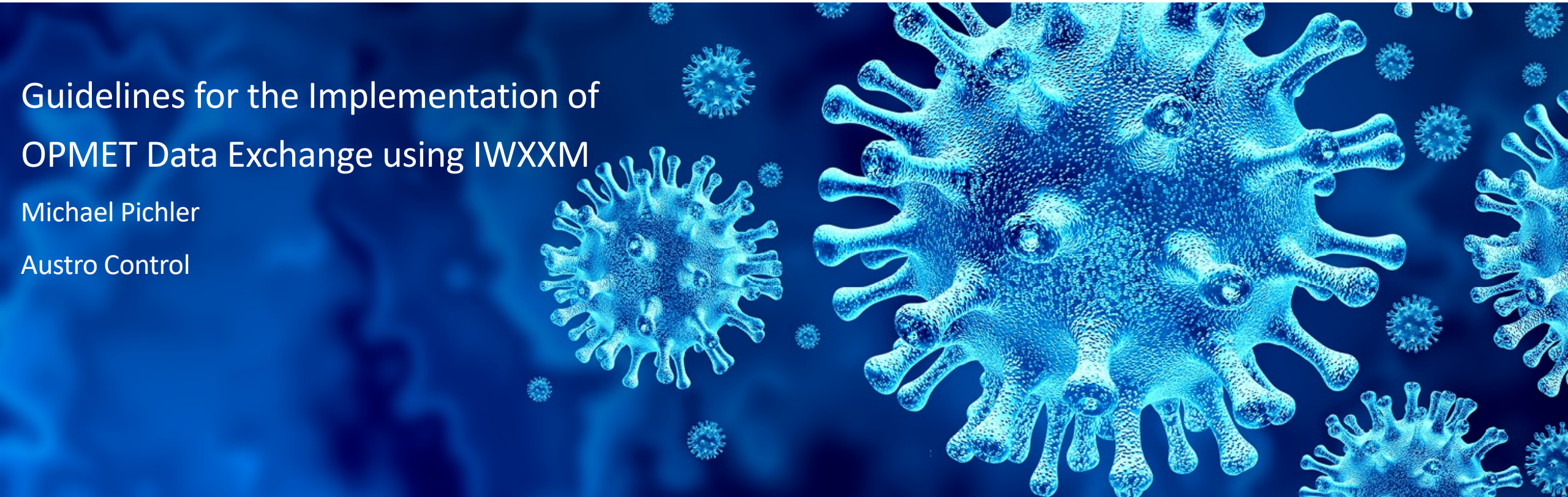
ICAO MID

ICAO MID IWXXM Implementation
WEBINAR
26 - 27 May 2021



Guidelines for the Implementation of OPMET Data Exchange using IWXXM

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ICAO MID IWXXM Implementation Webinar

Agenda Item 2: Background Information

Guidelines for the Implementation of OPMET Data Exchange using IWXXM

BRIEF HISTORY (1)

- March 2013: First draft by DMG (together with PT/MARIE & EC)
- Nov. 2013: AMD 76 to ICAO ANNEX 3 enabled states in the position to do so, to exchange OPMET data also in XML
- Nov. 2015: First version of CONOPS-Concept of Operations (EUR Doc 033)
- Oct. 2016: CONOPS adopted as global document by METP and renamed into “Guidelines for the Implementation of OPMET Data Exchange using IWXXM”
  - **4th Edition, issued November 2020**

BRIEF HISTORY (2)

- Recom. that ICAO-region maintains a regional version to cover regional features
  - **EUR Doc 033, 5th Edition issued on 19.10.2019**
  - **MID Doc 012, Edition issued in September 2018**
- Nov. 2016: AMD 77 to ICAO ANNEX 3 ➔ Recommendation that states should disseminate data also in IWXXM
- Nov. 2018: AMD 78 to ICAO ANNEX 3 ➔ Regulates that states shall disseminate IWXXM in parallel to TAC-data from 5. November 2020 onwards

BRIEF HISTORY (3)

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO FORECASTS

(See Chapter 6 of this Annex.)

1. CRITERIA RELATED TO TAF

1.1 TAF format

1.1.1 TAF shall be issued in accordance with the template shown in Table A5-1 and disseminated in the TAF code form prescribed by the World Meteorological Organization (WMO).

Note.— The TAF code form is contained in the Manual on Codes *(WMO-No. 306), Volume I.1, Part A* — Alphanumeric Codes.

1.1.2 **Recommendation**.— *Until 4 November 2020, TAF should be disseminated in IWXXM GML form in addition to the dissemination of the TAF in accordance with 1.1.1.*

1.1.2 As of 5 November 2020, TAF shall be disseminated in IWXXM GML form in addition to the dissemination of the TAF in accordance with 1.1.1.

