

Weather

Center of Excellence for General Aviation

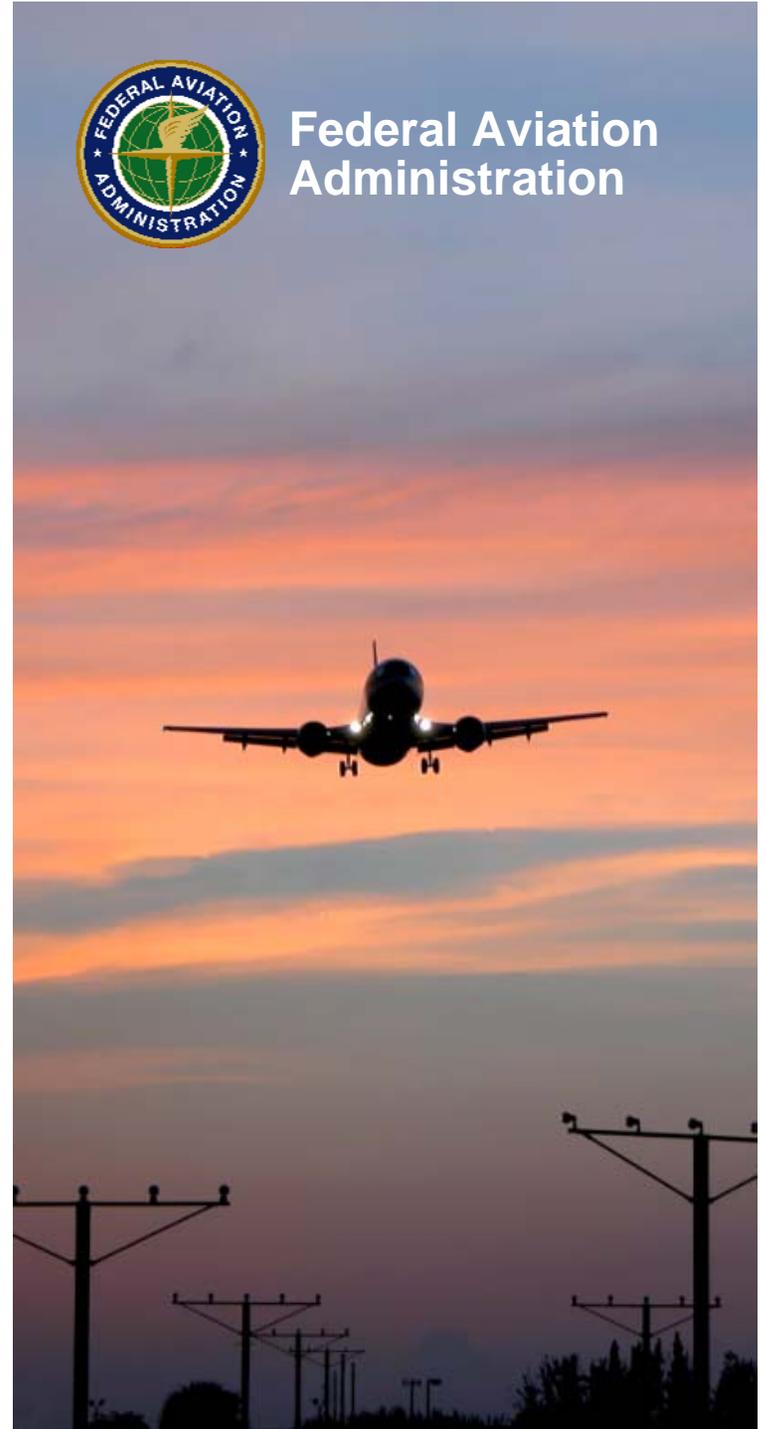
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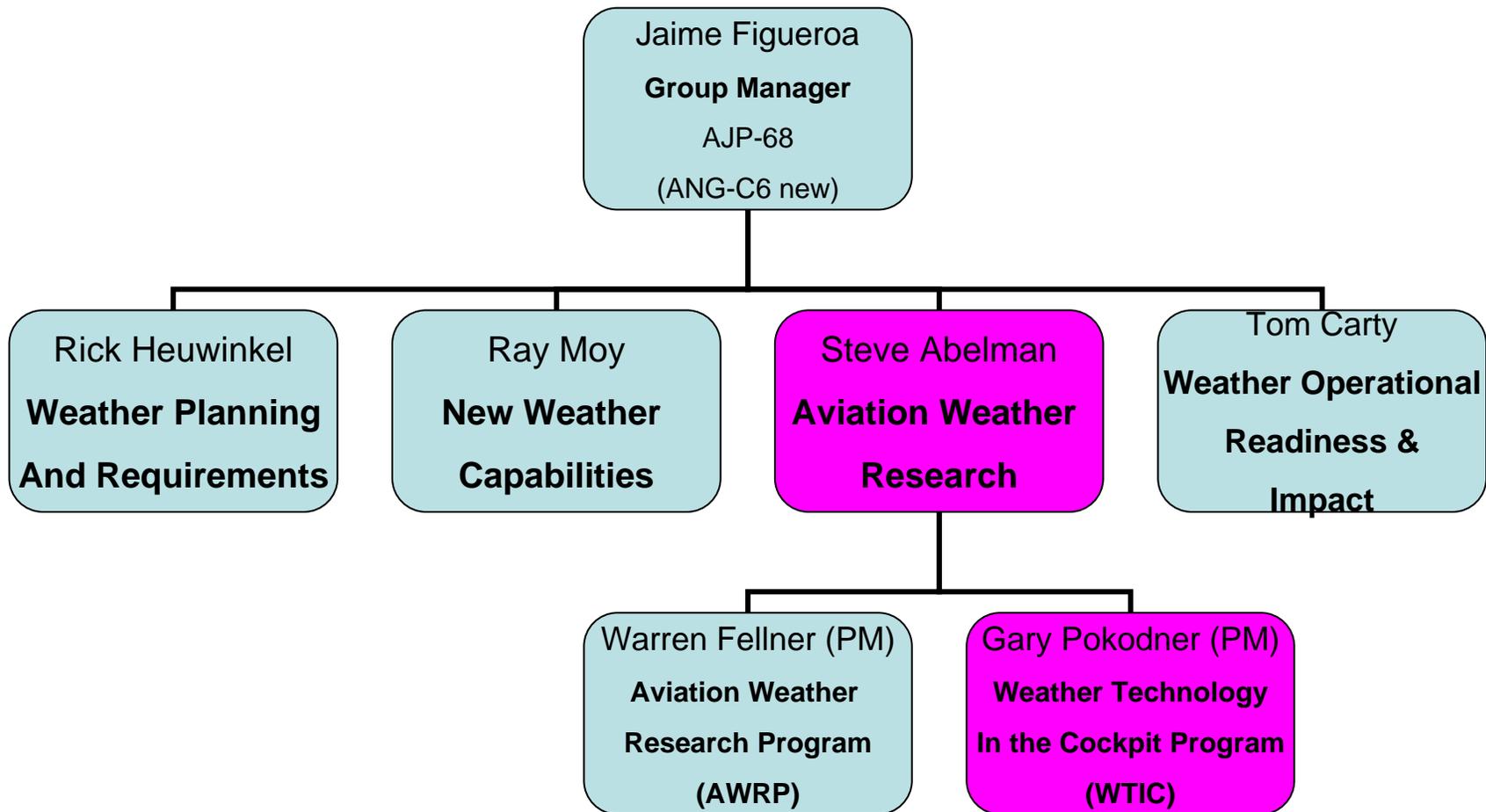
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Federal Aviation
Administration



