INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE TENTH MEETING OF THE ATM SUB-GROUP OF APANPIRG (ATM/SG/10)

VIDEO TELECONFERENCE, 17 – 21 OCTOBER 2022

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

CONTENTS

APPENDIXES TO THE REPORT

INTRODUCTION

Meeting

1.1 The Tenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/10) of the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held by Video Teleconference (VTC) from the ICAO Asia and Pacific Regional Office, Bangkok, Thailand.

Attendance

2.1 The meeting was attended by 265 registered participants from 29 States, two Special Administrative Regions of China and four International organizations, including Australia, Bangladesh, Bhutan, Cambodia, China, Hong Kong China, Macao China, Fiji, France, India, Indonesia, Japan, Kiribati, Kyrgyzstan, Lao People's Democratic Republic (PDR), Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea (ROK), Singapore, Somalia, Sri Lanka, Thailand, United Arab Emirates, United States, Viet Nam, Yemen, IATA, IFAIMA, IFALPA, and ICAO.

2.2 A list of participants is provided at **Appendix A** to this Report.

Officers and Secretariat

3.1 Mr Kuah Kong Beng, Director (Special Project), Civil Aviation Authority of Singapore presided over the ATM/SG/10 meeting as Sub-Group Chair.

3.2 Mr. Shane Sumner, Regional Officer, Air Traffic Management (ATM)/Aeronautical Information Management (AIM), ICAO Asia and Pacific Office, was the Secretary for meeting. He was assisted by Mr. Hiroyuki Takata, Regional Officer, ATM, Mr. Ying Weng Kit, ATM Officer and Ms. Prakayphet Chalayonnawin, Programme Analysis Associate, ATM. The meeting was also supported by Mr. Manjunath K. Nelli, Regional Officer ATM, Ms. Sunok Lee, Regional Officer ATM, and Mr. Zhifeng Xu, Regional Officer, of the ICAO Asia/Pacific Regional Sub-Office.

Language and Documentation

4.1 The ATM Sub-Group met as a virtual plenary meeting. The working language of the meeting was English for all documentation and this Report. A total of 46 Working Papers (WPs), 22 Information Papers (IPs), two flimsies and five presentations were considered by the meeting.

4.2 The List of Working and Information Papers is attached at **Appendix B** to this Report (IP01).

4.3 **DISCLAIMER:** The presentation of material in this report does not imply the expression of any opinion whatsoever on the part of ICAO, APANPIRG or the ATM Sub-Group of APANPIRG 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

ICAO Regional Office

5.1 Mr. Shane Sumner, on behalf of Mr. Tao Ma, Regional Director of the ICAO Asia and Pacific Office, welcomed all the participants to the meeting.

Draft Conclusions, Draft Decisions and Decisions of ATM/SG – Definition

6.1 The ATM Sub-Group recorded its actions in the form of Draft Conclusions, Draft Decisions and Decisions within the following definitions:

a) **Draft Conclusions** of the ATM/SG relate to matters that are not just of a purely technical or operational nature, which need to be considered by APANPIRG;

b) **Conclusions** of the ATM/SG relate to matters of a purely technical or operational nature, which APANPIRG had delegated authority to ATM/SG to act upon;

c) **Draft Decisions** relate solely to matters dealing with the internal working arrangements of the ATM/SG, which need to be considered by APANPIRG; and

d) **Decisions** of the ATM/SG that relate solely to matters dealing with the internal working arrangements of the ATM/SG, which APANPIRG had delegated authority to ATM/SG to act upon.

List of Draft Conclusions and Decisions

7.1 List of ATM/SG/10 Draft Conclusions

<table>
<tr><td colspan="3">Draft Conclusion ATM/SG/10-2: Provide clear direction on Doc 7030 Regional SUPPs publication requirements.</td></tr>
<tr><td colspan="2">What: That, ICAO provides clear direction on which separation minima require Doc 7030 Regional SUPPS publication to provide consistency in the information published in the different ICAO Regions.</td><td>Expected impact:
☒ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To provide consistency of published information in ICAO Doc 7030.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 23-November-22</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☐ Sub groups ☐APAC States ☒ ICAO APAC RO ☒ ICAO HQ ☐Other: XXXX</td></tr>
</table>

7.2 List of ATM/SG/10 Conclusions

Conclusion ATM/SG/10-1: Revised Reporting Date for ATM Regional Plans' Implementation Status Monitoring	
What: That, 1. States are urged to report their implementation status of the performance expectations of the following regional plans by not later than 28 February each year: a) Regional ATM Contingency Plan; b) Regional Framework for Collaborative ATFM; c) Regional Plan for Collaborative AIM; and d) Regional SAR Plan; and 2. The implementation reporting forms for each of these regional plans be updated to provide for reporting in percentages of implementation. *This Conclusion supersedes the status reporting requirements of Conclusions ATM/SG 5-3, 5-8 and 7-16*	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To provide for a common reporting date ensuring data is provided in time for review and analysis by the relevant technical group, and to standardize where appropriate the implementation reporting format.	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Conclusion ATM/SG/10-4: Update Regional Framework for Collaborative ATFM	
What: That, the Asia/Pacific Regional Framework for Collaborative ATFM Version 4.0. provided in **Appendix D to the Report** be adopted, and made available on the ICAO Asia/Pacific Regional Office web site, replacing Version 3.0.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To amend the Regional Framework document and performance expectations, taking into account updates in APAC Seamless ANS Plan and GANP and related ASBU modules;	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX	

Conclusion ATM/SG/10-5: ATFM Training Guide	
That, 1. the ATFM Training Guide provided in **Appendix E to the Report** be made available on the ICAO Asia/Pacific Regional Office website; and *2.* Asia/Pacific Administrations are urged to refer to the ATFM Training guidance material for developing their training programs.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To establish the ATFM Training Guide as a stand-alone regional guidance document .	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX	

Conclusion ATM/SG/10-6: Regional ATFM Implementation Status Reporting	
What: That, 3. the ATFM Implementation Status Report form (version 3.0) provided in **Appendix F to the Report** be adopted, and made available on the ICAO Asia/Pacific Regional Office website; 4. Asia/Pacific Administrations are urged to report their ATFM implementation status at least once annually by no later than 28th February each year, using the ATFM Implementation Status Report Form; and 5. The Regional Framework for Collaborative ATFM be amended to include the information in Appendix F to the Report. *Note: This Conclusion supersedes Conclusion ATM/SG/5-3*	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To facilitate the monitoring of implementation status of the updated performance expectations of the Regional Framework for Collaborative ATFM, and the identification of priority areas of ATFM for inclusion in Seamless ANS monitoring and for the attention of APANPIRG.	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX	

<table>
<tr><td colspan="3">Conclusion ATM/SG/10-7: Points of Contact List for Space Vehicle Launch and Re-Entry Coordination</td></tr>
<tr><td colspan="2">That,
1. An Asia/Pacific regional Points of Contact (POCs) List for coordination of space vehicle launch and re-entry be established;
2. The Asia/Pacific Space Vehicle Launch and Re-Entry Coordination POC List be managed by ICAO on behalf of ATM/SG, and published on the ICAO Asia/Pacific Regional Office website;
3. States are urged to:
a. formally identify to the ICAO Asia/Pacific Regional Office the POCs nominated to originate space vehicle launch and re-entry coordination, and POCs nominated to receive and respond to any such coordination; and
b. ensure at least one State POC is available and contactable at all times;
4. Nominated POCs should include an office or unit rather than an individual, and preferably be the operational management or supervisory function of the ATS centre in charge of the FIR who will;
a. Respond to coordination received; and
b. Ensure necessary coordination is undertaken with all affected ATS units within the FIR.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To support strengthened coordination of space vehicle launch and re-entry in the Asia/Pacific Region</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 21-Oct-22</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

Conclusion ATM/SG/10-9: Revalidation of Coordinate Data	
That, noting the factors that cause WGS-84 coordinate data to change over time, States are urged to ensure that all surveyed and calculated coordinate data published in AIP or used in Instrument Flight Procedure design is revalidated: 1. each five years; or 2. after a major natural event such as an earthquake or volcanic eruption; or 3. following construction of critical airport elements, whichever is the sooner, by ground survey, Light Detection and Ranging (LIDAR) survey, or imagery collection.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To ensure the coordinates of surveyed and calculated points (calculation based on a surveyed point or points) are updated as necessary to ensure their accuracy and integrity is maintained when changes occur due to geophysical effects	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:	

Conclusion ATM/SG/10-10: State Reports of 5LNC Status	
That, States are urged to provide an annual update on the status of duplicated 5LNCs in **ATM/SG/10 WP/44 Attachment 3** to the ICAO APAC Regional Office by not later than 28 February each year.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To enable AAITF and ATM/SG to track progress on resolution of duplicated 5LNCs, to assist the region in reaching compliance with the Annex 11 provisions in this regard	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Conclusion ATM/SG/10-11: Regional Guidance for Postponement of Changes to Aeronautical Information	
That, the Asia/Pacific Regional Guidance for Postponement of Changes to Aeronautical Information at **Appendix G to the Report** be adopted, and uploaded to the Asia/Pacific Regional Office website.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To provide harmonized guidance for AIS units to manage late notice changes to aeronautical information caused by circumstances outside the control of AIS, when the late notice change is non-compliant with the provisions of Annex 15 and PANS-AIM	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Conclusion ATM/SG/10-12: Checklist of Considerations in Readiness for Autonomous Distress Tracking	
Noting: 1. the recent deferral of applicability of Autonomous Distress Tracking (ADT) from 01 January 2023 to 01 January 2025; and 2. the likelihood that ADT equipped aircraft will increasingly be operating from late 2022 onwards; States are urged to implement a programme of education and procedure development for aviation regulators, aircraft operators, SAR services and ANSPs, using the Checklist of Considerations for Response to ADT Notifications at **Appendix H to the Report**. :	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To ensure all SAR alerting stakeholders are prepared for ADT alerts that will be distributed from late 2022	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:	

Conclusion ATM/SG/10-13: Revised Asia/Pacific Regional SAR Plan	
That, 1. the revised Asia/Pacific Regional SAR Plan at **Appendix I to the Report** be adopted, and uploaded to the Asia/Pacific Regional Office eDocuments web-page to replace the existing version; and 2. States are urged to update their national SAR Plans to align with the revised Regional SAR Plan.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To update the SAR plan to include guidance on GADSS/ADT, and complete editorial corrections	Follow-up: ☒Required from States
When: 21-Oct-22	Status: Adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

7.3 List of ATM/SG/10 Draft Decisions

Nil

7.4 List of ATM/SG/10 Decisions

Decision ATM/SG/10-3: Establish FF-ICE Operational Requirements Small Working Group	
That, ATM/SG establishes the FF-ICE Operational Requirements Small Working Group, that will: a) study ICAO global TBO and FF-ICE provisions and the outcomes of relevant ICAO technical panels and regional technical groups; to b) prepare a set of draft harmonised regional operational requirements of FF-ICE/R1, and related operational processes and procedures; c) present related information to the FF-ICE seminar to be organised by ATMAS TF in 2023; d) recommend an appropriate approach to devise a FF-ICE implementation strategy for the APAC region; and e) recommend priority ASBU elements and develop draft regional performance objectives for consideration for inclusion in the Asia/Pacific Seamless ANS Plan version 4.0.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: FF-ICE will transform the present-day flight plan and flight planning process. Therefore, it is necessary to be ready and comprehensively consider the benefits, potential changes in operational processes and procedures to the Asia/Pacific region.	Follow-up: ☐Required from States
When: 21-Oct-22	Status: Draft to be adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:	

<table>
<tr><td colspan="3">Decision ATM/SG/10-8: Space Vehicle Launch and Re-entry Coordination Small Working Group</td></tr>
<tr><td colspan="2">That, the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG), reporting to ATM/SG, be formed to:
1. Study global practices and procedures for the coordination of space vehicle launch and re-entry activities, with a view to making recommendations for best practices to be adopted in the Asia/Pacific Region;
2. Consolidate and update Asia/Pacific regional guidance material on space vehicle launch and re-entry coordination and response; and
3. Recommend consolidated guidance and performance expectations for inclusion in the 2023 update of the Asia/Pacific Seamless ANS Plan.
The SVLRC SWG will be comprised of relevant experts from Australia, China, India Japan, New Zealand, Republic of Korea, Singapore, Sri Lanka, Thailand, USA (rapporteur) and IATA. Other APAC States may also join the SWG.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To consolidate and update Asia/Pacific regional guidance for the coordination and response to space vehicle launch and re-entry events</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 21-Oct-22</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
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REPORT ON AGENDA ITEMS

Agenda Item 1: Adoption of Provisional Agenda

Adoption of Agenda (WP/1)

1.1 The Agenda (WP/1) was adopted by the meeting, which noted the Provisional Order of Discussion (OOD), and the Provisional List of Working and Information Papers (IP01).

Agenda Item 2: Review of Related High Level Meetings

ATM/SG/8 and APANPIRG Outcomes (WP/2)

2.1 The meeting was reminded of the outcomes of the ATM/SG/9 meeting (01 to 05 November 2021) and informed of the relevant outcomes from the Thirty-Second Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/32, 01 to 03 December 2021).

RASG and APRAST Meeting Outcomes (WP/3)

2.2 The meeting was informed of the outcomes of the Eleventh Meeting of the Regional Aviation Safety Group – Asia/Pacific (RASG-APAC/11, 25-26 November 2021). Eight Decisions and Three Conclusions were adopted.

2.3 Task # 2 of the RASG-APAC 2021/2022 Yearly and Standing Work Programme was highlighted. There was ongoing discussion by RASG and the Asia/Pacific Regional Aviation Safety Team (APRAST) on whether Mid-Air Collision (MAC) be considered as a High Risk Category event in the Asia Pacific Regional Aviation Safety Plan (AP-RASP), with data to be aligned with the Global Aviation Safety Plan (GASP) priorities. Collaboration with the Regional Airspace Safety Monitoring Advisory Group (RASMAG) would be needed to facilitate a thorough study and data analysis of MAC by the Asia/Pacific Safety Reporting and Programme Working Group (AP-SRP WG), with the results to be presented to APRAST.

Conference of Directors General of Civil Aviation Outcomes (IP/2)

2.4 Information was provided on the Action Items of main relevance to ATM/SG arising from the Fifty Seventh Conference of Directors General of Civil Aviation, Asia and Pacific (57th DGCA Conference, Incheon, Republic of Korea, 04 to 08 July 2022.

Agenda Item 3: Performance Frameworks and Metrics

ANS USOAP Update (WP/4)

3.1 The Secretariat provided information on the ICAO Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA). The paper discussed the Protocol Questions (PQs) used to assess a State's safety oversight system, and an annual update of ANS USOAP status.

3.2 The average ANS Effective Implementation (EI) of APAC region was 64.24%, as at October 2022. **Figure 1** illustrated the EI ratings for ANS-related PQs of the 37 APAC States that had been audited or received USOAP activity:

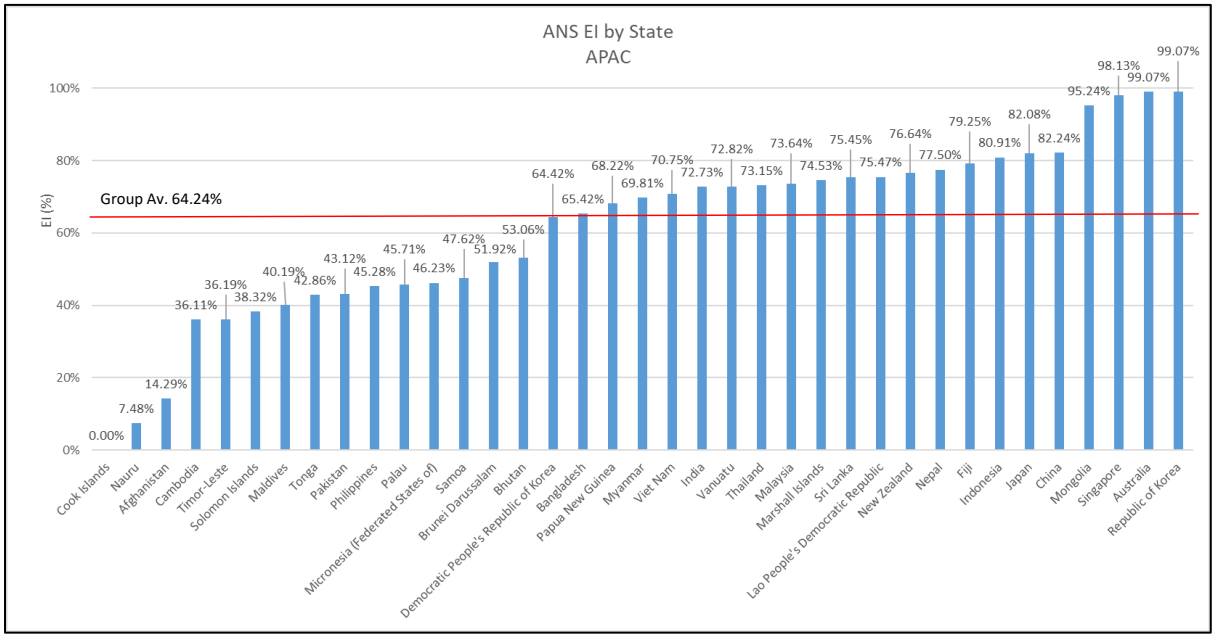

Figure 1: USOAP ANS EI Comparisons by State (October 2022)

3.3 The meeting was informed that the data source was the USOAP Continuous Monitoring Approach (CMA) Online Framework (OLF), which reflected the 2020 version of PQs and recent USOAP activities such as CMA Audit (CMAA), ICAO Coordinated Validation Mission (ICVM), and Off-Site Validation Activity (OSVA).

3.4 As of the end of June 2022, two CMA audits (including one focused audit) were completed, along with one off-site validation activity and one SSPIA in the APAC Region. Besides, one ICVM would plan for November 2022. For 2023, five USOAP CMA activities (including one focused audit) would be scheduled in the APAC Region: three CMA audits (including one focused audit), one ICVM, and one SSPIA.

3.5 The meeting was informed that two USOAP CMA workshops had been tentatively scheduled for 2023 in Bangkok. The details would be shared in due course.

3.6 In response to a query, ICAO informed the meeting that the updated 2020 set of PQs in **ATM/SG/9 WP/6 Attachment A** included Priority PQs (PPQs). The meeting was also informed that details, including previous EI based on the previous CMA activity, were available on the USOAP CMA OLF.

3.7 In discussion, Nepal noted that their overall EI had improved above the level indicated in the data provided in the paper, following a USOAP CMA audit conducted in 2022. ICAO informed the meeting that the data provided in the WP was sourced directly from the USOAP CMA OLF at the time of writing of the paper. The most recent updates of audit information may not yet have been processed into the OLF at that time. **Figure 1** included the updated EI for Nepal.

Updating the Asia/Pacific Seamless ANS Plan (WP/5)

3.8 The Secretariat presented a proposal for the update of the Asia/Pacific Seamless ANS Plan for ATM/SG comment. A summary of considerations for the update of the Seamless ANS Plan was provided in **ATM/SG/10 WP/5 Attachment 1**. It was proposed that the Seamless ANS Plan be updated in 2022/2023, for presentation to APANPIRG/34 in 2023 for approval, and that subsequent updates be submitted to APANPIRG in the year after each Assembly year, with the next update being presented to APANPIRG/37 in 2026. The matter of the document review cycle of the Global Air Navigation Plan, Asia Pacific Seamless ANS plan and its subsidiary ATM-related plans was further discussed in **ATM/SG/10 WP/6**.

3.9 States wishing to participate in the review of the Seamless ANS Plan would be invited to nominate a single point of contact. However, it was noted that the nomination may be held over until the proposal was presented to APANPIRG/33, due to the multi-disciplinary nature of the Seamless ANS Plan.

3.10 In response to a query on the recently revised process for GANP updates, where minor updates were made annually, ICAO informed the meeting that, in addition to its regular update cycle, the Seamless ANS Plan could be updated at shorter intervals than the three yearly cycle if APANPIRG considered there was a need to do so. However, it was considered unlikely that a minor GANP update would necessitate a consequential update of the Seamless ANS Plan.

ATM-Related Regional Guidance and Plans Update Cycle, Standardised Reporting Format and Reporting Date (WP/6)

3.11 The meeting considered a proposal for a revised document review cycle for ATM-related Regional guidance material and plans, and a revised common due date (28 February each year) and standardised format for implementation status reporting of their performance expectations.

3.12 It was noted that the Future Air Navigation Services (FANS) Interoperability Team – Asia (FIT-Asia) and the Regional Airspace Safety Monitoring Advisory Group (RASMAG) had agreed to the revised reporting date of 28 February each year for data link performance data and the Annual Survey of the Status of Current and Planned Implementation of Performance-based Separation Minima, as discussed.

3.13 The meeting agreed to the following Conclusion:

Conclusion ATM/SG/10-1: Revised Reporting Date for ATM Regional Plans' Implementation Status Monitoring

That,

1. States are urged to report their implementation status of the performance expectations of the following regional plans by not later than 28 February each year:
   a) Regional ATM Contingency Plan;
   b) Regional Framework for Collaborative ATFM;
   c) Regional Plan for Collaborative AIM; and
   d) Regional SAR Plan; and
2. The implementation reporting forms for each of these regional plans be updated to provide for reporting in percentages of implementation.

This Conclusion supersedes the status reporting requirements of Conclusions ATM/SG 5-3, 5-8 and 7-16

3.14 Hong Kong China informed the meeting of having received two survey requests from individual meetings for the same data, and suggested duplication should be avoided. The Secretariat requested details so the matter could be followed up.

3.15 The meeting agreed to the proposed document review cycle for ATM-related plans that were subsidiary to the Seamless ANS Plan, noting the intention to propose to APANPIRG/33 the revised review cycle for the Seamless ANS Plan, as discussed in **ATM/SG/10 WP/5**. Further coordination would be conducted with the AGA, CNS and MET sections of the ICAO Asia/Pacific Regional Office to examine the need for any revision of document update cycles and implementation reporting dates.

3.16 **Figure 2** illustrated the proposed ATM-related document review cycle.

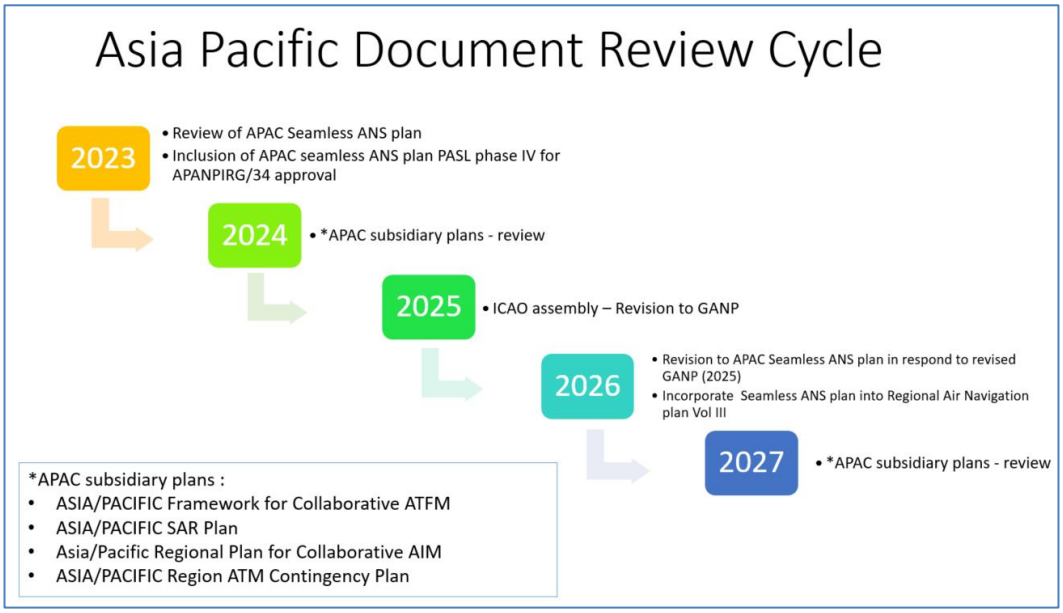

Figure 2: Proposed ATM-Related Document Review Cycle

FIT-Asia and RASMAG Outcomes (WP/7)

3.17 The Twelfth Meeting of the Future Air Navigation Services (FANS) Interoperability Team-Asia (FIT-Asia/12) and the Twenty-Seventh Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/27) were held by video teleconference from 25 to 28 July 2022 and 22 to 25 August 2022 respectively.

FIT-Asia/12 Meeting Outcomes

3.18 FIT-Asia/12 had been informed that the reduced number of data link problem reports (PRs) submitted in the last 12 months reflected the dramatic decrease in air traffic due to the impact of the COVID-19 pandemic.

3.19 FIT-Asia/12 had agreed to adopt the FANS1/A CPDLC latency timer value of 300 seconds which was also implemented under trial for several years in the NAT Region, and was now formalized in the *North Atlantic Operations and Airspace Manual*. The RASMAG/27 meeting had agreed to the following Conclusion drafted by FIT-Asia/12:

Conclusion RASMAG/27-1: CPDLC Latency Monitor Value

That, recognizing:

1. *the need for aircraft to provide an appropriate indication when the age of the time stamp of a received CPDLC message exceeds a defined value (latency timer value), in accordance with ICAO Doc 9869 PBCS Manual safety requirement SR-15; and*

2. *the need for a single, standardized global value.*

The Asia-Pacific region adopts a latency timer value of 300 seconds for use in oceanic airspace.

3.20 India noted that the processing of CPDLC latency differed between Boeing and Airbus aircraft, and that this together with ATM automation system capability should also be taken into account when implementing the latency monitor.

3.21 A total of 19 APAC Administrations had responded to the annual Survey of the Status of Current and Planned Implementation of Performance-Based Horizontal Separation Minima survey prior to FIT-Asia/11 (2021). Only Australia, Indonesia, Singapore and Thailand provided their annual survey response for 2022.

3.22 ICAO had provided further information on the need for an update of the survey form, and had proposed that the annual submission date for both the survey form and the PBCS performance monitoring data (ANSP to FIT) be brought forward to 28 February each year.

3.23 The RASMAG/27 meeting had agreed to ***Conclusion RASMAG/27-2: Updated Reporting of PBCS Implementation Status and Performance Monitoring Data***, supporting the revised survey form and the revised survey and performance data reporting date.

3.24 The annual Asia/Pacific Region Combined Performance-Based Communications and Surveillance (PBCS) report highlighted consolidated performance data and issues associated with Automatic Dependent Surveillance – Contract (ADS-C) Actual Surveillance Performance (ASP) and Controller – Pilot Data Link Communications (CPDLC) Actual Communications Performance (ACP) for the region.

3.25 Overall ASP and ACP for the region had met the 95% criterion. While the volume of the data count had slightly increased in 2021, the trend of regional performance in both the 95% and 99.9% criteria had generally improved.

RASMAG/27 Meeting Outcomes

3.26 The Monitoring Agency for the Asian Region (MAAR) had presented a combined summary of the safety analysis results for the Asia/Pacific Region, on behalf of the Asia/Pacific Regional Monitoring Agencies (RMAs) and Enroute Monitoring Agencies (EMAs). The report was divided into the Pacific (PAC) area, and Asia area.

3.27 The estimated vertical collision risk for 2021 for the PAC area did not meet the Target Level of Safety (TLS) (**Table 1**). The overall risk vertical risk had been increasing from 2016 to 2021 due to improvements in reporting. The PAC vertical collision risk estimates had been above TLS and trending upwards each year from 2016 to 2019. In 2020, there was a significant fall in the risk estimate, reflecting the reduction in traffic volumes caused by the COVID-19 pandemic, before resuming the upward trend in 2021. The estimated horizontal collision risk for 2021 for the PAC area met TLS in all longitudinal and lateral risk categories.

Pacific Area – annual flying hours = 2,159,665			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
Vertical Technical Risk	0.14×10^{-9}	2.5×10^{-9}	Below Technical TLS
Vertical Operational Risk	19.61×10^{-9}	-	-
2021 Vertical Overall Risk	19.74×10^{-9}	5.0×10^{-9}	Above TLS

Table 1: Pacific Area Vertical Collision Risk 2021

3.28 The estimated vertical collision risk for 2021 for the Asia area met TLS (**Table 2**). The overall risk continued to decline since 2017 due to various safety improvement initiatives. The estimated horizontal collision risk for 2021 for the Asia area met TLS in all longitudinal and lateral risk categories.

Asia Area – annual flying hours = 5,404,154 hours			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
Vertical Technical Risk	0.32×10^{-9}	2.5×10^{-9}	Below Technical TLS
Vertical Operational Risk	3.71×10^{-9}	-	-
2020 Vertical Overall Risk	**4.03×10^{-9}**	5.0×10^{-9}	**Below TLS**

Table 2 Asia Area Vertical Collision Risk 2021

3.29 RASMAG/27 considered that all current Large Height Deviation (LHD) hot spots (**Table 3**) should be retained due to the continuing reduced traffic resulting from the COVID-19 pandemic. The hot spots would be reviewed at RASMAG/28. Noting that the process of identifying, monitoring and removing LHD hot spots had been developed informally over several years to focus RASMAG attention on areas that required special attention, a draft process for identifying, monitoring and removing LHD hot spots had been developed by the Monitoring Agencies Working Group (MAWG). The regional monitoring agencies had trialled the draft process in their safety reports for RASMAG/27. It had been noted by RASMAG/27 that the trial hotspot identification process was subjective to some degree and difficult to standardize, but supported continuation of this activity with a view to its future formalization.

Hot Spot	Involved FIRs	Identified	Remarks
A1	Kolkata/Dhaka-Yangon	2015	Cat. E LHDs improved. Mitigations to be completed.
A2	Chennai – Yangon/Kuala Lumpur	2015	Cat. E LHDs slightly increasing
B	Incheon (AKARA Airspace)	2015	Cat. E LHDs improved. Mitigations to be completed.
D	Manila – all adjacent FIRs	2015	Cat. E LHDs increasing
F	Mogadishu – Mumbai	2015	Cat. E LHDs improved. Mitigations to be completed.
G	Sanaa/Muscat – Mumbai	2015	Cat. E LHDs improved. Mitigations to be completed.
J	Jakarta – Singapore/Kota Kinabalu	2018	Cat. E LHDs increasing.
M	Colombo – Melbourne	2019	Proposed to re-classify as non-hot spot. Mitigations to be completed.
N	Oakland USA – Hawaii CEP	2019	Cat. E LHDs increasing

Table 3: LHD Hot Spots in the Asia/Pacific Region

3.30 The Pacific Approvals Registry and Monitoring Organization (PARMO) provided an update on its analysis of the AKARA corridor airspace in the Incheon Flight Information Region (FIR). The route structure change implemented under phase 1 of the airspace improvement project had airspace affected specific collision risk modelling (CRM) parameters.

3.31 The vertical operational risk estimate was zero for calendar year 2021. The 2021 vertical technical risk estimate of 0.21×10^{-9} fatal accidents per flight hour (fapfh) met the TLS for vertical technical risk (2.5×10^{-9} fapfh). The overall vertical risk estimate of 0.21×10^{-9} fapfh met the overall vertical TLS (5×10^{-9} fapfh), and was a 72 percent decrease from the 2020 estimate

3.32 While there had been a significant increase in traffic in the airspace from 2020 to 2021, the December 2021, TSD indicated that traffic volume in the airspace remained more than 60% lower than December 2019.

3.33 RASMAG/27 was informed that the ICAO European Air Navigation Planning Group (EANPG) had been exploring potential actions that States could take to address and minimize rogue State aircraft, i.e. that flight planned 'W', but were not included in the global Reduced Vertical Separation Minimum (RVSM) approvals database and were reported on the European Air Navigation Region Bulletin, particularly those that had been listed for extended periods. 14 State aircraft from two Asia/Pacific States (India and Pakistan) were listed in the European Air Navigation Region Bulletin 17.7 (July 15 2022). Germany had requested that the EUROCONTROL Integrated Initial Flight Plan Processing System (IFPS) reject flight plans for such aircraft planning to operate in RVSM designated airspace over Germany. A proposal to extend the scheme throughout the area covered by the IFPS would be submitted to EANPG.

3.34 RASMAG/27 had reviewed the APANPIRG ATM and Airspace Safety Deficiency List. The updated Deficiencies agreed by RASMAG/27 were listed in **ATM/SG/10 WP/09 Attachment A**.

Application of ATC Separation Standards (WP/8)

3.35 The Secretariat provided information on the Seamless ATM survey conducted to determine which Air Traffic Control (ATC) separation minima were being applied within the Asia/Pacific Region. The response from Asia/Pacific Administrations to the latest survey was poor, with only 21 replies (48% of administrations). The survey measured the minimum horizontal separation standard within State/administration's FIR namely Category R, Category S and Category T airspace. The results showed that 27% (12 of 44) of APAC States and Administrations have all categories of airspace within the FIR with minimum separation compliant with the APAC Seamless ANS Plan (**Figure 3).**

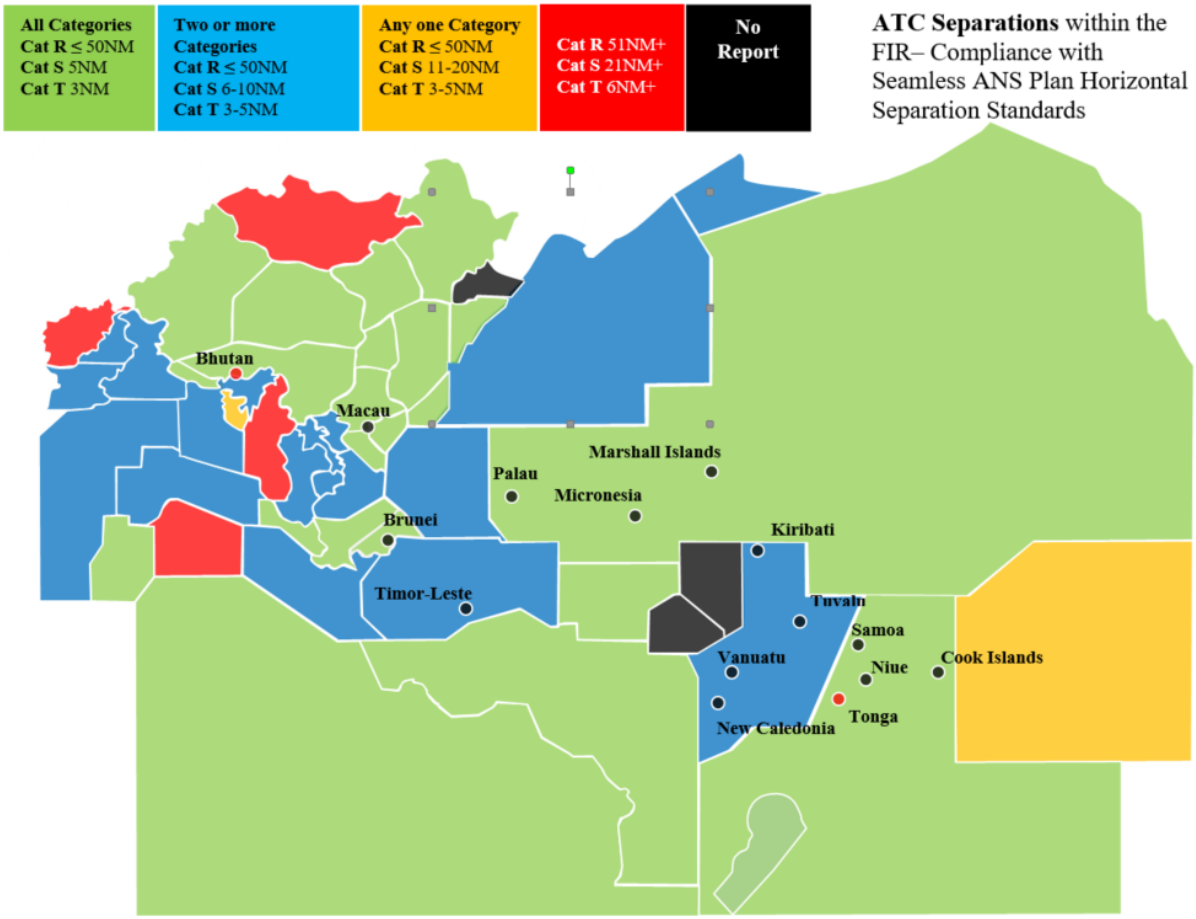

Figure 3: Horizontal Separation Minima within the FIR, September 2022

3.36 However regarding separation minima at inbound Transfer of Control (TOC) points, (**Figure 4**) only four Administrations were observed to have more than 90% of inbound FIR TOC points compliant with Seamless ANS Plan. The majority had less than 25% of the inbound TOC points that were compliant.

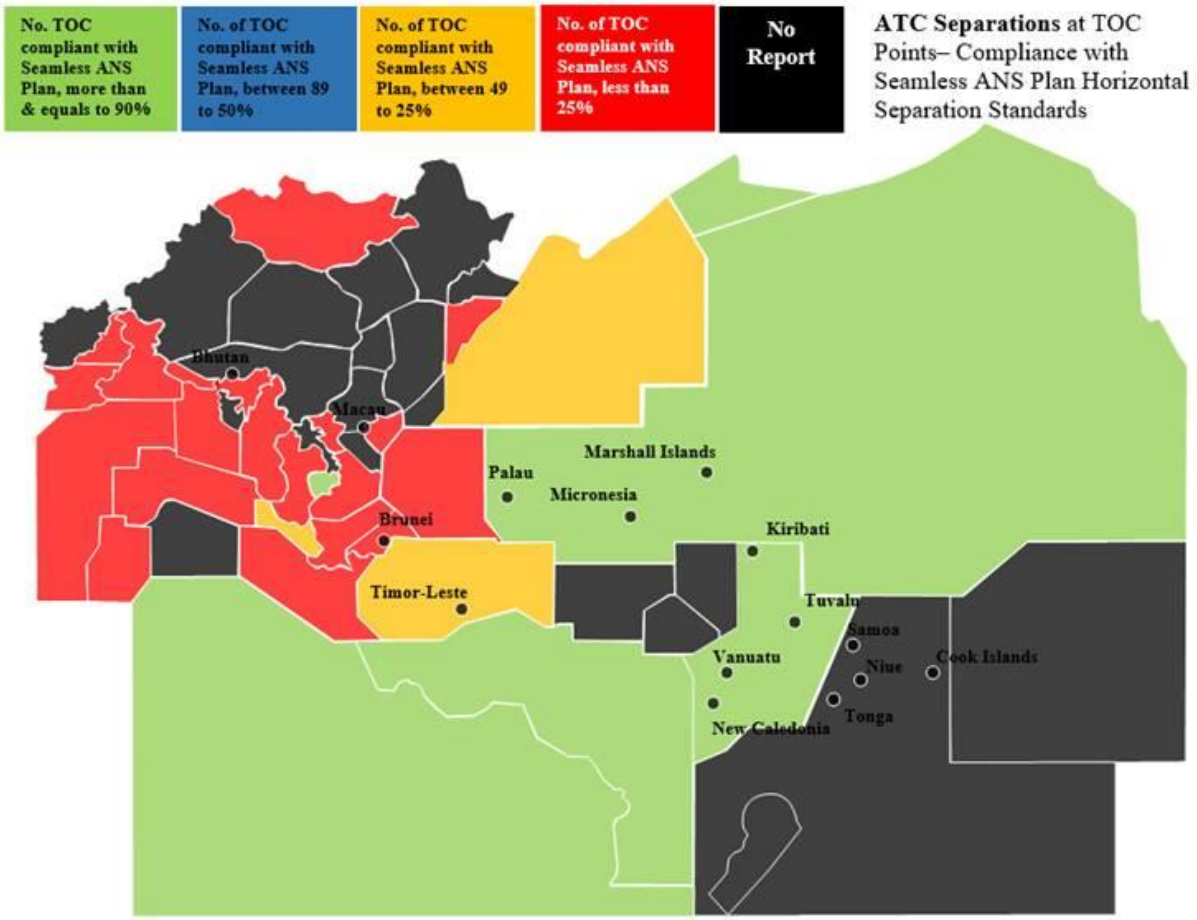

Figure 4: ATC Horizontal Spacing at Inbound FIR TOC points, September 2022

3.37 The survey results also revealed that for those compliant TOC points 'Category R/S airspace to Category S' FIR TOC Point had the highest rate of compliance in APAC region whereas for the non-compliant TOC points, the highest category was 'Category S airspace to Category S' FIR TOC Points with 432 TOC points reported. Even with surveillance coverage, the separation minimum of more than 10NM were currently applied at TOC points in the APAC region. All Administrations were urged to complete the ATC separations survey and to implement separation minima and update their Air Traffic Services (ATS) ATS LOAs to meet the expectations of the *Asia/Pacific Seamless ANS Plan*.

3.38 In response to a query ICAO had clarified the criteria used in the analysis of ATC horizontal spacing at inbound FIR TOC points:

Category R/S → R TOC- Acceptable standard: ≤ 50 NM

Category R → S TOC - Acceptable standard: ≤ 10 NM

Category S → S TOC - Acceptable standard: ≤ 10 NM

3.39 Sri Lanka highlighted the information on initiatives for the application of separation minima in the Colombo FIR (**ATM/SG/10 IP/18**)

ATM Performance Management Updates in China (IP/3)

3.40 The meeting was provided with a progress report on performance measurement implementation in China, including data collection, KPI verification, performance measurement and assessment, performance reporting, identification of implementation challenges and future tasks or proposals.

Agenda Item 4: Air Navigation Service Deficiencies

Air Navigation Service Deficiencies List (WP/9)

4.1 ICAO presented the list of APANPIRG Air Navigation Deficiencies in the ATM and Airspace Safety fields. The meeting agreed to the following change proposals for consideration by APANPIRG/33 and recorded in **Appendix C to the Report**:

a) SAR capability

i. Fiji Deficiency deleted;

ii. Tuvalu – new Deficiency.

b) WGS-84 not implemented

i. Bangladesh Deficiency deleted.

4.2 The meeting noted the following new Deficiency proposed by RASMAG/27:

a) Non-Provision of Safety-related Data

i. Brunei Darussalam – new deficiency.

IFALPA Information

4.3 The meeting was informed that the purpose of the inclusion of the IFALPA Annex 29 information in the ICAO ANS Deficiencies Working Paper at past meetings was to share information with States and promote resolution of issues identified. However, following up on the ATFM/SG/9 discussion ICAO APAC Regional Office discussed the matter further with IFALPA in a separate meeting.

4.4 Noting the APANPIRG handbook provisions for the use of information provided by International Organizations for consideration for APANPIRG ANS Deficiencies, the meeting was informed of the process to be put in place by ICAO Regional Office whereby cases of systemic, unaddressed non-compliance with ICAO Standards and Recommended Practices (SARPS), Procedures for Air Navigation Services (PANS), Regional Supplementary Procedures (SUPPS) Regional Air Navigation Plan (ANP) Vol I or Vol II provisions, as reported by International Organizations, would be assessed and considered for inclusion in the APANPIRG Deficiencies List.

Updates on Corrective Actions by Bangladesh to Eliminate Some ATM and Airspace Safety Deficiencies (WP/10)

4.5 Bangladesh provided information on two ATM and Airspace Safety Deficiencies; Departure (DEP) message transmission, and World Geodetic System 1984 (WGS-84) not implemented, and requested deletion of the Deficiencies.

4.6 The meeting was informed that Bangladesh had taken action to ensure compliance with the ICAO Doc 4444 Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) provisions for generation and transmission of DEP messages. According to the report of the 12th Meeting of the Air Traffic Flow Management Steering Group (ATFM/SG/12, 12 – 16 September 2022) it was reported that, for flights departing Bangladesh the non-receipt of DEP messages in Bangkok FIR was less than 1% during the period from January 2022 to August 2022 and 2% during the period from July 2021 to December 2021.

4.7 ICAO noted the improvement in DEP message transmission for flights operating to or through the Bangkok FIR had been observed. However, the more broad regional analysis would form the basis of information for the reassessment of the Deficiency.

4.8 The meeting was also informed that CAA Bangladesh published all related data with WGS-84 coordinates as provided from a survey of Bangladesh. The publication coordinate data in AIP Bangladesh in WGS-84 had been completed. ICAO would review the correspondence received from Bangladesh in this regard, with a view to advancing resolution of the related Deficiency.

Update on Designation of Australian Restricted Areas in International Waters (IP/4)

4.9 Australia provided an update on progress to remove Restricted Areas over international waters, to address the existing ICAO Deficiency.

Agenda Item 5: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

Regional Air Navigation Plan Update (WP/11)

5.1 ICAO presented an update on the progress of incorporating coordinate data for Asia/Pacific FIRs and Search and Rescue Regions (SRRs) in the Regional ANP Volume I. **Figure 5** & **Figure 6** illustrated the current status of the FIR and Search and Rescue Region (SRR) reviews.

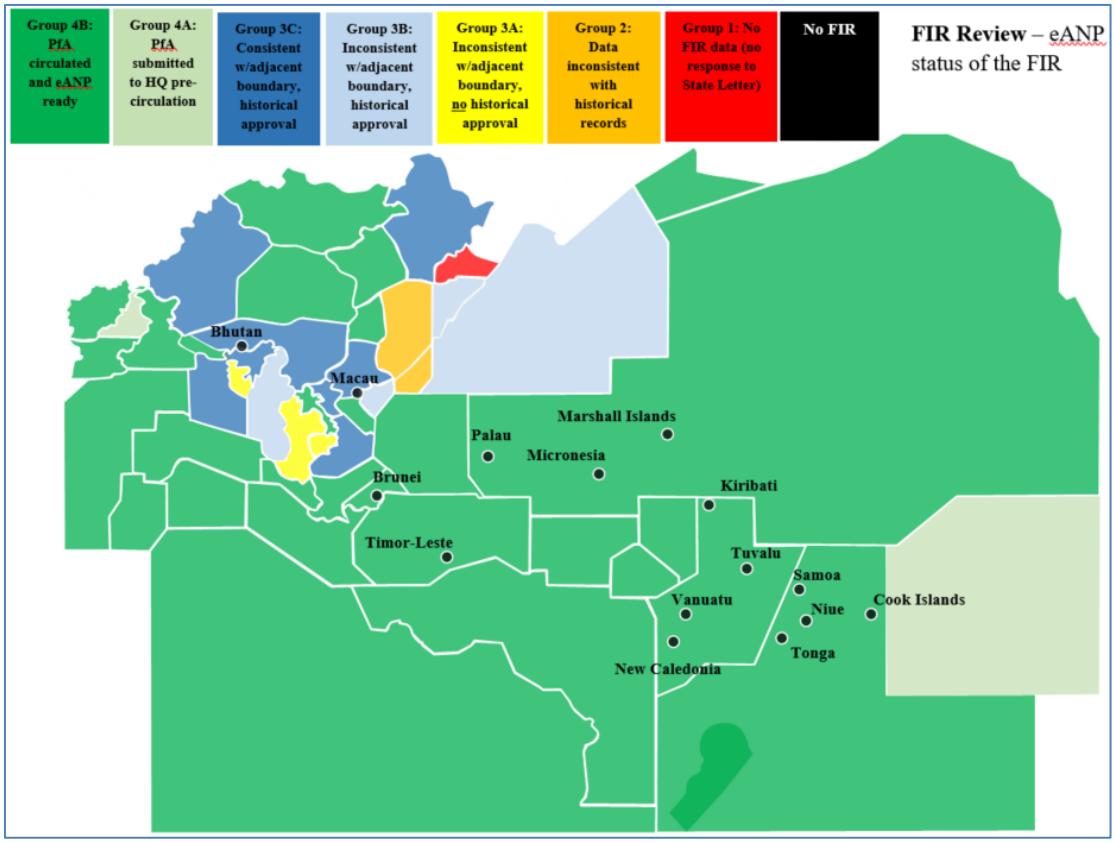

Figure 5: FIR Review Status, as at September 2022

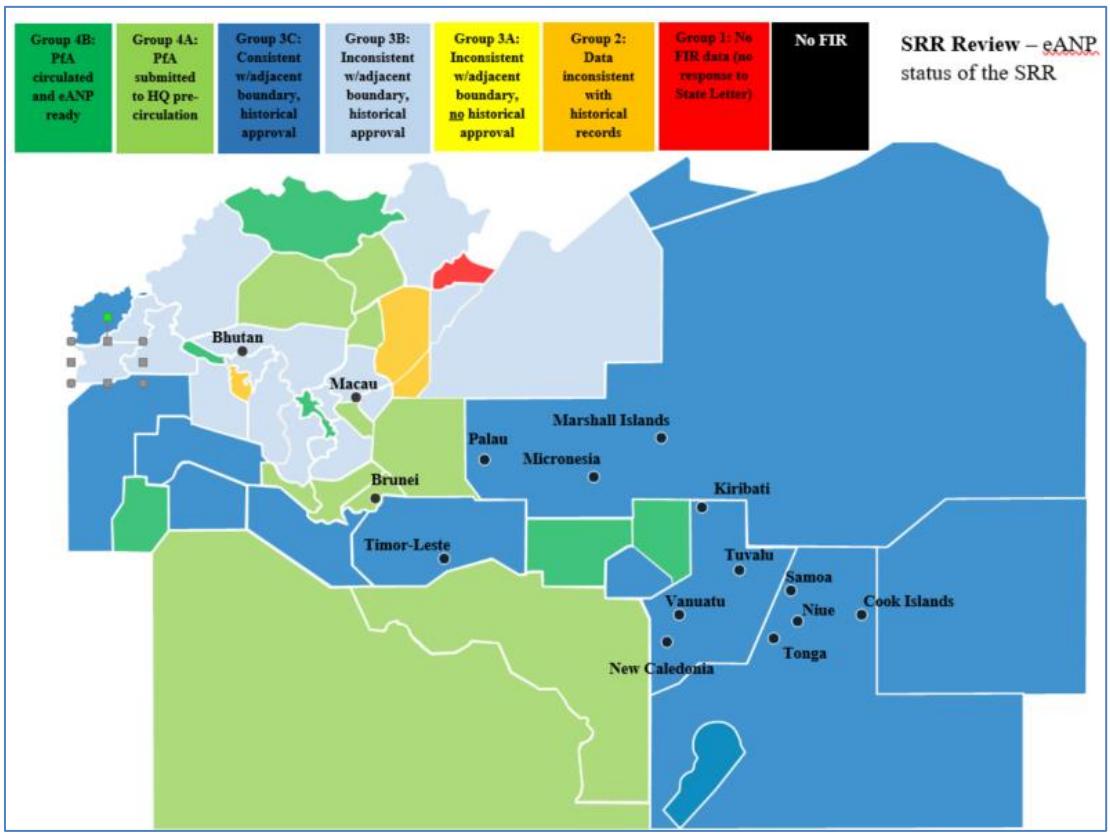

Figure 6: SRR Review Status, as at September 2022

5.2 ICAO shared the Proposal for Amendment (PfA) process of approval FIRs and SRRs data to be included in ANP Volume I (approval of the Council). In order to facilitate the PfA process, ICAO urged States to urgently review the FIR/SRR data of those FIRs and SRRs related to their administration that were not included in the ANP Volume I Table SAR I-1 and provide feedback to the Regional Office on the data's accuracy.

5.3 Information was provided on issues affecting resolution of fourteen FIRs. As some of the resolution issues had a political dimension it was appropriate for APANPIRG to be involved in terms of overseeing the process used to resolve them.

5.4 China made the following statement to the meeting:

- The *coordinates of the Shanghai and Taibei FIRs in the PfAs submitted by China did not involve any political dimension and were based on operational and technical considerations. China requested deletion of WP/11 paragraph 2.8-item e.*
- *the information in WP/11 Attachment I was not comprehensive or complete;*
- *According to historical documents, the FIRs concerned was defined at the first Regional Air Navigation meeting (RAN/1, 1973) in the absence of China and without China's consultation or agreement, which was not in line with the procedures.*
- *The RAN/1 meeting requested the Secretariat to coordinate with China. In 1975, ICAO began to coordinate with China and initiate the adjustment of relevant FIRs, which had not been accomplished by 1983.*
- *At the 2nd RAN meeting in 1983, China once again made a statement that China did not accept the definition of FIRs without China's presence, and the relevant FIR boundaries shall be adjusted at an appropriate time through consultations. China's statement was recorded in the minutes of the meeting of the General Committee of the Second RAN meeting in 1983;*
- *PfAs and further correspondence communicating their position and historical evidences had been provided to ICAO since January 2020, and no PfAs had been submitted in 2015.*

5.5 The meeting was informed that the purpose of this process was not to modify FIR boundaries. The purpose of the process was to define current FIR boundaries in Volume I of the ANP. ICAO would coordinate further with China on this matter.

5.6 Republic of Korea strongly supported paragraph 2.5 of the working paper which described the intention and purpose of the ANP review. Republic of Korea stated that in the process of ANP review, descriptions submitted by States that were different from the historical data should not be included in ANP. Republic of Korea further stated that Attachment I of this working paper provided obvious and legal evidence for relevant FIRs.

> *2.5 The initial exercise to review the ANP with FIR & SSR coordinates should be based on ICAO historical records and not new proposal for changes. Some States had submitted major amendments to their FIRs during the review process. These will only be considered if it was change that only affected the national airspace and not the neighbouring airspace, or if all parties agreed with the change proposal before submission to ICAO. And after the FIR/SRR Table has been updated with the published coordinates in the Regional Air Navigation Plan, States would need to file a PfA for any change to the Air Navigation Plan.*

5.7 Republic of Korea further informed the meeting that a PfA for the SRR had been submitted.

5.8 Bangladesh informed the meeting that following the discussion of the parallel working paper in 2019 (ATM/SG/7), further coordination on matters relating to the PfA for the Dhaka FIR had been undertaken through diplomatic channels. The efforts made by Bangladesh were further discussed in **ATM/SG/10 WP/12**.

Bangladesh Efforts on FIR Amendment Process and the Impact of the Delay on the Finalization of Dhaka FIR Description (WP/12)

5.9 Bangladesh informed the meeting of initiatives to resolve the Flight Information Region (FIR) boundary issue between Bangladesh, India and Myanmar. Bangladesh highlighted that they had initiated a process to restructure Dhaka FIR encompassing the airspace over the entire territory including the territorial water of Bangladesh and the airspace over the south-eastern part of the territory of Bangladesh, which was not included in either the Dhaka FIR nor in Yangon FIR. Bangladesh also emphasized the safety issue resulting from this undefined portion since a part of a major ATS route G463 fell within the airspace and where the provision of Air Traffic Services and SAR Services remained undetermined. Trilateral meetings of Bangladesh, Myanmar and India had resulted in agreement on the FIR boundary with India (Kolkata FIR). However, the boundary with Myanmar required some amendment to the initial proposal, and was awaiting further consent from Myanmar.

5.10 Myanmar advised that a reply had been sent from the Myanmar Ministry of Foreign Affairs to the Embassy of Bangladesh, and a response was awaited. Further coordination would be conducted between Bangladesh and Myanmar.

Transition to a Single Flight Information Region (IP/5)

5.11 Australia informed the meeting that the transition to Civil Military Air Traffic Management System (CMATS) would allow for a Single Flight Data Region (SFDRG) to consolidate the management of Australian administered airspace. The subsequent creation of a single Flight Information Region (FIR) would complete alignment and unification of air traffic management across Australia, provide benefits and simplify operations for customers through Australian airspace. Australia intends to implement the SFDRG (YAAA) by end of 2026.

ICAO Doc 7030 Regional Supplementary Procedures Publication Guidance for Implementation of ADS-B In-Trail Procedures (ITP) and Climb and Descent Procedure (WP/13)

5.12 New Zealand provided information on PfAs to ICAO Doc 7030 Regional Supplementary Procedures (SUPPS), jointly submitted by several States, for the implementation of ADS-B In Trail Procedure (ITP) and ADS-C Climb and Descent Procedure (CDP). In its review ICAO Headquarters had determined parts of the PfAs were unnecessary.

5.13 It was noted that for many years publication of an Air Traffic Control (ATC) procedure in SUPPS had been important to many ANSPs because it provided notification to their regulator that the FIR was approved to apply the procedure.

5.14 The meeting agreed to the following Draft Conclusion, for consideration by APANPIRG/33:

Draft Conclusion ATM/SG/10-2: Provide Clear Direction on Doc 7030 Regional Supplementary Procedures Publication Requirements

That, ICAO provides clear direction on which separation minima require Doc 7030 Regional Supplementary Procedure publication, to provide consistency in the information published in the different ICAO Regions.

IATA Equipage and Capability Survey (IP/06)

5.15 IATA presented initial analysis of airline responses to IATA's Aircraft Equipage and Capability Survey for Asia-Pacific and North Asia conducted in Quarters 1 and 2 of 2022. The survey specifically asked for aircraft fleet capabilities and operating approvals in the domains of PBCS, Performance-Based Navigation (PBN), Global Navigation Satellite System (GNSS) Augmentations, Mode Select Secondary Surveillance Radar (Mode S SSR) and System-Wide Information Management (SWIM). The airlines were asked to provide indications on future intentions where current capabilities were planned to be enhanced.

Main Outcomes of CNS SG/26 (WP/15)

5.16 ICAO informed the meeting of recent developments in the Communications, Navigation and Surveillance (CNS) area that were of interest to ATM/SG, as discussed at the 26th Meeting of the CNS Sub-Group of APANPIRG (CNS SG/26, 5-9 September 2022).

5.17 Information was provided on outcomes from 10 technical groups established under CNS SG, and four workshops/webinars/

5.18 The meeting noted that 13 States/Administrations provided their status on AMHS readiness for supporting the Meteorology Information Exchange Model (IWXXM) Traffic, out of the 23 States/Administrations in the APAC Region which put their AMHS into operations per the AMHS Routing Directory Tables from the ATS Messaging Management Centre (AMC). Although there has been a significant increase in the AMHS readiness for supporting IWXXM Traffic, the reporting gap as well as the slow progress on the reporting were still identified.

5.19 The Sixth Meeting of the System Wide Information Management Task Force (SWIM/TF/6) agreed to include the use of internet for meteorological information services in designing the regional SWIM architecture.

5.20 CNS SG/26 reviewed global Performance-Based Navigation (PBN) implementation status at international airports. ICAO informed that implementation of APV procedures for all instrument runway ends by 2016, a key requirement of ICAO Assembly Resolution A37-11, was behind global achievements. However, implementation of PBN SID/STAR were above the global implementation status (**Table 4**).

Sept 2021	LNAV	APV		PBN SID	PBN STAR
		LNAV/VNAV	LPV		
Global (%)	69.3	57.3	26.2	57.7	50.5
Asia/Pacific (%)	64.5	52.7	0	70	67

Table 4: PBN Implementation Status (Approach Procedures)

5.21 Formal CNS SG/26 outcomes of key interest to ATM/SG included:

Decision CNS SG/26/04 (SWIM TF/06/01) – The Use of the Internet for MET Information Services in Regional SWIM architecture.

Draft Conclusion CNS SG/26/06 (SWIM TF/06/02 and SWIM TF/06/04): The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan.

Draft Conclusion CNS SG/26/11 (SURICG/7/3): Revised Surveillance Strategy for the APAC Region

Conclusion CNS SG/26/12 (SURICG/7/4): Revised ADS-B Implementation and Operations Guidance Document (AIGD).

5.22 Proposed wording for the inclusion of SWIM-related Aviation System Block Upgrades (ASBUs) in the Asia/Pacific Seamless ANS Plan was provided in **ATM/SG/10 WP/15 Appendix C**.

5.23 In response to a query, ICAO informed the meeting that the update cycle of PBN implementation information in the ICAO iSTARS lagged behind the actual reported implementation by some significant time. Coordination on the matter had been undertaken with the relevant parties in ICAO headquarters. The PBN implementation data provided in this WP was as at September 2021, and was expected to be updated in due course.

Proposal on the Establishment of a Study Group to Prepare a Set of Harmonised Operational Requirements of FF-ICE for Asia/Pacific (WP/16)

5.24 Japan, Singapore, USA and Thailand proposed the establishment of a Study Group to prepare a set of harmonised operational requirements of Flight and Flow Information for a Collaborative Environment (FF-ICE) and recommend an approach to devise an FF-ICE implementation strategy for Asia/Pacific, aligned with the Asia/Pacific Seamless ANS objective. FF-ICE would require changes in operational processes and flight planning procedures. New processes would be required to cater to a mixed mode environment where both current flight plan (FPL2012) and FF-ICE flight plan co-exist. The interaction of FF-ICE with other ATM initiatives such as Air Traffic Flow Management (ATFM) would also need to be studied.

5.25 The meeting agreed to the following Decision:

Decision ATM/SG/10-3: Establish FF-ICE Operational Requirements Small Working Group

That, ATM/SG establishes the FF-ICE Operational Requirements Small Working Group, that will:

a) study ICAO global TBO and FF-ICE provisions and the outcomes of relevant ICAO technical panels and regional technical groups; to

b) prepare a set of draft harmonised regional operational requirements of FF-ICE/R1, and related operational processes and procedures;

c) present related information to the FF-ICE seminar to be organised by ATMAS TF in 2023;

d) recommend an appropriate approach to devise a FF-ICE implementation strategy for the APAC region; and

e) recommend priority ASBU elements and develop draft regional performance objectives for consideration for inclusion in the Asia/Pacific Seamless ANS Plan version 4.0.

5.26 Singapore volunteered to organise the first meeting of the small working group. The following States/Administrations and international organization expressed interest to participate in this small working group: Australia, China, Hong Kong China, India, Japan, Mongolia, New Zealand, Thailand, USA and IATA. ICAO explained that such a small working group (SWG) was not an ICAO formal group and therefore did not required a chairperson. The rapporteur of the SWG would report the outcomes to ATM/SG for consideration.

Updates of Trajectory-based Operations (TBO) in China (IP/7)

5.27 China shared the progress made and challenges experienced by China in the development of the concept of the Trajectory-Based Operations (TBO) through technical validation and flight tests in recent years and the next-step plan, such as the development of FF-ICE roadmap.

The Long-Term Vision for the Future Aur Traffic Systems of Japan (CARATS) (IP/8)

5.28 Japan introduced JCAB's measures for decarbonisation, especially through the long-term vision for the future air traffic system in Japan, known as Collaborative Actions for Renovation of Air Traffic Systems (CARATS). CARATS identified eight areas of innovation to achieve the goals of decarbonisation.

The Progress of Domestic CPDLC Trial Operation in Japan (IP/9)

5.29 The meeting was informed of the progress of domestic Controller Pilot Data Link Communications (CPDLC) trial operation since March. Japan Civil Aviation Bureau (JCAB) initiated the trial operation in March 2022. Data from the trial was analysed and evaluated from the perspective of communication performance and ATC operational with the future consideration for actual operation.

CMATS Implementation – OneSKY Update (IP/10)

5.30 Australia provided an update on the implementation of an advanced integrated system (Civil & Military Air Traffic Management System – CMATS) and the OneSKY Program to deliver more efficient air services, while supporting long-term future air traffic growth and enhancing national security.

Upgradation of CNS-ATM System within Dhaka FIR (IP/22)

5.31 Bangladesh shared an update of their initiatives to modernize the Communication, Navigation and Surveillance and Air Traffic Management (CNS-ATM) System within Dhaka FIR. The project was expected to be completed by Q3 2024, and was in line with ICAO standards and met the expectations of the APAC seamless ANS plan.

Air Traffic Flow Management Steering Group Outcomes (WP/17)

5.32 The meeting was informed of the outcomes of the 12th Meeting of the Air Traffic Flow Management Steering Group (ATFM/SG/12), held by VTC from 13 to 16 September 2022.

5.33 Updates were provided on progress in the Asia/Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC), the Northeast Asia Regional ATFM Harmonization Group (NARAHG), and the East-Asia Air Traffic Management Coordination Group (EATMCG). The meeting was grateful for EATMCG's cooperation in using the Regional ATFM Concept of Operations (multi-nodal ATFM concept), especially for acting as a bridge between North East Asia and South East Asia.

5.34 A summary of the ATFM implementation status of APAC Administrations was provided, reported against the performance objectives of the Regional Framework for Collaborative ATFM. Annual implementation status reports, due by 30 April 2022, were received from 15 APAC Administrations: Bangladesh, Cambodia, Hong Kong China, India, Indonesia, Japan, Mongolia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Thailand, Viet Nam.

5.35 Based on reports received States were assessed as having *Robust* (90-100%), *Marginal* (70-89%) or *Incomplete* (0-69%) implementation. Japan, Singapore, Thailand and USA were assessed as having Robust implementation. Australia, Cambodia, China, Hong Kong China, India, Pakistan, Philippines and Republic of Korea were assessed as having Marginal implementation.

5.36 The following APAC States had never provided an implementation status report, and their implementation status recorded as Did Not Report:

- Afghanistan, Bhutan, Brunei Darussalam, Cook Islands, Fiji, France (French Polynesia), DPR Korea, Kiribati, Lao PDR, Marshall Islands, Micronesia, Nauru, Palau, Samoa, Solomon Islands, Sri Lanka, Timor Leste, Tonga, Tuvalu, and Vanuatu.

5.37 The meeting was provided with information on ATFM in the context of recent years' contingency situations in the Asia and Pacific Region. The use of ATFM in contingency situations such as Kabul FIR CCT and Taibei FIR CTT were examples.

5.38 The subject of contingency planning and CCTs in the APAC Region was discussed in more detail in **ATM/SG/10 WP/42**.

5.39 Hong Kong China informed the meeting of the importance of operators filing flight plans with sufficient lead-time to enhance demand predictability, which in turn minimized the chance of initiating unnecessary ATFM measures and delay.

5.40 ATFM/SG/12 was informed of the benefits of using Ground Delay Programs (GDPs) as the preferred ATFM solution for Demand-Capacity Balancing (DCB) as compared to Minutes-In-Trial/Miles-In-Trail (MINIT/MIT). The meeting was also informed that ATFM measures were intended to be used for the purpose of managing traffic flow to address demand-capacity imbalance rather than as a tool to ensure aircraft separation. As such, tolerance windows for ATFM measures should be provided to account for tactical variations rather than applying the measures with the rigidity of an aircraft separation minimum.

5.41 The meeting was informed that ATFM Information Requirements Small Working Group (ATFM/IR/SWG) had worked on the updated of the Regional Framework for Collaborative ATFM, the ATFM Training Guide, and the Regional ATFM Implementation Status Reporting form. ATFM/SG/12 agreed to the updated regional documents and drafted several conclusions for consideration by ATM/SG/10.

5.42 The meeting agreed to the following Conclusions:

Conclusion ATM/SG/10-4: Update Regional Framework for Collaborative ATFM

That, the Asia/Pacific Regional Framework for Collaborative ATFM Version 4.0 provided in **Appendix D to the Report** be adopted, and made available on the ICAO Asia/Pacific Regional Office web site, replacing Version 3.0.

Conclusion ATM/SG/10-5: ATFM Training Guide

That,

1. the ATFM Training Guide provided in **Appendix E to the Report** be made available on the ICAO Asia/Pacific Regional Office website; and
2. Asia/Pacific Administrations are urged to refer to the ATFM Training Guidance material for developing their training programs.

Conclusion ATM/SG/10-6: Regional ATFM Implementation Status Reporting

That,

1. the ATFM Implementation Status Report form (version 3.0) provided in **Appendix F to the Report** be adopted, and made available on the ICAO Asia/Pacific Regional Office website;
2. Asia/Pacific Administrations are urged to report their ATFM implementation status at least once annually by no later than 28th February each year, using the ATFM Implementation Status Report Form; and
3. The Regional Framework for Collaborative ATFM be amended to include the information in Appendix F to the Report.

Note: This Conclusion supersedes Conclusion ATM/SG/5-3

5.43 The ATM/SG Chair, ATFM/SG and ICAO thanked the ATFM/IR/SWG for their hard work and effort over the year to update these regional documents.

CDM Process in GBA under Adverse Weather Conditions (WP/18 and SP/2)

5.44 A presentation was made on how China dealt with ATFM with various weather conditions, including CDM with all the stakeholders. The meeting was informed that the Pearl River Delta (PRD) Operational Management Committee was officially inaugurated and put into operation in May 2022, where ATC, the three airports in PRD (Guangzhou, Shenzhen and Zhuhai), and relevant airlines working in the same room for the effective situational awareness and information sharing.

5.45 In response to the proposal that there should be more sharing of experience, the meeting noted CDM harmonization activities were undertaken by ATFM/SG and/or sub-regional ATFM groups (e.g., AMNAC, NARAHG, EATMCG), and that MET involvement in CDM processes was covered in both DOC 9971 and the Regional Framework for Collaborative ATFM. As MET was a key factor affecting airspace and airport capacity, the Meteorology Sub-Group of APANPIRG (MET SG) and the Meteorological Requirements Working Group (MET R/WG) had been working closely with ATM/SG and ATFM/SG. It was also noted that the expectation that States share CDM processes and experiences was already included in the Seamless ANS Plan. The meeting agreed that any specific proposals in this regard should first be proposed to ATFM/SG, as the expert technical body, to consider whether any additional activity in the CDM/ATFM domain might be needed.

Flight CTOT on-Demand Service via ACARS in China (IP/11)

5.46 China updated the meeting on the provision of flight Calculated Take-Off Time (CTOT) on demand services via ACARS by ATMB of CAAC at 134 airports starting from the end of 2019, in accordance with ARINC 623 standards. Future integration with other information would be considered, such as COBT or TSAT from DMAN, other integrated IT system or data center, to further reduce air-ground voice communication workload and bring more convenient digital services to pilots.

Researches on the Application and Integration of AMAN-DMAN-SMAN (IP/12)

5.47 China provided information summarizing the application strategies and practical experience in flight mode, sector delay allocation, straight approach and other aspects of the AMAN system. At the same time, it briefly introduces the achievements and progress made in the research and verification of Air Traffic Management Bureau (ATMB), CAAC in point merge programs, AMAN/DMAN/SMAN integration and other aspects.

Application of PMS and AMAN in Shanghai TMA (IP/13)

5.48 China shared the application of Point Merge System (PMS) and AMAN in Shanghai TMA, the benefits included reduction of relative ATC instructions which would improve safety, capacity and efficiency.

Missing Departure (DEP) Messages (WP/19)

5.49 ICAO provided an update on the issue of missing Departure (DEP) messages, as discussed at ATFM/SG/8 (2018), ATFM/SG/9 (2019) and ATFM/SG/10/11/12 (2020-22) and presented to ATM/SG meetings in 2019 and 2021.

5.50 The meeting was reminded of PANS-ATM procedures for the addressing of ATS messages, noting that there were multiple examples of APAC Administrations specifying noncompliant Flight Plan (FPL) addressing requirements in Aeronautical Information Publication (AIP) Section ENR 1.11, together with the use in AFTN addresses of three-letter designators that were not registered for their use in Doc 8585 Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services. It was noted that specification of non-compliant addresses was a key factor in missing FPL and associated ATS messages (including DEP messages).

5.51 Analysis of incorrect FPL addressing requirements in AIP would continue, with a view to raising APANPIRG Air Navigation Deficiencies against non-compliance with ICAO Annexes and PANS where necessary.

5.52 The meeting was informed of the APAC Administrations for which APANPIRG ANS Deficiencies were recorded, where the most recent APAC regional analysis indicated 5% or more of the required DEP messages were not received by en-route and/or destination ATS units, as agreed by APANPIRG/31 and APANPIRG/32 (December 2021): Deficiency remained in place: Bangladesh, India, Malaysia, Maldives, Nepal, USA

5.53 The meeting was invited to note that few Administrations achieved 100% of DEP messages transmitted to all relevant participating FIRs. All Administrations should examine their processes and system configuration in order to improve overall performance.

5.54 The meeting was informed about the continued exercise by Thailand for identifying missing DEP messages of flights in Bangkok FIR.

5.55 It was noted that a large percentage of missing DEP messages pertained to flights departing from other ICAO regions (Mid-East/Europe/AFI). The meeting also noted that considerable progress had been made by APAC States in reducing the percentage of missing DEP messages.

5.56 Due to the COVID-19 pandemic the planned further data gathering and analyses in 2020 and 2021 had not been conducted, as the significant reduction in air traffic was considered to render a data analysis of unrepresentative. However, noting the importance of this issue another regional analysis was being tentatively planned.

5.57 The matter had also been discussed during ATFM/SG/12 meeting in September 2022. It was agreed that States that had participated in the earlier exercise would be approached by ICAO Secretariat in October 2022 for collection and sharing of data within a specific period. The data collected would be analyzed by the ICAO Secretariat for refining the regional scenario. States were requested to participate in the data collection exercise.

5.58 India informed the meeting that there were many technical limitations of ATM Automation systems regarding generation of DEP messages and the ICAO analysis should take due note of the same.

