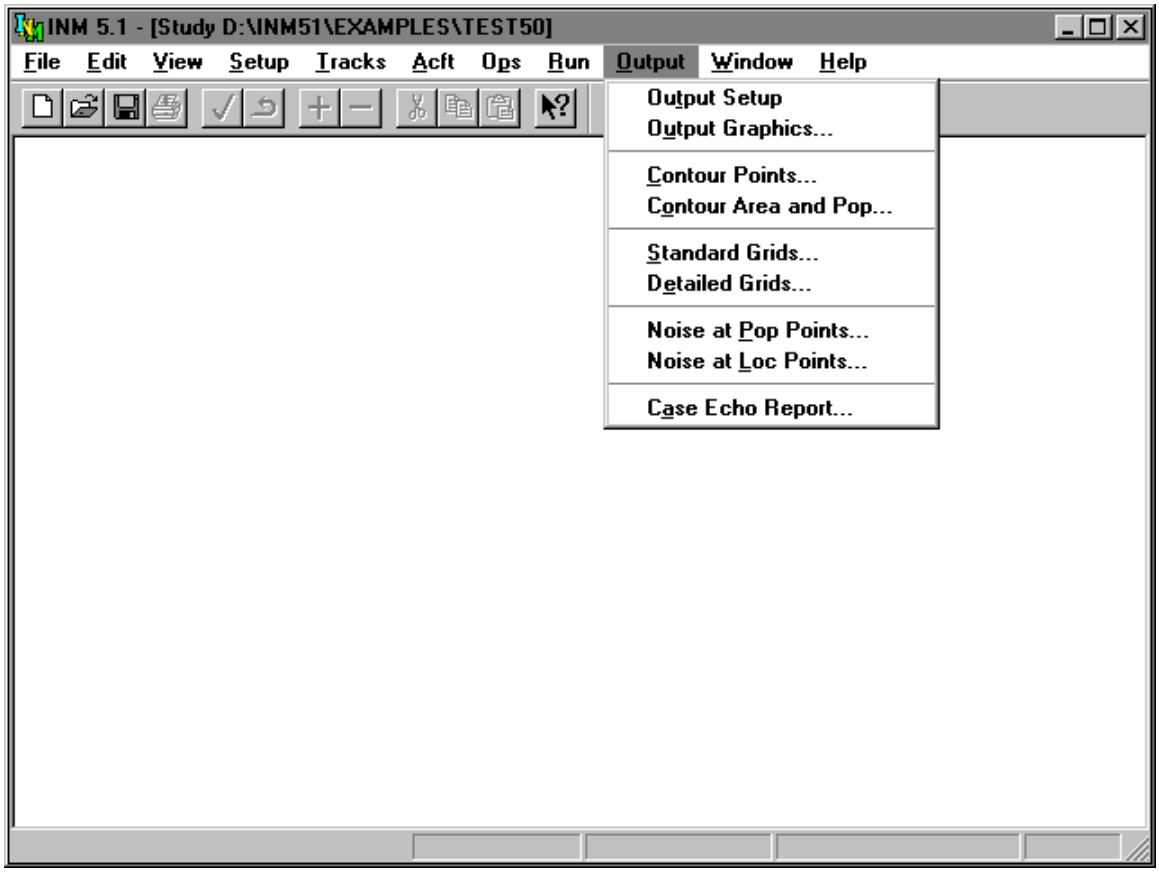
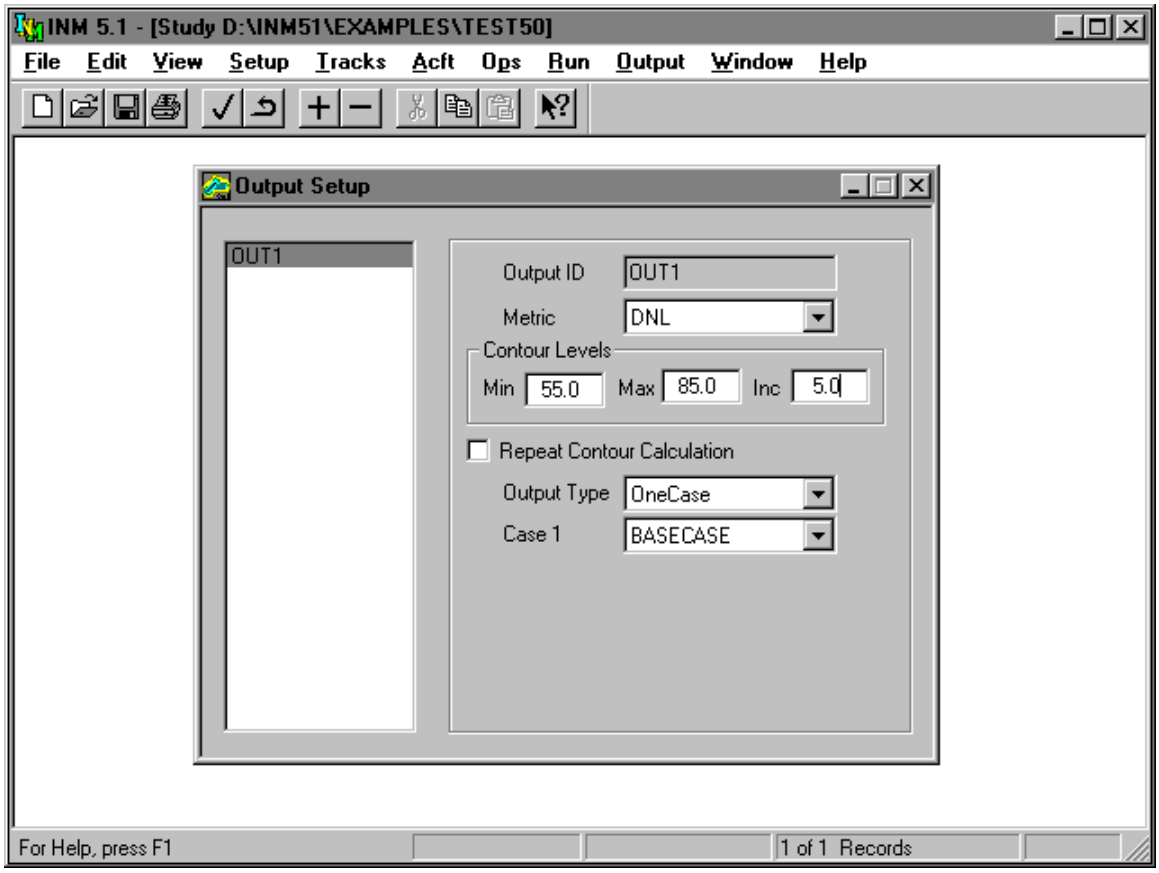


11. OUTPUT MENU

Use the Output menu to:

- setup output subdirectories for graphics post-processing
- display output graphics showing noise contours
- display a list of contour points
- display a list of areas and population counts inside contour levels
- display a list of standard grid point data
- display a list of detailed grid point data
- display a list of noise levels at populations points
- display a list of noise levels at location points
- display a summary report of Case input parameters.



11.1. Output Setup

Menu Item: Output // Output Setup

You must create Output records before you can use the Output Graphics function.

INM uses an Output record 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.

11.1.1. Contour Levels

Input the minimum, maximum, and incremental contour level (dB or minutes) for the noise Metric that you want to display.

The maximum less the minimum should be a positive integer number of increments.

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.

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.

11.1.2. Repeat Contour Calculation

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

11.1.3. Output Post-Processing Types

There are four types of output post-processing. The one that is similar to previous versions of INM is called "OneCase".

INM can also create output data by using NMPLOT multi-case processing functions.

The types of output post-processing are:

- OneCase standard output processing for a given case
- Difference dB difference between two cases
- LogAdd power sum of two or more cases
- Merge combining two or more cases to cover a larger area

11.1.4. One-Case Processing

You need to select a Metric and one Case.

The selection of a Metric determines the Cases that are available in the "Case1" list box. For example, if you select DNL, then all SingleMetric DNL cases and all MultiMetric A-weighted cases are displayed in the list box.

You will probably want to create several Output records for a Case that was setup as a MultiMetric run. Each Output record should have different Metrics but use the same MultiMetric Case.