Aviation Weather Group Overview



Aviation Weather Group Overview

- **Establishes and coordinates strategic direction for weather initiatives to enhance national airspace (NAS) weather capabilities in mitigating the impact of weather.**
- **Plans and conducts research, development and prototyping of new weather capabilities and technologies to meet current and future aviation needs.**
- **Evaluates suitability and utility of existing, new, or improved weather products, systems, and capabilities.**
- **Facilitates the integration of aviation weather capabilities into the NAS to enhance safety and capacity.**
- **Develop accurate and accessible weather information, systems and tools to improve safety, capacity, and efficiency of the Aviation system.**



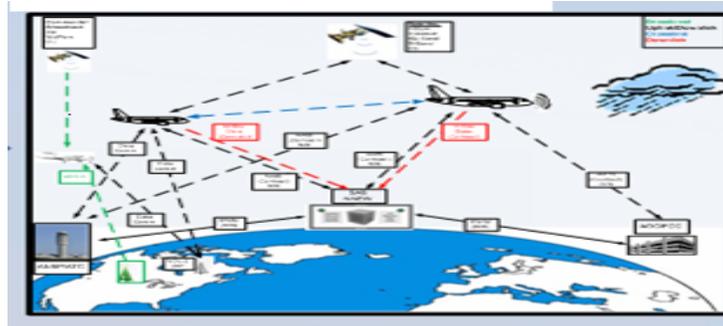
Weather Technology in the Cockpit (WTIC) Overview

