International Civil Aviation Organization

The Second Meeting of the APANPIRG ATM Sub-Group (ATM /SG/2)

Hong Kong, China, 4-8 August 2014

Agenda Item 4: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

AIR TRAFFIC FLOW MANAGEMENT STEERING GROUP OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of the Second and Third Meetings of the Air Traffic Flow Management Steering Group (ATFM/SG/2 and ATFM/SG/3), which were respectively held in Hong Kong, China, from 1 to 4 October 2013, in conjunction with an Air Traffic Flow Management Seminar, and in Singapore from 10 to 14 March 2014.

1. INTRODUCTION

1.1 The Air Traffic Flow Management Seminar and ATFM/SG/2 were attended by 69 participants from Australia, Bangladesh, China, Germany, Hong Kong China, India, Indonesia, Japan, Malaysia, Maldives, Nepal, New Zealand, Philippines, Singapore, Thailand, United States, Viet Nam, CANSO, EUROCONTROL, IATA, ICCAIA, IFATCA and ICAO. 15 working papers and 6 information papers were considered by the meeting.

1.2 ATFM/SG/3 was attended by 66 participants from Australia, Bangladesh, China, Hong Kong China, India, Indonesia, Japan, Malaysia, Nepal, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam, ACI, CANSO, IATA, IFATCA and ICAO. The meeting considered 15 working papers and 11 information papers.

2. DISCUSSION

ATFM-Related Outcomes from APANPIRG/24

2.1 APANPIRG/24, held in Bangkok, Thailand, from 24 to 26 June 2013, adopted the following Conclusions relating to ATFM:

Conclusion 24/13: Air Traffic Flow Management Capacity Assessments

That States be urged to establish capacity assessment and adjustment mechanisms, and regular review for all aerodromes and ATC sectors where traffic demand is expected to reach capacity, or is experiencing traffic congestion, and to report the assessment outcomes to the Asia/Pacific Regional Office prior to 1 May 2014.

Conclusion 24/14: Air Traffic Flow Management Information Sharing

That States, where ATFM processes are in place, including within adjacent airspace, be urged to share information, which may include:

a) capacity assessment: including factors of interest affecting capacity, such as special use airspace status, runway closures and weather information;

b) traffic demand information: which may include flight schedules, flight plan, repetitive flight plan data as well as associated surveillance updates of flight status; and

c) ATFM Daily Plan.

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.

Other Related Meeting Outcomes

2.2 The 3rd Meeting of the Regional ATM Contingency Plan Task Force (RACP/TF/3, Bangkok, Thailand, 12 to 15 November 2013) noted that, unlike the cases of North America and Europe, the Asia/Pacific Region did not have the benefit of a networked ATFM capability that would help to manage contingency events. It was further noted that with respect Large Scale Weather Deviations (LSWD) the (then) tripartite agreement between Hong Kong China, Singapore and Thailand should include appropriate CDM/ATFM measures to ensure maximum utilization of airport and en-route capacity.

2.3 RACP/TF/3 had considered the work being undertaken by the ATFM/SG, which was expected to lead to a networked ATFM solution for the Region, and agreed that the establishment of a linkage between the Regional ATM Contingency Plan and the Regional Framework for Collaborative ATFM should be further explored.

2.4 The Third Meeting of the Meteorological Requirements Task Force (MET/R TF/3), held in Bangkok, Thailand, from 26 to 29 November 2013 had noted the outcomes from ATFM/SG/2, including the proposed revised Terms of Reference (ToR) that included consideration of factors affecting capacity such as weather information, and also noted a number of early draft elements of the ATFM framework that would require MET support.

2.5 MET/R TF was of the view that current and future developments in the provisions for aeronautical meteorological information exchange should support interoperability and noted that any future exchange of meteorological information in addition to OPMET defined in Annex 3, and yet to be defined within the Regional ATFM framework, would also need standardization to support interoperability.

2.6 MET/R TF/3 also recalled that a number of States were developing or had developed customized MET products beyond the current scope of ICAO provisions, to support terminal area and ATFM operations. The 2010 regional survey of ATFM requirements for MET services/products was recalled, and the meeting agreed that a similar survey could be conducted to determine what MET products and tailored MET services were being provided to ANSPs. MET/R TF/3 agreed to a work programme addressing *inter alia* Regional ATM requirements for MET information, sub-regional exchange of MET information, integration of MET information into ATS/aircraft operator decision support tools, Meteorological Services for the Terminal Area (MSTA) and related Annex 3 developments, and a regional implementation plan for MSTA.

2.7 MET/R TF/3 acknowledged that there was benefit in formalizing a link between MET/R TF and ATFM/SG, and subsequently agreed to a revision of MET/R TF Terms of Reference for this purpose.

ASEAN AATIP Approach to ATFM

2.8 EUROCONTROL provided ATFM/SG/2 with a summary of the proposed approach of the Association of South East Asian Nations (ASEAN) Air Transport Integration Project (AATIP) in the domain of ATFM.

2.9 AATIP is a project funded by the European Union to support ASEAN in the creation of an aviation single market. The project was implemented by the European Aviation Safety Agency (EASA), through a consortium with EUROCONTROL, the United Kingdom Civil Aviation Authority and the Directorate General of Civil Aviation of France. Air Traffic Management (ATM) was one of 4 work packages. The main elements of the ATM domain are illustrated in **Figure 1**.

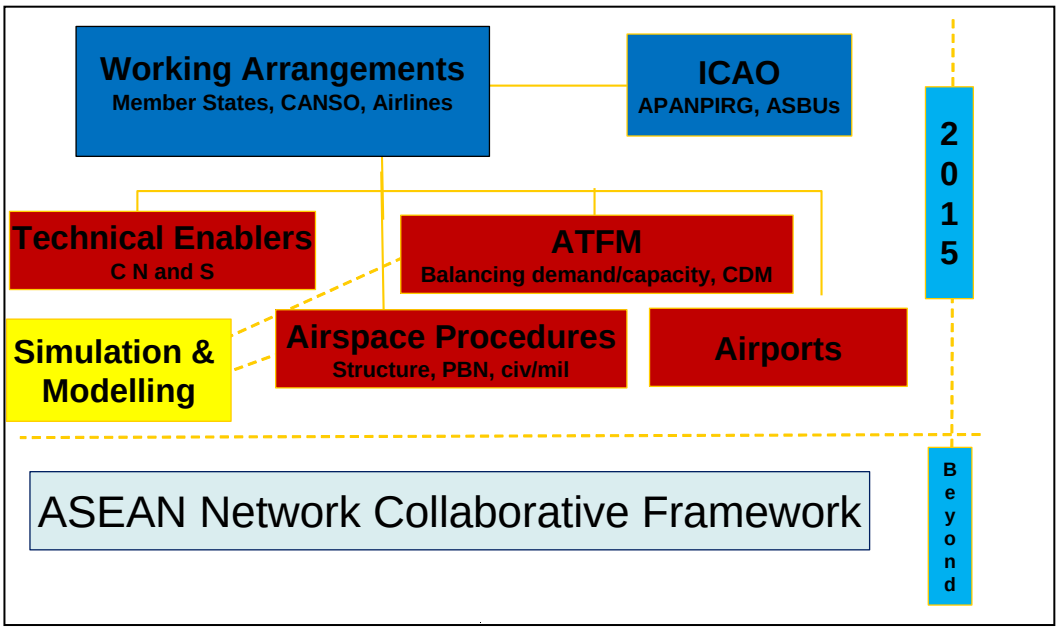

Figure 2: AAITIP ATFM Domain Elements

2.10 A workshop of experts from ASEAN member States agreed that AATIP would take the lead in the development of an ASEAN concept of operations for ATFM. Such developments would build on the ICAO ATFM guidance document (Doc 9971), and would take into consideration the on-going developments in the area such as the ATFM/CDM tri-partite initiative.

2.11 An important enabler for a functioning ATFM was the development of correct capacity baselines. This was a major element of the AATIP ATM work program and it was intended to acquire a functioning simulation and modelling capability for the ASEAN area.

2.12 ATFM/SG was informed that an implementation objective date of 2015 was established by ASEAN Ministers to maintain pressure for forward movement, and to reaffirm their intent. ATFM initiatives under AATIP would be progressed during that time, but a more realistic expectation for complete implementation was 2017 – 2020.

2.13 ATFM/SG/3 was provided with a report on discussions at the AATIP Cross-Border ATFM Workshop, which had the objectives of developing a common understanding of the requirements for cross-border ATFM in the ASEAN area and discussing priorities for the development of initial ATFM requirements including operational concept, training, pre-ATFM CDM processes, information exchange protocols and inter-organizational agreements. The workshop had concluded that AATIP would put forward clear proposals on the various issues discussed, and would provide them to ICAO as input to the development of the Regional Framework for Collaborative ATFM.

Sub-Regional Air Traffic Flow Management and IATA ATFM Study

2.14 IATA and CANSO presented a proposal to the ATFM/SG/2 meeting that the goal for the ATFM/SG should be a collaborative flow management function with distributed authority across the airspace and FIRs associated with the region's major traffic flows (MTF).

2.15 IATA was prepared to support and commission a study by external subject matter expert(s) to establish a baseline of current ATFM capabilities and future plans, and then develop a possible implementation strategy for further consideration by ATFM/SG and States.

2.16 Subsequent discussion by the meeting recognized the necessity of ensuring the alignment of the different multi-State ATFM projects and the regional ATFM framework. The meeting supported the initiative, and agreed to the following Decision:

Decision ATFM/SG/2-2: Asia/Pacific Region ATFM Study

That, the APAC ATFM SG agrees to support a project to be funded by IATA which will, for consideration by the ATFM Steering Group and States:

1. *collate current and planned ATFM initiatives in order to establish a regional baseline view of ATFM capability and interoperability, commencing in the 1st quarter of 2014; and, based on this information*

2. *develop recommended implementation strategies for collaborative Regional and sub-Regional ATFM;*

ATFM Specialist Team

2.17 In order to progress the work of the ATFM/SG it was necessary to form a small team ATFM experts, primarily from an operational ATM and ATFM background but also including industry representation, and having access to technical/engineering advice on network communications technology and applications. The primary task of this team is the initial drafting of the ATFM framework and on-going, between-meetings development of its Principles, Capability Elements and Preferred ATFM Service Categories before wider circulation to the Steering Group. In parallel to this work the team would also develop the Interim Regional Framework for Collaborative ATFM.

