IWXXM Framework

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ESAF Virtual Regional Workshop on IWXXM and Annex 3 Amendments

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IWXXM and its current status

- Became an ICAO Annex 3 Standard since Amendment 79 (Nov 2020)

- Updating of IWXXM schemas follows the amendment cycle of Annex 3 and PANS-MET

- With the publication of Amendment 82 of ICAO Annex 3 and the introduction of the new PANS-MET (ICAO Doc 10157), a new version of IWXXM (Version 2025-2) will be published in Nov 2025

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What is IWXXM?

- An XML/GML implementation of the SARPs in ICAO Annex 3

- IWXXM messages are computer friendly. Tools are readily available to validate integrity of the messages against IWXXM schemas

- However, IWXXM messages are for exchange only. This makes TAC which is used for both exchange and presentation still favourable

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IWXXM shall win at the end?

IWXXM and it reports

- IWXXM reports are implemented as packages in the schema

- Starting from IWXXM 2021-2 individual packages has its own version number, since only some of them will need to be changed in an amendment to Annex 3

- A compatibility table[*] is created to show the versions of IWXXM meeting requirements of an amendment to Annex 3

[*] https://community.wmo.int/en/activity-areas/wis/iwxxm

Compatibility table showing IWXXM versions, associated packages and relevant ICAO requirements

IWXXM Version	1.1	2.1	3.0	2021-2	2023-1	2025-2
METAR and SPECI	1.1.0	2.1.1	3.0.0	3.1.0	3.1.0	3.2.0
TAF	1.1.0	2.1.1	3.0.0	3.0.1	3.0.1	3.0.2
SIGMET	1.1.0	2.1.1	3.0.0	4.0.0	4.0.1	4.0.2
AIRMET		2.1.1	3.0.0	3.1.0	3.1.1	3.1.2
Tropical Cyclone Advisory		2.1.1	3.0.0	3.1.0	3.1.0	3.1.1
Volcanic Ash Advisory		2.1.1	3.0.0	3.1.0	3.1.0	3.2.0
Space Weather Advisory			3.0.0	3.0.1	3.0.1	3.1.0
WAFS SIGWX Forecast				1.0.0	1.1.0	1.2.0
Quantitative Volcanic Ash Concentration Information						1.0.0
Volcano Observatory Notice for Aviation						1.0.0
ICAO Annex 3 Amendment	76	77	78	79-80	79-81	82
PANS-MET Edition						first

Location of IWXXM resources (WMO)

- **Manual on Codes (WMO-No. 306), Volume I.3*:** IWXXM standard definitions
- **http://schemas.wmo.int/iwxxm:** IWXXM artifacts, such as schema files, examples, UML model, and release notes
- **http://codes.wmo.int:** Code tables referenced in IWXXM
- **https://community.wmo.int/en/activity-areas/wis/iwxxm:** IWXXM landing page on the WMO Community Platform
- **https://groups.wmo.int/tt-avdata:** TT-AvData e-mail list for all stakeholders
- **https://github.com/wmo-im/iwxxm:** TT-AvData working space for development and recording meeting notes

* https://library.wmo.int/idurl/4/35769

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Location of IWXXM resources (ICAO)

- **IWXXM Guidelines for OPMET Exchange:** Provides relevant information for preparation and exchanging IWXXM reports

- **Manual on the ICAO Meteorological Information Exchange Model (ICAO Doc 10003):** Gives an overall account of the structure of IWXXM ($)

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Preparation of IWXXM reports

- Producer are anticipated to prepare IWXXM reports at the source (organization)
- If not feasible, it is possible for other States (e.g. a ROC) to help, through bilateral arrangement or otherwise, to translate TAC to IWXXM
  - In this case remember to set the necessary attributes like translatedBulletinID, translationCentreName, etc. to provide information on translation
- If translation is carry out by the Producer itself, there is no need to set the translation attributes

