

AIXM Status

October 2017

Presented by: E. Porosnicu (EUROCONTROL)



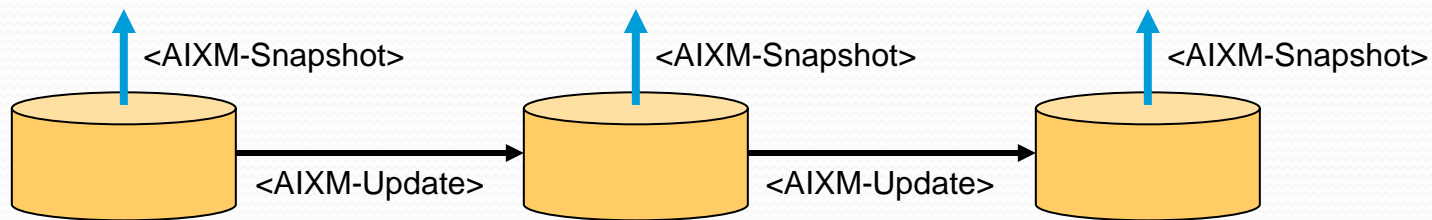
Content

- AIXM usage - current and future
- AIXM Governance - CCB
- Digital NOTAM



AIXM intended use

- **AIXM 2.1/3.3/4.5** - developed for the EAD (European AIS Database)



- **AIXM 5** – wider range of applications
 - See “White Paper” (public consultation in 2006)
 - http://www.aixm.aero/sites/aixm.aero/files/imce/AIXM50/aixm_5_proposal_20060620_whitepaper_.pdf
 - ground-ground data exchange
 - UML/XML + usage rules for specific use cases



AIXM use – current (October 2017)

- Data exchange in the European AIS Databased (EAD) context
 - National system to/from Regional system
- AIS data publication
 - Obstacles (growing number of States)
 - Airspace, Route, Airport, etc. data sets
 - ... mostly as side-effect of AIS automation, no ICAO requirements!
- Data exchange between AIS tools
 - Database to charting, AIP production, NOTAM, etc. tools
- Data origination
 - Procedure designer to AIS, etc.
- Local data provision to ATM systems
 - airspace, routes, points, etc.



AIXM use – new ICAO data sets

- Revised Annex 15
 - Digital data sets
 - AIP
 - Obstacles
 - Terrain
 - Airport Mapping
 - Instrument Procedures
- New PANS-AIM
 - More detailed requirements
 - Based on data catalogue
 - Subjects
 - Properties
 - Sub-properties
 - Types
 - Description, data quality...

Incentive : if the data set is provided,
no longer necessary to include the same data in the printed AIP!



Use of AIXM

- **AIP Data Set**
 - AIXM 5.1 Coding guidelines in development
 - Including data verification/validation rules
 - Including sample data set(s)
- **Airport Mapping Data Set**
 - ED-99A/DO-272A Mapping Guidelines for AIXM 5.1 available
<http://www.aixm.aero/sites/aixm.aero/files/imce/library/ed99atoaixm5.imappingvo.6.doc>
- **Obstacle Data Set**
 - AIXM 5.1 coding guidelines / data verification guidelines to be further developed (see eTOD Manual from EUROCONTROL)
- **Instrument Flight Procedures Data Set**
 - Will probably need AIXM 5.2 for complete coverage



AIP Data Set – harmonised coding rules

Pages 0

Overview

Created by EDUARD POROSNICU, last modified on 28 Jul 2017

The purpose of this Web site is to enable the AIXM community to collaboratively develop guidance material in support to the AIXM implementations and to provide information about such implementations. Three high-level areas of interest are identified: data sources, coding guidelines and extensions. In order to facilitate contributions from the global AIXM community, anonymous users are allowed to provide comments on certain sections of the Web site. Registered users have the possibility to make both inline and global comments and can also contribute to the development of the site.

www.aixm.aero/confluence


AIXM Data Sources



Presented as:

- map of the World
- list of sources

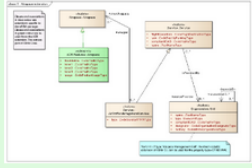
AIXM Coding Guidelines



Including:

- AIXM 5.1(1) Model Overview
- (ICAO) AIP Data Set
- Digital NOTAM

AIXM Extensions



Will be added progressively!

