



INTERNATIONAL CIVIL AVIATION ORGANIZATION

THE THIRD MEETING OF THE AERODROMES OPERATIONS AND PLANNING – WORKING GROUP (AOP/WG/3)

Malaysia, 2 – 4 June 2015

Agenda Item 2: Review Outcome of Relevant Meetings
AIR TRAFFIC FLOW MANAGEMENT STEERING GROUP OUTCOMES ON AIRPORT COLLABORATIVE DECISION-MAKING

(Presented by the Secretariat)

SUMMARY

This paper presents introductory information on Collaborative Decision-Making (CDM) and Airport Collaborative Decision-Making (A-CDM), and reports relevant outcomes from the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG), in particular the Draft Asia/Pacific Regional Framework for Collaborative ATFM and its provisions relating to Airport Collaborative Decision-Making.

This paper relates to –

Strategic Objectives:

- A: **Safety** – Enhance global civil aviation safety
- B: **Air Navigation Capacity and Efficiency** – Increase Capacity and improve efficiency of the global civil aviation system
- E: **Environmental Protection** – Minimize the adverse environmental effects of civil aviation activities

1. INTRODUCTION

1.1 The Air Traffic Flow Management Steering Group (ATFM/SG) was formed by APANPIRG/20 (September 2009) to prepare a Regional ATFM Concept of Operations, which was completed at its first meeting. The Steering Group was re-convened by APANPIRG/24 (June 2013) under the following Conclusion:

Conclusion 24/15: Asia/Pacific ATFM Steering Group

That, States participate in, and support the Asia/Pacific ATFM Steering Group to develop a common Regional ATFM framework, which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific Region.

1.2 Following its reconvention ATFM/SG has held 4 meetings, the most recent being ATFM/SG/5 held from 30 March to 3 April 2015. The final draft version of the *Regional Framework for Collaborative ATFM* (the Framework) was agreed at ATFM/SG/5, and will be presented for endorsement by ATFM/SG/3 in August 2015 before then being presented to APANPIRG/26 in September for adoption.

1.3 The Framework includes a number of items of interest to AOP/WG, most importantly those related to the harmonized, interoperable exchange of ATFM and related A-CDM information.

2. DISCUSSION

Collaborative Decision Making

2.1 Collaborative Decision-Making (CDM) is described in ICAO Doc 9971 *Manual on Collaborative Air Traffic Flow Management Part 1 – Collaborative Decision-Making (CDM)* as a process focused on how to decide on a course of action articulated between two or more community members. It is further described as follows:

CDM is a process applied to support other activities such as demand/capacity balancing. CDM can be applied across the timeline of activities from strategic planning (e.g. infrastructure investments) to real-time operations. CDM is not an objective but a way to reach the performance objectives of the processes it supports. These performance objectives are expected to be agreed upon collaboratively. Since implementing CDM likely will require investments, these will need to be justified in accordance with the performance-based approach.

Although information-sharing is an important enabler for CDM, the sharing of information is not sufficient to realize CDM and the objectives of CDM.

CDM also requires pre-defined and agreed upon procedures and rules to ensure that collaborative decisions are made expeditiously and equitably.

CDM ensures decisions are taken transparently based on the best information available as provided by the participants in a timely and accurate manner.

2.2 Examples of present-day CDM processes include:

1. airport and surface CDM;
2. network operations planning;
3. coordination of airspace use;
4. CDM under adverse weather;
5. special traffic management programmes and security; and
6. use of collaborative working groups and tools.

2.3 Doc 9971 provides detailed information on CDM. Additional information including the role of CDM in the global air traffic management operational concept, areas requiring collaboration, guidelines for collaboration on strategic planning decisions and an information-sharing approach to support it is provided in the following ICAO documents:

- a) Doc 9854 – Global Air Traffic Management Operational Concept;
- b) Doc 9882 – Manual on Air Traffic Management System Requirements;
- c) Doc 9883 – Manual on Global Performance of the Air Navigation System Parts I and II; and
- d) Doc 9965 – Manual on Flight and Flow – Information for a Collaborative Environment (FF-ICE).

Airport Collaborative Decision-Making

2.4 The specific application of CDM to airports is known as Airport-CDM (A-CDM).

2.5 A-CDM aims to improve the sharing of information between A-CDM partners and to pre-define procedures and rules for collaboration. It is an enabler of Air Traffic Flow Management (ATFM) at airports, reducing delays, improving the predictability of events and optimizing the utilization of resources. Decision-making by A-CDM partners is facilitated by the sharing of accurate and timely information and by adapted procedures, mechanisms and tools. Pre-defined procedures and rules, agreed between the A-CDM partners, describe how decisions will be taken in order to assure efficient operations and equity between the interests of the partners.

2.6 A-CDM partners include ATFM units, Air Traffic Control (ATC), airlines, ground-handling agents and airport operators.

