

# Digital data services in the ICAO AIS context

Presented to: ATIEC 2019

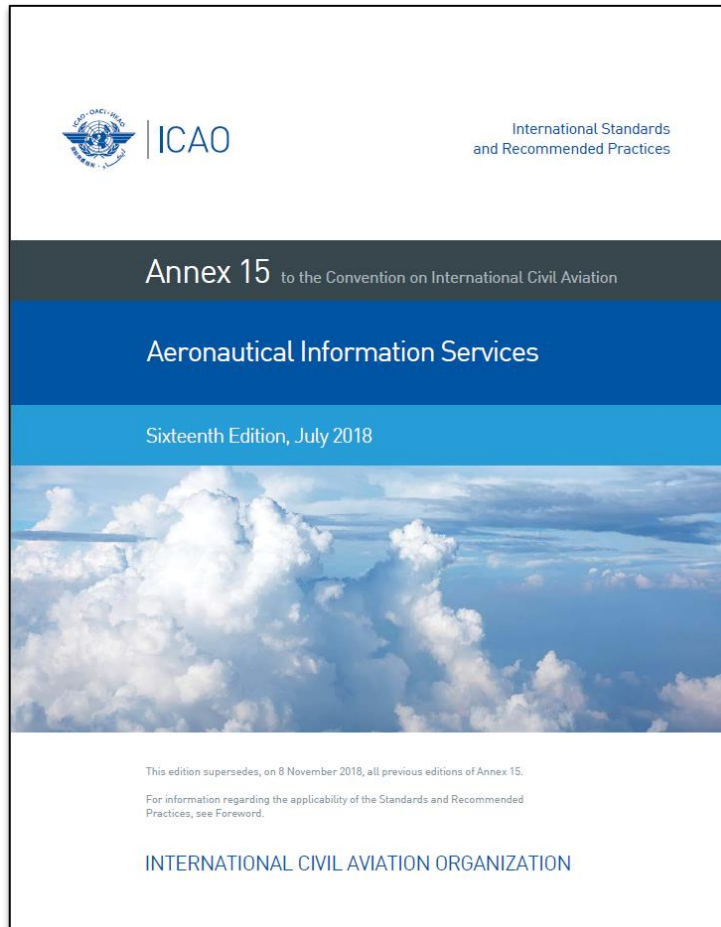
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Date: 23 September 2019

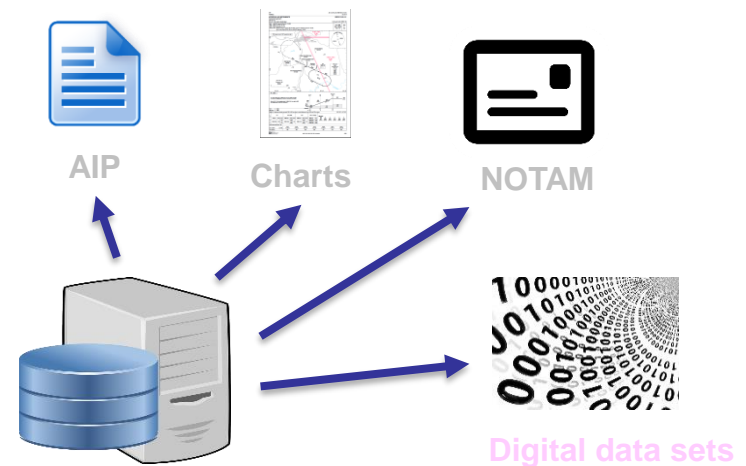
*Aviation Information World – Forecasting the Future*



# ICAO Requirements for AIS

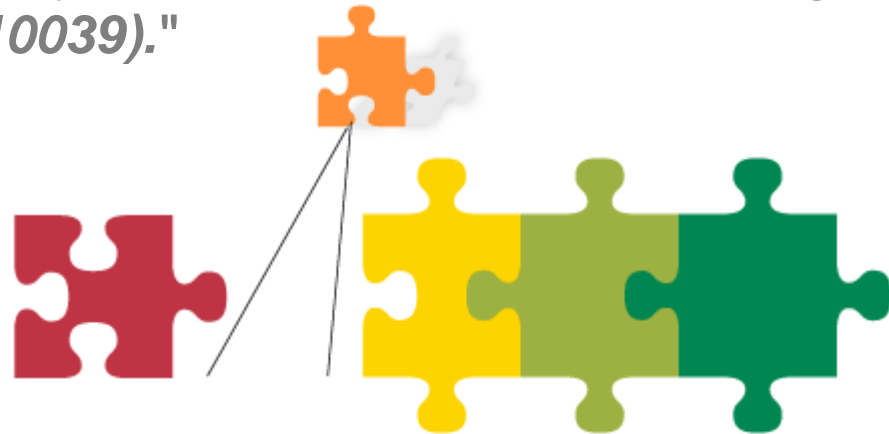


- **Applicable since NOV 2018**
- *"5.1.1 Aeronautical information shall be provided in the form of aeronautical information **products** and **associated services**."*

