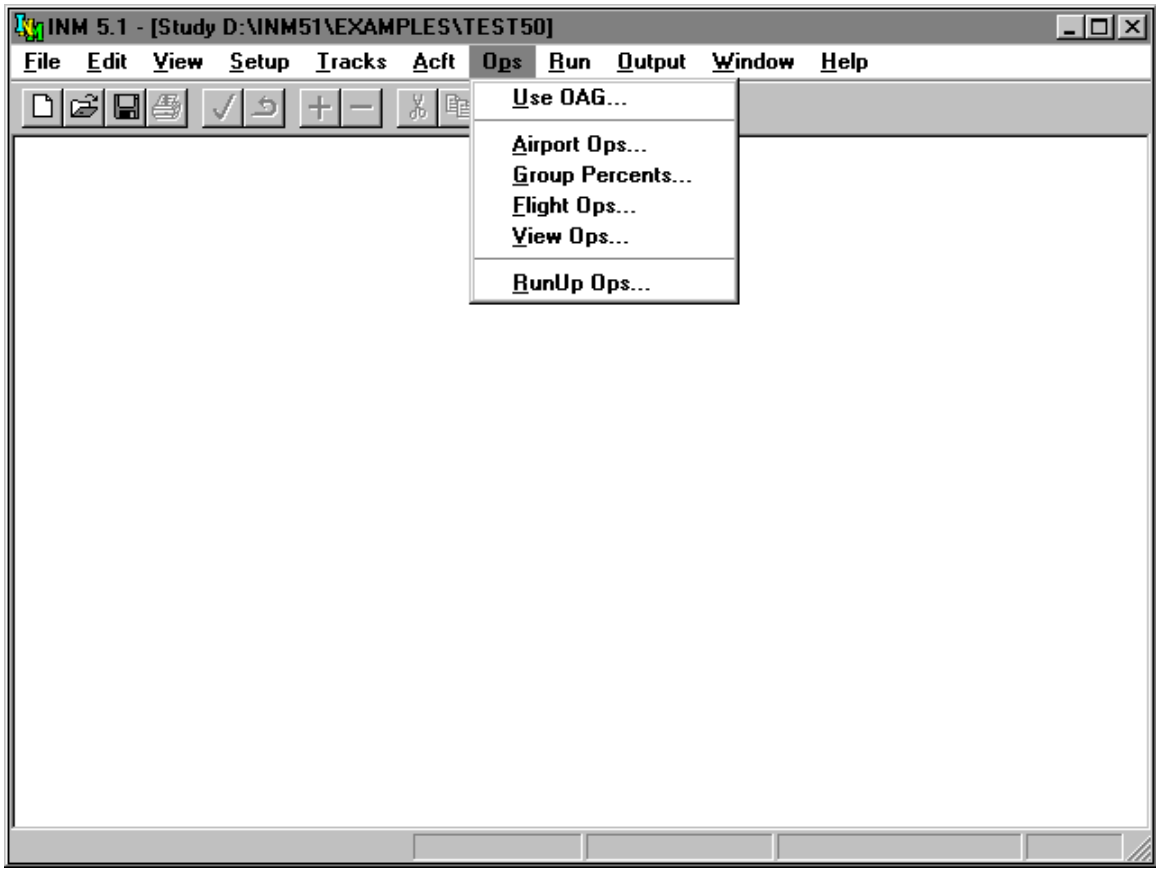


9. OPERATIONS MENU

Use this menu to input flight and run-up operations, calculate flight operations from "percentage" data, and view filtered and summary flight operations.

