REDAC/NAS Ops

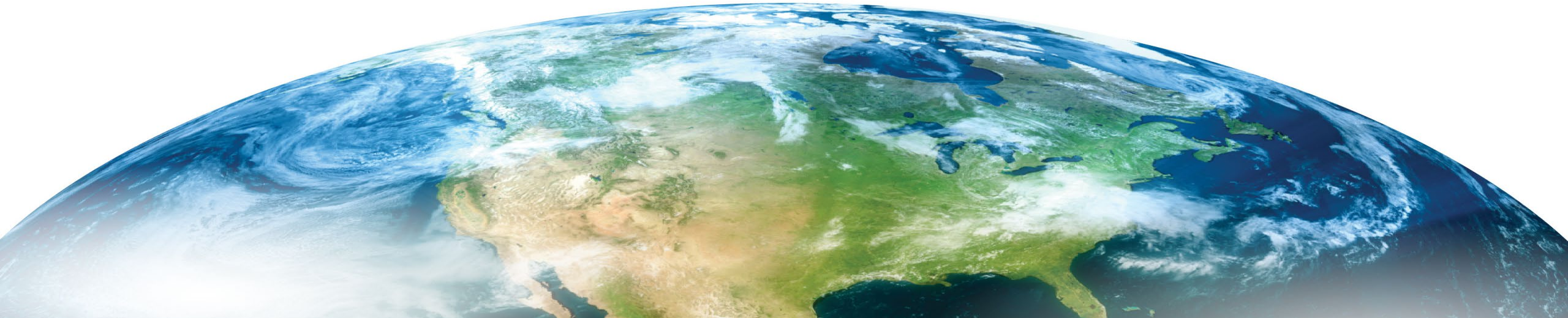
Wake Turbulence Re-Categorization (RECAT)

BLSI Number: 1A04B

Presenter Name: Jillian Cheng

Date: 2 September 2020

Review of FY 2020 - 2023 Proposed Portfolio



RECAT
Overview

What are the benefits to the NAS Users?

RECAT's development of enhanced means of safely separating aircraft from the wakes of other aircraft provides:

- Increased flight capacity of the nation's airports when weather or other conditions require ATC Instrument Flight Rule (IFR) operations
- Increased flight capacity of congested airspace
- Resulting in fewer flight delays/cancelations, reduced inflight operating costs, while ensuring the safety of the aircraft, crew, passengers & cargo

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 for wake for 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: 4 world renowned wake experts, two previous AFS Chief Science and Technology Advisors for Wake, retired branch manager for AFS-450

Laboratories/R&D Centers:

