



ICAO

*International Civil Aviation Organization***INFORMATION PAPER****Nineteenth Meeting of the Meteorological Information Exchange Working Group (MET/IE WG/19)**

Virtual meeting, 22 to 24 March 2021

Agenda Item 4: Meteorological information exchange in digital form**UPDATE ON IWXXM IMPLEMENTATION IN HONG KONG, CHINA**

(Presented by Hong Kong, China)

SUMMARY

This paper presents the recent update and lesson learnt on implementation of OPMET exchange in ICAO Meteorological Information Exchange Model (IWXXM) in Hong Kong, China.

1. INTRODUCTION

1.1 The requirement of digital exchange of aeronautical meteorological information, including METAR/SPECI, TAF, SIGMET, AIRMET, Volcanic Ash Advisory, Tropical Cyclone Advisory and Space Weather Advisory, in IWXXM GML form became applicable on 5 November 2020 according to Amendment 79 to ICAO Annex 3.

2. DISCUSSION

2.1 Hong Kong Observatory (HKO), as the Meteorological Service Provider, takes the role of an “IWXXM Producer” and generate OPMET data in IWXXM version 3.0 from source. HKO also joined hands with Hong Kong Regional OPMET Centre (ROC) of Hong Kong Civil Aviation Department (HKCAD) in developing IWXXM translation and aggregation services and supporting IWXXM exchange over AMHS. Details on the implementation of OPMET exchange in IWXXM in Hong Kong China as of November 2020 were presented in [MET SG/24 – IP/23](#), which covered the following aspects:

- Generation of MET reports in IWXXM
- IWXXM translation and aggregation services
- AMHS Implementation for IWXXM
- International dissemination of IWXXM reports by Hong Kong ROC

The following sections introduce the recent update and some lessons learnt on the implementation of IWXXM exchange in Hong Kong China since November 2020.

Agenda Item 4

22-24/03/21

Monitoring the dissemination of IWXXM reports

2.2 HKO and CAD have developed a new web tool for the operators of ROC Hong Kong and Airport Meteorological Office to monitor the dissemination of IWXXM reports and check the quality of the XML contents more effectively (Figure 1). The tool consists of:

- (a) a summary table at the top indicate the status of the content of individual aerodrome in the aggregated IWXXM report, such as “OK”, “Translation Failed”, “Missing”, etc;
- (b) a dissemination log showing the dissemination time and the GZIP file size of the disseminated IWXXM file; and
- (c) an XML viewer for the user to preview the content in the compressed XML file.

Statistics of translation service

2.3 Hong Kong ROC has been performing the function of “Translation Centre” and translating OPMET data disseminating by Manila NOC and Macao NOC from TAC to IWXXM. Table 1 shows the success rate of the TAC-IWXXM translation of METAR/SPECI and TAF by individual aerodromes as well as the SIGMET of Manila FIR during January to February 2021.

2.4 The translation success rates for METAR/SPECI and TAF were generally above 98%. In case of translation failure, “translationFailedTAC” would be indicated together with the original TAC message for the particular aerodrome in the aggregated IWXXM report.

2.5 For SIGMET, it was noted that the translation success rate in Feb 2021 was much lower than that in Jan 2021 due to issues of the translation software in handling the WC SIGMET. The translation software was being upgraded to enhance the WC SIGMET translation capability.

Statistics of validation service

2.6 To ensure the IWXXM data quality for operational use by the user system, ROC Hong Kong conducted validation of IWXXM messages for individual aerodrome received from NOC before it was allowed to be aggregated and disseminated.

2.7 The success rate of the IWXXM validation of incoming METAR/SPECI and TAF by individual aerodromes during January to February 2021 is also summarized in Table 1. Validation success rate for METAR/SPECI was about 90% or above for most of the aerodromes, while the success rate for TAF was close to 100%. To improve the success rate of the IWXXM validation, arrangements would be made to notify the IWXXM originator in case of validation failure.

