Federal Aviation Administration

The Aviation Environmental Design Tool (AEDT)

FAA Office of Environment and Energy

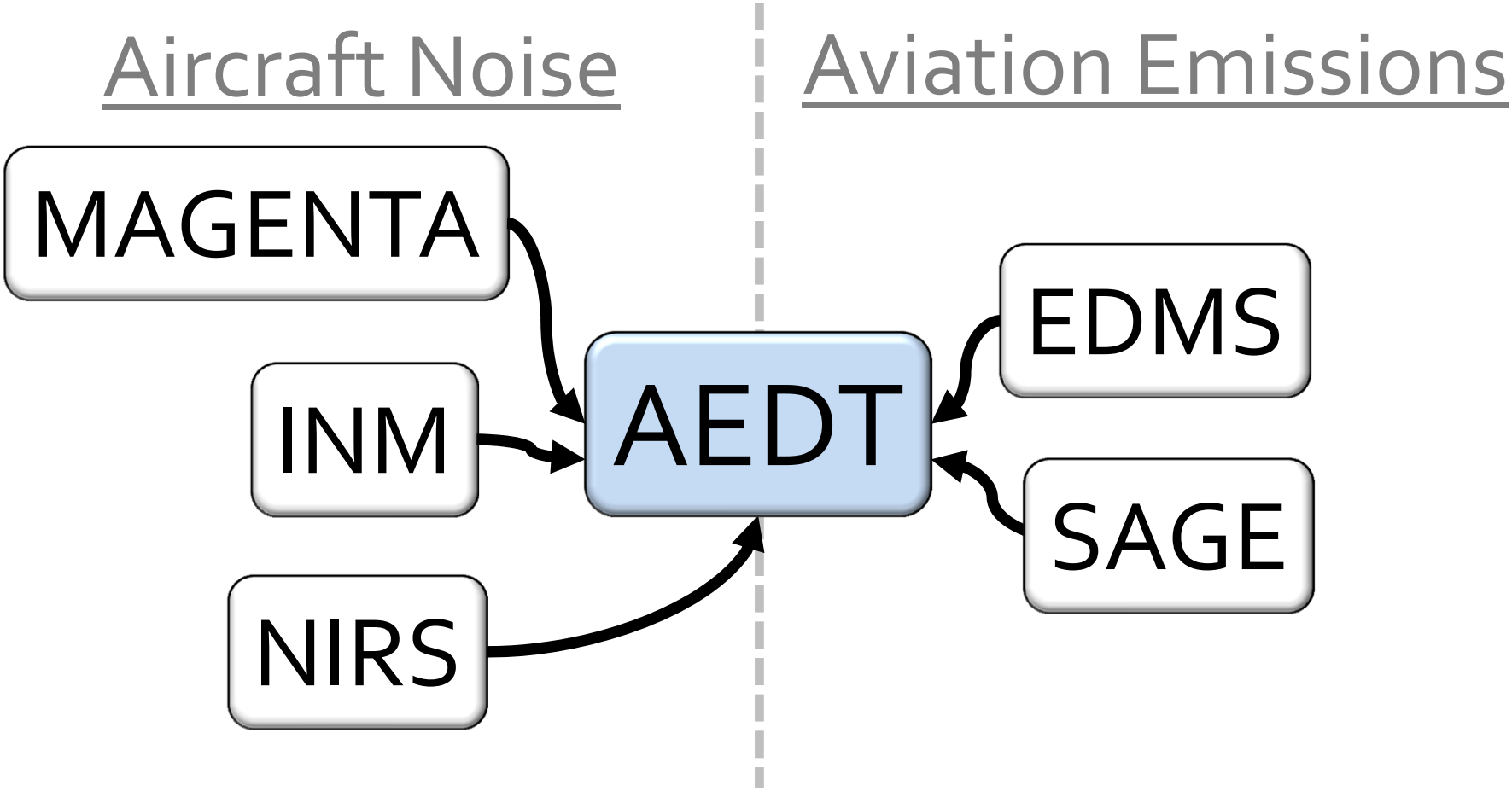
July, 2015

AEDT evaluates the environmental consequences of aviation activity.

The FAA has designed AEDT to simultaneously model:

