INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE FOURTEENTH MEETING OF THE ATM SUB-GROUP OF APANPIRG (ATM/SG/14)

BANGKOK, THAILAND, 3 – 7 AUGUST 2026

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

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

CONTENTS

APPENDIXES TO THE REPORT

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INTRODUCTION

Meeting

1.1 The Fourteenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/14) of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held from 3 to 7 August 2026 at the Kotaite Wing of the ICAO Asia and Pacific (APAC) Office in Bangkok, Thailand.

Attendance

2.1 The Meeting was attended by 113 registered participants (six online and 107 in-person) from 24 States, two Special Administrative Regions of China and five International Organizations, including Australia, Bhutan, Cambodia, China, Hong Kong China, Macao China, Fiji, India, Indonesia, Japan, Lao People's Democratic Republic (PDR), Malaysia, Maldives, Mongolia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Solomon Islands, Sri Lanka, Thailand, the United Kingdom, the United States, Viet Nam, IATA, ICCAIA, IFALPA, IFATCA and ICAO.

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

Officers and Secretariat

3.1 Mr. Vincent Hwa, Director of Air Traffic Services, Civil Aviation Authority of Singapore presided over the ATM/SG/14, as Chairperson.

3.2 Mr. Hiroyuki Takata, Regional Officer Air Traffic Management (ATM) and Mr. Mior Adli Bin Mior Sallehhuddin, Regional Officer ATM, ICAO APAC Office, were the Secretaries for the Meeting. They were assisted by Dr. Trish Prakayphet Chalayonnawin, Programme Analysis Associate ATM.

3.3 The Meeting was also supported by Ms. Ying Zhang, Deputy Chief, Mr. Manjunath Krishna Nelli, Regional Officer ATM, Mr. Liu Yonggang, Regional Officer ATM, and Mr. Irwandi Krinata, Regional Officer Performance-Based Navigation (PBN), ICAO APAC Regional Sub-Office.

Language and Documentation

4.1 The ATM/SG met as a plenary throughout the Meeting. The working language of the meeting was English for all documentation and this Report. A total of 47 Working Papers (WPs), 19 Information Papers (IPs), two Flimsies and eight Presentations (SPs) were considered by the Meeting.

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

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

<u>Chairperson of ATM/SG</u>

5.1 Mr. Vincent Hwa welcomed participants to the Meeting.

<u>ICAO APAC Office</u>

5.2 On behalf of Mr. Tao Ma, Regional Director of the ICAO APAC Office, Mr. Subash S., Deputy Regional Director of the ICAO APAC Office welcomed all the participants to the Meeting.

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

6.1 The ATM/SG recorded its actions in the form of Draft Conclusions, 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, Conclusions, Draft Decisions and Decisions

7.1 List of Draft Conclusions

Draft Conclusion ATM/SG/14-2: Adoption of Revised APAC Air Navigation Plan Volume III	
What: That, in accordance with *APANPIRG Conclusion 36/2,* the revised *APAC Air Navigation Plan Volume III* provided in **Appendix D** to the Report be adopted, and published on the ICAO APAC Office ANP webpage.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To incorporate changes from GANP 8th Edition and migration from *Asia/Pacific Seamless ANS Plan*, regional planning requirements, and to ensure harmonized guidance for development of NANPs.	Follow-up: ☒Required from States
When: 25-Nov-26	Status: Draft to be adopted by PIRG
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Draft Conclusion ATM/SG/14-4: Approval of the Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan	
What: That, the *Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan* provided in **Appendix G** to the Report be approved and be published on the ICAO APAC Office eDocuments webpage.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To provide regional strategy and guidance for the implementation of the FF-ICE/R1 within the APAC region.	Follow-up: ☒Required from States
When: 25-Nov-26	Status: Draft to be adopted by PIRG
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

<table>
<tr><td colspan="4">Draft Conclusion ATM/SG/14-5: Adoption of Asia/Pacific Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Timeline</td></tr>
<tr><td colspan="3">What: That, the following FF-ICE/R1 implementation timeline be adopted for the APAC region:
a) 2030: commencement of technical tests and trials involving eAUs and cross-border eASP interactions;
b) 2031: begin operational tests to identify and resolve any issues; and
c) 2032: full operationalization of three FF-ICE/R1 services (Filing Service, Flight Data Request Service and Notification Service).</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To ensure harmonized implementation of the FF-ICE/R1 within the APAC region.</td><td colspan="3">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 25-Nov-26</td><td colspan="3">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="4">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
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<table>
<tr><td colspan="4">Draft Conclusion ATM/SG/14-14: Adoption of the Asia/Pacific Region ATM Contingency Framework (RACF)</td></tr>
<tr><td colspan="3">What: That,
1. The Asia/Pacific Region ATM Contingency Framework (RACF), as contained in Appendix L to the Report be recommended to APANPIRG for adoption as the regional framework for ATM contingency planning and management; and
2. upon adoption by APANPIRG, the Asia/Pacific Region ATM Contingency Framework (RACF) replace the Asia/Pacific Region ATM Contingency Plan Version 3.0 (August 2019).</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Recognizing the need to modernize the existing regional ATM contingency arrangements and to strengthen harmonized contingency planning and coordination within and across ICAO regions.</td><td colspan="3">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 25-Nov-26</td><td colspan="3">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="4">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

7.2 List of Conclusions

<table>
<tr><td colspan="3">Conclusion ATM/SG/14-7: Adoption of APAC Regional Guidance Material for GNSS RFI and Associated Data Link Disruption Coordination and Reporting Procedures</td></tr>
<tr><td colspan="2">What: That, in accordance with Decision ATM/SG/12-8, the Asia/Pacific Regional Guidance Material for GNSS Radio Frequency Interference (RFI) and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0) provided in Appendix H to the Report be approved, and published on the ICAO APAC Office eDocuments webpage.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To establish a harmonized regional framework for the detection, reporting, coordination and information sharing of GNSS RFI and associated data link disruption events, thereby enhancing regional situational awareness and operational resilience.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 7-Aug-26</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>

<table>
<tr><td colspan="3">Conclusion ATM/SG/14-9: Regional Data Management Guidance Document</td></tr>
<tr><td colspan="2">What: That, the Regional Data Management Document at Appendix I to the Report be adopted as a guiding reference for data management, sharing, and use of operational and performance data across APAC DAG member States.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: While regional bodies like APEC, OECD, and ASEAN have data sharing guidelines, there is no overarching guidance for the wider APAC region. A survey by the AAC identified three key concerns among ANSPs: (a) absence of clearly defined data governance measures and risk of data misuse; (b) inconsistent data quality standards across states; and (c) differing data formats that require significant effort to standardise. A Regional Data Management Guidance Document is therefore essential to guide APAC DAG member states to adopt good data management practices and unlock the value of historical data for impactful use cases.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 7-Aug-26</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: APAC DAG</td></tr>
</table>

<table>
<tr><td colspan="3">Conclusion ATM/SG/14-10: Revised Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination</td></tr>
<tr><td colspan="2">What: That,
a) the revised Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination at Appendix J to the Report be adopted, and uploaded to the ICAO APAC Office eDocuments webpage to replace the existing version; and
b) States are urged to update national procedures to align with the revised Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: As space object activities increase in frequency and complexity, coordination procedures need refinement to maintain aviation safety.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 7-Aug-26</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>

<table>
<tr><td colspan="3">Conclusion ATM/SG/14-11: Adoption of Asia/Pacific Regional Guidance for Assessment of Airport Capacity and Airspace Capacity</td></tr>
<tr><td colspan="2">What: That, the Asia/Pacific Regional Guidance for Assessment of Airport and Airspace Capacity at Appendix K to the Report be adopted and uploaded to the ICAO APAC Office eDocuments webpage, for guidance and reference, by APAC States/Administrations in conducting airport and airspace capacity assessments in accordance with the provision of the Regional Framework for Collaborative ATFM.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To provide guidance for conducting airport and airspace capacity assessment and to improve understanding of the processes by cataloguing the best practices and models as adopted by APAC States/Administrations.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 7-Aug-26</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>

<table>
<tr><td colspan="3">Conclusion ATM/SG/14-12: Uploading the Revised AFTN/AMHS-based Interface Control Document</td></tr>
<tr><td colspan="2">What: That, the AFTN/AMHS-based Interface Control Document for ATFM (ICD) used by APAC States/Administrations to implement cross-border ATFM communications to be uploaded to the ICAO APAC Office eDocuments webpage, for guidance and reference, by APAC States/Administrations.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To enhance ATFM post-operations analysis and to improve regional interoperability by broadening the technical applicability of the ICD to conform with system requirements of all APAC States/Administrations.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 7-Aug-26</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>

<table>
<tr><td colspan="3">Conclusion ATM/SG/14-16: Withdraw Outdated Materials on CMAC/FUA from the ICAO APAC Office eDocuments Webpage</td></tr>
<tr><td colspan="2">What: That, the following documents be withdrawn from the ICAO APAC Office eDocuments webpage:
a) APAC Flexible Use of Airspace (FUA) Manual Template; and
b) Interim Guidance Material on Civil/Military Cooperation in Air Traffic Management.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: ICAO Doc 10088 provides more comprehensive guidance and contains more references to ICAO Annexes, Standards and Recommended Practices and guidance material where applicable.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 7-Aug-26</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>

7.3 List of Draft Decisions

<table>
<tr><td colspan="2">Draft Decision ATM/SG/14-1: Establish a Working Group to Review and Update the APAC Air Navigation Plan (ANP) Volume III</td></tr>
<tr><td>What: That, in order to support the continued improvement and maintenance of the APAC ANP Volume III, APANPIRG:
1. establish a Working Group, under the coordination of the ICAO APAC Office, to review and enhance the APAC ANP Volume III;
2. invite the interested States/Administrations and International Organizations to participate in the Working Group;
3. task the Working Group to:
a) conduct a comprehensive review of the APAC ANP Volume III considering the Asia/Pacific Seamless ANS Plan;
b) develop recommendations for future amendments to APAC ANP Volume III to ensure that regional priorities, implementation pathways, dependencies and performance expectations remain relevant and coherent; and
c) review the alignment between APAC regional priorities and ICAO global planning initiatives, including Global Air Navigation Plan (GANP), Minimum Implementation Path (MIP), and develop coordinated regional recommendations where appropriate; and
4. submit recommendations to ATM Sub-Group and APANPIRG for consideration.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To ensure that the APAC ANP Volume III remains current, coherent, implementation-oriented and responsive to evolving regional and global air navigation planning needs.</td><td>Follow-up: ☒Required from States</td></tr>
<tr><td>When: 25-Nov-26</td><td>Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="2">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

7.4 List of Decisions

<table>
<tr><td colspan="3">Decision ATM/SG/14-3: APAC Project 30/10 Task Force (AP30-10/TF) Terms of Reference (TOR)</td></tr>
<tr><td colspan="2">What: That, the AP30-10/TF TOR at Appendix F to the Report be adopted.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To support the Task Force in meeting its established objectives.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 7-Aug-26</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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<table>
<tr><td colspan="3">Decision ATM/SG/14-6: Establish Asia/Pacific Flight and Flow Information for a Collaborative Environment (FF-ICE) Implementation Task Force</td></tr>
<tr><td colspan="2">What: That, the APAC FF-ICE Ad-hoc Group be dissolved, and the APAC FF-ICE Implementation Task Force be established to support the FF-ICE/R1 deployment in the APAC region. The APAC FF-ICE Implementation Task Force will:
a) monitor and drive FF-ICE/R1 implementation in the APAC region in accordance with the Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan and the regional implementation timeline;
b) provide a forum for States to raise and coordinate any operational and technical issues arising from FF-ICE/R1 deployment;
c) be responsible for the update and refinement of the Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan;
d) report the implementation progress of FF-ICE/R1 services across APAC States/Administrations; and
e) collaborate with relevant APANPIRG contributory bodies, including the ATFM & A-CDM Steering Group and the SWIM Task Force, as required.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To support APAC States/Administrations in the implementation of FF-ICE/R1 services in accordance with the agreed regional implementation timeline and the APAC Regional FF-ICE/R1 Implementation Plan.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 7-Aug-26</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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<tr><td colspan="3">Decision ATM/SG/14-8: Dissolution of the Procedures for GNSS and Data Link Disruption Ad Hoc Group</td></tr>
<tr><td colspan="2">What: That, having completed the work assigned under Decision ATM/SG/12-8, including the development of the Asia/Pacific Regional Guidance for GNSS Radio Frequency Interference (RFI) and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0), the Procedures for GNSS and Data Link Disruption Ad Hoc Group be dissolved.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: The Ad Hoc Group has fulfilled its Terms of Reference and completed its primary deliverable. Ongoing monitoring, analysis of GNSS RFI events, identification of trends and hotspots, and future maintenance of the guidance material can be undertaken through existing regional mechanisms.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 7-Aug-26</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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<table>
<tr><td colspan="3">Decision ATM/SG/14-13: Establishment of the Asia/Pacific Region ATM Contingency Framework (RACF) Task Force</td></tr>
<tr><td colspan="2">What: That, in order to support the implementation and continuous development of the Asia/Pacific Region ATM Contingency Framework (RACF), the ATM Sub-Group establishes the Asia/Pacific Region ATM Contingency Frameworks (RACF) Task Force with the following initial terms of reference:
a) develop standardized regional Contingency Procedures and Arrangements (CPAs);
b) develop, maintain and periodically review the Asia/Pacific regional contingency risk register;
c) review lessons learned from contingency events and propose amendments to the RACF, as appropriate;
d) support harmonization of the RACF with corresponding frameworks developed by other ICAO regions; and
e) report progress and recommendations to future meetings of the ATM Sub-Group.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Recognizing that the implementation and continuous improvement of the APAC RACF will require continued collaboration among States and international organizations to develop standardized CPAs, the regional contingency risk register, and future enhancements to the RACF.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 7-Aug-26</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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<table>
<tr><td colspan="3">Decision ATM/SG/14-15: Establish APAC Flexible Use of Airspace Task Force</td></tr>
<tr><td colspan="2">What: That, the APAC Flexible Use of Airspace Task Force be established to develop regional guidance material that include but not limited to, the following tasks:
a) develop a regional template for airspace use plan (AUP) and updated airspace use plan (UUP) for FUA operations;
b) review and update the APAC document on NOTAM Templates for FUA in accordance with the relevant ICAO provisions and the guidance;
c) develop procedures to support efficient and effective promulgation of airspace use information, including machine readable output format; and
d) review and/or develop regional Key Performance Indicators (KPIs) to measure FUA effectiveness.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To develop regional guidance material, within the ICAO regulatory framework, to harmonize and enhance FUA implementation in APAC region.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 7-Aug-26</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 – ATM/SG/14

Agenda Item 1: Adoption of Provisional Agenda

Provisional Agenda (WP/01)

1.1 The provisional agenda was adopted by the Meeting. The Meeting noted IP/01 (List of Working and Information Papers).

Agenda Item 2: Review of Related High Level Meetings

ATM/SG/13, APANPIRG/36 and DGCA/60 Outcomes (WP/02)

2.1 The Meeting noted the information presented by the Secretariat on the outcomes of the Thirteenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/13), the Thirty-Sixth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/36) and the 60th Conference of Directors General of Civil Aviation, Asia and Pacific Regions (DGCA/60). It recalled the Conclusions and Decisions adopted by ATM/SG/13 and those subsequently endorsed by APANPIRG/36, including the establishment of the APAC Project 30/10 Task Force, updates to the Terms of Reference (TOR) of the ATM Sub-Group and Aeronautical Information Services – Aeronautical Information Management. Implementation Task Force (AAITF), the renaming of the Air Traffic Flow Management Steering Group (ATFM/SG), the adoption of the APAC Flight and Flow Information for a Collaborative Environment (FF-ICE) Ad Hoc Group TOR, and various Conclusions relating to the *Asia/Pacific Seamless ANS Plan*, collaborative Air Traffic Flow Management (ATFM), System-Wide Information Management (SWIM), Trajectory-based Operations (TBO), contingency coordination, Search and Rescue (SAR), Airport Collaborative Decision Making (A-CDM), and annual monitoring and reporting arrangements.

2.2 Regarding the use of Conclusions and Decisions across APANPIRG Sub-Groups, the Secretariat advised that, following concerns raised at ATM/SG/13, it had coordinated with the Secretariats of the other Sub-Groups. It had subsequently been agreed to apply the guidance contained in the APANPIRG Handbook to promote a common understanding and, to the extent practicable, greater consistency in the preparation and use of Draft Conclusions, Draft Decisions, Conclusions and Decisions.

2.3 The Meeting also noted the strategic discussions and Action Items arising from DGCA/60 relating to the implementation of TBO, ATFM, SWIM, data-driven ATM, Global Navigation Satellite System (GNSS) Radio Frequency Interference (RFI), contingency preparedness, meteorological support for ATFM, and future airspace management concepts. The Meeting recognised that these initiatives would support the implementation of the *Asia/Pacific Seamless ANS Plan* and noted that the relevant Action Items had been referred to the appropriate APANPIRG Sub-Groups for follow-up, as appropriate.

Outcomes from FIT-Asia/16 and RASMAG/31 (WP/03)

2.4 The Sixteenth Meeting of the FANS Interoperability Team-Asia (FIT-Asia/16) and the Thirty-First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/31) were held in Bangkok, Thailand, from 9 to 11 June 2026 and 29 June to 3 July 2026, respectively.

FIT-Asia/16 Outcomes

Asia/Pacific Region Combined PBCS Monitoring Report

2.5 Indonesia and Malaysia presented the aggregated data link performance monitoring report for the APAC region. The 95 per cent criterion was met in all Flight Information Regions (FIRs). All FIRs achieved marginal performance (99.0–99.89 per cent) in both halves of 2025, except VABF during the first half of the year. VABF improved in the second half and achieved marginal performance. CPDLC performance across the APAC region remained strong throughout 2025. All reporting FIRs met the 95 per cent Actual Communication Performance (ACP) and Actual Communication Technical Performance (ACTP) criteria, and most achieved the 99.9 per cent criteria, demonstrating stable performance across the region, including in high-volume FIRs.

Regional PBCS Implementation Update

2.6 States and Air Navigation Service Providers (ANSPs) implementing Performance-based Communication and Surveillance (PBCS) were expected to complete annually all survey sections (Groups A–E) of the *Survey of the Status of Current and Planned Implementation of Performance-Based Horizontal Separation Minima*, while States and ANSPs not yet implementing PBCS were encouraged to complete Groups D and E to indicate future plans, readiness, and approvals. It was noted that aircraft and operator approvals by the State of the Operator or State of Registry might still have been required to enable accurate PBCS capability reporting in flight plans where such procedures were applied.

RASMAG/30 Meeting Outcomes

APAC Consolidated Safety Report

2.7 The Monitoring Agency for the Asian Region (MAAR) presented a combined summary of the safety analysis results for the APAC region, on behalf of the APAC Regional Monitoring Agencies (RMAs) and En-route Monitoring Agencies (EMAs). The APAC Consolidated Safety Report could be found in **ATM/SG/14 WP/03 Appendix A**.

2.8 The estimated vertical collision risk for 2025 for the Pacific area did not meet the Target Level of Safety (TLS) **(Table 1).** There was a total of 147 Large Height Deviations (LHDs) in the Pacific area in 2025 (increased from 139 in 2024), with total duration 383.1 minutes and 33 levels crossed.

Table 1. Pacific Area Vertical Collision Risk 2025

Pacific Area Estimated annual flying hours = 3,840,508 hours *(Note: estimated hours based on December 2025 TSD)*		
Source of Risk	**Risk Estimation**	**Comparison with TLS**
Vertical Technical Risk	0.22×10^{-9}	Below technical TLS
Operational Risk	5.45×10^{-9}	-
Total Risk	$\mathbf{5.67 \times 10^{-9}}$	**Above TLS**

2.9 The estimated horizontal collision risk for 2025 for the Pacific area met TLS in all lateral and longitudinal risk categories. There was a total of 221 Large Lateral Deviations (LLDs) and Large Longitudinal Errors (LLEs) in the Pacific area in 2025 (increased from 171 in 2024), with a total duration of 602.5 minutes and total horizontal deviation of 1,603 NM.

2.10 The estimated vertical collision risk for 2025 for the Asia area met TLS (**Table 2**). There was a total of 813 LHDs in the Asia area in 2025 (increased from 763 in 2024), with total duration 384.1 minutes and 252.8 levels crossed.

Table 2. Asia Area Vertical Collision Risk 2025

Asia Area **Estimated annual flying hours = 11,115,453 hours** ***(Note: estimated hours based on December 2025 TSD)***		
Source of Risk	**Risk Estimation**	**Comparison with TLS**
Vertical Technical Risk	0.84×10^{-9}	Below technical TLS
Operational Risk	0.71×10^{-9}	-
Total Risk	$\mathbf{1.55 \times 10^{-9}}$	**Below TLS**

2.11 The estimated horizontal collision risk for 2025 for the Asia area met TLS in all lateral and longitudinal risk categories. There was a total of seven LLDs and LLEs in the Asia area in 2025 (increased from three in 2024), with a total duration of zero minutes and total horizontal deviation of 97 NM.

Hot Spots for RASMAG

2.12 RASMAG/31 agreed to the followings:

a) Hot Spots D1 (Fukuoka/Manila) and J (Jakarta/Kota Kinabalu/Singapore) proposed for removal;

b) Hot Spot D7 (Kota Kinabalu/Manila) as potential non-hot spot due to the number of reported LHDs and risk level were below hot spot criteria, and mitigation measures implemented; and

c) Hot Spot P (Jakarta/Ujung Pandang) as new hot spot.

ATM and Airspace Safety Deficiencies List

2.13 The following recommendations to be submitted to APANPIRG/37 based on the outcomes of RASMAG/31, together with additional information provided by States and MAAR, as of 17 July 2026:

a) to be retained in the Deficiencies list:

Safety Reporting Deficiencies

i) **Afghanistan** [Failure to submit Kabul FIR Large Height Deviation (LHD) data and traffic sample data (TSD)].

Long Term Height Monitoring (LTHM) Requirement Deficiencies

i) **Afghanistan** (Remaining monitoring burden of 50%, RASMAG/31).

ii) **India** (Remaining monitoring burden of 48%, RASMAG/31).

b) removal of Deficiency:

LTHM Requirement Deficiencies

i) **Nepal** (Remaining monitoring burden of 11%, RASMAG/31).

c) add new Deficiency:

LTHM Requirement Deficiencies

i) **Cook Islands** (Remaining monitoring burden of 100%, RASMAG/31);

ii) **Pakistan** (Remaining monitoring burden of 32%, RASMAG/31); and

iii) **Vanuatu** (Remaining monitoring burden of 100%, RASMAG/31).

2.14 The recommendation reflects the status as of 17 July 2026. Should accurate updates be provided to the Secretariat and MAAR, by 19 October 2026, the Secretariat would exclude such items from the recommendations to APANPIRG/37.

Transfer of RVSM Safety Assessment and Monitoring Responsibilities of Hong Kong China and Macao China to China RMA

2.15 RASMAG/31 reviewed and discussed the proposal from China RMA for the transfer of RVSM safety assessment and monitoring responsibilities for Hong Kong China and Macao China from MAAR to China RMA. The Meeting noted that the transfer would consolidate RVSM safety assessment and monitoring services under China RMA, leveraging existing coordination mechanisms and regional cooperation to strengthen safety oversight. A structured transition plan was presented, under which MAAR would retain responsibilities until RASMAG/31, followed by a data handover and transition period from mid-2026 to the end of 2026. China RMA would progressively assume operational duties with MAAR's support, with full implementation scheduled for 1 January 2027.

2.16 Following discussion, RASMAG/31 agreed to ***Draft Conclusion RASMAG/31-3: Transfer of RVSM Safety Assessment and Monitoring Responsibilities of Hong Kong, China and Macao, China from MAAR to China RMA***, for APANPIRG/37 consideration.

Removal of the Asia/Pacific Region En-Route Monitoring Agency (EMA) Handbook from the ICAO APAC Office Website

2.17 RASMAG/31 agreed that, in line with ***Conclusion RASMAG/22-9***, the *Manual on Monitoring the Application of Performance-based Horizontal Separation Minima* (ICAO Doc 10063) was intended to replace the *EMA Handbook* and continued publication of both documents could create unnecessary duplication and confusion. In view of the *EMA Handbook* removal, RASMAG/31 determined that a mechanism was required to record regionally agreed changes to ICAO Doc 10063 pending formal amendment, and consequently agreed to ***Conclusion RASMAG/31-1: Establishment of RASMAG Conclusions/Decisions Tracking List on Monitoring the Application of Performance-based Horizontal Separation Minima***.

Revision of the Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace

2.18 MAAR presented a proposed revision of the *Guidance Material for the Continued Safety Monitoring of the Asia-Pacific RVSM Airspace*, which incorporated recent developments and decisions endorsed by APAC monitoring agencies and relevant RASMAG meetings. Upon its review, RASMAG/31 agreed to ***Conclusion RASMAG/31-2: Guidance Material for the Continued Safety Monitoring of the Asia Pacific RVSM Airspace Version 4.0***.

RASMAG Terms of Reference (TOR)

2.19 RASMAG/31 reviewed the RASMAG TOR and agreed that it should be revised to more accurately reflect RASMAG's objectives and responsibilities as an APANPIRG contributory body, particularly with respect to the identification, review and updating of the APANPIRG Air Navigation Deficiencies List. Consequently, RASMAG/31 agreed to ***Draft Decision RASMAG/31-4: Update Regional Airspace Safety Monitoring Advisory Group (RASMAG) Terms of Reference (TOR)***, for APANPIRG/37 consideration.

Agenda Item 3: Performance Frameworks and Metrics

3.0 USOAP

ANS USOAP Update (WP/04)

3.0.1 The Secretariat provided information on the ICAO Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA). The paper provided update of the 2024 edition of the USOAP CMA Protocol Questions (PQs), and annual update of the regional USOAP Air Navigation Services (ANS) implementation status.

3.0.2 The Meeting noted the comparison of the PQs in the 2020 and 2024 editions and number of changes for the ANS audit area. To facilitate Member States and international organizations to easily identify the changes introduced in the 2024 edition of the PQs, ICAO had posted the track-changes version of the PQs in pdf format in the "CMA Library" of the USOAP CMA OLF (https://www.icao.int/usoap) under the heading of "USOAP Protocol Questions".

3.0.3 The APAC region ANS Effective Implementation (EI) as of 14 July 2026 was 68.69 per cent, which was slightly above the global average of 65.18 per cent. It was noted that a total of 21 APAC States achieved an ANS EI equal to or above the regional average.

3.0.4 The Meeting was informed that the ICAO Significant Safety Concern (SSC) Validation Committee, in accordance with the mechanism approved by the Council, had determined that Bhutan's corrective actions had effectively resolved the immediate risk associated with the SSC finding. As a result, the SSC had been removed from the ICAO USOAP CMA online framework.

3.0.5 The Meeting congratulated Bhutan on its successful efforts to address and resolve the SSC, and commended the commitment and dedication demonstrated by Bhutan in implementing the necessary corrective actions to enhance aviation safety oversight.

Agenda Item 3: Performance Frameworks and Metrics

3.1 APAC ANP Plan and APAC Seamless ANS Plan

Establishment of a Small Working Group to Review and Update the Asia/Pacific Seamless ANS Plan (WP/05)

3.1.1 Singapore presented the proposal to establish a Small Working Group (SWG) to review and update the *Asia/Pacific Seamless ANS Plan* prior to its migration into the *APAC Air Navigation Plan (ANP) Volume III*.

3.1.2 It was noted that while selected elements of the *Asia/Pacific Seamless ANS Plan* had been incorporated into the draft *APAC ANP Volume III* (**ATM/SG/14 WP/07** referred), key planning constructs, implementation pathways, transition arrangements, and linkages between operational objectives and enabling capabilities had not been fully reflected. The discussion highlighted the risk that *APAC ANP Volume III* could become primarily a monitoring and prioritization tool rather than a comprehensive regional planning framework, potentially resulting in inconsistent interpretation and implementation across States/Administrations.

3.1.3 The need for a coordinated and systematic review to ensure that the future *APAC ANP Volume III* remained coherent, current, and aligned with the latest *Global Air Navigation Plan* (GANP), Aviation System Block Upgrades (ASBUs) framework, regional priorities, and emerging concepts such as SWIM, FF-ICE, and TBO was highlighted. It was proposed that the SWG be established to review traceability between *Asia/Pacific Seamless ANS Plan* elements and *APAC ANP Volume III* objectives, reassess ASBU priorities and timelines, and recommend an appropriate transition approach.

3.1.4 ICAO, while supporting the establishment of a SWG, proposed a shift in its primary objective. Thailand sought clarification on the rationale to progress with the adoption of *APAC ANP Volume III* given the ongoing work by ICAO Headquarters (HQ) on a revised template for *ANP Volume III* and queried whether it would be appropriate to first review and update the *Asia/Pacific Seamless ANS Plan*. The Secretariat reminded the Meeting of the ***APANPIRG Conclusion 36/2***, which approved an action plan for updating *APAC ANP Volume III*. The Secretariat further noted that the revised template was unlikely to be available before 2028 and that the *APAC ANP Volume III* had therefore been updated by translating appropriate content from the *Asia/Pacific Seamless ANS Plan Version 4.0* and remapping the GANP ASBU elements in line with the GANP 8th Edition. The Secretariat clarified that elements of the *Asia/Pacific Seamless ANS Plan* would be reviewed by the proposed SWG and, where appropriate, mapped into *ANP Volume III*.

3.1.5 The Secretariat informed that developing and maintaining a static regional guidance document, such as the *Asia/Pacific Seamless ANS Plan*, was not considered a sustainable use of limited resources. The Secretariat further noted that APAC region remained the only ICAO region without a planning framework in the *ANP Volume III* and recommended that the proposed working group focus on review and updating the *APAC ANP Volume III*.

3.1.6 Given that the draft had already been reviewed by other APANPIRG Sub-Groups, the Meeting suggested that the draft *APAC ANP Volume III* presented in **ATM/SG/14 WP/07** be adopted as a preliminary version and that the proposed small working group be elevated to the status of a working group, with appropriate nominations from States/Administrations and International Organizations, comprising relevant experts in ATM, aerodromes, Communication, Navigation and Surveillance (CNS), and Meteorology (MET), to conduct a comprehensive review of *the Asia/Pacific Seamless ANS Plan* and the *APAC ANP Volume III*.

3.1.7 The Meeting, after discussion, adopted the following Draft Decision:

Draft Decision ATM/SG/14-1: Establish a Working Group to review and update the APAC Air Navigation Plan (ANP) Volume **III**

That, in order to support the continued improvement and maintenance of the *APAC ANP Volume III*, APANPIRG:

1. establish a Working Group, under the coordination of the ICAO APAC Office, to review and enhance the *APAC ANP Volume III*;
2. invite the interested States/Administrations and International Organizations to participate in the Working Group;
3. task the Working Group to:

a) conduct a comprehensive review of the *APAC ANP Volume III* considering the *Asia/Pacific Seamless ANS Plan*;

b) develop recommendations for future amendments to APAC ANP Volume III to ensure that regional priorities, implementation pathways, dependencies and performance expectations remain relevant and coherent; and

c) review the alignment between APAC regional priorities and ICAO global planning initiatives, including *Global Air Navigation Plan (GANP)*, Minimum Implementation Path (MIP), and develop coordinated regional recommendations where appropriate; and

d) submit recommendations to ATM Sub-Group and APANPIRG for consideration.

3.1.8 The draft TOR of the proposed APAC ANP Volume III Review Working Group was provided in **Appendix C** to the Report, and would be further discussed at the Working Group's inaugural meeting.

APAC Regional Priorities and the Relationship with the ICAO MIP (WP/06)

3.1.9 Singapore presented information on the ICAO MIP and its alignment with the APAC regional priorities as reflected in the *Asia/Pacific Seamless ANS Plan*. The Meeting noted that the objective of the MIP was to establish a global baseline of minimum interoperable capabilities and associated implementation timelines supporting the future evolution of the air navigation system, with an initial target of achieving "Evolutionary Step 2" capabilities by 2035.

3.1.10 The Meeting was reminded of the categorization of implementation priorities under the *Asia/Pacific Seamless ANS Plan* and the current status of implementation within the region. It was noted that several critical Priority 1 elements in the *Asia/Pacific Seamless ANS Plan* were not currently included in the proposed MIP. These included key operational capabilities such as Airport Collaborative Decision-Making (A-CDM), Free Route Operations (FRO), PBN procedures, and safety nets, as well as foundational information-sharing and communication capabilities including meteorological products, Air Traffic Services Interfacility Data Communication (AIDC), and VDL Mode 0/A. Conversely, the Meeting noted that a number of capabilities included in the initial MIP proposal, such as FPL2012 filing services and SWIM data consumption and provision, were not identified as Priority 1 elements in the *Asia/Pacific Seamless ANS Plan*.

3.1.11 The Meeting further noted the importance of addressing implementation dependencies within the MIP framework. As an example, AIDC (FICE-B0/1) was identified as a prerequisite capability for the implementation of the candidate MIP element FICE-B3/2, despite not being included in the current MIP proposal. In this regard, the Meeting was invited to consider whether implementation dependencies should be explicitly incorporated into the MIP to provide a clear and comprehensive implementation pathway, or whether the MIP should focus solely on core target capabilities, leaving States to identify and implement any necessary enabling capabilities independently.

3.1.12 The Meeting was invited to review, consider and discuss the following issues:

a) to review the *Asia/Pacific Seamless ANS Plan* priorities to ensure that they continued to reflect current operational requirements and implementation realities;

b) to provide regional input on the capabilities considered essential for global interoperability and inclusion in the MIP;

c) to consider how implementation dependencies should be reflected in the final MIP framework and whether the MIP should serve as a complete implementation pathway or a high-level set of target capabilities; and

d) in view of the planned adoption of the MIP by the ICAO Assembly in 2028, the importance of active APAC participation in shaping the definition of future global minimum capabilities was emphasized.

3.1.13 The Meeting, after discussion, in lieu of the proposed **Draft Decision ATM/SG/14-1**, agreed to include the following tasks as part of the draft TOR for the proposed APAC ANP Volume III Review Working Group:

a) conduct a comprehensive review of the *APAC ANP Volume III* considering the *Asia/Pacific Seamless ANS Plan*;

b) develop recommendations for future amendments to *APAC ANP Volume III* to ensure that regional priorities, implementation pathways, dependencies and performance expectations remain relevant and coherent; and

c) review the alignment between APAC regional priorities and ICAO global planning initiatives, including GANP, MIP, and develop coordinated regional recommendations where appropriate; and

d) submit recommendations to ATM Sub-Group and APANPIRG for consideration.

3.1.14 This approach ensured that the collective effort generated enduring value rather than a document that would have required constant updates.

Update of APAC ANP Volume III (WP/07)

3.1.15 The Secretariat presented the draft *APAC ANP Volume III*, which had incorporated the performance improvement expectations, related ASBU threads, elements, and priorities contained in the *Asia/Pacific Seamless ANS Plan*. The Meeting was provided with an overview of the development of *APAC ANP Volume III* and its relationship with the *Asia/Pacific Seamless ANS Plan*, and noted that maintaining two separate regional planning documents required significant resources. The Meeting further noted ongoing ICAO efforts to develop a globally harmonized template for *ANP Volume III* to support a standardized performance management framework across all ICAO regions and facilitate future approval by the ICAO Council. Pending the implementation of the global template, the ICAO APAC Office had undertaken actions to update *APAC ANP Volume III* to reflect the latest regional priorities and planning requirements.

3.1.16 The Meeting noted ***APANPIRG/36 Conclusion 36/2***, which agreed to the following action plan for updating the *APAC ANP Volume III*.

a) ICAO Secretariat to incorporate editorial amendments to Part 0 and Part I, with an expected completion date in Q1 2026;

b) ICAO Secretariat, in consultation with APANPIRG Subgroups and other contributory bodies, review and agree with the ASBU elements expected priority for implementation within the APAC Region, with an expected completion date in Q2 2026;

c) APANPIRG Subgroups review and endorse the ASBU elements expected priority for implementation within the APAC Region, with an expected completion date in Q3 2026; and

d) adoption of updated draft APAC ANP Volume III by APANPIRG/37, in Q4 2026.

3.1.17 The Meeting was informed that, following extensive internal consultations, the Secretariat had prepared a draft update of the *APAC ANP Volume III* incorporating updated regional priorities aligned with GANP 8th Edition. The draft was circulated to APAC States/Administrations for review, and comments received from Australia, China, Hong Kong China, Japan, Singapore, Sri Lanka, and the United States had been incorporated, as appropriate, into the revised draft presented to the Meeting.

3.1.18 It was noted that the ASBU threads and elements contained in *Asia/Pacific Seamless ANS Plan Version 4.0* had been reviewed and updated in accordance with the ASBU nomenclature of the GANP 8th Edition. This review included the introduction of additional Block 3 elements, the deferment of certain elements to later blocks, and revisions to the maturity levels of several elements. Consequently, several ASBU elements previously categorized under Block 2 in the *Asia/Pacific Seamless ANS Plan Version 4.0* had been reclassified to Block 3 or Block 4 and were therefore not included in the implementation planning reflected in the updated *APAC ANP Volume III*. The Meeting also noted that the current version of *APAC ANP Volume III* had been expanded beyond its previous scope, which had only incorporated ASBU elements from Blocks 0 to 2.

3.1.19 **Table 3** provided the changes in the ASBU elements compared with the *Asia/Pacific Seamless ANS Plan Version 4.0*, resulting from updates to the GANP 8th Edition.

Table 3. Changes in ASBU Elements in GANP 8th Edition

ASBU Thread	Asia/Pacific Seamless ANS Plan Version 4.0	GANP 8th Edition	Priority in Asia/Pacific Seamless ANS Plan Version 4.0
ACDM	ACDM-B1/1 to B1/2	ACDM-B2/1 to B2/3	2
APTA	APTA-B1/1, B1/2, B1/4, B1/5	APTA-B2/5, B2/6, B2/7, B2/8	3
	APTA-B2/2	Removed	3
	APTA-B2/4	APTA-B3/3	3
CSEP	CSEP-B2/1 to B2/3	CSEP-B3/3, B3/4, B3/5	3
FRTO	FRTO-B1/6	FRTO-B2/5	2
	FRTO-B1/7	**Removed**	2
	FRTO-B2/1, B2/2	FRTO-B3/1, B3/2	3
NOPS	NOPS-B2/1, B2/2	NOPS-B3/4, B3/5	3
	NOPS-B2/4, B2/5	NOPS-B3/6, B3/7	3
	NOPS-B2/7, B2/8	NOPS-B4/1, B4/2	3
SURF	SURF-B1/5	SURF-B4/1	2
TBO	TBO-B0/1, B1/1, B2/2-B2/2	**Removed**	2
DAIM	DAIM-B1/2 to B1/5	DAIM-B2/6- B2/9	1
	DAIM-B1/6	DAIM-B3/1	1
	DAIM-B1/7	DAIM-B2/10	2
	DAIM-B2/2	DAIM-B3/2	3
	DAIM-B2/3	DAIM-B4/1	3
	DAIM-B2/4	DAIM-B3/3	3
	DAIM-B2/5	DAIM-B3/4	3
ASUR	ASUR-B2/2	ASUR-B3/2, ASUR-B3/3	3

ASBU Thread	Asia/Pacific Seamless ANS Plan Version 4.0	GANP 8th Edition	Priority in Asia/Pacific Seamless ANS Plan Version 4.0
COMI	COMI-B1/3	COMI-B3/5	2
	COMI-B2/1	COMI-B4/1	3
	COMI-B2/2	COMI-B3/6	3
COMS	COMS-B1/3	COMS-B3/3	2
NAVS	NAVS-B2/1	NAVS-B4/1	3

3.1.20 **Table 4** presented the ATM-related ASBU elements and their associated priorities. The Meeting emphasized the importance of periodically reviewing the ATM-related ASBU elements and priorities to ensure their continued relevance to regional operational needs and global planning developments. ATM/SG was encouraged to review these elements on a regular basis and, where necessary, process amendments in accordance with the established regional procedures.

Table 4. ATM-related ASBU Elements

Functional Category	ASBU Element in Asia/Pacific Seamless ANS Plan Version 4.0	Description	ASBU Element in GANP 8th Edition	Priority
Information	DAIM	Digital Aeronautical Information	DAIM-B1/1, DAIM-B2/6-B2/9	1
		NOTAM Improvements	DAIM-B2/10	2
		AIS in SWIM Environment	DAIM-B2/1	3
Operational	ACDM	Airport CDM Information Sharing	ACDM-B0/1	1
		Airport CDM and ATFM integration	ACDM-B0/2	2
		Airport CDM Integration with ATM Network, AOP and APOC	ACDM-B2/1-B2/3	2
	CSEP	basic airborne situational awareness AIRB and VSA, and performance-based horizontal separations	CSEP-B1/1 to B1/4	2
	DATS	Digital Aerodrome Air Traffic Services	DATS-B1/1	3
	FRTO	Direct routing, airspace planning and FUA, flexible routings, and basic conflict detection and conformance monitoring	FRTO-B0/1 to B0/4	1
		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	FRTO-B1/1 to B1/5, FRTO-B2/5	2

Functional Category	ASBU Element in Asia/Pacific Seamless ANS Plan Version 4.0	Description	ASBU Element in GANP 8th Edition	Priority
		Integrated ATFM and ATC Planning, Dynamic Airspace Configuration, Cross-border FRA, Enhanced Conflict Resolution Tools	FRTO-B2/3-B2/4	3
	NOPS	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	NOPS-B0/1 to B0/5	1
		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	NOPS-B1/1 to NOPS-B1/10	2
		Collaborative Network Operation Planning	NOPS-B2/3	3
		ATFM for cross border FRA	NOPS-B2/6	3
	OPFL	ITP	OPFL-B0/1	3
		CDP	OPFL-B1/1	3
		Separation minima using ATS surveillance systems where VHF voice communications are not available	OPFL-B2/1	3
	RSEQ	Arrival and Departure Management	RSEQ-B0/1-B0/2	1
		Point Merge	RSEQ-B0/3	3
		Extended arrival metering	RSEQ-B1/1	2
		Integration of arrival and departure management	RSEQ-B2/1	3

3.1.21 The Meeting was informed about the *Asia/Pacific Trajectory-based Operations (TBO) Roadmap* and the *Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan*. It was informed that these two regional guidance documents supplement the global concepts and focus on regional implementation aspects bridging the gap between ICAO's global guidance and the specific needs of APAC States/Administrations. The *APAC ANP Volume III* referenced these regional guidance documents while defining the regional priorities and associated timelines. The two documents would be made available on the ICAO APAC Office website.

3.1.22 It was informed that the Secretariat had presented the draft *APAC ANP Volume III* to the Thirtieth Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/30, Bangkok, Thailand, 6 – 10 July 2026) of APANPIRG and Thirtieth Meeting of the Asia/Pacific Meteorology Sub-Group (MET SG/30, Bangkok, Thailand, 20 – 24 July 2026) of APANPIRG, and their respective feedback. The Meeting was also informed that the draft *APAC ANP Volume III* would be presented to AOP/SG at the Tenth Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/10, Bangkok, Thailand, 10 – 14 August 2026), for review and endorsement.

3.1.23 The Meeting reviewed and discussed the draft *APAC ANP Volume III*, as provided in **ATM/SG/14 WP/07 Appendix A**, and noted that the document had been updated by translating appropriate content from the *APAC Seamless ANS Plan Version 4.0* and remapping the GANP ASBU elements in line with the GANP 8th Edition. Following the review, the Meeting endorsed the following Draft Conclusion:

Draft Conclusion ATM/SG/14-2: Adoption of Revised APAC Air Navigation Plan Volume III

That, in accordance with *APANPIRG Conclusion 36/2*, the revised *APAC Air Navigation Plan Volume III* provided in **Appendix D** to the Report be adopted, and published on the ICAO APAC Office ANP webpage.

<u>ASEAN ANS Master Plan as a Regional Reference for Seamless ATM (WP/08)</u>

3.1.24 Singapore, on behalf of ASEAN, presented the *ASEAN Air Navigation Services (ANS) Master Plan* as a regional reference framework for achieving seamless ATM across the APAC region.

3.1.25 Information was provided on the *ASEAN ANS Master Plan*, which serves as a roadmap for the harmonized modernization of ANS systems among ASEAN Member States. The *ASEAN ANS Master Plan* encompasses key regional initiatives, including ATFM, Aeronautical Information Management (AIM), Common Aeronautical Virtual Private Network (CRV), SWIM and FF-ICE. These initiatives support cross-border information exchange, common situational awareness, collaborative decision-making, and regional network operations. It was further noted that the fourth edition of the *ASEAN ANS Master Plan*, targeted for adoption by the end of 2026, would incorporate additional information-centric capabilities, including FF-ICE notification services and meteorological information exchange in a SWIM environment.

3.1.26 The relevance of the *ASEAN ANS Master Plan* to the ongoing development of the ICAO MIP and the review of the *Asia/Pacific Seamless ANS Plan* was emphasized. ASEAN Member States indicated their readiness to share the fourth edition of the *ASEAN ANS Master Plan*, once finalized, with the ICAO GANP Study Group, ICAO APAC Office, and APANPIRG to support regional and global harmonization efforts.

3.1.27 The Meeting commended the work undertaken by the ASEAN Member States in developing the *ASEAN ANS Master Plan* and welcomed ASEAN's offer to share the finalized Fourth Edition of the *ASEAN ANS Master Plan* for consideration as a reference in the ongoing review of the *APAC ANP Volume III*.

Regional Air Navigation Plan Update (WP/09)

3.1.28 The Secretariat presented an update on the progress of incorporating coordinate data for FIRs and Search and Rescue Regions (SRRs) in the *APAC ANP Volume I*. States should note that ICAO Doc 9673 did not provide a legal description of the FIRs in the first place, therefore, it was very important for States to understand that this process of checking, alignment and validation was crucial if they would like a formal basis for their FIRs.

3.1.29 The exercise to review the ANP with FIR and SSR coordinates should be based on ICAO historical records and not new proposals for changes. The Proposal for Amendments (PfA) process for FIRs and SRRs was the same process of approval in *ANP Volume I* (approval of the Council). Some States had submitted major amendments to their FIRs during the review process. These would 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.

3.1.30 The Meeting noted that 30 FIRs and 15 SRRs PfAs were approved by the President of the Council and incorporated in the Table ATM I-1 and Table SAR I-1 respectively, of the *APAC ANP Volume I*, and that there were issues in some areas affecting the resolution of FIRs/SRRs affecting progress and urged States/Administrations to provide updates of any bilateral/trilateral discussion of unresolved FIR boundaries.

3.1.31 The Chairperson encouraged the concerned States to provide updates on any bilateral or multilateral discussions regarding unresolved FIR/SRR boundaries.

3.1.32 Pakistan informed the Meeting that it would continue coordinating with India to resolve the outstanding FIR boundary matters between the Lahore/Karachi FIRs and the Delhi FIR.

Agenda Item 4: Air Navigation Service Deficiencies

Update on the Airspace Classification of Macao, China (WP/10)

4.1 The Meeting noted that Macao China had made significant progress in addressing the ICAO Annex 11 airspace classification deficiency previously identified under APANPIRG. It was reported that the airspace supporting operations at Macau International Airport had been designated as an Aerodrome Traffic Zone (ATZ) and classified as Class C airspace, with the applicable standards and requirements established under Aeronautical Circular AC/ATS/003R05, which was empowered by the Air Navigation Regulation, as amended in May 2026. Macao, China further advised that the characteristics of the ATZ were being updated to ensure full compliance with the specifications of ICAO Annex 11, and that the corresponding Aeronautical Information Publication (AIP) amendment had been scheduled for publication on 20 August 2026. In view of the corrective actions undertaken to address the identified deficiency, Macao China proposed the removal of the associated deficiency from the APANPIRG Air Navigation Deficiencies List.

Corrective Actions Taken by Solomon Islands to Address Air Navigation Service Deficiency (WP/11)

4.2 The Meeting was informed that Solomon Islands had undertaken corrective actions to address the long-standing APANPIRG Air Navigation Deficiency related to airspace classification, which had remained unresolved since 7 July 1999. It was reported that, following the establishment of the Civil Aviation Authority of Solomon Islands (CAASI), the Government had worked with Airservices Australia to develop and implement Class A and Class G airspace classifications, supported by operational Letters of Agreement (LOA) governing airspace procedures.

4.3 Solomon Islands advised that sufficient evidence had been gathered through consultations with the ATS provider, Solomon Islands Airports Corporation Limited (SIACL), confirming that the airspace had been appropriately classified and published in the Solomon Islands AIP. Corrective actions included reviewing the identified deficiency, obtaining supporting documentation, requesting updates to AIP ENR 1.4, and submitting the evidence to ICAO APAC Office, for consideration. In view of the actions taken and the supporting evidence provided, Solomon Islands requested the removal of the associated ATM and Airspace Safety deficiency from the APANPIRG Air Navigation Deficiencies List.

Corrective Action Taken by India for Addressing ANS Deficiency Regarding "Designation of Restricted Areas Above the Land Areas or Territorial Waters of a State – Not Implemented" (WP/12)

4.4 The Meeting noted that India had completed all corrective actions to address the APANPIRG Air Navigation Deficiency raised in 2019, concerning the designation of Restricted Area VAR 44-A extending over the high seas. India reported that, through the application of the Flexible Use of Airspace (FUA) concept, VAR 44-A had been replaced with Temporary Reserved Areas (TRAs), i.e. TRA509A, TRA509B, and TRA509C, ensuring compliance with ICAO provisions while maintaining military operational requirements and preserving uninterrupted civil air traffic operations on ATS route N563, above FL270.

4.5 The revised airspace structure was developed through consultations with the Indian Navy and relevant aviation stakeholders, supported by a formal safety assessment, and subsequently approved by the Ministry of Civil Aviation of India and the regulator, the Directorate General of Civil Aviation (DGCA) India. The changes were promulgated through AIP Supplement No. 84/2026 and the original restricted area was permanently withdrawn effective 11 June 2026. As the non-compliant airspace configuration no longer existed, the Meeting was invited to consider recommending the removal of the related deficiency from the APANPIRG Air Navigation Deficiencies List.

ATM and Airspace Safety Deficiencies List (WP/13)

4.6 The Secretariat presented the list of APANPIRG Air Navigation Deficiencies in the ATM and Airspace Safety fields. The Meeting agreed to the following change proposals, which also included RASMAG/31 recommendations, as recorded in **Appendix E** to the Report, for consideration by APANPIRG/37:

a) removal of Deficiency on Aeronautical Information Services (AIS) Quality Management System (requirements of paragraph 3.6.1 of Annex 15 Quality Management System – not implemented): **Maldives**;

b) removal of Deficiency on Designation of Restricted Areas [requirements of Annex 2 (Definitions) to ensure that restricted areas are designated above the land areas or territorial waters of a State]: **India**;

c) removal of Deficiency on Airspace Classification (requirements of paragraph 2.6 of Annex 11): **Solomon Islands**, and **Macao China**, subject to the publication of the relevant AIP Amendment implementing the corrective action;

d) removal of Deficiency on Non-compliance with LTHM Requirement (remaining monitoring burden more than 30%): **Nepal**; and

d) add new Deficiency on Non-compliance with LTHM Requirement (remaining monitoring burden more than 30%): **Cook Islands**, **Pakistan** and **Vanuatu**.

4.7 The Chairperson congratulated the States/Administration that had successfully completed their Corrective Action Plans (CAPs), thus qualifying for removal from the APANPIRG Air Navigation Deficiencies List.

4.8 With regard to the proposed addition of Pakistan in the APANPIRG Air Navigation Deficiencies in the ATM and Airspace Safety fields arising from LTHM Deficiencies (remaining monitoring burden of 32%, RASMAG/31), the Meeting noted the ongoing efforts undertaken by Pakistan to address the issue, with completion expected by September 2026. The Meeting appreciated the progress made and the update provided by Pakistan, and the Secretariat would coordinate with MAAR upon receipt of the supporting evidence from Pakistan.

Agenda Item 5: ATM and CNS Systems Modernization

<u>Outcomes from CNS SG/30 (WP/14)</u>

5.1 The Meeting noted the information presented by the Secretariat on the outcomes of the Thirtieth Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/30), with particular attention to matters requiring follow-up by the ATM/SG. The Meeting noted the progress made in regional initiatives supporting collaborative ATFM, SWIM, FF-ICE, TBO and ATM automation.

5.2 Regarding the *AFTN/AMHS-based Interface Control Document (ICD) for ATFM*, CNS SG/30 agreed that ownership should be shared between ATM/SG and CNS SG, recognising that the document contains both operational and technical content. It was further agreed that ATM/SG, with support from the ATFM & A–CDM/SG, should be responsible for the operational aspects of the ICD, while CNS SG, with support from the Aeronautical Communication Services Implementation Coordination Group (ACSICG), should be responsible for its technical and communications-related components. The proposed joint ownership arrangement and the latest amendments to the ICD were referred to ATM/SG/14 for consideration and endorsement.

5.3 The CNS SG/30 reviewed **ACSICG/13 WP/18** for proposed amendments to the *AFTN/AMHS-based Interface Control Document (ICD) for ATFM* and agreed to endorse the proposed amendments, subject to ATM/SG/14 agreement on the proposed joint ownership arrangement.

5.4 The Meeting recognized the importance of maintaining a common ICD to support harmonized ATFM information exchange across the APAC region. The Meeting supported the joint ownership of the *AFTN/AMHS-based Interface Control Document (ICD) for ATFM* by ATM/SG and CNS SG to ensure its continued maintenance and coordinated development.

5.5 CNS SG/30 reviewed the draft *Asia/Pacific Regional Guidance Material for GNSS RFI and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0)*. The draft was updated to incorporate comments and feedback received during CNS SG/30. Following its review, the CNS SG endorsed the revised *Asia/Pacific Regional Guidance Material for GNSS RFI and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0)* and agreed that it should be submitted to ATM/SG/14 for further consideration and adoption.

5.6 With regard to SWIM implementation, the Meeting noted the progress made in developing regional implementation material to support cross-border ATM operations. This included the proposed adoption of *ATFM Flight Information Exchange Model (FIXM) Version 4.3* message templates as the regional standard for SWIM-enabled ATFM information exchange and the continued development of Version 2.0 of the *APAC Common SWIM Information Services*.

5.7 The Meeting recognized the importance of adopting standardized FIXM-based message data attributes and templates to support interoperable SWIM implementation in the APAC region. The Meeting noted that the adoption of a common regional standard would facilitate harmonized information exchange among States/Administrations and stakeholders.

5.8 CNS SG/30 also reviewed the future role of the APAC ATM Automation System Task Force and agreed that it should transition to the ATM Automation System Coordination Group. The proposed Coordination Group would provide a sustained regional mechanism to support harmonised implementation of ATM automation systems and associated initiatives, including AIDC, FF-ICE, SWIM, TBO and ATFM.

5.9 The Meeting noted the progress made in integrating the *Asia/Pacific Seamless ANS Plan* into the *APAC ANP Volume III* and the endorsement of the draft document by CNS SG/30 for further consideration by ATM/SG/14. The Meeting recognized that ATM/SG would continue to play an important role in reviewing ATM-related ASBU elements and maintaining *APAC ANP Volume III* in accordance with the established regional process.

5.10 CNS SG/30 endorsed the draft *APAC ANP Volume III* for further consideration by ATM/SG/14 and requested that any subsequent amendments be clearly identified using track changes to facilitate future review.

5.11 The Secretariat further noted that, as the MIP remained under development, consideration of MIP-related ASBUs by CNS SG would commence only after the MIP had been finalized.

5.12 The Meeting welcomed the outcomes of CNS SG/30 and recognized the close coordination between ATM/SG and CNS SG in advancing regional ATM, CNS and SWIM initiatives. The Meeting noted that continued collaboration between the two Sub-Groups would be essential to support the harmonized implementation of regional air navigation initiatives.

Implementation of Established on RNP AR (EoR) Operations at Shenzhen Bao'an International Airport (WP/15)

5.13 China presented information on the implementation of EoR operations at Shenzhen Bao’an International Airport as a solution to airspace constraints affecting northbound operations. The Meeting noted that Shenzhen Airport, which operated three parallel runways, had been unable to conduct independent parallel approaches using conventional Instrument Landing System (ILS) procedures due to complex airspace limitations. China reported on the development of EoR operations, which combined RNP AR and ILS approaches to facilitate independent parallel arrivals, enhance runway utilization, and improve operational efficiency. It was further noted that the project had been supported by the regulatory framework established by the Civil Aviation Administration of China (CAAC) and had involved close collaboration among ANSPs, airport operator, airlines, and aircraft manufacturer.

5.14 The Meeting noted that extensive preparatory work, including procedure design, validation, approval, and operational planning, had been completed. China reported that, first dual-aircraft simultaneous EoR validation flight had been successfully conducted in April 2026, demonstrating the safety and operational feasibility of independent parallel approaches using RNP AR procedures. The anticipated benefits included increased arrival capacity, reduced flight times, lower fuel consumption and carbon emissions, decreased controller and pilot workload, and enhanced operational efficiency. The Meeting further noted that future activities would include trial operations, continued airline equipage and certification for RNP AR capability, ongoing training for controllers and pilots, and the potential expansion of EoR operations.

5.15 IFALPA noted that, while simultaneous RNP AR approaches had the potential to significantly enhance airport capacity, they also introduced additional operational risks compared to conventional simultaneous ILS approaches. Particular attention was drawn to risks related to path deviations, RF leg tracking accuracy, missed approach conflicts, and GNSS interference, as these factors could reduce separation margins and adversely affect operational safety. IFALPA further emphasized the need for appropriate safety assessments, robust contingency procedures, and comprehensive pilot training prior to implementation.

Progress of TBO Pathfinder Development in the Asia/Pacific Region (WP/16, SP/01)

5.16 The Meeting was informed on the progress of the APAC TBO Pathfinder Project, an initiative established under the APAC ANSP Committee (AAC) to support the implementation of TBO concept in the region. The update highlighted achievements completed during 2025, including the development of TBO communication materials, stakeholder engagement activities, the successful completion of an FF-ICE/R1 laboratory demonstration, and the development of the *APAC TBO Roadmap*, which had subsequently been endorsed for incorporation into the next revision of the *Asia/Pacific Seamless ANS Plan*. It was noted that the Pathfinder initiative continued to promote awareness and understanding of TBO, SWIM, and FF-ICE among ANSPs and other aviation stakeholders, while providing a framework for regional collaboration and capability development.

5.17 Progress achieved during 2026 was also noted, with particular focus on advancing FF-ICE/R2 and enhancing stakeholder participation, especially from airspace users. Activities included stakeholder engagement sessions, regional awareness webinars conducted by IATA, technical interchange meetings, and table-top exercises to refine operational concepts, technical architecture, and implementation processes.

5.18 Preparations were underway for an FF-ICE/R2 laboratory demonstration scheduled for March 2027, which would showcase strategic trajectory negotiation and collaborative decision-making capabilities within a mixed operational environment. Increased participation by airlines and other airspace users was recognized as critical to ensuring realistic scenario development and achieving meaningful outcomes. Ongoing work to develop methodologies for assessing TBO benefits was also highlighted, supporting future implementation planning and helping States and stakeholders progress toward the regional deployment targets for SWIM by 2030 and FF-ICE/R1 services by 2032.

5.19 The Meeting commended the support and active participation of Pathfinder Project members and highlighted that it was encouraging to observe the increasing involvement of airspace users. The Chairperson emphasized that such participation was critical to advancing the operational deployment of TBO and ensuring close alignment between Pathfinder activities and the regional implementation timelines for SWIM and FF-ICE. The Chairperson further encouraged continued stakeholder engagement and stressed the importance of maintaining regional readiness to support the successful implementation of TBO in the future.

Challenges and Opportunities in Managing Airspace Efficiency and Resilience in APAC Region (WP/17)

5.20 IATA presented the challenges and opportunities associated with airspace efficiency and resilience in the APAC region, highlighting the operational impacts of airspace disruptions, geopolitical conflicts, GNSS interference and increasing airspace complexity. The Meeting noted the importance of strengthened contingency planning, cross-border and cross-regional coordination, ATFM, FUA and civil-military cooperation to enhance airspace management. The Meeting also noted the need to address the growing integration of Unmanned Aircraft Systems (UAS) while ensuring the safety and efficiency of existing aviation operations.

5.21 To address these challenges, IATA presented the outcomes of a data-driven airspace efficiency study and a proposed framework for airspace efficiency management. The Meeting noted that the framework promotes a structured, performance-based approach supported by governance, data analytics and digital technologies. The paper also highlighted the need for harmonized guidance, performance monitoring and digital tools to support airspace optimization, enhance operational resilience and enable safer and more efficient airspace operations across the APAC region.

5.22 IFALPA supported the proposed Airspace Efficiency Management System (AEMS) and emphasized the importance of demonstrating its operational benefits through quantitative evidence. IFALPA also highlighted the need to consider its operational impact on airlines and pilots, and stressed the importance of standardized procedures and enhanced cross-border information sharing to address emerging challenges, including GNSS interference and increasing UAS operations.

5.23 IFATCA commended IATA for presenting the working paper, particularly for highlighting the challenges arising from UAS and Advanced Air Mobility (AAM) operations. IFATCA informed the Meeting that it had conducted various studies and research on UAS and AAM operations and their impact on Air Traffic Control (ATC), and expressed its willingness to share the findings. IFATCA supported the view that stakeholders should work collaboratively to address these challenges and ensure the safety of all airspace users in the future.

5.24 The Chairperson requested further clarification from IATA on how the proposed framework could be aligned and integrated with existing regional plans and performance management frameworks. In this regard, the Chairperson invited IATA to provide additional details, preferably at the next meeting or through an appropriate mechanism beforehand, to assist States/Administrations and international organizations in assessing the framework and facilitating further progress in its development and implementation.

Landing Information Delivery (LID) Service in China and Its Implications for FF-ICE/R2 Operational Scenario Research in APAC (WP/18)

5.25 The Meeting noted the information provided by China on the implementation of the LID service, which has been operational since 2024. The Meeting noted that the service uses existing ACARS data link capability to provide arrival information to flight crews prior to descent, with the objective of improving operational efficiency, reducing controller-pilot voice communications and enhancing situational awareness.

5.26 In the context of regional FF-ICE implementation, China presented LID as a practical application aligned with FF-ICE/R2 concepts, demonstrating information synchronization during the flight execution phase. The Meeting noted that the operational experience gained from LID could provide useful input to the ongoing development of FF-ICE/R2 operational scenarios and future TBO implementation in the APAC region.

5.27 The Meeting was apprised that matters relating to the relationship between the LID and the updating of trajectory information had been discussed by the ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP), and it was noted that LID was not equivalent to FF-ICE/R2.

5.28 China commented that while both involved the exchange of trajectory-related information during flight, FF-ICE/R2 encompassed broader trajectory management and negotiation functions. Relevant operational experience gained from LID might provide useful input for future FF-ICE/R2 discussions, subject to further validation.

Practices and Exploration of Runway Incursion Prevention by China ATMB (WP/19)

5.29 The Meeting noted the information presented by China on its systematic approach to runway incursion prevention, including measures relating to safety management, ATC procedures, infrastructure enhancement and technology application. These measures have been implemented to address the challenges associated with high-density operations and complex airport configurations.

5.30 Drawing on operational experience in East China, China highlighted the safety benefits achieved through a combination of procedural improvements, infrastructure enhancements and decision-support technologies, resulting in a reduction in runway incursion risk. These practices provide useful experience for States seeking to strengthen runway safety in accordance with regional safety objectives.

5.31 The Meeting recognized the value of sharing operational experience and best practices across the APAC region. It further noted that runway incursion prevention was primarily a flight safety matter, while elements relating to AeroMACS and other CNS technologies, as well as aerodrome infrastructure and equipment, fall within the respective responsibilities of AOP/SG and CNS SG. Accordingly, the Meeting recommended that China share the relevant aspects of its experience with the appropriate APANPIRG Sub-Groups for further consideration.

Raising Airlines' Awareness of SWIM, FF-ICE and TBO (IP/02)

5.32 The Meeting noted the information presented by IATA on activities to raise airline awareness of SWIM, FF-ICE and TBO. These activities included regional webinars, educational materials and stakeholder engagement to improve understanding of the concepts and support airline preparedness for future implementation. The Meeting recognized the importance of active participation by airspace users in regional SWIM, FF-ICE and TBO initiatives. It encouraged continued collaboration among airlines, ANSPs and other stakeholders to support harmonised implementation across the APAC region.

Preparing for Trajectory-Based Operations through CARATS, Data Analytics and Regional Cooperation (IP/03)

5.33 Japan provided information on the reorganization of Fukuoka FIR and described the experience in analysing issues and improving operations using data. It provided an overview of the current initiatives, including the launch of SWIM operations, as part of Japan's strategy towards future TBO implementation through cooperation across the APAC region.

Transition to a Single Flight Information Region (IP/04)

5.34 The Meeting was informed of Australia's plan to transition to a Single Flight Data Region Group (SFDRG) as part of the Civil Military Air Traffic Management System (CMATS) programme, which aimed to consolidate the management of Australian-administered airspace and pave the way for the future establishment of a single FIR, to be designated as Australia FIR (YAAA).

5.35 Australia presented a ten-stage airspace transition programme under which airspace would progressively migrate from the existing Brisbane (YBBB) and Melbourne (YMMM) flight data regions to the new YAAA flight data region, while the current FIRs structure would remain in place throughout the transition period. The Meeting noted that the transition was planned to commence in November 2027 and conclude in October 2028, with coordination arrangements to be established with neighbouring ANSPs before each implementation stage. The Meeting further noted that ATS provided by Australia within portions of the Nauru and Honiara FIRs would transition into CMATS without changes to their existing flight data region arrangements, and that the eventual creation of a single Australia FIR would occur following completion of the airspace transition programme, without altering current FIR boundaries with adjacent FIRs.

Visual Surveillance System for Maneuvering Area (IP/05)

5.36 Australia presented information on the implementation of the Visual Surveillance System for Maneuvering Area (VSS-M) project at Brisbane Airport as a long-term solution to line of sight obstructions caused by airport expansion and infrastructure development. The system was developed to provide high-resolution visual coverage of obscured manoeuvring areas, enhancing controller situational awareness through day/night, infrared, and pan-tilt-zoom capabilities. Comprehensive testing, validation, and human factors assessments demonstrated that the VSS-M met or exceeded the effectiveness of the conventional out-the-window view under various weather and lighting conditions, while supporting operational efficiency and reducing controller workload. The successful implementation of the system enabled Brisbane Tower to address line of sight limitations and maintain safe aerodrome control operations in accordance with the provisions described in *Procedures for Air Navigation – Air Traffic Management* (PANS-ATM, ICAO Doc 4444).

Modernization of Indonesia's Air Traffic Management Automation System (IP/06)

5.37 Indonesia presented the ongoing modernization of its Air Traffic Management Automation System (ATMAS) and supporting air navigation systems to enhance operational efficiency, safety, interoperability and cross-border coordination within the Jakarta and Ujung Pandang FIRs. The Meeting noted the successful implementation of the new ATMAS at the Jakarta Air Traffic Service Center (JATSC), which entered operational service in June 2026 and included capabilities such as CPDLC, ADS-C, AIDC, and integrated arrival and departure management. The Meeting also noted progress in the implementation of a nationwide ATFM system, enhancement of the Aeronautical Message Handling System (AMHS), and the transition from AIS to AIM to support improved information exchange and future SWIM-enabled operations. Indonesia further informed the Meeting that AIDC implementation with adjacent FIRs was progressively planned from 2027, subject to bilateral readiness and coordination.

Progress on the Enhancement of Air Traffic Services from Procedural to Surveillance-Based Service at Balikpapan APP and Medan APP (IP/07)

5.38 The Meeting was informed of Indonesia's ongoing ATM modernization programme to transition ATS from procedural to surveillance-based operations at Balikpapan APP and Medan APP. The programme includes the consolidation of ATS under the two APPs, supported by ATM automation, surveillance and communication infrastructure. Supporting operational preparations, including safety assessments, operational procedures and AIP amendments, were reported to be progressing as planned, with implementation targeted for January 2027.

Agenda Item 6: ATM Coordination and Implementation

6.0 Reports on Relevant ATM Coordination and Ad Hoc Group Meetings

Outcomes from SAIOSEACG/5 (WP/20)

6.0.1 The Secretariat presented the key outcomes of the Fifth Meeting of the South Asia and Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/5, Bangkok, Thailand, 13 – 16 January 2026). Discussions covered regional ATM coordination, CNS/ATM implementation, ATS route development, safety monitoring, and APANPIRG Air Navigation Deficiencies. Progress was reported in reducing longitudinal separation minima across major ATS routes, including the successful application of 20 NM and 30 NM longitudinal separation on selected routes in the South China Sea and Bay of Bengal areas. Advancements in surveillance capabilities, particularly through wider Automatic Dependent Surveillance – Broadcast (ADS–B) implementation, and enhanced cross-border coordination were also highlighted. The outcomes reflected continued regional efforts to improve airspace capacity, operational efficiency, and safety, while supporting the objectives of the Project 30/10 initiative and the modernization of ATM operations across the region.

6.0.2 Significant attention was given to ongoing ATS route enhancement initiatives, including the implementation of reduced longitudinal separation on routes L642, M771, N571, N892, and L625, the development of parallel routes along ATS route A1. Positive results from these initiatives demonstrated improvements in capacity, flight flexibility, fuel efficiency, and regional coordination, while also identifying areas requiring further harmonization and technical coordination. Updates were also provided on ATM contingency planning, civil-military cooperation, Flexible Use of Airspace (FUA), and regional safety monitoring activities. Continued collaboration among States, ANSPs, airlines, and international organizations was encouraged to advance priority route enhancements, contingency preparedness, and future implementation of Free Route Airspace (FRA) and other performance-based airspace management concepts throughout the region.

6.0.3 The Meeting was informed that the ICAO-IATA Free Route Airspace (FRA) Implementation Workshop was planned to be held in Beijing, China, from 17 to 18 November 2026, to promote the knowledge, technical capabilities, and operational readiness necessary to accelerate FRA implementation across the APAC region. Further information on the Workshop could be found on the ICAO APAC Office website: http://www.icao.int/APAC/meetings.

6.0.4 To assist States/Administrations in facilitating the allocation of resources for participation in future meetings, the Secretariat informed the Meeting that, the BOBTFRG/8 and the SCSTFRG/14 were scheduled to be held in January 2027, while the SAIOSEACG/6 was planned for March 2027. It was noted that these meetings would be convened in Bangkok, Thailand.

Progress of the APAC Project 30/10 Task Force (WP/21)

6.0.5 The Secretariat presented the progress of the APAC Project 30/10 Task Force (AP30-10/TF), including the outcomes from the Kick-off Meeting of the APAC Project 30/10 Task Force (Video Teleconference, 21 April 2026) and the First Meeting of the APAC Project 30/10 Task Force (AP30-10/TF/1, Tangerang, Indonesia, 16 – 18 June 2026).

6.0.6 It was noted that the global Project 30/10 initiative endorsed by the Fourteenth Air Navigation Conference (AN-Conf/14, Montreal, Canada, 26 August – 6 September 2024) through ***AN-Conf/14 Recommendation 3.1/1***, which aimed to optimize the implementation of longitudinal separation minima of 30 NM or less in oceanic and remote airspace and 10 NM or less in other airspace. At the AP30-10/TF/1, updates were provided by several States and International Organizations on existing separation minima, implementation experiences, operational challenges, and enabling considerations and technologies. IATA presented airlines fleet equipage assessments, which indicated a generally high level of readiness among major air carriers to support reduced separation minima, while IFATCA emphasized the importance of addressing human performance, controller workload, training requirements, and safety considerations as part of implementation planning.

6.0.7 A regional baseline analysis conducted by the ICAO Secretariat reviewed 1,229 Transfer of Control (TOC) points across 34 FIRs within the APAC region. The analysis indicated that 341 TOC points, representing 27.7 per cent of the total, already met the Project 30/10 target, while the remaining continued to apply distance-based or time-based separation standards exceeding the Project 30/10 objectives. APAC States/Administrations were encouraged to target implementation by the end of 2028, subject to operational readiness and the availability of required technical and operational enablers. In this regard, States/Administrations were urged to strengthen staffing, training, cross-border coordination, and CNS/ATM modernization efforts to support harmonized implementation across the region and at inter-regional boundaries.

6.0.8 A breakout session was conducted to review existing ATC longitudinal separation minima at FIR boundaries and identify pathways towards achieving Project 30/10 objectives. Four geographically based working groups were established to focus on contiguous and adjacent airspace with significant traffic flows. The groups examined the separation minima currently applied at FIR boundaries, discussed implementation challenges, and identified opportunities for further harmonization. Outcomes of the discussions were presented by the respective rapporteurs, and agreement was reached to maintain the ATC separation minima data spreadsheets as living documents for continuous updating by States/Administrations. It was also agreed that the rapporteurs would be responsible for maintaining the data sets, while ICAO would explore the development of a regional dashboard to monitor implementation progress and separation minima across the region.

6.0.9 The Meeting further considered the draft TOR for the AP30-10/TF, which was presented to ATM/SG for adoption. ATM/SG/14 reviewed the draft TOR and agreed to the following Decision:

Decision ATM/SG/14-3: APAC Project 30/10 Task Force (AP30-10/TF) Terms of Reference (TOR)

That, the AP30-10/TF TOR at **Appendix F** to the Report be adopted.

6.0.10 In response to an enquiry, the Secretariat clarified that the AP30-10/TF meetings were to be convened on a quarterly basis, with one in-person meeting planned each year. Regarding the maintenance of the ATC separation minima data spreadsheets by the rapporteurs, it was noted that, until a regional dashboard became available, each rapporteur was expected to provide updates during the quarterly meetings.

Progress Update of the ICAO Asia/Pacific Flight and Flow Information for a Collaborative Environment (FF-ICE) Ad Hoc Group (WP/22)

6.0.11 Singapore and Thailand presented progress by the APAC FF-ICE Ad Hoc Group, noting that, through workshops and meetings, the Group had developed the draft *Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan*, which set out operational and technical requirements for regional FF-ICE/R1 implementation and recommended harmonization areas.

6.0.12 The APAC FF-ICE Ad-hoc Group finalized the draft *Asia/Pacific Regional FF-ICE/R1 Implementation Plan* at its fourth meeting. The draft was reviewed by ATFM & A-CDM/SG/16 in April 2026 and SWIM TF/11 in May 2026, endorsed by CNS SG/30 in July 2026, and subsequently presented to ATM/SG/14 for further review. As the *Asia/Pacific Regional FF-ICE/R1 Implementation Plan* complements the *Manual on FF-ICE* (ICAO Doc 9965) *Volume II – Implementation Guidance*, it was proposed that the endorsement of APANPIRG/37 be made conditional upon the availability of ICAO Doc 9965 Volume II, which was expected in Q3 2026.

6.0.13 Following discussion, ATM/SG/14 agreed to the following Draft Conclusion, for APANPIRG/37 consideration:

Draft Conclusion ATM/SG/14-4: Approval of the Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan

That, the *Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan* provided in **Appendix G** to the Report be approved and be published on the ICAO APAC Office eDocuments webpage.

6.0.14 ATM/SG/14 was informed that, to ensure harmonized FF-ICE/R1 implementation in the APAC region, the APAC FF-ICE Ad-hoc Group had developed and agreed a regional implementation timeline, which had been reviewed by ATFM & A-CDM/SG/16 in April 2026 and SWIM TF/11 in May 2026, and endorsed by CNS SG/30 in July 2026. ATM/SG/14 reviewed the timeline and agreed to the following Draft Conclusion for APANPIRG/37 consideration:

Draft Conclusion ATM/SG/14-5: Adoption of Asia/Pacific Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Timeline

That, the following FF-ICE/R1 implementation timeline be adopted for the APAC region:

a) 2030: commencement of technical tests and trials involving eAUs and cross-border eASP interactions;

b) 2031: begin operational tests to identify and resolve any issues; and

c) 2032: full operationalization of three FF-ICE/R1 services (Filing Service, Flight Data Request Service and Notification Service).

6.0.15 As the APAC FF-ICE Ad-hoc Group had achieved its TOR-specified objectives, it proposed that the next phase focus on implementation issues, regional progress monitoring and support for States/Administrations in the transition to FF-ICE/R1. Accordingly, it recommended dissolving the APAC FF-ICE Ad-hoc Group and establishing the APAC FF-ICE Implementation Task Force to support and monitor FF-ICE/R1 implementation per the regional plan and timeline. ATM/SG/14 agreed the following Decision:

Decision ATM/SG/14-6: Establish Asia/Pacific Flight and Flow Information for a Collaborative Environment (FF-ICE) Implementation Task Force

That, the APAC FF-ICE Ad-hoc Group be dissolved, and the APAC FF-ICE Implementation Task Force be established to support the FF-ICE/R1 deployment in the APAC region. The APAC FF-ICE Implementation Task Force will:

a) monitor and drive FF-ICE/R1 implementation in the APAC region in accordance with the *Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan* and the regional implementation timeline;

b) provide a forum for States to raise and coordinate any operational and technical issues arising from FF-ICE/R1 deployment;

c) be responsible for the update and refinement of the *Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan*;

d) report the implementation progress of FF-ICE/R1 services across APAC States/Administrations; and

e) collaborate with relevant APANPIRG contributory bodies, including the ATFM & A-CDM Steering Group and the SWIM Task Force, as required.

6.0.16 The draft TOR of the APAC FF-ICE Implementation Task Force was provided in **ATM/SG/14 WP/22 Appendix B**, and would be further discussed at the Task Force's inaugural meeting.

6.0.17 In response to an enquiry regarding the establishment of the APAC FF-ICE Implementation Task Force, the Secretariat clarified that, given the planned full operationalization of the three FF-ICE/R1 mandatory services for APAC region (Filing Service, Flight Data Request Service, and Notification Service) by 2032, it was appropriate for the group to be established as a Task Force, as it was expected to complete its mandate within that timeframe. The Secretariat further noted that any requirement for an extension beyond 2032 would be considered and addressed accordingly.

Progress of the Procedures for GNSS and Data Link Disruption Ad Hoc Group and Proposed Adoption of the Regional Guidance Document (WP/23)

6.0.18 Singapore, on behalf of the Procedures for GNSS and Data Link Disruption Ad Hoc Group, provided an update on the Ad Hoc Group's work. It was recalled that the Ad Hoc Group's key deliverable was to develop harmonized regional procedures for reporting, coordination and information sharing. It was reported that, based on shared information on current reporting and coordination processes, the Ad Hoc Group had consolidated best practices and lessons learned to develop draft guidance material with structured procedures encompassing detection, validation, reporting, coordination, mitigation, and post-event review.

6.0.19 The Meeting noted that the draft *Asia/Pacific Regional Guidance Material for GNSS RFI and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0)* established harmonized regional procedures for the detection, reporting, investigation and coordinated management of GNSS RFI and associated data link disruptions, and had clearly defined the roles and responsibilities of key stakeholders. By enabling timely information sharing and consistent operational responses across the region, the framework enhanced regional situational awareness, supported mitigation of safety risks, and strengthened overall system resilience.

6.0.20 The Meeting reviewed and updated the draft *Asia/Pacific Regional Guidance Material for GNSS RFI and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0)* and subsequently adopted the following Conclusion:

Conclusion ATM/SG/14-7: Adoption of APAC Regional Guidance Material for GNSS RFI and Associated Data Link Disruption Coordination and Reporting Procedures

That, in accordance with Decision ATM/SG/12-8, the *Asia/Pacific Regional Guidance Material for GNSS Radio Frequency Interference (RFI) and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0)* provided in **Appendix H** to the Report be approved, and published on the ICAO APAC Office eDocuments webpage.

6.0.21 Following the adoption of the regional guidance material, the Ad Hoc Group had fulfilled its assigned tasks and completed its primary deliverable. Ongoing monitoring, analysis of GNSS RFI events, identification of trends and hotspots, and future maintenance of the guidance material can be undertaken through existing regional mechanisms. The Meeting agreed to the following Decision:

Decision ATM/SG/14-8: Dissolution of the Procedures for GNSS and Data Link Disruption Ad Hoc Group

That, having completed the work assigned under ***Decision ATM/SG/12-8***, including the development of the *Asia/Pacific Regional Guidance for GNSS Radio Frequency Interference (RFI) and Associated Data Link Disruption Coordination and Reporting Procedures (Version 1.0)*, the Procedures for GNSS and Data Link Disruption Ad Hoc Group be dissolved.

6.0.22 The Meeting was further informed that, due to the meeting sequence, the regional guidance material adopted by ATM/SG would be presented to the Tenth Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/10, Bangkok, Thailand, 10 – 14 August 2026) for endorsement. Should AOP/SG propose any substantial amendments, the Secretariat would liaise with the ATM/SG Chairperson.

6.0.23 Upon publication of the regional guidance material on the ICAO APAC Office eDocuments webpage, States/Administrations and stakeholders were encouraged to apply the guidance material, as appropriate, to support harmonized reporting, coordination and information sharing relating to GNSS RFI and associated data link disruption events.

6.0.24 Thailand informed the Meeting of the ICAO ATM Operations Panel (ATMOPSP) Civil-Military Working Group work in response to Air Navigation Commission (ANC) tasking to develop guidance material on civil-military coordination in relation to harmful interference of GNSS originated or detected by militaries, in support of work arising from ***AN-Conf/14 Recommendation 2.2/2***. The ATMOPSP Civil-Military Working Group started work based on example coordination procedure for RFI activities at joint-use aerodromes and was expected to propose revision to the *Manual on Civil-Military Cooperation in Air Traffic Management* (ICAO Doc 10088).

6.0.25 IATA supported the regional guidance document and recognized it as a positive step towards harmonized regional reporting of GNSS RFI occurrences, while emphasizing the importance of minimizing duplicate reporting requirements for flight crews.

<u>Progress of the APAC Data Analytics Group (WP/24)</u>

6.0.26 Singapore presented the progress made by the APAC Data Analytics Group (DAG). Building on the analysis of performance data for year 2024 conducted in 2025, DAG members have expanded the analysis to include full-year data for 2024 and 2025, enabling a year-on-year comparison of performance. The analysis focused on 11 Key Performance Indicators (KPIs), aligned up to stage two of the APANPIRG-endorsed *APAC Air Traffic Management Performance Measurement Framework (ATM/PMF)*, as listed in **Table 5**. A comprehensive data collection guide detailing definitions and calculation methodologies for each KPI is provided in **ATM/SG/14 WP/24 Appendix B** to ensure consistency and reproducibility across member States.

Table 5. 11 KPIs reported by APAC DAG

KPA	KPI	Variant	GANP KPI Code	ATM/PMF KPIs
Capacity	Airport peak capacity	Departure	KPI09-D	Stage 1
		Arrival	KPI09-A	Stage 1
Capacity	Airport peak throughput	Departure	KPI10-1D	Stage 1

KPA	KPI	Variant	GANP KPI Code	ATM/PMF KPIs
		Arrival	KPI10-1A	Stage 1
Capacity	Airport throughput efficiency	Departure	KPI11-D	Stage 2
		Arrival	KPI11-A	Stage 2
Efficiency	Additional taxi-out time	Advanced	KPI02-2	Stage 1
Efficiency	Additional taxi-in time	Advanced	KPI13-2	Stage 1
Efficiency	Additional time in terminal airspace	Basic, Advanced; 40NM, 100NM	KPI08	Stage 2
Predictability	Departure punctuality	± 15 mins	KPI01-2A	Stage 1
Predictability	Arrival punctuality	± 15 mins	KPI14-2A	Stage 1

6.0.27 The analysis revealed regional patterns and interdependencies across KPIs. Most airports operated below declared capacity but maintained high throughput efficiency, indicating demand-limited operations. Departure punctuality consistently exceeded arrival punctuality, additional taxi-out times were generally longer than taxi-in, and year-on-year results showed improved departure punctuality while arrival punctuality and additional taxi-time trends were mixed, with increased additional time in terminal airspace at most airports warranting further monitoring.

6.0.28 The performance review highlighted the need to interpret KPI outcomes within each airport's operational context (traffic mix, runway/gate configuration, airspace design, etc.). The APAC DAG committed to further study of additional data and measurement challenges to inform future KPIs review, and encouraged States to collect six key timestamps (scheduled departure, off-block, take-off, landing, in-block, scheduled arrival) to enable measurement of the eight Stage 1 KPIs.

6.0.29 ATM/SG/14 was informed that the APAC DAG had developed a *Regional Data Management Guidance Document*, based on an AAC survey of data-sharing use cases and challenges. The draft *Regional Data Management Guidance Document* comprised three key pillars and, while intended primarily for APAC DAG data sharing, other APAC groups were encouraged to adapt it for their own use cases:

a) align with existing policy and legal requirements: data management principles set out within the guidance document builds upon existing policy and legal foundations and function as a complementary extension guide to data management;

b) good data management principles: prescribes data management principles across the data lifecycle and good data practices for different data roles and responsibilities for cross-border data sharing use cases; and

c) recommended interoperability measures: recommended common data standards and formats, along with best practices to ensure data quality.

6.0.30 Noting that the *Regional Data Management Guidance Document* intended primarily for DAG data sharing, ATM/SG/14 agreed to the following Conclusion:

Conclusion ATM/SG/14-9: Regional Data Management Guidance Document

That, the *Regional Data Management Guidance Document* at **Appendix I** to the Report be adopted as a guiding reference for data management, sharing, and use of operational and performance data across APAC DAG member States.

6.0.31 The Chairperson commended the achievements of the APAC DAG and recognized the value of its data-sharing initiatives in supporting future activities. The importance of a trusted and harmonized approach to data management and sharing was emphasized, and the endorsement of the *Regional Data Management Guidance Document* was welcomed.

6.0.32 The Meeting encouraged greater participation by States/Administrations in the APAC DAG, including those not yet ready to share data, noting that engagement in discussions and the sharing of operational challenges would contribute to the further enhancement of the guidance document and the development of consistent reporting metrics.

Proposal for Updating the Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination (WP/25)

6.0.33 The Secretariat presented the outcomes of the Workshop on APAC Region ATM Contingency Framework (RACF), held in Tokyo, Japan, from 13 to 17 July 2026. The Workshop had two primary objectives: to review and finalize the draft APAC RACF, which had been initially developed by AAC Workstream 3 and subsequently refined through a series of regional workshops and reviews; and to advance regional coordination on Space Object Launch and Re-entry Activities in response to discussions and actions arising from ATM/SG/13, particularly ***ATM/SG Task List Action Item 13/8***.

6.0.34 This paper provided the outcomes of the Workshop sessions on Space Object Launch and Re-entry Activities Coordination, which included presentations by Japan, the Republic of Korea, and the United States on recent experiences and developments in coordinating space object launch and re-entry activities. The workshop participants subsequently engaged in breakout group discussions to review the existing *Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination*, identify areas for improvement, and develop recommendations for amendment. Based on the outcomes of these discussions, ICAO prepared draft Version 2.0 of the *Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination*, incorporating enhancements aimed at strengthening regional coordination, improving information-sharing arrangements, clarifying stakeholder responsibilities, and supporting the safe and efficient integration of space object launch and re-entry activities within the airspace system.

6.0.35 The Meeting further noted that the proposed revisions introduced a new chapter on stakeholders' responsibilities, expanded the responsibilities of Launching States, Launching State ATS Authorities, and Affected ATS Authorities, and enhanced requirements for the maintenance of regional points of contact, incorporation of safety buffer zones, timely dissemination of operational information, post-activity analysis, and feedback mechanisms. The revised guidance also clarified coordination timelines, requiring initial coordination at least 10 days, preferably 14 days, prior to a tentative launch or re-entry activity, tactical updates three days prior to the start of the tentative launch window, and final confirmation not less than 24 hours before the activity.

6.0.36 Recognizing the increasing frequency and complexity of space object activities in the APAC region, the Meeting supported the adoption of the revised guidance material and encouraged States/Administrations to align their national procedures with the updated regional framework to further enhance aviation safety and operational efficiency. ATM/SG/14 agreed to the following Conclusion:

Conclusion ATM/SG/14-10: Revised Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination

That,

1. the revised *Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination* at **Appendix J** to the Report be adopted, and uploaded to the ICAO APAC Office eDocuments webpage to replace the existing version; and

2. States are urged to update national procedures to align with the revised *Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination*.

6.0.37 In response to an enquiry, the Secretariat informed the Meeting that the Space Transport Operations Task Force (STOTF) was developing global guidance material for the safe integration of space transport operations within airspace and that its work was expected to be completed by June 2027. The Meeting was further informed that, upon the availability of the global guidance material, the *Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination* would be reviewed and revised as necessary to ensure alignment with the global guidance, or withdrawn if deemed no longer required.

<u>Progress on Action Item 13/10 of the ATMSG Task List (IP/08)</u>

6.0.38 The Meeting noted the joint information presented by China and the Republic of Korea on the progress of ***ATM/SG Task List Action Item 13/10*** concerning the implementation of Phase 2 of the agreed arrangements for ATS route A593. The Meeting noted that consultations had continued following ATM/SG/13, covering Phase 2 implementation, the establishment of a joint safety oversight framework, and matters addressed in **ATM/SG/13 WP/39**, as presented by the Republic of Korea.

6.0.39 The Meeting further noted that, due to scheduling constraints, the two States had been unable to convene a bilateral meeting and finalise a joint working paper before ATM/SG/14. China and the Republic of Korea reaffirmed their commitment to continue constructive discussions and agreed to report further progress at APANPIRG/37 or a subsequent ATM/SG meeting.

6.0.40 The Meeting encouraged both States to continue their bilateral coordination to advance the implementation of Phase II. The Meeting also invited the two States to submit a joint WP to ATM/SG/15 in 2027 on the progress achieved.

<u>APAC ANSP Committee (AAC): Update on Progress and Next Steps (IP/09)</u>

6.0.41 The Meeting was informed of the achievements of the AAC during the 2023–2026 period and noted its proposed extension for 2027–2028. The AAC reported significant progress across its key workstreams, including the development of regional CNS/ATM architecture and training programmes, the advancement of ATFM and TBO, the development of the initial draft *APAC Region ATM Contingency Framework (RACF)*, and the preparation of guidance material FRO. The Meeting further noted that the proposed extension would focus on supporting the implementation of ICAO MIP, enhancing common situational awareness and Collaborative Decision-Making (CDM), promoting seamless air navigation services, and strengthening regional ATM contingency preparedness to address increasing air traffic demand and improve interoperability across the APAC region.

Agenda Item 6: ATM Coordination and Implementation

6.1 A-CDM and ATFM

<u>Outcomes from ATFM & A-CDM/SG/16 (WP/26)</u>

6.1.1 This paper provided the outcomes of the Sixteenth Meeting of the Air Traffic Flow Management and Airport Collaborative Decision-Making Steering Group (ATFM & ACDM/SG/16, Bangkok, Thailand, 6 – 10 April 2026) and sub-regional cross border ATFM programs. The meeting included a joint plenary session with the Fifteenth Meeting of Meteorological Requirements Working Group (MET/R WG/15).

6.1.2 A brief highlight of the discussions held during the ATFM & ACDM/SG/16 and the joint plenary session with the MET/R WG/15, were as follows:

a) the meeting noted updates on the proposed new ICAO provisions on ATFM, including amendments to ICAO Annex 11, PANS-ATM and updates to the *Manual on Collaborative ATFM* (ICAO Doc 9971);

b) ICAO provided a summary of the ATFM implementation status of APAC Administrations, reported against the performance objectives of the *Regional Framework for Collaborative ATFM*. Annual implementation status reports for 2026 were received from 22 APAC States/Administrations. The meeting was informed that based on reports received, Australia, China, Hong Kong China, Singapore, Thailand and United States were assessed as having “Robust” implementation;

c) the paper noted the progress updates of sub-regional ATFM implementation such as BOBCAT, NARAHG and AMNAC; and

d) the paper provided highlights of MET/ATM Joint Plenary Session and discussions thereon.

6.1.3 The Meeting was apprised of the draft *Regional Guidance Document for Airport and Airspace Capacity Assessment*, developed by ATFM/SG. The Meeting noted that the guidance document provided a brief description of airport capacity assessment processes along with airspace capacity assessment processes, including practical examples and appendices illustrating models that could support States/Administrations in evaluating capacity and the document aimed to assist ATM planners in developing plans to improve capacity in order to meet current and future system demand across the APAC region. The ATM/SG/14 reviewed the draft guidance document, and adopted the following Conclusion:

Conclusion ATM/SG/14-11: Adoption of Asia/Pacific Regional Guidance for Assessment of Airport Capacity and Airspace Capacity

That, the *Asia/Pacific Regional Guidance for Assessment of Airport and Airspace Capacity* at **Appendix K** to the Report be adopted and uploaded to the ICAO APAC Office eDocuments webpage, for guidance and reference, by APAC States/Administrations in conducting airport and airspace capacity assessments in accordance with the provision of the *Regional Framework for Collaborative ATFM*.

6.1.4 The Meeting was informed that the update process of *AFTN/AMHS-based Interface Control Document (ICD) for ATFM* had been taken up by ICAO Secretariat with the ICD expected to be presented to ACSICG/13 (April 2026) and proposed to CNS SG/30 (July 2026) for endorsement and noted the proposal for using REGUL and REGCAUSE as part of AMNAC ICD in the interim. The Meeting was informed that after discussions in ACSICG/13 and CNS/SG/30 meetings, the ICD was adopted by CNS SG/30 while proposing joint ownership of the document with ATM/SG. ATM/SG/14 endorsed ***Draft Conclusion CNS SG/30/02 (ACSICG/13/02) – AFTN/AMHS-based Interface Control Document for ATFM (ICD) be jointly owned by ATM SG and CNS SG***.

6.1.5 ATM/SG/14 subsequently adopted the following Conclusion:

Conclusion ATM/SG/14-12: Uploading the Revised AFTN/AMHS-based Interface Control Document

That, the *AFTN/AMHS-based Interface Control Document for ATFM (ICD)* used by APAC States/Administrations to implement cross-border ATFM communications to be uploaded to the ICAO APAC Office eDocuments webpage, for guidance and reference, by APAC States/Administrations.

6.1.6 The Meeting was presented with a summary of *Regional Monitoring and Reporting Scheme for the Asia/Pacific A-CDM Implementation*. The Meeting noted that annual implementation reports for 2026 were received from 21 APAC States/Administrations covering 87 airports in the region. The Meeting was informed that more than 85 per cent (67) of reported high-density international aerodromes indicated A-CDM in Operation and Monitoring Phase and the rest of the reported high-density international aerodromes indicated either A-CDM in Implementation Phase or Initiation Phase to implement A-CDM.

6.1.7 The paper presented information on identification, mapping, and development of ATFM FIXM message data attributes and associated message templates based on FIXM version 4.3, to support cross-border ATFM operations, A-CDM, ATFM/A-CDM integration, and traffic synchronization in a SWIM environment in the Asia/Pacific region. It was informed that ATFM & ACDM/SG agreed to the adoption of the identified ATFM FIXM messages data attributes, mapping, and associated message templates, based on FIXM version 4.3, as regional standard templates effective Q1 2027. The Meeting noted that subsequently, the updates were presented to SWIM TF/11 meeting and CNS SG/30 for consideration and CNS SG/30 had endorsed the Draft Conclusion for adoption by APANPIRG/37.

