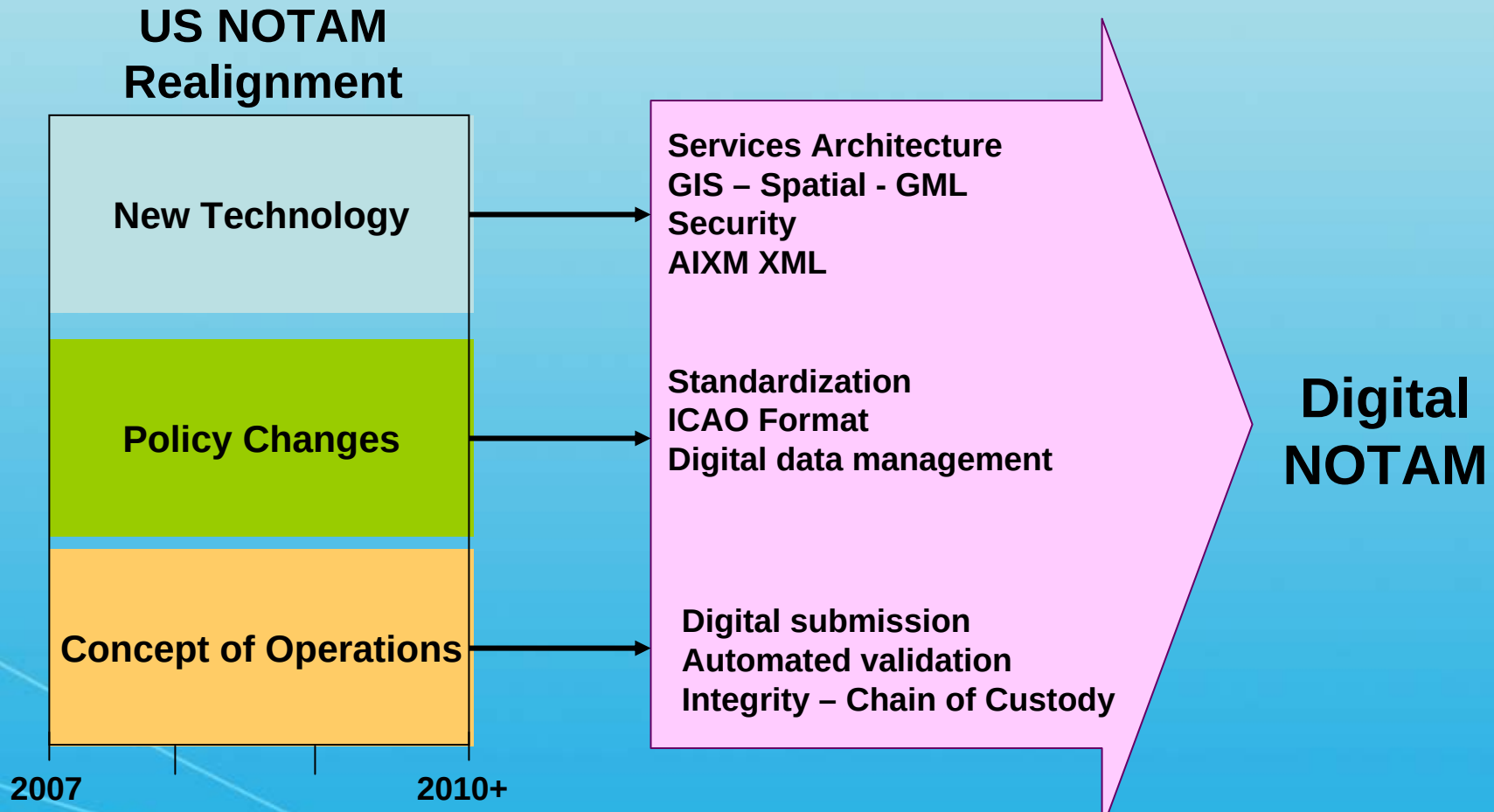
Digital NOTAMs

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

AIXM Class | 2007

In the United States Digital NOTAM is part of a multi-year NOTAM realignment strategy…