Fuel consumption	Noise
Emissions	Air quality

AEDT replaces legacy tools

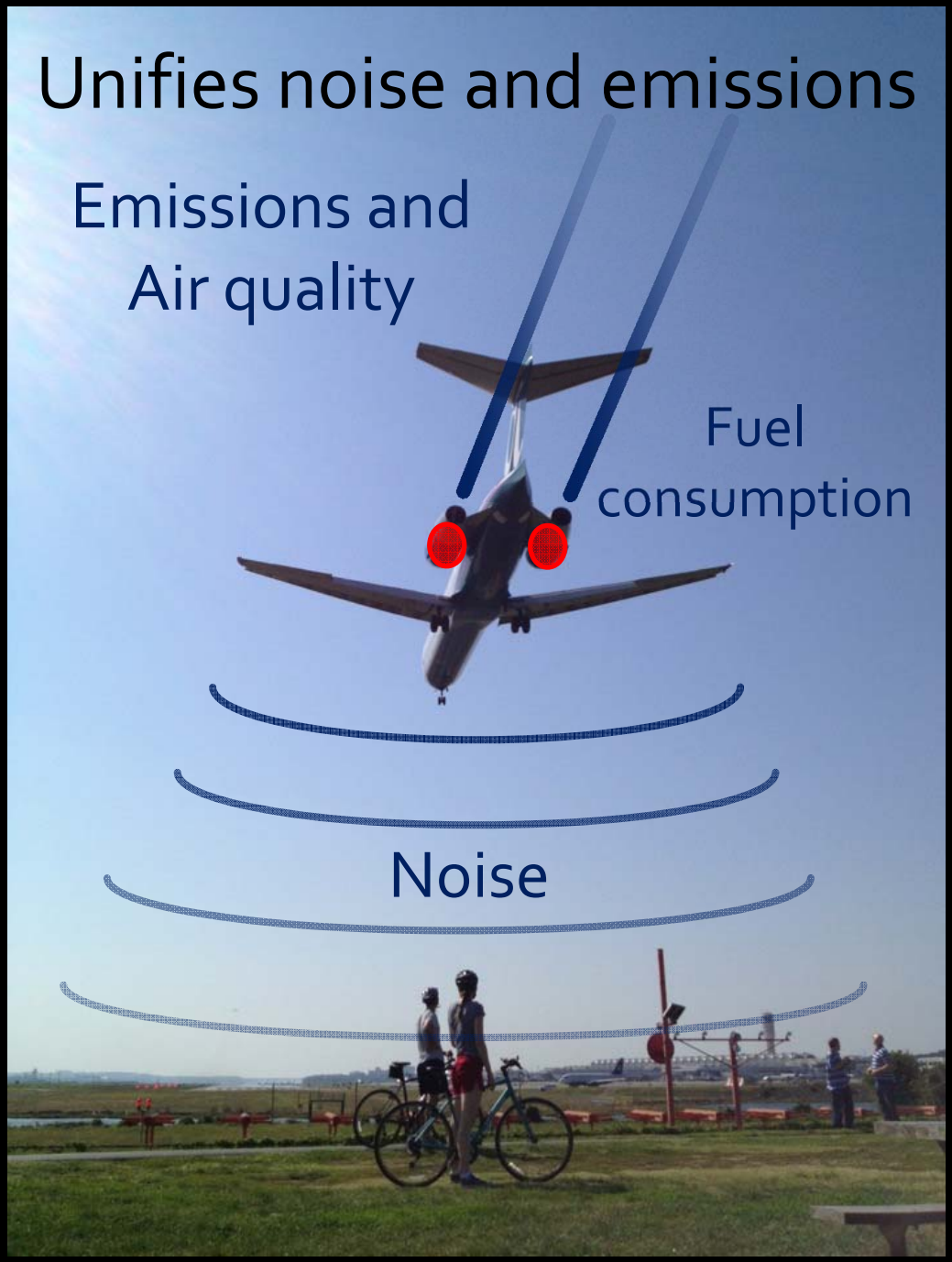


AEDT replaces legacy tools for environmental compliance, research, and policy analysis.

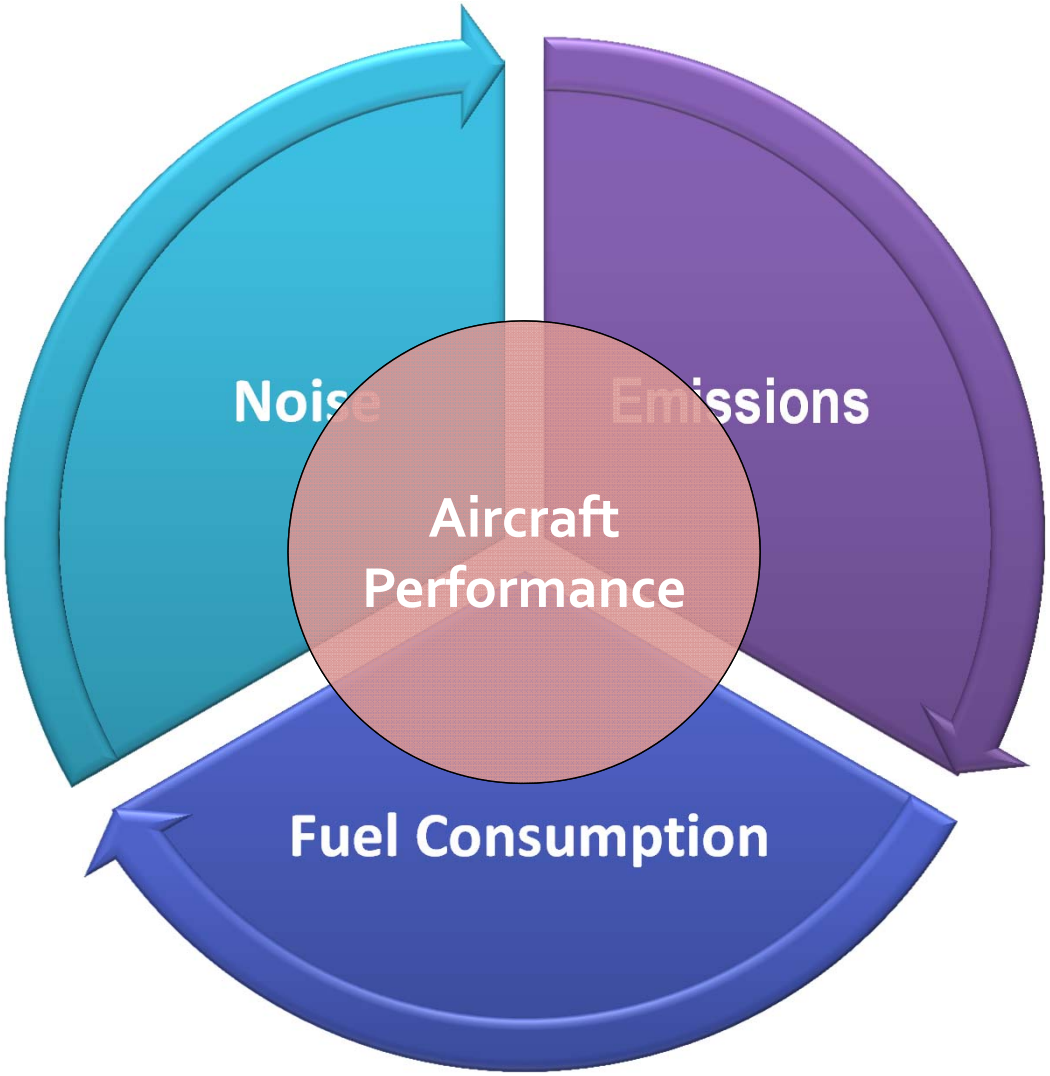
What makes AEDT better?