For example, you can create four Output records:

- CASE01.DNL for DNL
- CASE01.SEL for SEL
- CASE01.LMX for LAMAX
- CASE01.TA for TALA

All four records use CASE01, an A-weighted MultiMetric Case. When you use the Output Graphics function to display these four outputs, INM accesses multi-metric data stored in CASE01, computes the specified contours, and stores them in the four Output subdirectories.

You must have OneCase output defined and computed before INM can do any multi-Case post-processing (Difference, LogAdd, Merge).

This is because INM uses the GRD files in OneCase Output subdirectories for NMPLOT processing. INM creates a GRD file when you open an Output Graphics window (see Section 11.3 below).

11.1.5. Difference Processing

You specify a Metric and two Cases.

Difference processing creates contours that represent the decibel difference between the noise surfaces in the two Cases.

"Case 2" is subtracted from "Case 1" (for example, CASE01 – CASE02). Thus, if a point in Case 1 is 62 dB and the same point in Case 2 is 60 dB, the difference is positive 2 dB.

Difference contours can have negative levels, meaning that areas in Case 2 are louder than in Case 1.

Ordinarily, an "alternative" case is compared to a "base" case, using a convention where delta-noise is positive when the alternative is louder. For this convention, you need to make the alternative Case 1, and make the base Case 2.

If you use SingleMetric runs to build difference contours, do not use difference contours that are outside of the two valid noise areas.

- 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.

11.1.6. LogAdd Processing

You specify a Metric and two to five Cases. Their order does not matter.

Only areas that are common to all of the Cases are summed, so you want to make sure that your Cases use the same contouring grid definition.

LogAdd processing creates contours that represent the sum of the noise from the selected Cases. Decibels are converted to their power representations before adding, and then they are converted back to decibels. For example, 60 dB plus 60 dB equals 63 dB.

You cannot use the LogAdd function for time-above Metrics because their values should be added without logarithmic conversion.

11.1.7. Merge Processing

You specify a Metric and two to five Cases. Their order does not matter.

You can use this function to combine contours that were created using different contour grids, perhaps to fill in a missing piece.

Merge processing creates contours that represent noises combined from all of the Cases. When the Case contour grids overlap, the Case with the higher resolution is used.

11.1.8. Naming Convention

An organized naming convention for Case and Output subdirectories can help reduce the confusion about what is where.

A suggested Output naming convention for OneCase output is to use the Case name to indicate the source of the output data, and use the three-character extension to indicate the type of noise Metric.

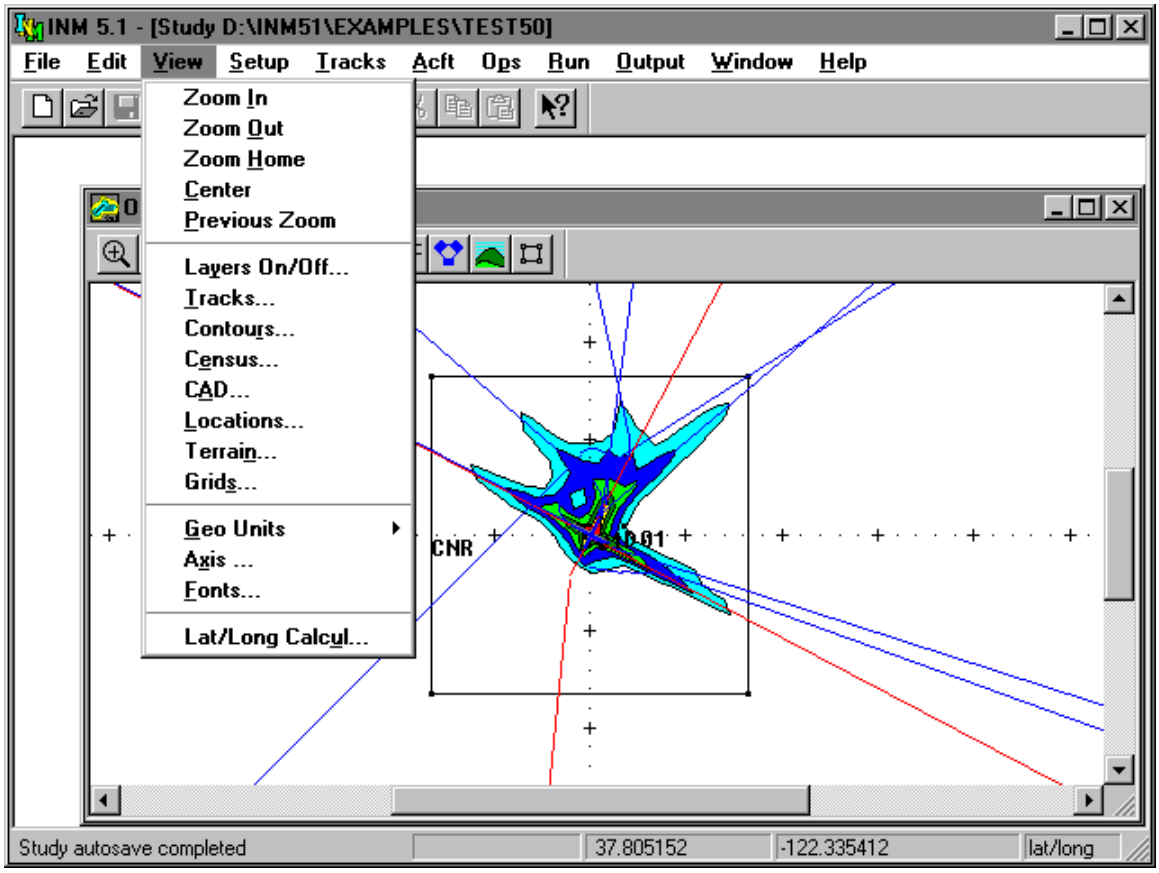
A suggested Output naming convention for multi-Case Output is to use the name to indicate the type of post-processing (for example, DIFF for difference), and use the three-character extension to indicate the type of noise Metric.

For example:

Case	Run-Type	One-Case Output	Multi-Case Output
CASE01	M	CASE01.DNL CASE01.LMX CASE01.TA	
CASE02	S	CASE02.DNL	DIFF12.DNL (CASE02-CASE01)
CASE03	S	CASE03.DNL	DIFF13.DNL (CASE03-CASE01)
CASE04	S	CASE04.DNL	DIFF14.DNL (CASE04-CASE01)
CASE05	S	CASE05.DNL	MRG345.DNL (CASE03+CASE04+CASE05)

CASE01.DNL and CASE02.DNL outputs must be created by running the Output Graphics function before DIFF12.DNL output can be displayed.

Notice that DIFF12.DNL is created by using MultiMetric CASE01.DNL and SingleMetric CASE02.DNL. SingleMetric and MultiMetric runs can be combined, once their OneCase outputs are computed.



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
- terrain contours.

You open an Output Graphics windows by selecting one or more Output identifiers in the Output Select dialog box. Output Graphics windows are associated with Output subdirectories.

If you want to see graphical output from one or more Cases, you must first define what you want by using the Output // Output Setup function (see Section 11.1, above).

11.2.1. One-Case Post-Processing

Before displaying OneCase 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.

Contour post-processing consists of:

- Running the CONVERT module to convert Case data into an NMPLOT.GRD file.
- Running the NMPLOT program to produce the CONTOURS.DAT file, which contains contour X,Y values.

If all 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 output contour levels. If you change the output contour levels, you may also have to change the cutoff parameters using the Run // Run Options function.

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

11.2.2. Multi-Case Post-Processing

Before computing and displaying multi-Case contours, INM checks for current NMPLOT.GRD files in OneCase Output subdirectories.

OneCase 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 OneCase contour data. If this happens, open the requested Output Graphics window(s), and then open the multi-Case output window again.

11.2.3. 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 box. Please refer to Section 7.1.15 for information about operating the color dialog box.