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```xml
-<iwxxm:METAR xsi:schemaLocation="http://icao.int/iwxxm/2025-2 http://schemas.wmo.int/iwxxm/2025-2RC2/iwxxm.xsd"
  gml:id="uuid.4324ada0-ddfc-4206-9689-3aa8b58649fd" reportStatus="NORMAL" permissibleUsage="OPERATIONAL"
  translatedBulletinID="TTAAiiCCCYYGGgg" translatedBulletinReceptionTime="2014-05-15T15:29:00Z" translationCentreDesignator="YUZZ"
  translationCentreName="Fictional translation centre" translationTime="2014-05-15T15:30:00Z" translationFailedTAC="METAR YUDO 221630Z
  INVALID">
  -<iwxxm:issueTime>
    -<gml:TimeInstant gml:id="uuid.e5460ae4-98a4-48fa-bbfc-21799896f1f2">
        <gml:timePosition>2012-08-22T16:30:00Z</gml:timePosition>
      </gml:TimeInstant>
    </iwxxm:issueTime>
  -<iwxxm:aerodrome>
    -<aixm:AirportHeliport gml:id="uuid.7a8db8f9-281a-40ca-a443-40253790bfff">
      -<aixm:timeSlice>
        -<aixm:AirportHeliportTimeSlice gml:id="uuid.6656af3d-e836-49d9-a7f1-f8c8b23790f9">
            <gml:validTime/>
            <aixm:interpretation>SNAPSHOT</aixm:interpretation>
            <aixm:designator>YUDO</aixm:designator>
            <aixm:name>DONLON/INTERNATIONAL</aixm:name>
            <aixm:locationIndicatorICAO>YUDO</aixm:locationIndicatorICAO>
          </aixm:AirportHeliportTimeSlice>
        </aixm:timeSlice>
      </aixm:AirportHeliport>
    </iwxxm:aerodrome>
  -<iwxxm:observationTime>
    -<gml:TimeInstant gml:id="uuid.064bf483-439b-4e40-91b8-8aadd0638d92">
        <gml:timePosition>2012-08-22T16:30:00Z</gml:timePosition>
      </gml:TimeInstant>
    </iwxxm:observationTime>
</iwxxm:METAR>
```

Exchange of IWXXM reports

- IWXXM reports requires AMHS with FTBP feature to exchange

- They are anticipated to be compressed and sent as an attachment

- The name of the compressed file should follow the requirements in *Abbreviated Heading Lines (AHLs) for aviation data over ICAO Aeronautical Fixed Service (AFS)*[*]

[*] https://community.wmo.int/en/activity-areas/wis/iwxxm/ahl-icao-data

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WMO Abbreviated Headings and Related Specifications Relevant for the Exchange of Aviation Data over ICAO AFS

- **Version:** 1.0.1
- **Date:** 11 August 2025
- **Location:** https://community.wmo.int/en/activity-areas/wis/iwxxm/ahl-icao-data

Abbreviated heading

(Original text from Section 2.3.2, Part II, WMO-No.386)

The abbreviated heading shall have the following format:

