



The FAA's Weather Research Program

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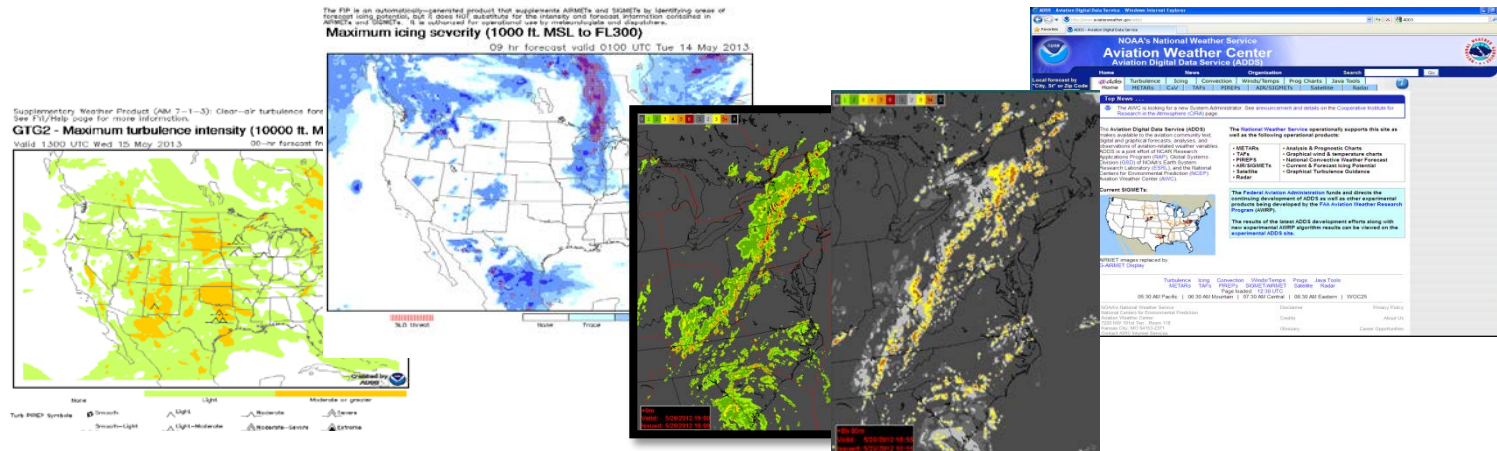
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FAA

Aviation Weather Research Program (AWRP)

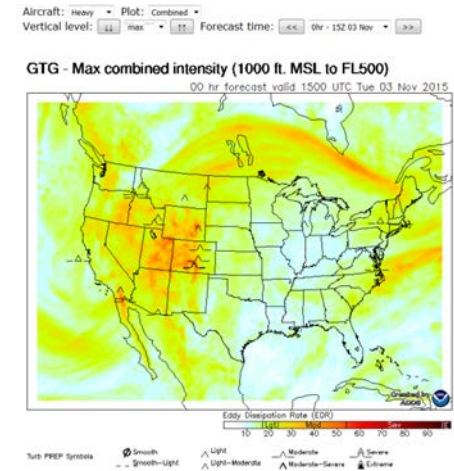
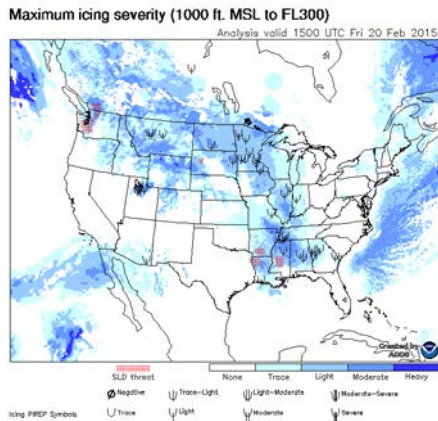


- Research to minimize the impact of weather on the NAS via:
 - Programs to meet specific NextGen Operational Improvements in NextGen Implementation Plans
 - Collaborative, complementary initiatives with National Weather Service (NWS) to transition legacy capabilities to meet NextGen requirements
 - Focused projects to help mitigate safety and/or efficiency issues associated with well-documented weather problems



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Formal Avenues for Research Inputs