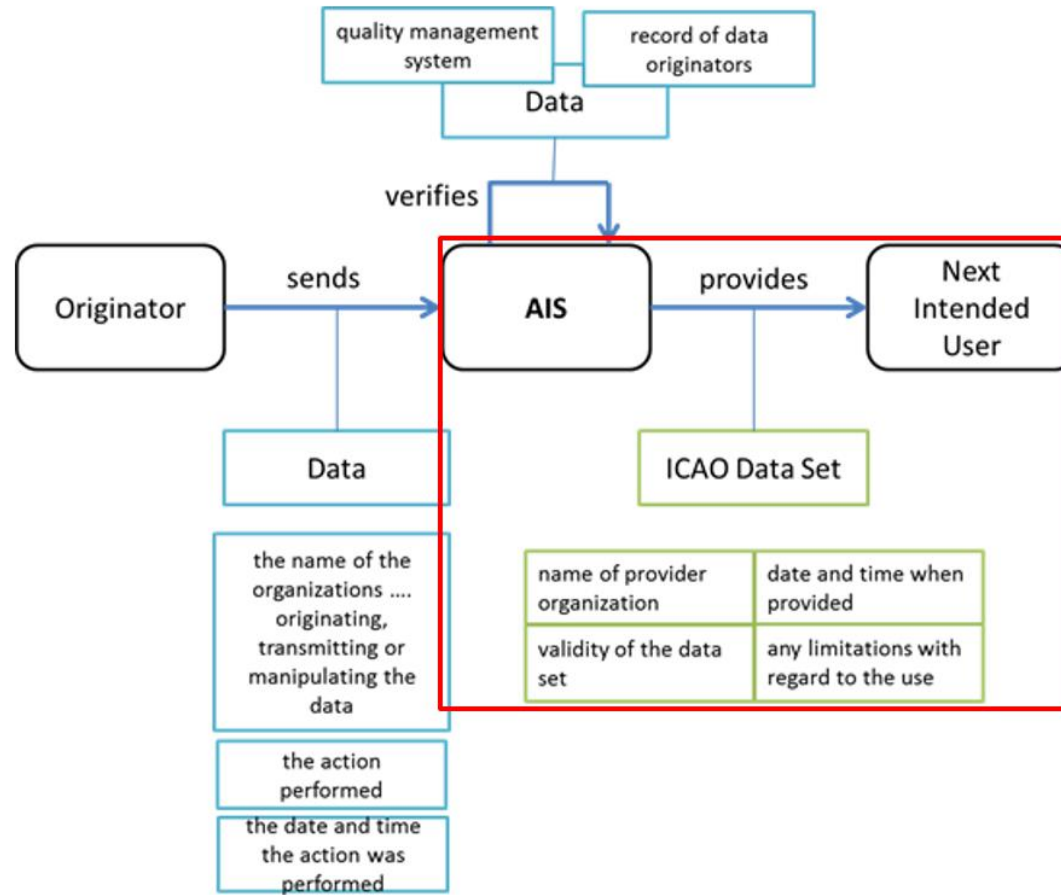


# ICAO Requirements for AIS

- "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)**."

