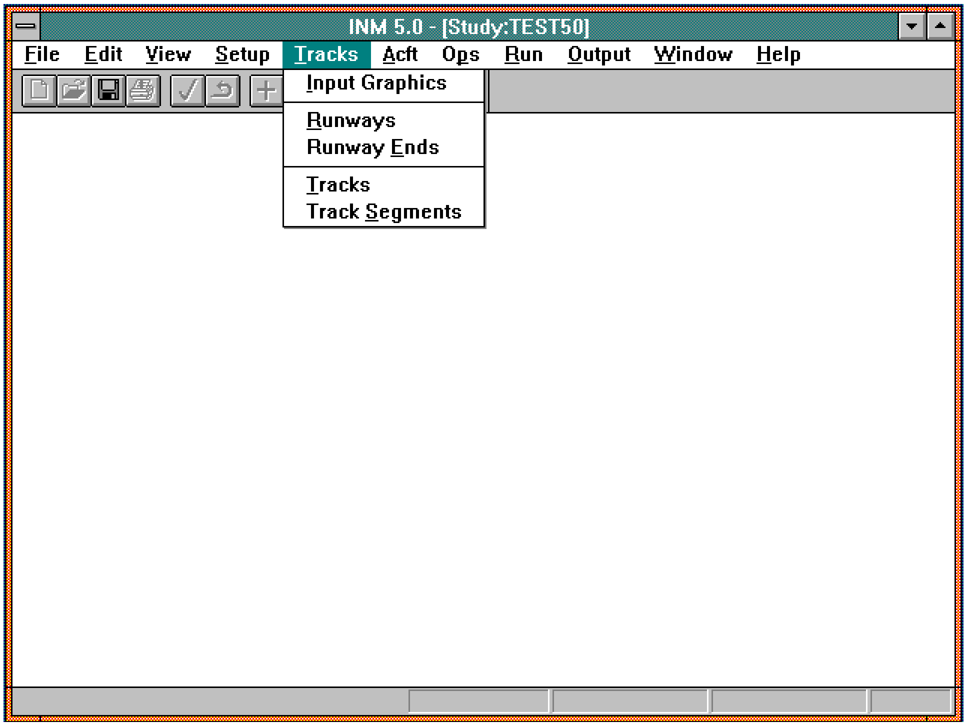
You use the Locations function to add and delete Location Points. Location Points are special user-defined points around an airport. If you used the "View Airports" button when you created your Study, navaid and fix Locations Points will probably already exist in the DBF window. If you want to get rid of the clutter of unwanted fixes, delete them with the Edit // Delete Records function.

You may want to add new Location Points so that you can display them on Input and Output Graphics, or because you may want to calculate noise at special points. Use the Edit // Add Record function and fill out a six-character point name, latitude/longitude, and height above the ground. The height parameter is added to the terrain elevation value, so if you want the noise calculated near the ground, use the default zero value.

You can also create your own table of points by using a DBMS program or by creating a text file and processing it with the Source Data Processor // Text function (see Section 14.2). In either case, you need to know the single-letter codes INM uses for the different kinds of points:

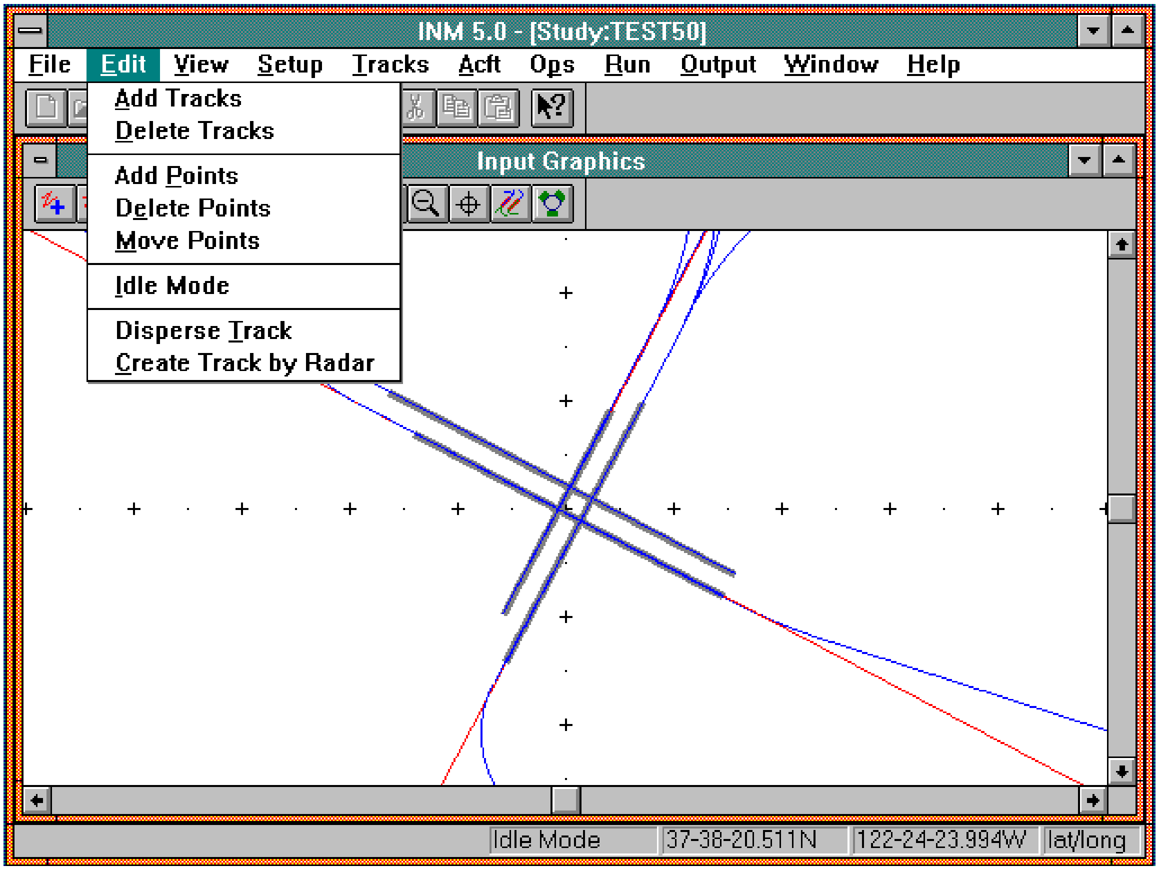
B	=	Building
C	=	Church, religious building
H	=	Hospital, medical facility
S	=	School, college, university
U	=	VOR
V	=	VORTAC
W	=	VOR/DME
T	=	TACAN
N	=	NDB
M	=	NDB/DME
F	=	Fix (air traffic control)
X	=	Other

The six types U V W T N M are collectively called "navaids", meaning electronic aids to navigation. Please use only these 12 capital letters because INM will not read a record that has an unknown enumerated type.



7 TRACKS MENU

You use the Tracks menu to create runways and tracks for your Study. Points-type Tracks can be added by interactive graphics methods, and vector-type Tracks can be added by typing in data. You should create Runways and Runway Ends before using the Input Graphics function. This is easily done by using the Setup // Study "View Airport" function at the time you create your Study. Or, you can manually create runway data in the Runway and Runway End windows.



7.1 Input Graphics

Menu Item: Track // Input Graphics

You use the Input Graphics function to graphically create and edit INM tracks. A graphically produced track is called a "points-type" track, or "P-track". A P-track is an ordered sequence of X,Y points. The other kind of track is called a "vectors-type" track, or "V-track". A V-track is created in the Track and Track Segments DBF windows by typing in data values. During the noise calculation process, INM converts V-tracks into sequences of X,Y points, so nothing is lost in creating P-tracks at the beginning.

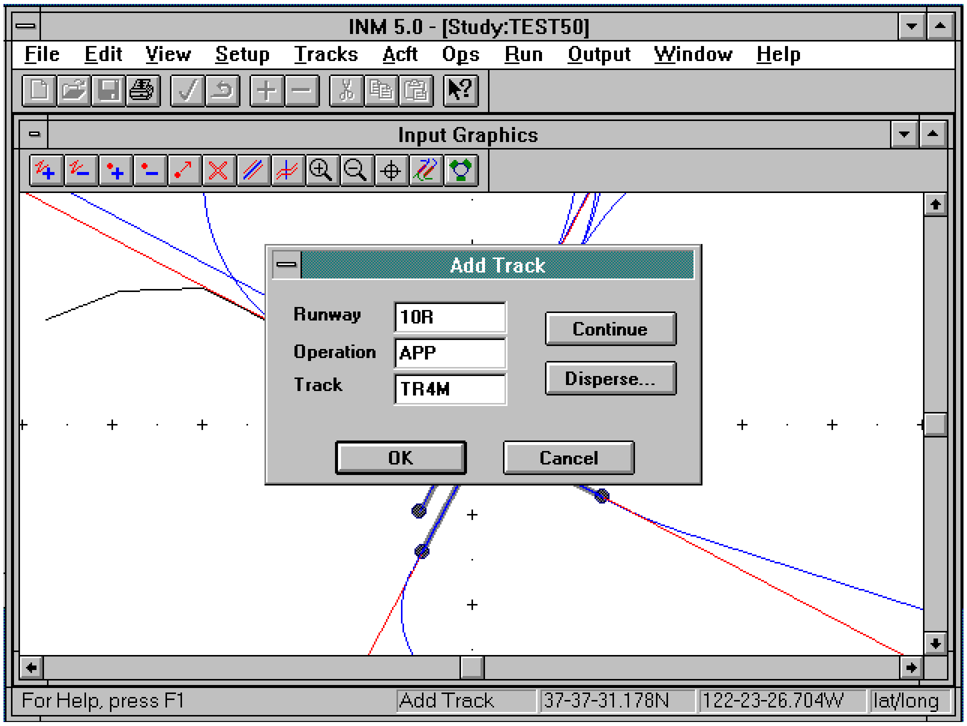
You cannot edit V-tracks in the Input Graphics window, and you cannot edit P-tracks in the DBF windows.

The Input Graphics function starts in an "idle" input mode. You change the input mode by using the Edit menu (note that the Edit menu is different when you focus on the Input Graphics window). For example, you can change to the "add tracks" input mode by pressing the Add Tracks function under the Edit menu. When you change input mode, the name of the new mode is displayed on the status bar at the bottom of the main window. You can go directly from one input mode to another, without having to go into the "idle" mode first.

The mouse behaves differently in different input modes. For example, in the "add tracks" 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 for typing in the coordinates. The behavior of the mouse buttons is described in the sections below.

In all of the input modes, you can move the graphics scene left / right / up / down by two methods. One way is to use the "scroll bars" on the bottom and right side of the Input Graphics window. You can click on the arrowheads located at the two ends of a scroll bar, or you can drag the "slider" along the bar. The other way of moving the scene is by pressing the right mouse 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 specified. The right mouse button does not always behave this way, but it does if you have not started a sequence of operations, such as adding points.

A graphics toolbar is displayed at the top of the Input Graphics window. You can turn it on or off by using the Windows // Toolbar toggle function. The graphics toolbar provides a short-cut method to access functions on both the Edit and View menus. The name of the function is displayed under the toolbar when you place the mouse pointer on the button for a second. The function name also appears on the status bar at the bottom of the screen.



7.1.1 Edit // Add Tracks

Toolbar: <u>Zig-zag with plus sign</u>

You can create new tracks using this input mode. Start a track by clicking the left mouse button where you want the first track point. Track points are always created in the order that an airplane flies along the track. Try to keep the angle between adjacent track segments to <u>less than 30 degrees</u>.
The last point is made by <u>double-clicking</u> with the left mouse button.

When you add points to a track, the <u>right</u> mouse button can be used to pop-up 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 pops up with default point data. If you previously set geo-units to "lat/long" (see Section 7.1.17, below), you fill out the latitude and longitude values that you want. If you set geo-units to "nautical miles", you fill out X,Y values, and similarly for "kilometers".

Use the "Esc" key to undo one step. Use the "+" or "=" key to zoom in, and the "!" key to zoom out, since the zoom functions are not accessible while in the Add Track function.

If you want to create a Departure track, click on the circle at the end of the runway from which the takeoff starts. For example, if runway 33L is used for departures, you 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, thus bringing up the dialog box.

In the "Add Track" dialog, fill out the 4-character track identifier. The full name of the track is formed from three identifiers: the Runway End identifier, the operation type (in this case, DEP for Departure), and the name that you type in. Although you do not have to, it is a good idea to make the identifier unique across all Tracks in the Study (except for Touch-and-Goes, as noted below).

You can exit the "Add Track" dialog window 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 subtracks (see Section 7.1.7, below).
"Continue"	Continue adding points (e.g., you made a mistake in double-clicking to finish the track).
"Cancel"	Delete the track (e.g., you want to start over again).

If you want to create an Approach track, start your track out in the terminal area, and add points toward the touchdown end of the runway. The last line segment should be lined up with the runway. Make the last point on the end of the runway by double-clicking inside the circle. Fill out the dialog, as you did for Departures.

A Touch-and-Go track is a closed loop. It starts in a runway circle and finishes in the same circle (i.e., your airplane "touches" and "goes" on the same end of the runway). Flying to and from a Touch-and-Go pattern is accomplished by adding Departure and Approach tracks that connect to the loop. You should identify these three coordinated tracks by similar track identifiers so that you can remember that they belong to a "touch-and-go trio". For example, they could all have the same track identifier, such as "T1"; thus, their full identification would be:

31-DEP-T1	Depart 31 and fly to the T&G pattern
07-TGO-T1	Do touch-and-goes on runway 07
31-ARR-T1	Fly from the pattern and land on 31

A Departure track ends somewhere on the downwind leg of the Touch-and-Go track. The Approach track starts at the same point that the Departure track ends. Please refer to Section 8.8.7 for more information on building Profiles for touch-and-go trios.

An Over-Flight track starts somewhere in the terminal area and finishes in the terminal area; it must not start or end inside a runway circle. INM automatically assigns "OVF" as the "runway" identifier to all Over-Flight tracks.

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

Toolbar: Zig-zag with minus sign

You can delete existing tracks using this input mode. 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. After you press the "OK" button, INM checks to see if the track is associated with any Group Percents or Flight Operations. (This may take several seconds if the Operations are not already in memory.) If the Track is associated, 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

Toolbar: Point with plus sign

You can add new points to existing Tracks using this input mode. Click on a track segment. INM draws a black segment over the current segment. The black segment becomes a triangle which is anchored by the original two points defining the segment. You can 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 point to add.

To add points to the end of a Track, add them in between the last two points, and then move the last point to where you want it.

7.1.4 Edit // Delete Points

Toolbar: Point with minus sign

You can delete existing points in tracks using this input mode. When you activate the "delete point" mode, INM displays little squares at the point positions. Click on the point that you want to delete. INM colors the point black and then requests confirmation. After you press the "Yes" button, INM takes a moment to commit the new set of points.

7.1.5 Edit // Move Points

Toolbar: Point with arrow

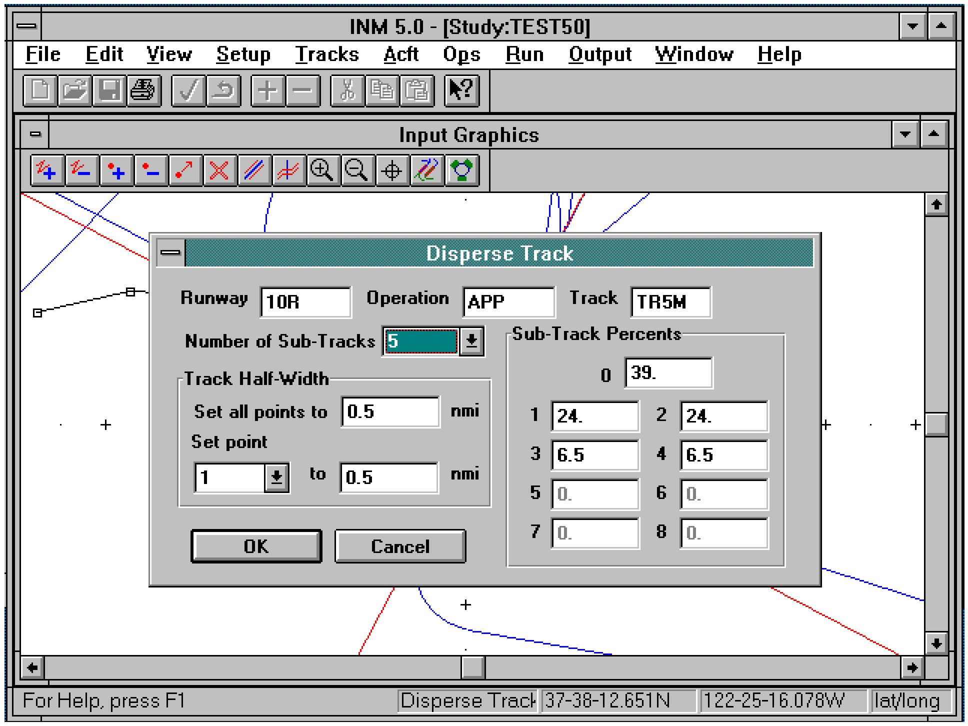
You can move existing points in tracks using this input mode. When you activate the "move point" input mode, INM displays little squares on point positions. Click on the point that you want to move. INM creates a black triangle using the two neighboring points as anchor points. Drag the apex of the triangle and click at the new position.

Use the right mouse button to bring up a dialog to input the coordinates of the new point.

7.1.6 Edit // Idle Mode

Toolbar: X sign

You can change to the "idle" input mode by using this function. 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

Toolbar: <u>3 straight lines</u>

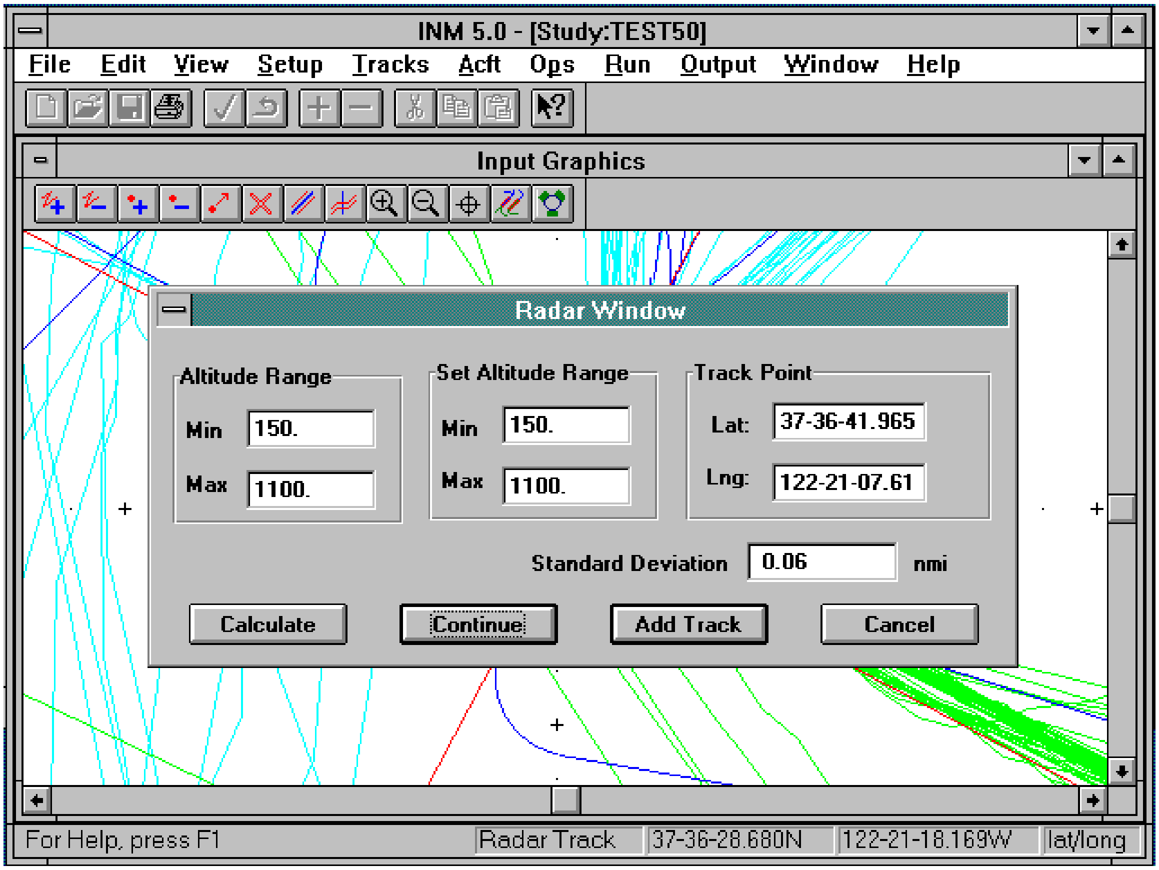
You can use this mode to create subtracks along side of a backbone track. The backbone track and its subtracks are collectively called a "dispersed" track. A dispersed track is used to model deviations from a nominal flight path, thus distributing noise over a larger area than provided by a single track. INM automatically distributes Flight Operations across subtracks, so all you do is assign Operations to a single object (the dispersed track) and INM takes care of the details.

When you activate the Dispersed Track input mode, INM displays little squares on point positions. Click on the track that you want to disperse, and INM displays the "Disperse Track" dialog box. Another way to disperse a <u>new</u> track is from the "Add Track" dialog; when you press the "Disperse" button, INM displays the same "Disperse Track" dialog box. In the dialog, you edit the following input parameters:

> Number of dispersed tracks -- the backbone track plus subtracks. This is an odd number from 1 to 9. Please note that a large number of subtracks will cause INM to run slower than with no subtracks. ICAO recommends 5-track dispersion.
>
> Subtrack percentages -- these data are use to distribute Flight Operations across the backbone track and its subtracks. INM sets default percentages; you can change these percentages, but please make sure that the new numbers add up to 100 percent.
>
> In the INM naming convention, subtracks always occur in pairs (e.g., 1 and 2, 3 and 4, etc.), where subtracks to the left of the backbone track are odd numbers and to the right are even numbers:
>
> Left 7 5 3 1 0 2 4 6 8 Right
>
> Left and right are determined by facing in the direction that your airplanes fly along the backbone track. The backbone track is identified by "0".
>
> Dispersed-track half-width -- this is the distance from the backbone track to the <u>outside</u> subtrack. Twice this parameter is the total width of the dispersed track. A half-width parameter is associated with each backbone <u>point</u>. Thus 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 individually 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 in the "disperse track" mode, you can change individual half-widths. Click on a backbone <u>point</u> (clicking on a segment produces no action). INM displays the "Disperse Track" dialog 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. For example, the Departure subtracks have zero width at the first and second points so that all subtracks are on the runway. You need to change the half-widths on point-3 and greater. If possible, you should base track dispersion on radar data. If radar data are not available, you should increase the dispersion width in proportion to the distance from the runway.



7.1.8 Edit // Create Track by Radar

Toolbar: <u>Line crossing 2 wavy lines</u>

You must be able to see radar tracks in the Input Graphics window to use this function. Section 14.6 explains how to bring radar track data into your Study, and the View // Tracks function (see Section 7.1.14, below) can be used to enable (make visible) the radar tracks.

The way you create a track is to specify a set of "radar windows" along a bundle of radar tracks. Click to the side of a bundle, pull a line across the bundle (perpendicular to the radar tracks), and click again. This line defines the horizontal extent of the radar window.

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 (e.g., Approach) later.

INM pops up the "Radar Window" dialog. The "Altitude Range" box shows the lowest and highest altitudes of all of the radar tracks that cross the line that you just specified. The "Set Altitude Range" 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.

After you reset the altitude values, press the "Calculate" button. INM then calculates the mean and standard deviation of the radar-track crossing points, which lie on the horizontal line. The statistics are displayed in the "Track Point" and "Standard Deviation" boxes. The statistics are in the geo-units that you specified in the Setup Geo Units function (see 7.1.17, below). 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.

You can exit the "Radar Window" 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. The radar points must be created in the same order that an airplane would fly along the track. 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. Choose the operation that you had in mind when you specified the points (Approach, Depart, Touch-and-Go, or Over-Flight), select a Runway End, and type in the track name. Now, select the number of dispersed tracks (the backbone track plus subtracks). Notice that when you change the point index number on the right, the dispersion half-width changes. This is because INM uses the calculated point standard deviation to determine the track half-width.

You can exit the "Add Radar Track" dialog window 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.

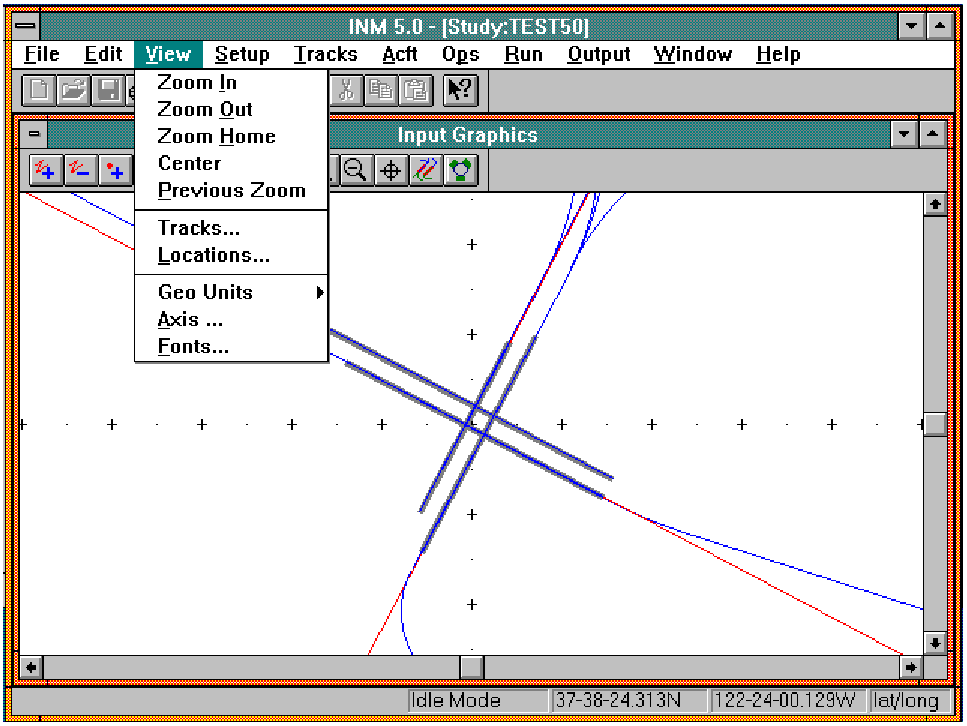
"Continue" Continue "Radar Window" input (e.g., you made a mistake and did not want to finish the radar track).

"Cancel" Delete the track and start over.

For your information, the table below shows the distance from the backbone track to individual subtracks at a point. The distance is in terms of the number of standard deviations. The track half-width at a point is the standard deviation at the point times the multiplier for the outside subtrack. 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 percentage values that INM assigns to the subtracks. INM uses a binomial probability distribution to derive 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 subtrack identifier of "0".

Number of Tracks	Subtrack Identifier	Std Dev Multiplier	Percent on Subtrack
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

Toolbar: Magnifier with plus sign

To "zoom in", select this function and then click with the left mouse button at the position that you want for the new center of the window. Move the mouse to create a rectangle that represents the border of the new window. Then 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

Toolbar: Magnifier with minus sign

To "zoom out", select this function and then click with the left mouse button at the position that you want for the new center of the window. Move the mouse to create a rectangle that represents the area into which you want old window to be displayed. Make a small rectangle to zoom out a long way. Then click with the left mouse button again to enable 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

Toolbar: Circle and plus sign

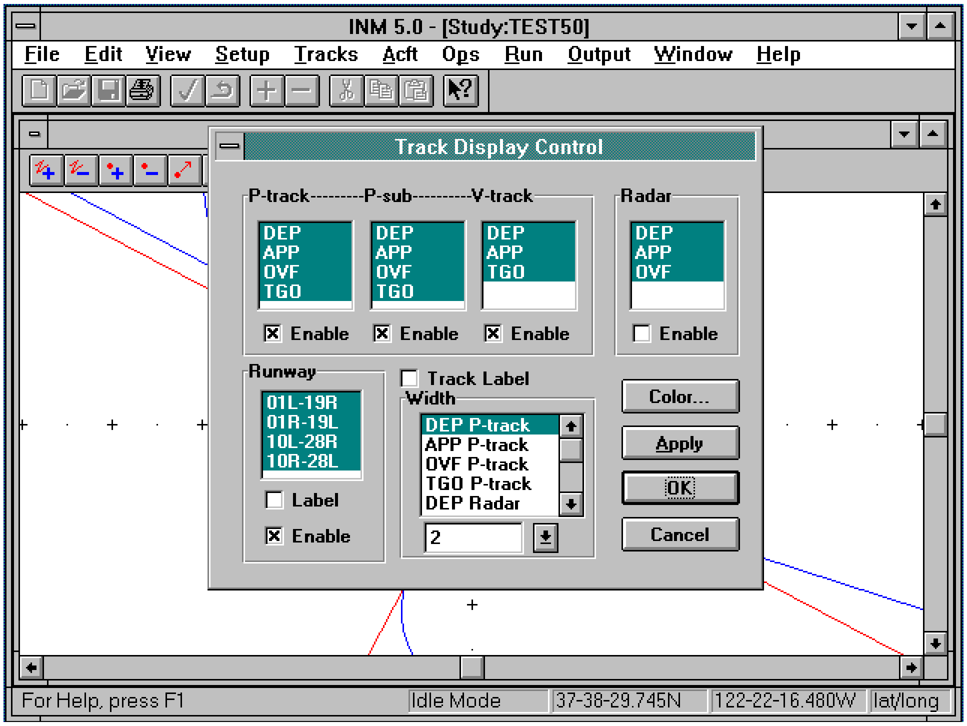
The Zoom Home function centers the display on the origin of the Study coordinate system and resets the scale to the default value, which displays about "20 nautical miles of the X-axis.

7.1.12 View // Center

The Center function re-centers the scene so that the origin of coordinates is in the center of the window. The current scale is not changed.

7.1.13 View // Previous Zoom

The Previous Zoom function returns the graphics scene to the scale that was used previous to the current scale.



7.1.14 View // Tracks

Toolbar: Runway and tracks

You use the Track Display Control 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 tracks
P-sub	Points-type subtracks
V-track	Vector-type tracks
Radar	Radar tracks

Each list box has three or four operation types:

DEP	Departure tracks
APP	Approach tracks
OVF	Over-Flight tracks
TGO	Touch-and-Go tracks

You click on an operation type to select (highlight) or de-select (plain) the type of track.

An "X" in an "Enable" box means that the highlighted tracks in the associated list box are turned on. For example, you can display just Approach P-tracks by selecting APP in the P-track list, de-selecting all other operation types in that list, putting an "X" in the P-track "Enable" box, and removing "X"s from the other "Enable" boxes.

If you want to display track identifiers (just the TRK_ID1 part), put an "X" in the "Track Label" box.

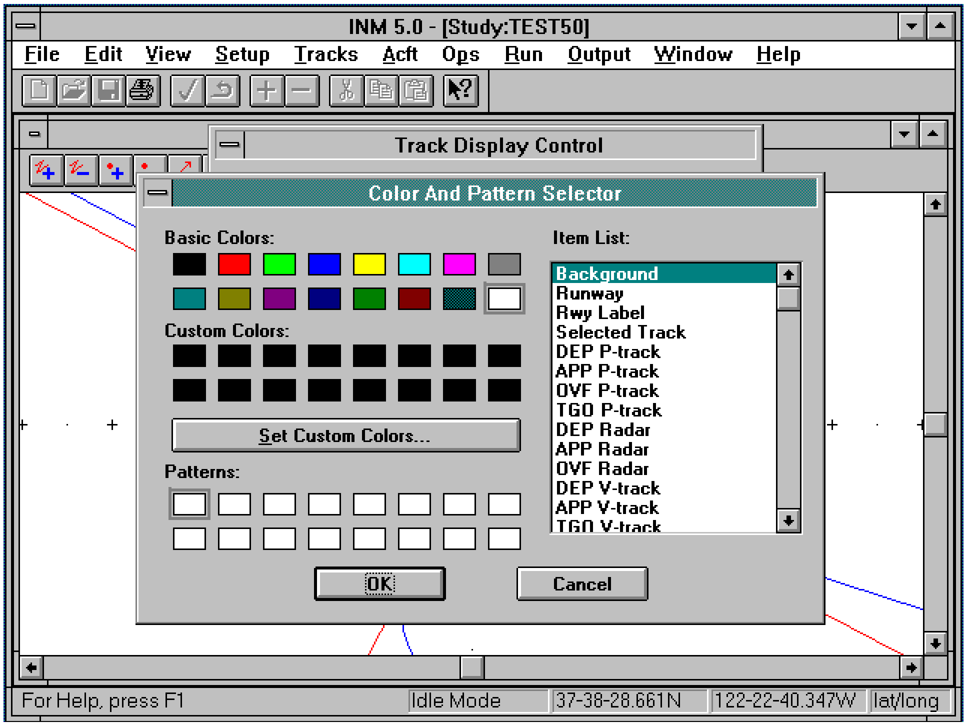
You can change the width of tracks by selecting a track type (e.g., DEP P-track) and then selecting a width number from the drop-down list box.

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 (see Section 7.1.15),
"Apply"	Display changes without committing them and leave the dialog up,
"OK"	Commit the current control settings and quit,
"Cancel"	Quit the "Display Control" dialog 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.



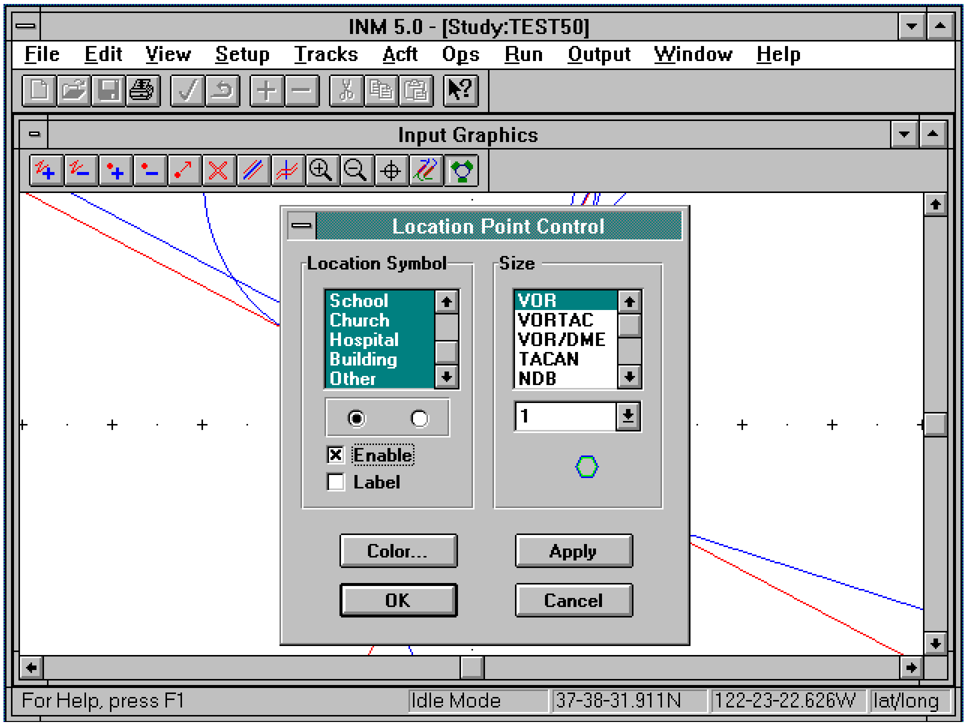
7.1.15 View // Tracks "Color"

You use the Color function to change the colors of classes of objects; in this case, tracks, runways, labels, and the graphics background.

To change colors, press the "Color" button on the "Display Control" dialog. The "Color and Pattern Selector" dialog is displayed, letting you select an object to color. Highlight an object, and then select its color by clicking on one of the colored boxes on the left. A gray border around the box designates the current color.

You can create your own colors by pressing the "Set Custom Colors" button. In the new dialog, click on a "Custom Color" box, click somewhere in the large multicolored box on the right, drag the slider-pointer on the far right to change the luminosity, and press the "Add to Custom Colors" button. After you press "OK" and return to the "Color Selector" dialog, 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.

After coloring objects, press "OK" in the "Color" dialog and then again in the "Display Control" dialog to enable and save the new colors.



7.1.16 View // Locations

Toolbar: <u>VORTAC symbol</u>

The Locations Points function lets you display various kinds of location points, including navaids and fixes. You must have a LOC_PTS file in your Study directory to display points in the Input or Output Graphics functions.

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

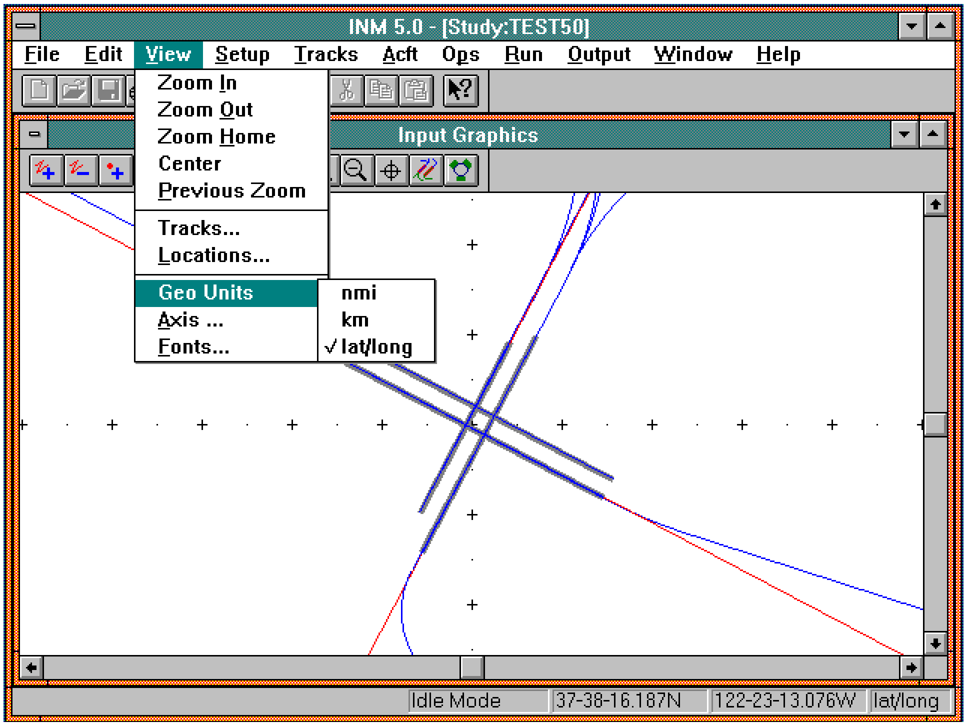
You can create a LOC_PTS file by variety of methods:

Automatically, by using the Setup // Study Setup function (Section 6.1),
Interactively, by using the Locations Points DBF window (Section 6.7),
From a text file, by using the Source Data Processor // Text function (Section 14.2.6),
With a DBMS program, by using the LOC_PTS template file in the SYS_DBF system subdirectory.

The various types of location points have preprogrammed graphic symbols. You can select all symbols by clicking on the left radio button under the symbol list, and you can deselect all symbols by clicking on the right radio button. Also, you can select or deselect symbols by clicking on items in the list box (e.g., you can turn off all fixes by clicking on "Fix").

After you select one or more symbols, you can turn them on for display by clicking on the "Enable" box -- thereby placing an "X" in the box. You can display the six-character point identifiers by putting an "X" in the "Labels" box. You can change the size of the symbols by selecting a symbol item in the "Size" list box, and then selecting a relative size number in the drop-down list box. After clicking on the "Color" button, you can set the color of point labels but not the color of the symbols themselves.

The "Apply" button allows you to see the results of your new display settings without closing the "Location Point Control" dialog box. The "OK" button applies your selections and closes the dialog. The "Cancel" button 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.

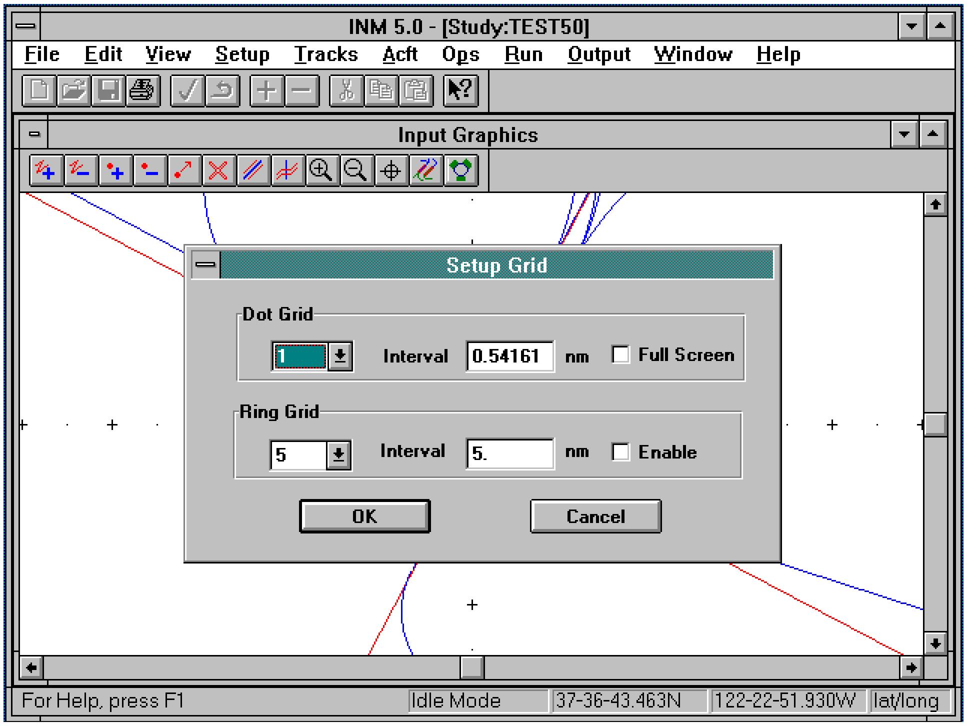


7.1.17 View // Geo Units

INM follows the mouse arrow and displays its geographical position on the right-hand part of the status bar below the main window. You can use the Geo Units function to specify the kind of units that appear on the status bar. The choices are:

X and Y in nautical miles,
X and Y in kilometers, or
Latitude and longitude.

After selecting new units with this function, the Track Input Point data input window in the Add Track function will also use the new units.



7.1.18 View // Axis

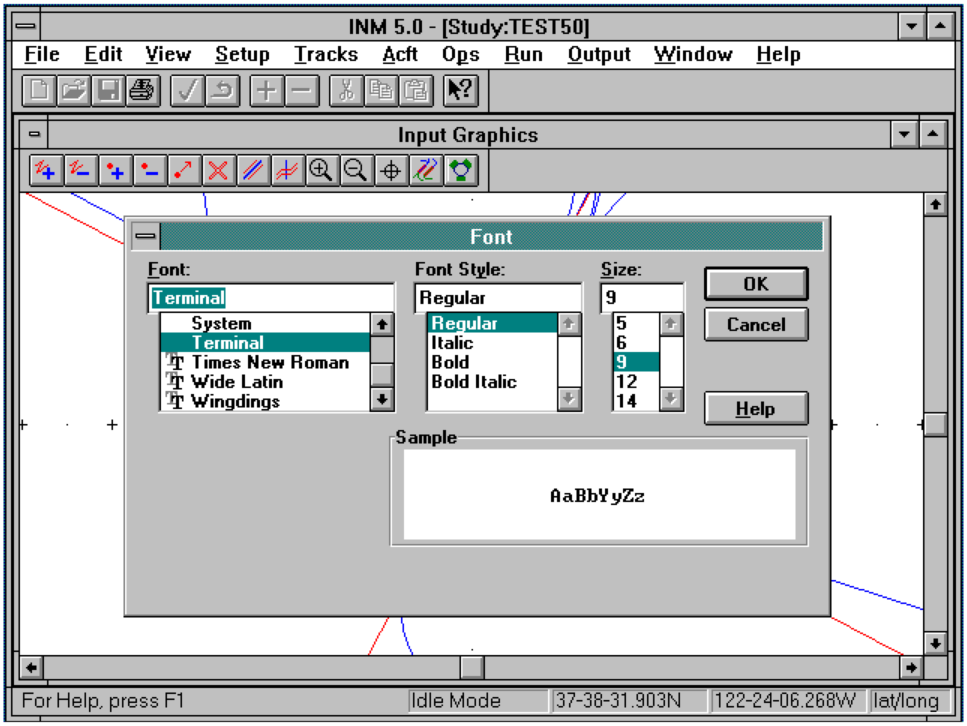
The Axis function lets you display two kinds of distance-measuring marks to help define the X,Y coordinates. They are called "Dot Grid" and "Ring Grid".

Using "Dot Grid", you can change the distance between the major divisions marks (the plus signs) on the X and Y axes. For example, you can set the axis "Interval" value to "1.0" to make the distance between plus signs 1.0 nautical mile, if you had previously set geo-units to "nautical miles" (see the Section above). If you are using "kilometers", the axis distance is entered as kilometers.

You can also 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), you select 4 dots (i.e., 4 dots makes 5 intervals).

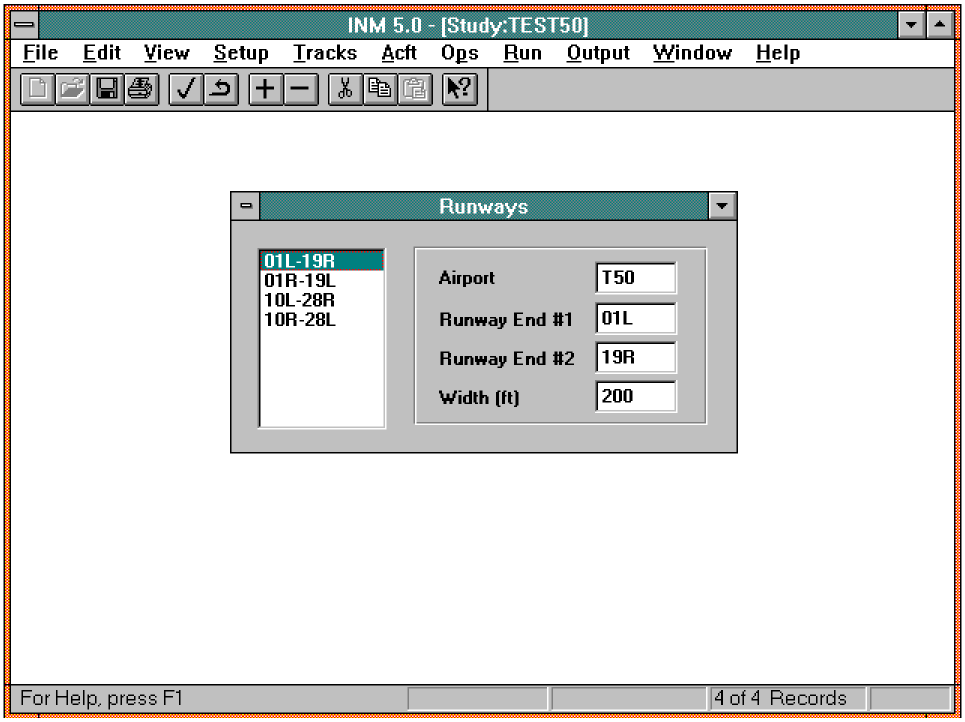
If you click on the "Full Screen" box, grid marks are displayed in the four quadrants, in addition to being displayed on the X and Y axis.

Using "Ring Grid", you can display range rings around the origin of coordinates. For example, you can set the "Interval" value to "5.0" to make the distance between rings 5.0 nautical miles. You can also specify the number of rings displayed. For example, to make 5 rings (at 5, 10, 15, 20, 25), select 5 in the drop-down list box. Click on the "Enable" box 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.



7.1.19 View // Fonts

The Fonts function lets you change the font style and point size for labels (i.e., names, identifiers) displayed in a graphics scene. This is a standard Microsoft function that is connected to your Windows operating system. Therefore, the list of available fonts and sizes depend on your computer system. You can experiment to see which font looks best on your display -- it depends on the screen resolution (SVGA, etc.) that you are using. You may have to change the font setting before printing because your printer may use a different resolution.



7.2 Runway Data

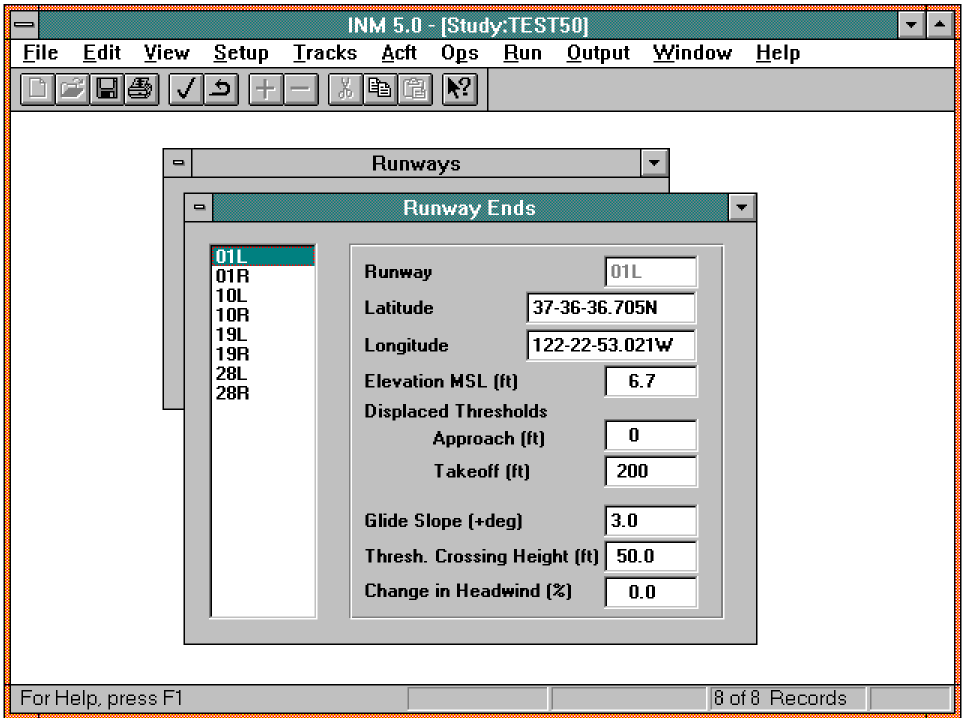
Menu Item: <u>Track // Runways</u>

You use this menu item to declare a pair of Runway End identifiers. Runways must be declared in this window before they are available for use in other windows. The only requirement for naming a runway is that each end is uniquely named.

You can declare Runways for one or more airports. The purpose of the airport identifier is to indicate which airport owns the Runway. INM does <u>not</u> use the airport identifier in distinguishing Runway Ends, so if you have two identical Runway End identifiers, you need to change one of them.

If you use the Setup // Study "View Airports" function (see Section 6.1), and if runway data exist in the SYS_RWY file, then Runway and Runway End records will be automatically created for you. You can then edit these records, if you wish.

The Runway width parameter is used to draw the runway in the Input and Output Graphics windows. Runway length is calculated from the latitude/longitude values assigned to the Runway Ends.



7.3 Runway End Data

Menu Item: <u>Track // Runway Ends</u>

After declaring Runway End identifiers in the Runways window (see Section 7.2), you can input data relevant one end of a runway using this menu item. The list on the left contains the declared Runway End identifiers, and the data-input form on the right allows you to input data. A Runway End identifier cannot be changed in this window; use the Runways window instead.

The geographical position of the Runway End is input as latitude / longitude values. Latitude and longitude are alphanumeric strings in a "DD-MM-SS.sssC" format, where "D" is integer degrees, "M" is integer minutes, "S" is decimal seconds, and "C" is a principal compass direction: "N" north, "S" south, "E" east, and "W" west. Please input the hyphens between degrees, minutes, and seconds, and capitalize the compass direction character. INM retains latitude and longitude to 1/1000-th of an arc-second, which is about 0.1 foot.

It is very important to correctly input Runway End latitudes and longitudes because the geometry of the whole Study depends on them. Even when INM supplies the geographical positions of the runway end points, it is your responsibility to verify them.

Suspected errors in the FAA NFDC database are recorded in the BAD_RWY.TXT file, which is in the system USR_DATA subdirectory. This file lists runways for which the difference between the computed length and the database length is more than 5 feet.

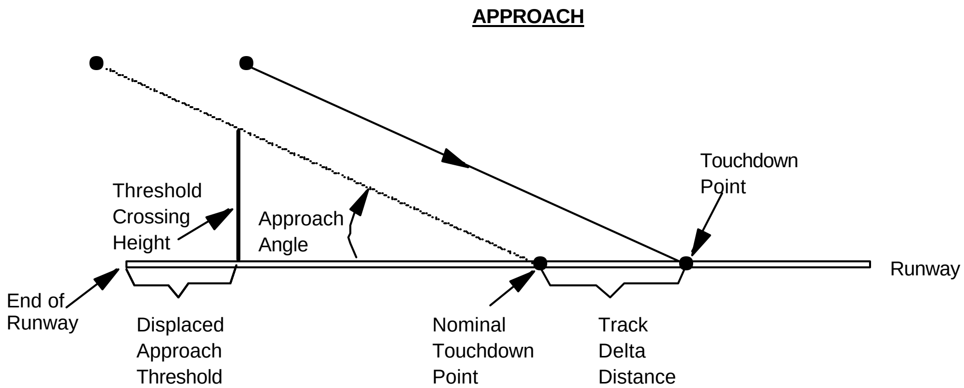
The elevation of a Runway End is its height above mean sea level. If this value is different for the two ends of the Runway, INM computes a runway gradient (i.e., an uphill or downhill slope) and uses it to adjust takeoff-roll distance for Profiles that are calculated from Procedure Steps (see Section 8.8).

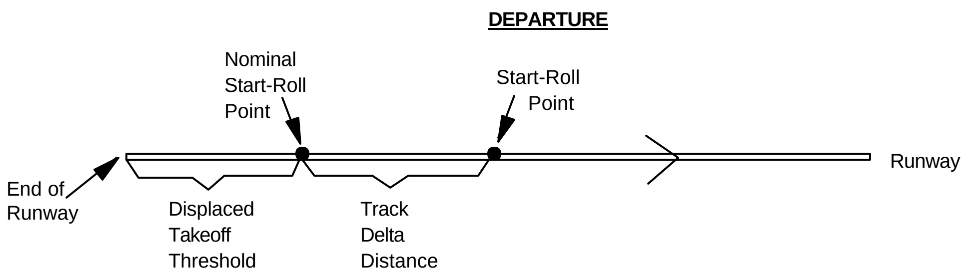
A Runway End can have displaced approach and takeoff thresholds. A displaced approach threshold is measured from the physical end of the runway to the threshold-crossing point (i.e., the point at which the "threshold crossing height" is measured). The threshold crossing point is usually at the end of the runway, so the displaced approach threshold is usually set to zero.

The displaced takeoff threshold is also measured from the end of the physical runway. It should be set to the average position of noise-producing engines at the start of takeoff roll, usually 100-200 feet from the physical end of the runway.

The "glide slope" is an approach angle for aircraft flying along an instrument landing system (ILS) electronic beam. INM does <u>not</u> 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.

The threshold crossing height (TCH) 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 may use different values. INM uses the TCH parameter to calculate a <u>nominal</u> touchdown point, as illustrated in the diagram. An Approach Track can be set





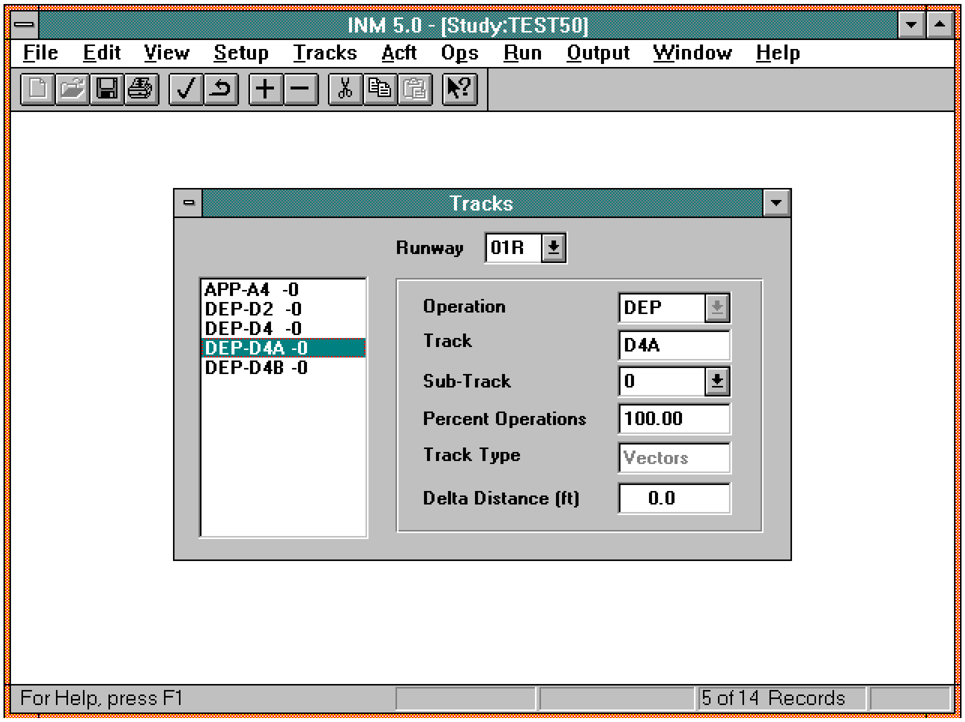
up to deviate from the nominal touchdown point (see Section 7.4).

The "percent-change in headwind" parameter is used to modify the airport-average headwind value to allow for a variation in average headwind for each Runway End. The airport-average headwind is a Case parameter (see Section 6.5). By changing one value on a Case record, the headwinds for all Runways Ends are changed according to their percent-change parameters. INM calculates the headwind for a Runway End by:

(Runway-end headwind) =
(Airport-average headwind) (1. + Percent-change/ 100) .

The Percent-change value is limited to !500% to 500% , and usually you should use values between !50% and 50% . A value of !100% means there is no average headwind on the runway, and a value of !200% means there is a tail wind equal to the Airport-average headwind. Normally, no runway would exhibit an average tail wind (averaged over flight operations, not time), but INM can compute a tail wind, if you want.

The SAE-AIR-1845 equations that are used to calculate Profiles from Procedure Steps 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 (e.g., climb angles are larger for headwind greater than 8 knots).



7.4 Track Data

Menu Item: Track // Tracks

This function is used to declare ground tracks. INM uses Tracks and Profiles to compute a three-dimensional flight path. There are two kinds of Tracks in INM: vectors-type and points-type. Vectors-type Tracks (V-tracks) are equivalent to INM 4.11 tracks. This kind of Track is represented by a list of Track Segments. Track Segments are flight vectoring instructions, such as "fly straight", "turn left", etc. A points-type Track is represented by list of X,Y-points. You create V-tracks in the Tracks and Track Segments DBF windows, and you create P-tracks in the Input Graphics window.

Both V-tracks and P-tracks are shown in the Tracks DBF window. You have full editing control over V-tracks in DBF windows, but you can only edit a couple of data fields for P-tracks. To edit P-track X,Y values, you need to work in the Input Graphics window.

A Track identifier consists of a Runway End identifier, an operation type, a four-character track identifier, and a subtrack number. For example: "16R-DEP-TK08(2)".

The operation types are abbreviated as follows:

A	APP	Approach
D	DEP	Depart (formerly called Takeoff)
T	TGO	Touch-and-Go
V	OVF	Over-Flight

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

The four-character track identifier must be unique for those Tracks that are associated with a specific Runway End and operation type. As recommended in INM 4.11, you may want to have totally unique track identifiers. This is OK too.

The reason for creating subtracks is so that you can assign operations to the group of subtracks as a whole, instead of specifying operations along each one. The subtrack function is primarily for P-tracks, and subtrack creation and naming is controlled in the Input Graphics window. The backbone Track is identified with the number "0". Subtracks use numbers "1" to "8". P-subtracks always occur in pairs (e.g., 1 and 2, 3 and 4, etc.), where P-subtracks to the left of the backbone track are odd numbers and to the right are even numbers:

Left 7 5 3 1 0 2 4 6 8 Right

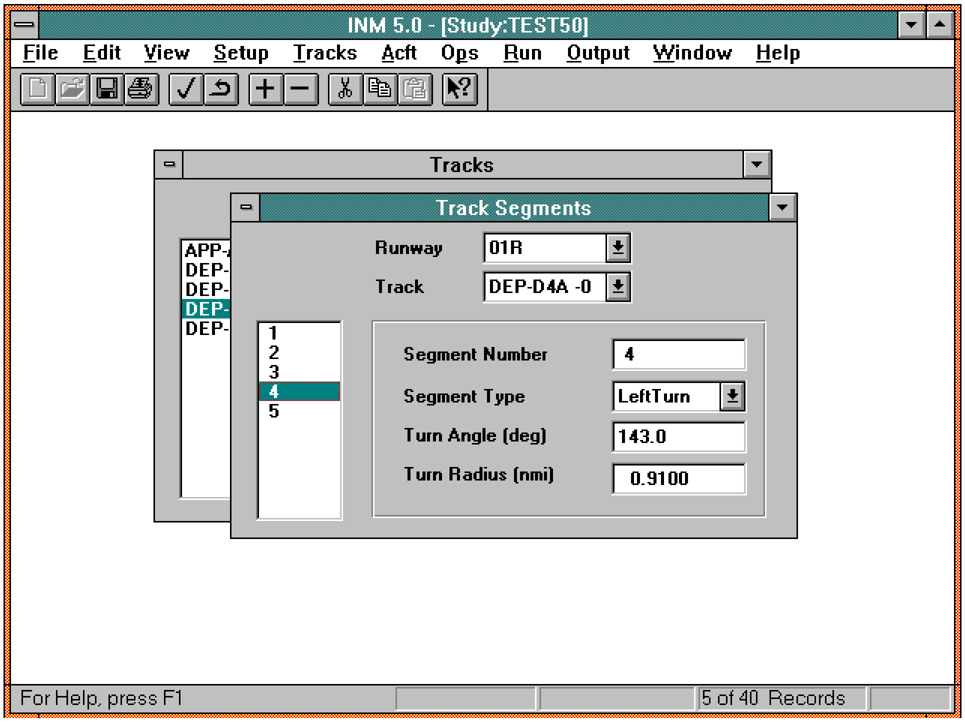
The Input Graphics function assigns default subtrack percentages, which are based on a binomial probability distribution. You can change these default values in either the Tracks DBF window or the Input Graphics window.

You can create V-subtracks if you wish. They do not have to be created in pairs nor follow the left/right numbering scheme, but it would be a good idea to so. V-subtracks are not displayed in the Tracks // Input Graphics window.

The percentage of operations assigned to subtracks must add up to 100 percent for all subtracks in a group. If there is only one Track in the group (with subtrack number "0"), then make the value 100 percent.

INM uses the "delta distance" parameter to adjust the takeoff start-roll point or the touchdown point on the runway for a particular Track. The nominal start-roll or touchdown point is determined by parameters in a Runway End record. This nominal point is used by all Tracks that are associated with the Runway End. You can override the Runway End nominal point by using a non-zero Track delta distance parameter. The Track 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 delta distance parameter are (1) wake turbulence avoidance on approach and (2) intersection takeoffs. If light aircraft use the same runway as do 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 <u>before</u> jet touchdown because light VFR aircraft use a steeper approach angle over the threshold. In this case, you should 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, you input a positive delta distance equal to the distance from the end to the intersection, less the nominal start-roll distance.



7.5 Track Segment Data

Menu Item: Track // Track Segments

This function is used to specify or view the details of ground tracks. You can view (but not edit) P-track "Segments", which are really individual X,Y points. And, you can create and edit V-track Segments, which are similar to the track input data in previous versions of INM.

You must first declare a V-track in the Tracks window, and then specify its Segments with this function. Use the Edit // Add Record function to create a new Track Segment with the next segment number in the sequence. You can create from 1 to 99 Track Segments to define a Track.

There are three kinds of vector Track Segments: straight, left turn, and right turn. For a straight Segment, you input the distance the aircraft moves along the Segment. For a turn Segment, you input the angle of the turn and the radius of the turn. You do not have to use a straight-turn-straight-turn sequence, as you did in INM 4.11. You can start and end a Track with any kind of Segment, and follow any Segment with any other (however, turning while taking-off, or following a straight segment with another one, does not make a lot of sense).

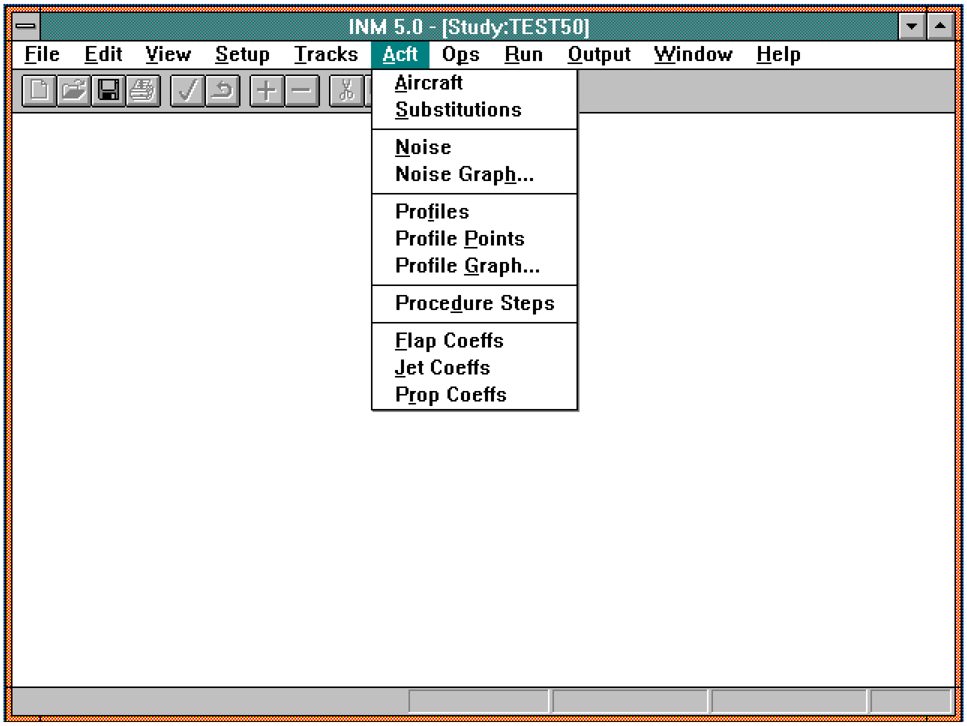
The previous INM method of using aircraft headings in place of turn angles is not supported in INM 5.0. This is because INM now uses an X,Y coordinate system aligned on true north, whereas aircraft headings are typically specified relative to magnetic north. To avoid confusion about what is north, and to simplify data input, the heading function was removed from INM.

When you create Track Segments, keep in mind that a Departure Track starts at the displaced takeoff threshold on the runway and ends in terminal airspace. The first Segment (it should be a straight segment) is automatically lined up with the runway.

An Approach Track starts in terminal airspace and ends at the displaced approach threshold on the runway. The last Segment (it should be a straight segment) is automatically lined up with the runway. Please note that Approach Track Segments are input in the order that they are flown, and they are never presented in reverse order.