2.7 A-CDM is being progressively implemented in some Asia/Pacific Region airports. Several non-ICAO workshops have been conducted with the support of IATA, based on the EUROCONTROL A-CDM Manual.

2.8 The ICAO Aerodrome Design and Operations Panel (ADOP, formerly the Aerodromes Panel), at its meeting in February 2015 formed a working group comprising China, USA, ACI, CANSO, EUROCONTROL and IATA to develop ICAO A-CDM guidance material. It has been envisaged that this guidance material may form Part III of Doc 9971, but this has yet to be agreed.

Asia/Pacific Region Seamless ATM Plan

2.9 The Asia/Pacific Seamless ATM Plan, adopted by the 24th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/24, June 2013), includes within its performance improvement plan the following A-CDM-related performance objective:

Preferred Aerodrome/Airspace and Route Specifications (PARS) Phase 1 (Expected implementation by 12 November 2015)

7.1 All high density aerodromes should operate an A-CDM system serving the Major Traffic Flows and busiest city pairs, with priority implementation for the busiest Asia/Pacific aerodromes (ASBU Priority 2)¹.

(Note: Major Traffic Flows – MTF – were previously defined in ICAO Doc 9750 – Global Air Navigation Plan. They are currently being updated, and will be incorporated in the Asia and Pacific Regions Air Navigation Plan)

Draft Regional Framework for Collaborative ATFM

¹ Based on 2012 ICAO data, the 21 busiest Asia/Pacific aerodromes were:

- Australia (Sydney, Melbourne);
- China (Beijing, Shanghai Pudong and Hong Jiao, Guangzhou, Hong Kong, Xi'an, Shenzhen, Chengdu, Kunming);
- India (New Delhi, Mumbai);
- Indonesia (Jakarta);
- Japan (Haneda, Narita);
- Malaysia (Kuala Lumpur);
- Philippines (Manila);
- Republic of Korea (Incheon);
- Singapore (Changi); and
- Thailand (Suvarnabhumi).

2.10 ATFM/SG recognized that a key consideration in the development of the Framework was the interoperability of systems, procedures and practices to ensure not only regionally harmonized ATFM, but also the effective, complementary operation of other systems forming part of the gate-to-gate chain of air traffic management. It is vital that all systems and processes use common information, terminology and communications protocols to ensure common understanding and optimal outcomes. In particular, the interoperability of ATFM, A-CDM, Arrival Manager (AMAN) and Departure Manager (DMAN) systems, and airspace user and ATM automation system interfaces, is critical to the success of a regional ATFM program and the optimized use of available airspace and airport capacity.

2.11 ATFM/SG recognized the lack of a current, globally standardized ATFM terminology. It was noted that the Global development of ATFM has largely been undertaken in isolation by individual ANSPs, EUROCONTROL, ICAO Sub-Regions or other informal groups of States, or by ATFM system vendors. This has resulted in differences in concept development and in the technical terms used for operational and technical coordination of ATFM information. ATFM/SG addressed these issues in the development of harmonized ATFM terminology and the specification of ATFM information exchange models.

2.12 In developing an agreed regional terminology those used by States and organizations advanced in ATFM implementation, both within and external to the Asia/Pacific Region, were considered. The Framework consequently includes a standardized ATFM terminology and establishes an agreed information exchange model for the Asia/Pacific Region to promote harmonization and interoperability of CDM/ATFM systems and procedures. The terms and definitions were drawn from those used by Australia, Canada, EUROCONTROL, Japan, South Africa and USA, and those in the *Flight Information Exchange Model* (FIXM¹) data dictionary.

2.13 The agreed Asia/Pacific Region ATFM terminology and phraseology for use in ATFM communications is provided at **Attachment 1**. The attention of AOP/WG is drawn to the terms that relate directly to airport operations. A terminology map is provided in the attachment, with the terminology organized according to phase-of-flight.

2.14 In alignment with and, where necessary expanding upon the performance objectives of the Seamless ATM Plan, the Framework's Performance Improvement Plan includes the following performance objectives relating to A-CDM:

¹ 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. FIXM is a data interchange format for sharing information about flights throughout their lifecycle. More information is available at www.fixm.aero.

REGIONAL ATFM CAPABILITY PHASE IB

Expected implementation by 25 May 2017

7.17 ATFM, AMAN/DMAN and A-CDM systems should be integrated through the use of common fixes, terminology and communications protocols to ensure complementary operations.

FIXM version 3.0 or later, extended where necessary is the agreed format for exchange of ATFM information in the Asia/Pacific Region.

Where full ATFM network communications capability is not yet established, ATFM messages conforming to ADEXP version 3.1 may be used for distribution of ATFM measures.