9.1. Use OAG Airport Operations

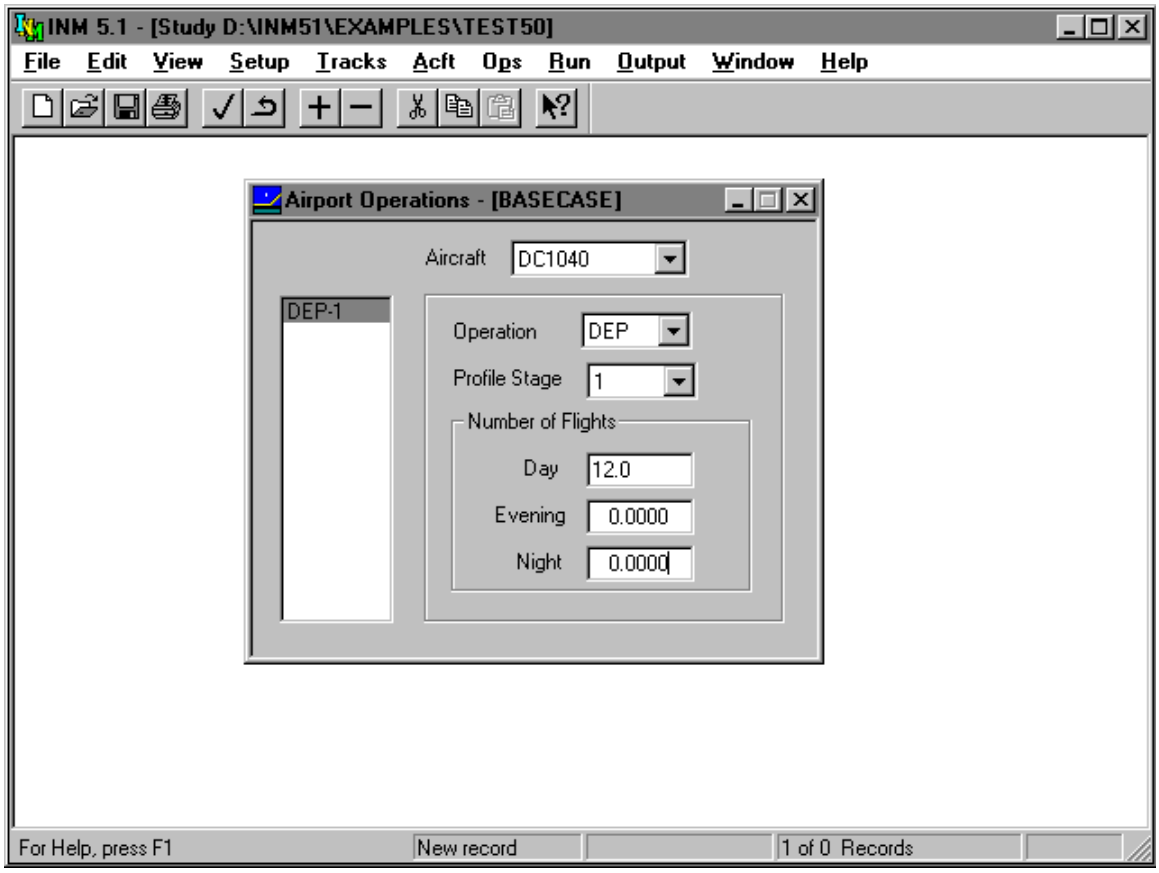
Menu Item: Ops // Use OAG

This function copies an OPS_APRT file from the Study directory into a Case subdirectory, and 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 14.4). The OAG processor creates an OPS_APRT file that contains scheduled flight operations. The processor uses a translation table of OAG aircraft identifiers versus INM standard Aircraft identifiers.

After using this function, you should use the Ops // Airport Ops function to modify and extend the OAG data. This is necessary because translation of OAG to INM aircraft may be somewhat different for your particular airport than provided by the OAG processor. Also, OAG data contain only scheduled commercial 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

Use this function with the Ops // Group Percents function (Section 9.3, below) to input operations by percentage.

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 number.

There are several ways to create Airport Operation records:

- Add records with the Edit // Add Record function.
- Create an OPS_APRT file by using a DBMS or spreadsheet program.
- Purchase OAG data, create a file with the OAG Source Data Processor (see Section 14.4), and copy it into your Case subdirectory with the Ops // Use OAG function (see Section 9.1, above).

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, require a 24-hour time period, not some other period.