2.18 ATFM/SG agreed to the following Decision:

Decision ATFM/SG/2- 3: ATFM Specialist Team

That, ATFM/SG forms a team of experienced ATM/ATFM specialists and other stakeholders, communicating by electronic means and, where necessary, holding ad-hoc

meetings, to draft, develop and circulate with the coordination and guidance of the Secretariat:

i) the Interim Framework for Collaborative ATFM, in final draft for consideration by APANPIRG/25; and

ii) the Asia Pacific Regional Framework for Collaborative ATFM

Concept Development for a Distributed Multi-Nodal ATFM Network for the Region

2.19 Hong Kong China, Singapore and Thailand initiated a collaborative effort to develop a concept of ATFM based on Collaborative Decision Making (CDM) through sub-regional cooperation, and involving the development of a distributed regional ATFM network. Unlike ATFM solutions based on centralised systems such as those found in Europe and North America, the concept was for a distributed multi-nodal ATFM network of interconnected ATFM nodes residing within individual ANSPs, forming a larger virtual ATFM platform for the sub-region or region.

2.20 The concept involved each ANSP operating an independent, virtual CDM/ATFM node supported by an interconnected information sharing framework. Airport-CDM (A-CDM) mechanisms, especially at busy airports could aid the CDM process between the ANSPs, and flows of air traffic would be managed effectively based on a common set of agreed principles among the participating ANSPs and airports.

2.21 In the initial concept a node comprising an ANSP with associated airports within a defined catchment area would manage the demand and capacity through adjustments in aircraft Target Landing Times (TLDT) which would in turn influence the issuance of Calculated Takeoff Times (CTOT) for aircraft at the participating airports within that catchment area. The resulting coordination would further enable the assignment of Target Start-up Approval Times (TSAT) for aircraft with the aid of A-CDM. The relevant information would in turn be shared with other participating nodes in the network. When replicated among similar combinations of ANSPs and airports in defined catchment areas the result would be a larger network, eventually connecting each sub-Region with other ATFM nodes beyond, as illustrated in **Figure 1**.

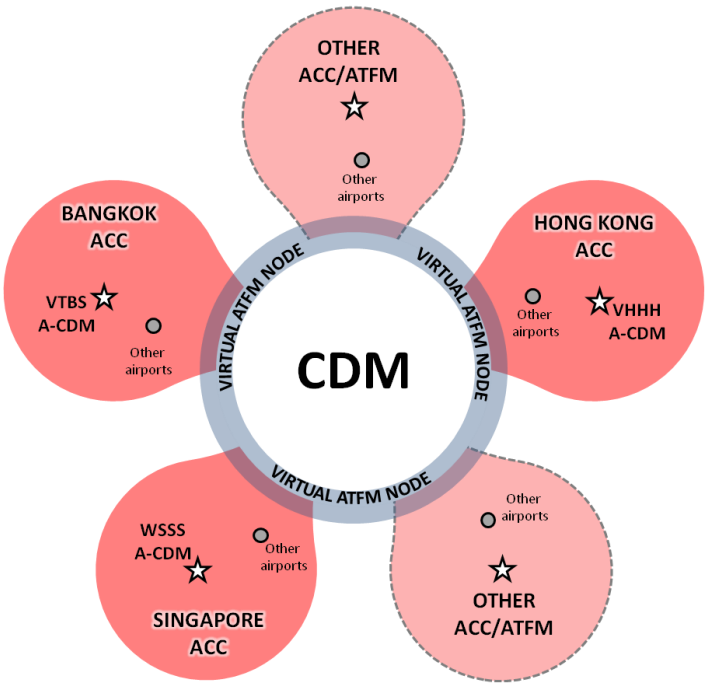

Figure 1: Distributed Multi-Nodal ATFM Network

2.22 The concept has been further developed, the number of participating States has broadened to include Australia, China, Indonesia, Malaysia and Vietnam, and trials are planned. Further information on the concept trial is provided in WP/10, submitted by the participating States.

2.23 A significant further developments of the concept is the according to airspace users of greater flexibility to manage delays through collaboration and negotiation with ANSPs and airport operators.

2.24 ATFM/SG recognized the concept as viable and adaptable for the region, and agreed that the elements captured in the concept should be considered for inclusion in the regional ATFM framework. The following Decisions were agreed:

Decision ATFM/SG/3-1Decision 3/1: Distributed Multi-Nodal Networked ATFM Concept

That, the distributed multi-nodal networked ATFM concept be considered as a viable foundation to be incorporated into the regional ATFM framework for the development and implementation of ATFM for the Asia/Pacific Region, taking into account the guidance of ICAO Doc 9971.

Decision ATFM/SG/3-2: Interoperability of Existing and Future ATFM Capabilities

That, recognizing that the region is in the early stages of ATFM development, the regional ATFM framework will foster the harmonization of the development of various ATFM concepts to ensure cross-border interoperability of existing and future ATFM capabilities in the Asia/Pacific region.

Decision ATFM/SG/3-3: Suitability, Interoperability and Alignment of ATFM Concepts

That, the ATFM Steering Group takes into consideration the diverse ATFM needs of States and other stakeholders in the Asia/Pacific region in developing the regional ATFM framework which takes into account suitability, interoperability and alignment with various concepts in the Asia/Pacific and other regions.

.North Asia Regional ATFM Harmonization Group (NARAHG)

2.25 China, Japan and the Republic of Korea had agreed to the establishment of the North Asia Regional ATFM Harmonization Group (NARAHG), and had requested the support of the ICAO Asia/Pacific Regional Sub-Office (RSO) to serve as facilitator to the group and coordinate progress meetings, which would be hosted by the States involved. The group aims to develop harmonized technical and operational communications protocols and procedures in accordance with ICAO Doc 9971 and the regional ATFM framework.

Regional Framework for Collaborative ATFM

2.26 The Secretariat proposed a work plan and methodology to develop the Asia/Pacific Region Framework for Collaborative Air Traffic Flow Management, as was required by APANPIRG **Conclusion 24/15.** It was envisaged that the Regional Collaborative ATFM Framework would be contributory to the Seamless ATM Plan.

2.27 The need for a regional framework to guide ATFM implementation to manage the rapid growth of Asia/Pacific Region traffic indicated that an aggressive timeline should be pursued. It was proposed the regional ATFM framework be developed over the course of three further meetings, held at intervals of approximately five or six months. It was envisaged that the final draft of the Regional Framework for Collaborative ATFM would be produced by ATFM/SG/5 in early-to-mid 2015, for submission to APANPIRG/26 in September 2015, through ATM/SG/3.

2.28 The structure and format of the draft Regional Framework for Collaborative ATFM document are aligned with those of the Seamless ATM Plan. An early draft of the Framework structure is provided at **Attachment A.**

2.29 Key concepts under consideration and/or development include:

- *Regional ATFM Principles* based on those of the Seamless ATM Plan, the Asia/Pacific Region ATFM Concept of Operations and ICAO Doc 9971 – Manual on Collaborative Air Traffic Flow Management. ATFM/SG will define sufficient principles to ensure the completeness of the framework document while avoiding, where practicable, duplication of principles already stated in related higher level documents or in global guidance;

- *ATFM Capability Elements*, being a suite of tools, procedures and practices to flexibly and efficiently manage demand. In discussing capability elements ATFM/SG noted that the delineation between the three phases of ATFM – Strategic, Pre-Tactical and Tactical – was not well defined. The phases should best be defined by their outcomes, rather than a rigid definition of the times or the particular pre-flight or in-flight stages to which they would apply;

- *Preferred ATFM Service Categories*, defining categories of airspace sector within which a minimum set of ATFM capability elements should be provided. Such categories should be determined by traffic density and airspace complexity, where complexity measurement includes such factors as traffic mix (IFR and VFR traffic, jet v non-jet, military activity, general aviation activity), airspace constraints, environmental factors, meteorological factors, etc.

  It was noted that several States did not consider such a concept in their operations as ATFM was considered to be an organization-wide function. Other States, however, were of the view that with refinement the concept could assist Asia/Pacific Region States to define and prioritize their implementation of ATFM services, and could include capacity assessment processes to better define an ATFM service category for the airspace being considered;

- *Functional Airspace Blocks*, being contiguous sectors of airspace of the same category of preferred ATFM service, sharing common ATFM procedures and processes, with CDM/ATFM decisions and coordination provided from a common ATFM Unit, Centre or Virtual Centre (distributed network). This concept was the subject of considerable discussion, and may be either further developed at a later stage, or dropped; and

- *Capacity Enhancement Initiatives*, including such considerations as route structure enhancements, civil-military ATM coordination, electronic hand-offs, elimination of paper flight progress strips, dynamic sector configuration, DMAN and AMAN and ATFM automation support. It was noted that in some cases ATFM was seen to be an excuse for not increasing capacity. The principle that the first step towards managing demand is to increase capacity has been included in the framework.

2.30 A suite of Appendices to the Draft Framework are under consideration and development, including *ATFM Principles, Airport and Airspace Capacity Assessment, Airport and Airspace Capacity Improvement, Service Categories and Capability Elements, Competencies for ATFM and ATC personnel, Training Requirements* and *ATS Route Considerations for ATFM*.

Interim Asia/Pacific Regional Framework for Collaborative ATFM

2.31 ATFM/SG/2 agreed that, given the time required for development of the regional ATFM framework, there was also the need to develop within a shorter timeframe guidance material for the implementation of interim ATFM procedures, particularly in cases where little or no organized or targeted ATFM was currently in place. Development of interim regional guidance for ATFM would not only provide earlier benefit to airspace users, but would also provide States having little experience in ATFM the opportunity to gain knowledge and experience before embarking on the more detailed implementation that would be driven by the broader ATFM framework.

2.32 The Interim Asia/Pacific Regional Framework for Collaborative ATFM would be primarily based on the guidance provided in ICAO Doc 9971 - *Manual on Collaborative Air Traffic Flow Management*. The guidance material developed could later be included in or appended to the regional collaborative ATFM framework, where appropriate.

2.33 Further work is required to finalize the draft Interim Framework. Work is currently being undertaken by the Secretariat with support from the Specialist Team. It is proposed that the final draft of the document should be presented to APANPIRG/25 for endorsement after review by the broader Steering Group and the Chairs of ATFM/SG and ATM/SG.

ATFM Messages, Terminology and Network Interoperability

2.34 Global development of ATFM had largely been undertaken in isolation by individual States, EUROCONTROL, ICAO Sub-Regions or other informal groups of States, or by ATFM system vendors. This had resulted in differences in concept development and in the technical terms used for operational and technical coordination of ATFM information. CANSO advised that lack of a standard set of terminologies was a global issue of concern that had been raised at every ATFM Global Conference held in the last 12 years.