5.59 In response to Malaysia's comments noting that ANS Deficiencies had been raised based on 2019 data and may not represent current data, ICAO informed the meeting that the planned new regional analysis would result in a review of the ANS deficiency list. The data provided by participating States for the regional analysis would be shared with States.

5.60 Singapore and Indonesia informed the meeting of the publication of revised AIP ENR 1.11 information supporting compliance with PANS-ATM ATS message addressing requirements.

5.61 China did not support the proposed action by the meeting in paragraphs 3.1 b) iii and 3.1 d) of this working paper. The full text of China's comments on this matter was provided in **ATM/SG/10 Flimsy 1**, prepared by the Secretariat. ICAO would further coordinate directly with China.

Need for Proper Guidance to Establish and Upgrade the ATS Airspace Classes (WP/20)

5.62 Nepal proposed that there was a need for updates to ICAO Annex 11 *Air Traffic Services* and/or other relevant ICAO documents to provide States with appropriate provisions or guidance to establish or upgrade their ATS airspace classification.

5.63 ICAO was requested to review Nepal's proposals and update Annex 11 and/or ICAO Doc 9426 *ATS Planning Manual*.

5.64 The meeting was informed that any revision to Annex 11 or ICAO Doc 9426 was a matter for the appropriate technical panel, in this case the ATM Operations Panel (ATMOPSP). It was suggested that Nepal may wish to raise the matter with ATMOPSP. In the case of Doc 9426, the meeting was informed that this document was currently under review by the ATMOPSP.

5.65 Nepal believed that if there was a need for separation there should also be provision for navigation and surveillance. The meeting noted that a prescriptive approach to navigation and surveillance requirements for particular classes of airspace would not generally be supported as it would remove the flexibility to classify airspace on the basis of separation needs, while navigation and surveillance could be considered separately.

5.66 ICAO agreed to explore the option of conducting a workshop on the classification of airspace, and of seeking information from States in order to compile guidance in the form of a checklist of considerations for States to use in determining airspace classification. IATA noted that some PBN implementation guidance documents included information on steps to be considered in airspace design, including airspace classification.

Asia/Pacific Unmanned Aircraft Systems (WP/21)

5.67 The meeting was provided information on the availability of global and regional guidance for the regulation and integration of Unmanned Aircraft Systems (UAS) in national airspace. Information was also provided on past and upcoming ICAO unmanned aviation symposia.

5.68 Links were provided to the Asia/Pacific Regional Guidance for the Regulation and Safe Operation of UAS within National Airspace, the ICAO UAS Toolkit, UAS Regulatory Guidance, UAS Traffic Management (UTM) Framework, and ICAO COVID-19 series webinars on UAS-related topics.

5.69 Meeting participants were invited to utilize the available regional guidance and the information available in the ICAO UAS Toolkit, Model UAS Regulations and UTM Framework, and participate in the ICAO Unmanned Aviation 2022 Symposia.

Alphanumeric Call Signs (WP/22)

5.70 An update was provided on the issue of call sign confusion and the use of Alphanumeric Call Signs in mitigation. The meeting was reminded of the outcomes of ATM/SG/4 (2016) and APANPIRG/27 in the same year, which enabled Phase 1 of the APAC Alpha Numeric Call Sign Project to commence. Phase 2 of the project was supported by a Conclusion of ATM/SG/5 in August 2017.

5.71 Following up on ***Conclusion APANPIRG/31/11: Alphanumeric Call Sign Initiative***, which had been drafted by RASMAG/25 and cited the extreme safety risks associated with pilot-ATC miscommunication and the number of Category D (ATC Loop Error) LHDs, ATM/SG Action item 5/5 had been updated by ATM/SG/9 to include CANSO and ACI among the responsible parties, and to reference the APANPIRG Conclusion.

5.72 As a result of offline consultation on the Action Item between ACI, CANSO, IATA and ICAO, a regional webinar was conducted with a view to provide information on the need for Alpha Numeric Call Signs to mitigate call sign confusion in ATC communications, implementation challenges, and benefits to all stakeholders. The webinar, hosted by CANSO as a joint activity with ACI, and supported by IATA, was held on 01 June 2022. The webinar details and presentations were available on the CANSO website at:

https://canso.org/event/regional-focus-safety-significance-and-implementation-of-alphanumeric-call-signs/

5.73 In follow-up consultation, the webinar organizers considered that development of a Safety Enhancement Initiative (SEI) for inclusion in the APAC Regional Aviation Safety Plan (RASP) might encourage APAC stakeholders to trial and then implement the use of alphanumeric call signs. The meeting was informed there could also be benefit in including a related regional planning element in the APAC Seamless ANS Plan.

5.74 Accordingly, the meeting agreed to update to the ATM/SG Task List, to include development of a SEI for consideration for inclusion in the APAC RASP, and to consider the inclusion of a regional planning element in the Seamless ANS Plan.

Review on the Implementation of Enhanced Wake Turbulence Separation at Hong Kong International Airport (WP/23)

5.75 The meeting was informed of the implementation of enhanced wake turbulence separation (e-WTS) for arrivals at Hong Kong International Airport (HKIA). Hong Kong China had implemented distance based enhanced wake turbulence separation minima based on the ICAO procedures in Amendment 9 to PANS-ATM since 5 November 2020.

5.76 The review concluded that the implementation increased the runway capacity of HKIA without compromising flight safety. An increase in hourly arrival capacity (from 34 to 35) and progressively for more hours in a day had been achieved. Information was provided on comprehensive safety assessment and safety case that were conducted to ensure all aspects of safety were reviewed and addressed.

5.77 An analysis on the potential benefit of implementing e-WTS for departures at HKIA had been conducted. After analysis, the proposed minima planned to be adopted at HKIA would be more conservative than stipulated in PANS-ATM. There was potential to increase the maximum hourly departure capacity at HKIA by 2-3%.

5.78 Hong Kong China proposed holding relevant workshop led by ICAO to encourage members to share experiences and lessons learnt in the implementation of e-WTS at their airports. ICAO informed the meeting that a workshop had been conducted in September 2021. A further workshop was also planned for 2022 (response to Hong Kong China's ATM/SG/9 paper) but had been postponed. ICAO would continue to consider the workshop for 2023.

5.79 In response to a query on the methodology of ascertaining the time separation in practice and the difficulty in applying the separation without automation. Hong Kong China responded that time-based separation was commonly applied in busy aerodrome control operations, and aerodrome controllers applied judgement to ensure the required separation was maintained when clearing consecutive departures.

Operational Improvements to Enhance Runway Capacity and Implementation of Wake Turbulence Groups (WP/24)

5.80 Republic of Korea presented a paper on measures for improvement of airport operation and ATC operation such as the High Intensity Runway Operation (HIRO) procedures and Independent Simultaneous Visual Approach (ISVA) to enhance capacity of Incheon International Airport (RKSI). The meeting was also informed about the Republic of Korea's experience of introducing wake turbulence groups to Incheon and Gimpo (RKSS) International Airports in accordance with PANS-ATM procedures.

5.81 HIRO procedures had been implemented in consultation with all stakeholders at RKSI since 2017. RKSI has also added multiple rapid exit taxiways on the 4th runway in 2021. Details of the procedures are described in AIP RKSI AD 2.20. About two years after the implementation of the HIRO, the throughput of the main landing runway was analyzed, and it was noted that the Runway Occupancy Time (ROT) improved significantly.

5.82 RKSI has also introduced Reduced Runway Separation Minima in accordance with PANS-ATM 7.11 in 2017 and independent visual approaches to parallel runways in 2020 to improve runway capacity.

5.83 Following analysis of the composition of wake turbulence groups of landing aircraft in each of its airports, performance of surveillance system, and projected effects of implementing the new separation minima, Republic of Korea had selected the distance-based approach separation for trial of the new separation minima at RKSI and RKSS for one year.

5.84 The new separation minima were tested out in the early half of 2022 and there had not yet been any report of wake turbulence encounters from a pilot or an airline.

Enhanced Wake Turbulence Separation in Japan (WP/25)

5.85 Japan presented information on the implementation process and status of the enhanced Wake Turbulence Separation (eWTS) at Tokyo/Haneda International Airport (RJTT) and Tokyo/Narita International Airport (RJAA), planned for implementation in early 2020 with a phased approach. A trial operation until 5 November 2020 had been conducted based on the result of safety assessments by JCAB.

5.86 The working group reviewed the trail operations from June 2020 to October 2020. Nine hazards and five mitigation measures were reviewed by the working group.

5.87 As the result of the review by the working group, it was agreed to implement e-WTS officially based on the PANS-ATM, ICAO Doc 10122 and Doc 8643 from 5 November 2020

5.88 The meeting was informed of Japan Civil Aviation Bureau (JCAB) plans for eWTS implementation at other airports in Japan such as Osaka/Kansai International Airport, including the implementation of advanced eWTS (time based wake turbulence separation for arrival aircraft).

5.89 Japan was willing to contribute to a workshop to encourage experience sharing and lessons learnt in the implementation of e-WTS at their airports, to support States and ATS providers in the Asia Pacific region that were considering to implement e-WTS.

Application of Re-Categorisation of Wake Turbulence Separation Minima in China (IP/14, SP/1)

5.90 China shared the process of safe and smooth implementation and benefits of re-categorized wake turbulence separation minima operations in China. Taking into consideration of operational needs and development level, the Chinese version of RECAT standard (RECAT-CN) was formulated by simplifying the seven categories of aircraft classification to five categories in reference to PANS-ATM.

Practice Sharing of A-SMGCS Level IV Lighting Guidance Application in China (IP/15)

5.91 This paper presented information regarding the construction, application, effects and relevant technical suggestions of implementing A-SMGCS Level 4 at China Daxing International Airport. Daxing Airport was the first airport in China to realize A-SMGCS Level 4 application, which had a very important reference role in promoting A-SMGCS Level 4 application and experience for aviation authorities.

Application of Runway Status Light System in China (IP/16)

5.92 China updated the meeting on the work done to mitigate runway incursion by Civil Aviation of China using technology and shared the implementation and promotion of Runway Status Lights (RWSL) system in China.

Airspace Reconstructions in Japan (IP/17)

5.93 This paper presented JCAB's progress in reorganizing the domestic airspace of Fukuoka FIR in order to respond to the future increase in demand of air traffic and in anticipation of future TBO (Trajectory Based Operation). In anticipation of future free routes in the high-altitude sector, future study would aim to increase the flexibility of routes in the wide airspace connecting Asia and the Pacific Ocean

Application of Standard ATC Separation within Colombo FIR (IP/18)

5.94 Sri Lanka informed the meeting of the initiatives taken by the Airport & Aviation Service (Sri Lanka) (Pvt) Ltd for the application of ATC Separation Minima within Colombo Flight Information Region in compliance with seamless ANS separation standards for the provision of harmonized and consistent air traffic services within Asia/Pacific Region. These initiatives included application of 50NM longitudinal Separation within Colombo oceanic airspace and application of 5NM and 3NM surveillance-based separations within category S and T airspaces respectively.

Remote Apron Control Implementation in China (WP/26, SP/3)

5.95 China shared their experience in the implementation of remote apron control tower technology and the trial operations of remote ATS based on visual surveillance system usage. The meeting was informed of technical highlights of the use of remote tower technology at Guangzhou Baiyun airport

5.96 Noting that ICAO Doc 9924 *Aeronautical Surveillance Manual* and PANS-ATM did not provide clear information on the role of the visual surveillance system or answer questions on what type of tools the system of visual surveillance referred to, China had developed several guidance documents on technical requirements and specifications for remote towers, remote tower operations and remote apron control for large civil airports.

5.97 In response to the proposal that operational and technical specifications be developed for remote towers in the Asia/Pacific Region, the meeting was informed that global specifications were currently under development by the ATM Operations Panel (ATMOPSP), including the use of digital technology to augment traditional aerodrome control tower operations. China was encouraged to engage with the ATMOPSP and contribute to this work.

Agenda Item 6: ATM Coordination (Meetings, Route Development, Contingency Planning)

SAIOSEACG Meeting Outcomes (WP/27)

6.1 ICAO presented the key outcomes of the First Meeting of the South Asia, Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/1, 29 March – 01 April 2022).

6.2 SAIOSEACG was formed under Decision APANPIRG/32/5 to consolidate the South Asia/Indian Ocean ATM Coordination Group (SAIOACG) and the South-East Asia ATS Coordination Group (SEACG) meetings. The Bay of Bengal Traffic Flow Review Group (BOBTFRG) and South China Sea Traffic Flow Review Group (SCSTFRG) reported to SAIOSEACG.

6.3 The meeting was informed of the notable outcomes of the BOBTFRG/3 meeting (14 – 15 December 2021), and the expected actions for implementation of an ADS-C/CPDLC mandate in the Bay of Bengal. In this regard, IATA invited States to note the results of the IATA equipage and capability survey (**ATM/SG/10 IP06**).

6.4 India highlighted the importance of fully understanding fleet capability when developing airspace, ATS route and performance-based separation implementation, and thanked IATA for their extensive work on fleet capability analysis. In response to comment about narrow-body CPDLC capability, IATA responded that closer analysis of the airspace would provide more accurate picture.

6.5 States were urged to present the proposed timeline of their PBCS implementation plan and their analysis on local fleet equipage capability status to start meaningful discussion on the ADS-C/CPDLC mandate.

6.6 The SAIOSEACG/1 meeting also noted some improvements in Bay of Bengal and South China Sea airspaces, such as RNAV 2 implementation on ATS routes L642, M771 and N892, and RNP 10 for ATS route M768, implementation of 10 NM surveillance spacing between Jakarta ACC and Ujung Pandang ACC, Malaysia's revised ATM contingency plan level 2 in Kuala Lumpur FIR, RNP 4 implementation on ATS routes M767 and N884, and the completion of a trial of 30 NM longitudinal spacing on ATS routes A461 and A583.

6.7 With regard to the Flight Level Allocation Scheme (FLAS) and non-standard Flight Level Orientation Scheme (FLOS) operations in the South China Sea area, Japan noted that the RASMAG/27 meeting had not identified FLAS/FLOS as a contributing factor to the LHD hot spot at the Fukuoka/Manila FIR boundary. ICAO responded that discussions of the South China Sea Traffic Flow Review Group (SCSTFRG) had considered the transition to/from the non-standard FLOS was a root cause. It was agreed that a meeting on the matter should be conducted between the relevant parties. While ICAO proposed the meeting should be held during the next SAIOSEACG meeting, Japan considered it should be held as a side meeting at RASMAG/28.

ATS Route Catalogue (WP/28)

6.8 The meeting was informed of the review process conducted by the ICAO APAC Regional Sub-Office for the Asia/Pacific Region ATS Route Catalogue, including correspondence with all concerned States/Administrations and IATA requesting status updates on relevant route proposals. Feedback had been incorporated into the draft Asia/Pacific Region ATS Route Catalogue, which was reviewed by the meeting and would be uploaded to the APAC website as Version 21.2.

6.9 There were currently 33 proposals in the Route Catalogue, with positive progress in three proposals, but none had been implemented in this year. Additionally, 26 proposals had no progress in the past four years, 27 proposals were classified as priority C or D by States, and four proposals were assigned LOW priority by IATA. These could trigger the deletion mechanism according to the established management protocols for the Asia/Pacific Region ATS Route Catalogue.

6.10 Hong Kong China informed the meeting that the remarks made on SCS01, 02 and 08 at previous meetings remained valid.

Outcomes of the Mekong ATM Coordination Group (WP/37)

6.11 Thailand presented, on behalf of Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam and IATA, outcomes of Ninth Meeting of the Mekong ATM Coordination Group (MK-ATM/CG/9) held on 21 – 23 September 2022.

6.12 Several route structure enhancements agreed to in previous MK-ATM/CG/9 Meetings had been discussed including route proposals from the ICAO APAC ATS Route Catalogue.

6.13 MK-ATM/CG/9 discussed operational issues related to Flight Level Allocation Scheme (FLAS) for ATS routes A1 and B202, tasking member States to further study and provide updates prior to the next meeting. ATFM service development in Lao PDR, and surveillance service development plans including surveillance data sharing between Lao PDR and Thailand had also been discussed.

6.14 The MK-ATM/CG/9 meeting had asked the member States to review A1000 Conspicuity Code support functionality in their ATM Automation Systems.

6.15 The next MK-ATM/CG meeting was proposed to be held in Lao PDR in 2023.

Enhancing Utilization of ATS Route L644 (WP30)

6.16 Singapore presented an overview of the plans and phased approach to enhance flight utilization of L644, starting with the removal of flight planning restrictions. The WP discussed a phased enhancement of operations and utilization of L644 that would help to provide airspace users flexibility in planning the most optimal flight paths.

6.17 Singapore had engaged with Indonesia, Viet Nam, and the Philippines to remove the flight planning restriction on L644 where it previously only served flights to Jakarta from Hong Kong China and beyond. The removal of the flight planning restriction had been effective since 8 September 2022.

6.18 L644 was designated as a Required Navigation Performance – 10 (RNP10) route with a longitudinal separation minimum of 10 minutes (80NM) using Mach Number Technique. Singapore would work with the relevant States and their Area Control Centers (ACCs) on this next phase of reviewing the longitudinal separation on L644.

6.19 Future phases of enhancements for L644 include allowing flights to join L644 from other ATS routes within Singapore FIR. This would not only provide airspace users with flexibility in flight planning, but also help to improve and optimize flight efficiencies and trajectories.

6.20 Viet Nam and Malaysia indicated support for the removal of flight planning restriction to facilitate flights to Indonesia. Viet Nam also suggested that Singapore consider applying a RNP 2/ RNP 4 navigation specification in Phase II. Singapore agreed to consider the same.

Progress Update on Capacity Optimisation on Air Routes L642 and M771 (WP/31)

6.21 Hong Kong China presented a progress update of the initiative to optimize the capacity of air routes L642 and M771 by means of enhancing the longitudinal spacing applied.

6.22 The meeting was informed that a comprehensive evaluation for optimization of the longitudinal spacing between aircraft operating along L642 and M771 from 50NM to 20NM within the Hong Kong FIR was completed in Q2 2022. Information was also provided on an additional ATC sector established for the southern portion of the Hong Kong FIR, and ADS-B surveillance coverage extending up to 80 NM south of the FIR boundary.

6.23 IATA had expressed their full support on this initiative.

6.24 A Letter of Agreement (LOA) detailing the requirements for different operating scenarios on the implementation of the proposed 20NM spacing between Hong Kong Air Traffic Control Centre (ATCC) and Sanya ACC had been drafted. The meeting was also informed that a similar agreement between Sanya ACC and Ho Chi Minh ACC would also be required.

6.25 Hong Kong China informed the meeting that the implementation timeline proposed was Q1 2023, and requested States/Administrations concerned (i.e. China, Viet Nam, Singapore and Hong Kong China) to re-confirm Points of Contact (POC) to facilitate with further discussion.

6.26 In response to a query, Hong Kong China informed the meeting that VHF voice communications were used on these routes.

6.27 Responding to a query from the Chair, Hong Kong China clarified there was a communication issue with Viet Nam, and thought there may have been a change of POC in Viet Nam. Hong Kong China encouraged Viet Nam and all concerned States/Administrations to actively participate in discussions in order to expedite the implementation of revised longitudinal spacing as soon as possible.

PBN Routes in Mongolia IP/19

6.28 Mongolia had established PBN routes (RNAV 5) in Mongolian airspace that were utilized from 6 October in 2022 in accordance with guidance manuals related to PBN (Docs 9992, 9613 and PANS-OPS 8168 Volume I). After the redesign of Mongolian airspace, it was expected to be more flexible to airspace users by increasing capacity while saving flight time and fuel, and reducing significant amount of CO2 emissions.

Update on Trials for Application of 10 Minutes Separation on Crossing tracks over Oceanic Airspace in Mumbai Flight Information Region (WP/32)

6.29 India proposed the application of 10 minutes' separation on an opportunity basis between ADS-B equipped aircraft flying on crossing tracks under Space Based ADS-B (SB ADS-B) Surveillance in the oceanic airspace of Mumbai FIR (**Figure 7**). For the proposed separation, the establishment of two-way radio communication via VHF/HF or CPDLC connection for suitably equipped aircraft was considered mandatory. 15 minutes' separation over the crossing points was currently being applied.

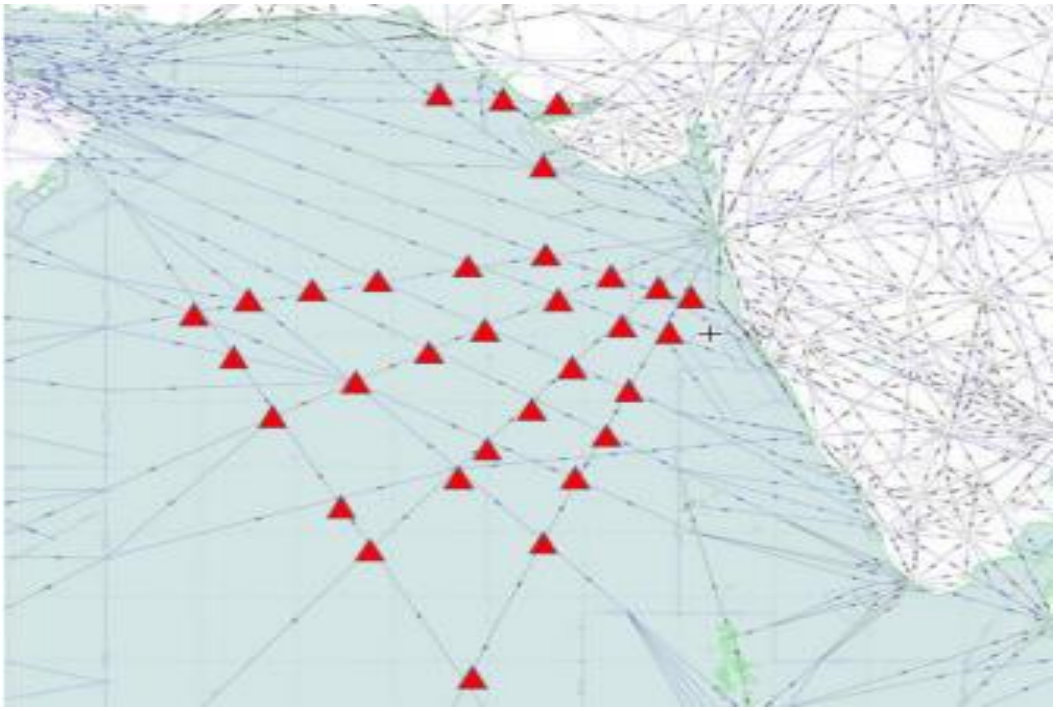

Figure 7: Crossing Track Separation in the Mumbai FIR

6.30 ATS provision in Mumbai oceanic airspace was dependent on procedural position reporting via HF, and/or by establishing ADS-C/CPDLC connection with appropriately equipped aircraft. However, with availability of Space Based ADS-B surveillance, improved performance of HF, availability of ADS-C/CPDLC and a strengthened Mumbai ATM Automation System the safe application of 10 minute separation between aircraft on crossing tracks was planned.

6.31 India conducted a trial from 01 May to 31 July 2022, applying 10 minutes horizontal separation on crossing tracks on opportunity basis only between the aircraft where their ADS-B tracks were correlated with the flight plan and positive contact was established with Mumbai Oceanic Control Centre (OCC) on voice (HF/VHF) or CPDLC.

6.32 During the trials reduced crossing time separation was utilized at least 51 times between 102 participating aircraft where the estimated crossing time values were from 10 to 14 minutes. This reduced separation minima thereby enabled flights at user preferred flight levels leading to reduced fuel burn and consequent reduced emissions. There were no safety-related issues reported or observed during the trial.

6.33 Responding to the proposal that ICAO recognize the separation applied in this project, the meeting was informed that ICAO may only 'recognize' separations that are defined in Annex 11, PANS-ATM and Doc 7030. ICAO suggested India may consider developing a Doc 7030 Pfa proposal, which would require extensive work, or engage with the Separation and Airspace Safety Panel (SASP).

6.34 Japan informed the meeting that SASP had created a Job Card on ADS-B and HF separation, and procedures were being considered for ADS-B and CPDLC separation.

6.35 India informed the meeting that Doc 4444 currently included provisions for separation of 10 minutes if navigation aids permitted the frequent determination of position and speed. India stated that the frequent determination of position and speed were achieved by SB ADS-B integrated display, as an aid which permitted reduction of separation from 15 to 10 minutes. India reiterated that ADS-B use would enable better surveillance and consequent reduction of separation, and requested cooperation from industry in improving equipage.

ADS-C CDP Progress in Fukuoka FIR (WP/33)

6.36 Japan provided information on the progress of the ADS-C Climb Descend Procedure (CDP) in the Pacific Ocean airspace of the Fukuoka FIR. ADS-C CDP allowed ATC to apply 15-25 NM longitudinal separation minima for a climb or descent through the cruising flight level of another aircraft. (**Figure 8**)

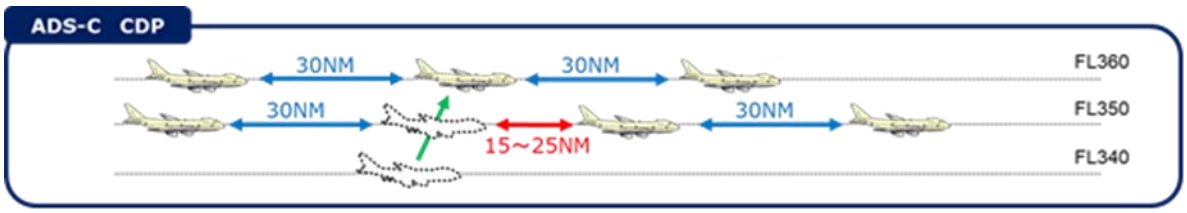

Figure 8: Example of adopting ADS-C CDP

6.37 The meeting was informed that JCAB established the ADS-C CDP implementation plan, in accordance with the Global Ari Navigation Plan (GANP), in their long-term vision for the future air traffic systems of Japan in 2015. The actual implementation in the Fukuoka FIR on 9 September 2019, as a trial after conducting a safety assessment.

6.38 A total of 386 flights were approved for flight level change while separated by ADS-C CDP from 9 September 2021 to 31 August 2022. As an additional result, implementing ADS-C CDP in the airspace made a contribution not only to PBCS-approved aircraft but also provided non-PBCS-approved aircraft more opportunities to fly at their preferred flight level. However, the meeting was informed that JCAB encouraged aircraft operators flying in the Pacific Ocean airspace to obtain PBCS approval/authorization.

6.39 The meeting was informed that JCAB would commence the ADS-C CDP formal operation after conducting the safety assessment of the trial phase among relevant members with more than 500 data samples.

6.40 ICAO commented that introducing ADS-C CDP would be an example of airspace capacity improvement and efficiency improvement providing benefit to long-haul flights.

Proposal to Strengthen Coordination for Safety of Civil Aircraft and Space Launch Vehicles (WP/34)

6.41 Republic of Korea proposed to strengthen international coordination procedures to secure the safety of civil aircraft and space launch vehicles when space vehicle launch and re-entry took place, and suggested that States/Administrations took appropriate measures in accordance with the ICAO Asia/Pacific Seamless ANS Plan and related guidance materials.

6.42 Information was provided on the requirement in Annex 11 section 2.19 that States shall coordinate with the appropriate ATS authorities with regard to activities potentially hazardous to civil aircraft.

6.43 Areas for improvement were identified, particularly the inability to conduct a conference for pre-tactical launch coordination due to the absence of a unitary POC, with no single contact designated for this matter among the domains identified in the ATM POC list.

6.44 Republic of Korea made a number of proposals to improve the coordination process, including the recommendation that a specific be identified by each State/Administration for this purpose, the list of POCs be published and managed on the ICAO website, launching States share information and engage in prior conference call coordination with affected States in accordance with the Seamless ANS Plan, and affected States actively cooperate.

Space Activity Coordination (WP/35)

6.45 USA presented a proposed process for the timely coordination of space launch and re-entry activities in the Asia/Pacific Region.

6.46 The proposal was supported by information on the marked increase in space operations since 2019, past regional challenges, intragovernmental challenges, frequently affected geographic areas (**Figure 9**), and regional guidance

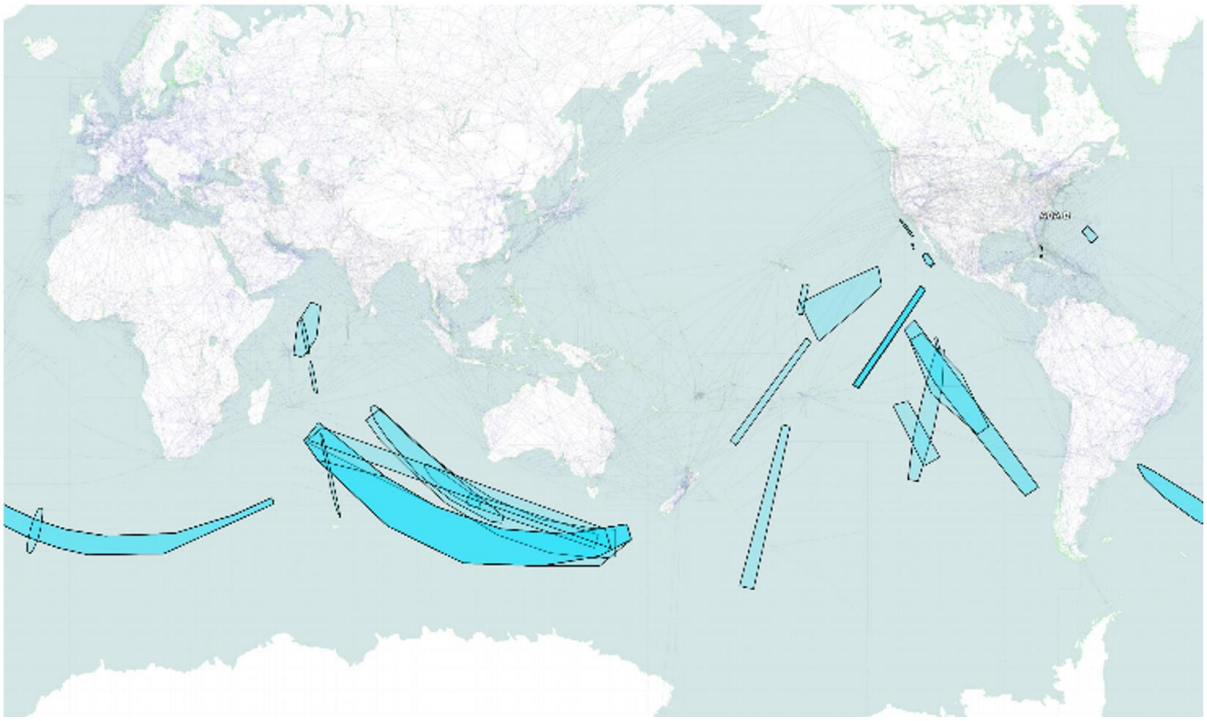

Figure 9: Aircraft Hazard Areas (AHAs) for Missions Coordinated by the US - 2022

6.47 Information was provided on specific coordination activities that all States and organizations that conducted ballistic launch or space re-entry activities should ensure, including development of written coordination agreements between the State civil aviation authority and the launch/re-entry agency concerned, coordination milestones and their timing, consideration of affected airspace users and ANSP to lessen possible disruption, and the establishment of communication with affected ANSPs.

6.48 Examples of recent coordination activities were provided, together with a list of guidelines developed by USA in collaboration with the Informal Pacific ATC Coordinating Group (IPACG) and the Informal South Pacific ATS Coordinating Group (ISPACG). USA had also conducted a live test with Fiji to validate the use of the Aeronautical Fixed Telecommunication Network (AFTN) using Service, utilizing Automated Message Handling System (AMHS).

6.49 USA proposed that States routinely affected by space activity recommend the establishment of a single email distribution list, and that States conducting or supporting space launches consider coordination using email and AFTN/AMHS. It was further recommended that ICAO include space coordination contact information in the current ATM POC list.

Meeting Discussion of Space Launch and Space Vehicle Re-Entry Coordination

6.50 In discussing the information provided in WPs 34, 35 and 36, the meeting raised the following initial points for consideration in any ongoing work in this area:

- The need for specific POCs for this purpose;
- The need for ANSPs to ensure POCs to be available '24/7', ideally being operational supervisors/managers in ATS facilities;
  - Specific POCs for planning coordination and tactical coordination could be considered;
- The importance of acknowledgement of any coordination received, and procedures in cases where no acknowledgement was received;

- The need for the authenticity of the agency or unit originating the coordination to be established;
- Consideration of time zone differences when establishing the timing of coordination events that must be coordinated.

6.51 The meeting agreed to the following Conclusion and Decision:

Conclusion ATM/SG/10-7: Points of Contact List for Space Vehicle Launch and Re-Entry Coordination

That,

1. An Asia/Pacific regional Points of Contact (POCs) List for coordination of space vehicle launch and re-entry be established;
2. The Asia/Pacific Space Vehicle Launch and Re-Entry Coordination POC List be managed by ICAO on behalf of ATM/SG, and published on the ICAO Asia/Pacific Regional Office website;
3. States are urged to:
   a. formally identify to the ICAO Asia/Pacific Regional Office the POCs nominated to originate space vehicle launch and re-entry coordination, and POCs nominated to receive and respond to any such coordination; and
   b. ensure at least one State POC is available and contactable at all times;
4. Nominated POCs should include an office or unit rather than an individual, and preferably be the operational management or supervisory function of the ATS centre in charge of the FIR who will;
   a. Respond to coordination received; and
   b. Ensure necessary coordination is undertaken with all affected ATS units within the FIR.

Decision ATM/SG/10-8: Space Vehicle Launch and Re-entry Coordination Small Working Group

That, the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG), reporting to ATM/SG, be formed to:

1. Study global practices and procedures for the coordination of space vehicle launch and re-entry activities, with a view to making recommendations for best practices to be adopted in the Asia/Pacific Region;
2. Consolidate and update Asia/Pacific regional guidance material on space vehicle launch and re-entry coordination and response; and
3. Recommend consolidated guidance and performance expectations for inclusion in the 2023 update of the Asia/Pacific Seamless ANS Plan.

The SVLRC SWG will be comprised of relevant experts from Australia, China, India, Japan, New Zealand, Republic of Korea, Singapore, Sri Lanka, Thailand, USA (rapporteur) and IATA. Other APAC States may also join the SWG.

Consideration of Airspace Established on Short Notice (WP/36)

6.52 Japan informed the meeting of the impact of the establishment of airspace on short notice, such as rocket launch/re-entry areas and military exercise areas, on ATM and ATC operations.

6.53 The meeting was reminded of ATM/SG/9 discussion outcomes, where the ICAO Doc 10066 PANS – Aeronautical Information Management (PANS AIM) procedure requirements for NOTAMs promulgating Danger Area activation be published for all affected FIRs with at least seven days' advance notice.

6.54 Information was provided on a number of Danger Areas that had been established in the North Pacific and affecting ATS routes in the Anchorage Oceanic and Fukuoka FIRs, and for which the notification had been at short notice of less than seven days, and required close coordination between the Anchorage Air Route Traffic Control Center (ARTCC) and the Fukuoka Air Traffic Management Center (ATMC) to establish alternative routes to avoid the danger areas.

6.55 A further example of short notice activation of multiple Danger Areas in the Taibei FIR in August 2022 had resulted in a significant impact on major international ATS routes between Japan and Southeast Asia, and irregular traffic flow and significant congestion in the affected sector of the Fukuoka Area Control Center.

6.56 Recalling Annex 11 section 2.19, the Asia/Pacific Seamless ANS Plan and ***Conclusion APANPIRG/29-9: Procedures for Ballistic Launch/Space Re-entry Management***, Japan highlighted that 14 days' prior coordination of rocket launch/re-entry areas and seven days' prior notification for military exercises would reduce operational impact, provide enough time for coordination among ATC units and allow ATC uints to arrange and manage human resources accordingly. Japan also informed the meeting that enhancement of civil-military coordination based on the guidance in ICAO Doc 10088 Manual on Civil – Military Cooperation in ATM would lead to more effective outcomes.

6.57 IATA strongly supported Japan's proposal that all States establish a coordination scheme between launching organizations and ATS authorities to sensitize launching organizations on resultant flight disruptions so they could carefully consider their launch timings. IATA also clarified that '10 days' was interpreted as at least '10 working days', which was a minimum notice required for planning for minimal flight disruption and sometimes seeking new overflight approvals for re-routing of flights.

Regional ATM Contingency Planning and Contingency Operations Update (WP/42)

6.58 ICAO presented information on the *Asia/Pacific Regional ATM Contingency Plan* with regard to State reporting of implementation of its performance expectations, a brief outline of recent ATM contingency events in the APAC Region, and an update on the proposal to update of the Regional contingency plan.

6.59 The Regional ATM Contingency Plan, available on the ICAO Asia/Pacific Regional Office eDocuments web-page, included among its performance expectations the expectation that States would report their implementation status at least once annually, using the Regional ATM Contingency Plan Monitoring and Reporting Form. The performance expectations of the plan were expected to be implemented by 10 November 2016, reflecting the Annex 11 standard that had been applicable since November 2003.

6.60 Implementation status was assessed as *robust* (90 – 100% of expectations implemented), *marginal* (70 – 89%) or *incomplete* (0 – 69%).

6.61 Only Indonesia, Singapore, Thailand and United States were assessed as having robust implementation.

6.62 21 Administrations had <u>never</u> provided an implementation status report.

Afghanistan, Bhutan, Brunei Darussalam, China, Cook Islands, DPR Korea, Fiji, France (French Polynesia), India, Kiribati, Lao PDR, Marshall Islands, Micronesia, Nauru, Palau, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu, Vanuatu.

6.63 **Figure 10** illustrated the overall regional implementation status:

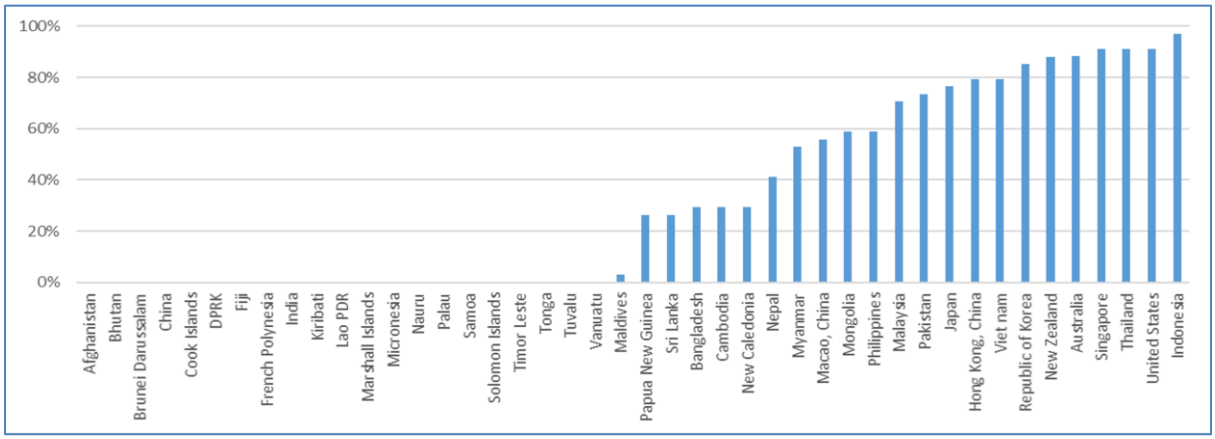

Figure 10: Regional ATM Contingency Plan –Implementation Status (21 October 2022)

6.64 In response to a request for clarification on the date for reporting implementation status, ICAO informed the meeting that the previously specified reporting date of 31 May each year was now superseded by ***Conclusion ATM/SG/10-1***, as agreed by this meeting. Reports were now requested by the common reporting date of 28 February each year.

6.65 The meeting was reminded of COVID-19 pandemic-related contingency information, and the *APAC Regional Strategy for COVID-19-related ATM Contingency Recovery*.

6.66 The meeting was reminded of Annex 11 Attachment C Material Relating to Contingency Planning, which provided guidelines supporting the standard in Annex 11 section 2.19. The information provided highlighted the allocation of responsibility among States and ICAO for contingency planning, and ICAO Asia/Pacific Regional Office consideration of any notification of ATM contingency operations to, where considered necessary, form a Contingency Coordination Team.

6.67 Regarding CCT communications, ICAO noted that, as evidenced by the direct experience of the ICAO Regional Office in successfully forming and running multiple CCTs in recent years, they usually comprised more than 50 persons at the initial stages and their size increased rapidly. It was therefore not feasible for the ICAO Regional Office to use forms of direct one-on-one communications such as telephone calls for the purpose of forming and coordinating with the CCT. ICAO therefore requested that all CCT POCs ensure they provide an up-to-date email address, and that their Administration ensures nominees for this purpose are enabled to receive and respond appropriately to official email communications out-of-hours.

6.68 A brief update of the current, ongoing ATM contingency operations in the Kabul FIR and the meetings of its related CCT was also provided. The meeting was also briefed on the ICAO response to the Tonga volcanic eruption and tsunami event of January 2022, noting that while the formation of a CCT was not considered necessary ICAO had a role in coordinating relevant aeronautical information to humanitarian aid agencies to support their preparations for relief operations.

6.69 The meeting was also informed of a related outcome of the DGCA/57 conference, which had agreed to Action Item 57/19 relating to regulatory support for ATM contingency planning, and reporting of the status of their implementation of the performance expectations of the Regional ATM Contingency Plan to the Regional Office

6.70 A further briefing was provided on contingency operations associated with the short notice promulgation by NOTAM of multiple Danger Areas affecting major traffic flows through the Taibei FIR in August 2022 **(Figures 11** and **12**).

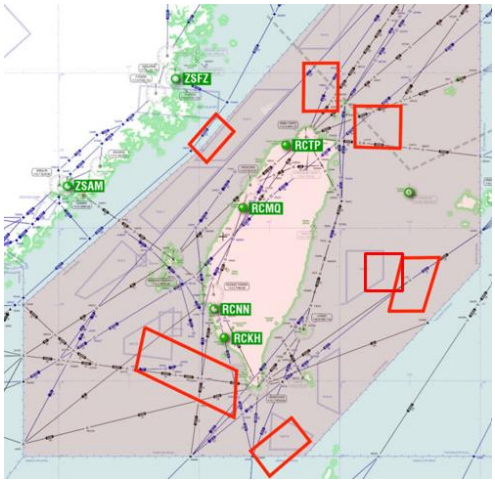

Figure 11: Danger Areas

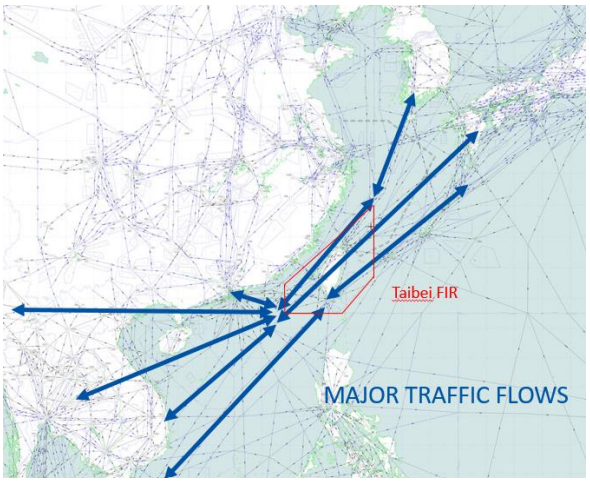

Figure 12: Major Traffic Flows

6.71 Subsequent NOTAMs imposing large longitudinal spacing requirements and substantial ATFM delays on flights that may have flight planned to avoid the Danger Areas via ATS routes to the west of the Taibei FIR were issued for the Shanghai and Hong Kong FIRs. No contingency ATS routes were made available to the west of the Taibei FIR.

6.72 A CCT was formed by the ICAO Asia/Pacific Regional Office on 03 August 2022, and dissolved on 05 August, 24 hours after the expiry of the last of the NOTAMs. During the contingency period traffic operating between Northeast Asia and Southeast Asia that would normally transit the Taibei FIR operated on alternate routes to the east of the FIR. ATFM support was provided by Japan, Singapore and Thailand.

6.73 Key points arising from the contingency situation were:

1. The need for compliance with the Standard in Annex 11 2.19 requiring that activities potentially hazardous to civil aircraft shall be coordinated with the appropriate ATS authorities;
2. The need for compliance with ICAO Annex 15 Aeronautical Information Services and Doc 10066 PANS – Aeronautical Information Management provisions for NOTAM promulgation, particularly relating to the use of correct location indicators in NOTAMs;
3. The value of ATFM capability among CCT participating Administrations.

6.74 ICAO acknowledged the competent, professional engagement of States and international organizations that participated in managing this contingency situation.

6.75 The planned 2021 update of the Regional ATM Contingency Plan had not been completed. It was envisaged that an updated Plan would be presented for review by ATM/SG/11 in 2023.

AKARA Corridor Progress and Update (WP/38)

6.76 Japan presented an update on the AKARA Corridor. The meeting was informed that Phase 1 of the AKARA airspace improvement project had been implemented since 25 March 2021, but Phase 2 was not yet completed.

6.77 Noting the ATM/SG/9 discussion, Japan and ROK had conducted a bilateral discussion on the use of non-FLAS flight levels, which would provide more preferred and efficient operation to aircraft operators and contribute to decreasing the technical risk estimates.

6.78 The meeting was informed the number/percentage of non-FLAS flight level usage westbound, especially FL320, FL340, FL360 and FL380, had significantly increased through positive coordination between Incheon ACC and Fukuoka ACC.

6.79 In cases where westbound aircraft (westbound only) flying at non-FLAS flight levels desired to maintain the same flight level in the AKARA corridor airspace, airspace users were informed that the aircraft should make the request to Fukuoka ACC by the waypoints CHINU or DGC. (**Figure 13**). In response to a query, Japan informed the meeting that this ATC procedure had not been published in the AIP. ICAO urged Japan to notify the procedure to all airspace users.

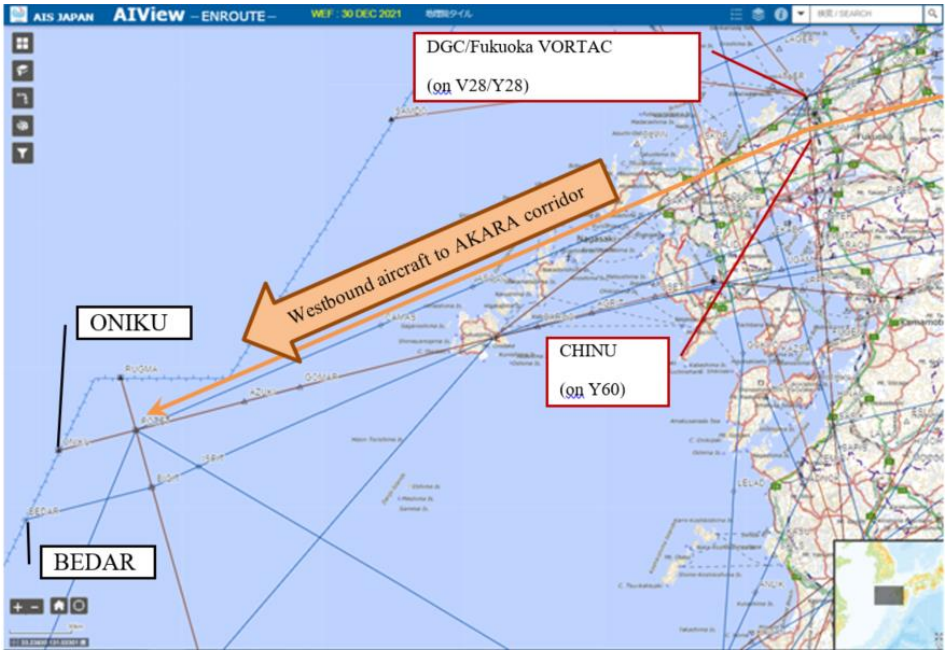

Figure 13: Location of waypoints to assign non-FLAS altitude

The Progress after Normalization of the AKARA Corridor (WP/39)

6.80 Republic of Korea provided an update on progress of the AKARA Corridor Phase 2 implementation (**Figure 14**) highlighting outstanding issues and safety/efficiency measures such as efficient FLAS operation, ATS Interfacility Data Communication (AIDC) implementation, and reduction of separation minima, which could be progressed regardless of the Phase 2 implementation in order to enhance the safety and efficiency of the AKARA Corridor airspace.

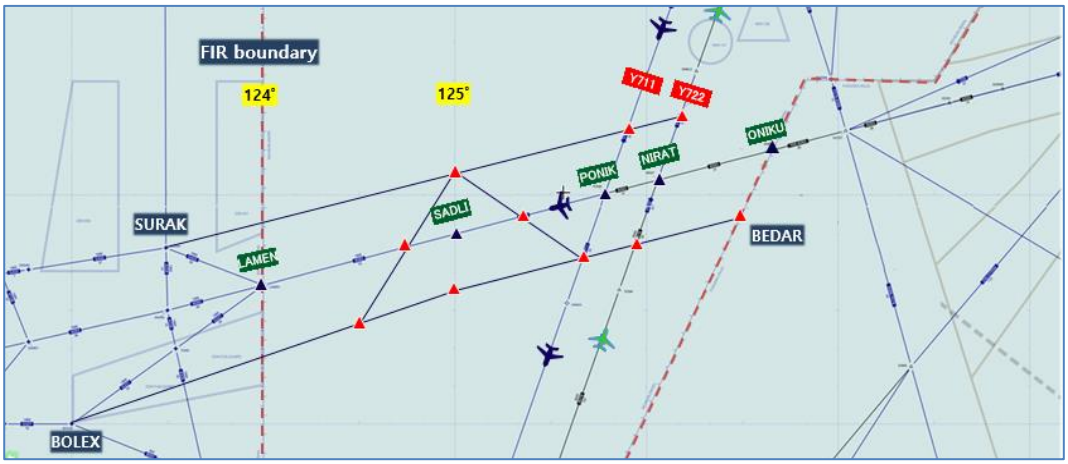

Figure 14: Phase 2 implementation

6.81 The meeting was informed that the airspace where Shanghai ACC provided ATC services within Incheon FIR needed to meet ICAO safety oversight requirements.

6.82 The meeting was also informed that Republic of Korea would work closely with China and Japan to improve the situation regardless of the Phase 2 implementation delay, including:

- Efficient FLAS operation: formulating measures and discussion with Japan;
- AIDC implementation: with Shanghai ACC targeted by 3Q 2023; and
- Reducing longitudinal separation minima: 10 minutes (currently with Shanghai ACC).

6.83 Republic of Korea informed the meeting that ADS-B services for the entire Incheon FIR and 13 VHF channels for Jeju Island were available, and radar system upgrade would be scheduled. Since the implementation of Phase 1, Republic of Korea had been increasing the number of air traffic controllers and was operating a supervisor position dedicated to the services on the Corridor, to promote further safety and efficiency in air navigation in the southern part of Incheon FIR.

6.84 The meeting was reminded that one of the objectives for the AKARA coordination was to identify optimum solutions to address the safety and efficiency issues in accordance with relevant ICAO Standards, procedures and policy. The meeting was also informed that some ANS USOAP CMA PQs were related to safety oversight.

6.85 ICAO mentioned that since Phase 2 had been delayed, ICAO would like to support the initiatives such as efficient FLAS operation, AIDC implementation between Incheon ACC and Shanghai ACC, and longitudinal separation minima improvement between Incheon ACC and Shanghai ACC). In this regard, Japan and the Republic of Korea agreed to discuss further efficient FLAS operations for the agreed target of 50% of non-FLAS usage.

6.86 China could discuss further improvement after the completion of Phase 2. ICAO informed the meeting that the Technical Working Group (TWG) Secretariat had advised that improvement initiatives, including FLAS, AIDC and separation minima could be arranged separately Phase 2 of the project, and independently from the TWG. The meeting Chair recommended the States concerned conduct bilateral and/or trilateral meetings to discuss this further.

Coordination of ATFMS Across the Region in the Irregularities Situation (WP/40)

6.87 Japan presented information on operations in response to contingency situations, especially ATFM operations, and shared lessons learned from this experience.

6.88 The meeting was informed of how Japan coordinated with the neighbouring ATS units when Danger Areas were recently promulgated in the Taibei FIR. Regular coordination processes were used to communicate with Taibei ACC, Daegu ATCC and Manila ACC for ATFM-related discussion. In addition, GDP for domestic flights were applied in order to accommodate separations/restrictions requested by the neighbouring FIRs.

6.89 The meeting was also informed that Japan could share information on trends in each FIR across APAC through the CCT. However, it was beneficial for Japan to coordinate directly with the ATS units in neighbouring FIRs such as Incheon and Manila without relying on timing of CCT meetings, to share information more actively through CDM meetings as needed with a limited number of stakeholders.

6.90 Through this experience, Japan had considered that, rather than establishing a contingency-specific scheme, coordinating with neighboring FIRs and enhancing the communication and coordination scheme during normal situations could result in flexible ATFM measures for any situation.

6.91 ICAO acknowledged Japan's ATFM initiative in the Taibei FIR contingency situation. ICAO pointed out the importance of direct coordination among the ATS units concerned rather than waiting for CCT activity since the ICAO Regional Office, while having a formal role in the convening and running of CCTs, was not a tactical ATS facility.

The Feasibility of Large-Scale Detour Procedure (WP/41)

6.92 China presented the Typhoon Detour Procedure trial jointly evaluated by China, Japan and Republic of Korea in September 2022, to manage the number of detouring flights by managing as many detour flights as possible without affecting regular flights. Additional information on Trajectory-based Operations (TBO) verification in China was provided.

6.93 The meeting was informed that MET was one of the key factors affecting airspace capacity and airport capacity, and common terminology, terms and abbreviation should be used to avoid confusion.

6.94 Republic of Korea emphasized that the ATFM delay should be distributed fairly and equitably among all traffic. In this context the meeting was informed that operational details of the Typhoon Detour Procedure were still under discussion between China, Japan and Republic of Korea.

6.95 In response to the action proposed in this paper, the meeting considered it should be discussed further by the ATFM/SG, being the expert technical body to consider whether any related activity in the CDM/ATFM domain might be needed.

COVID Impact and Forecast – Navigating Safely and Sustainably out of COVID (SP/5)

6.96 IATA provided an update on the COVID-19 pandemic impact on the airline industry, and recovery and traffic growth expectations.

6.97 Information was provided numbers of passengers and flights and the value of goods carried before and during the pandemic, and in the recovery period, noting that it was the largest and longest shock to hit the industry in the history of aviation. The meeting was informed of the rate of recovery of the industry, its financial performance, and the recovery of international travel, noting that the Asia/Pacific Region was lagging behind other regions in this aspect (**Figure 15**).

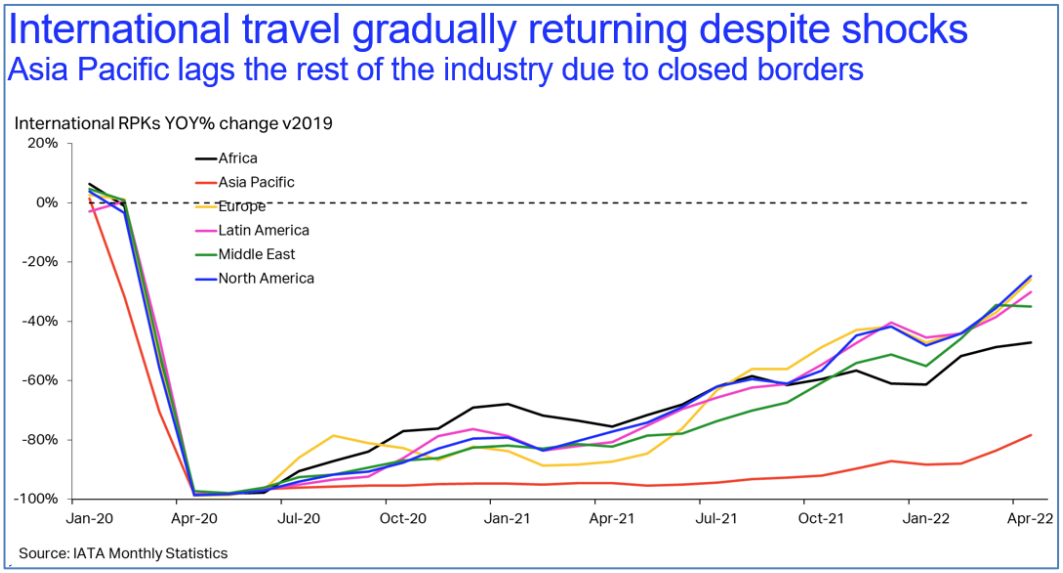

Figure 15: Post-Pandemic International Travel Recovery

6.98 The meeting was also informed of IATA activity in supporting operators restricted by airspace restrictions and ATM contingency operations, associated flight planning challenged, IATA targets on environment and sustainability and operations and infrastructure improvements. IATA thanked ANSPs for their continued support throughout the recovery process, which included some milestone examples of UPR trials by Indonesia and the CDR (Conditional Routes) initiative by India under FUA, among others.

Agenda Item 7: AOP, AIM, MET, SAR

AOP Sub-Group Outcomes (WP/43)

7.1 The relevant outcomes of the Sixth Meeting of the APANPIRG Aerodrome Operations and Planning Sub-Group (AOP/SG/6, 27 – 30 June 2022) were presented to the meeting.

7.2 Recognizing the need for promulgation of the procedures for the reporting of runway condition reports and issuance of new SNOWTAM format by States in their AIP, in accordance with Annex 15 section 6.3.1.2, AOP/SG/6 had agreed to the following Draft Conclusion for consideration by APANPIRG/33, which was also supported by the meeting:

Draft Conclusion AOP/SG/6 - 2 (AP-AA/WG/4-1): Publication of procedures for reporting of runway condition report and issuance of the SNOWTAM in AIP

That, Asia Pacific States/Administrations:

1) are urged to publish the procedures for reporting of runway condition report and issuance of SNOWTAM in their AIP in accordance with 6.3.1.2 of Annex 15 Aeronautical Information Services; and

2) may consider to publish above information in "AD 1.2.2 Snow plan" (refer to Appendix 2 of PANS-AIM (Doc 10066))

7.3 AOP/SG/6 had noted there were several States/Administrations that had yet to publish the status of certification of aerodromes in their AIP (section AD 1.5.). The assistance of ATM/SG was requested in encouraging the States concerned to comply with the requirements for publication of aerodrome certification status.

7.4 AOP/SG/6 had endorsed ***Draft Conclusion AAITF/17-3: Revalidation of Coordinate Data***, which was presented separately to the meeting in **ATM/SG/10 WP/44**.

AIS – AIM Implementation Task Force Outcomes (WP/44)

7.5 Outcomes from the 17th Meeting of the ICAO AIS – AIM Implementation Task Force (AAITF/17, 20 to 23 June 2022) were provided to the meeting.

7.6 AAITF/17 had reviewed APANPIRG Air Navigation Deficiencies in the AIS/AIM field. No changes to the Deficiencies List approved by APANPIRG/32 had been identified. 10 APAC States had Deficiencies recorded for non-implementation of World Geodetic System 1984 (WGS-84), two for non-implementation of AIP Format, and 20 for non-implementation of AIS Quality Management System (QMS).

7.7 The meeting was again reminded of the ongoing, deep concern about poor quality management of aeronautical information in the APAC Region, and the apparent lack of organizational priority for this safety-critical obligation of all States. The criteria used by the Regional Office to determine whether an AIS QMS-related Deficiency may be recommended for deletion were provided in **ATM/SG/10 WP/44 Attachment 1**.

7.8 An update was provided on the status of implementation of the performance expectations of the *APAC Regional Plan for Collaborative AIM*, which were expected to be implemented in in three phases: Phase I (immediately), Phase II (07 November 2019) and Phase III, (27 November 2025).

7.9 Japan and Singapore had reported implementation of all Phase I elements. Only Singapore reported implementation of all Phase II elements. **Figures 16 and 17** illustrated overall regional implementation of Phases I and II, which was unchanged from the implementation reported to ATM/SG/9 in 2021.

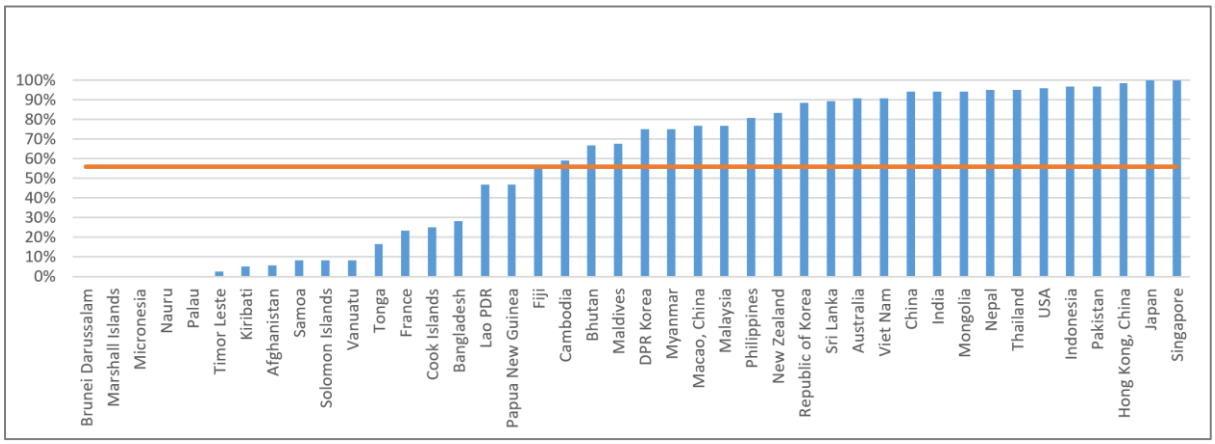

Figure 16: Regional Phase I Implementation Progress (updated 29 September 2022)

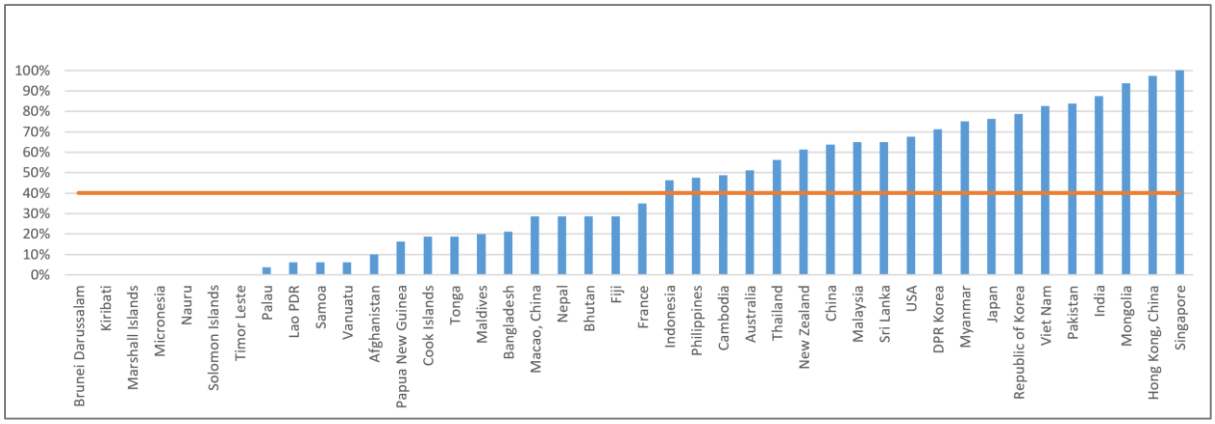

Figure 17: Regional Phase II Implementation Progress (updated 29 September 2022)

7.10 The meeting was invited to note there had been effectively zero regional progress in AIS/AIM implementation in the last year, and very little progress for several years.

WGS-84 Data Revalidation

7.11 Following discussion of the outcomes from the Workshop on WGS-84 and Data Accuracy (AAITF/17 Agenda Item 2), AAITF/17 had discussed the reasons that data revalidation was necessary, and recommended that data be revalidated every five years, after a major natural event, or following construction of critical airport elements.

7.12 Noting that Annex 11 Appendix 7 required the State to ensure that maintenance and periodic review of instrument flight procedures for aerodromes and airspace under the authority of the State were conducted, and that State must establish an interval for periodic review of instrument flight procedures not exceeding five years, AAITF/17 had drafted the following Conclusion which was subsequently agreed by the meeting:

Conclusion ATM/SG/10-9: Revalidation of Coordinate Data

That, noting the factors that cause WGS-84 coordinate data to change over time, States are urged to ensure that all surveyed and calculated coordinate data published in AIP or used in Instrument Flight Procedure design is revalidated:

1. each five years; or
2. after a major natural event such as an earthquake or volcanic eruption; or
3. following construction of critical airport elements,

whichever is the sooner, by ground survey, or Light Detection and Ranging (LIDAR) survey, or imagery collection.

7.13 IATA recommended that revalidation of coordinate data should be undertaken as soon as possible in any case where a major natural event or construction of critical airport elements had occurred since the last validation activity.

7.14 IFAIMA had conducted the annual analysis of NOTAMs for AAITF/17, supporting the drive to reduce NOTAM proliferation. **Figures 18** and **19** illustrated APAC NOTAM statistics since June 2020. At 01 June 2022, a total of 6122 NOTAMs were active in the APAC Region. 323 (5.3%) of these were *old* (i.e. more than three months but less than one year), and 666 (10.9%) were *very old* (one year or more).

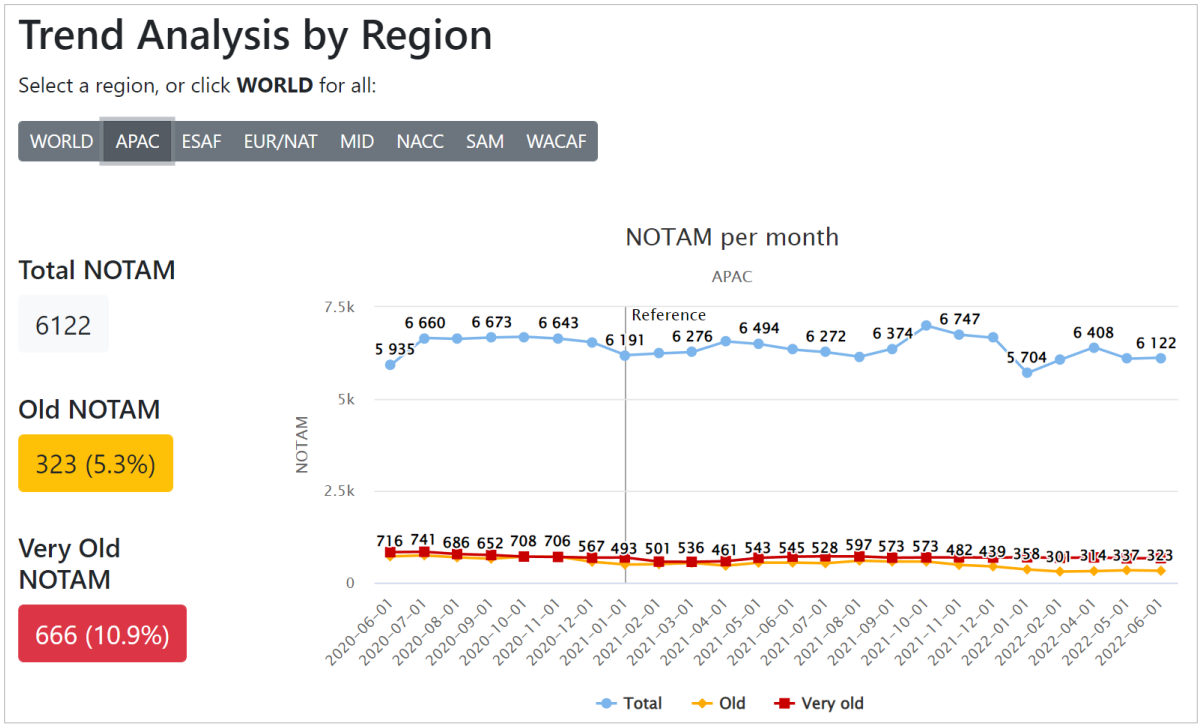

Figure 18: APAC NOTAM Statistics (Total, old and very old)

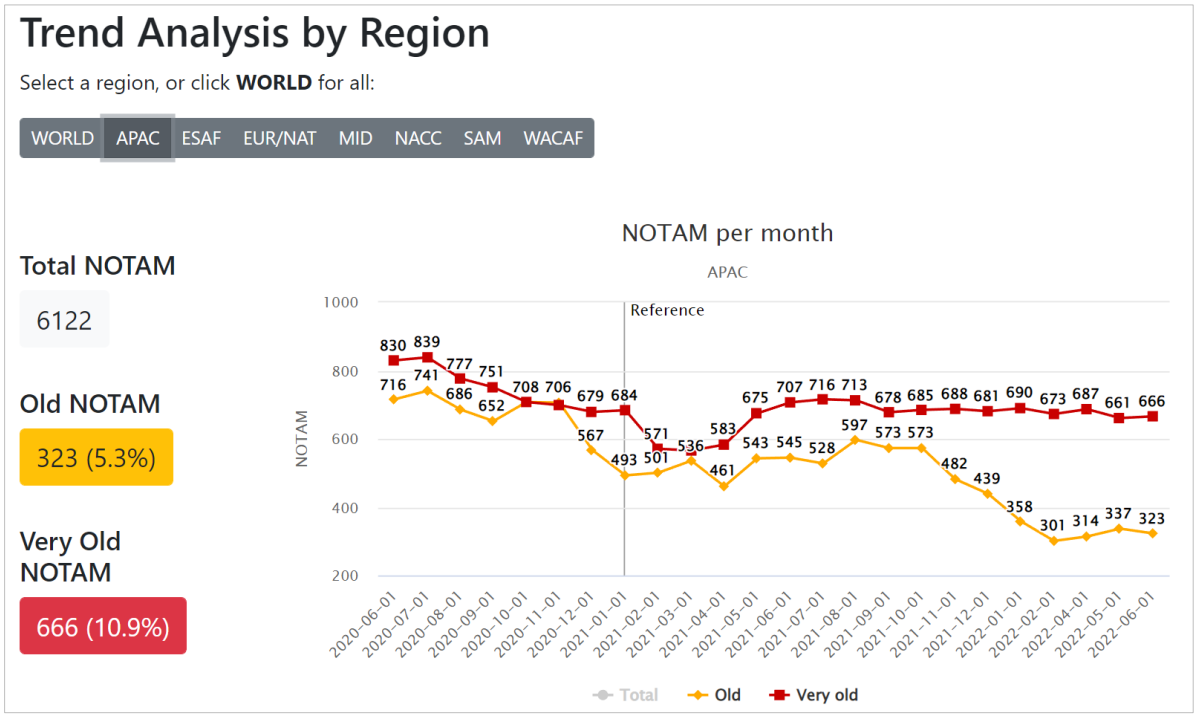

Figure 19: APAC NOTAM Statistics (old and very old)

Asia/Pacific Region ICARD Status and 5LNC Duplicate Resolution

7.15 ICAO provided an update on the use of the ICAO International Codes and Route Designators (ICARD) application in the APAC Region and the resolution status of 5-letter name code (5LNC) duplicates.

7.16 The ICAO International Codes and Route Designators (ICARD) application was the sole

repository of 5-letter name codes marking significant points that ensured global uniqueness, and was the only means by which the requirements of Annex 11 Appendix 2 paragraph 3.5 may be met.

7.17 The Regional Office had presented a State 5LNC status report for each Administration to the AAITF/15 meeting in 2020. The status reports were again presented to AAITF/16 in 2021 and AAITF/17 in 2022 (**ATM/SG/10 WP/44 Attachment 3**). APAC Administrations had been requested at AAITF/15 and AAITF/16 to review and maintain their status reports**,** and send an update to the ICAO Regional Office at least once per year. Very few reports had been received. Accordingly, AAITF/17 drafted the following Conclusion agreed by the meeting:

Conclusion ATM/SG/10-10: State Reports of 5LNC Status

That, States are urged to provide an annual update on the status of duplicated 5LNCs in **ATM/SG/10 WP/44 Attachment 3** to the ICAO APAC Regional Office by not later than 28 February each year.

Regional Guidance Document – Postponement of Aeronautical Information Distributed under AIRAC

7.18 The final Draft of the *Asia/Pacific Regional Guidance for Postponement of Changes to Aeronautical Information*, developed by the AAITF Small Working Group (SWG, Rapporteur Singapore) had been presented to AAITF/17 for discussion and agreement by the meeting. AAITF/17 drafted the following Conclusion which was subsequently agreed by the meeting:

Conclusion ATM/SG/10-11: Regional Guidance for Postponement of Changes to Aeronautical Information

That, the Asia/Pacific Regional Guidance for Postponement of Changes to Aeronautical Information at **Appendix G to the Report** be adopted, and uploaded to the Asia/Pacific Regional Office website.

