Aeronautical Information Services

AAtS Demonstration: Lessons Learned

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Collaborative Decision Making

System Wide Information Management

Air Traffic Management

Collaborative Decision Making

Aircrew

Equipped Aircraft (thousands)

North America Wi-Fi Availability Trend *

2013 2014 2015 2016 2017 2018

* http://www.ipass.com/wifi-growth-map/
Aircraft Access to SWIM

- Technology agnostic solution that demonstrates airborne application of ground based System Wide Information Management (SWIM) Service Oriented Architecture (SOA)
- Facilitates exchange of non-command and control/safety critical information between pilots and other National Airspace System (NAS) users
- Facilitates a commonly sourced/shared aviation information environment for strategic collaborative decision making
- Leverages existing air/ground third party service providers’ infrastructure and technologies without new equipage mandates
Operational Overview

Command & Control
Voice, Data Comm, ADS-B, ADS-C

AAtS Data Management Service

Dispatch
ACARS, Voice

Flight Operations Center

External Data Sources

System Wide Information Management Infrastructure
- Weather Information
- Aeronautical Information
- Traffic Management Information

Air Traffic Control
Automation Systems

Existing Exchange
IP Data Link

Air Traffic Management
Demonstration Objectives

• Assess feasibility of commercial services for exchanging SWIM-enabled NAS data

• Provide technical findings and recommendations for future standards development

• Validate concept in cooperation with NAS users/stakeholders
Demonstration Scenarios

- Weather Information
- Flight Information Update
- Electronic PIREP Submission
- Aircraft Preference Publication
- Initial 4DT Preference Exchange
Key Lessons Learned

- Data Format and Sizes
- Flight Object Governance
- DMS standardization
- Data Link Configuration
- EFB connectivity
- EFB application Integration with AOC
- Human Factors
Data Format and Sizes

- Standardized data formats that are optimal for ground to ground exchange are not ideal for limited bandwidth connections available on aircraft
  - Filtering non applicable fields in AXIM / WXXM / FIXM
  - Use of Industry standards (e.g. JSON)
Flight Object Management

- Flight Object* includes large number of data fields
  - Aircraft Identification, type, airspeed, departure location, destination, route of flight, ETA, crew capabilities, aircraft capabilities, etc.
- Define what fields should be editable by whom during which phases of flight to support flight operations

*Flight Object is the aggregated collection of flight data and related information which supports the goal of improving system-to-system interoperability within the NAS and beyond
Data Management Service Standardization

- Standardization required to ensure consistent display of information among DMS providers
  - NEXRAD washout
  - Data validity (PIREP)
Data Link Configuration

• Implementation requires close coordination with data link provider to ensure reliable service
  – Intended use
  – Data encryption
  – Editing the packets sent/received by the EFB application
  – Dedicated link to flight deck
  – IP data link availability requirement
Connection Status Indication

- Connectivity status notification required to prevent false sense of situational awareness
  - Router
  - Internet
  - DMS
  - SWIM
Integration with AOC and Avionics

- Potential for improved trajectory planning through integration with optimization tools and automation systems
  - AOC
  - FMS
Human Factors

• Implementation of EFB applications requires extensive human factors consideration
  – DMS Login Method
    • Balance security and functionality
  – Button placement
  – Map clutter
Future Potential

- SWIM Data Maturity
- IP Data Link Advancements
- Increased EFB and Avionics Integration
- Air Traffic Management Automation Improvements
- Automated Position Reporting
- Automated Aircraft Sensor Data Downlink
- Much More…
Contact

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