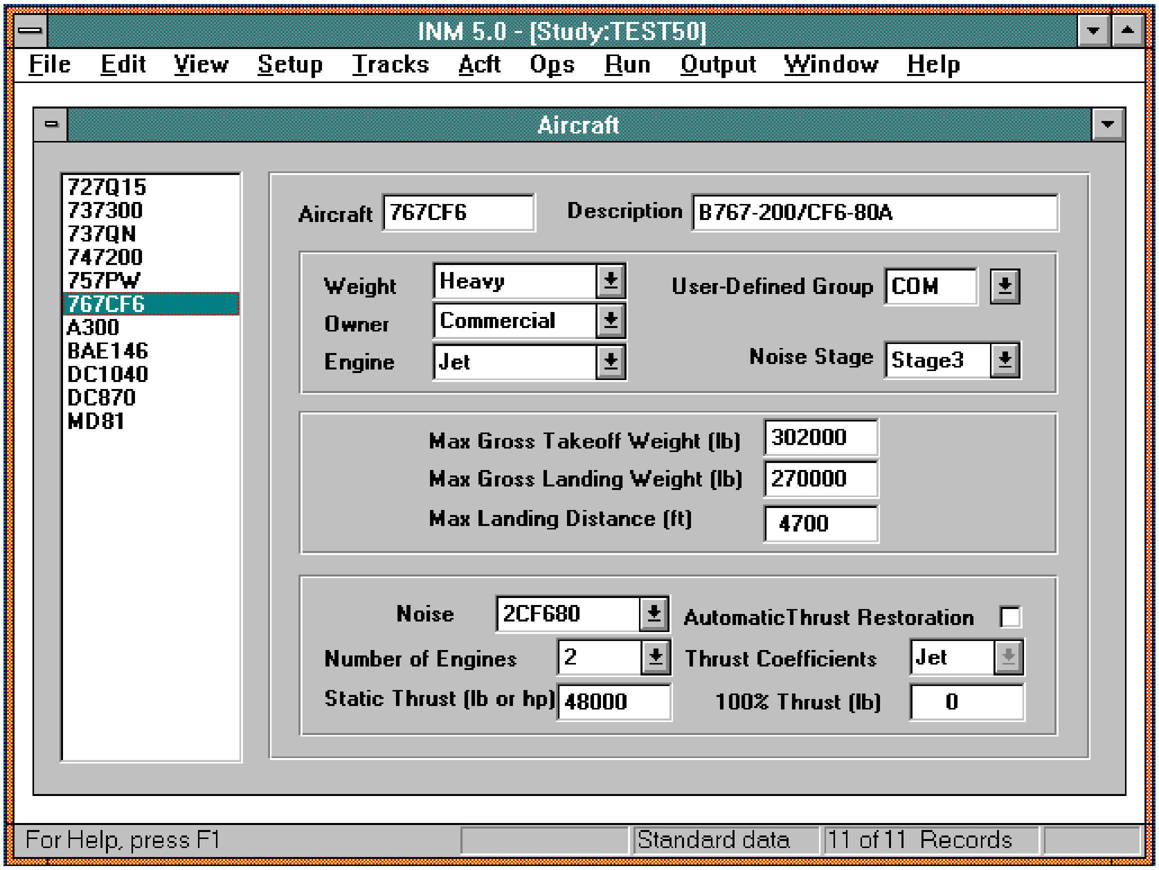
A Touch-and-Go Track both starts and ends at the displaced approach threshold on a runway. Usually, there are five Track Segments in a Touch-and-Go Track. A Touch-and-Go Track should (1) start with a straight segment, (2) turn left or right 180 degrees, (3) go downwind on a straight segment, (4) turn again 180 degrees onto final, and (5) end with a straight segment.

An Over-Flight Track starts and ends in terminal airspace. Over-Flights Tracks are created only in the Input Graphics function, because they are exclusively points-type tracks. This is because there is no physical runway to reference when computing X,Y points from vector parameters.



8 AIRCRAFT MENU

The Acft menu is used to input data relating to Aircraft defined for your Study, including airplane attributes, substitutions, noise levels, profile points, profile procedures, and aerodynamic coefficients. Aircraft are defined at the Study level and can be selectively used in Cases by specifying Flight Operations.



8.1 Aircraft Data

Menu Item: Acft // Aircraft

This menu item allows you to view and add Aircraft records. The list on the left-hand side of the Aircraft window contains all of the Aircraft that you have declared for your Study. You can declare more Standard Aircraft by using the Setup // Aircraft function. You can create new Aircraft records by using the Edit // Add Record function in this window. And, you can change an Aircraft record by making the modification in the edit controls on the right-hand side and committing the record with the Edit // Commit Record function.

Please note that a Standard Aircraft record cannot be changed, except for its identifier. By changing the Aircraft identifier, you make the record AUser data@ and then you can change other fields.

Some of the Aircraft parameters are essential for computing noise contours, and others are not. The essential parameters are:

1. The Aircraft identifier is used to associate an Aircraft with its flight Profiles, Profile Points, Procedure Steps, and aerodynamic Coefficient data. The identifier is used by aircraft Substitutions and various kinds of Operations.

2. If you want to use the "operations-by-percent" function (see Sections 9.2 and 9.3) to create Flight Operations, you need to specify an aircraft group which contains the Aircraft. The INM-4.11 group identifiers are COM (commercial), GA (general aviation), and MIL (military). INM 5.0 Standard Aircraft still use these three aircraft group identifiers so that previous INM input data are valid. You can change the aircraft groups to any 3-character identifiers that you want.

   When you assign Aircraft to groups, make sure that all of the Aircraft in a particular aircraft group have similar Profiles. For example, if aircraft group ABC contains an Aircraft with C-Profiles ("C" for "close-in" Noise Abatement Departure Profile), and you plan on using C-Profiles in a Group Percent record, then all members of the aircraft group must have C-Profiles (you can find out why in Section 9.3). The INM Standard database contains only S-Profiles ("S" for Standard), so this condition is automatically met for Studies based on Standard data. The difficulty occurs when you create non-S Profiles.

3. The Noise identifier associates an Aircraft with its Noise tables. Some Aircraft use the same Noise tables. Two Standard Aircraft (72710A and 72720A) are associated with an invalid noise identifier (they are set to the identifier "XXXXXX"). If you want to use these Aircraft in your Study, you need to create your own Noise tables or associate them with valid Standard Noise tables.

4. The number-of-engines parameter is used to calculate an engine-out thrust value for Noise Abatement Departure Profiles (NADPs). This is the only use of the number-of-engines parameter. Noise levels associated with an Aircraft will not change if the number of engines is changed. The noise levels in the Noise tables implicitly account for the number of engines. If you add an Aircraft and assign a Noise identifier,

you need to make sure that the Noise tables reflect the correct number of engines (see Section 8.3).

5. The Automated Thrust Restoration System (ATRS) parameter is used to calculate NADPs. If the box has an "X" 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. If you want an Aircraft to be both ATRS and non-ATRS, you need to create new Aircraft data (see how below), and set the two ATRS boxes accordingly. All of the INM Standard Aircraft are set to <u>non-ATRS</u>.

6. The thrust-coefficients parameter can be set to "Jet" or "Prop". "Jet" means that 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 the Noise tables. "Prop" means that the Prop Thrust Coefficients are used instead (see Sections 8.10 and 8.11).

   Some Standard Aircraft do not have thrust coefficients (i.e., their profiles are not computed); they are set to "Jet" or "Prop", depending on their engine type, but the parameter is not used.

   Please note that INM Standard turboprop Aircraft are usually classified as "Prop", but there are two that are classified as "Jet" (DHC8, DHC830). This means that turboprops can use either type of thrust equation.

7. The static-thrust parameter is used to compute reverse-thrust, taxi-thrust, and run-up-thrust value. For "Jet" Aircraft, static thrust is the rated thrust for a jet engine on a test stand. Usually, Standard "Jet" Aircraft use 60% of static thrust for reverse thrust and 10% for taxi thrust (see Section 8.8). Static thrust is also used to compute run-up thrust based on a percent-of-static-thrust parameter (see Section 9.6).

   For Standard "Prop" Aircraft, this parameter is really static power, rather than static thrust, and it <u>not</u> used by INM. This is because all Standard "Prop" Aircraft use percent-of-thrust in Noise tables, and their percent-of-thrust parameters (obtained from reverse thrust Procedure-Step or Run-up records) are used to directly access Noise data.

If you choose to create an Aircraft that uses Procedure Steps and/or Run-up Operations (either "Jet" or "Prop"), and you use a 100%-thrust value equal to zero (see below), you must input a valid static thrust value (i.e., not static power). Static thrust must be in units that are compatible with the associated Noise table. Usually, static thrust is in pounds.

If the Aircraft exclusively uses Profile Points (i.e., profiles are not calculated), and if and there are no Run-up Operations, then the static-thrust parameter is not used, and it can be set to zero.

8. The 100%-thrust parameter is used to calculate approach and departure percent-of-thrust values, which are then used to access the Noise tables. If INM detects a non-zero value for this parameter, percentages are computed and used in place of thrust values. The 100%-thrust parameter is used as the denominator in the percent calculation.

   100%-thrust is the net thrust per engine in pounds for an Aircraft for sea-level standard-day conditions. The 100%-thrust denominator should be in pounds because INM calculates the "corrected net thrust per engine" numerator in pounds.

   If the Aircraft's Noise tables are parameterized by percent-of-thrust, you must have a non-zero value for 100%-thrust. All INM Standard "Prop" Aircraft and one Standard "Jet" Aircraft use percent-of-thrust for Noise, and, therefore, these Aircraft have non-zero values for 100%-thrust.

   If the Aircraft's Noise tables are parameterized by pounds-thrust, you must set 100%-thrust to zero. Almost all Standard "Jet" Aircraft have zero for this parameter.

   If the Aircraft exclusively uses Profile Points (i.e., profiles are not calculated), the 100%-thrust parameter is not used, and it can be set to zero.

There are a number of Aircraft parameters that are not required for the proper operation of INM, but they are useful for classifying Aircraft and setting parameters in other windows. The non-essential parameters are:

9. A short (20-character) description of the Aircraft and its engines.

10. Weight class is "Small" (maximum gross takeoff weight is less than or equal to 12,500 pounds), "Large" (heavier than 12,500 but less than 300,000 pounds), and "Heavy" (300,000 pounds and heavier).

11. Owner category is "Commercial", "General Aviation", or "Military".

12. Engine type is "Jet" for turbojets, "Turboprop" for turbojet propeller-driven aircraft, and "Piston" for piston-engine propeller-driven aircraft.

13. 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.

14. Maximum gross takeoff weight is useful for entering Departure Profile weights (in the Profile window). If you need to choose a nominal Departure Profile weight, make it 85% of the maximum gross takeoff weight (recommended by SAE-AIR-1845).

15. Maximum gross landing weight is useful for entering Approach Profile weights (in the Profile window). If you need to choose a nominal Approach Profile weight, make it 90% of the maximum gross landing weight (recommended by SAE-AIR-1845).

16. 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 572 feet for a 5-degree approach, for a threshold crossing height of 50 feet. The distance parameters needed in the Procedure Steps window for the Deceleration step can be computed by using maximum landing distance (see Section 8.8.2).

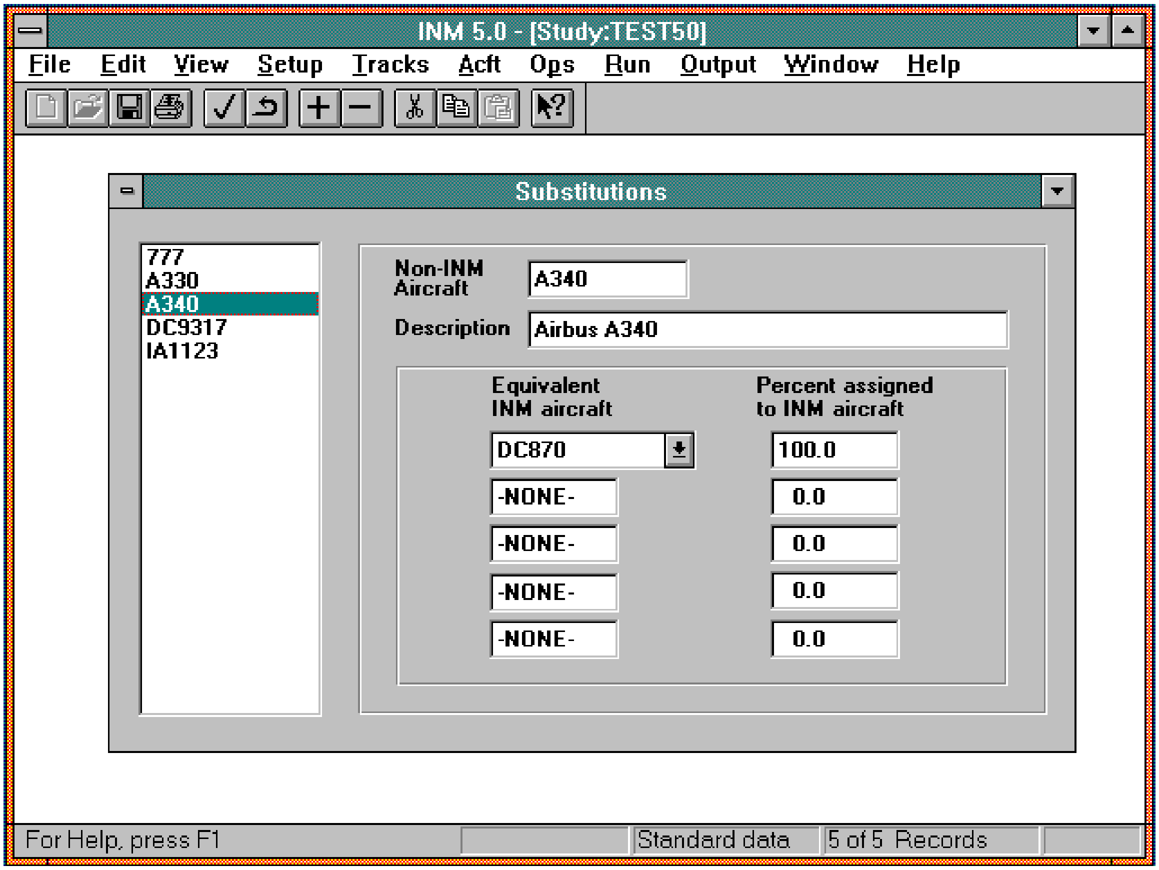
Sometimes, you may want to make a copy of Standard Aircraft data and then make changes. There is a special way to Copy and Paste an Aircraft:

1. Select a Standard Aircraft in the left-hand list box (i.e., one with "Standard data" showing on the status bar) and Copy the Aircraft.

2. Change the Aircraft identifier to something else, and commit the record. INM marks the changed Aircraft record as user-generated and displays "User data" on the status bar. INM also marks all of the records belonging the Aircraft as user-generated records (e.g., all Flap records). This takes a while.

3. Now, use the Edit // Paste function, to retrieve the original Standard Aircraft and its associated records. You now have the Standard Aircraft and a complete copy.

Please note that if you change an Aircraft identifier, all Substitution and Operation records that are associated with the Aircraft will be updated with he new identifier.



8.2 Aircraft Substitution Data

Menu Item: Acft // Substitutions

The Substitutions list on the left-hand side of the Substitutions window contains all of the aircraft Substitutions that you have declared for your Study. You can declare more INM Standard Substitutions by using the Setup // Substitutions function. You can create new Substitution records by using the Edit // Add Record function in this window.

Substitution identifiers are similar to Aircraft identifiers. In fact, these identifiers appear in Aircraft lists when you construct Flight Operations (they are indicated by "(s)" after their identifiers). You can use Substitutions as though they were declared Aircraft types.

The INM Standard Substitutions (i.e., the ones on the Setup // Substitutions list) are approved by the FAA for use in INM studies . The FAA official substitution list is continually updated. If you are unable to find an aircraft in the substitution database, refer to the contact provided in Appendix A for INM aircraft substitutions.

A few of the substitutions in the FAA published substitution list are not included in these data. Some of those that are missing include duplicate OAG codes and others require changes in noise levels, usually because the Substitution aircraft has a different number of engines than the INM Aircraft. These additional approved substitutions are:

1.	Falcon 50	LEAR35 + 1.8 dB
2.	Falcon 900	LEAR35 + 1.8 dB
3.	Antonov AN-225	74720B + 1.8 dB
4.	Yakovlev Yak-42	LEAR35 + 1.8 dB
5.	DC9-30 with JT8D-9A or JT8D-7B with hushkit	727EM2 ! 1.8 dB
6.	737 with Nordham retrofit or hushkit	727EM2 ! 1.8 dB

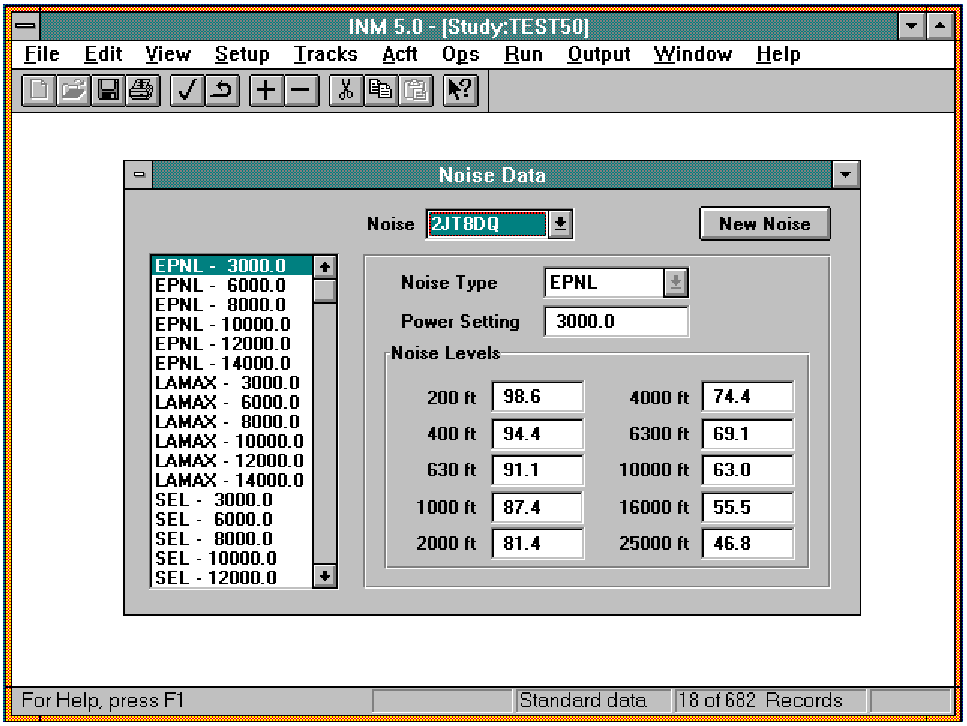
You need to create new Noise tables and Aircraft records for the above substitutions.

To create an aircraft Substitution, you input a 6-character identifier and a short, 40-character description. The Substitution identifier <u>must be different</u> from any Aircraft or other substitutions in your study.

Then, you select from one to five study Aircraft that will be used in place of your aircraft. If an Aircraft that you need is not on the list, you can bring it into the Study from the INM system, or you can create it. If just one Aircraft represents your aircraft, put it in the top box, enter 100 in the percent box, and leave the other boxes with "-NONE-" and A0" in them. If you want your aircraft split into two or more (up to five) Aircraft, fill out the boxes accordingly and in order. Please make sure that the percentage values add up to 100 percent.

INM uses the specified Aircraft in place of your Substitution aircraft when calculating numbers of operations. The numbers of operations are spilt according to the percentage values. For example, if you create a Substitution aircraft 737X and make it equal to 20% of 737300 and 80% of 737400, then 2.0 737X operations are expanded to 0.40 737300 operations and 1.60 737400 operations.

Please be careful when using Substitution aircraft for Operations. All Aircraft members on a Substitution record must have the named Profile, or else INM cannot correctly expand the substitution. For example, if you specify a DEP-C2 Profile for a Flight Operation, all of the Aircraft on the Substitution record must have a DEP-C2 Profile. You can check the FLIGHT.ERR file for this kind of problem.



8.3 Noise Data

Menu Item: Acft // Noise

A Noise table is a set of Noise records (curves) that have the same Noise identifier and the same noise type (e.g., the CF66D SEL table consists of six records with thrust values from 8,000 to 36,000 pounds thrust per engine). Each Noise record contains 10 noise levels measured in decibels.

You create a new Noise table by selecting the "New Noise" button, typing the identifier that you want, and pressing OK. Your new identifier will then appear in the Noise list, and you can add records with the Edit // Add Record function. Be sure to define at least two records for each table.

You can create four kinds of Noise tables: SEL and LAMAX tables, which belong to the A-weighted noise family, and EPNL and PNLTM tables, which belong to the perceived, tone-corrected noise family. "A-weighting" and "perceived, tone-corrected weighting" are two common methods of adjusting (weighting) a measured noise spectrum so that it represents the way that humans perceive noise.

Previous versions of INM contained Standard data for SEL and EPNL tables. INM 5.0 uses these data, and it also includes many new LAMAX tables and one new PNLTM table (TAY651). These maximum-level data are used in calculating time-above and maximum-level noise metrics.

For those cases where LAMAX and/or PNLTM data do not exist, INM uses equations that were derived via linear regression analyses using currently available Standard data. The derived relationships are:

$$L_{ASmx} = L_{AE} \; ! \; 7.19 \; ! \; 7.73 \log(D / 1000) ,$$
$$L_{PNTSmx} = L_{EPN} + 1.12 \; ! \; 9.34 \log(D / 1000) ,$$

where "log" is the base-10 logarithm function and "D" is distance in feet. The constants in these equations may change somewhat in later versions of INM as more data become available (especially for PNLTM).

Because of the derived relationship between maximum-level and exposure, you do not have to create both SEL and LAMAX tables (or EPNL and PNLTM tables). You can create one table and INM will compute the other. For example, you can input a table of PNLTM values and INM will compute the EPNL values. Obviously, you have more control by creating both tables.

You do <u>not</u> have to create both SEL and EPNL tables, as you did in previous versions of INM. For example, if all you are interested in is SEL and related metrics, you can just create the SEL Noise table. However, if you do this, please be aware that <u>only</u> the A-weighted noise metrics are valid, even though perceived-noise metrics may be computed. The reason is that Aircraft that you associate with your SEL-only Noise identifier are missing EPNL data; therefore, perceived-noise metrics will not have noise contributions from those Aircraft.

SEL and EPNL are noise-exposure metrics, and LAMAX and PNLTM are maximum-noise-level metrics. Their dB levels are relative to physical reference units, as listed below:

SEL	L_{AE}	$(20\ \mu Pa)^2(1\ s)$
EPNL	L_{EPN}	$(20\ \mu Pa)^2(10\ s)$
LAMAX	L_{ASmx}	$(20\ \mu Pa)^2$
PNLTM	L_{PNTSmx}	$(20\ \mu Pa)^2$

SEL and EPNL data represent aircraft flying at a reference speed of 160 knots (296.3 km/h) at a fixed thrust setting along a straight overhead flight path. INM adjusts the exposure levels for the actual speed flown.

The 10 noise levels are at 10 fixed distance values. For exposure metrics, "distance" is the distance from an observer to the closest point of approach on a straight flight path. For maximum-level metrics, "distance" is the distance at which the maximum 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

INM uses straight-line interpolation between points to calculate a noise level at a given distance and for a given thrust value. Noise level and thrust are on linear scales and distance is on a logarithmic scale. There must be at least two records (curves) per table so that thrust values can be interpolated or extrapolated. For distance less than 200 feet, INM uses !10 dB/decade for extrapolating noise exposure (e.g., SEL decreases 10 dB when going from 20 feet to 200 feet), and INM uses !20 dB/decade for extrapolating maximum-level. 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 log scale.

Usually, the thrust parameter that is associated with a Standard Noise record is the "corrected net thrust per engine" measured in pounds. For some Standard Aircraft (those that have non-zero 100%-thrust), the thrust parameter is the percent of corrected net thrust per engine. The word "corrected" means that the actual thrust (at the aircraft's altitude and ambient temperature) is divided by the ratio of the ambient atmospheric pressure over the sea-level standard pressure (i.e., thrust is "corrected" back to sea-level standard day).

Please note that Noise levels include the contribution from all of the engines, even though the Noise curves are parameterized by the thrust per engine.

Sixteen of the 108 Standard Aircraft use "percent-of-thrust" as a Noise parameter. They are listed below, along with their Noise identifiers:

BEC58P	TSIO52
C130	T56A15
C130E T56A7	
CNA441	TPE331
COMJET	CGAJ
COMSEP	CGASEP
CVR580	501D13
DC3	2R2800
DC6	4R2800
DHC6	PT6A27
DHC7	PT6A50
DHC8	PW120
DHC830	PW120
GASEPF	SEPFP
GASEPV	SEPVP
HS748A	RDA532

When you create Profile Points, you assign thrust values to the points (see Section 8.6). These thrust values can be in any physical units that you want, providing that you also create Noise records using compatible thrust units. This is very important.

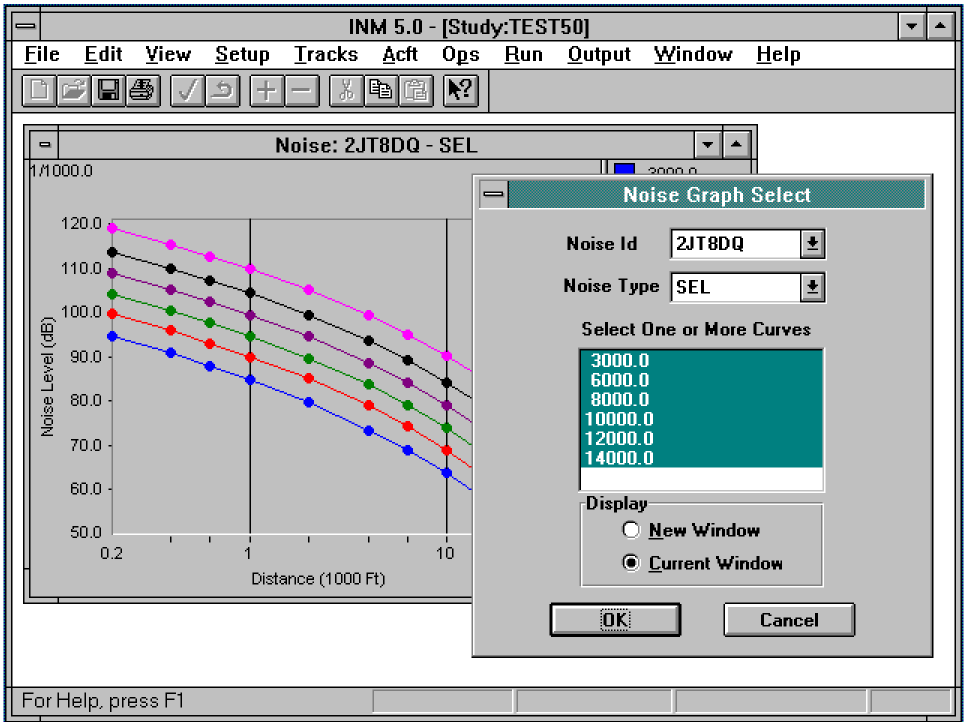
If you are using Procedure Steps to calculate a Profile (see Section 8.8), do not create arbitrary thrust units in a Noise table. The reason is that INM calculates "corrected net thrust per engine" in pounds along a flight path, and your Noise units and INM's flight units will be incompatible.

If you really need to have different thrust units for Procedure-Step related Noise, you can scale the thrust value. You do this by inputting a non-zero value in the Aircraft 100%-thrust parameter. The scaling constant, which multiplies pounds-thrust produced by INM, is the reciprocal of the 100%-thrust parameter. The INM-computed "percent" value, which is used to access your

Noise table, is in your desired units (i.e., INM does not care that the noise parameter is not a real percentage of maximum pounds-thrust). But if you do this, make sure that the "percent thrust" in a Decelerate step (see Section 8.8.1) or in a Run-up Operation (see Section 9.6) is in <u>your</u> Noise units, rather than a real percentage.

If you are in doubt about what thrust units to use, use <u>pounds thrust per engine</u> in your Noise table and set 100%-thrust to zero in the Aircraft record that is associated with your Noise table. Most of the INM Standard data are in this format.

Appendix D lists all of the Standard Noise identifiers, the number of engines causing the noise, and the Standard Aircraft that are associated with the identifier.



8.4 Noise Graph

Menu Item: Acft // Noise Graph

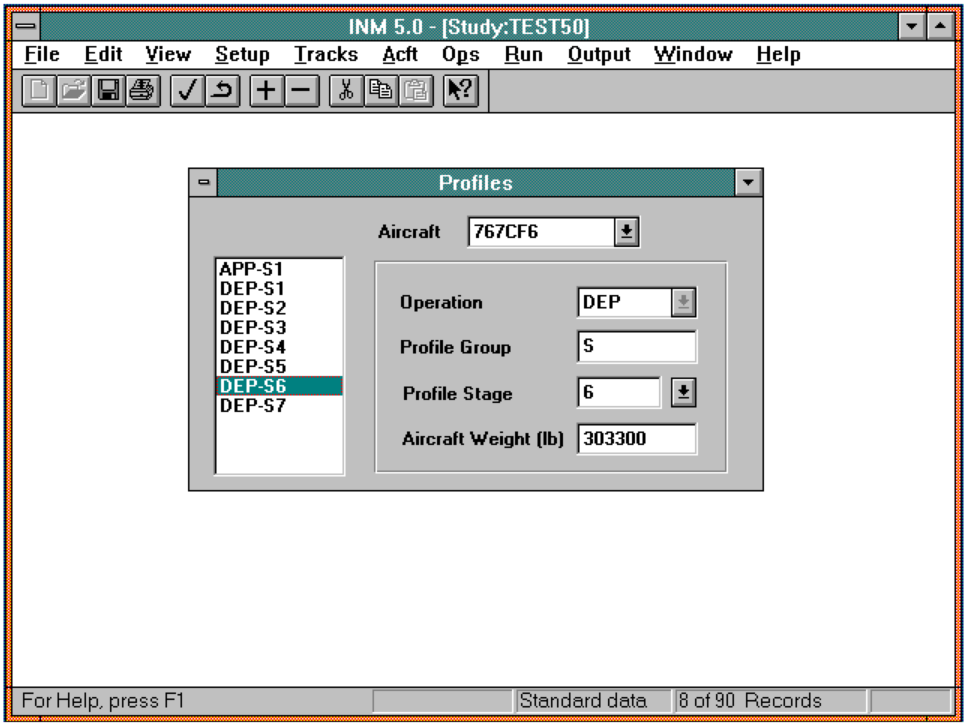
You can view a graph of noise level versus distance by first selecting a Noise identifier and then its type (SEL, LAMAX, EPNL, or PNLTM). INM pre-selects all of the records (curves) in the table -- all you have to do is press "OK" to see the graph. If you want to limit the number of curves on the graph, you can de-select some of the records before pressing OK.

Select "New Window" if you want INM to create another Noise Graph; select "Current Window" to overwrite data in the current Noise Graph.

You can use the File // Print function to print the graph to a printer or to a file. Edit // Copy writes the entire graphic to the Windows Clipboard as a metafile (WMF). The resulting data can be saved to disk, or directly pasted into a graphics program for manipulation and printing.

You can watch your noise levels being plotted as you commit each new Noise record. To do this, setup two windows side by side; one is the Noise DBF window, which is accessed though the Acft // Noise function, and the other is the Noise Graph window. Get your new Noise table started first (see Section 8.3) and then run Noise Graph. Each time you commit a new record, a curve is plotted on the graph.

You can view the distance (X value) and the sound 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.



8.5 Profile Data

Menu Item: Acft // Profile

This function is used to declare Profiles and to input Aircraft operational weight. A Profile is identified by an Aircraft identifier, an operation type, and two other identifiers which distinguish Profile groups and stages.

INM 5.0 supports four types of flight operations:

APP	Approach
DEP	Depart
TGO	Touch-and-Go
OVF	Over-Flight.

The first three are associated with Runway Ends and the last one is not (however, in some windows, over-flights are associated with the OVF "runway"). INM 5.0 Touch-and-Go Profiles are different than in INM 4.11. In INM 5.0, a constant pattern altitude can be flown. Over-Flight is a new kind of Profile that allows you to input arbitrary overhead flight tracks. The INM Standard database contains standardized Approach and Departure Profiles. There are no TGO or OVF Profiles in the Standard database.

The Profile "group" identifier is a 1-character identifier. It is called "group" because it identifies Profiles that belong to the same group (e.g., "C" = Close-in departure group). All INM Standard Profiles use the letter "S" for their group identifier. You should not use "S" when creating your own Profiles.

The Profile "stage" identifier is a 1-character identifier. It is called "stage" because it is used to identify stage lengths (1 to 7) for Departure Profiles. Stage length is a range of trip distances. INM stage lengths are defined as follows:

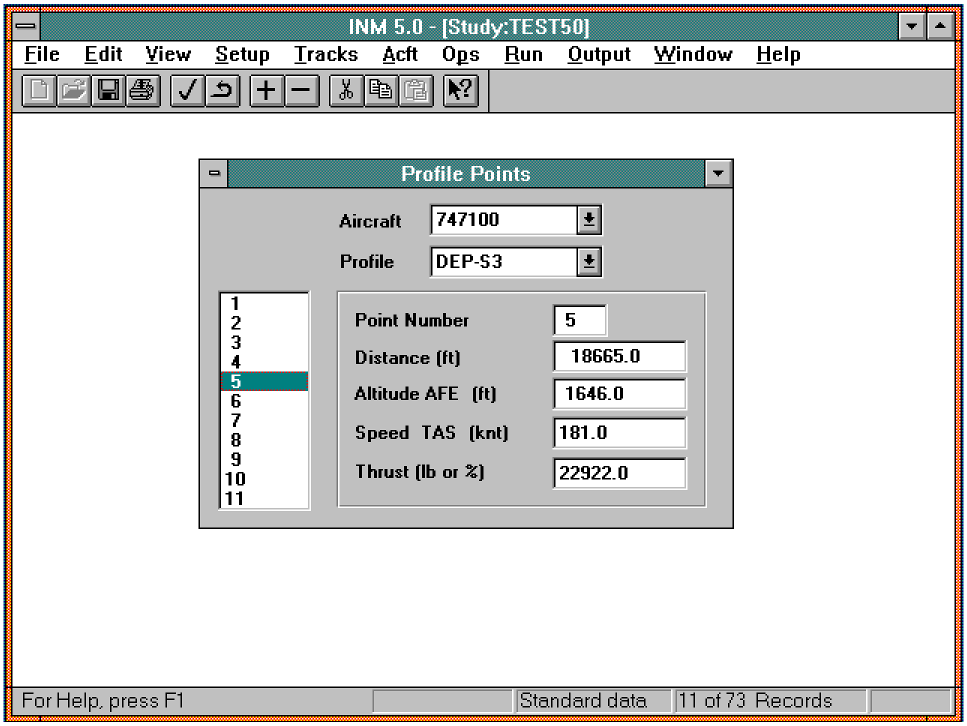
1	0	to	500	nmi
2	500	to	1000	nmi
3	1000	to	1500	nmi
4	1500	to	2500	nmi
5	2500	to	3500	nmi
6	3500	to	4500	nmi
7		over	4500	nmi

There is only one Standard Approach Profile for most Standard Aircraft, and its stage identifier is set to "1". (Some small Standard aircraft have both "1" and "2", representing 5-degree and 3-degree approaches.) Approach stage identifiers have nothing to do with stage lengths, they are just a way of distinguishing members in a group. For example, you could use Approach stages to mean different descent angles.

You can use the stage identifiers that are already defined by selecting them from the drop-down list, or you can create your own by typing a single character in the box.

The last data item in defining a Profile is the weight of the Aircraft on the Profile. If Profile Points are used to specify the Profile (see Section 8.6), the weight parameter has no effect -- INM does not use it. However, if Procedure Steps are used to specify the Profile (see Section 8.8), Profile weight influences the amount of thrust required along the flight path and the altitude that can be attained in a given amount of ground distance.

You should make sure that the Profile weight (1) makes sense relative to the assigned stage length for departures, (2) is less than the maximum gross takeoff weight for departures and overflights, and (3) is less than maximum gross landing weight for approach and touch-and-go operations.



8.6 Profile Points Data

Menu Item: Acft // Profile Points

This function is used to specify a Profile in terms of distance, altitude, speed, and thrust values at various "points" along a flight path. The advantage of using Profile Points is that you can control the details of a Profile. The disadvantage is that the Profile is fixed, and INM cannot change it in response to different airport temperature or wind conditions.

If you have the same Profile (e.g., DEP-S3) defined by both Profile Points and Procedure Steps, the Profile Points take precedence and are used in calculating the Profile.

Fifteen of the 108 Standard Aircraft use Profile Points, and the rest use Procedure Steps. The Standard Aircraft that use Profile Points are:

707	727EM2	F16PW0
707120	747100	F15PW9
720	DC820	MD11GE (approach only)
727200	F16A	MD11PW (approach only)
727EM1	F16GE	SABR80

To create a set of Profile Points, you first select an Aircraft and a Profile. Then, use the Edit // Add Record function (or Add button) and Tab through the fields, entering data as you go. The point numbers keep the records in order; the point number should start with 1 and be incremented by 1 for each new record. You can have up to 99 Profile Points. After a record is completed, use the Edit // Commit Record function (or Check button). You can also commit a record by adding another new one.

"Distance" is the horizontal distance from a reference point. You can think of distance as a value on the X axis, and the reference point is at X = 0. The reference point depends on the type of operation, as follows:

APP X = 0 at the touchdown point. Before touchdown, distance X is negative, at touchdown the distance is zero, and after touchdown distance is positive (i.e., X increases as the aircraft flies the profile). Please note that this definition is different from previous versions of INM.

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

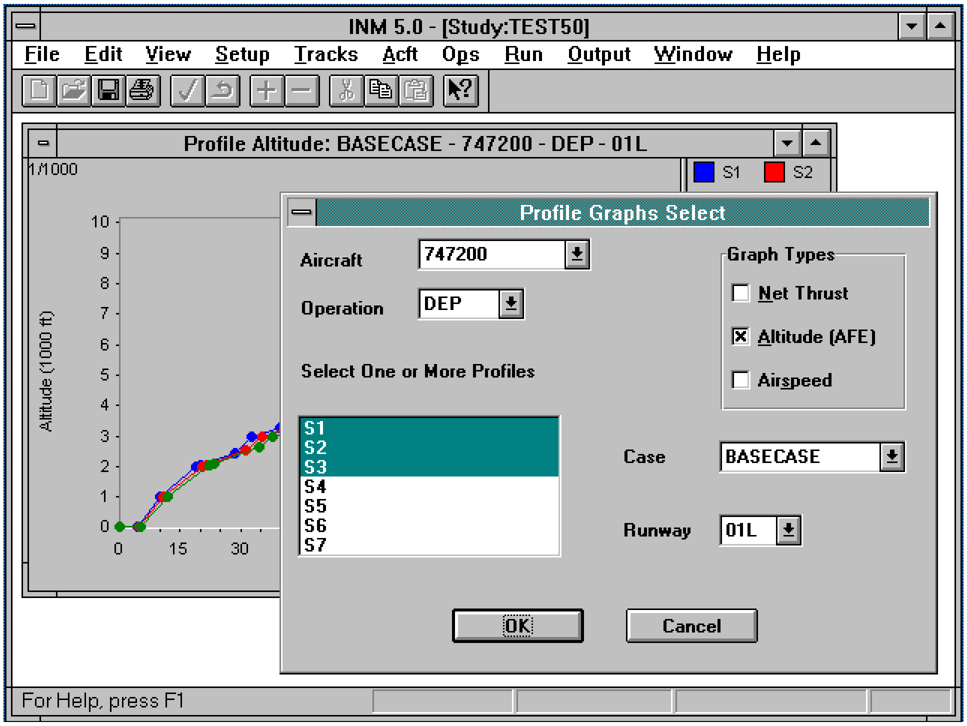
TGO X = 0 at the touchdown point. As with APP, the Profile starts with negative distance, is zero at touchdown, and positive after that.

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

"Altitude" is altitude above field elevation (AFE), not altitude above sea-level and not altitude above ground level. The altitude should be operationally realistic for the aircraft weight and airport temperature being modeled. For an Arrival, altitude decreases to zero at the touchdown point and remains zero thereafter. For a Departure, altitude starts at zero, and increase after takeoff. For a Touch-and-Go, altitude starts at the pattern altitude, decreases to zero at touchdown, stays at zero until takeoff, and returns to the original pattern altitude. For an Over-Flight, altitude usually remains constant for the entire Profile, although it does not have to.

"Speed" is <u>true airspeed</u> (TAS), not calibrated (indicated) airspeed. The speed values should be operationally realistic so that sound exposures are properly modeled. The speed value for the first Departure point <u>must be set to 16 knots</u> (29.6 km/h). This special reference value is used in computing the noise exposure behind an airplane at start-of-roll. It does not mean that the airplane has a rolling start.

"Thrust setting" is used to access the Noise table. Usually, this parameter is the "corrected net thrust per engine" in <u>pounds</u>. Some Standard Aircraft use "percent-of-thrust". The thrust setting should be operationally realistic for the aircraft weight, altitude, temperature, and pressure being modeled. Make sure that this parameter and the "thrust-setting" values in the Aircraft's Noise table are compatible.



8.7 Profile Graphs

Menu Item: Acft // Profile Graphs

You use this function to view graphs of (1) altitude vs. distance, (2) speed vs. distance, and (3) thrust vs. distance. Select an Aircraft, type of operation (APP, DEP, TGO, OVF), Case, and Runway End. INM pre-selects all of the Profile records for a given Aircraft and operation type. Press OK to see all three graphs. If you want to limit the number of curves on the graphs, you can de-select some of the records before pressing OK. Also, you can limit the number of graphs (altitude, speed, or thrust).

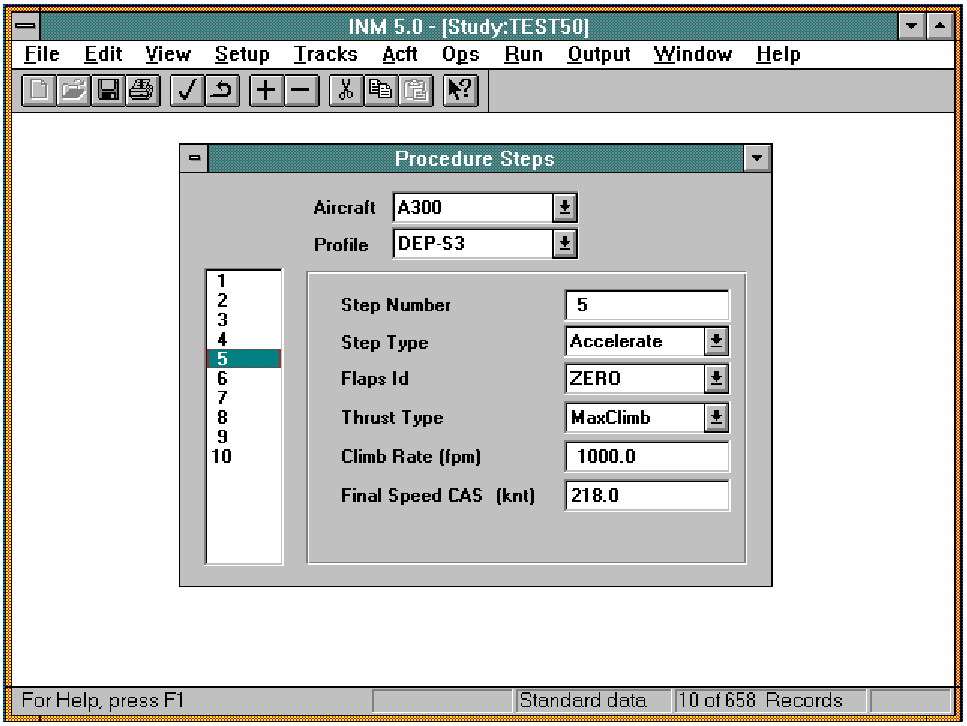
You can use the File // Print function to send the graph to a printer or to a file. Also, you can use the Edit // Copy function to write a metafile (WMF) to the Windows Clipboard.

The reason that you need to select a Case is because computed Profiles depend on airport temperature and pressure. The reason that you need to select a Runway End is because computed Profiles are adjusted for runway gradient and runway headwind.

The first time you run this function, INM will take a while to read the Profile, Procedure Points, and Procedure Steps data from disk. After that, the Profiles are quickly computed and displayed.

Occasionally, you will see a message box that indicates that there is no Track, and the Profile cannot be plotted. To fix the problem, you need to specify a Runway End that has an operational Track (e.g., a Runway End associated with a defined Departure Track with Track Segments). This behavior is caused by the INM implementation of the Profile Graph function -- INM is really running the flight path calculator and stopping before going into the noise calculations.

You can commit a record in the Procedure Steps or Profile Points window and immediately see the effect in the Profile Graph window. This feature is useful in debugging user-created Profiles.



8.8 Procedure Step Data

Menu Item: Acft // Procedure Steps

This function allows you to build your own Profiles by defining Procedure Steps. The advantage of doing so is that your Profiles will be computed using Study and Case setup data (i.e., airport elevation, airport temper- ature, airport pressure, runway headwind, and runway gradient). Many of the Standard Profiles are computed using Standard Procedure Steps. The best way to learn how to create your own Procedures is to study the Standard Procedure Step data.

Before starting Procedures, you need to declare a Profile in the Profile DBF window, as explained in Section 8.5. Then in the Procedure Steps window, you select the Aircraft and Profile that you plan use.

General rules for the Procedure Steps window:

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

8.8.1 How to Build an Approach Profile

There are four kinds of Approach steps: Level, Descend, Land, and Decelerate. The rules for using these steps are:

1. The first step type must be Level or Descend.
2. Level can be followed by Level or Descend.
3. Descend can be followed by Level, Descend, or Land.
4. There can be only one Land step.
5. Land is followed by Decelerate.
6. Decelerate can be followed by Decelerate.
7. The last step type must be Decelerate.

For INM 5.0, these rules are <u>not</u> enforced in the Procedure Steps window. However, they are reported in the FLIGHT.ERR file, which is produced in the Case subdirectory when the Profiles are calculated. If there are any errors reported in this file, you must revise the input data until the errors disappear, even though the Profiles may seem to compute OK.

For a **Level** step, you 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). For the Level or Descend step that follows this Level step, make sure that the altitude and speed values are equal to the altitude and speed values of this Level step.

For a **Descend** step, you select a flaps identifier and input the starting altitude, starting speed, and the descent angle for the segment. The Level or Descend step that follows this Descend step can have different altitude and speed values.

For the **Land** step, you select a flaps identifier and input the touchdown rolling distance, i.e., the distance that the aircraft rolls 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 the SAE-AIR-1845 equations.

For a **Decelerate** step, you input the segment distance, the starting speed, and the percent of static thrust at the start of the segment. INM usually applies the percent-thrust value to the Aircraft static-thrust value (shown in the Acft // Aircraft window) to compute a thrust-setting for accessing the Noise table. However, for those aircraft that have a 100%-thrust value greater than zero, the percent-thrust value is used to directly access the Noise table.

8.8.2 INM Standard Approach Procedures

The INM Standard Approach Procedures start with a Descend step, followed by three more Descend steps. The four steps at 6000, 3000, 1500, and 1000 feet AFE bring an aircraft from zero-flaps configuration, terminal-area entrance speed, down to landing-gear/flaps configuration, final-approach speed. For those aircraft that would generally fly IFR approaches, a 3-degree descent angle is used. For single-engine piston aircraft (and for BEC58P), a 5-degree descent angle is used to model VFR approaches.

For the Land step, the touchdown-roll distance is 10% of the total roll-out distance. The relationship between the total roll-out distance and the input parameter in the Aircraft window is:

(Roll-Out Distance) = 0.9 (Maximum Landing Distance) ! 954 feet ,

for those aircraft using 3-degree approaches. For those using 5-degree approaches, the 954-value is replaced with 572 feet (the angle is steeper, so the in-air portion of the flight path after crossing the end of the runway is shorter).

The Standard Approach Procedures have two Decelerate steps. The first Decelerate distance is 90% of the total roll-out distance, the starting speed is a little less than the touchdown speed, and the starting percent-thrust is 60% for jets and 40% for props. The first deceleration segment represents reverse thrust action. The second Decelerate distance is zero because it is last segment, the starting speed is 30 knots (representing taxi speed), and the starting percent-thrust is 10% of static thrust (representing taxi thrust).

8.8.3 How to Build a Departure Profile

There are four kinds of Departure steps: Takeoff, Climb, Accelerate, and Level. The rules for using these steps are:

1. The first step type must be Takeoff.
2. Takeoff can be followed by Climb or Accelerate.
3. Climb can be followed by Climb, Accelerate, or Level.
3. Accelerate can be followed by Climb, Accelerate, or Level.
5. Level can be followed by Climb, Accelerate, or Level.
6. The last step type can be Climb, Accelerate, or Level.

For a **Takeoff** step, you select a flaps identifier and a thrust type. The flaps identifier should not have a "U" or "D" prefix (even though you may think it makes sense to have the gear down when taking-off) because these coefficients were measured for descending flight paths.

You should usually select "MaxTakeoff" thrust, but other thrust types are available. "MaxClimb" thrust means that the aircraft takes off using reduced thrust and thus requires a longer runway. Always check the FLIGHT.ERR file in the Case subdirectory to see if your aircraft has exceeded the length of runway available.

"UserValue" thrust means that you supply the takeoff thrust value. Remember that the input thrust value is the "corrected net thrust per engine", or the percent of the 100%-thrust specified in the Aircraft window. INM uses your input value at both ends of the takeoff segment (at 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 using a reference value of 16 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.

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. Based on the average thrust that can be generated under these conditions and the aircraft weight, INM computes the climb angle and the ground distance. The speed on a climb segment is constant (constant CAS, not constant TAS) and it is equal to the final speed on the previous step.

Five thrust types are available for the Climb step. "MaxTakeoff" and "MaxClimb" are computed as in the Takeoff step. The value that you input for "UserValue" thrust is assigned to the final climb-to point. INM does not adjust this input value for airport conditions (elevation, temperature, and pressure), so that you have full control over the parameter used in the Noise tables.

You can also select "UserCutback" to input a thrust value. 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, again, INM does not adjust this value for atmospheric conditions.

You select "ReduceThrust" when building AC91-53A 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. If the Aircraft window has the Automatic Thrust Restoration System (ATRS) box checked, the thrust value is computed for a zero climb gradient with one engine inoperative. If ATRS is not checked, the thrust is computed for one engine inoperative and a climb gradient that is in accordance with FAR Section 25.111(c)(3) (i.e., 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 NADP must have two or more engines. Also, 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.

For an **Accelerate** step, you select a flaps identifier and a thrust type, and you 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. INM adjusts your climb rate to account for the actual airport elevation, temperature, and pressure. A 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 are also available for an acceleration segment.

For a **Level** step, you select a flaps identifier and input the altitude, speed, and distance flown along the segment. 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 has constant speed on the segment and has 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.

8.8.4 INM Standard Departure Procedures

INM Standard Departure Procedures for jets tend to follow a pattern (but there are exceptions):

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 **2** of the initial climb rate.
5. Accelerate to Vzf (zero-flaps minimum safe maneuvering speed) using MaxClimb thrust, minimal flaps, and 1000-fpm climb rate.
6. Climb to 3000 feet using MaxClimb thrust and zero flaps.
7. Accelerate to 250 knots using MaxClimb thrust, zero flaps, and 1000-fpm climb rate.
8. Climb to 5500 feet using MaxClimb thrust and zero flaps.
9. Climb to 7500 feet using MaxClimb thrust and zero flaps.
10. Climb to 10000 feet using MaxClimb thrust and zero flaps.

INM Standard Departure Procedures for propeller-driven aircraft also tend to follow a pattern:

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

7. Climb to 10000 feet using MaxClimb thrust and zero flaps.

An INM Aircraft usually has more than one Departure Profile. Longer trips require more fuel, making an aircraft heavier and the profile lower. The Profiles are distinguished by stage lengths 1 to 7. In the Profile window, an INM Standard Profile is indicated by an "S" for the group identifier, and by "1" to "7" for the stage identifier. The Departure Procedures for an Aircraft are almost the same for all stage lengths. Usually, the only change is in the Vzf value which increases for heavier aircraft. Sometimes, the climb rate for an Accelerate step is reduced for heavier aircraft.

8.8.5 How to Build a Close-In NADP

An INM Standard Departure Procedure can be used to create a "close-in" NADP that conforms to AC91-53A. The following method is <u>not</u> an official method; it is your responsibly to coordinate with the FAA when using your own Profiles for environmental impact studies.

1. Copy the Standard Procedure Step data for a Profile (usually 9 or 10 records).
2. Change the Profile group identifier from "S" to "C" for "close-in".
3. 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 Vzf using MaxClimb thrust. Use the same schedule for flaps and climb rate as used in the Standard Procedure. You may have to reduce the first two climb rates because MaxClimb thrust is not large enough 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 (5500, 7500, 10000 feet).

Appendix H shows an example Close-in NADP.

8.8.6 How to Build a Distant NADP

An INM Standard Departure Procedure can be used to create a "distant" NADP that conforms to AC91-53A. The following method is <u>not</u> an official method; it is your responsibly to coordinate with the FAA when using your own Profiles for environmental impact studies.

1. Copy the Standard Procedure Step data for a Profile
   (usually 9 or 10 records).
2. Change the Profile group identifier from "S" to "D" for "distant".
3. Change step-2 altitude from 1000 to 800 feet.
4. Change step-6 (sometimes step-5) MaxClimb to ReduceThrust,
   i.e., Climb to 3000 feet using ReduceThrust and zero flaps.
5. Leave all other steps as they are.

Appendix H shows an example Distant NADP.

8.8.7 How to Build a Touch-and-Go Profile

You need to create three Procedures to model a Touch-and-Go operation: (1) the Departure Procedure into the pattern, (2) the Touch-and-Go Procedure in the pattern, and (3) the Approach Procedure from the pattern. This method allows you to use one runway for departure and approach and a second runway for touch-and-goes.

The Touch-and-Go Departure and Approach Procedures follow the same rules as discussed above in the Departure and Approach sections, except:

1. A Departure Procedure must end with a Level step.
2. An Approach Procedure must start with a Level step.

The Touch-and-Go Procedure itself has six kinds of steps: Level, Descend, Land, Takeoff, Climb, and Accelerate. The rules for using Touch-and-Go steps are:

1. The first step type must be Level.
2. Level is followed by Descend.
3. Descend can be followed by Descend or Land
4. Land must be followed by Takeoff.
5. Takeoff can be followed by Climb or Accelerate
6. Climb can be followed by Climb, Accelerate, or Level.
7. Accelerate can be followed by Climb, Accelerate, or Level.
8. The last step must be Level.

You can follow this example to build Touch-and-Go Profiles:

1. Decide on a letter code for the Profile group identifier and a number code for the Profile stage identifier, e.g., "T1".
2. For the selected Aircraft, create three Profiles in the PROFILE window (e.g., DEP-T1, TGO-T1, and APP-T1). Use the same Profile group/stage identifiers for all three Profiles. Also, use the same aircraft weight for all three Profiles.

Depart to the Touch-and-Go Pattern:

3. In the Acft // Procedure window, select the DEP Touch-and-Go Profile (e.g., DEP-T1), and add a standard Takeoff step, followed by a Climb step for jets (or Accelerate and Climb steps for props). Climb to 900 feet AFE (or whatever your pattern altitude is).
4. Accelerate to Vzf in one or more steps using a reasonable schedule for thrust type and flaps. Use zero climb rate so that the aircraft stays at the pattern altitude.
5. The last step is Level at the pattern altitude. Use speed Vzf and zero flaps. (Note: if you want to fly downwind at slower speed using extended flaps, adjust these steps accordingly.) The distance value for the Level step should be the distance to a point on the downwind leg of the touch-an-go pattern. This point (call it point-P) is referenced later in the Approach Procedure discussion.

Touch-and-Go Pattern:

6. Select the TGO Touch-and-Go Profile (e.g., TGO-T1) and make step-1 a Level step at the pattern altitude and Vzf speed. Use 1000 feet for the distance.
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 power is applied to takeoff again.
9. Takeoff using MaxTakeoff thrust, takeoff flaps, and a starting speed that is 10-20 knots less than the touchdown speed. INM computes the distance needed to accelerate from this starting speed to takeoff speed.
10. The Climb (or Accelerate and Climb) the same as in the DEP-T1 Procedure.
11. Accelerate to Vzf at pattern altitude the same as in the DEP procedure.

12. The last step is Level at the pattern altitude. Make this segment 2000 feet long (it will be divided into two 1000-foot segments when INM detects the discontinuous change in thrust from the Accelerate step to the Level step). INM supplies the Level segment that connects the 2000-foot Level departure segment to the 1000-foot Level approach segment.

Approach from the Touch-and-Go Pattern and Stop:

13. Select the APP Touch-and-Go Profile (e.g., APP-T1) and make step-1 a Level segment at the pattern altitude and Vzf speed. Use a distance value that starts at point-P (see 5. above) on the downwind leg and ends at the start of descent.
14. Descend and Land the same as in the TGO-T1 Procedure.
15. Decelerate with reverse thrust (if desired). The last step is Decelerate at taxi thrust, taxi speed, and zero distance.

If you use the same Runway End for all three Procedures, there is a method for estimating the Level-step distance parameter needed for Departure and Approach (i.e., the distance to/from point-P). First, create the TGO Profile and its associated Procedure Steps. Then, go to the Acft // Profile Graphs function and look at the TGO Profile. It starts and ends at the touch-down point. Double-click on the point at the start of the Level segment and write down the X value, and do the same for the point at the end of the Level segment. When you create the Departure Procedure Level Step, use one-half of the difference between the X-values for the distance to point-P, and similarly for Approach. This method is not exactly accurate because TGO touch-down is at a different point than DEP start-roll, and because the takeoff points are different, but the method will provide the distance value within a few percent of the true value.

Appendix G shows an example set of Touch-and-Go Procedure Steps. They are located in the "User Defined Procedures" section of the Study TEST411 Basecase Echo Report.

8.8.8 How to Build an Over-Flight Profile

There are three kinds of Over-Flight steps: Level, Descend, and CruiseClimb. The rules for using these steps are:

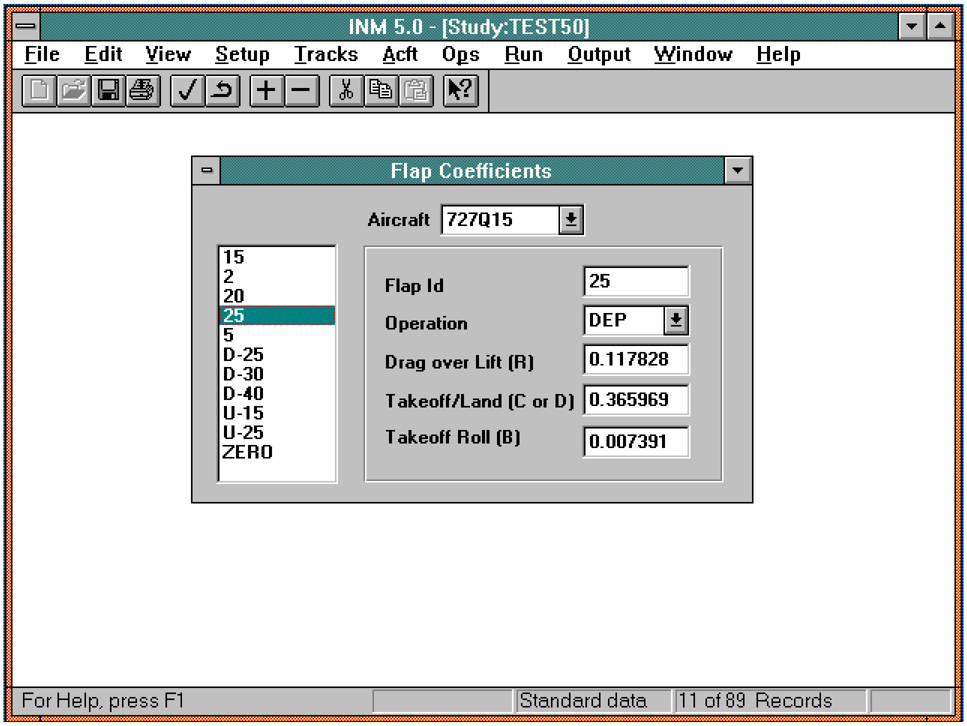
1. The first step can be any of the three.
2. Level can be followed by Level, Descend, or CruiseClimb.

3. Descend can be followed by Level.
4. CruiseClimb can be followed by Level.
5. The last step can be any of the three.

You input parameters for Level and Descend steps the same as discussed above for Approach and Depart procedures.

For a **CruiseClimb** step, you select a flaps identifier (usually "ZERO"), and you input the final altitude, the climb speed, and the climb angle for the segment. If a Level step follows, it must have the same altitude and speed. For a CruiseClimb step, 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 because Climb steps are used after takeoff when near-maximum thrust is applied. At cruise speed, less thrust is used in climbing from one level to another.



8.9 Flap Coefficients

Menu Item: Acft // Flap Coeff

Generally, you should not change or add Flap Coefficient records. These empirical data 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 your own coefficients, you need to follow the procedure described in SAE-AIR-1845.

If you accidently change or add records, "User data" appears on the status bar at the bottom of the main window. You can delete these user-generated records, one by one, or you can get into the File Manager and delete the entire FLAPS file from your Study directory. Either way, INM will use Standard coefficients the next time it is run.

Several Standard Aircraft do not have flap coefficients. INM supplies Standard Profile Point data for these Aircraft.

Flap coefficients depend on the type of operation (Approach or Depart) 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 still up during descent; the prefix "D" means that the gear is down. Sometimes a Departure flaps identifier is used in an Approach Procedure. 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 completely retracted.

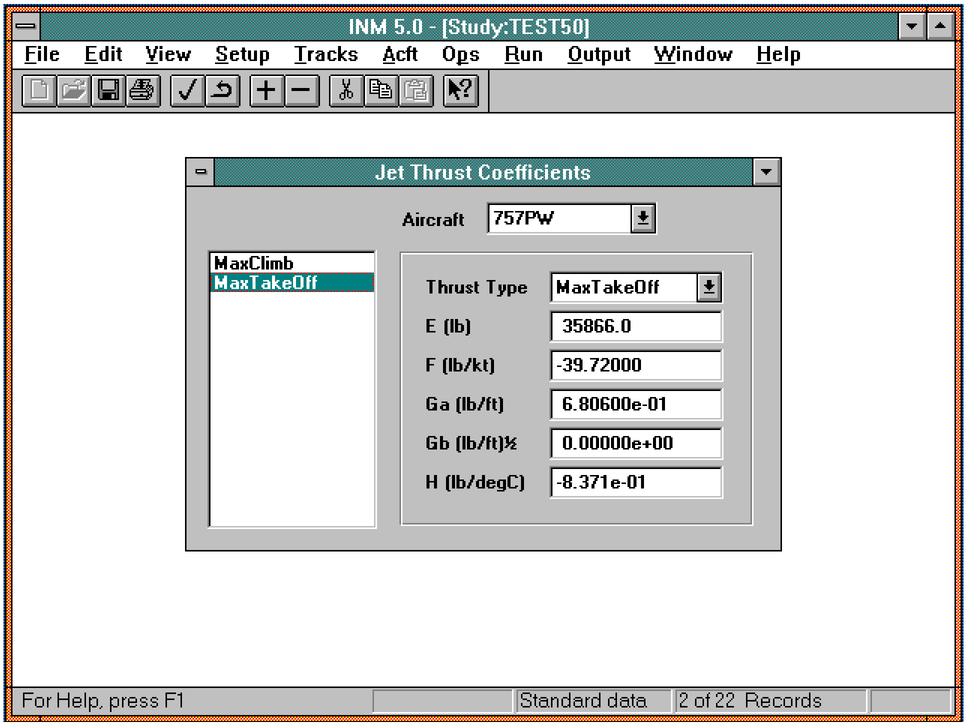
The drag-over-lift ratio (R) is used in SAE-AIR-1845 equations involving climb and acceleration.

The takeoff-speed coefficient **8** and the landing-speed coefficient (D) are used to calculate speed as a function of the square-root of the aircraft weight:

Takeoff $V_C = C \text{ sqrt}(W)$,
Landing $V_C = D \text{ sqrt}(W)$,

where V_C is the calibrated airspeed in knots, and W is the aircraft weight in pounds. Flap identifiers with the prefix "D" are D-coefficients, and the others are C-coefficients. Notice that some of the C/D coefficients are zero; this means that the flaps identifier <u>cannot</u> be used for takeoff or landing Procedure Steps.

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



8.10 Jet Thrust Coefficients

Menu Item: Acft // Jet Coeff

Generally, you should not change or add Jet Thrust Coefficient records. These empirical data are derived from measurements of actual aircraft flight dynamics. If you want to derive your own coefficients, you need to follow the procedure described in SAE-AIR-1845.

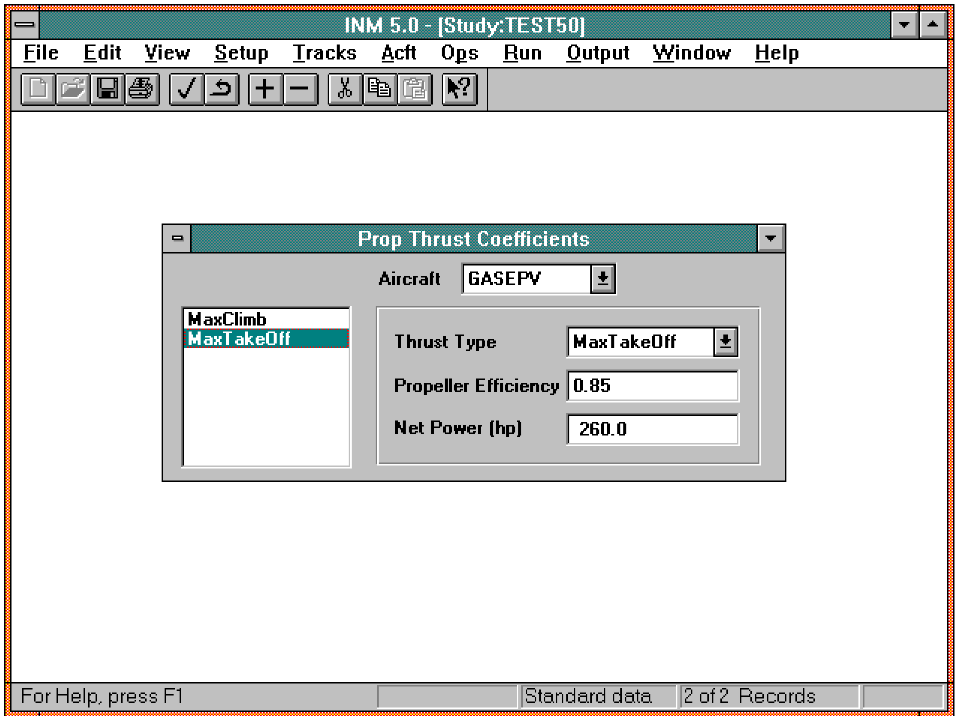
There are usually two Jet Thrust Coefficient records per Aircraft, one for MaxTakeoff thrust and one for MaxClimb thrust. One aircraft (727QF) has three records; the third thrust type is called MaxContinue for "maximum continuous" thrust. Several Standard jets do not have thrust coefficients. INM supplies Standard Profile Point data for these Aircraft.