How to use

Structure

The AIXM Confluence site is organised in "Spaces", each dedicated to a specific topic or sub-topic. Each space is a collection of pages, organised as a tree. A page may have other child pages.

Commenting

There are two ways of providing comments to the content.

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- **Registration:** the AIXM Confluence server is hosted by the European Organisation for the Safety of Air Navigation (EUROCONTROL). Log-in is possible for anyone who has an EUROCONTROL extranet account. However, this still require that the corresponding user is added in a specific group. Please use this registration page in order to request

Style and format aspects

Mark-up

The following four types of mark-up are used on some pages in order to draw the attention of the reader on some particular aspects:

Note
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Good to know
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AIP Data Set – harmonised coding rules

- Mapping of the ICAO PANS-AIM AIP Data Set to AIXM 5.1(.1)
- AIXM 5.1(.1) coding rules for the AIP Data Set
- Interoperability rules for the AIP Data Set (including conformance testing)
- AIXM 5.1(.1) verification rules for the AIP Data Set
- Reference implementation - sample AIXM 5.1(.1) AIP Data Set (DONLON)



AIP Data Set verification rules

Identifier	Data Encoding Rule	Justification	Data Verification Rule (UID)	Remarks
DPN-107	If DesignatedPoint.type equal-to ('ICAO' , 'COORD' , 'OTHER') then there should not exists any other designated point with type of ('ICAO' , 'COORD' , 'OTHER') located within 1NM.	Data consistency	TBD	
DPN-108	If DesignatedPoint.type equal-to 'ICAO', then DesignatedPoint.designator should be unique world-wide.	ICAO Annex 11 [1]	AIXM-5.1_RULE-2CEC0	
DPN-109	The DesignatedPoint.location property is mandatory.	Minimum AIP data set	AIXM-5.1_RULE-1A3384	
DPN-110	The Point.horizontalAccuracy (or ElevatedPoint.horizontalAccuracy) attribute is mandatory.	Minimum AIP data set	TBD	
DPN-111	If coded, the value of the horizontalAccuracy for the DesignatedPoint used in the enroute environment (i.e is used as EnRouteSegmentPoint) shall be 100 M or less.	PANS-AIM	AIXM-5.1_RULE-EC542 (rule does not check the DesignatedPoint but the EnRouteSegmentPoint feature), AIXM-5.1_RULE-EC543 (rule checks 300FT which is not defined in PANS-AIM)	
DPN-112	Coordinates of DesignatedPoint used in the enroute environment (i.e is used as EnRouteSegmentPoint) shall be published with at least 4 decimals resolution.	PANS-AIM	AIXM-5.1_RULE-639C1, AIXM-5.1_RULE-EB1B9	PANS-AIM requires a publication resolution of 1 second, which can be achieved by minimum 4 decimal of a degree.
DPN-113	Coordinates of DesignatedPoint used in the terminal environment (i.e is used as TerminalSegmentPoint) shall be published with at least 5 decimals resolution.	PANS-AIM	AIXM-5.1_RULE-639C2, AIXM-5.1_RULE-1A8CE1	PANS-AIM requires a publication resolution of 1/10 second, which can be achieved by minimum 4 decimal of a degree.



AIP Data Set verification rules

- Conformance testing



Rule

The AIP Data Set shall comply with all the rules from the corresponding AIXM Business Rules - AIP Data Set Profile that are identified with an 'Error' level in case of non-compliance.



