

# AIM Modernization in the United States

Washington D.C. | October 10 - 11, 2007

AIXM Class | **2007**

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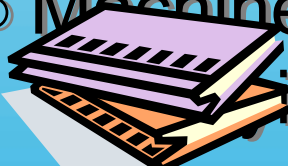



EUROCONTROL



- International Trends
- AIM Mission and Architecture
- Solution Components
- United States NOTAM Realignment status
- Conclusions

# Products versus Data

- Products are presentations (Views) of data
    - Effective at date of publication
  - The primary user of [paper] products is humans
    - Machines have to interpret products to extract data
- 
- Publications
- 
- Web Display
- Hypertext

- The real value is in the data

- The product is just the presentation

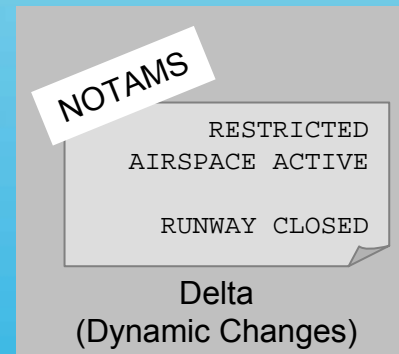
# The legacy of ICAO Annex 15

- ICAO Annex 15 describes the product requirements for the Aeronautical Information Service (AIS) (2 Products)



Baseline  
(Static Situation)

## Aeronautical Information Publication

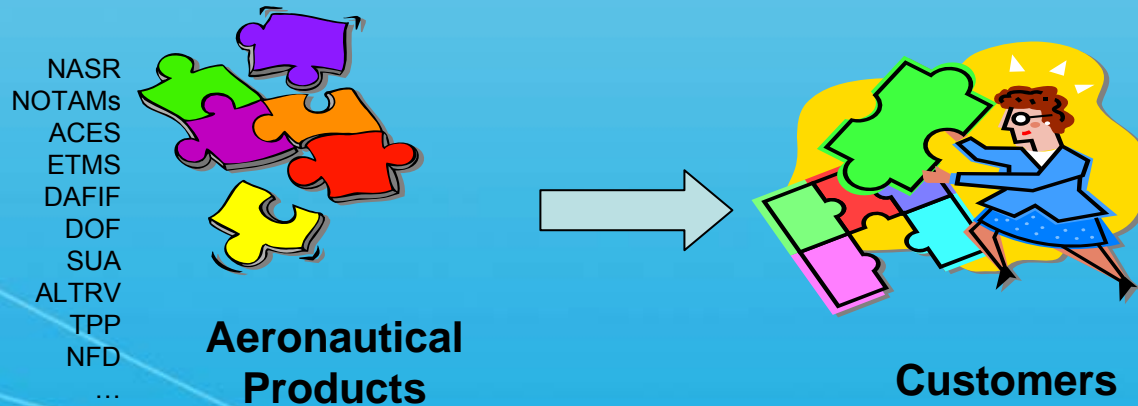


## Notice to Airman

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Aeronautical Information Exchange Model

- Historically we set up stovepipes to create products
  - Customers are responsible for integrating products into view of the aviation system
  - We cannot ensure the products are consistent

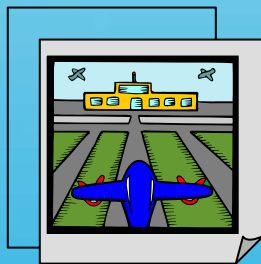


# What can we learn from this?

- **We don't have to live in the “product-centric” past**
  - We create many systems to do the same thing to the same basic data elements
  - Example of 2 Aeronautical Notices
    - Notice to Airman (NOTAM)
    - Special Use Airspace (SUA) status
- **Aeronautical information data products have common themes**
  - Identification and Operation [ What ]
    - Description (KIAD), Status (Open/Closed)
  - Period of Validity [ When ]
  - Geometry [ Where ]
    - Point, Line, Polygon
      - Latitude, Longitude, Altitude

# What is a NOTAM?

- Notice that the published information has changed
- NOTAM – Notice to Airmen
  - A0794/06 (09/027) - RUNWAY CLOSED 10/28 12 SEP 04:00 UNTIL UFN

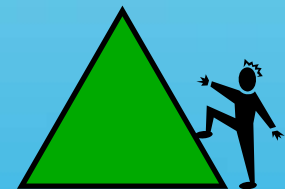


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12 Sep 0400 GMT  
Until Further  
Notice

