International Civil Aviation Organization

Eleventh Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/11)

Video Teleconference, 02 – 06 August 2021

Agenda Item 3: ATFM/CDM Global Update

ATFM OUTCOMES FROM THE ICAO ATM OPERATIONS PANEL (ATMOPSP)

(Presented by the ATFM/SG Chair)

SUMMARY

This paper presents ATFM-related outcomes of the Sixth Meeting of the ICAO Air Traffic Management Operations Panel of ICAO

1. INTRODUCTION

1.1 The ATM Operations Panel (ATMOPSP) was formed by the Air Navigation commission in 2012 to undertake specific studies and develop and/or review technical and operational ICAO provisions for improving safety, efficiency and harmonization in the areas of ATM, flight operations, ATFM, airspace management, procedures and phraseology.

1.2 The Sixth Meeting of the ICAO ATM Operations Panel (ATMOPSP/6) was held by video teleconference from 19 to 30 April 2021.

1.3 This paper provides a summary of the discussion outcomes of ATMOPSP/6 Agenda Item 3: Air Traffic Flow Management.

2. DISCUSSION

2.1 ATMOPSP/6 noted that the scope of collaborative decision-making and ATFM (ATFM/CDM) continued to evolve in line with operational needs and the innovative opportunities arising from information exchange and collaborative processes to facilitate the safe, orderly and expeditious flow of air traffic, and should not be limited to situations when demand exceeds capacity.

2.2 The Rapporteur of the ATFM Sub-group of ATMOPSP (ATFM SG) presented WP/09 (**Attachment 1**), which provided an update on the work plan of the ATFM Sub-Group and the draft proposal for amendments related to capacity determination.

Globally Networked ATFM

2.3 The meeting emphasized that once established based on Multi-State or regional agreement, ATFM would evolve towards network and performance management. A global “network of networks” would better interconnect regional/sub-regional networks and could contribute to the efficient continuity of air traffic flows at regional, inter-regional and global levels. All of these opportunities would be firmly based on ATFM’s basic building blocks of layered planning, information sharing of ATC capacity and air traffic demand, and collaborative planning and execution of ATFM demand and capacity balancing measures.

2.4 The meeting recognized that ATFM/CDM would also evolve to better support the effective implementation of coordinated ATM contingency measures and recovery plans. Recent crises had heightened awareness of the criticality of ATFM/CDM being a foundational service for handling disruptions, prioritization, exemptions and managing regional and inter-regional traffic flows in a collaborative and harmonized manner.

2.5 The meeting agreed that the current provisions should be amended and accompanied with additional guidance materials to facilitate the establishment of ATFM services and the evolution towards cross-border collaboration and aiming for globally connected networks of ATFM services.

2.6 The meeting agreed that the amendment of ICAO provisions would be mainly carried out in two packages; the first one catering for building the foundation for ATFM and introducing the required significant changes to the ATFM concept to be applicable by November 2026 (to be made available by 2024). This package would be articulated in subsequent proposals for amendment to Annex 11- *Air Traffic Services* and ICAO Doc 4444 – *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM) with the necessary ATFM-specific interface provisions according to the planning layers, with due regard to the consequential amendments that might be required for other ICAO documentation. Supportive guidance material would be provided through the development of a new operational handbook to be included in the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971) as Part IV. The ATFM guidance material would be ready by 2023.

2.7 The second package would support regional network-wide management, then linking these networks towards a global network of networks and a trajectory based operations environment. These steps would detail ATFM process improvements in line with the GANP and ASBUs and would include the interfaces to ATM related processes.

Proposals for Amendment to Annex 11 and PANS-ATM – Capacity Determination

2.8 The meeting reviewed proposals for amendment to Annex 11 and PANS-ATM in related to capacity determination.

2.9 The main intention of the proposals are to establish requirements for every State to determine the ATC capability that shall be periodically reviewed. Within the proposals, capacity determination has two clear types that are linked to the planning layers. The declared capacity is strategically established as a static value by the appropriate ATS authority and operational capacity, which values are dynamically updated based on prevailed and potential circumstances such as adverse weather, special activities and contingencies, ATS infrastructure, etc.

2.10 In light of the above, the meeting agreed further work is required to address the comments received. The Chairman noted that the revised version to be presented to ATMOPSP-WG/10 planned for October 2021.

2.11 Based on the foregoing, the meeting reviewed and agreed to revised job card that was proposed for ANC consideration.

ATMOPSP/ATMRPP Joint Session

2.12 A joint session of ATMOPSP and the Fourth Meeting of the ATM Requirements and Performance Panel (ATMRPP/4) was held to present and discuss matters of mutual interest for both panels mainly related to ATFM and *Flight and Flow - Information for a Collaborative Environment* (FF-ICE). The following is a summary of the discussion.

2.13 The joint meeting was presented with ATMOPSP/6-WP/23 and ATMRPP/4-WP/929 *ATMOPSP-ATMRPP Joint Task Force on ATFM and FF-ICE*, which proposed a revision to the terms of reference (ToR) of the joint task force (JTF) established to facilitate the necessary coordination between ATMOPSP and ATMRPP in the development of proposed amendments relating to air traffic flow management (ATFM) and flight and flow information for a collaborative environment (FF-ICE).

