

REDAC/NAS Ops Review of FY 2021 Proposed Portfolio

Randy Bass, ANG-C6 Weather Program BLI Number: A11.j

Weather Program A11.j

What are the benefits to the FAA

- Enhanced NAS safety via reduction of accidents associated with hazardous weather
- Improved NAS capacity/efficiency via reduced delays and cancellations and increased capacity in high traffic areas
- Reduction in environmental impact (i.e. lower fuel consumption via improved accuracy and accessibility of observed and forecast weather information)
- Enhanced GA safety via improved accuracy and accessibility of observed and forecast weather information

What determines program success

- Transition of research capabilities into evolving ATM decision support tools
- Research capabilities align with NSIP and NextGen emerging solution sets
- Incorporation by NWS of research capabilities to improve delivery of FAA required services
- Incorporation by NWS of research capabilities into weather information that is enhancing GA safety

Weather Program/BLI Number: A11.j Overview Capabilities

People:

• Program Manager and 10 Project Leads/Subject Matter Experts

Laboratories:

- NOAA ESRL Numerical Wx Modeling (NWM), Quality Assessment, TAIWIN
- NOAA NSSL Wx Radar Techniques, TAIWIN
- NOAA NCEP NWM, Ceiling & Visibility
- NWS MDL Ceiling & Visibility
- NCAR In-flight Icing, Turbulence, Convective Storms, Ceiling & Visibility, NWM, TAIWIN, HIWC
- MIT/LL Convective Storms, Ceiling & Visibility
- FAA Tech Center AWDE
- Volpe NTSC Weather Requirements for Wake Mitigation
- NRC TAIWIN
- ECCC TAIWIN, HIWC
- Diakon TAIWIN
- NASA HIWC, TAIWIN
- Australian BoM HIWC
- Metron Aviation, Inc. -- Turbulence

Weather Program–Accomplishments in FY19

- Convective Weather: Government and industry feedback on Offshore Precipitation Capability (OPC) collected; to be utilized in future upgrades. Assessment of Convective Weather Avoidance Model (CWAM) algorithms compared to NextGen Weather Processor (NWP) completed. Ongoing integration of Geostationary Orbiting Environmental Satellite (GOES) 16 and 17 into OPC
- **Turbulence:** Prototype HRRR-based Graphical Turbulence Guidance (GTG) using high-resolution numerical weather prediction input running at NCAR. GTG-Nowcast (GTGN), a short term, rapidly updated depiction of turbulence product, delivered to Aviation Weather Center for user evaluations. Developed automated turbulence translation technique to provide consistent interpretation of turbulence information, including a methodology for analyzing pilot behavior
- Ceiling and Visibility (C&V): Completed performance and user evaluations of C&V analyses targeted for implementation in the Helicopter Emergency Medical Services (HEMS) tool; Real-Time Mesoscale Analysis (RTMA) with improved product latency and C&V fields implemented into operations; transferred code for Localized Aviation MOS Program (LAMP) enhanced ceiling and visibility guidance to NWS for implementation; completed performance evaluation of CVA-AK Version 2.0; completed validation of camera based visibility algorithm performance with available METAR surface reporting sites
- In-flight Icing: Conducted In-Cloud and ICing Large drop Experiment (ICICLE) field program to collect in situ aircraft and surface based measurements of icing environments
- Advanced Weather Radar Techniques (AWRT): Modified Multi-Radar Multi-Sensor (MRMS) to compute composite reflectivity (CREF) product on specific flight levels; ARTCC overlays added to MRMS webpage; Improvements to brightband detection algorithm; Oklahoma City Terminal Doppler Weather Radar added to the MRMS experimental Composite Reflectivity (CREF)-max product for analysis



Weather Program – Accomplishments FY19 (cont'd)

- Modeling Development and Enhancement (MDE): Northern Hemisphere Rapid Refresh (RAP v4) implemented into operations by NWS; CONUS and Alaska versions of the High Resolution Rapid Refresh (HRRR v3) implemented into operations by NWS
- Quality Assessment (QA): Initial assessment of Ensemble Prediction of Oceanic Convective Hazards (EPOCH); C&V analysis assessment; core research on ensemble techniques, probabilistic forecasts, convectively induced turbulence techniques
- Aviation Weather Demonstration and Evaluation (AWDE) Services: Completed NWP Blended Forecast User Evaluation; Participated in the NOAA Aviation Weather Center (AWC) Testbed Summer & Winter Experiments
- Terminal Aviation Icing Weather Information for Nextgen (TAIWIN): Conducted ICICLE Dry-Run Exercise; Prepared and conducted ICICLE flight campaign
- **High Ice Water Content (HIWC):** Performed initial HIWC Nowcasting Trial between FAA, NCAR, and Australian BoM using the Algorithm for the Prediction of HIWC Areas (ALPHA) in preparation for formal study in FY20; HIWC Workshop with Trial participants
- Weather Requirements for Wake Mitigation: Continuation of examining weather parameters such as EDR and BVF information around the NAS to apply to the wake turbulence database