Asia/Pacific Search and Rescue Update (WP/46)

7.19 The Seventh Meeting of the Asia/Pacific Regional Search and Rescue Work Group (APSAR/WG/7) was held from 24 to 27 May 2022.

7.20 The APSAR/WG/7 meeting had discussed the Location of an Aircraft in Distress Repository (LADR), which would support the Autonomous Distress Tracking (ADT) Standards in Annex 6 *Operation of Aircraft* Part I *International Commercial Air Transport* – Aeroplanes. The LADR was intended to meet the requirements for information sharing as part of the Global Aeronautical Distress and Safety System (GADSS). The GADSS concept of operations and the functional specifications for the LADR were available at https://www.icao.int/safety/globaltracking.

Regional SAR Plan Implementation Status

7.21 The same analysis undertaken in July 2015 yielded an average EI score of 51%. While the general trend of improvement was welcomed, it was recognized that all Administrations needed to continue their efforts to address weak areas and to assist other States where possible.

7.22 The following 23 APAC Administrations submitted SAR Plan implementation status reports in 2022:

Australia, Bangladesh, Cambodia, China, Hong Kong China, Cook Islands, Fiji, India, Indonesia, Japan, Malaysia, Maldives, Mongolia, Nepal, New Caledonia, New Zealand, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Sri Lanka, Thailand, Viet Nam

7.23 **Figure 20** illustrates the implementation status of the implementation of the performance expectations of the SAR Plan as at 29 September 2022.

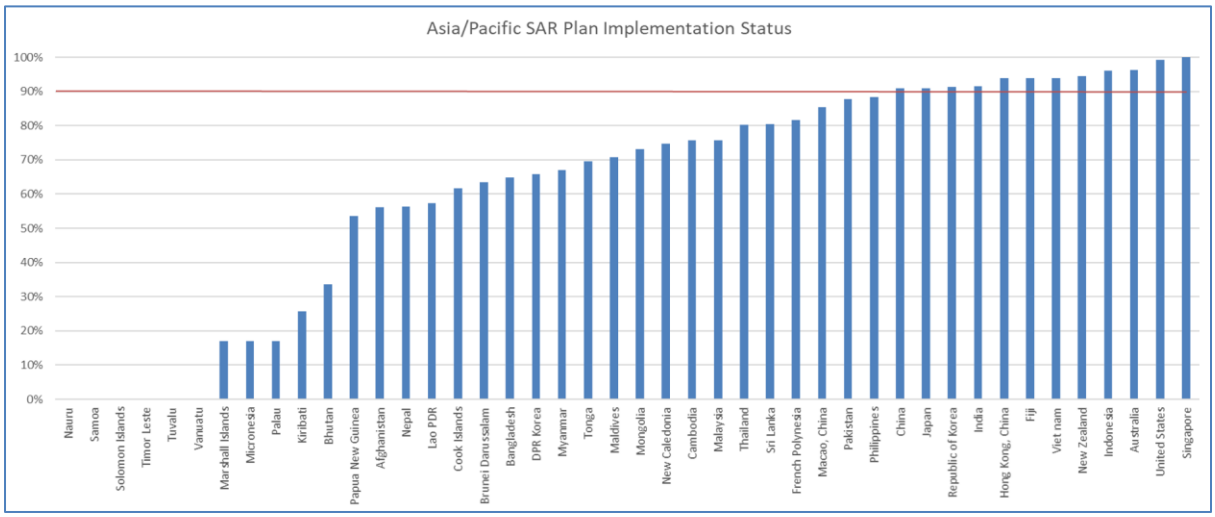

Figure 20: Asia/Pacific SAR Plan Implementation Status as at 29 September 2022

7.24 Regional policy established that States below 90% implementation would be considered to have an APANPIRG ANS Deficiency recorded for SAR implementation. Since APSAR/WG/6 (2020) there was an increase from 10 to 12 Administrations that had reported implementation of 90% or more:

Australia, China, Fiji, Hong Kong China, India, Indonesia, Japan, New Zealand, Republic of Korea, Singapore, USA and Viet Nam

GADSS Workshop Outcomes

7.25 APSAR/WG/7 discussion arising from the GADSS Workshop, held on 23 May 2022, identified an urgent need for effort to be made to improve knowledge of GADSS among Regulatory, Airline, SAR and ANSP stakeholders, and to promote development of procedures among them in preparation for the likely appearance of ADT, including ELT(DT) before the end of 2022 and increasingly after the applicability date.

7.26 The Checklist of Considerations supported by ***Draft Conclusion APSAR/WG/7-1*** formed the basis of the survey on ADT readiness that was circulated by the ICAO APAC Regional Office. State Letter (APAC) AP128/22 (ATM), 13 September 2022 refers.

7.27 The meeting was is invited to note that, as mentioned in the APAC State letter, Amendment 48 to Annex 6 *Operation of Aircraft* Part 1, adopted by the Council of ICAO on 18 July 2022, deferred the applicability of Standard for the location of an aeroplane in distress until 01 January 2025. ICAO (HQ) State Letter AN 22/75, 29 July 2022 referred. However, it was expected that increasing numbers of aircraft equipped with ADT devices would become operational from late 2022 and that ADT alerts would be distributed through the Cospas-Sarsat system and the ICAO LADR (when commissioned).

7.28 The meeting agreed to the following Conclusion, updating Draft Conclusion APSAR/WG/7-1 to take into account the deferred ADT applicability:

Conclusion ATM/SG/10-12: Checklist of Considerations in Readiness for Autonomous Distress Tracking

Noting:

1. the recent deferral of applicability of Autonomous Distress Tracking (ADT) from 01 January 2023 to 01 January 2025; and
2. the likelihood that ADT equipped aircraft will increasingly be operating from late 2022 onwards;

States are urged to implement a programme of education and procedure development for aviation regulators, aircraft operators, SAR services and ANSPs, using the Checklist of Considerations for Response to ADT Notifications at **Appendix H to the Report**.

Asia/Pacific Regional SAR Plan Update

7.29 The meeting was provided with an updated version of the Asia/Pacific Regional SAR Plan, prepared jointly by Australia, Singapore, USA and ICAO as arranged under APSAR/WG Action Item 6/3. The following Conclusion was agreed by the meeting:

Conclusion ATM/SG/10-13: Revised Asia/Pacific Regional SAR Plan

That,

1. the revised Asia/Pacific Regional SAR Plan at **Appendix I to the Report** be adopted, and uploaded to the Asia/Pacific Regional Office eDocuments web-page to replace the existing version; and
2. States are urged to update their national SAR Plans to align with the revised Regional SAR Plan.

APANPIRG ATM and Airspace Safety Deficiencies in the SAR Field

7.30 The updated list of SAR-related ATM and Airspace Safety Deficiencies as updated by APSAR/WG/7 was included in ATM/SG/10 WP/9.

Outcomes from MET SG/26 Relevant to ATM/SG (IP/21)

7.31 ICAO presented the outcomes from Twenty-Sixth Meeting of the Meteorology Sub-Group of APANPIRG (MET SG/26) and its contributory bodies relevant to ATM/SG, including discussion related to the MET/ATM Webinar, survey and guidance material, APANPIRG air navigation deficiencies, the ICAO space weather advisory service, the world area forecast system (WAFS) and the Secure Aviation Data Information System (SADIS). MET SG/26 formulated ***Draft Conclusion MET SG/26/04 – 0.25-degree WAFS hazard data*** to encourage SADIS users to migrate their services to the new 0.25-degree resolution WAFS hazard data as soon as possible.

Agenda Item 8: Any Other Business

Survey Results on Positive ATM Safety Culture in the APAC Region (WP/47)

8.1 ICAO presented an analysis of responses to a survey distributed by State Letter AP069/22 in May 2022. The survey had resulted from ATM SG Task List Action Item 9/9.

8.2 13 responses from were received from States/Administrations responding to questions on regulatory aspects in promoting a positive safety culture, and 1,268 responses from ANSPs in 22 different States/Administrations on how they were implementing and promoting a positive safety culture in the operational environment, using the online survey platform.

8.3 Responses were de-identified and aggregated into quantitative data. The meeting was informed of key observations from the survey results, together with conclusions drawn.

8.4 The full survey results with questionnaires are provided in **Appendix J** to this report.

8.5 APAC States/Administrations and industry were encouraged to utilize the survey results to promote a positive safety culture and strengthen safety management performance in ATM. The meeting was also invited to note that the conclusions above and further detailed survey results would be used to prioritize and develop future ICAO APAC implementation support planning.

8.6 As the survey outcomes revealed gaps and potential areas of improvements that required attention of all of the ATM community, particularly in the course of recovery from the pandemic, the meeting strongly supported the proposal that a safety management and safety culture workshop be conducted to provide a regional forum for ATM stakeholders to share experience, lessons learned and best practices in developing a positive safety culture to enhance ATM safety management performance and facilitate safe and effective implementation of APAC Seamless ANS Plan.

8.7 USA offered to facilitate the workshop, and multiple Administrations indicated their interest in participating in the activity.

ATM Point of Contact Update (WP/48)

8.8 The List of ATM Points of Contact was circulated to all registered ATM/SG/10 participants for update.

Air Traffic Management Security and Cybersecurity (IP/20)

8.9 ICAO informed the meeting on ICAO security requirements relating to Air Traffic Services Providers (ATS Providers) and Air Traffic Management. The paper also presents a review of activities related to aviation cybersecurity, including those mandated by the Assembly.

Agenda Item 9: Update the ATM Task List

APANPIRG ATM Sub-Group Terms of Reference and Task List (WP/49)

9.1 The ATM/SG Terms of Reference (TOR) were presented for review by the meeting.

9.2 The ATM/SG Task List was reviewed by the meeting, and is provided in **Appendix I to the Report**.

Agenda Item 10: Date and venue for the next meeting

ATM/SG/11

10.1 The tentative timeframe and venue for ATM/SG/11 was July - August 2023, at the Asia/Pacific Regional Office in Bangkok, Thailand. However, the mode of the meeting (face-to-face, online or a hybrid of both) was subject final confirmation.

Closing

10.2 The Chairman thanked meeting participants for their valuable work.

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List of Participants

	STATE/NAME		TITLE/ORGANIZATION
1.	**AUSTRALIA (3)**		
	1.	Mr. Brad Parker	Manager CNS/ATM Civil Aviation Safety Authority **AUSTRALIA**
	2.	Mr. Neil Bain	ATM Standards Manager Airservices Australia **AUSTRALIA**
	3.	Mr. Chris Kumar	ATS Specialist Lead Airservices Australia **AUSTRALIA**
2.	**BANGLADESH (5)**		
	4.	Mr. Readad Hossain	Member (ATM) Civil Aviation Authority of Bangladesh **BANGLADESH**
	5.	Ms. Sabera Rahman	Deputy Director (ATM) Civil Aviation Authority of Bangladesh **BANGLADESH**
	6.	Mr. Mahmud Akhter Hossain	Assistant Director (ATM) Civil Aviation Authority of Bangladesh **BANGLADESH**

	STATE/NAME		TITLE/ORGANIZATION
	7.	Mr. Mohammad Shamsudduha	Assistant Director (Investigation) Civil Aviation Authority of Bangladesh **BANGLADESH**
	8.	Md. Shakhaoat Hossain	Assistant Director (Airspace Design) Civil Aviation Authority of Bangladesh **BANGLADESH**
3.	**BHUTAN (12)**		
	9.	Mr. Kencho Tshering	AIS/PANS-OPS Officer Bhutan Civil Aviation Authority **BHUTAN**
	10.	Mr. Yonten Dendup	ANS Officer Bhutan Civil Aviation Authority **BHUTAN**
	11.	Mr. Karma Gayley	CNS Officer Bhutan Civil Aviation Authority **BHUTAN**
	12.	Mr. Karma Yonten	ATCO/AIS National Air Navigation Services Company (NANSC) **BHUTAN**
	13.	Ms. Sushma Rai	Senior Air Traffic Controller Department of Air Transport **BHUTAN**

	STATE/NAME		TITLE/ORGANIZATION
	14.	Mr. Jigme Wangchuk	Senior Air Traffic Controller II Department of Air Transport **BHUTAN**
	15.	Ms. Pema Zangmo	Air Traffic Controller III Department of Air Transport **BHUTAN**
	16.	Mr. Jamyang Sherub	Air Traffic Controller Royal Government of Bhutan **BHUTAN**
	17.	Mr. Sonam Dorji	Air Traffic Controller Department of Air Transport **BHUTAN**
	18.	Mr. Sonam Zangpo	Air Traffic Controller Department of Air Transport **BHUTAN**
	19.	Mr. Kinley Wangchuk	Air Traffic Controller Department of Air transport **BHUTAN**
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	STATE/NAME		TITLE/ORGANIZATION
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	21.	Mr. Oun Makara	Chief of Air Traffic Service Air Navigation Standard and Safety Department State Secretariat of Civil Aviation **CAMBODIA**
	22.	Mr. Khorn Vannak	Air Traffic Management Manager Cambodia Air Traffic Services **CAMBODIA**
	23.	Mr. Buntong Vichheka	ATM supervisor Cambodia Air Traffic Service **CAMBODIA**
5.	**CHINA (18)**		
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	34.	Ms. Ying Zhang	Director Air Traffic Management Bureau Civil Aviation Administration of China **CHINA**
	35.	Mr. Fan Liu	Senior Engineer Air Traffic Management Bureau Civil Aviation Administration of China **CHINA**
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	40.	Mr. Wei Tan	Deputy Director of ATC Office, Air Traffic Control Center, MS-R-ATMB Air Traffic Management Bureau Civil Aviation Administration of China **CHINA**
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	43.	Mr. Gabriel CHENG	Chief (Procedures and Evaluation) Civil Aviation Department, Hong Kong **HONG KONG, CHINA**
	44.	Mr. Alex NG	Senior Safety & Quality Officer Civil Aviation Department, Hong Kong **HONG KONG, CHINA**
	45.	Mr. Anfernee POON	Atg. Senior Operations Officer (Strategic Planning) Civil Aviation Department, Hong Kong **HONG KONG, CHINA**
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	110.	Mr. Nor Kamilia Nordin	Air Traffic Controller Air Navigation Services Technical Division Civil Aviation Authority of Malaysia **MALAYSIA**
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17.	**MONGOLIA (9)**		
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	135.	Mr. Dipak Kumar Bajaracharya	Deputy Director Civil Aviation Authority of Nepal (CAAN) **NEPAL**
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	144.	Mr. Paul Radford	Oceanic Systems Development Specialist Airways New Zealand **NEW ZEALAND**
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	149.	Mr. Muhammad Asif	Sr. Deputy Director (ATM) Pakistan Civil Aviation Authority **PAKISTAN**
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22.	**PHILIPPINES (4)**		
	151.	Ms. Anna Joy C. Papag	Division Chief III, Enroute Division Air Traffic Services Civil Aviation Authority of the Philippines **PHILIPPINES**

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23.	**REPUBLIC OF KOREA (19)**		
	155.	Ms. Jung-Ok Shin	Deputy Director, Ministry of Land, Infrastructure and Transport (MOLIT) **REPUBLIC OF KOREA**
	156.	Mr. Seungwon Chang	Deputy Director, Ministry of Land, Infrastructure and Transport (MOLIT) **REPUBLIC OF KOREA**

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	159.	Mr. Byung-pyo Kim	Assistant Director Ministry of Land, Infrastructure and Transport (MOLIT) **REPUBLIC OF KOREA**
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	STATE/NAME		TITLE/ORGANIZATION
24.	**SINGAPORE (14)**		
	174.	Mr. Kong Beng Kuah	Director (Special Project) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	175.	Mr. Vincent HWA	Director of Air Traffic Services (ATS) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	176.	Mr. Khung Hui Yeo	Chief (ATM) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	177.	Ms. Pauline Loo	Deputy Chief Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	178.	Mr. Benjamin Ong	Deputy Chief (Ops, Approach) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	179.	Ms. Peiru He	Senior ATC Manager (ATM – SEA 1) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	180.	Mr. Joseph Lim	Senior Air Traffic Control Manager Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**

	STATE/NAME		TITLE/ORGANIZATION
	181.	Ms. Sharon Li	Senior Manager (Airspace Policy) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	182.	Ms. Carol Teo	Head (Data Science) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	183.	Ms. Meijing Choo	Head (ATM-AP) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	184.	Mr. Kevin Koh	Manager (AIS) Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	185.	Ms. Qi Chen	Principal Engineer Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	186.	Mr. Victor Tan Yong Meng	Air Traffic Controller Civil Aviation Authority of Singapore (CAAS) **SINGAPORE**
	187.	Mr. Hing Loong Yuen	Air Traffic Controller Civil Aviaion Authority of Singapore (CAAS) **SINGAPORE**

	STATE/NAME		TITLE/ORGANIZATION
25.	**SOMALIA (1)**		
	188.	Mr. Abdiaziz Hussein	AIM Manager Somali Civil Aviation Authority **SOMALIA**
26.	**SRI LANKA (11)**		
	189.	Mr. Kalum Prasanna	Director Air Navigation Services Civil Aviation Authority of Sri Lanka **SRI LANKA**
	190.	Ms. Sherina Casseer	Deputy Director General Aeronautical Services Regulations Civil Aviation Authority of Sri Lanka **SRI LANKA**
	191.	Ms. Thilini Herath	Senior Civil Aviation Inspector – ATMSP Civil Aviation Authority of Sri Lanka **SRI LANKA**
	192.	Mr. Thilina Warnasinghe	Senior Civil Aviation Inspector Civil Aviation Authority of Sri Lanka **SRI LANKA**
	193.	Mr. Indika Bandupriya	Senior Manager – Air Traffic Control (ACC &TWR) Airport and Aviation Services (Sri Lanka) (Pvt) Ltd **SRI LANKA**

	STATE/NAME		TITLE/ORGANIZATION
	194.	Mr. Aruna Fernando	Senior Manager – Air Traffic Control (Planning & Standards) Airport and Aviation Services (Sri Lanka) (Pvt) Ltd **SRI LANKA**
	195.	Mr. Jagath Bhatiya Ratnayake	Manager – Air Traffic Control Airport & Aviation Services (Sri Lanka) (Pvt) Ltd **SRI LANKA**
	196.	Mr. Nishan Abeywardena	Head of Air Navigation Services Airport and Aviation Services (Sri Lanka) (Pvt) Ltd **SRI LANKA**
	197.	Mr. Chamara Liyanage	Senior Electronics Engineer Airport and Aviation Services (Sri Lanka) (Pvt) Ltd **SRI LANKA**
	198.	Mr. Prasanna Wijeratne	Electronics Engineer Airport and Aviation Services (Sri Lanka) (Pvt) Ltd **SRI LANKA**
	199.	Ms. Priyasha Hettiarachchi	Manager – Air Traffic Control (AUSO) Airport & Aviation Services (Sri Lanka) (Pvt) Ltd **SRI LANKA**

	STATE/NAME		TITLE/ORGANIZATION
27.	**THAILAND (16)**		
	200.	Mr. Jakrin Kutantham	Senior Officer, Air Navigation Services The Civil Aviation Authority of Thailand (CAAT) **THAILAND**
	201.	Mr. Jirakrit Thamnarak	Officer, Air Traffic Oversight Division The Civil Aviation Authority of Thailand (CAAT) **THAILAND**
	202.	Ms. Wongtawan Sawasdimongkol	Officer, Air Traffic Oversight Division The Civil Aviation Authority of Thailand (CAAT) **THAILAND**
	203.	Mr. Sirarate Tarasak	Officer The Civil Aviation Authority of Thailand **THAILAND**
	204.	Mrs. Sirikes Niemloy	Vice President (Air Traffic Management) Acting Senior Director, Air Traffic Management Network Bureau Aeronautical Radio of Thailand Ltd. (AEROTHAI) **THAILAND**
	205.	Mr. Suvichan Sathitkitpichet	Director, Network Operations Air Traffic Management Center Aeronautical Radio of Thailand Ltd. (AEROTHAI) **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	206.	Mr. Bunpot Kujaphun	Aeronautical Information Manager Aeronautical Radio of Thailand Ltd. (AEROTHAI) **THAILAND**
	207.	Mr. Piyawut Tantimekabut	Air Traffic Management Network Manager Aeronautical Radio of Thailand Ltd. (AEROTHAI) **THAILAND**
	208.	Ms. Amornrat Jirattigalachote	Strategic Planning Manager (Engineering) Aeronautical Radio of Thailand Ltd. (AEROTHAI) **THAILAND**
	209.	Ms. Sasiprapa Praedum	ATC Manager Aeronautical Radio of Thailand Ltd. (AEROTHAI) **THAILAND**
	210.	Ms. Nunnipak Nuntawatwong	Transport Technical Officer, Profession Level Office of the Search and Rescue Commission, Ministry of Transport **THAILAND**
	211.	Ms. Sutatip Jairak	Transport Technical Officer, Profession Level Office of the Search and Rescue Commission, Ministry of Transport **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	212.	Ms. Phojchanee Saelim	Transport Technical Officer, Practitioner Level Office of the Search and Rescue Commission, Ministry of Transport **THAILAND**
	213.	Ms. Phattaraporn Sarikkha	Transport Technical Officer, Practitioner Level Office of the Search and Rescue Commission, Ministry of Transport **THAILAND**
	214.	Ms. Awassada Phopratab	Transport Technical Officer, Practitioner Level Office of the Search and Rescue Commission, Ministry of Transport **THAILAND**
	215.	Mr. Patompong Wongsakda	Transport Technical Officer, Practitioner Level Office of the Search and Rescue Commission, Ministry of Transport **THAILAND**
28.	**UNITED ARAB EMIRATES (1)**		
	216.	Mr. Nasser AL Kharusi	Senior Specialist, Airspace Management UAE General Civil Aviation Authority **UNITED ARAB EMIRATES**

	STATE/NAME		TITLE/ORGANIZATION
29.	**UNITED STATES (6)**		
	217.	Mr. Michael W. Watkins	Senior Advisor, ATO International Federal Aviation Administration (FAA) **UNITED STATES**
	218.	Mr. Shayne Campbell	Senior Air Traffic Representative, Asia Pacific Federal Aviation Administration (FAA) Air Traffic Organization, Mission Support **SINGAPORE**
	219.	Mr. Harrie Copeland	Air Traffic Control Specialist Technical Advisory Team Federal Aviation Administration **UNITED STATES**
	220.	Mr. Vern Payne	Manager CDM and International Operations Federal Aviation Administration Air Traffic Control System Command Center (ATCSCC) **UNITED STATES**
	221.	Ms. Hannah Browne	Space Operations Specialist Federal Aviation Administration **UNITED STATES**
	222.	Mr. James Morimoto	Commmand Airspace Manager United States Air Force **UNITED STATES**

	STATE/NAME		TITLE/ORGANIZATION
30.	**VIET NAM (6)**		
	223.	Ms. Ho Doan Trang	Officer The Civil Aviation Authority of Vietnam (CAAV) **VIET NAM**
	224.	Mr. Lưu Văn Chiều	Official The Civil Aviation Authority of Vietnam (CAAV) **VIET NAM**
	225.	Mr. Truong Nguyen Xuan	ATS Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	226.	Ms. Hanh Hoa Bui	Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	227.	Mr. Le Cuong Nguyen Xuan	Official Viet Nam Air Traffic Management Corporation (VATM) **VIET NAM**
	228.	Mr. Thanh-Minh Phan	Lecture Vietnam Aviation Academy **VIET NAM**

	STATE/NAME		TITLE/ORGANIZATION
31.	**YEMEN (1)**		
	229.	Mr. Abdulmalik Gaizan	Adviser civil aviation Aden Civil Aviation and Meteorological Authority Aden **YEMEN**
32.	**IATA (9)**		
	230.	Mr. John Moore	Assistant Director, Safety & Flight Operations, ASPAC International Air Transport Association (IATA) **SINGAPORE**
	231.	Mr. Prashant Sanglikar	Assistant Director – Safety and Flight Operations IATA **INDIA**
	232.	Mr. Bin Hu	Manager, Operations Safety and Security International Air Transport Association (IATA) **CHINA**
	233.	Mr. Julian FUNG	International Operations Manager IATA/Cathay Pacific Airways **CHINA**
	234.	Mr. George Chan	Regulatory Affairs Manager - Industry and Flight Operations IATA/Cathay Pacific Airways **CHINA**

	STATE/NAME		TITLE/ORGANIZATION
	235.	Mr. Imshik Shin	Deputy General Manager – CNS/ATM Korean Air **REPUBLIC OF KOREA**
	236.	Mr. Toru Namba	Manager Japan Air Lines **JAPAN**
	237.	Mr. Neeraj Biala	Head - Flt Ops Safety Security & International Affairs Tata-SIA Airlines Limited **INDIA**
	238.	Mr. Sunil Prasad	AVP - Flight Operations Spice Jet Ltd **INDIA**
33.	**IFAIMA (1)**		
	239.	Mr. Erdenebaatar Davaasuren	APAC Regional Director IFAIMA **MONGOLIA**
34.	**IFALPA (3)**		
	240.	Captain Amornvaj Mansumitchai	Deputy President IFALPA **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	241.	Captain Max Matsumoto	RVP NOP IFALPA **JAPAN**
	242.	Mr. Seungpyo Lee	ALPA Korea ATS/AGE committee chair IFALPA **REPUBLIC OF KOREA**
35.	**ICAO (23)**		
	243.	Mr. Tao Ma	Regional Director ICAO Asia and Pacific Regional Office **THAILAND**
	244.	Dr. Manjit Singh	Deputy Regional Director ICAO Asia and Pacific Regional Office **THAILAND**
	245.	Mr. Raphael Guillet	Chief, Regional Sub-Office ICAO Asia and Pacific Regional Sub-Office, **CHINA**
	246.	Mr. Liu Jujiang	Deputy Chief, Regional Sub-Office ICAO Asia and Pacific Regional Sub-Office, **CHINA**
	247.	Mr. Shane Sumner	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	248.	Mr. Hiroyuki Takata	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**
	249.	Mr. Peter Dunda	Regional Officer, Aeronautical Meteorology ICAO Asia and Pacific Regional Office **THAILAND**
	250.	Dr. Punya Raj Shakya	Regional Officer, Aerodrome and Ground Aids ICAO Asia and Pacific Regional Office **THAILAND**
	251.	Mr. Ross Lockie	Regional Officer, Aviation Security ICAO Asia and Pacific Regional Office **THAILAND**
	252.	Mr. Yi Luo	Regional Officer, Communications, Navigation, and Surveillance ICAO Asia and Pacific Regional Office **THAILAND**
	253.	Ms. Soniya Nibhani	Regional Officer, Communications, Navigation, and Surveillance ICAO Asia and Pacific Regional Office **THAILAND**

	STATE/NAME		TITLE/ORGANIZATION
	254.	Mr. Susantha DeSilva	Regional Officer, Flight Safety ICAO Asia and Pacific Regional Office **THAILAND**
	255.	Mr. SM Nazmul Anam	Regional Officer, Flight Safety ICAO Asia and Pacific Regional Office **THAILAND**
	256.	Ms. Keziah Ogutu	Regional Officer, Air Traffic Management/Search and Rescue ICAO Eastern and Southern African Regional Office **KENYA**
	257.	Mr. Ahmad Amireh	Regional Officer, Air Traffic Management/Search and Rescue ICAO Middle East Regional Office **EGYPT**
	258.	Ms. Sunok Lee	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Sub-Office **CHINA**
	259.	Mr. Manjunath K Nelli	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Sub-Office **CHINA**

	STATE/NAME		TITLE/ORGANIZATION
	260.	Mr. Zhifeng Xu	Regional Officer ICAO Asia and Pacific Regional Sub-Office **CHINA**
	261.	Mr. Vijay Kumar Mishra	Regional Officer, PBN ICAO Asia and Pacific Regional Sub-Office, **CHINA**
	262.	Mr. Weng Kit Ying	Air Traffic Management Officer ICAO Asia and Pacific Regional Office **THAILAND**
	263.	Mr. Sze Lung How	Regional Officer, Communications, Navigation, and Surveillance ICAO Asia and Pacific Regional Office **THAILAND**
	264.	Ms. Prakayphet Chalayonnawin	Programme Analysis Associate, Air Traffic Management ICAO Asia and Pacific Regional Office **THAILAND**
	265.	Ms. Siqi Yang	Program Assistant ICAO Asia and Pacific Regional Sub-Office **CHINA**

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International Civil Aviation Organization

Tenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/10) of APANPIRG

Video Teleconference, 17 – 21 October 2022

LIST OF WORKING PAPERS AND INFORMATION PAPERS

(Presented by the Secretariat)

WORKING PAPERS

No.	Subject	Presented by
AI1 WP01	Provisional Agenda	Secretariat
AI2 WP02	Outcomes of ATM/SG/9 and APANPIRG/32	Secretariat
AI2 WP03	RASG-APAC/11 Update & and APRAST/18 Meeting Outcomes	Secretariat
AI3 WP04	ANS USOAP Update	Secretariat
AI3 WP05	Updating the Asia/Pacific Seamless ANS Plan	Secretariat
AI3 WP06	ATM-Related Regional Guidance and Plans - Update Cycle, Standardised Reporting Format and Reporting Date for ICAO Implementation Status Reports	Secretariat
AI3 WP07	FIT-Asia and RASMAG Outcomes	Secretariat
AI3 WP08	Application of ATC Separation Minimums	Secretariat
AI4 WP09	Air Navigation Service Deficiencies List	Secretariat
AI4 WP10	Updates on Corrective Actions by Bangladesh to Eliminate Some ATM and Airspace Safety Deficiencies	Bangladesh
AI5 WP11	Regional Air Navigation Plan Update	Secretariat
AI5 WP12	Bangladesh Efforts on FIR Amendment Process and the Impact of the Delay on the Finalization of Dhaka FIR Description	Bangladesh
AI5 WP13	ICAO Doc 7030 Regional Supplementary Procedures Publication Guidance for Implementation of ADS-B In-Trail Procedures (ITP) and Climb and Descent Procedure (CDP)	New Zealand
AI5 WP14	*Not provided*	--
AI5 WP15	Main Outcomes of CNS SG/26	Secretariat
AI5 WP16	Proposal on the Establishment of a Study Group to Prepare a Set of Harmonised Operational Requirements of FF-ICE for Asia/Pacific	Japan, Singapore, Thailand and USA
AI5 WP17	Air Traffic Flow Management Steering Group Outcomes	Secretariat
AI5 WP18	CDM Process in GBA under Adverse Weather Conditions	China

No.	Subject	Presented by
AI5 WP19	Missing Departure Messages	Secretariat
AI5 WP20	Need for Proper Guidance to Establish and Upgrade the ATS Airspace Classes	Nepal
AI5 WP21	Asia/Pacific Unmanned Aircraft Systems Update	Secretariat
AI5 WP22	Alpha Numeric Call Signs (Action Item 5/5)	Secretariat
AI5 WP23	Review on the Implementation of Enhanced Wake Turbulence Separation at Hong Kong International Airport	Hong Kong China
AI5 WP24	Operational Improvements to Enhance Runway Capacity and Implementation of Wake Turbulence Groups	Republic of Korea
AI5 WP25	Enhanced Wake Turbulence Separation in Japan	Japan
AI5 WP26	Remote Apron Control Implementation in China	China
AI6 WP27	SAIOSEACG Meeting Outcomes	Secretariat
AI6 WP28	ATS Route Catalogue	Secretariat
AI6 WP29	*Not provided*	--
AI6 WP30	Enhancing Utilization of ATS Route L644	Singapore
AI6 WP31	Progress Update on Capacity Optimisation on Air Routes L642 and M771	Hong Kong China
AI6 WP32	Update on Trials for Application of 10 Minutes Separation on Crossing Tracks over Oceanic Airspace in Mumbai Flight Information Region	India
AI6 WP33	ADS-C CDP Progress in Fukuoka FIR	Japan
AI6 WP34	Proposal to Strengthen International Coordination for Safety of Civil Aircraft and Space Launch Vehicles	Republic of Korea
AI6 WP35	Space Activity Coordination	USA
AI6 WP36	Consideration of Airspace Established on Short Notice	Japan
AI6 WP37	Outcomes of the Mekong ATM Coordination Group	Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam and IATA
AI6 WP38	AKARA Corridor Progress and Update	Japan
AI6 WP39	The Progress after Normalization of the AKARA Corridor	Republic of Korea
AI6 WP40	Coordination of ATFMS Across the Region in the Irregularities Situation	Japan
AI6 WP41	The Feasibility of Large-Scale Detour Procedure	China
AI6 WP42	Regional ATM Contingency Planning and Activities	Secretariat
AI7 WP43	AOP Subgroup Outcomes	Secretariat

No.	Subject	Presented by
AI7 WP44	AIS – AIM Implementation Task Force Outcomes	Secretariat
AI7 WP45	*Not provided*	--
AI7 WP46	Asia/Pacific Search and Rescue Update	Secretariat
AI8 WP47	Survey Results on Positive ATM Safety Culture in the APAC Region	Secretariat
AI8 WP48	ATM Point of Contact Update	Secretariat
AI9 WP49	APANPIRG ATM Sub Group Terms of Reference and Task List	Secretariat

INFORMATION PAPERS

No.	Subject	Presented by
AI1 IP01	Provisional List of Papers	Secretariat
AI2 IP02	Conference of Directors General of Civil Aviation Outcomes	Secretariat
AI3 IP03	ATM Performance Management Updates in China	China
AI4 IP04	Update on Designation of Australian Restricted Areas in International Waters	Australia
AI5 IP05	Transition to a Single Flight Information Region	Australia
AI5 IP06	IATA Equipage and Capability Survey	IATA
AI5 IP07	Updates of Trajectory-based Operations (TBO) in China	China
AI5 IP08	The Long-Term Vision for the Future Air Traffic Systems of Japan (CARATS)	Japan
AI5 IP09	The Progress of Domestic CPDLC Trial Operation in Japan	Japan
AI5 IP10	CMATS Implementation – OneSky Update	Australia
AI5 IP11	Flight CTOT on Demand Service via ACARS in China	China
AI5 IP12	Researches on the Application and Integration of AMAN-DMAN-SMAN	China
AI5 IP13	Application of PMS and AMAN in Shanghai TMA	China
AI5 IP14	Application of Re-Categorisation of Wake Turbulence Separation Minima in China	China
AI5 IP15	Practice Sharing of A-SMGCS Level IV Lighting Guidance Application in China	China
AI5 IP16	Application of Runway Status Light System in China	China
AI5 IP17	Airspace Reconstructions in Japan	Japan
AI5 IP18	Application of Standard ATC Separation within Colombo FIR	Sr Lanka
AI6 IP19	PBN Routes in Mongolia	Mongolia
AI8 IP20	Air Traffic Management Security and Cybersecurity	Secretariat

No.	Subject	Presented by
AI7 IP21	Outcomes from MET SG/26 Relevant to ATM/SG	Secretariat
AI5 IP22	Upgradation of CNS-ATM System within Dhaka FIR	Bangladesh

PRESENTATIONS

No.	Subject	Presented by
AI5 SP01	(IP14) Application of Re-Categorisation of Wake Turbulence Separation Minima in China	China
AI5 SP02	(WP18) CDM Process in GBA under Adverse Weather Conditions	China
AI5 SP03	(WP26) Remote Apron Control Implementation in China	China
AI5 SP04	(WP23) Review on the Implementation of Enhanced Wake Turbulence Separation at Hong Kong International Airport	Hong Kong China
AI6 SP05	COVID Impact and Forecast – Navigating Safely and Sustainably out of COVID	IATA

FLIMSY

No.	Subject	Presented by
Flimsy 1	China Response to Working Paper 19	Secretariat
Flimsy 2	Space Vehicle Launch and Re-entry Coordination - Conclusion and Decision	Secretariat

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ATM and Airspace Safety Deficiencies List (Updated 08 October 2022)

	Deficiencies			**Corrective Action**		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
	WGS-84 Requirements of Paragraph 1.2.1 of Annex 15					
Afghanistan	WGS-84 - Not implemented	24/6/2014		Afghanistan	TBD	A
~~Bangladesh~~	~~WGS-84 - Not implemented~~	~~24/6/2014~~		~~Bangladesh~~	~~TBD~~	~~A~~
Bhutan	WGS-84 - Not implemented	2/7/1999	Data conversion completed, but not published	Bhutan	TBD	A
Brunei Darussalam	WGS-84 - Not implemented	24/6/2014		Brunei Darussalam	TBD	A
Marshall Islands	WGS-84 - Not implemented	24/6/2014		Marshall Islands	TBD	A
Micronesia	WGS-84 - Not implemented	24/6/2014		Micronesia	TBD	A
Nauru	WGS-84 - Not implemented		Conferring with consultant	Nauru	TBD	A
Palau	WGS-84 - Not implemented	24/6/2014		Palau	TBD	A
Samoa	WGS-84 - Not implemented	24/6/2014		Samoa	TBD	A
Vanuatu	WGS-84 – Not implemented	2/7/1999	Implemented at main airports	Vanuatu	1999	A
	AIP Format Requirements of Chapter 5 of Annex 15					
Kiribati	AIP Format - Not implemented	7/7/99	ATM/AIS/SAR/SG/18 (June 2009) was advised AIP in draft stage	Kiribati		A
Nauru	AIP Format - Not implemented	7/7/99	ATM/AIS/SAR/SG/18 (June 2008) was advised work soon to start	Nauru		A
	AIS Quality Management System Requirements of Paragraph 3.6.1 of Annex 15 Quality Management System - Not implemented					

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
Afghanistan	AIS Quality Management System - Not implemented	24/6/2014		Afghanistan	TBD	A
Bangladesh	AIS Quality Management System - Not implemented	24/6/2014		Bangladesh	TBD	A
Bhutan	AIS Quality Management System - Not implemented	24/6/2014		Bhutan	TBD	A
Brunei Darussalam	AIS Quality Management System - Not implemented	24/6/2014		Brunei Darussalam	TBD	A
Cambodia	AIS Quality Management System - Not implemented	24/6/2014		Cambodia	TBD	A
Kiribati	AIS Quality Management System - Not implemented	24/6/2014		Kiribati	TBD	A
Lao PDR	AIS Quality Management System - Not implemented	24/6/2014		Lao PDR	TBD	A
Maldives	AIS Quality Management System - Not implemented	24/6/2014		Maldives	TBD	A
Marshall Islands	AIS Quality Management System - Not implemented	24/6/2014		Maldives	TBD	A
Micronesia	AIS Quality Management System - Not implemented	24/6/2014		Micronesia	TBD	A
Myanmar	AIS Quality Management System - Not implemented	9/6/2016		Myanmar	TBD	A
Nauru	AIS Quality Management System - Not implemented	24/6/2014		Nauru	TBD	A
Nepal	AIS Quality Management System - Not implemented	24/6/2014		Nepal	TBD	A

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
Palau	AIS Quality Management System - Not implemented	24/6/2014		Palau	TBD	A
Philippines	AIS Quality Management System - Not implemented	24/6/2014		Philippines	TBD	A
Samoa	AIS Quality Management System - Not implemented	24/6/2014		Samoa	TBD	A
Solomon Islands	AIS Quality Management System - Not implemented	24/6/2014		Solomon Islands	TBD	A
Sri Lanka	AIS Quality Management System - Not implemented	9/6/2016		Sri Lanka	TBD	A
Timor-Leste	AIS Quality Management System - Not implemented	24/6/2014		Timor-Leste	TBD	A
Vanuatu	AIS Quality Management System - Not implemented	24/6/2014		Vanuatu	TBD	A
	Aeronautical Data Area of Responsibility - requirements of Paragraph 2.1.2 of Annex 2 to ensure that the provision of aeronautical data and aeronautical information covers its own territory and those areas over the high seas for which it is responsible for the provision of ATS					
Bangladesh	Aeronautical Data Promulgation Within the State's Area of Responsibility - Not implemented	29/03/2019 SAIOACG /9		Bangladesh	TBD	A

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
	<u>Designation of Restricted Areas</u> - requirements of Annex 2 (Definitions) to ensure that restricted areas are designated above the land areas or territorial waters of a State					
Australia	Designation of Restricted Areas Above the Land Areas or Territorial Waters of a State - Not implemented	29/03/2019 SAIOACG /9	Danger areas within international airspace that is part of a State's responsibility is acceptable	Australia	December 2022	A
India	Designation of Restricted Areas Above the Land Areas or Territorial Waters of a State - Not implemented	29/03/2019 SAIOACG /9	Danger areas within international airspace that is part of a State's responsibility is acceptable	India	TBD	A
	<u>Airspace Classification</u> Requirements of Paragraph 2.6 of Annex 11					
China	Airspace Classification - Not implemented	7/7/99	Difference to Annex 11 is published in AIP, China.	China	APANPIRG/19 updated, implementation planned by end 2010.	A
Macau, China	Airspace Classification - Not implemented	05/09/2018		Macau, China	TBD	A
Nauru	Airspace Classification - Not implemented	7/7/99		Nauru	TBD	A
Solomon Islands	Airspace Classification - Not implemented	7/7/99		Solomon Islands	TBD	A

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
	<u>ATS Message Addressing</u> Requirements of Doc 4444 PANS-ATM Section 11.4 (Message Types and their Application)		Note: the threshold for a Deficiency is 5% or more DEP messages reported to have not been sent, and where the analysed data provided evidence of a systemic (either systems or human factors) failure to send the message			
Bangladesh	DEP message transmission	05/09/2018	DEP messages inconsistently transmitted Conclusion APANPIRG/27/12 and ICAO correspondence	Bangladesh	TBD	A
India	DEP message transmission	05/09/2018	DEP messages inconsistently transmitted Conclusion APANPIRG/27/12 and ICAO correspondence	India	TBD	A
Malaysia	DEP message transmission	05/09/2018	DEP messages inconsistently transmitted Conclusion APANPIRG/27/12 and ICAO correspondence	Malaysia	TBD	A
Maldives	DEP message transmission	09/08/2019	DEP messages inconsistently transmitted Conclusion APANPIRG/27/12 and ICAO correspondence	Maldives	TBD	A
Nepal	DEP message transmission	09/08/2019	DEP messages inconsistently transmitted Conclusion APANPIRG/27/12 and ICAO correspondence	Nepal	TBD	A

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
USA	DEP message transmission	05/09/2018	DEP messages inconsistently transmitted Conclusion APANPIRG/27/12 and ICAO correspondence	USA	TBD	A
	SAR capability: Requirements of Annex 12 as defined in the Regional Air Navigation Plan Volume II Part I – GENERAL PLANNING ASPECTS Section 3 SPECIFIC REGIONAL REQUIREMENTS, failure to reach 90% or more implementation of the Asia/Pacific SAR Plan					
Afghanistan	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/6 56%	Afghanistan	2019	U
Bangladesh	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/6 67%	Bangladesh	2019	U
Bhutan	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 34%	Bhutan	2019	U
Brunei Darussalam	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/4 63%	Brunei	2019	U
Cambodia	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 76%	Cambodia	2019	U
Cook Islands	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/5 44%	Cook Islands	2019	U
DPR Korea	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 66%	DPR Korea	2019	U
~~Fiji~~	~~Asia/Pacific SAR Plan~~	~~6/07/2015~~	~~APSAR/WG/6 89%~~ APSAR/WG/7 93%	~~Fiji~~	~~2019~~	~~U~~

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
French Polynesia	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/5 82%	French Polynesia	2019	U
Kiribati	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 26%	Kiribati	2019	U
Lao PDR	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 57%	Lao PDR	2019	U
Macau, China	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 85%	Macao, China	2019	U
Malaysia	Asia/Pacific SAR Plan	17/05/2019	~~APSAR/WG/6 77%~~ APSAR/WG/7 76%	Malaysia	2019	U
Maldives	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/6 71%	Maldives	2019	U
Marshall Islands	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/5 17%	Marshall Islands	2019	U
Micronesia	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/5 17%	Micronesia	2019	U
Mongolia	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/5 73%	Mongolia	2019	U
Myanmar	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 67%	Myanmar	2019	U
Nauru	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 0%	Nauru	2019	U
Nepal	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/5 56%~~ APSAR/WG/7 56%	Nepal	2019	U
New Caledonia	Asia/Pacific SAR Plan	17/05/2019	~~APSAR/WG/5 71%~~ APSAR/WG/7 75%	New Caledonia	2019	U
Pakistan	Asia/Pacific SAR Plan	17/05/2019	~~APSAR/WG/6 87%~~ APSAR/WG/7 88%	Pakistan	2019	U
Palau	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/5 17%	Palau	2019	U
Papua New Guinea	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/4 30%~~ APSAR/WG/7 54%	Papua New Guinea	2019	U

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
Philippines	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/6 88%	Philippines	2019	U
Samoa	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 0%	Samoa	2019	U
Solomon Islands	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 0%	Solomon Islands	2019	U
Sri Lanka	Asia/Pacific SAR Plan	17/05/2019	~~APSAR/WG/6 78%~~ APSAR/WG/7 80%	Sri Lanka	2019	U
Thailand	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/5 78%	Thailand	2019	U
Timor-Leste	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 0%	Timor-Leste	2019	U
Tonga	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 70%	Tonga	2019	U
Tuvalu	Asia/Pacific SAR Plan	28/05/2022	APSAR/WG/7 0%	Tuvalu	2024	U
Vanuatu	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/4 0%	Vanuatu	2019	U
	Non Provision of Safety-related Data Requirement of Paragraph 3.3.5.1 of Annex 11 (provision of data for monitoring the height-keeping performance of aircraft) and APANPIRG Conclusion 16/6 – Non Provision of safety related data by States					
Afghanistan	Non-provision of safety related data	12/07/2019	Failure to submit Kabul LHD data for January-December 2018 and 2020. Afghanistan had submitted data for the period January to July 2021, but no further LHD reports were received after August 2021.	Afghanistan	RASMAG/27	U

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
Brunei Darussalam	Non-provision of safety-related data	25/08/2022	Failure to submit RVSM approval status validation data for two consecutive years (2020, 2021)	Brunei Darussalam	RASMAG/28	U
	State Responsibility to comply with the Annex 6 Height-Keeping Monitoring Requirement Annex 6 Part I Section 7.2.9 (10th Ed.) and Part II Section 2.5.2.10 (9th Ed.)					
Afghanistan	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/23	Remaining monitoring burden of 85% (RASMAG/26) Information received by MAAR and reported at RASMAG/27 indicated the monitoring burden may have fallen below 30%. However, the deficiency is retained as the source of the information is not known to be authorized by the aeronautical authority in Afghanistan.	Afghanistan	RASMAG24	A
Pakistan	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/22	Remaining monitoring burden of 61% (RASMAG/26)	Pakistan	RASMAG24	A
	Data Link Performance Monitoring and Analysis Requirements of Paragraph 2.28 and/or 3.3.5.2 of Annex 11 not met					
India	Post-implementation monitoring not implemented	13/07/2017	Performance monitoring and analysis was reported for the Chennai and Kolkata FIRs, but was not reported for the Mumbai FIR.	India	TBD	A
Maldives	Post-implementation monitoring not implemented	29/5/2015	Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.	Maldives	TBD	A

** Note: In accordance with the *APANPIRG Handbook - Asia/Pacific Supplement to the Uniform Methodology for the Identification, Assessment and Reporting of Air Navigation Deficiencies*, priority for Air Navigation Deficiencies is guided by the principle that a deficiency with respect to an ICAO Standard is accorded a "U" status, while a non-compliance with a Recommended Practice or a PANS is considered as "A" or "B" subject to additional expert evaluation. The final prioritization of deficiencies is the prerogative of APANPIRG.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL FRAMEWORK

FOR

COLLABORATIVE AIR TRAFFIC FLOW MANAGEMENT

Version 4.0 October 2022

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

Approved by Tenth Meeting of ATM Sub-Group of APANPIRG and published by the ICAO Asia and Pacific Office, Bangkok

CONTENTS

SCOPE OF THE FRAMEWORK

Background of Regional Air Traffic Flow Management

1.1 The 24th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/24), held in June 2013, considered that with the strong growth of air traffic in the Asia Pacific Region there was a need to effectively manage demand and capacity, particularly at major international air hubs and in the associated major traffic flows (MTF).

1.2 The airspace of the Asia/Pacific Region, particularly that of Southeast Asia, is characterized by relatively small FIRs with corresponding low flight transit times. Any demand management process applied unilaterally in one FIR has a knock-on effect in multiple 'downstream' FIRs, and procedures applied are therefore structured around the lowest capability along any route/flow. 'Flow Management' in the region tended to be limited to rudimentary traffic spacing measures imposed by individual FIRs, rather taking a wider network view that optimizes available capacity and manages demand, only, when necessary, on a sub-regional basis.

1.3 The *Asia/Pacific Seamless Air Navigation Service (ANS) Plan* provides a blueprint for coordinated regional development, including capability improvements described in the ICAO Aviation System Block Upgrades (ASBU) roadmap. Air Traffic Flow Management (ATFM) taking a network view, is a key module in ASBU Block Zero and One. **NOPS-B0/1-5** - *Improved Flow Performance through Planning based on a Network-Wide view* have since been identified by APANPIRG as one of sixteen priorities for the Asia/Pacific Region.

1.4 While the concept of a single ATFM entity to serve a region works well in Europe and North America, a centralized ATFM Unit (ATFMU) approach is not practicable for the Asia/Pacific region. The need for a regional ATFM framework focusing on sub-regional, multi-State implementation, rather than individual FIR-based programs, was recognized by APANPIRG/24 in its adoption of the following Conclusion:

> ***Conclusion 24/15: Asia/Pacific ATFM Steering Group***
>
> *That, States participate in, and support the Asia/Pacific ATFM Steering Group to develop a common Regional ATFM framework, which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific region.*

1.5 This document, the *Asia/Pacific Regional Framework for Collaborative ATFM* (the Framework) is intended to provide a common regional framework that addresses ATFM implementation and ATFM operational issues in the Asia/Pacific region. Further discussed in later sections, a core concept of the Framework, is the distributed multi-nodal ATFM network, envisaged as interconnected States and/or sub-regional groups operating in an ATFM network without the need for any central, physical facility providing the network management function.

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

1.7 Version 3.0 of the Framework included near to medium term performance objectives to prepare and guide States in the implementation of collaborative, cross-border ATFM, providing for regionally harmonized ATFM concepts, communications, and practices.

1.8 The present Version of the Framework recognises that many States are progressing, albeit slowly, towards implementing ATFM systems and procedures in their areas in conformity with the Regional ATFM Framework. To encourage greater harmonization and ensure interoperability of various national and sub-regional ATFM implementation programs in the region, the Framework has further expanded the previous performance expectations in the medium term.

Framework Structure

1.9 The Framework, developed by the Asia/Pacific ATFM Steering Group (ATFM/SG), forms part of a suite of global and regional air navigation planning documents relevant to the Asia/Pacific Region.

1.10 Global vision and strategy perspectives are provided by the *Global ATM Operational Concept* (Doc 9854), *Global Air Navigation Plan* (GANP, Doc 9750), *and Global Aviation Safety Plan* (GASP, Doc 10004), as shown in **Figure 1**. The GANP includes the Aviation System Block Upgrade (ASBU) framework, its Modules, and its associated technology Roadmaps.

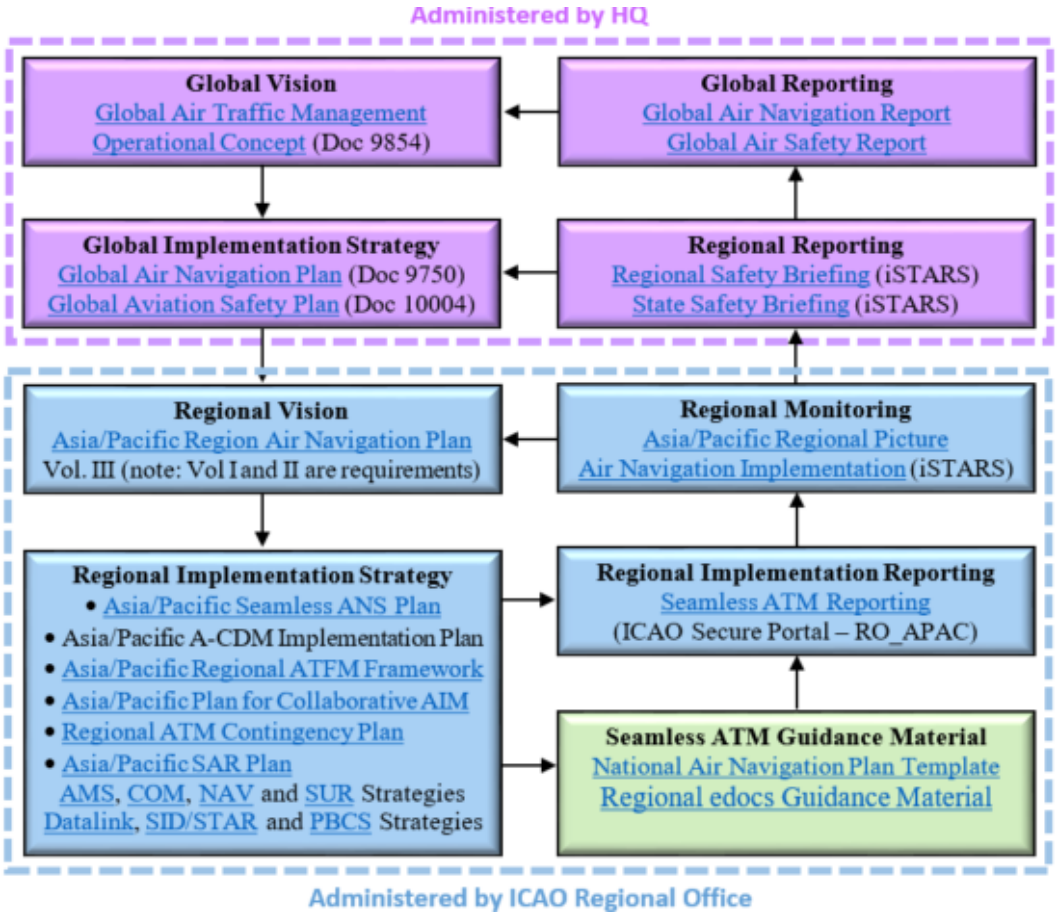

Figure 1: Hierarchy of Global and Regional Plans

1.11 Beneath this level is regional planning primarily provided by the *Asia/Pacific Regional Air Navigation Plan* (RANP, Doc 9673) and the *Asia/Pacific Seamless ANS Plan* which, together with its contributory documents, including this Framework, define goals and the means of meeting State planning objectives.

1.12 Now incorporated within the Seamless ANS Plan are the earlier *Asia/Pacific ATFM Concept of Operations* and *Air Navigation Concept of Operations*. The Framework draws upon and aligns with the guidance and recommendations of Doc 9971, and with the regional performance improvement expectations of the Seamless ANS Plan.

1.13 The Framework includes analysis of the current situation, a performance improvement plan, and considerations for research and future development.

1.14 The Framework includes reference to the *Asia Pacific Airport Collaborative Decision Making (A-CDM) Implementation Plan* which was developed to foster harmonized and interoperable A-CDM Implementation in the region. The framework further elaborates on need for ATFM and A-CDM integration and requirements. A-CDM-related performance expectations at A-CDM airports are illustrated in the APAC A-CDM Implementation plan to map with APAC Seamless ANS Plan and Regional Framework for Collaborative ATFM expectations.

1.15 The performance objectives of the Framework are expected to be implemented in phases aligned, where practicable, with those of the Seamless ANS Plan. Having considered the Phased expectations of the Seamless Plan, Regional ATFM Capability is expected to be implemented in the following phases.

- Phase IA, expected implementation by 12 November 2015 (aligned with Seamless ANS Plan Phase I)
- Phase IB, expected implementation by 25 May 2017
- Phase II, expected implementation by 07 November 2019 (aligned with Seamless ANS Plan Phase II)
- Phase III A, expected implementation by November 2022
- Phase III B, expected implementation by November 2025

1.16 None of the above phases or any element of the Framework is binding on any State, and they should be considered as a planning framework. It is important to note that, like the Seamless ANS Plan, the Framework's Phase commencement dates are planning targets. They should not be treated as a 'hard' date such as the example of Reduced Vertical Separation Minimum (RVSM) implementation. In that case there was a potential major regional problem if all States did not implement at the same time by the specific agreed date, which is clearly not the case for the start of the Framework Phases.

1.17 In that regard, although it would be ideal if all States achieved capability on day one of Phase I, this is probably not realistic. States should, however, consider the impact on stakeholders and on the needed improvements in cross-border ATFM and the ATM system overall that would result from not achieving target implementation dates. The Seamless ANS Plan Phase dates, and hence the Framework dates, were chosen as being an achievable target for most of the States. However, the dates were not designed to accommodate the least capable State, otherwise the region would fall behind the necessary urgent ATM improvements required by the Directors General of Civil Aviation and APANPIRG.

Document Review

1.18 The Framework is intended to be reviewed following the planned review of the Seamless ANS Plan and thereafter each three years, following the regular review of the Seamless ANS Plan. Earlier or more frequent review and amendment will be conducted as recommended by ATFM/SG and agreed by APANPIRG, through its Air Traffic Management (ATM) Sub-Group (ATM/SG).

DEVELOPMENT AND OBJECTIVES OF THE FRAMEWORK

Framework development

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

2.2 The Version 3.0 of the Framework was developed over four meetings of the ATFM/SG, supported by offline work by a team of specialists drawn from within the Steering Group. The Framework was endorsed by the 26th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/26, Bangkok, Thailand, 7 to 10 September 2015).

2.3 The Framework draws on relevant experience gained in Asia/Pacific States, and in other Regions. Key concepts used or adapted in the Framework include:

- A distributed multi-nodal cross-border ATFM network rather than a regionally centralized facility;
- An agreed model for ATFM information exchange;
- An agreed suite of ATFM terminologies for use in ATFM systems and processes, and in interfaces with other complementary systems;
- Meteorological forecasting information tailored for ATFM purposes; and
- Delay absorption intent, allowing aircraft operators to flexibly distribute their total ATFM delay across various phases of flight.

2.4 The performance objectives of the Framework are, wherever practicable, aligned with the ATFM-related objectives and implementation timelines of the Asia/Pacific Seamless ANS Plan.

Framework Objective

2.5 Having considered relevant documents such as the *Global Air Navigation Plan* (Doc 9750), the *Asia/Pacific Region Seamless ANS Plan* and the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971), the objective of the Framework is to provide a regionally agreed framework for the harmonized implementation of networked, interoperable, multi-FIR, multi-State, cross-boundary collaborative ATFM capability.

2.6 The Framework provides information, guidance and performance objectives including:

- ATFM principles;
- ATFM-related Aviation System Block Upgrades (ASBU);
- ATFM-related performance objectives / priorities of the Asia/Pacific Seamless ANS Plan;
- Distributed multi-nodal ATFM network concept;
- Collaborative decision-making (CDM);
- ATFM phases;
- Airspace and airport capacity improvement, planning, assessment and declaration;

- Airport Collaborative decision Making (A-CDM) and ATFM integration;
- ATFM daily plan;
- ATFM terminology, communications and information distribution;
- Meteorological information for ATFM;
- Training and competencies for ATFM personnel;
- Analysis of current ATFM capability in the Region;
- A performance improvement plan with considerations to relevant performance objectives from the Asia/Pacific Seamless ANS Plan; and
- Considerations for research and future development.

Framework Update

2.7 The need for an update of the Regional Framework for Collaborative ATFM, was necessitated on account the following considerations:

- Alignment of the Regional ATFM Framework and Doc 9971 (3rd edition 2018);
- Global Air Navigation Plan 2019 update, including a major restructure of the ASBU framework;
- Asia/Pacific Seamless ATM Plan 2019 update;
- The new suite of basic phrases for Cross-Border GDP facilitation;
- Development of ATFM Post Ops Analysis Framework;
- Introducing interoperability requirements between ATFM and A-CDM implementations in the APAC region;
- PfA to the Regional Framework – Origination of DLA Message; and
- Rationalization of the document and its appendices, including the need to establish some large appendices as separate documents.

2.8 Taking into considerations of the above, this edition of Framework document has been reviewed and updated by the Air Traffic Flow management- Information Requirements- Small Working Group (ATFM/IR/SWG). The ATFM/IR/SWG consists of Subject matter Experts (SMEs) nominated by different APAC States and International Organizations (IO). The SWG held a series of virtual meetings and coordinated electronically to draft this edition.

EXECUTIVE SUMMARY

Development of Regional Framework for Collaborative ATFM

3.1 The Asia-Pacific (APAC) region is the world's largest market for air transport. Asia-Pacific countries jointly accounted for nearly 35 percent of the world's revenue passenger kilometers (RPK) in 2019, up from 24 percent in 2004, and six of the region's airports ranked among the world's 15 busiest airports by passenger throughput traffic compared to just two in 2004.

3.2 The coronavirus (COVID-19) pandemic has had a devastating impact on the aviation industry globally as nearly all air travel came to a halt in late March and April 2020. The impact in APAC region has been the most severe as virtually all scheduled international flights were suspended and several countries implemented bans on domestic air travel in an attempt to contain the spread of COVID-19. In 2019, international travel within Asia represented 13.3 percent of global international travel, ranking it as second biggest market after the intra-Europe market. In 2021 Asia's share fell to 1.5 percent. Air Traffic in Asia-Pacific region is predicted to record the slowest improvement this year (2022), achieving only 62% of 2019 levels.

3.3 While recognizing that the first response to increased demand should always be an increase in capacity, the growing demand/capacity imbalance in the Region has resulted in increasing congestion, delays, costs and potential safety risks.

3.4 The need for a regional, network-based response to the challenges of increasing demand was recognized by APANPIRG/24 (June 2013) in its adoption of ***Conclusion 24/15****: Asia/Pacific ATFM Steering Group, re-convening the ATFM/SG to develop a common Regional ATFM framework addressing ATFM implementation and ATFM operational issues in the Asia/Pacific Region*. It was further recognized in the inclusion of the ASBU module **B0-NOPS** – *Improved Flow Performance through Planning based on a Network-Wide View* among the ten priorities and targets for the Asia/Pacific Region.

3.5 The scope of work of the ATFM/SG was further expanded by new terms-of-reference, endorsed by APANPIRG/25 (September 2014), which required the Steering Group to research and recommend appropriate ATFM guidance, and maintain an overview and review the effectiveness of Asia/Pacific CDM/ATFM programs.

3.6 The ATFM/SG developed the *APAC Regional Air Traffic Flow Management Concept of Operation* (ATFM CONOPS), version one, in 2015 and the *Asia/Pacific Regional Framework for Collaborative ATFM* in 2017.

3.7 With gathering pace of Airports Collaborative Decision Making (A-CDM) implementations across the APAC Region Airports, the Aerodrome Operations and Planning Sub-Group recognized that benefits accrue by the implementation of A-CDM at high density aerodromes. States were facing implementation challenges which included lack of guidance materials and awareness, lack of coordination procedures, financial constraints and unavailability of IT supporting systems at the airports, training needs and lack of qualified human resources. Hence formation of a task force for development of guidance material was proposed.

3.8 APANPIRG/27 (September 2016) in ***Decision 27/2*** approved the establishment of Asia/Pacific Airport Collaborative Decision Making Task Force (APA-CDM/TF). The APA-CDM/TF was formed in 2017. The APA-CDM/TF objective was to assist States to overcome the challenges in A-CDM implementation.

3.9 The APA-CDM/TF focussed on reviewing the status of A-CDM implementation in APAC Region, the effectiveness of existing A-CDM programmes in the APAC Region and the degree of harmonization with global guidance material. The TF analysed the ICAO Global A-CDM guidance in Doc 9971 to determine the need for and develop any necessary APAC Regional implementation guidance. The APA-CDM/TF developed the *APAC A-CDM Implementation Plan*, in July 2021.

3.10 In the APAC region, the System-Wide Information Management Task Force (SWIM/TF) has been established since 2017 to develop SWIM-related components and supporting materials required for the implementation in the APAC region. The work of SWIM/TF also includes the coordination with other Working Groups/Task Forces under APANPIRG to ensure that the operational requirements, particularly the ones specific to the region, are reflected and incorporated accordingly in the regional implementation strategies. SWIM/TF/3 held in May 2019 agreed that the SWIM implementation to support cross-border ATFM operation should be given high priority.

3.11 In the 11th meeting of ATFM/SG it was noted that the APA-CDM/TF had achieved its objectives and accomplished most of the tasks assigned under its Terms of Reference and hence it was recommended that APA-CDM/TF be dissolved, and tasks of the APA-CDM/TF be included in the tasks list of ATFM/SG. The decision was later adopted by APANPIRG/32 in December 2021.

3.12 ATFM/SG/11 meeting proposed to undertake review of the APAC Regional Collaborative ATFM Framework document by the ATFM Information Requirements-Small Working Group (ATFM/IR/SWG). The ATFM/IR/SWG functions through subject matter experts (SMEs) nominated by States and International Organizations. The ATFM/SG/11 meeting also agreed upon the scope of the work on the amendment of the Framework. The current edition is the product of the review thus undertaken.

Distributed Multi-Nodal Network ATFM Concept

3.13 The ATFM/SG/11 meeting also stressed that amendments to the Framework must remain aligned with the APANPIRG-approved Asia/Pacific ATFM Concept of Operations.

3.14 The core concept of the Framework is the Distributed Multi-Nodal ATFM Network, i.e., a network of Air Navigation Service Providers (ANSPs) and/or Sub-Regional Groups leading independent ATFM operation within their area of responsibility and connecting to each other through information sharing framework. The ATFM operations in each node will be based on regionally agreed principles and high-level operating procedures.

3.15 The concept has been accepted into the Asia/Pacific Regional Framework for Collaborative ATFM as a viable solution for the region.

3.16 A description of the concept is provided in APAC ATFM Concept of Operations Document at https://www.icao.int/APAC/Documents/edocs/Regional ATFM Concept of Operations.pdf.

Interoperability is the Key

3.17 The Framework considers the ATFM development initiatives undertaken by various States to balance demand and capacity within their airspaces. Recognizing the need to adopt a network wide view for improving the flow performance across the APAC region, the Framework has been developed in line with ATM performance improvement elements of the Seamless ANS Plan.

3.18 A key consideration in the development of Version 3.0 of the Regional Framework for Collaborative ATFM was the interoperability of systems, procedures, and practices to ensure not only regionally harmonized ATFM, but also the effective, complementary operation of other systems forming part of the gate-to-gate chain of air traffic management. It is vital that all systems and processes use common information, terminology, and communications protocols to ensure common understanding and optimal outcomes. In particular, the interoperability of ATFM, A-CDM, Arrival Manager (AMAN) and Departure Manager (DMAN) systems, and airspace user and ATM automation system interfaces, is critical to the success of a regional ATFM program and the optimized use of available capacity.

3.19 ATFM/SG addressed these issues in the development of harmonized ATFM terminology and the specification of automated system communications protocols, and through its linkage to AOP/SG, Meteorological Sub Group (MET/SG), and SWIM/TF.

3.20 In this edition, the interoperability requirements of ATFM and A-CDM systems have been described.

ABBREVIATIONS AND ACRONYMS

AAR	Airport Arrival Rate
ADEP	Departure Airport
ADES	Destination Airport
ACDM	Airport Collaborative Decision Making
ATM	Air Traffic Management
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AFP	Airspace Flow Program
AIDC	ATS Inter-facility Data Communications
AIGD	ICAO ADS-B Implementation and Guidance Document
AIM	Aeronautical Information Management
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
AIXM	Aeronautical Information Exchange Model
AMAN	Arrival Manager
ANSP	Air Navigation Service Provider
AOM	Airspace Organization and Management
APAC	Asia/Pacific
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ASBU	Aviation System Block Upgrade
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
CDM	Collaborative Decision-Making
CCO	Continuous Climb Operations
CDO	Continuous Descent Operations
CIBT	Calculated In Block Time
COM	Communication
CONOPS	Concept of Operations
COFT	Calculated Over Fix Time
CNS	Communications, Navigation, Surveillance
CPDLC	Controller Pilot Data-link Communications
CSP	Communication Service Provider
CTA	Control Area
CTR	Control Zone
CTOT	Calculated Take Off Time
COBT	Calculated Off_Block Time
CLDT	Calculated Landing Time
DGCA	Conference of Directors General of Civil Aviation
DMAN	Departure Manager
DME	Distance Measuring Equipment
DLA	Delay
EET	Estimated Elapsed Time

ETA	Estimated Time of Arrival
EST	Coordinate Estimate
FIR	Flight Information Region
FIRB	Flight Information Region Boundary
FMP	Flow Management Position
FOC	Flight Operations Centre
FUA	Flexible Use Airspace
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GBAS	Ground-based Augmentation System
GDP	Ground Delay Program
GSt	Ground Stop
GLS	GNSS Landing System
GNSS	Global Navigation Satellite System
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IO	International Organizations
KPA	Key Performance Area
MIT	Miles-in-Trail
MINIT	Minutes-in-Trail
MET	Meteorological
METAR	Meteorological Aerodrome Report
MTF	Major Traffic Flow
OPMET	Operational Meteorological
PARS	Preferred Aerodrome/Airspace and Route Specifications
PASL	Preferred ATM Service Levels
PBN	Performance-based Navigation
PIA	Performance Improvement Areas
PKP	Passenger Kilometres Performed
RANP	Regional Air Navigation Plan
RPK	Revenue Passenger Kilometres
RNAV	Area Navigation
RNP	Required Navigation Performance
RVSM	Reduced Vertical Separation Minimum
SAR	Search and Rescue
SBAS	Space Based Augmentation System
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
STAR	Standard Terminal Arrival Route or Standard Instrument Arrival (Doc 4444)
STCA	Short Term Conflict Alert
STS	Special Handling Status
SUA	Special Use Airspace
SUR	Surveillance
SWIM	System-Wide Information Management
TAF	Terminal Area Forecast
TBO	Trajectory Based Operations

TCAS	Traffic Collision Avoidance System
TMI	Traffic Management Initiative
TOC	Transfer of Control
UAS	Unmanned Aircraft Systems
UPR	User Preferred Routes
UTC	Coordinated Universal Time
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOLMET	Volume Meteorological
VOR	Very High Frequency Omni-directional Radio Range
VVIP	Very-Very Important Person
WAFC	World Area Forecast Centre

APAC REGIONAL COLLABORATIVE ATFM FRAMEWORK - PRINCIPLES, PROCEDURES AND PRACTICES

ATFM Principles

5.1 The major areas of Collaborative ATFM principles are mainly aligned with those of the Asia/Pacific Seamless ANS Plan; People (human performance), Facilities (physical equipment), and Technology and Information. The Seamless ANS Plan describes 37 principles in respect of People, Facilities and Technology and Information covering the entire spectrum of ANS Services. The principles relevant to implementation of ATFM and A-CDM are included **Appendix A**.

Aviation System Block Upgrades (ASBU)

5.2 At the Global level, ICAO started the ASBU initiative as a programme framework that developed a set of aviation system solutions or upgrades intended to exploit current aircraft equipage, establish a transition plan and enable global interoperability. ASBUs comprised a suite of modules organised into flexible and scalable building blocks, where each module represented a specific, well bounded improvement. The building blocks could be introduced and implemented in a State or a region depending on the need and level of readiness, while recognizing that not all the modules were required in all airspaces. ASBUs described a way to apply the concepts defined in the Doc 9854 with the goal of implementing regional performance improvements and were used in the new edition of the GANP to guide implementation.

5.3 ASBU are groups of operational improvements to advance air navigational capabilities and improve the performance of their air navigation system in a cost effect way. They are classified into three functional categories:

- Information;
- Operational; and
- CNS Technology and Services.

5.4 Within the ASBU framework in the Operational Category is the Module thread for Network Operations (NOPS), which aims to guide the development of air traffic flow management (ATFM) operation towards the envisaged end goal of shifting ATFM from trajectory management to airspace constraints management enabled by timely and precise information. The Global Air Navigation Plan (GANP-Ed.6, 2019) also recognised Airport Collaborative Decision Making (A-CDM) as an important operational enabler for tactical flow management at airports and terminal airspace.