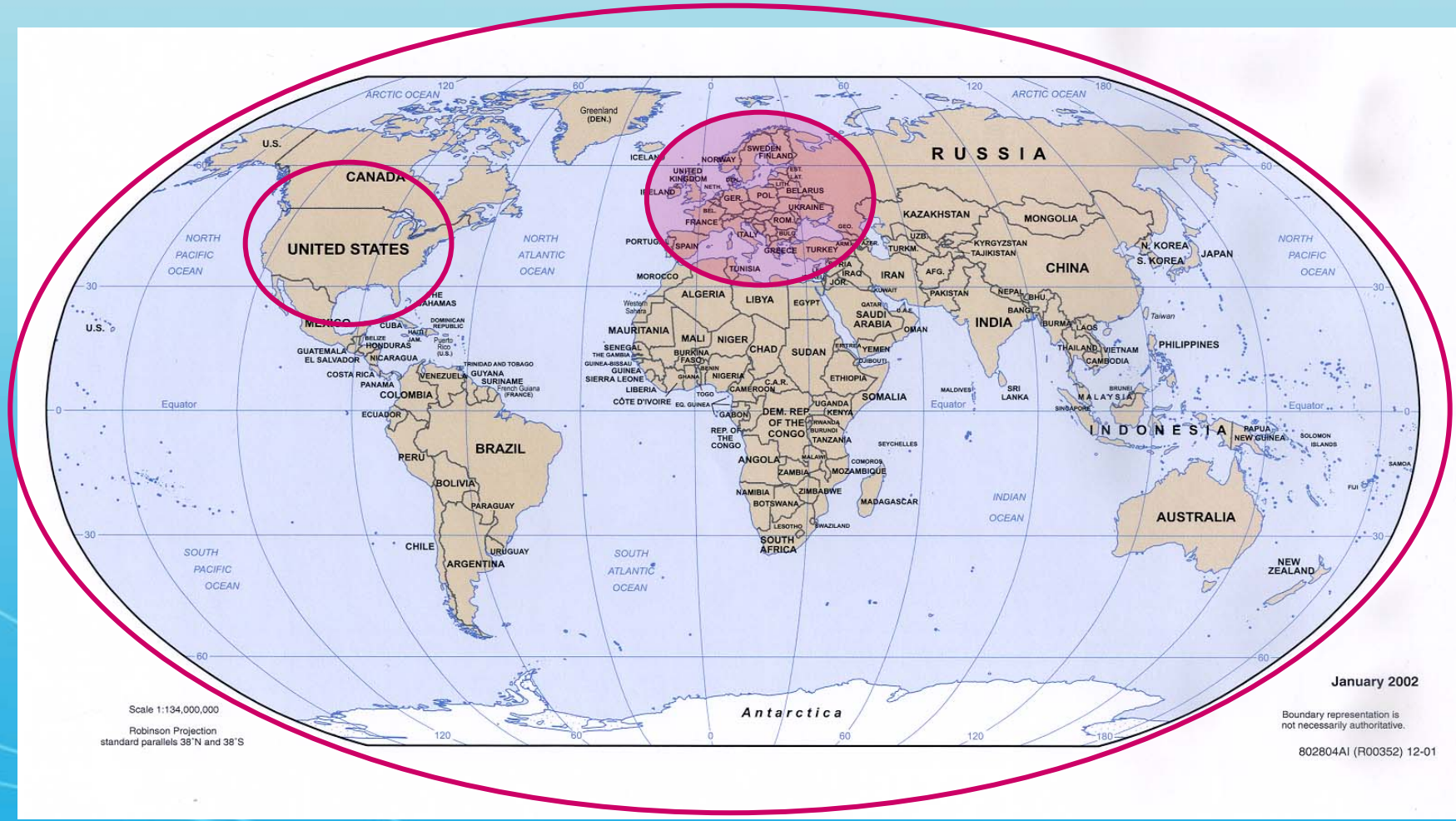
What problems is Digital NOTAM trying to solve?

- Data quality and integrity
  - NOTAMs today don't always say what we mean
- Poorly suited for human and computer
  - Not standardized
  - Difficult to interpret
  - Difficult to distribute
  - Inaccessible for computer
- Timeliness
- Manual processing
  - Entry, Validation and End user interpretation

Digital NOTAM Goals

- Radically improve the quality of NOTAM
  - Ensure NOTAM intent is accurately encoded
  - Ensure NOTAM submitted = NOTAM received
  - Ensure NOTAM are encoded the same way every time
- Streamline NOTAM processing
  - Reduce the time between NOTAM submission and publication
  - Reduce NOTAM rejections due to quality problems
- Enable customer benefits
  - Provide digital NOTAM output to enable computer systems to fully leverage NOTAM information
  - Enable customers to receive NOTAMs when and how they need it

