IWXXM implementation in Belgium

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IWXXM project in Belgium

→ (mainly) 1/2016 – 7/2017
→ budget: +/- 250k€
→ co-financed by the European Union (INEA)

- Scope
- Implementation items
- Discovered issues & decisions taken
- Future

In Scope

- National OPMET Centre (NOC) functionalities

→ MET switch & COM switch

- Regional OPMET Databank (RODB) functionalities

→ Ref ICAO docs:
- EUR Doc 18: EUR OPMET Data Management Handbook
- EUR Doc 20: EUR AMHS Manual
- EUR Doc 33: Guidelines for the Implementation of OPMET Data Exchange using IWXXM in the EUR Region

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

Implementation items (1)

- connection MET Switch – COM Centre: P3 AMHS with extended services
  → In operation since > 9 years; some changes needed for the AMHS IWXXM profile

- implementation of IWXXM functionalities in COM Centre & COM workstations
  - support exchange of IWXXM messages
  - visualisation of IWXXM messages
  - send requests to RODB

- implementation of IWXXM NOC functionalities in MET switch
  - switching functionalities for TAF / METAR / SIGMET / AIRMET / TCA / VAA in IWXXM format
    → reception, validation, visualisation for operators, store & forward message switching…
  - TAC → IWXXM translation: TAF / METAR / SIGMET / AIRMET
  - Compilation of collections: TAF / METAR

Implementation items (2)

- implementation of IWXXM RODB functionalities
  - message/data storage, decoding, …
    - → IWXXM messages are stored as complete products AND decoded in elements
  - request/reply functionality
  - RODB statistics regarding data availability and usage
  - access control
  - error/information replies
  - …

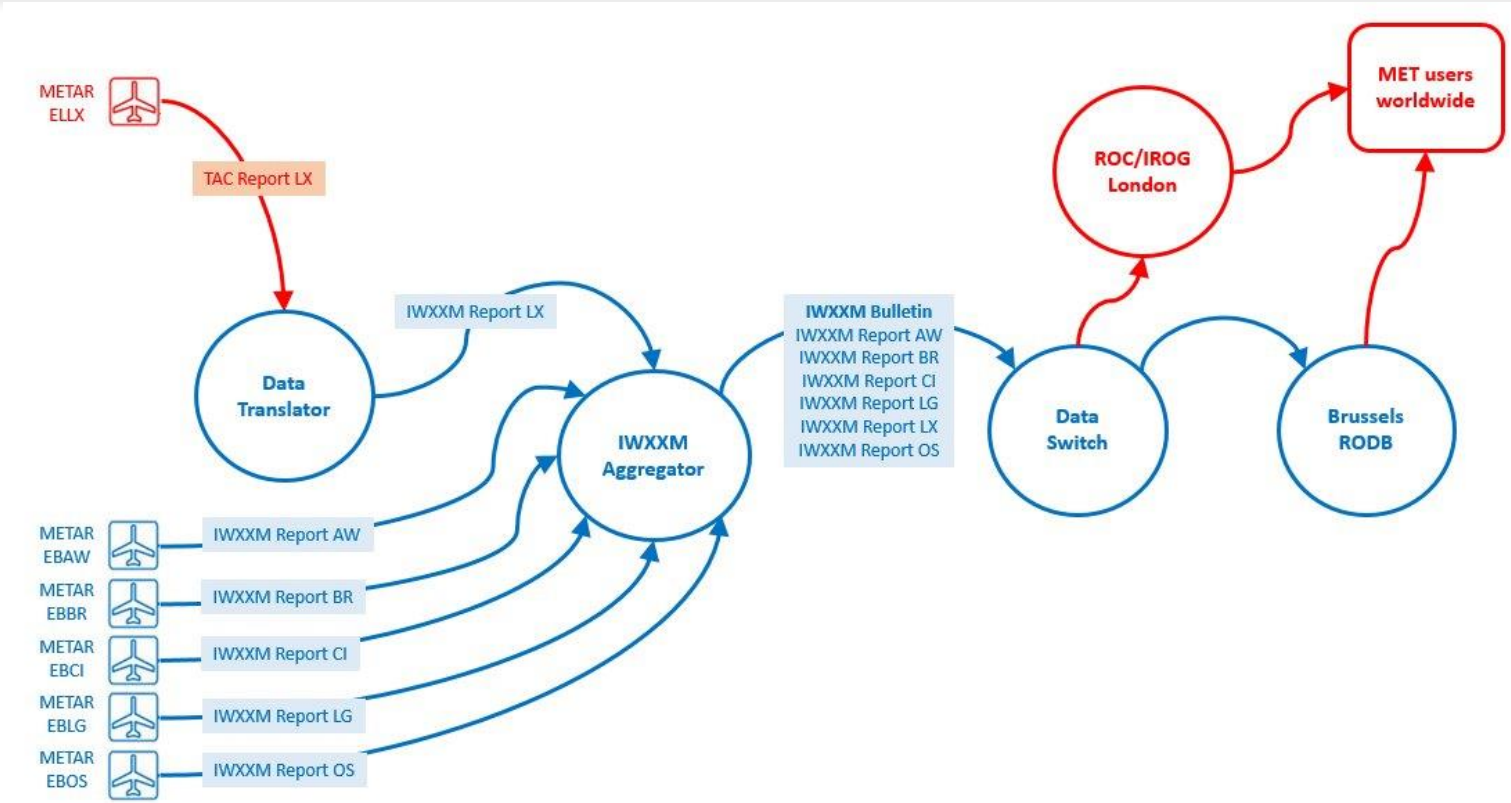
Implementation items (3)