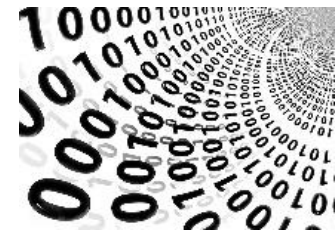


# ***AIS digital data set services***





# IMP Proposal



Digital data sets

## IMP/WGA – Working Group “AIM”



Minimum service



Complementary service



Update notification

### 5.4.3 Data set information services

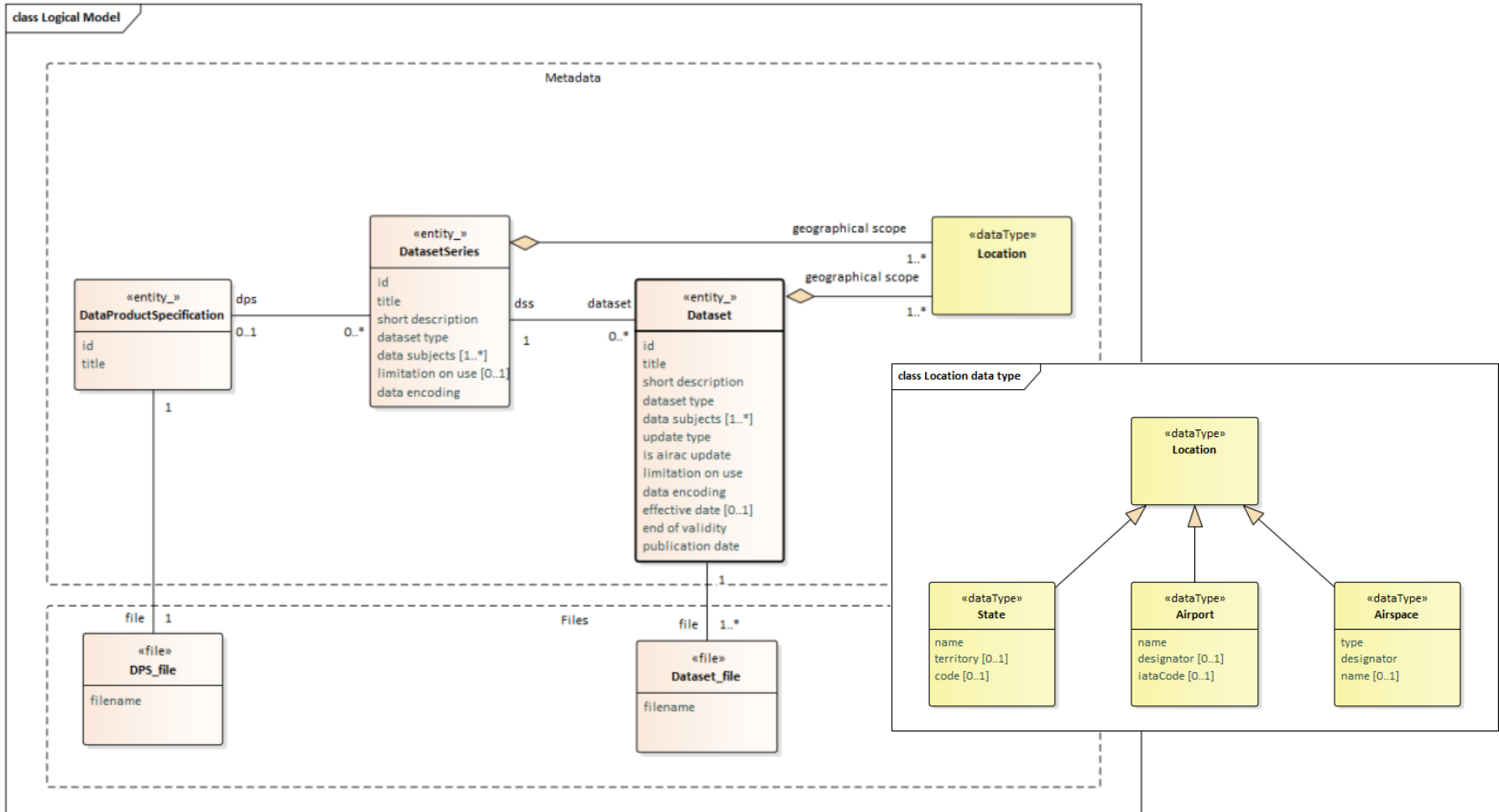
5.4.3.1. When provided, the digital data sets specified in 5.3 should be made available through information services that expose the content of the digital data set for online data querying and data retrieval.

5.4.3.1.2 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.

5.4.3.1.3 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.

5.4.3.1.4 Recommendation – a data set information service should provide the possibility to subscribe to notifications on data set updates.