Recommendation

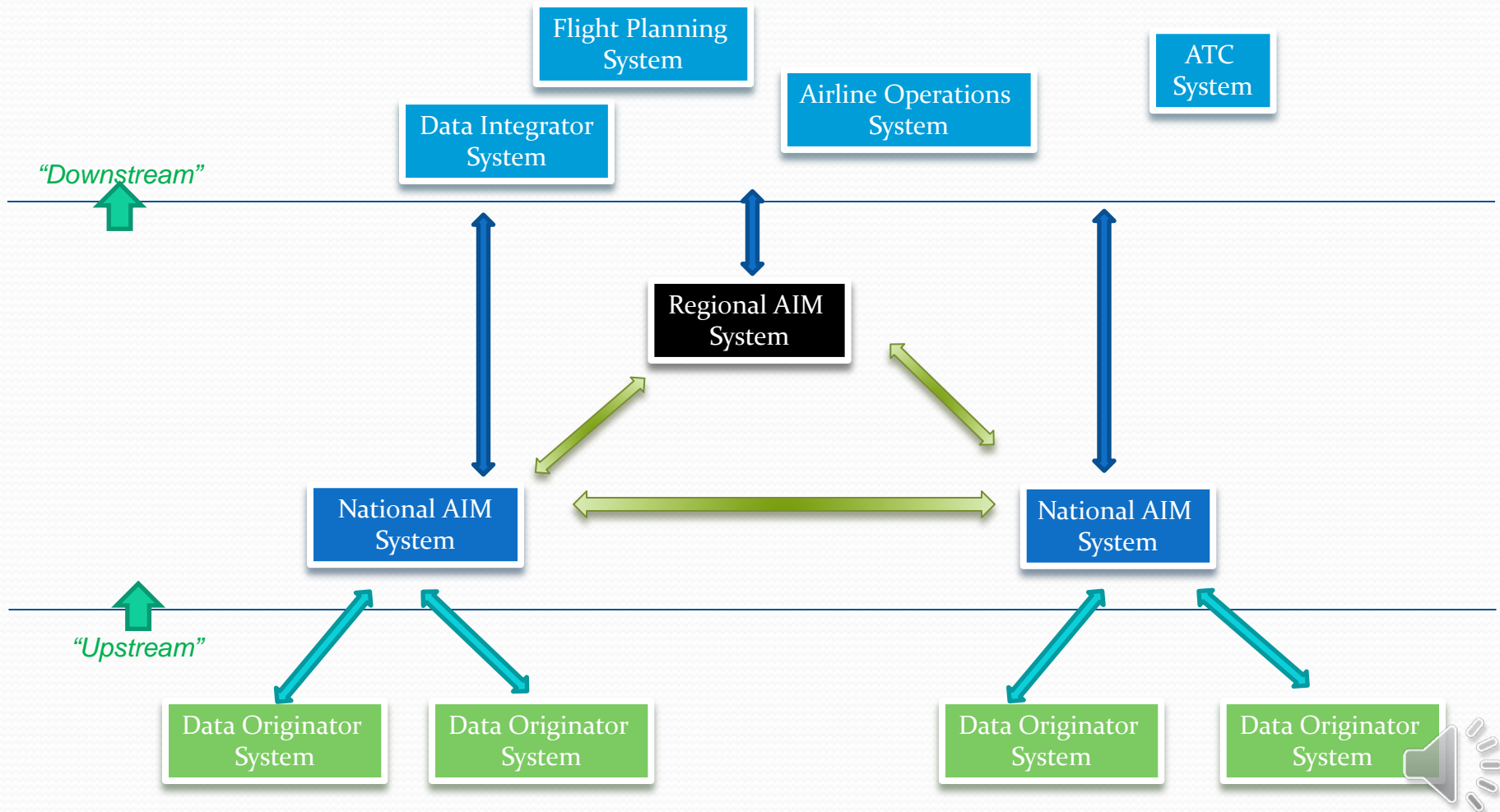
The AIP Data Set should comply with all the rules from the corresponding AIXM Business Rules - AIP Data Set Profile that are identified with an 'Warning' level in case of non-compliance.

... work in progress

- 2018 → Eurocontrol verification service for the AIP data set (proof of concept)



AIM Systems Interoperability



AIXM and interoperability

- Proposed **SOLUTION** : **Interoperability scenarios**
(AIXM use cases)

 ICAO Data Sets (downstream interoperability)

 AIM to Data Originator (upstream interoperability)

 Hub scenario (where applicable)



AIP Data Set – coding rules

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Interoperability rules (proposed)

- AIXM version for AIP Data Set



Rule

An AIP Data Set shall be valid against the AIXM 5.1.1 BasicMessage XMLSchema (http://www.aixm.aero/schema/5.1.1/message/AIXM_BasicMessage.xsd).

- GML Profile



Rule

The Data Set shall comply with the GML limitations and usage rules stated in the OGC 12-028r1 ^[1] document.