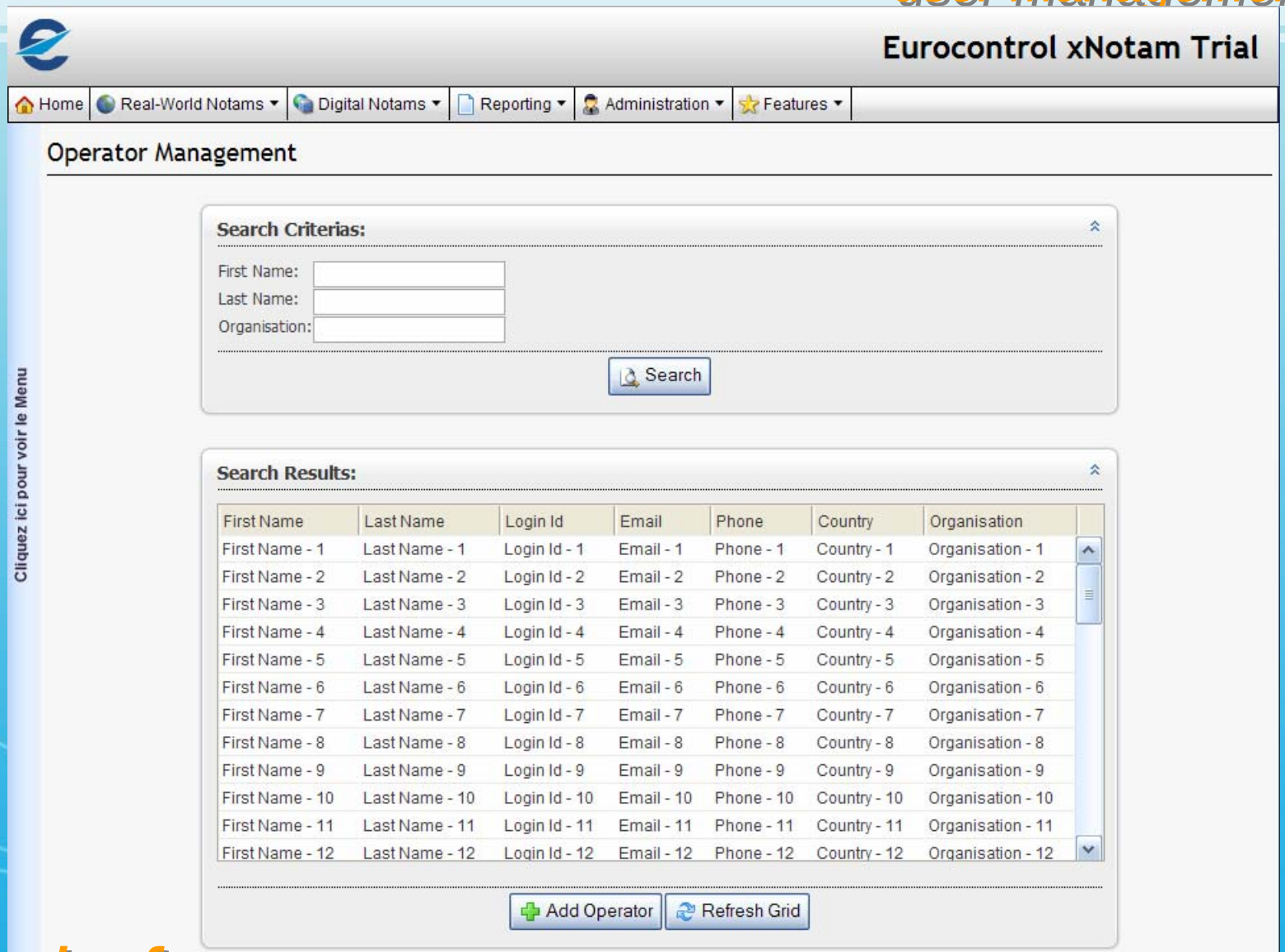
Digital NOTAMs are global



AIXM
Aeronautical Information Exchange Model

xNOTAM Trial – application interface

user management



draft

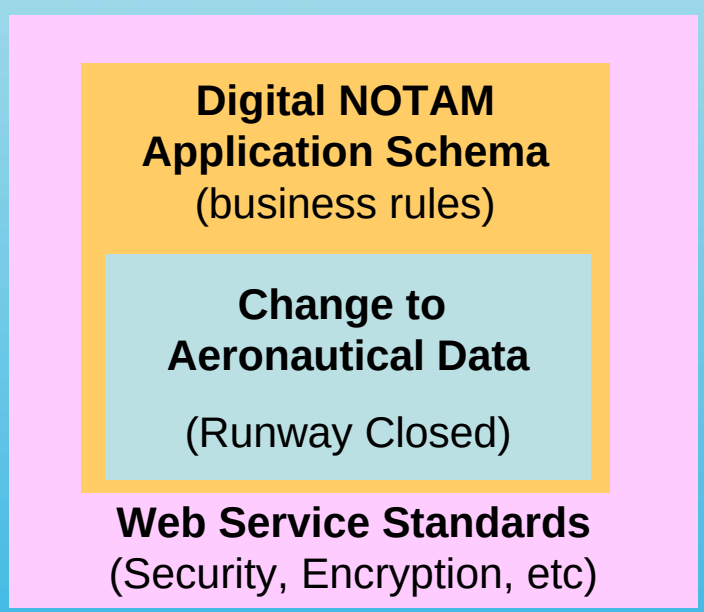
Powered by Pulsar

What is a digital NOTAM

- Digital description of changes to aeronautical data - AIXM
- Concept of operations for submission and publication of the change
  - Authorization
  - Workflow
  - Publication and Customer Products/Interfaces

What is a digital NOTAM

Digital Description - AIXM



Draft for consideration

- Aeronautical Information Exchange Model
  - Timeslice model for describing temporal changes
- Digital NOTAM application schema
  - Encapsulating AIXM
  - Business rules and workflow
- Web Services Standards

AIXM
Aeronautical Information Exchange Model

What is a digital NOTAM

Concept of Operations

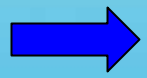
- Digital information from the originator
- AIM
  - Quality check
  - Convert to products (like NOTAM)
  - Distribution
- Customers
  - Human and computer systems

Introduction

- What are NOTAMs?
  - Notices to Airmen (NOTAM) are used to alert pilots about temporary changes affecting the National Airspace System
- Problem?
  - Manual generation – Free form text
  - Difficult to Read
  - Inconsistency and Lack of Standardization
  - Unable to fully computerize
  - Delivery challenges
  - **SAFETY CRISIS !!**

Solution

- Automation – Digitally Encode
  - Application for creating NOTAMs
  - Data Model – provides structure
  - Graphical output
  - Machine readable standards based message



- Digital Airport Surface NOTAMs
  - First step
  - Small set of Airports
  - Subset of Features
  - Demonstrate customer value

Goals of the Project

- Digitally encode and transmit airport surface NOTAMs
  - Integrate static and dynamic information
  - Fully data modeled
  - Fully geo-referenced
- Develop digital NOTAM data views
  - Traditional formats (US and ICAO)
  - Plain Language
  - AIXM
- Identify and address technology and policy risks
  - Concept of operations
  - Digital distribution and management
  - Information for navigational use

Concept of Operations

Concept of Operations
Prototype

Triggering event at the Airport

(e.g., Runway damage)