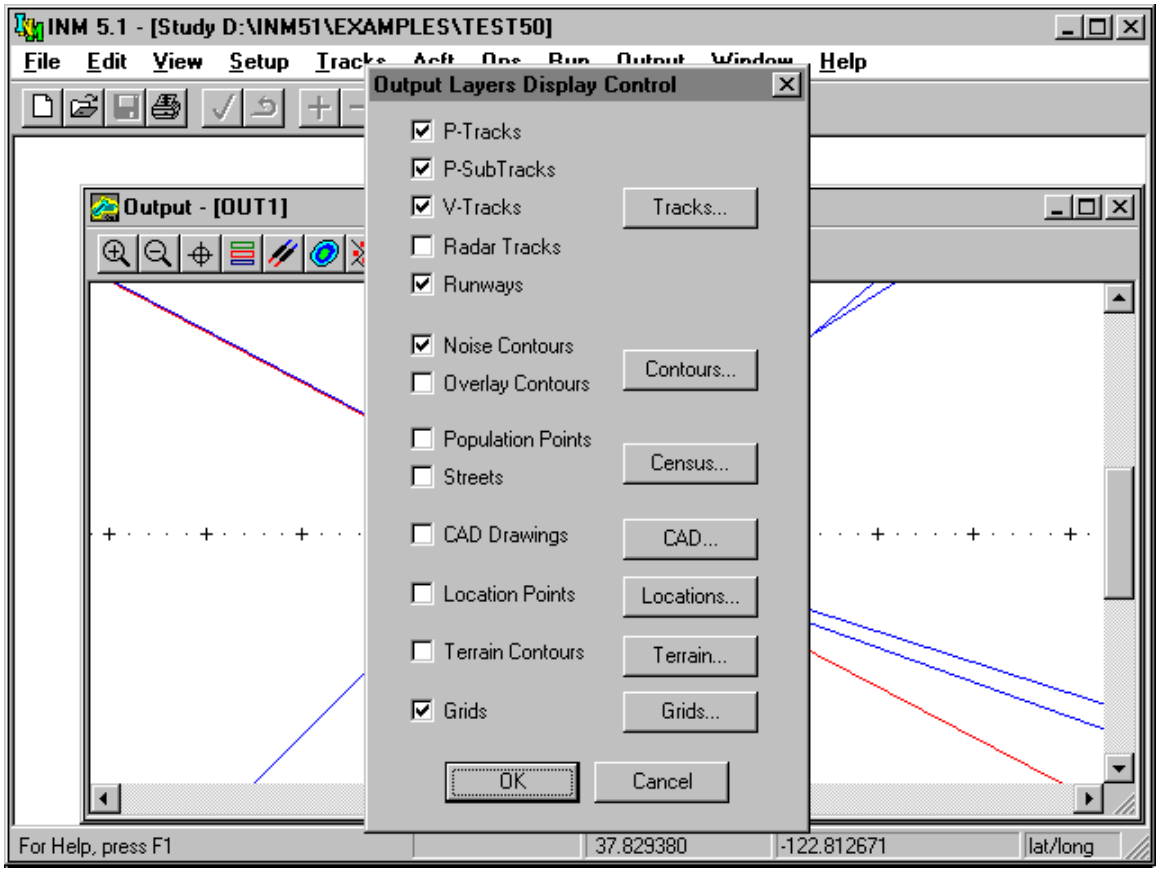
Many of the layer control functions have a pair of unlabeled circular buttons ("radio" buttons), one with a black dot, and one without. When you click in the left circle, INM selects (highlights) all items in the associated list box, which is usually directly above the pair of circles. When you click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

The following Output Graphics View 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 // CAD
View // Locations

View // Geo Units
View // Axis
View // Fonts
View // Lat/Long Calc



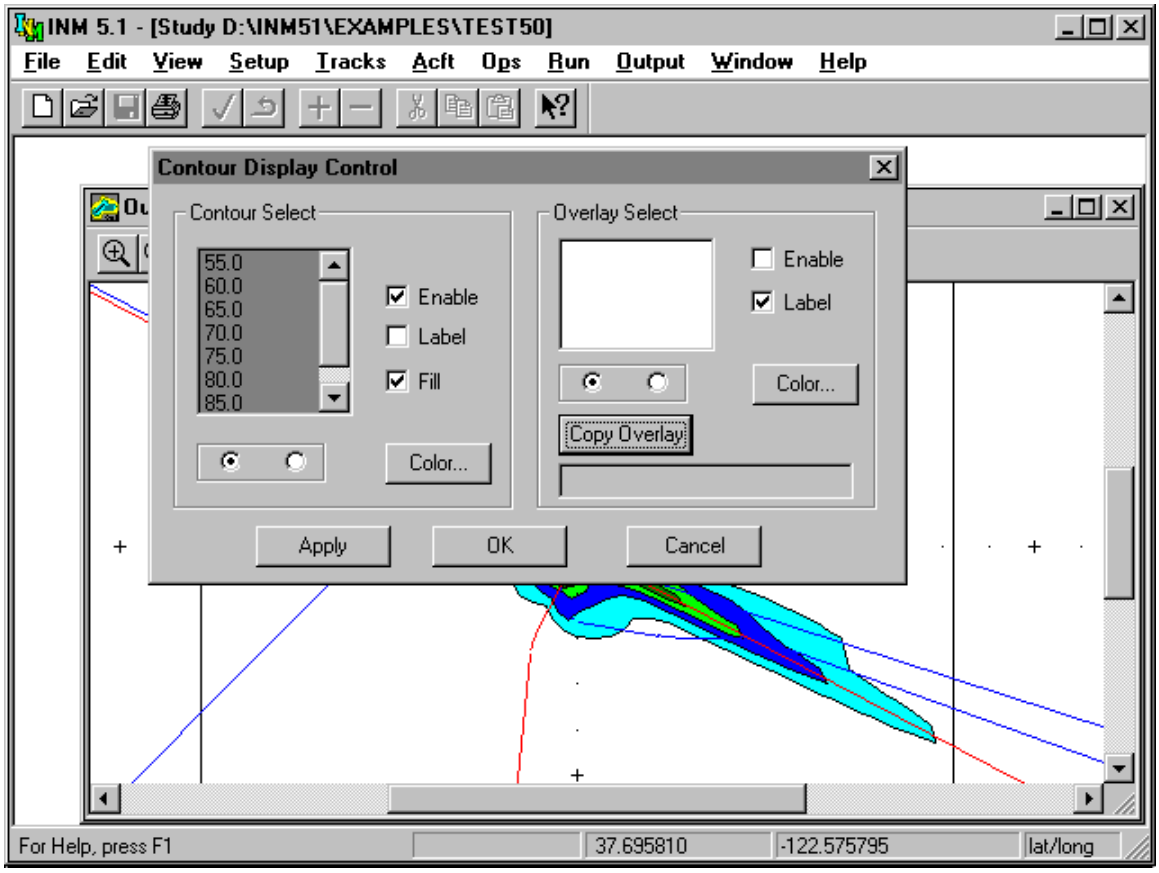
11.2.4. View // Layers On/Off

Toolbar: Stacked items

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

In addition to enabling layers in this Display Control dialog box, you can go directly to a detailed Display Control dialog box by selecting the button associated with a layer or group of layers.

For example, selecting the "Tracks" button, puts you in the same dialog box as selecting "Tracks" from the View menu.



