

Airline Flight Data Examination to Improve flight Performance Modeling Project 35

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- Two issues have been identified with the modeling of aircraft departure trajectories in AEDT.
 - Numerical and discretization errors in the “weight versus stage length” relationship currently being used.
 - No ability to model the effect of operating conditions (such as altitude and temperature) on the reduced thrust level of specific aircraft types.
- These issues impact aircraft trajectory modeling and the resulting noise and emissions estimates.

Motivation (cont'd)



- **Very limited** work on the development of an accurate correlation between stage length and weight, even though the aforementioned issues have been recognized for some time by the research community.
- Prior ACRP research on reduced thrust modeling has produced a means of generating the data necessary to model reduced thrust levels within AEDT, but the implementation requires a separate program that must be run outside of AEDT.

- Long term Outcomes
 - Improve the aircraft weight versus stage length (trip distance) relationship, thereby improving the accuracy of the weight values used in the prediction of departure trajectories.
 - **Develop** correlations to compute the departure thrust as a function of aircraft type, weight, and operating conditions, thereby improving the accuracy of the departure trajectories and their associated performance.
 - **Update** AEDT to enable accurate modeling of reduced thrust departures, which are approximately 90% of all commercial aircraft departures.

- Use data from a large operational database provided by carriers to generate aircraft specific correlations between trip distance and takeoff weight, and between operating conditions and both permissible and actual takeoff thrust.
- Coordinate analysis and development of correlations with SAE A-21 and provide necessary data for coefficient generation to the airframe manufacturers.

- The existing database analysis can be completed within 12 months from the project initiation date. While the analysis can be completed within this time frame, no specific completion date can be given for the airframe manufacturer effort necessary for the coefficient generation.