# **REDAC/NAS Ops**



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

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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

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## 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

	FY17	FY18	FY19			
R F&D	7.6	5.8	5.6			
(\$M)	FY20	FY21	FY22	FY23	FY24	FY25
	3.9	2.6	2.6	2.6	2.6	2.6