11.2.5. View // Contours

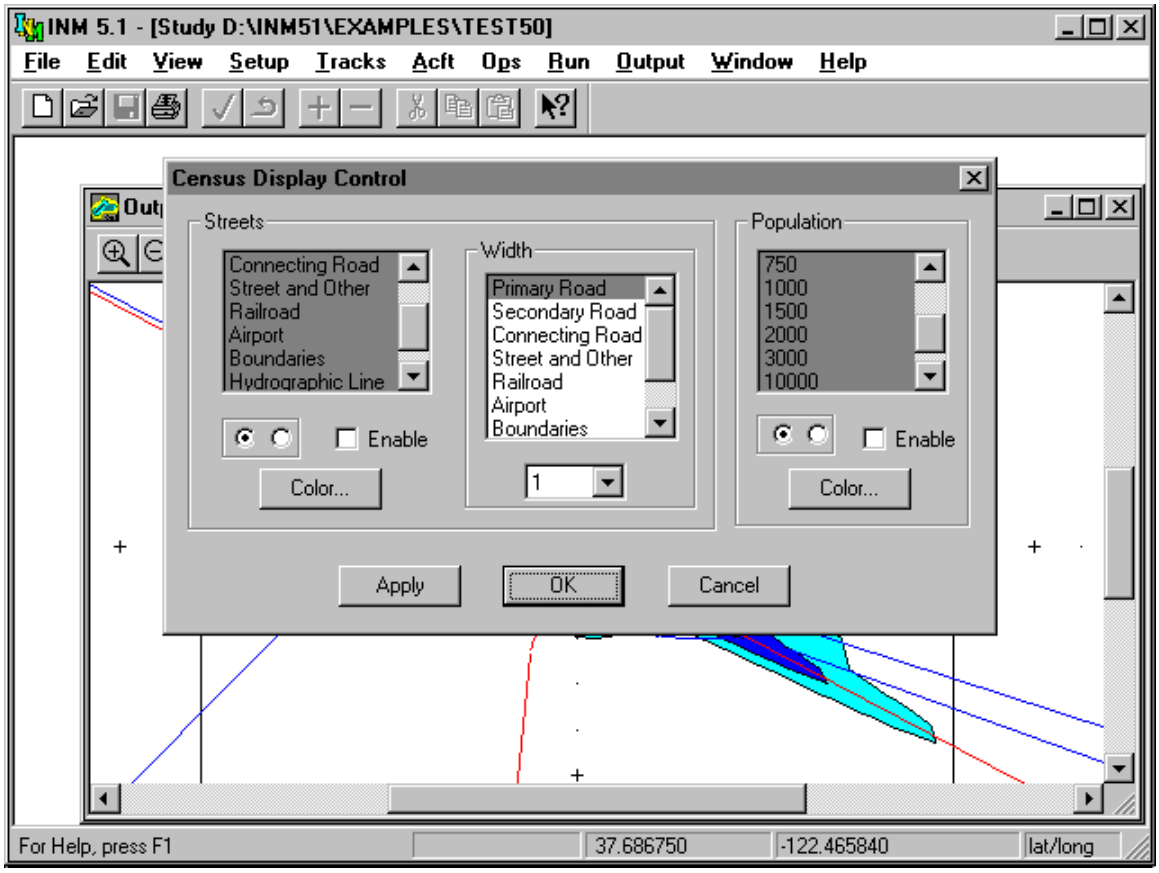
Toolbar: Contours

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 colors for overlay contours can be set independently of the base contour.



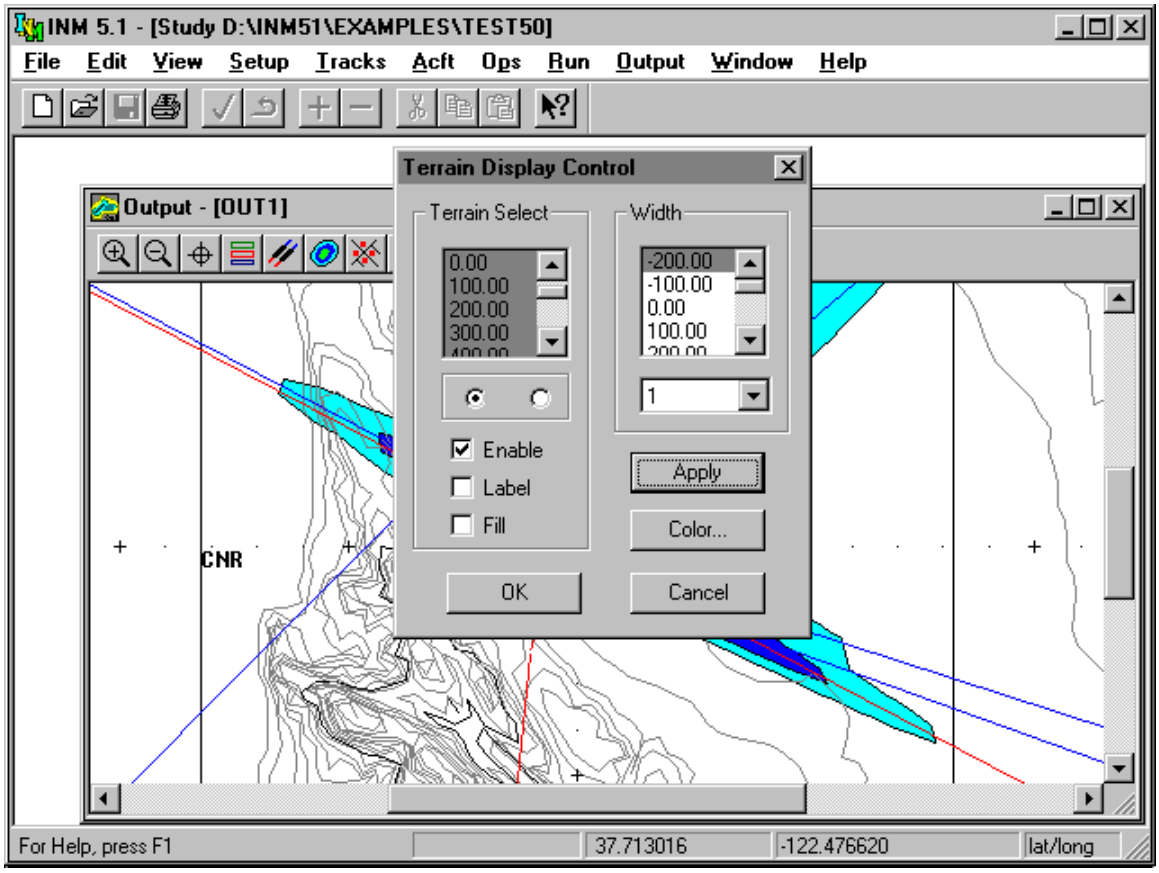
11.2.6. View // Census

Toolbar: Streets and population points

You can display street maps and population points with this function. You must obtain and process U.S. Census source data before this function will work (see Section 14.3).

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 graphical data.

Similarly, population points take 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.

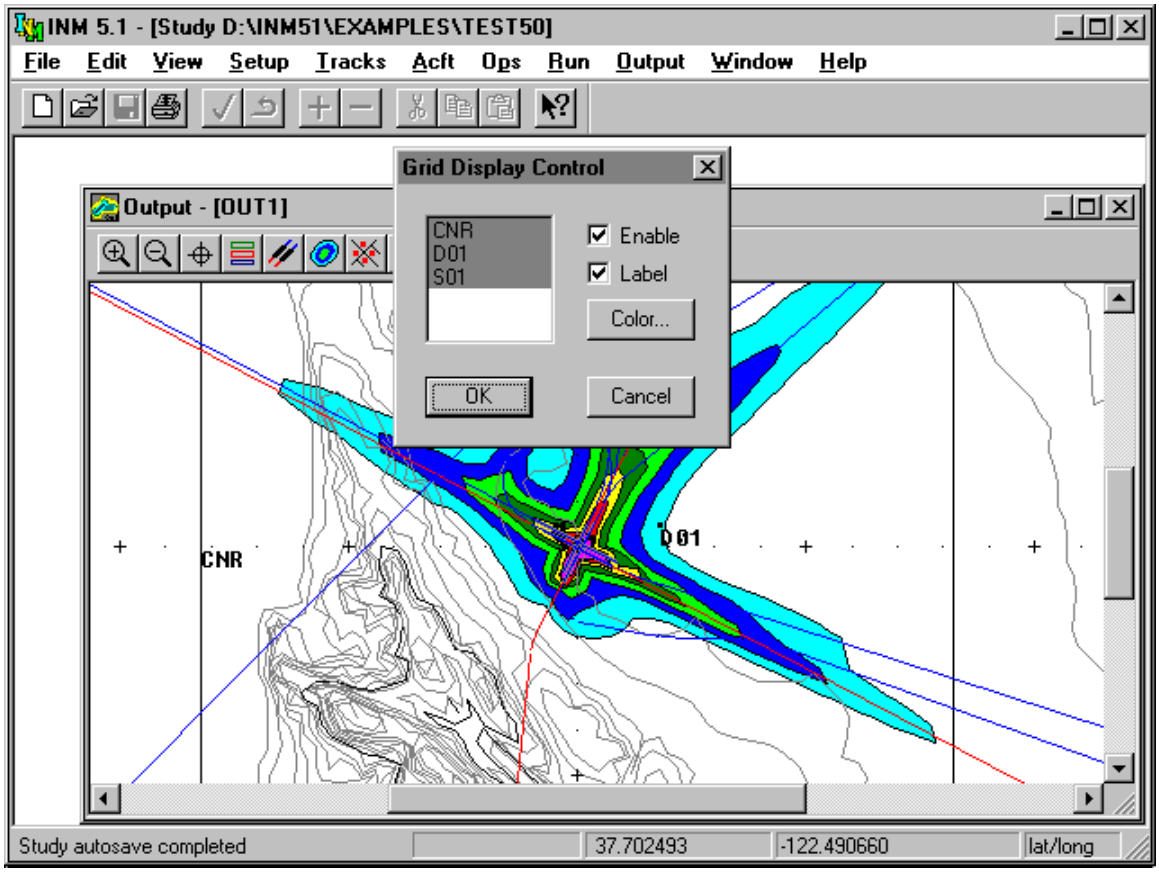


11.2.7. View // Terrain

Toolbar: Landscape with hills

You can display terrain contours using this function. You must obtain and process terrain source data before this function will work (see Section 14.2).

