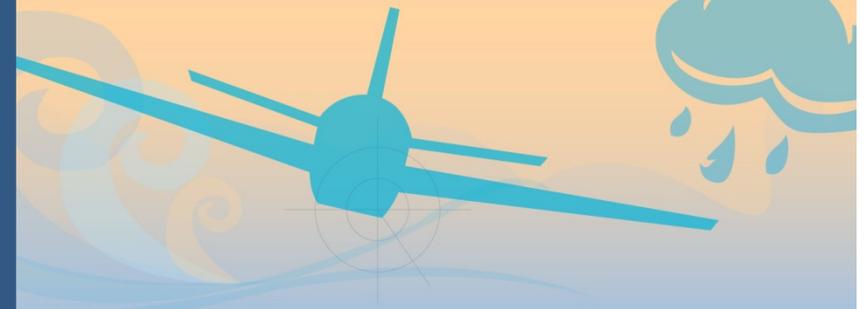*Enabling Information Sharing thru Common Services*

Federal NOTAM System (FNS)
Enabling NOTAM Modernization Through Information Management Standards

Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)

August 30, 2011 - September 1, 2011
NOAA Science Center & Auditorium
Silver Spring, Maryland

Presented By: Shaelynn Hales, CNA
Date: August 30, 2011

Introduction / Agenda

- Digital NOTAMs
  - Concept for NOTAM Modernization
- NOTAM Scenarios
  - Foundation of International Standards
- Federal NOTAM System (FNS)
  - End to End Demonstration: NOTAM Collection through Distribution

Framing the NOTAM Problem

- NOTAM Users experience an overload of information that is not easily managed to provide them with the critical real time information on the NAS relevant to their needs

- NOTAM Originators experience significant delays between the time they observe and report the hazard condition and when the NOTAM is issued to the aviation community

Addressing the NOTAM Problem

- FNS can help address the delay issue by collecting the information at the source in a standard manner that can be validated and published

- FNS can help address the issue of providing relevant information to end users by leveraging the standardized inputs that can be parsed and understood

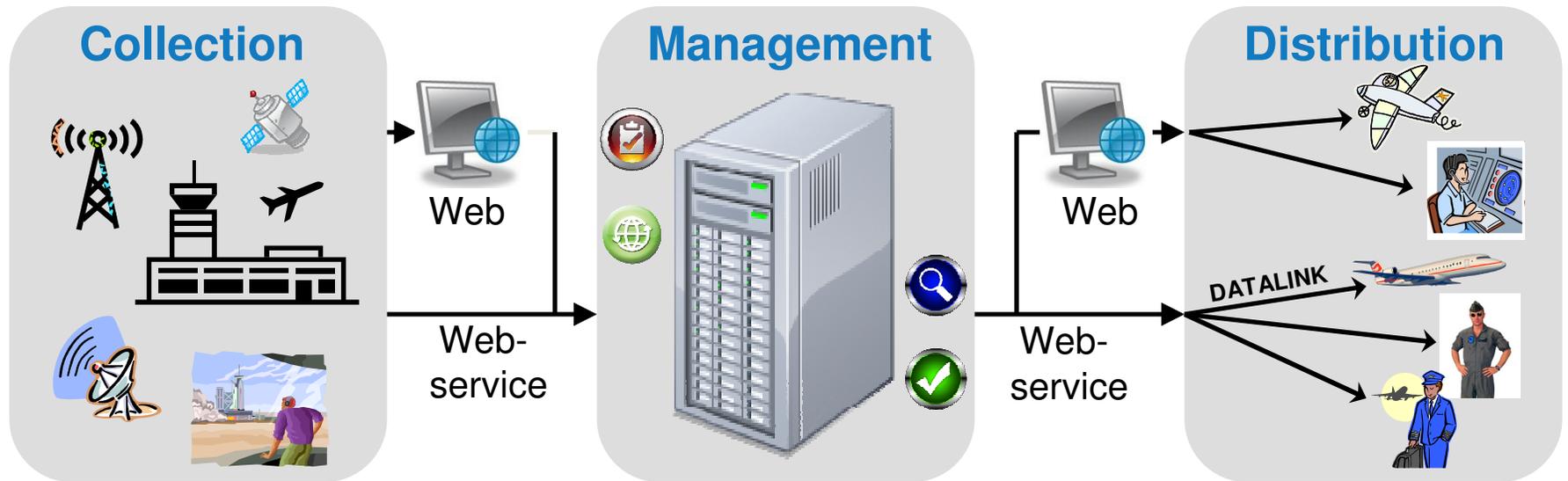# NOTAM Modernization Concept of Operation