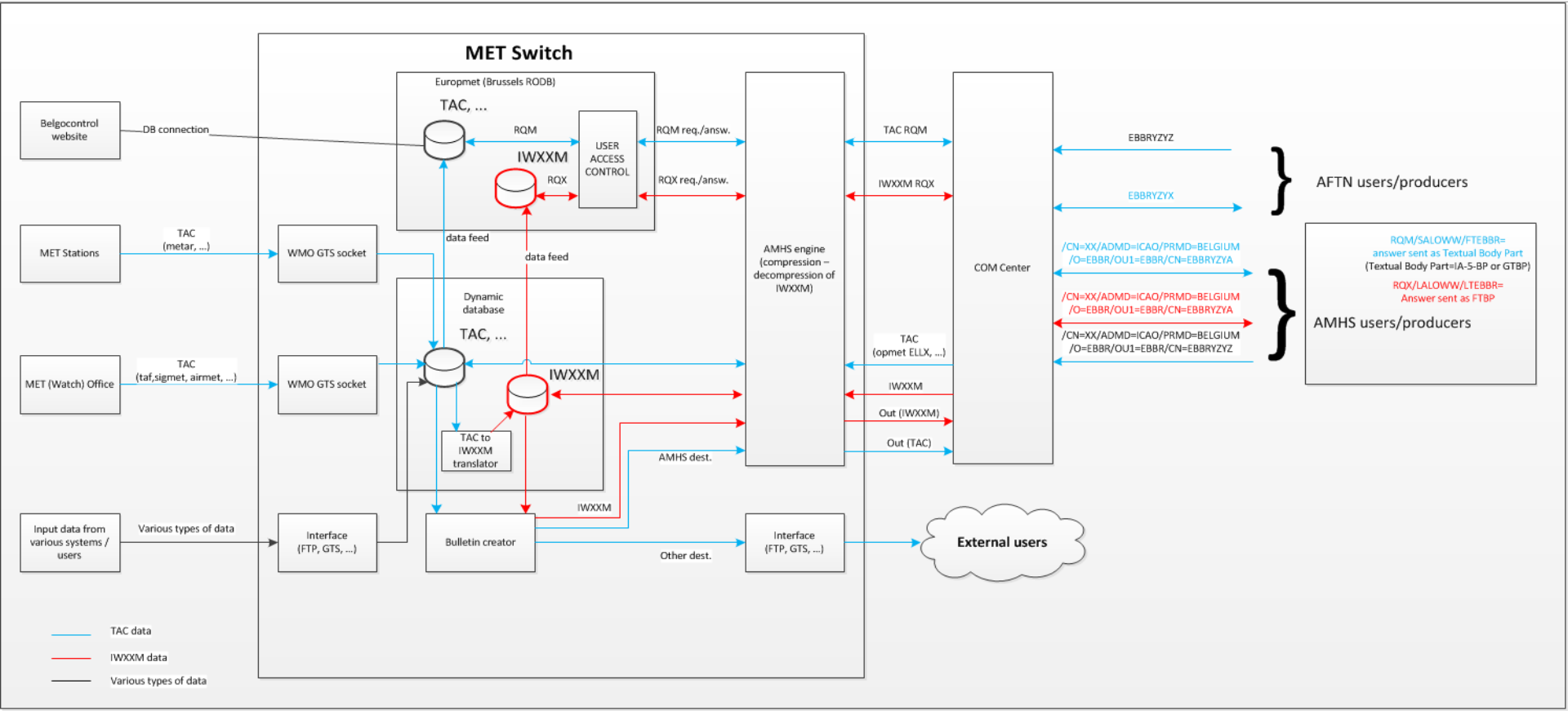
7/2017
IWXXM 2.0:
Distribution of TAF/METAR
& RODB