Use the Width function to change the width of the contour lines. Use the Color function to change their color. Select and enable contours to display. You can also display contour labels, which are terrain elevations in feet.



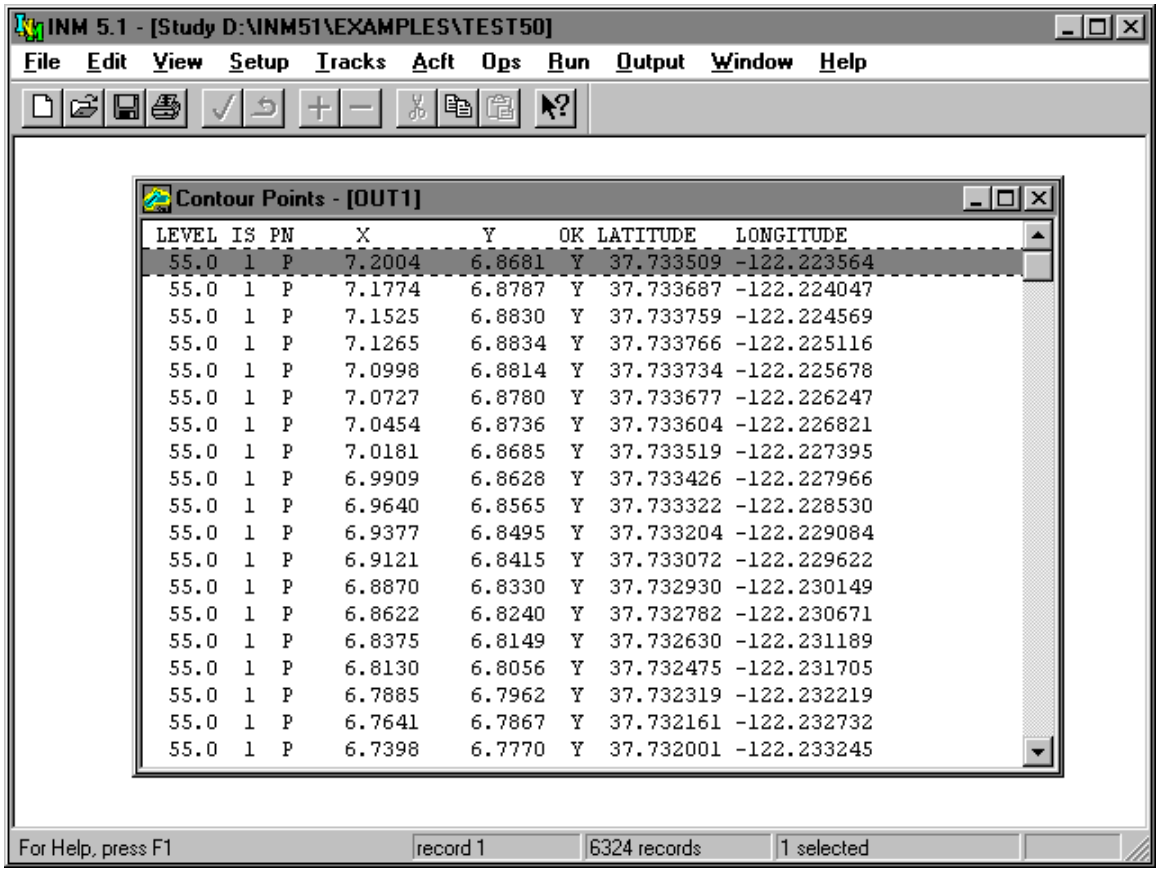
11.2.8. View // Grids

Toolbar: Grid of points

Use this function to display grids that are defined for the Case that is associated with the Output. Select grid records, and put a check in the enable box. Display the grid identifiers by checking the "Labels" box.

All three kinds of grids are shown (contour, standard, and detailed). The grid points are shown as small squares with connecting lines.

For multi-Case Output, the GRID.DBF file for "Case 1" is used. If you want to see a different grid file, copy it into the Output subdirectory.



11.3. Contour Points

Menu Item: Output // Contour Points

First, open the 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 (CONR_PTS) has the following fields:

1) LEVEL — Contour level (dB or minutes).

2) IS — Island number (an island is a single closed curve).

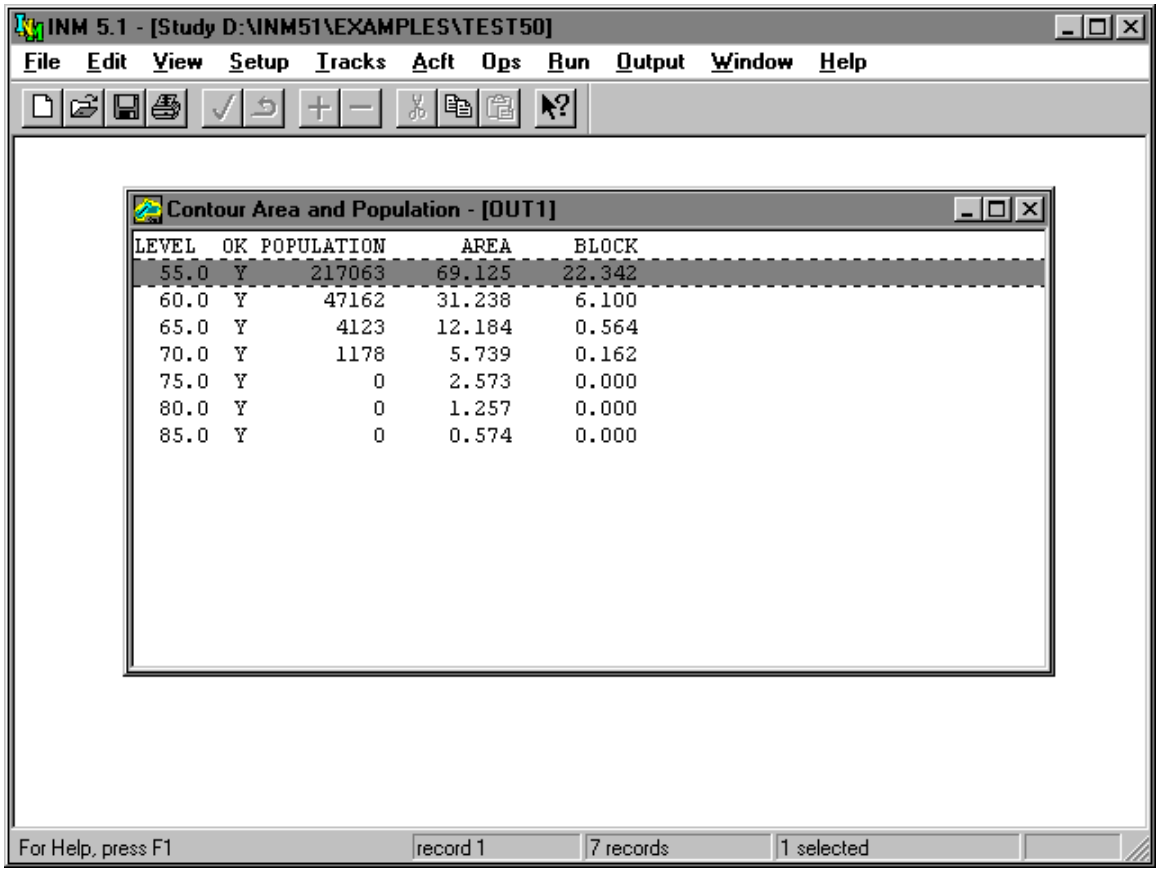
3) PN — Indicator whether the island is positive (P), meaning that noise inside the curve is louder than on the curve, or negative (N).