Rule

The GML pointProperty element shall not be used, except when necessary:

- in order to encode references to places, as stated in chapter Chapter 10 of the OGC 12-028r1 ^[1] document;
- in order to provide an accuracy value for a Curve point that is different from the accuracy of the whole Curve;
- in order to provide an srsName for a Curve point that is different from the srsName of the whole Curve;



Recommendation

Sequences of more than two consecutive GML pos elements should not be used in the Data Set. The GML posList should be used instead.



Interoperability rules (proposed)

- Feature identification and reference



Rule

Each AIXM feature included in an AIP Data Sets shall have a non-empty gml:identifier.



Rule

The gml:identifier shall be a UUID value, as defined in the AIXM Feature Identification and Reference ^[1] document.



Rule

The UUID values shall be generated with a compliant Version 4 UUID.



Rule

Abstract references (by gml:identifier), as defined in the ^[1] document, shall be used whenever the target record is not contained in the same data set.



Rule

Either abstract references (by gml:identifier) or internal references (by gml:id), as defined in the ^[1] document, shall be used whenever the target record is contained in the same data set.



Interoperability rules (proposed)

- Use of extensions

Permission

An AIP Data Set may include extension of the core model, on condition that:

Rule

The Data Set shall remain valid against one of the AIXM BasicMessage schema mentioned.

Rule

The extension schema shall be made available through a public URL.

Rule

A document explaining the purpose of the extension and the usage of each extension element shall be made available to all recipients of the data set.

Recommendation

The UML representation of the extension should be made available to all the recipients of the data set.



Interoperability rules (proposed)

- Common ICAO data subset

✔ **Rule**

An AIP Data Set shall not re-define locally the data features declared in the Common ICAO AIP Data Subset, available at:

http://www.aixm.aero/dataset/5.1.1/aixm_5_1_1_icao_common_data_subset.xml

! **Open issue**

What should be the `validTime.BeginPosition` and the `featureLifetime.BeginPosition` for the features included in the common ICAO AIP data set?

One proposal is to omit the `featureLifetime` for all the features included in the data set.

`validTime.BeginPosition` could be Nov 2018, as no AIP Data Sets would not be published before. Alternatively, the individual features could have a start of validity long time in the past as the data subset itself would be valid from the date of publication. That would ensure that references from legacy data are also covered in the past.

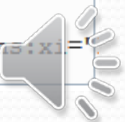
✔ **Rule**

An AIP Data Set shall use abstract references (as defined in section 3.4 of the AIXM Feature Identification and Reference [1]) in order to encode associations with features contained in the Common ICAO AIP Data Subset.

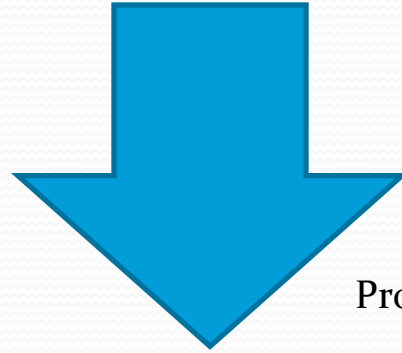
i **Permission**

An AIP Data Set may include the Common ICAO AIP Data Subset using the following XML include statement:

```
<xi:include href="http://www.aixm.aero/dataset/5.1.1/aixm_5_1_1_icao_common_data_subset.xml" parse="xml" xmlns:xi="xi" />
```



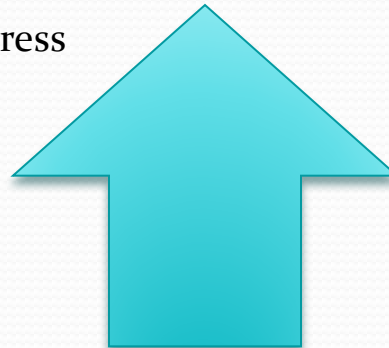
AIXM evolution



Protect investments



Ensure progress



AIXM Governance



aixm governance



www.aixm.aero

Tous

Images

Actualités

Vidéos

Maps

Plus

Paramètres

Outils

Environ 478 000 résultats (0,36 secondes)

Conseil : Recherchez votre recherche sur la page

Governance | AIXM
www.aixm.aero/page/AIXM-Change-Control-Board
AIXM Change Control Board maintain and to evolve

Future AIXM version
www.aixm.aero/page/Future-AIXM-version
23 janv. 2017 - Future AIXM version contains information

The banner features the AIXM logo in large blue letters, with the full name 'Aeronautical Information Exchange Model' below it. The background is a blue sky with a white contrail from an aircraft. On the right, there are logos for EUROCONTROL and the International Civil Aviation Organization (ICAO). A search bar is located in the bottom right corner of the banner.