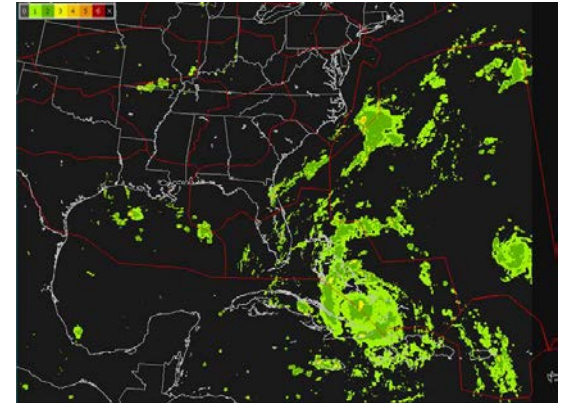
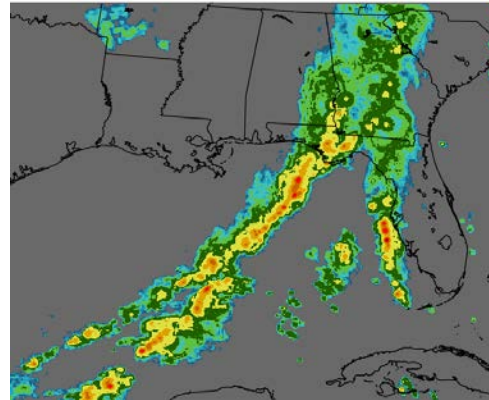
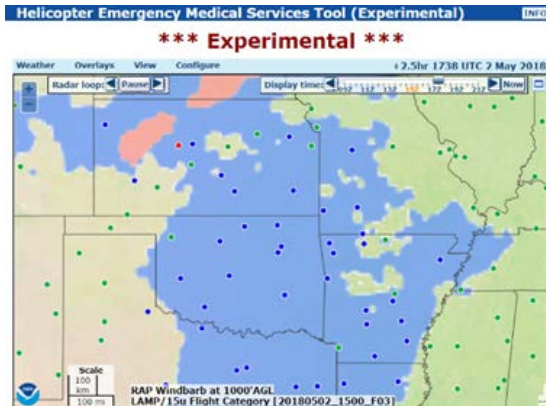


- Public stakeholder input received through the congressionally mandated Research, Engineering, and Development Advisory Committee (REDAC)
 - Advisory committee to the FAA
 - Stakeholders including industry, FFRDCs, and academia
- The REDAC provides advice and recommendations to the FAA Administrator on the needs, objectives, plans, approaches, content, and accomplishments of aviation research program



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Formal Avenues for Research Inputs



- The committee reviews and comments on the aviation research programs including Centers of Excellence and other grants
- Develops reports documenting REDAC's input known as REDAC Findings and Recommendations (F&Rs.)
- The research programs, including AWRP and the Weather Technology in the Cockpit (WTIC), evaluate REDAC findings and recommendations
 - Respond with adjudications and action plans for conducting research to meet REDAC F&Rs



Formal Avenues for Research Inputs

- The Weather Program Portfolio Proposal
 - Research team leads submit a list of proposed topics for FY+2
 - Based on NextGen requirements/regulatory linkages and roadmaps
 - Anyone or any group can recommend a research topic to the team leads
 - Prioritized by safety, efficiency and capacity, and internal/external drivers criteria
 - Voted on by FAA stakeholders including ANG, ATO and others
- Provides the basis for funding requests for future fiscal years, and lays the foundation for research plans



Weather Program PPT FY2020 Portfolio Proposal

Program	Aviation Weather Research Program (AWRP)
Fiscal Year	FY20
Title of Research Proposal	Convective Storms – Provide improved thunderstorm information (analyses and forecasts) that enable more efficient use of available airspace, thus increasing NAS efficiency, capacity, and safety.
Submitter	Randy Bass, ANG-C61, randy.bass@faa.gov , 202-267-3800
Sponsor Contact Information	William Bauman, ANG-C61, william.bauman@faa.gov , 202-267-8345
Description of the Proposal	<p>Convective events (thunderstorms) and associated hazards have a greater impact on National Airspace System (NAS) operations than do any other weather phenomena. Yet, as dynamic, short-lived and often fast-moving sub-synoptic scale phenomena, they are the most challenging aspect of weather to detect, depict (or display) and accurately forecast. Thunderstorms contribute to NAS inefficiency and reduced capacity by causing large numbers of flight delays and cancellations, as well as safety of flight to passengers and crew. In order to reduce the delays and cancellations caused by thunderstorms, better convective weather analyses and forecasts are needed, as are Decision Support Tools (DST) to mitigate the impacts of convection. Improved weather information will allow for greater utilization of available airspace, leading to greater NAS efficiency, capacity and safety during the transition into NextGen.</p> <p>Based on NextGen requirements, forecasts of hazards caused by thunderstorms must provide the following:</p> <ol style="list-style-type: none"> 1. Improved accuracy over legacy systems at all time horizons 2. High spatial resolution: extremely fine in terminal areas (<0.5 km) and gradually getting coarser in terminal, en route and global domains 3. High temporal resolution: extremely fine in terminal areas and short horizons (as fine as 25 seconds), and gradually getting coarser in terminal, en route and global



