Aeronautical Information Services

Honeywell

D-NOTAM Implementation

Presented to: ATIEC

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Aviation Information World – Forecasting the Future

Agenda (Abstract)

- This presentation will cover how Honeywell is:
  - Developing a system that will accept, process and deliver SWIM information (AIXM, FIXM, and WXXM), along with the supporting AIRM capability.
    - Ensures D-NOTAM (AIXM 5.1) information is provided to our customers through the ability to access information from various source; integrate & process the information; and provide it to our customers' avionics systems, EFBs and/or AOC/FOC, FBOs, etc.
  - Reviewing other organizations' implementation of SWIM information.
  - Addressing the challenges with ensuring our customers receive worldwide, trustworthy information when using D-NOTAMs to augment or replace the information based on other industry data standards.

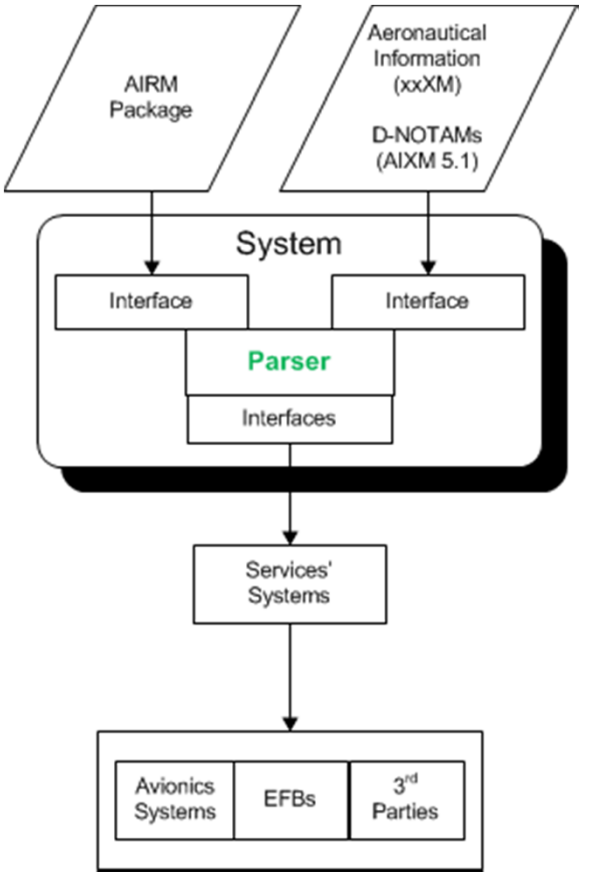
End-to-End SWIM Implementation

- **Honeywell's SWIM development is focusing on:**
  - Processing of SWIM information;
  - Integrating SWIM information into our service systems that support various applications and avionics products; and
  - Distributing this information to various platforms per their requirements.