```
T1T2A1A2ii CCCC YYGGgg [BBB]
```

The symbols shall have the following meanings:

- **Data designators (T1T2A1A2ii)**
  - `T1T2` - Data type designators.
  - `A1A2` - Geographical designators.
  - `ii` - It shall be a number with two digits. When an originator or compiler of bulletins issues two or more bulletins with the same `T1T2A1A2` and `CCCC` the `ii` shall be used to differentiate the bulletins.
- **Location indicator (CCCC)**
  - `CCCC` - International four-letter location indicator of the station or centre originating or compiling the bulletin, as agreed internationally, and published in WMO-No.9, Volume C1, Catalogue of Meteorological Bulletins.
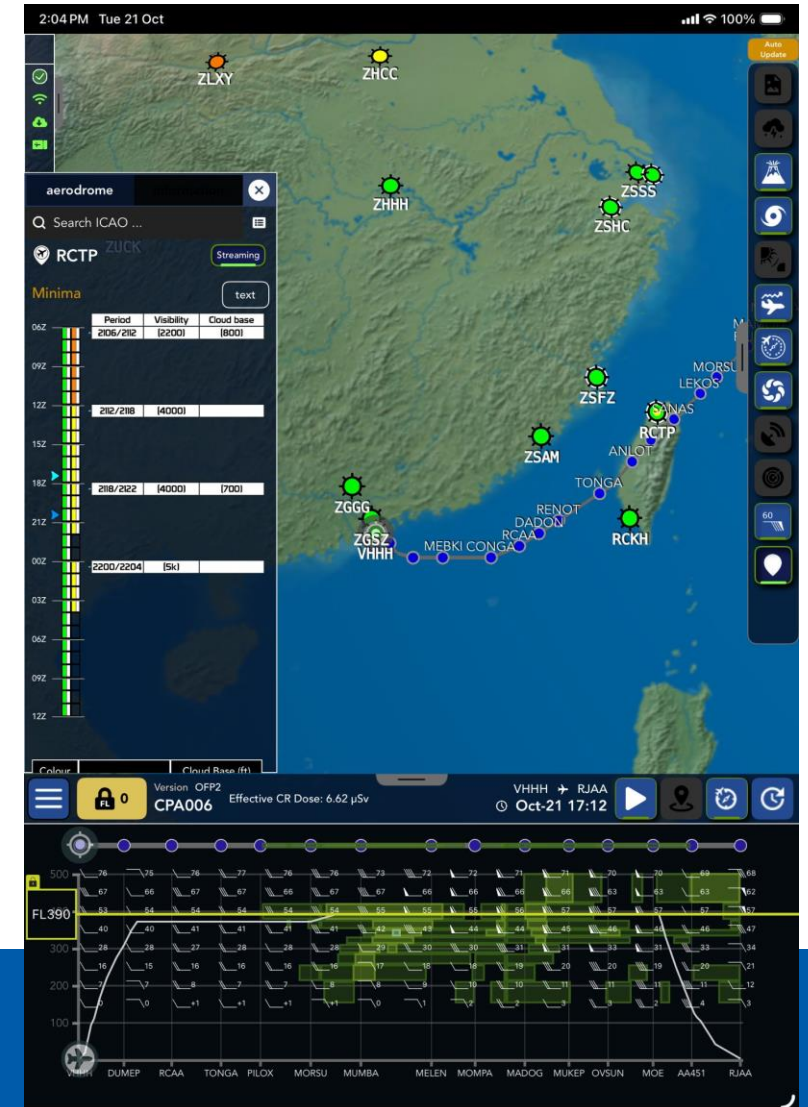
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Global availability of IWXXM reports for all AOP-aerodromes

Availability of IWXXM-Data									Availability of IWXXM-Data (Percentage)								
Region	LA			LC			LT			Region	LA			LC			LT		
	ALL	RX		ALL	RX		ALL	RX			ALL	RX		ALL	RX		ALL	RX	
		AFS	SADIS		AFS	SADIS		AFS	SADIS			AFS	SADIS		AFS	SADIS		AFS	SADIS
AFI	74	12	0	2	0	0	69	0	2	AFI	74	16.22%	0%	2	0%	0%	69	0%	2.9%
ASI	207	129	0	0	0	0	202	123	0	ASI	207	62.32%	0%	0	0%	0%	202	60.89%	0%
CAR	133	3	0	0	0	0	129	1	0	CAR	133	2.26%	0%	0	0%	0%	129	0.78%	0%
EUR	671	627	0	232	200	0	431	395	0	EUR	671	93.44%	0%	232	86.21%	0%	431	91.65%	0%
MID	60	46	0	0	0	0	54	18	0	MID	60	76.67%	0%	0	0%	0%	54	33.33%	0%
NAM	623	0	0	1	0	0	608	0	0	NAM	623	0%	0%	1	0%	0%	608	0%	0%
NAT	7	7	0	0	0	0	7	7	0	NAT	7	100%	0%	0	0%	0%	7	100%	0%
PAC	25	13	0	0	0	0	25	12	0	PAC	25	52%	0%	0	0%	0%	25	48%	0%
SAM	86	0	0	0	0	0	86	0	0	SAM	86	0%	0%	0	0%	0%	86	0%	0%
ALL	1886	837	0	235	200	0	1611	556	2	ALL	1886	44.38%	0%	235	85.11%	0%	1611	34.51%	0.12%

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Consuming IWXXM reports

- IWXXM needs software to render the information it carries (c.f. TAC)

- It seems that TAC itself is welcomed for presentation

- There are also efforts trying to render the information in textual and graphical ways

World Meteorological Organization

The gap between IWXXM and TAC is widening

- Some IWXXM reports has more information than their TAC counterparts:
  - IWXXM METAR can report more than 4 RVRs if necessary
  - IWXXM METAR can report temperature in tenth of a degree
  - Polygons in IWXXM SIGMET can have more than 7 points
