INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY SEVENTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/27)

Bangkok, Thailand, 5 to 8 September 2016

Agenda Item 3: **Performance Framework for Regional Air Navigation Planning and Implementation**

3.2: **ATM**

ATM/SG OUTCOMES

(Presented by Chairman of ATMSG)

SUMMARY

This paper presents the outcomes of the Fourth Meeting of the APANPIRG Air Traffic Management Sub-Group (ATM/SG/4, Bangkok, Thailand, 04 – 08 July 2016).

1. INTRODUCTION

1.1 The Fourth Meeting of the APANPIRG Air Traffic Management Sub-Group (ATM/SG/4) was held at the ICAO Regional Office, Bangkok, Thailand from 04 to 08 July 2016.

1.2 The meeting was attended by 96 participants from 23 States, two Special Administrative Regions of China and six International Organizations, including Australia, Bangladesh, Cambodia, China, Hong Kong China, Macao China, French Polynesia, India, Indonesia, Japan, Lao People's Democratic Republic (PDR), Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea (ROK), Singapore, Sri Lanka, Thailand, Tonga, USA, Viet Nam, CANSO, IATA, IFATCA, IFALPA, ICCAIA and ICAO.

1.3 The ATM Sub-Group met as a plenary throughout the meeting. A total of 41 Working Papers (WP), 14 Information Papers (IP) and two flimsies were considered by the meeting.

2 DISCUSSION

FIT-Asia/5 and RASMAG/21 Outcomes

2.1 The ATM/SG/4 meeting reviewed relevant major outcomes from the Operational Data Link Seminar and Fifth Meeting of the Future Air Navigation Services (FANS) Interoperability Team – Asia (FIT-Asia/5, Bangkok, 02 – 06 May 2016) and the Twenty-First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/21, 14 – 17 June 2016, Bangkok).

2.2 ATM/SG/4 noted with concern that only three of the eight FIT-Asia administrations known to be providing Automatic Dependent Surveillance – Contract (ADS-C)/Controller-Pilot Data Link Communications (CPDLC) services had submitted problem reports to a recognized Central Reporting Agency (CRA).

2.3 RASMAG/21 had agreed to the regional transition strategy proposed by FIT-Asia/5 for implementation of new ICAO performance-based communication and surveillance (PBCS) requirements applicable from 10 November 2016.

2.4 The ATM/SG/4 subsequently agreed that the Draft Regional PBCS Transition Strategy should be based on continuation of the current operational use of performance-based separation minima under certain conditions. This endorsement was based on operational knowledge that the 50NM and 30NM horizontal separation standards had consistently met the Target Level of Safety (TLS) for some years.

2.5 ATM/SG/4 agreed to the following Draft Conclusions arising from RASMAG/21, for further consideration by APANPIRG/27:

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-1: PBCS Operator Requirements</td></tr>
<tr><td>That, States are urged to take appropriate measures to develop, establish, implement and promulgate, through advisory circular or other relevant State instrument, necessary policies and procedures to enable operators conducting flights in airspace where separations are dependent on performance-based communication and surveillance (PBCS) to start using required communication performance (RCP) / required surveillance performance (RSP) indicators in the flight plan as soon as possible. This should take into account:
a) time for the operator to comply with the States’ policies; and
b) the need for the State to distribute data from PBCS monitoring programs, as necessary.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To ensure aircraft operators are prepared for implementation of performance-based separations by States in Asia/Pacific and other Regions implementing the new PBCS provisions.</td></tr>
<tr><td>When: 8-Sep-16</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>

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-2: State Implementation of ICAO Provisions for PBCS</td></tr>
<tr><td>That, States which apply or plan to apply 30 NM and/or 50 NM longitudinal separation minima and/or 23 NM lateral separation minimum are urged to implement the ATM system capability to process and use ICAO PBCS flight plan indicators to determine aircraft eligibility for performance-based separation by not later than 29 March 2018; and
Common implementation dates are applied by States using RCP/RSP indicators to establish performance-based separation in adjacent airspace, supported by joint submission of Proposals for Amendment (PfA) to ICAO Doc 7030 – Regional Supplementary Procedures.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: Recognizing that many States will not be ready to fully implement the new PBCS provisions on the applicability date of 10 November 2016.</td></tr>
<tr><td>When: As soon as possible, but not later than 29-Mar-18</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>

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-3: Asia/Pacific Region PBCS Transition Strategy</td></tr>
<tr><td>That, the Asia/Pacific Region PBCS Transition Strategy at Appendix C to the Report be endorsed, and posted on the Asia/Pacific Regional Office website.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To ensure aircraft operators are prepared for implementation of performance-based separations by States in Asia/Pacific and other Regions implementing the new PBCS provisions.</td></tr>
<tr><td>When: 8-Sep-16</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>

2.6 The ATM/SG urged India and Indonesia to improve safety reporting of Large Height Deviations (LHD) highlighted by the RASMAG/21 report and noted the improvements in reporting by China, the Democratic Republic of Korea (DPRK), Japan and the Republic of Korea. However, it was considered necessary by the ATM/SG to re-emphasise the urgent need for States to take action on the identified hot spots, which remained a major concern to both RASMAG and the ATM/SG.

2.7 The ATM/SG/4 agreed to the following Draft Conclusion, for further consideration by APANPIRG/27:

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-4: Airspace Safety Concern Response</td></tr>
<tr><td>That, noting the significant airspace safety issues and hot spots identified by RASMAG, Asia/Pacific States/Administrations are urged to take urgent action to:
a) review the RASMAG/21 Report; and
b) in cooperation with relevant Regional Monitoring Agencies (RMAs), determine corrective action plans (which should include an emphasis on operational improvements in addition to system upgrades; and
c) implement the corrective actions in an effective manner.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To ensure a more effective response to the high risk concerns identified by RASMAG/21.</td></tr>
<tr><td>When: 8-Sep-16</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>

<u>Air Traffic Flow Management Steering Group Outcomes</u>

2.8 The outcomes of the 6th Meeting of the Air Traffic Flow Management Steering Group (ATFM/SG/6, Bangkok, Thailand, 6 to 10 June 2016) were presented to the meeting.

2.9 Information provided included an operational analysis of westbound flights through the Kabul FIR associated with the Bay of Bengal Cooperative ATFM (BOBCAT) System. During the period October 2015 to March 2016 average ATFM delay had decreased by 16 percent when compared to the same period in 2014 – 2015, while associated with an average 8 percent increase in slot requests (**Figure 1**).

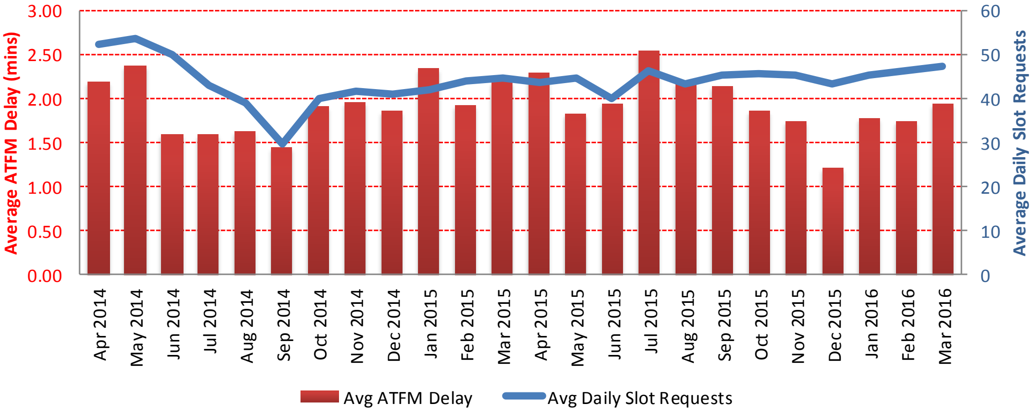

Figure 1: ATFM Delay and Average Daily Slot Request Traffic Demand, April 2014 – March 2016

2.10 In discussing a China/Thailand collaborative cross-border ATFM cooperation project to implement a Collaborative Miles-in-Trail (MIT) Conversion Program (CMCP), the possible proliferation of different ATFTM systems and procedures in the region had been noted. It was important that the CMCP, the Multi-Nodal Trial, and the North Asia Region ATFM Harmonization Group (NARAHG) project commenced harmonized operations as soon as possible.

2.11 The meeting noted the importance of timely submission of flight plans and transmission of Air Traffic Services (ATS) messages to support an effective ATFM service, the performance expectations included in the Regional Framework for Collaborative ATFM, and the requirements specified in ICAO Doc 4444 – PANS-ATM. Also considering apparent non-transmission of a significant proportion of departure (DEP) messages, the meeting agreed to the following Draft Conclusions for consideration by APANPIRG/27:

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-5: Origination of Flight Plan and ATS Messages</td></tr>
<tr><td>That, taking into account the Regional Framework for Collaborative ATFM Performance Improvement Plan provisions relating to the submission of FPL and ATS messages, States are urged to publish in AIP the requirement that:
1. Except where necessary for operational or technical reasons, FPL should be submitted not less than 3 hours before EOBT;
2. DLA messages should be originated when the departure of an aircraft, for which basic flight plan data (FPL or RPL) has been sent, is delayed by 15 minutes or more after the EOBT contained in the basic flight plan data; and
3. CHG and CNL messages are promptly originated in accordance with the provisions of ICAO Doc 4444 Procedures for Air Navigation Services (PANS-ATM) 11.4.2.2</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To ensure to the maximum extent possible the timely submission and update of flight plan data used for ATFM demand calculation and the formulation of ATFM measures.</td></tr>
<tr><td>When: 8-Sep-16</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>

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-6: Origination and Distribution of Departure (DEP) Messages</td></tr>
<tr><td>That, recognizing the importance of AFTN departure (DEP) messages in the management and coordination of flight plans in both manual and automated ATM environments, ICAO be requested to:
1. Conduct an analysis of the incidence of non-receipt of DEP messages required by ICAO Doc 4444 Procedures for Air Navigation Services (PANS-ATM) Section 11.4.2.2;
2. Request that States failing to ensure correct transmission of DEP messages promptly take corrective action and report the status of corrective actions to the ICAO APAC Regional Office by 30 April 2017; and
3. Raise APANPIRG Air Navigation Deficiencies against failure by States to comply with Doc 4444 Section 11.4.2.2, at APANPIRG/28.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To improve regional performance in complying with the requirements of Doc 4444, to improve ATM outcomes be ensuring activation of flight plan details in ATM systems, and to improve ATFM outcomes by improving the accuracy of demand calculation and ATFM measures.</td></tr>
<tr><td>When: 8-Sep-16</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>

2.12 In discussing the timely submission of FPL, it was noted that operational or technical reasons may preclude aircraft operator compliance with the Regional ATFM Framework provisions for FPL and DLA submission. It was further noted that the Framework provisions were currently limited to flights destined for ATFM Program Airports. This should be expanded to facilitate ATFM for constrained airspace. The meeting agreed to amend the text of the Framework document.

2.13 In response to *Decision ATFM/SG/4/3 – IATA Asia/Pacific Regional Air Traffic Flow Management Project Phase Two*, IATA had developed a draft Regional ATFM Implementation Guidance document which was subsequently edited by ICAO to conform to the form and structure of comparable APAC regional documents.

2.14 To enable the amendment of the text of the framework, and the inclusion of the Implementation Guidance, ATM/SG/4 agreed to the following Draft Conclusion:

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-7: Update Regional Framework for Collaborative ATFM</td></tr>
<tr><td>That, the Asia/Pacific Regional Framework for Collaborative ATFM Version 2.0 incorporating:
a) the amended text in Appendix D to the Report; and
b) as an appendix, the Regional ATFM Implementation Guidance document provided in Appendix E to the Report;
be made available on the ICAO Asia/Pacific Regional Office web site, replacing Version 1.0.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: a) To amend the Regional ATFM Framework performance expectation relating to submission of flight plans, taking into account operational or technical limitations and ensuring the applicability for ATFM in constrained airspace as well as at constrained airports; and b) To incorporate the regional ATFM implementation guidance material as agreed by ATFM/SG/6 in the Asia/Pacific Regional Framework for Collaborative ATFM</td></tr>
</table>

When: 8-Sep-16	Status: Draft to be adopted by PIRG
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

2.15 Noting that there had been several instances in the ATFM/SG/6 meeting of proposed actions or outcomes that were already included in the Regional Framework for Collaborative ATFM, it was emphasized that the Framework was the primary regional ATFM planning document and that its provisions should be included in all APAC ATFM implementation planning.