11/2018
Upgrade to
IWXXM 2.1.1
VAA & TCA
added

5/2019
Distribution of
SIGMET/AIRMET

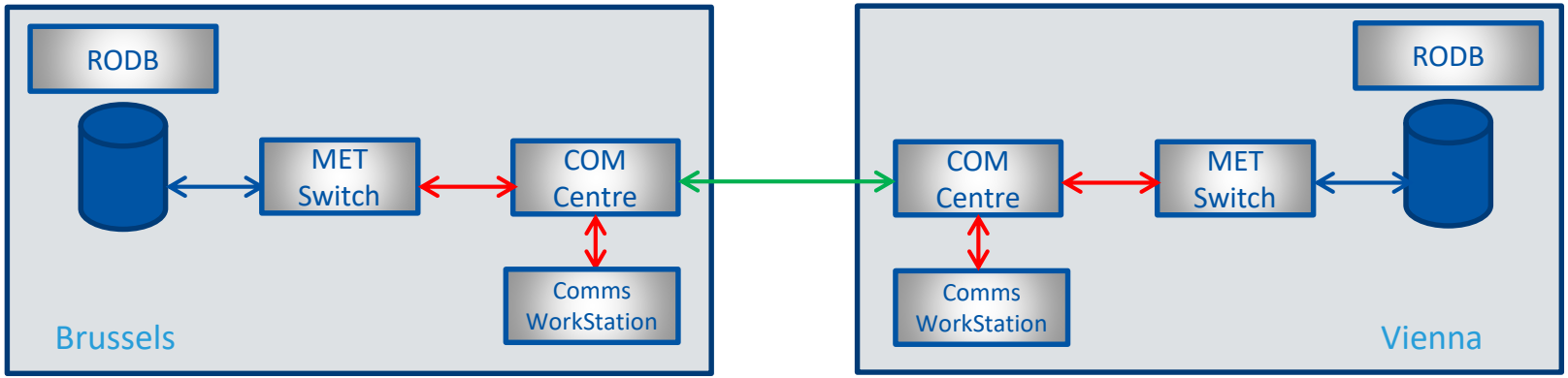
9-10/2020
Planned upgrade
to IWXXM 3.0


METAR ELLX
TAC Report LX
Data Translator
IWXXM Report LX
IWXXM Aggregator
IWXXM Bulletin
IWXXM Report AW
IWXXM Report BR
IWXXM Report CI
IWXXM Report LG
IWXXM Report LX
IWXXM Report OS
ROC/IROG London
MET users worldwide
Data Switch
Brussels RODB
METAR EBAW
IWXXM Report AW
METAR EBBR
IWXXM Report BR
METAR EBCI
IWXXM Report CI
METAR EBLG
IWXXM Report LG
METAR EBOS
IWXXM Report OS


MET Switch
Europmet (Brussels RODB)
TAC, ...
RQM
IWXXM
RQX
USER ACCESS CONTROL
RQM req./answ.
RQX req./answ.
Belgocontrol website
DB connection
MET Stations
TAC (metar, ...)
WMO GTS socket
data feed
data feed
Dynamic database
TAC, ...
IWXXM
MET (Watch) Office
TAC (taf,sigmet, airmet, ...)
WMO GTS socket
TAC to IWXXM translator
AMHS engine (compression – decompression of IWXXM)
TAC RQM
IWXXM RQX
TAC (opmet ELLX, ...)
IWXXM
Out (IWXXM)
Out (TAC)
AMHS dest.
COM Center
EBBRYZYZ
EBBRYZYX
/CN=XX/ADMD=ICAO/PRMD=BELGIUM /O=EBBR/OU1=EBBR/CN=EBBRYZYA
/CN=XX/ADMD=ICAO/PRMD=BELGIUM /O=EBBR/OU1=EBBR/CN=EBBRYZYA
/CN=XX/ADMD=ICAO/PRMD=BELGIUM /O=EBBR/OU1=EBBR/CN=EBBRYZYZ
AFTN users/producers
RQM/SALOWW/FTEBBR= answer sent as Textual Body Part (Textual Body Part=IA-5-BP or GTBP)
RQX/LALOWW/LTEBBR= Answer sent as FTBP
AMHS users/producers
Input data from various systems / users
Various types of data
Interface (FTP, GTS, ...)
Bulletin creator
IWXXM
Other dest.
Interface (FTP, GTS, ...)
External users
TAC data
IWXXM data
Various types of data

Implementation (testing)

- internal MET Switch Brussels
- MET Switch - COM Centre Brussels
- bilateral end-to-end tests with Austrocontrol



Issues & Decisions

general & message switching

- Validation: 4 levels
  - → Level 1: well formed XML document
  - → Level 2: level 1 + stations known
  - → Level 3: level 2 + XSD schema validation
  - → Level 4: level 3 + schematron validation (planned Oct 2020)

- Collect scheme
  - → WMO decision: to be used for all messages, not only for aggregations …

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 strictly the number of polygon coordinates to 7

→ Better solution (WMO? ICAO?): remove non-polygons from TAC code

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 do use aggregations; original XML name space declarations are stored in the DB and added to each report of the collection → this makes every report “self sufficient”

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

Future

→ Generation of (I)WXXM at source

→ Development of web services

→ SWIM functionalities

ICAO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ICAO Headquarters Montréal
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THANK YOU