Collection

Web

Web-service

Originate NOTAMs at the Source

Digitally Capture Temporary Hazard Information

Management

Web

Web-service

Integrate Permanent and Temporary Information

Apply Business Rules, Validate Data, Translate, and Publish

Distribution

DATALINK

Distribute NOTAMs to the Users

Electronic Distribution to FAA customers, Computer Readable

EUROCONTROL

Federal Aviation Administration

FNS User Benefits

Benefits for the NOTAM Originator

- Quick and easy issuance of NOTAMs
- Improved NOTAM management
- Standardization of NOTAM inputs
- Intuitive user interface
- Instant validation feedback
- Higher quality NOTAMs

Benefits for the NOTAM User

- Improved NOTAM understanding through standardized information
- Increased situational awareness
- Improved decision making
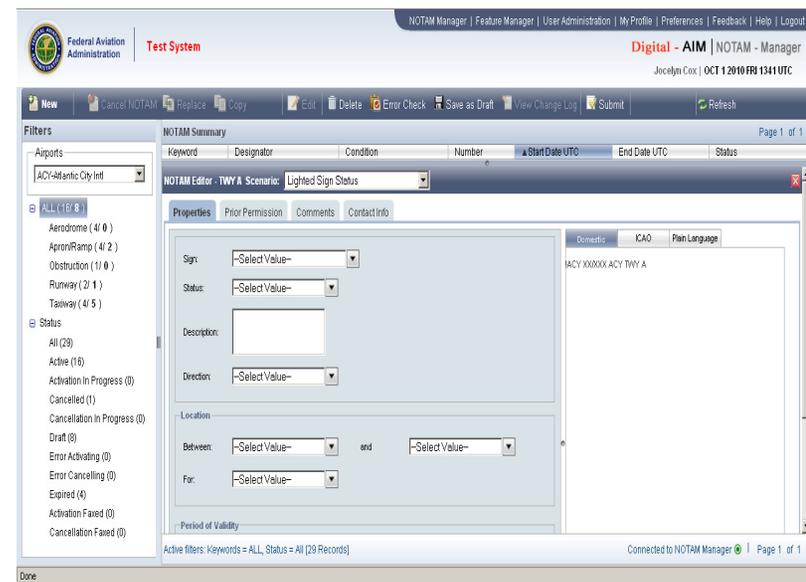- Advanced capabilities
- Higher quality NOTAMs

FNS Foundational Concepts

- ## Standards Based
    - Aeronautical Information Exchange Model (AIXM)
    - Open Geospatial Consortium (OGC) Web Services
    - Service Oriented Architecture (SOA)

- ## Business Processes Reengineering
    - Digitization of Aeronautical Information at the Source
    - Direct Digital Capture

What is a Digital NOTAM?

- Digital NOTAM Definition
  - A dataset that contains NOTAM information in a structured format
  - Fully interpreted by an automated system without human intervention

- Characteristics of Digital NOTAMs
  - Geo-referenced
  - Temporal
  - Linked to static data
  - Transformable
  - Query enabled
  - Electronically distributable