You need to input three of the coefficients (G_a, G_b, H) in scientific notation (e.g., "1.223e-5", meaning 1.223 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:

$$F_n/d = E + F V_C + G_a A + G_b A^2 + H T ,$$

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



8.11 Prop Thrust Coefficients

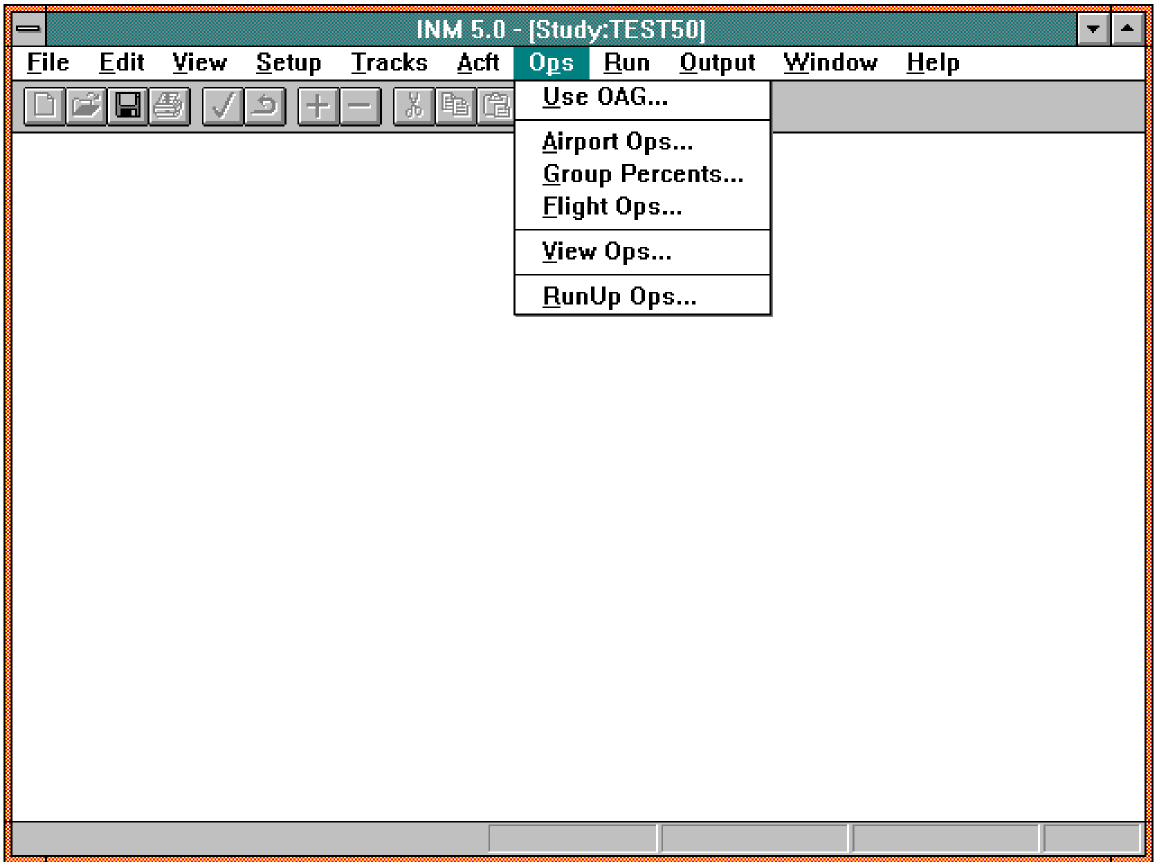
Menu Item: Acft // Prop Coeff

Generally, you should not change or add Prop Thrust Coefficient records. These empirical data are derived from measurements of actual aircraft flight dynamics. If you want to derive your own coefficients, you need to follow the procedure described in SAE-AIR-1845.

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

$$F_n/d \;=\; (\, 325.87\ E\ P\ /\ V_T\ )\ /\ d\ ,$$

where F_n is net thrust per engine in pounds, d 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 in horsepower, and V_T is true airspeed in knots.



9 OPERATIONS MENU

The Ops menu provides functions to input flight and run-up operations, calculate flight operations from "percentage" data, and view filtered and summaries of flight operations.

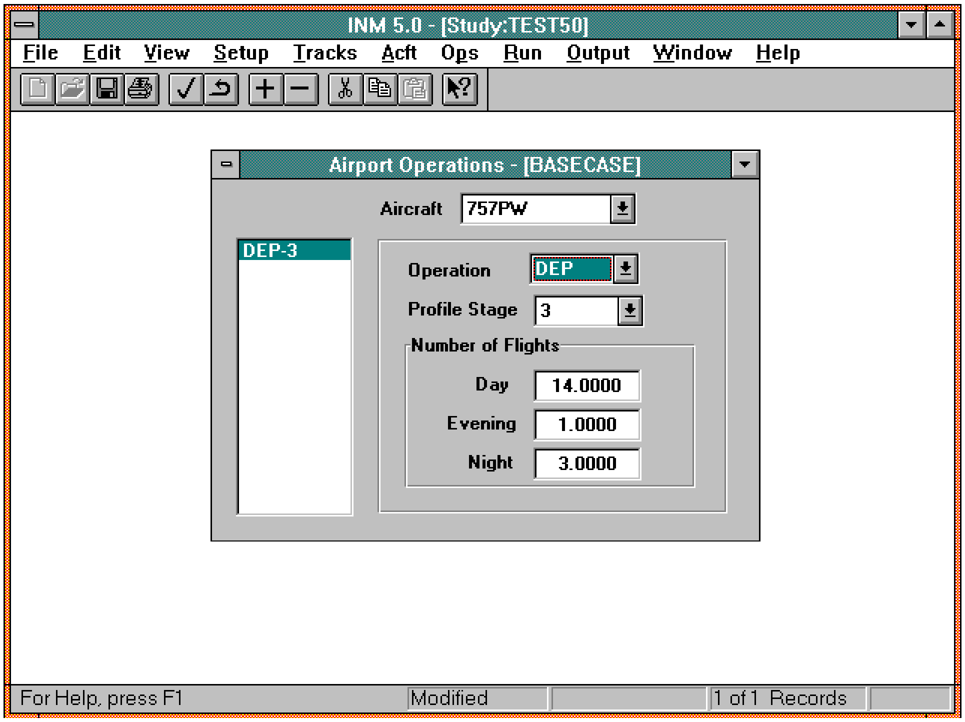
9.1 Use OAG Airport Operations

Menu Item: <u>Ops // Use OAG</u>

This function (1) copies an OPS_APRT file from the Study directory into a Case subdirectory, and (2) automatically adds Standard Aircraft to your Study that are in the OPS_APRT file but not yet declared in the Study. Before using this function, you need to purchase OAG data and run the OAG Source Data Processor (see Section 14.5). The OAG processor creates a file contains OAG scheduled flight operations that have been formatted as OPS_APRT records, including the translation of OAG aircraft identifiers into INM Standard Aircraft identifiers.

After you copy the OPS_APRT file into a Case subdirectory, you can edit it using the Ops // Airport Ops function. This will be necessary because translation of OAG to INM aircraft may be somewhat different for your particular Study and Case than that provided by the OAG processor. Also, OAG data contain only scheduled flights, not cargo, charter, general aviation, and military flights.

Although the purpose of this function is to bring OAG data into a Case, you can, if you wish, create your own OPS_APRT file, put it in the Study directory, and load it using this function, thereby automatically loading Aircraft at the same time. You must use only Standard Aircraft, however.



9.2 Airport Operations Data

Menu Item: Ops // Airport Ops

This function, along with the Ops // Group Percents function below, is used to input "operations-by-percentage", as the input method was called in previous versions of INM. Flight operations are specified for the airport-as-a-whole, meaning that they are not assigned to individual Runway Ends and Tracks. An airport flight operation is identified by Aircraft identifier, operation type, and Profile stage identifier.

There are several ways to create Airport Operation records. One way is to just start adding records with the Edit // Add Record function. Another way is to create an OPS_APRT file by using a DBMS or spreadsheet program. Another way is to purchase OAG data, create a file with the OAG Source Data Processor (see Section 14.5), and copy it into your Case subdirectory with the Ops // Use OAG function (see Section 9.1).

When adding or editing Airport Operation records, you can select Aircraft identifiers and Profile stage numbers from lists. If the item you want is not on the list, you need to create it in another window. For example, if you need a particular Aircraft, you can add it in the Aircraft window, or you can bring it in from the INM system by using the Setup // Aircraft function.

For the standard use of INM, the "number of flight operations" are for an average 24-hour day, and the "average 24-hour day" is derived from operations for one year. Please note that the definition of Standard noise Metrics, such as DNL, <u>require</u> a 24-hour time period, not some other period.

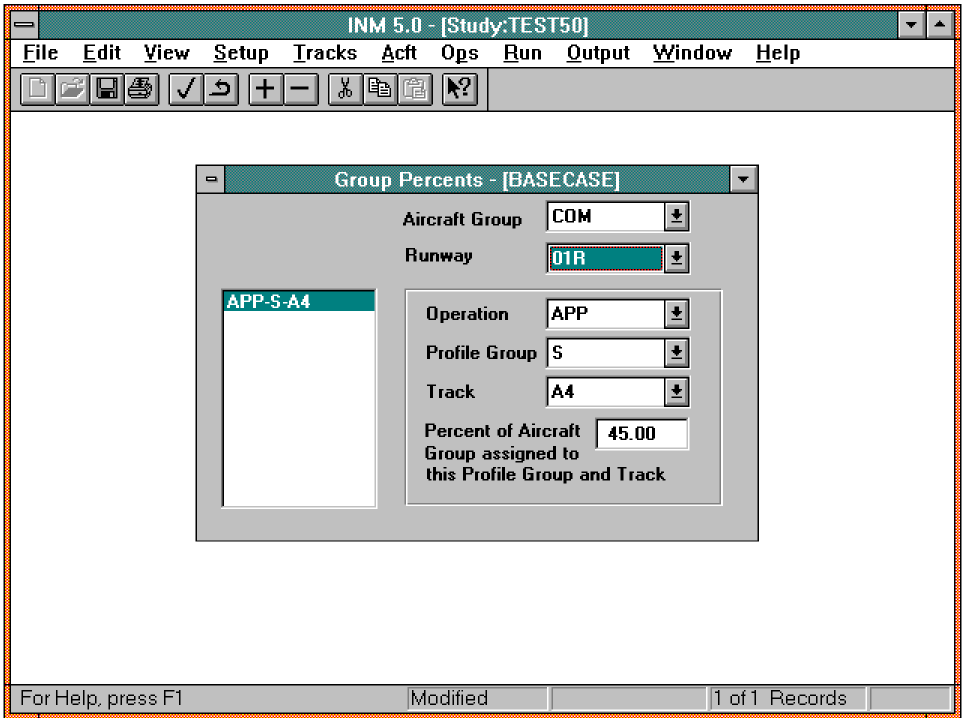
Daily flight operations are divided into three time periods: day, evening, and night. In the U.S. and for the standard use of INM, these time periods are defined relative to airport local time as:

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

You do not to have use these specific time periods -- day, evening, and night are simply the names of three time periods. The number of flights that you assign to a time period is what really gives it meaning. If you change the implicit number of hours in these time periods, you need to make sure that you define compatible noise Metrics (see Section 6.4).

You can input average operation numbers to four decimal places, which is two more decimal places than available in previous versions on INM.

Once an Airport Operation record exists, you cannot delete a record that is associated with it. This is a safety measure which helps maintain the integrity of the Study and Case databases. For example, you cannot delete Aircraft "XYZ" when an Airport Operation record is using "XYZ". You must first delete all references to "XYZ" in Airport Operations (Flight Operations and Run-up Operations), and then INM will let you delete the Aircraft record.



9.3 Aircraft Group Percents Data

Menu Item: <u>Ops // Group Percents</u>

This function, along with the Ops // Airport Ops function above, is used to input "operations-by-percentage" data. Data in the Group Percent records specify how the operations for the airport-as-a-whole are distributed among runways and tracks. The idea is that a "group" of Aircraft uses a given Track a certain percentage of the time. For example, the "COM" group could use Track "09L-DEP-TRK1" 80% of the time, and use "13-DEP-TRK5" 20% of the time. INM computes the actual number of operations for each Aircraft-Track combination based on these percentage values.

All Group Percent records that have the same <u>aircraft group identifier</u> and <u>operation type</u> 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.

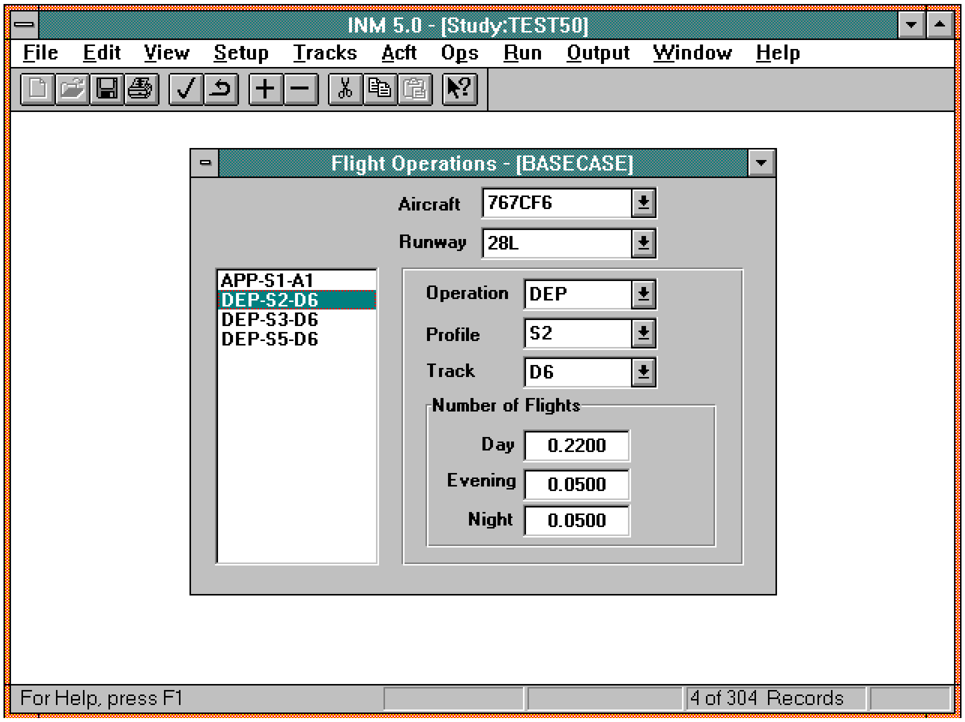
When you create a Group Percent record, you first select an aircraft group identifier. These identifiers are under your control, but they cannot be changed in the Group Percents window. Instead, you assign a user-defined, 3-character aircraft group identifier to individual Aircraft in the Acft // Aircraft window (see Section 8.1). After selecting an aircraft group identifier, you 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.

An INM Track (single or dispersed) is uniquely identified by three values: Runway End identifier, operation type, and Track identifier. You specify these three and one more: the Profile group identifier. The reason for specifying the Profile group is so that you have control over the kind of Profile flown on a Track. For example, you may want only close-in NADPs on a particular track.

The problem with you being able to control the Profile group on a Track is that when INM expands Airport Operations, the specified Aircraft may not have the required Profiles. For example, you put Aircraft XYZ into aircraft group ABC, and you assigned 30% of ABC to a specific Track and to the C-group of Profiles. But what if Aircraft XYZ does not have any C-group Profiles defined? INM cannot detect this problem until it computes Flight Operations; INM can only guarantee that at least one aircraft in the ABC group has C-group Profiles defined.

When INM does detect the problem, it does two things: (1) no record is produced for the XYZ-C case, and (2) a message is written to the error file "OPS_CALC.ERR" in the Case subdirectory. The message in the error file alerts you to the problem. You need to take care of the problem by adding a C-group of Profiles to the XYZ Aircraft, or by defining aircraft group ABC 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 records. This is because 30% of Aircraft XYZ operations do not appear on the specified Track and Profile group.

Please note that if you use only INM Standard data, the above problem does not occur because there is only one kind of Profile group -- the S-group.



9.4 Flight Operations Data

Menu Item: Ops // Flight Ops

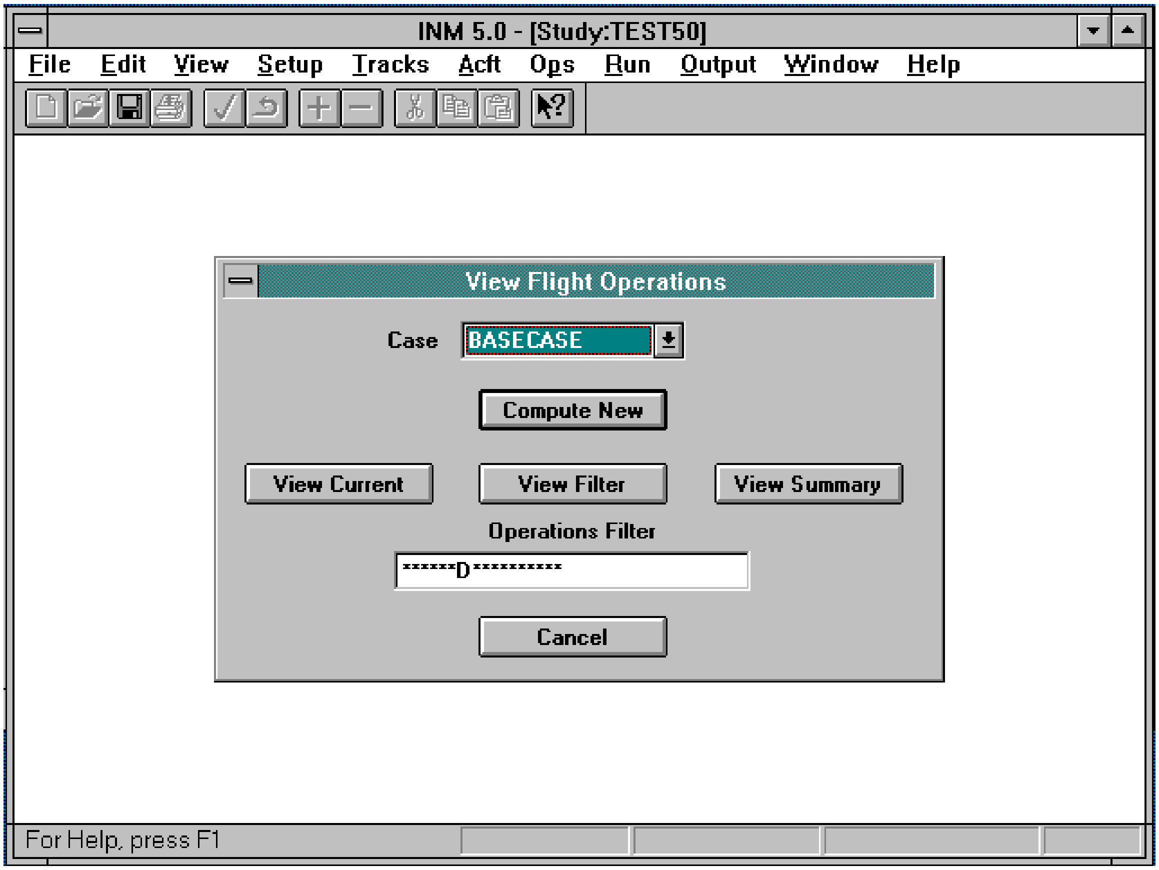
This function is used to input "operations-by-frequency", as the input method was called in previous versions of INM. Flight Operations data are at a detailed level, meaning that numbers of flights are assigned to individual runways and tracks. Flight Operations are identified by Aircraft, operation type, Profile group and stage, Runway End, and Track identifier.

There are several ways to create Flight Operation records. As with Airport Operations, you can add records with the Edit // Add Record function, or you can directly create an OPS_FLT file by using a DBMS or spreadsheet program. In addition, you can use the INM Text Input Source Data Processing function (see Section 14.2). You create a formatted text file of Flight Operations, and INM produces the OPS_FLT file.

When adding Flight Operations, remember that you must have both a Track and a Profile already defined, for the given type of Operation (e.g., OVF), before INM will allow you to add a Flight Operation.

You can input both "operations-by-percentage" and "operations-by-frequency" records for the same type of operation (unlike previous versions of INM). Usually, you would use this feature to distribute one group of Aircraft by percentages, while detailing another group. For example, you could use "percentage" on general aviation Departure operations and "frequency" on commercial Departure operations. In this way, you are not specifying the same records by two different methods.

Please be careful not define the same operations by both methods because you will end up with too many flights.

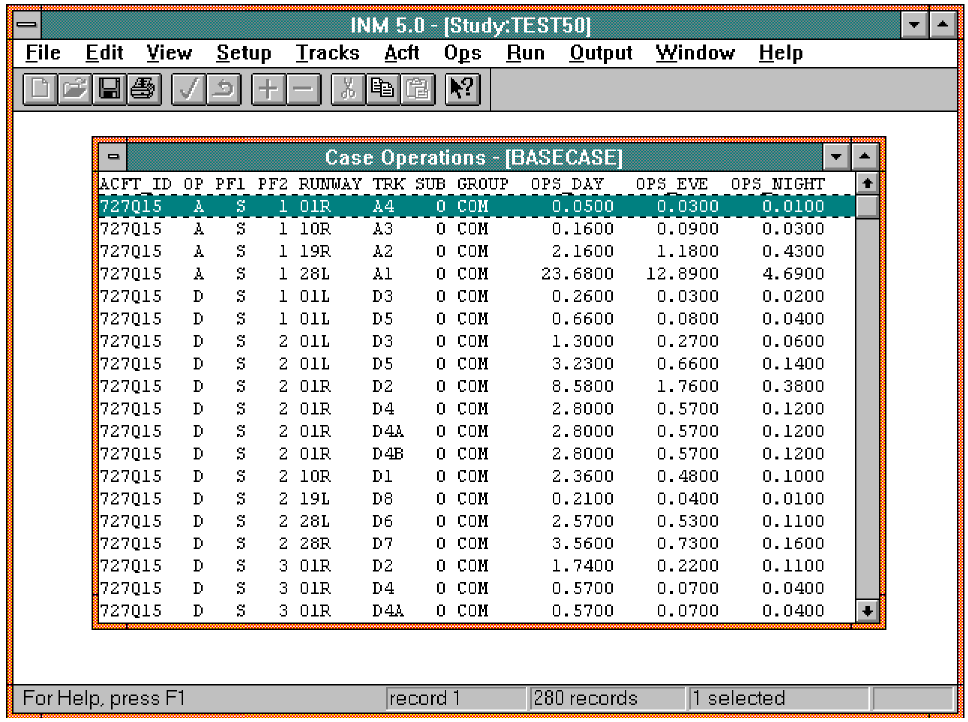


9.5 View Flight Operations

Menu Item: Ops // View Ops

This function lets you to view calculated Flight Operations for a given Case. INM compiles these records from Flight Operations data that you input by using the Ops // Flight Ops function, plus data that INM computes from Airport Operations, Group Percents, aircraft Substitutions, and dispersed Tracks. INM saves the calculated Flight Operations in the OPS_CALC file. If errors are generated during the calculation, INM writes them to the OPS_CALC.ERR file in the Case subdirectory.

The system will prompt you when the current set of calculated operations may not accurately reflect all of you input flight operations data (i.e., when the data have been modified subsequent to the last calculation); you may either recompute the operations, or view the existing data without the most recent changes). Note that sometime the prompt will be displayed even when you have not changed data that directly effect calculated operations.



9.5.1 Compute New Flight Operations

Press the "Compute New" button to compute and view a new set of Flight Operation records. For example, you can change data in Group Percents and see the change it makes in the final set of Flight Operation records. INM automatically calls this function before computing noise or writing an Echo Report, so that the Flight Operations are up to date.

9.5.2 View Current Flight Operations

Press the "View Current" button to view the current set of calculated Flight Operation records for a given Case. You can print the records, or a subset of the records, to a printer by using the File // Print function. You can export the records, or a subset of the records, to a file by using the File // Export As function. You can copy the records to the Windows Clipboard as text with the Edit // Copy function.

9.5.3 View Filtered Flight Operations

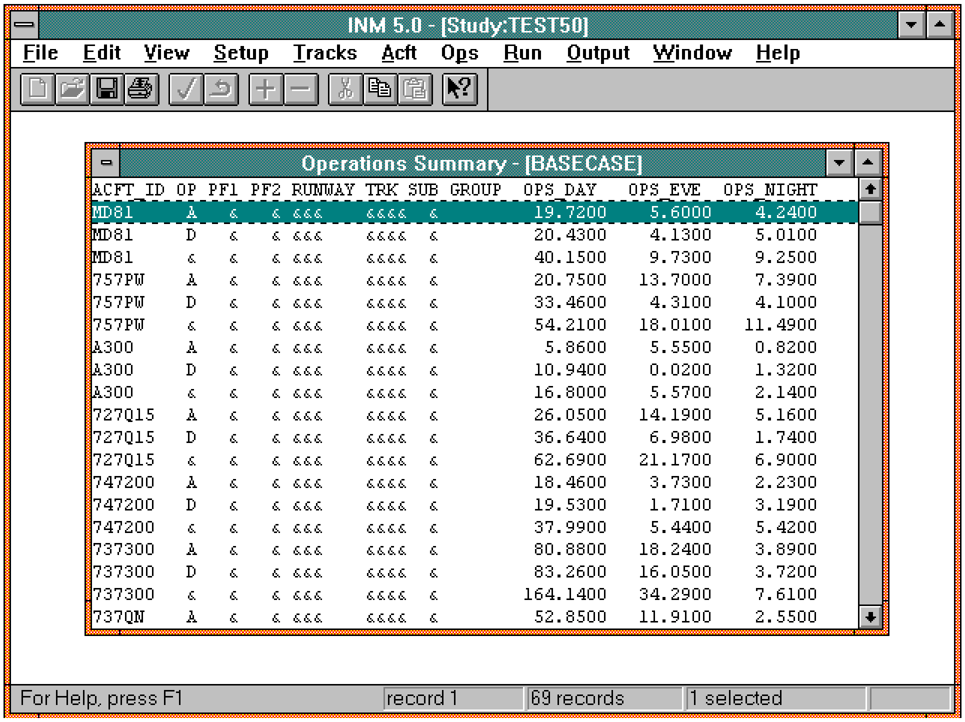
There can be a very large number of calculated Flight Operation records. You can view a subset of these records by first editing the filter command, and then pressing the "View Filter" button. The filter command is composed of the follow characters:

Start position	Number of characters	Field
1	6	Aircraft identifier (e.g., "DC930 "). If necessary, type blanks at the end to fill out 6 characters.
7	1	Type of operation (A = Approach, D = Depart, T = Touch-and-Go, V = Over-Flight).
8	2	Profile identifier (group and stage identifiers, e.g., "S5")
10	3	Runway End identifier (e.g., "27R"). If necessary, type blanks at the end to fill out 3 characters.
13	4	Track identifier (e.g., "TR07"). If necessary, type blanks at the end to fill out 4 characters.
17	1	Sub-Track number (0 to 8).

Use an asterisk "*" to indicate a "wild card", which will match any field value. You do not have to add asterisks to the end of the filter command; INM assumes that the filter command is filled with wild cards on the end.
Here are some examples:

7	Get all records with Aircraft identifiers starting with "7" (727Q15, 747200, etc.).
******A	Get all approach records.
******A**27R	Get all approaches to 27R.

You can use the filter function to view groups of records to see how INM computed Flight Operations using Airport Operation, Group Percents, Substitutions, and dispersed Tracks.



9.5.4 View Flight Operation Summary

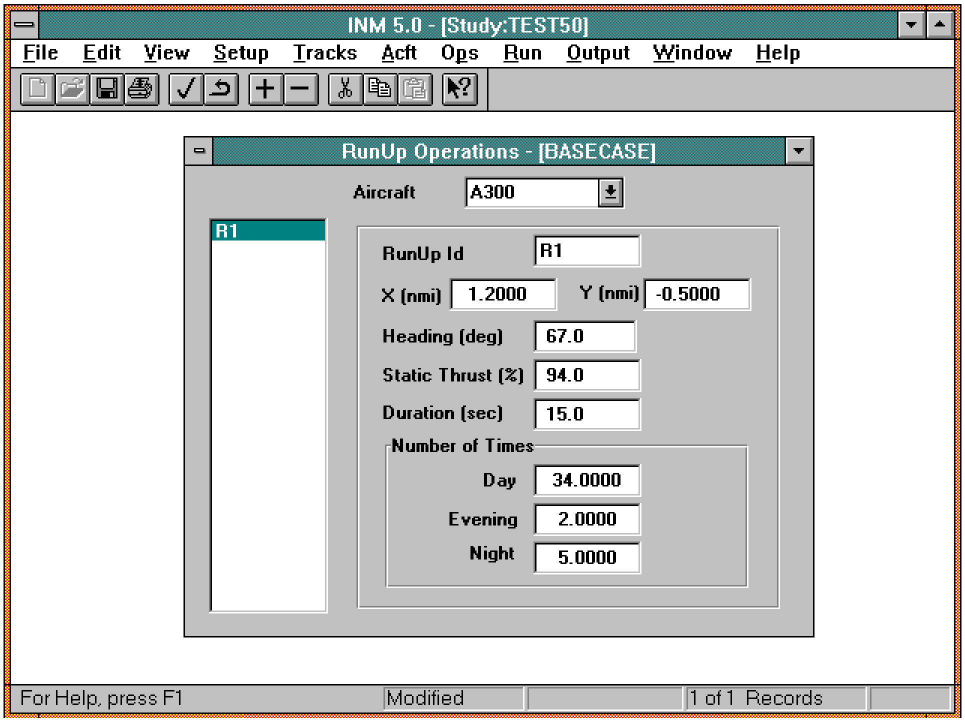
After computing a set of Flight Operations, press the "View Summary" button to view aggregates of day, evening, and night operations. Each row in the Summary window represents a summation across a set of Flight Operations records. The fields that are common to members of the set are indicated with an ampersand "&". Flight Operations are aggregated in the following ways:

1. Aircraft operations summed across Profiles, Runway Ends, and Tracks. Examples: the total number of 727Q15 departures; and the total number of 727Q15 operations of any kind.

2. Operations on Runway Ends and Tracks 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.

3. Operations 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: Do the average number of approaches to a given runway match the real operational data? Do the average number of departures equal the average number of arrivals?



9.6 Run-Up Operations Data

Menu Item: Ops // RunUp Ops

You use this function to input Run-Up Operations for a specific Case. First, select an Aircraft identifier and input a 2-character run-up pad identifier.

The position of the Aircraft is specified by X and Y coordinates. If you do not know the coordinates, you can use the View // Geo Units function in the Input Graphics window to change to X,Y values in nautical miles, position of mouse pointer on the run-up pad, and read the X and Y values off of the status bar.

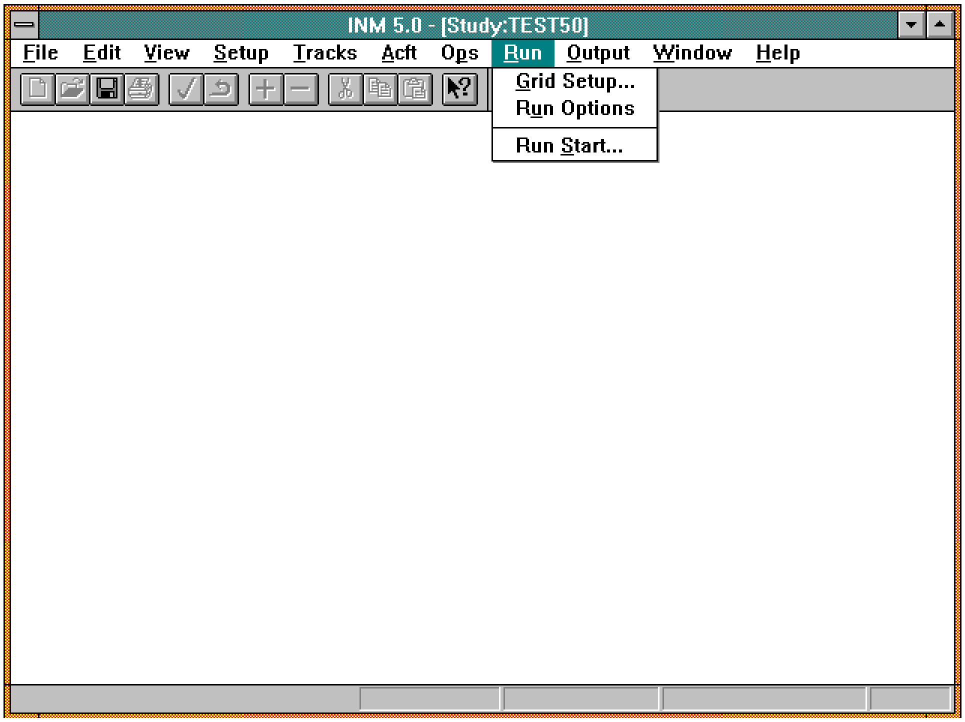
INM uses a directivity pattern to calculate noise (the same one as used for takeoff), so you also need to input the true heading of the airplane on the pad. Heading is measured in degrees clockwise from the Y-axis (true north).

Noise exposure for a run-up event is determined by an average thrust setting for an given duration. You input the <u>percent</u> of thrust, and INM calculates the thrust parameter that is used to access the Noise tables. (This is similar to using a percentage value for reverse thrust an taxi thrust in Approach Procedures.)

For Aircraft that do <u>not</u> have a value for 100%-thrust, which includes most of the Standard Aircraft (see Section 8.1), INM uses the "static thrust" parameter in the Aircraft record as the base thrust that multiplies the input percentage. For Aircraft that do have a value for the 100%-thrust parameter, INM uses your input percentage value to directly access Noise (i.e., there is no intervening calculation).

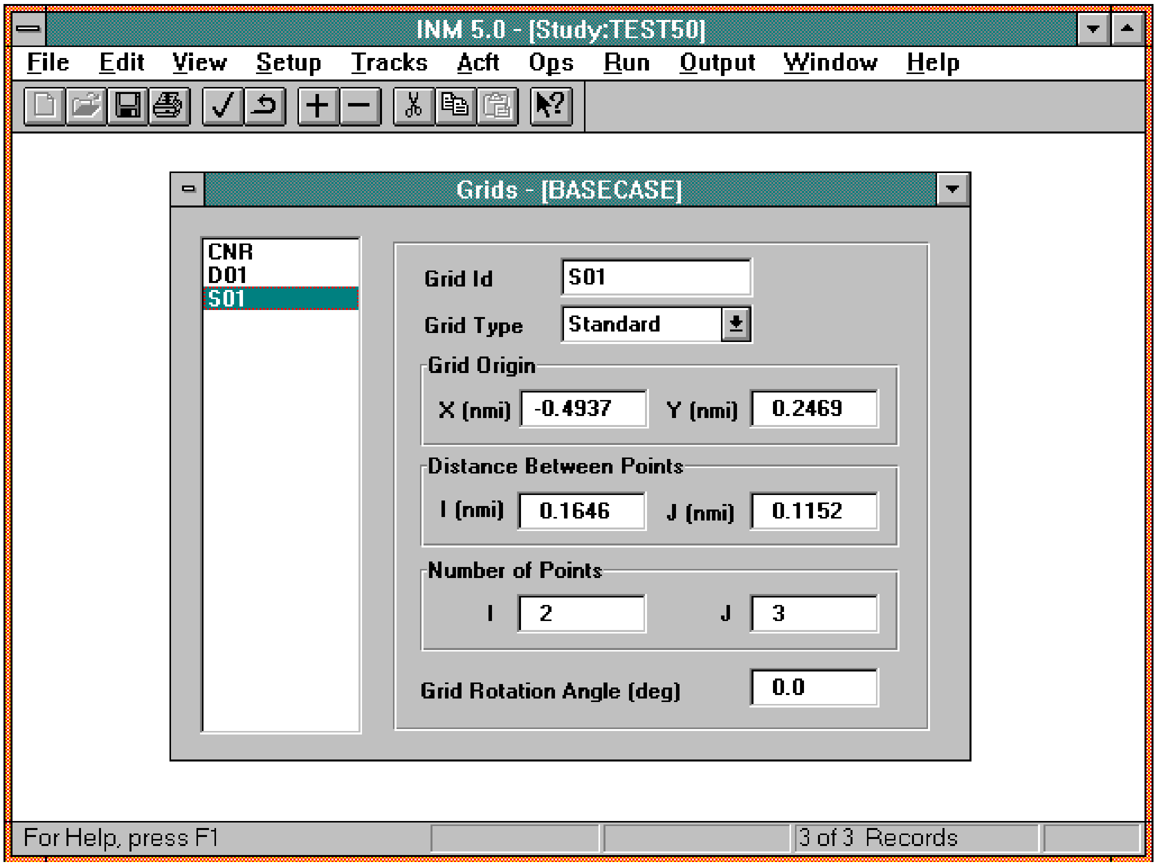
The run-up duration is the time that the average thrust is in effect, and it is measured in seconds.

Finally, you input the number of times the run-up event occurs during the day, evening, and night time periods.



10 RUN MENU

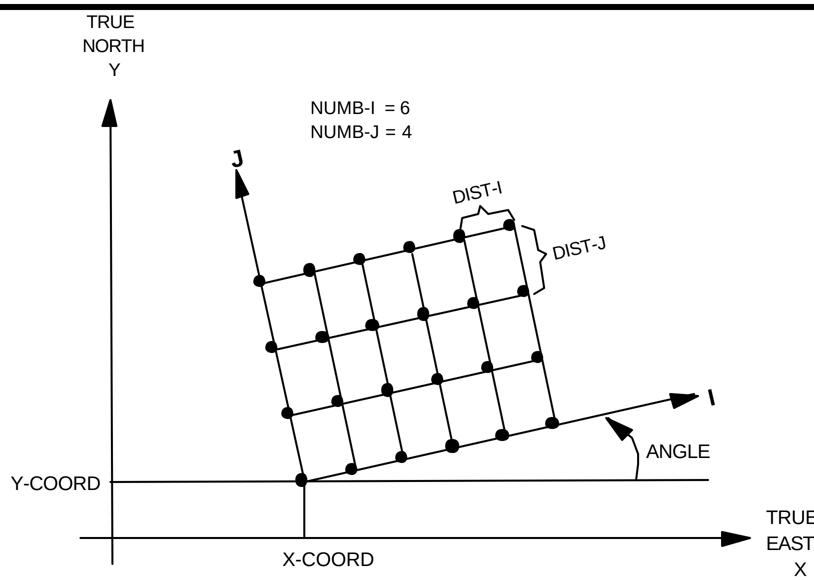
The set-up functions include defining grids and setting run options. The execution functions include launching one or more Cases and managing runs in progress.



10.1 Grid Setup

Menu Item: Run // Grid Setup

This function is used to define various kinds of grids that are used in calculating noise metrics. You must define at least a contour-type grid before you can run your Case. Each Case has its own set of grids. If you want to use the same set of grids for several Cases, you can use the Setup // Case Copy function to copy one Case to another or the Edit // Copy and Paste functions to copy records.



A grid is a rectangular array of points. A grid can be rotated relative to the X,Y coordinate system; and because it can be rotated, grid coordinates I,J are differentiated from Study coordinates X,Y. 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. You specify a grid by:

> X,Y values of the lower-left corner point (rotation is around this point),
> Distances between neighboring points along the I and J axes,
> Numbers of points along the I and J axes,
> Rotation angle (degrees counter-clockwise from the X-axis to the I-axis).

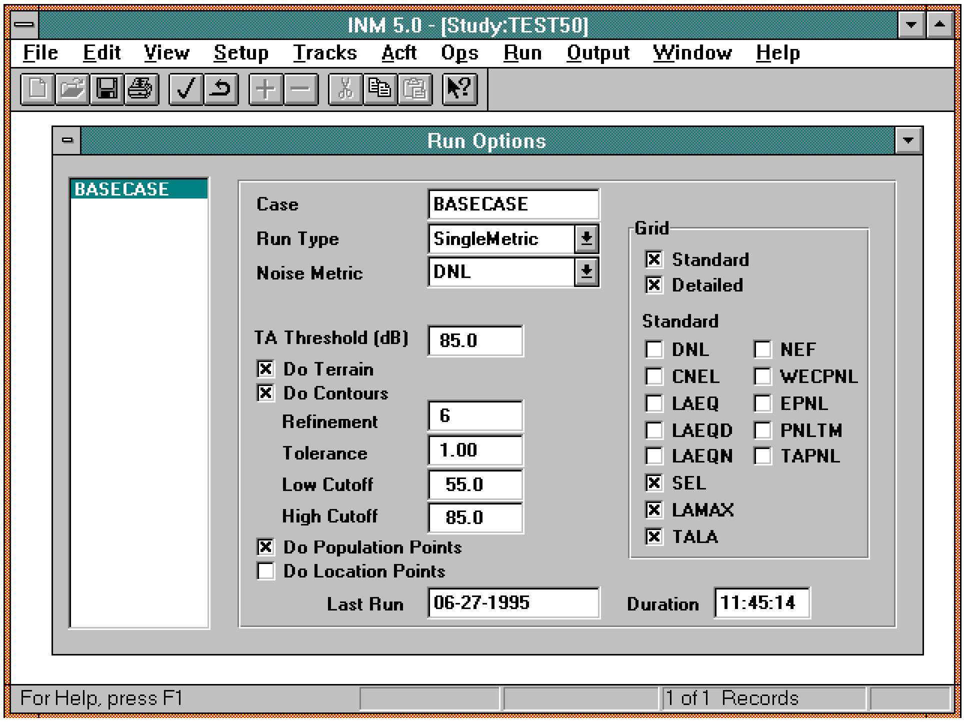
There are three kinds of grids: contour, standard, and detailed.

A "<u>contour</u>" grid is used to define four corners of a rectangle. INM produces noise contours inside of this rectangle (it was called a "contour window" in previous versions of INM). You should define only one contour grid per Case, and there should be two points in the I and J directions (i.e., the corner points). Contour grids cannot be rotated. When you add a record, INM creates a default, un-rotated, square contour grid, 16 nmi on a side, and centers it on the X,Y coordinate origin. You can override the default contour grid by changing its parameters.

A "<u>standard</u>" grid is used to create a concise noise analysis, in a manner that is similar to previous versions of INM. For a standard analysis at a point, INM computes up to 14 noise metrics (the user-defined Metric and 13 Standard Metrics, see Section 11.5).

A "detailed" grid is used to create an extensive noise analysis. For a detailed analysis at a point, INM computes and saves various geometric and acoustic measures for each Flight Operation (see Sections 11.5 and 11.6).

You can have any number of standard and/or detailed grids per Case. However, please be aware that 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.



10.2 Run Options Case Setup

Menu Item: Run // Run Options

You use this function to setup run options before running a Case. You can run INM in two modes. The first type of run is called "SingleMetric", and it is essentially the same as in previous versions of INM. You define which noise Metric you want to compute. In this run mode, INM can compute contours, standard grids, detailed grids, population points, and/or location points, all in one pass.

The second type of run is called "MultiMetric". It is used for computing contours only. You specify which noise family you want (A-weighted or Perceived) and INM calculates and saves enough information to later construct any noise Metric that belongs to that noise family.
The advantage of the MultiMetric mode is that you do not have to run INM over and over to get different kinds of contours (e.g., DNL, LAMAX, and

TALA) for the same Case. A MultiMetric run saves a large amount of computing time if you need multiple Metric contours. If you do not need multiple Metrics, or if you do need grids and/or points, you should run in the SingleMetric mode. A MultiMetric run takes longer than a SingleMetric run; however, it takes less time than two SingleMetric runs.

In setting up SingleMetric run options, you select a noise Metric from the list. The list includes the 13 Standard Metrics (see Section 6.4), and any other Metrics that you may have created. If you are computing a Time-Above Metric, you also need to input the threshold level above which time is accumulated.

Check the Do-Terrain box (i.e., click an "X" into the box) if you have a terrain elevation file (extension "3CD") in your Study directory, and if you want it to be used for the run. As in INM 4.11, INM 5.0 uses terrain elevation data to compute the distance from a ground observer to an airplane. Also, INM computes the angle from the ground surface to an airplane for the purpose of applying the "lateral attenuation" adjustment to the observed noise level. You can create a terrain elevation file by purchasing terrain elevation data and using the Terrain Source Data Processor (see Section 14.3).

If a terrain file is not used for a run, INM assumes that the ground around the airport is completely flat, and that it is at the same elevation as the Study elevation (even though the Runway End elevations may be slightly different). INM will run faster without using a terrain elevation file.

Check the Do-Contours box if you want INM to calculate contouring grids for the specified Metric. INM uses a recursively subdivided grid method to calculate data for contours. Areas where the noise changes substantially are divided into small grids, whereas areas where there is little change are left undivided.

You can control the size of the smallest contouring grid with the "refinement" parameter. If the distance between corner points of the contour grid is called "D" , the size of the smallest grid is ($D / 2^{N+1}$), where "N" is the refinement number.

You can control the process of subdividing a contouring grid with the "tolerance" parameter. If the tolerance is small, INM will be more sensitive to changes in the noise Metric over an area and will be more likely to divide a grid.

Tolerance is in decibels for noise level Metrics, and is in minutes for Time-Above Metrics.

For SingleMetric or MultiMetric runs, the combination of a large refinement number and a small tolerance level causes INM to calculate more contouring grid points, resulting in a longer run time, but producing higher-fidelity contours. Please be aware that very finely subdivided areas may cause COMP50 (the noise-calculation module) and/or NMPLOT (the contouring program) to run out of computer memory. You may have to upgrade to the NT operating system with 32 Mb of memory to use certain combinations of refinement and tolerance.

For a SingleMetric run, the two "cutoff" parameters also control contour fidelity and run time. Contouring grids that have noise values lower than the "low cutoff" level are not subdivided, and contouring grids that have noise values higher that the "high cutoff" level are not subdivided. Because of this feature, the "valid noise area" for computing contours (for a SingleMetric run) is the area that lies between the low-cutoff and high-cutoff contour levels.

A MultiMetric run does not use cutoff tests, and the valid noise area for computing contours encompasses the whole area around the airport.

Check the Do-Population-Points box if you have a POP_PTS file in your Study directory, and if you want noise Metric values calculated at the points. "Population points" are located at the centers of census blocks, which for densely populated areas, correspond to city blocks. You can create a POP_PTS file by purchasing U.S. Census data and using the Census Population Point Source Data Processor (see Section 14.4). Please be aware that a POP_PTS file can be very large, and it may take a very long time to compute noise values at all of the points.

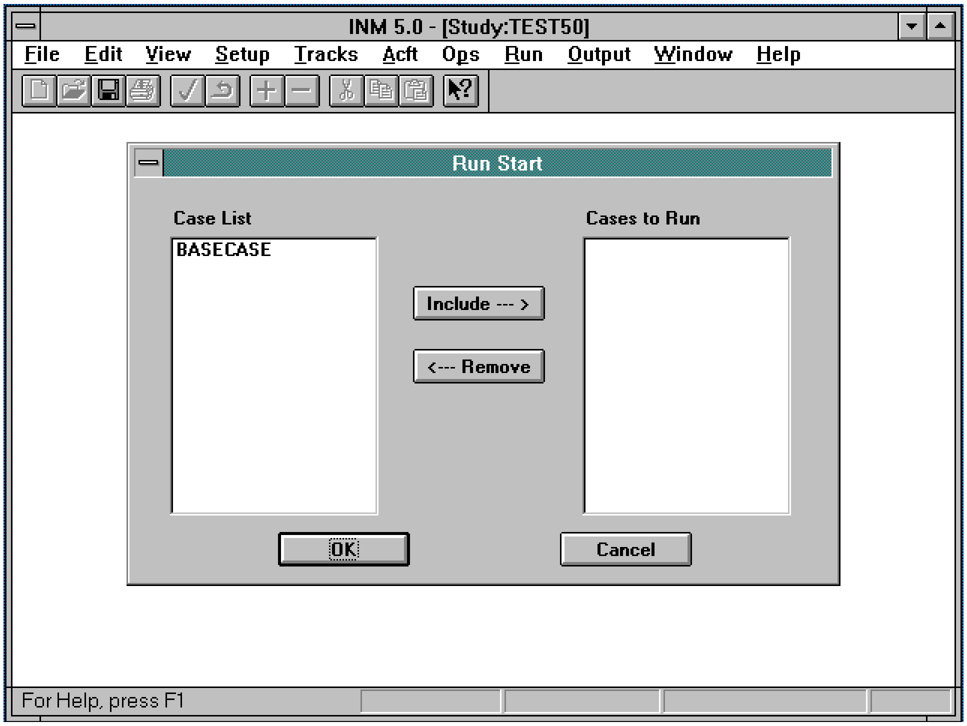
Check the Do-Location-Points box if you have a LOC_PTS file in your Study directory, and if you want noise Metric values calculated at the points. "Location points" are navaids, fixes, and special noise-sensitive locations around an airport, such as schools, hospitals, etc. You create the LOC_PTS file when you setup a Study, and you can add to it by entering data into the Setup // Locations Points window. You could also use a DBMS program, a spreadsheet program, or the INM Text Input Source Data Processor (see Section 14.2.6) to build a file of Location Points.

If you use a terrain file and calculate location points that include navaids and fixes, you may get an error message saying that a point is outside of the 1-deg by 1-deg area of the terrain file. In mid-latitudes the allowed area corresponds to a bounding box that is about 40 nmi east/west and 60 nmi north/south. You need to delete navaids and fixes that lie outside of the terrain bounding box, or turn off the terrain function.

Check the Do Standard Grids box if you previously defined one or more standard grids (see Section 10.1), and if you want noise Metric values calculated at the grid points. Up to 14 noise Metrics are calculated for a standard grid -- your selected Metric and 13 Standard Metrics. INM will always compute your selected Metric -- it is called "METRIC" in the output table. In addition, you can select Standard Metrics to be calculated. If one or more of your Aircraft is missing a noise family table (e.g., EPNL is missing), then you should turn off all of the Standard Metrics in that noise family because they will not calculate correctly.

Check the Do Detailed Grids box if you previously defined one or more detailed grids (see Section 10.1), and if you want noise Metric values and other measures calculated at the grid points. INM will automatically write records into both GRID_STD and GRID_DTL files. The reason is that detailed grid records are identified by I,J values, and you need the standard grid records to convert I,J values into the actual X,Y,Z values. (Not repeating X,Y,Z over and over in the GRID_DTL file saves space). You should have most of the Standard Metric boxes turned off, or you will get an extremely large amount of output data.

The "Last Run" and "Duration" boxes are filled with view-only information after you run the Case. The date and time of the run and the length of time for the run are written into these boxes. Once you edit an item in the window, these two boxes are cleared in preparation for another run.



10.3 Batch Runs

Menu Item: Run // Run Start

After setting up Grids and run options, you are ready to run a Case. To run one or more Cases, select them in the left-hand box in the Run Start dialog and press the "Include" button. INM moves the selected Cases to the right-hand box. Start the batch run by pressing "OK".

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, and writes the flight-path data to the FLIGHT.PTH file in the Case subdirectory. Runway and Track output graphical data are also saved at this time in file _RWY_TRK.BIN.

Then, INM displays the Run Status dialog box and starts COMP50, which is the main noise computation module. Cases shown in the left-hand box are queued up to run in the future, the Case in the center box is currently running, and the Cases in the right-hand box have already finished running. The Run Status dialog shows the progress of the runs by updating the "Percent Done" box. COMP50 may take a very long time to execute, depending on how complicated your Case is.

For a "Do-Contours" run, COMP50 first calculates 289 base points, and then it begins updating the percentage-done value as subgrid areas are processed. There are 64 subgrid areas, which are created by dividing the contour grid area into 8-by-8 subgrids. Each of the 64 subgrids is recursively subdivided into smaller and smaller areas. The number of subdivisions depends on the noise field gradients and input parameters -- refinement, tolerance, minimum cutoff, and maximum cutoff.

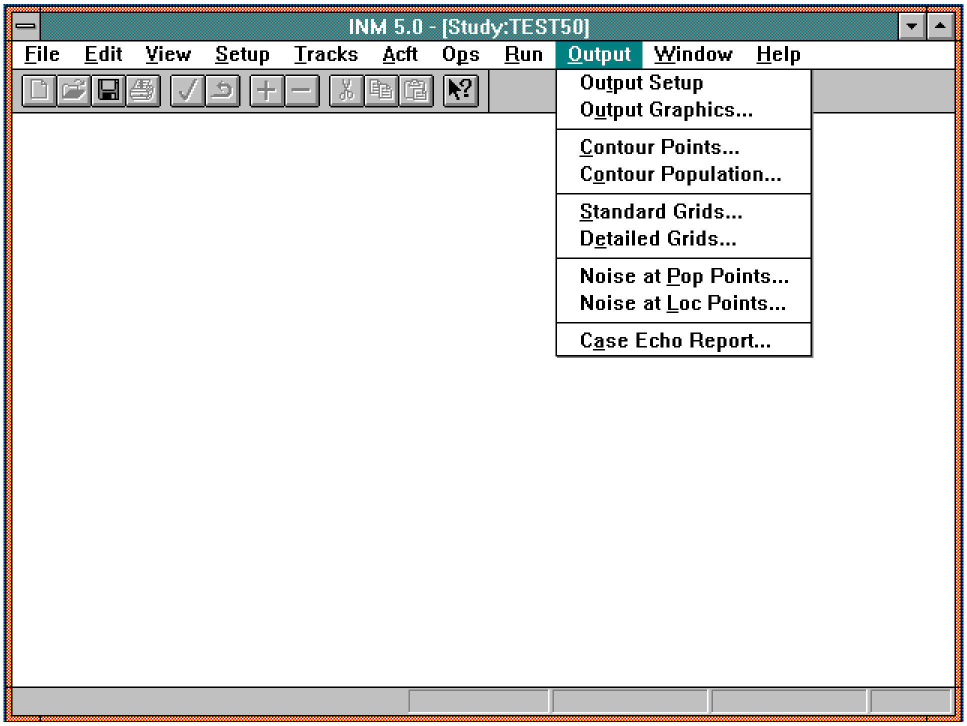
While INM-COMP50 is running, NT users can switch to a different application and a continue working, although the system response time will be slow. If the INM window is maximized, you will have to use the Alt-Tab method of switching applications. NT users cannot continue working in INM (i.e., INM is not multithreaded).

Windows-3.1 users must wait until the run is finished before using the computer again. This run behavior (NT and Windows) is because of programming constraints imposed by the Win32s software and because of extremely slow run times that were experienced when large numbers of messages were processed.

You can select the "Abort" button to stop the currently running Case. The abort event is processed when INM communicates with COMP50 (e.g., 64 times during a contouring run), so please be patient.

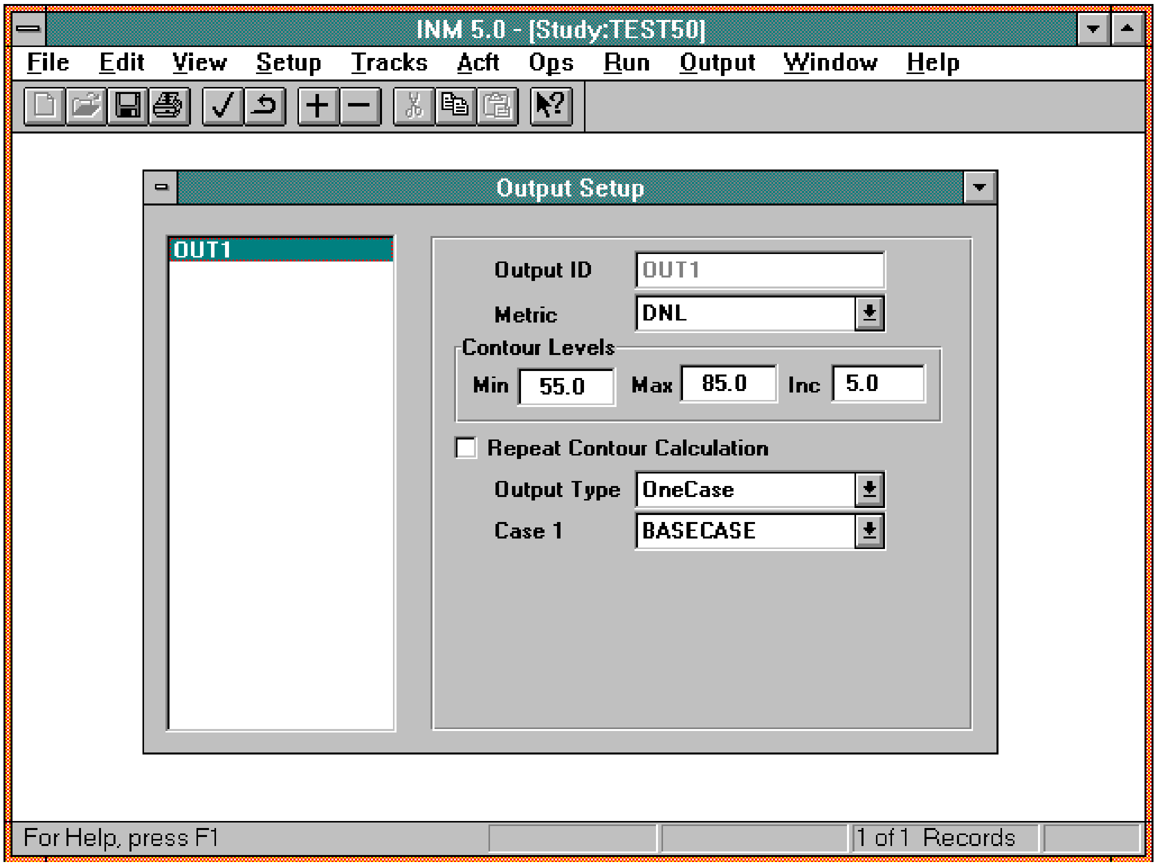
INM displays a message box if there is an error during a run. Use a text editor such as Notepad to open the FLIGHT.ERR file in the Case subdirectory to find out what went wrong. Correct the input data and try again.

After a batch of runs is finished, INM removes the Run Status dialog and unlocks the INM user interface. Now, you can go to the Output menu to view the results. Grid and noise-at-point results are stored in Case subdirectories. These kinds of output tables are available for immediate viewing. However, results relating to contours require more processing. Contour post-processing occurs when you access Output // Output Graphics, as explained in Section 11.2.



11 OUTPUT MENU

The Output menu contains functions that let you create and display various kinds of noise contours and tables of output data.



11.1 Output Setup

Menu Item: Output // Output Setup

You must create Output records before you can use the Output Graphics function. An Output record is used to create a subdirectory where noise-contour data are stored. An Output record contains the following kinds of information:

Output identifier, which is used to create the subdirectory name
Noise Metric that you want to display
Minimum, maximum, and incremental levels for contours
Type of output post-processing
Case (or Cases) that are to be processed.

For the noise Metric that you want to display, input the minimum contour level (dB or minutes), maximum contour level, and the incremental level change in between. The maximum less the minimum should be a positive integer number of increments. You can also specify the minimum, maximum, and incremental levels for computing the difference between two cases. For example, (!3.0, 3.0, 1.5) specifies 5 difference contours from -3 dB to 3 dB in increments of 1.5 dB.

INM keeps track of whether or not to post-process Case data (i.e., to run CONVERT and NMPLOT) before displaying contours. You can force INM to calculate contours again by putting an "X" in the "Repeat Contour Calculation" box.

There are four kinds of Output post-processing. The one that is similar to previous versions of INM is called "OneCase". You can also create multi-Case Output data using NMPLOT multi-case processing functions. NMPLOT Version 3.03 can process several GRD input files, producing one contour file. The Output types are:

OneCase You specify a Metric and one Case. If you select a "SingleMetric" Case, you must select the same Metric as specified in Run // Run Options.

If you select a "MultiMetric" Case, you will probably want to create several Output records, each record having different Metrics, but using the same MultiMetric Case. For example, you can create DNL "case01.dnl", SEL "case01.sel", LAMAX "case01.lmx", and TALA "case01.ta" Output records (four records) for "case01", an A-weighted MultiMetric Case. When you use the Output Graphics function, INM accesses multi-metric data stored in "case01", computes the specified contours, and stores them in the Output subdirectory.

You must have OneCase Output <u>defined and computed</u> before INM can do any multi-Case post-processing (difference, etc.). This is because INM uses the GRD files in OneCase Output subdirectories for NMPLOT processing. You create a GRD file by opening an Output Graphics window (see Section 11.3 below).

When you specify OneCase Output for a SingleMetric run, make sure that your 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.

Difference You specify a Metric and two Cases. The resulting contours represent the decibel difference between the noise surfaces in the two Cases. "Case2" is subtracted from "Case1" (e.g., Case1 ! Case2), thus if a point in Case1 is 62 dB and the same point in Case2 is 60 dB, the difference is positive 2 dB.

Please note that difference contours can have negative levels, meaning that areas in Case2 are louder than in Case1. 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, you need to make the alternative Case1, and make the base Case2.

If you use SingleMetric runs to build difference contours, please do not use or assign significance to difference contours that are outside of the valid noise area. The "valid noise area" for a SingleMetric run is the area that lies between the low-cutoff and high-cutoff contour levels. When two SingleMetric runs are used, the valid noise area for difference contours is the union of the two valid-noise areas.

Log-Add You specify a Metric and two to five Cases; their order does not matter. The resulting contours represent the sum of the noise from all of the Cases. Only areas that are common to all of the Cases are summed, so you want to make sure that your Cases use the same contour grid.

"Log-Add" means that decibels are converted to their power representations before adding, and then they converted back to decibels. For example, 60 dB plus 60 dB equals 63 dB.

You cannot use the Log-Add function for Time-Above Metrics because their values should be added without logarithmic conversion.

Merge You specify a Metric and two to five Cases; their order does not matter. The resulting contours represent noises combined from all of the Cases. When the Case contour grids overlap, the

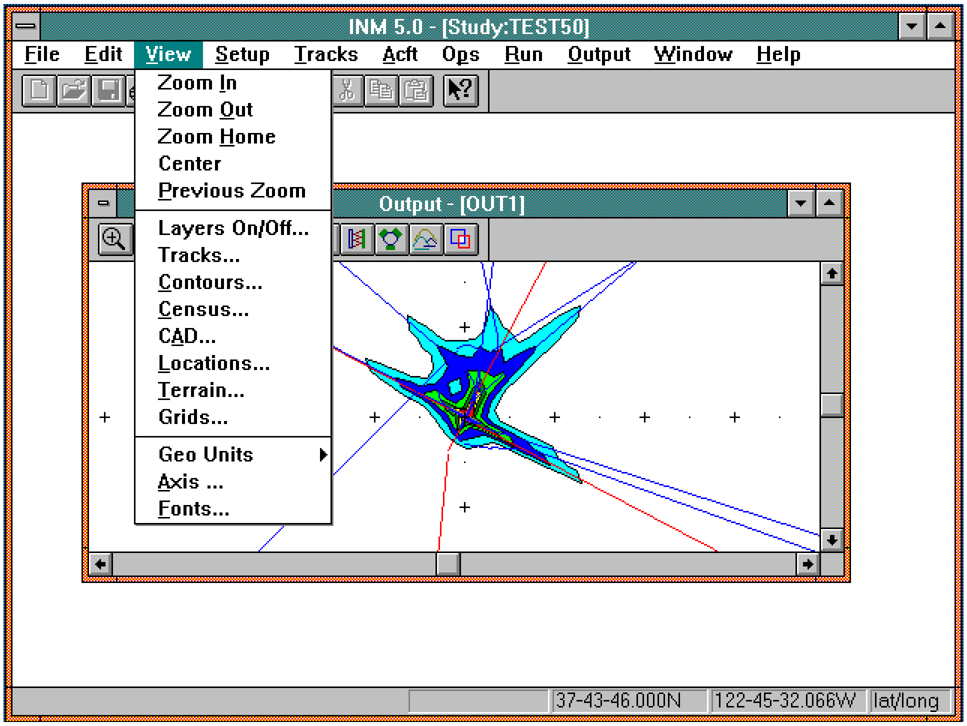
Case with the higher resolution is used. You can use this function to combine contours that were created using different contour grids, perhaps to fill in a missing piece.

Because there are both Case and Output subdirectories, an organized naming convention for subdirectories can help reduce the confusion of what is where. A suggested Output naming convention for one-Case Output is to use the Case name to indicate the source of the output data and use the extension to indicate the type of noise Metric. For Multi-Case Output names, indicate the type of post-processing (e.g., "diff" for difference) and the noise Metric. For example:

Case	Run-Type	One-Case Output	Multi-Case Output
case01	M	case01.dnl case01.lmx case01.ta	
case02	S	case02.dnl	diff01.dnl (case02 ! case01)
case03	S	case03.dnl	diff02.dnl (case03 ! case01)
case04	S	case04.dnl	diff03.dnl (case04 ! case01)
case05	S	case05.dnl	merg01.dnl (case03 + case04 + case05)

The 3-character extension indicates the Metric used in the Output subdirectory:

A-weighed:	.cnl .dnl .leq .lqd .lqn .lmx .ta .sel
Perceived:	.wec .nef .pnl .tap .epn



11.2 Output Graphics

Menu Item: Output // Output Graphics

You can use the Output Graphics function to view noise contours, flight tracks, runways, street maps, population points, airport drawings, selected location points, radar tracks, and terrain contours. You open Output Graphics windows by selecting one or more Output identifiers in the Output Select dialog.

Output Graphics windows are associated with Output subdirectories. Thus, if you want to see graphical output from one Case, a difference of two Cases, an addition of Cases, or a merging of Cases, you must first define what you want by using the Output // Output Setup function.

Before displaying one-Case Output contours, INM checks files and dates in the Output and Case subdirectories. If new Case data are present, INM initiates post-processing, which may take several seconds, or even minutes for some

Cases. INM runs the CONVERT module to convert Case data into an NMPLOT.GRD file. Then, INM runs NMPLOT to produce the CONTOURS.DAT file, which contains contour X,Y values.

If all of your noise levels are lower than the minimum contour level, NMPLOT asks if you want to automatically calculate contours. Usually, a "yes" answer produces contours. Whether NMPLOT produces contours or not, you should find out why the noise is too low or change the contour levels. If running a SingleMetric Case, remember to change the cutoff parameters using the Run // Run Options function.

Before computing and displaying multi-Case Output contours, INM checks for current GRD files in one-Case Output directories. One-Case data must be up-to-date and accessible before INM can compute differences, etc. INM may display a message asking you to run NMPLOT again to update one-Case contour data. If this happens, open the requested Output Graphics window(s), and then open the multi-Case Output again.

You can force INM to re-run NMPLOT by putting an "X" in the "Repeat Contour Calculation" box in the Output // Output Setup window. You should use this feature if you change the contour minimum, maximum, or increment parameters.

11.2.1 View // Functions in Common

When an Output Graphics window is in focus, the View menu on the main menu bar is changed 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. Please refer to Section 7.1.15 for information about operating the color dialog.