Anticipated Research in FY19 and FY20

Planned Research Activities

- Convective Weather: Improve OPC, CWAM and the EPOCH systems. Incorporate revised algorithms, new data sets to expand domain and user feedback
- **Turbulence:** Complete GTG High resolution (HRRR-based) & transition to NWS for implementation; Transition GTG Nowcast (15 min update rate) to NWS for implementation
- Ceiling & Visibility: Transition GLMP C&V analysis to operational HEMS tool; continue to develop camera-based visibility estimates technology and begin the transition to operations; establish real-time developmental parallel 3D RTMA with cloud analysis; begin work to increase the temporal resolution of the forecast to 15 minutes for the first three hours; transition the CVA-AK dynamic model calibration capability from NCAR to EMC for implementation in the RTMA; conduct an initial assessment of Slant Range operational needs, challenges & opportunities; and analyze and research methods of translating C&V analysis and predictions products into airport capacity and/or safety impacts
- IFI: Complete ICICLE field program to collect in situ aircraft measurements of inflight icing environments to use for development and validation of high resolution diagnostic and forecast capabilities including drop size
- QA: Plan, coordinate, and conduct scientific meteorological assessments of OPC; IPA-F Implementation; RAP Model V5 Upgrade; HRRR Model V4 Upgrade Impact; and VRMC Infrastructure and Monitoring Components
- AWDE: Conduct exploratory research to determine the suitability and develop use cases for IPA-D; Conduct research to determine how Ensemble Forecasts are used, how to visually display the forecasts, and information requirements needed for Ensemble Forecasts; Participate in the AWC winter and summer experiments; Conduct assessments of diagnosis and forecasting products including ceiling and visibility analysis, turbulence, and convective weather products

Anticipated Research in FY19 & FY20 (cont'd)

Planned Research Activities

- UAS Wx: Collaborate with FAA UAS community to ensure weather research to support UAS integration into the NAS aligns with the FAA's vision; Determine if ongoing weather research for manned operations can be leveraged to support weather capabilities for unmanned operations; Determine Urban Air Mobility weather needs; Identify existing weather capabilities for low altitude operations that may be applicable to UAS operations
- Terminal Aviation Icing Weather Information for Nextgen (TAIWIN): Develop capability that identifies and distinguishes between App C and App O icing conditions in the terminal area; Processing of ICICLE aircraft and ground sensor data for use in post-ICICLE analyses; Analysis of flight test results for specific ICICLE flight test events to begin to quantify the ability to diagnose and forecast the detection/discrimination of freezing drizzle from freezing rain aloft; Use available results from analysis of ICICLE flight campaign data to begin improving model microphysics and icing weather tools with emphasis on supercooled large drops
- High Ice Water Content (HIWC): Conduct analyses of flight test results to determine capability of modified airborne weather radar to identify hazardous HIWC conditions; Evaluate ALPHA with results from HIWC Airborne Radar II campaign and initial results from HIWC Nowcasting Trial. Coordinate and plan additional flight research focusing on continental engine ice crystal icing; Complete formal study for HIWC Nowcasting Trial between FAA, NCAR, and Australian BoM using ALPHA
- Advanced Weather Radar Techniques (AWRT): Improve QC algorithms for new MRMS integrated radars, including Cayman Islands, Belize, Sabanquay, and Campeche; Use data mining methods to better distinguish ground clutter vs areas with precipitation on radar systems; Improve mosaicking techniques to assess the effects of adding TDWRs into the MRMS mosaic; Perform evaluation on the Hydrometeor Classification Algorithm (HCA) on the developmental MRMS system
- Modeling Development and Enhancement (MDE): Transfer RAP v5 and HRRR v4 to NWS for FY20 implementation
- Weather Requirements for Wake Mitigation: Continue to monitor incident reports at near ground and in ground altitudes, continue analysis with LIDAR and weather sensor data to determine ideal location for future data collection; Arrival and Departure Wake Separation advisory system concept for single and parallel runways and assessment