Previous AWRP Research Process

- Annual Weather Research Workshops
 - Recommendations from attendees including airlines, General Aviation, National Weather Service and FAA Air Traffic Management (ATM) are considered in developing the Weather Program Portfolio
- Guidance from Research Evolution Plans
 - Developed with inputs from airlines, NOAA, ATM, other agencies, industry and subject matter experts (SMEs)
 - Utilized to facilitate the identification and selection of research in the Weather Program portfolio
- Attendance at scientific conferences and symposia
 - Learn about the latest aviation weather advances, new techniques, shortfalls in weather support and services, and emerging concerns
 - Meet with other aviation and weather SMEs for exposure to discuss and gather inputs from both national and international user and research perspectives



Previous AWRP Research Process

- Inputs from labs and vendors
 - Recommendations and proposals from our national lab partners, commercial vendors, and NOAA
 - Backwards process
- Unsolicited proposals
 - Rarely implemented due to the FAA contracts process, even for good ideas
- Research team leads
 - “The Grinch got a wonderful, awful idea”

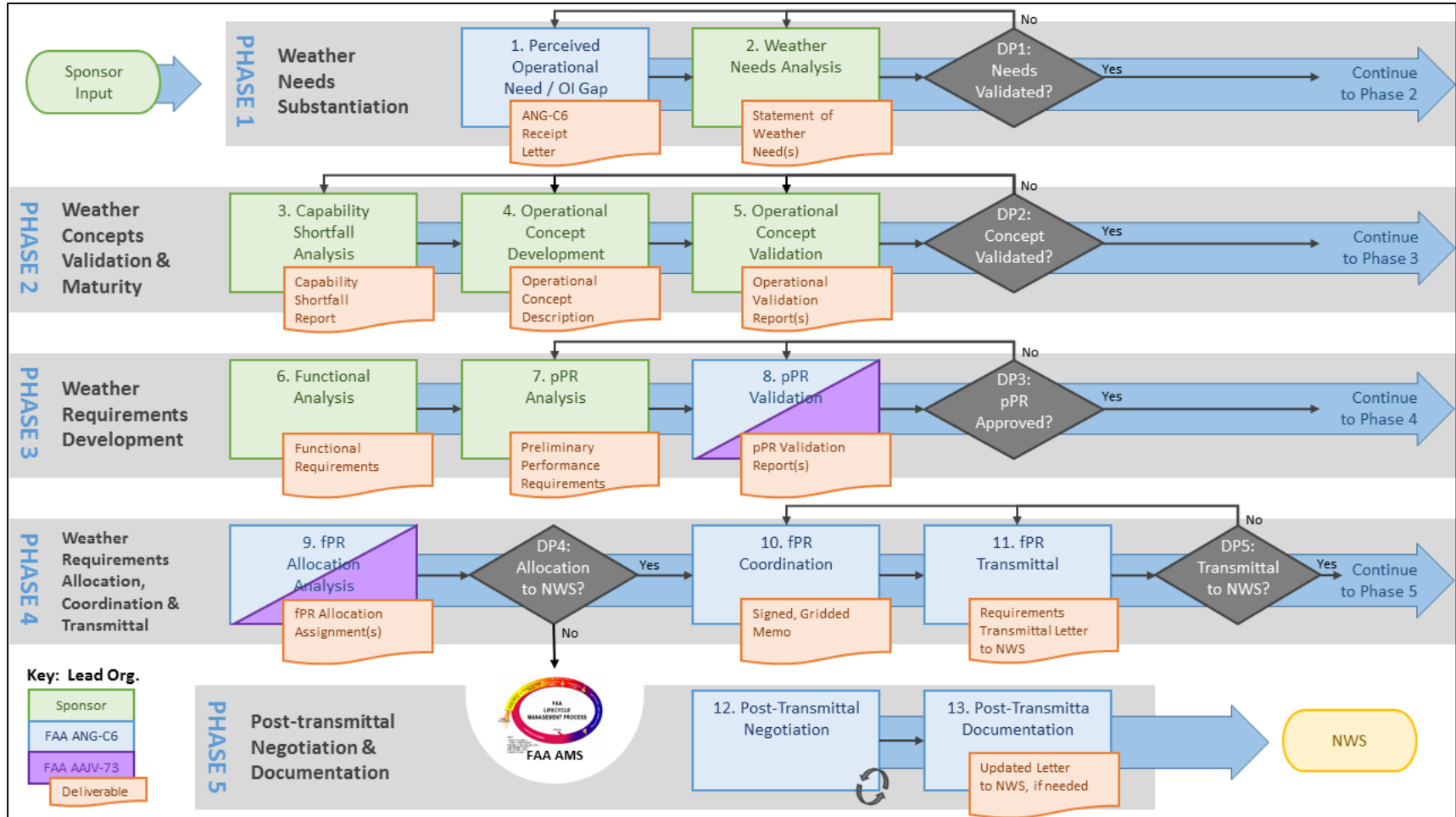


The New Research Process

- Instead of AWRP leads responsible for determining which topics should be researched, we went back to basics
- Base weather research topics on validated requirements
- Policy & Requirements Branch, ANG-C64, responsible for determining requirements
 - Clearinghouse for all FAA weather requirements
- Requirements that can't be met through existing NWS, FAA or industry solutions and require research are sent to the Weather Requirements Branch, ANG-C61
- Prioritized and vetted
- Stakeholders and providers such as NWS are now included in the process from the beginning to facilitate smoother transition to operations for successful research projects