+



**Aeronautical Information  
Identification & Operation**

**Period of Validity**

**Geometry**

**Message**

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# Another notice

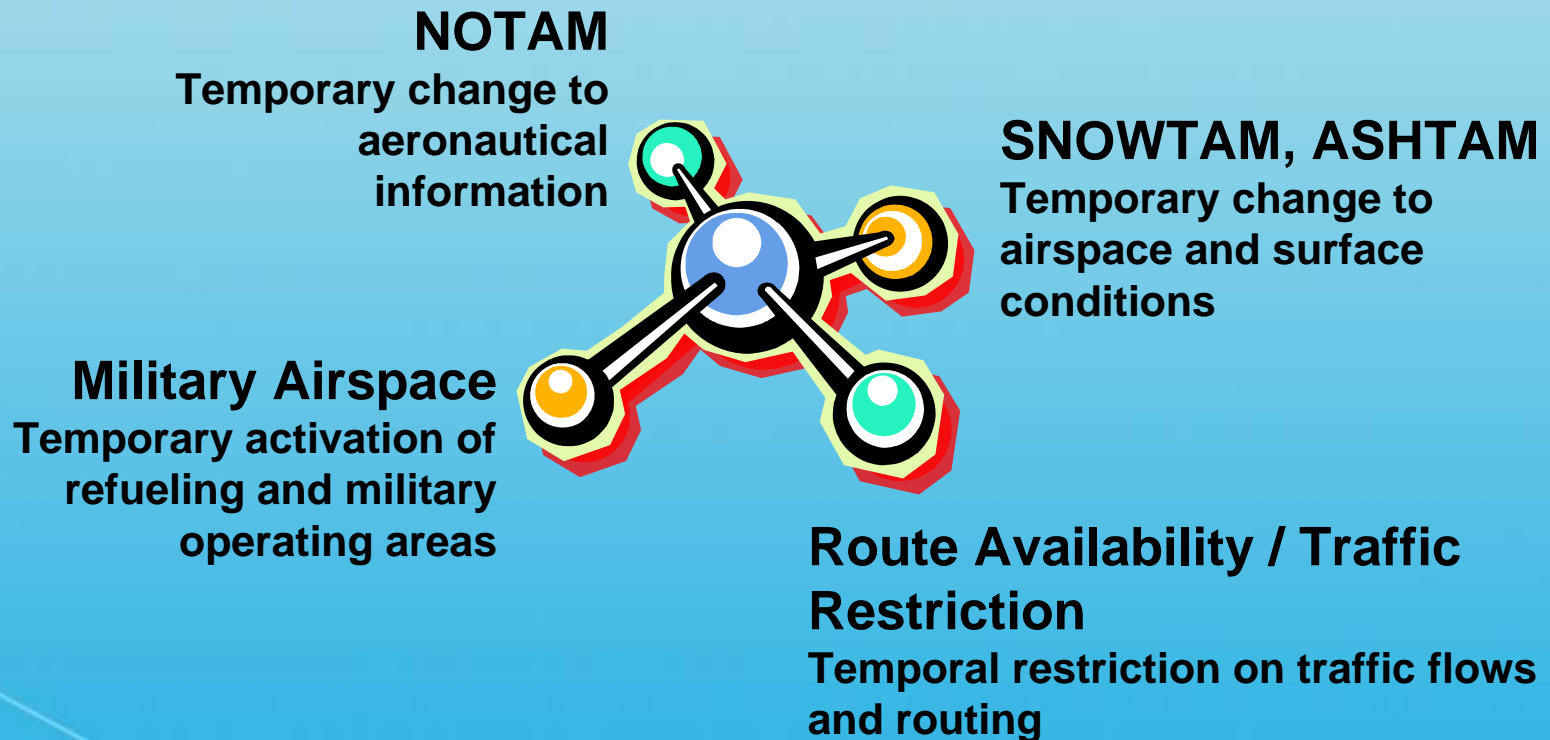
## Military Airspace Status

- **Military Airspace status**
  - **Buckeye Military Operation Area (MOA)**
    - Activated 0900 to 1300 on Sep 9 2006





