

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**REPORT OF THE SIXTEENTH MEETING OF THE ASIA/PACIFIC
AIR TRAFFIC FLOW MANAGEMENT AND
AIRPORT COLLABORATIVE DECISION-MAKING STEERING GROUP
(ATFM & A-CDM/SG/16)**

BANGKOK, THAILAND, 06 – 10 April 2026

The views expressed in this Report should be taken as those of the
Meeting and not the Organization

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

ATFM & A-CDM/SG/16
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INTRODUCTION

Meeting

1.1 The Sixteenth Meeting of Air Traffic Flow Management and Airport Collaborative Decision Making Steering Group (ATFM & A-CDM/SG/16) was held in Bangkok, Thailand, from 6 to 10 April 2026. The Meeting included a joint plenary session with the Fifteenth Meeting of Meteorological Requirements Working Group (MET/R WG/15).

Attendance

2.1 The ATFM & A-CDM/SG/16 was attended by 134 participants from 20 States/Administrations, and six International Organizations including Australia, Cambodia, China, Hong Kong China, Fiji, India, Indonesia, Japan, Lao PDR, Malaysia, Maldives, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam, ACI, CANSO, IATA, ICCAIA, IFATCA and ICAO. A list of registered participants is at **Appendix A** to the report.

2.2 The joint plenary session was conducted on 8 April 2026 and was attended by 168 participants from 22 States/Administrations and five International Organizations, including Australia, Bhutan, Cambodia, China, Hong Kong China, Fiji, India, Indonesia, Japan, Lao PDR, Malaysia, Maldives, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam, ACI, CANSO, IATA, ICCAIA and ICAO.

Officers and Secretariat

3.1 Mr. Piyawut Tantimekabut, ATM Expert (Director Level), AEROTHAI, Thailand, Chaired the ATFM & A-CDM/SG/16.

3.2 Mr. Manjunath Krishna Nelli, Regional Officer Air Traffic Management (ATM), ICAO Asia and Pacific Regional Sub-Office (APAC RSO) was Secretary for the ATFM & A-CDM/SG/16. He was assisted by Mr. Hiroyuki Takata, Regional Officer ATM, Mr. Mior Adli Bin Mior Sallehuddin, Regional Officer ATM, Mr. Tak Chuen Chui, and Dr. Prakayphet Chalayonnawin, Programme Analysis Associate (ATM), ICAO Asia and Pacific (APAC) Office and Ms. Chen Yanru, Administrative Support and Programme Assistant, ICAO APAC RSO.

3.3 Mr. Piyawut Tantimekabut and Mr. Ashwin Naidu, Aviation Customer Lead, Australian Bureau of Meteorology, co-Chaired the joint plenary session of ATFM & A-CDM/SG/16 & MET R/WG/15. Mr. Peter Dunda, Regional Officer Aviation Meteorology, ICAO APAC Office, and Mr. Manjunath Krishna Nelli, Regional Officer ATM, ICAO APAC RSO, were Secretaries of the joint plenary session.

Language and Documentation

4.1 The working language of the Meeting and all documentation was English. There were 22 working papers, seven information papers, 16 presentations and one flimsy considered by the Meeting.

4.2 The list of working and information papers is at **Appendix B** to the report.

4.3 **DISCLAIMER:** The presentation of material in this report does not imply the expression of any opinion whatsoever on the part of ICAO, Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) or ATM Sub-Group of APANPIRG or ATFM & A-CDM/SG/16 concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

Opening of the Meeting

5.1 On behalf of Mr. Tao Ma, Regional Director of the ICAO APAC Office, Mr. Manjunath Krishna Nelli welcomed all the participants to the Meeting.

5.2 Mr. Piyawut Tantimekabut welcomed participants to the Meeting.

Draft Conclusions, Conclusions, Draft Decisions and Decisions of ATFM & A-CDM/SG – Definition

6.1 ATFM & A-CDM/SG recorded its actions in the form of Draft Conclusions, Conclusions, Draft Decisions and Decisions within the following definitions:

Draft Conclusions of the ATFM & A-CDM/SG deal with matters that, according to APANPIRG terms of reference, require the attention of States, or action by the ICAO in accordance with established procedures;

Conclusions of the ATFM & A-CDM/SG deal with matters of a technical nature relating to regional guidance material for publication on the ICAO APAC Office website;

Draft Decisions of the ATFM & A-CDM/SG deal with the matters of concern only to APANPIRG and its contributory bodies; and

Decisions of the ATFM & A-CDM/SG that relate solely to matters dealing with the internal working arrangements of ATFM/SG.

List of Draft Conclusions, Conclusions, Decisions and Draft Decisions

7.1 List of Draft Conclusions

Draft Conclusion ATFM & A-CDM/SG/16-1: Adoption of Asia/Pacific Regional Guidance for Assessment of Airport Capacity and Airspace Capacity	
<p>What: That, the <i>Asia/Pacific Regional Guidance for Assessment of Airport and Airspace Capacity</i> at Appendix C to the report be uploaded to the ICAO APAC Office eDocuments webpage, for guidance and reference, by APAC States/Administrations in conducting airport and airspace capacity assessments in accordance with the provision of the <i>Regional Framework for Collaborative ATFM</i></p>	<p>Expected impact:</p> <p><input type="checkbox"/> Political / Global</p> <p><input type="checkbox"/> Inter-regional</p> <p><input type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Ops/Technical</p>
<p>Why: To provide guidance for conducting airport and airspace capacity assessment and to improve understanding of the processes by cataloging the best practices and models as adopted by Asia/Pacific States/Administrations</p>	<p>Follow-up: <input type="checkbox"/> Required from States</p>
<p>When: 7-Aug-26</p>	<p>Status: Draft to be adopted by Subgroup</p>
<p>Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:</p>	

Draft Conclusion ATFM & A-CDM/SG/16-2: Adoption of ATFM FIXM Message Data Attributes and Associated Message Templates Based on FIXM Version 4.3 as Asia/Pacific Regional Standard	
<p>What: Adopt the ATFM FIXM message data attributes and associated message templates (Appendix A, B, and C), based on FIXM Version 4.3, as APAC regional standard templates effective Q1/2027 to support cross-border ATFM information exchange via SWIM</p>	<p>Expected impact:</p> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
<p>Why: To support harmonised and automated message validation for cross-border ATFM system to system data exchanges, in alignment with Conclusion APANPIRG/35/4</p>	<p>Follow-up: <input type="checkbox"/> Required from States</p>
<p>When: 7-Aug-26</p>	<p>Status: Draft to be adopted by Subgroup</p>
<p>Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input checked="" type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: SWIM TF</p>	

7.2 List of Conclusions

Conclusion ATFM & A-CDM/SG/16-3: Adoption of a revised <i>Asia/Pacific ATFM Daily Plan (ADP) Exchange Procedure</i>	
<p>What: That, noting the importance of effective procedure for ATFM Daily Plan (ADP) exchange in the regional ATFM network, the revised <i>Asia/Pacific ATFM Daily Plan (ADP) Exchange Procedure</i> be adopted as a “version 1.0” together with a separate Asia/Pacific ADP Exchange Operational Contact List be uploaded to the ICAO APAC Office eDocuments webpage, replacing the current working draft version</p>	<p>Expected impact:</p> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
<p>Why: To adopt a common procedure for ADP exchange among States/Administrations in the region, enabling more effective distribution and processing of ADPs and paving the way toward automatic digital ADP exchange in the future</p>	<p>Follow-up: <input type="checkbox"/> Required from States</p>
<p>When: 10-Apr-26</p>	<p>Status: Adopted by ATFM & A-CDM/SG</p>
<p>Who: <input type="checkbox"/> Sub groups <input type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:</p>	

7.3 List of Draft Decisions

Nil.

7.4 List of Decisions

Nil.

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REPORT ON AGENDA ITEMS

Agenda Item 1: Adoption of Agenda

Provisional Agenda (WP-01-01)

1.1 The provisional agenda was adopted by the Meeting.

Agenda Item 2: Review Outcomes of Related Meetings

Related Meeting Outcome (WP-02-01)

2.1 The Meeting was presented with the Air Traffic Flow Management (ATFM) and Airport Collaborative Decision Making (A-CDM) related outcomes of meetings conducted by the relevant contributory bodies of the APANPIRG.

2.2 The Thirteenth Meeting of Air Traffic Management Sub-Group (ATM/SG/13) of APANPIRG adopted the following Conclusions:

- **Conclusion ATM/SG/13-3:** *The Use of Digital Form to Collect Annual Regional ANS-related Monitoring and Reporting Data*
- **Conclusion ATM/SG/13-4:** *Addition Appendix to the Aisa/Pacific Regional Framework for Collaborative ATFM*
- **Conclusion ATM/SG/13-5:** *Change Process of the FIXM Version Used for Asia/Pacific Cross-Border Operational ATFM System-to-System Information Exchange in SWIM*
- **Conclusion ATM/SG/13-14:** *Normalization of Asia/Pacific Regional A-CDM Monitoring and Reporting Scheme*

2.3 The Meeting noted the discussion during ATM/SG/13 on the APANPIRG Air Navigation Deficiencies List, the initiative on establishing a collaborative operational mechanism for regional ATFM in the APAC region and the proposed inclusion of ATFM-related phraseologies contained in ICAO Doc 9971 into ICAO Doc 4444.

2.4 The Twenty-Ninth Meeting of ICAO Asia/Pacific Meteorology Sub-group (MET SG/29) of APANPIRG adopted the following Decision:

- **Decision MET SG/29/12:** *Updating the APAC Use Cases for SWIM-based Meteorological Information Services Supporting ATFM*

2.5 The following Draft Conclusion and Draft Decision endorsed from the Twenty-Ninth Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/29) of APANPIRG was adopted by the APANPIRG/36:

- **Decision APANPIRG/36/11:** *Adoption of APAC Common SWIM Information Services, v1.0*
- **Conclusion APANPIRG/36/12:** *Asia/Pacific Regional FIXM version 4.3 Extension*

2.6 The following Draft Decision endorsed from the ATM/SG/13 was adopted by the APANPIRG/36:

- **Decision APANPIRG/36/8: Modification of Name of ATFM Steering Group (ATFM/SG) to ATFM and A-CDM Steering Group (ATFM & A-CDM/SG)**
-

Agenda Item 3: ATFM Global Update

Presentation on ATFM New Provisions (SP/01)

3.1 Mr. Elie El Khoury, Regional Coordinator from Air Navigation Bureau, ICAO HQ presented on the topic of “ATFM New Provisions” to provide updates on the proposed. new ICAO provisions on ATFM, including amendments to ICAO Annex 11, PANS-ATM (Doc 4444), and updates to the guidance material in ICAO Manual on Collaborative ATFM (Doc 9971). These changes aligned with ICAO’s Strategic Plan 2026–2050 and responded to the continued growth and increasing complexity of global air traffic following pandemic recovery, emphasizing the need for a more systematic and collaborative approach to demand and capacity balancing.

3.2 It was highlighted that ATFM had been elevated from a conditional measure to a mandatory supporting air traffic service (ATS). Under the new Standards in ICAO Annex 11, States/Administrations were required to establish and to provide ATFM services for all controlled airspace and designated aerodromes, either individually or collaboratively. Key requirements included the establishment of ATFM units with defined areas of responsibility, designation of Flow Management Positions (FMPs), coordination between ATFM units, and formal determination and declaration of air traffic control (ATC) capacity.

3.3 A major element of the new provisions was the formalization of ATFM operations across four phases (strategic, pre-tactical, tactical, and post-operations) supported by structured information exchange among ATFM stakeholders. The provisions would also strengthen the requirements for capacity management, ATFM planning, coordination mechanisms, and progressive integration with flight and flow information for a collaborative environment (FF-ICE) and system-wide information management (SWIM) concepts.

3.4 It was emphasized that ATFM being a key enabler of safety, efficiency, cost-effectiveness, and environmental sustainability, particularly in managing disruptions, contingency situations, and recovery operations. The revised provisions set goals to ensure globally consistent application of ATFM measures and to support enhanced cross-border, intra-regional, and inter-regional collaboration, with a long-term vision of an “ATFM Network of Networks.”

3.5 Regarding implementation, the Meeting was advised that States/Administrations would need to develop national and/or regional ATFM implementation plans covering regulatory frameworks, organizational structures, systems, capacity determination processes, daily planning, operating procedures, training requirements, and stakeholder coordination. The consultation process for the proposed amendments was in progress, with final review by the ICAO Air Navigation Commission scheduled for June 2026.

3.6 The Meeting was informed of the ICAO Air Navigation World (ANW) 2026 – Air Traffic Flow Management, scheduled from 5 to 9 October 2026 in Montreal, Canada. States/Administrations and relevant stakeholders were encouraged to participate the event. The list of subjects to be covered in the ANW was also introduced.

3.7 In response to a query on the concept of “ATFM Network of Networks”, it was clarified that the concept of “ATFM Network of Networks” referred not to technical connectivity alone, but to a progressive organizational and operational linking of multiple ATFM units at national, sub-regional, regional, and global levels. States or groups of States could establish their own ATFM arrangements, such as a sub-regional or regional ATFM organization, based on operational needs and maturity.

Agenda Item 4a: Review of Current ATFM Operations and Problem Areas

Regional ATFM Implementation Status (WP-4a-01)

4.1 ICAO provided a summary of the ATFM implementation status of APAC Administrations, reported against the performance objectives of the Regional Framework for Collaborative ATFM. Annual implementation status reports for 2026 were received from 22 APAC Administrations:

Australia, Bangladesh, Bhutan, Cambodia, China, Hong Kong China, Macao China, Fiji, India, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, and Thailand.

4.2 Republic of Korea and Viet Nam provided the implementation update after the working paper was prepared. Hence its implementation was not available in the working paper but was included in the Meeting report.

4.3 Based on reports received, States were assessed as having *Robust* (90-100%), *Marginal* (70-89%) or *Incomplete* (0-69%) implementation.

4.4 Australia, China, Hong Kong China, Singapore, Thailand and United States were assessed as having *Robust* implementation.

4.5 The following APAC States had never provided an implementation status report:

Afghanistan, Brunei Darussalam, Cook Islands, DPR Korea, Kiribati, Marshall Islands, Micronesia, Nauru, Palau, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu.

4.6 As Phase IIIB *Regional ATFM Capabilities* were to be implemented by November 2025, these capabilities were incorporated into the overall assessment of implementation status. **Table 1** summarised the overall implementation status as of 11 March 2026.

Table 1: APAC Region ATFM Implementation Status

Administration (Tier)	% age of Implementation				Implementation Status
	2023	2024	2025	2026	
Afghanistan (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Australia (B*)	<i>no report</i>	98	<i>no report</i>	95	Robust
Bangladesh (A ^{Error!} Bookmark not defined.)	<i>no report</i>	6	15	6	Incomplete

* Change in Tier

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Administration (Tier)	% age of Implementation				Implementation Status
	2023	2024	2025	2026	
Bhutan (B)	21	21	21	41	Incomplete
Brunei Darussalam (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Cambodia (A)	95	89	91	77	Marginal
China (A)	97	99	94	98	Robust
Hong Kong, China (A)	95	95	95	92	Robust
Macao, China (B)	39	47	47	47	Incomplete
Cook Islands (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Fiji (A <small>Error! Bookmark not defined.</small>)	0	16	24	7	Incomplete
France (French Polynesia) (B)	40	40	<i>no report</i>	<i>no report</i>	Incomplete
DPR Korea (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
India (A)	85	88	88	81	Marginal
Indonesia (A)	54	57	57	65	Incomplete
Japan (A)	91	93	93	86	Marginal
Kiribati (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Lao PDR (B <small>Error! Bookmark not defined.</small>)	<i>no report</i>	<i>no report</i>	<i>no report</i>	43	Incomplete
Malaysia (A)	36	37	84	79	Marginal
Maldives (B)	<i>no report</i>	20	<i>no report</i>	<i>no report</i>	Incomplete
Marshall Islands (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Micronesia (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Mongolia (A)	28	28	31	25	Incomplete
Myanmar (B)	<i>no report</i>	30	<i>no report</i>	<i>no report</i>	Incomplete
Nauru (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Nepal (A <small>Error! Bookmark not defined.</small>)	<i>no report</i>	39	39	13	Incomplete
New Caledonia (B)	<i>no report</i>	43	<i>no report</i>	<i>no report</i>	Incomplete

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Administration (Tier)	% age of Implementation				Implementation Status
	2023	2024	2025	2026	
New Zealand (A)	78	78	73	63	Incomplete
Pakistan (B)	59	65	65	72	Marginal
Palau (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Papua New Guinea (A)	<i>no report</i>	21	<i>no report</i>	67	Incomplete
Philippines (A)	59	64	65	60	Incomplete
Republic of Korea (A)	93	97	97	85	Marginal
Samoa (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Singapore (A)	99	99	100	95	Robust
Solomon Islands (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Sri Lanka (B)	<i>no report</i>	25	25	24	Incomplete
Timor Leste (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Tonga (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Thailand (A)	91	91	93	90	Robust
Tuvalu (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
United States (A)	96	96	96	<i>no report</i> (95 [†])	Robust
Vanuatu (B)	<i>no report</i>	<i>no report</i>	<i>no report</i>	<i>no report</i>	Did Not Report
Viet Nam (A)	71	71	85	85	Marginal

4.7 **Figure 1** summarized the implementation status for Part A (Administrations that were expected, or intend, to implement and distribute cross-border ATFM measures).

[†] No data provided for 2026, percentage adjusted based on previous submission.

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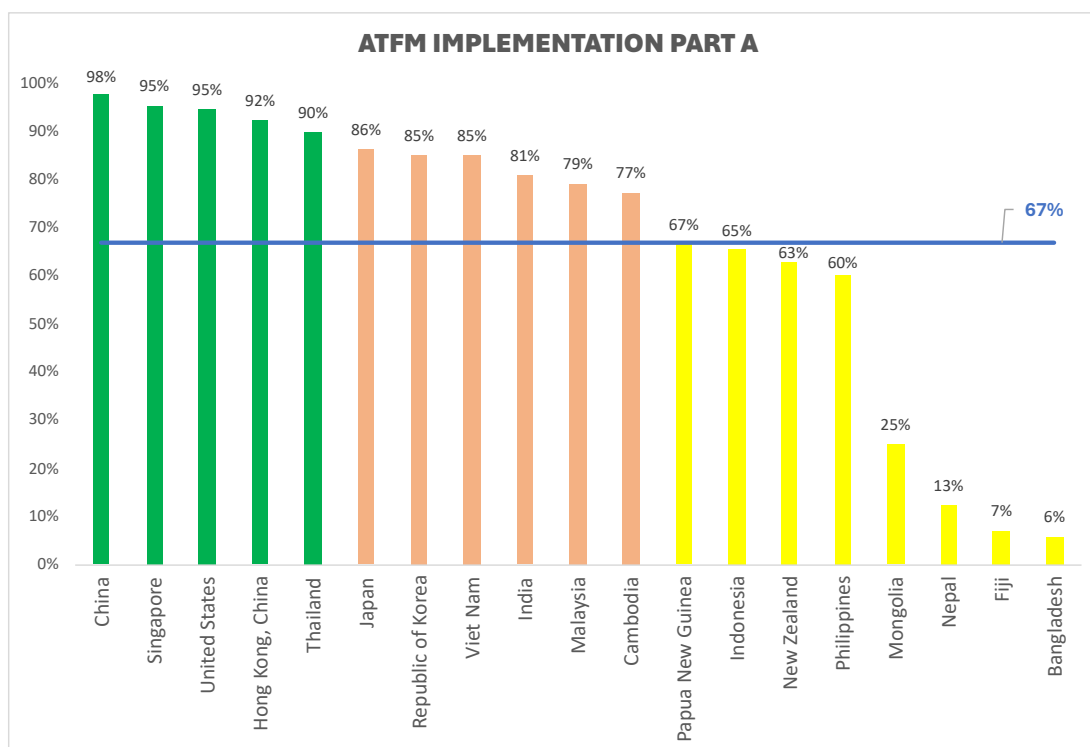


Figure 1: ATFM Implementation Status - Part A

4.8 Figure 2 summarized the implementation status for Part B (Administrations that were not expected to implement and distribute cross-border ATFM measures).

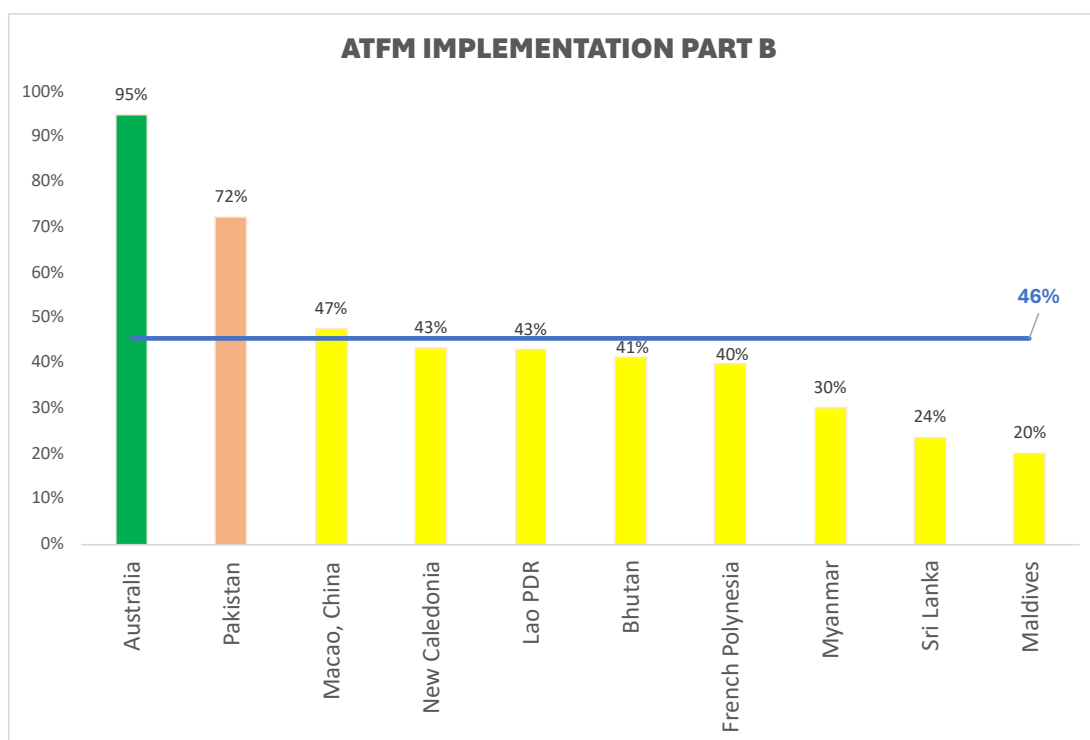


Figure 2: ATFM Implementation Status - Part B

4.9 The *Regional ATFM Monitoring and Reporting Form* in MS Excel format was available on the ICAO APAC Office [eDocuments \(ATM\) webpage](#) for reference and Administrations’ internal data preparation only. The annual data submission and/or any subsequent updates shall be submitted through the *Asia/Pacific Regional ATFM Plan Monitoring and Reporting Form* over the MS Forms platform (<https://forms.office.com/r/PPz8z81Xk6>).

BOBCAT ATFM Operational Updates (WP-4a-02)

4.10 Thailand presented the post-operations analysis of the Bay of Bengal Cooperative ATFM (BOBCAT) operations which was resumed since 4 September 2025. The analysis covered traffic demand and delay impact assessment, ATFM [Calculated Take-Off Time (CTOT)] compliance and effectiveness analysis based on achievable flight levels by BOBCAT traffic for the period of 4 September 2025 to 28 February 2026.

4.11 During the 178-day analysis period, BOBCAT handled 9,180 flights, averaging 52 flights per night. Traffic demand saw a significant increase starting in late November 2025, peaking at 80 flights on 18 January 2026. This surge followed EASA safety bulletins advising operators to avoid the Tehran FIR, leading to a shift in traffic toward Kabul FIR entry waypoints such as DOBAT and BIROS. **Figure 3** illustrated the daily traffic distribution by entry waypoints.

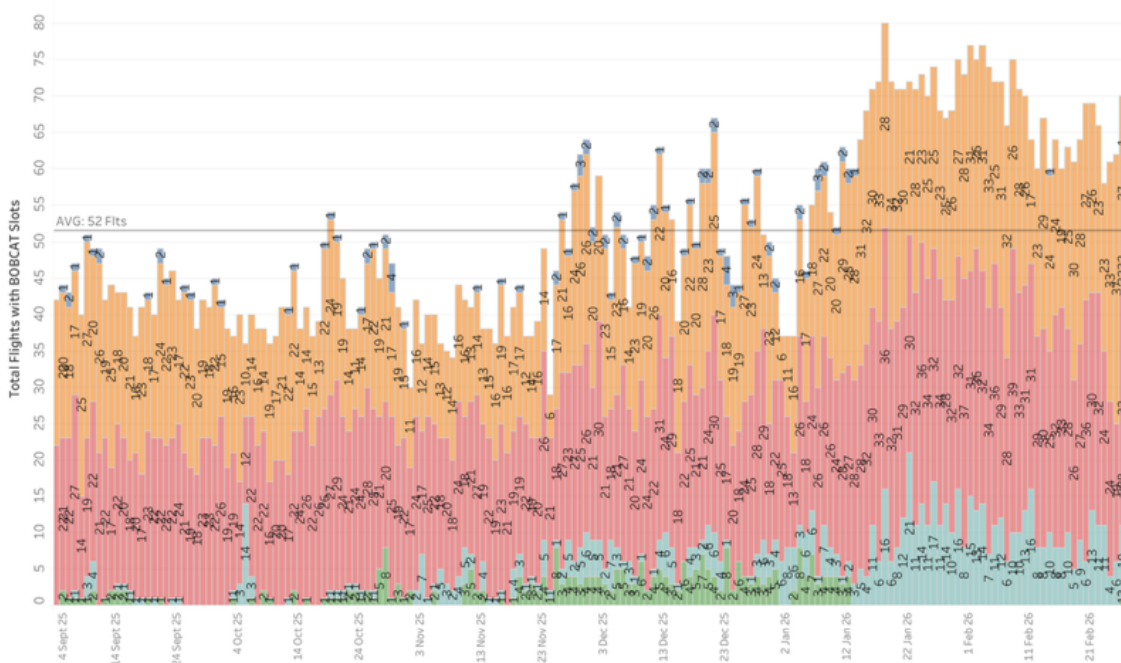


Figure 3: BOBCAT Traffic Demand from Slot Request: 4 Sep 2025 - 28 Feb 2026

4.12 A total of 24 aerodromes and 29 airlines participated in BOBCAT operations. The primary departure hubs were Bangkok (VTBS), Singapore (WSSS) and Delhi (VIDP). Thai Airways maintained the largest share of flights at 21.0%, followed by Singapore Airlines at 11.1% and Vietnam Airlines at 10.1%. **Figure 4** showed the BOBCAT major stakeholders and their operational share.

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THA 21.0% (11 flts/night)	DLH 9.5% (5 flts/night)	BAW 6.7% (4 flts/night)	THY 6.2% (4 flts/night)	EVA 5.3% (3 flts/night)	
SIA 11.1% (6 flts/night)	CAL 5.3% (3 flts/night)	SWR 4.6% (3 flts/night)	AUA 1.4% (1)	MAS 1.3% (1)	ACA 1.3% (1)
HVN 10.1% (6 flts/night)	KLM 4.8% (3 flts/night)	AFR 4.2% (3 flts/night)	CFG 1.3% (1)	FIN 1.2% (1)	VIR
			AHY 1.2% (1)		
			QFA		

Figure 4: BOBCAT Slot Allocation by Airlines: 4 Sep 2025 - 28 Feb 2026

4.13 ATFM delays averaged 3.6 minutes per flight, totalling 29,387 minutes for the period. While delays were generally low, spikes of up to 7.2 minutes in average ATFM delays were observed during demand surges in early 2026. High-density waypoints such as DOBAT and BIROS experienced higher average delays of 4.0 and 3.1 minutes per night, respectively. Figure 5 illustrated the daily average ATFM delay.