<u>Enhancing Regional ATFM Coordination through Regional Collaborative Operational Mechanism (RECOM) (IP/10)</u>

6.1.8 China presented information on the Regional Collaborative Operational Mechanism (RECOM), a voluntary initiative aimed at enhancing coordination and information exchange among existing sub-regional ATFM collaborative mechanisms in the APAC region. The Meeting noted the operational rationale, structural concept, implementation experience, and coordination arrangements associated with the initiative, as well as its potential contribution to strengthening regional collaboration and supporting the harmonization of cross-border ATFM operations. The Meeting further noted that, in response to the increasing number of ATFM-related coordination meetings across the region, RECOM had been initiated to promote interaction and information sharing through an open, inclusive, and operationally focused coordination framework. Information was also provided on the Asia/Pacific Traffic Flow Coordination Call (APAC TFCC) mechanism for regional coordination.

Agenda Item 6: ATM Coordination and Implementation

6.2 ATC Separation

<u>Operational Implementation and Experience of 20 NM Longitudinal Separation on ATS Routes L642 and M771 (WP/27)</u>

6.2.1 The Meeting noted the successful implementation of a 20 NM longitudinal separation minimum on ATS routes L642 and M771 following a two-year trial jointly conducted by the Ho Chi Minh, Hong Kong, and Sanya Area Control Centres (ACCs). The Meeting further noted that the revised LOA were signed on 20 May 2026, formally establishing the 20 NM longitudinal separation minimum as the default transfer standard for the two ATS routes. As of 30 June 2026, approximately 5,900 flights had benefited from the initiative.

6.2.2 The Meeting further noted that the implementation had improved flight level utilization, traffic management flexibility and cross-FIR operational harmonization, while reducing coordination workload and enhancing the efficiency of cross-border operations. The Meeting also recognized the importance of continued performance monitoring and the sharing of implementation experience to support similar initiatives across the APAC region.

6.2.3 The Meeting noted IATA's comments on the operational and environmental benefits of reducing longitudinal separation minima, including improved access to preferred flight levels, reduced fuel consumption and lower carbon emissions. Viet Nam expressed its support for the implementation and reaffirmed its commitment to continuing coordination with China on the implementation of AIDC for ATS routes L642 and M771, to further improve regional airspace capacity.

6.2.4 The Chairperson congratulated the participating States/Administrations on the successful transition from trial to routine implementation and encouraged States to continue efforts to reduce longitudinal separation minima, where operationally appropriate, in support of the objectives of Project 30/10.

Separation between Taxiing Aircraft and Vehicle During Low Visibility Operations (WP/28, SP09)

6.2.5 Pakistan presented information on the application of separation between taxiing aircraft and vehicles during Low Visibility Operations (LVO). The Meeting noted that ICAO provisions require States and ATS authorities to prescribe appropriate separation minima based on local operational conditions and available surveillance and control aids, recognizing that fixed numerical minima may not be suitable for all aerodromes. The Meeting further noted that the relevant ICAO SARPs and guidance were contained in several ICAO documents.

6.2.6 The Meeting noted that safe operations during LVO were generally achieved through a combination of operational procedures, surveillance systems, movement guidance, vehicle controls and training, rather than prescribed distance-based separation standards. The Meeting also noted Pakistan's proposal for ICAO to review the relevant provisions and develop consolidated guidance to support the harmonized implementation of aircraft-to-vehicle separation requirements during LVO.

6.2.7 The Secretariat thanked Pakistan for the work undertaken in examining the application of ICAO Annex 11, paragraph 3.8.2(b), with the objective of enhancing clarity and consistency in the implementation of the provision. However, it was noted that the paper did not clearly identify the specific aspect of the existing provision that was considered unclear, nor did it provide evidence of inconsistent interpretation or application in practice. Furthermore, the absence of proposed amendment text or alternative wording made it difficult to fully assess the nature of the issue and the actions required to address it.

6.2.8 It was also observed that the paper concluded that numerical or distance-based minima may not be practicable and that safety is assured through procedures tailored to the layout, visual aids and facilities of each aerodrome. This was considered consistent with the current intent of paragraph 3.8.2(b), which allowed the appropriate ATS authority to establish suitable arrangements based on local operational circumstances and the aids available.

6.2.9 Accordingly, it was considered that additional evidence, a more clearly defined problem statement, and greater detail regarding the proposed solution would be beneficial before any amendments to ICAO Annex 11, paragraph 3.8.2(b), or the development of new consolidated guidance material, were considered. In this regard, Pakistan supported the Secretariat's proposal for the matter to be further addressed offline.

Agenda Item 6: ATM Coordination and Implementation

6.3 ATM Contingency Planning

<u>Regional ATM Contingency Planning and Contingency Operations Update (WP/29)</u>

6.3.1 The Meeting noted the update provided by the Secretariat on regional ATM contingency planning, including the reported implementation status of the performance expectations of the *Asia/Pacific Region ATM Contingency Plan* and recent ATM contingency operations in the region. The importance of maintaining national ATM contingency plans and regularly reporting implementation status in accordance with the regional monitoring arrangements was recalled.

6.3.2 **Figure 1** illustrated the reported implementation status of the *Asia/Pacific Region ATM Contingency Plan*, as updated to reflect the implementation status information submitted by Viet Nam in June 2026. While continued progress by a number of States was noted, concern was expressed that several States had not submitted implementation status reports. States were encouraged to submit their annual reports in a timely manner to support regional monitoring and implementation.

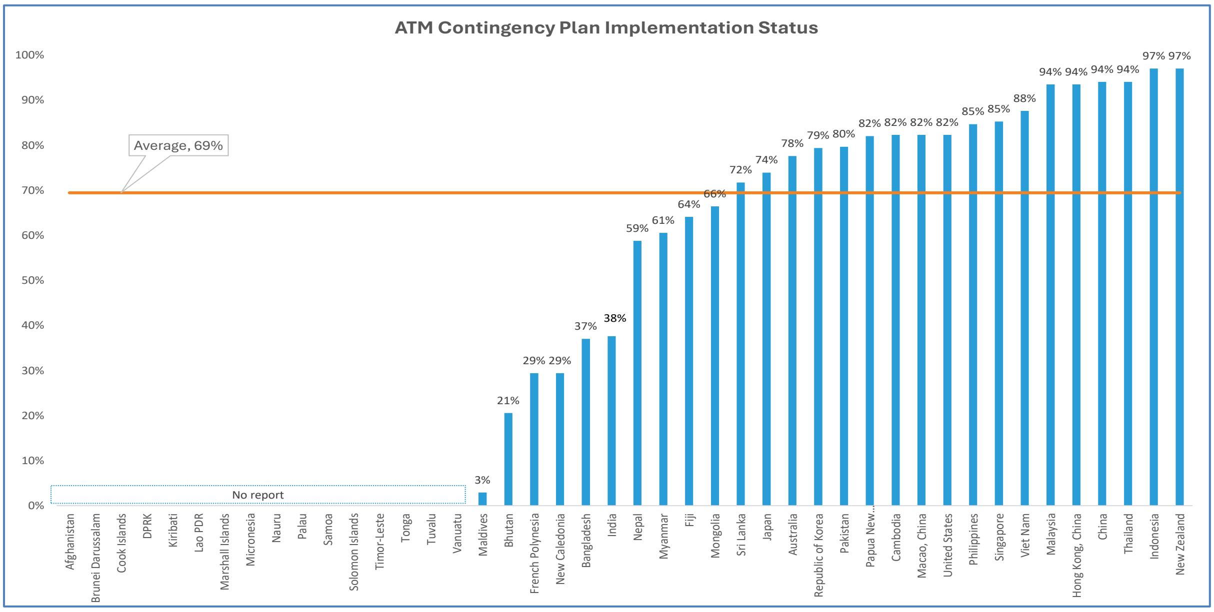

Figure 1. Regional ATM Contingency Plan Overall Implementation Status (31 July 2026)

6.3.3 The Meeting also noted the continuing Kabul FIR contingency operations, including the ongoing application of the Kabul FIR Contingency Arrangements and BOBCAT ATFM procedures in support of the contingency arrangements.

6.3.4 The Meeting recognized the importance of maintaining effective ATM contingency arrangements to ensure the safe and orderly provision of air traffic services during disruptions. Pakistan expressed appreciation for the Secretariat's support and indicated that further discussion on increasing traffic demand in the Afghanistan contingency airspace would be addressed under the relevant agenda item.

6.3.5 The Meeting noted IATA's suggestion to further strengthen cross-border contingency planning and cooperation among States to enhance regional operational resilience during major disruptions. Mongolia informed the Meeting of the update to its national ATM contingency plan and its intention to enhance bilateral contingency arrangements with neighbouring States. China confirmed its willingness to discuss ATM contingency planning with Mongolia through existing bilateral coordination mechanisms.

BOBCAT ATFM Operational Updates (IP/11)

6.3.6 Thailand presented updates on the operational performance of the Bay of Bengal Cooperative ATFM (BOBCAT) system following its reactivation on 4 September 2025 under the current Kabul FIR ATM Contingency Arrangements. The post-operations analysis covering the period from 4 September 2025 to 30 June 2026 indicated that BOBCAT managed a total of 18,601 flights, averaging 62 flights per night, with traffic demand increasing significantly following regional airspace restrictions associated with developments in the Middle East. The Meeting noted that the average ATFM delay during the period was 4.1 minutes per flight and that the implementation of BOBCAT contributed to an estimated saving of approximately 8,353 tonnes of fuel and a reduction of about 26,394 tonnes of CO_2 emissions. The analysis also demonstrated that approximately 89 per cent of flights achieved their allocated or higher flight levels when entering Kabul FIR, indicating the continued effectiveness of BOBCAT in balancing traffic demand with available airspace capacity.

6.3.7 The Meeting further noted the results of assessments on CTOT compliance, flight level achievement, CTO window compliance, and the impact of increasing traffic demand arising from regional airspace closures. It was observed that rising traffic levels had resulted in increased ATFM delays and a gradual reduction in the percentage of aircraft achieving their preferred flight levels, although overall operational performance remained stable and effective. The Meeting was reminded of the importance of timely transmission of ATS movement messages and adherence to CTOT and CTO requirements to improve operational efficiency and flight level allocation outcomes. The Meeting also noted that BOBCAT continued to provide a valuable mechanism for managing peak nighttime traffic through Kabul FIR under contingency conditions, and that post-operational monitoring and analysis would continue with the support of participating States to further enhance operational performance and regional coordination.

6.3.8 Pakistan acknowledged the collaborative efforts of all relevant stakeholders to improve the Kabul FIR Contingency Arrangements. Pakistan informed the Meeting that it had completed the necessary safety risk assessment for the proposed reduction of longitudinal separation from 15 to 10 minutes, and emphasized that any further improvements would require continued coordination and agreement among all relevant stakeholders.

Collaborative ATM Contingency Response to Volcanic Eruption Events: Indonesia's Experience (WP/30)

6.3.9 Indonesia presented its experience in managing the impact of volcanic eruption events on aviation operations through a collaborative ATM contingency framework. Recognizing Indonesia’s exposure to frequent volcanic activity, a comprehensive regulatory framework had been established to support the safe management of volcanic ash hazards, complemented by the Integrated Web-based Aeronautical Information System Handling (I-WISH) platform to facilitate collaborative decision-making and information sharing. The presentation outlined the roles and responsibilities of key stakeholders, the activation mechanisms of the I-WISH platform, and the procedures applied for early detection, impact assessment, operational coordination, and information dissemination during volcanic eruption events. It was further highlighted that the framework integrated information from multiple sources, including Volcano Observatory Notices for Aviation (VONA), SIGMETs, ASHTAMs, NOTAMs, meteorological reports, pilot reports, and volcanic ash forecasts, thereby enabling timely decision-making and coordinated operational responses to safeguard flight operations.

6.3.10 Indonesia further described its operational arrangements for managing volcanic ash disruptions through the Indonesia Network Management Center (INMC), supported by ATFM tools, contingency route planning, teleconferences, and close coordination among aviation authorities, meteorological agencies, airports, airlines, and neighbouring stakeholders. The eruption of Mount Kelud in February 2014 was presented as a case study demonstrating the significant operational impact that volcanic ash events could have on the air transport system. Lessons learned from recent volcanic eruptions highlighted the importance of rapid information exchange, collaborative decision-making, dynamic rerouting, coordinated air traffic flow management measures, and regional cooperation. It was emphasized that continued collaboration among States, ANSPs, volcanic ash advisory centres, meteorological organizations, airports, and airlines remained essential to strengthening operational resilience and mitigating the effects of volcanic ash events across the region.

6.3.11 The Meeting recognized the importance of timely information sharing on volcanic ash events to support collaborative decision-making among stakeholders. The Meeting also encouraged States/Administrations to share their operational experience and lessons learned to support regional preparedness and enhance the management of volcanic ash events.

Proposal for the Adoption of the Asia/Pacific Regional ATM Contingency Framework (RACF) (WP/31)

6.3.12 The Meeting considered the outcomes of the ICAO APAC Region ATM Contingency Framework (RACF) Workshop held in Tokyo, Japan, from 13 to 17 July 2026. The Meeting recognized the significant contribution of the AAC Workstream 3 (WS3) in developing the initial RACF, which was subsequently refined through a series of inter-regional workshops and ICAO Secretariat coordination. It was noted that the proposed *Asia/Pacific Region ATM Contingency Framework* (APAC RACF) would replace the current *Asia/Pacific Region ATM Contingency Plan Version 3.0* and strengthen regional contingency planning, preparedness, response, recovery and post-assessment.

6.3.13 The principal features of the proposed APAC RACF were presented, including common contingency planning principles, standardized contingency terminology, contingency procedures and arrangements, defined governance arrangements, a contingency management cycle, and guidance for national contingency planning. The Meeting also noted that the APAC RACF supports harmonized contingency management and inter-regional coordination while maintaining consistency with the provisions of ICAO Annex 11.

6.3.14 Recognizing that further work would be required following adoption of the RACF, particularly on the development of standardized Contingency Procedures and Arrangements (CPAs), the regional contingency risk register and future amendments to the Framework, the Meeting agreed to establish the Asia/Pacific Region ATM Contingency Framework (RACF) Task Force through the following Decision:

Decision ATM/SG/14-13: Establishment of the Asia/Pacific Region ATM Contingency Framework (RACF) Task Force

That, in order to support the implementation and continuous development of the *Asia/Pacific Region ATM Contingency Framework (RACF)*, the ATM Sub-Group establishes the Asia/Pacific Region ATM Contingency Framework (RACF) Task Force with the following initial terms of reference:

a) develop standardized regional Contingency Procedures and Arrangements (CPAs);

b) develop, maintain and periodically review the Asia/Pacific regional contingency risk register;

c) review lessons learned from contingency events and propose amendments to the RACF, as appropriate;

d) support harmonization of the RACF with corresponding frameworks developed by other ICAO regions; and

e) report progress and recommendations to future meetings of the ATM Sub-Group.

6.3.15 In response to an enquiry, the Secretariat clarified that further work was required to develop the *APAC Region ATM Contingency Monitoring Mechanism*, which could be based on the *Regional ATM Contingency Plan Monitoring and Reporting Form*. In this regard, it was proposed that this matter be included within the scope of the Task Force's tasks and responsibilities.

6.3.16 The Meeting further agreed to recommend that APANPIRG adopt the *Asia/Pacific Region ATM Contingency Framework (Version 1.0)*, replacing the current *Asia/Pacific Region ATM Contingency Plan Version 3.0*, and encouraged States/Administrations to review and update their national ATM contingency plans accordingly. The Meeting also requested the Secretariat to continue coordinating with ICAO HQ and other ICAO Regional Offices to maintain harmonization of regional ATM contingency frameworks.

Draft Conclusion ATM/SG/14-14: Adoption of the Asia/Pacific Region ATM Contingency Framework (RACF)

That,

1. the *Asia/Pacific Region ATM Contingency Framework (RACF)*, as contained in **Appendix L** to the Report, be recommended to APANPIRG for adoption as the regional framework for ATM contingency planning and management; and
2. upon adoption by APANPIRG, the *Asia/Pacific Region ATM Contingency Framework (RACF)* replace *the Asia/Pacific Region ATM Contingency Plan Version 3.0 (August 2019)*.

6.3.17 The Meeting noted that, following adoption of the *Asia/Pacific Region ATM Contingency Framework (RACF)*, AAC WS3 would transition from framework development to implementation support. In coordination with the ICAO APAC Office, AAC WS3 agreed to lead the development and facilitation of regional ATM contingency Table-Top Exercises (TTXs), support validation of contingency arrangements, capture operational lessons learned, and provide implementation feedback to support the continuous improvement of the APAC RACF.

<u>Multi-stakeholder Table-top Exercise on Air Traffic Management Contingency Plans Operations in the Kota Kinabalu Flight Information Region (KK FIR) (IP/18)</u>

6.3.18 The Meeting was informed of Malaysia’s experience in conducting a multi-stakeholder TTX to assess the effectiveness of its ATM contingency arrangements for the Kota Kinabalu Flight Information Region (KK FIR). The exercise involved key stakeholders, including the Civil Aviation Authority of Malaysia (CAAM), the Royal Malaysian Air Force (RMAF), Malaysia Meteorological Department, technical service providers, and operational partners, and simulated three contingency scenarios: volcanic ash activity, a TRA for military operations, and ATM facility malfunction with partial loss of building capability.

6.3.19 The exercise successfully validated existing contingency plans, demonstrated the resilience of ATM services, and confirmed the effectiveness of communication, coordination, and decision-making processes during operational disruptions. Key lessons identified included the importance of timely information sharing, strong civil-military coordination, clearly defined communication channels, and regular multi-agency validation exercises. Malaysia also reported the development of an ATM Contingency TTX Handbook to support future preparedness activities and indicated its intention to incorporate lessons learned into future contingency plan enhancements and expand similar exercises to other flight information regions where appropriate.

Agenda Item 6: ATM Coordination and Implementation

6.4 ATS Route Development

Guidance Material for the Implementation of FRTO in the Asia/Pacific Region (WP/32)

6.4.1 IATA presented a summary of the work undertaken by AAC Workstream 4 in developing the *Guidance Material for the Implementation of Free Route Trajectory Operations (FRTO) in the Asia-Pacific Region*. The guidance material was developed based on lessons learned from the South-East Asia–Oceania (SEA-O) FRTO Trial conducted between August 2024 and October 2025, involving multiple States, ANSPs, and airline operators. The trial demonstrated operational, environmental, and economic benefits through enhanced flight planning flexibility, reduced fuel consumption, lower emissions, and improved cross-border collaboration. The document consolidated regional experiences, lessons learned, and best practices to support States, ANSPs, and airspace users in the safe, structured, and harmonized implementation of FRTO initiatives.

6.4.2 The guidance material provided a comprehensive roadmap for FRTO implementation, encompassing stakeholder engagement, regulatory alignment, airspace design, safety risk management, technology requirements, operational trials, performance monitoring, and regional harmonization. The guidance emphasized the importance of a phased implementation approach, progressing from direct routing and User-Preferred Routes (UPRs) to Free Route Airspace (FRA), and ultimately to large-scale cross-border FRA, while maintaining robust safety oversight and continuous performance evaluation. Through case studies and implementation experiences from APAC States, the guidance material highlighted practical lessons learned and reinforced the importance of collaboration among regulators, ANSPs, airlines, and military stakeholders.

6.4.3 It was highlighted that the guidance material had undergone several iterations and reviews by key AAC Workstream 4 members, participants of the SEA-O FRTO Trial, and the AAC prior to its endorsement. The document was subsequently submitted to the Sixth Meeting of the APAC ANSP Committee (AAC/6, Da Nang, Viet Nam, 6 July 2026), where it received endorsement from the Committee members. The *Guidance Material for the Implementation of FRTO in the Asia-Pacific Region (Version 1.0)*, as provided in **ATM/SG/14 WP/32 Appendix A**, was made available on the AAC section of the ICAO APAC Office website. States/Administrations were encouraged to utilize the guidance material as a reference to support future FRTO initiatives and advance the objectives of the ICAO GANP and the *Asia/Pacific Seamless ANS Plan*.

6.4.4 Indonesia reaffirmed its commitment to supporting the continued implementation of FRTO in the APAC region and encouraged the continued sharing of operational results and implementation experience, including operational efficiency and environmental benefits, to facilitate wider implementation across the APAC region.

Proposal for Advancing Regional Collaboration and Accelerating Parallel Route A1 Implementation (WP/33)

6.4.5 China and Hong Kong China presented a proposal to advance regional collaboration and accelerate the implementation of parallel route to ATS route A1, highlighting the increasing operational significance of the route linking Southeast Asia and Northeast Asia. Rapid traffic recovery and sustained growth had increased demand on the route and further intensified challenges related to airspace capacity, controller workload, flight level allocation, and air traffic management.

6.4.6 Particular attention was drawn to the operational complexities arising from the current bi-directional route structure, including flight conflicts associated with terminal operations in the Sanya and Da Nang areas, as well as traffic surges caused by weather-related rerouting during major tropical cyclone events. These developments underscored the need for enhanced route efficiency, operational resilience, and regional coordination to support future traffic growth.

6.4.7 Progress achieved under the South China Sea Traffic Flow Review Group (SCSTFRG) was also highlighted, including consensus among the concerned States/Administrations on the establishment of parallel unidirectional routes as a regional priority. Agreement had been reached on key technical elements, including the allocation of the northern route for westbound traffic and the southern route for eastbound traffic, while discussions on remaining technical parameters continued among the relevant parties. Ongoing coordination was noted, together with the need for strengthened cross-FIR communication and collaboration. Continued engagement with ANSPs, airlines, IATA, and other operational stakeholders was encouraged to facilitate implementation, optimize operational arrangements, and enhance the safety, efficiency, and resilience of the regional air navigation system.

6.4.8 IFALPA supported the establishment of a parallel ATS route to A1 and emphasized that implementation should be supported by appropriate safety assessments and close coordination among the States concerned.

Establishment of a Parallel ATS Route to A1 ATS Route (Flimsy/01)

6.4.9 The Meeting noted the proposal presented by Viet Nam on the establishment of a parallel ATS route to A1. The Meeting noted the operational importance of ATS route A1 in supporting traffic between Northeast Asia and Southeast Asia and the continuing increase in traffic demand in the region. The Meeting further noted that the establishment of a parallel route was intended to enhance flight safety, increase airspace capacity, improve air traffic flow and provide operational benefits to airspace users.

6.4.10 The Meeting recalled that the development of a parallel ATS route had been discussed at successive meetings of the SCSTFRG and the SAIOSEACG since 2023. The Meeting noted that the relevant States had reached a common understanding on the route concept and that SCSTFRG had encouraged the timely implementation of the agreed arrangements with a view to commencing trial operations in 2027.

6.4.11 Viet Nam informed the Meeting that it had been progressing the implementation of a uni-directional RNAV 2 parallel ATS route connecting to the existing ITBAM waypoint, consistent with the proposals discussed by the relevant coordination groups. In this regard, Viet Nam proposed to retain the route alignment as discussed at previous coordination meetings be retained as the baseline for implementation.

6.4.12 China emphasized that the reference of ITBAM was a technical proposal rather than the final decision.

6.4.13 The Meeting noted the views expressed by the States/Administrations concerned regarding the proposed establishment of a parallel ATS route to A1, including their continued support for the initiative and the need to resolve the remaining technical issues through further coordination.

6.4.14 The Chairperson encouraged the States/Administrations concerned to continue discussions through the appropriate coordination mechanisms to resolve the remaining issues and report progress at a future meeting, as appropriate.

Outcome of Data-Driven Airspace Efficiency Study on ATS Route Proposals at Europe-Asia Interface (WP/34, SP/03)

6.4.15 IATA presented the outcomes of its Data-Driven Airspace Efficiency Study, conducted in collaboration with airlines, ANSPs, and other industry stakeholders to address airspace efficiency challenges at the Europe–Asia interface arising from geopolitical conflicts, airspace restrictions, and shifting traffic flows. The study focused on key FIRs including Almaty, Lanzhou, Urumqi, and Ulaanbaatar, where increasing traffic demand and airspace constraints had affected operational performance. The Meeting noted that the study applied a comprehensive data-driven and performance-based methodology, including analysis of historical flight and NOTAM data, statistical modelling, stakeholder consultations, technical site visits, and multi-dimensional performance assessments. An industry validation workshop involving representatives from States, ANSPs, airlines, and international organizations was also conducted, resulting in broad endorsement of the study methodology and findings.

6.4.16 The Meeting further noted that simulations covering 68,256 flights demonstrated significant potential benefits from the proposed ATS route optimizations through the Urumqi and Ulaanbaatar FIRs. Analysis indicated that 14.4 per cent of flights had been affected by NOTAM-related airspace restrictions, resulting in substantial delays, while the proposed alternative routes could potentially reduce annual flight time by approximately 4,968 hours, fuel consumption by 33,530 tonnes, CO_2 emissions by 105,623 tonnes, route charges by approximately USD 2.04 million, and delay time by 13,084 hours. The Meeting was informed of the strategic value of the proposed ATS routes in enhancing regional airspace resilience and operational efficiency and noted IATA's recommendations for strengthened cross-border and civil-military cooperation, the adoption of data-driven decision-making approaches, and the progressive development of digital and technology-enabled airspace management solutions.

6.4.17 The Meeting noted Mongolia's support for the initiative and its willingness to cooperate with IATA and the States concerned. China acknowledged the value of the study and indicated its willingness to continue dialogue with IATA while noting that some proposals might had limited feasibility in the short term due to broader airspace considerations. The Meeting emphasized the importance of strengthening cross-border collaboration and data exchange to enhance common situational awareness during periods of restricted airspace availability.

6.4.18 The Secretariat informed the Meeting that the ATS route proposals provided in the paper had been incorporated into the draft *Asia/Pacific Region ATS Route Catalogue (Version 26)*, which would be reviewed under **ATM/SG/14 WP/35**.

Asia/Pacific Region ATS Route Catalogue (WP/35)

6.4.19 The Secretariat provided the latest updates to the *Asia/Pacific Region ATS Route Catalogue*, which had been under continuous review since 2004 and had helped track current and future regional air traffic needs. The most recent update (Version 25.2) incorporated feedback and coordination outcomes from BOBTFRG/7 and SAIOSEACG/5, and was intended to improve operational efficiency, environmental performance, and cross-regional connectivity.

6.4.20 The following updates were discussed:

a) route proposals presented by IATA in **ATM/SG/14 WP/34** had been incorporated as IATA 03 and IATA 04;

b) SCS 19: the PfA on the establishment of ATS route M757 had been approved (State Letter T3/2.6, T3/3.1-AP019/26 (ATM) dated 3 February 2026 referred). Malaysia and Thailand were requested to confirm whether the implementation of the ATS route had been promulgated in their respective AIPs. Following publication, SCS 19 would be removed. It was noted that Malaysia was in the process of promulgating the information in its AIP, with publication targeted for November 2026;

c) feedback received from Japan on FE0008 / RDGE 15.003 / APAC RUS 5, FE0021 / RDGE 13.028 / APAC RUS 4, and FE0056 / RDGE 20.017 had been incorporated;

d) WPC 01: Philippines commented that the route proposal was not feasible for implementation due to safety concerns and proposed for removal; and

e) Thailand updated the route descriptions for BOB 03 as follows: Route 1: BKK (1353.61N 10035.78E) – **GUSOP** – New POXEM – PTN (1648.78N 9446.78E); and Route 2: BKK (1353.61N 10035.78E) – **IKIGO** – DAMIM – PUMEK (1528.64N 9748.61E) – BGO (1719.11N 9631.20E). Implementation was expected in September 2027.

6.4.21 IATA commented that route proposals rejected by States/Administrations should be accompanied by relevant justification and evidence, noting that as at the moment the *Asia/Pacific Region ATS Route Catalogue* had not been effectively utilized for the evaluation and coordination of such proposals.

6.4.22 The Meeting reviewed and agreed to the updated *Asia/Pacific Region ATS Route Catalogue (Version 26)*, as provided in **Appendix M** to the Report, which would be published on the ICAO APAC Office eDocuments webpage.

Establishment of ATS Route L770 (IP/12)

6.4.23 The Meeting noted the planned implementation of the new unidirectional ATS route L770, based on the RNAV 2 navigation specification, which had been jointly developed by China, Lao PDR and Thailand, to enhance connectivity between the Bangkok and Kunming FIRs and accommodate the increasing regional air traffic demand. The initiative had progressed through a series of coordination meetings and technical workshops since 2024, and it was reported that ATS route L770 would reduce flight distances by approximately 27.5 to 35.2 NM, thereby enhancing operational efficiency. The Meeting further noted that the required approvals had been obtained from the relevant authorities, operational coordination arrangements had been updated, and the route had been scheduled for implementation on 3 September 2026. In addition, the Meeting noted that the establishment of ATS route L770 represented the first phase in the development of a unidirectional parallel route structure intended to supplement ATS route A581.

6.4.24 The Meeting noted China's update on the coordinated implementation of new ATS route entry and exit points at the China–Lao PDR interface, with implementation planned before the end of 2026.

Progress Update on Direct Route Operations (DRO) Implementation Initiative in Malaysia (IP/19)

6.4.25 Malaysia presented its progress in implementing DRO within the Kuala Lumpur FIR (KL FIR) and KK FIR, as part of its broader FRTO initiative aimed at improving airspace efficiency, operational performance, and environmental sustainability. Malaysia reported that the phased implementation, which commenced in 2025, successfully introduced direct routing opportunities following comprehensive safety assessments, stakeholder consultation, and operational evaluations.

6.4.26 Further enhancements were implemented in 2026, including five additional direct routes within the KL FIR that reduced flight distances and supported more efficient flight trajectories. The initiative demonstrated effective collaboration among operational, planning, and aeronautical information management functions, while maintaining required safety and operational oversight. Malaysia also highlighted ongoing efforts to identify further route optimization opportunities through engagement with airspace users and neighbouring ANSPs, including the potential development of cross-boundary direct routing concepts, as part of its long-term vision for progressive implementation of FRTO across KL FIR and KK FIR.

Agenda Item 6: ATM Coordination and Implementation

6.5 Civil-Military ATM Cooperation

Outcomes of the Inter-Regional Workshop on Civil-Military Cooperation in ATM and Flexible Use of Airspace (WP/36)

6.5.1 The Secretariat presented the outcomes of the ICAO Inter-Regional Workshop on Enhanced Civil-Military Cooperation in Air Traffic Management (CMAC) and Flexible Use of Airspace (FUA) Implementation, held in Bangkok, Thailand, from 19 to 23 January 2026. The Workshop brought together over 110 participants from civil aviation authorities, ANSPs, military organizations, international organizations and industry stakeholders from the APAC and European (EUR) regions. Participants exchanged implementation experiences, discussed challenges and best practices, visited the joint civil-military Airspace Management Cell (AMC) of AEROTHAI, and took part in practical exercises on airspace management and civil-military coordination. The Workshop highlighted the importance of CMAC and FUA as key enablers of airspace capacity, operational efficiency, safety and environmental sustainability.

6.5.2 The Meeting noted the Workshop recommendations aimed at advancing FUA implementation in the APAC region, including the development of regional templates for Airspace Use Plans (AUPs) and Updated Airspace Use Plans (UUPs), enhancement of procedures for airspace-use information exchange, promotion of machine-readable information formats, and the establishment of key performance indicators to assess FUA effectiveness. The Meeting further discussed on the proposal to establish an APAC Flexible Use of Airspace Task Force to develop regional guidance material and support harmonized implementation across the region, and agreed on the following Decision:

Decision ATM/SG/14-15: Establish APAC Flexible Use of Airspace Task Force

That, the APAC Flexible Use of Airspace Task Force be established to develop regional guidance material that include but not limited to, the following tasks:

a) develop a regional template for airspace use plan (AUP) and updated airspace use plan (UUP) for FUA operations;

b) review and update the APAC document on NOTAM Templates for FUA in accordance with the relevant ICAO provisions and the guidance;

c) develop procedures to support efficient and effective promulgation of airspace use information, including machine readable output format; and

d) review and/or develop regional KPIs to measure FUA effectiveness.

6.5.3 In response to an enquiry, the Secretariat commented that matters relating to the use of military and/or joint civil-military aerodromes as alternate aerodromes were not currently included in the draft TOR of the APAC Flexible Use of Airspace Task Force. It was noted that the draft TOR (**ATM/SG/14 WP/36 Appendix B**) would be further discussed and finalized during the inaugural meeting of the Task Force.

6.5.4 In addition, the Meeting noted the recommendation of the Workshop to withdraw outdated regional guidance materials on CMAC/FUA, recognizing that ICAO Doc 10088 had provided comprehensive and globally applicable guidance on CMAC, and agreed on the following Conclusion:

Conclusion ATM/SG/14-16: Withdraw Outdated Materials on CMAC/FUA from the ICAO APAC Office eDocuments Webpage

That, the following documents be withdrawn from the ICAO APAC Office eDocuments webpage:

a) APAC Flexible Use of Airspace (FUA) Manual Template; and

b) Interim Guidance Material on Civil/Military Cooperation in Air Traffic Management.

6.5.5 The Meeting invited the States/Administrations to take appropriate actions in accordance with the Recommendations from the ICAO Inter-Regional Workshop on CMAC/FUA (**ATM/SG/14 WP/36 Appendix A**).

<u>Survey Outcome on Civil-Military Cooperation in ATM and Flexible Use of Airspace Implementation in APAC Region (WP/37, SP/04)</u>

6.5.6 The Meeting noted the results of an ICAO APAC Survey on Civil-Military Cooperation in Air Traffic Management (CMAC) and Flexible Use of Airspace (FUA) which was circulated via a State Letter [RSO – AP104/25 (RSO)] in September 2025. 22 States/Administrations had completed the Survey and provided a single response respectively to the ICAO APAC Office before 31 March 2026. Participating organizations of each States/Administrations include Civil Aviation Authorities (CAAs) and/or ANSPs. The survey results, together with the corresponding questionnaires, were provided in **ATM/SG/14 WP/37 Appendix A**.

6.5.7 Key findings indicated that implementation maturity varies significantly among responded States/Administrations. While three States had fully implemented all ten CMAC/FUA elements identified by APANPIRG, most respondents were at varying stages of development. Approximately half of the respondents had established high-level civil-military coordination bodies, and Special Use Airspace (SUA) management is the most widely implemented element. FUA implementation was progressing, with 12 States/Administrations reported implementation and six more under development, although fully mature, all-phased FUA remains limited.

6.5.8 The Survey highlighted growing recognition of the importance of civil-military data sharing and ATM system integration, with 14 respondents reported data sharing interoperability between civil and military systems. However, gaps remained in areas such as the establishment of joint civil-military AMC, common civil-military training, performance monitoring of FUA operations, integration with initiatives such as ATFM, FRA, and UAS/RPAS operations, as well as the establishment of comprehensive regulatory frameworks.

6.5.9 The principal challenges identified were limited financial, technical and human resources, technological differences between civil and military systems, national security concerns, insufficient regulatory frameworks, and limited technical guidance. Nevertheless, respondents reported significant benefits from CMAC/FUA implementation, particularly in terms of safety, capacity enhancement, operational efficiency, contingency response, and fuel/emissions reduction.

6.5.10 Respondents emphasized the value of strong institutional arrangements, regular civil-military coordination mechanisms, and joint training programmes. Priority areas for future development include strengthening strategic coordination frameworks, expanding FUA implementation, and enhancing civil-military data sharing and system integration. Respondents also requested ICAO support through regional guidance material, technical guidance, workshops, training programmes, and assistance in developing national strategies.

6.5.11 The Meeting emphasized the need for States/Administrations continue establishing high-level civil-military coordination mechanisms, implement phased FUA and three-level ASM concepts, strengthen post-operational assessment processes, enhance joint civil-military training or workshop as a low-cost, high-trust building measure, further the civil-military data sharing interoperability and ATM system integration, and share best practices.

Agenda Item 7: AOP, AIM, MET, SAR

Outcomes from MET SG/28 Relevant to ATM/SG (WP/38)

7.1 The Secretariat presented the outcomes of the Thirtieth Meeting of the Asia/Pacific Meteorology Sub-Group (MET SG/30, Bangkok, Thailand, 20 – 24 July 2026) that were relevant to the work programme of the ATM/SG. It was noted that MET SG/30 had reviewed progress in aeronautical meteorological service implementation, with particular emphasis on meteorological support for ATM operations, SWIM-enabled services, ICAO Meteorological Information Exchange Model (IWXXM) implementation, Air Navigation Deficiency management, aviation hazard information, and *APAC ANP Volume III* development. The Meeting further noted the continued efforts to strengthen operational integration between meteorological and ATM stakeholders through collaborative initiatives and future MET/ATM engagement activities.

7.2 The Meeting noted that MET SG/30 had approved updates to the *APAC Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations* and had adopted ***Decision MET SG/30-08*** to support the continuous improvement of meteorological services used in ATM decision-making. The Meeting also noted ongoing regional challenges associated with the implementation of the IWXXM, including version compatibility, dissemination capabilities, and supporting communication infrastructure. In this regard, MET SG/30 had formulated draft conclusions to promote harmonized IWXXM implementation and strengthen regional and global meteorological information exchange in support of ATM modernization and SWIM initiatives.

7.3 With respect to Air Navigation Deficiencies, the Meeting noted that MET SG/30 had reviewed a number of outstanding MET deficiencies affecting the region and had adopted conclusions concerning the provision of IWXXM SIGMETs, meteorological advisories, and METAR/TAF information. The Meeting further noted concerns regarding differing interpretations of APANPIRG Air Navigation Deficiency identification and management procedures and that ***Action Item MET SG/30-02*** had been established to seek clarification and promote consistent application across APANPIRG contributory bodies. The outcomes were recognized as having direct relevance to ATM-related deficiency monitoring, assessment, and resolution activities.

7.4 The Meeting also noted the discussions on volcanic activity information dissemination and the continued development of the *APAC ANP Volume III*. In particular, MET SG/30 had identified the need for further consideration of Volcano Observatory Notice for Aviation (VONA) dissemination arrangements and had requested coordination with ATM/SG due to the operational implications ATM. The Meeting further noted feedback from MET SG/30 regarding the need for clearer identification of MET-related implementation expectations, priorities, targets, and indicators within *APAC ANP Volume III*, recognizing the importance of these elements in supporting regional implementation planning, performance monitoring, and future air navigation improvements.

Provision of NOTAM for Volcanic Activity (WP/39)

7.5 New Zealand presented the provision of NOTAM for volcanic activity, including developments following MET SG/30 regarding the reporting of volcanic activity in Tonga. The Meeting noted the establishment of national coordination arrangements to support the dissemination of VONA and the issuance of NOTAM to improve awareness of volcanic hazards.

7.6 The Meeting further noted recent developments within the ICAO Meteorology Panel concerning the provision of information on significant pre-eruptive volcanic activity. It was explained that a VONA with an aviation colour code of yellow or higher may constitute an operationally significant change in volcanic activity, and that updated guidance in the *Handbook on the International Airways Volcano Watch* (ICAO Doc 9766) to published later this year, recommended that NOTAM issued for pre-eruptive volcanic activity within an FIR should normally specify an upper limit of UNL, unless otherwise advised by the relevant State Volcano Observatory.

7.7 Recognizing the importance of ensuring consistent notification of pre-eruptive volcanic activity to support flight planning and operational safety, the Meeting agreed that the harmonization of NOTAM practices and associated text within the APAC region should be further considered in coordination with the appropriate AIM, MET and ATM experts.

7.8 The Meeting agreed that this matter would be further discussed at the Twenty-Second Meeting of the AIS – AIM Implementation Task Force (AAITF/22) in 2027.

Facilitating Industry Shift to Data-driven Turbulence Mitigation (SP/05)

7.9 The Meeting noted the presentation by IATA on facilitating the industry's transition to data-driven turbulence mitigation. The presentation highlighted the increasing safety and operational impacts of turbulence and described the limitations of traditional turbulence reporting methods, including subjective pilot reports and forecast-based information. The Meeting noted that advances in aircraft technology now enable the objective measurement of turbulence using Eddy Dissipation Rate (EDR) data.

7.10 The Meeting was informed of IATA's Turbulence Aware programme, a global platform for the real-time sharing of anonymized EDR turbulence data. The programme enables participating airlines to share objective turbulence information while retaining ownership of their data and supports integration with flight planning, Electronic Flight Bag (EFB), ATM and meteorological systems to enhance operational situational awareness.

7.11 Continued growth of the Turbulence Aware programme was noted, with increasing numbers of participating aircraft, airlines and turbulence reports. Potential operational benefits identified included improved flight planning and turbulence avoidance, enhanced air traffic flow management, support for meteorological research and SIGMET validation, and improved safety through the availability of objective, real-time turbulence information.

7.12 The Secretariat informed the Meeting that PIRG & RASG Regional Coordination Meeting held twice annually to discuss subjects of common interest. The Secretariat further informed the Meeting that turbulence encounters had been added to the common subjects in the previous year, with RASG-APAC serving as the lead and the ATM and MET sections coordinating the matter on behalf of APANPIRG. The Secretariat also indicated its intention to include the outcomes of the coordination meetings in future ATM/SG reports.

AIS – AIM Implementation Task Force (AAITF/21) Outcomes (WP/40)

7.13 The Meeting noted the outcomes of the Twenty-First Meeting of the AIS – AIM Implementation Task Force (AAITF/21) relevant to ATM operations. The Meeting recognized that the work of AAITF continues to support the implementation of digital AIM capabilities, the improvement of aeronautical information quality, the resolution of duplicated Five-Letter Name Codes (5LNC), the development of SWIM-enabled information services, and the implementation of FF-ICE and TBO.

7.14 The Meeting reviewed the regional implementation status of Phase III of the *Asia/Pacific Regional Plan for Collaborative AIM*, as illustrated in **Figure 2**, and noted that implementation remained at an early stage. Recognizing the need to align the regional plan with evolving ICAO digital AIM provisions and the migration of regional planning material to the *APAC ANP Volume III*, the Meeting supported ***Conclusion AAITF/21-2***, which revised the implementation timeline for Phase III to 20 November 2031.

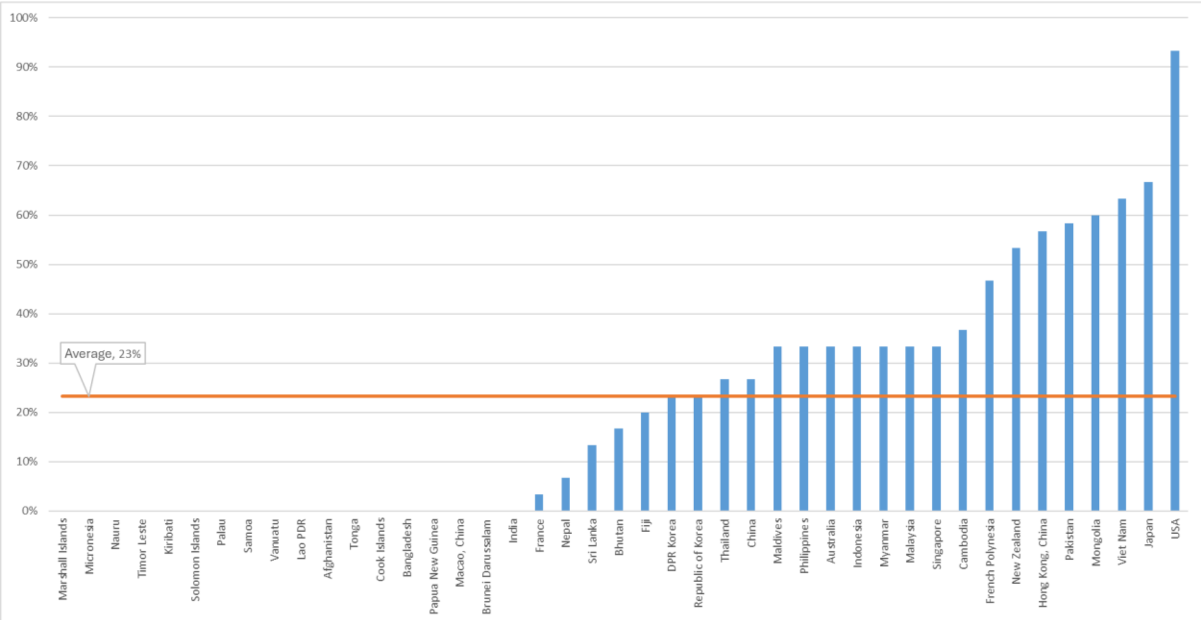

Figure 2. Regional Phase III Implementation Progress

7.15 The Meeting also reviewed the regional analysis of NOTAM, as illustrated in **Figure 3**. While noting improvements in reducing the number of old NOTAM, concern was expressed over the continued proliferation of active NOTAM and the use of long-duration or repeatedly replaced NOTAM in circumstances where the information should have been incorporated into the AIP or an AIP Supplement. The Meeting recognized that improvements in NOTAM quality would enhance flight planning, controller situational awareness and operational decision-making, and noted the importance of maintaining current AIS points of contact to support the timely dissemination of aeronautical information during contingency situations.

Figure 3. Regional NOTAM Analysis

7.16 Progress of the APAC 5LNC Ad Hoc Group in addressing the shortage and duplication of waypoint identifiers, including the utilization of Five-Alpha Numeric Name Codes (5ANNC), continued ICARD coordination and the resolution of duplicated 5LNCs, was noted. The Meeting also recognized that duplicated waypoint identifiers could adversely affect CPDLC route uplink, flight management systems and future FF-ICE and TBO operations, and supported ***Conclusion AAITF/21-1***, encouraging States/Administrations to consider the use of 5ANNC and share implementation experience and best practices.

7.17 The Meeting was reminded of the outcome of AAITF/19 (Bangkok, Thailand, 10–14 June 2024), which agreed that States should plan well in advance when submitting 5LNC requests through ICARD. States were requested to limit submissions to a maximum of ten 5LNC requests per week. Where more than 40 requests were expected to be submitted over any four consecutive weeks, States were requested to notify ICAO by email at least two weeks in advance. AAITF/19 also recommended that States allow a minimum processing period of 30 working days.

7.18 Continuing developments relating to digital AIM, SWIM-enabled aeronautical information services and *APAC Common SWIM Information Services* were also noted. National implementation initiatives and the work of the APAC 5LNC Ad Hoc Group were recognized as important steps towards supporting machine-readable aeronautical information, system-wide information management, FF-ICE and future trajectory-based operations.

7.19 The Meeting noted Japan's update on the implementation of Information Services, which commenced on 4 March 2026, and its emphasis on the importance of establishing effective national governance arrangements, engaging AIS units and stakeholders at an early stage, and preparing for the regional transition to AIXM 5.1.1. Japan also highlighted the need to strengthen data migration and GIS capabilities, develop clear operational concepts and service descriptions, and ensure that future services meet diverse user requirements through both web-based interfaces and API services.

7.20 The Meeting also noted Pakistan's update on its implementation of the 5LNC replacement programme, under which more than 150 duplicated 5LNCs had been replaced, resulting in no duplicated 5LNCs within Pakistan. Pakistan expressed reservations regarding the potential future use of five-letter alphanumeric codes for ATC purposes, noting the need for further study to ensure compliance with ICAO requirements for unique 5LNCs.

7.21 China and Pakistan highlighted that ICAO Annex 11 and the *Procedures for Air Navigation – Aircraft Operations* (PANS-OPS, ICAO Doc 8168) currently specified the use of 5ANNC in support of RNAV SIDs, STARs, and instrument approach procedures, but not for en-route phases. It was therefore suggested that ATMOPSP be consulted regarding the proposal to utilize 5ANNC for the en-route phase, taking into consideration compliance with, and any potential amendments to, ICAO Annex 11 and PANS-OPS.

7.22 The Meeting acknowledged that the availability of unique 5LNCs continues to present a challenge and recognized the need to consider future approaches to address the limited availability of 5LNCs.

Challenges of 5LNC Utilization and Suggestions to ICARD (WP/41)

7.23 The Meeting considered a paper presented by China on the challenges associated with the utilisation of 5LNCs and suggestions for improvements to the ICAO ICARD. The paper highlighted the increasing demand for 5LNCs, resulting in growing difficulties in obtaining suitable new name-codes, longer processing times for ICARD applications and challenges associated with sound-like proximity checks.

7.24 It was also noted that certain sound-like combinations, such as AGTAP, AGTOB and AGTEL, had been approved by ICARD despite operational concerns identified during controller simulations. In addition, the paper referred to the implementation status of ***Conclusion ATM/SG/13-8***, noting that unallocated identifiers beginning with the letter "X" remained available for selection in ICARD.

7.25 Several improvements were presented, including enhancements to ICARD functionality and sound-like screening algorithms, a review of approval procedures and timelines, accelerated implementation of ***Conclusion ATM/SG/13-8***, and further consideration of the wider use of 5ANNCs. In response, the Secretariat informed the Meeting that these matters had already been discussed by the APAC 5LNC Ad Hoc Group under the AAITF. With regard to ICARD applications, the Secretariat recalled that the AAITF had agreed that, where practicable, large numbers of 5LNC requests should be submitted in phases rather than as a single batch to facilitate more efficient processing. The Secretariat also advised that, owing to the increasing number of applications and the limited human resources available for ICARD processing, longer processing times might occasionally be unavoidable.

7.26 Regarding ICARD-related issues, the Secretariat recalled that the APAC 5LNC Ad Hoc Group continued to consider matters related to the further development of ICARD. The Meeting was further informed that representatives of the Ad Hoc Group had been nominated to participate in ICAO HQ-led discussions on ICARD to ensure that the operational experience and regional requirements of the APAC Region are appropriately reflected in future global developments.

7.27 The Meeting acknowledged China's willingness to join the APAC 5LNC Ad Hoc Group for further discussions on ICARD-related matters. The Meeting noted that China's participation would facilitate the exchange of views and contribute to the Group's ongoing work.

Progress on Aerodrome-related Information Services for the APAC Common SWIM Aeronautical Information Services (WP/42)

7.28 The Meeting considered a paper presented by the Secretariat on the progress of the APAC Common SWIM Aeronautical Information Services relating to the Aerodrome Feature Service and the Runway Surface Condition Report Service. The Meeting noted that the APAC Common SWIM Aeronautical Information Services Ad Hoc Group had developed the initial set of regional information services, which had been endorsed by APANPIRG/36, and had subsequently conducted further reviews with aerodrome Subject Matter Experts (SMEs) to ensure that operational aerodrome requirements were appropriately reflected.

7.29 The Ad Hoc Group had agreed to proposed amendments to the Aerodrome Feature Service, including revisions to the service description and clarification of the information to be exchanged. The revised proposal was confirmed to remain consistent with the APAC Common SWIM Aeronautical Information Services framework and to support harmonised implementation using the Aeronautical Information Exchange Model (AIXM).

7.30 The Ad Hoc Group had also undertaken extensive discussions on the proposed Runway Surface Condition Report Service, including the service description, terminology relating to runway condition codes, the relationship with the ICAO Global Reporting Format (GRF) and SNOWTAM, the inclusion of runway condition reports and pilot reports of runway braking action, and consistency with the provisions of ICAO Annex 14. As a result, the service description had been revised to directly reference the GRF, and the information to be exchanged had been simplified by identifying the Runway Condition Code (RWYCC) as the primary information element.

7.31 The Meeting recognized that the proposed amendments would support the harmonized digital exchange of aerodrome information within the SWIM environment and facilitate the regional implementation of SWIM-enabled ATM capabilities, including FF-ICE, Digital NOTAM and TBO. The Meeting agreed to the proposed amendments and supported their submission to the AOP/SG for endorsement, followed by consideration by SWIM TF at its next available opportunity.

Asia/Pacific Search and Rescue Update (WP/43)

7.32 The Eleventh Meeting of the Asia/Pacific Search and Rescue Workgroup (APSAR/WG/11) was held in Bangkok, Thailand from 5 to 8 May 2026. A SAR Workshop was held in conjunction with APSAR/WG/11 on 5 May 2026. Topics covered included an overview of SWIM and SWIM information services; the Global Aeronautical Distress and Safety System (GADSS) concept; Autonomous Distress Tracking (ADT) provisions and aircraft equipage; and an introduction to the Location of an Aircraft in Distress Repository (LADR) and the OPS Control Directory, including a demonstration for registering and accessing information.

7.33 APSAR/WG/11 noted that, based on analysis of 16 USOAP SAR-related PQs in April 2026, the overall EI for SAR had slightly increased to 59 per cent compared with 55 per cent in the previous year. The PQ analysis identified persistent weaknesses in key SAR areas, notably SAR coordination agreements; implementation of training plans for SAR inspectors; effective regulatory surveillance oversight of SAR; detailed SAR operational plans; and verification that SAR operational personnel received regular training, including participation in SAR exercises.

7.34 **Figure 4** illustrated the *Asia/Pacific SAR Plan* implementation status as of 13 July 2026, based on the annual *Regional SAR Plan Monitoring and Reporting Form*, and noted that the majority of States/Administrations had achieved compliance of 70% or higher.

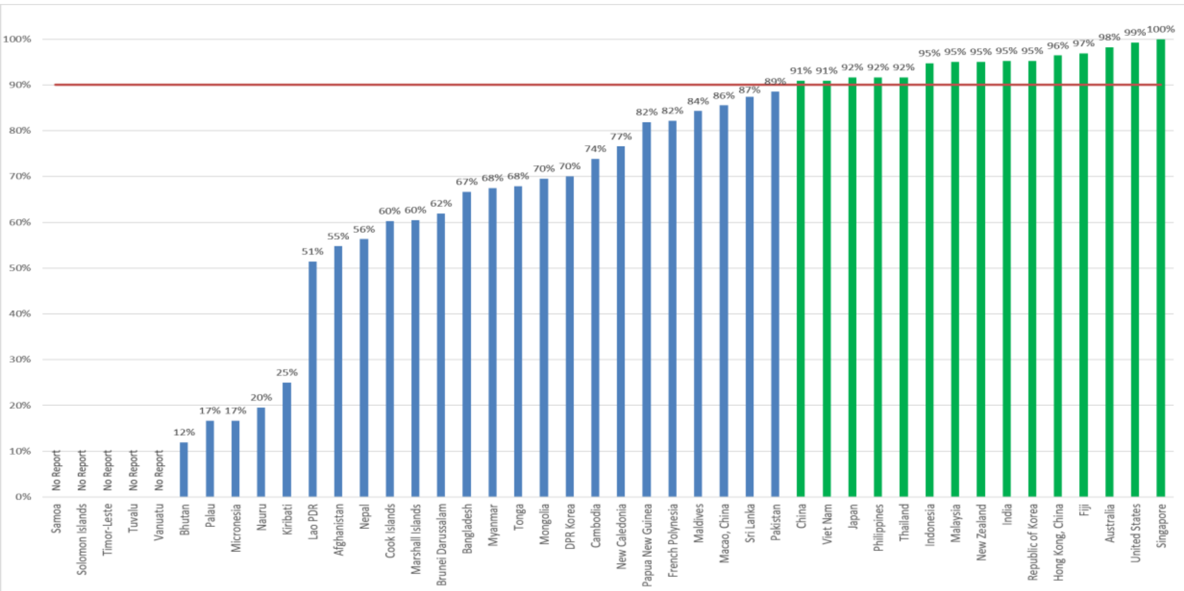

Figure 4. Asia/Pacific SAR Plan Implementation Status, as of 13 July 2026

7.35 Following ***Conclusion ATM/SG/13-10***, only 12 States/Administrations had submitted annual updates on SAR Rescue Unit (SRU) capabilities to the ICAO APAC Office by 28 February for units approved to operate in neighbouring SRRs. APSAR/WG/11 noted that submission of SRU capability information had been voluntary and did not constitute a commitment to provide SAR assistance. States/Administrations were requested to notify the ICAO APAC Office if submission had not been feasible due to sensitivity, and to indicate "Not Applicable (NA)" in the annual *Regional SAR Plan Monitoring and Reporting Form* where appropriate. The submitted SRU capability information had been posted on the ICAO APAC Office eDocuments webpage.

7.36 ***APSAR/WG Task List Action Item 10/2***, which had called on APAC Administrations to intensify efforts for ADT implementation, prompted the ICAO APAC Office to conduct a 2026 follow-up survey to assess anticipated improvements. Only 17 Administrations responded, and the results showed measurable progress across all four categories (States, aircraft operators, SAR service providers and ANSPs) with overall positive responses rising from 48 per cent to 61 per cent, but limited participation and low levels of procedure promulgation and training completion underscored the need for sustained, accelerated regulatory, procedural and training actions to achieve full ADT implementation.

Agenda Item 8: Any Other Business

National Air Navigation Plan (NANP) Implementation (Flimsy/02)

8.1 The Secretariat introduced the planned implementation support initiatives for the period 2026–2028 to assist States in developing, updating and implementing National Air Navigation Plans (NANPs) aligned with the GANP and the Regional Air Navigation Plan (RANP). The Meeting noted that the initiatives, subject to the availability of resources, were expected to be coordinated between ICAO HQ and the Regional Offices and delivered through regional workshops, technical guidance and targeted assistance to strengthen States' capacity to implement GANP-aligned NANPs.

8.2 The Meeting noted that NANPs provided a coordinated national framework for the implementation of air navigation improvements, taking into account the GANP, the applicable RANP and national priorities, and that they supported the translation of regional priorities into nationally coordinated implementation programmes. The Secretariat encouraged States to review the status of their NANPs and identify areas where implementation assistance might be required to facilitate the planning of future support activities. The Secretariat advised that further details would be communicated once the implementation support arrangements had been finalised.

ATM Points of Contact (WP/44)

8.3 The ATM Points of Contact List was circulated to all registered ATM/SG/14 participants, for review and update.

Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination (WP/45)

8.4 The *Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination* was circulated to all registered ATM/SG/14 participants, for review and update.

Enhancement of Inter-Regional Coordination (WP/46)

8.5 The Secretariat presented recent developments relating to Project 30/10 implementation at the interface between the APAC and Middle East (MID) regions. The Meeting recalled that AN-Conf/14 had endorsed ***AN-Conf/14 Recommendation 3.1/1 – Project 30/10: Optimized implementation of longitudinal separation minima***, which promoted the harmonized implementation of reduced longitudinal separation minima. In this regard, the Meeting recognized that successful implementation would require effective coordination among adjacent FIRs and ICAO regions. The Meeting further noted the establishment of the APAC Project 30/10 Task Force (AP30-10/TF) and emphasized the importance of inter-regional collaboration in areas such as the application of separation minima, alignment of implementation timelines, communications, navigation and surveillance capabilities, AIDC implementation, coordination procedures, safety assessments, and implementation monitoring.

8.6 The Meeting also noted the outcomes of recent Special Air Traffic Management Coordination Meeting (SCM) involving States from the APAC and MID regions, including discussions on operational and technical issues affecting major traffic flows and interface optimization between the two regions. The Meeting further noted Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG)'s proposal to establish an APAC–MID Interface Task Force to support Project 30/10 implementation and enhance transparency and coordination. While recognizing the benefits of strengthened inter-regional cooperation, the Meeting considered that further consideration should be given to identifying the most effective and proportionate coordination mechanism, taking into account existing regional arrangements, resource implications, and the effectiveness of established bilateral, multilateral, and special coordination meeting frameworks.

8.7 IFALPA supported enhanced inter-regional coordination through practical operational cooperation rather than additional administrative structures, emphasizing harmonized ATS procedures, enhanced AIDC implementation, joint safety assessments and coordinated contingency planning to support the harmonized implementation of Project 30/10.

8.8 The Meeting recognized the importance of cross-border and inter-regional coordination in harmonizing implementation initiatives, including the application of longitudinal separation minima. The Meeting further noted that the AP30-10/TF's objectives and tasks included promoting and coordinating seamless regional and inter-regional operations, with the objective of supporting the implementation of Project 30/10 by the end of 2028. To avoid duplication of effort, the Meeting considered that implementation and coordination activities should continue to be progressed through existing SCMs, bilateral and multilateral coordination mechanisms, and the AP30-10/TF, as appropriate. The Meeting further considered that the establishment of the proposed new Task Force could be considered at a later stage, if necessary, taking into account the progress of implementation and the effectiveness of the existing coordination mechanisms.

Advanced RNP Navigation Specification Inconsistency in ICAO Documents PANS-OPS (Doc 8168) and PBN Manual (Doc 9613) (IP/13)

8.9 Pakistan presented information on identified inconsistencies between the updated Advanced RNP (A-RNP) navigation specification contained in the *Performance-based Navigation (PBN) Manual* (ICAO Doc 9613, 5th Edition) and the provisions currently reflected in the *Procedures for Air Navigation Services – Aircraft Operations* (PANS-OPS, ICAO Doc 8168) Volumes I and II. It was highlighted that, although the Advanced RNP framework had been revised to align with updated standards, including the removal of final approach applicability and scalable RNP requirements, the corresponding design criteria and operational references in PANS-OPS had not yet been updated accordingly.

8.10 The Meeting noted that these inconsistencies could potentially lead to misinterpretation or inappropriate application of the navigation specification, with associated safety and efficiency implications. The Meeting further noted Pakistan's intention to raise the matter at the Thirteenth Meeting of the Performance-based Navigation Implementation Coordination Group (PBNICG/13, Bangkok, Thailand, 14 – 16 October 2026), for further consideration and discussion by the relevant ICAO forum.

Analysis of Fatigue-Related Voice and Video Characteristics between High-Altitude Aerodrome and Low-Altitude Aerodrome Air Traffic Controllers (IP/14)

8.11 The Meeting noted the information presented by China on the comparative analysis of fatigue-related voice and video characteristics of controllers operating at high-altitude and low-altitude aerodromes. The study found that controllers at high-altitude aerodromes exhibited more pronounced fatigue-related voice and facial characteristics, with the high-altitude environment contributing to accelerated fatigue accumulation. The Meeting also noted China's ongoing efforts to enhance fatigue detection through multimodal audio-video analysis and the development of integrated fatigue monitoring and early warning systems to support controller fatigue risk management.

Key Takeaways from 2025 ATMB & IATA Workshop on APAC ATCO Competency Enhancement and Collaborative Development (IP/15)

8.12 The Meeting was presented the outcomes of the APAC ATCO Competency Enhancement and Collaborative Development Workshop, held in Xi'an, China, in November 2025. The workshop brought together representatives from States, ANSPs, airlines and international organizations to discuss controller competency, operational safety and efficiency, emerging technologies and collaborative operations. The Meeting noted the importance of strengthening cross-border information sharing through regional ATFM collaboration, enhancing operational competencies, and leveraging innovative technologies such as Competency-based Training and Assessment (CBTA), Fatigue Risk Management Systems (FRMS), TBO, FF-ICE and datalink services to improve ATM performance. The Meeting further noted that ATMB and IATA were developing a programme of activities for 2026 and 2027 to support continued regional collaboration and capability development.

Work of ICAO LPRI TF Based on the Results of the IATA Survey on Language Issues in ATC Communication (IP/16)

8.13 The Meeting noted the information presented by IATA on the work of the ICAO Language Proficiency Requirements Implementation Task Force (LPRI TF) Subgroup 2, based on the IATA Survey on Language Issues in ATC Communication. The survey identified communication challenges, including local accents, non-standard phraseology, use of languages other than English, and excessive speech tempo, which increased pilot workload and operational risk. The Meeting further noted that the LPRI TF had developed recommendations to improve communication effectiveness and aviation safety through enhanced standardization, training, oversight and international collaboration.

AAM 2026 (IP/17)

8.14 The Meeting noted the information provided by the Secretariat regarding the Second ICAO Advanced Air Mobility Symposium (AAM 2026), to be held in Bangkok, Thailand, from 1 to 3 December 2026 under the theme "From Vision to Implementation: Enabling the AAM Ecosystem." The Meeting noted that the symposium would focus on the safe and interoperable implementation of AAM, including regulatory, operational, technological and infrastructure aspects, with particular emphasis on integration into the existing aviation system. The Meeting further noted that the event would promote collaboration and the exchange of implementation experience among States, international organizations, industry and academia.

Outcomes of Gender Equality Indicator Survey (SP/06)

8.15 The Secretariat presented the outcomes of the first *APAC Gender Equality Indicators Survey*, which was conducted to assess the implementation of gender equality indicators across the region in support of ICAO Assembly Resolution A41-26 and the Delhi Ministerial Declaration. The survey received responses from 16 States/Administrations and indicated positive progress in establishing safe and inclusive working environments, supported by workplace protection policies and training programmes. However, the results also highlighted limited adoption of measurable gender equality targets and the continued underrepresentation of women in leadership and decision-making positions. The presentation emphasized the need to move from policy commitments to measurable outcomes through the establishment of national targets, integration of gender equality initiatives into aviation strategies and workforce frameworks, and the strengthening of leadership development opportunities for women, with continued support and monitoring by the ICAO APAC Office.

Outcomes of the ICAO Global Artificial Intelligence Survey (SP/07)

8.16 The Secretariat presented the outcomes of the *ICAO Global Artificial Intelligence (AI) Survey*, which was conducted in collaboration with ICAO HQ to assess the current status of AI adoption and the development of AI governance frameworks within the aviation sector. The survey findings indicated that, of the 81 responding States/Administrations globally, 29 had established AI governance frameworks and only three reported extensive AI use, while among the 19 APAC respondents, only three had governance frameworks and none reported extensive AI adoption. The presentation further noted that data analysis and decision support and airport operations were the most common areas of AI application, while key challenges included the lack of international standards, limited expertise and skilled personnel, data privacy and security concerns, and safety assurance and certification issues. The survey outcomes highlighted the need for ICAO guidance on global AI principles, safety assurance, and certification frameworks, and informed ongoing discussions on future ICAO initiatives, including further study of AI governance and the possible establishment of a dedicated task force to develop high-level deliverables.

Agenda Item 9: ATM/SG Task List Update

APANPIRG ATM Sub-Group Terms of Reference and Task List (WP/47)

9.1 The Secretariat presented the ATM/SG TOR for review by the Meeting.

9.2 The ATM/SG Task List as updated by the Meeting was provided in **Appendix N** to the Report.

Agenda Item 10: Date and Venue for Next Meeting

ATM/SG/15

10.1 The Fifteenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/15) of APANPIRG would be tentatively held in August 2027, in Bangkok, Thailand.

Closing of the Meeting

11.1 In closing the Meeting, the Chairperson thanked and congratulated the efforts made by the participants for their contributions to the Meeting.

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LIST OF PARTICIPANTS

		STATE/NAME	TITLE/ORGANIZATION
1.		**AUSTRALIA (2)**	
	1.	Mr. Brad Parker	Section Manager CNS/ATM Civil Aviation Safety Authority
	2.	Mr. James Eason	Senior ATS Specialist Airservices Australia
2.		**BHUTAN (2)**	
	3.	Mr. Dawa Tshering	Asst. Air Traffic Control Officer Department of Air Transport, Bhutan
	4.	Mr. Kencho Tshering	Sr. AIS/PANS-OPS Officer Bhutan Civil Aviation Authority
3.		**CAMBODIA (5)**	
	5.	Mr. OUN Makarm (Online)	Chief of ATS Office of ANS State Secretariat of Civil Aviation of the Kingdom of Cambodia (SSCA)
	6.	Mr. PO Kosal (Online)	ATS Official State Secretariat of Civil Aviation of the Kingdom of Cambodia (SSCA)
	7.	Mr. SOK Piseth (Online)	Director of ATS Operation Cambodia Air Traffic Services
	8.	Mr. KHORN Vannak (Online)	Senior Manager of ATM Development Cambodia Air Traffic Services

	STATE/NAME		TITLE/ORGANIZATION
	9.	Ms. SREYNOCH San (Online)	Aeronautical Management Centre Supervisor Cambodia Air Traffic Services
4.	**CHINA (6)**		
	10.	Mr. Zhifeng Xu	ATC Officer of ATC Division Air Traffic Management Bureau, HQ Civil Aviation Administration of China
	11.	Mr. Peng Jiayi	Senior Engineer of Air Space Management Center of Air Traffic Management Bureau Civil Aviation Administration of China
	12.	Mr. Zhou Dake	Engineer of Operation Center of Air Traffic Management Bureau Civil Aviation Administration of China
	13.	Mr. Liang Jialun	Assistant of ATC Division, Middle-South Regional Air Traffic Management Bureau Civil Aviation Administration of China
	14.	Mr. Cheng Yongyue	Chairperson China RMA
	15.	Mr. Shen Zhiyuan	Professor, Director of Civil Aviation Training Center of Nanjing University of Aeronautics and Astronautics
5.	**HONG KONG, CHINA (2)**		
	16.	Ms. LAI Fung Kwan, Vonnie	Senior Safety & Quality Officer (Terminal) Civil Aviation Department, Hong Kong China

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	17.	Mr. CHEUNG Henry Hin Cheung	Atg. Senior Evaluation Officer Civil Aviation Department, Hong Kong China
6.		**MACAO, CHINA (2)**	
	18.	Mr. CHIU Kuan Hou, Bryan	Safety Officer Civil Aviation Authority - Macao, China
	19.	Ms. CHEONG Kit Meng, Pricilla	Advisor to Head of ATS Division Macau International Airport Co. Ltd.
7.		**FIJI (2)**	
	20.	Mr. Anthony Gonerogo	Air Navigation Service Inspector -ATM/SAR Civil Aviation Authority of Fiji
	21.	Mr. Ratu Elimeleki Navula	Controller Standards and SAR Air Navigation Service Provider Fiji Airports Limited
8.		**INDIA (4)**	
	22.	Mr. Moosa Thudhathifanuge	Executive Director (ATM-ASM) Airports Authority of India
	23.	Mr. Naresh Kumar Chaudhary	General Manager (ATM-ASM) Airports Authority of India
	24.	Mr. Arvind Kumar Asija	General Manager (Air Traffic Management) Airports Authority of India
	25.	Ms. Mahua Bhattacharya Adhikary	General Manager (Air Traffic Management) Airports Authority of India

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9.	**INDONESIA (3)**		
	26.	Mr. Suryadi Joko Wiratmo	Executive Vice President of Air Navigation Service Planning AirNav Indonesia HQ
	27.	Mr. Wahyu Widodo	Vice President of Air Traffic Services Development AirNav Indonesia HQ
	28.	Mr. Ali Husein Bahweres	Vice President of Air Navigation Control Service ACC – Interim Officer AirNav Indonesia HQ
10.	**JAPAN (3)**		
	29.	Mr. Yoshihisa Kumamoto	Special Assistant to the Director, Air Traffic International Affairs Office, Air Navigation Services Department Japan Civil Aviation Bureau
	30.	Mr. Ryu Yonaha	Special Assistant to the Director, Air Traffic International Affairs Office, Air Navigation Services Department Japan Civil Aviation Bureau
	31.	Mr. Motochika Ichikawa	Special Assistant to the Director, Air Navigation Services Planning Division, Air Navigation Services Department Japan Civil Aviation Bureau

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11.		**LAO PDR (5)**	
	32.	Mr. Sohnsacksit Khamkeo	Director of Air Navigation Standards Division, Department of Civil Aviation of Laos
	33.	Mr. Maity SYLITHAMMAVONG	Deputy General Director Lao Air Navigation Service (LANS)
	34.	Mr. Xaygnasith XOUYMANIVONG	Acting Director of ATS Office, Lao PDR
	35.	Mr. Soukane SENGSOULICHAN	Chief of Vientiane Aerodrome Control Tower
	36.	Mr. Phonepasith THONGSAVATH	Deputy chief of Area control Center
12.		**MALAYSIA (2)**	
	37.	Mr. Muhammad Firdaus Ismail	Deputy Director Air Navigation Services Technical Division Civil Aviation Authority of Malaysia
	38.	Mr. Ahmad Shukri Shamsudin	Senior Manager KL Air Space Division Civil Aviation Authority of Malaysia
13.		**MALDIVES (1)**	
	39.	Mr. Hussain Didi	Chief Operating Officer Maldives National Air Traffic Services
14.		**MONGOLIA (1)**	
	40.	Ms. Mandkhai Batjil	Civil Aviation Oversight inspector (in charge of Airspace management) Civil Aviation Authority of Mongolia

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15.	**NEPAL (2)**		
	41.	Mr. Prem Nath Thakur	Deputy Director General Civil Aviation Authority of Nepal
	42.	Mr. Dipak Kumar Bajracharya	Director Civil Aviation Authority of Nepal
16.	**NEW ZEALAND (1)**		
	43.	Mr. Edmund Heng	Senior Technical Specialist Aeronautical Services Civil Aviation Authority of New Zealand
17.	**PAKISTAN (3)**		
	44.	Mr. Arif Mumtaz	Senior Joint Director, AAR Pakistan Civil Aviation Authority
	45.	Mr. Akhtar Niqab	AdlD Ops. ATS / ATM Pakistan Airports Authority
	46.	Mr. Muhammad Imran	Sr. Joint Director (ATS) Airspace and PBN Pakistan Airports Authority
18.	**PHILIPPINES (5)**		
	47.	Mr. Ernesto P. Discaya Jr.	Supervising ASSI, Aerodrome and Air Navigation Safety Oversight Office (AANSOO) Civil Aviation Authority of the Philippines
	48.	Ms. Melba S. Acurantes	Chief, ATS Civil Aviation Authority of the Philippines

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	49.	Ms. Anna Joy C. Papag	Division Chief III, Enroute Division, ATS Civil Aviation Authority of the Philippines
	50.	Ms. Jesseelyn P. Heje	Acting Department Manager, AISD Civil Aviation Authority of the Philippines
	51.	Ms. Janice T. Palaganas	Acting Division Chief, PCD, AISD Civil Aviation Authority of the Philippines
19.	**REPUBLIC OF KOREA (3)**		
	52.	Mr. KIM Jong-Seong	Assistant Director for Air Traffic Service Division Korea Office of Civil Aviation Ministry of Land, Infrastructure and Transport
	53.	Ms. KIM Ha-Yeong	Assistant Director for Air Traffic Service Division Korea Office of Civil Aviation Ministry of Land, Infrastructure and Transport
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20.	**SINGAPORE (3)**		
	55.	Mr. Vincent HWA	Director of Air Traffic Services (ATS) Civil Aviation Authority of Singapore (CAAS)
	56.	Mr. Hermizan Jumari	Deputy Director (Planning) Civil Aviation Authority of Singapore

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	57.	Mr. Han Chee Chew	Principal Air Traffic Control Manager (ATM-Asia Pacific) Civil Aviation Authority of Singapore
21.	**SOLOMON ISLANDS (1)**		
	58.	Mr. Allen Zunia (Online)	ANS Technical Officer Civil Aviation Authority of Solomon Islands
22.	**SRI LANKA (1)**		
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	61.	Mr. Akkarin Insuwan	Head of Aeronautical Information Division 10 The Civil Aviation Authority of Thailand
	62.	Wg.Cdr. Kornek Chirtsanuchabunwiphak	Head of Aeronautical Information Management Division 9 The Civil Aviation Authority of Thailand
	63.	Ms. Nattha Inluemsai	Head of Air Navigation Operations Planning Division 9 The Civil Aviation Authority of Thailand

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	67.	Ms. Achiraya Dechanuntasin	Air Navigation Services Standards Officer 6 The Civil Aviation Authority of Thailand
	68.	Ms. Supaporn Thongmaunglaung	Air Navigation Services Standard Officer 5 The Civil Aviation Authority of Thailand
	69.	Ms. Woranit Thawonchumphonphat	Air Navigation Services Standards Development Officer 5 The Civil Aviation Authority of Thailand
	70.	Ms. Natkritta Srithaweepan	Chief of the Search and Rescue Coordination and Operation Division Office of the Search and Rescue Commission
	71.	Ms. Supapohn Ekgachant	Transport Technical Officer, Professional Level Office of the Search and Rescue Commission

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	72.	Ms. Napawan Toumpuemsub	Transport Technical Officer, Professional Level Office of the Search and Rescue Commission
	73.	Mr. Rittikrit Garin	Director of Aeronautical Weather Monitoring Sub-Division, Aeronautical Meteorological Division Thai Meteorological Department
	74.	Mr. Pongkhun Maneesri	Meteorologist, Professional Level Aeronautical Meteorological Division Thai Meteorological Department
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	76.	Mr. Piyawut Tantimekabut	Expert, Director Level Aeronautical Radio of Thailand Ltd. (AEROTHAI)
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	78.	Ms. Pantip Changpradit	Expert (Director Level) Aeronautical Radio of Thailand Ltd. (AEROTHAI)
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	82.	Mrs. Siriporn Ruaengraiwan	ATC Manager (Bangkok ACC) Aeronautical Radio of Thailand Ltd. (AEROTHAI)
	83.	Ms. Potchara Aungaphinant	ATC Manager (Bangkok ACC) Aeronautical Radio of Thailand Ltd. (AEROTHAI)
	84.	Sqn.Ldr.Paytye Junphuang	Director of Aviation Services Standard Division, Aviation Services Standard Department Airports of Thailand Public Company Limited
	85.	Mr. Kritsada Khumnualthong	Director, Aerodrome Standards, Aerodrome Standards and Safety Airports of Thailand Public Company Limited
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	86.	Ms. Sydney Maniam (Observer)	Strategic Business Advisor NATS Services Limited
	87.	Mr. Edwin Pang (Observer)	Key Account Director NATS Services Limited

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	88.	Mr. Shayne Campbell	Senior Air Traffic Representative, Asia Pacific Federal Aviation Administration Air Traffic Organization, Mission Support
	89.	Mr. Vern Payne	Manager, CDM and International Operations Federal Aviation Administration Air Traffic Control System Command Center (ATCSCC)
	90.	Ms. Almira (Alma) Ramadani	Senior Air Traffic Representative, Asia Pacific Federal Aviation Administration Air Traffic Organization, Mission Support
26.		**VIET NAM (6)**	
	91.	Ms. Tran Duc Hoai Phuong	Deputy Director, Air Navigation Department Civil Aviation Authority of Viet Nam (CAAV)
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	93.	Ms. To Thu Trang	Manager of AIS Operation Viet Nam Air Traffic Management Corporation
	94.	Mr. Nguyen Viet Dung	Deputy Manager of Hanoi ACC Viet Nam Air Traffic Management Corporation (VATM)

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	95.	Ms. Anh Tran Thi Ngoc	Official Viet Nam Air Traffic Management Corporation (VATM)
	96.	Mr. Khuu Cong Van	Deputy Manager of HCM ACC Viet Nam Air Traffic Management Corporation (VATM)
27.	**IATA (5)**		
	97.	Mr. John Moore	Head ATM-CNS IATA Asia-Pacific
	98.	Mr. Phil Gennaoui	Regional Head of Sales, Asia Pacific IATA
	99.	Mr. Cheng Yeow TAN	Senior Manager ATM, Asia-Pacific; Operations, Safety & Security IATA
	100.	Mr. Bin (Kevin) Hu	Manager Safety ATFM Liaison & Flight Operations IATA North Asia
	101.	Mr. George Chan	Regulatory Affairs Manager – Operations and Industry IATA
28.	**ICCAIA (3)**		
	102.	Ms. Helen Lee	Technical Fellow, Airport Airspace and ATM Programs
	103.	Mr. Diego Albert	Director, APAC Sales

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	104.	Mr. Joe Holewa	Manager, APAC Sales
29.		**IFALPA (1)**	
	105.	Captain Choong Sub Lee	Regional Vice-President, North Pacific (NOP) President of ALPA-K / Korean Air Senior Captain Ph.D. in Air Transportation
30.		**IFATCA (1)**	
	106.	Mr. Lok Man Leung	Regional Chair for Operations International Federation of Air Traffic Controllers' Associations (IFATCA)
31.		**ICAO (7)**	
	107.	Mr. Hiroyuki Takata	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office
	108.	Mr. Mior Adli Bin Mior Sallehhuddin	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Office
	109.	Dr. Trish Prakayphet Chalayonnawin	Programme Analysis Associate, Air Traffic Management ICAO Asia and Pacific Regional Office
	110.	Ms. Ying Zhang	Deputy Chief ICAO Asia and Pacific Regional Sub-Office
	111.	Mr. Manjunath K. Nelli	Regional Officer, Air Traffic Management ICAO Asia and Pacific Regional Sub-Office

		STATE/NAME	TITLE/ORGANIZATION
	112.	Mr. Irwandi Krinata	Regional Officer, PBN ICAO Asia and Pacific Regional Sub-Office
	113.	Mr. Liu Yonggang	Regional Officer, Air Traffic Management (AOM-ASM) ICAO Asia and Pacific Regional Sub-Office

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LIST OF WORKING PAPERS AND INFORMATION PAPERS

WORKING PAPERS

No.	Agenda Item	Subject	Presented by
01	1	Provisional Agenda	Secretariat
02	2	ATM/SG/13, APANPIRG/36 and DGCA/60 Outcomes	Secretariat
03	2	Outcomes from FIT-Asia/16 and RASMAG/31	Secretariat
04	3.0	ANS USOAP Update	Secretariat
05	3.1	Establishment of a Small Working Group to Review and Update the Asia/Pacific Seamless ANS Plan	Singapore, Thailand and United States
06	3.1	APAC Regional Priorities and the Relationship with the ICAO MIP	Singapore and United States
07	3.1	Update of APAC ANP Volume III	Secretariat
08	3.1	ASEAN ANS Master Plan as a Regional Reference for Seamless ATM	Singapore, on behalf of ASEAN
09	3.1	Regional Air Navigation Plan Update	Secretariat
10	4	Update on the Airspace Classification of Macao, China	Macao China
11	4	Corrective Actions Taken by Solomon Islands to Address Air Navigation Service Deficiency	Solomon Islands
12	4	Corrective Action Taken by India for Addressing ANS Deficiency Regarding “Designation of Restricted Areas Above the Land Areas or Territorial Waters of a State – Not Implemented”	India
13	4	ATM and Airspace Safety Deficiencies List	Secretariat
14	5	Outcomes from CNS SG/30	Secretariat
15	5	Implementation of Established on RNP AR (EoR) Operations at Shenzhen Bao'an International Airport	China
16	5	Progress of TBO Pathfinder Development in the Asia/Pacific Region	Indonesia, on behalf of Hong Kong China, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam and IATA
17	5	Challenges and Opportunities in Managing Airspace Efficiency and Resilience in APAC Region	IATA

No.	Agenda Item	Subject	Presented by
18	5	Landing Information Delivery (LID) Service in China and Its Implications for FF-ICE/R2 Operational Scenario Research in APAC	China
19	5	Practices and Exploration of Runway Incursion Prevention by China ATMB	China
20	6.0	Outcomes from SAIOSEACG/5	Secretariat
21	6.0	Progress of the APAC Project 30/10 Task Force	Secretariat
22	6.0	Progress Update of the ICAO Asia/Pacific Flight and Flow Information for a Collaborative Environment (FF-ICE) Ad Hoc Group	Singapore and Thailand, on behalf of the APAC FF-ICE Ad-hoc Group
23	6.0	Progress of the Procedures for GNSS and Data Link Disruption Ad Hoc Group and Proposed Adoption of the Regional Guidance Material	Singapore, on behalf of the Procedures for GNSS and Data Link Disruption Ad Hoc Group
24	6.0	Progress of the APAC Data Analytics Group	Singapore, on behalf of Australia, China, Hong Kong China, India, Indonesia, Japan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, United States and Viet Nam
25	6.0	Proposal for Updating the Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination	Secretariat
26	6.1	Outcomes from ATFM & A-CDM/SG/16	Secretariat
27	6.2	Operational Implementation and Experience of 20 NM Longitudinal Separation on ATS Routes L642 and M771	China and Hong Kong China
28	6.2	Separation between Taxiing Aircraft and Vehicle During Low Visibility Operations	Pakistan
29	6.3	Regional ATM Contingency Planning and Contingency Operations Update	Secretariat
30	6.3	Collaborative ATM Contingency Response to Volcanic Eruption Events: Indonesia's Experience	Indonesia

No.	Agenda Item	Subject	Presented by
31	6.3	Proposal for the Adoption of the Asia/Pacific Regional ATM Contingency Framework (RACF)	Secretariat
32	6.4	Guidance Material for the Implementation of FRTO in the Asia/Pacific Region	IATA, on behalf of the AAC Workstream 4
33	6.4	Proposal for Advancing Regional Collaboration and Accelerating Parallel Route A1 Implementation	China and Hong Kong China
34	6.4	Outcome of Data-Driven Airspace Efficiency Study on ATS Route Proposals at Europe-Asia Interface	IATA
35	6.4	Asia/Pacific Region ATS Route Catalogue	Secretariat
36	6.5	Outcomes of the Inter-Regional Workshop on Civil-Military Cooperation in ATM and Flexible Use of Airspace	Secretariat
37	6.5	Survey Outcome on Civil-Military Cooperation in ATM and Flexible Use of Airspace Implementation in APAC Region	Secretariat
38	7	Outcomes from MET SG/28 Relevant to ATM/SG	Secretariat
39	7	Provision of NOTAM for Volcanic Activity	New Zealand
40	7	AIS – AIM Implementation Task Force (AAITF/21) Outcomes	Secretariat
41	7	Challenges of 5LNC Utilization and Suggestions to ICARD	China
42	7	Progress on Aerodrome-related Information Services for the APAC Common SWIM Aeronautical Information Services	Secretariat
43	7	Asia/Pacific Search and Rescue Update	Secretariat
44	8	ATM Points of Contact	Secretariat
45	8	Asia/Pacific Points of Contact List for Space Object Launch and Re-entry Activities Coordination	Secretariat
46	8	Enhancement of Inter-Regional Coordination	Secretariat
47	9	APANPIRG ATM Sub-Group Terms of Reference and Task List	Secretariat

INFORMATION PAPERS

No.	Agenda Item	Subject	Presented by
01	1	Provisional List of Papers	Secretariat
02	5	Raising Airlines' Awareness of SWIM, FF-ICE and TBO	IATA
03	5	Preparing for Trajectory-Based Operations through CARATS, Data Analytics and Regional Cooperation	Japan
04	5	Transition to a Single Flight Information Region	Australia
05	5	Visual Surveillance System for Maneuvering Area	Australia

No.	Agenda Item	Subject	Presented by
06	5	Modernization of Indonesia's Air Traffic Management Automation System	Indonesia
07	5	Progress on the Enhancement of Air Traffic Services from Procedural to Surveillance-Based Service at Balikpapan APP and Medan APP	Indonesia
08	6.0	Progress on Action Item 13/10 of the ATMSG Task List	China and Republic of Korea
09	6.0	APAC ANSP Committee (AAC): Update on Progress and Next Steps	Singapore, on behalf of the APAC ANSP Committee
10	6.1	Enhancing Regional ATFM Coordination through Regional Collaborative Operational Mechanism (RECOM)	China
11	6.3	BOBCAT ATFM Operational Updates	Thailand
12	6.4	Establishment of ATS Route L770	Lao PDR and Thailand
13	8	Advanced RNP Navigation Specification Inconsistency in ICAO Documents PANS-OPS (Doc 8168) and PBN Manual (Doc 9613)	Pakistan
14	8	Analysis of Fatigue-Related Voice and Video Characteristics between High-Altitude Aerodrome and Low-Altitude Aerodrome Air Traffic Controllers	China
15	8	Key Takeaways from 2025 ATMB & IATA Workshop on APAC ATCO Competency Enhancement and Collaborative Development	IATA, on behalf of China and IATA
16	8	Work of ICAO LPRI TF based on the Results of IATA Survey on Language Issues in ATC Communication	IATA
17	8	AAM 2026 - Second Advanced Air Mobility Symposium	Secretariat
18	6.3	Multi-Stakeholder Table-Top Exercise on Air Traffic Management Contingency Plans Operations in the Kota Kinabalu Flight Information Region (KKFIR)	Malaysia
19	6.4	Progress Update on Direct Route Operations (DRO) Implementation Initiative in Malaysia	Malaysia

FLIMSIES

No.	Agenda Item	Subject	Presented by
1	6.4	Establishment of a parallel ATS route to A1 ATS route	Viet Nam
2	8	National Air Navigation Plan (NANP) Implementation	Secretariat

PRESENTATIONS

No.	Agenda Item	Subject	Presented by
01	5	Progress of TBO Pathfinder Development in the Asia/Pacific Region (WP/16)	Indonesia, on behalf of Hong Kong China, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam and IATA
02	-	*withdrawn*	-
03	6.4	Outcome of Data-Driven Airspace Efficiency Study on ATS Route Proposals at Europe-Asia Interface (WP/34)	IATA
04	6.5	Survey Outcome on Civil-Military Cooperation in ATM and Flexible Use of Airspace Implementation in APAC Region (WP/37)	Secretariat
05	7	Facilitating Industry Shift to Data-driven Turbulence Mitigation	IATA
06	8	Outcomes of Gender Equality Indicator Survey	Secretariat
07	8	Outcomes of the ICAO Global Artificial Intelligence Survey	Secretariat
08	6.3	BOBCAT ATFM Operational Updates (IP/11)	Thailand
09	6.2	Separation between Taxiing Aircraft and Vehicle During Low Visibility Operations (WP/28)	Pakistan

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Terms of Reference

APAC ANP Volume III Review Working Group

Item	**Description**
Project Title	APAC ANP Volume III Review Working Group
Parent Group	ATM/SG
Project Period	Until completion of assigned tasks
Project Objective	To review the *APAC Air Navigation Plan (ANP) Volume* III considering the *Asia/Pacific Seamless ANS Plan* and develop recommendations for future amendments, taking into consideration inputs from APANPIRG contributory bodies, regional implementation experience, and developments in ICAO global planning frameworks, including the Global Air Navigation Plan (GANP), Aviation System Block Upgrade (ASBU) framework and Minimum Implementation Path (MIP).
Project Outcomes	1. Conduct a comprehensive review of the *APAC ANP Volume III* considering the *Asia/Pacific Seamless ANS Plan*. 2. Develop recommendations for future amendments to APAC ANP Volume III to ensure that regional priorities, implementation pathways, dependencies and performance expectations remain relevant and coherent. 3. Review the alignment between APAC regional priorities and ICAO global planning initiatives, including GANP, MIP, and develop coordinated regional recommendations where appropriate.
Membership	Subject Matter Experts (SMEs) from interested APAC States/Administrations, International Organizations and Industry Partners, as appropriate.
Coordination Requirements	Virtual meetings and correspondence, supplemented by meetings held in conjunction with APANPIRG contributory body meetings, as required.
Project Terms of Reference / High-Level Tasks	1. Review the *APAC ANP Volume III* and identify areas requiring refinement, clarification or enhancement. 2. Review recommendations, conclusions and outcomes from APANPIRG contributory bodies and assess their implications for *APAC ANP Volume III*. 3. Assess the continued relevance of APAC regional priorities, implementation targets, timelines and performance expectations reflected in *APAC ANP Volume III*. 4. Review whether capability dependencies, enabling capabilities and implementation pathways are adequately reflected within *APAC ANP Volume III* and recommend enhancements where necessary. 5. Review the alignment between *APAC ANP Volume III* and relevant ICAO planning frameworks, including the GANP 8th Edition and ASBU

	framework, and the first version of MIP to be proposed for the endorsement by the 44th Ordinary Session of the ICAO Assembly (A44) in 2028. 6. Assess whether APAC regional implementation priorities and operational needs are adequately reflected in the MIP and identify any gaps, omissions, dependency considerations or interoperability issues that may warrant regional input to ICAO. 7. Consider how mature, implemented and baseline capabilities should be reflected within *APAC ANP Volume III* to maintain focus on active regional implementation priorities. 8. Develop recommendations for future amendments to *APAC ANP Volume III*, including updates to priorities, implementation targets, performance indicators, implementation pathways and capability relationships. 9. Develop coordinated APAC recommendations on matters related to the ICAO MIP and other relevant global planning initiatives, as appropriate. 10. submit recommendations to ATM Sub-Group and APANPIRG for consideration 11. Prepare draft amendments and supporting rationale for consideration by the relevant APANPIRG contributory bodies and APANPIRG.
Project Rapporteur	To be nominated by ATM SG.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

DRAFT

ASIA PACIFIC AIR NAVIGATION PLAN

VOLUME III

ASIA PACIFIC AIR NAVIGATION PLAN

VOLUME III

TABLE OF CONTENTS

ASIA PACIFIC ANP, VOLUME III

PART 0 – INTRODUCTION

1. INTRODUCTION

1.1 The background to the publication of Air Navigation Plans (ANPs) in three volumes is explained in the Introduction in Volume I. The procedure for amendment of ANP Volume III is also described in Volume I.

1.2 ANP Volume III contains dynamic/flexible plan elements related to the implementation of the air navigation system and its modernization in line with the ICAO Aviation System Block Upgrades (ASBUs) and associated technology roadmaps described in the *Global Air Navigation Plan (GANP)*. GANP is an important planning tool for setting global priorities to drive the evolution of the global air navigation system and ensure that the vision of an integrated, harmonized, globally interoperable and seamless system becomes a reality.

1.3 Collaborative decision-making is key for a cost-effective modernization of the air navigation system and ensures that all concerned aviation stakeholders are involved and given the opportunity to influence decisions to reach defined performance objectives. Volume III guides the aviation community in the application of performance management process and identification of relevant and timely operational improvements to a given region's air navigation system including some within the ASBU framework.

1.4 The information contained in Volume III is related mainly to:

- Planning: objectives set, priorities and targets planned at regional or sub-regional levels;

- Implementation monitoring and reporting: monitoring of the progress of implementation towards targets planned. This information should be used as the basis for reporting purposes (i.e.: global and regional air navigation reports and performance dashboards); and/or

- Guidance: providing regional guidance material for the implementation of specific system/procedures in a harmonized manner.

1.5 The management of Volume III is the responsibility of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG).

1.6 Volume III should be used as a tool for monitoring and reporting the status of implementation of the elements, using the tables/databases and/or references to online monitoring tools, as endorsed by APANPIRG. The status of implementation is updated on a regular basis as endorsed by APANPIRG.

1.7 The GANP aims for a seamless and high-quality provision of air navigation services worldwide through the establishment of regional and national performance objectives aligned with global performance ambitions. To achieve this, States and regions must assess their operational environments and select the most appropriate modernization options based on operational requirements and expected performance gains. This ensures the efficient use of resources while addressing the needs of the aviation community.

1.8 Whereas ICAO addresses the planning strategy at the global and regional levels, planning at the national level is the responsibility of States. A national planning framework should be developed by each State based on its needs and in collaboration with regional and global partners. This will ensure to the greatest extent possible that solutions are internationally harmonized and integrated. States are encouraged to develop and implement policies and procedures specifying the interval and methodologies for updating their national air navigation plans (NANPs).

1.9 NANPs, as well as other national plans dealing with other aspects of aviation such as safety, security and facilitation, should all be linked together in a broader national aviation plan to ensure an integrated strategic approach at the State level. This broader plan can be considered as a Civil Aviation Master Plan (CAMP) addressing all aspects of air transport at the State level. The objective is to provide a clear and comprehensive planning and implementation strategy for the future development of the entire civil aviation sector in terms of policies, legislation, objectives, facilities, equipment, organization and capacity-building.

1.10 The CAMP should also emphasize the importance of air transport for the economic development of the State. As such, the CAMP should be linked to the State's overarching national development plan, where applicable, to mobilize public and private resources and partnerships for the implementation of the plan and to strengthen the civil aviation sector.

1.11 A clearly defined relationship between NANPs aligned with the GANP and APAC ANP, CAMP and States' national development plans will enable the prioritization and optimum allocation of resources for all planned projects within States and across all sectors of activity.

2. AVIATION SYSTEM BLOCK UPGRADES (ASBUs), ELEMENTS AND ROAD MAPS

2.1. GANP represents a rolling, long term strategic methodology which leverages existing technologies and anticipates future developments based on State/industry agreed operational objectives. GANP's ASBU methodology is a programmatic and flexible global system's engineering approach that allows all Member States to develop their Air Navigation capacities based on their specific operational requirements. The Block Upgrades will enable aviation to realize global harmonization, increased capacity, and improved environmental efficiency that modern air traffic growth now demands in every region around the world.