# AIM needs a common transaction model

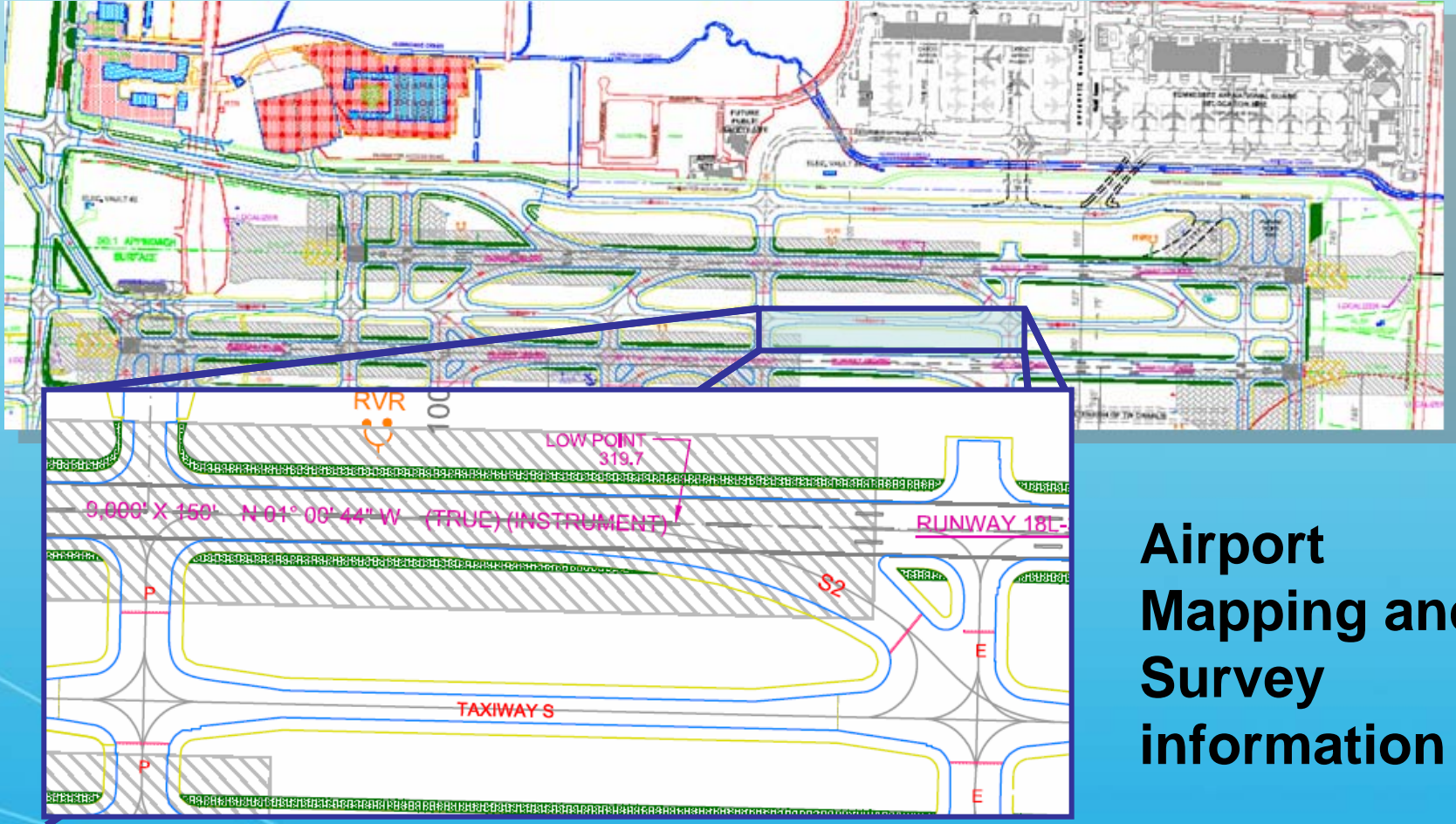


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# AIM needs detailed aeronautical data that goes beyond Annex 15



**Airport  
Mapping and  
Survey  
information**

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FROM AIRCRAFT INFORMATION EXCHANGE MODEL

# What's changed?

- International Recognition that we need to move from text-based products
- There is a global exchange model available
  - Aeronautical Information Exchange Model (AIXM)
    - Describes aeronautical information and relationships
  - Designed for system to system exchange of data
- We now understand that existing legacy products can be created from base NAS data
  - Publications
  - NOTAMs
  - Charts (after adaptation for best presentation)
- Data Quality starts at the beginning of the process (survey) and must be maintained
  - Trace-ability of data source and modification
  - Chain-of-Custody