AIXM (XML) Message

```
<aixm:designator>ACY</aixm:designator>
<aixm:name>ATLANTIC CITY INTERNATIONAL AIRPORT</aixm:name>
<aixm:locationIndicatorICAO>KACY</aixm:locationIndicatorICAO>
<aixm:designatorIATA>ACY</aixm:designatorIATA>
</aixm:AirportHeliportTimeSlice>
</aixm:timeSlice>
<aixm:timeSlice>
<aixm:AirportHeliportTimeSlice gml:id="CY01_TS02">
<gml:validTime>
<gml:TimePeriod gml:id="CY01_TS02_TP01">
<gml:beginPosition>2010-01-15T09:00:00</gml:beginPosition>
<gml:endPosition>2010-01-16T09:00:00</gml:endPosition>
</gml:TimePeriod>
</gml:validTime>
<aixm:interpretation>TEMPDELTA</aixm:interpretation>
<aixm:sequenceNumber>13</aixm:sequenceNumber>
<aixm:availability>
<aixm:AirportHeliportAvailability gml:id="ACYAVAIL_02">
<aixm:annotation>
<aixm:Note gml:id="CY01_TS02_NT01">
<aixm:propertyName>operationalStatus</aixm:propertyName>
<aixm:purpose>REMARK</aixm:purpose>
<aixm:translatedNote>
<aixm:LinguisticNote gml:id="CY01_TS02_NT02">
<aixm:note lang="en">due to snow</aixm:note>
</aixm:LinguisticNote>
</aixm:translatedNote>
</aixm:Note>
</aixm:annotation>
<aixm:operationalStatus>CLOSED</aixm:operationalStatus>
</aixm:AirportHeliportAvailability>
</aixm:availability>
</aixm:AirportHeliportTimeSlice>
</aixm:timeSlice>
</aixm:AirportHeliport>
</message:hasMember>
```
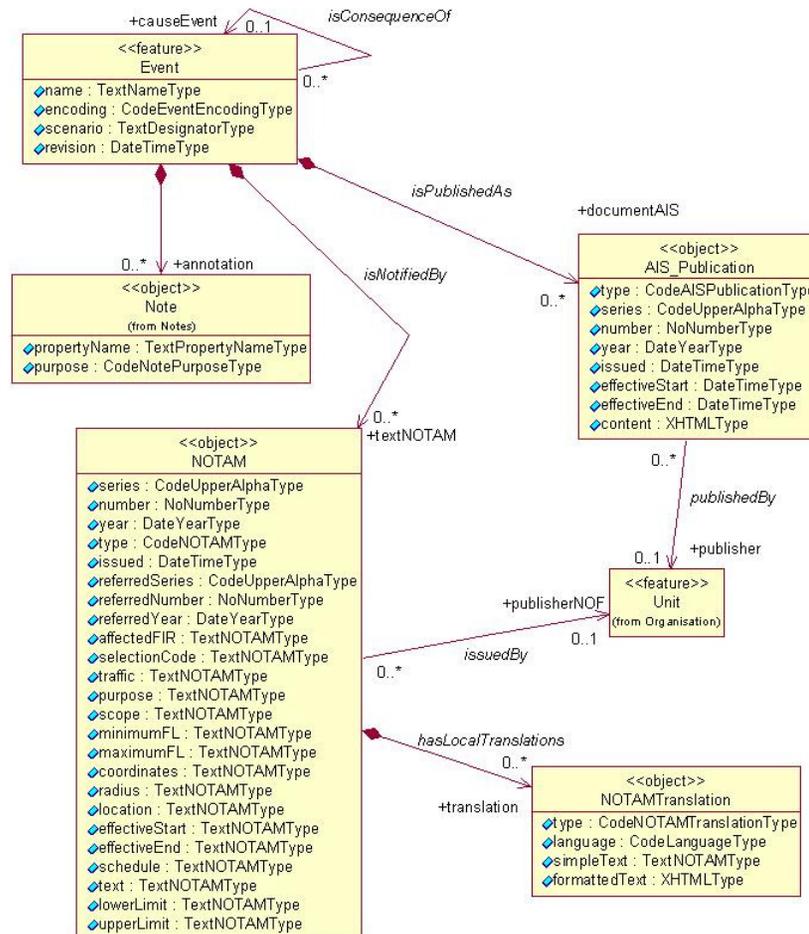
ACY AD CLSD DUE TO SNOW