2.35 The development of the Asia/Pacific Regional Framework for Collaborative ATFM provided the opportunity to also develop a standardized set of terminologies, messages and message formats and communications protocols necessary for collaborative ATFM. The first step in this process was agreement on a set of ATFM terminologies. By agreeing to an appropriate set of ATFM terminologies and messages for the Asia/Pacific Region the ATFM/SG had the opportunity to also influence the global interoperability of ATFM/CDM.

2.36 Led by CANSO, a small group of participating States (India, Japan, Singapore and Thailand) agreed to work offline to develop a list of ATFM terminologies, their meanings and application. The latest draft version of the terminologies is provided at **Attachment B**.

2.37 The terminologies are drawn from those in use by a number of ANSPs globally, and where available those defined in the Flight Information Exchange Model (FIXM[1]) Version 2.0.

ATFM Capacity Scope and Units

2.38 APANPIRG Conclusion 24/13 urged States to establish capacity assessment and adjustment mechanisms and regular review of all aerodromes and ATC sectors where traffic demand was expected to reach capacity, or was experiencing traffic congestion, and to report the assessment outcomes by 1 May 2014.

2.39 The meeting noted that there was no formula for capacity measurement in the global guidance material (doc 9971). ICAO observed that the measurement varied among States according to such factors as social conditions, tools, and controller capability. While aiming to use a single, standardized method for the assessment of capacity was a sound objective, it may not be an absolute requirement. More important than using the same method was the sharing of capacity related figures, which was key to global ATFM implementation. Accepting that each State retained full responsibility for establishing its own capacities could better facilitate the disclosure of capacity figures.

2.40 Concerning units of measurement, ICAO also commented that that assessing capacities using occupancy figures was a very efficient method. It was noted, however, that it relied on extensive use of surveillance related data. Hourly entry counts had also proven to be an extremely valuable and accurate way to express capacity.

2.41 The meeting considered that the wording of APANPIRG Conclusion 24/13 was sufficiently broad to permit States to report their capacity assessments in the units they were currently using internally for this purpose. It was also noted that this would be a large task for some States, which may be reflected in the number of reports eventually received.

Airport Collaborative Decision Making (A-CDM)

2.42 During 2013 IATA had conducted a series of 5 A-CDM workshops in Singapore, Beijing, Shanghai, Haneda and Narita, to increase understanding of A-CDM and its benefits and to foster harmonization of terminology and processes. The workshops were based on the *EUROCONTROL A-CDM Implementation Manual version 4*, which was developed with inputs form Airports Council International (ACI) and IATA, and appeared to be commonly used and widely accepted by airports and ANSPs as the predominant A-CDM development and implementation guidance.

2.43 The criticality of harmonization of systems, procedures and terminologies from the user perspective was stressed, as pilots would interface with multiple systems at multiple locations in different States, and expected common interface protocols and terminology.

2.44 It was recognized that the full implementation of the EUROCONTROL A-CDM manual's processes may be unnecessarily complex in the APAC Region, and it was recommended that States should take a "fit for purpose" view and tailor programs to suit local operating conditions.

[1] FIXM is part of a suite of information exchange models including Aeronautical Information Exchange Model (AIXM) and Meteorological Information Exchange Model (WXXM) developed to meet requirements for globally interoperable information exchange envisaged in the Doc 9854 - Global Air Traffic Management Operational Concept, Doc 9965 – Manual on Flight and Flow – Information for a Collaborative Environment.

2.45 Differences between the EUROCONTROL manual and the FAA's Surface Collaborative Decision Making program were acknowledged. Some systems implemented under the EUROCONTROL manual may not have directly followed its guidance. It was important to ensure synergy with other airports globally and the adoption of best practices to facilitate future interoperability.

2.46 ACI advised the meeting that they supported the A-CDM initiative, had worked with IATA and CANSO to promote it, and had offered consultancy services and planned to provide guidance material to members.

2.47 The meeting was informed that several States and airport operators had borrowed heavily from the EUROCONTROL manual. It was noted, however, that the manual included many considerations that were unique to the Europe/EUROCONTROL operational ATM and ATFM/CDM environments which would not be either suitable or necessary for the Asia/Pacific Region.

2.48 It was also noted that the next version of ICAO Doc. 9971 Manual on Collaborative ATFM would include A-CDM guidance.

2.49 The meeting agreed that rather than adopt the EUROCONTROL manual in its entirety its content should be considered for use as a basis for Regional A-CDM guidance.

2.50 The ATFM/SG Secretary has subsequently commenced coordination with the Aerodromes Operations and Planning Working Group (AOP/WG) to ensure that all relevant parties are engaged in the development of any regional A-CDM direction, and to initiate consideration of future arrangements for the development of regional A-CDM guidance.

APEC Air Traffic Management Emissions Reduction Project

2.51 In a joint working paper provided by Indonesia, Malaysia, Thailand and the United States the meeting was briefed on activities under the APEC Air Traffic Management Emissions Reduction Project. The project was proposed by the United States, with the goals of studying economic and environmental benefits of CDM/ATFM implementation and proposing the path to implementation of required procedures and systems. The project report was planned to be published by the end of 2013.

2.52 The paper noted the multiple other CDM/ATFM projects under development in the Asia/Pacific Region, including the European Union/ASEAN AATIP, the (then) Hong Kong China – Singapore – Thailand tripartite project, the Indonesia – Philippines – Australia CDM/ATFM Joint Task Force (JTF-IPA), and Indonesia's plans to create a similar task force with Singapore and Malaysia as an improvement on the current bi-lateral meetings process.

2.53 It was proposed that the ATFM/SG coordinates such efforts as these to ensure CDM/ATFM developments were proceeding towards the same goals while reducing duplication of work.

2.54 EUROCONTROL, as a participating party in the AATIP program, stated that until very recently they were not aware of either the APEC work in the Asia/Pacific CDM/ATFM domain. EUROCONTROL had therefore identified the need to contact APEC, to reach agreement on ensuring the avoidance of duplicated or poorly targeted effort, and to identify any gaps in the overall work being done by both projects.

2.55 It was clearly becoming more important to be aware of what is going on in the region, and that the Steering Group had a role to play in terms of project overview which should be reflected

in its Terms of Reference.

Review of ATFM Related Provisions of Asia/Pacific BANP

2.56 Part V of the Asia and Pacific Regions Air Navigation Plan Volume I, Basic ANP contains elements of the existing planning system and introduced the basic planning principles, operational requirements and planning criteria related to Air Traffic Management (ATM) as developed for the Asia/Pacific Regions. This included the objectives and general principles of the ATFM service.

2.57 The alignment of the BANP with both the Regional Framework for Collaborative ATFM and the ICAO Manual on Collaborative ATFM (doc 9971) is now included in the ATFM/SG Task List.

ATFM/SG Terms of Reference

2.58 Noting the subsuming of ATFM-relevant provisions of global and Asia/Pacific Region ATFM-related documents into the (then) draft Doc 9971, the Conclusions adopted by APANPIRG/24, and its adoption of the Seamless ATM Plan, revised TOR for ATFM/SG were drafted, incorporating the following considerations:

- Reference to the ATS Planning Manual (Doc 9426) was replaced by reference to the Manual on Collaborative Air Traffic Flow Management (Doc 9971);
- Reference to Major Traffic Flows (MTF) was replaced with a more clear and better targeted description of airspace considerations for ATFM;
- Reference to the Seamless ATM Plan and its provisions for structural airspace capacity measures replaced the former wording;
- The requirement to develop a Concept of Operations was replaced by the requirement to develop an ATFM framework addressing ATFM implementation and operational issues;
- The requirement to review and update the *ATFM Communications Handbook for the Asia/Pacific Region* was deleted due to its supersession by Doc 9971 and the Seamless ATM Plan;
- The provisions of APANPIRG Conclusions 24/13 and 24/14 were incorporated in paragraph 2, with some rewording to clarify the expected output of the Steering Group;
- A new requirement to research and recommend guidance regarding compliance by airspace users with ATFM measures was added;
- Redundant information in paragraph 3 was removed and replaced with a requirement for the coordination and alignment of CDM/ATFM programs;
- Reference to development of an ATFM web site was removed as it was now covered by the reworded paragraph 2;
- The reporting requirement was changed to reflect the re-named ATM Sub-Group.

2.59 ATFM/SG/2 agreed that the proposed TOR should provide guidance for the on-going work of the Group pending their adoption by APANPIRG/25.

2.60 The ATFM/SG/3 meeting subsequently made further amendments to the TOR proposed at ATFM/SG/2. These amendments aligned with the outcomes of RACP/TF/3 and MET/R TF/3, incorporating linkages with these groups in the TOR.

2.61 The following Draft Decision is proposed for consideration by the ATM Sub-Group:

Draft Decision ATFM/SG/3-4: ATFM/SG Terms of Reference

That, the proposed Terms of Reference appended at **Attachment C** be adopted for the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) Agree to the Draft Decision amending the ATFM/SG Terms of Reference; and

c) discuss any relevant matters as appropriate.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

D R A F T

ASIA/PACIFIC REGION

FRAMEWORK

FOR

COLLABORATIVE AIR TRAFFIC FLOW MANAGEMENT

DRAFT Version 0.1.2, MONTH YEAR

This Plan was developed by the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG)

Approved by APANPIRG/XX and published by the
ICAO Asia and Pacific Office, Bangkok

CONTENTS

SCOPE OF THE FRAMEWORK

Structure of the Framework

1.1 The Asia/Pacific Region Framework for Collaborative Air Traffic Flow Management (ATFM), under development by the Air Traffic Flow Management Steering Group (ATFM/SG), will form part of a suite of global and regional air navigation planning documents relevant to the Asia/Pacific Region.

1.2 Global vision and strategy perspectives are provided by the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global ATM Operational Concept* (Doc 9854) and the *Global Aviation Safety Plan* (GASP), The GANP includes the Aviation System Block Upgrade (ASBU) framework, its Modules and its associated technology Roadmaps.

1.3 Beneath this level is regional planning primarily provided by the Asia/Pacific Basic Air Navigation Plan (BANP, Doc 9673) and the Asia/Pacific Seamless ATM Plan which, together with its contributory documents including the Collaborative Framework and other guidance material, define goals and the means of meeting State planning objectives.

1.4 Now incorporated within the Asia/Pacific Seamless ATM Plan are the Asia/Pacific ATFM Concept of Operations and Air Navigation Concept of Operations. The Framework for Air Traffic Flow Management, hereinafter referred to as 'the Framework' draws upon and aligns with guidance and recommendations of the Seamless ATM Plan and ICAO Doc 9971 *Manual on Collaborative ATFM*.