REGIONAL ATFM CAPABILITY PHASE II

Expected implementation by 08 November 2018

7.29 Full interoperability of cross border ATFM, A-CDM, AMAN, DMAN, ATM automation and airspace user systems should be implemented, utilizing FIXM 3.0 (or later) , to provide seamless gate-to-gate collaborative ATFM operations.

2.15 The ATFM terminology developed by the Asia/Pacific Region was presented to the Global ATFM Conference held in Cancun, Mexico, in November 2014, and is expected to be included in the further development of ICAO global ATFM and A-CDM guidance material.

2.16 The final draft version of the Asia/Pacific Regional Framework for Collaborative ATFM is currently included as an appendix to the final report of ATFM/SG/5. It may be viewed on the ICAO Asia/Pacific Regional Office website at:

<http://www.icao.int/APAC/Meetings/Pages/2015-ATFM-SG5.aspx>.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Note the terminology, communication protocols and ATFM phraseology developed by ATFM/SG; and
- b) Support and promote the terminology, and FIXM version 3.0 or later, as the standard for use in A-CDM interfaces with ATFM, AMAN and DMAN systems and procedures in the Asia/Pacific Region.

.....

ATTACHMENT 1: ATFM TERMINOLOGY AND COMMUNICATIONS

ATFM Terminology - General

Acronym	Term	Definition
AAR	Airport Acceptance Rate	Arrival capacity of an airport normally expressed in movements per hour
ADR	Airport Departure Rate	Departure Capacity of an airport normally expressed in movements per hour
ASD	Aircraft Situation Display	ATC Aircraft/Traffic Situation Display
AFIX	Arrival Fix	A waypoint during the arrival phase of a flight. In the context of ATFM it could a waypoint where an ATFM Measure may be applied
CDM	Collaborative Decision-Making	Process which allows decisions to be taken by amalgamating all pertinent and accurate sources of information, ensuring that the data best reflects the situation as known, and ensuring that all concerned stakeholders are given the opportunity to influence the decision. This in turn enables decisions to best meet the operational requirements of all concerned.
CDR	Conditional Route	ATS route that is available for flight planning and use under specific conditions
DFIX	Departure Fix	The first published fix/waypoint used after departure of a flight.
DMAN	Departure Manager	A planning system to improve the departure flows at an airport by calculating the Target Take-Off Time (TTOT) and Target Startup Approval Time (TSAT) for each flight, taking multiple constraints and preferences into account
FCA	Flow Constrained Area	An sector of airspace where normal flows of traffic are constrained, which could be caused by weather, military exercise etc.
FMP	Flow Management Position	A position in any ATCC that monitors traffic flows and implements or requests ATFM measures to be implemented"

AOP/WG/3–WP/14
ATTACHMENT 1

Acronym	Term	Definition
GDP	Ground Delay Program	ATFM process where aircraft are held on the ground in order to manage capacity and demand in a specific volume of airspace or at a specific airport. In the process departure times are assigned and correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport
GS	Ground Stop	A tactical ATFM measure where some selected aircraft remain on the ground
MINIT	Minutes in Trail	A tactical ATFM measure expressed as the number of minutes required between successive aircraft. It is normally used in airspace without air traffic surveillance or when transitioning from surveillance to non-surveillance airspace, or even when the spacing interval is such that it would be difficult for a sector controller to measure it in terms of miles
MIT	Miles in Trail	A tactical ATFM measure expressed as the number of miles required between aircraft (in addition to the minimum longitudinal requirements) to meet a specific criterion which may be separation, airport, fix, altitude, sector or route specific. MIT is used to organize traffic into manageable flows as well as to provide space to accommodate additional traffic (merging or departing) in the existing traffic flows. It will never be less than the separation minima.
RFIX	En-route Fix	A waypoint during the en-route phase of a flight. In the context of ATFM it could a waypoint where an ATFM Measure may be applied
SUB	Slot Swapping	The ability to swap departure slots gives AUs the possibility to change the order of flight departures that should fly in a constrained area
-	ATFM Measure	ATFM Measure which will balance demand against capacity or assist in the safe expeditious flow of traffic