- New reports are having IWXXM versions only
  - WAFS Significant Weather Forecast
  - Quantitative Volcanic Ash (QVA) Concentration Information
- A global repository of IWXXM schema extensions is being established to collect national schemas being used and possible inclusion into the core IWXXM schemas
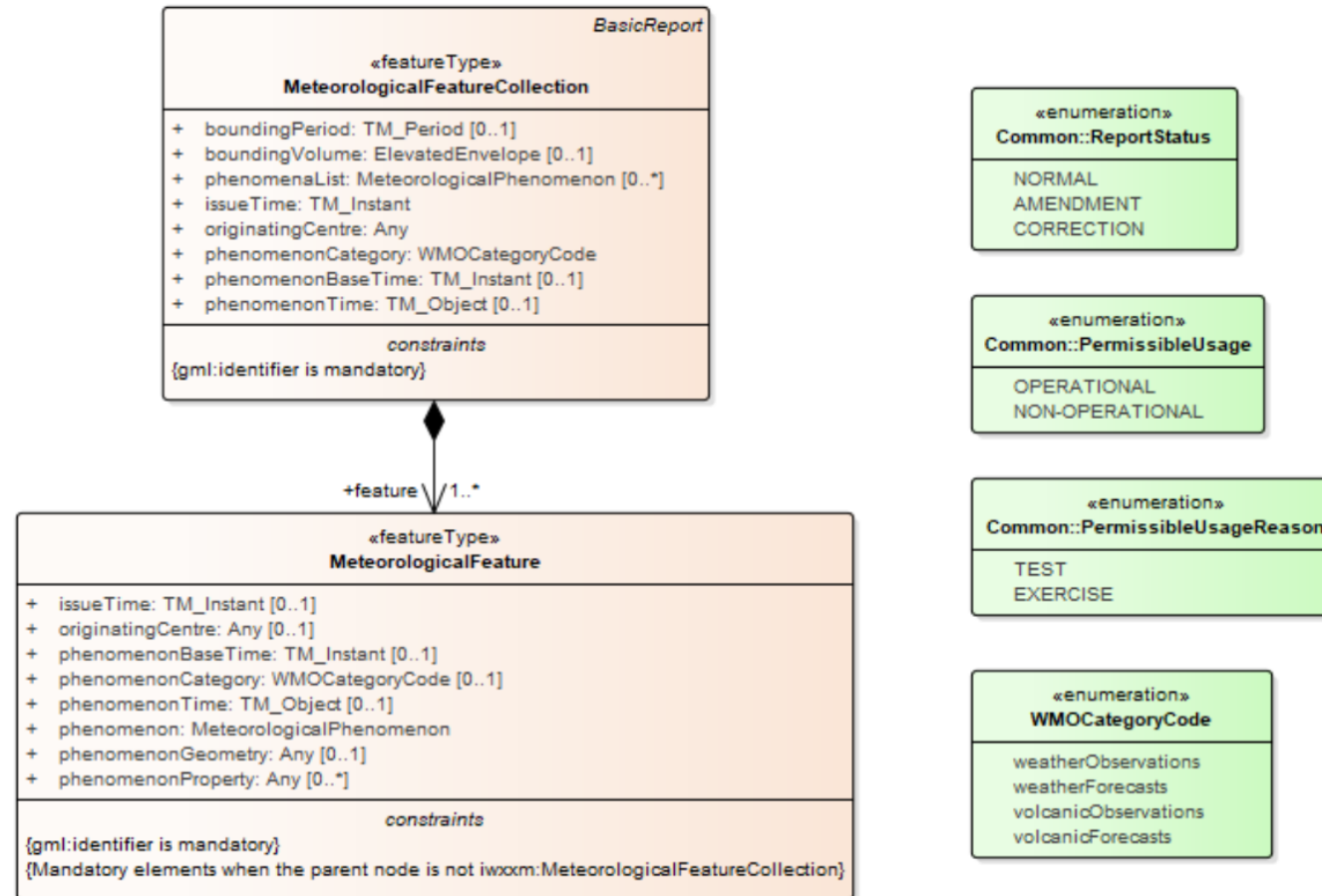
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Moving forward

- IWXXM Guidelines for OPMET exchange would be updated to reflect deprecation of IWXXM 2021-2 and earlier versions once IWXXM 2025-2 is officially released in Nov 2025

- Migration to information services on SWIM sparks the development of new IWXXM-only representations:
  - Aerodrome MET Observation Information Service (AMOIS)
  - Aerodrome MET Forecast Information Service (AMFIS)
  - Hazardous Weather Information Service (HWIS)

- There are ICAO METP WG-MIE activities to develop:
  - Informal guidance material on visualizing IWXXM data
  - Guidelines for MET-SWIM implementation

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Operational IWXXM versions for use after Nov 2025

IWXXM Version	2023-1	2025-2
METAR and SPECI	3.1.0	3.2.0
TAF	3.0.1	3.0.2
SIGMET	4.0.1	4.0.2
AIRMET	3.1.1	3.1.2
Tropical Cyclone Advisory	3.1.0	3.1.1
Volcanic Ash Advisory	3.1.0	3.2.0
Space Weather Advisory	3.0.1	3.1.0
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New IWXXM design which better supports SWIM information services

Context Diagram: Meteorological Feature and Collection : Class diagram

Conclusion (messages to your boss)

- IWXXM has become a standard since 2020
- Yet global exchange of IWXXM reports over AFS is less than expected
- Note that there are plans to introduce sunset clauses for TAC by 2030
- Furthermore, new information to be introduced in the coming years in Annex 3 and PANS-MET will only be available in IWXXM format
- Visualization could be an issue and this require discussions with your consumers
- In any case it is of utmost importance to start implementing the preparation and exchange of IWXXM reports immediately, or otherwise your office will not be able to catch up in several years' time

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Thank you
for your kind attention

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