Doc 9971 states that *in its initial application, ATFM need not involve complicated processes, procedures or tools. The goal is to collaborate with system stakeholders and to communicate operational information to airspace users, air navigation service providers, and to other stakeholders in a timely manner*.

ATFM Phases

1.5 ICAO Doc 9971 describes three phases of ATFM execution; *strategic*, *pre-tactical* and *tactical*.

1.6 The Strategic ATFM phase encompasses measures taken more than one day prior to the day of operation. Much of this work is accomplished two months or more in advance. Strategic ATFM includes the planning and execution of long-term demand and capacity balancing including arrival slot allocation at Coordinated Airports. TThe Pre-Tactical ATFM phase encompasses measures taken up to one day prior to operations, with the main objective of optimizing capacity through an effective, dynamic organization of resources. Effective Pre-Tactical ATFM is normally dependent on CDM processes established between all stakeholders, and in the broader network sense requires significant network communications and information processing capability. The necessary inter-State network capability is not yet developed in the Asia/Pacific Region. Implementation guidance for networked ATFM is itself being developed for inclusion in the Regional Framework for Collaborative ATFM.

1.7 Pre-tactical ATFM measures are those taken xxxxxx……(note: some divergence from definition in doc 9971. To be further discussed)

DRAFT

Tactical ATFM measures are taken on the day of operation, managing traffic flows and capacities in real time. Tactical ATFM practices, procedures and competencies should be the first priority for ATFM implementation, as they are critical to the real-time operational response to demand/capacity imbalance, and the improvement and maintenance of safety in the management of operational situations where traffic demand exceeds capacity.

The timely application of ATFM Measures requires a fundamental understanding of airport and airspace capacity, and the continuous assessment of capacity and the factors that impact upon it.

ATFM Service Categories

1.8 The Framework categorizes ATFM Service Categories within any particular airspace sector or terminal area on the basis of assumed traffic density and airspace complexity associated with major international airports, and in some cases on the ATFM Service Categories of adjacent airspace sectors. A minimum suite of ATFM Capability Elements is defined for each Service Category.

1.9 The ATFM Service Categories that are under consideration for definition in the Regional Framework for Collaborative ATFM are:

- xxxxx
- xxxxx
- xxxxx
- xxxxx
- xxxxx
- xxxxx
- xxxxx
- xxxxx

Note: The Service Category assigned to any particular airspace may be amended where traffic density, complexity or other factors dictate that a higher level of Service Category is appropriate.

ATFM Capability Elements

1.10 ATFM Capability Elements are a suite of tools, practices and procedures defined to enable the flexible and efficient management of demand within the Tactical and Strategic Phases of ATFM. ATFM Capability Elements are based on the guidance provided in Doc 9971, and include:

- Planning Tools;
- Prediction and Monitoring Tools;
- CDM Tools;
- ATFM Execution Tools; and
- ATFM Measures

Implementation Timelines

1.11 Implementation timelines for ATFM services are formulated to facilitate alignment with the timelines expected in the Seamless ATM Plan's Preferred ATM Service Levels (PASL).

Document Review

1.12 Being Contributory to the Seamless ATM Plan, the Asia/Pacific Region Collaborative Framework for ATFM is intended to be reviewed each three years coincident with the regular review of the Seamless ATM Plan, or at more frequent intervals as determined by APANPIRG.

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DEVELOPMENT AND OBJECTIVES OF THE FRAMEWORK

Framework Development

2.1 The Asia Pacific Region Air Traffic Management Steering Group (ATFM/SG) was formed by the Asia/Pacific Region Air Navigation Planning and Implementation Regional Group (APANPIRG) to *inter alia*, develop a common Regional ATFM framework which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific Region.

2.2 The Framework was developed as a contributory document to the Seamless ATM Plan, in response to the identified need for guidance in the State, Sub-Regional and Regional implementation of ATFM. The Framework has been developed in consultation with Asia/Pacific States and Administrations, and International Organizations.

2.3 xxxxx

Framework Objective

2.4 Having considered relevant documents such as the Manual on Collaborative Air Traffic Flow Management (Doc 9971) and the Asia/Pacific Region Seamless ATM Plan, the objective of the Framework is to address ATFM implementation and operational issues in the Asia/Pacific Region by recommending appropriate guidance for:

a. capacity assessment and adjustment mechanisms;

b. regular review for all aerodromes and ATC sectors where traffic demand has reached or is expected to reach or exceed capacity, or is resulting in traffic congestion;

c. mechanisms for ATFM data gathering, collation and sharing; and

d. regionally harmonized benchmarks for airport acceptance rates (AAR) and the throughput of airspace (sector capacity);

e. xxxx

f. xxxx

g. xxxx

Figure x: x

EXECUTIVE SUMMARY

[UNDER CONSTRUCTION.

Heading

3.1 x.

Heading

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ABBREVIATIONS AND ACRONYMS

AAR	Aerodrome Arrival Rate or Airport Acceptance Rate
ATM	Air Traffic Management
ABI	Advanced Boundary Information (AIDC)
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACP	Acceptance (AIDC)
ADOC	Aircraft Direct Operating Cost
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AIDC	ATS Inter-facility Data Communications
AIGD	ICAO ADS-B Implementation and Guidance Document
AIM	Aeronautical Information Management
AIRAC	Aeronautical Information Regulation and Control
AIRD	ATM Improvement Research and Development
AIS	Aeronautical Information Service
AIXM	Aeronautical Information Exchange Model
AMAN	Arrival Manager
ANSP	Air Navigation Service Provider
AN-Conf	Air Navigation Conference
AOC	Assumption of Control (AIDC)
AOM	Airspace Organization and Management
APAC	Asia/Pacific
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
APCH	Approach
APEC	Asia Pacific Economic Cooperation
APSAPG	Asia/Pacific Seamless ATM Planning Group
APV	Approach with Vertical Guidance
APW	Area Proximity Warning
ASBU	Aviation System Block Upgrade
ASD	Aircraft Situation Display
ASEAN	Association of Southeast Asian Nations
ASMGCS	Advanced Surface Movements Guidance Control Systems
ATC	Air Traffic Control
ATCONF	Worldwide Air Transport Conference
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service
ATS	Air Traffic Services
ATSA	Air Traffic Situational Awareness
ATM	Air Traffic Management
CANSO	Civil Air Navigation Services Organization
CARATS	Collaborative Actions for Renovation of Air Traffic Systems
CDM	Collaborative Decision-Making
CCO	Continuous Climb Operations
CDO	Continuous Descent Operations
CFIT	Controlled Flight into Terrain
CLAM	Cleared Level Adherence Monitoring
COM	Communication
CONOPS	Concept of Operations
CNS	Communications, Navigation, Surveillance
CPAR	Conflict Prediction and Resolution
CPDLC	Controller Pilot Data-link Communications

CPWG	Cross-Polar Working Group
CSP	Communication Service Provider
CTA	Control Area
CTR	Control Zone
DARP	Dynamic Airborne Re-route Planning
DGCA	Conference of Directors General of Civil Aviation
DMAN	Departure Manager
DME	Distance Measuring Equipment
EST	Coordinate Estimate
FAA	Federal Aviation Administration
FDPS	Flight Data Processing System
FIR	Flight Information Region
FIRB	Flight Information Region Boundary
FL	Flight Level
FLAS	Flight Level Allocation Scheme
FLOS	Flight Level Orientation Scheme
FRMS	Fatigue Risk Management System
FUA	Flexible Use Airspace
GANIS	Global Air Navigation Industry Symposium
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GBAS	Ground-based Augmentation System
GDP	Gross Domestic Product
GLS	GNSS Landing System
GNSS	Global Navigation Satellite System
GPI	Global Plan Initiative
HF	High Frequency
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMC	Instrument Meteorological Conditions
INS	Inertial Navigation Systems
IO	International Organizations
IPACG	Informal Pacific ATC Coordinating Group
ISPACG	Informal South Pacific ATS Coordinating Group
ITP	In-Trail Procedure
KPA	Key Performance Area
LNAV	Lateral Navigation
LVO	Low Visibility Operations
MET	Meteorological
METAR	Meteorological Aerodrome Report
MLAT	Multilateration
MSAW	Minimum Safe Altitude Warning
MTF	Major Traffic Flow
NextGen	Next Generation Air Transportation System
OPMET	Operational Meteorological
OLDI	On-Line Data Interchange
OTS	Organised Track System
PACOTS	Pacific Organized Track System
PARS	Preferred Aerodrome/Airspace and Route Specifications
PASL	Preferred ATM Service Levels
PBN	Performance-based Navigation

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PIA	Performance Improvement Areas
PKP	Passenger Kilometres Performed
PVT	Passenger Value of Time
RAIM	Receiver Autonomous Integrity Monitoring
RAM	Route Adherence Monitoring
RANP	Regional Air Navigation Plan
RPK	Revenue Passenger Kilometres
RNAV	Area Navigation
RNP	Required Navigation Performance
RVSM	Reduced Vertical Separation Minimum
SAARC	South Asian Association for Regional Cooperation
SATVOICE	Satellite Voice Communications
SAR	Search and Rescue
SBAS	Space Based Augmentation System
SCS	South China Sea
SESAR	Single European Sky ATM Research
SHEL	Software, Hardware, Environment and Liveware
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
SPECI	Special Weather Report
STAR	Standard Terminal Arrival Route or Standard Instrument Arrival (Doc 4444)
STCA	Short Term Conflict Alert
STS	Special Handling Status
SUA	Special Use Airspace
SUR	Surveillance
SWIM	System-Wide Information Management
TAF	Terminal Area Forecast
TAWS	Terrain Awareness Warning Systems
TBO	Trajectory Based Operations
TCAC	Tropical Cyclone Advisory Centre
TCAS	Traffic Collision Avoidance System
TOC	Transfer of Control
UAS	Unmanned Aircraft Systems
UAT	Universal Access Transceiver
UPR	User Preferred Routes
VHF	Very High Frequency
VMC	Visual Meteorological Systems
VNAV	Vertical Navigation
VAAC	Volcanic Ash Advisory Centre
VMC	Visual Meteorological Conditions
VOLMET	Volume Meteorological
VOR	Very High Frequency Omni-directional Radio Range
VSAT	Very Small Aperture
WAFC	World Area Forecast Centre

BACKGROUND INFORMATION

Principles

5.1 The major areas of Collaborative ATFM planning are aligned with those of the Asia/Pacific Seamless ATM Plan; People (human performance), Facilities (physical equipment), and Technology and Information. The xx principles within these areas, as agreed by ATFM/SG and endorsed by APANPIRG, are included at **Appendix X.**

Aviation System Block Upgrades (ASBU)

5.2 The ICAO ASBU initiative is intended to provide a set of aviation system solutions or upgrades intended to exploit current aircraft equipage and capability, and to establish a transition plan enabling global interoperability. The ASBUs comprise a suite of modules organized into flexible and scalable building blocks where each module represents a specific, well-bounded improvement. The modules may be introduced and implemented in a State or region depending on the need and level of readiness. It is recognized that all the modules are not required in all airspaces. The ASBUs describe a way to apply the concepts defined in Doc 9854 *Global Air Traffic Management Operational Concept* with the goal of implementing regional performance improvements, and are used in Doc 9750 *Global Air Navigation Plan (GANP) Edition 4.*

5.3 ATM modernization is a complex but necessary task, given the benefits as traffic levels increase. It is clear that to safely and efficiently accommodate the increase in air traffic demand — as well as respond to the diverse needs of operators, the environment and other issues, it is necessary to renovate ATM systems, in order to provide the greatest operational and performance benefits.