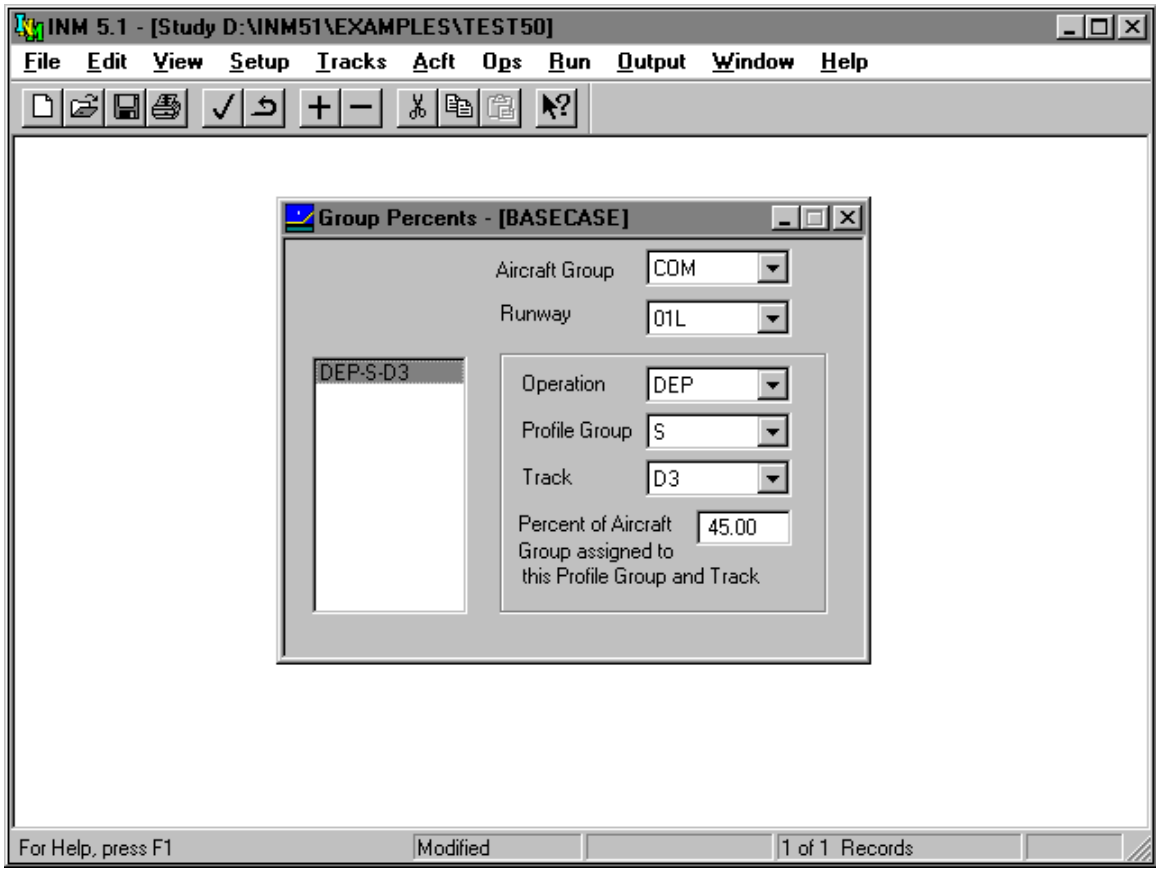
Daily flight operations are divided into three time periods: day, evening, and night. In the U.S. for the standard use of INM, these time periods are defined relative to airport local time as:

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).

Once an Airport Operation record exists, you cannot delete a record that is associated with it. This is a safety measure that helps maintain the integrity of the database.

- 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 (also in Flight Operations and Run-up Operations), and then INM will let you delete the Aircraft record.



9.3. Aircraft Group Percents Data

Menu Item: Ops // Group Percents

Use this function with the Ops // Airport Ops function (Section 9.2, above) to input operations by percentage.

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 uses Track "09L-DEP-TRK1" 80% of the time, and uses "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 aircraft group identifier and operation type should add up to 100%. INM normalizes the percentage values before computing, but you should also make sure that they add to 100% for your own information.

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, three-character aircraft group identifier to individual Aircraft in the Acft // Aircraft window (see Section 8.1).

After selecting an aircraft group identifier, 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 specifying 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 G1, and you assigned 30% of G1 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 calculates flight operations.