2.14 The joint meeting noted that a proposed additional task of the *ATMOPSP-ATMRPP Joint Task Force (JTF) on ATFM and FF-ICE* was to *identify technical and procedural pre-requisites for the implementation of ATFM and FF-ICE*. It was noted that assessment of the need for developing an exchange model for flow information (FLXM) was on-going. No consensus had yet been reached within the ATMRPP on the suitability of FIXM to cater for flow information exchange. The work of the JTF would provide inputs to the ATMRPP's assessment of the need for the information exchange model(s). The result of this assessment would subsequently be coordinated with the Information Management Panel (IMP), as the matter was associated with the development of the ATM Information Reference Model (AIRM).

2.15 The joint meeting was informed of the progress of ATMOPSP ATFM Sub-group, including:

a) ATFM scenarios for ground delay measures as a meaningful source to identify the factors, leading to ATFM information exchanges;

b) use-cases for sharing of ATFM measures between ATFM and FF-ICE services;

c) ATFM specific information exchanges and those that can be sharable with FF-ICE; and

d) Proposed list of information to be exchanged.

2.16 The joint meeting was also informed of the progress and planned work of the ATMRPP in support of the initial implementation FF-ICE services in a mixed-mode environment. The paper also highlighted areas on which the ATMOPSP was invited to provide feedback.

2.17 The joint meeting was also briefed on the work of concerning the development of consequential amendments to various Annexes and PANS, the FF-ICE implementation guidance, which would form Volume II of the *Manual on FF-ICE* (Doc 9965), and an FF-ICE implementation strategy. The ATMOPSP agreed to provide feedback, when ATMOPSP were provided with these materials as modified by the ATMRPP/4.

2.18 Concerning collection, assessment and documentation of new flight information needs, the joint meeting noted the principles applied by the ATMRPP in the assessment of new flight information needs. It was noted that changes to a standard FPL2012 field be recommended only when necessary to address a short term critical safety risk during the transition period, and that the changes do not generate unjustifiable financial impact on ANSPs and operators. The joint meeting noted that while no changes to a standard FPL2012 field be introduced, guidance would be provided on recommended codes for certain capabilities that have clear operational needs and have global applicability. No objections or concerns on this approach were observed.

2.19 With respect to the list of flight capabilities identified by the ATMRPP as requiring indication in a flight plan, the joint meeting noted concerns expressed on the level of granularity for some PBN capabilities, and on the need for specific examples to clarify the operational use statement for certain PBN capabilities.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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AIR TRAFFIC MANAGEMENT OPERATIONS PANEL

SIXTH MEETING (ATMOPSP/6)

(Virtual, 19– 30 April 2021)

Agenda Item 3: Air Traffic Flow Management (ATFM)

ATFM SUB-GROUP PROGRESS REPORT

(Presented by Richard Stevens, EUROCONTROL on behalf of ATFM sub-group)

SUMMARY

This paper presents the progress on the Job card Ref. *ATMOPSP.008.03* items including the ATFM-SG vision and approach, proposed revision to the current job card and proposal for amendment to SARPs and PANS-ATM for review and approval by the meeting. The paper also provides update on the support activities to other panels, ATMOPSP/ATMRPP Joint Task Force for ATFM and FF-ICE and the ATFM SG future work programme and priorities as well as it requests for a formal ATMOPSP meeting during Q2 2022 for the approval of set of proposals for amendment and guidance material.

1. INTRODUCTION

1.1 The ATFM sub-group of ATMOPSP was established in response to ATMOPSP Job Card ATMOPSP.008.03 with the following expectations:

a) identify requirements to foster increased implementation of ATFM in Annex 11;

b) identify the procedures instrumental to the implementation of ATFM, phraseology and an ATFM message set in PANS-ATM; and

c) develop the provisions related to exchange of information between between ATFM systems, the training requirement and core competency involved in the exercise of ATFM responsibilities in Manual on Collaborative ATFM (Doc 9971), Part II.

1.2 Recently, three new members from China, Jordan and IATA have joined the ATFM sub-group experts from: AEROTHAI, Airservices Australia, IFACTA, IATA, CGNA (Brazil) CAAS, FAA, EUROCONTROL, CANSO and the ICAO Secretariat with Mr. Richard Stevens (EUROCONTROL) serving the team as their rapporteur during the weekly web meetings.

2. DISCUSSION

2.1 Since ATMOPSP-WG/9 meeting (Virtual, 9-19 November 2020), the ATFM sub-group have held fifteen web meetings to further progress the work on the assigned tasks and the Job Card topics. The discussion in the paper will cover the following topics:

- ATFM-SG vision and approach;
- Proposal for a revised job card;
- proposals for amendment (PfA) to SARPs and PANS-ATM to facilitate ATFM building blocks;
- report on support activities to other panels, ATMOPSP/ATMRPP JTF for ATFM and FF-ICE; and
- future work programme and priorities of the ATFM sub-group.

2.2 ATFM-SG vision and approach

2.2.1 The scope of the ATFM service continues to evolve in line with operational needs and the innovative opportunities arising from information exchange and collaborative processes. These evolutions provide the potential to establish close operational interfaces with other related domains such as: contingency planning, FF-ICE, A-CDM, ASM and to tactical planning during operations. ATFM should also support the evolutionary transformation to trajectory based operations environment.