2.2. Derived from the global strategic level, the global technical level of the Global Air Navigation Plan (GANP) is designed to support technical managers in planning the implementation of basic services and new operational improvements in a scalable and cost-effective manner and according to specific operational and performance needs, while ensuring interoperability of systems and harmonization of procedures. The GANP establishes, under the "Global Technical layer" three (3) technical frameworks to guide States in modernizing their air navigation systems:

- the Basic Building Blocks (BBBs), which define the essential air navigation services required by all States;
- the Aviation System Block Upgrades (ASBUs) framework, which offers modular, scalable improvements based on operational needs; and
- the Performance Framework (PF), which encompasses the key performance areas (KPAs), and key performance indicators (KPIs).

2.3. The BBB framework outlines the foundation of a robust air navigation system. It identifies basic services to be provided for international civil aviation in accordance with ICAO Standards. These basic services are defined in the areas of aerodromes, air traffic management, search and rescue, meteorology and information management. The BBB framework also identifies the end users of these services as well as the assets (CNS infrastructure) that are necessary to provide them.

2.4. The ASBU and Performance Frameworks offer modular, scalable improvements based on operational needs; and define key performance areas (KPAs), indicators (KPIs), and planning targets. No phase, nor any ASBU element is binding on any State/Administration but should be considered as guidance material for a planning framework. In this regard, the phase commencement/completion dates in the ANP should be understood as planning targets rather than fixed implementation dates.

2.5. This resultant framework is intended primarily to ensure that the aviation system will be maintained and enhanced, that ATM improvement programmes are effectively harmonised, and that barriers to future aviation efficiency and environmental gains can be removed at a reasonable cost. In this sense, the adoption of the ASBU methodology significantly clarifies how the ANSP and airspace users should plan for future equipage.

2.6. The ANP Volume III leverages these frameworks to support the planning, implementation, and performance monitoring of air navigation systems at the regional and national levels, ensuring alignment with the GANP's global ambitions.

2.7. Although the GANP has a worldwide perspective, it is not intended that all Block Upgrade Elements are required to be applied in every State, sub-region and/or region. Many of the Block Upgrade Elements contained in the GANP are specialized packages that should be applied only where the specific operational requirement exists, or corresponding benefits can be realistically projected. Accordingly, the Block Upgrade methodology establishes an important flexibility in the implementation of its various Elements depending on a region, sub-region and/or State's specific operational requirements. Guided by the GANP, ICAO APAC regional, sub-regional and State planning should identify elements which best provide the needed operational improvements.

ASIA PACIFIC ANP, VOLUME III

PART I - GENERAL PLANNING ASPECTS (GEN)

1. PLANNING METHODOLOGY

1.1 Guided by GANP, the regional planning process starts by identifying the homogeneous ANS areas, major traffic flows and international aerodromes. An analysis of this data leads to the identification of opportunities for performance improvement. Elements from the ASBUs are evaluated to identify which of those elements best provide the needed operational improvements. Depending on the complexity of the element, additional planning steps may need to be undertaken including financing and training needs. Finally, regional plans would be developed for the deployment of elements by drawing on supporting technology requirements. This is an iterative planning process which may require repeating several steps until a final plan with specific regional targets is in place. This planning methodology requires full involvement of States, service providers, airspace users and other stakeholders, thus ensuring commitment by all for implementation.

1.2 APANPIRG is responsible for the regional level of the GANP. Based on regional performance and operational needs, differences, constraints and opportunities, APANPIRG is responsible for defining regional planning and implementation priorities, aligned with the GANP, through Volumes I, II and III of APAC ANP. They are also responsible for the identification of air navigation deficiencies considering the air navigation plans.

1.3 In APAC ANP Volume III, APANPIRG identify dynamic/flexible planning elements for modernizing the regional air navigation system, following a performance-based approach. As part of this approach, APANPIRG define regional priorities and performance objectives, linked to the Key Performance Areas (KPAs) and Key Performance Indicators (KPIs) of the GANP, to achieve the global performance ambitions as well as to the operational improvements within the ASBU framework that could be implemented by States, based on identified needs at local and national level.

1.4 Performance objectives should be specific, measurable, achievable, relevant and time-bound (SMART). The current/past performance (Performance Baseline) expected future performance, as well as actual progress in achieving performance objectives, should be expressed by means of KPIs. In the GANP performance framework, a list of KPIs is linked to relevant objectives and is used to set targets through objective quantification. Performance measurement is therefore done through the collection of data for the supporting metrics. Data collection should be as detailed as possible, as the availability of granular data greatly enhances the effectiveness of the PBA.

1.5 ICAO APAC office coordinates the review and updating of APAC ANP. ICAO APAC Office also coordinates the activities of APANPIRG to ensure their alignment with the GANP and ensures close coordination between APANPIRG and Asia Pacific Regional Aviation Safety Groups (RASG-APAC)). To verify the effectiveness and rate of operational improvements implementation, ICAO provides data and tools to support performance and implementation monitoring and facilitates the sharing of relevant information and best practices across regions.

1.6 States should consider operational improvements (ASBU elements) within the ASBU framework as potential solutions to improve performance relative to selected objectives and KPIs within the operational environment under analysis.

1.7 As part of the process to assess the achievements, States should calculate/estimate the benefits accrued from the implementation of the selected solutions/projects.

1.8 Considering the global objectives defined in the GANP and those identified by States, within the KPAs as prioritized above, APANPIRG may set common objectives to be pursued by the States within the Region and to be monitored at regional level.

<u>Operational Planning Framework</u>

<u>Definitions</u>

1.9 High-density Aerodromes: - It is to note that high density aerodromes and terminal airspace are defined in the APAC ANP as:

a) having 100,000 scheduled movements per annum or more; or
b) where strategic slot allocation is implemented; or
c) those designated by the relevant authority as requiring or potentially requiring ATFM implementation.

1.10 Airspace Categorization: - It is to note that the APAC ANP categorizes airspace by reference to its CNS capability as:

a) **Category R**: remote en-route airspace with Air Traffic Services (ATS) HF or CPDLC communications and outside the coverage of ground-based surveillance coverage; or
b) **Category S**: serviced (or potentially serviced) en-route airspace – by both direct [not dependent on a Communication Service Provider (CSP)] ATS communications and surveillance; or
c) **Category T**: terminal operations serviced by both direct ATS communications and surveillance.

1.11 The APAC ANP categorises operational improvements in a priority implementation within the Asia Pacific region and allocates priority based on its importance in promoting Seamless ANS as:

a) **Priority 1** – critical upgrade assignment based on whether the implementation of an element could bring most benefit to the region or regional upgrade by States and is essential to achieve the service level required globally;

b) **Priority 2** – recommended upgrade assignment for those elements which would bring benefits to the region and generally to be implemented from 2025, but States are encouraged to implement earlier if beneficial; and

c) **Priority 3** – assigned to those elements which may not be universally implemented in the Asia/Pacific Region.

1.12 Implementation Phases: - It is to note that the APAC ANP Volume III categorizes implementation phases by reference to GANP update cycles as:

a) Immediate – Implementation of Block 0 and Block 1 Priority 1 elements
b) Mid-term – Implementation of Block 0, Block 1 and Block 2 Priority 2 elements (recommended as 2028, being the mid-year of Block 3 period)
c) Long-Term - – Implementation of Block 0, Block 1 and Block 2 Priority 3 elements (recommended as 2031, being the end year of Block 3 period).

2. REVIEW AND EVALUATION OF AIR NAVIGATION PLANNING

2.1. The progress and effectiveness against the priorities set out in the APAC ANP should be annually reported, using a consistent reporting format, to ICAO APAC Office.

2.2. Performance monitoring requires a measurement strategy. Data collection, processing, storage and reporting activities supporting the identified global/regional performance metrics are fundamental to the success of performance-based approaches.

2.3. The technical sub-groups of APANPIRG, viz., Aerodrome Operations and Planning Sub-group (AOP/SG), Air Traffic Management Sub-group (ATM SG), Communications, Navigation and Surveillance Sub-group (CNS SG) and Meteorology Sub-group (MET SG) review the APAC ANP Volume

III as part of their regular work programme and consult, as necessary, with States and International organizations on proposed amendments. The proposed amendment(s) should be presented to other technical sub-groups for approval when required and subsequently submitted to APANPIRG for adoption by Member States.

2.4. The ANP Volume III is therefore reviewed and updated as follows:

a) a change to the prioritization ASBU elements and regional elements/capabilities can be submitted apac@icao.int by any State/Administrations or International Organization with the proposed changes shown as a markup of the original text together with the rationale for the change. Supporting documentation should also be submitted, if applicable;

b) the ICAO Secretariat, will conduct an initial evaluation of the proposal and prepare it for further consideration of respective sub-group (AOP/SG, CNS/SG, MET/SG and ATM/SG) ;

c) the respective subgroup will review and accept, modify or reject the proposal;

d) if the proposal, as amended through the above steps, is approved or accepted, the ICAO Secretariat will include it for endorsement in the subsequent APANPIRG; and

e) If the proposal is rejected, the ICAO Secretariat will notify the originator and provide the rationale for refusal.

3. REPORTING AND MONITORING RESULTS

3.1 Reporting and monitoring results will be analyzed by the APANPIRG, to steer the air navigation improvements, take corrective actions and review the allocated objectives, priorities and targets if needed. The results will also be used by ICAO and aviation partner stakeholders to develop the annual Global Air Navigation Report. The report results will provide an opportunity for the international civil aviation community to compare progress across different ICAO regions in the establishment of air navigation infrastructure and performance-based procedures.

3.2 The reports will also provide the ICAO Council with detailed annual results based on which tactical adjustments will be made to the performance framework work programme, as well as triennial policy adjustments to the GANP and the Block Upgrade Elements.

3.3 Table GEN III-1 contains ASBU Block 0, Block 1 and Block 2 elements and selected regional elements categorized according to APAC regional priorities aligned with GANP and supporting the global performance ambitions.

TABLE GEN III-1 – ASBU and Regional Elements in APAC Region

ASBU Elements			
Area	**Priority 1**	**Priority 2**	**Priority 3**
Airport	ACDM-B0/1	ACDM B0/2	ACDM B2/1 to B2/3
Airport, TMA, En-route	AMET- B0/1 to B0/4	AMET-B1/1 to B1/4	AMET B2/1 to B2/4
Information	DAIM B1/1, DAIM B2/6 to DAIM-B2/9	DAIM-B2/10	DAIM-B2/1
Information	FICE B0/1	FICE B2/2 , FICE B2/4	
Information Technology		SWIM-B2/1, SWIM-B2/2	
Airspace – TMA and En-route	APTA-B0/1, APTA B0/2	APTA-B0/4, APTA-B0/5, APTA-B0/7, APTA-B0/8	APTA-B0/3, APTA-B0/6, APTA-B2/1, APTA-B2/3, APTA-B2/5, APTA-B2/6, APTA-B2/7, APTA- B2/8
Airspace (En-route)		CSEP B1/1 to B1/4	
Aircraft Tracking	GADS-B1/1, GADS-B1/2		
Airport			DATS B1/1
Airspace- (En-route)	FRTO-B0/1 to B0/4	FRTO-B1/1 to B1/5	FRTO-B2/3 to B2/5
Airspace- (En-route)	NOPS-B0/1 to B0/5	NOPS-B1/1 to B1/10	NOPS-B2/3 NOPS-B2/4, NOPS-B2/6
Airspace- (En-route)			OPFL-B0/1, OPFL-B2/1
Airspace (TMA)	RSEQ-B0/1, RSEQ-B0/2	RSEQ-B1/1	RSEQ-B0/3, RSEQ-B2/1
Technology	SNET-B0/1 to B0/4	SNET-B1/1 to B1/2	
Airport – Ground Surveillance		SURF-B0/1 to B0/3, SURF-B1/1 to B1/4	SURF B2/1 to B2/3
Surveillance	ASUR-B0/1 to B0/3	ASUR-B1/1	ASUR-B2/1
Communication	COMI-B0/3, COMI-B0/7, COMI-B1/1	COMI-B0/1, B0/2, B0/4, B0/5, B0/6, COMI-B1/2, COMI-B1/4	COMI-B2/3
Surveillance		COMS-B0/1 to COMS-B0/2, COMS-B1/1 to COMS-B1/2	COMS-B2/1 to COMS-B2/2
Navigation	NAVS B0/3 to B0/4	NAVS B0/1 to B0/2	NAVS-B1/1, NAVS- B2/2 to NAVS-B2/3

Regional Elements			
Area	**Priority 1**	**Priority 2**	**Priority 3**
Civil Military Cooperation	Civil-Military Special Use Airspace (SUA) management	Civil-Military common procedures and training	
	Civil-Military strategic and tactical coordination	Civil-Military integrated systems and facilities	
Search and rescue	Enhanced SAR systems		
Human Performance	ANSP human and simulator performance		
Space Transport Operations	Space objects launch and re-entry management		
Airport		Aerodrome management and coordination	Optimization of runway capacity facilities
Airspace		ADS-B, SSR Mode S and PBN Airspace (SUR and PBN Airspace Capability)	
		Airspace classification	
Unmanned Aircraft System (UAS)		UAS Management	
ATC Procedures		Flight Level Orientation Scheme (FLOS)	
		Flight Level Allocation Schemes (FLAS)	
		Adjacent ATS sector coordination	
		ATC horizontal (longitudinal and lateral) separation	
		ATC sector capacity	
ATC Systems		Electronic Flight Progress Strips	
		ATS surveillance data sharing	
		Data-Link Departure Clearance (DCL)	

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PART II – AIR NAVIGATION SYSTEM IMPLEMENTATION

1. INTRODUCTION

1.1 The planning and implementation of the ASBUs should be undertaken within the framework of the APANPIRG with the participation and support of all stakeholders, including regulatory personnel.

1.2 The ASBU Blocks and Elements adopted by the APAC Region should be followed in accordance with the specific ASBU requirements to ensure global interoperability and harmonization of air traffic management. The APANPIRG should determine the ASBU Elements, which best provides the operational improvements in the ICAO APAC Region.

2. ICAO ASIA PACIFIC AIR NAVIGATION OBJECTIVES, PRIORITIES AND TARGETS

2.1 In accordance with Recommendation 6/1 of the Twelfth Air Navigation Conference (AN-Conf/12), all PIRGs were requested to establish priorities and targets for air navigation, in line with the ASBU methodology.

2.2 In 2012, ICAO APAC Region developed Asia/Pacific Seamless ANS Plan (APSAP) (previously known as the Asia/Pacific Seamless ATM Plan) and Version 1.0 was published on June 2013, to facilitate and promote Seamless ATM in APAC Region. The Seamless ANS Plan included regional priorities agreed by APANPIRG, from the Aviation System Block Upgrades (ASBU) Block 0 and Block 1 elements from the GANP 4th Edition. APSAP is intended to provide a framework for a transition to a Seamless ATM environment, to meet future performance requirements.

2.3 Subsequently, APANPIRG approved APAC ANP Volume III in 2015 which included the APAC regional priorities as noted in the APSAP.

2.4 In establishing and updating the APAC ANP, the APANPIRG gives due consideration to the safety priorities set out in the Global Aviation Safety Plan (GASP) and APAC Region safety strategy.

2.5 Since 2017, APSAP has been regularly updated to reflect the updates in GANP. The most recent Asia/Pacific Seamless ANS Plan Version 4.0 was endorsed by APANPIRG/35 (in 2024). With the release of GANP 8th edition, the regional priorities as reflected in APSAP V4.0 have been updated and incorporated into this APAC ANP Volume III.

2.6 The objectives, priorities and targets for each element, corresponding to Priority 1, Priority 2 and Priority 3, are documented in the APAC Main Planning Tables in **Appendix A, Appendix B**, and **Appendix C,** respectively.

2.7 States in the APAC Region should establish their own air navigation objectives, priorities and targets to meet their individual needs and circumstances in line with the GANP and APAC ANP objectives, priorities and targets.

<u>APAC Subsidiary Air Navigation Planning</u>

2.8 The *Asia/Pacific Regional Collaborative Air Traffic Flow Management (ATFM) Framework, Asia/Pacific Plan for Collaborative Aeronautical Information Management (AIM), Asia/Pacific Region ATM Contingency Framework, Asia/Pacific Search and Rescue (SAR) Plan and Asia/Pacific Airport Collaborative Decision Making (A-CDM) Implementation Plan* form part of the regional planning and guidance material connected to the APAC ANP Volume III.

2.9 States shall report their implementation progress and status of the applicable regional planning and guidance material at least once annually, by 28 February.

Note: a 'robust' status plan that is not subject to consideration as an APANPIRG Air Navigation Deficiency is one that is evaluated as achieving ***90%*** *or more implementation of the planning elements.*

2.10 APAC States and Administrations should carry out analysis of each ASBU element and Regional operational requirement applicability for implementation in their area of responsibility.

2.11 The analysis should be reported as follows:

- Applicable or Not – The State has analysed this ASBU element, and decided it is applicable or not applicable;
- Several metrics are used to report progress of implementation
  a) such as a percentage of ACCs, aerodromes, or airspace where the function has been implemented or ;
  b) YES or NO indicators where the implementation assessment is categorical or;
  c) while assessing immediate implementation of a national capability, the implementation progress is reported as indicated below:
     - 100% = YES / Completed / Operational
     - 80% = Final stage of implementation
     - 60% = Intermediate stage of implementation
     - 40% = Early stage of implementation
     - 20% = Planning / Feasibility Study stage
     - 0% = NO / Related work not commenced
  d) For assessing medium term and long-term capabilities
     - -"In Preparation/Planning -0-25%,
     - "Under Development/Implementation- 25-75%" and
     - "In Operation-100%"

Trajectory-Based Operations (TBO)

2.12 Trajectory-Based Operations (TBO) is a key enabler for the progressive realisation of advanced Air Traffic Management (ATM) operations in the Asia/Pacific Region. In support of harmonised regional implementation, a TBO roadmap has been developed to provide States and Administrations with a structured pathway towards the achievement of TBO capabilities, supported by key enabling ASBU elements, including SWIM and FF-ICE. The roadmap outlines the required capabilities, associated ASBU enablers, indicative timelines and operational use cases to guide implementation.

2.13 States/Administrations should take into consideration the TBO roadmap in planning the progressive implementation of ASBU elements, to support a coordinated transition towards trajectory-based operations. The APAC TBO roadmap is available on ICAO APAC eDocuments webpage.

APAC regional Flight and Flow Information For A Collaborative Environment (FF-ICE) RELEASE 1 implementation plan

2.14 The APAC FF-ICE/R1 Plan has been developed to complement the ICAO global framework and guidance and focuses on the operational and technical requirements for the implementation of FF-ICE/R1 services. It focuses on regional implementation aspects bridging the gap between ICAO's global guidance and outlines how FF-ICE can be implemented across the APAC region in a coordinated and harmonized manner.

2.15 It is also recognised that System Wide Information Management (SWIM) is a pre-requisite for FF-ICE implementation. The implementation of SWIM, within the APAC region, should follow the regionally agreed-upon guidelines, including APAC SWIM Technical Infrastructure and information exchange capabilities.

2.16 States/Administrations should take into consideration the FF-ICE/R1 implementation plan in planning the progressive implementation of related ASBU elements, to support a coordinated transition ensuring APAC States' readiness to support the sunset of FPL2012 in 2034. The APAC FF-ICE/R1 implementation plan is available on ICAO APAC eDocuments webpage.

ATC Separation Minima

2.17 Pursuant to ICAO Fourteenth Air Navigation Conference (AN-Conf/14) Recommendation 3.1/1, APANPIRG, by Decision APANPIRG/36/7 approved the establishment of the APAC Project 30/10 Task Force to develop a regional roadmap for the optimized implementation of longitudinal separations of 55.5 km (30 NM) or less in oceanic and remote airspace, and 19 km (10 NM) or less elsewhere, in APAC Region.

2.18 Implementation initiatives should be regionally coordinated to ensure a seamless and harmonized implementation. APAC States unable to complete implementation by 2028 will be subjected to APANPIRG Air Navigation Deficiency.

3. MONITORING OF ASBU ELEMENTS IMPLEMENTATION

3.1 The monitoring of individual ASBU Blocks Upgrade Elements and Regional Elements is assigned to the relevant APANPIRG sub-groups.

3.2 To encourage States to implement Priority 1 elements of the ASBU Blocks Upgrade Elements and Regional Elements, the APANPIRG sub-groups may monitor compliance through direct engagement with States, and where necessary, through the APANPIRG Air Navigation Deficiency process.

3.3 APAC States/Administrations are required to report on their implementation progress at least once a year (by 28th February of each year) through the Seamless ANS Reporting Tool https://oaci.sharepoint.com/sites/ATM_reporting/Lists/ANS%20Reporting%20Priority/NewForm.aspx.

3.4 Information regarding the Seamless ANS Reporting Tool can be accessed at:

Asia Pacific Seamless ANS Plan

3.5 Access to the Seamless ANS Reporting Tool requires prior registration by ICAO APAC Regional Office using a Microsoft account. Guideline to register is available at:

icao.int/sites/default/files/inline-files/Registration of Microsoft Account.pdf

3.6 User Guide for Seamless ANS Reporting Tool can be accessed at:. ICAO-ANS-Reporting-User-Guide-V2.0.pdf

Appendix A

APAC Main Planning Tables -Objectives and Targets for Priority 1 elements

Objectives		**Target**		**Remarks**
Purpose	**ASBU Element/** **Regional Planning Element**	**Definition of Target**	**Definition of Indicator as Progress**	**TimeLine** Immediate Medium Term (2028) Long Term (2031)
To generate common situational awareness by sharing relevant surface operations data among the local stakeholders involved in aerodrome operations.	ACDM-B0/1	All high-density international aerodromes should operate an A-CDM system for ACIS integrated with the ATM network function consistent with ACDM-B0/1	% of high-density international aerodromes with operational A-CDM system which fulfil the criteria	Immediate
Provides Meteorological observations in support of flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning	AMET-B0/1	Aeronautical meteorological observations products, consistent with AMET-B0/1, should be disseminated in compliance with AMET-B0/4, 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 (Priority 1)	% of availability of MET observation information to ATC Units • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
Provides Meteorological forecasts, advisories and warnings in support of flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning.	AMET-B0/2	Aeronautical meteorological observations products, consistent with AMET-B0/2, should be disseminated in compliance with AMET-B0/4, and in accordance with global and regional guidance material. An agreement between the MET authority and the appropriate ATS authority should be	% of availability of MET forecast information to ATC Units • 100% = YES / Completed / Operational • 80% = Final stage of implementation	Immediate

		established to ensure the appropriate exchange of meteorological information obtained from aircraft (Priority 1)	• 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	
Climatological products in support of the design and planning of infrastructure, flight routes and airspace management. Historical meteorological observations, forecasts, advisories and warnings in support of incident and accident investigations	AMET-B0/3	Climatological and historical meteorological products (such as aerodrome meteorological forecasts and reports, aerodrome warnings and wind shear warnings) consistent with AMET-4B0/3, should be disseminated in compliance with AMET-B0/4, 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 (Priority 1)	% of availability of Climatological and historical MET information to ATC Units • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
Dissemination of meteorological products in support of flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning	AMET-B0/4		% of dissemination of MET information to ATC Units using AFTN/AMHS and/or WFS/SAFIS • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage	Immediate

			• 0% = NO / Related work not commenced	
This element represents the use of PBN in design of approach procedures to provide more flexibility to airspace planners to manage the use of airspace, and to facilitate access to airports. It includes the provision of instrument approach procedures with vertical guidance in support of stabilized approaches.	APTA-B0/1	Where practicable, all instrument runways serving aeroplanes should have the following approach procedures consistent with APTA-B0/1 (Priority 1) and APTA-B0/2: a) SBAS/GBAS CAT1 precision approaches; or ILS CAT1 approaches (with APV approach as a backup); or b) Approaches with Vertical Guidance (APV); RNP APCH with LNAV-VNAV or LPV Minima; or c) if an APV is not practical, straight-in RNP APCH with Lateral Navigation (LNAV) or SBAS based LPV Minima	% of instrument runways which are provided with the approach procedures [(a) or (b) or (c)] as described	Immediate
Use of PBN capabilities allows more flexible placement of arrival and departure routing without the need for Ground-based infrastructure to support these routes	APTA-B0/2	Where practicable, all aerodromes should have RNAV 1 (ATS surveillance environment) or RNP 1 (ATS surveillance and non-ATS surveillance environments) SID/STAR procedures consistent with APTA-B0/2 (Priority 1).	% of aerodromes having at least one runway end provided with RNAV 1 or RNP1 SID/STAR procedures	Immediate
To support the provision of Air Traffic Services and operational applications at reduced cost and increased surveillance coverage.	ASUR-B0/1	ADS-B (using 1090ES) or radar surveillance systems should be used to provide coverage of all Category T airspace supporting high-density international aerodromes consistent with ASUR-B0/1. Data from ATS surveillance systems should be integrated into operational ATC aircraft situation displays (standalone displays of ATS surveillance data should not be used operationally).	% of Category T airspace supporting international aerodromes designated as non-exclusive or exclusive ADS-B airspace	Immediate
	ASUR-B0/1	ADS-B (using 1090ES) or radar surveillance systems should be used to provide coverage of all Category S airspace as far as practicable consistent with ASUR-B0/1. Data from ATS	% of Category S airspace provided with radar or/and ADS-B surveillance system and	Immediate

		surveillance systems should be integrated into operational ATC aircraft situation displays (standalone displays of ATS surveillance data should not be used operationally).	integrated with ATC aircraft situation displays	
To provide an alternative to radar surveillance by using available aircraft transponders	ASUR-B0/2	MLAT or radar surveillance systems should be used to provide coverage of all Category T airspace supporting high-density international aerodromes consistent with ASUR-B0/2. Data from ATS surveillance systems should be integrated into operational ATC aircraft situation displays (standalone displays of ATS surveillance data should not be used operationally).	% of Category T airspace surrounding high-density international aerodromes provided with radar or/and MLAT surveillance system and integrated with ATC aircraft situation displays	Immediate
	ASUR-B0/2	MLAT or radar surveillance systems should be used to provide coverage of all Category S airspace as far as practicable consistent with ASUR-B0/2. Data from ATS surveillance systems should be integrated into operational ATC aircraft situation displays (standalone displays of ATS surveillance data should not be used operationally).	% of Category S airspace provided with radar or/and MLAT surveillance system and integrated with ATC aircraft situation displays	Immediate
To obtain additional information from an aircraft transponder in support of the provision of Air Traffic Services	ASUR-B0/3	All Category R and S upper controlled airspace should require the carriage of an operable mode S transponder within airspace where Mode S radar services are provided to support ASUR-B0/3	% of Category R and S Upper controlled airspace where Mode S radar services are provided and require carriage of an operable Mode S Transponder	Immediate
To support Air /Ground Data Link Communication	COMI-B0/3	Where applicable, all ATC Sectors should be supported by VDL Mode O/A consistent with COMI-B0/3	% of ACCs supported by VDL-Mode 0/A	Immediate
To supports improved communication over AFTN To provide flight information coordination between ANSPs at adjacent FIRs, and with relevant military units, support separation assurance, potentially providing, when	COMI-B0/7	Where applicable, all ATC Sectors should be supported by AMHS communication systems consistent with COMI-B0/7	% of ACCs supported by AMHS communication system	Immediate

used in conjunction with other enablers (e.g. navigation capabilities), reduced separation. 1. Flight Plan/Clearance 2. AIDC: Flight transfer 3. MET data				
To support Air Traffic Service Communication (ATSC) as well as Aeronautical Industry Service Communication (AINSC), such as Aeronautical Administrative Communications (AAC) and Aeronautical Operational Communications.	COMI-B1/1	All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with: b) COMI-B1/1 to B1/4, including VDL Mode 2 Multi-Frequency, SATCOM Class B (SB-S) Voice and Data, ATN/IPS and AeroMACS Ground-Ground;	% of ACCs which are equipped with ATN/IPS internetwork (e.g., CRV) for ATS Communication	Immediate
The main purpose of this element is to ensure that aeronautical data and information comply with quality standards to meet the needs of airspace users and support the safety of flight operations.	DAIM-B1/1	ATM systems should be supported by digitally based AIM systems consistent with DAIM-B1/1, Provision of quality-assured aeronautical data and information, in adherence with ICAO and regional AIM planning and guidance material. ATM systems should be supported by aeronautical information digital data exchange of at a minimum, version AIXM 5.1 (Priority 1)	Indicate whether aeronautical data and information comply with quality standards: • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
To make available digital AIP data and information in an interoperable and mutually understood manner.	DAIM-B2/6	ATM systems should be supported by digitally based AIM systems consistent with DAIM-B2/6, Provision of digital AIP data sets, in adherence with ICAO and regional AIM planning and guidance material.	Indicate whether digital AIP data sets are available – • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation	Immediate

			• 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	
To make available digital terrain data and information in an interoperable and mutually understood manner.	DAIM-B2/7	ATM systems should be supported by digitally based AIM systems consistent with DAIM-B2/7, Provision of digital terrain data sets, in adherence with ICAO and regional AIM planning and guidance material.	Indicate whether digital terrain data sets are available – • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
To make available digital obstacle data in an interoperable and mutually understood manner.	DAIM-B2/8	ATM systems should be supported by digitally based AIM systems consistent with DAIM-B2/8, Provision of digital obstacles data sets, in adherence with ICAO and regional AIM planning and guidance material.	Indicate whether digital obstacle data sets are available – • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate

To make available digital aerodrome mapping data and information in an interoperable and mutually understood manner.	DAIM-B2/9	ATM systems should be supported by digitally based AIM systems consistent with DAIM-B2/9, Provision of digital aerodrome mapping data sets, in adherence with ICAO and regional AIM planning and guidance material.	Indicate whether digital aerodrome mapping data sets are available – • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
To improve the efficiency of coordination and transfer of control between ATSUs	FICE-B0/1	ATS systems should enable AIDC (version 3 or later), or an alternative process that achieves at least the same level of performance as AIDC, between en-route ATC units and terminal ATC units where transfers of control are conducted consistent with FICE-B0/1, unless alternate means of automated communication of ATM system track and flight plan data are employed (Priority 1). As far as practicable, the following AIDC message types should be implemented: • Advanced Boundary Information (ABI); • Coordinate Estimate (EST); • Acceptance (ACP); • TOC; and • Assumption of Control (AOC).	% of ACCs using AIDC (Version 3 or later) for ATS coordination with adjacent ACCs	Immediate
Direct routings are established with the aim of providing airspace users with additional flight planning route options on a larger scale across FIRs such that overall	FRTO-B0/1	ATC units should conduct Airspace Planning and enable systems that manage direct and flexible routings where practicable, and the	Indicate whether State has published DCT routings and made available for flight planning :	Immediate

planned leg distances are reduced in comparison with the fixed route network		optimal operation of FUA consistent with FRTO-B0/1, Direct Routing, (Priority 1)	• Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	
Establish the Flexible Use of Airspace (FUA) process and improve data exchange between civil and military stakeholders by automation to enable a more efficient use of airspace based on transparency and due regard to national security needs	FRTO-B0/2		Has the State established a flexible Use of Airspace (FUA) process and automated airspace reservations? • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
A collection of routes that have been pre-validated and coordinated with impacted air route traffic control centres and airspace users	FRTO-B0/3		Has the State published flexible routings? Indicate • Indicate- 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation	Immediate

			• 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	
Reduction of ATCO's workload via early and systematic conflict detection and conformance monitoring	FRTO-B0/4		Indicate whether the ATM Automation systems are equipped with i. RAM- ii. CLAM iii. MTCD Indicate YES -100% or NO-0%	Immediate
To assist the air traffic controller in preventing collision between aircraft, using position data from surveillance	SNET-B0/1	ATS surveillance systems should enable basic conflict detection and conformance monitoring consistent with FRTO-B0/4 and SNET-B0/1: STCA: MTCD	Indicate whether the ATM Automation systems are equipped with i. Short Tem Conflict Alert (STCA) - ii. MTCD Indicate YES -100% or NO-0%	Immediate
To assist the air traffic controller in preventing controlled flight into terrain accidents by generating, in a timely manner, an alert of aircraft proximity to terrain or obstacles	SNET-B0/2	ATS surveillance systems should enable basic conflict detection and conformance monitoring consistent with FRTO-B0/4 and SNET-B0/2 : MSAW;	Indicate whether the ATM Automation systems are equipped with i. MSAW- Indicate YES -100% or NO-0%	Immediate
APW is designed, configured and used to make a significant positive contribution to the prevention of accidents arising from unauthorized penetration of an airspace volume	SNET-B0/3	ATS surveillance systems should enable basic conflict detection and conformance monitoring consistent with FRTO-B0/4 and SET-B0/3 :APW	Indicate whether the ATM Automation systems are equipped with i. APW- Indicate YES -100% or NO-0%	Immediate
APM is a Ground-based safety net intended to warn the controller about increased risk of controlled flight into terrain accidents by generating, in a timely manner, an alert of aircraft proximity to terrain or obstacles during final approach	SNET-B0/4	ATS surveillance systems should enable basic conflict detection and conformance monitoring consistent with FRTO-B0/4 and SET-B0/4 : APM;	Indicate whether the ATM Automation systems are equipped with i. APM- Indicate YES -100% or NO-0%	Immediate

Aircraft Tracking To provide support to the ATSU Alerting Service in areas without ATS surveillance with an update rate of the aircraft position of at least once per 15 mins.	GADS-B1/1 GADS-B1/2	An appropriate enhanced SAR system and systems to support aircraft tracking capability should be established consistent with the provisions of Annex 12 and to support GADS-B1/1 and B1/2, and in accordance with the Asia/Pacific SAR Plan.	Indicate whether State has established appropriate enhanced SAR system • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
To support all PBN navigation specifications except for RNP APCH down to LPV/LP minima.	NAVS-B0/3	ABAS system should be established as appropriate to the level and type of aircraft operations and the operating environment consistent with NAVS-B0/3 subject to an assessment of benefits and costs.	Indicate whether State has established procedures using ABAS systems? Indicate YES-100% or NO-0%	Immediate
• To adjust conventional navaids networks through the increased deployment of satellite-based navigation systems and procedures to ensure the necessary levels of resilience for navigation. • To provide a minimum level of capabilities to accommodate State aircraft operations where there is a mismatch in terms of aircraft equipage. • To make a more efficient use of the frequency spectrum	NAVS-B0/4	Navigation Minimal Operating Networks (Nav. MON) system should be established as appropriate to the level and type of aircraft operations and the operating environment consistent with NAVS-B0/4 subject to an assessment of benefits and costs.	Indicate whether State has established a NAV MON network? Indicate • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate

Introduce ASM/ATFM techniques, procedures and tools for the initial establishment of an integrated collaborative airspace management and air traffic flow and capacity management process applicable to the strategic through to the tactical phases of operations	NOPS-B0/1	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, consistent with NOPS-B0/1 (Priority 1)	% of ACCs operating within FIRs implementing ATFM with CDM using bi-lateral and multilateral agreements	Immediate
Improve ATFM situation awareness in order to facilitate re-routings and coordinated application of ATFM measures	NOPS-B0/2	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, Collaborative Network Flight Updates, consistent with NOPS-B0/2 (Priority 1)	% of ACCs operating within FIRs implementing ATFM with initial integration of ASM	Immediate
The Network Operation Planning provides an overview of the situation from strategic planning through real time operations with ever increasing accuracy up to and including the day of operations by a common situational awareness for all ATFM actors within and adjacent to the ATFM area and allowing network wide demand and capacity balancing	NOPS-B0/3	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, Basic Network Operation Planning, consistent with NOPS-B0/3 (Priority 1)	% of ACCs operating within FIRs implementing ATFM with Basic Network Operation Planning and Initial Airport/ATFM slots,	Immediate
Initial integration of airports into the ATM network function	NOPS-B0/4	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 Airport/ATFM slots and A-CDM Network Interface, consistent with NOPS-B0/4 (Priority 1)	% of ACCs operating within FIRs implementing ATFM with A-CDM Network Interface	Immediate
Provision of dynamic departure ATFM slot allocation including Calculated Take-off Time (CTOT) for regulated flights to avoid ATFM congestions.	NOPS-B0/5	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, Dynamic ATFM Slot	% of ACCs operating within FIRs implementing ATFM with Dynamic Slot Allocation	Immediate

		Allocation, consistent with NOPS-B0/5 (Priority 1)		
To optimize sequencing for arrivals	RSEQ-B0/1	All high-density international aerodromes where ATFM facilities are required should be served by AMAN facilities consistent with RSEQ-B0/1 (Priority 1)	% of high-density international aerodromes where AMAN is implemented	Immediate
To optimize departure operations	RSEQ-B0/2	All high-density international aerodromes where ATFM facilities are required should be served by DMAN facilities consistent with RSEQ-B0/2 (Priority 1)	% of high-density international aerodromes where DMAN is implemented	Immediate
For optimum utilization of airspace	*Regional* Civil Military Cooperation	Civil-Military Airspace expectations are as follows: a) SUA should only be established after due consideration of its effect on civil air traffic by the appropriate Airspace Authority to ensure it will be: • used for the purpose that it is established; • used regularly; • as small as possible, including any internal buffers, required to contain the activity therein; • if applicable, operated in accordance with FUA principles; and • activated only when it is being utilised;	Indicate whether State has established SUA management process: Indicate - • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
For optimum utilization of airspace	*Regional* Civil Military Cooperation	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.	Indicate whether State has established SUA review process: Indicate • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation	Immediate

			• 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	
For increased safety	*Regional* ANSP Human and Simulator Performance - Human Performance training	The following systems should be established to support human performance in the delivery of a Seamless ANS service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors Digest No. 1 and related reference material: a) human performance training for all managers of operational air navigation services (such as aerodrome operators, ATC organisations and aeronautical telecommunications), such training to include the importance of: • a proactive organisational culture where managers and operational staff are informed and safety is a first priority, using open communications and an effective team management approach; • assessment and management of risks by safety review and assessment teams comprising multidisciplinary operational staff and managers which review safety performance and assess significant proposals for change to ATM systems, particularly those related to human capabilities and limitations; • human factors in – o air safety investigation; o system design (ergonomics, human-in-the-loop); o effective training (including the improved application of simulators); o fatigue management; o automated safety nets; and	indicate whether State has established i. Human performance training for all managers of ANS – • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate

		o contingency planning; • effective safety reporting systems that – o are non-punitive, supporting a "positive safety culture"; o promote open reporting to management; and o focus on preventive (systemic), not corrective (individual) actions in response to safety concerns, incidents and accidents.		
For increased safety	Regional ANSP Human and Simulator Performance - Human Performance training	The following systems should be established to support human performance in the delivery of a Seamless ANS service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors Digest No. 1 and related reference material: b) human performance-based training and procedures for operational staff providing ATS, including: • the application of tactical, surveillance-based ATC separation; • control techniques near minimum ATC separation; and • responses to ATM contingency operations, irregular/abnormal operations and safety net alerts.	indicate whether State has established ii. Human performance-based training for operational staff – • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate

	Regional ANSP Human and Simulator Performance - Human Performance training	The following systems should be established to support human performance in the delivery of a Seamless ANS service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors Digest No. 1 and related reference material: c) human performance-based training and procedures for staff providing operational air navigation services (such as aerodrome staff operating 'airside', air traffic controllers and aeronautical telecommunications technicians) regarding the importance of: • an effective safety reporting culture; and • 'Just Culture' (Priority 1).	indicate whether State has established iii. Human performance-based training regarding safety reporting and just culture- • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
For optimum utilization of airspace; For increased safety	Regional Space object Launch and re-entry	All States with organisations that conduct space object launch or re-entry activities should ensure: a) the development of written coordination agreements between the State civil aviation authority and the launch/re-entry agency concerned	Indicate whether State has implemented a. coordination agreement between the concerned authorities- • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate

For optimum utilization of airspace For increased safety	Regional Space object Launch and re-entry	All States with organisations that conduct space object launch or re-entry activities should ensure: b) that strategic coordination is conducted between the State civil aviation authority and any States affected by the launch/re-entry activity at least 14 days prior to the proposed activity, providing notice of at least: • three days for the defined launch window; and • 24 hours for the actual planned launch timing	Indicate whether State has implemented b. Strategic coordination between authorities concerned- • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
For optimum utilization of airspace For increased safety	Regional Space object Launch and re-entry	All States with organisations that conduct space object launch or re-entry activities should ensure: c) that consideration of affected airspace users and ANSPs is made after consultation, so that the size of the airspace affected is minimized and the launch window is optimized for the least possible disruption to other users; and	Indicate whether State has implemented procedures for c. Due consideration to be made of affected AU and ANSPs • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Immediate
For optimum utilization of airspace For increased safety	Regional Space object Launch and re-entry	All States with organizations that conduct space object launch or re-entry activities should ensure: d) that communication is established with affected ANSPs to provide accurate and	Indicate whether State has implemented procedures for d. Communication with affected ANSPs. • 100% = YES / Completed / Operational	Immediate

		timely information on the launch/re-entry activity to manage tactical responses (for example, emergencies and activity completion) (Priority 1)	• 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	

Appendix B

APAC Main Planning Tables -Objectives and Targets for Priority 2 elements

Objectives		Target		Remark
Purpose	**ASBU/ Regional Element**	**Definition of Target**	**Definition of Indicator of Progress**	**Timeline**
Airport CDM operations will be enriched by enhanced arrival information from the ATM network and, at the same time, network operations will benefit from more accurate departure information from CDM airports	ACDM-B0/2	All high-density international aerodromes should operate an A-CDM system integrated with the ATM network, consistent with ACDM-B0/1 and B0/2.	% of high-density international aerodromes with operational A-CDM system integrated with ATM network operations	Medium term
Meteorological observation information supporting automated decision processes and ATM impact conversion.	AMET-B1/1	Capability for providing aeronautical meteorological observations in support of automated decision processes or aids and performance-based requirements, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support should be enabled, consistent with AMET-B1/1	Indicate whether State has commenced the process of providing MET observation information supporting automated decision process Indicate- Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Meteorological forecast and warning information supporting automated decision processes and ATM impact conversion.	AMET-B1/2	Capability for providing aeronautical meteorological forecast and warning information s in support of automated decision processes or aids and performance-based requirements, should be enabled, consistent with AMET-B1/2	Indicate whether State has commenced the process of providing MET forecast and warning information Indicate- Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Climatological information in support of the design and planning of infrastructure, flight routes and airspace management. Historical meteorological observations, forecasts, advisories and warnings in support of incident and accident investigations.	AMET-B1/3	Capability for providing aeronautical climatological and historical information should be enabled, consistent with AMET-B1/3	Indicate whether State has commenced the process of providing Climatological and Historical MET information Indicate- Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term

Dissemination of meteorological information in support of automated decision process or aids, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support.	AMET-B1/4	All States should ensure that aeronautical meteorological products supported by automated decision systems or aids using IWXXM consistent with AMET- B1/4	Indicate whether State has commenced dissemination of MET information in IWXXM format and WEB services consistent with AMET-B1/4 Indicate-“ Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Medium term
Reduce fuel burn by not requiring application or power during descent	APTA-B0/4	Terminal Areas serving high-density international aerodromes should implement CCO (Continuous Climb Operations) operations consistent with APTA-B0/4 where practicable	% of high-density international aerodromes implemented CCO	Medium term
Reduce fuel burn by not requiring level-offs during climb	APTA-B0/5	Terminal Areas serving high-density international aerodromes should implement CDO (Continuous Descent Operations) operations consistent with B0/5 where practicable	% of high-density international aerodromes implemented CDO	Medium term
Standard Aerodrome operating minima are predicated upon aircraft equipped with the minimum required equipment (the basic aircraft) for that approach. These aerodrome operating minima relate directly to the established types and categories of operations and the associated infrastructure requirements (e.g. runway lights, approach lights). Aircraft with more advanced equipage can take advantage of existing infrastructure to obtain special authorizations for enhanced approach operations to lower minimums than basic aircraft can use.	APTA-B0/7	Terminal Areas serving high-density international aerodromes should implement performance-based aerodrome operating minima-aerodromes advanced aircraft consistent with APTA-B0/7	% of high-density international aerodromes implementing Performance Based Operating Minima for aerodromes advanced aircraft	Medium term
For Basic aircraft, improvements include: Instrument approaches to non-instrument runways, improving	APTA-B0/8	Terminal Areas serving high-density international aerodromes should implement performance-based aerodrome operating minima-basic aircraft consistent with APTA-B0/8	% of high-density international aerodromes implementing Performance Based Operating Minima for basic aircraft	Medium term

airport access Flexibility to improve the ground infrastructure with consequent improvements in operating minima				
To provide surveillance coverage in locations where ground stations siting is not possible or not currently provided	ASUR-B1/1	ACCs operating within Category R airspace should implement SB ADS-B consistent with ASUR-B1/1, subject to an assessment of costs and benefits.	% of ACCs operating within Category R airspace implementing SB ADS-B	Medium term
To enable the data exchanges through Controller/Pilot Data Link Communication (CPDLC); ▪ To enable the data exchanges through Automatic Dependant Surveillance-Contract (AERODROMESS-C) Communication ▪ To enable Airlines Operations Communication	COMI-B0/1	All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with: a) COMI-B0/1, B0/2, B0/4, B0/5 and B0/6, including ACARS, ATN/OSI, VDL Mode 2 Basic, SATCOM Class C Data, and HFDL;	% of ACCs provided with ACARS	Medium term
To support Operational Data Exchange (Flight Plans, NOTAMs and OPMET)	COMI-B0/2		% of ACCs provided with ATN/OSI	Medium term
To support Air /Ground Data Link Communication with higher performance than VDLM0/A	COMI-B0/4		% of ACCs provided with VHF Mode 2 Basic	Medium term
To provide surveillance and communications in Continental Remote and Oceanic airspaces, where VHF usage is not possible or practical. • Satellite-based, narrow-band communication provided by multiple service providers that can be used for safety and routing communications	COMI-B0/5		% of ACCs provided with SATCOM Class C Data	Medium term

To exchange data messages between aircraft end-systems and corresponding ground based HFDL ground stations	COMI-B0/6		% of ACCs provided with HFDL	Medium term
• To support transmission of data link message sets to supplement current voice operations, thus • reducing voice channel congestion, while increasing productivity and capacity. • Support increased subnetwork capacity and reduces interference over the standard VDL Mode 2 system.	COMI-B1/2	All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with: b) COMI-B1/1 to B1/4, including VDL Mode 2 Multi-Frequency, ATN/IPS and AeroMACS Ground-Ground;	% of ACCs equipped with VDL Mode 2 Multi-Frequency	Medium term
To reduce Separation & Efficiency To improve situational awareness To reduced Cost	COMI-B1/4		% of high-density International Aerodromes equipped with AeroMACS Ground-Ground network connectivity	Medium term
To support: • reduction of voice channel congestion and increase of capacity in domestic airspace, • introduction of performance-based reduced separation minima in procedural airspace	COMS-B1/1	All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with: d) COMS-B1/1 to B1/2, including PBCS approved CPDLC (FANS 1/A+), ADS-C for domestic and procedural airspace	% of ACCs with operational PBCS approved CPDLC	Medium term
To support introduction of performance-based reduced separation minima in procedural airspace	COMS-B1/2		% of ACCs with operational PBCS approved AERODROMESS-C	Medium term
To improve traffic situational awareness in all phases of flight	CSEP-B1/1	Unless excepted by ATC, all aircraft operating within Category S and T controlled airspace should have	%age of ACCs which have procedures to utilize i) CDTI with TCAS (AIRB) ;	Medium term

		systems that enable basic airborne situational awareness AIRB consistent with CSEP-B1/1		
To assist pilots in maintaining own separation during successive visual approach procedures. VSA is defined to support aircraft performing successive visual approach and landing operations	CSEP-B1/2	Unless excepted by ATC, all aircraft operating within Category S and T controlled airspace should have systems that enable Visual Separation on Approach VSA consistent with CSEP-B1/2	% of ACCs which have mandated requirement for all aircraft operating within Category S and T airspace to have systems i) for conducting VSA using CDTI;	Medium term
Reduced separation allowing more flights to operate in their optimum flight levels	CSEP-B1/3	Unless excepted by ATC, all aircraft operating within Category S and T controlled airspace should have systems that enable where applicable, performance-based horizontal minima consistent with CSEP-B1/3	%age of ACCs which have mandated requirement for all aircraft operating within Category S and T airspace to have systems for application of (RCP240 and RSP 180) i) reduced longitudinal separation minima;	Medium term
To increase airspace capacity and allow optimum utilization of available airspace	CSEP-B1/4	Unless excepted by ATC, all aircraft operating within Category S and T controlled airspace should have systems that enable where applicable, performance-based horizontal minima consistent with CSEP-B1/4	%age of ACCs which have mandated requirement for all aircraft operating within Category S and T airspace to have systems for application of ii) reduced lateral separation minima ;	Medium term
To provide timely and relevant Information about status and condition of the ANS infrastructure to the next intended users via NOTAM.	DAIM-B2/10	ATM systems should be supported by digitally based NOTAM consistent with DAIM-B2/10	Indicate whether State has implemented provision of digital NOTAM through AIXM Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
To support implementation of FFICE	FICE-B2/2	States should establish FF-ICE (Flight and Flow Information for Collaborative Environment) consistent with FICE-B2/2, implementing the following as a minimum: a) Filing Service (FICE-B2/2) b) Flight Data Request Service (FICE-B2/4)	Indicate whether State has implemented FICE-B2/2 , i.e., Filing Service Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
	FICE-B2/4		Indicate whether State has implemented FICE-B2/4 , i.e., Flight Data Request service	Medium term

			Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	
The Free Route Airspace (FRA) concept brings significant flight efficiency benefits and a choice of user preferred routes to airspace users	FRTO-B1/1	ACCs should enable, where practicable, Free Route Airspace, consistent with FRTO-B1/1	Indicate whether in the State has established i) Free Route Airspace (FRTO-B1/1)- Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
RNP routes should be deployed within en- route airspace where Free Route Airspace (FRA) is not planned or if FRA is deployed the RNP routes should ensure the connectivity between FRA and TMAs	FRTO-B1/2	ACCs should enable, where practicable, RNP routes, consistent with FRTO-B1/2	%age of ACCs with established RNP routes (FRTO-B1/2) -	Medium term
FUA and airspace management (ASM) need to be enhanced with collaborative airspace data sharing between all ATM actors, negotiation procedures, system support and real time ASM data integration	FRTO-B1/3	ACCs should enable, where practicable, advanced FUA and Airspace Management (ASM), consistent with FRTO-B1/3	Indicate whether State has implemented iii) advanced FUA and airspace management (FRTO-B1/3) - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Dynamically implement ATC sectorization to respond to traffic demand without increasing the number of controllers working position in use.	FRTO-B1/4	ACCs should enable, where practicable, Dynamic Sectorisation consistent with FRTO-B1/4	Indicate whether State has implemented iv) Dynamic sectorization (FRTO-B1/4) - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Enhancements of basic mid-term conflict detection (MTCD)/ monitoring alert (MONA) functions and thus further improving the ATCO productivity and reducing the workload	FRTO-B1/5	ACCs should enable, where practicable, Enhanced Conflict Detection Tools and Conformance Monitoring consistent with FRTO-B1/5	Indicate whether State has implemented v) Enhanced conflict detection tools and conformance monitoring (FRTO-B1/5) - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term

This element is applicable only to en- route sectors that are currently staffed by two ATCOs (planning and tactical). The multi-sector planning (MSP) function defines a new organization of controller team(s) and new operating procedures to enable the planning controller to provide support to several tactical controllers operating in different adjacent sectors. This function might reduce the ATCO workload related to intra/inter centre coordination. The workload conversion to potential capacity gains might vary considerably depending on the sector configurations	FRTO-B2/5	ACCs should enable, where practicable, Multi-Sector Planner Function consistent with FRTO-B2/5	Indicate whether State has implemented vi) Multi-sector planning (FRTO-B2/5) - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
To support Precision Approach and landing operations (CAT I) at a specific airport (one system may support all runway ends). As an option, may support arrival and departure phases of flight	NAVS-B0/1	GBAS system should be established as appropriate to the level and type of aircraft operations and the operating environment consistent with NAVS-B0/1 subject to an assessment of benefits and costs.	Indicate whether GBAS systems have been established meeting the definition - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
To support PBN in all phases of flight with an increased accuracy, integrity and availability compared to ABAS. Increases accuracy and integrity for the vertical guidance	NAVS-B0/2	SBAS system should be established as appropriate to the level and type of aircraft operations and the operating environment consistent with NAVS-B0/2 subject to an assessment of benefits and costs.	Indicate whether SBAS systems have been established meeting the definition - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Short Term ATFM Measures (STAM) intends to smooth sector workload by reducing traffic peaks through short-term applications of minor ground delays, appropriate flight level capping, timing and modalities of ATC re- sectorisation These measures can reduce	NOPS-B1/1	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Short Term ATFM measures, consistent with NOPS-B1/1 supporting the integration of time-based management within a flow centric approach	Indicate whether State has implemented ATFM systems with i) application of short-term ATFM measures (NOPS-B1/1) –	Medium term

the traffic complexity for ATC with minimum curtailing impact on the airspace users			Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	
The Network Operations Planning needs to be enhanced to achieve collaborative planning with the support of services which can be automated (B2B interfaces/SWIM services)	NOPS-B1/2	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Enhanced NOPS Planning, consistent with NOPS-B1/2	Indicate whether State has implemented ATFM systems with ii) Enhanced Network Operations Planning (NOPS-B1/2) - Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Medium term
Integrate the airport operations planning (AOP) into the network operations planning (NOP)	NOPS-B1/3	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Enhanced integration of airport operations and NOPS planning, consistent with NOPS-B1/3	Indicate whether State has implemented ATFM systems with iii) Enhanced integration of airport operations planning with network operations planning (NOPS- B1/3) - I indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Medium term
Enhanced traffic complexity assessment by automation	NOPS-B1/4	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Enhanced Traffic Complexity Management, consistent with NOPS-B1/4	Indicate whether State has implemented ATFM systems with iv) Enhanced traffic complexity assessment by automation (NOPS-B1/4) - Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Medium term
Ensure a continuous, seamless and iterative airspace management and air traffic flow management approach	NOPS-B1/5	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Full integration of ASM with ATFM, consistent with NOPS-B1/5	Indicate whether State has implemented ATFM systems with v) Full integration of airspace management with ATFM (NOPS-B1/5) - Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Medium term
ASM solutions and initial dynamic	NOPS-B1/6	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable,	Indicate whether State has implemented ATFM systems with	Medium term

airspace configurations for ATFM planning, synchronization of traffic flows and demand/capacity balancing		where applicable, Initial Dynamic Airspace configurations, consistent with NOPS-B1/6	vi) Initial dynamic airspace configurations (NOPS- B1/6) - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	
Improve the Airspace Users driven ATFM slot swapping process	NOPS-B1/7	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Enhanced ATFM slot swapping, consistent with NOPS-B1/7	Indicate whether State has implemented ATFM systems with vii) Enhanced ATFM slot swapping (NOPS-B1/7) – Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
ATM Network function contributions to extended Arrival Management	NOPS-B1/8	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, Extended Arrival Management, consistent with NOPS-B1/8	Indicate whether State has implemented ATFM systems with viii) Extended Arrival Management (NOPS-B1/8)- Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Use of Target Times for ATFM purposes including an initial level of arrival sequencing in case of an arrival ATFM measure	NOPS-B1/9	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, ATFM Target Times consistent with NOPS-B1/9	Indicate whether State has implemented ATFM systems with ix) Use of target times for ATFM purposes (NOPS-B1/9) – Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Collaborative Trajectory Options Programs are Traffic Management Initiatives (TMI) that allow ATFM to choose the best possible balance between ATFM delay and rerouting by using airspace user provided Trajectory Option Sets (TOS) to mitigate the operational impact of weather or traffic demand airspace constraints.	NOPS-B1/10	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, ATFM Target Times consistent with NOPS-B1/10	Indicate whether State has implemented ATFM systems with x) Collaborative Trajectory options program (NOPS-B1/10) - Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term

To enhance predictability and ATM decision compliance	RSEQ-B1/1	All ATC units providing services to high-density international aerodromes should operate extended arrival metering consistent with RSEQ-B1/1	% of high-density international AERODROMES with extended arrival metering capability	Medium term
Assist the air traffic controller in preventing collision between aircraft, using position data from ground surveillance and flight intent reported by aircraft	SNET-B1/1	ATS surveillance systems should enable Enhanced STCA with aircraft parameters consistent with SNET-B1/1	Indicate whether State has implemented Enhanced STCA with aircraft parameters according to SNET-B1/1 Indicate YES-100% or NO-0%	Medium term
Assist the air traffic controller in preventing collision between aircraft, using position data from ground surveillance, and considering possible crew intents linked to traffic patterns and ATC practices in complex TMAs	SNET-B1/2	ATS surveillance systems should enable Enhanced STCA in complex TMAs consistent with SNET-B1/2	Indicate whether State has implemented Enhanced STCA in complex TMAs according to SNET-B1/2 Indicate YES-100% or NO-0%	Medium term
To improve safety and efficiency during ground operations by providing proper indications to pilots and vehicle drivers	SURF-B0/1	All ATC units providing services to high-density international aerodromes should operate basic ATC surface operations tools consistent with SURF-B0/1	% of high-density international AERODROMES fulfil the criteria	Medium term
To better maintain ATCO awareness of ground operations.	SURF-B0/2	All ATC units providing services to high-density international aerodromes should operate Comprehensive situational awareness of surface operations consistent with SURF-B0/2	% of high-density international AERODROMES fulfil the criteria	Medium term
Detection by the ATCO of potentially unsafe situations with regard to runway operations.	SURF-B0/3	All ATC units providing services to high-density international aerodromes should operate initial ATCO alerting service for surface operations consistent with SURF-B0/3	% of high-density international AERODROMES fulfil the criteria	Medium term
To improve surface operations with the aim to reduce taxi time and fuel burn, potential mistakes	SURF-B1/1	All ATC units providing services to high-density international (ICAO aerodrome reference codes 3 and 4) aerodromes having complex layouts should implement	% of high-density international AERODROMES fulfil the criteria	Medium term

		A-SMGCS incorporating advanced surface traffic management visual aids, consistent with SURF-B1/1		
To improve ground operations based on increasing pilot's situational awareness and safety especially at taxiway and runway intersections, as well as for aircraft landing and taking off	SURF-B1/2	All ATC units providing services to high-density international (ICAO aerodrome reference codes 3 and 4) aerodromes having complex layouts should implement A-SMGCS incorporating pilot comprehensive awareness consistent with SURF-B1/2	% of high-density international AERODROMES fulfil the criteria	Medium term
The enhanced A- SMGCS alerting service anticipates potential runway conflicts, runway incursion and other hazardous situations on the aerodrome surface	SURF-B1/3	All ATC units providing services to high-density international (ICAO aerodrome reference codes 3 and 4) aerodromes having complex layouts should implement A-SMGCS incorporating runway alerting, enhanced ATC alerting, consistent with SURF-B1/3.	% of high-density international AERODROMES fulfil the criteria	Medium term
To improve pre- departure and departure sequencing by provision of accurate taxi times and efficient routing service	SURF-B1/4	All ATC units providing services to high-density international (ICAO aerodrome reference codes 3 and 4) aerodromes having complex layouts should implement A-SMGCS incorporating routing service to support ATC consistent with SURF-B1/4	% of high-density international AERODROMES fulfil the criteria	Medium term
To define the requirements for an information service provider to make aviation-related information available as an information service	SWIM-B2/1	States should establish SWIM services consistent with SWIM-B2/1 and B2/2, implementing the following as a minimum: a) Information Service Provision (SWIM-B2/1);	Indicate whether State has established Information Service provision Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
To define the requirements for an information service consumer to discover and access aviation-related information provided via information services.	SWIM-B2/2	States should establish SWIM services consistent with SWIM-B2/1 and B2/2, implementing the following as a minimum: Information Service Consumption (SWIM-B2/2)	Indicate whether State has established Information Service consumption Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term

Guidance to comprehensive Airport Master Plan	Regional- Aerodromes	All high-density 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;	% of high-density International AERODROMES s with operational Apron Management Service	Medium term
	Regional- Aerodromes	b) ATS coordination (including meetings and agreements) related to: • airport development and maintenance planning; • local authority coordination (environmental, noise abatement, and obstacles);	% of high-density International AERODROMES s with operational ATS Coordination	Medium term
	Regional- Aerodromes	c) regular airport capacity analysis, including a detailed assessment of passenger, airport gate, apron, taxiway and runway capacity.	% of high-density International AERODROMES s with regular airport capacity analysis	Medium term
To enhance Surveillance coverage and improve airspace capacity	Regional- ADS-B	Unless supported by alternative means of ATS surveillance (such as radars, where there are no plans for ADS-B), all Category T airspace supporting international aerodromes should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B OUT using 1090ES with DO-260/260A and 260B capability to support ASUR-B0/1.	% of Category T airspace supporting international aerodromes meeting the criteria	Medium term
To enhance Surveillance coverage and improve airspace capacity	Regional- SSR Mode S	All Category T airspace supporting international aerodromes should require the carriage of an operable mode S transponder within airspace where Mode S radar services are provided to support ASUR-B0/3.	% of Category T airspace supporting international aerodromes meeting the criteria	Medium term
To optimise airspace capacity by utilising aircraft capability	Regional- PBN Airspace	All Category T airspace supporting international aerodromes should be designated as non-exclusive or exclusive PBN airspace as appropriate to allow operational priority for PBN approved aircraft, except for State aircraft, to facilitate seamless operations and off-track events such as weather deviations to support APTA-B0/1, B0/2, B0/3 and B0/6.	% of Category T airspace supporting international aerodromes meeting the criteria	Medium term
Standardization	Regional- FLOS	All States should use the ICAO Table of Cruising Levels (FLOS) based on feet as contained in Annex 2 Appendix 3a	Indicate whether State has implemented FLOS - YES-100% or NO-0%	Medium term
To support UAS operations	Regional-	States should implement regulations supporting the integration of UAS operations in nonsegregated airspace,	Indicate whether State has implemented regulations regarding UAS operations:	Medium term

	UAS	using a risk-based approach and in accordance with the guidance provided by the UAS Advisory Group of the Remotely Piloted Aircraft Systems (RPAS) Panel, as a minimum	Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	
To improve ATS units' coordination	Regional- ATS COM	All ATS sectors providing ATS surveillance in controlled airspace should have direct speech circuits or digital voice communications, meeting pre-established safety and performance requirements, and where practicable, automated hand-off procedures that allow the TOC of aircraft without the necessity for voice communications, unless an aircraft requires special handling.	% of ACCs meeting the criteria	Medium term
To enhance regional surveillance coverage	Regional- ATS SUR	Subject to appropriate filtering, ATS surveillance data, particularly from ADS-B, should be shared with neighbouring ATC units to support ASUR-B0/1 and B0/2.	% of ACCs meeting the criteria	Medium term
To standardise airspace classification across region	Regional- Airspace	Controlled airspace classification should be consistent with Annex 11 Appendix 4 and applied as follows: Category R upper controlled airspace – Class A; and	% of ACCs meeting the criteria	Medium term
	Regional- Airspace	Category S upper controlled airspace – Class A, or if there are high level general aviation or military VFR operations: Class B or C; and	% of ACCs meeting the criteria	Medium term
	Regional- Airspace	Category S lower controlled airspace – Class C, D or E airspace, as determined by safety assessments.	% of ACCs meeting the criteria	Medium term
To optimise airspace capacity	Regional- ATC Separation	All ATC units should authorise the use of the horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable, considering such factors as: a) the automation of the ATM system, including automated hand-off between sectors; b) the capability of the ATC communications system; the performance of the ATS surveillance system, including data-sharing or overlapping coverage at TOC points; c) and ensuring the competency of air traffic controllers to apply the full tactical capability of ATS surveillance systems.	Indicate whether State has implemented ATC horizontal separation minima as stated in Doc 4444 Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term

To optimise safe air traffic flow	Regional- FLAS	Priority for FLAS level allocations should be given to higher density ATS routes over lower density ATS routes. FLAS should comply with Annex 2, Appendix 3a unless part of an OTS.	Indicate whether State has implemented FLAS in compliance with Annex 2 , Appendix 3a. Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
To encourage ATS planners to conduct regular capacity assessment	Regional- ATM Capacity	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	Indicate whether State has implemented ATC Sector Capacity Assessment and declared a nominal aircraft capacity figure Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
To enhance efficiency	Regional- Aerodromes	ATC systems should utilise electronic flight progress strips wherever automation systems allow the capability due to efficiency and transcription error/data mismatch issues	Indicate whether State has implemented Electronic Flight Systems (EFS) in all the ATM automation systems in all ATS units; Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Promote Civil-Military cooperation	Regional- Civil Military Cooperation	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)	Indicate whether State has established i) Strategic Civil-Military coordination body and process – Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
	Regional- Civil Military Cooperation	b) formal civil-military liaison should take place for tactical responses by encouraging military participation at civil ATM meetings and within ATC centres;	Indicate whether State has established ii) Tactical Civil -Military coordination process – Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
	Regional-	c) integration of civil and military ATM systems using joint procurement, and sharing of ATS surveillance data	Indicate whether State has implemented	Medium term

	Civil Military Cooperation	(especially from AERODROMESS-B systems) should be provided as far as practicable	i) Integration of Civil-Military ATM systems- Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	
	Regional- Civil Military Cooperation	d) joint provision of Civil-Military navigation aids and aerodromes	Indicate whether State has implemented iii) Operation and provision of Nav Aids in joint civil-military aerodromes – Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
	Regional- Civil Military Cooperation	e) common training should be conducted between civil and military ATM units in areas of common interest;	Indicate whether State has implemented; i) Common Training between Civil and Military Units – Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
	Regional- Civil Military Cooperation	f) civil and military ATM units should utilize common procedures as far as practicable.	Indicate whether State has implemented; ii) Provision of common procedures between Civil and Military ATM units- Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Medium term
Improve ATC communication	Regional- ATC Operations	All ATM systems serving high-density international aerodromes should implement Data link Departure Clearance (DCL) compliant with EUROCAE WG78/RTCA SC 214 standards.	% of high-density International Aerodromes having ATM Systems with operational DCL systems	Medium term
For optimum utilization of airspace,	ASUR-B1/1, COMS-B0/1, COMS-B1/1, COMS-B1/2, CSEP-B1/3, CSEP-B1/4, FRTO-B1/5 OPFL-B2/1,	*APAC States and Administrations are encouraged to implement longitudinal separations of 55.5 km (30 NM) or less in oceanic and remote airspace, and 19 km (10 NM) or less elsewhere*	Indicate whether State has implemented longitudinal separations of 30NM or less in Oceanic and remote airspace • 100% = YES / Completed / Operational • 80% = Final stage of implementation	Medium term

			• 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	
For increased safety and efficiency	ASUR-B0/1, ASUR-B1/1 COMS-B0/1, COMS-B1/1, COMS-B1/2, CSEP-B1/3, CSEP-B1/4, FRTO-B1/5 OPFL-B2/1,	*APAC States and Administrations are encouraged to implement longitudinal separations of 55.5 km (30 NM) or less in oceanic and remote airspace, and 19 km (10 NM) or less elsewhere*	Indicate whether State has implemented longitudinal separations of 10 NM or less in en-route airspace (other than Oceanic and Remote airspace) • 100% = YES / Completed / Operational • 80% = Final stage of implementation • 60% = Intermediate stage of implementation • 40% = Early stage of implementation • 20% = Planning / Feasibility Study stage • 0% = NO / Related work not commenced	Medium term

Appendix C

APAC Main Planning Tables -Objectives and Targets for Priority 3 elements

Objective		Target		Remark
Purpose	ASBU / Regional Element	Definition of Target	Definition of Indicator of Progress	Timeline
To enhance the planning and management of airport operations and allow their fully integration in the ATM network and enhance collaboration between airport stakeholders.	ACDM-B2/1	All high-density international aerodromes should establish Airport Operations Plan (AOP) consistent with ACDM-B2/1	"% of high-density international AERODROMES implementing AOPs	Long term
	ACDM-B2/2	All high-density international aerodromes should establish Airport Operations Centres (AOPCs) consistent with ACDM-B2/2	"% of high-density international AERODROMES implementing AOPCs	Long term
	ACDM-B2/3	All high-density international aerodromes should implement Total Airport Management (TAM) consistent with ACDM-B2/3	"% of high-density international AERODROMES implementing TAM	Long term
Integrated meteorological observations in support of enhanced ATM and airport decision-making processes, particularly in the near-term	AMET-B2/1	Capability for providing integrated aeronautical meteorological observations, in support of automated decision processes and the design and planning of infrastructure, flight routes and airspace management should be enabled, consistent with AMET-B2/1	Indicate whether State has commenced the planning for providing MET observation information in support of automated decision making to users as described in AMET-B2/1: Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%""	Long term
Integrated meteorological forecast and warning information in support of enhanced operational ground and air decision-making processes, particularly in the near-term.	AMET-B2/2	Capability for providing integrated aeronautical meteorological forecast and warning information in support of automated decision processes and the design and planning of infrastructure, flight routes and airspace management should be enabled, consistent with AMET-B2/2	Indicate whether State has commenced the planning for providing MET forecast and warning information in support of automated decision making to users as described in AMET-B2/2: Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%""	Long term
Climatological products (historical and forecast) in support of the design and planning of infrastructure, flight routes and airspace management. Historical meteorological observations, forecasts, advisories and warnings in support of incident and accident investigations.	AMET-B2/3	Capability for providing integrated climatological and historical meteorological products in support of automated decision processes and the design and planning of infrastructure, flight routes and airspace management should be enabled, consistent with AMET-B2/3	Indicate whether State has commenced the planning for providing MET climatological and historical information in support of automated decision making to users as described in AMET-B2/3 Indicate- "In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%""	Long term

Integrated meteorological information service in the SWIM environment in support of enhanced operational ground and air decision-making processes, particularly in the planning phase and near-term.	AMET-B2/4	States should establish Meteorological information service consistent with AMET-B2/4, implementing the following as a minimum	Indicate whether State has commenced the planning for Met Information Service in SWIM environment to users as described in AMET-B2/4 Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”"	Long term
Introduction of SBAS and GBAS CAT I procedures allow for reduced minima at aerodromes situated in areas of significant terrain, where ILS is not possible.	APTA-B0/3	Where there is an operational benefit Terminal Areas serving all high-density international aerodromes should implement SBAS/GBAS CAT I precision approach procedures n accordance with APTA-B 0/3	"% of high-density international aerodromes and terminal airspace which fulfil the criteria	Long term
Helicopter unique capabilities allow IFR operations that start or terminate from any suitable point in space (PinS), as long as visual conditions support take-off/landing capability from that point.	APTA-B0/6	Where there is an operational benefit Terminal Areas serving all high-density international aerodromes should implement PBN Helicopter Point in Space (PinS) operations consistent with APTA- B0/6	"% of high-density international aerodromes and terminal airspace which fulfil the criteria	Long term
Introduction of GBAS CAT III/III procedures allow for reduced minima at aerodromes where ILS is not possible.	APTA-B2/1	Where there is an operational benefit Terminal Areas serving all high-density international aerodromes should implement GBAS CAT II/III precision approach procedures consistent with APTA- B2/1	"% of high-density international aerodromes and terminal airspace which fulfil the criteria	Long Term
To enable Helicopter Steep Approach procedures	APTA-B2/3	Where there is an operational benefit Terminal Areas serving all high-density international aerodromes should implement PBN Helicopter Steep Approach operations consistent with APTA- B2/3	"% of high-density international aerodromes and terminal airspace which fulfil the criteria	Long term
PBN approaches with advanced functionality allow for the introduction of more flexible approaches including the use of RF legs within the Final Approach Segment (FAS) and RNP.	APTA-B2/5	Where there is an operational benefit Terminal Areas serving all high-density international aerodromes should implement advanced capability PBN SID and STAR procedures and performance based aerodrome operating minima for advanced aircraft with SVGS consistent with APTA-B2/5	"% of high-density international aerodromes and TMA which fulfil the criteria	Long term
Advanced PBN functionality further supports flexibility of route placements in airspace design.	APTA-B2/6	Where there is an operational benefit Terminal Areas serving all high-density international aerodromes should implement advanced capability PBN SID and STAR procedures and performance-based aerodrome operating minima for advanced aircraft with SVGS consistent with APTA-B2/6	%age of Terminal Areas servicing high-density international aerodromes implementing advanced capability PBN SID and STAR procedures	Long term
Increase the ability CDO operations to contribute to terminal airspace efficiency.	APTA-B2/7	Where there is an operational benefit, all Terminal Areas serving high-density international aerodromes should implement Advanced CDO operations consistent with APTA-B2/7	"% of high-density international aerodromes implementing Advanced CDO operations	Long term

Increase the ability CCO operations to contribute to terminal airspace efficiency.	APTA-B2/8	Where there is an operational benefit, all Terminal Areas serving high-density international aerodromes should implement Advanced CCO operations consistent with APTA-B2/8	"% of high-density international aerodromes implementing Advanced CCO operations	Long term
To: • reduce operational cost; • improve performance; • take advantage of new technologies sooner; • enable the global exchange of non-safety information.	COMI-B2/3	All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with: a) COMI- B2/3, including Links for non-safety communication;	% of ACCs with links for non-safety communication Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
Provision of new data-link functionalities and Improved CPDLC performance for Air Traffic Services (ATS).	COMS-B2/1	All ATC units should be equipped with or be able to interface with communication systems appropriate to support the service provided, consistent with: b) COMS-B2/1 to B2/3, including PBCS approved CPDLC, ADS-C ~~f~~or domestic and procedural airspace	% of ACCs with PBCS approved CPDLC Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
Provision of new data-link functionalities and performance to support Air Traffic Services (ATS) and the extension of data link communications use in support of including trajectory-based operations, in particular with ADS-C Extended Project Profile	COMS-B2/2		% of ACCs with PBCS approved ADS-C Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
Integrated aeronautical information service in a SWIM environment in support of enhanced operational ground and air decision-making processes for all phases of flight .	DAIM-B2/1	States should establish Aeronautical Information dissemination consistent with DAIM-B2/1, implementing the following as a minimum: d) Dissemination of Aeronautical Information in a SWIM Environment (DAIM-B2/1)	Indicate whether State has implemented dissemination of Aeronautical Information in SWIM environment Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
To provide ATS at aerodromes not from a traditional on-site building, but remotely from either a local or a different location. The service provided may be an aerodrome control service or an aerodrome flight information service (AFIS) as appropriate.	DATS-B1/1	Where there is an operational benefit, remotely operated Aerodrome Air Traffic Services should be implemented, consistent with DATS B1/1	% of high-density international aerodromes with Remote ATS Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term

Large -scale operations based on regional implementation can provide even greater freedom and benefits to Airspace Users to fly according to their own business models to full trajectory-based operations.	FRTO-B2/3	ACCs should enable, where practicable, large-scale cross-border Free Route Airspace in coordination with adjacent FIRs, consistent with FRTO-B2/3	% of ACCs which have enabled Free Route Airspace Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
Providing conflict resolution support for ATCOs considering elements of ATM layered planning and overall network effect.	FRTO-B2/4	ACCs should enable, where practicable, enhanced conflict resolution tools consistent with FRTO-B2/4.	% of ACCs which have enhanced conflict resolution tools Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
Enhance Network Operation Planning to support the Collaborative Network Management in the context of more dynamic /rolling planning processes and the initial Trajectory Based Operations (TBO).	NOPS-B2/3	All ACCs operating within FIRs where demand may exceed capacity should operate systems that enable, where applicable, collaborative network operations planning, consistent with NOPS-B2/3 supporting the integration of time-based management within a flow centric approach.	% of ACCs with Collaborative Network Operations Planning Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
Advanced ATFM to accommodate cross border Free Route operations.	NOPS-B2/6	ACCs should enable, where practicable, ATFM for cross-border Free Route Airspace in coordination with adjacent FIRs consistent with NOPS-B2/6 and FRTO-B2/3	% of ACCs which have ATFM systems for cross border FRA operations Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
To enable aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety.	OPFL-B0/1	ACCs should enable, where practicable, In Trail Procedures (ITP)	% of ACCs which have ITP procedures Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
Use of increased frequency of position information update from Space Based ADS-B	OPFL-B2/1	ACCs should enable, where practicable, reduced lateral and longitudinal separation minima that capitalize on the increased frequency of position information update, using Space Based ADS-B information	% of ACCs which have reduced lateral and longitudinal separation minima procedures Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term
To allow merging of arrival flows.	RSEQ-B0/3	Where there is an operational benefit, Terminal Areas serving all high-density international aerodromes should implement point merge operations consistent with RSEQ-B0/3	% of high-density international aerodromes implementing point merge operations Indicate-"In Preparation/Planning -0-25%, "Under Development/Implementation- 25-75%" and "In Operation-100%"	Long term

To set up detailed integrated arrival and departure sequence for the same runway.	RSEQ-B2/1	All aerodromes where ATFM facilities are required, should be served by an integrated system of arrival and departure management sequences into a single runway or dependent runways consistent with RSEQ-B2/1	% of relevant aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
To improve the guidance of pilots and vehicle drivers on the aerodrome surface.	SURF-B2/1	All ATC units providing services to high-density international aerodromes should operate enhanced surface guidance for pilots and vehicle drivers consistent with SURF-B2/1	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
Expansion of situation awareness to vehicle drivers	SURF-B2/2	All ATC units providing services to high-density international aerodromes should operate comprehensive vehicle driver situational awareness on airport surface consistent with SURF-B2/2	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
To improve safety during runway operations by providing traffic indication and alerts to pilots and/or vehicle drivers	SURF-B2/3	All ATC units providing services to high-density international aerodromes should operate conflict alerting service for runway operations consistent with SURF-B2/3	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
Guidance for comprehensive Airport Master Plan	Regional-Aerodrome Infrastructure	Where practicable, all high-density international aerodromes should provide, in accordance with an Airport Master Plan, the following facilities to optimise runway capacity: a) aerodromes additional runway(s) with aerodromes equate separation between runway centrelines for parallel independent operations;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		b) parallel taxiways, rapid exit taxiways at optimal locations to minimize runway occupancy times and entry/exit taxiways;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		c) rapid exit taxiway indicator lights (distance to go information to the nearest rapid exit taxiway on the runway);	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		d) twin parallel taxiways to separate arrivals and departures;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term

		e) perimeter taxiways to avoid runway crossings;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		f) taxiway centreline lighting systems;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		g) aerodromes equate manoeuvring area signage (to expedite aircraft movement);	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		h) holding bays;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		i) aerodromes additional apron space in contact stands for quick turnarounds;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		j) short length or tailored runways to segregate low speed aircraft;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		k) taxi bots or towing systems, preferably controlled by pilots, to ensure efficiency and the optimal fuel loading for departure;	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term
		l) aerodromes advanced visual docking guidance systems.	% of high-density international aerodromes fulfil the criteria Indicate-“In Preparation/Planning -0-25%, “Under Development/Implementation- 25-75%” and “In Operation-100%”	Long term

ATM and Airspace Safety Deficiencies List (Updated 6 July 2026)

	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
Brunei Darussalam	WGS-84 - Not implemented	24/6/2014		Brunei Darussalam	31/12/2025	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
	AIS Quality Management System Requirements of Paragraph 3.6.1 of Annex 15 Quality Management System - Not implemented					
Afghanistan	AIS Quality Management System - Not implemented	24/6/2014		Afghanistan	TBD	A

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
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	31/03/2026	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 completed AIS QMS implementation.	~~Maldives~~	~~30/09/2024~~	~~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	31/12/2025	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
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
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
	<u>Aeronautical Data Area of Responsibility</u> - requirements of Paragraph 2.1.2 of Annex 15 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
	<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					

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
~~India~~	~~Designation of Restricted Areas Above the Land Areas or Territorial Waters of a State - Not implemented~~	~~29/03/2019 SAIOACG/9~~	India has removed the airspace identified as an APANPIRG Deficiency and established a Temporary Reserved Area (TRA) in coordination with the military authorities.	~~India~~	~~TBD~~	~~A~~
	Airspace Classification 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
~~Macao, China~~	~~Airspace Classification - Not implemented~~	~~05/09/2018~~	Macao China has taken appropriate action to address the Deficiency related to airspace classification.	~~Macao, 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 has taken appropriate action to address the Deficiency related to airspace classification.	~~Solomon Islands~~	~~TBD~~	~~A~~

	Deficiencies			**Corrective Action**		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
	ATS Message Addressing 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			
Maldives	DEP message transmission	09/08/2019	DEP messages inconsistently transmitted Conclusion APANPIRG/27/12 and ICAO correspondence	Maldives	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/10 55%	Afghanistan	2019	U
Bangladesh	Asia/Pacific SAR Plan	17/05/2019	~~APSAR/WG/10 66%~~ APSAR/WG/11 67%	Bangladesh	2019	U
Bhutan	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/10 26%~~ APSAR/WG/11 12%	Bhutan	2019	U
Brunei Darussalam	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/10 62%	Brunei	2019	U
Cambodia	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 74%	Cambodia	2019	U
Macao, China	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 86%	Macao, China	2019	U
Cook Islands	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 60%	Cook Islands	2019	U

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
DPR Korea	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 70%	DPR Korea	2019	U
French Polynesia	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/10 82%	French Polynesia	2019	U
Kiribati	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 25%	Kiribati	2019	U
Lao PDR	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/10 56%~~ APSAR/WG/11 51%	Lao PDR	2019	U
Maldives	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/10 76%~~ APSAR/WG/11 84%	Maldives	2019	U
Marshall Islands	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/10 17%~~ APSAR/WG/11 60%	Marshall Islands	2019	U
Micronesia	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 17%	Micronesia	2019	U
Mongolia	Asia/Pacific SAR Plan	17/05/2019	~~APSAR/WG/10 87%~~ APSAR/WG/11 70%	Mongolia	2019	U
Myanmar	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 68%	Myanmar	2019	U
Nauru	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/10 0%~~ APSAR/WG/11 20%	Nauru	2019	U
Nepal	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/10 50%~~ APSAR/WG/11 56%	Nepal	2019	U
New Caledonia	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/10 77%	New Caledonia	2019	U
Pakistan	Asia/Pacific SAR Plan	17/05/2019	APSAR/WG/10 89%	Pakistan	2019	U
Palau	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 17%	Palau	2019	U
Papua New Guinea	Asia/Pacific SAR Plan	6/07/2015	~~APSAR/WG/10 37%~~ APSAR/WG/11 82%	Papua New Guinea	~~2019~~ 30 November 2026	U
Samoa	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 0%	Samoa	2019	U
Solomon Islands	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 0%	Solomon Islands	2019	U
Sri Lanka	Asia/Pacific SAR Plan	17/05/2019	~~APSAR/WG/10 86%~~ APSAR/WG/11 87%	Sri Lanka	2019	U

	Deficiencies			**Corrective Action**		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
Timor-Leste	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 0%	Timor-Leste	2019	U
Tonga	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 68%	Tonga	2019	U
Tuvalu	Asia/Pacific SAR Plan	28/05/2022	APSAR/WG/10 0%	Tuvalu	2024	U
Vanuatu	Asia/Pacific SAR Plan	6/07/2015	APSAR/WG/10 0%	Vanuatu	2019	U
	<u>Non Provision of Safety-related Data</u> 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	TBD	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 50% (RASMAG/29) MAAR informed ICAO that all known airframes in Afghanistan have complied with the monitoring requirement (November 2022).	Afghanistan	TBD	A

	Deficiencies			Corrective Action		
States/facilities	**Description**	**Date first reported**	**Remarks**	**Executing body**	**Target date**	**Priority ****
			Deficiency retained due to the unknown status of the Afghanistan aeronautical authority responsible for ensuring monitoring is conducted.			
Cook Islands	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/31	Remaining monitoring burden of 100% (RASMAG/31)	Cook Islands	TBD	A
India	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/29	~~Remaining monitoring burden of 46% (RASMAG/30)~~ Remaining monitoring burden of 48% (RASMAG/31)	India	TBD	A
~~Nepal~~	~~Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)~~	~~RASMAG/28~~	~~Remaining monitoring burden of 45% (RASMAG/30)~~ Remaining monitoring burden of 11% (RASMAG/31)	~~Nepal~~	~~TBD~~	~~A~~
Pakistan	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/31	Remaining monitoring burden of 32% (RASMAG/31)	Pakistan	TBD	A
Vanuatu	Non-compliance with LTHM requirement (remaining monitoring burden more than 30%)	RASMAG/31	Remaining monitoring burden of 100% (RASMAG/31)	Vanuatu	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.

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Terms of Reference

APAC Project 30/10 Task Force (AP30-10/TF)

Objectives

1. The objectives of the Task Force are:
   a) to develop the APAC region action plans for the implementation of Project 30/10; and
   b) to facilitate, monitor and support inter-regional collaboration for a harmonized implementation of Project 30/10 within the APAC region and in coordination with adjacent regions, with a view to achieving seamless regional and inter-regional operations by 2028.

Tasks

2. To meet its objectives, the Task Force shall:
   a) conduct comprehensive analysis of the current separation minima applied within the APAC States/Administrations and between adjacent FIRs;
   b) identify technical and operational enablers necessary for the successful implementation of Project 30/10, including reviewing and updating regional documents;
   c) collaborate with adjacent regions to achieve harmonized implementation of Project 30/10; and
   d) assess training needs for controllers to effectively apply more efficient separation minima.

Reporting

3. The Task Force reports to the Air Traffic Management Sub-Group (ATM/SG) of APANPIRG.

Membership

4. The membership of the Task Force is all APAC States/Administrations and related international organizations.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL FLIGHT AND FLOW – INFORMATION FOR A COLLABORATIVE ENVIRONMENT RELEASE 1 (FF-ICE/R1) IMPLEMENTATION PLAN

Version 1.0, xxxx yyyy

This guidance was developed by the Asia/Pacific Flight and Flow Information for a Collaborative Environment Ad Hoc Group

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

CONTENTS

1. SCOPE OF APAC REGIONAL FF-ICE/R1 IMPLEMENTATION PLAN

1.1 Alignment with Global Framework

1.1.1 This *Asia/Pacific Regional Flight and Flow – Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan* (the "Plan") has been developed to complement the International Civil Aviation Organization (ICAO) global framework and guidance. This Plan supplements and tailors the global Flight and Flow – Information for a Collaborative Environment (FF-ICE) concepts and objectives to the regional context of the Asia/Pacific (APAC), providing a practical roadmap for implementation in APAC States while remaining aligned with ICAO's provisions. This Plan operates on established relevant ICAO materials and on the foundational concepts, principles, and guidelines of System-wide Information Management (SWIM), Air Traffic Flow Management (ATFM) practices, and aviation information security requirements. Therefore, this Plan does not duplicate fundamental explanations from the *Manual on Flight and Flow — Information for a Collaborative Environment (FF-ICE)* (ICAO Doc 9965) or other global manuals. Instead, it focuses on regional implementation aspects bridging the gap between ICAO's global guidance and the specific needs of APAC stakeholders.

1.1.2 In accordance with other APAC regional plans, such as the *Asia/Pacific Plan for Collaborative Aeronautical Information Management*, this Plan is not intended to duplicate or pre-empt global guidance issued by ICAO expert groups. Rather, it builds upon the issued guidance to outline how FF-ICE can be implemented across the APAC region in a coordinated and harmonized manner. Global reference documents, i.e. *Manual on FF-ICE - Implementation Guidance* (ICAO Doc 9965 - Volume II), *Manual on System-wide Information Management (SWIM) Concept* (ICAO Doc 10039), etc., contain these foundational concepts, and this Plan serves to apply those concepts in the regional implementation setting.

1.1.3 This Plan uses the terms "shall", "should", and "may" to indicate the level of compliance expected from States in following this document.

1.1.3.1 "Shall" indicates provisions that are compulsory for States to implement as these provisions are considered necessary for regional harmonization and interoperability.

1.1.3.2 "Should" indicates provisions that are recommended as best practices for regional coordination. States are encouraged to implement these provisions where operationally feasible.

1.1.3.3 "May" indicates provisions that are optional and can be implemented at the discretion of individual States based on their operational requirements and capabilities.

1.1.4 This Plan recognizes that States retain control over their implementation decisions, while encouraging regional harmonization.

1.2 APAC Regional Context and Guidance

1.2.1 The FF-ICE implementation in the APAC region is being undertaken in parallel with the region's broader air navigation modernization strategies. The *APAC Air Navigation Plan (ANP) Volume III* explicitly identifies FF-ICE and Trajectory-based Operations (TBO) as key elements of future Air Traffic Management (ATM) enhancements. The *APAC ANP Volume III* calls on APAC States to work collaboratively through ICAO and regional platforms towards a seamless ATM environment, including the implementation of SWIM, FF-ICE, and TBO to support future traffic growth and sustainability. Particularly, the implementation of SWIM, a key enabler for FF-ICE, within the APAC region, should follow the regionally agreed-upon guidelines, including *APAC SWIM Technical Infrastructure Profiles Version 1.0*, and the *APAC Common SWIM Information Services*. Following these guidelines will ensure interoperability and harmonized implementation.

1.2.2 Moreover, the *Asia/Pacific Plan for Collaborative Aeronautical Information Management Version 4.0* and the *Asia/Pacific Regional Framework for Collaborative ATFM Version 4.0* complement the FF-ICE initiative by simultaneously addressing the Aeronautical Information Management (AIM) and ATFM improvements that are needed. The *Asia/Pacific Plan for Collaborative Aeronautical Information Management* provides guidance on the transition from Aeronautical Information Services (AIS) to AIM and digital data exchange, which is a foundational element for successful FF-ICE implementation.

1.3 Mandatory and Optional FF-ICE Services

1.3.1 In accordance with *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, ICAO Doc 4444), Filing Service and Flight Data Request Service are mandatory. Additionally, to support the sunsetting of ICAO 2012 Flight Plan (FPL2012) and, at a minimum, DEP and ARR related Air Traffic Services (ATS) messages, the Notification Service is a mandatory service within the APAC region. The FF-ICE Planning Service, Trial Service, and Publication Service are considered optional within the APAC region.

2. EXECUTIVE SUMMARY

2.1 This Plan provides regional strategy and guidance for the implementation of the FF-ICE within the APAC region. This Plan also supports the transition from the traditional FPL2012 to the modernized FF-ICE environment, enabling collaborative, service-based information exchange among ATM Service Providers (ASPs), Airspace Users (AUs), and other aviation stakeholders. This Plan is aligned with the *Global Air Navigation Plan* (GANP) (ICAO Doc 9750), and the *APAC ANP Volume III*.

2.2 The implementation of FF-ICE represents a significant step towards achieving TBO in the region. Through standardized information services and system-to-system interoperability, FF-ICE will facilitate the sharing and management of comprehensive flight and flow data through all phases of flight. This Plan defines the regional approach to implementing FF-ICE/R1 covering the pre-departure phase and lays the foundation for a future expansion to Release 2 (FF-ICE/R2 - post-departure operations).

2.3 The APAC region is adopting a harmonized approach to the use of global data standards, particularly the Flight Information Exchange Model (FIXM) version 4.3.0, together with the APAC regional FIXM version 4.3.0 Extension to support cross-border ATFM and Airport Collaborative Decision Making (A-CDM) integration. Mixed-mode operations between legacy and FF-ICE environments are expected during the transition period, and guidance has been included regarding translation mechanisms, validation procedures, and coordination processes necessary for maintaining seamless operation.

2.4 This Plan details the operational and technical requirements for the implementation of FF-ICE services. Filing Service and Flight Data Request Service are established as mandatory in accordance with ICAO Doc 4444, with the Notification Service also identified as mandatory within the APAC region to support the eventual retirement of the FPL2012 and related ATS messages. The Planning, Trial, and Publication Services are considered optional but are recommended, to enhance collaborative decision-making and information availability.

2.5 Recognizing the importance of data integrity and operational assurance, this Plan introduces a common validation process, standardized submission response codes, and uniform filing-status interpretations. It outlines cybersecurity considerations for FF-ICE operations, recommending implementation of secure communication protocols and promoting adherence to ICAO information security guidance.

2.6 Implementation of FF-ICE/R1 across the APAC region will be achieved in phases. Technical trials and cross-border testing are targeted to begin in 2030, followed by operational testing in 2031. The testing will lead to full operational capability (FOC) of the regionally mandatory FF-ICE/R1 services (Filing Service, Flight Data Request Service and Notification Service) by 2032. This timeline supports regional readiness for the planned global sunset of the FPL2012 in 2034. States and Administrations will report progress to the ICAO APAC Regional Office annually to ensure synchronous advancement and to identify any areas requiring additional support or coordination.

2.7 This Plan will be maintained and updated in alignment with revisions to *GANP* (ICAO Doc 9750), and the *APAC ANP Volume III*. Post-implementation coordination and performance monitoring will ensure continuous improvement and harmonization across the region. Through the collaborative and progressive implementation of FF-ICE, the APAC region will advance towards a fully information-driven ATM environment that enhances safety, efficiency, and predictability in support of the global vision for a seamless and interoperable air navigation system.

3. DEFINITIONS (REFERENCED FROM DOC 9965)

Air Traffic Management (ATM) — The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

ATM community — The aggregate of organizations, agencies or entities that may participate, collaborate and cooperate in the planning, development, use, regulation, operation and maintenance of the ATM system.

ATM configuration — The arrangement of the non-flight elements of the Air Traffic Control (ATC) System. The ATM configuration imposes constraints on flights through such factors including military airspace reservations and releases, sector configurations, runway combinations and runway usage.

ATM Service Provider (ASP) — A Unit involved in performing Air Traffic Management responsibilities as introduced in the PANS-ATM.

ATM system limitations — Inherent characteristics that limit its ability to support desired aircraft operations or effectively accommodate demand on resources.

Coordinated airport — Any airport where, in order to land or take off, it is necessary for an aircraft operator to have been allocated a slot by an appropriate authority.

Effective flight constraints — The subset of flight constraints that actually affected the flight's unconstrained trajectory.

Emergency Service Provider (ESP) — Provider of emergency services, such as search and rescue organizations.

Flight and Flow – Information for a Collaboration Environment (FF-ICE) — Information necessary for planning, coordination, and notification of flights exchanged in a standardized format between members of the ATM community, including those involved in flight operations and aerodrome operations.

FF-ICE can refer to a single instance (an individual flight) and also to an aggregation of flights (each with their own flight information in FF-ICE).

Flight and Flow – Information for a Collaboration Environment (FF-ICE) services — A set of services established for the purpose of facilitating the exchange of flight and flow – information for a collaborative environment, more accurate assessment of demands, appropriate resource planning, and optimum flight planning and execution.

Flight constraint — Results from applying a restriction to a particular flight and describes bounds (e.g. in altitude, speed, time, and route) that constrain free movement of the flight.

Note: Throughout this document, the term 'constraint' should be understood as 'flight constraint' unless explicitly indicated otherwise.

Flight plan — Specified information relative to an intended flight or portion of a flight of an aircraft.

Note 1: the term "flight plan" may be prefixed by the words "preliminary", "filed", "current" or "operational" to indicate the context and different stages of flight.

Note 2: when the word "message" is used as a suffix to this term, it denotes the context and format of the flight plan data as transmitted.

Operational flight plan. The operator's plan for the safe conduct of the flight, based on considerations of aeroplane performance, other operating limitations, and relevant expected conditions on the route to be followed and at the aerodromes concerned.

Preliminary flight plan (PFP). The flight plan submitted by an operator or a designated representative to conduct collaborative planning of a flight, prior to filing a flight plan for use by ATS units.

Filed flight plan. The latest flight plan as submitted and updated by the pilot, an operator or a designated representative for use by ATS units.

Note: the FPL denotes a filed flight plan exchanged using aeronautical fixed services while eFPL denotes a filed flight plan exchanged using FF-ICE services. The eFPL allows for the exchange of additional information not contained within the FPL.

