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# Implementation of MET Information Exchange in IWXXM format

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# Amendment 79 to ICAO Annex 3

- IWXXM: ICAO Meteorological Information Exchange Model
- Applicable from 5 November 2020, States shall disseminate specific meteorological information in IWXXM GML form, in addition to the dissemination of their corresponding Traditional Alphanumeric Code (TAC).
- MET information in IWXXM includes: METAR/SPECI, TAF, SIGMET, AIRMET, Volcanic Ash Advisory, Tropical Cyclone Advisory and Space Weather Advisory
- IWXXM would support WAFS Significant Weather Forecast starting from Nov 2021



## IWXXM in short



- A data format for reporting and exchanging aviation weather information in machine readable XML/GML form
- Original TAC contents are enriched in their IWXXM counterparts with metadata (e.g. projection) and extension
- XML Schema and Schematron enforces report integrity and reporting requirements in ICAO Annex 3





# IWXXM Implementation Status in APAC

- Online register of APAC IWXXM exchange status developed under MET/IE WG
- A number of States have been
  - generating MET information in IWXXM format (latest version 3.0)
  - distributing IWXXM message in APAC region via Advanced Message Handling System (AMHS).

Online Register of APAC IWXXM Exchange Status  
Updated: 8 March 2021

ROC	ROC ready to receive IWXXM	ROC address to receive IWXXM	AMHS message size limit	AMHS supporting FTBP+HE*	Disseminate IWXXM to ROCs	Disseminate IWXXM to NOCs	NOC	IWXXM generated	NOC ready to receive IWXXM	NOC address to receive IWXXM	Remarks	
Bangkok	VTBB	YES	VTBB@PYL	6 MB	YES	VH-HL, WSSS, YBBB	YES	Bangkok	VTBB	YES	YES	VTBB@MYK
								Phnom Penh	VQPP	NO	NO	
								Vientiane	VVLT	NO	NO	
								Ha Noi	VVNB	YES	NO	translation service from VTBB
Beijing	ZBBB	YES/NO	ZBBB@PYL	3 MB	YES		Beijing	ZBBB	YES	NO		
							Ulaanbaatar	ZULB				
							Brisbane	YBRN	YES	YES		
Brisbane	YBRN	YES	YBRN@PYL	4 MB	YES	NZKL, VH-HL, VTBB, WSSS	No recipients ready	Port Moresby	JYFY	PARTIAL	NO	translation service from NZKL
								Nauru	ANNY	YES	NO	translation service from NZKL
								Honolulu	JGCH	PARTIAL	NO	translation service from NZKL
								Delhi	VIDP	NO	NO	
Colombo	VCCC	NO					Colombo	VCCC				
							Maui	VRMM				
Delhi	VIDP	NO					Delhi	VIDP				
Kolkata	VECC	NO						Kolkata	VECC			
								Dhaka	VEZR			
								Asso	VQPR			
								Katmandu	VNKT			
Mumbai	VABB	NO						Mumbai	VABB			
Hong Kong	VH-HL	YES	VH-HL@PYL	4 MB	YES	NZKL, VTBB, WMKK, WSSS, YBBB	YES	Hong Kong	VH-HL	YES		
								Taipei City	RCTP	YES	YES	RCAA@WMK
								Manila	RPLM	YES	NO	translation service from VH-HL
								Macao	VMMC	YES	NO	translation service from VH-HL
Incheon	RKSI	NO					Incheon	RKSI	YES		available through Open-API	
Jakarta	WIII	NO					Jakarta	WIII	YES			
KARACHI	OPKC	NO					KARACHI	OPKC				
Kuala Lumpur	WMKK	YES	WMKK@MXM	4 MB	YES	WSSS		Kuala Lumpur	WLMK	YES		
								Brisbane	WSSS	NO		
Nadi	NFFN	NO						Nadi	NFFN	PARTIAL	NO	translation service from NZKL
								Cook Islands	NCRB	YES	NO	translation service from NZKL
								Tonga	NFTP	YES	NO	translation service from NZKL
								Turvalu	NTFU	YES	NO	translation service from NZKL
								Kiribati	NTKA	YES	NO	translation service from NZKL
								Niue	NIUE	YES	NO	translation service from NZKL
								Samoa	NSFA	YES	NO	translation service from NZKL
								Vanuatu	NVVV	YES	NO	translation service from NZKL
								New Caledonia	NWWW	YES	NO	IWXXM to be sent to NZKL over GTS via Melbourne for onward distribution
								French Polynesia	NTAA	YES	NO	
								American Samoa	NSTU	May 2021 or later	NO	IWXXM by US NWS via the FT/SA/SURFCS KBWC bulletin
Singapore	WSSS	YES	WSSS@PYL	4 MB	YES	VTBB, WMKK, YBBB	Singapore	WSSS	YES			
Tokyo	RJTD	April 2021	RJTD@YVA	2 MB	YES		Tokyo	RJTD	Autumn Summer 2021		TC Advisory in IWXXM available via TCAC Tokyo website	
Wellington	NZKL	YES	NZKL@MYL	6 MB	YES	VH-HL, VTBB, WSSS, YBBB	Wellington	NZKL	YES			

\* AMHS enable for IWXXM exchange is specified in the (operand 4 of) Distribution for the implementation of CPDUT Data Exchange using IWXXM. For further information and updates, please contact: Peter Dunst (pdunsta@icao.int), Marco Kik (mkik@icao.int) or Pierre Lamarche (plamarche@icao.int)