2.2.2 Once established within a sub region, ATFM planning can evolve its focus towards network and performance management. A global “network of networks” could better interconnect regional/sub-regional networks and could contribute to the efficient continuity of air traffic flows at global level between ICAO regions as well as within the regions.

2.2.3 All of these opportunities are firmly based on ATFM’s basic building blocks of layered planning, information sharing of: ATC capacity, air traffic demand; collaborative planning and execution of ATFM demand and capacity balancing measures.

2.2.4 Many of these basic building blocks used by ATFM are in common with those used in ATM planning and crises contingency planning processes.

2.2.5 Although the advantages of establishing ATFM services are clearly borne out to those that have already begun to implement them, this need may not yet have been directly established by others for many

different reasons. However, ATMOPS-WG/9 put forward that States that did not have any problem could be impacted by other States; therefore, these States should form part of sub-regional, regional and global ATFM.

2.2.6 Considering all of the current and future advantages of ATFM, it is proposed to bring its global adoption in steps taken along a clear evolutionary journey setting out: establishment of bi/multi-lateral agreements, implementation of basic building blocks harmonised within the sub region and region. With a subsequent step to interconnect between adjacent regions and finally establishing a global network of networks.

2.2.7 The scope of the ATFM-SG is wide. It has to provide a set of beneficial, costs effective and adoptable provisions to cover a wide ranging set of needs in a continuum of maturity levels whilst being receptive to new, emergent innovations and the evolving performance requirements of the aviation community.

2.2.8 The deployment of the basic building blocks must be accomplished in the spirit of the provisions and with one eye on acquiring the direct or indirect benefits and a second eye to what comes next on the evolutionary path.

2.2.9 The near term planning approach followed since ATMOPSP-WG/9 has been to deliver the ATFM basic building blocks in two tranches. The first tranche is a single step that initiates with **capacity determination**. The second tranche delivers the remaining ATFM steps and its interface with contingency planning.

2.2.10 The first tranche/step to determine capacity can be undertaken in the complete absence of ATFM service provision. The requirement for capacity determination is introduced in the initial PfA for annex 11 and PANS-ATM. Guidance material can be found in Doc 9971 part II and additional "How to" material will be included into the new part IV. The guidance provided covers the different approaches available and it recommends that local/regional service providers harmonise their approaches to initiate and formalise collaboration activities that will support the second tranche steps.

2.2.11 The second tranche's steps will be articulated in a subsequent PfA updating Annex 11 and PANS-ATM documents with the full range of necessary ATFM specific and contingency planning interface provisions according to the planning layers with due regard to the consequential amendments that might be required for other ICAO documentation. Supportive guidance material is provided in Doc 9971 parts II and will be provided in part IV and also in the proposed ATFM guidance materials [action packs].

2.2.12 In the longer term, future tranches may need to be considered to over the formalisation of the steps towards regional network-wide management, then linking these as an initial step towards a global network of networks and trajectory based operations environment. These steps would detail ATFM process improvements in line with the GANP and ASBUs and will include the interfaces to ATM related processes: A-CDM, ASM, ATS contingency planning and performance schemes.

2.3 Proposal for a revised Job card

2.3.1 In consideration of both: the reply to **Decision WG9/05**: *That the ATFM-SG job card is updated to address comments provided during WG9;* and the two tranches identified above. There has been a review of the JC008 topics and the schedule.

2.3.2 As anticipated, the previous Q1 2021 timeframes have been found to be insufficient to accomplish the current JC008.03 scope. It follows that only the first tranche of PfA provisions is delivered to this ATMOPSP/6. The second tranche is planned to be delivered at an additional panel meeting that is requested

by the ATFM-SG to be scheduled for **quarter 2 of 2022**. The two tranches and their proposed timeframes are included into the proposed JC008.03 revisions in Appendix A

2.3.3 In addition to these adjustments. The ATFM-SG has adjusted the JC008 scope in line with the ATFMOPS-WG/9 discussions to include a globalised mandate for ATFM and that the provisions should be amended in such a way that States that did not have any [demand capacity] problem could be impacted by other States; therefore, these States **should** form part of sub-regional, regional and global ATFM.

2.4 Proposals for amendment to SARP and PANs documents to facilitate ATFM building blocks.

2.4.1 The first tranche/step is to mandate every State to establish the capability for **capacity determination** and for its **periodic review** provisioned in SARPs 2.35.1 ~~(at the level of PANs only)~~. This capability can be used immediately by States as an input into ATM planning and into contingency planning within the State and shared with other States and stakeholders.

2.4.2 The capacity determination provision will be built upon in the subsequent PfA for tranche 2 for specific provisions for ATFM services [All States should form part of sub-regional ATFM].

2.4.3 Additional guidance material for capacity determination will now be prepared and finalised in time for the Q2 2023 to support the Nov 2026 ~~2024~~ applicability date.

2.4.4 Within the PfA provisions, capacity determination has two clear types that are linked to the planning layers. The *declared capacity* is strategically established as a static value by the appropriate ATS authority.

2.4.5 The *declared capacity* is subsequently becomes the *operational capacity's* initial value for a discrete period. The operational capacity values are dynamically updated by the appropriate ATS authority in time to reflect new and refined information (e.g., sector configuration and runway changes etc.) until the tactical planning layer (phase) has concluded. Operational capacity is provisioned in SARPs 2.35.2.