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MODEL EXCHANGE INFORMATION

# AIM Mission in the United States

- **To provide value to our customers**
  - Providing services supporting safe and efficient air traffic operations.
- **We are successful when we**
  - Provide services needed by our customers today
  - Develop new services to meet future needs
- **We are committed to**
  - International aeronautical information coordination to improve data interoperability for our customers
  - Supporting aeronautical data developers and producers to ensure high quality data for our customers
  - Transform using modern methodologies and technology to provide AI services quickly, efficiently and safely for our customers

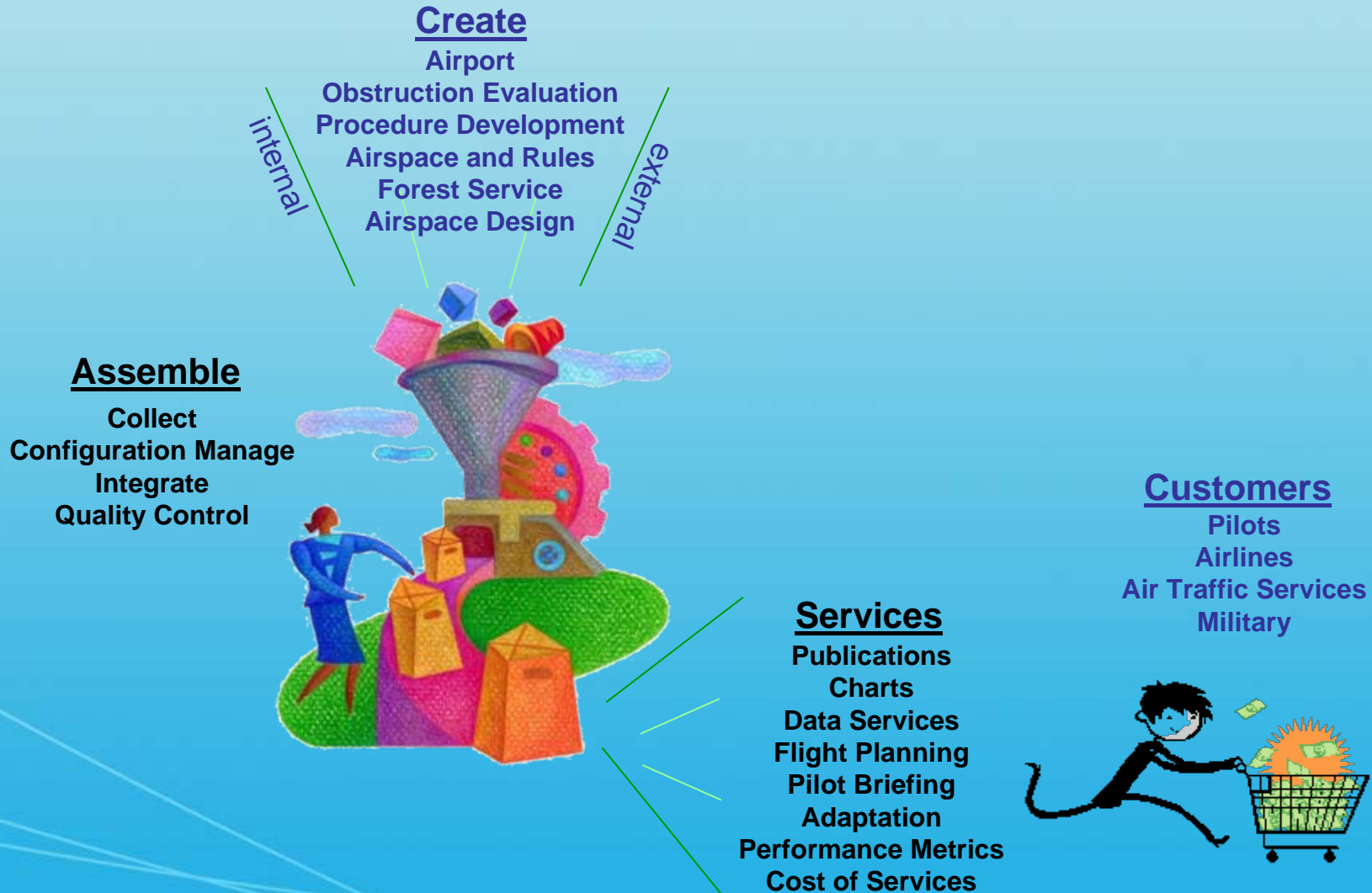
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Aeronautical Information Exchange Model



