# INM Version 6.0b Software Update

January 16, 2001

## Version Information

INM Version 6.0b is a software update to Version 6.0a. You must already have INM 6.0 or 6.0a to use this software update. If you do not have one of these two versions, you can order INM 6.0b by downloading the INM Order Form from the FAA AEE-100 web site (http:/www.aee.faa.gov/aee-100/inm).

The Version 6.0 User's Guide and the Version 5.1 Technical Manual are the current manuals for INM Version 6.0b software.

## Installation Instructions

1.  Use MS Windows to make a copy of your existing INM6.0a directory. Select your INM6.0a directory, and using the Windows File Manager under the "Edit" menu, select "copy" and then select "paste". This will create a new directory called "Copy of INM6.0a".

2.  Use the right button of your mouse to select the "Copy of INM6.0a" directory created in step 1. Select "Rename" and rename the directory INM6.0b.

3.  Download the *INM60B.EXE* file from the FAA Web site. Put it in the new INM6.0b directory.

4.  Double click on the *INM60B.EXE* file name to automatically extract the updated files into the new INM6.0b directory. Select the "Unzip" button. This process will overwrite the old INM 6.0a files and replace them with those required for INM 6.0b. The 20 distributed files are:

    | File | Date |
    |------|------|
    | *inm.exe* | 12/22/2000 |
    | *compute.dll* | 12/22/2000 |
    | *graph.dll* | 12/22/2000 |
    | *compu50.dll* | 12/22/2000 |
    | *winutil.dll* | 12/22/2000 |
    | *alaska3cd.exe* | 11/20/2000 |
    | *sys_data\acdb60.bin* | 12/22/2000 |
    | *sys_data\\*.dbf  (12 files)* | 12/22/2000 |
    | *process\dxf\cadcvrt.exe* | 10/10/2000 |

## Database Modifications

1.  New data for the Airbus A320-211 with CFM56-5A1 engines replaced A320 data in the INM database. The aircraft identifier is still A320 and the noise identifier is CFM565. The approach profile is now a fixed-point profile of standard 3-degree descent, which includes a 3000-foot level segment. There are three sets of procedural departure profiles: ICAO_A, ICAO_B, and STANDARD, all containing stage lengths 1 through 5. STANDARD profiles are identical to ICAO_B profiles. The stage-5 profile is to be used for departures operating at maximum gross takeoff weight.

2.  Data for the Airbus A330-301 with CF6-80 E1A2 engines were added to the INM database. The aircraft identifier is A330 and the noise identifier is CF680E. The single fixed-point approach profile is a standard 3-degree descent with a 3000-foot level segment. There are three sets of procedural departure profiles: ICAO_A, ICAO_B, and STANDARD, all of which have stage lengths 1 through 6. The STANDARD departure profiles are identical to ICAO_B profiles.

3.  The A330 aircraft identifier was removed from the substitution database. Previously, the A310 was substituted for the A330. INM studies should now use the new A330 data.

4.  New noise-power-distance (NPD) curves for the Airbus A340-211/CFM-56-5C2 were added to the database and previous NPD curves were removed. The INM aircraft identifier is A340 and the noise identifier is CF565C.

5.  The A320, A330, A340, and 777200 fixed-point approach profiles were modified by setting the reverse thrust point at 60% of static thrust so that they are now similar to other INM aircraft reverse thrust values.

6.  INM fixed-point approach profiles were modified to model reverse thrust using higher thrust departure NPD curves instead of approach NPD curves. This is consistent with previous versions of INM that did not separate approach and departure NPD curves for extrapolation.

7.  Data for the Boeing 737-700 with CFM56-7B engines were added to the INM database. The aircraft identifier is 737700 and the noise identifier is CF567B. The procedural approach profile is a standard 3-degree descent. There are two sets of procedural departure profiles: ICAO_B has stage lengths 1 through 5, and STANDARD has stage lengths 1 through 5. The STANDARD departure profiles are identical to the ICAO_B profiles.

8.  Data for the Cessna 550 Citation Bravo with PW530A engines were added to the INM database. The aircraft identifier is CNA55B and the noise identifier is PW530A. Standard procedural profiles for one approach and one departure are included. There are two additional procedural departure profiles: FLAPS_0 is a departure with aircraft flaps set at zero, and FLAPS_15 is a departure with aircraft flaps set at 15. The STANDARD departure is equivalent to the FLAPS_15 profile.

9.  Data for the Cessna 172R with a Lycoming IO-360-L2A engine were added to the INM database. The aircraft identifier is CNA172 and the noise identifier is IO360L. Standard procedural profiles for one approach, one departure, one touch and go, and one circuit profile are in the database.

10. The CNA172 aircraft identifier was removed from the substitution database. Previously, the GASEPF was substituted for the CNA172. INM studies should now use the new CNA172 data.