Unifies noise and emissions

Unifies noise and emissions



Interdependencies



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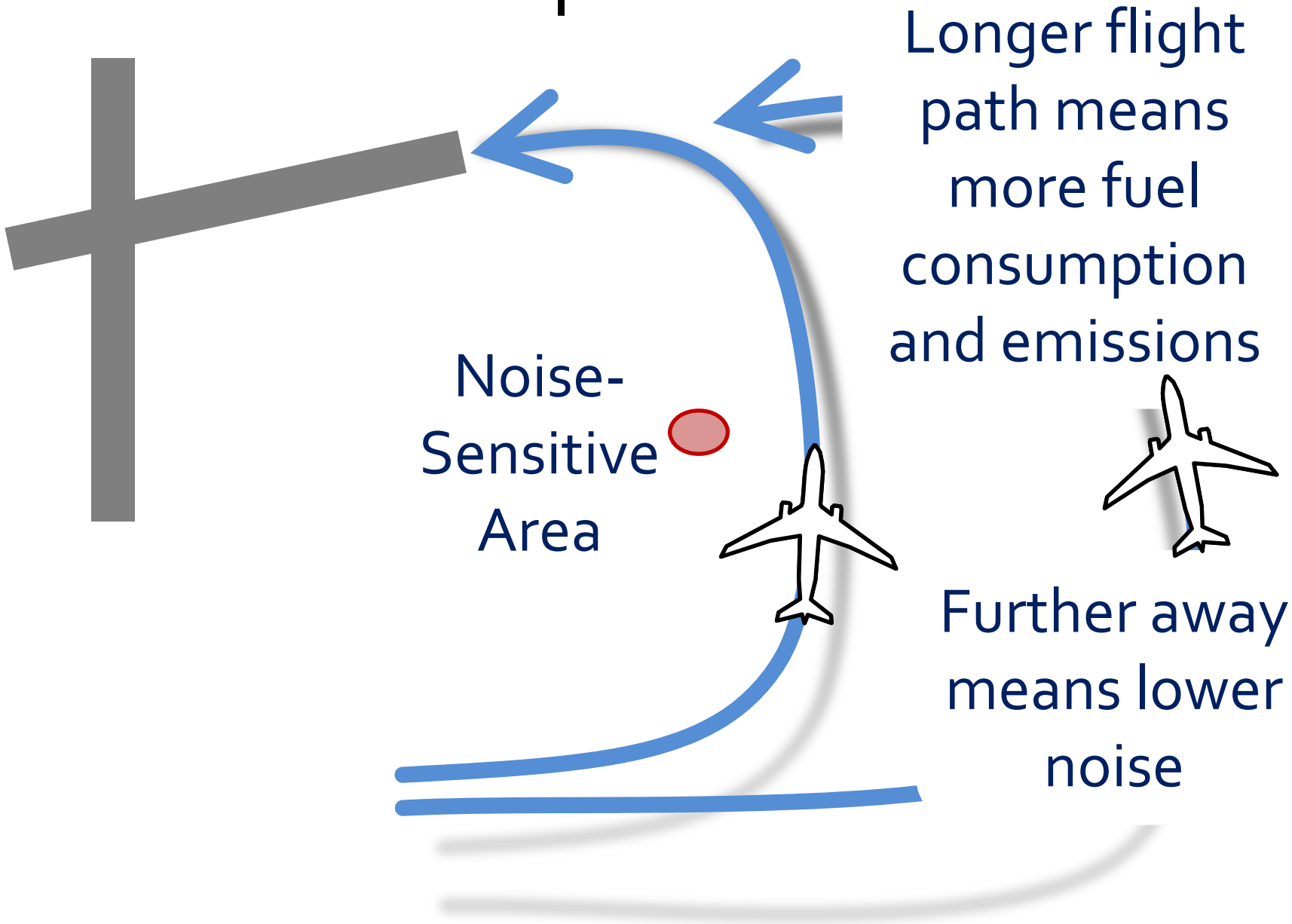
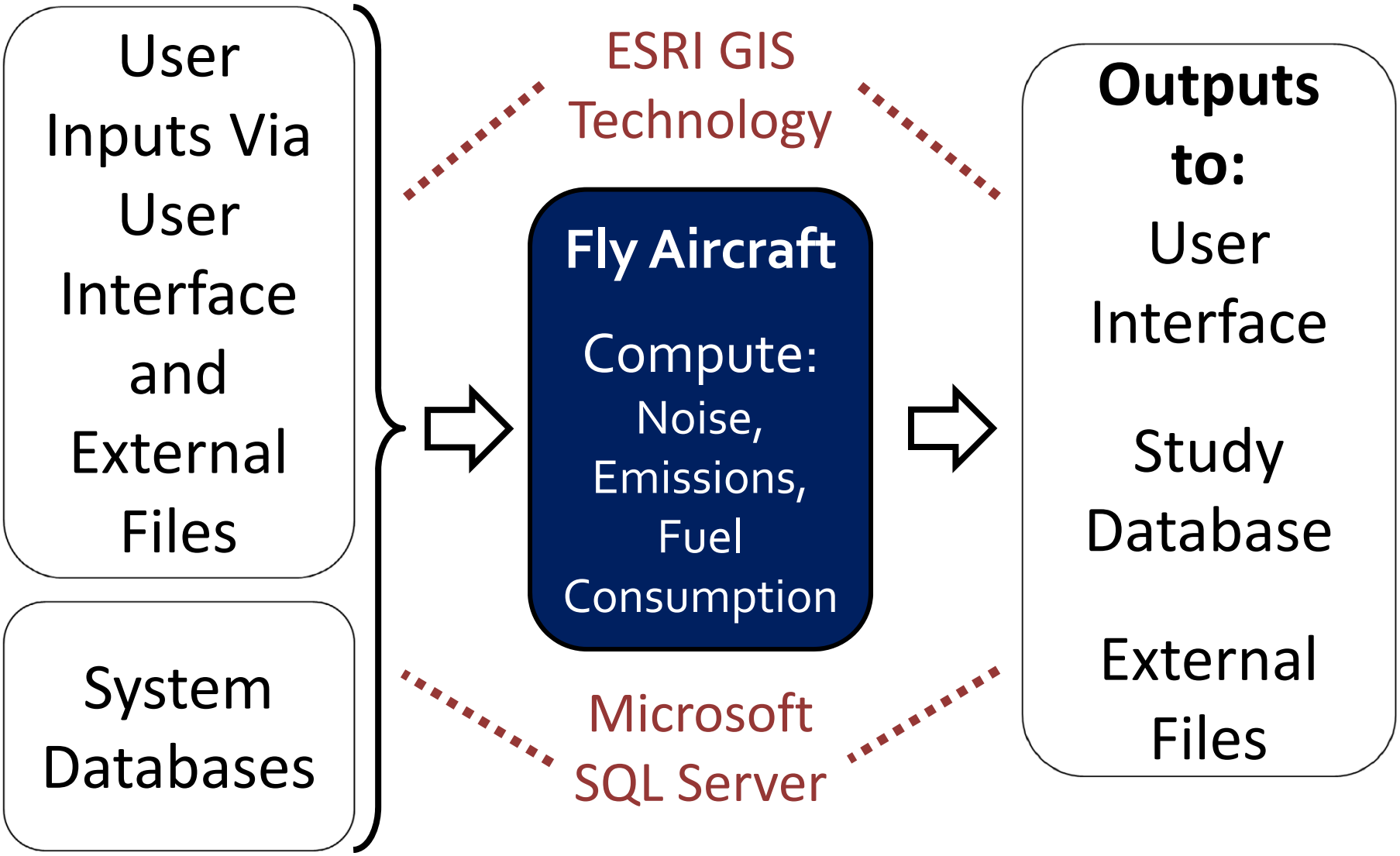
