

Analytical Methods for Expanding the AEDT Aircraft Fleet Database

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Objective:

Improve the accuracy of AEDT noise and emissions modeling for aircraft/engine combinations currently required to use “closest match” substitutions of aircraft/engine combinations fully supported by OEM data, i.e., Aircraft Noise and Performance (ANP) data by leveraging statistical learning techniques to meaningfully combine data from various sources.

Project Benefits:

- Development of a statistical learning-based methodology to improve noise and emissions modeling for engine/aircraft combinations with incomplete data
- Overall accuracy improvement to AEDT’s current representation of aircraft operations and fleet usage

Research Approach:

- Construct a superset database by combining existing robust public and proprietary aircraft datasets to collect config. and performance data for all AEDT aircraft a.k.a. **ANP Extension DB**
- Formulate and apply statistical learning methods to produce ANP and noise data for a down-selected list of representative aircraft types that are assumed “missing” from the **ANP Extension DB**
- Compare against high-fidelity data to validate the substitutions made by the statistical learning methods
- Expand and validate approach for generalized aircraft fleets (commercial/GA/military airlift, etc.)

Major Accomplishments (to date):

- Collecting type certificate data sheet (TCDS) information to augment the ANP Extension DB, which is performance and geometric information
- Continued gathering of EASA noise certification data
- Identification of AEDT Fleet dB issues
- Researched, down-selected, and tested appropriate machine learning-based analytical techniques to perform aircraft/engine substitutions

Future Work / Schedule:

- Continue population of the **ANP Extension DB** from EASA and TCDS
- Document AEDT Fleet dB issues for development team
- Improve the proposed analytical methods and apply them to larger datasets
- Validate the developed methods and develop an approach to expand the current Fleet database