5.4 ASBU are comprised of a suite of modules, each having the following qualities:

- a clearly-defined measurable operational improvement and success metric;
- necessary equipment and/or systems in the aircraft and on the ground along with an operational approval or certification plan;
- standards and procedures for both airborne and ground systems; and
- a positive business case over a clearly defined period of time.

5.5 ASBU are divided into four Performance Improvement Areas (PIA):

- PIA 1: Airport Operations;
- PIA 2: Globally Interoperable Systems and Data – *Through Globally Interoperable System Wide Information Management*;
- PIA3: Optimum Capacity and Flexible Flights – *Through Global Collaborative ATM*; and
- PIA 4: Efficient Flight Path – *Through Trajectory-based Operations.*

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Asia/Pacific ASBU Implementation

~~5.6 ASBU Block 0 modules are incorporated into the Asia/Pacific Seamless ATM Plan. **Table X** provides a summary of the Block 0 elements, and the expected priority for implementation within the Asia/Pacific region as defined in the Seamless ATM Plan. The allocation of priority was based on factors including each module's importance in promoting Seamless ATM (Priority 1 = critical upgrade, Priority 2 = recommended upgrade, Priority 3 = may not be universally implemented).~~

PIA	**Element**	**Economic Analysis**	**Priority**
PIA 1	B0-APTA Optimization Of Approach Procedures Including Vertical Guidance	-	2
	B0-WAKE Increased Runway Throughput Through Optimized Wake Turbulence Separation	-	3
	B0-RSEQ Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN)	-	2
	B0-SURF Safety and Efficiency Of Surface Operations (A-SMGCS)	Yes	3
	B0-ACDM Improved Airport Operations Through Airport Collaborative Decision Making (A-CDM)	-	2
PIA 2	B0-FICE Increased Interoperability, Efficiency And Capacity Through Ground-Ground Integration (AIDC)	-	1
	B0-DATM Service Improvement Through Digital Aeronautical Information Management	-	1
PIA 3	B0-FRTO Improved Operations Through Enhanced En-Route Trajectories (CDM, FUA)	-	1
	B0-NOPS Improved Flow Performance Through Planning Based On A Network-Wide View	-	1
	B0-ASUR Initial Capability For Ground Surveillance	Yes	1
	B0- ASEP Air Traffic Situational Awareness (ATSA)	-	2
	B0-OPFL Improved Access To Optimum Flight Levels Through Climb/Descent Procedures Using Automatic Dependent Surveillance – Broadcast (ADS-B)	-	3
	B0-ACAS ACAS Improvements	Yes	2
	B0-SNET Increased Effectiveness Of Ground-based Safety Nets	-	2
	B0-AMET Meteorological Information Supporting Enhanced Operational Efficiency and Safety	-	2
PIA 4	B0-TBO Improved Safety And Efficiency Through The Initial Application Of Data Link En-Route	-	1
	B0-CDO Improved Flexibility And Efficiency In Descent Profiles (Continuous Descent Operations - CDO)	-	2
	B0-CCO Improved Flexibility And Efficiency Departure Profiles - Continuous Climb Operations (CCO)	-	2

~~**Table X:** Seamless ATM Plan ASBU Block 0 Implementation Priority~~

5.7 xxxxxx

ASBU Upgrades to Support ATFM

5.8 ATFM/SG considered the ASBU Modules identified and prioritized in the Seamless ATM Plan, and the outcomes of the meeting of the Chairpersons of APANPIRG Sub-Groups meeting held in Hong Kong, China, 16 to 17 January 2014, which agreed to the highest priority regional targets for ASBU implementation and the implementation priorities for ASBU and Seamless ATM Plan elements. Based on these priorities ATFM/SG established a recommended order of implementation of those upgrades that will best facilitate an achievable step-by-step ATFM implementation. Table X presents the recommended order of priority for implementation.

Note: The identification of 'critical' elements and a recommended order of priority for implementation do not suggest that they have a higher priority than safety critical improvements.

ATFM-related ASBU Elements Order of Implementation		**Chairs' Priority**
1	**B0-ASUR** Initial Capability For Ground Surveillance	1
2	**B0-FICE** Increased Interoperability, Efficiency And Capacity Through Ground-Ground Integration (AIDC)	1
3	**B0-RSEQ** Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN)	2
4	**B0-TBO** Improved Safety And Efficiency Through The Initial Application Of Data Link En-Route	1
5	**B0-NOPS** Improved Flow Performance Through Planning Based On A Network-Wide View	1
6	**B0-CDO** Improved Flexibility And Efficiency In Descent Profiles (Continuous Descent Operations - CDO)	2
7	**B0-CCO** Improved Flexibility And Efficiency Departure Profiles - Continuous Climb Operations (CCO)	2
8	**B0-APTA** Optimization Of Approach Procedures Including Vertical Guidance	1
9	**B0-ACDM** Improved Airport Operations Through Airport-Collaborative Decision-Making (A-CDM)	2
10	**B0-SURF** Safety and Efficiency Of Surface Operations (A-SMGCS)	3

Table X: ATFM-Related Order of Implementation for ASBU Elements

5.9 xxxxxx

5.10 **B0-ASUR** *Ground-Based ATS Surveillance*: ADS-B, MLAT. Recognizing the principle that increasing capacity is central to the management of increased demand, this module provides States with the means to improve ATC capacity in en-route airspace sectors through the application of PANS/ATM-defined surveillance separation standards. ADS-B technology is an initial step in creating a more flexible, higher capacity air transportation system that will create seamless surveillance and shared situational awareness picture for both ground and air operations. ADS-B data may be readily shared between neighbouring ATSUs, enhancing safety, increasing capacity and efficiency and facilitating seamless ATM operations.

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5.11 **B0-FICE** *Ground – Ground Integration and Interoperability*: ATS Inter-facility Data Communications (AIDC). AIDC application exchanges information between ATS units in support of critical ATC functions, including notification of flights approaching a Flight Information Region (FIR) boundary, coordination of boundary-crossing conditions, and transfer of control. AIDC application improves the overall safety of the ATM system, as well as increasing airspace capacity, as it permits the controller to simultaneously carry out other tasks. AIDC provides for the necessary improvements in the accuracy and update of aircraft position and estimate information that permit earlier inclusion in sequence planning and application of ATFM measures.

5.12 **B0-RSEQ** *Runway Sequencing*: Arrival Manager (AMAN), Departure Manager (DMAN). AMAN/DMAN procedures are designed to provide automation support for synchronisation of arrival sequencing, departure sequencing and surface information. Training and competency standards for automation support, operational standards and procedures are necessary.

5.13 **B0-TBO** *En-route Data-link*: Automatic Dependent Surveillance-Contract (ADS-C), Controller Pilot Data-link Communications (CPDLC). Data-link application for ATC surveillance and communications supports flexible routing, optimized separation (and thus increased capacity) and improved safety in areas where technical constraint or cost-benefit analysis does not support the use of ground-based surveillance (SSR, ADS-B or MLAT). In these cases ADS-C and CPDLC provide for greater accuracy and update in aircraft position and estimate information for aircraft outside the coverage of ground-based surveillance systems than is provided in voice AIREP, and automated update of ATC information, hence permitting earlier inclusion in FLOW/sequence planning and application of ATFM measures and the timely, reliable and accurate transmission of ATFM measure instructions to such aircraft.

5.14 **B0-NOPS** *Network Flow Management* ATFM: Inter-linked and networked ATFM nodes between ANSPs should be developed to serve various sub-regions. xxxxxxx

5.15 **B0-CDO**: *Improved Flexibility and Efficiency in Descent Profiles* CDO and Standard Instrument Arrival (STAR). These arrival procedures allow aircraft to fly their optimum profile, taking into account airspace and traffic complexity, and permit the maximum use of aircraft capability to meet Calculated Times Over (CTO) and Calculated Times of Arrival (CTA) during the descent phase of flight. This element has been accorded a high priority by ICAO HQ, due to the improvement in safety regarding Controlled Flight into Terrain (CFIT) and greater efficiency in terms of fuel usage and emissions.

5.16 **B0-CCO** *Flexible and Efficient Departure Profiles* Continuous Climb Operations (CCO), SID. These procedures have been accorded a high priority by ICAO HQ due to greater efficiency in terms of fuel usage and emissions. They also optimize ATFM outcomes by segregating departing/climbing traffic from inbound/descending traffic, and facilitating higher runway departure rates by segregating the departure routes of aircraft different speed and climb performance characteristics.

5.17 **B0-ACDM** *Airport CDM*: The decision making process at the airport is enhanced by sharing up-to-date relevant information and by taking into account the preferences, available resources and the requirements of the stakeholders at the airport. Airport CDM improves the outcomes of collaborative ATFM by facilitating the timely positioning of aircraft in order to comply with ATFM measures such as Calculated Take-Off Time (CTOT). xxxxxxxx

5.18 **B0-SURF**: *Improved Runway Safety*: Advanced Surface Movements Guidance Control Systems (ASMGCS), where warranted by weather conditions and capacity. While Implementation of ASMGCS may not be a high priority in the Asia/Pacific except at high density aerodromes where the cost benefits of mandating this were positive, it would improve ATC capability to ensure the efficient positioning of aircraft to comply with DMAN-generated ATFM measures.