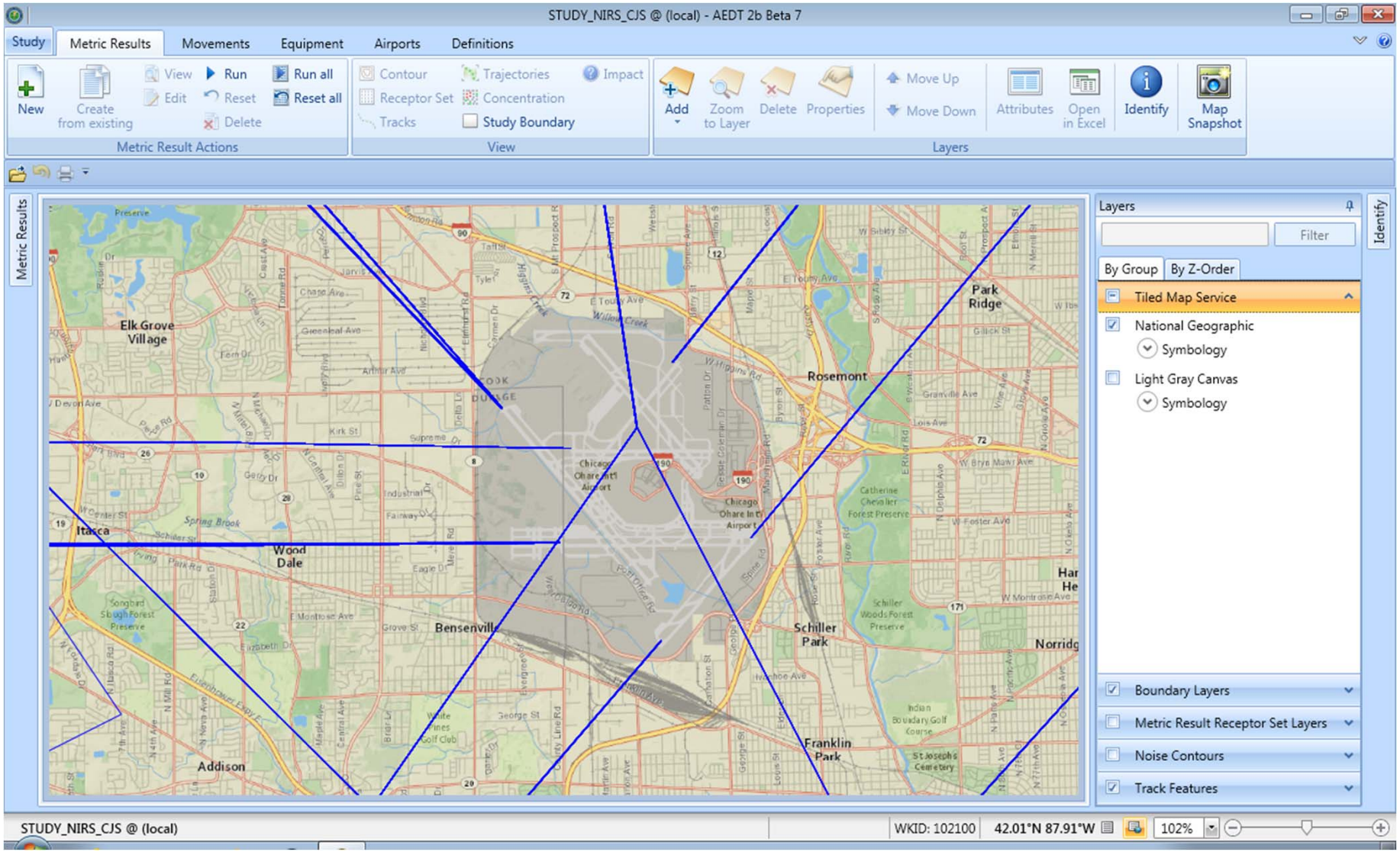


The FAA has been using versions of AEDT for domestic regulatory compliance and domestic & international policy-making, including a CO_2 emissions standard for aircraft.