# Draft Operational Concept



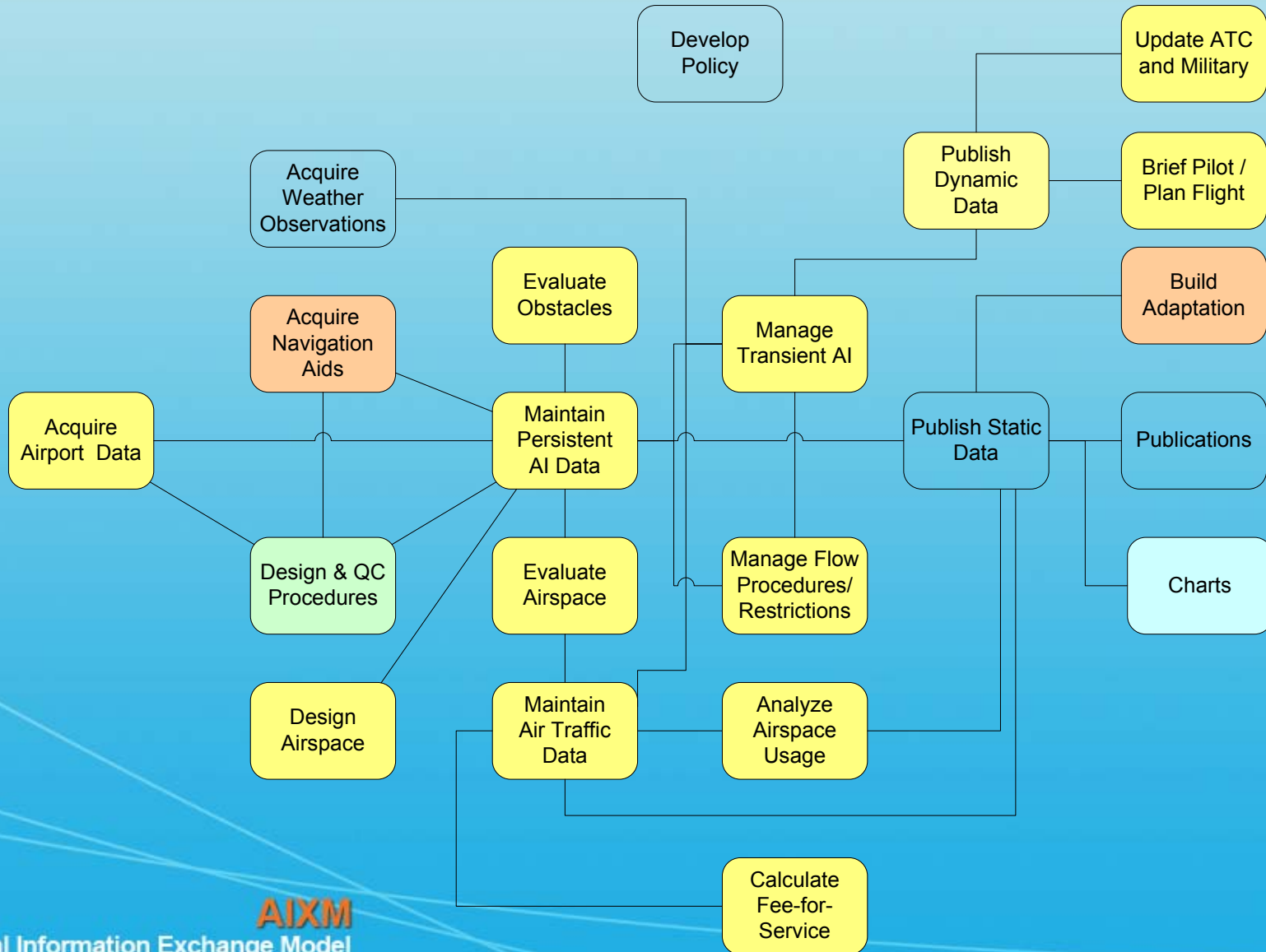
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# Business View

## AIM Enterprise



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EXCHANGE MODEL

# A Case for Change

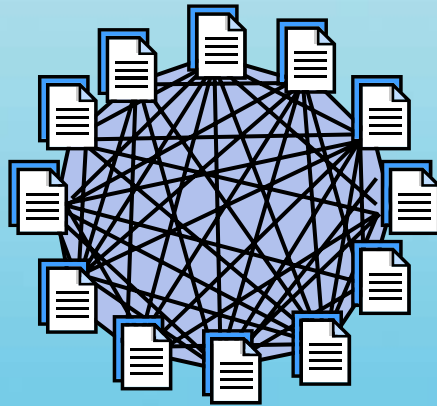
## Our AIS developers, providers and customers are changing