5.19

ATFM Elements Derived from the Seamless ATM Plan Initiatives

5.20 The Asia/Pacific Seamless ATM Plan identifies a number of Global and Regional elements having a bearing on CDM and ATFM

5.21 **Aerodrome Capacity Analysis**. Runway capacity should be maximized. There is a need to determine capacity and related constraints for runways, taxiways and gates, especially for Low Visibility Operations (LVO). Aircraft gate movement predictability affecting ATFM may be influenced by the efficiency of the embarkation and disembarkation of people and goods. In conducting aerodrome capacity analysis, it is important to include an assessment of the capacities of the airport passenger and cargo terminals and landside infrastructure to handle passengers, checked-in baggage, air freight and road traffic to ensure that the airfield, passenger/cargo terminals and landside capacities are balanced as much as possible.

5.22 Apron Management Services need to be integrated with ATC services using interoperable systems (including automated tools), shared data and harmonised procedures. Therefore clear procedures between a provider of aerodrome ATS services and the aerodrome operator are necessary in order to ensure that the planning, operation and review of aerodrome services are conducted collaboratively.

5.23 **Flight Information Regions** (FIRs). FIR boundaries should not limit the delivery of ATFM messages and the coordination and application of ATFM measures.

5.24 **Airspace Priority.** At the 6th Worldwide Air Transport Conference (ATCONF, Montréal, 18-22 March 2013) support was expressed for work to be undertaken on the schemes of economic incentives, 'best equipped or capable, best served' and 'most capable, best served' concepts. The CONOPS states that in each case where any aircraft that does not meet specified requirements, it should receive a lower priority, except where prescribed (such as for State aircraft).

5.25 **ATC Separation**. In areas where the provision of direct ATS surveillance is possible, ATC separation should be based on these surveillance systems (i.e.: radar, multilateration and ADS-B). The Regional Surveillance Strategy reinforces this by encouraging the provision of communication, navigation, and data management capabilities necessary to make optimal use of surveillance systems. Moreover, States are expected to enhance ATM automation tools and safety nets through the use of aircraft-derived data such as flight identification, trajectories and intentions.

5.26 ATS surveillance-based separation may be provided with only one ATS surveillance system. Multiple ATS surveillance systems such as radar, ADS-B or MLAT should not be required, unless a single system does not demonstrate reliable performance in terms of availability, or overlapping coverage is required near an ATS sector boundary, or a safety case required enhanced redundancy or for any other economic reason.

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5.27 **Civil Data-Sharing**. The provision of ATS surveillance data between civil ANSPs (suitably filtered as appropriate in terms of national security) is important for harmonised Transfer of Control (TOC) procedures between ATC units, unless surveillance coverage extends well into the adjacent unit's airspace. ADS-B system data should not require filtering, as it is publically broadcast information, lending itself to improving safety through the sharing of ATS surveillance data across FIR boundaries, in accordance with the Regional Surveillance Strategy.

Human Performance

5.28 The Global ATM Operational Concept (Doc 9854) states:

Humans will play an essential and, where necessary, central role in the global ATM system. Humans are responsible for managing the system, monitoring its performance and intervening, when necessary, to ensure the desired system outcome. Due consideration to human factors must be given in all aspects of the system.

5.29 The role of the human is especially important in delivering high quality and consistent services supporting collaborative ATFM. Therefore it is crucial to ensure that ATFM training, competency and licensing (if any) requirements are developed using a competency-based framework, and that ATFM performance data is collected, analysed and acted upon.

5.30 An important human performance consideration for the delivery consistent, harmonized, safe and efficient Tactical ATFM measures is ATC training, Controllers need to be trained in the application of positive control techniques such as vectoring and speed control, and in the use of agreed, standardized phrases, to maintain separation between conflict pairs and to successfully apply ATFM measures. The appropriate use of ATC simulators to enhance their learning experience is an essential part of the necessary training.

Civil/Military Cooperation

5.31 Data sharing arrangements (including aircraft surveillance), are a key part of civil/military cooperation for tactical ATFM. Data sharing between the civil and military could facilitate CDM, a vital component of ATFM. The Regional Surveillance Strategy espouses civil/military cooperation and system interoperability.

The following civil/military elements were incorporated into the Seamless ATM framework, and should be included in ATFM implementation planning:

a) **Strategic Liaison**. This element emphasises the creation of a permanent body and procedures such as participation at appropriate civil ATM meetings, to ensure long and medium-term planning for optimal civil and military operations;

b) **Tactical Liaison**. The daily, safe and efficient tactical management of operations, including airspace scheduling through interaction and communications between civil and military units, which should include military representation within civil ATC Centres where necessary;

c) **Military SUA**. The minimisation of airspace exclusively assigned for civil or military use in accordance with FUA principles, assessed by the percentage of military SUA within an FIR;

d) **SUA Review**. The regular review of SUA, to ensure that the means and notice of activation provide adequate warning for other airspace users, and the airspace designations (SUA types) as well as the lateral and vertical limits are the minimum required to safely contain the activity therein. The review of airspace should be conducted by an airspace authority independent or a collaboration of civil and

military airspace users;

e) **International SUA**. The minimisation of SUA that affected international civil ATS routes. Restricted and prohibited areas must not be designated in international airspace or airspace of undefined sovereignty;

f) **Integrated Civil/Military ATM Systems**. The integration of civil and military ATM systems where practicable, including joint procurement of systems where possible;

g) **Shared Civil/Military Data**: The provision of ATS surveillance data from civil surveillance systems to military units to improve monitoring (thereby reducing the need for individual defence identification authorisation), trust and confidence. The provision of surveillance data from military surveillance systems where this would enhance ATS surveillance coverage and redundancy; suitably filtered as appropriate;

h) **Common Civil/Military Training**. The familiarisation of civil and military ATM personnel in each other's systems and procedures where national security allows. Training and licensing of civil and military air traffic controllers to equivalent standards; and

i) **Common Civil/Military Procedures**. The implementation of the same or equivalent standards, procedures and policies for the provision of ATS and the management of air traffic.

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CURRENT SITUATION

Analysis

6.1 [UNDER CONSTRUCTION. The IATA study will provide the bulk of the detail for this section.]

6.2 x.

PERFORMANCE IMPROVEMENT PLAN

ATFM Capability Elements

7.1 Most if not all ATC units in the Region currently provide some form of ATFM service, whether they are aerodrome control towers providing services in low-density control zones, high density TMA or en-route radar sectors in an AACC environment, or something in between. The actual service may in many cases be simple, such as merely queuing arriving aircraft into a holding pattern at the primary approach navigation aid or ad-hoc traffic metering. In high density airspace the ATFM service may be provided through a well-developed and coordinated, automated CDM/ATFM system, or by manual Tactical ATFM processes, or by far less developed ad-hoc traffic management techniques applied by individual sector controllers. In other cases rudimentary ATFM outcomes may be achieved by applying a single large and longitudinal spacing no matter the level of demand, or use of non-surveillance separation standards within areas of contiguous surveillance coverage.

7.2 The minimum ATFM service capability applicable to particular types of airspace may be achieved by applying a tailored selection of *capability elements* from a suite of regionally agreed tools, procedures and practices to flexibly and efficiently manage demand. This requires the definition of a comprehensive list of ATFM capability elements (**Appendix X**).

7.3 xxx.

ATFM Service Capability Categories

7.4 ATFM Service Categories define types of airspace within which specified levels of ATFM service capability apply. :

- Xxxxx
- Xxxxxx
- Xxxxxx
- xxxxxxx

7.5 The Service Categories define airspace within which a specified minimum of ATFM Capability Elements should be implemented. Coordination agreements should be established with ATS units providing service in airspace either not defined in these Service Categories or without any ATFM Capability to ensure the reliable and timely delivery of ATFM messages to airspace users.

7.6 The ATFM Capability Elements applicable to each ATFM Service Category are defined in **Appendix X**. Administrations may also elect to apply appropriate ATFM measures in airspace not defined in the Capability Categories, as determined by traffic density and airspace complexity, where complexity measurement may include such factors as traffic mix (IFR and VFR traffic, jet v non-jet, military activity, general aviation activity), airspace constraints, environmental factors or meteorological factors.

7.7 In order to determine the airspace sectors that will be categorized as xxxx or xxxxx, it is necessary to identify Asia/Pacific Region xxxxx airspace, i.e. terminal areas with radar or ADS-B surveillance servicing major international airports. The agreed list of major international airports to which this applies is provided at Appendix X.

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7.8 x

7.9 x

Airspace and Airport Capacity Measurement

7.10 [UNDER CONSTRUCTION]

7.11 x

Strategic ATFM Guidance

7.12 [UNDER CONSTRUCTION]

Airport CDM

7.13 Effective implementation of Airport CDM is a vital component of an overall collaborative ATFM system, and from the perspective of the ANSP facilitates airspace user compliance with ATFM measures.

7.14 xxxxxxxx

ATFM Communications Capability

7.15 [UNDER CONSTRUCTION]

ATFM Messages

7.16 [UNDER CONSTRUCTION]

ATFM Competencies - ATC

7.17 [UNDER CONSTRUCTION. (these are being compiled from material provided by ATFM/SG/2 participants.)]

ATFM Competencies – ATFM Staff

7.18 [UNDER CONSTRUCTION]x

ATFM Compliance

ATFM Implementation Steps

7.19 ATFM implementation steps should be undertaken in the following seqence:

a) ATFM data gathering and analysis;

b) Capacity assessment and adjustment;

i. assess minimum spacing between consecutive landing aircraft in different runway and approach type configurations to determine airport acceptance rates;

ii. determine enroute and TMA sector capacities;

iii. identify opportunities for capacity improvement.

c) Determine ATFM Service Categories of all ATC sectors;

d) Determine suite of ATFM Capability Elements required;

e) Plan initial Tactical ATFM capability, including:

i. Stakeholder engagement;

~~ii. determining minimum spacing between consecutive landing aircraft in different runway and approach type configurations;~~

~~iii. determining airport acceptance rates;~~

iv. manual techniques for determination of landing sequence and required ATFM measures;

v. ATFM coordination;

- Tactical Coordination Procedures and Facilities
  - ATFMU to ATFMU;
  - ATFMU to ATC;
  - ATC to ATFMU
  - ATC to ATC
  - Stakeholder conference call scheduling and triggering events for non-scheduled coordination.

Note: An ATFMU need not be established as a stand-alone facility or capability. The Tactical ATFM functions of an ATFMU may be carried out by appropriately skilled ATC personnel at an operational ATC position.

vi. Develop ATFM and related ATC competency criteria

vii. Plan, develop and deliver training; and

viii. Implement Tactical ATFM Capability Elements (ATFM Measures);

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f) Strategic ATFM;

i. Arrival Slot Allocation Process;

g) Tactical ATFM Optimisation, including implementation of ASBU Elements in the following recommended order:

- **xxxxxx**

h) ATFM performance review and improvement.