Note.— The technical specifications for IWXXM are contained in the Manual on Codes *(WMO-No. 306), Volume I.3, Part D* — Representation Derived from Data Models. *Guidance on the implementation of IWXXM is provided in the* Manual on the Digital Exchange of Aeronautical Meteorological Information *(Doc 10003).*

WHY NOT STAYING WITH TAC?

- WMO decision to move to BUFR
- TAC data is not geo-referenced
- Coding exceptions are commonly used by states
- TAC often
  - **contains typographical errors**
  - **is poorly structured**
  - **lacks validation**
- Extension of TAC code not easily possible
- SWIM (**S**ystem **W**ide **I**nformation **M**anagement) requires a machine-readable format for web services

WHAT TO FIND IN THE GUIDELINES?

- Current operations and capabilities
- Principles and requirements for the transition from TAC to IWXXM
- Description of the new functionalities

CURRENT FUNCTIONS AND CAPABILITIES

- Originating Unit
- National OPMET Centre (NOC)
- Regional OPMET Centre (ROC)
- Interregional OPMET Gateway (IROG)
- Regional OPMET Database (RODB)

NEW FUNCTIONALITIES (1)

- Originating Unit
  - Current Tasks: Issue TAC-Data (METAR, TAF, SIGMET,..)
  - New Tasks
    - Data Producer: Issue in parallel IWXXM-versions
- NOC (National OPMET Centre)
  - Current Tasks
    - Collect & validate national data, compile into bulletins and send to responsible ROC
    - Supply national users with required data
  - New Tasks
    - Data Translator ➔ translate national TAC-data into IWXXM
    - Data Aggregator ➔ aggregate individual IWXXM-reports into a collection (bulletin)
    - Data Switch ➔ compress data before sending to responsible ROC

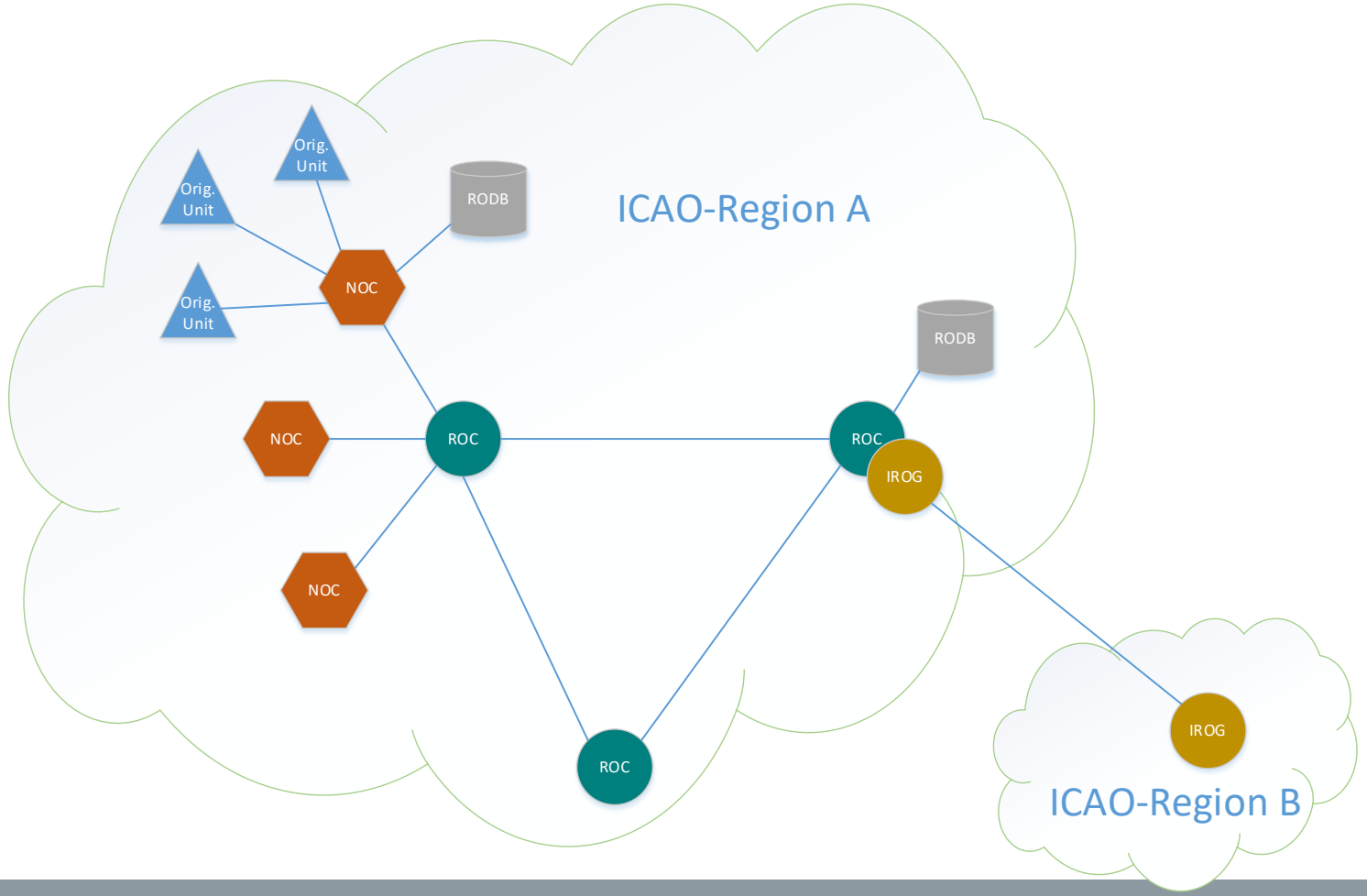
NEW FUNCTIONALITIES (2)