- Data developers are producing better data ... digitally
  - Airport layouts
  - Procedure development tools
  - Survey data
- Data customers have sophisticated demands for digital data
  - Aerodrome Mapping Databases (AMDB)
  - Electronic Flight Bags (EFB)
- NextGen modernization is changing the operating environment
  - System Wide Information Management (SWIM)
  - Rise of web services and XML

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# Need New Approach



## Legacy AIS

- Product oriented with multiple duplicative data chains
- Paper based
- Policy-challenged by an array of policy and procedure manuals.
- Limited by technology limitations



## Next Generation AIM

- Streamlined digital data collection and distribution processes
- Data integrity with high accuracy and timeliness.
- Modern methodologies
- Enabled by consistent policy

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# AIM Solution

- Digital data and service-oriented
- Standardized information model and exchange format
- Policy realigned with modernized system



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MODEL EXCHANGE INFORMATION AERONAUTICAL

# Enabling a Digital Aviation Environment

- **Standardize aeronautical information**
  - Information coded in computer readable format
  - Elimination/reduction of free-form text
  - Founded on common information meanings and representations
- **Geographically reference information**
  - Provide ability to plot aeronautical information on maps

# Enabling a Digital Aviation Environment (continued)

- Rethink aeronautical information management
  - Information commonalities
    - NOTAMs, Special Use Airspace activations, GPS Outages
- Merge static and dynamic information
  - Aeronautical data isn't static
  - NOTAM – “Temporary Change to Aeronautical Data”

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# Service Oriented Architecture

- Distributed
- Modular and interoperable
  - *At service*, not lower, level
- Independent of underlying platforms or programming languages
  - Not tied to a particular technology
- Complies to standards
- Uses Web-services

# Implementing Policy Realignment

- Coordinate with Policy / Procedures / Regulatory / Standards Organizations from the outset
- Involve customers -- stakeholders / users / bargaining -- units from the outset
- Resolve legal issues early
- Generate and validate new / revised policies / procedures for AIM prototypes
- Generate and validate new / revised policies / procedures as Next Generation AIM is developed