# AeronauticalDataset Service



# AeronauticalDataset Service

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



Minimum service

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



Update notification



IMP/WGA – Working Group “AIM”


ATHEC

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# AeronauticalDataset Service

Example: accessing the service prototype using Web browser

Aeronautical dataset

Data set series

Data set

All data set files

Manager

Code:

Title (Pattern allowed '%'):

Dataset Series Code:

Type:

AIP Data Set

Update Type:

None

Encoding:

None

Airac Update:

None

Effective Date:

End valid Date:

Publication Date:

= Date

Countries:

Please enter at least the first character

Airports:

Please enter at least the first character

Airspaces:

Please enter at least the first character

Region Territories:

Please enter at least the first character

Reset

Apply

	Code	Title	Type	Update Type	Encoding	Effective Date	End Valid Date	Publication Date	Airac Update	File(s)
>	DS05	AIP Data Set for Donlon (Baseline)	AIP Data Set	FULL	AIXM 5.1.1	2017-07-01	2018-12-06	2019-01-22	N	- EA_AIP_DS_FULL_BI_20170701.xml
>	DS06	AIP Data Set for Donlon (Baseline)	AIP Data Set	FULL	AIXM 5.1.1	2018-12-06		2019-01-22	Y	- EA_AIP_DS_FULL_20181206_AIRAC_route irspace.xml - EA_AIP_DS_FULL_20181206_AIRAC_aip xml
>	DS07	AIP Data Set for Donlon (Baseline Update)	AIP Data Set	FULL	AIXM 5.1.1	2018-12-06		2019-01-22	Y	- EA_AIP_DS_UPD_BI_20181206_AIRAC.x
>	DS08	AIP Data Set for Donlon (Delta Update)	AIP Data Set	FULL	AIXM 5.1.1	2018-12-06		2019-01-22	Y	- EA_AIP_DS_UPD_DELTA_20181206.xml



# 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](https://portal.opengeospatial.org/files/?artifact_id=58922)).

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



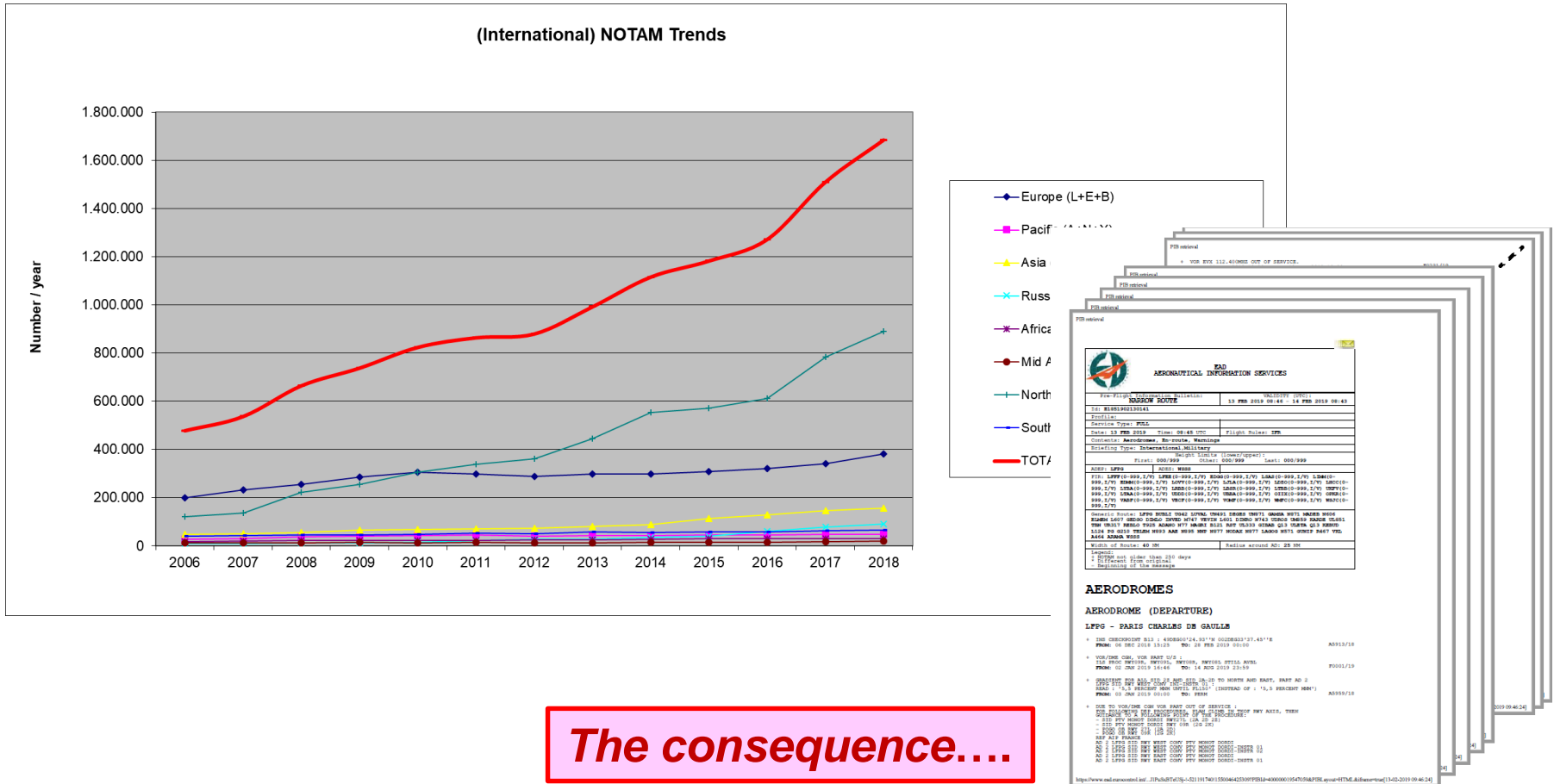
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# What about NOTAM?



