

INM News

The Integrated Noise Model

A publication of HARRIS MILLER MILLER & HANSON INC. for users of the Integrated Noise Model.
May 2000

FAA Releases INM Version 6.0a

The FAA plans to release INM version 6.0a on 18 May 2000. The upgrade is available on the FAA web site at: www.aee.hq.faa.gov. It is a free upgrade for users of INM 6.0.

The new version will contain:

- Noise and performance data for the Airbus 340 (INM Code A340), with different procedures provided for both ICAO A and B takeoffs (the INM “standard” will be the ICAO B).
- New aircraft type for the Embraer 120 (EMB120) and EMB145LR.
- Bug fixes resolved from INM 6.0 release, including modifications to tone-corrected metrics.

In addition, the utility for converting INM version 4.11 files will now be available as a separate utility (conv411.exe), also available on the FAA web site.

INM Design Review Group Meeting

The INM Design Review Group met in Washington, DC on 4-5 April 2000. Among the topics discussed were:

- Data base expansion. Plans for new aircraft include: 737-600, -700, -800; A320; A330; and Cessna 172, 206, 206T;
- New sound propagation algorithms to: (a) modify the existing lateral attenuation algorithm, and (b) account for atmospheric absorption. These new algorithms require the use of spectral classes in the INM (see discussion below);
- Comparison of v. 5.2a and v. 6.0 contours;
- Low frequency noise issues;
- Hill effects; and
- User feedback.

Spectral Classes in the INM

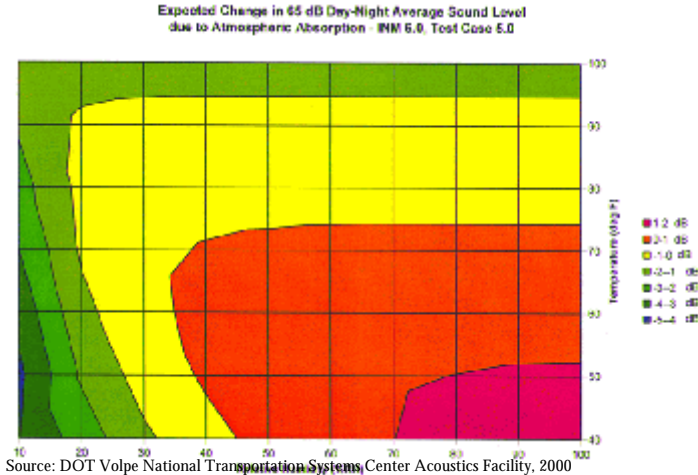
Version 6.0 introduced the concept of “spectral classes” to the INM – aircraft with similar frequency spectra are now grouped together for the purposes of implementing some algorithms which require frequency information. For example, 737300 (B737-300 with CFM56-3B-1 engines) is in spectral classes 102 “Two engine high bypass ratio turbofan aircraft”; other aircraft included in this spectral class are: 7373B2, 737400, and 737500.

One of the uses of spectral classes is for computation of atmospheric absorption. The INM uses algorithms described in SAE AIR 866A (the same standard used for aircraft noise certification) to compute the effect of temperature and relative humidity on propagation of sound through the air. To implement the option, you must select **Modify NPD Curves** in the **Setup/Cases** window, and supply appropriate temperature and humidity data.

Depending on the user-supplied weather conditions, the resulting contours can be either larger or smaller than contours run without the Modify NPD Curve option. Tests conducted by the DOT’s Volpe Center indicate that for many weather conditions in the US, the resulting DNL 65 dB contours will be as much as 1 dB greater, while areas that are very hot and very dry (e.g., Las Vegas) will have resulting contours that are 1-2 dB smaller at the ends of the 65 dB DNL contour. Analysis by FAA indicates that the new algorithm provides better agreement with measured data, and more consistent results with other noise models. ***Although the FAA does not require that you use this feature, HMMH recommends it.***

Spectral Classes (continued)

The figure below shows the range of expected change in DNL contours using the atmospheric absorption feature, for a variety of temperature and relative humidity conditions.



Spectral classes also will be used to implement a new lateral attenuation algorithm in a future release of INM. The new algorithm is currently being reviewed by the SAE A-21 Committee. The algorithm is expected to result in bigger contours, especially near takeoff roll, reverse thrust, and other ground noise sources.

For more information on spectral classes and lateral attenuation, please see:

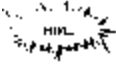
John A. Volpe National Transportation Systems Center Acoustics Facility, *Spectral Classes for FAA's Integrated Noise Model*, DTS-34-FA065-LR1, December, 1999.

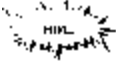
Gregg G. Fleming, Joseph Burstein, Amanda Rapoza, David Senzig, and John Guldin, "Ground effects in FAA's integrated noise model", *Noise Control Eng. J.*, 48 (1), 2000 Jan - Feb.

INM Training Course Schedule

HMMH's next INM training course will be offered on **September 13-15, 2000**, at our Burlington, Massachusetts office. For more information, please see our web site: www.hmmh.com/inm.html. We also are offering a two-day Airport Noise Officer Training Course on September 11-12, 2000.

INM Hints

 To cut/copy/paste, highlight the field of interest (with the cursor or by double-clicking), and then right-click on your mouse button. This is especially useful when using the **View/Lat-Long Calculator**. **Ctrl-Insert** and **Ctrl-Delete** will also work to copy and paste.

 If you do not have access to radar data directly, use a commercial graphics package to convert Bitmap flight track graphics to dxf format. You can then use the dxf file as a CAD basemap, and create points-type flight tracks (**Tracks/Input Graphics**) using the CAD layer as a guide (INM will not, however, use the data for calculations).

Useful web sites for the INM:

Organization	Topic	Web site address
FAA Office of Environment and Energy	INM 6.0a release info conv411.exe	www.aee.hq.faa.gov
Wasmer Consulting	NMPlot	www.wasmerconsulting.com
NOAA	weather data	
AirNav	Airport data	www.airnav.com
HMMH	Training courses INM Newsletters Consulting	www.hmmh.com

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