5.5 The 30th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/30, 2019) endorsed 16 Priority-1(ASBU Block 0 and 1 and Regional) Elements, as recommended in the Asia Pacific Seamless ANS Plan Version 3.0, as follows:

a) Aeronautical Meteorology: AMET-B0/1-4;

b) Aeronautical Information Management: DAIM-B1/1-6*;

c) Airport CDM: ACDM-B0/1-2;

d) ANSP human and simulator performance (Regional);

e) ATS Inter-facility Datalink Communications: FICE-B0/1;

f) Ballistic launches/space re-entry management (Regional);

g) Civil-Military Special Use Airspace (SUA) management (Regional);

h) Civil-Military strategic and tactical coordination (Regional);

i) Core data communications: VDL Mode O/A and AMHS COMI-B0/3, 7;

j) Direct and Free Route Operations: FRTO-B0/1-4;

k) Enhanced SAR systems (Regional);

l) Ground-based Surveillance: ASUR-B0/1-4;

m) Network Operations: NOPS-B0/1-5;

n) Performance-based Navigation Approach Procedures: APTA-B0/1-2;

o) Runway Sequencing: RSEQ-B0/1-2; and

p) Safety Nets SNET-B0/1-4.

**Note: DAIM-B1/7 is placed within PASL Phase III.*

5.6 The Asia Pacific Seamless ANS Plan has recommended implementation of A-CDM-B0/1-2 and NOPS-B0/1-5 as Priority 1, i.e., which is considered as critical upgrade assignment essential to achieve the service level required regionally and globally.

5.7 The Version 3.0 of the Framework had considered Network Operations - NOPS-B0/1-5 modules for developing guidance material on Regional ATFM Framework implementation. This version of the Framework document, in addition, has considered A-CDM-B0/1-2 modules for inclusion in the guidance material for Regional ATFM implementation to ensure harmonized and interoperable system implementation across Airports and Airspace.

Asia/Pacific Region ATFM Operational Concept

5.8 The Regional ATFM Concept of Operations is based on the Distributed Multi-Nodal ATFM Network concept, which exists as a network of ANSPs leading independent ATFM operations within their area of responsibility and connected to other ANSPs and stakeholders through effective information sharing with collaborative decision-making mechanism. The concept, adopted by ATFM/SG as the foundation for a Regional ATFM concept and implementation strategy, with the implementation date of 7 November 2019 in alignment with the Seamless ANS Plan.

5.9 The concept recognizes that a centralized ATFM Unit (ATFMU) approach is not yet practicable for the Asia/Pacific region. At the centre of the concept is the distributed multi-nodal ATFM network, illustrated in **Figure 2**.

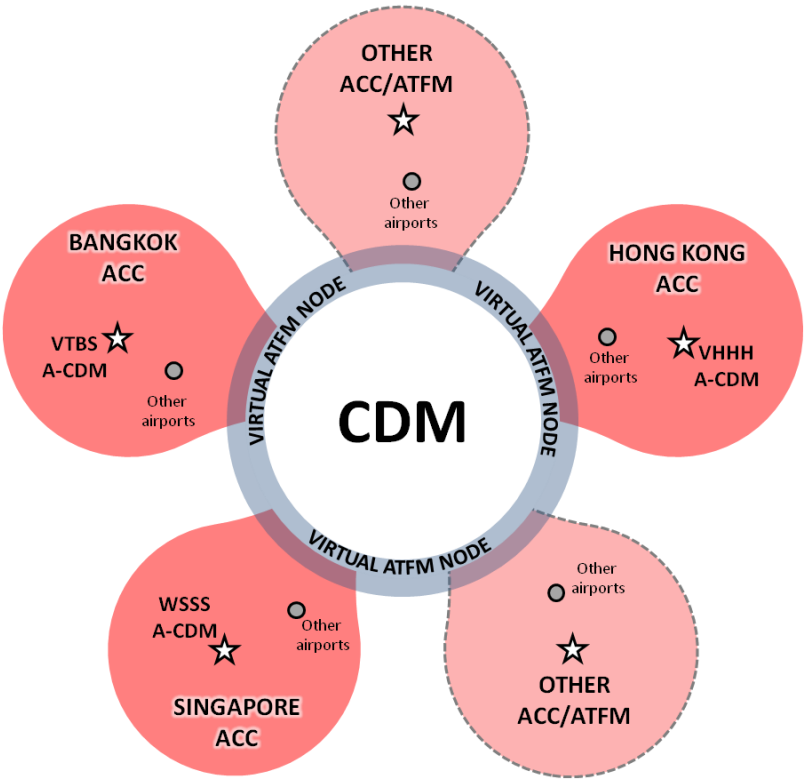

Figure 2: A Distributed Multi-Nodal ATFM Network

5.10 The Regional ATFM Concept of Operations document is available at https://www.icao.int/APAC/Documents/edocs/Regional%20ATFM%20Concept%20of%20Operations.pdf.

Collaborative Decision Making

5.11 ICAO Doc 9971 defines Collaborative Decision Making:

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

5.12 One key to the successful implementation of an effective ATFM service is achieving a robust coordination among aviation stakeholders. It is envisioned that ATFM is performed as a collaborative decision-making (CDM) process where aerodromes, ANSPs, airspace users (AUs) and other stakeholders work together to improve the overall performance of the ATM system. It is likewise envisioned that such coordination will take place within a flight information region (FIR), between FIRs and ultimately, between ICAO regions.

5.13 Key components and characteristics of the different ATFM/CDM concepts are shown below in **Table 1**:

Features	Domestic ATFM	Regional ATFM	Regional ATFM Cross-Border Multi-Nodal
Capability and Functionality	ANSP has an independent ATFM system.	Centralized ATFM organization for multiple ANSPs within a geographical region.	Each ANSP has an independent ATFM system which is connected in a distributed ATFM network sharing ATFM information.
	ANSP manages demand/capacity of its own airspace and airport(s).	Shared responsibility between each local FMU and central unit for management of demand/capacity of each ANSP's airspaces and airport(s).	ANSP independently manages demand/capacity of its own resources.
	Only domestic traffic is subject to ATFM measures.	Geographical region's flights subject to ATFM measures.	Flights participating in ATFM nodes within the region subject to ATFM measures.
	CDM is performed by stakeholders via software web interfaces or accepted messaging protocols.	Multi-level CDM processes and applications via web interfaces and accepted messaging protocols (legacy and SWIM messaging) applied in all ATFM processes.	CDM is performed by stakeholders via software web interfaces or accepted messaging protocols.
	National procedures published by each State in the national regulations and AIP.	Common set of procedures for the geographical region's ATFM contained in the Regional Supplementary Procedures (Doc 7030) and common operations manual.	Individual procedures published by each ANSP, though normally coordinated and harmonized based on common operating procedures.
		Centralized compliance measurement and reporting.	
Specify capacity and demand prediction	Demand prediction – flight progress is via manual input or automated data feed (e.g., FDP, AMHS, or AFTN).	Demand prediction – centralized flight planning function ensures single and accurate demand picture throughout the region.	Demand prediction – flight progress is via manual input or automated data feed (e.g., FDP, AMHS or AFTN) to each node.
		ATFM measure assignments are automatically dispatched to all affected stakeholders and are visible via web interfaces and SWIM messaging.	

	Capacity management – inputs from FMP and FOC are via ATFM web-based interface.	Capacity management – inputs from FMP and FOC are via ATFM web-based interface. All constraints are reconciled to avoid conflicting measures.	Capacity management – inputs from FMP and FOC are via ATFM web-based interface. Conflicting ATFM measures must be manually resolved.
Evaluate Alternatives, Initiate/ Modify ATFM Measures	Aircraft operators perform CDM with airport operators for ground/surface delay intent.		
	ATFM slot assignments can be viewed via software, web interface and notifications.		

Table 1: ATFM/CDM Concepts *(Source: ICAO Doc 9971 – Manual on Collaborative ATFM)*

5.14 Cross-border ATFM/CDM should provide opportunities for the efficient exchange of operational and strategic information for all stakeholders, ensuring strategic cooperation towards achieving the objectives of seamless ATM ANS and optimization of traffic flows across the region.

5.15 Regional ATFM in its basic principles, is no different from domestic ATFM: it relies on transparency, information exchange and collaboration. The difference arises from the number and variety of stakeholders. This generates additional complexity but yields a significant benefit as it allows providers from various States to collaborate and anticipate rather than be confronted with the consequences of ATFM measures implemented locally.

5.16 CDM partners and stakeholders should include:

- States, establishing regulations and overseeing safety and compliance;
- ANSPs, implementing ATFM capability;
- International Organizations such as ACI, CANSO, IATA and IFATCA;
- International ATFM Organizations (to share tactical flight data through ATFMU) – EUROCONTROL, FAA;
- Airport operators; and
- CDM-participating airlines.

5.17 Each State will develop ATFM capability according to its needs and requirements, and the overarching goal of seamless ATM across the Asia/Pacific Region.

5.18 The Regional concept for cross-border ATFM is based on a distributed multi-nodal ATFM network concept. Under this concept each State/Administration participating collaboratively in cross-border ATFM will form a node of the multi-nodal network and should be led by an agreed ANSP as the Node Leader.

5.19 Within an ATFM node there may be a number of airport operators, and airspace users and other stakeholders with an access to the node arranged by the Node Leader, facilitating their participation in the cross-border ATFM initiative.

5.20 The Node Leader should be responsible for engagement with the various Nodes stakeholders and ensuring the Node is ready and able to participate in the Regional Cross-Border ATFM process. The processes within a node to enable this readiness may vary from node to node and be applicable to the environment within the State(s). However, the readiness to engage with the regional cross- border multi- nodal system should be in accordance with the Regional Framework for Collaborative ATFM and its underlying distributed multi-nodal ATFM network concept, and any specific procedures identified and agreed by the multi-nodal participants. The Node Leader is responsible for ensuring compliance and therefore readiness to participate in the APAC cross-border multi-nodal ATFM initiative.

5.21 ANSPs and airspace users may participate in transition or trial participation leading to their full participation in the multi-nodal ATFM network. An example of tiered trial participation levels for ANSPs and airspace users is provided at **Appendix B**.

ATFM Phases

5.22 ICAO Doc 9971 describes a methodology to balance demand and capacity which can be accomplished through the application of an "ATFM planning and management". ATFM execution consists of three phases: strategic, pre-tactical, and tactical. These phases should not be considered as concrete steps, but rather as a continuous planning, action and review cycle that is fully integrated in the ATM planning and post-operations processes, three phases of ATFM execution; strategic, pre-tactical and tactical, illustrated in **Figure 3**.

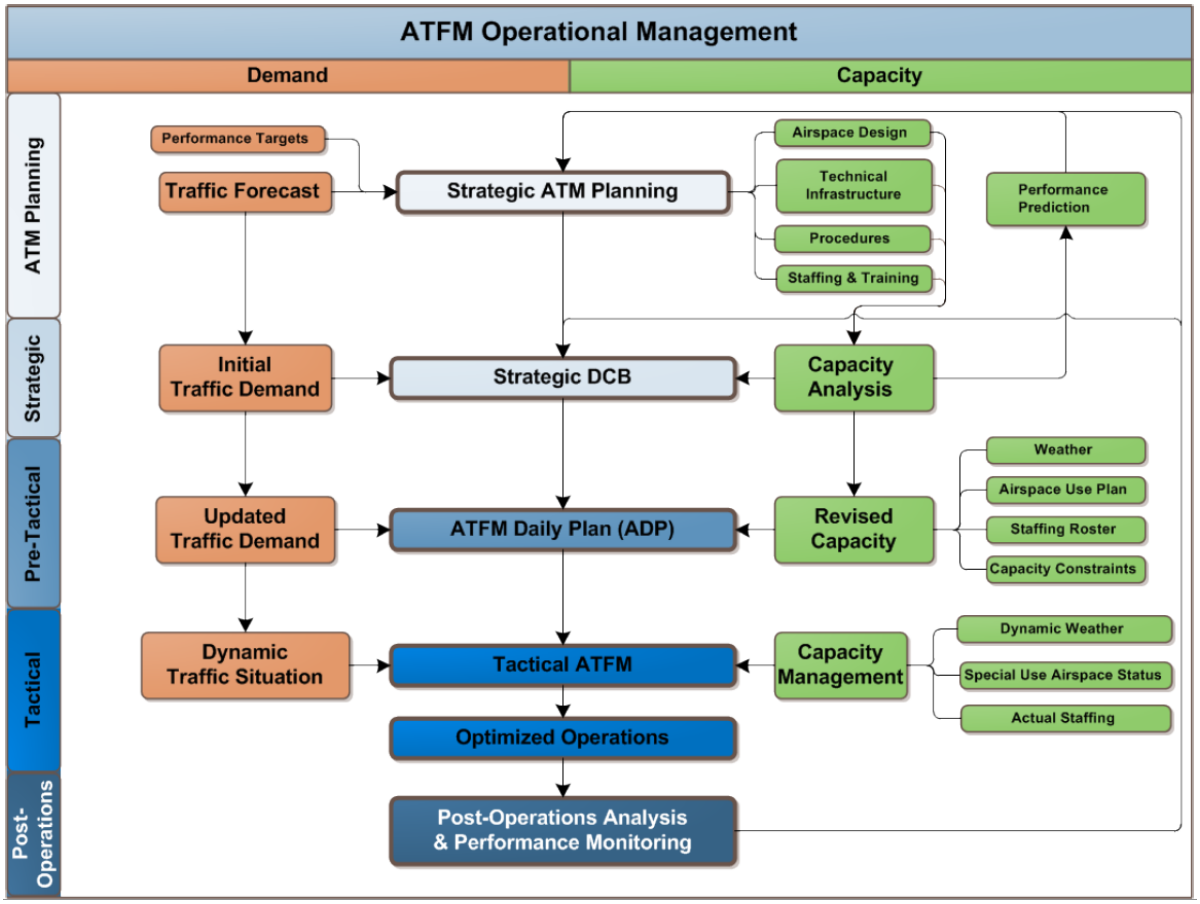

Figure 3: ATFM Operational Management

5.23 The **Strategic ATFM phase** generally encompasses measures taken more than one week prior to the day of operation. Much of this work is accomplished two months or more in advance. This phase applies the outcomes of the ATM planning activities. It takes advantage of the increased dialogue between AUs and capacity providers, such as ANSPs and airports, in order to analyse airspace, airport and ATS restrictions, seasonal meteorological condition changes and significant meteorological phenomena. It also seeks to identify, as soon as possible, any discrepancies between demand and capacity to jointly define possible solutions which would have the least impact on traffic flows. These solutions are not set in stone and may be adjusted according to the demand foreseen in this phase.

5.24 The **Pre-Tactical ATFM phase** normally spans from one day to one week prior to operations. During this phase, the traffic demand for the day is analysed and compared to the predicted available capacity. The plan, developed during the strategic phase, is then adapted and adjusted accordingly. The main objective of the pre-tactical phase is to optimize capacity through an effective organization of resources (e.g., sector configuration management, use of alternate flight procedures). The work methodology is based on a CDM process established between the stakeholders (e.g., flow management unit (FMU), airspace managers, AUs

5.25 **Tactical ATFM** solutions and measures are adopted on the day of the operation. Traffic flows and capacities are managed in real time. The ADP is amended taking due account of any event likely to affect it. During this phase, any opportunity to mitigate disturbances should be used. The need to adjust the original ADP may result from staffing problems, significant meteorological phenomena, crises and special events, unexpected opportunities or limitations related to ground or air infrastructure, more precise flight plan data, the revision of capacity values, etc.

5.26 **Post-operations analysis** is the final phase in the ATFM planning and management process. During this phase, an analytical process is carried out to measure, investigate and report on operational processes and activities. This process is the cornerstone in developing best practices and/or lessons learned that will further improve the operational processes and activities. The process should also include an analysis of items such as anticipated and unanticipated events, ATFM measures and delays, the use of predefined scenarios, flight planning and airspace data issues.

5.27 These phases of ATFM execution should not be considered as concrete steps, but rather as a continuous planning, action and review cycle that is fully integrated in the ATM planning and post-operations processes. The involvement of operational stakeholders in each phase is of utmost importance.

5.28 The timely application of measures in all three ATFM phases requires a fundamental understanding of airport and airspace capacity, and the continuous assessment of capacity and the factors that impact upon it.

Capacity Planning, Assessment and Declaration

5.29 Annex 11 to the Convention on International Civil Aviation (Air Traffic Services) defines declared capacity as a 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 specified portion of airspace in each period, taking due account of weather, ATC unit configuration, staff and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace.

5.30 The primary areas of capacity assessment and declaration for ATFM are Airport Arrival Rate (AAR), Airport Departure Rate (ADR), and airspace sector capacity. AAR and ADR are usually expressed in terms of movements per hour. Sector capacity may be expressed in terms of occupancy count and/or entry count.

5.31 ICAO Doc 9971 – *Manual on Collaborative ATFM* provides the following guidance on capacity planning and assessment:

- *Part II Chapter 3 and 4 – Capacity Determination and ATFM Phases and Solutions.*
- *Appendix II-B – Determining the Airport Arrival Rate – An example of a simplified methodology for determining the acceptance rate at an airport, based on scientific process developed by the Federal Aviation Administration (FAA).*
- *Appendix II-C – Determining Sector Capacity – An example of a simplified methodology for determining sector capacity at an area control centre (ACC), based on the process developed by the Federal Aviation Administration for establishing sector capacity.*
- *Appendix II-D – Capacity Planning and Assessment Process – Provides information developed by the European Organisation for the Safety of Air Navigation (EUROCONTROL) related to the ATFM capacity and planning assessment process.*

5.32 Detailed, high quality assessments of ATC sector capacity may also be conducted using fast-time simulations to analyse relevant data and the effects on capacity of proposed ATS changes or improvements. Data inputs include static infrastructure data, traffic data, ATC logic, procedures and task definition, and aircraft performance data.

5.33 Steps in a sector capacity assessment methodology utilizing fast-time simulations include:

i. Collect the necessary airspace and traffic data;

ii. Verify (with the support of local controllers) the traffic sample routes and the procedures used on a flow-by-flow basis;

iii. Correct, refine and insert the information into the model (done by the simulation experts). This includes the ATC procedures used in the sector, standard controller tasks, simulation parameters and aircraft performance parameters;

iv. Run an initial test-run of the model;

v. Verify flight profiles: The knowledge of local controllers can be used to adapt aircraft performance to local conditions, to define and verify sector specific controller tasks together with simulation parameters including conflict detection and resolution mechanisms;

vi. Consolidate a final model which is used to calculate results for all simulation scenarios, e.g. different sector configurations, different traffic samples, etc.;

vii. Verify the simulation scenarios and the initial results, and if so required, do a fine-tuning of parameters.

5.34 A fast-time simulation capacity assessment methodology should use a simulation engine that reproduces the ATC environment and should follow a reiterative process of validation involving licensed ATC staff currently active on the sector/s under assessment. A fast-time simulation capacity assessment methodology should use a simulation engine that reproduces as truly as possible the ATC environment and should follow a reiterative process of validation involving licensed ATC staff currently active on the sector/s under assessment.

Airspace and Airport Capacity Improvement

5.35 Increased capacity is the primary and central method for managing increasing demand. Capacity increases may be achieved by improvements in infrastructure, airspace and ATS route design, procedures, and stakeholder behaviours.

5.36 Airspace capacity improvements may be achieved by:

- Improved ATS route design including segregation of inbound, outbound and overflight traffic flows and, where supported by a business case, mandating of RNP specifications for ATS routes;
- Civil-military cooperation, including increased use of FUA to replace SUA;
- Improved ATC sectorization to more evenly apportion workload, including the capability for dynamic sector configuration;
- Segregation of SIDs and STARs in terminal areas to reduce ATC and pilot workload;
- ATM automation system enhancements including automated coordination and hand-off of aircraft between systems (AIDC) and sectors, and transition from paper flight progress-strips to automated, integrated electronic displays and flight plan interfaces;
- Implementation or extension of ATS surveillance services, and surveillance-based separations specified in ICAO Doc 4444 (PANS-ATM); and
- Implementation of RNP-based separations (RNP 4 or better) in non-surveillance airspace.

5.37 Airport capacity improvements may be achieved by:

- Improved airport design including additional runways, taxiways, parking stands and optimally positioned rapid-exit taxiways as per traffic mix and intensity;
- Harmonized AMAN, DMAN, A-CDM systems and ATFM systems;
- Analysis and improvement of runway occupancy times through enhancement of procedures and associated pilot practices; and
- Implementation of precision approaches to all runways.

5.38 The Seamless ANS Plan includes performance objectives aimed to improve airspace and airport capacity in the Asia/Pacific Region. The Performance Improvement Plan of this Framework includes capacity improvement objectives that are complementary to or expanding upon those of the Seamless Plan.

Demand Capacity Balancing (DCB)

5.39 Assessment of Capacity and Demand are integral part of ATFM process. The assessment process is carried out in different time spans as described in ATFM Phases above. Increase of (airport, airspace) capacity to meet the forecast demand is the most preferred option. However, when most of the airports or airspaces are running at or near capacity, any capacity reducing event will create a demand-capacity imbalance. **Appendix C** provides a brief outlook on the DCB process and ATFM data requirements.

Airport Collaborative Decision Making (A-CDM)

5.40 Airport collaborative decision making is a process in which key stakeholders - airport operators, airlines, other flight operators (e.g., general aviation), ground handlers, air navigation service providers (ANSPs) and air traffic flow managers - make joint operational decisions based on a shared set of operational data.

5.41 At its core, A-CDM is focused on enhancing the efficiency and utilization of airport, air traffic, and aircraft operator resources via collaborative and data-driven decision making. Often these decisions are associated with the real-time or near real-time sequencing of aircraft operations on the airfield in response to changing operational, environmental, or physical conditions at the airport or in the airspace near the airport.

5.42 In more advanced applications, A-CDM can also incorporate information regarding changing ATM network conditions including airspace constraints in the enroute environment, conditions at other airports upstream and downstream from the airport of interest, and non-aeronautical constraints such as passenger processing or baggage handling constraints in airport terminals.

5.43 Regardless of the breadth of activities considered in a particular A-CDM implementation, the conceptual focus of the decision-making process is the same – determining how to equitably and efficiently sequence outbound (i.e., departing), inbound (i.e., arriving), and repositioning aircraft operations on the airfield to:

- reduce aircraft delays;
- equitably distribute what delays cannot be eliminated; and
- enhance the utilization of airport facilities, particularly aircraft parking stands.

5.44 Part III of Doc 9971 provides guidance on the implementation of A-CDM, It explains the basic concept of A-CDM, its benefits, basic elements such as variable taxi-time and coordination between ATFM and A-CDM systems. On the implementation of A-CDM, it explains how to engage with implementation partners, their roles, project, and manage the project, and highlights the importance of measuring the success of an A-CDM system with KPIs. Furthermore, in the form of appendices to it, Part III of Doc 9971 illustrates these concepts with practical examples such as an MOU template between A-CDM partners for cooperation, a template of generic AIP provided by EUROCONTROL for States to implement A-CDM, a template MOU contributed by FAA of USA for data exchange, and a list of examples of KPI for the measurement of the effectiveness of A-CDM.

ATFM-ACDM Integration

5.45 A-CDM and ATFM systems should be integrated to facilitate collaboration, improve airport operations, especially for better capacity planning and operational performance at other airports. See chapter 8 of the *APAC A-CDM Implementation Plan* for more information on integration between A-CDM and ATFM.

5.46 A-CDM and ATFM are collaborative processes, with a common objective to optimize resources and improve efficiency in an airspace or airport. Through the integration of both systems, useful departure and arrival information could be exchanged to ensure that a common situational awareness is established for CDM stakeholders to enable effective decision-making.

Using the A-CDM milestones approach as a guideline for local ATFM-ACDM integration

5.47 The A-CDM milestones should be considered for the development and implementation of interoperability among A-CDM and ATFM systems. Each milestone could be a certain point in time or an operational event at the inbound, turn around or outbound phase of a flight. The definition and the associated actions of each milestone need to be defined and decided in accordance with local arrangements.

Formulation of baseline demand prediction for ATFM operations

5.48 The integration of ATFM and A-CDM Systems enables the sharing of schedule arrival and departure flight information from the A-CDM System to the ATFM System. The airport slot data in the ATFM System are automatically updated to obtain a reliable demand prediction. The data associated with flight intent that can be provided to ATFM services for use in demand predictions can be found in, Paragraph 5.4.4 on Data type description and harmonization Chapter 5 (ATFM service interfaces) of Doc 9971.

Information used to provide A-CDM in ATFM systems

5.49 The information that could be used to provide A-CDM in ATFM systems can be found in Doc 9971, Chapter 3, A-CDM methods and tools, Para 3.5.2, Groups/types of information. The **Figure 4** below provides the overview of the various information in A-CDM application.

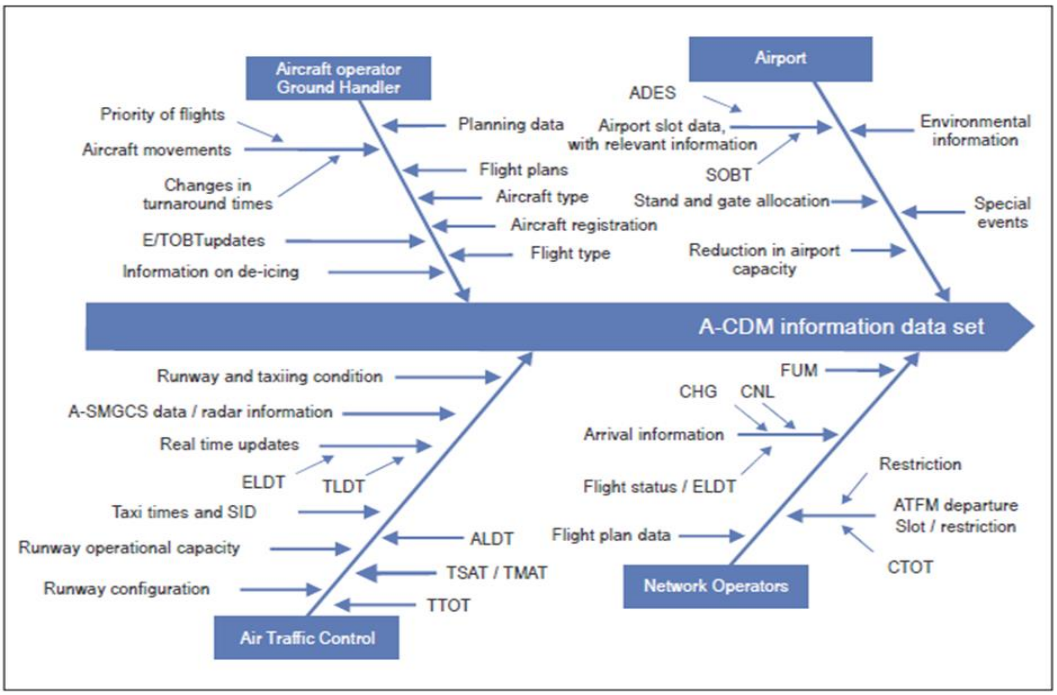

Figure 4: A-CDM Information data set

Sharing arrival information between ATFM and A-CDM Systems

5.50 The purpose of A-CDM during the inbound phase is to enhance the distribution and use of advance arrival information to/by stakeholders when the flight is in-bound to the CDM airport. Flight Update Messages (FUM), or equivalent, are sent to the A-CDM System from the ATFM System to update on the progress of a flight. The details on the distribution of information can be found in Doc 9971, Chapter 3 on A-CDM methods and tools; and Para 3.4.4 on the inbound phase.

Sharing departure information between ATFM and A-CDM Systems

5.51 The purpose of A-CDM for the outbound phase is to optimize planning of the departing flights. The details on the distribution of information can be found in Doc 9971, Chapter 3, A-CDM methods and tools; and Para 3.4.6, Departure - outbound phase.

Sharing ATFM Measure Information

5.52 ATFM Measures (CTOTs) affect departing flights from A-CDM Airport. Exchanging this information timely through integration between ATFM and A-CDM would enable pre-departure sequencer to generate TSATs accordingly. By sharing this information, stakeholders can have increased awareness about departure flow and restrictions.

ATFM Daily Plan

5.53 Doc 9971 states that the organization and structure of the CDM process depends on the complexity of the ATFM system in place, and must be structured to ensure that the affected stakeholders, service providers and airspace users can discuss airport and airspace capacity and demand issues through regular meeting sessions and formulate plans that aim to optimize the efficiency of the ATM system while balancing demand and capacity by taking all pertinent aspects and points of view into account.

5.54 Frequent tactical briefings and conferences can be used to provide an overview of the current ATM situation, discuss any issues, and provide an outlook on operations for the coming period. They should occur at least daily but may also be scheduled more frequently depending on the traffic demand and capacity situation (e.g., an evolving meteorological event may require that the briefing frequency be increased). Participants should include involved ATFM and ATS units, airspace user representatives, affected military authorities and airport authorities, as applicable.

5.55 The output of these daily conferences should be the publication of an ATFM daily plan (ADP) and should include subsequent updates. The ADP should include a proposed set of ATFM solutions (e.g., activation of routing scenarios, miles-in-trail (MIT), or ground delay program (GDP)) prepared by the ATFM unit and agreed upon by all partners concerned during the planning phase. The ADP should evolve throughout the day and be periodically updated and re-published as required.

5.56 In addition to the daily conferences, the ATFM unit should consider holding periodic and event specific CDM conferences, with an agenda based on experience. The objective should be to ensure that the chosen ATFM measures are decided through a CDM process and agreed to by all affected stakeholders.

5.57 It is recommended that an ADP cover a 24-hour period, and may, however, cover a shorter period, provided that appropriate mechanisms are in place to update the plan on a regular basis. An ADP should include at minimum, the following items of information:

i. Aerodrome or Airspace Sector identification;

ii. Declared Capacity or Operational Capacity (airport and/or airspace sector capacity);

iii. Description of constraints;

iv. Time frame;

v. Proposed ATFM measures; and

vi. Remarks/other relevant information

5.58 A template for the ATFM daily plan is provided at **Appendix D**.

5.59 To facilitate network-wide situational awareness in the Asia/Pacific region, and to ensure ADPs can be distributed and processed by regional stakeholders, the ADP exchange procedure has been developed. States/Administrations wishing to share ADPs should follow the procedure outlined in the Asia/Pacific ATFM Daily Plan (ADP) Exchange Procedure (working draft) accessible at ICAO APAC eDocument webpage - https://www.icao.int/APAC/Pages/eDocs.aspx.

5.60 An important component of the CDM process is post-operations analysis, including consideration of feedback from airspace users, airports operators, ATS and other ATFM units. The feedback can be used for the continuous improvement of pre-tactical and tactical planning. It can help identify the reason(s) for ATFM solutions and corrective actions that can be used to avoid reoccurrence and to improve upon the implemented solutions. It is recommended, therefore, that post-operations analysis result of the previous day's operations, if applicable, be shared during the daily teleconferences. Supplementary conferences focusing on assessing the outcomes of specific ATFM solutions can also be called when the ATFM programs are activated in response to abnormal situations.

Advance Notification of ATFM

5.61 Timely dissemination of ATFM information is critical to successful ATFM operations. Whenever possible, ATFM units should provide notice of ATFM measure activation as far in advance as is practicable, considering the balance between providing enough lead time for stakeholders to prepare for the measures and the accuracy of demand-capacity information available for advanced decision-making. ATFM measures activated "with immediate effect", especially ones with significant delay impacts, tend to have many repercussions and create challenges for stakeholders especially airborne aircraft and upstream ATS units. It is advisable, therefore, that ATFM units avoid such short-notice activation as much as practicable, and to open channels for CDM process to properly address the repercussions and challenges faced by stakeholders when these are activated.

5.62 Different ATFM measures require different lead time to activate, and Doc 9971 provides some guidance on choosing the appropriate ATFM measure given the lead time available. Post-operations analysis, with a focus on stakeholders' ability to comply with the ATFM measures, can be useful in determining whether the lead time provided is enough for stakeholders to respond to the requirements and should therefore be tracked and used to adjust the procedures.

ATFM Coordination Phrases and Terminology

5.63 Recognizing the lack of a current, globally standardized ATFM terminology, ATFM/SG considered the terminologies used by States and organizations advanced in ATFM implementation, both within and external to the Asia/Pacific Region.

5.64 The global development of ATFM has largely been undertaken in isolation by individual ANSPs, EUROCONTROL, other informal groups of States, or by ATFM system vendors. This has resulted in differences in concept development and consequently the technical terms used for operational and technical coordination of ATFM information.

5.65 ATFM/SG developed a set of standardized ATFM terminology for the Asia/Pacific Region to promote harmonization and interoperability of CDM/ATFM systems and procedures. The terminology set is referenced from Doc 9971 (3rd Ed, 2018), adjusted to be appropriate for Asia/Pacific regional use.

5.66 The Asia/Pacific Region ATFM terminology for use in ATFM communications is provided at **Appendix E**.

5.67 In addition, the ATFM/SG also considered the need for a harmonized set of plain-language phrases for ATFM coordination between ATFM units, ATS units, and airspace users, especially as cross-border ATFM coordination generally occurs in plain-language English and many Asia/Pacific States and organizations do not have English as their official/first language. The harmonized set of coordination phrases helps form the starting basis for operational staff to communicate with one another in a cross-border ATFM environment with low risk of miscommunication. The Basic Phrases for Cross-Border ATFM Coordination (working draft) is provided in the ICAO APAC eDocument webpage - https://www.icao.int/APAC/Pages/eDocs.aspx.

Note: The Basic Phrases are for use as an interim procedure, pending development of globally standardized ATFM-related phraseology

ATFM System Communications

5.68 Regional and Global interoperability of communications is critical to the implementation of effective, network-based cross-border ATFM.

5.69 Flight Information Exchange Model (FIXM) is one of the standardized information exchange models developed to enable the global interoperability for the ATM community. Particularly, it is to support the seamless exchange of flight-specific information among ATM stakeholders throughout a flight's lifecycle. FIXM is an equivalent to Aeronautical Information Exchange Model (AIXM) and ICAO Meteorological Information Exchange Model (IWXXM), both of which are developed to provide global standards for the sharing of aeronautical information and meteorological information, respectively. **Figure 5** illustrates the data-level interoperability among stakeholders achieved by FIXM.

Figure 5: FIXM Interoperability among Stakeholders

5.70 FIXM is referenced in the FICE ASBU thread of Global Air Navigation Plan, especially in Block 2 and Block 3 timeframes:

- *FICE-B2*
  - *Introduce the FF-ICE Release 1, pre-departure trajectory coordination and synchronization;*
  - *Provide mechanisms for collaborative flight information management, which is a basis for initial TBO, through the exchange of flight intent in FIXM format;*

  - *Enable the improved capacity utilization based on timely and accurate flight information shared among ATM stakeholders.*

- *FICE B3*
  - *Introduce mechanisms to support the post-departure trajectory coordination and synchronization;*
  - *Enable trajectory management integrated with tactical ATC operations through capabilities to manage trajectory when there are dynamic resource, e.g. airspace, constraints.*

5.71 In November 2019, the FIXM version 4.1 Extension was adopted by APANPIRG/30 to be the Asia/Pacific FIXM version 4.1 Extension for use by Asia/Pacific States/Administrations to support the cross-border ATFM information exchange. With the release of FIXM version 4.2 in February 2021, the Asia/Pacific FIXM version 4.1 Extension have been updated to version 4.2. FIXM version 4.2 (or later), extended where necessary, to accommodate additional regional requirements, is therefore the agreed ATFM information exchange model for exchanging ATFM data between ATFM systems in the Asia/Pacific Region.

5.72 More information on FIXM is available at https://www.fixm.aero.

ATFM Information Distribution

5.73 ATFM Daily Plans and ATFM Measures for individual aircraft may be distributed between ATFM units, ATS units, airport operators, and airspace users by the following means:

- Networked, web-based interface at ATFMU, ATSU and airspace user locations, each forming a node of a distributed multi-nodal ATFM platform; or
- Web-based interface at ATFMU, ATSU and airspace user locations, providing access directly to ATFM information provided by the ATFMU responsible for the initiation of ATFM measures for the destination airport or constrained airspace; or
- SWIM-based technologies to support the exchange of both flight-specific and non-flight-specific information (depending on the exchange model development progress); or
- AFTN/AMHS messages distributed to individual ATSUs and Airspace Users; or
- Email distribution; or
- Voice Coordination.

5.74 Considering the scope and performance objectives of this Framework, and the stage of development of the Distributed Multi-Nodal ATFM Network concept, **Table 2** outlines the minimum items of ATFM information that ATFM systems should be able to obtain, process, and – for some of the data elements – share with stakeholders.

Flight Event Times					
Applicability	**Flight Plan**	**System Estimated**	**Calculated (ATFM Measure)**	**Targeted (A-CDM)**	**Actual**
Departure Terminal Gate (Airline Intention)	EOBT			TOBT	AOBT
Departure Terminal Gate (ATC Sequencing)				TSAT*	
Departure Runway		ETOT	CTOT*	TTOT	ATOT
RFIX or AFIX		ETO	CTO*		ATO
Arrival Runway		ELDT	CLDT*		ALDT
Arrival Terminal Gate					AIBT
Other Information					
ATFM Daily Plan (ADP)*					
***Note: Items marked with an asterisk (*) are items that should be shared with stakeholders.					

Table 2: Minimum ATFM Information for Distribution and Sharing

ATFM Communications by AFS

5.75 Recognizing that States' needs for ATFM may vary, where necessary ATSUs may participate in collaborative ATFM without having the need for dedicated ATFM systems or terminals. The Aeronautical Fixed Service (AFS) may provide a suitable method for distribution of ATFM measure information to such ATSUs.

5.76 Given that the main ATFM measure used in Asia/Pacific under the Distributed Multi-Nodal ATFM Network concept is the Ground Delay Program (GDP), the ability to exchange Calculated Take-Off Times (CTOTs) and other associated data elements in machine-readable formats over AFS (AFTN/AMHS) between not only ATFM systems but also ATM automation is critical. The ATFM/SG therefore studied the best practices from other regions on the topic, with particular attention paid to the EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP) which governs the AFS-based exchanges of ATFM slot-related messages within the European ATFM network.

5.77 The study culminated in the development of Asia/Pacific AFTN/AMHS-Based Interface Control Document for Air Traffic Flow Management, a document outlining the various AFTN/AMHS message formats to be used for information exchange during a Ground Delay Program.

5.78 In the interim before the implementation of System-Wide Information Management (SWIM) in the region, the AFTN/AMHS-Based ICD discussed above is the agreed format for ATFM message exchange in Asia/Pacific. The ICD can be found on the ICAO Asia/Pacific Regional Office's eDocument webpage.

Meteorological Information for ATFM

5.79 Where the capability exists, it is recommended that the ANSP collaborates with the State's dedicated meteorological services provider as well as meteorologists of major airspace users, to determine the projected meteorological impact on the available capacity. The upfront involvement of airspace users ensures transparency of the capacity planning process, and then forms the first step of CDM. This level of transparency can greatly assist the effectiveness of downstream CDM in the operational realm, as early involvement in developing the operational plan results in less blaming between stakeholders and more constructive dialogue.

5.80 The accuracy of pre-tactical and tactical demand and capacity assessment is reliant on the predictability of events that will impact capacity. In the case of weather-related constraints, the traditional Annex 3 services in support of aerodrome operations and FIR/Global operations do not fully address the needs of ATFM. While globally, MET authorities are working steadily towards the institutional provision of Meteorological Services to support the Terminal Area (MSTA), there is a greater urgency for ATFM providers to collaborate closely with Met service providers to develop products that bridge the gap between the traditional information.

5.81 The provision of timely, accurate and targeted meteorological information is an important factor in making decisions for the determination of capacity at an aerodrome and/or airspace. Whilst the weather forecasts and advisory services are expected to be accurate, timely and relevant, there are still uncertainties primarily due to the chaotic nature of the atmosphere. It is also inevitable that uncertainties would grow with forecast time. It is important to factor these in when making ATFM decisions. For determining an effective ATFM measure, in addition to the timing and the severity of a particular weather phenomenon, the probability of the occurrence is also essential to assist in capacity assessment.

5.82 When predicting the capacity of an airport regarding forecast meteorological conditions, it is important to not only consider the runway/s and immediate airport surroundings, which are covered by the Aerodrome Forecast (TAF) to a distance of 8km, but to also take into consideration the ability for air traffic to flow via the terminal area on the normal arrival routes and instrument approach procedures to that airport. In particular, weather affecting the airspace in the vicinity of the primary holding areas and initial approach fixes can have a significant impact on the delivery of flights into the approach airspace and onto the runway.

5.83 The current Annex 3 provisions do not include provisions for meteorological information that specifically support the determination of weather impact on capacity. OPMET information is typically pilot and/or tactical ATC oriented, with limited ATFM orientation and are largely produced in coded text format, which makes rapid interpretation difficult for ATM officers.

5.84 ICAO Annex 3 requires that each Contracting Sate shall determine the meteorological service which it will provide to meet the needs of international air navigation, and that this shall consist of the provision of meteorological information to users that is necessary for the performance of their respective functions. Therefore, to enable rational and quantifiable capacity determination, ANSPs and Meteorological service authorities should collaborate closely to define meteorological services to be provided to support ATM and ATFM decisions, based on specific impact to operations. Such targeted MET information should address key thresholds for various weather criteria which have a quantifiable impact on airport and terminal airspace capacity, such as headwind, crosswind, visibility, ceiling, wind shear, and convective weather at the initial approach fix (IAF) or in the vicinity of critical arrival fixes, holding points and sequencing areas. An example of the simple type of matrix that could be produced, with intuitive colour coding for quick recognition by ATM staff, is shown in **Figure 6.** In terms of the wider Terminal area, similar defined criteria, thresholds and color coding can enable rapid interpretation of impact on operations.

Detailed Terminal Area Forecast for the next 9 hours

Issue time: 220734Z

Time (UTC)	0730	0800	0900	1000	1100	1200	1300	1400	1500	1600
Overall										
Wind TEMPO	290/05 --	290/05 --	290/05 --	290/05 040/10	040/10 --	040/10 --	040/10 --	040/10 --	040/10 --	040/10 --
07 Headwind (kt) TEMPO	-4 --	-4 --	-4 --	-4 9	9 --	9 --	9 --	9 --	9 --	9 --
25 Headwind (kt) TEMPO	4 --	4 --	4 --	4 -9	-9 --	-9 --	-9 --	-9 --	-9 --	-9 --
Crosswind (kt) TEMPO	N 3 --	N 3 --	N 3 --	N 3 N 5	N 5 --	N 5 --	N 5 --	N 5 --	N 5 --	N 5 --
Visibility TEMPO	3300 m --	3300 m --	3300 m --	4500 m 7000 m	7000 m --	7000 m --	7000 m --	7000 m --	7000 m --	7000 m --
Ceiling (ft) TEMPO	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --

Notes:

(i) The forecasts are normally updated every half an hour.
(ii) The colours highlighted are based on the thresholds in the following Table. TEMPO group, when given, will also be used when determining the colour levels.

Level	Head wind	Cross wind	Visibility	Ceiling
1	=< 20 kt	< 30 kt	> 1000 m	> 400 ft
2	21 - 40 kt	30 - 35 kt	600 – 1000 m	200 – 400 ft
3	> 40 kt	> 35 kt	< 600 m	< 200 ft
-	< -5 kt	-	-	obscured sky

(iii) The winds are for the central part of the North Runway. "G" refers to gust. "07" and "25" indicate respectively Runway 07 and Runway 25.
(iv) Grey colour will be shown under "Headwind" in cases when the headwind is less than -5 kt (i.e. tailwind greater than 5 kt).
(v) "N" and "S" in crosswind represent northerly crosswind and southerly crosswind respectively.
(vi) "---" in cloud ceiling means no cloud or cloud ceiling above 5000 ft. Obscured sky will be indicated by grey colour.
(vii) Gusts (G) will not be indicated in the headwind or crosswind row in view of their nature. Instead, a symbol "#" will be displayed.
(viii) Winds which are highly variable in wind direction will be displayed as VRB. VRB winds will be indicated in the headwind and crosswind in full strength.

Figure 6: Example Colour-Coded Matrix of Met Information

5.85 An example of IAF and holding stack prediction based on weather intensity and coverage area is shown in **Figure 7**, using similarly defined criteria and thresholds to facilitate rapid interpretation of the impact on operations.

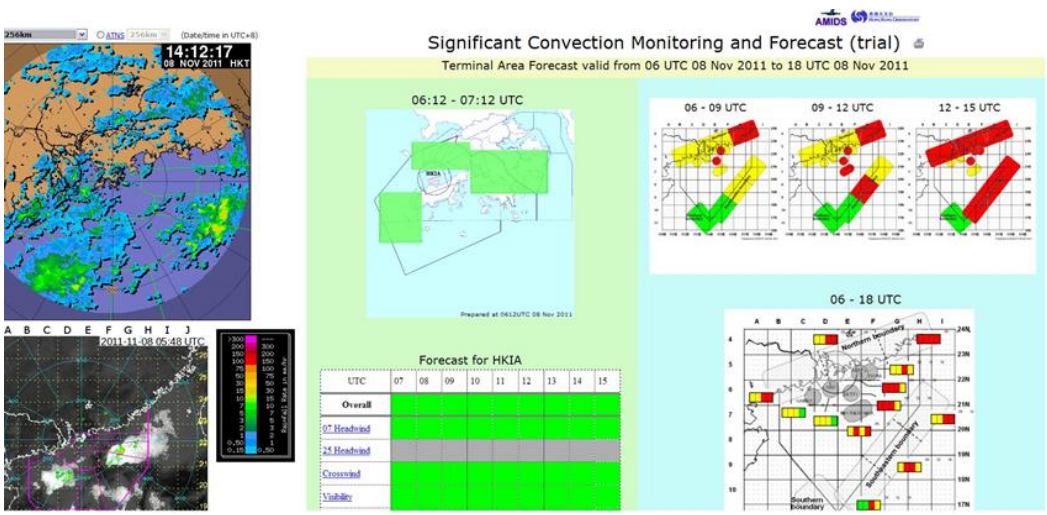

Figure 7: IAF and Holding Stack Weather Prediction

5.86 When identifying criteria to be used in determining MET services, consideration should be given to thresholds for meteorological elements that result in a change of runway operating mode, such as:

- a change of runway dependency;
- a change of spacing between arriving aircraft;

- a change in nominal aircraft approach speeds;
- an exceedance of aircraft operating limitations for significant numbers of aircraft (e.g., maximum crosswind component);
- an inability to commence an approach via the IAF; or
- an inability to hold in the primary published holding areas, etc.

5.87 When considering the lead time requirements for such forecast products, it is necessary to strike a balance between the desired probability and accuracy and the target ATFM aircraft population.

5.88 Given the direction towards Regional ATFM through ground delay programs, it is therefore desirable that the forecast period cover at least 6-8 hours ahead to encompass the majority of regional length flights with notification of ATFM measures an acceptable time before estimated off blocks time (EOBT).

5.89 In accordance with Annex 3 requirements, including the requirement that close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological services for international air navigation, States should ensure that the MET service provides sufficient detail and accuracy.

5.90 ICAO APAC Meteorological Requirements Working Group (MET/R WG) has developed specific regional guidance material necessary to assist States in developing and implementing tailored meteorological information and services to support effective ATM. The guidance captures most of the necessary processes from preparatory to operational phases. Furthermore, it provides detailed operational services, with specific examples and an operational scenario on ATM-tailored MET information and services. The APAC - Regional Guidance for Tailored MET Information to Support ATM is available at ICAO e-Documents website.

5.91 Joint post-operational analysis could be conducted between service provider (MET) and user (ATM) to enhance the effectiveness and reliability of MET information and services for supporting ATM operations. By collecting necessary operation logs and feedback from stakeholders daily, post-operational analysis can be conducted on a regular basis or as required for identifying room for improvement of MET information and services. Results of post-operational analysis are summarized as reports and reviewed in the meeting between MET and ATM so that a recommended practices can be integrated into the ATFM framework for daily operations.

Training, Competencies, and Qualification for ATFM Personnel

5.92 An ATFM service must be staffed by personnel with sufficient knowledge and understanding of the ATM system they are supporting and the potential effects of their work on the safety and efficiency of air navigation. To ensure this and within the framework of their training policy, States and ANSPs should establish training plans to ensure that ATFM service staff are properly trained.

5.93 ICAO Doc 9971, *Manual on Collaborative ATFM*, recognizes the requirement for training all stakeholders in an ATFM service, i.e., those directly operation and ATFM function and all other ATFM stakeholders including airspace users and ATS personnel.

5.94 The APAC ATFM Training Guide is available on ICAO APAC e-Documents website - https://www.icao.int/APAC/Pages/eDocs.aspx.

5.95 To ensure an ATFM service is provided by personnel with sufficient competencies, States and ANSPs should consider establishing national ATFM service personnel qualification program that is appropriate to the local environment and the level of ATFM service to be provided. The qualification scheme established by States and/or ANSPs should include provisions for:

- Appropriate recruitment of candidates with requisite ATS/ATM background,
- Methodical training program, with varying methods of instructions to ensure effective achievement of desired competencies,
- Assessment program to evaluate candidates' competencies to function as ATFM personnel,
- Regular refresher/recurrent training to ensure up-to-date knowledge among the personnel,
- Recency of experience evaluation to be used before a return-to-service when personnel has been absent from the function for an extended period, and
- Any other provisions appropriate to the local requirements.

5.96 Considering that ATFM is not a directly safety-critical service, albeit still a service that contributes to the planning of safety of air traffic services, the ATFM personnel qualification scheme may not need to be as rigorous as that of the air traffic service personnel licensing (e.g., air traffic controller licensing). It should, however, be at the appropriate level of rigor to ensure ATFM personnel are able to interface with each other, with ATS personnel, and with stakeholders effectively and professionally.

5.97 Considering also that ATFM operations in Asia/Pacific is largely cross-border in nature and ATFM personnel will be required to coordinate with international counterparts, States and ANSPs should also consider including appropriate level of English language proficiency into the ATFM qualification scheme.

5.98 Any qualification scheme established should be in line with the provisions in ICAO Annex 1 – *Personnel Licensing*.

Regional ATFM Implementation Guidance

5.99 Under Phase II of the IATA Regional Air Traffic Flow Management Project, as agreed by ATFM/SG/4, IATA delivered the Regional ATFM Implementation Guidance document for consideration by ATFM/SG/6 (Bangkok, Thailand, June 2016). The guidance was included as an Appendix in version 3.0 of the Framework document as it was important to provide harmonized implementation guidance to assist States in the planning and execution of ATFM implementation projects, and to the future interoperability of State and Regional ATFM programs.

5.100 Subsequently Doc 9971, *Manual on Collaborative ATFM*, 3rd Edition published in 2018 further amplified the guidance document and included a comprehensive guidance on ATFM implementation in Chapter 8 of Part II. It includes information and guidance on:

- ATFM Implementation Steps;
- Operational Implementation;
- Implementation Risks and Mitigation;
- Post-implementation activities;
- Regulatory requirements; and

- Assessment of benefits.

5.101 The above guidance should, in conjunction with this document and the Asia/Pacific Regional ATFM Concept of Operations, be examined by all APAC Region States planning ATFM implementation.

Regional ATFM Implementation Monitoring

5.102 The Regional Framework for Collaborative Air Traffic Flow Management is one of several important plans that are subsidiary to the APAC Seamless ANS Plan, namely:

- Asia/Pacific Search and Rescue (SAR) Plan;
- Asia/Pacific Region ATM Contingency Plan;
- Asia/Pacific Regional Framework for Collaborative ATFM;
- Asia/Pacific Collaborative Aeronautical Information Management (AIM) Plan; and
- Asia/Pacific A-CDM Implementation Plan.

5.103 States report implementation of the performance expectations of the Seamless ANS Plan using an online reporting form. Monitoring and reporting schemes for subsidiary plans enhance the current Seamless ANS monitoring and reporting scheme.

5.104 A common reporting date of 28 February is proposed for implementation status reports provided against regional plans including the Regional Framework for Collaborative ATFM, Regional Plan for Collaborative AIM, Regional SAR Plan and Regional ATM Contingency Plan. This would ensure that the reported data is received sufficiently early to facilitate implementation reporting to the relevant technical group while allowing flexibility in the scheduling of technical meetings.

5.105 In addition, it is also proposed to standardise the reporting format of the forms to percentages for example: 20%, 50%, 72%, etc… for consistency and clarity (**Appendix F**).

5.106 The monitoring and reporting scheme for regional collaborative ATFM implementation measures State implementation of the performance expectations specified in Section 7 of this document.

5.107 Asia/Pacific Administrations should report their implementation status to the ICAO Asia/Pacific Regional Office at least once annually, by no later than 28th February each year. Reported implementation status will be examined each year by the ATFM/SG, or other appropriate regional body designated by APANPIRG, to measure, report and advance regional implementation progress, and to recommend priority ATFM elements to be added to the APAC Seamless ANS monitoring and reporting scheme.

5.108 It is expected that the relevant ATFM expert/s in each Administration will be responsible for the detailed reporting in the Regional ATFM Monitoring and Reporting form, and that these experts will then liaise closely with their Administration's Seamless ANS reporting point of contact to ensure the accuracy of the higher-level reporting and consistency between the separate reporting levels.

5.109 The Regional ATFM Monitoring, and Reporting Form is provided at **Appendix F**, and is available on the ICAO APAC e-Documents webpage at https://www.icao.int/APAC/Pages/eDocs.aspx.

APAC REGIONAL ATFM IMPLEMENTATION – CURRENT STATUS

Background

6.1 The Fifth Meeting of the Air Traffic Management Sub-Group of APANPIRG (ATM/SG/5, Bangkok, Thailand, 31 July to 04 August 2017), agreed to the use of a Regional ATFM Monitoring and Reporting Form that would be used to analyse ATFM implementation against the performance objectives of the Regional Framework for Collaborative ATFM with the following Conclusion:

> ***Conclusion ATM/SG/5-3****: Asia/Pacific Regional Framework for Collaborative ATFM Amendment*
>
> *That,*
>
> *1 the Regional Framework for Collaborative ATFM be amended to include the information and performance objectives in Appendix D to the Report; and*
>
> *2. the ATFM Implementation Status Report form provided in Appendix E to the Report be included in the Regional Framework for Collaborative ATFM as an appendix and made available on the ICAO Asia/Pacific Regional Office website; and*
>
> *3. Asia/Pacific Administrations are urged to report their ATFM implementation status at least once annually by no later than 30 April each year, using the ATFM Implementation Status Report Form.*

6.2 The Regional ATFM Monitoring, and Reporting Form is provided at **Appendix F**, and is available on the ICAO APAC e-Documents webpage at https://www.icao.int/APAC/Pages/eDocs.aspx.

6.3 States report implementation of the performance expectations of the Regional Collaborative ATFM Framework using the above reporting form.

6.4 The reporting form provides evidence of implementation of ATFM, which States are obliged to implement in accordance with the standards of Annex 11. Non-reporting will be treated in the same way as non-implementation for the purpose of ICAO reporting to ATM/SG and APANPIRG.

6.5 The ATFM Implementation Status Report form provides for two tiers of status reporting:

> ***A****: Administrations that are expected, or intend, to implement and distribute cross-border ATFM measures under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM; and*
>
> ***B:*** *Administrations that are not expected to implement and distribute cross-border ATFM measures as described in A.*
>
> *Note: Administrations that are not expected to implement and distribute cross-border ATFM measures are expected to implement a number of other elements of the Regional Framework for Collaborative ATFM in order to support regional cross-border ATFM.*

6.6 Administrations reporting against Tier B implementation should note the Regional Framework for Collaborative ATFM and Asia/Pacific Seamless ATM Plan elements referring to *ATFM Program Airports, High Density Airports and High-Density FIR*s, and commence reporting against Tier A elements where any of their aerodromes or FIRs met these criteria.

6.7 In alignment with the methodology applied to assessment of implementation status in several significant ATM technical fields in the APAC Region, implementation status of each Administration is assessed as Robust (90 – 100% implementation), Marginal (70 – 89%) or Incomplete (0 – 69%).

Analysis

6.8 The collated Regional ATFM implementation status data as reported in the last five years, is provided in **Table 3** below. It summarizes current implementation status. Administrations that have filed reports against the incorrect reporting tier, or have not reported at all, are indicated accordingly.

Note: The letters (A)/(B) indicate the tier of implementation status of the State (reported or otherwise).

Administration (Tier)	**Reports Received**					**Implementation Status (2022)**
	2018	2019	2020	2021	2022	
Afghanistan (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Australia (A)	yes	yes	No Report	Yes (87)	No Report	Marginal
Bangladesh (B)	yes	yes	No Report	Yes (13)	Yes (13)	Incomplete
Bhutan (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Brunei Darussalam (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Cambodia (A)	yes	yes	Yes (63)	No Report	Yes (82)	Marginal
China (A)	yes	yes	Yes (87)	No Report	No Report	Marginal
Hong Kong, China (A)	yes	yes	No Report	Yes (89)	Yes (89)	Marginal
Macao, China (B)	yes	yes	Yes (23)	No Report	No Report	Incomplete
Cook Islands (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Fiji (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
France (French Polynesia) (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
DPR Korea (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
India (A)	yes	yes	yes	Yes (92)	Yes (84)	Marginal
Indonesia (A)	yes	yes	yes	Yes (71)	Yes (63)	Incomplete

Japan (A)	yes	yes	No Report	Yes (89)	Yes (94)	Robust
Kiribati (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Lao PDR (A)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Malaysia (A)	yes	yes	Yes (16)	No Report	No Report	Incomplete
Maldives (B)	yes	yes	Yes (20)	No Report	No Report	Incomplete
Marshall Islands (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Micronesia (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Mongolia (B)	No Report	No Report	Yes (39)	No Report	Yes (40)	Incomplete
Myanmar (B)	yes	yes	Yes (30)	No Report	No Report	Incomplete
Nauru (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Nepal (B)	yes	yes	Yes (0)	Yes (43)	Yes (40)	Incomplete
New Caledonia (B)	yes	yes	Yes (43)	No Report	No Report	Incomplete
New Zealand (A)	yes	yes	Yes (44)	No Report	Yes (67)	Incomplete
Pakistan (B)	yes	yes	No Report	Yes (11)	Yes (80)	Marginal
Palau (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Papua New Guinea (B)	yes	yes	Yes (21)	No Report	No Report	Incomplete
Philippines (A)	yes	yes	No Report	Yes (61)	Yes (77)	Marginal
Republic of Korea (A)	yes	yes	No Report	Yes (82)	Yes (87)	Marginal
Samoa (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Singapore (A)	yes	yes	yes	Yes (97)	Yes (97)	Robust
Solomon Islands (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Sri Lanka (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report

Timor Leste (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Tonga (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Thailand (A)	yes	yes	yes	Yes (90)	Yes (90)	Robust
Tuvalu (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
United States (A)	yes	yes	No Report	Yes (94)	No Report	Robust
Vanuatu (B)	No Report	No Report	No Report	No Report	No Report	Did Not Report
Viet Nam (A)	yes	yes	No Report	Yes (34)	Yes (34)	Incomplete

Table 3: ATFM Implementation Status (as of October 2022)

6.9 Out of 39 States and two Special Administrative Regions in APAC Region, 23 Administrations have reported ATFM implementation status at least once in the last five years. The ATFM implementation of only three Administrations; Singapore, Thailand and United States, have been assessed as Robust.

6.10 The COVID-19 pandemic has caused significant traffic downturn and consequently the needs for ATFM measures has reduced. However, the implementation of cross-border ATFM has resulted in a collaborative environment over the years across many States. The ATFM platform has enabled exchange of information through web conferences and electronic data exchanges. The ATFM infrastructure at many States has also contributed during large scale airspace contingency scenarios.

ATFM and A-CDM Implementation Indicators

6.11 In the first ICAO's APAC Ministerial Conference on Civil Aviation in Beijing in January 2018, the Ministers in charge of civil aviation representing 36 governments endorsed the Beijing Declaration formalizing their shared commitments on high-priority aviation safety and efficiency objectives. Implementation of Air Traffic Flow Management (ATFM) and Airport Collaborative Decision Making (A-CDM) at all high-density airports and airspaces by 2022 is accorded top priority in the Beijing Declaration.

6.12 The following two indicators have been considered to reflect on the current implementation status as of 2022.

- Number of international high density airports with A-CDM implemented (**Figure 8**) , and
- High density FIRs and FIRs supporting Major Traffic Flows and high-density aerodromes with ATFM/CDM implemented (**Figure 9**)

Note: High Density airport = airport with 100,000 scheduled movements per annum or more (Asia/Pacific Seamless ATM plan, V2.0, September 2016)

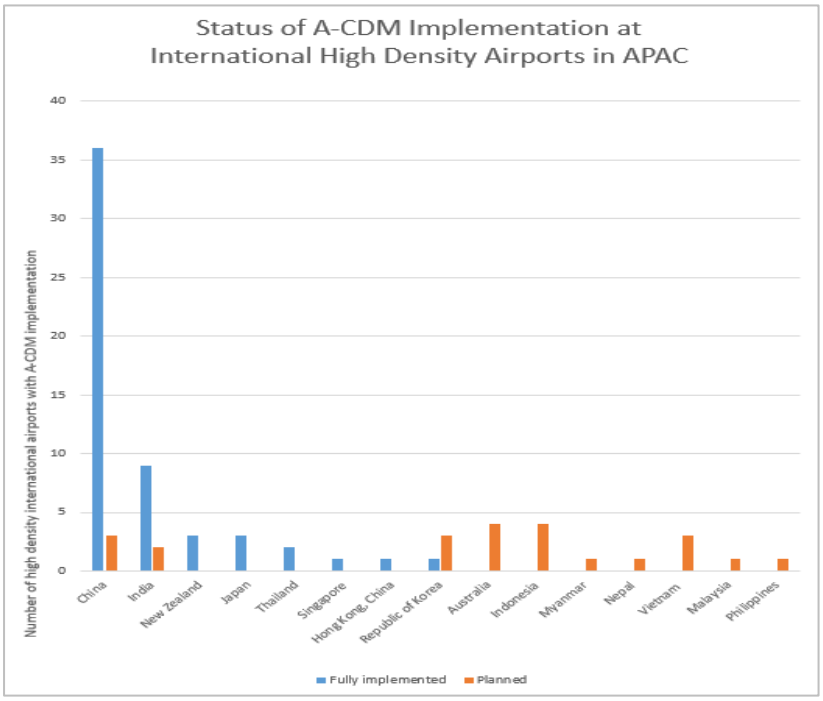

Figure 8: A-CDM Implementation in APAC Region Airports

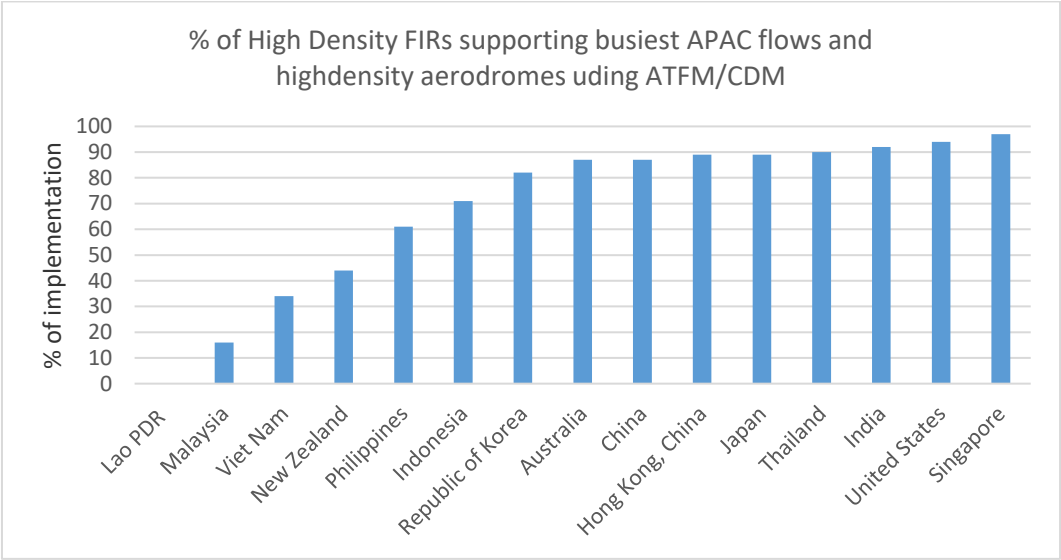

Figure 9: ATFM Implementation in High Density FIRs (as per the Seamless Plan)

6.13 ATFM implementation is progressing in APAC but many efforts and collaboration among States are expected. Sub regional ATFM initiatives need to be harmonized to ensure full benefits of ATFM in APAC.

Multi-Nation, Cross Border ATFM Programs

6.14 Much progress has been made in multi-nation collaborative ATFM implementations, such as Asia Pacific Multi Nodal ATFM Collaboration (AMNAC) and Northeast-Asia Regional ATFM Harmonization Group (NARAHG). The following paras provide a brief update on each of the respective implementation programs.

Asia/Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC)

6.15 Following the development and adoption of Distributed Multi-Nodal ATFM Network concept as the foundation of regional ATFM in Asia/Pacific, several States/Administrations banded together for an Operational Trial project aimed at validating and operationalizing the concept in live environment. The initiative, originally named the Distributed Multi-Nodal ATFM Operational Trial, began in 2015 and followed a phased approach to methodically develop and validate cross-border distributed ATFM procedures for the region.

6.16 In the subsequent years, the initiative expanded both in terms of membership and operational experience. The initiative now comprises 11 Asia/Pacific States/Administrations with varying levels of ATFM maturity, structured such that they can contribute according to their needs and readiness. The expansion of membership has also allowed the initiative to introduce distributed ATFM measures in live environment, with network members utilizing the jointly developed Common Operating Procedure as a basis for administering and facilitating compliance to the measures. The ATFM measures, particularly the Ground Delay Programs (GDP), have been applied in various types of demand-capacity imbalances ranging from planned aerial events to unplanned capacity constraints at aerodromes or airspace and emergency infrastructure outages.

6.17 Recognizing the maturity of the initiative, members agreed to change the name of the initiative to Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC) and to transition the focus from operational trials to full implementation. Current focus areas now include improving the common operating procedure, expanding the AMNAC network, providing operational inputs to the development of SWIM-based ATFM information exchange, supporting members in upgrading their ATFM maturity, and harmonizing with other ATFM initiatives in the region.

Northeast-Asia Regional ATFM Harmonization Group (NARAHG)

6.18 In 2014, to respond to the rapidly increasing demand for traffic in Northeast Asia, China, Japan, and the Republic of Korea established a sub-regional ATFM group, “Northeast-Asia Regional ATFM Harmonization Group (NARAHG)”. The objective is to achieve the implementation and harmonization of ATFM/CDM procedures and practices to support international flights in Northeast-Asia to promote regional air traffic safety, capacity, and efficiency with the development of a concrete operational improvement. Thus, this appropriate Demand and Capacity Balance (DCB) will contribute to the ATM operation for all stakeholders.

6.19 To achieve the above-mentioned goal, NARAHG is manly working on:

- Sharing relevant and necessary information on the current air traffic situation;
- Developing an operational mechanism to support cross-border ATFM harmonization including regular joint ATFM post-operations analysis;
- Developing a harmonized technical and operational communication protocol/procedures/tool to support the associated agreed ATFM/CDM operations; and
- Coordinating the development of a technical and operational communications document defining the protocols and procedures for ATFM operations.

6.20 In addition, NARAHG is striving to operate a new conceptual ATFM measures by exchanging flight trajectory data in real time to mitigate the inefficiency caused by conventional ATFM measures such as MINIT, level capping or etc. In this regard, NARAHG members are cooperating to develop the operation procedure and ultimately promoting cross-border ATFM optimized for the environment and characteristics of the three States.

6.21 By continuously improving operating procedures and complementing the systems, sub-region can implement a harmonized seamless ATFM by an appropriate DCB. Maintaining an optimal DCB will contribute to the ATM operation for all stakeholders.

PERFORMANCE IMPROVEMENT PLAN

Note: prior* to implementation, *ATFM systems* and *procedures* should *be verified by safety assessment under State Safety Management Systems.

ATFM Related Performance Objectives of the Seamless ANS Plan

7.1 The Asia/Pacific Seamless ANS Plan, Version 3.0, November 2019, specifies performance objectives under Preferred Aerodrome/Airspace and Route Specifications (PARS) and Preferred ANS Service Levels (PASL), to be implemented in four phases:

- PARS/PASL Phase I – had an expected implementation by 12 November 2015 (Phase I elements that had not been completed as of 2019 were moved to Phase II);
- PARS/PASL Phase II – had an expected implementation by 07 November 2019;
- PARS/PASL Phase III - expected implementation by 03 November 2022; and
- PARS/PASL Phase IV – expected implementation by 27 November 2025.

7.2 ATFM-related performance objectives of the Seamless ANS Plan, summarized as follows, were taken into account in the formulation of Regional ATFM performance objectives specified in this Framework:

- *PARS/PASL Phase II*

7.1 All international aerodromes should enable, in accordance with an Airport Master Plan, aerodrome management and coordination services:

a) when traffic density requires, an appropriate apron management service to regulate aircraft operations in coordination with ATS;

c) regular airport capacity analysis, which included a detailed assessment of passenger, airport gate, apron, taxiway and runway capacity.

7.3 All international aerodromes should operate an A-CDM system for ACIS integrated with the ATM network function.

7.16 Civil-Military Airspace expectations are as follows:

b) SUA should be regularly reviewed to ensure the activities that affect the airspace, and size and timing of such activity are accurately reflected by the SUA type, dimensions, activation notice and duration of activation.

7.17 States should implement regulations supporting the integration of UAS operations in non-segregated airspace, using a risk-based approach and in accordance with the Asia/Pacific Regional Guidance for the Regulation of UAS, as a minimum.

7.32 All international aerodromes where ATFM facilities are required should be served by AMAN/DMAN facilities.

Note: All AMAN systems should take into account airport gates for runway selection and other aircraft departures from adjacent gates that may affect arriving aircraft.

7.36 ATC units should conduct Airspace Planning and enable systems that manage direct and flexible routings where practicable, and the optimal operation of FUA.

7.37 All ATC Sectors should have a nominal aircraft capacity figure based on a scientific capacity study and safety assessment, to ensure safe and efficient aircraft operations.

7.38 All ACCs operating within FIRs where demand may exceed capacity should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements, initial integration of ASM with ATFM, Collaborative Network Flight Updates, Basic Network Operation Planning and Initial Airport/ATFM slots, A-CDM Network Interface and Dynamic Slot Allocation.

7.41 Aeronautical meteorological observations, forecast, warning, climatological and historical products (such as aerodrome meteorological forecasts and reports, aerodrome warnings and wind shear warnings) should be disseminated to users, and in accordance with global and regional guidance material. An agreement between the MET authority and the appropriate ATS authority should be established to ensure the appropriate exchange of meteorological information obtained from aircraft.

7.44 Civil-Military ATM expectations are as follows:

a) a national Civil-Military body should be formed to coordinate strategic civil- military activities (military training should be conducted in locations and/or at times that do not adversely affect civilian operations, particularly those associated with major aerodromes);

- *PARS/PASL Phase III*

7.18 All international aerodromes should operate an A-CDM system integrated with the ATM network, and an AOP and where practicable an APOC.

7.46 All ATC units providing services to international aerodromes should operate extended arrival metering.

7.51 ACCs should enable, where practicable, Free Route Airspace, RNP routes, Advanced FUA and Airspace Management (ASM), Dynamic Sectorisation, Enhanced Conflict Detection Tools and Conformance Monitoring and Multi-Sector Planner Function.

7.52 All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Short Term ATFM measures, Enhanced NOPS Planning, Enhanced integration of airport operations and NOPS planning, Enhanced Traffic Complexity Management, Full integration of ASM with ATFM, Initial Dynamic Airspace configurations, Enhanced ATFM slot swapping, Extended Arrival Management, ATFM Target Times and Collaborative Trajectory Options Programme supporting the integration of time-based management within a flow centric approach.

7.56 All States should ensure that aeronautical meteorological products supported by automated decision systems or aids using IWXXM.

7.3 The regional ATFM performance objectives specified in Section 7 of this framework – Performance Improvement Plan, complement and where necessary expand upon the performance objectives of the Seamless ANS Plan.

Structure of the Performance Improvement Plan

7.4 Regional collaborative ATFM performance objectives are arranged in Regional ATFM Capability phases aligned, where practicable, with Phases I – IV of the Asia/Pacific Seamless ANS PARS and PASL.

7.5 Recognizing the short lead time between the finalization of the Version 3.0 of the Framework and PARS/PASL Phase I, Regional ATFM Capability Phase I were further divided into sub-phases A and B, with expected implementation 12 November 2015 and 25 May 2017 respectively.

7.6 Also recognizing the substantial performance expectations in PARS/PASL Phase III, the different update cycles between the Asia/Pacific Seamless ANS Plan and the Framework, the significant impact due to COVID-19 pandemic, and the potential benefits of a more granular progress tracking, Regional ATFM Capability Phase III is further divided into sub-phases A and B, with expected implementation of 03 November 2022 and November 2025.