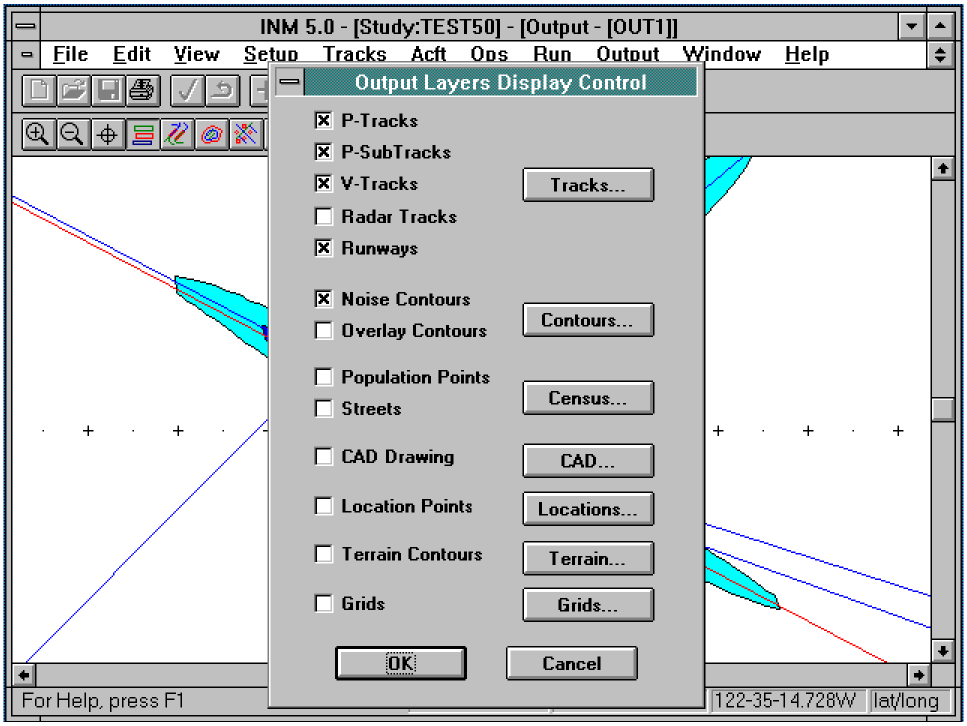
Many of the layer control functions have a pair of unlabeled circular buttons ("radio" buttons), one with a black dot, and one without. When you click in the left circle, INM selects (highlights) all items in the associated list box, which is usually directly above the pair of circles. When you click in the right circle, INM de-selects all items.

The following Output Graphics functions operate the same as they do in the Input Graphics View menu. Please refer to Section 7.1 for their description.

View // Zoom In
View // Zoom Out
View // Zoom Home
View // Center
View // Previous Zoom

View // Tracks
View // Locations

View // Geo Units
View // Axis
View // Fonts

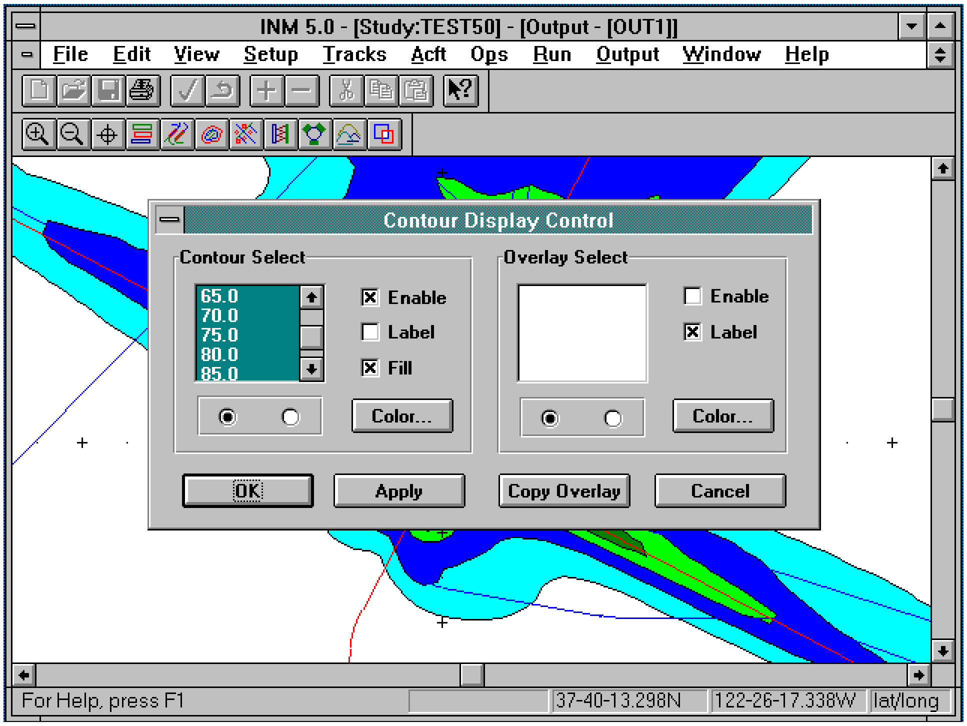


11.2.2 View // Layers On/Off

Toolbar: <u>Stacked items</u>

This dialog window summarizes which output graphics layers are turned on and off. You can enable or disable a layer by clicking in the box next to layer name. An "X" in the box means that the layer is on.

In addition to enabling layers in this Display Control dialog window, you can directly go to a detailed Display Control dialog window by selecting the button associated with a layer (or group of layers). For example, selecting the "Tracks" button, puts you in the same dialog as selecting "Tracks" from the View menu. ("P-Tracks" means points-type tracks, and "V-Tracks" means vectors-type tracks.)

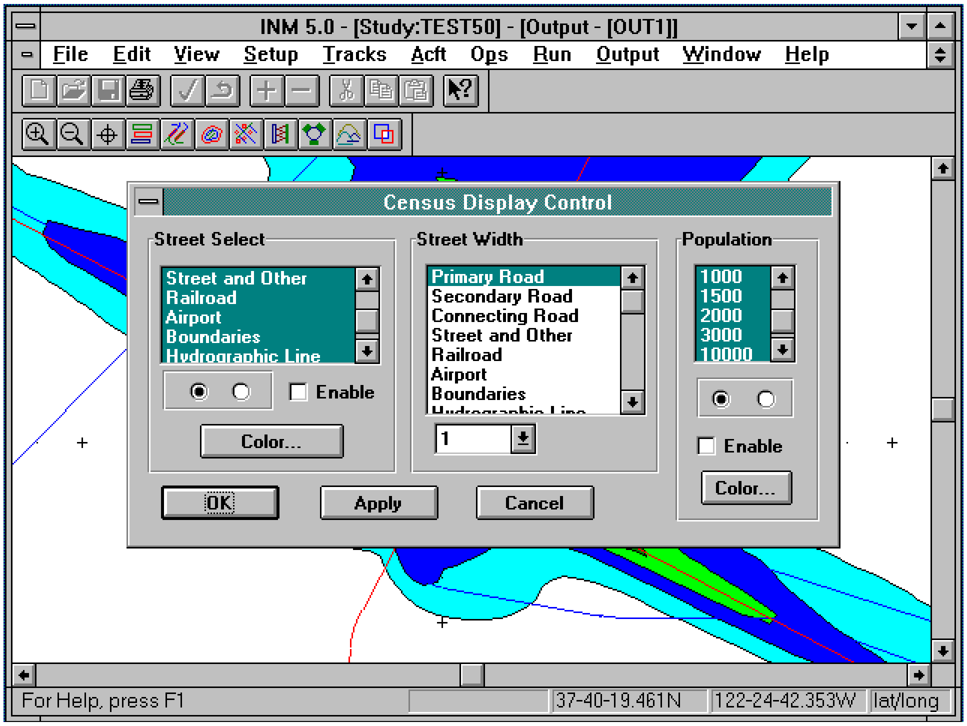


11.2.3 View // Contours

Toolbar: Contours

The Contours Display Control lets you choose which noise contours to display and how to color them. You can select or deselect all contours with the pair of radio buttons, or you can select individual contours. INM displays contour labels and fills the contours with color when you mark the appropriate boxes. The color of a contour fills the area to the next higher contour.

You can also copy a binary contour file (the _INM.BIN file) from a different Output subdirectory and overlay it on the contour. You can select which overlay contours to display, and the colors for overlay contours can be set independently of the base contour.



11.2.4 View // Census

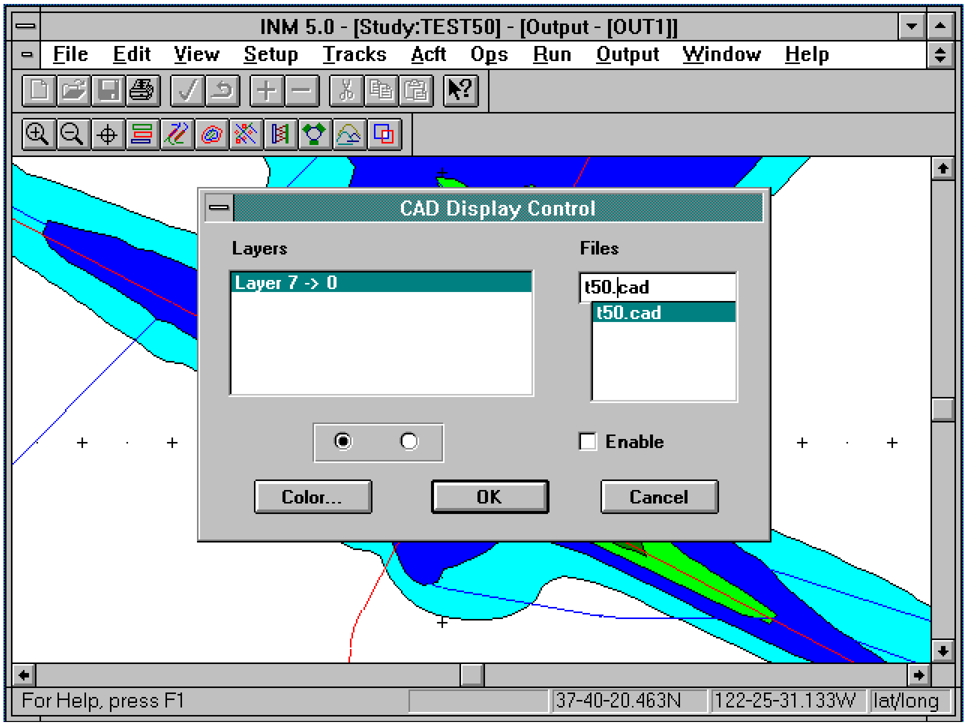
Toolbar: <u>Streets and population points</u>

The Census Display Control lets you display street maps and population points. You must acquire and process U.S. Census source data before this function will work (see Section 14.4).

You can selectively display various types of map objects, color them, and change their widths. Select all three "Road" types and the "Street and Other" type to select all streets. After pressing "OK", INM takes a while to display the map because of the large amount of data required.

Similarly, population data takes a while to display. Population points are color coded to represent different numbers of people living in the census blocks. A "census block" is usually a city block in densely populated areas, and elsewhere it relates to larger area of land.

If you check the "Population Points" box in the Run // Run Options window, and if there is a POP_PTS file in the Study directory, INM will calculate the noise levels at all of the population points and display the results in the Output // Noise at Population Points window. You can generate a POP_PTS DBF file, which contains records for all of the census blocks, their areas, and population counts, by using the Source Data Processor (see Section 14.4.3).

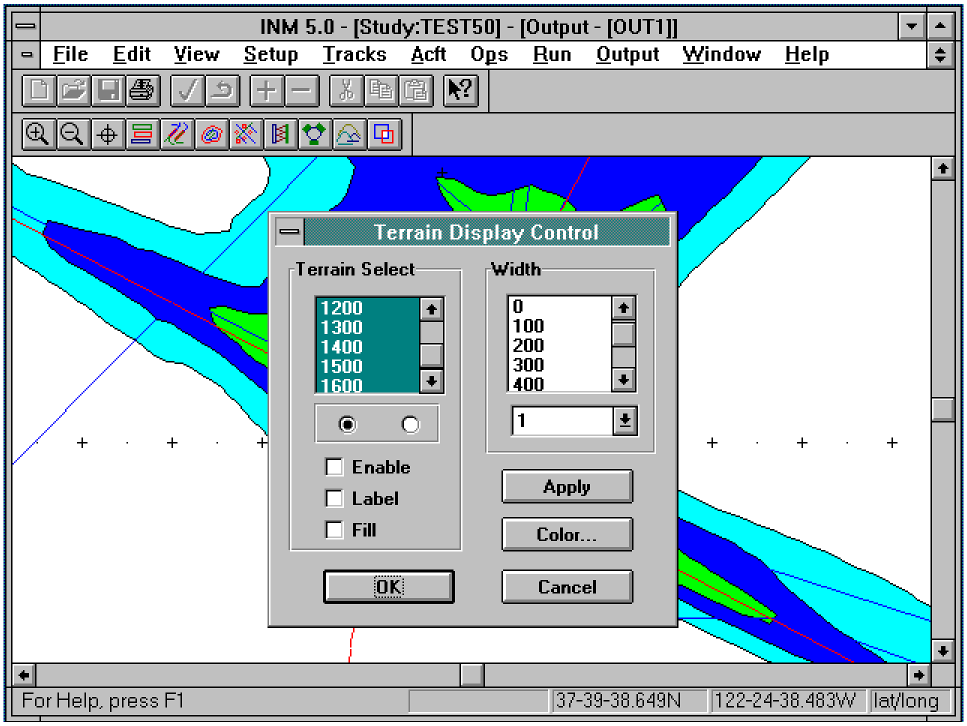


11.2.5 View // CAD

Toolbar: Runway/taxiway diagram

The CAD Display Control lets you display INM-formatted CAD files, typically a diagram of an airport. You must process DXF-formatted files before this function will work (see Section 14.7).

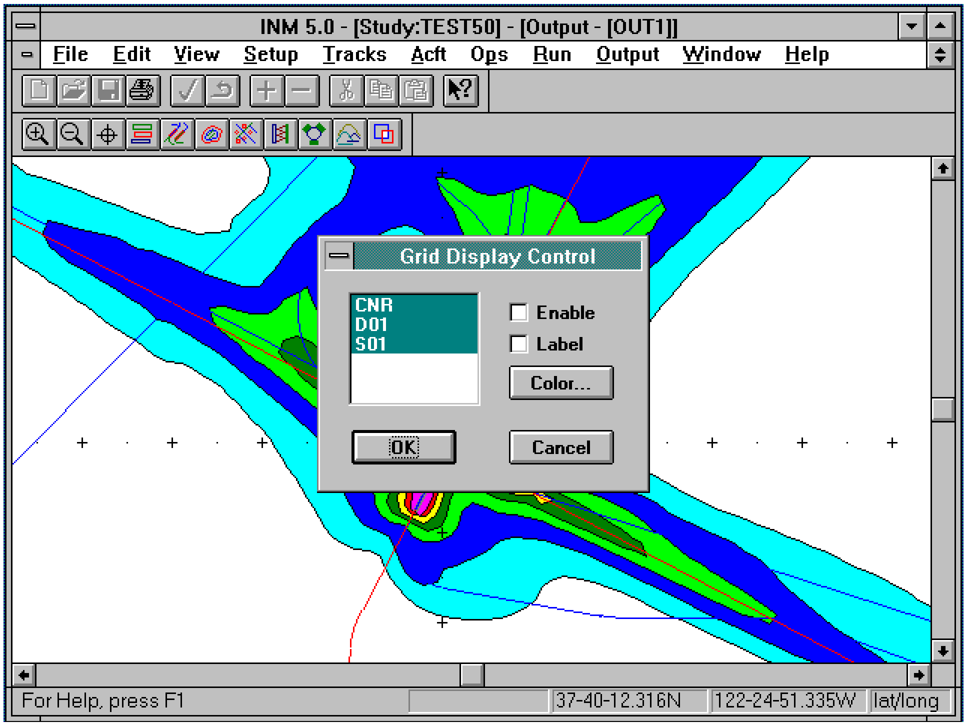
The INM-formatted CAD files have a "CAD" extension and they are placed in the Study directory. Pick a CAD file out of the list, and then select the layers within the file that you want to display. You can color individual layers with the Color function.



11.2.6 View // Terrain

Toolbar: Landscape with hills

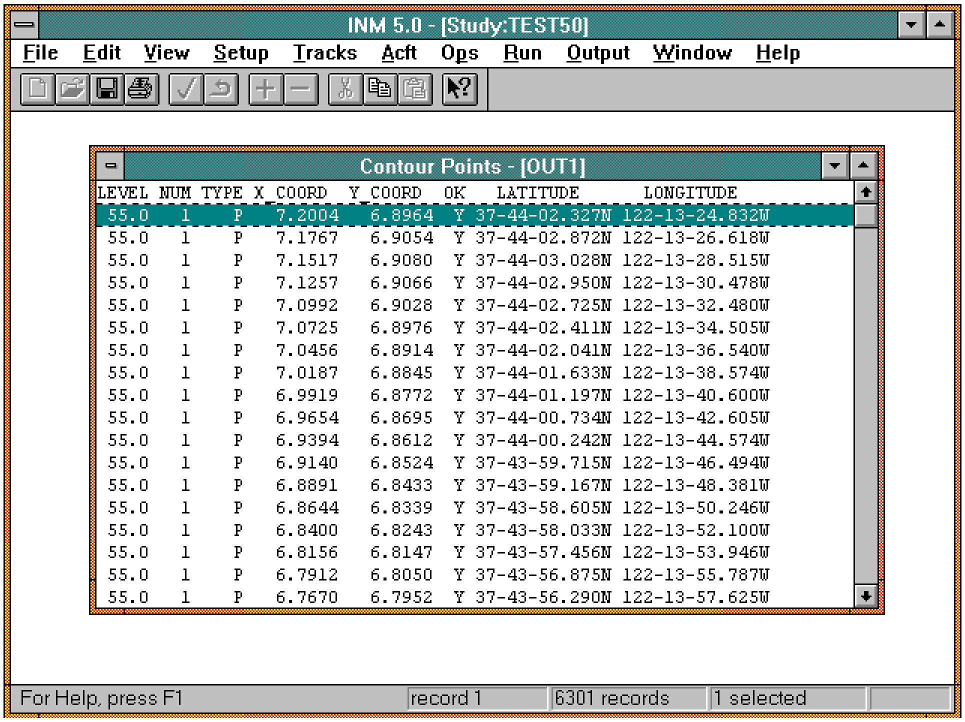
You can display terrain contours using this function. You need to create a terrain elevation file (one with a 3CD extension) and then process this file to produce an INM-compatible contour file (see Section 14.3). You can select individual terrain contours to display and color them.



11.2.7 View // Grids

Toolbar: <u>Grid of points</u>

You can use the Grids function to display grids that you defined for the Case that is associated with the Output. For multi-Case Output, the GRID file associated with the first Case is used. All three kinds of grids are shown -- contour, standard, and detailed. The grid points are shown as small squares with connecting lines. You can also display grid identifiers by enabling "Labels".

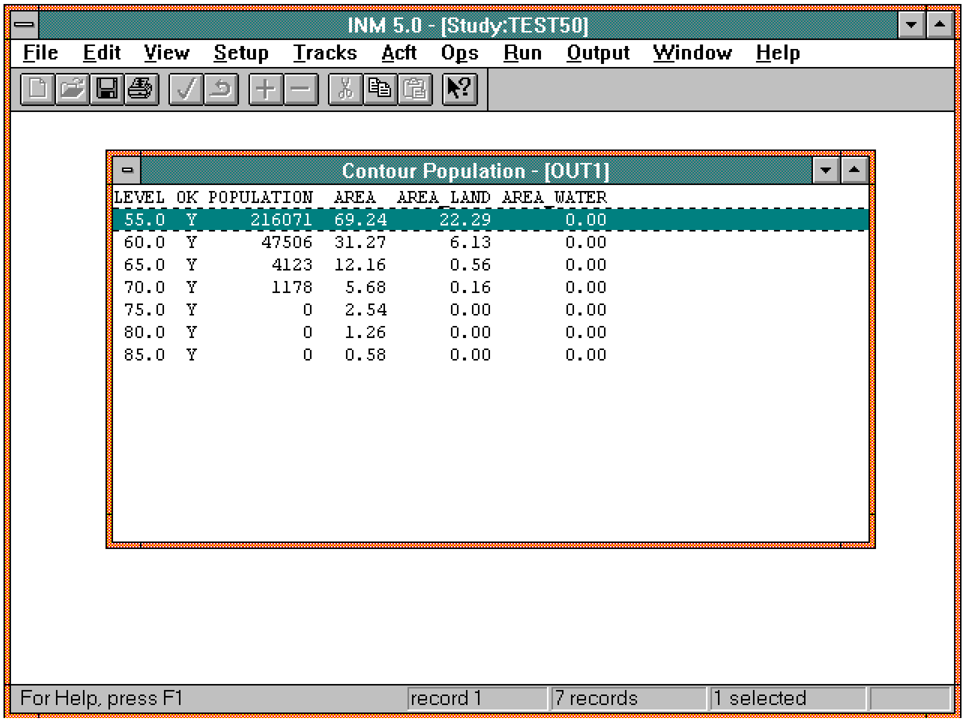


11.3 Contour Points

Menu Item: Output // Contour Points

First, open an Output Graphics window for the selected Output -- this action causes INM to create and display noise contour data. Then, you can select this function to create and view the contour-points table. The CONR_PTS file is created when you open the Contour Points window for the first time, thereafter the data are displayed more quickly.

A contour-points table lists X,Y and latitude/longitude values for each contour point, the "island" (i.e., a closed curve) to which the point belongs, whether the island is positive (P) (i.e, noise inside the curve is louder than on the curve) or negative (N), and whether the point is inside the contour grid (Y = yes) or on the border (N = no). The columns of data are in the same order as the CONR_PTS fields in Appendix B.



11.4 Contour Population and Area

Menu Item: Output // Contour Population

As with the contour-points table, you first need to open a Output Graphics window to generate the contours that are used to compute population counts inside of contours. In addition, you need to have a population data file in your Study directory (see Section 14.4 for creating one). INM may take a long time to compute the population inside contours because of the large number of population points.

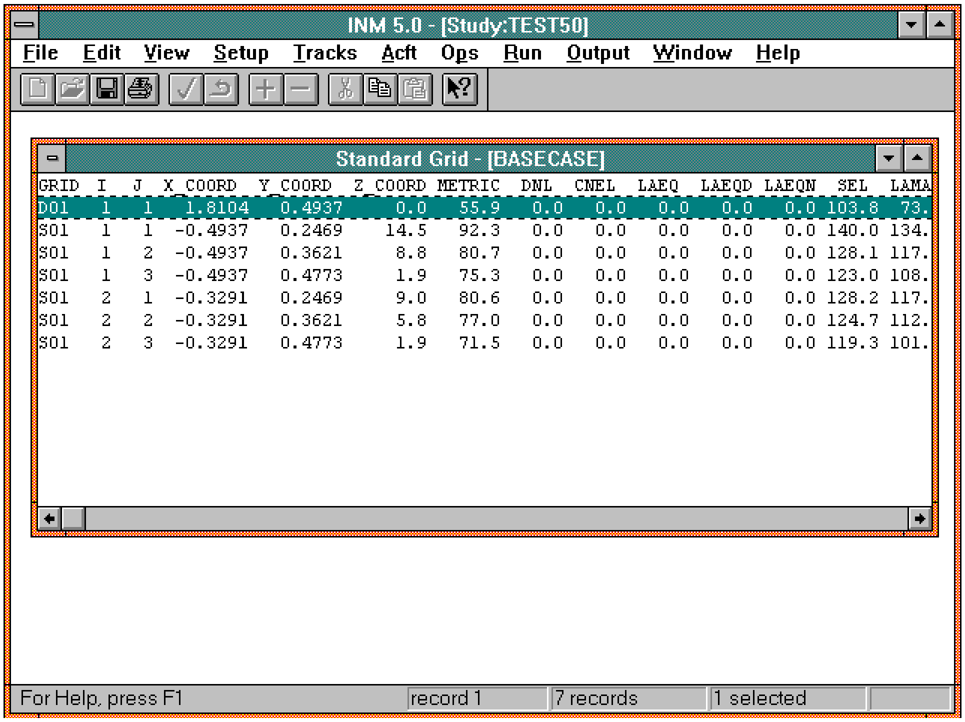
If the POP_PTS population file is missing, INM calculates the area inside of the contours, and sets the populations counts and the census-block areas to zero.

The contour-population table lists the contour level, the population inside all islands of the contour level, the calculated area inside the contour islands, and whether all islands are inside the contouring grid (Y) or not (N). INM also cumulates the census-block areas (land and water) that are given in the population-points input file. The columns of data are in the same order as the POP_CONR fields in Appendix B.

The values of the actual enclosed area (under column "AREA") and the sum of the land and water areas are usually different. There are two reasons for this. First, INM counts the entire census-block area when the population point, which designates the center of the area, is inside the contour, even if contour cuts through a census block. Thus, if a population point is inside the contour, the census-block area may be over-counted, and if the point is outside, the area may be under-counted.

The other reason that the two areas may differ is that the noise contours may enclose water areas that are not included in the census data. In this case, noise areas may be significantly larger than census areas, as in the example TEST50 Study.

The ratio of the actual area to the census-block area can be used to gauge whether population is under or over counted within a particular contour. However, do not assume that the ratio of the actual vs. census-block population equals the ratio of the areas. The reason is that the population count is weighted differently than the area count. For example, large numbers of people may live in census blocks that are completely contained by a contour, thus making the population count fairly accurate; but low-density, large-area census blocks lying on the contour line may cause a large difference between actual and census-block areas.



11.5 Standard Grid Analysis

Menu Item: <u>Output // Standard Grids</u>

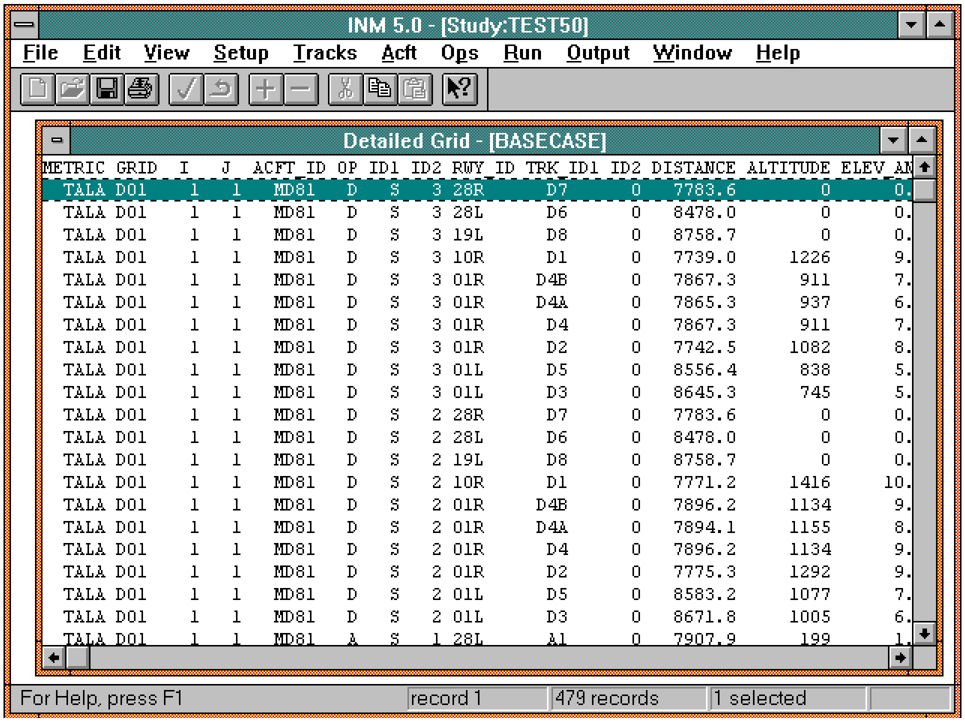
You can view Standard Grid results for a Case, providing that you specified either a standard or a detailed grid analysis in the Run // Setup Run function before you ran the Case. Also, the Case must be run in the "SingleMetric" mode.

Standard results include the name of the grid, I,J grid indices which serve to name the point, X,Y,Z values of the grid point (Z is relative to mean sea level), and 14 noise Metrics (one user-defined Metric and 13 Standard Metrics). The columns of data are in the same order as the GRID_STD fields in Appendix B.

The first noise Metric, identified as "METRIC", is the noise Metric that you specified for the SingleMetric run. It can be either a user-defined Metric or a

Standard Metric, depending on how you set it up. If you specified a Standard Metric, INM turns off the corresponding Standard Metric.

Please notice that if you created a Noise table, but did not define both kinds of noise families (SEL and EPNL), then the values that are shown under those Metrics belonging to the missing family are not valid. Please see Section 8.3 for more information on this point.



METRIC	GRID	I	J	ACFT_ID	OP	ID1	ID2	RWY_ID	TRK_ID1	ID2	DISTANCE	ALTITUDE	ELEV	AN
TALA	D01	1	1	MD81	D	S	3	28R	D7	0	7783.6	0	0.	
TALA	D01	1	1	MD81	D	S	3	28L	D6	0	8478.0	0	0.	
TALA	D01	1	1	MD81	D	S	3	19L	D8	0	8758.7	0	0.	
TALA	D01	1	1	MD81	D	S	3	10R	D1	0	7739.0	1226	9.	
TALA	D01	1	1	MD81	D	S	3	01R	D4B	0	7867.3	911	7.	
TALA	D01	1	1	MD81	D	S	3	01R	D4A	0	7865.3	937	6.	
TALA	D01	1	1	MD81	D	S	3	01R	D4	0	7867.3	911	7.	
TALA	D01	1	1	MD81	D	S	3	01R	D2	0	7742.5	1082	8.	
TALA	D01	1	1	MD81	D	S	3	01L	D5	0	8556.4	838	5.	
TALA	D01	1	1	MD81	D	S	3	01L	D3	0	8645.3	745	5.	
TALA	D01	1	1	MD81	D	S	2	28R	D7	0	7783.6	0	0.	
TALA	D01	1	1	MD81	D	S	2	28L	D6	0	8478.0	0	0.	
TALA	D01	1	1	MD81	D	S	2	19L	D8	0	8758.7	0	0.	
TALA	D01	1	1	MD81	D	S	2	10R	D1	0	7771.2	1416	10.	
TALA	D01	1	1	MD81	D	S	2	01R	D4B	0	7896.2	1134	9.	
TALA	D01	1	1	MD81	D	S	2	01R	D4A	0	7894.1	1155	8.	
TALA	D01	1	1	MD81	D	S	2	01R	D4	0	7896.2	1134	9.	
TALA	D01	1	1	MD81	D	S	2	01R	D2	0	7775.3	1292	9.	
TALA	D01	1	1	MD81	D	S	2	01L	D5	0	8583.2	1077	7.	
TALA	D01	1	1	MD81	D	S	2	01L	D3	0	8671.8	1005	6.	
TALA	D01	1	1	MD81	A	S	1	28L	A1	0	7907.9	199	1.	

11.6 Detailed Grid Analysis

Menu Item: Output // Detailed Grids

You can view Detailed Grid results for a Case, providing that you specified a detailed grid analysis in the Run // Setup Run function before you ran the Case. Also, the Case must be run in the "SingleMetric" mode.

INM computes detailed grid data for the Metrics that you checked in the Run // Setup Run dialog, for each grid point for detailed Grids defined for the Case, and for every significant combination of Aircraft, Profile, and Track. For exposure-related and time-above Metrics, INM records the flights that contribute 97% of the total exposure or time (ordered from most to least significant), not just the top 20 flights as was done in INM 4.11. For maximum-level Metrics, INM records the single flight that caused the maximum level.

The Grid identifier and the I,J indices are used to identify a grid point. You can obtain the X,Y,Z values for grid points from the Standard Grid file (this is the reason both standard and detailed data are written when you specify detailed Grids).

Because of all the possible combinations, a Detailed Grid file can become very large, so you should try to limit the number of detailed grids and the number of points in the grids when you setup the run.

The columns of data display in the table are in the same order as the GRID_DTL fields in Appendix B. A Detailed Grid record contains the following data for a given grid point and Flight Operation:

Distance (feet) from the grid point (on the surface of the terrain, if any) to the Aircraft at closest-point-of-approach (CPA),
Altitude (feet AFE) of the Aircraft at CPA,
Elevation angle (degrees) from the grid-point ground plane to the Aircraft at CPA,
Speed (knots TAS) of the Aircraft at CPA,
Thrust setting (lbs or %) of the Aircraft at CPA,
Equivalent number of day operations for the given flight operation,
Metric value (dB or minutes) for a single operation of the given flight,
Metric value (dB or minutes) for all operations of the given flight,
Percent (%) of the total Metric caused by the flight operation.

The methods INM use to compute the equivalent number of operations, the metric for all operations, and the percent of total 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 )
```

$$\text{PERCENT} = 100 * 10^{\text{METRIC\_ALL}/10} / (\text{Total } 10^{\text{METRIC\_ALL}/10})$$

Only those flights that contribute to the top 97% of the total exposure are recorded.

For maximum-level Metrics:

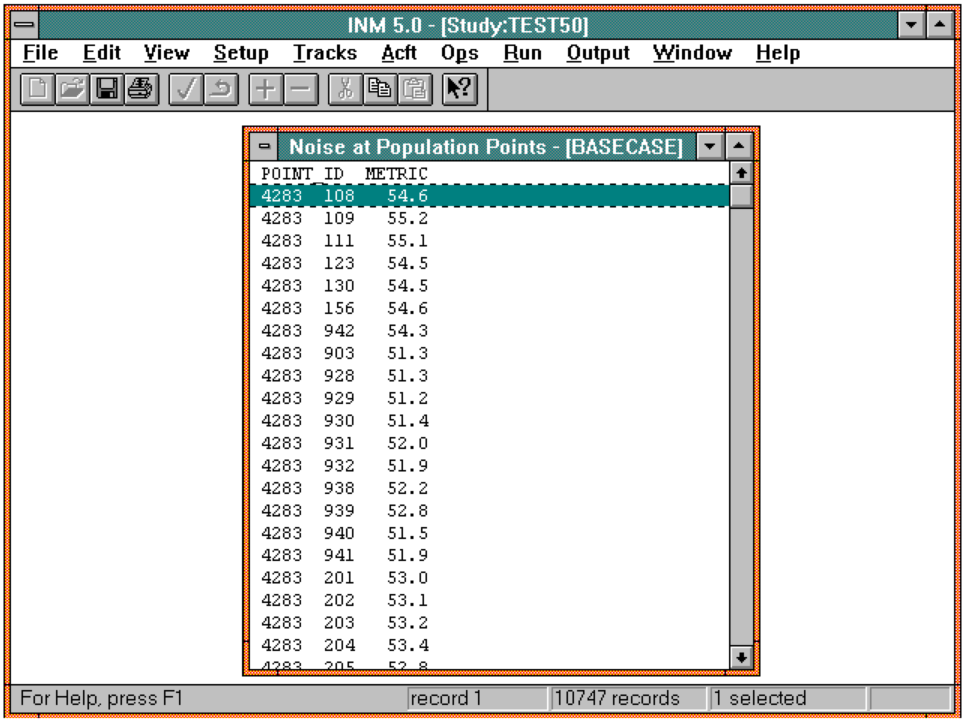
```
OPS_EQUIV  =  1.0

METRIC_ALL  =  METRIC_ONE

PERCENT  =  100.0
```

Only one flight is recorded, 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 / ( Total METRIC_ALL )
```

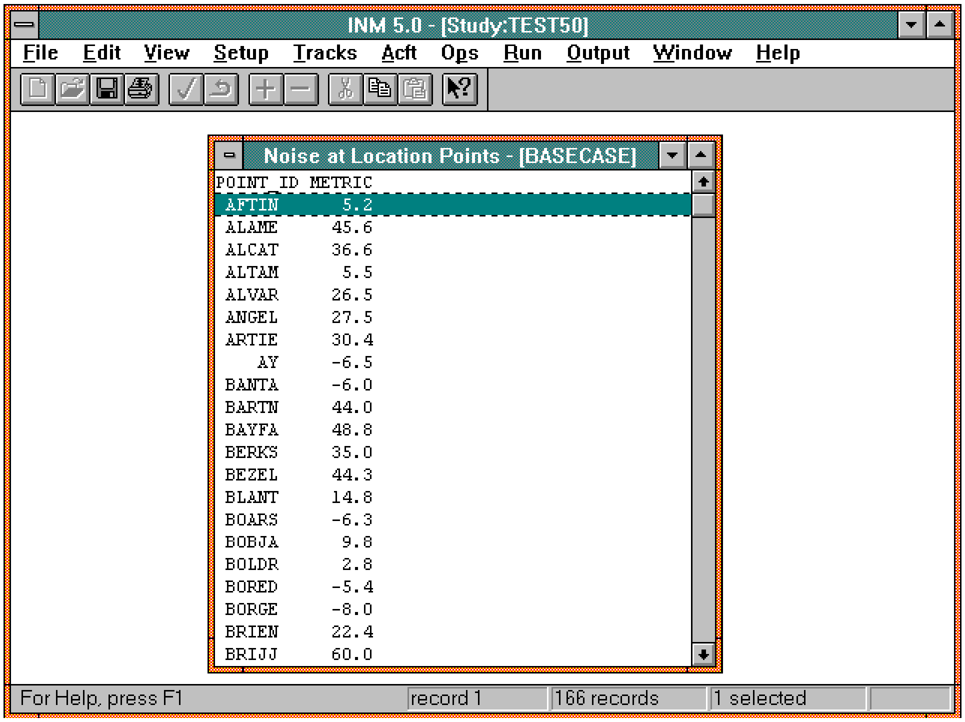
Only those flights that contribute to the top 97% of the total time-above are recorded.



11.7 Noise at Population Points

Menu Item: Output // Noise at Pop Points

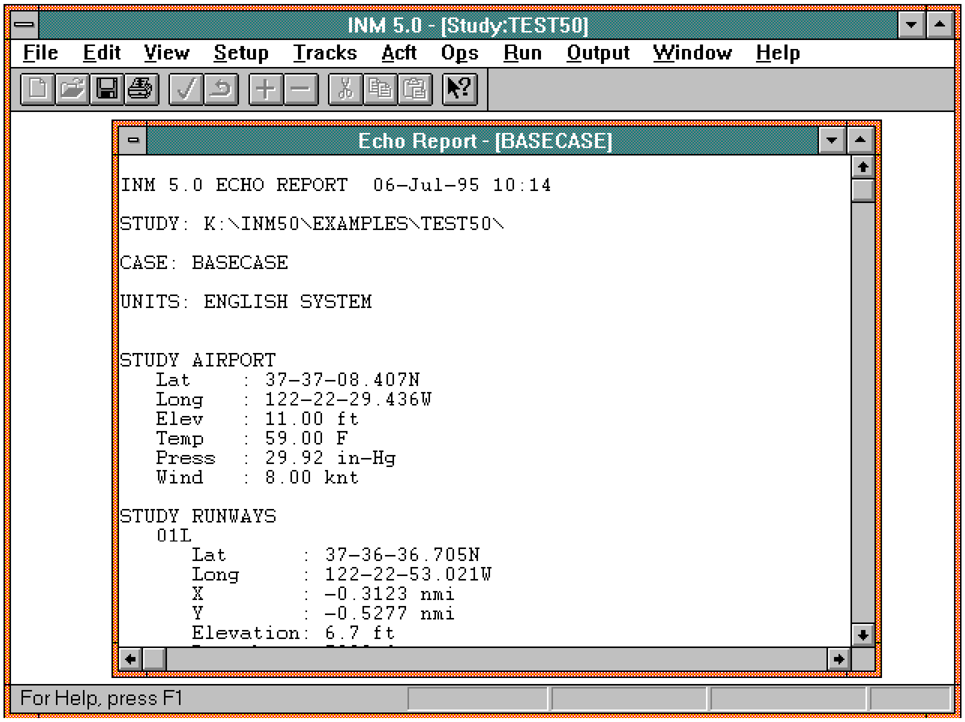
INM computes Metric values at each population point when you check "Do Population Points" in the Run // Setup Run dialog, and if you have a POP_PTS file in the Study directory (see Section 14.4.3 for how to make one). The resulting POP_NOIS file has one record for each point. Rather than repeating latitude/longitude, population, and area data for every Case, INM lists only the census-block identifier and the computed Metric. The census-block identifier in the POP_PTS file in the Study directory gives you access to these other population-point data.



11.8 Noise at Location Points

Menu Item: <u>Output // Noise at Loc Points</u>

INM computes Metric values at each location point when you check "Do Location Points" in the Run // Setup Run dialog, and if you have a LOC_PTS file in the Study directory. The resulting LOC_NOIS file has one record for each point. Rather than repeating latitude, longitude, and height data for every Case, INM lists only the point identifier and the computed Metric. The point identifier in the LOC_PTS file in the Study directory gives you access to these other location-point data.

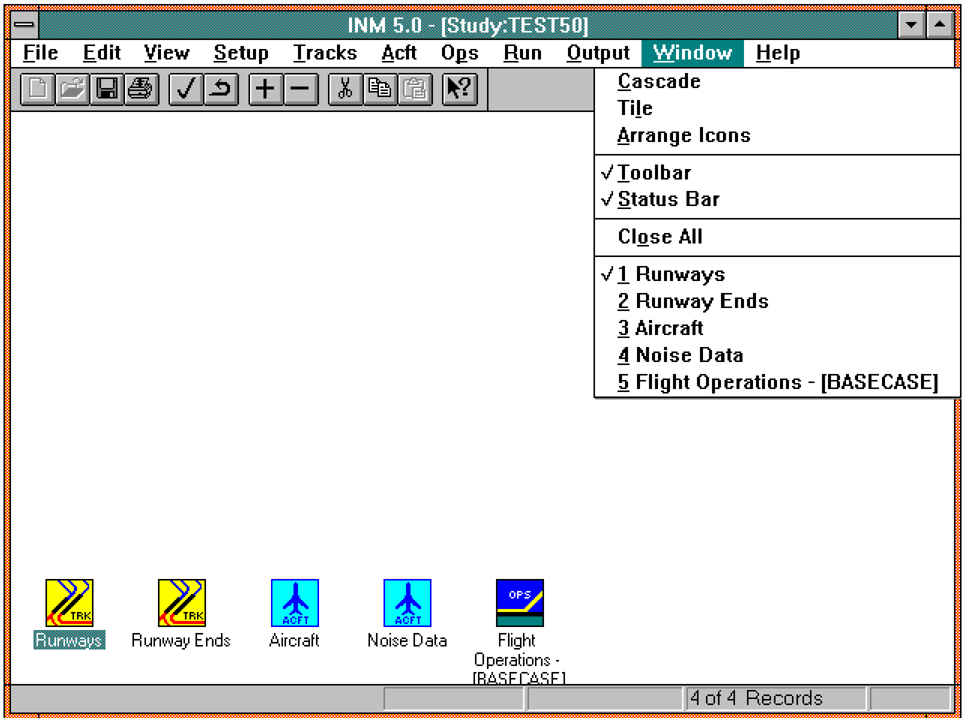


11.9 Case Echo Report

Menu Item: <u>Output // Case Echo Report</u>

The purpose of this report is to provide, in one place, all of the input data for a given Case, including Study-level data. The Echo Report documents user-generated Study data and all Case-specific data (e.g., calculated Flight Operations). If you make a <u>change</u> to a Standard-data record, the change will show in the Echo Report. The Echo Report is written in the units specified for the Study (English or metric). The data shown in the Echo Report scrolling window are also written to the REPORT.TXT text file in the Case subdirectory. You can use the Echo Report as an appendix to your INM documentation.

An example Echo Report is shown in Appendix G.



12 WINDOW MENU

The Window menu contains a variety of standard Microsoft windows-management functions.

12.1 Cascade

Menu Item: Window // Cascade

You use this function to rearrange the set of visible (i.e., 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

You 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

You 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 Toolbar On/Off

Menu Item: Window // Toolbar

You can turn on or turn off the toolbar with this function. The icon buttons on the toolbar represent functions on the menus. There are three different toolbars, one for main window functions, one for Input Graphics functions, and one for Output Graphics functions. A toolbar button is disabled when the underlying function is inoperative.

To turn off both the main and graphics toolbars, first focus on a graphics window and turn off the graphics toolbar, then focus on a DBF window and turn off the main tool bar.

12.5 Status Bar On/Off

Menu Item: Window // Status Bar

You can turn on or turn off the status bar with this function. The status bar shows various kinds of help information. A short help phrase is usually displayed on the left. When a DBF window is in focus, the origin of the current record (Standard or User data) and the number of records are displayed on the right. When a graphics window is in focus, the position (e.g., latitude/longitude) of the mouse pointer is display on the right.

12.6 Close All Windows

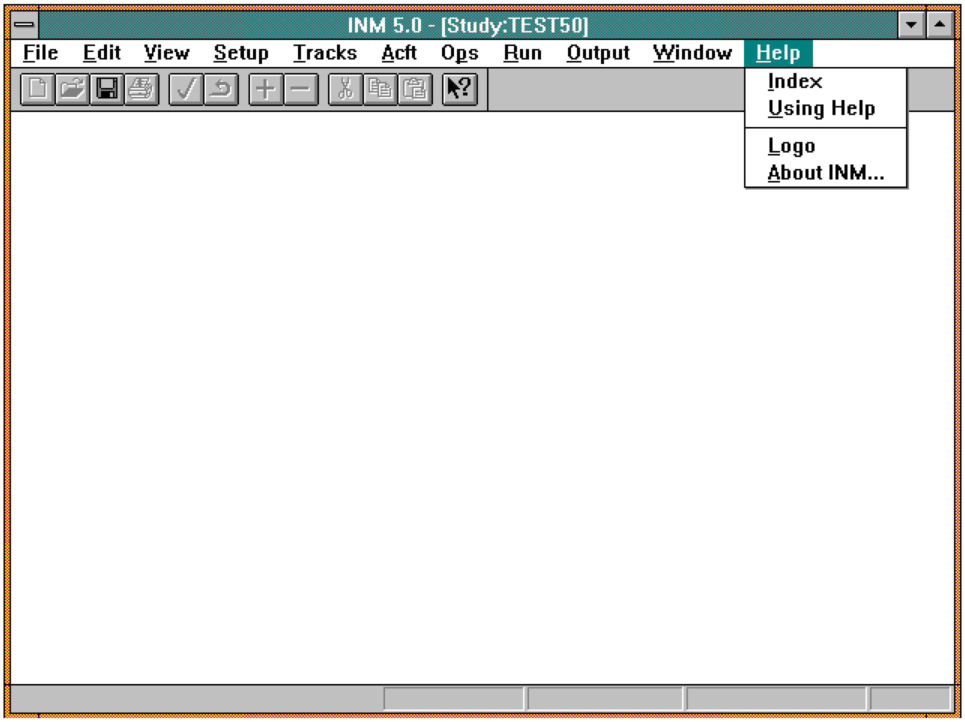
Menu Item: Window // Close All

This function is used to close all open windows, including minimized (iconified) windows.

12.7 Window List

Menu Item: Window // (List of Window Titles)

The window list shows all of the open windows, including those that are "maximized" (that fill the main window), "restored" (of regular size), and "minimized" (represented by an icon). You can focus on any 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 Microsoft functions that provide information about the INM system.

13.1 Index

Menu Item: <u>Help // Index</u>
Toolbar: <u>Question mark & arrow</u>

This function runs the Microsoft WINHELP.EXE program using the INM.HLP file. You can also run the Help system by double clicking on the INM.HLP file name in the INM system directory. The Help // Index 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.

The toolbar question-mark button allows you to jump directly to a Help section of interest. First, click on the button and get the question-mark cursor to follow the mouse. Then, click on a menu item of interest. You will go directly to the menu item help text.

13.2 Using Help

Menu Item: Help // Using Help

This function puts you into the standard Microsoft module for learning how to use the Microsoft WINHELP.EXE program. This function relates only to WINHELP, and it is not part of the INM system (other than being on the menu).

13.3 INM Logo

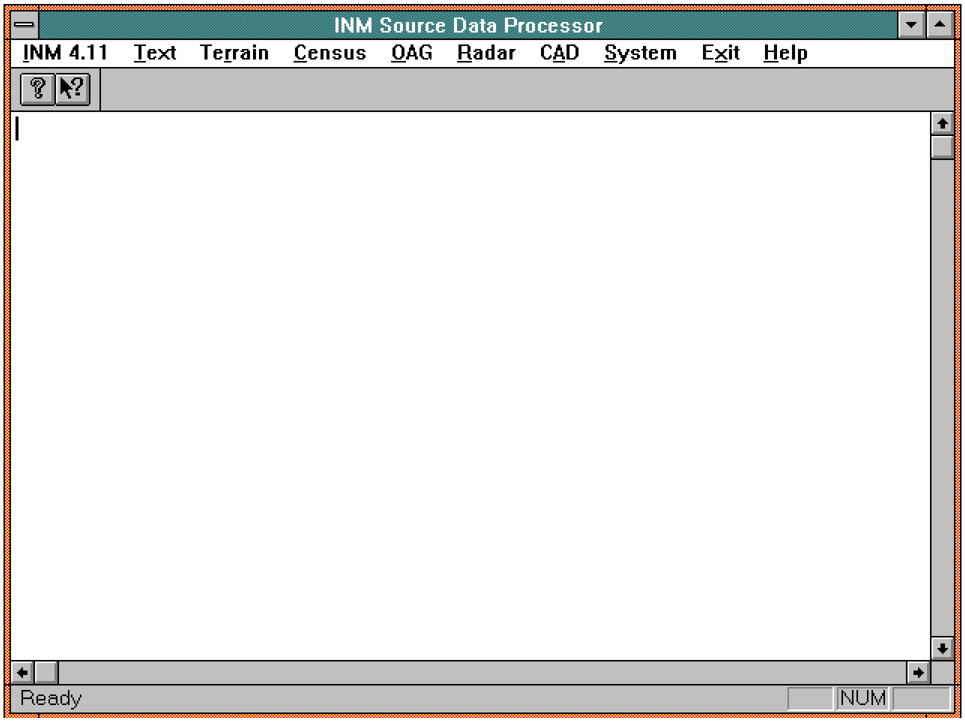
Menu Item: Help // Logo

This function turns 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

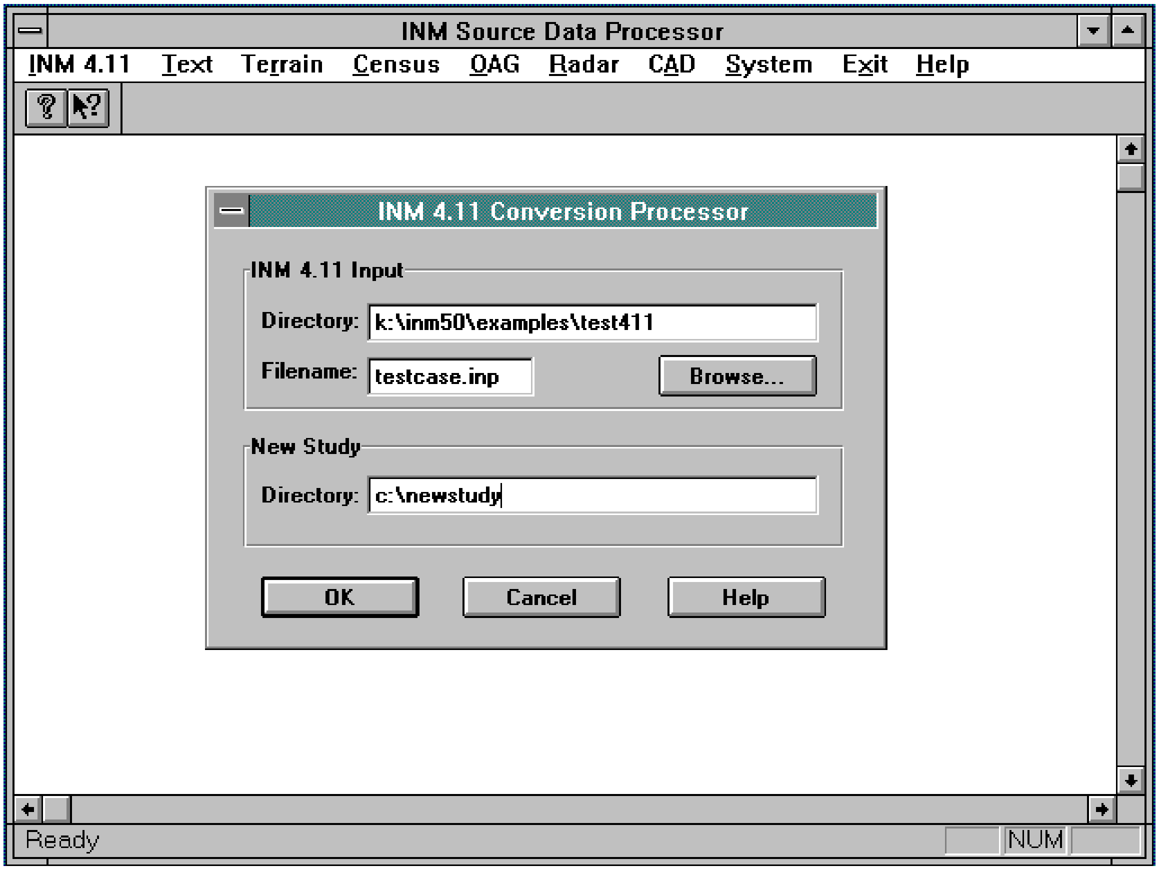
The About box contains sponsoring agency name, program name and version number, and program author credits.



14 SOURCE DATA PROCESSING

Source data processing functions are contained in a separate Windows program, which can be accessed by using Microsoft Program Manager through the INM Program Group, or by using the File Manager and double-clicking on the PREPROC.EXE file name in the INM system directory.

The Source Data Processing program is used to process various kinds of source data, such as terrain and census data, so that they can be adapted to your particular Study. Sometimes this task is called "preprocessing" because you are preparing data in advance for input into the model. Later versions of INM may integrate these preprocessing functions into the main INM Windows program (INM.EXE) under the Setup menu.



14.1 INM 4.11 Input Data Conversion

Menu Item: INM4.11

You can use the INM 4.11 Conversion Processor to create INM-5.0 DBF files by processing an INM-4.11 FOR02.DAT file. Usually, input files from INM versions earlier than 4.11 will convert also, but you may need to make minor changes (e.g., change INM-3.9 "GA3D" approach profiles to "STD3D" or "STD5D").

If you want real latitude/longitude values in your INM 5.0 database, put the position of the 4.11 origin of coordinates into the 4.11 input file before converting to 5.0. For example, Boston-Logan would be:

```
SETUP:
TITLE <...>
AIRPORT <...>
CODE BOS
LATITUDE 42 21 20
LONGITUDE 71 00 48
```

If you do not do this, the study origin will be at latitude 00-00N, longitude 000-00E.

Please make sure that INM 4.11 successfully reads the input file before attempting to use the 4.11-to-5.0 conversion software. The 4.11 input file must be successfully processed by the INM-4.11 INPUT.EXE program.

You can access the INM 4.11 Conversion Processor through the Source Data Processing program, or you can run a DOS batch file. The conversion programs are DOS programs, not Windows programs.

Use the "Browser" button to fill out the path and file name of an INM-4.11 input file, which is usually stored under a name that is different than FOR02.DAT (e.g., "C:\ TEST411 \ TESTCASE.INP"). Then, input the path name of the INM 5.0 Study directory (e.g., "C:\ TEST411") that you want to create. The Study directory can either exist or not. If it does exist, DBF files may be overwritten.

After you press "OK", INM converts the old input file into DBF files, creates a Study directory, creates a Case subdirectory, writes the STUDY.INM file to the Study directory, and copies DBF files to the new directories.

If your input file is large, the conversion process will take a long time, possibly an hour or more.

14.1.1 DOS Batch File

You can run the CONV411.BAT batch file instead of using the Source Data Processing program. First, go to DOS and set the current directory to INM50 \ CONV411. Then, run the batch file:

C:\INM50\CONV411> CONV411 [input-file] [output-directory]

where the two parameters, [input-file] and [output-directory], are full-path names. You can view the batch file to see the steps in the conversion process.

14.1.2 Modify Converted Data

The INM 4.11 Conversion Processor cannot completely convert an old input file because some required data are not accessible during the conversion process, and because of new ways of modeling certain airport operations. Please check the list below and modify and add to your INM 5.0 data after conversion.

1. Check the list of Aircraft. If any has "User data" showing on the status bar, you need to check, and perhaps provide input data for, the Aircraft's "static thrust" and "100%-thrust" parameters. Both thrust parameters can be zero, but only when Profile Points (not Procedure Steps) are used for all of the Approach and Departure Profiles and when there are no Run-up Operations. If you do use Procedure Steps and/or Run-up Operations for a "User data" Aircraft, either (1) "static thrust" must be non-zero, or (2) "static thrust" and "100%-thrust" must be non-zero. Please read Section 8.1, points 7 and 8.

   If there are zero thrust-values on the Aircraft record, and you try to calculate profiles using Procedure Steps, INM will usually stop the run with an error message. If you just converted an INM-4.11 case, and are having trouble running it, please check the Aircraft records.

2. If you have touch-and-go Flight Operations, your new Study will contain TGO Profile records, but TGO Profiles will not have the necessary associated Profile Points or Procedure Steps. The reason is that INM 5.0 uses a different method for modeling touch-and-goes, and the INM-4.11 touch-and-go approach and departure data are not appropriate conversion. Look in file MSTUDY.TXT to see a list of TGO Profiles.

   You must define TGO Profile Points or Procedure Steps before making a run. If you forget to do this, INM will stop after computing flight paths.

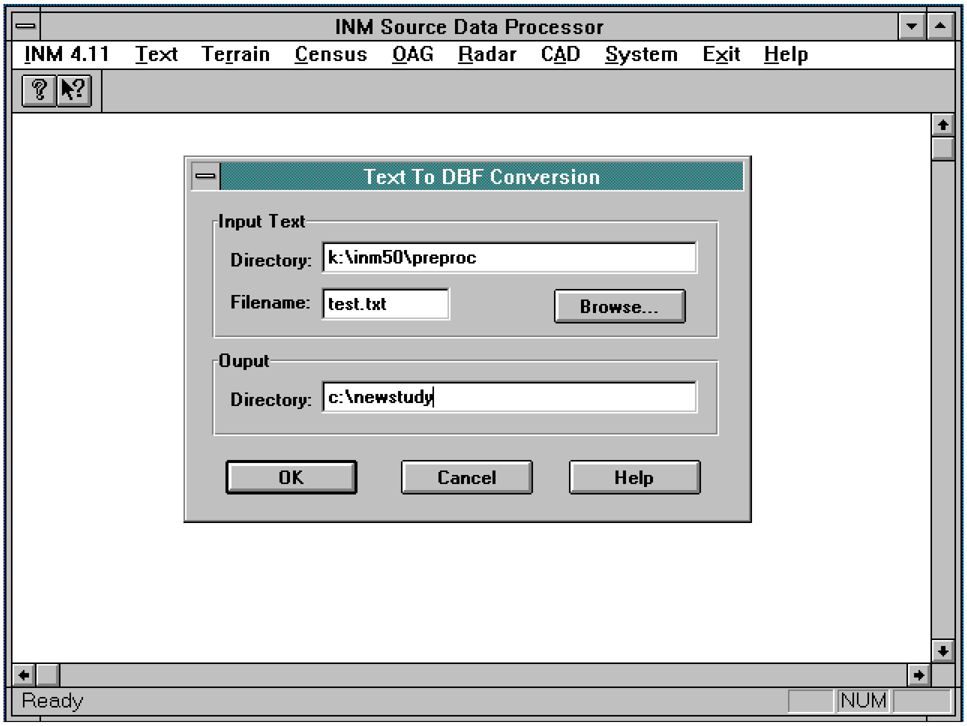
   Although you can run with only the TGO records, you really should add two more Profiles to complete the three parts of a touch-and-go Profile. Please read Sections 8.5, 8.6, and 8.8 to learn how to do this. If you do add touch-and-go APP and DEP Profiles, you must also add

Tracks -- one for departure to the touch-and-go pattern, and one for approach from the pattern. Please read Section 7.1.1.

3. If you have Run-up Operations, you may want to revise the "percent thrust" parameter. INM 5.0 models run-ups differently than in INM 4.11. In INM 5.0, run-up thrust is based on a percentage of the Aircraft "static thrust" (as is reverse thrust), instead of being equal to takeoff thrust.

4. INM creates a generic BASECASE Case, including default run options. Before you make a run, you should review the options to see if they are what you want.

Appendix G shows the results of converting the INM 4.11 TESTCASE.INP file. The first section of the Appendix lists the manual steps that were performed after the automated conversion process.



14.2 INM Text Input Data

Menu Item: Text

You can use the Text Processor to convert a text file into one or more DBF files that can be read by INM. The input text file has to be in a particular format.

The Text Processor does not check for errors as it converts text (e.g., a track record can refer to a runway that does not exist). However, when you load the DBF files, INM does verify data, and any mistakes will show up at that time. In INM, records are processed to verify that key fields relate to the rest of the database. For example, a Flight Operation record with key values "727Q15-DEP-S1-09L-TRK1" must have an Aircraft "727Q15" record already in the database. You will have to revise the text file (or Study data) and try again.

First, you need to create a text file with a text editor, or perhaps with a computer program. Put the text file in an accessible directory. Then run the

Source Data Processing program, select the Text function, use the "Browse" button to select the input file, and type the directory where the DBF files should be written.

When you press "OK", INM writes a small configuration file (textfile.CFG) into the text file directory, converts the text file into one or more DBF files, and puts them in the directory that you specified.

Usually, you should specify the Study directory. However, if you have already created a Study and have put data into it, you should be careful about sending output to the Study directory because your original Study files may be overwritten. If you want the output files from the Text function to be appended to current Study files, you will have to use a DBMS program to append one DBF file to another.

14.2.1 Separate Windows Program

If you want to, you can run the text conversion program separately from the Source Data Processing program. You need to create both the input text file and a configuration text file, and then call the TXT2DBF.EXE Windows program via the File Manager:

TXT2DBF c:\work1\test.cfg

The following is an example configuration file (including the comments):

```
C:\inm50\sys_dbf     // where to find DBF
templates
C:\study\sfo1 // where to put DBF files
C:\work1\test.txt    // input file
```

14.2.2 Input Text File

You can create an input text file that has from one to four sections; each section has a key word and relates to one or more DBF files:

Key Word	DBF Files
RUNWAYS	RUNWAY and RWY_END
TRACKS	TRACK and TRK_SEGS
FLIGHT-OPERATIONS	OPS_FLT
LOCATION-POINTS	LOC_PTS

For example, if you want to create just the LOC_PTS file, you would have only one section in the text file and it would be indicated by the LOCATION-POINTS key word.

The text file must start with a line that specifies the kind of units that you are using and the origin of the coordinate system. For example, the following tells the program that you want to use X,Y values for defining points (XY), English units (ENG), and that the X,Y coordinate system is at the given latitude and longitude.

```
XY, ENG, 37-36-36.705N, 122-22-53.021W
```

Please make sure that the latitude/longitude is the same as your Study latitude/longitude.

The other way of specifying points is by latitude/longitude values, in which case you do not have to specify the origin of the coordinates. For example, the following line specifies latitude/longitude coordinates (LL) and metric units (MET):

```
LL, MET
```

After the header line, make a line with one of the four key words, and then follow it with one or more data lines, as discussed below.

14.2.3 Runways

The format for a runway section is as follows:

```
RUNWAYS

AprtId, Width
, RwyId, X or Lat, Y or Long, Elev, TkoTh, AppTh, GS, TCH
, RwyId, X or Lat, Y or Long, Elev, TkoTh, AppTh, GS, TCH

AprtId, Width
, RwyId, X or Lat, Y or Long, Elev, TkoTh, AppTh, GS, TCH
, RwyId, X or Lat, Y or Long, Elev, TkoTh, AppTh, GS, TCH
etc.
```

where,

AprtId	Airport id -- 3 or 4 characters (e.g., BOS)
Width	Runway width (ft, m)
RwyId	Runway end -- 3 characters (e.g., 32R). It must be unique.

X or Lat	X value (nmi, km) or latitude
Y or Long	Y value (nmi, km) or longitude
Elev	Runway end elevation MSL (ft, m)
TkoTh	Takeoff displaced threshold (ft, m)
AppTh	Approach displaced threshold (ft, m)
GS	Glide slope (+deg)
TCH	Threshold crossing height (ft, m)

After each AprtId line you must place two RwyId lines (i.e., the two ends of the runway). You must have a comma as the first character on a subordinate line. You can have any number of runways.

14.2.4 Tracks

The format for a track section is as follows:

```
TRACKS

RwyId, OpType, TrkId, Delta
, X or Lat, Y or Long
, X or Lat, Y or Long
, X or Lat, Y or Long

RwyId, OpType, TrkId, Delta
, X or Lat, Y or Long
, X or Lat, Y or Long
etc.
```

where,

RwyId	Runway end -- 2 or 3 characters (e.g., 32R). It must be unique.
OpType	Type of operation -- one of the following letters: (A = Approach, D = Depart, T = Touch-and-Go, V = Over-flight)
TrkId	Track identifier -- 1 to 4 characters
Delta	Track delta distance (ft, m), see Section 7.4
X or Lat	X value (nmi, km) or latitude
Y or Long	Y value (nmi, km) or longitude

These are "points-type" tracks (P-tracks). The number of points per track must be between 2 and 99. The points must be listed in the order that they are flown. You must have a comma as the first character on a subordinate line. You can have any number of tracks.

14.2.5 Flight Operations

The format for a flight operations section is as follows:

```
FLIGHT-OPERATIONS

RwyId, Optype, TrkId
, Acft, ProfId, Day, Eve, Night
, Acft, ProfId, Day, Eve, Night
, Acft, ProfId, Day, Eve, Night

RwyId, Optype, TrkId
, Acft, ProfId, Day, Eve, Night
, Acft, ProfId, Day, Eve, Night
etc.
```

where,

RwyId	Runway end -- 2 or 3 characters (e.g., 32R). It must be unique.
OpType	Type of operation -- one of the following letters: (A = Approach, D = Depart, T = Touch-and-Go, V = Over-flight)
TrkId	Track identifier -- 1 to 4 characters
Acft	Aircraft type identifier -- 1 to 6 characters
ProfId	Profile identifier -- 2 characters (PROF_ID1 + PROF_ID2)
Day	Number of day operations
Eve	Number of evening operations
Night	Number of night operations

You must have a comma as the first character on a subordinate line. You can have any number of operations.

After conversion, you will have to move the OPS_FLT file into a Case subdirectory so that INM can access it.

14.2.6 Location Points

The format for a location points section is as follows:

```
LOCATION-POINTS

LocId, LocCat, X or Lat, Y or Long, Height
LocId, LocCat, X or Lat, Y or Long, Height
etc.
```

where,

LocId	Point identifier -- 1 to 6 characters		
LocCat	Point category -- one of the following letters:		
	B = building	U = VOR	M = NDB/DME
	C = church	V = VORTAC	T = TACAN
	S = school	W = VOR/DME	F = fix
	H = hospital	N = NDB	X = other
X or Lat	X value (nmi, km) or latitude		
Y or Long	Y value (nmi, km) or longitude		

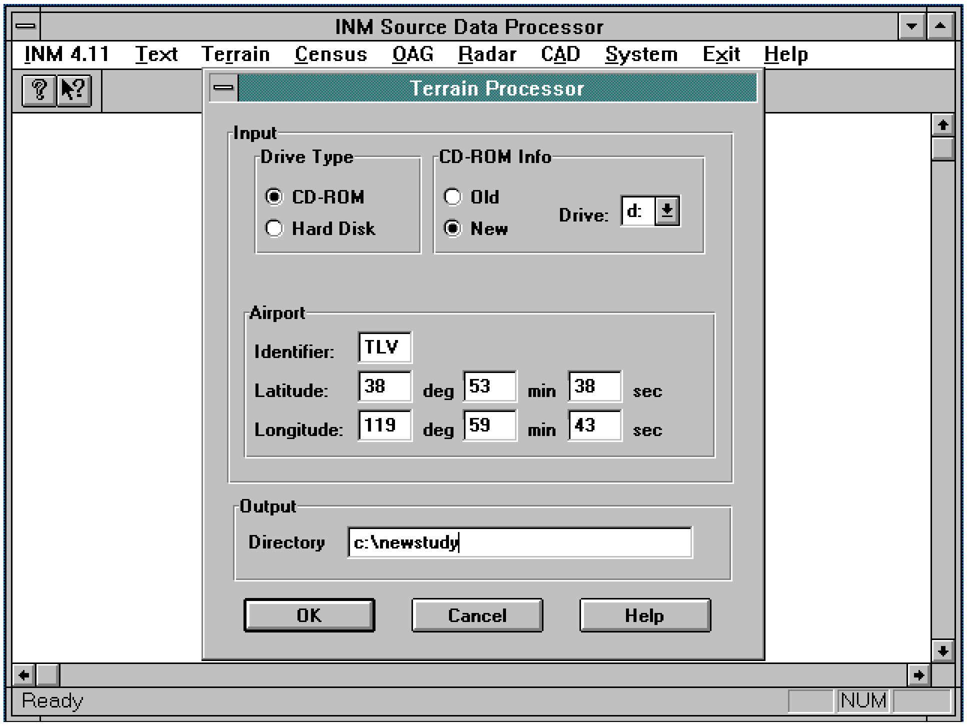
Height	Height above the ground (ft, m)

You can have as many location points as you want.