11. The new INM aircraft CNA172 is now substituted for the CNA150, CNA152, CNA170, and CNA177 aircraft. Previously, the GASEPF was used for these aircraft.

12. Data for the Cessna 206H with a Lycoming IO-540-AC engine were added to the INM database. The aircraft identifier is CNA206 and the noise identifier is IO540. Fixed-point profiles for one approach, four departures (3000LB, 3300LB, 3600LB, and STANDARD), one touch and go, and one circuit profile are included. The STANDARD departure profile is equivalent to the 3600LB profile. The "Thrust Setting" for the Noise-Power-Distance curves and the approach and departure profiles is RPM. INM groups all power settings other than corrected net thrust and percent net thrust into an "other" category. The approach, touch and go, and circuit profiles use 3-degree descents.

13. The new INM aircraft CNA206 is now substituted for the CNA180, CNA182, CNA185, CNA205, and CNA210 aircraft. Previously, the GASEPV was used for these aircraft.

14. Data for the Cessna T206H with a Lycoming TIO-540-AJ1A engine were added to the INM database. The aircraft identifier is CNA20T and the noise identifier is TIO540. Fixed-point profiles for one approach, four departure (3000LB, 3300LB, 3600LB, and STANDARD), one touch and go, and one circuit profile are included. The STANDARD departure profile is equivalent to the 3600LB profile. The "Thrust Setting" for the Noise-Power-Distance curves and the approach and departure profiles is RPM. INM groups all power settings other than corrected net thrust and percent net thrust into an "other" category. The approach, touch and go, and circuit profiles use 3-degree descents.

15. The new INM aircraft CNA20T is now substituted for the CNA207. Previously, the GASEPV was used for the CNA207.

16. The INM aircraft F10062 is now substituted for the 717 and 717ER aircraft. Previously, the DC93LW was used for the 717, and the DC95HW was used for the 717ER.

17. As in previous versions of INM, user-defined aircraft data have priority over INM standard data. For example, if a user had created a Version 6.0a 737700 aircraft record and associated performance and profile records, these data (not the new INM 737700 data) will be used when INM Version 6.0b is run. The Version 6.0b Case Echo Report will show the user-defined 737700 data. To make clear that the user-defined aircraft is not the new INM 737700, change the name of the user-defined aircraft. There is no easy way within INM to change from user-defined 737700 data to new INM 737700 data. This is because INM will not allow an aircraft to be deleted if it is associated with flight operations, without first deleting the flight operations. A non-INM solution is to use a spreadsheet program to delete 737700-related records from study directory files (*aircraft.dbf, profile.dbf, procedur.dbf, flaps.dbf, thr_jet.dbf*). Then, INM Version 6.0b will read new INM 737700 data, instead of user-defined data. The names of the profiles used in the user-defined 737700 flight operations records must be the same as the names for the new INM standard 737700 profiles.

## Program Modifications

1. INM 6.0b automatically switches to the new A330 and CNA172 data. A330 and CNA172 aircraft identifiers were previously used as substitution names. The Version 6.0b *acft_sub.dbf* file no longer contains these two names because they are now in the INM aircraft database. When a Version 6.0 or 6.0a study is opened, an information message box informs the user that the new aircraft data are being used.

2. The ground-based directivity adjustment (see Section 3.7 in the INM 5.1 Technical Manual) was removed from approach noise calculations. This modification was part of the INM 6.0a release.

3. A minor modification was made to the noise-exposure fraction algorithm ground-based directivity adjustment. The change is limited to the noise on landing roll for exposure metrics such as SEL and produces a rounded, uniform directivity at the end of the final segment of the landing roll.

4. The NPD upper extrapolation limit of 5-dB above the highest curve has been removed. This modification affects values near the start of takeoff roll. The NPD lower extrapolation limit of 5-dB below the lowest NPD curve is still in effect.

5. The calculation of procedural approach profiles was modified so that the reverse thrust point is now associated with higher thrust departure NPD curves instead of approach NPD curves. This is consistent with previous versions of INM which did not separate approach and departure NPD curves for extrapolation.

6. Climbing and accelerating flight segments use departure NPD curves. Level, descending, and decelerating segments use approach NPD curves (except for reverse thrust). Previously, level flight used departure NPD curves.

7. The Input Graphics Pick-Track list box was modified so that the list contains names of tracks that are near the picked point and visible in the window. Picked tracks that are not visible are indicated in the list with "--". Previously, all tracks near a picked point were listed by name, regardless of their enabled state.

8. The Output Graphics Contour Display function was changed so that 50 noise contours can be displayed. Previously, only 14 contours could be displayed. INM automatically updates the *.opt* (display options) files to the new format.