AIXM Change Control Board

Objective

The objective of the AIXM Change Control Board (CCB) is to maintain and to evolve the AIXM Specification as necessary for enabling States to comply with the ICAO global and regional requirements for the provision of aeronautical information, in the context of the evolution towards digital AIM and System Wide Information Management (SWIM).

Membership

The members of the AIXM CCB represent a wide range of stakeholder organisations from many parts of the World. They act under the provisions of the Change Management Charter ("Charter"), which also defines the change management processes.

 [AIXM CCB Charter](#)

The AIXM CCB is open for participation to any AIXM stakeholder organisation. Currently, the AIXM CCB comprises representatives from around 45 organisations, with the following profiles:



AIXM COMMUNITY

Forum | **AIXM**

- AIXM Forum - read only (*anonymous access*)
- AIXM Forum - post messages (*requires registration*)



- [Visit our Wiki](#)

GitHub

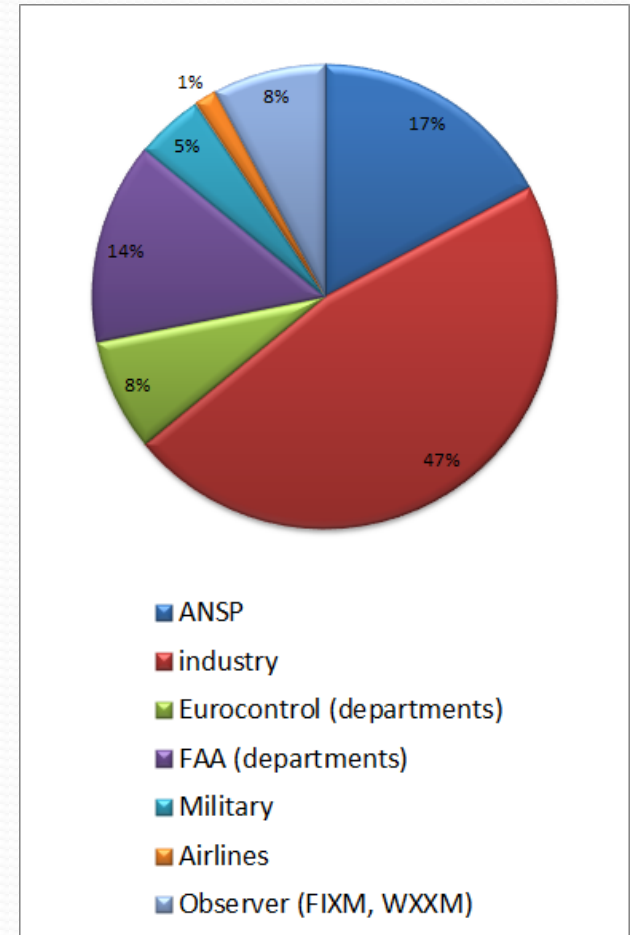
- [Find AIXM related resources on GitHub](#)

QUICK LINKS



AIXM CCB

- AIXM Change Control Board
 - Established based on the ICAO AIS-AIMSG recommendations
 - In close contact with the ICAO IMP
 - CCB process to be aligned with eventual IMP decisions
 - Reports progress on an annual basis
 - Membership implies acceptance of the Charter
 - <http://www.aixm.aero/page/governance>
 - Current distribution of members
 - 71 members from 52 organisations
 - including FIXM & WXXM observers
 - FAA & Eurocontrol ensuring the secretariat and support



CCB tool – JIRA (cloud hosting)

WARNING: Because of a limitation of JIRA, it is not possible to disable or restrict the actions "Clone Issue/SubTask" and "Convert Issue to Sub-task". These features are NOT compatible with the AIXM Change Management Process, so **please do NOT use them**, under any circumstances! Thank you for your understanding and cooperation — The AIXM Secretariat.</p>

- [AIXM 5.2 Dashboard](#)
- [AIXM 5.1.1 Dashboard](#)
- [AIXM System Dashboard](#)**

AIXM System Dashboard

Activity Stream

AIXM Change Management 📄 📑 📡

September 28

Antonio Locandro (COCESNA) commented on AIXM-255 - TerminalArrivalArea relationship to IAP

We have some examples, one would be having a RNAV (GNSS) procedure and a different ILS based on RNAV initial segments, the IAF most likely would be the same for both so TAA would be the same.