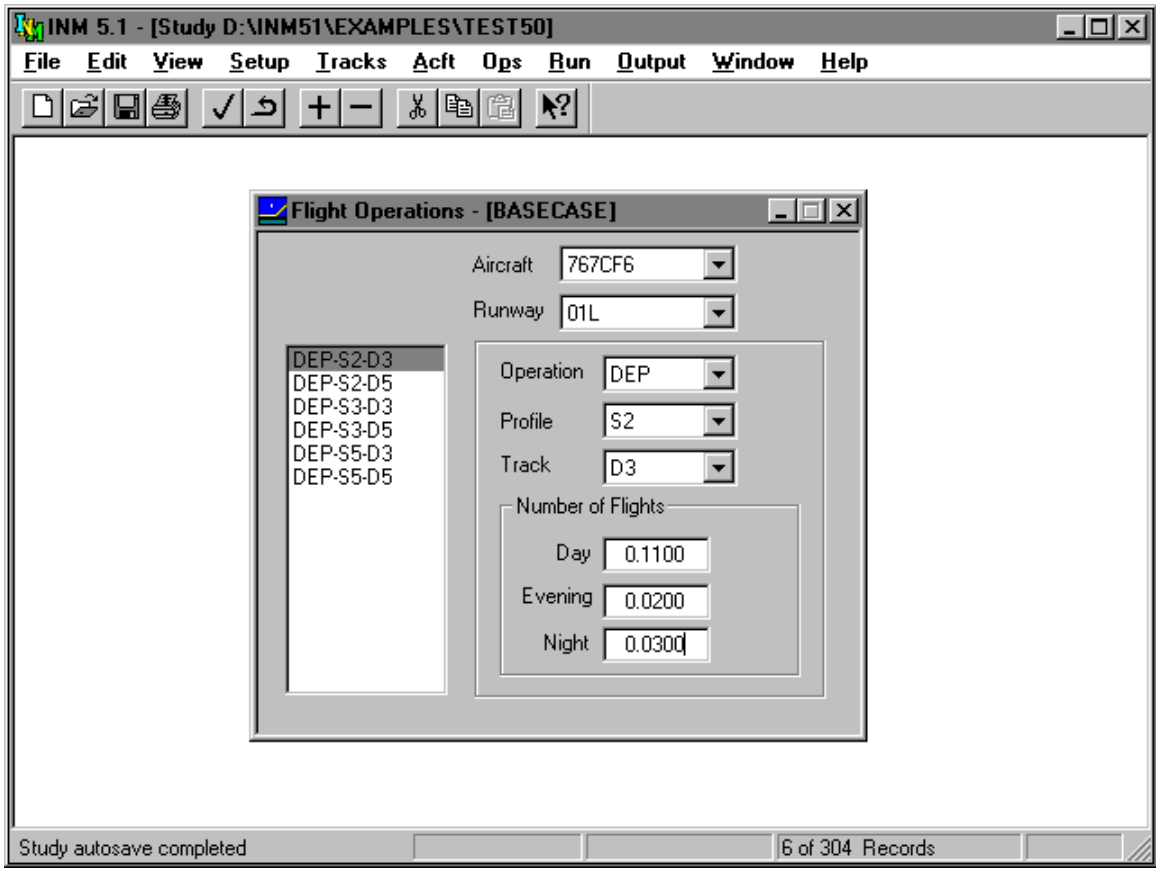
When INM does detect the problem, it does two things:

- No record is produced for the XYZ-C operation
- 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 G1 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. 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

Use this function to input operations-by-frequency.

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:

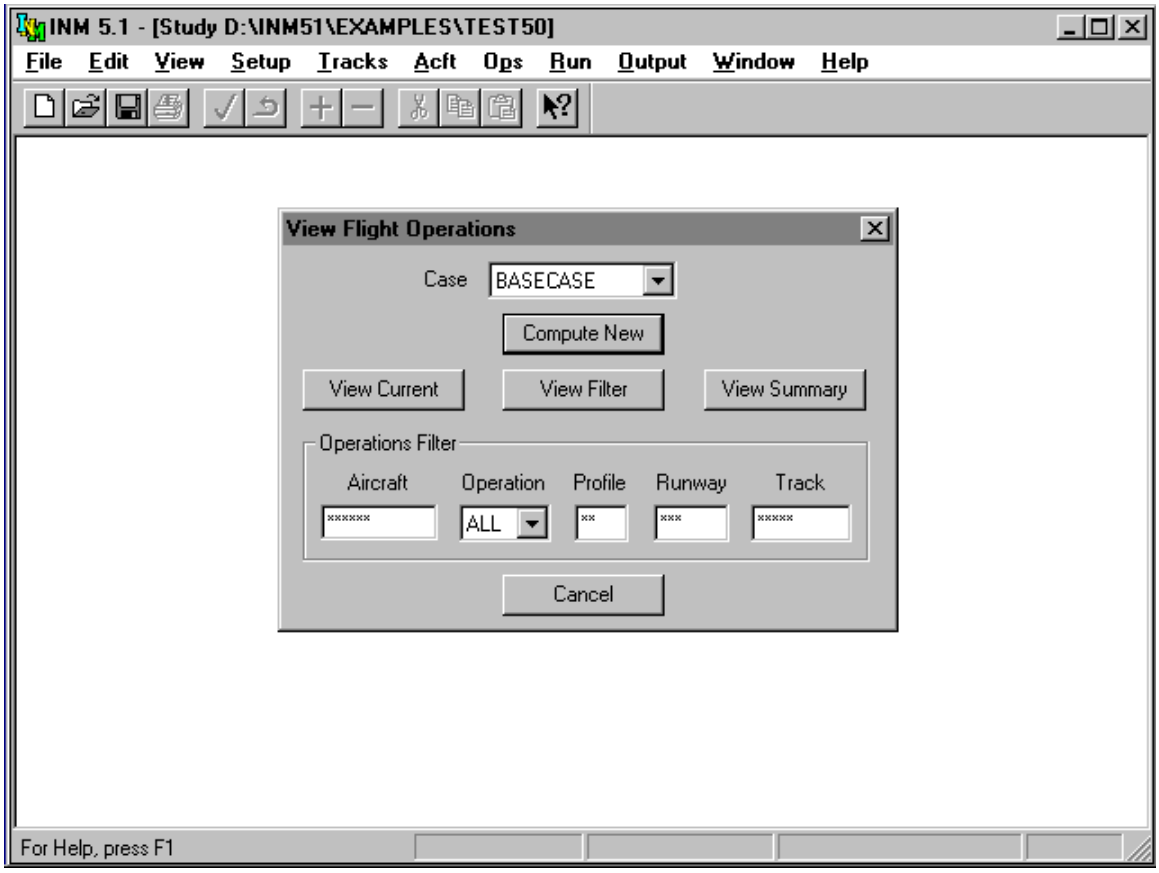
- Add records with the Edit // Add Record function
- Create an OPS_FLT file by using a DBMS or spreadsheet program
- Use the File // Import // Text-to-DBF function (see Section 3.5.1). You create a formatted text file of flight operations, and INM produces the OPS_FLT file.

When adding Flight Operations, you must already have both a Track and a Profile defined for the given type of flight operation.

You can input both "operations-by-percentage" and "operations-by-frequency" records for the same type of operation. 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.

Do not define the same operations by both "operations-by-percentage" and "operations-by-frequency" methods because you will end up with too many flights.