14.2.7 Example Input File

The following is an example INM text input data file:

```
# Test input file for TXT2DBF program

XY, ENG, 37-36-36.705N, 122-22-53.021W

RUNWAYS

ABC, 200
, 09L , 0.0  ,  0.0   , 555 , 200 ,    0 ,  3.0 , 50
, 27R , 1.56 , -0.086 , 547 , 200 , 1000 ,  3.2 , 54

ABC, 150
, 17  1.056  1.109  543  200  0  3.0  50
, 35  1.56  -0.086  548  200  0  3.0  50

TRACKS

09L, A, TR01, 55, 0
, 1.0 , 2.0
, 3.0 , 4.0
, 5.0 , 6.0

17, D, TR05, 100, 444
, 11.0 , 12.0
, 13.0 , 14.0
, 15.0 , 16.0

FLIGHT-OPERATIONS

09L, A, TR05-0
, 747200, S3, 3.2, 0, 0.004
, 737QN , S1, 9  , 0, 0

35, D, TR01
, 747200, S1, 1  , 0  , 0
, 737QN , S2, 5.5, 3.3, 7.7

LOCATION-POINTS

LOC01  S  1.3  1.4   0
LOC02, C, 1.7, 1.91, 0
LOC03, H, 3.7, 3.2 , 100
LOC04, B, 3.7, 7.0 , 300
LOC05, X, 3,   1   , 5
```



14.3 Terrain Elevation Data

Menu Item: Terrain

The Terrain Processor (1) creates a binary file of terrain elevation data used in computing noise, and (2) creates a binary file of terrain contours used as an overlay in the Output // Output Graphics window.

To run the Terrain Processor, you need to input information about the 3CD source-data input files. You can purchase a CD-ROM containing 3CD files for U.S. terrain elevations (see Appendix A). Users outside of the U.S. can create an "INM-3CD" file of elevation data by using the file format described in Appendix J.

First, select the input device that you are using: "CD-ROM" or "Hard Disk". If you select "CD-ROM", select the format that is being used: "Old" or "New". If the Micropath label on the CD-ROM lists the U.S. states contained on the CD-

ROM, then use the "New" format. Finally, select the CD-ROM drive letter from the drop-down box.

If your 3CD files are on a hard disk, select "Hard Disk", and type the full path name to the directory in which the 3CD files are located (e.g., "C:\ 3CD_DATA").

Next, input an airport identifier. This identifier is used as a file name and you may want to make it the same as your Study name.

When you input the geographic coordinates of the airport, please make sure that they are exactly the same as used to set up the Study, or else the terrain contours will not be aligned with the other output graphic layers. Since the Windows version of the Terrain Processor is intended for U.S. users, the longitude value is assumed to be west longitude.

The final input item is the full path name to the Study directory where the terrain elevation and terrain contour files are to be saved.

When you press "OK", the Terrain Processor reads four 3CD source files and produces one "INM-3CD" file. The INM-3CD file contains a 1201-by-1201 grid of elevation data, covering a 1-by-1 degree area centered on the airport. (The "INM-3CD" format is the same as the source-data 3CD format, except that some extra information is added to the end of the file.) The INM-3CD file is used by the COMP50 module in calculating noise.

The Terrain Processor next creates a GRD file using the INM-3CD data. The GRD file is then processed by the NMPLOT Version 3.03 program, producing a binary file of terrain contour data.

14.3.1 DOS Batch File

You do not have to use the Windows Source Data Processing program to process terrain data. Instead, you can use the MAKE3CD.BAT batch file and four DOS programs, three of which are in the INM system TERRAIN subdirectory (NMPLOT is in the NMPLOT subdirectory):

MAKEFILE	Processes four 3CD input files, creating the INM-3CD file
TERRAIN	Processes the INM-3CD file, creating the

	TERRAIN.GRD file
NMPLOT	Processes the GRD file, creating the CONTOUR.DAT file
DAT2BIN	Processes the DAT file, creating the _TERRAIN.BIN file

To run the DOS programs, do the following:

1. Change the current directory to INM50 \ TERRAIN

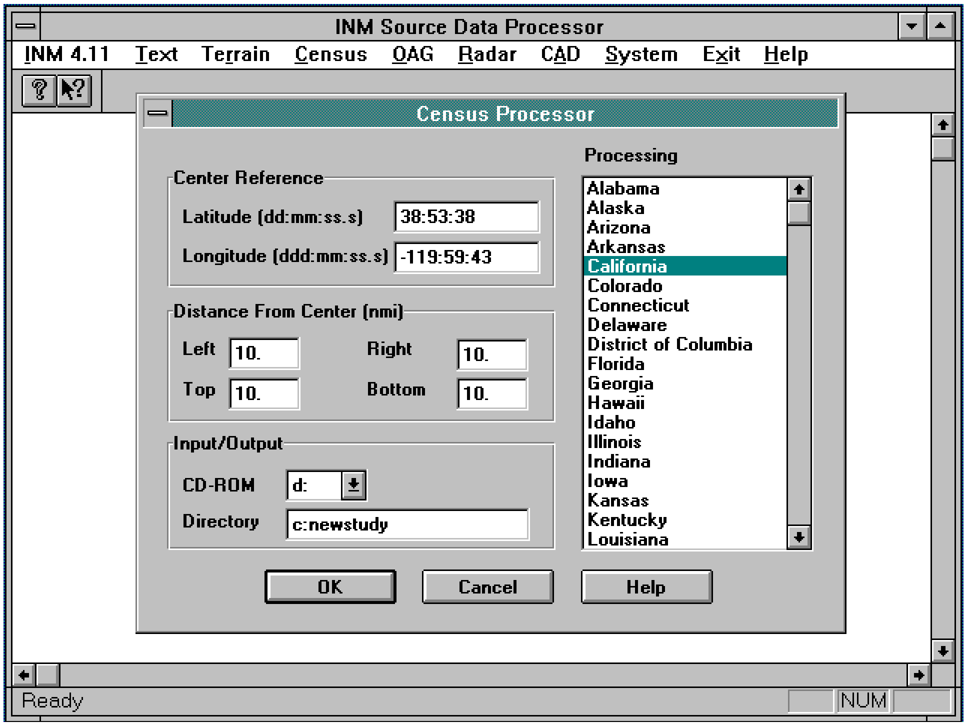
2. Create the MAKEFILE.CFG text file with one line of data:
   Airport id
   Latitude (d m s) positive is north
   Longitude (d m s) positive is west (not east!)
   Directory where *.3cd source files are stored (or CD drive)
   CD-ROM (Y=Yes, N=No)
   CD-ROM format (O=Old, N=New) (note: 'O' is a letter, not zero)

   Example:
   TVL 38 53 38 119 59 43 c:\inm\vmakfile\tvl N N

3. Run the batch file: MAKE3CD [airport] [Study path]
   [airport] must be the same as in MAKEFILE.CFG
   [Study path] is where aprt.3CD and _TERRAIN.BIN files go

   Example:
   MAKE3CD TVL k:\inmstudy\tvl

You may want to modify the MAKE3CD.BAT batch file. For example, users outside of the U.S., who directly create the INM-3CD file by using the format in Appendix J, do not need to run the MAKEFILE program, and should comment-out this DOS call.



14.4 Census Data

14.4.1 TIGER/Lines CD-ROM to Street Map Files

Menu Item: TIGER CDROM to Street Map

This function reads data from a TIGER/Lines CD-ROM and creates two related binary files: _TIGER.BIN and _TIGER.IDX. TIGER data provide polylines (arrays of X,Y points) depicting streets, highways, hydrographic features, civil boundaries, etc. If INM finds these two files in a Study directory, it can display a street map.

To use the TIGER Processor, first type in the latitude/longitude parameters, making sure that they are the same as for the origin of coordinates in your Study. If the two origins are different, the street map layer will not line up with the noise contours. Use a negative sign for west longitudes.

Next, 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. The dimensions of the box are left/right and top/bottom from the 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.

Then, select the drive letter for the CD-ROM drive (usually "d:") and type in the name of the directory where you want the output files written.

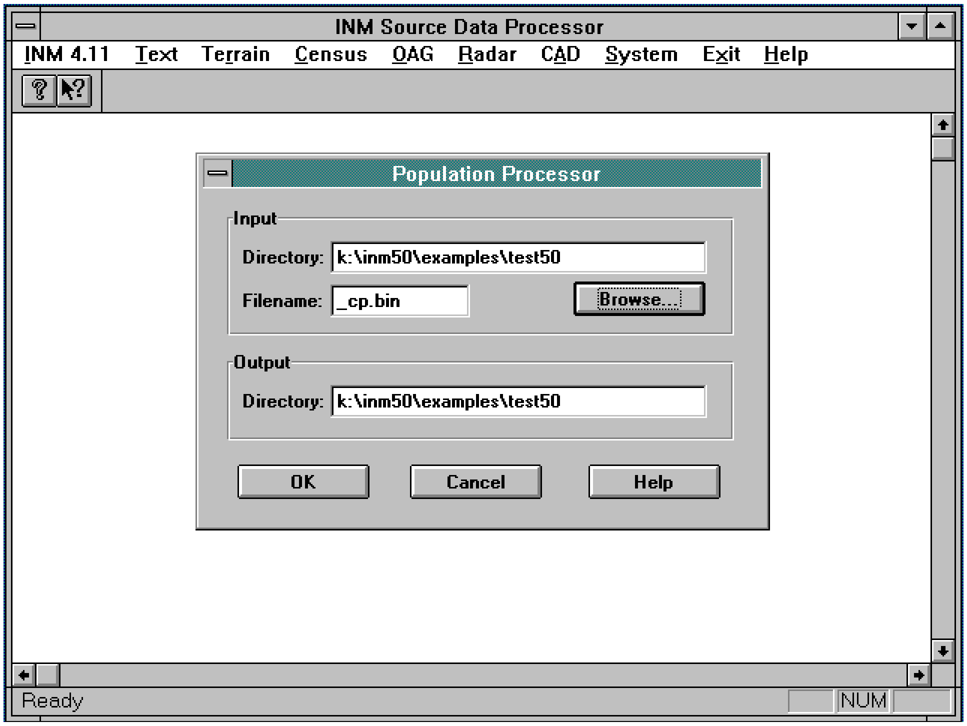
Finally, select the U.S. state in which your airport resides. If your Study is on a border, you can process multiple states by pressing "Ctrl" while clicking with the mouse. The program will ask you input the appropriate CD-ROM if the states are not on the same disk. Press "OK" to start the TIGER Processor.

14.4.2 PL94-171 CDROM to Population File

Menu Item: PL94-171 CDROM to Population

This function reads data from a PL94-171 CD-ROM and creates the _CP.BIN file containing binary data. Each population record contains the "census block" identifier, the latitude and longitude of the center of the block, the number of people living in the block, and the land and water areas in the block. INM uses the _CP.BIN file to display population points and to calculate the population inside of noise contours. The _CP.BIN file must be in your Study directory before INM can display and process population-point information.

To use the Population Processor, follow the instructions for the TIGER Processor (see Section 14.4.1, above).



14.4.3 Convert Population File to DBF File

Menu Item: Population to DBF

This function creates a POP_PTS DBF file using binary data in a _CP.BIN file. There are two reasons why you may want to do this. First, you need to have a POP_PTS file in your Study directory if you want INM to calculate noise values at population points. Second, you may want to edit population records.

If you do edit the POP_PTS DBF file, you must convert it back to the binary format using the "DBF to Population" function (see Section 14.4.4, below). INM will use your new binary file when computing population inside of contours.

To make a POP_PTS file, use the "Browse" button to navigate to the directory where the _CP.BIN file exists, select the file, and then specify the directory where you want the POP_PTS file to be written. The POP_PTS file usually goes into the Study directory, which is presented as the default directory.

INM uses the POP_PTS file to write X,Y coordinates into the FLIGHT.PTH file so that the noise computation module can calculate the noise level at each point. INM then writes out the noise data into the POP_NOIS DBF file by extracting the POINT_ID field in POP_PTS and reproducing it in POP_NOIS in the same order as in POP_PTS. Thus, you have two related files: POP_PTS, with latitude/longitude and population numbers, and POP_NOIS, with noise levels. They are related across the POINT_ID field. You may have many Output POP_NOIS files related to one POP_PTS file. You can use a DBMS to "join" two related files.

It is very important that you do not change the POP_PTS file while INM is computing noise (e.g., from another computer on a network) because INM does not actually copy the POINT_IDs into the FLIGHT.PTH file, instead relying on the order of the computed X,Y points being the same as the order of the POP_PTS records from which they were extracted. If the record order is changed, noise levels will be assigned to the wrong POINT_IDs.

Please be aware that the POP_PTS file can be very large. For example, the TEST50 POP_PTS file is about 667 Kb and contains over 10,000 records.

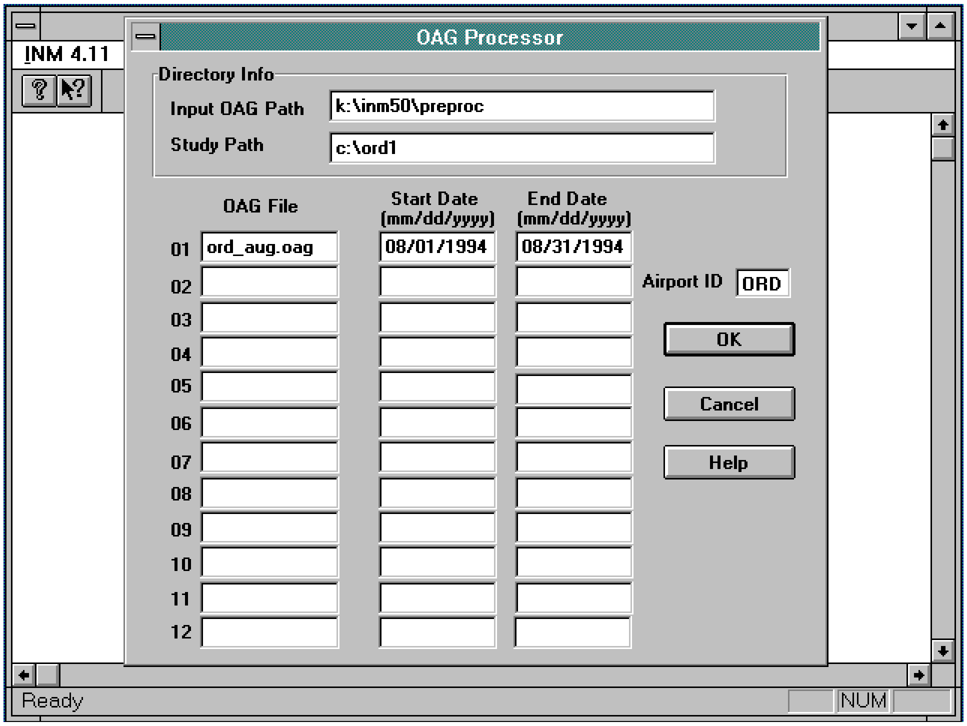
14.4.4 Convert DBF File to Population File

Menu Item: DBF to Population

This function creates a _CP.BIN binary file using data in a POP_PTS file. You need to use this function if you create your own POP_PTS file (by using a DBMS and the DBF header definition in the SYS_DBF subdirectory), or if you changed the POP_PTS file produced by the "Population to DBF" function, above.

Use the "Browse" button to navigate to the directory where the POP_PTS file exists, select the file, and then specify the directory where you want the _CP.BIN file to be written. The _CP.BIN file usually goes into the Study directory, which is presented as the default directory.

INM uses the _CP.BIN file to display population points and to calculate the population inside of noise contours.



14.5 OAG Flight Data

Menu Item: <u>OAG</u>

The OAG Processor is used to convert flight event data from the Official Airline Guides (OAG) to an OPS_APRT format for use in INM 5.0. The OAG data must be in the "Basic Chronological Diskette" format that provides one month's worth of flight data for a single airport. A technical description of the OAG format is provided in Appendix K.

The OAG Processor can process up to twelve month's worth of data for a single airport. When you process data for more than a single day, the event data are averaged to produce an average day over the user-selected time interval.

The OAG Processor requires two paths names: (1) the input directory path where the Basic Chronological Diskette files are located; and (2) the output directory path where you want the results to be written.

In addition to creating the OPS_APRT file, the OAG Processor produces a log file (e.g., OAG_LOG.ORD), which contains statistical information on the converted flight data, as well as a list of warnings for OAG flight data that could not be converted. If the log file currently exists, the program <u>appends</u> information to the end of an existing file. You should <u>delete</u> current versions of log file and OPS_APRT file, if they exist, before running the OAG processor.

You provide the name or names of the OAG files. These files must be located in the input directory specified above. For each file, you specify a start date and an end date. For a single day's worth of data, these two dates are the same. For example, to convert event data for July 7 through July 31 of 1994, you type in "07/07/1994" for the start date, and "07/31/1994" for the end date. Please notice the use of <u>leading zeros</u> and the four-digit year! The program produces an average day's worth of event data for this time period.

You specify an airport identifier. This must be the same as the three-character airport code of the airport in the OAG file. For example, if you have OAG files for Chicago O'Hare, you type "ORD" in the "Airport Id" box of the dialog window.

After providing the data listed above, click the "OK" button to begin OAG processing. The OAG Processor reads four DBF files, which are distributed with INM. The first, USR_DATA \ SYS_APRT.DBF, provides latitudes and longitudes for airports. The OAG Processor uses these coordinates to calculate the distances between two airports, obtaining INM "stage length" number. If an airport, which is in the OAG, is not in the SYS_APRT file, the flight is discarded, and a warning message is written to the log file.

The OAG Processor also reads the USR_DATA \ OAG_SUB.DBF file, which describes how OAG aircraft equipment codes are mapped to INM aircraft identifiers. If there is an OAG equipment code that is not provided in the OAG_SUB file, the flight is excluded, and a warning messages is written to the log file. You can add to or change the OAG_SUB file to improve equipment-code mapping for your particular Study.

Important: If you do change the SYS_APRT and/or OAG_SUB files, and you load a new version of INM, please remember to save these files before deleting the old version of INM.

The OAG Processor also reads SYS_DATA \ PROFILE.DBF data to determine the maximum stage length of an aircraft. If INM does not support a stage length implied in the OAG, a warning message is written to the log file. You can add these flights to your Study later, but you cannot change the INM Standard Profile database.

Finally, the SYS_DBF \ OPS_APRT.DBF file is used to get the DBF definition of the output file, which is also called OPS_APRT. It is written into the output directory that you specified.

As the OAG Processor executes, run-time messages are sent to a windows status bar. Upon successful completion of the program, a message box appears, notifying you that OAG processing is completed. Click on the "OK" button to return to the Source Data Processor main menu.

14.5.1 Adjusting the Computed Airport Operations

After creating the OPS_APRT file, you need to edit this file by using either INM or a DBMS program. This editing process includes adding missing flights that are identified in the OAG log file, deleting known "code-share" flights, and adding non-OAG flights.

The OAG_LOG.* file contains:

A section listing the airports not found in the SYS_APRT.DBF file

A section listing the distance to origin/destination airports and the corresponding INM stage length numbers

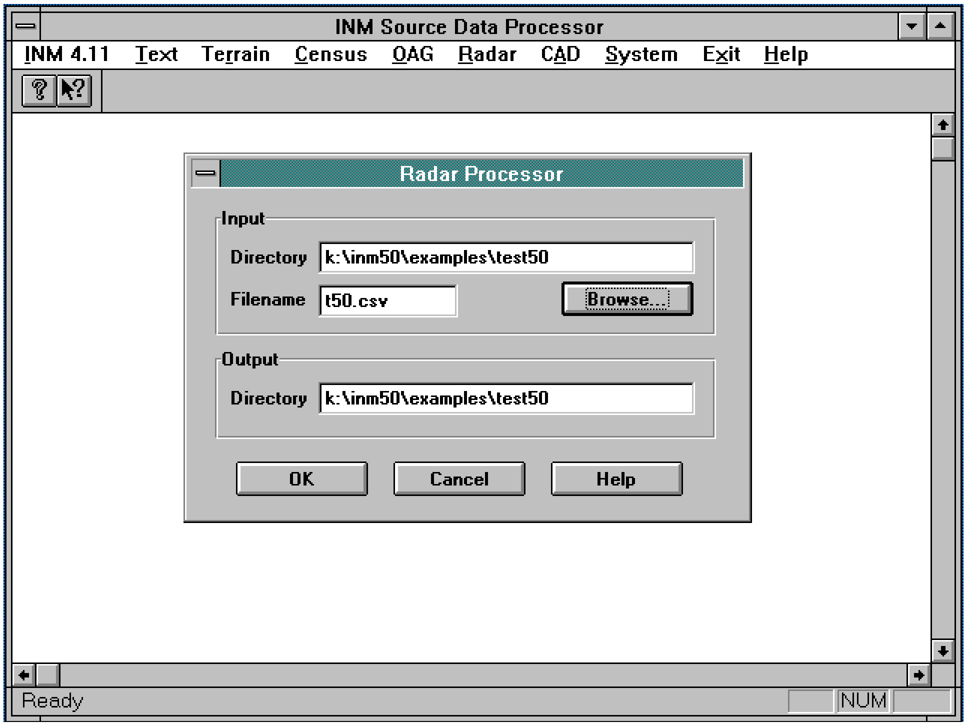
A warning section listing missing airports (especially non-U.S. airports), missing equipment types (especially helicopters), and flights with incompatible stage lengths

A section listing all of the types of OAG equipment, the OAG average daily operation frequency (Freq1), the resultant INM frequency (Freq2), the equivalent INM aircraft identifier, and the stage length.

If there are warnings, you need to fix them. One way is to add missing airports to the SYS_APRT file, add new OAG types to the OAG_SUB file, and run the OAG Processor again. If there are incompatible stage lengths (usually because the computed distance is slightly longer than the INM stage-length definition), you need to manually add these flights back into the OPS_APRT file. Use the next lower stage number.

Some OAG flights are duplicates of others; this situation is caused by the practice of airline "code sharing". Somehow you need to identify duplicate flights and decrease the number of flight operations in the OPS_APRT file.

Also, remember that you need to add unscheduled commercial flights, general aviation flights, and military flights because they are not represented in the OAG.



14.6 Radar Track Data

Menu Item: Radar

The Radar Processor reads a text file containing "radar tracks" and converts it into binary 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 ARTS radar tracks and write them to a specially formatted text file (see below). The INM system does not have a function to process raw ARTS data.

Use the "Browse" button to navigate to the directory where a file with the extension "CSV" exists, select the file, and then specify the directory where you want the output binary radar track files to be written. The two output files are called _FP.BIN and _TK.BIN, and they should be located in a Study directory.

14.6.1 Radar Input Format

The radar track text file format is:

```
# Comment line

XY-ORIGIN, Lat, Long, ENGLISH
      -or-
XY-ORIGIN, Lat, Long, METRIC

Code, FltId, AcType, OpType, ApFrom, ApTo, RwyId
, Time, X, Y, Alt, Spd
, Time, X, Y, Alt, Spd

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

where,

Lat,Long	X,Y coordinate origin: DDD-MM-SS.sssC (C = N,S,E,W)
Code	Beacon or numeric code (e.g., 0557) or "0000"
FltId	Flight identifier (e.g., AAL1234)
AcType	FAA aircraft type id (e.g., B727)
OpType	Operation type: A=approach, D=depart, V=overflight, ?=unknown
ApFrom	From-airport (e.g., "SAN") or "???"
ApTo	To-airport (e.g., "LAX") or "???"
RwyId	Runway end (e.g., "31L") or "???"
Time	Time of radar return (decimal hours)
X,Y	Aircraft position (nmi or km)
Alt	Aircraft altitude MSL (ft or m)
Spd	Aircraft ground speed (knt or km/h) or "0"

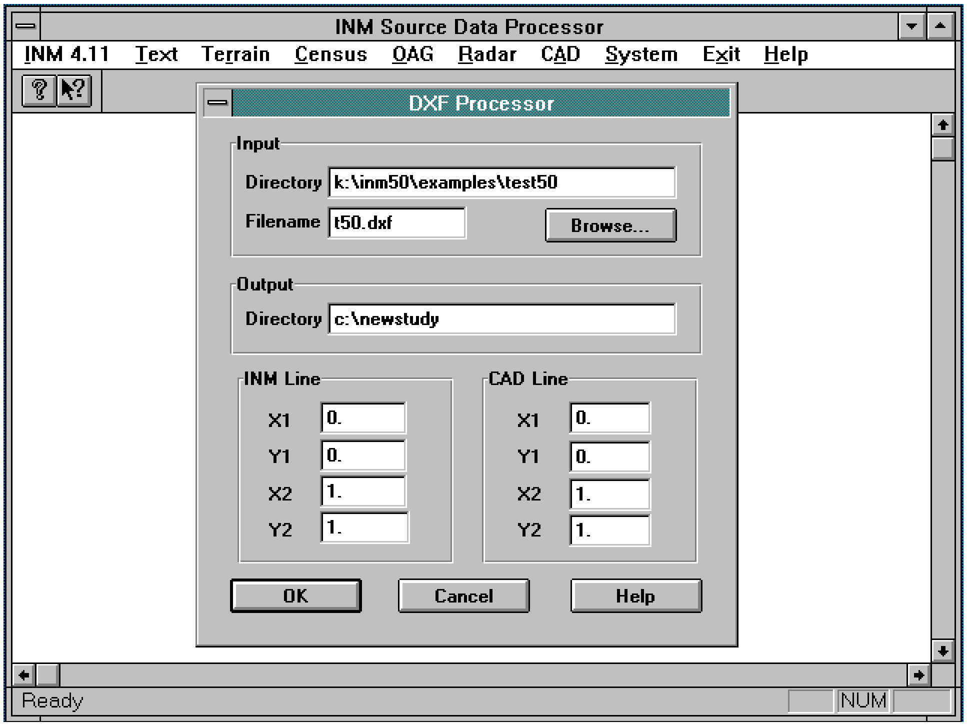
A comma must be in first column of a track-point line. There must be commas between data fields. Blank lines and comments lines can be anywhere. There can be any number of tracks and points per track.

If you want the Radar Processor to automatically list the radar track text file, make the file name extension "CSV".

14.6.2 Example Input File

The following listing is an edited portion of a radar track text file. The complete example file is in the INM50 \ STUDIES \ TEST50 Study directory and is called T50.CSV.

```
#EXAMPLE RADAR FILE

XY_ORIGIN, 37-37-08.407N, 122-22-29.436W, ENGLISH

0012, SDU105, BA31, A, ???, SFO, ???
, 9.28833, 11.15063, -5.67526, 3500, 187
, 9.28972, 10.99544, -5.53952, 3500, 186
, 9.29861, 9.70882, -5.04810, 3200, 179
, 9.30000, 9.54690, -4.92547, 3100, 179
, 9.32556, 6.00305, -2.91978, 2100, 187
, 9.32694, 5.85762, -2.77866, 2100, 185
, 9.36861, 0.72443, -0.19788, 100, 150

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
, 9.19611, 1.01306, -0.43077, 200, 147
, 9.19722, 0.82907, -0.37683, 200, 150
, 9.20000, 0.53725, -0.21331, 200, 150

0006, UAL1519, B737, A, ???, SFO, ???
, 9.16806, 13.94159, -7.02957, 5400, 251
, 9.17194, 13.15676, -6.71975, 4900, 242
, 9.17333, 12.90488, -6.67196, 4900, 238
, 9.20944, 7.44772, -3.81162, 2500, 190
, 9.21056, 7.30507, -3.63770, 2500, 190
, 9.24528, 2.04526, -0.91942, 600, 179
, 9.24806, 1.71276, -0.72447, 400, 174
, 9.25056, 1.50370, -0.64106, 300, 0
, 9.25306, 1.03050, -0.36880, 200, 171
, 9.25556, 0.70671, -0.21291, 100, 165
```



14.7 CAD Drawings

Menu Item: <u>CAD</u>

The CAD functions (1) provide a way for you to convert a DXF-formatted file into INM graphics format, for display as a layer in the Output Graphics window, and (2) convert INM track, runway, and noise-contour images into a DXF file.

14.7.1 DXF File to Airport Overlay File

You can use the DXF Processor to import an airport drawing into INM. First, you need a CAD file in the "DXF" format. Most CAD application programs provide a DXF-file export option. Try to use a simple drawing of the runways, taxiways, and buildings -- not an complicated engineering drawing. A simple drawing makes the size of the DXF file small, keeps the converted file small, and allows INM to display the airport overlay quickly.

Use the "Browse" button to navigate to the directory where the DXF file exists, select the file, and then specify the directory where you want the INM file to be written. The INM file will have the same name as the DXF file and will use a "CAD" extension. The CAD file usually goes into the Study directory, which is presented as the default directory.

After specifying the input file and output directory, press "OK". Do not change the default values of the parameters in the "INM Line" and "CAD Line" sections for the first pass through the conversion program.

When the DXF Processor is finished converting your DXF file for the first time, bring up INM and look at the INM runway and the CAD drawing overlays (see Sections 11.1 and 11.2 for how to create an Output Graphic window and view overlays).

Write down some numbers. First, set the View // Geo Units function to nautical miles. Then, pick a line connecting two points on the INM runway system -- usually two runway end points. Put the mouse pointer on the first point (your decision) and write down the X and Y values displayed on the status bar. Put the mouse pointer on the second point and write down the X and Y values again. Call these two points INM (X1, Y1) and INM (X2, Y2).

If you can see the CAD drawing, move the mouse pointer to the corresponding first point on the CAD drawing. For example, if INM point-1 is the end of runway 05R, then find on the CAD drawing where 05R ends. Write down the CAD point-1 values, and, similarly, the point-2 values. Call these two points CAD (X1, Y1) and CAD (X2, Y2).

If you cannot see the CAD drawing, even though it is enabled and you zoomed out and in, you need to get a CAD application program (e.g., AutoCAD[7]). You use the CAD program to obtain coordinate values, CAD (X1, Y1) and CAD (X2, Y2), in the CAD drawing.

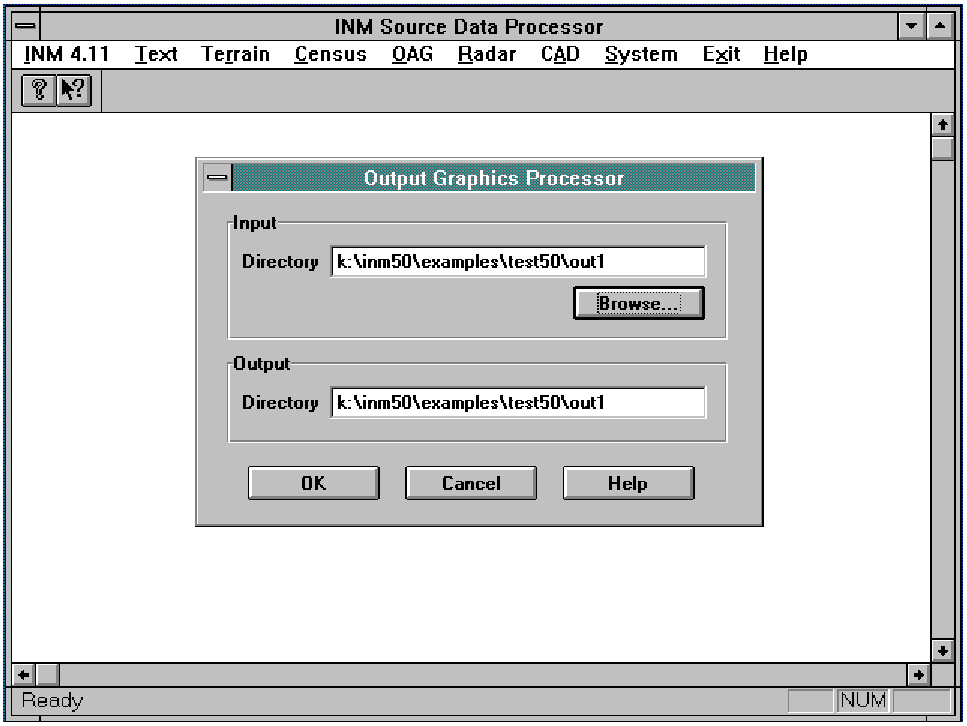
INM airport-size coordinates are contained in a box approximately "5 by "5 units (nautical miles). Some CAD drawings may use much larger numbers than "5 units (e.g., 10,000 feet). Also, some CAD drawings may employ a coordinate system that has an origin a long way from the airport.

Note that it does not matter what physical units are used in the CAD drawing (feet, meters, kilometers, etc.), only the coordinate values are important.

The second-pass conversion fixes the problems of a CAD drawing being at the wrong place, of the wrong size, and rotated. Return to the DXF Processor, and fill out the input file name and output directory, as before. This time, however, input the data you collected using INM (or INM and a CAD program). The INM points (X1, Y1) and INM (X2, Y2) go in the "INM Line" section. Similarly, the two CAD points go in the "CAD Line" section. After typing the eight coordinates, press "OK".

When the DXF Processor is finished converting your DXF file for the second time, go back to INM and look at the result. You will have to close the Output Graphics window and then open it again, so that it can read the new CAD file. Now, 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 your INM runway latitude/longitude values may be in error, or the DXF file has complex structures that are not being properly converted, or your CAD drawing may be distorted. (The TEST50 airport drawing is slightly distorted, and this is the reason that runways 10-28 are off.)



14.7.2 Output Graphics File to DXF File

The Output Graphics Processor converts _INM.BIN and _RWY_TRK.BIN files into DXF format. This allows you to manipulate INM graphics output in a separate CAD application program (e.g., AutoCAD[7]). The output DXF file is called "INM.DXF".

This is the same conversion function as the File // Export as DXF function in the INM.EXE program (see Section 3.10).

Use the "Browse" button to navigate to the directory where an _INM.BIN file exists, select the directory, and then specify the directory where you want the DXF file to be written. The DXF file usually goes into the same Output subdirectory as the input _INM.BIN and _RWY_TRK.BIN files. This Output subdirectory is presented as the default directory for the INM.DXF file.

14.8 System Extract DBF Files

Menu Item: System // Extract Files

The System // Extract Files function reads the ACDB50.BIN file, which is in the SYS_DATA system subdirectory, and creates ten INM Standard data DBF files, storing them back in the SYS_DATA subdirectory. You can look at the DBF files by using a DBMS program. You can also use the INM utility program PRN_DBF.EXE to write text files containing INM Standard data (see Appendix M.2).

You can edit and use these DBF files if you want to, but do not leave them in the SYS_DATA subdirectory because the next time that you use INM or the System // Extract Files function, they will be overwritten.

The presence of DBF files in the SYS_DATA directory has no effect on INM because INM reads the ACDB50.BIN file when it accesses Standard data.

14.9 Help Information

Menu Item: Help // Index
Toolbar: Question mark & arrow

This function runs the Microsoft WINHELP.EXE program using the PREPROC.HLP file. The Help // Index 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.

The toolbar question-mark button lets you jump directly to a Help section of interest. First, click on the button and get the question-mark cursor to follow the mouse. Then, click on a menu item of interest. You will go directly to the menu-item help text.

The various Source Data Processor dialog windows contain "Help" buttons that let you also jump directly to the appropriate Help section.

14.10 Exit Program

Menu Item: Exit

This function immediately closes the Source Data Processing program.

APPENDICES

1 SOURCES AND CONTACTS

This Appendix lists who to contact for more information about INM and related services.

1.1 Federal Aviation Administration

The INM program is managed in the Office of Environment and Energy (AEE) at the following address:

Office of Environment and Energy
Federal Aviation Administration
Room 900W
800 Independence Ave. S.W.
Washington, DC 20591

FAX (202) 267-5594

The main AEE contacts and their program areas are:

Dr. Jake A. Plante Analysis and Evaluation Branch AEE-120 (202) 267-3539	Branch Manager
Mr. John M. Gulding AEE-120 (202) 267-3654	Program Manager for INM 5.0
Dr. Steve G. Vahovich AEE-120 (202) 267-3559	Program Manager for AEE Bulletin Board System, INM aircraft substitutions
Ms. Donna G. Warren AEE-120 (202) 267-3571	Program Manager for Heliport Noise Model (HNM), Area Equivalent Method (AEM)

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 John Gulding or Donna Warren.

1.2 Technical Assistance

For technical assistance from the INM development team:

Mr. Jeffrey R. Olmstead
ATAC Corporation
757 N. Mary Ave.
Sunnyvale, CA 94086-2909

PHN (408) 736-2822
FAX (408) 736-8447

System integration, Pre-processing, Post-processing, Flight profiles, Flight paths, User interface, 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

Noise Model, NMPLOT

For technical assistance from FAA/AEE staff (see A.1 for phone numbers):

John M. Gulding
Steve G. Vahovich
Donna G. Warren

1.3 U.S. Terrain Elevation Data

You can purchase U.S. terrain elevation data from Micropath Corporation (formerly Rocky Mountain Communication, Inc.). Formatted USGS 3-arc-second elevation data are distributed on six CD-ROMs. Each CD-ROM costs $495. The elevation files are in a new "Release 2" directory format. 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

Please contact:

Mr. Marc Miller
Micropath Corporation
2023 Montane Drive East
Golden, CO 80401-9123

PHN (303) 526-5454
FAX (303) 526-2662

1.4 U.S. Census Data

Population data for the U.S. are distributed on 10 CD-ROMs, each one containing data for several states. Order the "1990 Census of Population and Housing, Public Law 94-171 Data". The price of each CD-ROM is $150.

Street map data for the U.S. are distributed on 44 CD-ROMs, each one containing data for a several counties in a state, one state, or several states. Order the "TIGER/Lines Census Files, 1990". The price of each CD-ROM is $250.

Please contact:

U.S. Department of Commerce
Bureau of the Census
Data User Services Division
Customer Services Branch
Washington, DC 20233

PHN (301) 763-4100
FAX (301) 763-4794

1.5 OAG Data

OAG Basic Chronological Diskette costs $265 for one airport for one month. Call for the price for multiple months.

Please contact:

Mr. Mark Nelson or Ms. Cindy McDonald
Official Airline Guides, Inc.

PHN 708-574-6000

1.6 SAE Reports

The two SAE reports that are the basis for the INM noise model are:

1. "Procedure for the Calculation of Airplane Noise in the Vicinity of Airports", SAE-AIR-1845, prepared by SAE Committee A-21, March 1986.

2. "Prediction Method for Lateral Attenuation of Airplane Noise During Takeoff and Landing", SAE-AIR-1751, March 1981, reaffirmed March 1991.

These documents can be ordered from:

Society of Automotive Engineers, Inc.
400 Commonwealth Drive
Warrendale, PA 15096-0001

PHN (412) 776-4841
FAX (412) 776-5760

2 DBF FILE FORMATS

This Appendix documents DBF file formats in terms of:

Name of the DBF file
Number of records in the file (for Standard files)
Number of bytes per record (including the dBase delete-byte)
Names of the fields
Type of field
Size of field
Description of field

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, and "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 (e.g., "! 234.678"). When an N-type field has "0" digits after the decimal point, the decimal point is not stored (e.g., "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  108 records   70 bytes/record
   Aircraft Table -- INM aircraft data
 * ACFT_ID     C   6
      INM Aircraft identifier

   ACFT_DESCR  C  20
      Aircraft type and engine type names

   GROUP_ID    C   3
      Default aircraft group identifier

   WGT_CAT     C   1
      Weight class (S = Small, L = Large, H = Heavy)

   OWNER_CAT   C   1
      Owner category (C = Commercial, G = GenAviation, M = Military)

   ENG_TYPE    C   1
      Engine type (J = Jet, T = Turboprop, P = Piston)

   NOISE_CAT   C   1
```

```
      Noise stage number (0,1,2,3)

   NOISE_ID    C   6
      Noise identifier

   NUMB_ENG    N   1  0
      Number of engines (1..4)

   THR_RESTOR  C   1
      Aircraft has Automated Thrust Restoration System (Y = Yes, N = No)

   MX_GW_TKO   N   6  0
      Maximum gross takeoff weight (lb)

   MX_GW_LND   N   6  0
      Maximum gross landing weight (lb)

   MX_DS_STOP  N   5  0
      FAR landing field length at maximum landing weight (ft)

   COEFF_TYPE  C   1
      Type of departure thrust coefficients (J = Jet, P = Prop)

   PWR_STATIC  N   5  0
      Rated engine static thrust (lb) or static power (hp)

   THR_100PCT  N   5  0
      Corrected net thrust per engine at 100%-setting (lb)


ACFT_SUB   42 records  102 bytes/record
   Aircraft Substitution Table -- new types mapped into defined INM types
 * SUB_ID      C   6
      Substitution identifier

   SUB_DESCR   C  40
      Description of the aircraft type

   ACFT_ID1    C   6
      First INM aircraft identifier

   PERCENT1    N   5  1
      Percent of SUB_ID1 that is assigned to ACFT_ID1

   ACFT_ID2    C   6
      Second INM aircraft identifier

   PERCENT2    N   5  1
      Percent of SUB_ID2 that is assigned to ACFT_ID2

   ACFT_ID3    C   6
      Third INM aircraft identifier

   PERCENT3    N   5  1
```

```
        Percent of SUB_ID2 that is assigned to ACFT_ID3

     ACFT_ID4    C   6
        Forth INM aircraft identifier

     PERCENT4    N   5  1
        Percent of SUB_ID3 that is assigned to ACFT_ID4

     ACFT_ID5    C   6
        Fifth INM aircraft identifier

     PERCENT5    N   5  1
        Percent of SUB_ID5 that is assigned to ACFT_ID5


  NOISE     682 records   65 bytes/record
     Noise Level Table -- noise-power-distance curves
   * NOISE_ID    C   6
        Noise identifier

   * NOISE_TYPE  C   1
        Type of noise (S = SEL, M = LAMAX, E = EPNL, P = PNLTM)

   * THR_SET     N   7  1
        Corrected net thrust per engine (lb or %)

     L_200       N   5  1
        Level for 200 feet (dB)

     L_400       N   5  1
        Level for 400 feet (dB)

     L_630       N   5  1
        Level for 630 feet (dB)

     L_1000      N   5  1
        Level for 1000 feet (dB)

     L_2000      N   5  1
        Level for 2000 feet (dB)

     L_4000      N   5  1
        Level for 4000 feet (dB)

     L_6300      N   5  1
        Level for 6000 feet (dB)

     L_10000     N   5  1
        Level for 10,000 feet (dB)

     L_16000     N   5  1
        Level for 16,000 feet (dB)

     L_25000     N   5  1
```

```
      Level for 25,000 feet (dB)


PROFILE   507 records   16 bytes/record
   Profile Identification Table -- takeoff and approach weight data
 * ACFT_ID     C   6
      Aircraft identifier

 * OP_TYPE     C   1
      Type of operation

 * PROF_ID1    C   1
      Profile group identifier

 * PROF_ID2    C   1
      Profile stage identifier

   WEIGHT      N   6  0
      Aircraft weight during this operation (lb)


PROF_PTS  605 records   40 bytes/record
   Profile Points Table -- aircraft profile data
 * ACFT_ID     C   6
      Aircraft identifier

 * OP_TYPE     C   1
      Type of operation

 * PROF_ID1    C   1
      Profile group identifier

 * PROF_ID2    C   1
      Profile stage identifier

 * PT_NUM      N   2  0
      Point number of the profile (1..99)

   DISTANCE    N   9  1
      Distance along the ground relative to start (ft)

   ALTITUDE    N   7  1
      Altitude of aircraft AFE (ft)

   SPEED       N   5  1
      Ground speed at this point (knt)

   THR_SET     N   7  1
      Corrected net thrust per engine at this point (lb or %)


PROCEDUR 3963 records   39 bytes/record
   Procedure Steps Table -- parameters used to calculate profiles
 * ACFT_ID     C   6
```

```
      Aircraft identifier

 * OP_TYPE     C   1
      Type of operation

 * PROF_ID1    C   1
      Profile group identifier

 * PROF_ID2    C   1
      Profile stage identifier

 * STEP_NUM    N   2  0
      Step number of the procedure (1..99)

   STEP_TYPE   C   1
      Type of step (T = Takeoff, C = Climb, ...)

   FLAP_ID     C   6
      Flap-setting identifier

   THR_TYPE    C   1
      Type of thrust (T = MaxTakeoff, C = MaxClimb, N = MaxContinue)

   PARAM1      N   7  1
      Parameter for this step type

   PARAM2      N   5  1
      Parameter for this step type

   PARAM3      N   7  1
      Parameter for this step type


FLAPS     639 records   38 bytes/record
   Flaps Table -- data related to approach & departure flaps settings
 * ACFT_ID     C   6
      Aircraft identifier

   OP_TYPE     C   1
      Type of operation (A = Approach, D = Depart, T = TouchGo, V = OverFlt)

 * FLAP_ID     C   6
      Flap-setting identifier

   COEFF_R     N   8  6
      Drag-over-lift ratio

   COEFF_C_D   N   8  6
      Takeoff and landing speed coefficient (knot/lb^1/2)

   COEFF_B     N   8  6
      Takeoff distance coefficient (ft/lb)


THR_JET   159 records   59 bytes/record
```

```
   Jet Thrust Table -- coefficients for departure thrust equations
 * ACFT_ID     C   6
      Aircraft identifier

 * THR_TYPE    C   1
      Type of thrust (T, C, N)

   COEFF_E     N   8  1
      Corrected net thrust per engine (lb) at zero speed

   COEFF_F     N   9  5
      Speed adjustment coefficient (lb/knt TAS)

   COEFF_GA    C  12
      Altitude adjustment coefficient (lb/ft MSL)

   COEFF_GB    C  12
      Altitude-squared adjustment coefficient (lb/ft^2 MSL)

   COEFF_H     C  10
      Temperature adjustment coefficient (lb/degC)


THR_PROP   32 records   18 bytes/record
   Propeller Thrust Table -- parameters for departure thrust equations
 * ACFT_ID     C   6
      Aircraft identifier

 * THR_TYPE    C   1
      Type of thrust (T, C)

   EFFICIENCY  N   4  2
      Propeller efficiency ratio

   POWER       N   6  1
      Net propulsive power per engine (hp) for this type of thrust


RUNWAY      0 records   14 bytes/record
   Runway Table -- geometric data for runways
 * RWY_ID1     C   3
      Runway end identifier

 * RWY_ID2     C   3
      Runway end identifier

   APRT_ID     C   4
      Airport identifier

   WIDTH       N   3  0
      Physical runway width (ft)


RWY_END     0 records   59 bytes/record
   Runway End Table -- data relating to runway ends
```

```
 * RWY_ID      C   3
      Runway end identifier

   LATITUDE    C  13
      Latitude of end (deg-min-sec N/S)

   LONGITUDE   C  14
      Longitude of end (deg-min-sec E/W)

   ELEVATION   N   6  1
      Elevation of end MSL (ft)

   DIS_TH_TKO  N   4  0
      Takeoff displaced threshold (ft)

   DIS_TH_APP  N   4  0
      Approach displaced threshold (ft)

   GLIDE_SL    N   3  1
      Glide slope for runway end (deg)

   TH_CR_HGT   N   5  1
      Approach threshold crossing height AGL (ft)

   PCT_WIND    N   6  1
      Percent change (%) in airport average headwind


TRACK       0 records   24 bytes/record
   Track Table -- dispersed track definition
 * RWY_ID      C   3
      Runway end identifier

 * OP_TYPE     C   1
      Type of operation

 * TRK_ID1     C   4
      Track identifier

 * TRK_ID2     C   1
      Sub-track identifier (0..8)

   PERCENT     N   6  2
      Percent (%) of dispersed track operations on this sub-track

   TRK_TYPE    C   1
      Type of track (V = Vectors, P = Points)

   DISTANCE    N   7  1
      Delta distance from nominal start-roll or touch-down point (ft)


TRK_SEGS    0 records   29 bytes/record
   Track Segments Table -- ground track segment data
 * RWY_ID      C   3
```

```
     Runway end identifier

  * OP_TYPE     C   1
     Type of operation

  * TRK_ID1     C   4
     Track identifier

  * TRK_ID2     C   1
     Sub-track identifier

  * SEG_NUM     N   2  0
     Segment or point number of the track (1..99)

    SEG_TYPE    C   1
     Type of track segment (S = Straight, L = Left, R = Right, P = Point)

    PARAM1      N   8  4
     Parameter  S= distance(nmi),  L/R= angle(deg),   P= x-coord(nmi)

    PARAM2      N   8  4
     Parameter  S= (blank),        L/R= radius(nmi),  P= y-coord(nmi)


GRP_PCT     0 records   19 bytes/record
   Group Percentage Table -- percent of flights on tracks
  * GROUP_ID    C   3
     User-defined aircraft group identifier

  * RWY_ID      C   3
     Runway end identifier

  * OP_TYPE     C   1
     Type of operation (A, D, T, V)

  * TRK_ID1     C   4
     Track identifier

  * PROF_ID1    C   1
     Profile group identifier

    PERCENT     N   6  2
     Percent of flights of this aircraft group using this track & prof.group


OPS_APRT    0 records   36 bytes/record
   Airport Operations Table -- operations summed over tracks
  * ACFT_ID     C   6
     INM or substitution aircraft identifier

  * OP_TYPE     C   1
     Type of operation (A, D, T, V)

  * PROF_ID2    C   1
```

```
      Profile stage identifier (0..9)

   OPS_DAY     N   9  4
      Number of day operations on all tracks

   OPS_EVE     N   9  4
      Number of evening operations on all tracks

   OPS_NIGHT   N   9  4
      Number of night operations on all tracks


OPS_FLT     0 records   44 bytes/record
   Flight Operations Table -- operations on tracks
 * ACFT_ID     C   6
      INM or substitution aircraft identifier

 * OP_TYPE     C   1
      Type of operation (A, D, T, V)

 * PROF_ID1    C   1
      Profile group identifier

 * PROF_ID2    C   1
      Profile stage identifier (0..9)

 * RWY_ID      C   3
      Runway end identifier
  * TRK_ID1     C   4
      Track identifier

   OPS_DAY     N   9  4
      Number of day operations

   OPS_EVE     N   9  4
      Number of evening operations

   OPS_NIGHT   N   9  4
      Number of night operations


OPS_CALC    0 records   48 bytes/record
   Flight Operations Calculation Table
 * ACFT_ID     C   6
      INM or substitution aircraft identifier

 * OP_TYPE     C   1
      Type of operation (A, D, T, V)

 * PROF_ID1    C   1
      Profile group identifier

 * PROF_ID2    C   1
      Profile stage identifier (0..9)
```

```
 * RWY_ID      C   3
      Runway end identifier

 * TRK_ID1     C   4
      Track identifier

 * TRK_ID2     C   1
      Sub-track identifier (0..8)

   GROUP_ID    C   3
      User-defined aircraft group identifier (for filtering purposes)

   OPS_DAY     N   9  4
      Number of day operations

   OPS_EVE     N   9  4
      Number of evening operations

   OPS_NIGHT   N   9  4
      Number of night operations


OPS_RNUP    0 records   67 bytes/record
   Run-Up Operations Table -- run-up operations
 * ACFT_ID     C   6
      INM or substitution aircraft identifier
   * RUNUP_ID    C   2
      Run-up identifier

   X_COORD     N   8  4
      X coordinate at run-up position (nmi)

   Y_COORD     N   8  4
      Y coordinate at run-up position (nmi)

   HEADING     N   5  1
      Aircraft heading (deg from true North)

   PCT_THR     N   5  1
      Percent (%) of static thrust used during run-up (%)

   DURATION    N   5  1
      Average duration of run-up event (seconds)

   OPS_DAY     N   9  4
      Number of day operations

   OPS_EVE     N   9  4
      Number of evening operations

   OPS_NIGHT   N   9  4
      Number of night operations


METRIC     13 records   32 bytes/record
```

```
  Noise Metric Definition Table -- system-default and user-defined metrics
* METRIC_ID   C   6
     Noise metric identifier

  METRIC_TYP  C   1
     Type of metric (E = Exposure, M = MaxLevel, T = TimeAbove)

  FREQ_TYPE   C   1
     Type of frequency weighting (A = A-Weighted, P = Perceived)

  WGT_DAY     N   6  2
     Weight multiplying day operations (0 or 1 for M and T types)

  WGT_EVE     N   6  2
     Weight multiplying evening operations

  WGT_NIGHT   N   6  2
     Weight multiplying night operations

  DB_MINUS    N   5  2
     Decibel amount subtracted from exposure level


CASE        0 records  157 bytes/record
  Case Parameters Table -- case setup parameters
* CASE_ID     C  12
     Case identifier (subdirectory under the study directory)

  CASE_DESC   C  40
     Case description

  DATE        C  15
     Date and time that the subdirectory was created

  TEMPERATUR  N   5  1
     Average temperature on the airport runways (deg F)

  PRESSURE    N   6  2
     Average atmospheric pressure on the airport runways (in-Hg)

  HEADWIND    N   4  1
     Average headwind on the airport runways (knt)
    RUN_TYPE    C   1
     Type of run (S = SingleMetric, M = MultiMetric)

  FREQ_TYPE   C   1
     Type of frequency weighting (A, P)

  METRIC_ID   C   6
     Noise metric identifier for single-metric run

  DO_FIELD    C   1
     Noise field representation computed (Y, N)

  DO_GRID1    C   1
```

```
   Standard grid analysis (Y, N)

DO_GRID2    C   1
   Standard & detailed grid analysis (Y, N)

DO_POP      C   1
   Population points computed (Y, N)

DO_LOC      C   1
   Location points computed (Y, N)

TA_THRESH   N   5  1
   Noise-level threshold for time-above metric (dB)

RS_REFINE   N   2  0
   Maximum number of refinement levels for subdividing grid

RS_TOLER    N   5  2
   Tolerance test value used in the subdivided grid method (dB)

RUN_DATE    C  15
   Date and time that the case was last run

RUN_DURATN  C   8
   Execution time for the Noise Calculation Program for the last run

DO_TERRAIN  C   1
   Terrain elevation calculation (Y, N)

DO_DNL      C   1
   Day-Night Level (Y, N)

DO_CNEL     C   1
   Community Noise Equivalent Level (Y, N)

DO_LAEQ     C   1
   Equivalent A-Level for 24h (Y, N)

DO_LAEQD    C   1
   Equivalent A-Level for Day 0700-2200 (Y, N)

DO_LAEQN    C   1
   Equivalent A-Level for Night 2200-0700 (Y, N)

DO_SEL      C   1
   Sound Exposure Level (Y, N)

DO_LAMAX    C   1
   Maximum A-Level (Y, N)

DO_TALA     C   1
   Time-Above an A-Level Threshold (Y, N)
```

```
   DO_NEF      C   1
      Noise Exposure Forecast (Y, N)
    DO_WECPNL   C   1
      Weighted Equivalent Continuous Perceived Noise Level (Y, N)

   DO_EPNL     C   1
      Effective Perceived Noise Level (Y, N)

   DO_PNLTM    C   1
      Maximum Perceived Noise Level (Y, N)

   DO_TAPNL    C   1
      Time-Above a Perceived Level Threshold (Y, N)

   CUTOFF_LOW  N   6  1
      Low cutoff for SingleMetric noise calculation (dB or min)

   CUTOFF_HI   N   6  1
      High cutoff for SingleMetric noise calculation (dB or min)


OUTPUT      0 records   97 bytes/record
   Output Definition Table -- subdirectories for computed metrics
 * OUTPUT_ID   C  12
      Subdirectory used to store the output files

   METRIC_ID   C   6
      Metric identifier

   OUT_TYPE    C   1
      Type or output (S = Single, D = Difference, A = LogAdd, M = Merge)

   CASE_ID1    C  12
      Case identifier (types S, D, A, and M)

   CASE_ID2    C  12
      Case identifier (types D, A, and M)

   CASE_ID3    C  12
      Case identifier (types A and M)

   CASE_ID4    C  12
      Case identifier (types A and M)

   CASE_ID5    C  12
      Case identifier (types A and M)

   CONR_MIN    N   6  1
      Minimum contour level (dB or min)

   CONR_MAX    N   6  1
      Maximum contour level (db or min)

   CONR_INC    N   4  1
```

```
      Increment level (dB or min)

   CONR_CALC   C   1
      Do post-processing calculations (CONVERT & NMPLOT) again (Y, N)


GRID        0 records   48 bytes/record
   Grid Definition Table -- grid points for noise calculation and analysis
 * GRID_ID     C   3
      Grid identifier

   GRID_TYPE   C   1
      Type of grid (C = Contour, S = Standard, D = Detailed)

   X_COORD     N   8  4
      X coordinate of the lower-left corner of the grid (nmi)

   Y_COORD     N   8  4
      Y coordinate of the lower-left corner of the grid (nmi)

   ANGLE       N   5  1
      Grid rotation angle (deg) from the X-axis to the I-axis

   DIST_I      N   8  4
      Distance between points in the I direction (nmi)

   DIST_J      N   8  4
      Distance between points in the J direction (nmi)

   NUMB_I      N   3  0
      Number of points in the I direction

   NUMB_J      N   3  0
      Number of points in the J directions


GRID_STD    0 records  105 bytes/record
   Standard Grid Analysis Table -- calculated noise metrics on the grid
 * GRID_ID     C   3
      Grid identifier

 * I_INDEX     N   3  0
      I index of the grid point

 * J_INDEX     N   3  0
      J index of the grid point

   X_COORD     N   8  4
      X coordinate value (nmi)

   Y_COORD     N   8  4
      Y coordinate value (nmi)

   Z_COORD     N   7  1
```

```
        Z coordinate value MSL (ft)

     METRIC      N   5  1
        User-defined metric value (dB or minutes)

     DNL         N   5  1
        DNL value (dB)

     CNEL        N   5  1
        CNEL value (dB)

     LAEQ        N   5  1
        LAeq value (dB)

     LAEQD       N   5  1
        LAeqD value (dB)

     LAEQN       N   5  1
        LAeqN value (dB)

     SEL         N   5  1
        SEL value (dB)

     LAMAX       N   5  1
        LAMAX value (dB)

     TALA        N   6  1
        TA-LA value (minutes)

     NEF         N   5  1
        NEF value (dB)

     WECPNL      N   5  1
        WECPNL value (dB)

     EPNL        N   5  1
        EPNL value (dB)

     PNLTM       N   5  1
        PNLTM value (dB)

     TAPNL       N   6  1
        TA-PNL value (minutes)


  GRID_DTL    0 records   90 bytes/record
     Detailed Grid Analysis Table -- calculated noise metric components
   * METRIC_ID   C   6
        Metric Identifier

   * GRID_ID     C   3
        Grid identifier

   * I_INDEX     N   3  0
```

```
      I index of the grid point

 * J_INDEX     N   3  0
      J index of the grid point

 * ACFT_ID     C   6
      Aircraft identifier

 * OP_TYPE     C   1
      Type of operation (A, D, T, V)

 * PROF_ID1    C   1
      Profile group identifier

 * PROF_ID2    C   1
      Profile stage identifier (0..9)

 * RWY_ID      C   3
      Runway end identifier

 * TRK_ID1     C   4
      Track identifier

 * TRK_ID2     C   1
      Sub-track identifier (0..8)

   DISTANCE    N   8  1
      Distance to aircraft at CPA (ft)

   ALTITUDE    N   5  0
      Altitude of aircraft at CPA AFE (ft)

   ELEV_ANG    N   4  1
      Elevation angle at CPA (deg above ground plane)

   SPEED       N   5  1
      Speed of aircraft at CPA TAS (knt)
     THR_SET     N   7  1
      Thrust setting at CPA (lb or %)

   OPS_EQUIV   N   9  4
      Equivalent number of operations for this flight

   METRIC_ONE  N   6  1
      Metric value caused by one operation (dB or minutes)

   METRIC_ALL  N   6  1
      Metric value caused by all operations (dB or minutes)

   PERCENT     N   7  3
      Percent (%) of total metric due to this aircraft's operations


CONR_PTS    0 records   53 bytes/record
   Contour Points Table -- points defining noise contours
```

```
 * LEVEL       N   5  1
      Contour level (dB or minutes)

 * ISLAND_NUM  N   2  0
      Island number (for multiple contours at same level)

   ISLAND_TYP  C   1
      Type of island (P = Positive, N = Negative)

 * X_COORD     N   8  4
      X coordinate on contour (nmi)

 * Y_COORD     N   8  4
      Y coordinate on contour (nmi)

   POINT_OK    C   1
      This point is on the contour and not on the border (Y, N)

   LATITUDE    C  13
      Latitude of the point

   LONGITUDE   C  14
      Longitude of the point


POP_CONR    0 records   31 bytes/record
   Population Contour Table -- number of people inside noise contours
 * LEVEL       N   5  1
      Contour level (dB or minutes)

   CONR_OK     C   1
      Contour completely contained inside grid boundary (Y, N)

   POPULATION  N   6  0
      Number of people inside all islands of this contour

   AREA        N   6  2
      Calculated area inside all islands of this contour (mi^2)

   AREA_LAND   N   6  2
      Land area of blocks with centers inside (mi^2)

   AREA_WATER  N   6  2
      Water area of blocks with centers inside (mi^2)


POP_PTS     0 records   62 bytes/record
   Population Points Table -- US Census PL-94-171 CD data
 * POINT_ID    C  10
      Point identifier (census block identifier)

   LATITUDE    C  13
      Latitude of the center of the block (deg-min-sec N/S)

   LONGITUDE   C  14
```

```
      Longitude of the center of the block (deg-min-sec N/S)

   POPULATION  N   5  0
      Number of people in the block

   AREA_LAND   N   8  6
      Land area in the block (nmi^2)

   AREA_WATER  N   8  6
      Water area in the block (nmi^2)

   LAND_USE    C   3
      User-defined land-use identifier (blank)


POP_NOIS    0 records   17 bytes/record
   Population Noise Point Table -- noise at population points
 * POINT_ID    C  10
      Point identifier (defined in POP_PTS)

   METRIC      N   6  1
      Metric value (dB or minutes)


LOC_PTS     0 records   40 bytes/record
   Location Points Table -- location of schools
 * POINT_ID    C   6
      User-defined point identifier

   POINT_CAT   C   1
      User-defined point category (S=school, ...)

   LATITUDE    C  13
      Latitude of the point

   LONGITUDE   C  14
      Longitude of the point

   HEIGHT      N   5  0
      Height above the ground of the point (ft)


LOC_NOIS    0 records   13 bytes/record
   Location Noise Point Table -- noise at location points
 * POINT_ID    C   6
      Point identifier (defined in LOC_PTS)

   METRIC      N   6  1
      Metric value (dB or minutes)


SYS_APRT 1500 records   73 bytes/record
   System Airport Table -- NFDC data
 * APRT_ID     C   4
```

```
      Airport identifier

   NAME        C  25
      City/airport name

   STATE       C   2
      U.S. state

   LATITUDE    C  13
      Latitude of airport reference point (deg-min-sec N/S)

   LONGITUDE   C  14
      Longitude of airport reference point (deg-min-sec E/W)

   ELEVATION   N   4  0
      Elevation of highest point on any runway MSL (ft)

   PATTRN_ALT  N   4  0
      Pattern altitude AFE (ft)

   YR_OPS_ALL  N   6  0
      Yearly operations (Commercial + GenAv + Military)


SYS_RWY  1033 records  109 bytes/record
   System Runway Table -- NFDC data
 * APRT_ID     C   4
      Airport identifier

   RWY_LENGTH  N   5  0
      Physical runway length (ft)

   RWY_WIDTH   N   3  0
      Physical runway width (ft)

 * A_RWY_ID    C   3
      Runway identifier for end A

   A_LAT       C  13
      Latitude of end A (deg-min-sec N/S)

   A_LONG      C  14
      Longitude of end A (deg-min-sec E/W)

   A_ELEVATN   N   6  1
      Elevation of end A MSL (ft)

   A_DIS_APP   N   4  0
      Approach displaced threshold for end A (ft from end)

   A_GLIDE_SL  N   3  1
      Glide slope for end A (deg)

   A_TCH       N   5  1
```

```
     Threshold crossing height at end A AGL (ft)

* B_RWY_ID    C   3
     Runway identifier for end B

  B_LAT       C  13
     Latitude of end B (deg-min-sec N/S)

  B_LONG      C  14
     Longitude of end B (deg-min-sec E/W)

  B_ELEVATN   N   6  1
     Elevation of end B MSL (ft)

  B_DIS_APP   N   4  0
     Approach displaced threshold for end B (ft from end)

  B_GLIDE_SL  N   3  1
     Glide slope for end B (deg)

  B_TCH       N   5  1
     Threshold crossing height for end B AGL (ft)
```

3 INM STANDARD DATA

This Appendix documents the INM Standard database. The DBF files which comprise the database are listed below. The indicator following the file name shows whether the file in the Appendix is complete, or is just a partial listing.