2.16 The ATM/SG/4 meeting agreed to the following Draft Conclusion for APANPIRG/27's consideration:

Draft Conclusion ATM/SG/4-8: State Review of the Regional Framework for Collaborative ATFM	
That, noting the: a. need for harmonized, interoperable State and Sub-Regional ATFM implementation to achieve cross-border ATFM in the Asia/Pacific Region; and b. Asia/Pacific Regional Framework for Collaborative ATFM, available on the Asia/Pacific Regional Office web site, is the primary planning document addressing ATFM implementation and operational issues in the Asia/Pacific Region; States are urged to: 1. review the Regional Framework for Collaborative ATFM; and 2. ensure that full consideration is given in all ATFM implementation planning to the provisions of the Regional Framework for Collaborative ATFM.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To ensure that all State and sub-regional ATFM projects are aligned with the direction provided by the Regional Framework for Collaborative ATFM, facilitating future harmonization, interoperability and effective cross-border ATFM.	
When: 8-Sep-16	Status: Draft to be adopted by PIRG
Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:	

Use of Alphanumeric Call-signs

2.17 IATA proposed that the Asia/Pacific made greater use of alphanumeric call-signs to mitigate the possibility of confusion with same or similar call-signs. The ICAO Europe and Middle East Regions had implemented projects to reduce the incidence of call-sign conflicts, and Europe had implemented a Call Sign Similarity Tool (CSST) to automate the process of checking individual airline call-signs and airlines in general for this problem.

2.18 IATA suggested a phased implementation using step-by-step trials so testing, familiarisation and the identification of issues (such as overflight approvals) could be evaluated. It was noted that Japan had already implemented alphanumeric call-signs with no difficulties.

2.19 The ATM/SG/4 meeting agreed to the following Draft Conclusion for APANPIRG/27 consideration:

Draft Conclusion ATM/SG/4-9: Use of Alpha Numeric Call-signs for Scheduled Airline Operations	
That, ICAO conducts a Survey of Asia Pacific States to ascertain the status of capability to accept / process alphanumeric ATC call-signs for scheduled airline operations.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To determine the ability of Asia/Pacific States to accept and process alphanumeric call-signs.	
When: 8-Sep-16	Status: Draft to be adopted by PIRG
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Seamless ATM Plan Review (WP17)

2.20 A review of the Asia/Pacific Seamless ATM Plan was undertaken during 2016. Following the Global Air Navigation Plan (GANP) Aviation System Block Upgrade (ASBU) framework implementation, the review included *inter alia* reference to the expected Block 1 ASBU and new regional elements, to enhance safety and efficiency in the Asia/Pacific Region. As a result, the following new ASBU Block 1 elements which were considered to be mature and of some urgency, and were proposed to be added to Seamless ATM Plan Phase II (2019): B1-ACDM; B1-SURF; B1-RSEQ; B1-CDO; B1-TBO (only Datalink Clearance - DCL); and B1-NOPS.

2.21 In addition, new regional items were identified and added for Phase II: B1-SAR; Human-performance-language proficiency; Ballistic rocket launch/space re-entry management planning; Voice communications over IP between ATS units (VoIP); Common aeRonautical Virtual private network (CRV) and Airport Master Plans. The ATM/SG agreed to the following Draft Conclusion for consideration by APANPIRG/27:

Draft Conclusion ATM/SG/4-10: Asia/Pacific Seamless ATM Plan Update	
That, the draft Seamless ATM Plan as updated in accordance with the 2016 review at **Appendix F to the Report** be approved and uploaded to the ICAO Regional Office website.	Expected impact: ☒ Political / Global ☐ Inter-regional ☒ Economic ☒ Environmental ☒ Ops/Technical
Why: The Seamless ATM Plan Version 1.0 has a review clause requiring an update every three years to ensure it is up-to-date. In addition, the update incorporates certain Aviation System Block Upgrade (ASBU) Block 1 elements.	
When: 8-Sep-16	Status: Draft to be adopted by PIRG
Who: ☒Sub groups ☒APAC States ☐ICAO APAC RO ☒ICAO HQ ☐Other:	

2.22 ICAO was developing standards for Remotely Piloted Aircraft Systems (RPAS, generally above 25kg) that were focused on international RPAS operations, to support B1-RPAS. Noting the challenges from many thousands of Unmanned Aircraft Systems (UAS) and the fact that UAS were easily transportable across national boundaries, ATM/SG/4 recommended the incorporation of a specific UAS Block 1 element within the Asia/Pacific Seamless ATM Plan (2019) to ensure a more harmonised approach across the Asia/Pacific Region.

2.23 The element's objective would be to manage the ATM aspects of UAS (for example, it would not include matters such as radio spectrum or security, except where it affected ATM)

2.24 The ATM/SG/4 agreed to the establishment of an Asia/Pacific UAS Task Force to develop standards and procedures for UAS in accordance with the following Draft Decision and TOR:

<table>
<tr><td colspan="2">Draft Decision ATM/SG/4-11: Asia/Pacific Unmanned Aircraft Systems Task Force</td></tr>
<tr><td>That, an Asia/Pacific Unmanned Aircraft Systems Task Force (APUAS/TF) be established in accordance with the Terms of Reference at Appendix G to the Report to develop regional guidance material that:
a) Incorporates reference to Aviation System Block Upgrade (ASBU) B1-RPAS implementation; and
b) Provides uniform expectations for regulators, Air Navigation Service Providers and operators of small UAS on the management of the <u>Air Traffic Management</u> aspects of UAS.</td><td>Expected impact:
☒ Political / Global
☒ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: Recognizing that ICAO HQ is focusing on larger UAS (Remotely Piloted Aircraft Systems) and the increasing numbers of smaller UAS used for a variety of commercial and recreational operations, it is appropriate to provide a forum for regional discussion on how to safely and effectively manage these new aircraft within the ATM system.</td></tr>
<tr><td>When: 8-Sep-16</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>

2.25 ICAO requested that the minimum membership of the proposed APUAS/TF should be Australia, China, New Zealand and USA, due to their relatively advanced experience and regulation development in this area. Other States were also encouraged to participate.

<u>Recent CNS-Related Developments in APAC</u>

2.26 Noting the equivalence for RNP 2 recognized by Australia (RNAV 2, RNP 1 GNSS) and the issue with the flight plan not directly recognizing RNP 2, the ATM/SG/4 meeting endorsed a PBNICG Draft Conclusion for the implementation of RNP 2, urging States to ensure that:

a) all aircraft operators file the designator 'Z' in item 10 and 'NAV/RNP 2' in item 18 to indicate RNP 2 capability until the ICAO flight plan is updated to include RNP 2; and

b) an equivalence for RNP 2 is recognised if the aircraft is approved for RNAV 2, RNP 1 and GNSS.

2.27 The ATM/SG meeting agreed to the inclusion of reference to the RNP 2 equivalence within the Seamless ATM Plan. Automatic Dependent Surveillance – Broadcast In-Trail Procedures (IP02) eANP (FIRs/SRRs)

2.28 ICAO provided updated information on FIR and Search and Rescue Region (SRR) descriptions being analysed for incorporation into the electronic Air Navigation Plan (eANP). The meeting noted that in the first round of consultation regarding the FIRs and SRRs, 11 of the 30 administrations responded (only 36.7%). After the second round, 14 administrations had responded (46.7%). This represented a relatively poor response, given the importance of FIRs and SRRs. States which did not respond are as follows:

> Afghanistan, Cambodia, Democratic People's Republic of Korea, French Polynesia (France), Indonesia, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nauru, Nepal, Pakistan, Papua New Guinea, Solomon Islands.

2.29 Only one State’s response (Japan) had allowed a confirmation that the FIR data was correct, and consistent with historical approvals (either a Regional Air Navigation Proposal for Amendment or as an outcome of a Regional Air Navigation meeting).

2.30 The ATM/SG/4 meeting agreed that with only one FIR ready for eANP insertion, that a further delay of one year would be recommended to APANPIRG before the FIR/SRR tables could be submitted for approval.

Flexible Use Airspace Manual Template

2.31 The original draft of a model template for Asia/Pacific administrations to consider in implementing Flexible Use Airspace (FUA), provided by India had been reviewed by the ICAO Regional Sub-Office and the Regional Office. ATM/SG/4 agreed to the following Draft Conclusion, for consideration by APANPIRG/27:

<table>
<tr><td colspan="3">Draft Conclusion ATM/SG/4-12: Flexible Use Airspace Manual Template</td></tr>
<tr><td colspan="2">That, Asia/Pacific States are urged to:
a) review the model Flexible Use Airspace (FUA) Manual Template at Appendix H to the Report; and
b) utilize the model template as a guide if the State is not already using a FUA Manual.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="3">Why: To provide guidance material supporting the implementation of a high priority Seamless ATM element.</td></tr>
<tr><td>When: 8-Sep-16</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

Civil/Military Cooperation Update

2.32 ATM/SG/4 recalled that civil/military cooperation was one of the highest priority items in the Asia/Pacific Region, as evidenced by the ten Seamless ATM elements on this subject. Given that the Asia/Pacific was now the largest aviation market in the world by several measures and the fact that the Region did not have the same civil/military cooperation structures in place that North America and Europe did, progress in this area was considered vital.

2.33 The ATM/SG/3 (Bangkok, 03 – 07 August 2015), had noted major delays in Chinese airspace. The ATM/SG/4 noted continuing reports of problems related to Chinese airspace and China's commitment to implement some ATFM measures in certain ATMB regions to better manage the traffic during 2017. Moreover, in reference to the rocket launch problem from Hainan Island (described in ATM/SG/4/WP22), the meeting requested China to coordinate with the space launch agency to ensure compliance with the regional expectations being placed in the Seamless ATM Plan.

2.34 In Afghanistan airspace, the ATM/SG/3 had noted the outcomes of the Ad Hoc Afghanistan Contingency Group (AHACG), which has been tasked with developing contingency plans in the event of possible non-availability of Afghanistan Air Navigation Services (ANS). ICAO noted that no information had been received by the Regional Office regarding Afghanistan's current ANS status, or the expected Kabul FIR contingency plan. The plan had been previously partially drafted by AHACG participants. Afghanistan did not attend the ATM/SG/4. The meeting expressed concern about the apparent lack of information from Afghanistan; especially as earlier advice had been received indicating that the donor funding supporting the provision of the Kabul FIR's ANS may be exhausted by the third quarter of 2016.

2.35 IATA, India and Pakistan supported a Special Coordination Meeting (SCM) to review and address the ANS provision situation in Afghanistan, and the contingency bypass arrangement if needed. IATA stressed that Afghanistan must attend any such SCM, so the choice of venue was important. IATA suggested that one of the SCM objectives should ensure effective implementation of the Inter-Regional Afghanistan ATM Contingency Arrangements.

2.36 Pakistan commented that they had continuing communication problems with Afghanistan. IFALPA thanked ICAO and adjoining States to Afghanistan for their contingency planning efforts, advising that they would be interested in joining the proposed SCM.

2.37 India agreed to internally discuss connectivity from NH to Pratapgarh as a matter of urgency. India, Pakistan, Thailand and IATA discussed various possibilities of traffic routings and congestion that may result if Scenario C (AHACG bypass arrangement of Afghanistan airspace for over-flights) became the only option.