Airport Authority

dNOTAM

CREATE Digital NOTAM

VALIDATE Authorization, Business Rules

PUBLISH Web Service, Product Specs

<AIXM>

Text

Map

USNS

dNOTAM

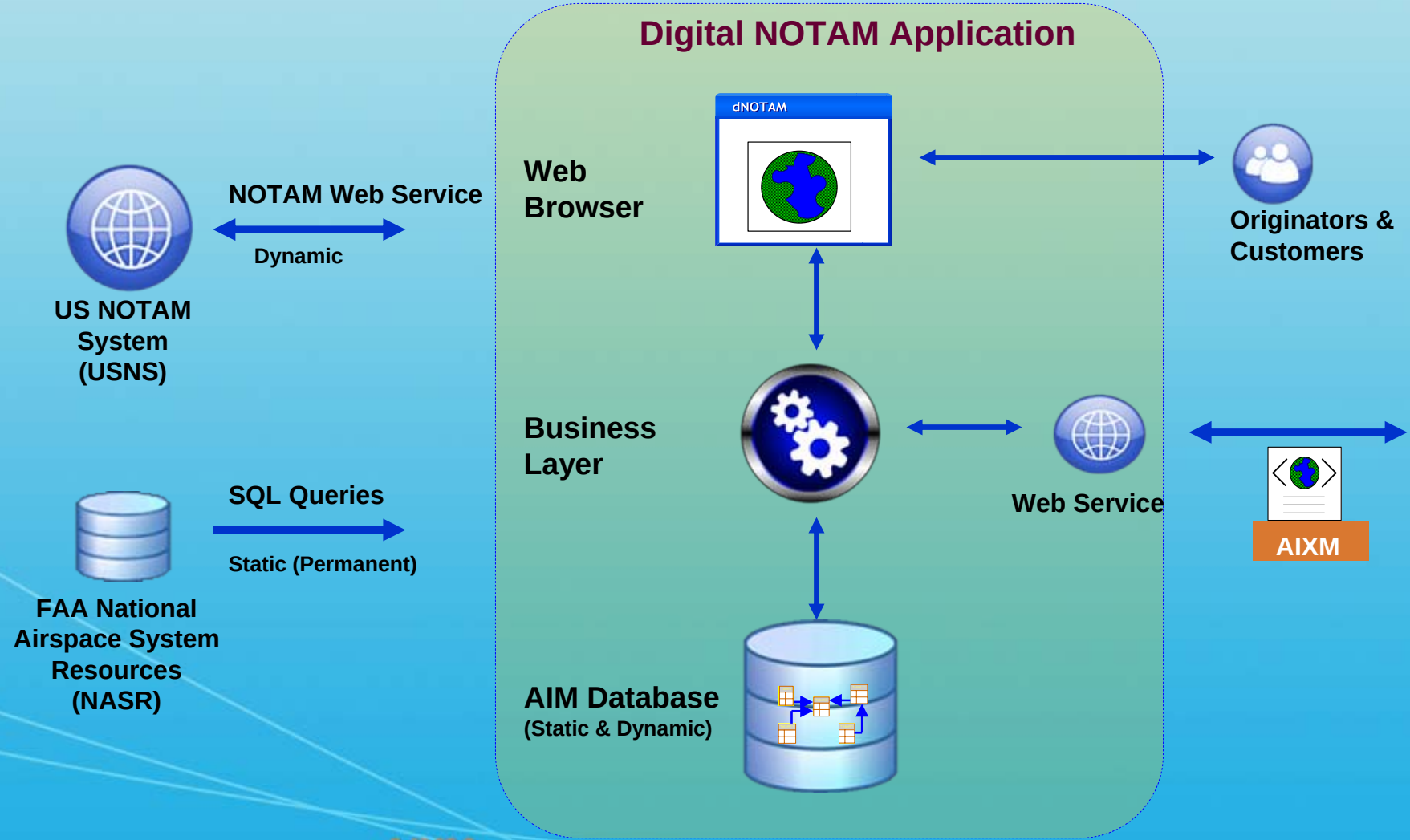
ENCODE Digital NOTAM

Demonstrate completeness of data model
Familiarization and translation

AIXM as the Foundation

- AIXM 5.0 Based Data Model
  - Comprehensive data model – Globally applicable
  - Temporality
  - Data content separate from product specification
  - To ease mapping message elements to data
- NOTAM Message Service– AIXM
  - Worldwide interoperability
  - Integrate into loosely coupled systems
  - Instantly available upon activation

Architecture
Prototype



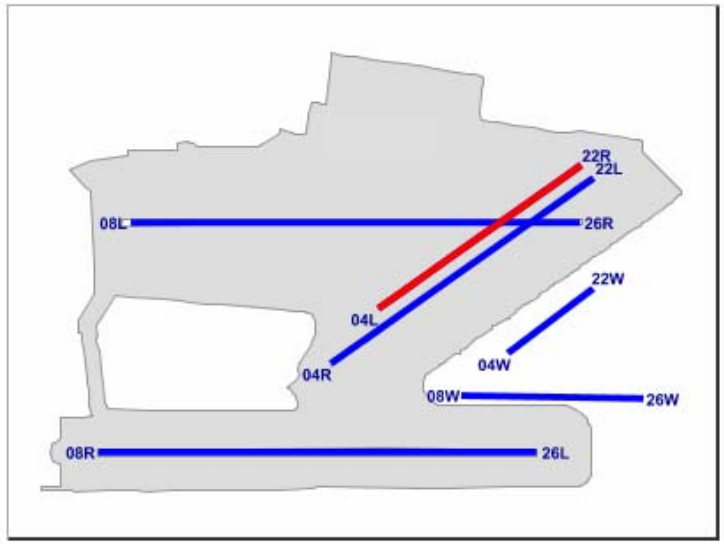
Prototype - Results

!HNL 10/051 HNL 4L/22R CLSD 0400-1600 DLY WEF 0612180400-0612201600

Plain Language NOTAM

Description	AIXM XML
NOTAM Number	10/051
Issue Date	16 Dec 2006 09:00:00 UTC
Airport	HNL (PHNL) Honolulu International
Effective Times	
Beginning	18 Dec 2006 04:00:00 UTC
Ending	20 Dec 2006 16:00:00 UTC
Affected Area(s)	
Runway	04L/22R
Operation Status	Closed
Affected Hours	Start Time 04:00:00 UTC - End Time 16:00:00 UTC
Issuing Authority	Honolulu International