4) X and Y — Coordinates of the contour point (nmi).

5) OK — Indicator whether the point is inside the contouring grid border (Y=yes) or on the border (N=no).

6) LAT and LONG — Latitude and longitude of the contour point (decimal degrees).

Only the first 16,000 contour points are displayed or exported. However, all the points are contained in the CONR_PTS.DBF file.



11.4. Contour Area and Population

Menu Item: Output // Contour Area and Pop

First, open an Output Graphics window to generate the contours that are used to compute area and population inside of contours.

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

To compute population inside of contours, you need to have a population points file (see Section 14.3 for creating one). INM may take a long time to compute the population inside contours because of the large number of population points.

A contour-population table (POP_CONR) has the following fields:

1) LEVEL — Contour level (dB or minutes).

2) OK — Indicator whether all islands are inside the contouring grid border (Y=yes), or if one or more islands are cut by the border (N=no). If OK=N, the population and areas data are not accurately represented.

3) POPULATION — Sum of the number of people inside all islands of the contour level.

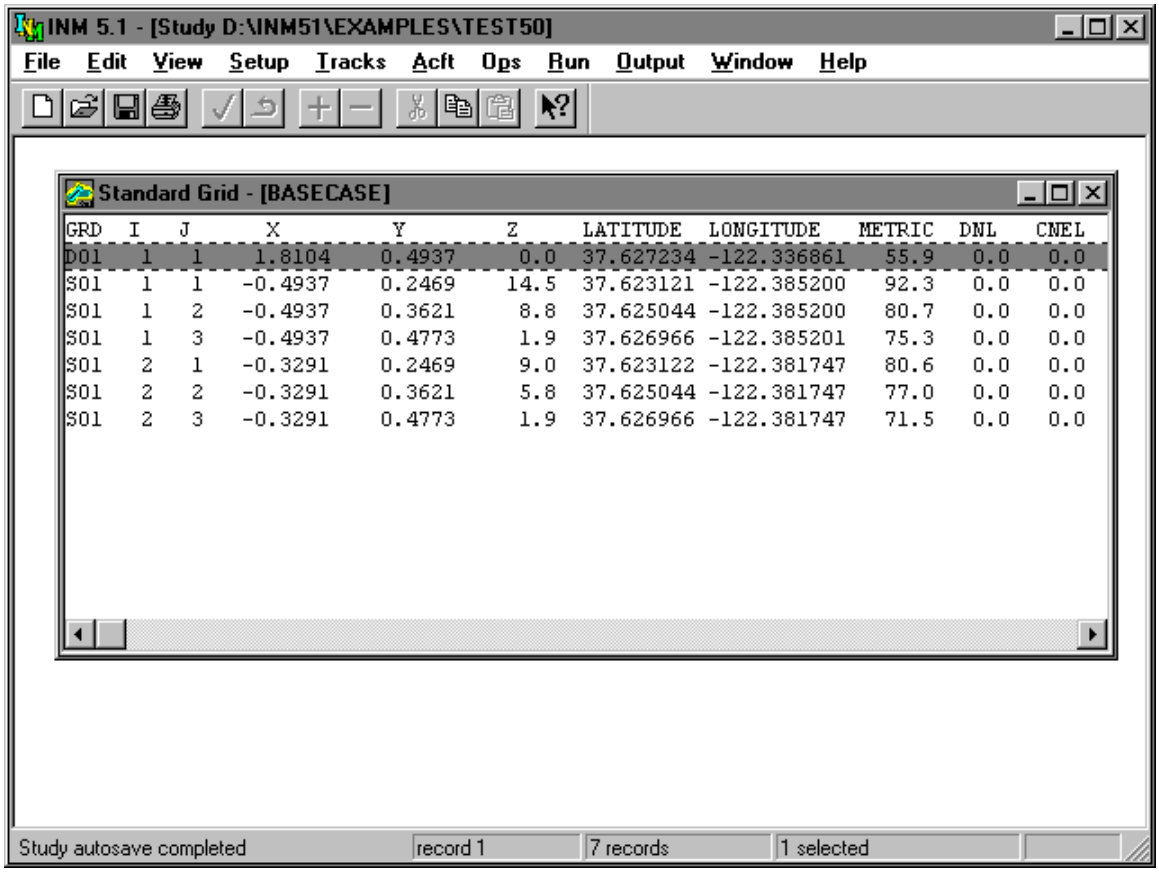
4) AREA — Calculated area inside all islands of the contour level (square statute miles).

5) BLOCK — Sum of census-block land areas inside all islands of the contour level (square statute miles). The block areas are given in the population-points input file.

The values of the calculated area (AREA) and the sum of the land areas (BLOCK) are usually different. There are two reasons for this:

- INM adds the whole census-block area when the population point (which designates the center of the area) is inside the contour, even if the contour cuts through the census block area. 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.

- Noise contours may enclose areas (especially water) that are not included in the census data. In this case, calculated areas may be significantly larger than census-block areas, as in the TEST50 Study example.



GRD	I	J	X	Y	Z	LATITUDE	LONGITUDE	METRIC	DNL	CNEL
D01	1	1	1.8104	0.4937	0.0	37.627234	-122.336861	55.9	0.0	0.0
S01	1	1	-0.4937	0.2469	14.5	37.623121	-122.385200	92.3	0.0	0.0
S01	1	2	-0.4937	0.3621	8.8	37.625044	-122.385200	80.7	0.0	0.0
S01	1	3	-0.4937	0.4773	1.9	37.626966	-122.385201	75.3	0.0	0.0
S01	2	1	-0.3291	0.2469	9.0	37.623122	-122.381747	80.6	0.0	0.0
S01	2	2	-0.3291	0.3621	5.8	37.625044	-122.381747	77.0	0.0	0.0
S01	2	3	-0.3291	0.4773	1.9	37.626966	-122.381747	71.5	0.0	0.0

11.5. Standard Grid Analysis

Menu Item: Output // Standard Grids

You can view Standard Grid results for a Case, providing that:

- The Case was run in the "SingleMetric" mode.
- You specified either a standard or a detailed grid analysis in the Run // Setup Run function before you ran the Case.

A standard-grid table (GRID_STD) has the following fields:

1) GRD — Grid identifier.

2) I and J — Grid indices (numbers) which serve to name the point.

3) X and Y — Coordinates of the grid point (nmi).

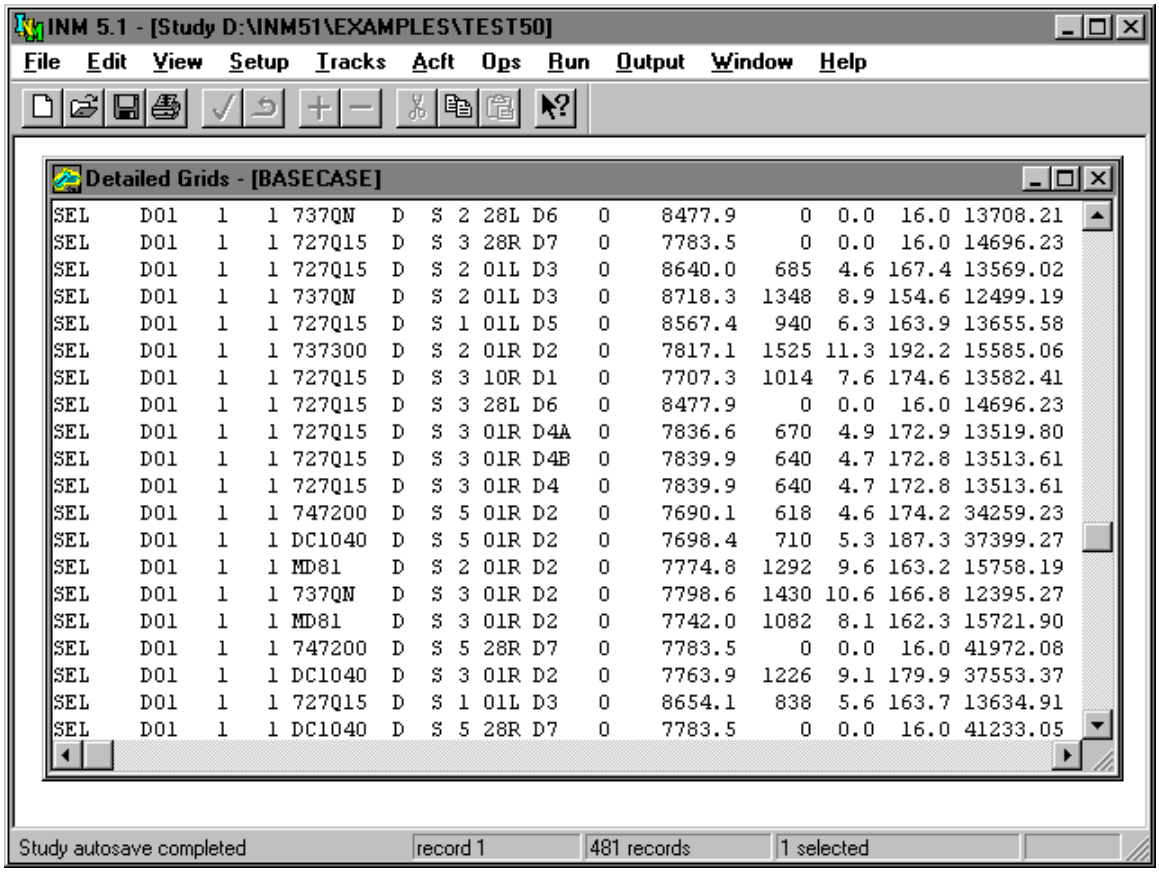
4) Z — Elevation of the grid point (feet MSL).

