REDAC/NAS Ops

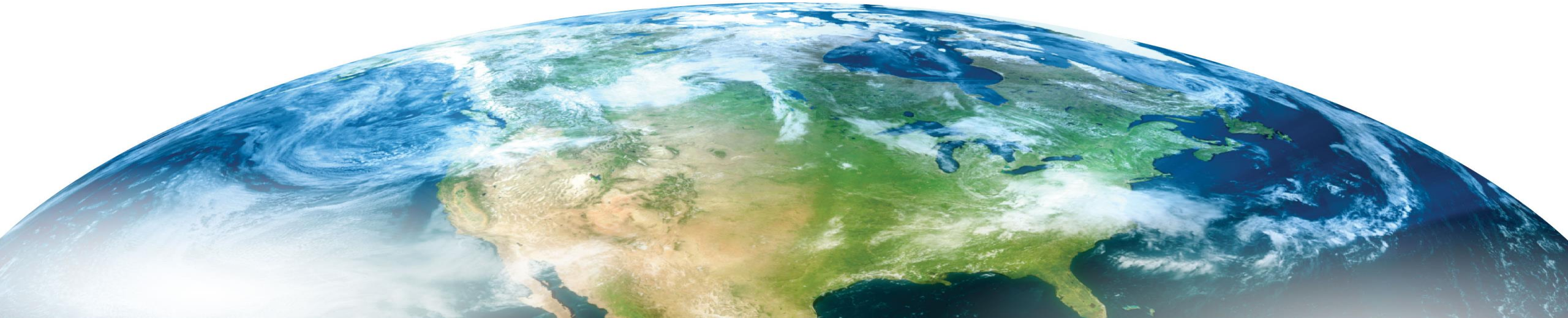
Wake Turbulence Re-Categorization (RECAT)

BLSI Number: 1A05C

Presenter Name: Jillian Cheng

Date: 17 March 2021

Review of FY 2021-2023 Proposed Portfolio



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

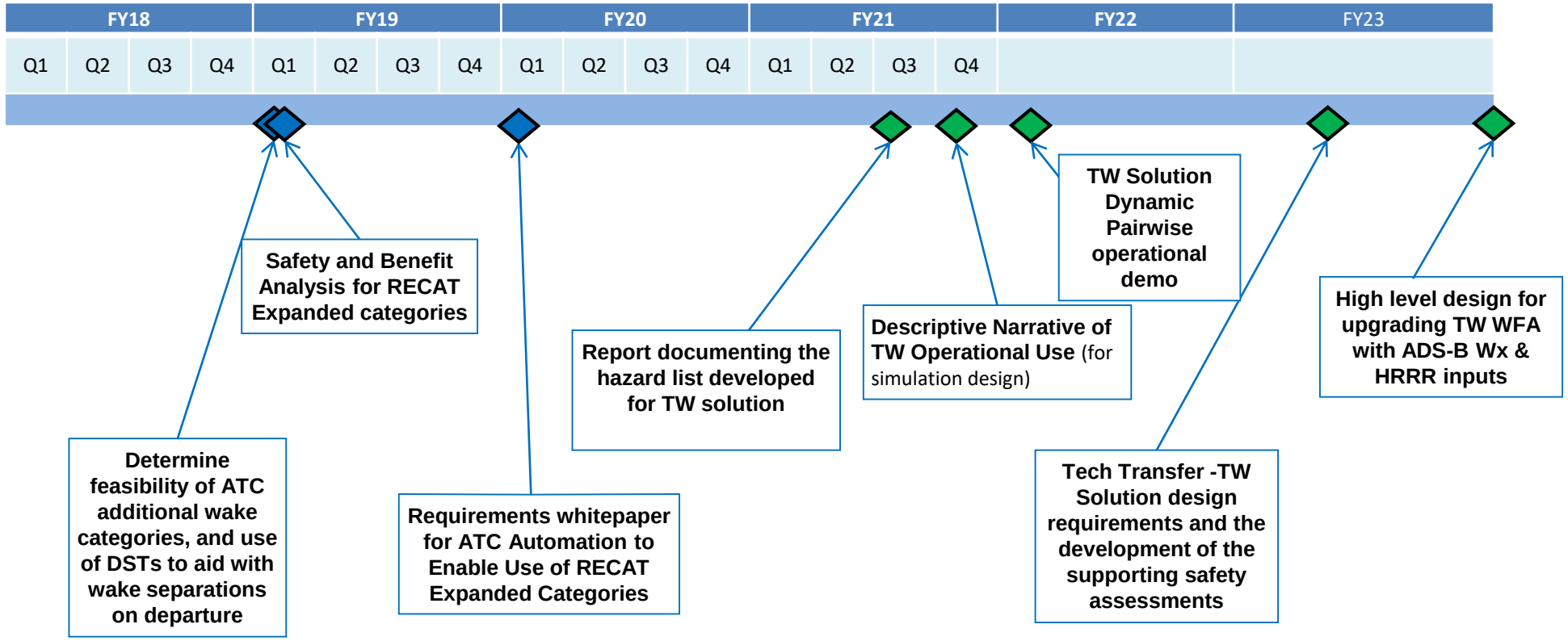
Provided wake separation recommendations for ATC's use with new aircraft types

