REDAC/NAS Ops

NextGen – Wake Turbulence (Wake R,E&D)

BLSI Number: A11.n
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Review of FY 2021-2024
Proposed Portfolio
Wake R,E&D Overview

What are the benefits to the NAS Users?
Wake R,E&D’s assessment of aircraft wake encounter risk provides the information to develop ATC wake risk mitigations that will enable fewer flight delays/cancellations and reduced inflight operating costs.

- Assessments of wake generation and resistance to wake encounter for new aircraft types entering service in the NAS
- Wake risk mitigation solutions for specific airport/airspace ATC operations
- Aircraft wake generation/encounter databases, modeling and analyses

What determines program success?
- No increase in the reported wake encounters per flights in the NAS
- Increased Airport Arrival Rates set by ATC when in Instrument meteorological conditions (IMC)
- ATC able to mitigate wake encounter risk when separating en route aircraft at distances less than 5 NM
Wake R,E&D
Project Support

People:
• Jillian Cheng, Project Manager
• Other federal resources: AIR Wake CSTA, AFS-400 and Volpe Center
• Contract support SMEs: wake modeling and analysis experts; ATC systems, operations and analysis experts; GA, and air carrier pilot experts

Laboratories/R&D Centers:
• MIT/LL
• Volpe Center
• FOQA Data Centers
Current FY21 Accomplishments

• Developed wake risk assessments for new aircraft types (piloted & Large UAS) slated to receive ATC Separation Service when operating in the NAS (~60 assessments through 3rd Qtr. FY21)

• Progressed in the development of candidate Absolute Wake Encounter Metrics (projected severity if aircraft encounters a wake from another aircraft) for use in evaluating safe separations between aircraft

• Continued the collection of aircraft wake tracks at SFO and JFK airports

• Completed updates to refine methodologies for assessing required wake separations

• Applied the previously developed statistical wake encounter screening utility (SU) to archived Flight Operational Quality Assurance (FOQA) data from flights into and out of EWR, JFK, MIA & LAX Airports. The number of low level (not reportable) wake encounter statistics from the SU matched the suspected, but never before confirmed, incidence of low level wake encounters.

• Successful SU use of Aviation Safety Information Analysis and Sharing (ASIAS) archived FOQA data sets. Troubleshooting continues to determine reasons for periodic spikes in the FOQA data parameters
Wake R,E&D Anticipated Research in FY22

Planned Research Activities:

• Develop wake risk assessments for new aircraft types (piloted and Large UAS) slated to receive ATC Separation Service when operating in the NAS
• Continue collection of aircraft wake tracks at SFO & JFK (funding shortfall may further reduce data collection capacity)
• When requested, assess airport/airspace ATC operations to develop wake risk mitigation solutions that will address specific operational constraints
• Development of En Route wake encounter model
• Continue development of Absolute Wake Encounter Metrics

Expected Research Products:

• Wake risk assessments for new aircraft types and for other aircraft types requested by ATC
• Absolute wake encounter metrics for an additional category of aircraft types
• En Route wake encounter model to be used for concept development
• Wake risk assessments of proposed changes to ATC procedures/systems which involve risk mitigation operations
Wake R,E&D Anticipated Research in FY23

Planned Research Activities:
• Develop wake risk assessments for aircraft types operating in the NAS
• When requested, assess airport/airspace ATC operations to develop wake risk mitigation solutions that will address specific operational constraints
• Continue development of candidate Absolute Wake Encounter Metrics for use in providing safe, flight capacity efficient separation recommendations for aircraft types operating in the NAS
• Concept development for En Route wake encounter risk mitigation
• Continue collection and assessment of aircraft wake tracks at SFO and JFK airports

Expected Research Products:
• Wake risk assessments for new aircraft types and for other aircraft types requested by ATC
• Absolute wake encounter metrics for an additional category of aircraft types
• Concept for En Route wake encounter risk mitigation
• Wake risk assessments of proposed changes to ATC procedures/systems which involve wake risk mitigation operations
Continuing & Emerging FY24 Focal Areas

Application of Wake Track Data and Its Assessment

• Develop wake risk assessments for aircraft types slated to begin operating in the NAS and receiving ATC Separation Services
• When requested, assess requested airport/airspace ATC operations to develop wake risk mitigation solutions that will address specific operational constraints

Acquiring additional Wake Track Data

• Continue collection and assessment of aircraft wake tracks at SFO & JFK
• Acquire and assess additional wake track data for aircraft types flying at cruise altitude
**Wake R,E&D (FY24)**

**Research Requirements**
- Assess wake risk in today’s and future ATC operations to enable a safe increase in NAS capacity

**Outputs/Outcomes**
- Wake risk assessments for new aircraft types
- From additional collected data – update aircraft wake risk assessments for RECAT’s use in developing wake risk mitigations for ATC’s current and future operations

**FY 2024 Planned Research**
- Assess new & requested re-evaluations of aircraft types for wake risk
- Develop wake risk mitigation solutions for specific airport/airspace constraints
- Assess proposed changes to ATC procedures for wake risk
- Continue ground-based collection of wake track data to enhance the statistical data used for wake risk assessments
- Collect and assess wake track data for aircraft types in the cruise phase of flight

**Past, Current and Planned Project Funding**

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