2.38 The ATM/SG/4 agreed to the following Decision to establish a SCM:

<table>
<tr><td colspan="2">Decision ATM/SG/4-13: Afghanistan Contingency Planning Special Coordination Meeting</td></tr>
<tr><td>That, a Special Coordination Meeting on Afghanistan contingency planning be conducted prior to APANPIRG/27 to:
a) determine the current status of Afghanistan's Air Navigation Service (ANS) provision, continuity and contingency planning; and
b) support possible implementation of the Inter-Regional Afghanistan ATM Contingency Arrangements; and
c) make recommendations related to Afghanistan's ANS capability and contingency planning.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To prepare for the possibility of the non-availability of ANS within the Kabul FIR for any reason, robust planning and information sharing must be undertaken prior to the funding of the current ANS contract being exhausted.</td></tr>
<tr><td>When: 8-Jul-16</td><td>Status: Adopted by Subgroup</td></tr>
<tr><td colspan="2">Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☒ICAO HQ ☒Other: IATA, IFALPA, IFATCA</td></tr>
</table>

<u>Regional ATM Contingency Plan Task Force Outcomes</u>

2.39 The Draft Regional ATM Contingency Plan was uploaded to the ICAO Asia/Pacific Regional Office website under ***Conclusion APANPIRG/26/14 – Draft Regional ATM Contingency Plan***, to permit State use of finalized contents pending the completion of the document.

2.40 The Fifth Meeting of the Regional ATM Contingency Plan Task Force (RACP/TF/5, Bangkok, Thailand, 1 to 4 December 2015) considered the recommendations and other outcomes of the Asia/Pacific Volcanic Ash Exercises Steering Group (VOLCEX/SG) in formulating background information, contingency planning principles and performance objectives for inclusion in the plan.

2.41 It was noted that sub-regional contingency route structures and FLAS appended to the Draft Regional ATM Contingency Plan were incomplete as not all States had provided information, and that the information was subject to change. A qualifying statement to that effect was included in the Plan.

2.42 It was agreed that residual ongoing tasks relating to State reporting of contingency plan status, and the provision and update of contingency ATS route and FLAS information, would be transferred to ATM/SG.

2.43 The meeting agreed to the following Draft Conclusion and Draft Decision, for consideration by APANPIRG/27:

<table>
<tr><td colspan="3">Draft Conclusion ATM/SG/4-14: Regional ATM Contingency Plan</td></tr>
<tr><td colspan="2">That~~,~~ Version 1.0 of the Asia/Pacific Regional ATM Contingency Plan be adopted, and uploaded to the ICAO Asia/Pacific Regional Office Website.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="3">Why: To provide information, guidance and performance objectives for Regional ATM Contingency Planning.</td></tr>
<tr><td>When: 8-Sep-16</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
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<table>
<tr><td colspan="3">Draft Decision ATM/SG/4-15: Dissolution of RACP/TF</td></tr>
<tr><td colspan="2">That, having completed Version 1.0 of the Asia/Pacific Regional ATM Contingency Plan, RACP/TF be dissolved and any future revision of the plan and residual tasks arising be managed by ATM/SG.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="3">Why: Completion of the main body of work of the RACP/TF. Any further work can be managed by ATM/SG without the need for convening a Task Force meeting.</td></tr>
<tr><td>When: 8-Sep-16</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

SAIOACG/6 and SEACG/23 Meeting Outcomes

2.44 The combined Sixth Meeting of the South Asia/Indian Ocean ATM Coordination Group (SAIOACG/6) and Twenty-Third Meeting of the South-East Asia ATM Coordination Group (SEACG/23) was held in Bangkok, Thailand, from 29 February to 03 March 2016.

2.45 The SAIOACG6/SEACG23 meeting had discussed the ATM difficulties caused by short notice operational restrictions in Chinese airspace. Singapore, Hong Kong China, Lao PDR and IATA had all agreed that the issue continued to cause major disruptions within their airspace. Hong Kong, China had stated that they had tried to have a meeting with Guangzhou and Shanghai Area Control Centres (ACCs) to discuss the issues but so far this had not been possible. ICAO had noted that similar concerns had been raised at past ATM/SG meetings, and urged States to use the opportunity to conduct a meeting to discuss this matter. It was recognised that this might be difficult at a civil level, given the civil/military issues that appeared to be a cause of the problems.

2.46 The Third meeting of the South China Sea Traffic Flow Review Group (SCS/TFRG/3, formed under SEACG) had been held from 25-27 February 2016 at Bangkok. One of the main objectives of the Group was to review the Flight Level Allocation Scheme (FLAS) to align it with the standard Flight Level Orientation Scheme (FLOS) in Annex 2.

2.47 ICAO presented an overview of the existing non-standard FLAS/FLOS that had been in operation for many years. The meeting was of the opinion that this needed to be amended especially in the light of the safety issues caused by non-standard direction of flight, changes in traffic flows as well as the possibility to transition towards surveillance-based separation standards, supported by newer PBN navigation specifications.

2.48 The meeting discussed a proposed South China Sea (SCS) Operational Concept, with an expected implementation of 09 November 2017. The meeting noted that the principles of the Operational Concept could be amended to accommodate specific problems, and agreed it was a useful means of identifying a common vision that was in line with the Asia/Pacific Seamless ATM Plan.

2.49 The ATM/SG/4 agreed to the following Draft Conclusion developed by SEACG/23, for consideration by APANPIRG/27:

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-16: South China Sea Operational Concept</td></tr>
<tr><td>That, the South China Sea (SCS) Operational Concept appended as Appendix I to the Report be adopted as planning guidance, and posted on the ICAO Regional Office website.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To enhance safety and harmonise Air Traffic Management (ATM) procedures in accordance with the Seamless ATM Plan and take advantage of the communications and surveillance capabilities in the SCS.</td></tr>
<tr><td>When: 8-Sep-16</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>

AOP Working Group Outcomes

2.50 The results of the Fourth Meeting of the Aerodromes Operations and Planning Working Group (AOPWG/4, Bangkok, Thailand, 23 to 25 May 2016) were reviewed by the ATM/SG/4. The subsequent Draft Conclusions and Decisions related to the AOP/WG as follows would be provided to APANPIRG under Agenda Item 3.1:

- Draft Decision ATM/SG/4-17 - Establishment of A-CDM Task Force;
- Draft Conclusion ATM/SG/4-18: Seminar on Implementation of A-CDM to Enhance Airport Efficiency and Capacity;
- Draft Conclusion ATM/SG/4-19: Capacity Building in Aerodrome Certification;
- Draft Conclusion ATM/SG/4-20: Certification of Aerodromes;
- Draft Conclusion ATM/SG/4-21: Implementation of Environmental Friendly Measures at Airports.

AIS – AIM Implementation Task Force Outcomes

2.51 The AIM Seminar and 11th Meeting of the Aeronautical Information Services (AIS) – Aeronautical Information Management (AIM) Implementation Task Force (AAITF/11) were held in Bangkok, Thailand, from 20 to 24 June 2016).

2.52 Regional progress in the implementation of AIM transition steps from the ICAO Roadmap for Transition from AIS to AIM is recorded in the AIM Transition Table, available on the ICAO Regional Office website. Current overall regional implementation for Phases 1 and 2 was 61% and 33% respectively. Only Mongolia and Singapore had reported implementing all Phase 1 and 2 roadmap steps.

2.53 A number of Asia/Pacific States had provided points-of-contact for the Asia/Pacific AIM information sharing website hosted by Mongolia, but only Mongolia had shared information on the website. ATM/SG/4 agreed to the following Draft Conclusion:

<table>
<tr><td colspan="2">Draft Conclusion ATM/SG/4-22: Asia/Pacific Region AIM Information Sharing Website</td></tr>
<tr><td colspan="2">That, States are urged to register on the Asia/Pacific Region AIM Information Sharing Website at http://aim-tracking.org/ and provide information for the purpose of sharing experience and knowledge of challenges and issues in AIM implementation.
Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To facilitate the sharing of experience and knowledge in order to assist States in their AIM transition.</td></tr>
<tr><td>When: 8-Sep-16</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>

2.54 An update to the Asia/Pacific Region Operating Procedures for AIS Dynamic Data (OPADD) had been provided to AAITF/11 by Japan.

2.55 The ATM/SG/4 meeting agreed to the following Draft Conclusion, for APANPIRG/27's consideration:

<table>
<tr><td colspan="3">Draft Conclusion ATM/SG/4-23: Asia/Pacific Region Operating Procedures for AIS Dynamic Data (OPADD)</td></tr>
<tr><td colspan="2">That,
a) OPADD Edition 4 provided in Appendix L to the Report be inserted in the Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Region, to replace OPADD Edition 3; and
b) States review systems and procedures to ensure adherence to OPADD Edition 4</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="3">Why: To update regional procedures for NOTAM.</td></tr>
<tr><td>When: 8-Sep-16</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

2.56 It was proposed that additional AIM provisions responding to several APANPIRG Conclusions be included in the Asia/Pacific Air Navigation Plan. The AAITF/11 meeting supported a PfA to the Asia and Pacific Regions Air Navigation Plan, to be jointly submitted to ICAO by Fiji, India, Mongolia and Thailand, to include new paragraphs provided in **Attachment K**.

2.57 AAITF/11 agreed to ***Decision AAITF/11/4 – Regional Collaborative AIM Plan***, initiating a project to be undertaken by the AAITF Small Working Group (AAITF SWG) to develop a Regional Plan for Collaborative AIM.

2.58 The meeting reviewed the proposed amendment to the AAITF Terms of Reference (TOR), and agreed to the following Draft Decision:

<table>
<tr><td colspan="3">Draft Decision ATM/SG/4-24: Revised AAITF Terms of Reference</td></tr>
<tr><td colspan="2">That, the revised Terms of Reference of the AIS – AIM Implementation Task Force (AAITF) at Appendix N to the Report be adopted.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="3">Why: To update the Terms of Reference to ensure it aligned with the required scope and work output of the AAITF.</td></tr>
<tr><td>When: 8-Sep-16</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

<u>Meteorology Issues Relevant to ATM</u>

2.59 ATM/SG/4 noted the outcomes of the joint session meeting of MET/SG/20 and ATFM/SG/6 including the necessity for the ATM community to fully engage with the work of the Meteorological Requirements Working Group (MET/R WG), which had been formed to develop MET information supporting ATM, including ATFM. States were strongly encouraged to provide relevant ATM expertise to MET/R WG meetings to ensure the region's needs for tailored MET information for ATM and ATFM were addressed.

2.60 The meeting endorsed ***Draft Conclusion MET SG/20/10 – Membership of the MET/R WG from both MET and ATM experts***, which urged States to nominate experts for the MET/R WG from both MET and ATM fields, and actively participate in the work program of the MET/R WG.

<u>Asia/Pacific Search and Rescue Update</u>

2.61 ATM/SG/4 noted that the First Meeting of the Asia/Pacific SAR Workgroup (APSAR/WG/1) would be held at Bangkok from 15 – 18 August 2016. As a result of the APSAR/WG/1 being held after the ATM/SG/4 meeting, the key results (including Draft Conclusions) from the APSAR/WG/1 were included in this paper, after being endorsed by the ATM/SG Chair.

2.62 The United States provided information on a possible future amendment of Annex 12 and other ICAO documents related to SAR such as Annex 6 *Operation of Aircraft*, Annex 11 *Air Traffic Services*, and Annex 13 *Aircraft Accident and Incident Investigation*. The ICAO Asia and Pacific Regional Office supplemented this paper with a review of possible Annex amendments that resulted from of lessons learnt following the MH370 and the QZ8501 tragedies. The meeting agreed to present the information to the JWG in September 2016 through the Chair of the JWG, who was present at the APSAR/WG/1 meeting, for its consideration of specific Annex change proposals.

2.63 The meeting noted that aviation Emergency Locator Transmitters (ELTs) remained a significantly disproportionate contributor to false alerts: six times greater than maritime Emergency Position-Indicating Radio Beacons (EPIRBs) and ten times greater than Personal Locator Beacons (PLBs). This appeared to be due, at least in significant part, to training and information issues for cockpit crews and maintenance personnel, who activate beacons for testing without understanding that all transmitted alert signals were treated as real.

