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

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July 22, 2014
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

<table>
<thead>
<tr>
<th>FY13 Enacted</th>
<th>FY14 Enacted</th>
<th>FY15 President’s Budget Submission</th>
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<tbody>
<tr>
<td>$4.8M</td>
<td>$4.0M</td>
<td>$4.04M</td>
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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
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
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)
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
- 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

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