Aeronautical Information Exchange Model

- AIXM is designed to enable the management and distribution of Aeronautical Information Services (AIS) data through the use of a common exchange model

Benefits to using AIXM

- Achieve neutrality against applications and their local views of the data
  - Display customized for end user

- Improved safety
  - Reduce data inconsistencies, computer readable data means fewer errors for pilots and other users
  - Automated processing of information
  - Ensure the quality of the Aeronautical Information required by modern air navigation and ATC systems

- Represents both static and dynamic data

- International Digital Harmonization
  - Establish a set of international standards and specifications for exchanging digital information

Defining Event Scenarios

- What is an event scenario?
  - A scenario describes the NOTAM condition or event that is being reported
  - The purpose is to capture the rules that are specific to each category of aeronautical information events

KEYWORD → Attribute → Description of Attribute → Location →

Lower Limit- → Upper Limit → Condition → Notes →

Schedule → Start Date/Time- → End Date/Time
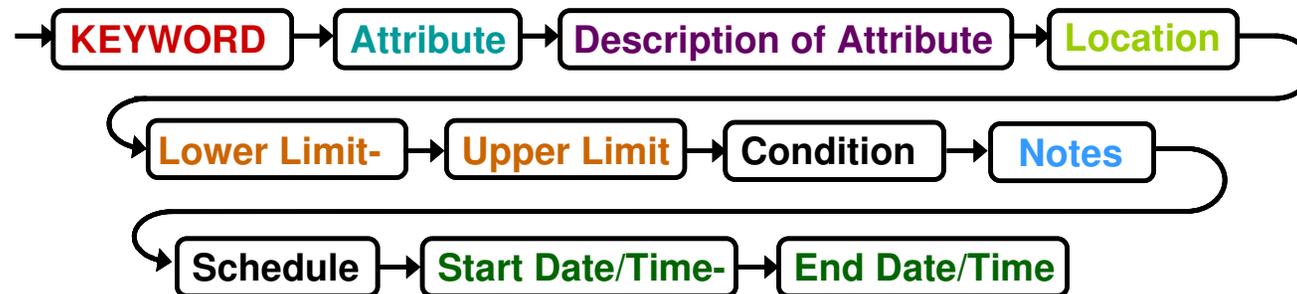
- Each scenario documents the following:
  - Minimum required data
  - AIXM Mapping of NOTAM elements
  - Translations between the digital encoding to FAA legacy, ICAO, and Plain Language
  - Business Rules
  - Sample Digital NOTAM Messages

Multiple Views of Data

FAA Legacy Format:
!IAD IAD RWY 1C/19C CLSD WEF 201105030900-201105031600

ICAO Format:
AXXXX/XX NOTAMN
Q) KZDC/QMRLC/IV/NBO/A/000/999/3856N07727W005
A) KIAD
B) 1105030400
C) 1105031600
E) RWY 1C/19C CLSD

Plain Language Format:
Issuing Airport: (IAD) Washington Dulles Intl
NOTAM Number: XX/XXX
Effective Time Frame
Beginning: Tuesday, May 3, 2011 0400 (UTC)
Ending: Tuesday, May 3, 2011 1600 (UTC)
Affected Areas
Runway: 1C/19C
Operating Status: Closed

Graphical Format:

IAD – Dulles International Airport

RWY 1C/19C CLOSED
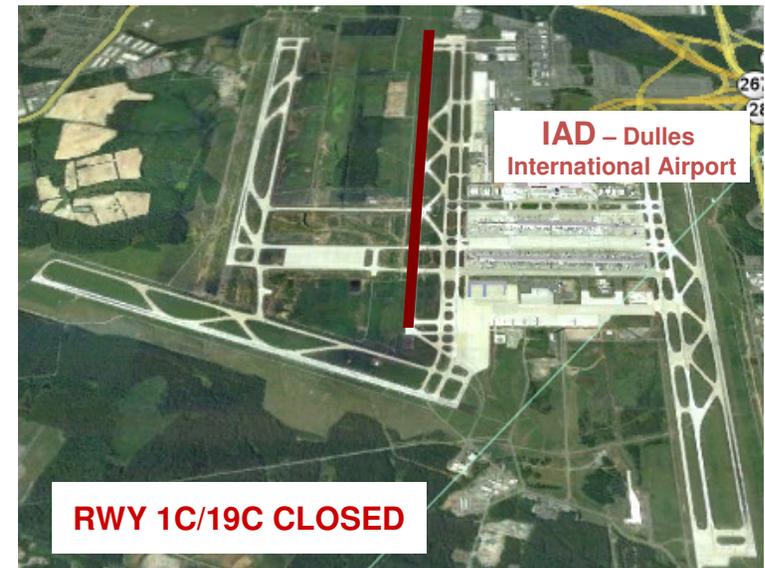
International Collaboration