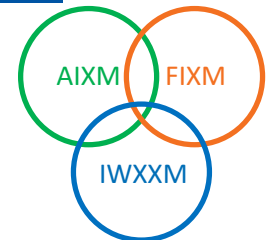
# Benefits of IWXXM

- For reading by machine rather than human (i.e. more accurate decoding)
  - IWXXM ensures valid data structure, which promotes valid data content
  - Avoid the issue of wrongly formatted TAC messages
- Presence of metadata reduces possible confusion
  - Allows the geographic position and time of MET information to be easily integrated with systems
- Allows structured extensions
  - c.f. RMK section in METAR or TAF
  - to include additional information defined by national or regional institutions



# Benefits of IWXXM

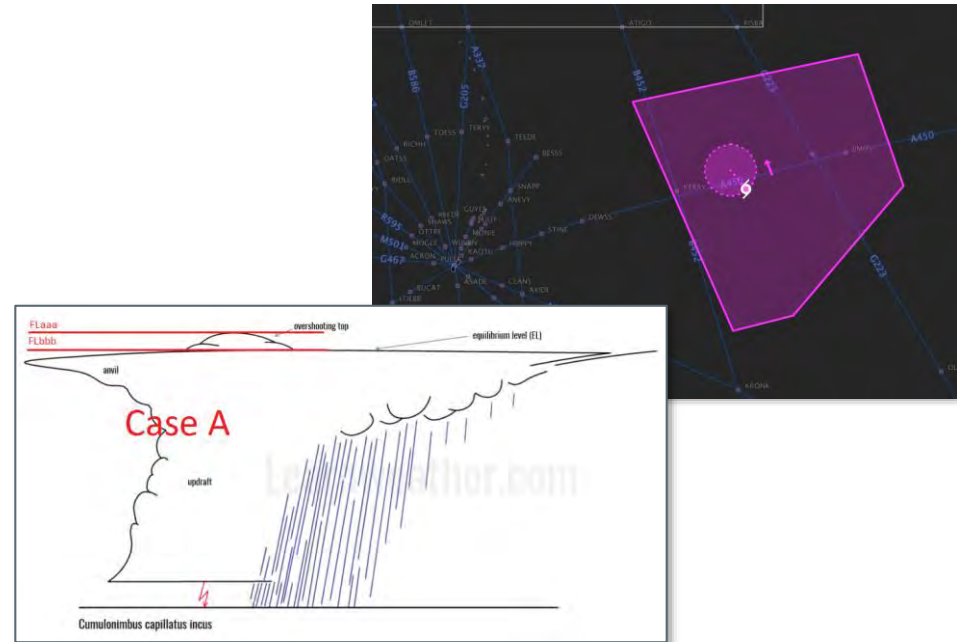
- Possibility of improvement in information resolution
  - IWXXM could potentially provide more detailed information than TAC in future, such as:
    - 15 or 5-minute “METAR” observations with non-rounded values
    - Finer resolution ceiling and CB forecast in TAF
  - Example:
    - METAR uses rounded values: e.g. measured RVR of 622 metres reported as M0600
    - IWXXM could report both the METAR rounded value, as well as the actual measured value for better precision to support future operations (e.g. TBO).
- Facilitate fusion of MET data with flight data and aeronautical data in XML in System Wide Information Management (SWIM) environment
  - IWXXM is one of the key enablers of SWIM
  - harmonization with AIXM (e.g. FIRs) and FIXM (e.g. Flight Plan)
  - support integration with decision supporting tools



Information Exchange Models SWIM

# Links with AIXM

- Aeronautical Information Exchange Model (AIXM) enables the provision of aeronautical information in digital format
- IWXXM imports AIXM for:
  - identifying
    - ATM units
    - FIR/UIR/CTA
    - Aerodromes
    - Runways
  - defining the geospatial coverage of weather features (e.g. a thunderstorm)





# For stakeholders

- MET service providers may set up new web service interfaces for stakeholders to retrieve IWXXM reports
  - based on flight plan or customized business rules
- To process IWXXM reports, you will need to have an XML parser/decoder
  - machine-to-machine (supporting new systems/applications)
- To render IWXXM reports, you will need to have a textual/graphical renderer
  - machine-to-human (textual or graphical visualization tools)
- Future ATM systems and flight planning systems would need to support the reception of IWXXM messages
- Need to start thinking about the integration of MET information in IWXXM into decision-making systems



# IWXXM Resources on Internet

- Wikipedia (<https://en.wikipedia.org/wiki/IWXXM>) – as landing page
- WMO
  - No.306 Vol. I.3 ([https://library.wmo.int/index.php?lvl=notice\\_display&id=19508](https://library.wmo.int/index.php?lvl=notice_display&id=19508))
  - No.386 ([https://library.wmo.int/index.php?lvl=notice\\_display&id=10728](https://library.wmo.int/index.php?lvl=notice_display&id=10728))
  - Schema repository (<https://schemas.wmo.int/>) and WMO Codes Registry (<https://codes.wmo.int>)
  - Q&A for implementors of IWXXM: <https://groups.google.com/a/wmo.int/forum/#!/forum/cbs-tt-avxml>
  - GitHub repositories (for development only)
    - IWXXM - <https://github.com/wmo-im/iwxxm>
    - IWXXM UML Model - <https://github.com/wmo-im/iwxxm-modelling>
    - TAC-to-IWXXM translation examples - <https://github.com/wmo-im/iwxxm-translation>
- ICAO
  - Doc No.10003 (<https://store.icao.int/en/manual-on-the-icao-meteorological-information-exchange-model-doc-10003>)



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THANK YOU