2.4.6 The clearer definition of declared capacity requires a minor consequential change to the ATFM service definition by replacing the word *declared* with *determined*. The ATMOPS panel are informed that the ATFM service definition will be considered for a second amendment to modernise and align the ATFM service definition by improving upon the *traffic volume* wording. **The ATFM-SG ask the ATMOPS panel to consider how best to manage the PfAs in regard to amending the ATFM service definition twice?** Would it be better to propose both amendments in tranche 1, even though this would exceed the tranche 1 scope of capacity determination or is it better to make two independent PfA amendments to subsequent service definitions.

~~2.4.7 With regards to the Annex 11 recommendation of 2.35.2 [and reflected in PANS-ATM 3.1.1.3], it is anticipated that this recommendation will be promoted to a requirement in tranche 2 alongside the wider requirements for ATFM. Noting that supporting guidance material will be produced and in consideration of the November 2024 tranche 1 applicability date with likely deployment lead times, **the ATMOPS panel are asked to consider whether this tranche 1 PfA should move to immediately promote recommendation 2.35.2 into a requirement in readiness of the tranche 2 PfA for ATFM services?**~~

2.4.8 An interesting point to note is the current contradiction between the scope of Annex 11 and PANS-ATM and the difficulties this presents when drafting PfA materials:

2.4.8.1 Annex 11 SARPs are at the level of **ATS** which encompasses three services: ATC, FIS, AR.

2.4.8.2 PANS-ATM are at the level of **ATM** which encompasses ATS, ASM and ATFM.

2.4.8.3 The structure of annex 11 (ATS) does not lend itself to include the full scope of ATFM beyond demand capacity balancing in service of ATS. It follows that annex 11 will not readily support the planned integration of ATFM beyond its simple demand and capacity interface with ATS. This issue impedes PfA progress. **The ATFM-SG proposes that in the future, the ATMOPSP considers the future needs and the method by which Annex 11 will accommodate the future provisions to fully support the GANP and its ASBUs.**

2.4.8.4 In light of the as-is situation, the ATFM-SG will struggle to dove-tail simple ATFM service requirements into the SARPs document. The ATFM-SG has avoided answering this and other specific questions and instead has focused upon ATFM functions (building blocks) without establishing definitions for where service provision occurs to the same as extent that ATS service provision is defined into units and physical locations.

2.5 Support activities to other Panels, JTF for FF-ICE

2.5.1 The ATFM domain will be enhanced with the 4D trajectory information sharing delivered by the FF-ICE services and it is intended that the ATFM domain will introduce constraint information back to FF-ICE release 1.

2.5.2 In this regard the ATFM-SG did plan to dedicate time to prepare support to the JTF. Progress in this matter has been slower than anticipated and the ATFM-SG proposes that a joint meeting is held where specific ATFM needs can be agreed in an expedited fashion. [Covered in WP/10]

2.6 Future work programme and priorities of the ATFM Sub-Group

2.6.1 The ATFM sub-group considers the following areas are worthwhile items considered for inclusion into a **tranche 3** SARPs and provisions development activities:

a) ATFM – A-CDM Integration

b) Long Range ATFM, including airborne absorption of ATFM delay

c) Conflicting ATFM measures (ATMOPSP-WG/7 Decision WG7/11)

d) Flight Plan addressing to support ATM contingency planning operations (ATMOPSP Tasks 5/11, WG7/9, WG7/10)

e) Integration of the ASM and ATFM processes (focussing on the ATFM pre-tactical phase)

2.6.2 There is nothing to report regarding these future activities. They are effectively held until the more pressing tranche 2 topics are sufficiently progressed.

2.6.3 The ATFMOPSP/06 are asked should a new ATFM job card be created to accommodate tranche 3, advanced ATFM interfaces and capabilities.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the content of this working paper;

b) review the proposed revised JC008.003 in **Attachment A**;

c) review, discuss, update and approve the draft proposal for amendments to Annex 11 and PANS-ATM in **Attachment B**;

d) discuss and take action with respect to the proposed vision and future work programme of the ATMOPSP related to ATFM, should a new ATFM JC be created to accommodate tranche 3 items; and

e) consider that a formal panel meeting is scheduled for spring 2022 to review and agree on the Tranche 2 of the proposals for amendments and guidance material.

— END —

Attachment A

PROPOSED AMENDMENT TO

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

AIR TRAFFIC SERVICES

ANNEX 11

NOTES ON THE EDITORIAL PRESENTATION OF THE PROPOSED AMENDMENT

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1.	~~Text to be deleted is shown with a line through it~~.	text to be deleted
2.	New text to be inserted is highlighted with grey shading.	new text to be inserted
3.	~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

PROPOSED AMENDMENT TO

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

Annex 11 — *Air Traffic Services*

INITIAL PROPOSAL 1

FOREWORD

…

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

CHAPTER 1. DEFINITIONS

Note 1.— Throughout the text of this document the term "service" is used as an abstract noun to designate functions, or service rendered; the term "unit" is used to designate a collective body performing a service.

…

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities ~~declared~~determined by the appropriate ATS authority.

…

Calendar. Discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108).

