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FAA Office of NextGen (ANG)

REDAC / NAS Ops

Review of FY2022 – 2024 Proposed Portfolio

Name of Program: Wake RECAT

BLI Number: 1A04B0

Presenter Name: Jillian Cheng

Date: 16 March 2022

Wake RECAT Overview

What are the benefits to the NAS User:

RECAT's development of enhanced means of separating aircraft from the wakes of other aircraft will enable fewer flight delays/cancellations, reduced inflight operating costs, while ensuring the safety of the aircraft, crew, passengers & cargo by:

- Increasing flight capacity of the nation's airports when weather or other conditions require ATC Instrument Flight Rule (IFR) operations
- Increasing flight capacity of congested airspace

What determines program success:

- No increase in the reported wake encounters per flights in the NAS
- Increased Airport Arrival Rates set by ATC when forced to go to IFR operations
- ATC able to mitigate wake encounter risk when separating en route aircraft at distances less than 5 NM

RECAT
Program Support

People:

- Program Manager: Jillian Cheng
- Subject Matter Experts: wake analysis experts; ATC systems and operations experts; GA, regional and air carrier pilot experts

Laboratories/R&D Centers:

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

Current FY22 Accomplishments

Provided wake separation recommendations for ATC's use with new aircraft types

Progressed in developing the Pair-Wise Dynamic Wind (DW) Solution for adding flight capacity to IFR flight capacity constrained airports:

- Further refined the ATC applied pairwise wake separations that can be safely reduced when winds at the airport are at a certain magnitude (aircraft wakes decay faster dependent on atmospheric conditions)
- Continued planning for mid to late CY22 demonstration of simulated DW Solution's use in an ATC operational terminal area environment (Note: FAA COVID-19 prevention "operations essential only access" measures at the WJHTC has caused nearly a 12 month slip in schedule)
- Completed benefit/safety assessments for the DSW separations for the simulated airport and associated fleet mix
- Continued analysis of the benefit that would be derived from the use of the DSW Solution at candidate IFR flight capacity constrained airports

- ADS-B Wx (real-time aircraft based weather observation transmissions) data elements were simplified in the Change 1 edits to DO-181F – approved by RTCA in January 2022 and by EUROCAE in their documents
- Presented ADS-B Wx design working papers to the ICAO Air Navigation Commission's Surveillance Working group
- Met with the Director NWS/AWS and presented a ADS-B Wx informational briefing to the NOAA/NWS Mission Delivery Council as a first step for establishing a NWS/AWS project for distributing ADS-B Wx data

Anticipated R&D in FY23

Planned R&D Activities:

- Develop the DW wind forecast algorithm adaptation parameters for the candidate IFR capacity constrained airports that will receive the DW Solution
- Initiate development of DW wind forecast algorithm that would incorporate CSS-Wx delivered real time aircraft observed weather data
- Initiate development of a Dynamic Wake Solution in en route airspace

Expected Research Products

- DW Solution design requirements along with detailed benefit and safety assessments
- DW wind forecast algorithm adaptation parameters for candidate IFR capacity constrained airports that would receive the DW Solution
- Progress report on Dynamic Wind + ADS-B Wx algorithm development
- Progress report on Dynamic Wake Solution development for en route airspace

Emerging FY24 Focal Areas

- Continue development of a Dynamic Wake Solution for use by ATC to gain flight capacity in congested air corridors
- Based on initial en route Dynamic Wake Solution design – develop NAS User benefit and safety assessment tools that will assist in optimizing the en route Dynamic Wake Solution Design
- Support engineering development of the RECAT ATC terminal area wake risk mitigation Dynamic Wind Solution

Wake RECAT

R&D Requirements

- Develop safe wake risk mitigation solutions for NAS Users increased operational efficiency – Fulfilling current needs of ATC and providing solutions to fulfill 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
- Initial design requirements for a Dynamic Wake Solution that ATC use in their en route Separation Services
- Validation that the prototype CSS-Wx design for the distribution of real time aircraft Wx transmissions fulfills the data input requirements for enhanced Dynamic Wake terminal area solutions

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
- Continue development of design requirements for a Dynamic Wake Solution in enroute airspace
- Continue requirements development support for incorporating ADS-B Wx data in ADS-B ground system receipt & distribution (aircraft transmission of ADS-B Wx data expected to begin in CY24)
- Continue development of enhanced Dynamic Wake algorithms that use NWS forecasts and ADS-B Wx data

Out Year Funding Requirements*

	FY22	FY23	FY24	FY25	FY26	FY27
F&E	$ 2.5M	$2.5M	$ 2.5M	$ 2.5M	$ 2.5M	$ 1.0M

* Funding for out years FY24-27 has been requested but not yet approved in the FAA F&E Capital Investment Plan