Progressed in developing the Total Wind (TW) 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 a late 2021 virtual proof of concept demonstration of simulated TW use in an ATC operational terminal area environment
- Initial design for using the SimFast prototyping capability for the TW 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

RECAT Timeline



RECAT Anticipated Development in FY21

Planned Activities:

- Finalization of the prototype dynamic wind forecast algorithm for use in the dynamic wake solution demonstration
- Completion of SimFast scenarios for use in the 2021 virtual dynamic wake proof of concept demonstration
- Initial Enterprise Architecture system level engineering to route ADS-B Wx data to future dynamic wake DSTs

Expected Products:

- Updated wake separation adaptation parameter recommendations for ATC automation systems
- Plans for the 2021 dynamic wake virtual proof of concept demonstration
- Initiate inclusion of ADS-B Wx in the TSO revisions for the Version 3 ABS-B update

RECAT Anticipated Development in FY22

Planned Activities:

TW Solution Development

- Dynamic Wake Solution Virtual Demonstration
- Refine the TW Solution to incorporate findings from the proof of concept
- Develop detailed NAS User Benefit and Safety Assessments

Enterprise Architecture (EA) System Level Engineering

- Continue Enterprise Architecture system level engineering to route ADS-B Wx data to future dynamic wake DSTs

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

Expected Products:

- TW Solution's detailed NAS User benefit and safety assessments based of User feedback
- Continued inclusion of ADS-B Wx in the TSO revisions for the Version 3 ABS-B update

Emerging FY23 Focal Areas

(Note: FY23 is last year RECAT is planned to be funded)

Complete Dynamic Wake TW Solution Development:

- Transfer of the Dynamic Wake Solution's design requirements along with NAS User benefit and safety assessments to the FAA's engineering development organization for future development of the capability
- Develop TW algorithm adaptation parameters

TW Prototype Wind Forecast Algorithm Upgrade:

- Continue development of an TW algorithm upgrade that integrates NWS forecast model information and ADS-B Wx real time aircraft observed weather data
- High level assessment of User benefit coming from forecast algorithm upgrade

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

Outputs/Outcomes

- TW 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 TW algorithm upgrade

FY 2023 Planned R&D

- Technology transfer of the Dynamic Wake TW solution to FAA Engineering development
- High level design of TW algorithm upgrade that integrates NWS High Resolution Rapid Refresh (HRRR) and ADS-B Wx aircraft weather data to enhance controllers' wake risk mitigating DSTs

Current and Planned Project Funding

F&E ($M)

FY20	FY21	FY22	FY23	FY24	FY25
1.5	2.0	2.5	2.5	0.0	0.0