AEDT System Overview



Built-in geographic information system (GIS)

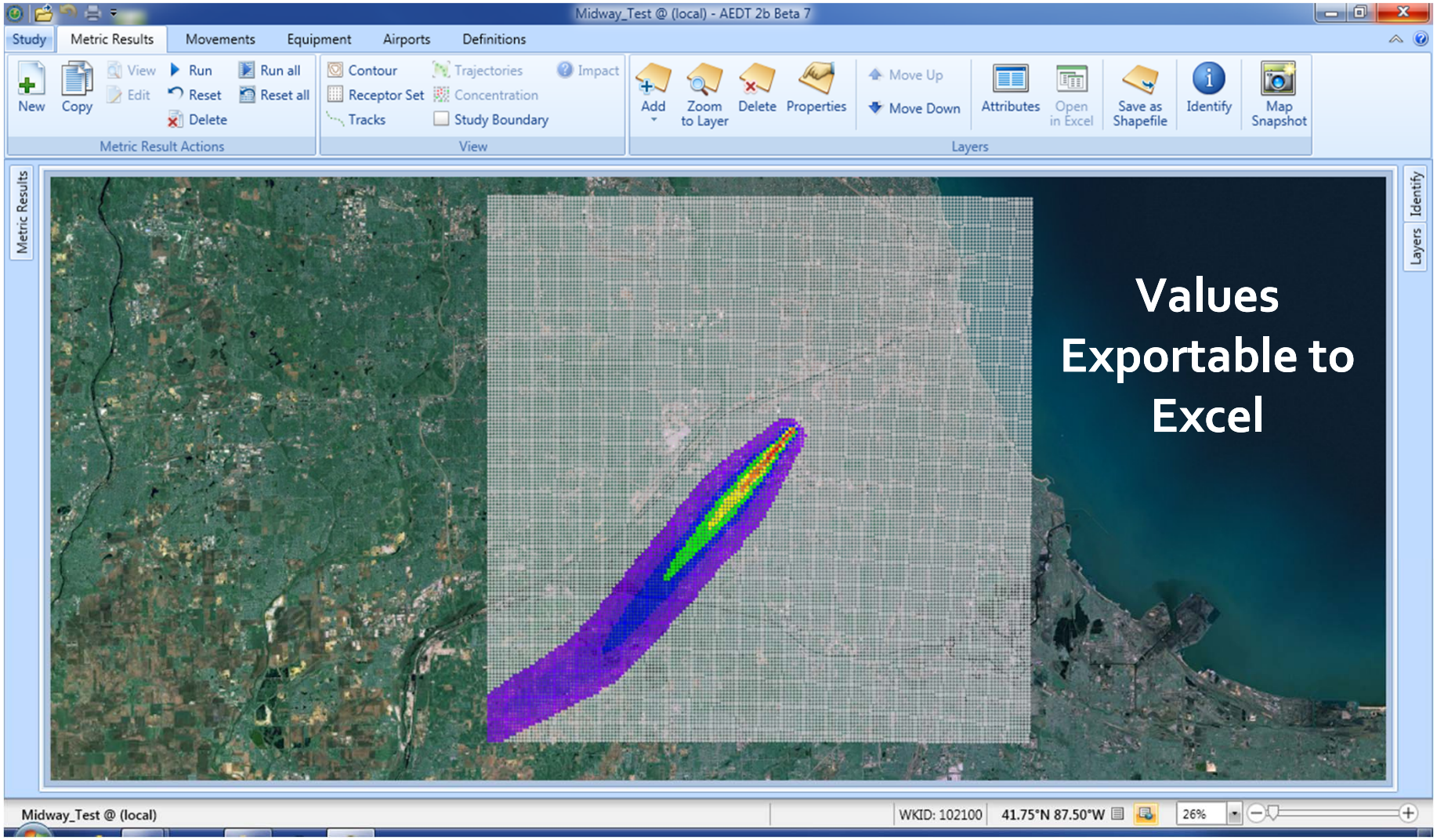


FICTIONAL FLIGHT TRACKS

Noise contours, like INM

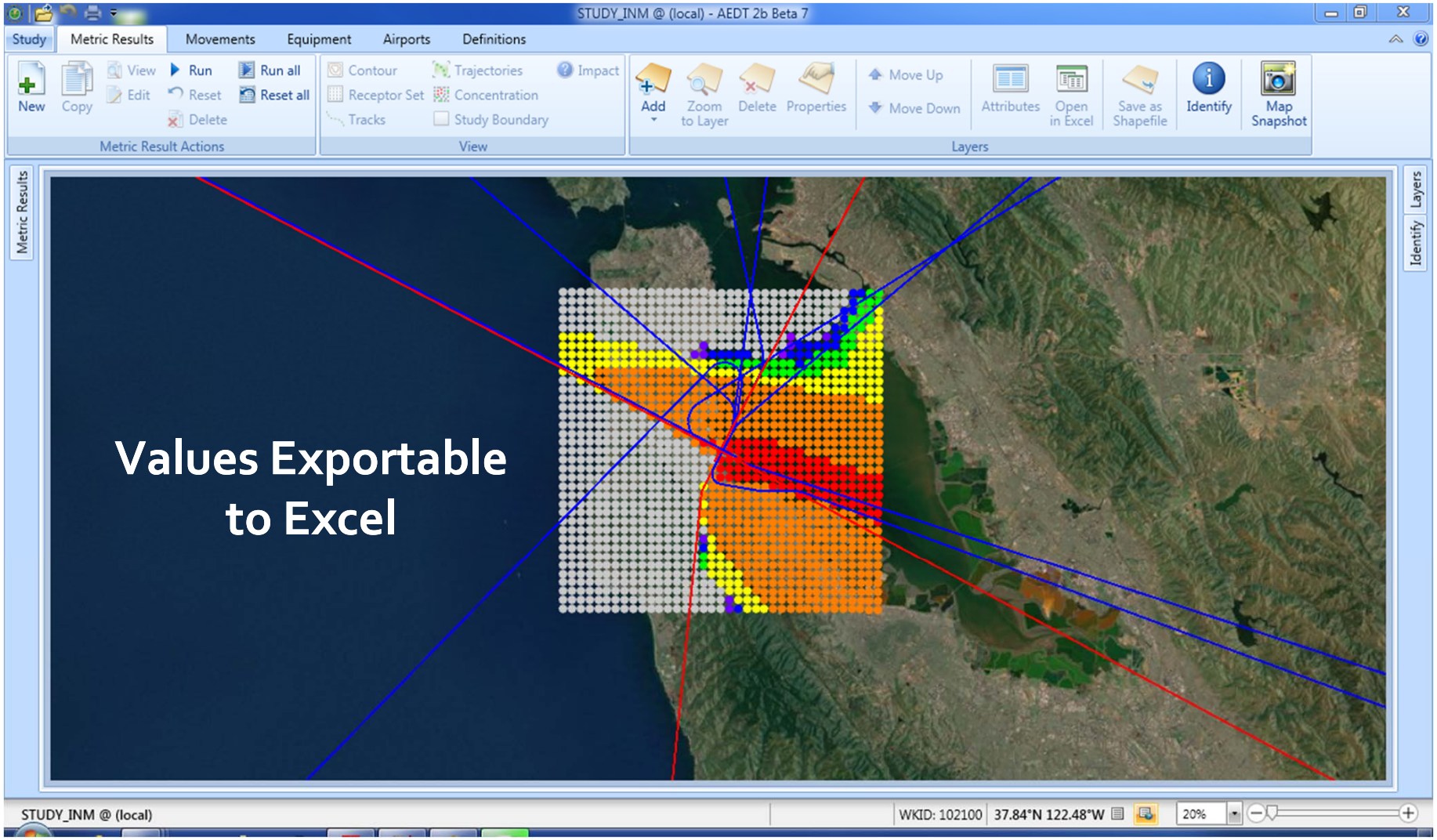
FICTIONAL RESULTS

Colored noise receptor grids



FICTIONAL RESULTS

Curved flight paths with emissions dispersion



FICTIONAL FLIGHT TRACKS AND RESULTS

Emission reports

Operation Group	Mode	Fuel(Ton)	Distance(mi)	Duration	CO(Ton)	HC(Ton
Arrival	ClimbTaxi	0.00000	0.00	00:00:00.00	0.00000	0.0
Arrival	ClimbGround	0.00000	0.00	00:00:00.00	0.00000	0.0
Arrival	ClimbBelow1000	0.00000	0.00	00:00:00.00	0.00000	0.0
Arrival	ClimbBelowMixingHeight	0.00000	0.00	00:00:00.00	0.00000	0.0
Arrival	ClimbBelow10000	0.00000	0.00	00:00:00.00	0.00000	0.0
Arrival	Above10000	4.67971	3202.21	00:01:43.14	0.11986	0.0
Arrival	DescendBelow10000	67.35661	9028.48	00:08:33.67	0.51909	0.0
Arrival	DescendBelowMixingHeight	46.89417	3431.66	00:04:30.49	0.19385	0.0
Arrival	DescendBelow1000	25.05669	1258.74	00:01:55.60	0.05949	0.0
Arrival	DescendGround	5.49122	173.10	00:00:25.20	0.01623	0.0
Arrival	DescendTaxi	0.00000	0.00	00:00:00.00	0.00000	0.0
Arrival	FullFlight	72.03633	12230.69	00:10:16.81	0.63895	0.0