9. The Input and Output Graphics CAD Display Control was modified so that *.cad* files can now be displayed from any directory, not just the study directory.

10. The File // Export As DXF function was modified to export tracks into DXF layers based on track type (e.g., vectors), operation type (e.g., approach), and runway end. Previously, all displayed tracks of a given track type and operation type were put into one DXF layer. Now, each runway end is a separate layer. For example, "P-subtracks departing 28R" is a DXF layer.

11. The File // Export As DXF function was modified so that grid identifiers for population and location grid types are not written to the *DXF* file. The identifiers "POPULATN" and LOCATION" were previously placed at X=0 Y=0.

12. The File // Export As DXF function was modified so that population point labels (number of people) are not written to the *DXF* file.

## Reported Problems Fixed

1. A problem with INM 6.0a A340 and EMB120 aircraft has been fixed. In INM 6.0a, these two aircraft were removed from the substitution database, and new data were added to the aircraft database. If a version 6.0 user-defined aircraft had the same identifier (e.g., a user-defined EMB120), INM 6.0a incorrectly reported errors when loading aircraft data. In INM 6.0b, user-defined A330, A340, CNA172, or EMB120 data are used if defined in the study directory, and INM standard data are used otherwise.

2. A problem with changing a user-defined aircraft identifier has been fixed. Previously, INM correctly changed the aircraft identifier in all files related to *aircraft.dbf*, except for *flaps.dbf* (INM changed flaps too, if the Acft // Flaps Coeffs window had been activated). Now, all aircraft child records are renamed.

3. A problem reading international *3CD* files was fixed. Previously, files with names constructed from single-digit latitude or longitude could not be opened, and an error message was written to the *terrain_err.txt* file in the terrain directory. Also, the terrain error message has been modified to report the international formatted file name (e.g., *N44E009.3CD*) instead of the Micropath file name. The international file name specifies the latitude and longitude of the southwest corner of the 1-by-1-degree area of terrain elevations.

4. The File // Import Data Into Study // Radar Tracks CSV File function was fixed. Previously, this INM function would occasionally shutdown with an error message while processing a <u>valid</u> radar text file.

5. A problem with switching from one study to another study while processing radar text files was fixed. Previously, INM had to be closed and reopened before it would correctly use the latitude and longitude of the new study. The affected function is: File // Import Data Into Study // Radar Tracks CSV File; tab "Track Data"; check box "Tracks points are in X,Y"; check box "X,Ys are relative to study origin".

6. A problem with departure subtrack dispersion used in conjunction with the Edit // Create Track by Radar function was fixed. Previously, the second track point was incorrectly dispersed after selecting multiple subtracks and pressing OK in the Add Radar Track dialog box. Only after accessing the Edit // Disperse Track dialog box was the second point correctly assigned a zero half-width, thus limiting departure subtracks to the runway. Now, the Disperse Track dialog box is automatically called after closing the Add Radar Track dialog box, and departure subtracks are correctly dispersed.

7. An incorrect track selection action using the Input Graphics Pick-Track box was fixed. Previously, selecting a track from the list did not necessarily highlight the selected track. The problem occurred infrequently.

8. A problem involving maximum-level metrics in detailed-grid output was fixed. Previously, two identical *grid_dtl.dbf* records were occasionally produced, each one representing the maximum of all noise levels, instead of one record per flight path. This problem occurred when the Run // Run Options, Do Detailed Grids, Save 100% Flights box was checked.

9.  A DXF-layer problem with points-type tracks and subtracks was fixed.  Previously, the P-tracks DXF layer contained both P-tracks and P-subtracks, and the P-subtracks DXF layer contained both P-subtracks and P-tracks, making it impossible to turn on/off the two different layers in AutoCAD.

10. A Windows 2000 color-palette problem has been fixed.  Previously, the Color and Pattern Selector window, available through many different INM functions, did not display the array of color boxes.  This was a problem only in Windows 2000.

11. For dispersion of points-type tracks,  the subtrack percentages assignment logic was fixed.  Previously, subtracks on the right side of the center track were sometimes assigned the percent values on the left side, and vice versa.  For default symmetrical subtrack percentages, the switch made no difference in the noise calculation.

12. The headwind adjustment for calculated approach thrust was fixed.  Previously, approach thrust decreased when runway headwind was greater than 8 knots (the default).  Now, approach thrust increases in a strong headwind.

13. Micropath files for Alaska contain a special format that is half the size of the files distributed for the rest of the United States.  To assist INM users performing Alaskan studies, this release includes a program *Alaska3cd.exe,* which will convert an Alaska 3CD file into the normal full-size 3CD file.  Run the program in a DOS window (e.g., `C:\inm60b> alaska3cd \mystudy\65148.3CD`). The program will write a full-size 3CD file using the international file name (e.g., `\mystudy\N65W149.3CD`).