AMHS path for IWXXM dissemination

2.8 Hong Kong China has been disseminating IWXXM reports to the ROCs of Bangkok, Singapore, Brisbane and Wellington through operational AMHS network since November 2020. There had been a file size limitation of 6 KB at some nodes of the original AMHS paths restricting the routing of aggregated IWXXM TAF messages of about 10 KB disseminated by ROC Hong Kong.

2.9 The AMHS path for IWXXM dissemination was reconfigured in December 2020 and updated as follows passing through Manila so that IWXXM TAF disseminated by ROC Hong Kong could also reach other ROC destinations:

Destination (ROC)	AMHS path	Type of IWXXM report	Status
Bangkok	VHHH-VTBB	METAR/SPECI, SIGMET	Operational
Singapore	VHHH-RPLL-WSSS	METAR/SPECI, TAF, SIGMET	Operational
Kuala Lumpur	VHHH-RPLL-WSSS-WMKK	METAR/SPECI, TAF, SIGMET	Operational
Brisbane	VHHH-RPLL-WSSS-YBBB	METAR/SPECI, TAF, SIGMET	Operational
Wellington	VHHH-RPLL-WSSS-YBBB-NZCH	METAR/SPECI, TAF, SIGMET	Operational

"Authorization Time" in AMHS message heading

2.10 During the early implementation phase of IWXXM exchange, ROC Hong Kong observed that IWXXM Messages received with format error alarm were occasionally triggered at AMHS when IWXXM messages were being received from some ROCs. After investigation, it was found that the cause of error was due to absence of the character "Z" in "Authorization Time" element (Figure 2) when creating the IPM heading of AMHS message. The "Authorization Time" element is part of the AMHS Functional Group IPM Heading Extensions (IHE) as per ICAO Doc 9880, Part II, table 3-2 and para. 3.3.4.2.

2.11 The "Authorization Time" element of IWXXM messages shall either consists of a specification of a calendar date and a UTC time followed by a letter "Z" or a specification of a calendar date, the local time and the difference between local time and UTC.

2.12 The alarm was no longer triggered at AMHS of ROC Hong Kong after the originating stations implemented the system fix successfully.

The way forward

2.13 Hong Kong China will continue to conduct further IWXXM exchange with other NOCs, ROCs and RODBs to identify possible operational issues associated with international exchange of IWXXM bulletin via AMHS.

2.14 Hong Kong China would also develop a new IWXXM database to consolidate the IWXXM reports received from other States and develop new web service interfaces for airline users to retrieve IWXXM reports based on their operational requirements.

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.

IWXXM Dissemination
 Hong Kong Regional OPMET Centre

VHHH	RCTP	RCKH	RCSS	RCMQ	RCNN	RCFN	VMMC	RPLL	RPVM	RPLB	RPMD	RPLI	RPMZ
OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Show entries