# Status of United States NOTAM Realignment Strategy

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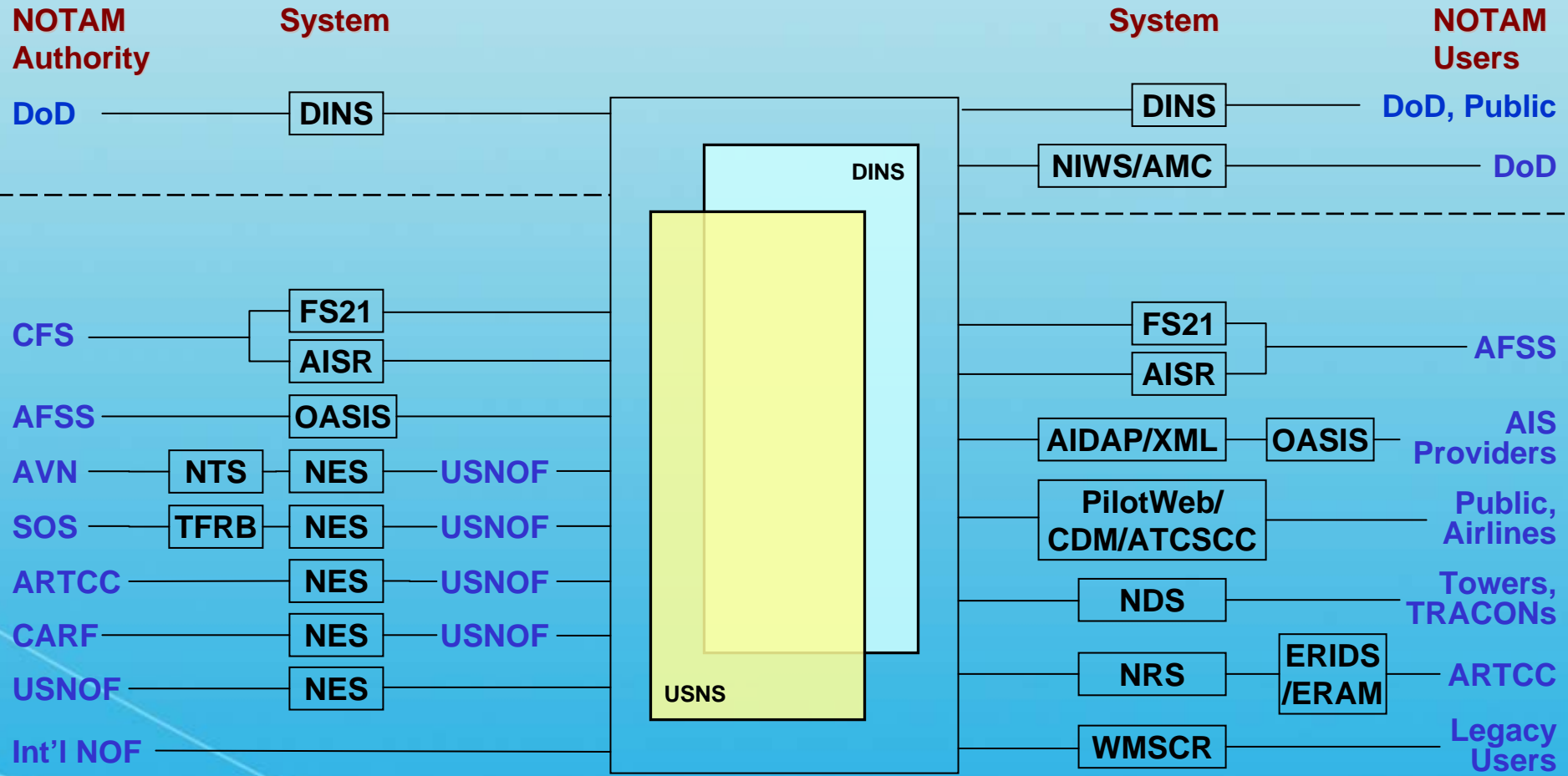
# Why Modernize?

- **Must respond to customer concerns**
  - ICAO standardization
  - Local NOTAM accessibility
  - Data reliability, accuracy, and timeliness
  - Digital delivery of data
- **Need to operate more efficiently**
  - Resources are limited
  - Improve service delivery without increase in cost
- **Need to work cooperatively with stakeholders**
  - May 2007
    - DoD/FAA formed partnership to harmonize/consolidate NOTAM system
    - Held Industry Day

# Modernization Goals

- **Improve the quality of NOTAMs**
  - Provide meaningful information
  - Enhance NOTAM interpretation
    - Graphical depiction necessary
  - Improve reliability and accessibility
    - Digital data exchange will enhance filtering and sorting
- **Conform to ICAO standards**
- **Provide a single source for all NOTAMs**
  - One collection and distribution point for all information
  - Consolidate inefficient legacy systems for improved customer service
- **Balance diverse customer needs**
  - Airlines, ATC, General Aviation, International, Military

