# Weather Technology in the Cockpit (WTIC) Planning and Status Update

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# Weather Technology in the Cockpit (WTIC)

## Program Description

- Research projects to develop, verify, and validate requirements for incorporation into Minimum Weather Service (MinWxSvc) standards
  - FAR Part 121, OPERATING REQUIREMENTS: DOMESTIC, FLAG, AND SUPPLEMENTAL OPERATIONS (i.e. commercial operations)
  - FAR Part 135, OPERATING REQUIREMENTS: COMMUTER AND ON DEMAND OPERATIONS AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT (i.e. commuter, on demand, and air taxi operations)
  - FAR Part 91, GENERAL OPERATING AND FLIGHT RULES (includes General Aviation operations)

- The MinWxSvc is defined as:
  - Minimum cockpit meteorological (MET) information
  - Minimum performance standards (e.g. accuracy) of the MET information
  - Minimum information rendering standards

| FY13 Enacted | FY14 Enacted | FY15 President's Budget Submission |
|---|---|---|
| $4.8M | $4.0M | $4.04M |

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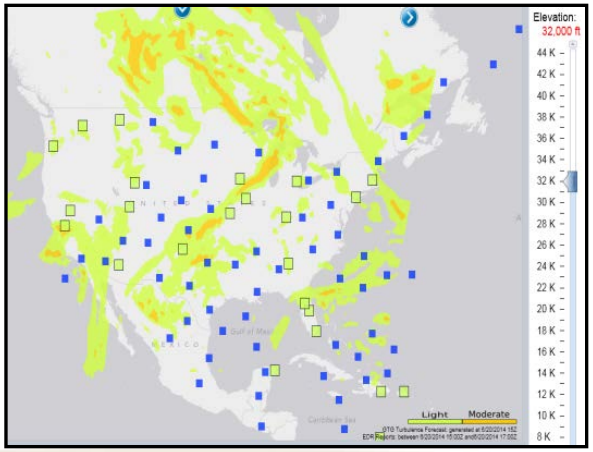
# WTIC – Eddy Dissipation Rate (EDR) Update

- Completing operational demonstration on cockpit display of turbulence information
- Benefits assessment post demo – Benefits to aircraft and NAS to be assessed
- Developing technical transfer package

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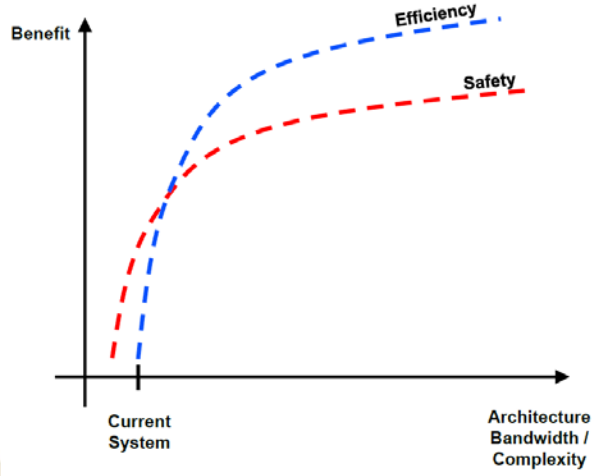
# Adverse Weather Alerting

- Researching potential benefits of providing adverse weather alerting in GA and Part 121
  - Turbulence alerting using NTDA separate alerting project
  - Candidates: microbursts, hail, icing, non-convective turbulence, low IFR, high crosswinds, etc




- What are the minimum data link requirements for weather alerting?
  - Investigate the data link architecture design space
  - Some data link capabilities are more beneficial than others
  - Prioritize use cases to fully understand the tradeoff of architecture capability (complexity, bandwidth) to system benefit

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# WTIC – Standards Development

- WTIC research and deliverables to support standards, guidance, and training material development
- GA training modules planned to be posted on FAA training site
- RTCA standards alignment among contributing special committees (SC-186, SC-206, SC-214, SC-227)

# RTCA Special Committee 206

- Established Feb. 11, 2005 at the request of the FAA to address the future ATM concept of:
  - Establishing the aircraft as a primary participant in collaborative decision making (CDM).
  - Transitioning to a global Aeronautical Information Management (AIM) environment.
  - Using Broadcast, Demand, and Contract data link modes for accessing AIS/MET information.
  - Establishing the data link services as the normal (or primary) means for cockpit receipt & decisions using time-critical information
  - ***For the first two deliverables listed below, this SC worked in conjunction with EUROCAE WG-76***

- Leadership
  - Co-Chairs: Rocky Stone, United Airlines and Allan Hart, Honeywell
  - Designated Federal Official: Eldridge Frazier, FAA - Weather Research Branch
  - Secretary: Tom Evans, NASA
  - RTCA Program Directors: Sophie Bousquet

- Sub-groups
  - #4 (DO-252) Tim Rahmes, Boeing & Tammy Farrar, FAA
  - #5 (MOPS) Stephanie Smith, Garmin & Paul Freeman, ITT Exelis
  - #6 (MASPS) Matt de Ris, Panasonic Avionics Corporation & Allan Hart, Honeywell

| Deliverable | Date Completed | Status | Document # |
|---|---|---|---|
| Operational Service and Environment Description (OSED) for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services | Dec 2007 | Released | DO-308 |
| Safety and Performance Requirements (SPR) for AIS and MET Data Link Services | Oct 2010 | Released | DO-324 |
| Wake Vortex, Air Traffic Management, and Weather Applications OSED | June 2012 | Released | DO-339 |
| Concept of Use of AIS and MET Data Link Services (supports MASPS) | June 2012 | Released | DO-340 |
| AIS and MET Services Delivery Architecture Recommendations | December 2013 | Released | DO-349 |
| Revise DO-252 to include performance standards for determining EDR and meteorological sensor reports and status | June 2014 | Approved | |
| Minimum Operational Performance Standards (MOPS) for Flight Information Services – Broadcast (FIS-B) with Universal Access Transceiver (UAT) | December 2014 | In works | |
| Minimum Aviation System Performance Standards (MASPS) for AIS and MET Services | December 2015 | In works | |

# WTIC General Aviation Gap Analyses

- Multiple projects performing research to identify safety hazards at least in part attributable to a gap of MET information the cockpit
- Sample gaps and shortfalls
  - Inconsistent recognition of changing weather states between commercial presentation
  - As low as 26% recognition of METAR changing from MFR to IMC
  - Weather related incidents/accidents decision based versus skill based
  - Interim research indicating as much as 70% GA aircraft penetrating convective weather had NEXRAD on board
  - GA MET equipment marketing is primarily feature based versus use and application based

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# WTIC - Future

- Displays - Integrating information on the flight deck
  - Weather integrated with other information
  - Human factors for hazard alerting
  - Integration of airborne sensor data into 4-D weather
- Sensing and information processing
  - Research on new and enhanced external sensors
  - Automated weather hazard monitoring
- Net-centric information sharing