Current flight plan (CPL). The flight plan that reflects changes to the filed flight plan by subsequent ATC clearances.

Repetitive flight plan (RPL). A flight plan related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator or a designated representative, for retention and repetitive use by ATS units.

eFPL. A symbol used to designate a filed flight plan exchanged using FF-ICE services.

FPL. A symbol used to designate a filed flight plan exchanged via Aeronautical Fixed Services (AFS).

Flight plan originator — An operator or the operator's designated representative that has flight planning responsibility for the flight.

Gate-to-gate — An expression that describes the ground and airborne segments of aircraft operations from the first movement with intention of flight (from gate, stand or parking position) to completion of movement after flight (gate, stand or parking position).

Globally unique flight identifier (GUFI) — An unchangeable data element associated with a flight that allows all eligible members of the ATM community to unambiguously refer to information pertaining to the flight.

Message — A discrete unit of communication, expressed electronically, and intended by the source for consumption by some recipient or group of recipients. The term "message" is thus not limited only to ATS messages over AFTN, but can include communication via other technologies including those described in ICAO Doc 10039.

Message originator — An operator, their designated representative, or an ATS unit that transmitted the message.

Note: This is equivalent to the use of Originator in PANS-ATM Chapter 11.

Operator — The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Procedure — A procedure is an established practice or prescribed method of proceeding with an action, normally non-systematic, under given circumstance or situation, in the provision of a service or part thereof.

Process — A process is an operation or series of operations performed in a definite manner, normally systematically, in the provision of a service or part thereof.

Ranked trajectories — A series of desired trajectories organized in the order of preference, with tolerances supplied, if necessary, by the airspace user, to define when the next ranked trajectory should be used.

Note: *Tolerances are used to express the bounds of variation on the trajectory, triggering a preference for the next ranked trajectory.*

Relevant ASP — Unit(s) designated by the appropriate ATS authority to which the flight plan for a particular flight needs to be provided and includes:

- The Area Control Centre (ACC) or flight information centre serving the control area of the Flight Information Region (FIR) within which the departure aerodrome is situated;
- The centres in charge of each FIR or upper FIR along the route;
- For flights along specified routes or portions of routes in close proximity to FIR boundaries, the centres in charge of each FIR or upper FIR adjacent to such routes or portions of routes;
- When a potential re-clearance in flight (RIF) request is indicated in the flight plan, the additional centres concerned and to the aerodrome control tower of the revised destination aerodrome;
- The aerodrome control tower at the destination aerodrome;
- Flow management centres responsible for ATS units along the route.
- Flight and flow – information services unit along the route of the flight.

Restrictions — Documented rules that are aimed at managing the ATM System, which act on, and reduce the freedom of a group of flights (i.e., flights with certain common characteristics). Restrictions result from ATM system limitations.

Note: a published restriction, in addition to the cause and applicability criteria, may also include the constraint. For example, "due to congestion all flights departing ABCD between Monday and Friday during the hours from 07:00 to 17:00 and routing via AWY1 to destination WXYZ must remain below FL250".

Typically, an Air Traffic Flow Management (ATFM) measure, which is a type of restriction, will require a specific flight constraint to be issued to each impacted flight. For example, "between 09:00 and 14:00, the airspace <airspace ref> can only accept 15 aircraft per hour. Flights planned to enter the airspace during this time period will be issued with an ATFM slot".

Runway Visual Range (RVR) — The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

Service — A service is the provision of a pre-defined set of work including any associated information intended to benefit the customer.

Trajectory **—** The representation of an aircraft continuous path, both in the air and on the ground, comprised of position (x, y, z) and time.

Desired trajectory **—** The trajectory that is requested and generated by the airspace user with its knowledge of the ATM system's configuration and published restrictions and that reflects the most recent request of the airspace user.

Note: *there is only one desired trajectory for any given flight at any time. To allow for flexibility and as the ATM system has unpredictable or uncontrollable events, it is likely that it will be necessary to renegotiate trajectories leading to a revision in the agreed trajectory. The desired trajectory therefore reflects the most recent airspace user request. Where the agreed trajectory is not the desired trajectory then the ASP will negotiate to obtain a revised agreed trajectory.*

Negotiating trajectory **—** A trajectory proposed by eAU or eASP as a potential agreed trajectory.

Note: *each participant would be allowed only one negotiating trajectory at a time which represents their most recent proposal in the negotiation. These trajectories may not necessarily be a gate-to-gate trajectory and are intended to be transitory.*

Agreed trajectory — The trajectory that reflects the most recent agreement between the airspace user and the ASP after collaboration, and/or imposition of pre-collaborated rules.

Note: *There is only one agreed trajectory for any given flight at any time.*

Executed trajectory **—** The actual trajectory of the aircraft from the start-up to the last known position.

Note: *The executed trajectory is what was executed and is not necessarily the desired or agreed trajectories. The executed trajectory relates only to the current flight of the aircraft (and does not contain information from previous flights, even with an en-route to en-route perspective). The executed trajectory information can be used for performance and operational analysis.*

Trajectory synchronization — The process of aligning the trajectories for a single flight held by operationally relevant entities (including ground and airborne) such that remaining differences are operationally negligible for the execution of the flight.

Minutes in Trail (MINIT) / Miles in Trail (MIT) — MINIT/MIT are tactical ATFM measures and are expressed as the number of minutes or miles between each successive aircraft at an airspace boundary point. (Doc 9971)

4. INTRODUCTION

4.1 FF-ICE is a global ICAO initiative to modernize flight planning and trajectory management through enhanced information exchange methods and collaboration. At the global level, FF-ICE is designed to address the limitations of the traditional FPL2012 by enabling a fully collaborative TBO environment. This means that a flight's trajectory can be shared, managed, and adjusted among stakeholders in all phases of flight, improving predictability and efficiency in line with the TBO concept. By exchanging more comprehensive flight and flow data (such as detailed route trajectories and aircraft performance information) in a standardized, system-wide manner, FF-ICE aims to increase airspace capacity and flight efficiency while maintaining safety. This is a key objective identified in the *Global Air Traffic Management Operational Concept* (GATMOC) (ICAO Doc 9854) for future ATM systems, and a critical goal for the FF-ICE effort overall.

4.2 ICAO's FF-ICE concept is documented in ICAO Doc 9965, which is organized into two volumes. Volume I outlines the overall FF-ICE Concept, covering how information for flight planning, flow management, and trajectory management will support a collaborative ATM environment. Volume II, *FF-ICE Implementation Guidance,* provides detailed guidance to ASPs and AUs for implementing FF-ICE in the pre-departure phase, particularly the FF-ICE/R1 capabilities. According to this ICAO guidance, FF-ICE/R1 introduces a set of new services including Planning Service, Filing Service, Trial Service, Flight Data Request Service, Notification Service, and Publication Service, which collectively enable stakeholders to file collaborative flight plans, perform trial trajectory analyses, update or cancel plans, share flight event updates, and request flight information through SWIM-based messages. Each service is defined through agreed-upon procedures and message formats to help ensure consistent information exchange among FF-ICE participants, while allowing flexibility in interface implementation. The subsequent FF-ICE/R2 will extend these principles into the post-departure phase by supporting in-flight trajectory updates and collaborative adjustments between ASPs and AUs, further building on the foundation established by FF-ICE/R1.

5. BACKGROUND

5.1 SWIM as an Enabler for FF-ICE

5.1.1 The implementation of FF-ICE is fundamentally supported by the concept of SWIM. SWIM provides the technical infrastructure, standards, and governance needed to allow seamless information exchange among ATM stakeholders.

5.1.2 In the FF-ICE environment, flight data sharing is accomplished through SWIM-based information services rather than traditional point-to-point messaging. FF-ICE operates within a SWIM operational environment where the key flight planning processes are described and offered in terms of services.

5.1.3 These services are published and discovered via SWIM, enabling authorized stakeholders to exchange flight and flow information in real time, using common formats and protocols. SWIM ensures that all FF-ICE messages are exchanged on a secure, interoperable network with agreed-upon data exchange models and service interfaces. Crucially, SWIM's service-oriented architecture means that FF-ICE information exchanges are standardized at the service level, even as the underlying technologies and implementations may differ between States.

5.1.4 Guidance on implementing SWIM information services, such as those to support FF-ICE, are provided in the *Procedures for Air Navigation Services – Information Management* (PANS-IM, ICAO Doc 10199) requirements and *Manual on the SWIM Implementation* (ICAO Doc 10203).

5.1.5 As the SWIM technical infrastructure evolves over time, the focus for FF-ICE will be on creating and maintaining adaptive operational services and data exchanges, ensuring that any State's system can communicate using the standard FF-ICE service definitions. The hardware/software implementation within each State can be flexible and technology-agnostic on the condition that the State is able to provide and consume the defined FF-ICE services and related information services through SWIM.

5.2 FIXM and Regional Extensions

5.2.1 The information exchange mechanism of FF-ICE relies on standardized data formats. Notably, it relies on FIXM for encoding flight information. While FF-ICE defines what flight information needs to be exchanged among stakeholders, FIXM defines how that information is structured for digital exchange within a SWIM environment. As the globally standardized information exchange model, FIXM provides the rich, detailed, and structured flight and flow information required by the FF-ICE concept, representing a major advancement from the traditional teletype-format flight plan (FPL2012).

5.2.2 APAC stakeholders implement FF-ICE using the globally defined FIXM standard for flight data. However, in recognizing certain regional operational needs, the APAC region has developed its own endorsed extensions to FIXM to accommodate additional information specific to the region. An APAC FIXM extension was developed to include flight-specific data attributes necessary for cross-border ATFM operations, A-CDM, ATFM/A-CDM integration, and traffic synchronization. The APAC FIXM extension adds fields for information such as target take-off time, target time over, and other collaborative decision-making parameters that are crucial for coordinating operations across Flight Information Regions (FIRs) within the region.

5.2.3 This approach allows APAC States to exchange all necessary flight and flow information, including regional specifics, under FF-ICE, supporting the implementation of regional initiatives while still adhering to global standards and ensuring interoperability between APAC and other ICAO regions.

5.2.4 **Appendix A** provides guidance on translating FF-ICE FIXM information to ATS messages, and the structure of the legacy FPL2012, which may be needed to support ingestion of the FPL2012 flight plan.

5.2.5 **Appendix B** maps the FIXM Core version 4.3.0 data attributes required to support cross-border ATFM information exchanges.

5.3 Mixed-Mode Operations During Transition

5.3.1 As the APAC region begins implementing FF-ICE, there is expected to be an extended transition period during which legacy and new systems will operate in parallel. Not all States or ASPs will be ready to switch to FF-ICE/R1 on the same date. System upgrades and operational readiness will vary. Consequently, a mixed-mode environment will exist for several years, wherein some flights will be filed and managed using traditional FPL2012 procedures, while others will use the new FF-ICE services.

5.3.2 Section 6.1.8 provides regional implementation considerations for mixed-mode operations.

6. APAC REGIONAL IMPLEMENTATION PLAN

6.1 General

6.1.1 Information Exchange Standards

6.1.1.1 FF-ICE operations, as described in ICAO Doc 9965 Volume II, are performed through FF-ICE services. Each FF-ICE service is encompassed with a set of FF-ICE messages for exchanging flight information between stakeholders. These messages are constructed using FIXM, a globally standardized information model for flight and flow information exchange.

6.1.1.2 ATM Information Reference Model (AIRM) (https://airm.aero/), a standardized dictionary for ATM information, shall be used as a reference for ATM vocabulary in digital information exchange among stakeholders within the FF-ICE/R1 processes, to prevent ambiguities. To ensure semantic interoperability and consistency across information domains, AIRM also underpins the development of FIXM, Aeronautical Information Exchange Model (AIXM), and the ICAO Meteorological Information Exchange Model (IWXXM).

6.1.1.3 FIXM is comprised of the following components:

a) FIXM Core – provides globally harmonized flight data structures;

b) FIXM Applications – built upon FIXM Core to provide specific flight data structure such as FF-ICE messages and FF-ICE message templates; and

c) FIXM Extensions – Extends FIXM Core to support additional local, national, or regional information exchange requirements.

6.1.1.4 To ensure harmonized FF-ICE operations, the FF-ICE message templates specified in ICAO Doc 9965 Volume II and published on the official FIXM website (https://fixm.aero/) shall be used for FF-ICE implementation. Use of these templates will ensure consistent validation of data fields across stakeholders.

6.1.1.5 FIXM version 4.3.0 shall be used as the standard format for the implementation of FF-ICE/R1 services in the APAC region starting from Q3/2026, as agreed by APANPIRG/35 through its *Conclusion APANPIRG/35/4.*

6.1.1.6 The APAC regional FIXM version 4.3.0 Extension shall be used for cross-border ATFM operations, A-CDM, ATFM/A-CDM integration, and traffic synchronization within the region, as agreed by APANPIRG/36 through its *Conclusion APANPIRG/36/12*.

6.1.1.7 The change process for the cross-border FIXM operating version used to support system-to-system information exchange via SWIM shall follow the procedure agreed by ATM/SG/13 through its *Conclusion ATM/SG/13-5*.

6.1.1.8 It is recommended that the FIXM version used within the APAC region for FF-ICE services implementation and cross-border ATFM information exchange remain aligned to ensure effective communication and interoperability across ATM operation support systems throughout the region.

6.1.2 Globally Unique Flight Identifier (GUFI)

6.1.2.1 Under the current operational format, multiple fields are used to identify a specific flight, such as aircraft identification, departure aerodrome, destination aerodrome, date of flight, and Estimated

Off-Block Time (EOBT). However, this method may not always uniquely identify a flight, for example, when a flight is delayed. Automation will play a critical role in the FF-ICE environment where large volumes of simultaneous transactions and message exchanges are expected.

6.1.2.2 To avoid ambiguity in flight identification and accurate correlation of flight data, GUFI shall be used. The GUFI provides a unique reference to each flight and ensures clear distinction between flights with otherwise similar information.

6.1.2.3 When a flight plan is cancelled and a new flight plan is submitted, a new GUFI shall be assigned, even if the flight is considered the same by the operator. Alternatively, in place of the cancel and refile option, a new filed flight plan message can be provided with the same GUFI but with an incremented flight plan version and as a consequence, it will be treated as a complete replacement of the existing data.

6.1.2.4 It is recommended that the current flight association practices continue to be applied in parallel with the use of GUFI, during the initial implementation of FF-ICE. This approach will provide more robust data correlation and support operations in a mixed-mode environment.

6.1.3 Flight Plan Differentiation

6.1.3.1 In the early stage of FF-ICE implementation and the introduction of using GUFI as an additional field to differentiate a flight, it is possible that two flight plans with two different GUFIs may refer to the same flight. One of the scenarios is a system failure causing incomplete cancellation but followed by re-filing of eFPL. eAUs and eASPs should perform typical flight plan differentiation using aircraft identification, departure aerodrome, destination aerodrome, and EOBT, in addition to the check using only GUFI.

6.1.3.2 During the transition period, the eASPs should verify that multiple eFPLs with distinct GUFIs do not refer to the same flight. When such incidents are detected, manual resolution may be required.

6.1.4 GUFI Allocation Criteria

6.1.4.1 For GUFI allocation, the operation of an aircraft is considered “a flight” from the submission of its first flight plan – whether a Preliminary Flight Plan (PFP) or an eFPL – until the aircraft is in-block at the arrival aerodrome. For multi-leg operations, a different GUFI shall be allocated for each leg, as the departure aerodrome differs.

6.1.4.2 A key consideration in determining a flight is whether the aircraft becomes airborne. Once airborne, and subsequently landed at an aerodrome – whether the intended destination aerodrome, a diversion aerodrome, or even the departure aerodrome – the flight is deemed complete. If the aircraft intends to continue its operation, a new flight plan with a new GUFI shall be required.

6.1.4.3 If an aircraft is compelled to return to its parking stand prior to becoming airborne, such as in a “ground return” or “aborted take-off”, the original flight plan and GUFI may be retained, provided the intention is to continue the same flight. Otherwise, the flight plan shall be cancelled.

6.1.5 GUFI Procedure

6.1.5.1 An operator, or its designated representative, shall generate and allocate a GUFI to each flight plan. The operator should also ensure that all flight data submitted for that flight uses the same GUFI, and that no GUFI is reused for any other flight.

6.1.5.2 Upon receipt of either a PFP or an eFPL, the eASP shall verify it against the flight plan differentiation checks to ensure that:

a) the same PFP with a different GUFI does not already exist in the system;

b) the same eFPL with a different GUFI does not already exist in the system; and/or

c) a different PFP or eFPL with the same GUFI does not already exist in the system. If such a case exists and the newly received PFP or eFPL contains a later version number, it should be treated as a complete replacement of the existing data.

6.1.5.3 An eFPL should carry the same GUFI as its corresponding PFP, if submitted, but with an incremented version number.

6.1.5.4 Upon receipt of a Flight Plan Update message or a Flight Cancellation message, the eASP shall use the GUFI to retrieve the associated flight plan information before performing the required actions. It is also recommended that the eASP perform verification using other key fields in the received messages (e.g. aircraft identification, departure aerodrome, destination aerodrome, EOBT, etc.) to ensure accurate flight plan association.

6.1.6 **GUFI Composition and Validation**

6.1.6.1 A GUFI shall include a version 4 Universally Unique IDentifier (UUID) that has been standardized by the Open Software Foundation (OSF). The UUID specification is published by the Internet Engineering Task Force (IETF) as RFC 9562.

Note: RFC 9562 supersedes RFC 4122 (referenced in ICAO Doc 9965) and is backward compatible.

6.1.6.2 The UUID used in a GUFI shall be supplemented with the following additional information:

a) Namespace Identifier: captures the originator of the GUFI. Recommendations for constructing the namespace are as follows:

   i) eAU should use the three-letter designator in accordance with the *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services* (ICAO Doc 8585);

   ii) eASP should use the four-letter location indicator in accordance with the *Location Indicators* (ICAO Doc 7910); and

   iii) Other GUFI originators should construct their namespace based on the Fully Qualified Domain Name (FQDN) of their organization.

b) Creation Timestamp: provides increased uniqueness of the generated GUFI. The timestamp should be in the Coordinated Universal Time (UTC), in accordance with FIXM version 4.3.0 schema.

6.1.6.3 The namespace portion of the GUFI should be static for a given originator. The UUID portion of the GUFI should be validated for proper formatting. In addition, the UUID portion should also be checked for duplication against existing UUIDs, generated by its own system and previously received from external systems.

6.1.6.4 The sole use of UUID as a GUFI is not recommended as it may lead to interoperability issues among stakeholders and potential GUFI collisions.

6.1.7 Cyber Security

6.1.7.1 eASPs and eAUs shall ensure that their FF-ICE systems are protected against cyber-attacks and that all exchanged information is authentic. Network and server protections such as a firewalls shall be implemented. Cybersecurity recommendations provided in *Aviation Common Certificate Policy* (ICAO Doc 10169) and *Manual on Aviation Information Security* (ICAO Doc 10204) should be utilized.

6.1.7.2 In the absence of a regionally agreed-upon Public Key Infrastructure (PKI) framework, a Transport Layer Security (TLS) self-signed certificate should be implemented, at minimum.

6.1.8 Mixed Mode Operations

6.1.8.1 eASP Responsibility

6.1.8.1.1 An eASP may provide a translation service to convert eFPL into FPL2012 to support the varying capabilities of AUs and ASPs within the APAC region during mixed-mode operations.

6.1.8.2 eAU Responsibility

6.1.8.2.1 An eAU or its designated representative shall submit eFPL to all relevant eASPs and FPL2012 to aASPs in accordance with ICAO Doc 4444 Chapter 17. The eAU or its designated representative shall ensure that all Flight Plan Updates are submitted to all relevant eASPs and aASPs using the appropriate message type:

a) If any changes are made after submitting eFPL (e.g. aircraft, route, delay): the eAU shall submit a Flight Plan Update to all relevant eASPs, and a CHG or DLA message to aASPs.

b) If a flight is expected to be delayed by more than 30 minutes: the eAU shall submit a Flight Plan Update to all relevant eASPs and a CHG or DLA message to aASPs.

c) If a flight is cancelled: the eAU shall submit a Flight Cancellation to all relevant eASPs and a CNL message to aASPs.

6.1.8.3 Translation

6.1.8.3.1 Translation between legacy FPL2012 and other relevant ATS messages in the current flight planning process into FF-ICE messages will play an important role in accommodating differing implementation timelines during the transition to full FF-ICE/R1 operations. ASPs may need to consider implementing the legacy-to-FF-ICE translation function to support its internal automation.

6.1.8.3.2 Translation is, however, only considered an interim solution. FF-ICE operations represent not only a change in flight plan format, but a paradigm shift in flight information exchange and management among ATM stakeholders.

6.1.8.3.3 Potential data loss may occur during translation between eFPL and FPL2012, because eFPL contains significantly more information than the legacy FPL2012. eAUs and eASPs are therefore encouraged to leverage the full benefits of FF-ICE services rather than prolonging reliance on translation.

6.1.8.3.4 For translation guidance, reference should be made to ICAO Doc 9965.

6.1.9 **Access Management for FF-ICE Services**

6.1.9.1 All FF-ICE services should implement robust access control mechanisms to ensure that only authorized parties can access FF-ICE services and receive flight data, safeguarding the confidentiality and integrity of sensitive information.

6.1.9.2 The following security safeguards should be implemented for all FF-ICE services:

a) authentication mechanisms to verify the identity of service users; and

b) authorization controls to ensure users can only access data and services appropriate to their role.

6.1.9.3 All FF-ICE service usage should be logged for operational monitoring, troubleshooting, and accountability purposes.

6.2 **Common Validation Process for FF-ICE Services**

6.2.1 **Submission Response Message**

6.2.1.1 Submission Response Messages are responses provided by the message recipient for every message submitted to them to acknowledge that they have received the messages and to indicate whether they are able or unable to process the messages. Submission Responses are used in a similar manner for five of the FF-ICE/R1 Services (Filing Service, Flight Data Request Service, Notification Service, Planning Service, and Trial Service). A Submission Response shall be "ACK", "REJ" or "MAN", where:

a) ACK: indicates the message will be processed by the eASP.

b) REJ: indicates the message cannot be processed and no data will be retained by the eASP.

c) MAN: indicates that manual intervention is required before processing can be completed.

6.2.1.2 Status Response Messages (Filing Status, Planning Status, and Trial Response) are only provided when the Submission Response status is "ACK". If an eAU receives a Submission Response of "REJ", no status response will be provided. The eAU must address the issues identified in the Submission Response explanation and resubmit the message until an "ACK" Submission Response is received, after which the appropriate status response will be provided.

6.2.2 **General Validation Requirements**

6.2.2.1 Upon receipt of any messages, the message recipient shall perform the following checks before returning a Submission Response. These checks include:

a) Basic syntax and semantic validation including FIXM version 4.3.0 schema compliance and applicable FIXM FF-ICE Applications; and

b) Other validation checks specific to the individual FF-ICE/R1 services.

Note: these are explained in greater detail in subsequent sections under each of the relevant FF-ICE/R1 services.

6.2.3 Submission Response “REJ”

6.2.3.1 When validation fails, the message recipient shall provide a Submission Response of “REJ” and include an explanation in the explanation note field. While harmonization of explanation notes is not required, eASPs should ensure that explanations are precise enough for eAUs to rectify their original message if necessary.

6.2.3.2 **Table 1** provides a sample template for eASPs to use within the explanation note regarding the various types of validation checks that might result in a Submission Response of “REJ”.

Table 1: FF-ICE Submission Response Feedback for General Validation

Checks	**Explanation Note**
Syntax and Semantic Check	Wrong data format in field <X>
FIXM schema compliance	Field <X> not compliant to FIXM version 4.3.0
Mandatory Fields	Mandatory field <X> missing

6.2.4 Manual Processing Requirements

6.2.4.1 While FF-ICE processes are expected to be predominantly automated, manual processing may be required for specific operational needs. eASPs should clearly document their manual processing procedures and criteria and make them available to AUs.

6.2.4.2 When manual processing is required, eASPs shall send a “MAN” Submission Response to the message originator.

6.2.4.3 No action is required of the message originator on receipt of a “MAN” Submission Response from the eASP. The message originator should not submit any other messages relating to that flight until such time as an “ACK” or “REJ” Submission Response is received for that message.

6.2.4.4 After manual processing is completed, an “ACK” Submission Response shall be sent if the issue is resolved. A “REJ” Submission Response shall be sent if the issue remains unresolved. The eASP shall also provide a clear explanation of any manual changes made in their copy of the eFPL, within the explanation field of the Submission Response message.

6.2.4.5 Upon receipt of an “ACK” following a “MAN” Submission Response, the eAU should determine the need to submit a Flight Plan Update or Filed Flight Plan to all relevant ASPs incorporating the manual change that has been made to maintain a consistent flight plan across all ASPs.

6.2.4.6 The following scenarios should be considered for manual processing:

a) <u>Special Handling Flights:</u> flights requiring special handling (e.g. MEDEVAC, SAR) as identified in the Special Handling field, as defined in ICAO Doc 4444.

   Note: these flights should normally not be rejected, even if they are non-compliant with standard restrictions. If these flight plans fail automatic validation checks, manual processing is recommended to ensure prompt facilitation and appropriate consideration of their special status.

b) <u>Known System Issues:</u> flights requiring manual intervention.

   Note: these are cases where ATM system errors or configuration data errors which require manual intervention.

c) Other Exceptional Cases: these cases will be identified and documented by the eASP.

6.3 Filing Service

6.3.1 Introduction

6.3.1.1 The Filing Service is a mandatory service. Operators use the Filing Service to submit eFPLs and send updates, which are necessary to receive air traffic services.

6.3.1.2 To support the organized implementation of Filing Service in this region, a set of operational requirements and business rules should be utilized to provide clarity and operational consistency. While each eASP may have unique considerations and priorities, the transboundary nature of flights necessitates that certain processes be regionally agreed-upon, to allow for efficient flight planning for both eAUs and eASPs.

6.3.1.3 The Filing Service encompasses three primary processes:

a) Flight plan filing;

b) Flight plan updating; and

c) Flight plan cancellation.

6.3.1.4 **Figure 1** depicts the workflow and associated FF-ICE message exchanges for each Filing Service process, detailing the interaction between eAUs and eASPs throughout the flight plan lifecycle.

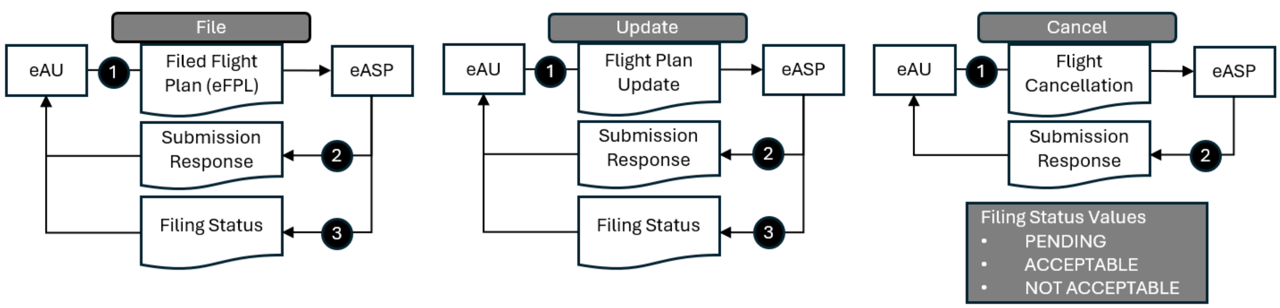


Figure 1: Filing Service Process Overview

6.3.1.5 There are five FF-ICE messages available under the Filing Service:

a) Filed Flight Plan Message;

b) Flight Plan Update Message;

c) Flight Cancellation Message;

d) Submission Response Message; and

e) Filing Status Message.

6.3.1.6 The following sections discuss the necessary processes and identify areas that would benefit from regional co-ordination for each of the Filing Service messages.

6.3.2 **Filed Flight Plan Message**

6.3.2.1 eFPLs are submitted by the eAUs as the first step under the Filing Service to obtain air traffic services. The eFPLs are subjected to validation checks resulting in a Submission Response, and evaluation checks resulting in a Filing Status.

6.3.3 **Flight Plan Filing Cut-off Times**

6.3.3.1 Flight plan filing cut-off times refer to the earliest and latest submission times for the filed flight plan. The earliest and latest submission times are defined in ICAO Doc 4444. However, regional agreements may impose stricter requirements necessitating that eAUs file their flight plans earlier than the standard latest submission time. The relevant cut-off times should be published by eASPs in the States' Aeronautical Information Publication (AIP). The flight plan filing cut-off times for the APAC region include:

a) Earliest submission timings: in accordance with ICAO Doc 4444 Section 4.4.2.1.1, eFPL shall not be submitted more than 120 hours before the EOBT of a flight. This requirement applies specifically to eFPL and does not extend to PFP.

b) Latest submission timings: In accordance with ICAO Doc 4444 Section 11.3.2, basic flight plan data necessary for flow control procedures shall be furnished at least 60 minutes in advance of the flight. eFPL shall therefore be submitted at least 60 minutes before EOBT.

6.3.3.2 The requirements specified in the *Asia Pacific Regional Framework for Collaborative Air Traffic Flow Management* should be followed, i.e. eFPL is to be submitted no less than three hours prior to the EOBT, except where operational or technical constraints necessitate otherwise.

6.3.4 **Versioning**

6.3.4.1 eASPs should refer to ICAO Doc 9965 Volume II Chapter 3.8 *Versioning & Reference Information*. It is the sole responsibility of the eAUs to increase the versioning of the flight plans. eASPs shall refer to the version numbers provided by eAUs and not change the flight plan versions.

6.3.4.2 eAUs shall increment the flight plan version by one, for the following scenarios:

a) a Flight Plan Update is made to the PFP;

b) a PFP has been previously submitted and the eAU is filing the flight plan (eFPL) for the same flight; or

c) an update is made to the eFPL.

6.3.4.3 It should be noted that the version number for the first submission of the eFPL received by an eASP might not be "1". This might occur when:

a) the eASP does not provide Planning Service and the eAU has previously submitted PFP to other eASPs that provide Planning Services; or

b) route changes result in the eASP becoming newly relevant to the flight, requiring the eAU to submit an eFPL with the current version number to inform the eASP of the existing flight plan.

6.3.4.4 If there is a concern of inconsistent version numbers between eAU and eASP, Flight Data Request Service can be used to obtain the eFPL which includes the version number.

6.3.5 **Submission Response**

6.3.5.1 The general validation requirements in accordance with section 6.2.2.1 also apply to the Submission Response Message.

6.3.5.2 **Specific Validation Requirements for Filed Flight Plan**

6.3.5.2.1 In addition to the checks listed in paragraph 6.2.2.1, submission timeframe, versioning, and flight association checks should also be conducted for Filed Flight Plans and Flight Plan Updates. eASPs may also implement additional checks based on local requirements to ensure that route/trajectories filed by eAUs contain valid routes, fix names, coordinates, etc. These checks include, but are not limited to:

a) trajectory syntactic checks; and

b) semantic checks.

6.3.5.2.2 **Table 2** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of “REJ”:

Table 2: FF-ICE Submission Response feedback for Filed Flight Plans and Flight Plan Updates

Additional Checks for Filed Flight Plans and Flight Plan Updates	
Checks	***Explanation Note***
Submission Timeframe	EOBT is outside allowable submission timeframe
Versioning	A later version <Y> exists in the system
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Route validation (Structure of route, lat/long of point, fix names)	Trajectory Info Error Invalid Route Structure Invalid Fix/waypoint

6.3.6 **Filing Status Message**

6.3.6.1 **Overview**

6.3.6.1.1 Filing Status reflects the operational acceptability of a flight plan based on the eASP's evaluation or re-evaluation against its operational environment, including but not limited to airspace configuration, published restrictions, and other relevant constraints. eASPs provide feedback to eAUs to identify the restrictions and constraints applicable to the flights. The Filing Status serves as a key mechanism for eASPs to communicate flight plan acceptability to eAUs before departure.

6.3.6.1.2 eASPs should evaluate eFPLs against restrictions and constraints managed by existing ATM systems to ensure comprehensive evaluation of flight plan acceptability. Restrictions and constraints considered should include but are not limited to:

a) aerodrome, airspace and route availability;

b) ATFM measures;

c) environmental conditions such as aerodrome and enroute meteorological forecasts and hazards, affecting airspace availability or constraints; and

d) aircraft operations requirements (e.g. required navigation performance specifications, required equipage, etc.)

Note: the above list represents constraints and restrictions that eASPs should consider. However, not all of these will necessarily result in a "Not Acceptable" Filing Status.

6.3.6.2 **Filing Status Values and Expected Actions from the eAUs**

6.3.6.2.1 While eASPs retain the option to determine the specific criteria for each Filing Status based on their operational environment, the interpretation and expected actions from the eAUs for each Filing Status value shall be established as described in **Table 3**.

Table 3: FF-ICE Filing Status Interpretation and Expected eAU Action

Filing Status	Interpretation	Expected eAU Action
ACCEPTABLE	The flight plan complies with operational requirements. Any constraints identified can be accommodated without flight plan modifications.	No immediate action or update required. Note any provided constraints for awareness. Prepare for possible tactical clearances reflecting identified constraints.
NOT ACCEPTABLE	The flight plan does not comply with operational requirements and requires modification.	Submit Flight Plan Update to address non-compliance. If close to EOBT, the operator may be unable to update their flight plan in time, using FF-ICE/R1 processes. In these cases, the operator may update their flight plan as needed through tactical coordination with ATC. *Note: if departure eASP provides a "Not Acceptable" Filing Status, eAU can expect refusal to start-up clearance if non-compliance requires flight plan modification (e.g. aerodrome closure). This does not apply to "Not Acceptable" status received from downstream eASPs.*
PENDING	Flight plan evaluation has not yet been performed. More details under Section 6.3.6.5.1	Await subsequent filing status update. Monitor Expected Evaluation Time if provided.

6.3.6.2.2 The Filing Status is intended to indicate the acceptability of a proposed route or trajectory within airspaces where ATS are provided. It cannot be interpreted as the issuance of ATC clearance.

6.3.6.2.3 A "NOT ACCEPTABLE" Filing Status indicates that the flight plan is operationally inconsistent with the ATM configuration and/or with published restrictions and that operator action is required to obtain a clearance. eAUs are expected to submit Flight Plan Updates to address the non-compliance. Note that the Filing Status reflects route/trajectory acceptability only and does not prevent ATC tactical coordination during operations.

6.3.6.2.4 An "ACCEPTABLE" Filing Status can include potential constraints to alert eAUs of constraints that may affect the flight plan. For example, if a flight plan is 'Acceptable' but there is an applicable ATFM program for the arrival airport, the arrival eASP should include this constraint in the Filing Status even though its specific impact (e.g. constraint time) is not yet known. In this case, eAUs are not expected to submit Flight Plan Update to make any changes to their eFPLs.

6.3.6.2.5 When a Filing Status is "PENDING" or "NOT ACCEPTABLE", an explanation shall be included within the Filing Status response to eAU.

6.3.6.3 **Feedback Methods for Restrictions/Constraints**

6.3.6.3.1 When providing restrictions and/or constraints to eAUs within the Filing Status, eASPs shall make use of one or more of the following methods:

a) Filing Status Explanation;

b) General Flight Constraint; and/or

c) Route/Trajectory (R/T) Point Constraint.

6.3.6.3.2 eASPs should retain flexibility in determining their Filing Status feedback methods and content, except in the scenarios described in paragraph 6.3.6.4.1, which require harmonized responses to ensure regional interoperability and consistent handling of situations.

6.3.6.3.3 Filing Status Explanation

6.3.6.3.3.1 The Filing Status Explanation is a mandatory field when the status is "PENDING" or "NOT ACCEPTABLE", but is otherwise optional. It should provide information necessary for eAUs to understand why a flight plan is not operationally acceptable or to be alerted to potential constraints that could impact the flight. Where available, the explanation should include references to published restriction identifiers to facilitate the eAU's understanding and response.

6.3.6.3.4 General Flight Constraint

6.3.6.3.4.1 General Flight Constraints may be used to indicate constraints that apply to the entire flight rather than specific trajectory points. These types of constraints may include:

a) applicability period of the constraint;

b) operational impact on the flight;

c) reference to published restriction identifiers where available; and

d) other operational information affecting flight.

6.3.6.3.5 Route/Trajectory (R/T) Point Constraints

6.3.6.3.5.1 Providing an “Agreed” or “Negotiating R/T” within the Filing Status is optional. When provided, eASPs may include specific constraints at route or trajectory points. These constraints may specify speed, level, and/or time requirements that the flight is expected to meet. Such constraints should be accompanied by information for the eAU to understand their operational impact, including but not limited to:

a) description of the constraint;

b) speed, level, and/or time constraints where relevant;

c) reference to published restriction identifiers, where available; and

d) other point-specific operational requirements.

6.3.6.4 **Harmonized Filing Status Responses for Identified ATFM Scenarios**

6.3.6.4.1 While eASPs maintain flexibility in determining their trajectory evaluation criteria and feedback methods, certain scenarios require pre-determined Filing Status responses to ensure regional interoperability and consistent handling of operational conditions. The following ATFM scenarios were identified to benefit from pre-established Filing Status responses:

a) Calculated Time Over (CTO) a point or Calculated Landing Time (CLDT) imposed by eASPs;

b) Ground Stop (GSt) imposed by arrival eASPs;

c) flight level restrictions imposed by relevant eASPs;

d) fix balancing imposed by relevant eASPs; and

e) re-routing imposed by relevant eASPs.

6.3.6.4.2 Harmonized Filing Status Responses

6.3.6.4.2.1 The regionally agreed-upon Filing Status Responses for these scenarios are detailed in **Table 10**. Consistent implementation by all eASPs in APAC is necessary to facilitate the processing requirements of eAUs.

6.3.6.4.2.2 eASPs are not required to suggest alternative solutions to eAUs. However, if eASPs choose to offer suggestions to assist eAUs, they may:

a) add additional suggested details to the end of the regionally agreed-upon explanation format in the Filing Status Explanation field; and/or

b) provide a Negotiating R/T containing the suggested alternative trajectory, including route, levels, or timing.

6.3.6.4.2.3 The regionally agreed-upon explanation format shown in **Table 10** should remain the primary response, with any additional suggested information considered as supplementary content rather than replacing the required format.

6.3.6.4.3 Scenario A) Calculated Time Over (CTO) a point or Calculated Landing Time (CLDT) imposed by eASPs

6.3.6.4.3.1 Due to demand capacity imbalance, the eASP may impose a time constraint of CTO or CLDT to flights.

Note: eASP shall provide feedback only on constraints within airspace where it provides ATS or ATFM service. Where constraints are to be applied outside this airspace, e.g. assignment of Calculated Take-Off Time (CTOT) at the departure aerodrome in an airspace outside the eASP's jurisdiction, special arrangement between ASPs shall be established.

6.3.6.4.3.2 When a CTO or CLDT is imposed on flights, the following responses shall be provided as presented in **Table 10**:

a) Filing Status value shall be "NOT ACCEPTABLE";

b) an explanation shall be provided, specifying at a minimum the ATFM constraint/restriction affecting the flight;

c) a Negotiating R/T shall be included to indicate the constrained point and its associated time constraint;

d) when providing constraint details in the Negotiating R/T, eASPs should:

   i) use ElementStartPoint to identify the location of the constraint;

   ii) provide the time constraint using Constraint.Time, and any additional level/speed constraints using Constraint.Level/Constraint.Speed, if applicable;

   iii) provide the REGCAUSE in the constraint description;

   iv) provide the REGUL in restriction reference; and

e) the message format for REGCAUSE and REGUL should be in accordance with the *Asia/Pacific Region AFTN/AMHS-based Interface Control Document (ICD)* for ATFM.

6.3.6.4.4 Scenario B) Ground Stop (GSt) imposed by arrival eASPs

6.3.6.4.4.1 The arrival eASP may need to restrict arrivals for a period when capacity has been severely reduced.

6.3.6.4.4.2 When a GSt is implemented, the eASP initiating the measure the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be NOT ACCEPTABLE;

b) an explanation shall be provided. The following format should be used: GSt imposed on flights arriving into <aerodrome> from <YYYY-MM-DDTHH:mm:ssZ> to <YYYY-MM-DDTHH:mm:ssZ>;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> / ADP <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for GSt restrictions.

6.3.6.4.5 Scenario C) Flight level restrictions imposed by relevant eASPs

6.3.6.4.5.1 Restrictions resulting in unavailability of certain flight levels may be imposed.

6.3.6.4.5.2 When flight level restrictions are imposed, the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be “NOT ACCEPTABLE”;

b) an explanation shall be provided. The following format should be used: <FL or altitude, FL or altitude> on route <XXXX> not available;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for flow restrictions.

6.3.6.4.6 Scenario D) Fix balancing imposed by relevant eASPs

6.3.6.4.6.1 Fix balancing is a tactical ATFM measure aimed at distributing demand and avoiding delays, whereby the aircraft is assigned a different arrival or departure fix. This can be used, for example, during conditions where a STAR or a SID is unusable.

6.3.6.4.6.2 When fix balancing measures are imposed on flights, the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be NOT ACCEPTABLE;

b) an explanation shall be provided. The following format should be used: Trajectory Point <XXXXX> not available;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for fix-balancing.

6.3.6.4.7 Scenario E) Re-routing imposed by relevant eASPs

6.3.6.4.7.1 eASPs may require flights to use alternative routing if specific routes/airspace are unavailable or constrained.

6.3.6.4.7.2 When re-routing measures are imposed on flights, the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be “NOT ACCEPTABLE”;

b) an explanation shall be provided in the format: Route <XXXXX> not available;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for re-routing.

6.3.6.4.8 Expected eAU Action

6.3.6.4.8.1 Upon receiving a "NOT ACCEPTABLE" Filing Status, eAUs shall submit a Flight Plan Update (refer to Section 6.3.7 for more details on Flight Plan Updates) to comply with assigned restrictions/constraints. In a mixed-mode environment, the corresponding CHG/DLA message should be submitted when applicable.

6.3.6.4.9 eASP Compliance Checking and Filing Status Response

6.3.6.4.9.1 eASPs shall evaluate the Flight Plan Update to check for compliance against the restrictions/constraints where applicable. Paragraphs 6.3.6.4.9.2 to 6.3.6.4.9.6 provide an example on how this evaluation can be performed for the following scenarios.

6.3.6.4.9.2 For Scenario A, eASPs should check the Estimated Time Over (ETO) of the constrained point submitted within the Flight Plan Update for compliance to the CTO:

a) If the ETO falls within the compliance window, the Filing Status response of the Flight Plan Update will be "ACCEPTABLE".

b) If the ETO falls outside the compliance window, the flight will be re-evaluated by the eASP.

c) The compliance window parameters as established through regional ATFM procedures shall be applied.

6.3.6.4.9.3 For Scenario B, the arrival eASP should check that the updated estimated landing time of the Flight Plan Update is not within the constrained period.

6.3.6.4.9.4 For Scenario C, the eASPs should check the Flight Plan Update to ensure that the unavailable Flight Levels of the specific trajectory points are not being used.

6.3.6.4.9.5 For Scenario D, the eASPs should check the Flight Plan Update to ensure that the unavailable trajectory points are not being used.

6.3.6.4.9.6 For Scenario E, the eASPs should check the Flight Plan Update to ensure that the unavailable routes are not being used.

6.3.6.4.9.7 When ATFM restrictions are cancelled and the last Filing Status value was "NOT ACCEPTABLE", the eASP shall provide an updated Filing Status with the value of "ACCEPTABLE" and an explanation that the ATFM restriction is no longer applicable or has been cancelled.

6.3.6.4.9.8 When ATFM restrictions are cancelled and the last Filing Status value was "ACCEPTABLE", the eASP should provide an optional updated Filing Status with the value of "ACCEPTABLE" and an explanation that the ATFM restriction is no longer applicable or has been cancelled.

Note: an "ACCEPTABLE" Filing Status may include information about applicable ATFM restrictions that do not constrain the flight (e.g. MIT/MINIT). This additional information is provided for situational awareness. The eAUs may choose to modify their flight plan to optimize operations or may proceed without changes. The flight remains acceptable as filed, but operators can use this information to make informed decisions about potential route adjustments or other operational considerations.

6.3.6.4.9.9 When ATFM restrictions are cancelled and the eAU had previously modified their Desired Route/Trajectory to comply with the restriction, the eAU may use available SWIM services to identify when restrictions are lifted and may submit a Flight Plan Update to adjust their Desired Route/Trajectory.

6.3.6.5 **Usage of "PENDING" Status**

6.3.6.5.1 It is recommended that eASPs evaluate flight plans as soon as they are available. However, in situations where immediate evaluation is not possible, a "PENDING" Filing Status may be used when the eASP's system requires more time than the time-out period (see paragraph 6.8.1.1) to provide a definitive Filing Status. This could occur in scenarios such as:

a) When the flight plan has been received well in advance of the eASP's processing horizon for the flight; and

b) When eASPs do not conduct a re-evaluation process and hence prefer to provide the filing status nearer to the EOBT.

Note 1: this is not recommended as it may create a situation where other eASPs have returned a filing status to the flight plan, and there is no clarity for eAUs to determine whether the flight plans are accepted by all relevant eASPs.

Note 2: ICAO Doc 9965 recommends that the first non-Pending Filing Status should be provided no later than three hours before EOBT, provided the submission was made in the correct timeframe.

6.3.6.5.2 When providing a "PENDING" status, the eASP shall include an explanation. An Expected Evaluation Time should be included to indicate when the flight plan is likely to be fully processed.

6.3.7 **Flight Plan Update Message**

6.3.7.1 Flight Plan Updates are submitted by eAUs to inform on changes to the eFPL. These updates are subjected to similar validation and evaluation checks as the eFPLs.

6.3.7.2 When route changes result in new eASPs becoming concerned with the flight that did not previously receive the eFPL, the eAU shall submit the current version of the complete set of flight plan data in eFPL to those new eASPs, rather than a Flight Plan Update.

6.3.7.3 **Flight Plan Update Cut-off Times**

6.3.7.3.1 The submission timeframe for Flight Plan Update should provide sufficient flexibility to eAUs to cater to operational issues and any additional considerations that may arise after the filing of the eFPL. It is recommended that Flight Plan Updates are permitted from the time that the eAU receives the Filing Status of a submitted eFPL until route clearance delivery or the flight's AOBT, whichever occurs first.

6.3.7.3.2 eASPs shall ensure that any Flight Plan Update received after route clearance delivery results in appropriate clearance revision by ATC to maintain consistency between the flight plan and delivered clearance.

6.3.7.4 **Flight Plan Update Threshold**

6.3.7.4.1 ICAO Doc 9965 states that eASPs may publish threshold modification values that trigger the transmission of an update (see ICAO Doc 9965). With FF-ICE automating most of these processes, eAUs should be able to provide eASPs with the most recent data as possible, to increase operational predictability for all stakeholders.

6.3.7.4.2 It is recommended that eAUs submit Flight Plan Update each time there is a change in eFPL data, subject to their system capabilities. At a minimum, eAUs shall submit Flight Plan Update due to changes equivalent to an FPL2012 data update (ICAO Doc 4444 Section 11.4.2.2.4 states that a CHG message shall be transmitted when any change is to be made to basic flight plan data contained in previously-transmitted FPL or RPL data).

6.3.7.4.3 The same recommendation applies for updates to EOBT. eAUs should submit Flight Plan Update each time there is a change in EOBT, subject to their system capabilities. At a minimum, eAUs shall submit Flight Plan Update if EOBT is delayed by more than 30 minutes (ICAO Doc 4444 Section 11.4.2.2.3.1 states that a DLA message shall be transmitted if the flight is delayed by more than 30 minutes after the estimated off-block time contained in the basic flight plan data).

6.3.7.4.4 Providing the most recent data to eASPs ensures that all stakeholders have the most accurate and updated information of the flight plan available to perform their ATM functions, as even minor changes to route can affect trajectory predictions.

6.3.7.4.5 While the varying update thresholds for FPL2012 and eFPL will result in varying information received by eASPs versus aASPs, it should be noted that in a mixed-mode environment eASPs have the advantage of receiving the most updated information that eAUs are most likely to utilize. For this reason, the varied information received by eASPs versus aASPs should not present cause to delay sending more precise Flight Plan Updates to eASPs only.

6.3.8 Flight Cancellation

6.3.8.1 Specific Validation Requirements for Flight Cancellation

6.3.8.1.1 In addition to the general validation checks indicated in paragraph 6.2.2.1, eASPs should perform a flight association check, verify that the flight has not yet departed, and authenticate that the message originator has the authority to cancel the flight.

6.3.8.1.2 **Table 4** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 4: FF-ICE Submission Response Feedback for Flight Cancellation Messages

Additional Checks for Flight Cancellation Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Authenticated user	No information available
Flight Plan State	Flight has already departed

Note: If the source of the request has no authorized access to the identified flight, a Submission Response of "REJ" should be returned, with an explanation that the recipient does not have the requested information. Note that a response indicating non-authorization verifies for the sender that the flight exists, which is information in itself. Therefore, a generic message indicating that there is no information for the flight is preferable.

6.3.8.1.3 In accordance with ICAO Doc 9965, the eASP shall provide an "ACK" response when cancellation is successful, which shall terminate operational use of GUFI, as well as any further processing of all instances of the flight plan (preliminary and filed). A "REJ" response shall be given with an explanation, when cancellation is unsuccessful.

6.3.8.1.4 A cancelled flight cannot be reinstated. If the operator later decides to operate the flight, a new flight plan with a new GUFI shall be submitted.

6.3.9 **Filing Requirements for Cross-ANSP and Local Agreements**

6.3.9.1 Individual eASPs may consider establishing cross-ANSP agreements and local agreements with eAUs to facilitate seamless filing processes and the coordination of flight plan submissions across different airspace jurisdictions.

6.3.9.2 eASPs may likewise establish regional agreements with other eASPs for regional flight plan distribution and/or coordinated feedback on airspace restrictions.

6.3.9.3 eASPs may also establish local agreements with eAUs to facilitate FF-ICE implementation through translation services, Filing Status handling procedures, and tactical coordination arrangements.

6.3.9.4 However, the operational challenges that could arise from the potential complexity arising of a multitude of agreements, especially in the context of mixed mode operations, should also be a consideration.

6.3.9.5 It is recommended that APAC States adhere to the procedures in this Plan. Any local agreements or cross-ANSP agreements should not contradict the guidance provided in ICAO Doc 9965 or this Plan, which should supersede any supplementary or tangential agreements.

6.4 **Flight Data Request Service**

6.4.1 **Introduction**

6.4.1.1 The Flight Data Request Service is a mandatory service that eASPs will provide in the FF-ICE environment to allow authorized parties to obtain information about a flight, including flight plans, supplementary data, and flight status.

6.4.1.2 **Figure 2** depicts the workflow and associated FF-ICE message exchanges between FF-ICE participants during flight data queries.

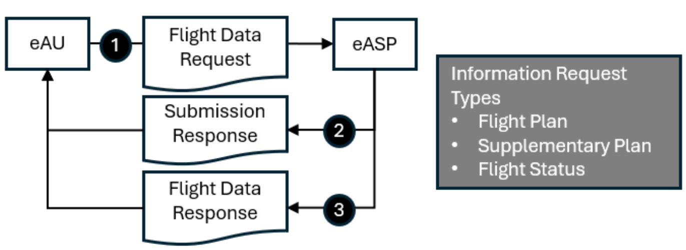


Figure 2: Flight Data Request Service Overview

6.4.1.3 There are three FF-ICE messages available under the flight data request service:

a) Flight Data Request Message;

b) Submission Response Message; and

c) Flight Data Response Message.

6.4.2 **Flight Data Request Message**

6.4.2.1 Information available for request by the eASPs should include the minimum set of data types as listed in ICAO Doc 9965 (flight plans, supplementary data, and flight status) as well as any additional information which the eASPs may choose to make available. eAUs may also enable eASPs to request relevant information concerning a flight. Request codes should be specified in the Requested Flight Data Item field of the Flight Data Request Message.

6.4.2.2 **Access Control**

6.4.2.2.1 In addition to the general requirements specified in Section 6.1.9, eASPs and eAUs should implement robust access control mechanisms to ensure that only authorized parties can receive the requested data, safeguarding the confidentiality and integrity of sensitive information. The following safeguards are recommended:

a) eAUs are limited to querying their own flights;

b) relevant eASPs should have full access to the eFPL and associated data;

c) adjacent eASPs (providers of airspaces not planned to be directly traversed by the flight but the boundaries of which are close to the flight trajectory) may be granted limited access to relevant eFPL for planning purposes; and

d) airport operators should have access to departures and arrivals pertinent to their operations.

6.4.2.3 **Query Limits**

6.4.2.3.1 The Flight Data Request Service is designed for querying information about individual flights, not for bulk data retrieval, in accordance with ICAO Doc 9965. eASPs and eAUs should publish request rate limit (i.e. the number of requests that can be made to the Flight Data Request Service within a specific period). Flight Data Requests that exceed the published request rate limit shall receive a Submission Response with status REJ and an appropriate explanation in **Table 5**, provided in section 6.4.2.6.2, indicating the rate limit violation.

6.4.2.4 **Applicability Period**

6.4.2.4.1 A flight data request pertaining to a specified eFPL is only valid from the time the eFPL is submitted to the time the flight is completed. A flight is completed when it has landed at the destination, diversion, or other alternate aerodrome.

6.4.2.4.2 An eASP may also support the submission of an information request for PFP data. This request will be valid from the time the PFP is submitted until the submission of the eFPL.

6.4.2.5 **Submission Response Message**

6.4.2.5.1 The general validation requirements in accordance with section 6.2.2.1 apply to the Submission Response Message criteria.

6.4.2.6 **Specific Validation Requirements for Flight Data Request**

6.4.2.6.1 In addition to the checks listed in paragraph 6.2.2.1, eASPs should perform flight association checks and validate the legitimacy of the request, ensuring that only authorized parties can access flight data.

6.4.2.6.2 **Table 5** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of “REJ”.

Table 5: FF-ICE Submission Response feedback for Flight Data Request Messages

Additional Checks for Flight Data Request Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Multiple flights matched	Multiple flights with the requested information: a) Aircraft ID1, dep, dest, EOBT, GUFI b) Aircraft ID1, dep, dest, EOBT, GUFI
Requested flight not found	Flight does not exist
No authorized access to the identified flight	No information available
Requested flight data items not supported by the eASP	Request not supported
Query Limit	Query Limit Exceeded

6.4.3 **Flight Data Response Message**

6.4.3.1 It is recommended that the following R/T be included within the Flight Data Response for the various requests:

a) Flight Plan Request: eASPs should include the Desired R/T representing the last filed R/T by eAU. This is based on the understanding that the requestor wants to see the route information that the eAU last submitted; and

b) Flight Status Request: eASPs should include the latest R/T (either Agreed R/T or Negotiating R/T) as per the latest Filing Status of the flight, if applicable. This is based on the understanding that the requestor wants to see the latest response (i.e. Filing Status) provided by the eASPs.

6.5 **Notification Service**

6.5.1 **Introduction**

6.5.1.1 The Notification Service enables eASPs to notify relevant eASPs, as identified through the flight plan, of significant flight events such as departure and arrival. While Notification Service is not a service mandated by ICAO Doc 4444 to be FF-ICE capable, it will likely be necessary to support the sunset of FPL2012 and the associated ATS messages. All ASPs in the APAC region shall implement the Notification Service according to the regional implementation timeline.

6.5.1.2 The Notification Service currently encompasses the full process of flight event notification through the sending of flight departure and arrival messages. **Figure 3** depicts the workflow and associated FF-ICE message exchanges, showing the interaction between FF-ICE participants throughout the flight notification process.

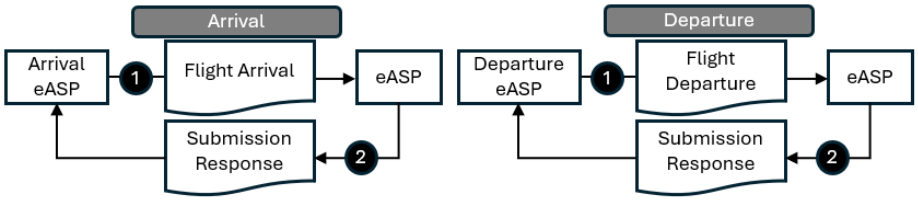


Figure 3: Notification Service Overview

6.5.1.3 There are three FF-ICE messages available under the Notification Service:

a) Flight Departure Message;

b) Flight Arrival Message; and

c) Submission Response Message.

6.5.2 **Submission Response Message**

6.5.2.1 In addition to the checks listed in paragraph 6.2.2.1, eASPs should perform flight association checks and timestamp validation checks to ensure that the arrival/departure time is not in the future and that the arrival time does not precede departure time in the case of the Arrival message. Additionally, the eASP should check to ensure that the originators of the Flight Departure/Flight Arrival Message are from the appropriate eASPs.

6.5.2.2 **Table 6** provides a sample template for eASPs to use within the explanation note for the various types of validation checks that might result in a Submission Response of "REJ".

Table 6: FF-ICE Submission Response feedback for Flight Departure and Flight Arrival Messages

Additional Checks for Flight Departure and Flight Arrival Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Timestamp Check	Arrival/Departure time is in the future Arrival time is before departure time
Permission to send notification	No rights to send Arrival/Departure message

6.5.2.3 Upon receipt of a Submission Response indicating "REJ" status from Notification Service, the sender shall review the Submission Status Explanation to determine the cause of rejection. The sender shall make the necessary corrections to address the identified issues and re-submit the notification message, if applicable.

6.6 **Planning Service**

6.6.1 **Introduction**

6.6.1.1 The Planning Service is an optional service that enables collaborative decision-making between eAUs and eASPs by sharing informal flight plans well ahead of time via Preliminary Flight Plans, allowing improved demand prediction and optimal trajectory planning before the formal filing of flight plans. eASPs providing Planning Services shall publish the availability of the service in their AIP.

6.6.1.2 The Planning Service encompasses three primary processes:

a) PFP submission;

b) PFP updating; and

c) PFP cancellation.

6.6.1.3 **Figure 4** depicts the workflow and associated FF-ICE message exchanges for each process, showing the interaction between eAUs and eASPs throughout the PFP lifecycle.

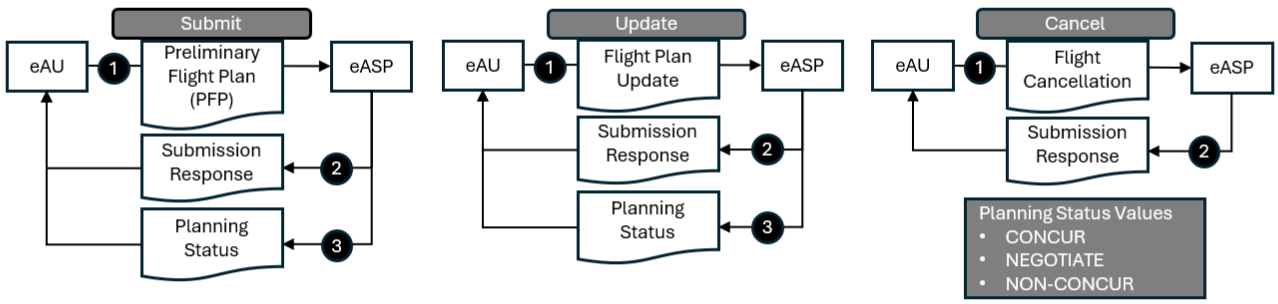


Figure 4: Planning Service Process Overview

6.6.1.4 There are five FF-ICE messages available under the Planning Service:

a) PFP Message;

b) Flight Plan Update Message;

c) Flight Cancellation Message;

d) Submission Response Message; and

e) Planning Status Message.

6.6.1.5 The processes under Planning Service are similar to those related to Filing Service, except that these processes take place in a timeframe designated before the submission of eFPL. This timeframe enables negotiations to take place with more advance notice.

6.6.2 **Preliminary Flight Plan Message**

6.6.2.1 PFPs are submitted by the eAUs as the first step under the Planning Service. Unlike eFPL which is submitted to all relevant eASPs, eAUs can choose to submit PFPs to select eASPs that they have designated for cooperative planning efforts. Typically, these eASPs have airspaces that are complex or regularly constrained. The PFPs are subjected to validation checks resulting in a Submission Response, and evaluation checks resulting in a Planning Status.

6.6.3 **PFP Cut-off Times**

6.6.3.1 The PFP cut-off times refer to the earliest and latest submission times for the PFP. The earliest submission time is dependent on eASPs' capability and the type of advance planning that could be conducted between the eASPs and eAUs. Meanwhile, the latest submission time should be determined by the time that the eFPL is due. The PFP expires when the eFPL is due. PFP expiry refers to the point at which a PFP can no longer be processed or updated by eASP. The due time of eFPL is determined by each eASP and shall comply with the latest submission timing as defined in ICAO Doc 4444 and any regional agreements. This will also be the time after which the PFP will not be accepted. The cut-off times should be published by eASPs in the AIPs.

6.6.3.2 After an eFPL has been submitted, a PFP can no longer be submitted for the same flight.

6.6.4 **Versioning**

6.6.4.1 As with eFPL, it is the responsibility of the eAUs to increase the versioning of the PFPs. Every new version or Flight Plan Update made to the PFP will increment the version by one.

6.6.5 **Submission Response Message**

6.6.5.1 The general validation requirements as per paragraph 6.2.2.1 apply to the Submission Response Message criteria.

6.6.6 **Specific Validation Requirements for PFPs**

6.6.6.1 In addition to the checks listed in paragraph 6.2.2.1, submission timeframe, existence of eFPL, versioning, and flight association check should be conducted for PFPs and Flight Plan Updates. eASPs may also implement additional checks based on local requirements, to ensure that route/trajectories filed by eAUs contain valid routes, fix names, and coordinates, including but not limited to:

a) trajectory syntactic checks; and

b) semantic checks.

6.6.6.2 **Table 7** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 7: FF-ICE Submission Response feedback for Preliminary Flight Plans and Flight Plan Updates

Additional Checks for PFPs and Flight Plan Updates	
Checks	***Explanation Note***
Submission Timeframe	EOBT is outside allowable submission timeframe
Existence of eFPL	eFPL for the same flight has already been submitted
Versioning	A later version <Y> exists in the system
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Route validation (Structure of route, lat/long of points, fix names)	Trajectory Info Error Invalid Route Structure Invalid Fix/waypoint

6.6.7 **Planning Status Message**

6.6.7.1 **Overview**

6.6.7.1.1 The Planning Status reflects the likelihood that the flight plan will be operationally acceptable if submitted as an eFPL. The evaluations conducted for the PFPs are therefore similar to those conducted for the eFPLs. eASPs provide feedback within the Planning Status to eAUs to identify the restrictions and constraints applicable to the flights.

6.6.7.1.2 In line with the evaluations conducted for eFPLs, eASPs should evaluate PFPs against restrictions managed by existing ATM systems, to ensure comprehensive evaluation of flight plan acceptability. Refer to section 6.3.6.1.2 for the recommended list.

6.6.7.2 **Planning Status Values**

6.6.7.2.1 eASPs retain flexibility in determining the specific criteria for each planning status based on their operational environment. However, the criteria for a "NON-CONCUR" Planning Status should be similar to the criteria for a "NOT ACCEPTABLE" Filing Status.

6.6.7.2.2 Similarly, the criteria for a "CONCUR" Planning Status should be similar to the criteria for an "ACCEPTABLE" Filing Status.

6.6.7.2.3 A third Planning Status of "NEGOTIATE" is also available. This Planning Status refers to any situation where the flight plan is likely to be accepted if filed, but the R/T details differ.

6.6.7.3 **Feedback Methods for Restrictions/Constraints**

6.6.7.3.1 When providing restrictions / constraints to eAUs within the Planning Status, eASPs should make use of methods similar to those detailed under the Filing Status, as outlined in Section 6.3.6.3.1.

6.6.7.3.2 eASPs should retain flexibility in determining their Planning Status feedback methods and content, except in the scenarios described in Section 6.3.6.4.1 which require pre-established responses to promote regional interoperability and consistent handling.

6.6.7.3.3 For the five Scenarios (as described in Section 6.3.6.4.1), the Planning Status should therefore be "NON-CONCUR" with a Negotiating R/T provided where applicable, as specified in the established requirements.

6.6.7.3.4 The regionally agreed-upon Planning Status response format and explanation templates for the respective scenarios are detailed in **Appendix C Table 10**. The explanation formats listed within the table shall be used together with the "NON-CONCUR" Planning Status value.

6.6.8 **Flight Plan Update Message**

6.6.8.1 Flight Plan Updates are submitted by eAUs to provide information regarding changes to the PFPs. These updates are subjected to similar validation and evaluation checks as the PFPs.

6.6.9 **Flight Plan Update cut-off times**

6.6.9.1 The submission of Flight Plan Update for PFP should be allowed from the time that the eAU submits a PFP to the time that the eFPL is due.

6.6.10 **Flight Plan Update Threshold**

6.6.10.1 Unlike the flight plan filing process, which operates in a mixed-mode environment, the Planning Service impacts only FF-ICE-capable stakeholders. For this reason, eAUs are advised to submit Flight Plan Update each time there is a change in PFP data. There is no legacy message equivalent to the PFP, meaning that the PFP update may be as frequent as allowed within the system's capabilities, without impact to non-FF-ICE-capable stakeholders.

6.6.11 Flight Cancellation

6.6.11.1 Specific Validation Requirements for Flight Cancellation

6.6.11.1.1 In addition to the general validation checks detailed in paragraph 6.2.2.1, eASPs should perform flight association checks and authenticate that the message originator has the authority to cancel the flight.

6.6.11.1.1.1 **Table 8** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 8: FF-ICE Submission Response feedback for Flight Cancellation

Additional Checks for Flight Cancellation Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Authenticated User	No information available

6.7 Trial Service

6.7.1 Introduction

6.7.1.1 The Trial Service is an optional service that allows operators to evaluate "what-if" scenarios for both preliminary and filed flight plans, without affecting the actual flight plan data, enabling better flight planning and constraint resolution.

6.7.1.2 The Trial Service encompasses the process of evaluating alternative flight scenarios without affecting existing flight plans. **Figure 5** depicts the workflow and associated FF-ICE message exchanges, showing the interaction between eAUs and eASPs throughout the trial request and evaluation process.

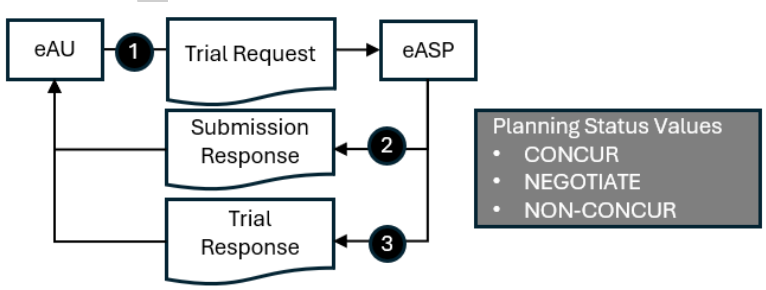


Figure 5: Trial Service Overview

6.7.1.3 There are three FF-ICE messages available under the Trial Service:

a) Trial Request Message;

b) Submission Response Message; and

c) Trial Response Message.

6.7.2 **Trial Request Message**

6.7.2.1 Trial Requests are submitted by the eAUs as the first step under the Trial Service. As with the PFPs, eAUs can choose to submit Trial Requests to selected eASPs with whom they wish to conduct the trials. Multiple Trial Requests can be submitted to the same eASP and these requests can be submitted even without the presence of PFPs/eFPLs. Trial Requests are subjected to validation checks resulting in a Submission Response and evaluation checks resulting in a Planning Status. Trial Requests shall be treated by the eASP as a separate, standalone transaction which has no impact on existing data.

6.7.2.2 **Limits on Trial Request Frequency**

6.7.2.2.1 eASPs may set limits on the maximum frequency of requests allowable within a specified period for each eAU to prevent system overload and ensure service availability for all users. These limitations should be published in the eASP's AIP.

6.7.2.3 **Submission Response Message**

6.7.2.3.1 The general validation requirements as per paragraph 6.2.2.1 apply to the Submission Response Message criteria.

6.7.2.4 **Specific Validation Requirements for Trial Requests**

6.7.2.4.1 In addition to the checks listed in paragraph 6.2.2.1, submission timeframe and request frequency checks should be conducted for Trial Requests. For submission timeframes, Trial Requests can be allowed up to route clearance delivery, allowing sufficient time to submit a Flight Plan Update arising from a positive Trial Response. This option is only available when Trial Requests are for a flight that is already provided as a PFP or eFPL. eASPs may also implement additional checks based on local requirements, to ensure that R/Ts filed by eAUs contain valid routes, fix names, and coordinates, including but not limited to:

a) trajectory syntactic checks; and

b) semantic checks.

6.7.2.4.2 **Table 9** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 9: FF-ICE Submission Response feedback for Trial Requests

Additional Checks for Trial Requests	
Checks	***Explanation Note***
Submission Timeframe	Outside the allowable submission timeframe
Request Frequency	Frequency of Trial Requests has been exceeded
Route validation (Structure of route, lat/long of points, fix names)	Trajectory Info Error Invalid Route Structure Invalid Fix/waypoint

6.7.3 **Trial Response Message**

6.7.3.1 **Planning Status Values**

6.7.3.1.1 The Planning Status within the Trial Response Message reflects the likelihood that the flight plan will be operationally acceptable if submitted as a PFP or eFPL. The evaluations conducted for the Trial Requests are similar to those that are conducted for the PFPs.

6.7.3.1.2 However, as eAUs are allowed to submit multiple Trial Requests, it may not be practical for eASPs to consider all Trial Requests as actual traffic demand. It is therefore not expected for eASPs to provide flight specific constraints. For example, if a trial flight plan is expected to operate during the duration of an ATFM program, eASPs are expected to provide feedback to the eAUs that the flight will be caught in the ATFM program. A flight specific constraint need not be provided to the eAUs.

6.7.3.1.3 eASPs should publish the scope of evaluation performed for Trial Requests, in the AIP.

6.7.3.2 **Feedback Methods for Restrictions/Constraints**

6.7.3.2.1 When providing restrictions/constraints to eAUs within the Trial Response, eASPs should use methods similar to those used for the Planning Service. eASPs should similarly retain flexibility in determining their Trial Response feedback methods and content.

6.7.3.2.2 For the five Scenarios (as described in Section 6.3.6.4.1) which require regionally agreed-upon responses to ensure regional interoperability and consistent handling, the Trial Response shall contain a Planning Status of "NON-CONCUR". In addition, no flight specific constraints or R/Ts will be expected in the response.

6.7.3.2.3 The explanation within **Appendix C Table 10** can be used for relevant scenarios.

Note: eASPs should not include any flight-specific constraints or resource allocations, as Trial Requests are "what-if" scenarios that do not represent actual flight operations. The response should indicate general restriction applicability without reserving operational resources or assigning specific constraint values.

6.8 **Message Delivery Assurance**

6.8.1 **Time-out for submitted messages**

6.8.1.1 Time-outs are predefined waiting periods during which a system expects to receive a response from another system or user. If no response arrives within this window, the system marks the request as failed or expired. These time-out periods are deliberately set longer than the typical response time to account for various delays, such as system latency and network delays.

6.8.1.2 States should publish business-level time-out periods in their AIPs to provide operators with expected response times for FF-ICE services. These time-outs represent commitments for completing processes such as flight plan evaluation and trajectory assessment.

6.8.1.3 The time-out periods specified in the following sections are recommended business-level time-outs that eASPs should implement to ensure consistent service delivery across the region.

6.8.2 **Submission Response**

6.8.2.1 It is recommended that the timeout for the Submission Response message be set at one minute. If Submission Response is not received after one minute, the message originator should resubmit the original message (e.g. eFPL / Flight Plan Update / Flight Cancellation / PFP / Flight Departure / Flight Arrival / Flight Data Request etc).

6.8.3 Filing and Planning Status

6.8.3.1 For Filing Service, it is recommended that the timeout for Filing Status Message be set at one minute from the time the eAU receives a Submission Response of “ACK”. If the first Filing Status is not received one minute after receiving the Submission Response of “ACK”, eAUs may contact the eASPs. Filing Status Message is not expected if a Submission Response of “REJ” or “MAN” was received.

6.8.3.2 For Planning Service, if a re-evaluation process is provided, it is recommended that the timeout for Planning Status Message be set at one minute from the time the eAU receives a Submission Response of “ACK”. If the first Planning Status Message is not received one minute after receiving the Submission Response of “ACK”, eAUs may contact the eASPs. Planning Status Message is not expected if a Submission Response of “REJ” or “MAN” was received.

6.8.4 Trial Response and Flight Data Response

6.8.4.1 It is recommended that the timeout for Trial Response Message and Flight Data Response Message be set at one minute from the time the eAU receives a Submission Response of “ACK”. If the Trial Response or Flight Data Response is not received one minute after receiving the Submission Response of “ACK”, eAUs are expected to contact the eASPs. Trial Response Message or Flight Data Response Message are not expected if a Submission Response of “REJ” or “MAN” was received.

6.9 Publication Service

6.9.1 The Publication Service is an optional FF-ICE/R1 service used to provide flight information to authorized stakeholders. It is an event-based service that disseminates information whenever defined criteria are met.

6.9.2 Subscribers to this service may include a wide range of stakeholders from AUs to customs and immigration authorities, who may use the service to enhance situational awareness and adjust their operations based on the updated flight information received.

6.9.3 An eASP providing a Publication Service should ensure that the service is discoverable by potential subscribers, through the AIP or a SWIM service registry, for example. The eASP shall also ensure that appropriate access control is in place so that the subscribers can retrieve only the flight information relevant to their operations.

6.9.4 Given the nature of the Publication Service, it is recommended that its implementation uses a Publish/Subscribe message exchange pattern, with a push mechanism applied to improve service efficiency.

6.9.5 Currently, no specific FF-ICE message is defined for Publication Service. However, it is recommended that FIXM be used wherever possible, to exchange flight information through this service.

6.10 Re-evaluation Process

6.10.1 Re-evaluation is an optional process that an eASP may perform to determine whether a flight plan still complies with published restrictions or ATM constraints that may have been applied or modified since its last evaluation. Re-evaluation is provided as part of the Filing Service and Planning Service when implemented by an eASP. If implemented, reference should be made to ICAO Doc 9965.

6.10.2 The re-evaluation process is triggered by predefined factors, including:

a) Event trigger: an event affecting ATM configuration such as:
   i) airspace or airport conditions;
   ii) routing availability;
   iii) ATC constraints;
   iv) demand-capacity imbalance situations;
   v) meteorological constraints; and

b) Time trigger: a predefined interval that initiates the re-evaluation process, e.g. every 30 minutes.

   Note: the specific interval is to be determined by each eASP.

6.10.3 The re-evaluation process may continue until the aircraft has off-block. This may vary depending on ATM conditions. Cut-off times for specific ATM conditions are subject to national and/or regional agreement.

6.10.4 If, following a re-evaluation, the Filing Status (or Planning Status) changes, the eASP shall provide the eAU with the updated status and an explanation of the change as specified in Section 6.3.6.4.2.

6.11 Implementation Timeline for APAC

6.11.1 A phased approach to FF-ICE/R1 implementation with the following timeline is recommended for the APAC region:

a) 2030: commencement of technical tests and trials involving eAUs and cross-border eASP interactions.
b) 2031: begin operational tests to identify and resolve any issues.
c) 2032: full operationalization of three FF-ICE/R1 services (Filing Service, Flight Data Request Service and Notification Service).

6.11.2 This recommended timeline will ensure APAC States' readiness to support the sunset of FPL2012 in 2034. Note that SWIM implementation is a prerequisite for FF-ICE/R1 deployment, as FF-ICE services are built upon SWIM infrastructure and information exchange capabilities.

6.12 Implementation Monitoring

6.12.1 This Plan is a supplementary plan to the *APAC ANP Volume III*, supporting the transition from current flight planning to FF-ICE operations. Implementation monitoring ensures harmonized regional deployment of FF-ICE capabilities and identifies areas requiring additional support or coordination.

6.12.2 APAC States should report their FF-ICE implementation status to the ICAO APAC Regional Office annually by 28 February. Implementation status will be examined by the APAC FF-ICE/R1 Implementation Task Force and presented at the Air Traffic Management Sub-Group (ATM/SG) of

Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) to measure, report, and advance regional implementation progress, and identify implementation challenges.

6.12.3 It is expected that the relevant FF-ICE experts in each APAC State will be responsible for detailed reporting using the *Regional FF-ICE Monitoring and Reporting Form* (**Appendix D**) and coordinate with their APAC Seamless ANS Reporting point of contact to ensure the accuracy of higher-level reporting and consistency between separate reporting levels.

6.13 **Plan Update Cycle and Process**

6.13.1 This Plan requires periodic updates to maintain alignment with updates to:

a) ICAO Doc 9965;

b) GANP, including ASBU framework restructuring;

c) APAC ANP Volume III; and

d) any other relevant documents and APANPIRG Conclusions/Decisions.

6.13.2 This Plan is intended to be reviewed every three years following its initial implementation. Earlier or more frequent review and amendment may be conducted as recommended by the APAC FF-ICE/R1 Implementation Task Force and as agreed-upon by APANPIRG through the ATM/SG.

6.13.3 This Plan shall be reviewed and updated by the APAC FF-ICE Regional Implementation Plan Drafting Group to be established under the APAC FF-ICE/R1 Implementation Task Force. The drafting group will consist of subject matter experts (SMEs) nominated by APAC States and International Organizations.

6.14 **Post Implementation Process**

6.14.1 To ensure continuous improvement of FF-ICE operations, both in operational procedures and technical capabilities, close and routine coordination among stakeholders should be conducted on an annual basis. This coordination should focus on sharing and reviewing the collective performance of FF-ICE operations, as well as implementing improvements within the region. The APAC FF-ICE/R1 Implementation Task Force will serve as a platform for these activities.

6.14.2 The following indicators are recommended for monitoring, to assess the performance of FF-ICE operations within the region.

a) submission time of the first eFPL, compared to EOBT specified in the eFPL;

b) number of "REJ" Submission Response messages, along with their explanations;

c) number of "MAN" Submission Response messages, along with their explanations;

d) number of "NOT ACCEPTABLE" Filing Status messages, along with their explanations;

e) number of negotiations before achieving "ACCEPTABLE" Filing Status, including time elapsed from the first submission of eFPL to the "ACCEPTABLE" Filing Status;

f) number of flights departing with "NOT ACCEPTABLE" Filing Status; and

g) number of Flight Data Request transactions and type of information requested.

REFERENCED DOCUMENTS

Asia/Pacific A-CDM Implementation Plan

Asia/Pacific ANP Volume III

*Asia/Pacific Common SWIM Information S*ervices.

Asia/Pacific Plan for Collaborative Aeronautical Information Management (AIM), Version 4.0

Asia/Pacific Region ATM Contingency Plan

Asia/Pacific Regional Framework for Collaborative Air Traffic Flow Management

Asia/Pacific SWIM Technical Infrastructure Profiles Version 1.0

Conclusion from APANPIRG/35/4

Conclusion from APANPIRG/36/12

Conclusion from ATM/SG/13-5

ICAO Doc 4444 — *Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)*

ICAO Doc 7910 — *Location Indicators*

ICAO Doc 8585 — *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*

ICAO Doc 9750 — *Global Air Navigation Plan (GANP)*

ICAO Doc 9854 — *Global Air Traffic Management Operational Concept (GATMOC)*

ICAO Doc 9965 — *Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE), Volume I (Concept) and Volume II (Implementation Guidance)*

ICAO Doc 9971 — *Manual on Collaborative Air Traffic Flow Management (ATFM)*

ICAO Doc 10039 — *Manual on the System Wide Information Management (SWIM)*

ICAO Doc 10169 — *Aviation Common Certificate Policy (ACCP)*

ICAO Doc 10199 — *Procedures for Air Navigation Services – Information Management (PANS-IM)*

ICAO Doc 10203 —*Manual on the System-wide Information Management (SWIM) Implementation*

ICAO Doc 10204 — *Manual on Aviation Information Security*

IETF RFC 9562 — *Universally Unique IDentifiers (UUIDs)*

IETF RFC 4122 — *A Universally Unique IDentifier (UUID) URN Namespace*

ABBREVIATIONS AND ACRONYMS[1]

Abbreviation/Acronym	Expansion
ACC	Area Control Centre
A-CDM	Airport Collaborative Decision Making
AFS	Aeronautical Fixed Services
AFTN	Aeronautical Fixed Telecommunication Network
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIRM	ATM Information Reference Model
AIS	Aeronautical Information Services
AIXM	Aeronautical Information Exchange Model
ANP	Air Navigation Plan
ANS	Air Navigation Services
ANSP	Air Navigation Service Providers
AOBT	Actual Off-Block Time
APAC	Asia/Pacific
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ASBU	Aviation System Block Upgrade
ASP	ATM Service Provider
ATC	Air Traffic Control
aASP	Non-FFICE Capable ATM Service Provider
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATM/SG	Air Traffic Management Sub-Group

[1] Refer to ICAO Doc 9965 for definition of terms

Abbreviation/Acronym	Expansion
ATS	Air Traffic Services
AU	Airspace User
aAU	An AU that is not capable of using mandatory FF-ICE services.
CHG	ATS Change Message
CLDT	Calculated Landing Time
CNL	ATS Cancel Message
CPL	Current Flight Plan
CTO	Calculated Time Over
CTOT	Calculated Take-Off Time
DLA	ATC Delay Message
eASP	An ASP that is not capable of providing the mandatory FF-ICE services.
eAU	An AU that is capable of using mandatory FF-ICE services.
eFPL	Filed flight plan exchanged using FF-ICE services
EOBT	Estimated Off-Block Time
ESP	Emergency Service Provider
ETO	Estimated Time Over
FF-ICE	Flight and Flow Information for a Collaborative Environment
FIR	Flight Information Region
FIXM	Flight Information Exchange Model
FPL	Filed flight plan exchanged using via aeronautical fixed services (AFS)
FQDN	Fully Qualified Domain Name
GSt	Ground Stop
GUFI	Globally Unique Flight Identifier
ICAO	International Civil Aviation Organization
IETF	Internet Engineering Task Force

Abbreviation/Acronym	**Expansion**
IWXXM	ICAO Meteorological Information Exchange Model
MEDEVAC	Medical Evacuation
MINIT	Minutes in Trail
MIT	Miles in Trail
OSF	Open Software Foundation
PFP	Preliminary Flight Plan
PKI	Public Key Infrastructure
R1	Release 1 (for pre-departure phase)
R2	Release 2 (for post-departure phase)
RFC	Request for Comments
RIF	Re-Clearance in Flight
RPL	Repetitive Flight Plan
R/T	Route/Trajectory
RVR	Runway Visual Range
SAR	Search and Rescue
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Hazards
SME	Subject Matter Expert
STAR	Standard Terminal Arrival Route
SWIM	System-wide Information Management
TAF	Terminal Area Forecast
TBO	Trajectory-based Operations
TLS	Transport Layer Security
UTC	Coordinated Universal Time
UUID	Universally Unique IDentifier

Abbreviation/Acronym	Expansion
WAF	Weather Avoidance Field

APPENDIX A FIXM MAPPING TO ATS

Translation of FF-ICE FIXM to ATS Messages is available on the FIXM website at https://docs.fixm.aero/#/ats-message-to-fixm-mapping/translating-ffice-fixm-messages-to-ats-messages

APPENDIX B MAPPING OF FIXM CORE 4.3.0 DATA ATTRIBUTES TO SUPPORT CROSS-BORDER ATFM INFORMATION EXCHANGE

Data Attribute	FIXM version 4.3.0 Core
EOBT	FlightType.departure.estimatedOffBlockTime = (EOBT)
ETO	FlightType.routeTrajectoryGroup.desired.element.point4D.time = (ETO) FlightType.routeTrajectoryGroup.desired.element.elementStartPoint = (point at which ETO is specified)
ELDT	FlightType.routeTrajectoryGroup.desired.element.point4D.time = (ELDT) FlightType.routeTrajectoryGroup.desired.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.desired.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator
CTOT	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CTOT) FlightType.routeTrajectoryGroup.negotiating.element.point4D.pointProperty.propertyType = WHEELS_OFF FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.departure.aerodrome.locationIndicator
CTO	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CTO) FlightType.routeTrajectoryGroup.negotiating.element.constraint.level = (Altitude, Flight Level or Range) FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint = (point at which CTO is specified)
CLDT	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CLDT)

Data Attribute	FIXM version 4.3.0 Core
	FlightType.routeTrajectoryGroup.negotiating.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator

APPENDIX C HARMONIZED FILING STATUS RESPONSES

Table 10: Harmonized Filing Status Responses for Identified ATFM Scenarios

Scenario	Who to feedback	Filing Status Value	Planning Status Value	Explanation through FF-ICE Message (Mandatory if NOT ACCEPTABLE)	Type of Trajectory	FIXM Elements to use	Type of Constraint (Level, Speed, Time)	Constraint. Description (Optional)	Constraint. Restriction Reference (Optional)	Checking Point
a) CTO/ CLDT imposed by eASPs	Initiating eASP	NOT ACCEPTABLE	NON CONCUR	REGUL <AAAACCCCCDDMMMVV> Note: If available, *See NOTAM <XXX> / ADP <XXX> for details.*	Negotiating	ElementStartPoint for location Constraint.Time for time Constraint.Level/ Constraint.Speed if applicable	Time (Level, Speed if applicable)	REGCAUSE <XX XX>	REGUL <AAAACCCCCDDMMMVV>	ETO / ELDT against CTO /CLDT
b) Ground Stop imposed by Arrival eASPs	Initiating eASP / Arrival eASP	NOT ACCEPTABLE	NON CONCUR	GSt imposed on flights arriving into <WSSS> from <YYYY-MM-DDTHH:mm:ssZ> to <YYYY-MM-DDTHH:mm:ssZ>. Note: If available, *See NOTAM <XXX> / ADP <XXX> for details.*	NULL	-	-	-		- ELDT against restricted period
c) Flight level Restrictions	All relevant eASP	NOT ACCEPTABLE	NON CONCUR	<FL or altitude, FL or altitude> on route <XXXX> not available.	NULL	-	-	-		Flight Level on Point against restricted flight levels

Scenario	**Who to feedback**	**Filing Status Value**	**Planning Status Value**	**Explanation through FF-ICE Message (Mandatory if NOT ACCEPTABLE)**	**Type of Trajectory**	**FIXM Elements to use**	**Type of Constraint (Level, Speed, Time)**	**Constraint. Description (Optional)**	**Constraint. Restriction Reference (Optional)**	**Checking Point**
				Note: If available, *See NOTAM <XXX> / ADP <XXX> for details.*						
d) Fix Balancing	All relevant eASP	NOT ACCEPTABLE	NON CONCUR	Fix <XXXXX> not available. Note: If available, *See NOTAM <XXX> / ADP <XXX> for details.*	NULL	-	-	-		Flight Trajectory against restricted points
e) Re-routing	All relevant eASP	NOT ACCEPTABLE	NON CONCUR	Route <XXXXX> not available. Note: If available, *See NOTAM <XXX> / ADP <XXX> for details.*	NULL	-	-	-		Flight Trajectory against restricted routes

APPENDIX D REGIONAL FF-ICE MONITORING AND REPORTING FORM

This form is designed to monitor the implementation status of Flight and Flow Information for a Collaborative Environment (FF-ICE) services and capabilities within the region. This form should be completed by States to report their progress in implementing FF-ICE in accordance with ICAO Doc 9965 and the *Asia/Pacific Regional FF-ICE/R1 Implementation Plan*.

States should complete this form annually by 28 February to track implementation progress.

Scoring System

Each element uses a three-level scoring system:

- **0%** = Not implemented or no progress
- **50%** = Partial implementation with gaps, manual intervention required, or development in progress
- **100%** = Full implementation in compliance with regional requirements

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
General			
Implementation of FIXM-based information exchange	0% - State has not implemented FIXM-based information exchange 50% - State has implemented FIXM-based capability but uses older version 100% - State has implemented FIXM-based capability with latest FIXM version (v4.3.0)	State should implement FIXM-based information exchange using FIXM version 4.3.0 for all FF-ICE messages	
Implementation of national FF-ICE procedures, in accordance with ICAO Doc 4444 and ICAO Doc 9965	0% - State has not developed any national FF-ICE procedures 50% - State is in process of developing and implementing its national FF-ICE procedures 100% - State has fully established and published FF-ICE procedures based on ICAO Doc 9965 that are adhered to by stakeholders	State should establish and publish procedures covering FF-ICE operations, communication, and stakeholder responsibilities	

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
Filing Service			
Implementation of Filing Service	0% - No Filing Service implementation 50% - Partial implementation with gaps (e.g. incomplete message set support, incomplete validation/ evaluation capability, manual intervention required) 100% - Full automated implementation with complete message set, validation and evaluation capability in compliance with this document	Filing Service is mandatory service for eASPs Full implementation should include: a) complete message set support b) automated validation and evaluation c) published validation and evaluation criteria in AIP	
Implementation of Filing Re-evaluation Process	0% - No re-evaluation process 50% - Partial re-evaluation (e.g. limited status change handling, re-evaluation only for selected restrictions, and/or procedures not fully established) 100% - Full re-evaluation with established procedures	State should establish and publish clear procedures for the re-evaluation process and handling of status changes	
Implementation of national procedures for Filing Service mixed mode operations to support both FF-ICE and FPL2012 message handling (FPL, CHG, DLA), in accordance with ICAO Doc 4444, ICAO Doc 9965 and regional plan	0% - No mixed mode procedures 100% - Full procedures established for handling both FF-ICE and FPL2012 formats with appropriate message dissemination	State should establish and publish clear procedures so that eAUs understand what messages to submit, how to submit them, and what to expect to receive based on their technical capabilities (FF-ICE or FPL2012)	
Flight Data Request Service			
Implementation of Flight Data Request Service	0% - No implementation 50% - Partial implementation with gaps (e.g. limited request	Flight Data Request Service is mandatory service for eASPs	

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
	types support, manual intervention required) 100% - Full automated implementation in compliance with this document	Full implementation should include automated support for all required request types (Flight Plan, Supplementary Plan and Flight Status)	
Implementation of national procedures for Flight Data Request Service mixed-mode operations to support both FF-ICE and FPL2012 message handling (RQP, RQS), in accordance with Doc 9965, Doc 4444 and regional plan	0% - No mixed mode procedures 100% - Full procedures established for handling both FF-ICE and FPL2012 formats with appropriate message dissemination	State should establish and publish clear procedures so that eAUs/eASPs understand what messages to submit, how to submit them, and what to expect to receive based on their technical capabilities (FF-ICE or FPL2012)	
Notification Service			
Implementation of Notification Service	0% - No implementation 50% - Partial implementation with gaps (e.g. limited event types, manual intervention required) 100% - Full automated implementation in compliance with this document	Notification Service is mandatory service for APAC. Full implementation should include automated support for departure and arrival notifications	
Implementation of local procedures for Notification Service mixed mode operations to support both FF-ICE and FPL2012 message handling (DEP, ARR), in accordance with ICAO Doc 4444, ICAO Doc 9965 and regional plan	0% - No mixed mode procedures 100% - Full procedures established for handling both FF-ICE and FPL2012 formats with appropriate message dissemination	State should establish and publish clear procedures so that parties understand the notifications they should expect to receive based on their technical capabilities (FF-ICE or FPL2012)	
Planning Service			
Implementation of Planning Service	0% - No Planning Service implementation	Planning Service is recommended for ASPs	

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
	50% - Partial implementation with gaps (e.g. incomplete message set support, incomplete validation/evaluation capability, manual intervention required) 100% - Full automated implementation in compliance with this document	whose airspace is complex and/or regularly constrained Full implementation should include: a) complete message set support b) automated validation and evaluation c) published validation and evaluation criteria in AIP	
Implementation of Planning Re-evaluation Process	0% - No re-evaluation process 50% - Partial re-evaluation (limited status change handling, re-evaluation only for selected restrictions, and/or procedures not fully established) 100% - Full re-evaluation with established procedures	State should establish and publish clear procedures for the re-evaluation process and handling of status changes	
Trial Service			
Implementation of Trial Service	0% - No Trial Service implementation 100% - Full automated implementation in compliance with this document *Note: Partial implementation of trial service is not expected as manual intervention is not practical for potentially large number of "fire and forget" messages.*	Optional service allowing "what-if" evaluation of flight plan alternatives Full implementation should include automated processing of Trial Requests and responses.	
Publication Service			
Implementation of Publication Service	0% - No implementation 100% - Subscription options published and available	Optional service for disseminating flight information. State should publish available subscription	

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
	through SWIM with clear procedures for information subscription	options and clear procedures for stakeholders to subscribe through SWIM	

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL GUIDANCE MATERIAL FOR GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) RADIO FREQUENCY INTERFERENCE (RFI) AND ASSOCIATED DATA LINK DISRUPTION COORDINATION AND REPORTING PROCEDURES

Version 1.0, August 2026

This guidance was developed by the Procedures for GNSS and Data Link Disruption Ad Hoc Group

Approved by ATM/SG/14 and published by the
ICAO Asia and Pacific Office, Bangkok

CONTENTS

1. SCOPE OF THE DOCUMENT

Guidance for GNSS RFI and its Associated Data Link Disruption Coordination and Reporting Procedures

1.1 This document, *Asia/Pacific Regional Guidance Material for GNSS RFI and Associated Data Link Disruption Coordination and Reporting Procedures*, provides non-binding guidance material for Asia and Pacific (APAC) States/Administrations on Radio Frequency Interference (RFI) affecting Global Navigation Satellite System (GNSS) and its associated Air Traffic Services (ATS) data link operations.

1.2 This document is intended to support a harmonized regional approach through the establishment of common reporting processes, coordination mechanisms, and operational considerations intended to mitigate the safety and operational impacts of GNSS RFI and its associated data link disruption.

1.3 This document does not supersede ICAO Standards and Recommended Practices (SARPs) and should be applied in conjunction with relevant provisions contained in ICAO Annexes, Procedures for Air Navigation Services (PANS) and associated guidance material.

Document Review

1.4 This document will be subject to ad hoc review as needed, in response to relevant global or regional developments.

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.

2. INTRODUCTION

Background

2.1 The Twelfth Meeting of the Air Traffic Management Sub-Group (ATM/SG/12, Bangkok, Thailand, 23 – 27 September 2024), which reports to the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), adopted *Decision ATM/SG/12-8: Establish Procedures for GNSS and Data Link Disruption Ad Hoc Group*.

2.2 The Ad Hoc Group was tasked to:

a) collect data on GNSS and data link disruption in APAC region; and

b) develop the procedures for GNSS and data link disruption that include (but not limited to) the need for:

  i. reporting process by airspace users to ATS units; and

  ii. sharing of information between stakeholders.

2.3 The work of the Ad Hoc Group resulted in the development of operational reporting procedures and coordination mechanisms intended to enhance regional situational awareness and resilience.

Background on GNSS in Aviation

2.4 The United States' Global Positioning System (GPS), the first operational GNSS, became fully operational in 1995. Since then, additional satellite constellations have become operational, including:

a) Global'naya Navigatsionnaya Sputnikovaya Sistema (GLONASS);

b) Galileo; and

c) BeiDou Navigation Satellite System.