…

Declared capacity. A measure of the ability of the ATC system ~~or any of its subsystems or operating positions~~ to provide ATC service to aircraft during normal activities. It is expressed as the maximum number of aircraft that can safely enter~~ing~~ a specified portion of airspace, or a controlled aerodrome in a given period of time, taking due account of meteorological conditions~~weather~~, ATC unit configuration, staff and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace or controlled aerodrome.

Note 1.— The given period of time is normally one hour. Such hourly periods can be converted into daily, monthly or annual values.

Note 2.— The declared capacity at an aerodrome is inclusive of any limits imposed by the aerodrome authority.

Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

a) are located on an area intended for the surface movement of aircraft; or

b) extend above a defined surface intended to protect aircraft in flight; or

c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

Operational capacity. A measure of the ability of the ATC system to provide ATC service to aircraft during a specific period, determined by iterative update to the declared capacity taking due account of prevailing and potential circumstances and any other factors that may affect the workload of the controller responsible for the airspace or controlled aerodrome.

Note.— The operational capacity is initially set to the declared capacity value and, subsequently incorporates circumstances, such as special activities or contingencies, adverse forecast meteorological conditions, degradation of ATS infrastructure, runway closures, and any other factor that may affect controller workload.

….

Origin:	*Rationale*
ATMOPSP	The proposed changes to the definition are as follows: Firstly a generalised "***declared capacity***", amended definition, that does not consider precisely on which future day or period it will be applied. It is characterised by attributes of static information [e.g., Runways, ATS route structures, prevailing traffic flows, consolidated expected meteorological and historic flight data]. The new text used has been mostly taken from the current PANS-ATM 3.1.1.3. Secondly, an "***operational capacity***", a new definition, that is applied to a specific future referent time period. It is initiated with the declared capacity and then iteratively refined with more precise information when it becomes available until the referent time period is passed. Thirdly, "***Air traffic flow management ATFM***" has a consequential change that replaces "declared" with "determined", which is necessary to maintain consistency with the new definition of **declared** capacity, and the new section 2.35 about determination of the capacity [see proposal 2].

INITIAL PROPOSAL 2

CHAPTER 2. GENERAL

2.1 Establishment of authority

…

2.31 Contingency arrangements

Air traffic services authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services in the airspace for which they are responsible for the provision of such services. Such contingency plans shall be developed with the assistance of ICAO as necessary, in close coordination with the air traffic services authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned.

Note 1.— Guidance material relating to the development, promulgation and implementation of contingency plans is contained in Attachment C.

Note 2.— Contingency plans may constitute a temporary deviation from the approved regional air navigation plans; such deviations are approved, as necessary, by the President of the ICAO Council on behalf of the Council.

…

2.34 Instrument flight procedure design service

States shall ensure that an instrument flight procedure design service is in place in accordance with Appendix 7.

2.35 Determination of ATC system capacity

2.35.1 The appropriate ATS authority shall determine the declared capacity for control areas, control sectors within a control area and for controlled aerodromes and periodically review the values in relation to traffic demand. The periodic review of the declared capacity shall be carried out at least on an annual basis.

2.35.2 The appropriate ATS authority shall determine the operational capacity for control areas, control sectors within a control area and for controlled aerodromes. The number of aircraft provided with an ATC service shall not exceed that which can be safely handled by the ATC unit concerned under the prevailing circumstances.

Origin:	*Rationale*
ATMOPSP	To ensure that capacity determination is to be undertaken and reviewed periodically, a new section 2.35 in chapter 2 is inserted. 2.35.1 relates to the determination and periodic review of the declared capacity on at least an annual basis.

	2.35.2 requests the determination of the operational capacity based on prevailing and potential circumstances that would affect controller workload. Also it indicates that the number of traffic provided with ATC service shall not exceed the capacity of the ATS system, A new provision in PANS-ATM is inserted to request the implementation of necessary measures in case that the number of traffic is expected to exceed the operational capacity.

PROPOSED AMENDMENT TO

**PROCEDURES FOR AIR NAVIGATION SERVICES —
AIR TRAFFIC MANAGEMENT**

(PANS-ATM, DOC 4444)

NOTES ON THE EDITORIAL PRESENTATION OF THE PROPOSED AMENDMENT

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PROPOSED AMENDMENT TO

**PROCEDURES FOR AIR NAVIGATION SERVICES —
AIR TRAFFIC MANAGEMENT**

(PANS-ATM, DOC 4444)

INITIAL PROPOSAL 1

CHAPTER 1. DEFINITIONS

Note 1.— Throughout the text of this document the term "service" is used as an abstract noun to designate functions, or service rendered; the term "unit" is used to designate a collective body performing a service.

…

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities ~~declared~~determined by the appropriate ATS authority.

…

Decision altitude (DA) or decision height (DH). A specified altitude or height in a 3D instrument approach operation at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

Note 1.— Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.

Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation.

Note 3.— For convenience where both expressions are used they may be written in the form "decision altitude/ height" and abbreviated "DA/H".

…

Declared capacity. A measure of the ability of the ATC system ~~or any of its subsystems or operating positions~~ to provide ATC service to aircraft during normal activities. It is expressed as the maximum number of aircraft that can safely enter~~ing~~ a specified portion of airspace, or a controlled aerodrome in a given period of time, taking due account of meteorological conditions~~weather~~, ATC unit configuration, staff and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace or controlled aerodrome.