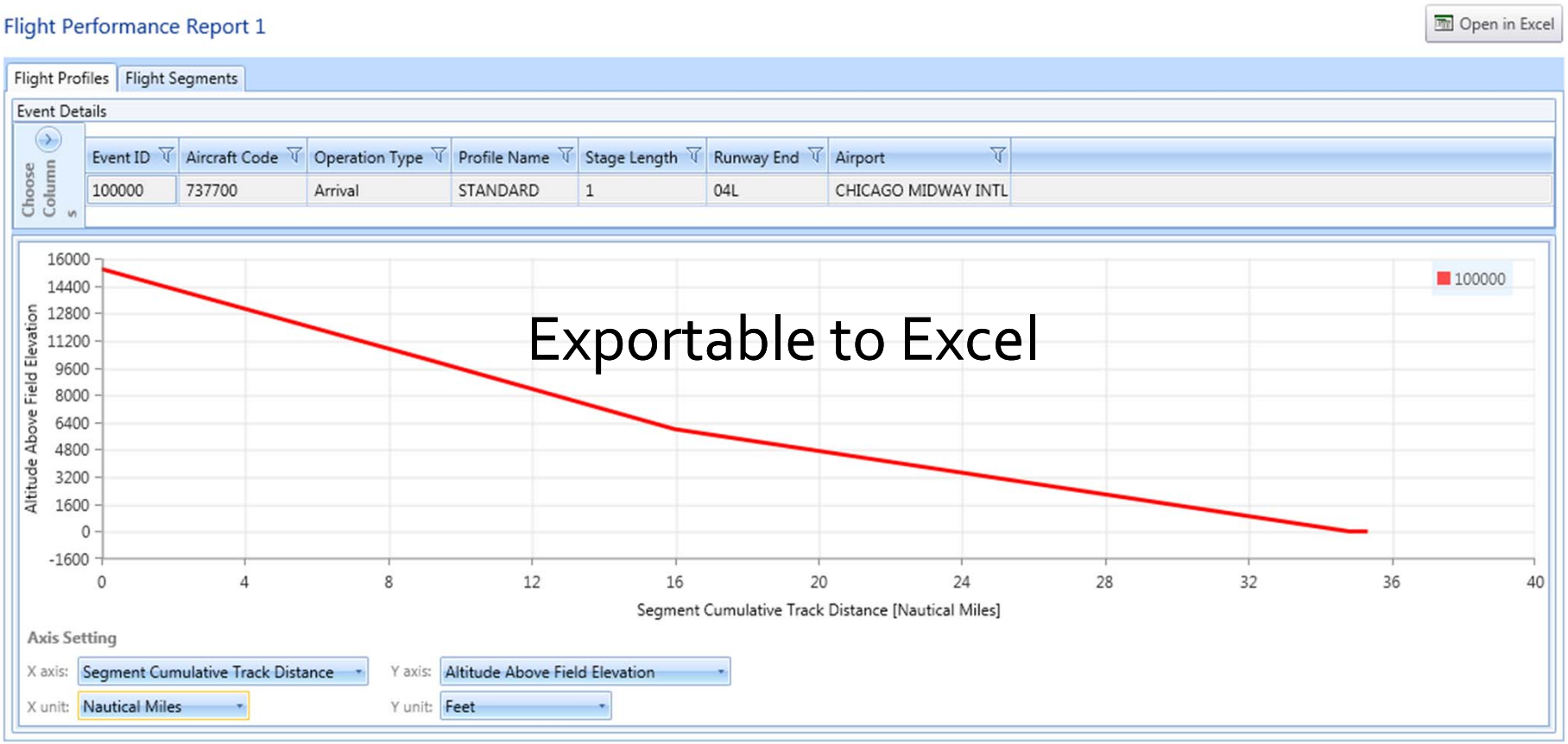
Includes emissions above mixing height

Entire modeled flight

AEDT can also export emission reports to Excel.

FICTIONAL RESULTS

Flight performance report – vertical profile



AEDT can also produce charts of aircraft speed, thrust, weight over time, and other performance results.

FICTIONAL RESULTS

AEDT version 2b runs on Windows 7 desktop and workstation computers.

For further information and demo videos:

aedt.faa.gov

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Federal Aviation Administration

Aviation Environmental Design Tool

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WELCOME TO THE FAA'S OFFICE OF ENVIRONMENT AND ENERGY - AEDT SUPPORT WEBSITE

This website is provided by the FAA's Office of Environment and Energy as part of its Models - Aviation Environmental Tools Suite. This site is dedicated to helping you resolve issues that you may have when using the Aviation Environmental Design Tool or simply AEDT. The site is organized as follows:

- Product Information: describes the current release version and lists AEDT 2b system requirements and documentation.
- Purchase: describes AEDT 2b pricing schedule and purchase information.
- Outreach: lists the latest AEDT news and videos.
- FAQs: contains a list of frequently asked questions including known issues.
- Downloads: lists the installer for the current AEDT release, including pre-requisites and optional tools.
- All Feedback: lists the support feedback submitted by AEDT users, including the current status.
- My AEDT: lists the support feedback submitted by you, and links for managing your account.
- Submit Feedback: contains a form for submitting incidents, questions and suggestions for improvement.

AEDT 2b Information Page

AEDT version 2b product information including functionality, system requirements, and pricing is now available on the new 2b information page.

Quick Links

- How to Obtain AEDT 2b - Pricing Schedule
- 2b Purchase and Licensing FAQs

This site is maintained by the AEDT Development Team at the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center.

U.S. Department of Transportation
Federal Aviation Administration
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AEDT – Legacy Tools Functionality Comparison (1)

Function Availability	INM	EDMS	AEDT 2a	AEDT 2b
64-bit application				X
ESRI ArcGIS	N/A	N/A	10	10.2.2
Database Platform	DBF	DBF	SQL 2008 R2	SQL 2008 R2
Unified study for global/regional/airport analysis				X
Multithreaded execution	X		X	X
Real-time status and logging	X	X		X
Distributed computing execution			X	X
System data protected from user changes; user-defined data creation from system data template	X	X		X
Integrated function for updating Study versions	X	X		X
Only a single study database to manage				X
Creation and maintenance of studies through the user interface	X	X		X
Checking for study internal consistency	X	X		X
Terrain, ambient, and weather references saved	X			X
Generation of administrative file, including complete study database, log files, and study input report	X			X
Conversion of INM and EDMS studies to ASIF format				X
ASIF import	N/A	N/A	X	X
ASIF partial study import	N/A	N/A	X	X
ASIF export of aircraft definitions	N/A	N/A		X
Flight track display	X		X	X
Flight track dispersion	X			X
Emissions inventory reporting (segment to modal)		X	X	X
NIRS-format noise impact chart and table reports			X	X
Noise ranking and flight track reassignment of aircraft operations for change analysis			X	X
Noise contour generation and display	X		X	X
Calculate & presentation of emission concentrations (based on AERMOD)		X		X

AEDT – Legacy Tools Functionality Comparison (2)