🔴 6 days ago [Comment](#)

Antonio Locandro (COCESNA) commented on AIXM-273 - SegmentLeg Support for Two Course Values (True and Magnetic)

Additionally it would need to be recorded the date the magnetic track was calculated at.

🟢 6 days ago [Comment](#) [Watch](#)

Antonio Locandro (COCESNA) commented on AIXM-275 - designatedPoint magnetic variation

Agreed, we are experimenting the same issue for route segments, the date of the magnetic variation is not recorded and this doesn't necessarily correspond to the feature validity as it we change a different attribute it will trigger a new effective [Read more >](#)

Two Dimensional Filter Statistics: AIXM Issues - Unreleased ⋮

Components	ISSUE OPEN / UNDER EV...	ISSUE IN PROGRESS / C...	ISSUE CLOSED	ISSUE REJECTED / CLO...	T:
🔗 Aerial Refuelling	1	1	0	0	2
🔗 Aircraft and Flight	0	2	0	0	2
🔗 AirportHeliport	16	7	0	0	23
🔗 Airspace	1	5	0	1	7
🔗 Airspace Layer	1	0	0	0	1
🔗 Geometry	1	2	0	0	3
🔗 Holding	0	3	0	0	3
🔗 Light Element	0	1	0	0	1
🔗 Nav aids	2	2	0	0	4
🔗 Obstacle	2	2	0	1	5
🔗 Organisation	0	1	0	0	1
🔗 Points	1	3	1	3	8
🔗 Procedure	16	19	1	2	38
🔗 Routes	4	10	1	1	16
🔗 Schedules	1	3	0	1	5



[2018] AIXM 5.2

- Objectives:
 - to facilitate the provision of ICAO data sets (except for terrain data), as specified in the new Annex 15 and PANS-AIM. This includes the development of guidance material for the provision of the data sets and of the associated metadata in a globally interoperable manner;
 - to simplify the metadata schema, either through a profile or through a dedicated aviation metadata schema;
 - to enable an initial global implementation of Digital NOTAM;
 - to enable the provision of data that supports the deployment of “performance based” ICAO concepts, such as PBN, etc.
 - to enable data provision for emerging concepts such as free routes, large-scale use of RPAS, etc.
 - to ensure the interoperability of aeronautical data (AIXM) with flight data (FIXM) domain and with the MET data (iWXXM) domain;
 - to introduce a deprecation mechanism for features/properties that are no longer used or are replaced by a new concept. A common approach with AIXM and FIXM is envisaged.
 - to correct issues and limitations detected in the previous versions.
- Currently, the AIXM CCB is working on evaluating issues and improvement proposals that might be considered for AIXM 5.2.



[2020 or later] AIXM 5.3

- Objectives:
 - alignment with the ICAO SWIM requirements as developed by the ICAO Information Management Panel;
 - enable the provision of new aeronautical data elements specified by ICAO, in particular in support of FF-ICE;
 - enable the provision of aeronautical data in support to future ATM concepts, such as time based operations (TBO);
 - ensure the interoperability of aeronautical data (AIXM) with the evolving needs of the flight data (FIXM) and MET data (iWXXM);
 - correct issues and limitations detected in the previous versions;
 - provide Guidance material for the implementation of AIS data services compliant with the SWIM concepts.