# Current NOTAM Process

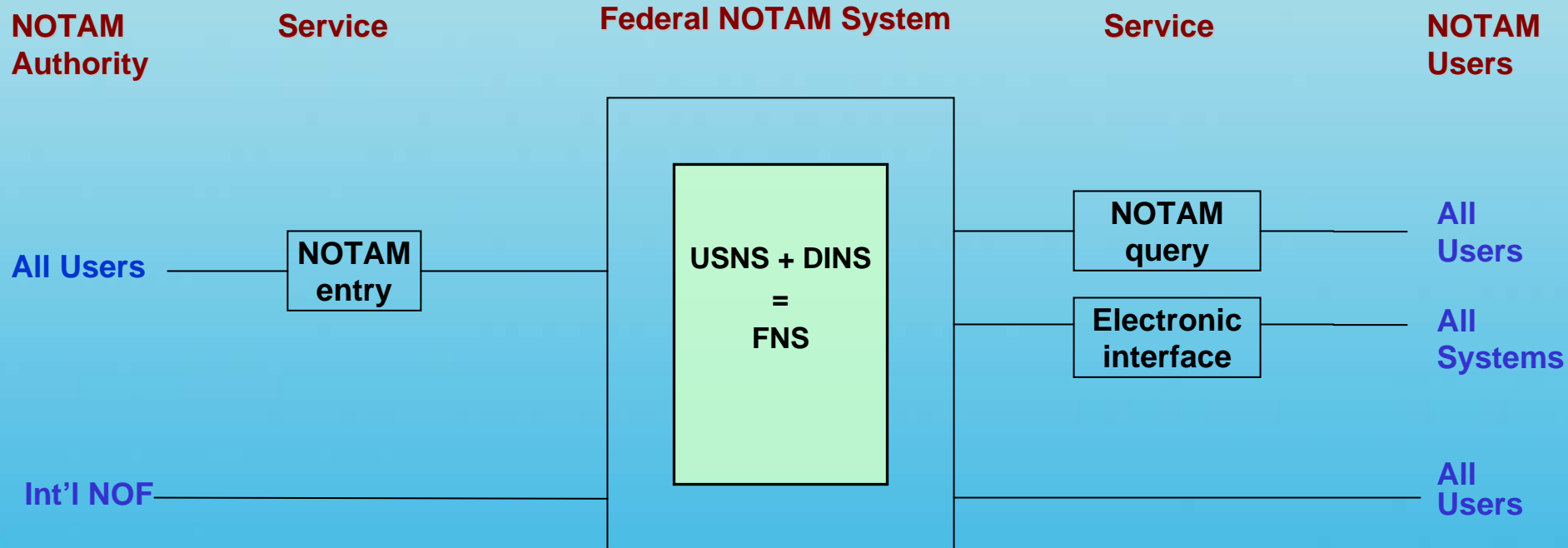


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# Future NOTAM Process



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Model for exchanging aeronautical information

Activity	Date		Result
Industry Day	May '07		Commitment by U.S. Government to Modify NOTAM System
Initial Policy Change	Oct '07		NOTICE: D NOTAMs redefined consistent with ICAO definition (reclassify civil L NOTAMs)
System and Additional Policy Changes	Aug '09		One Federal NOTAM System (FNS) with Full ICAO Implementation
System Enhancements	2010+		Aeronautical Information eXchange Model (AIXM) NOTAM Capabilities


# Initial Policy Change for Oct/Nov 2007

- **Expand definition of a Distant (D) NOTAM**
  - Adopt ICAO definition for aerodrome movement area
    - Includes taxiways, ramps, aprons, lighting
    - All D NOTAMs will be prefaced with a keyword
- **Label unverified reports of hazards**
  - Information that meets NOTAM criteria but is unverified will be tagged with (U) and disseminated as D NOTAM
    - Applicable only where letters of agreement exist
- **Label other information that doesn't meet ICAO criteria**
  - Other information that may impact aircraft operations will be tagged with (O) and disseminated as D NOTAM

# NOTAM D Examples For Oct/Nov 2007

- **Runway condition**
  - !MIV 07/123 MIV RWY 10/28 CLSD 0709021200-0709021600
- **Taxiway status**
  - !RDU 07/123 RDU TWY A CLSD BTWN A1, A2 TIL 0709011600
- **Ramp status**
  - !MEM 07/123 MEM RAMP PAEW FEDEX CARGO EAST
- **Other status information**
  - !LOU 07/123 LOZ (O) CONTROLLED BURN 6.5SM NORTH TIL 0708302200



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- **Town hall meeting TBD**
  - Interactive, web based forum, question and answer session to answer questions and resolve any issues
- **NOTICE effective October 2007**
- **NOTAM Handbook update published July 31, 2008**
- **Kick off next phase NOTAM Realignment**
  - Continue weekly meetings until ICAO standardized document
- **Begin federal system consolidation 2008**
- **Goal: Full ICAO implementation including SNOWTAMs and ASHTAMs**
  - 28 August 2009

## Digital NOTAMs

### Modernizing the United States NOTAM System

By: Dr. Brett K. Brunk and Amy Johns  
Aeronautical Information Management  
Date: June 2007



***To be discussed later today***

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REPORT Aeronautical Information Exchange Model

# International Adoption

From 2006 Global AIS Congress

- Australia
- Canada
- China
- EuroControl
- Japan
- South Africa
- United States



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# A couple things to remember...

- **Quality from the very beginning**
  - Quality check as data enters the system
    - Authorization and accuracy
  - Focus on end-to-end quality
  - Complete Chain-of-Custody
- **Move to digital delivery of Aeronautical data**
  - Build products from base AI data
  - Merge like data types (NOTAMs and SUAs)
  - Single entry – Multiple Views
  - We will still have to maintain many of our legacy formats
- **Aeronautical data is not just traditional AIS and NOTAMs**
- **Its Global...**