

## PREFACE

The FAA Office of Environment and Energy supports the assessment of aircraft noise impacts by developing and maintaining noise-evaluation models and methodologies. In particular, the FAA's Integrated Noise Model (INM) is widely used by the civilian aviation community for evaluating aircraft noise impacts in the vicinity of airports. Since 1978, the FAA has made the INM available to hundreds of U.S. and international users. Domestic use of the model includes FAR Part 150 noise compatibility planning and FAA Order 1050 environmental assessments and impact statements.

INM was originally designed for a batch-process mainframe-computer environment and evolved in the mid-1980s to the PC microcomputer environment.

In Version 5, INM takes advantage of recent advances in computer hardware and software technology. Major enhancements include a new graphics user interface, enhanced data preparation and data input aids, new graphics and plotting capabilities, and improved and faster noise calculation algorithms. INM Version 5.1 runs on PCs using the Windows 95™ or Windows NT™ operating systems.

The INM Development Team members and their main areas of responsibility are:

- FAA Office of Environment and Energy (AEE-120) — project management
- ATAC Corporation — system integration, user interface, and flight model
- Volpe National Transportation Systems Center (VNTSC) — noise model
- LeTech Incorporated — interactive graphics and source data processing.

As part of the planning for Version 5, the FAA formed a noise modeling Design Review Group (DRG). The DRG is a technical advisory group of government and private sector experts in the fields of aviation, acoustics, and computer modeling who are guiding AEE-120 in INM and other noise model development. The DRG reviews functional designs and recommends how to effectively implement designs to meet FAA and industry user requirements.

The DRG consists of INM Development Team Members (AEE-120, ATAC, VNTSC, LeTech), representatives from various FAA offices, other Federal agencies, airport authorities, industry, and international organizations. The DRG members are listed below:

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(AEE-120)

Office of Environment and Energy, Technology Division (AEE-100)

Office of Systems Capacity & Requirements, Airspace Capacity Planning  
(ASC-200)

Office of Airspace Management, Environmental Program (ATA-300)  
Office of System Architecture & Program Evaluation, Program Analysis &  
Operations Research, Technology (ASD-430)  
Office of Airport Planning/Programming, Community/Environmental Needs  
(APP-600)

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Metropolitan Washington Airports Authority, Alexandria, VA  
NASA Langley Research Center, Acoustics Division, Hampton, VA  
U.S. Army Construction Engineering Research Lab, Champaign, IL  
Volpe National Transportation Systems Center, Cambridge, MA

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ATAC Corporation, Sunnyvale, CA  
Bolt Beranek & Newman Inc., Systems & Technologies, Canoga Park, CA  
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Greiner Engineering Sciences Inc., Timonium, MD  
Harris Miller Miller & Hanson Inc., Burlington, MA  
Howard Needles Tammen & Bergendoff Inc., Alexandria, VA  
Landrum & Brown Inc., Lawrence, KS  
Leigh Fisher Associates Inc., San Mateo, CA  
LeTech Inc., Alexandria, VA  
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DELTA Acoustics & Vibration, Lyngby, DENMARK  
SINTEF DELAB, Trondheim, NORWAY

## **DISCLAIMER**

The contents of this report reflect the views of the ATAC Corporation, which is responsible for the facts and accuracy of the material presented herein. The contents do not necessarily reflect the official views or policy of the U.S. Department of Transportation. This User's Guide does not constitute a standard, specification, or regulation. The design, production, and distribution of this manual has been paid for entirely from user fees.

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INM ORDER FORM



## GLOSSARY

AEE	FAA Office of Environment and Energy
AEM	Area Equivalent Model
AFE	Above Field Elevation (altitude)
AGL	Above Ground Level (altitude)
APP	Approach operation
ARTS	Automated Radar Terminal System
ATRS	Automated Thrust Restoration System (on aircraft)
C	degrees Celsius (temperature)
CAD	Computer Aided Design (application program)
CAS	Calibrated Airspeed (corrected indicated airspeed)
CD-ROM	Compact Disk Read Only Memory (laser-encoded disk)
CIR	Circuit flight operation
CPA	Closest Point of Approach
dB	decibel, a unit of noise level or noise exposure level
DBF	dBase-IV database file format
DBMS	Database Management System (application program)
deg	degrees (angle)
DEP	Departure operation
DLL	Dynamic Link Library (supporting software)
DNL	Day Night Average Sound Level (noise metric)
DOS	Disk Operating System (PC operating system)
DOT	U.S. Department of Transportation
DXF	Drawing Exchange Format (CAD graphics data in a text format)
EIS	Environmental Impact Study
EPNL	Effective Perceived Tone-Corrected Noise Level (noise metric)
epr	engine pressure ratio (thrust-setting parameter)
F	degrees Fahrenheit (temperature)
FAA	Federal Aviation Administration (U.S. DOT)
FAR	Federal Aviation Regulations
ft	foot, feet
GUI	Graphical User Interface
h	hours
HNM	Helicopter Noise Model
hp	horsepower
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
in-Hg	inches of mercury (barometric pressure)
INM	Integrated Noise Model
kg	kilograms weight
km	kilometers
knt	knots (international nautical miles per hour)
LAMAX	Maximum A-Level (noise metric)

lb	pounds force or weight
L <sub>AE</sub>	Symbol for SEL — A-weighted sound exposure level (dB)
L <sub>EPN</sub>	Symbol for EPNL — perceived sound exposure level (dB)
m	meters
mi	U.S. statute miles
min	minutes
mm-Hg	millimeters of mercury (barometric pressure)
μPa	micropascal (10 <sup>-6</sup> newton/meter <sup>2</sup> , unit of acoustic pressure)
MSL	Mean Sea Level (altitude above sea level)
NADP	Noise Abatement Departure Profile (AC-91-53A)
NFDC	FAA National Flight Data Center (database)
NMBG	Noise Model Binary Grid (file format for NMPLLOT Program)
nmi	international nautical mile (1852 meters)
NPD	Noise-power-distance
OAG	Official Airlines Guides (commercial flight schedule data)
OVF	Overflight operation
PC	Personal Computer (based on Intel processor architecture)
PNLTM	Maximum Perceived Tone-Corrected Noise Level (noise metric)
s	seconds
SAE	Society of Automotive Engineers
SEL	Sound Exposure Level (noise metric)
TA	Time-Above (noise metric)
TAS	True Airspeed
TCH	Threshold Crossing Height
TGO	Touch-and-go operation
USGS	U.S. Geological Survey
VFR	Visual Flight Rules
VNTSC	Volpe National Transportation Systems Center (U.S. DOT)
Vzf	Zero-flaps minimum safe maneuvering speed
WMF	Windows Metafile (a graphics format)