Function Availability	INM	EDMS	AEDT 2a	AEDT 2b
Workflow (wizard) features for creating operations and defining desired metric results				X
Metric results definitions as a more-flexible replacement for scenarios and cases				X
Copy-edit of scenarios/metric results definitions	X	X		X
User-editable annualizations (scaling factors on operation groups/cases)	X		X	X
Grid/Receptor set construction in the user interface	X	X		X
Point/grid/population receptors	X		X	X
Dynamic grid support (Recursive grid in INM)	X			X
Aircraft noise-power-distance table plotting	X		X	
Display of all aircraft equipment available	X	X	X	X
Make new airplane from existing airplane	X	X		X
Editing of aircraft parameters and flight profiles	X	X		X[i]
Editing of non-aircraft parameters		X		X[ii]
Flights distributed across tracks using group percent	X			X
Interactive editing of group percent distributions	X			X
Airport layout editor undo and redo	X			X
Airport configuration assignment		X		X
Editing of airport capacity parameters		X		X
Flight track point-and–click creation	X			X
Taxi network graphical design with adjustable emissions dispersion parameters		X		X
Taxiway, taxipath, and airport configuration editing		X		X
Taxipath connectivity verification		X		X
Taxi delay and sequencing of operations		X		X
Taxi time-in-mode emissions modeling		X		X
Modeling of emissions sources other than aircraft main engines, including ground support equipment and auxiliary power units		X		X[iii]
Non-aircraft emission factor deterioration based on equipment age		X		X

AEDT – Legacy Tools Functionality Comparison (3)

Function Availability	INM	EDMS	AEDT 2a	AEDT 2b
Modeling of scheduled aircraft operations	X	X	X	X
Modeling of operational profile operations for aircraft and non-aircraft emissions sources		X		X
Application of study area boundaries	X		X	X
Usage of 3CD terrain models	X		X	X
Usage of USGS DEM terrain models	X	X	X	X
Usage of Gridfloat terrain models	X		X	X
Editing of metric types and definitions	X	X		X
Creation and editing of equipment groups	X			X
Direct use of US Census data for population exposure	X			X
Comprehensive geographic feature attribute viewing	X	X		X
Graphical rendering of ESRI Shapefile layers	X			X
Import of satellite imagery and other GIS map services				X
Export GIS layers to shapefiles	X			X
Map navigation tools (zoom, pan, rotate)	X	X	X	X
Conversion calculator from X/Y to latitude/longitude	X			X
Color and symbol legends for flight operations and airport designs	X		X	X
User-adjustable transparency on map layers				X
Last map location saved	X			X
Screenshot function for map view image capture				X
Annual average airport weather specification and editing	X	X	X	X
Usage of NCDC ASOS weather sources		X		X
Usage of RUC, NCAR, and GEOS/MERRA weather			X	X
Airport and runway locations for tens of thousands of airports globally	X	X	X	X
Creation of user-defined airports and runways	X	X		X
Adjustable fuel sulfur content for emissions modeling purposes		X		X

AEDT – Legacy Tools Functionality Comparison (4)

Function Availability	INM	EDMS	AEDT 2a	AEDT 2b
Adjustable sulfur-to-sulfate conversion rate for emissions modeling at non-US airports		X	X	X
Track angle checking	X		X	X
Bank angle modeling	X		X	X
Option to compute flight performance only			X	X
Viewing of terrain model on map display	X			X
Default terrain values for missing terrain data	X			X
Visualization of missing terrain data	X			
Modeling of Touch-and-go operations	X	X		X
Modeling of Circuit operations	X			X
Noise modeling of Runup operations	X			X
Modeling of helicopter taxi operations				X
Line-of-sight blockage modeling for noise metrics	X			X
Noise modeling lateral attenuation adjustment	X		X	X
Noise spectral cutoff calculation	X			N/A[iv]
SAE ARP 5534 and SAE ARP 866A atmospheric absorption algorithms	X			X
A-weighted noise metrics	X		X	X
Tone-corrected noise metrics	X		X	X
C-weighted noise metrics	X		X	X
Modeling of time based noise metrics	X			X
Noise ambient data screening	X			X[v]
Detailed noise grid computation with attribution to contributing flight operations	X			X
Comprehensive input parameter report	X	X	X	X
Aircraft flight profile and performance graphs	X		X	X
X-Y plotting of flown aircraft trajectory	X		X	X
Noise table reports	X		X	X

AEDT – Legacy Tools Functionality Comparison (5)

Function Availability	INM	EDMS	AEDT 2a	AEDT 2b
Emissions and fuel consumption table reports by source type, with adjustable units		X	X	X
Emissions dispersion table reports		X		X
Expansion of speciated organic gas emissions		X	X	X
Carbon dioxide, water, and particulate matter speciation for aircraft engines[vi]		X		X
VALE emissions reporting		X		X
Emissions dispersion of aircraft operations on curved flight tracks				X
Emissions dispersion of aircraft engine startup emissions		X		X
Emissions dispersion of emissions sources other than aircraft main engines, including APUs, GSE, and other airport sources		X		X
Creation and editing of buildings for emissions dispersion modeling purposes		X		X[vii]
Point and polygon airport gates with adjustable emissions dispersion parameters		X		X
Import and export of NMGF formatted noise results	X			X

[i] Edits must be made through import of ASIF aircraft/equipment.
[ii] Edits must be made through import of ASIF aircraft/equipment.
[iii] See the supporting MOVES documentation ("Using MOVES with AEDT 2b") for roadways, or parking facilities, and construction operations. Users
[iv] Addressed by the dynamic gridding algorithm rather than pre-processing of aircraft source data as in INM.
[v] Requires review and authorization by the FAA Office of Energy and Environment (AEE).
[vi] Aircraft particulate matter estimated only for engines in the ICAO Engine Emissions Databank.
[vii] Airport layouts support import, creation, and editing of building definitions. The building downwash effects are not modeled

Thank you for your time

Questions, comments, discussion…