International Civil Aviation Organization

The Fourth Meeting of ICAO Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/4)

Bangkok, Thailand, 1 – 5 December 2014

Agenda Item 5: Development of Regional ATFM Framework

ATFM COMMUNICATIONS

(Presented by the Secretariat)

SUMMARY

This paper presents information on ATFM communications, and proposes communications capability and protocols for inclusion in the Regional Framework for Collaborative ATFM.

1. INTRODUCTION

1.1 A key consideration in the development of inter-State, sub-Regional or Regional networked ATFM capability is the harmonization of ATFM messages and information exchange protocols.

2. DISCUSSION

ATFM Automated System Communications

2.1 The Regional ATFM Concept (WP/04) advocates web-based interfaces as the primary communications medium for the coordination of ATFM information. Examples of information exchanged may be:

- From FMP to aircraft operator, airport operator, ATC and/or other FMP:
  - Tactical ATFM measures Calculated Take-Off Time (CTOT) and Calculated Time Over (CTO) and any amendments or cancellations;
- From aircraft operator to FMP/ATFM system;
  - Slot Swapping (SUB);
  - Delay Absorption Intent.

2.2 The development and implementation of a web-based ATFM network will require consideration of such matters as hosting, and human-machine interface (HMI) requirements, in addition to the information exchange model. Network reliability and availability requirements should also be determined in accordance with each State's safety management system (SMS) processes.

Flight Information Exchange Model

2.3 The Flight Information Exchange Model (FIXM) is part of a suite of data exchange formats including Aeronautical Information Exchange Model (AIXM) and Meteorological Information Exchange Model (WXXM) intended to provide a global standard for information exchange

2.4 FIXM is a data interchange format for sharing information about flights throughout their lifecycle. FIXM is intended to increase flight data interoperability among all air traffic stakeholders by creating a common vocabulary across all domains with a common and unambiguous description of data elements exchanged by all stakeholder systems. The requirement for FIXM was identified by the ICAO ATM Requirements and Performance Panel (ATMRPP) and endorsed at the 12th Air Navigation Conference as part of the Aviation System Block Upgrades (ASBU), and as described in Flight and Flow Information for a Collaborative Environment (FF-ICE). The FIXM model will be referenced in a generic form in ICAO publications from 2016. More information can be found at www.fixm.aero.

2.5 The latest release of FIXM is version 3.0, with *Extension Releases* US v3.0 and EUROCONTROL A-CDM developed for local application. Version 4.0, including further developed 4D trajectory information modelling is expected to be released in 2016.

2.6 Version 3.0 FIXM does not include some concepts from the proposed Asia/Pacific Region ATFM Concept or ATFM terminology. It is proposed that ATFM/SG agrees that FIXM 3.0 should be the Regional ATFM data exchange model, with regional extension developed as required to include concepts specific to the Asia/Pacific Region. Version 4.0 should be adopted as the regional ATFM information exchange model upon its release, with further local extension as required.

Other ATFM Voice Communications

2.7 ATFM information may need to be shared by other communications media including dedicated voice communications channels, public telephone networks or AFTN.

2.8 The ATFM communications specified in the *Air Traffic Flow Management (ATFM) Communications Handbook for the Asia/Pacific Region* were included in the development of ICAO Doc 9971 – *Manual on Collaborative ATFM* Part II. The general form of phrases used for the coordination of ATFM messages between ATFM and ATC units is included in Doc 9971 Part II Section 8.6, and should be used by Asia/Pacific Region ANSPs.

2.9 Additional message formats for the transmission of ATFM instructions to pilots and aircraft operating agencies where web-based interfaces may not be available should also be agreed.