5) LAT and LONG — Latitude and longitude of the grid point (decimal degrees).

6) METRIC — Computed value of the noise Metric you specified for the Case (dB or minutes). This can be either a user-defined Metric or a standard Metric, depending on how you setup the Case.

7) DNL, CNEL, LAEQ, etc. — Computed values for 13 standard noise Metrics (dB or minutes).

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 the Metrics belonging to the missing family are not valid. Please see Section 8.4.2 for more information on this point.



11.6. Detailed Grid Analysis

Menu Item: Output // Detailed Grids

You can view Detailed Grid results for a Case, providing that:

- The Case was run in the "SingleMetric" mode.
- You specified a detailed grid analysis in the Run // Run Options window before you ran the Case.

INM computes a detailed grid record for:

- Every Metric that you checked in the Run // Run Options window.
- Every grid point of every detailed Grid defined for the Case.
- Every significant combination of Aircraft, Profile, and Track.

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.

Unwanted double records are generated if you check a standard Metric that is also your selected Metric. For example, you run a grid analysis on DNL, and you also put a check mark in the DNL box. Then, you will get a set of DNL records for the user-Metric and an identical set of DNL records for the checked standard Metric. To avoid this problem, do not put a check mark in the standard DNL box.

A detailed-grid table (GRID_DTL) has the following fields:

1) METRIC — Noise Metric identifier.

2) GRD — Grid identifier.

3) I and J — Grid indices which serve to name the point. You can obtain the X,Y,Z coordinates for detailed grid points from the Standard Grid file (this is the reason both standard and detailed data are written when you specify detailed Grids).

4) ACFT — Aircraft identifier.

5) OP — Type of flight operation (A=approach, D=departure, T=touch-and-go, F=circuit flight, V=overflight).

6) PF — Profile group identifier.

7) S — Profile stage number.

8) RWY — Runway End identifier.

9) TRK — Track identifier.

10) S — Sub-track number.

11) DISTANCE — Distance (feet) from the grid point (on the surface of the terrain, if any) to the aircraft at closest-point-of-approach.

12) ALT — Altitude (feet AFE) of the aircraft at closest-point-of-approach.

13) ANG — Elevation angle (degrees) from the grid-point ground plane to the aircraft at closest-point-of-approach.

14) SPEED — Speed (knots TAS) of the aircraft at closest-point-of-approach.

15) THRUST — Thrust setting (pounds, percent, epr, other) of the aircraft at closest-point-of-approach.

16) EQUIV — Equivalent number of operations (weighted day, evening, and night operations) for the given flight operation (see below).

17) ONE — Metric value (dB or minutes) for a single operation of the given flight.

18) ALL — Metric value (dB or minutes) for all weighted operations of the given flight (see below).

19) PERCENT — Percent of the total Metric value that is caused by the flight operation (see below).

The methods used 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 )

PERCENT  =  100 * 10^METRIC_ALL/10 / ( Total 10^METRIC_ALL/10 )
```

Only those flights that contribute to the top 97% of the total exposure are recorded in the detailed-grid table.

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.

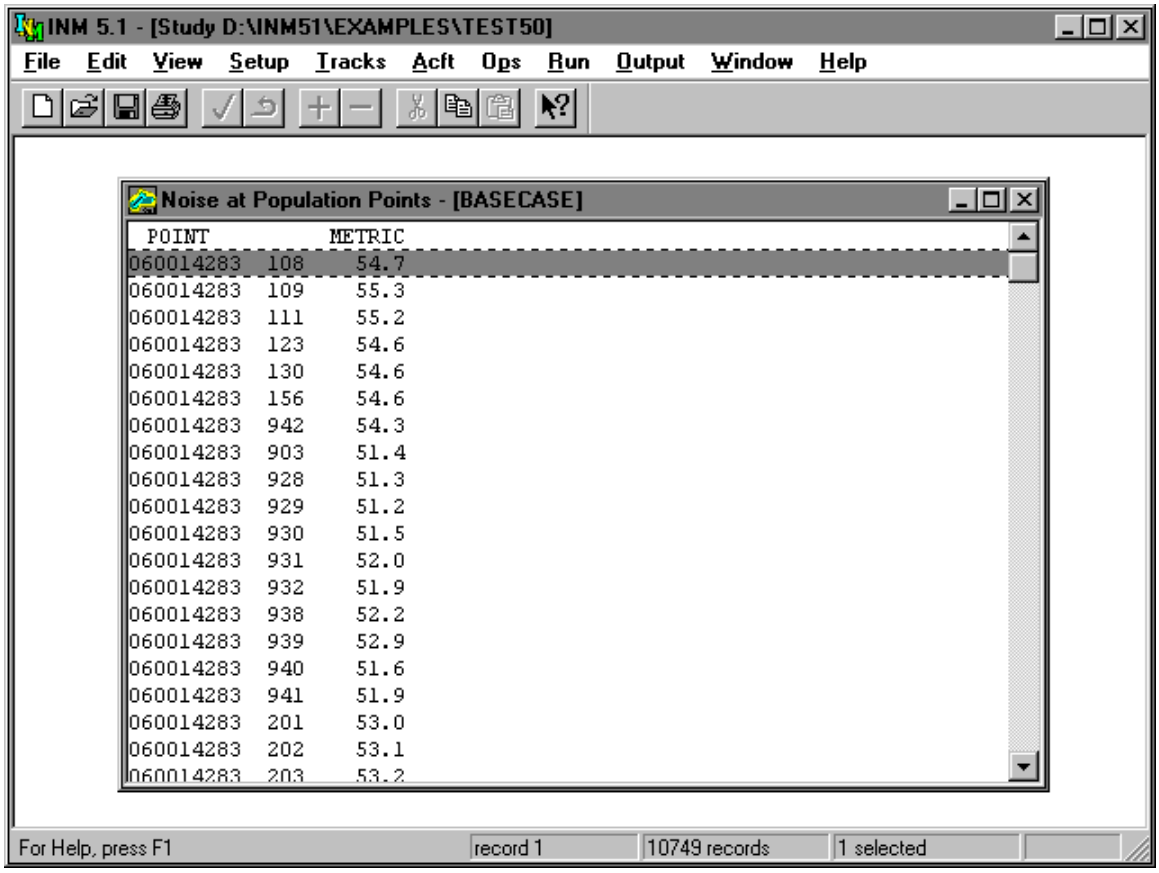
For time-above Metrics:

```
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 in the detailed-grid table.