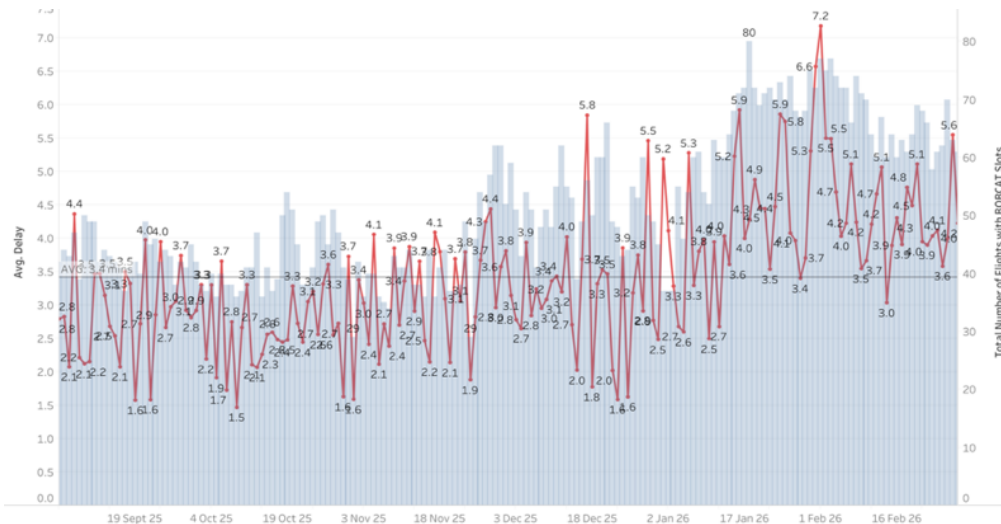


Figure 5: Daily Average ATFM Delay: 4 Sep 2025 - 28 Feb 2026

4.14 The Meeting was reminded that ATS movement messages should continue to be forwarded to the Bangkok ATFM Unit via aeronautical fixed telecommunication network (AFTN) address VTBBZDZX. Missing ATS movement messages, in particular departure messages (DEP), would impact the accuracy of post-operations analysis, and States/Administrations were requested to ensure proper transmission.

4.15 It was highlighted that the success of BOBCAT operations hinged on high CTOT compliance being facilitated by departure aerodromes. Data as shown in Figure 6 revealed that CTOT compliance varied significantly by aerodrome, with major hubs showing high compliance while others showed room for improvement.

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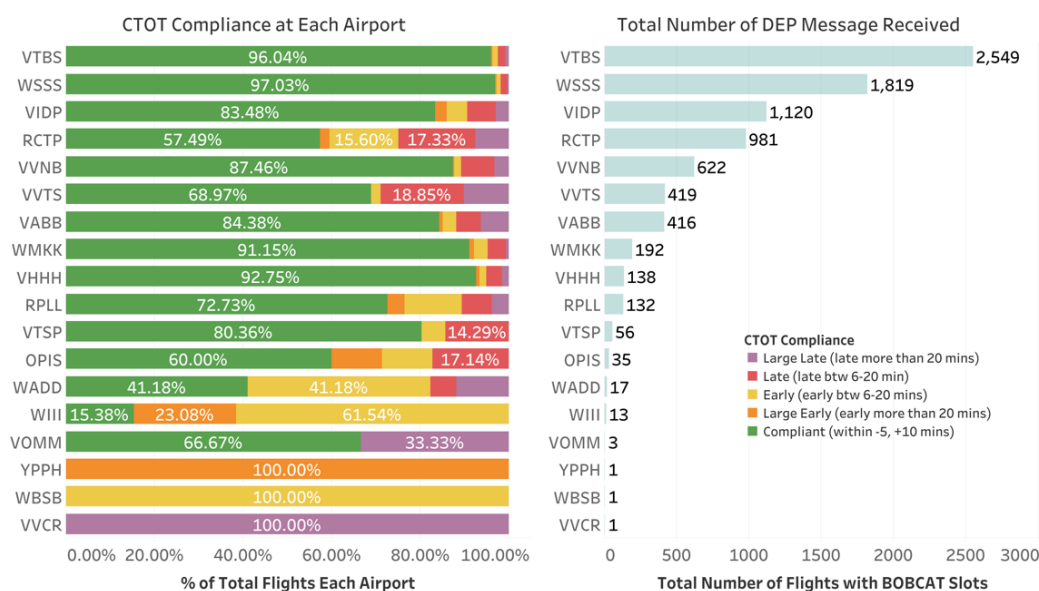


Figure 6: BOBCAT CTOT Compliance at Major Aerodromes: 4 Sep 2025 - 28 Feb 2026

4.16 According to the traffic sample data (TSD) provided by Pakistan, a high percentage of flights (approximately 92%) were able to enter Kabul FIR at the same or higher flight levels as those assigned by the BOBCAT system. For the 8% of flights that entered at lower levels, the primary cause was identified as compliance with the assigned Calculated Time Over (CTO) at the entry waypoint (41%), followed by tactical ATC interventions (27%) and CTOT non-compliance (19%).

4.17 Thailand also conducted an analysis on the impact of different CTO window configurations. It was noted that expanding the window to 2 or 5 minutes could increase compliance to 19% or 30%, respectively, however widening the CTO compliance window could require additional spacing between CTOs assigned by the system which would result in potential increase in ATFM delay.

4.18 Throughout the 178-day period since the resumption of BOBCAT up to 28 February 2026, the operation had proven effective in balancing traffic demand with available airspace capacity during the peak nighttime period in Kabul FIR, with flights achieving the same or higher flight levels when transiting the airspace, estimating approximately 3,350 tons of fuel savings and 10,586 tons of CO₂ emissions reduction.

4.19 In addition to the routine post-operations analysis, Thailand also conducted an analysis on the impact of heightening political tension in the Middle East region which resulted in airspace closures of up to nine regional FIRs since the beginning of March 2026. The initial assessment confirmed that the closure of Middle East airspace had resulted in an increasing trend of BOBCAT traffic demand, particularly on ATS routes routing traffic around Tehran FIR (L750, N644, and L509-M875).

4.20 Considering this impact, Thailand recommended airspace users to include alternate Kabul FIR entry waypoints and flight levels, and to configure their Maximum Acceptable Delay (MAD) parameters appropriately, in their slot requests to reduce the possibility of slots not being allocated.

4.21 IATA suggested that Thailand's recommendation be communicated to the airspace users through established channels such as through BOBCAT mailing list and announcement on BOBCAT website. IATA would also assist by communicating to their members accordingly.

NARAHG Updates – Enhancing Cross-Border ATFM Collaboration through Flexible, Automated “0-VOICE” Coordination (WP-4a-03)

4.22 NARAHG presented a new cross-border ATFM coordination method that jointly trialled by China and Republic of Korea under the NARAHG framework. The concept unitized CTO at boundary waypoints allowing for “0-VOICE” operations where no manual voice communication be required between coordination units. The downstream unit would define a set of operational parameters including Trailing Intervals, Waypoint Tolerances and Minimum Intervals to govern traffic flow.

4.23 Under this model, the upstream unit was granted the autonomy to manage its own departure sequence and adjust traffic queues independently, provided concerned flights be predicted to meet the constraints. Automated alerts would only be triggered if a potential infringement of the minimum interval being detected. This approach significantly reduced the coordination burden on controllers and tactical ATC intervention, as demonstrated by the positive endorsement from Shanghai ACC.

4.24 A live operational trial was conducted on 26 February 2026 between the Republic of Korea (upstream) and China (downstream) using the Cross Region ATFM Collaborative Platform (CRACP) data-sharing network. The trial monitored eight flights bound for Shanghai Pudong International Airport (ZSPD) via the SADLI boundary waypoint.

4.25 The trial validated the “0-VOICE” environment that four flights required zero adjustments; four flights were managed autonomously by upstream unit without re-coordination; the downstream unit maintained full situational awareness through real-time data sharing on the CRACP system.

4.26 NARAHG expressed that the second phase of trials was planned to enhance CTO accuracy by requesting flight crews to enter the assigned CTOs into the onboard FMS. This phase aimed to narrow the waypoint tolerance towards ± 1 minute. NARAHG emphasized such efforts would support the region’s long-term transition towards Trajectory-based Operations (TBO) as envisioned in the ICAO *Global Air Navigation Plan (GANP)*.

4.27 NARAHG noted that despite the CTO trial was conducted under no ATFM delay conditions to provide an indicative result over CTO compliance, the “0-VOICE” coordination method provided useful insight for cross-border ATFM coordination among NARAHG to reduce Air Navigation Service Provider (ANSP)-to-ANSP voice coordination while maintaining downstream situational awareness. In response to query on communication of the CTO to the cockpit, it was clarified that the CTO would still be communicated to the cockpit using voice communications.

4.28 Noting the trial was conducted between China and Republic of Korea, ICAO queried whether similar trials be planned between Japan and Republic of Korea. Japan commented that CTOT and CTO exchange were used between the two States, no trial was planned at the moment but noted the benefits of “0-VOICE” concept to reduce verbal coordination.

4.29 The Meeting also discussed the potential challenges and difficulties for flight crews to enter and comply with the CTO especially when there were multiple CTO constraints along the flight route.

Progress Update from the Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC) (WP-4a-04)

4.30 The Meeting was presented with the updates from AMNAC covering the network post-operations analysis for March 2025 – February 2026, an agreed CTOT compliance performance target, updates to the Common Operating Procedure (COP), adoption of harmonized REGUL and REGCAUSE nomenclatures, modification of the ATFM Daily Plan (ADP) exchange procedure, and progress of the trial of ATFM information exchange via SWIM.

4.31 Network post-operations analysis showed that Ground Delay Programs (GDPs) were used consistently among Level 3 ANSPs to balance demand and capacity. Of flights subjected to CTOTs, 77% departed from Level 2 or 3 aerodromes. CTOT compliance varied: 71% for departures from aerodromes of Level 3 ANSPs and 60% for departures from aerodromes of Level 2 ANSPs, with CAAP (the Philippines) demonstrating notably high compliance at 86%. Recognizing the need for improvement, AMNAC/25 agreed to monitor CTOT compliance against an initial 80% performance target, referencing both regional experience and benchmarks from the European Union and United States. Performance against this target would form the monitoring baseline for AMNAC in the coming year and may serve as the foundation for recommending region-wide CTOT compliance performance expectations in the future.

4.32 In addition to compliance, AMNAC identified the need for expanded post-operations analysis, particularly concerning the locations and causes of ATFM constraints and the effectiveness of ATFM measures. Harmonized nomenclatures for REGUL and REGCAUSE fields were recognized as essential for better network-wide insight. Work on improved performance indicators is being advanced through **ATFM & A-CDM/SG/16 IP-4a-02**.

4.33 The COP underwent updates during AMNAC/24 and AMNAC/25 to improve contextual information, management of contact information, and Standard Taxi-out Time (STT) parameters. Harmonized REGUL and REGCAUSE nomenclatures were incorporated into the updated COP (version 7.0). To support dynamic updates, contact and STT information were moved to a new *AMNAC Supplementary Information Document (SID version 2.0)*. Both documents had been distributed to all participating ANSPs.

4.34 Regarding REGUL and REGCAUSE nomenclature, ***Draft Conclusion ATFM/SG/15-2*** had been forwarded to the ATM Sub-Group and required endorsement within ICAO's CNS Sub-Group in 2026. Given delays in formal publication of the revised regional ICD, AMNAC agreed to adopt the nomenclatures ahead of the ICD and incorporated them into the COP as Annex D. This adoption would enable ATFM system upgrades by Level 3 ANSPs and support improved identification of constraint locations and delay causes. ANSPs of other regional States/Administrations were invited to consider adopting the nomenclature as stipulated.

4.35 AMNAC continued work on the standardization of ADP data formats, supporting future SWIM-based digital exchange. The AMNAC Core Team revised the *Asia-Pacific ADP Exchange Procedure* to include a new ADP template and updated contact lists, with the proposed procedure submitted in **ATFM & A-CDM/SG/16 WP-6a-04** for adoption by the Meeting.

4.36 With regards to the technical development supporting ATFM information exchange via SWIM, the AMNAC Technical Subgroup (TSG) proposed focusing on the exchange of cross-border ATFM FIXM messages covering three primary data types, i.e. CTOT, CTO, and Target Take-Off Time (TTOT). To support the exchange of these data types using FIXM version 4.3, AMNAC TSG undertook work to identify the required data attributes, map these data attributes to FIXM v4.3 Core and Regional APAC Extension, and develop ATFM FIXM v4.3 message templates. Further details were provided in **ATFM & A-CDM/SG/16 WP-6b-02**.

4.37 AMNAC TSG had also established a phased approach for the ATFM Information Exchange Trial with clearly defined milestones. With offline verification and validation of messages completed in March 2026, the group targeted trial exchanges of ATFM FIXM messages among SWIM systems in May 2026 followed by non-operational ATFM-to-ATFM system message exchange in September 2026.

4.38 The Meeting was informed that the update process of AFTN/AMHS ICD for ATFM had been taken up by ICAO Secretariat with the ICD expected to be presented to ACSICG/13 (April 2026) and proposed to CNS SG/30 (July 2026) for endorsement and noted the proposal for using REGUL and REGCAUSE as part of AMNAC ICD in the interim.

4.39 The Meeting discussed the proposal for recommending CTOT compliance target as 80% to be considered as a regional target. It was clarified that the recommendation was based on reference to established global targets. The Meeting also noted that caution was expressed against recommending or mandating such regional benchmarks without due consideration of local conditions, operational constraints, and contextual factors.

Analysis of CTO Trial in Fukuoka FIR (WP-4a-05)

4.40 Japan presented the update on the CTO trial conducted within Fukuoka FIR, analyzing approximately 2,800 flights. The trial aimed to evaluate the operational performance, time accuracy, and cancellation factors of CTO as an ATFM measure. The analysis highlighted how operational conditions, including weather and traffic situations, influence the effectiveness of these measures in balancing demand and capacity. **Figure 7** illustrated the scope of the trial.

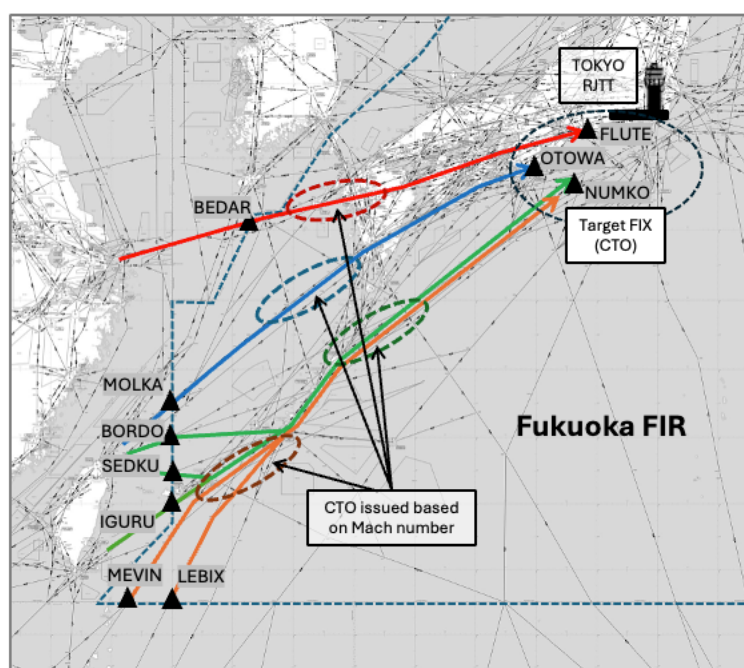


Figure 7: CTO Target Fixes in Fukuoka FIR

4.41 Flights with assigned CTO were expected to achieve a window of ± 3 minutes. Out of 2,808 analyzed flights, 1,897 CTO assignments were complied with, while 911 assignments were cancelled. The analysis indicated that weather avoidance, tactical ATC intervention for separation and altitude constraints were the major contributing factors towards CTO cancellations. **Figure 8** showed the cancellation reasons before and after CTO assignment.

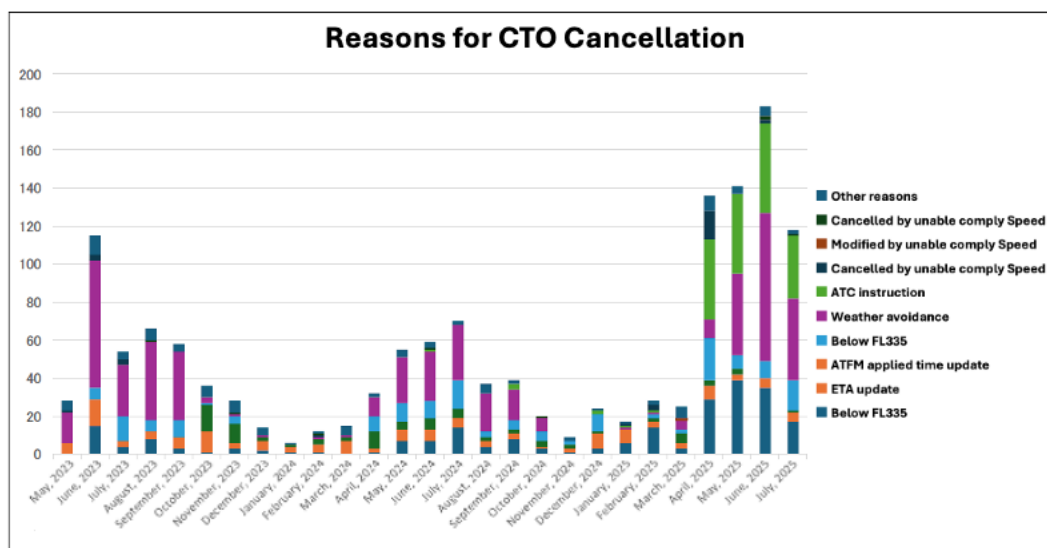


Figure 8: Reasons for CTO Cancellation

4.42 The trial observed variations in ETA prediction accuracy with reference to different operational conditions. The ETA prediction errors were also evaluated against different time horizons indicating the presence of adjacent FIR data would improve predictability.

4.43 The trial also identified a gap between assigned CTOs and actual times over the designated waypoints. These discrepancies were often linked to tactical ATC operations and the specific structure of traffic flows within the sectors. The findings indicated that while CTO was a useful tool, its accuracy was highly dependent on the level of coordination between ATFM planning and real-time tactical ATC interventions.

4.44 Based on the observations in the operational trial, Japan emphasized the importance of understanding operational context such as seasonal operational constraints and coordination between ATFM and ATC for the application of CTO under within Fukuoka FIR.

4.45 Japan was enquired on the compliance window that applied to the CTOs and how far in advance CTOs were issued to flight crew. Japan responded that no formal compliance window was applied during the trial, as it focused on short time deviations (about one to two minutes). CTOs were provided primarily for monitoring and evaluation purposes rather than enforcement. Japan further elaborated that CTOs were issued after aircraft entered Fukuoka FIR, with issuance occurring about 30 minutes to one hour after entry to ensure ETA stability. From issuance to the target fix, operators were approximately 1 hour 20 minutes to up to 2 hours before arriving in Tokyo Haneda Airport to allow sufficient time for speed adjustment to meet the CTO.

4.46 United States shared experience that time-based operations, including CTO, were challenging in convective weather due to frequent flight deviations, agreeing with Japan's observations. The discussion concluded that ATFM would require multiple complementary tools while time-based solutions being optimal in stable conditions, classical flow control and rerouting would be necessary during weather disruptions. Japan concurred, noting the need to balance rerouting efficiency, flight length, and overall flow management effectiveness.

Progress Update on ATFM Activities in India (WP-4a-06)

4.47 India presented their progress update on various ATFM activities undertaken by India since ATFM/SG/15.

4.48 As per *ATFM & A-CDM/SG Action Item 15/6*, India provided inputs and shared process of Post Operations Analysis (POA) data including methodologies for measuring reduced air delay, fuel savings, and CO₂ emission reductions due to the implementation of ATFM measures, to the Fifth Meeting of the Data Analytics Ad-Hoc Group (DAG) in May 2025.

4.49 As per *ATFM & A-CDM/SG Action Item 15/4*, India presented working papers to the ATM/SG/13 and the Sixteenth Meeting of Air Traffic Management Operations Panel Working Group (ATMOPSP-WG/16) proposing inclusion of ATFM-related phraseologies from ICAO Doc 9971 into ICAO Doc 4444. The ATMOPSP Working Group concluded that its ATFM WG should further review the information and determine whether such phraseologies should be proposed for inclusion. Corresponding action had been recorded in the working group.

4.50 To facilitate the reactivation of BOBCAT, India had prepared an AIP Supplement base on AEROTHAI's guidance, conducted a safety risk assessment and implemented BOBCAT operations since 4 September 2025. Stakeholders training, issuance of login credentials and continued post-ops monitoring were also conducted.

4.51 India reported on the significant improvements observed following the harmonization of ATS procedures with the provision of ATFM. CTOT compliance increased from 77% in 2023 to 85% in 2024 and further to 97% in 2025. In 2025, 513 ATFM measures were applied, air delay reduction of 248,470 minutes (~4,141 hours), fuel savings of 15,650.288 tons, and CO₂ reduction of 49,454.911 tons were recorded. India also amended its ATFM Unit AFTN address to VIDPZDZX effective 30 October 2025.

4.52 India initiated development of tailored meteorological information and services for ATM, in collaboration with Indian Meteorological Department and other stakeholders. A daily meteorological briefing mechanism had been established, and a prototype tailored MET product was being developed, initially at IGI Airport Delhi before expansion to other airports.

4.53 India also undertook review of STT for the ATFM automation system, to generate improved trajectories. Additionally, India had been exploring the possibility to capture of airlines' movement messages to enhance trajectory accuracy, demand projection, situational awareness, and data availability for performance benchmarking under the ICAO GANP.

4.54 Chair of ATFM & A-CDM/SG informed the Meeting on the update process of the ATMOPSP consideration of proposal from India on inclusion ATFM-related phraseologies into ICAO Doc 4444. It was expected that the ATFM phraseology might not be included in the ATFM PfA planned to be applicable in 2030. Nevertheless, ATMOPSP ATFM Working Group was expected to continue its work on ATFM phraseology for the next batch of updates, while also considering communications of other ATFM measures between controllers and pilots.

4.55 The Meeting appreciated India's efforts on improving CTOT compliance. India informed that they would share the updated Standard Taxi-in and Standard Taxi-out for India airports with the Bangkok ATFMU for BOBCAT operations.

Streamlining Regional ATFM Collaborative Decision-Making Platform (WP-4a-07)

4.56 The Meeting was presented the proposal to streamline regional ATFM CDM platforms by consolidating the APAC Bi-Weekly ATFM Web Conference and the Traffic Flow Coordination Call (TFCC) into a single unified platform to enhance operational efficiency and improving resource management in the region.

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4.57 The Meeting noted similar coordination platforms within the region. One such forum was the AMNAC-initiated APAC Bi-Weekly ATFM Web Conference, held every other Thursday at 0800 UTC for sharing ATFM events and post-operations analysis for the preceding two weeks. Another forum was the AAC-initiated Traffic Flow Coordination Call (TFCC), held daily at 0200 UTC for sharing daily operational information and weekly POA. Both platforms shared similar agendas and were attended largely by the same participants, resulting in duplication of effort.

4.58 It was proposed that the two platforms be consolidated into the APAC TFCC effective 1 June 2026 (0000 UTC) to optimize resources and minimize efforts for participating parties.

4.59 The Meeting was briefed on the onboarding plan designed to help ANSPs transition into the unified APAC TFCC in phased approach as shown below:

Table 2: Phase 1 for Weekly APAC TFCC

Stage	Description	Date
0	Preparation, outreach and alignment – Prepare both existing and potential participants for transition to APAC TFCC	ATFM & A-CDM/SG/16
1	Onboarding and familiarization – Facilitate the addition of participants (existing + new) to APAC TFCC community on MS Teams	13 – 30 April 2026 (3 weeks)
2	Observation – Passive exposure to real operations	1 – 15 May 2026 (2 weeks)
3	Active Participation – Transit from passive to active participation	16 – 31 May 2026 (2 weeks)
4	Sustained participation in APAC TFCC – Participants may progressively adopt the APAC TFCC as the main avenue for weekly ATFM update	1 June 2026
<i>Note: There may be a few weeks where members may still need to attend both web conference calls. When members are ready, they may proceed to participate in the daily APAC TFCC.</i>		

Table 3: Phase 2 for Daily APAC TFCC

Stage	Description	Date
1	Observation – Passive exposure to real operations	Whenever ready
2	Active Participation – Transit from passive to active participation	Whenever ready

4.60 The paper encouraged ANSPs of States/Administrations currently not participating in the TFCC to join the APAC TFCC to enhance network collaboration.

4.61 The Meeting discussed the different role and purposes between the weekly TFCC and daily TFCC. It was clarified that the weekly TFCC discussion would be strategic focusing on airspace and ATS routes as well as POA review, while the daily TFCC be tactical in nature considering traffic flows and impact of weather.

4.62 Noting that the TFCC had been initiated by the AAC, the Meeting requested clarification on the platform which the proposed harmonized APAC TFCC would operate under. It was clarified that the APAC TFCC would operate as an independent collaboration platform, rather than under the AAC.

4.63 The Meeting supported the proposal of harmonizing the different coordination mechanisms in the region. It was expressed that APAC States/Administrations interested in joining the TFCC calls could approach China, Hong Kong China or Singapore POCs listed in **ATFM & A-CDM/SG/16 WP-4a-07 Annex B Appendix A**.

4.64 The Meeting observed the conduct of TFCC on 9 April 2026.

Lessons Learned from Thailand ATFM System Transition (IP-4a-01)

4.65 Thailand presented the successful transition of its in-house developed Air Traffic Flow Advisory System (ATFAS) from version 1.0 to 2.0, which entered its operational trial phase on 22 January 2026. Developed by AEROTHAI, the upgraded system introduces several critical enhancements designed to manage increasingly complex traffic environments.

4.66 The transition process highlighted several vital lessons for the region, particularly the necessity of maintaining high-quality aeronautical databases and ensuring accurate trajectory modelling based on FPL2012 data. Thailand emphasized the importance of constant stakeholder engagement through various platforms and the need for robust contingency planning to address unforeseen technical issues during system cut overs.

4.67 The Meeting discussed the various handling considerations for multi-leg flights under multiple ATFM constraints; the importance of operator-driven EOBT updates; flexible CTOT revisions; operational challenges with cascading delays and potential future use of ATFM simulation data. In addition, the Meeting noted automated processing and visualization of ADP exchanged in accordance with the APAC ADP Exchange Procedure.

Improving Post-Operation Analysis for Cross-Border ATFM Operations within AMNAC (IP-4a-02)

4.68 AMNAC presented an on-going work to enhance ATFM POA through a uniform set of Key Performance Indicators (KPIs) and methodologies. The group aimed to move beyond basic compliance and delay reporting to metrics that assess ATFM measures impact, level of ATFM compliance and ATFM measure effectiveness.

4.69 As an initial step, AMNAC would trial the standardized KPIs and methodologies for upcoming rounds of POA, before considering to propose them to be incorporated into the *Asia/Pacific ATFM Post-Operations Analysis Recommended Framework* for promoting greater consistency and transparency in POA reporting strengthening regional situational awareness, improving performance evaluation and supporting improvement of ATFM operations.

4.70 The Meeting noted on the proposed set of KPIs. It was emphasized that these KPIs should be interpreted with caution and assessed in light of a multitude of operational, environmental, and systemic factors. The Meeting further noted that CTOT non-compliance being the outcome of multiple aspects of system performance and should be considered as one of several measures of ATFM effectiveness, rather than a standalone indicator.

Impact of Increased BOBCAT Traffic through Pakistan (IP-4a-03)

4.71 The Meeting was informed on the operational analysis of westbound BOBCAT traffic transiting Pakistan airspace (Lahore FIR) since the reactivation of the BOBCAT. It was highlighted that near double of average daily BOBCAT traffic, largely attributed to geopolitical instability in the Middle East and the increased use of Afghanistan airspace (Kabul FIR) as a major trunk route. As the primary gateway for westbound traffic entering Kabul FIR, Pakistan faced growing operational challenges in ensuring compliance with the Kabul ATM Contingency Plan, particularly the requirement for 15-minute longitudinal separation at the same flight level.

4.72 Key constraints under current BOBCAT operations, including the reduction of ATS routes due to the closure of Tehran FIR, resulted in daily bottlenecks for Lahore ACC. With BOBCAT operating on a 15+0-minute spacing (no buffer), precise adherence to CTOs were rarely achievable, resulting in frequent ATC intervention. The situation had been further compounded by non-participating BOBCAT flights and additional traffic from Middle Eastern airports, leading to increased controller workload, flight safety hazards, delays, fuel burn and carbon emissions.

4.73 The Meeting noted that the increase of CTO buffer might help addressing significant portion of flights that entered Afghanistan airspace at a flight level lower than BOBCAT slot as presented in **ATFM & A-CDM/SG/16 WP-4a-02**.

4.74 To enhance air traffic capacity through the Kabul FIR and help in implementing CTO buffer, Pakistan proposed reducing longitudinal spacing under the Kabul FIR Contingency Plan from 15 to 10 minutes with application of the Mach number technique; and allocating FL300 to ATS routes UL333, P628, L750 and N644. The Meeting noted that Pakistan would conduct safety risk assessments to support the proposed changes and would share the results with ICAO for further coordination.