9.5. View Flight Operations

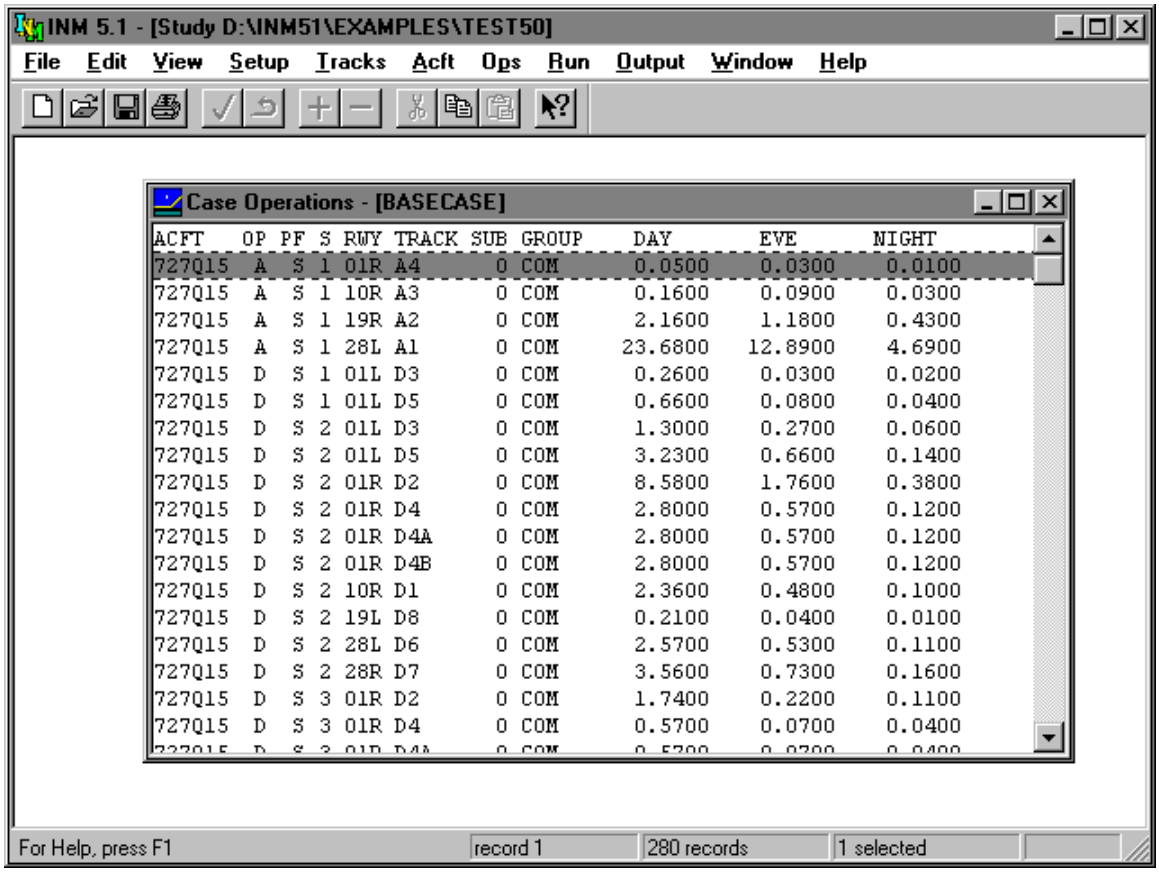
Menu Item: Ops // View Ops

Use this function to view calculated flight operations for a given Case.

INM calculates flight operations by:

- Using Flight Operations records
- Distributing Airport Operations across tracks, as specified by Group Percents records
- Distributing flight operations across INM aircraft, as specified by aircraft Substitution records
- Distributing flight operations across sub-tracks, as specified by Track records.

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



9.5.1. Compute New Flight Operations

Press the "Compute New" button to compute and view a new set of calculated flight operation records. For example, you can change data in the Group Percents window, and see the change it makes in the calculated flight operation records.

INM automatically calls the "Compute New" function before computing noise or writing an Echo Report, so that the calculated flight operations are up to date.

9.5.2. View Current Flight Operations

Press the "View Current" button to view the current set of calculated flight operation records for a given Case.

- Print the records, or a subset of the records, by using the File // Print function
- Export the records, or a subset of the records, to a file by using the File // Export As function

- Copy the records to the Windows Clipboard as text with the Edit // Copy function.

