AEDT Development Plans

Presented to: E&E REDAC Subcommittee

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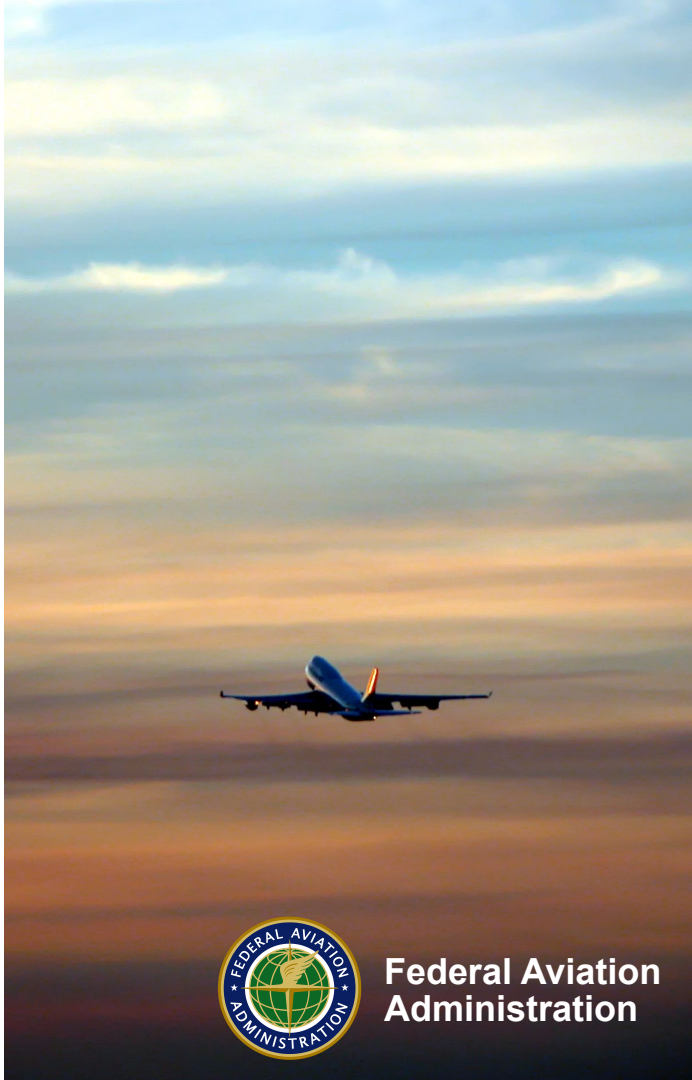

Outline

- Implementation Steps of a New Aviation Dispersion Model into AEDT
- AEDT Support of Airport NEPA Study
- AEDT 3b Current Status
- AEDT 3x Development (FY19 – FY21)
- AEDT 4 (FY22+)
- AEDT Summary

Notes:
1. NEPA: National Environmental Policy Act

Implementation Steps of a New Aviation Dispersion Model into AEDT

- **EPA and airports outreach**
- **Implementation of the new model into AEDT**
- **Validation & verification**
  - Model performance testing
  - Limitations
- **EPA regulatory activities**
  - Revise the *Guideline on Air Quality Models*
    - Appendix W to 40 CFR Part 51

Notes:
1. 40 CFR: Title 40 of the United States Code of Federal Regulations

AEDT Support of Airport NEPA Study

- **Issues**
  - AEDT's Delay, Sequence, and Queuing Model (DSQM) is experiencing congestion on the taxiway network
  - Long delays leading to delayed flights
  - Incorrect runway assignments
  - Emissions assigned to extended runways (heavy aircraft)
- **AEDT development team quickly identified root cause**
  - DSQM calculations
  - With the fix
    - Aircraft are departing from intended runways
    - Aircraft are not experiencing delays
- **AEDT 2d patch was developed within 2 weeks to support customer schedule**
  - Updated code was provided to customer
  - Provided guidance in setting up the study
- **Solution**
  - AEDT 2d patch is available to the AEDT emissions dispersion modelers

Notes:
1. NEPA: National Environmental Policy Act
2. DSQM: Delay, Sequencing, and Queuing Model

AEDT 3b Current Status

- **AEDT 3b release planned for September 12, 2019**
  - BADA4 implementation
  - Enhanced user flexibility for departure modeling
- **Aviation emissions dispersion modeling updates**
  - AERMOD/AERMET update to latest version
  - Three-tiered screening approach to NO2 modeling
  - AERMET updates
- **Fleet database updates**
  - Gulfstream G650; Boeing 737- MAX8; Boeing 737-800 Approach; Airbus 320-271Neo, Falcon 900, Airbus 350-941