2.5 Collectively, these systems form the foundation of modern GNSS capability.

2.6 GNSS has enabled significant safety and efficiency improvements in civil aviation. Applications include:

a) Performance-based Navigation (PBN) operations across all phases of flight;

b) area navigation;

c) Automatic Dependent Surveillance – Broadcast (ADS-B);

d) Automatic Dependent Surveillance – Contract (ADS-C);

e) Multilateration (MLAT) when integrated with GNSS-derived timing;

f) moving map displays and synthetic vision systems;

g) Search and Rescue (SAR) emergency locator transmitters (ELTs); and

h) precision timing application supporting Communications, Navigation and Surveillance (CNS) systems.

2.7 The increasing integration of GNSS into airborne and ground-based systems has resulted in substantial operational dependence on satellite-based Positioning, Navigation and Timing (PNT).

2.8 The need for resilient terrestrial backup capabilities was recognized under the Global Air Navigation Plan's (GANP) Aviation System Block Upgrade (ASBU) framework through the Minimum Operational Network (MON) concept. While MON provides a terrestrial navigation safety net, it represents only one component of a comprehensive resilience strategy required to address widespread GNSS disruption.

GNSS RFI

2.9 GNSS signals are inherently low power at the receiver antenna and therefore vulnerable to both intentional and unintentional sources of RFI. In addition, certain ionospheric disturbances from space weather events may degrade signal quality.

2.10 RFI affecting GNSS may result in:

a) loss of position accuracy:

b) loss of navigation capability;

c) loss of timing synchronisation; or

d) hazardously misleading information.

2.11 In recent years, the aviation community has observed a rising number of GNSS RFI occurrences in the form of jamming and spoofing, reported on a recurring basis in several regions of the world especially in proximity to certain conflict areas, with associated operational impacts reported by operators and service providers.

2.12 The United Nations Terminology Database (UNTERM; https://unterm.un.org) defines:

a) **jamming**, as intentional RFI that prevents GNSS receiver from locking onto satellite signals, effectively rendering the GNSS system unusable or degraded for users in the jammed area; and

b) **spoofing**, as the broadcast of GNSS-like signals that cause avionics to calculate erroneous positions and provide false guidance.

2.13 GNSS RFI affecting civil aviation arises under a range of circumstances:

a) **unintentional interference**, often associated with equipment malfunction or unintended emissions from aviation or non-aviation systems. Such occurrences have historically been limited and typically resolved once identified;

b) **intentional interference not directed at aviation**, where any impact on aviation is generally incidental rather than deliberate and civil aircraft becomes a collateral consequence; and

c) **intentional interference directed at aviation**, where the severity can range from relatively benign cases such as the misuse of low-power devices in or near aircraft or aerodromes to more serious scenarios involving targeted jamming of approach or terminal airspace.

2.14 Such interference is typically localized and intermittent. However, when combined with multipath effects or ionospheric disturbances, it may degrade GNSS receiver performance.

2.15 Multipath occurs when a radio signal reaches the receiver via both direct and reflected paths, creating time-delayed and phase-shifted signal components. Although GNSS receivers are designed to mitigate predictable multipath and ionospheric effects, unpredictable RFI may compound these errors and reduce positioning integrity.

2.16 There are no specific flight crew alerts for GNSS RFI. When GNSS RFI occurs, flight crew may see multiple system warnings but cannot easily tell which ones are caused by the interference. For example, some aircraft Flight Management Systems (FMS) rely on GNSS for time measurement and even Inertial Navigation Systems (INS) may use GNSS inputs. Thus, GNSS RFI can affect multiple systems simultaneously, making it difficult for flight crew to identify the source of the problem.

Operational Considerations

2.17 As GNSS RFI may occur during any phase of flight, contingency procedures should consider:

a) phase-of-flight criticality;

b) available response time;

c) airspace complexity; and

d) availability of conventional navigation infrastructure.

2.18 Mitigation measures should prioritize:

a) prevention of interference sources where practicable;

b) system resilience through redundancy and alternative navigation capability; and

c) reactive operational measures to ensure continued safety of flight.

Policy and Strategic Considerations

2.19 The ICAO Fourteenth Air Navigation Conference (AN-Conf/14, Montreal, Canada, 26 August – 06 September 2024) *Recommendation 2.2/2*, urged States/Administrations to address GNSS RFI and contingency planning by maintaining sufficient conventional navigation infrastructure to ensure operational safety and airspace capacity during periods of satellite navigation disruption.

2.20 The ICAO APAC Radio Navigation Symposium (New Delhi, India, 7 – 9 April 2025) identified several recommendations relevant to RFI management. Key focus areas include:

a) improve coordination with the military;

b) monitor and geolocate the source of the GNSS RFI [consider using ADS-B Out (ground-based or space-based) or Wide Area Multilateration (WAM)];

c) prohibit the sale of GNSS jamming transmitters;

d) use standard radiotelephony phraseologies for specific RFI scenarios;

e) integrate GNSS RFI factors into contingency fuel and alternate planning;

f) maintain a Resilient Navigation Operational Network (RON) in the event of RFI;

g) consider space-based surveillance and evolution into Satellite Time Difference of Arrival (TDA) to mitigate GNSS RFI;

h) ensure flight crew maintain proficiency in conventional navigation methods;

i) ensure a full Inertial Reference System (IRS) alignment before departure;

j) provide comprehensive training and awareness programmes for controller and Air Traffic Safety Electronic Personnel (ATSEP);

k) consider GNSS RFI information exchange using NOTAM, Aeronautical Information Publication (AIP), and/or Automatic Terminal Information Service (ATIS), Electronic Flight Bags (EFB) and the International Air Transport Association's (IATA) Turbulence Aware platform;

l) enhance GNSS robustness with rapidly deployable Multi-Mode Receivers (MMR) and strategic system upgrades; and

m) achieve robust PNT with a comprehensive assessment of:

   i. cyber risk for all CNS and ATM systems; and

   ii. GNSS vulnerabilities, their impact on air, ground and space systems, and the maintenance of operational independence.

3. REFERENCES

3.1 ICAO Annexes and Documents:

a) ICAO Annex 6 – *Operation of Aircraft*;

b) ICAO Annex 10 – *Aeronautical Telecommunication*;

c) ICAO Annex 19 – *Safety Management*;

d) ICAO Doc 4444 – *Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)*;

e) ICAO Doc 9849 – *Global Navigation Satellite System (GNSS) Manual*;

f) ICAO Doc 10037 – *Global Operational Data Link Manual*;

g) ICAO Doc 10066 – *Procedures for Air Navigation Services – Aeronautical Information Management (PANS-AIM)*; and

h) ICAO Doc 10088 – *Manual on Civil-Military Cooperation in Air Traffic Management*.

3.2 ICAO Assembly Resolutions:

a) *Assembly Resolution A41-8, Appendix C: Ensuring the resilience of ICAO CNS/ATM systems and* services; and

b) *Assembly Resolution A42-4: Addressing risks to civil aviation arising from conflict zones*.

3.3 APANPIRG Conclusions/Decisions:

a) *APANPIRG Conclusion 27/36: Protection of GNSS Signal Against Jamming*.

3.4 Others:

a) ICAO State Letter AN 7/5-20/89 – *Strengthening of communications, navigation, and surveillance (CNS) systems resilience and mitigation of interference to global navigation satellite system (GNSS)*; and

b) ICAO Electronic Bulletin 2011/56 – *Interference to Global Navigation Satellite System (GNSS) Signals.*

3.5 Abbreviations:

ACI	Airports Council International
ADS-B	Automatic Dependent Surveillance – Broadcast
ADS-C	Automatic Dependent Surveillance – Contract
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
ANSP	Air Navigation Services Provider
APAC	Asia/Pacific
APNT	Alternative Position, Navigation and Timing
ASBU	Aviation Safety Block Upgrade
ATIS	Automatic Terminal Information Service

ATS	Air Traffic Services
ATSEP	Air Traffic Safety Electronic Personnel
CAA	Civil Aviation Authority
CFIT	Controlled Flight into Terrain
CNS	Communications, Navigation and Surveillance
CPDLC	Controller-Pilot Data Link Communications
DFMC	Dual-Frequency/Multi-Constellation
DME	Distance Measuring Equipment
ECAM	Electronic Centralized Aircraft Monitor
EFB	Electronic Flight Bag
EICAS	Engine Indicating and Crew Alerting System
ELT	Emergency Locator Transmitter
FCOM	Flight Crew Operating Manual
FIR	Flight Information Region
FMS	Flight Management System
GANP	Global Air Navigation Plan
GBAS	Ground Based Augmentation System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
HF	High Frequency
IATA	International Air Transport Association
IFALPA	International Federation of Airline Pilots' Associations
IFATCA	International Federation of Air Traffic Control Associations
ILS	Instrument Landing System
INS	Inertial Navigation System
IRS	Inertial Reference System
ITU	International Telecommunication Union
MEL	Minimum Equipment List
MFMC	Multi-Frequency Multi-Constellation
MLAT	Multilateration
MMR	Multi-Mode Receivers
MON	Minimum Operational Network
MOPS	Minimum Operational Performance Standards
OEM	Original Equipment Manufacturer
PANS	Procedures for Air Navigation Services
PBN	Performance-based Navigation

PNT	Positioning, Navigation and Timing
POC	Point of Contact
RAIM	Receiver Autonomous Integrity Monitoring
RFI	Radio Frequency Interference
RON	Resilient Navigation Operational Network
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SATCOM	Satellite Communication
SBAS	Satellite-Based Augmentation System
SIRRS	Satellite Interference Reporting and Resolution System
SMS	Safety Management System
TAWS	Terrain Awareness Warning System
TCAS	Traffic Alert and Collision Avoidance System
TDA	Time Difference of Arrival
UAS	Unmanned Aerial System
UTC	Coordinated Universal Time
VOR	VHF Omnidirectional Radio Range
WAM	Wide Area Multilateration

4. OVERVIEW

4.1 This document establishes a harmonized framework for the detection, reporting and management of GNSS RFI and its associated data link disruptions in the APAC region. It integrates operational, technical and regulatory perspectives to support timely mitigation of safety and operational impacts while maintaining consistency across States/Administrations and Air Navigation Service Providers (ANSPs).

4.2 This document promotes a structured and consistent approach to:

a) timely reporting of suspected GNSS RFI and its associated data link disruption events;

b) coordinated operational response to mitigate safety impacts;

c) systematic information sharing among civil aviation stakeholders; and

d) enhancement of regional situational awareness and resilience.

4.3 The framework operates across three layers:

a) operational layer, covering real-time flight crew reporting, controller response, and tactical mitigation;

b) national layer, encompassing technical validation, post-flight reporting, and coordination among ANSPs, Civil Aviation Authorities (CAAs), and aircraft operators; and

c) regional layer, which addresses cross-Flight Information Region (FIR) coordination, harmonized reporting, and engagement with the ICAO APAC Regional Office for interference events with impact to multiple States/Administrations.

4.4 Both tactical and pre-tactical reporting, along with standardized phraseology and structured workflows, ensure consistent situational awareness and risk mitigation.

4.5 By providing an integrated approach to detection, operational response, investigation, regional coordination, and trend monitoring, this framework strengthens resilience to GNSS and data link disruptions. It promotes transparency, enables rapid mitigation measures, and supports long-term planning to preserve the safety, continuity, and efficiency of civil aviation operations across the APAC region.

5. ROLES AND RESPONSIBILITIES

Overview

5.1 Effective management of GNSS RFI requires coordinated action at international, regional, national and operational levels. The following roles and responsibilities support a harmonized APAC region framework.

International Civil Aviation Organization (ICAO)

5.2 ICAO plays a central role in the global coordination of GNSS RFI resilience and mitigation.

5.3 ICAO should:

a) develop and promulgate international SARPs, PANS and guidance material addressing GNSS RFI, including updates to relevant documents such as ICAO Annex 10 and ICAO Doc 9849, to support States/Administrations in mitigating its safety and operational impacts;

b) coordinate expert groups dedicated to the development of standards and long-term resilience measures, including work on Alternative Position, Navigation and Timing (APNT), spectrum protection, and system robustness;

c) promote global awareness of GNSS RFI risks and highlight that such interference is expected to persist, thereby encouraging States/Administrations to strengthen monitoring and resilience measures;

d) facilitate coordination where GNSS RFI events have cross-FIR implications and cannot be resolved by individual States/Administrations, including engagement under International Telecommunication Union (ITU) radio regulations procedures; and

e) review the standardized radiotelephony phraseologies in ICAO Doc 4444 to ensure relevancy for GNSS RFI scenarios, and propose new phraseologies for inclusion where gaps, which may require additional phraseologies to be added, are identified.

States/Administrations and CAAs

5.4 States/Administrations retain overall responsibility for ensuring the safety of civil aviation within their airspace.

5.5 States/Administrations, through their CAAs, should:

a) establish regulatory frameworks to address GNSS RFI mitigation and resilience;

b) monitor, assess, and report GNSS RFI events within their airspace, and collaborate with ANSPs and international counterparts to mitigate operational impacts;

c) issue operational advisories and contingency instructions to airspace users when GNSS RFI affects navigation performance or system integrity;

d) report to and coordinate with national spectrum and telecommunications regulators to investigate interference sources and provide relevant information to ICAO for regional and global situational awareness;

e) coordinate with military authorities regarding activities potentially hazardous to civil aviation, including the use of GNSS jammers during exercise or operations; and

f) include appropriate reporting provisions in the AIP, including procedures related to GNSS loss of capability.

5.6 Based on the State's/Administration's arrangement, these responsibilities may also be handled by the ANSP.

ANSPs

5.7 ANSPs are responsible for maintaining safe and orderly air traffic services during GNSS RFI and its associated data link disruptions.

5.8 ANSPs should:

a) strengthen navigation aid resilience, particularly when implementing rationalization under the MON concept;

b) conduct risk assessments addressing potential impacts of GNSS RFI on navigation, surveillance and timing systems, including ADS-B and other GNSS-dependent services;

c) establish procedures to identify, assess and minimize GNSS RFI sources in coordination with regulators and law enforcement authorities;

d) coordinate with adjacent FIRs to ensure consistent handling of interference events across boundaries;

e) disseminate GNSS RFI events and information via appropriate notification channels as described in Chapter 10 of this document;

f) develop contingency procedures to mitigate the effects of GNSS RFI, including fallback surveillance and communication measures; and

g) implement GNSS RFI awareness training for operational and technical personnel.

ATS Units

5.9 ATS units should:

a) monitor flight crew reports and correlate them with other situational data to validate potential GNSS RFI and its associated data link disruptions;

b) provide immediate operational instructions to affected aircraft, including radar vectors, position verification, altitude confirmation, and fallback communications procedures;

c) coordinate with adjacent ATS units to ensure continuity of service and consistent handling of anomalies across FIR boundaries;

d) submit notifications or reports through existing national and ICAO-compliant mechanisms, ensuring no duplication of reporting pathways; and

e) support information flow to relevant ANSP CNS units for technical investigation and analysis.

CNS Units

5.10 CNS units should:

a) coordinate with ATS units and/or relevant monitoring units, where applicable to assess operational impacts, investigate potential root causes, and ensure accurate documentation of the event;

b) report significant disruptions to the national level ATM POC in a timely and standardized manner; and

c) if applicable, report GNSS RFI events to national spectrum and telecommunications regulators to investigate interference sources.

AIS/Aeronautical Information Management (AIM) Unit

5.11 AIS/AIM units should:

a) publish aeronautical information appropriately and in a timely manner upon receiving a request from originator, concerning GNSS RFI and associated data link failure;

b) ensure that publications are timely, accurate and operationally relevant; and

c) coordinate with ATS, CNS and regulatory authorities prior to publication, as required by national procedures.

Aircraft Operators

5.12 Aircraft operators are responsible for assessing operational risks associated with GNSS RFI and ensuring appropriate mitigation measures are implemented.

5.13 Aircraft operators should:

a) establish mechanisms to receive current GNSS RFI information, including regulatory advisories, ICAO guidance, industry briefings and NOTAMs;

b) conduct safety assessments addressing risks associated with degradation or loss of GNSS-dependent systems;

c) coordinate with Original Equipment Manufacturers (OEMs) to understand aircraft-specific impacts of GNSS RFI events;

d) develop and maintain contingency procedures addressing GNSS RFI and associated data link disruptions;

e) ensure flight planning considers availability of conventional navigation aids and suitable alternate procedures;

f) brief flight crews and operational control personnel on ongoing GNSS RFI events and associated operational considerations;

g) conduct GNSS RFI awareness training for flight operations, dispatch and maintenance personnel; and

h) analyze reported GNSS RFI events to support internal safety management and State/Administration-level reporting.

Flight Crew

5.14 Flight crew should:

a) timely recognise and verify potential GNSS degradation, navigation anomalies, or ADS-C/Controller-Pilot Data Link Communications (CPDLC) performance issues;

b) report anomalies to ATS units using established procedures, including voice communication where data link performance is degraded;

c) execute operational contingency procedures, such as reverting to conventional navigation or surveillance methods as required; and

d) document post-flight reports in accordance with operator procedures to support trend analysis and State/Administration-level safety assessments.

Aerodrome Operators

5.15 Aerodrome operators should:

a) submit requests to the AIS/AIM unit for the publication of aeronautical information related to aerodrome facilities affected by GNSS RFI;

b) maintain reliable communication and coordination with ATS units, CNS units, aircraft operators, and relevant authorities;

c) as applicable, implement or otherwise support aerodrome radio frequency management measures to mitigate the risk of local radio frequency interference, including the identification, control, or elimination of potential radio frequency emitters located within aerodrome boundaries;

d) in the event of persistent interference, facilitate or otherwise support (as applicable) radio frequency spectrum surveys, site inspections, or technical investigations in coordination with the CAA and/or the ANSP, in accordance with applicable national regulatory requirements;

e) participate in post-event reviews by providing relevant ground-based system logs, maintenance data, and local observations to support safety investigation, analysis, and root-cause identification; and

f) monitor trends in GNSS RFI-related occurrences, incorporating relevant findings into airport safety committee deliberations, Safety Management System (SMS) reporting processes, and corrective action tracking mechanisms to support continuous safety improvement in close coordination with the CAA.

6. DETECTION OF GNSS RFI EVENTS

Overview

6.1 Detection of GNSS RFI events relies on a combination of technical monitoring systems, operational observations, and aircraft reports. Timely detection is critical given the density of international operations and the extensive reliance on GNSS for navigation, surveillance, and data link enabled ATM services.

6.2 GNSS RFI events may be detected through the following sources:

a) ground-based GNSS monitoring networks and reference stations;

b) ATM system alerts indicating degradation of dependent services (e.g. ADS-B, ADS-C, CPDLC). Depending on the ATM system in use, controllers may be alerted by, but not limited to, the following:

   i. degradations in RNP due to overdue position reports or low figure of merit values;

   ii. discarded downlinks with time stamps indicating that they were sent after they were received;

   iii. aircraft inability to remain connected to CPDLC; and

   iv. ADS-B position gaps, inconsistencies or jumps.

c) flight crew reports of navigation or data link abnormalities. Reports may include, but are not limited to:

   i. GNSS failure message;

   ii. ADS-B failure/warning;

   iii. Ground Proximity Warning System (GPWS) caution or failure message;

   iv. loss of Satellite Communication (SATCOM);

   v. loss of synthetic vision system;

   vi. rapid actual navigation performance value increase;

   vii. GNSS position and IRS or FMS “Position Disagree” caution message; and

   viii. unexpected change in aircraft clock time.

d) ANSP operational observations, including loss of surveillance fidelity or unexpected system behaviour.

6.3 Early detection enables rapid coordination, mitigation, and accurate reporting to regional and global stakeholders.

Recognition of GNSS RFI

6.4 GNSS RFI should be recognized when abnormal GNSS performance is observed that is inconsistent with known system outages or expected propagation effects. GNSS RFI may be intentional or unintentional and may manifest as jamming or spoofing.

6.5 Common indicators of GNSS RFI include:

a) sudden or intermittent loss of GNSS position, velocity, or time information;

b) degradation of navigation accuracy, integrity, or availability without prior notice;

c) simultaneous GNSS performance issues reported by multiple aircraft or ground systems within a defined geographic area;

d) GNSS receiver alerts indicating signal interference, loss of lock, or integrity warnings; and

e) correlated degradation across multiple GNSS-dependent services (e.g. PBN operations, ADS-B).

Note: recognition should be based on pattern analysis rather than single-source observations.

<u>Recognition of Data Link Disruption due to GNSS RFI</u>

6.6 Data link disruptions attributable to GNSS RFI should be recognized when CPDLC, ADS-C, or related services are disrupted in a manner that correlates temporally and geographically with GNSS performance issues.

6.7 Common indicators include:

a) loss or degradation of ADS-C position reporting coincident with GNSS anomalies, such as:

   i. position reports overdue

   ii. degraded figure of merit values;

b) CPDLC message failures, delays, or abnormal session terminations linked to GNSS-derived position or time dependencies;

c) inconsistencies between primary and backup communication or surveillance systems; and

d) concurrent reports from aircraft indicating both navigation performance degradation and data link disruption.

6.8 It is essential to distinguish GNSS associated data link disruptions from network or service provider outages, aircraft avionics failures, or procedural and human factors issues.

<u>Classification of GNSS RFI Events</u>

6.9 Once detected and recognized, GNSS RFI and its associated data link anomalies should be classified to support appropriate coordination, reporting, and mitigation actions. Initial classification should be operationally focused and may be refined as additional information becomes available.

6.10 Recommended classification dimensions include:

a) type of GNSS RFI events:

   i. GNSS interference (jamming);

   ii. GNSS signal manipulation (suspected spoofing);

   iii. GNSS signal degradation or loss (cause undetermined);

   iv. GNSS associated data link disruption; and

   v. combined GNSS and data link impact.

b) scope and impact:

   i. single aircraft;

   ii. multiple aircraft;

iii. sector-wide;

iv. airport-wide;

v. FIR-wide or cross-FIR; and

vi. regional or cross-regional.

c) severity (operational impact):

i. Minor: no impact to safety or service continuity;

ii. Moderate: degraded operations requiring procedural mitigation;

iii. Significant: loss of services requiring contingency procedures; and

iv. Severe: safety-critical impact or widespread disruption.

d) confidence level:

i. confirmed;

ii. suspected; or

iii. under investigation.

6.11 Initial classification should prioritize operational decision-making and information sharing rather than definitive technical attribution.

7. STANDARDIZED OPERATIONAL REPORTING MECHANISMS

Overview

7.1 Effective management of GNSS RFI and its associated data link disruptions requires timely operational reporting, structured controller response, and coordinated information dissemination. Procedures related to GNSS RFI should be published in the AIP as follows:

a) where procedures describe actions to be taken by flight crew during GNSS or data link disruption that directly affect the conduct of flight, the most appropriate location is section ENR 1.1; and

b) where additional detail is required regarding formal reporting mechanisms, post-event notification process, or coordination channel with ATS unit or relevant authorities, a reference may be included in section ENR 1.14.

Reporting Procedures by Flight Crew to Controller

7.2 Flight crew encountering GNSS RFI and its associated data link disruptions should, as soon as practicable, report the occurrence to the appropriate ATS unit using the applicable air-ground communication frequency. This reporting is vital if it is a previously unidentified area of RFI, to facilitate the rapid dissemination of safety-critical information to other aircraft operating within the affected area.

7.3 Flight crew should, as soon as practicable, report to the appropriate ATS unit upon the occurrence of any operational anomaly or system degradation consistent with the indicators described in Chapter 6 of this document. Reporting should be conducted in accordance with the provisions in ICAO Doc 4444 Chapter 12 and ICAO Annex 10 Volumes I and II.

GNSS RFI

7.4 Flight crews should report any suspected or confirmed GNSS degradation, denial, or interference, including but not limited to:

a) total or partial loss of GNSS signals reception impacting navigation accuracy;

b) anomalies impacting navigation precision or surveillance integrity (e.g. ADS-B positional integrity); or

c) disruption of time synchronisation services critical to flight operations.

GNSS RFI Associated Impacts

7.5 For GNSS RFI associated data link disruption, flight crew should notify controller of the occurrence in accordance with the ICAO Doc 10037.

7.6 For GNSS RFI associated navigation performance degradation, flight crew shall notify controller of any loss of RNP or inability to comply with the navigation specification in accordance with ICAO Doc 9613.

Safety-Significant Operational Impact

7.7 Flight crew should report any GNSS RFI event where system degradation directly necessitates a change in flight profile or tactical execution, specifically, but not limited to:

a) any event resulting in the inability to execute published instrument flight procedures;

b) execution of a missed approach or go-around due to navigation guidance loss; or

c) requiring reversion from PBN to conventional navigation methods [e.g. VHF Omnidirectional Radio Range (VOR), Distance Measuring Equipment (DME) and Instrument Landing System (ILS)].

7.8 Radiotelephony phraseology examples are as follows:

Event	**Phraseology**
GNSS RFI experienced	BASIC GNSS UNAVAILABLE [DUE TO (*reason, e.g.* LOSS OF RAIM *or* RAIM ALERT)] e.g. BASIC GNSS UNAVAILABLE DUE TO GNSS JAMMING BASIC GNSS UNAVAILABLE DUE TO GNSS SPOOFING BASIC GNSS UNAVAILABLE DUE TO INTERFERENCE

Note: As there is currently no standard phraseology for flight crew to advise controller that GNSS RFI is no longer present, flight crew may convey this using one of the following:

a) GNSS JAMMING NO LONGER EXPERIENCED; or

b) GNSS SPOOFING NO LONGER EXPERIENCED; or

c) GNSS INTERFERENCE NO LONGER EXPERIENCED.

7.9 Flight crew should, as soon as practicable, relay the following minimum information to controller at the time the anomaly is observed:

a) aircraft callsign;

b) time of occurrence in Coordinated Universal Time (UTC); and

c) approximate position (latitude/longitude, fix, radial/distance, or segment of ATS route).

7.10 Flight crew is required to communicate the following supplemental information to controller when it is practicable to do so:

a) nature of anomaly (GNSS, CPDLC, ADS-C, ADS-B);

b) operational impact (unable RNAV/RNP, rerouting needed, reverting to voice, surveillance affected);

c) any assistance required; and/or

d) any attempted mitigation (switch to DME/VOR, inertial navigation, reversionary procedures).

Sequence of Actions to be Taken by ATS Unit

7.11 Upon receipt of a GNSS RFI report from flight crew, the ATS unit should first acknowledge the report and initiate tactical operational mitigation.

7.12 The ATS unit should concurrently forward the report to the appropriate ANSP CNS unit for investigation and analysis of the situation. This phase ensures that immediate safety measures are applied while investigation and analysis are being conducted.

7.13 Following the initial assessment and controller acknowledgement, the ATS unit should monitor the affected airspace for further reports. If no further instances are reported, the process moves directly to recording the information. In the event of repeated occurrences, the ATS unit should notify all related stakeholders, including adjacent ATS units/ANSPs and aircraft operators. This notification is a precursor to the formal issuance of a NOTAM to alert all affected airspace users.

7.14 If the GNSS RFI is determined to be persistent, the ATS unit should coordinate the issuance of a NOTAM to officially promulgate the hazard information to all airspace users. Once a NOTAM has been issued, the ATS unit should continue to monitor for further recurrence to assess whether there is a need to extend the NOTAM validity should the occurrence prolong or cancel the NOTAM and resume normal operation should there be no recurrence reported.

7.15 The ATS unit should record all pertinent information received and file a formal report in accordance with applicable national regulatory requirements, to document the event and its resolution.

7.16 A comprehensive workflow chart for the ATS unit action in handling GNSS RFI real-time reporting can be found in **Appendix 1**.

Post-Flight Reporting

7.17 Aircraft operators should submit a Post-Flight Reporting Form (see sample template in **Appendix 2**) following any GNSS RFI event, as follows:

Item / Elements	**Details**
Submission Timeline	Within 48 hours of the event, or as soon as practicable in the case of a safety-significant occurrence.
Reporting Channels	CAA occurrence reporting system, or any applicable reporting medium, is available for use.
Purpose	To support occurrence investigation, trend analysis, and coordination of operational, technical, and regulatory mitigation measures.

7.18 The following data elements should be collected consistently by the State/Administration to enable effective investigation, analysis, and trend monitoring:

Elements	**Details**
Aircraft Identification	Callsign, aircraft registration, aircraft type and operator.
Flight Details	Flight number, origin and destination aerodromes, ATS route or segment, cleared level and speed
Time and Position	time (in UTC) of onset and cessation; aircraft position (latitude/longitude or fix), altitude/flight level, and phase of flight.
Symptoms / Operational Impacts	Examples: loss or degradation of navigation guidance; RAIM alerts; “GPS PRIMARY LOST” indications; inability to conduct RNAV/RNP operations; CPDLC uplink/downlink failures; ADS-C contract drops; ADS-B degradation; timing or synchronization anomalies.
Duration / Intermittency	Event characterization (single, intermittent, or continuous), including start and end times.

Elements	Details
Mitigations Applied	Reversion to conventional navigation aids; radar vectoring; speed and/or altitude changes; procedural or route amendments.
Operational Consequences	Route deviations, delays, go-around events, activation of contingency procedures, or any loss of separation risk (if applicable).
Unit and Contacts	ATS unit, controller identifier (where permitted), and FIR contact point.
Weather / Environmental Context	Relevant meteorological or environmental conditions, including known solar activity, thunderstorms, military activity, or observed RF sources.
Equipment Details (if available)	FMS make and model; GNSS receiver type; software/Software Control Number version; data link media (SATCOM, VHF, HF) and service provider; antenna configuration where relevant.
Attachments / Logs (if available)	Supporting evidence such as FMS screenshots, maintenance log references, ACARS or CPDLC log extracts, and recorded alerts or messages.

7.19 States/Administrations shall apply applicable national and operator data-protection policies in accordance with ICAO Annex 19, ensuring a non-punitive safety reporting environment and the appropriate protection of personal identifiers.

7.20 GNSS RFI event reports should be processed in accordance with the reporting workflow outlined in **Appendix 3**.

Aerodrome Operator Engagement

7.21 To enhance aerodrome-level situational awareness, timely dissemination of operational advisories to airspace users is needed to support effective management of the local radio frequency environment, particularly where GNSS RFI may impact aerodrome safety or efficiency.

7.22 Aircraft operators should submit a report of any GNSS RFI incidents occurring within the vicinity of an aerodrome to the relevant aerodrome operator via an established reporting platform or any applicable reporting procedures.

7.23 The aerodrome operator should establish procedures to promulgate airside advisories internally, ensuring operational awareness among key aerodrome stakeholders.

Original Equipment Manufacturer (OEM) Engagement

7.24 Close coordination and strategic engagement with aircraft and equipment OEMs are crucial to enable targeted technical diagnostics and effective corrective actions. This coordination ensures alignment with applicable manufacturer notifications, such as Service Bulletins and Service Letters regarding effects of GNSS RFI events.

7.25 Engagement with OEMs should be initiated upon the identification of any of the following conditions:

a) recurrent anomalies affecting specific aircraft fleets, avionics types, or equipment configurations;

b) suspected defects in avionics software, firmware, or system configuration impacting GNSS, data link, or surveillance performance; or

c) complex or safety significant events requiring specialist engineering analysis or manufacturer-level support.

8. INVESTIGATION AND ANALYSIS PROCEDURES

Overview

8.1 Once immediate safety is assured and initial reports are received, the investigation and analysis will need to be carried out to establish the source and scope, assess the safety impact, and apply applicable mitigations. The following provisions describe some of the investigation and analysis procedures.

ANSP CNS Unit Actions

8.2 There are different levels of investigation and analysis that may be carried out by ANSP CNS units. These range from use of existing information already available to the ANSP to do basic investigation and analysis to advanced detection capabilities. States/Administrations can determine the appropriate level of investigation and analysis capabilities of the ANSP CNS unit to ensure safe operations.

8.3 Basic investigation and analysis of GNSS RFI events may be conducted through monitoring of systems dependent on GNSS (e.g. ADS-B). ADS-B messages contain multiple data fields [e.g. Navigation Uncertainty Category – Position (NUCp), Navigation Integrity Category (NIC), Navigation Accuracy Category for Position (NACp), Source Integrity Level (SIL), Figure of Merit (FOM)], which indicates the integrity and accuracy of the position message. When the ADS-B messages from multiple aircraft demonstrate low values for these data fields, it will indicate a possible GNSS RFI event and the area affected can be derived from when the ADS-B messages first show signs of degradation. A rough location of the source of interference may then be determined.

8.4 ANSP CNS units may also, if applicable, coordinate with the national spectrum and telecommunications regulators to explore deploying direction finders to detect and locate GNSS RFI sources. These employ various techniques like using time difference of arrival from multiple signals to then triangulate the location of the source with greater precision.

Operational Risk Assessment

8.5 Based on the investigation and analysis results of the GNSS RFI event, ANSPs should conduct an operational risk assessment to determine the effects and necessary mitigations based on the likelihood and severity of the identified scenario.

8.6 Once the appropriate required mitigations have been identified, ANSPs should begin coordination and notification processes to raise awareness of all stakeholders on the ongoing event as well as monitoring for trends and incorporating lessons learnt into training syllabus which will be covered in the later chapters.

8.7 IATA has published *Global Navigation Satellite System (GNSS) Radio Frequency Interference Safety Risk Assessment* for use by airlines and included in-part in Chapter 11 of this document.

9. REGIONAL COORDINATION FRAMEWORK

Overview

9.1 Addressing GNSS RFI that transcends national borders requires a multi-lateral approach involving diplomacy, data synchronization, and cross-border regulatory enforcement. Given the proliferation of interference, States/Administrations must recognize that GNSS RFI may impact neighbouring regions across national borders. In such instances, the regional coordination framework detailed in this Chapter can be used as a guidance on the communication channels and POCs for the coordination.

Establishment of Formal Communication Channels

9.2 Effective mitigation relies on pre-emptive coordination rather than reactive measures. States/Administrations should establish formal communication protocols to ensure any RFI events are promptly coordinated and communicated.

9.3 Each State/Administration should designate operational and technical POCs for GNSS-related matters at both:

a) ATS unit level; and

b) national level (ATM POC).

9.4 These POCs should be:

a) codified in bilateral or multilateral Letters of Agreement (LoA);

b) maintained in an up-to-date regional contact directory; and

c) reviewed and updated annually through ATM/SG meetings to ensure effective coordination and information exchange.

9.5 ATS unit level POCs are designated to coordinate and implement operational measures arising from unforeseen events. Having direct communication links or "hotlines" can facilitate immediate tactical responses, such as traffic rerouting or increasing separation minima.

9.6 National level ATM POCs are responsible for coordinating planned RFI activities to ensure that aviation risks are minimized through prior notification. For ease of having an up-to-date regional contact directory, these national level ATM POCs will be based on the list of ATM POCs (i.e. ATC = Air Traffic Control), as reviewed and updated annually through ATM/SG by ICAO APAC Regional Office.

9.7 In the event that coordination with the designated national level ATM POC cannot be established, the ICAO APAC Regional Office should be notified to facilitate the resolution of GNSS RFI and to mitigate potential safety risks.

Harmonized Regional Coordination

9.8 To support development of a comprehensive regional database of GNSS RFI hot spots, there will be a need for information to be shared and coordinated within the region and should be structured at two distinct levels: pre-tactical and tactical.

9.9 Pre-tactical coordination:

a) pre-tactical coordination supports trend analysis, risk assessment and flight planning considerations;

b) utilizing the standardized reporting mechanisms in Chapter 7, the collation of historical RFI data aids in trend analysis (as detailed in Chapter 8) and supports the identification of geographical areas of concern and commonly reported operational effects to inform the development of mitigation priorities;

c) the resulting regional information may assist aircraft operators in incorporating GNSS RFI awareness into flight planning, navigation contingency and backup considerations, alternate routing where practicable, and flight crew briefings regarding the potential operational effects of GNSS RFI; and

d) in addition, the resulting regional information may enhance ATS unit situational awareness of areas where aircraft may experience loss, degradation, or failure of surveillance or navigation signal transmission, such as ADS-B which could result in incorrect information being displayed to them. Improved awareness supports timely operational responses and reduces the risk of airspace infringements and/or unintended route deviations.

9.10 Tactical coordination:

a) for known or scheduled military electronic warfare training or security operations RFI events, NOTAMs must be disseminated using the harmonized format specified in Chapter 10. Clear, standardized NOTAMs reduce flight crew workload and mitigate the stress associated with sudden system degradations.

9.11 Cross-border notification and procedures:

a) a structured three-phase approach is recommended for managing inter-State RFI events with the flow diagram in **Appendix 4**:

Coordination with ICAO APAC

9.12 States/Administrations should provide consolidated GNSS RFI occurrence reports to the ICAO APAC Regional Office on a semi-annual basis. The regional data collection and analysis process is outlined below:

Phase	**Step**	**Responsible Party**	**Action / Deliverable**	**Timeline**
1. Data Collection and Processing	1.1 Occurrence Reporting	Operators and ANSPs	Operational occurrences reported to the State authority	Real-time / per occurrence
	1.2 State Data Consolidation	National level ATM POC	Consolidation and submission of occurrence data to the ICAO APAC Regional Office	Semi-annually, prior to APRAST meetings
	1.3 Regional Data Consolidation	ICAO Secretariat	Consolidation of regional data and dissemination to relevant working groups	Within 30 days following data submission

Phase	Step	Responsible Party	Action / Deliverable	Timeline
2. Data Analysis and Prioritization	2.1 Safety Risk Assessment	OPS WG and CNS SG	Assessment of operational safety impacts, identification of areas of concern, and prioritization of associated regional safety risks	Conducted through intersessional coordination activities and APRAST meetings
3. Consultation and Regional Action	3.1 Joint Review and Action Planning	OPS WG and CNS SG	Joint review of findings and agreement on appropriate regional actions	Following APRAST meetings
	3.2 Mitigation Measures	OPS WG and CNS SG	Development of operational guidance material, including Regional Aviation Safety Group – Asia Pacific (RASG-APAC) Safety Advisories (RSAs), as appropriate	Prior to RASG-APAC meetings
		OPS WG and CNS SG	Consideration of immediate mitigation measures, including State Letters or other urgent coordination actions, where necessary	As required
4. Progress Reporting	4.1 Outcome Reporting	OPS WG and CNS SG	Reporting of progress, analysis outcomes, and mitigation activities to APANPIRG and RASG-APAC	Through appropriate APANPIRG/RASG-APAC meetings

10. NOTIFICATION OF GNSS RFI EVENTS

GNSS RFI Notifications Mechanism

10.1 This Chapter documents the various notification mechanisms for dissemination of GNSS RFI events. ATS units should select the most efficient means to ensure rapid dissemination of information to all stakeholders as appropriate. These include:

a) **broadcast over VHF**, direct broadcast over the current means of communication established with aircraft in the affected area. This means is for fast and efficient outreach to aircraft already in the affected area but less sustainable for prolonged events;

b) **publication of NOTAM**, coordinate with AIS unit to publish a NOTAM for GNSS RFI event (both planned and unplanned) with short notice. This means will provide advance notice to aircraft about to enter affected areas and allow for mitigating actions such as rerouting or configuration of aircraft to exclude GNSS inputs, if applicable, to be taken; and/or

c) **broadcast on ATIS**, inclusion of information of GNSS RFI events in ATIS broadcast and D-ATIS, where applicable. This means is particularly effective for events occurring in the vicinity of aerodromes as it would ensure aircraft departing and arriving would receive updated information to apply mitigating measures prior to entering the affected area.

10.2 While there are many means of notification available, it is important to determine the appropriate notification mechanism to ensure that information is promptly conveyed to the relevant stakeholders without unnecessary workload. States/Administrations may consider referencing the following decision matrix framework to develop the appropriate notification framework that best suits their environment.

Area Affected	Notification Mechanism
Enroute	NOTAM and through ATS unit over VHF
Terminal Control Area	NOTAM and ATIS
Approach	NOTAM and ATIS
Aerodrome	NOTAM and ATIS

10.3 ATS units should also develop their own criteria for the trigger of notification to airspace users considering the following:

a) impact to provision of ATS (i.e. results in changes to the level of service provided);

b) impact to safety of airspace users (i.e. close proximity to airports and approach paths);

c) severity of the occurrence (i.e. large volume of airspace that crosses FIR); and

d) number of airspace users impacted (i.e. small number or all aircraft affected).

GNSS RFI Notification through ATS Units over VHF

10.4 For unplanned GNSS RFI events, aircraft already in the affected area will need to be notified through the ATS units over VHF. Radiotelephony phraseology examples are as follows:

Event	Phraseology
GNSS RFI experienced	GNSS REPORTED UNRELIABLE (*or* GNSS MAY NOT BE AVAILABLE [DUE TO INTERFERENCE]) IN THE VICINITY OF *(location)(radius)* [BETWEEN *(levels)*] e.g. GNSS REPORTED UNRELIABLE DUE TO GNSS JAMMING IN THE VICINITY OF {WAYPOINT}
	GNSS REPORTED UNRELIABLE (*or* GNSS MAY NOT BE AVAILABLE [DUE TO INTERFERENCE]) IN THE AREA OF *(description)* (or IN *(name)* FIR) [BETWEEN *(levels)*]

Note: As there is currently no standard phraseology for flight crew to advise controller that GNSS RFI is no longer present, flight crew may convey this using one of the following:

a) GNSS NO LONGER UNRELIABLE; or

b) GNSS NOW AVAILABLE.

GNSS RFI Notification through NOTAMs

10.5 Currently, the ICAO Navigation Systems Panel has proposed standardized NOTAM codes for GNSS RFI events to differentiate between GNSS jamming or spoofing. This will allow aircraft operators to create effective filtering mechanisms to identify NOTAMs for information related to GNSS RFI events.

10.6 Key elements that should be standardized include:

a) use of Q code:

i. QGWLF for jamming; or

ii. a new code that is being developed for spoofing.

b) use of one of the following templates for Item E for GNSS jamming:

i. GNSS MAY BE UNRELIABLE WITHIN THE VICINITY OF {WAYPOINT};

ii. GNSS MAY BE UNRELIABLE WITHIN THE VICINITY OF {AERODROME}; or

iii. GNSS MAY BE UNRELIABLE WITHIN THE AREA OF (description) (or IN (name) FIR) [BETWEEN (levels)].

c) use of one of the following templates for Item E for GNSS spoofing:

i. GNSS MAY BE MISLEADING WITHIN THE VICINITY OF {WAYPOINT};

ii. GNSS MAY BE MISLEADING WITHIN THE VICINITY OF {AERODROME}; or

iii. GNSS MAY BE MISLEADING WITHIN THE AREA OF (description) (or IN (name) FIR) [BETWEEN (levels)].

d) inclusion of instruction for flight crew to report when no longer experiencing GNSS RFI within the area published in the NOTAM for ATS units to follow up with NOTAM cancellation:

i. FLIGHT CREW TO REPORT IF GNSS INTERFERENCE NO LONGER EXPERIENCED.

e) Sample NOTAM for GNSS signal that is currently subject to jamming interference:

A1311/26 NOTAMN

Q) EACC/QGWLF/I/NBO/AE/000/999/5222N03155W250

A) EADD B) 2611131215 C) 2611132359EST

E) GNSS MAY BE UNRELIABLE WITHIN … FLIGHT CREW TO REPORT IF GNSS INTERFERENCE NO LONGER EXPERIENCED

10.7 Besides the above NOTAM template to raise awareness on the GNSS RFI event, States/Administrations should also separately assess the consequential impact and publish separate NOTAMs for the suspension of services and procedures as appropriate [e.g. suspension of ADS-B services, suspension of free-route airspace/direct routing operations, suspension of CPDLC services, unavailability of RNAV(GNSS) approaches].

<u>GNSS RFI Notification through ATIS</u>

10.8 For GNSS RFI events in the vicinity of aerodrome, ATS units should consider appending information of the GNSS RFI event in the ATIS broadcast and D-ATIS using the following suggested broadcast phrasing:

a) GNSS MAY BE UNRELIABLE WITHIN THE VICINITY OF {AERODROME}; or

b) GNSS MAY BE MISLEADING WITHIN THE VICINITY OF {AERODROME}.

10.9 Similarly, additional information on the suspension of affected approaches should be included as well as the expected alternative procedures.

11. TRAINING REQUIREMENTS

Flight Crew

11.1 Learning:

a) recognize the precursors/threats:

Precursors	Description
Jamming	Locally generated RFI is used to "drown out" satellite signals. Possible sources: personal privacy devices, television broadcast station malfunction, and military RFI.
Spoofing	Counterfeit GNSS signals are broadcast and decoded by airborne receivers, resulting in a false position displayed in the cockpit and used by avionics. (Position Manipulation)
Solar Storms	Electromagnetic interference from space weather events such as solar flares "drowns out" the GNSS satellite signals.
Signal Reflection	Reflection and/or refraction of GNSS signals due to objects such as buildings or ionospheric scintillation

b) understanding the possible consequences/impacts:

Systems Affected/Potential Accident Scenarios		CFIT	Midair Collisions	Runway Excursion
Navigation	Downgraded aircraft position computation. GPS (loss of GPS primary)	X		
	Loss of FMS Landing System, GBAS Landing System, SBAS Landing System deviations, and loss of RNP and RNAV capability	X		
	Abnormal differences between ground speed and true airspeed	X		
Surveillance	Loss of Terrain Awareness Warning System (TAWS) Undue TAWS Alerts false "Pull up" calls (or no calls)	X		
	Terrain display shift on Navigation Display	X		
	Loss of ADS-B Out Reporting False ADS-B Out Position Reporting		X	
	Loss of TCAS		X	
Communication	Loss of CPDLC and SATCOM		X	
Others	Loss of Runway Overrun Prevention System or Runway Situation Awareness Tools			X

11.2 Flight planning:

a) checking NOTAMs for information on known or expected GNSS RFI (potential RFI map highlighting possible areas);

b) checking the availability of non-GNSS-based routes, procedures, and approaches (ILS, VOR, and DME); and

c) consider limitations caused by inoperative radio navigation systems to operate in GNSS RFI-affected areas.

11.3 Training for in-flight:

a) communication protocol as per ICAO or other recommended radiotelephony phraseology;

b) determining the start and end of GNSS RFI to react accordingly;

c) reinforce actions taken for Electronic Centralized Aircraft Monitor (ECAM) / Engine Indicating and Crew Alerting System (EICAS) reports and Flight Crew Operating Manual (FCOM), or supplemental procedures for loss of GNSS;

d) guidance from aircraft OEMs on flight deck effects and corresponding actions;

e) plan for rapid transitioning from GNSS to alternative navigation methods; and

f) explore the feasibility of using non installed spoofing detector and EFB to enhance situational awareness of the crew.

11.4 Post-flight:

a) technical report in the maintenance logbook in case any cockpit effects related to GNSS RFI are experienced;

b) establish maintenance/operations feedback after troubleshooting GNSS RFI reports;

c) report any suspected GNSS RFI events to relevant regional and international organizations (e.g. IATA, ANSPs); and

d) when GNSS RFI events have been experienced, aircraft data should be sent to OEMs for further investigation.

11.5 Future fitments:

a) training for mitigation of GNSS RFI onboard: development of Dual-Frequency/Multi-Constellation (DFMC) and Multi-Frequency Multi-Constellation (MFMC) receivers and Minimum Operational Performance Standards (MOPS).

<u>ATS Units</u>

11.6 Learning through briefings and reference to case studies:

a) recognition of GNSS RFI events;

Event	**Signs**
Jamming	Loss of surveillance tracks in ADS-B only environment Reversion to ADS-C tracks
Spoofing	Sudden appearance and disappearance of surveillance tracks in ADS-B only environment Surveillance tracks that do not comply with their flight plan route

b) understanding the impact to service provision; and

Services	**Impact**
ADS-B	Loss of surveillance tracks in ADS-B only environment. Potential reversion to procedural separation.
ADS-C	Loss of Data Link connection ADS-C tracks with low Figure of Merits ADS-C tracks with inaccurate position Potential reversion to traditional longitudinal separation instead of performance-based separation
CPDLC	Receipt of CPDLC messages with send time in the future Receipt of CPDLC messages with large latency Disconnection of CPDLC Potential need for reversion to alternate means of communication
GBAS/SBAS	Unavailability of GNSS-based landing procedures Potential need for reversion to alternate landing procedures (e.g. ILS or visual)
Free Route Airspace / Direct Routing Operations	Potential need for reversion to traditional ATS route for areas outside radar coverage
SATVOICE	Loss of SATVOICE connection Potential reversion to alternate means of communication

c) understanding the impact from flight crew actions.

Flight Crew Actions	**Impact**
Erroneous position reporting	Potential missed position report or need for confirmation of position with other sources
Response to false terrain awareness and warning system alerts	Sudden climb or descend that could result in conflict with other aircraft
Degraded navigation performance	Inability to fly certain route and approach procedures and may require radar vectors
Inability to recover even after leaving affected area	Inability to fly certain route and approach procedures and may require radar vectors

11.7 Training

a) besides recognizing GNSS RFI events and its consequential impact to services and potential actions by flight crew, it is important that these are also incorporated into refresher simulator trainings to ensure familiarity and competency in handling abnormal operations and activation of contingency procedures.

CNS Units

11.8 Learning through courses to improve knowledge in the following areas;

a) recognition of GNSS RFI events through monitoring of system health and time synchronisation errors; and

b) recognition of GNSS RFI events through analysis of available data fields that can signify suspected events.

11.9 Training:

a) software application training that support investigation and analysis of data; and

b) contingency procedures training to ensure time synchronisation issues can be mitigated through switching to alternate time sources.

12. CONCLUSION

12.1 The global aviation system has become increasingly dependent on GNSS to support CNS and timing functions. While GNSS enables significant operational efficiencies and capacity improvements, this reliance also introduces systemic vulnerabilities. Intentional and unintentional interference, signal manipulation, and broader space-based system disruptions have the potential to adversely affect aviation safety and operational continuity across wide geographic areas.

12.2 Beyond localized interference events, more complex crisis scenarios including deliberate disruption of satellite services, spoofing activities, satellite malfunction, or large-scale orbital debris events such as the Kessler Syndrome illustrate the importance of resilience planning. Although such scenarios may be low in probability, their operational consequences could be significant. Accordingly, strengthening resilience to GNSS RFI contributes not only to interference mitigation, but also to broader contingency preparedness and system robustness.

12.3 This document provides a structured framework to assist States/Administrations, ANSPs, aircraft operators, aerodrome operators and other stakeholders in policy development, contingency planning, operational detection, reporting of GNSS RFI events, coordinated regional response, harmonized classification of GNSS RFI events, and post-event analysis and continuous improvement.

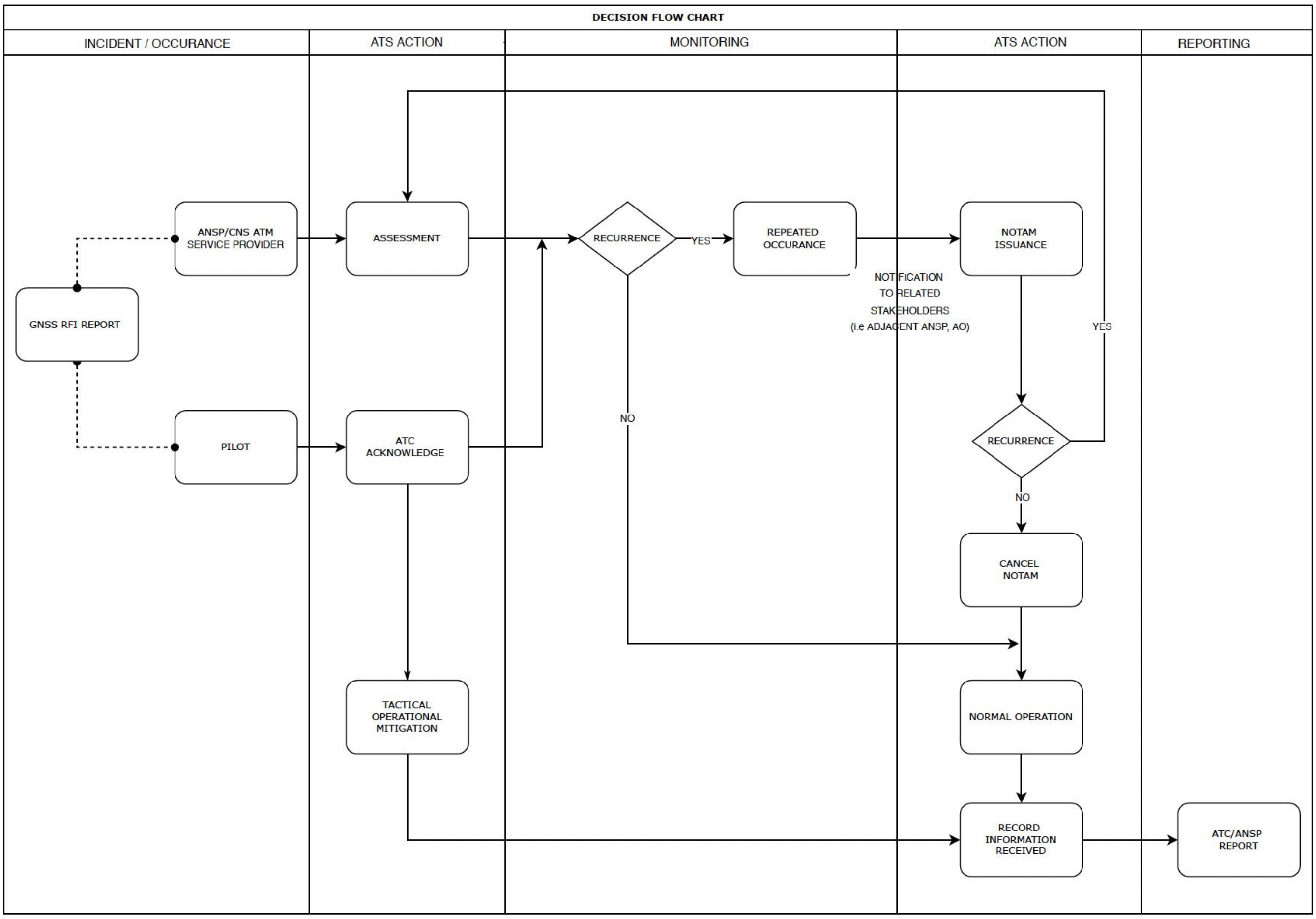
12.4 The establishment of standardized procedures for detection of GNSS and its associated data link disruption, classification and reporting support the development of an effective regional coordination network. Such harmonization enhances situational awareness, promotes transparency, and facilitates timely mitigation measures across FIR boundaries.

12.5 Given that GNSS RFI is inherently transnational in nature, sustainable solutions require coordinated regional and global approaches. Continued collaboration among ICAO regions, led by ICAO Headquarters, will support harmonization of procedures and future development of SARPs and related guidance material as the threat environment evolves.

12.6 Close coordination with international organizations such as Airports Council International (ACI), IATA, the International Federation of Airline Pilots' Associations (IFALPA), and the International Federation of Air Traffic Controllers' Associations (IFATCA) remains essential to ensure harmonized implementation across all aviation domains.

12.7 Through proactive coordination, standardized reporting, and collective commitment to resilience, the aviation community can mitigate the operational and safety risks associated with GNSS RFI and preserve the integrity, continuity and safety of international civil aviation.

APPENDIX 1: ATS UNIT HANDLING OF GNSS RFI EVENT



APPENDIX 2: SAMPLE POST-FLIGHT REPORTING DATA ELEMENTS

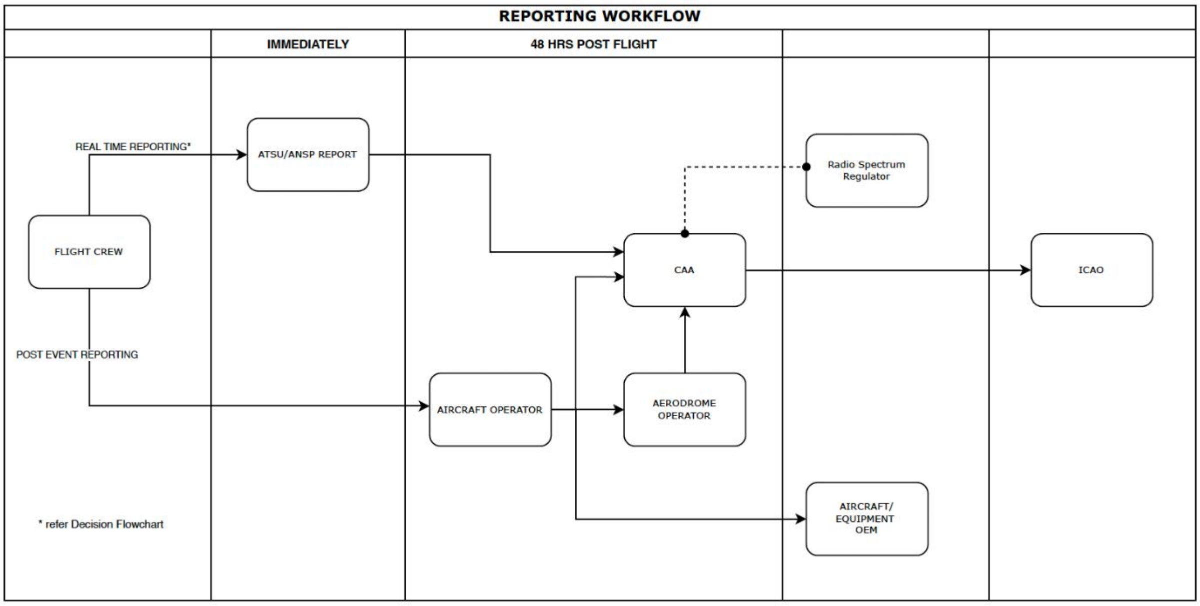
GNSS RFI REPORTING FORM FOR USE BY ANS PERSONNEL	
Description of interference	
Source of initial interference report	[ ] Flight crew [ ] Engineer/technician [ ] Other
Observability of the interference	Interference was noticeable: [ ] only on board the aircraft (flying, not on the ground) [ ] only on the ground (aircraft parked/taxiing) or by means of ground detection systems available [ ] both
Number of received reports	
Coordinates of the area of occurrence/time (UTC)	UTC: ___ Lat: ___ Long: ___ FL/Altitude: ___
Problem duration:	Days, hours, minutes, seconds ____________ [ ] continuous [ ] intermittent
Affected GNSS element	[ ] GPS [ ] GLONASS [ ] GALILEO [ ] BDS [ ] Other constellation [ ] EGNOS [ ] WAAS [ ] BDSBAS [ ] Other SBAS [ ] GBAS (VHF data link for GBAS)
Affected constellation frequency	[ ] L1 [ ] L5 [ ] Both
Used GNSS contingency procedure	[ ] Radar vectoring [ ] Switch to procedures based on conventional navaids (e.g. DME/DME or VOR/DME-based PBN, DME and VOR-based conventional, ILS) [ ] Diversion to another airport [ ] Missed approach [ ] Use of alternate means for communication (e.g. VHF) [ ] Other: ___
In case of report by flight crew	
Airline name	
Aircraft type and registration	
Flight number	
Airway/route flown	
Reported on-board failure	[ ] Total loss of navigation capabilities [ ] Need to change the navigation procedure [ ] Inability to fly RNP and request for radar vectoring [ ] Inability to fly a GNSS-based approach (GLS, SLS) [ ] GNSS fault (1 or 2)

	[ ] TAWS/EGPWS warnings or loss of terrain and surface functionalities [ ] Loss of ADS-B [ ] Wind and ground speed wrong presentations [ ] Aircraft clock anomaly [ ] Loss of situational awareness (SVS, Cockpit Display of Traffic Information) [ ] Loss of communication functions (CPDLC, ACARS) [ ] AHRS failure [ ] Map shift [ ] Other: ___
Information on presumed source of interference	
Presumed location of interference source	Lat: ___ Long: ___ or Nearest city or landmark:
Interfering frequency (if known)	
Signal strength and reference bandwidth (if known)	
Further descriptions of the interference case	[ ] Spectrum plot [ ] Map [ ] Other material:

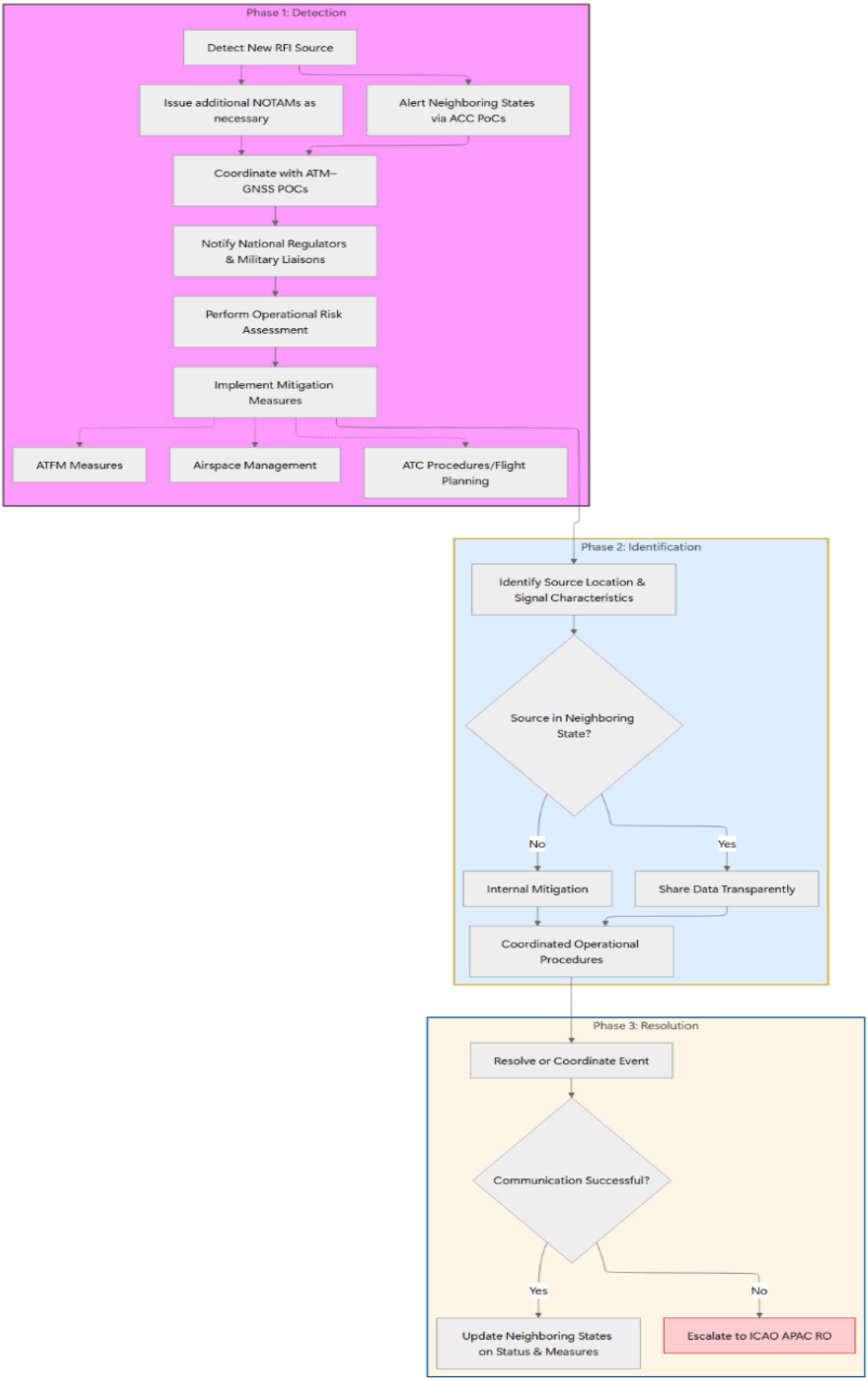
GNSS RFI REPORTING FORM FOR USE BY FLIGHT CREW	
Description of interference	
Reported failure and operational impact	[ ] Total loss of navigation capabilities [ ] Need to change the navigation procedure [ ] Inability to fly RNP and request for radar vectoring [ ] Inability to fly a GNSS-based approach (GLS, SLS) [ ] GNSS fault (1 or 2) [ ] TAWS/EGPWS warnings or loss of terrain and surface functionalities [ ] Loss of ADS-B [ ] Wind and ground speed wrong presentations [ ] Aircraft clock anomaly [ ] Loss of situational awareness (SVS, Cockpit Display of Traffic Information) [ ] Loss of communication functions (CPDLC, ACARS) [ ] AHRS failure [ ] Map shift [ ] Other: ___
Used GNSS contingency procedure	[ ] Request for radar vectoring [ ] Switch to another mean of navigation (e.g. DME/DME, VOR/DME, ILS) [ ] Diversion to another airport [ ] Missed approach [ ] Use of alternate means for communication (e.g. VHF) [ ] Other: ___
Affected GNSS element	[ ] GPS [ ] GLONASS [ ] GALILEO [ ] BDS [ ] other constellation

	[ ] EGNOS [ ] WAAS [ ] BDSBAS [ ] other SBAS [ ] GBAS (VHF data link for GBAS)
Affected constellation frequency	[ ] L1 [ ] L5 [ ] Both
Aircraft type and registration	
Flight number	
Airway/route flown (airport RWY/gateway/parking gate in case of on ground detection)	
Coordinates of the area of occurrence/time (UTC)	UTC: ___ Lat: ___ Long: ___ FL/Altitude: ___
Problem duration	Days, hours, minutes, seconds ____________ [ ] continuous [ ] intermittent

APPENDIX 3: GNSS RFI AND ASSOCIATED DATA LINK DISRUPTION REPORTING WORKFLOW



APPENDIX 4: CROSS-BORDER COORDINATION PROCEDURES



Phase 1: Detection

1.1. Upon detecting a new GNSS RFI event, the affected ATS units should:

a) immediately alert adjacent ATS units of the affected area via established ATS unit level POCs;

b) assess the need for issuance or amendment of NOTAMs; and

c) implement immediate tactical mitigation measures, as required.

1.2. Concurrently, ATS unit level POCs should coordinate with and notify the national level ATM POCs to enable:

a) coordination with national frequency regulators and military liaisons;

b) technical investigation and analysis of the GNSS RFI source; and

c) coordination of additional operational mitigation measures with affected States/Administrations and relevant service providers after completing the operational risk assessments (details in Chapter 8).

1.3. Mitigation measures may include:

a) airspace management actions;

b) air traffic flow management measures;

c) revised air traffic control procedures; and

d) flight planning advisories.

1.4. Operational risk assessment should guide the selection of mitigation measures.

Phase 2: Identification

1.5. National level ATM POCs should cooperate to identify:

a) the source location;

b) signal characteristics (e.g. centre frequency and bandwidth), and

c) expected duration or operational parameters.

1.6. Where the source is located within another State/Administration, relevant data should be shared transparently. It must be noted that while some sources (e.g. national security) may not be deactivated, their impact can be mitigated through coordinated operational procedures.

Phase 3: Resolution

1.7. Once the RFI event is resolved or sufficiently coordinated, the national level ATM POC should provide an update to relevant States/Administrations regarding the status of the interference, any remaining limitations, and the specific mitigation measures taken.

1.8. If coordination or resolution between the national level ATM POCs is unsuccessful, the ICAO APAC Regional Office should be informed to assist in facilitating resolution and safeguarding aviation safety.

REGIONAL DATA MANAGEMENT GUIDANCE DOCUMENT

1. INTRODUCTION

1.1 While international and cross-border data sharing and management guidelines exist for regional bodies such as APEC, OECD or ASEAN, there is currently no overarching Guidance Document for the wider APAC region. Examples of existing guidelines include the APEC Cross Border Privacy Rules, ASEAN Model Contractual Clauses, ASEAN Data Management Framework, OECD Guide to Data Governance and Policymaking.

1.2 In 2025, a survey conducted gathered 14 data sharing use cases in APAC, where States expressed concerns about:

a) the lack of clearly defined data governance measures governing the use, storage, and protection of shared data, as well as the associated risk of data misuse;

b) inconsistent data quality standards across participating states, with variations in timeliness, completeness, and accuracy, often stemming from technical and resource limitations; and

c) differing data formats, requiring substantial effort to process and standardise before meaningful analysis can occur

1.3 See **Appendix 1** for detailed survey findings on the use cases, challenges and additional considerations gathered.

2. PROPOSED APPROACH

2.1 Considering the challenges and concerns observed, and given that APAC States depend on one another for data especially when it comes to data sharing use cases on performance benchmarking and CONOPS development, a Regional Data Management Guidance Document is essential to guide APAC States to collectively work towards unlocking the value of historical data to drive impactful use cases, with a focus on implementing good data management practices.

2.2 To facilitate safe and efficient data sharing across APAC, the Regional Data Management Guidance Document aims to establish a trusted and interoperable guide with data management best practices and recommend standardised data semantics to promote responsible and effective use of data.

2.3 While this Guidance Document has been developed primarily for data sharing within the APAC Data Analytics Group (DAG), other groups within APAC that wish to adapt this document for their data sharing use cases are welcome to do so, and are encouraged to reach out to the DAG for guidance and support.

3. REGIONAL DATA MANAGEMENT GUIDANCE DOCUMENT

3.1 The Regional Data Management Guidance Document comprises the following key pillars: (1) Aligned with Existing Policy and Legal Requirements; (2) Good Data Management Principles; and (3) Recommended Interoperability Measures.

(1) Aligned with Existing Policy and Legal Requirements

3.2 As the Regional Data Management Guidance Document is developed to provide non-obligatory guidance based on best practices in data management, the Guidance Document should not be read nor constitute as legal advice or used as a tool for compliance with any law or regulatory requirements.

3.3 For avoidance of doubt, this Guidance Document will not take precedence over existing legal or regulatory requirements that APAC States are subject to. The data management principles set out within this Guidance Document build upon existing policy and legal foundations (see **Appendix 1** for information) and function as a complementary extension guide to data management.

(2) Good Data Management Principles

3.4 This section outlines data management practices and principles across the data lifecycle (see **Figure 1**) which is largely mirrored after existing APAC data sharing use cases.

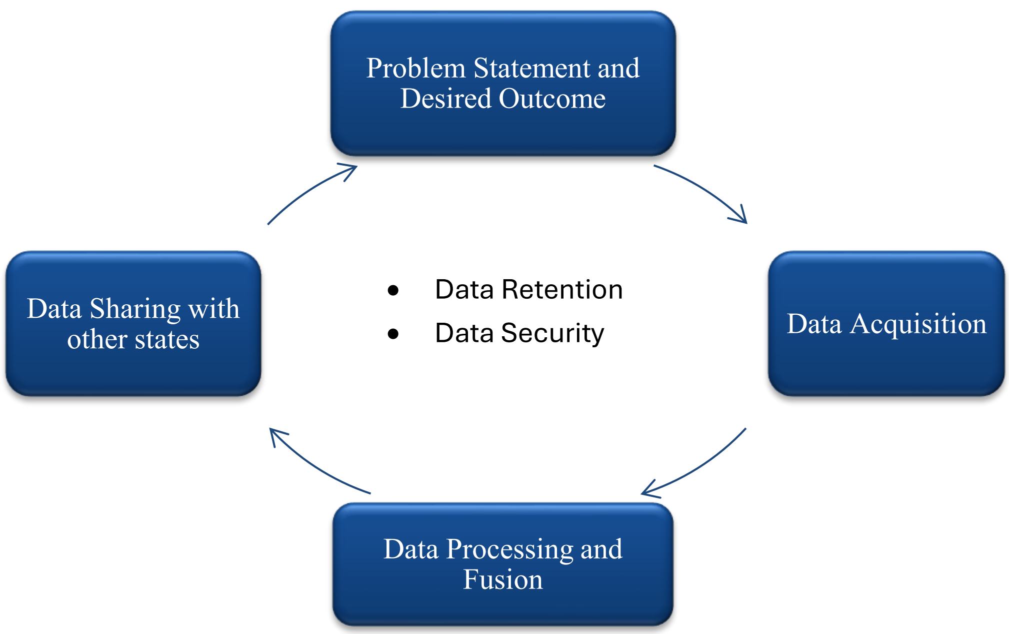


Figure 1. Data Lifecycle

3.5 Data Acquisition

3.5.1 The use case should be clearly defined with the data identified required to fulfil the use case, before acquiring data from other States.

3.5.2 To minimise risks of unauthorised use or disclosure, the acquisition of data should be minimised to only what is necessary.

3.5.3 When data is acquired from States, the data should as far as possible be acquired via electronic means.

3.6 Data Processing and Fusion

3.6.1 To minimise errors arising from data processing and fusing, APAC States that process and fuse data should put in place processes such as data validation checks, documentation of formulations and algorithms, and periodic review of error logs.

3.6.2 When processing and fusing data, APAC States should as far as possible, apply anonymisation techniques, including the alteration or removal of identifiers, to minimise the risk of unauthorised identification or disclosure of sensitive or proprietary information.

3.7 Data Sharing

3.7.1 Before APAC States share data with another State, they should check whether there is any law (e.g. legislation, contract, legal privilege, state-level policies etc.) governing such data disclosure.

3.7.2 Where APAC States receive data from another APAC State, they should not disclose the data received to other parties and only use the data for specified or directly related purpose(s), without the explicit approval of said APAC State, unless otherwise authorised (e.g. by the State) or required by law. In addition, APAC States receiving data should not publish any summary conclusions or interpretations based on the data received without the explicit approval of the APAC State which the data originated from, unless otherwise authorised or required by law.

3.7.3 Recommended Roles and Responsibilities

Role/ Definition	**Responsibilities**
Data Provider APAC States which the data originated from	• Communicate the known limitations of the requested data as far as practicable (e.g. completeness, accuracy, time specificity, other physical attributes including Intellectual Property rights and limitations, and contextual limitations) • Inform the Data Requestor of any issues with the publication of the requested data and/ or its statistics derived after being informed of the intention to publish • Take reasonable effort to evaluate data requests. For more complex data requests, the Data Provider, Data Controller and Data Requestor should work together to establish the time required to meet the data request at the onset • Transfer the data at the mutually agreed frequency
Data Controller APAC States that have possession or custody of the data	• Take reasonable measures to ensure that the shared data is protected against loss, unauthorised access, use, modification, disclosure or other misuse • Ensure that data and/or data or statistics derived from Data Providers are not shared with any third party without explicit approval of the Data Provider

Role/ Definition	Responsibilities
	• Only use the data for the specified or directly related purpose(s) and seek approval from the Data Provider if it wishes to use the requested data for other purposes • Notify the Data Provider without undue delay when it becomes aware of any data breach, and in no event later than the maximum period permitted under any applicable laws, and take all reasonable measures to rectify the breach, including measures directed by the Data Provider • Purge the data when it is no longer needed
Data User APAC States	• Only use the data for the specified or directly related purpose(s) and seek approval from the Data Provider if it wishes to use the requested data for other purposes (e.g. Background Intellectual Property/ Raw data should not be shared without approval from the Data Provider) • Ensure that the Data Provider is notified at a mutually agreed timeframe prior to any publication of the requested data and/or its derived statistics (e.g. Foreground Intellectual Property/ Reports etc.) • Notify the Data Provider without undue delay when it becomes aware of any data breach, and in no event later than the maximum period permitted under any applicable laws, and take all reasonable measures to rectify the breach, including measures directed by the Data Provider • Purge the data when no longer needed

3.8 Data Retention

3.8.1 APAC States should retain data only for the period necessary to fulfil the purposes for which it was collected.

3.8.2 APAC States should set a retention period for each dataset. Upon the expiry of the stipulated retention period, the data shall be securely destroyed in accordance with the respective APAC State's data management policies.

3.9 Data Security

3.9.1 APAC States should consider the following data security measures to protect data and prevent data compromises:

a) ensure that Data User (i.e. APAC States) request and retrieve only the data required for the use case and do not retrieve more data than necessary;

b) processes and controls to ensure that the rights to access data are granted on a need-to-know basis, where data access rights are regularly reviewed;

c) predefined limits for volume of data to be accessed and duration of access through access control features;

d) log and monitor data transactions to detect suspicious or risky activities and take action to prevent any data compromises;

e) implement technical measures to protect data and render the data unusable to an attacker (e.g. field level encryption, hashing with salt, tokenization, obfuscation/ masking of entity attributes); and

f) password protect and/or encrypt files when sharing data.

(3) Recommended Interoperability Measures

3.10 Common Data Standards and Format

3.10.1 Existing international data standards such as the following (non-exhaustive) should be used as reference:

a) ISO/IEC 11179: Guidance Document for a Metadata Registry;

b) UN/CEFACT Core Components Library;

c) World Customs Organisation (WCO) Data Model;

d) Organisation for Economic Co-operation and Development (OECD) Data Quality guidelines;

e) DAMA-Data Management Body of Knowledge (DMBOK);

f) IATA Airline Industry Data Model (AIDM); and

g) FAA System Wide Information Management (SWIM).

3.10.2 To strengthen interoperability, APAC States should adhere to mutually agreed data standard and format prior to the data sharing use case.

3.10.3 Where possible, APAC States should use standard data templates which fulfil the needs of the use case when sharing data. For example, where there are joint projects, members should only share data using a common data template, whether agreed upon collectively by all members or proposed by any single member, provided that the data template adheres to an existing international data standard.

3.11 Data Quality

3.11.1 To ensure that data is reliable and fit for us, APAC States should consider the following data quality indicators:

a) Usability (for example, APAC States to ensure that the historical data records provided are in usable formats);

b) Accuracy (for example, APAC States to ensure that the historical data records provided are error free); and

c) Data Error/ Discrepancy Resolution (for example, APAC States who provide data should take reasonable measures to rectify and address data errors and/or discrepancies and inform Data Controller and downstream Data Users).

4. OPEN DATA SHARING

4.1 APAC States should consider undertaking a stock-take of all their data and decide what data is possible, suitable and useful to be shared openly with other APAC States.

4.2 Where such data is identified, APAC States should make the data available in an appropriate manner to facilitate proper interpretation and meaningful use.

4.3 APAC States should explore the use of open source and third-party commercial data to supplement data gaps.

APPENDIX 1: DETAILED SURVEY FINDINGS

1. INTRODUCTION

This document contains the detailed survey findings for the Regional Data Management Guidance Document. The findings gathered includes: (a) APAC Data Sharing Use Cases and Challenges Faced by APAC States; (b) APAC States' Additional Considerations on Data Sharing and (c) Existing Regulatory and/or Legal Requirements that APAC States Adhere To.

(a) APAC Data Sharing Use Cases and Challenges Faced by APAC States

<table>
<tr><th>S/N</th><th>APAC States</th><th>Data Sharing Use Cases</th><th>Challenges Faced</th></tr>
<tr><td>1</td><td>Singapore</td><td>Singapore shares historical performance indicators on a yearly basis with APAC countries as part of our membership of the Data Analytics Group (DAG).

The DAG uses the shared measures for analysis on eight Key Performance Indicators (KPIs) under the Global Air Navigation Plan (GANP), which aims to derive insights for ATM performance to support management and operational decisions.</td><td rowspan="3">While Singapore does not face any particular challenge when sharing historical performance measures with APAC countries, Singapore observed that there are (a) concerns on the use of shared data and (b) different data quality.

For (a), APAC States have previously raised concerns on data governance, particularly regarding how shared data will be used and stored. Currently, only in-principle agreement is being sought among members of the working groups that the performance measures will not be shared beyond the group and that any documents referring to these data should be cleared through the member States first. There have been no further follow-ups from this concern, but it will be useful if a regional governance guidance document could help support these works. Having explicit data governance and protection measures as part of the regional governance guidance document will also provide greater assurance that the contributed data is adequately protected and is likely to encourage more active contribution of data.

For (b), Singapore notes that data quality varies across states (e.g. timeliness, completeness and accuracy), which could be due to technical/ resource limitations. It will be helpful if the regional governance guidance document stipulates baseline data quality standards, which</td></tr>
<tr><td>2</td><td>Singapore</td><td>Singapore shares historical data on a yearly basis with members of the Performance Benchmarking Working Group (PBWG) which studies and benchmarks operational KPIs related to air traffic management. The PBWG intends to expand its analytical scope to include vertical flight efficiency, additional fuel burn, flight time variability, turnaround time which would require more data fields and higher granularity data to be shared.</td></tr>
<tr><td>3</td><td>Singapore</td><td>Singapore shares historical data on a yearly basis with members of the Civil Air Navigation Services Organisation Global Benchmarking Workgroup (CANSO GBWG) conducts an annual global benchmarking exercise to produce the Global ANS Performance Report that measures and compares ANSPs' performance in cost-effectiveness and ATCO productivity. Singapore contributes to the following KPIs in the CANSO ANS Performance Framework by sharing data on ANS cost, IFR flight hours, number of</td></tr>
</table>

S/N	APAC States	Data Sharing Use Cases	Challenges Faced
		ATCOs in operations and ATCO in operations hours.	promotes the contribution and use of quality data. To date, while performance measures are shared between countries, the underlying data are not shared due to different data laws. Sharing of such data and having common situational insights will unlock precious value to the participating countries.
4	Philippines	Under the Framework for ASEAN Simulation and Modelling Function (ASAM), Philippines is requested to do a one-time sharing of historical air traffic data to support the establishment of an updated baseline for the ASEAN region. This initiative is coordinated by the Air Traffic Management Research Institute (ATMRI) and involves depositing national traffic data into the ASEAN Air Traffic Management Data Repository (AADR). The data will be used for regional modeling, simulation, and performance analysis.	Data Formatting requirements
5	Philippines	In accordance with ICAO APANPIRG Conclusion 16/4, Air Traffic Service (ATS) provider States (i.e. Philippines) are required to submit Traffic Sample Data (TSD) on a yearly basis. This data supports regional airspace safety monitoring, including Reduced Vertical Separation Minimum (RVSM) compliance and performance-based communication and surveillance assessments. The Monitoring Agency for Asia Region (MAAR) coordinates the collection and analysis of this data.	
6	Indonesia	Indonesia provides historical ADS-B data for use in the Altimetry System Error (ASE) analysis conducted by the RVSM Regional Monitoring Agency (AAMA) to ensure that operators and aircraft conform to ICAO standards on aircraft altimetry and Long-Term Height Monitoring.	Different policies governing the availability and sharing of historical data to be shared internationally Data collection and processing are currently semi-automated, where data is obtained and processed with heavy human intervention.
7	Indonesia	Indonesia provides Traffic Sample Data every semester to ASEAN ATM SPG,	

S/N	APAC States	Data Sharing Use Cases	Challenges Faced
		covering the periods from 1st to 7th June and from 1st to 7th December each year.	Differences in data formats and systems create challenges in integrating data from multiple ANSPs
8	Hong Kong SAR	Hong Kong provides daily sharing of Airport Acceptance Rate (AAR) though ATFM Daily Plan (ADP) by email to certain APAC states.	Data Management: Historical data often resides in isolated systems or departmental silos, making it difficult to consolidate into a unified, accessible format for sharing. Besides, historical datasets from various sources may have different formats, structures, coding standards, or contain inaccuracies, duplicates, and missing information. This poor data hygiene requires significant effort to cleanse and standardize before it can be used effectively for analysis. Insufficient Tools and Technology: Legacy systems and a lack of interoperability standards or APIs can hinder seamless and automated data exchange between different platforms and organizations. Loss of Control: Once data is shared with external partners, companies may lose partial or complete control over how that information is used, stored, and protected, which can lead to concerns about data governance and potential misuse.
9	Hong Kong SAR	As part of the Ground Delay Programme, the compliance rates of CTOT were sent by China, Hong Kong China, Singapore, Thailand, Korea, Vietnam, Cambodia and shared among AMNAC network members. Data involved was ACFT callsign, EOBT, CTOT, ATOT, which are shared monthly through a common online platform.	
10	Hong Kong SAR	As part of the ICAO APAC ATM/SG Data Analytic Ad-hoc Group (DAG), performance data are gathered a few times per year for the group rapporteur to consolidate and generate analytical reports on various areas of concern, e.g. Airport peak capacity and throughput, Additional Taxi Time etc.	
11	Australia	Sharing of sample ADSB data between Indonesia and Australia to enable monitoring of altimetry system error as part of regional monitoring agency activities. Indonesia supplies data which Airservices processes and provides monitoring results.	The lack of central accessible systems for transfer means defining new secure data transfer systems is complex and requires repeating.
12	Cambodia	Sharing of missing flight plan from adjacent FIRs upon request	Time consuming and accuracy of data. Lack of coordination. State policy and regulation.
13	Cambodia	Sharing of missing NOTAM from originator upon request.	
14	Cambodia	Exchange of AIDC historical record between Cambodia and Thailand for reviewing of operational usage	

(b) APAC States' Additional Considerations on Data Sharing

APAC States	Additional Considerations
Singapore	Singapore suggests that the countries can identify a set of raw data to be shared with other countries. Performance measures are good but does not provide insights into the "why". This will unlock value to operations. Singapore suggests that further efforts can be placed into organising the historical data that has been collected by Working Groups. E.g. clear folders/ documentation on what data is available and who can access this data, which will be helpful for member states who would like to review or conduct further analysis of the shared data.
Philippines	*N.A.*
Indonesia	Reciprocity and the right to access derived products resulted from the usage of shared data.
Hong Kong SAR	Resources associated with preparing, cleaning, storing, and securing data for sharing can be a major impediment
Australia	Based on sharing safety occurrence data across agencies within Australia, but would extend to any APAC framework, is ensuring that if data from the source is changed, it can be synchronised to all users, or users have a way to know that previous data has now been updated. The details of safety occurrences can change from the initial report to final review or investigation. Consideration of suitable lag times for making data available may also address this.
Cambodia	State policy/ regulation of each country.

(c) Existing Regulatory and/or Legal Requirements that APAC States Adhere To

APAC States	Existing Regulatory/ Legal Requirements
Singapore	<u>Data Sharing within APAC</u> N.A. Members adhere to the Terms of References of the Working Group. There is no legally binding agreement that Singapore refers to when sharing data to the above Working Groups. <u>Data standards/ data quality used within Singapore</u> For data sharing with the Working Groups, Singapore often collaborates with the members to develop a standard data template for all member states to adhere to, when contributing data. This ensures that the data shared is of a common standard, which facilitates the Working Group's analysis.
Philippines	*N.A.*
Indonesia	<u>Data Sharing within APAC</u> The exchange of historical data is currently managed on a case-by-case basis, as a specific regulatory framework for such exchanges has not yet been established.

APAC States	Existing Regulatory/ Legal Requirements
	Data standards/ data quality used within Indonesia There is currently no known national standard on exchanging historical data. Data are exchanged based on the mutual agreements among parties regarding data quality, exchange frequency, etc.
Hong Kong SAR	*N.A.*
Australia	Data Sharing within APAC and Australia Based on sharing safety occurrence data across agencies within Australia, but would extend to any APAC framework, legal and regulatory considerations included: a. Privacy and handling confidential information b. Intellectual Property rights and end-user rights, obligations and risk c. Information Security which may also consider what data can be shared and stored outside of each country d. Freedom of Information obligations and how data will be treated if subject to disclosure requirements
Cambodia	*N.A.*

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL GUIDANCE

FOR

SPACE OBJECT LAUNCH AND RE-ENTRY ACTIVITIES COORDINATION

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CONTENTS

1. SCOPE OF THE DOCUMENT

1.1 This guidance document was developed by the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG) formed through a decision of the Tenth Meeting of the Air Traffic Management Sub-Group of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), in October 2022. The document builds upon and replaces the regional guidance provided in the *Asia/Pacific Seamless ANS Plan Version 3.0*, and in the *Asia/Pacific Planning Checklist for Ballistic Launch and Space Re-Entry* approved by the Twenty Ninth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/29), and is in keeping with the provisions of United Nations Resolution 2222 (XXI) as amended.

1.2 Participants of the SVLRC SWG consisted of representatives from Australia, China, Hong Kong China, India, Japan, New Zealand, Papua New Guinea, Republic of Korea, Singapore, Sri Lanka, Thailand, United States, Viet Nam, and IATA.

1.3 This guidance applies to all forms of space object launch and re-entry, and includes commercial, State, ballistic launch, or any other space object activities that can pose a hazard to civil aviation.

1.4 The goal of this guidance is to achieve timely and efficient collection, coordination and dissemination of space object launch and re-entry information that will assist with avoiding hazards to civil aircraft and minimize interference with the normal operation of such aircraft.

1.5 This guidance should be harmonized with other ICAO regions who are working on similar efforts so that there is consistency across the globe on how space object launch and re-entry activities are coordinated and disseminated.

1.6 While space object launch and re-entry activities have existed for decades within the region, not all States and/or stakeholders are equally affected. The collection, coordination and dissemination of space object launch and re-entry activity information mainly include the following stakeholders:

a) Launching State;

b) Launching State Appropriate Air Traffic Service (ATS) Authority;

c) Affected Appropriate ATS Authority;

d) Space Object Launch and Re-entry Operator; and

e) Airspace user.

1.7 To facilitate timely and orderly information dissemination, all Asia and Pacific (APAC) States are urged to identify and provide contact information for space object launch and re-entry activities coordination. These will be added to the regional *Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination*, maintained by the ICAO APAC Office, and posted on its eDocuments webpage.

1.8 Launching State Appropriate ATS Authority should make efforts to collaborate with Affected Appropriate ATS Authorities, Space Object Launch and Re-entry Operators, and other affected stakeholders to minimize potential impacts to the airspace system.

1.9 Generally, space object launch and re-entry activities take place from pre-defined locations, including States facilities or private spaceports. Launch locations should be positioned with consideration for minimal disruption to the safety and efficiency of airspace system.

1.10 The procedures below are intended to improve regional coordination efforts by complementing well-established and proven processes compliant with ICAO Annex 11– *Air Traffic Services*, *Manual on Civil-Military Cooperation in Air Traffic Management* (ICAO Doc 10088), *Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations* (ICAO Doc 9554), and replacing existing ICAO APAC Office regional guidance.

1.11 States conducting space object launch and re-entry activities, or managing airspace affected by said activities are encouraged to develop, test, and refine practices and procedures that fit their needs. The State is responsible for coordination of activities potentially hazardous to civil aircraft, regardless of whether they're conducted by its space launch agencies, its military, or any other organization.

1.12 States defining consistent coordination procedures allows sufficient time for airspace managers to assess the operational impact and airspace users to plan around hazardous activity. States routinely conducting space object launch and re-entry activities and States managing affected airspace, are encouraged to dedicate adequate resources to this planning and coordination effort to assure the continued safe operation of all airspace users.

2. DEFINITIONS, ABBREVIATIONS AND ACRONYMS

2.1 Definitions

Affected Appropriate ATS Authority. The relevant authority responsible for providing air traffic services in the airspace affected by space object launch and re-entry activities conducted by the Launching State.

Airspace user. Organizations or individuals operating flights using aircraft and/or vehicles in the airspace.

Air traffic service. A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

Appropriate ATS Authority. The relevant authority designated by the State who is responsible for providing air traffic services in the airspace concerned.

Launch or re-entry window. The span of time during which a launch or re-entry may take place while satisfying the constraints imposed by safety and mission objectives.

Launching State. A State which launches or procures the launching of a space object or a State from whose territory or facility a space object is launched. This includes any space object launch and re-entry activities.

NOTAM. A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Space object. Includes component parts of a space object as well as its launch vehicle and parts thereof.

Space Object Launch and Re-entry Operator. An entity who conducts or will conduct the launch or re-entry of a space object and any payload.

Note: the definitions listed above are to aid readers in understanding and applying the principles outlined in this document. They may not be universally agreed upon outside of the APANPIRG.

2.2 Abbreviations and Acronyms

AFTN	Aeronautical Fixed Telecommunication Network
AIS	Aeronautical Information Service
AMHS	ATS Message Handling System
ATS	Air Traffic Services
FIR	Flight Information Region
NOF	International NOTAM Office
POC	Point of Contact

3. STAKEHOLDERS' RESPONSIBILITIES

3.1 This chapter provides an overview of the general responsibilities of the Launching State, Launching State Appropriate ATS Authority, Affected Appropriate ATS Authority, Space Object Launch and Re-entry Operator and airspace user. All entities must coordinate to ensure the safe and efficient integration of activities into airspace systems. It is important to consider the responsibilities of each organization within their States.

3.2 General responsibilities of Launching State:

a) regulate space object launch and re-entry activities;

b) develop and enact regulations ensuring that the Space Object Launch and Re-entry Operator and the Launching State Appropriate ATS Authority comply with the requirements in ICAO Annex 11 Section 2.19, for the coordination of activities potentially hazardous to civil aircraft;

c) identify the Appropriate ATS Authority responsible for coordination of activities, including identifying the proper entity to initiate NOTAM request for space object launch and re-entry activities within the FIR/s assigned to the Launching State, in accordance with ICAO Annex 15 Section 2.1;

d) validates the launch or re-entry window and the coordinates (in degrees, minutes and seconds format, example: 012345N 1234567E) of the extent of the airspace affected by the space object launch and re-entry activities. An appropriate safety buffer zone should be incorporated; and

e) ensures the Launching State Appropriate ATS Authority provide up-to-date information to Affected Appropriate ATS Authorities with minimal delay.

3.3 General responsibilities of Launching State Appropriate ATS Authority:

a) ensure that the State's Points of Contact (POCs) in the *Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination* are regularly updated and provided to the ICAO APAC Office;

b) serve as the focal point for collecting, coordinating, and disseminating all available information relevant to space object launch or re-entry activities to Affected Appropriate ATS Authorities and/or other affected stakeholders;

c) plot area using validated coordinates (in degrees, minutes and seconds format, example: 012345N 1234567E) and provide a graphical representation of the polygon to Affected Appropriate ATS Authorities for reference. An appropriate safety buffer zone should be incorporated into the plotted area;

d) ensure up-to-date information relevant to launch or re-entry activities is provided to the Affected Appropriate ATS Authorities with minimal delay;

e) identify and assess potential impacts or constraints to airspace where the State is responsible for the provision of ATS, to ensure the compliance of the requirements in ICAO Annex 11 Section 2.19;

Note: this includes the determination for the need to establish any Special Use Airspace (SUA), airspace restrictions or temporary withdrawal of established ATS routes to avoid hazards to civil aircraft and inform affected ATS unit accordingly.

f) collect feedback from Affected Appropriate ATS Authorities and conduct post-activity analysis to improve coordination process; and

g) ensure the safe and efficient integration of space object launch and re-entry activities into the airspace system.

3.4 General responsibilities of Affected Appropriate ATS Authority:

a) ensure that the State's POCs in the *Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination* are regularly updated and provided to the ICAO APAC Office;

b) receive and coordinate information relevant to space object launch or re-entry activities from Launching State Appropriate ATS Authority with other affected stakeholders;

c) identify and assess potential impacts or constraints to airspace where the State is responsible for the provision of ATS, to ensure the compliance of the requirements in ICAO Annex 11 Section 2.19;

Note: this includes the determination for the need to establish any SUA, airspace restrictions or temporary withdrawal of established ATS routes to avoid hazards to civil aircraft and inform affected ATS unit accordingly.

d) plot hazard/danger area;

e) ensure the issuance and update of any NOTAM promulgating information on the activity;

f) ensure the safe and efficient integration of space object launch and re-entry activities into the airspace system; and

g) conduct post-activity analysis and provide feedback to Launching State Appropriate ATS Authority to improve coordination process.

3.5 General responsibilities of Space Object Launch and Re-entry Operator:

a) provide tentative launch or re-entry window commencement time and duration (primary and, if any, backup timing and dates), and extent of airspace affected (latitude/longitude coordinates), and any other necessary supporting information to the Launching State Appropriate ATS Authority.

Note: once the Launching State approves an operation, the Space Object Launch and Re-entry Operator works with the Launching State Appropriate ATS Authority to determine the necessary steps for coordination of airspace and operations.

3.6 General responsibilities of airspace user:

a) undertake safety risk assessments in accordance with standard operating procedures; and

b) comply with promulgated airspace and ATS restrictions.