ANG-C6 Weather Requirements Service (WRS) Process



The New Research Process

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These are still valid ways for those with aviation-weather interests to interact with AWRP personnel and suggest topics of research, but we will gently guide you to the Policy Branch to work



In Conclusion

- The Aviation Weather Division has established a new requirements process that drives weather research
- The Policy and Requirements Branch will collect, validate and vet requirements; the Weather Research Branch will conduct research when a suitable solution is not available to meet a requirement
- Suggestions, recommendations and other inputs regarding research ideas are welcome from government, industry and academia
 - We don't want solutions looking for problems, but sometimes a technology push is a good thing



Weather Technology in the Cockpit (WTIC) Program Overview

- **Portfolio of research projects to develop, verify, and validate standards recommendations to incorporate into Minimum Weather Service (MinWxSvc) standards and guidance documents for Part 91, 135, and 121 aircraft**
- **MinWxSvc is defined as:**
 - Minimum cockpit meteorological (MET) information
 - Minimum performance standards/characteristics of the MET information
 - Minimum information rendering standards
 - Enhanced MET training



WTIC Program Objectives

- **Enhance safety by identifying and resolving risks before they become accidents**
- **Incorporate MinWxSvc recommendations into standards and other guidance documents**
 - Enables NextGen operations and benefits, and pilot roles
- **Resolve operational (current and NextGen) inefficiencies associated with adverse weather**
- **Enhance pilot MET-training to enable effective and consistent adverse weather decision-making**

WTIC is not building cockpit applications so outreach to industry is necessary for implementing MinWxSvc(s).



WTIC – Avenues for Research Inputs

- Identify gap or problem that needs to be resolved
 - WTIC projects are primarily applied research to resolve issues
 - A gap should identify the current state and the desired state
 - Gap needs to be verified or supported by data, or research input needs to be a request for a gap analysis
 - Confirmed gaps are tracked on a WTIC spreadsheet to resolve
 - Program attempts to place gaps in buckets to achieve overall MinWxSvc goals (Pilot roles, Automation, Safety)
 - WTIC accepts inputs on gaps that need resolution from any source and in any format
 - Upon verification of gap, it is added to tracking spreadsheet



WTIC – Avenues for Research Inputs

- Project development
 - Scoping meeting held with NextGen upper management typically in first quarter of fiscal year
 - Present list of candidate projects, resolves selected gaps from spreadsheet, for evaluation and approval
 - Number of projects based on funding and estimated costs of each effort
 - Project planning includes estimation of total cost to resolve gap (number of phases to reach transition point)
 - Projects typically conducted in 1-year phases due to instability of funding
 - Each phase attempts to produce useful conclusions
 - Target is for phases to cost \$200K to \$400K to enable multiple projects to be worked



WTIC – Avenues for Research Inputs

- Scoping Meeting Results
 - Projects either approved, disapproved, or requests for additional details
 - Goal of scoping meeting is to receive approvals on projects that total available funding
 - Since each gap is a verified problem difficult to prioritize
 - Gaps not selected or approved remain on spreadsheet for tracking to resolution
 - A project that is not approved does not mean that the gap is not valid



WTIC – Avenues for Research Inputs

- Project Level Agreement (PLA)
 - PLAs typically submitted for approval around the end of the calendar year
 - PLA is both a project plan and a NextGen management approval to spend project funds on projects in the PLA
 - PLA includes description of work, estimated cost, anticipated contractor/vehicle or grant to perform research, schedule
 - PLA addresses intended path to transition
 - MinWxSvc recommendations to: Standards groups (RTCA), pilot community, industry, training materials



WTIC – Avenues for Research Inputs

- Summary and Conclusion
 - Any individual or organization is welcome to submit inputs for gaps they want WTIC to research to develop a recommendation for resolution
 - Submit directly to the WTIC Program Office or through NextGen management
 - Fourth quarter fiscal year is best time to submit inputs to align with scoping meeting and PLA process
 - Pure research is conducted periodically, but typically small dollar amounts and must have some path to implementation
 - Research needs to benefit FAA and not just enhance knowledge