- Two areas of International Collaboration
  - Aeronautical Information Exchange Model (AIXM)
  - Defining Event Scenarios for Digital NOTAMs
    - Digital NOTAM Focus Groups – collaboration between the FAA, EUROCONTROL, ECAC Member States, airlines, and industry
    - Detailed description of the Event Scenarios and their encoding as a Digital NOTAM (using AIXM version 5.1)

- Benefits
  - Establish a set of international standards and specifications for exchanging digital information
  - Efficient exchange of NOTAM information between operational systems

- Goal
  - Enable the machines that assist the specialist to provide a common and accurate view of the aeronautical 4D environment

http://www.aixm.aero/public/subsite_homepage/homepage.html

FNS Demonstration:
End to End Digital NOTAMs

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Collection

Management

Distribution

Web

Web-service

Web

Web-service

DATALINK
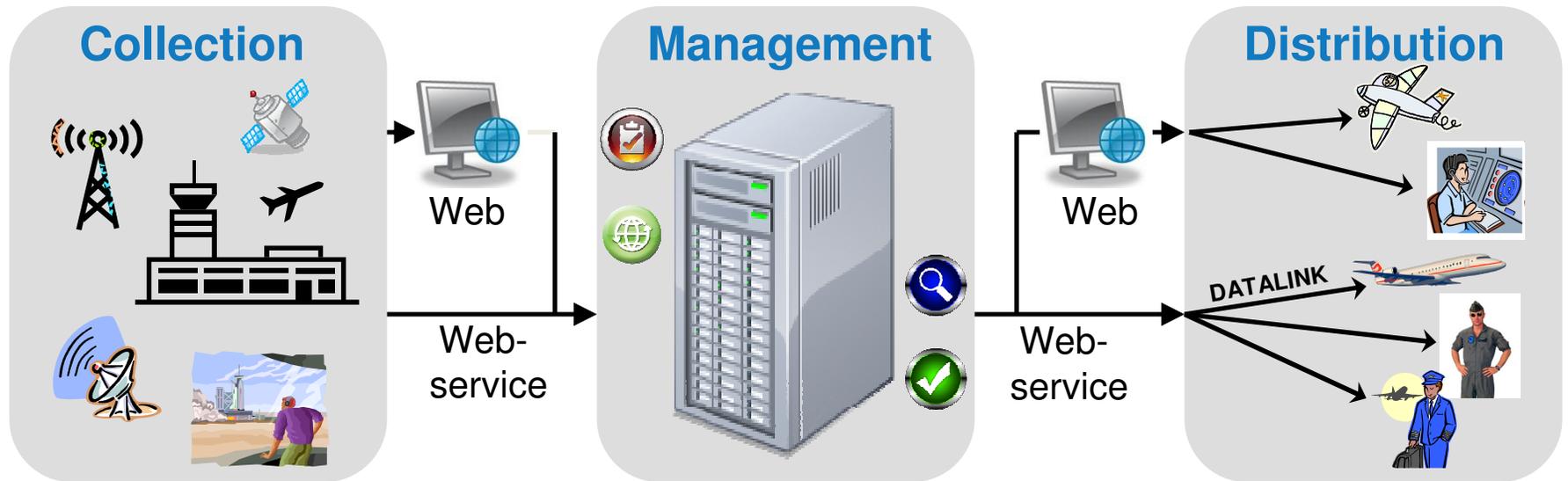
Originate NOTAMs at the Source

Digitally Capture Temporary Hazard Information

Integrate Permanent and Temporary Information

Apply Business Rules, Validate Data, Translate, and Publish

Distribute NOTAMs to the Users

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FNS Demo: NOTAM Origination

FNS Demo: NOTAM Origination

FNS Demo: NOTAM Origination

NOTAM template options are tied back to the AIXM attributes per the NOTAM Event Scenario definitions.