4. COORDINATION ON SPACE OBJECT LAUNCH AND RE-ENTRY ACTIVITIES

4.1 Pre-Launch Planning and Coordination

4.1.1 Operational coordination to the Affected Appropriate ATS Authorities should be accomplished using Aeronautical Fixed Telecommunication Network (AFTN) or ATS Message Handling System (AMHS), while supplemental material should be provided via email. Ideally a conference call or some other form of positive coordination should also be accomplished by the Launching State Appropriate ATS Authority. States should provide group mailboxes for operational coordination.

Note: this may include a list for advanced planning, including additional POCs for situational awareness, and one for tactical event updates, such as removal once an activity is complete to reopen the airspace. Ideally, each State has a single group email box forwarding information internally to appropriate parties.

4.1.2 The Launching State Appropriate ATS Authority should begin coordinating with Affected Appropriate ATS Authorities, **at least 10 days (ideally 14 days) prior to the tentative space object launch or re-entry activity**. The following information should be included in the coordination:

a) **tentative launch or re-entry window** commencement time and duration (primary and, if any, backup timing and dates);

b) activity time of day and extent of airspace affected. The affected airspace should include an appropriate safety buffer and be defined using geographic coordinates expressed in degrees, minutes, and seconds format (e.g. 012345N 1234567E);

Note: in cases where extent of airspace affected crosses multiple FIRs, individual requests should be developed and sent to each impacted FIR. The Launching State Appropriate ATS Authority should ensure there are shared points for airspace affected spanning across multiple FIRs to ensure safety.

c) identification of POC in the Launching State ATS Authority;

d) identification of POCs in the Affected Appropriate ATS Authorities; and

e) any other necessary supporting information.

4.1.3 The Affected Appropriate ATS Authorities should ensure planning (please see **Appendix A**) and notification are in place for all stages of the activity to include any re-entry/debris possibility, and in accordance with the *Procedures for Air Navigation Services Aeronautical Information Management* (PANS AIM, ICAO Doc 10066). Publication of the NOTAM for all affected FIRs should be completed **at least seven days** in advance and include the following items of information:

a) launch or re-entry window duration;

b) activity time of day and extent of proposed danger or restricted area (latitude/longitude coordinates); and

Note: for ease of implementation, each danger area or restricted area should be plotted with the minimum number of coordinates to present a polygon (please refer to PANS AIM, for exacts on how the danger area or restricted area is formulated). Publication of the danger area coordinates is crucial to ensure the safety of air traffic, especially in the event of an emergency. It is therefore vital for controller and flight crew to have precise awareness of danger areas while managing any inflight contingencies.

c) any other necessary supporting information, such as affected ATS routes, alternate routings, direct routings, etc.

4.2 **Tactical Launch Coordination**

4.2.1 Launching State Appropriate ATS Authority should provide notice of **three days prior to the start of the tentative launch or re-entry window** via AFTN or AMHS, to all Affected Appropriate ATS Authorities.

4.2.2 Positive coordination between Affected Appropriate ATS Authorities and Launching State Appropriate ATS Authority should be executed to confirm and manage the definitive dates of the activity **within three days, but not less than 24 hours, of the start of the tentative launch or re-entry window**. The definitive information should be shared externally to ensure maximum efficiency of affected airspace.

4.2.3 After confirming coordination via AFTN or AMHS, the Affected Appropriate ATS Authorities should publish a NOTAM for the **definitive launch or re-entry window as soon as practicable, but not less than 24 hours**.

Note: NOTAM are published by the International NOTAM Office (NOF) serving the affected FIR in response to the request/direction of the Appropriate ATS Authorities for that FIRs.

5. RE-ESTABLISHING NORMAL AIRSPACE OPERATIONS FOLLOWING THE END OF ACTIVITIES

5.1 When confirmation from the Space Object Launch and Re-entry Operator of the end of activities potentially hazardous to civil aircraft occurs prior to the end of the coordinated launch or re-entry window, the Launching State Appropriate ATS Authority should notify the Appropriate ATS Authorities to enable timely cessation of mitigations and cancellation of NOTAMs for all affected FIRs. Otherwise, the NOTAMs will expire as published.

5.2 Cancellations of launch activities at any point of time needs to be disseminated by the Launching State Appropriate ATS Authority, as soon as possible to all affected FIRs.

6. POST-ACTIVITY ASSESSMENT

6.1 It is recommended for the Launching State and the Launching State Appropriate ATS Authority conduct a post-activity assessment, which helps in improving the maturity of launch-related airspace management processes. It is recommended that the affected States and the Affected Appropriate ATS Authorities conduct a similar assessment. All stakeholders may provide comments to improve future activities. POCs may exchange suggestions on improving coordination and reducing impacts on civil air traffic flow.

6.2 States should share lessons learned and proposed revisions to this regional guidance with APANPIRG, through its ATM/SG.

APPENDIX A: SPACE OBJECT CHECKLIST

1. Launch or re-entry required by:

2. Proposed temporary danger area or restricted area (coordinates in degrees, minutes and seconds format):

3. Proposed tentative launch or re-entry window, including backup dates:

   Date: DD/MM/YYYY to DD/MM/YYYY Time: XX:XX to YY:YY UTC

4. Proposed definitive launch or re-entry window:

   Date: DD/MM/YYYY to DD/MM/YYYY Time: XX:XX to YY:YY UTC

5. Expected exact date of launch: DD/MM/YYYY

Affected FIR	***Affected ATS Routes***	***Affected Flights in Requested Time Window***	***Option 1: Suggested Revised Time and Date***	***Option 1: Affected Flights in Revised Time and Date***	***Option 2: Suggested Revised Time and Date***	***Option 2: Affected Flights in Revised Time and Date***

6. With this information, airspace managers and other State authorities are expected to assess the impact of the proposed launch or re-entry details and determine if the activities can be conducted safely. This assessment includes airspace and ATS routes affected as well as expected traffic density during the event. Potential mitigations include rerouting traffic around the danger area or delay of traffic to avoid the event window.

7. If adequate mitigations are available, the airspace manager, State or designated competent authority should reply to the requester noting support. However, if adequate mitigations are not available, timely feedback to the requestor clarifying the issue and potential solutions is required.

   Note: space missions require specific timing to meet orbital requirements. Options for modification may be limited. If needed, establishing a planning call to address concerns or clarify mission parameters is highly effective.

APPENDIX B: LIST OF REFERENCES

ICAO Annex 11 *Air Traffic Services*

ICAO Annex 15 *Aeronautical Information Services*

ICAO Doc 4444 *Procedures for Air Navigation Services Air Traffic Management (PANS ATM)*

ICAO Doc 9554 *Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations*

ICAO Doc 9750 *Global Air Navigation Plan*

ICAO Doc 9854 *Global Air Traffic Management Operational Concept*

ICAO Doc 10004 *Global Aviation Safety Plan*

ICAO Doc 10066 *Procedures for Air Navigation Services Aeronautical Information Management (PANS AIM)*

ICAO Doc 10088 *Manual on Civil-Military Cooperation in Air Traffic Management*

Asia/Pacific Regions (APAC) Air Navigation Plan

Asia/Pacific Seamless ANS Plan

FAA Joint Order 7400.2P Procedures for Handling Airspace Matters

Basics of Space Flight Section III. Space Flight Operations (nasa.gov)

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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

Version 1.0, AUGUST 2026

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

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

RECORD OF AMENDMENTS AND CORRIGENDA

Amendments / Corrigendum			
No	Amendment/Corrigendum	Date of Issue	Subject Matter

Table of Contents

Chapter 1 - Introduction

1.1 Purpose and overview of the guidance

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

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

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

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

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

1.2 Development of Regional Guidance Document

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

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

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

1.3 Process towards implementation

<u>Preparatory Phase- Need for Capacity Assessment</u>

1.3.1 Regular assessment of historical air traffic statistics at major airports provides an overview of air traffic demand. Flight delays are ~~is~~ usually the best source for identifying capacity shortfalls. The departure and arrival delay as well as punctuality statistics obtained from the different sources (airspace users, airports, ANSPs), and compiled together, are among the best sources for identification of capacity imbalances and shortcomings. When it is noted that air traffic demand consistently exceeds the available airport and airspace capacity, the ATM planners should initiate a comprehensive capacity assessment process to identify bottlenecks, either for an airport or for airspace or for both. ~~for identifying bottlenecks~~. Other triggers for capacity assessment could be expected growth of the traffic, or due to change in ATM resource airport infrastructure, procedures or change in the traffic mix, etc.

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

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

Stakeholders' consultation-

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

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

Note: For example, to establish an AAR Process;

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

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

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

--Doc 9971, Appendix II-B, 2

Past events and Case Studies-

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

Data Collection Phase-

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

Data	**Type of data/Time period**	**Units**
Traffic	Monthly, daily, hourly	Average/distribution
Traffic mix	Type of aircraft, Operator share, Patterns (AA/DD, ADA…)	Average/distribution

Data	**Type of data/Time period**	**Units**
Runway use	~~Hours~~ Hourly, Daily, Monthly	Average/distribution
Arrival Throughput	Hourly/30'/15'	Average/distribution
Departure throughput	Hourly/30'/15'	Average/distribution
Max observed throughput in peak	Hourly/ Daily	Average
Runway Occupancy Time(ROT)-Arrival	Per aircraft, runway and exit point	Average/distribution/median
ROT-Departure	Per aircraft, runway and entry point	Average/distribution/median
Separation on final approach	Distance or Time	Average
Separation Minima (Terminal airspace)	Distance	Average

Table 1- List of Data Considered for Airport Capacity Assessment Process

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Chapter 2 - Understanding Capacity

2.1 What is Capacity?

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

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

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

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

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

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

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

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

2.1.6 Some ANSPs may prefer not to declare capacities in advance based on normal operating circumstances, instead establishing these capacities daily based on known/current operational factors. Establishing capacities at different planning horizons provides an important reference for understanding the total system performance under normal operating conditions and provides a basis to work from when determining the impact of operational factors limiting capacity. These factors include – but are not limited to – Air Traffic Control Office (ATCO) availability and workload.

2.2 Importance of Capacity and Demand Assessment

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

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

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

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

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

2.2.6 DOC 9971 in Appendix II-D note that:

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

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

2.3 Key Performance Indicators for Measurement of Capacity

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

<u>KPI09 Airport Peak Capacity</u>

Definition: The highest number of operations an airport can accept in a one-hour time frame (also called declared capacity). Can be computed for arrivals, departures or arrivals + departures combined.
Measurement Units: • Number of departures per hour, • Number of landings per hour, • Number of (departures + landings) per hour
Operations Measured: The capacity declaration of an airport.

Variants: • Variant A: Airport peak arrival capacity • Variant D: Airport peak departure capacity • Variant AD: Airport peak movement capacity (departures + arrivals)
Objects Characterized: • The KPI is computed for individual airports.
Utility of the KPI: This KPI indicates the highest number of operations that an airport will can accept, using the most favorable runway configuration under optimum operational conditions. The runways may or may not be the most constraining factor for airport capacity: at some airports the most constraining factor may be the terminal airspace, the taxiways, the number of gates, passenger handling capacity etc. The KPI is typically used for scheduling and ATFM purposes, and to develop capacity investment plans.

KPI06 En-Route Airspace Capacity

Definition: The maximum volume of traffic an airspace volume will can safely accept under normal conditions in a given time period.
Measurement Units: • Variant 1: Movements/hr • Variant 2: Number of aircraft (occupancy count)
Operations Measured: • The nominal capability of an ANSP to deliver ATM services to IFR traffic in a given volume of en-route airspace, as seen at a given planning horizon.
Different Type of capacity for each horizon: • Planned capacity: expected values one or more years ahead for planning and investment purposes • Declared capacity: values used during the strategic and pre-tactical ATFM processes • Expected capacity: values as finalised at the end of the pre-tactical process • • Actual capacity: values as actually used on the day of operation during tactical ATFM and ATC.
Variants: • Variant 1: airspace throughput (entry flow rate) • Variant 2: airspace occupancy count
Objects Characterized: • The KPI is typically used at the level of individual sectors (sector capacity) or en-route facilities (ACC capacity).
Utility of the KPI: The KPI measures an upper bound on the allowable throughput or occupancy count of an en-route facility or sector.

Chapter 3 - Airport Capacity Assessment

3.1 Introduction

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

> ***Definition****: Airport capacity refers to the maximum throughput that an airport system or its individual components (runways, taxiways, terminals, airspace, etc.) can accommodate over a specific period (e.g., hourly, annually) without causing unacceptable delays*.
>
> *This document defines airport capacity as the maximum number of airport operations in a given aerodrome under specified conditions (e.g., aerodrome layout, aircraft mix, weather conditions, facilities, aircraft parking, etc.), taking into account all take-off and landing operations during a specified period of time (hour, day, month, year, season).*

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

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

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

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

3.2 Importance of Airport Capacity Assessment:

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

3.3 Factors to be considered for assessment of Airport Capacity

Numerous factors affect an airport's capacity, including:

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

3.4 Methodologies

<u>Calculating and Expressing Airport Capacity - Contributing Factors</u>

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

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

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

- Analytical tools use mathematical formulas to estimate capacity based on factors like runway occupancy time, separation standards, and aircraft mix (e.g., FAA's Airfield Capacity Model (ACM))-ACM is a widely recognized analytical tool used to calculate the runway capacity of an airport. It considers factors such as runway configuration, aircraft mix, weather conditions (VMC/IMC), and operational procedures. The model estimates capacity by analyzing the time intervals between successive aircraft operations. The FAA has upgraded this model over time to incorporate more features and improve accuracy.
- Mathematical models use formulas based on queuing theory and statistical analysis to estimate capacity. They consider factors like runway occupancy times and separation

requirements. These models can provide quick assessments but might oversimplify complex airport operations.

- Employing computer simulations to model aircraft and passenger flows under different scenarios and analyze their impact on capacity and delays.
    - ✓ Runway Capacity Analyzer: This tool employs Monte Carlo simulation to account for uncertainties in input parameters and provides probabilistic estimates of runway throughput. It can optimize flight sequences and analyze the impact of factors like fleet mix and required aircraft separation. This is the methodology used by EUROCONTROL when performing Airport Capacity Assessment, described in **Appendix B**.
    - ✓ Discrete Event Simulation Models: These models simulate individual aircraft movements on the ground (taxiways, runways, gates) and in the airspace as discrete events occurring over time. They can provide a detailed analysis of airport operations, including delays and bottlenecks, under various scenarios. They may also incorporate a 3D modeling capability.
- Analyzing historical operational data (e.g., arrival and departure rates, delays) to understand current capacity and identify constraints.

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

3.4.3 Key considerations when using models to assess Airport Capacity

- Data Accuracy: The accuracy of the model outputs heavily depends on the quality and granularity of the input data (e.g., traffic schedules, aircraft characteristics, operational procedures).
- Model Scope: Different models have varying scopes. Some focus primarily on runway capacity, while others can model the entire airport system, including terminals and landside operations.
- Level of Detail: The choice of model depends on the required level of detail and the complexity of the airport and the analysis being conducted.

Assumptions and Limitations:

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

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

3.5 Measures for Enhancement of Airport capacity

3.5.1 Airport capacity enhancement is a multi-faceted challenge, requiring a comprehensive approach that addresses various components of the airport ecosystem. It is important to differentiate between measures for improving airport capacity (new runways, new gates, wake RECAT, new procedures that reduce spacing between aircraft, etc.) and improving throughput or the use of existing capacity (A-CDM, etc).
3.5.2 Measures can be broadly categorized into infrastructure expansion, technological integration, and operational efficiency improvements. The following figure is a (indicative) list of airport capacity enhancement measures.

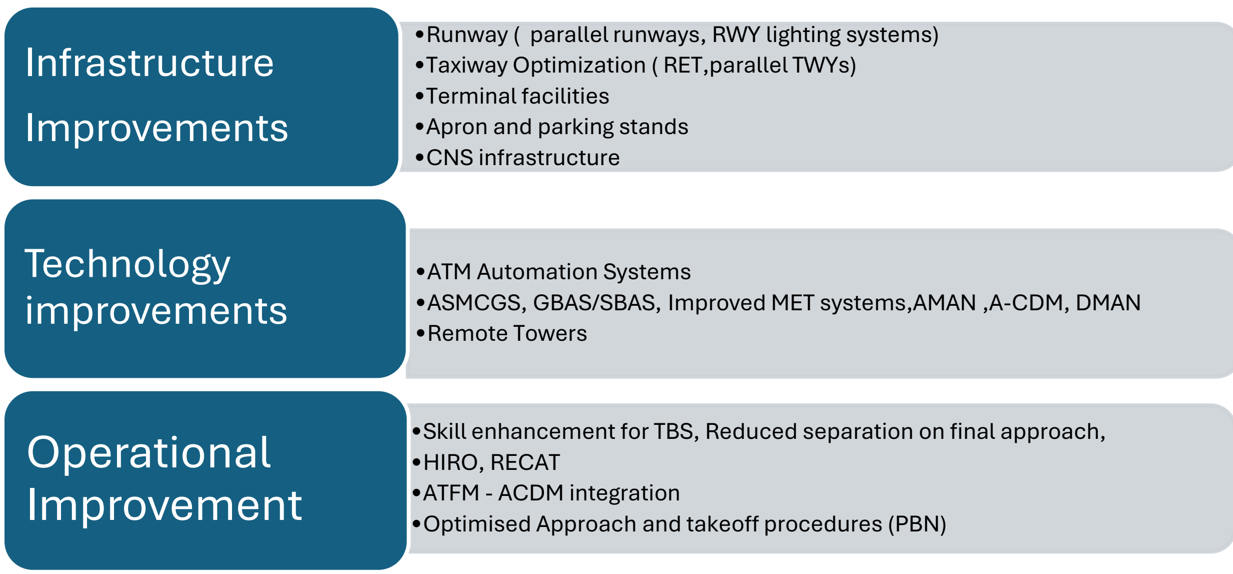

Figure 1- Airport Capacity Enhancement Measures

3.5.3 The primary factor driving the maximum arrival or departure throughput is linked to the arrival or departure separation attained, which itself is dependent on separation or spacing minima established and the delivery performance to these minima. The separation and spacing constraint are in turn linked to surveillance needs, and wake turbulence and runway occupancy of preceding traffic. Optimization can then come from enhancement to separation minima or to the ATC capabilities to deliver traffic closer to the minima, reducing unnecessary buffers.

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

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

1. Sharing information across the airport ensures that all stakeholders—from ground operations to air traffic control—are aligned and responsive to real-time and strategic developments.
2. Making better use of existing resources allows for optimization without the need for major infrastructure investments.
3. Balancing demand through dynamic scheduling and coordination helps prevent bottlenecks and improves flow.

4. Getting your sequence right—whether in aircraft departures, arrivals, or parking stand assignments—can significantly reduce delays and improve throughput; and
5. Being consistently consistent in applying procedures and standards fosters predictability and reliability, which are crucial for maintaining high operational performance.

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

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

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

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

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

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

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

- Enhanced Situational Awareness: A-CDM provides a common operational picture (COP) for all stakeholders, including airlines, air traffic control (ATC), ground handlers, and airport authorities. This shared view of real-time data on aircraft movements, parking stand availability, baggage handling, and passenger flows allows for a more accurate and dynamic assessment of current and projected capacity.
- Improved Predictability and Planning: By integrating data from various sources, A-CDM enables better prediction of potential bottlenecks and capacity constraints. This allows stakeholders to proactively adjust their plans, such as optimizing departure sequences, managing gate assignments, and allocating ground resources more efficiently, thereby maximizing existing infrastructure capacity.
- Optimized Resource Utilization: A-CDM facilitates the efficient allocation of critical airport resources like runways, taxiways, gates, stands, and ground support equipment. Through collaborative planning and real-time adjustments, it helps ensure that these resources are utilized to their fullest potential, reducing idle times and improving throughput.
- Reduced Delays and Congestion: By enabling quicker and more informed decisions, A-CDM helps mitigate the impact of disruptive events (e.g., adverse weather, technical issues) on airport operations. This leads to fewer delays, reduced taxi times, and less congestion

on the airfield and in the terminals, effectively increasing the operational capacity of the airport.

- Decision Making supported by data: A-CDM relies heavily on common operational picture, however supported by associated data support analytics to identify trends, predict future states, and evaluate the impact of different operational choices. This data-driven support provides a more robust foundation for capacity assessment, allowing airports to make more tailored and flexible decisions about infrastructure investments, operational procedures, also in the long planning horizon.
- Stakeholder Collaboration: At its core, A-CDM is about collaboration. It establishes formal and informal mechanisms for stakeholders to communicate, share information, and jointly resolve issues related to capacity and efficiency. This collective intelligence leads to more effective solutions than any single entity could achieve alone.

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

3.7 KPIs for Airport Performance Assessment

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

Total ATM (Departure, Arrival, Total)

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

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

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

3.8 Conclusion

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

Chapter 4 - Airspace (Sector) Capacity Assessment

4.1 Introduction

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

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

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

4.1.3 Airspace Capacity & Separation Standards

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

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

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

4.1.6 Additionally, the provision of air traffic services within uncontrolled airspace often results in periods of acute workload intensity that are less predictable than those in terminal areas. In APAC region, there are many such areas, which present unique mixed airspace challenges. However, this document specifically does not address capacity measurement of uncontrolled aerodrome and airspace operations.

4.2 Calculating and Expressing Airspace Capacity (Annex 11)

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

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

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

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

4.3 Importance: Accurate capacity assessment is essential for:

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

4.4 Factors to be considered

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

- Airspace Complexity: The size, shape, vertical limits, presence of Prohibited, Restricted and Danger Areas and route structure within the sector. Complex airspace with numerous crossing routes or altitude changes typically has lower capacity, as does the temporary designation of airspace for special activities or events.
- Traffic Characteristics: The volume, type (aircraft mix), speed, and direction of traffic flows. Predictable and uniform flows allow for higher capacity.
- ATC Procedures: The complexity and efficiency of separation standards, coordination requirements with adjacent sectors, coordination mechanism with Military Units and the use of standard routings.
- ATC Tools and Technology: The availability and sophistication of surveillance systems, automation tools, and communication systems. Advanced tools can enhance a controller's situational awareness and workload management, potentially increasing capacity.

- Controller Workload: The number and complexity of tasks required to manage traffic within the sector, including communication, coordination, conflict detection and resolution, and data management. An acceptable level of workload is a primary constraint on capacity.
- Meteorological Conditions: Adverse weather (e.g., thunderstorms, turbulence) can increase controller workload due to required deviations, special procedures and increased communication, thus reducing capacity.
- Sector Configuration: Changes in sector boundaries or the opening/closing of sub-sectors can dynamically affect capacity.

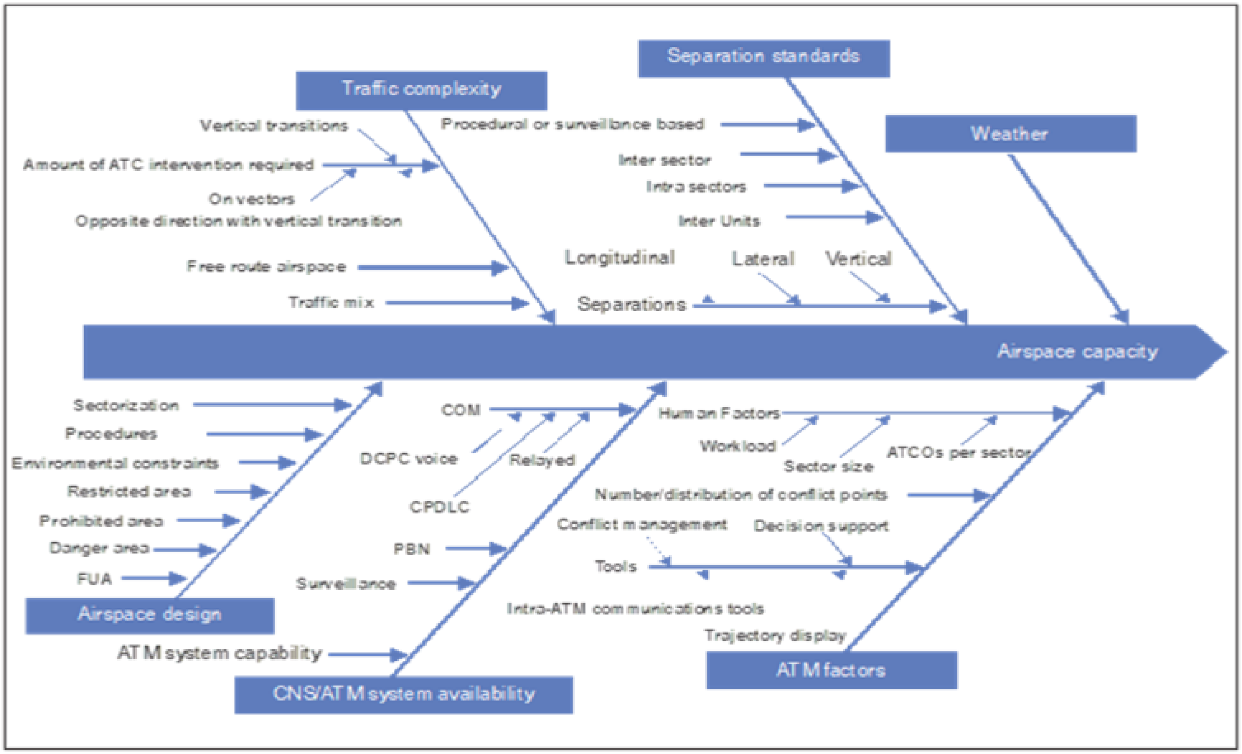

Figure 2- Factors Affecting Airspace (Sector) Capacity (Doc 9971)

4.5 Methodologies

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

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

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

- This allows for more granular analysis to mitigate and temporarily accept higher traffic demand values that exceed the entry counts monitoring value.
- Such occupancy count capacities require accurate and frequent ATC movement messages and ATS surveillance system data updates to the ATFM service system.

- Occupancy counts should be made available in advance of the flight entry into the given airspace and on a frequent basis.

Evaluation Models

4.5.2 Airspace sector capacity assessment models are tools and methodologies used to determine the maximum number of aircraft that an air traffic control (ATC) sector can safely and efficiently handle within a given period. These models help in understanding sector limitations, optimizing airspace utilization, and mitigating potential congestion and delays.

Methodologies for Assessment:

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

i. Mathematical occupancy and complexity models –

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

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

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

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

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

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

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

Air Traffic Controller (ATCO) Workload

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

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

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

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

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

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

4.5.6 Below are the evaluation methodologies based on ATCO workload:

Operational Experience o Investigate how much traffic a particular volume of airspace can handle, followed by interviews to ascertain the ATCOs' perception of traffic load. o Limited ability to determine capacity for a future ATC setting.
Fast Time Simulations (FTS) o These models are based on evaluating the time required by controllers to perform all necessary tasks associated with managing air traffic within a sector. o Tasks are often categorized (e.g., communication, coordination, conflict detection, flight data management), and time weights are assigned to each. o Often described as calculating task-load rather than workload, FTS do not aggregate the functional relationship between the traffic numbers, airspace sector factors and ATCO workload; as such, they lack ATCO judgement, experience and way of thinking. o This can be mitigated by involving active ATC staff in an iterative process of simulation refinement through rigorous data analysis
Real Time Simulations (RTS) o RTS involves ATCOs, pilots, and a model of an ATC system to create the full operational environment. o While realistically capturing the human element, they are often costlier and require additional infrastructure along with longer simulation time and training of personnel.

4.5.7 Benefits and Limitations:

- Entry/Occupancy Count: Simple to implement but may not accurately reflect controller workload or airspace complexity.
- Frequency Occupancy: Focuses on a key controller task but might not capture other workload drivers.

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

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

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

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

4.6 Measures for Enhancement of airspace capacity

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

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

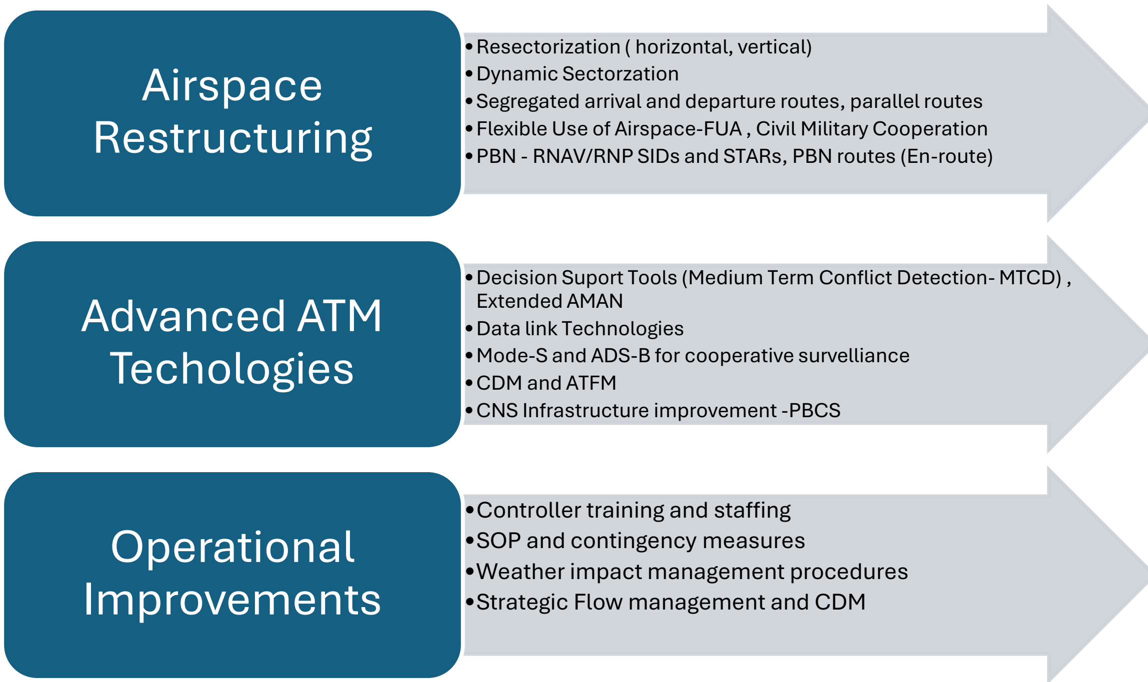

Figure 3- Airspace Sector Capacity Enhancement Measures

4.6.3 By integrating these measures, air navigation service providers can significantly enhance airspace sector capacity, leading to fewer delays, more direct routes, reduced fuel consumption, and improved environmental performance.

4.6.4 In summary, airspace sector capacity assessment is a vital process for ensuring the safe and efficient management of air traffic. By considering the various influencing factors and employing appropriate assessment methodologies, ATC authorities can effectively determine the operational limits of their airspace and implement strategies to optimize its use while maintaining acceptable levels of safety and service.

References

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

Appendix A – Airport Capacity Assessment

A-1 Determining Airport Arrival Rate (AAR)

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

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

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

--Doc 9971, Appendix II-B, 1.1

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

Definitions

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

Administrative Considerations

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

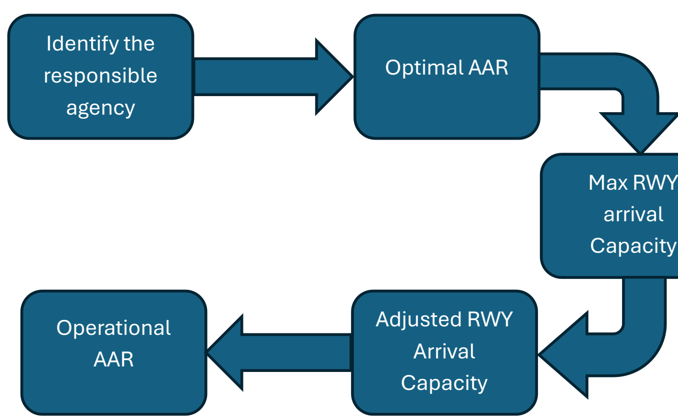

Figure APP.A- 1 Simplified Methodology for Establishing AARs[1]

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

<u>Optimal AAR</u>

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

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

<u>Maximum runway arrival capacity</u>

Calculate the maximum runway arrival capacity as follows:

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

<u>Adjusted runway arrival capacity</u>

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

- intersecting arrival and departure runways;
- lateral distance between arrival runways;
- dual use runways — runways that share arrivals and departures;
- land and hold short operations;
- availability of high-speed taxiways;
- airspace limitations and constraints;
- procedural limitations (noise abatement, missed approach procedures);
- taxiway layouts; and
- meteorological conditions.

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

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

<u>Operational AAR</u>

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

- aircraft type and fleet mix on final;
- runway conditions;
- runway/taxiway construction;

- equipment outages;
- approach control constraints; and
- wind (speed & direction).

Operational AAR = Optimal AAR - Adjustment Factors

A-2 Airport Capacity Assessment Process

Example of Airport Capacity Assessment Process by EUROCONTROL Network Manager

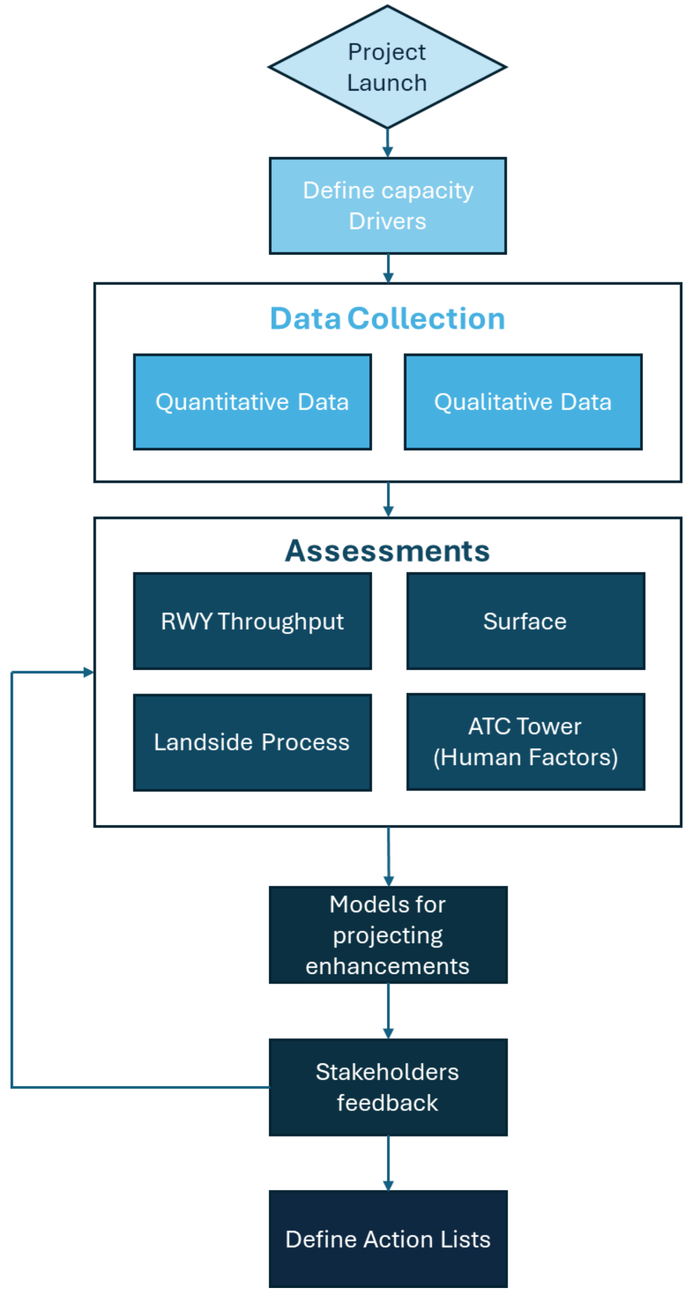

Figure APP.A- 2 Simplified Flow Chart on Methodology for Airport Capacity Assessment by EUROCONTROL

The explanation of the steps is as follows

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

    c. Surface
    d. Runway
    e. TMA

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

Appendix B – Airspace Sector Capacity Assessment

B-1 FAA sector capacity assessment model

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

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

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

15 minutes x 60 seconds = 900 seconds
900 seconds / 25 aircraft = 36 seconds per aircraft

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

$$\boldsymbol{Optimum\ Sector\ Capacity} = \frac{\mathbf{60}\ \boldsymbol{x\ Average\ Sector\ Flight\ Time}\ (\boldsymbol{min})}{\mathbf{36}\ (\boldsymbol{seconds})}$$

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

Table APP.B- 1 Simplified Flying-time-based Method for calculating Sector Capacity[2]

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

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

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

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

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

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

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

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

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

Steps for building a workload model:

1. Determine input and output parameters of the workload model:
   a. Identify tasks performed over a period of time (e.g., Mon-Fri, 0700-1900);
   b. Record task times and task distributions to execute each task; and
   c. Sum the task times to estimate of workload for each time period (e.g., rolling 15-minute intervals for 1440 intervals in 24 hours).
2. Set the workload threshold to 90% of the theoretical workload (e.g., 810 sec for a theoretical 15-minute/900 sec interval).
3. Describe the characteristics of traffic complexity for each period.
   a. Consider three complexity types: cruise, transition (climb/descent), and delay – which may be individual or combined; and.
   b. For each complexity type, consider if separation-related activity is low or high.
4. Determine the complexity profile that characterizes sector operations over a period of time; for each complexity type:
   a. Set an alert value according to the highest observed traffic count – hence, less complex sector operations receive higher alert values and more complex sector operations receive lower alert values;
   b. Express the occurrence of each complexity type as a percentage;
   c. Calculate the weighted average by multiplying the values from 4a and 4b; and
   d. The weighted averages are summed together and rounded to determine the monitoring value.

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

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

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

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

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

B-2 Brazil sector Capacity Assessment Model

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

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

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

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

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

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

Sector capacity is the function of the following factors:

- $\boldsymbol{\varphi}$: factor of controller availability, defined as the percentage of time available to plan the aircraft separation procedures;
- $\boldsymbol{\delta}$: average distance flown by aircraft in the sector, which is a function of the ATS route structure within the sector;
- $\boldsymbol{\eta}$: number of controller-pilot communications for each aircraft in the sector;
- $\boldsymbol{\tau}_{m}$: average duration of each controller-pilot communication; and
- $\boldsymbol{v_m}$: average speed of the aircraft in the sector.

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

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

The values of the factors $\boldsymbol{\varphi}$, $\boldsymbol{T}$, $\boldsymbol{\eta}$ and $\boldsymbol{\tau_m}$ are collected empirically, following the standardized procedures specified by the appropriate ATS authority.

Example for calculating the capacity:

- factor of controller availability: $\boldsymbol{\varphi}$ = 60%
- average flight time spent by the aircraft crossing the sector: $\boldsymbol{T}$ = 12 minutes
- number of controller-pilot communications for each aircraft in the sector: $\boldsymbol{\eta}$ = 6
- average duration of each controller-pilot communication: $\boldsymbol{\tau_m}$ = 9 seconds

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

Number of aircraft controlled simultaneously by a single controller
$\boldsymbol{N = 8}$

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

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

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

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

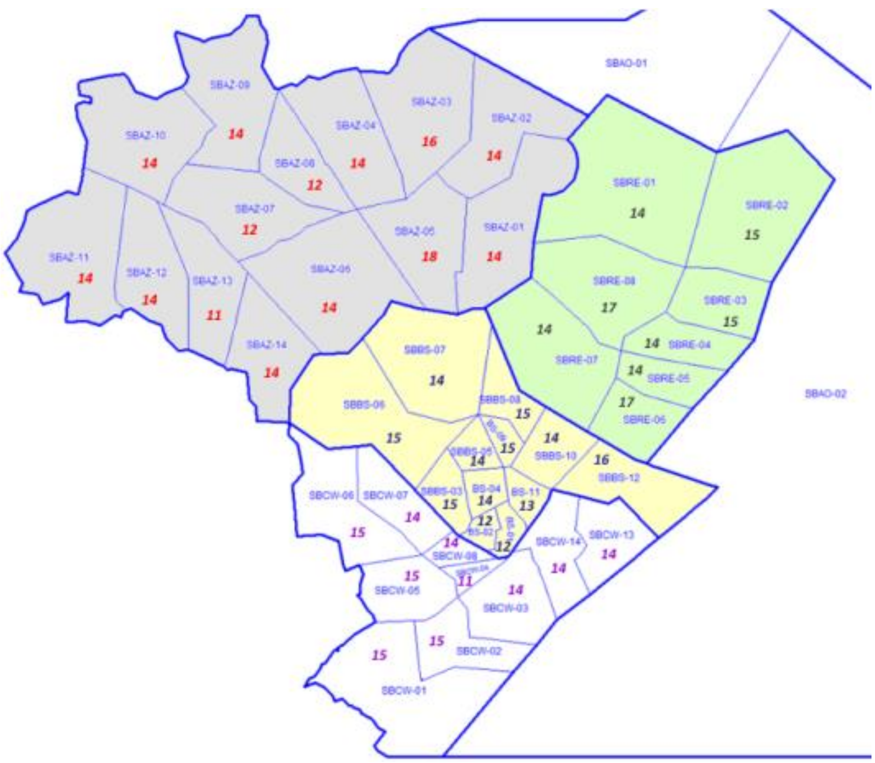

Figure APP.B- 1 Calculated Sector Capacity in Brazil

B-3 Saudi Arabia Capacity Assessment Model

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

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

- φ**: ATCO Availability factor (expressed as %)**, defined as the percentage of time available for planning aircraft separation procedures;
- T: **Average flight time on the aircraft in the sector** (the unit of time needs to be the same as for τ_m);

- η : **Number of controller-pilot communications for each aircraft in the sector**; and
- τ_m: **Mean duration of each controller-pilot communication** (the unit of time needs to be the same as for T).

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

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

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

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

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

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

B-4: EUROCONTROL Methodology

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

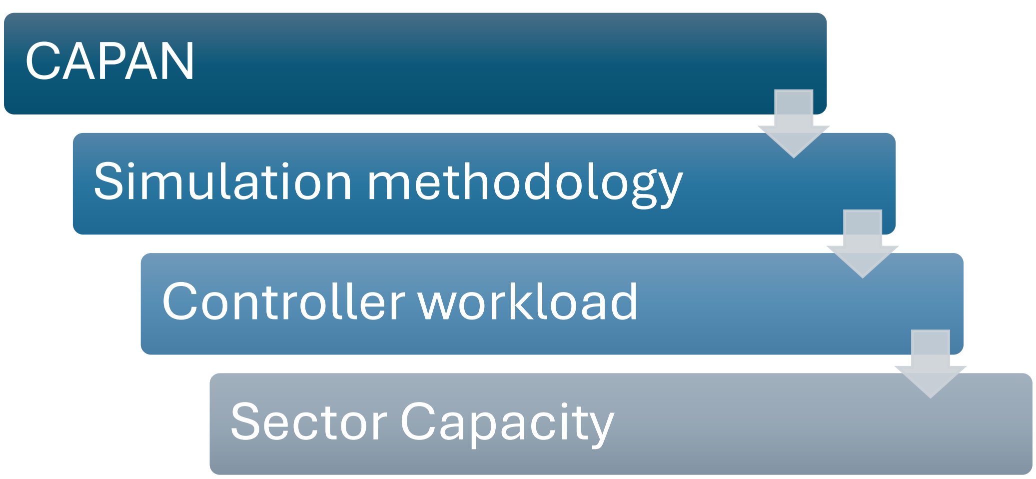

Figure APP.B- 2 Simplified Illustration on CAPAN Methodology

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

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

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

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

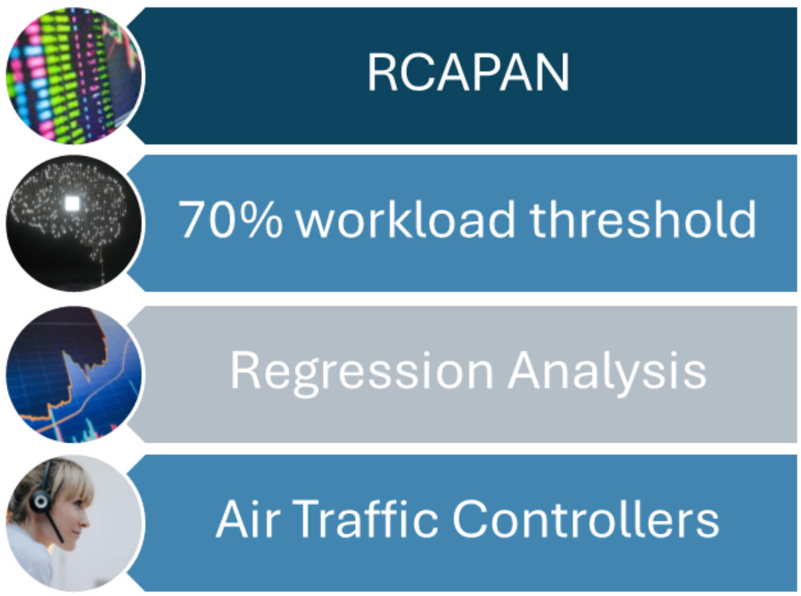

Figure APP.B- 3 CAPAN Main Principles

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

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

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

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

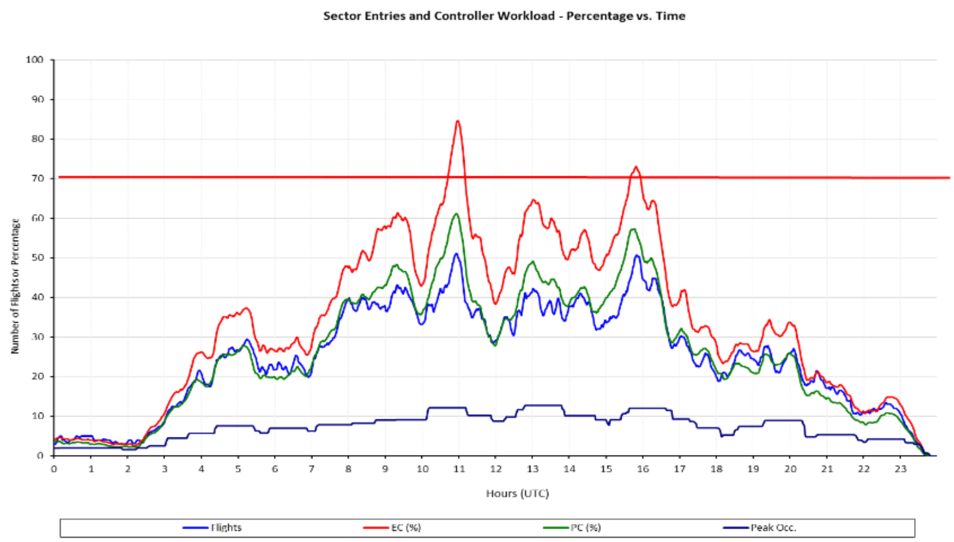

Figure APP.B- 4 Relationship between Sector Entries and Controller Workload

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

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

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

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

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

Table APP.B- 3 CAPAN Workload Thresholds

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

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

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

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

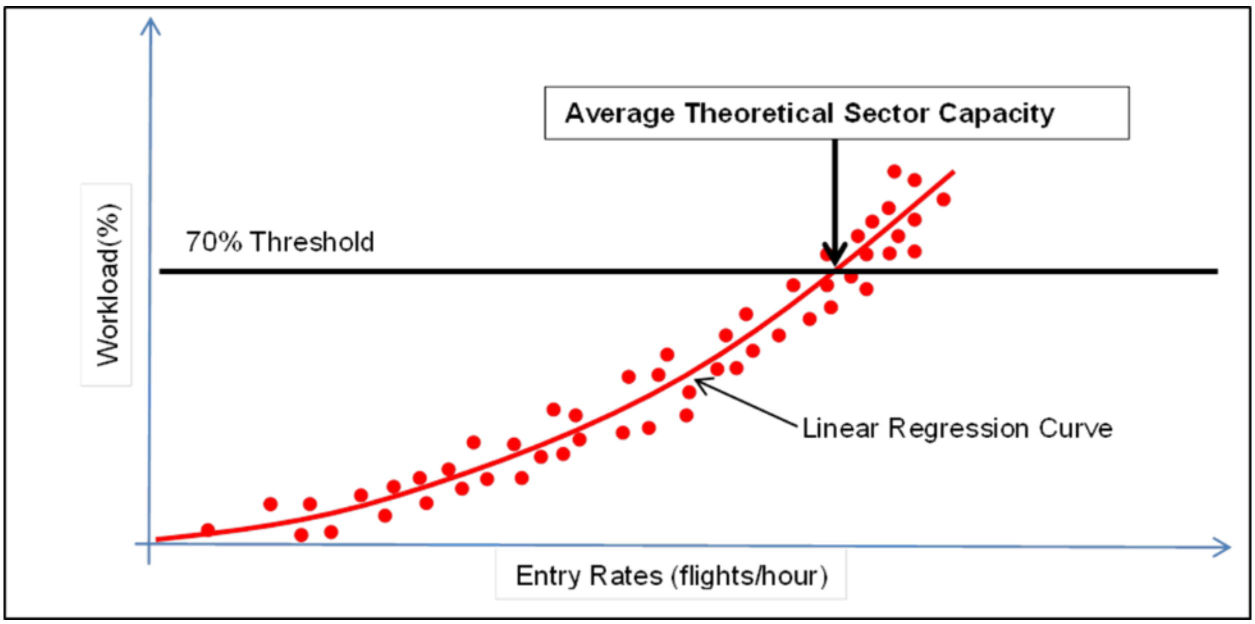

Figure APP.B- 5 Calculation of Regression Capacity

CAPAN Input Data

Traffic Data

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

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

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

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

Airspace Data

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

Aircraft Performance

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

ATC Model

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

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

Standard model for controller tasks for both ACC and TMA environment

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

Divided into 5 main task categories:

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

Appendix -C – Capacity Assessment Examples from States

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

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

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

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

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

Table APP.D- 1 Potential Runway Arrival Rate[3]

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

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

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

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

Australia

Brisbane and Melbourne airport capacity expectations:

- single runway: **48** (24 arrivals - 150 seconds between arrivals, 24 departures, VMC)
- single runway: **40** (20 arrivals - 180 seconds, 20 departures, IMC)

Japan

Airport capacity expectations:

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

- Narita (dual runways): 56-64
- Haneda (4 runways): 74

New Zealand

Auckland airport capacity expectations:

- single runway: **45** (VMC)
- single runway: **39** (IMC circling)
- single runway: **37** (IMC below circling with missed approach protection for jets)
- single runway: **32** (IMC below circling with missed approach protection)

ATC Sector capacity expectations:

- terminal/low level Category T airspace: **12** aircraft
- en-route Category S airspace: **15** aircraft
- en-route Category R airspace: **15** aircraft

Singapore

Changi airport capacity expectations:

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

Thailand

Suvarnabhumi airport capacity expectations:

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

United States of America

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

Aerodrome	Runways	IMC	VMC
KATL	5	104	126
KORD	5	84	112
KDFW	5	90	96
KATL	4	92	112
KDEN	4	-	114
KLAX	4	64	80
KORD	4	-	92
KATL	3	76	96
KDEN	3	-	96
KIAD	3	72	100
KATL	2	68	82
KJFK	2	-	58
KSDF	2	40	52
KATL	1	34	42
KSDF	1	20	26
KSFO	1	25	27

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

Average airport arrival capacity expectations (range):

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

ATC Sector capacity expectations:

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

Summary

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

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

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

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

Table APP.D- 4 Capacity Expectations Summary

DRAFT

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGION AIR TRAFFIC MANAGEMENT CONTINGENCY FRAMEWORK

(APAC RACF)

Version 1.0, November 2026

Approved by APANPIRG/37 and published by
the ICAO APAC Regional Office

ASIA/PACIFIC REGION ATM CONTINGENCY FRAMEWORK

TABLE OF CONTENTS

Contents

FOREWORD

Guidelines for contingency measures for application in the event of disruptions of air traffic services (ATS) and related supporting services were first approved by the Council on 27 June 1984 in response to Assembly Resolution A23-12, following a study by the Air Navigation Commission and consultation with States and international organizations concerned, as required by the Resolution. The guidelines, published in Attachment C to Annex 11 — *Air Traffic Services,* were subsequently amended and amplified in light of experience gained with applying contingency measures in various parts of the world and differing circumstances.

This document provides guidelines to ensure the safe and orderly flow of international air traffic across the ICAO Asia/Pacific (APAC) Region in the event of disruptions of ATS or related supporting services, when they may lead to contingency events, and to preserve the availability of major ATS routing in such circumstances. This document replaces and supersedes the APAC Region air traffic management (ATM) Contingency Plan Version 3.0. To support air navigation services providers (ANSPs) in developing their national contingency and emergency plans, a National ATM Contingency Plan Template, ATS Emergency Response Template and Tower Emergency Plan Template are available on the ICAO APAC Office website [link]. In accordance with Annex 11 provisions, it the regional contingency the arrangements and procedures to support effective regional collaboration, minimize the impact of disruption, and ensure the continued safety of flight operations.

Implementing the regional framework will prepare the region to respond to and manage contingency events effectively. States are responsible for ensuring they comply with the ICAO provisions concerning contingency and emergecy planning and implementation.

————————

RECORD OF AMENDMENTS

Amendment Number	Effective Date	Initiated by	Paragraph/ Reference	Remarks
1				

ABBREVIATIONS AND ACRONYMS

ACC	Area Control Centre
ACG	ATM Contingency Group
AIS	Aeronautical Information Service
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider
APP	Approach
ATA	Air traffic advisory
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATS	Air Traffic Services
ATS unit	Air Traffic Services Unit
BPE	Basic Planning Elements
CAA	Civil Aviation Authority
CAT	Contingency Category
CCC	Contingency Coordination Committee
CCT	Contingency Coordination Team
CDM	Collaborative Decision-Making
CNS	Communications, Navigation, Surveillance
CPA	Contingency procedures and arrangements
CR	Contingency Route
FIC	Flight Information Centre
FIR	Flight Information Region
FIS	Flight Information Service
FLAS	Flight Level Allocation Scheme
FPL	Flight Plan
GNSS	Global Navigation Satellite System
IATA	International Air Transport Association
IVATF	International Volcanic Ash Task Force
LOA	Letter of Agreement
MET	Meteorological
RACF	Regional ATM Contingency Framework
RCC	Rescue Coordination Centre
RSC	Rescue Sub-centre
SAR	Search and Rescue
SMS	Safety Management system
SRA	Safety Risk Assessment
TWR	Tower
VAAC	Volcanic Ash Advisory Centre

Chapter 1

INTRODUCTION

1.1 The Asia/Pacific Region ATM Contingency Framework (APAC RACF) has been developed to assist in providing for the safe and orderly flow of international air traffic in the event of disruption or potential disruption of ATS and related supporting services and infrastructure in the APAC Region, in accordance with the provisions of ICAO Annex 11 – *Air Traffic Services*, Chapter 2, 2.32 and its Attachment C. This framework will assist States, ANSPs, and involved aviation stakeholders in developing their own national contingency plans.

1.2 The framework includes contingency procedures and arrangements (CPA) – a set of predefined contingency scenarios with their associated pre-agreed CPAs between adjacent area control centres (ACCs), and relevant ATS units when required, that would be applied in most contingency events – to be implemented in cases when the airspace users decide to circumnavigate airspace(s) due to contingency-related events such as armed conflict, adverse weather, natural disasters, or public health emergencies. The framework also includes scenarios when the ATS are disrupted due to events such as ATM system failure, industrial actions, national security, or pandemic, which might significantly affect traffic routing and increase air traffic movements in other airspace(s) and require cross-border coordination.

Note. Where the ATS are provided by a service provider based on multilateral agreements among States, arrangements should be implemented to ensure that contingency management is part of such agreements, and special procedures to be applied in case of contingency events may be required for the relevant ATS units, such as approach and towers in the States concerned. In this context, the term ACC encompasses the ATS units involved in contingency management.

1.3 The framework adheres to the full ATM contingency management cycle, which consists of four Phases: Prepare and Plan, Response, Recovery, and Post-assessment.

1.4 The framework defines the roles, responsibilities and functions of the Contingency Coordination Committee (CCC), and the ATM Contingency Group (ACG) that manage State's response to contingency events. The framework also describes the role and responsibilities of the Contingency Coordination Teams (CCTs), as a mechanism used to ensure effective regional coordination and collaboration in responding to and managing contingency events.

1.5 The framework supports preparedness to address contingency events at the national, regional and inter-regional levels through guidelines on the planning aspects and the CPAs to be implemented. It also provides guidance on the roles of each stakeholder and the process to be followed.

1.6 The ICAO APAC Regional Office will coordinate with ICAO Headquarters and the Regional Offices concerned about any amendments to the RACF and its components.

1.7 The relevant ICAO Regional Offices will distribute this document to all States and international organizations within their regions.

1.8 This version and its updates are available on the ICAO APAC Office website [link].

1.9 To help keep this document up to date, Stakeholders are encouraged to send their comments/suggestions for improvements to the ICAO APAC Regional Office (apac@icao.int).

1.10 The RACF comprises two main aspects: national and regional, as reflected in **Figure 1**. It also describes the regional ATM contingency planning principles and the basic planning elements.

Scope and scale of contingency event and response

1.11 To establish operational clarity, the RACF delineates the scope of disruptions across three distinct thresholds:

Crisis: The baseline term defining any macro-event (e.g., natural disasters, public health outbreaks) with a major, destabilizing impact on standard operations.

Emergency: A localized, abnormal act or failure directly impacting specific facility or aircraft operations.

Contingency: The specific ATM classification used when a crisis or an emergency degrades service levels or limits airspace availability, requiring a coordinated operational response. Therefore, the term "contingency" refers to events that impact airspace operation. Not every emergency or crisis requires a contingency response, particularly if they affect regional traffic flow.

Escalation Example: A localized technical emergency, such as a catastrophic power failure resulting in an 'ATS Zero' at a major ACC, can rapidly escalate into a Level 3 contingency event by disrupting traffic flows across multiple neighbouring flight information regions (FIRs). Another example is when an emergency at a major aerodrome hub affected the traffic as many flights would be diverted, rerouted, or delayed in neighbouring FIRs.

1.12 The following three levels describe the scale of a contingency:

Level 1: contingency event remained within the State's delineated airspace that can be managed locally;

Level 2: cross-border contingency event requiring collaboration between two adjacent States; and

Level 3: cross-border contingency event requiring collaboration of more than two States.

1.13 To specify more clearly the necessary mitigation measures for any contingency scenario, the possible degradation of ATS could be due to human resources or any supporting services is presented in four statuses:

a) ATS Normal;

b) ATS Degraded – ATC available with limitations;

c) ATS Degraded – Advisory services (ATA), flight information services (FIS) and/or Alerting Service available; and

d) ATS Zero (complete loss of ATS).

1.14 The airspace availability is described in three statuses:

a) Airspace Available (full access to the whole airspace);

b) Airspace Partially Available (access limited to the portion of the airspace impacted by the contingency event, but aircraft can operate in the other portion of the airspace); and

c) Airspace Not Available (the airspace is closed or avoided by the airspace users, irrespective of the ATS status).

1.15 The following are the categories of contingency events that identify the scope of the event and its potential impact on traffic flows. These categories are based on combinations of airspace availability and status of air traffic services:

Category A – Airspace Available and ATS Degraded – ATC available with limitations.

Category B – Airspace Partially Available and ATS Normal.

Category C – Airspace Partially Available and ATS Degraded – ATC available with limitations.

Category D – Airspace Available or Partially Available and ATS Degraded – ATA, FIS and/or Alerting service available.

Category E – Airspace Available or Partially Available and ATS Zero.

Category F – Airspace Not Available or avoided by airspace users regardless of the status of the ATS.

1.16 The matrix in **Table 1.** provides the combinations of airspace availability and status of air traffic services:

	ATS Normal	**ATS Degraded – ATC Available with Limitations**	**ATS Degraded** – ATA, **FIS and/or Alerting Service Available**	**ATS Zero**
Airspace Available	**Normal Situation**	CAT A	CAT D	CAT E
Airspace Partially Available	CAT B	CAT C	CAT D	CAT E
Airspace NOT Available	CAT F	CAT F	CAT F	CAT F

Table 1. Matrix between airspace availability and status of air traffic services

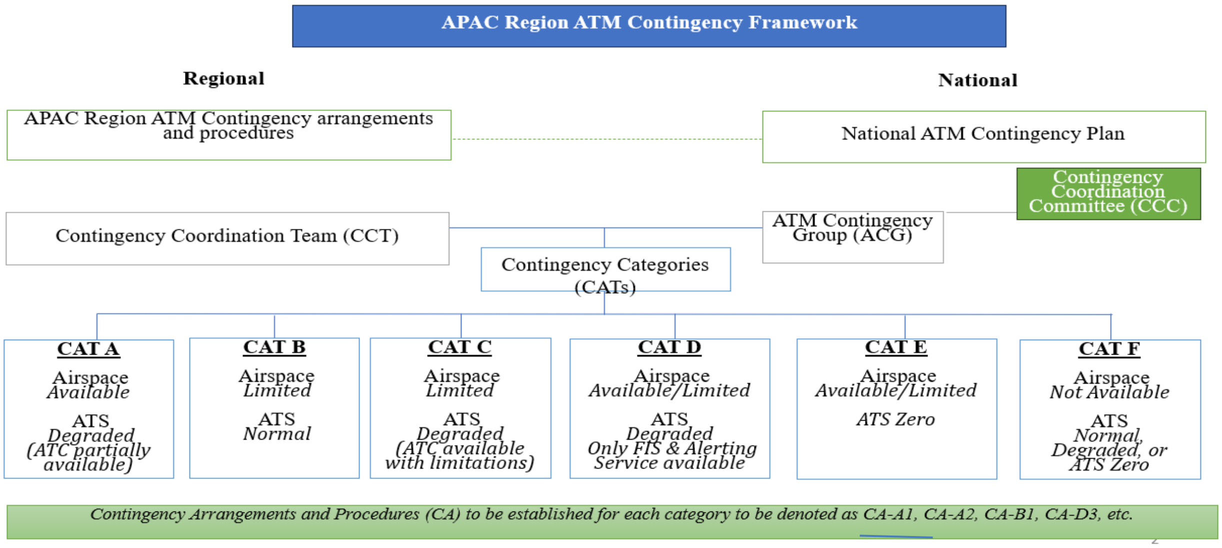

Figure 1. APAC Region ATM Contingency Framework

1.17 Events that would impact the availability of airspace and/or the provision of ATS include among others: industrial action, pandemic, earthquake, adverse weather, ATM system failure, volcanic ash, nuclear emergency, military activity, national security, political unrest, conflict zones, complete loss of facility operational capability, loss of manpower, global navigation satellite system (GNSS) radio frequency interference (RFI), cyber security, major events.

1.18 The relations of different contingency events with the national, regional, and global focus are provided in **Figure 2**, for illustrative purposes (Reference ICAO EUR Doc 031).

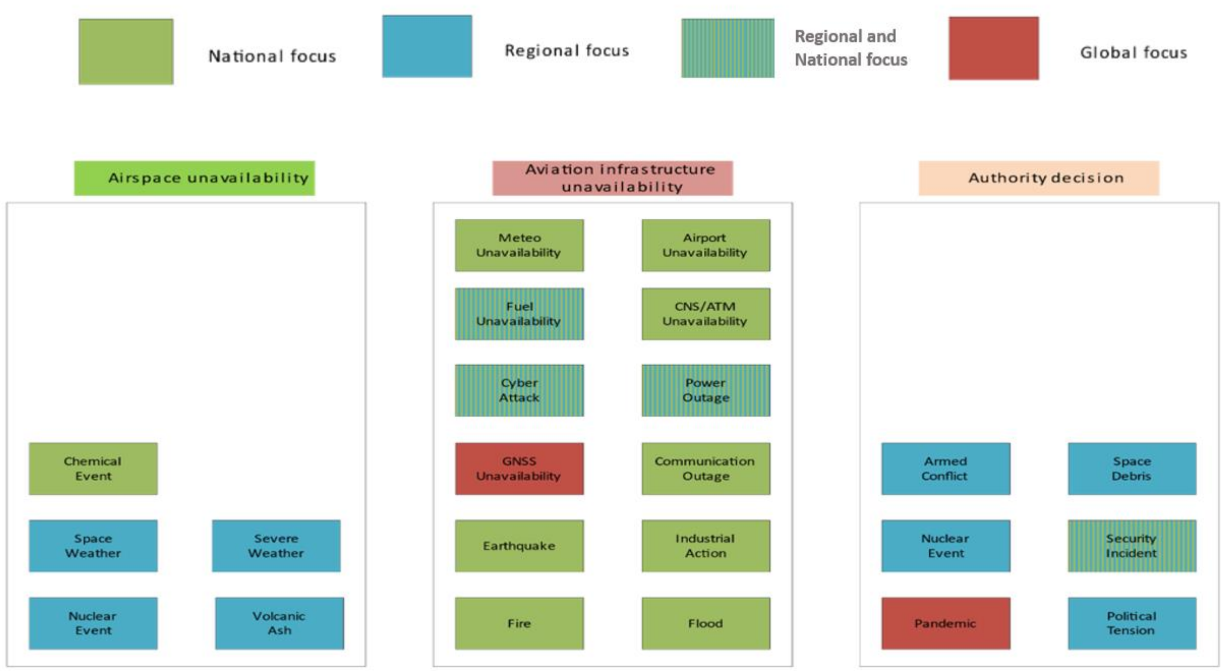

Figure 2. Relationships of different contingency events with the national, regional, and global focus

ATM Contingency Planning Principles

1.19 The ATM contingency planning principles in **Appendix A** form the basis for the development of contingency responses and management of any contingency event including bilateral and multilateral States CPAs.

ATM Contingency Basic Planning Elements

1.20 The Basic Planning Elements (BPE) in **Appendix B** define the minimum recommended considerations for inclusion in contingency responses, such as those related to Administration, Plan Management, Airspace Management, ATM Procedures, Pilot/Operator Procedures, Communications Facilities and Procedures, Aeronautical Support services including AIS and MET, and Contact Details of involved facilities and focal points in contingency response and management.

1.21 ANSPs should establish and implement a mechanism to determine the safety and operational impacts of a contingency event promptly to ensure an effective and rapid response to such an event

1.22 States and ANSPs should include aspects of contingency management in the training programme of all personnel involved in contingency management, including those related to the RACF and its components. Workshops and exercises at national level should be conducted annually, and cross-border ones at least every three years, to raise awareness and prepare the regions for effective response to contingency events.

APAC Region ATM Contingency Focal Points

1.23 The list of APAC Region ATM Contingency Focal Points is available on the ICAO APAC Office website [link]. States and international organizations are urged to keep the contact details of their focal points up to date by contacting the ICAO APAC Regional Office (apac@icao.int).

APAC Region ATM Contingency Monitoring Mechanism

1.24 The monitoring mechanism and status of the APAC Region's readiness to respond to contingency events are available at the ICAO APAC Regional Office website [link].

APAC Region Contingency Risk Register

1.25 A contingency risk registry for events that may require a contingency response based on the assessment of their potential impact regarding their severity and probability should be conducted by the ATM Sub-group every two years or earlier if deemed necessary. The registry is to be maintained on the ICAO APAC Regional Office website [link].

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CHAPTER 2

NATIONAL

2.1 In accordance with Annex 11, air traffic services authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services in the airspace for which they are responsible for the provision of such services. Such contingency plans shall be developed with the assistance of ICAO as necessary, in close coordination with the air traffic services authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned.

2.2 Preparatory actions should include the initial development of contingency plan that covers responses to contingency events categories A to E that are likely to affect the availability of airspace for civil aircraft operations and/or the provision of air traffic services and supporting services.

2.3 The responsibility for appropriate contingency action for airspace over the high seas continues to rest with the State(s) normally responsible for providing the services until, and unless, that responsibility is temporarily reassigned by ICAO to other State(s) in accordance with the provisions of Annex 11.

2.4 States are required to review annually their National ATM Contingency Plan and coordinate any amendments with neighbouring States and the ICAO APAC Regional Office. Copies of the latest version of the National ATM Contingency Plan should be provided to the ICAO APAC Regional Office for posting on its website [link].

2.5 ATM Contingency Plan Template, and an Emergency Checklist have been developed to support States in developing their national ATM Contingency Plans and responding to contingencies and emergencies. These documents are available on the ICAO APAC Regional Office website [link].

2.6 States are urged to conduct training for the personnel involved in contingency management as well as periodic contingency management tabletop exercises, as these are key elements for effectively responding to and managing a contingency event, supported by ICAO as required.

2.7 States should establish an ATM Contingency Group (ACG) responsible for planning, responding to and managing contingency events. During a contingency event, the ACG introduces CPAs (in full adherence to CDM principles) and provides up-to-date information at national and regional levels on the situation and associated contingency measures until the situation returns to normal operation. The ACG should perform its tasks in accordance with an established communication policy and coordination mechanism to engage internal and external stakeholders.

2.8 A National Contingency Coordination Committee (CCC), comprising high-level representatives from aviation and non-aviation key stakeholders, should be established to serve as the central authority for information exchange and strategic coordination during disruptions. As the primary decision-making body, the CCC supports the ACG in executing contingency and recovery workflows. The ACG shall maintain a continuous feedback loop with the CCC, providing updates on the situation, the status of implemented measures, operational challenges, and required high-level interventions. If a State possesses an existing national crisis and disaster management entity, a distinct CCC is unnecessary, provided the roles and functions defined in this framework are formally adopted by that entity.

2.9 The terms ACG and CCC are used as indicative names. States might elect to use different terms, especially if already-established entities perform the same tasks.

2.10 The ACG should be composed of the following as a minimum, other experts and representatives may be invited to join as required:

Note. The title "ACC Manager" is used throughout this document for illustrative purposes; in some States, these functions may be performed by an equivalent position. Additionally, these tasks may be delegated to designated staff acting on behalf of the Manager. Also, the case when the ATS provider's area of responsibility extends through multiple FIRs should be considered as the designated ACG.

a) ACC Manager as Lead;

b) Head of or their delegates: ATFM unit, AIS, CNS, MET, RCC; Airspace Planning; CAA/ANS (regulator); facility maintenance; airport operation;

c) Military Liaison Officer;

d) Managers or supervisors of other ATS units, as required;

e) Representative(s) of aerodrome, as required; and

f) Representatives of local air operators, as required.

2.11 The ACG functions should include, but not be limited to, the following:

a) develop National ATM Contingency Plan in coordination with all stakeholders;

b) ensure that all personnel involved in contingency management are competent and well trained;

c) conduct table-top exercises, local, national and cross-border exercises to test the preparedness for responding to contingency events;

d) convene promptly to exchange information to support the assessment of the situation responding to a contingency event;

e) identify which Contingency Arrangements and Procedures (CA) to apply;

In cases when the event is not covered in a CA, then the ACG must explore contingency arrangements and procedures to be implemented;

f) advise and coordinate with adjacent ATS units, ICAO Regional Office, and airspace users (IATA), if no other unit is in place to do so;

g) inform the CCC of the situation and indicate actions required from the CCC, if any;

h) activate the national ATM contingency plan and initiate the implementation of the associated contingency arrangements and procedures as reflected in the relevant CA;

At this stage required NOTAMs should be issued by all the States concerned.

i) keep always updated on the contingency situation;

j) review and update the contingency arrangements and procedures, as required;

k) participate and contribute to the discussions of the CCT when established by ICAO and provide required information and updates;

l) exchange up-to-date information with the adjacent ATS authorities concerned to coordinate contingency measures;

m) notify the designated organizations of the contingency situation sufficiently in advance and/or as soon as possible thereafter;

n) take necessary action to issue NOTAMs in accordance with the contingency plan or as otherwise required by the particular contingency situation. NOTAMs Templates should be prepared in advance and used as far as possible. In the case of foreseeable disruption, the advance notice should in any case not be less than 48 hours;

o) prepare actions for the recovery phase - resumption of normal operations;

p) assess and confirm if the situation is rectified and normal operations can be resumed;

q) agree on the deactivation of the contingency plan and advise the CCT, if established;

r) cancel the NOTAMs related to the contingency situation; and

s) conduct a post-event assessment for lessons learned.

2.12 The CCC should include high-level representation from the following as necessary:

a) Civil Aviation Authority as Lead;

b) ANSPs;

c) Military Authorities;

d) Aerodrome Operators;

e) Airspace users (Commercial air transport, business aviation, general aviation, cargo, state aircraft operations);

f) Meteorological Service Provider if not part of ANSP;

g) Search and rescue (RCC, RSCs, and mission control facilities);

h) Representatives of authorities or Ministry responsible for defence/national Security, Finance, Interior Affairs, International Affairs, Health, Transportation, Communication; and

i) Other relevant authorities/agencies.

2.13 The CCC functions should include, but not be limited to, the following:

a) convene rapidly to exchange information and provide high-level support and resources to the ACG in responding to and managing contingency events, as required;

b) take actions, such as mobilizing resources for the provisions of ATS;

c) facilitate coordination between appropriate civil and military authorities for the effective management of the airspace, including the establishment of contingency routing as applicable; and

d) coordinate internally and with the States and organizations concerned for actions that require high-level decision-making, as necessary.

2.14 The following provides the step-by-step actions to be taken in case of a contingency event:

Note. The title "ACC Manager" is used throughout this document for illustrative purposes; in some States, these functions may be performed by an equivalent position. Additionally, these tasks may be delegated to designated staff acting on behalf of the Manager. Also, the case when the ATS provider's area of responsibility extends through multiple FIRs should be considered as the designated ACG.

1- The ACC supervisor to action as per the applicable standards of operations;

2- ACC supervisor to inform the ACC Manager to assess the situation;

3- ACC Manager as the Lead of ACG calls for the ACG;

4- The ACG decides which CPA to apply;

5- The ACG Lead advises the adjacent States, ICAO Regional Office and IATA;

6- The ACG Lead informs the CCC, indicating if actions are required from the CCC;

7- ACG Activate the contingency plan (CPAs to be implemented);

8- NOTAM issuance by all the States concerned (affected FIRs), as applicable;

9- Contingency Response goes Live – ACG to call for meetings (in-person or via video conference);

10- ACG monitors and continuously assesses the situation;

11- ACG reviews and introduces adjustments to the CPAs as needed;

12- Contingency event ceased – ACC Manager advises the adjacent States and ICAO Regional Office and the CCC;

13- Deactivation of contingency plan (Cancellation of NOTAMs); and

14- ACG to carry out a post-assessment for improvements.

2.15 When informing the ICAO Regional Office (ref. step 5) or based on information received by ICAO, a CCT, as described in Chapter 3, may be established and follow the following steps:

1- To assess the situation, the need, and the scope of the CCT, the ICAO Regional Officer/ATM (RO) coordinates with the following:

   a) ICAO Headquarters and other Regional Offices concerned;

   b) Contingency Focal Points of States concerned;

   c) IATA; and

   d) Other organizations as needed.

2- ICAO Regional Office activates the CCT and calls for the first CCT Meeting;

3- CCT agrees on the implementation of CPAs;

4- CCT monitors and continuously assesses the situation;

5- ICAO arranges for periodic meetings (usually via web conference) of the CCT;

6- ICAO shares the outcome of CCT meetings and updates received;

7- Contingency event ceased – ICAO deactivates the CCT. In the event of a long running but stable contingency, the CCT may be put into monitoring status; and

8- CCT members carry out post-assessments for improvements.

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CHAPTER 3

REGIONAL

3.1 A Contingency Coordination Team (CCT) would be established with the support of the ICAO APAC Regional Office to effectively respond to and manage a contingency event involving more than one State (Level 2 or 3). CCT is a forum for exchanging information related to a contingency event and for agreeing on the implementation of necessary CPAs in a collaborative manner.

3.2 A Contingency Coordination Team (CCT) should be established from the following members:

- a) ICAO (Headquarters and Regional Offices);
- b) States concerned (CAA and ANSPs);
- c) IATA (representing airspace users affected by the contingency events); and
- d) other organizations and agencies as deemed necessary.

3.3 The main functions of the CCT are not limited to the following:

- a) continuous monitoring of the information from all relevant sources;
- b) initiate action for the activation/deactivation of the CPAs determined for the contingency event;
- c) arrange for the constant exchange of relevant information to the ICAO Regional Offices and Headquarters; and
- d) enable the exchange of up-to-date information among States directly concerned and States that would be potentially involved in contingency response; and

3.4 Tactical ATC considerations during periods of overloading may require re-routing, which might be coordinated through CCT.

3.5 CCT should facilitate the agreement on alternative routes to maximize the use of existing available airspace, level of ATS, and communication, navigation, and surveillance.

3.6 In the event that ATS is disrupted, NOTAM should be published indicating the following:

- a) time and date of the beginning of the contingency measures;
- b) airspace available for landing and overflying traffic and airspace to be avoided;
- c) details of the facilities and services available or not available and any limits on ATS provision (e.g., ACC, APP, TWR, ATA, FIS and alerting service), including an expected date of restoration of services if available;
- d) information on the provisions made for alternative services;
- e) ATS contingency routes that have been activated as alternate routes;
- f) procedures to be followed by neighbouring ATS units;
- g) procedures to be followed by pilots; and
- h) any other details with respect to the disruption and actions being taken that aircraft operators may find useful.

3.7 In the event that the State/ANSP is unable to issue NOTAMs, arrangements will be made for another NOTAM Office to issue the required NOTAMs.

3.8 **Draft NOTAMs** are included as templates in each CPAs to be used in case of a contingency event.

3.9 **Contingency Routes (CRs)** might be developed in advance and be included in the CPAs in case the traffic cannot be accommodated on the current ATS route structure.

3.10 Where possible, aircraft on long-haul international flights should be given priority with respect to cruising levels.

3.11 It is recognized that operators may incur economic penalties during a contingency event. Therefore, air traffic flow management (ATFM) measures should be implemented to the extent possible to make operations more predictable.

Traffic Information Broadcast by Aircraft (TIBA) Procedures

3.12 Traffic Information Broadcast by Aircraft (TIBA) procedures shall be applied in accordance with ICAO Annex 11 – *Air Traffic Services*, Attachment B. The TIBA frequency for the APAC Region is 128.95MHz in accordance with Asia/Pacific Planning and Implementation Regional Group (APANPIRG) Conclusion 13/7.

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CHAPTER 4

CONTINGENCY PROCEDURES AND ARRANGEMENTS (CPAS)

4.1 Contingency procedures and arrangements (CPAs) are designed to bridge the gap between the planning and implementation phases. They may include a set of pre-agreed contingency arrangements and procedures to be implemented by ATS units in response to contingency events.

4.2 The CPAs should be developed and maintained based on a determination of the airspace availability and the status of air traffic services to be provided. The matrix below (**Table 2**) illustrates the link of each CA with the contingency category:

	ATS Normal	ATS Degraded ATC available with limitations	ATS Degraded ATA, FIS and/or Alerting Service	ATS Zero
Airspace Available	**Normal Situation**	CAT A CA-A[number]	CAT D CA-D[number]	CAT E CA-E[number]
Airspace Partially Available	CAT B CA-B[number]	CAT C CA-C[number]	CAT D CA-D[number]	CAT E CA-E[number]
Airspace NOT Available	CAT F CA-F[number]	CAT F CA-F[number]	CAT F CA-F[number]	CAT F CA-F[number]

Table 2. Contingency Procedures and Arrangements (CPAs) Matrix

4.3 The CPAs therefore cover a comprehensive range of contingency events; however, appropriate CPAs might be required to address other contextual factors. Therefore, ANSPs are required to effectively engage with their neighbouring States, airspace users (IATA) and ICAO, if needed, via the CCT, to agree on the specific CPAs for such events.

4.4 CPAs are required when the normal arrangements and procedures agreed upon in the ATS letters of agreement (LOAs) between adjacent ATS units cannot be applied, hence they are temporary in nature and should be periodically reviewed and updated as needed.

4.5 The following CPAs, that should be detailed utilizing the template in Appendix C, can be populated and reused as required during contingency events. The CPAs can be provided on a web-based platform or an app for easy access and utilization:

CPA-A1:
Airspace is available as usual, but ATS is degraded due to events such as industrial action, pandemic, earthquake, nuclear emergency, adverse weather, ATM system failure, and GNSS RFI, which would affect the provision of ATS to some extent. In this kind of event, traffic will have access to the entire airspace; however, the ATS unit will be limited in providing services as usual.

CPA-B1
ATS is normal; however, the airspace is limited due to contingency events such as Volcanic Ash, nuclear emergencies, military activity, and weather. In this kind of event, traffic would not have access to the affected portion of the airspace; accordingly, the ATS unit will have to accommodate traffic in the available airspace by introducing changes to the ATS route structure.

CPA-C1
Airspace is limited, and ATS are degraded due to contingency events such as Volcanic Ash, nuclear emergencies, military activity, ATM system failure and adverse weather. This kind of event requires procedures to circumnavigate traffic away from the affected airspace, taking into consideration the limitations of ATS.

CPA-D1
Airspace is available or limited, but no air traffic control (ATC), only flight information services can be provided, due to a contingency event such as a pandemic, national security, industrial action, or ATM system failure. In this kind of event, air traffic control is affected, but other ATS will remain available or arranged. One contingency measure would be changing the airspace classification to Class G.

CPA-E1
Airspace is available or limited, but ATS is unavailable (ATS Zero) due to a contingency event, such as a complete loss of facility operational capability, total loss of manpower, or security. In this kind of event, ATS could not be provided; however, traffic might still have access to, or operate within, the affected uncontrolled airspace. This may require neighbouring ATS units to reroute traffic to avoid the affected airspace.

CPA-F1
Airspace is not available or avoided due to an imposed closure by the State or when airlines avoid the airspace due to adverse weather, military activities, or natural disaster, despite the status of ATS (normal or Degraded). This kind of event requires neighbouring ATS units to reroute traffic to avoid the airspace.

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CHAPTER 5

CONTINGENCY MANAGEMENT CYCLE

5.1 The contingency management should be a continuous, cyclic process recognizing that the effective management of disruptive events does not merely begin when air traffic services are lost and ends when the circumstances cease; however, it requires an active progression through four distinct, interconnected phases as illustrated in **Figure 3**:

Phase 1: Be Ready (Prepare/Plan)

Phase 2: Respond

Phase 3: Recover

Phase 4: Review & Improve

Figure 3. Contingency Management Cycle

5.2 By systematically applying these four phases, the region ensures that the aviation network maintains the maximum possible resilience, safety, and continuity during non-normal operations.

Phase 1: Be Ready (Prepare/Plan)

5.3 The foundational phase of the regional contingency loop focuses on proactive risk management, capability building, and vulnerability reduction.

5.3.1. Airspace Contingency Planning and Agreements:

a) Promulgation of Plans: States must establish, promulgate, and maintain proactive contingency plans to address anticipated threat levels before an emergency unfolds.

b) Bilateral and/or Multilateral Frameworks: States should establish formal cross-border understandings and regional coordination mechanisms to handle localized or widespread airspace closures effectively.

c) States/Administrations should include a list of emergency facilities in their State ATM Contingency Plans and/or Emergency Response Plans to facilitate timely coordination and continuity of operations during contingency events.

5.3.2. Threat and Safety Risk Assessments (SRA):

a) Hazard Identification: Regions must implement dynamic Hazard Identification and Risk Assessment (HIRA) processes to scan the horizon for geopolitical conflicts, severe weather, volcanism, public health crises, and system vulnerabilities.

b) The "Three Rs" Principle: Planners must integrate Redundancy, Robustness, and Resiliency into critical ATM/CNS network layers. This includes preserving a Resilient Operational Network (RON) to safeguard navigation against primary system failures or signal degradation (e.g., systemic GNSS RFI).

5.3.3. Training, Testing, and Joint Exercises:

a) Contingency management should be included in the training programmes of all personnel involved in contingency management.

b) Simulations and Desktop Exercises: CAA/ANS, ANSPs, and aircraft operators must participate in desktop scenario training, computer simulations, and live "stress test" exercises.

c) Regional Validation: Multi-national coordination exercises must be conducted at least once every three years with adjacent flight information regions (FIRs) to identify single points of failure and validate cross-border handling procedures.

Phase 2: Respond

5.4 The response phase is triggered when an unusual, hazardous, or disruptive event alters nominal service levels or compromises regional airspace integrity.

5.4.1. Contingency Coordination Team (CCT) Activation:

a) Level 1 Contingency will be managed by the ACG, keeping the ICAO Regional Office apprised of the development as required.

b) Operational Bridging for Level 2 or 3: Upon a severe regional disruption, a CCT is activated to serve as an operational bridge between affected ANSPs, adjacent States, and international operators (including IATA).

c) Tactical Flow Management: The CCT exchanges information among its members and coordinates CPAs as required to ensure the safety and continuity of the traffic flow.

5.4.2. Civil-Military Cooperation and Dynamic Airspace Management:

a) Airspace avoidance: in case of hazardous activities to civil aircraft, safety protections must be implemented immediately through the temporary designation of restricted areas over a State's sovereign airspace or only danger areas over high seas.

b) Promulgation of Constraints: All critical route adjustments, security constraints, and service degradations must be immediately broadcast via standardized, explicit NOTAM templates to maintain absolute network transparency.

c) Dynamic airspace management: through effective civil-military cooperation, manage the restricted areas (releasing them or changing their dimensions and time), allowing for the prompt establishment of contingency routing to support avoiding the affected airspace.

5.4.3. Interface with ICAO Headquarters Crisis Management Framework:

a) Escalation and Verification: If a disruption exceeds standard localized coping procedures or involves massive UN humanitarian responses, Regional Offices will interface with the ICAO Crisis Manager to verify and formally declare a designated crisis.

b) Unified Communications Protocol: To prevent misinformation, all official communications and public statements during an officially designated crisis must be funnelled exclusively through the ICAO Crisis Manager and senior legal/external relations teams.

Phase 3: Recover

5.5 The recovery phase manages the orderly transition from emergency/degraded contingency configurations back into normalized, baseline air traffic management operations.

5.5.1. Infrastructure Restoration and Stabilization:

a) System Re-verification: Prior to restoring normal flight routing parameters, verification should be conducted for the infrastructure and facilities if they were impacted by the contingency events.

b) Workforce readiness: verification of the readiness of all personnel involved in the provisions of ANS.

c) Notification: ensure aeronautical information is published well in advance to provide airspace users sufficient time to accommodate the changes in their operations.

d) Handling Priority Air Traffic: During the recovery curve, priority should continue to be given to handling, parking allocation, and logistical provisioning to arriving or departing international humanitarian, search and rescue (SAR), and relief operations.

5.5.2. Stabilization of Contingency Teams:

a) Gradual Deactivation: CCT and regional response components must remain active and accessible via a stable deactivation curve rather than shutting down abruptly. Oversight bodies must verify that the regional operational environment has permanently stabilized before formal deactivation occurs.

b) Deactivation: Once it has been concluded that the operation is normal, the CCT will be deactivated by the ICAO Regional Office.

Phase 4: Review and Improve

5.6 As shown in **Figure 3**, the loop connects the end of an operational cycle back to preparedness through comprehensive debriefing and systemic modification.

5.6.1. Post-Event Analysis and Just Culture:

a) Non-Punitive Systemic Debriefing: As soon as practicable following a contingency deactivation, a rigorous post-event evaluation must collect comprehensive feedback from all participating ANSPs, regulators, military stakeholders, and aircraft operators.

b) Focus on Learning: Consistent with a Just Culture, the evaluation must avoid individual finger-pointing or blaming human errors. Instead, it must look structurally at system interfaces, procedure omissions, and latent technical holes.

5.6.2. Build Back Better and Documentation Revision:

a) Integrating Lessons Learned: Findings from the review process must be incorporated into updated regional policies, organizational manuals, and local emergency frameworks to proactively mitigate future cost, safety, and efficiency degradations.

b) Regulatory Compliance Reporting: To evaluate the ongoing success of these modifications, States within the region must complete and submit updated contingency plans to their accredited Regional Office at least once per calendar year.

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CHAPTER 6

APAC ATM VOLCANIC ASH CONTINGENCY PLAN

6.1. The ICAO Air Traffic Management Volcanic Ash Contingency Plan Template provides information on terminology related to volcanic ash contingency responses, and the *pre-eruption*, *start of eruption*, *on-going eruption* and *recovery* phases of volcanic ash cloud events. Information is also provided on air traffic services procedures, and on-air traffic flow management procedures.

6.2. The phases of volcanic eruption activity may be summarized as follows:

Pre-Eruption Phase: a volcanic eruption is expected.

Start of Eruption Phase: commences with the outbreak of the volcanic eruption and entrance of volcanic ash into the atmosphere.

On-going Eruption Phase: commences with the issuance of the first volcanic ash advisory (VAA) containing information on the extent and movement of the volcanic ash cloud.

Recovery Phase: commences with the issuance of the first VAA containing a statement that no volcanic ash is expected.

6.3. The actions to be taken by relevant Volcanic Observatories, Volcanic Ash Advisory Centres (VAAC), MWOs, AIS Units and ACCs are described in ICAO Doc 9766 – *Handbook on the International Airways Volcano Watch (IAVW)*.

6.4. Operators are required by ICAO Annex 6 – *Operation of Aircraft* to implement appropriate mitigation measures for volcanic ash in accordance with their safety management system (SMS), as approved by the State of the Operator/Registry. This document assumes that ICAO requirements regarding safety management systems have been implemented by all States and aircraft operators. Detailed guidance on Safety Risk Assessments (SRAs) for flight operations with regard to volcanic ash contamination can be found in the manual on *Flight Safety and Volcanic Ash – Risk Management of Flight Operations with Known or Forecast Volcanic Ash Contamination* (ICAO Doc 9974).

6.5. States' regulatory provisions and arrangements should be reviewed to ensure that, in accordance with the guidance provided in ICAO Doc 9974:

a) Aircraft operators are required to include in their safety management system (SMS) an identifiable safety risk assessment for operations into airspace forecast to be, or at aerodromes known to be, contaminated with volcanic ash; and

b) Safety oversight procedures are used for the evaluation of operators' capability to conduct flight operations safely into airspace forecast to be, or aerodromes known to be, contaminated with volcanic ash.

6.6. States' airspace and airport management policies and procedures should be reviewed to ensure that (in accordance with the guidance provided in ICAO Doc 9974 – *Flight Safety and Volcanic Ash* and the provisions of ICAO Doc 4444 – *PANS-ATM*, 15.8.1c and Note 2):

a) Airspace affected by volcanic ash cloud should not be 'closed';

b) Specification in NOTAM of alternate routing or other air traffic flow management (ATFM) measures to manage airspace constraints arising from volcanic ash cloud should be solely for the purpose of ensuring the predictability and regularity of air traffic, and should be based on an assessment of capacity and demand in airspace affected by volcanic ash and/or or by aircraft avoiding the volcanic ash cloud;

c) NOTAM specifying alternate routing or other ATFM measures related to a volcanic eruption or volcanic ash cloud should be issued separately from the ASHTAM/NOTAM issued in accordance with Annex 15, 6.3.2.3, t) and w);

d) Aerodromes should only be closed by NOTAM for periods of observed volcanic ash contamination of the surface of the aerodrome movement area;

e) Airport capacity limitations of alternate aerodromes, including apron capacity, should be considered, and recommendations for the use of other alternates considered for inclusion in NOTAM (in c, above); and

f) If required by State regulations, any declaration of a Danger Area or Restricted Area should be confined to the pre-eruptive or erupting volcano and the area containing its forecast or observed ejecta[1].

6.7. To ensure effective volcanic ash information, coordination and collaboration, States should:

a) Establish a mechanism to provide regular and timely updates of information during a volcanic eruption and/or ash cloud event to ensure all stakeholders are up to date with current information, situation reports and contingency planning;

b) participate in volcanic ash exercises; and

c) consider establishing an internal crisis management centre, where applicable, to support the collaborative and timely sharing of information such as volcanic eruptions or other crises that will have a significant impact on airport and/or airspace management.

Note. This is supplemental to the provisions of Annexes 3 and 15.

6.8. AIS units are required under the provisions of Annex 15 to issue information relating to volcanic ash cloud. Information may be issued in either NOTAM or ASHTAM format. Annex 15 specifies that ASHTAM shall include *Item E — Colour code for level of alert indicating volcanic activity*. Color-coded levels for volcanic activity are not provided by all volcanic observatories and/or Volcanic Ash Advisory Centres (VAACs) in the Asia/Pacific Region, and only one State issues ASHTAM. NOTAM format should be used to disseminate volcanic ash cloud information.

6.9. NOTAM issued for volcanic eruption or volcanic ash cloud should include all items of information listed in the ASHTAM format except item I (closure of airspace and/or air routes). Color-coded activity level information may be included in NOTAM if available.

6.10. Each State should ensure that a list of volcanoes relevant to the State is maintained at all International NOTAM Offices, with volcano name, number and nominal position.

6.11. ICAO Doc 9691 *Manual on Volcanic Ash, Radioactive material and Toxic Chemical Clouds* Appendix E – *Cross reference list of volcanoes and navigation aids* provides a list of ICAO registered volcanoes. The information provided includes the following note:

[1] Information on the definition of a radius of special use airspace definition around a pre-eruptive or eruptive volcano may be found in the AIP New Zealand at http://www.aip.net.nz/pdf/ENR_5.3.pdf.

Note. Doc 9691 Appendix E requires that another list, the List of Volcanoes of the World for VAAC Use, available at http://www.volcano.si.edu/projects/vaac-data/ and maintained by the Global Volcanism Program of the Smithsonian Institution, should be used in case of any discrepancy between the Smithsonian database and the list published in Doc 9691 Appendix E.

6.12. The List of Volcanoes of the World for VAAC Use (Smithsonian Institution) should be considered the definitive list of volcanoes for use in the APAC Region. The List of volcanoes is updated frequently, without notification. States should ensure that relevant NOTAM Offices include in their local procedures' provisions for frequent checks of the list to ensure any changes are recorded and used in ASHTAM/NOTAM and NOTAM Templates.

6.13. The APAC Region Volcanic Ash Plan is available on the ICAO APAC Regional Office website [link].

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APPENDIX A: ATM CONTINGENCY PLANNING PRINCIPLES

1. Area Control Centres (ACCs) and Flight Information Centres (FICs) should have a National ATM Contingency Plan to ensure the safe transit of international traffic in the event of disruption or potential disruption of ATS and related supporting services in the airspace for which they are responsible. ATM contingency procedures and arrangements (CPAs) would refer to measures with cross-border aspects (Level 2 or 3 of the RACF).

2. The overriding principle is that safety has primacy over efficiency and optimal levels and routes;

3. Contingency Operations might necessitate lower than normal airspace capacity to ensure safety.

4. System and ATC service redundancy are the most effective contingency capability.

5. Contingency Plan should define the following where applicable:

   a) Contingency Routes supported by Flight Level Allocation Scheme (FLAS) and minimum navigation and height-keeping (e.g. RVSM or non-RVSM) capability for access;

   Note. Contingency Route and/or FLAS need not be defined as the Contingency Plan states that all routes and/or levels remain available during contingency operations.

   b) provisions for tactical definition and coordination of additional routes/FLAS and priority for access to accommodate selected non-scheduled operations such as humanitarian, medical evacuation and flood and fire relief (FFR) flights;

   c) priority determination for routine scheduled and non-scheduled flights;

   d) flights excluded from operations in contingency airspace, and minimum navigation and height keeping (RVSM) capability required for access to the contingency airspace;

   e) specified minimum longitudinal spacing between consecutive aircraft entering the contingency airspace on non-separated ATS contingency routes;

   f) Contingency communication arrangements including means of communication within contingency airspace and communications transfer arrangements for aircraft entering and leaving the airspace;

   g) Details of delegation of air traffic services arrangements (if any); and

   h) Contingency points of contact.

6. Contingency procedures and arrangements (arrangements between neighbouring administrations) should be included in bilateral or multilateral agreements between States in all cases where the activation of the Contingency Plan would impact upon a neighbouring State.