Note: No ATFM-related initiative is identified in PARS/PASL Phase IV of the Asia/Pacific Seamless ANS Plan, version 3.0 (November 2019).

7.7 Accordingly, the various phases of Regional ATFM Capability can be summarized as follows:

- Phase I A, expected implementation by 12 November 2015 (aligned with Seamless ANS Plan Phase I);
- Phase I B, expected implementation by 25 May 2017;
- Phase II, expected implementation by 07 November 2019 (aligned with Seamless ANS Plan Phase II);
- Phase III A, expected implementation by November 2022; and
- Phase III B, expected implementation by November 2025.

7.8 At the time of this edition (2022), the deadline for phases IA, IB, and II capability implementation has passed. The expected capabilities for those phases are still retained in the document for reference as States/Administrations may not have implemented all elements in those phases yet.

7.9 Performance objectives are presented under the following general structure for each Regional ATFM Capability Phase, where relevant:

- ATFM and Other Related Regulations;
- ATFM System;
- Strategic ATFM, Pre-Tactical ATFM or Tactical ATFM;
- Capacity and Demand Monitoring and Analysis;
- Capacity Improvement;
- ATFM Execution;
- ATFM Measures;
- Post-Operations Analysis;
- ATFM/A-CDM Integration; and
- Civil-Military ATM Coordination.

ATFM Program Airports

7.10 ATFM Program Airports, referenced in the performance objectives are:

- Airports where strategic slot allocation is implemented; and
- All other airports designated by the relevant authority as requiring or potentially requiring ATFM implementation.

REGIONAL ATFM CAPABILITY PHASE IA

Expected implementation by 12 November 2015

ATFM Regulations

7.11 Air traffic flow management (ATFM) shall be implemented for airspace where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned.

Annex 11 to the Convention on Civil Aviation section 3.7.5.1 refers.

Strategic Capacity and Demand Monitoring and Analysis

7.12 A regular program of bi-annual strategic airport and airspace capacity and demand analysis should be implemented for all international airports and associated terminal area airspace, and for all en-route ATC sectors supporting the homogeneous ATM areas and major traffic flows identified in the Asia and Pacific Regions (**Figure 10**), including consideration of:

- CNS systems;
- ATC resources and capability;
- ATC separation standards and techniques;
- runway occupancy times;
- seasonal schedules; and
- historical traffic data and traffic growth forecasts

7.13 Where strategic analysis indicates that demand does not yet exceed capacity, preparation for the implementation of ATFM capability should be based on careful analysis of current traffic and expected growth in the next 5 years.

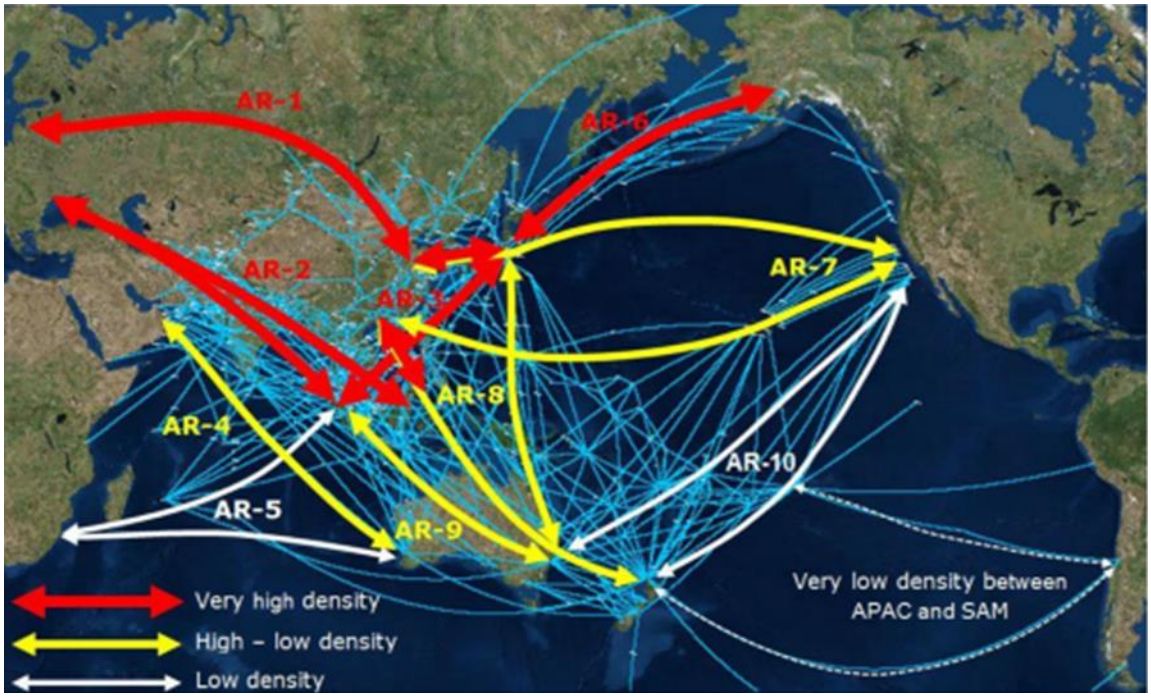

Figure 10: Homogeneous ATM Areas and Major Traffic Flows Identified in the Asia and Pacific Regions *(Source: Asia and Pacific Regions (APAC) Air Navigation Plan, Volume II, April 2022)*

Pre-Tactical Capacity and Demand Monitoring and Analysis

7.14 Daily pre-tactical airport and airspace capacity and demand analysis should be conducted for all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors supporting the busiest Asia/Pacific city pairs, including consideration of:

i. expected runway and airspace configurations;

ii. forecast meteorological phenomena;

iii. ATC resources, facilities and equipment;

iv. other known or expected capacity constraints; and

v. updated flight schedule and flight plan information.

Pre-Tactical ATFM Execution

7.15 ATFM Daily Plan (ADP) for all ATFM Program Airports and associated terminal area airspace, including airport and airspace capacity declarations and related background information, should be prepared, and distributed to all relevant stakeholders.

7.16 ADP should be distributed to stakeholders by either:

i. Web-based ATFM network; or

ii. Webpages hosted by each participating ANSP; or

iii. Email distribution.

Relevant stakeholders include:

a) Neighboring ATFMUs or, where not provided, ATSUs

b) ATSUs supported by the originating ATFMU;

c) Relevant airport operators; and

d) Participating aircraft operators.

7.17 ADP should be coordinated by the responsible ATFMU or ATSU and agreed with all relevant stakeholders, through chairing and/or participation in scheduled and, where necessitated by changes in airport or airspace capacity or other events, ad-hoc ATFM conferences for pre-tactical ATFM planning.

Post-Operations Analysis

7.18 The accuracy and effectiveness of capacity and demand analyses and ADP preparation and distribution, including supporting information listed in paragraph 7.7, should be verified through comparison with operational outcomes observed, and rectification of discrepancies included in planning for system and process improvements.

REGIONAL ATFM CAPABILITY PHASE IB

Expected implementation by 25 May 2017

ATFM Systems

7.19 Operational FPL and ATS message distribution systems and processes should be analyzed and, where necessary, modified to ensure that FPL, CHG, DEP, DLA and CNL messages are originated, distributed and processed in accordance with the requirements specified in ICAO Doc.4444 PANS-ATM.

7.20 Requirements should be published in all relevant State AIP, specifying that, except where necessary for operational or technical reasons, FPL should be submitted not less than 3 hours prior to EOBT.

7.21 Where the delay is the result of a GDP, CTOT and other slot allocation information originated from the ATFM unit responsible for the destination airport shall be made available to the airlines, relevant ATS unit and ATFM units.

7.22 A DLA message should be transmitted when the departure of an aircraft, for which basic flight plan data FPL has been sent, is delayed by more than 15 minutes after the estimated off-block time contained in the basic flight plan data.

7.23 Subject to local ATFM procedures, the responsibility for the origination of DLA messages should be of the departure ATS Unit, the airspace user, or any other authorized unit. Subsequent transmission of the DLA message would be in accordance with the provisions of ICAO Doc 4444 *PANS-ATM*.

7.24 Appropriate procedures should be implemented to ensure that FPL are not discarded from other ATM systems because of ATFM delay.

7.25 ATFM, AMAN/DMAN and A-CDM systems should be integrated using common fixes, terminology, and communications protocols to ensure complementary operations. The implementation of an integrated ATFM and A-CDM network will complement each other and together create a seamless air traffic environment.

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

Remark: "The current version of FIXM core provision is version 4.2. The agreed ATFM information exchange model for in the Asia/Pacific region is therefore changed to FIXM version 4.2 (or later), extended where necessary. This expectation is reflected in the Regional ATFM Capability Phase IIIB"

Note: Where SWIM-based ATFM communications capability is not yet established, ATFM messages identified in the Asia/Pacific AFTN/AMHS-Based Interface Control Document for ATFM may be used for distribution of ATFM measure information via AFTN/AMHS in the interim.

Capacity Improvement

7.26 Airport and terminal airspace capacity should be increased through optimized ATC separation standards and techniques and reduced runway occupancy at all ATFM Program Airports and in associated terminal area airspace.

Strategic ATFM Execution

7.27 Implement strategic airport slot allocation at all international airports, for periods where demand significantly exceeds the airport's capacity.

Pre-Tactical Capacity and Demand Monitoring and Analysis

7.28 Pre-tactical modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures, should be implemented for all ATFM Program Airports and associated terminal area airspace.

Pre-Tactical ATFM Execution

7.29 CDM capability should be implemented, enabling the sharing of all relevant information with all stakeholders, providing continuous availability of information and common reference material for daily and ad-hoc ATFM conferences.

Tactical Capacity and Demand Monitoring and Analysis

7.30 Dynamic update of airport and airspace capacity constraints, capacity calculation, demand information using schedule, flight plan and ATS messaging, and ATM system information and modelling of tactical ATFM programs should be implemented.

Tactical ATFM Execution

7.31 Tactical ATFM at ATFM Program Airports should be implemented when required using:

- Ground Delay Programs (GDP) with the assignment of Calculated Take-Off Time (CTOT), or
- Minutes in trail (MINIT) or miles in trail (MIT) or other ATFM measures specified in ICAO Doc 9971 – Manual for Collaborative ATFM.

Note: MINIT and MIT can increase the workload of upstream ATSUs and can result in extensive and unpredictable delays as the requirements traverse many FIRs. Extended use of these measures should therefore be minimized.

7.32 All States should ensure that local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT are implemented. (Reference to **Appendix B**)

Note 1: At controlled aerodromes, CTOT compliance should be facilitated through the cooperation of the aircraft operator and the issuance of ATC clearances. As a minimum, CTOT should be made available to the relevant ATC tower and the aircraft operator;

Note 2: For flights departing aerodromes where an ATC service is not provided, CTOT information should be made available to the aircraft operator and the first ATS unit providing services to the flight.

Note 3: States planning to implement ground delay programs should ensure adequate time is provided for local procedure development and promulgation at aerodromes where CTOT will be applied.

7.33 CTOT for individual aircraft should, where necessary, be revised or cancelled.

7.34 Tactical ATFM should be implemented for operations through constrained airspace sectors, only during periods affected by the constraint.

7.35 As far as practicable, individual aircraft should not be subject to more than one tactical ATFM measure per flight.

Post-Operations Analysis

7.36 Procedures and agreements should be developed to ensure post-operational analysis of cross-border ATFM programs, including the canvassing and consideration of feedback from airspace users, airports operators, ATS and other ATFM units. Daily collaborative conferences among stakeholders should be held, supplemented where necessary by ad-hoc conferences called to assess the outcomes of programs of ATFM measures responding to non-normal situations.

7.37 The results of post-operations analyses should be used for planning ATFM, airspace and ATS route improvements.

The Asia/Pacific ATFM Post-Operations Analysis Recommended Framework, which can be found at ICAO Asia/Pacific eDocument webpage, provides guidance on ATFM post-operations analysis.

REGIONAL ATFM CAPABILITY PHASE II

Expected implementation by 07 November 2019

ATFM Systems

7.38 ATFM information distribution capability utilizing FIXM Version 3.0 (or later) * should be implemented for the exchange of flight specific ATFM information including CTOT, CTO, and CLDT.

**Note: "The current version of FIXM core provision is version 4.2. The agreed ATFM information exchange model for in the Asia/Pacific region is therefore changed to FIXM version 4.2 (or later), extended where necessary. This expectation is reflected in the Regional ATFM Capability Phase IIIB"*

7.39 ATFM systems implemented should have the following capabilities

i. Capability to share ATFM Daily Plan (ADP) providing information on demand/capacity imbalance issues and planned/expected ATFM measures;

ii. Capability to allocate ATFM slots and distribute necessary information such as CTOT, CTO, and CLDT when slot-based measures such as Ground Delay Program are to be used;

iii. Capability for authorized users to manage ATFM slots through revision, cancellation, and swapping; and

iv. Capability to monitor or collect data for the purpose of monitoring and reporting ATFM slot compliance, whether real-time automated or as part of post-operations analysis process.

7.40 Full interoperability of cross- border ATFM, A-CDM, AMAN, DMAN, ATM automation and airspace user systems should be implemented, to provide seamless gate-to-gate collaborative ATFM operations

Pre-Tactical Capacity and Demand Monitoring and Analysis

7.41 Automated modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures, should be implemented for all ATFM Program Airports and associated terminal area airspace and, where possible, en-route airspace supporting the busiest Asia/Pacific Region city pairs and high-density major traffic flows.

Tactical Capacity and Demand Monitoring and Analysis

7.42 Meteorological services to support ATM in the terminal area (MSTA) should be implemented, including near-term or now-casting forecasts of convective weather activity at or affecting ATFM Program Airports and associated instrument approach procedures, terminal area ATS routes and holding points and other significant locations.

Note: Annex 3 requires that States ensure the quality management of meteorological information.

Tactical ATFM execution

7.43 ATFM measures should be applied to flights through constrained airspace.

7.44 Ground Delay Programs utilizing CTOT should be applied when appropriate to:

i. aircraft destined for constrained ATFM Program Airports, that have not yet departed; and

ii. aircraft planned to operate through constrained airspace where tactical ATFM measure CTO at RFIX or AFIX is in place, that have not yet departed.

7.45 ATFM systems should have the capability to consider long haul flights.

7.46 Systems should be in place to ensure the timely update of estimate information for airborne aircraft.

7.47 A-CDM-related performance expectations - A-CDM-related performance expectations at A-CDM program airports are illustrated in Chapter 10 of Asia/Pacific A-CDM Implementation Plan to map with APAC Seamless ANS Plan and Regional Framework for Collaborative ATFM expectations. See Appendix III-D of Doc 9971 for a list of sample key performance indicators for A-CDM systems.

REGIONAL ATFM CAPABILITY PHASE IIIA

Expected implementation by 3 November 2022

Capacity and Demand Monitoring and Analysis

7.48 Regular reviews of airspace usage, including areas operated under the FUA concept, should be conducted; considerations should be given t identifying and mitigating bottlenecks using techniques including – inter alia – direct and flexible routings and optimal sharing of civil/military airspace based on up-to-date demand information.

ATFM/A-CDM Integration

7.49 A-CDM should be implemented at international aerodromes and, when implemented, should be integrated with ATFM operations with appropriate information exchange between the two systems and processes.

Civil-Military ATM Coordination

7.50 National Civil-Military ATM Coordination body should be established to enable strategic, pre-tactical, and tactical airspace management (ASM), allowing closer coordination between civil and military airspace authorities and effective usage of airspace appropriate to both civil traffic demand and military mission requirements.

7.51 Special Use Airspace (SUA) should be regularly reviewed under the auspice of Civil-Military ATM Coordination body to ensure optimal use of all airspace areas in accordance with the flexible use of airspace (FUA) concept.

REGIONAL ATFM CAPABILITY PHASE IIIB

Expected implementation by 2025

ATFM and Other Related Regulations

7.52 Appropriate regulations should be established to support the integration of UAS operations in non-segregated airspace to ensure the safe and efficient operations of manned aircraft, especially when ATFM measure is applied.

ATFM Systems

7.53 ATFM information distribution capability utilizing FIXM version 4.2 (or later), extended where necessary, should be implemented for the exchange of flight specific ATFM information.

7.54 ATFM, AMAN/DMAN, and A-CDM systems should be integrated through effective cross-platform information exchange, utilizing FIXM version 4.2 (or later) with necessary extension to facilitate common-format exchanges.

Strategic Capacity Improvement

7.55 Techniques and tools to enhance ATC capacity including Free Route Airspace, RNP routes, ASM concept with FUA operations, dynamic sectorization, and enhanced conflict detection should be explored and implemented based on safety case and cost-benefit analysis.

Tactical Capacity and Demand Monitoring and Analysis

7.56 Meteorological information exchange with ATM and ATFM systems should be in IWXXM version 3.0 or later.

Tactical Capacity Improvement

7.57 Extended arrival metering for international aerodromes should be explored and, if deemed necessary, implemented in collaboration with adjacent States to increase predictability and enhance arrival management effectiveness across FIRs.

Tactical ATFM Execution

7.58 Advanced/enhanced ATFM-related solutions including – inter alia – ASM/ATFM full integration, dynamic airspace configurations, target time operations, and collaborative trajectory options should be explored and implemented based on stakeholders' needs, safety case, and cost-benefit analysis.

RESEARCH AND DEVELOPMENT POSSIBILITIES

Research and Development

8.1 Version 3.0 of the Regional Framework for Collaborative ATFM provided the initial framework for implementation of a distributed multi-nodal ATFM network, as envisaged in the Regional ATFM Concept of Operations. This concept will continue to develop as experience is gained through trials and subsequent operational implementation. The Framework is therefore iterative in nature and will require regular update in the medium term.

8.2 Further research and development of the distributed multi-nodal ATFM network concept will largely be conducted by ATFM/SG participating States through their operations trial programs, consistent with Principle 36 of the Asia/Pacific Seamless ATM Plan Principle 36 – 'Clustering' for the research, development and implementation of ATM projects. The outcomes of trials and lessons learned from operational deployment will be considered by ATFM/SG for the improvement and updating of the Framework.

ATFM information sharing

8.3 To achieve a seamless information sharing among ATFM Nodes, while at the same time being able to maintain the flexibility to accommodate new users and additional customized functions of individual ATFM systems, a system-to-system connection designed according to ICAO System-Wide Information Management (SWIM) concept has been identified as viable and suitable solution for the Distributed Multi-Nodal ATFM operation.

8.4 SWIM Task Force along with ATFM technical team has undertaken work towards drafting the technical specifications for system-to-system connection and the exchange of ATFM data over a regional SWIM infrastructure (CRV).

8.5 To support the ATFM information exchange for cross-border ATFM operations and ATFM/A-CDM integration in the Asia/Pacific Region, the Asia/Pacific SWIM Task Force (SWIM TF), developed the Flight Information Exchange Model (FIXM) version 4.1 Extension. Currently FIXM version 4.2, extended where necessary, is the agreed ATFM information exchange model for exchanging ATFM data between ATFM systems in the Asia/Pacific Region

8.6 Subject to the availability of the baseline SWIM specifications for ATFM service and CRV connectivity, further review of the feasibility of system technical trials on CTOT Distribution, CTOT Revision, CTOT Cancellation, and CTOT Request to enable its long-term development of ATFM SWIM-based technical specifications will be required.

Collaborative ATFM Concept Developments

8.7 The following concepts should be researched, and developed, for implementation in the Asia/Pacific Region:

a. Delay Absorption Intent – included in the Regional ATFM Concept of Operations, provides aircraft operators with the flexibility to choose how to distribute the delay assigned by an ATFM measure to various phases of flight. Not yet included in the ATFM Performance Improvement Plan, this concept has the potential to improve outcomes by increasing the number of aircraft participating in the program, through the application of ATFM delays to longer distance flights that are currently exempt from ground delay programs. The development of this concept will be undertaken in trials before then being potentially included in the broader Framework.

b. The ASBU module NOPS Block 1 aims to introduce enhanced processes to manage flows and improve overall fluidity. One of the main features of ATFM in Block 1 includes the development of "management of arrival/overfly times Targeted time of arrival (TTA)/ Targeted time over (TTOs)". With TTA/TTOs, it is envisaged that the intended ATFM measures would be more encompassing, increasing dynamism of flow management, while ensuring equity in delay management. This enhanced ability must be complimented by continuous developments on the reliable and precise information sharing, and exchange mechanism, which eventually will also form the foundation for implementation of System Wide Information Management (SWIM) and Flight and Flow in Collaborative Environment (FF-ICE).

c. Application of ATFM Measures to Long Range Flights – will improve equity in ATFM processes, and contribute to better outcomes in those ATC sectors where long range flights are currently exempt from all but minimal en-route delays. This will require further development of ATFM measures the CTO ATFM measure, and the formulation of regionally agreed limits on the total ATFM+AMAN delay that may be applied to long range and ultra-long-range flights. The LR-ATFM trials in the future could also provide the opportunity to experiment with inter-airline ATFM slot negotiation as airlines would have the best knowledge of their business model and operating cost index.

d. Interoperability of ATFM, AMAN/DMAN and A-CDM systems – will require ANSPs and airport operators to collaboratively develop their local operational letters-of-agreement to incorporate procedures and practices optimizing gate-to-gate flow management of flights.

e. Development and implementation of interoperability among A-CDM and ATFM platforms should incorporate considerations of relevant milestones involved, open standards for sharing data with systems across border, alignment of compliance criteria in A-CDM and ATFM and coordinated timing for data exchange matched with data availability timeline. Further exploration will be needed on A-CDM and ATFM enabling systems and integration solutions including SWIM concepts and infrastructure and how SWIM and existing XMLs can support connecting the two disciplines for an overall improvement in benefits for service providers and aircraft operators. Specifically, the developments related to ACDM B1 modules on Airport Operations Plan data sharing which support strategic flow management and refinement of ATFM Daily Plan will need to be explored.

f. Collaborative Trajectory Options – provide for flexible routing options that permit aircraft operators to elect to re-route flights via longer trajectories to avoid constrained airspace and take advantage of the reduction or removal of ground delay (or en-route delay, where implemented) that would be imposed if the flight continued through the constrained airspace. A collaborative trajectory options program would significantly improve the safety and efficiency of ATM in cases of large-scale weather deviations (LSWD) such as those experienced in the cyclonic weather season in the Bay of Bengal and South China Sea areas, and contingency operations including the avoidance of airspace that is either unsafe (e.g. volcanic ash cloud) or unavailable. A collaborative trajectory options program would first require a full understanding of airspace capacity, which should be supported by a comprehensive study.

g. The development of a collaborative trajectory options program in the Asia/Pacific Region, particularly in Southeast Asia, will require a coordinated multi-partite effort to improve the regional ATS route network and ATS surveillance/communications infrastructure, and to provide sufficient ATS route options for the program. ATS route specification and implementation of surveillance and communications infrastructure are included in the performance objectives of the Seamless ATM Plan.

h. Network Collaborative Decision-Making – to provide mechanisms within the distributed multi-nodal ATFM network for the formulation of executive flow management decisions in the event of competing stakeholder priorities. This will require research and development of network- suitable automated decision-support tools and associated business rules. Operational experience in the distributed multi-nodal ATFM network environment will be key to identifying the potential challenges and formulating and testing strategies.

i. Harmonization of Multiple Flow Management Programs – will ensure that all ATFM measures applied are collaboratively managed to ensure that individual flights are not unduly penalized by multiple measures in one flight, and that ATFM network outcomes are more predictable. Currently aircraft may be subject to independently applied en-route and airport ATFM delays, resulting in potentially unreasonable cumulative delay over the course of a flight. A significant amount of research is being conducted, and needs to be conducted, into the effects and harmonization of multiple flow programs in multiple FIRs.

j. Development of SWM-based MET information services specifically addressing the needs of ATFM in the APAC region – APAC MET R WG is developing use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region. It will also investigate assisting the SWIM TF in identifying and developing specifications of information services for exchange of MET information supporting ATFM operations.

MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

Milestones and Timelines

9.1 Section 7 (Performance Improvement Plan) provides milestones and timelines for a number of elements generally aligned with the Asia/Pacific Seamless ANS Plan PARS and PASL Phase I and II, being effective 12 November 2015 and 09 November 2018 respectively:

Regional ATFM Capability Phases	Expected Implementation of ATFM	Expected Implementation as per APAC ACDM Implementation Plan	Harmonized Milestones
Phase I A	12 November 2015	-	2015
Phase I B	25 May 2017	-	2017
Phase II	07 November 2019		2019
Phase III A	2022	2022	2022
Phase III B	2024	2025	2025

9.2 States that have not yet implemented collaborative ATFM or having implementations that are not in accordance with the provisions of this Framework, should commence planning from the date of its approval by APANPIRG.

9.3 It should be noted, however, that the ATFM capability outlined in the Framework should be implemented as early as possible. The Framework timelines should under no circumstances be interpreted as limiting or deferring ATFM implementation where there is a current or expected need for it in an earlier timeframe than outlined.

Priorities

9.4 While it is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers, States should be aware of the Asia/Pacific Regional Priorities adopted by APANPIRG, including ASBU B0-NOPS and the Annex 11 requirement for States to implement ATFM where there is a current or expected imbalance of demand and capacity.

Actions

9.5 This Plan is iterative in nature and will require further development as experience is gained in operational trials of the distributed multi-nodal ATFM network concept. ATFM/SG, under its terms of reference, should continue to oversee and coordinate the development of the concept and subsequent amendment of the Framework, facilitate the coordination and alignment of CDM/ATFM programs being conducted within the Region, and review the effectiveness of existing and planned ATFM programs.

APPENDIX A: COLLABORATIVE ATFM FRAMEWORK PRINCIPLES

People: Cultural and Political Background

- High-level political support (including development of educational information for decision-makers) to support Seamless ANS initiatives, including military cooperation and AIM.

- Education and implementation of non-punitive reporting and continuous SMS improvement systems

- Aviation Regulations, Standards and Procedures

- Harmonised regional or sub-regional rules and guidelines, modelled on the regional application of common regulations incorporated by reference into local legislation.

- Shared ATM operational standards, procedures, guidance materials through common manuals and templates.

- An emphasis on delivery of ATM services based on CNS capability, resulting in flexible, dynamic systems.

ATM Coordination

- Sub-regional ATFM based on system wide CDM serving the busiest terminal airspace and MTF.

- Cross-border/FIR cooperation for use of aeronautical facilities and airspace, collaborative data sharing, airspace safety assessment and ATM Contingency planning.

- Encouragement of military participation in civil ATM meetings and in ATS Centres where necessary.

Airspace Organisation

- Promoting flexible use airspace arrangements and regular review of airspace to ensure it is appropriate in terms of purpose, size, activation and designation.

- The optimisation of airspace structure through amalgamation and use of technology. (Asia/Pacific Seamless ANS Plan V3.0)

Facilities: Aerodromes

- To encourage aerodrome operators to actively participate in ATM coordination in respect of Airport CDM development and operational planning, including aerodrome complexity and capacity.

- Planning and coordination with local authorities and government agencies to take into account environmental issues, obstacles, aerodrome and PBN development.

ATS Units

- Collaboration by ANSPs for evaluation and planning of ATM facilities.

- Optimization of ATM facilities through amalgamation and the use of technology, including automation, satellite-based systems and remote facilities.

Aeronautical Data

- Early implementation of AIM, including cooperative development of aeronautical databases and SWIM to support interoperable operations.

APPENDIX B: CDM/ATFM TRIAL TIERED PARTICIPATION LEVELS

ANSPs play a key role as Node Leaders in the ATFM Operations. Accurate traffic demand prediction and ATM resource outlook, effective issuance of ATFM measures, and coordination of CDM web/teleconference are important elements provided by ATFM Units and ATS Units within each ANSP. The Distributed Multi-nodal ATFM model has adopted a tiered participation level approach to provide the opportunity for ANSPs to participate based on their readiness and capability. The different participation levels also provide an avenue for ATFM Nodes to upgrade to a higher level as ATFM implementation becomes more ready and capable. It is recommended that ATFM nodes endeavour to be at Level 3 to implement Regional ATFM. The following tables outline responsibilities on the part of ANSPs at various participation levels**.**

Level 3 ANSPs	
Responsibilities	**Descriptions**
General ATFM Responsibilities	
Demand-Capacity Prediction and Monitoring	• Predict traffic demand at ATM resources within the node through a range of data sources including schedules, airport slots, flight plans (FPLs) and ATS messages or other forms of flight progress updates • Predict capacities at ATM resources within the node • Assess demand-capacity imbalance • Monitor the accuracy of demand and capacity predictions
Local CDM Conference	• Host scheduled CDM conference with local stakeholders to prepare ATFM measures
Cross-Border CDM Conference	• Host or participate in cross-border CDM conference with other node leaders
ATFM Daily Plan (ADP)	• Generate ADP to outline ATM situation for the day
ATFM Measure Execution	• Ensure the effective implementation / revision / cancellation of ATFM measures in collaboration with local FMP/ATS units • Provide information on ATFM in a timely manner to relevant stakeholders in accordance to the cross-border procedures developed
ATFM Measure Effectiveness Monitoring	• Monitor ATFM measure effectiveness and revise as appropriate to the developing situations
ATFM Post-Operations Analysis	• Lead the collaborative effort to perform post-operations analysis after each round of ATFM program
Responsibilities Specific to GDP	
CTOT Distribution	• Generate CTOTs and distribute via appropriate channels preferably no less than 90 minutes before Estimated Off-

	Block Time (EOBT) to support stakeholder's advance planning
Slot Management	• Provide platform or protocol for slot management process (change, swap, remove, add)
Adherence to CTOT in departure management	• Manage departure traffic in adherence to CTOT within the CTOT compliance window
	• Include CTOT information as part of the air traffic control clearance when a given flight is subject to CTOT *Ref: ICAO Doc 9971, 3rd Ed., Part II, Chapter 6*
	• Ensure that local ATC procedures and CDM processes facilitating compliance with received CTOT are implemented

Table 1: Level-3 ANSP Responsibilities

Level 2 ANSPs	
Responsibilities	**Descriptions**
General ATFM Responsibilities	
Cross-Border CDM Conference	• Participate in cross-border CDM conference with other node leaders
ATFM Post-Operations Analysis	• Participate in the collaborative effort to perform post-operations analysis by providing information from departure side
Responsibilities Specific to GDP	
Adherence to CTOT in departure management	• Manage departure traffic in adherence to CTOT within the CTOT compliance window
	• Include CTOT information as part of the air traffic control clearance when a given flight is subject to CTOT *Ref: ICAO Doc 9971, 3rd Ed., Part II, Chapter 6*
	• Ensure that local ATC procedures and CDM processes facilitating compliance with received CTOT are implemented

Table 2: Level-2 ANSP Responsibilities

Level 1 ANSPs	
Responsibilities	**Descriptions**
General ATFM Responsibilities	
Participation in Project Updates	• Participate in regular project meetings to keep up to date with latest developments

ATFM Education	• Educate local stakeholders and personnel on ATFM in preparation for capability upgrade
ATFM Information Distribution	• Distribute information about ATFM initiatives to local stakeholders, e.g. information about an active ATFM measure in the region, to ensure stakeholders are aware of the project progress and implementation elsewhere
Planning for Capability Upgrade	• Study the concept of ATFM and Distributed Multi-nodal ATFM operations • Assess the needs and plan for capability upgrade, especially if supplying traffic to FIRs serviced by Level-3 ANSPs

Table 3: Level-1 ANSP Responsibilities

APPENDIX C: DEMAND-CAPACITY BALANCING

General Principle

1. The implementation of Air Traffic Flow Management (ATFM) manages air traffic demand over airport or airspace where demand at times exceeds or is expected to exceed the capacity of the Air Traffic Control (ATC) services, to ensure that traffic demand is compatible with ATC capacity. The implementation of ATFM also facilitates and contributes to a safe, orderly, and expeditious flow of air traffic by ensuring that ATC capacity is optimised and utilised to the maximum extent possible.

2. In the APAC region, the regional concept for cross border ATFM is based on a Distributed Multi-Nodal ATFM Network concept, whereby each node is led by an agreed Air Navigation Service Provider (ANSP) as the Node Leader. The Node Leader is responsible for Demand-Capacity Monitoring and Balancing at ATM resources such as airports or airspace.

3. Demand and Capacity Balancing can be performed during the different ATFM phases, and it can start as early as during the strategic phase, to the pre-tactical phase and finally the tactical phase. More details on the individual ATFM phases can be found in Asia/Pacific Framework for Collaborative ATFM under the section of Background Information.

Establishment of an accurate prediction for traffic demand

4. As specified in Chapter 5 of ICAO Doc 9971, an accurate picture of the expected traffic demand can be established when reliable and accurate flight intent data are provided for ATFM services. These data can be provided by the various organisations responsible for the authorisation or execution of flights. The following data associated with flight intent can be provided to ATFM services for use in demand predictions:

a. Airspace User (AU) marketing schedule data;

b. airport strategic slot data from the airport slot coordination process;

c. AU flight intent updates;

d. ANSP ATM automation system data (e.g., ATS messages via aeronautical fixed telecommunication network (AFTN) or ATS message handling systems (AMHS), or data provided by the flight data processing (FDP) component) including:

   i. flight plans (FPL ATS message or comparable data);

   ii. flight plan amendments (CHG ATS message or comparable data);

   iii. flight plan cancellation (CNL ATS message or comparable data);

   iv. indication of departure (DEP ATS message or comparable data)

   v. indication of arrival (ARR ATS message or comparable data);

   vi. indication of flight delay (DLA ATS message or comparable data); and

   vii. flight coordination (CPL and EST ATS messages or comparable data);

e. aerodrome departure planning and arrival information;

f. correlated surveillance data (e.g., ADS-B, SSR, WAM, MLAT); and

g. aircraft position report (airspace user provided position report).

Planning, assessment and declaration of capacity

5. The assessment and declaration for the various types of capacities can be referenced from Asia/Pacific Framework for Collaborative ATFM, para 5.27 to 5.36.

Addressing demand and capacity imbalance

6. ATFM measures should generally be applied during periods when demand exceeds capacity. They are techniques used for the management of air traffic demand according to system capacity and should not be applied on a routine basis.

7. During the ATFM strategic phase, discussions should be conducted between Airspace Users (AUs) and capacity providers such as ANSPs and airports for the analysis of airspace, airport and ATS restrictions. In addition, significant meteorological phenomena and changes in seasonal meteorological condition should also be discussed. From these discussions, discrepancies between demand and capacity can be identified, and possible solutions can be jointly developed to address the demand capacity imbalance.

8. If demand-capacity imbalances cannot be resolved in the strategic phase, pre-tactical and tactical ATFM measures may be required. **Table 1** sets out the various types of ATFM measures which can be adopted during the ATFM pre-tactical and tactical phases. The table also outlines how these measures are applied, as well as the associated timeframe for its application. The list is not exhaustive and provides guidance on where the measures lie on the ATFM timeline.

9. For an effective provision of ATFM service, data exchange is required. As depicted in **Figure 1**, the data to be shared include information related to the flight intent, capacity, aerodrome, and airspace demand, ATFM measures, and CDM actions for the purpose of cooperation and coordination of air traffic flow management activities between ATFM stakeholders. There is also a requirement for the ATFM function to be regularly updated with information on the overall ATM resources (e.g., airspace status and aerodrome infrastructure) to understand the impact on the available capacity.

ATFM measure	*Constraint*			*Control mechanism*	*Time frame*	*Requirements to be effective*
	Airport arrivals	*Airport departures*	*Airspace*			
GDP	X	X	X	CTOT	Pre-tactical and tactical	Participation in percentage and distance
Re-route			X	Flight path change to avoid constraint	Pre-tactical and tactical	Access to airspace and published routes
Ground stop	X			Prevent departures from specific aerodromes to address existing tactical load on an arrival aerodrome	Tactical	
MIT/MINT	X		X	Time- or distance-based separation on a single stream of traffic	Tactical	
MDI	X		X	Time-based separation from departures from the same aerodrome	Tactical	
Fix balancing	X		X	Flight path change to avoid	Tactical	
Level capping			X	Flight path change to avoid	Tactical	

Table 1: Summary of ATFM Measures

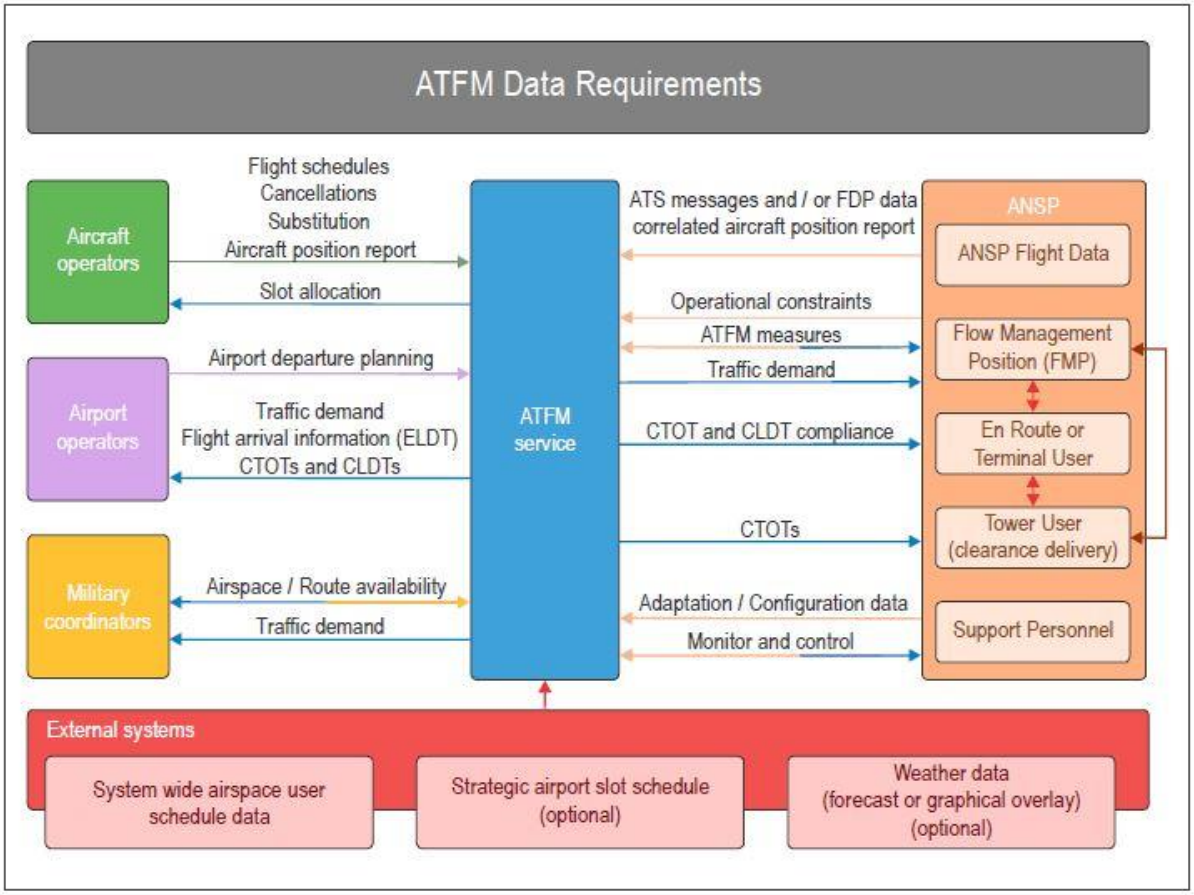

Figure 1: ATFM Data Requirements

APPENDIX D: ATFM DAILY PLAN SAMPLE TEMPLATE

ATFM DAILY PLAN	[ANSP or ATFM Unit Name]
DATE / TIME OF ISSUE	[Date]/[Time of issuance]
STATUS / REFERENCE	[Status of the ADP, e.g., *New*, *Revision 1*, etc.]/ [FIR Name_YYYYMMDD_version]

CONSTRAINTS AND IMPACT					
LOCATION	APPLICABLE PERIOD (UTC)			REMARK	EXPECTED ARRIVAL DELAY (AVERAGE)
[Constraint Loc]	[Date]	[Start]	[End]	[Constraint/Issue]	[Expected Delay]

ATFM MEASURE					
LOCATION	ATFM MEASURE PERIOD (UTC)			ATFM MEASURE	CAPACITY IMPACT
[Constraint Loc]	[Date]	[Start]	[End]	[ATFM measure]	[Capacity number]

OTHER INFORMATION
[Pertinent weather information]
[Additional instruction, e.g., CTOT compliance windows]
[Contact information, web-conference address]
[Additional remarks]

EXAMPLE ATFM DAILY PLAN

ATFM Daily Plan	RJJJ	1504022000 - 1504031959

CAPACITY and CONSTRAINTS			
Location (AD or SECT)	**APPLICABLE PERIOD**	**AAR (landings per hour)**	**CONSTRAINT/REMARK**
RJCC	2100 – 2300	04 – 06	LVP
RJTT	0200 – 0300	10	RWY34L/16R CLSD 0200 – 0245 CONST
RJTT	0300 – 0500	14	FLTCK RWY22 ILS
SECT 1	0130 – UFN	-	Developing CB

ATFM MEASURES		
Location (AD or SECT)	**APPLICABLE PERIOD**	**MEASURE REMARKS**
RJTT	2330 – 0140	CTOT DEST RJCC
SECT 12	2300 – 0005	3 MINIT DEP RJAA/RJTT
SECT 12	0130 – UFN	G585 8 MINIT AT [WAYPOINT] WB FOR ZMUB REGARDLESS OF FL

POSSIBLE/DEVELOPING ISSUES		
Location (AD or SECT)	**APPLICABLE PERIOD**	**MEASURE REMARKS**
RJAA	0300 – 0500	15 MIT, 250KT AT [WAYPOINT] [WAYPOINT]
RJTT	0300 – UFN	CTOT

APPENDIX E: ATFM TERMINOLOGY AND COMMUNICATIONS

ATFM Terminology – General

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

MINIT	Minutes in Trail	A tactical ATFM measure expressed as the number of minutes required between successive aircraft at an airspace boundary point. It is normally used in airspace without air traffic surveillance or when transitioning from surveillance to non-surveillance airspace, or even when the spacing interval is such that it would be difficult for a sector controller to measure it in terms of miles
MIT	Miles in Trail	A tactical ATFM measure expressed as the number of miles required between successive aircraft (in addition to the minimum longitudinal requirements) to meet a specific criterion which may be separation, airport, fix, altitude, sector or route specific. MIT is used to organize traffic into manageable flows as well as to provide space to accommodate additional traffic (merging or departing) in the existing traffic flows. It will never be less than the separation minima.
RFIX	En-route Fix	A waypoint during the en-route phase of a flight. In the context of ATFM it could a waypoint where an ATFM Measure may be applied
-	ATFM Measure	ATFM solution which will balance demand against capacity or facilitate the safe, orderly, and expeditious flow of air traffic

ATFM Terminology – Phase of Flight

Acronym	**Term**	**Definition**
SOBT	Scheduled off Block Time	The time that an aircraft is scheduled to depart from the parking position
EOBT	Estimated Off Block Time	The estimated time that an aircraft will start movement associated with departure; normally this should match the SOBT at airports with Strategic Slot Coordination Process
TOBT	Target Off - Block Time	The time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready to receive start-up approval/push-back clearance
TSAT	Target Start up Approval Time	The time provided by ATC taking into account TOBT, CTOT and/or the traffic situation that an aircraft can expect start-up/push-back approval
COBT	Calculated Off Block Time	A time calculated and issued by an ATFM Unit, as a result of tactical ATFM slot allocation, at which a flight is expected to push back / vacate parking position so as to meet a CTOT, taking into account start and taxi time.
AOBT	Actual Off Block Time	The time the aircraft pushes back / vacates parking position (Equivalent to Airline / Handlers ATD – Actual Time of Departure & ACARS=OUT)
TTOT	Target Take-Off Time	The Target Take-Off Time of an aircraft taking into account the TOBT/TSAT plus Estimated Taxi-Out Time

CTOT	Calculated Take off Time	A time calculated and issued by an ATFM Unit, as a result of tactical ATFM slot allocation in a Ground Delay Program, at which a flight is expected to become airborne
ETOT	Estimated Take Off Time	The Estimated Take-Off Time of an aircraft, taking into account EOBT plus Estimated Taxi-Out Time
ATOT	Actual Take Off time	The time that an aircraft takes off from the runway (Equivalent to ATC ATD–Actual Time of Departure, ACARS = OFF)
ETO	Estimated Time Over	Estimated time at which an aircraft would be over a fix, waypoint or particular location typically where air traffic congestion is expected
CTO	Calculated Time Over	Time calculated and issued by an ATFM Unit, as a result of tactical ATFM slot allocation, at which a flight is expected to be over a fix, waypoint or particular location typically where air traffic congestion is expected
TLDT	Target Landing Time	Targeted Time from the Arrival Management process at the Threshold, taking runway sequence and constraints into account; Progressively refined planning time used to coordinate between arrival and departure management processes
CLDT	Calculated Landing Time	A landing time calculated and issued by an ATFM unit, as a result of tactical ATFM slot allocation at which a flight is expected to land on a runway
ELDT	Estimated Landing Time	The estimated time that an aircraft will touch-down on the runway
ALDT	Actual Landing Time	Actual time an aircraft lands on a runway (Equivalent to ATC ATA –Actual Time of Arrival = landing, ACARS=ON)
SIBT	Scheduled In Block Time	The Time that an aircraft is scheduled to arrive at its first parking position
CIBT	Calculated In Block Time	An in-block time calculated and issued by an ATFM unit, as a result of tactical ATFM slot allocation at which a flight is expected to be at its first parking position.
AIBT	Actual In Block Time	The time that an aircraft arrives in-blocks (Equivalent to Airline/Handler ATA –Actual Time of Arrival, ACARS = IN)

ATFM Terminology Map

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

ATFM Phraseology

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

Circumstance	Phraseology
Calculated take-off time (CTOT) delivery resulting from a slot allocation. The CTOT shall be communicated to the pilot at the first contact with ATC.	CTOT (*time*)
Change to CTOT resulting from a Slot Revision.	REVISED CTOT (*time*)
CTOT cancellation resulting from a Slot Cancellation.	CTOT CANCELLED, REPORT READY
Start-up requested too late to comply with the given CTOT.	CTOT EXPIRED, REQUEST A NEW CTOT
Denial of Start-up when requested too late to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE CTOT EXPIRED, REQUEST A NEW -CTOT
Start-up requested too early to comply with the given CTOT.	REQUEST A NEW CTOT
Denial of Start-up when requested too early to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE CTOT (*time*), REQUEST START-UP AT (*time*)

……

APPENDIX F: ATFM MONITORING AND REPORTING FORM

ATFM PERFORMANCE INDICATORS

The following indicators are based on the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM, which should be read in conjunction with this form. The information provided will be used by the relevant regional bodies to assess individual Administration and overall regional compliance with the Framework, and may be used by Administrations to internally evaluate their implementation status.

INSTRUCTIONS

A	If your administration. i. has implemented ATFM and distributing ATFM measures; or ii. has plans to implement and distribute ATFM measures under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM: **Answer Questions 1 to 42**

B	If your administration is not planning to implement ATFM measure under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM: **Answer Questions 43 -61**

Date of Reporting - 28th February each year

A. Administrations Distributing ATFM Measures -
Indicate whether *your administration has:*

Number	Regional ATFM Framework Performance Expectations	Response
1.	Enacted regulations for the implementation of ATFM	
2.	Implemented a program of annual or bi-annual strategic airport and airspace capacity, and strategic demand analysis	
3.	Performed an analysis of current traffic demand and expected growth for the next 5 years (rolling)	
4.	Commenced daily pre-tactical airport and airspace capacity-demand analysis for ATFM Program airports and associated terminal airspace as well as enroute ATC sectors supporting the homogeneous ATM areas and major traffic flows identified in the Asia and Pacific Regions	
5.	Made arrangements for relevant ATFMU to chair and/or participate in regularly scheduled ATFM conferences for pre-tactical ATFM planning	
6.	Commenced ATFM post-operations analysis and rectification, taking guidance from the Asia/Pacific ATFM Post-Operations Analysis Recommended Framework as starting point	
7.	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	
8.	Enacted requirements to ensure FPL is submitted no less than 3 hours prior to EOBT except where necessary for operational or technical reasons	
9.	Enacted requirements to ensure a DLA message is transmitted when the departure of an aircraft for which basic FPL has been sent is delayed by more than 15 minutes after the EOBT specified in that basic FPL	
10.	Ensured that, when there is a delay from a GDP, CTOT and other slot allocation information originated from the ATFMU is communicated to all relevant stakeholders	
11.	Implemented or designed systems to ensure that FPL are not discarded from relevant ATM systems as a consequence of ATFM delay.	

12.	Implemented common fixes, terminology and communications in ATFM, AMAN/DMAN and A-CDM systems	
13.	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	
14.	Implemented strategic airport slot allocation at all international airports where demand significantly exceeds airport capacity	
15.	Implemented pre-tactical modelling of airport and airspace configuration and traffic demand, and the effect of ATFM measures	
16.	Implemented tactical ATFM measures for flights inbound to ATFM program airports	
17.	Enabled sharing of relevant information between all stakeholders through implementation of CDM	
18.	Implemented dynamic updating of airport and airspace capacity constraints, capacity calculations and demand information	
19.	Implemented local procedures for ATFM operations and communication, including phraseology and terminology for ATFM Units, ATS Units, airspace users, and airport operators, drawn from ICAO Doc. 9971	
20.	Established ATFM capability with appropriately trained staff and operating procedures	
21.	Developed procedures for ATFMU, ATS Units, airspace users, and airport operators when ATFM program is active	
22.	Implemented local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT	
23.	Implemented tactical ATFM measures for flights inbound to constrained airspace	
24.	Ensured tactical ATFM measures are only applied during periods of constraint	
25.	Promulgated procedures to avoid subjecting individual flights to more than one tactical ATFM measure	
26.	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	
27.	Ensured post-operations analyses are used for planning ATFM, airspace and ATS route improvements	
28.	Commenced daily preparation and sharing of an ATFM Daily Plan (ADP) for all ATFM Program airports and associated terminal airspace	
29.	Promulgated procedures for tactical management of ATFM measures, including revision, cancellation where necessary	
30.	Ensured interoperability of implemented ATFM, A-CDM, AMAN, DMAN, ATM automation systems and airspace user systems where operational interfaces exist or are planned	
31.	Implemented meteorological services to support ATM in the terminal area (e.g. Meteorological Service in Terminal Area -MSTA)	

32.	Implemented distributed multi-nodal ATFM information distribution capability	
33.	Ensured ATFM systems take long haul flights into account in demand predictions	
34.	Ensured ATM and ATFM systems provide timely update of estimate information for airborne aircraft	
35.	Implemented A-CDM at international aerodrome and integrated with ATFM operations with appropriate information exchange between the two systems and processes	
36.	Established national civil-military ATM coordination body to enable strategic, pre-tactical, and tactical airspace management (ASM)	
37.	Established a civil-military ATM coordination body to regularly review the use of Special Use Airspace (SUA) to ensure optimal usage all airspaces based on the FUA concept	
38.	Established regulations to support a safe integration of UAS operations in non-segregated airspace	
39.	Implemented ATFM information distribution capability utilizing FIXM v4.2 (or later), extended where necessary, to enable the exchange of flight-specific ATFM information	
40.	Integrated ATFM, AMAN/DMAN, and A-CDM systems through cross-platform information exchange based on FIXM v4.2 (or later) with appropriate extension	
41.	Established research and development programs to explore novel capacity enhancement techniques such as free route airspace, extended arrival metering, dynamic airspace configurations, target time operations, and collaborative trajectory options, with an emphasis on needs, safety case, and cost-benefit analysis	
42.	Implemented Meteorological information exchange with ATM and ATFM systems using IWXXM v3.0 (or later)	

B. States/Administrations *Facilitating* ATFM Measures (but not expected to implement and distribute cross-border ATFM)

Indicate whether your administration has:

Number	Regional ATFM Framework Performance Expectations	Response
43.	Implemented a program of annual or bi-annual strategic airport and airspace capacity, and strategic demand analysis	
44.	Performed an analysis of current traffic demand and expected growth for the next 5 years (rolling)	
45.	Made arrangements for relevant personnel from ATSU to participate in regularly scheduled ATFM conferences for pre-tactical ATFM planning	
46.	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	
47.	Enacted requirements to ensure FPL is submitted no less than 3 hours prior to EOBT except where necessary for operational or technical reasons	
48.	Enacted requirements to ensure a DLA message is transmitted when the departure of an aircraft for which basic FPL has been sent is delayed by more than 15 minutes after the EOBT specified in that basic FPL	
49.	Ensured local stakeholders are able to access CTOT information readily, either directly from the ATFMU distributing it or through local dissemination	
50.	Implemented or designed systems to ensure that FPL are not discarded from relevant ATM systems as a consequence of ATFM delay.	
51.	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	
52.	Enabled sharing of relevant information between all stakeholders through implementation of CDM	
53.	Implemented local procedure with regards to ATFM operations and communication, including phraseologies, among ATFMU, ATS Units, airspace users, and airport operators drawn from ICAO Doc 9971	
54.	Developed procedures for ATS units, airspace users, and airport operators when ATFM program is active	
55.	Implemented local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT	

56.	Developed ATFM post-operations analysis workflow among ATFMU, ATS units, airspace users, and airport operators to ensure proper and timely feedback mechanism can be distributed to ATFMU originating the ATFM measures	
57.	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	
58.	Ensured post-operations analyses are used for planning ATFM, airspace, and ATS route improvements	
59.	Ensured capability to receive ATFM Daily Plan (ADP) from Administrations distributing the ATFM measures and to distribute it among local stakeholders for situational awareness	
60.	Ensured ATM systems provide timely update of estimate information for airborne aircraft	
61.	Educated ATM staff and stakeholders on the basic of ATFM and its connection with ATS	

ATFM TRAINING GUIDE

Chapter 1 - Introduction

General

Air Traffic Flow Management (ATFM) is an enabler of Air Traffic Management (ATM) efficiency and effectiveness. ATFM contributes to the safety, efficiency, cost effectiveness and environmental sustainability of an ATM system. ATFM enhances safety by balancing traffic demand against available capacity, thereby enabling the safe management of air traffic especially in a constrained environment.

As traffic grows, an increasing number of States begin to implement ATFM. As ATFM becomes more widely adopted, it is worth remembering that ATFM's effects are trans-boundary in nature and therefore the operation needs to be coordinated between States. Therefore, ATFM systems need to be compatible and interoperable, with the development of coordinated and harmonized training requirements being the first step in ensuring harmonized ATFM implementation.

In developing a training program, it is important to recognize that ATFM provides a vital support to Air Traffic Control (ATC) services and affects the operations of all ATM stakeholders. ATFM service should therefore be provided by personnel with sufficient knowledge and understanding of an ATM system in which they operate. The comprehensive effects of ATFM on all stakeholders also means that suitable ATFM knowledge should be provided for all stakeholders, not just ATFM service personnel. This is in line with the *ICAO Manual on Collaborative Air Traffic Flow Management (Doc 9971)* which suggests that other non-ANSP stakeholders should also be made aware of and understand the ATFM services and the specific roles they carry in the process.

This document provides guidance for States/ANSPs in systematically developing their ATFM training programs through a set of harmonized training requirements. It describes the requirements for ATFM staff and stakeholder training at various levels befitting the role they play in an ATFM environment. The proposed training requirements are designed to support both local application of ATFM and ATFM operations at the regional level.

Note that the material in this document is a general guidance focusing on ATFM concepts, principles, and procedures. Each State/ANSP will have to add locally specific training requirements and materials especially in relation to the specific ATFM system, equipment, and local procedures used.

ICAO and EUROCONTROL sources were consulted for the development of the training concepts and methodology presented herein. The proposed training syllabus is derived with the support of in-depth ATFM service expertise.

Purpose and Scope of the Document

The purpose of this document is to provide a guideline for the development of ATFM training process and materials by States/ANSPs, and to ensure regional ATFM service personnel and stakeholders have a similar level of knowledge and experience in ATFM.

In many cases, an individual may already possess the required competence and experience in a particular domain and may not need to follow a formal training course on the subject. Nevertheless, a process to confirm the individual's competence should still be followed. The document addresses the following:

- Who is to be trained?
- What pre-requisite skills are required or can be obtained?
- What are the job responsibilities and required competencies?
- What is the required content of ATFM training?
- What is the level of training depending on the level of responsibilities to be exercised?

Structure of the Document

This ATFM training guide consists of 3 chapters and 2 attachments:

- Chapter 1 – Introduction
- Chapter 2 – ATFM Training Structure
- Chapter 3 – Job Responsibilities, Competencies, Training Requirements

- Attachment 1 – Recommended Training Modules (Ab-Initio and Basic)
- Attachment 2 – Example Training Program: Japan

Chapter 2 – ATFM Training Structure

A Model of ATFM Training

ATFM training is the method by which ATFM staff can obtain the appropriate skills to operate an ATFM system and provide ATFM services that are effective, harmonized, and consistent. The training should be provided not only to ATFM unit staff but also to other stakeholders who will need to operate in an ATFM environment, to ensure that all relevant personnel are aware of and understand their roles and responsibilities within an ATFM process. Operational personnel to whom ATFM training should be provided, in addition to the ATFM unit staff, therefore include:

- ANSP
  - ATCs
- Airspace Users
  - Flight Operations/Dispatch Staff
  - Pilots
- Airport Operators
  - Airside Operations Staff
  - Ground Handling Agents
- Military
  - Military ATCs
  - Military Pilots
- Regulatory Body (CAAs and equivalent)
  - Regulators
  - Auditors

An ATFM service is provided by staff at different levels, each with its own training requirements. The different levels of ATFM responsibilities include operations management and supervision, ATFM planning and execution, and essential support staff. Other support functions, CDM partners, and general ATM personnel should also be considered when developing training requirements.

This guidance proposes six-level (taxonomy levels) training objectives as a basis for training requirement development. Different ATFM or ATFM-related personnel can then be assigned the training courses that will provide the required levels of knowledge in various areas appropriate to their functions within the ATFM process. The six levels are:

Level	Objective
Level 0	Learners to be aware of the materials
Level 1	Learners to possess the basic knowledge of the subject and to be able to memorize and retrieve the essential points
Level 2	Learners to have the ability to understand and discuss the subject intelligently, and able to apply the knowledge in certain events
Level 3	Learners to possess thorough knowledge of the subject and the ability to apply it in the development and execution of plans

Level	Objective
Level 4	Learners to be able to integrate the knowledge and establish action plans/methods to resolve a problem in a familiar situation
Level 5	Learners to be able to analyze new situations/complex problems and apply the learned principles to develop resolution strategies

(Source: EUROCONTROL Specification for the ATCO Common Core Content Initial Training)

A matrix should be constructed to determine the level of training and competency required for personnel responsible for the various ATFM function. A partial matrix template is shown below, with the levels shown for illustrative purpose.

Personnel / Subject	Ops Manager	Supervisor	ATFM Planner	ATFM Execution	Ops Support	CDM Partner	General ATM Personnel
ATM	2	2	2	2	2	1	1
ATFM	2	3	4	3	2	2	1
ATC Ops	2	2	2	1	1	1	1
Airport Ops	2	2	2	2	1	1	1
Airline Ops	2	2	2	2	1	1	1
Meteorology	2	2	3	3	2	1	1
ICAO Provisions	3	2	2	2	2	1	1
ATFM Tools	2	2	3	3	3	2	1
Capacity Assessment	2	2	2	1	1	1	1
Airspace Design	2	2	2	1	1	1	1
...	...	...	...	...	...		...

Phases of ATFM Training

ATFM training can be divided into several phases. This document concentrates on training requirements for Ab-Initio and Basic training; other phases are only discussed briefly.

Ab-Initio Training

Ab-initio training is intended to ensure that new ATFM staff possess the necessary contextual knowledge in order to follow the more detailed job-related training. In many cases, staff may already possess some knowledge (e.g. ATC staff will possess the necessary ATC knowledge, airline operations personnel the necessary aircraft operations knowledge). The possession of the necessary ab-initio subject knowledge should be assessed upon recruitment / assignment. In cases where staff already possess the necessary contextual knowledge, they may be exempted in whole or in part from elements of the ab-initio training.

Basic Training

Basic training is the main phase during which the core ATFM and associated operational topics are covered comprehensively. Basic training also covers more detailed knowledge of subjects related to ATFM than in the ab-initio training. At the successful completion of basic

training, the staff member should have all the relevant knowledge to proceed to on-the-job training before performing his/her roles in the ATFM operation.

On-the-Job Training

For an ATFM staff to be able to apply the knowledge from the basic training course in an operational environment, supervised practice in the form of an on-the-job training (OJT) is required. The main purpose of OJT is to reinforce the theoretical knowledge and to help assure staff member's competency to perform the ATFM functions to the required standards. OJT can also follow advanced or refresher training.

Advanced Training

As ATFM functions develop, several advanced ATFM analysis and application techniques are used. Some staff, having progressed in their ATFM careers, will also require a higher level of knowledge and skills for their functions. The advance training modules will therefore be required. The purpose of advanced training is to augment the skills and knowledge of ATFM personnel in dealing with either more specific complex problems or with a wider breadth of issues.

Recurrent/Refresher Training

It is essential that ATFM personnel update his or her competencies in accordance with the latest operational requirements, procedures, and new methodology/technologies through regular recurrent training. ATFM personnel can also be absent from their function for an extended period; recurrent/refresher training should also be administered prior to return-to-service for this case as well.

Training Requirements for ATFM Instructors

To ensure effective provision of ATFM training, ATFM instructors must not only possess thorough knowledge of the subject matters but must also be able to convey the knowledge in a structured and comprehensible way. Where possible, ATFM instructors should also be trained on the principles and methods of effective teaching.

If a State is implementing the ATFM service for the first time and therefore do not have instructors with the expertise needed to provide the training, different solutions should be considered. A *train-the-trainers* package can be provided by the ATFM system provider if a software/system were to be procured.. For more in-depth knowledge of the procedures and processes involved, staff responsible for the training may also be sent to attend courses given by trainers having the experience required to train ATFM staff at training institutions elsewhere.

Chapter 3 – Job Responsibilities, Competencies, Training Requirements

General

Introduction

The first steps in the process of designing detailed training requirements are to:

- Identify job responsibilities and associated performance and measurement criteria,
- Identify the competencies required to meet these job responsibilities and performance.

With full understanding of job responsibilities, it is possible to determine what the competencies are of a fully competent staff member. Items that may be needed to perform this analysis include:

- the specific job or position description or summary,
- specific ATFM organization performance requirements or competencies, and
- standard operating procedures that apply to an individual's position or responsibilities.

When the pre-requisites described above are identified and analyzed, it is possible to design the training required to address the gaps through the development of learning objectives for each competency area. Based on the identification of the learning objectives, a curriculum can then be designed.

Linkages between ATC and ATFM

Before looking at the job responsibilities of an ATFM Unit, it is crucial to understand ATFM linkage with ATC operations. ATFM is a cross-domain activity, and with its comprehensive focus on demand/capacity balancing activity, there is a very strong linkage between ATC operations and ATFM service.

In general, an ATC supervisor is accountable for the provision of ATC services within an area (enroute sector, TMA, aerodrome) for which this service is being provided. As part of that responsibility, he/she is normally also accountable for all strategic and tactical ATFM decisions. In a smaller ATC unit, the supervisor may keep that responsibility, whereas in a larger unit, this can be delegated to an *Airspace Manager*, either being the Flow Management Position (FMP) within the unit or the supervisor of a separate ATFM Unit (ATFMU).

For the airspace manager, either the FMP or the ATFMU supervisor, to be able to make strategic and tactical ATFM decisions, a large measure of ATC knowledge and preferably ATC background is necessary. While the requirement for the airspace managers to have an ATC background may be less critical as ATFM operations mature and issues well documented, it is still important that the training provided ensures the staff fully understand and are able to discuss ATC operations so that the expected outcomes can be achieved.

Over time, the objective should be to develop the ATFMU to become an integral part of ATC operations so that the unit is seen as the manager of the airspace, responsible for the delivery of the right amount of demand and the optimal use of capacity.

Tasks and Competencies

Main Tasks of an ATFM Unit

The main objective of an ATFM unit is ensuring an effective management of airspace availability and capacity, through the optimization of traffic demand and complexity against the ATC capacity.

Such objective requires that the ATFMU maintains a strategic and tactical overview of the network (airspaces and airports within and adjacent to its area of responsibility), being responsible for the development of tactical ATFM strategies in response to demand and capacity issues.

The main tasks of an ATFM unit therefore include:

- Receiving and analysing all ATFM data and associated parameters,
- Planning and coordinating capacity adjustment,
- Developing and distributing ATFM Daily Plan,
- Coordinating tactical ATM resource capacity adjustments in consultation with ATC Supervisors,
- Managing proper execution of ATFM measures,
- Ensuring proper integration of traffic demand inputs,
- Ensuring proper configuration of ATFM support systems,
- Ensuring optimisation of resources through effective CDM process,
- Providing focus and specialist expertise for planning, coordinating, and implementing capacity management and contingency measures, and
- Conducting post operations analysis of ATFM operations.

Competencies for ATFM Staff

To perform the ATFM tasks discussed above, staff needs to possess a number of competencies. They need to have full knowledge of the FIR and/or airports for which the service is provided. They also need to understand the factors impacting ATM resource capacity, as well as the impacts of the ATFM solutions they propose. Most importantly, they need to be able to coordinate and cooperate closely with ATCs, airport operators, airspace users, and other relevant stakeholders effectively.

The required competencies for ATFM staff should include the ability to:

- Determine an accurate picture of air traffic demand,
- Receive, verify, evaluate, enter, and store all relevant ATFM data,
- Monitor the evolution of demand versus capacity,
- Identify all shortfalls and opportunities for capacity optimization,
- Determine the need for ATFM measures in all phases of ATFM,
- Develop and publish ATFM plans with all relevant information,

- Create, maintain, monitor, and adjust all relevant ATFM scenarios and measures,
- Ensure that stakeholders – especially Airspace Users – are provided with advice and guidance for minimising delays and disruption, and
- Know and adhere to all relevant operational instructions, procedures, and letters of agreement.

Training Requirements

This section provides a set of requirements for Ab-Initio and Basic training phases, which can be used by States/Administrations/ANSPs as bases for their training program development.

Ab-Initio ATFM Training

Ab-Initio Training is intended to ensure that new ATFM staff possess the necessary contextual knowledge to follow the more detailed job-related training. In many cases, staff may already possess some knowledge (e.g., ATC staff will possess the necessary ATC knowledge, airline operations personnel the necessary aircraft operations knowledge). The possession of the necessary ab-initio subject knowledge should be assessed upon recruitment / assignment. In cases where staff already possess the necessary contextual knowledge, they may be exempted in whole or in part from elements of the ab-initio training.

Basic Requirements

There are several basic requirements or pre-requisites for the successful conduct of ab-initio ATFM training, including:

- Pre-requisite skills and experience (e.g. experience in ATM, aircraft operations, airport operations),
- Complementary skills (IT, written and oral communication, operations analysis, statistics experience),
- Medical requirements,
- Language requirements

These basic requirements should normally be assessed as part of the ATFM staff recruitment process. Detailed definition of these basic requirements is beyond the scope of this document. However, materials are readily available in the public domain from other ATM-related functions that can be adapted for ATFM recruitment.

Training Content

The focus of ab-initio training should be on the Level-1 and Level-2 understanding of ATFM principles and other related materials. The modules recommended to be covered during the ab-initio training is provided in ***Attachment 1*** to this guidance. As ATFM is a collaborative process involving not just the ANSP but also other stakeholders (airspace users, airport

operators), these stakeholders and their operations should also be part of the training content.

Basic ATFM training

Basic training is the main phase during which the core ATFM and associated operational topics are covered comprehensively. Basic training also covered more detailed knowledge of subjects related to ATFM than in the ab-initio training. At the successful completion of basic training, the staff member should have all the relevant knowledge to proceed to on-the-job training before performing his/her roles in the ATFM operation.

When deciding on training content for a specific Basic Training course, it is important to consider:

- the position that the trainees are going to be trained for, i.e., the job responsibilities,
- the competencies required to carry out the tasks, and
- the background of the trainees, i.e., the competency level.

Recommended Training Modules

Based on the requirements for Ab-Initio and Basic trainings discussed above, ***Attachment 1*** to this guidance provides a set of recommended modules that can be considered by States/Administrations/ANSPs when designing their ATFM training program. Note that the document does not provide a detailed curriculum since it has to be individually prepared to match the needs of specific local environments. States/Administrations/ANSPs should use the set of recommended modules as a starting point and tailor their training programs to be suitable for their needs.

Additionally, ***Attachment 2*** to this guidance provides a description of how one State (Japan) has organized its training for ATFM positions, including the items to be demonstrated by the trainee during the OJT period. This is given as an example for other States/Administrations/ANSPs for the development of their ATFM training programs.

Attachment 1 – Recommended Training Modules

General

This attachment provides a set of recommended training modules that can be adapted by States/Administrations/ANSPs in developing their Ab-Initio and Basic training programs. Note that the document does not provide a detailed curriculum since it has to be individually prepared to match the needs of specific local environments. States/Administrations/ANSPs should use the set of recommended modules as a starting point and tailor their training programs to be suitable for their needs.