7.20 x.

RESEARCH AND FUTURE DEVELOPMENT

x

8.1 [UNDER CONSTRUCTION

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MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

9.1 [UNDER CONSTRUCTION]

9.2 x

APPENDIX X: ATFM FRAMEWORK PRINCIPLES

People: Aviation Regulations, Standards and Procedures

1. Increased capacity is the primary and central method for management of increasing demand.

2. Regional model of inter-connected sub-regional ATFM networks based on system-wide CDM, serving the busiest terminal airspace and major sub-Regional traffic flows.

3. Harmonized regional or sub-regional ATFM rules and guidelines based on the ICAO Manual on Collaborative Air Traffic Flow Management (Doc 9971).

4. Regionally harmonized methodology for the collection, analysis and ongoing monitoring of demand and capacity data.

5. Development of manual processes and skills to promote practical knowledge and understanding of ATFM before implementing technology based solutions, and as a contingency response capability.

6. Consistency between the ICAO Regional Air Navigation Plan, Asia/Pacific Seamless ATM Plan and Regional ATFM Framework.

7. An emphasis on delivery of ATFM services based on CNS capability, resulting in flexible, dynamic systems providing equity of access and delivering optimal ATFM network outcomes.

8. The use of high-fidelity simulators to train controllers and ATFMU personnel involved in in ATFM procedures and techniques.

ATM Coordination

9. The prioritization of integrated AIDC systems for timely ATM and ATFM system updates of trajectory data, including preferred implementation of advanced AIDC messaging and configuration of systems for early delivery of AIDC messages.

Facilities: Aerodromes

10. Encouragement for aerodrome operators to actively participate in ATM coordination in respect of Airport CDM development and operational planning, including aerodrome complexity and capacity.

ATS Units

11. Collaboration by ANSPs for evaluation and planning of ATFM facilities.

12. Optimization of ATFM facilities through automated, networked, central flow management centres and units or equivalent virtual platforms.

Technology and Information: ATFM Systems

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13. Continuous supervision, operation, adjustment, monitoring and executive control of ATFM systems and their output by ~~qualified~~ trained and competent ATC or ATFM personnel.

14. Encouragement of the use of dual-redundant automated ATFM processing and communications systems, supported by agreed contingency procedures and facilities including ATN/AMHS and public telephone systems.

15. Collaborative development of CDM, ATFM, A/MAN and D/MAN support tools.

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16. Encourage real-time sharing of dynamic air traffic data relating to flights operating or intending to operate in civil-controlled airspace, between military ATM systems and civil ATM/ATFM systems.

ATM Modernisation Projects

17. Inter-regional and sub-regional cooperation (‘clustering’) for the research, development and implementation of ATFM projects

18. A focus on harmonized technologies for earliest deployment and best cost benefits.

19. Xx

APPENDIX X: COLLABORATIVE ATFM CAPABILITY ELEMENTS

Planning Tools

- Airspace design and ATS Route Planning including segregated SIDs (CCO) and STARs (CDO)
- Capacity Analysis and workload modelling
- ~~Network Operational Plans~~

ATFM Unit, Centre or Virtual ATFM Centre Structure

- Strategic management unit;
- ~~Pre-Tactical Management Unit;~~
- Tactical Management Unit;
- Capacity Unit;
- ~~Operability Monitoring Unit;~~
- Coordination and Decision Unit; and
- Flow Management Positions (ACC, TMA positions linked to ATFM Unit or Centre)

Prediction and Monitoring Tools

- Demand and workload prediction
- weather prediction
- monitoring tools

CDM Tools

- ~~information exchange~~
- ~~collaboration~~
- ~~electronic user helpdesk~~
- ~~crisis management~~

Tactical ATFM Capability

- Agreed acceptance rates
- Agreed flow gates at uniform distances from the aerodrome
- Prioritization of landing aircraft;

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- Industry notification of additional fuel for traffic delays;
- Prioritization of compliant flights and de-prioritization of non-complaint flights

ATFM Execution Tools

- Slot Allocation
- Route and Fix Balancing
- ~~Collaborative Trajectory Options~~

ATFM Measures

- Miles in Trail
- Minutes in trail
- fix balancing
- rerouting

(could be both strategic and tactical)

- mandatory rerouting
- Level capping
- alternative or advisory routing
- minimum departure intervals
- slot swapping
- ~~Collaborative trajectory options~~
- ground delay programme
- ground stop
- airborne holding

Analysis Tools

- data analysis and reporting

APPENDIX X: MAJOR INTERNATIONAL AND HIGH DENSITY DOMESTIC AIRPORTS

Administration	Airport	Remark

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APPENDIX X: ATFM SERVICE CATEGORY AND CAPABILITY ELEMENTS MATRIX

	Example ATFM Capability Elements																				
	Planning			Prediction and Monitoring		CDM				Tactical ATFM Capability						ATFM Execution				ATFM Measures			
	Airspace Design/ATS Route Planning	Capacity Analysis and Modelling	Demand and Workload Prediction	Weather Prediction	Monitoring	Information Exchange	Collaboration	Electronic User Helpdesk	Crisis Management	Segregated SIDS and STARS	Agreed Acceptance Rates	Holding Patterns with CDO	Agreed Flow Gates at Uniform Distances	Prioritization of Landing Aircraft	Notification of Additonal Fuel for Delays	Slot Allocation	Route and Fix Balancing	Flight Level Balancing	Miles in Trail	Minutes in Trail	Fix Balancing	Rerouting	Mandatory Rerouting
Example: TMA - Major International Airport	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x		x		x		
Example – Enroute – Major ATS Routes/City Pairs – Radar	x	x	x	x	x	x	x	x	x		x	x	x				x	x				x	x

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	Example ATFM Capability Elements																				
	Planning			Prediction and Monitoring		CDM				Tactical ATFM Capability						ATFM Execution				ATFM Measures			
	Airspace Design/ATS Route Planning	Capacity Analysis and Modelling	Demand and Workload Prediction	Weather Prediction	Monitoring	Information Exchange	Collaboration	Electronic User Helpdesk	Crisis Management	Segregated SIDS and STARS	Agreed Acceptance Rates	Holding Patterns with CDO	Agreed Flow Gates at Uniform Distances	Prioritization of Landing Aircraft	Notification of Additonal Fuel for Delays	Slot Allocation	Route and Fix Balancing	Flight Level Balancing	Miles in Trail	Minutes in Trail	Fix Balancing	Reroutingq	Mandatory Rerouting
Example – Enroute – Major ATS Routes/City Pairs – Non-Radar	x	x	x	x	x	x	x	x	x		x							x	x	x		x	x
Example – TWR/TMA – Regional – Radar	x	x	x	x		x	x			x							x		x		x			
Example – TWR/TMA – Regional Non-Radar	x	x	x	x		x	x													x			

APPENDIX X: CAPACITY ENHANCEMENT INITIATIVES

- Implementation of Strategic Demand and capacity balancing Airport (Slot Allocation and strict slot compliance to slots as allocated)
- Applying Minimized Authorized Separation on final approach.
- Standardized Taxi routes (Arrival and departure)
- Multiple Departure Line-up Queues
- Multiple Intermediate Departure Holding Points
- Reduced Pilot reaction times on departure
- Reduced ROT on departure
- Reduced Line up times
- Additional and correctly placed RET
- Segregated runway operations or multi – mode option could be more optimal depending on local conditions.
- Limiting certain aircraft categories to operate at times of the day
- Limiting or banning aircraft below certain speeds (turbo – prop or prop aircraft)
- Balancing Arrival/Departure demand
- Implementing PBN
- Optimizing SIDS and STARS
- Implementation Pre-Tactical and Tactical Flow management procedures
- Implementation of Pre-Departure Sequencing procedures and Tools
- Optimize Aircraft sequencing
- Introduce standardization across different operators and aircraft types
- Improved Airspace and procedure design
- Implement Standard Arrival speeds (STAAS)
- Obvious capacity enhancements, runway, taxiway, apron construction
- Implementation or improvement of CNS.

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APPENDIX X: ATFM PERSONNEL QUALIFICATIONS, SKILLS AND ATTRIBUTES

Air Traffic Flow Management Manager

- Qualification/Experience preferred :
- ATC Qualification: Experience in all disciplines (Good understand of all disciplines if not rated in all)
- Supervisory experience in ATM environment
- In depth knowledge of:
    - Airline Operations
    - Military Operations
    - Airport Operations
    - Climatology and local weather conditions and how they affect ATM operations
- Knowledge of:
    - Airspace and procedure planning
    - IATA Airport Slot Coordination Processes
- Skills/competencies
    - Diplomatic
    - Negotiator
    - Analytical
    - Problem Solver
    - Flexible
    - Decisive
    - Communication- written and verbal
    - Passionate about ATFM
    - Information Management
- Optional:
    - Aviation Management training

ATFM Operator

- Qualification/Experience preferred :
  - ATC Assistant Qualification: Exposure to all ATC disciplines.
  - Aeronautical Information Management
- Knowledge of:
  - Airline Operations
  - Military Operations
  - Airport Operations
  - Climatology and local weather conditions and how they affect ATM operations
  - Airspace and procedure planning
  - IATA Airport Slot Coordination Processes
- Skills/competencies
  - Analytical
  - Problem Solver
  - Communication- written and verbal
  - Passionate about ATFM
  - Information

APPENDIX X: ATFM TRAINING REQUIREMENTS

Level 1 ATFMU Personnel – ATC background

- ICAO Manual on Collaborative ATFM (Doc 9971)
- Airspace Organization & Management (EUROCONTROL ASM-ASM)
- Slot Coordination
- MET for ATM Operations
- CNS/ATM Training
- ATFM Automation System

Level 1 ATFMU Personnel – Non-ATC background

The above topics, and:

- Aviation English
- Air Traffic Services (Annex 11)
- Basic Aerodrome Control Service (Simulation)
- Basic Approach Control Service (Simulation)
- Basic Area Control Service (Simulation)
- Intro to Network Operations
- Aeronautical Information Services (Annex 15)
- Flight Plan
- Aeronautical Telecommunications (Annex 10 Volume II)
- Rule of the Air (Annex 2)

