



International Civil Aviation Organization

INFORMATION PAPER

**SIXTEENTH MEETING OF THE ASIA/PACIFIC METEOROLOGICAL
INFORMATION EXCHANGE WORKING GROUP (MET/IE WG/16)**

Bangkok, Thailand, 19 – 21 March 2018

Agenda Item 4: Meteorological information exchange in digital form

**FOLLOW UP TEST ON INTERNATIONAL IWXXM EXCHANGE OVER AMHS
AMONG HONG KONG CHINA, THAILAND AND SINGAPORE**

(Presented by Hong Kong China, Thailand and Singapore)

SUMMARY

This paper presents the progress, outcome and lesson learned of the follow up test on IWXXM exchange conducted over VPN AMHS path connecting Thailand, Singapore and Hong Kong China. The test successfully demonstrated the capability of Thailand's AMHS server in relaying IWXXM attachment between Hong Kong China and Singapore via AMHS, paving the path for digital OPMET exchange between MET service providers of Singapore and Hong Kong China.

1. INTRODUCTION

1.1 To prepare for the implementation of IWXXM for digital OPMET exchange to meet the proposed mandatory requirement in 2020 in ICAO Annex 3, initial tests on IWXXM exchange over Extended AMHS were conducted between Thailand and Hong Kong China as well as between Thailand and Singapore in early 2017, which was presented in MET/IE WG/15 - IP/08. Following suggestions from the IWXXM workshop hosted by Hong Kong China in coordination with ICAO APAC and WMO in October 2017, Thailand, Singapore and Hong Kong China collaborated to conduct the second phase of the joint test on end-to-end IWXXM exchange between MET service providers in early 2018.

2. DISCUSSION

Preparation of IWXXM OPMET messages

2.1 Hong Kong Observatory (HKO) and Meteorological Service Singapore (MSS) were the originating meteorological services responsible for the generation of IWXXM bulletins of METAR/SPECI, TAF and SIGMET for the test. HKO and MSS generated IWXXM bulletin of version 2.1 and 2.0 respectively using a TAC-to-IWXXM OPMET translation software. The

translation software used by Hong Kong was developed in house while that for Singapore was from its Message Switching System.

2.2 To discriminate IWXXM messages from Traditional Alphanumeric Code (TAC) messages, a new set of Abbreviated Headers has been defined by WMO (see Table B7 of WMO GTS Manual (<http://wis.wmo.int/file=3558>)). The following are the headers used in the test:

Bulletin Header	Hong Kong China		Singapore	
	TAC	IWXXM	TAC	IWXXM
METAR	SAHK	LAHK	SASR	LASR
TAF*	FTHK	LTHK	FTSR	LTSR
WS SIGMET	WSHK	LSHK	WSSR	LSSR

*valid time ≥ 12 hours

Test environment

2.3 To make the test environment as close to the future operational environment as possible to that mentioned in the "Guidelines for the Implementation of OPMET data exchange using IWXXM", IWXXM test messages were exchanged via Extended AMHS servers (Message Transfer Agents (MTAs)) provided by Hong Kong Civil Aviation Department (HKCAD) and Aeronautical and Radio of Thailand Ltd. (AEROTHAI). AEROTHAI, HKCAD and MSS have joined hands to set up two Virtual Private Network (VPN) connections over internet to connect Extended AMHS MTAs and AMHS clients among three States (VPN1 and VPN2 in Figure 1) to ensure operational link is not affected. Protocols used for exchanging messages between MTAs or clients involved P1, P3 and SOAP, as shown in Figure 1.