Note 1.— The given period of time is normally one hour. Such hourly periods can be converted into daily, monthly or annual values.

Note 2.— The declared capacity at an aerodrome is inclusive of any limits imposed by the aerodrome authority.

…

Obstacle clearance altitude (OCA) or obstacle clearance height (OCH). The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.

Note 1.— Obstacle clearance altitude is referenced to mean sea level and obstacle clearance height is referenced to the threshold elevation or in the case of non-precision approach procedures to the aerodrome elevation or the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. An obstacle clearance height for a circling approach procedure is referenced to the aerodrome elevation.

Note 2.— For convenience when both expressions are used they may be written in the form "obstacle clearance altitude/height" and abbreviated "OCA/H".

Operational capacity. A measure of the ability of the ATC system to provide ATC service to aircraft during a specific period, determined by iterative update to the declared capacity taking due account of prevailing and potential circumstances and any other factors that may affect the workload of the controller responsible for the airspace or controlled aerodrome.

Note.— The operational capacity is initially set to the declared capacity value and, subsequently incorporates circumstances, such as special activities or contingencies, adverse forecast meteorological conditions, degradation of ATS infrastructure, runway closures, and any other factor that may affect controller workload.

Origin:	*Rationale*
ATMOPSP	The proposed changes to the definition are as follows: Firstly a generalised "**declared capacity**", amended definition, that does not consider precisely on which future day or period it will be applied. It is characterised by attributes of static information [e.g., Runways, ATS route structures, prevailing traffic flows, consolidated expected meteorological and historic flight data]. The new text used has been mostly taken from the current PANS-ATM 3.1.1.3. Secondly, an "**operational capacity**", a new definition, that is applied to a specific future referent time period. It is initiated with the declared capacity and then iteratively refined with more precise information when it becomes available until the referent time period is passed. Thirdly, "***Air traffic flow management ATFM***" has a consequential change that replaces "declared" with "determined", which is necessary to maintain consistency with the new definition of **declared** capacity.

INITIAL PROPOSAL 2

Chapter 3

ATS SYSTEM CAPACITY AND AIR TRAFFIC FLOW MANAGEMENT

3.1 CAPACITY MANAGEMENT

3.1.1 General

3.1.1.1 The capacity of an ATS system depends on many factors, including the ATS route structure, the navigation accuracy of the aircraft using the airspace, weather-related factors, and controller workload. Every effort should be made to provide sufficient capacity to cater to both normal and peak traffic levels; however, in implementing any measures to increase capacity, the responsible ATS authority shall ensure, in accordance with the procedures specified in Chapter 2, that safety levels are not jeopardized.

3.1.1.2 The appropriate ATS authority shall implement such measures as to ensure that the number of aircraft provided with ATC services does not exceed the operational capacity determined in accordance with Annex 11, 2.35.2. ~~The number of aircraft provided with an ATC service shall not exceed that which can be safely handled by the ATC unit concerned under the prevailing circumstances. In order to define the maximum number of flights which can be safely accommodated, the appropriate ATS authority should assess and declare the ATC capacity for control areas, for control sectors within a control area and for aerodromes.~~

Note.— Guidance on the measures that may be applied is contained in the Manual on Collaborative Air Traffic Flow Management (ATFM) *(Doc 9971).*

~~3.1.1.3 ATC capacity should be expressed as the maximum number of aircraft which can be accepted over a given period of time within the airspace or at the aerodrome concerned.~~

~~*Note. — The most appropriate measure of capacity is likely to be the sustainable hourly traffic flow. Such hourly capacities can, for example, be converted into daily, monthly or annual values.*~~

3.1.2 Determination of the ~~C~~capacity ~~assessment~~

In assessing capacity values, factors to be taken into account should include, *inter alia*:

a) the level and type of ATS provided;

b) the structural complexity of the control area, the control sector or the aerodrome concerned;

c) controller workload, including control and coordination tasks to be performed;

d) the types of communications, navigation and surveillance systems in use, their degree of technical reliability and availability as well as the availability of backup systems and/or procedures;

e) availability of ATC systems providing controller support and alert functions; and

f) any other factor or element deemed relevant to controller workload.

Note.— Guidance on the methods for determining the capacity for control areas, control sectors within a control area and for controlled aerodromes is contained in the Manual on Collaborative Air Traffic Flow Management (ATFM) *(Doc 9971).*

~~*Note.— Summaries of techniques which may be used to estimate control sector/position capacities are contained in the* Air Traffic Services Planning Manual *(Doc 9426).*~~

Origin: ATMOPSP	*Rationale* Section 3.1 establishes the need for capacity management in the support of ATS. The existing text of 3.1.1.2 is moved to Annex11 and new text inserted to ensure the implementation of necessary measures when the number of aircraft is expected to exceed the operational capacity. A new note is added referring to the *Manual on Collaborative Air Traffic Flow Management (ATFM)* (Doc 9971) for guidance on the measures that would be implemented. The original 3.1.1.3 and its note are deleted as a consequential change because their contents have been incorporated into revised definition of declared capacity and a note in chapter 1. Section 3.1.2 establishes the determination of capacity. The title is changed to be consistent with new section 2.35 of Annex 11. The note is replaced with a note that references the *Manual on Collaborative Air Traffic Flow Management (ATFM)* (Doc 9971) only.