Ab-Initio ATFM Training Modules

Training Area	Subject	Objective	Topics	References
Regulatory Framework	Aviation Law & Institutional Background	To understand the regulatory context of national, regional, and global aviation; particularly in relation to the ATM environment	International Aviation Structure & Organizations National Aviation Structure National Regulatory Framework	Chicago Convention, Annex 11 Local legislations & rules
	Local & Regional ATFM Arrangement	To understand the regulatory framework of air traffic flow management (ATFM) at the national and regional levels	National ATFM Infrastructure Asia/Pacific Regional ATFM Arrangement	Local legislations & rules Asia/Pacific Seamless ANS Plan Asia/Pacific Framework for Collaborative ATFM
Air Traffic Management	Air Traffic Management (ATM) Basics	To understand the basic principles of air traffic management and all the underlying services	Air Traffic Services (ATS) - Air Traffic Control Services - Advisory Services - Flight Information Services - Alerting Services	Annex 11 - ATS Doc 4444 - PANS-ATM
			Air Traffic Flow Management (ATFM) - ATFM Background & Concept	Doc 9971 - Manual on Collaborative ATFM

Training Area	Subject	Objective	Topics	References
			Airspace Management (ASM) - ASM Background & Concept	Circular 330 (?)
	Aeronautical Information Service (AIS) Basics	To understand the basic principles of aeronautical information service	Flight Plan Management	
			Aeronautical Information Management - AIP, AIC - NOTAM	
	Communications, Navigation, Surveillance (CNS) Basics	To understand the basic principles of communications, navigation, and surveillance systems as well as the modern CNS concepts including PBN and PBCS; and to appreciate how the loss of these systems can affect ATM capacity, necessitating the use of ATFM solutions	Communication Systems - VHF, HF, UHF - CPDLC	
			Navigation Systems - NDB, VOR, DME - ILS, MLS - GNSS	
			Surveillance Systems - PSR, SSR - ADS-B, ADS-C	
			Modern CNS Concepts - PBN - PBCS	
Air Traffic Flow Management	Air Traffic Flow Management Introduction	To understand the basic principles of air traffic flow management and collaborative decision making, and be ready to further the knowledge in the next phase of training	ATFM Background	Doc 9971 - Manual on Collaborative ATFM
			ATFM Objectives	
			ATFM Benefits	
			ATFM Principles	
			CDM Concept & Processes	

Training Area	Subject	Objective	Topics	References
Meteorology	Meteorology for Aviation	To understand the basic principles of meteorological phenomena and their impacts on flight and ATM operations. To understand also the aviation meteorological information services and their products, which are essential to the safe flight operations	Basics of Meteorological Phenomena	
			Aviation Meteorology Products - METAR, TAF - SIGMET, AIRMET - Significant Weather Charts - Satellite & Radar Images	
			Meteorological Impacts on Aviation - Impacts on Flights - Impacts on ATM System Capacity	
Stakeholder Operations	Airport Operations	To understand the basic principles of airport management and operations, and to appreciate the need for coordination between ATFM service provider and airport operators	Aerodrome Infrastructure	
			Aerodrome Maintenance	
			Aerodrome Capacity Management	
			Airport Scheduling and Slot Coordination	
			Disruption/Crisis Management	
	Airline Operations	To understand the basic principles of airline management and operations, and to appreciate the need for coordination between ATFM service provider and airspace users	Airline Management and Infrastructure	
			Airline Operating Models	
			Airline Flight Scheduling	
			Flight Planning	
			Flight Operations	

Basic ATFM Training Modules

Training Area	Subject	Objective	Topics	References
Regulatory Framework	Local & Regional ATFM Arrangement	To understand the regulatory framework of air traffic flow management (ATFM) at the national and regional levels	National ATFM Infrastructure	Local legislations & rules
			Asia/Pacific Regional ATFM Arrangement	Asia/Pacific Seamless ANS Plan Asia/Pacific Framework for Collaborative ATFM
Air Traffic Management	(n/a)	(n/a)	(n/a)	(n/a)
Air Traffic Flow Management	Foundation of ATFM	To understand the foundations of air traffic flow management, including the philosophy, objectives, and benefits of ATFM operations, and to introduce basic terms and definitions related to ATFM	ATFM Philosophy	Doc 9971 - Manual on Collaborative ATFM
			ATFM Objectives	
			ATFM Benefits	
			ATFM Principles	
			Linkages with other services/processes (ATS, ASM, A-CDM)	
	Foundation of CDM	To understand and appreciate the principle of collaborative decision making (CDM) and to understand the means by which all ATFM stakeholders can collaborate and coordinate	Principles of CDM: Objectives, Benefits, and Requirements	Doc 9971 - Manual on Collaborative ATFM
			ATFM Stakeholders, Roles, and Responsibilities	
			Stakeholder Communications in ATFM Process	

Training Area	Subject	Objective	Topics	References
	ATM Planning	To understand the concept of capacity, factors impacting capacity, and capacity optimization solutions	Concepts of Capacity - Baseline/Declared Capacity - Operational Capacity	Doc 9971 - Manual on Collaborative ATFM
			Factors Impacting Capacity	
			Capacity Assessment Process	
			Capacity Optimization Techniques & Solutions	
	ATFM Process	To understand the various phases of ATFM operations and relevant processes, outcomes, and roles and responsibilities of ATFM service personnel and stakeholders; and to also understand the requisite information for each ATFM phase	Overview of the ATFM Process	Doc 9971 - Manual on Collaborative ATFM Asia/Pacific Framework for Collaborative ATFM Local ATFM Operating Procedure
			Strategic ATFM Operations	
			Pre-Tactical ATFM Operations	
			Tactical ATFM Operations	
	ATFM Solutions	To understand the various demand-capacity balancing solutions that can be applied in various ATFM phases, along with the required supporting infrastructure - such as data exchange agreement and operating procedures - to enable their usage	Capacity Optimization Solutions (e.g. Resectorization, Dynamic sectorization)	Doc 9971 - Manual on Collaborative ATFM
			Demand Distribution Solutions (e.g. Rerouting, Fix Balancing, Level Capping)	
			Demand Regulation Solutions (e.g. Ground Delay Program, Ground Stop, Minimum Departure Intervals)	

Training Area	Subject	Objective	Topics	References
	ATFM Operations Analysis	To understand the framework for ATFM post-operations analysis, and how the analysis can be used to identify challenges and areas for improvements in ATFM operations	ATFM Post-Operations Analysis - Impact Assessment - Compliance Monitoring - Effectiveness Analysis	Asia/Pacific ATFM Post-Operations Analysis Recommended Framework
			ATFM Benefits Analysis	
			Stakeholder Engagement Analysis	
	ATFM Tools	To know how to use the ATFM support systems to carry out ATFM operations	ATFM Data and Data Exchange	Local ATFM Operating Procedure
			ATFM Support Systems	
	ATFM in Contingency Situation	To understand how appropriate ATFM solutions can be used to manage contingency situations	ATM Contingency Plans and Procedures	Local ATFM Operating Procedure
			Adverse Weather Operations	
			ATFM in Adverse Conditions	
	Foundation of A-CDM	To understand the basic concept of A-CDM and relevant processes, and to also understand the linkages between ATFM operations and A-CDM process	A-CDM Concept & Processes	Doc 9971 - Manual on Collaborative ATFM CANSO Guide on A-CDM CANSO Guide on ATFM/A-CDM Integration
			Linkages between ATFM & A-CDM	
			A-CDM Support Tools	
			ATFM/A-CDM Integration	
Meteorology	(n/a)	(n/a)	(n/a)	(n/a)
Stakeholder Operations	(n/a)	(n/a)	(n/a)	(n/a)

Attachment 2 – ATFM Training for ATM Officers in Japan

The **Air Traffic Management Center (ATMC)** is the organization of Japan Civil Aviation Bureau (JCAB) providing ATFM services to the aircraft flying Fukuoka FIR. As soon as he or she is transferred into the ATMC, a rookie ATM officer starts initial training for an assistant position. The training course includes, but are not limited to:

- Concept of Air Traffic Management
- Organizational structure and regulatory bases of ATMC
- Outline of ATM services (i.e., ASM, ATFM, Oceanic ATM, and CDM)
- Knowledge and understanding of the present ATM environment (i.e., FIRs, Sectors of ACCs, TMAs, ATS routes, Training/Restricted areas, Navigational aids, Operations and performances of aircraft, Information processing system/tool/network related to ATM services, Communication procedures, etc.)

The special training for ATFM positions is scheduled following the initial training. The ATFM training consists of two parts. The first part consists of classroom lectures and practical simulator trainings. The second part consists of on-the-job trainings.

The ATFM training starts from the classroom lectures and practical simulator trainings, which are typically programmed as follows:

Day	Topics
Day 1	ATFM system and other associated equipment (*management and coordination procedures of standard routes and alternative routes*)
Day 2	Capacity value calculation procedures (*weather and ATFM*)
Day 3	Monitoring and prediction of traffic volume (*flow control procedures*)
Day 4	Algorithm of Expected Departure Clearance Time (EDCT) calculation (*handling procedures related to diversions at major airports*)
Day 5	Cross border ATFM (*characteristics of traffic flow and ATC operating procedures in ACC sectors*)
Day 6	Specifications of airports/aerodromes and ATC operating procedure (*ATM operations plan (OP) and CDM*) (*simulator: extracting relevant information/lists, setting capacities*)
Day 7	Regulations and agreements on ATFM (*simulator: flow management of ACC sectors*)
Day 8	In-house operating procedures (*simulator: flow management of RJTT/RJAA*)
Day 9	Recently introduced/amended procedures (*simulator: flow management of international ATS routes*)
Day 10	Case studies (*final checks*)

The on-the-job training (OJT) is phased and standardized. The trainee and the training supervisors are required to use “OJT check sheet” so that the trainee can master all required skills for ATFM services systematically. The check sheet used in Japan is provided herewith.

Note 1: In the OJT check sheet, the acronym “EDCT” is used. EDCT stands for Expected Departure Clearance Time, which is equivalent to the commonly known Calculated Take-Off Time (CTOT). EDCT is specific to the ATFM system used in Japan.

Note 2: JCAB is developing a new ATM training program that will comply with the competency-based training and assessment method following PANS-TRG procedures. Once developed, the current training program discussed here will be replaced and this document will be updated accordingly.

OJT check sheet			phase A ▪B ▪C		month	Starting date of the phase A:			B:			C:						
ATFM	crew	graduating class	name	Number of mark" 4" earned by previous month	date	date	date	date	date	date	date	date	date	date	date	date	date	date
					hour	hour	hour	hour	hour	hour	hour	hour	hour	hour	hour	hour	hour	hour
					SV	SV	SV	SV	SV	SV	SV	SV	SV	SV	SV	SV	SV	SV
					4	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13

phase			Monitoring traffic volume																
A			able to manipulate TEAM and display necessary information timely																
A			able to calculate workload value of sectors per aircraft																
A			able to extract relevant departure flight plans for flow control initiatives																
A			able to evaluate EDCT flow controls before starting/ending the initiatives																
A			able to make the intended target highlight on the screen																
	B		able to evaluate EDCT flow controls including a groundstop																
	B		able to evaluate flow controls thru assignment of departure intervals																
	B		able to evaluate flow controls thru assignment of inflow intervals																
	B		able to except particular aircraft from flow controls or demand tallying process before/during initiatives																
	B		able to monitor airports/sectors with traffic flow characteristics taken into account																
	B		able to analyze flight plans correctly																
	B		checking combine/de-combine status of sectors and conditions of inflight aircraft by manipulating FPVD																
	B		able to plan and input the pre-tactical operation of variable sectors																
		C	able to perceive RWY operation patterns of RJTT/RJAA and input correctly																
		C	able to input capacity values correctly in accordance with present MET conditions or RWY in use																
		C	able to change capacity values in accordance with expected scenarios																
		C	able to predict the change of traffic demand graph and cope with it when traffic is surged against prediction																
		C	able to evaluate intended flow controls with the initiatives planned in the other ATFM position taken into account																
		C	able to cope with the unexpected, such as RWY closure																

			Flow control procedures
A			able to figure out and input FROM-TO of EDCT flow controls
A			able to figure out and input START-END of EDCT flow controls
	B		able to coordinate about the start of flow controls with related ATC facilities
	B		Conveying just enough information (i.e. flow controlled area, measure, start time, end time, FROM-TO, max demand value, capacity value) to an ATM supervisor before starting initiatives timely
	B		able to make flow controls on inflight aircraft (i.e. assigning inflow intervals, specifying airspeed/altitude/route, assigning airborne holding)
	B		able to make flow controls on departures by assigning departure intervals
	B		able to figure out appropriate FROM-TO of flow controls on airports
	B		able to figure out appropriate FROM-TO of flow controls on sectors
	B		able to figure out appropriate FROM-TO of flow controls on ATS routes
	B		able to adjust EDCT appropriately as needed
	B		balancing the amount of delay of EDCT and arising no reverse in departure sequence in the respective airports
	B		able to evaluate and decide the end time of flow controls appropriately
	B		able to coordinate about the end of flow controls with related ATC facilities
	B		able to cope with the change in ending time of flow controls (including input timing of "TO")
	B		able to cope with EDCT exceeding the ending time of flow controls
		C	able to cope with reversed departure sequence arisen by the capacity change during EDCT flow controls
		C	able to make flow controls on departures by using the groundstop feature
		C	able to conduct time frame coordination
		C	able to make a judgement on whether ongoing ATC restrictions should be changed to ATFM initiatives, and able to cope with the change

[Marks] 1: incapable/unknowing 2: lack of skill/understanding 3: barely able 4: able 5: well enough

The mark "4" indicates 70-80%, and "5" indicates beyond 80%, which are acceptable level.

When marking "5", the training supervisors should fill in own initials to the right colomn. The "5" marked training items will be exempted in the subsequent OJT.

The training items rarely happen can be substituted by oral tests in the OJT. The mark through oral tests shall be expressed by an encircled number.

Acquiring "4" three times or more, or acquiring "5" can complete the training item. After completing all the training items of the phase, the OJT moves on to the next phas

[Abbreviations] TEAM : Trajectorized Enhanced Aviation Management ...Japanese ATM systems that calculate the required delay and assign EDCTs to appropriate aircraft, EDCT: Expected Departure Clearance Time,

ATFM

phase				4	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13
			Cross Border ATFM														
A			able to extract aircraft groups bound for particular destination via particular ATS route														
	B		able to adequately communicate with foreign ANSPs														
	B		able to make a judgement on whether the ATFM initiatives are consistent with the stipulations of LOA (i.e. flow controlled airport, reason, lead time for coordination, measure)														
	B		able to coordinate with related ATC facilities about the flow controls on G585 (SAPRA) requested from Incheon ACC														
	B		able to coordinate with related ATC facilities about the flow controls requested from Taipei ACC														
		C	able to cope with the unexpected or any change in ATFM initiatives requested by foreign ANSPs														
			Operating procedures for handling diversions														
A			able to notify facilities concerned without omission in accordance with the phase of diversions														
A			able to input start/end diversion to TEAM														
A			able to display number of spots available all day in the phase 1														
	B		able to allocate airports for diversion appropriately in response to requests														
	B		able to manage the case when aircraft request diversion to RJOO														
	B		able to manage the case when the width or length of diverting aircraft is unclear (including A346, B777, B773, B77W, etc)														
	B		able to manage the case when aircraft request diversion to RJTY or RODN														
		C	able to manage the case when aircraft request diversion to airports not registered in TEAM														
		C	able to manipulate TEAM when aircraft canceled diversion														
		C	able to make a judgement and coordination about ending respective phases of diversion														

			Acquiring/providing adequate information																	
A			able to extract necessary NOTAMs quickly																	
A			able to display MET data of particular airports																	
	B		Keeping good watch on the situations being faced in the other ATFM positions																	
	B		able to get information about restricted areas, training/testing areas, etc																	
		C	able to exchange information with the other ATFM positions that will be affected by the own flow controls decided and being started shortly																	
			Miscellaneous																	
	B		able to take over the ongoing ATFM services accurately																	
		C	able to handle rarely happened situations																	

[Marks] 1: incapable/unknowing, 2: lack of skill/understanding, 3: barely able, 4: able, 5: well enough

The mark "4" indicates 70-80%, and "5" indicates beyond 80%, which are acceptable level.

When marking "5", the training supervisors should fill in own initials to the right colomn. The "5" marked training items will be exempted in the subsequent OJT.

The training items rarely happen can be substituted by oral tests in the OJT. The mark through oral tests shall be expressed by an encircled number.

Acquiring "4" three times or more, or acquiring "5" can complete the training item. After completing all the training items of the phase, the OJT moves on to the next phas

[Abbreviations] TEAM: Trajectorized Enhanced Aviation Management ...Japanese ATM systems that calculate the required delay and assign EDCTs to appropriate aircraft, EDCT: Expected Departure Clearance Time,

REGIONAL ATFM PLAN MONITORING AND REPORTING FORM

ATFM PERFORMANCE INDICATORS

The following indicators are based on the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM, which should be read in conjunction with this form. The information provided will be used by the relevant Regional bodies to assess individual Administration and overall regional compliance with the Framework, and may be used by Administrations to internally evaluate their implementation status.

Phase IIIB Regional ATFM capabilities, with expected implementation by November 2025, will not be considered for evaluation and compliance. Therefore, response for the implementation status of such elements will be voluntary in nature.

INSTRUCTIONS

A If your administration ;
i. has implemented ATFM and distributing ATFM measures ; or
ii. has plans to implement and distribute ATFM measures
under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM:
Answer Questions 1 to 42

B If your administration is not planning to implement ATFM measure under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM:
Answer Questions 43 to 61

C **Not implemented = 0%** **Partial implementation = 25%,50%,75%** **Full implementation = 100%**

D **Date of Reporting - 28th February each year**

#	Reporting Form Element	S7, Para.	S7, Para.2	S7, Phase	Response	Reporting Metrices	Expected Outcome/ Guidance to States
1	Enacted regulations for the implementation of ATFM	7.11		IA		0% - State has not enacted any ATFM-related regulations ; 100%- State has enacted ATFM regulations governing the provision of ATFM service with associated ATFM-related procedure in AIP	State has published ATFM procedures and Regulations in AIP
2 (43)	Implemented a program of annual or bi-annual strategic airport and airspace capacity, and strategic demand analysis	7.12		IA		0%- State has not implemented any strategic demand and capacity analysis; 50%- State has implemented either strategic demand analysis or strategic capacity analysis capability; 100%- State has implemented both strategic demand analysis and strategic capacity analysis capabilities	States assess their demand & capacity annually or bi-annually. Not every airport needs strategic airport slot allocation. State that allocates airport slots (schedules) with respect to strategic airport and airspace capacity (following IATA WSG guidelines) may carry out capacity-demand analyssi on a winter/summer schedule basis or on annual basis.
3 (44)	Performed an analysis of current traffic demand and expected growth for the next 5 years (rolling)	7.13		IA		0%- State does not have a capability of assessing current and expected traffic demand; 25%-State has a capability of analyzing the current traffic demand through information such as FPLs and/or flight schedules; 50%-State has a capability of analyzing the current traffic demand and the traffic demand for the upcoming (6-month/12-month) season; 100%-State has a capability of analyzing current and seasonal traffic demand, as well as demand prediction/forecasting capability for the next 5 years.	State/ ANSP carries out current traffic demand analysis and traffic demand projections for future period (It may be for one year/two year and so on) This is also applicable for States where strategic assessment indicates that current demand does not yet exceed capacity. The capabilty of analysis of future projected demand and capacity will enhance ANSP strategic planning.
4	Commenced daily pre-tactical airport and airspace capacity-demand analysis for ATFM Program airports and associated terminal airspace as well as enroute ATC sectors supporting the homogeneous ATM areas and major traffic flows identified in the Asia and Pacific Regions	7.14	7.13	IA		0%- State does not have a capability of assessing pre-tactical demand-capacity imbalance; 50%-State has a capability of assessing pre-tactical demand-capacity imbalance but has not implemented a procedure to perform daily assessment; 100%-States has a capability and a procedure to perform pre-tactical demand-capacity imbalance assessment daily.	See definition of ATFM Program Airports in the Framework Document. ANSP (ATFM Section) has capability to carry out capacity-demand analysis for; i. ATFM Program Airports and associated Terminal Airspace; ii. Enroute ATC (ACC) Sectors
5	Made arrangements for relevant ATFMU to chair and/or participate in regularly scheduled ATFM conferences for pre-tactical ATFM planning	7.16		IA		0%-State has not made any arrangement for relevant ATFMU to chair and/or partcipate in ATFM conferences for pret-tactical ATFM planing; 50%-States has made ad-hoc/non-regular arrangements for ATFMU to chair and/or participate ATFM conferences for pre-tactical ATFM planning 100%-State has made the arrangement per the requirement.	State has established an ATFM function within appropriate ATS unit or a separate ATFM Unit. The designated ATFM Unit conducts/partcipates in ATFM conferences with stakeholders for ATFM Planning . *Note : Not all ATFM measures require conducting ATFM conference(s) with stakeholders for ATFM planning.*
6	Commenced ATFM post-operations analysis and rectification, taking guidance from the Asia/Pacific ATFM Post-Operations Analysis Recommended Framework as starting point	7.17		IA		0%- State has no capability to conduct ATFM post-operations analysis; 50%-State has capability to conduct ATFM post-operations analysis but has no procedures to do it regularly. 100%- State has the capability and procedures to conduct regular ATFM post-operations analysis.	State has established an ATFM function within appropriate ATS Unit or a separate ATFM Unit. The ATFM Units are conducting post operational analysis and provide feedback to ANSP/ Airports.
7 (46)	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	7.18		IB		0%- State's FPL and ATS message regulation is not in compliant with ICAO Doc 4444; 100%- State's FPL and ATS message regulation is in compliant with ICAO Doc 4444	State has published FPL Regulations in AIP
8 (47)	Enacted requirements to ensure FPL is submitted no less than 3 hours prior to EOBT except where necessary for operational or technical reasons	7.19		IB		0%- State's FPL regulation does not stipulate a requirement for 3-hour advance FPL filing; 100%- State's FPL regulation has a requirement for 3-hour advance FPL filing	State has published FPL Regulations in AIP
9 (48)	Enacted requirements to ensure a DLA message is transmitted when the departure of an aircraft for which basic FPL has been sent is delayed by more than 15 minutes after the EOBT specified in that basic FPL	7.21		IB		0%- State's ATS message regulation does not stipulate a requirement for 15-min DLA message; 100%- State's ATS message regulation has a requirement for 15-min DLA message.	State has published FPL Regulations in AIP
10 (49)	Ensured that, when there is a delay from a GDP, CTOT and other slot allocation information originated from the ATFMU is communicated to all relevant stakeholders	7.20		IB		0%- State's ATFMU is unable to deliver CTOT and/or other slot information to any relevant stakeholders; 50%- State's ATFMU is able to deliver CTOT to some relevant stakeholders, but not all, e.g. only delivering to ATFMU but not airline; 100%- State's ATFMU is able to deliver CTOT to all relevant stakeholders.	State has established ATFM procedures to ensure that GDP information, CTOT and other slot allocation information orginated from an ATFMU is communciated to all relevant stakeholders.
11 (50)	Implemented or designed systems to ensure that FPL are not discarded from relevant ATM systems as a consequence of ATFM delay.	7.23		IB		0%- State's FPL management system is unable to retain FPLs when flights are delayed due to ATFM measure; 100%- State's FPL management system is able to retain FPLs when flights are delayed due to ATFM measure	State has established procedures in FPL database management (in the ATM Automation systems).

#	Reporting Form Element	S7, Para.	S7, Para.2	S7, Phase	Response	Reporting Metrices	Expected Outcome/ Guidance to States
12	Implemented common fixes, terminology and communications in ATFM, AMAN/DMAN and A-CDM systems	7.24	7.39	IB		NOT APPLICABLE - State does not have AMAN/DMAN and A-CDM Systems. 0%-Terminologies in ATFM, AMAN/DMAN, and A-CDM systems do not match; 50% - Terminologies in ATFM and A-CDM systems are harmonised; 100%-Terminologies in ATFM and A-CDM systems are aligned or able to be translated across systems	If State has implemented ATFM and A-CDM systems at one or more airports, State has published operating procedures with common fixes, terminolgy and communication between ATFM and ACDM systems. *Note : The AMAN/DMAN is the local connection within the propietary systems of the State.*
13 (51)	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	7.25		IB		0%- State has not begun an initiative to optimize ATC separation and reduce runway occupancy time; 25%- State has begun an initiative to assess runway occupancy times or efficiency of terminal ATC separation; 50%- (i) State has implemented reduced runway occupancy time operations at airports or optimized terminal ATC separation; (ii) State has begun an initiative to assess runway occupancy times and efficiency of terminal ATC separation; 75%- State has implemented reduced runway occupancy time operations at airports/optimized terminal ATC separation, and has began an initive to assess efficiency of terminal ATC separation/runway occupancy times 100%- State has fully implemented reduced runway occupancy time operations at airports with connection to optimized terminal ATC separation.	State has declared/notified or identified ATFM program airports. State has developed/is developing procedures for i. Optimised ATC Separation in Terminal Airspace ii. Reduced Runway Occupancy Time at these airports and associated terminal airspace
14	Implemented strategic airport slot allocation at all international airports where demand significantly exceeds airport capacity	7.26		IB		NOT APPLICABLE - State does not have any airports that need strategic airport slot allocation. 0%- State has not begun any initiative on strategic airport slot allocation; 50%- State has begun an initiative to implement strategic airport slot allocation process, e.g., has formed or is forming airport slot committee; 100%- State has enacted strategic airport slot allocation regulation and process.	State should review their demand level and capacity strategically, but need not necessarily implement strategic slot allocation if their airports do not need it (i.e. not enough demand per IATA's guideline etc.).
15	Implemented pre-tactical modelling of airport and airspace configuration and traffic demand, and the effect of ATFM measures	7.27		IB		0%- State has no capability to model airport and airspace configuration, taking into account traffic demand and ATFM measure impact; 25%- State has a capability to pre-tactically assess traffic demand level at airports and in airspace sectors; 50%- State has a capability to pre-tactically assess traffic demand and simulate/model the impact of ATFM measures on the demand level; 75%- State has a capability to pre-tactically model airport and airspace configuration that best respond to traffic demand; 100%- State has implemented a procedure to pre-tactically adjust airport and airspace configuration to best respond to traffic demand	State has capability to model both airport and airspace demand capacity scenarios and arrive at choice of sutable ATFM measures
16	Implemented tactical ATFM measures for flights inbound to ATFM program airports	Para 7.30		IB		0%- State has no capability to use tactical ATFM measures to manage traffic demand; 50%- State has a capability to anticipate excessive traffic demand and a procedure to use proactive ATC techniques to tactically respond ; 100%- State has a capability and procedure to use tactical ATFM measures during periods of excessive demand in airspace sectors .	State has notified/declared ATFM Program Airports. State has established ATM procedures for implementing ATFM measures (GDP, MINIT, MILT, Airborne holding etc).
17 (52)	Enabled sharing of relevant information between all stakeholders through implementation of CDM	7.28		IB		0%- State has not implemented CDM process between ATFM stakeholders; 100%- State has implemented CDM process, e.g. teleconferences or direct communication channels between operational units, among stakeholders	State has established CDM Procedures and implemented CDM invloving all stakeholders
18	Implemented dynamic updating of airport and airspace capacity constraints, capacity calculations and demand information	7.29		IB		0%- State has no procedure to dynamically update airport and airspace capacity constraints nor demand information; 50%- State has a capability to dynamically update either traffic demand or capacity information at airports and airspace; 100%- State has a capability to dynamically update traffic demand and capacity information at airports and airspace.	State has established ATFM Units or designated ATFM function within appropriate ATS Units. ATFM Unit has access to dynamic flight data (demand) and information on airport and airspace constraints. ATFM Unit dynamically updates demand and capacity information.

#	Reporting Form Element	S7, Para.	S7, Para.2	S7, Phase	Response	Reporting Metrices	Expected Outcome/ Guidance to States
19 (53)	Implemented local procedures for ATFM operations and communication, including phraseology and terminology for ATFM Units, ATS Units, airspace users, and airport operators, drawn from ICAO Doc. 9971	7.31		IB		0%- State has not developed any local ATFM communication procedure; 50%- State is in the process of developing and implementing local ATFM communication procedures for stakeholders ; 100%- State has fully established (developed and published) local ATFM communication procedures with phraseologies based on the recommendations in Doc 9971 that are adhered to by stakeholders.	State has established and published ATFM Operating procedures.
20	Established ATFM capability with appropriately trained staff and operating procedures	7.31		II		0%- State has not implemented ATFM capability and function; 50%- State is in the process of implementing ATFM function; 100%- State has completed the implementation of ATFM function, with operational ATFM unit/function staffed by trained personnel.	State has establsihed ATFM Unit or designated ATFM function with appropriate ATS Units with adequate resources.
21 (54)	Developed procedures for ATFMU, ATS Units, airspace users, and airport operators when ATFM program is active	7.31		IB		0%- State has not developed any local ATFM procedure; 50%- Stats is in the process of developing and implementing local ATFM procedures for stakeholders; 100%- State has fully established (developed and published) local ATFM procedures that are adhered to by stakeholders.	State has established and published ATFM Operating procedures.
22 (55)	Implemented local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT	7.31		IB		0%- State has not developed a procedure to facilitate CTOT compliance; 50%- State is in the process of developing a procedure to facilitate CTOT compliance, e.g. has a procedure that is not yet formally published ; 100%- State has fully established (developed and published) procedures to facilitate CTOT compliance.	State has established and published ATFM Operating procedures to faciliate compliance with received CTOT.
23	Implemented tactical ATFM measures for flights inbound to constrained airspace	7.33	7.42	IB		NOT APPLICABLE - State does not have any constrained airspace that requires tactical ATFM measures. 0%- State has no capability to use tactical ATFM measures to manage traffic demand; 50%- State has a capability to anticipate excessive traffic demand and a procedure to use proactive ATC techniques to tactically respond ; 100%- State has a capability and procedure to use tactical ATFM measures during periods of excessive demand in airspace sectors .	State has established ATM procedures for implementing ATFM measures (GDP, MINIT, MILT, Airborne holding etc). This is similar to element 15 but not the same. Element 15 focuses on implementing ATFM measure to manage traffic into a constrained/congested airport, while this one focuses on managing the flights into an airspace. Managing flights into an airspace is considerably more complex as it requires an ATFM system that is able to "model" a flight profile throughout its route, whereas a simple system may be able to rely on just FPL information ("EET" in Item 15) to estimate times to an airport to run an airport ATFM measure. States may implement these capabilities sequentially.
24	Ensured tactical ATFM measures are only applied during periods of constraint	7.33		IB		0%- State has no procedure to ensure ATFM measures are only applied during constraint ; 100%- State has a procedure to ensure ATFM measures are only applied during constraint .	State has established ATFM procedures.
25	Promulgated procedures to avoid subjecting individual flights to more than one tactical ATFM measure	7.34		IB		0%- State has no procedure to avoid subjecting flights to more than one tactical ATFM measure at a time; 100%- State has a procedure, manual or automated, to avoid subjecting flights to more than one tactical ATFM measure at a time.	State has established ATFM procedures.
26 (57)	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	7.35		IB		0%- State has no ATFM post-operations analysis capability; 50%- State has an ATFM post-operations analysis capability but has not exchanged the information with cross-border/international stakeholders; 100%- State has an ATFM post-operations analysis capability and has a procedure to exchange the information across borders.	State has established ATFM Post-Operations Analysis procedures
27 (58)	Ensured post-operations analyses are used for planning ATFM, airspace and ATS route improvements	7.36		IB		0%- State has no ATFM post-operations analysis capability; 50%- State regularly conducts ATFM post-operations analysis but has not established procedure to use the result for airspace improvements; 100%- State regularly conducts ATFM post-operations analysis and has a procedure to use the result for airspace improvements.	State has established ATFM units or designated ATS Units with ATFM responsibilty. The ATFM Units are conducting post operational analysis and provide feedback.
28 (59)	Commenced daily preparation and sharing of an ATFM Daily Plan (ADP) for all ATFM Program airports and associated terminal airspace	7.15	7.38	II		0%- State does not have an ADP preparation and distribution procedure; 50%- State prepares and distributes ADP when required, but not daily; 100%- State prepares and distributes ADP daily.	State has established ATFM units or designated ATS units with ATFM responsibilty. State has published procedures for preparing/sharing of ATFM daily Plan to stakeholders. The ATFM Units are preparing, sharing and distributing ADP.

#	Reporting Form Element	S7, Para.	S7, Para.2	S7, Phase	Response	Reporting Metrices	Expected Outcome/ Guidance to States
29	Promulgated procedures for tactical management of ATFM measures, including revision, cancellation where necessary	7.31 and 7.32		II		0%- State does not have capability to conduct tactical ATFM measures ; 50%- State has a capability to conduct static tactical ATFM measures which cannot be amended once published; 100%- State has a capability to conduct dynamic tactical ATFM measures which can be amended as capacity situation changes.	State has established ATM procedures for implementing ATFM measures (GDP, MINIT, MILT, Airborne holding etc).
30	Ensured interoperability of implemented ATFM, A-CDM, AMAN, DMAN, ATM automation systems and airspace user systems where operational interfaces exist or are planned	7.39		II		NOT APPLICABLE - State does not have A-CDM and AMAN/DMAN systems. 0%- State has not planned interoperability at the interfaces between the systems; 50%- State has started on the process of implementing the interoperability at the interfaces between the systems; 75%- State has partial interoperability at the interfaces between the systems; 100%- State has full interoperability at the interfaces between the systems.	State has implemented ATFM and A-CDM and/or AMAN/DMAN systems as part of ATM Automation. State has published operating procedures with common fixes, terminology and communication to ensure interoperability.
31	Implemented meteorological services to support ATM in the terminal area (e.g. Meteorological Service in Terminal Area - MSTA)	7.41		II		0%- State has not planned the implementation of MSTA; 25%- State has begun an initiative to implement MSTA, e.g. has developed initial coordination between MET service provider and ANSP; 50%- State is in the process of implementing MSTA; 100%- State has implemented MSTA.	State has established MET services for ATM in the terminal area. MET for ATM applications may have been developed for enroute airspace but not the terminal area, which could be considerably more complex.
32	Implemented distributed multi-nodal ATFM information distribution capability	7.38		II		NOT APPLICABLE- State currently does not need to implement Cross-Border ATFM measure 0%- State has not implemented the capability; 100%- State has implemented the information distribution capability that ensures ATFM information are distributed to all stakeholders.	State is partcipating in Cross-Border ATFM. State has capability for ATFM information distribution to support Cross-Border ATFM.
33	Ensured ATFM systems take long haul flights into account in demand predictions	7.44		II		0%- State's ATFM system is not able to take into account long-haul flights when pre-tactically and tactically assessing and predicting demand; 100%- State's ATFM system takes into account long-haul flights when pre-tactically and tactically assessing and predicting demand.	State has established ATFM Unit or designated ATFM function in appropriate ATS Units. ATFM Unit takes into account long-hual flights in demand calculations.
34 (60)	Ensured ATM and ATFM systems provide timely update of estimate information for airborne aircraft	7.45		II		0%- State has no capability to receive or provide timely update of airborne aircraft; 50%- State has a capability to receive or provide timely update of airborne aircraft in either ATM or ATFM system. 100%- State has a capability to receive or provide timely update of airborne aircraft in both ATM and ATFM system.	Expectation is that the ATFM systems are able to receive / calculate / provide updated estimates (e.g. ETOs, ELDTs) among the systems for the purpose of updating traffic demand profile accurately.
35	Implemented A-CDM at international aerodrome and integrated with ATFM operations with appropriate information exchange between the two systems and processes	7.48		IIIA		NOT APPLICABLE - State has not implemented A-CDM system 0%- State has not implemented A-CDM at any international aerodrome; 50%- State has implemented A-CDM at appropriate* international aerodromes but has not integrated with ATFM operations; 75%- State has implemented A-CDM and has begun the integration with ATFM operations, e.g. has some information exchange but not complete; 100%- State has implemented A-CDM and integrated with ATFM operations with automated information exchange between the systems at appropriate* international aerodromes.	State has implemented ACDM and ATFM. State has implemented ATFM-ACDM system integration . * Appropriate international aerodromes refers to international aerodromes with high traffic density and are subjected to subject to cost benefit analysis. Rationale: The inclusion of cost benefit analysis is aligned with the recommendations in the APAC A-CDM implementation plan
36	Established national civil-military ATM coordination body to enable stratetic, pre-tactical, and tactical airspace management (ASM)	7.49		IIIA		0%- State has not established a national civil-military ATM coordination body/authority; 100%- State has established a national civil-military ATM coordination body with appropriate authority to enable ASM function.	State has established national Civil-Military ATM Coorniation body.
37	Established a civil-military ATM coordination body to regularly review the use of Special Use Airspace (SUA) to ensure optimal usage all airspaces based on the FUA concept	7.50		IIIA		0%- State has not implemented a civil-military ATM coordination body (e.g. airspace management cell) to coordinate airspace use per FUA concept; 50%- State has implemented a coordination body that enables strategic and pre-tactical coordination of airspace use per FUA concept; 100%- State has implemented a coordination body that enables strategic, pre-tactical, and tactical airspace use coordination per FUA concept.	Regular review of SUA is undertaken.

#	Reporting Form Element	S7, Para.	S7, Para.2	S7, Phase	Response	Reporting Metrices	Expected Outcome/ Guidance to States
38	Established regulations to support a safe integration of UAS operations in non-segregated airspace	7.51		IIIB		NOT APPLICABLE - State has no formal requirement or provision for UAS operations; 25%- State has a provision for UAS operations in a segregated airspace; 50%- State has begun an initiative to integrate UAS operations into the airspace, e.g., has commissioned a feasibility study; 75%- State is in the process of integrating UAS operations into the airspace in a non-segregated manner, e.g. a trial operation zone; 100%- State has fully integrated UAS operations into the airspace that is not segregated from manned aircraft operations	May not be applicable to all States. Firstly, States may wish UAS to operate in segregated airspaces. Secondly, UAS operations in non-segregated airspace affect civil flights in two aspects. 1) Safety and 2) capacity . State may strategically plan for non-segregated operations in busy terminal airspaces with adequate safety and capacity safeguards. ATFM operations will need to cater to both.
39	Implemented ATFM information distribution capability utilizing FIXM v4.2 (or later), extended where necessary, to enable the exchange of flight-specific ATFM information	7.52		IIIB		0%- State has not implemented SWIM-based ATFM information exchange capability; 50%- State has implemented SWIM-based capability but uses an older version of FIXM, e.g. FIXM v3.0; 100%- State has implemented SWIM-based capability with FIXM v4.2 or later.	For ATFM information distribution
40	Integrated ATFM, AMAN/DMAN, and A-CDM systems through cross-platform information exchange based on FIXM v4.2 (or later) with appropriate extension	7.53		IIIB		0%- State has not integrated ATFM, AMAN/DMAN, and A-CDM systems; 50%- State has integrated the systems but is not using SWIM-based technology or using the technology but with an older version of FIXM; 100%- State has integrated the systems using SWIM-based technology with FIXM v4.2 or later as the informatione exchange model.	For ATFM system interoperability with other systems. This may be seen as system connections either externally (cross-border) and/or internally (local connection). In case of local connection, States may have their internal own proprietary systems and interconncections. In case of cross-border connection, it could be possible that the various ATFM systems are connected to SWIM (via FIXM 4.2 r later) and through the ATFM systems, these information are being exchanged seamlessly within the State's local propietary systems.
41	Established research and development programs to explore novel capacity enhancement techniques such as free route airspace, extended arrival metering, dynamic airspace configurations, target time operations, and collaborative trajectory options, with an emphasis on needs, safety case, and cost-benefit analysis	7.54	7.56	IIIB		NOT APPLICABLE - State has no capacity enhancement research and development programs; 50%- State has initiated research and development programs for advance aviation concepts ; 100%- State has research and development programs that focus on capacity enhancement, among other aviation-related topics .	An R&D program looking at capacity enhancement techniques is relevant to ATFM, as the first priority in demand/capacity balancing should be on enhancing capacity.
42	Implemented Meteorological information exchange with ATM and ATFM systems using IWXXM v3.0 (or later)	7.55		IIIB		0%- State has not implemented MET information exchange on IWXXM v 3.0 protocol; 50%- State has implemented IWXXM v 3.0 MET information exchange; 100%- State has integrated the systems using SWIM-based technology with IWXXM 3.0 or later as the informatione exchange model.	For system-to-system interoperability

#	Reporting Form Element	S7, Para.	S7, Para.2	S7, Phase	Response	Reporting Merices	Expected Outcome / Guidance to States
43 (2)	Implemented a program of annual or bi-annual strategic airport and airspace capacity, and strategic demand analysis	7.12	7.46	IA		0%- State has not implemented any strategic demand and capacity analysis; 50%- State has implemented either strategic demand analysis or strategic capacity analysis capability ; 100%- State has implemented both strategic demand analysis and strategic capacity analysis capabilities.	States assess their demand & capacity annually or bi-annually. Through the strategic capacity-demand analysis, States may expect traffic at particular airport or airspace to cross the threshold that requires implementation for ATFM regulations and measures.
44 (3)	Performed an analysis of current traffic demand and expected growth for the next 5 years (rolling)	7.13	7.46	IA		0%- State does not have a capability of assessing current and expected traffic demand; 25%- State has a capability of analyzing the current traffic demand through information such as FPLs and/or flight schedules ; 50%- State has a capability of analyzing the current traffic demand and the traffic demand for the upcoming (6-month/12-month) season ; 100%- State has a capability of analyzing current and seasonal traffic demand, as well as demand prediction/forecasting capability for the next 5 years.	State/ ANSP carries out current traffic demand analysis and traffic demand projections for future period (It may be for one year/two year and so on). This is also applicable for States where strategic assessment indicates that current demand does not yet exceed capacity. The capabilty of analysis of future projected demand and capacity will enhance ANSP strategic planning. Through this analysis, State may be able to plan implementation of ATFM when required.
45 (5)	Made arrangements for relevant personnel from ATSU to participate in regularly scheduled ATFM conferences for pre-tactical ATFM planning	7.16		IA		NOT APPLICABLE - State currently does not require any pre-tactical ATFM planning; 0%- State has not made the arrangement per the requirement; 100%- State has made the arrangement per the requirement .	State has assigned responsibility for ATFM operations to appropriate ATS Unit.The ATS Unit partcipates in ATFM conferences with stakeholders for ATFM Planning as necessary.
46 (7)	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	7.18		IB		0%- State's FPL and ATS message regulation is not in compliant with ICAO Doc 4444; 100%- State's FPL and ATS message regulation is in compliant with ICAO Doc 4444.	State has published FPL Regulations in AIP
47 (8)	Enacted requirements to ensure FPL is submitted no less than 3 hours prior to EOBT except where necessary for operational or technical reasons	7.19		IB		0%- State's FPL regulation does not stipulate a requirement for 3-hour advance FPL filing; 100%- State's FPL regulation has a requirement for 3-hour advance FPL filing.	State has published FPL Regulations in AIP
48 (9)	Enacted requirements to ensure a DLA message is transmitted when the departure of an aircraft for which basic FPL has been sent is delayed by more than 15 minutes after the EOBT specified in that basic FPL	7.21		IB		0%- State's ATS message regulation does not stipulate a requirement for 15-min DLA message; 100%- State's ATS message regulation has a requirement for 15-min DLA message.	State has published FPL Regulations in AIP
49 (10)	Ensured local stakeholders are able to access CTOT information readily, either directly from the ATFMU distributing it or through local dissemination	7.2				0%- State has not implemented a procedure to ensure CTOT accessibility among local stakeholders; 100%- State has implemented a procedure to ensure CTOT accessibility among local stakeholders.	State has established ATFM procedures for coordination with Stakeholders.
50 (11)	Implemented or designed systems to ensure that FPL are not discarded from relevant ATM systems as a consequence of ATFM delay.	7.23		IB		0%- State's FPL management system is unable to retain FPLs when flights are delayed due to ATFM measure; 100%- State's FPL management system is able to retain FPLs when flights are delayed due to ATFM measure.	State has established procedures in FPL database management (in the ATM Automation systems).
51 (13)	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	7.25		IB		NOT APPLICABLE - State does not have an ATFM program airport 0%- State has not begun an initiative to optimize ATC separation and reduce runway occupancy time; 25%- State has begun an initiative to assess runway occupancy times and efficiency of terminal ATC separation; 50%- State is in the initial phase of an initiative to reduce runway occupancy times at airports, e.g., has begun consultation with airspace users; 75%- State is in the mature phase of an initiative to reduce runway occupancy times at airports, e.g., has developed a procedure and is in trial; 100%- State has fully implemented reduced runway occupancy time operations at airports with connection to optimized terminal ATC separation.	State has declared/ notified ATFM program airports. State has/is developed/developing procedures for i. Optimised ATC Separation in Terminal Airspace ii. Reduced Runway Occupancy Time
52 (17)	Enabled sharing of relevant information between all stakeholders through implementation of CDM	7.28		IB		0%- State has not implemented CDM process between ATFM stakeholders; 100%- State has implemented CDM process, e.g. teleconferences or direct communication channels between operational units, among stakeholders.	State has established CDM Procedures and implemented CDM invloving all stakeholders
53 (19)	Implemented local procedure with regards to ATFM operations and communication, including phraseologies, among ATFMU, ATS Units, airspace users, and airport operators drawn from ICAO Doc 9971	7.31		IB		0%- State has not developed any local ATFM communication procedure; 50%- State is in the process of developing and implementing local ATFM communication procedures for stakeholders ; 100%- State has fully established (developed and published) local ATFM communication procedures with phraseologies based on the recommendations in Doc 9971 that are adhered to by stakeholders.	State has established and published ATFM Operating procedures.

#	Reporting Form Element	S7, Para.	S7, Para.2	S7, Phase	Response	Reporting Merices	Expected Outcome / Guidance to States
54 (21)	Developed procedures for ATS units, airspace users, and airport operators when ATFM program is active	7.31				0%- State has not developed any local ATFM procedure; 50%- State is in the process of developing and implementing local ATFM procedures for stakeholders ; 100%- State has fully established (developed and published) local ATFM procedures that are adhered to by stakeholders.	State has established and published ATFM Operating procedures.
55 (22)	Implemented local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT	7.31		IB		0%- State has not developed a procedure to facilitate CTOT compliance; 50%- State is in the process of developing a procedure to facilitate CTOT compliance, e.g. has a procedure that is not yet formally published; 100%- State has fully established (developed and published) procedures to facilitate CTOT compliance.	State has established CDM Procedures and implemented CDM involving all stakeholders
56 (6)	Developed ATFM post-operations analysis workflow among ATFMU, ATS units, airspace users, and airport operators to ensure proper and timely feedback mechanism can be distributed to ATFMU originating the ATFM measures	7.35		II		0%- State has no ATFM post-operations analysis workflow; 50%- State has local ATFM post-operations analysis workflow but does not have a linkage with ATFMU originating the measures to share data; 100%- State has local ATFM post-operations analysis workflow and shares the data/result with ATFMU originating the measures.	State has established procedures to support Post-Operations Analysis of relevant ATFMU originating ATFM measures
57 (26)	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	7.35		II		0%- State has no ATFM post-operations analysis capability; 50%- State has an ATFM post-operations analysis capability but has not exchanged the information with cross-border/inter stakeholders; 100%- State has an ATFM post-operations analysis capability and has a procedure to exchange the information across borders .	State has established procedures to support Post-Operations Analysis of relevant ATFMU originating ATFM measures
58 (27)	Ensured post-operations analyses are used for planning ATFM, airspace, and ATS route improvements	7.36		II		NOT APPLICABLE - State has not implemented ATFM measure, and Post-Operations Analyses from other ATFMUs are not relevant 0%- State has no ATFM post-operations analysis capability; 50%- State regularly conducts ATFM post-operations analysis but has not established procedure to use the result for airspace improvements; 100%- State regularly conducts ATFM post-operations analysis and has a procedure to use the result for airspace improvements.	State has established Post Ops procedures for ATFM
59 (28)	Ensured capability to receive ATFM Daily Plan (ADP) from Administrations distributing the ATFM measures and to distribute it among local stakeholders for situational awareness	7.38	15	II		0%- State is not able to receive ADP from foreign administrations distributing it; 50%- State is able to receive the ADP, but does not have a procedure to distribute it among local stakeholders; 100%- State is able to receive the ADP and has a procedure to distribute it among local stakeholders.	State has established procedures for receiving ADP from other States/ATFM Units. State has established procedures for sharing the ADP with local stakeholdrers.
60 (34)	Ensured ATM systems provide timely update of estimate information for airborne aircraft	7.45		II		0%- State has no capability to receive or provide timely update of airborne aircraft; 100%- State has a capability to receive or provide timely update of airborne aircraft in their ATM system.	Expectation is that the ATM systems are able to provide timely update of airborne flights for the purpose of updating traffic demand profile accurately.
61	Educated ATM staff and stakeholders on the basic of ATFM and its connection with ATS					0%- State does not have ATFM training included in their operational personnel development program; 50%- State provides ATFM training for their operational personnel on a non-regular basis, and ATFM is not included in the standard training program; 100%- State has ensured ATFM is included in the standard training program for relevant operational personnel.	State has developed procedures for ATFM training/familiarization to ATM staff and other stakeholders.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL GUIDANCE FOR POSTPONEMENT OF CHANGES TO AERONAUTICAL INFORMATION

June 2022

This guidance was developed by the Asia/Pacific Aeronautical Information Services – Aeronautical Information Management Implementation Task Force (AAITF)

Approved by ATM/SG/10 and published by the
ICAO Asia and Pacific Office, Bangkok

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LIST OF APPENDICES

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SCOPE OF THE DOCUMENT

Guidance for Postponement of Changes to Aeronautical Information

1.1 This document, the *Asia/Pacific Regional Guidance for the Postponement of changes to aeronautical information*, provides background information, responsibilities of stakeholders and guidance.

1.2 The document is not intended to encourage States/Administrations to fail to meet their obligations under the Convention on International Civil Aviation to conform with the Standards and Recommended Practices (SARPS) and Procedures in the relevant Annexes to the Convention and Procedures for Air Navigation Services (PANS), in particular Annex 15 *Aeronautical Information Services*, Annex 4 Aeronautical Charts and Doc 10066 *PANS – Aeronautical Information Management (AIM)*.

1.3 The Aeronautical Information Regulation and Control (AIRAC) System and associated SARPS are of central importance to the functioning of an ICAO-compliant, quality-managed Aeronautical Information Service (AIS). This document is intended to provide guidance for aeronautical project planning to ensure compliance with the AIRAC system, and for the operational response by the AIS and, where necessary, the regulatory authority whenever there is a short-notice need to postpone changes to aeronautical information that have been promulgated under the Aeronautical Information Regulation and Control (AIRAC) system.

Document Review

1.4 The document will be subject to ad-hoc review as needed, in response to relevant global or regional developments in the regulation of AIM Implementation.

1.5 Reviews should include examination of relevant new or amended ICAO Annexes, PANS and guidance material to ensure the minimization of duplication, and alignment with global direction.

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OBJECTIVES

2.1 The objective of this document is to provide guidance for handling last minute postponement of changes to aeronautical information distributed under AIRAC system. The guidance is intended to include:

- Scenarios for postponement of aeronautical information/data published through an AIRAC AIP Supplement / AIRAC AIP Amendment and operational procedures to manage these scenarios.
- Workflow charts showing the consolidated general overview on the management of last-minute postponement of aeronautical information/data published through the AIRAC system. *Ref Appendix A and Appendix B.*
- A sample Safety assessment form to identify operational consequences and risks associated with the last-minute delays resulting in users not being updated on time and implement mitigation measures to reduce the risk before initiating the *postponements. A Sample Safety Assessment Form is provided in Appendix C.*

2.2 Without a global standardised procedure or guidance for managing such postponements, each AIS provider from various States/Administration is likely to have developed their own solution.

2.3 Lack of standardisation will result in ambiguity and affects aeronautical data quality requirements set in relevant Annexes intended to assist States/Administration in managing aviation risks associated with Aeronautical publications.

2.4 This regional guidance is intended to guide Asia/Pacific Administrations in development of a standardised procedure to manage last-minute postponements of aeronautical information distributed under the AIRAC system, due to circumstances beyond the control on the part of the Data Originators. However, States/Administration must take all necessary steps to avoid last-minute postponements and put in their best efforts to adhere to the AIRAC system.

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EXECUTIVE SUMMARY

3.1 The *Asia Pacific Guidance for the Postponement of Changes to Aeronautical Information* was developed in response to the concerns expressed by the Asia/Pacific AIM community at the 15th Meeting of the AIS – AIM Implementation Task Force (AAITF/15, 01 to 05 June 2020) and the Eighth Meeting of the Air Traffic Management Sub-Group of APANPIRG (ATM/SG/8, 23 – 27 June 2020). Those meetings were informed of the need for guidance on the management of postponement of changes to aeronautical information distributed under AIRAC, citing the current guidance in ICAO Doc 8126 – *AIS Manual* that any postponement of the effective date of new or amended AIRAC information should be notified by NOTAM at least 28 days in advance of the effective date, and the incidence of cases where a late-notice postponement may be necessary due to circumstances beyond the control of the data originator and AIS.

3.2 AIRAC is a system established to ensure that changes to specified aeronautical information[1] are made available and effective by States/Administrations in a consistent manner on globally agreed timelines. This ensures that the downstream stakeholders in the data chain, such as the data integrators and aircraft operators, are able to perform their obligations and keep the necessary manuals and documents up-to-date and in a timely manner.

3.3 Adherence to the AIRAC system, where changes are effected on scheduled predetermined dates, does not just depend on the AIS provider. The upstream stakeholders of the data chain i.e., the data originators, play a significant role as well, given that they are the trigger for changes in aeronautical information. It is imperative that these data originators factor the AIRAC timeline into their project planning and change management. Thorough planning and the cooperation of all parties involved would be needed to ensure that the project proceeds on time and there is no postponement of the effective date of change.

3.4 The current Doc 8126 guidance stipulates that any postponement of effective date of change should be notified by way of NOTAM at least 28 days in advance of the indicated effective date. However, there may be occasions when, due to events that are beyond the control of the data originators and AIS provider, there is a delay in the project which results in the effective date of the change being required to be postponed at the last minute. This may happen despite the fact that all parties involved had taken all possible and reasonable measures to ensure that the project takes place as planned.

3.5 Nonetheless State/Administrations must take all possible steps to avoid undesirable consequences that may impact flight safety and efficiency. Hence, there is a need to ensure changes to the circumstances listed in Annex 15, Chapter 6 section 6.2 related to AIRAC information must come into effect as per AIRAC schedule effective dates, through proper coordination with all the stakeholders involved.

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[1] The items of aeronautical information that must be promulgated under AIRAC are listed in Annex 15 *Aeronautical Information Services* Chapter 6.

ABBREVIATIONS, ACRONYMS AND DEFINITIONS

APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
AIM	Aeronautical Information Management
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
AIP	Aeronautical Information Publication
AIC	Aeronautical Information Circular
ATC	Air Traffic Control
ATM	Air Traffic Management
Eff	Effective
FMS	Flight Management System
NOTAM	Notice to Airmen
ATS	Air Traffic Services
SARPS	Standards and Recommended Practices

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BACKGROUND INFORMATION

Current ICAO standards, procedures and guidance

Annex 15, Aeronautical Information Services

5.1 The following Standards and Recommended Practices (SARPS) are included in Annex 15 – *Aeronautical Information Services*:

Chapter 6. Aeronautical Information Updates

6.2 Aeronautical information regulation and control (AIRAC)

6.2.1 Information concerning the following circumstances shall be distributed under the regulated system (AIRAC), i.e. basing establishment, withdrawal or significant changes upon a series of common effective dates at intervals of 28 days, including 8 November 2018:

a) limits (horizontal and vertical), regulations and procedures applicable to:

1. *flight information regions;*
2. *control areas;*
3. *control zones;*
4. *advisory areas;*
5. *air traffic services (ATS) routes;*
6. *permanent danger, prohibited and restricted areas (including type and periods of activity when known) and air defence identification zones (ADIZ);*
7. *permanent areas or routes or portions thereof where the possibility of interception exists;*

a) positions, frequencies, call signs, identifiers, known irregularities and maintenance periods of radio navigation aids, and communication and surveillance facilities

b) holding and approach procedures, arrival and departure procedures, noise abatement procedures and any other pertinent ATS procedures;

c) transition levels, transition altitudes and minimum sector altitudes;

d) meteorological facilities (including broadcasts) and procedures;

e) runways and stopways;

f) taxiways and aprons;

g) aerodrome ground operating procedures (including low visibility procedures);

h) approach and runway lighting; and

i) aerodrome operating minima if published by a State.

6.2.2 The information notified under the AIRAC system shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.

6.2.3 Information provided under the AIRAC system shall be made available by the aeronautical information service (AIS) so as to reach recipients at least 28 days in advance of the effective date.

6.2.5 Implementation dates other than AIRAC effective dates shall not be used for pre-planned operationally significant changes requiring cartographic work and/or for updating of navigation databases.

6.2.6 ***Recommendation.*** *— The regulated system (AIRAC) should be used for the provision of information relating to the establishment and withdrawal of, and premeditated significant changes in, the circumstances listed below:*

a) position, height and lighting of navigational obstacles;

b) hours of service of aerodromes, facilities and services;

c) customs, immigration and health services;

d) temporary danger, prohibited and restricted areas and navigational hazards, military exercises and mass movements of aircraft; and

e) temporary areas or routes or portions thereof where the possibility of interception exists.

6.3 Aeronautical information product updates

6.3.1.2 Permanent changes to the AIP shall be published as AIP Amendments.

6.3.1.3 Temporary changes of long duration (three months or longer) and information of short duration which contains extensive text and/or graphics shall be published as AIP Supplements.

6.3.2.2 A NOTAM shall be originated and issued promptly whenever the information to be distributed is of a temporary nature and of short duration, or when operationally significant permanent changes or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.

6.3.2.1 When an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures, a Trigger NOTAM shall be originated.

Doc 10066 – PANS AIM

5.2 The following procedures are included in ICAO Doc. 10066 – *Procedures for Air Navigation Services – Aeronautical Information Management*:

Chapter 5. Aeronautical Information Products and Services

5.2.1.4.4 A checklist of valid AIP Supplements shall be issued at intervals of not more than one month as part of the checklist of NOTAM required by 5.2.5.3 and with distribution as for the AIP Supplements.

5.2.5.1.9 Each NOTAM shall deal with only one subject and one condition of the subject.

5.2.5.1.12 A NOTAM containing permanent information or temporary information of long duration shall carry appropriate AIP or AIP Supplement references.

5.2.5.3.3 A NOTAM checklist shall refer to the latest AIP Amendments, AIP Supplements, data sets and at least the internationally distributed AIC, and, when it is selected, include the checklist of AIP Supplements.

Chapter 6. Aeronautical information product updates

6.1.3 Specifications for AIP Supplements. When an error occurs in an AIP Supplement or when the period of validity of an AIP Supplement is changed, a new AIP Supplement shall be published as a replacement.

Note 1.— The requirements for NOTAM apply when time constraints do not allow sufficient time for the distribution of an AIP Supplement.

6.1.4.1 NOTAM should be published with sufficient lead time for the affected parties to take any required action, except in the case of unserviceability, volcanic activity, release of radioactive material, toxic chemicals and other events that cannot be foreseen.

6.1.4.4 Within three months from the issuing of a permanent NOTAM, the information contained in the NOTAM shall be included in the aeronautical information products affected.

6.1.4.5 Within three months from the issuing of a temporary NOTAM of long duration, the information contained in the NOTAM shall be included in the AIP Supplement.

6.1.4.6 When a NOTAM with estimated end of validity unexpectedly exceeds the three-month period, a replacement NOTAM shall be issued, unless the condition is expected to last for a further period of more than three months; in this case, an AIP Supplement shall be issued.

6.1.4.7 When an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures, a so-called "Trigger NOTAM" shall be originated giving a brief description of the contents, the effective date and time, and the reference number of the amendment or supplement.

Doc 8126 - Aeronautical Information Service Manual

5.3 The following guidance is included in ICAO Doc 8126 – *Aeronautical Information Service Manual:*

Chapter 3. Aeronautical Information Updates

Postponement or cancellation of changes to aeronautical information

3.2.10.1 Postponement or cancellation of changes to circumstances listed in Annex 15, Chapter 6, section 6.2 has the effect of cancelling information notified by AIRAC and reinstating previously valid information. Doing so by NOTAM less than 28 days before the effective date for changes to circumstances listed in Annex 15, Chapter 6, section 6.2 does not generally allow sufficient time for previously valid information to be reinstated in airborne navigation databases, with the result that erroneous information would be presented to flight crews. Furthermore, since charts used by flight crews and ATC are updated on a different schedule than airborne navigation databases, it is possible that valid information which is not reflected in the airborne database may nevertheless appear on charts. The resulting mismatch of information would lead to considerable operational difficulties and potential safety hazards. In the worst case, area navigation (RNAV) procedures that require a navigation database may not be flown (operated).

3.2.10.2 In order to avoid negative consequences to the safety and efficiency of flights, all possible measures should be taken to ensure that changes to circumstances listed in Annex 15, Chapter 6, section 6.2 take place as notified on the AIRAC date. This requires

careful planning of aeronautical information changes and the cooperation of all parties involved, including AIS.

Note 1.— Current AIS Manual has not updated by latest Annex 15 Amendment. Therefore, Annex 15 references in 2.6.21 – 2.6.23 should be read as follows:

- *Annex 15, Appendix 4, Parts 1 and 3 as '**Annex 15, paragraph 6.2.1 and 6.2.7**'*
- *Annex 15, Appendix 4 as '**Annex 15, 6.2 Aeronautical information regulation and control (AIRAC)**'*

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GUIDING PRINCIPLES FOR POSTPONEMENT OF AERONAUTICAL INFORMATION

6.1 While this document presents various scenarios to address the postponements of AIRAC publications, it shall by no means taken as an 'option of convenience' for data originators to adopt due to poor planning. On the contrary, it should only be used as a last resort for large-scale projects where inevitable delays may occur due to multiple coordination taking place

6.2 State/Administrations shall endeavor to engage and educate their Data Originators on the consequences of last-minute postponements and emphasize on the need to engage all relevant stakeholders who will be impacted before initiating the postponement.

6.3 States/Administrations must implement procedures for Data Originators to conduct a Safety Assessment to identify operational consequences and the risks associated with the last-minute delay resulting in users not being updated on time and implement mitigation measures to reduce the risk before initiating a postponement. Safety Assessment Form is provided in **Appendix C** for reference.

6.4 States/Administrations must be involved at the planning stage, particularly for large projects, to ensure the data quality requirements, AIRAC cycle and the associated cut-off dates for providing information to AIS and the AIRAC cycle limitations are well understood, and contingency arrangements are built into the planning in case of postponements.

6.5 When planning, States/Administrations should in collaboration with their Data Originators consider the following options to reduce the potential for an aeronautical information roll back if delays occur. For example:

a. consider if the circumstances may safely allow the existing and planned new information to be current at the same time over a transition period.

b. the actual change over date/time (e.g., operational availability of a facility) may be managed by NOTAM and/or ATC in some cases.

c. to allow the new information to become effective as published but make the facility not available for use. (e.g., managed operationally in real-time by ATC or Aerodrome operator).

d. consider if very changes could be done in stages to reduce the likelihood and impact of any delays.

6.6 Additionally, to avoid the need to roll-back or make changes after 28 days prior to effective date unless absolutely safety critical, particularly for instrument flight procedure related data, Data originators should consider the following:

e. Data houses who would have likely processed the data and it may be being uploaded to aircraft as the effective date approaches.

f. Number of days taken for airlines to update their fleet's navigation database once received.

g. Cost to airlines to request an updated database for a cycle and to roll-back.

6.7 In mitigating postponements for AIRAC information publication e.g., AIRAC AIP SUPs containing large or complex changes, States/Administrations may consider, in collaboration with Data Originators, to plan the implementation of large changes in smaller tranches where possible. Additionally, States should, in particular, identify the type of changes that would be more manageable at short notice than others in order to provide Airspace Users with better decision-making options.

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GUIDANCE FOR POSTPONEMENT OF CHANGES TO AERONAUTICAL INFORMATION

Responsibilities

Data originator

7.1 Data originators should provide all information required to postpone changes to aeronautical information such as:

- New effective date of aeronautical information;
- All previous aeronautical data (in case it needs to be reinstated);

AIS Provider

7.2 AIS Provider should take appropriate action depending on raw data provided by Data originator in accordance with ICAO SAPRs, procedures and guidance.

Guidance

7.3 Postponement of changes to aeronautical information should be carried out via workflow appended in **Appendix A and Appendix B**.

7.4 Data originators are required to make assessment and determine new effective date as soon as they are aware of a delay which will result in the postponement of the effective date of aeronautical information.

7.5 Data originator should check whether effective date change could be informed at least 28 days before the previously indicated effective date.

7.6 If the effective date change for the published AIRAC AIP Supplement could be informed 28 days before the previously indicated effective date, data originator should inform the new effective date to AIS as soon as possible. AIS should issue a NOTAM using guidance contained in the current ICAO Doc 8126 – AIS Manual (Chapter 3. Aeronautical Information Updates para 3.2.10.) the data originator and AIS shall adhere to the operational procedures stated below:

Postponement of information informed by Data originator more than or equal to 28 days prior to the indicated AIRAC effective date

a. Data originator should inform the new effective date to AIS as soon as possible.

b. AIS to promulgate a NOTAM to cancel the AIRAC AIP Supplement.

   i. The validity of the NOTAM is to last till the publication of the next round of NOTAM checklist

   ii. NOTAM Format: “XX” should not be used in the Q-code. Instead, the Trigger NOTAM Q-code should be used

   iii. NOTAM Content: Specific keywords should be used in item E such as Trigger and postpone

c. AIS to promulgate a “CNL Trigger NOTAM” using the Trigger NOTAM Q-code.

d. AIS to promulgate 'NIL AIRAC FOR EFFECTIVE DATE ……" if applicable.

e. AIRAC AIP Supplement to be removed as soon as possible but preferably on the same day.

f. Data-houses proceeding to perform the update work e.g., charting products or flight planning system/navigation databases should maintain a back-up copy of the previous information should the need arise to reinstate the information and distribute to the users.

g. Data originator to determine the next AIRAC effective date. AIS to publish the new AIRAC AIP Supplement on the corresponding publication date e.g., Pub-2 or Pub-3 for effective date Eff-2 or Eff-3.

7.7 If the effective date change for the published AIRAC AIP Supplement could not be informed 28 days before the previously indicated effective date, the data originator should check whether new effective date is next AIRAC effective date or beyond. Data originator and AIS shall adhere to the operational procedures stated below:

Postponement of information less than 28 days prior to the indicated AIRAC Effective date, with the estimated effective date on or prior to the next scheduled AIRAC effective date.

a. AIS should inform Data Originators that such postponement should be avoided unless absolutely necessary as there will be impact to aviation users:

   i. Operators may not be able to roll-back to the previous aeronautical data in the navigational databases (NAVDBs).

   ii. Pilots are limited on the type of navigation data that can be manually inserted or modified in the FMS.

   iii. Significant cost and operational resources incurred to roll-back to the previous aeronautical data into NAVDBs.

b. Data originators should engage relevant stakeholders and conduct a Safety Assessment to identify operational impact and the risks associated with the last-minute postponement.

c. Data originators to implement mitigation measures to reduce the risk.

d. AIS to publish NOTAM informing the aviation community of the delay, using guidance contained in the current ICAO Doc 8126 – AIS Manual (Chapter 3. Aeronautical Information Updates para 3.2.10)

   i. including reason for the delay (for accountability), and the new effective date. NOTAM to also include information on the current status of the facility/ service, if available e.g., whether to revert to the pre-implementation state, or if the facility/ service is unavailable/ closed in the meantime.

e. Replace Trigger NOTAM to indicate new Effective date.

7.8 If new effective date is not next AIRAC effective date or beyond, a NOTAM should be promulgated. NOTAM content depends on whether aeronautical information has been published via AIP Amendment or AIP Supplement.

7.9 If aeronautical information has been published via AIRAC AIP Supplement, the NOTAM should contain information such as the reason of the delay and the new effective date. The data originator and AIS shall adhere to the operational procedures stated below:

Postponement of information less than 28 days prior to the indicated AIRAC Effective date and i) the new estimated effective date is on or after the next scheduled AIRAC effective date; or ii) data originators are unable to determine the new effective date.

a. Data originators to engage relevant stakeholders and conduct a Safety Assessment to identify risks associated with the last-minute postponement and implement mitigation measures to reduce the risk. AIS to publish NOTAM to cancel the AIRAC AIP Supplement.

b. AIS to publish NOTAM to cancel the AIRAC AIP Supplement.

    i. Validity of the NOTAM is to last till the publication of the next round of NOTAM checklist, and

c. AIS to promulgate a “CNL Trigger NOTAM” using the Trigger NOTAM Q-code.

d. AIRAC AIP Supplement is to be removed as soon as possible but preferably on the same day.

e. Data-houses should reinstate the previous information in the navigation database and distribute to the users as soon as possible.

f. Data originator to determine the next AIRAC effective date and send the information to AIS at least 7 days prior to publication date in accordance with the AIRAC system.

g. AIS to publish the new AIRAC AIP Supplement on the corresponding publication date once the new effective date has been finalized.

7.10 If aeronautical information has been published via AIRAC AIP Amendment, following NOTAMs should be promulgated depending on usage of previously published aeronautical information. The data originator and AIS shall adhere to the operational procedures stated below:

Postponement of information informed by data originators **more** / **less** than or equal to 28 days prior to the indicated AIRAC effective date.

a. Data originators to engage relevant stakeholders and conduct a Safety Assessment to identify risks associated with the last-minute postponement and implement mitigation measures to reduce the risk.

b. Data originator should inform the new effective date to AIS as soon as possible.

c. AIS to promulgate a NOTAM informing the aviation community of the intended postponement.

    i. NOTAM should indicate the rationale for the postponement.

ii. Contain specific keywords in item E such as postponement of specific information to AIRAC EFF-2 or EFF-3. (e.g., Reference to AIRAC AIP Amendment XX/22 page XX, an AIP Supplement will be published to reinstate the previous information.)

iii. Validity of the NOTAM is to last till the next 'AIRAC Eff-2 or Eff-3' and an AIP Supplement is to be published as soon as possible but preferably on the same day to reinstate previous information.

d. Data originator to determine the next AIRAC effective date. AIS to publish the new AIP Supplement on the corresponding publication date.

e. AIS to publish an AIP Supplement informing the aviation community of the intended postponement.

i. AIP Supplement shall contain previous AIP information that will be reinstated.

ii. AIP Supplement start date: 'AIRAC Eff-1, end date: 'AIRAC Eff-2' or 'AIRAC Eff-3'

iii. Validity of the AIP Supplement to last till 'AIRAC Eff-2 or 'AIRAC Eff-2'

f. If there is no need to use previously published aeronautical information, NOTAM should contain 'not availability' of aeronautical information such as closed, unserviceable, not available and etc. NOTAM will be valid until the change become effective.

7.11 If new effective date is next AIRAC effective date or beyond, following action should be taken depending on whether aeronautical information has been published via AIP Amendment or AIP Supplement:

a. If aeronautical information has been published via AIP Amendment, action stated in paragraph 6.10 should be taken.

b. If aeronautical information has been published via AIP Supplement, previously published AIP Supplement should be cancelled by NOTAM. The validity of NOTAM will last till 1st of the following month, which is when the AIS provider publishes the NOTAM Checklist. Cancelled AIP Supplement should be excluded from checklist of valid AIP Supplement which is part of NOTAM Checklist. A new AIRAC AIP Supplement should be published at the next AIRAC publication date.