7. Close cooperation between neighbouring administrations, together with supporting mechanisms for the tactical definition and promulgation of contingency routes.

8. Contingency routes must be vertically separated whenever lateral route spacing is less than the minimum specified by the State for contingency operations.

9. FLAS planning should include consideration of allocating the optimum flight levels to routes used by long haul aircraft, depending on the traffic density on the route, wherever practicable.

10. Spacing between contingency ATS routes should be in accordance with the applicable separation described in the *Procedures Air Navigation Services – Air Traffic Management (Doc 4444) and Regional Supplementary Procedures (Doc 7030)*.

11. Minimum longitudinal separation between aircraft operating on the same contingency route and not vertically separated should be 15 minutes or 120 NM. However, this may be reduced to 10 minutes or 80 NM in conjunction with application of the Mach number technique authorized by the relevant authority and agreed in the appropriate LOAs or other CPAs.

12. Contingency ATS routes and FLAS, and contingency procedures, should be agreed between geographically grouped neighbouring States to form sub-regional contingency plans.

13. Contingency ATS routes should be published in the State AIP to permit the storing of route details in airspace users' navigation databases. CPAs should include the sovereign and, if applicable, also the High Seas part of the airspace.

14. Airspace classifications for ICAO Classes A, B, and C airspace should remain unchanged as practicable during contingency operations to facilitate managed access to the airspace in accordance with the contingency plan. Classes D and E airspace may be reclassified as Class C or higher where necessary to preclude VFR operations.

15. Ground and airborne navigation requirements should be defined, if necessary.

16. Alternate aerodromes should be specified where necessary for the readiness of the airport control towers, approach units and airport operators.

17. Airspace affected by volcanic ash cloud should not be closed to international civil aviation, where operators comply with the relevant ICAO provisions.

18. Amended ATS routes, whether published or promulgated ad-hoc, may be prescribed as part of the air traffic flow management (ATFM) response to expected demand and capacity imbalance caused by aircraft avoiding volcanic ash cloud.

19. Aerodromes should only be closed by NOTAM for periods of observed volcanic ash contamination of the surface of the aerodrome movement area.

20. Closure of airports affected by volcanic ash deposition should be supported by a safety assessment conducted in collaboration between airport operators, aircraft operators and the air navigation service provider, in accordance with their respective safety management systems.

21. Civil aircraft operations over or near conflict zones should be in accordance with ICAO Doc 10084 and ICAO Doc 9554.

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APPENDIX B: BASIC PLAN ELEMENTS OF A CONTINGENCY PLAN

Element 1: Administration

a) Record of signatories, version control and records of amendment.

b) Definition of the objectives, applicable airspace and operations, and exclusions.

Element 2: Plan Management

c) List of States and FIRs affected, and the agreed methods of notification in the event of pre-activation, activation and termination of the plan.

Contingency events may arise with insufficient advance notice to permit pre-activation of contingency plans

d) Details of the arrangements in place for management of the plan, including:

i. Establishment of ATM Contingency Group (ACG) for 24-hour responding to and management of contingency and coordination of operational and supporting activities under the contingency plan; and

ii. establishment of a Contingency Coordinating Committee composed of high-level representatives from aviation and other stakeholders to act as a central agency for the purpose of exchanging information and coordinating activities during disruption. The CCC provides required high-level support to ACG and takes necessary action to restore the situation.

e) Details of testing, review and reporting actions:

i. schedule of desktop and simulator testing;

ii. post-assessment requirements:

- a preliminary PAR report within 28 days of any activation or testing of contingency plans, including any recommendations to address deficiencies and implement improvements in contingency plans, arrangements, procedures and training.

- a more comprehensive PAR report should be prepared for major contingency events, or any contingency event involving an air safety incident investigation.

A full PAR analysis of major events could take many months to complete.

- input to the PAR from all parties affected by or involved in the response to the contingency is actively sought and considered;

- bi-lateral or multi-lateral PAR for activation or testing of Level 2 and 3 CPAs;

iii. timely reporting to ICAO APAC RO and other affected States of anticipated or experienced disruptions requiring activation of contingency plans.

f) inclusion of contingency plans, procedures and arrangements in ATS and other involved personnel training and refresher training programmes;

g) raising awareness of all parties involved in contingency.

Element 3: Airspace

h) Procedures for dynamic management of the airspace;

Note. Guidance on the dynamic management of restricted, prohibited and danger areas as well enhanced flexible sue of airspace are contained in the ICAO manual on Civil-Military in Air Traffic Management (Doc 10088).

i) Criteria for airspace classification changes and associated separation;

j) CNS status and performance requirements;

k) Implementation of oriented track system in collaboration with neighbouring ACCs; and

l) Procedures for the Prior Permission Required (PPR) aeronautical information publication when required to access the airspace.

Element 4: ATM Procedures

m) Details of re-routing to avoid the whole or part of the airspace concerned, normally involving establishment of:

   i. strategic and tactical collaborative oriented track system providing additional routes or route segments with associated conditions for their use; and/or

   ii. a simplified route network through the airspace concerned, together with a FLAS, to ensure that a standard minimum vertical separation is applied where less than a specified minimum lateral separation exists between routes.

n) details of how domestic traffic, departing and arriving flights and SAR, humanitarian and State aircraft flights will be managed during the contingency period;

o) procedures for transition from normal services levels to contingency services, and resume normal service;

p) procedures for joining or departing a contingency route;

q) details of reduced levels of service, if any, within the affected airspace;

r) establishment of for controlled access to the contingency area to prevent overloading of the contingency system, utilizing allocated airspace entry times or, where ATFM capability exists, tactical ATFM measures;

s) procedures for adjacent service providers to establish longitudinal spacing at the entry point, and to maintain such separation through the airspace;

t) reassignment of responsibility for providing air traffic services, to the extent possible, in non-sovereign airspace and to international aircraft transiting sovereign airspace; and/or

u) coordination and communications transfer procedures for aircraft entering and leaving the affected airspace.

Element 5: Pilot/Operator Procedures

v) requirements for flight plan submission during the contingency period, including contingency route planning requirements, and arrangements if airspace is restricted or not available and no contingency route is available;

w) emergency procedures, including TIBA and/or in-flight requirements for broadcast of position and other information, and for continuous listening watch, on specified pilot- pilot and GUARD VHF frequencies;

x) requirements for display of navigation and anti-collision lights;

y) requirements for climbing and descending well to the right of the centreline of specifically identified routes; and

z) requirements for all operations to be conducted in accordance with IFR, including operating at IFR flight levels from the relevant Table of Cruising Levels in Appendix 3 of Annex 2, except when modified by a FLAS.

Element 6: Communications Facilities and Procedures

aa) provision and operation of adequate air-ground communications, AFTN and ATS direct speech links;

bb) specification of radio frequencies to be used for particular contingency routes;

cc) log-on and connection management for CPDLC aircraft, where appropriate; and

dd) use of ADS-C automatic position reporting in lieu of voice position reporting to ATS.

Element 7: Aeronautical Support Services including AIS and MET

ee) AIP Information regarding the Contingency Planning, and notification by NOTAM of anticipated or actual disruption of air traffic services and/or supporting services, including associated contingency arrangements, as early as practicable and, in the case of foreseeable disruption, not less than 48 hours in advance; and

ff) reassignment to adjacent States of the responsibility for providing meteorological information and information on status of navigation aids.

Element 8: Contact Details

gg) contact details for the RCC responsible for the affected FIR(s), and coordination arrangements;

hh) contact details of adjacent States ANSPs and other international organizations participating in the contingency plan; and

ii) prior notification requirements for adjacent FIR activation of Level 2 and 3 contingency arrangements.

Note. The first priority response to any short notice contingency response should be the immediate handling of the air situation, followed by the activation of the contingency plan.

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APPENDIX C: CONTINGENCY PROCEDURES AND ARRANGEMENTS (CPA)

[ACC]
Contingency Procedures and Arrangements (CPA-A1) This CPA contains procedures and arrangements to ensure the continued safety of flight operations during the disruption. The plan has been prepared in accordance with ICAO Annex 11 ─ *Air Traffic Services,* Chapter 2, paragraph 2.32 and Attachment C to provide the ATS procedures, contingency route structure, and other arrangements, to be used on a temporary basis, while air traffic services are being provided from **[ATS Unit NAME]** but with some limitation than normal situation. Procedures must account for when conversion or change from feet to metric altimeter units, and vice versa, is required.

Point of Contact Name:	**Contact details:**	**Agreed Date:**
Airspace Status	**ATS Status**	**Level of Response**

Airspace	Available	Partially Available	Not Available

ATS	Normal	ATC available with limitations	ATS, FIS and Alerting services are available	ATS Zero

	States
Level 1 – One State	
Level 2 – Two adjacent States	
Level 3 – more than two States	

Events details

Due to: (select from risk register what to apply)	Date:	Start Time:
Example: ATCO shortage (or strike) ATM System failure VAC Natural Disaster Power supply/infrastructure failure	GNSS interference/spoofing Cyber attack Weather Airport unavailability Other (e.g. SWX space weather, Pandemic, fuel shortage)	

	Status
COM	
SUR	
NAV	
Aerodrome	

Conditions: (depending on the percentage of impacted ATS operations, a description of "What has to be done to solve the issue by whom and when " has to be defined)	Description
Explain the cause:	

Actions		**Status**
Adjacent ACCs	Contact	
ACC A		
ACC B		
ACC C		

IATA		
ICAO		
ATS OPERATIONAL PROCEDURES		
Issuing NOTAM		
Rerouting scheme		
Separation standards LAT LONG		
Separation standards Vertical		
ATFM Flow Control		
Capacity Restrictions/Limitations		
Level Restrictions or FLAS		
Airspace Classification		
Transfer of Control		
Position Reporting TIBA		
Overflight Permissions		
Instructions for Overflying traffic		
Procedures for flights to/from airports inside [Name of States]		
Filing of flight plans		
Pilot operating procedures		
Prior Permission Required (PPR)		
Interception of civil aircraft		

Airport impacts		

— END —

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGION ATS ROUTE CATALOGUE

Version 26

August 2026

Table of Contents

Foreword

1.1 The *Air Navigation Plan – Asia and Pacific Regions* (ICAO Doc 9673) has been superseded, in electronic form by the electronic Air Navigation Plan (eANP), which contains a table of regional ATS routes in Volume II (*Table ATM II- APAC- 1 – Asia and Pacific Regions ATS Routes*).

1.2 A Contracting State or qualifying International Organization identifying a need for a new route requirement to be included in the eANP or to change an existing route contained in the eANP, may submit an amendment proposal to the ICAO Asia and Pacific (APAC) Office in accordance with established procedures summarized below and the template provided on the ICAO APAC Office website.

1.3 Appropriately presented and documented proposals to amend the eANP are submitted to the ICAO Secretary General through the Regional Office and circulated to States and International Organizations for comment. If, in reply to the ICAO Regional Office's inquiry, no objection is raised to the proposal by a specified date, it will be deemed that a regional agreement (involving the relevant PIRG) on the subject has been reached. The Regional Office will inform States and International Organizations concerned of the approval and the eANP will be amended accordingly.

1.4 If, in reply to the ICAO Regional Office's inquiry, any objection is raised, and if objection remains after further consultation, the matter will be documented for discussion by APANPIRG and, ultimately for formal consideration by the Air Navigation Commission, if it remains unresolved. If the Commission concludes that the amendment is acceptable in its original or other form, it will present appropriate recommendations to the Council.

1.5 The Fourteenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/14, August 2004) under *Conclusion 14/5* established the ATS Route Network Review Task Force (ARNR/TF) to review the Asia and Pacific ATS route network to determine present and future route requirements. To facilitate the amendment process and keep track of route implementation and future requirements, and with the objective of providing more up to date information on ATS route developments, ARNR/TF prepared the draft *Asia/Pacific Region ATS Route Catalogue*.

1.6 APANPIRG/16 (August 2005, Bangkok, Thailand), recognizing the value of a consolidated reference document for the regional ATS routes and future route requirements of States and airspace users, accepted the *Asia/Pacific Region ATS Route Catalogue* under *Decision 16/9*. The *Asia/Pacific Region ATS Route Catalogue* is intended to be a living document, supplementing the eANP and maintained by the ICAO APAC Regional Sub-Office on behalf of the ICAO APAC Office. Communication related to the *Asia/Pacific Region ATS Route Catalogue* should be made via email to apac-rso@icao.int.

1.7 The APAC Regional Sub-Office, which is responsible for maintaining the *Asia/Pacific Region ATS Route Catalogue*, will update from time to time as amendment proposals are presented, progressed and agreed or not agreed. The revision number and date shown on the cover page of the *Asia/Pacific Region ATS Route Catalogue*. The *Asia/Pacific Region ATS Route Catalogue* is posted on the ICAO APAC Office eDocuments webpage at (https://www.icao.int/APAC/apac-electronic-documents).

1.8 *The Asia/Pacific Region ATS Route Catalogue* is now as follows: Chapter 1: South Asia; Chapter 2: Southeast Asia; Chapter 3: East Asia; Chapter 4: Trans-Regional (South Asia); Chapter 5: Trans-Regional (East Asia); Chapter 6: Trans-Regional (Mid Asia); and Chapter 7: Pacific.

1.9 Regional ATS route proposals affecting APAC airspace should be presented as part of a paper to ATM coordination groups or other suitable bodies, and then may be entered into the *Asia/Pacific Region ATS Route Catalogue* by the ICAO APAC Office. The APAC Office or Regional Sub-Office will periodically present to appropriate ATM coordination groups or other suitable bodies the proposals within their geographical area of interest for review.

1.10 The *Asia/Pacific Region ATS Route Catalogue* contained proposals for route changes that had not yet been agreed and implemented.

1.11 States in APAC were required to reclassify the routes as:

- Priority A – Short Term (i.e. it could be implemented within 12 months);
- Priority B – Medium Term (i.e. it could be implemented within 13 to 36 months);
- Priority C – Long term (i.e. more than 36 months); and
- Priority D – Cannot be implemented (reasons to be provided).

Note: as some States were not represented, these ATS route proposal were classified as Priority C and will be updated when more information becomes available.

1.12 IATA has also prioritised the routes in terms of efficiency and environmental benefits as:

- HIGH – one of top priorities for airlines; or
- MEDIUM – has significant benefits but can wait until high priority proposals are implemented; or
- LOW – the route proposal may be deleted if the State cannot implement within 36 months.

1.13 After review, the *Asia/Pacific Region ATS Route Catalogue* may be updated by:

- deletion of the proposal when the proposal has been agreed and entered into the eANP; or
- deletion of the proposal when it has been decided that there is no possibility of implementation in the foreseeable future [i.e. the proposal has had <u>no</u> progress in the past five years, or it is a Priority C or D (more than 36 months) by States and is assigned a LOW priority by IATA]; or
- amendment with the addition of supplementary information; or
- addition of a new ATS route proposal.

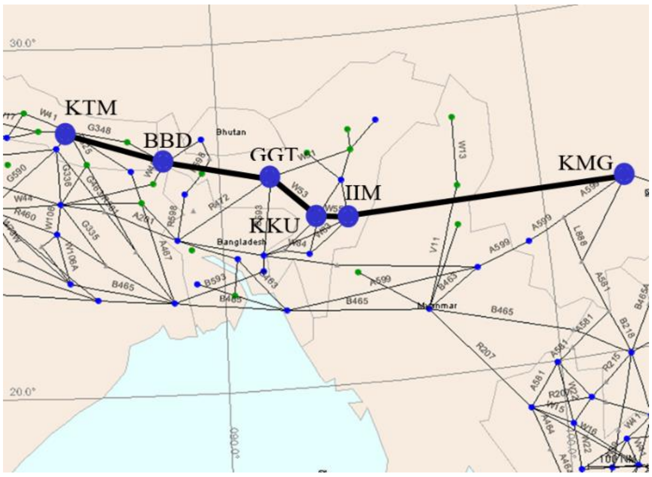
Amendment Record

Version	Date	Amended by	Comments
0.1	14 February 2005	-	ARNR/TF/2 developed draft version.
0.2	5 May 2005	ARNR/TF/3	Finalized format following contribution from members.
0.3	29 July 2005	ATM/AIS/SAR/SG/15	Sub-Group concluded the Catalogue be adopted (Draft Conclusion 15/3).
1	26 August 2005	APANPIRG/16	APANPIRG/16 decided that the Catalogue be accepted (Decision 16/9).
2	24 January 2006	BBACG/17	Reviewed and updated the Catalogue.
3	19 May 2006	SEACG/13	Reviewed and updated the Catalogue.
4	26 January 2007	BBACG/18	Reviewed and updated the Catalogue.
5	23 May 2008	SEACG/15	Reviewed and updated the Catalogue.
6	15 May 2009	SEACG/16	Reviewed and updated the Catalogue.
7	27 May 2010	SEACG/17	Reviewed and updated the Catalogue.
8	10 March 2011	BBACG/21	Reviewed and updated the Catalogue.
9	6 May 2011	SEACG/18	Reviewed and updated the Catalogue.
10	22 September 2011	SAIOACG/1	Reviewed and updated the Catalogue.
11	22 June 2012	ATM/AIS/SAR/SG/22 APANPIRG/23	Reviewed, reformatted, and updated the Catalogue, approved by APANPIRG/23.
12	26 June 2013	SAIOACG/SEACG, ATM/SG	Reviewed, reformatted, and updated the Catalogue, approved by APANPIRG/24.
13	11 September 2014	SAIOACG/SEACG, ATM/SG APANPIRG/25	Reviewed subsequent to Easter Island being transferred out of the Region; added trans-regional proposals.
14	September 2015	SAIOACG/SEACG, ATM/SG APANPIRG/26	Removal of Chapter A (BANP routes).
15	September 2016	SAIOACG/SEACG, ATM/SG APANPIRG/27	Reviewed and updated the Catalogue.
16	August 2017	SAIOACG/SEACG, ATM/SG	Reviewed and updated the Catalogue.
17	September 2018	SAIOACG/SEACG, ATM/SG	Reviewed and updated the Catalogue, incorporated IATA inputs, added State and IATA priority label.
18	April 2019	SAIOACG/9, SEACG/26	Reviewed and updated the Catalogue.
19	September 2019	ATMSG/7, AIRARD TF/4	Reviewed and updated the Catalogue.
20	December 2020	ATMSG/8	Reviewed and updated the Catalogue.

21	November 2021 March 2022, October 2022 December	SAIOACG/10, SEACG/27, ATM/SG/9, SAIOSEACG/1, ATM/SG/10 BOBTFRG/4	Reviewed and updated the Catalogue.
22	March 2023 July 2023	SAIOSEACG/2 SCSTFRG/11	Reviewed and updated the Catalogue.
23	October 2023 December 2023 April 2024	ATMSG/11 BOBTFRG/5 SAIOSEACG/3	Reviewed and updated the Catalogue.
24	September 2024 November 2024 November 2024	ATMSG/12 SCSTFRG/12 BOBTFRG/6	Reviewed and updated the Catalogue.
25	March 2025 July 2025 August 2025	SAIOSEACG/4 SCSTFRG/13 ATM/SG/13	Reviewed and updated the Catalogue, including new Chapter 6 on Trans-Regional (Mid Asia), new ATS route proposals (MEKONG 02, MEKONG 03 and BOB 03), and added States and IATA proposals and feedback.
26	December 2025 January 2026 August 2026	BOBTFRG/7 SAIOSEACG/5 ATM/SG/14	Reviewed and updated the Catalogue.

Chapter 1: South Asia

(referred to States, SAIOSEACG and BOBTFRG for review)

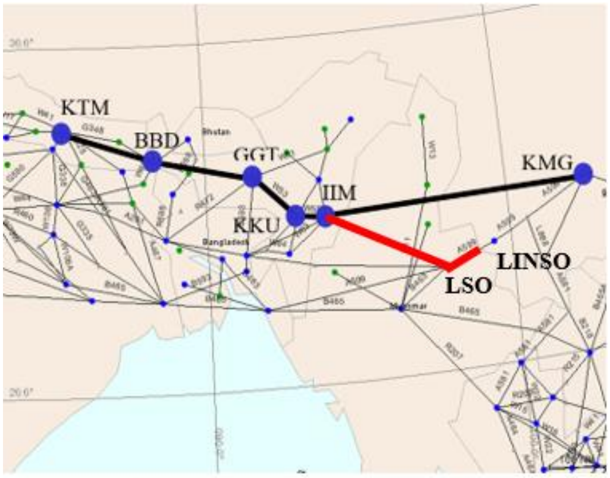
ATS Route Name	**HIMALAYA 02**
State Priority	**D**
IATA Priority	**HIGH**
Requested by (when)	Nepal (01/09/2018)
States/Administrations Involved	Nepal, India, Myanmar, China (Kathmandu, Kolkata, Yangon, Kunming FIRs)
Route Description	Kathmandu (KTM) 2740.5N 08521.0E –Bagdogra (BGD) 264118N 0881934E – Guwahati (GGT) 2606.1N 09135.3E – Silchar (KKU) 2454.8N 09258.9E – Imphal (IIM) 2446.0N 09354.5E – Kunming (KMG) 2501N 10244E Alternate proposal by IATA: Kathmandu (KTM) 2740.5N 08521.0E – Bagdogra (BGD) 264118N 0881934E – Guwahati (GGT) 2606.1N 09135.3E – Dimapur (DMR) 255251.30N 0934655.29E – Kunming (KMG) 2501N 10244E
Flight Level Band	
Benefit (fuel, environmental)	110 NM / 15 minutes, 520 kg fuel, 1640 kg CO_2 per flight Potential to save 19 to 25 minutes per flight and assist in decongesting A599/Lashio.
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: IATA North Asia Office approached China who have indicated this route will be considered as part of the overall China route review – no timeline was given. China advised that they would seriously look at the proposal and would coordinate with Nepal (ref. para 8.4 of the SEA-RR/TF/4 report). At SAIOACG/9: with the improvement of surveillance capability, Myanmar would review this proposal. At ATMSG/7: Under consideration by China; and Myanmar commented this route proposal would be dependent on the enhancement of surveillance and communication coverage in the area. 26/09/2020: Nepal updated this route proposal was under discussion with Myanmar, and they were optimistic that communication and surveillance capabilities would be available in Yangon FIR in the near future to support the implementation of this route. 20/11/2020: China commented that it was not possible to establish a new entry/exit	

point, and counter-proposed to re-align IIM – LSO – LINSO (existing entry/exit point between Yangon and Kunming FIRs).

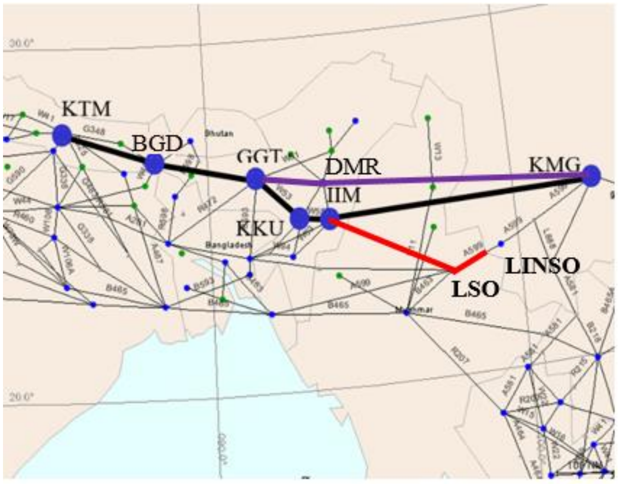
At ATM/SG/8: In response to China's counter-proposal, Myanmar provided their disagreement; and India commented the existing established routes in Kolkata FIR (i.e. W137, W53 and W55) was for domestic operations only, and India would need to review the possibility of opening these routes for international operations. India also suggested that in light of this, and the delay of more than nine years and the positions of Myanmar and China, Nepal may wish to consider a new proposal.

At ATM/SG/9: IATA commented that based on detailed re-assessment conducted by airlines, it confirmed a '**HIGH**' priority to HIMALAYA 02. In addition, IATA suggested an alternate proposal which had potential to save up to 19 to 25 minutes, and would also help to decongest ATS route A599/Lashio (LSO) and save additional 88 NM compared with IIM – LSO – LINSO route. IATA also requested India to consider keeping ATS route J7 (CDR2/3 route between GGT – DMR) available based on traffic demand timings. Nepal supported the alternate proposal as suggested by IATA, and would coordinate and hold a consultation meeting with the various stakeholders. <u>China commented that it was not possible to establish a new entry/exit point.</u>

At BOBTFRG/3: Myanmar supported the proposal by IATA; India expressed its concern in getting a favourable response from its military authorities for the route between Guwahati (GGT) – Dimapur (DMR) – Kunming (KMG). According to India, implementing the route from Imphal (IIM) to Kunming (KMG) was more feasible. Given the fact that China had revised the priority as "D", IATA was requested to consider the position of China before pursuing the proposal; and Bangladesh suggested IATA to consider: Kathmandu (KTM) – Saidpur (SDP) –



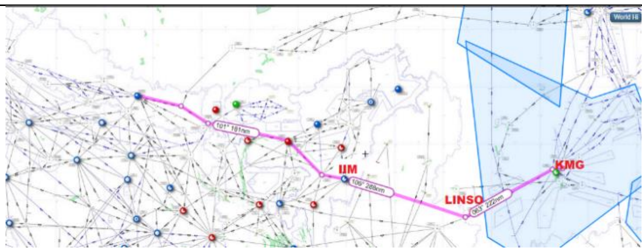
Counter-proposal by China



Counter-proposal by China

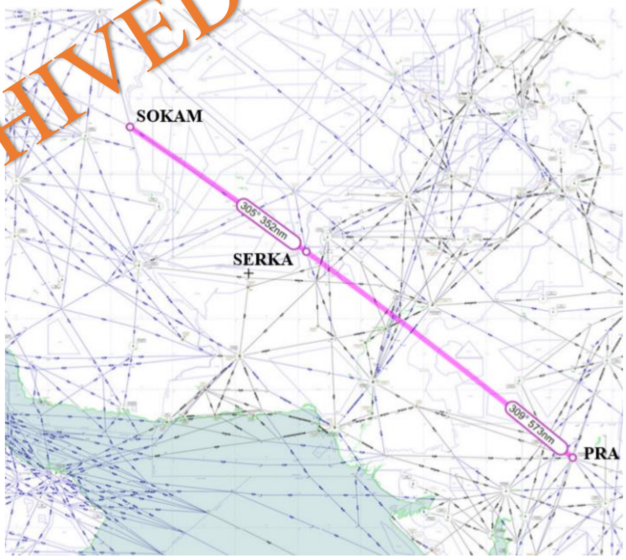
Suggested by IATA

[Map provided by ICAO]

Silchar (KKU) – Imphal (IIM) – Kunming (KMG). 27/1/2022: Nepal is having in-house discussion and consultation with different stakeholders and planning to coordinate with the affected States soon. 1/3/2022: IATA may request that China explores possibility in near future of opening up additional entry/exit as this has direct savings to flights from Nepal and China. 3/3/2022: China commented there is no status update. In August 2022, China commented that there was no plan to establish a new entry/exit point and suggested considering the route proposal based on the current existing entry/exit point LINSO. At BOBTFRG/4: Noting that with the upgradation of Bangladesh's CNS/ATM system, full coverage of communication in Dhaka FIR would be available shortly, so taking consideration of China's counter-proposal, Bangladesh proposed two route options as: Kathmandu (KTM)-Saidpur (SDP)-SYT-LSO or,Kathmandu (KTM)- Saidpur (SDP)-SYT- Imphal (IIM)-LSO. India commented that further meaningful discussion of this proposal should be based on the basic agreement between China and Myanmar. Before SAIOSEACG/2: Nepal implied that they would like to insist on their initial proposal if IATA's proposal is not acceptable and pointed out that Nepal would put further efforts to discuss with the Chinese Authority to see the further possibilities without deviating much from the initial proposal. At SAIOSEACG/2: a) Nepal reiterated that they would like to retain their initial proposal if IATA's proposal is not acceptable and pointed out that Nepal would put further efforts into discussing with the relevant States to see the further possibilities without deviating much	 HIMALAYA 02 as New Proposal by Nepal

from the initial proposal. IATA supported. b) Considering the divergence on the segment, in terms of FMS load for track change from KTM to KMG, Bangladesh requested IATA to reconsider their proposal for the segment from: Kathmandu (KTM)- Saidpur (SDP)- SYT- Imphal (IIM). c) Myanmar stated they did not agree with the route segment from IIM – LSO – LINSO. d) China commented that there was no plan to establish a new entry/exit point so far. e) Given that the situation had not changed for more than 15 years, India suggested Nepal re-evaluate this proposal. In response, Nepal stated that they would re-evaluate the proposal, and if there would be a possibility for modification, they would present a working paper accordingly in the next appropriate ICAO forum. At ATMSG/11: Nepal suggested that the Hymalaya 02 route should remain in this catalogue. In response, the ICAO APAC RSO will continueously discuss it within the ATS route catalogue. At SAIOSEACG/3: Nepal emphasised that the HIMALAYA 02 route potential to enhance economic viability and environmental sustainability for air travel. India stated that since domestic routes are involved, it has to review international operations on these routes. It also stated that this route passes through military areas, for which discussion with military authority is required. India also suggested that Nepal's route may be finalised and discussed with Myanmar (an important stakeholder) first before consideration by other concerned states. Bangladesh suggested Nepal to consider their proposal for the segment from Kathmandu (KTM) - Saidpur (SDP) - SYT - Imphal (IIM). The meeting recognised that further meaningful discussion of this proposal should be based on the basics of Myanmar's presence. In this connection, Nepal agreed to refine the route proposal taking into consideration of comments	

from Bangladesh and China and requested ICAO to set up a coordination meeting that involved all stakeholders, including Myanmar, for necessary discussion on the matter. At the side meeting, China and Nepal reviewed all four proposed schemes for this route proposal and particularly discussed the fourth scheme (i.e. IIM-LINSO) in depth. China acknowledged about using the existing entry/exit FIR boundary point, etc. Nepal agreed to consider these technical concerns further. Both China and Nepal agreed that they would continue to maintain close contact on this proposal via ICAO APAC RSO. Before the SAIOSEACG/4: Nepal updated through email that they wish to keep it in this ATS route catalogue with high priority. Nepal commented that this route would be crucial to achieve the strategic objectives of ICAO. IATA also accorded this route as high priority. At BOBTFRG/7: IATA expressed its support of the HIMALAYA 02 proposal and expects clear operational benefits for flights operating from Nepal to more distant FIRs.	

ATS Route Name	**IND 07 (N877 Extension)**
State Priority	**D**
IATA Priority	**MEDIUM**
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	India, Pakistan, Afghanistan (Mumbai, Delhi, Karachi, Kabul FIRs)
Route Description	Pratagarh (PRA) 2401.8N 07445.0E – SERKA 2951.0N 06615.0E – SOKAM 3313.3N 06037.9E
Flight Level Band	28,000 - 46,000 ft
Benefit (fuel, environmental)	51 NM / 7 minutes, 835 kg fuel, 2,630 kg CO_2 per flight, 3,387 tonnes fuel, 10,668 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	LH, KL KUL/SIN – Middle East – East/Europe
Remarks: This proposal predates the extension of UL333 through Kabul FIR and has been under consideration for a number of years. The extension of UL333 is under utilised against other Kabul routes largely due the 45 NM ‘penalty’ in track mileage the current route structure requires. The route’s primary benefit at this stage will be westbound and during BOBCAT traffic flow. Extension completed SERKA to SOKAM. Update 08/02/13: PRA – SERKA has been approved by India after lengthy consultation with the military, complementary action from Pakistan awaited. At SAIOACG/9: Pakistan commented this route proposal was very unlikely to be implemented. Future of this route would be decided at SAIOACG/10 in 2020. Update from India on 02/08/2019: Since the proposal is pending concurrence of Pakistan for a long time, India need to renegotiate the proposal with military after comments from Pakistan. 17/08/2020: The designated established military areas in Karachi FIR and route structure (crosser routes near the boundary with Delhi and Kabul FIRs) does not allow the establishment of this route. Pakistan proposed for deletion. At ATMSG/8: IATA preferred this route proposal to be retained in the Catalogue. At BOBTFRG/3: Pakistan re-affirmed that the designated established military areas in Karachi FIR and route structure	

(crossing routes near the boundary with Delhi and Kabul FIRs) would not permit the establishment of this route. 1/3/2022: IATA wants this proposal to be archived and reintroduced if/when future possibilities permit its success. At BOBTFRG/4: Pakistan reaffirmed that the proposed route was not feasible and supported archiving this proposal for future possibility, and IATA had no objection.	

ARCHIVED

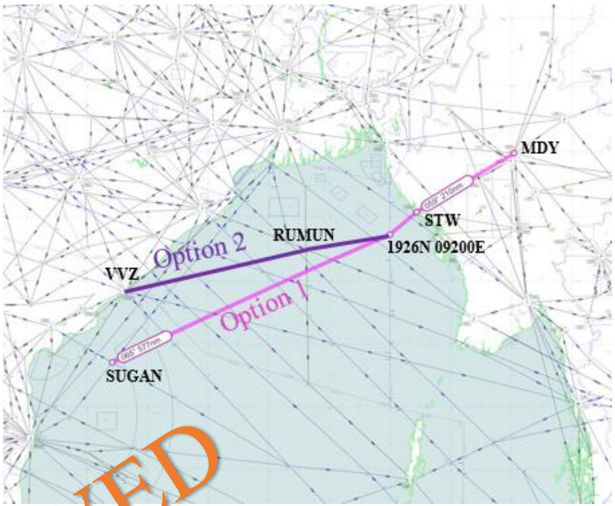
ATS Route Name	**BOB 01**
State Priority	
IATA Priority	**HIGH**
Requested by (when)	IATA (05/11/2021: ATM/SG/9)
States/Administrations Involved	India, Bangladesh, Myanmar (Chennai, Kolkata, Dhaka, Yangon FIRs)
Route Description	Option 1: SUGAN 152500N 0825045E – New Waypoint 192600N 0920000E (FIR BDRY between Kolkata and Yangon) – Sittwe (STW) – Mandalay (MDY) Option 2: Vishakhapatnam (VVZ) 174003.90N 0831510.00E – RUMUN 185805N 0891420E – New Waypoint 192600N 0920000E (FIR BDRY between Kolkata and Yangon) – Sittwe (STW) – Mandalay (MDY) Counter proposal by India: Eastbound: Q10 - TATUX - DOPID - MDY. Westbound: MDY - DOPID - KAGUL - Q11. Counter proposal by Bangladesh: TATUX-DOPID-Cox's Bazar -CHILA-A599- LSO-LINSO
Flight Level Band	All suitable bi-directional flight levels. Else, at least suitable eastbound flight levels. (airline operators preferred flight level would be FL330 as primary and FL310 as secondary)
Benefit (fuel, environmental)	Option 1: Narrow body fleet: 94 NM / 12 minutes, 456 kg fuel, 1.5 tonnes CO_2 per flight, 166 tonnes fuel, 548 tonnes CO_2 annually Wide body fleet: 94 NM / 12 minutes, 900 kg fuel, 3.0 tonnes CO_2 per flight, 329 tonnes fuel, 1095 tonnes CO_2 annually Option 2: Narrow body fleet: 71 NM / 9 minutes, 344 kg fuel, 1.1 tonnes CO_2 per flight, 126 tonnes fuel, 402 tonnes CO_2 annually Wide body fleet: 71 NM / 9 minutes, 679 kg fuel, 2.2 tonnes CO_2 per flight, 248 tonnes fuel, 803 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	About 110 flights per week Africa/South Asia – Far East, Southern India – East Coast of the United States

Remarks: The proposed routes would efficiently connect South West Bay of Bengal traffic and Far East. At BOBTFRG/3: In order to conduct better assessment, India requested IATA to provide the analysis of the fleet equipage in ADS-C/CPDLC and PBCS.
IATA provided its analysis result on fleet readiness of its members in the SAIOSEACG/1 meeting (Mar. 2022).

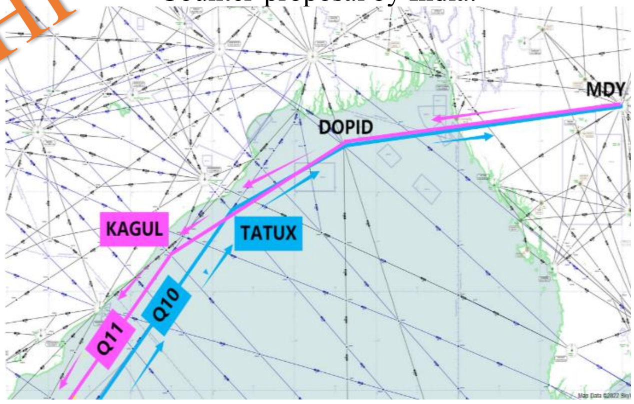
On 8/8/2022: India in its assessment on BOB01 & BOB02 commented the proposed routes are outside the SUR and VHF coverage imposing unnecessary restrictions for all other cross-cutting routes. Therefore proposed alternatives as below:
Eastbound aircraft via Q10: TATUX – DOPID – MDY.
Westbound aircraft: MDY – DOPID – KAGUL – Q11.
India stated this would improve the availability of getting optimum flight levels (well covered by SUR and VHF in Kolkata FIR) and require the approval of Bangladesh and Myanmar.

ATMSG/10: Bangladesh commented that India's counter-proposal overflies the designated established military areas, so Bangladesh needs to consult with the military authorities.

BOBTFRG/4: Bangladesh noted that the consultation with the military authority was still under process. To avoid the Danger area, two more alternative options are proposed with a connection to the new DVOR (Cox's Bazar, CXB), which is under construction and would be available in three months, detailed as follow:
DOPID – Cox's Bazar (CXB DVOR) – MDY or,
TATUX – Cox's Bazar (CXB DVOR) – MDY.
In response to Bangladesh's counterproposal, IATA suggested specifying a new waypoint at the position of Cox's Bazar instead of waiting for the availability of the new DVOR and proposed the following route connecting Cox Bazar-APAGO-CHILA and onwards joining ATS Route A599:

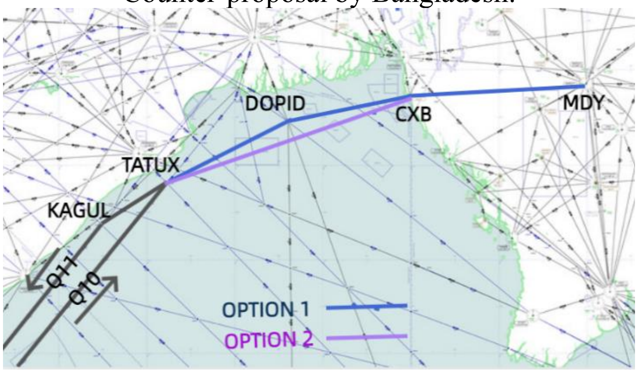


Counter-proposal by India:

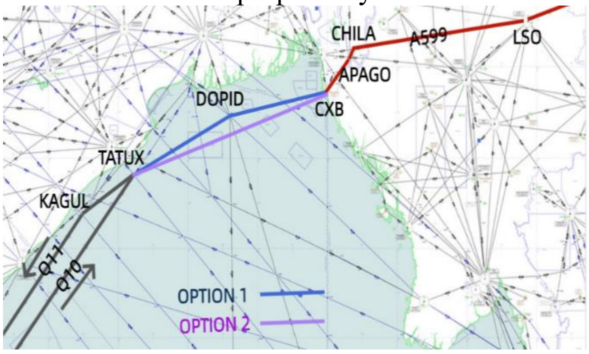
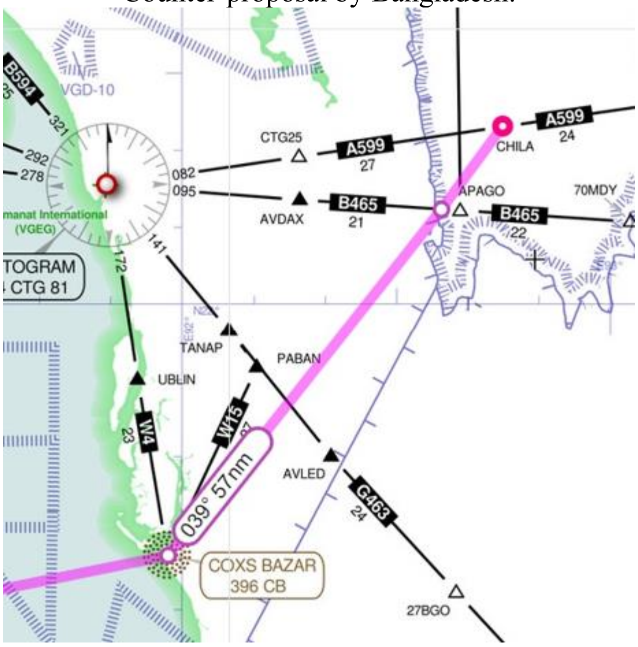


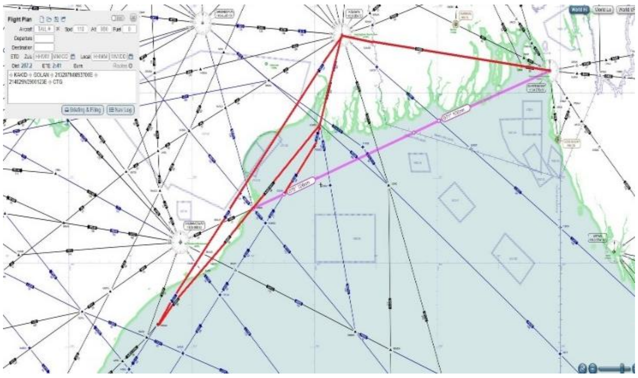
[Map provided by ICAO]

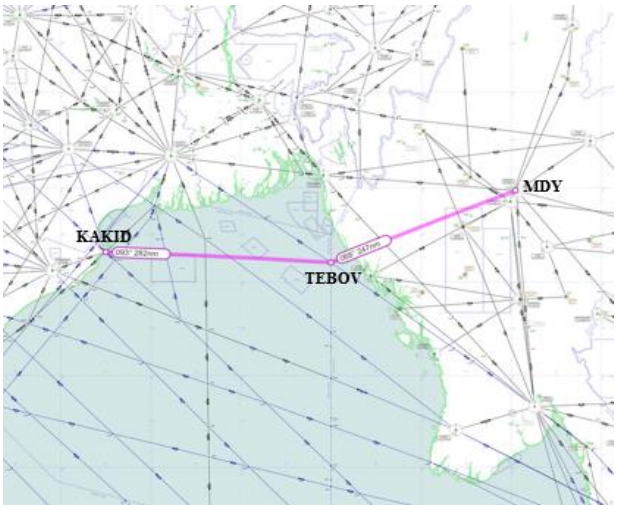
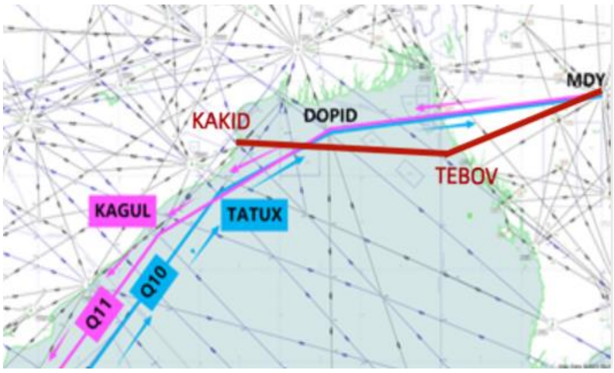
Counter-proposal by Bangladesh:



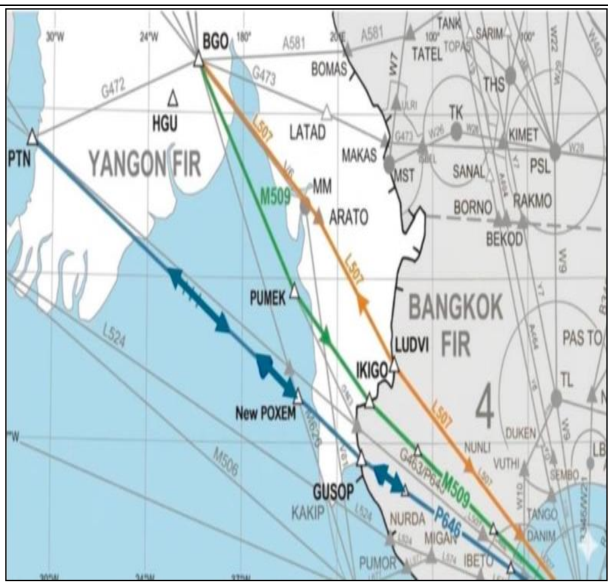
[Map provided by ICAO]

TATUX-DOPID-Cox's Bazar -APAGO-CHILA-A599- LSO-LINSO Before SAIOSEACG/2, all stakeholders had extensive discussion on the BOB01. IATA affirmed its proposal: A599 – CHILA - APAGO – CB (Coxs Bazar) – DOPID – TATUX - KAGUL Q11. Bangladesh suggested to skip the waypoint "APAGO". At SAIOSEACG/2: a) India and IATA had no objection to Bangladesh's counter-proposal in principle. b) In response to India's concern about the handover separation, Bangladesh confirmed that they could accept the transfer separation from Yangon FIR. c) Myanmar suggested to consider Bangladesh's counter proposal: A599 – CHILA– CB (Coxs Bazar) – DOPID – TATUX - KAGUL Q11, and pointed out that the optimization of the FLAS operation was the major issue which needed to be addressed before the establishment of the new route. d) Bangladesh suggested the resolution on the new route would be finalized considering the revision of LOA between Bangladesh-India and Bangladesh-Myanmar. e) IATA suggested Bangladesh and India to consider an interim solution – making BOB 01 an Eastbound airway, establishing eastbound air traffic on present A599 and B465 airways before entering into Yangon FIR; till the time Myanmar raised FLAS issues are sorted out, then enabling BOB01 for Westbound flights. After SAIOSEACG/2: ICAO RSO hosted a special coordination meeting (Video Teleconference, 11 May 2023), involving Bangladesh, India and IATA. The Special coordination meeting formally agreed to establish the BOB01 Route proposal connecting SURUP - KAKID – GOLAN - (WPT1) - (WPT 2) - Chattogram (CTG). This bi-directional route option saves about 55NM, expected to benefit about 110 weekly flights.	Counter-propasal by IATA:  [Map provided by ICAO] Counter-proposal by IATA:  [Map provided by ICAO] Counter-proposal by Bangladesh:  [Map provided by IATA]

At BOBTFGR/5: discussion highlighted the near-finalization of new route proposals involving Bangladesh and India. The meeting was informed that the Route designator has been approved as P632. The need for a formal safety assessment process for the proposed routes was emphasized. Bangladesh and India indicated their commitment to finalizing the necessary safety assessments, including participation from ICAO for supervisory guidance. Participants expressed hope that the proposed amendments to the routes would be promulgated in the first quarter of 2024, subject to the completion of safety assessments. At SAIOSEACG/3: Bangladesh and India presented the update of establishing BOB 01 route. It was intimated that Bangladesh and India have already conducted a safety assessment in the second week of April. The PfA had already been submitted to the ICAO APAC office. Following the approval of PfA by the ICAO Office and the signing of the LoA by both states, the ATS route shall be promulgated by both countries, which will be a part of a regional network of ATS Routes.	 Formally agreed BOB01 Route Proposal (Pink line – Agreed Direct Route, Red lines – Present routes.

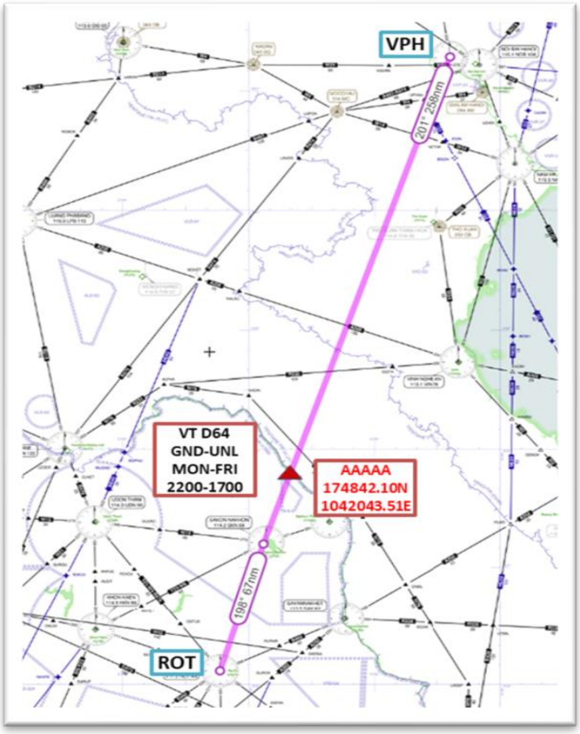
ATS Route Name	**BOB 02**
State Priority	
IATA Priority	**HIGH**
Requested by (when)	IATA (05/11/2021: ATM/SG/9)
States/Administrations Involved	India, Bangladesh, Myanmar (Kolkata, Yangon FIRs)
Route Description	KAKID 203833N 0865951E – TEBOV 202504N 0915949E – Mandalay (MDY) Counter proposal by India: Eastbound: Q10 - TATUX - DOPID - MDY. Westbound: MDY - DOPID - KAGUL - Q11.
Flight Level Band	All suitable flight levels
Benefit (fuel, environmental)	Narrow body fleet: 50 NM / 6 minutes, 228 kg fuel, 750 kg CO_2 per flight, 83 tonnes fuel, 274 tonnes CO_2 annually Wide body fleet: 50 NM / 6 minutes, 450 kg fuel, 1.5 tonnes CO_2 per flight, 164 tonnes fuel, 548 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	About 110 flights per week Africa/South Asia – Far East, Southern India – East Coast of the United States
Remarks: The proposed route would not only provide efficient connection over Bay of Bengal, but it would also help in de-congesting ATS routes A791, B465, Q19 and Q20. At BOBTFRG/3: In order to conduct better assessment, India requested IATA to provide the analysis of the fleet equipage in ADS-C/CPDLC and PBCS. 08/08/2022: India in its assessment on BOB01 & BOB02 commented the proposed routes are outside the SUR and VHF coverage imposing unnecessary restrictions for all other cross-cutting routes. Therefore proposed alternatives as below: Eastbound aircraft via Q10: TATUX - DOPID - MDY. Westbound aircraft: MDY - DOPID - KAGUL - Q11. India stated this would improve the availability of getting optimum flight levels (well covered by SUR and VHF in Kolkata FIR) and require the approval of Bangladesh and Myanmar. ATMSG/10: Bangladesh commented that India's counter-proposal overflies the designated established military areas, so Bangladesh needs to consult with the military authorities. 16/11/2022: In response to India's concerns about SUR and VHF coverage,	 Counter-proposal by India vs original proposal by IATA:  [Map provided by ICAO]

IATA suggested that with the issuing of the ADS/C &CPDLC mandate, PBCS-equipped aircraft could operate on this proposed route. Regarding the military area, IATA pointed out that the danger area VGD-31 was permanently removed; thus, the possible route connecting DOPID (India proposed waypoint)-TEBOV is not affected by the consequent restrictions(see the Map provided by IATA). Considering the complexity of this airspace, IATA preferred this route to be retained separately and discussed in tandem with BOB01. At BOBTFRG/4: Considering the complexity and constraints in the area, Bangladesh and India wanted to focus on Bangladesh's counter-proposes for BOB 01 in the first place. Since the SWG has prioritised the BOB01 as the primary task, it was proposed by IATA that BOB 02 to be archived for future possibility. At SAIOSEACG/2: agreed that BOB02 be retained in the route catalogue. At BOBTFGR/5: there was a consensus to move the BOB 02 route proposal into archives since the BOB 01 route has reached it's final stages of implementation. IATA, Bangladesh, and India agreed with this decision.	Possible route overflies VGD-31 (permanently removed):  [Map provided by IATA]

ATS Route Name	**BOB 03**
State Priority	**B**
IATA Priority	HIGH/MEDIUM/LOW *(Need IATA assessment)*
Requested by (when)	Myanmar and Thailand (November 2024)
States/Administrations Involved	Myanmar and Thailand (Yangon and Bangkok FIRs)
Route Description	Route 1: BKK (1353.61N 10035.78E) – ~~HORIN~~ GUSOP – New POXEM – PTN (1648.78N 9446.78E) Route 2: BKK (1353.61N 10035.78E) – ~~GOBAP~~ IKIGO – DAMIM – PUMEK (1528.64N 9748.61E) – BGO (1719.11N 9631.20E)
Flight Level Band	
Benefit (fuel, environmental)	Further optimize air traffic flows from Europe, South Asia and Middle East to continental Southeast Asia operating through Myanmar and Thailand airspace
Operational Information (potential airlines, flight frequency, potential city pairs)	*(Need information from IATA)*
Remarks: At SIOSEACG/4: this proposal is newly incorporated. Concerned States are realigning of N895/P646 between PTN – BKK and designating as bi-directional route for overflight traffic and G463 between BGO-BKK, and designating it a uni-directional RNAV2/RNAV10 route serving eastbound PBN-capable traffic. BIMT Phase 2b (Myanmar – Thailand Route Development) aims to further optimize air traffic flows between Myanmar and Thailand. The route will be Performance-Based Navigation (PBN) (RNAV2 or RNAV10). Myanmar and Thailand agreed to continue implementation efforts during BIMT/8 (November 2024). At BOBTFRG/7: Thailand informed that a bilateral meeting between Thailand and Myanmar was planned for the following week. The outcomes of the discussion would be reported at future regional meeting, such as SAIOSEACG/5. At ATM/SG/14: Thailand updated the routes description, and informed that implementation was expected in September 2027.	

Chapter 2: Southeast Asia

(referred to States, SAIOSEACG and SCSTFRG for review)

ATS Route Name	MEKONG 01
State Priority	**B**
IATA Priority	**MEDIUM**
Requested by (when)	Thailand, Vietnam (21/03/2023)
States/Administrations Involved	Thailand, Lao PDR, Vietnam (Bangkok, Vientiane, Hanoi) Cambodia, Thailand, Lao PDR, Viet Nam (Phnom Penh FIR, Bangkok FIR, Vientiane FIR, Hanoi FIR)
Route Description	VINH PHUC (VPH) (211634N 1053604E) – BISON (2026.20N 10538.01E) – CB (1952.58N 10530.98E) – IDOTA (Ha Noi/Vientiane FIR Boundary) (1841.23N 1058.35E) – New Bangkok/Vientiane FIR Boundary (174842.10N 1042043.51E) – ROI-ET (ROT) (160700.59N 1034619.45E) – BIDEM (Bangkok/Phnom Penh FIR Boundary) (1423.06N 10347.27E) – REP (1321.62N 10413.42E) – PNH (1135.69N 10445.85E)
Flight Level Band	
Benefit (fuel, environmental)	Potential to save 12 minutes and 750 kilograms of fuel per flight (VVNB – VDSR)
Operational Information (potential airlines, flight frequency)	Allow flights from Guangzhou FIR and beyond on the ATS route R474 to fly shorter distance into Bangkok FIR (VTBS) and further South into Phnom Penh FIR (VDSA & VDPP)
Remarks: This route was proposed as Conditional Route (CDR) to promote international CDR arrangement among the Mekong states. The route availability will be subject to civil-military coordination in pre-tactical and tactical level. At SAIOSEACG/2: Viet Nam supported the initiative by Thailand, and added that the new route would be further realigned with the existing primary routes within Hanoi FIR. For the update, the approval procedure of the route proposal by its higher authority is in progress, and which expected to be completed soon. It is suggested that Thailand organize a tripartite meeting involving all States concerned to further discuss the detail. At SCSTFRG/12: Further information will be provided after Mekong-ATMCG meeting (27-28 November 2024). At SAIOSEACG/4: the relevant States agreed to the design principle of the ATS route to be implemented as an RNAV2 CDR with the MFA of FL270 and would continue with implementation planning in due course. Viet Nam and Thailand informed the meeting	 **Figure 1:** VPH – ROT Route

of the following points through WP17 derived from MK-ATM/CG/10 meeting. Hanoi FIR, Viet Nam and Bangkok FIR, Thailand agreed to the design principle of ATS route serving traffic as Fig-2 between VPH – ROT – PNH to be implemented as an RNAV2 CDR with the MFA of FL270 and would continue with implementation planning in due course. Hanoi FIR (Viet Nam) and Bangkok FIR (Thailand) agreed to the design principle of ATS route serving traffic between VPH – ROT – PNH to be implemented as an RNAV 2 CDR with the MFA of FL270 as depicted Fig-3 and would continue with implementation planning in due course.

Thailand added remarks regarding the Fig-3 as follow: relevant States discussed the design of the route which had been altered to align with requirements within Hanoi FIR, Vientiane FIR, and Bangkok FIR as well as the route specification and Minimum Flight Altitude (MFA) for the route, at the MK-ATM/CG/10 (Nov 2024). It was agreed that the route would be designated an RNAV2 Conditional Route (CDR) with the minimum flight altitude of FL270. Moreover, the route was further extended into Phnom Penh FIR, connecting to Phnom Penh (VDPP) and Siem Reap (VDSA) by overlaying existing conventional route R345 (ROT – BIDEM – REP) and VD W1/Y13 (REP – PNH).

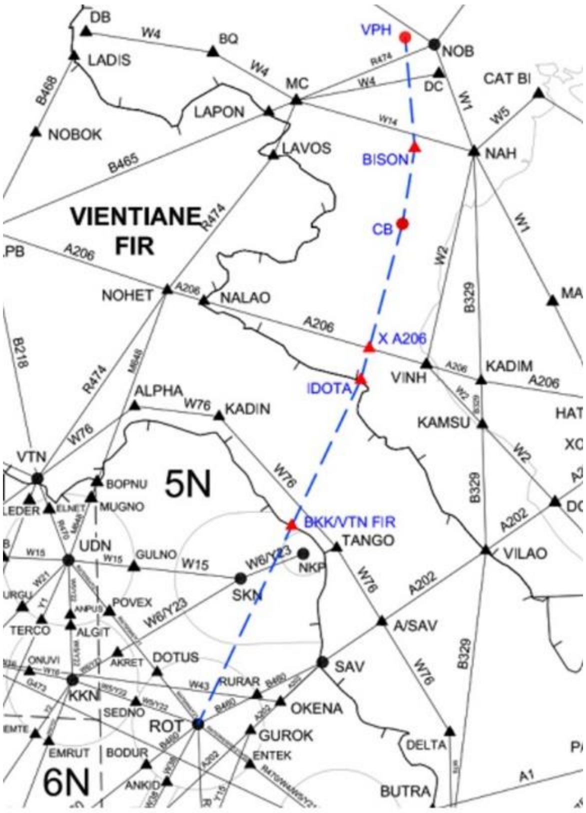


Figure 2: Proposed VPH - ROT Route

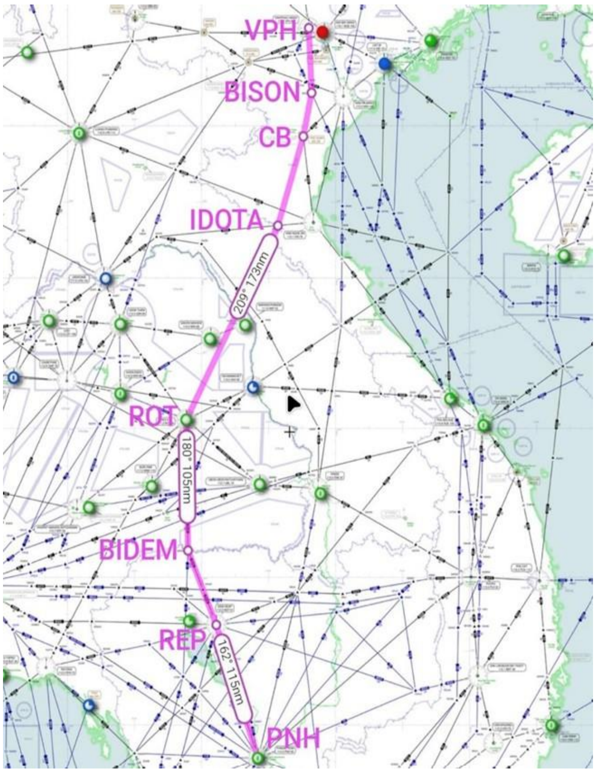
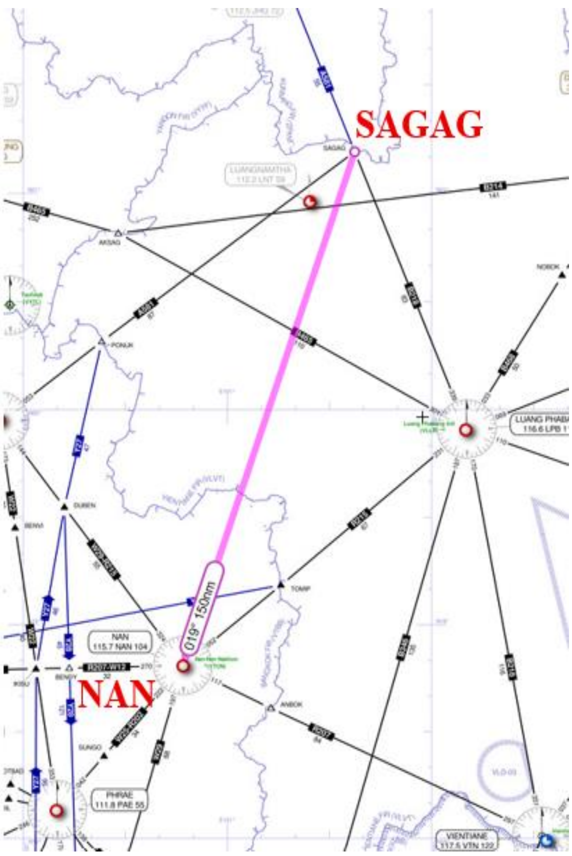
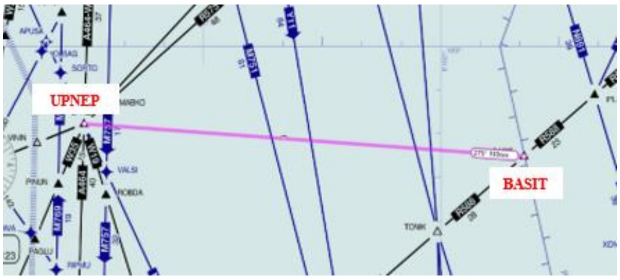
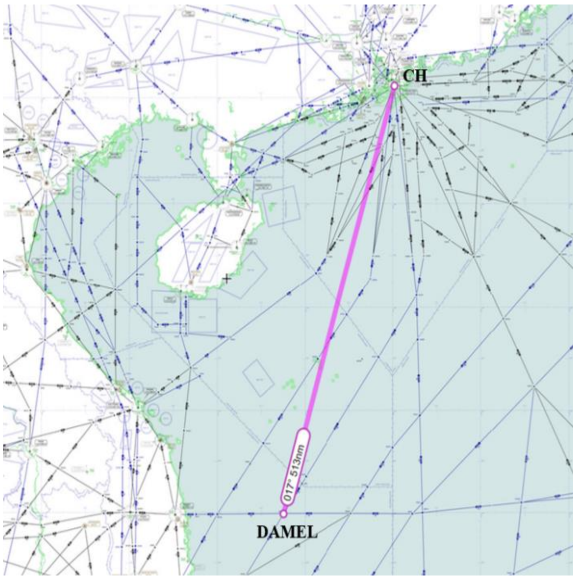
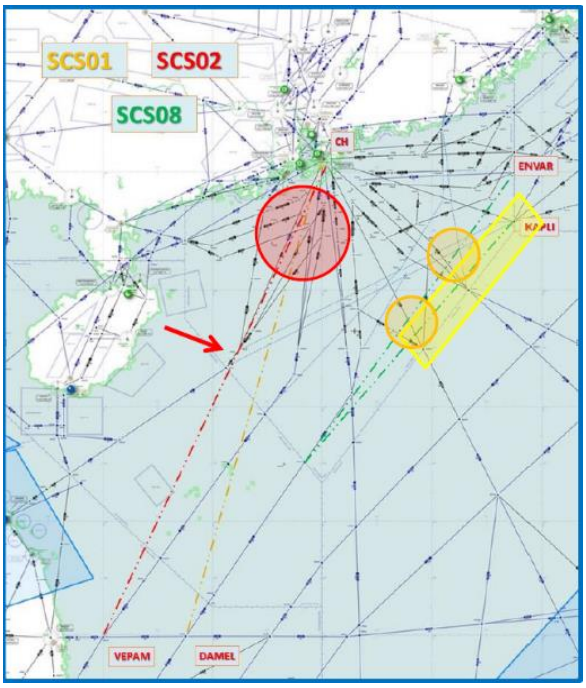


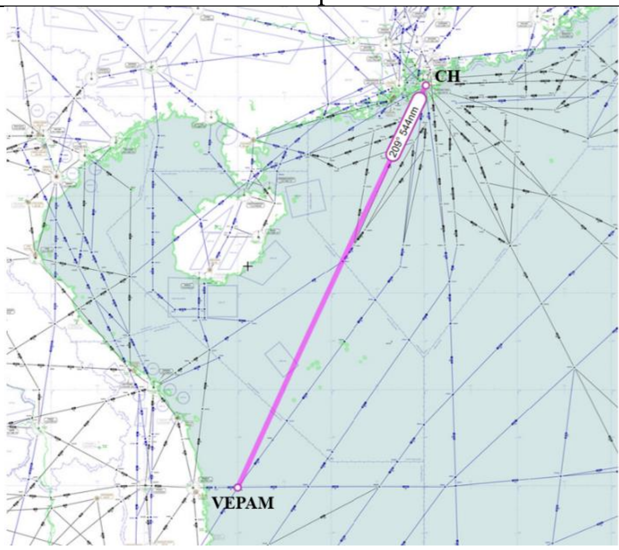
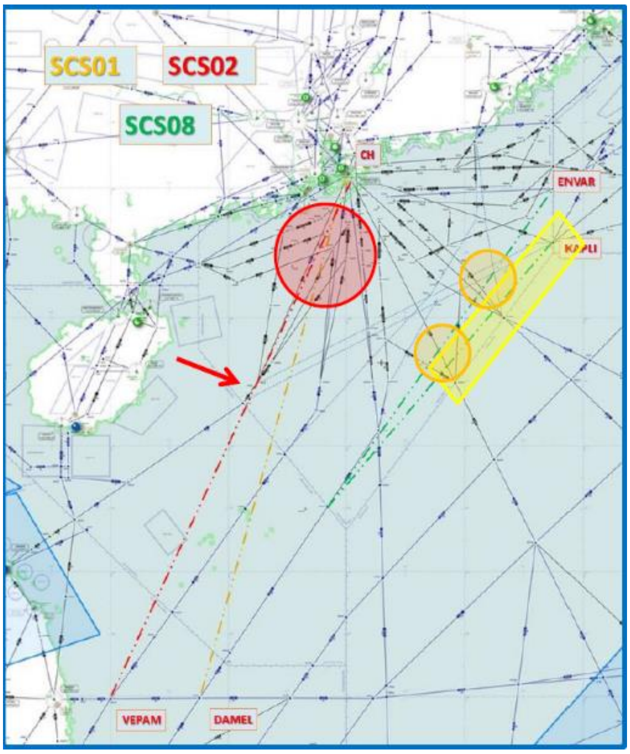
Figure 3: Proposed VPH - ROT - PNH Route

ATS Route Name	**MEKONG 02 (NAN – SAGAG)**
State Priority	B
IATA Priority	HIGH/MEDIUM/LOW *(Need IATA assessment)*
Requested by (when)	Lao PDR and Thailand (June 2024)
States/Administrations Involved	China, Lao PDR, Thailand (Kunming, Vientaine, Bangkok FIRs)
Route Description	NAN (1848.61N 10047.28E) – New Bangkok/Vientiane FIR Boundary (coordinate TBC) – SAGAG (2112.91N 10137.05E)
Flight Level Band	FL270 – FL460
Benefit (fuel, environmental)	Reduce NAN – SAGAG flight distance by 35 NM
Operational Information (potential airlines, flight frequency)	FD, TG, MF, MU *(Need further traffic count from IATA)*
Remarks: At SAIOSEACG/4: this proposal was newly incorporated. The proposed route were designed to enhance airspace capacity between NAN (Bangkok FIR) – SAGAG (Vientiane FIR) into Kunming FIR in southwestern China which the route design principle has been agreed through the tri-lateral discussion between China, Lao PDR and Thailand on 24 – 25 June 2024. At SCSTFRG/14: China commented to ensure seamless coordination and timely implementation for ATS routes from LPB to ELASU, a technical coordination meeting will be convened between China, Lao PDR, Thailand to finalize operational arrangements, validate route design, and confirm implementation timelines on Q4 2026.	

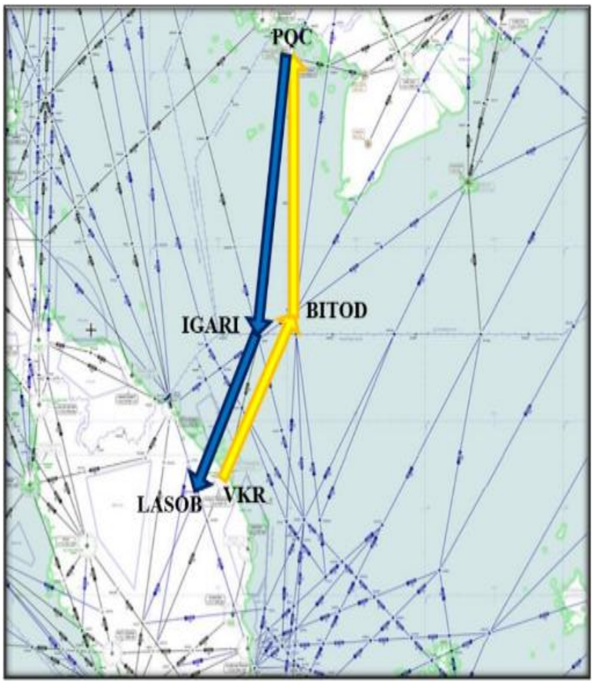
ATS Route Name	**MEKONG 03 (BASIT-UPNEP)**
State Priority	**B**
IATA Priority	**HIGH/MEDIUM/LOW** *(Need IATA assessment)*
Requested by (when)	Cambodia and Thailand (2015)
States/Administrations Involved	Cambodia, Thailand (Phnom Penh and Bangkok FIRs)
Route Description	UPNEP (942.26N 10029.60E) – BASIT (Bangkok/Phnom Penh FIR Boundary) (934.95N 10221.12E)
Flight Level Band	
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency)	VN
Remarks: At SAIOSEACG/4: this proposal is newly incorporated. The development of a direct ATS route serving traffic between VVTS (Viet Nam), VDSV (Cambodia) and VTSM/VTSP (Thailand) was discussed during the MK-ATM/CG/10 (Nov 2024), the design principle of the route was agreed among relevant States. With a 2-phase implementation plan, this agreement was captured as Conclusion MK-ATM/CG/10-3 from the meeting: a) Phase 1: implementation of BASIT – UPNEP, which were agreed upon by Cambodia and Thailand. Both States were ready to begin the implementation. b) Phase 2: implementation of TUNPO – BASIT by Cambodia and Viet Nam. This route segment would be added into ATS Route Catalogue later as Viet Nam need to conduct internal assessment before developing an implementation plan. At SCSTFRG/13: Cambodia reported ongoing cooperation with Thailand under Phase 1, and stated that this topic would be further addressed at the upcoming Mekong ATM Meeting later this year.	

ATS Route Name	**SCS 01**
State Priority	**D**
IATA Priority	**HIGH**
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	Viet Nam, China, Hong Kong China (Ho Chi Minh, Sanya, Hong Kong FIRs)
Route Description	DAMEL 1358.7N 11130.6E – Cheung Chau (CH) 2213.2N 11401.8E
Flight Level Band	28,000 – 46,000 ft
Benefit (Environmental)	23 NM / 4 minutes, 300 kg fuel per flight, 1,560 tonnes fuel, 4,914 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	CX, KA, MH, SQ More than 100 flights per week SIN – Pearl River Delta airports
Remarks: Proposed route shortening for M771 into the Pearl River Delta area. At SEACG/19: WP09 Hong Kong China advised they had studied the proposal for track shortening and advised the proposed change would reduce capacity of A1/P901. It would also require an extensive change in the flight route system and ATC sectors in Hong Kong FIR. However, Hong Kong China would continue to study this proposal for the implementation of RNP4/2. At SEACG/26: Hong Kong China commented they would need to review the integration of this route proposal with its planned airspace enhancement projects. 22/07/2019: Viet Nam has no objection, subject to agreement from China and Hong Kong China. 23/10/2020: China commented the proposal was under consideration. 30/10/2020: Hong Kong China commented SCS 01 and SCS 02 were conflicting with each other (see the red circle in the figure below). **The two routes would create additional confliction points in the most congested ATC sector and ATS route segment in the Hong Kong FIR** (see the red circle and arrow in the figure below). **Therefore, these two routes were not recommended**. At ATM/SG/8: IATA provided updates on IATA priority; implementation benefits; and operational information.	 

29/09/2021: China commented SCS 01 would create conflict with existing ATS routes A1, L642 and M771, and therefore not recommended for implementation. At ATM/SG/9: IATA provided update on the route operational information. At SCSTFRG/13: Hong Kong China suggested to archive SCS 01 to focus on the discussion to other feasible routes. IATA advised that they will reassess the feasibility of the proposal and retain it in the ATS Route Catalogue list pending further review.	

ATS Route Name	SCS 02
State Priority	D
IATA Priority	HIGH
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	Viet Nam, China, Hong Kong China (Ho Chi Minh, Sanya, Hong Kong FIRs)
Route Description	VEPAM 1358.0N 11000.0E – Cheung Chau (CH) 2213.2N 11401.8E
Flight Level Band	28,000 – 46,000 ft
Benefit (Environmental)	12 NM / 1 minutes, 200 kg fuel per flight, 2,080 tonnes fuel, 8,580 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	CX, KA, MH, SQ More than 200 flights per week SIN – Pearl River Delta airports
Remarks: Proposed route shortening for L642 out of the Pearl River Delta area. At SEACG/19: WP09 Hong Kong China advised they had studied the proposal for track shortening and advised the proposed change would reduce capacity of A1/P901. It would also require an extensive change in the flight route system and ATC sectors in Hong Kong FIR. However Hong Kong, China would continue to study this proposal for the implementation of RNP4/2. At SEACG/26: Hong Kong China commented they would need to review the integration of this route proposal with its planned airspace enhancement projects. 22/07/2019: Viet Nam has no objection, subject to agreement from China and Hong Kong China. 23/10/2020: China commented the proposal was under consideration. 30/10/2020: Hong Kong China commented SCS 01 and SCS 02 were conflicting with each other (see the red circle in the figure below). **The two routes would create additional confliction points in the most congested ATC sector and ATS route segment in the Hong Kong FIR** (see the red circle and arrow in the figure below). **Therefore, these two routes were not recommended**. At ATM/SG/8: IATA provided updates on implementation benefits; and operational information. 29/09/2021: China commented SCS 02 would create conflict with existing	 

ATS routes A1, L642 and M771, and therefore not recommended for implementation. At ATM/SG/9: IATA provided update on the route operational information. At SCSTFRG/13: Hong Kong China suggested to archive SCS 02 to focus on the discussion to other feasible routes. IATA advised that they will reassess the feasibility of the proposal and retain it in the ATS Route Catalogue list pending further review.	

ATS Route Name	**SCS 11**
State Priority	**B**
IATA Priority	**LOW**
Requested by (when)	IATA (10/03/2015: SEACG/22)
States/Administrations Involved	Viet Nam, Singapore, Malaysia (Ho Chi Minh, Singapore, Kuala Lumpur FIRs)
Route Description	Kuala Terengganu (VKR) 0521.6N 10304.9E – BITOD 0715.4N 10407.1E
Flight Level Band	
Benefit (fuel, environmental)	6 NM / 0 minutes, 23 kg fuel per flight, 167 tonnes fuel, 527 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	MH, VN At least 20 flights per week KUL – HAN/PNH/SGN
Remarks: At SEACG/26: Malaysia, Singapore and Viet Nam had agreed in principle the feasibility of the route proposal. The States concerned would meet to further discuss the proposal in due time, and Malaysia agreed to become the lead coordinator. 22/07/2019: Viet Nam proposed the following route proposals for consideration by Malaysia and Singapore: Uni-directional eastbound route VKR – BITOD – PQC; and uni-directional westbound route PQC – IGARI – LASOB. At ATMSG/7: Malaysia would lead the tripartite meeting, expected during the SCSTFRG/8 in September 2019. At ATMSG/8: This route proposal was under consideration by Viet Nam; and IATA provided updates on IATA priority, implementation benefits and operational information. 08/10/2021: Malaysia commented they would host the meeting between Malaysia, Singapore and Viet Nam in Q4 2021 or Q1 2022. 22/2/2022: the tripartite meeting between Malaysia, Singapore and Viet Nam was canceled and will be rescheduled to report the discussion outcome to SCSTFRG/10 meeting (scheduled 31/5 – 1/6 2022) In the tripartite meeting in September 2022, Viet Nam proposed the following route proposals: unidirectional Eastbound: VKR-IPRIX-BITOD-PQU; and unidirectional Westbound: PQU-IGARI-LASOB.	 

Upon agreement by States concerned (Malaysia and Viet Nam), IATA proposed an extention from IPRIX to VIGEN to this proposal for smooth joining to M765 saving 5 - 6 NM for eastbound flights.

Before SAIOSEACG/2: Malaysia indicated that Malaysia, Singapore and Vietnam have broadly agreed to the proposal. Malaysia's proposal for the Coordination Procedure has been agreed by Singapore pending Viet Nam acknowledgement.

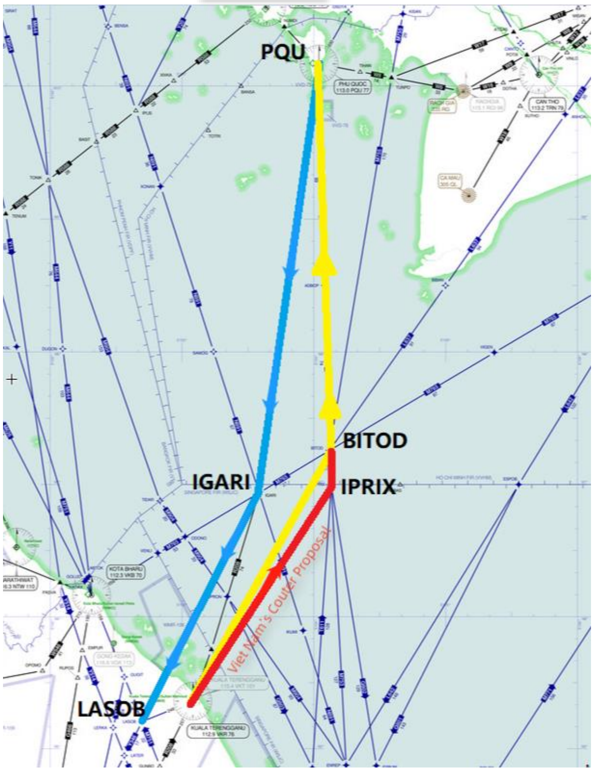
At SAIOSEACG/2: regarding the additional proposal by IATA to further line up the IPRIX to VIGEN, Viet Nam declined based on their safety and efficiency evaluation.

At SCSTFRG/11: Viet Nam submitted IP05 that commented at the Tripartite Meeting (through a video teleconference) between Malaysia, Viet Nam, and Singapore on the ATS route, and other relevant issues on 28 July 2022. Viet Nam principally agreed to the proposal for the establishment of a new ATS route as requested by IATA. Viet Nam suggested a minor adjustment to the proposal, stating that VKR–IPRIX should be used instead of VKR–BITOD to minimize the number of transfer points at IPRIX and reduce the workload of ATC. Viet Nam also suggested RNAV 2/RNP 2 for both routes. The timeline depends on the Malaysia and Singapore sides.

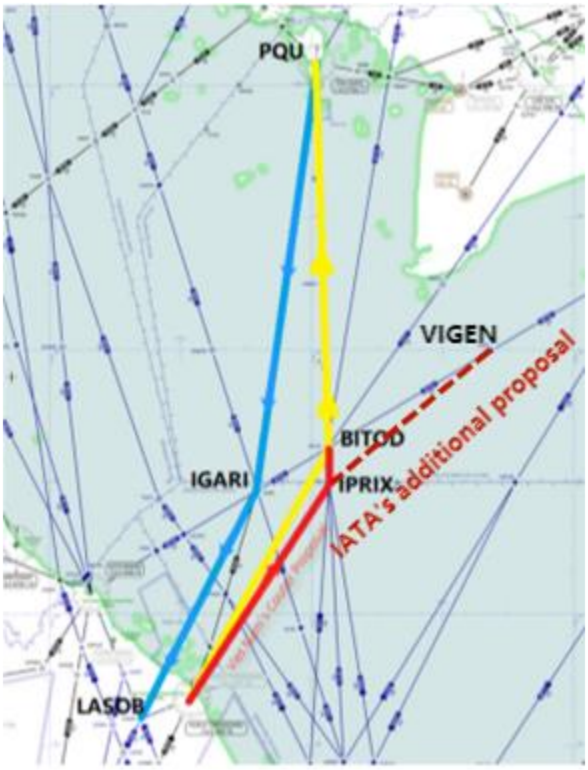
At SAIOSEACG/3: Malaysia suggested to apply RNP10 route specification on the proposed routes. Singapore had no objections to either RNP 2 or RNP 10 navigation specifications for the proposed routes but highlighted that there are some operational details that need to be further discussed between the three States involved. In line with the APAC Seamless ANS Plan, ICAO recommended RNAV 2 and RNP 4 as preferable options for future air navigation, and the suggestion was echoed by Viet Nam. As requested by Malaysia, IATA agreed to investigate the fleet equipage operating in the area.

At SCSTFRG/12: Malaysia has engaged with local airlines operating in the area and confirmed that they are ready for RNAV

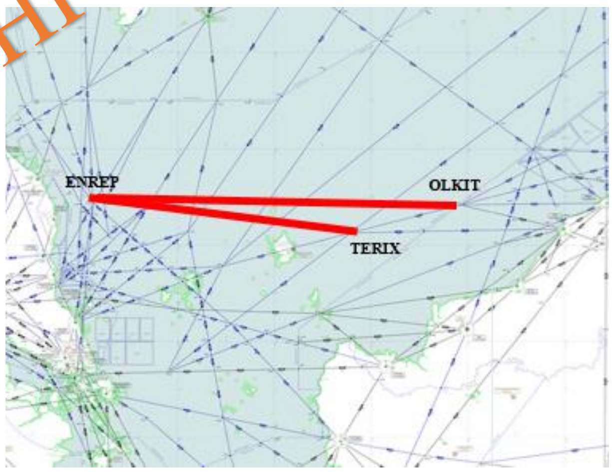
Counter-proposal by Viet Nam:



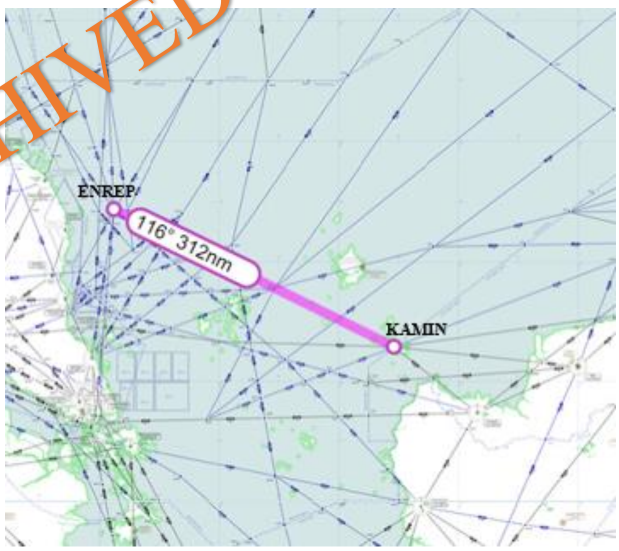
Suggested by IATA:



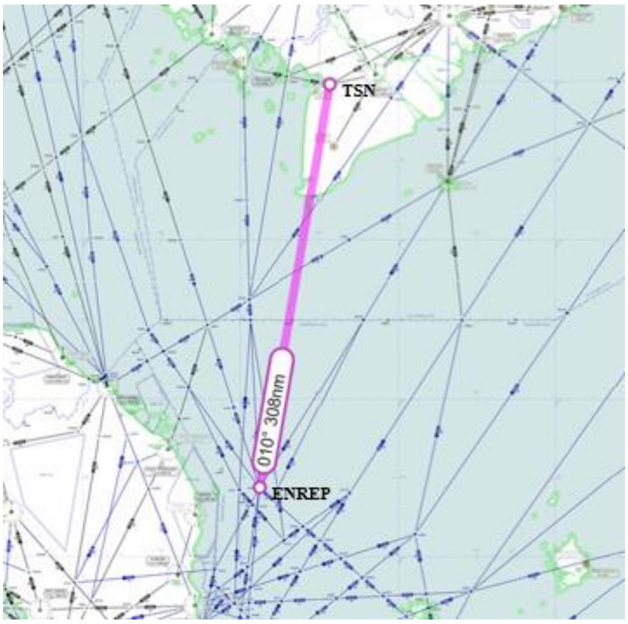
2/RNP 4. Further discussions with the relevant states are scheduled to take place in Q1 2025. Before SAIOSEACG/4: Malaysia updated through email that technical discussion between CAAM and CAAS was conducted on 18/2/25. Tripartite discussion is proposed in Q2/3 subject to states availability. At SAIOSEACG/4: IATA proposed deleting the additional proposal to further connect the IPRIX and VIGEN in order for the counter-proposal from Viet Nam to be progressed without further delay. 12/12/2025: Malaysia informed that further discussion on the route proposal would be arranged with Singapore and Viet Nam in the near future.	

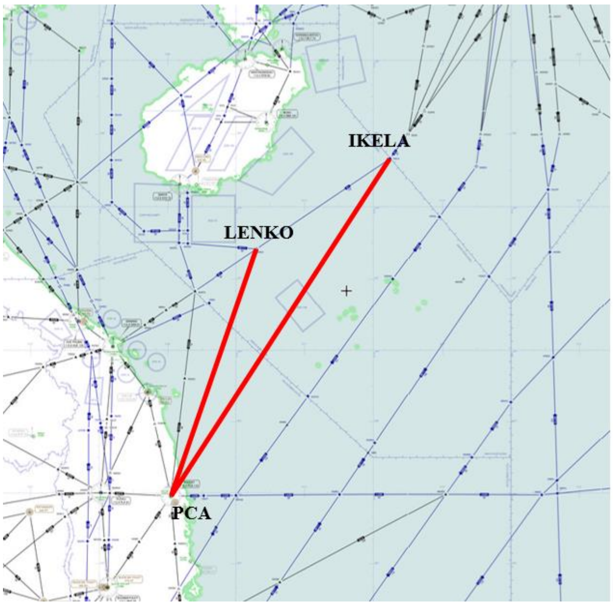
ATS Route Name	**SCS 14**
State Priority	**B**
IATA Priority	**LOW**
Requested by (when)	Malaysia (26/03/2018: SAIOACG/8 & SEACG/25)
States/Administrations Involved	Malaysia, Singapore (Kota Kinabalu, Singapore FIRs), Indonesia
Route Description	ENREP 045223.88N 1041442.00E – OLKIT 045012.12N 1115118.00E or ENREP 045223.88N 1041442.00E – TERIX 041520.88N 1093455.92E
Flight Level Band	At or below 29,000 ft
Benefit (fuel, environmental)	107 NM / 12 minutes, 365 kg fuel, 1,153 kg CO_2 per flight, 266,450 kg fuel, 841,982 kg CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	BKI – KBR
Remarks: Purpose is to circumnavigate major confluence of air traffic at VPK thus providing better efficiency for flight operating from/to KBR. Operation at 29,000 ft and below to avoid crossing traffic within the South China Sea airspace. At SEACG/26: Singapore commented implementation of this route would be possible with the implementation of space-based ADS-B in Singapore FIR, planned by end of 2019; and IATA would assign its priority after a comprehensive review of the Catalogue by its focus group. 15/05/2020: discussion on this route proposal would be conducted when the COVID-19 situation improved, and a face-to-face meeting could be conducted between Malaysia and Singapore. At ATMSG/8: Indonesia commented future discussion on this route proposal would require their involvements; and IATA assigned "**LOW**" priority and recommended for deletion. 16/09/2021: Singapore commented that, as the COVID-19 situation had not improved, the face-to-face meeting between the States involved had yet to materialise. At SAIOSEACG/3: Malaysia proposed withdrawing the route proposal. Singapore informed that they have no objections to the withdrawal of SCS 14. IATA suggested that the two route proposals be archived for future	

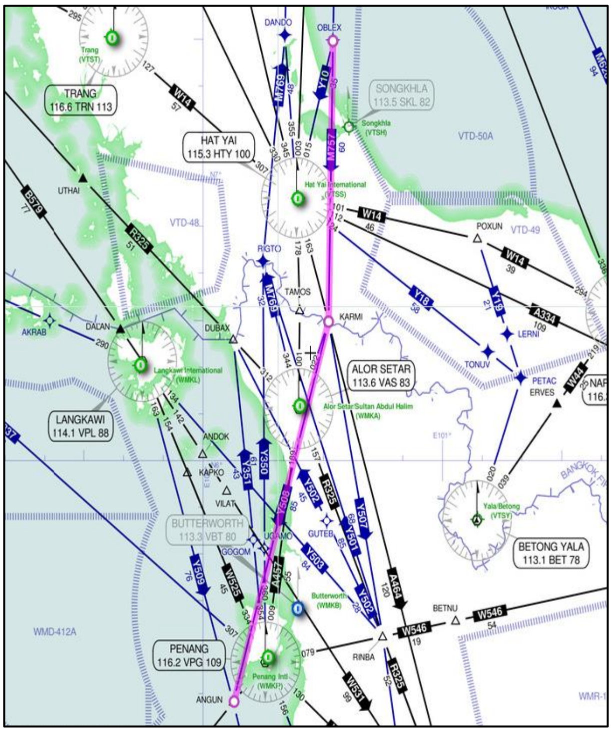
use instead of withdrawn. The meeting agreed to archive the two route proposals from the ATS Route Catalogue.	

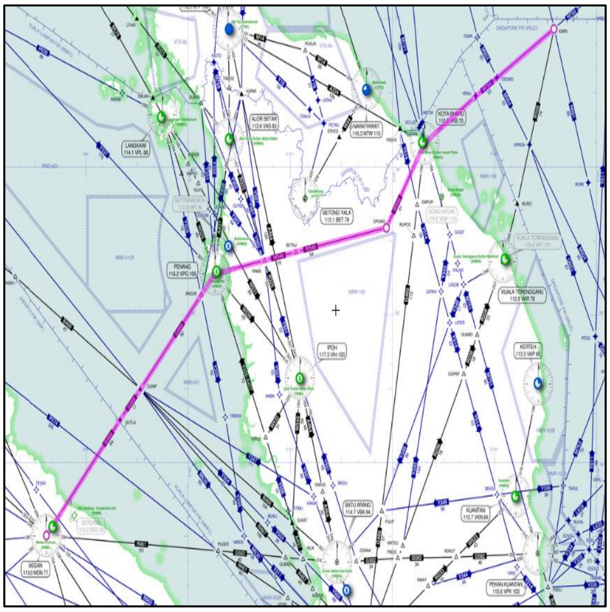
ATS Route Name	**SCS 15**
State Priority	**B**
IATA Priority	**LOW**
Requested by (when)	Malaysia (26/03/2018: SAIOACG/8 & SEACG/25)
States/Administrations Involved	Malaysia, Singapore (Kota Kinabalu, Singapore FIRs)
Route Description	ENREP 045223.88N 1041442.00E – KAMIN 023441.88N 1085536.12E
Flight Level Band	At or below 29,000 ft
Benefit (fuel, environmental)	107 NM / 12 minutes, 365 kg fuel, 1,153 kg CO_2 per flight, 266,450 kg fuel, 841,982 kg CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	KCH – KBR
Remarks: Purpose is to circumnavigate major confluence of air traffic at VPK thus providing better efficiency for flight operating from/to KBR. Operation at 29,000 ft and below to avoid crossing traffic within the South China Sea airspace. At SEACG/26: Singapore commented implementation of this route would be possible with the implementation of space-based ADS-B in Singapore FIR, planned by end of 2019; and IATA would assign its priority after a comprehensive review of the Catalogue by its focus group. 15/05/2020: discussion on this route proposal would be conducted when the COVID-19 situation improved, and a face-to-face meeting could be conducted between Malaysia and Singapore. At ATM/SG/8: Indonesia commented future discussion on this route proposal would require their involvements; and IATA assigned "**LOW**" priority and recommended for deletion. 16/09/2021: Singapore commented that, as the COVID-19 situation had not improved, the face-to-face meeting between the States involved had yet to materialise. At SAIOSEACG/3: Malaysia proposed withdrawing the route proposal. Singapore informed that they have no objections to the withdrawal of SCS15. IATA suggested that the two route proposals be archived for future use instead of withdrawn. The meeting	

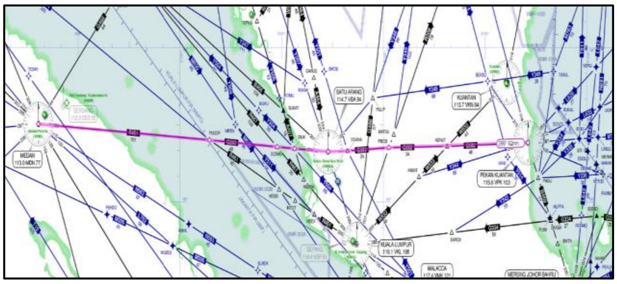
agreed to archive the two route proposals from the ATS Route Catalogue.	

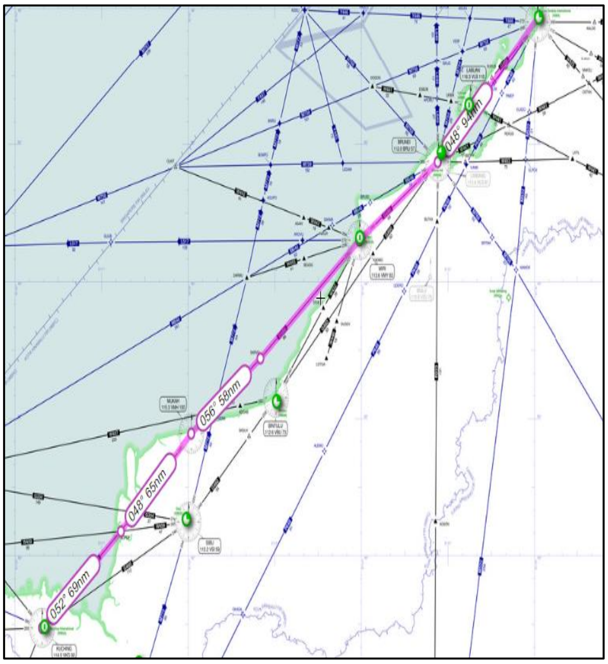
ATS Route Name	**SCS 16**
State Priority	**C**
IATA Priority	**MEDIUM**
Requested by (when)	Viet Nam (01/04/2019: SEACG/26)
States/Administrations Involved	Singapore, Viet Nam (Singapore, Ho Chi Minh FIRs)
Route Description	Implementation of new uni-directional northbound ATS route: ENREP 045223.88N 1041442.00E – New Waypoint (FIR BDRY between Singapore and Ho Chi Minh) – Tan Son Nhat (TSN) 104859.20N 1063844.10E
Flight Level Band	
Benefit (fuel, environmental)	48 NM / 6 minutes, 252 kg fuel, 794 kg CO_2 per flight, 576,576 kg fuel, 1,816 tonnes CO_2 annually Reduction in Distance/Time/Fuel/CO2 by 19NM/2MIN/600LBS/860KGS per flight with B744ERF for SIN/SGN portion on the basis of annual average wind conditions.
Operational Information (potential airlines, flight frequency, potential city pairs)	SIN – SGN
Remarks: 22/07/2019: Viet Nam update that due to crossing routes, this route proposal would be possible subject to the enhancement of surveillance and ATFM capabilities in the concerned area. At ATM/SG/8: Viet Nam commented this route proposal was under consideration; and IATA assigned "**MEDIUM**" priority. 11/2/2022: Singapore commented the concerned area is fully covered by ADS-B to support the proposal and ready to discuss on the implementation. 11/02/2022: Viet Nam commented they would continue to assess a necessity of this ATS/PBN route requirement adding ATS surveillance (SSR and ADS-B) capability has been enhanced by cooperation between Viet Nam and Singapore, and new ATM aoutomation/AFTM capability will be enhanced with a long-term plan.	

