REDAC/NAS Ops

Wake Turbulence Re-Categorization (RECAT)

BLSI Number: 1A05C

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RECAT Overview

What are the benefits to the NAS Users in the post COVID Era?

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
Project Support

People:

- Jillian Cheng, Project Manager

- Other federal resources: AIR Wake CSTA and AFS-400

- Contract support SMEs: wake analysis experts; ATC systems and operations experts; GA, regional and air carrier pilot experts

Laboratories/R&D Centers:

- MIT/LL

- Volpe Center

- WJH Technical Center
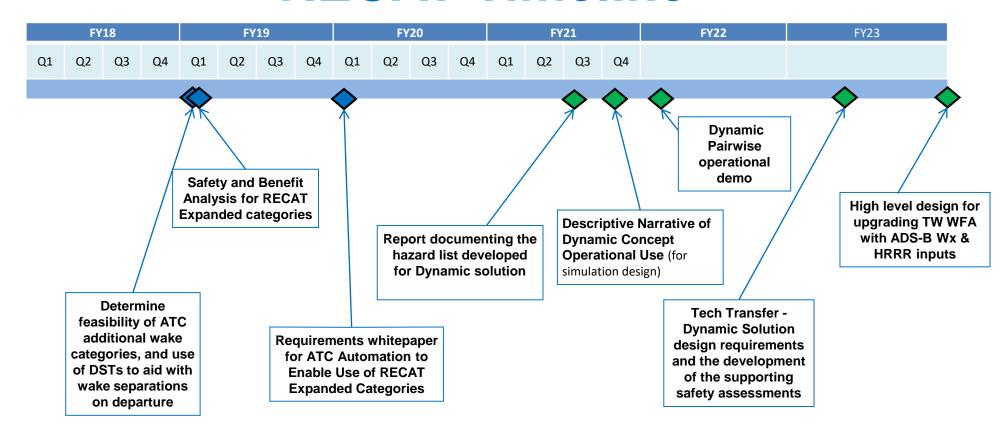
Current FY21 Accomplishments

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

Progressed in developing the Dynamic Pair-Wise Wake Separation – Mitigation (DSW-M) 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 Q1 FY22 demonstration of simulated Dynamic Pairwise Solution use in an ATC operational terminal area environment

- Initial design for using the SimFast prototyping capability for the Dynamic Pairwise Solution demonstration

- Continued analysis of the benefit that would be derived from the use of the TW Solution

ADS-B Wx data elements in the published Version 3 update of ADS-B MOPS

- Initiated inclusion of ADS-B Wx in the Technical Standard Orders (TSO) revisions for the Version 3 ADS-B update

- Developed minor ADS-B Wx corrections to the Version 3 ADS-B update

RECAT Timeline

FY18				FY19				FY20				FY21				FY22	FY23
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		

Safety and Benefit Analysis for RECAT Expanded categories

Dynamic Pairwise operational demo

Report documenting the hazard list developed for Dynamic solution

Descriptive Narrative of Dynamic Concept Operational Use (for simulation design)

High level design for upgrading TW WFA with ADS-B Wx & HRRR inputs

Determine feasibility of ATC additional wake categories, and use of DSTs to aid with wake separations on departure

Requirements whitepaper for ATC Automation to Enable Use of RECAT Expanded Categories

Tech Transfer - Dynamic Solution design requirements and the development of the supporting safety assessments

RECAT Anticipated Development in FY22

Planned Activities:

Dynamic Solution Development

- Dynamic Wake Solution Demonstration

- Refine the Dynamic Solution to incorporate findings from the proof of concept

- Develop detailed NAS User Benefit and Safety Assessments

Enterprise Architecture (EA)System Level Engineering
- Enterprise Architecture system level engineering to incorporate ADS-B Wx data to future dynamic wake Decision Support Tools (DSTs)

Initiate development of real time weather (ADS-B Wx) & NWS forecast upgrade to Wind Forecast Algorithm

Expected Products:

- Dynamic Solution's detailed NAS User benefit and safety assessments based of User feedback

- Continued inclusion of ADS-B Wx in the Technical Standard Orders (TSO) revisions for the Version 3 ABS-B update

RECAT Anticipated Development in FY23

Planned Activities:

- Technology transfer of the Dynamic Wake solution to FAA engineering development organization

- Complete high level design of Dynamic Wake algorithm upgrade that integrates NWS HRRR and ADS-B Wx aircraft weather data to enhance controllers' wake risk mitigating DSTs

- Continue engineering support in incorporating ADS-B Wx data into ADS-B ground system receipt & distribution

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

Expected Products:

- Dynamic Solution technology transfer package (design requirements, prototype wind forecast algorithm documentation, detail NAS User benefit and safety analyses, workshops with engineering developers)

- High level design of Dynamic solution algorithm upgrade for incorporating new weather data

- Continue inclusion of ADS-B Wx in the TSO revisions for the Version 3 ABS-B update

Emerging FY24 Focal Areas (if funded)

Initiate Dynamic Wake Technology Transfer to Interval Management (IM) & Paired Approach (PA) development activities

- Determine how the Dynamic capability is integrated into a wake risk mitigation solution for IM and PA
- Initiate development of Dynamic capability supplements to the IM and PA design requirement documentation
- Initiate development of Dynamic wind forecast algorithm modification needed for use in the IM and PA capabilities.

Initiate development of high level requirements for dynamic wake (DW) risk mitigation solutions for 3 NM En Route and En Route Interval Management (IM)

- Develop high dynamic wake risk mitigations for use in 3 NM En Route and En Route IM ATC operations
- High level assessment of User benefit coming from use of DW separations instead of the current static 5 NM wake risk mitigation separations

RECAT (FY24)

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 supporting OI-102157 Paired Approaches to CSPR, 102159 Paired Departure CSPR & 102117 Expanded use of 3 NM En Route

FY24 Outputs/Outcomes (if funded)

- Feasibility assessment of enroute wake concepts
- Initial design for integrating Dynamic solution into Paired Approaches to CSPR
- Feasibility algorithm for using ADS-B Wx in dynamic wake solution for 3 NM Enroute

FY 2024 Planned Development (if funded)

- Continue developing wake risk mitigation recommendations for new aircraft types (piloted and UAS) slated to receive ATC Separation Services
- Initiate adapting the Dynamic Solution for application in the Interval Management Arrival capability
- Initiate development of high level requirements for dynamic wake risk mitigation solution for 3 NM En Route
- Continued engineering support into incorporating ADS-B Wx data in ADS-B ground system receipt & distribution

Current and Planned Project Funding

	FY21	FY22	FY23	FY24	FY25	FY26
F&E ($M)	2.0	2.5	2.5	0.0	0.0	0.0