

Air Traffic Management Cost Assessment Tool, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



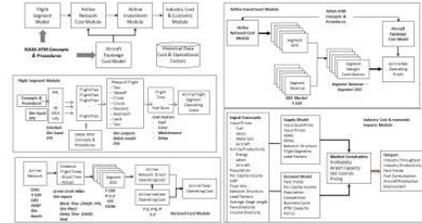
ABSTRACT

The Robust Analytics Air Traffic Management Cost Assessment Tool (ACAT) provides the comprehensive capability to analyze the impacts of NASA air traffic management (ATM) research from individual flight trajectories through airline network operations and airline investments in equipment and training. Our air traffic management cost and economic model offers researchers and project managers a greater understanding of the cost drivers for aircraft operators and helps to validate the cost and revenue impacts of AOSP research. Increased validity of predicted results will help AOSP continue to receive operator support and hasten the transition of ARMD technologies into the NAS. Our model generates cost-benefit estimates for concept and procedure alternatives for individual airlines. The model also estimates a variety of impacts on industry, including input utilization and productivity, throughput, air transportation industry costs and fares, and broader economic effects such as employment and benefits to other industries. The ACAT goes beyond simple flight cost factors by providing greater fidelity in the cost analysis of flight segments, explicit estimation of training and certification cost, and realistic treatment of deployment time and risk. Our cost analysis is performed using airline-specific data, enabling more realistic assessment of airline investment decisions and identification of disparate effects and willingness to invest among airlines. ACAT can improve airline cost-benefit analyses to estimate the profitability of new and existing service on an ongoing basis, as well as investment in advanced ATM capabilities. The model will operate as a stand-alone tool and can integrate with airline flight planning and tracking systems. The model uses publicly available data that can be updated quarterly.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: 1. Provide NASA

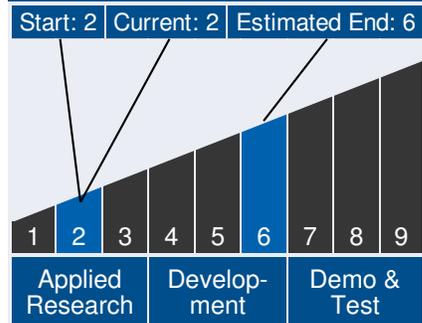


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Table of Contents

- Abstract 1
- Anticipated Benefits 1
- Technology Maturity 1
- Management Team 1
- Technology Areas 2
- U.S. Work Locations and Key Partners 3
- Details for Technology 1 4

Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Continued on following page.

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system analysts with a comprehensive cost and airline revenue model to conduct trade studies and portfolio assessments. By integrating with ACES and FACET, the models of choice for system analyses, would provide more credible results and reduce the cost and effort to conduct studies. 2. Provide a much-needed analytical tool to estimate the total system operating cost for the current baseline or under the advanced concepts and architectures in ARMD's research portfolio. The Strategy, Architecture, and Analysis organization in ARMD does not currently have any model or analytical tool that can estimate the total system operating cost for the current baseline or under the advanced concepts and architectures in ARMD's research portfolio. Neither do the Centers or AOSP. 3. Meet the requirements for a total system cost model for the Airspace Systems Shadow Mode Assessment for Realistic Technologies in the National Airspace System (SMART NAS) project. Our cost model solution aims to meet the requirements of SMART NAS while simultaneously providing the much-needed cost estimating and airline benefit capability to support ATM investment analyses. 4. Support AOSP trade studies and provide useful feedback to researchers on likely operator acceptance based on realistic return on investment estimates, assessment of risks and deployment timelines, and financial constraints.

To the commercial space industry:

Potential Non-NASA Commercial Applications: All airlines require analytical tools and data to estimate the profitability of new and existing service on an ongoing basis. Offering a comprehensive cost modeling tool that improves the ability of its airline customers to plan and operate scheduled flights would be valuable. We have had discussions on airline cost-benefit analyses with current and former flight profitability managers at United and Continental. Those discussions indicated that even these sophisticated airlines had to conduct cost assessments of new procedures on an ad hoc basis and could benefit from access to a good cost model. For instance, United conducted assessments of the new curved approach procedures into SFO

Management Team (cont.)