4.75 The Meeting also discussed the proposal for aligning India-Pakistan exit FIR points with Pakistan-Afghanistan FIR entry points to reduce complexity and to easing out coordination for crossing track within Pakistan airspace, hence, to increase predictably and situational awareness among stakeholders.

Agenda Item 4b: MET Information for ATFM and A-CDM Operations

MET/ATM Joint Plenary Session

4.76 The MET/ATM Joint Plenary Session was organised on the morning of 8 April 2026.

4.77 A total of 6 papers were presented during the plenary session:

- **MET/R WG/15 WP/05** – MET/ATM Seminar
- **MET/R WG/15 WP/07** – Probabilistic Low-Level Windshear Forecasting for Hong Kong International Airport Using Machine Learning Algorithm
- **MET/R WG/15 WP/10** – Follow-Up on the Survey of State MET Information Supporting ATM and Development of Future Activities
- **MET/R WG/15 WP/11** – APAC Use Cases for Swim-Based MET Information Services Supporting ATFM
- **MET/R WG/15 WP/13** – Updates of Asia/Pacific Regional Guidance for Tailored Meteorological Information and Services to Support Air Traffic Management Operations
- **MET/R WG/15 Flimsy/01** - Aligning Next Generation MET Information with ATM/ATFM Requirements for Seamless Operation

4.78 The joint plenary agreed to conduct a MET/ATM Seminar in 2027 with the seminar objectives, content, format and agenda to be developed by a small joint task group composing of both MET/R WG and ATFM & A-CDM/SG members.

4.79 Recalling the last *Survey of State Meteorological Information Supporting Air Traffic Management* being conducted in 2021, the joint plenary noted that the MET/R WG/15 adopted a decision to continue the development of a well-defined proposal for the follow-up regional survey and to expand the composition of the existing MET/R WD Ad-hoc Group to include representatives from the ATFM & A-CDM/SG in order to clarify the survey’s operational value, scope and relevance to ATM stakeholders.

4.80 Realizing the role of impact-based MET information to support ATM decision making, the joint plenary noted that MET/R WG/15 adopted a decision to update the *Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations* with the draft guidance to be finalized by 1 June 2026 for approval at the MET SG/30.

4.81 The joint plenary also noted on the editorial improvements in the Second Edition of *APAC Use Cases for SWIM-Based MET Information Services Supporting ATFM* to be published in accordance with **Decision MET SG/29/12**.

Agenda Item 4c: Airspace Capacity Optimization, Integrations of Airspace Management with ATFM Operations

Asia Pacific Regional Guidance Document for Airport and Airspace Capacity Assessment (WP-4c-01)

4.82 The Meeting was presented with the draft *Regional Guidance Document for Airport and Airspace Capacity Assessment*, developed following the ICAO APAC Airport and Airspace Capacity Assessment Workshop held in Yogyakarta, Indonesia, in June 2025.

4.83 The draft regional guidance document was first introduced during the workshop to support ATM operations by outlining common understanding and recommended methodologies for assessing airport and ATC sector capacity. The document was subsequently circulated to APAC ATFM Points of Contact in October 2025 for further development, and comments were received from several APAC States/Administrations.

4.84 The guidance provided a brief description of airport capacity assessment processes along with airspace capacity assessment processes, including practical examples and appendices illustrating models that could support States/Administrations in evaluating capacity. Its purpose was to assist ATM planners in developing plans to improve capacity in order to meet current and future system demand across the APAC region.

4.85 States/Administrations were encouraged to contribute additional examples of airport and airspace sector capacity assessments already performed in their respective systems, enhancing the practicalities of the guidance by cataloguing best practices and offering practical models that other States may adopt.

4.86 The Meeting agreed to the following Draft Conclusion to adopt the *Asia/Pacific Regional Guidance for Assessment of Airport Capacity and Airspace Capacity* (**Appendix C** to the report).

Draft Conclusion ATFM & A-CDM/SG/16-4: Adoption of Asia/Pacific Regional Guidance for Assessment of Airport Capacity and Airspace Capacity	
What: That, the Asia/Pacific Regional Guidance for Assessment of airport and Airspace Capacity at Appendix C to the report be uploaded to the Asia/Pacific Regional Office website, for guidance and reference, by Asia/Pacific States/Administrations in conducting airport and airspace capacity assessments in accordance	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic

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with the provision of the Regional Framework for Collaborative ATFM.		<input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: To provide guidance for conducting airport and airspace capacity assessment and to improve understanding of the processes by cataloging the best practices and models as adopted by Asia/Pacific States/Administrations.	Follow-up: <input type="checkbox"/> Required from States	
When: 7-Aug-26	Status: To be adopted by Sub-Group	
Who: <input checked="" type="checkbox"/> Sub groups <input type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:		

4.87 Pakistan sought clarification on the recommended regional threshold for controller workload used in capacity assessments. In response, it was clarified that the document was intended to provide methodological guidance for conducting capacity assessments, rather than prescribing fixed thresholds. States/Administrations were advised to take into account local constraints, traffic characteristics, and operational complexity when conducting capacity assessments, and to determine workload thresholds that were appropriately tailored to their specific operational environments.

Agenda Item 5: A-CDM Operations, Airport Capacity Optimization, Airport Operations Plan (AOP), and A-CDM/ATFM Integration

Status on Regional Monitoring and Reporting Scheme for A-CDM Implementation (WP-05-01)

5.1 ATFM/IR/SWG provided a summary of the *Regional Monitoring and Reporting Scheme* for the Asia/Pacific A-CDM Implementation. Annual implementation reports for 2026 were received from 21 APAC States/Administrations covering 87 airports in the region:

Australia, Bangladesh, Cambodia, China, Hong Kong China, Macao China, Fiji, India, Japan, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand and Viet Nam

5.2 All reported aerodromes were international aerodrome, of which 82% (71) were reported as high-density international aerodromes. All reported high-density international aerodromes had A-CDM planned or implemented.

5.3 More than 85% (67) of reported high-density international aerodromes indicated A-CDM in Operation and Monitoring Phase. The rest of the reported high-density international aerodromes indicated either A-CDM in Implementation Phase or Initiation Phase to implement A-CDM.

5.4 Out of the 67 aerodromes (including both high density and other international aerodromes) that A-CDM in Operation and Monitoring Phase, 63 of them had implemented all eight required A-CDM Milestones. The reasons for not implementing all required Milestones included information sharing platform was not available or respective ATM systems was unable to capture the required Milestone event.

5.5 **Figure 9** below indicated the A-CDM Implementation Status distribution for APAC region in 2026.

5.11 China expressed that the success of A-CDM implementation was attributed to sufficient investment support from stakeholders; supporting role of regulatory body; effective interoperability between individual A-CDM and National Traffic Flow Management; and the establishment of the operations management committee responsible for the performance review of stakeholders.

5.12 China implemented a comprehensive 45-milestone model that covers all operational entities. This exceeded the 16-milestone model commonly used in Europe and ensured that over 80% of operational data be collected automatically. This broader scope provided enhanced visibility and traceability across the entire A-CDM process, allowing airports to design additional milestones tailored to their specific local requirements.

5.13 India queried the methodology used by China to quantify the direct financial benefits resulting from the implementation of A-CDM. In response, China clarified that a predefined set of parameters was used for this purpose, including metrics such as revenue associated with unit fuel savings and revenue linked to specific airport facility usage, to assess and quantify the financial contributions attributable to A-CDM implementation.

The Latest Development of TAM in China (IP-05-01)

5.14 The Meeting was informed of China's five-year plan to transition from traditional airport operations to Total Airport Management (TAM), focusing on the implementation of AOP and Airport Operations Centers (APOC). CAAC would launch TAM trial projects at four major international hubs in 2026.

5.15 The technical architecture of the TAM platform would build upon a three-layer structure consisting of perception, decision-making, and execution, leveraging big data and Artificial Intelligence (AI) to drive autonomous optimization. A cross-mode data sharing platform that could integrate civil aviation with ground transportation would be designed to enhance the passenger experience by providing seamless itinerary planning.

5.16 The Meeting appreciated China's efforts in implementing A-CDM in 43 airports and noted plans for developing TAM concept. The Chair suggested that the experience and lessons learned be shared with the ICAO Aerodrome Design and Operations Panel.

A-CDM Implementation in Australia (IP-05-02)

5.17 The Meeting was informed of the successful deployment of A-CDM in the four ATFM airports in Australia (Brisbane, Melbourne, Perth and Sydney airports). Despite initial challenges in various stages, the system delivered measurable efficiency gains including a 75% reduction in departure delays during the morning peak at Perth Airport and a consistent network-wide TOBT compliance rate averaging over 80%.

5.18 Australia expressed the five main focus areas in improving the system which included the aspects of TSAT stability; surveillance jitter; software updates; data quality and data priority. Through the governance forums, Australia would work with local partners to develop key reports on system performance and metrics to track against business case benefits.

5.19 The Meeting appreciated the update from Australia on A-CDM system implementation in its four ATFM airports, especially the site-specific technical challenges during the implementation process.

Digital Transformation for A-CDM Operations in Indonesia (Flimsy-05-01)

5.20 The Meeting was informed of the Indonesian national approach to digital transformation for A-CDM operations, focusing on airport capacity optimization, AOP, and A-CDM/ATFM integration. Indonesia highlighted the strategic importance of air transport across its archipelagic geography and identified major pilot airports—Soekarno-Hatta (WIII), I Gusti Ngurah Rai (WADD), and Juanda (WARR)—within the broader context of managing operations at 37 airports.

5.21 Structured phased approach had been adopted for the implementation of A-CDM in Indonesia, aligned with ICAO Doc 9971 and the regulations stipulated under the DGCA Indonesia.

5.22 India queried on the timeline for Indonesia to complete the A-CDM implementation process for the three mentioned airports while the Chair encouraged Indonesia to provide implementation status report to the ICAO APAC Office.

Agenda Item 6a: Regional ATFM Framework, Regional ATFM Concept of Operations, A-CDM Plan and related Guidance Material

Progress of the ATFM Concept Design Ad-Hoc Group (WP-6a-01)

6.1 The Meeting was presented with the progress from the ATFM Concept Design Ad-Hoc Group which was established following the ATFM/SG/15 in 2025, with primary mandate to review and propose a revised regional ATFM concept of operations (ConOps) that would address from near-term operational challenges to long-term vision for the APAC region.

6.2 The Ad-Hoc Group comprised of 36 representatives and 10 observers from 11 States/Administrations and three international organizations. Mr. Sugoan Fucharoen from Thailand and Mr. Yan Xiaoyu from China were the co-rapporteurs to coordinate the work of the group.

6.3 The Ad-Hoc Group established structured working arrangements including scheduled virtual monthly meetings, well defined working areas and groups, and a dedicated SharePoint workspace on top of email for information sharing. In-person meetings would be arranged on needed basis.

6.4 The following deliverables were expected for submission at ATFM & A-CDM/SG/17 in 2027:

- Draft revised *Asia/Pacific Regional ATFM Concept of Operations* document; and
- Principles guiding the amendment of the *Asia/Pacific Regional Framework for Collaborative ATFM* based on the revised *Asia/Pacific Regional ATFM Concept of Operations*.

6.5 The Ad-Hoc Group agreed that the ConOps to be developed would be further divided to address the following challenges and improvement areas:

- Concept of operations to address short-term challenges (2028);
- Concept of operations for mid-term improvements (2032); and
- Conceptual framework for long-term vision (2035).

6.6 A work plan was developed in phases with dedicated volunteering parties and led by the

designated POCs. **Table 4** illustrated the overview of the work plan.




Table 4: Overview of ATFM Concept Design Ad-Hoc Group Work Plan

	Q3 2025	Q4 2025	Q1 2026	Q2 2026	Q3 2026	Q4 2026	Q1 2027
Phase 1: Gaps and Needs Analysis							
Work Area 1.1 Review of Existing Concept and Practices							
Work Area 1.2 Stakeholders' Survey							
Work Area 1.3 Assessment of Techs and Ops Enablers							
Phase 2: Concept Development							
Work Area 2.1 Concept of Operations to Address Near-Term Challenges (2028)							
Work Area 2.2 Concept of Operations for Mid-Term Improvements (2032)							
Work Area 2.3 Conceptual Framework for Long-Term Vision (2035)							
Work Area 2.4 Preparation for Tabletop Exercise/Simulation							
Phase 3: Finalization of Concept Document (Work Areas TBD)							
Phase 4: Implementation Guiding Principles (Work Areas TBD)							
Phase 5: Final Review of Documents							

6.7 The Ad-Hoc Group had completed the majority of Phase 1, which involved a comprehensive review of the existing ATFM concept and practices in the region; the conduct of stakeholders' survey in both ATS authorities and airspace users' aspects, and assessment of technological and operational enablers of new ATFM concepts and practices.

6.8 The Ad-Hoc Group was transitioning into Phase 2 (Concept Development), which would focus on drafting the core technical content of the ConOps. This phase would involve defining the areas of improvement to be addressed by the revised ConOps, based on the gaps and needs analysis conducted in Phase 1. The framework for ConOps development is shown in **Table 5** below.

Table 5: Proposed Framework for ConOps Development

Proposed Framework for defining Short, Mid and Long-Term Areas of Improvement			
	Short-Term	Mid-Term	Long-Term
Implementation Period 	2028 – 2032	2032 – 2035	Beyond 2035
Potential methods or enablers to improve operations 	<ul style="list-style-type: none"> Refining or improving current ATFM processes Make better use of existing tools or systems for information exchange 	<ul style="list-style-type: none"> Develop concept to harmonise with future ATM operational concepts Leverage technological enablers for improved regional coordination e.g. SWIM, FF-ICE 	<ul style="list-style-type: none"> New technology deployment, i.e., adoption of AI/Machine Learning Infrastructure transformation Potential new concept of ATFM operations for the APAC region to facilitate regionally optimised ATFM solutions
Resource Requirements 	Low to moderate investment	Moderate to high investment	<ul style="list-style-type: none"> High investment Multi-year programmes

6.9 The Ad-Hoc Group anticipated to have 1 or 2 in-person meetings during Phase 2 to facilitate an effective brainstorming and discussion in concept development. One such meeting would be conducted alongside the ATFM & A-CDM/SG/16 while another was expected in the fourth quarter of 2026. Progress updates would be shared with the Chairperson of the ATFM & A-CDM/SG and be reported to relevant regional forums when needed to ensure the deliverables would remain aligned with broader regional air navigation objectives.

Enhancing Regional ATFM Coordination through Regional Collaborative Operational Mechanism (RECOM) (WP-6a-02)

6.10 The Meeting was presented with the RECOM voluntary initiatives by AAC intended to enhance coordination among existing sub-regional ATFM mechanisms by outlining the operational rationale, structural concept, ongoing implementation, and future integration of regional collaborative arrangements.

6.11 Despite the significant progress in implementing cross-border ATFM operations through several sub-regional collaborative mechanisms, the scale and complexity of traffic flows in the region had evolved to the extent that enhanced cross-sub-regional situational awareness and coordination would become more salient.

6.12 It was highlighted that while sub-regional mechanisms remained effective, the number of ATFM-related coordination meetings had increased and lead to duplicative efforts with increased coordination burden. It was suggested that an open, inclusive, operationally focused platform—RECOM—could streamline coordination without altering governance arrangements or infringing on States/Administrations’ responsibilities. RECOM was emphasized as a distributed, multi-nodal, non-centralized mechanism that respects States’ decision-making authority.

6.13 The Meeting noted that RECOM was designed to provide enhanced visibility of planned measures and traffic flow expectations, helping participants anticipate potential network interactions and harmonize ATFM measures affecting common traffic flows. In large-scale rerouting or severe weather deviation scenarios, RECOM would reduce duplication of restrictions, limit cascading impacts of local measures, and would improve predictability for airspace users by improving regional network resilience.

6.14 It was expressed that TFCCs had served as the initial operational tool supporting RECOM. Weekly trials began on 15 September 2025, followed by daily sessions from 9 February 2026 and event-triggered calls starting 30 December 2025. These calls were described as structured, video-based mechanisms enabling real-time discussions on traffic demand, meteorological impacts, planned ATFM measures, and post-operations analysis. TFCC participation had expanded progressively, reflecting that the initiative could respond to operational needs.

6.15 IATA expressed that airlines would be interested in participating any development that could cultivate ATFM information sharing initiatives. IATA also emphasized the need to assess the relative benefits of such initiatives and sought guidance on how the ATFM & A-CDM/SG would intend to progress towards convergence or alignment, in order to identify a clear and sustainable way forward for regional ATFM information-sharing solutions.

6.16 India and Thailand echoed the comment by IATA and sought clarification on the methodologies to operationalize and materialize the RECOM concept into implementation. Thailand emphasized the importance of streamlining regional efforts to avoid resource burden associated with participation in multiple parallel initiatives.

6.17 Thailand expressed that the objectives of RECOM needed to be further clarified, and that if the objectives were related to future ATFM concepts then the initiative should be coordinated through the ATFM Concept Design Ad-Hoc Group, whereas if the objectives were related to harmonization of various regional ATFM initiatives (i.e., AMNAC and NARAHG) then the initiative could be coordinated through the ATFM/IR/SWG.

6.18 Thailand also queried whether TFCC would operate as an independent collaboration platform, rather than under the AAC, as clarified during the discussion of **ATFM & A-CDM/SG/16 WP-4a-07**. No further clarification was provided.

6.19 The sponsors of this paper expressed that the RECOM initiative was an ANSP-level cooperation mechanism, aiming to promote integrated ATFM operations across the APAC region. While existing mechanisms such as AMNAC and NARAHG being effective, practical operational challenges persisted for cross-regional coordination and the implementation of multiple ATFM measures. Communication and operational alignment gaps existed between these groups. In this context, RECOM could offer to bridge these differences and could foster more coordinated and efficient ATFM operations across the region.

6.20 The sponsors further mentioned that RECOM would explore opportunities to enhance and streamline regional coordination, starting with enhancing common situational awareness and consolidating ATFM coordination meetings as initial steps. From a regional perspective, this consolidation effort could support more efficient use of resources and strengthen alignment among stakeholders. RECOM would enable participants to come together to discuss and explore ATFM solutions for the APAC region.

Need for A-CDM Performance Reporting (WP-6a-03)

6.21 Recognizing the lack of performance reporting to measure the effectiveness and benefits of A-CDM system for ANSPs, CANSO presented to the Meeting on the A-CDM Performance Framework to support A-CDM performance-based steering, reporting, and publication in APAC.

6.22 CANSO expressed that in APAC and Europe, ATFM reporting had been improving, however, shortcoming in A-CDM performance reporting hindered further development for improvements.

6.23 By creating a common A-CDM performance framework with international reporting and publications, performance monitoring and reporting gaps could be overcome, and such framework would also complement existing industry performance frameworks that apply to airport operational efficiency.

6.24 The Meeting noted that the CANSO A-CDM Performance Framework would provide a comprehensive model for assessing performance indicators in alignment with key business drivers and strategic objectives. The Framework would also envisage the establishment of a representative organization mandated to determine and publish Level Status assessments that reflect the efficiency performance of ANSPs and airports. In the longer term, this organization could further assume a certification role for airports and ANSPs that demonstrate compliance with the highest performance criteria.

6.25 The A-CDM Performance Framework was expected to enhance ATFM ground delay compliance, flight plan adherence, and overall ATM efficiency, while increasing data-driven performance publications that foster harmonization and innovation, and would serve as a key enabler for FF-ICE, TBO, and future ATFM developments through improved predictability of pushback and take-off times.

6.26 The Meeting noted CANSO had proposed forming a joint task force with ACI and IATA to finalize the A-CDM Performance Framework and to establish a performance-assessment mechanism, while encouraging States/Administrations and their ANSPs to support early validation of the draft Framework and ICAO to consider its use for regional A-CDM implementation and monitoring.

6.27 Viet Nam queried whether all A-CDM implementation metrics were to be undertaken simultaneously across all airports. In response, it was discussed that airports could adopt a phased approach, with the timing of implementation metrics depending on traffic growth forecasts, operational needs, and financial considerations. It was noted that smaller airports might not require the same level of automation as larger hubs, provided comparable performance outcomes can be achieved.

6.28 New Zealand sought clarification on the practical application of moving from punctuality-based metrics to predictability-based performance, and whether improved predictability would allow airlines and airports to reduce operational buffers. It was explained that the performance framework aimed to facilitate discussion and harmonization, with long-term efficiency gains expected once consistent predictability be achieved across multiple airports.

6.29 Singapore queried if the performance framework would include any recommended target values (e.g. TOBT accuracy thresholds) and whether CANSO would propose any performance benchmarking. It was clarified that the framework included draft performance levels intended for validation and discussion, not as mandated standards, and that feasibility would vary depending on airport maturity and technology.

Proposal to Amend Asia/Pacific ATFM Daily Plan Exchange Procedure (WP-6a-04)

6.30 The Meeting was presented with the proposal to update the *Asia/Pacific ADP Exchange Procedure*, incorporating the new ADP template presented during ATFM/SG/15 and an updated contact information list for ADP exchange.

6.31 During ATFM/SG/15, the AMNAC Core Team reviewed the ADP template and observed variations in the data formats used by ANSPs. The team harmonized the data elements of the ADP template to support an eventual transition to machine-readable digital exchange, forming the basis of a future SWIM-based information exchange model. The revised ADP template was proposed for incorporation into Appendix A of the updated *Asia/Pacific ADP Exchange Procedure*.

6.32 The AMNAC Core Team also updated the contact information list used for ADP distribution, ensuring accurate ATFM unit contact details for APAC States/Administrations. During the meeting, it was agreed for this ADP exchange operational contact list to be uploaded as a standalone document on ICAO APAC Office eDocuments webpage.

6.33 The Meeting discussed the maintenance of the contact list for ADP distribution. It was agreed that the list would be maintained by ICAO APAC Office, with a formal review of the list conducted annually during the ATFM & A-CDM/SG meeting. In between the annual review, States/Administrations could update the list following procedures to be set by ICAO APAC Office.

6.34 The revised draft *Asia/Pacific ADP Exchange Procedure* including the revised template, updated contact list, and editorial amendments is attached as **Appendix D** to this report. The Meeting agreed to the following Conclusion:

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Conclusion ATFM & A-CDM/SG/16-5: Adoption of a revised <i>Asia/Pacific ATFM Daily Plan (ADP) Exchange Procedure</i>	
<p>What: That, noting the importance of effective procedure for ATFM Daily Plan (ADP) exchange in the regional ATFM network, the revised <i>Asia/Pacific ATFM Daily Plan (ADP) Exchange Procedure</i> be adopted as a “version 1.0” and, together with a separate Asia/Pacific ADP Exchange Operational Contact List, be uploaded to the ICAO Asia/Pacific Regional Office eDocuments webpage, replacing the current working draft version</p>	<p>Expected impact:</p> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
<p>Why: To adopt a common procedure for ADP exchange among States/Administrations in the region, enabling more effective distribution and processing of ADPs and paving the way toward automatic digital ADP exchange in the future</p>	<p>Follow-up: <input type="checkbox"/> Required from States</p>
<p>When: 10-Apr-26</p>	<p>Status: Adopted by ATFM & A-CDM/SG</p>
<p>Who: <input type="checkbox"/> Sub groups <input type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:</p>	

Development of the CANSO Operational Messaging Platform for ATFM Sharing and Synchronization (COMPASS) (IP-6a-01)

6.35 The Meeting was informed of the development of the COMPASS designed to enhance collaboration and shared situational awareness among ANSPs managing cross-border traffic flows. Evolved from CADENA, COMPASS would provide a structured platform (supports APAC multi-nodal ATFM concept) where stakeholders could publish and access traffic management measures, operational constraints, advisories, and ADPs while also incorporating operational flight information from existing ATS messaging networks to support data-driven visibility of traffic demand.

6.36 CANSO emphasized the operational benefits of COMPASS, including improved network-wide situational awareness, better visibility of regional traffic management measures, reduced reliance on multiple communication channels, and enhanced support for collaborative decision-making during evolving operational scenarios. CANSO would continue working with ANSPs and regional stakeholders to refine the COMPASS environment and expand participation by strengthening the role in supporting regional coordination activities.

6.37 The Meeting noted that the COMPASS platform remained under development to support interaction with a wide range of diverse messaging platforms. It was further noted that the COMPASS platform was intended solely to facilitate information sharing and not designed to provide or replace ATFM operational solutions.

6.38 The Meeting noted that CANSO membership was not a prerequisite to utilise basic features in the COMPASS platform free-of-charge. Interested States, Administrations and stakeholders were invited to contact CANSO directly for further information regarding participation and access.

Agenda Item 6b: ATFM, A-CDM systems communication – ATFN/AMHS, FIXM, SWIM

Guidance Material to Assist APANPIRG Subsidiary Groups in Reviewing and Updating the List of APAC Common Swim Information Services (WP-6b-01)

6.39 The Meeting recalled that *Decision APANPIRG/36/11* adopted the *First Version of the Business Functionality for APAC Common SWIM Information Services* and requested APANPIRG Subsidiary Groups to review the document for the development of the *Second Version of the APAC Common SWIM Information Services* document, through the provision of guidance material.

6.40 Guidance material provided in **ATFM & A-CDM/SG/16 WP-6b-01 Appendix A** illustrated the type and level of detail required, including business functionality of the information service, brief description of the service, type of information to be exchanged, information exchange model/message type, message exchange pattern, and priority. A worked example was included for reference.

6.41 APANPIRG subsidiary groups were invited to assess whether existing entries combine multiple business functions and, if so, to consider splitting them into more detailed and focused information services. A working draft of the Second Version had been developed, and APANPIRG subsidiary groups were requested to submit updates using “track changes” for consolidation at SWIM TF/11 (26–29 May 2026).

6.42 The Meeting noted the two potential future enhancements identified by SWIM TF: the introduction of an “applicability” field (e.g. region-wide vs. as needed by subset of States) and the addition of desired implementation timeframe (immediate, medium-term, long-term). It also recommended that APANPIRG subsidiary groups review the document regularly at each meeting, and to provide updates to SWIM TF as necessary to maintain the currency of the list relevant to their information domain.

6.43 Feedback from the APAC FF-ICE Ad Hoc Group emphasized that domain-specific groups should focus on defining business rules and business process-completion criteria, while SWIM TF should determine Message Exchange Pattern (MEP). The APAC FF-ICE Ad Hoc Group also recommended including comprehensive operational scenarios as appendices, with **Figure 10** illustrating how these can be incorporated.

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM-IS (1) / (2) / (3)
FF-ICE filing service	Provides a means to submit, update or cancel flight plans through a SWIM-based interface using FIXM. Appendix A: Filing Scenario	Flight plan for registration, update or cancellation	FIXM	Appendix A	1

SWIM TF to fill in
↓

Appendix A: Filing Scenario

	Message	Details	Timeout	Comments	Message Exchange Pattern
1	eAU send eFPL (FFP) to eASP	Mandatory	N/A	-	
2	eASP returns Submission Response (SR) #1 to eAU	Mandatory (after eFPL received)	1 minute	eASPs validate message format and basic rules. SR ACK: Validation passed SR REJ: Validation failed SR MAN: Manual Processing needed	
3	eASP returns Submission Response (SR) #2 to eAU	Conditional (only if SR#1 = MAN)	Variable (manual processing time)	Any subsequent SR is provided after manual intervention of eFPL (after SR MAN)	
4	eASP returns Filing Status (FS) #1 to eAU	Mandatory (if final SR = ACK)	1 minute after SR “ACK”	eASPs evaluate flight plan against operational constraints and ATM configuration	
5	eASP returns Filing Status (FS) #2 to eAU	Conditional (if FS #1 = PENDING, or due to re-evaluation)	Variable (2 nd evaluation)	eASP sends updated FS when flight is ready to be evaluated (for PENDING) or when operational changes affect flight status	

Figure 10: Example of how the comprehensive scenarios may be incorporated in the Business Functionality of APAC Common SWIM Information Services

6.44 The information contained in the paper had also been presented to SURSG/5 and SURICG/11; both meetings reviewed the guidance material and proposed no changes but recommended that guidance material for the sharing of surveillance data in SWIM should be added as a reference document for APAC Common SWIM Surveillance Information Services to support service implementers.

6.45 The Meeting was invited to provide further updates to the presented version for ATFM/A-CDM/Flow-related SWIM Information Service. Feedback submitted by FF-ICE/4, SURSG/5 and SURICG/11 would be reviewed by the SWIM TF/11 in May 2026.

6.46 Singapore and Thailand presented a joint response (SP/14) that aligned with the outcomes of the APAC FF-ICE Ad hoc Group discussion. The response proposed updates to the APAC Common SWIM Information Services related to ATFM, focusing on improving clarity and usability. Key proposals included replacing the existing “Priority” column with two new columns - “Applicability” and “Desired Implementation Timeframe” - to better reflect operational relevance and implementation planning considerations. It was also noted that the current MEP column had created ambiguity between business and technical aspects; therefore, it was proposed that MEP be addressed by the SWIM Task Force.