FNS Demo: NOTAM Origination

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Exchange Conference - (featuring
AIXM, WXXM and FIXM)

NOTAM Editor - Scenario: Closure

Properties | Prior Permission | Comments

Domestic | ICAO | Plain Language

!ACY XX/XXX ACY RWY 4/22 CLSD WEF 1108190003-1108211600

Domestic | ICAO | Plain Language

!ACY XX/XXX ACY RWY 4/22 CLSD

Domestic | **ICAO** | Plain Language

XX/XXX NOTAMN
Q) KZDC/QMRLC/IV/NBO/A /000/999/3927N07434W005
A) KACY (ACY)
B) 1108190003
C) 1108211600
E) RWY 4/22 CLSD

Domestic | ICAO | **Plain Language**

Issuing Airport:	(ACY) Atlantic City Intl
NOTAM Number:	XX/XXX
Effective Time Frame	
Beginning:	Friday, August 19, 2011 0003 (UTC)
Ending:	Sunday, August 21, 2011 1600 (UTC)
Affected Areas	
Runway:	4/22
Operating Status:	Closed

NOTAMs are translated to Domestic, ICAO, and Plain Language formats as defined in the NOTAM Event Scenarios.

Except

Due To

Reaso

Period of Validity

Start Date (UTC)   End Date (UTC)

☐ Start Upon Activation

MM/dd/yyyy | hhmm | MM/dd/yyyy | hhmm

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FNS Demo: NOTAM Origination

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Digital NOTAM AIXM Messages are created from the information digitally captured at the source.

FNS Demo: NOTAM Origination

Web services provide immediate feedback on validation and submission of digital NOTAMs.

FNS Demo: NOTAM Origination

NOTAM Originators can manage their NOTAMs within FNS.

FNS Demo: NOTAM Distribution

Digital NOTAMs are able to be searched, sorted and filtered to provide context to NOTAM users.

FNS Demo: NOTAM Distribution

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Additional information is provided to the user about NOTAMs they are interested in.