Asia/Pacific Regional ATFM Information Exchange

2.10 **Attachment A** provides a proposed draft of the following for consideration by ATFM/SG for the first stage of implementation:

- Minimum functional HMI requirement for web-based ATFM system communication interfaces;
- Phraseology for ATFM messages exchanged by voice between ATFM/ATC units and ATC units/pilots; and
- AFTN message formats for exchange of ATFM messages.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) agree to include FIXM version 3.0, and version 4.0 when available, as extended for Asia/Pacific Regional requirements, as the Regional ATFM information exchange model;

c) agree to use the minimum HMI requirements, ATFM message phraseology and AFTN message formats as the basis for regional ATFM communications and information sharing development; and

d) discuss any relevant matters as appropriate.

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1. Minimum Functional HMI Requirement for Web-based ATFM System Interfaces – Initial Implementation

ATFM Unit or Flow Management Position (FMP)					
Aircraft Identification	ADEP	RFIX	AFIX	ADES	(Significant Point)
	EOBT	**ETO**	**ETO**	**ELDT**	(Estimate)
	CTOT	**CTO**	**CTO**	**CLDT**	(ATFM Measures)
	ATOT	**ATO**	**ATO**	**ALDT**	(ATFM Monitoring)
- *All ATFM Measure fields are interactive at ATFMU/FMP.* - *All ATFM Monitoring fields are interactive unless automatically updated by ATM/Surveillance system information, or updated by ATC input.*					

ACC, AACC or TCU					
Aircraft Identification	ADEP	RFIX	AFIX	ADES	(Significant Point)
	EOBT	**ETO**	**ETO**	**ELDT**	(Estimate)
	CTOT	**CTO**	**CTO**	**CLDT**	(ATFM Measure)
	ATOT	**ATO**	**ATO**	**ALDT**	(ATFM monitoring)
- *ATFM Measure **CTO** fields are interactive* - *ATFM Monitoring Fields ATO are interactive, unless automatically updated by ATM/Surveillance system information.*					

ATC Tower				
Aircraft Identification	ADEP	AFIX	ADES	(Significant Point)
	EOBT	**ETO**	**ELDT**	(Estimate)
	CTOT	**CTO**	**CLDT**	(ATFM Measure)
	ATOT	**ATO**	**ALDT**	(ATFM monitoring)
- *ATFM Measure **CTOT** field is interactive* - *ATFM Monitoring Fields ATOT and ALDT are interactive, unless automatically updated by ATM/Surveillance system information.*				

ATC Tower, or ACC/AACC/TCU managing ATFM interface on behalf of Tower.					
Aircraft Identification	ADEP	RFIX	AFIX	ADES	(Significant Point)
	EOBT	**ETO**	**ETO**	**ELDT**	(Estimate)
	CTOT	**CTO**	**CTO**	**CLDT**	(ATFM Measure)
	ATOT	**ATO**	**ATO**	**ALDT**	(ATFM monitoring)
- *ATFM Measure fields **CTOT** and **CTO** are interactive.* - *ATFM Monitoring Fields **ATOT** and **ALDT** are interactive*					

Aircraft Operator					
Aircraft Identification	ADEP	AFIX	ADES		(Significant Point)
	EOBT	ETO	ELDT		(Estimate)
	COBT	**CTO**	**CLDT**	**CIBT**	(ATFM Measure)
	AOBT	**ATO**	**ALDT**	**AIBT**	(ATFM monitoring)
- *ATFM Monitoring Fields **AOBT** and **ALDT** are interactive*					

Notes:

- ATFM HMI for each flight should be automatically generated and amended at all ATFM HMI interfaces on receipt of inputs from:
  - FPL or other ICAO aircraft movement messages;
  - ATM automation and surveillance systems, including aircraft departure times, updated ETO and actual times at ATFM-significant points.

- Authorized inputs to ATFM Measure and ATFM Monitoring fields should automatically update the information in the ATFM network.

- The HMI should only provide the Significant Point ATFM Measure and ATFM Monitoring fields relevant to the operator, and only where related to ATFM and its direct interface with A-CDM.