Notes:
1. BADA4: Base of Aircraft Data family 4
2. AERMOD: The American Society/Environmental Protection Agency Regulatory Model
3. AERMET: Meteorological data preprocessor for AERMOD

FY19 Development Plan: AEDT 3c

- Release planned for February 2020
- Support for FY19 Inventories
- Emissions and dispersion modeling updates
- Fleet database updates

FY20 Development Plan: AEDT 3d

- **Focus on AEDT maintenance**
  - Large backlog of bug fixes
  - Technical debt
  - Usability
- **De-prioritize new feature development to AEDT 3e**
- **Continue Aircraft Fleet Database Update**
- **Launch user feedback review team**
  - Select user group invited to provide feedback on AEDT 3c
  - Review of AEDT 3d scoping and requirements
  - Review of Sprint releases

AEDT 3x Development Goals (FY21+)

- **Further improve the tool's efficiency and user workflow**
  - Apply lessons learned from user feedback and improved technologies
- **Expand and refine ground operations modeling capabilities**
  - Implement latest Taxi operations research
- **Improve terminal area noise modeling for airports near water**
  - Implement latest noise propagation research
- **Improve helicopter noise modeling**
  - Expand helicopter noise database
  - Improve helicopter procedure modeling
- **Include capabilities to model supersonic aircraft performance in cruise**

AEDT 4 Development Goals (FY22+)

- **Higher fidelity noise characterization**
  - Introduce configuration-based NPD concept to capture airframe noise
  - More accurately model benefits of NextGen advanced operational procedures and support innovative noise abatement procedure designs aimed at preserving fuel efficiency
  - More accurately model noise beyond DNL 65 dB
- **Incorporate improved version of EPA's AERMOD for local-scale airport air quality modeling**
  - Improvements critical to achieving NAAQS and NEPA compliance thereby avoiding delays in project milestones or schedule
- **Update GIS engine to reduce development costs**
  - Current GIS software license is static and drives up development resources to work around
  - Software updates are expensive
  - Seeking open source replacement of current system

AEDT Future Development Timeline

ACRP 02-27 Aircraft Taxi Noise Database
ACRP 02-52 Noise Modeling of Mixed Ground Surfaces
ACRP 02-55 Enhanced AEDT Modeling of Aircraft Arrival and Departure Profiles
Volpe helicopter polar sphere research
ASCENT 10 Aircraft Technology Modeling and Assessment
ASCENT 19 Development of Aviation AQ Tool for Airport-Specific Impact Assessment: AQ Modeling
ASCENT 36 Parametric Uncertainty Assessment for AEDT
ASCENT 38 Rotorcraft Noise Abatement Procedures Development
ASCENT 45 Takeoff/Climb Analysis to Support AEDT APM Development
ASCENT 46 Surface Analysis to Support AEDT APM Development

ACRP 02-66 Commercial Space Operations Noise and Sonic Boom Modeling and Analysis
ACRP 02-79 Aircraft Noise with Terrain and Manmade Structures
ACRP 02-81 Commercial Space Operations Noise and Sonic Boom Measurements
ACRP 02-85 Commercial Space Vehicle Emissions Modeling
ASCENT 9 GIS-based Noise Estimation Tool
ASCENT 19 - Development of Aviation AQ Tool for Airport-Specific Impact Assessment: AQ Modeling
ASCENT 23 Noise from Advanced Operational Procedures
ASCENT 36 Parametric Uncertainty Assessment for AEDT
ASCENT 40 Quantifying Uncertainties in Predicting Aircraft Noise in Real-world Situations
ASCENT 43 Noise Power Distance Re-Evaluation (Research)
ASCENT 44 Aircraft Noise Abatement Procedure Modeling and Validation

2020 2021 2022 2023

- Supersonic Aircraft performance modeling
- Infrastructure and usability updates to improve efficiency and workflow
- Aircraft database updates
- Enhance noise modeling for airports near water
- Helicopter noise modeling improvements
- Air quality modeling enhancements

AEDT 3x – Release AEDT updates biannually

- Higher fidelity aircraft noise characterization
- Update GIS engine to reduce development costs
- Modeling noise with Terrain and Manmade Structures
- New Air Quality model

AEDT 4 series

AEDT Summary

- **AEDT development team responded quickly to customer issue with AEDT 2d**
- **AEDT 3b is first public release with BADA 4 implementation**
  - Higher fidelity performance capability
  - Enhanced user flexibility for departure modeling
- **AEDT 3c will focus on updates to support FY19 inventories and emissions/dispersion modeling needs**
- **AEDT 3d will focus on model maintenance**