6.47 In addition, Singapore and Thailand recommended enhancing “Brief description of the service” column by incorporating reference to a dedicated appendix, to provide detailed use cases and required message exchange patterns. Five ATFM information exchange scenarios were highlighted, derived from existing AMNAC work, to be applied within the SWIM environment. The proposed next steps included finalizing the scenarios by the ATFM & A-CDM/SG and submitting them to the SWIM TF/11 to support the identification of MEP.

6.48 The Meeting noted that **ATFM & A-CDM/SG/16 WP-6b-01 Appendix B** identified four ATFM-related SWIM Information Services; however, only two services—namely the Flight-Specific ATFM Measure Service and the ATFM/A-CDM Integration Service—had been included in the first published edition. It was highlighted that the remaining two services—the ADP Distribution Service and the Flow-Specific ATFM Measure Service—had been previously discussed but were not included due to unresolved issues related to information exchange models (e.g. FLXM). The Meeting encouraged further review of these two services, considering any progress since the previous SWIM TF discussions, and invited feedback on their potential inclusion in the next revision.

6.49 It was clarified that the proposed ATFM messages were associated with two APAC Common SWIM Information Services, with the FIXM TTOT Allocation message exchanged under the ATFM/A-CDM Integration Service and the FIXM CTOT Allocation, FIXM CTOT Cancellation, FIXM CTO Allocation, and FIXM CTO Cancellation messages exchanged under the Flight-Specific ATFM Measure Service. To support the SWIM TF in understanding the relationship between the aforementioned ATFM and A-CDM messages, further information on the mapping between these messages and their corresponding information services would be necessary.

6.50 The Meeting noted that, while a reference document for the ADP Distribution Service was made available following the elevation of the Asia-Pacific ADP exchange procedure, the digital data format and the appropriate information exchange model for ADP remained under development. The Flow-Specific ATFM Measure Service was similarly recognized as less mature, given the absence of harmonized, region-wide operational application and potential network impacts. It was agreed that further operational and technical development would be required before detailed operational use cases could be developed to support identification of MEP. It was also discussed that the priority of ADP Distribution Service and Flow-Specific ATFM Measure Service could be reviewed by the ATFM & A-CDM SG, and that its feedback could be provided to the SWIM TF/11.

ATFM FIXM Message Data Attributes and Associated Message Templates Based on FIXM Version 4.3 as Asia/Pacific Regional Standard (WP-6b-02)

6.51 The Meeting was presented with the work on identification, mapping, and development of ATFM FIXM message data attributes and associated message templates based on FIXM version 4.3, to support cross-border ATFM operations, A-CDM, ATFM/A-CDM integration, and traffic synchronization in a SWIM environment in the APAC region.

6.52 It was recalled that the *Asia/Pacific Regional Framework for Collaborative ATFM* identified FIXM 4.2 or later as the agreed information exchange model, and that ICAO ATM RPP recommended FIXM 4.3 for FF-ICE/R1 services. FIXM 4.3 was endorsed at ATFM/SG/14 and ATM/SG/12, with APANPIRG/35 formalizing its adoption. Successive regional FIXM extensions, developed jointly by ATFM SG and the TF, were adopted through **Conclusion APANPIRG/36/12** to support harmonised implementation across the region.

6.53 The Technical Sub-Group (TSG) of AMNAC, working with the SWIM TF, identified the initial set of ATFM FIXM messages required for cross-border operations:

- FIXM_CTOT_ALLOCATION;
- FIXM_CTOT_CANCELLATION;
- FIXM_CTO_ALLOCATION;
- FIXM_CTO_CANCELLATION; and
- FIXM_TTOT_ALLOCATION.

6.54 The TSG identified and mapped data attributes for these messages to the FIXM 4.3 Core and the APAC Extension, ensuring alignment with the *Asia/Pacific AFTN/AMHS-based Interface Control Document (ICD)*. Appendix A to the WP-6b-02 listed the data attributes, while Appendix B detailed the corresponding mapping.

6.55 The Meeting was reminded about **Conclusion APANPIRG/36/12** on the adoption of APAC Regional FIXM V4.3 Extension for certain data attributes required being not included in the FIXM version 4.3 Core.

6.56 Based on this identification and mapping, the TSG developed ATFM FIXM message templates (**ATFM & A-CDM/SG/16 WP-6b-02 Appendix C**). These templates defined the structure and rules for automated validation of ATFM-related FIXM messages, covering CTOT/CTO allocation/cancellation and TTOT allocation. The templates also integrated FIXM Flight, Base, and APAC Extension schemas to ensure harmonised and interoperable message construction for cross-border ATFM system-to-system exchanges via SWIM.

6.57 The Meeting agreed to the adoption of the identified ATFM FIXM messages data attributes, mapping, and the associated message templates, based on FIXM version 4.3, as regional standard templates effective Q1/2027.

Draft Conclusion ATFM & A-CDM/SG/16-6: Adoption of ATFM FIXM Message Data Attributes and Associated Message Templates Based on FIXM Version 4.3 as Asia/Pacific Regional Standard	
<p>What: Adopt the ATFM FIXM message data attributes and associated message templates (Appendix A, B, and C), based on FIXM Version 4.3, as Asia/Pacific regional standard templates effective Q1/2027 to support cross-border ATFM information exchange via SWIM</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Political / Global</p> <p><input type="checkbox"/> Inter-regional</p> <p><input type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p>

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		<input checked="" type="checkbox"/> Ops/Technical
Why: To support harmonised and automated message validation for cross-border ATFM system to system data exchanges, in alignment with Conclusion APANPIRG/35/4	Follow-up: <input type="checkbox"/> Required from States	
When: 7-Aug-26	Status: Draft to be adopted by Subgroup	
Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input checked="" type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: SWIM TF		

Asia/Pacific Regional Flight and Flow Information for A Collaborative Environment (FF-ICE) Release 1 Implementation Plan (WP-6b-03)

6.58 The Meeting was presented with the draft *APAC Regional FF-ICE Release 1 (FF-ICE/R1) Implementation Plan* developed by the APAC FF-ICE Ad Hoc Group. The Plan detailed the operational and technical requirements for regional FF-ICE/R1 services implementation, as well as the identified and recommended areas of harmonization for the APAC region to ensure regional interoperability and consistent handling of operational conditions.

6.59 The identified and recommended areas of harmonization for the APAC region, as included in the latest draft of the *APAC FF-ICE/R1 Implementation Plan* and agreed by the APAC FF-ICE Ad hoc Group in March 2026, included, amongst others, the type of validation checks for eFPL, interpretation of Filing Status responses, and feedback methods for restrictions and constraints. The plan detailed how eFPLs should be evaluated by eASPs against aerodrome, airspace, route availability, ATFM measures, environmental conditions, and aircraft operations requirements, before providing Filing Status responses back to eAUs.

6.60 The Meeting was briefed on the interpretation and expected eAU actions for the Filing Status values as in **Table 6**. It was emphasized that the Filing Status would reflect the operational acceptability only and would not constitute an ATC clearance.

Table 6: FF-ICE Filing Status Interpretation and Expected eAU Action

Filing Status	Interpretation	Expected eAU Action
ACCEPTABLE	The flight plan complies with operational requirements. Any constraints identified can be accommodated without flight plan modifications.	No immediate action or update required. Note any provided constraints for awareness. Prepare for possible tactical clearances reflecting identified constraints.
NOT ACCEPTABLE	The flight plan does not comply with operational requirements and requires modification.	Submit Flight Plan Update to address non-compliance. If close to EOBT, the operator may be unable to update their flight plan in time using FF-ICE/R1 processes. In these cases, the operator may update their flight plan as needed through tactical coordination with ATC. <i>Note: if departure eASP provides a “Not Acceptable” Filing Status, eAU can expect refusal to start-up clearance if non-compliance requires flight plan modification (e.g. aerodrome closure). This</i>

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		<i>does not apply to “Not Acceptable” status received from downstream eASPs.</i>
PENDING	Flight plan evaluation has not yet been performed.	Await subsequent Filing Status update. Monitor Expected Evaluation Time if provided.

6.61 For certain ATFM scenarios, pre-determined Filing Status responses were required to ensure regional interoperability and consistent handling of operational conditions. The FF-ICE Ad-hoc Group proposed to provide Filing Status of “NOT ACCEPTABLE” for these ATFM scenarios, prompting the eAU to modify its flight plan. Similarly, for the Planning Service, a Planning Status of “NON CONCUR” was proposed. Such response expectations were summarized in Appendix C of the draft Plan.

6.62 Subsequent to ATFM & A-CDM SG/16, the updated draft of the *APAC FF-ICE/R1 Implementation Plan* would be submitted to SWIM TF/11 for review, CNS SG/30 and ATM SG/14 for approval. Subject to approval by both groups and the availability of ICAO Doc 9965 *Manual on FF-ICE Vol. II – Implementation Guidance*, the draft would be submitted to APANPIRG/37 for endorsement.

6.63 The Meeting noted that with the submission of *APAC FF-ICE/R1 Implementation Plan* to ATM/SG, the APAC FF-ICE Ad Hoc Group would be dissolved, and APAC FF-ICE Implementation Task Force would be proposed to be established to overlook the transition from FPL2012 to FF-ICE; operations in mixed-mode environment and other FF-ICE/R1 related implementation issues.

6.64 The Meeting reviewed the draft *APAC FF-ICE/R1 Implementation Plan* including the harmonized responses for the selected ATFM scenarios.–The Meeting provided two suggestions: to review paragraph 6.3.6.2.4, in particular the example related to the “ACCEPTABLE” Filing Status, and to consider the inclusion of ADP in the scenarios in the table stipulated in the Appendix C of the draft Plan.

6.65 The Meeting also discussed whether a recommendation on the priority of route/trajectory evaluation against restrictions/constraints could be established to assess if an eFPL could be accepted. Noting the dynamic nature of factors such as weather and other operational constraints, as well as the differing operational considerations currently applied among ANSPs, the Meeting noted that assigning priorities at the current stage might not be appropriate and that further in-depth analysis would be better addressed by a future APAC FF-ICE Implementation Task Force.

6.66 With a substantive discussion, the Meeting acknowledged that while ATFM was not a prerequisite for FF-ICE/R1, and FF-ICE could be implemented independently prior to 2030 when ATFM services were not yet mandatory. However, ATFM would be the key enabling requirement for subsequent FF-ICE/R2 and beyond. It was emphasized on the importance of considering the applicable timeframes and evolving operational environment when interpreting these relationships.

6.67 Japan sought clarification on how estimated times at destination would be managed under the *APAC FF-ICE/RI Implementation Plan* would be when airspace users did not update their eFPL. It was explained that the draft *APAC FF-ICE/RI Implementation Plan* recommended that operational constraints applied to flights should fall within the area of responsibility of the relevant ATM service provider. Accordingly, constraints affecting destination aerodromes should preferably be expressed using CTO or Calculated Landing Time.

Agenda Item 7: Any Other Business

APANPIRG ATM and Airspace Safety Deficiencies in the ATFM And A-CDM Fields (WP-07-01)

7.1 The Meeting was presented with the current APANPIRG ATM and Airspace Safety Deficiencies in the ATFM and A-CDM fields. As adopted by APANPIRG/36, Maldives had been recorded with deficiency in the ATS Message Addressing field since 2019.

7.2 India and Thailand continued to provide traffic message record to facilitate analysis upon Missing DEP Messages. **Table 7** below provides the summary of 2026 analysis:

Table 7: Summary of Missing DEP Message Data Analysis

Month	Data	India	Thailand
November 2025	Number of FPL received	1188	67
	Missing DEP Messages	124	2
	Percentage of Missing DEP Messages	10.44%	2.99%
December 2025	Number of FPL received	1427	69
	Missing DEP Messages	93	1
	Percentage of Missing DEP Messages	6.52%	1.45%
January 2026	Number of FPL received	1437	59
	Missing DEP Messages	94	2
	Percentage of Missing DEP Messages	6.54%	3.39%

7.3 As the analysis indicated the missing DEP messages rate for Maldives remained above the threshold of five percent or more of flights. it was concluded that the corresponding deficiency would remain valid requiring continuous monitoring and review.

7.4 Maldives was urged to provide respective corrective action plans (CAPs) and target date for resolving the captioned deficiency.

7.5 The Chair recommended that Maldives engage with India to jointly review and identify existing gaps, and to explore possible corrective actions to address the issue of missing DEP messages.

ATFM Points of Contact (WP-07-03)

7.6 In accordance with usual practice at meetings of ICAO APAC technical groups in the ATM, Aeronautical Information Management (AIM) and Search and Rescue (SAR) fields, including ATFM, A-CDM and Contingency Coordination Team (CCT), the consolidated ATM Points of Contact List was provided for any update by ATFM & A-CDM/SG participants. Any changes could be provided to the ICAO APAC Office by email.

7.7 The Meeting noted that the consolidated ATM Points of Contact List predominantly contained administrative contact details of States/Administrations. To enable timely notification and dissemination of critical information affecting airspace availability outside normal working hours, and in situations where administrative points of contact were not accessible, States/Administrations were requested to provide 24-hour ANSP contact information, especially for relevant Area Control Centres. This information was to be incorporated into the consolidated ATM Points of Contact List.

Agenda Item 8: Review of Task List

Terms of Reference and Task List (WP/21)

8.1 The Meeting reviewed the ATFM & A-CDM/SG terms of reference, which was provided in **Appendix E** to the Report.

8.2 The ATFM & A-CDM/SG Task List, as reviewed and updated by the Meeting, was provided in **Appendix F** to the Report.

Agenda Item 9: Date and Venue of the Next Meeting

9.1 The next meeting of ATFM/SG was tentatively planned to be held in April or May 2027. Any Administration considering hosting ATFM & A-CDM/SG/17 or later meetings was invited to contact ICAO.

Closing of the Meeting

10.1 The Chair thanked all participants for their contributions to the Meeting.

List of Participants

	STATE/NAME		TITLE/ORGANIZATION
1.	AUSTRALIA (2)		
	1.	Mr. Simon Godsmark	Head Network Performance and Standards Airservices Australia <u>AUSTRALIA</u>
	2.	Mr. Jeremy Bienkowski - <i>Online</i>	Needs and Optioneering Adviser Airservices Australia <u>AUSTRALIA</u>
2.	CAMBODIA (1)		
	3.	Mr. Khorn Vannak - <i>Online</i>	Senior Manager of Air Traffic Management Cambodia Air Traffic Services (CATS) <u>CAMBODIA</u>
3.	CHINA (5)		
	4.	Mr. Xiaoyu Yan	Senior Engineer Air Traffic Management Bureau Civil Aviation Administration of China <u>CHINA</u>
	5.	Mr. Liu Hong	Senior Engineer Operation Supervisory Center Civil Aviation Administration of China <u>CHINA</u>
	6.	Mr. Wang Yifei	Assistant Operation Management Center Air Traffic Management Bureau Civil Aviation Administration of China <u>CHINA</u>
	7.	Mr. Liao Yin	Director, Operations Office Flow Management Department ATC Centre East China Air Traffic Management Bureau Air Traffic Management Bureau Civil Aviation Administration of China <u>CHINA</u>
	8.	Mr. Yongqiang Fu	Deputy Director of Sanya Area Control Center Air Traffic Management Bureau Civil Aviation Administration of China <u>CHINA</u>
4.	HONG KONG, CHINA (3)		

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	STATE/NAME		TITLE/ORGANIZATION
	9.	Mr. Anfernee Poon	Senior Operations Officer (Strategic Planning) Hong Kong Civil Aviation Department <u>HONG KONG, CHINA</u>
	10.	Mr. Gene KWOK	Electronics Engineer Hong Kong Civil Aviation Department <u>HONG KONG, CHINA</u>
	11.	Mr. Marco Kok - <i>Online</i>	Sr Scientific Officer International Aviation Meteorological Collaboration <u>HONG KONG, CHINA</u>
5.	FIJI (2)		
	12.	Ms. Vakatokoi Adinaulumatua	Air Navigation Services Inspector ATM/MET CAA Fiji <u>FIJI</u>
	13.	Ms. Kalusi Kouvou	Air Traffic Management Center Coordinator FIJI Airports Limited <u>FIJI</u>
6.	INDIA (4)		
	14.	Mr. Sanjeev Gupta	Joint General Manager ATM- ATFM Airports Authority of India <u>INDIA</u>
	15.	Mr. Sudhanshu Gupta	Joint General Manager ATM Airports Authority of India <u>INDIA</u>
	16.	Mr. Manoj Kumar Singh	DGM (ATM-ATFM) Airports Authority of India <u>INDIA</u>
	17.	Mr. Ashish Nandan Lal	Assistant General Manager (CNS) Airports Authority of India <u>INDIA</u>
7.	INDONESIA (4)		
	18.	Mr. Wahyu Widodo	VP of ATS Development DGCA Indonesia <u>INDONESIA</u>
	19.	Mr. Iwan Ardiansyah	VP of Network Planning DGCA Indonesia <u>INDONESIA</u>

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	STATE/NAME		TITLE/ORGANIZATION
	20.	Mr. Arief Wahyu Pamungkas	Airside & Landside Operation Strategy Division Head PT. Angkasa Pura Indonesia <u>INDONESIA</u>
	21.	Muhammad Ibnu Fahmi	Plt. Application Development Specialist PT. Angkasa Pura Indonesia <u>INDONESIA</u>
8.	JAPAN (4)		
	22.	Mr. Toshihiro YONE	Special Assistant to the Director Air Traffic Control Division Japan Civil Aviation Bureau (JCAB) <u>JAPAN</u>
	23.	Mr. Mark Brown	Principal Researcher Department of Air Traffic Management Electronic Navigation Research Institute <u>JAPAN</u>
	24.	Ms. Hiroko Hirabayashi	Chief Researcher Department of Air Traffic Management Electronic Navigation Research Institute <u>JAPAN</u>
	25.	Mr. Takanori Okamoto	Special Assistant to the Director Planning and Coordination Division Air navigation services Enhancement Center Japan Civil Aviation Bureau (JCAB) <u>JAPAN</u>
9.	LAO PDR (5)		
	26.	Mr. Anosin LIENGXAY	Technical Officer Government of LAO PDR <u>LAO PDR</u>
	27.	Mr. Vixay VORLACHIT	ATM and SAR officer Department of Civil Aviation of Lao PDR <u>LAO PDR</u>
	28.	Mr. khamxing BOUALAPHANH	Deputy chief of ATFM Lao Air Traffic Services "LANS" <u>LAO PDR</u>
	29.	Ms. PHOUVONG SENGVONGDEUANE	Chief of ATFM Lao Air Traffic Services "LANS" <u>LAO PDR</u>

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	STATE/NAME		TITLE/ORGANIZATION
	30.	Mr. Manasavanh Kounlath	Deputy General Director Lao Air Navigation Services (LANS) <u>LAO PDR</u>
10.	MALAYSIA (2)		
	31.	Mr. Sharudin Bin Hashim	Manager Air Navigation Services Technical Division Civil Aviation Authority of Malaysia <u>MALAYSIA</u>
	32.	Mr. Mohd Norhidayat Bin Mohamad Khalid	Executive Kuala Lumpur Air Traffic Control Center (KL ATCC) & Kuala Lumpur International Airport (KLIA) Civil Aviation Authority of Malaysia <u>MALAYSIA</u>
11.	MALDIVES (1)		
	33.	Mr. Ibrahim Saeed	Flight Procedure Design Specialist Maldives National Air Traffic Service <u>MALDIVES</u>
12.	NEPAL (2)		
	34.	Babu Raja Nakarmi	Act. Director CAA of Nepal <u>NEPAL</u>
	35.	Shreeker Prajapati	Manager CAA of Nepal <u>NEPAL</u>
13.	NEW ZEALAND (1)		
	36.	Mr. Peter Blair	ANS Requirements Team Leader Airways New Zealand <u>NEW ZEALAND</u>
14.	PAKISTAN (4) - Online		
	37.	Mr. Shafiq Ur Rehman	Chief Operation Officer Lahore Area Control Center PAKISTAN AIRPORTS AUTHORITY <u>PAKISTAN</u>
	38.	Mr. Muhammad Imran	Sr. Joint Director Airspace & PBN/ ICAO PAKISTAN AIRPORTS AUTHORITY <u>PAKISTAN</u>

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	STATE/NAME		TITLE/ORGANIZATION
	39.	Mr. Muhammad Salman Nazar	Sr. Joint Director Lahore Area Control Center PAKISTAN AIRPORTS AUTHORITY <u>PAKISTAN</u>
	40.	Mr. Muhammad Naeem	Sr. Joint Director Lahore Area Control Center PAKISTAN AIRPORTS AUTHORITY <u>PAKISTAN</u>
15.	PHILIPPINES (3)		
	41.	Mr. Robin F. Alzona	Aerodrome Control Division Chief III, Aerodrome Division, ATS Civil Aviation Authority of the Philippines <u>PHILIPPINES</u>
	42.	Ms. Mary Grace Dalumpines	Air Traffic Management Officer IV Civil Aviation Authority of the Philippines <u>PHILIPPINES</u>
	43.	Ms. Tamyia Lemuria N. Tayam-Sullivan	Assistant Chief, Manila ATFMU Air Traffic Service Civil Aviation Authority of the Philippines <u>PHILIPPINES</u>
16.	REPUBLIC OF KOREA (4)		
	44.	Mr. SEOTAEK OH	Assistant Director Cross-border ATFM Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT) <u>REPUBLIC OF KOREA</u>
	45.	Ms. Min Young JANG	Senior Manager Incheon International Airport Corporation <u>REPUBLIC OF KOREA</u>
	46.	Ms. Yijeong Min	Apron Controller Incheon International Airport Corporation <u>REPUBLIC OF KOREA</u>
	47.	Ms. Semin Jang	Manager Incheon International Airport Corporation <u>REPUBLIC OF KOREA</u>
17.	SINGAPORE (7)		
	48.	Ms. Jialing He	Head ATC Specialist (ATFM) Civil Aviation Authority of Singapore <u>SINGAPORE</u>

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	STATE/NAME		TITLE/ORGANIZATION
	49.	Mr. Roger Lau	Senior Chief (ATM) Civil Aviation Authority of Singapore <u>SINGAPORE</u>
	50.	Ms. Shu Ning Fong	ATC Manager (Operations Technology Planning) Civil Aviation Authority of Singapore <u>SINGAPORE</u>
	51.	Mr. Xue Li Chng	Air Traffic Control Officer Civil Aviation Authority of Singapore <u>SINGAPORE</u>
	52.	Mr. Jack Toh	Engineer Civil Aviation Authority of Singapore <u>SINGAPORE</u>
	53.	Mr. Jason Sim	Engineer Civil Aviation Authority of Singapore <u>SINGAPORE</u>
	54.	Mr. Chan Ze Ren	Engineer Civil Aviation Authority of Singapore <u>SINGAPORE</u>
18.	THAILAND (40)		
	55.	Mr. Thanakrit Lertpiya	Air Navigation Services Standards Officer Civil Aviation Authority of Thailand (CAAT) <u>THAILAND</u>
	56.	Ms. Kamonchanok Chuamnat	Senior Air Navigation Operations Planning Division Officer 7 Civil Aviation Authority of Thailand (CAAT) <u>THAILAND</u>
	57.	Ms. Achiraya Dechanuntasin	Air Navigation Services Standards Officer Civil Aviation Authority of Thailand (CAAT) <u>THAILAND</u>
	58.	Mr. Sakorn Peekong	Air Navigation Services Standard Officer Civil Aviation Authority of Thailand (CAAT) <u>THAILAND</u>
	59.	Mr. Vittaya Plaeyao	Air Traffic Management Standards Division Senior Officer The Civil Aviation Authority of Thailand <u>THAILAND</u>

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	STATE/NAME		TITLE/ORGANIZATION
	60.	Ms. Thitibhorn Prathumchai	Senior ANS Officer Civil Aviation Authority of Thailand (CAAT) <u>THAILAND</u>
	61.	Ms. Supattra Tassaro	Senior Air Navigation Operations Planning Officer 7 Civil Aviation Authority of Thailand (CAAT) <u>THAILAND</u>
	62.	Ms. Lakwadee Jampachaisri	Computer Technical Officer Department of Airports, Thailand <u>THAILAND</u>
	63.	Mr. Nattakorn Prajit	Transport Technical Officer Department of Airports, Thailand <u>THAILAND</u>
	64.	Ms. Lakwadee Jampachaisri	Computer Technical Officer Department of Airports, Thailand <u>THAILAND</u>
	65.	Ms. Ploykaprib Soralump	Transport Technical Officer Department of Airports, Thailand <u>THAILAND</u>
	66.	Ms. Tanaporn Sottiudom	Officer Department of Airports, Thailand <u>THAILAND</u>
	67.	Ms. Ratchaneekorn Thamchadee	Officer Department of Airports, Thailand <u>THAILAND</u>
	68.	Ms. Paweena Panikodom	Meteorologist Thai Meteorological Department <u>THAILAND</u>
	69.	Mr. PONGKHUN MANEESRI	Meteorologist Thai Meteorological Department <u>THAILAND</u>
	70.	Mr. Patchara Kaewboran	Software Engineer AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>

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	STATE/NAME		TITLE/ORGANIZATION
	71.	Mr. Tanakarn Chamnankit	Air Traffic Controller AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	72.	Mr. Wasoontra Powlinjong	Air Traffic Management Data Officer AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	73.	Mr. Arthit Tosukolvan	Engineer AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	74.	Mr. Piyawut Tantimekabut	ATM Expert, Director Level AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	75.	Ms. Chamaiporn Sangphet	Senior Air Traffic System Engineer AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	76.	Mr. Sagoon Fucharoen	Air Traffic Management Network Assistant Manager AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	77.	Ms. Nunthaphak Kulartyut	Executive Strategic Planning Officer AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	78.	Mr. Worapong Jirojkul	Executive Air Traffic Systems Engineer AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	79.	Mr. Voramet Chunvattananon	Air Traffic Engineer AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	80.	Mr. Rut Charaslertrangsi - <i>Online</i>	Air Traffic Controller 2 AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>

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	STATE/NAME		TITLE/ORGANIZATION
	81.	Ms. SUVACHIRA TEERAPHATHANANON	Senior Engineer Airport of Thailand PLC. <u>THAILAND</u>
	82.	Mr. PEERAPAT CHANCHAROEN	A-CDM Coordinator Airport of Thailand PLC. <u>THAILAND</u>
	83.	Ms. saowakhon Tetiya	Aerodrome Safety Officer Airport of Thailand PLC. <u>THAILAND</u>
	84.	Mr. Tanapon Intaruk	Airport Operation System Engineer Airport of Thailand PLC. <u>THAILAND</u>
	85.	Mr. Paytye Junphuang	Officer Airport of Thailand PLC. <u>THAILAND</u>
	86.	Mr. Chayanin Phoosangthong	Supervisor of Aeronautical Information Service Airport of Thailand PLC. <u>THAILAND</u>
	87.	Ms. Threenuch Lueangwichit	Administrative Officer Airport of Thailand PLC. <u>THAILAND</u>
	88.	Mrs. Wachiraporn Chaiwattanakulkit	Air Traffic Control Manager AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	89.	Mr. Wanchai Rattanasing	Aeronautical Information Manager AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	90.	Ms. Amornrat Jirattigalachote	Expert (Director Level) AEROTHAI, Aeronautical Radio of Thailand Ltd. <u>THAILAND</u>
	91.	Ms. Vararat Vanichkajorn	Manager - Airport Standard Bangkok Airways <u>THAILAND</u>

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	STATE/NAME		TITLE/ORGANIZATION
	92.	Ms. Siripich Ramchuanchorn	Officer - Airport Standard Bangkok Airways <u>THAILAND</u>
	93.	Mr. Apiwat Techakaew	Supervisor - Airport Standard Bangkok Airways <u>THAILAND</u>
	94.	Mr. Thanawut Niamthong	Air Traffic Controller U-tapao <u>THAILAND</u>
19.	UNITED STATES (3)		
	95.	Mr. Shayne Campbell - <i>Online</i>	Senior International Air Traffic Representative Asia Pacific Federal Aviation Administration (FAA) <u>SINGAPORE</u>
	96.	Ms. Almira Ramadani – <i>Online</i>	Sr ATO Representative for APAC Federal Aviation Administration (FAA) <u>SINGAPORE</u>
	97.	Mr. Vern Payne	Manager CDM and International Operations Federal Aviation Administration (FAA) <u>UNITED STATES</u>
20.	VIET NAM (12)		
	98.	Mr. Nguyen Ba Tuan	Deputy Director of Air Traffic Flow Management Centre Civil Aviation Authority of Viet Nam <u>VIET NAM</u>
	99.	Mr. Pham Xuan Thanh	Manager of ATFM Services Division/ATFMC Civil Aviation Authority of Viet Nam <u>VIET NAM</u>
	100.	Ms. Tran Hoang Linh	Official of ATFM Group - Department of ATS Civil Aviation Authority of Viet Nam <u>VIET NAM</u>
	101.	Mr. Le Hai Anh	Official of CNS Department Civil Aviation Authority of Viet Nam <u>VIET NAM</u>