Anticipated Research in FY19 and FY20

Expected Research Products

- **Convective Weather:** EPOCH forecast capability with higher Probability of Detection and lower False Alarm Rate; New CWAM tool for incorporation into NWP and increased domain (to include Western U.S., Hawaii and Guam) of OPC
- Turbulence: High Resolution GTG; High Resolution GTG Nowcast
- Ceiling & Visibility: Enhanced C&V information in the HEMS tool; Improved RTMA C&V analysis; improved camera based visibility estimates that are gridded for model ingest
- In-Flight Icing: Initial, internal high resolution diagnostic and forecast capabilities
- Terminal Aviation Icing Weather Information for Nextgen (TAIWIN): Demonstrate a TAIWIN capability that identifies and distinguishes between App C and App O icing conditions in the terminal area; Report on ICICLE campaign
- High Ice Water Content (HIWC): Report on flight test campaign, including analysis of results; ALPHA product ready for operational testing
- Advanced Weather Radar Techniques (AWRT): Time stamp mosaic operating on multiple vertical levels; Beam width mosaic implemented on the NSSL experimental MRMS system; Specific flight levels on the MRMS CREF product will be available on MRMS webpage
- Modeling Development and Enhancement: Begin development of HRRR v5 which will include longer convective weather forecasts up to 21 hours, 3 hour AK runs, common core with NWS models

Emerging FY21 Focal Areas

- **Convective Weather:** Transition of OPC and EPOCH to NWS; Transition of CWAM to NWP; High resolution, nowcasts (0-2 hour) of convection for UAS and Commercial Space
- **Turbulence:** Adapt GTGN to the High Resolution Rapid Refresh model; Incorporation of automated turbulence translation technique into traffic flow management decision support processes
- Ceiling & Visibility: Explore and develop ways to translate C&V analysis and prediction products into airport capacity and/or safety impacts; begin the transition of camera-based visibility estimates to an operational system; conduct field testing of a super compact, low energy usage ceilometer for use in remote areas with data gaps; improve C&V weather prediction models and post processing algorithms; develop tools and processes that advance the concept of a common operating picture for all aviation decision makers.
- QA: Investigation of new techniques and data sources; C&V Short-Term Forecasts; HRRR-based GTG; HRRR-based Current Icing Product (CIP) and FIP; VRMC; Investigation of techniques for assessment in support of Unmanned Aircraft Systems (UAS).
- AWDE: Assessments of diagnosis and forecasting products including ceiling and visibility analysis, turbulence, and convective weather products; Advance the AWDE Concept and Product Capability for the integration, evaluation and demonstration of future NextGen weather concepts and technologies.
- IFI: Diagnostic and forecast information in compliance with updated regulations and aircraft certification envelopes
- Terminal Aviation Icing Weather Information for Nextgen (TAIWIN): Assess and validate meteorological data from NWP models, weather radars, and other data sources with ICICLE research flight data collected for TAIWIN capability; Identify path forward for demonstrated TAIWIN capability
- High Ice Water Content (HIWC): Flight test campaign close to industrial area, where "non-pristine" environments exist, containing a larger variety and concentration of aerosols



Convective Weather

Research Requirement

- Improve observations and forecasts of convective weather and create and improve standards and techniques for weather DSTs to mitigate impacts on and improve efficiency of the NAS
- Improve accuracy over legacy systems; higher spatial and temporal resolution; well-defined probabilistic and gridded information; guidelines and strategies for developing products and DSTs that meet users' requirements and are applicable to their needs
- Sponsored by ANG-C6, ANG-C7, AJV, AJR, AJM
- POC: Jason Baker, ANG-C61, 202-267-1625

Outputs/Outcomes

- OPC: Blend lightning data, satellite imagery and weather model data to produce an estimate of precipitation for areas that lack radar coverage, merged with existing radar mosaic to provide controllers with better situational awareness for offshore sectors
- CWAM: Redesign of the model to incorporate machine learning techniques and optimize use in strategic time frames (2-8 hour forecasts)



EPOCH: Probabilistic convection guidance with lead times from 0 to 36 hours used for current operations and strategic planning of transoceanic flights

FY 2021 Planned Research

- Complete transition of the OPC to NWS and/or into NWP WP2 (Enhancement 1)
- Complete transition of new CWAM to AJM for integration into NWP
- Complete transition of the EPOCH algorithm to operations at the NOAA/Environmental Modeling Center (EMC) for use by the Washington World Area Forecast Center