INITIAL PROPOSAL 3

Chapter 3

ATS SYSTEM CAPACITY AND AIR TRAFFIC FLOW MANAGEMENT

3.1 CAPACITY MANAGEMENT

…

3.1.4 **Enhancement of ATC capacity**

3.1.4.1 The appropriate ATS authority should~~:~~

~~a) periodically review ATS capacities in relation to traffic demand; and~~
~~b)~~ provide for flexible use of airspace in order to improve the efficiency of operations and increase capacity.

Origin: ATMOPSP	*Rationale* Bullet a) of 3.1.4.1 is moved to Annex 11 and the paragraph is amended accordingly.

New SARP/PANS Proposal

IMPACT ASSESSMENT AND IMPLEMENTATION PLAN

Air Traffic Flow Management

PART 1: IMPACT ASSESSMENT

1.1 What is the problem/opportunity that this proposal is designed to address?

Please include reference to Job card / ASBU / work programme item, as applicable

Job Card ATMOPSP.008.03 – The provisions affecting ATFM operations are not keeping up to date with the development of ATFM nodes worldwide and the arrival of new technologies.

The main objective of this proposal is to mandate States to determine and periodically review the capacity of the controlled airspace and aerodromes. This capability can be used by States as an input into the determination of AFTM, ATM planning and contingency planning within the State and shared with other States and stakeholders as necessary.

The proposed amendment related to capacity determination is the foundation for the subsequent development of ATFM related provisions envisioning that all States should be part of a regional or sub-regional ATFM initiative.

Additional guidance material for capacity determination will be developed for inclusion in the Manual on Collaborative
Air Traffic Flow Management (ATFM) (Doc 9971).

1.2 What is the overall impact of this proposal on the strategic objectives of ICAO, namely:

	Positive / Negative / Negligible/None	Rationale: *Please provide an explanation for your choice and highlight any caveats or limitations in the selection*
Safety	Positive	The proposal ensures that the traffic volume will be maintained at the level which can be safely managed by ATS units
Security	Negligible/None	
Environment	Positive	Where the traffic volume is compatible with the capacity of the airspace and aerodromes, it will result in lesser aircraft holding for delays. This corresponds with a reduction in fuel use and CO2 emissions, which improves on the environmental performance of aviation.
Efficiency	Positive	Where the traffic volume is compatible with the capacities declared by the appropriate ATS authority, it is expected that flights will be more efficiently managed.

Note: In the following questions 'States' applies to the adoption and oversight of new SARPs. 'Industry' applies to the service provision and use, whether State owned or not (e.g. ANSPs, airlines aerodromes, meteorology, general aviation, etc). With respect to financial costs for States, it refers to the cost to develop, implement, maintain, and consider oversight issues associated with the proposed change. For Industry, it refers to the cost of implementing the change, where compliance is required by the State, which may translate in costs for equipage, human resources, training, documentation, aircraft modifications or upgrades, operations and airworthiness for example.

1.3 What is the overall impact on resources (financial, personnel, etc.) of this proposal for:

	Increase/decrease/ negligible/unknown	Rationale: *Please provide an explanation for your choice and highlight any caveats or limitations in the selection*
States	Negligible/No impact	States may have to amend their national regulations to include the requirements for capacity determination.
Industry	Increase in overall cost	New system, software and additional subject matter experts might be required.

1.4 In your opinion, do the benefits of this proposal justify the cost of implementing the proposal from the perspective of:

	Answer	Rationale: *Please provide an explanation for your choice and highlight any caveats or limitations in the selection*
States	Yes	Determination of capacity of the controlled airspace and aerodromes is a necessary step to ensure the safe and efficient provision of air traffic services.
Industry	Yes	Information on capacity is essential for consideration of strategic and tactical ATM planning.

PART 2: IMPLEMENTATION PLAN

To assist ICAO and States ensure this proposal will be effectively implemented please answer the following questions.

Note: The ANC recognizes that panel experts may feel limited in their ability to answer some or all of these questions, however, encourages the panels to provide their views. If still unsure, it is acceptable to leave one or more blank. The answers presented to the ICAO Council with the proposed amendment will be further developed by ICAO.

2.1 What supporting documentation is required for this proposed amendment?

Please include reference to any documents that require initial release/amendment e.g. ICAO Document or Circular name and number, industry specification, etc.

- Existing guidance in the Manual on Collaborative Air Traffic Flow Management (Doc 9971) will be reviewed and amended accordingly with more specific guidance on capacity determination.

2.2 What other guidance, training and support activities do you recommend ICAO undertake to ensure the effective implementation of this proposed amendment?

Please include reference to any existing support/promotional programmes and whether it is required globally or regionally e.g. regional seminars, ikits, etc.

- Training courses and workshops at regional levels. The Panel will develop supporting materials.

2.3 What are the essential steps to be followed by a State in order to implement this proposed amendment?

Please include the major steps e.g. amendment of national legislation, change of oversight procedures, training of oversight personnel, required competencies, etc.

- Gap analysis with current national procedures.
- Amendment of national aviation legislation.