11.7. Noise at Population Points

Menu Item: Output // Noise at Pop Points

INM computes Metric values at each population point:

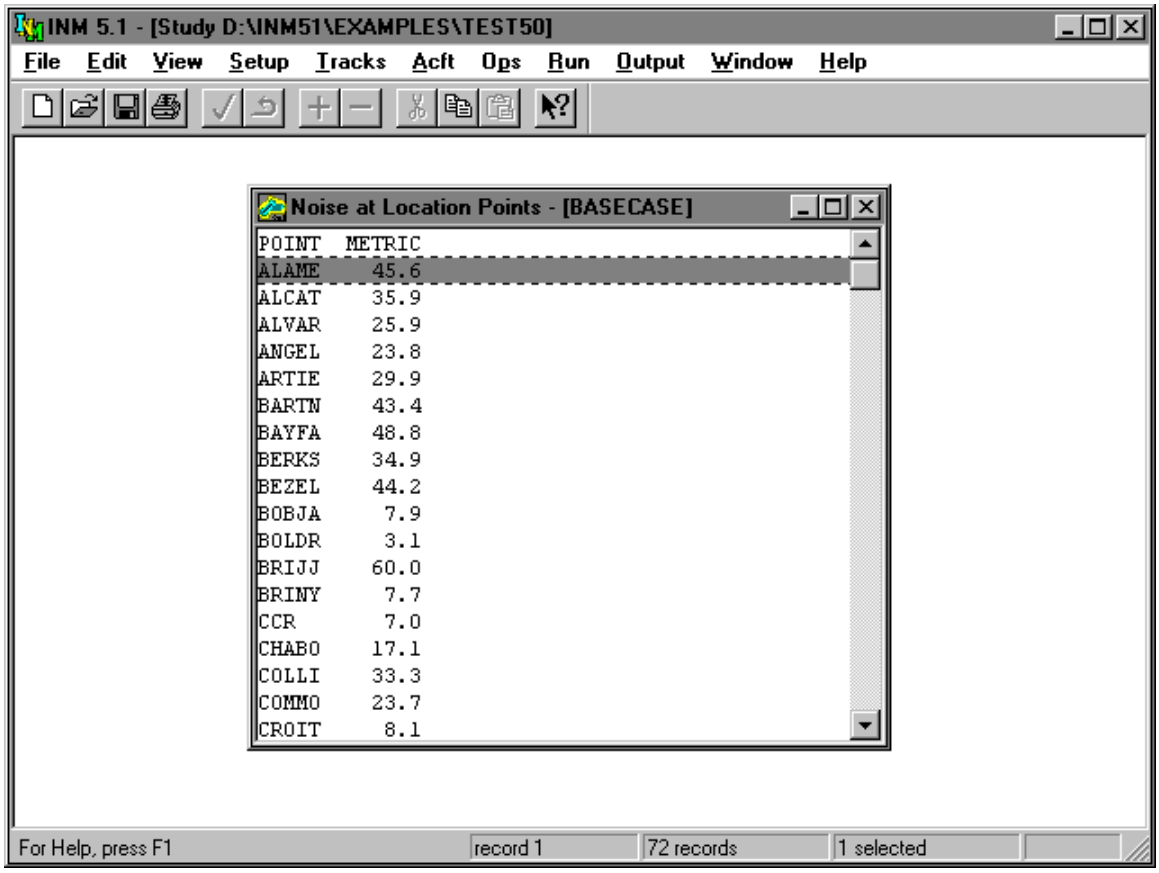
- When you check "Do Population Points" in the Run // Run Options window.
- If you have a POP_PTS file in the Study directory (see Section 14.4.3 for how to make one).

A population-noise table (POP_NOIS) has the following fields:

1) POINT — Population point identifier. It is a concatenation of the state code (2 digits), county code (3 digits), tract/BNA code (6 characters), and block code (4 characters).

2) METRIC — Noise Metric value at the point (dB or minutes).

Rather than repeating latitude, longitude, population, and area data for every Case, INM lists only the population point identifier and the computed Metric. The population point 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: Output // Noise at Loc Points

INM computes Metric values at each location point:

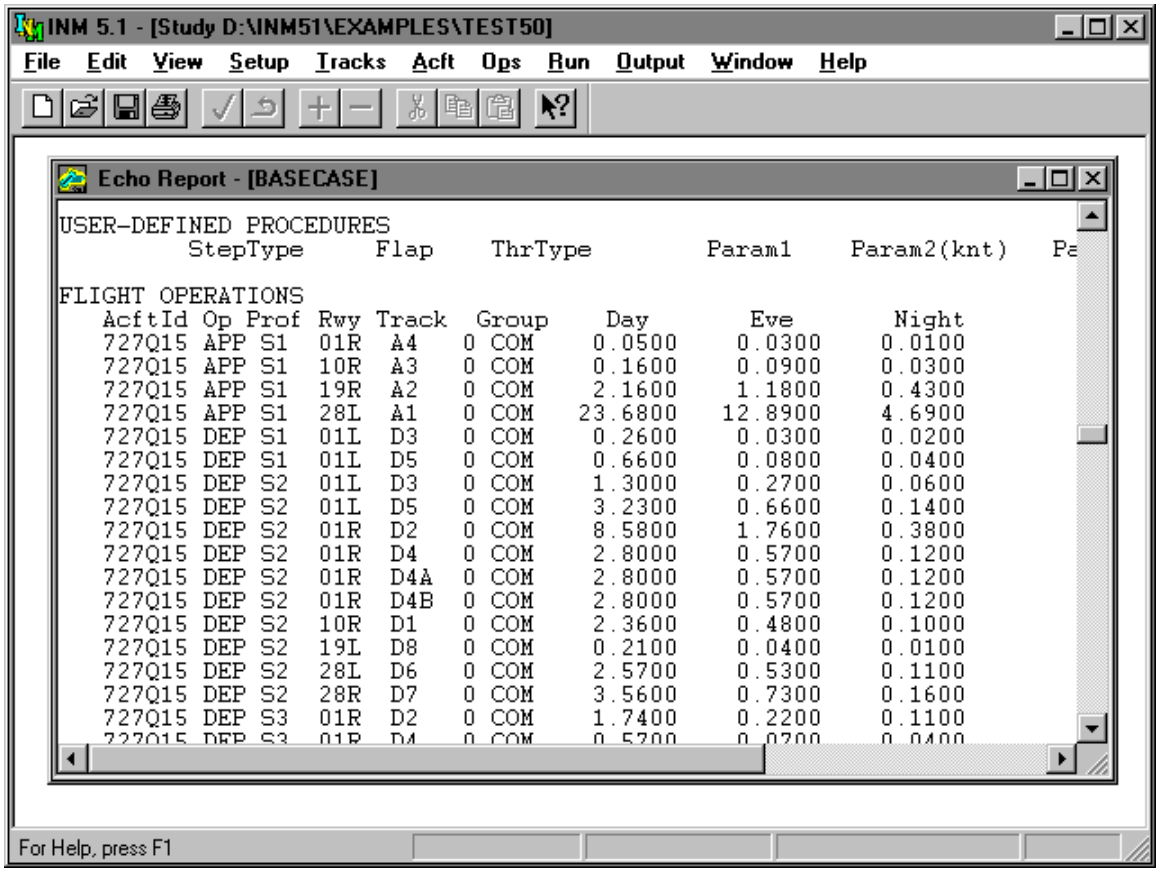
- When you check "Do Location Points" in the Run // Run Options window.
- If you have a LOC_PTS file in the Study directory (see Sections 3.5.1 and 6.7 to find out how to make one).

A location-noise table (LOC_NOIS) has the following fields:

1) POINT — Location point identifier.

2) METRIC — Noise Metric value at the point (dB or minutes).

Rather than repeating latitude, longitude, and height data for every Case, INM lists only the location point identifier and the computed Metric. The location point identifier in the LOC_PTS file in the Study directory gives you access to these other location-point data.



11.9. Case Echo Report

Menu Item: Output // Case Echo Report

The Case Echo Report documents user-generated Study data and all Case-specific data (for example, calculated flight operations). The purpose of this report is to provide, in one place, all of the input data for a given Case, including the Study-level data. Appendix K shows an example Case Echo Report.

If you make a change to a standard-data record, the change will show in the Echo Report. If you find an unintentional change to a standard record, delete the record, close the Study, and reopen it. The standard record will be read in, and the change will not show in the report.

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.

The Echo Report is written in the units specified for the Study (English or metric).