IWXXM implementation in Belgium

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*Belgocontrol - Brussels RODB & NOC*

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IWXXM project in Belgium

• Scope
• Planning & Status
• Discovered issues & decisions taken
• Future
In Scope

- **National OPMET Centre (NOC) functionalities:**
  - Enable issuance of TAF/METAR/SIGMET/AIRMET in IWXXM format
    → by TAC to IWXXM translation in message switch
  - Enable the MET Message Switch to process IWXXM
    → reception, validation, routing, “bulletin” creation, visualisation,…
  - Enable the Belgocontrol ATS Message Handling System to support exchange of XML-messages

- **Regional OPMET Databank (RODB) functionalities**
  - receive and store OPMET data in IWXXM format
  - handle request/reply for data in IWXXM format
Out of scope

• Generation of IWXXM at source (observing & forecasting systems)

• Processing of IWXXM by other ATM or MET systems

• Web/SWIM services built on the (I)WXXM data model

→ these can (or should) be part of follow-up projects
Planning & Status

• P3 AMHS connection with extended services between MET & COM switch
  \(\rightarrow\) In operation since > 5 years

• Implementation of IWXXM v1.1 functionalities in MET switch
  • TAF/METAR/SIGMET \(\rightarrow\) IWXXM translation
  • Compilation of collections
  • IWXXM message transmission & reception via FTBP AMHS
  \(\rightarrow\) Implemented in Nov 2016; no operational message distribution yet

• Implementation of IWXXM functionalities in COM workstations
  • Visualisation of IWXXM messages
  • RODB request/reply procedure from COM workstation
  \(\rightarrow\) Implementation May 16th
Planning & Status

• Upgrade of IWXXM functionalities in MET Switch
  • Upgrade to IWXXM 2.0
  • Extra message types: AIRMET, VAA, TCA
  • SIGMET translation for non-polygon areas
  • …
  → Implementation planned 30/6/2017

• Implementation of IWXXM RODB functionalities
  • Message storage, decoding, …
  • Request/reply functionality
  • RODB data availability and usage statistics
  • Access control
  • error/information replies
  • …
  → Implementation planned 30/6/2017
Issues & Decisions

general & message switching

- European Interoperability requirements
  - Not really clear for MET systems; AMHS IWXXM profile not yet published
    → Declaration of Suitability for Use prepared based on the proposed IWXXM AMHS profile

- IWXXM version
  - Too many issues with IWXXM v1.1
    → Decided to support from v2.0 onwards

- Schematron validation
  - Only WMO offline tool available
    → real-time schematron validation will be follow-up project (end 2017); till then only schema validation

- Permissible usage attribute
  → Will be used for test messages and test data-streams
Issues & Decisions

general & message switching

- WMO abbreviated header line
  - Will not be added on top of XML document (will be configurable though)
  - For message routing: extract AHL from filename or bulletin identifier tag in XML collect scheme

- Collect scheme
  - Will only be used for aggregated messages; i.e. not for SIGMET, AIRMET,…
  - Waiting for WMO decision

- Compilation of aggregated messages
  - Possible issue of non-compatible pre-fixes in name space declarations if original messages are from different sources
  - Namespace declarations for each individual report in the collection
Issues & Decisions

general & message switching

• Conditional message routing
  • Prevent test messages and “untrusted” messages from being routed
    → routing/processing can be based on attributes (permissible usage, translation centre,…)

• Message translation: SIGMETs
  • TAC → IWXXM translation is difficult for non-polygon areas; “clipping” needed against FIR boundaries
    → It is advisable not to limit the number of polygon coordinates to 7
    → Better solution (WMO? ICAO?): remove non-polygons from TAC code or add to IWXXM scheme

• Message translation: METAR/TREND
  • Usage of “phenomenon start/end time” unclear if TREND includes no specific time info
    (e.g. TREND = “NOSIG”)
    → Use METAR time as start time and METAR time + 2h as end time
Issues & Decisions

RODB implementation

• Different versions of a report received?
  ➔ Use prioritization: e.g. non-translated messages have higher priority than translated messages; higher priority overwrites lower priority

• Database tables
  • Cover current needs (reports, messages) as well as future data exchange (data)
  ➔ Store data as a) XML documents and b) decoded elements

• RODB reply messages
  • Compiling collections of reports of different sources (or even different IWXXM versions) is not straightforward
  ➔ Brussels RODB replies will (for the time being) not use aggregations and collect scheme
Issues & Decisions

RODB implementation

• Database catalogue
  → No separate IWXXM catalogue
  → Use TAC OPMET requirements and issue information reply if no IWXXM data available
    (No TAC to IWXXM translations by EUR RODBs !)

• AMHS issues → non-delivery report handling
  • RQX requests from a user without extended AMHS capabilities cannot be serviced and will result in a non-delivery report (NDR) sent by COM switch to RODB
  → RODB sends appropriate error message to user
  → To avoid (small) risk of endless loop: Brussels will send max 1 NDR-error message per 10 minutes to the same user
Future

• Start operational IWXXM distribution/reception/RODB functions
  ➔ Depending on ROC London for international data exchange
  ➔ In the mean time: bi-lateral exchange?
  ➔ Test messages only until official WMO / ICAO approval?

• Further future
  ➔ Generation of (I)WXXM at source
  ➔ Development of web services
  ➔ SWIM functionalities
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Backup slide: issue with non-compatible namespace declarations

producer 1:

```xml
<c:bul xmlns:c=http://def.wmo.int/collect/2014 xmlns:w=http://icao.int/iwxxm/2.0>
  <w:metar>LOWW</metar>
</c:bul>
```

producer 2:

```xml
  <iwxxm:metar>EBBR</iwxxm:metar>
</collect:bul>
```

aggregation by producer 2 → fails validation

```xml
  <w:metar>LOWW</w:metar>
  <iwxxm:metar>EBBR</iwxxm:metar>
</collect:bul>
```

Possible solution (not XML best practice)

```xml
<collect:bul collect=http://def.wmo.int/collect/2014>
  <w:metar xmlns:w=http://icao.int/iwxxm/2.0>LOWW</w:metar>
  <iwxxm:metar xmlns:iwxxm=http://icao.int/iwxxm/2.0>EBBR</iwxxm:metar>
</collect:bul>
```