Digital data services in the ICAO AIS context

Presented to: ATIEC 2019
By: Eduard Porosnicu, EUROCONTROL
Date: 23 September 2019
ICAO Requirements for AIS

- Applicable since NOV 2018
- "5.1.1 Aeronautical information shall be provided in the form of aeronautical information products and associated services."

AIP
Charts
NOTAM

Digital data sets
ICAO Requirements for AIS

- "5.4.1.3 Recommendation.— Global communication networks such as the Internet should, whenever practicable, be employed for the provision of aeronautical information products."

- "Further guidance on digital data set distribution can be found in the Manual on System-wide Information Management (SWIM) Concept (Doc 10039)."
AIS digital data set services
5.4.3 Data set information services

5.4.3.1. When provided, the digital data sets specified in 5.3 should be made available through information services that expose the content of the digital data set for online data querying and data retrieval.

5.4.3.2. A data set information service shall provide as a minimum the possibility to query and retrieve as a whole each of the digital data set specified in 5.3.

5.4.3.3. Recommendation – a data set information service should provide the possibility to query and retrieve selected elements of the digital data set specified in 5.3.

5.4.3.4. Recommendation – a data set information service should provide the possibility to subscribe to notifications on data set updates.
AeronauticalDataset Service
### AeronauticalDataset Service

<table>
<thead>
<tr>
<th>function</th>
<th>result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow a service consumer to query the lists of dataset series matching a series of criteria including type, geographical scope, title</td>
<td>the list of matching dataset series objects is returned</td>
</tr>
<tr>
<td>Allow a service consumer to query the lists of datasets matching a series of criteria including dataset series, period of validity, geographical scope, limitations on use, title</td>
<td>the list of matching dataset objects is returned</td>
</tr>
<tr>
<td>Allow a service consumer to retrieve the content of a dataset</td>
<td>the content of the dataset file(s) is returned</td>
</tr>
<tr>
<td>Allow a service consumer to retrieve the content of a data product specification</td>
<td>the content of the DPS file is returned</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>function</th>
<th>result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow the service consumer to subscribe to notifications concerning the availability of datasets matching a series of criteria.</td>
<td>subscription is created and subscription object is returned.</td>
</tr>
<tr>
<td>Allow the service consumer to be notified about the availability of datasets matching the series of criteria as subscribed.</td>
<td>a list of dataset objects is returned</td>
</tr>
</tbody>
</table>

**IMP/WGA – Working Group “AIM”**
Example: accessing the service prototype using Web browser
Aeronautical Feature Service

Open Geospatial Consortium (OGC) – Web Feature Service (WFS) (with the Temporal Extension)

OGC 12-027r3 (see https://portal.opengeospatial.org/files/?artifact_id=58922.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Use Case</th>
<th>Category</th>
<th>Example</th>
<th>Technical requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Retrieve the complete state of a feature at a point in time</td>
<td>Visualization, decision support</td>
<td>Retrieve the state of a runway at the time of arrival.</td>
<td>Filtering of features and generation of SNAPSHOT time slices.</td>
</tr>
<tr>
<td>2</td>
<td>Retrieve all features fulfilling a certain criteria at a point in time</td>
<td>Decision support</td>
<td>Retrieve all airports in a certain area that are operational at the time of arrival.</td>
<td>Filtering of features and generation and filtering of SNAPSHOT time slices.</td>
</tr>
<tr>
<td>3</td>
<td>Retrieve all time slices of a feature relevant for (i.e. affecting the state at) a point in time</td>
<td>Change-aware visualization</td>
<td>Retrieve all time slices of a runway relevant for the time of arrival. (This enables the client to process any TEMPDELTA as e.g. digital NOTAMs) received at a later point in time</td>
<td>Filtering of features and determination of the relevant time slices according to the AIXM-TM.</td>
</tr>
</tbody>
</table>
What about NOTAM?

The consequence....

...very large Pre-flight Information Bulletins (PIB) !!
What about NOTAM?

- **Current ICAO Annex 15 Recommendation:**

  “6.3.3.4 - *When temporary changes of short duration are made available as digital data (digital NOTAM), they should use the same aeronautical information model as the complete data set.*”
Digital NOTAM

- type
- designator
- activation status
- schedule
- geometry
- etc.

Airspace

(Baseline)

Airspace (new) [Tempdelta]

- activationStatus
- activity
- schedule...

Digital data sets

See:
https://ext.eurocontrol.int/aixm_confluence/display/public/DNOTAM/Commented+Digital+NOTAM+coding+example
WGA job card – “NOTAM system revision”

- **VISION** - *Establish an efficient system that makes short-term changes to aeronautical information available for users.*

- **How to**
  
  1. **baseline data that is available in digital data sets**
     - short-term updates and temporary information shall be provided as an *update to the relevant digital data set*, made available through *information services*
     - ensures backward compatibility with legacy systems (*issue NOTAM for as long as necessary*)

  2. **data that is not part of the digital data sets** and for information that is too complex for digital coding
     - short-term updates and temporary information would continue to be provided as *NOTAM messages*
Conclusion

AIP

Charts

NOTAM

Digital data sets

INFORMATION SERVICE

Airspace (new) [Tempdelta]
- activationStatus
- activity
- schedule...

Digital NOTAM

Minimum service

Complementary service

Update notification