NASA SBIR/STTR Technologies

Integrated Testbed for Environmental Analysis of NextGen Concepts using ACES

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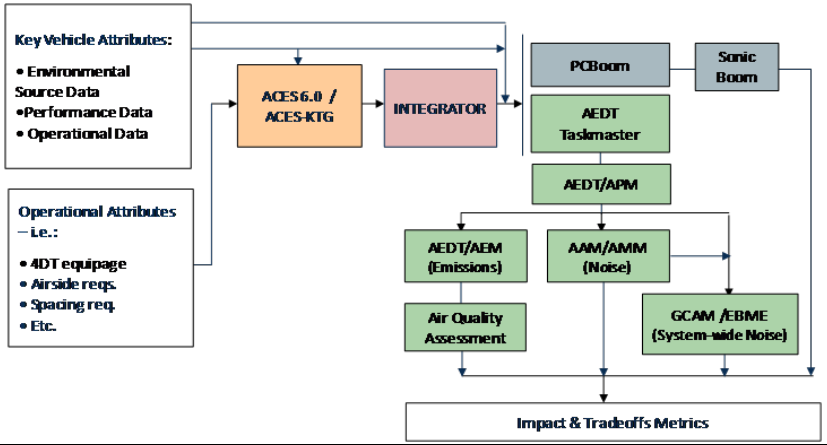
Identification and Significance of Innovation

The key innovation in this effort is the development of an analysis testbed to integrate simulation tools, such as ACES, with aviation environmental effects models, such as the Aviation Environmental Design Toolkit (AEDT), to provide a "360-degree" evaluation of new operational concepts. The testbed will be demonstrated by producing a "360-degree" evaluation of advanced NextGen concepts such as time-based merging and spacing at ATL airport, high-density metroplex concepts, and the efficiency of new route structures with environmentally responsible aircraft using RNAV routing.

TRL 2 at project inception, TRL 3 at end.



Technical Objectives and Work Plan

Objective 1. Implement a commercial-grade integrator designed to seamlessly interface the ACES performance model with the AEDT environmental model. The proof-of-concept integrator from Phase I, which was prototyped in MATLAB, will be ported to Java and all remaining issues with the integration will be resolved.

Objective 2. Demonstrate the utility of the integrator with three different NextGen-oriented analyses, showing the value of the 360-degree analysis approach.

Objective 3. Validate the resulting system through comparison with standard models as well as comparison with actual field data, such as radar data or other data, to provide confidence in the resulting system.

Work Plan:

Task 1: Kickoff Meeting
Task 2: Implement Integrator in Java
Task 3: M&S at ATL Airport
Task 4: Metroplex Capacity Enhancements
Task 5: Enroute Routing Improvmenets
Task 6: Validation of the trajectory generators
Task 7: Final Demonstration
Task 8: Reports and Deliverables

NASA and Non-NASA Applications

Potential applications include NASA, the FAA, and industrial companies whose business it is to do either environmental assessment or performance analysis. They would use this capability to develop an integrated picture of the performance and environmental assessment of future proposed projects. Potentially, all airports with planned improvements, all large metroplexes (approximately fourteen) with planned system upgrades, and all air traffic control centers are customers.

Firm Contacts

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NON-PROPRIETARY DATA