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FAA Office of NextGen (ANG)

REDAC / NAS Ops

Review of FY2024 – 2026 Proposed Portfolio

Name of Program: Wake R,E&D

BLI Number: A11.o

Presenter Name: Jillian Cheng

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Wake R,E&D Overview

What are the benefits to the NAS User

Wake R,E&D's assessment of aircraft wake encounter risk provides the information to develop ATC wake risk mitigations that 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 analysis tool development that enable increased flight flexibility and capacity for NAS Users
- Increased NAS flight safety and capacity through the application of wake encounter hazard mitigation concepts

What determines program success when research is implemented

- No increase in the reported wake encounters per flights in the NAS
- Increased Airport Arrival Rates set by ATC when in IMC
- ATC able to mitigate wake encounter risk when separating enroute aircraft at distances less than 5 NM
- Wake encounter risk mitigation strategies developed for AAM aircraft

Wake R,E&D Program Support

People:

- Program Manager: Jillian Cheng
- Subject Matter Experts: wake data collection & analysis experts, pulsed LIDAR application experts, statistical wake encounter FOQA data extraction experts, wake modeling experts & aviation safety/ATC experts

Laboratories/R&D Centers:

- Volpe Center
- National Institute of Aerospace
- MIT/Lincoln Laboratory

Current Wake R,E&D FY24 Accomplishments

- Developed wake generation and wake encounter response assessments for new aircraft types (piloted and large UAS) slated to receive ATC Separation Service when operating in the NAS
- Progressed in the development of candidate absolute wake encounter metrics (quantitative severity benchmarks) for use in developing safe, flight capacity efficient ATC applied separations between aircraft types
- Continued the collection and assessment of aircraft generated wakes at SFO and JFK airports – resulting in decreased “uncertainty” buffers included in wake risk mitigation recommendations
- Continued analysis of collected enroute aircraft wake generation data for modifying current low altitude wake generation models into wake generation models that can be used for enroute airspace wake analyses

Anticipated Wake R,E&D Research in FY25

Planned Research Activities:

- Develop wake encounter risk assessments for New Entrants (e.g. Legacy and AAM) operating in the NAS
- When requested, assess airport/airspace ATC operations to develop wake encounter risk mitigation solutions that will address specific operational constraints
- Continue collection and analysis of aircraft wake tracks at SFO and JFK airports to include repair of LIDAR systems
- Finalize the absolute wake encounter metrics for aircraft flying enroute
- Continue development of a Wake Hazard Avoidance (WHA) feasibility algorithm that uses real time and forecast weather data combined with a fast-time wake generation/transport model to determine location of an aircraft generated hazardous wake

Expected Research Products:

- Wake encounter risk assessments for New Entrants
- Concept alternatives for the controller display of wake encounter hazard locations
- Wake encounter risk assessments of proposed changes to ATC procedures/systems used in ATC Separation Services
- Wake encounter risk mitigation solutions for unique airport/airspace operational constraints
- 2nd interation of a hazardous wake location feasibility algorithm design

Emerging Wake R,E&D FY26 Focus Areas

Application of Wake Generation and Encounter Data

- Provide wake encounter risk assessments for New Entrants slated to begin operating in the NAS and receiving ATC Separation Services
- When requested, assess airport/airspace ATC operations to develop wake encounter risk mitigation solutions that will address specific operational constraints
- Continue the development of absolute wake encounter risk metrics for use in determining an aircraft's wake encounter risk

Acquiring Additional Wake Generation/Transport Data

- Continue collection and assessment of aircraft generated wake tracks with suites of ground based sensors to characterize the aircraft generated wake and how its transport is affected by atmospheric conditions and airport location

Complete development of the Wake Hazard Avoidance (WHA) concept and associated feasibility algorithm design.

Wake R,E&D

Research Requirements

- Assess wake encounter risk in today's and future ATC operations to ensure target level of safety is maintained
- Accomplish aircraft wake generation/transport/encounter analyses to develop concepts of wake encounter risk mitigation solutions that will increase flight efficiency/capacity in the NAS
- Provide wake encounter risk mitigation solutions for specific ATC airport/airspace operating constraints and concepts for the future NAS
- Develop metrics for safe/flight efficient ATC wake encounter risk mitigation aircraft-to-aircraft separations

Outputs/Outcomes

- Wake encounter risk assessments for requested current aircraft and New Entrants that are to begin operating in the NAS and will require ATC Separation Services.
- Wake encounter risk assessments of proposed changes to ATC separation procedures
- Wake encounter risk mitigation solutions for specific airports/airspace
- Wake encounter risk metrics for determining safe separation from a leading aircraft's hazardous wake
- Wake Hazard Avoidance concept and associated feasibility algorithm for more flight efficient ATC wake hazard mitigations

FY 2026 Planned Research

- Continue developing wake encounter risk assessments for New Entrants (e.g Legacy and AAM) slated to receive ATC Separation Services
- Assess proposed changes to ATC procedures for wake risk
- Continue ground-based collection of wake generation/ transport data to enhance the statistical data used for wake encounter risk assessments
- Continue development of absolute wake encounter risk metrics
- Finalize development of the Wake Hazard Avoidance concept and feasibility prototype algorithm

Out Year Funding (contract dollars)*

	FY24 (Enacted)	FY25 (President's Budget)	FY26 (CIP)
R,E&D	$ 3.7M	$3.7M	$ 2.6M