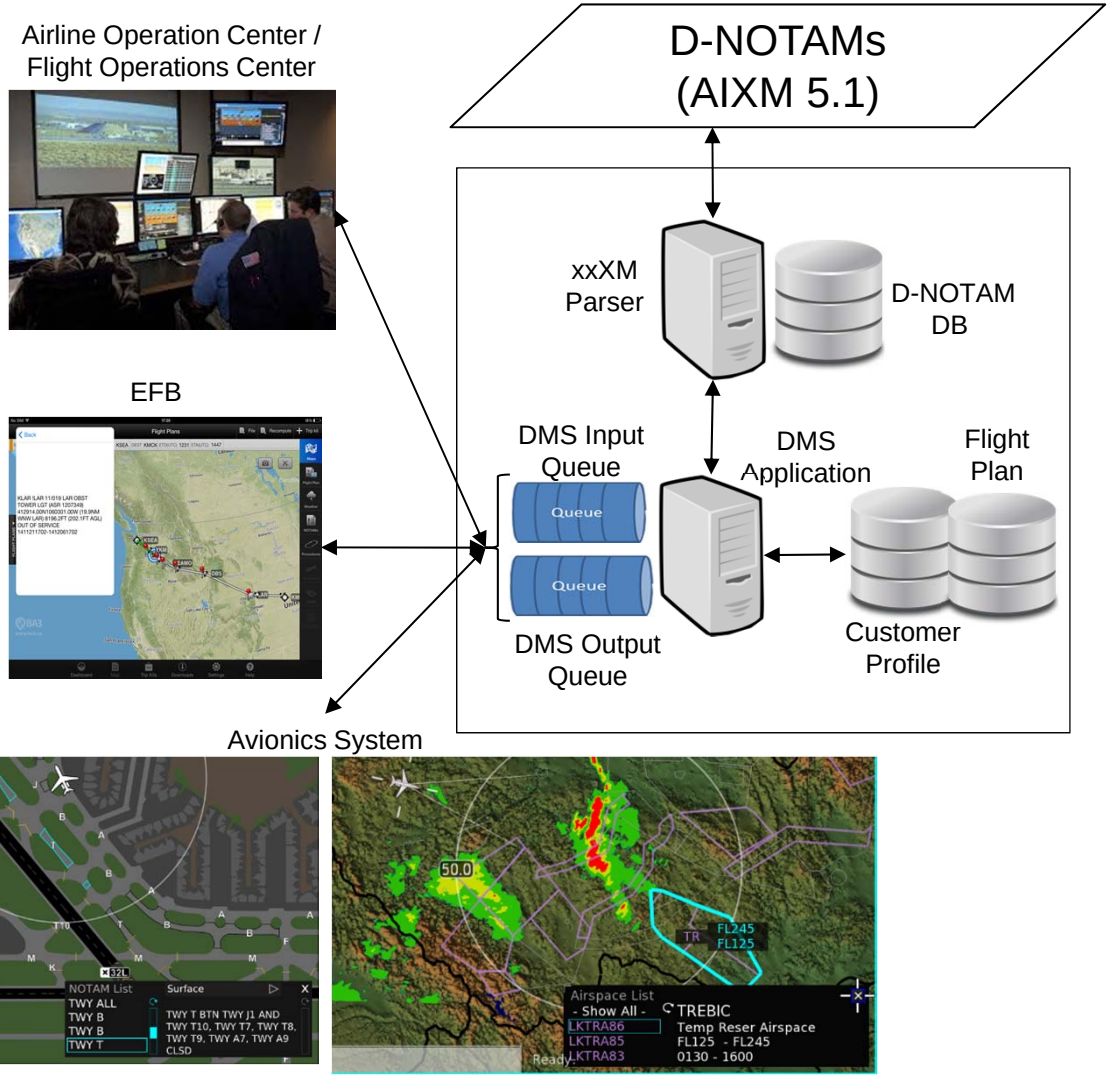
- **The processing of SWIM information addresses the following industry information exchange models:**
  - Aeronautical (AIXM / ***AIXM 5.1 for D-NOTAMS***);
  - Weather (WXXM);
  - Flight & Flow (FIXM); and
  - Air Traffic Management Information Reference Model (AIRM).

- **The processing & integration of SWIM information includes:**
  - Development of a parser that receives, processes & distributes the data;
  - Enhancements to our services' processing systems:
    - Development of the "***Data Management Services***" (DMS) concept introduced in the FAA's Aircraft Access to SWIM program; and
    - Integration of temporal information in support of RTCA SC-206 / EUROCAE WG76's ***Aeronautical Update & Baseline Synchronization Services***.

- **The distribution of the SWIM information supports the need to provide the information to:**
  - Avionics systems;
  - EFBs; and
  - 3rd parties systems associated with AOC, FOC, FBO, etc.