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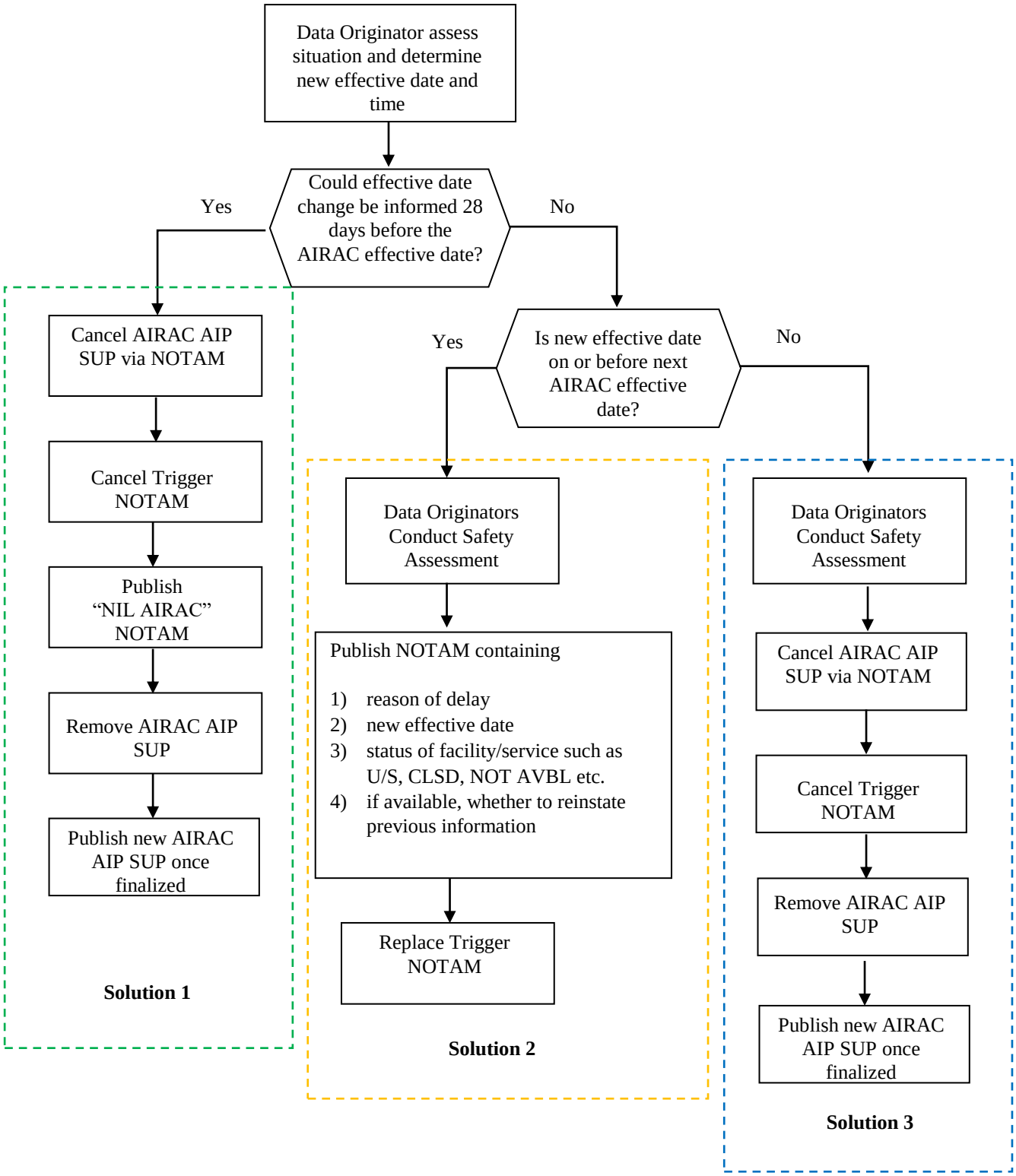
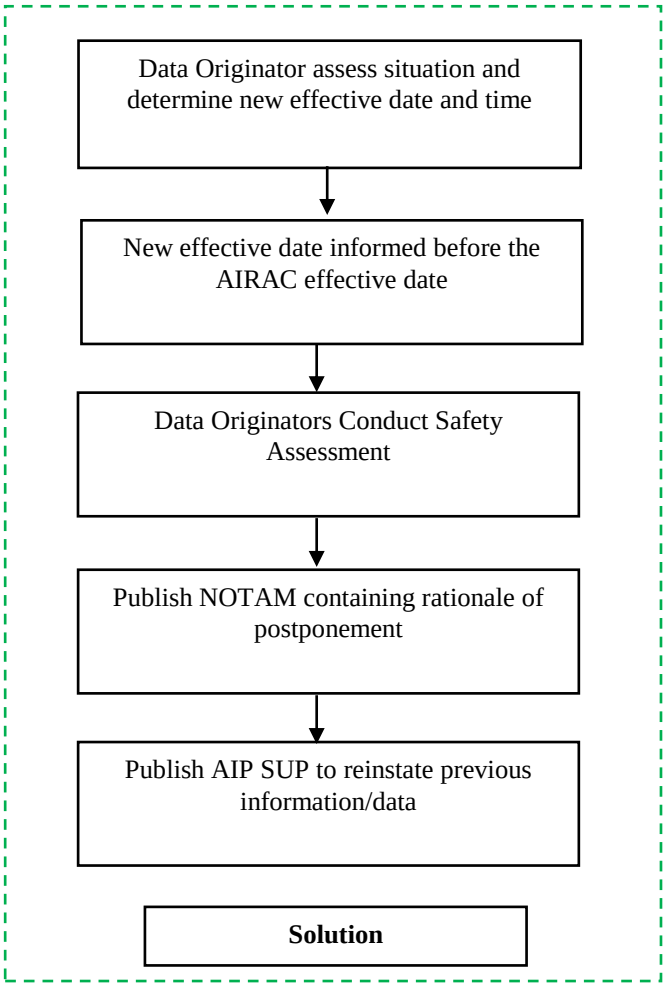
APPENDIX A – Flow Chart on Postponement of AIRAC AIP Supplement



APPENDIX B – Flow Chart on Postponement of AIRAC AIP Amendment



Asia/Pacific Regional Guidance for Postponement of Changes to Aeronautical Information

APPENDIX C – Sample Safety Assessment Form for Postponement of AIRAC Information

* Delete as appropriate

Part I – Application and Declaration		
Type of Postponement: AIRAC AIP Amendment ( ) | AIRAC AIP Supplement ( ) *(Please indicate a tick (√) on the type of postponement required.)*		
Requests for postponement should be submitted **as soon as possible** to AIS upon knowledge of postponement.		
A. Postponement Request		
Name of requestor: _____ Contact Nos: _____ Organisation: _____		X _____ Signature / Designation
AIP AMDT/ AIP SUP No:	AIP Section affected (*if applicable*): *Part: GEN / ENR / AD	Section:
Please complete **Part III** in the next page of the *Safety Assessment Form* prior to submission for approval.		
Submission date:	Publication date:	Effective Date:
B. Postponement endorsed by Section Head		
I, _____ (Name of Section Head), confirm that the postponement of aeronautical data and information set out in this form was due to extenuating circumstances and has gone through our internal checking processes. The requestor has done his/her due diligence in engaging the stakeholders and appropriate mitigations are addressed to reduce the risk to aviation community in accordance with "*Regional Guidance Material on postponement AIRAC information publication*"		X _____ Signature / Designation / Date
C. Approved by Division Head		
I, _____ (Name of Division Head), acknowledge and take responsibility for the risk and outcomes associated with non-adherence to the AIRAC system requirements for the data/information submitted. I am satisfied with **Part III** of the Safety Assessment Form. Comprehensive safety assessment has been conducted and appropriate mitigation actions have been taken to minimize the risk. (Please attach Safety Assessment Form for record purposes.)		X _____ Signature / Designation / Date
D. Consultation with CAA Regulator		
I, _____ (Name of Regulator), confirm that Data Originator has consulted me on the non-compliance to AIRAC publication requirements and we are satisfied with the mitigation measures put in place by the Data Originator to address any safety risk posed by the postponement of the aeronautical data and information publication. The actions carried out by the requestor is in accordance with "*Regional Guidance Material*"		

	X Signature / Designation / Date

Part II – For Official Use

E. Approved by CAA Division Head

X

Signature / Designation / Date

F. Action by AIS (in accordance with *Regional Guidance Material*)

AIRAC AIP Amendment:	AIRAC AIP Supplement:
Scenario 1 – Postponement informed ≥ 28 ≤ days prior to Effective Date	Scenario 1 – Postponement informed ≥ 28 days prior to Effective Date
☐ Publish NOTAM to postpone AIRAC AIP AMDT	☐ Publish NOTAM to cancel AIRAC AIP SUP
☐ Publish AIP SUP to reinstate previous information	☐ Remove AIRAC AIP SUP
	☐ Cancel Trigger NOTAM
	☐ Publish NOTAM "NIL AIRAC"
	Scenario 2 – Postponement informed ≤ 28 days prior to Effective Date
	☐ Publish NOTAM on the reason of the postponement
	☐ Replace Trigger NOTAM for the new Effective date
	Scenario 3 – Postponement informed ≤ 28 days prior to Effective Date
	☐ Publish NOTAM to cancel AIRAC AIP SUP
	☐ Remove AIRAC AIP SUP
	☐ Cancel Trigger NOTAM

Part III – Determination of Safety Significance of the Postponement

Requests for postponement of AIRAC AIP Amendment/AIRAC AIP Supplement shall complete the below but not limited to:

1) Reason(s) for the AIRAC postponement.

_____

_

_____

–
2) Have the relevant stakeholders been consulted and the impact to stakeholders analysed? _____ – _____ –
3) What are the safety risks identified and mitigation measures put in place? _____ – _____ –

SURVEY OF STATE READINESS FOR AUTONOMOUS DISTRESS TRACKING (ADT)

(Annex 6 *Operation of Aircraft* Part 1 *International Commercial Air Transport – Aeroplanes* section 6.18)

The survey questions in the following pages resulted from the discussion outcomes of the Seventh Meeting of the Asia/Pacific SAR Working Group (APSAR/WG/7, 24 to 27 May 2022), and are intended to:

1. Gauge State readiness for ADT alerts; and
2. Serve as a checklist of considerations for regulatory authorities, SAR services and Air Traffic Service Units (ATSUs) to support their preparation for the reception and handling of ADT alerts.

APAC Administrations are requested to ensure the survey is circulated to the following entities, and their responses provided in a consolidated State response to the survey:

1. Aviation Regulatory Authority;
2. Aircraft Operators (Annex 6 Part 1);
3. SAR Service Providers; and
4. Air Navigation Service Providers

States are requested to provide their consolidated response to the ICAO Asia/Pacific Regional Office (apac@icao.int) by **not later than 07 October 2022**, in order that regional readiness for ADT may be assessed by the 10th Meeting of the Air Traffic Management Sub-Group of APANPIRG (ATM/SG/10, 17 to 21 October 2022), and subsequently by APANPIRG/33 (21 to 23 November 2022).

Notes:

The ADT provisions of Annex 6 *Operation of Aircraft* Part I section 6.18 were originally applicable from 01 January 2023. However, at the sixteenth meeting of its 226th Session (18 July 2022) the Council of ICAO adopted Amendment 48 to the Annex, revising the provision as follows (ICAO State Letter AN 11/1.3.35-22/75 dated 29 July 2022 refers.):

> 6.18.1 As of 1 January 2025, ~~A~~all aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 202~~3~~4, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress, in accordance with Appendix 9.

However, regardless of the deferral of the Annex 6 provisions, airlines, Search and Rescue (SAR) Services and Air Traffic Service Units (ATSUs) may receive ADT alerts or notifications before the applicability date as increasing numbers of aircraft complying with the standard become operational from late 2022 onwards. Some aircraft manufacturers have chosen the Emergency Locator Transmitter (Distress Tracking) - ELT(DT) – as their ADT solution and it is expected that delivery of new aircraft fitted with the ELT(DT) may commence in increasing numbers from late 2022. ELT(DT) alerts will be processed via the Cospas-Sarsat system and also later through the new ICAO Location of an Aircraft in Distress Repository (LADR) when that system is commissioned. Therefore, State SAR Services and ATSUs will need to be prepared to respond to ELT(DT) alerts as increasing numbers of aircraft fitted with this system may become operational from late 2022 onwards.

……

AVIATION REGULATORY AUTHORITY		
Check the box if State has:		
1.	☐	Registered a State Focal Point in the ICAO OPS CTRL Directory (email: aircrafttracking@icao.int website: https://www4.icao.int/opsctrl/
2.	☐	Taken action to ensure and facilitate the registration of all relevant organizations in the OPS CTRL Directory
3.	☐	Recorded the required operational contact details in the OPS CTRL Directory
4.	☐	Identified relevant entities and ensured they are prepared to subscribe to LADR notifications when the service is commissioned
5.	☐	Developed regulations requiring aircraft operator compliance with Annex 6 Section 6.18
6.	☐	Ensured the incorporation of procedures for ADT notifications, and verification by aircraft operators, in existing procedures for ATS alerting services.
7.	☐	Ensured the development of procedures for RCC actions in response to ADT notifications
8.	☐	Ensured the development of procedures for RCC actions in response to ELT(DT) alerts via the Cospas-Sarsat system
9.	☐	Incorporated ADT considerations in procedures and manuals for safety oversight of aircraft operators, ANSPs and SAR service organizations
10.	☐	Published and promulgated educational material on ADT for aircraft operator, ATSU and RCC personnel and other necessary stakeholders

AIRCRAFT OPERATOR		
Check the box if the Aircraft Operator has:		
1.	☐	Registered in the ICAO OPS CTRL Directory (email: aircrafttracking@icao.int website: https://www4.icao.int/opsctrl/)
2.	☐	Commenced preparation for subscription to LADR notifications, when the service is commissioned.
3.	☐	Developed procedures for the initial aircraft operator response to ADT notifications
4.	☐	Developed procedures for the initial aircraft operator response to ELT(DT) alert coordination received from SAR authorities or ATSUs
5.	☐	Trained flight despatch and other relevant personnel to understand ADT notifications and ELT(DT) alerts (according to fleet equipage), and to execute ADT procedures accordingly
6.	☐	Developed procedures for informing appropriate ATS units of the outcome of ADT validation checks

SAR SERVICE PROVIDER (RCC/RSC)		
Check the box if the Air Navigation Service Provider has:		
1.	☐	Registered in the ICAO OPS CTRL Directory (email: aircrafttracking@icao.int website: https://www4.icao.int/opsctrl/)
2.	☐	Commenced preparation for subscription to LADR notifications, when the service is commissioned.
3.	☐	Developed procedures for the initial response to ADT notifications received from ATS units.
4.	☐	Developed procedures for the initial response to ELT(DT) alerts.
5.		Developed procedures for the use of LADR
6.	☐	Trained SAR personnel to understand ADT notifications and ELT(DT) alerts, and to execute ADT procedures accordingly.

AIR NAVIGATION SERVICE PROVIDER		
Check the box if all relevant Air Traffic Service (ATS) Units have:		
1.	☐	Registered in the ICAO OPS CTRL Directory (email: aircrafttracking@icao.int website: https://www4.icao.int/opsctrl/)
2.	☐	Commenced preparation for subscription to LADR notifications, when the service is commissioned
3.		Provided for LADR access to the relevant operational supervisory position in the ACC in charge of each FIR, when the services is commissioned
4.	☐	Developed procedures for the response to ADT notifications received from aircraft operators.
5.	☐	Developed procedures for the response to ELT(DT) coordination received from SAR authorities.
6.	☐	Trained relevant ATS personnel to understand ADT notifications and ELT(DT) alerts, and to coordinate in accordance with procedure.

Reference Material

Seventh Meeting of the Asia/Pacific Search and Rescue Working Group (APSAR/WG/7)

ICAO Annex 6 *Operation of Aircraft* Part I

ICAO Annex 11 Air Traffic Services

ICAO Annex 12 *Search and Rescue*

ICAO Annex 13 *Accident and Incident Investigation*

ICAO Doc 4444 *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM)

ICAO Doc 100542 *Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery*

ICAO Doc 10165 Global Aeronautical Distress and Safety System (GADSS) Manual (NEW)

Expected availability Q3/Q4 2022

International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volumes I and II

ICAO Asia/Pacific Regional SAR Plan Version 4.0

Subject to approval by the Tenth Meeting of the ATM Sub-Group of APANPIRG, November 2022

ICAO Web Resources:

Global Tracking Initiatives

https://www.icao.int/safety/OPS/OPS-Section/Pages/Global-tracking.aspx

Update on GADSS-Related Global Aircraft Tracking Initiatives

https://www.icao.int/safety/globaltracking/Pages/GADSS-Update.aspx

ICAO Skytalk: GADSS Implementation Support Tools

https://www.youtube.com/watch?v=ZbD3IIdkzbk

ICAO OPS Control Directory

https://www4.icao.int/opsctrl/

Cospas-Sarsat Documentation:

C/S A.001 (data distribution procedures for ELT(DT)s)

C/S A.002 (structure and samples of ELT(DT) distress alert messages sent to SPOCs)

C/S T.001 and C/S T.018 (respectively, FGB and SGB (ELT(DT) specifications)

C/S G.007 (RCC handbook)

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC SEARCH AND RESCUE (SAR) PLAN

Version 4.0 October 2022

This Plan was developed by the Asia/Pacific Search and Rescue Task Force (APSAR/TF) and the Asia/Pacific Search and Rescue Work Group (APSAR/WG)

Approved by ATM/SG/10 and published by the
ICAO Asia and Pacific Office, Bangkok

CONTENTS

SCOPE OF THE PLAN

Plan Structure

1.1 The Asia/Pacific Search and Rescue (SAR) Plan (hereinafter referred to as the 'Plan') references different levels. At the higher level are global requirements established by the ICAO Annex 12 to the ICAO Convention on International Civil Aviation (ICAO Doc 7300). Global guidance material is provided by the International Maritime Organization (IMO) and ICAO's joint publication, the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual. Beneath this is regional planning guidance primarily provided by this Plan and other regional guidance material, in order to enable States to define the goals and means of meeting objectives for State planning towards improving State SAR System capability, such as the performance objectives of Asia/Pacific (APAC) Regional Air Navigation Plan (ANP) and Seamless Air Navigation Services (ANS) Plan.

1.2 The global air navigation perspective is guided mainly by the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global ATM Operational Concept* (Doc 9854) and the *Global Aviation Safety Plan* (GASP).

1.3 The scope of the Plan is the identification of:

- the current status of SAR preparedness of Asia/Pacific Region States and State SAR arrangements; and
- recommendations for SAR planning and preparedness enhancements, in terms of compliance with Annex 12 of the ICAO Convention, IAMSAR Manual guidance, and accepted best international practice.

1.4 References in the Plan to 'States' are intended to include Special Administrative Regions and territories.

Plan Review

1.5 As an iterative process, the Plan requires regular updating to keep current with changes in ICAO Annexes and guidance material, outcomes from the ICAO-IMO JWG-SAR, the IAMSAR manual, regional aviation activity, developments in the Air Traffic Management (ATM) system, new technology, political considerations, human performance and lessons learned from actual SAR responses. Plan updates should also focus on the SAR system being an important component of an integrated regional and global air navigation system. It is intended that APANPIRG and its contributory bodies conduct a complete review every three years from 2019 (or a shorter period determined by Asia/Pacific Air Navigation Planning and Implementation Regional Group - APANPIRG) of the Plan to align with the review cycle of the GANP and the IAMSAR Manual. The review should be guided by a consultative process involving States and relevant International Organisations and technical bodies.

OBJECTIVES

Introduction

2.1 Asia/Pacific States that are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of Annex 12 – *Search and Rescue*. Increases in both aviation and maritime traffic throughout the Asia/Pacific region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical and maritime SAR services.

2.2 The world's citizens, who frequently fly over or sail through the Asia/Pacific, expect a timely and adequate SAR response to be provided should it be required. States in the region need to be adequately prepared for the provision of efficient and effective SAR services. To assist in achieving this, it is essential for States to cooperate, collaborate and in some cases assist with resources to neighbouring and sub-regional RCCs.

2.3 ICAO Regional Office maintains a record, as reported to ICAO by the States themselves, of the status of individual State SAR compliance against Annex 12 requirements. There are significant variations in the level of State SAR capability across the region with significant gaps requiring urgent action, especially in oceanic areas. A number of States have not reported their status at all to ICAO. The ICAO Universal Safety Oversight Audit Programme – Continuous Monitoring Approach (USOAP-CMA) also provides a useful tool to States to self-assess their individual SAR system status. Since the establishment of this Plan, there had already been commendable improvements to the SAR systems of some States which have contributed to building better regional SAR capability. However, there was still considerable work required to address capability gaps.

2.4 There is a high risk of negative consequences to a State which does not provide an adequate SAR response to an aircraft or vessel in distress. The primary concern is the higher probability for loss of lives which may have been saved. The ability for news to spread rapidly in today's technologically connected world also provides the opportunity for a poor or ineffective SAR response to quickly reach a global audience resulting in damage to that State's reputation internationally and potential economic loss to sensitive State industries such as tourism and transport. However, the benefits of an effective and reliable SAR service to States offers many advantages. Besides reduction of loss of life and human suffering, other advantages include the following aspects.

a) Safer and more secure environment for aviation and maritime related industries, commerce, recreation and travel. Increased safety may promote use and enjoyment of aviation and maritime environments, tourism and economic development. This is especially true when the SAR system utilised programmes aimed at preventing or reducing the effects of mishaps, sometimes referred to as 'Preventative SAR'.

b) Availability of SAR resources often provides the initial response and relief capabilities critical to saving lives in the early stages of natural and man-made disasters. SAR services offer an integral part of local, national and regional emergency management systems.

c) Well performed SAR operations can provide positive publicity about situations which may otherwise be viewed negatively. This can lead to improved public confidence in that State's reputation and commitment to providing a safe environment, leading to increased confidence to conduct activities beneficial to that State's economy.

d) As SAR is a relatively non-controversial and humanitarian mission, it provides an excellent opportunity to enhance cooperation and communication in general between States and organisations, not only for SAR. It can also foster better working relationships between States and organisations at the local, national and international levels, including civil/military cooperation.

2.5 In 2014 Malaysia Airlines flight MH370, a Boeing 777 with 239 persons on board, disappeared when flying from Kuala Lumpur, Malaysia to Beijing, China, and Air Asia QZ8501 was lost on a flight from Surabaya to Singapore. The MH370 event resulted in probably the largest and most expensive search response for a missing aircraft in human history. Together with Air France flight AF447, which crashed into the Atlantic Ocean in 2009, these tragedies highlighted vulnerabilities in the air navigation system including the SAR system, which have hampered timely identification and localisation of aircraft in distress, hindering effective response efforts. ICAO is addressing these vulnerabilities through implementation of functions of the Global Aeronautical Distress and Safety System (GADSS) concept of operations; however, this new system is also dependent on improvements in global SAR capability, especially for remote and oceanic SAR response.

2.6 The Plan is designed to address both civil and military SAR authorities and has been developed in consultation with Asia/Pacific States, SAR administrations and relevant International Organisations. States should consult with stakeholders nationally, regionally and internationally as appropriate and determine actions in order to commit to achieving the objectives of this Plan in order to meet at least the minimum SAR service requirements in accordance with ICAO Annex 12. It is noted that where a State is unable to meet minimum SAR Standards and Recommended Practices (SARPs) of ICAO Annex 12, Article 38 to the ICAO Convention requires notification to ICAO of the differences between its own practice and that established by the international standards.

2.7 It is a common practice for the military to conduct or have a major role in SAR operations to fulfil or assist in fulfilling the State's obligation to provide SAR services. From the perspective of providing SAR services, civil-military coordination takes on many forms. This includes coordination during an actual SAR response, national coordination with other agencies to determine the military role, part of an international agreement or set of procedures with a neighbouring State to assist in SAR response, or other types of coordination. ICAO Document 10088 – Civil/Military Cooperation is focused on airspace management and includes SAR matters relevant to civil-military coordination in airspace management.

2.8 The IAMSAR Manual, Volume II, has guidance on Multiple Aircraft Operations and establishing areas of SAR action to assist with the safe coordination and management of aircraft operations during SAR operations. SAR authorities should have procedures in place to rapidly notify airspace users of SAR operations and the establishment of any temporary airspace operation such as danger areas or restricted areas through appropriate State authorities. The combination of guidance in the IAMSAR Manual and ICAO Document 10088 should enable a State to have an appropriate plan in place for civil-military coordination and cooperation in readiness for efficient and effective SAR response.

2.9 States should aim to meet their obligations progressively in a strategically structured and planned manner with improvement goals set for short term, medium term and long term implementation. It may be more productive to make gains in small steps commencing with measures that are more easily achievable in the short term and have a minimal cost, progressing to measures which will take longer to implement over the medium to long term. Short term measures that may be implemented relatively easily include the establishment of a national SAR Committee and ensuring SAR Agreements are in place with neighbouring States allowing for seamless cross-border transit of search assets engaged in SAR activity. A SAR agreement can be in the form of 'Letter of Agreement' (LOA) or a Memorandum of Understanding or other acceptable term indicating a lower form of arrangement for operational matters between SAR service providers (such as RCCs and/or RSCs) or a more formal agreement for arrangements between governments concerned.

2.10 All States are encouraged to use the guidance provided within this Plan as a way forward, thus ensuring a timely, well-coordinated response to any SAR incident within their area of responsibility, or during cooperative responses involving more than one Search and Rescue Region (SRR) including overlapping aeronautical and maritime SRRs which may be the responsibility of different RCCs.

Plan Objective

2.11 The objective of this SAR Plan is to provide a framework to assist Asia/Pacific States to meet their SAR needs and obligations accepted under the Convention on International Civil Aviation and for the harmonised and interoperable delivery of both aeronautical and maritime SAR services within the region, and across other ICAO regional boundaries, where practicable.

2.12 The Plan is to be consistent with the SARPs of ICAO Annex 12 - *Search and Rescue*, and aligned where appropriate with the SAR technical and operational standards and guidance of the IMO.

2.13 The Plan recognizes that ICAO serves as the forum for the implementation of practical and achievable measures to improve SAR services for international civil aviation. The Plan also recognizes that the IMO provides a similar forum for SAR services to maritime shipping.

2.14 Both ICAO and IMO share the same goal of ensuring that SAR services are available globally wherever people sail or fly. The SAR services that ICAO and IMO promote are complementary and offer tangible opportunities to derive mutually beneficial efficiencies for both the aviation and maritime transportation SAR systems globally, regionally and nationally. The objective of this Plan includes encouraging States to take advantage of such efficiencies. States should, where practicable, align their SAR systems with the guidance provided by the IAMSAR Manual, which also provides the benefit for standardised SAR coordination between RCCs and across SRR lines of delineation.

2.15 State SAR plans describe how SAR services will be provided, organized and supported in order for States to meet their obligations under the relevant Conventions. Search and Rescue Coordinators (SC) and SAR managers oversee and implement these plans. National SAR plans should be signed by all Government agencies which can provide or support SAR services. These agencies should all be represented on the State's Search and Rescue Coordinating Committee (SCC), which oversees these plans.

Note: The SC should not be confused with the operational nature of the SAR Mission Coordinator (SMC). The primary purpose of the national SC is to enable a whole-of-government approach to make efficient and effective use of a State's capabilities for SAR.

Plan Development

2.16 The Plan was developed as part of a suite of Asia/Pacific air navigation plans, including the *Asia/Pacific Seamless ATM Plan*, the *Asia/Pacific Plan for Collaborative Aeronautical Information Management* (AIM), the *Asia/Pacific Framework for Collaborative Air Traffic Flow Management* (ATFM), and the *Regional ATM Contingency Plan*, so the Plan should not be considered in isolation.

2.17 The Plan is expected to provide guidelines and recommendations for Asia/Pacific States to consider for the enhancement and improvement of national, sub-regional and regional SAR capability including:

a) compliance with Annex 12 SARPs;

b) identification and addressing of deficiencies in SAR capability;

c) continuous and coherent development of SAR capability;

d) harmonisation of aeronautical and maritime SAR services;

e) civil/military cooperation and coordination (including SAR response, information sharing and use of airspace);

f) remote oceanic SAR response capability (including provision for Mass Rescue Operations (MRO);

g) establishment and review of arrangements between neighbouring States to expeditiously facilitate SAR coordination, operations and cooperation across regional boundaries including sharing SAR resources and contingency procedures;

h) facilitation of the implementation of SAR systems and services including the establishment of JRCCs where suitable and practicable;

i) supporting the sharing of SAR information, data and expertise;

j) integration with ATM systems and future ATS developments, where appropriate;

k) monitoring of outcomes from APANPIRG Sub-Groups, other ICAO Region SAR groups, ICAO/IMO Joint Working Group on Harmonisation of Aeronautical and Maritime SAR (JWG) and related forums for issues that may affect the Plan;

l) facilitation of a continuous reporting mechanism of State SAR capability, Annex 12 compliance and SAR performance data to the APAC Regional Office through the APANPIRG Air Traffic Management Sub-Group (ATM/SG);

m) implementation of a SAR System Improvement and Assessment measures, including Safety Management System, Quality Assurance programme and risk assessment, and programs to reduce the number of SAR incidents;

n) coordinating the introduction of new technology affecting the regional SAR system;

o) sharing future research and development concepts;

p) seeking efficiencies, through the coordination and facilitation of concurrent regional SAR meetings, seminars, workshops and exercises, including joint ICAO and IMO, and sub-regional forums where practicable; and

q) conducting efficient SAR Exercises (SAREXs) that identify improvements and latent problems.

2.18 The Plan elements should be periodically reviewed by APANPIRG to ensure that they remain relevant to the SAR system, particularly for new technology developments and alignment with other relevant global and regional SAR plans and the Global Air Navigation Plan.

EXECUTIVE SUMMARY

3.1 Before the COVID-19 pandemic, the Asia/Pacific Region had the largest share of Passenger Kilometres Performed (PKP), accounting for more than one third of the global total at 34.5% (Europe and North America were the two other key regions, with shares of 26.7% and 22.4% respectively). As the world's major manufacturing and distribution hub, the Asia/Pacific Region also accounted for the largest share of global air freight traffic in 2018, at 35.5%. As the world emerges from the effects of the pandemic, it is likely that the Asia/Pacific Region will return to pre-pandemic levels of aviation activity and potentially grow further.

3.2 For the maritime industry, the United Nations Conference on Trade and Development (UNCTAD) Review of Maritime Transport 2020 reported that Asia continued to dominate the global maritime trade arena. In 2019 the region accounted for 41% of goods unloaded, and had strengthened its position as a maritime hub that brings together more than 50% of global maritime trade volumes. Before the COVID-19 pandemic, growth in the cruise ship industry together with the many other forms of maritime transport such as fishing vessels and passenger ferries created added potential demand for regional SAR services. Whilst IMO assists the Parties to the Maritime SAR Convention, particularly their implementation related to the provision of maritime SAR services, the demand for aeronautical SAR services which frequently support responses to maritime SAR incidents is also likely to rise.

3.3 Asia/Pacific States that are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of Annex 12 - *Search and Rescue*. Increases in both aviation and maritime traffic throughout the Asia/Pacific region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical and maritime SAR services.

3.4 Considering that many of the Asia/Pacific States have the challenging responsibility for providing a SAR service over vast and remote areas, including three of the world's five oceans, the importance for States with oceanic SAR responsibility to cooperate, collaborate and share resources with their neighbouring and regional/sub-regional RCCs is essential.

3.5 High-level support might be necessary from regional bodies that can effectively support the Plan's implementation, such as the:

- Association of Southeast Asian Nations (ASEAN) and ASEAN Regional Forum (ARF);
- Asia Pacific Economic Cooperation (APEC);
- South Asian Association for Regional Cooperation (SAARC);
- Pacific Community (SPC); and
- Indian Ocean Rim Association (IORA).

SAR System Funding

3.6 The level of funding provided for effective SAR systems is a matter of concern for all senior decision-makers. An effective SAR system helps prevent lives being lost that may have been saved which provides a persuasive argument for proper funding. The resources should be sufficient to develop and/or maintain the required SAR service per their obligations as signatories to the relevant aeronautical and maritime SAR conventions. This may require the development of business cases to governments outlining where additional funding is required.

3.7 Such business cases should include consideration of amendments to existing State SAR arrangements which may provide more efficient delivery of the SAR service by better utilisation of existing resources (for example by establishing Joint RCCs (JRCCs), or additional funding sources where required (for example charging a levy to aircraft operators for providing the SAR service or seeking company sponsorship for SRUs). The economic value of a life saved when compared against the economic value of a life lost can also be a significant persuasive factor in any business case.

Joint Rescue Coordination Centres (JRCCs)

3.8 Where practicable, States are encouraged to examine the potential benefits that may be derived by the establishment of JRCCs to incorporate the aeronautical and maritime SAR activities and/or facilities of ARCCs/ARSCs and MRCC/MRSCs. JRCCs have the potential to not only provide a more effective SAR service to both the aeronautical and maritime industries, but also offer potential financial efficiencies by releasing funds for improvements in other SAR areas.

Note 1: Where JRCCs are not practicable, facilities and procedures should be developed which provide and/or enhance effective SAR coordination and collaboration between the ARCCs and MRCCs in support of each other, to provide an efficient and integrated State SAR system for both aeronautical and maritime SAR incident response.

Note 2: A JRCC may be established either physically or by virtual means using the integration of communications, information and computer technology between an ARCC and an MRCC to achieve full search and rescue coordination functionality.

3.9 Where practicable, the JRCC evaluation may consider consolidation of two or more different State RCCs into single sub-regional JRCCs.

Note: a single sub-regional JRCC may be established in partnership with a group of States and serve as a 24 hour nodal JRCC supported by Joint Rescue Sub-Centres (JRSCs) of the other partner States which may not necessarily need to be staffed 24 hours but could be activated when required.

ABBREVIATIONS AND ACRONYMS

ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
ADT	Autonomous Distress Tracking
ANP	(Regional) Air Navigation Plan
ANRF	Air Navigation Reporting Form
ANSP	Air Navigation Service Provider
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
APEC	Asia Pacific Economic Cooperation
APSAR/TF	Asia/Pacific SAR Task Force
APSAR/WG	Asia/Pacific SAR Working Group
ARCC	Aeronautical Rescue Coordination Centre
ARF	ASEAN Regional Forum
ARSC	Aeronautical Rescue Sub-Centre
A/SMC	Assistant SMC
ASEAN	Association of Southeast Asian Nations
ASPOCS	Administrative Single Point of Contact for SAR
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATSU	Air Traffic Service Unit
CONOPS	Concept of Operations
COSPAS-SARSAT	**Co**smicheskaya **S**istema **P**oiska **A**variynyh **S**udov-Search and Rescue Satellite-Aided Tracking
EI	Effective Implementation
ELT	Emergency Locator Transmitter
ELT(DT)	Emergency Locator Transmitter (Distress Tracking)
EPIRB	Emergency Position Indicating Radio Beacon
FIR	Flight Information Region
GADSS	Global Aeronautical Distress and Safety System
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System
IAMSAR	International Aeronautical and Maritime SAR (Manual)
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IORA	Indian Ocean Rim Association
iSTARS	Integrated Safety Trend Analysis and Reporting System
JRCC	Joint (aeronautical and maritime) Rescue Coordination Centre
JRSC	Joint Rescue Sub-Centre
JWG-SAR	ICAO/IMO Joint Working Group on the Harmonisation of Aeronautical and Maritime Search and Rescue
LOA	Letter of Agreement
MCC	Mission Control Centres
MEOSAR	Medium-altitude Earth Orbit Search and Rescue
MRCC	Maritime Rescue Coordination Centre
MRO	Mass Rescue Operations
MRSC	Maritime Rescue Sub-Centre
OJT	On-the-Job Training
PLB	Personal Locator Beacon
PQs	Protocol Questions
PSCS	Preferred SAR Capability Specifications

RCC	Rescue Coordination Centre
RPAS	Remotely Piloted Aircraft Systems
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SAARC	South Asian Association for Regional Cooperation
SAREX	SAR Exercises
SC	Search and Rescue Coordinator
SCC	Search and Rescue Coordinating Committee
SMC	Search and Rescue Mission Coordinator
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea
SPC	Pacific Community
SPOC	SAR Point of Contact
SRR	Search and Rescue Region
SRU	Search and Rescue Unit
SWIM	System Wide Information Management
UNCLOS	United Nations Convention on the Law of the Sea
USOAP-CMA	Universal Safety Oversight Audit Programme – Continuous Monitoring Approach

BACKGROUND INFORMATION

Improvement Drivers

5.1 The ICAO USOAP-CMA focuses on a State's capability in providing safety oversight by assessing whether the State has effectively and consistently implemented the critical elements of a safety oversight system and determining the State's level of implementation of ICAO's safety–related SARPs, including Annex 12 — *Search and Rescue*, and associated procedures and guidance material.

5.2 ICAO APAC Regional Office maintains the APANPIRG Air Navigation Deficiencies Lists, including the ATM and Airspace Safety Deficiencies List where SAR-related deficiencies are recorded. This list is based on the uniform methodology for identification, assessment and reporting of such deficiencies as described in Part V of the APANPIRG Procedural Handbook. By identifying and addressing specific deficiencies, APANPIRG and its Sub-groups facilitate the development and implementation of action plans by States to resolve identified deficiencies, where necessary.

5.3 The APANPIRG Air Navigation Deficiencies information has been populated into the ICAO iSTARS (Integrated Safety Trend Analysis and Reporting System) CHECK database and is accessible through the ICAO Secure Portal. The intention is to merge this data with the CMA Data, and manage the deficiencies using a single web-based process.

Asia/Pacific SAR System Monitoring

5.4 Significant Annex 12 compliance weaknesses had been identified within the Asia/Pacific region based upon information provided (and in many cases not provided) by States to the ICAO Regional Office. This regional status of the SAR capability and SAR agreements as reported by States is recorded in tables made available to APANPIRG. This process is expected to be enhanced with the integration of SAR elements into the Seamless ATM on-line monitoring system.

ICAO Global Aeronautical Distress and Safety System (GADSS)

5.5 The tragedies of Malaysia Airlines flight MH370 in 2014 and Air France flight AF447 in 2009 highlighted vulnerabilities in the air navigation system which hampered timely identification and location of aircraft in distress, particularly in remote oceanic areas. This significantly hindered effective SAR efforts and recovery operations.

5.6 As part of the response to the Conclusions and Recommendations from the 2014 ICAO Multi-disciplinary Meeting on Global Tracking, ICAO developed a Concept of Operations (CONOPS) for a GADSS. The implementation of this target concept affects the provision of services such as air traffic control, SAR and accident investigation. It contained a large number of measures targeting improvements in SAR system response integrated within the wider ATM and aircraft/airline operations systems.

5.7 The CONOPs notes that the effectiveness of the current alerting systems and SAR services should be addressed by a number of key improvement areas. The CONOPS also included aspects which potentially involve use of different distress systems, including for example 406 MHz Emergency Locator Transmitters (ELTs) and the Cospas-Sarsat system as part of the proposed GADSS solution.

5.8 Guidance on the aircraft tracking function is provided in ICAO Circular 347, *Aircraft Tracking Implementation Guidelines*. Chapter 8 outlines procedures to be followed when an operator notifies an ATSU of a missed aircraft 15 minute tracking report. This circular is for aircraft operators and civil aviation authorities, and applies to the aircraft tracking function that commenced on 8 November 2018. Of particular relevance is information from the circular Section 8.2 and Appendix C *Missed 4D/15 Position Report Form for Operator*, which has been updated and is now included in ICAO Doc 8168 *Procedures for Air Navigation Services – Aircraft Operations* (PANS-OPS) Volume III – *Aircraft Operating Procedures* Section 10 – *Flight Tracking*. The operator is required to notify the air traffic services unit (ATSU) of a missed aircraft 4D/15 tracking report (four-dimensional position of individual aircraft in flight at 15-minute intervals). The information that the operator has to provide the ATSU closely aligns with what the ATSU has to provide the RCC (using the ALR message described in ICAO Doc 4444 – *PANS – Air Traffic Management* (PANS-ATM) Appendix 3. However, the ATSU-to-RCC requirement is not automated (machine-to-machine).

5.9 The ADT device notifies the aircraft operator (airline, air cargo, business jet or similar) of the last known position of an aircraft that may be in a distress condition in flight. ADT activation is a notification, not a distress alert. This would be as a minimum at one-minute intervals while the aircraft is in flight. The operator is responsible to make the position information available to the ATSUs and RCCs. To facilitate this ICAO is leading the effort to create an ADT Location of Aircraft in Distress Repository (LADR) as a database for storing the ADT information. The LADR would then notify the aircraft operator, and if subscribed, the ATSU and RCC that ADT information relevant to them is in the LADR for those stakeholders to pull the data.

5.10 When ADT activates, the ATS unit may already be informed by other means of an emergency situation, such as from the aircrew. For aircraft in-flight, the aeronautical alerting process is based on the ATS unit making the decision about whether or not the aircraft is in distress and, if determined to be a distress situation, must notify the RCC immediately before contacting the operator per Annex 11. ICAO has not prescribed a specific technology for ADT but one of the technologies will be a new beacon type of the aeronautical 406 MHz emergency locator transmitter – the ELT Distress Tracking ELT(DT). The ELT(DT), as an ADT device, does not have a requirement to meet all of the ELT standards such as being crash-survivable or having the 121.5 homing signal.

5.11 ADT notifications from the ELT(DT) will be delivered directly to SAR services using the existing Cospas-Sarsat ground segment infrastructure and also via the LADR.

5.12 Having the ADT notifications from the ELT(DT) going directly to an RCC in addition to via the LADR was not the original intent of ICAO and is a major change in the aeronautical alerting process envisaged under the GADSS. RCCs need to prepare to be able to respond to ADT activations and that the aircraft could remain in flight across multiple SAR regions. RCC staff also need to be provided with training to ensure understanding of the ADT system and processes.

5.13 For ADT notifications from the ELT(DT) or other types of ADT systems, RCCs may need to update SAR practices and procedures for concerns such as:

- accurate delimitation of SAR regions to ensure proper transfer of the SAR operation to the next responsible RCC;
- effective and efficient coordination between the ATS unit (or aeronautical RCC) and the maritime RCC;
- harmonized operations between aeronautical and maritime SAR services; and
- initial response to an ADT notification from the ELT(DT), including rapid contact with the ATS unit to notify and confirm if the aircraft is in distress,.

5.14 It will be necessary to develop common ADT procedures, nationally and regionally, among the three primary stakeholders (aircraft operators, ATS units, and RCCs) for efficient handling of information received from the ADT system. The 2022 edition of the IAMSAR Manual provides a comprehensive overview of ADT. The IAMSAR Manual, Volume II appendix *Autonomous distress tracking of aircraft in flight* includes a *Schematic sequence of events arising from an ADT device activation* that serves as a flowchart of actions. The schematic sequence of events together with background notes is provided in **Appendix 1**.

5.15 ICAO is in the final stage of completing a formal, comprehensive manual on GADSS: ICAO Doc 10165 *Manual on Global Aeronautical Distress and Safety System (GADSS)*. Doc 10165 complements the ICAO Concept of Operations, (CONOPS), *Global Aeronautical Distress & Safety System*, (GADSS), version 6.0, and incorporates all of its pertinent information. Doc 10165 also incorporates the information provided in ICAO Circular 347, and ICAO Document 10054, *Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery*.

Cospas-Sarsat System

5.16 The International Cospas-Sarsat System is available to maritime and aviation users and to persons in distress situations who activate a distress beacon operating at 406 MHz. Access is provided to all States on a non-discriminatory basis and is free of charge for the end-user in distress. On average, about 7 persons are rescued every day with the assistance of Cospas-Sarsat alert and location data. The System is composed of:

- distress beacons operating at 406 MHz,
- SAR payloads on satellites in low- and mid-altitude Earth orbit, and in geostationary orbit,
- ground receiving stations (LUTs) spread around the world; and
- a network of Mission Control Centres (MCCs) to distribute distress alert and location information to SAR authorities, worldwide.

5.17 Cospas-Sarsat has been developing two major enhancements to its distress-alerting System of value to all System users, including the aviation industry. One is the introduction of in 2020, of a new space-segment architecture based primarily on Medium-altitude Earth Orbit Search and Rescue (MEOSAR) payloads aboard the European Commission's Galileo system, the Russian Federation's Global Navigation Satellite System (GLONASS) and the United States' Global Positioning System (GPS) satellites. Another potential satellite system from China, the Beidou Navigation Satellite System, could be part of the Cospas-Sarsat Space Segment.

5.18 This architecture permits determination of distress incident location (independent of any location data transmitted in the beacon message) beginning with the first burst from the distress beacon. This could mean near real-time and very frequent delivery of distress alerts.

5.19 The SAR/Galileo space segment also provides a Return Link Service (RLS) that, among other possible future uses, provides an acknowledgment from the MCC back to the beacon to confirm that the distress message has been received.

5.20 The technical specifications for the second generation 406 MHz distress beacon have been approved, including for ELTs. This new generation of beacons based on wideband spectrum technology improves speed and accuracy in locating an activated distress beacon. The period from beacon activation to first transmission is reduced from 50 seconds to three seconds. The specification considers in-flight activation of ELTs when certain flight parameters are exceeded. Consequently, false alerts will affect real SAR events significantly.

5.21 Cospas-Sarsat will introduce a new beacon type in 2023, an ELT for distress tracking. ELT(DT)s will activate autonomously when an aircraft exceeds certain flight parameters that have been predetermined by expert agencies to indicate that, unless corrected, a crash is imminent. ELT(DT)s allow an aircraft in distress to be tracked in-flight, prior to any crash, without human intervention. ELT(DT)s use both the existing beacon transmission method (first-generation) and the second-generation (spread-spectrum) modulation schemes. Distress data from activated ELT(DT)s will be delivered directly to distress authorities as well as the ICAO Location of an Aircraft in Distress Repository (LADR).

5.22 States also need to ensure the critical requirement to provide for a suitable, clear and simple means for aircraft owners to register and keep updated their 406 MHz distress beacon details.

Note: information on beacon registration is at: https://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals).

5.23 Entries in the beacon register should be available to both aeronautical and maritime RCCs on a 24 hour basis (Annex 12 – *Search and Rescue* refers, although Annex 10 establishes the registration requirement).

5.24 Further information for distress authorities can be found in the RCC Handbook, document C/S G.007, https://www.cospas-sarsat.int/en/documents-pro/system-documents.

ICAO Annexes and PANS

5.25 States should note that Annex 12 should be read in conjunction with elements of the following ICAO Annexes and PANS:

Annex 6 – *Operation of Aircraft*;

Annex 10 – *Aeronautical Telecommunications*;

Annex 11 – *Air Traffic Services* (particularly Chapter 5 Alerting Service)*;*

Annex 14 – *Aerodromes* (particularly aerodrome emergency planning with the RCC);

Annex 15 – *Aeronautical Information Services*, particularly Section 6.3.2 *NOTAM*;

Annex 19 – *Safety Management*;

DOC 4444 – PANS-ATM

Doc 8168 – PANS-OPS Volume III, particularly Section 10 *Flight Tracking*; and

Doc 10066 – *PANS –Aeronautical Information Management* (PANS-AIM)

CURRENT SITUATION

Global Situation

6.1 The ICAO USOAP Report of audit results, 1 January 2016 until 31 December 2018, revealed that, while the Effective Implementation of SAR among audited States was 78%, more than 50% of audited States did not effectively conduct surveillance over SAR services.

Asia/Pacific SAR Analysis

Universal Safety Oversight Audit Programme – SAR-Related Protocol Questions

6.2 The last decade prior to the COVID-19 pandemic had seen a steady increase in air traffic in the Asia/Pacific Region. Maritime traffic was also increasing, adding further urgency to ensure that States with oceanic SAR responsibilities in the region met the requirements of both ICAO and IMO for the provision of aviation and maritime SAR services. While the pandemic led to a significant reduction in air traffic, recovery of full seat capacity in the Asia/Pacific Region is expected by 2023 – 2024.

6.3 An analysis of the 26 Universal Safety Oversight Audit Programme (USOAP) SAR-related Protocol Questions (PQs) indicated that the overall Effective Implementation (EI) in the Asia/Pacific Region for SAR had risen from 50.7% in July 2015 to 58.99% in March 2019. **Figure 1** provides the EI of individual SAR-related PQs in March 2019.

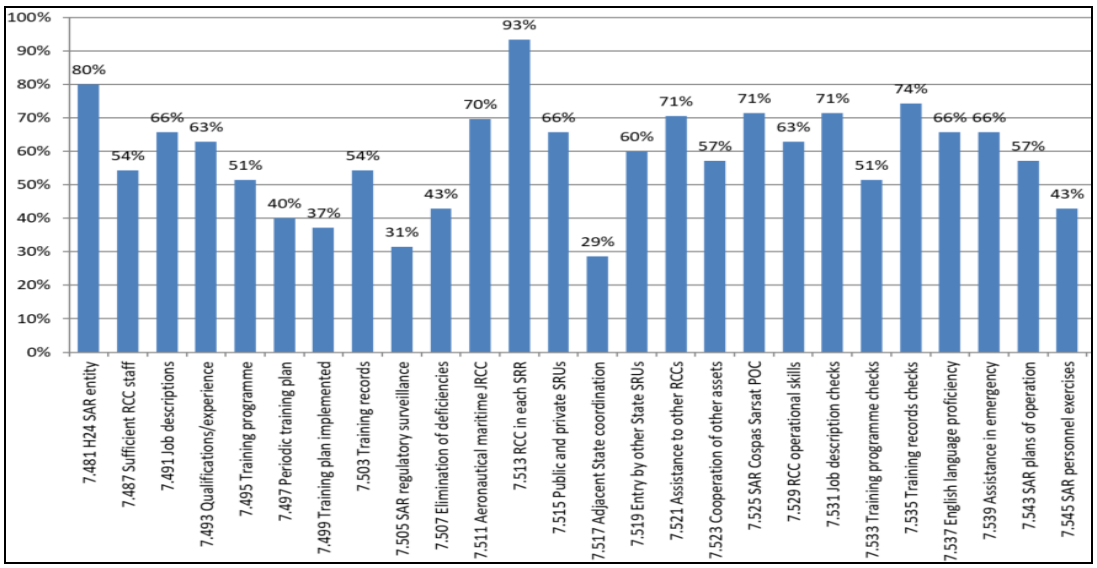


Figure 1: APAC USOAP CMA SAR PQ Compliance – March 2019 (average: 59)

6.4 Following an update and consolidation of the USOAP CMA PQs in 2020, the number of SAR-related PQs was reduced from 26 to 17.

6.5 **Figure 2** provides the overall Asia/Pacific Region EI for individual SAR-related PQs in October 2022.

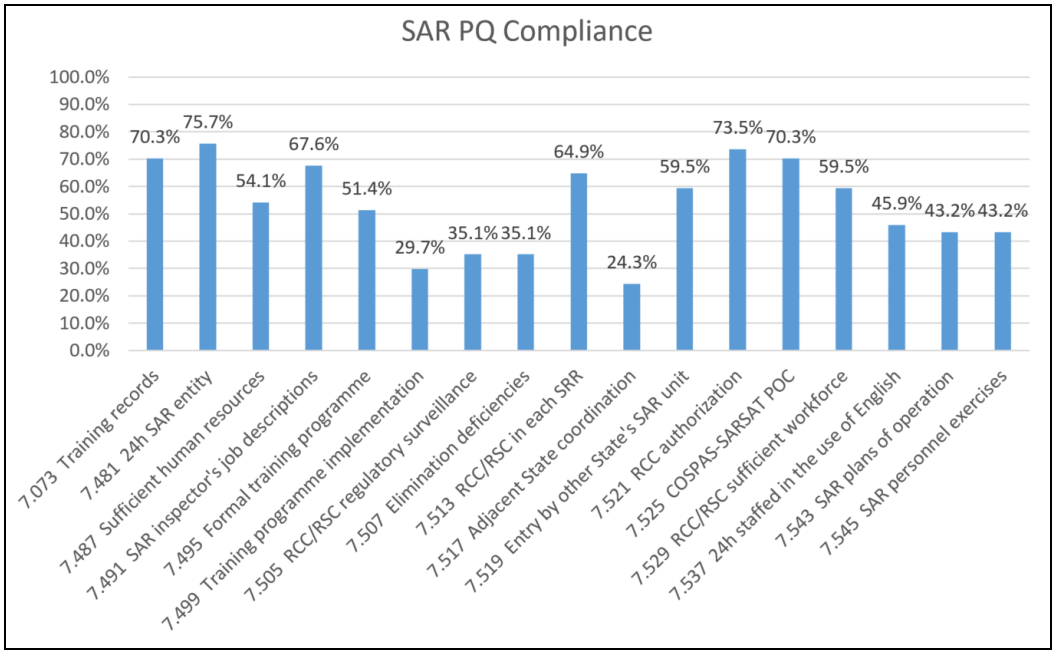


Figure 2: APAC USOAP CMA SAR PQ Compliance – October 2022 (average 53.13%)

6.6 From these analyses it appeared that the major areas of weakness were in effective SAR oversight, coordination with adjacent States, elimination of deficiencies. Therefore, a focus on the minimisation of barriers associated with the efficient cross-border coordination of SRU (such as pre-arranged approval) and other coordination mechanisms, including updates of SAR agreements (whatever their form) was vital.

6.7 The analyses also revealed the need for improved systemic approaches to training for both SAR inspectors and personnel responsible for the provision of SAR services, including the regular organisation of effective SAR exercises that test systems and personnel. It should be noted that the training of SAR inspectors does not necessarily require SAR-specific technical training, but was more focused on effective audit and inspection techniques, etc.

Regional SAR Implementation Performance – the Asia/Pacific Regional SAR Plan

6.8 With the advent of the Asia/Pacific SAR Plan and its more comprehensive expectations, an accurate assessment of capability aligned with the SAR Plan was developed. This assessment could be used by States as a means of internal gap analysis, in addition to providing a more accurate metric of the Asia/Pacific SAR Plan implementation, noting that implementation was scheduled for 2019. **Figure 3** summarizes the reported implementation of the performance expectations of the Asia/Pacific SAR Plan (see Section 7).

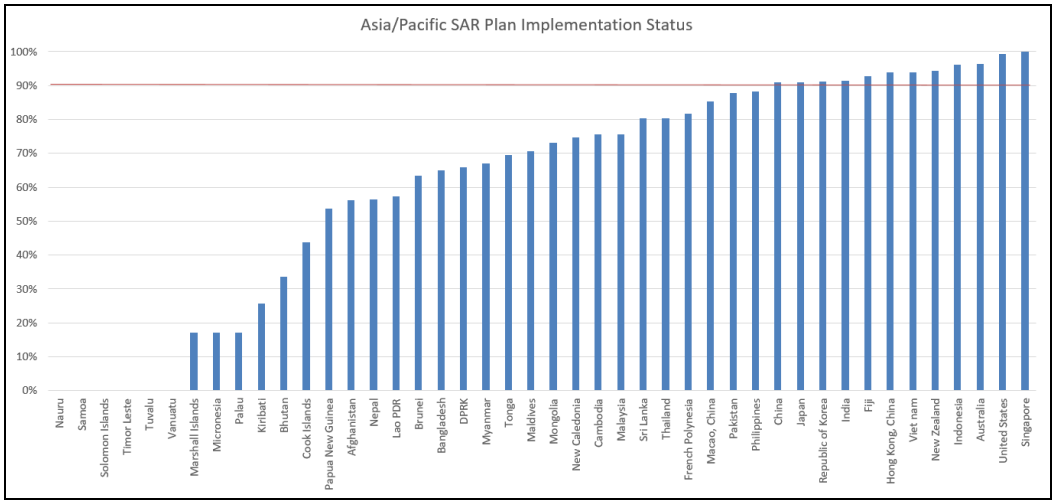


Figure 3: Implementation Status of the Performance Expectations of the Asia/Pacific Regional SAR Plan – October 2022 (Average 62%)

6.9 The Asia/Pacific Regional Air Navigation Plan Vol II Section 3 Specific Regional Requirements states, in respect of State reporting of implementation regional air navigation planning elements:

a 'robust status plan that is not subject to consideration as an APANPIRG Deficiency is one that is evaluated as achieving 90% or more implementation of the planning elements.

6.10 Accordingly, and noting that SAR services were a safety of life matter. APANPIRG ATM and Airspace Safety Deficiencies were recorded for 32 Administrations in the Asia/Pacific Region, for failure to reach 90% or more implementation of the performance expectations of the Asia/Pacific SAR Plan (APANPIRG/32, December 2021).

Asia/Pacific SAR Coordination Forums

6.11 The Asia/Pacific Region will benefit from the cooperation and coordination of States and International Organizations involved in the APSAR Working Group. The establishment of permanent joint ICAO/IMO Regional SAR Forums to enable collaboration and cooperation on oceanic SAR matters across the specific oceanic regions and including adjacent ICAO regions should be considered.

6.12 There were several regional initiatives for cooperative support and development already being undertaken in the Asia/Pacific Region to assist with SAR capability enhancement.

6.13 Such improvement programmes could result from a request by a State needing assistance, ICAO/IMO oversight, the users of the SAR system itself, an audit or following a SAR 'Go-Team' visit that identifies weaknesses in the State's SAR capability (a 'Go Team' normally consists of external SAR experts from ICAO/IMO, more advanced 'champion' States or external agencies such as Cospas-Sarsat). The programs can be conducted by experts from a 'champion' State, or through a cooperative effort by several States or a regional body.

*Note: **Appendix 2** provides a summary of benefits to the SAR System of States assisting other States.*

Barriers

6.14 The following potential issues should be considered to ensure they do not become barriers to the achievement of the expected SAR capability:

a) absence of established appropriate legal framework designating, recognizing, supporting and giving authority to national SAR authorities, RCCs and SMCs;

b) inadequate funding and equipping of SAR authorities and in particular, resourcing of RCCs;

c) absence of an appropriate SAR organizational framework;

d) absence of a national SAR committee;

e) lack of clarity of responsibilities for each component of the SAR system;

f) inadequate collaboration and cooperation between aeronautical and maritime SAR agencies;

g) absence of bilateral/multi-lateral/international SAR Agreements;

h) inadequate civil/military cooperation; and

i) complacency about, or lack of recognition of, the importance or priority given to SAR.

Global and Regional SAR Issues

6.15 States should monitor outcomes from global and regional ICAO and IMO SAR forums to ensure their State SAR authorities are updated on relevant SAR developments, otherwise State planning may not be synchronized with external international expectations, including users. Such forums may include APANPIRG and its Sub-Groups, other ICAO Region SAR groups, the JWG, ICAO High Level Safety Conferences, etc.

6.16 The provision of sufficient resources is critical in a number of areas, including:

a) Financial-

- funding for 24 hour RCC facility and staff;
- funding for use/hire of search and rescue units; and
- provision of a suitable administrative process enabling financial support including the ability for SAR authorities to quickly authorise payments required for emergency response aircraft, vessels and supporting logistics such as fuel.

b) RCC personnel- a suitable number of trained and skilled staff, supplemented by a pool of trained RCC support staff where appropriate;

c) RCC facilities-

- appropriate RCC facility space;
- minimum RCC tools (such as current charts, plotting equipment, documentation, etc.);
- ability to identify and task available SRUs;
- aircraft and vessel tracking information including ATS surveillance, Automatic Identification System, etc.;

- reliable and rapid H24 communications, and a suitable means to-
  - receive, communicate and acknowledge distress alerts
  - communicate with ATS units, other RCCs/RSCs, Coastal Radio Stations, COSPAS-SARSAT Mission Control Centres (MCCs), military units, medical services, meteorological offices, etc.;
- information technology-
  - RCC workstation computers;
  - Software including basic databases, drift modelling, incident management, etc.;

d) Contingency- back-up RCC facility, or arrangement with another RCC as a contingency against inability to operate from the primary RCC due to the need to evacuate or loss of systems, etc.;

e) Search and Rescue Units (SRUs)-

- available and suitable SAR aircraft and crews;
- funding arrangements/agreements for hiring/payment/sharing of SRUs to permit rapid deployment; and
- Available and suitable SAR survival equipment for delivery by aircraft to survivors and to assist SAR coordination efforts (e.g.: SAR Datum Buoys, droppable life rafts and survival supplies, etc.);

f) Training support-

- RCC staff – basic and ongoing;
- SRU crews – pilots, air crew and air observers;
- RCC support staff – basic and refresher;
- SAR inspectorate staff- basic and on-going; and
- Other SAR Units-
  - aeronautical units
  - maritime units
  - land units
  - specialised units (paramedical, divers, etc.)

PERFORMANCE IMPROVEMENT PLAN

Preferred SAR Capability Specifications (PSCS)

Note 1: PSCS are the non-mandatory expectations on all Asia/Pacific Region States to enhance SAR systems in order to meet a minimum level of SAR capability, with a high degree of interoperability and harmonisation, and interoperability with other ATM components such as Air Navigation Service Providers (ANSPs) and aerodrome operators, and between aeronautical and maritime SAR services. PSCS were not expected to contravene existing Annex 12 standards.

Note 2: Asia/Pacific SAR Plan Version 1.0, published in September 2015, included the expectation that all PSCS would be implemented by 07 November 2019. Noting that the implementation date is, at the time of publication of this fourth version of the Plan, several years in the past, and also noting that further changes to PSCS are expected to be incremental and relatively minor in scope, dates for future implementation are not included. All States should note that APANPIRG ATM and Airspace Safety Deficiencies for non-implementation of 90% of the elements of this plan will continue to be raised and maintained by the ICAO Asia/Pacific Regional Office.

7.1 *Legal Framework and Structure Planning*: All States should develop statutes and related provisions that establish or enhance the legal foundation for a State SAR organization and its framework, resources, policies and procedures, where appropriate, to:

a) ensure that it is party to, and/or aligned with the following Conventions, as applicable –

   i. Convention on International Civil Aviation 1944;

   ii. International Convention on Maritime Search and Rescue, 1979;

   iii. International Convention for the Safety of Life at Sea (SOLAS), 1974;

   iv. Convention on the High Seas, 1958; and

   v. United Nations Convention on the Law of the Sea (UNCLOS), 1982;

b) unless delegated by written agreement, establish an entity that provides, on a 24-hour basis, SAR services within its territories and designated area of responsibility/SRR;

c) establish a national SAR committee consisting of civil and, where appropriate, military members to enable a whole-of-government approach;

d) empower SAR Mission Coordinators with the authority to adequately carry out their responsibilities;

e) conduct studies to check the feasibility for, and develop an implementation plan if practicable, the integration of aviation and maritime SAR activities, and as far as practicable, civil and military activities, including joint training and familiarisation of staff and review of documentation to ensure harmonisation of procedures, and joint exercises;

f) conduct studies to align, as far as practicable, aeronautical and maritime Search and Rescue Regions (SRRs); and SRRs and Flight Information Regions (FIRs); and

g) establish a single State SAR Plan that –

i. designates the responsible RCC(s), RSC(s) and 24-hour SPOC/ASPOC;

ii. describes the relevant aeronautical and maritime SRRs, including the coordinates and geographical chart depiction of the aeronautical and maritime SRR and neighbouring aeronautical and maritime SRRs;

iii. establishes an Administrative Single Point of Contact for SAR (ASPOCS) for non-urgent, administrative matters, such details to be submitted to the ICAO Regional Office;

iv. details the National SAR Committee;

v. details the governmental and non-governmental agencies with authority and responsibility for SAR coordination and supporting of SAR response operations within its territories and designated area of responsibility;

vi. details required and available SAR facilities, personnel, and equipment;

vii. describes the SAR manuals, plans and procedures used for national and regional cooperative SAR response arrangements;

viii. details the SAR personnel training and competency programme, qualification standards, SAR certification if applicable and SAR cooperation training;

ix. lists the SAR agreements required;

x. is electronic and accessible on the Internet, such details to be submitted to the ICAO Asia/Pacific Regional Office; and

xi. is monitored by quality assurance processes.

7.2 *SAR Standards and Procedures*: All States should:

a) establish aerodrome emergency plans that provide for co-operation and co-ordination with RCCs (plans should include clear responsibilities for response to emergencies in proximity to aerodrome boundaries including adjacent waterways);

b) establish SAR agreements with States having adjoining SRRs or FIRs, including trans-regional neighbours (the agreements should include clear responsibilities for overlapping or non-adjoining aeronautical and maritime SRRs);

c) provide up to date cross-border information on SAR capability (this should be included in bilateral SAR agreements);

d) pre-arrange procedures for cross-border SAR responses (this should be included in bilateral SAR agreements);

e) establish a program for regular SAREX, which may be a desktop communications exercise, with each alternate SAREX being a full exercise (this expectation may be fulfilled by participating in a sub-regional SAREX that tests the State's SAR system);

f) establish RCC plans for response to Mass Rescue Operations (MROs) integrated with national disaster plans;

g) establish SAR Operations Plans between the State's SAR Authorities and Government, Military and Commercial operators, including those with an over-water rotary wing or sea plane capability, to include:

i. procedures for cooperation and deployment of foreign SRUs;

ii. provision for translators/liaison Officers/Embassy Officers for the daily tasking of the SRUs at the RCC;

iii. provision of information for logistic and administrative support (hotels, fuel, security passes, food, medicine, etc.);

iv. instructions on communication (ops normal reports, sightings, etc.) for search planning, command and control to foreign SRUs;

v. planning and arrangements that ensure the availability of State and other SRU assets, especially over-water rotary wing capability where applicable, to support a timely and effective SAR response; and

vi. daily end of day report by SRUs to the RCC (via mobile, email, fax, etc.); and

h) establish SAR Alerting procedures which:

i. are tested and fully integrated with RCC procedures so that RCCs are rapidly notified of any SAR event 24 hours a day;

ii. include procedures for joint aeronautical and maritime distress alert notification, including reliable delivery and acknowledgement of Cospas-Sarsat distress alerts, support and response to both aviation and maritime SAR incidents;

iii. where applicable, include protocols for civil and military support and sharing of information.

i) establish arrangements for situations where RCCs need to conduct SAR operations (in accordance with Annex 12) at the same time as the accident investigation authority needs to conduct search and recovery operations (in accordance with Annex 13).

Note: A sample MOU between the SAR service and the accident investigation authority is provided in ***Appendix 3.***

SAR Facilities and Resources

7.3 *RCC Facility*: All States should ensure that RCCs are of sufficient size with adequate provision for operational positions designed in accordance with human factors principles (such as human machine interface) for all SAR incidents from small scale to major searches involving civil and military assets where applicable, and facilities such as:

a) workstations, telephones (with international access), plotting tables, wall notice/status boards, computer, and communications equipment and systems, briefing/debriefing areas, room for storage including incident records and recorders, RCC staff break and rest facilities;

b) computer resources which may provide support to RCCs with incident management, plotting, search planning, mapping, contact databases, web-based information, etc.;

c) charts, electronic or paper, which:

i. apply to SAR (aeronautical, nautical, topographic and hydrographic);

ii. depict aeronautical and maritime SRR(s), neighbouring aeronautical and maritime SRRs, FIR(s),

iii. depict SAR resources and SAR Units locations ,

iv. depict FIR(s), ATS units and airspace boundaries including military and Prohibited, Restricted and Danger Areas;

v. depict maritime navigation information including hazardous and environmentally sensitive areas:

vi. provide a means of plotting;

d) ability to reliably receive and acknowledge distress alerts 24 hours a day;

e) a means of recording, playback and archiving of communications and SAR incident data;

f) shipping/vessel communications and maritime broadcast facilities such as Coastal Radio Stations, RCC radio and satellite communications, marine radio networks;

g) aircraft communications – via ATS units, aircraft operators, satellite communications or direct between RCC and aircraft;

h) access to aircraft and ship tracking data, e.g. ATS surveillance data, GADSS Autonomous Distress Tracking data, commercial satellite tracking data, Automatic Identification System and Long Range Identification and Tracking of Ships (LRIT) allowing rapid identification of potential aircraft and vessels that may divert to assist;

i) a means of obtaining meteorological information – forecast, present and historical data;

j) if applicable, drift modelling software;

k) if applicable, ocean data including sea temperature, currents, winds, tides, etc.;

l) if applicable, SAR Datum Buoys, preferably with satellite tracking capability;

m) RCC documentation and reference material such as plans of operation, procedures manuals, guidance material, ICAO and IMO references, SAR agreements;

n) Cospas-Sarsat equipment and reference material; and

o) SWIM-enabled systems that can evolve the sharing of Flight Data, Aeronautical Information and MET data in alignment with contemporary practices being implemented under global and regional planning.

7.4 *Personnel and Training* All States should, where applicable to maintain a 24 hour service:

a) provide adequate ATS resources (either an ATS supervisor or other staff) that can provide relief within Area Control Centres (ACCs) to allow timely response to SAR alerts and information to RCCs;

b) provide sufficient RCC staffing;

c) provide a sufficient number of trained specialist RCC officers including SMCs and Assistant SMCs (A/SMCs);

d) provide availability of a pool of RCC support staff who are familiar with RCC operations, but not trained as coordinators, that can assist with the functioning of the RCC during SAR incident response;

e) develop SAR personnel position descriptions that detail responsibilities and eligibility criteria for recruitment of operational staff;

f) develop a comprehensive training programme that includes SAR training for:

   i. RCC SAR Coordinators (SCs) based on a competency-based assessment approach to ensure technical proficiency, cyclical (periodic) instruction that provides continuous training to ensure competency is maintained, and a system for maintaining training records; and

   ii. SRU staff, including military personnel.

g) facilitate RCC staff to be proficient in the English language; and

h) facilitate a programme of regular liaison between relevant RCCs, ATS units and airline operating centres in order to understand those organizations, facilities and capabilities (reference Annex 12, paragraph 3.1.9).

7.5 *Oceanic Capability*: Where applicable, States should establish additional oceanic SAR capability as far as practicable to ensure a timely and adequate SAR response is available to all oceanic areas of their SRRs. This may be met through cooperative arrangements with neighbouring States or other RCCs.

7.6 *Search and Rescue Units*: All States should establish capabilities enabling:

a) availability and deployment of suitably crewed, trained and equipped SRUs (including a pool of air search observers trained in visual search techniques), public and/or private, civil and military, for rapid SAR response;

b) availability and deployment of SRU craft that may be in use for another primary purpose but made available to RCCs for SAR purposes on an as needed emergency basis (vessels, aircraft and land units);

c) protocols for civil SAR authorities to request the assistance of military assets, and similarly military SAR authorities to request civil assets;

d) a communication means and information protocols between the State's Aeronautical and Maritime SAR Authorities;

e) cooperative use and/or sharing of SAR assets with protocols incorporated within National SAR Plans and bilateral SAR Agreements;

f) pre-arranged government authority for funding of costs associated with hiring of SRUs, and payment for critical supporting logistics such as fuel, to avoid any delays in response availability;

g) pre-approval of specified SRU assets that may be utilised cross-border (requiring diplomatic pre-approval) or cross-SRR boundary (which may not require diplomatic approval if operating within international airspace); and

h) aircraft with the ability and regulatory approval to safely conduct SAR missions.

Note: guidance material on SAR aircraft capability is found in the IAMSAR manual.

7.7 *Distress Beacons*: All States should:

a) where separate ARCCs and MRCCs exist with responsibility for coincident aviation and maritime SRRs, coordinate distress beacon alert procedures to ensure both RCCs are aware of any distress beacon activations within their areas to avoid duplication of response. For example, MRCCs should ensure their procedures alert ARCCs and ATS units to any EPIRB activations;

b) have a reliable distress beacon registration system that:

i) provides a readily accessible mechanism (preferably one that is available by Internet as well as other conventional means) to enable distress beacon owners to fulfil their obligation to register ELTs, EPIRBs and PLBs, and update the registration data as information changes (e.g., change in ownership);

ii) is available to RCCs 24 hours a day and includes up-to-date registration details for all national civil and military ELTs, EPIRBs and PLBs;

c) take steps (including education) required to prepare for, and to implement changes related to, the introduction of second generation beacons, the transition to the MEOSAR satellite architecture, and the pending Return Link Service provided by the Galileo constellation;

d) establish an appropriate nationwide means of disposal for old distress beacons; and

e) conduct promotional programmes, including, where appropriate, with airworthiness agencies and civil aviation authorities, related to the minimization of false alerts.

Note 1: Information on beacon registration is at: http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals.)

Note 2: Incorrect disposal of distress beacons often causes the deployment of scarce and often expensive SAR resources only to have the beacon located as a non-distress event in a rubbish dump or similar location. This also creates the risk of SAR resources being diverted away from a real emergency should it arise at the time. Beacon batteries are hazardous items which should be disposed of in an environmentally friendly manner.

Note 3: Education should include matters such as an update on beacon registration systems to be compatible with new beacon hexadecimal identifications, the transition to the MEOSAR satellite architecture (e.g.: update local user terminals and mission control centres to properly receive and manage MEOSAR data), in accordance with Cospas-Sarsat specification documents (http://www.cospas-sarsat.int/en/documents-pro/system-documents).

7.8 *Contingency Facilities*: All States should ensure there are established contingency facilities, or when a SAR service is not able to be provided, procedures in place for the temporary delegation of the SAR responsibility to another appropriate national body or State. All States should test their contingency arrangements periodically, but not less than once every six months.

SAR Information

7.9 *Provision of Information*: All States should ensure the:

a) establishment of a centralised information source publishing all Asia/Pacific State Aeronautical Information Publication (AIP) information (refer ICAO Doc 10066 PANS-AIM Appendix 2, GEN 3.6 Search and Rescue):

   i. The agency responsible for providing SAR services;

   ii. The area of SAR responsibility where SAR services are provided;

   iii. The type of SAR services and facilities provided including indications where SAR aerial coverage is dependent upon significant deployment of aircraft;

   iv. SAR agreements;

   v. The conditions of SAR facility and service availability; and

   vi. SAR procedures and signals used;

b) establishment of an Internet-based SAR information sharing system (with security protocols as required and in accordance with the emerging System Wide Information Management – SWIM - concept as applicable) to share SAR activity with States and key stakeholders participating in a SAR activity (the information sharing system should include a means of handling media and next of kin enquiries, and recognise the need to avoid premature media statements); and

c) maximum practicable cooperation between State entities in the provision of accurate and timely information when required, including from military sources, except where national security could be adversely affected.

7.10 *SAR Facilities and Equipment Lists*: All States should develop and maintain a current, comprehensive electronic list of State SAR Facilities, SAR Equipment, and SAR Units (SRUs), including joint or shared facilities and equipment.

7.11 *SAR Library*: All States should:

a) establish a web-based SAR Library, or cooperate by contributing to an Internet-based Asia/Pacific resource (such as https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Response-Policy-CG-5R/Office-of-Incident-Management-Preparedness-CG-5RI/US-Coast-Guard-Office-of-Search-and-Rescue-CG-SAR/SAR-Publications/); and

b) ensure that each RCC and SAR Authority has ready access to a current copy (either electronic or hard copy) of the following reference documents at a minimum:

i. ICAO Annex 12;

ii. IAMSAR Manual Volumes I, II and III;

iii. International Convention on Maritime SAR (SAR Convention);

iv. Asia/Pacific SAR Plan/electronic Air Navigation Plan; and

v. relevant regional, national and agency SAR documents.

Note: The Asia/Pacific SAR Library hosted by the US Coast Guard contains a list of documents that may be held by RCCs and JRCCs as appropriate. In addition, a list of documents (SAR.7/Circ.12) would be available on the IMO web site at: (http://www.imo.org/en/OurWork/Safety/RadioCommunicationsAndSearchAndRescue/SearchAndRescue/Pages/Default.aspx).

SAR Improvement

7.12 *Search and Rescue Exercises (SAREX)*: All States should conduct regular SAREX (at least once every two years) to test and evaluate existing coordination procedures, data and information sharing and SAR response arrangements involving:

a) both aeronautical and maritime SAR authorities including both civil and military agencies as applicable, and related bodies such as Air Navigation Service Providers (ANSPs) and Airline Operations Centres (AOCs);

b) where appropriate, cross-aeronautical SRR boundary coordination (SAREX should routinely involve SAR authorities of adjacent SRRs); and

c) improvement of SAREX effectiveness through a post-SAREX review and written report, completed to ensure that deficient areas or latent problems are identified and remedied.

Note 1: a SAREX template is provided ***in the IAMSAR Manual, Volume I, Appendix O, Sample template for a joint SAREX****.*

Note 2: SAREX should test the SAR system, including unannounced alerts that allow an actual search (whether it is a desktop or a physical operation) to be conducted which will indicate weaknesses in the system. SAREX should not be confused with, or take the form of, simulated crash fire exercises such as for Aerodrome Emergency Procedures that do not have a search component.