ATFM Terminology – Phase of Flight

Acronym	Term	Definition
SOBT	Scheduled off Block Time	The time that an aircraft is scheduled to depart from the parking position
EOBT	Estimated Off Block Time	The estimated time that an aircraft will start movement associated with departure
TOBT	Target Off - Block Time	The time that an aircraft Operator or Ground handler estimates that an aircraft will be ready to startup/pushback immediately upon reception of clearance from the tower.
TSAT	Target Start Up Approval Time	The time provided by ATC taking into account TOBT, CTOT and/or the traffic situation that an aircraft can expect start up/push back approval
COBT	Calculated Off Block Time	A time calculated and issued by ATFM Unit, as a result of tactical slot allocation, at which a flight is expected to pushes back / vacates parking position so as to meet a CTOT taking into account start and taxi time.
AOBT	Actual Off Block Time	The time the aircraft pushes back / vacates parking position (Equivalent to Airline / Handlers ATD – Actual Time of Departure & ACARS=OUT)
STOT	Scheduled Take Off Time	The estimated take off time derived from an aircraft operators schedule, typically based on a standard taxi-out time
PTOT	Planned Take Off Time	Time aircraft is expected to take off derived from the flight plan.
TTOT	Target Take Off Time	The Target Take off Time taking into account the TOBT/TSAT plus Estimated Taxi-Out Time
CTOT	Calculated Take off Time	A time calculated and issued by ATFM Unit, as a result of tactical slot allocation, at which a flight is expected become airborne
ETOT	Estimated Take Off Time	The Estimated take off time taking into account EOBT plus Estimated Taxi-Out Time
ATOT	Actual Take Off time	The time that an aircraft takes off from the runway (Equivalent to ATC ATD–Actual Time of Departure, ACARS = OFF)
SEET	Scheduled Estimated En-route Time	The estimated elapsed time of a flight derived from the aircraft operators schedule

AOP/WG/3–WP/14
ATTACHMENT 1

Acronym	Term	Definition
ETO	Estimated Time Over	Estimated time at which an aircraft would be over a fix, waypoint or particular location typically where air traffic congestion is expected
CTO	Calculated Time Over	Time calculated and issued by ATFM Unit, as a result of tactical slot allocation, at which flight is expected to be over a fix, waypoint or particular location typically where air traffic congestion is expected (referred to in FIXM 2.0 as "Airspace Entry Time - Controlled")
PLDT	Planned Landing Time	The expected landing time of a flight derived from the flight plan
SLDT	Scheduled Landing Time	Scheduled time aircraft is expected to land on a runway, typically based on Scheduled In-Block Time (SIBT) and a standard taxi-in time
TLDT	Target Landing Time	Targeted Time from the Arrival Management process at the Threshold, taking runway sequence and constraints into account; Progressively refined planning time used to coordinate between arrival and departure management processes
CLDT	Calculated Landing Time	A landing time calculated and issued by ATFM unit, as a result of tactical slot allocation at which a flight is expected to land on a runway
ELDT	Estimated Landing Time	The estimated time that an aircraft will touch-down on the runway (equivalent to ETA)
ALDT	Actual Landing Time	Actual time an aircraft lands on a runway (Equivalent to ATC ATA –Actual Time of Arrival = landing, ACARS=ON)
SIBT	Scheduled In Block Time	The Time that an aircraft is scheduled to arrive at its first parking position.
CIBT	Calculated In Block Time	An in block time calculated and issued by ATFM unit, as a result of tactical slot allocation at which a flight is expected to be at its first parking position.
AIBT	Actual in block time	The time that an aircraft arrives in-blocks (Equivalent to Airline/Handler ATA –Actual Time of Arrival, ACARS = IN)

ATFM Terminology Map

Phase of Flight	Scheduled	Flight Plan	Target (Airline)	Target (ANSP)	ATFM Measure	Estimated	Actual
Off-Block Time (OBT)	SOBT	EOBT	TOBT	TSAT	COBT		AOBT
Take-Off Time (TOT)	STOT			TTOT	CTOT	ETOT	ATOT
Time Over (TO)					CTO	ETO	ATO
Landing Time (LDT)	SLDT			TLDT	CLDT	ELDT	ALDT
In-Block Time (IBT)	SIBT				CIBT		AIBT

ATFM Phraseology

Note: The following phrases are suggested for use as an interim procedure, pending the development of globally standardized ATFM –related phraseology

Circumstance	Phraseology
Calculated take-off time (CTOT) delivery resulting from a slot allocation. The CTOT shall be communicated to the pilot at the first contact with ATC.	SLOT (<i>time</i>)
Change to CTOT resulting from a Slot Revision.	REVISED SLOT (<i>time</i>)
CTOT cancellation resulting from a Slot Cancellation	SLOT CANCELLED, REPORT READY
Flight suspension until further notice.	FLIGHT SUSPENDED UNTIL FURTHER NOTICE, DUE (<i>reason</i>)
Flight de-suspension.	SUSPENSION CANCELLED, REPORT READY
Start-up requested too late to comply with the given CTOT.	SLOT EXPIRED, REQUEST A NEW SLOT
Denial of-Start-up when requested too late to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE SLOT EXPIRED, REQUEST A NEW SLOT
Start-up requested too early to comply with the given CTOT.	REQUEST A NEW SLOT

AOP/WG/3-WP/14
ATTACHMENT 1

Circumstance	Phraseology
Denial of Start-up when requested too early to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE SLOT (<i>time</i>), REQUEST START-UP AT (<i>time</i>)

.....