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	STATE/NAME		TITLE/ORGANIZATION
	102.	Ms. Nguyen Ngoc Anh	Official of Safety and Quality Dept Civil Aviation Authority of Viet Nam <u>VIET NAM</u>
	103.	Mr. Nguyen Chanh Duy	Deputy Director of Airport Operation Department Airports Corporation of Vietnam <u>VIET NAM</u>
	104.	Mr. Dinh Gia Quyen	Manager of Safety Management Division – Safety and Quality control Department Airports Corporation of Vietnam <u>VIET NAM</u>
	105.	Mr. Vu Ngoc Tuan	Deputy Manager of Airport Operation Center – Noi Bai International Airport Airports Corporation of Vietnam <u>VIET NAM</u>
	106.	Mr. Nguyen Van Son	Deputy Manager of Airport Operation Center – Tan Son Nhat International Airport Airports Corporation of Vietnam <u>VIET NAM</u>
	107.	Mr. Hoang Phuoc Sanh	Deputy Manager of Technology and Environment Division – Da Nang International Airports Airports Corporation of Vietnam <u>VIET NAM</u>
	108.	Ms. Do Dieu Huyen	Specialist of Airport Operation Department Airports Corporation of Vietnam <u>VIET NAM</u>
	109.	Mr. Le Hoang Anh Thong	Specialist of Technology and Environment Department Airports Corporation of Vietnam <u>VIET NAM</u>
21.		ACI (1)	
	110.	Ms. Badriyah Noordin	Senior Manager Airport Council International (ACI) <u>MALAYSIA</u>
22.		CANSO (5)	

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	111.	Mr. Poh Theen Soh – <i>Online</i>	Director, Asia Pacific Affairs CANSO <u>SINGAPORE</u>
	112.	Mr. Stuart Ratcliffe	Co-Chair ATFM/A-CDM WG CANSO <u>UNITED STATES</u>
	113.	Mr. Eugène Tuinstra	Senior Aviation Consultant To70 B.V. CANSO <u>NETHERLANDS (KINGDOM OF THE)</u>
	114.	Mr. Nicki Harricharan - <i>Online</i>	Operations Programme Manager CANSO <u>UNITED STATES</u>
	115.	Ms. Kapri Kupper	Director ATFM Business Development Metron Aviation CANSO <u>UNITED STATES</u>
23.	IATA (5)		
	116.	Mr. John Moore	Assistant Director, Safety and Flight Operations, ASPAC IATA <u>SINGAPORE</u>
	117.	Mr. Zhang Ti	Senior Manager Flight Operations & GADM IATA <u>CHINA</u>
	118.	Ms. Megan Yin	Senior Manager-Air Traffic Strategy Asia Pacific United Airlines IATA <u>CHINA</u>
	119.	Mr. Arthur Wong	Assistant Manager - Regulatory & Industry Affairs Cathay Pacific Airways IATA <u>CHINA</u>
	120.	Mr. Pakdee Dangksan	Flight Dispatch Manager Bangkok Airways Public Company Limited <u>THAILAND</u>
24.	ICCAIA (3)		

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	STATE/NAME		TITLE/ORGANIZATION
	121.	Mr. Diego Albert	Director, APAC Sales ICCAIA / Aireon <u>SINGAPORE</u>
	122.	Mr. Joe Holewa	Manager, APAC Sales ICCAIA / Aireon <u>UNITED STATES</u>
	123.	Mr. David Antonello	Product Line Manager, Air Ground Solutions ICCAIA / Thales <u>FRANCE</u>
25.	IFATCA (1)		
	124.	Mr. Kenrick Taylor	Technical officer IFATCA <u>AUSTRALIA</u>
26.	VARIFLIGHT (2)		
	125.	Mr. Joseph Xia	General Manager VariFlight <u>SINGAPORE</u>
	126.	Ms. Xinyi Liu	Researcher Feeyo Technology Co. Ltd. <u>CHINA</u>
27.	ICAO (8)		
	127.	Mr. El Khoury Elie Tanious – <i>Online</i>	Technical Officer ICAO Air Navigation Bureau <u>MONTREAL</u>
	128.	Mr. Manjunath K Nelli	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Sub-Office <u>CHINA</u>
	129.	Mr. Mior Adli Mior Sallehuddin	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office <u>THAILAND</u>
	130.	Mr. Hiroyuki Takata	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office <u>THAILAND</u>
	131.	Dr Soniya Nibhani	Regional Officer, Air Navigation Services (CNS) Implementation ICAO Asia and Pacific Regional Office <u>THAILAND</u>

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	STATE/NAME		TITLE/ORGANIZATION
	132.	Mr. Tak Chuen CHUI	ICAO Asia and Pacific Regional Office <u>THAILAND</u>
	133.	Ms. Prakayphet Chalayonnawin	Programme Analysis Associate, Air Traffic Management ICAO Asia and Pacific Regional Office <u>THAILAND</u>
	134.	Ms. Chen Yanru	Programme Assistant ICAO Asia and Pacific Regional Sub-Office <u>CHINA</u>



ICAO

International Civil Aviation Organization

Sixteenth Meeting of the Asia/Pacific Air Traffic Flow Management and Airport Collaborative Decision-Making Steering Group (ATFM & A-CDM/SG/16)

Bangkok, Thailand, 06 – 10 April 2026

LIST OF WORKING AND INFORMATION PAPERS

(Presented by the Secretariat)

WORKING PAPERS

NO	AGENDA	TITLE	PRESENTED BY
WP-1-01	1	Provisional Agenda/Order of Discussion	Chairperson
WP-2-01	2	Related Meetings Outcomes	Secretariat
WP-4a-01	4a	Regional ATFM Implementation Status Rev.1	Secretariat
WP-4a-02	4a	BOBCAT ATFM Operational Updates (SP/02)	Thailand
WP-4a-03	4a	NARAHG Updates: Enhancing Cross-Border ATFM Collaboration Through Flexible, Automated '0-VOICE' Coordination	NARAHG
WP-4a-04	4a	Progress Update from the Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC) (SP/03)	China, Hong Kong China, Singapore, Thailand, CANSO, and IATA
WP-4a-05	4a	Analysis of a CTO Trial in Fukuoka FIR	Japan
WP-4a-06	4a	Progress Update on Air Traffic Flow Management Activities in India	India
WP-4a-07	4a	Streamlining Regional ATFM Collaborative Decision-Making Platforms (SP/04)	China, Hong Kong China and Singapore
WP-4c-01	4	Asia Pacific Regional Guidance Document for Airport and Airspace Capacity Assessment	Secretariat
WP-5-01	5	Status on Regional Monitoring and Reporting Scheme for A-CDM Implementation Rev.2 (SP/11)	ATFM/IR/SWG
WP-5-02	5	The Operational Efficiency Promotion by Support from A-CDM in China	China and IATA
WP-6a-01	6a	Progress of the ATFM Concept Design Ad-Hoc Group (SP/08)	ATFM Concept Design Ad-Hoc Group
WP-6a-02	6a	Enhancing Regional ATFM Coordination through Regional Collaborative Operational Mechanism	China, Hong Kong China and

NO	AGENDA	TITLE	PRESENTED BY
		(RECOM) (SP/09)	Singapore
WP-6a-03	6a	Need for A-CDM Performance Reporting (SP/12)	CANSO
WP-6a-04	6a	Proposal to Amend Asia/Pacific ATFM Daily Plan Exchange Procedure	China, Hong Kong China, Singapore, Thailand, CANSO and IATA
WP-6b-01	6b	Guidance Material to Assist APANPIRG Subsidiary Groups in Reviewing and Updating the List of APAC Common Swim Information Services	SWIM TF
WP-6b-02	6b	ATFM FIXM Message Data Attributes and Associated Message Templates Based on FIXM Version 4.3 as Asia/Pacific Regional Standard (SP/15)	Hong Kong China, Singapore, and Thailand
WP-6b-03	6b	Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment (FF-ICE) Release 1 Implementation Plan (SP/16)	Singapore and Thailand on behalf of the FF-ICE Ad- hoc Group
WP-7-01	7	APANPIRG ATM and Airspace Safety Deficiencies in the ATFM and A-CDM Fields	Secretariat
WP-7-03	7	ATFM Points of Contact List	Secretariat
WP-8-01	8	Terms of Reference and Task List	Secretariat

INFORMATION PAPERS

NO	AGENDA	TITLE	PRESENTED BY
IP-1-01	1	List of Working and Information Papers	Secretariat
IP-4a-01	4a	Lessons Learned from Thailand ATFM System Transition (SP/07)	Thailand
IP-4a-02	4a	Improving Post-Operations Analysis for Cross-Border ATFM Operations within AMNAC (SP/06)	China, Hong Kong China, Singapore and Thailand
IP-4a-03	4a	Impact of Increased BOBCAT Traffic through Pakistan	Pakistan
IP-5-01	5	The Latest Development of TAM in China (SP/13)	China
IP-5-02	5	A-CDM Implementation in Australia (SP/10)	Australia
IP-6a-01	6a	Development of the CANSO Operational Messaging Platform for ATFM Sharing and Synchronization (COMPASS) (SP/05)	CANSO

FLIMSIES

NO	AGENDA	TITLE	PRESENTED BY
Flimsy-5-01	5	Digital Transformation for A-CDM Operations in Indonesia	Indonesia

PRESENTATIONS

NO	AGENDA	TITLE	PRESENTED BY
SP/01	3	ATFM Global Updates - ATFM New Provisions	ICAO HQ
SP/02	4a	BOBCAT ATFM Operational Updates	Thailand
SP/03	4a	Progress Update from the Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC)	China, Hong Kong China, Singapore, Thailand, CANSO, and IATA
SP/04	4a	Streamlining Regional ATFM Collaborative Decision-Making Platforms	China, Hong Kong China and Singapore
SP/05	6a	Development of the CANSO Operational Messaging Platform for ATFM Sharing and Synchronization (COMPASS)	CANSO
SP/06	4a	Improving Post-Operations Analysis for Cross-Border ATFM Operations within AMNAC	China, Hong Kong China, Singapore and Thailand
SP/07	4a	Lessons Learned from Thailand ATFM System Transition	Thailand
SP/08	6a	Progress of the ATFM Concept Design Ad-Hoc Group	ATFM Concept Design Ad-Hoc Group
SP/09	6a	Enhancing Regional ATFM Coordination through Regional Collaborative Operational Mechanism (RECOM)	China, Hong Kong China and Singapore
SP/10	5	A-CDM Implementation in Australia	Australia
SP/11	5	Status on Regional Monitoring and Reporting Scheme for A-CDM Implementation Rev.2	ATFM/IR/SWG
SP/12	6a	Need for A-CDM Performance Reporting	CANSO
SP/13	5	The Latest Development of TAM in China	China

NO	AGENDA	TITLE	PRESENTED BY
SP/14	6b	Reply to SWIMTF Presentation on WP-6b-01	Singapore and Thailand
SP/15	6b	ATFM FIXM Message Data Attributes and Associated Message Templates Based on FIXM Version 4.3 as Asia/Pacific Regional Standard	Hong Kong China, Singapore, and Thailand
SP/16	6b	Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment (FF-ICE) Release 1 Implementation Plan	Singapore and Thailand on behalf of the FF-ICE Ad-hoc Group

— END —

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**ASIA/PACIFIC REGIONAL GUIDANCE
FOR ASSESSMENT OF
AIRPORT CAPACITY AND AIRSPACE CAPACITY**

Version 1.0, APRIL 2026

This Guidance Document was developed by the Asia/Pacific Air Traffic Flow Management & Airport Collaborative Decision Making Steering Group (ATFM & A-CDM/SG)

Adopted by **XXX** Meeting of ATM Sub-Group of APANPIRG and published by the ICAO Asia and Pacific Office, Bangkok

RECORD OF AMENDMENTS AND CORRIGENDA

Amendments / Corrigendum			
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Chapter 1 - Introduction

1.1 Purpose and overview of the guidance

1.1.1 This guidance aims to enhance States' understanding of recommended methodologies to assess airport and ATC sector capacity, within Asia/Pacific (APAC) region. The purpose of this document is to assist ATM planners to develop plans, where necessary, to improve such capacity in order to meet present or future demands of the system. Although the document is aimed at Asia/Pacific region, the concept, application and guidance presented herein is globally applicable.

Note: In this document the terms "airport and/or aerodrome" refer to "controlled aerodrome".

1.1.2 The guidance captures most of the necessary processes from preparatory to implementation phases. Information in this guidance can be used to facilitate further improvement in ATM Services by the States.

1.1.3 A stepwise (process-wise) structure of the guidance is expected to allow each State to refer to chapters, sections or subsections useful for the commencement, implementation or improvement of its capacity assessment process to support effective ATM.

1.1.4 This Guidance is intended to be referred to by the ATM community to ensure common understanding for the implementation and/or enhancement of capacity assessment process.

1.2 Development of Regional Guidance Document

1.2.1 ICAO APAC Air Traffic Flow Management Steering Group (ATFM/SG) 13th meeting, held in September 2022 in Bangkok, noted that assessment of Airport and Airspace capacity is an essential initial step towards ATFM implementation. However, the detailed explanation for carrying out Airport and Airspace Capacity assessment has not yet been specified in Annex 11. The meeting also noted that specific regional guidance material is necessary to assist States in developing and implementing airport and airspace capacity assessment to support effective ATM and agreed to conduct a workshop as a way towards developing the regional guidance material.

1.2.2 ICAO conducted a workshop on Airport and Airspace Capacity Assessment in June 2025 in Yogyakarta, Indonesia.

1.2.3 A draft regional guidance document for conducting airport and airspace capacity assessment to support ATM operations was presented during the workshop. The draft document was circulated to ATFM points of Contact (POC) of APAC States and administrations in October 2025 for further development and a final draft presented to APAC ATFM & A-CDM/SG in April 2026 for approval.

1.3 Process towards implementation

Preparatory Phase- Need for Capacity Assessment

1.3.1 Regular assessment of historical air traffic statistics at major airports provides an overview of air traffic demand. Flight delays are usually the best source for identifying capacity shortfalls. The departure and arrival delays as well as punctuality statistics obtained from the different sources (airspace

users, airports, ANSPs), and compiled together, are among the best sources for identification of capacity imbalances and shortcomings. When it is noted that air traffic demand consistently exceeds the available airport and airspace capacity, the ATM planners should initiate a comprehensive capacity assessment process to identify bottlenecks, either for an airport or for airspace or for both. ~~for identifying bottlenecks.~~ Other triggers for capacity assessment could be expected growth of the traffic, or due to changes in ATM resource airport infrastructure, procedures or change in the traffic mix, etc.

1.3.2 Doc 9971 in Appendix II-D recommends that an annual capacity planning and assessment process, as well as a cyclical process that identifies and quantifies the capacity requirements for the short- and medium-term, should be put in place.

1.3.3 Asia Pacific Seamless ANS Plan V4.0 also recommends that regular airport capacity analysis (Para 7.1 c) and ATC Sector capacity assessment (Para 7.40) should be conducted.

Stakeholders' consultation-

1.3.4 Airport and Airspace Capacity assessment is a collaborative process involving all the stakeholders of the aviation system such as airport operators, ANSPs, Airspace users, military authorities, ground handling agencies, security agencies etc. The capacity assessment process will involve the stakeholders concerned at many stages. For example, airport capacity assessment is not restricted only to the runway capacity, but also considers the combined system: runways, taxiways, aprons and terminals. Hence the involvement of all stakeholders in the process is essential.

1.3.5 The following is an extract from Doc 9971 on establishing an Airport ~~Aerodrome~~ Arrival Rate (AAR) process at an airport. It shows the collaborative process.

Note: For example, to establish an AAR Process;

- *Identify the organization responsible for the establishment and implementation of AARs at the selected airports*

NOTE: It is recommended that you establish a small working group of stakeholders that will have input into the AAR value. For example, ATCOs, supervisors, airport authority, a major airline.

- *Establish optimum AARs for the airport identified; and*
- *Review and validate the airport primary runway configurations and associated AARs at least once each year*

--Doc 9971, Appendix II-B, 2

Past events and Case Studies-

1.3.6 ATM Planners can draw upon the lessons learned from organizing large scale events such as air shows, military exercises, long duration airport maintenance work, major upgradation of crucial CNS facilities etc., which resulted in large scale air traffic disruptions and rescheduling. Such events provide valuable ~~steps~~ information for demand and capacity balancing process. Post operation analysis after the event will also indicate the accuracy of capacity and demand estimation. Such analysis will help in refining the capacity assessment process.

Data Collection Phase-

1.3.7 ATM Planners will need to carefully consider the data required for capacity assessment process. The type, extent and accuracy of data will determine the quality of the capacity assessment process. The following is an indicative list of data which may be considered for the airport capacity assessment process.

Data	Type of data/Time period	Units
Traffic	Monthly, daily, hourly	Average/distribution
Traffic mix	Type of aircraft, Operator share, Patterns (AA/DD, ADA...)	Average/distribution
Runway use	Hours-Hourly, Daily, Monthly	Average/distribution
Arrival Throughput	Hourly/30'/15'	Average/distribution
Departure throughput	Hourly/30'/15'	Average/distribution
Max observed throughput in peak	Hourly/ Daily	Average
Runway Occupancy Time (ROT)-Arrival	Per aircraft, runway and exit point	Average/distribution/median
ROT-Departure	Per aircraft, runway and entry point	Average/distribution/median
Separation on final approach	Distance or Time	Average
Separation Minima (Terminal airspace)	Distance	Average

Table 8- List of Data Considered for Airport Capacity Assessment Process

Chapter 2 - Understanding Capacity

2.1 What is Capacity?

2.1.1 Annex 11 to the ICAO Convention defines “declared capacity” as the measure of the ability of the ATC system or any of its subsystems or operating positions to provide service to aircraft during normal activities. It is expressed as the number of aircraft entering a specific portion of airspace in each period of time, taking due account of weather, ATC unit configuration, available staff and equipment, and any other factors that may affect the workload of the controller responsible for the airspace.

2.1.2 Additionally, Document 4444, ATM, Procedures for Air Navigation Services, in paragraph 3.1.4.1 of Chapter 3, establishes that the appropriate ATS authority should periodically review ATS capacity in relation to traffic demand; and should provide for flexible use of airspace to improve operational efficiency and increase capacity.

2.1.3 Next, paragraph 3.1.4.2 states that, in the event that traffic demand regularly exceeds ATC capacity, resulting in continuous and frequent traffic delays, or it becomes apparent that traffic demand forecasts will exceed capacity values, the appropriate ATS authority should, to the extent possible, take steps to maximize the use of existing system capacity; and develop plans to increase capacity in order to meet current or foreseen demand.

2.1.4 The following is an extract from draft proposal of ATMOPS Panel. It shows how the definition of CAPACITY is evolving to recognize the relationship with time.

- **Strategic capacity.** *A measurement of the ability of the ATC unit to provide safe, orderly and efficient service to aircraft during normal circumstances expressed as the number of aircraft entering a specified controlled airspace or operating at a specific aerodrome in a given period of time. Strategic capacity is often referred to or considered as ~~Planned~~ Declared Capacity.*

Note: Declared capacity' and 'Strategic capacity' are equivalent terms and have been used interchangeably in this document.

- **Operational capacity.** *A dynamic, time-specific capacity value derived from strategic capacity, to be updated as required and used in ATFM pre-tactical planning and ATFM tactical operations.*

2.1.5 Strategic capacities are primarily used for multi-year and investment planning. Declared, expected (or Operational) capacities are used in strategic, pre-tactical and tactical traffic flow management as well as for measuring and monitoring service delivery and efficiency. In contrast to normal circumstances considered for Strategic capacity evaluation, Operational capacity accounts for evolving operating conditions on the day-of operation.

2.1.6 Some ANSPs may prefer not to declare capacities in advance based on normal operating circumstances, instead establishing these capacities daily based on known/current operational factors. Establishing capacities at different planning horizons provides an important reference for understanding the total system performance under normal operating conditions and provides a basis to work from when

determining the impact of operational factors limiting capacity. These factors include – but are not limited to – Air Traffic Control Office (ATCO) availability and workload.

2.2 Importance of Capacity and Demand Assessment

2.2.1 Annex 11 in paragraph 3.7.5.1, establishes that air traffic flow management (ATFM) will be implemented in airspaces where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned, and paragraph 3.7.5.2 contains a Recommendation to implement ATFM through regional air navigation agreements or, if appropriate, through multilateral agreements, and that such agreements must make provision for common procedures and methods for determining capacity.

2.2.2 The purpose of ATFM is to achieve a balance between air traffic demand and system capacity to ensure an optimum and efficient use of system airspace. This is achieved by balancing expected/forecasted demand and the capacity declared by the appropriate air traffic service providers in order to accommodate a maximum number of flights under a gate-to-gate concept.

2.2.3 In order to achieve demand-capacity balance in long-term , strategic horizon,, it is necessary to know the current and expected demand, to establish a capacity baseline using an analytical calculation, to analyze the impact that expected demand will have on existing capacity, to identify the limitations of, and possible improvements to, the current system based on a cost/benefit analysis thereof, to set priorities, and to develop a capacity management improvement plan.

2.2.4 Knowledge of the capacity of air traffic sectors or ATC operating positions is necessary for two main reasons. The first is that, for long-term planning, it is necessary to anticipate efficiently any shortfall of future capacity, as inferred from traffic forecasts. The second reason is that if there is already a shortfall in capacity that calls for flow control, it must be known in order to restrict traffic without overloading the system or excessively affecting operators, or to implement best practices on operational performance.

2.2.5 There are many methods for calculating capacity and, as readily noted from the different models described in this document, air traffic controller workload is a significant parameter in these models. Therefore, a better knowledge of workload factors and their implications will provide for a more suitable operational adjustment of the services provided to meet the demand.

2.2.6 DOC 9971 in Appendix II-D note that:

The overriding objective is to develop a capacity assessment process that contributes to the requirement to:

“provide sufficient capacity to accommodate the demand in typical busy hour periods without imposing significant operational, economic or environmental penalties under normal circumstances.”

2.3 Key Performance Indicators for Measurement of Capacity

2.3.1 The Global Air Navigation Plan (Doc 9750) notes the following Key Performance Indicators (KPIs) for measuring airport and airspace capacity.

KPI09 Airport Peak Capacity

<p>Definition: The highest number of operations an airport can accept in a one-hour time frame (also called declared capacity). Can be computed for arrivals, departures or arrivals + departures combined.</p>
<p>Measurement Units:</p> <ul style="list-style-type: none"> • Number of departures per hour, • Number of landings per hour, • Number of (departures + landings) per hour
<p>Operations Measured: The capacity declaration of an airport.</p>
<p>Variants:</p> <ul style="list-style-type: none"> • Variant A: Airport peak arrival capacity • Variant D: Airport peak departure capacity • Variant AD: Airport peak movement capacity (departures + arrivals)
<p>Objects Characterized:</p> <ul style="list-style-type: none"> • The KPI is computed for individual airports.
<p>Utility of the KPI: This KPI indicates the highest number of operations that an airport will can accept, using the most favorable runway configuration under optimum operational conditions. The runways may or may not be the most constraining factor for airport capacity: at some airports the most constraining factor may be the terminal airspace, the taxiways, the number of gates, passenger handling capacity etc. The KPI is typically used for scheduling and ATFM purposes, and to develop capacity investment plans.</p>

KPI06 En-Route Airspace Capacity

<p>Definition: The maximum volume of traffic an airspace volume will can safely accept under normal conditions in a given time period.</p>
<p>Measurement Units:</p> <ul style="list-style-type: none"> • Variant 1: Movements/hr • Variant 2: Number of aircraft (occupancy count)
<p>Operations Measured:</p> <ul style="list-style-type: none"> • The nominal capability of an ANSP to deliver ATM services to IFR traffic in a given volume of en-route airspace, as seen at a given planning horizon.
<p>Different Type of capacity for each horizon:</p> <ul style="list-style-type: none"> • Planned capacity: expected values one or more years ahead for planning and investment purposes • Declared capacity: values used during the strategic and pre-tactical ATFM processes • Expected capacity: values as finalised at the end of the pre-tactical process •

<ul style="list-style-type: none">• Actual capacity: values as actually used on the day of operation during tactical ATFM and ATC.
Variants: <ul style="list-style-type: none">• Variant 1: airspace throughput (entry flow rate)• Variant 2: airspace occupancy count
Objects Characterized: <ul style="list-style-type: none">• The KPI is typically used at the level of individual sectors (sector capacity) or en-route facilities (ACC capacity).
Utility of the KPI: <p>The KPI measures an upper bound on the allowable throughput or occupancy count of an en-route facility or sector.</p>

Chapter 3 - Airport Capacity Assessment

3.1 Introduction

3.1.1 Airport Capacity Assessment is a crucial process for understanding an airport's ability to handle a specific volume of aircraft and passenger traffic within a given timeframe while maintaining desired levels of service. It involves evaluating the capabilities of various airport components, identifying bottlenecks, and providing insights for future planning and development.

***Definition:** Airport capacity refers to the maximum throughput that an airport system or its individual components (runways, taxiways, terminals, airspace, etc.) can accommodate over a specific period (e.g., hourly, annually) without causing unacceptable delays.*

This document defines airport capacity as the maximum number of airport operations in a given aerodrome under specified conditions (e.g., aerodrome layout, aircraft mix, weather conditions, facilities, aircraft parking, etc.), taking into account all take-off and landing operations during a specified period of time (hour, day, month, year, season).

3.1.2 Many different parameters are used for measuring airport and airspace capacity. Consequently, care must be taken when defining the scope of each capacity in order to better understand the indicators to be used for assessing each capacity. The scope of airport capacity can cover airside or landside, however primary KPIs will be different (airside typically focuses on air traffic movements, while landside on passenger counts. Both will contribute to the overall airport capacity) however most of the information presented in this document focuses on the airside aspects.

3.1.3 Airport airside capacity is driven by capabilities and bottlenecks along the arrival and departure trajectories, from TMA, Runway, surface and apron. These should be separately analyzed, to determine the capacity for each segment/area and identify the most constraining one, and act on these.

3.1.4 In some cases, the physical capacity of the aircraft parking area—defined by the number of aircraft it can accommodate—may be lower than the estimated runway capacity for the same aerodrome. In such instances, the apron becomes the actual limiting factor for airport operations.

3.1.5 When all applicable requirements are duly met, service capacity is 100%. This capacity is reduced when such requirements have operational limitations; the greater the constraint in resources, the lower the service capacity. But the declaration of an operational capacity lower than the strategic capacity may also be considered in order to manage contingencies or uncertainties.

3.2 Importance of Airport Capacity Assessment:

- Identifying current and future limitations: Pinpointing areas of congestion and potential bottlenecks.
- Supporting strategic planning: Informing decisions about infrastructure development, operational improvements, and resource allocation.
- Maintaining service quality: Ensuring acceptable levels of service for passengers and airlines by minimizing delays and congestion.
- Optimizing efficiency: Maximizing the utilization of existing infrastructure.

- Stakeholder communication: Providing data for discussions with airlines, air traffic control, and the community.

3.3 Factors to be considered for assessment of Airport Capacity

Numerous factors affect an airport's capacity, including:

- Airfield Characteristics: Number of runways, the runway and runway rapid exit taxiways (RETs) configuration, Runway length, and separation of runways; layout of taxiways; number of aprons and parking stands.
- Airspace Management: Design and complexity of airspace, air traffic control procedures and equipment and technology.
- Applicable separation and spacing minima (e.g., wake, surveillance, arrival spacing), separation delivery accuracy, runway occupancy time.
- Meteorological Conditions: Visibility, wind, and other weather phenomena.
- Aircraft Mix: Types and performance characteristics of aircraft using the airport.
- Operational Procedures: Efficiency of takeoff and landing procedures, ground handling, and gate parking stand utilization.
- Terminal Building Infrastructure: Size and layout of terminals, number of gates, check-in counters, security checkpoints, and baggage handling systems.
- Passengers' profiles (or mix): travel purpose (business vs. leisure), group type (families, PRMs, short connectors), and nationality or visa status.

3.4 Methodologies

Calculating and Expressing Airport Capacity - Contributing Factors

3.4.1 Normally defined as the total number of movements, i.e. arrivals and departures, that the aerodrome can handle during the given period.