2.64 The APSAR/WG/1 meeting agreed to the following Draft Conclusion (as endorsed by the ATM/SG Chair), for consideration by APANPIRG/27:

<table>
<tr><td colspan="2">Draft Conclusion APSAR/WG/1 – 1: ELT Inadvertent Activation</td></tr>
<tr><td>That, noting that:
(1) Emergency Locator Transmitters (ELTs) remained a significantly disproportionate contributor to false alerts; and
(2) the next generation ELTs would transmit within three seconds (reducing the time available to cancel an inadvertent activation); and
(3) cockpit crews and maintenance personnel who activate beacons for testing are a high proportion of false alerts; and
(4) all transmitted alert signals are received as an alert and treated as a real distress;
States should investigate the reasons for false alerts in their area, and develop mitigation strategies, including education, to reduce the number of false activations.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: Given the already high and disproportionate number of false alerts attributed to ELTs at present, States need to implement action to reduce the incidence of false alerts, which utilises valuable SAR resources, and to prepare for the effective implementation of next generation beacons, which will have an even shorter interval between activation and first transmission, and therefore may cause even more false alerts.</td></tr>
<tr><td>When: 8-Sep-16</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>

2.65 ICAO provided information on the known status of Asia/Pacific SAR capability. An analysis of the 31 Universal Safety Oversight Audit Programme (USOAP) SAR-related Protocol Questions (PQs) indicated that the overall Effective Implementation (EI) had risen from 50.7% in mid-2015 to **54.8%** in August 2016 for the Asia/Pacific Region. However, the 12 PQs below 50% EI had not improved, and in three cases were worse than the results from 2015.

2.66 **Figure 2** provided an overview of the Asia/Pacific's USOAP SAR PQ compliance.

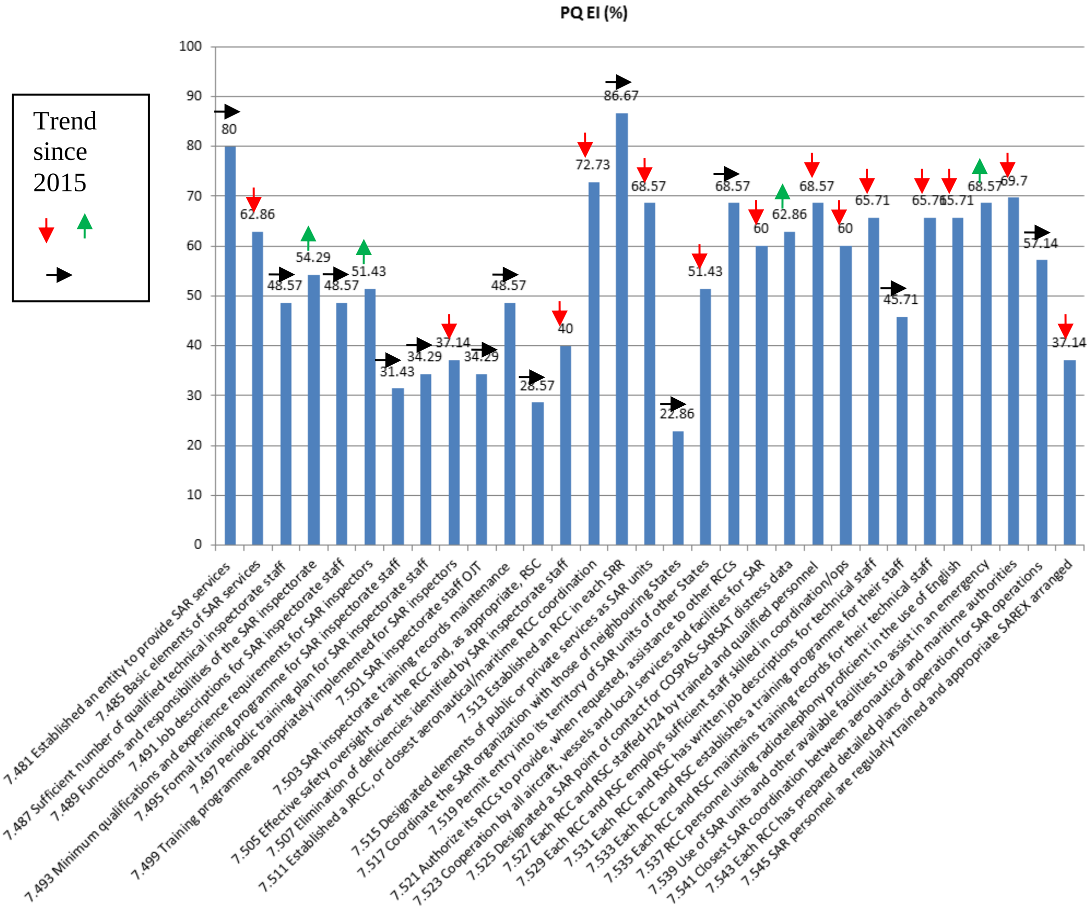

Figure 2: APAC USOAP CMA SAR PQ Compliance (average: 54.8%)

2.67 From this analysis, it appeared that major areas of weakness remained in the areas of coordination with adjacent States, effective SAR oversight, and training of both SAR inspectors and staff that provide the SAR services. Therefore, the APSAR/WG noted the vital need for improved coordination with other States, a focus on the minimisation of barriers associated with the efficient cross-border coordination of SAR Units (SRU, such as pre-arranged approval) and other RCC coordination mechanisms.

2.68 In addition, the meeting recognised the need for improved systemic approaches (possibly on a sub-regional or regional basis) regarding training for both SAR inspectors and personnel responsible for the provision of SAR services, including the regular organisation of effective SAREX that actually tested systems and personnel.

2.69 The SAR Capability Matrix Table is appended as **Attachment M**.

2.70 **Figure 3** provides the updated SAR compliance overview for APSAR/WG/1.

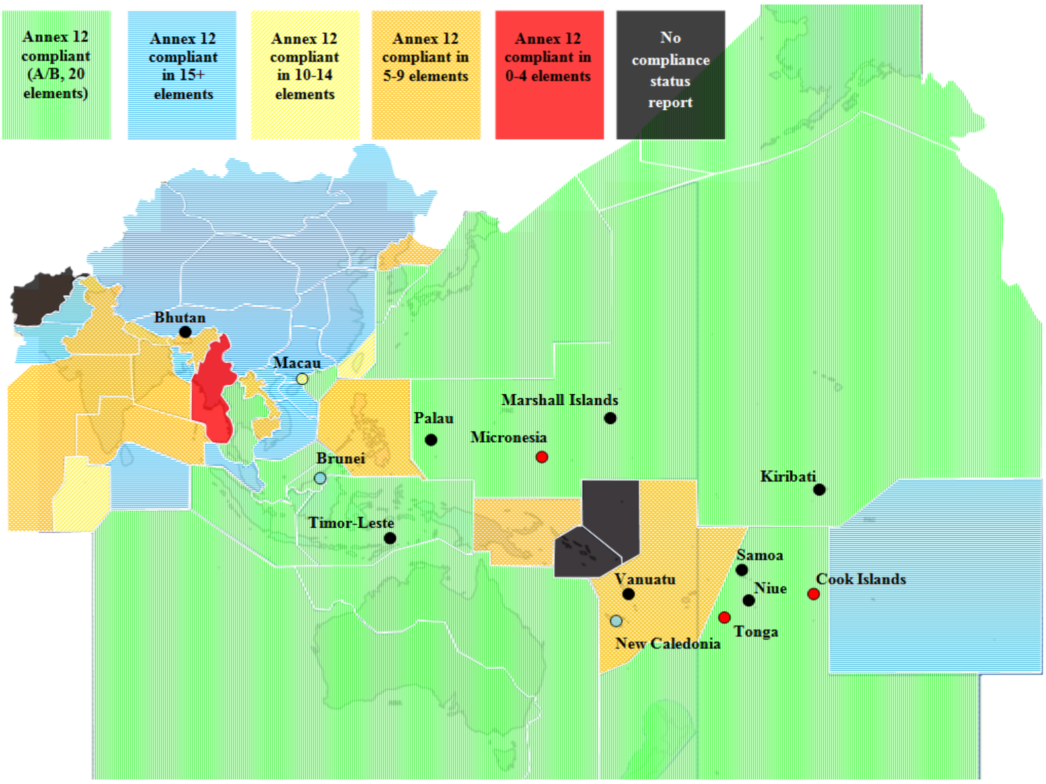

Figure 3: APSAR/WG/1 Asia/Pacific Regional SAR Overview

2.71 **Figure 3** indicated that significant Annex 12 compliance weaknesses remained in the Southwest Pacific and improvement was necessary in several Asian States: Afghanistan; Democratic People's Republic of Korea (DPRK); Maldives; Myanmar; Nepal; and the Philippines (note: the APANPIRG ANS Deficiencies List is at **Attachment N** for consideration by APANPIRG/27).

2.72 The overall SAR capability ranking of Asia/Pacific States (using a metric of 5% for an A and 4% for a B as assessed in the SAR Capability Matrix) is indicated in **Figure 4**:

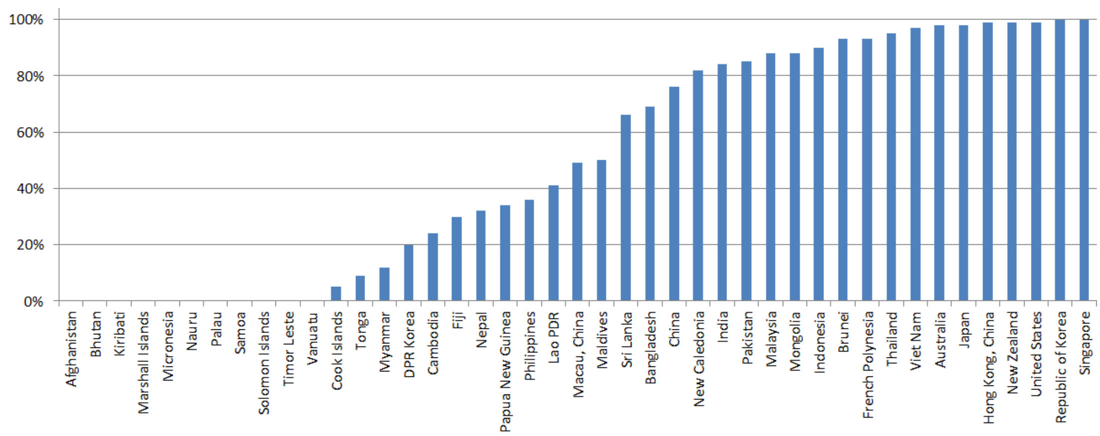

Figure 4: Asia/Pacific SAR Capability Ranking

2.73 The meeting discussed whether the 20 Annex 12 SAR compliance elements used in the capability ranking could be superseded over a transition period of some years by a more accurate self-assessment of capability aligned with the SAR Plan, as presented by the ICAO Regional Office (**Attachment O**).

2.74 The following Draft Conclusion was agreed by the APSAR/WG/1 (as endorsed by the ATM/SG Chair), for consideration by APANPIRG/27:

<table>
<tr><td colspan="2">Draft Conclusion APSAR/WG/1 – 2: SAR Plan Capability Measurement</td></tr>
<tr><td>That, the SAR Plan Capability Measurement System appended at Appendix X to the Report be adopted and States be urged to provide information on their capability with respect to this new performance system.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To provide a more accurate measurement of SAR capability than the 20 element Annex 12 based system and to provide APANPIRG with a more detailed measurement of Asia/Pacific SAR Plan implementation, and to provide an internal assessment tool to be used by States/Administrations.</td></tr>
<tr><td>When: 8-Sep-16</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>

2.75 ICAO presented information on the implementation of the Asia/Pacific SAR Plan, and updates considered necessary. A minor update was recommended to the Asia/Pacific SAR Plan, to include reference to strengthened operational requirements. The United States also provided a paper with some minor amendments to the Asia/Pacific SAR Plan.