A portfolio of research projects that support the common goal of enabling availability and enhancing the quality and quantity of meteorological (MET) information available to the aircraft to support safe and efficient commercial and general aviation operations



WTIC Goals and Benefits

- **Support collaborative ATM Services philosophy to accommodate user preferences**
- **Enable the MET data exchange to/from the NextGen-defined Weather Common Service and its infrastructure**
- **Improved reaction to changing airport conditions**



WTIC Goals and Benefits (cont)

- **Enhanced FMS utilization of wind data**
- **Updated and improved MET training and MET guidance material**
- **Improved human factors and enhanced common situational awareness**
- **More efficient use of existing data link bandwidth allocated for MET**
- **MET data ready for full integration with cockpit decision support tools**
- **Enable NextGen concepts**



Previous and On-going GA Research

GA User Needs Study

- **RESEARCH**

- Preferences for MET information services for preflight planning and during flight
- Preferred methods for receiving MET information

- **PROCESS**

- Conducted pilot surveys, mapped results to demographic groups, performed statistical analyses, and documented findings and recommendations



Previous and On-going GA Research

GA Concept of Operations (CONOPS)

- **RESEARCH**

- Identify elements to include in a WTIC GA CONOPS
- Survey pilots to identify their MET product preferences (focused on weather products provided by ADS-B)

- **PROCESS**

- Survey approximately 500 pilots
- Analyze data to recommend number and type of flight scenarios, flight phases, and weather conditions
- Define preferred weather products and weather alerts



Previous and On-going GA Research MET Training and Guidance Materials

- **RESEARCH**

- Examine education and training issues
- Identify depth of pilot knowledge required
- Review MET policy and guidance material for currency and comprehensiveness
- Provide improvement recommendations

- **PROCESS**

- Review guidance documents (Advisory Circulars)
- Perform interviews to evaluate weather-related decision making in a collaborative environment
- Deploy and evaluate a proposed training module



Previous and On-going GA Research Incident Investigation

- **RESEARCH**

- Identify contributing causes to incidents/accidents on data linked equipped aircraft (Part 91 and 121) that list weather as a contributing factor
- Assess impact of available MET data on incident

- **PROCESS**

- Develop CALLBACK survey
- Perform detailed CALLBACKs on 100 Aviation Safety Reporting System (ASRS) incident reports (Part 91 and 121)
- Perform trend analysis on CALLBACK results
- Provide recommendations



Previous and On-going GA Research

MET Presentation Standardization

- **Research**

- Quantify GA pilot weather-related decision making with current non-standardized MET data presentations
- Determine prioritization, if any, of developing standardized MET symbols (is standardization more important for certain information presentation)

- **Process**

- In simulator, evaluate pilot decisions during weather encounters with various common MET presentations
- Assess impact of non-standardized presentations

Potential GA Research

- **Development of a GA Conops**
- **Potential issues as NextGen capabilities are phased in (interim ground and air states)**
- **Enhanced observation data and presentation to GA aircraft**
- **Uses of portable devices to improve common situational awareness between air and ground**
- **Impacts of probability on pilot weather-related decision making (vs deterministic)**
- **Human factors issues associated with the dynamic reconfiguration of airspace, including issues associated with information display, training and cognitive complexity**



Potential GA Research

- Develop an industry standard for designating the age of a NextRad image and time stamping it (currently weather providers compile and stamp the image differently).
- Feasibility, potential uses, and a benefits analysis of GA aircraft receiving and using AeroMACS in the terminal area at low altitudes (currently being developed for on-ground use). For example, receive graphical AWOS to obtain current cross wind information prior to landing.
- Getting PIREPS on actual conditions into the system efficiently, quickly disseminated, and forecasts updated (auto-PIREPS may be cost prohibitive for GA).
- Develop and recommend appropriate rule sets for weather avoidance decision-making in both non congested and highly congested airspace



Challenges for New WTIC Research

- WTIC GA projects harder to sell internally than commercial aviation related projects
- GA and commercial aviation have different needs and solutions
- Differentiation of FAA roles and industry roles in moving forward
- Need to keep equipage costs really low
- Need to build strong FAA business case (capacity, efficiency, etc) with targeted stakeholders for each new WTIC research project
- Funding