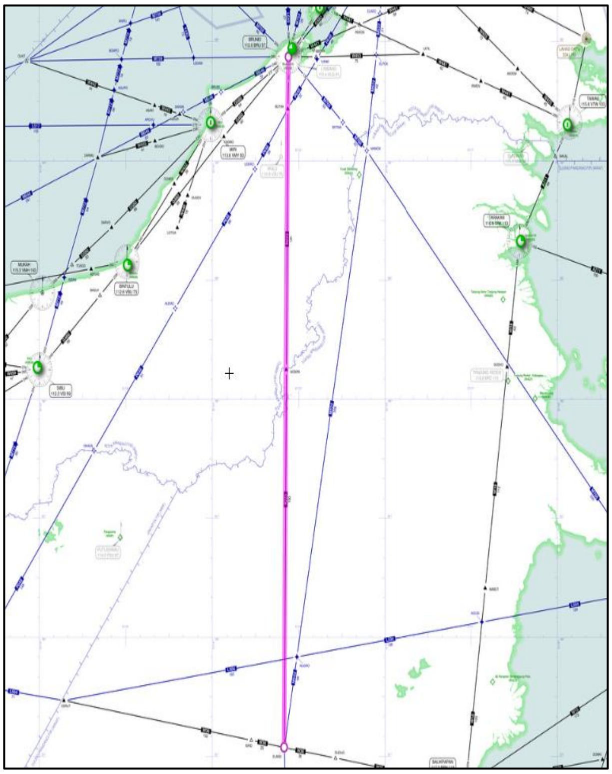
ATS Route Name	SCS 18
State Priority	C
IATA Priority	LOW
Requested by (when)	Viet Nam (01/04/2019: SEACG/26)
States/Administrations Involved	Viet Nam, China, Hong Kong China (Ho Chi Minh, Sanya, Hong Kong FIRs)
Route Description	Phu Cat (PCA) 135726.00N 1090233.60E – IKELA 183942.00N 1121442.00E or Phu Cat (PCA) 135726.00N 1090233.60E – LENKO 172456.88N 1101800.00E
Flight Level Band	
Benefit (fuel, environmental)	52 NM / 5 minutes, 220 kg fuel per flight, 435 tonnes fuel, 1,370 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	KA, MH At least 30 flights per week KUL – SGN – East Asia
Remarks: At ATMSG/7: China proposed to concentrate on the implementation of parallel route to A1 (SCSTFRG Priority Area 1). This route proposal may not be needed, if the parallel route to A1 is implemented. 23/10/2020: No update (SCSTFRG/9 postponed to 2021). At ATMSG/8: IATA provided updates on IATA priority; implementation benefits; and operational information. At ATM/SG/9: No update (discussion on planned implementation of parallel route to A1 was still ongoing at the SCSTFRG meeting). At SCSTFRG/13: Hong Kong China agrees with the remark made by China to focus on the implementation of parallel routes on A1. It is suggested to archived SCS 08 to focus on the discussion to other feasible routes.	

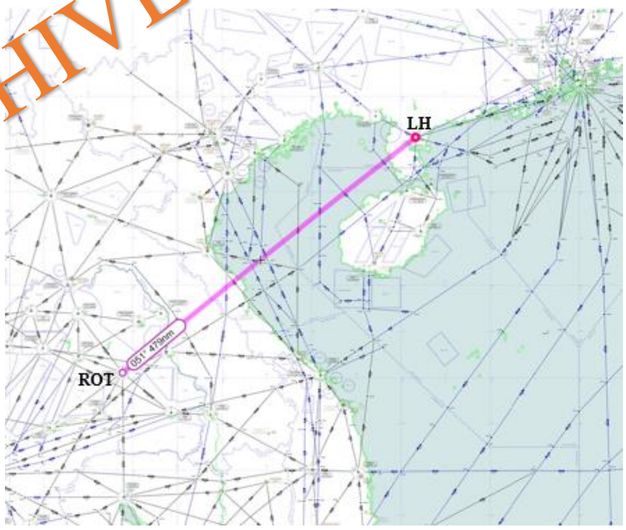
ATS Route Name	**SCS 19**
State Priority	**A**
IATA Priority	**MEDIUM**
Requested by (when)	Malaysia (20/03/2023)
States/Administrations Involved	Malaysia, Thailand
Route Description	This proposal essentially focuses on extending M757 to replace the conventional route Y508
Flight Level Band	
Benefit (fuel, environmental)	The implementation of PBN Airspace and to simplify FPL in Kuala Lumpur FIR.
Operational Information (potential airlines, flight frequency)	
Remarks: At SAIOSEACG/2: Thailand indicated its full support for the extension of M757. At SCSTFRG/12: Thailand said that they already submitted PfA to ICAO. 3/12/2025: PfA had been circulated. PfA has been approved. Refer to State letter T3/2.6, T 3/3.1 – AP019/26 (ATM) dated 3 February 2026.	

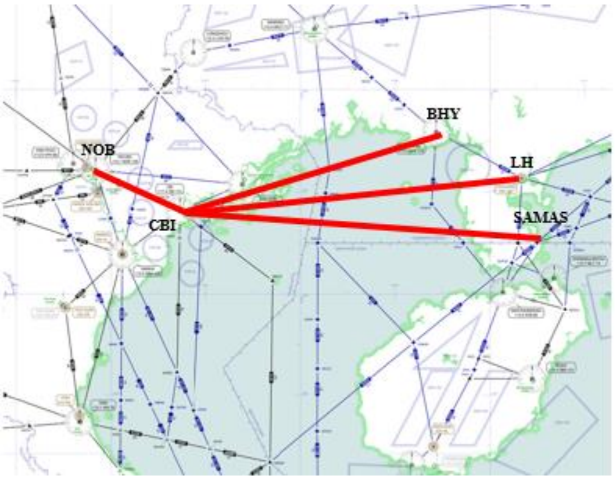
ATS Route Name	**SCS 20**
State Priority	**B**
IATA Priority	**MEDIUM**
Requested by (when)	Malaysia (20/03/2023)
States/Administrations Involved	Malaysia, Singapore, Indonesia, Viet Nam
Route Description	This proposal essentially focuses on extending M765 to replace the conventional routes W546 and G468.
Flight Level Band	
Benefit (fuel, environmental)	The implementation of PBN Airspace and to simplify FPL in Kuala Lumpur FIR.
Operational Information (potential airlines, flight frequency)	
Remarks: At SAIOSEACG/2: Indonesia expressed its favourable consideration on this proposal, further assessment was needed. At SCSTFRG/12: Malaysia has informed that the proposals are currently under review by Indonesia. Malaysia has proposed bilateral discussions on these proposals, and the outcomes of these discussions will be communicated to ICAO. Before SAIOSEACG/4: Malaysia updated through email that a draft PfA for the proposal has been circulated to states involved for their review and consideration. At SCSTFRG/13: Indonesia noted that further coordination with Malaysia would be conducted. 13/12/2025: Malaysia informed that further dialogue would be held to determine the direction of the proposals. A technical meeting between Indonesia and Malaysia was planned for Q1 2026 to jointly review the proposals.	

ATS Route Name	**SCS 21**
State Priority	**B**
IATA Priority	**MEDIUM**
Requested by (when)	Malaysia (20/03/2023)
States/Administrations Involved	Malaysia, Singapore, Indonesia
Route Description	This proposal essentially focuses on extending M758 to replace the conventional routes G582 and R461 (PUGER to MDN).
Flight Level Band	
Benefit (fuel, environmental)	The implementation of PBN Airspace and to simplify FPL in Kuala Lumpur FIR.
Operational Information (potential airlines, flight frequency)	
Remarks: At SAIOSEACG/2: Indonesia expressed its favourable consideration on this proposal, further assessment was needed. At SCSTFRG/12: Malaysia has informed that the proposals are currently under review by Indonesia. Malaysia has proposed bilateral discussions on these proposals, and the outcomes of these discussions will be communicated to ICAO. At SCSTFRG/13: Indonesia noted that further coordination with Malaysia would be conducted. 13/12/2025: Malaysia informed that further dialogue would be held to determine the direction of the proposals. A technical meeting between Indonesia and Malaysia was planned for Q1 2026 to jointly review the proposals.	

ATS Route Name	**SCS 22**
State Priority	**B**
IATA Priority	**MEDIUM**
Requested by (when)	Malaysia (20/03/2023)
States/Administrations Involved	Malaysia, Singapore, Indonesia
Route Description	Upgrade a portion of conventional ATS routes G580 (VKG to VJN) to PBN Route
Flight Level Band	
Benefit (fuel, environmental)	The implementation of PBN Airspace.
Operational Information (potential airlines, flight frequency)	
Remarks: At SAIOSEACG/2: Indonesia expressed its favourable consideration on this proposal, further assessment was needed. At SCSTFRG/12: Malaysia has informed that the proposals are currently under review by Indonesia. Malaysia has proposed bilateral discussions on these proposals, and the outcomes of these discussions will be communicated to ICAO. 13/12/2025: It was noted that Indonesia had provisionally agreed to the proposal. A technical meeting between Indonesia and Malaysia was planned for Q1 2026 to jointly review the details of the proposal.	

ATS Route Name	**SCS 23**
State Priority	**B**
IATA Priority	**MEDIUM**
Requested by (when)	Malaysia (20/03/2023)
States/Administrations Involved	Malaysia, Indonesia
Route Description	Upgrade from conventional ATS routes R223 to PBN Route
Flight Level Band	
Benefit (fuel, environmental)	The implementation of PBN Airspace.
Operational Information (potential airlines, flight frequency)	
Remarks: At SCSTFRG/12 meeting, Malaysia has informed that the proposals are currently under review by Indonesia. Malaysia has proposed bilateral discussions on these proposals, and the outcomes of these discussions will be communicated to ICAO. 13/12/2025: It was noted that Indonesia had provisionally agreed to the proposal. A technical meeting between Indonesia and Malaysia was planned for Q1 2026 to jointly review the details of the proposal. SAIOSEACG/5: The list of States/Administrations Involved was updated.	

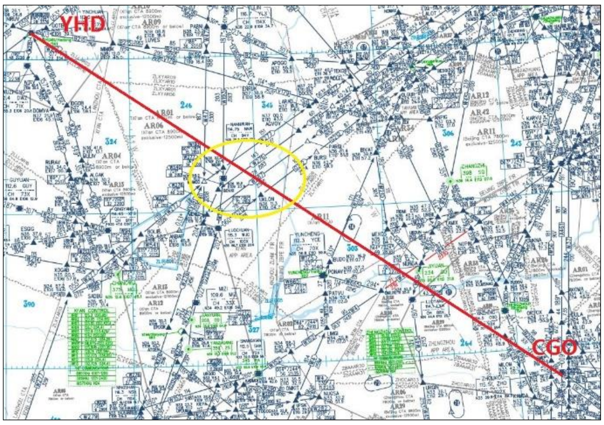
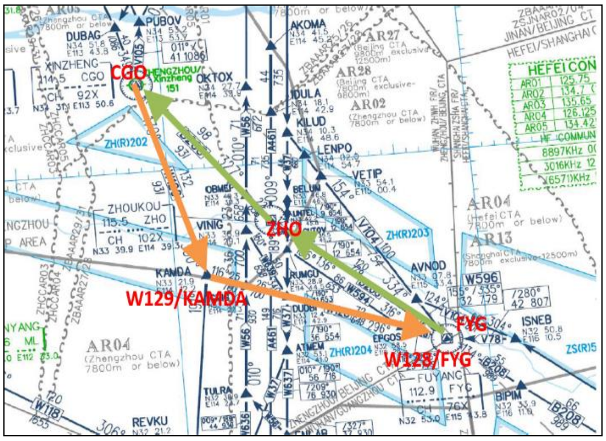
ATS Route Name	**SEA 12**
State Priority	**C**
IATA Priority	**HIGH**
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	Thailand, Lao PDR, Viet Nam, China (Bangkok, Vientiane, Hanoi, Sanya, Guangzhou FIRs)
Route Description	Roiet (ROT) 1607.0N 10346.7E – Huguang (LH) 2107.9N 11020.2E
Flight Level Band	29,000 – 46,000 ft
Benefit (fuel, environmental)	14 NM / 2 minutes, 208 kg fuel, 655 kg CO_2 per flight, 1,731 tonnes fuel, 5,451 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	CX 160 flights per week JKT/KUL/PNH/SIN – HKG/SYX
Remarks: Provide parallel to the A202 route. At SEACG/26: Viet Nam proposed to concentrate on SCSTFRG Priority Area 1: parallel route to A1 proposal. This route proposal to be reviewed at a later stage. 23/10/2020: No update (SCSTFRG/9 postponed to 2021). At ATM/SG/9: No update (discussion on planned implementation of parallel route to A1 was still ongoing at the SCSTFRG meeting). At SAIOSEACG/4: IATA agreed to archive the proposal requested by ICAO, as the main focus is on the parallel routes to A1. IATA noted that in the absence of an A1 parallel route progressing, this proposal will be reactivated.	

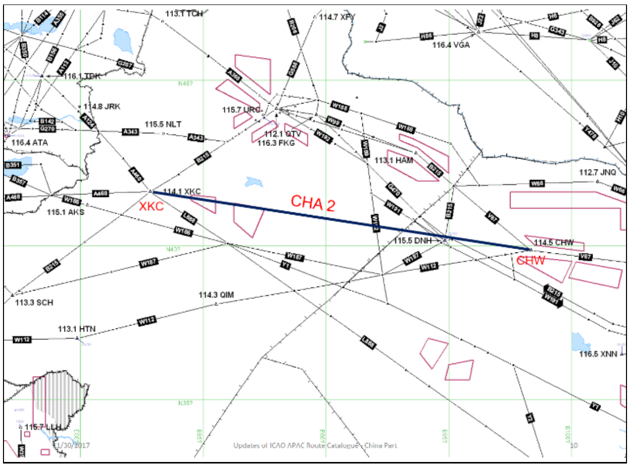
ATS Route Name	VIET NAM 02
State Priority	D
IATA Priority	HIGH
Requested by (when)	Viet Nam (01/09/2018)
States/Administrations Involved	Viet Nam, China (Hanoi, Sanya, Guangzhou FIRs)
Route Description	Noi Bai (NOB) 2112.8N 10550.1E – Cat Bi (CBI) 2049.1N 10642.5E – SAMAS 2030.3N 11029.7E or Noi Bai (NOB) 2112.8N 10550.1E – Cat Bi (CBI) 2049.1N 10642.5E – Huguang (LH) 2107.9N 11020.2E or Noi Bai (NOB) 2112.8N 10550.1E – Cat Bi (CBI) 2049.1N 10642.5E – Nankang (BHY) 2135.2N 10925.9E
Flight Level Band	28,000 – 46,000 ft
Benefit (fuel, environmental)	48 NM / 6 minutes, 252 kg fuel, 794 kg CO_2 per flight, 576,576 kg fuel, 1,816 tonnes CO_2 annually For ZGGG-VVNB with B789, Viet Nam02 can reduce the flight distance by 73NM, reduce the flight time by 9 minutes, and save 700Kg of fuel.
Operational Information (potential airlines, flight frequency, potential city pairs)	CX 44 flights per week
Remarks: Because of small traffic demand and cost/benefit considerations, this route is impossible and cannot be implemented at present. Retain proposal for long-term planing (Viet Nam). Retention discussed at SEACG/22. At SEACG/26: China commented that this route proposal was very unlikely to be implemented, and recommended for this route proposal to be deleted from the Catalogue; and Viet Nam proposed alternate option: Noi Bai (NOB) 2112.8N 10550.1E – Cat Bi (CBI) 2049.1N 10642.5E – Nankang (BHY) 2135.2N 10925.9E to serve traffic between Ha Noi/Cat Bi/Van Don (new international airport in Viet Nam) and destinations in China and beyond. 23/10/2020: China commented the proposal was under consideration. At ATMSG/8: IATA preferred this route proposal to be retained in the Catalogue. 29/09/2021: China commented the proposal was still under consideration. 1/3/2022: IATA preferred this route proposal to be retained in the Catalogue. Despite currently low traffic due to the epidemic, as traffic returns this proposed route can give	

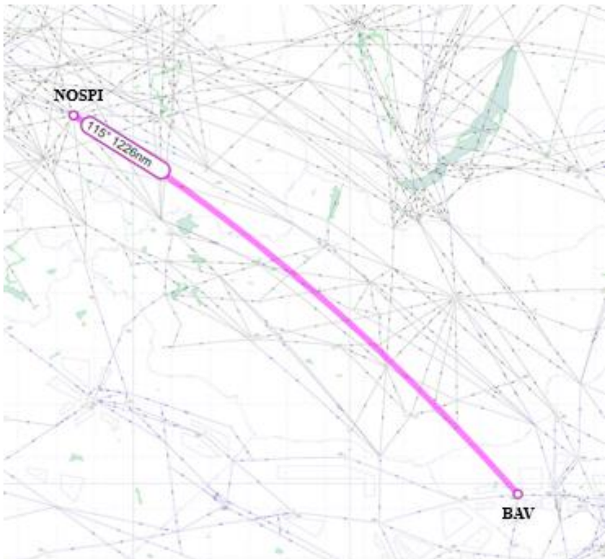
airlines more flight route options between China and Vietnam and beyond. 3/3/2022: China proposed for deletion due to inconsistency with overall flight flow. At SCSTFRG/11: Viet Nam suggested this route proposal be retained in the APAC Route Catalogue and wished that China would reconsider the feasibility of this new route. It was also supported by IATA. In response, China confirmed that they would further assess this route proposal internally and discuss it with Viet Nam during their upcoming bilateral meeting. At SCSTFRG/12: Viet Nam said that they have been continuously discussing the implementation of this route with China. At SCSTFRG/13: China stated that the parallel route to A1 remains the top priority. Viet Nam does support this priority. 8/12/2025: China informed no progress update.	

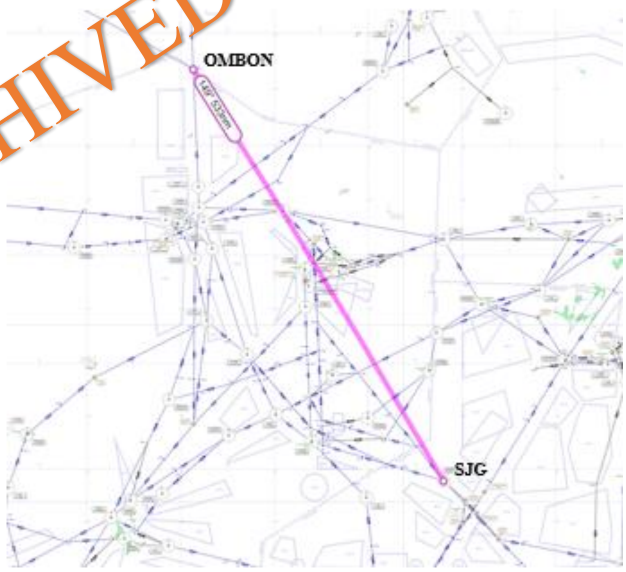
Chapter 3: East Asia

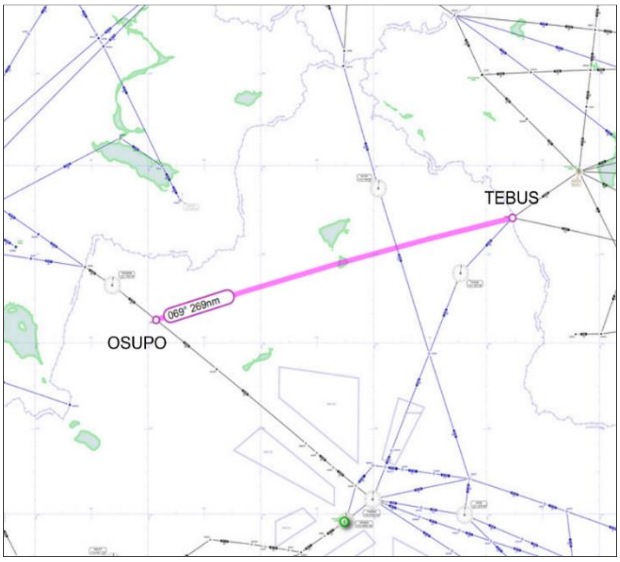
(referred to States, SAIOSEACG and SCSTFRG for review)

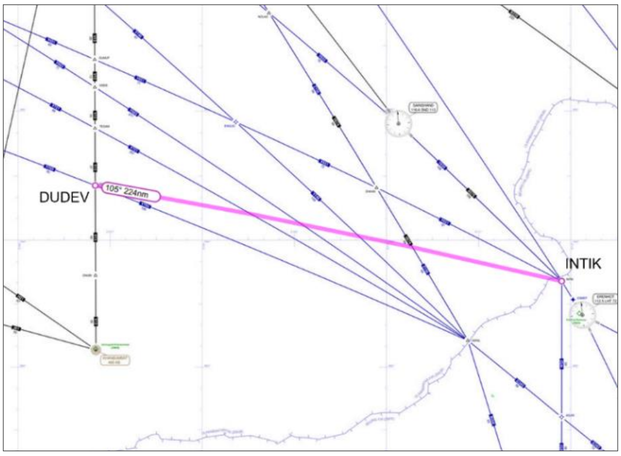
ATS Route Name	**CHA 01**
State Priority	**D**
IATA Priority	**HIGH**
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	China (Lanzhou, Beijing, Wuhan FIRs)
Route Description	Yinchuan (YHD) 3820.8N 10624.6E – Zhengzhou (CGO) N3431.1 E11350.6
Flight Level Band	8,400 – 15,000 meters
Benefit (fuel, environmental)	73 NM / 9 minutes, 26,645 kg fuel, 825,995 kg CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	Europe – Shanghai
Remarks: Original proposal: YHD – YAV – CGO – ZHO – SB/HFE. The route segment between CGO – ZHO – HFE has been implemented as part of ATS route B208 since 2008. Therefore, the route description was amended as YHD – CGO accordingly. At ATMSG/7: China commented the proposed route would create numerous conflicts, and was not consistent with its planned route network. 23/10/2020: China commented there was no progress on this proposal. At ATMSG/8: IATA preferred this route proposal to be retained in the Catalogue, and proposed the route segment between CGO – ZHO – HFE to be made available for eastbound too. In response to IATA's proposal, China commented the following uni-directional routing systems had been implemented for flight planning: (a) eastbound: HFE – FYG – ZHOU – CGO. (b) westbound: CGO – W129/KAMDA – W128/FYG. At SAIOACG/10 and SEACG/27: China proposed for deletion. 3/3/2022: China commented how the current uni-directional routing system works in actual operation (see the Map provided by China) adding that it could reduce heavy traffic and conflict over ZHO. 8/12/2025: China commented that this route proposal would cross multiple main routes, which could cause many conflicts, making it unfeasible. China recommended for deletion.	  [Map provided by China]

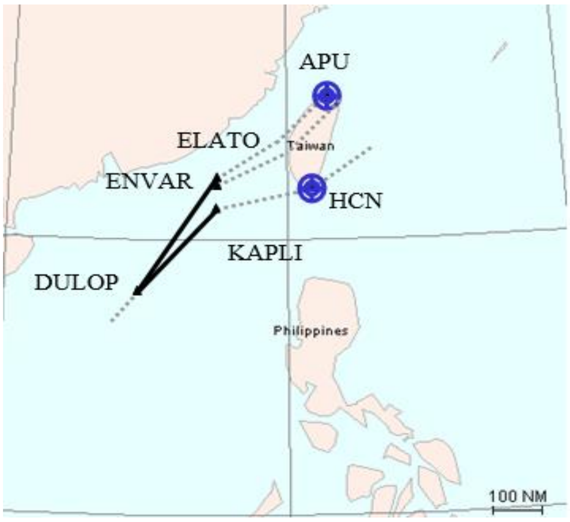
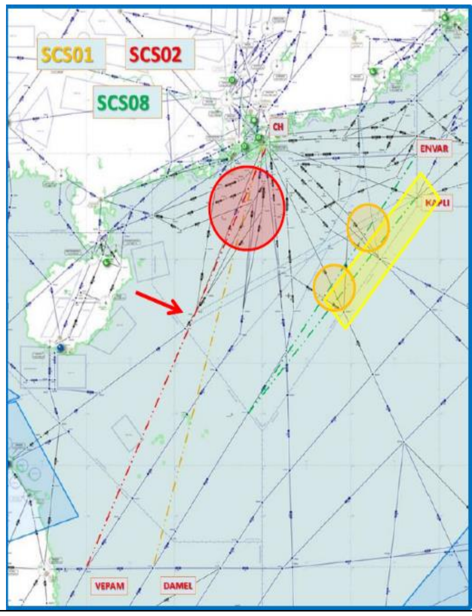
ATS Route Name	CHA 02
State Priority	D
IATA Priority	HIGH
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	China (Urumqi, Lanzhou FIRs)
Route Description	Qiuci (XKC) 4140.6N 08250.6E – Jiayuguan (CHW) 3951.3N 09821.0E
Flight Level Band	8,400 – 15,000 meters
Benefit (fuel, environmental)	93 NM / 12 minutes, 4,426 tonnes fuel, 1,372,202 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	63 flights per week Middle East/Pakistan – China/Japan/Korea
Remarks: China comment: there are existing routes between XKC and CHW. At ATMSG/7: China commented the proposed route was not possible for implementation, and proposed for deletion; and IATA would provide feedback after a comprehensive review of the Catalogue by its focus group, expected in March 2020. 23/10/2020: China proposed for deletion. At ATM/SG/8: IATA preferred this route proposal to be retained in the Catalogue. 8/12/2025: China informed no progress update.	

ATS Route Name	**CHA 12**
State Priority	D
IATA Priority	HIGH
Requested by (when)	IATA (29/08/2018)
States/Administrations Involved	Russia, Mongolia, China (Novosibirsk, Krasnoyarsk, Ulaanbatar, Beijing FIRs)
Route Description	NOSPI 534912.00N 0865248.00E – New Waypoint (FIR BDRY between Novosibirsk and Krasnoyarsk) – New Waypoint (FIR BDRY between Krasnoyarsk and Ulaanbatar) – New Waypoint (Entry/Exit Point: FIR BDRY between Ulaanbatar and Beijing) – Baotou (BAV)
Flight Level Band	28,000 – 46,000 ft
Benefit (fuel, environmental)	5 minutes, 6,090 tonnes fuel, 19,185 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	85 flights per week
Remarks: New route proposal replacing the previous from Weixian to Novokuznetsk. At ATMSG/7: China and Mongolia commented the proposed route was not possible for implemention; and IATA would provide feedback after a comprehensive review of the Catalogue by its focus group, expected in March 2020. 23/10/2020: China proposed for deletion. At ATM/SG/8: IATA preferred this route proposal to be retained in the Catalogue.	

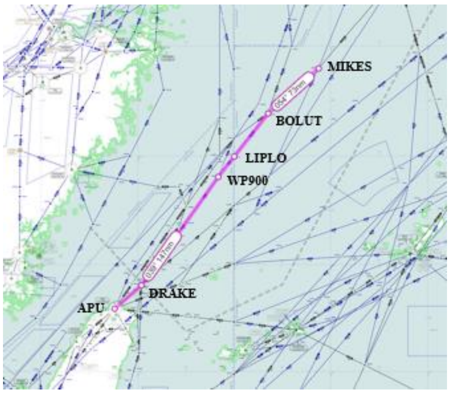
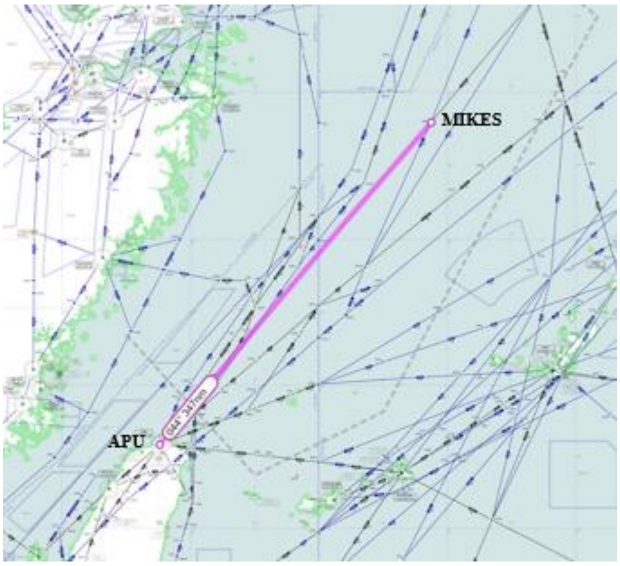
ATS Route Name	**IATA 02**
State Priority	**D**
IATA Priority	**HIGH**
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	China (Kunming, Guangzhou FIRs)
Route Description	OMBON 3321.4N 10416.3E – Sanjiang (SJG) 2546.6N 10936.6E
Flight Level Band	8,400 – 15,000 meters
Benefit (fuel, environmental)	14 minutes, 6,657 tones fuel, 20,636 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	56 flights per week Europe – Pearl River Delta airports
Remarks: China comments: There are existing routes between OMBON and RO. Direct route is impossible at present. 23/10/2020: China proposed for deletion. At ATM/SG/8: IATA preferred this route proposal to be retained in the Catalogue. At the SCSTFRG/13: IATA and China agreed to archive the proposal and consider the potential of Conditional Route (CDR) when appropriate. IATA shared that discussions had taken place in a side meeting with China. As the route proposal aims to connect Europe with Southern China, due to safety concerns related to traffic conflicts, IATA proposed to support and facilitate the flight operations via Y1 and L888 as an alternate.	

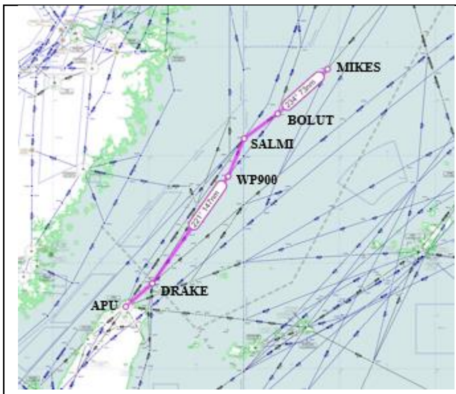
ATS Route Name	IATA 03
State Priority	
IATA Priority	HIGH
Requested by (when)	IATA (03/08/2026; ATM/SG/14)
States/Administrations Involved	China, Mongolia (Urumqi, Ulaanbaatar FIRs)
Route Description	Implementation of new bi-directional ATS route: OSUPO – TEBUS
Flight Level Band	28,000 – 46,000 ft
Benefit (fuel, environmental)	Assuming full diversion for flights with shorter alternative distances, annual total flight time could be reduced by 4,968 hours, fuel consumption by 33,530 tons, and CO_2 emissions by 105,623 tons. Route charges would decrease by approximately USD 2.04 million, while delay time attributable to NOTAM restrictions would be reduced by 13,084 hours. The total controller service time would be reduced by 4,968 sector hours. Further details can be found in IATA White Paper: Data-driven Airspace Efficiency Study.
Operational Information (potential airlines, flight frequency, potential city pairs)	Operators from Asia/Pacific, Europe, Middle East regions (more than 68,000 flights annually)
Remarks:	

ATS Route Name	**IATA 04**
State Priority	
IATA Priority	**HIGH**
Requested by (when)	IATA (03/08/2026; ATM/SG/14)
States/Administrations Involved	Mongolia, China (Ulaanbaatar, Beijing FIRs)
Route Description	Implementation of new bi-directional ATS route: DUDEV – INTIK
Flight Level Band	28,000 – 46,000 ft
Benefit (fuel, environmental)	Assuming full diversion for flights with shorter alternative distances, annual total flight time could be reduced by 4,968 hours, fuel consumption by 33,530 tons, and CO_2 emissions by 105,623 tons. Route charges would decrease by approximately USD 2.04 million, while delay time attributable to NOTAM restrictions would be reduced by 13,084 hours. The total controller service time would be reduced by 4,968 sector hours. Further details can be found in IATA White Paper: Data-driven Airspace Efficiency Study.
Operational Information (potential airlines, flight frequency, potential city pairs)	Operators from Asia/Pacific, Europe, Middle East regions (more than 68,000 flights annually)
Remarks:	

ATS Route Name	**SCS 08**
State Priority	**D**
IATA Priority	**HIGH**
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	Hong Kong China, Taibei ACC (Hong Kong, Taibei FIRs)
Route Description	DULOP 1814.2N 11432.6E – ELATO 2220.0N 11730.0E – A1 or DULOP 1814.2N 11432.6E – ENVAR 2159.5N 11730.0E – M750 or DULOP 1814.2N 11432.6E – KAPLI 2110.0N 11730.0E – G86
Flight Level Band	28,000 – 46,000 ft
Benefit (fuel, environmental)	6 minutes, 850 kg fuel, 2,687 kg CO_2 per flight, 1,863 tonnes fuel, 5,868 tonnes CO_2 annually Note: Savings based on DULOP – ENVAR.
Operational Information (potential airlines, flight frequency, potential city pairs)	BR, CI At least 42 flights per week Southeast Asia – North Asia airports
Remarks: Supports traffic Northeast Asia – Southeast Asia. Potentially problematic as will impact South China Sea's traffic arrangements (IATA to review). At SEACG/19: in WP09, Hong Kong China advised they had studied the proposal for track shortening and advised that allowing flights to proceed from M771 DUMOL to ELATO/ENVAR/KAPLI will likely create a bottle neck at these points and result in flights not getting optimum levels or increase ground delay to departures from Hong Kong and Macao to East Asia. However, Hong Kong China would continue to study this proposal. Most preferred: DULOP – ENVAR. 30/10/2020: Hong Kong China commented these two routes are too close to the Hong Kong and Manila FIR boundary (see the yellow shaded areas in the figure below). New confliction points would be created and the distance/time available for traffic resolution is not sufficient. There are safety concerns and these proposed routes were not recommended. Therefore, the two routes are not recommended. At ATM/SG/8: IATA preferred this route proposal to be retained in the Catalogue. At SCSTFRG/13: Hong Kong China suggested to archive SCS08 to focus on the	 

discussion to other feasible routes. IATA explained that the proposal originated from member airlines wishing to connect Hong Kong China with north and southeast Asia. Prior to COVID-19, 42 flights per week were operated. IATA proposed extending the use of M771 to connect to KAPLI and ENVAR, noting that M771 is located very close to the FIR boundary, which raises safety concerns. IATA will continue to refine the proposal and provide updates in future meetings.	

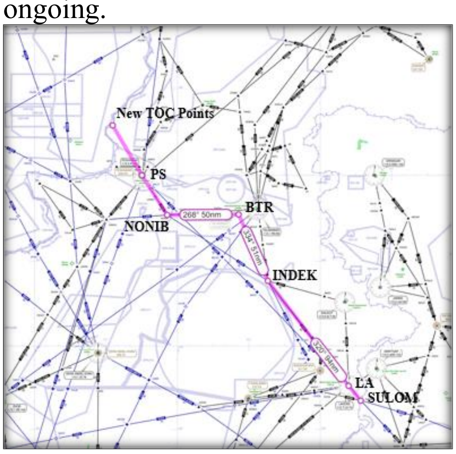
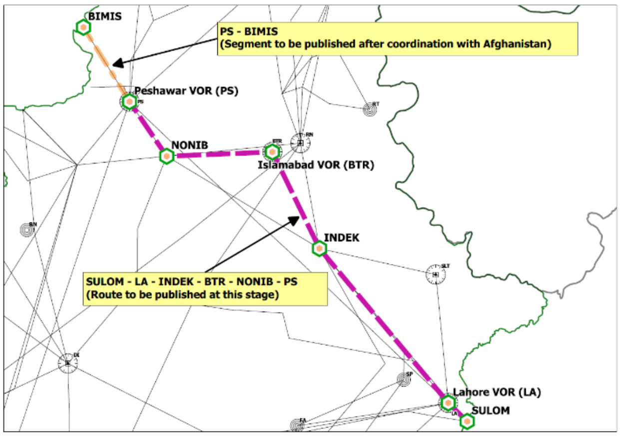
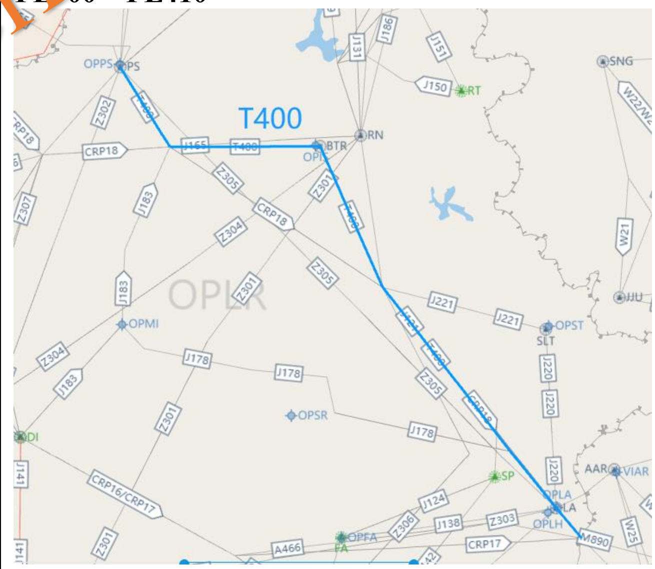
ATS Route Name	**TPE 01**
State Priority	C
IATA Priority	HIGH
Requested by (when)	IATA (01/09/2018)
States/Administrations Involved	Taibei ACC, Japan (Taibei, Fukuoka FIRs)
Route Description	Anbu (APU) 2510.6N 12131.3E – New Waypoint (FIR BDRY beween Taibei and Fukuoka) – MIKES 2935.2N 12544.9E
Flight Level Band	28,000 – 46,000 ft
Benefit (fuel, environmental)	16 NM / 2 minutes, 107 kg fuel, 337 kg CO_2 per flight, 1,168 tonnes fuel, 3,680 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	BR, CI 210 flights per week Southeast Asia/HKG/TPE – Fukuoka
Remarks: Supports traffic between APU and Japan. 29/06/2019: update from Japan, this route was under consideration. 23/10/2020: Japan commented this proposal was under consideration. At ATMSG/8: IATA preferred this route proposal to be retained in the Catalogue. 16/09/2021: Based on information provided by the IFATCA, the proposed route TPE 01 partially overlaps ATS route Q11 and several other ATS routes that already existed in the area, and therefore it was not possible to implement a new route in Taibei FIR. Counter-proposal: Northbound traffic: APU – A1 – DRAKE – Q11 – WP900 – L4 – LIPLO – Y741 – BOLUT – MIKES.  Southbound traffic: MIKES – BOLUT – B576 – SALMI – Q11 – DRAKE – APU.	

 15/10/2021: Japan commented this proposal was still under consideration. 25/2/2022: Japan commented no progress at this stage, although this proposal is recognized as one of the business coordination projects by both Taibei and Fukuoka ACCs. 23/9/2022: IFATCA, the segment in the counter-proposal for both north and south already existing, the segment btw BOLUT and MIKES is subject to the Fukuoka FIR.	

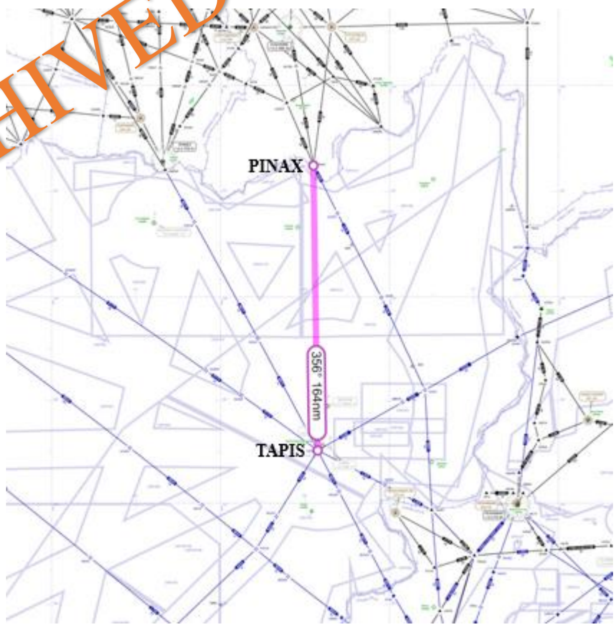
Chapter 4: Trans-Regional (South Asia)

(referred to States, SAIOSEACG and BOBTFRG for review)

ATS Route Name	**AFG 01**
State Priority	**B**
IATA Priority	**MEDIUM**
Requested by (when)	Afghanistan (03/08/2019: AIRARD TF/4)
States/Administrations Involved	Pakistan, Afghanistan (Lahore, Kabul FIRs)
Route Description	Peshawar (PS) 335841.50N 0713100.90E – SURVI 350606.12N 0702512E
Flight Level Band	
Benefit (fuel, environmental)	32 NM / 4 minutes, 400 kg fuel per flight, 957 tonnes fuel, 3,014 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	AI, AY, TG About 46 flights per week (some operating during winter season only) HEL – BKK/SIN
Remarks: This is an alternative proposal to INDEK-BABEV-SURVI, which will shorten the flight distance. Original proposal: IMTIL – SURVI. At ATMSG/7: Pakistan counter-proposed for this route via SURVI – Peshawar (PS). Pakistan informed the meeting the proposed route between SURVI and PS had been submitted to the relevant authorities of Pakistan for approval. 17/08/2020: Pakistan informed this route proposal was still under consideration by the relevant authorities. At ATMSG/8: IATA assigned "**MEDIUM**" priority; implementation benefits; and operational information. IATA also proposed to review the time restrictions LAJAK-SULOM (1500-2359Z) to make proposal beneficial to more traffic. At SAIOACG/10 and SEACG/27: Pakistan informed this route proposal was still under consideration by the military authority. 15/09/2021: Pakistan informed that the military authorities of Pakistan had approved the following ATS route proposal (bi-directional), on the request of Tajikistan and Uzbekistan: SULOM – Lahore (LA) – INDEK – Islamabad (BTR) – NONIB – Peshawar (PS) – 343433N 0710533E (new TOC points between Afghanistan and Pakistan). The above route proposal was under approval process of Pakistan Federal Government and coordination process with Afghanistan and Tajikistan regarding further route connectivity in Afghanistan airspace and	

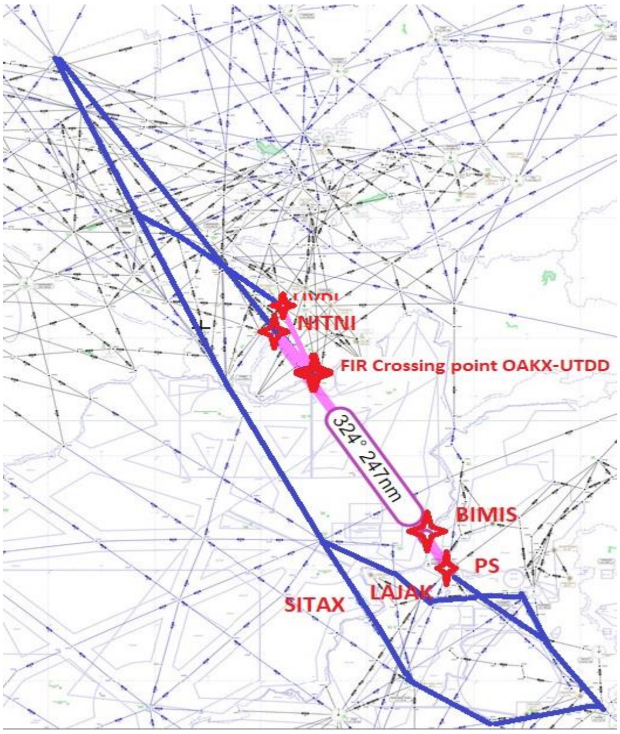
beyond from the new TOC points was ongoing.  18/02/2022: Upon approval on a new RNAV bi-directional int. ATS route in Lahore FIR by the Federal Government of Pakistan, Pakistan requested a new RNAV Route designator to APAC RO awaiting the response from Afghanistan for further connectivity in Kabul FIR (the last segment from Peshawar VOR to PAK/AFGHAN new TCP BIMIS (Lahore FIR)), and saying a joint PfA will be processed. In April 2022, the segment in Lahore FIR, Pakistan was established: SULOM – Lahore VOR – INDEK - Islamabad VOR (BTR) – NONIB – Peshawar VOR as the domestic route T400. Further route connectivity in Afghanistan airspace and beyond the new TOC points will be further discussed according to the situation in Afghanistan. At BOBTFRG/4: Pakistan affirmed that airway T400 starting from point SULOM (TOC with India) - INDEK – NONIB – PS - BIMIS was already operational and available for flights at this stage after being approved by the relevant government authorities. Further connectivity to BIMIS (TOC with Afghanistan) was subject to the response from Afghanistan. At SAIOSEACG/2: Pakistan preferred that this route proposal should be retained in the catalogue and be re-activated according to the situation in Afghanistan. Pakistan also affirmed that airway T400 starting from point SULOM (TOC with India) - INDEK – NONIB – PS providing connectivity with P500 (MOTMO-FIRUZ) was already operational and available for	 **SULOM – Lahore VOR – INDEK – Islamabad VOR (BTR) – NONIB – Peshawar VOR (PS) – BIMIS 343433N, 0710533E (<u>Pak/Afghan new proposed TCP boundary waypoint</u>), Vertical Limit FL300 – FL410** 

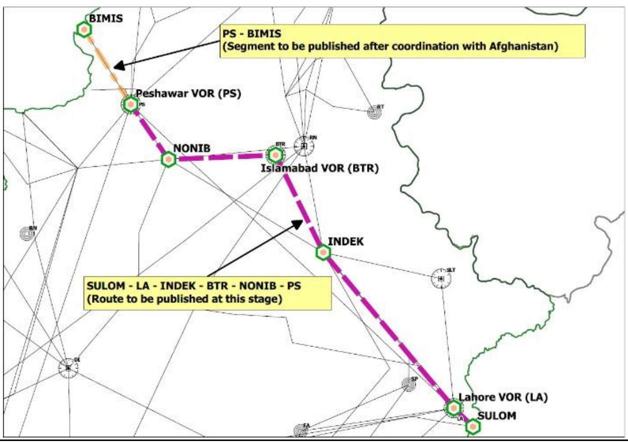
flights. The portion between PS-BIMIS is approved but further connectivity to/from PS-BIMIS (TOC with Afghanistan) is subject to the response from Afghanistan. At BOBTFRG/5: discussions about route proposals involving Afghanistan were influenced by the current situation in the States. Given the sanctions and focus on restoring air traffic services in Afghanistan, it was suggested that these route proposals be held in abeyance or archived until further notice.	

ATS Route Name	**AFG 02**
State Priority	C
IATA Priority	LOW
Requested by (when)	Tajikistan (03/08/2019: AIRARD TF/4)
States/Administrations Involved	Afghanistan, Tajikistan (Kabul, Dushanbe FIRs)
Route Description	TAPIS 343100.12N 0690900E – PINAX 371500N 0690600E
Flight Level Band	
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Afghanistan commented that waypoint TAPIS is a converging point for two congested routes, and would review this proposal. At ATM/SG/8: IATA assigned "**LOW**" priority and recommended for deletion. *Note: continuation of this proposal is 29.007 "TAPIS-PINAX-SORAM-TENRO" in RDGE Middle Asia ATS Route Catalogue.*	

<table>
<tr><th>ATS Route Name</th><th>AFG 03</th></tr>
<tr><td>State Priority</td><td></td></tr>
<tr><td>IATA Priority</td><td>HIGH</td></tr>
<tr><td>Requested by (when)</td><td>IATA (Either as the Afghanistan Contingency route plan /or as the airspace reopens for flight operations)</td></tr>
<tr><td>States/Administrations Involved</td><td>Pakistan, Afghanistan, Tajikistan (Lahore, Kabul, Dushanbe FIRs)</td></tr>
<tr><td>Route Description</td><td>Peshawar (PS) - BIMIS – DCT –370841N 0692043E (new FIR crossing point between OAKX and UTDD) – DCT LIVDI and DCT NITNI</td></tr>
<tr><td>Flight Level Band</td><td>As suitable</td></tr>
<tr><td>Benefit (fuel, environmental)</td><td>Estimated Potential Savings Per Flight:
Compared to SITAX:
71 NM equivalent to 700Kg fuel, 2.2Ton CO2
Compared to LAJAK:
41 NM equivalent to 400Kg fuel, 1.3Ton Co2</td></tr>
<tr><td>Operational Information
(potential airlines, flight frequency, potential city pairs)</td><td>South Asia – Europe Traffic flow (bi-directional)</td></tr>
<tr><td>Remarks: Primarily intended for long-haul wide-body ULR (Ultra Long-Range) flights between South Asia.

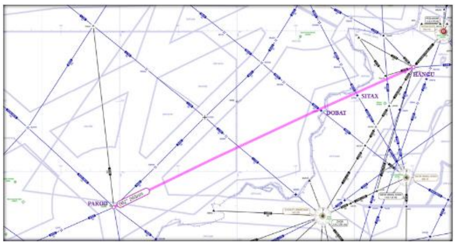
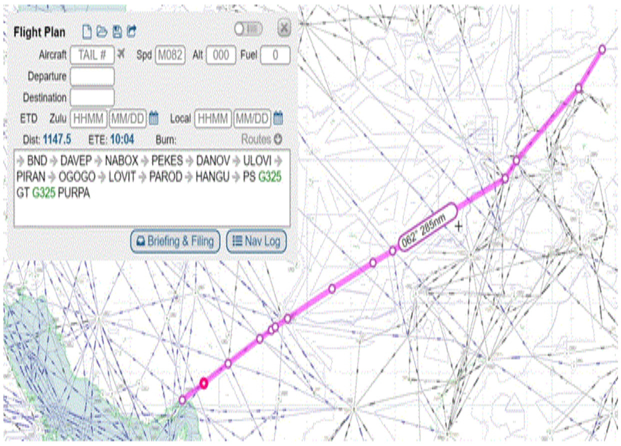
Tactical ATFM efforts. By offering an additional FIR crossing between Pakistan and Afghanistan, upon the reopening of Afghanistan's airspace, it could mitigate congestion at (OPLA-OAKX) FIR crossing points SITAX and LAJAK. Pakistan agreed to publish PS – BIMIS after coordination with Afghanistan (… ref AFG 01 proposal in the Route catalogue)

At SAIOSEACG/3: IATA has suggested new air routes AFG 03, aiming to open a new route through Kabul's airspace, linking Peshawar with waypoints in Dushanbe, which could save up to 71 NM. This route would help reopen Afghanistan's airspace, reduce environmental impact, and ease congestion at critical crossing points. Targeted primarily at long-haul, wide-body flights, these proposals are part of broader efforts to enhance air traffic management for improved efficiency and safety. Pakistan affirmed its readiness to enhance airspace efficiency and mentioned the approval of the AFG 01 route from Peshawar to BIMIS. However, due to the contingency situation in Afghanistan's airspace, further exploration of this route awaits Afghanistan's readiness. IATA urged ICAO to consider updating this route as a contingency option or at a suitable time when Afghanistan's airspace stabilizes.</td><td>


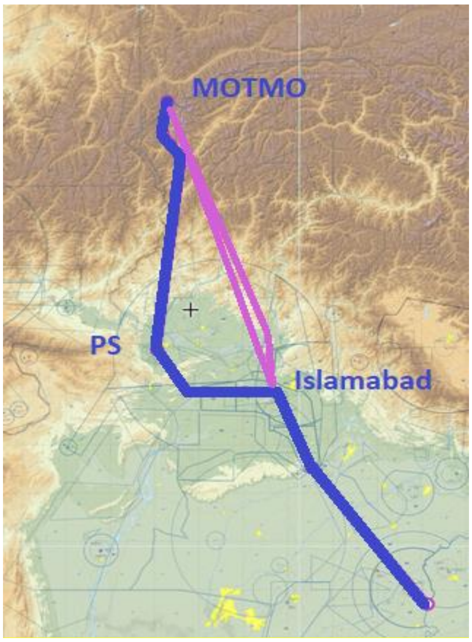
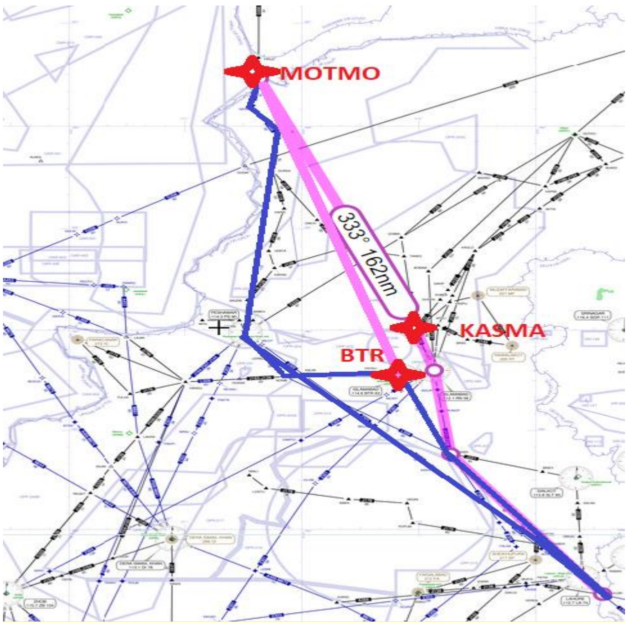


</td></tr>
</table>

ICAO RSO agreed to seek assistance from the ICAO APAC office to explore the feasibility of the project. At ATM/SG/12: Pakistan updated AFG-03 through email. They said that AFG-03, it is apprised that said proposal is similar to previous APAC Region ATS Route proposal AFG-01 in Pakistan airspace, the approvals of which are already taken. Pakistan is ready to establish this route from PS till BIMIS (transfer of control point between Pakistan and Afghanistan International Border), further connectivity from BIMIS onwards (as mentioned in AFG-03,APAC Region ATS route catalogue) is the sole responsibility of Afghanistan. Subject to availability of ATS infrastructure in Afghanistan and stabilization of Afghanistan airspace, the connectivity from PS till BIMIS will be established. IATA updated AFG 03 though email: The Afghanistan CAA has indicated a positive stance towards this route proposal; however, implementation will be considered only after the resumption of regular ATM services. The Pakistan and Tajikistan CAAs are affirmative for the necessary re-alignment of the airway. At BOBTFRG/6: Given the current situation in Afghanistan, IATA and Pakistan agreed that they would discuss it further at the planned CCT meeting to explore the feasibility of the proposal. At BOBTFRG/7: The meeting agreed for this route proposal to be further discussed when ATS in Kabul FIR was fully restored.	

ATS Route Name	**MID 02(a)**
State Priority	**D**
IATA Priority	**HIGH**
Requested by (when)	AIRARD TF/2 (04/05/2018)
States/Administrations Involved	Iran, Pakistan, Afghanistan (Tehran, Karachi, Kabul, Lahore FIRs)
Route Description	Bandar Abbas (BND) 2711.8N 05622.0E – DAVEP 2742.4N 05720.1E – NABOX 2816.5N 05826.0E – PEKES 2859.5N 05952.3E – DANOV 2914.7N 06023.9E – ULOVI 2919.8N 06034.5E – PIRAN 2934.1N 06108.1E – OGOGO 3024.9N 06309.1E – LOVIT 3109.1N 06500.4E – PAROD 3129.0N 06554.0E – A453 – HANGU 3329.1N 07100.3E – Penshawar (PS) 3358.7N 07131.0E – G325 – Gilgit (GT) 3555.2N 07420.1E – G325 – PURPA 3656.5N 07524.4E
Flight Level Band	
Benefit (fuel, environmental)	40 NM / 3 minutes, 600 kg fuel per flight, 1,342 tonnes fuel, 4,262 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	EK, EY, QR About 43 flights per week
Remarks: High Priority MID 02 (a) preferred over MID 02 (b) if only one route is chosen. 17/08/2020: The proposed entry into Pakistan airspace allows very minimal response time (less than two minutes) for traffic de-confliction at DOBAT and SITAX and other crosser routes.  Pakistan proposed for deletion. At ATMSG/8: IATA assigned "**HIGH**" priority; implementation benefits; and operational information. IATA preferred this route to be retained in the Catalogue and commented this route could be used for contingency and for aircraft with limited oxygen requirements. At BOBTFRG/3: Pakistan re-affirmed that the proposed route was not feasible. BOBTFRG/4: Pakistan reaffirmed that the proposed route was not feasible and	

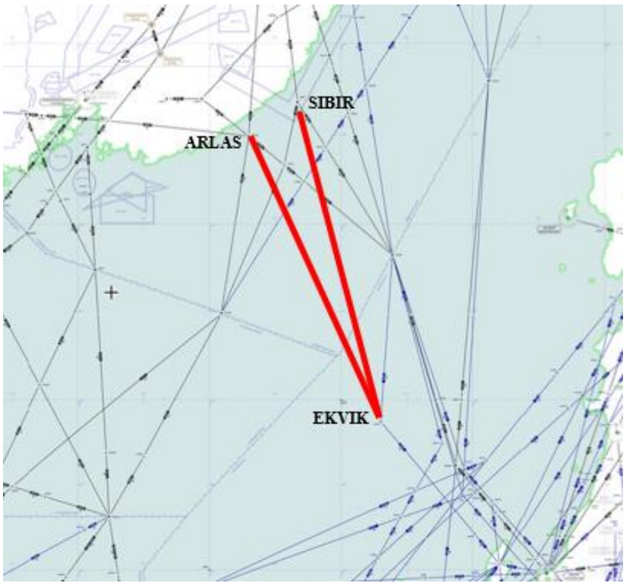
supported archiving this proposal for future possibility and IATA had no objection.	

ATS Route Name	**PAK 01**
State Priority	
IATA Priority	**HIGH**
Requested by (when)	IATA (either by ATM/SG/12 or earlier)
States/Administrations Involved	Pakistan (Kabul FIR)
Route Description	Option 1: INDEK J121 RN J130 KASMA DCT MOTMO Option 2: INDEK T400 BTR (Islamabad) DCT MOTMO
Flight Level Band	As suitable
Benefit (fuel, environmental)	Estimated Potential Savings Per Flight: 50 NM, Equivalent to 500Kg Fuel, 1.6 Ton CO2
Operational Information (potential airlines, flight frequency, potential city pairs)	South Asia – Europe Traffic flow (bi-directional)
Remarks: This proposed air route will primarily cater to long-haul wide-body flights between South Asia and Europe. It will not only promise reductions in CO2 emissions but also enhance safety. By optimizing emergency diversion routes, especially over the Hindukush high terrain, it helps minimise critical passenger oxygen requirements in the event of rapid depressurization. At SAIOSEACG/3: IATA suggested new air routes to improve flight efficiency between South Asia and Europe. PAK 01, includes two options that shorten the current Lahore FIR route by about 48 - 49 NM by using direct paths to MOTMO. These routes are expected to reduce CO2 emissions and increase safety by providing better options for emergency diversions over difficult terrain. Pakistan mentioned restructuring of ATS Route T400 (route connectivity with P500) back in 2022 to facilitate traffic avoiding Kabul FIR and, in this regard, referred to its A41-WP/68. Pakistan reiterated its commitment to safety and flight efficiency while acknowledging airspace constraints due to restricted and prohibited areas near the proposed route. Pakistan emphasised the need for a detailed assessment of the proposal. IATA expressed openness to suitable alterations and encouraged the exploration of opportunities. At ATM/SG/12: Pakistan updated PAK-01 (Option-2) and (Option-1) through email. They said that PAK-01 (Option-2) the proposed ATS route passes through prohibited area OP/P226 and thus cannot be materialized. And PAK-01 (Option-1), the	 

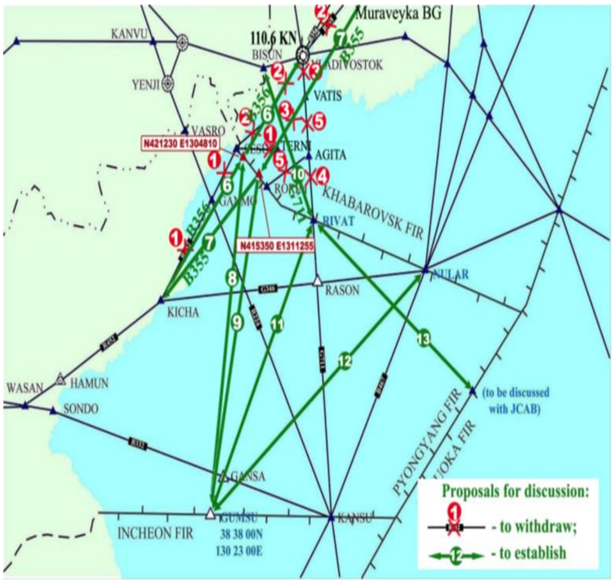
proposed ATS route passes in close proximity to danger and prohibited areas, it is estimated that in case of inclement weather conditions, any diversions would cause violation of danger / prohibited areas and thus not a viable option either, keeping in view flight safety. Nevertheless, deliberation with stakeholders are underway for a workaround to make this proposed option safer for flight operations but it seems to be difficult for establishment of subject route. IATA also updated PAK 01 though email: Given that Afghanistan's airspace is likely to remain in contingency mode for some more time, IATA strongly urges the Pakistan CAA to consider authorizing PAK01 as an interim measure. It is requested that if required the route may be modified to account for the requirements of reserved/special use airspace, as well as to utilize the existing 'J' routes, which are already established for domestic operations. At BOBTFRG/6: given the current situation in Afghanistan, IATA and Pakistan agreed that they would discuss it further to move forward. At BOBTFRG/7: IATA requested Pakistan consider establishing the route at least on a contingency or opportunity basis, for example when there is no military activity, under Flexible Use of Airspace concepts. IATA also commented that this proposed route would improve options for weather avoidance and better use of jet streams, especially during periods of strong winds.	

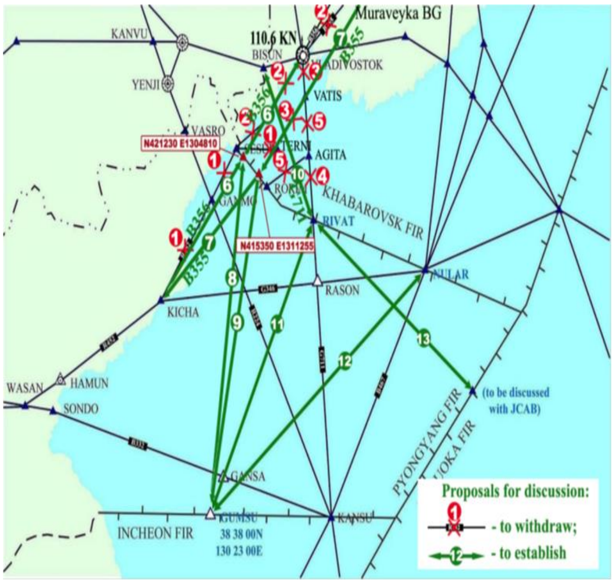
Chapter 5: Trans-Regional (East Asia)

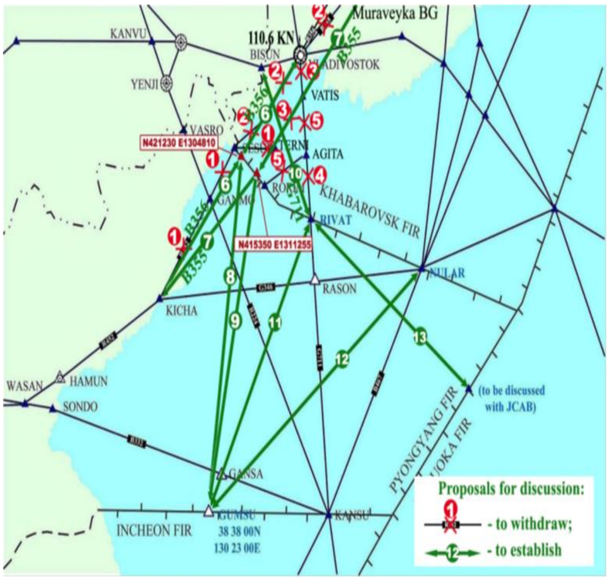
(referred to States and ATM/SG for review)

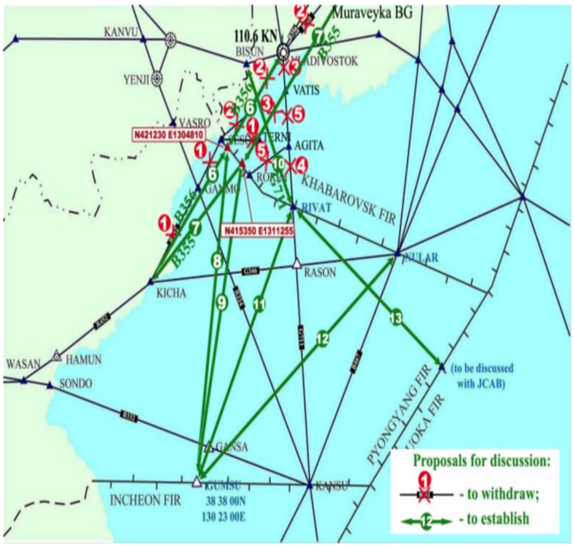
ATS Route Name	**FE0008 / RDGE 15.003 / APAC RUS 5**
State Priority	**C**
IATA Priority	**MEDIUM**
Requested by (when)	Russia, IATA (01/09/2018)
States/Administrations Involved	Russia, Japan (Khabarovsk, Fukuoka FIRs)
Route Description	Implementation of two new bi-directional ATS routes: a. SIBIR 432154.00N 1352024.00E – New Waypoint (FIR BDRY between Khabarovsk and Fukuoka) – New EKVIK Waypoint b. ARLAS 425906.00N 1343553.88E– New Waypoint (FIR BDRY between Khabarovsk and Fukuoka) – New EKVIK Waypoint
Flight Level Band	
Benefit (fuel, environmental)	No fuel gain but could help to reduce ground delays for HND/KIXNRT operations to Europe.
Operational Information (potential airlines, flight frequency, potential city pairs)	AF, BA, KL, LH
Remarks: To improve north-south traffic flows between Khabarovsk FIR and Fukuoka FIR, Original SIBIR – LURED – EKVIK proposal will be changed due to new position of EKVIK further east as a result of the planned airspace structure change in Japan, when both new ATS routes will be implemented, the existing B451 ARLAS – LAKTA – LURED – IGROD will be withdrawn. Based on the results from the coordination meeting between the Russian Federation and Japan in February 2017, the implementation could not be progressed as Japan indicated that no further airspace changes for the Fukuoka FIR are acceptable before the 2020 timeframe (RDGE/27). Russian Federation: New waypoint needed 404751N 1361021E (FIR Boundary), coordination with Japan (Fukuoka FIR) required. Alternative bi-directional route to EN15. 23/10/2020: Japan commented no update. At ATMSG/8: IATA assigned "**MEDIUM**" priority and recommended for this route to be retained in the Catalogue. 15/10/2021: Japan commented no update. 23/07/2026: Japan commented no update.	

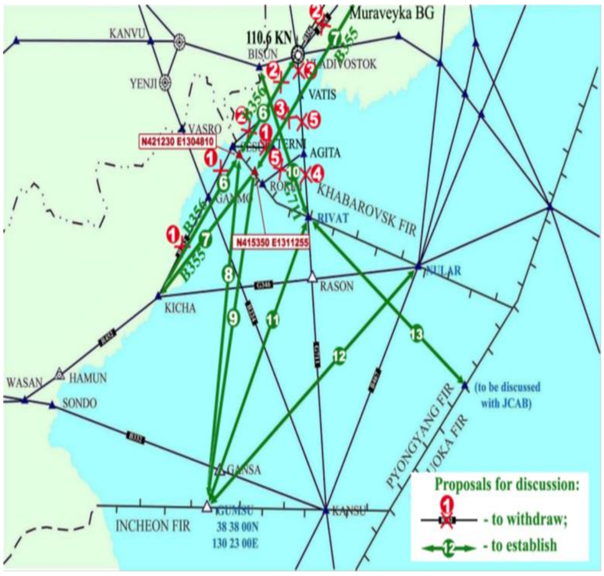
ATS Route Name	**FE0021 / RDGE 13.028 / APAC RUS 4**
State Priority	**C**
IATA Priority	**HIGH**
Requested by (when)	Russia, IATA (01/09/2018)
States/Administrations Involved	Russia, Japan (Khabarovsk, Fukuoka FIRs)
Route Description	Implementation of new bi-directional ATS route: AVGOK – Niigata (GTC) 375729.90N 1390653.60E
Flight Level Band	
Benefit (fuel, environmental)	20 NM / 4 minutes, 440 kg fuel per flight, 2,400 tonnes fuel, 7,550 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pair)	AF, AY, JL, KL, NH About 105 flights per week HND/NRT to Europe
Remarks: During a bilateral meeting between the State ATM Corporation and the JCAB Japan (in Tokyo, November 2012), a difference in coordinates of the AVGOK waypoint was identified in the aeronautical information publications of Russia and Japan. The incorrect coordinates were confirmed by Japan and a decision was made to report this issue to the appropriate Regional ICAO Offices. The Russian Federation proposes the following coordinates (4336N and 13815E) for the AVGOK waypoint. Based on the results from the coordination meeting between the Russian Federation and Japan in February 2017, the implementation of the bi-directional ATS Route AVGOK – GTC requires further studies due to the involved military area. RDGE/27 meeting in 2017: could become a conditional route. Further discussion with Japan is required through the ICAO APAC Office. To reduce route distance of 13NM as compared to current routing AVGOK – KADBO – GTC. 23/10/2020: Japan commented no update. At ATMSG/8: IATA assigned "**HIGH**" priority and recommended for this route to be retained in the Catalogue. 15/10/2021: Japan commented no update. 23/07/2026: Japan commented no update.	

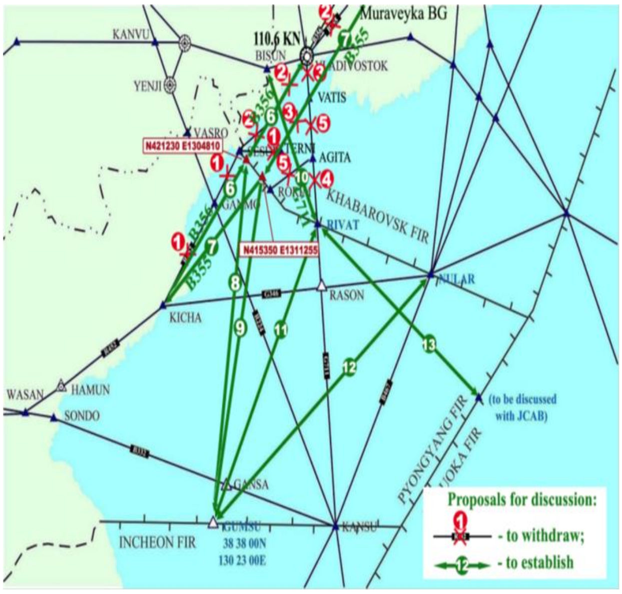
ATS Route Name	FE0049 / RDGE 20.010
State Priority	C
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK (Khabarovsk, Pyongyang FIRs)
Route Description	Implementation of new uni-directional eastbound ATS route: KICHA 404103N 1291140E – ADNUR 421230N 1304810E – Vladivostok (KN) 432303N 1320708E
Flight Level Band	17,000 – 53,000 ft
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Planned implementation date as part of project in 2015. Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 6)	

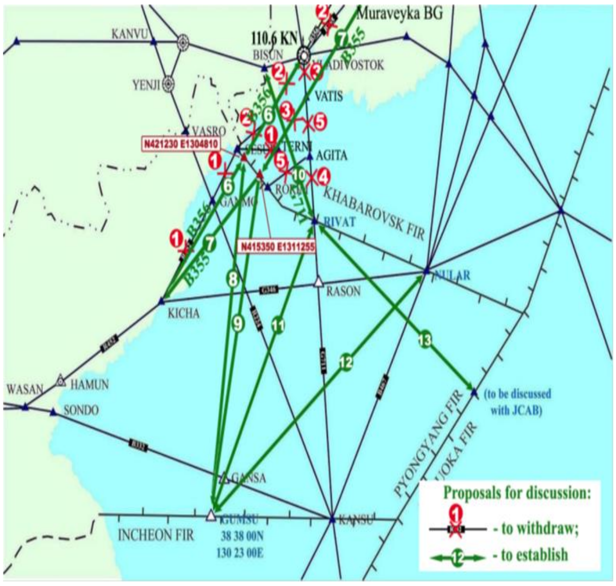
ATS Route Name	**FE0050 / RDGE 20.011**
State Priority	**C**
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK (Khabarovsk, Pyongyang FIRs)
Route Description	Implementation of new uni-directional westbound ATS route for B355: Muraveyka (BG) 435303N 1331511E – VATIS 425143N 1320851E – TERNI 422213N 1314003E –BUMEP 415350N 1311255E – KICHA 404106N 1291140E
Flight Level Band	18,000 – 51,000 ft
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Planned implementation date as part of project in 2015. Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 7).	

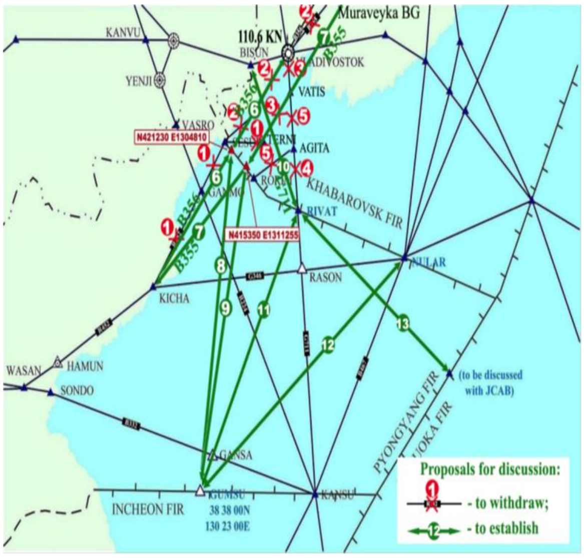
ATS Route Name	**FE0051 / RDGE 20.012**
State Priority	C
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK (Khabarovsk, Pyongyang FIRs)
Route Description	Implementation of new uni-directional eastbound ATS route segment: MESOV 383800N 1302300E – ADNUR 421230N 1304810E
Flight Level Band	29,000 – 53,000 ft
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Planned implementation date as part of project in 2015. Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 8). Implementation has not progressed as the connection/ continuation of this ATS route (implemented ATS routes end at FIR border over High Seas) into Incheon FIR still missing. No information was received from DPRK and South Korea (ROK) via the ICAO APAC Office. Implementation could not be progressed as no information from DPRK at RDGE/28.	

ATS Route Name	**FE0052 / RDGE 20.013**
State Priority	C
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK (Khabarovsk, Pyongyang FIRs)
Route Description	BUMEP 415350N 1311255E – MESOV 383800N 1302300E
Flight Level Band	28,000 – 51,000 ft
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 9). Implementation has not progressed as the connection/ continuation of this ATS route (implemented ATS routes end at FIR border over High Seas) into Incheon FIR still missing. No information was received from South Korea (ROK) via the ICAO APAC Office. Implementation could not be progressed as no information from DPRK at RDGE/28.	

ATS Route Name	**FE0053 / RDGE 20.014**
State Priority	**C**
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK (Khabarovsk, Pyongyang FIRs)
Route Description	New G711 BISUN 431400N 1311148E – TERNI 422213N 1314003E – RIVAT 412900N 1321600E
Flight Level Band	21,000 – 53,000 ft
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 10). *Note: to verify has this route been implemented as G705?*	

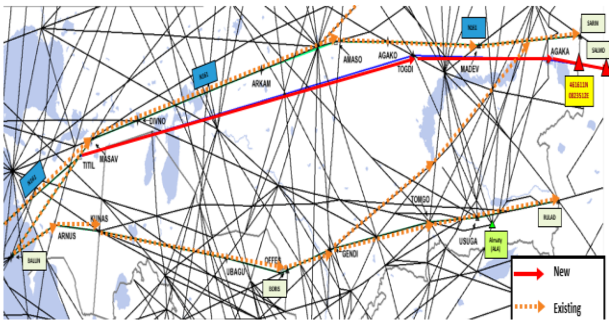
ATS Route Name	**FE0054 / RDGE 20.015**
State Priority	C
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK (Khabarovsk, Pyongyang FIRs)
Route Description	Implementation of new bi-directional ATS route: RIVAT 412900N 1321600E – MESOV 383800N 1302300E
Flight Level Band	21,000 – 53,000 ft
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 11). Planned implementation date 11 December 2014. *Note: to verify has this route been implemented as N513?*	

ATS Route Name	**FE0055 / RDGE 20.016**
State Priority	C
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK (Khabarovsk, Pyongyang FIRs)
Route Description	Implementation of new bi-directional ATS route: NULAR 405912N 1341100E – MESOV 383800N 1302300E
Flight Level Band	28,000 – 53,000 ft
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 12). Planned implementation date 11 December 2014. *Note: to verify has this route been implemented as L771?*	

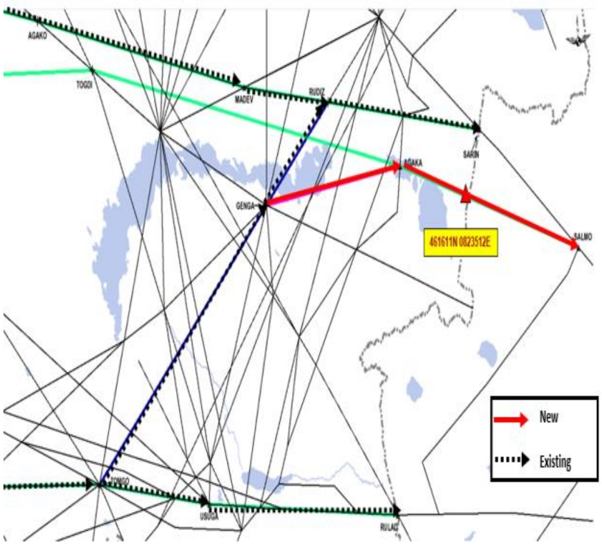
ATS Route Name	FE0056 / RDGE 20.017
State Priority	C
IATA Priority	
Requested by (when)	DPRK, Russia (01/09/2018)
States/Administrations Involved	Russia, DPRK, Japan (Khabarovsk, Pyongyang, Fukuoka FIRs)
Route Description	Implementation of new bi-directional ATS route segment: RIVAT 412900N 1321600E – New Waypoint (FIR BDRY between Pyongyang and Fukuoka)
Flight Level Band	
Benefit (fuel, environmental)	
Operational Information (potential airlines, flight frequency, potential city pairs)	
Remarks: Khabarovsk/Vladivostok airspace re-organisation project, (in map No. 13), for further discussion with JCAB, Japan. Planned implementation date as part of project in 2015. Implementation could not be progressed as no information from China at RDGE/28. 23/07/2026: Japan commented no update.	

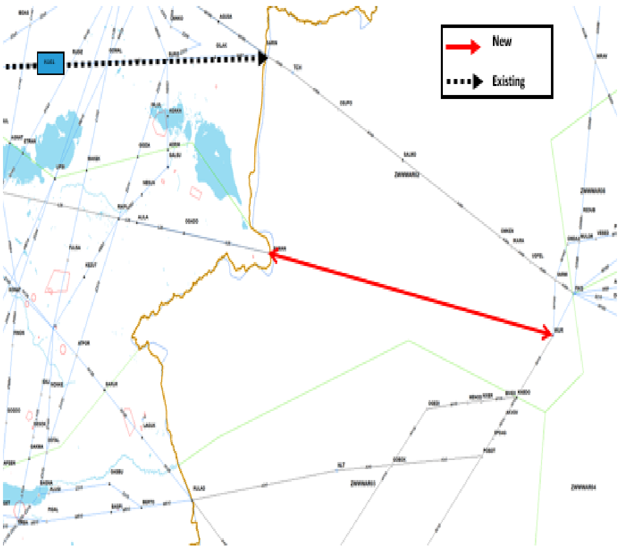
Chapter 6: Trans-Regional (Mid Asia)

(referred to States, RDGE, SAIOSEACG and SCSTFRG for review)

ATS Route Name	**RDGE-TRANS-REGIONAL MID-ASIA 01**
State Priority	**A**
IATA Priority	HIGH
Requested by (when)	Kazakhstan (RDGE-SCM/2024)
States/Administrations Involved	Kazakhstan & China (Almaty & Urumqi FIRs)
Route Description	Unidirectional Eastbound: TITIL - XXXXX – TOGDI - 470156N 0771253E – AGAKA - 461611N 0823512E (new FIR boundary waypoint) – SALMO.
Flight Level Band	With Minimum Obstacle Clearance of 2000 ft, segment from AGAKA at coordinates 461611N 0823512E is set at 8800 ft.
Benefit (fuel, environmental)	Fuel savings: 25 194 l, CO2 reduction: 63 993 kg Objectives: 1. Ease congestion in Astana FIR Sector A1C, Shymkent FIR Sector A1I (heavily loaded) & Almaty FIR Sector A3A; 2. Provide an alternative route utilizing different FIR boundary crossing points and sector intersections; 3. Significantly distance transit flow from busy airports such as Almaty and Astana, which, in turn, will reduce controller workload, enhance flight safety, and improve overall air traffic management efficiency; and 4. Allow air traffic controllers to use altitude change procedures more flexibly, simplifying management across different ATS route segments.
Operational Information (potential airlines, flight frequency)	Supported by major airlines such as All Nippon Airways (ANA), KLM, EgyptAir, and Finnair. Anticipated traffic shifts (approximately 1307 flights per month): 1. 40% from N161 and BORIS – RULAD; and 2. 80% from BORIS – SARIN and BALUN – SARIN.
Remarks: 8/12/2025: China commented that the existing entry and exit points (SARIN and RULAD), which connect China and Kazakhstan, experience moderate daily traffic, and their operational capacity was not yet at full saturation. It was concluded that the existing airspace structure was sufficient to meet operational demands. The proposal within China is not feasible. It was therefore recommended to fully utilize the existing air route resources.	

<table>
<tr><th>ATS Route Name</th><th>RDGE-TRANS-REGIONAL MID-ASIA 02</th></tr>
<tr><td>State Priority</td><td>A</td></tr>
<tr><td>IATA Priority</td><td>HIGH</td></tr>
<tr><td>Requested by (when)</td><td>Kazakhstan (RDGE-SCM/2024)</td></tr>
<tr><td>States/Administrations Involved</td><td>Kazakhstan & China (Almaty & Urumqi FIRs)</td></tr>
<tr><td>Route Description</td><td>Unidirectional Eastbound
GENGA - 462546N 0782244E – AGAKA - 461611N 0823512E (new FIR boundary waypoint) – SALMO.</td></tr>
<tr><td>Flight Level Band</td><td>With a Minimum Obstacle Clearance of 2000 ft, the segment from AGAKA at coordinates 461611N 0823512E is set at 8800 ft.</td></tr>
<tr><td>Benefit (fuel, environmental)</td><td>Distance: 325.7 NM, savings: 14.7 NM, fuel savings: 187 l, CO2 reduction: 474 kg

Objectives:
1. Ease controller workload in Almaty FIR Sector A4A;
2. Creates options for two corridors, BALUN and BORIS;
3. Reduces load on the TOMGO waypoint, Shymkent FIR, Sector A1I, and Almaty FIR Sector A3A; and
4. Creates options compared to the existing ATS routes, i.e. BORIS – SARIN and BALUN – SARIN.</td></tr>
<tr><td>Operational Information
(potential airlines, flight frequency)</td><td>Anticipated traffic shifts:
1. 80% from BORIS-SARIN – approx. 417 flts/mth; and
2. 40% from BALUN-SARIN – approx. 230 flts/mth.</td></tr>
<tr><td>Remarks: 8/12/2025: China commented that the existing entry and exit points (SARIN and RULAD), which connect China and Kazakhstan, experience moderate daily traffic, and their operational capacity was not yet at full saturation. It was concluded that the existing airspace structure was sufficient to meet operational demands. The proposal within China is not feasible. It was therefore recommended to fully utilize the existing air route resources.</td><td>
</td></tr>
</table>

ATS Route Name	**RDGE-TRANS-REGIONAL MID-ASIA 05**
State Priority	**B/C**
IATA Priority	HIGH/MEDIUM/LOW
Requested by (when)	Kazakhstan (RDGE-SCM/2024)
States/Administrations Involved	Kazakhstan & China (Almaty & Urumqi FIRs)
Route Description	Bidirectional BAMAN-WUR
Flight Level Band	
Benefit (fuel, environmental)	The total length of 2281.5 NM (4225 km), serves as an alternative to several existing routes, such as N161 with a distance of 2282.4 NM (4227 km), BORIS – SARIN with a distance of 2335.4 NM (4325 km), and BALUN – SARIN with a distance of 2307.4 NM (4273 km). The new ATS route is 0.9 NM (2 km) shorter than N161, 53.9 NM (100 km) shorter than BORIS – SARIN, and 25.9 NM (48 km) shorter than BALUN – SARIN. Objectives: 1. total flight distance from SUBUT to GOVSA is reduced by 1 NM; 2. reduce the load on the SARIN waypoint, Almaty FIR Sector A4A, and the RULAD waypoint in Sector A3A; and 3. will attract air traffic from the BORIS – SARIN corridor, which in turn will ease the workload in the Shymkent FIR, Sector A1I.
Operational Information (potential airlines, flight frequency)	Anticipated traffic shifts (approximately 542 flights per month): 1. 10% from N161; 2. 60% from BALUN-SARIN; and 3. 80% from BORIS-SARIN.
Remarks: 8/12/2025: China commented that the existing entry and exit points (SARIN and RULAD), which connect China and Kazakhstan, experience moderate daily traffic, and their operational capacity was not yet at full saturation. It was concluded that the existing airspace structure was sufficient to meet operational demands. The proposal within China is not feasible. It was therefore recommended to fully utilize the existing air route resources.	

Chapter 7: Pacific

(referred to States and ATM/SG for review)

ATS Route Name	**WPC 01**
State Priority	**D**
IATA Priority	**HIGH**
Requested by (when)	IATA (30/07/2018)
States/Administrations Involved	Papua New Guinea, Indonesia, USA, Philippines, Japan, Taibei ACC (Port Moresby, Ujung Pandang, Oakland Oceanic, Manila, Fukuoka, Taibei FIR)
Route Description	Port Moresby (PY) 0927.2S 14712.9E – Vanimo (VNO) 0240.7S 14118.2E – Koror (ROR) 0722.1N 13433.0E – ENDAX 1415.0N 13000.0E – BISIG 2027.0N 12500.0E – TINHO 2421.2N 12201.7E
Flight Level Band	FL250 – FL430
Benefit (fuel, environmental)	163 NM / 15 minutes, 1,604 kg fuel, 5,053 kg CO_2, 5,000 tonnes fuel, 15,700 tonnes CO_2 annually
Operational Information (potential airlines, flight frequency, potential city pairs)	60 flights per week Taibei and beyond – Australia, New Zealand, and Papua New Guinea
Remarks: BISIG replaces the waypoint that was published in the ICAO route catalogue as that waypoint no longer exists. May also be useable as an offload route for flights between Manila and Australasia. At ATM/SG/6: PNG positive, Indonesia positive, Japan was reviewing, Philippines and Taibei yet to be discussed. At ATMSG/7: Under consideration by Philippines. 17/01/2020: Philippines supported the implementation of this route. 23/10/2020: Japan commented this route proposal was under consideration. 16/09/2021: Based on information provided by the IFATCA, implementation of this proposed route in Taibei FIR was not possible because it would cross ATS routes G581 and Q13, and traverse restricted area RCR 17. Proposed for deletion. 15/10/2021: Japan commented this route proposal was still under consideration. 25/02/2022: Japan commented no discussion, but if necessary it would be put on the agenda at future meeting. 23/09/2022: IFATCA, this proposal requires further coordination with the military.	

At ATM/SG/12: IATA updated WPC 01 through email: WPC 01 retain pending outcome of consideration access to military airspace. 23/07/2026: Japan commented no discussion, but if necessary it would be put on the agenda at future meeting. 24/07/2026: Philippines commented that this route proposal was not feasible for implementation due to safety concerns. Proposed for removal.	

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 7 August 2026, amendments are shown in highlight)

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
18/8 **Priority A**	Identify and manage Deficiencies in the ATM, AIS and SAR fields: 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 ATS Route Catalogue.	Ongoing	IATA, ATM Coordination Groups, ATM/SG	Open	

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~~.	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. ATM/SG/13 WP/23
5/8	Follow-up on Mumbai/Mogadishu/Seychelles FIR route PfA.	~~SAIOSEACG/3~~ ~~SAIOSEACG/4~~ ~~SAIOSEACG/5~~ SAIOSEACG/6	India, ICAO	Open	Coordinate with ICAO ESAF and States
9/3	Follow up on Fukuoka/Khabarovsk FIR boundary discrepancy.	~~2024 (TBA)~~ ~~2025 (TBA)~~ Ongoing	ICAO/Japan	Open	Update 5/10/23: Meeting TBA
9/7	Review Regional ATM Contingency Plan.	~~ATM/SG/12~~ ~~ATM/SG/13~~ ATM/SG/14	ICAO/IATA Australia Nepal	~~Open~~ Completed	ATM/SG/9 report 6.57 ATM/SG/12 report 6.7
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/12~~ ~~ATM/SG/13~~ Ongoing	ICAO, RASG SEI WG	~~Open~~ Closed	ATM/SG/10 report 5.74

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
13/1	Organize a webinar on using the updated Asia/Pacific Seamless ANS Plan Reporting Tool.	January 2026	ICAO	~~Open~~ Completed	ATM/SG/13 report 3.17
13/2	Provide Working Paper at the ATFM/SG/16 on initiative on establishing a collaborative mechanism on ATFM.	ATFM/SG/16 and update the discussion to ATM/SG/14	Cambodia, China, Hong Kong China, Singapore, Viet Nam and IATA	~~Open~~ Completed	ATM/SG/13 report 5.40
13/3	Review APAC Common SWIM Aeronautical Information Services related to ATM/SG, particularly those with incomplete fields, and share the review results with the SWIM TF for inclusion in the next version of APAC Common SWIM Information Services document.	Ongoing	APAC Common SWIM Aeronautical Information Services Ad-hoc Group	Open	ATM/SG/13 report 5.14 ATM/SG/14 report x.xx
13/4	Consider establishing a mechanism to conduct regular review of the APAC Common SWIM Information Services document, and notify the SWIM TF of any changes to existing business requirements identified in the document or the introduction of new ones related to ATM SG.	SWIM TF/11	APAC FF-ICE Ad-hoc Group, APAC Common SWIM Aeronautical Information Services Ad-hoc Group, ATFM/SG	~~Open~~ Completed	ATM/SG/13 report 5.15

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
13/5	Consider establishing a regional migration strategy and timeline for transitioning to the ATM information exchange via SWIM.	~~SWIM TF/11~~ SWIM/TF/12	APAC FF-ICE Ad-hoc Group, APAC Common SWIM Aeronautical Information Services Ad-hoc Group, support by ATFM/SG	Open	ATM/SG/13 report 5.16
13/6	Deliberate and review the list of recommendations provided in ATM/SG/13 WP/12 Appendix B and share feedback.	CNS SG/30	Procedures for GNSS and Data Link Disruption Ad-hoc Group	~~Open~~ Completed	ATM/SG/13 report 5.19
13/7	Refer matters related to Transition Altitude to ICAO HQ for clarification and guidance.	ATM/SG/14	ICAO	~~Open~~ Completed	ATM/SG/13 report 5.124
13/8	Conduct a workshop on space object launch and re-entry activities.	ATM/SG/14	ICAO and States	~~Open~~ Completed	ATM/SG/13 report 6.55
13/9	Consider conducting a GNSS RFI related workshop in conjunction with CNS section.	2027	ICAO ~~and Procedures for GNSS and Data Link Disruption Ad-hoc Group~~	Open	ATM/SG/13 report 5.116
13/10	Continue to discuss the matter and present a joint paper of the progress of Phase 2 implementation.	~~ATM/SG/14~~ ATM/SG/15	China and the Republic of Korea	Open	ATM/SG/13 report 6.71 e) ATM/SG/14 report xxx

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
13/11	Incorporate the relevant contingency planning and procedures for geophysical hazards into the Asia/Pacific Region ATM Contingency Plan.	2027	ICAO	~~Open~~ Closed	ATM/SG/13 report 7.22
13/12	Raise the ATFM-related phraseology in Doc 9971 to be included in Doc 4444 at ICAO Air Navigation Commission for further action by ICAO ATM Operations (ATMOPS) Panel.	2026	ICAO	~~Open~~ Completed	ATM/SG/13 report 8.6
14/1	Actively participate in the following Working Group and Task Forces established by ATM/SG/14, as appropriate, to support regional implementation activities: • APAC ANP Volume III Working Group; • APAC FF-ICE Implementation Task Force; • Asia/Pacific Region ATM Contingency Framework (RACF) Task Force; and • APAC Flexible Use of Airspace (FUA) Task Force.	2026	All States/Administrations and International Organizations	Open	ATM/SG/14 report xxx
14/5	Plan 5LNC requests well in advance, limit ICARD submissions to a maximum of 10 requests per week, notify ICAO APAC at least two weeks in advance if more than 40 requests are expected over any four consecutive weeks, and allow a minimum 30 working days for processing	On going	All States/Administrations	Open	ATM/SG/14 report xxx

ACTION ITEM & PRIORITY	DESCRIPTION	TARGET DATE	RESPONSIBLE PARTY	STATUS	REMARKS
14/6	Review and update national ATM contingency plans in accordance with the new APAC RACF.	ATM/SG/15	All States/Administrations	Open	ATM/SG/14 report xxx
14/7	Participate in the AAC WS3 tabletop exercise on contingency management and provide feedback to support further refinement of the regional guidance.	On going	All States/Administrations	Open	ATM/SG/14 report xxx
14/8	Provide justification and supporting evidence for rejected ATS route proposals in the Asia/Pacific Region ATS Route Catalogue.	ATM/SG/15	States/Administrations concerned	Open	ATM/SG/14 report xxx
14/9	Review National Air Navigation Plans (NANPs), identify implementation support needs, and coordinate with the ICAO APAC Office, as appropriate. The ICAO APAC Office will circulate further information on the implementation support arrangements once finalized.	2027-2028	All States/Administrations and ICAO	Open	ATM/SG/14 report xxx

— END —