- A-CDM system HMI requirements for aircraft operators and airport operators for the display and modification of SOBT, STOT should be separately defined.

- Significant point fields for ATFM Measures should be blank if no ATFM program applies to the flight.

- CTO at AFIX, and CLDT, should be harmonized with AMAN systems.

2. Delay Absorption Intent and Slot Swapping

Aircraft Operator – Delay Absorption Intent						
Aircraft Identification	ADEP	SOBT	TMI Delay	Gate Delay	Surface Delay	Airborne Delay
	[ADEP]	**[TIME]**	**[MINS]**	**[MINS]**	**[MINS]**	**[MINS]**
- *Gate Delay, Surface Delay and Airborne Delay fields are interactive.*						
- *The sum of Gate Delay, Surface Delay and Airborne Delay is always equal to TMI Delay*						

Aircraft Operator – Slot Swapping (SUB)				
Aircraft Identification	ADEP	ADES		(Significant Point)
	SOBT	**SLDT**	**SIBT**	(Schedule)
	COBT	**CLDT**	**CIBT**	(ATFM Measure)
Aircraft Identification	ADEP	ADES		(Significant Point)
	SOBT	**SLDT**	**SIBT**	(Schedule)
	COBT	**CLDT**	**CIBT**	(ATFM Measure)
- *CIBT field is interactive - may be swapped by the Aircraft operator*				
- *The ATFM system should recalculate all other times at significant points*				

3. Phraseology[1] for ATFM Messages Exchanged between ATFM and ATC Units, or ATC Units and Pilots

CTOT *(Slot Allocation Message - SAM)*

[AIRCRAFT IDENTIFICATION] SLOT [TIME]

CTOT Amendment *(Slot Revision Message - SRM)*

[AIRCRAFT IDENTIFICATION] REVISED SLOT [TIME]

CTOT Cancellation *(Slot Cancellation Message - SCM)*

[AIRCRAFT IDENTIFICATION] SLOT CANCELLED. REPORT READY.

Denial of Start-up/push-back when requested due too late to comply with CTOT

[AIRCRAFT IDENTIFICATION] UNABLE TO APPROVE START-UP/PUSH-BACK CLEARANCE DUE SLOT EXPIRED. REQUEST A NEW SLOT.

Denial of Start-up/push-back when requested due too early to comply with CTOT

[AIRCRAFT IDENTIFICATION] UNABLE TO APPROVE START-UP/PUSH-BACK CLEARANCE DUE SLOT [TIME]. REQUEST START-UP/PUSH-BACK AT [TIME].

CTO

[AIRCRAFT IDENTIFICATION] CROSS [WAYPOINT] AT [TIME][2]

4. AFTN Messages for CTOT[3]

Slot Allocation Message

SAM [AIRCRAFT IDENTIFICATION] [ADEP] [ADES] EOBT [TIME] CTOT [TIME]

SAM [AIRCRAFT IDENTIFICATION] [ADEP] [ADES] EOBT [TIME] CTO [WAYPOINT] [TIME]

Slot Revision Message

SRM [AIRCRAFT IDENTIFICATION] [ADEP] [ADES] EOBT [TIME] NEWCTOT [TIME]

[1] Source: ICAO Doc 7030 Regional Supplementary Procedures EUR 10.5
[2] Source: ICAO Doc 4444 PANS-ATM 12.3.2.8
[3] Flow Control Messages distributed by AFTN are defined in Doc 4444 as *Flight Safety Messages*. Format and data conventions for automated interchange of flow control messages have not yet been developed (Doc 4444 PANS-ATM 11.4.2.6.3)

Slot Requirement Cancellation Message

SLC [AIRCRAFT IDENTIFICATION] [ADEP] [ADES] EOBT [TIME] CNL CTOT

Notes: Flow Control Messages distributed by AFTN should be sent with the priority indicator FF, and addressed to the ATC tower at the departure aerodrome.

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