Airport Layout



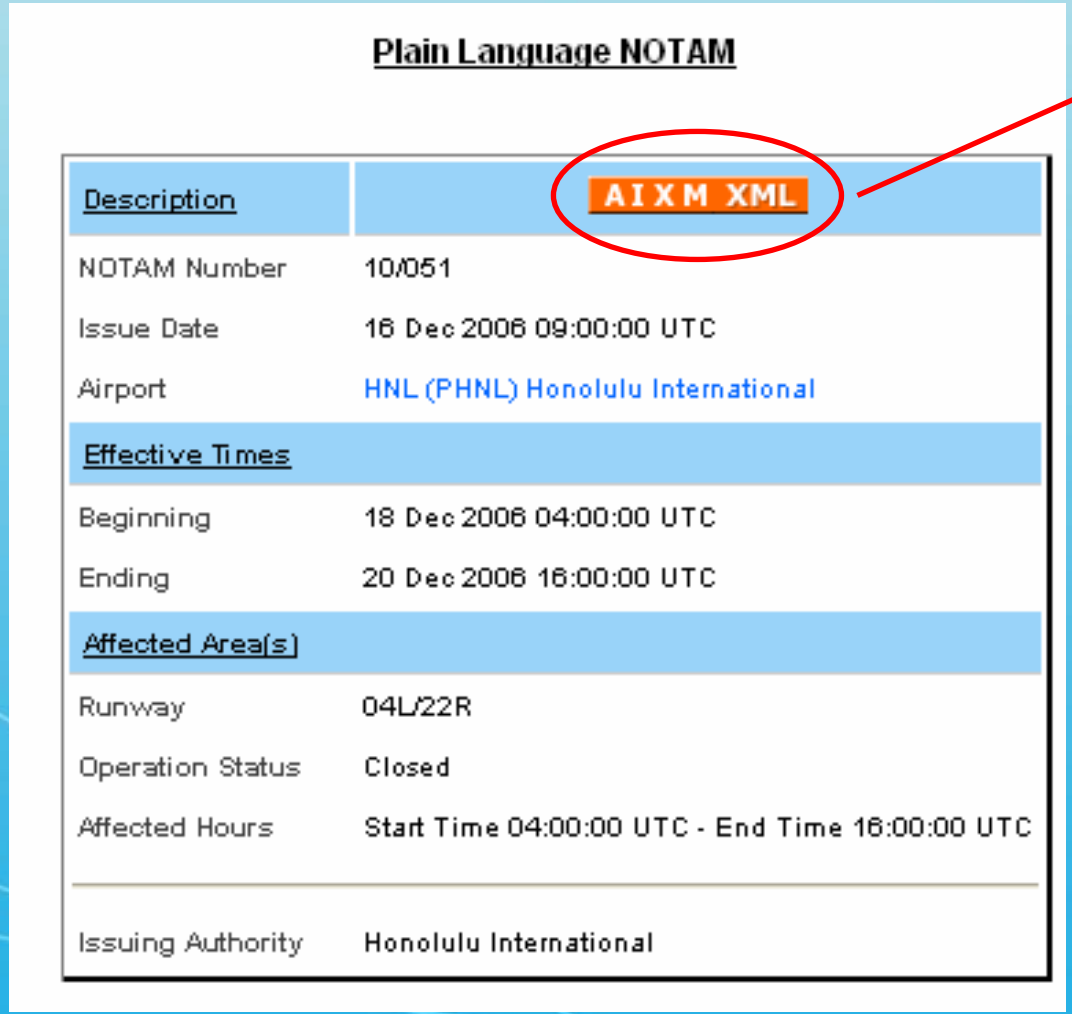
Plain Language Text

Graphical Output

AIXM
Aeronautical Information Exchange Model

Prototype – Results (contd.,)

