

Integrated Noise Model (INM)

What is the INM?

The INM is a computer model that evaluates aircraft noise impacts in the vicinity of airports.

What are the uses of INM?

In the United States, the model is typically used for FAR Part 150 noise compatibility planning and for FAA Order 1050 environmental assessments and environmental impact statements. The INM has many analytical uses, such as:

- Assessing current aircraft noise impacts around a given airport or heliport
- Assessing changes in noise impact resulting from new or extended runways or runway configurations
- Assessing changes in noise impact resulting from new traffic demand and fleet mix
- Evaluating noise impacts from new operational procedures
- Evaluating noise impacts from aircraft operations in and around National Parks

Who is the developer of the INM?

The INM model is developed and maintained by:

- FAA Office of Environment and Energy (AEE-100) — project management
- ATAC Corporation — system integration, user interface, and flight model
- Volpe National Transportation Systems Center (VNTSC) — noise model

Who has access to the INM?

The INM is available to the general public, and currently has over 1,000 users in 64 countries.

What are the plans for INM in the future?

Version 7.0 is expected to be the last major release of INM. INM version 7.0 was released in April 2007. After this, INM will have further integration with other tools in AEDT and is expected to be released as AEDT 1.0.

What is the appropriate substitution aircraft for an [insert aircraft type] aircraft in INM?

The only pre-approved substitution aircraft for use within INM studies can be found under Setup // Substitutions within the INM interface. Beyond those substitution aircraft included within INM, FAA leaves it up to the INM user performing a noise study to choose the most appropriate substitution for a given aircraft. Only the analyst performing the INM study has the detailed knowledge of the purpose for and intended use of the study's results, specifics about fleet mix and operational details at the airport being modeled, and so on, required to make the best substitution choice within a given situation. When non-standard aircraft substitutions in INM are utilized for FAA-funded projects, they must be approved by the FAA Office of Environment and Energy (AEE).

Can the INM be used to model small airports or airplanes?

Yes, although the INM's database does not include the same level of coverage for smaller aircraft as it does for the larger commercial aircraft fleet. There are no limits within the INM in terms of airport layout/size, number of operations, or fleet mix.

Are there training courses provided for the INM?

The FAA does not require that a user go through formal training in order to conduct INM studies, and does not provide training on the use of the INM, as the supplied

documentation is often sufficient for most modeling purposes. There are commercial training courses for the INM available which can readily be found via the Internet.

Can the INM model helicopters?

INM version 7.0 contains extensive helicopter modeling capabilities, based on FAA's Heliport Noise Model (HNM) Version 2.2. This includes helicopter-specific noise data and directivity implementation, and expanded helicopter operational modeling functionality (including helicopter-specific operational modes such as hover or idle). Nineteen different helicopters are represented in the INM version 7.0 database.

In addition, INM versions 6.0c through 6.2a had limited ability to model the noise produced by helicopter operations, as civil aircraft operations. This ability does not include the modeling of helicopter-specific directivity or operational modes such as hover or idle.

Is the current version of the INM compliant with ECAC Doc. 29?

INM version 7.0 is compatible with the methodologies contained in ECAC/CEAC Doc. 29R (2006). Previous versions of INM complied with the methodologies contained in ECAC/CEAC Doc. 29, 2nd Edition (1997).

Is there a student/educational version of the INM or a discount available?

There is only one publicly available version of the INM, charged at a minimal fee (i.e. US\$300 for INM7.0). The fee is to cover the cost associated with the distribution of the software and technical support, and there are no further discounts available.

Can you create new aircraft, flight profiles, and/or noise data within the INM?

The INM allows for the creation of user-defined data to represent most aspects of an INM study including basic aircraft data, flight profile definitions, and aircraft source noise data. The INM User's Guide and Technical Manual fully describe these types of data, as well as requirements for the use of user-defined aircraft data within federally sponsored noise analyses.

Is there a callable version of the INM that can be incorporated within other software?

There is no publicly available callable version of the INM.

Why are the noise contours generated by my INM study oddly shaped or asymmetrical?

The shape of INM noise contours depends on numerous factors; such as study geometry, terrain, flight operations (including bank angle), and source directivity (for helicopters). Any one of these factors (or combination thereof) can result in asymmetrical noise contours.

Furthermore, the shape of INM noise contours can be influenced by the resolution of the underlying contour grid, specifically a large spacing between contour grid points can result in abnormally shaped/asymmetrical contours. It is especially important to ensure adequate contour grid resolution when dealing with small noise contours. Information on changing the resolution of contour grids within the INM can be found on page 236 of the INM 7.0 User's Guide.

What coordinate system/map projection method does the INM use?

The INM uses a conic projection using the WGS-84 spheroid and is described in Appendix L of the INM 7.0 User's Guide. The standard airport, runway, navaid, and fix location data included with the INM use the NAD83 datum.

The FAA's Integrated Noise Model (INM) produces DNL noise contours. INM is a computer model used to develop aircraft noise exposure maps. INM is the industry standard for calculating the level of aircraft noise at and around airports. INM uses a database of aircraft noise characteristics to predict DNL based on user input on the types and number of aircraft operations, annual average airport operating conditions, average aircraft performance, and aircraft flight patterns.