- ROC (Regional OPMET Centre)
  - Current Tasks
    - Collect and validate TAC OPMET data from NOCs in AoR
    - Correct invalid messages based on principles in EUR Doc 018, Chapter 12
    - Send TAC OPMET-data from AoR to other ROCs
    - Supply NOCs in AoR with required TAC OPMET-data
  - New Tasks
    - Data Switch
      - Collect IWXXM OPMET data from NOCs in AoR
      - Log information on received IWXXM OPMET data based on principles in EUR Doc 033, Chapter 8
      - Send IWXXM OPMET-data from AoR to other ROCs
      - Supply NOCs in AoR with required IWXXM OPMET-data
    - Data Translator
      - Translate TAC OPMET-data on behalf of states in the AoR (for limited amount of time)

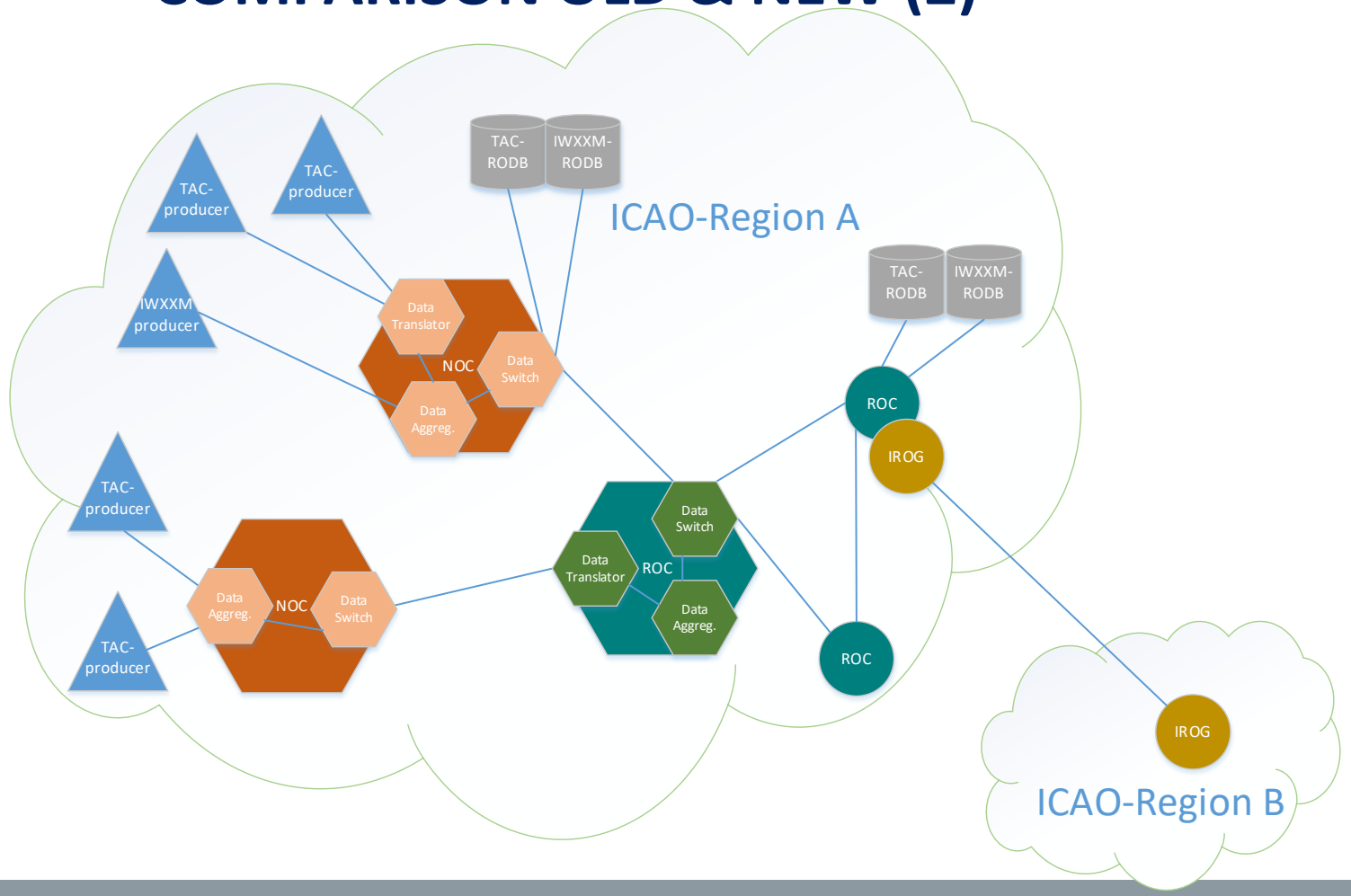
NEW FUNCTIONALITIES (3)