- Capacity values are calculated for each aerodrome runway configuration and for the anticipated range of weather conditions, i.e., visual meteorological conditions, instrument meteorological conditions, and low visibility conditions
- Often infrastructure-related, as opposed to ATCO workload-related, airport capacity is easier to calculate using mathematical models.
- Nonetheless, the ATCO workload element, e.g., the need for the ATCO to coordinate departures with the adjoining unit, remains important and should be assessed during the calculation of airport capacity

3.4.2 Methodologies for Assessment: Various qualitative and quantitative methods are employed to assess airport capacity. These can range from relatively simple analytical models to complex simulation tools. Some common approaches include:

- Analytical tools use mathematical formulas to estimate capacity based on factors like runway occupancy time, separation standards, and aircraft mix (e.g., FAA's Airfield Capacity Model (ACM). ACM is a widely recognized analytical tool used to calculate the runway capacity of an airport. It considers factors such as runway configuration, aircraft mix, weather conditions (VMC/IMC), and operational procedures. The model estimates capacity by analyzing the time intervals between successive aircraft operations. The FAA has upgraded this model over time to incorporate more features and improve accuracy.
- Mathematical models use formulas based on queuing theory and statistical analysis to estimate capacity. They consider factors like runway occupancy times and separation requirements. These models can provide quick assessments but might oversimplify complex airport operations.
- Employing computer simulations to model aircraft and passenger flows under different scenarios and analyze their impact on capacity and delays.
 - ✓ Runway Capacity Analyzer: This tool employs Monte Carlo simulation to account for uncertainties in input parameters and provides probabilistic estimates of runway throughput. It can optimize flight sequences and analyze the impact of factors like fleet mix and required aircraft separation. This is the methodology used by EUROCONTROL when performing Airport Capacity Assessment, described in **Appendix B**.
 - ✓ Discrete Event Simulation Models: These models simulate individual aircraft movements on the ground (taxiways, runways, gates) and in the airspace as discrete events occurring over time. They can provide a detailed analysis of airport operations, including delays and bottlenecks, under various scenarios. They may also incorporate a 3D modeling capability.
- Analyzing historical operational data (e.g., arrival and departure rates, delays) to understand current capacity and identify constraints.

Note: It is fundamental that the use of models have their baseline operations calibrated against real-life operations and data. Often models are simplified value or approximations, also for critical parameters influencing capacity, for example on runway capacity, which could lead to over-estimated or under-estimated capacity, while there is observed variability in operations, such as aircraft landing speed, or achieved separation at runway threshold, runway occupancy time or runway exit usage. This has a direct effect on the arrival or departure throughput/capacity. The model parametrization should reflect the observed variability in operations, such as aircraft landing speed, or achieved separation at runway threshold, or runway occupancy time, usage of runway exits, accounting for the actual observed average but also the distribution spread around.

3.4.3 Key considerations when using models to assess Airport Capacity

- Data Accuracy: The accuracy of the model outputs heavily depends on the quality and granularity of the input data (e.g., traffic schedules, aircraft characteristics, operational procedures).

- Model Scope: Different models have varying scopes. Some focus primarily on runway capacity, while others can model the entire airport system, including terminals and landside operations.
- Level of Detail: The choice of model depends on the required level of detail and the complexity of the airport and the analysis being conducted.

Assumptions and Limitations:

It is crucial to understand the underlying assumptions and limitations of each model to interpret the results correctly. Analytical models often rely on simplifying assumptions, while simulation models can be computationally intensive and require careful calibration and validation.

3.4.4 In practice, a combination of different models and analysis techniques is often used to provide a comprehensive assessment of airport capacity. The FAA also provides guidelines and methodologies for conducting airport capacity analyses in its Advisory Circulars.

3.5 Measures for Enhancement of Airport capacity

3.5.1 Airport capacity enhancement is a multi-faceted challenge, requiring a comprehensive approach that addresses various components of the airport ecosystem. It is important to differentiate between measures for improving airport capacity (new runways, new gates, wake RECAT, new procedures that reduce spacing between aircraft, etc.) and improving throughput or the use of existing capacity (A-CDM, etc.).

3.5.2 Measures can be broadly categorized into infrastructure expansion, technological integration, and operational efficiency improvements. The following figure is a (indicative) list of airport capacity enhancement measures.

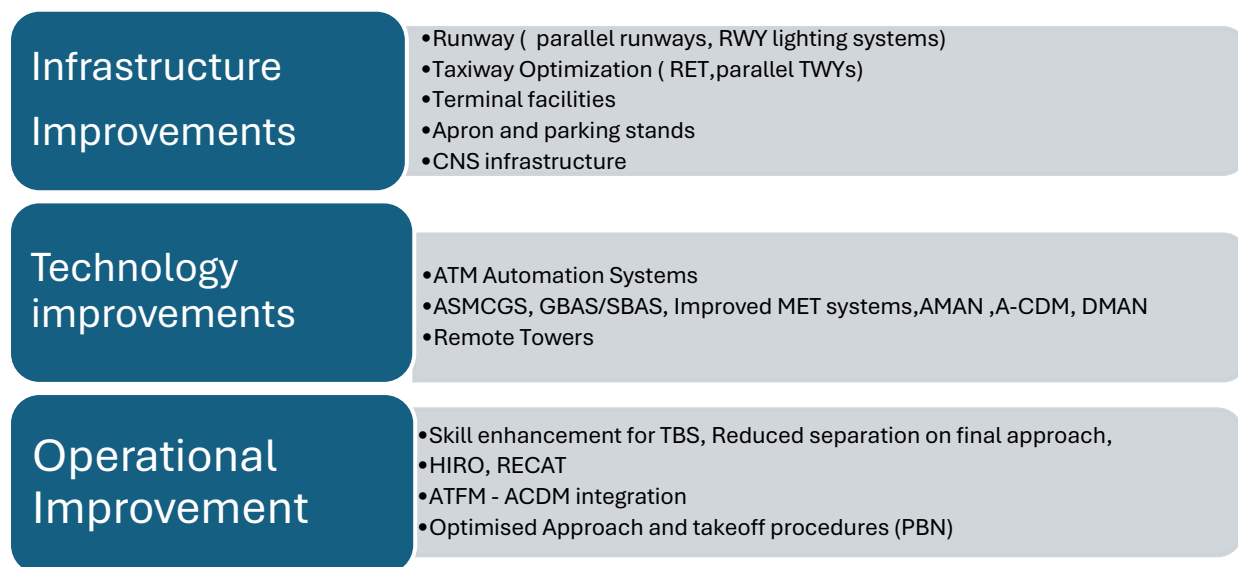


Figure 11- Airport Capacity Enhancement Measures

3.5.3 The primary factor driving the maximum arrival or departure throughput is linked to the arrival or departure separation attained, which itself is dependent on separation or spacing minima

established and the delivery performance to these minima. The separation and spacing constraint are in turn linked to surveillance needs, and wake turbulence and runway occupancy of preceding traffic. Optimization can then come from enhancement to separation minima or to the ATC capabilities to deliver traffic closer to the minima, reducing unnecessary buffers.

3.5.4 By strategically combining these measures, airports can significantly enhance their capacity, reduce delays, improve efficiency, and accommodate growing air travel demand. It is crucial to consider the interdependencies between airport and airspace components, as increasing capacity in one area without addressing others can lead to new bottlenecks.

3.5.5 Optimum utilization of airport capacity (NATS example)- To utilize existing airport capacity effectively, NATS takes into consideration the following factors.

1. Sharing information across the airport ensures that all stakeholders—from ground operations to air traffic control—are aligned and responsive to real-time and strategic developments.
2. Making better use of existing resources allows for optimization without the need for major infrastructure investments.
3. Balancing demand through dynamic scheduling and coordination helps prevent bottlenecks and improves flow.
4. Getting your sequence right—whether in aircraft departures, arrivals, or parking stand assignments—can significantly reduce delays and improve throughput; and
5. Being consistently consistent in applying procedures and standards fosters predictability and reliability, which are crucial for maintaining high operational performance.

3.6 Role of Airport Collaborative Decision Making (A-CDM) in Airport Throughput Optimization

3.6.1 If the Airport capacity assessment identifies bottlenecks that will require fundamental infrastructure changes and the Airport has limited opportunities to tackle them, it is worth considering operational optimization to improve the airport throughput. One such optimization may come from improved monitoring of the turnaround process and timely information sharing.

3.6.2 To address the challenges and issues that arise from ineffective data and information exchange between airports and airspace operations, Airport Collaborative Decision Making (A-CDM) has been developed. A-CDM supports both normal and disrupted operations with the aim of increasing the efficiency of airport operations and improving the performance of the overall ATM network, by:

- Reducing delays
- Improving predictability
- Optimizing the use of resources

3.6.3 Another advantage of improving the efficiency of the operation is that aircraft spend less time taxiing and standing with engines running in queues for departure. This is good for the operators and environment as less fuel is burnt.

3.6.4 Airport Collaborative Decision Making (A-CDM) plays a crucial role in enhancing the use of airport capacity by fostering a shared understanding and optimizing operational processes among all stakeholders. It moves beyond traditional, siloed approaches to overall airport capacity management by promoting real-time information exchange and coordinated decision-making.

3.6.5 A-CDM primarily focusses on airport throughput optimization and may support identification of factors useful in airport capacity assessment by:

- **Enhanced Situational Awareness:** A-CDM provides a common operational picture (COP) for all stakeholders, including airlines, air traffic control (ATC), ground handlers, and airport authorities. This shared view of real-time data on aircraft movements, parking stand availability, baggage handling, and passenger flows allows for a more accurate and dynamic assessment of current and projected capacity.
- **Improved Predictability and Planning:** By integrating data from various sources, A-CDM enables better prediction of potential bottlenecks and capacity constraints. This allows stakeholders to proactively adjust their plans, such as optimizing departure sequences, managing gate assignments, and allocating ground resources more efficiently, thereby maximizing existing infrastructure capacity.
- **Optimized Resource Utilization:** A-CDM facilitates the efficient allocation of critical airport resources like runways, taxiways, gates, stands, and ground support equipment. Through collaborative planning and real-time adjustments, it helps ensure that these resources are utilized to their fullest potential, reducing idle times and improving throughput.
- **Reduced Delays and Congestion:** By enabling quicker and more informed decisions, A-CDM helps mitigate the impact of disruptive events (e.g., adverse weather, technical issues) on airport operations. This leads to fewer delays, reduced taxi times, and less congestion on the airfield and in the terminals, effectively increasing the operational capacity of the airport.
- **Decision Making supported by data:** A-CDM relies heavily on common operational picture, however supported by associated data support analytics to identify trends, predict future states, and evaluate the impact of different operational choices. This data-driven support provides a more robust foundation for capacity assessment, allowing airports to make more tailored and flexible decisions about infrastructure investments, operational procedures, also in the long planning horizon.
- **Stakeholder Collaboration:** At its core, A-CDM is about collaboration. It establishes formal and informal mechanisms for stakeholders to communicate, share information, and jointly resolve issues related to capacity and efficiency. This collective intelligence leads to more effective solutions than any single entity could achieve alone.

3.6.6 In summary, A-CDM transforms static, reactive airport process into a dynamic, proactive, and collaborative endeavor. By leveraging turnaround monitoring, sharing real-time information, fostering common understanding, and optimizing resource allocation, it helps airports unlock and increase utilization of their capacity, improve operational efficiency, and enhance the overall passenger experience.

3.7 KPIs for Airport Performance Assessment

3.7.1 GANP describes the following KPIs for Airport Operational Performance Assessment. These KPIs indicate the operational capacity of the airport and infrastructure bottlenecks.

Total ATM (Departure, Arrival, Total)

- i. Peak Capacity and throughput
- ii. Taxi-In time
- iii. Taxi-Out Time
- iv. Arrival and Departure Punctuality

3.7.2 In addition, the data analysis should also provide metrics such as

- ROT-Arr
- ROT-Dep
- Stand Occupancy time

3.8 Conclusion

3.8.1 In conclusion, Airport Capacity Assessment is a multifaceted process that provides essential information for the efficient operation, planning, and development of airports. By understanding the factors that influence capacity and utilizing appropriate assessment methodologies, airports can proactively address congestion, optimize infrastructure use, and enhance the overall passenger experience.

Chapter 4 - Airspace (Sector) Capacity Assessment

4.1 Introduction

4.1.1 Airspace sector capacity assessment is the process of determining the maximum number of aircraft that an air traffic control (ATC) sector can safely and efficiently handle within a specific period while maintaining an acceptable level of controller workload. It's a critical element of air traffic flow and capacity management (ATFM), ensuring a balance between traffic demand and the ability for ATC to safely handle the traffic in a volume of the airspace to accommodate it.

***Definition:** Airspace sector capacity represents the maximum throughput of aircraft that can enter and transit a defined volume of airspace managed by a specific ATC unit or sector over a given time (usually hourly or within a 15-minute interval). This capacity is constrained by the controller's ability to safely and effectively manage the traffic.*

4.1.2 Airspace sector capacity is not unlimited, but it can be more or less optimized depending on many factors, such as airspace sector design and flexibility; ATC system capacity; number of sectors and their complexity; segregated airspace; availability, training, and response capability of personnel; available CNS infrastructure; degree of automation; complexity of traffic flows in volume of airspace and the equipage and type of aircraft in the fleet.

4.1.3 Airspace Capacity & Separation Standards

- Airspace capacity is directly related to the applicable separation standard.
- The smaller the separation standard, the more aircraft fit in an airspace volume (sector) CNS infrastructure improvements improve the accuracy of information about aircraft position and movements, resulting in lower separation standard; for instance, PBCS separations in oceanic airspace.

4.1.4 When analyzing airspace capacity, the document focuses on ATC sector capacity and, in this sense, highlights some concepts that must be taken into account as indicators to calculate the ATC sector capacity, such as workload, the importance of observable and non-observable tasks performed by air traffic controllers. The document describes some models used to measure and assess the parameters employed to determine capacity to meet air traffic demand.

4.1.5 While the document mostly focusses on Terminal Area (TMA) and En-route Area Control (ACC) operations, it is important to distinguish that workload dynamics in these environments differ significantly from other air traffic control (ATC) sectors encompassing uncontrolled airspace. Although TMAs and ACCs manage higher volumes of passengers and aircraft, sectors with uncontrolled airspace face unique complexities, specifically the provision of Flight Information Services (FIS), combined areas of controlled and uncontrolled airspace, larger geographic coverage, and a higher density of operational aerodromes where aircraft and passenger movement data is recorded.

4.1.6 Additionally, the provision of air traffic services within uncontrolled airspace often results in periods of acute workload intensity that are less predictable than those in terminal areas. In APAC region, there are many such areas, which present unique mixed airspace challenges. However, this

document specifically does not address capacity measurement of uncontrolled aerodrome and airspace operations.

4.2 Calculating and Expressing Airspace Capacity (Annex 11)

4.2.1 The strategic capacity of controlled airspace and designated aerodromes is to be determined on a seasonal or annual basis and periodically reviewed and updated to account for changing circumstances, such as a new runway being commissioned, new automation systems being implemented, or a new separation standard being introduced or changes to ATC procedures.

4.2.2 The operational capacity is initially set by referencing the strategic capacity as a baseline value, and re-calculated iteratively to account for dynamic, short-term, time-specific changes in factors affecting operating conditions and ATCO workload.

4.2.3 There is no universal rule for calculating capacity because it can be affected by many variables and other considerations

- Depending on the local regulatory environment, the State, appropriate ATS authority, ATC unit, and/or ATFM unit decide how to calculate capacity.
- Methods range from observation-based basic models to highly sophisticated mathematical models.
- Typically, capacity assessment is normally done by using detailed analysis by specialist ATFM personnel, input from ATCOs and other operational ATS staff (e.g., planner and flow ATCOs, assistants and supervisors), review of safety information regarding high ATCO workload, and real-time observations.
- Due consideration should be given to the methods employed by neighboring States and within the region to ensure consistency in the methods that consider the same traffic flows.
- Multilateral agreements may be established for sharing are great tools for ensuring consistency in capacity calculation methodologies to ensure consistency.

4.3 Importance: Accurate capacity assessment is essential for:

- Ensuring safety: Preventing sector overload and maintaining adequate separation between aircraft.
- Optimizing airspace utilization: Maximizing the efficiency of the airspace by accommodating the highest possible traffic volume without compromising safety.
- Minimizing delays: Proactively identifying potential bottlenecks and implementing ATFCM measures to mitigate congestion.
- Supporting ATC planning: Informing decisions about sector design, staffing levels, and the implementation of new procedures and technologies.
- Facilitating coordination: Providing a common understanding of airspace limitations for all stakeholders, including ATC units, airlines, and airport operators.

4.4 Factors to be considered

4.4.1 Factors Influencing Sector Capacity: As illustrated in Figure 2, several factors impact the capacity of an airspace sector:

- **Airspace Complexity:** The size, shape, vertical limits, presence of Prohibited, Restricted and Danger Areas and route structure within the sector. Complex airspace with numerous crossing routes or altitude changes typically has lower capacity, as does the temporary designation of airspace for special activities or events.
- **Traffic Characteristics:** The volume, type (aircraft mix), speed, and direction of traffic flows. Predictable and uniform flows allow for higher capacity.
- **ATC Procedures:** The complexity and efficiency of separation standards, coordination requirements with adjacent sectors, coordination mechanism with Military Units and the use of standard routings.
- **ATC Tools and Technology:** The availability and sophistication of surveillance systems, automation tools, and communication systems. Advanced tools can enhance a controller's situational awareness and workload management, potentially increasing capacity.
- **Controller Workload:** The number and complexity of tasks required to manage traffic within the sector, including communication, coordination, conflict detection and resolution, and data management. An acceptable level of workload is a primary constraint on capacity.
- **Meteorological Conditions:** Adverse weather (e.g., thunderstorms, turbulence) can increase controller workload due to required deviations, special procedures and increased communication, thus reducing capacity.
- **Sector Configuration:** Changes in sector boundaries or the opening/closing of sub-sectors can dynamically affect capacity.

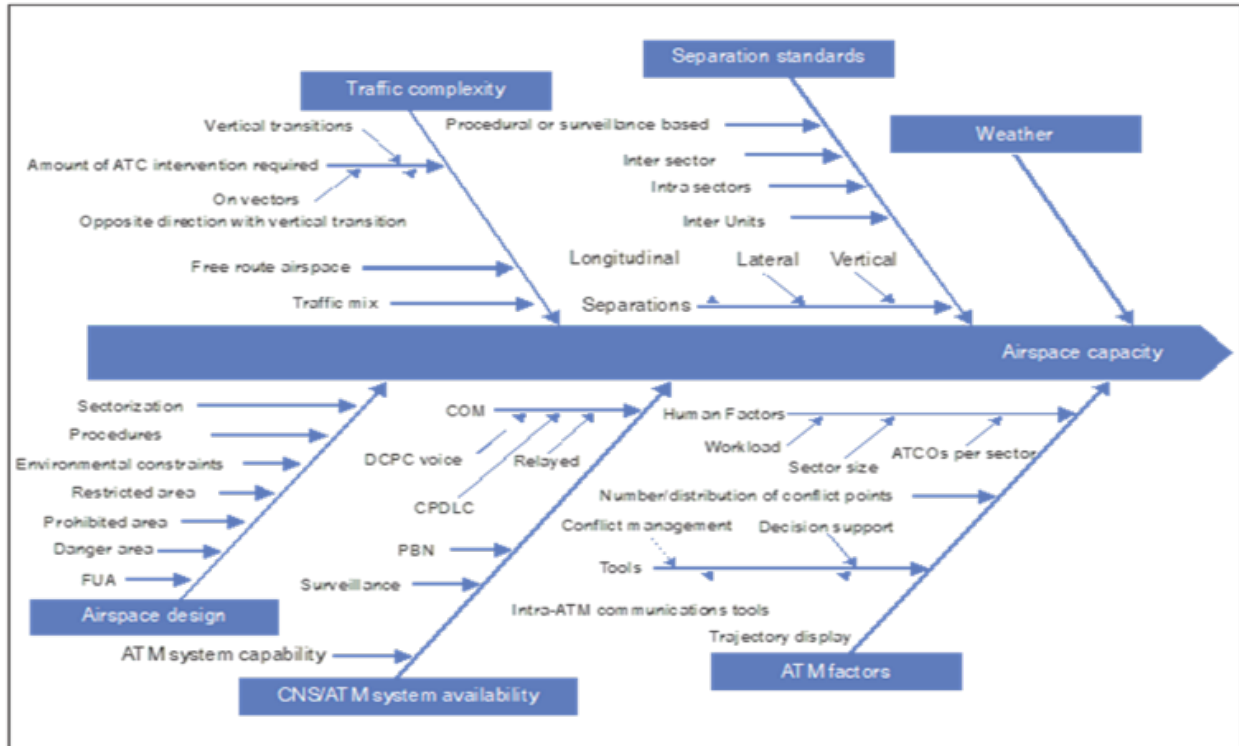


Figure 12- Factors Affecting Airspace (Sector) Capacity (Doc 9971)

4.5 Methodologies

4.5.1 The capacity for a portion of airspace is normally expressed as

- An entry count monitoring value—the maximum number of aircraft which may enter the airspace in a given period of time, normally one hour, or.
- An occupancy count monitoring value — the number of aircraft which may simultaneously operate within the portion of airspace over a specific time period, normally one minute, and the average number of aircraft expected to be maintained over a longer elapsed period e.g., 10 minutes.

In some cases, instantaneous or short duration occupancy counts can be used to complement entry counts.

- This allows for more granular analysis to mitigate and temporarily accept higher traffic demand values that exceed the entry counts monitoring value.
- Such occupancy count capacities require accurate and frequent ATC movement messages and ATS surveillance system data updates to the ATFM service system.
- Occupancy counts should be made available in advance of the flight entry into the given airspace and on a frequent basis.

Evaluation Models

4.5.2 Airspace sector capacity assessment models are tools and methodologies used to determine the maximum number of aircraft that an air traffic control (ATC) sector can safely and efficiently

handle within a given period. These models help in understanding sector limitations, optimizing airspace utilization, and mitigating potential congestion and delays.

Methodologies for Assessment:

4.5.3 Various methods are employed to assess airspace sector capacity, ranging from simple estimations to complex simulations:

i. Mathematical occupancy and complexity models –

These models use mathematical formulas and queuing theory principles to estimate capacity based on parameters like aircraft arrival rates, sector transit times, and controller task load. They can provide quick estimations but may simplify the complexities of real-world ATC operations.

These are relatively simple methods that define capacity based on the maximum number of aircraft allowed to enter a sector within a specific timeframe (entry count) or the maximum number of aircraft permitted to be within the sector at any given time (occupancy count). These models often incorporate buffer mechanisms and adjustments based on factors like sector size and complexity.

ii. Simulations Models: These are more complex models that use computer simulations to represent air traffic flow and controller actions within a sector.

a. Fast-Time Simulation (FTS): Tools like runway Simulator and customized versions of RAMS Plus (used in CAPAN methodology) fall into this category.

b. Real-Time Simulation: These involve human-in-the-loop simulations with controllers interacting with simulated traffic to assess workload and capacity under realistic conditions.

c. Data-Driven Models using historical data: These approaches analyze historical operational data (e.g., traffic counts, delays, controller inputs) to identify patterns and statistically estimate sector capacity based on observed performance under varying traffic levels.

iii. ATCO workload assessment models- Considers average execution times of definable and measurable tasks that contribute to ATCO workload.

Air Traffic Controller (ATCO) Workload

4.5.4 ATCO workload is the key driver of airspace capacity in high -density/high-complexity traffic areas

i. Operational experience suggests that a safer measure of capacity is based on ATCO's physical and mental work to ensure safe separation and control of traffic

ii. Capacity is often defined as the traffic volume that results in a controller workload reaching a predetermined acceptable threshold (e.g., 70-80% of available time), leaving a buffer for unexpected events or continuous actions which cannot be related to a specific task

iii. ATS authorities commonly use simulation techniques to model ATCO workload for estimation of airspace capacity; this allows greater flexibility in capacity estimation and ensuring impact assessment of wider ranges of capacity improvement proposals

4.5.5 While ATCO workload definition and evaluation methods vary, they aim to establish the relationship between aircraft numbers (entering or occupying a sector) and the resulting controller workload over a given time period.'

- a) According to scientific literature, methods for measuring ATCO workload are usually categorized as subjective and objective.
- b) Several workload measurement methods of different states of maturity are currently known and used in the simulation, such as: Self-Assessment Techniques, Workload assessment questionnaires, Third Person-Assessment Techniques, Primary/Secondary Task Performance, Technical measurements of any kind.

4.5.6 Below are the evaluation methodologies based on ATCO workload:

<p>Operational Experience</p> <ul style="list-style-type: none">○ Investigate how much traffic a particular volume of airspace can handle, followed by interviews to ascertain the ATCOs' perception of traffic load.○ Limited ability to determine capacity for a future ATC setting.
<p>Fast Time Simulations (FTS)</p> <ul style="list-style-type: none">○ These models are based on evaluating the time required by controllers to perform all necessary tasks associated with managing air traffic within a sector.○ Tasks are often categorized (e.g., communication, coordination, conflict detection, flight data management), and time weights are assigned to each.○ Often described as calculating task-load rather than workload, FTS do not aggregate the functional relationship between the traffic numbers, airspace sector factors and ATCO workload; as such, they lack ATCO judgement, experience and way of thinking.○ This can be mitigated by involving active ATC staff in an iterative process of simulation refinement through rigorous data analysis
<p>Real Time Simulations (RTS)</p> <ul style="list-style-type: none">○ RTS involves ATCOs, pilots, and a model of an ATC system to create a full operational environment.○ While realistically capturing the human element, they are often costlier and require additional infrastructure along with longer simulation time and training of personnel.

4.5.7 Benefits and Limitations:

- Entry/Occupancy Count: Simple to implement but may not accurately reflect controller workload or airspace complexity.

- Frequency Occupancy: Focuses on a key controller task but might not capture other workload drivers.
- Controller Workload: Provides a direct measure of the limiting factor but requires detailed task analysis and can be subjective.
- Simulation Models: Offer high fidelity and can model complex interactions but are data-intensive and require significant computational resources and expertise.
- Mathematical/Analytical Models: Useful for initial estimations and theoretical studies but often rely on simplifying assumptions.
- Empirical Models: Based on real-world operations but are limited by the availability and quality of historical data and may not predict well under new conditions.

4.5.8 The choice of model depends on the specific objectives of the capacity assessment, the availability of data and resources, and the complexity of the airspace and traffic environment being analyzed. Often, a combination of different models and techniques can provide a more comprehensive and robust understanding of airspace sector capacity.

4.5.9 The following systems are sources of data to support the capacity assessment:

- ATC Automation system (Flight Data Processing System (FDPS), AFTN/AMHS flight plan data)
- Billing System (used for Route and Terminal navigation charges)
- ATFM system
- A-CDM/ AOCC (Airport operations) system
- Surveillance system data (archive)

4.6 Measures for Enhancement of airspace capacity

4.6.1 Enhancing airspace sector capacity is critical for managing growing air traffic volumes, reducing delays, and improving overall air navigation efficiency. This involves a combination of strategic airspace design, advanced technology, and optimized operational procedures.

4.6.2 The following figure provides a broad view of various measures that can be implemented to enhance airspace sector capacity.

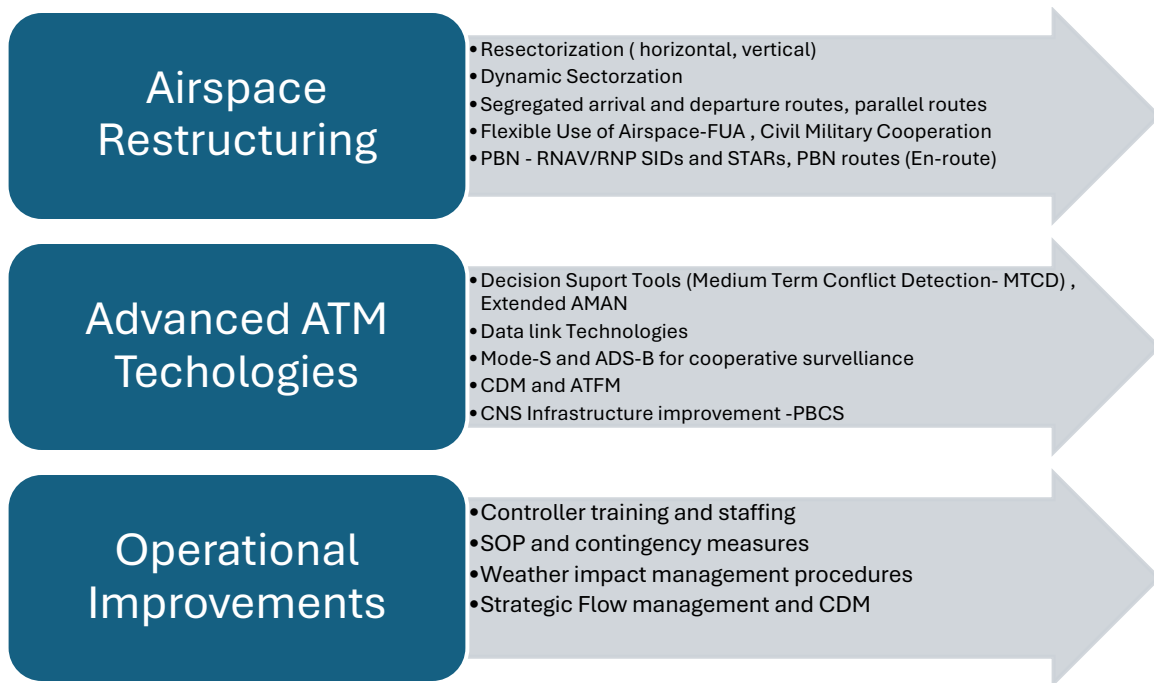


Figure 13- Airspace Sector Capacity Enhancement Measures

- 4.6.3 By integrating these measures, air navigation service providers can significantly enhance airspace sector capacity, leading to fewer delays, more direct routes, reduced fuel consumption, and improved environmental performance.
- 4.6.4 In summary, airspace sector capacity assessment is a vital process for ensuring the safe and efficient management of air traffic. By considering the various influencing factors and employing appropriate assessment methodologies, ATC authorities can effectively determine the operational limits of their airspace and implement strategies to optimize its use while maintaining acceptable levels of safety and service.

