International Civil Aviation Organization

Tenth Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/10)

Video Teleconference 04 – 08 May 2020

Agenda Item 5: Regional ATFM Framework and Guidance Material

PROGRESS OF THE TECHNICAL SUB-GROUP OF THE DISTRIBUTED MULTI-NODAL ATFM NETWORK PROJECT

(Presented by China, Hong Kong China, Singapore, Thailand, CANSO, and IATA)

SUMMARY

This paper shares the progress of the Technical Sub-Group under the Distributed Multi-Nodal ATFM Network Project. Importantly, it is considered that the outputs of the Technical Sub-Group can be utilized to fulfill the objectives of the ICAO Asia-Pacific ATFM Information Requirement Small Working Group (ATFM-IR/SWG).

1. INTRODUCTION

1.1 Recognizing the challenges associated with multiple Air Traffic Flow Management (ATFM) systems developed or acquired independently within the Distributed Multi-Nodal ATFM Network, the Technical Sub-Group has been established under the Distributed Multi-Nodal ATFM Network Project to develop an information linkage framework for efficient and harmonized ATFM systems interconnection required to support the operational requirements for this decentralized cross-border ATFM.

1.2 Aiming at achieving the seamless information sharing among involved stakeholders, particularly among ATFM Nodes locating geographically dispersed, while at the same time being able to maintain the flexibility to accommodate new users and additional customized functions of individual ATFM systems, a system-to-system connection designed based on Service-Oriented Architecture (SOA) with the use of XML-based information exchange model according to ICAO System-Wide Information Management (SWIM) concept has been identified by the Technical Sub-Group as viable and suitable solution for the Distributed Multi-Nodal ATFM operations. While working towards the target of developing and establishing SWIM-based ATFM data exchange mechanism for system technical trials over the Common Aeronautical Virtual Private Network (CRV) earliest in December 2020, it was agreed under the Distributed Multi-Nodal ATFM Network Project on an interim arrangement that the system-to-system exchange of ATFM data would be operated using the EUROCONTROL Slot Allocation Message (SAM) and its related messages distributed over Aeronautical Fixed Telecommunication Network (AFTN) and/or ATS Message Handling System (AMHS).

2. DISCUSSION

ATFM Data Exchange over AFTN/AMHS

2.1 Among the Level-3 ATFM Nodes, most of the members have completed the implementation of ATFM data exchange capability over AFTN/AMHS, using SAM, SRM (Slot Request Message), and SLC (Slot Cancellation Message) messages. The implementation status of the Level-3 ATFM Nodes is as follows:

Level-3 ATFM nodes	Status	Remark
AEROTHAI	Completed	
SANYA ATFMU	Completed	Only SAM implemented
CATS	Completed	
HKCAD	Completed	
CAAS	In-Progress	Undergoing reliability testing, estimated completion by Q2 2020.

2.2 The draft ATFN/AMHS-Based Interface Control Document (ICD) for the ATFM data exchange using SAM, SRM, and SLC was adopted by CNS SG/23 and published on the ICAO Asia/Pacific Regional Office website as a technical guidance material for Asia/Pacific States/Administrations in the implementation of cross-border ATFM communication. To improve the consistency of the aforementioned ICD and ICAO Annex 10 Aeronautical Telecommunications, Volume II Communication Procedure (Seventh Edition, July 2016), the following table (Table 1. Summary of IA-5 Fields used in messages sent via AFTN/AMHS of the ICD) is updated. Additionally, the Technical Sub-Group will continue to seek feedback on the ICD from other States/Administrations through ATFM/IR/SWG and provide update to the ICD if required.

Field #	Description	Format	Example
1	Start of Message/ Start of heading	~~4 letters~~ 1 character	~~ZCZC~~ 0/1
2	Transmission Identification	3 letters + 3 numbers	HAR001
3	Additional Service Indication	Optional <11 characters	123456
4	Priority Indicator	2 letters	FF
5	Addressee of the message	8 letters	EGLLZRZX
6	Day / time of the message	DDHHMM (UTC)	041345
7	Originator of the message	8 letters	OPSTZQZX
8	Optional Heading Information	ODF – See AIDC	See AIDC
9	ATS Message Payload	…	…
10	End of Message	~~4 letters~~ 1 character	~~NNNN~~ 0/3

2.3 Multi-nodal ATFM Nodes and other States/Administrations, who wish to receive SAM and related messages through ATFN or AMHS to facilitate cross-border ATFM, could approach the Technical Sub-Group to arrange for technical trial, based on ATFN/AMHS-based ICD aforementioned.

ATFM Data Exchange over SWIM

2.4 The Technical Sub-Group is working on drafting the technical specifications for system-to-system connection and the exchange of ATFM data over a regional SWIM infrastructure. Considering the distributed nature of the Distributed Multi-Nodal ATFM Network and the current SWIM and FF-ICE development progress, one of the very first steps required to be established for the time being is to define the clear business rules on who, when, and how flight information should be created and exchanged among related stakeholders to support cross-border ATFM. The existing cross-border ATFM operational process and applied procedures in regard to demand monitoring and updating will be used as the baseline in defining these business rules.

2.5 To support the ATFM information exchange for cross-border ATFM operations and ATFM/A-CDM integration in the Asia/Pacific Region, the Asia/Pacific SWIM Task Force (SWIM TF), with support of the Technical Sub-Group, developed the Flight Information Exchange Model (FIXM) version 4.1 Extension, as previously reported to ATFM SG/9. Consequently, in November 2019, the FIXM version 4.1 Extension aforementioned was adopted by APANPIRG/30 to be the Asia/Pacific FIXM version 4.1 Extension for use by Asia/Pacific States/Administrations to support the cross-border ATFM information exchange. This Asia/Pacific FIXM Extension was also uploaded to the ICAO Asia/Pacific Regional Office website. Moreover, the Asia/Pacific FIXM Extension was forwarded to the FIXM Change Control Board (CCB) for review and it was published on the FIXM official website for use by other stakeholders as well. The list of data attributes included in the Asia/Pacific FIXM version 4.1 Extension is as follows.

	Estimated	**Calculated**	**Target**	**Actual**
Off Block			TOBT	AOBT
Start-up Approval			TSAT	
Take Off		CTOT	TTOT	
Time Over	ETO	CTO		ATO
Landing	ELDT	CLDT		
Other				
Trajectory			**Aircraft Track**	
• ETO • CTO • ATO • Flight level or Altitude • Waypoint			• Ground speed • Bearing • Flight level or Altitude • Position (Designator or Latitude/Longitude or Relative Point) • Time over position	

2.6 It is worth mentioning that the Asia/Pacific FIXM version 4.1 Extension was used to support the conduct of operational scenarios regarding cross-border ATFM operations and ATFM/A-CDM integration during the SWIM in ASEAN Demonstration in November 2019. The demonstration results illustrate that, with the SWIM infrastructure and related information services designed and developed for the demonstration, the Asia/Pacific FIXM Extension can be utilized for the efficient information sharing among stakeholders in the distributed ATFM network environment.

2.7 Further down the road as well as subject to the availability of the baseline SWIM specifications for ATFM service and CRV connectivity, the Technical Sub-Group is reviewing the feasibility of starting system technical trials on CTOT Distribution, CTOT Revision, CTOT Cancellation, and CTOT Request to enable its long-term development of ATFM SWIM-based technical specifications.

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.