Flight Deck Weather Information: Current and Future

Friends and Partners of Aviation Weather

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Overview

• Background

• Current Capabilities
  – Weather Information on mobile devices and avionics
  – Advanced Airborne Radar
  – Improved Global Weather

• Future Capabilities
  – Integrated Weather
  – Advanced HMI for 4D Weather Avoidance
  – Crowd Sourced Weather
Background

• Cockpit Weather Information Improvement Enablers and Drivers:
  – Improved Connectivity
  – Improved Airborne Wx Sensors
  – Increased Automation
  – Mobile Devices
  – FAA NextGen Weather and System Wide Information Management (SWIM)

• Cockpit Weather Information Deficiencies
  – Lack of high quality global weather information
  – Lack of integrated weather
  – Disparate views of weather from pilot vs. ground perspectives.
Weather on Flight Decks: Mobile Devices

• Nearly all mobile devices have applications that can access and display weather information.

• ARINCDirect mobile application provides display of weather information. Integrated with ground flight support services, the application provides alerting of future weather threats to operators.

• Mobile devices provide an effective method of delivering advanced interactive weather solutions to flight decks.
  – Easier to incorporate enhanced weather threats (turbulence, icing, convective, etc.)
  – Decision support functions can be readily added.
Weather on Flight Decks: Integrated Avionics

- Integrated avionics, such as Pro-Line Fusion, provide the most up to date information on position and location of threats, including weather threats using uplink weather and the airborne weather radar.

- Multiple views of the weather allow pilot to display graphical weather with flight path and aircraft position overlays.

- Unrestricted use in all phases of flight.
MultiScan ThreatTrack™ Radar

- WXR-2100 MultiScan In Service Since 2002

- Extensive Customer Base
  - 8000+ Systems in Service

- Fully Automatic Radar Operation
  - Horizontal and Vertical weather scanning.
  - Adaptive Gain and Ground Clutter suppression
  - OverFlight Protection™
  - Geographic Weather Correlation
  - Certified Turbulence & Windshear Detection
  - Threat Assessment

- Based on ‘Dark Cockpit’ (Clean Screen) Philosophy

Threat Assessment Brings Significant Operational Benefits
Improved Global Weather

- Weather vendors and university researchers developing high quality global weather information.

- Satellite products and existing global sensors being used in unique ways.

ARINCDirect Predicted Convection
Global Integrated Weather

Data Fusion automates complex datalink usage logic and takes advantage of the strengths of each sensor source.

DO-340 Datalink Wx Usage Guidelines

Single Integrated Threat Display

Separate Threat Displays/Layers
Advanced 4D weather avoidance
Crowd Sourcing Weather Information

- FAA WTIC office research to determine feasibility of Crowd Sourcing weather information for aviation.
- Global anonymous participants (aka “crowd”) analyze web camera images to provide summary visibility data to operators.
- 2016 Research:
  - Prototype evaluation at William J. Hughes Technical Center.
  - Quality Control Assessment.

Current State

Future State