References

- ICAO Annex 11, Air Traffic Services.
- ICAO Doc. 4444- Air Traffic Management 15th. Edition.
- ICAO Doc. 9426, Air Traffic Service Planning Manual.
- ICAO Doc 9971, Manual on Collaborative Air Traffic Flow Management
- ICAO Global Air Navigation Plan ([ICAO GANP Portal](#))
- ICAO APAC Seamless ANS Plan V4.0
- ICAO APAC Framework for collaborative ATFM

Appendix A – Airport Capacity Assessment

A-1 Determining Airport Arrival Rate (AAR)

Airport Arrival Rate (AAR) is a dynamic parameter specifying the number of arrival aircraft that an airport, in conjunction with

- terminal airspace,
- ramp space,
- parking space, and
- terminal facilities,

can accept under specific conditions during any consecutive 60-minute period.

--Doc 9971, Appendix II-B, 1.1

Determining the Airport Arrival Rate (Doc 9971, Appendix II-B)

Definitions

- Airport arrival rate (AAR) — a dynamic parameter specifying the number of arrival aircraft that an aerodrome, in conjunction with terminal airspace, ramp space, parking space, and terminal facilities, can accept under specific conditions during any consecutive 60-minute period.
- Aerodrome primary runway configuration— an aerodrome configuration that handles three percent or more of the annual operations.

Administrative Considerations

- Identify the organization responsible for the establishment and implementation of AARs at selected aerodromes;
- Establish optimal AARs for the aerodromes identified; and
- Review and validate the aerodrome primary runway configurations and associated AARs at least once each year.

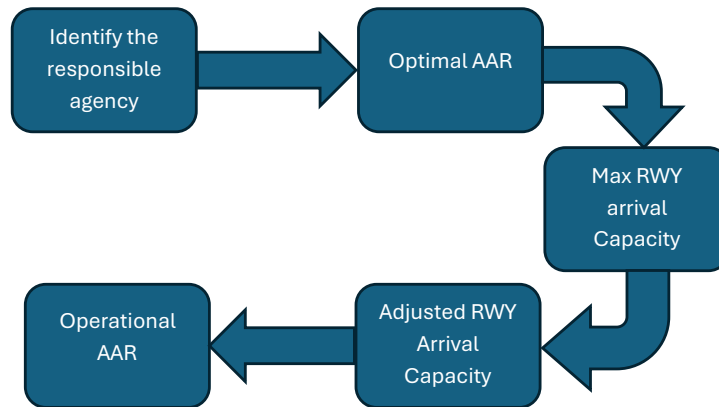


Figure APP.A- 1 Simplified Methodology for Establishing AARs²

Optimal AAR

Calculate optimal AAR—the strategic capacity of a runway configuration— for the following meteorological conditions:

- visual meteorological conditions (VMC): meteorological conditions allow vectoring for visual approaches;
- marginal VMC: meteorological conditions do not allow vectoring for visual approaches, but visual separation on final is possible;
- instrument meteorological conditions (IMC): visual approaches and visual separation on final are not possible; and
- low IMC: meteorological conditions dictate Category II or III operations.

Maximum runway arrival capacity

Calculate the maximum runway arrival capacity as follows:

- Determine the average ground speed over the runway threshold and the spacing interval between successive arrivals accounting for required minima and separation delivery accuracy;
- Divide the ground speed by the spacing interval to determine the optimum AAR; and
- Round down to the next whole number, or refer to ICAO Doc 9971, Table II-App B-1.

Adjusted runway arrival capacity

Identify any conditions that may adjust the runway arrival capacity, including:

- intersecting arrival and departure runways;
- lateral distance between arrival runways;
- dual use runways — runways that share arrivals and departures;

² Scientific process developed by the FAA as in FAA Order JO 7210.3EE, Facility Operation and Administration, Chapter 10, Section 7

- land and hold short operations;
- availability of high-speed taxiways;
- airspace limitations and constraints;
- procedural limitations (noise abatement, missed approach procedures);
- taxiway layouts; and
- meteorological conditions.

Determine the adjusted runway arrival capacity using the previous factors listed for each runway used in an aerodrome configuration:

- add the adjusted runway arrival capacity values for all runways used in an aerodrome configuration to determine the optimal AAR for that airport configuration.

Operational AAR

Calculate the operational AAR by accounting for real-time factors that require dynamic adjustments to the optimal AAR.

- aircraft type and fleet mix on final;
- runway conditions;
- runway/taxiway construction;
- equipment outages;
- approach control constraints; and
- wind (speed & direction).

$$\text{Operational AAR} = \text{Optimal AAR} - \text{Adjustment Factors}$$

A-2 Airport Capacity Assessment Process

Example of Airport Capacity Assessment Process by EUROCONTROL Network Manager

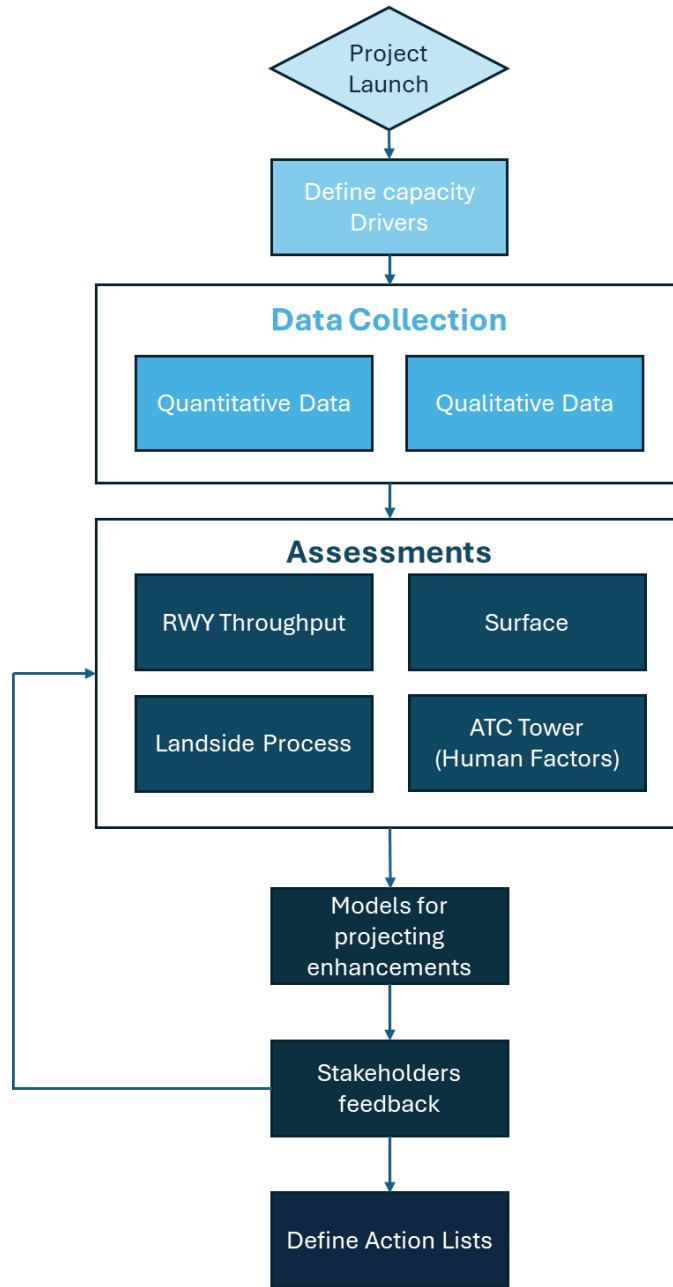


Figure APP.A- 2 Simplified Flow Chart on Methodology for Airport Capacity Assessment by EUROCONTROL

The explanation of the steps is as follows

- 1) Launch of Airport capacity assessment
- 2) Define the capacity drivers, by identifying the current operation status, collecting inputs from all Stakeholders on:
 - a. Terminal

- b. Apron
 - c. Surface
 - d. Runway
 - e. TMA
- 3) Collect Quantitative data based on Traffic and Passenger data
 - 4) Collect Qualitative data based on OPS feedback and Stakeholders survey
 - 5) Perform a RWY throughput assessment
 - 6) Perform a Surface assessment
 - 7) Perform a Landside process assessment if considered as relevant for the assessment
 - 8) Perform an ATC Tower (Human Factors) assessment if considered as relevant for the assessment
 - 9) Use models for projecting Airport capacity enhancements effect on runway throughput and develop scenarios
 - 10) Present result to stakeholders (e.g. in forms of recommendations) and obtain feedback
 - 11) Define action list and ensure regular follow-ups on implementation.

Appendix B – Airspace Sector Capacity Assessment

B-1 FAA sector capacity assessment model

Simple methodology for determining sector capacity developed by the FAA assumes that the sectors under consideration work best when they handle:

- no more than 25 aircraft during any 15-minute period; and
- no more than 18 aircraft during any one-minute period.

Therefore, each aircraft requires 36 seconds of a controller’s work time

$$15 \text{ minutes} \times 60 \text{ seconds} = 900 \text{ seconds}$$

$$900 \text{ seconds} / 25 \text{ aircraft} = 36 \text{ seconds per aircraft}$$

Sector capacity is calculated using the average sector flight time in minutes from 0700 hours to 1900 hours, Monday through Friday, for any 15-minute time period

$$\text{Optimum Sector Capacity} = \frac{60 \times \text{Average Sector Flight Time (min)}}{36 \text{ (seconds)}}$$

Avg Sector Flight Time (minutes)	3	4	5	6	7	8	9	10	11	12+
Optimum Sector Capacity (aircraft count)	5	7	8	10	12	13	15	17	18	18

Table APP.B- 1 Simplified Flying-time-based Method for calculating Sector Capacity³

This simple methodology limits capacity by considering controller workload by assuming that a controller spends 36 seconds providing an ATC service to each flight.

This optimum value needs to be adjusted for applicable factors, such as:

- ATS route structure;
- airspace volume (vertically and laterally);
- complexity;
- climbing and descending traffic;
- terrain and obstacles, if applicable;
- number of adjoining sectors that require interaction; and
- military operations.

The 36-second assumption does not account for dynamic changes in sector traffic complexity characteristics over time and may not be applicable to future capabilities.

³ ICAO Doc 9971 Manual on Collaborative ATFM, Third Edition, 2018, Appendix II-C, Table II-App C-1

Improvements to the simplified method: a workload model that considers the number of aircraft and their interactions with each other, ATC services needed by each aircraft, and the amount of time to provide services:

- Estimate the workload associated with imposed task demands by considering the difficulty, number, rate, and complexity of demands;
- Calculate time-on-task workload for the en-route sector radar controller positions based on post-operation logs including sector configurations and
- Model sector tasks and task categories over a period of time to establish more accurate workload estimates for:
 - entry (identify aircraft, establish clearance plan, handoff, flight crew call-in, ack);
 - exit;
 - non-standard (non-radar) arrivals and/or departures;
 - vertical transitions (interim, altitude amendment),
 - scanning;
 - coordination (flash-through or point-out);
 - separation assurance; and
 - delay (vectoring, shortcut, reroute, holding, diversion).

Use industry-standard human performance modeling techniques to identify radar controllers' tasks per sector (or sector combination) and estimate task times:

- Field observations at ACCs
- Human-in-the-loop simulation

Steps for building a workload model:

1. Determine input and output parameters of the workload model:
 - a. Identify tasks performed over a period of time (e.g., Mon-Fri, 0700-1900);
 - b. Record task times and task distributions to execute each task; and
 - c. Sum the task times to estimate of workload for each time period (e.g., rolling 15-minute intervals for 1440 intervals in 24 hours).
2. Set the workload threshold to 90% of the theoretical workload (e.g., 810 sec for a theoretical 15-minute/900 sec interval).
3. Describe the characteristics of traffic complexity for each period.
 - a. Consider three complexity types: cruise, transition (climb/descent), and delay – which may be individual or combined; and.
 - b. For each complexity type, consider if separation-related activity is low or high.
4. Determine the complexity profile that characterizes sector operations over a period of time; for each complexity type:

- a. Set an alert value according to the highest observed traffic count – hence, less complex sector operations receive higher alert values and more complex sector operations receive lower alert values;
- b. Express the occurrence of each complexity type as a percentage;
- c. Calculate the weighted average by multiplying the values from 4a and 4b; and
- d. The weighted averages are summed together and rounded to determine the monitoring value.

ATC experts can further tune the monitoring value produced by the workload model to:

- a. propose experience-based adjustments; and
- b. account for additional, frequently occurring sector combinations.

The monitoring value of the operational capacity can be dynamically adjusted during periods of reduced efficiency to reflect the ability to provide air traffic services (e.g., meteorological conditions, and temporary degradation of infrastructure). When efficiencies improve, the monitoring value is adjusted back to baseline.

Complexity-type	Avg. complexity type alert value for the sector	Frequency	Weighted average Complexity
Transition with low separation assurance workload	19	41%	7.80
Cruise with low separation assurance workload	22	32.4%	8.13
Delay and transition with low separation assurance workload	21	12.8%	2.70
Delay with low separation assurance workload	18	5.6%	1.00
Transition with high separation assurance workload	18	5.2%	0.90
Delay with high separation assurance workload	17	1.4%	0.20
Cruise with high separation assurance workload	19	0.8%	0.15
Delay with Transition with high separation assurance workload	17	0.5%	0.09
<i>Calculated workload-based monitoring value (capacity)</i>			20

Table APP.B- 2 Sample Case on Calculated Workload-based Monitoring Value

B-2 Brazil sector Capacity Assessment Model

In Brazil, the capacity of ACCs is calculated by observing the capacity of their sectors, which is analytically obtained according to the methodology established in the ICA 100-30, ATC personnel planning (DECEA, 2007).

Calculated capacity value represents the maximum number of aircraft that can be simultaneously controlled by each operational position (ATCO). According to the current model, the controller's workload is the summation of the time spent on each of the following tasks:

- a. Communications (transmission/reception);
- b. Manual activities (filling-out strips) and coordination; and
- c. Traffic planning and distribution.

The Brazilian methodology applies the concept of the controller's "availability factor" (φ), which is defined as the percentage of time available for the ATCO to plan the aircraft separation procedures. This availability factor is found, usually, between a minimum value of 40% of the ATCO time in a non-surveillance environment, and 60% in a surveillance environment.

The number of aircraft that can be simultaneously controlled by a controller N , within the sector under consideration can be calculated as:

$$N = \frac{\varphi * \delta}{\eta * \tau_m * v_m}$$

Sector capacity is the function of the following factors:

- φ : factor of controller availability, defined as the percentage of time available to plan the aircraft separation procedures;
- δ : average distance flown by aircraft in the sector, which is a function of the ATS route structure within the sector;
- η : number of controller-pilot communications for each aircraft in the sector;
- τ_m : average duration of each controller-pilot communication; and
- v_m : average speed of the aircraft in the sector.

By replacing δ and v_m with the average time flown by aircraft in the sector T , where $T = \frac{\delta}{v_m}$, the number of aircraft that can be simultaneously controlled by a controller N can be calculated as:

$$N = \frac{\varphi * T}{\eta * \tau_m}$$

The values of the factors φ , T , η and τ_m are collected empirically, following the standardized procedures specified by the appropriate ATS authority.

Example for calculating the capacity:

- factor of controller availability: $\varphi = 60\%$
- average flight time spent by the aircraft crossing the sector: $T = 12$ minutes
- number of controller-pilot communications for each aircraft in the sector: $\eta = 6$

- average duration of each controller-pilot communication: $\tau_m = 9$ seconds

$$N = 60\% \cdot 12_{min} \cdot (6 \cdot 9_{sec})^{-1}$$

$$N = 60\% \cdot (12 \cdot 60_{sec}) \cdot (6 \cdot 9_{sec})^{-1}$$

Number of aircraft controlled simultaneously by a single controller

$N = 8$

Dynamically changing conditions may necessitate updating sector capacity values to account for significant changes

Data gathering needs to be meaningful to accommodate a reasonable range of operational uncertainties and represent trustworthy values to the ATC unit.

In ideal conditions, data research shall be conducted when there is heavy air traffic activity, for this reason choosing the ideal season is a factor to be considered, once it has a direct influence in final results.

Brazil has calculated the capacities of all sectors, individual and combined. After calculating the initial sector capacity, further adjustment is made to account for the significant air traffic flows, the complexity of each sector, and the capacities of the adjacent sectors.

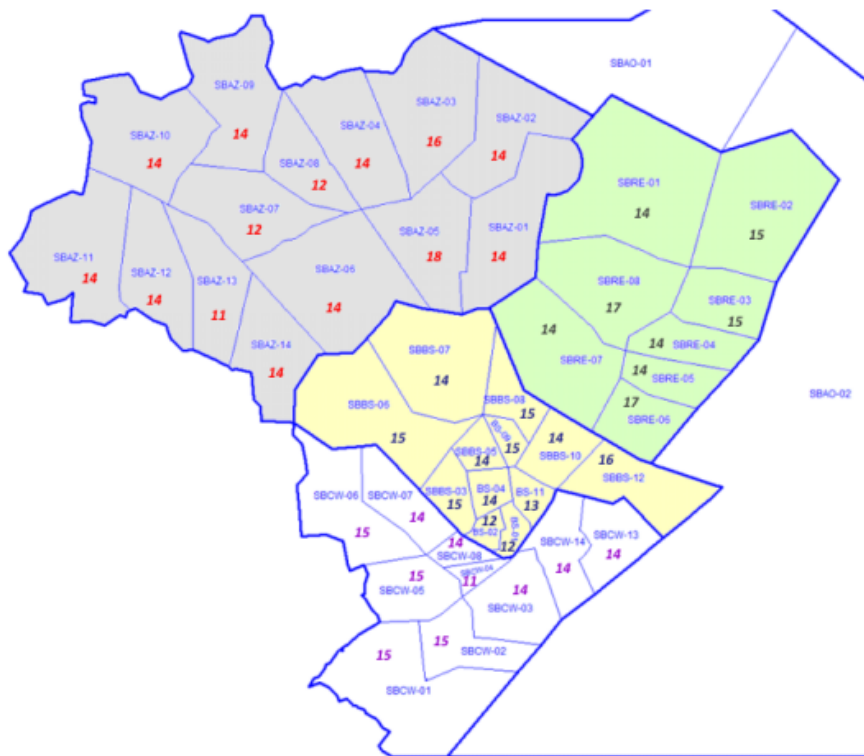


Figure APP.B- 1 Calculated Sector Capacity in Brazil

B-3 Saudi Arabia Capacity Assessment Model

ATC sector capacity calculation is based on the equations to determine the theoretical number of aircraft that can be managed and handled by ATCO. The ATS unit must perform further validation by a group of experts to confirm the calculated sector capacity and consider all possible factors that may impact that capacity.

The number of aircraft that can be controlled simultaneously by a single ATCO (Sector capacity) is calculated as the function of the following factors:

- **φ : ATCO Availability factor (expressed as %)**, defined as the percentage of time available for planning aircraft separation procedures;
- **T : Average flight time on the aircraft in the sector** (the unit of time needs to be the same as for τ_m);
- **η : Number of controller-pilot communications for each aircraft in the sector**; and
- **τ_m : Mean duration of each controller-pilot communication** (the unit of time needs to be the same as for T).

A significant data sampling is required to accommodate a reasonable range of operational uncertainties and determine reliable values for the ATC unit.

According to the current model, controller workload is the summation of times spent on:

- Communication (transmission /reception)
- Manual activities (updating of flight progress strip) and coordination
- Traffic planning and distribution

Availability factor, φ , is defined as the percentage of time available for the ATCO to plan aircraft separation procedures. Its typical range is between 40% of ATCO time in a non-surveillance environment and 60% of ATCO time in a surveillance environment. It is thus clear that efforts need to focus on increasing the availability factor φ .

Studies conducted by experts, who analysed the sampling techniques, show that it is advisable to make at least 25 observations of each parameter for an average controller, during peak traffic, respecting the minimum number of controllers specified by the sampling technique used.

It is essential to collect as many observations from as many controllers as possible in the unit being assessed in order to eliminate extreme values and to minimise any type of trend (e.g., cases of controllers or pilots who are either too slow or too quick in their communications, affecting the arithmetical mean).

B-4: EUROCONTROL Methodology

EUROCONTROL developed the CAPAN (ATC Capacity Analysis) Methodology to calculate ATC sector capacity by assessing controller workload. The methodology ensures a consistent and robust technique to derive ATC controller workload and the associated sector/controlling position capacity through an ATC task-based fast-time simulation.

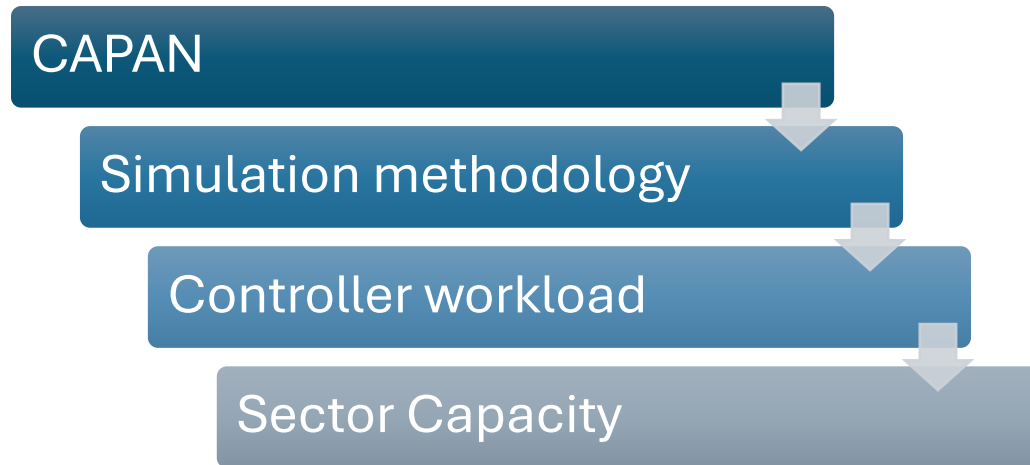


Figure APP.B- 2 Simplified Illustration on CAPAN Methodology

The methodology defines task categories and tasks representing controller actions, conflict detection and resolution mechanisms, a set of rules to mimic controller reasoning, a threshold for average theoretical working time corresponding to sector capacity and a technique, based on regression analysis, to establish the relation between workload and capacity.

The methodology uses a fast-time simulation engine which allows reproducing the ATC environment and follows an iterative process of validation for every assessment case.

Active ATC staff are involved throughout the full process of validation to guarantee simulation scenarios are as realistic as possible. This is fundamental to include the human component into the fast-time simulation, though it makes the process complex and long.

ATC controller workload is calculated by collecting the ATC related tasks generated through an ATC task-based fast-time simulation. The latter reproduces ATC related discrete events which in their turn are used to record tasks representing the actions performed by an ATC controller.

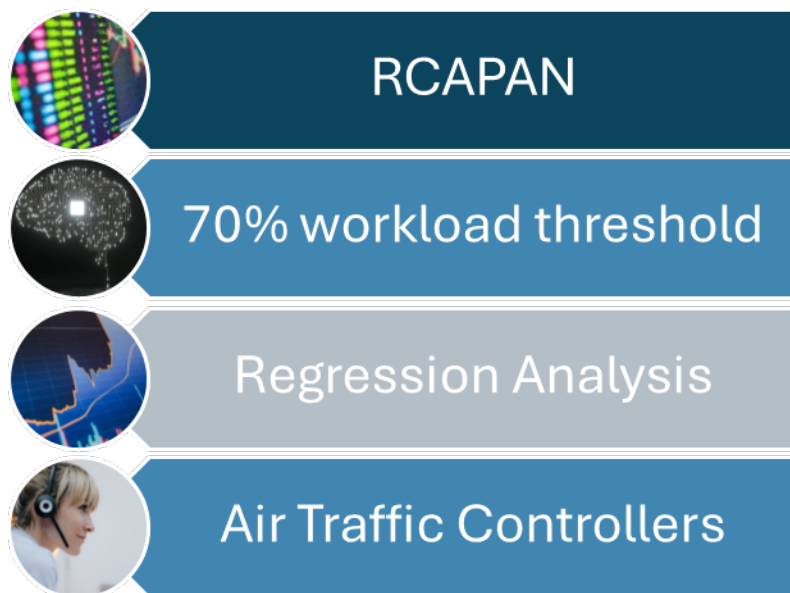


Figure APP.B- 3 CAPAN Main Principles

From a modelling point of view, the profile of a flight through airspace can be used to generate ATC related events, such as sector entry/exit, start of descent, etc.

These ATC events are used to trigger the controller tasks, which are given a specific time weight, representing the average ATC controller effort to perform each specific action.

The sum of all tasks for a certain sector and/or controlling position over a specific period of time, (normally one hour) determines the workload over that period of time.

The relationship between controller workload and the sector entries or occupancy over time is used for analysis of specific periods of the day in the sector, effectively showing the activity happening in the sector over the 24 hours.

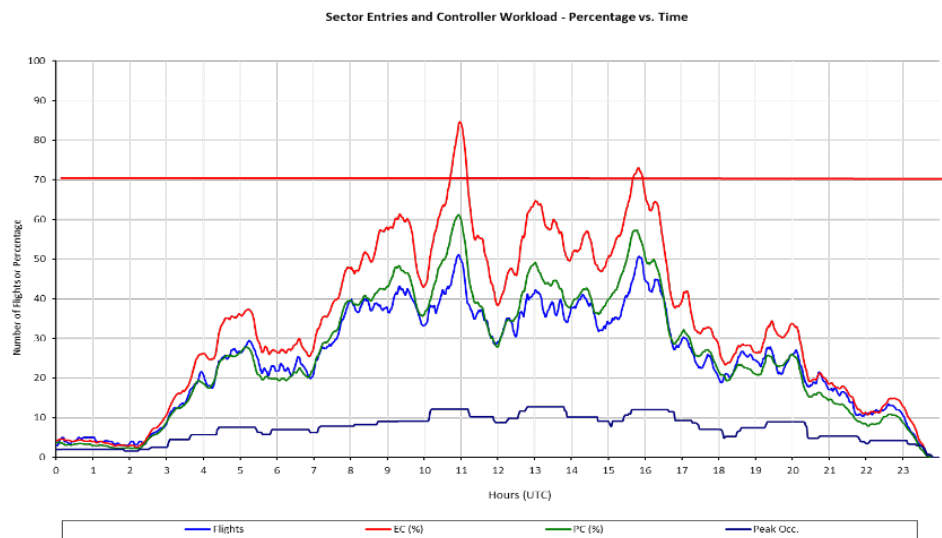


Figure APP.B- 4 Relationship between Sector Entries and Controller Workload

As illustrated in the figure above, the blue curve represents the number of sector entries in a one-hour period, using a sliding window every minute of the day; the green curve represents the corresponding planning controller (PC) workload percentage; the red curve represents the corresponding executive or radar controller (EC) workload percentage. The red line represents the overload threshold of 70% used by CAPAN to identify overloaded working positions.

Simulated workload percentage is often observed to vary with the period of the day, where sector entries can be of a similar number. This represents different complexity of the traffic flows present in this sector at different times of the day and enables a detailed analysis of the sector.