- IROG (Interregional OPMET Gateway)
  - Current Tasks
    - Collect and validate TAC OPMET data from defined ICAO-region
    - Correct invalid messages based on principles in EUR Doc 018, Chapter 12
    - Send TAC OPMET-data from EUR-region to defined ICAO-region
    - Send TAC OPMET-data from defined ICAO-region to ROCs in EUR-region
  - New Tasks
    - Data Switch
      - Collect IWXXM OPMET data from defined ICAO-region
      - Send IWXXM OPMET-data from EUR-region to defined ICAO-region
      - Send IWXXM OPMET-data from defined ICAO-region to ROCs in the EUR-region
- RODB (Regional OPMET Databank)
  - Current Task ➔ Support request/reply functionalities for TAC OPMET-data
  - New Task ➔ Support request/reply functionalities for IWXXM OPMET-data

COMPARISON OLD & NEW (1)



COMPARISON OLD & NEW (2)



EXCHANGING IWXXM-DATA (1)

- IWXXM-Data > AFTN-Limit of 1800 characters
- Solution➔Send as File using Extended AMHS
  - FTBP (File Transfer Body Part)
  - Compression (Average date size ratio compr. IWXXM- and TAC-data = 5,8)
- File naming according to WMO naming convention
- Bulletin Header included in Filename (necessary for MET-Switch to rout data properly)

EXCHANGING IWXXM-DATA (2)

WMO naming convention

A_TTAAiiCCCCYYGGgg*BBB*_**C**_CCCC_YYYYMMddhhmmss**.xml.gz**

- Elements in **black and bold** are fixed elements
- TTAAiiCCCCYYGGgg is the current WMO header with the date time group
- *BBB* is optional like for the TAC-versions
- CCCC is the repeated CCCC part from TTAAiiCCCC
- YYYYMMddhhmmss is the creation date/time group of the file
- **gz** is the Compression suffix of the officially defined compression method

EXCHANGING IWXXM-DATA (3)

WMO T1T2 definitions for IWXXM data

- Aviation Routine Report (*METAR*): *LA*
- Special Aviation Weather Reports (*SPECI*): *LP*
- Aerodrome Forecast (*"short" TAF*) (VT < 12 hours): *LC*
- Aerodrome Forecast (*"long" TAF*) (VT >= 12 hours): *LT*
- AIRMET LW
- Aviation General Warning (*SIGMET*): *LS*
- Aviation Volcanic Ash Warning (*VA SIGMET*): *LV*
- Volcanic Ash Advisory LU
- Aviation Tropical Cyclone Warning (*TC SIGMET*): *LY*
- Tropical Cyclone Advisory LK
- *Space Weather Advisory (SWXA):* *LN*

OPERATING PRINCIPLES (1)

- Managing the Transition
  - Dedicated Group per Region beneficial (DMG in EUR)
  - METP WG-MIE (Meteorological Information Exchange) to act on a global level
  - Exchange and co-ordination with other regions depending on availability of AMHS-connection
- Translation
  - Final target is to produce IWXXM at source
  - Translation shall only take place once to prevent different versions
  - No translation from IWXXM to TAC until 2029 (parallel phase)
  - Translation Centre and date/time of translation is included in IWXXM-message
  - If translation fails IWXXM message shall be produced without any MET-parameters but containing the original TAC-message (see screenshot next slide)