Digital NOTAM



Digitally enhanced briefing

- European SESAR Project 13.2.2

- Overview
- Aerodromes
- DEP : KJFK
- Airport**
- TMA
- MET
- ARR : LOWW
- Alternate
- Emergency
- En-Route
- Settings
- Flight Plans



Time filter: 16-01-28 14:00 to 16-01-28 16:00 Edit

<input checked="" type="checkbox"/>	1 TWY Closure	16Jan18 14:00 to 16Jan28 23:00	A0296/16
	TWY JB, JA, Y between RWY 13R/31L and TWY J closed		
<input checked="" type="checkbox"/>	2 TWY Closure	16Jan18 14:00 to 16Jan28 23:00	A0296/16
	TWY H between TWY Y and TWY Z closed		
<input checked="" type="checkbox"/>	3 TWY Closure	16Jan18 14:00 to 16Jan28 23:00	A0296/16
	TWY NB closed to Southbound turns to TWY A		
<input checked="" type="checkbox"/>	4 TWY Closure	16Jan18 14:00 to 16Jan28 23:00	A0294/16
	TWY Y between TWY J and TWY H closed		
<input checked="" type="checkbox"/>	5 OTHER	15Dec30 17:35 to 16Dec31 17:35	A9408/14
	RWY 22R PAPI beyond 8 deg right of rcl unusable		
<input checked="" type="checkbox"/>	6 OTHER	15May05 20:10 to 99Dec31 00:00	A4415/14
	RWY 22L engineered materials arresting system not STD		
<input checked="" type="checkbox"/>	7 OTHER	16Jan17 23:45 to 16Jan29 23:15	A0286/14
	RWY 13R/31R wet deiced liquid and deiced solid observed at 1601172149		
<input checked="" type="checkbox"/>	8 OTHER	15Nov05 05:25 to 16Jan29 22:00	A8166/14
	RWY 22R PAPI commissioned		
<input checked="" type="checkbox"/>	9 OTHER	15Dec02 17:00 to 16Apr01 17:00	A8773/14
	Runway status lights (rws) are in an operational test and must be complied with. Runway status lights are red in-pavement lights that serve as warning lights on runways and taxiways indicating that it is unsafe to enter, cross, or begin takeoff on a runway. Note: runway status lights indicate runway status only. They do not indicate clearance. Pilots and vehicle operators must still receive a clearance from air traffic control before proceeding. For additional information visit: http://www.Faa.Gov/air?Traffic/technology/rws		
<input checked="" type="checkbox"/>	10 OTHER	16Jan17 23:22 to 16Jan29 23:15	A0281/14
	RWY 13R/31L wet deiced liquid and deiced solid observed at 1601172122.		
<input checked="" type="checkbox"/>	11 OTHER	16Jan17 23:15 to 16Jan29 23:15	A0280/14
	RWY 04R/22L wet deiced liquid and deiced solid observed at 1601172115.		
<input checked="" type="checkbox"/>	12 OTHER	16Jan17 23:45 to 16Jan29 23:15	A0284/14
	RWY 04L/22R wet deiced liquid and deiced solid observed at 1601172145		
<input checked="" type="checkbox"/>	13 RWY Closure	16Jan22 05:10 to 16Feb13 14:00	A1388/16
	RWY 13L/31R closed		



Key enabler - Digital NOTAM

- Identify types of “events” for which the information is currently provided through NOTAM
 - Example: runway closed, navaid u/s, new obstacle, etc.
- Provide the AIXM encoding rules for each type of event
 - Including data verification
- ... also, support the automatic generation of NOTAM messages (as long as necessary)



Digital NOTAM Specification

- Version 2.0 – work in progress

<i>scenarios</i>	<i>scenarios</i>
•Published special activity area – activation	•Displaced threshold
•Published ATS airspace - activation or deactivation	•Declared distances changes
•Ad-hoc special activity area – creation	•Runway portion closure
•Ad-hoc ATS airspace – creation	•Airport Usage limitation
•Route portion closure	•Runway usage limitation
•Route portion opening	•Taxiway usage limitation
•Aerodrome closure	•Approach lights unserviceable
•Runway closure	•Approach lights downgraded
•Navaid unserviceable	•Runway lights unserviceable
•New obstacle	•Obstacle lights unserviceable
•Taxiway closure	•Visual Approach slope indicator unserviceable
•Surface contamination (SNOWTAM)	•Taxiway lights unserviceable
•Other Event (any other situation that does not have a dedicated scenario)	

Conclusions

- Revised ICAO Annex 15 and PANS-AIM
 - Digital data sets (AIP, obstacles, IFP, ...)
 - AIXM 5.1 as coding format (proposed)
 - Harmonised coding rules in support to interoperability objective
 - AIXM 5.2 will improve the coding, in particular for IFP
- Digital NOTAM – version 2.0
 - additional scenarios,
 - alignment with the ICAO data sets