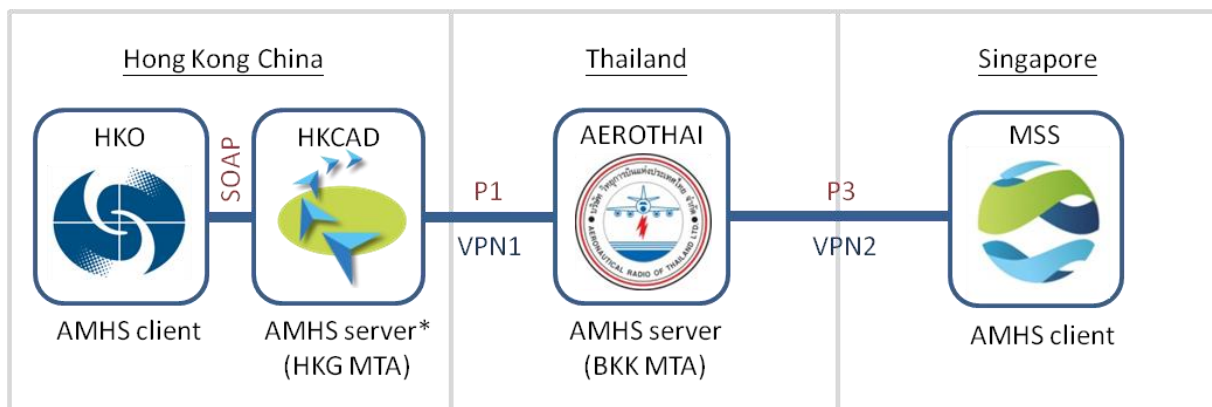


Figure 1: Test set up of the IWXXM exchange via Hong Kong MTA, Bangkok MTA and AMHS clients among Hong Kong, China, Thailand and Singapore. (*Test AMHS server, with settings the same as the operational AMHS server)

IWXXM message exchange test result.

2.4 The test consists of two main scenarios, namely (1) HKO to send IWXXM messages and (2) MSS to send IWXXM messages. Each time HKO or MSS sent an ATS message with IWXXM attachment to the other three destination AMHS addresses (Section B of Appendix), each recipient would verify if the IWXXM attachment could be received and opened correctly.

2.5 For messages sent from HKO, the IWXXM bulletin was compressed in ZIP format and sent as an attachment to the ATS message. HKCAD and AEROTHAI received the AMHS message

with attachment and opened the IWXXM bulletin. MSS was also able to receive the AMHS message and the associated attachment. While MSS client software could read the correct size of the attachment and read the texts in the message body, the software was not able to process the ZIP attachment file or open it.

2.6 For messages sent from MSS, the IWXXM bulletin was in TEXT format without compression and was sent as an attachment to the ATS message. AEROTHAI was able to receive the AMHS message and open the IWXXM bulletin. The same message with the attachment had also reached HKG side correctly. However, it was found that some ATS header attributes, such as Priority and Filing Time, were missing.

Observations and the way forward

2.7 During the tests between Hong Kong, China and Thailand in 2017, attachments of file size larger than 6 KB could not be exchanged between HKG and BKK MTAs in the test environment. In the latest test, compressed and uncompressed IWXXM attachment of up to 30KB could be successfully exchanged between HKG and BKK. Larger attachments would be used in the coming tests to test the capability of the MTAs to handle sizes larger than 30KB.

2.8 Discussion with the Message Switching System vendor(s) of the observed issues mentioned in Paras. 2.5 and 2.6 would be conducted, and the client software would be upgraded as necessary. Further tests will be conducted to check the interoperability of AMHS messages.

2.9 In the next phase, routine test of live IWXXM messages would be conducted among Hong Kong China, Thailand and Singapore when the observed issues in opening IWXXM attachment are solved. Validation for IWXXM bulletins received at HKO and MSS would also be conducted using WMO/ICAO XML Web Validator¹. The joint IWXXM exchange test will continue to be conducted on test AMHS servers and VPN test links until it is confirmed safe with all issues solved.

Conclusion

2.10 The test successfully demonstrated the capability of Thailand's AMHS server in relaying AMHS message with IWXXM attachment between Singapore and Hong Kong China. Moreover, end-to-end IWXXM exchange between MET service providers was achieved and IWXXM message generated by HKO could reach MSS.

2.11 The test could serve as an implementation model of OPMET exchange in IWXXM via AMHS for APAC region, which would lead to a better understanding of associated requirements and the lessons learned could help accelerate the implementation within APAC region.