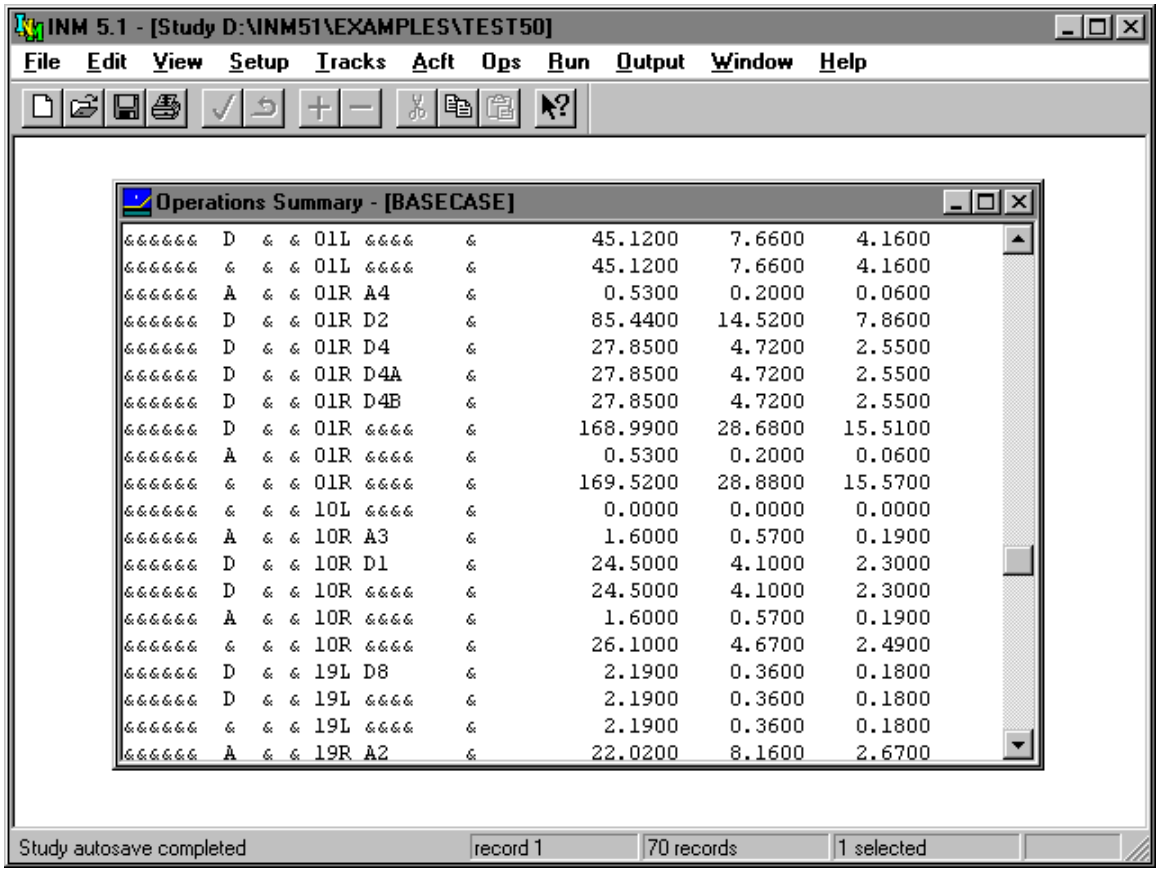
9.5.3. View Filtered Flight Operations

There may be a very large number of calculated flight operation records. You can view a subset of these records by first editing the filter command, and then pressing the "View Filter" button.

The filter command is composed of the following sub-units:

- Aircraft identifier (for example, DC930)
- Type of operation (APP, DEP, TGO, CIR, OVF)
- Profile identifier (group and stage identifiers; for example, S5)
- Runway End identifier (for example, 27R)
- Track identifier (4 characters) and sub-track identifier (1 digit). For example, use TR07* to see all sub-tracks of TR07.

Use an asterisk to indicate a "wild card", which will match any character. For example, 737*** filters all aircraft starting with 737.



9.5.4. View Flight Operations Summary

After calculating 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 calculated flight operation records.

Aggregated fields are indicated with an ampersand "&". Flight operations are aggregated in the following ways:

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

- Operations on Runway Ends and Tracks are summed across Aircraft and Profiles. Examples: the total number of departures on 09L using TR01; the total number of departures on 09L; and the total number of operations of any kind on 09L.

- Operations are summed across Aircraft, Profiles, Runway Ends, and Tracks. Examples: the total number of departures; and the total number of operations of any kind.

Flight operation summary data are useful for checking your input data. For example:

- Does the average number of approaches to a given runway match the real operational data?
- Does the average number of departures equal the average number of approaches?

Airport operations are counted differently than shown in the flight operations summary table. You can calculate airport operations by using INM summary data:

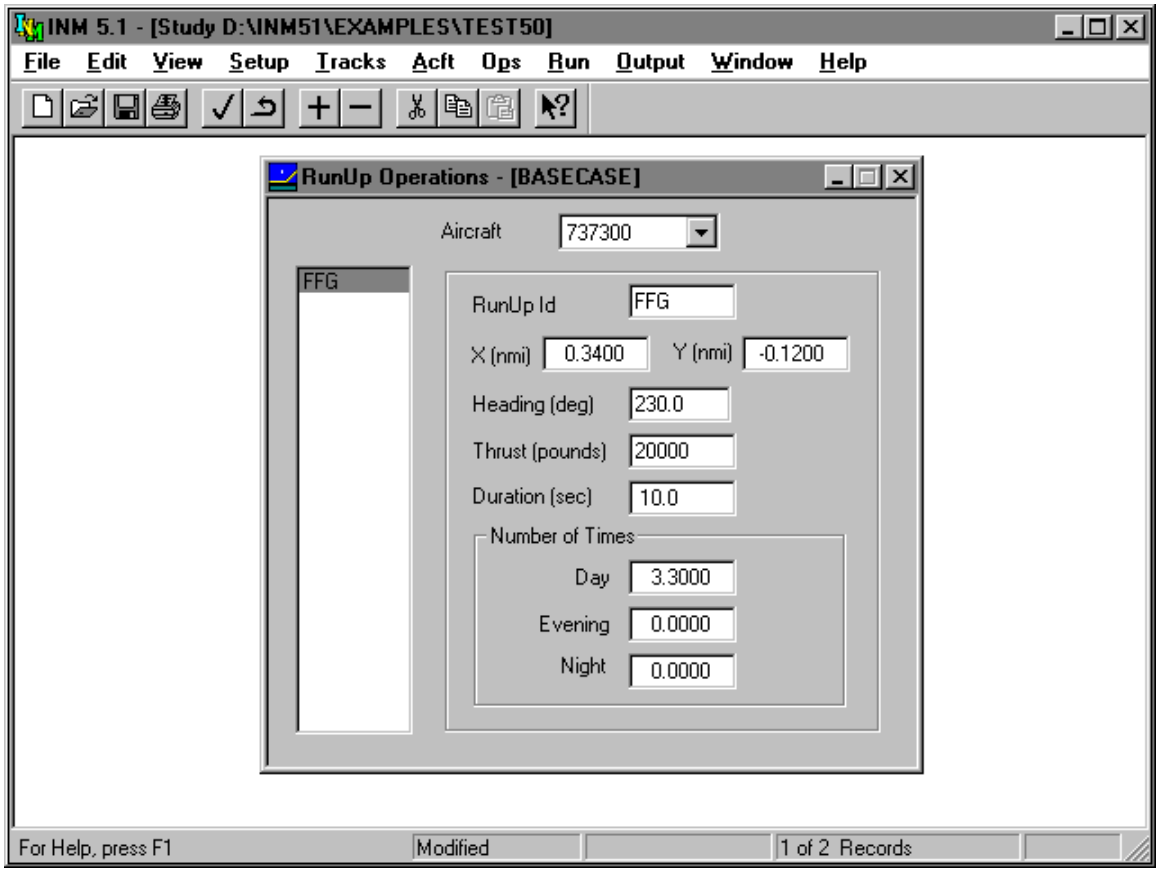
$$\text{Airport Takeoffs} = N_{DEP} + N_{TGO} + N_{CIR}$$

$$\text{Airport Landings} = N_{APP} + N_{TGO} + N_{CIR}$$

Where,

N_{DEP} = sum of all departures (D)
N_{APP} = sum of all approaches (A)
N_{TGO} = sum of all touch-and-goes (T)
N_{CIR} = sum of all circuit flights (F)

A touch-and-go flight operation is counted twice because it has both a takeoff event and a landing event. This is true for a circuit flight operation too.



9.6. Run-Up Operations Data

Menu Item: Ops // RunUp Ops

Use this function to input run-up operations for a specific Case.

1) Select an Aircraft identifier and input a three-character run-up pad identifier.

2) Input the X,Y position of the pad. If you do not know the coordinates, use the View // Geo Units function in the Input Graphics window to first change to X,Y nautical miles, then position the mouse pointer on the run-up pad, and read the X and Y values on the status bar.

3) Input the heading of the airplane on the run-up pad. Heading is measured in degrees clockwise from the Y-axis (true north).

4) Input the average thrust-setting and run-up duration. Duration is the time that the average thrust setting is in effect, and it is measured in seconds.

5) Input the number of times the run-up event occurs during the day, evening, and night time periods.

INM uses a single directivity pattern to calculate noise around an airplane on a run-up pad. This is the same SAE-AIR-1845 directivity pattern function that is used to compute noise behind takeoff. The directivity pattern is symmetric around the longitudinal axis of the airplane.

The INM directivity pattern function is given by:

$$P = 0.0 \qquad 0 \le \theta \le 90$$

$$P = 51.44 - 1.553\,\theta + 0.015147\,\theta^2 - 0.000047173\,\theta^3 \qquad 90 < \theta \le 148.4$$

$$P = 339.18 - 2.5802\,\theta - 0.0045545\,\theta^2 + 0.000044193\,\theta^3 \qquad 148.4 < \theta \le 180$$

$$L = P \qquad 0 < D \le 2500$$

$$L = P\ 2500/D \qquad D > 2500$$

Where

- L is the number of decibels added to the maximum noise level at distance D from the airplane (dB).
- θ is the angle from the nose of the airplane to an observer behind the airplane (degrees).
- D is the distance from the airplane to the observer (feet).