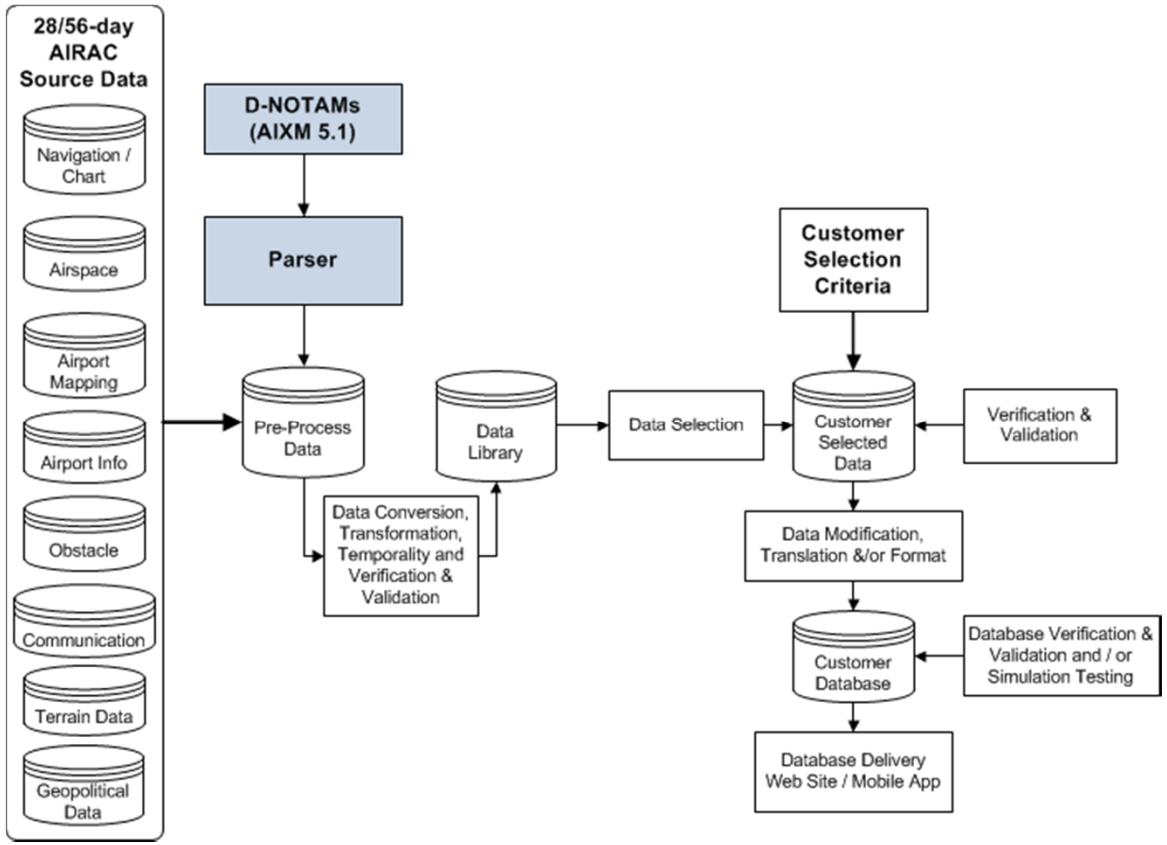


D-NOTAM Updates (AUS)



- Parser gets D-NOTAMs from external sources and stores in DB.
- Customer sends request to DMS
  - DMS sends acknowledgment
- DMS processes request
  - DMS fetches customer profile from databases, including the flight plan
  - DMS fetches D-NOTAMs associated with customer profile & flight plan
- DMS filters, formats and sends the appropriate D-NOTAMs to customer's target device(s).
- DMS continues to monitor D-NOTAM feed and pushes updates to customer device per the customer profile.

D-NOTAM Update (BSS)



- Parser gets D-NOTAMs from external sources and provides to DB processing system.
- Pre-processing D-NOTAM application manages the temporality associated with the D-NOTAM against the AIRAC 28-day time period.
- Customer's selection criteria indicates their need for updates more frequent than every 28-days.
- DB processing system produces and delivers the customer's database based on the temporality of the D-NOTAMs.

D-NOTAM Delivery

- The delivery of the D-NOTAM data is dependent on the target applications.
  - The application may require the data in a message, file and / or a unique database format.