3. ACTION BY THE MEETING

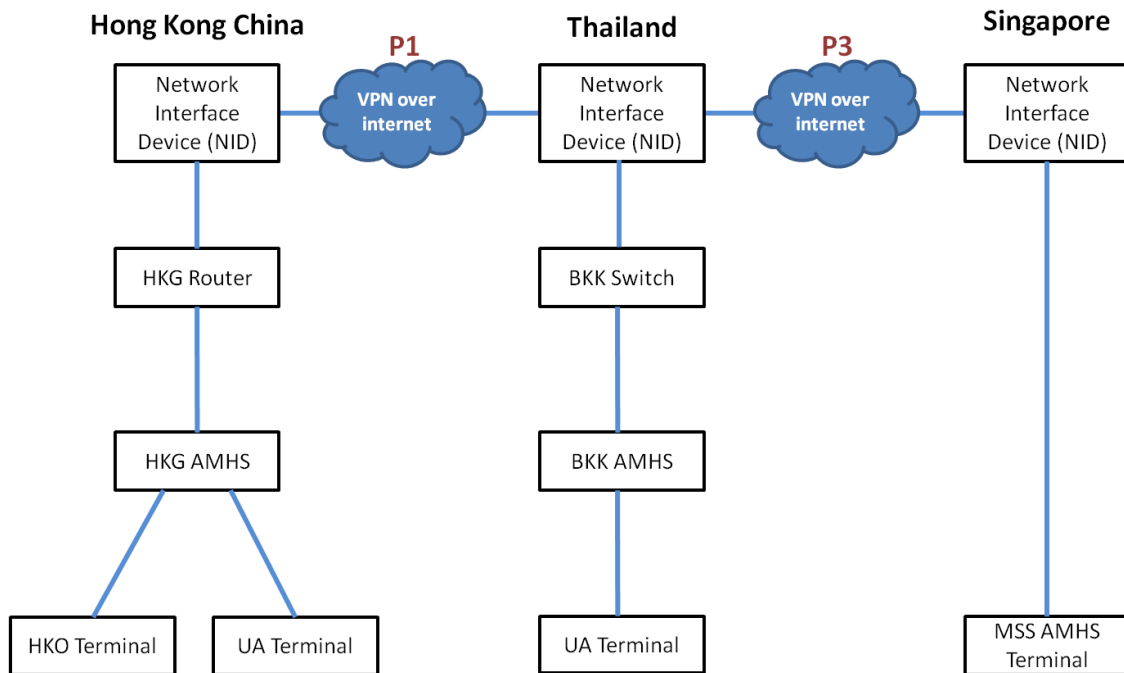
3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

¹ <http://wmo-icao-validator.rap.ucar.edu/>

Appendix - Detailed test configuration

A. Network diagram of the testing environment of AMHS clients and servers among Hong Kong China, Thailand and Singapore.



B. AMHS Addressing

Below are the configuration of addresses used in AMHS test connections among Singapore, Thailand and Hong Kong China:

Thailand address

C=XX, ADMD=ICAO, PRMD=Thailand, O=VTBB, OU1=VTBB, CN=VTBBMHSA

Hong Kong China addresses

HKCAD:

C=XX, ADMD=ICAO, PRMD=HONGKONG, O=HKGCAD, OU1=VHHH, CN=VHHHMHSA

HKO:

C=XX, ADMD=ICAO, PRMD=HONGKONG, O=HKGCAD, OU1=VHHH, CN=VHHHHKOA

Singapore address

C=XX, ADMD=ICAO, PRMD= SINGAPORE, O= CAASG, OU1= WSSS, CN= WSSSIWXM

Recipient	MSS	AEROTHAI	HKCAD	HKO
P=	SINGAPORE	THAILAND	HONGKONG	HONGKONG
O=	CAASG	VTBB	HKGCAD	HKGCAD
OU1=	WSSS	VTBB	VHHH	VHHH
CN=	WSSSIWXM	VTBBMHSA	VHHHMHSA	VHHHHKOA

P = private-domain-name

O = organization

OU1 = organization-unit-name1

CN = common-name