2.4 What is the timeframe needed to implement this proposal by:

	Answer	Rationale: *For the State, the timeframe is the length of time needed to implement in the national regulatory framework* *For industry, the timeframe is the length of time needed for industry to start implementing in their operations*
States	1 - 2 Years	This timeframe is needed by States to revise their national regulations, if necessary.
Industry	1 - 2 Years	There may be a need to develop new procedures and training of personnel related to capacity determination.

PART 3: AUDIT PLAN

Note: This section will be completed by ICAO prior to the presentation of any proposed changes to SARPs or PANS. The Panel Secretary will coordinate with the relevant experts in ICAO.

3.1 Does this proposal require an amendment of the USOAP CMA protocol questions to assess effective implementation by States?

Please include reference to existing PQs that may need amendment or description of any new PQs that may be required. State 'Not applicable' if no impact

Yes.

ATMOPSP.008.03	ATFM
Source	12th Air Navigation Conference, ASBU B1-NOPS, B-2 NOPS, B-3 NOPS, B-1 FRTO
Problem Statement	~~The provisions affecting ATFM operations are not keeping up to date with the development of ATFM nodes worldwide and the arrival of new technologies.~~ The current provisions related to ATFM limits the applicability of ATFM in airspace where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned. As operational needs of airspace users and ATS providers evolves, there is an opportunity that ATFM can be utilized, leveraging on innovative information exchanges and collaborative processes, to facilitate cross border collaboration, enabling the safe, orderly and expeditious flow of air traffic.
Specific Details	~~ATFM is an enabler of ATM efficiency. ICAO provisions related to ATFM need to be updated and kept current, catering for worlwide applicability while ensuring the consisent development and implementation of new tools and technologies~~ ~~- ATFM message set~~ ~~- ATFM phraseology~~ ~~- ATFM staff training requirements and baseline competencies~~ ~~Coordination activities expected with ATMRPP and CP.~~ The scope of collaborative decision making and ATFM (ATFM/CDM) continues to evolve in line with operational needs and the innovative opportunities arising from information exchange and collaborative processes to facilitate the safe, orderly and expeditious flow of air traffic, and should not be limited to situations when demand exceeds capacity. ATFM/CDM can also evolve to better support the effective implementation of coordinated ATM contingency planning, measures and recovery plans. Recent crises have heightened awareness of the criticality of ATFM/CDM being a foundational service for handling disruptions, prioritization, exemptions and managing regional and inter-regional traffic flows in a collaborative and harmonized manner. The current provisions should be amended and accompanied with additional guidance materials to facilitate the establishment of ATFM services and the evolution towards cross border ATFM/CDM collaboration and aiming for a globally connected networks of ATFM services. ATFM is a major enabler of safety, efficiency, cost-effectiveness and environmental sustainability of the ATM system. ICAO provisions related to ATFM need to be updated and kept current, catering for worldwide applicability while ensuring the consistent development and implementation of new tools and technologies. The amendment of ICAO provisions will be mainly carried out in two packages, first one applicable in 2024 catering for building the foundation for ATFM and the second package to introduce the required significant changes to the ATFM concept to be applicable by 2026. The ATFM guidance material will be ready by 2023. The scope of work will include but not limited to: - Determination of Capacity - ATFM measures (regulations) - ATFM information exchange set - ATFM phraseology - ATFM staff training requirements and baseline competencies Close coordination of activities with ATMRPP for (FF-ICE) and other expert group work related to ATFM.

Expected Benefits	Enhanced safety, ~~i~~increased capacity, maximised use of available airspace, reduced delays, increased flight efficiency, greater environmental performance of aviation and support to contingency planning and implementation of recovery plans.							
Reference Documents								
Primary Expert Group:	Air Traffic Management Operations Panel (ATMOPSP)							
	WPE No.	**Document Affected or Actions Needed**	**Description of Amendment proposal or Action**		**Supporting Expert Group**	**Status**	**Expected dates:**	
							Delivery	**Effective**	**Applicability**
✓	9555	*Manual on Collaborative Air Traffic Flow Management* (Doc 9971)	Amend and develop guidance related to exchange of information between ATFM systems, training and core competencies, and how to implement and exercise ATFM.			~~On~~Re-schedule	Q2 2023 ~~2018~~		Nov 2026 ~~Nov 2020~~
✓		Annex 11	Develop provisions related to ATFM and capacity determination.			Proposed	Q2 2021	June 2024	Nov 2026
✓		PANS-ATM (Doc 4444)	Develop procedures related to AFTM and capacity determination.			Proposed	Q2 2021	June 2024	Nov 2026
✓	9553	Annex 11	Identify requirements fostering increased implementation of ATFM.			Re-scheduled	Q2 2022 ~~Q2 2020~~	June 2024 ~~Jun 2022~~	Nov 2026 ~~Jun 2022~~
✓	9554	PANS-ATM (Doc 4444)	Identify the procedures instrumental to the implementation of ATFM; develop ATFM phraseology and an ATFM message set.			Re-scheduled	Q2 2022	June 2024	Nov 2026
✓		ATFM training and awareness material	Develop the content for training and awareness.			Proposed	Q4 2023		
Status:			**Priority:**	**Initial Issue Date:**	**Date Approved by ANC:**		**Session / Meeting:**		
~~Approved~~			-	~~22 September 2015~~	~~05 June 2019~~		~~211-10~~		
RATIONALE									
~~AN-WP/9297~~									