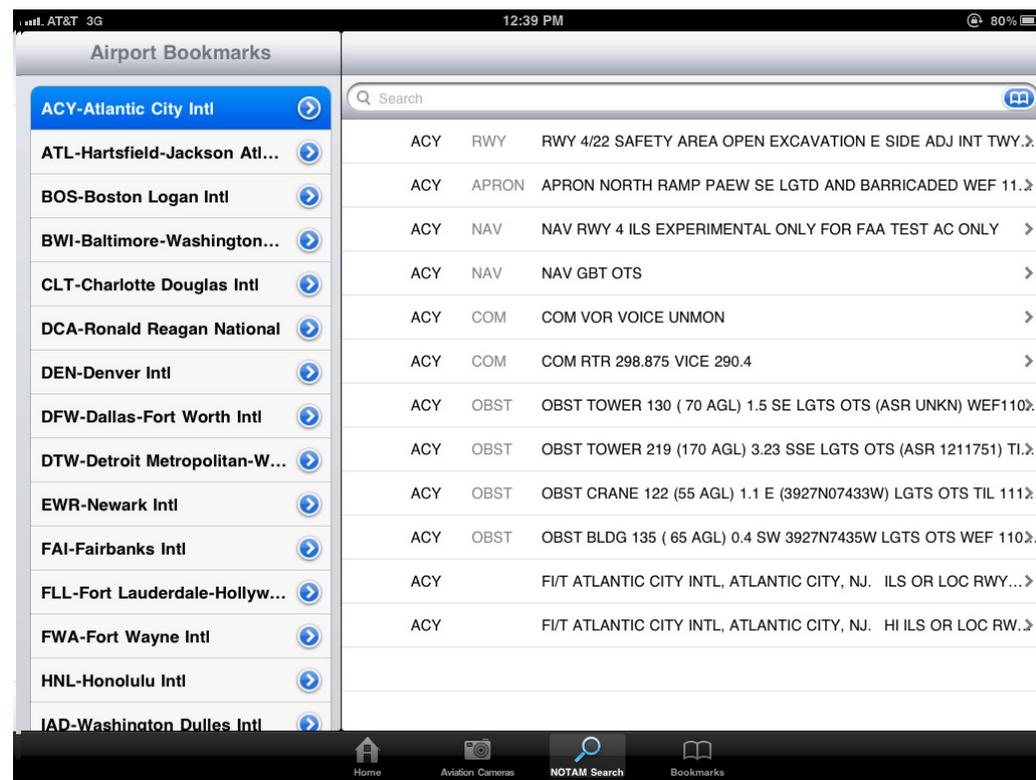# FNS Demo: NOTAM Distribution

Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)

Standards based web services can provide Digital NOTAM information to a variety of end applications, including mobile devices.

Supported by Standards
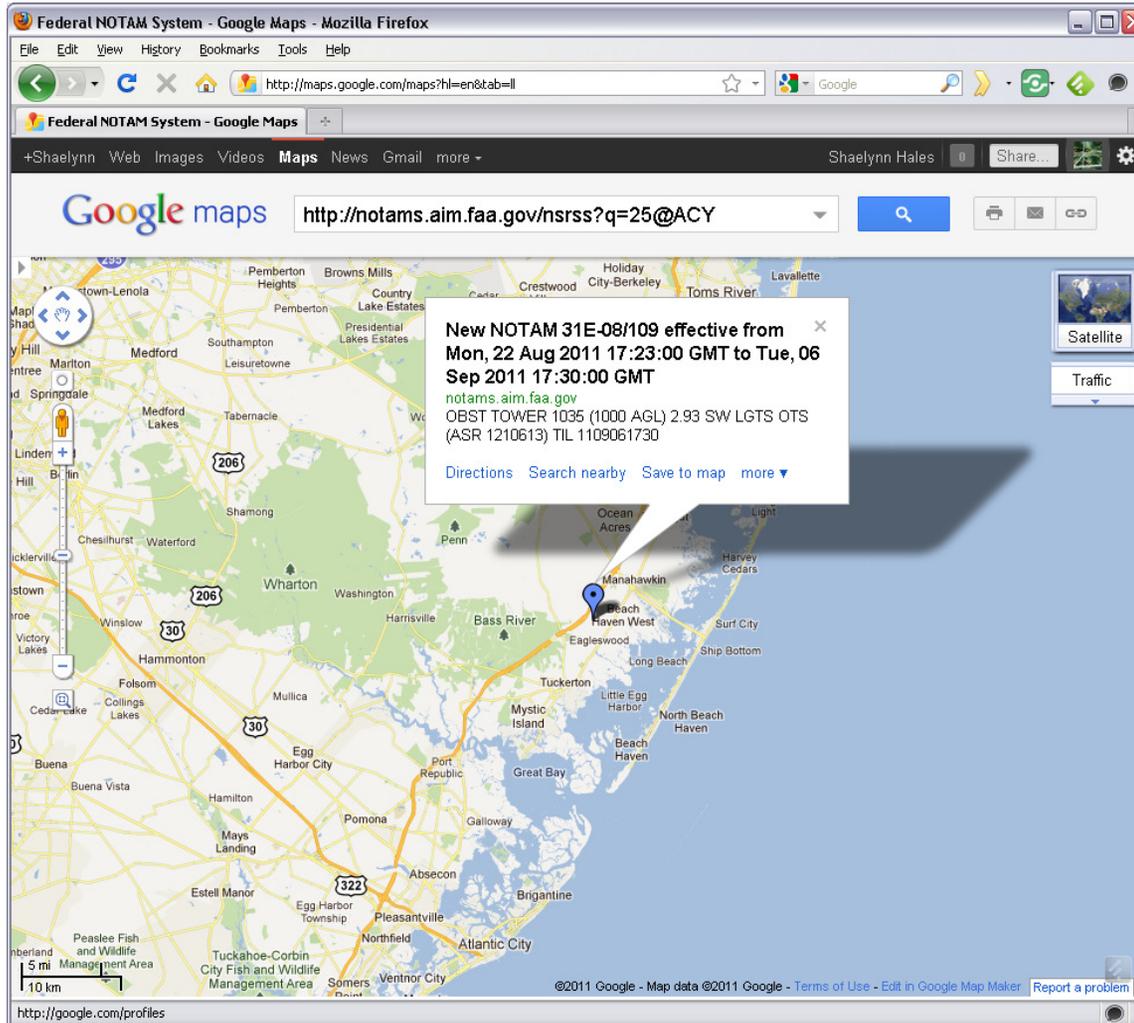- AIXM Distribution Service
- JSON Adapter