FY19	FY20
\$1.2M	TBD



Turbulence

Research Requirement

- Improve turbulence observation and forecasting capabilities throughout the NAS to accurately identify & predict time, locations, & intensity of turbulence; improving safety, capacity, and efficiency in the NAS
- Sponsored by ANG-C6, ANG-C7, AJV, AJR, AJM
- POC: Tammy Flowe, ANG-C61, 202-267-2796

Outputs/Outcomes

 High resolution, gridded, global detection and probabilistic forecasts of turbulence (clear-air, mountain wave & convectivelyinduced) to support ATM DSTs, dispatcher and pilots resulting in improved safety, increased capacity and reduced atmospheric emissions within the NAS

Aircraft: Heavy • Plot: Combined • Vertical level: 4 max • 11 Forecast time: << Ohr - 152 03 Hov • >>

GTG - Max combined intensity (1000 ft. MSL to FL500)



FY 2021 Planned Research

- GTG ensembles/probabilistic development commences
- GTG Nowcast 2 (GTGN-2) high-resolution (HRRRbased) development commences

FY19	FY20
\$1M	TBD



Ceiling and Visibility (C&V)

Research Requirement

- Improve C&V prediction models with the goal of reducing GA accidents / incidents and improving airport efficiency
- Applications for improved C&V predictions include support for current and future TAF production; production of automated TAFs in areas where no TAF exists; improvements to the accuracy & resolution of AIRMETs; improvements to forecasts in TRACON areas; updates to the C&V analysis of Helicopter Emergency Medical Services (HEMS) tool
- Done in collaboration with NWS to improve products and services the FAA requires
- Sponsored by ANG-C6, ANG-C7, AJV, AJR, AJM
- POC: Jenny Colavito, ANG-C61, 202-267-2787

Outputs/Outcomes

- Improvements to C&V information in HEMS tool via LAMP
- All C&V products generated by common weather information
- Supports enhanced GA safety & ATM based decision support processes, dispatchers, and pilots resulting in improved safety



FY 2021 Planned Research

- Explore and develop ways to translate C&V analysis and prediction products into airport capacity and/or safety impacts
- Begin the transition of camera-based visibility estimates to an operational system
- Conduct field testing of a super compact, low energy usage ceilometer for use in remote areas with data gaps
- Improve C&V weather prediction models and post processing algorithms
- Develop tools and processes that advance the concept of a common operating picture for all aviation decision makers

FY19	FY20
\$1.1M	TBD

Quality Assessment (QA)

Research Requirement

- Improved observations & enhanced forecasts must have effective & reliable verification prior to becoming operational to ensure the accuracy, performance, and value of these products for NAS users
- Sponsored by ANG-C6, ANG-C7, AJV, AJR, AJM
- POC: ANG-C63 Sean Whelan 609-485-4838 & Steve Maciejewski 609-485-5950

Outputs/Outcomes

- Verification/assessment of aviation impact weather forecasts and analyses
- Data provided supports transition of research weather forecast products based on forecast accuracy, quality, and operational meaningfulness to ATM, dispatchers, and pilots



FY 2021 Planned Research

 Conduct quality assessments of weather research products for Alaska ceiling and visibility using camera images; high resolution turbulence; and high resolution inflight icing

FY19	FY20
\$1.276M	TBD



UAS Weather

Research Requirement

- There are gaps between current weather capabilities and weather information needed for safe and efficient airspace management of UAS operations
- The goals of the UAS Weather project are to further research identified gaps and explore the potential enhancement of current weather capabilities or development of new capabilities to close those gaps
- Sponsored by ANG-C6, ANG-C7 AJV, AJR, AJM
- POC: Lyndsay Digneo, ANG-C63, 609-485-6250

Outputs/Outcomes

 Improving weather information required for safe and efficient UAS operations and integration into the NAS



FY 2021 Planned Research

- Continue collaboration with FAA UAS organizations
- Include UAS weather needs in ongoing research

FY19	FY20
\$365K	TBD



Aviation Weather Demonstration & Evaluation (AWDE) Services

Research Requirement

- NextGen Implementation Plan (Reduce Weather Impact & Validating Concepts) states human factors, human-in-the-loop testing and demonstrations are essential tools for validating NextGen concepts
- Demonstration and evaluation services are required to assess weather research maturity and concept readiness for transition
- Sponsored by ANG-C6, ANG-C7 AJV, AJR, AJM
- POC Sonia Alvidrez, ANG-C63; 609-485-7613