1.	AIRCRAFT	Complete
2.	ACFT_SUB	Complete
3.	NOISE	Partial
4.	PROFILE	Partial
5.	PROF_PTS	Partial
6.	PROCEDUR	Partial
7.	FLAPS	Partial
8.	THR_JET	Complete
9.	THR_PROP	Complete
10.	METRIC	Complete

```
File: K:\INM50\SYS_DATA\AIRCRAFT.DBF
Last update: 27-Jul-1995
Fields(16):
 1  ACFT_ID      C   6
 2  ACFT_DESCR   C  20
 3  GROUP_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  PWR_STATIC   N   5.0
16  THR_100PCT   N   5.0
Records(108):
 707    , B707-120/JT3C        , COM , H , C , J , 1 , JT4A   , 4 , N , 302400 , 188900 ,  6682 , J ,     0 ,      0
 707120 , B707-120B/JT3D-3     , COM , H , C , J , 1 , JT3D   , 4 , N , 302400 , 188900 ,  6893 , J ,     0 ,      0
 707320 , B707-320B/JT3D-7     , COM , H , C , J , 1 , JT3D   , 4 , N , 334000 , 247000 ,  5622 , J , 19000 ,      0
 707QN  , B707-320B/JT3D-7QN   , COM , H , C , J , 2 , JT3DQ  , 4 , N , 334000 , 247000 ,  5622 , J , 19000 ,      0
 720    , B720/JT3C            , COM , L , C , J , 1 , JT4A   , 4 , N , 223500 , 155600 ,  4871 , J ,     0 ,      0
 720B   , B720B/JT3D-3         , COM , L , C , J , 1 , JT3D   , 4 , N , 234000 , 175000 ,  5717 , J , 18000 ,      0
 727100 , B727-100/JT8D-7      , COM , L , C , J , 1 , 3JT8D  , 3 , N , 169500 , 142500 ,  4867 , J , 14000 ,      0
 72710A ,"B727-100/JT8D-7,219 ", COM , L , C , J , 0 , XXXXXX , 3 , N , 169500 , 142500 ,  4867 , J , 19133 ,      0
 727200 , B727-200/JT8D-7      , COM , L , C , J , 1 , 3JT8D  , 3 , N , 217600 , 163300 ,  5571 , J ,     0 ,      0
 72720A ,"B727-200/JT8D-17,217", COM , L , C , J , 0 , XXXXXX , 3 , N , 208000 , 164000 ,  5283 , J , 19233 ,      0
 727D15 , B727-200/JT8D-15     , COM , L , C , J , 1 , 3JT8D  , 3 , N , 208000 , 169000 ,  4922 , J , 15500 ,      0
 727D17 , B727-200/JT8D-17     , COM , L , C , J , 2 , 3JT8DQ , 3 , N , 208000 , 169000 ,  5444 , J , 16000 ,      0
 727EM1 , FEDX 727-100/JT8D-7  , COM , L , C , J , 3 , 3JT8E7 , 3 , N , 185900 , 142500 ,  4867 , J ,     0 ,      0
 727EM2 , FEDX 727-200/JT8D-15 , COM , L , C , J , 3 , 3JT8E5 , 3 , N , 240000 , 169000 ,  4922 , J ,     0 ,      0
 727Q15 , B727-200/JT8D-15QN   , COM , L , C , J , 2 , 3JT8DQ , 3 , N , 208000 , 169000 ,  4922 , J , 15500 ,      0
 727Q7  , B727-100/JT8D-7QN    , COM , L , C , J , 2 , 3JT8DQ , 3 , N , 169500 , 142500 ,  4867 , J , 14000 ,      0
 727Q9  , B727-200/JT8D-9      , COM , L , C , J , 2 , 3JT8DQ , 3 , N , 190000 , 160000 ,  5444 , J , 14500 ,      0
 727QF  , UPS 727100 22C 25C   , COM , L , C , J , 3 , TAY651 , 3 , N , 169000 , 142500 ,  4448 , J , 15380 ,      0
 737    , B737/JT8D-9          , COM , L , C , J , 1 , 2JT8D  , 2 , N , 109000 ,  98000 ,  3900 , J , 14500 ,      0
 737300 , B737-300/CFM56-3B-1  , COM , L , C , J , 3 , CFM563 , 2 , N , 135000 , 114000 ,  4580 , J , 20000 ,      0
 7373B2 , B737-300/CFM56-3B-2  , COM , L , C , J , 3 , CFM563 , 2 , N , 139000 , 114000 ,  4580 , J , 22000 ,      0
 737400 , B737-400/CFM56-3C-1  , COM , L , C , J , 3 , CFM563 , 2 , N , 150000 , 124000 ,  5062 , J , 23500 ,      0
 737500 , B737-500/CFM56-3B-1  , COM , L , C , J , 3 , CFM563 , 2 , N , 138500 , 111000 ,  4551 , J , 20000 ,      0
 737D17 , B737-200/JT8D-17     , COM , L , C , J , 2 , 2JT8DQ , 2 , N , 124000 , 107000 ,  4244 , J , 16000 ,      0
 737QN  , B737/JT8D-9QN        , COM , L , C , J , 2 , 2JT8DQ , 2 , N , 109000 ,  98000 ,  3900 , J , 14500 ,      0
 747100 , B747-100/JT9DBD      , COM , H , C , J , 2 , JT9DBD , 4 , N , 733000 , 516600 ,  5727 , J ,     0 ,      0
 74710Q , B747-100/JT9D-7QN    , COM , H , C , J , 3 , JT9DFL , 4 , N , 733000 , 564000 ,  6200 , J , 45500 ,      0
 747200 , B747-200/JT9D-7      , COM , H , C , J , 3 , JT9DFL , 4 , N , 770000 , 564000 ,  6200 , J , 45500 ,      0
 74720A , B747-200/JT9D-7A     , COM , H , C , J , 3 , JT9D7Q , 4 , N , 785000 , 564000 ,  6200 , J , 46300 ,      0
 74720B , B747-200/JT9D-7Q     , COM , H , C , J , 3 , JT9D7Q , 4 , N , 800000 , 630000 ,  6200 , J , 53000 ,      0
 747400 , B747-400/PW4056      , COM , H , C , J , 3 , PW4056 , 4 , N , 870000 , 630000 ,  6989 , J , 56800 ,      0
 747SP  , B747SP/JT9D-7        , COM , H , C , J , 3 , JT9DFL , 4 , N , 702000 , 475000 ,  5911 , J , 45500 ,      0
 757PW  , B757-200/PW2037      , COM , L , C , J , 3 , PW2037 , 2 , N , 240000 , 198000 ,  4790 , J , 38300 ,      0
 757RR  , B757-200/RB211-535E4 , COM , L , C , J , 3 , RR535E , 2 , N , 220000 , 198000 ,  4640 , J , 40100 ,      0
 767300 , B767-300/PW4060      , COM , H , C , J , 3 , 2CF680 , 2 , N , 407000 , 320000 ,  4710 , J , 60000 ,      0
```

767CF6	B767-200/CF6-80A	COM	H	C	J	3	2CF680	2	N	302000	270000	4700	J	48000	0
767JT9	B767-200/JT9D-7R4D	COM	H	C	J	3	2CF680	2	N	351000	270000	4744	J	48000	0
A300	A300B4-200/CF6-50C2	COM	H	C	J	3	2CF650	2	N	364000	295000	5367	J	52500	0
A310	A310-300/CF6-80C2A2	COM	H	C	J	3	2CF650	2	N	331000	271000	4880	J	53500	0
A320	A320-211/CFM56-5A-1	COM	L	C	J	3	CFM565	2	N	162000	142000	1730	J	25000	0
A7D	"A-7D,E/TF-41-A-1 "	MIL	L	M	J	0	TF41	1	N	42000	37100	7356	J	14500	0
BAC111	BAC111/SPEY MK511-14	COM	L	C	J	2	2JT8D	2	N	89600	82000	4449	J	11400	0
BAE146	BAE146-200/ALF502R-5	COM	L	C	J	3	AL502R	4	N	93000	81000	3770	J	6970	0
BAE300	BAE146-300/ALF502R-5	COM	L	C	J	3	AL502R	4	N	97500	84500	3960	J	6970	0
BEC58P	BARON 58P/TS10-520-L	GA	S	G	P	0	TSIO52	2	N	6100	6100	2733	P	310	779
C130	C-130H/T56-A-15	MIL	L	M	T	3	T56A15	4	N	155000	135000	4850	P	4680	8026
C130E	C-130E/T56-A-7	MIL	L	M	T	0	T56A7	4	N	155000	130000	4670	P	4050	7063
CIT3	CIT 3/TFE731-3-100S	GA	L	G	J	3	TF7313	2	N	20000	17000	2770	J	3650	0
CL600	CL600/ALF502L	GA	L	G	J	3	AL502L	2	N	36000	33000	3300	J	7500	0
CL601	CL601/CF34-3A	GA	L	G	J	3	CF34	2	N	43100	36000	3550	J	9220	0
CNA441	CONQUEST II/TPE331-8	COM	S	C	T	0	TPE331	2	N	9900	9400	1939	P	636	1535
CNA500	CIT 2/JT15D-4	GA	L	G	J	3	JT15D1	2	N	14700	14000	3050	J	2500	0
COMJET	1985 BUSINESS JET	GA	L	G	J	1	CGAJ	2	N	19200	16200	2889	J	3600	2900
COMSEP	1985 1-ENG COMP	GA	S	G	P	0	CGASEP	1	N	2400	2400	1156	P	165	605
CONCRD	CONCORDE/OLY593	COM	H	C	J	0	OLY593	4	N	400000	245000	10600	J	38100	0
CVR580	CV580/ALL 501-D15	COM	L	C	T	0	501D13	2	N	58000	52000	4256	P	3750	8100
DC1010	DC10-10/CF6-6D	COM	H	C	J	3	CF66D	3	N	455000	363000	5820	J	40000	0
DC1030	DC10-30/CF6-50C2	COM	H	C	J	3	CF66D	3	N	572000	403000	5418	J	53200	0
DC1040	DC10-40/JT9D-20	COM	H	C	J	3	CF66D	3	N	555000	403000	6020	J	49400	0
DC3	DC3/R1820-86	COM	L	C	P	0	2R2800	2	N	28000	24500	2222	P	1425	3120
DC6	DC6/R2800-CB17	COM	L	C	P	0	4R2800	4	N	106000	95000	3010	P	2500	4180
DC820	DC-8-20/JT4A	COM	H	C	J	1	JT4A	4	N	317600	194400	6527	J	0	0
DC850	DC8-50/JT3D-3B	COM	H	C	J	1	JT3D	4	N	325000	240000	5400	J	18000	0
DC860	DC8-60/JT3D-7	COM	H	C	J	1	JT3D	4	N	355000	275000	5310	J	19000	0
DC870	DC8-70/CFM56-2C-5	COM	H	C	J	3	CFM562	4	N	355000	258000	6500	J	22000	0
DC8QN	DC8-60/JT8D-7QN	COM	H	C	J	2	JT3DQ	4	N	355000	275000	5310	J	19000	0
DC910	DC9-10/JT8D-7	COM	L	C	J	1	2JT8D	2	N	90700	81700	5030	J	14000	0
DC930	DC9-30/JT8D-9	COM	L	C	J	1	2JT8D	2	N	114000	102000	4680	J	14500	0
DC950	DC9-50/JT8D-17	COM	L	C	J	2	2JT8DQ	2	N	121000	110000	4880	J	16000	0
DC9Q7	DC9-10/JT8D-7QN	COM	L	C	J	2	2JT8DQ	2	N	90700	81700	5030	J	14000	0
DC9Q9	DC9-30/JT8D-9QN	COM	L	C	J	2	2JT8DQ	2	N	114000	102000	4680	J	14500	0
DHC6	DASH 6/PT6A-27	COM	S	C	T	0	PT6A27	2	N	12500	12300	1500	P	652	2000
DHC7	DASH 7/PT6A-50	COM	L	C	T	3	PT6A50	4	N	41000	39000	2150	P	1174	2850
DHC8	DASH 8-100/PW121	COM	L	C	T	3	PW120	2	N	34500	33900	3000	J	1950	4750
DHC830	DASH 8-300/PW123	COM	L	C	T	3	PW120	2	N	43000	42000	3500	J	2142	4918
F10062	F100/TAY 620-15	COM	L	C	J	3	TAY620	2	N	95000	85500	4560	J	13900	0
F10065	F100/TAY 650-15	COM	L	C	J	3	TAY650	2	N	98000	88000	4704	J	15100	0
F16A	F-16A/PW-200	MIL	L	M	J	0	PW200	1	N	29400	23300	4444	J	0	0
F16GE	F-16C/D/GE-100	MIL	L	M	J	0	GE100	1	N	29400	23300	4444	J	0	0
F16PW0	F-16C/D/PW-220	MIL	L	M	J	0	PW220	1	N	29400	23300	4444	J	0	0
F16PW9	F-16C/D/PW-229	MIL	L	M	J	0	PW229	1	N	29400	23300	4444	J	0	0
F28MK2	F28-2000/RB183MK555	COM	L	C	J	2	RB183	2	N	65000	59000	3540	J	9850	0
F28MK4	F28-4000/RB183MK555	COM	L	C	J	2	RB183P	2	N	71000	64000	3546	J	9900	0
F4C	F-4C/J79-GE-15	MIL	L	M	J	0	J79	2	N	52000	40000	4444	J	10900	0
FAL20	FALCON 20/CF700-2D-2	GA	L	G	J	2	CF700	2	N	28700	27300	2490	J	4500	0
GASEPF	1985 1-ENG FP PROP	GA	S	G	P	0	SEPFP	1	N	2200	2200	1160	P	150	560
GASEPV	1985 1-ENG VP PROP	GA	S	G	P	0	SEPVP	1	N	3000	3000	1111	P	260	790
GIIB	GIIB/SPEY MK511-8	GA	L	G	J	2	SP5118	2	N	65500	58500	3200	J	11400	0
GIV	GIV/TAY 611	GA	L	G	J	3	TAY620	2	N	71700	58500	3200	J	13850	0
HS748A	HS748/DART MK532-2	COM	L	C	T	2	RDA532	2	N	46500	43000	3360	P	2280	5150
IA1125	ASTRA 1125/TFE731-3A	GA	L	G	J	3	TF7313	2	N	23500	20700	3689	J	3700	0
KC135	KC135A/J57-P-59W	MIL	H	M	J	0	J57	4	N	300000	228000	6689	J	11750	0
KC135B	KC135B/JT3D-7	MIL	H	M	J	0	JT3D	4	N	300000	228000	6689	J	19000	0
KC135R	KC135R/CFM56-2B-1	MIL	H	M	J	0	CFM56A	4	N	324000	244000	6556	J	22000	0
L1011	L1011/RB211-22B	COM	H	C	J	3	RB2112	3	N	430000	358000	5693	J	42000	0
L10115	L1011-500/RB211-224B	COM	H	C	J	3	RB2112	3	N	510000	368000	6800	J	50000	0
L188	L188C/ALL 501-D13	COM	L	C	T	0	T56A7	4	N	116000	98100	4960	P	3750	8000
LEAR25	LEAR 25/CJ610-8	GA	L	G	J	2	CJ610	2	N	15000	13500	2620	J	2950	0
LEAR35	LEAR 36/TFE731-2	GA	L	G	J	3	TF7312	2	N	18300	15300	3076	J	3500	0
MD11GE	MD-11/CF6-80C2D1F	COM	H	C	J	3	2CF68D	3	N	682400	433300	5131	J	61500	0
MD11PW	MD-11/PW 4460	COM	H	C	J	3	PW4460	3	N	682400	433300	4681	J	60000	0
MD81	MD-81/JT8D-209	COM	L	C	J	3	2JT8D2	2	N	140000	128000	4860	J	19300	0
MD82	MD-82/JT8D-217A	COM	L	C	J	3	2JT8D2	2	N	149500	130000	4920	J	20900	0
MD83	MD-83/JT8D-219	COM	L	C	J	3	2JT8D2	2	N	160000	139500	5200	J	21700	0
MU3001	MU300-10/JT15D-4	GA	L	G	J	3	JT15D5	2	N	14100	13200	2800	J	2500	0
SABR80	NA SABRELINER 80	GA	L	G	J	2	CF700	2	N	33720	27290	2490	J	0	0
SD330	SD330/PT6A-45AR	COM	L	C	T	3	PT6A45	2	N	22900	22600	3650	P	1254	2670
SF340	SF340B/CT7-9B	COM	L	C	T	3	CT75	2	N	27300	26500	3470	P	1750	4067

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Last update: 9-Aug-1995
Fields(12):

1	SUB_ID	C	6
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3	ACFT_ID1	C	6
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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(213):
 7073SH , 707-300 ADV/C w/Shannon H/K              , 707QN  , 100.0 , -NONE- ,   0.0 ,
 707C56 , 707 w/CFM56                              , DC870  , 100.0 , -NONE- ,   0.0 ,
 720TJ  , B720 Turbojet                            , DC820  , 100.0 , -NONE- ,   0.0 ,
 727RR1 , 727-100 with RR TAY 650 eng.             , 727EM1 , 100.0 , -NONE- ,   0.0 ,
 727RR2 , 727-200 with RR TAY 650 eng.             , 727EM2 , 100.0 , -NONE- ,   0.0 ,
 73717A , 737-100 w/JT8D-7A                        , 737QN  , 100.0 , -NONE- ,   0.0 ,
 737215 , 737-200 ADV w/JT15QN                     , 737D17 , 100.0 , -NONE- ,   0.0 ,
 7373C1 , 737-300 w/CFM56-3C1                      , 7373B2 , 100.0 , -NONE- ,   0.0 ,
 7375B2 , 737-500 w/CFM56-3B2                      , 7373B2 , 100.0 , -NONE- ,   0.0 ,
 7375C1 , 737-500 w/CFM56-3C1                      , 7373B2 , 100.0 , -NONE- ,   0.0 ,
 7472G2 , 747-200 w/JT9D-7R4G2                     , 747200 , 100.0 , -NONE- ,   0.0 ,
 7473G2 , 747-300 w/JT9D-7R4G2                     , 74720B , 100.0 , -NONE- ,   0.0 ,
 747R21 , 747 w/CF6 or RB211 engines               , 74720B , 100.0 , -NONE- ,   0.0 ,
 777    , Boeing 777                               , 767JT9 , 100.0 , -NONE- ,   0.0 ,
 A10    , USAF Thunderbolt II                      , A7D    , 100.0 , -NONE- ,   0.0 ,
 A330   , Airbus A330                              , A310   , 100.0 , -NONE- ,   0.0 ,
 A340   , Airbus A340                              , DC870  , 100.0 , -NONE- ,   0.0 ,
 A4     , US Navy Skyhawk (All Series)             , A7D    , 100.0 , -NONE- ,   0.0 ,
 A7     , US Military Corsair II (All Series)      , A7D    , 100.0 , -NONE- ,   0.0 ,
 AA5A   , Grumman Cheetah (AA5A)                   , GASEPF , 100.0 , -NONE- ,   0.0 ,
 AEROJT , Aero Commander Jet Commander             , LEAR25 , 100.0 , -NONE- ,   0.0 ,
 AN124  , Antonov-124                              , 74720B , 100.0 , -NONE- ,   0.0 ,
 AN26   , Antonov-26                               , CVR580 , 100.0 , -NONE- ,   0.0 ,
 AN74TK , Antonov-74                               , DC9Q9  , 100.0 , -NONE- ,   0.0 ,
 ATR42  , Avions de Transport Regional ATR-42      , DHC8   , 100.0 , -NONE- ,   0.0 ,
 ATR72  , Avions de Transport Regional ATR-72      , HS748A , 100.0 , -NONE- ,   0.0 ,
 BAEATP , British Aerospace Advanced Turboprop ATP , HS748A , 100.0 , -NONE- ,   0.0 ,
 BAEJ31 , British Aerospace BAe Jetsream 31        , DHC6   , 100.0 , -NONE- ,   0.0 ,
 BEC18  , Beechcraft Model 18                      , CNA441 , 100.0 , -NONE- ,   0.0 ,
 BEC23  , Beechcraft Model 23 Musketeer            , GASEPF , 100.0 , -NONE- ,   0.0 ,
 BEC33  , Beechcraft Model 33 Debonair/Bonanza     , GASEPV , 100.0 , -NONE- ,   0.0 ,
 BEC400 , Beechcraft Beechjet 400                  , LEAR35 , 100.0 , -NONE- ,   0.0 ,
 BEC45  , Beechcraft Model 45 Mentor (T34A & T34B) , GASEPV , 100.0 , -NONE- ,   0.0 ,
 BEC50  , Beechcraft Model 50 Twin Bonanza         , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BEC55  , Beechcraft Model 55 Barron               , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BEC58  , Beechcraft Model 58 Barron               , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BEC60  , Beechcraft Model 60 Duke                 , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BEC65  , Beechcraft Model 65 Queen Air            , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BEC76  , Beechcraft Model 76 Duchess              , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BEC80  , Beechcraft Model Queen Air 80 series     , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BEC95  , Beechcraft Model 95 Travel Air           , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BECM35 , Beechcraft Model M35 Bonanza             , GASEPV , 100.0 , -NONE- ,   0.0 ,
 BN2A   , Britten-Norman BN-2A Islander            , BEC58P , 100.0 , -NONE- ,   0.0 ,
 BN3    , Britten-Norman BN-3 Nymph                , GASEPF , 100.0 , -NONE- ,   0.0 ,
 C141   , Lockheed C-141 Starlifter                , 707320 , 100.0 , -NONE- ,   0.0 ,
 C17A   , Globemaster III C-17                     , DC870  , 100.0 , -NONE- ,   0.0 ,
 C20    , US Military Gulfstream III               , GIIB   , 100.0 , -NONE- ,   0.0 ,
 C20A   , US Military Gulfstream III               , GIIB   , 100.0 , -NONE- ,   0.0 ,
 C5     , Lockheed Galaxy                          , 74720B , 100.0 , -NONE- ,   0.0 ,
 C8     , US Army DHC-5 Buffalo                    , HS748A , 100.0 , -NONE- ,   0.0 ,
 C9B    , Navy DC9-30 SkyTrain                     , DC9Q9  , 100.0 , -NONE- ,   0.0 ,
 CA212  , CASA C-212 Aviocar                       , DHC6   , 100.0 , -NONE- ,   0.0 ,
 CAN235 , CACA-Nurtanio CN-235 Airtech             , SF340  , 100.0 , -NONE- ,   0.0 ,
 CC138  , Canadian Air Force DHC-6 Twin Otter      , DHC6   , 100.0 , -NONE- ,   0.0 ,
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CL610  , Canadair CL-610 Challenger E             , CL601  , 100.0 , -NONE- ,   0.0 ,
CLREGJ , Canadair Regional Jet                    , CL601  , 100.0 , -NONE- ,   0.0 ,
CNA150 , Cessna 150                               , GASEPF , 100.0 , -NONE- ,   0.0 ,
CNA172 ,  Cessna 172 Skyhawk                      , GASEPF , 100.0 , -NONE- ,   0.0 ,
CNA177 , Cessna  177 Cardinal                     , GASEPF , 100.0 , -NONE- ,   0.0 ,
CNA180 , Cessna Skywagon                          , GASEPF , 100.0 , -NONE- ,   0.0 ,
CNA182 , Cessna Skylane                           , GASEPF , 100.0 , -NONE- ,   0.0 ,
CNA185 , Cessna Skywagon                          , GASEPF , 100.0 , -NONE- ,   0.0 ,
CNA208 , Cessna Caravan I                         , GASEPV , 100.0 , -NONE- ,   0.0 ,
CNA310 , Cessna 310                               , BEC58P , 100.0 , -NONE- ,   0.0 ,
CNA340 , Cessna 340                               , CNA441 , 100.0 , -NONE- ,   0.0 ,
CNA401 , Cessna 401                               , CNA441 , 100.0 , -NONE- ,   0.0 ,
CNA402 , Cessna 402                               , CNA441 , 100.0 , -NONE- ,   0.0 ,
CNA421 , Cessna 421 Golden Eagle                  , BEC58P , 100.0 , -NONE- ,   0.0 ,
CNA501 , Cessna Citation I Single Pilot (SP)      , CNA500 , 100.0 , -NONE- ,   0.0 ,
CNA550 , Cessna Model 550 Citation II             , MU3001 , 100.0 , -NONE- ,   0.0 ,
CNA551 , Cessna Citation II Single Pilot (SP)     , MU3001 , 100.0 , -NONE- ,   0.0 ,
CNA560 , Cessna 560 Citation V                    , CNA500 , 100.0 , -NONE- ,   0.0 ,
CNA650 , Cessna 650 Citation VII                  , CIT3   , 100.0 , -NONE- ,   0.0 ,
CNACAR , Cessna AGCARRYALL                        , GASEPV , 100.0 , -NONE- ,   0.0 ,
CNATRK , Cessna AGTRUCK                           , GASEPV , 100.0 , -NONE- ,   0.0 ,
CNAWAG , Cessna AGWAGON                           , GASEPV , 100.0 , -NONE- ,   0.0 ,
CNV600 , Convair 600                              , HS748A , 100.0 , -NONE- ,   0.0 ,
CNV640 , Convair 640                              , HS748A , 100.0 , -NONE- ,   0.0 ,
CNV880 , Convair 880                              , DC820  , 100.0 , -NONE- ,   0.0 ,
CNV990 , Convair 990                              , 707    ,  50.0 , 720    ,  50.0 ,
CONSTE , Lockheed Constellation                   , DC6    , 100.0 , -NONE- ,   0.0 ,
DBMERC , Dassualt Mercure                         , 737D17 , 100.0 , -NONE- ,   0.0 ,
DC4    , Douglas DC-4                             ,  DC6   , 100.0 , -NONE- ,   0.0 ,
DC7    , Douglas DC-7                             , DC6    , 100.0 , -NONE- ,   0.0 ,
DC86BT , DC8-62/63  w/Burbank Treatment           , DC8QN  , 100.0 , -NONE- ,   0.0 ,
DC9317 , DC930 w/JT8D-17 &15                      , DC9Q9  , 100.0 , -NONE- ,   0.0 ,
DC937A , DC930 w/JT8D-7 & 7A                      , DC9Q9  , 100.0 , -NONE- ,   0.0 ,
DC9411 , DC940 w/JT8D-11                          , DC9Q9  , 100.0 , -NONE- ,   0.0 ,
DHC2   , De Havilland DHC-2 Beaver                , BEC58P , 100.0 , -NONE- ,   0.0 ,
DHC4   , De Havilland DHC-4 Caribou               , DC3    , 100.0 , -NONE- ,   0.0 ,
DO228  , Dornier-228                              , DHC6   , 100.0 , -NONE- ,   0.0 ,
DO328  , Dornier-328                              , DHC8   , 100.0 , -NONE- ,   0.0 ,
EA6    , US Navy EA-6 Intruder (Electronic)       , A7D    , 100.0 , -NONE- ,   0.0 ,
EMB110 , Embraer Bandeirante 110                  , DHC6   , 100.0 , -NONE- ,   0.0 ,
EMB120 , Embraer Bandeirante 120                  , SF340  , 100.0 , -NONE- ,   0.0 ,
F100   , USAF Super Sabre                         , A7D    , 100.0 , -NONE- ,   0.0 ,
F14    , US Navy F-14 Tomcat                      , A7D    , 100.0 , -NONE- ,   0.0 ,
F18    , US Navy F-18 Hornet                      , A7D    , 100.0 , -NONE- ,   0.0 ,
FAL10  , Falcon 10                                , LEAR35 , 100.0 , -NONE- ,   0.0 ,
FAL200 , Falcon 200                               , LEAR35 , 100.0 , -NONE- ,   0.0 ,
FH227  , Fairchild-Hiller F-227 (Fokker 27 Elong) , HS748A , 100.0 , -NONE- ,   0.0 ,
FH27   , Fairchild-Hiller F-27 (Fokker 27)        , HS748A , 100.0 , -NONE- ,   0.0 ,
FK27   , Fokker F.27                              , HS748A , 100.0 , -NONE- ,   0.0 ,
FK50   , Fokker 50                                , DHC830 , 100.0 , -NONE- ,   0.0 ,
FK70   , Fokker 70                                , F10062 , 100.0 , -NONE- ,   0.0 ,
G164AG , GrummanAmerican Super Agcat              , GASEPV , 100.0 , -NONE- ,   0.0 ,
GA7    , Grumman Cougar (GA7)                     , BEC58P , 100.0 , -NONE- ,   0.0 ,
GROB15 , Burkhart Grob G 115                      , GASEPF , 100.0 , -NONE- ,   0.0 ,
GULF1  , Gulfstream I (G159)                      , HS748A , 100.0 , -NONE- ,   0.0 ,
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GULF2  , Gulfstream II (Noise Stage 1 Aircraft)   , LEAR25 , 100.0 , -NONE- ,   0.0 ,
GULF3  , Gulfstream III                           , GIIB   , 100.0 , -NONE- ,   0.0 ,
HS125  , Hawker-Siddeley 125                      , LEAR25 , 100.0 , -NONE- ,   0.0 ,
HS1258 , Bae (Hawker-Siddeley) 125-800            , LEAR35 , 100.0 , -NONE- ,   0.0 ,
IA1123 , IAI 1123 Westwind                        , LEAR25 , 100.0 , -NONE- ,   0.0 ,
IA1124 , IAI 1124 Westwind                        , LEAR35 , 100.0 , -NONE- ,   0.0 ,
IARAVA , IAI Arava                                , DHC6   , 100.0 , -NONE- ,   0.0 ,
IL114  , Ilyushin-114                             , CVR580 , 100.0 , -NONE- ,   0.0 ,
IL62   , Ilyushin-62                              , 707QN  , 100.0 , -NONE- ,   0.0 ,
IL76   , Ilyushin-76                              , DC8QN  , 100.0 , -NONE- ,   0.0 ,
IL86   , Ilyushin-86                              , DC8QN  , 100.0 , -NONE- ,   0.0 ,
IL96   , Illyushin-96                             , 747200 , 100.0 , -NONE- ,   0.0 ,
JST1TF , Jetstar 1 Turbofan                       , LEAR35 , 100.0 , -NONE- ,   0.0 ,
JST1TJ , Jetstar 1 Turbojet                       , LEAR25 , 100.0 , -NONE- ,   0.0 ,
JST2TF , Lockheed Jetstar 2                       , LEAR35 , 100.0 , -NONE- ,   0.0 ,
KC135E , Boeing KC135 Stratotanker (Re-engined)   , 707320 , 100.0 , -NONE- ,   0.0 ,
LEAR23 , Learjet 23                               , LEAR25 , 100.0 , -NONE- ,   0.0 ,
LEAR24 , Learjet 24                               , LEAR25 , 100.0 , -NONE- ,   0.0 ,
LEAR31 , Learjet 31                               , LEAR35 , 100.0 , -NONE- ,   0.0 ,
LEAR36 , Learjet 36                               , LEAR35 , 100.0 , -NONE- ,   0.0 ,
LEAR55 , Learjet 55                               , LEAR35 , 100.0 , -NONE- ,   0.0 ,
M20J   , Mooney 201LM and 205  (M20J)             , GASEPV , 100.0 , -NONE- ,   0.0 ,
M20K   , Mooney 252TSE (M20K)                     , GASEPV , 100.0 , -NONE- ,   0.0 ,
M20L   , Mooney Pegasus (M20L)                    , GASEPV , 100.0 , -NONE- ,   0.0 ,
MB339C , Aermacchi M.B. 339-C                     , A7D    , 100.0 , -NONE- ,   0.0 ,
MD80   , McDonnell-Douglas  MD80                  , MD81   , 100.0 , -NONE- ,   0.0 ,
MD87   , McDonnell-Douglas  MD87                  , MD81   , 100.0 , -NONE- ,   0.0 ,
MD88   , McDonnell-Douglas  MD88                  , MD83   , 100.0 , -NONE- ,   0.0 ,
MD8819 , MD88 w/JT8D-119                          , MD81   , 100.0 , -NONE- ,   0.0 ,
MD90   , McDonnell-Douglas  MD90                  , MD83   , 100.0 , -NONE- ,   0.0 ,
MU2    , Mitsubishi MU-2                          , DHC6   , 100.0 , -NONE- ,   0.0 ,
MU300  , Mitsubishi Diamond MU-300                , CNA500 , 100.0 , -NONE- ,   0.0 ,
NRD262 , Nord-Aviation NORD-262                   , SD330  , 100.0 , -NONE- ,   0.0 ,
P3     , US Navy Lockheed Orion                   , L188   , 100.0 , -NONE- ,   0.0 ,
PA18   , Piper PA-18 Super Cub                    , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA22CO , Piper PA-22 Colt                         , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA22TR , Piper PA-22 Tripacer                     , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA23AP , Piper PA-23-235 Apache                   , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA23AZ , Piper PA-23 Aztec                        , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA24   , Piper PA-24 Comanche                     , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA25   , Piper PA-25 Pawnee                       , GASEPV , 100.0 , -NONE- ,   0.0 ,
PA28AR , Piper PA-28-181 Archer II                , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA28C2 , Piper PA-28-235E Cherokee 235E           , GASEPV , 100.0 , -NONE- ,   0.0 ,
PA28CA , Piper PA-28R-200 Cherokee Arrow II       , GASEPV , 100.0 , -NONE- ,   0.0 ,
PA28CC , Piper PA-28-180 Cherokee Challenger      , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA28CH , Piper PA-28-140 Cherokee 140             , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA28DK , Piper PA-28-236 Dakota                   , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA28WA , Piper PA-28-161 Warrior II               , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA30   , Piper PA-30 Twin Comanche                , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA31   , Piper PA-31 Navajo                       , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA31CH , Piper PA-31-350 Chieftain                , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA31T  , Piper PA-31T Cheyenne                    , CNA441 , 100.0 , -NONE- ,   0.0 ,
PA32C6 , Piper PA-32 Cherokee Six                 , GASEPV , 100.0 , -NONE- ,   0.0 ,
PA32LA , Piper PA-32R-300 Lance                   , GASEPV , 100.0 , -NONE- ,   0.0 ,
PA32SG , Piper PA-32 Saratoga                     , GASEPV , 100.0 , -NONE- ,   0.0 ,
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PA34   , Piper PA-34 Seneca                        , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA38   , Piper PA-38-112 Tomahawk                  , GASEPF , 100.0 , -NONE- ,   0.0 ,
PA39   , Piper PA-39 Twin Comanche C/R             , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA42   , Piper PA-42 Cheyenne III                  , CNA441 , 100.0 , -NONE- ,   0.0 ,
PA46   , Piper PA-46 Malibu                        , GASEPV , 100.0 , -NONE- ,   0.0 ,
PA60   , Piper PA-60 Aerostar Model 600            , BEC58P , 100.0 , -NONE- ,   0.0 ,
PA61   , Piper PA-61 Aerostar Model 601            , BEC58P , 100.0 , -NONE- ,   0.0 ,
PC6    , Pilatus PC-6                              , GASEPV , 100.0 , -NONE- ,   0.0 ,
RWCM12 , Rockwell Commander 112 (Alpine)           , GASEPF , 100.0 , -NONE- ,   0.0 ,
RWCM14 , Rockwell Commander 114 (Gram Turismo)     , GASEPV , 100.0 , -NONE- ,   0.0 ,
RWCM50 , Rockwell Shrike Commander 500S            , BEC58P , 100.0 , -NONE- ,   0.0 ,
RWCM69 , Rockwell Turbo Commander 690              , CNA441 , 100.0 , -NONE- ,   0.0 ,
S212   , Siai Marchetti S212                       , CNA500 , 100.0 , -NONE- ,   0.0 ,
S3     , US Navy Viking (Lockheed)                 , A7D    , 100.0 , -NONE- ,   0.0 ,
SA226  , Swearingen Metro II                       , DHC6   , 100.0 , -NONE- ,   0.0 ,
SA227  , Swearingen Metro III                      , DHC6   , 100.0 , -NONE- ,   0.0 ,
SABR40 , Sabreliner 40                             , LEAR25 , 100.0 , -NONE- ,   0.0 ,
SABR60 , Sabreliner 60                             , LEAR25 , 100.0 , -NONE- ,   0.0 ,
SABR65 , Sabreliner 65                             , LEAR35 , 100.0 , -NONE- ,   0.0 ,
SABR70 , Sabreliner 70                             , LEAR25 , 100.0 , -NONE- ,   0.0 ,
SABR75 , Sabreliner 75                             , LEAR25 , 100.0 , -NONE- ,   0.0 ,
SAMER2 , Swearingen Merlin II                      , CNA441 , 100.0 , -NONE- ,   0.0 ,
SAMER3 , Swearingen Merlin III                     , CNA441 , 100.0 , -NONE- ,   0.0 ,
SAMER4 , Swearingen Merlin IV                      , DHC6   , 100.0 , -NONE- ,   0.0 ,
SE210  , Aerospatiale Caravelle                    , 737    , 100.0 , -NONE- ,   0.0 ,
SF260M , Siai Marchetti SF260M                     , GASEPV , 100.0 , -NONE- ,   0.0 ,
SN600  , Aerospatiale SN 600 Corvette              , CNA500 , 100.0 , -NONE- ,   0.0 ,
T2     , US Navy North American Buckeye            , A7D    , 100.0 , -NONE- ,   0.0 ,
T2C    , US Navy T-2C Buckeye                      , A7D    , 100.0 , -NONE- ,   0.0 ,
T33    , USAF Lockheed Shooting Star (Trainer)     , A7D    , 100.0 , -NONE- ,   0.0 ,
T37    , USAF Cessna T37 or 318                    , LEAR25 , 100.0 , -NONE- ,   0.0 ,
T38    , USAF Northrop T38                         , LEAR25 , 100.0 , -NONE- ,   0.0 ,
T43A   , USAF 737-200                              , 737    , 100.0 , -NONE- ,   0.0 ,
T47A   , US Navy Cessna Citation S/II              , CNA500 , 100.0 , -NONE- ,   0.0 ,
TA4    , US Navy Skyhawk (two seat trainer)        , A7D    , 100.0 , -NONE- ,   0.0 ,
TAYF19 , Taylorcraft Sprtsman 100 (F19)            , GASEPF , 100.0 , -NONE- ,   0.0 ,
TED600 , Ted Smith Aerostar 600                    , GASEPF , 100.0 , -NONE- ,   0.0 ,
TU134  , Tupolev-134                               , 737QN  , 100.0 , -NONE- ,   0.0 ,
TU154  , Tupolev-154                               , 727D17 , 100.0 , -NONE- ,   0.0 ,
TU204  , Tupolev-204                               , 757RR  , 100.0 , -NONE- ,   0.0 ,
TU334  , Tuploev-334                               , F10065 , 100.0 , -NONE- ,   0.0 ,
U3     , USAF Cessna Model 310                     , BEC58P , 100.0 , -NONE- ,   0.0 ,
UV18   , US Military DHC-6 Twin Otter              , DHC6   , 100.0 , -NONE- ,   0.0 ,
VC10TF , Vickers VC10 TurboFan                     , 707    ,  50.0 , 720    ,  50.0 ,
VC10TJ , Vickers VC10 TurboJet                     , DC820  , 100.0 , -NONE- ,   0.0 ,
VC2    , Vickers VC2 Viscount                      , L188   , 100.0 , -NONE- ,   0.0 ,
YAK42  , Yakovlev Yak-42                           , 72710A , 100.0 , -NONE- ,   0.0 ,
YS11   , Nihon Aeroplane (NAMC) YS-11              , HS748A , 100.0 , -NONE- ,   0.0 ,
YS11C  , Nihon Aeroplane (NAMC) YS-11 Cargo        , HS748A , 100.0 , -NONE- ,   0.0 ,
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Last update: 24-Mar-1995
Fields(13):
 1  NOISE_ID     C   6
 2  NOISE_TYPE   C   1
 3  THR_SET      N   7.1
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 4  L_200       N   5.1
 5  L_400       N   5.1
 6  L_630       N   5.1
 7  L_1000      N   5.1
 8  L_2000      N   5.1
 9  L_4000      N   5.1
10  L_6300      N   5.1
11  L_10000     N   5.1
12  L_16000     N   5.1
13  L_25000     N   5.1
Records(682):
 2CF650 , E , 10000.0 , 106.2 , 101.1 ,  97.2 ,  92.5 ,  84.2 ,  75.0 ,  68.0 ,  61.4 ,  53.4 ,  43.3
 2CF650 , E , 25000.0 , 109.8 , 105.1 , 101.5 ,  97.3 ,  90.3 ,  82.0 ,  76.0 ,  70.0 ,  62.7 ,  53.9
 2CF650 , E , 40000.0 , 113.0 , 108.6 , 105.2 , 101.5 ,  95.6 ,  88.2 ,  83.1 ,  77.5 ,  70.8 ,  63.3
 2CF650 , M , 10000.0 ,  99.2 ,  91.9 ,  86.7 ,  81.0 ,  72.1 ,  63.0 ,  56.7 ,  49.6 ,  41.6 ,  33.1
 2CF650 , M , 25000.0 , 105.3 ,  98.3 ,  93.4 ,  88.0 ,  79.5 ,  70.5 ,  64.3 ,  57.4 ,  49.7 ,  41.5
 2CF650 , M , 40000.0 , 109.1 , 102.3 ,  97.6 ,  92.5 ,  84.3 ,  75.4 ,  69.3 ,  62.6 ,  55.1 ,  47.2
 2CF650 , S , 10000.0 ,  99.9 ,  95.0 ,  91.4 ,  87.5 ,  81.3 ,  74.6 ,  69.7 ,  64.2 ,  57.7 ,  50.7
 2CF650 , S , 25000.0 , 103.7 ,  99.3 ,  96.1 ,  92.7 ,  87.1 ,  80.6 ,  75.8 ,  70.5 ,  64.3 ,  57.5
 2CF650 , S , 40000.0 , 106.8 , 102.9 , 100.1 ,  97.1 ,  92.0 ,  85.8 ,  81.0 ,  75.9 ,  69.9 ,  63.4
 2CF680 , E ,  7000.0 , 104.4 ,  99.5 ,  95.8 ,  91.6 ,  84.1 ,  76.3 ,  71.1 ,  65.8 ,  60.3 ,  55.1
 2CF680 , E , 12000.0 , 106.5 , 101.5 ,  97.7 ,  93.5 ,  85.7 ,  78.1 ,  73.0 ,  67.9 ,  62.6 ,  57.6
 2CF680 , E , 17000.0 , 107.1 , 102.5 ,  99.1 ,  94.5 ,  86.9 ,  79.5 ,  75.3 ,  69.5 ,  64.0 ,  58.4
 2CF680 , E , 25000.0 , 107.4 , 102.9 ,  99.5 ,  95.9 ,  89.2 ,  82.2 ,  77.4 ,  71.8 ,  65.9 ,  59.8
 2CF680 , E , 33000.0 , 107.7 , 103.7 , 100.7 ,  97.1 ,  91.8 ,  85.5 ,  80.7 ,  75.2 ,  69.0 ,  62.6
 2CF680 , E , 41000.0 , 111.6 , 107.8 , 105.0 , 102.1 ,  96.9 ,  90.6 ,  85.8 ,  80.3 ,  74.1 ,  67.7
 2CF680 , S ,  7000.0 ,  98.1 ,  93.9 ,  90.8 ,  87.4 ,  81.4 ,  75.0 ,  70.3 ,  65.7 ,  60.6 ,  55.7
 2CF680 , S , 12000.0 ,  99.3 ,  95.0 ,  91.9 ,  88.5 ,  82.5 ,  76.2 ,  71.7 ,  67.2 ,  62.3 ,  57.6
 2CF680 , S , 17000.0 , 100.0 ,  95.6 ,  92.6 ,  89.3 ,  83.7 ,  77.6 ,  73.1 ,  68.5 ,  63.4 ,  58.4
 2CF680 , S , 25000.0 , 100.3 ,  96.7 ,  93.9 ,  90.9 ,  85.9 ,  79.8 ,  75.4 ,  70.5 ,  65.2 ,  59.8
 2CF680 , S , 33000.0 , 103.3 ,  99.9 ,  97.3 ,  94.5 ,  89.7 ,  83.6 ,  79.2 ,  74.3 ,  69.0 ,  63.5
 2CF680 , S , 41000.0 , 106.2 , 103.1 , 100.8 ,  98.2 ,  93.6 ,  87.6 ,  83.1 ,  78.1 ,  72.5 ,  66.8
 2CF68D , E , 10020.0 , 101.6 ,  97.0 ,  93.0 ,  89.0 ,  82.1 ,  75.5 ,  70.1 ,  64.3 ,  58.1 ,  52.3
 2CF68D , E , 23190.0 , 110.9 , 106.0 , 102.2 ,  98.7 ,  90.1 ,  81.7 ,  75.7 ,  69.3 ,  62.5 ,  55.9
 2CF68D , E , 25940.0 , 110.7 , 104.2 , 100.2 ,  96.2 ,  89.5 ,  81.2 ,  75.2 ,  68.4 ,  61.2 ,  54.2
 2CF68D , E , 39180.0 , 112.2 , 106.7 , 103.2 ,  99.5 ,  93.2 ,  86.2 ,  80.7 ,  74.2 ,  67.2 ,  60.2
 2CF68D , E , 51530.0 , 114.7 , 110.2 , 107.2 , 104.2 ,  98.7 ,  92.4 ,  88.0 ,  82.0 ,  75.2 ,  68.5
 2CF68D , E , 55500.0 , 117.2 , 112.7 , 110.0 , 107.2 , 101.8 ,  96.2 ,  91.7 ,  86.7 ,  80.2 ,  73.7
 2CF68D , S , 10020.0 ,  99.5 ,  95.1 ,  91.4 ,  88.3 ,  82.5 ,  76.3 ,  71.9 ,  66.6 ,  61.3 ,  56.3
 2CF68D , S , 23190.0 , 105.1 , 100.6 ,  97.1 ,  93.7 ,  87.0 ,  80.1 ,  75.1 ,  69.5 ,  64.0 ,  58.4
 2CF68D , S , 25940.0 , 103.7 ,  98.7 ,  95.4 ,  92.2 ,  87.0 ,  80.7 ,  76.0 ,  70.2 ,  64.0 ,  55.2
 2CF68D , S , 39180.0 , 106.0 , 101.7 ,  98.7 ,  96.2 ,  91.2 ,  85.2 ,  80.2 ,  75.0 ,  68.7 ,  60.2
 2CF68D , S , 51530.0 , 110.2 , 106.2 , 103.4 , 100.7 ,  96.2 ,  90.7 ,  86.2 ,  81.2 ,  75.2 ,  67.2
 2CF68D , S , 55500.0 , 113.2 , 109.2 , 106.4 , 103.7 ,  98.2 ,  94.2 ,  89.7 ,  85.2 ,  79.2 ,  72.0
 2JT8D  , E ,  3000.0 , 107.0 , 102.4 ,  98.7 ,  94.4 ,  87.0 ,  78.6 ,  73.0 ,  66.4 ,  59.0 ,  49.4
 2JT8D  , E ,  6000.0 , 110.3 , 105.8 , 102.1 ,  97.9 ,  91.0 ,  83.0 ,  77.3 ,  71.0 ,  63.3 ,  54.1
 2JT8D  , E ,  8000.0 , 112.9 , 108.4 , 104.7 , 100.9 ,  94.0 ,  86.2 ,  80.6 ,  74.7 ,  67.6 ,  59.3
 2JT8D  , E , 10000.0 , 115.7 , 111.5 , 108.0 , 104.3 ,  98.0 ,  90.8 ,  85.9 ,  80.3 ,  73.8 ,  66.1
 2JT8D  , E , 12000.0 , 119.3 , 115.2 , 112.0 , 108.6 , 102.8 ,  96.1 ,  91.8 ,  86.5 ,  80.5 ,  73.5
 2JT8D  , E , 14000.0 , 123.9 , 119.9 , 117.1 , 113.0 , 108.0 , 101.7 ,  97.3 ,  92.9 ,  87.5 ,  81.1
 2JT8D  , M ,  3000.0 , 102.6 ,  94.6 ,  88.6 ,  82.3 ,  73.8 ,  64.5 ,  58.0 ,  51.0 ,  42.8 ,  34.4
 2JT8D  , M ,  6000.0 , 105.4 ,  97.9 ,  91.5 ,  85.8 ,  77.2 ,  68.5 ,  61.9 ,  55.1 ,  47.1 ,  38.5
 2JT8D  , M ,  8000.0 , 108.6 , 100.7 ,  95.6 ,  89.9 ,  81.8 ,  73.2 ,  66.5 ,  59.9 ,  52.0 ,  43.8
 2JT8D  , M , 10000.0 , 111.6 , 104.3 ,  99.5 ,  94.6 ,  86.3 ,  77.7 ,  71.8 ,  64.9 ,  57.2 ,  48.9
 2JT8D  , M , 12000.0 , 115.9 , 108.9 , 104.3 ,  99.4 ,  91.1 ,  82.8 ,  76.8 ,  70.1 ,  62.8 ,  54.6
 2JT8D  , M , 14000.0 , 120.8 , 113.4 , 109.4 , 104.5 ,  96.4 ,  88.2 ,  82.3 ,  75.8 ,  68.6 ,  60.9
 2JT8D  , S ,  3000.0 , 102.3 ,  97.2 ,  92.9 ,  88.5 ,  82.8 ,  75.6 ,  70.9 ,  65.4 ,  58.8 ,  51.8
 2JT8D  , S ,  6000.0 , 106.1 , 100.5 ,  96.7 ,  93.0 ,  87.2 ,  80.9 ,  76.1 ,  70.7 ,  64.1 ,  56.9
 2JT8D  , S ,  8000.0 , 108.8 , 103.9 , 100.5 ,  96.8 ,  91.5 ,  85.7 ,  80.5 ,  75.1 ,  68.9 ,  62.0
 2JT8D  , S , 10000.0 , 111.4 , 107.2 , 104.3 , 101.1 ,  95.7 ,  89.5 ,  85.0 ,  79.8 ,  73.5 ,  66.7
 2JT8D  , S , 12000.0 , 115.1 , 111.1 , 108.4 , 105.5 , 100.2 ,  94.3 ,  89.9 ,  85.0 ,  78.8 ,  72.1
 2JT8D  , S , 14000.0 , 119.8 , 115.9 , 113.3 , 110.5 , 105.4 ,  99.7 ,  95.3 ,  90.3 ,  84.5 ,  78.4

File: K:\INM50\SYS_DATA\PROFILE.DBF
Last update: 4-Apr-1995
Fields(5):
 1  ACFT_ID      C   6
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 2  OP_TYPE      C   1
 3  PROF_ID1     C   1
 4  PROF_ID2     C   1
 5  WEIGHT       N   6.0
Records(507):
 707    , A , S , 1 , 170000
 707    , D , S , 1 , 175000
 707    , D , S , 2 , 185000
 707    , D , S , 3 , 200000
 707    , D , S , 4 , 220000
 707    , D , S , 5 , 245000
 707    , D , S , 6 , 257000
 707120 , A , S , 1 , 170000
 707120 , D , S , 1 , 175000
 707120 , D , S , 2 , 185000
 707120 , D , S , 3 , 200000
 707120 , D , S , 4 , 220000
 707120 , D , S , 5 , 245000
 707120 , D , S , 6 , 257000
 707320 , A , S , 1 , 222300
 707320 , D , S , 1 , 214000
 707320 , D , S , 2 , 228000
 707320 , D , S , 3 , 240000
 707320 , D , S , 4 , 260000
 707320 , D , S , 5 , 286000
 707320 , D , S , 6 , 312000
 707320 , D , S , 7 , 330000
 707QN  , A , S , 1 , 222300
 707QN  , D , S , 1 , 214000
 707QN  , D , S , 2 , 228000
 707QN  , D , S , 3 , 240000
 707QN  , D , S , 4 , 260000
 707QN  , D , S , 5 , 286000
 707QN  , D , S , 6 , 312000
 707QN  , D , S , 7 , 330000
 720    , A , S , 1 , 140000
 720    , D , S , 1 , 145000
 720    , D , S , 2 , 155000
 720    , D , S , 3 , 165000
 720    , D , S , 4 , 180000
 720    , D , S , 5 , 190000
 720B   , A , S , 1 , 157500
 720B   , D , S , 1 , 165000
 720B   , D , S , 2 , 175000
 720B   , D , S , 3 , 185000
 720B   , D , S , 4 , 200000
 720B   , D , S , 5 , 210000
 727100 , A , S , 1 , 128250
 727100 , D , S , 1 , 136000
 727100 , D , S , 2 , 143000
 727100 , D , S , 3 , 150000
 727100 , D , S , 4 , 158000
 72710A , A , S , 1 , 128250
 72710A , D , S , 1 , 136000
 72710A , D , S , 2 , 143000
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72710A , D , S , 3 , 150000
72710A , D , S , 4 , 158000
727200 , A , S , 1 , 147000
727200 , D , S , 1 , 152000
727200 , D , S , 2 , 163000
727200 , D , S , 3 , 174000
727200 , D , S , 4 , 185000
72720A , A , S , 1 , 147600
72720A , D , S , 1 , 156000
72720A , D , S , 2 , 164000
72720A , D , S , 3 , 175000
72720A , D , S , 4 , 189000
72720A , D , S , 5 , 204000
727D15 , A , S , 1 , 152100
727D15 , D , S , 1 , 156000
727D15 , D , S , 2 , 164000
727D15 , D , S , 3 , 175000
727D15 , D , S , 4 , 189000
727D15 , D , S , 5 , 204000
727D17 , A , S , 1 , 152100
727D17 , D , S , 1 , 157000
727D17 , D , S , 2 , 169000
727D17 , D , S , 3 , 180000
727D17 , D , S , 4 , 189000
727EM1 , A , S , 1 , 128250
727EM1 , D , S , 1 , 136000
727EM1 , D , S , 2 , 143000
727EM1 , D , S , 3 , 150000
727EM1 , D , S , 4 , 158000
727EM2 , A , S , 1 , 152100
727EM2 , D , S , 1 , 156000
727EM2 , D , S , 2 , 164000
727EM2 , D , S , 3 , 175000
727EM2 , D , S , 4 , 189000
727EM2 , D , S , 5 , 204000
727Q15 , A , S , 1 , 152100
727Q15 , D , S , 1 , 156000
727Q15 , D , S , 2 , 164000
727Q15 , D , S , 3 , 175000
727Q15 , D , S , 4 , 189000
727Q15 , D , S , 5 , 204000
727Q7  , A , S , 1 , 128250
727Q7  , D , S , 1 , 136000
727Q7  , D , S , 2 , 143000
727Q7  , D , S , 3 , 150000
727Q7  , D , S , 4 , 158000
727Q9  , A , S , 1 , 152100
727Q9  , D , S , 1 , 156000
727Q9  , D , S , 2 , 168000
727Q9  , D , S , 3 , 180000
727Q9  , D , S , 4 , 191000
727QF  , A , S , 1 , 128250
727QF  , D , S , 1 , 136000
727QF  , D , S , 2 , 143000
727QF  , D , S , 3 , 150000
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 727QF  , D , S , 4 , 158000
 737    , A , S , 1 ,  88200
 737    , D , S , 1 ,  82000
 737    , D , S , 2 ,  85000
 737    , D , S , 3 ,  92000
 737    , D , S , 4 , 100000
 737300 , A , S , 1 , 102600
 737300 , D , S , 1 ,  96000
 737300 , D , S , 2 , 102000
 737300 , D , S , 3 , 108000
 737300 , D , S , 4 , 119000
 7373B2 , A , S , 1 , 102600
 7373B2 , D , S , 1 ,  98000
 7373B2 , D , S , 2 , 105000
 7373B2 , D , S , 3 , 111000
 7373B2 , D , S , 4 , 122000