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FNS Demo: NOTAM Distribution

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With standard services, there is a wide variety of end uses that can help provide users with NOTAM information.
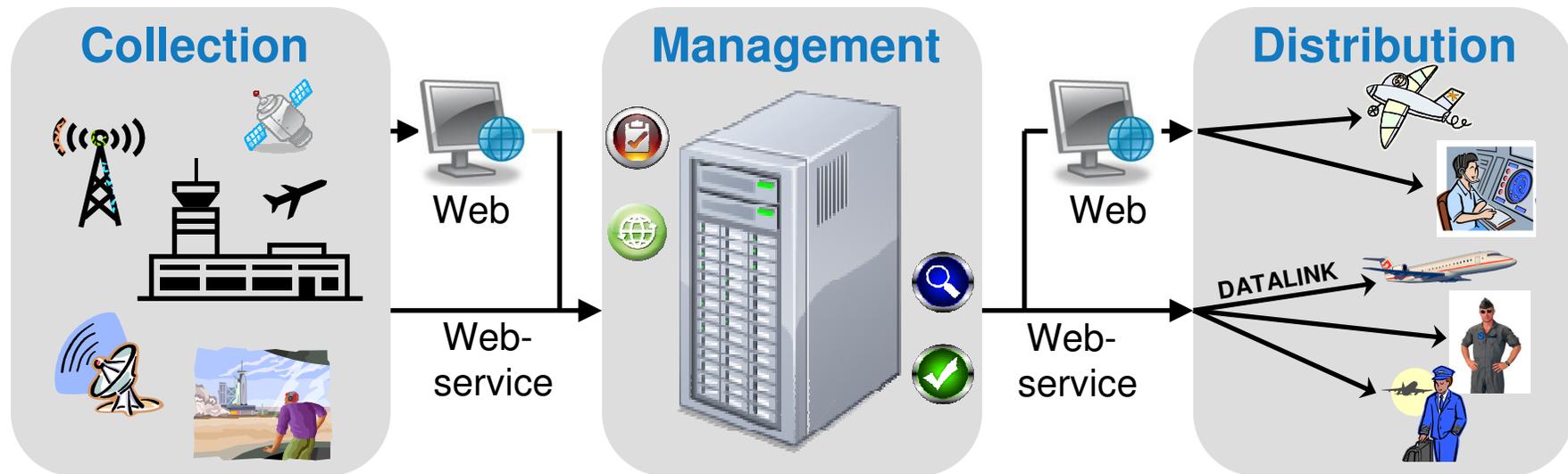
Supported by Standards
- GeoRSS

Summary / Conclusion

Standards such as AIXM support Digital NOTAMs

from direct digital capture of NOTAM
information by originators…

through digital distribution to end users within
the global airspace system…

Collection

Web

Web-
service

Management

Distribution

Web

Web-
service

DATALINK

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Questions & Answers / Feedback

More Information / Contacts

- Federal NOTAM System
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