2.76 In addition, as the amendment cycle for the Asia/Pacific Seamless ATM Plan is proposed to be amended to 2019 (thence every three years), a minor amendment in 2016 would re-align the SAR Plan with the parent document's amendment cycle. The following Draft Conclusion was agreed by the APSAR/WG/1 (as endorsed by the ATM/SG Chair), for consideration by APANPIRG/27:

<table>
<tr><td colspan="2">Draft Conclusion APSAR/WG/1 – 3: Asia/Pacific SAR Plan Update</td></tr>
<tr><td>That, the Asia/Pacific SAR Plan V 2.0 as appended at Appendix X to the Report be adopted and updated on the ICAO Asia/Pacific website.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To make a minor amendment for additional operational requirements and to align the review cycle to match with the Seamless ATM Plan Review in 2019.</td></tr>
<tr><td>When: 8-Sep-16</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>

<u>Election of Chairpersons</u>

2.77 Mr. Kuah Kong Beng, Director (Special Project) Singapore Air Navigation Services Group, Civil Aviation Authority of Singapore, was re-elected as the Chairman of the ATM/SG for another four years, from 2017 until 2020.

2.78 Mr. Mukesh Chand Dangi, General Manager (ATM), Airports Authority of India, was re-elected as the Vice-Chairman of the ATM/SG for another four years, from 2017 until 2020.

2.79 Mr. Ibrahim Thoha General Manager Air Traffic Management, Maldives Airports Company Ltd was elected as the new Chairman of SAIOACG for four years, from 2016 until 2019.

2.80 Mr. Chhun Sivorn, Director of Air Navigation, Standards and Safety, SSCA of Cambodia, was elected as the new Chairman of SEACG four years, from 2016 until 2019.

2.81 Mr. Tai Kit, Senior Air Traffic Control Manager (Search and Rescue/Business Continuity Planning), Civil Aviation Authority of Singapore was elected as Chairman of the APSAR/WG for four years, from 2016 until 2019.

3 ACTION BY THE MEETING

3.1 The Meeting is invited to note the information in this paper and:

a) discuss the following Draft Conclusions and Decisions:

i. Draft Conclusion ATM/SG/4-1: PBCS Operator Requirements (paragraph 2.5);

ii. Draft Conclusion ATM/SG/4-2: State Implementation of ICAO Provisions for PBCS (2.5);

iii. Draft Conclusion ATM/SG/4-3: Asia/Pacific Region PBCS Transition Strategy (2.5);

iv. Draft Conclusion ATM/SG/4-4: Airspace Safety Concern Response (2.7);

v. Draft Conclusion ATM/SG/4-5: Origination of Flight Plan and ATS Messages (2.11);

vi. Draft Conclusion ATM/SG/4-6: Origination and Distribution of Departure (DEP) Messages (2.11);

vii. Draft Conclusion ATM/SG/4-7: Update Regional Framework for Collaborative ATFM (2.14);

viii. Draft Conclusion ATM/SG/4-8: State Review of the Regional Framework for Collaborative ATFM (2.16);

ix. Draft Conclusion ATM/SG/4-9: Use of Alpha Numeric Call-signs for Scheduled Airline Operations (2.19);

x. Draft Conclusion ATM/SG/4-10: Asia/Pacific Seamless ATM Plan Update (2.21);

xi. Draft Decision ATM/SG/4-11: Asia/Pacific Unmanned Aircraft Systems Task Force (2.24);

xii. Draft Conclusion ATM/SG/4-12: Flexible Use Airspace Manual Template (2.31);

xiii. Draft Conclusion ATM/SG/4-14: Regional ATM Contingency Plan (2.43);

xiv. Draft Decision ATM/SG/4-15: Dissolution of RACP/TF(2.43);

xv. Draft Conclusion ATM/SG/4-16: South China Sea Operational Concept (2.49);

xvi. Draft Conclusion ATM/SG/4-22: Asia/Pacific Region AIM Information Sharing Website (2.53);

xvii. Draft Conclusion ATM/SG/4-23: Asia/Pacific Region Operating Procedures for AIS Dynamic Data (OPADD) (2.55);

xviii. Draft Decision ATM/SG/4-24: Revised AAITF Terms of Reference (2.58);

xix. Draft Conclusion APSAR/WG/1 – 1: ELT Inadvertent Activation (2.64);

xx. Draft Conclusion APSAR/WG/1 – 2: SAR Plan Capability Measurement (2.74);

xxi. Draft Conclusion APSAR/WG/1 – 3: Asia/Pacific SAR Plan Update (2.76);

b) Note Decision ATM/SG/4-13: Afghanistan Contingency Planning Special Coordination Meeting (2.38); and

c) Discuss any other relevant matters as appropriate.

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DRAFT

PERFORMANCE-BASED COMMUNICATION AND SURVEILLANCE (PBCS) IMPLEMENTATION STRATEGY FOR THE ASIA/PACIFIC (APAC) REGIONS

Considering that:

1. The ICAO Provisions for PBCS including new Standards and Recommended Practices (SARPS) and related guidance material are applicable from 10 November 2016;

2. State policies and procedures enabling aircraft operators to file Required Communication Performance (RCP) and Required Surveillance Performance (RSP) designators in flight plans are not likely to be promulgated and implemented by the applicable date;

3. Some Asia/Pacific Region States providing Required Navigation Performance (RNP)-based horizontal separation minima requiring the use of Controller-Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance – Contract (ADS-C) are not likely to be ready to implement separation minima based on PBCS designators in flight plans by the applicable date;

4. Some States outside the APAC Regions may require the filing of PBCS designators in flight plans for the provision of 50 NM and 30 NM longitudinal and 23 NM (formerly 30 NM) lateral separation minima on or soon after the applicability date of the PBCS provisions;

5. Area Navigation (RNAV) and Required Navigation Performance (RNP)-based 50 NM and 30NM longitudinal 30NM lateral separation minima are currently being applied in some APAC Region FIRs, normally between a relatively small proportion of eligible aircraft pairs;

6. RNAV and RNP-based horizontal separation minima should already be supported by data link performance monitoring in accordance with Annex 11 requirements;

7. RASMAG has noted that horizontal PBN separation standards (30NM and 50NM) have consistently met Target Level of Safety for many years; and

8. ATM automation systems should, as a minimum, currently be configured to accept without processing PBCS indicators in received flight plans[i].

The APAC Regional PBCS Implementation Strategy is as follows:

1. States are urged to take appropriate measures to develop, establish, implement and promulgate, through advisory circular or other relevant State instruments, necessary policies and procedures to enable operators conducting flights in airspace where separations are dependent on Performance-Based Communication and Surveillance (PBCS) to start using required communication performance (RCP) / required surveillance performance (RSP) indicators in the flight plan as soon as possible.

   This should take into account:

   a. time for the operator to comply with the States' policies; and

   b. the need for the State to distribute data from PBCS monitoring programs, as necessary.

2. The application of existing and planned RNAV and RNP-based 50 NM and 30NM longitudinal and 30NM lateral separation minima should continue, subject to the conditions that:

    a. PBCS monitoring is in place; and

    b. Performance-based horizontal separation using PBCS designators in flight plans is implemented as soon as practically possible;

3. Common implementation dates are applied by States using PBCS indicators to establish performance-based separation in adjacent airspace, supported by joint submission of Proposals for Amendment (PfA) to ICAO Doc 7030 – Regional Supplementary Procedures; and

4. States that apply or plan to apply 30 NM and/or 50 NM longitudinal separation minima and/or 30 NM or 23 NM lateral separation minimum are urged to implement the ATM system capability to process and use ICAO PBCS flight plan indicators to determine aircraft eligibility for performance-based horizontal separation by **not later than 29 March 2018**; and

5. States applying performance-based horizontal separation minima, whether RNAV/RNP or PBCS based, should report their implementation status to the FANS-Interoperability Team – Asia (FIT-Asia) at least once annually, and upon any change of implementation status[ii].

…………………………

[i] As described in the *Asia/Pacific Guidance Material for the Implementation of Amendment 1 to the 15th Edition of the Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444)*.

[ii] Reporting form to be developed and distributed by the FIT-Asia Secretary.

AMENDMENT TO THE REGIONAL FRAMEWORK FOR COLLABORATIVE ATFM.

1. **AMEND** paragraph 7.13 (and note) as follows:

7.13 Requirements should be published in all relevant State AIP, specifying that, except where necessary for operational or technical reasons, FPL ~~for flights operating to ATFM Program airports~~ should be submitted not less than 3 hours prior to EOBT.

~~*The requirement for FPL submission not less than 3 hours prior to EOBT is currently stipulated in other Regions for ATFM purposes. However, it should be noted that some airspace user flight planning systems are limited to maximum prior submission less than 3 hours.*~~

2. **ADD** new paragraphs as follows:

Regional ATFM Implementation Guidance

5.78 Under Phase II of the IATA Regional Air Traffic Flow Management Project, as agreed by ATFM/SG/4, IATA delivered the Regional ATFM Implementation Guidance document for consideration by ATFM/SG/6 (Bangkok, Thailand, June 2016).

5.79 ATFM/SG/6 noted the importance of harmonized implementation guidance to assist States in the planning and execution of ATFM implementation projects, and to the future interoperability of State and Regional ATFM programs.

5.80 The Regional ATFM Implementation Guidance, provided at **Appendix F**, includes information and guidance on:

- The background of ATFM/CDM in the Asia/Pacific Region;
- Setting up an ATFM/CDM project;
- Implementation;
- Implementation Risks and Mitigation;
- Post-implementation activities;
- Timelines; and
- Assessment of benefits.

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

3. **ADD** as an Appendix to the Regional Framework for Collaborative ATFM:

APPENDIX F – Regional ATFM Implementation Guidance.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

DRAFT

ASIA/PACIFIC REGIONAL
AIR TRAFFIC FLOW MANAGEMENT
IMPLEMENTATION GUIDANCE

Version 1.0 September 2016

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

Approved by APANPIRG/27 and published by the

ICAO Asia and Pacific Office, Bangkok

TABLE OF CONTENTS

INTRODUCTION

Executive Summary

1.1 The large growth of air traffic movements in the Asia-Pacific (APAC) region in recent years has resulted in airport and airspace capacity that is inadequate to accommodate the ever increasing demand. The failure to balance demand and capacity has been exacerbated by airborne holding and excessive tactical Air Traffic Control (ATC) measures, which result in increased airline sector times. In addition, adverse weather often reduces the capacity of airports and airspace, resulting in additional strain on the air navigation service providers (ANSPs).

1.2 While it is a requirement under Annex 11 to the Convention on Civil Aviation for States to implement Air Traffic Flow Management (ATFM), the more urgent impetus to do so is that balancing the demand against capacity will create a more orderly and expeditious flow of traffic. There already have been many successful implementations of ATFM in other parts of the world; however, the APAC region has unique Cross-Border requirements which must be addressed through Regional and Sub-Regional ATFM planning and implementation. Positive progress has been made—with the involvement of all appropriate stakeholders—in defining the required Concept of Operations (ConOps) for the region. This development is ongoing and will evolve as the various initiatives mature.

1.3 The Asia/Pacific ATFM Steering Group (ATFM/SG) recommended that a *distributed multi-nodal ATFM network*, detailed in the *Asia/Pacific Regional ATFM Concept of Operations* ("the Regional ATFM ConOps") be adopted as a key concept of the *Asia/Pacific Regional Framework for Collaborative ATFM* ("the Regional ATFM Framework") Both the ConOps and the Framework were formally endorsed by the 26th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/26, Bangkok, Thailand, 7-10 September 2015. Cross-Border Multi-Nodal ATFM will ensure a network approach to ATFM on a regional and/or sub-regional basis. Trials of the Cross-Border Multi-Nodal ATFM concept are currently underway with positive results being achieved.