The CAPAN Methodology produces values representing the workload loading in the simulated control positions. Based on the measured workload level, quantitative threshold values and their corresponding qualitative interpretations are defined as follows:

- **Theoretical Sector Capacity** is attained when controller **workload reaches 70%** of the absolute working time, i.e. 42 minutes in an hour
- **30%** represents tasks which cannot be captured by discrete events, e.g. a general monitoring of the radar screen or recuperation time
- 70% threshold has been assessed through a **process of fine-tuning** of the discrete event logic when the first CAPAN studies were carried out together with several Real-Time simulations

Threshold	Interpretation	Recorded Working Time during 1 hour
70 % or above	Overload	42 minutes +
54 % - 69 %	Heavy Load	32 - 41 minutes
30 % - 53 %	Medium Load	18 - 31 minutes
18 % - 29%	Light Load	11 - 17 minutes
0 % - 17 %	Very Light Load	0 - 10 minutes

Table APP.B- 3 CAPAN Workload Thresholds

Capacity results are the average of a series of simulation runs – normally 25 - where the entry times of the flights and the aircraft performances are made to vary, to create different situations in the analysed ATC Sectors. This reduces the possibility that the traffic sample creates a too complex or a not enough complex situation. In the case sectors are not sufficiently loaded, flights can be cloned in a proportional way to create a traffic load sufficient enough to calculate theoretical sector capacities.

The mathematical technique, known as Regression Analysis, is used to evaluate an average theoretical sector capacity over a specific period of time. Sector/controlling position capacity is defined in terms of hourly entry rates as well as occupancy counts.

This Regression Analysis sector capacity value is based on the 24-hour average traffic complexity of the sector.

It should be noted that when the workloads recorded during the 24-hour simulation are light, the capacity by regression analysis may give too high values. In fact, as the traffic demand is low, the behaviour of the sector during difficult periods has not been measured and the function traffic/workload is almost linear. For this capacity calculation a minimum of ten iterations of the traffic sample would normally be used.

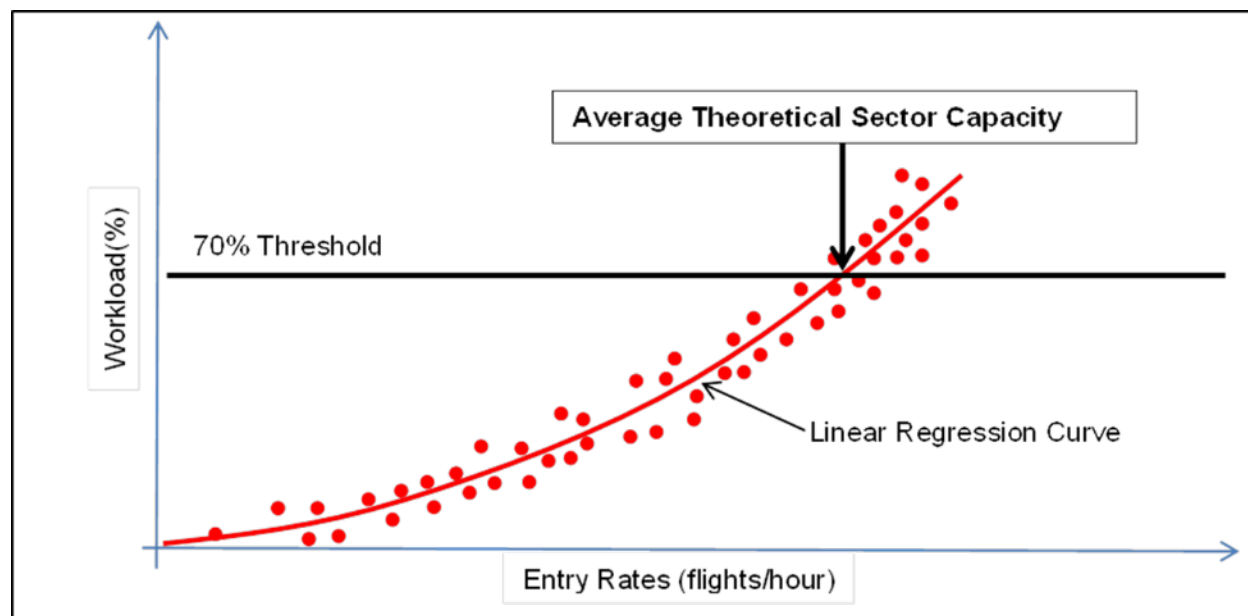


Figure APP.B- 5 Calculation of Regression Capacity

CAPAN Input Data

Traffic Data

Eurocontrol Network Manager's common archive DDR2 provides three types of traffic data:

- Initial demand: the latest flight plan updates.
- Regulated demand: flight plans impacted by flow restrictions.
- Actual demand: flight profiles derived from coordinated position reports.

Samples are selected to represent typical flows in the target area.

The prepared traffic is then iterated multiple times to simulate various scenarios (e.g., entry times, performances).

Airspace Data

Airspace data is directly available in EUROCONTROL Database, it is based on AIRAC Cycle Publication and can be complemented with AIP and tactical information.

Aircraft Performance

Eurocontrol Database BADA (Base of Aircraft Data) provides a range of aircraft type nominal performance tables. They are fundamental for trajectory calculation and totally customizable to local procedures and company policies.

ATC Model

Several parameters are required for fast-time simulation to properly model ATC procedures. CAPAN uses tailored parameters for ACC and TMA environments. Parameters include among others:

- Conflict detection and Resolution parameters
- Sector Manning
- ATC Tasks Several parameters required for fast-time simulation

Standard model for controller tasks for both ACC and TMA environment

Totally Customizable depending on system capabilities, specific procedures, separation minima, etc.

Divided into 5 main task categories:

- ✓ Flight Data Management
- ✓ Conflict Search
- ✓ Coordination
- ✓ Standard Radio Telephony
- ✓ Radar
- ✓ Applicable to single/double man operations, multi-sector planner, etc.

Appendix -C – Capacity Assessment Examples from States

Capacity metrics will vary considerably, depending upon many factors such as the COM and SUR capabilities, the presence of terrain, physical attributes of aerodromes and weather. Thus, the expectations outlined for the following States need to be treated with caution, however they form a useful guide as to the sort of capability being achieved with modern systems and appropriately trained controllers.

The arrival rate is obtained as the average ground speed (in kt) divided by the separation (in NM), rounded down to the closest integer.

Table APP.D- 1 provides an indication of potential Aerodrome Airport Arrival Rate (AAR) for a single runway, given aircraft ground speeds and aircraft spacing near the runway threshold.

		Inter-arrival Spacing									
		3NM	3.5NM	4NM	4.5NM	5NM	6NM	7NM	8NM	9NM	10NM
Speed	140kt	46	40	35	31	28	23	20	17	15	14
	130kt	43	37	32	28	26	21	18	16	14	13
	120kt	40	34	30	26	24	20	17	15	13	12

The arrival rate is obtained as the average ground speed (in kt) divided by the separation (in NM), rounded down to the closest integer.

Table APP.D- 1 Potential Runway Arrival Rate⁴

ATC capacity calculations needed to take into account the volume of airspace of each sector, which varied considerably by State, and factors such as automation, density of traffic and complexity of routes/airspace. The *Manual on Collaborative Air Traffic Flow Management* (ICAO Doc 9971) contained guidelines for ATC sector capacity assessment. **Table APP.D- 2** provides simplified ATC sector calculation guidance from ICAO Doc 9971.

Avg Sector Flight Time (minutes)	3	4	5	6	7	8	9	10	11	12+
Optimum Sector Capacity (aircraft count)	5	7	8	10	12	13	15	17	18	18

Table APP.D- 2 Simplified ATC Sector Capacity Table (no complexity/automation allowance)

Australia, Japan, New Zealand, Singapore, Thailand and the United States of America provided runway and airspace (ATC Sector) capacity data, to indicate potential capacity figures in varying Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC) circumstances.

Australia

Brisbane and Melbourne airport capacity expectations:

single runway: **48** (24 arrivals - 150 seconds between arrivals, 24 departures, VMC)

single runway: **40** (20 arrivals - 180 seconds, 20 departures, IMC)

Japan

⁴ Guide for the Application of a Common Methodology to Estimate Airport and ATC Sector Capacity for the SAM Region, Attachment 7: Calculation of the Aerodrome Acceptance Rate used by the FAA

Airport capacity expectations:

Narita (dual runways): 56-64

Haneda (4 runways): 74

New Zealand

Auckland airport capacity expectations:

single runway: **45** (VMC)

single runway: **39** (IMC circling)

single runway: **37** (IMC below circling with missed approach protection for jets)

single runway: **32** (IMC below circling with missed approach protection)

ATC Sector capacity expectations:

terminal/low level Category T airspace: **12** aircraft

en-route Category S airspace: **15** aircraft

en-route Category R airspace: **15** aircraft

Singapore

Changi airport capacity expectations:

two parallel/near parallel runways: **72** (IMC)

Thailand

Suvarnabhumi airport capacity expectations:

single runway: **34** (VMC/IMC)

United States of America

Table APP.D- 3 provides an indication of optimal aerodrome parallel or near parallel arrival rate runway arrival capacity at selected USA aerodromes. It should be noted that multiple runway combinations or whether runways were used for arrivals, departures, or both yielded a number of permutations from the data.

Aerodrome	Runways	IMC	VMC
KATL	5	104	126
KORD	5	84	112
KDFW	5	90	96
KATL	4	92	112
KDEN	4	-	114
KLAX	4	64	80
KORD	4	-	92
KATL	3	76	96
KDEN	3	-	96
KIAD	3	72	100
KATL	2	68	82
KJFK	2	-	58
KSDF	2	40	52
KATL	1	34	42

Aerodrome	Runways	IMC	VMC
KSDF	1	20	26
KSFO	1	25	27

Table APP.D- 3 Capacity at Selected United States of America Aerodromes

Average airport arrival capacity expectations (range):

- single runway: IMC average **26** (25-34), VMC average **32** (26-42)
- two parallel/near parallel runways: IMC **55** (40-68), VMC **64** (52-82)
- three parallel/near parallel runways: IMC **74** (72-76), VMC **97** (96-100)
- four parallel/near parallel runways: IMC **78** (64-92), VMC **100** (80-112)
- five parallel/near parallel runways: IMC **92** (84-104), VMC **111** (96-126)

ATC Sector capacity expectations:

- terminal/low level Category T airspace: **12-18** aircraft
- en-route Category S airspace: **16-20** aircraft
- en-route Category R airspace: **17-24** aircraft

Summary

Note: given the unique operation environment and constraints of individual States, these figures are indicative only and do not represent the same expectation across different States in the region.

Table APP.D- 4 summarizes runway and airspace capacity expectations from States, with the greatest capacity achieved in optimum conditions highlighted in bold.

	Parallel or Near Parallel Runway Capacity					ATC Sector Capacity		
	1	2	3	4	5	T	S	R
Australia	40-48							
Japan		56-64		74				
NZ	32-40					12	15	15
Singapore		72						
Thailand	34							
USA	61	95	150	177	211	12-18	16-20	17-24
ICAO Doc 9971 Simplified Table Comparison						15	18	18

Note: given the unique operation environment and constraints of individual States, these figures are indicative only and do not represent the same expectation across different States in the region.

Table APP.D- 4 Capacity Expectations Summary

Asia/Pacific ATFM Daily Plan (ADP) Exchange Procedure

To facilitate network-wide situational awareness, ATFM Units (ATFMUs) in the Asia/Pacific region shall exchange the **ATFM Daily Plans (ADPs)** in accordance with the following procedure:

1. ADP Content and Format

The ADP is a document outlining situations and possible issues affecting ATC capacities at various ATM resources within the ATFMU's area of responsibilities for the upcoming day (24 hours). It should also include planned and/or expected ATFM measures that will be activated to manage excessive traffic demand. The purpose of exchanging ADP is to ensure that all ATFMUs and stakeholders are aware of the situation and can plan their operations accordingly.

For the purpose of ADP exchange within Asia/Pacific, the ADP should include, at minimum, information contained in **Appendix A** to this procedure.

2. ADP Exchange Protocols

In the absence of digital information exchange model for ADP, ATFMUs shall distribute their active ADP as a **PDF file attached to an email disseminated to all other ATFMUs in the network with the following specifications:**

- E-Mail Subject:
ADP_[FIR Name 1][FIR Name 2]...[FIR Name n]_[Effective Date, yyyyymmdd]_[Version]
- PDF File Name:
ADP_[FIR Name1][FIR Name 2]...[FIR Name n]_[Effective Date, yyyyymmdd]_[Version]
- Example:
ADP_VTBB_20191122_1
ADP_YBBBYMMM_20191122_1

where *FIR Name* refers to the FIR(s) for which the ATFMU is responsible and *Effective Date* refers to the date on which information in the ADP applies.

The use of common email subject and file name will enable ADP recipients to develop or procure a system to automatically process the ADPs if necessary.

In the future, when digital information exchange model for ADP is developed and SWIM infrastructure is implemented, the exchange of ADPs may be moved to a SWIM-based service accordingly.

3. ADP Exchange Frequency

ATFMUs with capability to activate ATFM measure should **disseminate ADPs at least once (1x) per day** regardless of **whether an ATFM measure is required**.

4. Dissemination of ADP to Local Stakeholders

To facilitate common situational awareness among stakeholders (airspace users, airport operators, ground handling agencies, etc.), **it is the responsibility of ATFMUs to determine whether the ADPs received should be further disseminated to local stakeholders**. In general, whenever an ATFM measure is expected to be active, stakeholders with expected impact should be provided with the information.

5. Contact Information for ADP Exchange

The contact information for ADP exchange is included in **Asia/Pacific ADP Exchange Contact List**. This includes, where available, direct ATFM unit or other ATS unit contact details of respective States/Administrations. The Contact List is maintained by ICAO Asia/Pacific Regional Office separately, and States/Administrations wishing to update the contact details can [...]

Asia-Pacific ATFM Network ATFM Daily Plan (ADP) Template

ADP Template

ORIGINATOR	ICAO 4 LETTER CODE [E.G. VTBB]
DATE / TIME OF ISSUANCE	DD MMM YYYY / HHMM UTC [E.G. 14 OCT 2024 / 0800 UTC]
VERSION	1

CONSTRAINTS AND IMPACT				
LOCATION	APPLICABLE PERIOD (UTC)		DESCRIPTION	CAPACITY IMPACT
	START	END		
AD or FIR ICAO 4 LETTER CODE	DD MMM YYYY HHMM	DD MMM YYYY HHMM	[FREE TEXT]	[FREE TEXT]
VTBS	14 OCT 2024 2300	15 OCT 2024 1100	TFC CONGESTION	AAR = 32
VTBB SECTOR 1S	15 OCT 2024 0200	15 OCT 2024 1100	TFC CONGESTION	(Nil)

ATFM MEASURE			
LOCATION	APPLICABLE PERIOD (UTC)		DESCRIPTION
	START	END	
AD or FIR ICAO 4 LETTER CODE	DD MMM YYYY HHMM	DD MMM YYYY HHMM	[FREE TEXT]
VTBS	14 OCT 2024 2300	15 OCT 2024 1100	GDP FOR FLT DEST VTBS
VTBB SECTOR 1S	15 OCT 2024 0200	15 OCT 2024 1100	GDP FOR FLT INTO 1S DEST VTBD, VTBS, VTBU DURING CONGESTION (FLOW RATE: MINIT = 4)

OTHER INFORMATION
ANY OTHER PERTINENT INFORMATION AS FREE TEXT E.G. ATFMU CONTACT INFORMATION

ADP Field Description

Field	Format	Description
Header		
Originator	ICAO 4-letter FIR code	FIR code representing the originator of the ADP
Date/Time of Issuance	DD MMM YYYY / HH MM UTC	Date and time, in UTC, of the issuance of the ADP
Version	Integer	Version number of the ADP, starting from 1
Constraints and Impact		
Location	ICAO 4-letter FIR and sector/waypoint name or aerodrome code	Location of the constrained ATM resource, which could be an aerodrome, a waypoint or sector of an airspace, or an ATS route or route segment
Applicable Period	DD MMM YYYY HHMM	Date and time, in UTC, corresponding to the anticipated start and end of the constraint
Description	Free Text	Description of the constraint at the associated location and time period
Capacity Impact	Free Text	Anticipated impact to the capacity; this can be in the form of capacity number or flow rate or percent reduction. Note: this can be left blank if the issue is traffic congestion with no capacity shortfall
ATFM Measure		
Location	ICAO 4-letter FIR and sector/waypoint name or aerodrome code	Location of the ATM resource for which the ATFM measure is activated, which could be an aerodrome, a waypoint or sector of an airspace, or an ATS route or route segment
Applicable Period	DD MMM YYYY HHMM	Date and time, in UTC, corresponding to the anticipated start and end of the ATFM measure
Description	Free Text	Description of the ATFM measure to be implemented, with affected traffic flows specified
Other Information		
Other Information	Free Text	Any other pertinent information that will be helpful for readers of the ADP, e.g. contact information of the originating ATFMU/ANSP

Asia/Pacific ATFM Daily Plan (ADP) Exchange Operational Contact List

NAME	E-MAIL
AUSTRALIA	
Network Coordination Center (NCC)	atfmu@airservicesaustralia.com
CAMBODIA	
Phnom Penh ATFMU	pnhatfmu@cats.com.kh
CHINA	
Operations Management Center (OMC)	omc_atfmu@163.com
HONG KONG, CHINA	
Hong Kong ATFM Unit	hkatfmu@cad.gov.hk atmdflm@cad.gov.hk
INDIA	
Central Command Center (CCC)	ccc_catfm@aai.aero
MALAYSIA	
CAAM ATFM Unit	atfm@caam.gov.my
PHILIPPINES	
Manila ATFM Unit	atfm@caap.gov.ph
SINGAPORE	
Singapore ATFM Unit	caas_atfmu@caas.gov.sg
THAILAND	
Bangkok ATFM Unit	atfmu@bobcat.aero
VIET NAM	
Viet Nam ATFM Center	atfmu@vatm.vn vatfmc@gmail.com

Terms of Reference

Air Traffic Flow Management and Airport Collaborative Decision Making Steering Group (ATFM & A-CDM/SG)

1. Having considered relevant documents such as the Manual on Collaborative Air Traffic Flow Management (Doc 9971), regional air traffic data and the Asia/Pacific Region city pairs and associated airspace and ATS routes and aerodromes experiencing the most significant traffic demand, and noting the Asia/Pacific Seamless ANS Plan provisions for structural airspace capacity increasing measures, develop an Asia/Pacific Regional ATFM Framework which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific Region;
2. 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 and A-CDM data gathering, collation and sharing between States, International Organizations and ICAO, which may include; capacity assessments, including factors affecting capacity such as special use airspace status, runway closures and weather information; 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 ATFM Daily Plan;
 - d. compliance by airspace and aerodrome users with ATFM and A-CDM measures; and
 - e. any other guidance relevant to the Regional ATFM Framework and Asia/Pacific A-CDM Implementation Plan.
3. Maintain an overview of CDM/ATFM and A-CDM programs being conducted within the Region, with a view to facilitating their coordination and alignment, and to promote;
 - a. harmonized procedures;
 - b. implementation of the performance expectations of the Regional ATFM Framework and Asia/Pacific A-CDM Implementation Plan; and
 - c. interoperability of A-CDM with ATFM;
4. Review the effectiveness of existing and planned ATFM and A-CDM programs in the Asia/Pacific Region, and make specific recommendations, including any adjacent airspace affecting the Asia/Pacific Regions, and research and recommend appropriate mechanisms for the on-going review of such programs;

5. The Group coordinates closely with other relevant bodies such as the Airport Operations and Planning Sub-Group (AOP SG), the Meteorological Requirements Working Group (MET/R WG) and System Wide Information Management Task Force (SWIM TF).
6. The Group reports to the ATM Sub-Group (ATM/SG).

Air Traffic Flow Management and Airport-Collaborative Decision Making Steering Group

Task List

(last updated ATFM & A-CDM/SG/16, 10th April 2026)

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
11/1	<p><i>APA-CDM/TF Action Item 5/2 - included in ATFM/SG Task List pending APANPIRG decision on re-assignment of responsibility for A-CDM.</i></p> <p>Develop joint operational procedure guidance for the integration of ATFM and A-CDM operations, focusing the integration between A-CDM and "cross-border" ATFM in collaboration with Experts from ATFM/SG and SWIM TF</p>	<p>ATFM/SG/12</p> <p>ATFM/SG/13</p> <p>ATM/SG/10</p> <p>(CANSO)</p> <p>ATFM/SG/14</p> <p>ATFM/SG/16</p> <p>ATFM & A-CDM/SG/17</p>	<p>(APA-CDM/TF/6)</p> <p>ATFM/IR/SWG to lead</p> <p>China, Hong Kong China, India, Pakistan, Republic of Korea, Thailand, Group of Experts, CANSO</p>	In progress	<p>Included at ATFM/SG/11</p> <p>APA-CDM/TF/6 WP/03 Task to be carried out by the APANPIRG technical body assigned ongoing responsibility for oversight of A-CDM.</p> <p>CANSO provides a paper</p> <p>ATM/SG/10</p>
12/3	<p>Register the Asia/Pacific Bi-Weekly Web Conference (AMNAC) to share the ATFM-related information through the MS Teams</p>	Ongoing	Administrations willing to join	<p>Open</p> <p>Closed</p>	<p>ATFM/SG/12 report para. 4.29 invitation extended to some States outside of AMNAC</p> <p>ATFM/SG/13 report para. 4.13</p> <p>ATFM/SG/14 report para 4.80</p>
13/1	Report on the progress of CTO trials	<p>ATFM/SG/14</p> <p>Ongoing</p>	Japan	<p>Open</p> <p>closed</p>	<p>ATFM/SG/13 report para. 4.53</p> <p>ATFM/SG/14 report para 4.89</p> <p>ATFM/SG/15 report para 4.51</p>
13/2	Report on the progress of multi constraints resolution	<p>ATFM/SG/14</p> <p>Ongoing</p>	China, Hong Kong China, Republic of Korea, Singapore, Thailand	Open	<p>ATFM/SG/13 report para. 4.71</p> <p>ATFM/SG/15 report para 4.20</p>
13/3	Support the workshop on capacity assessment, and consider to include ATFM-related USOAP PQs	<p>Nov 2023 2024</p> <p>(tentative)</p> <p>2-5 June 2025</p>	Secretariat, China, Thailand, Singapore, Japan, Hong Kong China, ROK, Pakistan, USA, India,	<p>Open</p> <p>Completed</p>	<p>ATFM/SG/13 report para. 7.5</p> <p>ATFM/SG/15 report para. 7.4</p>

ATFM & A-CDM/SG/16
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ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
			Malaysia, Philippines, IATA and CANSO		Capacity assessment workshop conducted in Yogyakarta, Indonesia in June 2025
13/7	Update MET/R WG ad-hoc group member list (ATFM experts)	MET/R WG/12	MET/R WG ad-hoc group member	Open closed	ATFM/SG/13 report para. 2.4
13/8	Provide feedback and additional use cases for <i>APAC User Requirements for SWIM-based MET Information Services Supporting ATFM</i> to MET R/WG ad-hoc group	MET/R WG/13	Secretariat, All administrations	Open closed	ATFM/SG/13 report para. 2.4
14/2	Air Traffic Flow over Bay of Bengal – Status Update	ATM/SG/12 ATM/SG/13 ATM/SG/14	Singapore, Malaysia, India, IATA	Open	ATFM/SG/14 report para 4.23 ATFM/SG/15 Report Para. 7.6
15/1	To update the APAC ADP exchange procedures- working draft	ATFM/SG/16	AMNAC Group	Open Completed	ATFM/SG/15 report para. 4.18
15/2	Sharing of COP and ICD for ATFM information exchange by NARAHG group with AMNAC Group for harmonization of procedures	ATFM/SG/16 ATFM/SG/17	NARAHG Group	Open	ATFM/SG/15 report para. 4.31
15/3	Examine the applicability of Flow Rate restrictions as an interim ATFM measure for application between adjacent airspaces and inclusion in the Regional ATFM Framework	ATFM/SG/16 ATFM/SG/17	ROK, China,.....	Open	ATFM/SG/15 report para 4.47
15/4	Present a WP on inclusion of ATFM related phraseologies in Doc 4444 to the ATMOPS panel meeting	ATMOPS meeting later this year ATM/SG Meeting	India	Open Completed	ATFM/SG/15 report para. 4.57
15/5	To update APAC ATFM Post ops analysis framework	ATFM/SG/16 ATFM/SG/17	Thailand, India.....	Open	ATFM/SG/15 report para. 6.1

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ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
15/6	To provide inputs and share process of data analysis carried out for Post Ops analysis by India with the Ad-Hoc DAG in the next meeting	May 2025 (Ad-Hoc DAG meeting in Tianjin, China)	India	Open Completed	ATFM/SG/15 report para 4.64
15/7	To provide a WP to the SWIM/TF meeting in May 2025 on the draft conclusions of WP06, WP07 and WP24 presented in the ATFM/SG/15 meeting	May 2025	Thailand, Singapore and HKG China with Secretariat	Open Completed	ATFM/SG/15 report para 6.1-13
15/8	To include Capacity calculation guidelines as adopted by ROK as an Appendix to Regional ATFM Framework document	ATFM/SG/17	Secretariat, ROK	Open	ATFM/SG/15 report para. 4.68
15/9	To include mapping of ASBU Priority 1 and Priority 2 elements of APSAP provided by MET/R/WG ad-hoc group as an appendix to the APSAP	ATM/SG/14	Secretariat	Open Completed	ATFM/SG/15 report para 2.10
15/10	States and Administrations to nominate members to the AD-Hoc group for conducting the next MET requirements survey	Immediate	All States and administrations	Open closed	ATFM/SG/15 report para. 2.10
15/11	To share experiences and results of trial operations using cloud network including ATFM data exchange	ATFM/SG/16 ATFM/SG/17	China	Open	ATFM/SG/15 report para. 6.22
15/12	Review the SWIM information services on ATFM/ACDM integrated service and Traffic Flow information services and provide inputs to the SWIM TF/10 meeting	10 th May 2025 for onward presentation to the SWIM TF/10 meeting (May 2025)	Thailand, Singapore and compiled by Secretariat	Open Completed	ATFM/SG/15 report para 6.38
15/13	Nominate subject matter experts to Ad-Hoc group for developing a new Regional Concept for Collaborative ATFM in APAC Region	31st May 2025	All States and Administrations, IO	Open Completed	ATFM/SG/15 report para 6.31

ATFM & A-CDM/SG/16
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ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
15/14	Develop a new Regional Concept for Collaborative ATFM in APAC Region and submit to ATFM/SG for consideration	ATFM/SG/17	Ad-Hoc Group	Open	ATFM/SG/15 report para 6.29 ATFM & A-CDM/SG/16 report para 6.1-6.9
16/01	To provide operational contact information to the Asia/Pacific ADP Exchange Operational Contact List	immediate	All States and administrations	Open	ATFM & A-CDM/SG/16 report para 6.30
16/02	Review the SWIM information services on ATFM/ACDM integrated service and Traffic Flow information services and provide inputs to the SWIM TF/11 meeting	SWIM /TF/11	Thailand, Singapore and compiled by Secretariat	Open	ATFM & A-CDM/SG/16 report para 6.39-6.50
16/03	States and Administrations to nominate members to the MET Task force for conducting the next MET/ATM Seminar	Immediate	All States and administrations	Open	ATFM/SG/16 report para.4.78
16/04	To upload the APAC ADP exchange procedures- working draft and ATFM Contact List to ICAO Website	Immediate	Secretariat	Open	ATFM/SG/16 report para. 6.34
16/05	Conduct safety risk assessment for reduction of longitudinal separation to 10' and availability of FL 300 on ATS routes UL333, P628, L750 and N644 and inform ICAO Secretariat	immediate	Pakistan	Open	ATFM/SG/16 report para 4.74
16/06	States/Administrations to provide 24-hour ANSP contact information. This information will be incorporated into the consolidated ATM Points of Contact List.	ATM/SG/14	All States and Administration	Open	ATFM/SG/16 report para 7.7
16/07	To provide missing DEP messages and FPL messages details to ICAO	ATM/SG/14	Thailand and India	Open	ATFM/SG/16 report para 7.5

ATFM & A-CDM/SG/16
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ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
	Secretariat for the months of April, May, June and July				
16/08	Review and provide feedback on the guidance material for tailored MET products to ICAO Secretariat	ATFM & A-CDM/SG/17	All States and Administrations	Open	ATFM/SG/16 report 4.80
16/09	Participation to APAC TFCC	Immediate	Administrations willing to join	open	ATFM/SG/16 report 4.62
16/10	Provide developed ATFM FIXM Message Data Attributes and Associated Message Templates based on FIXM version 4.3 to SWIM TF	SWIM TF/11	Secretariat	open	ATFM/SG/16 report 6.57

— END —