Level 2 ATFMU Personnel – Recruited from Level 1 ATFMU Personnel

- Introduction to ATFCM (EUROCONTROL ASM-ATFCM)
- Airspace Organization & Management (EUROCONTROL ASM-ASM)
- Civil / Military ATM Coordination (EUROCONTROL GEN-CIV/MIL)
- Intro to Airline Operations: Flight Planning and Flight Operations
- Flight Efficiency : Re-routing and Fuel Costs
- Slot Coordination
- MET for ATM Operations
- Basic PANS/OPS
- ATFM Automation Systems – Level 2 Functions

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Level 3 – ATFMU Manager – Recruited from Level 2 ATFMU Personnel

- Flow Management Position – Module 2 (EUROCONTROL)
- Network Capacity Planning (EUROCONTROL ASM-CAP)
- Enhanced Civil/Military Coordination (EUROCONTROL ASM-FUA)
- Airport Collaborative Decision Making (EUROCONTROL APT-ACDM)
- PBN Airspace Design
- ATFM Automation System – Manager Functions

Level 4 – ATFM Network Manager – Recruited from Level 3 ATFMU Manager Personnel

- Flow Management Position – Module 3 (EUROCONTROL)
- Advanced Airline Operations
- Advanced Airport Operations
- AIS / AIM Operations

** DRAFT ** ATFM TERMINOLOGIES ** DRAFT **			
Proposed APAC Acronym	**Description**	**Explanation**	**Source / History**
General			
AAR	Airport Acceptance Rate	Arrival capacity of an airport normally expressed in movements per hour	ICAO Doc 9971 North America, South Africa, Australia, EUROCONTROL, Japan
ADR	Airport Departure Rate	Departure Capacity of an airport normally expressed in movements per hour	North America, South Africa, Australia
ASD	Aircraft Situation Display	ATC Aircraft/Traffic Situation Display	South Africa, Australia, EUROCONTROL
AFIX	Arrival Fix	A waypoint during the arrival phase of a flight	North America, South Africa, Australia, EUROCONTROL, Japan
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.	ICAO Doc 9971
CDR	Conditional Route	ATS route that is available for flight planning and use under specific conditions	EUROCONTROL ASM Handbook
DFIX	Departure Fix		North America, South Africa, Australia, EUROCONTROL, Japan, FIXM 2.0

** DRAFT ** ATFM TERMINOLOGIES ** DRAFT **			
Proposed APAC Acronym	**Description**	**Explanation**	**Source / History**
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	EUROCONTROL Airport CDM
FCA	Flow Constrained Area	An sector of airspace where normal flows of traffic are constrained, which could be caused by weather, military exercise etc	North America, South Africa, FIXM 2.0
FMP	Flow Management Position	Provides a flow of information from the operational ATC unit to the Network Operations about the current situation within their ACC and the operational situation at the airportUnit that monitors and balances traffic flows within areas of responsibility in accordance with ATM directives through implementation of approved ATFM measures	EUROCONTROL Airport CDMICAO Doc 9971
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	ICAO Doc 9971
GS	Ground Stop	A tactical ATFM measure where some selected aircraft remain on the ground	ICAO Doc 9971
IMC	Instrument Meteorological Conditions	Instrument meteological conditions expressed in terms of visibility, distance, and ceiling, less than the minima specified for visual meteorological conditions.	ICAO Doc 4444

** DRAFT ** ATFM TERMINOLOGIES ** DRAFT **			
Proposed APAC Acronym	**Description**	**Explanation**	**Source / History**
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	ICAO Doc 9971
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	ICAO Doc 9971
RFIX	Route Fix	A waypoint during the en-route phase of a flight	FIXM 2.0 Data Dictionary and ATFM/SG
SID	Standard Instrument Departure	A designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences.	ICAO Doc 4444
SEVWX	Severe Weather	A weather condition which could lead to the reduction in capacity of an ATM resource, including airport or airspace volume	ICAO Doc ? North America ? Japan?
STAR	Standard Terminal Arrival Route	A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced.	ICAO Doc 4444

** DRAFT ** ATFM TERMINOLOGIES ** DRAFT **			
Proposed APAC Acronym	**Description**	**Explanation**	**Source / History**
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	ICAO Doc 9971
TMI	Traffic Management Initiative	ATFM Measure which will balance demand against capacity or assist in the safe expeditious flow of traffic <<There needs to be mapping with ATFM Measure>>	Need to refer to ICAO Doc 9971 vs ATFM Measure, FIXM 2.0
VFR	Visual Flight Rules	Set of regulations under which a pilot operates an aircraft in weather conditions where pilots can see outside the cockpit, to control the aircraft's altitude, navigate, and avoid obstacles and other aircraft	Based on FAA Section 91.155 ICAO Annex 11
VIS	Visibility	Flight visibility - forward visibility.	ICAO Doc ? Annex ?
VMC	Visual Meteorological Conditions	Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima, which visual flight rules flight is permitted.	Based on ICAO Annex 2
Phase of Flight			
SOBT	Scheduled off block time	The time that an aircraft is scheduled to depart from the parking position	EUROCONTROL Airport CDM, FIXM 2.0
EOBT	Estimated Off Block Time	The estimated time that an aircraft will start movement associated with departure	ICAO Doc 4444, FIXM 2.0
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.	EUROCONTROL Airport CDM, FIXM 2.0
TSAT	Target Start Up Approval Time	The time provided by ATC taking into account TOBT, CTOT and/or the traffic situation that an aircaft can expect start up/push back approval	EUROCONTROL Airport CDM, FIXM 2.0

** DRAFT ** ATFM TERMINOLOGIES ** DRAFT **			
Proposed APAC Acronym	**Description**	**Explanation**	**Source / History**
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	Based on CTOT
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)	EUROCONTROL Airport CDM
STOT	Scheduled Take Off Time	The estimated take off time derived from an aircraft operators schedule, typically based on a standard taxi-out time	Based on Airport CDM TTOT
PTOT	Planned Take Off Time	Time aircraft is expected to take off derived from the flight plan.	South Africa, Australia
TTOT	Target Take Off Time	The Target Take off Time taking into account the TOBT/TSAT plus Estimated Taxi-Out Time	EUROCONTROL Airport CDM
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	EUROCONTROL Airport CDM, FIXM 2.0
ETOT	Estimated Take Off Time	The Estimated take off time taking into account EOBT plus Estimated Taxi-Out Time	EUROCONTROL Airport CDM, FIXM 2.0
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)	EUROCONTROL Airport CDM
SEET	Scheduled Estimated En-route Time	The estimated elapsed time of a flight derived from the aircraft operators schedule	South Africa, Australia
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	Needed for En Route ATFM operations, FIXM 2.0

** DRAFT ** ATFM TERMINOLOGIES ** DRAFT **			
Proposed APAC Acronym	**Description**	**Explanation**	**Source / History**
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")	Based on En Route ATFM operations, FIXM 2.0
PLDT	Planned Landing Time	The expected landing time of a flight derived from the flight plan	North America, South Africa, Australia
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	Based on Airport CDM ELDT South Africa, Australia
TLDT	Target Landing Time	Targeted Time from the 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	EUROCONTROL Airport CDM, FIXM 2.0
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	Based on Airport CDM CTOT and ALDT
ELDT	Estimated Landing Time	The estimated time that an aircraft will touch-down on the runway (equivalent to ETA)	EUROCONTROL Airport CDM
ALDT	Actual Landing Time	Actual time an aircraft lands on a runway (Equivalent to ATC ATA –Actual Time of Arrival = landing, ACARS=ON)	EUROCONTROL Airport CDM
SIBT	Scheduled In Block Time	The Time that an aircraft is scheduled to arrive at its first parking position.	EUROCONTROL Airport CDM

** DRAFT ** ATFM TERMINOLOGIES ** DRAFT **			
Proposed APAC Acronym	**Description**	**Explanation**	**Source / History**
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.	Based on Airport CDM CTOT and AIBT
AIBT	Actual in block time	The time that an aircraft arrives in-blocks (Equivalent to Airline/Handler ATA – Actual Time of Arrival, ACARS = IN)	EUROCONTROL Airport CDM

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

Terms of Reference

AIR TRAFFIC FLOW MANAGEMENT STEERING GROUP (ATFMSG)

1. Having considered ~~the *ATS Planning Manual* (Doc 9426)~~ relevant documents such as the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971), regional air traffic data and the ~~Major Traffic Flows~~ Asia/Pacific Region city pairs and associated airspace and ATS routes experiencing the most significant traffic demand, and noting ~~that recognized structural airspace capacity increasing measures have preference to use of ATFM~~ the Asia/Pacific Seamless ATM Plan provisions for structural airspace capacity increasing measures, develop an Asia/Pacific Regional ATFM ~~Concept of Operations(including principles and objectives)~~ Framework which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific Region;

~~1. Review and update the *ATFM Communications Handbook for the Asia Pacific Region* until superseded by Global Material;~~

2. ~~Encourage and develop~~Identify, research and recommend appropriate guidance regarding:

   a. capacity assessment and adjustment mechanisms;

   b. regular review for all aerodromes and ATC sectors where traffic demand is expected to reach capacity, or is resulting in traffic congestion;

   c. mechanisms for ATFM data gathering, collation and sharing between States, International Organizations and ICAO, which may include;

      i. capacity assessments, including factors affecting capacity such as special use airspace status, runway closures and weather information;

      ii. traffic demand information which may include flight schedules, flight plan data, repetitive flight plan data as well as associated surveillance updates of flight status; and

      iii. ATFM Daily Plan;

   d. compliance by airspace users with ATFM measures; and

   e. any other guidance relevant to the Regional ATFM Framework.

3. ~~Research suitable and regionally harmonized benchmarks for airport acceptance rates (AAR) and the throughput of airspace (sector capacity) which may vary depending on weather conditions, and associated technique, e.g. the ground delay programme and miles/minutes in trail (MIT).~~ Maintain an overview of CDM/ATFM programs being conducted within the Region, with a view to facilitating their coordination and alignment.

4. Review the ~~safety and efficacy of~~ effectiveness of existing and planned ATFM ~~systems~~ programs in the Asia and Pacific Region, and make specific recommendations regarding ATFM, including any adjacent airspace affecting the Asia and Pacific Regions, and research and recommend appropriate mechanisms for the on-going review of such programs.

~~5. Encourage the development of an ATFM web site by Asia and Pacific Region States with significant experience in ATFM, which contains information on regional ATFM, including *inter alia*, real time flight delay data.~~

5. The Group has linkages to the Regional ATM Contingency Plan Task Force (RACP/TF) and the Meteorological Requirements Task Force (MET/R TF).

6. The Group reports to the ATM~~/AIS/SAR~~ Sub-Group.

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