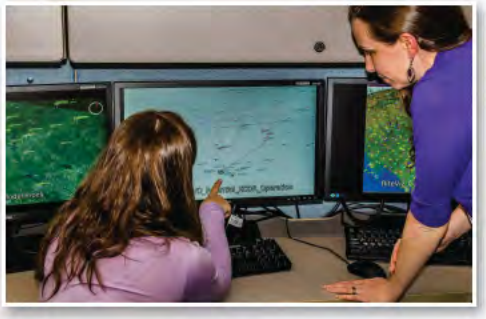
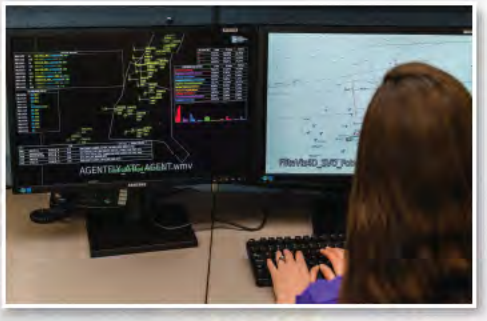
Projects

- **Separation Management Modern Procedures** – Adding the Conflict Probe to the radar display requires high precision in trajectory modeling and conflict prediction. Engineering assessments are carried out on prototypes and potential improvements to these En Route Automation Modernization (ERAM) sub-systems.
- **Conflict Resolution Advisories (CRA)** – This project involves development and conceptual testing of a prototype decision support tool that proposes ranked resolution options for conflicts and facilitates inter-sector coordination of trial plans. Our supporting work includes a safety assessment, benefit mechanism analysis, cost/benefit analysis, concept of operations document, and automation requirements. Both fast-time and real-time simulation studies support the prototype development and investigation of benefits.
- **Integrated Arrival/Departure Control Services (IADCS)** – This fast-time simulation study evaluates the capacity and efficiency benefits associated with the IADCS concept. Our modeling activity examined the use of flexible routing structures within the Atlanta area facilities, Atlanta Center (ZTL) and the Atlanta Terminal Radar Approach Control (TRACON). We will quantify the validity and benefits associated with the tools offered by the IADCS concept for routing and rerouting aircraft during periods of high traffic volume and inclement weather.
- **Space Vehicle Operations (SVO)** – The objective of this study is to quantify the potential impact of SVO on the National Airspace System (NAS). We use an agent-based fast-time simulation to evaluate changes to the capacity and efficiency of the NAS.
- **Department of Defense (DoD) Unmanned Aircraft System Airspace Integration (UAS-AI) Joint Test (JT) Project** – This project researches the development of standard operating procedures into and out of specified terminal areas where a mix of military and civil air traffic operate. Our support of these activities consists of a set of iterative fast-time computer simulation experiments that support the DoD's development process of the standardized procedures. The simulations aim at helping mitigate any technical risks associated with the UAS flying these procedures and to gain insight on their impact on the NAS.
- **Unmanned Aircraft Systems Detect and Avoid Task (UAS DAA)** – This task utilizes detect and avoid algorithms to provide insight in developing a methodology for future certification. We will assist by conducting an assessment of the metrics to determine their value.





Modeling and Simulation Branch
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Our branch has a distinguished reputation of collaboration with multiple organizations within the FAA as well as other government agencies, industry, and international entities. Contact us for continued and future collaboration.

For more information please visit:
https://acy.tc.faa.gov

Federal Aviation Administration

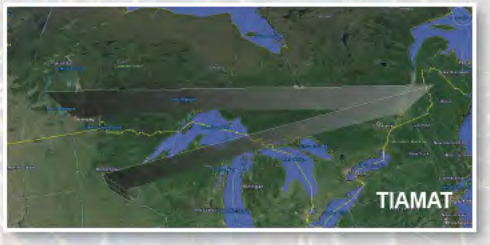
Modeling And Simulation Branch

Engineering
Partnership
Data Analysis
Simulation
Programming
Visualization

Mission

The mission of the Modeling & Simulation Branch (ANG-C55) within the Technology Development & Prototyping Division (ANG-C5) is to design and conduct simulation and analysis activities to support concept development and validation which includes the development of Concept of Operations (ConOps) and Concept of Use (ConUse) requirements for future National Airspace Systems (NAS) operations and technologies.

