AEDT Update

Presented to: E&E REDAC Subcommittee

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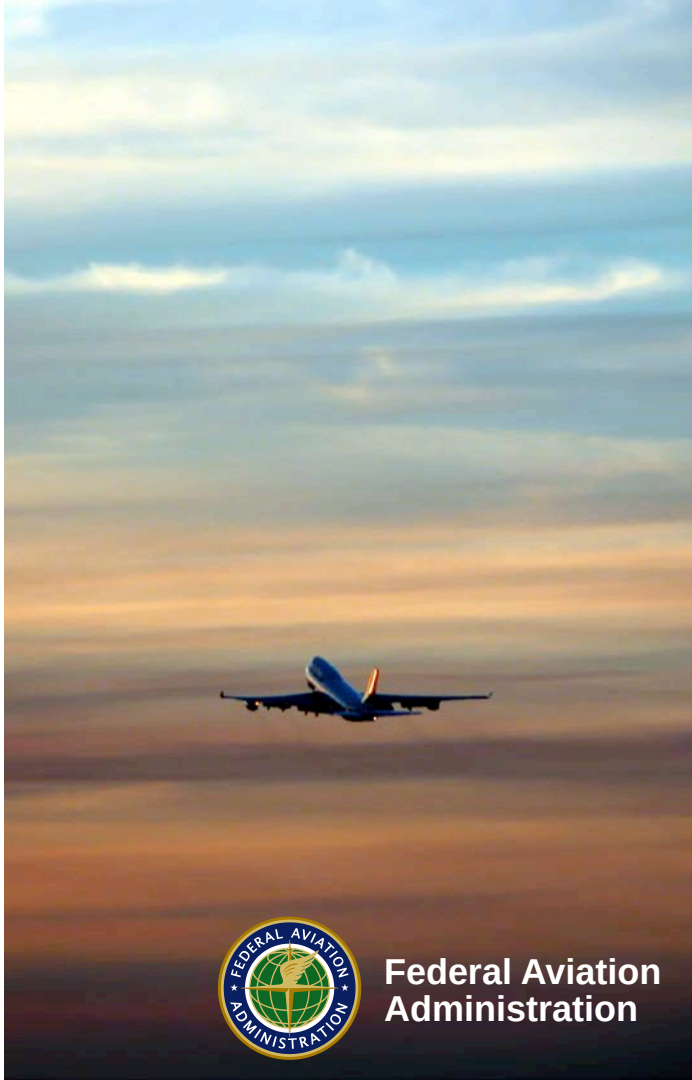

AEDT 3c Current Status

- **AEDT 3c released on March 6, 2020**
- **Performance Module Updates**
  - Departure profile speed adjustment to reflect real world operations
  - BADA 4 fuel burn will be default model for AEDT 3c
- **Aviation emissions dispersion modeling updates**
  - ICAO/CAEP FOA4.0 (Doc9889) method for nvPM mass and number calculations
  - Latest versions of AERMOD and AERMET
  - GSE SO_2 emissions calculations for updated Fuel Sulfur Content (FSC)
- **Usability Improvements**
  - Added ability to create user-defined profiles in GUI
  - AEDT supports Microsoft SQL Server 2012 & 2017

1. BADA = Base of Aircraft DAta
2. AERMOD = The American Society/Environmental Protection Agency Regulatory Model
3. AERMET = Meteorological data preprocessor for AERMOD
4. ICAO = International Civil Aviation Organization
5. CAEP = Committee on Aviation Environmental Protection
6. FOA = First Order Approximation
7. nvPM = Non-Volatile Particular Matter

AEDT Future Development Goals

- **Continue to improve accuracy and fidelity of performance, noise, and emissions modeling**
  - Leverage existing tools
  - Utilize ASCENT research
- **Improve the usability of AEDT**
  - Work with user community to better understand their needs
  - Improve AEDT computational efficiencies
  - Prioritize code maintenance
- **Expand AEDT capabilities for new entrants**
  - Enhance supersonic aircraft modeling
  - Develop unmanned aircraft modeling capability

FY20 Development Plan: AEDT 3d

- **Focus on AEDT maintenance**
  - Large backlog of bug fixes
- **Usability Improvements**
  - Allow import of Aircraft noise spectral data
  - AEDT/AERMOD dispersion computational efficiencies
    - Hourly Rate Emissions (HRE) file generation
    - SQL server memory handling
    - SQL server data storage handling
  - HAP emissions generation – workflow changes
- **Continue Aircraft Fleet Database Update**
  - nvPM database update for engines with measured data

HAP: Hazardous Air Pollutant

External Feedback

- **Launch user feedback review team April 8, 2020**
  - Select user group invited to provide feedback on AEDT
  - Group will feature both power users and novice users
  - Users will contribute to scoping and requirements and will be able to test Sprint releases to enhance agile process

- **External audit of AEDT development process**
  - Improve efficiency of development cycle
  - Review and enhance quality control process
  - Focus on database update process to improve flexibility and efficiency

AEDT 3x Development Goals (FY21+)

- **Incorporate aircraft-specific air quality model(s) for local-scale airport air quality analysis**
  - Improvements critical to achieving NAAQS and NEPA compliance thereby avoiding delays in project milestones or schedule
- **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**
- **Improve terminal area noise modeling for airports near water**
- **Improve rotorcraft noise modeling**
  - Expand noise database
  - Improve 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
- **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 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
ASCENT 54 AEDT Evaluation and Development Support

ACRP 02-79 Aircraft Noise with Terrain and Manmade Structures
ASCENT 9 Geospatially Driven Noise Estimation Module
ASCENT 19 - Development of Aviation AQ Tool for Airport-Specific Impact Assessment: AQ Modeling
ASCENT 23 Noise from Advanced Operational Procedures
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
ASCENT 54 AEDT Evaluation and Development Support
ASCENT 60 Analytical Methods for Expanding the AEDT Aircraft Fleet Database

- 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

- **Current focus on code quality and maintenance**
- **Seeking external feedback to improve AEDT**
  - User Review Group to enhance usability
  - External process review to improve development efficiency
- **ASCENT will continue to provide support for AEDT feature development**
  - Implementation timeline impacted by delays in funding