1.4 Capacity growth should always be a priority and have ongoing focus by ANSPs and airports. ANSPs should carry out analysis of their operations to establish if ATFM/CDM is required and if required, which concept as described in this document should be implemented. Should a State not have requirements for ATFM, they are expected to support other States that are implementing ATFM/CDM by adhering to agreed region procedures. Cooperation and collaboration between all stakeholders in the region will ensure successful implementation of ATFM/CDM in the region, which will benefit all users by reducing airborne holding, increasing predictability, and providing greater operational flexibility.

Scope and Purpose of the ATFM Implementation Guidance Document

2.1 The purpose of this document is to provide guidance to the ANSPs in the APAC Region on ATFM/CDM implementation strategies, with particular emphasis on Cross-Border Regional ATFM/CDM. In addition to this, the document will support the the Regional ATFM Framework to ensure synergies during implementation of ATFM in the region.

2.2 There is clear evidence that implementation of ATFM/CDM in other areas of the world has brought significant benefits to the aviation community. For ATFM/CDM to be effective in the APAC region, Regional ATFM procedures and Cross-Border operations will be required due to the unique operational requirements of the region.

2.3 ATFM/CDM implementation is a complex task and this document is not the definitive manual on implementation; however, it is intended to serve as a guide for Cross-Border Regional ATFM implementation for APAC and should be read in conjunction with other relevant documentation on ATFM implementation.

2.4 The International Civil Aviation Organisation (ICAO) Doc. 9971 – Manual on Collaborative ATFM, together with the Regional ATFM ConOps and the Regional ATFM Framework guide ANSPs in the planning and implementation of interoperable cross-border ATFM. Regional ATFM ConOps details the ATFM concept for the Region, and the Regional ATFM Framework details the “what and when” of implementation. This document, the Asia/Pacific Regional ATFM Implementation Guidance Document, provides additional guidance (the “how”) for states in the APAC region and will assist ANSPs with both identifying and implementing the appropriate ATFM capability in their areas of responsibility. It is fully expected that this document will evolve as the Cross-Border Multi-Nodal ATFM concept further develops.

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LIST OF ACRONYMS

A-CDM .... Airport Collaborative Decision Making

AATIP.................... ASEAN Air Transport Integration Program

ACC .... Area Control Centre

ADP .... ATFM Daily Plan

AFIX .... Arrival Fix

AFTN..................... Aeronautical Fixed Telecommunications Network

AMAN .... Arrival Management

ANSP .... Air Navigation Service Provider

APAC..................... (ICAO) Asia and Pacific Region

APANPIRG............ Asia/Pacific Air Navigation Planning and Implementation Regional Group

ASBU..................... Aviation System Block Upgrades

ASEAN .... Association of Southeast Asian Nations

ATC .... Air Traffic Control

ATCC..................... Air Traffic Control Centre

ATCO.................... Air Traffic Controller

ATCSCC................ Air Traffic Control System Command Center

ATFM .... Air Traffic Flow Management

ATFM/CDM .... ATFM Collaborative Decision Making

ATFM/SG .... ICAO Asia/Pacific Region ATFM Steering Group

ATM....................... Air Traffic Management

ATS........................ Air Traffic Service

AU.......................... Airspace Users

CAAS..................... Civil Aviation Authority of Singapore

CANSO .... Civil Air Navigation Services Organisation

CBA .... Cost Benefit Analysis

CDM .... Collaborative Decision Making

CFMU .... Central Flow Management Unit

CLDT .... Calculated Landing Time

CNS........................ Communication, Navigation, and Surveillance

CO_2 .... Carbon Dioxide

ConOps .... Concept of Operations

CTO .... Controlled Time Over

CTOT .... Calculated Take-off Time

DCB .... Demand and Capacity Balancing

DMAN .... Departure Management

ECAC..................... European Civil Aviation Conference

EU .... European Union

FAA .... Federal Aviation Administration

FDP .... Flight Data Processor

FIR .... Flight Information Region

FIXM .... Flight Information Exchange Model

FMP .... Flow Management Position

FMU....................... Flow Management Unit

FOC........................ Flight Operation Centre

FPL......................... Flight Plan Message

GDP .... Gross Domestic Product

GDP .... Ground Delay Program

HITL .... Human-In-The-Loop

IATA...................... International Air Transport Association

ICAO...................... International Civil Aviation Organisation

ILS .... Instrument Landing System

LOA .... Letter of Agreement

MINIT .... Minutes in Trail

MIT .... Miles in Trail

NARAHG .... North Asia Regional ATFM Harmonisation Group

NAS .... National Airspace System

NavAid................... Navigation Aid

NOPS .... Network Operations

PBN........................ Performance-Based Navigation

RFIX .... En-route Fix

SG .... Steering Group

SME .... Subject Matter Expert

US/U.S. .... United States of America

VIP .... Very Important Person

WATS .... World Air Transport Statistics

WSG....................... World Slot Guidelines

BACKGROUND OF ATFM/CDM IN THE ASIA/PACIFIC REGION

Introduction

1.1 In 2014, after identifying the need to have regional Air Traffic Flow Management (ATFM) in the region, the International Air Transport Association (IATA) initiated a project to establish a regional baseline of ATFM capability with particular reference to Cross-Border ATFM/ Collaborative Decision Making (ATFM/CDM) capabilities. The project, endorsed by the ATFM/SG, conducted a region wide survey of Air Navigation Service Providers (ANSPs) to establish the regional base-line of ATFM capability. The results showed that while all ANSPs in the Asia-Pacific (APAC) region have implemented or have plans to implement ATFM/CDM, little collaboration in regard to Cross-Border ATFM/CDM is evident. As a result, the ATFM/SG endorsed a second stage of the project to develop an Implementation Guidance for Cross-Border ATFM/CDM for the APAC region.

1.2 It was recognised that a centralised ATFM concept, as practised in other parts of the world, is not feasible in the APAC region. For ATFM/CDM to be fully effective in the region, a scalable, collaborative, cohesive, and flexible approach for achieving integrated and coordinated ATFM capabilities within the APAC region will need to be adopted. As a result of this and recommendations from Phase 1 of the IATA project, the Asia/Pacific ATFM/SG accepted and endorsed the Multi-Nodal ATFM concept as the regional foundation for Cross-Border ATFM.

History of ATFM/CDM Implementation

1.3 The 1990s saw air traffic increases previously unseen in the U.S., bringing with it unprecedented delays. There were few tools available for CDM and fewer still for common situational awareness. The Federal Aviation Administration (FAA) found their already limited resources extremely strained. Air traffic controllers (ATCOs) had limited and untimely access to delay information around the National Airspace System (NAS) and were unable to adequately manage ground operations for congested or weather-impacted airports and airspace. Moreover, with a decentralised database of aircraft route data, there were no systems to identify problems or areas of inefficiencies throughout the NAS. Officials at the FAA sought procedures and systems that would aid in information-sharing and through . industry partnerships developed tools to assist them in predicting demand and consequently balancing demand against capacity. History has shown that these initiatives have enhanced safety and saved many tons of fuel over time.

1.4 In Europe the Central Flow Management Unit (CFMU) was created in 1995 as a response to the chronic delays plaguing European air traffic throughout the eighties. Based on ICAO's concept of centrally coordinated ATFM, and with the support of the European Civil Aviation Conference (ECAC) Member States, the CFMU succeeded in containing the delay crisis at the time. As a result, strong operational collaboration processes were put in place between all aviation actors—especially ANSPs and airlines—to manage traffic and delays in partnership.

1.5 ICAO has recognised that it is necessary for all ANSPs to have a common understanding of ATFM/CDM. To that end, ICAO published the following definition: "*A service established with the objective of contributing to a safe, orderly, and expeditious flow of air traffic by ensuring that Air Traffic Control (ATC) capacity is utilised to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate Air Traffic Services (ATS) authority*."

1.6 Additionally, ICAO has published *ICAO Doc 9971- Manual on Collaborative ATFM Part 1 and 2* developed by Subject Matter Experts (SMEs) in ATFM/CDM from across the globe. Stakeholders are encouraged to read *ICAO Doc 9971* in conjunction with this APAC ATFM Implementation Guidance document.

1.7 To improve efficiency and optimise operations in the APAC region, APANPIRG/24 in June 2013 endorsed the *Asia Pacific Seamless Air Traffic Management (ATM) Plan*. The objective of the Seamless ATM Plan is to facilitate Asia/Pacific Seamless ATM operations by developing and deploying ATM solutions capable of ensuring the safety and efficiency of air transport throughout the APAC region. The Plan provides a framework for a transition to a Seamless ATM environment by establishing an expectation of harmonised and interoperable systems in order to meet future performance requirements. Aviation System Block Upgrade (ASBU) B0-NOPS *Network Operations* (of which ATFM taking a Network view is a key element) is a critical part of the plan and is also one of APANPIRG's top ten regional priorities.

APAC Regional ATFM/CDM Implementations and Strategies

1.8 In 2014, the study commissioned by IATA established a baseline view of ATFM capability and interoperability of States in the APAC region. It is important to list the key findings here as this implementation Guidance will address the shortcomings identified by the study.

1.9 The results of the study are summarised below (status in some countries may have changed since the study was completed):

- All APAC States have recognised the requirement for ATFM.
- Few States have well-established ATFM Organisational structures.
- ATFM infrastructure is very diverse; only two States, Australia and Japan have mature ATFM systems, while others have varying degrees of infrastructure, as indicated by the corresponding colours in the map and legend. See (**Figure 1**).
- CDM between States is minimal. While there is a common desire for better CDM, there is no standard for the region. (**Figure 2**).
- There is no substantive interoperability between the States. There is little official ATFM procedure agreement between States as written in the Letters of Agreement (LOAs). See (**Figure 3**).

- Airport capacities are declared for most major airports in the region, but only five States are declaring capacities for airspace.

- Very few countries are performing Demand Capacity Balancing (DCB) in the strategic phase of ATFM beyond allocating Airport Slots via the IATA World Slot Guidelines (WSG).

- Only the limited number of States with mature ATFM systems are able to carry out DCB in the pre-tactical phase.

- States without mature ATFM systems that are encountering DCB issues do not have any facility to monitor demand against capacity.

- Only five States (Australia, New Zealand, Philippines, China, and Japan) have the ability to issue ATFM Measures using allocated slot times to smooth traffic into airports.

- The major development in Cross-Border ATFM implementation is the Civil Aviation Authority of Singapore (CAAS)-initiated Regional ATFM ConOps. ANSPs and relevant stakeholders from four States participated in the development of the concept. The resultant collaborative trial of the concept—Distributed Multi-Nodal ATFM Operational Trial—is underway with the following nine States participating: Australia, China, Hong Kong China, Indonesia, Malaysia, Singapore, Thailand, Philippines, and Vietnam.