OPERATING PRINCIPLES (2)

- **Report #2: DTTD, iwxxm:METAR 3.0 TAC translation failed, 06.05.2021, 00:00,**
  - Report attributes
    - reportStatus: NORMAL
    - permissibleUsage: OPERATIONAL
    - translatedBulletinID: SATS35DTTA060000
    - translatedBulletinReceptionTime: 2021-05-06T00:03:22.072Z
    - translationCentreDesignator: LFPW
    - translationCentreName: Toulouse
    - translationTime: 2021-05-06T00:03:22.072Z
    - translationFailedTAC: METAR DTTD 060000Z AUTO 04006KT 360V100 NCD 20/13 Q1015
    - gml:id: uuid.f9cfca9f-72bc-4899-b470-bc2b4dcf6fc1
  - XML definitions
  - iwxxm:issueTime
    - gml:TimeInstant — gml:id="uuid.3147b8c5-854c-4e06-b8cb-69deb1aa240c"
      - gml:timePosition: 2021-05-06T00:00:00Z
  - iwxxm:aerodrome
    - aixm:AirportHeliport — gml:id="uuid.81bb9339-623f-4f7d-a457-7e2ee3938aed"
      - aixm:timeSlice
        - aixm:AirportHeliportTimeSlice — gml:id="uuid.043bbfb9-ee35-4787-ac72-810c63739294"
          - gml:validTime
          - aixm:interpretation: SNAPSHOT
          - aixm:locationIndicatorICAO: DTTD
  - iwxxm:observationTime
    - gml:TimeInstant — gml:id="uuid.5bc78834-cae2-40d6-b8f6-31a52708e8f3"
      - gml:timePosition: 2021-05-06T00:00:00Z
- **Report #3: DTTK, iwxxm:METAR 3.0, 06.05.2021, 00:00,**

OPERATING PRINCIPLES (3)

- Data Collection
  - Bulletin realized by “COLLECT” feature to be used for all data types
  - Aggregating Centre Identifier and date/time group in XML
  - No mixture of TAC and IWXXM data
  - Single file contains only one bulletin
- Transmission & Routing
  - Ext. AMHS shall be used for exchange
  - Filename used as data identifier, no header on top of message

OPERATING PRINCIPLES (4)

- Compliance Testing
  - Testing between centres involves MET & COM-switches!!
    - Correct parameters used in P3 submission-envelope
    - Correct filename used
    - Correct usage of FTBP as well as IA5 Text Body Part with ATS-message-header
    - Checking of IWXXM message to follow rules for schema and schematron
    - Checking of RODB-functionalities (if applicable)
  - Standardized test would be beneficial
    - As a minimum the proposed conformance tests defined in EUR Doc 020, Appendix H, 3.2.4.
    - On MET-switch level check correct format of exchanged messages.
    - Use different types of data

OPERATING PRINCIPLES (5)

- RODB
  - IWXXM-requests use similar rules as for TAC
  - Answers may include operational as well as non-operational IWXXM-messages
  - In case no full AMHS-path available (non-delivery report received by databank) error reply sent in IA5-bodypart to user
- Aeronautical Information Metadata
  - Partly included as metadata in IWXXM (Name, aerodrome coordinates)
  - Problem especially for Translation Centres to have this available (e.g. coordinates of airport, FIR shapes)
  - More metadata available from AIXM-model which could be linked via the AIRM (ATM Information Reference Model) ➔SWIM

OPERATING PRINCIPLES (6)

- Additional Clarification needed for IWXXM 3.0
  - IWXXM 3.0 supports national extensions
    - Procedure to co-ordinate/inform about national extensions needed (idea of global repository)
    - Procedure to implement widely used national extensions in future IWXXM versions

STATUS EUR/NAT-REGION

- There are 52 states in the EUR-region
- For 48 states (92%) IWXXM-data is available, of which
  - ➢26 states (54%) make use of a translation agreements with a ROC

ICAO Paris and DMG initiated several surveys to get an actual picture of the implementation status. ROCs regularly co-ordinate with AoR to have up-to-date information, which can be found on DMG website.

ICAO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South American (SAM) Office Lima
ICAO Headquarters Montréal
Western and Central African (WACAF) Office Dakar
European and North Atlantic (EUR/NAT) Office Paris
Middle East (MID) Office Cairo
Eastern and Southern African (ESAF) Office Nairobi
Asia and Pacific (APAC) Sub-office Beijing
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THANK YOU