File: K:\INM50\SYS_DATA\PROF_PTS.DBF
Last update: 29-Sep-1994
Fields(9):
 1  ACFT_ID      C   6
 2  OP_TYPE      C   1
 3  PROF_ID1     C   1
 4  PROF_ID2     C   1
 5  PT_NUM       N   2.0
 6  DISTANCE     N   9.1
 7  ALTITUDE     N   7.1
 8  SPEED        N   5.1
 9  THR_SET      N   7.1
Records(605):
 707    , A , S , 1 ,  1 , -114487.0 ,  6000.0 , 250.0 ,   600.0
 707    , A , S , 1 ,  2 ,  -57243.0 ,  3000.0 , 124.0 ,  3560.0
 707    , A , S , 1 ,  3 ,  -28622.0 ,  1500.0 , 124.0 ,  3585.0
 707    , A , S , 1 ,  4 ,  -19081.0 ,  1000.0 , 124.0 ,  3585.0
 707    , A , S , 1 ,  5 ,       0.0 ,     0.0 , 124.0 ,  3585.0
 707    , A , S , 1 ,  6 ,     506.0 ,     0.0 , 124.0 ,  6070.0
 707    , A , S , 1 ,  7 ,    5060.0 ,     0.0 ,  30.0 ,  1010.0
 707    , D , S , 1 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
 707    , D , S , 1 ,  2 ,    3963.0 ,     0.0 , 141.0 , 10120.0
 707    , D , S , 1 ,  3 ,   11856.0 ,  1000.0 , 141.0 , 10120.0
 707    , D , S , 1 ,  4 ,   15071.0 ,  1262.0 , 151.0 , 10120.0
 707    , D , S , 1 ,  5 ,   16071.0 ,  1336.0 , 154.0 ,  9108.0
 707    , D , S , 1 ,  6 ,   21854.0 ,  1743.0 , 171.0 ,  9108.0
 707    , D , S , 1 ,  7 ,   26167.0 ,  2043.0 , 191.0 ,  9108.0
 707    , D , S , 1 ,  8 ,   33607.0 ,  3000.0 , 191.0 ,  9108.0
 707    , D , S , 1 ,  9 ,   50032.0 ,  3884.0 , 250.0 ,  9108.0
 707    , D , S , 1 , 10 ,   64678.0 ,  5500.0 , 250.0 ,  9108.0
 707    , D , S , 1 , 11 ,   84775.0 ,  7500.0 , 250.0 ,  9108.0
 707    , D , S , 1 , 12 ,  113530.0 , 10000.0 , 250.0 ,  9108.0
 707    , D , S , 2 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
 707    , D , S , 2 ,  2 ,    4429.0 ,     0.0 , 145.0 , 10120.0
 707    , D , S , 2 ,  3 ,   13188.0 ,  1000.0 , 145.0 , 10120.0
 707    , D , S , 2 ,  4 ,   16777.0 ,  1261.0 , 155.0 , 10120.0
 707    , D , S , 2 ,  5 ,   17777.0 ,  1327.0 , 158.0 ,  9108.0
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707    , D , S , 2 ,  6 ,   23903.0 ,  1731.0 , 175.0 ,  9108.0
707    , D , S , 2 ,  7 ,   28831.0 ,  2021.0 , 195.0 ,  9108.0
707    , D , S , 2 ,  8 ,   37100.0 ,  3000.0 , 195.0 ,  9108.0
707    , D , S , 2 ,  9 ,   53610.0 ,  3807.0 , 250.0 ,  9108.0
707    , D , S , 2 , 10 ,   70261.0 ,  5500.0 , 250.0 ,  9108.0
707    , D , S , 2 , 11 ,   92180.0 ,  7500.0 , 250.0 ,  9108.0
707    , D , S , 2 , 12 ,  123675.0 , 10000.0 , 250.0 ,  9108.0
707    , D , S , 3 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
707    , D , S , 3 ,  2 ,    5176.0 ,     0.0 , 149.0 , 10120.0
707    , D , S , 3 ,  3 ,   15387.0 ,  1000.0 , 149.0 , 10120.0
707    , D , S , 3 ,  4 ,   19138.0 ,  1217.0 , 159.0 , 10120.0
707    , D , S , 3 ,  5 ,   20138.0 ,  1270.0 , 162.0 ,  9108.0
707    , D , S , 3 ,  6 ,   26414.0 ,  1600.0 , 179.0 ,  9108.0
707    , D , S , 3 ,  7 ,   31515.0 ,  1840.0 , 199.0 ,  9108.0
707    , D , S , 3 ,  8 ,   42489.0 ,  3000.0 , 199.0 ,  9108.0
707    , D , S , 3 ,  9 ,   58611.0 ,  3639.0 , 250.0 ,  9108.0
707    , D , S , 3 , 10 ,   79178.0 ,  5500.0 , 250.0 ,  9108.0
707    , D , S , 3 , 11 ,  104049.0 ,  7500.0 , 250.0 ,  9108.0
707    , D , S , 3 , 12 ,  140036.0 , 10000.0 , 250.0 ,  9108.0
707    , D , S , 4 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
707    , D , S , 4 ,  2 ,    6263.0 ,     0.0 , 156.0 , 10120.0
707    , D , S , 4 ,  3 ,   18791.0 ,  1000.0 , 156.0 , 10120.0
707    , D , S , 4 ,  4 ,   24025.0 ,  1257.0 , 166.0 , 10120.0
707    , D , S , 4 ,  5 ,   25025.0 ,  1302.0 , 168.0 ,  9108.0
707    , D , S , 4 ,  6 ,   33512.0 ,  1683.0 , 186.0 ,  9108.0
707    , D , S , 4 ,  7 ,   39650.0 ,  1931.0 , 206.0 ,  9108.0
707    , D , S , 4 ,  8 ,   51477.0 ,  3000.0 , 206.0 ,  9108.0
707    , D , S , 4 ,  9 ,   68056.0 ,  3575.0 , 250.0 ,  9108.0
707    , D , S , 4 , 10 ,   91865.0 ,  5500.0 , 250.0 ,  9108.0
707    , D , S , 4 , 11 ,  122142.0 ,  7500.0 , 250.0 ,  9108.0
707    , D , S , 4 , 12 ,  164959.0 , 10000.0 , 250.0 ,  9108.0
707    , D , S , 5 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
707    , D , S , 5 ,  2 ,    7767.0 ,     0.0 , 163.0 , 10120.0
707    , D , S , 5 ,  3 ,   24013.0 ,  1000.0 , 163.0 , 10120.0
707    , D , S , 5 ,  4 ,   30363.0 ,  1224.0 , 173.0 , 10120.0
707    , D , S , 5 ,  5 ,   31363.0 ,  1276.0 , 175.0 ,  9108.0
707    , D , S , 5 ,  6 ,   41136.0 ,  1573.0 , 193.0 ,  9108.0
707    , D , S , 5 ,  7 ,   47922.0 ,  1771.0 , 213.0 ,  9108.0
707    , D , S , 5 ,  8 ,   64158.0 ,  3000.0 , 213.0 ,  9108.0
707    , D , S , 5 ,  9 ,   79744.0 ,  3399.0 , 250.0 ,  9108.0
707    , D , S , 5 , 10 ,  112222.0 ,  5500.0 , 250.0 ,  9108.0
707    , D , S , 5 , 11 ,  147937.0 ,  7500.0 , 250.0 ,  9108.0
707    , D , S , 5 , 12 ,  201000.0 , 10000.0 , 250.0 ,  9108.0
707    , D , S , 6 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
707    , D , S , 6 ,  2 ,    8547.0 ,     0.0 , 166.0 , 10120.0
707    , D , S , 6 ,  3 ,   27030.0 ,  1000.0 , 166.0 , 10120.0
707    , D , S , 6 ,  4 ,   36301.0 ,  1321.0 , 176.0 , 10120.0
707    , D , S , 6 ,  5 ,   37301.0 ,  1353.0 , 177.0 ,  9108.0
707    , D , S , 6 ,  6 ,   50473.0 ,  1773.0 , 196.0 ,  9108.0
707    , D , S , 6 ,  7 ,   58441.0 ,  2002.0 , 216.0 ,  9108.0
707    , D , S , 6 ,  8 ,   72904.0 ,  3000.0 , 216.0 ,  9108.0
707    , D , S , 6 ,  9 ,   89375.0 ,  3419.0 , 250.0 ,  9108.0
707    , D , S , 6 , 10 ,  124537.0 ,  5500.0 , 250.0 ,  9108.0
707    , D , S , 6 , 11 ,  163793.0 ,  7500.0 , 250.0 ,  9108.0
707    , D , S , 6 , 12 ,  222644.0 , 10000.0 , 250.0 ,  9108.0
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707120 , A , S , 1 ,  1 , -114487.0 ,  6000.0 , 250.0 ,   520.0
707120 , A , S , 1 ,  2 ,  -57243.0 ,  3000.0 , 124.0 ,  3560.0
707120 , A , S , 1 ,  3 ,  -28622.0 ,  1500.0 , 124.0 ,  3585.0
707120 , A , S , 1 ,  4 ,  -19081.0 ,  1000.0 , 124.0 ,  3585.0
707120 , A , S , 1 ,  5 ,       0.0 ,     0.0 , 124.0 ,  3585.0
707120 , A , S , 1 ,  6 ,     525.0 ,     0.0 , 124.0 ,  8910.0
707120 , A , S , 1 ,  7 ,    5250.0 ,     0.0 ,  30.0 ,  1485.0
707120 , D , S , 1 ,  1 ,       0.0 ,     0.0 ,  16.0 , 14850.0
707120 , D , S , 1 ,  2 ,    2799.0 ,     0.0 , 141.0 , 14850.0
707120 , D , S , 1 ,  3 ,    7018.0 ,  1000.0 , 141.0 , 14850.0
707120 , D , S , 1 ,  4 ,   16711.0 ,  2461.0 , 191.0 , 14850.0
707120 , D , S , 1 ,  5 ,   17711.0 ,  2672.0 , 191.0 , 13120.0
707120 , D , S , 1 ,  6 ,   19261.0 ,  3000.0 , 191.0 , 13120.0
707120 , D , S , 1 ,  7 ,   30495.0 ,  4112.0 , 250.0 , 13120.0
707120 , D , S , 1 ,  8 ,   38083.0 ,  5500.0 , 250.0 , 13120.0
707120 , D , S , 1 ,  9 ,   49995.0 ,  7500.0 , 250.0 , 13120.0
707120 , D , S , 1 , 10 ,   66737.0 , 10000.0 , 250.0 , 13120.0
707120 , D , S , 2 ,  1 ,       0.0 ,     0.0 ,  16.0 , 14850.0
707120 , D , S , 2 ,  2 ,    3128.0 ,     0.0 , 145.0 , 14850.0
707120 , D , S , 2 ,  3 ,    7729.0 ,  1000.0 , 145.0 , 14850.0
707120 , D , S , 2 ,  4 ,   18728.0 ,  2536.0 , 195.0 , 14850.0
707120 , D , S , 2 ,  5 ,   19728.0 ,  2731.0 , 195.0 , 13120.0
707120 , D , S , 2 ,  6 ,   21102.0 ,  3000.0 , 195.0 , 13120.0
707120 , D , S , 2 ,  7 ,   32638.0 ,  4080.0 , 250.0 , 13120.0
707120 , D , S , 2 ,  8 ,   40995.0 ,  5500.0 , 250.0 , 13120.0
707120 , D , S , 2 ,  9 ,   53843.0 ,  7500.0 , 250.0 , 13120.0
707120 , D , S , 2 , 10 ,   71935.0 , 10000.0 , 250.0 , 13120.0
707120 , D , S , 3 ,  1 ,       0.0 ,     0.0 ,  16.0 , 14850.0
707120 , D , S , 3 ,  2 ,    3656.0 ,     0.0 , 149.0 , 14850.0
707120 , D , S , 3 ,  3 ,    8860.0 ,  1000.0 , 149.0 , 14850.0
707120 , D , S , 3 ,  4 ,   21356.0 ,  2537.0 , 199.0 , 14850.0
707120 , D , S , 3 ,  5 ,   22356.0 ,  2712.0 , 199.0 , 13120.0
707120 , D , S , 3 ,  6 ,   23991.0 ,  3000.0 , 199.0 , 13120.0
707120 , D , S , 3 ,  7 ,   35824.0 ,  3992.0 , 250.0 , 13120.0
707120 , D , S , 3 ,  8 ,   45671.0 ,  5500.0 , 250.0 , 13120.0
707120 , D , S , 3 ,  9 ,   59986.0 ,  7500.0 , 250.0 , 13120.0
707120 , D , S , 3 , 10 ,   80205.0 , 10000.0 , 250.0 , 13120.0
707120 , D , S , 4 ,  1 ,       0.0 ,     0.0 ,  16.0 , 14850.0
707120 , D , S , 4 ,  2 ,    4424.0 ,     0.0 , 156.0 , 14850.0
707120 , D , S , 4 ,  3 ,   10511.0 ,  1000.0 , 156.0 , 14850.0
707120 , D , S , 4 ,  4 ,   25592.0 ,  2580.0 , 206.0 , 14850.0
707120 , D , S , 4 ,  5 ,   26592.0 ,  2733.0 , 206.0 , 13120.0
707120 , D , S , 4 ,  6 ,   28328.0 ,  3000.0 , 206.0 , 13120.0
707120 , D , S , 4 ,  7 ,   40086.0 ,  3868.0 , 250.0 , 13120.0
707120 , D , S , 4 ,  8 ,   52220.0 ,  5500.0 , 250.0 , 13120.0
707120 , D , S , 4 ,  9 ,   68620.0 ,  7500.0 , 250.0 , 13120.0
707120 , D , S , 4 , 10 ,   91888.0 , 10000.0 , 250.0 , 13120.0
707120 , D , S , 5 ,  1 ,       0.0 ,     0.0 ,  16.0 , 14850.0
707120 , D , S , 5 ,  2 ,    5486.0 ,     0.0 , 163.0 , 14850.0
707120 , D , S , 5 ,  3 ,   12816.0 ,  1000.0 , 163.0 , 14850.0
707120 , D , S , 5 ,  4 ,   32304.0 ,  2723.0 , 213.0 , 14850.0
707120 , D , S , 5 ,  5 ,   33304.0 ,  2855.0 , 213.0 , 13120.0
707120 , D , S , 5 ,  6 ,   34412.0 ,  3000.0 , 213.0 , 13120.0
707120 , D , S , 5 ,  7 ,   46154.0 ,  3753.0 , 250.0 , 13120.0
707120 , D , S , 5 ,  8 ,   61277.0 ,  5500.0 , 250.0 , 13120.0
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707120 , D , S , 5 ,  9 ,   80516.0 ,  7500.0 , 250.0 , 13120.0
707120 , D , S , 5 , 10 ,  107989.0 , 10000.0 , 250.0 , 13120.0
707120 , D , S , 6 ,  1 ,       0.0 ,     0.0 ,  16.0 , 14850.0
707120 , D , S , 6 ,  2 ,    6037.0 ,     0.0 , 166.0 , 14850.0
707120 , D , S , 6 ,  3 ,   14028.0 ,  1000.0 , 166.0 , 14850.0
707120 , D , S , 6 ,  4 ,   35580.0 ,  2748.0 , 216.0 , 14850.0
707120 , D , S , 6 ,  5 ,   36580.0 ,  2870.0 , 216.0 , 13120.0
707120 , D , S , 6 ,  6 ,   37640.0 ,  3000.0 , 216.0 , 13120.0
707120 , D , S , 6 ,  7 ,   49160.0 ,  3685.0 , 250.0 , 13120.0
707120 , D , S , 6 ,  8 ,   65998.0 ,  5500.0 , 250.0 , 13120.0
707120 , D , S , 6 ,  9 ,   86704.0 ,  7500.0 , 250.0 , 13120.0
707120 , D , S , 6 , 10 ,  116374.0 , 10000.0 , 250.0 , 13120.0
720    , A , S , 1 ,  1 , -114487.0 ,  6000.0 , 250.0 ,   270.0
720    , A , S , 1 ,  2 ,  -57243.0 ,  3000.0 , 112.0 ,  2930.0
720    , A , S , 1 ,  3 ,  -28622.0 ,  1500.0 , 112.0 ,  2960.0
720    , A , S , 1 ,  4 ,  -19081.0 ,  1000.0 , 112.0 ,  2960.0
720    , A , S , 1 ,  5 ,       0.0 ,     0.0 , 112.0 ,  2960.0
720    , A , S , 1 ,  6 ,     343.0 ,     0.0 , 112.0 ,  6070.0
720    , A , S , 1 ,  7 ,    3430.0 ,     0.0 ,  30.0 ,  1010.0
720    , D , S , 1 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
720    , D , S , 1 ,  2 ,    2721.0 ,     0.0 , 131.0 , 10120.0
720    , D , S , 1 ,  3 ,    8425.0 ,  1000.0 , 131.0 , 10120.0
720    , D , S , 1 ,  4 ,   10478.0 ,  1225.0 , 141.0 , 10120.0
720    , D , S , 1 ,  5 ,   11478.0 ,  1323.0 , 146.0 ,  9108.0
720    , D , S , 1 ,  6 ,   14902.0 ,  1661.0 , 161.0 ,  9108.0
720    , D , S , 1 ,  7 ,   18285.0 ,  1955.0 , 181.0 ,  9108.0
720    , D , S , 1 ,  8 ,   24479.0 ,  3000.0 , 181.0 ,  9108.0
720    , D , S , 1 ,  9 ,   38789.0 ,  3986.0 , 250.0 ,  9108.0
720    , D , S , 1 , 10 ,   49285.0 ,  5500.0 , 250.0 ,  9108.0
720    , D , S , 1 , 11 ,   64506.0 ,  7500.0 , 250.0 ,  9108.0
720    , D , S , 1 , 12 ,   86046.0 , 10000.0 , 250.0 ,  9108.0
720    , D , S , 2 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
720    , D , S , 2 ,  2 ,    3109.0 ,     0.0 , 135.0 , 10120.0
720    , D , S , 2 ,  3 ,    9486.0 ,  1000.0 , 135.0 , 10120.0
720    , D , S , 2 ,  4 ,   11899.0 ,  1239.0 , 145.0 , 10120.0
720    , D , S , 2 ,  5 ,   12899.0 ,  1328.0 , 149.0 ,  9108.0
720    , D , S , 2 ,  6 ,   17006.0 ,  1696.0 , 165.0 ,  9108.0
720    , D , S , 2 ,  7 ,   20800.0 ,  1997.0 , 185.0 ,  9108.0
720    , D , S , 2 ,  8 ,   27337.0 ,  3000.0 , 185.0 ,  9108.0
720    , D , S , 2 ,  9 ,   42377.0 ,  3958.0 , 250.0 ,  9108.0
720    , D , S , 2 , 10 ,   54112.0 ,  5500.0 , 250.0 ,  9108.0
720    , D , S , 2 , 11 ,   70868.0 ,  7500.0 , 250.0 ,  9108.0
720    , D , S , 2 , 12 ,   94661.0 , 10000.0 , 250.0 ,  9108.0
720    , D , S , 3 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
720    , D , S , 3 ,  2 ,    3523.0 ,     0.0 , 138.0 , 10120.0
720    , D , S , 3 ,  3 ,   10626.0 ,  1000.0 , 138.0 , 10120.0
720    , D , S , 3 ,  4 ,   13435.0 ,  1253.0 , 148.0 , 10120.0
720    , D , S , 3 ,  5 ,   14435.0 ,  1334.0 , 151.0 ,  9108.0
720    , D , S , 3 ,  6 ,   19256.0 ,  1727.0 , 168.0 ,  9108.0
720    , D , S , 3 ,  7 ,   23453.0 ,  2030.0 , 188.0 ,  9108.0
720    , D , S , 3 ,  8 ,   30372.0 ,  3000.0 , 188.0 ,  9108.0
720    , D , S , 3 ,  9 ,   46197.0 ,  3929.0 , 250.0 ,  9108.0
720    , D , S , 3 , 10 ,   59268.0 ,  5500.0 , 250.0 ,  9108.0
720    , D , S , 3 , 11 ,   77647.0 ,  7500.0 , 250.0 ,  9108.0
720    , D , S , 3 , 12 ,  103840.0 , 10000.0 , 250.0 ,  9108.0
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 720    , D , S , 4 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
 720    , D , S , 4 ,  2 ,    4193.0 ,     0.0 , 143.0 , 10120.0
 720    , D , S , 4 ,  3 ,   12509.0 ,  1000.0 , 143.0 , 10120.0
 720    , D , S , 4 ,  4 ,   15626.0 ,  1229.0 , 153.0 , 10120.0
 720    , D , S , 4 ,  5 ,   16626.0 ,  1296.0 , 156.0 ,  9108.0
 720    , D , S , 4 ,  6 ,   21924.0 ,  1650.0 , 173.0 ,  9108.0
 720    , D , S , 4 ,  7 ,   26448.0 ,  1919.0 , 193.0 ,  9108.0
 720    , D , S , 4 ,  8 ,   35184.0 ,  3000.0 , 193.0 ,  9108.0
 720    , D , S , 4 ,  9 ,   51075.0 ,  3780.0 , 250.0 ,  9108.0
 720    , D , S , 4 , 10 ,   67289.0 ,  5500.0 , 250.0 ,  9108.0
 720    , D , S , 4 , 11 ,   88283.0 ,  7500.0 , 250.0 ,  9108.0
 720    , D , S , 4 , 12 ,  118385.0 , 10000.0 , 250.0 ,  9108.0
 720    , D , S , 5 ,  1 ,       0.0 ,     0.0 ,  16.0 , 10120.0
 720    , D , S , 5 ,  2 ,    4671.0 ,     0.0 , 146.0 , 10120.0
 720    , D , S , 5 ,  3 ,   13890.0 ,  1000.0 , 146.0 , 10120.0
 720    , D , S , 5 ,  4 ,   17340.0 ,  1226.0 , 156.0 , 10120.0
 720    , D , S , 5 ,  5 ,   18340.0 ,  1286.0 , 159.0 ,  9108.0
 720    , D , S , 5 ,  6 ,   24167.0 ,  1633.0 , 176.0 ,  9108.0
 720    , D , S , 5 ,  7 ,   28994.0 ,  1890.0 , 196.0 ,  9108.0
 720    , D , S , 5 ,  8 ,   38718.0 ,  3000.0 , 196.0 ,  9108.0
 720    , D , S , 5 ,  9 ,   54832.0 ,  3714.0 , 250.0 ,  9108.0
 720    , D , S , 5 , 10 ,   73085.0 ,  5500.0 , 250.0 ,  9108.0
 720    , D , S , 5 , 11 ,   95958.0 ,  7500.0 , 250.0 ,  9108.0
 720    , D , S , 5 , 12 ,  128897.0 , 10000.0 , 250.0 ,  9108.0
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File: K:\INM50\SYS_DATA\PROCEDUR.DBF
Last update: 4-Apr-1995
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
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 707320 , A , S , 1 ,  1 , D , ZERO   ,   ,  6000.0 , 250.0 ,     3.0
 707320 , A , S , 1 ,  2 , D , 14     ,   ,  3000.0 , 160.0 ,     3.0
 707320 , A , S , 1 ,  3 , D , D-25   ,   ,  1500.0 , 145.0 ,     3.0
 707320 , A , S , 1 ,  4 , D , D-40   ,   ,  1000.0 , 131.6 ,     3.0
 707320 , A , S , 1 ,  5 , L , D-40   ,   ,   410.6 , 131.6 ,     0.0
 707320 , A , S , 1 ,  6 , B ,        ,   ,  3695.4 , 124.9 ,    60.0
 707320 , A , S , 1 ,  7 , B ,        ,   ,     0.0 ,  30.0 ,    10.0
 707320 , D , S , 1 ,  1 , T , 14     , T ,     0.0 , 144.5 ,     0.0
 707320 , D , S , 1 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
 707320 , D , S , 1 ,  3 , A , 14     , T ,  2047.0 , 175.0 ,     0.0
 707320 , D , S , 1 ,  4 , A , INT    , C ,  1000.0 , 195.0 ,     0.0
 707320 , D , S , 1 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
 707320 , D , S , 1 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
 707320 , D , S , 1 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
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707320 , D , S , 1 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707320 , D , S , 1 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707320 , D , S , 2 ,  1 , T , 14     , T ,     0.0 , 149.2 ,     0.0
707320 , D , S , 2 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707320 , D , S , 2 ,  3 , A , 14     , T ,  1905.0 , 179.0 ,     0.0
707320 , D , S , 2 ,  4 , A , INT    , C ,  1000.0 , 199.0 ,     0.0
707320 , D , S , 2 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707320 , D , S , 2 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707320 , D , S , 2 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707320 , D , S , 2 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707320 , D , S , 2 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707320 , D , S , 3 ,  1 , T , 14     , T ,     0.0 , 153.1 ,     0.0
707320 , D , S , 3 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707320 , D , S , 3 ,  3 , A , 14     , T ,  1793.0 , 183.0 ,     0.0
707320 , D , S , 3 ,  4 , A , INT    , C ,  1000.0 , 203.0 ,     0.0
707320 , D , S , 3 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707320 , D , S , 3 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707320 , D , S , 3 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707320 , D , S , 3 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707320 , D , S , 3 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707320 , D , S , 4 ,  1 , T , 14     , T ,     0.0 , 159.3 ,     0.0
707320 , D , S , 4 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707320 , D , S , 4 ,  3 , A , 14     , T ,  1624.0 , 189.0 ,     0.0
707320 , D , S , 4 ,  4 , A , INT    , C ,  1000.0 , 209.0 ,     0.0
707320 , D , S , 4 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707320 , D , S , 4 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707320 , D , S , 4 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707320 , D , S , 4 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707320 , D , S , 4 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707320 , D , S , 5 ,  1 , T , 14     , T ,     0.0 , 167.1 ,     0.0
707320 , D , S , 5 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707320 , D , S , 5 ,  3 , A , 14     , T ,  1430.0 , 197.0 ,     0.0
707320 , D , S , 5 ,  4 , A , INT    , C ,  1000.0 , 217.0 ,     0.0
707320 , D , S , 5 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707320 , D , S , 5 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707320 , D , S , 5 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707320 , D , S , 5 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707320 , D , S , 5 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707320 , D , S , 6 ,  1 , T , 14     , T ,     0.0 , 174.5 ,     0.0
707320 , D , S , 6 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707320 , D , S , 6 ,  3 , A , 14     , T ,  1259.0 , 205.0 ,     0.0
707320 , D , S , 6 ,  4 , A , INT    , C ,   800.0 , 225.0 ,     0.0
707320 , D , S , 6 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707320 , D , S , 6 ,  6 , A , ZERO   , C ,   800.0 , 250.0 ,     0.0
707320 , D , S , 6 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707320 , D , S , 6 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707320 , D , S , 6 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707320 , D , S , 7 ,  1 , T , 14     , T ,     0.0 , 179.5 ,     0.0
707320 , D , S , 7 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707320 , D , S , 7 ,  3 , A , 14     , T ,  1151.0 , 209.0 ,     0.0
707320 , D , S , 7 ,  4 , A , INT    , C ,   800.0 , 229.0 ,     0.0
707320 , D , S , 7 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707320 , D , S , 7 ,  6 , A , ZERO   , C ,   800.0 , 250.0 ,     0.0
707320 , D , S , 7 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707320 , D , S , 7 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
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707320 , D , S , 7 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707QN  , A , S , 1 ,  1 , D , ZERO   ,   ,  6000.0 , 250.0 ,     3.0
707QN  , A , S , 1 ,  2 , D , 14     ,   ,  3000.0 , 160.0 ,     3.0
707QN  , A , S , 1 ,  3 , D , D-25   ,   ,  1500.0 , 145.0 ,     3.0
707QN  , A , S , 1 ,  4 , D , D-40   ,   ,  1000.0 , 131.6 ,     3.0
707QN  , A , S , 1 ,  5 , L , D-40   ,   ,   410.6 , 131.6 ,     0.0
707QN  , A , S , 1 ,  6 , B ,        ,   ,  3695.4 , 124.9 ,    60.0
707QN  , A , S , 1 ,  7 , B ,        ,   ,     0.0 ,  30.0 ,    10.0
707QN  , D , S , 1 ,  1 , T , 14     , T ,     0.0 , 144.5 ,     0.0
707QN  , D , S , 1 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707QN  , D , S , 1 ,  3 , A , 14     , T ,  2047.0 , 175.0 ,     0.0
707QN  , D , S , 1 ,  4 , A , INT    , C ,  1000.0 , 195.0 ,     0.0
707QN  , D , S , 1 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707QN  , D , S , 1 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707QN  , D , S , 1 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707QN  , D , S , 1 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707QN  , D , S , 1 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707QN  , D , S , 2 ,  1 , T , 14     , T ,     0.0 , 149.2 ,     0.0
707QN  , D , S , 2 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707QN  , D , S , 2 ,  3 , A , 14     , T ,  1905.0 , 179.0 ,     0.0
707QN  , D , S , 2 ,  4 , A , INT    , C ,  1000.0 , 199.0 ,     0.0
707QN  , D , S , 2 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707QN  , D , S , 2 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707QN  , D , S , 2 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707QN  , D , S , 2 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707QN  , D , S , 2 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707QN  , D , S , 3 ,  1 , T , 14     , T ,     0.0 , 153.1 ,     0.0
707QN  , D , S , 3 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707QN  , D , S , 3 ,  3 , A , 14     , T ,  1793.0 , 183.0 ,     0.0
707QN  , D , S , 3 ,  4 , A , INT    , C ,  1000.0 , 203.0 ,     0.0
707QN  , D , S , 3 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707QN  , D , S , 3 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707QN  , D , S , 3 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707QN  , D , S , 3 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707QN  , D , S , 3 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707QN  , D , S , 4 ,  1 , T , 14     , T ,     0.0 , 159.3 ,     0.0
707QN  , D , S , 4 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707QN  , D , S , 4 ,  3 , A , 14     , T ,  1624.0 , 189.0 ,     0.0
707QN  , D , S , 4 ,  4 , A , INT    , C ,  1000.0 , 209.0 ,     0.0
707QN  , D , S , 4 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707QN  , D , S , 4 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707QN  , D , S , 4 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707QN  , D , S , 4 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707QN  , D , S , 4 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707QN  , D , S , 5 ,  1 , T , 14     , T ,     0.0 , 167.1 ,     0.0
707QN  , D , S , 5 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707QN  , D , S , 5 ,  3 , A , 14     , T ,  1430.0 , 197.0 ,     0.0
707QN  , D , S , 5 ,  4 , A , INT    , C ,  1000.0 , 217.0 ,     0.0
707QN  , D , S , 5 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707QN  , D , S , 5 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
707QN  , D , S , 5 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707QN  , D , S , 5 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707QN  , D , S , 5 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707QN  , D , S , 6 ,  1 , T , 14     , T ,     0.0 , 174.5 ,     0.0
707QN  , D , S , 6 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
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707QN  , D , S , 6 ,  3 , A , 14     , T ,  1259.0 , 205.0 ,     0.0
707QN  , D , S , 6 ,  4 , A , INT    , C ,   800.0 , 225.0 ,     0.0
707QN  , D , S , 6 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707QN  , D , S , 6 ,  6 , A , ZERO   , C ,   800.0 , 250.0 ,     0.0
707QN  , D , S , 6 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707QN  , D , S , 6 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707QN  , D , S , 6 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
707QN  , D , S , 7 ,  1 , T , 14     , T ,     0.0 , 179.5 ,     0.0
707QN  , D , S , 7 ,  2 , C , 14     , T ,  1000.0 ,   0.0 ,     0.0
707QN  , D , S , 7 ,  3 , A , 14     , T ,  1151.0 , 209.0 ,     0.0
707QN  , D , S , 7 ,  4 , A , INT    , C ,   800.0 , 229.0 ,     0.0
707QN  , D , S , 7 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
707QN  , D , S , 7 ,  6 , A , ZERO   , C ,   800.0 , 250.0 ,     0.0
707QN  , D , S , 7 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
707QN  , D , S , 7 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
707QN  , D , S , 7 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
720B   , A , S , 1 ,  1 , D , ZERO   ,   ,  6000.0 , 250.0 ,     3.0
720B   , A , S , 1 ,  2 , D , 20     ,   ,  3000.0 , 160.0 ,     3.0
720B   , A , S , 1 ,  3 , D , U-30   ,   ,  1500.0 , 149.0 ,     3.0
720B   , A , S , 1 ,  4 , D , D-30   ,   ,  1000.0 , 139.0 ,     3.0
720B   , A , S , 1 ,  5 , L , D-30   ,   ,   419.1 , 139.0 ,     0.0
720B   , A , S , 1 ,  6 , B ,        ,   ,  3771.9 , 131.9 ,    60.0
720B   , A , S , 1 ,  7 , B ,        ,   ,     0.0 ,  30.0 ,    10.0
720B   , D , S , 1 ,  1 , T , 20     , T ,     0.0 , 144.8 ,     0.0
720B   , D , S , 1 ,  2 , C , 20     , T ,  1000.0 ,   0.0 ,     0.0
720B   , D , S , 1 ,  3 , A , 20     , T ,  2632.0 , 175.0 ,     0.0
720B   , D , S , 1 ,  4 , A , INT    , C ,  1000.0 , 195.0 ,     0.0
720B   , D , S , 1 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
720B   , D , S , 1 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
720B   , D , S , 1 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
720B   , D , S , 1 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
720B   , D , S , 1 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
720B   , D , S , 2 ,  1 , T , 20     , T ,     0.0 , 149.1 ,     0.0
720B   , D , S , 2 ,  2 , C , 20     , T ,  1000.0 ,   0.0 ,     0.0
720B   , D , S , 2 ,  3 , A , 20     , T ,  2470.0 , 179.0 ,     0.0
720B   , D , S , 2 ,  4 , A , INT    , C ,  1000.0 , 199.0 ,     0.0
720B   , D , S , 2 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
720B   , D , S , 2 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
720B   , D , S , 2 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
720B   , D , S , 2 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
720B   , D , S , 2 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
720B   , D , S , 3 ,  1 , T , 20     , T ,     0.0 , 153.3 ,     0.0
720B   , D , S , 3 ,  2 , C , 20     , T ,  1000.0 ,   0.0 ,     0.0
720B   , D , S , 3 ,  3 , A , 20     , T ,  2323.0 , 183.0 ,     0.0
720B   , D , S , 3 ,  4 , A , INT    , C ,  1000.0 , 203.0 ,     0.0
720B   , D , S , 3 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
720B   , D , S , 3 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
720B   , D , S , 3 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
720B   , D , S , 3 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
720B   , D , S , 3 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
720B   , D , S , 4 ,  1 , T , 20     , T ,     0.0 , 159.4 ,     0.0
720B   , D , S , 4 ,  2 , C , 20     , T ,  1000.0 ,   0.0 ,     0.0
720B   , D , S , 4 ,  3 , A , 20     , T ,  2125.0 , 189.0 ,     0.0
720B   , D , S , 4 ,  4 , A , INT    , C ,  1000.0 , 209.0 ,     0.0
720B   , D , S , 4 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
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720B   , D , S , 4 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
720B   , D , S , 4 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
720B   , D , S , 4 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
720B   , D , S , 4 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
720B   , D , S , 5 ,  1 , T , 20     , T ,     0.0 , 163.3 ,     0.0
720B   , D , S , 5 ,  2 , C , 20     , T ,  1000.0 ,   0.0 ,     0.0
720B   , D , S , 5 ,  3 , A , 20     , T ,  2005.0 , 193.0 ,     0.0
720B   , D , S , 5 ,  4 , A , INT    , C ,  1000.0 , 213.0 ,     0.0
720B   , D , S , 5 ,  5 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
720B   , D , S , 5 ,  6 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
720B   , D , S , 5 ,  7 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
720B   , D , S , 5 ,  8 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
720B   , D , S , 5 ,  9 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
727100 , A , S , 1 ,  1 , D , ZERO   ,   ,  6000.0 , 250.0 ,     3.0
727100 , A , S , 1 ,  2 , D , 5      ,   ,  3000.0 , 160.0 ,     3.0
727100 , A , S , 1 ,  3 , D , D-25   ,   ,  1500.0 , 125.5 ,     3.0
727100 , A , S , 1 ,  4 , D , D-30   ,   ,  1000.0 , 123.2 ,     3.0
727100 , A , S , 1 ,  5 , L , D-30   ,   ,   342.6 , 123.2 ,     0.0
727100 , A , S , 1 ,  6 , B ,        ,   ,  3083.4 , 116.8 ,    60.0
727100 , A , S , 1 ,  7 , B ,        ,   ,     0.0 ,  30.0 ,    10.0
727100 , D , S , 1 ,  1 , T , 5      , T ,     0.0 , 153.1 ,     0.0
727100 , D , S , 1 ,  2 , C , 5      , T ,  1000.0 ,   0.0 ,     0.0
727100 , D , S , 1 ,  3 , A , 5      , T ,  1342.0 , 160.0 ,     0.0
727100 , D , S , 1 ,  4 , A , 2      , T ,  1342.0 , 190.0 ,     0.0
727100 , D , S , 1 ,  5 , A , ZERO   , C ,  1000.0 , 200.0 ,     0.0
727100 , D , S , 1 ,  6 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
727100 , D , S , 1 ,  7 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
727100 , D , S , 1 ,  8 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
727100 , D , S , 1 ,  9 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
727100 , D , S , 1 , 10 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
727100 , D , S , 2 ,  1 , T , 5      , T ,     0.0 , 157.0 ,     0.0
727100 , D , S , 2 ,  2 , C , 5      , T ,  1000.0 ,   0.0 ,     0.0
727100 , D , S , 2 ,  3 , A , 5      , T ,  1265.0 , 160.0 ,     0.0
727100 , D , S , 2 ,  4 , A , 2      , T ,  1265.0 , 190.0 ,     0.0
727100 , D , S , 2 ,  5 , A , ZERO   , C ,  1000.0 , 200.0 ,     0.0
727100 , D , S , 2 ,  6 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
727100 , D , S , 2 ,  7 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
727100 , D , S , 2 ,  8 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
727100 , D , S , 2 ,  9 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
727100 , D , S , 2 , 10 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
727100 , D , S , 3 ,  1 , T , 5      , T ,     0.0 , 160.8 ,     0.0
727100 , D , S , 3 ,  2 , C , 5      , T ,  1000.0 ,   0.0 ,     0.0
727100 , D , S , 3 ,  3 , A , 5      , T ,  1192.0 , 165.0 ,     0.0
727100 , D , S , 3 ,  4 , A , 2      , T ,  1192.0 , 195.0 ,     0.0
727100 , D , S , 3 ,  5 , A , ZERO   , C ,  1000.0 , 205.0 ,     0.0
727100 , D , S , 3 ,  6 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
727100 , D , S , 3 ,  7 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
727100 , D , S , 3 ,  8 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
727100 , D , S , 3 ,  9 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
727100 , D , S , 3 , 10 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0
727100 , D , S , 4 ,  1 , T , 5      , T ,     0.0 , 165.0 ,     0.0
727100 , D , S , 4 ,  2 , C , 5      , T ,  1000.0 ,   0.0 ,     0.0
727100 , D , S , 4 ,  3 , A , 5      , T ,  1115.0 , 170.0 ,     0.0
727100 , D , S , 4 ,  4 , A , 2      , T ,  1115.0 , 200.0 ,     0.0
727100 , D , S , 4 ,  5 , A , ZERO   , C ,  1000.0 , 210.0 ,     0.0
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 727100 , D , S , 4 ,  6 , C , ZERO   , C ,  3000.0 ,   0.0 ,     0.0
 727100 , D , S , 4 ,  7 , A , ZERO   , C ,  1000.0 , 250.0 ,     0.0
 727100 , D , S , 4 ,  8 , C , ZERO   , C ,  5500.0 ,   0.0 ,     0.0
 727100 , D , S , 4 ,  9 , C , ZERO   , C ,  7500.0 ,   0.0 ,     0.0
 727100 , D , S , 4 , 10 , C , ZERO   , C , 10000.0 ,   0.0 ,     0.0


File: K:\INM50\SYS_DATA\FLAPS.DBF
Last update: 19-Dec-1994
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(639):
 707320 , A , D-25   , 0.107756 , 0.307537 , 0.000000
 707320 , A , D-40   , 0.134567 , 0.279116 , 0.000000
 707320 , A , D-50   , 0.154720 , 0.275511 , 0.000000
 707320 , A , U-25   , 0.098219 , 0.000000 , 0.000000
 707320 , D , 14     , 0.089316 , 0.312431 , 0.004514
 707320 , D , INT    , 0.072743 , 0.000000 , 0.000000
 707320 , D , ZERO   , 0.056170 , 0.000000 , 0.000000
 707QN  , A , D-25   , 0.107756 , 0.307537 , 0.000000
 707QN  , A , D-40   , 0.134567 , 0.279116 , 0.000000
 707QN  , A , D-50   , 0.154720 , 0.275511 , 0.000000
 707QN  , A , U-25   , 0.098219 , 0.000000 , 0.000000
 707QN  , D , 14     , 0.089316 , 0.312431 , 0.004514
 707QN  , D , INT    , 0.072743 , 0.000000 , 0.000000
 707QN  , D , ZERO   , 0.056170 , 0.000000 , 0.000000
 720B   , A , D-30   , 0.109478 , 0.350247 , 0.000000
 720B   , A , D-50   , 0.148843 , 0.339412 , 0.000000
 720B   , A , U-30   , 0.098050 , 0.000000 , 0.000000
 720B   , D , 20     , 0.091933 , 0.356426 , 0.005730
 720B   , D , 30     , 0.104243 , 0.340735 , 0.005238
 720B   , D , INT    , 0.074052 , 0.000000 , 0.000000
 720B   , D , ZERO   , 0.056170 , 0.000000 , 0.000000
 727100 , A , D-25   , 0.128359 , 0.350485 , 0.000000
 727100 , A , D-30   , 0.145903 , 0.343897 , 0.000000
 727100 , A , D-40   , 0.186604 , 0.335992 , 0.000000
 727100 , A , U-15   , 0.090698 , 0.000000 , 0.000000
 727100 , A , U-25   , 0.113154 , 0.000000 , 0.000000
 727100 , D , 15     , 0.095459 , 0.392649 , 0.008301
 727100 , D , 2      , 0.085700 , 0.000000 , 0.000000
 727100 , D , 25     , 0.115623 , 0.371567 , 0.007389
 727100 , D , 5      , 0.088916 , 0.415048 , 0.008692
 727100 , D , ZERO   , 0.063600 , 0.000000 , 0.000000
 72710A , A , D-30   , 0.146526 , 0.373900 , 0.000000
 72710A , A , U-30   , 0.136164 , 0.000000 , 0.000000
 72710A , D , 2      , 0.095800 , 0.000000 , 0.000000
 72710A , D , 5      , 0.128015 , 0.402558 , 0.007955
 72710A , D , ZERO   , 0.063600 , 0.000000 , 0.000000
 72720A , A , D-30   , 0.151096 , 0.359600 , 0.000000
 72720A , A , U-30   , 0.141604 , 0.000000 , 0.000000
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72720A , D , 2      , 0.087800 , 0.000000 , 0.000000
72720A , D , 5      , 0.111900 , 0.387655 , 0.006545
72720A , D , ZERO   , 0.063600 , 0.000000 , 0.000000
727D15 , A , D-25   , 0.109535 , 0.383689 , 0.000000
727D15 , A , D-30   , 0.143164 , 0.378419 , 0.000000
727D15 , A , D-40   , 0.184387 , 0.372094 , 0.000000
727D15 , A , U-15   , 0.089969 , 0.000000 , 0.000000
727D15 , A , U-25   , 0.109535 , 0.000000 , 0.000000
727D15 , D , 15     , 0.100631 , 0.387088 , 0.008078
727D15 , D , 2      , 0.085700 , 0.000000 , 0.000000
727D15 , D , 20     , 0.108897 , 0.376653 , 0.007712
727D15 , D , 25     , 0.117828 , 0.365969 , 0.007391
727D15 , D , 5      , 0.094926 , 0.409200 , 0.009062
727D15 , D , ZERO   , 0.063600 , 0.000000 , 0.000000
727D17 , A , D-25   , 0.124821 , 0.383689 , 0.000000
727D17 , A , D-30   , 0.143164 , 0.378419 , 0.000000
727D17 , A , D-40   , 0.184387 , 0.372094 , 0.000000
727D17 , A , U-15   , 0.089969 , 0.000000 , 0.000000
727D17 , A , U-25   , 0.109535 , 0.000000 , 0.000000
727D17 , D , 15     , 0.100631 , 0.387088 , 0.008078
727D17 , D , 2      , 0.085700 , 0.000000 , 0.000000
727D17 , D , 20     , 0.108897 , 0.376653 , 0.007712
727D17 , D , 25     , 0.117828 , 0.365969 , 0.007391
727D17 , D , 5      , 0.094926 , 0.409200 , 0.009062
727D17 , D , ZERO   , 0.063600 , 0.000000 , 0.000000
727Q15 , A , D-25   , 0.109535 , 0.383689 , 0.000000
727Q15 , A , D-30   , 0.143164 , 0.378419 , 0.000000
727Q15 , A , D-40   , 0.184387 , 0.372094 , 0.000000
727Q15 , A , U-15   , 0.089969 , 0.000000 , 0.000000
727Q15 , A , U-25   , 0.109535 , 0.000000 , 0.000000
727Q15 , D , 15     , 0.100631 , 0.387088 , 0.008078
727Q15 , D , 2      , 0.085700 , 0.000000 , 0.000000
727Q15 , D , 20     , 0.108897 , 0.376653 , 0.007712
727Q15 , D , 25     , 0.117828 , 0.365969 , 0.007391
727Q15 , D , 5      , 0.094926 , 0.409200 , 0.009062
727Q15 , D , ZERO   , 0.063600 , 0.000000 , 0.000000
727Q7  , A , D-25   , 0.128359 , 0.350485 , 0.000000
727Q7  , A , D-30   , 0.145903 , 0.343897 , 0.000000
727Q7  , A , D-40   , 0.186604 , 0.335992 , 0.000000
727Q7  , A , U-15   , 0.090698 , 0.000000 , 0.000000
727Q7  , A , U-25   , 0.113154 , 0.000000 , 0.000000
727Q7  , D , 15     , 0.095459 , 0.392649 , 0.008301
727Q7  , D , 2      , 0.085700 , 0.000000 , 0.000000
727Q7  , D , 25     , 0.115623 , 0.371567 , 0.007389
727Q7  , D , 5      , 0.088916 , 0.415048 , 0.008692
727Q7  , D , ZERO   , 0.063600 , 0.000000 , 0.000000
727Q9  , A , D-25   , 0.124565 , 0.372885 , 0.000000
727Q9  , A , D-30   , 0.142606 , 0.367614 , 0.000000
727Q9  , A , D-40   , 0.184273 , 0.359182 , 0.000000
727Q9  , A , U-15   , 0.090523 , 0.000000 , 0.000000
727Q9  , A , U-25   , 0.109315 , 0.000000 , 0.000000
727Q9  , D , 15     , 0.100631 , 0.387088 , 0.008078
727Q9  , D , 2      , 0.085700 , 0.000000 , 0.000000
727Q9  , D , 20     , 0.108897 , 0.376653 , 0.007712
727Q9  , D , 25     , 0.117828 , 0.365969 , 0.007391
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727Q9  , D , 5      , 0.094926 , 0.409200 , 0.009062
727Q9  , D , ZERO   , 0.063600 , 0.000000 , 0.000000
727QF  , A , D-15   , 0.118200 , 0.000000 , 0.000000
727QF  , A , D-25   , 0.135900 , 0.000000 , 0.000000
727QF  , A , D-30   , 0.160200 , 0.365800 , 0.000000
727QF  , A , D-40   , 0.200300 , 0.356800 , 0.000000
727QF  , A , U-05   , 0.087090 , 0.000000 , 0.000000
727QF  , A , U-15   , 0.096760 , 0.000000 , 0.000000
727QF  , A , U-25   , 0.120100 , 0.000000 , 0.000000
727QF  , A , U-ZERO , 0.060270 , 0.000000 , 0.000000
727QF  , D , 02     , 0.081000 , 0.000000 , 0.000000
727QF  , D , 05     , 0.092100 , 0.424200 , 0.008490
727QF  , D , 15     , 0.100500 , 0.412000 , 0.007525
727QF  , D , 25     , 0.122200 , 0.388500 , 0.006900
727QF  , D , ZERO   , 0.065990 , 0.000000 , 0.000000
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
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Last update: 19-Dec-1994
Fields(7):
 1  ACFT_ID      C   6
 2  THR_TYPE     C   1
 3  COEFF_E      N   8.1
 4  COEFF_F      N   9.5
 5  COEFF_GA     C  12
 6  COEFF_GB     C  12
 7  COEFF_H      C  10
Records(159):
 707320 , C ,  15943.8 , -13.95840 , +1.67200e-01 , +5.70740e-06 , +0.000e+00
 707320 , 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
 707QN  , T ,  18044.7 , -15.79760 , +1.89300e-01 , +6.45950e-06 , +0.000e+00
 720B   , C ,  14540.1 , -13.41490 , +1.21548e-01 , +1.78264e-06 , +0.000e+00
 720B   , T ,  16768.6 , -15.47100 , +1.40178e-01 , +2.05590e-06 , +0.000e+00
 727100 , C ,  12029.2 ,  -7.99864 , -5.20250e-02 , +5.44617e-06 , +0.000e+00
 727100 , T ,  13218.9 ,  -8.78972 , -5.71710e-02 , +5.98480e-06 , +0.000e+00
 72710A , C ,  14655.1 ,  -7.05590 , +1.43591e-01 , +0.00000e+00 , +0.000e+00
 72710A , T ,  18242.2 , -12.90510 , +5.31830e-02 , +0.00000e+00 , +0.000e+00
 72720A , C ,  14732.9 ,  -8.00670 , +1.29573e-01 , +0.00000e+00 , +0.000e+00
 72720A , T ,  18364.3 , -13.03300 , +1.55297e-01 , +0.00000e+00 , +0.000e+00
 727D15 , C ,  13421.0 ,  -7.65638 , +2.11202e-01 , -2.63762e-05 , +0.000e+00
 727D15 , T ,  14829.8 ,  -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
 727D17 , T ,  15519.8 ,  -8.46009 , +2.33373e-01 , -2.91450e-05 , +0.000e+00
 727Q15 , C ,  13421.0 ,  -7.65638 , +2.11202e-01 , -2.63762e-05 , +0.000e+00
 727Q15 , T ,  14829.8 ,  -8.46009 , +2.33373e-01 , -2.91450e-05 , +0.000e+00
 727Q7  , C ,  12029.2 ,  -7.99864 , -5.20250e-02 , +5.44617e-06 , +0.000e+00
 727Q7  , T ,  13218.9 ,  -8.78972 , -5.71710e-02 , +5.98480e-06 , +0.000e+00
 727Q9  , C ,  12746.2 ,  -8.11613 , -4.90000e-04 , -4.53384e-06 , +0.000e+00
 727Q9  , T ,  13705.6 ,  -8.72702 , -5.27000e-04 , -4.87510e-06 , +0.000e+00
 727QF  , C ,  11266.0 ,  -9.33500 , +1.69297e-01 , -4.70391e-06 , +0.000e+00
 727QF  , N ,  11987.0 ,  -9.33500 , +1.58001e-01 , -4.70391e-06 , +0.000e+00
 727QF  , T ,  14100.0 , -12.25000 , +1.49500e-01 , -1.17500e-05 , +0.000e+00
 737    , C ,  12740.1 ,  -7.93589 , -2.66230e-02 , -4.27620e-07 , +0.000e+00
 737    , T ,  13847.9 ,  -8.62596 , -2.89390e-02 , -4.64800e-07 , +0.000e+00
 737300 , C ,  17448.0 , -17.32000 , +1.55700e-01 , +0.00000e+00 , +0.000e+00
 737300 , T ,  18745.0 , -20.12000 , +4.04300e-01 , +0.00000e+00 , +0.000e+00
 7373B2 , C ,  18859.0 , -17.91000 , +1.95300e-01 , +0.00000e+00 , -2.034e+00
 7373B2 , T ,  20758.0 , -20.65000 , +2.17200e-01 , +0.00000e+00 , -2.418e+00
 737400 , C ,  19695.0 , -18.15000 , +2.08000e-01 , +0.00000e+00 , +0.000e+00
 737400 , T ,  21610.0 , -20.83000 , +2.27400e-01 , +0.00000e+00 , +0.000e+00
 737500 , C ,  17448.0 , -17.32000 , +1.55700e-01 , +0.00000e+00 , +0.000e+00
 737500 , T ,  18745.0 , -20.12000 , +4.04300e-01 , +0.00000e+00 , +0.000e+00
 737D17 , C ,  13083.2 ,  -7.13185 , +1.96733e-01 , -2.45690e-05 , +0.000e+00
 737D17 , T ,  15519.8 ,  -8.46009 , +2.33373e-01 , -2.91450e-05 , +0.000e+00
 737QN  , 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
 74710Q , C ,  36791.4 , -43.50740 , +3.00400e-01 , -9.20000e-06 , +0.000e+00
 74710Q , 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
 747200 , T ,  42780.7 , -50.59000 , +3.49279e-01 , -1.06970e-05 , +0.000e+00
 74720A , C ,  34860.0 , -35.00000 , +4.96200e-01 , +0.00000e+00 , +0.000e+00
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74720A , T ,  40870.0 , -40.11000 , +4.43500e-01 , +0.00000e+00 , +0.000e+00
74720B , C ,  39594.0 , -38.08000 , +5.26200e-01 , +0.00000e+00 , +0.000e+00
74720B , T ,  48866.0 , -43.68000 , +6.64100e-01 , +0.00000e+00 , +0.000e+00
747400 , C ,  43601.0 , -42.70000 , +7.26000e-01 , +0.00000e+00 , +0.000e+00
747400 , T ,  53670.0 , -54.30000 , +5.15000e-01 , +0.00000e+00 , +0.000e+00
747SP  , C ,  36791.4 , -43.50740 , +3.00400e-01 , -9.20000e-06 , +0.000e+00
747SP  , T ,  42780.7 , -50.59000 , +3.49279e-01 , -1.06970e-05 , +0.000e+00
757PW  , C ,  28765.0 , -32.00000 , +4.01500e-01 , +0.00000e+00 , +1.471e-01
757PW  , T ,  35866.0 , -39.72000 , +6.80600e-01 , +0.00000e+00 , -8.371e-01
757RR  , C ,  29350.0 , -29.50000 , +4.15300e-01 , +0.00000e+00 , +0.000e+00
757RR  , T ,  37092.0 , -33.50000 , +3.99800e-01 , +0.00000e+00 , +0.000e+00
767300 , C ,  45480.0 , -41.90000 , +5.59000e-01 , +0.00000e+00 , +0.000e+00
767300 , T ,  56370.0 , -53.00000 , +2.51000e-01 , +0.00000e+00 , +0.000e+00
767CF6 , C ,  38057.0 , -43.24000 , +7.05000e-01 , +0.00000e+00 , +0.000e+00
767CF6 , T ,  44769.0 , -48.34000 , +5.00000e-01 , +0.00000e+00 , +0.000e+00
767JT9 , C ,  38700.0 , -34.50000 , +4.90000e-01 , +0.00000e+00 , +0.000e+00
767JT9 , T ,  43190.0 , -39.30000 , +8.76000e-01 , +0.00000e+00 , +0.000e+00
A300   , C ,  43416.5 , -35.00000 , -1.25234e-01 , +6.27209e-07 , +0.000e+00
A300   , T ,  49336.9 , -39.82430 , -1.42311e-01 , +7.12738e-07 , +0.000e+00
A310   , C ,  43524.4 , -42.80000 , +1.14627e+00 , -2.39432e-05 , +0.000e+00
A310   , T ,  49459.6 , -48.64640 , +1.30258e+00 , -2.72082e-05 , +0.000e+00
A320   , C ,  20891.4 , -18.56110 , -6.36000e-02 , +3.16980e-07 , +0.000e+00
A320   , T ,  23740.2 , -21.09210 , -7.22000e-02 , +3.59700e-07 , +0.000e+00
A7D    , C ,  12844.2 ,  -5.33364 , +1.53447e-01 , +3.47724e-06 , +0.000e+00
A7D    , T ,  13961.1 ,  -5.79744 , +1.66790e-01 , +3.77961e-06 , +0.000e+00
BAC111 , C ,   9827.9 ,  -5.89674 , -1.96560e-02 , +0.00000e+00 , +0.000e+00
BAC111 , T ,  11168.1 ,  -6.70084 , -2.23360e-02 , +0.00000e+00 , +0.000e+00
BAE146 , C ,   6339.4 ,  -9.95850 , +5.60570e-02 , -1.23124e-05 , +0.000e+00
BAE146 , T ,   6542.4 ,  -9.95850 , +5.60570e-02 , -1.23124e-05 , +0.000e+00
BAE300 , C ,   6339.4 ,  -9.95850 , +5.60570e-02 , -1.23124e-05 , +0.000e+00
BAE300 , T ,   6542.4 ,  -9.95850 , +5.60570e-02 , -1.23124e-05 , +0.000e+00
CIT3   , C ,   2987.4 ,  -3.49920 , +6.12300e-02 , -1.16640e-06 , +0.000e+00
CIT3   , T ,   3319.3 ,  -3.88800 , +6.80320e-02 , -1.29600e-06 , +0.000e+00
CL600  , C ,   5543.3 ,  -5.65420 , +8.44200e-02 , +0.00000e+00 , +0.000e+00
CL600  , T ,   6159.2 ,  -6.28240 , +9.38000e-02 , +0.00000e+00 , +0.000e+00
CL601  , C ,   6517.3 ,  -6.64760 , +9.77600e-02 , +0.00000e+00 , +0.000e+00
CL601  , T ,   7241.4 ,  -7.38620 , +1.08620e-01 , +0.00000e+00 , +0.000e+00
CNA500 , C ,   1919.5 ,  -1.99614 , +6.15000e-02 , -2.40502e-06 , +0.000e+00
CNA500 , T ,   2132.8 ,  -2.21793 , +6.83330e-02 , -2.67224e-06 , +0.000e+00
COMJET , C ,   3029.4 ,  -3.49920 , +6.21000e-02 , -1.18260e-06 , +0.000e+00
COMJET , T ,   3366.0 ,  -3.88800 , +6.90000e-02 , -1.31400e-06 , +0.000e+00
CONCRD , C ,  33252.1 , -26.60000 , +2.32800e-01 , +0.00000e+00 , +0.000e+00
CONCRD , T ,  39653.0 , -31.72200 , +2.77600e-01 , +0.00000e+00 , +0.000e+00
DC1010 , C ,  30596.0 , -28.44160 , -1.01635e-01 , +5.09020e-07 , +0.000e+00
DC1010 , T ,  35985.4 , -30.99090 , -1.10745e-01 , +5.54650e-07 , +0.000e+00
DC1030 , C ,  38520.0 , -29.38000 , +4.90000e-01 , +0.00000e+00 , +0.000e+00
DC1030 , T ,  49310.0 , -42.42000 , +6.10000e-01 , +0.00000e+00 , +0.000e+00
DC1040 , C ,  34087.9 , -12.98590 , -4.64050e-02 , +2.32410e-07 , +0.000e+00
DC1040 , T ,  41594.9 , -22.30710 , -7.97140e-02 , +3.99230e-07 , +0.000e+00
DC850  , C ,  14243.5 ,  -5.65650 , -2.02130e-02 , +1.01230e-07 , +0.000e+00
DC850  , T ,  15670.3 ,  -5.89550 , -2.10670e-02 , +1.05510e-07 , +0.000e+00
DC860  , C ,  15558.7 ,  -7.23390 , -2.58500e-02 , +1.29470e-07 , +0.000e+00
DC860  , T ,  16740.5 ,  -4.93940 , -1.76500e-02 , +8.84010e-08 , +0.000e+00
DC870  , C ,  18859.0 , -17.91000 , +1.95300e-01 , +0.00000e+00 , -2.034e+00
DC870  , T ,  20758.0 , -20.65000 , +2.17200e-01 , +0.00000e+00 , +0.000e+00
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DC8QN  , C ,  15558.7 ,  -7.23390 , -2.58500e-02 , +1.29470e-07 , +0.000e+00
DC8QN  , T ,  16740.5 ,  -4.93940 , -1.76500e-02 , +8.84010e-08 , +0.000e+00
DC910  , C ,  11194.3 ,  -3.02740 , -1.08180e-02 , +5.41810e-08 , +0.000e+00
DC910  , T ,  12308.2 ,  -0.47800 , +1.70800e-03 , +8.55000e-09 , +0.000e+00
DC930  , C ,  11561.8 ,  -2.94773 , -1.05340e-02 , +5.27560e-08 , +0.000e+00
DC930  , T ,  12972.0 ,  -2.31038 , -8.25600e-03 , +4.13490e-08 , +0.000e+00
DC950  , C ,  12365.4 ,  -2.54939 , -9.11020e-03 , +4.56270e-08 , +0.000e+00
DC950  , T ,  14698.5 ,  -2.13511 , -7.62980e-03 , +3.82120e-08 , +0.000e+00
DC9Q7  , C ,  11194.3 ,  -3.02740 , -1.08180e-02 , +5.41810e-08 , +0.000e+00
DC9Q7  , T ,  12308.2 ,  -0.47800 , +1.70800e-03 , +8.55000e-09 , +0.000e+00
DC9Q9  , C ,  11561.8 ,  -2.94773 , -1.05340e-02 , +5.27560e-08 , +0.000e+00
DC9Q9  , T ,  12972.0 ,  -2.31038 , -8.25600e-03 , +4.13490e-08 , +0.000e+00
DHC8   , C ,   6323.6 , -21.44450 , +8.82324e-02 , +0.00000e+00 , +0.000e+00
DHC8   , T ,   7026.2 , -23.82720 , +9.80360e-02 , +0.00000e+00 , +0.000e+00
DHC830 , C ,   6679.0 , -21.99190 , +9.03051e-02 , +0.00000e+00 , +0.000e+00
DHC830 , T ,   7421.1 , -24.43540 , +1.00339e-01 , +0.00000e+00 , +0.000e+00
F10062 , C ,  10472.0 ,  -9.57000 , +1.37000e-01 , +0.00000e+00 , +0.000e+00
F10062 , T ,  13551.0 , -16.56000 , +2.80400e-01 , +0.00000e+00 , +0.000e+00
F10065 , C ,  10970.0 , -10.52000 , +1.23800e-01 , +0.00000e+00 , +0.000e+00
F10065 , T ,  14814.0 , -16.72000 , +6.50000e-02 , +0.00000e+00 , +0.000e+00
F28MK2 , C ,   8408.0 ,  -4.72000 , +1.04800e-01 , +0.00000e+00 , +0.000e+00
F28MK2 , T ,   9851.0 ,  -7.68000 , +8.89000e-02 , +0.00000e+00 , +0.000e+00
F28MK4 , C ,   8459.0 ,  -4.87400 , +9.97000e-02 , +0.00000e+00 , +0.000e+00
F28MK4 , T ,   9905.0 ,  -7.44500 , +7.65000e-02 , +0.00000e+00 , +0.000e+00
F4C    , C ,  10494.9 ,  -4.35810 , +1.25380e-01 , +2.84120e-06 , +0.000e+00
F4C    , T ,  16368.2 ,  -6.79700 , +1.95500e-01 , +4.43130e-06 , +0.000e+00
FAL20  , C ,   4102.0 ,  -2.38310 , -1.14653e-01 , +1.02126e-05 , +0.000e+00
FAL20  , T ,   4017.4 ,  -3.45670 , +5.80240e-02 , -2.49247e-06 , +0.000e+00
GIIB   , C ,   9827.9 ,  -5.89674 , -1.96560e-02 , +0.00000e+00 , +0.000e+00
GIIB   , T ,  11168.1 ,  -6.70084 , -2.23360e-02 , +0.00000e+00 , +0.000e+00
GIV    , C ,  11598.8 , -13.09090 , +5.08640e-02 , +0.00000e+00 , +0.000e+00
GIV    , T ,  13180.5 , -14.87600 , +5.78000e-02 , +0.00000e+00 , +0.000e+00
IA1125 , C ,   3114.4 ,  -3.49920 , +4.12500e-02 , -2.81988e-06 , +0.000e+00
IA1125 , T ,   3460.5 ,  -3.88800 , +4.58340e-02 , -3.13320e-06 , +0.000e+00
KC135  , C ,   9199.2 ,  -3.80630 , +1.09505e-01 , +2.48150e-06 , +0.000e+00
KC135  , T ,  10783.7 ,  -4.47802 , +1.28830e-01 , +2.91940e-06 , +0.000e+00
KC135B , C ,  15306.4 , -12.73050 , +1.52517e-01 , +5.20540e-06 , +0.000e+00
KC135B , T ,  18007.5 , -14.97710 , +1.79432e-01 , +6.12400e-06 , +0.000e+00
KC135R , C ,  18859.0 , -17.91000 , +1.95300e-01 , +0.00000e+00 , -2.034e+00
KC135R , T ,  20758.0 , -20.65000 , +2.17300e-01 , +0.00000e+00 , -2.418e+00
L1011  , C ,  34204.8 , -43.81720 , +2.70193e-01 , +2.01530e-06 , +0.000e+00
L1011  , T ,  40720.0 , -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
L10115 , T ,  46840.0 , -52.16330 , +3.21659e-01 , +2.39920e-06 , +0.000e+00
LEAR25 , C ,   2560.9 ,  -1.83520 , -1.50910e-02 , +1.95912e-06 , +0.000e+00
LEAR25 , T ,   2845.4 ,  -2.03911 , -1.67680e-02 , +2.17680e-06 , +0.000e+00
LEAR35 , C ,   3071.0 ,  -3.49920 , -3.97000e-03 , +1.38915e-06 , +0.000e+00
LEAR35 , T ,   3412.2 ,  -3.88800 , -4.41000e-03 , +1.54350e-06 , +0.000e+00
MD11GE , C ,  47037.0 , -45.71000 , +8.54000e-01 , +0.00000e+00 , -3.681e+02
MD11GE , T ,  57156.0 , -42.73000 , +3.03000e-01 , +0.00000e+00 , -3.575e+02
MD11PW , C ,  51197.0 , -59.27000 , +4.16000e-01 , +0.00000e+00 , -3.570e+02
MD11PW , T ,  57661.0 , -51.30000 , +5.13000e-01 , +0.00000e+00 , -4.266e+02
MD81   , C ,  16018.0 ,  -6.25000 , +1.67000e-01 , +0.00000e+00 , -1.050e+02
MD81   , T ,  17900.0 , -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
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```
MD82   , T ,  19350.0 , -15.00000 , +2.00000e-01 , +0.00000e+00 , +0.000e+00
MD83   , C ,  17742.0 ,  -7.20000 , +2.60000e-01 , +0.00000e+00 , -7.750e+01
MD83   , T ,  20400.0 , -15.00000 , +1.00000e-01 , +0.00000e+00 , +0.000e+00
MU3001 , C ,   1919.5 ,  -1.99614 , +6.15000e-02 , -2.40502e-06 , +0.000e+00
MU3001 , T ,   2132.8 ,  -2.21793 , +6.83330e-02 , -2.67224e-06 , +0.000e+00
```

```
File: K:\INM50\SYS_DATA\THR_PROP.DBF
Last update: 12-Sep-1994
Fields(4):
 1  ACFT_ID      C   6
 2  THR_TYPE     C   1
 3  EFFICIENCY   N   4.2
 4  POWER        N   6.1
Records(32):
 BEC58P , C , 0.90 ,  261.3
 BEC58P , T , 0.90 ,  310.0
 C130   , C , 0.85 , 3575.0
 C130   , T , 0.85 , 4205.0
 C130E  , C , 0.85 , 3200.0
 C130E  , T , 0.85 , 3700.0
 CNA441 , C , 0.90 ,  620.0
 CNA441 , T , 0.90 ,  635.5
 COMSEP , C , 0.85 ,  154.0
 COMSEP , T , 0.85 ,  165.0
 CVR580 , C , 0.85 , 3344.0
 CVR580 , T , 0.85 , 3800.0
 DC3    , C , 0.85 , 1130.0
 DC3    , T , 0.85 , 1302.0
 DC6    , C , 0.90 , 1750.0
 DC6    , T , 0.90 , 1900.0
 DHC6   , C , 0.90 ,  557.5
 DHC6   , T , 0.90 ,  587.0
 DHC7   , C , 0.90 ,  846.0
 DHC7   , T , 0.90 ,  940.0
 GASEPF , C , 0.85 ,  133.0
 GASEPF , T , 0.85 ,  142.0
 GASEPV , C , 0.85 ,  242.0
 GASEPV , T , 0.85 ,  260.0
 HS748A , C , 0.90 , 1805.0
 HS748A , T , 0.90 , 2006.0
 L188   , C , 0.90 , 3180.0
 L188   , T , 0.90 , 3460.0
 SD330  , C , 0.90 ,  972.0
 SD330  , T , 0.90 , 1080.0
 SF340  , C , 0.90 , 1587.0
 SF340  , T , 0.90 , 1763.0


File: K:\INM50\SYS_DATA\METRIC.DBF
Last update: 5-Jun-1995
Fields(7):
 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(13):
 DNL    , E , A ,   1.00 ,   1.00 ,  10.00 , 49.37
 CNEL   , E , A ,   1.00 ,   3.16 ,  10.00 , 49.37
```

```
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
SEL    , E , A ,   1.00 ,   1.00 ,   1.00 ,  0.00
LAMAX  , M , A ,   1.00 ,   1.00 ,   1.00 ,  0.00
TALA   , T , A ,   1.00 ,   1.00 ,   1.00 ,  0.00
NEF    , E , P ,   1.00 ,   1.00 ,  16.67 , 88.00
WECPNL , E , P ,   1.00 ,   3.16 ,  10.00 , 39.37
EPNL   , E , P ,   1.00 ,   1.00 ,   1.00 ,  0.00
PNLTM  , M , P ,   1.00 ,   1.00 ,   1.00 ,  0.00
TAPNL  , T , P ,   1.00 ,   1.00 ,   1.00 ,  0.00
```

4 STANDARD NOISE IDENTIFIERS VS. AIRCRAFT

You can use this Appendix to look up Aircraft that use a particular Noise identifier.

Noise Id	Engines	Aircraft Id
2CF650	2	A300, A310
2CF680	2	767300, 767CF6, 767JT9
2CF68D	3	MD11GE
2JT8D	2	737, BAC111, DC910, DC930
2JT8D2	2	MD81, MD82, MD83
2JT8DQ	2	737D17, 737QN, DC950, DC9Q7, DC9Q9
2R2800	2	DC3
3JT8D	3	727100, 727200, 727D15
3JT8DQ	3	727D17, 727Q15, 727Q7, 727Q9
3JT8E5	3	727EM2
3JT8E7	3	727EM1
4R2800	4	DC6
501D13	2	CVR580
AL502L	2	CL600
AL502R	4	BAE146, BAE300
CF34	2	CL601
CF66D	3	DC1010, DC1030, DC1040
CF700	2	FAL20, SABR80
CFM562	4	DC870
CFM563	2	737300, 7373B2, 737400, 737500
CFM565	2	A320
CFM56A	4	KC135R
CGAJ	2	COMJET
CGASEP	1	COMSEP
CJ610	2	LEAR25
CT75	2	SF340
GE100	1	F16GE
J57	4	KC135
J79	2	F4C
JT15D1	2	CNA500
JT15D5	2	MU3001
JT3D	4	707120, 707320, 720B, DC850, DC860, KC135B
JT3DQ	4	707QN, DC8QN
JT4A	4	707, 720, DC820
JT9D7Q	4	74720A, 74720B
JT9DBD	4	747100
JT9DFL	4	74710Q, 747200, 747SP
OLY593	4	CONCRD
PT6A27	2	DHC6
PT6A45	2	SD330
PT6A50	4	DHC7
PW120	2	DHC8, DHC830

PW200	1	F16A
PW2037	2	757PW
PW220	1	F16PW0
PW229	1	F16PW9
PW4056	4	747400
PW4460	3	MD11PW
RB183	2	F28MK2
RB183P	2	F28MK4
RB2112	3	L1011, L10115
RDA532	2	HS748A
RR535E	2	757RR
SEPFP	1	GASEPF
SEPVP	1	GASEPV
SP5118	2	GIIB
T56A15	4	C130
T56A7	4	C130E, L188
TAY620	2	F10062, GIV
TAY650	2	F10065
TAY651	3	727QF
TF41	1	A7D
TF7312	2	LEAR35
TF7313	2	CIT3, IA1125
TPE331	2	CNA441
TSIO52	2	BEC58P
XXXXXX	3	72710A, 72720A

----

5 INM SYSTEM DIRECTORY

```
INM50\      INM system directory

      inm.exe           INM Windows program
      inm.hlp           INM help file
      inm.ini           INM initialization file (text)
      preproc.exe       Source Data Processing Windows program
      preproc.hlp       preproc help file
      *.dll             dynamic link libraries

      SYS_DATA\   INM Standard Data subdirectory

            acdb50.bin        compressed file of dbf files (binary)
            aircraft.dbf      aircraft data
            acft_sub.dbf      aircraft substitutions
            noise.dbf         noise curves for SEL, EPNL, etc.
            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
            metric.dbf        default noise metric parameters

      SYS_DBF\    System dbf-template subdirectory

            *.dbf             dbf files used by INM (without records)

      USR_DATA\   User data subdirectory

            sys_aprt.dbf      NFDC airport data plus some non-US
            sys_rwy.dbf       NFDC runway data for 500 airports
            loc_pts.dbf       US navaids and fixes
            oag_sub.dbf       OAG aircraft substitutions
            bad_rwy.txt       possible errors in runway data (text)

      COMP50\     Noise computation subdirectory

            comp50.dll        dll to calculate noise
            convert.dll       dll to produce nmplot input file
            level*            temporary files of subdivided-grid data

      NMPLOT\     Contour computation subdirectory

            nmplot.bat        batch file to run nmplot in batch mode
            nmplotx.exe       DOS nmplot 3.03 program, uses extended memory
            batch.cfg         input configuration for batch mode
```

```
      nmplot.cfg        input configuration for interactive mode
      nmplot.hlp        help file (not Windows .hlp)
      nmplot.ico        Windows icon
      rtm.exe           extended memory library
      egavga.bgi        display driver
      litt.chr          character fonts
      dpmi16bi.ovl      overlay
```

PREPROC Source Data Processing subdirectory

```
      config.oag        oag function configuration file
      ord_aug.oag       example OAG input file (ORD Aug 1994)
      oag_log.ord       example oag output log file (text)
      cadcvrt.exe       Windows program to convert dxf to cad format
      debuglxt.out      cadcvrt output status file (text)
      census.exe        Windows program to extract census data
      census.cfg        config file for census.exe
      fipscode.dat      list of fips codes for census.exe
      fipstate.dat      list of state codes for census.exe
      txt2dbf.exe       Windows program to convert text to dbf
      txt2dbf.cfg       example config file for txt2dbf (text)
      test.txt          example file to test txt2dbf (text)
```

CONV411 INM 4.11 conversion subdirectory

```
      conv411.bat       DOS batch file to run conversion programs
      input50.exe       DOS program adapted from INM 4.11 input.exe
      transfer.exe      DOS dBase program to make dbf files
      transfer.prg      dBase source code
      config.db         dBase configuration file
      login.db          dBase login file
      dbase.res         dBase engine
      dbase16.rtl       dBase run-time library
      mstudy.exe        DOS program to create study.inm & modify dbf
for02.dat         INM 4.11 input file (text)
      for03.dat         INM 4.11 aircraft data (binary)
      for*.dat          input50.exe output data files (text & binary)
      *.dbf             INM 5.0 template input & output files
      *.mdx             dBase index files
      input.out         input50.exe standard output echo file (text)
      table.out         input50.exe runway-roll output file (text)
      fatal.err         input50 & transfer error status file (text)
      temp.dbf          transfer.exe temporary error file (dbf)
      aircraft.txt      transfer.exe output aircraft list (text)
      basecase.dbf      default case.dbf file
      output.dbf        default output.dbf file
      study.inm         INM 5.0 configuration file
```

TERRAIN Terrain processing subdirectory

```
      make3cd.bat       DOS batch file to run the terrain processor
```

```
run.txt          information file to run make3cd (text)
makefile.cfg     config file used by makefile.exe & terrain.exe
makefile.exe     DOS program to create INM-3CD file
makefile.err     makefile error file
terrain.exe      DOS program to create terrain.grd file
terrain.cfg      config file for nmplotx (interactive mode)
batch.cfg        config file for nmplotx (terrain batch mode)
dat2bin.exe      DOS program to convert contours.dat to bin file
```

UTILITY   Utility program subdirectory

```
prn_dbf.exe      print dbf file to dtx file (text)
prn_hdr.exe      print dbf header to the screen
prn_flt.exe      print flight.pth file to text file
xy_to_ll.exe     convert x,y to lat,long
```

6 EXAMPLE STUDY DIRECTORY

```
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)
      t50.3cd            terrain elevation data (binary)
      t50.dxf            drawing of airport (dxf)
      t50.csv            radar track data (text)
      ops_aprt.dbf       OAG airport operations
      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)
      t50.cad            drawing of airport (binary)
      track.opt          recent input graphics display settings (binary)
      lut.dat            recent look-up table of display settings (binary)
                   (output intermediate)
      inmerror.txt       temporary error file

      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_calc.err       ops calc error file (text)
            flight.pth         flight paths (binary)
            flight.err         flight path error file (text)
            _rwy_trk.bin       runway/track graphics data (binary)
                         (output intermediate)
            grid               single-metric noise file 1 of 2 (binary)
            contour            single-metric noise file 2 of 2 (binary)
                                     (or)
            grid.mn            multi-metric noise file 1 of 6 (binary)
```

```
      grid.mx           multi-metric noise file 2 of 6 (binary)
      grid.ta           multi-metric noise file 3 of 6 (binary)
      contour.mn        multi-metric noise file 4 of 6 (binary)
      contour.mx        multi-metric noise file 5 of 6 (binary)
      contour.ta        multi-metric noise file 6 of 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 input parameters (text)


CASE1.DNL\  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      population and area 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          grid data for graphics presentation
      output.opt        recent output graphics display settings (binary)
      inm.dxf           contour/runway/track graphics (dxf)

CASE2\      Another Case subdirectory

CASE2.DNL\  Another Output subdirectory
```

7 TEST411 STUDY INPUT DATA

This Appendix presents Study input data that were produced by converting the INM 4.11 TESTCASE.INP file. This Study is in the system directory under the EXAMPLES \ TEST411 subdirectory.

7.1 Edit Steps

After converting an INM 4.11 input file, you need to make some changes and additions, mainly to implement touch-and-go operations. To give you an idea of what is involved, the editing steps that were performed on the TEST411 Study are outlined below.

1. Look in Acft // Aircraft for records marked with "User data" on the status bar. 727Q15, DC870, and DC930 are marked "User data" because they had their profiles altered. The INM conversion process inserted proper "static thrust" values because these three Aircraft are in the Standard database. However, static thrust for the user-defined S-76 Aircraft is zero because it is unknown. The S-76 static thrust can remain zero because its profile is determined by Profile Points, not computed from Procedure Steps. This is also the reason why the Standard Aircraft SABR80 does not have a static thrust value. There are no changes for Aircraft data.

2. In Track // Track, for Runway End 17, add two records: DEP-TR14 and APP-TR14. Track TGO-TR14 is already defined. Use the same Track identifier (TR14) for all three parts of the touch-and-go operation to help you remember that they go together.

3. In Track // Track Segments, for Runway End 17 Track DEP-TR14, add three records:

   1 Straight 3 nmi,
   2 LeftTurn 180 deg, 2-nmi radius,
   3 Straight 6 nmi.

   Also, for Track APP-TR14, add three records:

   1 Straight 6 nmi,
   2 LeftTurn 180 deg, 2-nmi radius,
   3 Straight 3 nmi.

   These Track Segments define Tracks to and from the touch-and-go pattern. The downwind parts overlap (i.e., the two 6-nmi segments), but this does not matter because the two Profiles (DEP-T1 and APP-T1) determine where the flight path starts and stops.

4. In Acft // Profiles, for Aircraft BEC58P, add two records: APP-T1 and DEP-T1. Use 5500 pounds for the two weights because TGO-T1 is already set to 5500 pounds. You can change all three of these weights; however, they should all be the same weight.

5. In Acft // Procedure Steps, for Aircraft BEC58P, add 5 Procedure Step records for the DEP-T1 Profile:

   1 Takeoff using TO flaps and MaxTakeoff power.
   2 Accelerate using TO flaps and MaxTakeoff power, climbing at 1040 fpm, with final speed 115 knots.
   3 Climb using TO flaps and MaxTakeoff power to 900 feet.
   4 Accelerate using TO flaps and MaxClimb power to final speed 130 knots.
   5 Fly level using ZERO flaps at 900 feet, 130 knots, for a distance of 63347 feet.

   Add 8 Procedure Step records for the TGO-T1 Profile:

   1 Fly level using ZERO flaps at 900 feet, 130 knots, for a distance of 1000 feet.
   2 Descend using D-15 flaps, from 900 feet, at 115 knots, along a 5-degree angle.
   3 Land using D-30 flaps and roll for 500 feet.
   4 Takeoff using TO flaps and MaxTakeoff power, start takeoff roll at 65 knots.
   5 Accelerate using TO flaps and MaxTakeoff power, climbing at 1040 fpm, with final speed 115 knots.
   6 Climb using TO flaps and MaxTakeoff power to 900 feet.
   7 Accelerate using TO flaps and MaxClimb power to final speed 130 knots.
   8 Fly level using ZERO flaps at 900 feet, 130 knots, for a distance of 2000 feet.

   Add 5 Procedure Step records for the APP-T1 Profile:

   1 Fly level using ZERO flaps, at 900 feet, 130 knots, for a distance of 65134 feet.
   2 Descend using D-15 flaps, from 900 feet, at 115 knots, along a 5-degree angle.
   3 Land using D-30 flaps and roll for 188 feet.
   4 Decelerate for 1700 feet, starting at 94 knots, using 40% power.
   5 Decelerate (taxi) at 30 knots, using 10% power.

6. In Ops // Flight Ops, Case BASECASE, for Aircraft BEC58P Runway End 17, change TGO-T1-TR14 (23 day operations), and add two new records, DEP-T1-TR14 and APP-T1-TR14:

   DEP-T1-TR14 4.6 day operations,
   TGO-T1-TR14 18.4 day operations,

APP-T1-TR14 4.6 day operations.

The original 23 operations are changed to 4.6 takeoff/land operations plus 18.4 touch-and-go operations, making an average of 4 touch-and-goes per takeoff. You can use a different number of touch-and-goes per takeoff, if you wish. Make sure that the number of takeoffs plus the number of touch-and-goes equals the original INM-4.11 number of operations (4.6 + 18.4 = 23). Also, the number of takeoffs must equal the number of landings (4.6 = 4.6).

7. In Ops // RunUp Ops, Case BASECASE, for Aircraft 747200, RunUp R1, change the percent value from 100% to 92.3%, so that run-up thrust is approximately equal to that used in the INM-4.11 TESTCASE.

7.2 Echo Report