**...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

## Airspace [Baseline]

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

## Airspace (new) [Tempdelta]

- activationStatus
- activity
- schedule...



(Baseline)

Digital data sets

```
<?xml version='1.0' encoding='UTF-8'?>
1 <message:AIXMBasicMessage xmlns:message="http://www.aixm.aero/schema/5.1.1/message"
  xmlns:gts="http://www.isotc211.org/2005/gts" xmlns:gco="http://www.isotc211.org/2005/gco"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:gml="http://www.opengis.net/gml/3.2"
  xmlns:gss="http://www.isotc211.org/2005/gss" xmlns:aixm="http://www.aixm.aero/schema/5.1.1"
  xmlns:gsm="http://www.isotc211.org/2005/gsm" xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:event="http://www.aixm.aero/schema/5.1/event" xmlns:xlink="http://www.w3.org/1999/xlink"
  xsi:schemaLocation="http://www.aixm.aero/schema/5.1.1/message http://www.aixm.aero/schema/5.1.1/message/AIXM_BasicMessage.xsd
  http://www.aixm.aero/schema/5.1/event http://www.aixm.aero/schema/5.1.1/event/version_5.1-e/Event_Features.xsd"
  gml:id="M00001">
  <message:hasMember>
    <aixm:Airspace gml:id="uid.28e6905-f99a-4ca7-a736-2c0787cdcf57">
      <gml:identifier codeSpace="urn:uuid:">028e6905-f99a-4ca7-a736-2c0787cdcf57</gml:identifier>
      <aixm:TimeSlice>
        <aixm:AirspaceTimeSlice gml:id="ID_70">
          <gml:validTime>
            <gml:TimePeriod gml:id="ID_71">
              <gml:beginPosition>2018-06-30T06:00:00Z</gml:beginPosition>
              <gml:endPosition>2018-06-30T15:30:00Z</gml:endPosition>
            </gml:TimePeriod>
          </gml:validTime>
          <aixm:interpretation>TEMPDELTA</aixm:interpretation>
          <aixm:sequenceNumber>1</aixm:sequenceNumber>
          <aixm:activation> (23 lines)
          <aixm:extension>
            <event:AirspaceExtension gml:id="ID_80">
              <event:theEvent xlink:href="urn:uuid:2b64b247-3d56-4768-846b-183f96d47ec1"/>
            </event:AirspaceExtension>
          </aixm:extension>
        </aixm:AirspaceTimeSlice>
      </aixm:Airspace>
    </message:hasMember>
    <message:hasMember>
      <event:Event gml:id="uid.2b64b247-3d56-4768-846b-183f96d47ec1">
        <gml:identifier codeSpace="urn:uuid:">2b64b247-3d56-4768-846b-183f96d47ec1</gml:identifier>
        <event:timeSlice> (50 lines)
      </event:Event>
    </message:hasMember>
  </message:AIXMBasicMessage>
```

See:

[https://ext.eurocontrol.int/aixm\\_confluence/display/public/DNOTAM/Commented+Digital+NOTAM+coding+example](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

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

- 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*)

Digital NOTAM

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