Text Output



AIXM compliant message

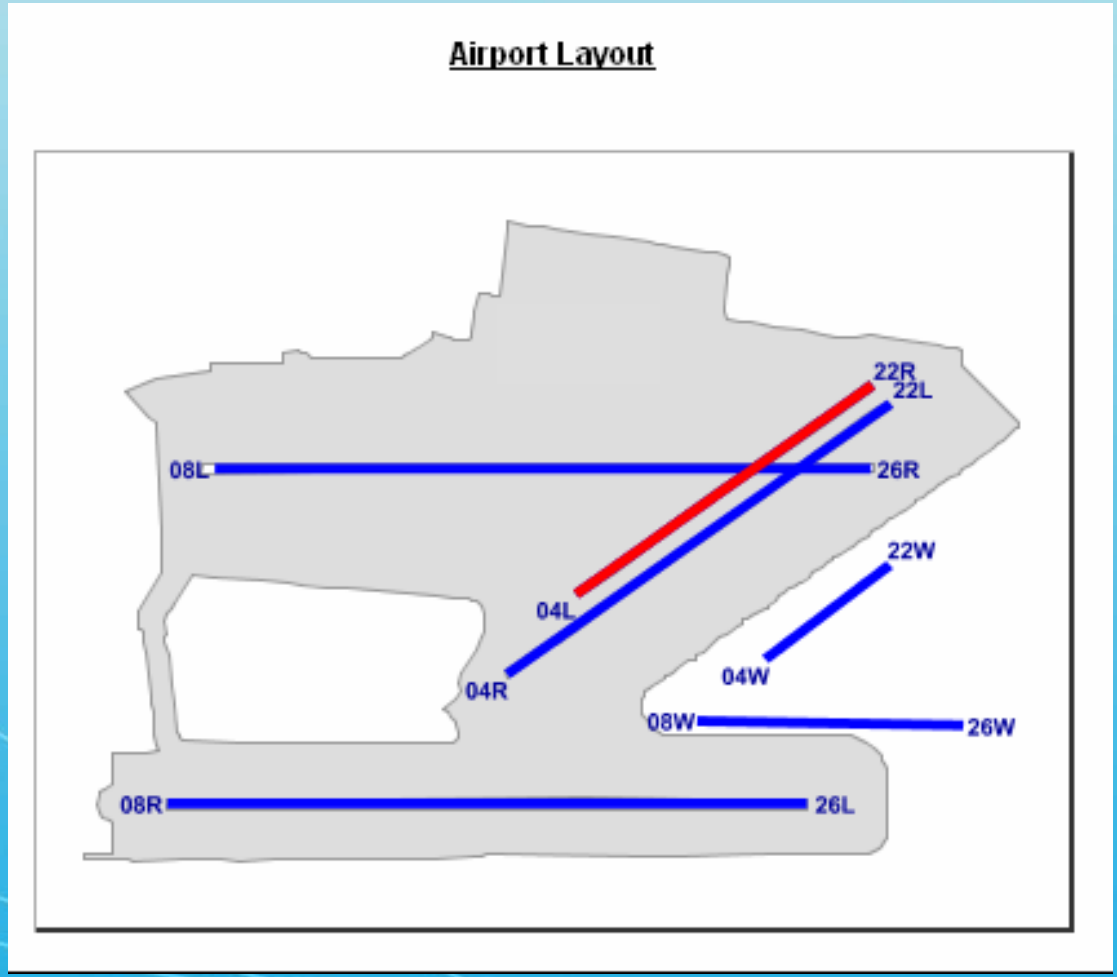
Metadata

Effective Times

Affected Area

Prototype – Results (contd.,)

Graphical Output



Honolulu International Airport Layout

NOTAM affected Runway (04L/22R) in RED

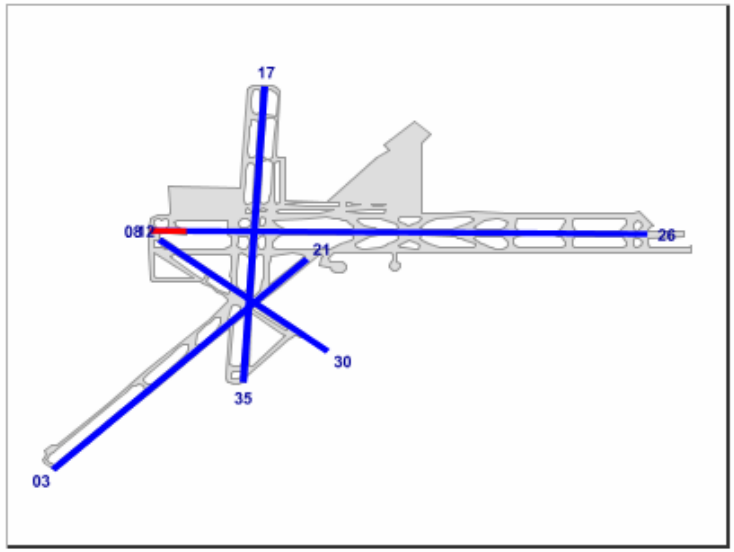
Prototype – Results (contd.,)

!ABQ 10/024 ABQ 8/26 W 1000 CLSD

Plain Language NOTAM

Description	AIXM XML
NOTAM Number	10/024
Issue Date	3 Oct 2006 11:00:00 UTC
Airport	ABQ (KABQ) Albuquerque International Sunport
Effective Times	
Beginning	Effective immediately
Ending	Until further notice
Affected Area(s)	
Runway	08/26
Operation Status	Open with Restriction(s)
Length	West 1000 ft closed
Issuing Authority	Albuquerque International Sunport