```
INM 5.0 ECHO REPORT  31-Jul-95 15:43

STUDY: K:\INM50\EXAMPLES\TEST411\
   Created date: 10-Dec-94 14:21
   Decsription : INM FOR02.DAT CONVERSION
   Airport     : XXX

CASE: BASECASE
   Created date: 06-Jan-95 05:39
   Description :

UNITS: ENGLISH SYSTEM


STUDY AIRPORT
   Lat    : 00-00-00.000N
   Long   : 000-00-00.000E
   Elev   : 0.00 ft
   Temp   : 59.00 F
   Press  : 29.92 in-Hg
   Wind   : 8.00 knt

STUDY RUNWAYS
   09L
      Lat      : 00-00-00.000N
      Long     : 000-00-00.000E
      X        : 0.0000 nmi
      Y        : 0.0000 nmi
      Elevation: 0.0 ft
      Length   : 9500 ft
      Gradient : 0.00%
      Wind     : 8.0 knt
      TkoThrsh : 0 ft
      AppThrsh : 0 ft
   09R
```

```
   Lat      : 00-00-10.360S
   Long     : 000-01-08.211W
   X        : -1.1389 nmi
   Y        : -0.1718 nmi
   Elevation: 0.0 ft
   Length   : 11129 ft
   Gradient : 0.00%
   Wind     : 8.0 knt
   TkoThrsh : 0 ft
   AppThrsh : 0 ft
17
   Lat      : 00-01-06.904N
   Long     : 000-01-03.154E
   X        : 1.0545 nmi
   Y        : 1.1096 nmi
   Elevation: 0.0 ft
   Length   : 5458 ft
   Gradient : 0.00%
   Wind     : 8.0 knt
   TkoThrsh : 0 ft
   AppThrsh : 0 ft
27L
   Lat      : 00-00-13.992S
   Long     : 000-00-41.429E
   X        : 0.6917 nmi
   Y        : -0.2321 nmi
   Elevation: 0.0 ft
   Length   : 11129 ft
   Gradient : 0.00%
   Wind     : 8.0 knt
   TkoThrsh : 0 ft
   AppThrsh : 0 ft
27R
   Lat      : 00-00-04.932S
   Long     : 000-01-33.514E
   X        : 1.5614 nmi
   Y        : -0.0818 nmi
   Elevation: 0.0 ft
   Length   : 9500 ft
   Gradient : 0.00%
   Wind     : 8.0 knt
   TkoThrsh : 0 ft
   AppThrsh : 0 ft
35
   Lat      : 00-00-13.555N
   Long     : 000-01-12.498E
   X        : 1.2105 nmi
   Y        : 0.2248 nmi
   Elevation: 0.0 ft
   Length   : 5458 ft
   Gradient : 0.00%
   Wind     : 8.0 knt
   TkoThrsh : 0 ft
   AppThrsh : 100 ft
```

```
STUDY TRACKS
   RwyId-OpType-TrkId
     Sub  PctSub   TrkType   Delta(ft)
   09L-DEP-TR1
      0   100.00   Vectors     0.0
   09R-APP-TR9
      0   100.00   Vectors     0.0
   09R-DEP-TR3
      0   100.00   Vectors     0.0
   17 -APP-TR11
      0   100.00   Vectors     0.0
   17 -APP-TR14
      0   100.00   Vectors     0.0
   17 -DEP-TR14
      0   100.00   Vectors     0.0
   17 -DEP-TR6
      0   100.00   Vectors     0.0
   17 -DEP-TR7
      0   100.00   Vectors     0.0
   17 -TGO-TR14
      0   100.00   Vectors     0.0
   27R-APP-TR8
      0   100.00   Vectors     0.0
   27R-DEP-TR2
      0   100.00   Vectors     0.0
   27R-DEP-TR4
      0   100.00   Vectors     0.0
   35 -APP-TR10
      0   100.00   Vectors     0.0
   35 -DEP-TR5
      0   100.00   Vectors     0.0

STUDY TRACK DETAIL
   RwyId-OpType-TrkId-SubTrk
          SegType      Param1     Param2(nmi)
   09L-DEP-TR1 -0
      1   Straight    4.1000 nmi
      2   LeftTurn   88.0000 deg    1.6000
      3   Straight   50.0000 nmi
   09R-APP-TR9 -0
      1   Straight   50.0000 nmi
      2  RightTurn   12.0000 deg    1.5000
      3   Straight    7.0000 nmi
   09R-DEP-TR3 -0
      1   Straight    1.3000 nmi
      2   LeftTurn   15.0000 deg    1.0000
      3   Straight    1.4000 nmi
      4  RightTurn   57.0000 deg    1.8000
      5   Straight    0.5000 nmi
      6  RightTurn   50.0000 deg    1.6000
      7   Straight   50.0000 nmi
   17 -APP-TR11-0
      1   Straight   50.0000 nmi
   17 -APP-TR14-0
      1   Straight    6.0000 nmi
```

```
      2   LeftTurn  180.0000 deg    2.0000
      3   Straight    3.0000 nmi
   17 -DEP-TR14-0
      1   Straight    3.0000 nmi
      2   LeftTurn  180.0000 deg    2.0000
      3   Straight    6.0000 nmi
   17 -DEP-TR6 -0
      1   Straight   50.0000 nmi
   17 -DEP-TR7 -0
      1   Straight    1.5000 nmi
      2  RightTurn   95.0000 deg    0.2500
      3   Straight    3.0000 nmi
      4   LeftTurn   20.0000 deg    1.0000
      5   Straight   50.0000 nmi
   17 -TGO-TR14-0
      1   Straight    3.0000 nmi
      2   LeftTurn  180.0000 deg    2.0000
      3   Straight    6.0000 nmi
      4   LeftTurn  180.0000 deg    2.0000
      5   Straight    3.0000 nmi
   27R-APP-TR8 -0
      1   Straight   50.0000 nmi
      2  RightTurn   82.0000 deg    1.5000
      3   Straight    4.2000 nmi
   27R-DEP-TR2 -0
      1   Straight    4.1000 nmi
      2   LeftTurn   88.0000 deg    1.6000
      3   Straight   50.0000 nmi
   27R-DEP-TR4 -0
      1   Straight    4.1000 nmi
      2   LeftTurn   43.0000 deg    2.2000
      3   Straight   50.0000 nmi
   35 -APP-TR10-0
      1   Straight   50.0000 nmi
   35 -DEP-TR5 -0
      1   Straight   50.0000 nmi

STUDY AIRCRAFT
   727Q15 User-defined
      Descrip   : 727Q153JT8DQ
      UserID    : COM
      WgtCat    : Large
      OwnerCat  : Commercial
      EngType   : Jet
      NoiseCat  : 3
      Type      : Jet
      NumEng    : 2
      NoiseId   : 3JT8DQ
      ATRS      : No
      TkoWgt    : 204000 lb
      LndWgt    : 152100 lb
      LndDist   : 0 ft
      Static    : 15500 (lb or hp)
      Thr100    : 0 lb
   737300 Standard data
```

```
747200 Standard data
757PW  Standard data
767JT9 Standard data
A300   Standard data
BEC58P Standard data
DC1030 Standard data
DC870  User-defined
   Descrip   : DC870CFM562
   UserID    : COM
   WgtCat    : Large
   OwnerCat  : Commercial
   EngType   : Jet
   NoiseCat  : 3
   Type      : Jet
   NumEng    : 3
   NoiseId   : CFM562
   ATRS      : No
   TkoWgt    : 325000 lb
   LndWgt    : 232200 lb
   LndDist   : 0 ft
   Static    : 22000 (lb or hp)
   Thr100    : 0 lb
DC930  User-defined
   Descrip   : DC9302JT8D
   UserID    : COM
   WgtCat    : Large
   OwnerCat  : Commercial
   EngType   : Jet
   NoiseCat  : 3
   Type      : Jet
   NumEng    : 1
   NoiseId   : 2JT8D
   ATRS      : No
   TkoWgt    : 112000 lb
   LndWgt    : 91800 lb
   LndDist   : 0 ft
   Static    : 14500 (lb or hp)
   Thr100    : 0 lb
MD81   Standard data
S-76   User-defined
   Descrip   : S-76250C30
   UserID    : GA
   WgtCat    : Large
   OwnerCat  : Commercial
   EngType   : Piston
   NoiseCat  : 0
   Type      : Prop
   NumEng    : 1
   NoiseId   : 250C30
   ATRS      : No
   TkoWgt    : 10000 lb
   LndWgt    : 10000 lb
   LndDist   : 0 ft
   Static    : 0 (lb or hp)
   Thr100    : 0 lb
```

```
   SABR80 Standard data

STUDY SUBSTITUTION AIRCRAFT

USER-DEFINED NOISE
        Distances (ft)     200   400   630  1000  2000  4000  6300 10000 16000 25000
   250C30 EPNL       1.0  90.2  85.8  82.8  79.4  73.7  67.6  62.5  56.8  51.0  45.5
   250C30 EPNL       2.0  91.2  87.2  84.1  80.7  75.1  68.2  63.2  57.4  51.5  45.9
   250C30 EPNL       3.0  97.2  93.1  90.3  87.4  82.6  77.2  73.2  68.7  64.1  59.7
   250C30 SEL        1.0  88.6  84.2  81.2  77.8  72.1  66.0  60.9  55.2  49.4  43.9
   250C30 SEL        2.0  90.0  85.6  82.5  79.1  73.5  66.6  61.6  55.8  49.9  44.3
   250C30 SEL        3.0  95.6  91.5  88.7  85.8  81.0  75.6  71.6  67.1  62.5  58.1

USER-DEFINED PROFILES
     OpType   Prof       Weight(lb)
   727Q15
      APP      U1        152100
   BEC58P
      APP      T1          5500
      DEP      T1          5500
      TGO      T1          5500
      TGO      U1             0
   DC870
      APP      U1        232200
   DC930
      APP      U1         91800
   S-76
      APP      U1         10000
      DEP      U1         10000

USER-DEFINED PROFILE POINTS
         Distance(ft)  Altitude(ft)  Speed(knt)  Thrust
   727Q15-APP-U1
      1   -122518.8     6000.0        273.5       809.2
      2    -61757.7     3236.0        167.3      2495.2
      3    -31377.1     1644.0        153.0      3143.6
      4    -19224.9     1007.0        149.8      4854.6
      5     -7072.6      370.0        147.6      4682.3
      6         0.0        0.0        140.0      9300.0
      7      3433.5        0.0         30.0      1550.0
   DC870 -APP-U1
      1   -122518.8     6000.0        273.5       172.3
      2    -61757.7     3236.0        174.3      1353.0
      3    -31377.1     1644.0        154.1      4103.3
      4    -19224.9     1007.0        148.9      4821.0
      5     -7072.6      370.0        146.7      4649.9
      6         0.0        0.0        139.2     13200.0
      7      4853.5        0.0         30.0      2200.0
   DC930 -APP-U1
      1   -122518.8     6000.0        273.5      1008.4
      2    -61757.7     3236.0        169.9      1749.9
      3    -31377.1     1644.0        155.9      2019.8
      4    -19224.9     1007.0        144.6      4010.0
      5     -7072.6      370.0        142.5      3867.7
      6         0.0        0.0        135.2      8700.0
```

```
     7      3215.5        0.0         30.0      1450.0
   S-76  -APP-U1
     1    -23696.9     2500.0        160.0         3.0
     2    -18836.0     2000.0        160.0         3.0
     3    -14582.7     1500.0        160.0         3.0
     4     -9721.8     1000.0        160.0         3.0
     5     -4860.9      500.0        160.0         3.0
     6         0.0        0.0        160.0         3.0
     7         0.0        0.0        160.0         3.0
   S-76  -DEP-U1
     1         0.0        0.0         32.0         2.0
     2      1376.0        0.0        160.0         2.0
     3      4126.0      500.0        160.0         2.0
     4      6876.0     1000.0        160.0         2.0
     5      6887.0     1000.0        160.0         1.0
     6      9626.0     1500.0        160.0         1.0
     7     10000.0     1500.0        160.0         1.0
     8     15000.0     1500.0        160.0         1.0

USER-DEFINED PROCEDURES
         StepType     Flap    ThrType        Param1    Param2(knt)   Param3
   BEC58P-APP-T1
     1  Level        ZERO    None            900.0 ft     130.0    65134.0 ft
     2  Descend      D-15    None            900.0 ft     115.0        5.0
     3  Land         D-30    None            188.0 ft       0.0        0.0
     4  Decelerate           None           1700.0 ft      94.0       40.0 %
     5  Decelerate           None              0.0 ft      30.0       10.0 %
   BEC58P-DEP-T1
     1  Takeoff      TO      MaxTakeOff        0.0          0.0        0.0
     2  Accelerate   TO      MaxTakeOff     1040.0 fpm    115.0        0.0
     3  Climb        TO      MaxTakeOff      900.0 ft       0.0        0.0
     4  Accelerate   TO      MaxClimb          0.0 fpm    130.0        0.0
     5  Level        ZERO    None            900.0 ft     130.0    63347.0 ft
   BEC58P-TGO-T1
     1  Level        ZERO    None            900.0 ft     130.0     1000.0 ft
     2  Descend      D-15    None            900.0 ft     115.0        5.0
     3  Land         D-30    None            500.0 ft       0.0        0.0
     4  Takeoff      TO      MaxTakeOff        0.0         65.0        0.0
     5  Accelerate   TO      MaxTakeOff     1040.0 fpm    115.0        0.0
     6  Climb        TO      MaxTakeOff      900.0 ft       0.0        0.0
     7  Accelerate   TO      MaxClimb          0.0 fpm    130.0        0.0
     8  Level        ZERO    None            900.0 ft     130.0     2000.0 ft

FLIGHT OPERATIONS
   AcftId Op Prof Rwy Track  Group   Day        Eve      Night
   727Q15 APP U1  09R  TR9  0 COM   19.6000    0.0000    2.8000
   727Q15 APP U1  27R  TR8  0 COM   50.4000    0.0000    7.2000
   727Q15 DEP S1  09L  TR1  0 COM    3.0000    0.0000    0.5000
   727Q15 DEP S1  09R  TR3  0 COM   21.0000    0.0000    2.5000
   727Q15 DEP S1  27R  TR2  0 COM    6.0000    0.0000    1.0000
   727Q15 DEP S2  09L  TR1  0 COM    2.6000    0.0000    0.6000
   727Q15 DEP S2  09R  TR3  0 COM   16.5000    0.0000    4.0000
   727Q15 DEP S2  27R  TR2  0 COM    4.4000    0.0000    1.4000
   727Q15 DEP S3  09L  TR1  0 COM    1.2000    0.0000    0.1000
   727Q15 DEP S3  09R  TR3  0 COM    8.0000    0.0000    0.5000
```

727Q15	DEP	S3	27R	TR2	0	COM	1.8000	0.0000	0.4000
737300	APP	S1	09R	TR9	0	COM	0.4200	0.0000	0.1400
737300	APP	S1	27R	TR8	0	COM	1.0800	0.0000	0.3600
737300	DEP	S1	09L	TR1	0	COM	1.5000	0.0000	0.5000
737300	DEP	S2	09R	TR3	0	COM	0.5000	0.0000	0.0000
747200	APP	S1	09R	TR9	0	COM	0.8400	0.0000	0.0000
747200	APP	S1	27R	TR8	0	COM	2.1600	0.0000	0.0000
747200	DEP	S1	09L	TR1	0	COM	1.1000	0.0000	0.0000
747200	DEP	S2	09L	TR1	0	COM	1.1000	0.0000	0.0000
747200	DEP	S3	09L	TR1	0	COM	1.1000	0.0000	0.0000
757PW	APP	S1	09R	TR9	0	COM	1.6800	0.0000	0.2800
757PW	APP	S1	27R	TR8	0	COM	4.3200	0.0000	0.7200
757PW	DEP	S2	09L	TR1	0	COM	1.5000	0.0000	0.0000
757PW	DEP	S3	09R	TR3	0	COM	2.5000	0.0000	0.0000
A300	APP	S1	09R	TR9	0	COM	0.5600	0.0000	0.2800
A300	APP	S1	27R	TR8	0	COM	1.4400	0.0000	0.7200
A300	DEP	S2	27R	TR2	0	COM	2.0000	0.0000	0.0000
A300	DEP	S3	27R	TR2	0	COM	1.0000	0.0000	0.0000
BEC58P	APP	S1	17	TR11	0	GA	29.4000	0.0000	3.5000
BEC58P	APP	S1	35	TR10	0	GA	12.6000	0.0000	1.5000
BEC58P	APP	T1	17	TR14	0	GA	8.0000	0.0000	0.0000
BEC58P	DEP	S1	17	TR6	0	GA	30.0000	0.0000	3.0000
BEC58P	DEP	S1	35	TR5	0	GA	13.0000	0.0000	1.0000
BEC58P	DEP	T1	17	TR14	0	GA	8.0000	0.0000	0.0000
BEC58P	TGO	T1	17	TR14	0	GA	15.0000	0.0000	0.0000
DC1030	APP	S1	09R	TR9	0	COM	6.1600	0.0000	0.5600
DC1030	APP	S1	27R	TR8	0	COM	15.8400	0.0000	1.4400
DC1030	DEP	S1	09L	TR1	0	COM	1.5000	0.0000	0.0000
DC1030	DEP	S1	27R	TR2	0	COM	1.5000	0.0000	0.0000
DC1030	DEP	S2	09L	TR1	0	COM	2.5000	0.0000	0.0000
DC1030	DEP	S2	27R	TR2	0	COM	3.0000	0.0000	0.0000
DC1030	DEP	S3	27R	TR2	0	COM	1.0000	0.0000	0.0000
DC1030	DEP	S4	09L	TR1	0	COM	2.0000	0.0000	0.0000
DC1030	DEP	S4	27R	TR2	0	COM	1.0000	0.0000	0.0000
DC1030	DEP	S5	27R	TR2	0	COM	0.5000	0.0000	0.0000
DC1030	DEP	S6	27R	TR2	0	COM	0.5000	0.0000	0.0000
DC870	APP	U1	09R	TR9	0	COM	6.1600	0.0000	0.5600
DC870	APP	U1	27R	TR8	0	COM	15.8400	0.0000	1.4400
DC870	DEP	S1	09R	TR3	0	COM	2.0000	0.0000	0.5000
DC870	DEP	S1	27R	TR2	0	COM	2.0000	0.0000	0.5000
DC870	DEP	S2	09R	TR3	0	COM	3.5000	0.0000	1.0000
DC870	DEP	S2	27R	TR2	0	COM	3.5000	0.0000	1.0000
DC870	DEP	S3	09R	TR3	0	COM	1.0000	0.0000	0.0000
DC870	DEP	S3	27R	TR2	0	COM	1.0000	0.0000	0.0000
DC870	DEP	S4	09R	TR3	0	COM	1.5000	0.0000	0.0000
DC870	DEP	S4	27R	TR2	0	COM	2.5000	0.0000	0.0000
DC870	DEP	S5	09R	TR3	0	COM	0.5000	0.0000	0.0000
DC870	DEP	S5	27R	TR2	0	COM	1.0000	0.0000	0.0000
DC870	DEP	S6	27R	TR2	0	COM	0.5000	0.0000	0.0000
DC930	APP	U1	09R	TR9	0	COM	19.6000	0.0000	1.1200
DC930	APP	U1	27R	TR8	0	COM	50.4000	0.0000	2.8800
DC930	DEP	S1	09L	TR1	0	COM	26.5000	0.0000	0.5000
DC930	DEP	S1	09R	TR3	0	COM	26.5000	0.0000	0.5000
DC930	DEP	S2	09L	TR1	0	COM	8.0000	0.0000	0.5000
DC930	DEP	S2	09R	TR3	0	COM	8.0000	0.0000	0.5000

```
   DC930  DEP S3  09L  TR1  0 COM    1.5000    0.0000    0.0000
   DC930  DEP S3  09R  TR3  0 COM    1.5000    0.0000    0.0000
   MD81   APP S1  09R  TR9  0 COM    1.1200    0.0000    0.1400
   MD81   APP S1  27R  TR8  0 COM    2.8800    0.0000    0.3600
   MD81   DEP S1  09R  TR3  0 COM    3.0000    0.0000    0.5000
   MD81   DEP S2  09L  TR1  0 COM    1.0000    0.0000    0.0000
   S-76   APP U1  17   TR11 0 GA     3.5000    0.0000    0.0000
   S-76   APP U1  35   TR10 0 GA     1.5000    0.0000    0.0000
   S-76   DEP U1  17   TR7  0 GA     5.0000    0.0000    0.0000
   SABR80 APP S1  17   TR11 0 GA    17.5000    0.0000    1.4000
   SABR80 APP S1  35   TR10 0 GA     7.5000    0.0000    0.6000
   SABR80 DEP S1  17   TR6  0 GA    12.5000    0.0000    0.5000
   SABR80 DEP S1  27R  TR4  0 GA     3.0000    0.0000    0.1000
   SABR80 DEP S1  35   TR5  0 GA    30.5000    0.0000    2.5000

RUNUP OPERATIONS
          ID    X(nmi)   Y(nmi)   Head  Thrust Time(sec) Day       Eve     Night
   747200 R1   0.0000    0.0000   93.0  92.3   1.0   10.0000    0.0000    0.0000

USER-DEFINED METRICS
           Type      Family     Day    Eve   Night  Time(db)

USER-DEFINED FLAP COEFFICIENTS
          Flap   Op  Coeff R   Coeff C_D  Coeff B

USER-DEFINED JET THRUST COEFFICIENTS
               ThrType    CoeffE   Coeff F    CoeffGA       CoeffGB          CoeffH

USER-DEFINED PROP THRUST COEFFICIENTS
               ThrType  Efficincy Power

GRIDS
                   X(nmi)       Y(nmi)     Ang(deg)       DistI(nmi)  DistJ(nmi) NI NJ
   CNR Contour    -8.2289      -8.2289        0.0         16.4579     16.4579    2  2
   GD1 Standard   -0.4937       0.2469        0.0          0.1646      0.1152    2  3
   GD2 Detailed    1.8104       0.4937        0.0          0.0000      0.0000    1  1

RUN OPTIONS
   Run Type      : SingleMetric
   NoiseMetric   : DNL
   TA Threshold  : 85.0 dB
   Do Terrain    : No
   Do Contour    : Yes
   Refinement    : 6
   Tolerance     : 1.00
   Do Population : No
   Do Locations  : No
   Do Stand.Grid : Yes
   Do Detail.Grid: Yes
   Low Cutoff    : 55.0
   High Cutoff   : 85.0
Compute System Metrics
      DNL    : No
      CNEL   : No
      LAEQ   : No
```

```
LAEQD  : No
LAEQN  : No
SEL    : Yes
LAMAX  : Yes
TALA   : Yes
NEF    : No
WECPNL : No
EPNL   : No
PNLTM  : No
TAPNL  : No
```

8 EXAMPLE PROCEDURE STEPS FOR AC91-53A PROFILES

The following two DBF files show example data for close-in and distant NADPs. The NADP Procedure Steps were derived from Standard data by using the methods in Sections 8.8.5 and 8.8.6. 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 , 195.0 ,     0.0
 747200 , D , C , 4 ,  5 , A , 5      , C ,   750.0 , 235.0 ,     0.0
 747200 , D , C , 4 ,  6 , A , ZERO   , C ,   750.0 , 255.0 ,     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 , 195.0 ,     0.0
747200 , D , D , 4 ,  4 , A , 5      , C ,   750.0 , 235.0 ,     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 , 255.0 ,     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 , 195.0 ,     0.0
747200 , D , S , 4 ,  4 , A , 5      , C ,   750.0 , 235.0 ,     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 , 255.0 ,     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
```

9 DEFINITION OF PROCEDURE STEP PARAMETERS

The table below shows the types of data values that are placed in the last three fields of a PROCEDUR record. These fields are called PARAM1, PARAM2, and PARAM3. They take on 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 Level step should have a flaps identifier, blank thrust type, altitude, speed, and distance-flown values.

OP_TYPE	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
A,D,T,V	V	ID		ALT	SPD	DIST
A,T,V	D	ID		ALT	SPD	ANG
A,T	L	ID		DIST	0	0
A	B			DIST	SPD	PCT
D	T	ID	T,C,N	0	0	0
D	T	ID	U	0	0	THR
T	T	ID	T,C,N	0	SPD	0
T	T	ID	U	0	SPD	THR
D,T	C	ID	T,C,N,R	ALT	0	0
D,T	C	ID	K,U	ALT	0	THR
D,T	A	ID	T,C,N,R	CLM	SPD	0
D,T	A	ID	K,U	CLM	SPD	THR
V	M	ID		ALT	SPD	ANG

```
OP_TYPE                 THR_TYPE
  A = Approach            T = MaxTakeoff
  D = Depart              C = MaxClimb
  T = Touch&Go            N = MaxContinue
  V = OverFlight          R = ReduceThrust
                          K = UserCutback
                          U = UserValue

STEP_TYPE
```

```
V = Level              PARAM
D = Descend              THR  = Thrust
L = Land                 ALT  = Altitude
B = Decelerate           SPD  = Speed
T = Takeoff              DIST = Distance
C = Climb                ANG  = Angle
A = Accelerate           PCT  = Percent
M = CruiseClimb          CLM  = Climb Rate
```

10 TERRAIN ELEVATION FILE FORMAT

The terrain file, which has a "3CD" file extension, is a binary file of elevation data in integer meters. The first part of the file -- the elevation data -- is in the same format as the source data 3CD files distributed by Micropath (see Appendix A.4). The last part of the file is unique to INM. The file format is the same as used in INM 4.11.

```
Record#        Data Item
-----------------------------------------------------------------------------

0  to          Elevation data in integer meters above mean sea level.
1442400        Use C "short int" type (size of record is 2 bytes).
               A record number can be computed by:
                  rec = 1201 * i  +  j
               where (0,0) is the SW corner, i = 0..1200 increases East,
               and  j = 0..1200 increases North.
               There are 1201 x 1201 elevation values.
               The distance between adjacent points is 3 arc-seconds.
               The matrix of points covers a 1-deg x 1-deg area.

1442401        Minimum elevation in meters (short int, 2 bytes)

1442402        Maximum elevation in meters (short int, 2 bytes)

1442403        Reserved (8 bytes)

1442407        Southeast corner (long int, 4 bytes)
               Encoded SE latitude/longitude value =
               100000*( 100*LatDeg + LatMin ) + ( 100*LongDeg + LongMin )
               Note: north latitude and west longitude only.

1442409        Reserved (2 bytes)

1442410        Latitude distance metric (feet/arc-second) (float, 4 bytes)

1442412        Longitude distance metric (feet/arc-second) (float, 4 bytes)

1442414        Change in latitude metric (feet/arc-sec^2) (float, 4 bytes)

1442416        Change in longitude metric (feet/arc-sec^2) (float, 4 bytes)

-----------------------------------------------------------------------------
Note: Only elevation data and SE-corner data are used in INM 5.0
```

Non-U.S. Users: If your airport is in the eastern or southern hemispheres, you must translate its coordinates to a fictitious location that has north latitude and west longitude. The reason is that the SE-corner encode equation cannot take negative numbers. Also, the COMP50 terrain function is programmed such that latitude increases to the north and longitude increases to the west.

11 OAG FILE FORMAT

All records in the OAG Basic Chronological Diskette adhere to a column format. Each record contains 59 columns. The rules for the column format are specified in this Appendix.

The first two records of an OAG Basic Chronological Diskette contain header information. The OAG Processor ignores these two records.

Column	Field Name	Description
Record 1		
1-10	Copyright	Contains "COPYRIGHT"
11-14	Copyright year	Year in which the file was created.
15-47	Copyright data	This field contains a portion of Official Airline Guides statutory copyright notice.
48-59	Blank	Blank Spaces
Record 2		
1-19	City/State	City and State of the copyright data.
20-59	Blank	Blank Spaces
Records 3 to End of File		
1-3	Port1	This is the 3 character selected airport code for this record. It is usually the source/destination for the INM airport under study.
4-7	Time1	Depending on the direction of travel (col 46), the time field indicates arrival or departure time. If the direction field contains a T= it is the arrival time of the selected port. If the direction field contains an F= it is the departure time of the selected port.
8-10	Carrier code	Airline carrier code for this flight.

11-14	Flight number	Flight number for this flight.
15-21	Frequency	This field contains the days of the week for this flight. There are seven spaces in this record each representing a day of the week. Position 15 is for Monday and position 21 is for Sunday. A number in the position indicated the flight is active for that day. For example a 1= in position 15 indicated the flight is active on Monday. A 2= in position 16 indicates the flight is active on Tuesday. A blank space in any position indicates the flight is not active on that day.
22-24	Port2	This field contains a 3 position port code. If the direction (col 46) code is T=, this field is the airport from which the flight originated. If the direction code is F=, this airport represents the destination of the flight.
25-27	Equipment	The three character code representing the airplane or helicopter equipment used for this flight. A list of airplane codes supported by this program is given in the file OAG_SUB.DBF. Helicopter codes such as BH2 (Bell Helicopters), S58 (Sikorsky S-58T), NDE (Aerospatiale AS 350/AS 355 Ecureuil) and NDH (Aerospatiale SA 365 Dauphin 2) are not supported.
28-37	Class of service	Type of class of service used for this flight. This field is not read by the OAG processor.
38-41	Effective date	The beginning date for which this record applies. The format is MMDD. If this record is blank, the effective begin date is the first day of the month.
42-45	Discontinue date	The ending date for which this record applies. The format is MMDD. If this record is blank, the end date is the last day of the month.
46	Direction	This field contains either a "T" or an "F" depending on whether the information for the selected port (Port1) is an arrival or departure. F - Departure from Port1 T - Arrival to Port1

47-55	Issue date	This field contains the effective issue date of the ACTS02.ACTOUT file. The information is in MMMDDYYYY format. MMM is a three character code for the month.
56-59	Time2	This field represents the Port2 time. If the selected airport Port1 is the arrival airport, then this field is the departure time form Port2. If Port1 is the departure airport, then this field is the arrival time for port2. This field is not read by the OAG processor.

The following listing contains a sample of an OAG Basic Chronological Diskette.

```
COPYRIGHT 1994 BY OFFICIAL AIRLINE GUIDES,
OAK BROOK, ILLINOIS
ORD0001UA  120123456 LAX757FYBMQ     09070930TSEP0119941815
ORD0001UA  120      7LAX757FYBMQ     09100924TSEP0119941815
ORD0005AA 22841234567DFWM80FYBMV     0907    TSEP0119942200
ORD0007AA 22841234567DFWM80FYBMV         0906TSEP0119942200
ORD0008UA  2421234567DEN320FYBMQ         0902TSEP0119942059
ORD0008UA  242123    DEN320FYBMQ     09040906TSEP0119942059
ORD0543AA  650123456 LASM80FYBMV     0907    TSEP0119940025
ORD0543AA 1036      7LASM80FYBMV     0911    TSEP0119940025
ORD0722UA  705  3    BUF735FYBMQ     09070907TSEP0119940650
ORD0722UA  705123456 BUF73AFYBMQ     09080926TSEP0119940650
ORD0722UA  705      7BUF732FYBMQ     09110925TSEP0119940650
ORD0722UA  705  345  BUF73AFYBMQ     09280930TSEP0119940650
ORD1015UA  316  3    ICT732FYBMQ     09070907TSEP0119940835
ORD1015UA  3161234567ICT735FYBMQ     09080930TSEP0119940835
ORD1237AA 20981234567SJCM80FYBMV         0906TSEP0119940632
ORD1514NW  19812345 7MSP320FYBMH     0915    TSEP0119941400
ORD1709UA 53951234567MKE146YBMQH             TSEP0119941630
ORD1710DL 16671234567JFK72SFYBMH     0912    TSEP0119941530
ORD1710H9  12812345  CGXNDEY                 TSEP0119941700
ORD1803UA 15271234567BNA732FYBMQ     09070930TSEP0119941630
ORD2045AF 6421  3    JFK74FCARGO     09280928TSEP0119941905
ORD2114UA 1039 2     CVG732FYBMQ     09060906TSEP0119942100
ORD2358UA 1842  3    DEN757FYBMQ     09070907TSEP0119942050
ORD0010FM   79      7MSPM1FCARGO             FSEP0119940124
ORD0600AA  328123456 LGAM80FYBMV         0901FSEP0119940901
ORD0600AA  328    5  LGAM80FYBMV     09020902FSEP0119940901
ORD0600AA  328 2     LGAM80FYBMV     09060906FSEP0119940901
ORD0700AA 41041234567SBNAT7YBMVQ             FSEP0119940745
ORD0700AA 41181234567LANAT7YBMVQ             FSEP0119940905
ORD0700AA 43211234567RFDATRYBMVQ             FSEP0119940740
ORD0700AA 43971234567SGFSF3YBMVQ         0906FSEP0119940910
ORD0844AA 40781234567BMIATRYBMVQ         0906FSEP0119940934
ORD0844AA 40781234567BMIATRYBMVQ     0907    FSEP0119940934
ORD0910NW  16612345  DTW757FYBMH         0914FSEP0119941124
```

```
ORD0910NW  166      7DTWD9SFYBMH         0911FSEP0119941124
ORD1044UA 19481234567FLL735FYBMQ         0906FSEP0119941440
ORD1514LH 6470  3    SMF737FCVBL     09070907FSEP0119941742
ORD1514LH 64701234567SMF737FCVBL     0908    FSEP0119941742
ORD1601H9  12312345  PWKNDEY                 FSEP0119941611
ORD1735QF  306  3456 LAXM80JYBQK     09070910FSEP0119941951
ORD1735QF  3061234567LAXM80JYBQK     0911    FSEP0119941951
ORD1828AA 15851234567ABQM80FYBMV         0906FSEP0119942022
ORD1945UA 53711234567FSD146YBMQH     0907    FSEP0119942125
ORD2105BA  296    56 LHR747FJMSB     0916    FSEP0119941100
ORD21305X  6091234   PHLD8FCARGO             FSEP0119940017
ORD21305X  615    5  PHL72FCARGO             FSEP0119940017
ORD2210UA  57512345 7LAS757FYBMQ     09070930FSEP0119942354
ORD2340ER  128    5  CVG72FCARGO             FSEP0119940145
```

12 FLIGHT PATH FILE FORMAT

The FLIGHT.PTH file is a binary file containing three-dimensional flight paths for Case-specific aircraft operations. The FLIGHT.PTH binary file can be decoded by using the UTILITY \ PRN_FLT.EXE program (see Appendix M.4).

The following file format specification uses C++ data structures. All strings are zero terminated. The file is packed on 1-byte boundaries.

The binary file starts with a header section:

```
struct FF_Header
   // Data at the beginning of the flight file
   {
   char    case_id [80];       // full path name of case subdirectory
   double  aprt_lat;           // airport latitude (seconds +N)
   double  aprt_long;          // airport longitude (seconds +E)
   float   aprt_elev;          // airport elevation (feet)
   float   aprt_temp;          // airport temperature (degF)
   float   aprt_press;         // airport pressure (in-Hg)
   float   ta_thresh;          // time-above threshold (dB)
   short   rs_refine;          // max number of refinement levels
   float   rs_toler;           // tolerance test value (dB or min)
   char    run_type;           // type of run (single or multi metric)
   char    metric_id [7];      // metric identifier (single metric)
   char    fq_type;            // type of freq. weighting (multimetric)
   float   min_level;          // minimum contour level (dB, minutes)
   float   max_level;          // maximum contour level (dB, minutes)
   char    metric_type;        // type of metric (expos, lmax, ta)
   float   metric_weight [3];  // day, evening, night weights
   float   metric_time;        // 10 log( time )
   char    do_contour_grid;    // file contains a contour grid (0,1)
   char    do_standard_grids;  // file contains standard grids (0,1)
   char    do_detailed_grids;  // file contains detailed grids (0,1)
   char    do_metric [13];     // metric calculation array (0=no, 1=yes)
   char    do_terrain;         // terrain calculation (0=no, 1=yes)
   char    terrain_file [90];  // full path name of terrain file
   short   numb_noise;         // number of noise-curve records
   short   numb_acft;          // number of aircraft ops (flt + rnup)
   long    numb_grids;         // number of grids
   long    numb_pop_pts;       // number of population points
   long    numb_loc_pts;       // number of location points
   };
   // do_metric[13] order:
   // DNL, CNEL, LAEQ, LAEQD, LAEQN, SEL, LAMAX, TALA,
   // NEF, WECPNL, EPNL, PNLTM, TAPNL
```

The next section in the file contains the Noise curves. FF_Noise records are written into the file such that records for given Noise identifier are contiguous and the thrust values increase from low to high values. There are "numb_noise" FF_Noise records, and they are implicitly indexed from zero to (numb_noise ! 1). FF_Acft records reference a set of FF_Noise records by employing a starting index and the number of records in the set. In this way, one set of Noise data can serve all Aircraft.

```
struct FF_Noise
    // Data for a pair of noise curves.
    // Standard speed of 160 knots.
    // Noise is given for 10 distances:
    // 200, 400, 630, 1000, 2000, 4000, 6300, 10000, 16000, 25000 feet
    {
    float  thrust;       // corrected net thrust per engine (lb, %)
    float  expos [10];   // single-event noise exposure level (dB)
    float  lmax  [10];   // maximum noise level (dB)
    };
```

The next section contains aircraft operations, and it comprises the bulk of the file. For each aircraft operation, a FF_Acft record is written, followed by either a FF_Runup record or a FF_Flight record. If there is a FF_Flight record, it is follow by multiple FF_Segment records. The run-up operations are written first, followed by the flight operations. `There are "numb_acft" operations.`

```
struct FF_Acft
   // Data for an aircraft operation
   {
   char   acft_id [7];   // inm aircraft type id string
   char   eng_type;      // type of engine (J, T, P)
   char   owner_cat;     // owner category (C, G, M)
   char   op_type;       // type of operation (A, D, T, V, R=run-up)
   float  numb_ops [3];  // array of number of ops (day, eve, nght)
   short  first_a_noise; // index of the first A-weighted noise record
   short  numb_a_noise;  // number of A noise records for this acft
   short  first_p_noise; // index of the first P-weighted noise record
   short  numb_p_noise;  // number of P noise records for this acft
   };

struct PointXY
   // Two-dimensional point
   {
   float x, y;
   };

struct FF_Runup
   // Data for a runup-type operation
   {
   char     runup_id [3];  // runup pad id string
```

```
      PointXY  point;         // x,y of runup pad
      float    heading;       // aircraft heading (deg from N)
      float    thrust;        // corrected net thrust per engine (lb, %)
      float    duration;      // time duration of runup event (sec)
      };

   struct FF_Flight
      // Data for a flight-type operation
      {
      char   op_type;       // type of operation (A, D, T, V)
      char   prof_id1 [2];  // profile group id string
      char   prof_id2 [2];  // profile stage id string
      char   rwy_id [4];    // runway end id string
      char   trk_id1 [5];   // track id string
      char   trk_id2 [2];   // sub-track id string
      short  numb_segs;     // number of path segments
      };

   struct PointXYZ
      // Three-dimensional point or vector
      {
      float x, y, z;
      };

   struct FF_Segment
      // Data for a flight path segment
      // "thrust" is corrected net thrust per engine (lb)
      // or percent of 100%-thrust (%)
      {
      PointXYZ  start;      // segment start x,y,z (z MSL) point (ft)
      PointXYZ  unit;       // unit vector along the segment
      float     length;     // length of the path segment (ft)
      float     speed;      // start speed (knt)
      float     delta_spd;  // change in speed along segment (knt)
      float     thrust;     // start thrust (lb, %)
      float     delta_thr;  // change in thrust along segment (lb, %)
      };
```

The next section in the file contains grid information. For each grid specified by the user, a FF_Grid record is written. The data members "point" and "numb_points" are set to zero. These two variables are enabled when the file is read. There are "numb_grid" FF_Grid records.

```
   struct FF_Grid
      // Data for observer grid geometry
      {
      char      grid_id [4];  // grid id string
      char      grid_type;    // type of grid (C, S, D)
      PointXY   origin;       // x,y of lower-left grid point (ft)
      float     angle;        // angle from X-axis to I-axis (deg)
      float     delta_i;      // distance between I-points (ft)
```

```
float     delta_j;      // distance between J-points (ft)
short     numb_i;       // number of I-points
short     numb_j;       // number of J-points
PointXY*  point;        // pointer to array of grid points
long      numb_points;  // number of grid points in the array
};
```

If the user asked for noise to be calculated at population points, the next section in the file contains the X,Y values for the population points. The points are in the same order as in the POP_PTS DBF file (the point identifiers are not written into the FLIGHT.PTH file). There are "numb_pop_pts" PointXY records.

If the user asked for noise to be calculated at location points, the next section in the file contains the X,Y,Z values for the location points. The points are in the same order as in the LOC_PTS DBF file. There are "numb_loc_pts" PointXYZ records.

13 UTILITY PROGRAMS

You can use the following utility programs to view data files and to convert coordinates systems.

13.1 NMPLOTX.EXE

INM uses the NMPLOT program in a batch processing mode, but you can also run it as an independent program in a user interactive mode. This is a DOS application that can be called from Windows or from the DOS command line. Set the current directory to INM50 \ NMPLOT so that the program can read the default configuration file, NMPLOT.CFG. The program has an on-line help system.

13.2 PRN_DBF.EXE

You can use the PRN_DBF program to read a DBF file and write a text file of data in "comma-quote" format. This is a Windows program and it cannot be run in DOS. The program is executed by using the File Manager File // Run command, and typing the DBF file path name as a parameter:

```
c:\inm50\utility\PRN_DBF  c:\study1\PROF_PTS.DBF
```

Also, you can use the File Manager to associate all files that have a DBF extension with the PRN_DBF program. Then, you can double click on a DBF file name in your File Manager directory to run the program.

The PRN_DBF program writes a text file with "DTX" extension into the same directory as the DBF file. The DTX file contains DBF header information, and there is one record per line. Commas are placed between fields, and quotes enclose text-fields that contain commas.

The PRN_DBF program was used to print the DBF files presented in the Appendices.

13.3 PRN_HDR.EXE

Instead of writing a text file using the PRN_DBF program (above), you can use the PRN_HDR program to show DBF header information in a window. This program cannot be run in DOS. The program is executed by using the File Manager File // Run command, and typing the DBF file path name as a parameter. Also, you can use the File Manager to associate all files that have a DBF extension with the PRN_HDR program. Then, you can double click on a DBF file name to run the program.

13.4 PRN_FLT.EXE

You can use the PRN_FLT program to create a text file of the binary data contained in a FLIGHT.PTH file. This Windows program and it cannot be run in DOS. The program is executed by using the File Manager File // Run command, and typing the FLIGHT.PTH file path name as a parameter:

```
c:\inm50\utility\PRN_FLT  c:\study1\case1\FLIGHT.PTH
```

Also, you can use the File Manager to associate all files that have a PTH extension with the PRN_FLT program. Then, you can double click on a FLIGHT.PTH file in your File Manager directory to run the program.

The PRN_FLT program writes a text file called FLIGHT.TXT into the same directory as the binary file. The text file is about three times larger than the binary file.

13.5 XY_TO_LL.EXE

You can use this Windows program to calculate latitude and longitude values for a set of X,Y values. This program cannot be run in DOS. First, construct a text file called XY_TO_LL.TXT that looks like the following:

```
37-36-36.705N 122-22-53.021W
09L   0.0  0.0
27R   1.56136  -0.0818
27L   0.69173  -0.23206
P01   1.0  2.0
P02   -2.0  3.0
```

The first line contains the latitude/longitude of the origin of your X,Y coordinate system. The rest of the lines contain a 3-character identifier, followed by X and Y values in nautical miles. The mapping method is a fast approximation of a Lambert conic conformal projection using one standard parallel (i.e., the input latitude). The latitude/longitudes are accurate for X,Ys within plus or minus 100 nautical miles of the origin.

Put the text file into the same directory as the XY_TO_LL.EXE program. The program is executed by using the File Manager File // Run command and the program name:

```
c:\inm50\utility\XY_TO_LL
```

The program reads the XY_TO_LL.TXT file and writes it back out with the latitude/longitudes appended to the X,Y lines:

```
37-36-36.705N 122-22-53.021W
```

```
09L   0.00000   0.00000   37-36-36.705N  122-22-53.021W
27R   1.56136  -0.08180   37-36-31.775N  122-24-50.918W
27L   0.69173  -0.23206   37-36-22.762N  122-23-45.251W
P01   1.00000   2.00000   37-38-36.840N  122-24-08.565W
P02  -2.00000   3.00000   37-39-36.890N  122-20-21.899W
```

N ERROR MESSAGES

N.1 Error Reporting Methods

There are two methods for reporting errors:

N.1.1 Real-Time Messages

Error messages are displayed as Modal Dialog boxes (i.e. users must acknowledge the message before continuing work with INM); these message boxes consist of a descriptive message, a caption (which may also give information about the error, such as the name of an input data database file) and one or more buttons for actions that are available.

Most error messages displayed the user are informational; that is users must simply acknowledge the error by clicking on the "OK" button, and the process that generated the error is terminated. Others allow the user a set of choices; one or more choices will allow the process to continue, possibly with some loss of data.

N.1.2 Error Files

Two error files are written to Case subdirectories.

N.1.2.1 OPS_CALC.ERR

This Case file is written whenever you run the flight operations calculation algorithm to compute a complete set of traffic operations for the simulation. The file contains messages relating to any records (Airport Operations, Group Percentages, or Flight Operations) that could not be used. For example, an Airport Operation record is unusable if there is no "aircraft group" associated with its Aircraft. Similarly, there may not be Flight Profile data for a given Airport Operation and Group Percentage pair. You should review this file and resolve any anomalies.

N.1.2.2 FLIGHT.ERR

This Case file is written whenever you run the flight path calculator. The file contains messages relating to problems encountered when calculating flight profiles and 3D flight paths. For example, a message is written when the length of available runway is not long enough for the takeoff roll distance. You should review this file and resolve any anomalies.

N.2 Types of Errors

There are four general types of real-time error messages used in INM.EXE, along with miscellaneous warnings.

I/O errors
INM database file errors
Data record validation errors
Unrecoverable software errors

N.2.1 I/O Errors

Generally, when an I/O error occurs, you are informed via a message box; the displayed message will include a description of the error and the name of the file or directory that is causing the problem.

I/O errors can occur for a large number of reasons. The displayed message will provide information on the nature of the problem when possible. These errors can occur when a required file:

Is missing,
Cannot be accessed (e.g., file is marked read only),
Is corrupt (i.e., bad format).

General methods to correct an I/O error include:

Check that there is sufficient disk space available.

DOS Windows users can check that there are enough file handles available to the operating system (set FILES=50 or more in the CONFIG.SYS file).

Check that the file exists; if it is missing regenerate it with the appropriate process.

Check that the file is not corrupted or incorrectly formatted; repair or regenerate the file with the appropriate process.

Be sure that no other program is using an INM file - in most cases the software will not allow data sharing.

Check that there is not another file stored that uses the same name as an INM file.

Check that the INM, Study and Case directory structures are intact; it is generally not a good idea to remove or rename INM files or directories. You can safely delete an entire Study as long as INM is not running.

N.2.1.1 File or Directory Errors

"The file does not exist" -- The named file or directory does not exist; check the directory structure.

"Could not create file" -- Could not create a new file; check the directory structure and write permissions.

"Could not delete file" -- Could not remove a file; check the directory structure and write permissions.

"Could not access directory" -- The named directory does not exist.

"Could not create the directory" -- Could not create named directory; check the directory structure and write permissions.

"Could not delete directory" -- Could not remove the named directory; check the directory structure and write permission; the directory is not empty.

"XXX is not a valid directory name." -- A directory with this name is not compatible with the file system in use; check for blanks or other characters in the directory name.

"No write privileges on the directory XXX" -- The system cannot write to the given directory; check write permissions on the directory.

N.2.1.2 File Input Errors

"Could not open file"
"File read error"
"A file read error has occurred"
"An unrecoverable file read error has occurred" -- The named file could not successfully read.

"User data file read error" -- The named file (from USR_DATA) could not be read.

"An unexpected end-of-file was encountered" -- The file is corrupt.

"Cannot open this file; another process is using it" -- The file is open in another program; close the open file or exit the program that has loaded it.

N.2.1.3 File Output Errors

"File write error"
"A file write error has occurred"
"An unrecoverable file write error has occurred" -- The named file could not be written.

"Could not open the file for writing; another process may be using it" -- Could not write the named file; it may be that the file is in use by another program, or that the user does not have write privileges on the file.

"The file already exists" - The named file already stored on disk; delete the old file.

"The file cannot overwrite itself" -- The named file must be saved under a different name; use a different file name.

"Could not write database header information" -- A file write error for the named dBase-IV file.

N.2.1.4 System Data File Errors

FAA authorized data are stored in SYS_DATA \ ACDB50.BIN, which is an "archive" file. The software extracts the records it needs from this file at run-time. A system file error can occur when a general I/O error condition exists (see above), or when a problem exists with the archive itself. If an error is reported that indicates that archive is unusable, reinstall the ACDB50.BIN file.

Never attempt to modify the ACDB50.BIN file; its format is customized for INM.

"Archive error"
"System file read error" -- The system dBase-IV data could not be read.

"System file write error" -- The system data could not be written.

"The system database file XXX is corrupted; please rebuild the database."
"Incorrect number of system files found. Please consult documentation."
"The archive is corrupt; please reinstall file." -- The archive corrupted; reinstall it.

"The archive is missing or corrupt; please reinstall file." -- The archive file not found; reinstall it.

N.2.1.5 Other File Errors

"Could not open the study data file" -- The named Study could not be opened: the STUDY.INM file may be missing or corrupt, or the Study may be missing required files.

"A valid directory name for the study is required." -- Study name must be valid for a directory on the file system in use; remove any illegal characters.

N.2.2 INM Database File Errors

INM works with its complete set of database files as a whole, and treats these files hierarchically. Many database files have antecedents: for example, PROCEDUR.DBF depends on PROFILE.DBF (its parent) and uses data in FLAPS.DBF (one of its servers). Therefore, before PROCEDUR.DBF can be processed, the system requires all of its antecedents be fully processed.

Similarly, changes to an antecedent file may require changes to its dependent files. For example, when a record in AIRCRAFT.DBF is modified, changes must be made to PROFILE.DBF (a child) and to all Case-level Flight Operation files (clients). The Aircraft record cannot be modified until all such dependent files have been successfully processed.

This can lead to I/O errors. For suggestions on correcting such reported errors, see the discussion of general I/O errors above.

"Could not open required server file"
"Could not open required parent file" -- The named antecedent file could not be read.

"Could not open related client file"
"Could not open related child file" -- The named dependent file could not be read for posting.

N.2.3 Data Record Validation Errors

INM enforces strict data integrity checks within each database file; additionally the system requires that data records be fully consistent across all tables (referential integrity). Data validation errors are reported at two points: when an file is read, and when records are created or modified within the INM interface.

N.2.3.1 File Validation

All dBase-IV files used in the INM database must use the exact format expected by the software. Users creating files off-line (i.e. with a third party DBMS) must be sure to write such files correctly. The correct formats and data types are fully described in the INM system documentation, Appendix B.

"Incorrect file format for this database." -- The dBase-IV header is incorrect; check the file format.

"Incorrect data type for field XXX." -- The dBase-IV header description for the named field is incorrect; check the file format.

N.2.3.2 Data Field Validation

Each field of a record has logical constraints that must be met for the data to be usable in INM.

Each field of each record has an expected size (width), and format (e.g., date/time, latitude, and longitude fields are stored as strictly formatted multi-character strings), and type (character, string, number, etc.). Additionally, each numeric field has a valid range of permissible values, and most single character fields must have values from within a restricted set. The INM system protects users from creating invalid records by reporting all violations of these rules.

Data validation errors report the full key of the object that is invalid, the name (as described by the dBase-IV header data given in Appendix B) of the field causing the problem, and the nature of the error. In addition, if the error is reported during file input, the record number in the input file is shown.

When data validation errors are reported during file input, users have a choice between aborting the process (no data in the original file are modified), or continuing input. If the latter choice is made, all invalid data records will be lost from the original file (users will have an opportunity to backup the original data to another file). This situation should only occur when users modify INM database files off-line. Try to correct the errors off-line before attempting to read the file into INM again.

Consult the system documentation for the correct formats and ranges for any invalid field. Be particularly careful with latitude and longitude entries.

General field validation errors reported are:

"The value XXX is invalid." -- A generic error; the given value is not usable.

"A value for field XXX is required." -- The named field must have a non-empty value.

"The value XXX is invalid for this type." -- The given character value must be within a specific subset (see Appendix B).

"The length of XXX is incorrect." -- The length of the value for the named field is too small or too large.

"The length of XXX is too great." -- The length of the value for the named field is too large.

"The format of XXX is incorrect." -- The format of the value for the named field is wrong.

"The numeric value of XXX is too large." -- The numeric value for the named field to too big.

"The numeric value of XXX is too small." -- The numeric value for the named field to too small.

Some additional, specific errors reported are:

"Min should be less than Max." -- Of two related values, one is too large relative to the other (e.g. noise contour min/max).

"The value X is not a valid operation type." -- The given value is not a recognized operation type (i.e., A D T V)

"The latitude XXX is invalid (check the format)." -- The given latitude is either out of bounds, or incorrectly formatted.

"The longitude XXX is invalid (check the format)." -- The given longitude is either out of bounds, or incorrectly formatted.

"The latitude XXX is out of range." -- The given latitude is out of bounds.

"The longitude XXX is out of range." -- The given longitude is out of bounds.

"The elevation XXX is out of range." -- The given elevation is too high or low.

Some errors specific to Procedure Steps data (see Appendix I) are:

"The value X is not a valid procedure step type." -- The given procedure step type is not valid for this Procedure record.

"The thrust setting X cannot be used for this Procedure."

"The value X is not a valid thrust setting." -- The given thrust type value is not valid for this Procedure Step record.

"The operation type X cannot be used for this Procedure." -- The given operation value is not valid for this Procedure Step record.

N.2.3.3 Referential Errors

All records in dBase-IV format use character string "keys" to uniquely identify the records. Strict rules are enforced on the use of these keys, both within a table and between related tables.

The first requirement is that keys for records in a single table must be unique (without respect to case sensitivity - that is to INM "Balloon" is the same as "BALLOON").

"A record with this key is already stored in the database" -- The record with the named key already exists; use a different identifier for the offending record.

The keys of many records are composed in part of keys from records in other database tables; that is, many records have required antecedents. For example, Flaps records "belong to" Aircraft (an Aircraft is the "parent" of its Flaps) so a Flaps record is only usable if its Aircraft can be found.

While working in the INM interface, users are generally protected from errors of this type. If data tables are modified off-line, it is quite easy (through a typographic error, for example) to create an invalid record. Such errors are reported in a manner similar to that described for data field validation errors. Again, users can either ignore the errors (and lose the bad records), or return to the DBMS and correct the problem.

To correct such errors:

Check the spelling on the field for the record that is causing the problem (for example, if you are creating Flaps records, check that you are using the correct Aircraft identifier).

Rename that part of the record's key to use a record known to exist.

Delete the offending record.

Create the record that is needed in the related table. If the missing record is an Aircraft or aircraft Substitution, be sure that record is part of your Study.

Each error of this type reports the name of the table (file) containing the problem record, the key of the record that is unusable, and the nature of the problem:

"There are no parent data for this record." -- A generic error reporting that a parent record is required before loading a child record.

"There are no server data for this record." -- A generic error reporting a missing server record.
"There are no Noise curves for this record." -- Missing noise (required by Aircraft).

"There is no Aircraft for this record." -- Missing Aircraft record required by a Flaps record, for example.

"There is no Case for this record." -- Missing Case record.

"There are no Metric data for this record." -- Missing Metric record.

"There is no aircraft Substitution for this record." -- Missing aircraft Substitution record (may be required by Operations records).

"There are no Flaps data for this record." -- Missing Flaps record (required by Procedure Steps).

"There are no Thrust data for this record." -- Missing Thrust record (required by Procedure Steps).

"There is no Profile for this record." -- Missing Profile record (required by Procedure Steps and Profile Points).

"There is no Runway for this record." -- Missing Runway record (required by Runway End records).

"There is no Runway End for this record." -- Missing Runway End record (required by Track and Track Segment records).

"There is no Track for this record." -- Missing track record (required by Track Segments records).

N.2.3.4 User Errors

The hierarchical structure of the INM database files implies that some user actions affect multiple files. For example, when you attempt to delete Profile records, any associated Procedure Step or Profile Point records must also be deleted. Additionally, tables that use Profile data (i.e., the clients of PROFILE.DBF) must be checked before the delete is permitted. For example, you may have Flight Operation records specific to a particular Profile record; if the Profile record were removed, the Operation record would be unusable.

When you work through the INM interface, the system essentially prevents referential integrity errors preemptively, and you are notified of actions that would create such situations.
To avoid an error, be sure that the action taken is actually what's desired, then locate the record(s) in the associated table(s), and either delete them, or change the data so that these records are no longer associated with the record(s) to be deleted or edited. Thus, if you want to delete a certain Profile record and the system complains about Flight Operation records that still need that Profile, reset the Profile data on those Operations records to use a different Profile, and then delete the original Profile data.
These messages may also be displayed (preceded by another error message) if an I/O or other software error occurs.

Generic error messages for this situation look like this:

"Operation cannot be completed. Record in use."
"Could not perform operation in the client document."
"Could not perform operation in the child document."
"Could not perform operation in dependent document."

More specific messages (which are usually displayed) are:

"Action not completed in dependent Aircraft document."
"Action not completed in dependent aircraft Substitution document."
"Action not completed in dependent Flaps document."
"Action not completed in dependent Thrust document."
"Action not completed in dependent Profile document."
"Action not completed in dependent Procedures document."
"Action not completed in dependent Profile Points document."
"Action not completed in dependent Runway End document."
"Action not completed in dependent Track document."
"Action not completed in dependent Track Segments document."
"Action not completed in dependent Case document."
"Action not completed in dependent Output document."
"Action not completed in dependent Airport Operations document."
"Action not completed in dependent Group Percentages document."

"Action not completed in dependent Flight Operations document."
"Action not completed in dependent Run-up Operations document."

N.2.3.5 Printing Errors

Windows printing is quite complex, and a number of errors can occur. In general, consult your Windows documentation for information on printing. Make sure your printer is on and has paper loaded. Make sure that your printer is logically connected to the printer port (LTP1, etc.). If INM does not print, check that other programs can print correctly.

"Print error" -- A general error: the print job is aborted or incomplete.
"Could not start the print job." -- Could not initialize the printer; check that it is on-line.

"Failed to compute any lines to print." -- No lines would fit on the current page; check page size and margins.

"Failed to compute any fields to print." -- No columns would fit on the current page; check page size and margins.

"The 'from' page is too large." -- The selected page range is invalid; use a lower starting page number.

N.2.3.6 Other Errors

"Failed to delete record XXX." -- A Case or Output record could not be deleted; the record may be in use by the system; check write privileges on all files stored in the directory.

"There are no data available; please run the appropriate process first." -- A file required for the process is missing; run the process (possibly the related a Case) to generate the file.

N.2.4 Unrecoverable Software Errors

These are reported only when unexpected errors occur in the system. If you see one of these messages, immediately try to save your Study data. You should then exit INM, and restart the program. It is not a good idea to ignore these errors.

"A software error has occurred in the tree." -- An in-memory data storage error occurred.

"Unrecoverable program error."
"An unknown error has occurred." -- An unknowable error; assume the worst.

"Failed to load required resource." -- Windows could not locate a binary resource; on DOS Windows this may be because system resources are dangerously low. Try closing other running programs, or close all programs, exit Windows, and then start windows and INM again.

N.2.5 Warnings

In some situations, the system warns you about non-serious potential problems, particularly if there is ambiguity that could lead to a situation other than what you may expect. Warning messages:

"Please note: the directory contains one or more files." -- A directory (Case or Output) cannot be removed because it still contains files; remove the files off-line and try again.

"Not all records were successfully processed." -- The user action did not complete on all records (e.g., multiple-record delete or paste); this warning is sometimes preceded by other messages.

"You need to Add a new record first." -- INM cannot perform the requested action without data; create one or more records.

"You must create a Noise identifier first." -- There are no Noise curves in the Study; create some.

"You need to create one or more Cases first." -- There are no Cases in the Study and these are needed for the requested action; create one or more Cases.

"You need to create one or more Output records first." -- There are no Output records in the Study, and these are needed for the requested action; create one or more records.

"The backup file XXX already exists. Do you want to overwrite it?" -- Errors were encountered reading a Study file, and you have indicated that you want to save the non-modified data to a backup file and the system has found an old backup file is already there. Answer carefully: if you say "Yes", the previous backup data will be lost. If you want to keep both backup files, use File Manager or the Command Prompt to rename the old file (or move it out of the way) before indicating "Yes".

O INM INITIALIZATION FILE

INM stores various user preferences as program initialization information. In Version 5.0, these data are kept in a text file, INM.INI, located in the same directory as INM.EXE. In this way INM remembers your settings between sessions. Support for the program database registry will be added in a later release of INM.

The settings in the INI file can, for the most part, be managed from within INM.EXE. In all cases, the program will use suitable defaults if a particular setting is missing or incorrect.

For your reference, the following describes the sections and settings.

[Recent Study List]

1=D:\INM5\INM\STUDIES\ENGLISH1\STUDY.INM
2=D:\INM5\INM\STUDIES\TEST411\STUDY.INM
3=K:\NETWORK\INM5\SFO\STUDY.INM
4=
5=

A list of the five most recently used INM Studies; each Study name is a full file path specification. INM.EXE manages this list for you automatically, and display Studies in order on the File menu. INM.EXE tries to automatically load Study 1 when the program is started.

[Operations Filter]

CDialog=******D**17******

This section saves the last flight operation filter (search criteria) that you used. This value is a key mask for an OPS_CALC.DBF record.

[FONTS]

CINMRowView=-11,0,400,0,0,34,MS Sans Serif // font for row views
CStaticDoc=-38,0,400,0,0,49,Courier New // font for the printer
CStdReportView=-24,0,400,0,0,49,Roman 10cpi // font for printing echo report

This section saves your font preferences for INM print jobs and "row views" (e.g., output database tables). You should probably not change the INI file values; use the Font selection dialogs in INM.EXE instead. Note that the actual fonts available vary among computers and printers, and between operating systems on a given machine (e.g., NT and Windows 3.1), so fonts that work well for you might not be optimal for a co-worker at a different workstation.

[PRINTER]

Margins=0.5,0.5,0.5,0.5

This section saves your preferred margin settings (in inches) for printing INM database records. Typically, you would set these from the Margins command available on the INM Print dialog box when you need to adjust your printed output. The margins are in the order of Left, Top, Right, Bottom.

[File Save]

Directory=D:\inm5\inm\studies\TEST_RLB\
Format=1
Range=1

This section saves your choices for using the File // Export As function to write database records. The Directory is the path to the last file written. Format is the last text file format used: 0 = dBase, 1 = fixed length, 2 = quote delimited. Range is the set of records written: 0 = selected records only, 1 = all records.

[OPTIONS]

Units=0
CToolBar=1
CStatusBar=1
RecordDelete=1
RecordCommit=1
BackupInterval=2

Units is the measurement system INM uses as a default for new Studies and for some display purposes: 0 = English units, 1 = metric units. Users outside the U.S. may want to change this to 1. This switch can only be changed by editing the INI file.

CToolBar and CStatusBar turn on and off the information bars at the top and bottom of the INM main window: 1 = on, 0 = off. INM manages this for you via the Window menu.

RecordDelete can be turned on or off: 1 = on, 0 = off. Turn it on if you want INM to prompt you each time you try to delete a record; the record will not be deleted without your confirmation. Turn it off if you want deletes to occur without confirmation. This switch can only be changed by editing the INI file.

Similarly, RecordCommit can be turned on if you want INM to check with you before committing changes for any record you modify. INM commits your changes in a variety of situations (for example, when you close a window), so this can be useful if you want to always be aware when your changes are committed. This switch has no effect on the Edit // Commit (check mark button) command. This switch can only be changed by editing the INI file.

The BackupInterval is in minutes. INM automatically writes all changed input database files to disk similar to most word processors. You can set this to 0, or delete the item entirely to eliminate automatic backups. This switch has no effect on the File // Save (floppy disk button) command. This switch can only be changed by editing the INI file.

Remember that like most relational databases, INM.EXE writes data to your disk storage at arbitrary times; that is, once you commit a record you should assume your change is permanent. Of course, when a Study is saved -- either manually or automatically, all modified files are completely written.

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INM Order Form

FAA Integrated Noise Model Version 5.0

Id Number_______________(from previous orders)   Date_____________________

First Name___________________________ Last Name_________________________________

Company____

Division____

Street____

U.S. City_________________________________ State______ Zip+4____________________

Non-U.S.

City & Postal Code____

Country____

Phone______________________________ Fax______________________________

Number of copies of INM 5.0 at **$250** each ________ $ _________

Number of extra User's Guides at **$50** each ________ $ _________

Total Enclosed $ _________

Payment: Please send a check, money order, or purchase order payable to "ATAC", with this Order Form to:

Ms. Lois Masin   Phone (408) 736-2822
ATAC Corporation   Fax (408) 736-8447
757 N. Mary Ave.
Sunnyvale, CA 94086

ATAC will accept a valid company purchase order and will send the invoice with your INM shipment. You can Fax your order if you use a company purchase order. ATAC cannot accept payment by credit card.

Licensing: An INM package must be purchased for each distinct company address (site), although copies may be made to permit several individuals at one site to use INM. The User's Guide may be photocopied. Additional User's Guides can be purchased for $50 each.

Package: The INM package includes eight 3.5-inch diskettes and a 300-page User's Guide. The package price also includes minor upgrades to Version 5 (e.g., Version 5.1), a Version-5.0 Technical Manual (pending), limited technical support, and shipping and handling costs.

Delivery: U.S. orders will be sent via U.S. Mail and non-U.S. orders via Air Mail. Express delivery (e.g., FedEx) can be used if you request such delivery and include your express delivery account number so that the delivery cost is billed to you.