XML filename	GZIP	Type	Dissemination Time
A_LAHK31VHHH212230_C_VHHH_20210221224220.xml	4.6 KB	METAR	2021-02-21 22:42:22
A_LAHK31VHHH212200_C_VHHH_20210221220800.xml	4.9 KB	METAR	2021-02-21 22:08:04
A_LAHK31VHHH212130_C_VHHH_20210221214210.xml	4.3 KB	METAR	2021-02-21 21:42:20
A_LAHK31VHHH212100CCA_C_VHHH_20210221212500.xml	1.6 KB	METAR	2021-02-21 21:25:05
A_LAHK31VHHH212100_C_VHHH_20210221210800.xml	4.7 KB	METAR	2021-02-21 21:08:13
A_LAHK31VHHH212030_C_VHHH_20210221204210.xml	4.3 KB	METAR	2021-02-21 20:42:29
A_LAHK31VHHH212000_C_VHHH_20210221201200.xml	4.7 KB	METAR	2021-02-21 20:12:16
A_LAHK31VHHH211930_C_VHHH_20210221194220.xml	4.2 KB	METAR	2021-02-21 19:42:27
A_LAHK31VHHH211900_C_VHHH_20210221191220.xml	4.8 KB	METAR	2021-02-21 19:12:26
A_LSPH31RPLL211908_C_RPLL_20210221191200.xml	1.8 KB	SIGMET	2021-02-21 19:12:08
A_LAHK31VHHH211830_C_VHHH_20210221184210.xml	4.2 KB	METAR	2021-02-21 18:42:23
A_LAHK31VHHH211800_C_VHHH_20210221181000.xml	4.8 KB	METAR	2021-02-21 18:10:06
A_LAHK31VHHH211730_C_VHHH_20210221174220.xml	4.3 KB	METAR	2021-02-21 17:42:23
A_LTHK31VHHH211700_C_VHHH_20210221172200.xml	8.9 KB	TAF	2021-02-21 17:22:05
A_LAHK31VHHH211700_C_VHHH_20210221171200.xml	4.7 KB	METAR	2021-02-21 17:12:09
A_LAHK31VHHH211630_C_VHHH_20210221164220.xml	4.2 KB	METAR	2021-02-21 16:42:22
A_LAHK31VHHH211600_C_VHHH_20210221161210.xml	4.8 KB	METAR	2021-02-21 16:12:12
A_LAHK31VHHH211530_C_VHHH_20210221154210.xml	4.3 KB	METAR	2021-02-21 15:42:21
A_LSPH31RPLL211515_C_RPLL_20210221151900.xml	1.8 KB	SIGMET	2021-02-21 15:19:04
A_LAHK31VHHH211500_C_VHHH_20210221150800.xml	4.9 KB	METAR	2021-02-21 15:08:05
A_LAHK31VHHH211430_C_VHHH_20210221144220.xml	4.3 KB	METAR	2021-02-21 14:42:22
A_LAHK31VHHH211400_C_VHHH_20210221141200.xml	4.7 KB	METAR	2021-02-21 14:12:10
A_LAHK31VHHH211330_C_VHHH_20210221134210.xml	4.4 KB	METAR	2021-02-21 13:42:21
A_LSPH31RPLL211327_C_RPLL_20210221133100.xml	1.8 KB	SIGMET	2021-02-21 13:31:04
A_LAHK31VHHH211300_C_VHHH_20210221131210.xml	4.7 KB	METAR	2021-02-21 13:12:12

Search:

A_LAHK31VHHH212200_C_VHHH_20210221220800.xml
 XML Content

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<collect:MeteorologicalBulletin xmlns:axm="http://www.axm.aero/schema/5.1.1" xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:iwxxm="http://icao.int/iwxxm/3.0" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:collect="http://def.wmo.int/collect/2014" gml:id="uuid.d3a34585-f85e-4ff5-af3b-3fe91127c38e"
xsi:schemaLocation="http://def.wmo.int/collect/2014 http://schemas.wmo.int/collect/1.2/collect.xsd http://icao.int/iwxxm/3.0
http://schemas.wmo.int/iwxxm/3.0/iwxxm.xsd">
  <collect:meteorologicalInformation>
    <iwxxm:METAR automatedStation="false" gml:id="uuid.8ca65e74-bba1-4e41-9ac1-28c09171f4df" permissibleUsage="OPERATIONAL"
reportStatus="NORMAL" translatedBulletinID="LAHK31VMMC212200" translatedBulletinReceptionTime="2021-02-21T10:00:00Z"
translationCentreDesignator="VHHH" translationCentreName="Hong Kong Regional OPMET Centre" translationTime="2021-02-
21T10:00:04.035Z">
      <iwxxm:issueTime>
        <gml:TimeInstant gml:id="uuid.58e69745-283d-4e5f-ab3e-e6ac44b84ee4">
          <gml:timePosition>2021-02-21T22:00:00.000Z</gml:timePosition>
        </gml:TimeInstant>
      </iwxxm:issueTime>
      <iwxxm:aerodrome>
        <axm:AirportHeliport xmlns:ns0="http://www.opengis.net/gml/3.2" ns0:id="uuid.963c97bb-9282-476d-8ccf-61c7edec31e4">
          <axm:timeSlice>
            <axm:AirportHeliportTimeSlice ns0:id="uuid.89ab91e1-0c0f-46df-97a7-7588725952a8">
              <gml:validTime/>
              <axm:interpretation>BASELINE</axm:interpretation>
              <axm:name>MACAU/INTERNATIONAL</axm:name>
              <axm:locationIndicatorCAO>VMMC</axm:locationIndicatorCAO>
              <axm:ARP>
                <axm:ElevatedPoint axisLabels="Lat Lon" ns0:id="uuid.e2618700-41e7-4025-ad92-2a1bd49420da"
srsDimension="2" srsName="http://www.opengis.net/def/crs/EPSG/0/4326">
                  <gml:pos>22.149369 113.591411</gml:pos>
                </axm:ElevatedPoint>
              </axm:ARP>
            </axm:AirportHeliportTimeSlice>
          </axm:timeSlice>
        </axm:AirportHeliport>
      </iwxxm:aerodrome>
      <iwxxm:observationTime>
        <gml:TimeInstant gml:id="uuid.5feb4774-10fc-4e3b-82bd-10b71c294094">
          <gml:timePosition>2021-02-21T22:00:00.000Z</gml:timePosition>
    