Note 3: Real SAR incident responses which include an adequate post-response review and evaluation with lessons learned may replace the need for a SAREX.

7.13 *SAR Quality Assurance*: All States should implement SAR System Improvement and Assessment measures, including Safety Management and Quality Assurance systems, that:

a) provide performance and safety indicators, including post-incident/accident lessons learned and management reviews (RCC and SAR System Continuous Improvement process), and feedback from RCC staff, SAR system users or SAR stakeholders;

b) identifies risk and corrective and preventive actions that prevent or minimise risk and the possibility of substandard SAR performance;

c) establishes an internal quality assurance programme, which includes regular internal audits of the RCC, SAR operations, SAR facilities and procedures that are conducted by trained auditors;

d) ensures the person responsible for internal quality assurance within the entity responsible for SAR services has direct access to report to the Head of the entity responsible for SAR services on matters of quality assurance; and

e) where appropriate, provides submissions to the ICAO/IMO JWG-SAR to share lessons learned and experiences with other global States for the continuous improvement of the worldwide SAR system.

Note 1: Resourcing of SAR system audit arrangements could be mitigated by States entering cooperative arrangements, including sub-regional regulation, between States for auditing of each other's SAR systems to share expertise and costs.

Note 2: Provisions of Annex 19 for a Safety Management System (SMS) may apply where a SAR service is provided under the authority of an ATS provider).

Note 3: Peer review, either external or internal, may provide a useful internal quality assurance tool.

7.14 *SAR Management Review*: All States should conduct an annual or more frequent analysis of their current State SAR system to identify specific gaps in capability against the minimum requirements of Annex 12 and the guidelines of the IAMSAR Manual to:

a) enable the ICAO Asia/Pacific SAR data to be updated to accurately reflect the State's capability;

b) be informed regarding the availability and capability of SAR services in neighbouring States;

c) identify SAR research and development programmes, especially those which could be conducted if possible in cooperation with other States;

d) establish a common set of basic SAR system statistics, which include-

i. number of SAR incidents per year;

ii. number of lives at risk versus number of lives saved;

iii. records of time from first alert to tasking the SRU;

iv. records of time from first alert to arrival on scene of first SRU; and

v. records of time from first alert to rescue.

vi. records of false alerts or unnecessary activation of SAR services.

e) plan for any necessary improvements to gradually build and improve capability over time, which would be detailed in the State SAR Plan; and

f) regularly review and update SAR agreements as appropriate.

Note 1: The National self-assessment on SAR found in IAMSAR Manual Vol I Appendix H and the ICAO USOAP-CMA Protocol Questions for SAR may assist States with their reviews.

Note 2: The number of incidents should identify the type (e.g.: Cospas-Sarsat alert, ATS alerts, etc.) and outcome of SAR incidents.

7.15 *SAR Promotion*: All States should conduct SAR promotional programs (e.g. Seminars, Workshops and public safety campaigns) to:

a) encourage higher SAR preparedness by persons that may require SAR services through public safety campaigns aimed at preventing persons getting into distress situations (i.e.: 'preventative SAR');

b) foster a reduction in false alerts to avoid wasting valuable SAR resources and risk to SAR crews responding unnecessarily;

a) ensure the support of government decision-makers for SAR facilities and improvements, in particular adequate funding availability;

b) assist media to understand SAR operations in order to minimise the need for explanations during SAR responses;

c) recognise improvement in State SAR systems;

d) enhance cooperation between SAR services and –

i. civil, military and police agencies;

ii. ANSPs;

iii. aerodrome and port operators;

iv. aircraft and shipping operators;

v. meteorological agencies;

vi. accident investigation authorities;

vii. government and non-government agencies affected by SAR operations, in particular large scale national and international responses involving whole of government agencies; and

viii. other States.

Note: social media may be an effective means of SAR promotion that reduces the workload of SAR staff during major SAR responses.

EMERGING ISSUES AND FUTURE DEVELOPMENTS

Planning for the Future

8.1 States should monitor developments such as improvements to existing and new technologies and other emerging matters which may impact on the SAR system of the future as part of State, regional and global aviation strategic direction and planning. This may include matters such as:

- the need to cater for increased growth or changes in air and maritime traffic through SAR regions which may increase the demand, or present changed capability requirements, for SAR services. This may include, for example, new air routes using longer range aircraft into more remote areas or increased numbers of, and/or larger, cruise ships; and
- new technology such as:
    - UAS,
    - autonomous vessels,
    - new distress alerting devices and systems,
    - new tracking systems,
    - new electronic search equipment (such as optical radar systems),
    - online virtual conferencing platforms,
    - smartphone apps,
    - artificial intelligence, and
    - data driven decision making tools.

Research and Development

8.2 To develop the tools and systems required to meet foreseeable long-term requirements, there is a need for States to undertake planning and co-operation on SAR matters. This includes major efforts to define concepts, to extend knowledge and invent new solutions to future SAR challenges so these new concepts are selected and applied in an appropriate timely manner. Such efforts could be forged through collaborative partnerships between, States, ANSPs, International Organizations, institutes of higher learning and specialised technical agencies. This concept is consistent with Seamless ATM Principle 36 (*Inter-regional cooperation ('clustering') for the research, development and implementation of ATM projects*), and may manifest itself in joint projects such as:

- ICAO and/or IMO regional SAR training opportunities, where provided, to assist States that are unable to provide their own SAR training;
- Joint Sub-regional RCCs (ASEAN States in particular may be candidates for a single centre of excellence that brings together civil and military SAR experts from all ASEAN States and provides a single SAR facility that is cost-effective and has a level of resources and facilities that would be difficult for all States to maintain by themselves); and
- Regional online eLearning packages.

*Note: **Appendix 1** provides a summary of benefits to the SAR System of States assisting other States.*

8.3 With the end goal of a globally interoperable SAR system in mind, the region will have to consider planning for a long term supporting concept and infrastructure, including possible integration of the new technologies listed in paragraph 8.1 for SAR application. The following are possible areas that should be considered for future SAR research and development, in order to promote the maximum possible harmonisation and interoperability of SAR systems:

a) data sharing such as aircraft and ship tracking information;

b) automated data link communication to RCCs when an aircraft or ship exceeds a Variable Set Parameter (VSP) in terms of its operating envelope, or activation of an emergency status (could be displayed as a symbol, and the data could include certain operating parameters such as acceleration and altitude for an aircraft) – note the ICAO GADSS includes this concept;

c) regional UAS and autonomous vessels for use in SAR and their safe operation alongside crewed aircraft and vessels;

d) inclusion of the SAR system and RCC access as a component of the ICAO SWIM concept of operation and implementation;

e) on-going development of standardised SAR training objectives and advanced training systems, including the use of high fidelity simulators;

f) enhanced technology oriented systems to improve SAR system effectiveness such as use of virtual conferencing platforms to enhance real-time SAR incident coordination between RCCs and other stakeholders, and live imagery and video streaming from SAR units to RCCs; and

g) transition to MEOSAR System and second generation beacons

MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

Milestones

9.1 Section 7 (*Performance Improvement Plan*) provides a scheme for the implementation of a collective set of enhancements for a number of elements in the PSCS.

9.2 States should implement the various PSCS elements of this Plan without delay, and should include consideration of issues such as:

- safety/operational analysis and assessment;
- cost-effectiveness;
- budgetary issues;
- development of operational procedures; and
- training.

9.3 Section 8 (*Research and Future Development*) provides, subject to future agreement by concerned parties, possible SAR improvements over the next 10 years.

Priorities

9.4 It is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers.

Actions

9.5 This Plan necessitates a number of implementation actions. It is expected that each Asia/Pacific State report progress on each applicable element to APANPIRG through the ATM Sub-Group. All States should note the importance of SAR status monitoring, which is expected to be conducted as part of the Seamless ANS on-line monitoring. Reporting of implementation progress of SAR elements from this Plan is expected to be conducted by the on-line Seamless ANS Reporting and Monitoring system, once this system is enabled to include the subsidiary plan such as the Asia/Pacific SAR Plan.

9.6 Section 6 (*Current Situation*) provides analysis and major concerns in the region, which should be considered in the formulation of specific State plans.

9.7 SAR Coordination Forums, which are likely to be based on sub-regional development (such as a Pacific Ocean SAR Forum and Indian Ocean SAR Forum) need to be promoted, established and supported to ensure the on-going implementation work and future review of SAR expectations linked to this Plan are conducted.

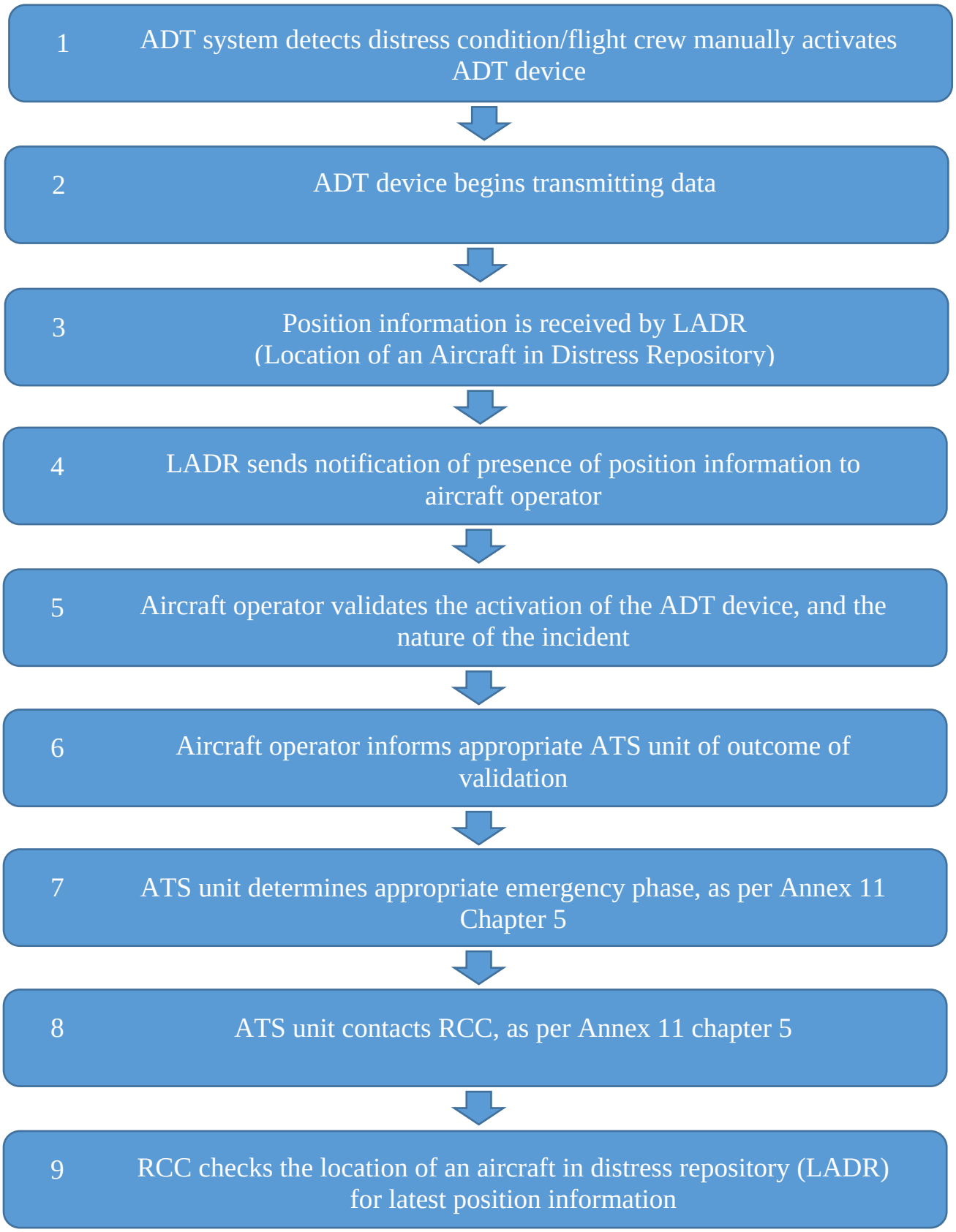
SAREX

9.8 A program is expected to be established for an annual SAREX in each sub-region (South Asia, Southeast Asia, East Asia and the Pacific), with every second year being a desktop communications exercise, and alternate years being a full exercise. The SAREX outcomes and lessons learned should be reported to APANPIRG through the ATM Sub-Group.

9.9 The ICAO Asia and Pacific Regional Office is responsible for taking actions that assist the implementation of SAR within its accredited States, in cooperation with the IMO. In addition, the Asia and Pacific Regional Office is responsible for coordinating with adjacent ICAO regional offices on an ad hoc basis or at relevant trans-regional meetings.

APPENDIX 1: FLOWCHART OF ACTIONS FOLLOWING ACTIVATION OF AN ADT DEVICE.

Reproduced from IAMSAR Manual Volume II Appendix V Figure 1, with explanatory annotations.



Notes on the nine steps in the Flowchart of Actions:

1. ADT system detects distress condition.
    a. The ADT system activates under certain conditions when the aircraft is in flight, there is no requirement to operate after an accident.
    b. Activated automatically or manually by flight crew. De-activated by the same means it was activated.

2. ADT device begins transmitting data
    a. Aircraft operator (airline) required to obtain information from which a position can be determined at least once every minute, and make the position information available to the appropriate ATS unit and RCC.

3. Position information received by the LADR
    a. All ADT devices send ADT information to the LADR.
    b. The ELT(DT) also sends a Cospas-Sarsat formatted message to the relevant RCC.
    c. The mandatory ADT information to be sent to the LADR is:
        i. Last known position (latitude/longitude, altitude, time stamp, flight track (past position reports)
        ii. Date and time of transmission
        iii. Aircraft operator identifier (3-Letter Designator (3LD)
        iv. Nationality mark and Aircraft registration mark (i.e., tail number)
        v. Contributor, data source (e.g., Cospas-Sarsat).
    d. Optional information may also be in the LADR.

4. LADR sends notifications to subscribers
    a. Subscribers (RCCs, ATS units, aircraft operator)
    b. Subscribers are notified that ADT information is available to view or download
    c. Notification sent from LADR for the first received position and normally not sent for each position report.
    d. New LADR notification sent when an aircraft is distress transits from one FIR to a second (and any subsequent) FIR.
    e. Notification from LADR sent by email, SMS, or ATS message over AFTN/AMHS
    f. ELT(DT) data also automatically sent to relevant RCC in a Cospas-Sarsat SIT 185 message.
    g. Cospas-Sarsat MCC will automatically send all ADT information to the LADR but will not send all ELT(DT) messages to the RCC because of the large number of transmissions.

5. Aircraft operator validates/attempts to validate
    a. Aircraft operator has various methods to validate if its aircraft is in distress or not.
    b. Aircraft operator needs to be aware that the relevant ATS unit and associated RCC have likely been notified.

c. ADT concept envisioned the current alerting process as per Annex 11 chapter 5 would not change.

6. Aircraft operator informs appropriate ATS unit

   a. Aircraft operator needs to be aware that the relevant ATS unit and associated RCC have likely been notified.

   b. Aircraft operator, ATS unit and RCC need common ADT procedures, nationally and regionally, for efficient handling of information received from the ADT system.

7. ATS unit determines emergency phase

   a. As per Annex 11 chapter 5.

   b. ATS unit, RCC and aircraft operator need common ADT procedures, nationally and regionally, for efficient handling of information received from the ADT system.

8. ATS unit contacts RCC

   a. As per Annex 11 chapter 5.

   b. ATS unit, RCC and aircraft operator need common ADT procedures, nationally and regionally, for efficient handling of information received from the ADT system.

9. RCC checks the LADR

   a. In addition to the initial notification other information may be available.

   b. If aircraft is equipped with an ELT(DT), the RCC will also receive an ELT(DT) message from the Cospas-Sarsat system.

   c. RCC, ATS unit and aircraft operator need common ADT procedures, nationally and regionally, for efficient handling of information received from the ADT system.

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APPENDIX 2: BENEFITS TO THE SAR SYSTEM OF STATES ASSISTING OTHER STATES

APAC States Face Demanding SAR Responsibilities with Few Resources

2.1 Many APAC States have the challenging responsibility of providing SAR services over vast and remote land and oceanic areas and several have few resources available to meet Annex 12 requirements.

Taking A Regional Approach Improves Effectiveness and Efficiency

2.2 To provide an effective and efficient SAR service in the region it is important that States focus not only on meeting their own national obligations, but also take the broader view that their State SAR system is only one part of the wider regional SAR system. States therefore need to cooperate, collaborate and share resources and technical expertise with their neighbouring and regional RCCs, with the more developed SAR States in particular looking for opportunities to assist their lesser developed State neighbours.

When Developed SAR States Support Less Developed Neighbours, Everyone Wins

2.3 Sometimes simple measures can reduce the incidence of SAR operations in a State's Area of Responsibility.

2.4 An example of this is where New Zealand has been regularly requested to send resources to Kiribati, which is not in New Zealand's SRR, to conduct aerial searches for people missing in small vessels at sea. New Zealand recognised that with the provision of basic aids, the number of people going missing at sea could be reduced. The work was completed through an aid program and the benefit was immediate and twofold. There has been a large reduction in the number of people going missing at sea and New Zealand has reduced costs through less aerial searches being required.

2.5 Another example is where Australia has recognised that increasing aircraft and vessel traffic in the north and western areas of its SRR in the Indian Ocean region comes with increased likelihood of more frequent SAR responses in that region. As a result, Australia worked in partnership with the Maldives, Mauritius and Sri Lanka to fund and provide technical assistance to improve the SAR capabilities of those countries that will also assist Australia's SAR response obligations in that area of its SRR. Similarly, since 2008 Australia has been providing funding and development assistance to Indonesia to improve SAR capability and cooperation.

2.6 States that aren't compliant with Annex 12 SARPs and are unable to meet the minimum SAR service requirements could consult and seek assistance from 'champion' States that are compliant and have well developed SAR systems in place.

2.7 Examples of assistance that could be provided by States, International Organisations (such as IMO and ICAO) or multi-lateral initiatives include:

a) conducting of a SAR Gap Analysis;

b) advice on the establishment of a SAR organisational framework;

c) advice for the establishment of a National SAR Committee;

d) technical assistance in the development of a National SAR Plan;

e) providing copies of relevant SAR documents to be used as templates;

f) technical assistance on the establishment of SAR agreements;

g) technical assistance in the development of RCC position descriptions;

h) training of SAR personnel;

i) provision of SRU where appropriate and training of SRU crews;

j) provision/sharing of computerised SAR tools including incident management systems, databases, maritime drift modelling software, etc.;

k) establishing data and information sharing agreements between RCCs;

l) provision of operational search plan data;

m) providing advice on how to conduct a SAREX and post-SAREX analysis; and

n) set up of SAR system publicity and safety awareness campaigns.

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APPENDIX 3: SAMPLE MOU BETWEEN THE SAR SERVICE AND THE ACCIDENT INVESTIGATION AUTHORITY

Notification and Cooperation during concurrent [Search and rescue service] Search and Rescue (SAR) and [Accident investigation authority] Accident Investigation Operations

1. **Purpose**. This MOU between the [Search and rescue service] and the [Accident investigation authority] is to address the [Search and rescue service's] obligations under the Convention on International Civil Aviation (ICAO), Annex 12 Search and Rescue; and, the [Accident investigation authority's] obligations under ICAO Annex 13 Aircraft Accident and Incident Investigation during concurrent responses to an aircraft accident.

2. **General.** The [Search and rescue service] is the [State name] lead agency with regard to its obligations in support of Annex 12. It establishes and provides SAR services in accordance with the Annex. The [Search and rescue service] is the national SAR Coordinator for aircraft in distress in the [maritime and/or aeronautical] search and rescue region(s). The [Accident investigation authority] leads the investigation of all civil aircraft accidents or incidents.

3. **SAR and Accident Investigation Protocols.** The [Search and rescue service] and [Accident investigation authority] agree that mutual coordination and cooperation between the two agencies promotes efficient and effective SAR and accident investigation operations. The [Accident investigation authority] does not participate in the search and rescue of persons that are involved in an aircraft accident but may assist [SAR authority] with information and expertise that assists the SAR operation. The [SAR authority] may assist the [Accident investigation authority] with information resulting from the SAR operation that assists with accident investigation and may also provide assistance with search and recovery operations.

    a. When a SAR operation involving an aircraft accident occurs in a SAR region in which the [Search and rescue service] is responsible, the [Search and rescue service] will notify the [Accident investigation authority] at the earliest opportunity. The point of contact for the [Accident investigation authority] is: [contact details such as telephone number and email address].

        i. If an [Accident investigation authority] investigator-in-charge has been named, the [Accident investigation authority] point of contact will inform the Search and rescue service] point of contact.

        ii. The [Accident investigation authority] point of contact may share the investigator-in-charge's contact information with the [Search and rescue service] point of contact.

        iii. The [Search and rescue service] SAR point of contact is the rescue coordination centre (RCC) or rescue sub-centre (RSC) responsible for the coordination of the SAR operation.

    b. The State of occurrence, i.e. the State in the territory (and territorial sea) of which an accident or incident occurs, is responsible for the conduct of the investigation in accordance with ICAO Annex 13. For accidents and incidents outside the territory and territorial sea of any State, the State of Registry of the aircraft is responsible for the conduct of the investigation.

    c. States nearest the scene of an accident in international waters, particularly the State with the search and rescue region responsibility, are to provide assistance as they are able and respond to requests by the State of Registry. If the State of Registry takes control of the investigation, then the [Accident investigation authority] will coordinate with the State of Registry investigator-in-charge to meet the intent of this MOU.

d. Typically, the [Accident investigation authority's] on-scene investigative work begins after the SAR operation concludes and the recovery phase begins, but it may begin during the SAR operation on the understanding that the SAR operation takes priority whilst there is opportunity to rescue survivors.

   i. The [Accident investigation authority] may conduct its investigation of wreckage recovered during a SAR operation. The [Accident investigation authority] investigator-in-charge will coordinate with the RCC or RSC responsible for coordinating the SAR operation to ensure neither agency's work hinders that of the other, and that both coordinate any updates to the media to ensure consistency of facts.

e. The [Search and rescue service] will provide data and information related to the SAR operation requested by the [Accident investigation authority] for its accident investigation. Where appropriate, arrangements should also be mutually agreed for the securing of any debris or wreckage retrieved during the SAR operation as practicable without diverting effort from the SAR operation.

f. The [Search and rescue service] and the [Accident investigation authority] will abide by the terms of this MOU.

Note: *This template serves as guidance for States to draft an agreement or amend an existing agreement (which may take the form of an MOU or Arrangement or other instrument title) and the text to be included in this document is for the Parties involved to decide.*

Depending on national rules and procedures, this sample MOU may need to be modified for arrangements between one national search and rescue service and one national accident investigation authority.

This template may also assist with the development of separate arrangements for investigation of maritime craft.

SURVEY RESULTS ON ICAO APAC ATM SAFETY CULTURE

INTRODUCTION

ICAO Annex 19[1] – Safety Management requires that "States shall take necessary measures, including the promotion of a positive safety culture, to encourage safety reporting through both mandatory and voluntary safety reporting systems to collect safety data and safety information". In addition, "the Service Provider shall define its safety policy reflecting organizational commitment regarding safety, including the promotion of a positive safety culture in accordance with international and national requirements".

The Asia/Pacific Seamless ANS Plan emphasizes the importance of having optimal Aviation Culture by allocating Priority 1 to the regional element 7.43 (ANSP Human and Simulator Performance) to ensure safe implementation of modernization of Air Navigation Systems stemming from global and regional plans.

The purpose of this survey is to:

- establish better understanding of the current status of implementation of Safety Culture in States and Air Navigation Service Provider (ANSP) organizations in the Asia/Pacific (APAC) region; and
- identify improvement areas and needs requiring more attention in promoting an ATM Safety Culture in the APAC region.

HOW THE SURVEY WAS CONDUCTED

The ICAO APAC ATM Safety Culture Survey was launched on 06 May 2022 via State Letter AP069/22 (RSO), which was stemmed from a working paper submitted to ATM SG/9 meeting with proposals that was supported as ATM SG Task List Action Item 9/9.

States and Air Navigation Service Providers were requested to respond to two separately prepared questionnaires, through which States' regulatory information was collected by email from Civil Aviation Authorities and feedback from Service providers were received through online survey.

13 States' responses and 1,268 responses from ANSPs in 22 different States/Administrations were collected and aggregated until 24 June 2022.

OBSERVAIONS

The observations reflected do not aim to identify or reflect any State or group to preserve the anonymity of the recipient. A holistic analysis of the survey was out of the scope as the focus was on identifying implementation support initiatives for effective ATM safety management in APAC.

The following was observed:

- the responses were influenced by characteristics of the State aviation systems, regulatory environment and implementation maturities of State safety management;
- the gap between what is established in the regulatory system and how effectively it has been implemented needs to be narrowed down;
- the States and organizations' policies and procedures to support Safety Culture, such as safety data/information protection, safety data sharing systems, disciplinary actions for what's unacceptable behaviors and relevant training policy, and safety reporting system, are not sufficiently understood nor well communicated throughout the operational environment in ANSPs;
- there is common recognition among both States and operational personnel on the need for an improvement plan and periodic assessment of safety culture to enhance the effectiveness and maturity of safety management implementation;

[1] Annex 19 Sections 3.2, 3.5, 5.3, and Appendix 2 Section 1.1

- operational personnel is lacking of expectations and trust in management's genuine commitment to safety and safety issue resolution;
- despite the protection policy on safety data/information and its sources from external interference other than safety benefits, operational personnel feels no sufficient confidence and trust in fairness and protection when safety occurrence is reported in terms of post-consequences, legal accountability and job security;
- operational personnel feels hazard reporting system is needed to be improved in efficiency and easiness to use; and
- there is a strong interest among respondents from both States/Administrations and Service Providers in ICAO initiatives with a preference for pertinent workshops and trainings to share experience in fostering safety management capabilities and a positive safety culture in collaboration with other ATM stakeholders including industry.

CONCLUSIONS

Based on the key observation above, the following conclusions were drawn:

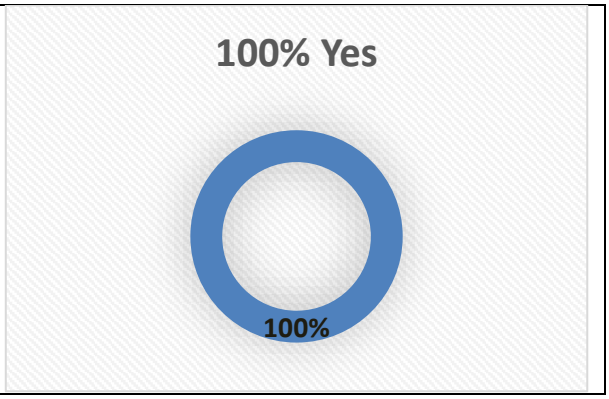
- States need to put more efforts to narrow the gap between regulatory framework and implementation effectiveness with a view to enhancing awareness and understanding of their established policies and procedures amongst people in the organization, maybe through national training programmes, tailored workshops and seminars, etc.;
- States need to ensure that safety reporting system is non-punitive if no violation of any regulations or procedures, or if appropriate according to the received training experience, so that operational personnel feels protected, well-informed and report any safety concerns for the good of safety;
- States need to review and assess their current maturity level of safety culture regularly to ensure continuously improving safety management performance in ATM by developing the improvement plans with supporting activities;
- well-structured and well-purposed training is needed to raise operational personnel's awareness of safety reporting systems including policies and associated procedures as well as the fundamental principles of aviation safety management;
- rewarding system and feedback procedures for voluntary safety reports could be a good enabler to boost safety reporting as recommended by Doc 9859; and
- further promotional initiatives to support States' enhancement of ATM safety management capability are needed at regional level for the effective implementation of ANS upgrades.

SURVEY RESULTS

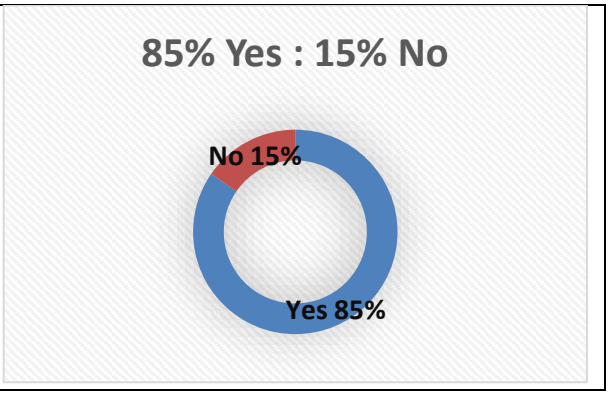
QUESTIONNAIRE 1: FOR STATE

1. **13 State/Administration** responded: China, Hong Kong China, India, Macau China, Nepal, Philippines, Pakistan, ROK, Singapore, Sri Lanka, Thailand, USA, Viet Nam

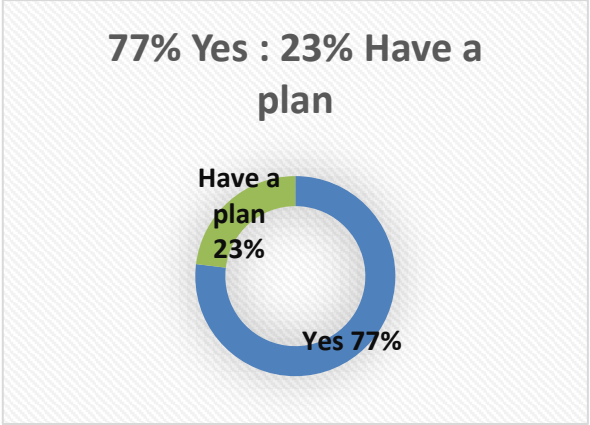
2. Has your State established policies and procedures to support Safety Culture and Just Culture principles containing description of what's unacceptable behaviours and disciplinary actions thereon including relevant training policy, which is formally promulgated and made public?

Yes: China, Hong Kong China, India, Macau China, Nepal, Philippines, Pakistan, ROK, Singapore, Sri Lanka, Thailand, USA, Viet Nam	

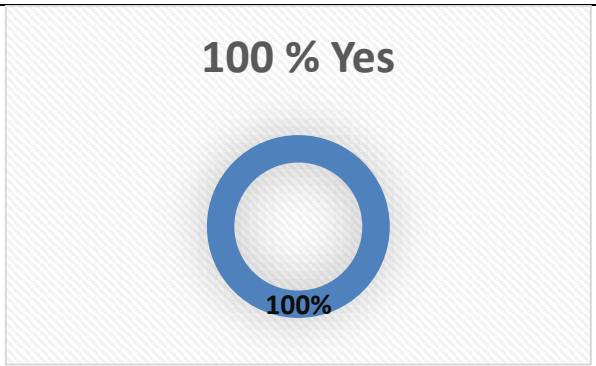
3. Within your State's legal/judiciary system, is safety data/information and the data/information sources sufficiently protected from external interference other than safety benefit?

Yes: China, Hong Kong China, India, Macau China, Nepal, Pakistan, ROK, Singapore, Sri Lanka, Thailand, USA **No:** Philippines, Viet Nam	

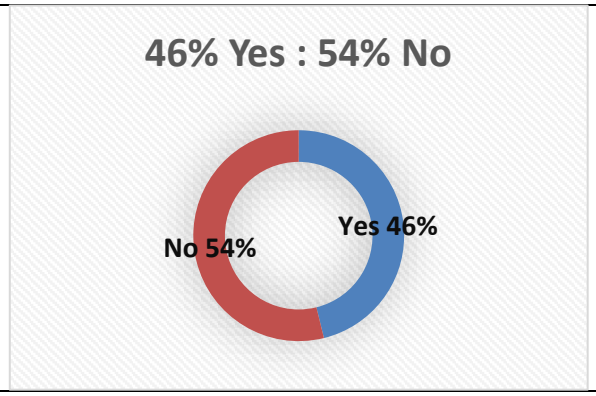
4. Is your State developing systems and processes to support safety data sharing and periodic publication to provide easy access to safety information gathered by the safety reporting programmes?

Yes: China, Hong Kong China, India, Macau China, Philippines, Nepal, ROK, Singapore, Thailand, USA **Have a plan:** Pakistan, Sri Lanka, Viet Nam	

5. Is your State aware of the need for an improvement plan and periodic assessments of safety culture?

Yes: China, Hong Kong China, India, Macau China, Philippines, Nepal, Pakistan, ROK, Singapore, Sri Lanka, Thailand, USA, Viet Nam	

6. Does your State assess its safety culture and disseminate the results throughout the State at least once every 5 years to establish a shared understanding of State's safety culture and identify its strengths and weaknesses?

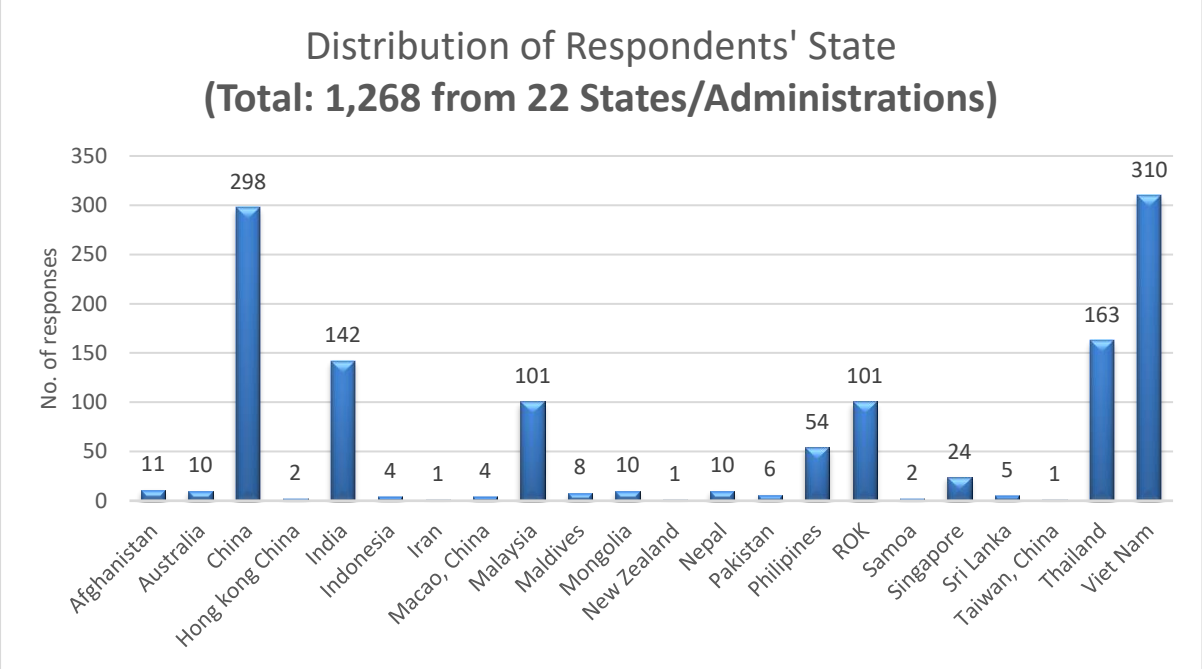
Yes: Hong Kong China, India, Macau China, ROK, Singapore, USA **No:** China, Philippines, Nepal, Pakistan, Sri Lanka, Thailand, Viet Nam	

7. If you have any other suggestions or comments, please indicate here.

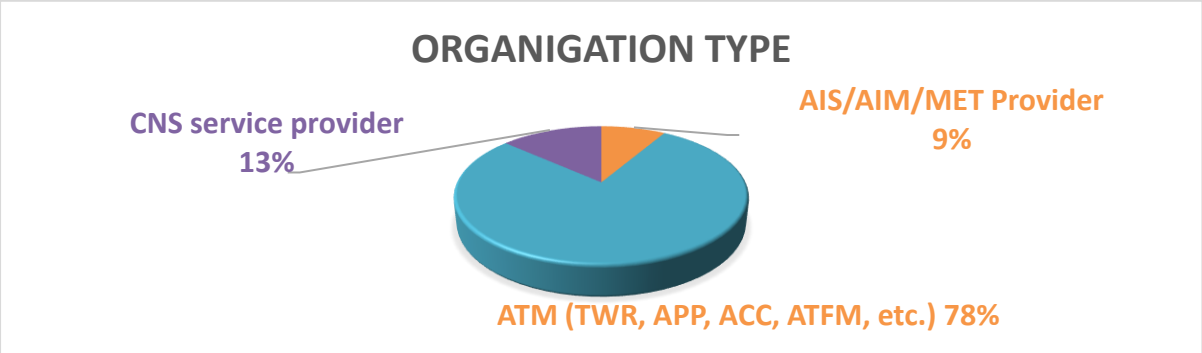
- ICAO may consider providing a validated checklist for safety culture survey.
- Evolvement and assessment of just culture/safety culture is not an easy task. Kindly share the best industry practices where the same has been implemented & prevailed.

QUESTIONNAIRE 2: ONLINE SURVEY FOR SERVICE PROVIDER

1. Please select your State.

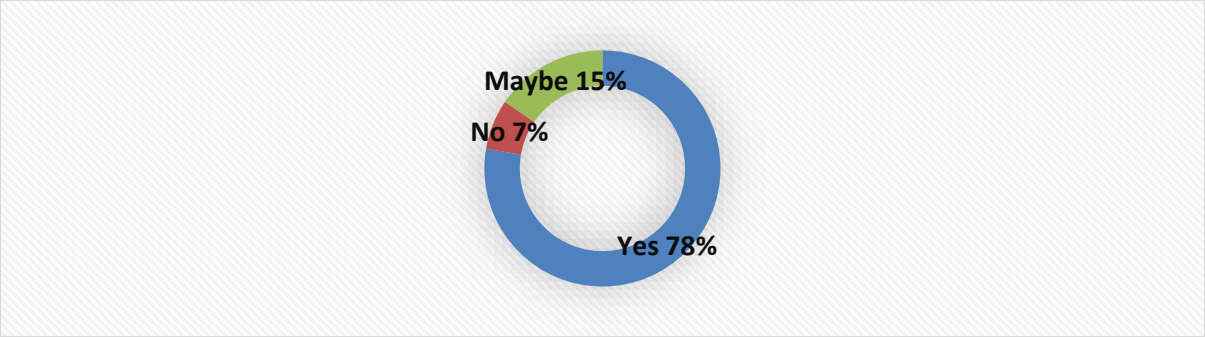


2. Please select your organization type.

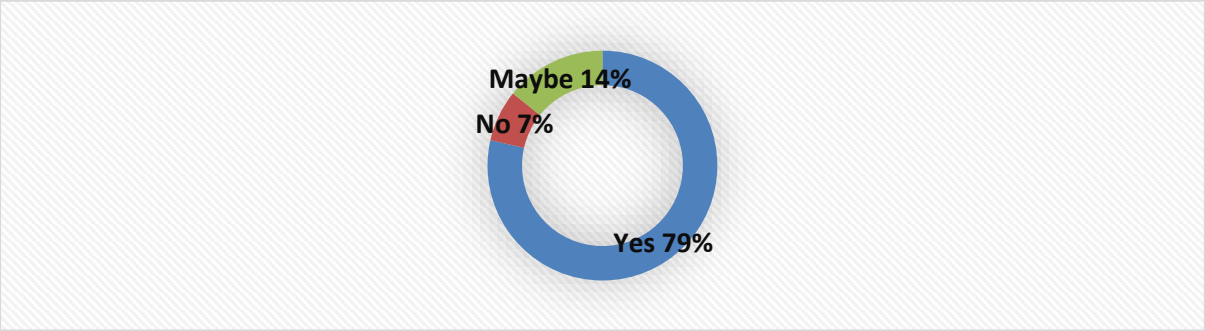


3. Please describe your current work position.

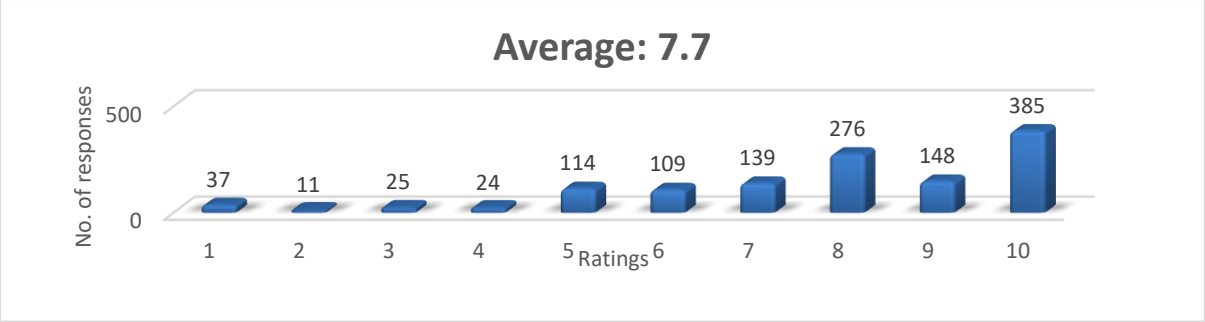
4. Has your State established policies and procedures to support Safety Culture and Just Culture principles containing description of what's unacceptable behaviours and disciplinary actions thereon including relevant training policy, which if formally promulgated in a public domain?



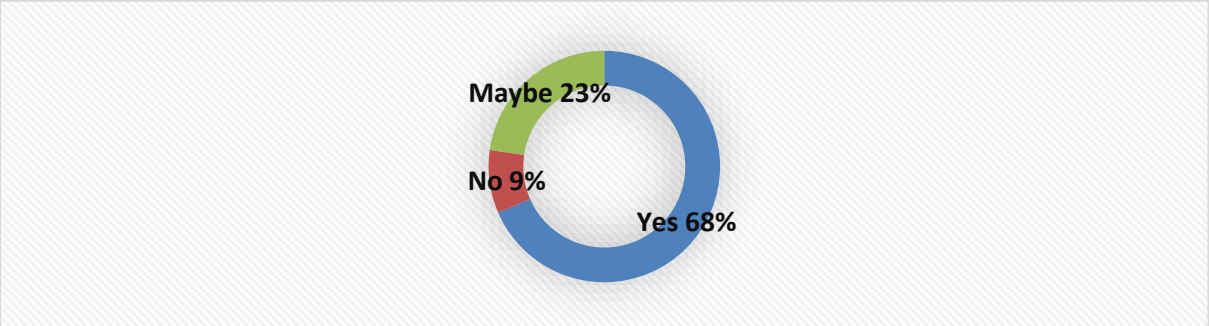
5. Are policies and procedures in place that define safety culture i.e. a Vision/Mission Statement with a description of what effective safety looks like in your organization?



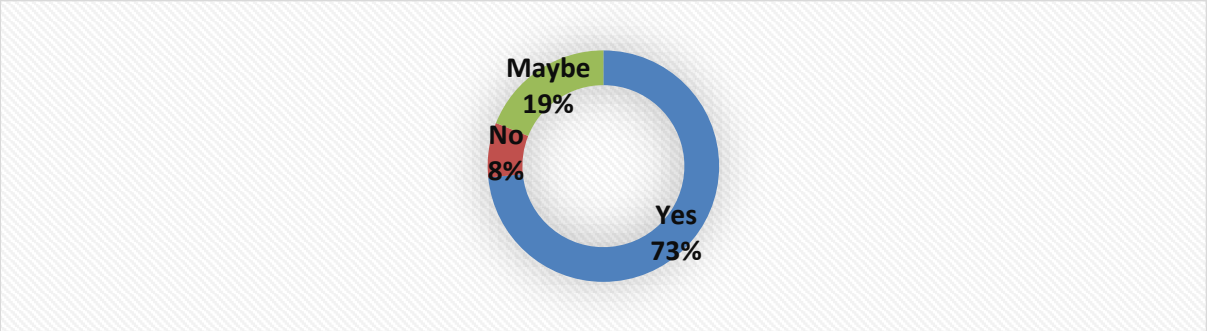
6. Is safety an organization priority and a core value of your organization?



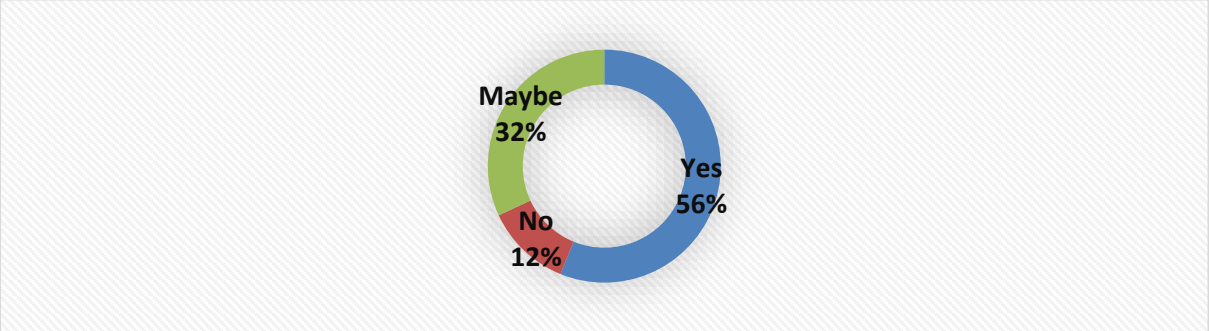
7. Are systems and processes in place to support safety data sharing and periodic publication to provide easy access to safety information gathered by the safety reporting programmes?



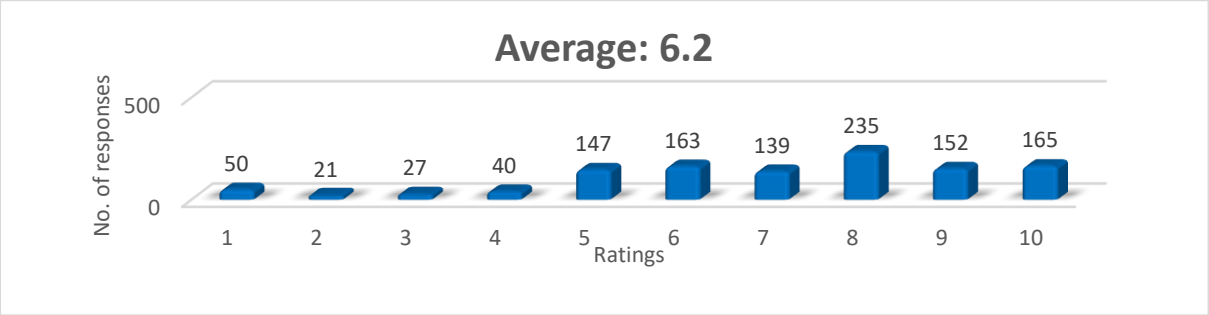
8. Is your organization aware of the need for an improvement plan and periodic assessments of safety culture?



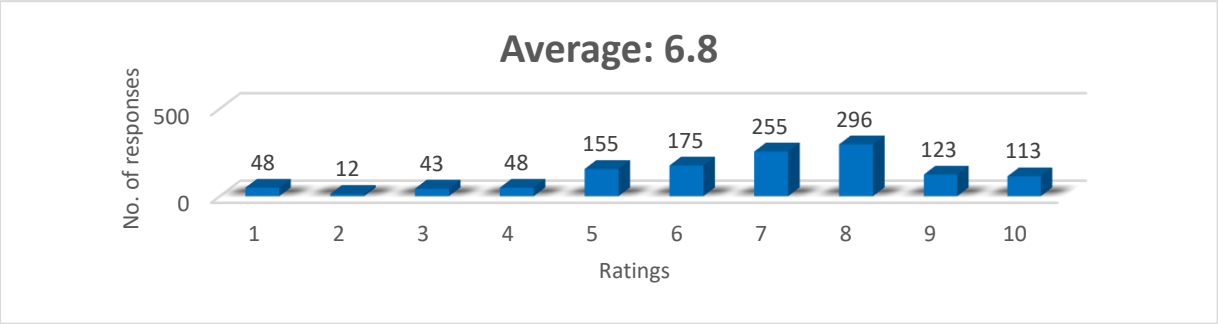
9. Does your organization assess its safety culture and disseminate the results throughout the nation at least once every 5 years to establish a shared understanding of organization's safety culture and identify its strengths and weaknesses?



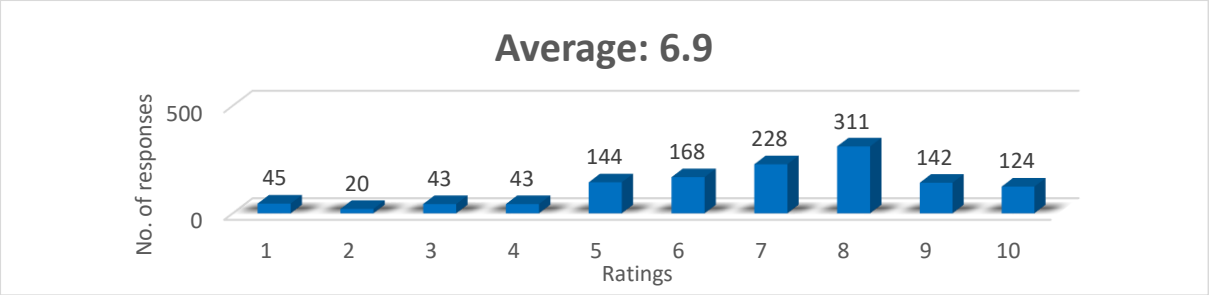
10. Does management's approach to safety demonstrate a genuine commitment to addressing safety issues by visibly endorsing and executing safety initiatives i.e. do they lead by example?



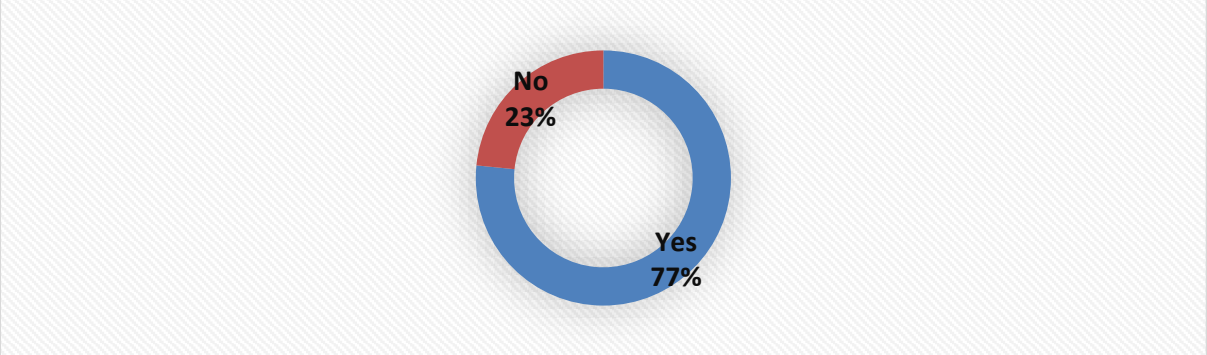
11. To what extent do you think all levels of your organization clearly understands and accepts the difference between acceptable and unacceptable behaviours, and disciplinary actions?



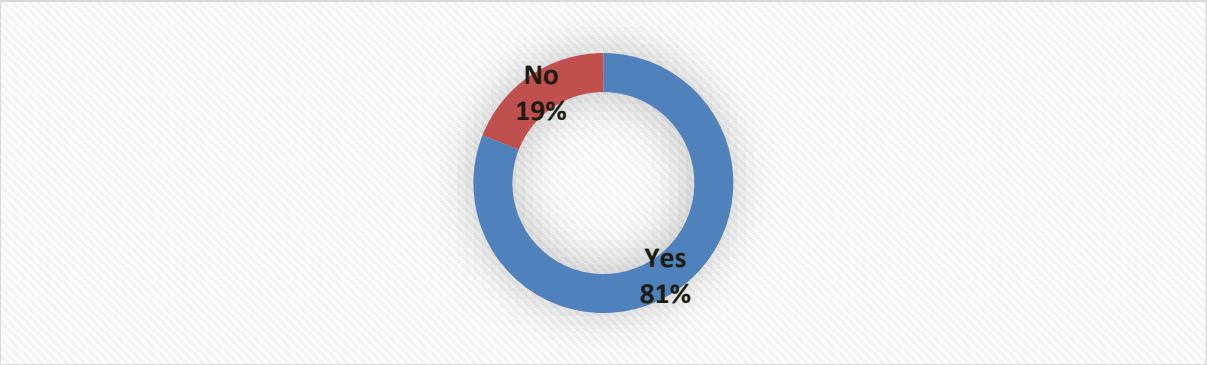
12. Are safety risks and hazards faced by the organization properly well understood at all levels (up to and including senior managers)? (1 being Not likely/Never, 10 being Very likely/Always)



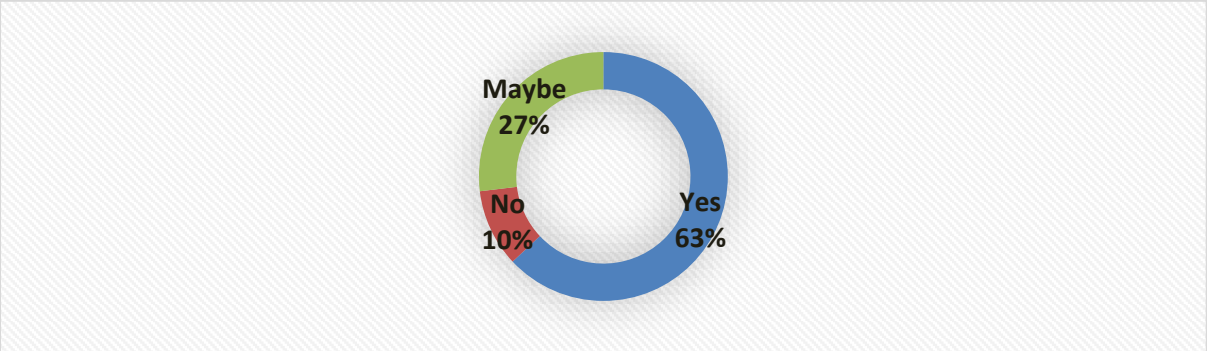
13. Does your organization encourage staff to challenge procedures, practices and people to improve safety performance?



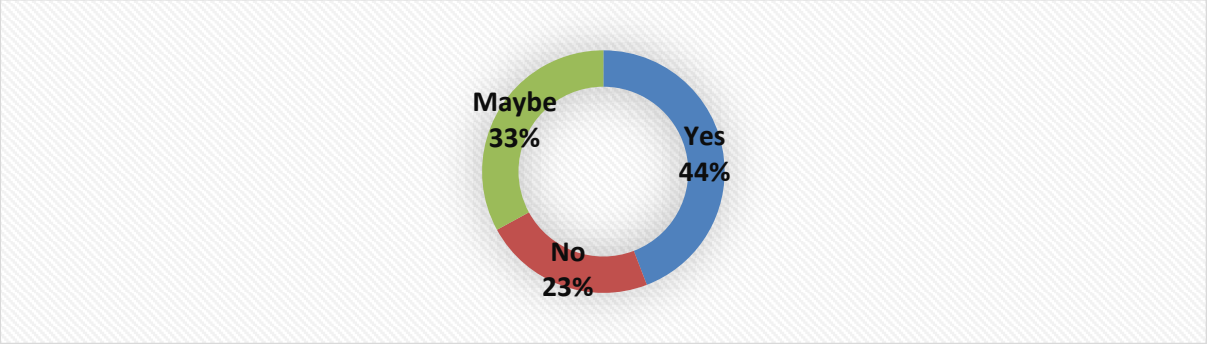
14. Does your organization provide regular feedback to staff based on safety occurrence reports?



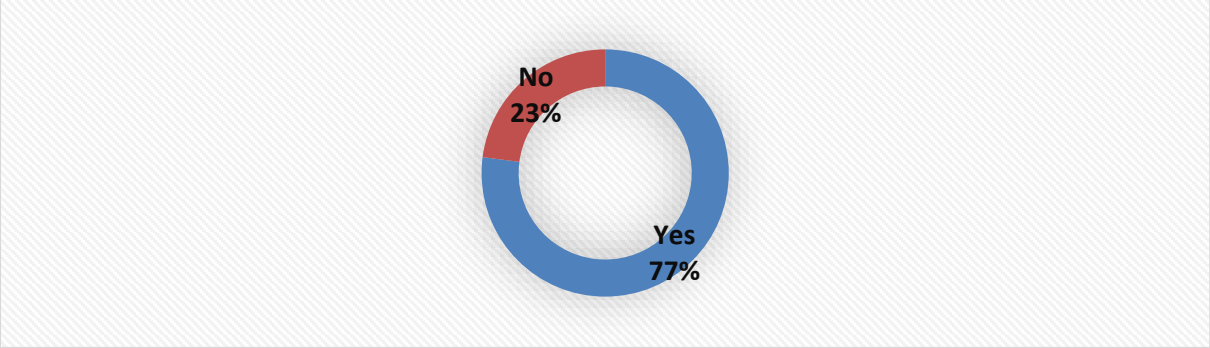
15. Is there a formal process to inform staff who have reported a safety occurrence of the progress of the investigation?



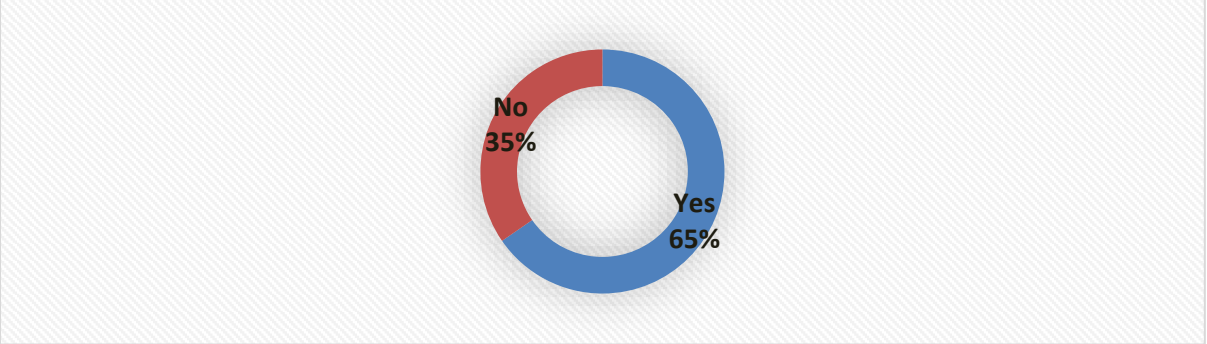
16. Are high safety issue reporters formally praised and recognized/rewarded by your colleagues and organization?



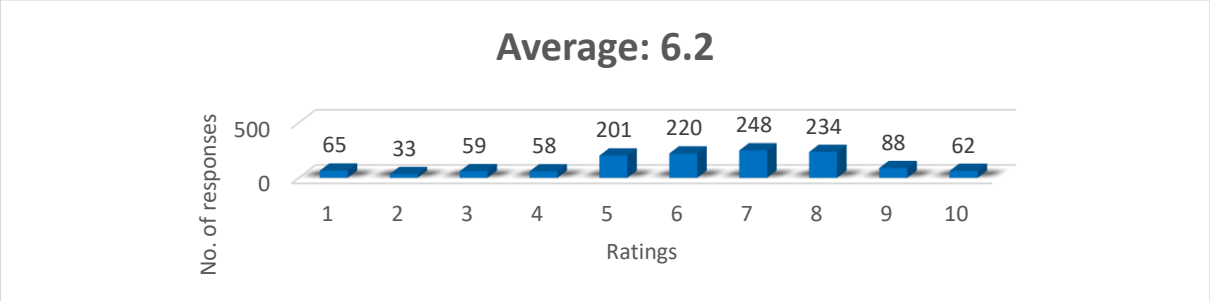
17. If you report your own safety occurrences, do you expect you will be treated fairly in accordance with the principles of the Just Culture definition?



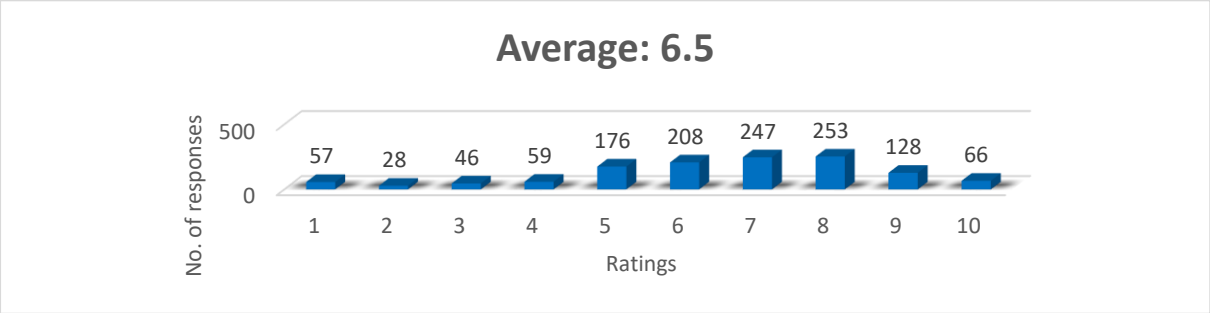
18. Do you feel your organization's hazard reporting system is efficient enough and easy to use?



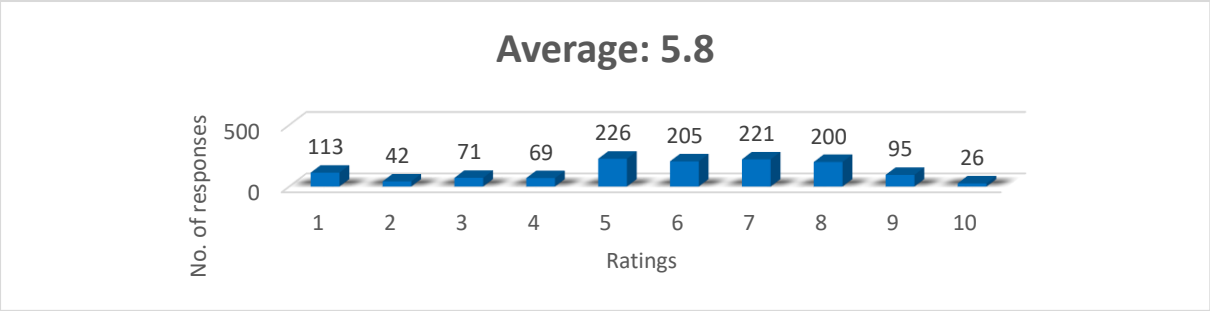
19. Is voluntary reporting of hazard/safety issue valued and appreciated among colleagues and management level in your organization? (1 being Not likely/Never, 10 being Very likely/Always)



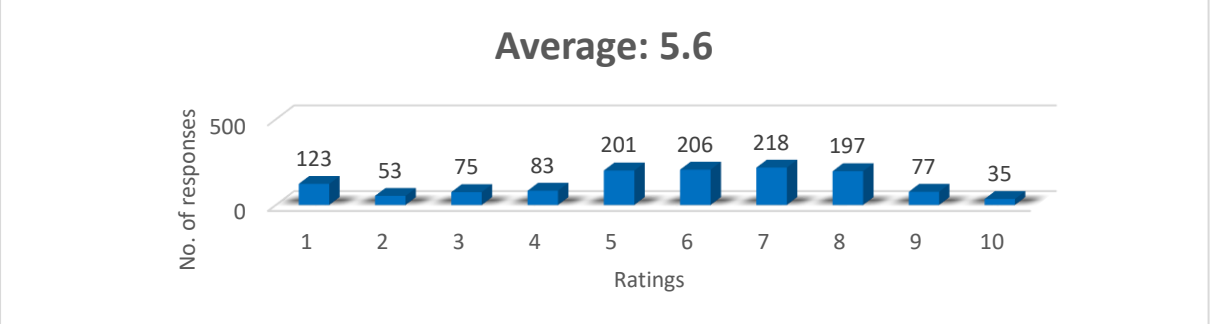
20. Do you feel the safety issue will be resolved and corrected when you report? (1 being Not likely/Never, 10 being Very likely/Always)



21. Are you comfortable with subsequent consequences when you report your own errors and/or mistakes? (1 being Not likely/Never, 10 being Very likely/Always)



22. Do you feel that you are protected in legal accountability and job security when you report your own errors and/or mistakes? (1 being Not likely/Never, 10 being Very likely/Always)



23. If you have any other suggestions or comments, please indicate here.

Feedback from written-in responses will be further analysed to be utilised for identifying and prioritizing support activities in promoting development of a positive safety culture and enhancement of ATM safety management performance to better support safe and effective implementation of APAC Seamless ANS Plan.

ATM Sub Group of APANPIRG — TASK LIST

The priorities assigned in the list have the following connotation:

A = Tasks of a high priority on which work should be expedited; and
B = Tasks of a medium priority on which work should be undertaken as soon as possible but not to the detriment of Priority "A" tasks.

(Last update November 2020, amendments are shown in highlight)

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/8 **Priority A**	**<u>Identify and manage Deficiencies in the ATM, AIS and SAR fields</u>** a) Develop and maintain Deficiencies list, b) Identify unimplemented items in the ANP, c) Assist States to correct deficiencies, d) Promote timely resolution of safety-critical items identified by APANPIRG	ONGOING	**Functional Responsibility:** No specific working group established, all parties have responsibilities in this area (States, Users, International Organisations, Regional Office, ATMSG APANPIRG)	OPEN	

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/9 **Priority B**	**SAR Matters** Assist appropriate provision of SAR facilities, services and procedures within the Asia Pacific Region by: a) Periodic review of SAR facilities, services and procedures in the region, b) Encourage States to delegate or negotiate SAR services, c) Asia/Pacific SAR Plan Assessment be kept up to date and distributed to States for information and action., d) Asia/Pacific "Register of SAR Agreements" be kept up to date and distributed to States for information and action	ONGOING	States, Regional Office, APSARWG ATM/SG APANPIRG	OPEN	States to update the ATM/SG and APSAR/WG each year on SAR capability
22/1 **Priority B**	**Review and Update the Asia/Pacific Route Catalogue**	On-going	IATA, ATM Coordination Groups, ATM/SG	OPEN	
4/1	Analysis of ANSPs which failed to send Departure (DEP) messages, notify the States and raise deficiencies	~~ATM/SG/10~~ ATM/SG/11	ICAO	Open	Some States were not Asia/Pacific so were just subject to notification

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
5/5	Phase 2 of the Alphanumeric Call Sign Project report to ATM/SG/7	~~ATM/SG/10~~ ONGOING?	IATA/States/ CANSO/ACI	Open	ATM/SG/10 WP/22 ATM/SG/9 update: ***Conclusion APANPIRG/31/11*** urged aerodrome operators, in coordination with CANSO and ACI, to consider a trial to identify and overcome barriers, with a view to developing a project for the APAC Region.
5/8	Follow-up on Mumbai/Mogadishu/Seychelles FIR route PfA	~~ATM/SG/10~~ ATM/SG/11	India, ICAO	Open	Coordinate with ICAO ESAF and States.
6/1	After discussions about the Ministerial Declaration's priorities, the meeting agreed that an effective means of monitoring would be a publically-available implementation progress report.	ATM/SG/9	ICAO	Closed	
7/1	A survey of Asia/Pacific implementation of the new SID/STAR phraseology would be circulated in Q3 2019 and Q1 2020	ATM/SG/9	ICAO	Completed	
7/2	ICAO suggested that Afghanistan provide an outline of its action plan to ICAO that demonstrated how they would overcome the surveillance and communication issues.	ATM/SG/9	Afghanistan	Closed	Overtaken by events of 2021.
7/4	India was requested to provide a draft of a contingency ATFM response concept.	ATFM/SG/12	India Thailand Secretariat	Closed	Updated at ATM/SG/9 Transferred to ATFM/SG

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
					Task List
8/1	The ATM/SG/8 meeting noted that ICAO intended to circulate a new survey to update the data on separations/TOC/ Flight Level Allocation Scheme (FLAS) held by the Regional Office in December 2020 or January 2021.	February 2021	ICAO	Completed	
8/2	ICAO recalled the need for a Doc. 7030 amendment to contain a regional air navigation agreement for a mandate within that portion of international airspace over the 'high seas'. The meeting also noted that there were a number of other States contemplating the use of ADS-B within international airspace, including SB ADS-B, so it would be better to have several States jointly submit a PfA. The Chair encouraged a Small Working Group of interested States to work on the PfA.	February 2021	ICAO/States (including Hong Kong China, India)	Closed	Coordination with ICAO HQ indicates that Doc 7030 support for this may not be necessary. Further coordination being undertaken within ICAO.
9/1	Provide relevant sections of AIP to ICAO Regional Office, re replacement of R Area in international airspace with D area	12 November 2021	Indonesia	~~Open~~ Completed	ATM/SG/9 report 4.3 Support removal of APANPIRG Deficiency
9/2	Provide IFALPA with ICAO List of Contacts for Deficiencies. Discuss IFALPA provision of separate paper introducing IFALPA Deficiencies at future ATM/SG meetings	ATM/SG/10	ICAO/IFALPA	~~Open~~ Closed	ATM/SG/9 report 4.15 ATM/SG/10 report 4.4, 4.5
9/3	Follow up on Fukuoka/Khabarovsk FIR boundary discrepancy	30 November ~~2021~~ 2022 Tentative	ICAO	Open	Update 21/10/22: Meeting planned tentative November 2022. ATM/SG/9 report 5.48

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
9/5	Review 2 x parallel processes of updating the ATS Route Catalogue with two papers	ATM/SG/10	ICAO/IATA/ICAO APAC RSO	~~Open~~ Completed	ATM/SG/9 report 6.12
9/6	Consider sharing experience and lessons learned in implementation of enhanced wake turbulence separation	~~SAIOSEACG/1 ATM/SG/10~~ 2023	ICAO Hong Kong China Japan Republic of Korea	Open	ATM/SG/9 report 6.19 ~~ATM/SG/10 – explore option of a workshop activity on ATM/SG/10 Day 4 afternoon~~ ATM/SG/10 report 5.78
9/7	Review Regional ATM Contingency Plan	~~ATM/SG/10~~ ATM/SG/11	ICAO/IATA Australia Nepal	Open	ATM/SG/9 report 6.57
9/8	Workshop to share experience of ANSPs in planning and readiness for COVID-19-related ATM Contingency Recovery	Q1/2 2022	ICAO Singapore Indonesia Nepal Others?	~~Open~~ Completed	ATM/SG/9 report 6.60 Webinar conducted 09 June 2022
9/9	Conduct ATM Safety Management survey and workshop	~~Q4 2022~~	ICAO	~~Open~~ Closed	ATM/SG/9 report 9.5 ATM/SG/10 8.1 Survey completed Action Item 10/7
9/10	Clarification of the effect on activity periods with the change from R areas to D areas in high seas airspace	~~SAIOSEACG/1~~ SAIOSEACG/2	ICAO	Open	
10/1	Coordinate with Regional Monitoring Agencies to explore how best to gather data on mid-air collision (MAC) pre-cursor events such as Large Height	03 November 2022	ATM/SG - RASMAG Secretariat	Open	ATM/SG/10 report 2.3

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
	Deviations, ACAS RAs, etc.				
10/2	Coordinate with the AGA, CNS and MET sections of the ICAO Asia/Pacific Regional Office to examine the need for any revision of document update cycles and implementation reporting dates.	03 November 2022	ICAO	Open	ATM/SG/10 report 3.15
10/3	Review correspondence from Bangladesh on WGS-84 Deficiency	03 November 2022	ICAO	~~Open~~ Completed	ATM/SG/10 report 4.9
10/4	Explore option of conducting a workshop on the classification of airspace, and seek information from States in order to compile guidance in the form of a checklist of considerations in determining airspace classification	ATM/SG/11	ICAO, States? Nepal	Open	ATM/SG/10 report 5.66
10/5	Develop SEI (Alphanumeric Call Signs) for consideration for inclusion in the APAC RASP. Consider inclusion of related regional planning element in the Seamless ANS Plan	ATM/SG/11	ICAO, RASG SEI WG	Open	ATM/SG/10 report 5.74
10/6	Assist AOP/SG in encouraging States to comply with requirements for publication of aerodrome certification status in AIP	AAITF/18	ICAO, AAITF	Open	ATM/SG/10 report 7.3

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
10/7	Conduct workshop on Safety Management and Positive Safety Culture in ATM	2023	USA (facilitator) Australia, Hong Kong China, India, Japan, Malaysia, Nepal, Other States? IATA, IFALPA, ICAO	Open	ATM/SG/10 report 8.6, 8.7
10/8	Arrange a meeting to discuss implementation of 20 NM longitudinal spacing on L642 M771	November 2022	China, Hong Kong China, Singapore, Viet Nam ICAO	Open	Timing subject to administrative issues or restrictions

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