

FAA Office of NextGen (ANG)

REDAC / NAS Ops

Review of FY2022 – 2024 Proposed Portfolio

Name of Program: Wake R,E&D BLI Number: A11.p Presenter Name: Jillian Cheng Date: 16 March 2022

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 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 IMC
- ATC able to mitigate wake encounter risk when separating en route aircraft at distances less than 5 NM

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

Laboratories/R&D Centers:

- Volpe Center
- National Institute of Aerospace
- MITRE/CAASD ASIAS data center
- National Research Council Canada Flight Research Laboratory

Current FY22 Accomplishments

- Developed wake generation and wake encounter response assessments for new aircraft types (piloted & Large UAS) slated to receive ATC Separation Service when operating in the NAS (~20 assessments through 1st Qtr. FY22)
- 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 and assessment of aircraft wake tracks at SFO and JFK airports
- Completed updates to refine methodologies for assessing aircraft generation and wake encounter response
- Successful application of the previously developed statistical wake encounter FOQA data screening utility (SU) on ASIAS's archived FOQA data sets. Completion report of the SU-ASIAS integration effort was briefed (22 February 2022) to the ASIAS Tri-Chairs and the ASIAS Issues Analysis Team

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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 the analysis process to provide safe wake separation recommendations for aircraft types operating in the NAS
- Concept Development for enroute 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 use as a method of assessing severity
- Concept for enroute wake encounter risk mitigation
- Wake risk assessments of proposed changes to ATC procedures/systems which involve wake risk mitigation operations

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
- Coordinate the transfer of the statistical wake encounter SU to the appropriate LOB

Acquiring additional Wake Track Data

Continue collection and assessment of aircraft wake tracks with suite of wake sensors

Wake R, E&D

R&D Requirements

- Assess wake risk in today's and future ATC operations to enable a safe increase in NAS capacity
- Develop safe wake risk mitigation solutions for NAS Users increased operational efficiency – Fulfilling current needs of ATC and providing solutions to the Dynamic, Pair-Wise Wake Turbulence Separation NSIP Operational Improvement OI-102152 and 102117 Expanded use of 3 NM En Route

Outputs/Outcomes

- Wake risk mitigation separation recommendations for new aircraft types that are to begin operating in the NAS and will require ATC Separation Services
- Concept requirements for a Dynamic Wake Solution in en route airspace
- Continue development of Absolute wake metric for enroute airspace

FY 2024 Planned R&D (if funded in FY24)

- Continue developing wake risk mitigation recommendations for new aircraft types (piloted and UAS) slated to receive ATC Separation Services
- 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

Out Year Funding*

R,E&D	FY22	FY23	FY24	FY25	FY26	FY27
	\$ 2.6M	\$2.6M	\$ 2.6M	\$ 2.6M	\$ 2.6M	\$ 2.6M

* These are the funding levels of the NARP. Additional dollars needed per year to resume wake risk mitigation concept development, wake data collection instrument replacement and sponsoring en route aircraft wake track data collection flights by NRC Canada. (These activities were halted in FY20 due to a 50% reduction in FAA's R,E&D budget)