```

Figure 1: New tool for ROC Hong Kong to monitor the dissemination of IWXXM reports

```

- <extensions>
  <type>2.6.1.5.12</type>
- <value>
  <PrecedencePolicyIdentifier>1.3.27.8.0.0</PrecedencePolicyIdentifier>
</value>
<type>2.6.1.5.5</type>
- <value>
  <AuthorizationTime>20201207073000.0</AuthorizationTime>
</value>
</extensions>
</heading>
- <body>
  - <BodyPart>
    - <extensions>
      <type>2.6.1.5.12</type>
      - <value>
        <PrecedencePolicyIdentifier>1.3.27.8.0.0</PrecedencePolicyIdentifier>
        </value>
        <type>2.6.1.5.5</type>
      - <value>
        <AuthorizationTime>20201207073608.008970Z</AuthorizationTime>
        </value>
      </extensions>
    </heading>
  - <BodyPart>

```

Figure 2: Examples of correct and incorrect format of “Authorization Time” observed during the reception of AMHS message carrying IWXXM file

Table 1: Success rate of IWXXM translation service and IWXXM validation service provided by ROC Hong Kong during January to February 2021

ROC HONG KONG IWXXM SERVICE	PRODUCT TYPE	LOCATION	Jan 2021			Feb 2021		
			Total	Fail	Success Rate	Total	Fail	Success Rate
Translation of TAC messages from NOC	METAR/SPECI	RPLB	747	2	99.7%	679	3	99.6%
		RPLI	562	9	98.4%	517	4	99.2%
		RPLL	785	13	98.3%	693	7	99.0%
		RPMD	752	6	99.2%	683	2	99.7%
		RPMZ	546	4	99.3%	504	6	98.8%
		RPVM	750	2	99.7%	688	7	99.0%
		VMMC	1488	0	100.0%	1345	0	100.0%
	TAF	RPLB	111	0	100.0%	114	1	99.1%
		RPLI	112	0	100.0%	113	0	100.0%
		RPLL	112	2	98.2%	113	1	99.1%
		RPMD	111	0	100.0%	113	1	99.1%
		RPMZ	110	2	98.2%	114	1	99.1%
		RPVM	112	1	99.1%	113	0	100.0%
SIGMET	RPHI	119	0	100.0%	115	0	100.0%	
Validation of IWXXM messages from NOC	METAR/SPECI	RCFN	1805	14	99.2%	1395	11	99.2%
		RCKH	1673	99	94.1%	1535	151	90.2%
		RCMQ	1835	139	92.4%	1677	247	85.3%
		RCNN	1727	106	93.9%	1596	137	91.4%
		RCSS	1600	45	97.2%	1469	43	97.1%
		RCTP	1835	195	89.4%	1569	119	92.4%
	TAF	RCFN	125	0	100.0%	114	0	100.0%
		RCKH	131	0	100.0%	118	0	100.0%
		RCMQ	139	0	100.0%	125	0	100.0%
		RCNN	126	1	99.2%	113	0	100.0%
		RCSS	128	0	100.0%	115	0	100.0%
		RCTP	137	0	100.0%	136	0	100.0%