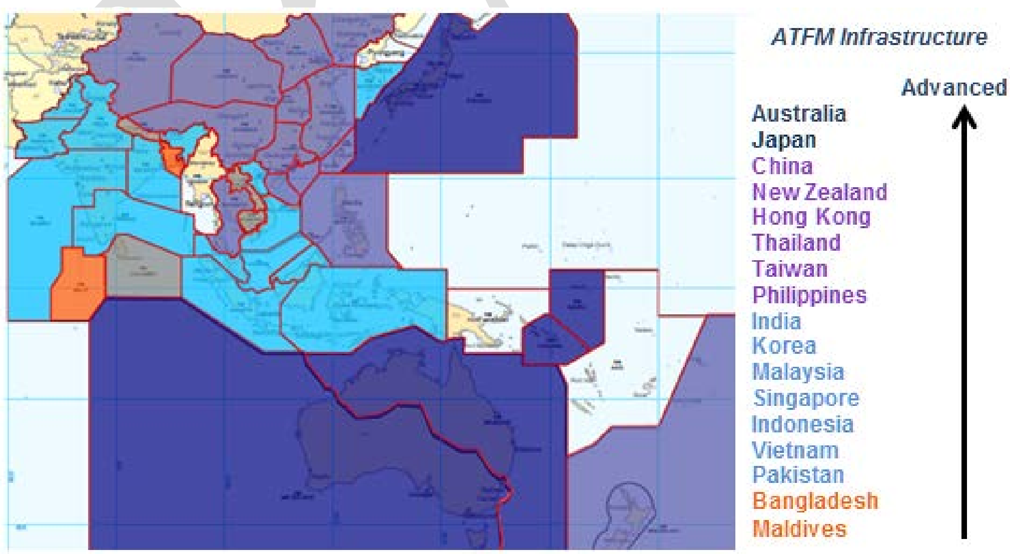


Figure 1: ATFM Infrastructure

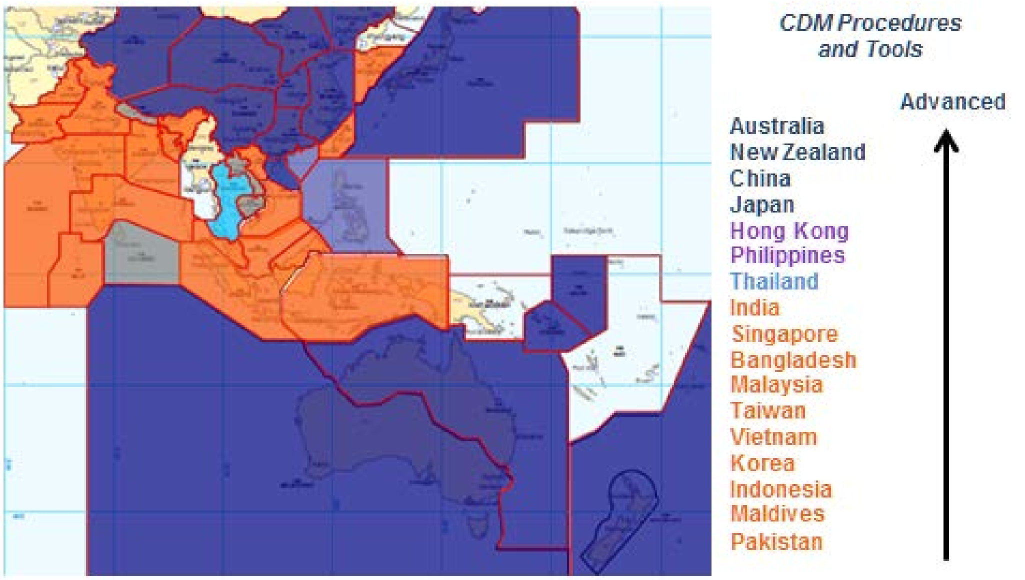


Figure 2: CDM tools and procedures between States

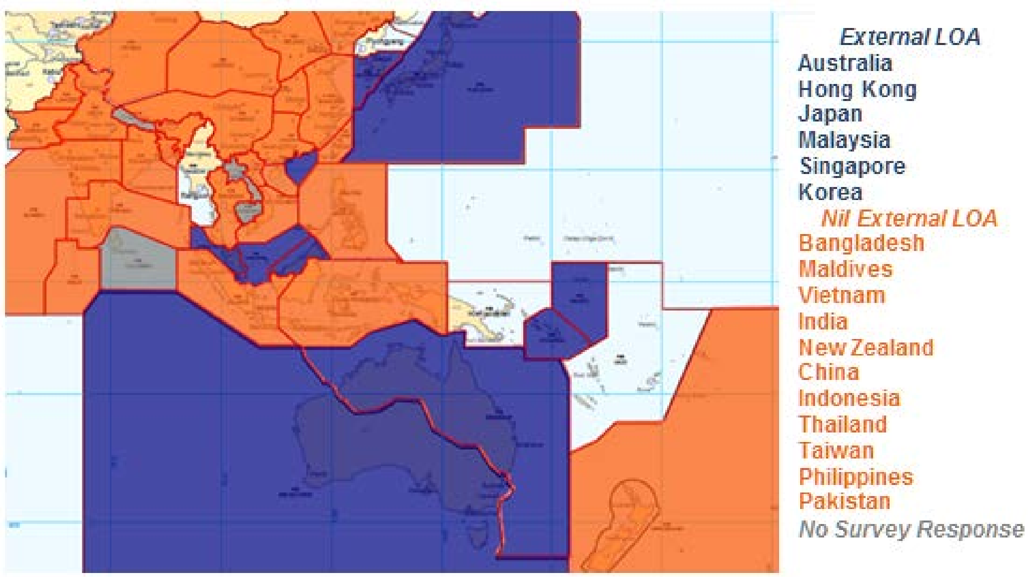


Figure 3: External LOA between States

1.10 The overarching finding of the study was that while all the surveyed ANSPs had ATFM/CDM implementation plans, there were no current Cross-Border arrangements to facilitate ATFM/CDM. There are initiatives to commence with Cross-Border ATFM which are discussed in following sections

ATFM/CDM in APAC and the Requirement for Cross-Border Regional ATFM/CDM

1.11 The APAC Region has experienced strong growth of 5–6% per year and is forecasted to continue this trend for the foreseeable future. Most regional hubs are already operating near the limits of their current capacity, and solutions to efficiently manage traffic flows are carried out to a large degree in isolation by individual ANSPs. During 2012, a Civil Air Navigation Services Organisation (CANSO) initiative led to Singapore, Hong Kong China, and Thailand commencing CDM trials. These trials showed that with the cooperation of ANSPs in the region, ATFM could be implemented; however, the existing centralised model of ATFM operations as in the Americas, Australia, South Africa and Europe was considered not suitable for the APAC region.

1.12 The traditional model of ATFM initiatives, which relies on delaying domestic traffic to achieve effective demand metering is not possible for a number of APAC ANSPs due to the lack of domestic traffic. During the development of the Regional ATFM ConOps it was determined that a 70% participation of flights is needed for ATFM measures[1] to be effective. Additionally, the makeup of the region, particularly South-East Asia, with relatively small Flight Information Regions (FIRs) require a Cross-Border solution..

Understanding the impact of ATFM/CDM implementation

1.13 ATFM is now entrenched in the ICAO ATM operational concept, the ICAO Aviation System Block Upgrade - Block 0 and Block 1 (ASBU B0/B1) and the Asia Pacific Seamless ATM Plan. Some ANSPs in the region, such as Japan, Australia, and New Zealand, have implemented ATFM/CDM these implementations have had significant positive impact on operations resulting in both qualitative and quantitative benefits.

1.14 For ATFM to have a sustained impact, the cooperation of the majority of stakeholders is required. Stakeholders' participation in ATFM includes activities such as ANSPs being required to respect ATFM measures applied in other Flight Information Regions (FIRs) that will affect operations in their own areas of responsibility, Aircraft Operators having to manage assigned delay by either taking ground delay or providing en-route delay intent to comply with delays imposed, and Airport Operators accommodating flights being delayed at departure airports. While ATFM requires the various user groups to actively participate in ATFM measures, the additional workload ultimately provides network benefits. Estimated benefits are discussed in later sections

1.15 When increased ATFM measures are introduced in the APAC region, whether domestically or Cross-Border, stakeholder education, interaction and consultation are necessary to ensure impacts, goals and overall network benefits are well identified and understood.

[1] ICAO Doc 9971 – *Manual on Collaborative Air Traffic Flow Management (Chapter 6)* defines ATFM Measures as *techniques used to manage air traffic demand according to system capacity*. *Some ATFM measures must be considered as control instructions or procedures.*

1.16 ATFM/CDM implementation will require new or changed working procedures, and a good understanding and application of these procedures will be required by all stakeholders for ATFM/CDM to be successful. It is essential that a collaborative approach is taken when agreeing new work practices and ensuring comprehensive communications and training is delivered to all stakeholders.

Cultural change

1.17 ATFM/CDM implementation requires a significant culture change in all stakeholder organisations. This culture change is required at all levels within organisations. In previous ATFM/CDM implementations, when a culture change was embraced at executive and senior management levels, the change has been effective. A change management process needs to be executed to ensure the culture change occurs. In particular, operational staff (ATCOs and pilots) are often reluctant to accept the change to a structured ATFM environment. It is essential that these groups are fully engaged and supportive of ATFM and special attention should be given to their training and education. This aspect of implementation should not be under-estimated and can be managed by education and effective change-management programs.

Benefits of ATFM/CDM implementation

1.18 The following are possible benefits derived as a result of ATFM/CDM implementation, whether Domestic or Cross-Border Regional ATFM. There are very clear advantages to the network if ATFM/CDM is conducted in accordance with a Cross-Border ConOps.

Qualitative benefits

- More timely and informed collaborative decision making which takes the entire region's requirements into consideration.
- A coordinated network ATFM approach to all air traffic flying in the region would result in a seamless, optimised, expeditious flow of traffic throughout the region.
- With the implementation of ATFM, automated and procedural communication will be implemented, benefiting not only ATFM communication, but also ATC communications.
- As ATFM develops in the region, States will be incentivised to collaborate on airspace design so as to accommodate better flows of traffic to accommodate ATM and ATFM procedures.
- Enhanced situational awareness for the region through shared information.
- As Regional ATFM matures, better planning and CDM in all phases of ATFM, including post-event analysis will occur.
- The traditional model of ATFM implementation requires only domestic traffic to adhere to the controlled times issued. The *Regional ATFM* ConOps requires all aircraft to adhere to assigned delays. Therefore, States with no domestic flights, such as Hong Kong China and Singapore, can perform demand and capacity balancing.

- In addition, if only domestic traffic is subject to ATFM measures, those aircraft can be unfairly delayed while non-participating aircraft (i.e., international flights) are not. With the Regional ATFM Concept, all traffic is expected to be subject to ATFM measures, and the delay is distributed fairly and equitably.
- Establishment of Regional ATFM will lead to enhanced information-sharing and CDM practises during events such as volcanic eruptions (as the FAA Air Traffic Control System Command Center [ATCSCC] and the EUROCONTROL Network Manager have collaborated during recent volcanic eruptions), disease, political unrest, and war.

Quantitative benefits

1.19 The aviation industry contributes significantly to State economies. In the Asia-Pacific region, the air transport sector supported 4.8 million jobs (2012) and contributed US$265 billion to the Gross Domestic Product (GDP). Oxford Economics forecasts the number of jobs supported by aviation and tourism impacts will increase by 91% by 2032.[2]

1.20 Successful Regional ATFM will optimise traffic flows by balancing demand with the available system capacity. This is achieved through the implementation of flow management measures based on an accurate prediction and assessment of demand and capacity. These flow management measures transfer existing delay to a more efficient phase of operation. Efficiency encompasses many variables but typically focuses on fuel burn savings, which are impacted by aircraft type, configuration, weight, altitude, etc. While the goal is the elimination of airborne delay, the benefit of transferring delay from the arrival phase (holding, speed control, vectoring) to ground delay for air carrier operations has resulted in an average savings of US$47 per minute in 2014. The Regional ATFM operational concept provides an additional mechanism to transfer assigned delay from the terminal area phase to the en-route phase of flight. It is estimated the benefit gained by absorbing some assigned delay more efficiently is projected to yield an average savings of US$42 per minute. Table 1 shows the possible quantitative benefits resulting from ATFM in the region.

2 ATFM	2014	2019
Regional ATFM	US$250 – $300M	US$600M – $800M
Domestic & Regional ATFM	US$660 – $810M	US$1.1B – $1.4B

Table 1. Possible quantitative benefits of Regional ATFM

1.21 A complete list of benefits can be found in **0**.

[2] Aviation Benefits Beyond Borders, Air transport Action Group, April 2014.