D-NOTAM Deliverable	Delivery Processing Driver	Data Link (Delivery) Environment
Messages	Based on existing data link processing requirement; e.g. industry standards such as ARINC 618 A/G Protocol, 620 DL Ground Sys Standard, 622 ATS DL Apps	Provided through ACARS, IP based communication links (Satcom, WiFi etc.), and / or 3G/4G mobile connectivity
Files	Based on target application requirements, e.g. XML, Flat files	Provided through IP based communication links (Satcom, WiFi etc.), and / or 3G/4G mobile connectivity
Databases	Based on target system requirements, e.g. avionics system binary format	

ARINC 424 vs. AIXM Review

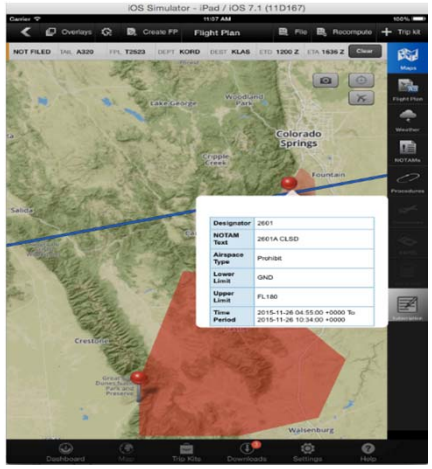
424 Type	Sub-Type	AIXM Support
Navaids	VHF & NDB	Supports
Enroute	Waypoints	Supports
	Airways	Supports
	Holding Patterns	Supports
	Communications	Supports
	Preferred Routes	N/A–not used
SUAs	Restricted Airspace	Supports
	FIR/UIR	Supports
	Controlled Airspace	Supports
Tables	Cruising	N/A-not used
	Geo Reference	N/A-not used
MORA	Grid MORA	Does not support
Customer	Company Routes	N/A–flight plan
	Alternates	N/A-aerodrome

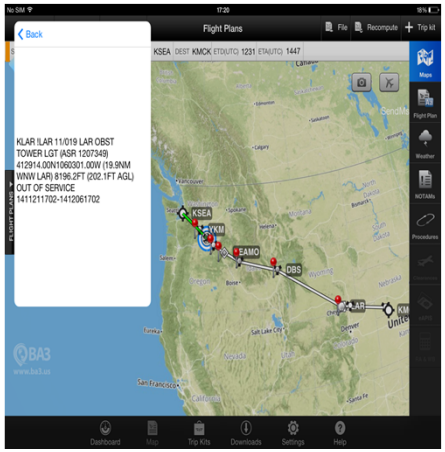
424 Type	Sub-Type	AIXM Support
Terminal	Aerodrome/Heliport	Supports
	Gates	Supports
	Runways	Supports
	Localizer / Markers	Supports
	MLS	N/A-no AIP data
	GNSS Landing Sys	Does not support
	GBAS Path Point	Does not support
	SBAS Path Point	Does not support
	SID/STAR/Approach	Supports
	Waypoints	Supports
	NDB	Supports
	MSA	Supports
	Communications	Supports
	Arrival Altitude	N/A–not used

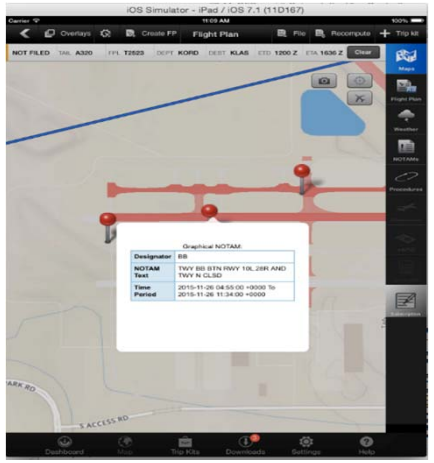
Determined that some of the data that is used to support our customers needs to be address by AIXM
The ARINC 424 Committee is working on an XML version of the standard

FAA FNS NDS Review

- Honeywell reviewed the D-NOTAMs available through the FAA's Federal NOTAM System (FNS) NOTAM Distribution System (NDS) test site.
  - Downloaded D- NOTAMs
  - Validate the data with the AIXM 5.1 schemas
  - Parsed & stored the D-NOTAMs
  - Created a flight plan using our flight planning system and determined the associated D-NOTAM
  - Displayed the flight plan and the D-NOTAMs graphical & textual information on an EFB.
- Found no issues with the use of the FAA system and the data that was available.