- MIT/LL
- Volpe Center
- WJH Technical Center

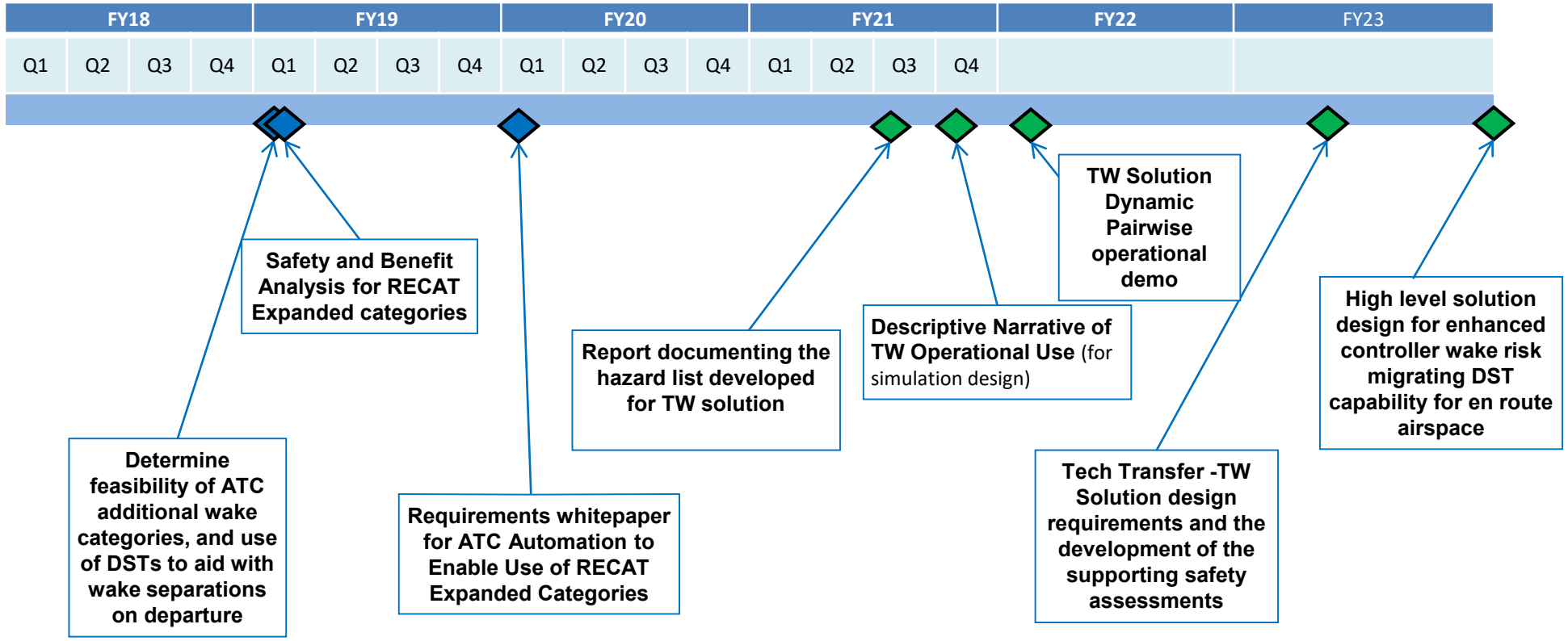
RECAT – Accomplishments in FY20

Progress in developing the Total Wind (TW) Dynamic Pairwise Wake Separation – Mitigation (DSW-M) solution for adding flight capacity to IFR flight capacity constrained airports:

- Determination of the ATC applied aircraft-to-aircraft wake separations that can be safely reduced when winds at the airport are at a certain magnitude (aircraft wakes decay faster when there is a wind present)
- Development of a prototype wind forecast algorithm that uses past history and current airport winds to forecast when it is safe to reduce wake separations between aircraft arriving to a single runway
- High level assessment of which NAS airports that would gain runway capacity benefits from the development and implementation of the TW solution
- Initiated planning for an October 2021 WJHTC demonstration of simulated TW use in an ATC operational terminal area environment

ADS-B Wx data elements accepted for inclusion in the Version 3 update of ADS-B MOPS

RECAT Timeline



RECAT Anticipated in FY21

Planned Activities:

- Preparations for a demonstration of TW solution simulated use in a “Hub” terminal area environment (scheduled for WJHTC Oct. 2021)
- Finalization of the prototype TW wind forecast algorithm coding for use in the TW solution demonstration
- Completion of ATC simulated procedure and DST design for use in the TW Oct. 2021 WJHTC demonstration
- Completion of comment resolution associated with the addition of ADS-B Wx data to the ADS-B Version 3 update
- Enterprise Architecture system level engineering to route ADS-B Wx data to future dynamic wake DSTs

Expected Products:

- Plans for the Oct. 2021 WJHTC demonstration of the TW solution’s simulated use
- WJHTC simulation environment for the TW demonstration
- Inclusion of ADS-B Wx requirements in the publication of the Version 3 ABS-B update

Activities in FY22

Planned Activities:

TW Solution Development

- Develop detailed NAS User Benefit and Safety Assessments
- NAS User Community review of preliminary design requirements, benefits and safety assessment
- Account for feedback from the NAS User Community review, begin development of finalized design requirement documentation

Enhanced Integrated Wind Forecast Algorithms Development

- Begin development of enhanced algorithms that integrate NWS forecast model information and ADS-B Wx real time aircraft observed weather data to enhance controller wake risk mitigating DSTs

Expected Products:

- TW Solution's detailed NAS User benefit and safety assessments
- High level design of integrated forecast and real time weather data algorithms to enhance controller DSTs

Emerging FY23 Focal Areas

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

TW Solution Development:

- Technology transfer of the TW Solution's finalized design requirements along with NAS User benefit and safety assessments to the FAA's engineering development organization for use in placing the TW capability onto the FAA terminal automation platforms

Enhanced Integrated Wind Forecast Algorithms Development:

- Continue development of enhanced algorithms that integrate NWS forecast model information and ADS-B Wx real time aircraft observed weather data to enhance controller wake risk mitigating DSTs

Solution Development to Mitigate En Route Wake Encounter Risks:

- Begin development of high-level wake risk mitigation solutions to enable controllers to provide the full NAS User operating efficiency benefits of Interval Management, Time Based Separation, and Trajectory Based Operations

RECAT

R&D Requirements

- Develop safe wake risk mitigation solutions to provide NAS Users increased operational efficiency – Fulfilling the requested 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 integrated data forecast algorithms
- System level solution design for providing en route controllers with dynamic wake risk mitigating decision support

FY 2023 Planned R&D

- Technology transfer of the TW solution to FAA Engineering development
- Development of enhanced algorithms that integrate NWS HRRR and real time aircraft observed weather data to enhance controllers' wake risk mitigating DSTs
- Develop system level solution alternatives for providing dynamic wake risk mitigating support to en route controllers

Current and Planned Project Funding

	FY20	FY21	FY22	FY23	FY24	FY25
F&E ($M)	1.5	2.0	2.5	2.5	0.0	0.0