Outputs/Outcomes

 Enhanced demonstration and evaluation services with subject matter expertise, improved data resources including live aircraft situation data, and metrics capability



 Data & analysis to reduce programmatic risk, aid in definition & validation of requirements & inform AMS lifecycle management activities to improve the delivery of research capabilities developed

FY 2021 Planned Research

- Conduct assessments of diagnosis and forecasting products. Including:
 - Turbulence Forecast
 - Ceiling and Visibility Analysis
 - Convective Weather Forecast Statements
 - In-flight Icing Diagnosis

FY19	FY20
\$500K	TBD



Terminal Area Icing Wx Information for NextGen (TAIWIN)

Research Requirement

- Responds to operational needs new SLD Rule 25.1420 and NextGen *Reduce Weather Impact* capacity and throughput requirements in freezing precipitation
- Develop capability/technology to manage impact of new certification Supercooled Large Drops (SLD) rule on terminal area operations; research on automated reporting systems and improved weather diagnostic/forecast tools
- Sponsored by: ANE-100, ANM-100
- POC Stephanie DiVito, ANG-E2; 609-485-7152

Outputs/Outcomes

- Improved icing weather information including SLD in terminal area
- Maintain/improve efficiency and safety in icing conditions under new SLD rules in terminal area, facilitating smooth transition to new operational rules and/or



Freezing drizzle ice accretion process

guidance anticipated from Flight Standards corresponding to new SLD certification rule

FY 2021 Planned Research

- Continue to conduct analysis of flight test results to quantify the ability to diagnose and forecast the detection/ discrimination of freezing drizzle from freezing rain aloft.
- Use available results from ICICLE flight campaign data analyses to continue improving model microphysics and icing weather tools with emphasis on supercooled large drops.

FY19	FY20
\$1.4M	TBD

Mitigating the Ice Crystal Wx Threat to Aircraft Turbine Engines (HIWC)

Research Requirement

- NTSB: A-96-54, -56, & -58
- Characterization of High Ice Water Content (HIWC) ice crystal environments that can be a threat to turbine engines
- Diagnosis and forecasting of HIWC ice crystal environments
- Sponsored by AFS-200
- POC Jim Riley, ANG-E2; 609-485-4144

Outputs/Outcomes

- Atmospheric HIWC ice crystal data set sufficient for assessment of certification envelopes, development of test facilities, onboard detection for avoidance, and diagnosis and forecasting for avoidance
- Enhanced avoidance of HIWC conditions



Flight path for collection of HIWC ice crystal data

FY 2021 Planned Research

 Preparation for additional flight research focusing on continental engine ice crystal icing (ICI)

FY19	FY20
\$750K	TBD



Acronyms

- AAWU Alaska Aviation Weather Unit
- Airmet Airmen's Meteorological Information
- AK Alaska
- ALPHA Algorithm for Prediction of HIWC Areas
- ATM Air Traffic Management
- AWRT Advanced Weather Radar Techniques
- BOM Australian Bureau of Meteorology
- BVF Brunt Vaisala Frequency
- CIP Current Icing Product
- CWAM Convective Weather Avoidance Model
- ECCC Environmental & Climate Change Canada
- EPOCH Ensemble Prediction of Oceanic Convective Hazard
- FIP Forecast Icing Product
- FLs Flight Levels
- GA General Aviation
- GLMP Gridded LAMP
- GTG Graphical Turbulence Guidance
- GTGN GTG Nowcast
- GOES Geostationary Operational Environmental Satellite
- HCA Hydrometor Classification Algorithm
- HEMS Helicopter Emergency Medical Services
- HIWC High Ice Water Content

- HRRR High Resolution Rapid Refresh
- ICICLE In-Cloud Icing and Large-Drop Experiment
- LAMP Localized Aviation MOS Program
- MDL Meteorological Development Laboratory
- MRMS Multi-Radar, Multi-Sensor
- NAS National Airspace System
- NRC National Research Council of Canada
- NSIP NextGen Segment Implementation Plan
- NTSC National Transportation Systems Center
- NWP Numerical Weather Prediction
- NWS National Weather Service
- OPC Offshore Precipitation Capability
- RTMA Real-Time Mesoscale Analysis
- RU Rapid Update
- SLD Supercooled Large Droplet
- TAF Terminal Area Forecast
- TAIWIN Terminal Area Icing Wx Information for NextGen
- TDWR Terminal Doppler Weather Radar
- TRACON Terminal Radar Approach Control
- UAS Unmanned Aircraft Systems
- Wx Weather