The Modeling & Simulation Branch (ANG-C55) conducts research to assess the operational and technical feasibility of proposed system changes to NAS operations. This work includes validating new aviation concepts' technologies, investigating system capacity issues, and evaluating the performance of emerging and existing systems within the NAS.



Expertise

Our personnel are leaders in industry organizations with extensive knowledge in several domain areas, experience working with advanced commercial-off-the-shelf tools (COTS), and the capability to develop unique applications internally.

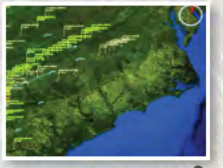
Domain Areas

- Fast time simulation modeling
- Advanced statistical methods
- NAS automation algorithms
- Experimental design
- Aeronautical engineering
- Software engineering

AirTOp©

Advanced Tools

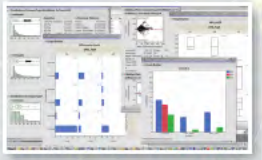
- AirTOp©, RAMS Plus©, and ACES: gate-to-gate simulations with varying degrees of fidelity and capabilities
- SWAC: NAS-wide queuing model
- JMP® from SAS: advanced, graphical statistical tool
- AgentFly© agent-based scalable platform including
  - NAS-wide simulations
  - ATC behavioral model
  - Open architecture
  - Aircraft trajectory planning
  - Simulation of UAS



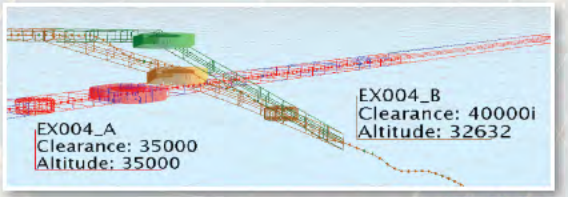
AGENTFLY©

Customized In-House Applications

- FliteViz4D
- Fuel Burn Calculator
- Trajectory Prediction
- Conflict Probe Assessment
- TIAMAT- Total Integrated Aviation Modeling Adminstration Tool



JMP®



FliteViz4D

Services

Engineering

We support internal and external customers by providing a variety of engineering services, including but not limited to:

- Conducting research and development of new aviation concepts
- Quantifying impact of aviation concepts on the present and future NAS
- Estimating cost/benefits of a proposed FAA NextGen concept
- Performing shortfall analyses (e.g. perform needs assessment via subject matter expertise and gap analysis on present and future systems to address the need)
- Conducting independent test and evaluation (T&E) of algorithmic automation changes in the NAS
- Developing methods and tools (rapid prototyping) to support evaluation of concepts and/or T&E of automation changes
- Communicating technical results via comprehensive technical reports and concise white papers, professional publications (scientific journals, industry conference proceedings, government reports), presentations, and participation on industry panels
- Employing state-of-the-art computer graphics to visualize NextGen concepts

Project Management

We provide the full spectrum of project management services to support the FAA's acquisition management system (AMS) at any phase, with extensive experience in the early stages of the lifecycle process. We;

- Develop operational concepts from inception through deployment and sustainment, involving end-to-end coordination with internal and external organizations
- Manage full budget lines of government funds
- Author and negotiate NextGen Project Level Agreements (PLAs)
- Develop and administer contracts in collaboration with FAA contracts organization
- Plan, execute, and maintain detailed project schedules
- Communicate project status and results to various stakeholders
- Participate in cross organizational teams or matrix teams (e.g. UAS matrix team)
- Coordinate special agreements with academy, other government agencies, and industry partners, e.g. using Collaborative Research Development Agreements (CRDA) and Reimbursable Agreements (RA)