Airport Layout



Plain Language Text

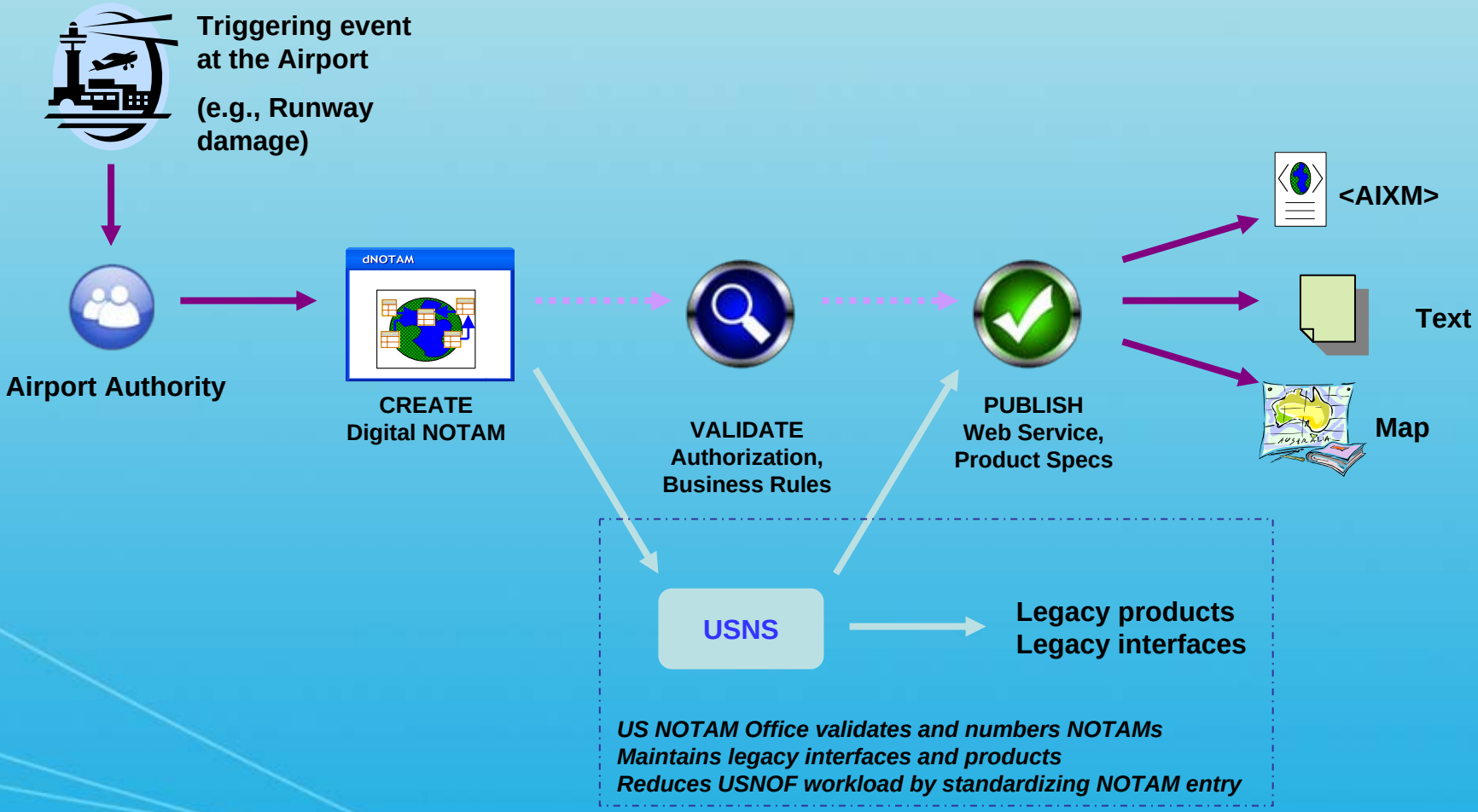
Graphical Output

AIXM
Aeronautical Information Exchange Model

What's Next

- Take it to the Next Level
  - Create NOTAMs
  - End-to-End Workflow
  - Interface with US NOTAM System
  - Multiple output formats: Plain Language, FAA, ICAO
  - Improved mapping

Concept of Operations
Candidate Transition Plan



Conclusion

- Digital Airport Surface NOTAMs towards building a fully Digital NOTAM solution
  - Identify technology challenges
  - Develop a concept of operations
  - Demonstrate value

Towards digital NOTAMs

- International recognition that we need to move to digital information exchange
- 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 NOTAMs can be encoded digitally
- Data Quality must start at the beginning of the process (survey) and must be maintained
  - Trace-ability of data source and modification
  - Chain-of-Custody