Principal Investigator:

- Peter Kostiuk

Technology Areas

Primary Technology Area:

Aeronautics (TA 15)

- └ Safe, Efficient, Growth in Global Aviation (TA 15.1)
 - └ Improved Efficiency and Hazard Reduction within NextGen Operational Domains (TA 15.1.1)
 - └ Increase Throughput (TA 15.1.1.1)

Secondary Technology Area:

Modeling, Simulation, Information Technology and Processing (TA 11)

- └ Modeling (TA 11.2)
 - └ Software Modeling and Model Checking (TA 11.2.1)

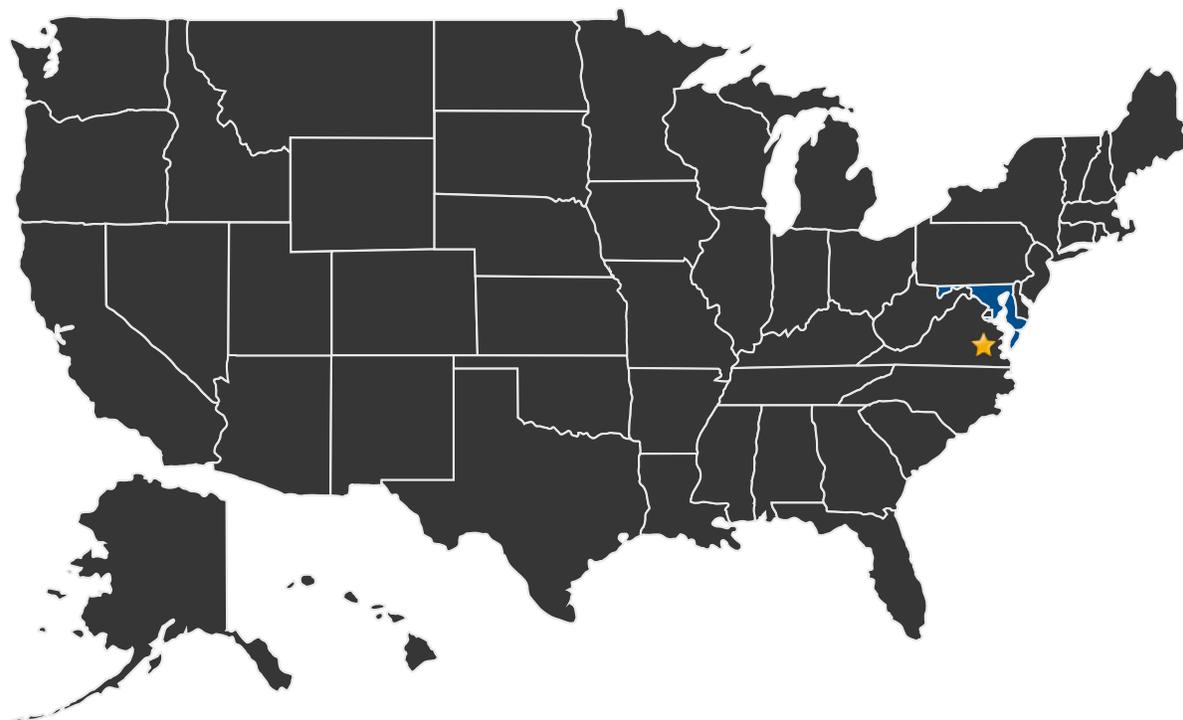
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and calculated the relative costs of the baseline and new procedure cases. This analysis could have been conducted much faster and more effectively with our proposed cost model combined with simulation capabilities provided by FACET and ACES. The ACAT will operate as a stand-alone tool coupled with professional analytical services and can be into airline flight planning and analysis systems. The mechanism for providing this improved capability will be through airline flight operations center planning and operational software. Many NextGen and Airspace Systems tools rely on airline FOCs to manage flights, trajectory planning, and re-routing. We envision the cost model as an added capability to AOCs to assist in evaluating the impact of airline investments in ATM and NextGen capabilities.

U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States With Work ★ **Lead Center:**
Langley Research Center

Other Organizations Performing Work:

- Robust Analytics (Gambrills, MD)

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PROJECT LIBRARY

Presentations

- Briefing Chart
 - (<http://techport.nasa.gov:80/file/18021>)

DETAILS FOR TECHNOLOGY 1

Technology Title

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