In-Flight Icing

Research Requirement

- Improve operationally-available, high-resolution, accurate diagnoses and forecasts of aircraft icing conditions that can be used by aviation users to make decisions on icing threat areas, optimum routings, and areas to avoid in compliance with recently updated regulations and aircraft certification envelopes
- Sponsored by ANG-C6, ANG-C7, AJV, AFS, AIR
- POC: Danny Sims, ANG-C61, 202-267-2785

Outputs/Outcomes

 Diagnostic & forecasts up to and beyond 18 hours over the CONUS and Alaska for operational use by ATM, dispatchers, and pilots to enhance capacity and safety.



In-Flight Icing Severity 1000 ft MSL – FL300

FY 2021 Planned Research

 Transition to NWS CONUS and Alaska high resolution in-flight icing diagnosis and forecast capability to explicitly predict conditions associated with certification envelopes.

FY19	FY20
\$900K	TBD



Model Development and Enhancement

Research Requirement

- Weather prediction models are the basis for all aviation weather hazard forecasts beyond 2 hours. Improve operationally available numerical weather prediction model resolution and refresh rates to enhance forecasts of aviation weather hazards including inflight icing, turbulence, convective weather, and ceiling and visibility will require model enhancements
- Sponsored by ANG-C6, ANG-C7, AJV, AJR, AJM, AFS, AIR
- POC: Danny Sims, ANG-C61, 202-267-2785

Outputs/Outcomes

- 0-36 hour high resolution rapid refresh to include oceanic airspace to support aviation forecast products
- Global model with hourly output compatible with suite of NOAA models
- Enhanced NAS safety and capacity/efficiency from improved forecasts of aviation specific weather hazards



FY 2021 Planned Research

- Transition enhanced High Resolution Rapid Refresh (HRRR) version 4 to NWS for implementation
- Conduct research towards hourly updated global forecasts to supplant current, regional, hourly-updated models

FY19	FY20
\$1.0M	TBD



Advanced Weather Radar Techniques

Research Requirement

- Conduct and implement research toward a highresolution, high quality, three-dimensional (3D) weather radar data analysis from national and international radar networks
- Provide improved detection and forecasting for hazardous phenomena such as turbulence, icing and convection, and deliver these products and services in a manner that allows for their rapid and effective use by NAS decision-makers
- Sponsored by ANG-C6, ANG-C7, AJV, AJR, AJM
- POC: Randy Bass, ANG-C61, 202-267-2800

Outputs/Outcomes

- Domain Expansion: Incorporate data from international radars, including those in and around the Caribbean, Gulf of Mexico and Pacific basin
- Provide reflectivity at specific flight levels beneficial to aviation users



- Improve validation techniques to ensure that Multi-Radar Multi-Sensor (MRMS) data can be used effectively and reliably for operational decision making
- Improve diagnosis and depiction of icing conditions of interest to aircraft operations, including graupel and hail

FY 2021 Planned Research

- Increase the spatial coverage of MRMS capabilities over offshore areas, including areas in the Caribbean, Mexico, and the Pacific
- Time Stamp Mosaic: Improve capability for determining the age of radar data and ways to alert users with a time indicator on the current MRMS mosaic
- Implement Terminal Doppler Weather Radars (TDWRs) into the MRMS mosaic

FY18	FY19
\$380K	TBD

Weather Requirements for Wake Mitigation

Research Requirement

- Applications include development of the requirements for an encounter probability model to test operational concepts of wake solutions and the development of wake vortex prediction model for real-time use of establishing wake vortex separations.
- This application will incorporate weather information with its associated measurability and predictability, calculate statistical prediction bounds on the transport and decay of aircraft wake.
- Sponsored by ANG-C5, AFS
- POC: Jillian Cheng, ANG-C51 202-267-9157

Outputs/Outcomes

- Computer modeling for Encounter Probability Model
- Development of an airport wind and weather-based wake vortex separation advisory system
- Information/Analyses to develop procedures and systems to improve NAS safety and efficiency



FY 2021 Planned Research

• Integrate wake turbulence data with higher resolution weather data to further explore wake mitigation potentials

FY19	FY20
\$300K	TBD