EAIMS Reviews

- **Honeywell reviewed the European ATM Information Management Service (EAIMS) aeronautical information dataset.**
  - Feedback addressed missing elements within the data catalogue associated with:
    - Aerodrome Routine Meteorological Reports (METAR)
    - Aerodrome Special Meteorological Reports (SPECI)
    - TAF Message
    - GAMET Message
    - SIGMET/AIRMET Messages And Special Air-Reports
    - Aerodrome Warnings
    - Wind Shear Warnings
    - Advisory Message For Volcanic Ash
    - Advisory Message For Tropical Cyclones
    - AERODROME/HELIPORT - Magnetic Variation

The recommendations were accepted and added to the data catalogue.

ICAO AIRM Reviews

- **Reviewed ICAO AIRM v006 and provided comments associated with:**
  - ATM Business terms and reference documents in AIRM
  - AIRM feature associations
  - xxXM (AIXM, FIXM, WXXM) features availability in AIRM

- **Examples of observation provided:**

  – Association Multiplicity was generic whereas it needs to be specific.
    - e.g. Runway feature the association multiplicity between Runway and Aerodrome is mentioned as 0..*. But it should be 1..*

  – The logical model representation of displaying attributes of base class in the derived class needs to be consistent.

  – Aerodrome mapping feature “Taxiway” and its associated elements like aerodrome, marking, light system etc. were captured from RTCA DO-272D_291C / EUROCAE ED-99D_119C as the model lacked source reference fields
    - Further details on next slide

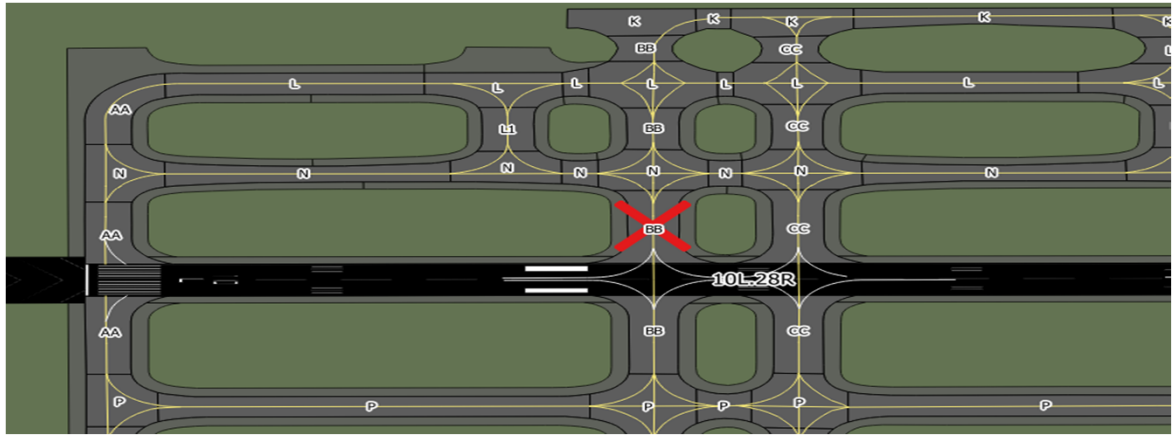
Comments were reviewed and those accepted will be incorporated by ICAO Information Management Panel AIRM team in the next version

D-NOTAM Challenge #1

Review of Closed Taxiway indicated a need for graphical data

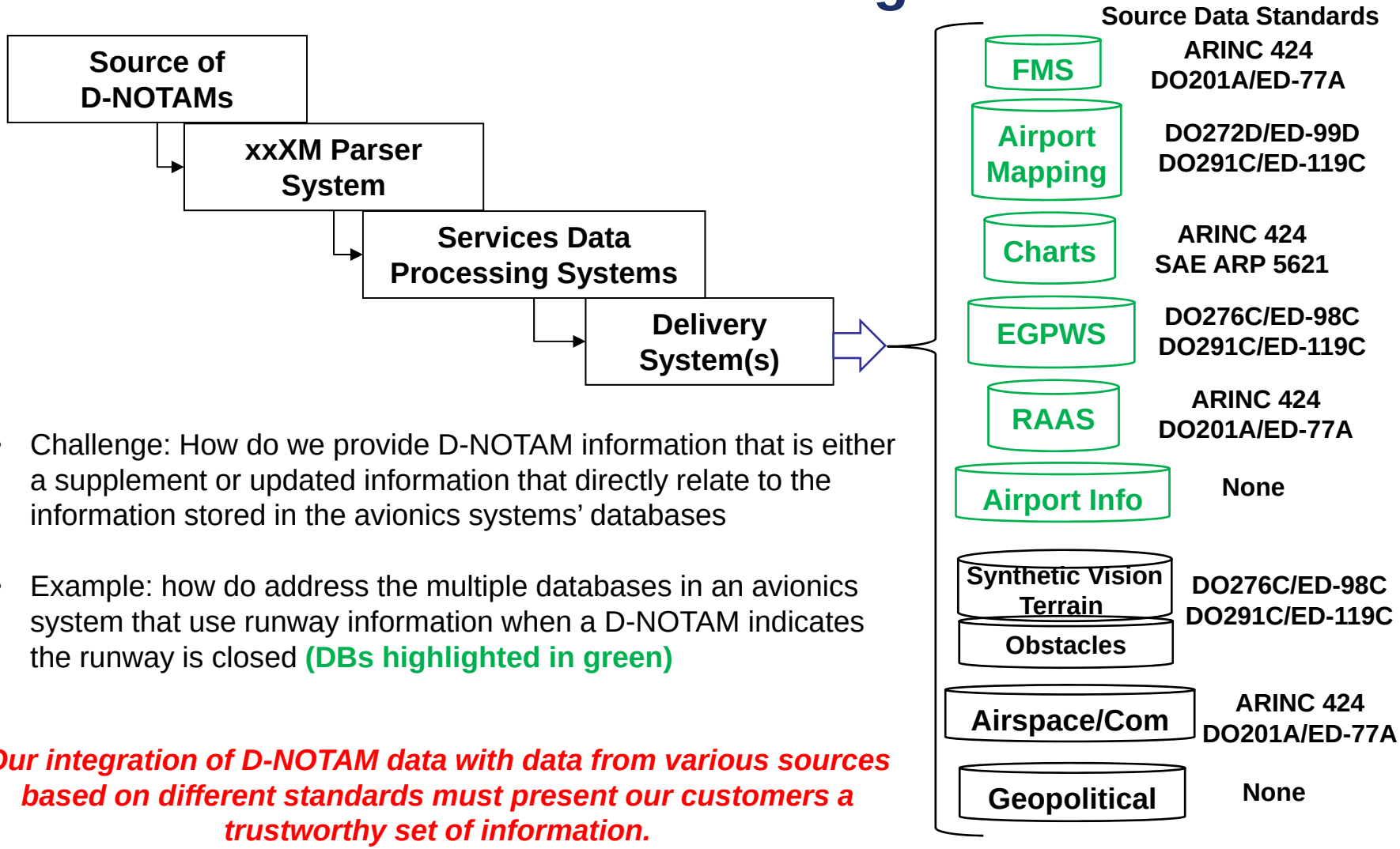
- D-NOTAM: <ns11:text>TWY BB BTN RWY 10L.28R AND TWY N CLSD</ns11:text> <ns11:effectiveStart>201411031102</ns11:effectiveStart><ns11:effectiveEnd>201502032359</ns11:effectiveEnd>

- Challenge: The D-NOTAMs above lack graphical data that was needed to represent the closed taxiway. We supplemented the data by using aerodrome mapping data based on RTCA DO-272D_291C / EUROCAE ED-99D_119C
  - Solution: Use of the Aerodrome Mapping Exchange Model (AMXM)



A general review of AIXM 5.1 indicates a need for more (worldwide) graphical D-NOTAM information in order to support our customers

D-NOTAM Challenge #2



- Challenge: How do we provide D-NOTAM information that is either a supplement or updated information that directly relate to the information stored in the avionics systems' databases

- Example: how do address the multiple databases in an avionics system that use runway information when a D-NOTAM indicates the runway is closed **(DBs highlighted in green)**

Our integration of D-NOTAM data with data from various sources based on different standards must present our customers a trustworthy set of information.

Thank You

Any Questions?

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