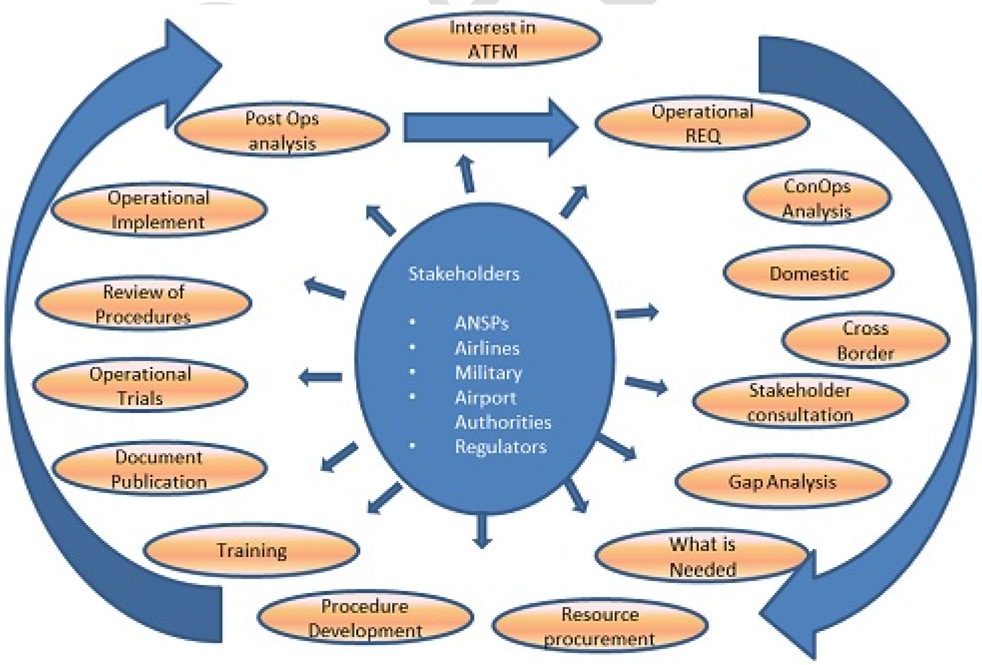
SETTING UP AN ATFM/CDM PROJECT

Requirement assessment and gap analysis assessment

2.1 ANSPs should perform an analysis of ATM operations to determine whether ATFM is required in their environment and if so, the scope of ATFM implementation, capacity enhancement initiatives must be considered in conjunction with any assessment of the requirement for ATFM. The operational requirements assessment should determine the scope of ATFM implementation; either Domestic ATFM or Cross-Border ATFM as detailed in the Regional ATFM Framework. This assessment can be carried out internally or by an external experienced agency. Once the scope of ATFM is identified, a gap analysis needs to be carried out to identify the existing baseline, technical capabilities, and implementation requirements for the State concerned.

General ATFM/CDM implementation process

2.2 A general process for ATFM/CDM implementation is presented in Figure Figure **4**. It shows the implementation process of ATFM/CDM, whether it be Domestic or Cross-Border Regional ATFM/CDM. The process commences with an interest in implementing ATFM/CDM from the Strategic phase to Post-Operational analysis with the entire process being regularly re-evaluated as requirements change. During the entire process there is continued stakeholder participation. A Cost Benefit Analysis (CBA) is not indicated; however, it should be performed.



Figure

Figure 4: Typical ATFM/CDM process

Educating and convincing all stakeholders

2.3 Most stakeholders will realise the value and benefits of ATFM/CDM implementation; however, previous implementations have shown that some stakeholders require education and to be convinced of benefits before completely accepting and becoming part of the implementation process. Programs need to be developed to educate all levels in stakeholder organisations, from operational staff to executive management. These programs could include workshops, seminars, etc. Printed and electronic media is also a valuable vehicle in educating stakeholders.

2.4 Experience shows it is imperative to get executive and senior management support. It is important to identify the correct stakeholders from the beginning of ATFM/CDM implementation and include them from the outset of ATFM/CDM implementation. Stakeholders may include but may not be restricted to the following:

1. Flow Management Units (FMUs);
2. Aircraft Operators – airlines, military, police, business aviation and general aviation;
3. Pilots;
4. Air Traffic Control (ATC) units
5. Airport authorities;
6. Adjoining ANSPs; and
7. Regulatory bodies.

Role of stakeholders

2.5 Stakeholders have distinct roles in ATFM /CDM. The following sections provide a high-level (i.e., non-exhaustive) description of their roles.

FMUs

- Daily Airport and Airspace Capacity determination
  - Demand Prediction – Flight progress is via manual input or automated data feed (e.g., ATM Automation System Flight Data Processor [FDP] or Aeronautical Fixed Telecommunications Network [AFTN])
- Capacity Management – Inputs from Flow Management Position (FMP) and Flight Operation Centre [FOC] are via ATFM web-based interface
- Assess effects of imbalance to traffic beyond capacity impact range
- Stakeholder CDM engagement

- Model Flow programs and set hourly capacity and arrival slots to ensure demand/capacity balance
- Slot assignments can be viewed via software web interface and notifications.
- Monitor effectiveness of ATFM measure and amend as required
- Provide daily post-operational analysis

Aircraft Operators

- Participate in CDM process (Telecons)
- Supplying flight updates via ATS methods or through CDM processes
- Monitor flight progress for compliance
- Manage flight delay intent and substitute flights if necessary

Pilots

- Follow ATC operational procedures when trying to achieve compliance by meeting intended delay absorption
- Communicate potential non-compliance

ATC

- Departure Airports – Monitor compliance with Calculated Take-Off Times (CTOTs)
- En-route – Aware of ATFM Measures but minimal interventions required
- Arrival phase of flight – Assist with compliance with Calculated Time Over Fix

Airport Operators

- Departure Airports – Respect ATFM-measure-affected departures and assist in meeting departure times based on Airport capacity
- Declare daily maximum allowable delay at gates

Adjoining ANSPs

- Reach agreement on Cross-Border operational procedures
- Write and sign LOAs – (Specific ATFM LOA Templates should be developed)

Regulators

- Coordinate with appropriate government body to ensure legislation supporting ICAO Document Annex 11 (Section 3.7.5, a and b) "develop and publish regulations applicable to all ATFM/CDM stakeholders, responding to this legislation."
- Ensure publication of ATFM procedures and information in the State Aeronautical Information Publication

Setting the objectives for ATFM/CDM Implementation

2.6 All ATFM/CDM partners have the common objective of providing a safe expeditious flow of traffic to Airspace Users to ultimately benefit passengers and cargo movement. To achieve this main objective, there are many supporting objectives such as:

- Enhance Safety
- Reduce fuel burn
- Reduce carbon emissions
- Increase situational awareness
- Improve predictability
- Optimise airspace and airport operations

2.7 In addition to the aforementioned objectives, Cross-Border Regional ATFM objectives include:

- Enable ATFM/CDM to be effectively implemented in States where there is insufficient domestic traffic
- Enable and apply ATFM measures to regional flights and across multiple FIRs
- Implement seamless ATFM across multiple FIRs

IMPLEMENTATION

Introduction

3.1 The ATFM baseline study indicated that all regional ANSPs, in accordance with ICAO requirements, have intentions of implementing ATFM; these initiatives vary from existing tactical ATFM measures to advanced strategic, pre-tactical, and tactical automated systems.

When should ATFM be implemented

3.2 ANSPs should have a plan for implementing ATFM, either domestically or regionally, depending on their requirement and level of maturity. Even though ANSPs may not have the operational requirement to implement ATFM domestically, they may be expected to participate in Cross-Border Regional Multi-Nodal ATFM by adhering to regionally accepted procedures, for example, ensuring that all flights subject to an ATFM measure comply with CTOT.

3.3 During the requirements analysis (detailed in section 3.3) ANSPs should ascertain when and in what form ATFM is required, and what trigger points need to be identified for implementation. For example, the trigger points could include when certain demand levels are reached which would allow the required lead time to implement the appropriate ATFM processes.

3.4 The level of an ATFM service required in each ANSP will depend on a number of factors as previously described. It is important to note that an ATFM service may be simple or complex depending on the requirements in an individual ANSPs area of responsibility. For successful implementation in the region it is important that all ATFM implementations are harmonized.

ATFM/CDM Requirements Analysis

3.5 ANSPs should perform an analysis of ATM operations to determine whether ATFM is required in their environment and if so, the scope of ATFM implementation. Factors which need to be taken into consideration during this assessment are as follows (note that this should not be construed as an exhaustive list):

- Whether demand exceeds capacity on a regular basis in either airspace or **at** airports.
- Whether there are periods of high workload on ATC followed by periods of minimal traffic.
- Whether there are initiatives to increase capacity that are in line with predicted demand.

- What is the anticipated growth in traffic movements and whether that demand will exceed resource capacity in the future.
- What are the military airspace and operational impacts on capacity of airspace.
- Whether there are significant increases in seasonal demand (holiday season) resulting in demand exceeding capacity.
- Whether airlines are experiencing increased sector times.
- Whether there are noise abatement procedures causing reduction in capacity.
- Whether there is excessive airborne holding, vectoring, speed control, and/or surface queuing.
- Whether there are capacity constraints (e.g., weather, very important person [VIP] movements, sporting events, military exercises, frequent equipage outages, political unrest, labour issues).
- Whether there are flights that depart from airfields within their area of jurisdiction to other FIRs where ATFM measures are in place.
- Participation in Cross-Border ATFM initiatives.
- What is the ratio of domestic traffic versus international and regional traffic.
- Whether there are multiple resources (airports or airspace) within the area of jurisdiction which require ATFM/CDM.
- What is the type and equipage of aircraft fleet.
- What are the Communication, Navigation, and Surveillance (CNS) capabilities of ANSP.
- Are major changes in CNS equipage changes likely to affect capacity during implementation.
- What are airport resources and processes (Airport Collaborative Decision Making [A-CDM]).

- Once the requirements are identified a gap analysis needs to be carried out to establish the existing baseline, technical capabilities, and develop ATFM implementation requirements for the State concerned.

ATFM/CDM ConOps

3.6 Once the ATFM/CDM implementation Requirements are established, the ANSP will need to develop a ConOps for its area of responsibility. This ConOps could be limited to one or be a combination the ATFM/CDM ConOps described in the following sections.

Domestic ATFM

3.7 The State may have the required number of domestic flights to make Domestic ATFM effective without including regional and international flights. As previously stated, it has been calculated that a minimum of 70% participation of flights in an ATFM program such as a Ground Delay Program (GDP) is the minimum required to gain operational and efficiency benefits. In this chosen option, only domestic flights will be subjected to ATFM measures; regional and international flights may be exempt. While a State may have enough domestic flights for ATFM to be implemented, it is advisable that a concept including regional and international flights is considered to ensure the distribution of delay is fair, equitable, and efficient.

3.8 Examples of Domestic ATFM/CDM implementations (South Africa, Australia, and Japan); have all recognised the requirement to include regional and/or international flights in ATFM measures. South Africa is considering including flights from surrounding States, and Australia is planning to include long-range flights in its ATFM program. Japan is part of the North Asia Regional ATFM Harmonisation Group (NARAHG) regional group which is considering how to develop Cross-Border ATFM/CDM in this sub region.

3.9 In APAC, ANSPs may initially implement Domestic ATFM/CDM; however, long-term plans should be to “upgrade” to Cross-Border Regional ATFM.

Key components of the Domestic ATFM/CDM concept.

- System Capability and functionality
  - ANSP independently manages demand/capacity of its own Airport(s).
  - Only domestic traffic is subject to ATFM measures.
  - Stakeholders/ANSPs communicate via Internet/Telecommunications networks.
  - CDM is performed by stakeholders via software web interfaces.
- Specify Capacity and Predict Demand
  - Demand Prediction – Flight progress is via manual input or automated data feed (e.g., FDP or AFTN).

    - Capacity Management – Inputs from FMP and FOC are via ATFM web-based interface.

- Evaluate Alternatives, Initiate/Modify ATFM Measures
    - Domestic Aircraft Operators manage the ATFM Measure delay assigned to flights.
    - Slot assignments can be viewed via software web interface and notifications.

Cross Border Regional ATFM/CDM

3.10 While it is not envisaged any state will implement a Cross Border Regional ATFM/CDM ConOps in isolation, the Cross Border Regional ATFM/CDM ConOps is explained for understanding.

3.11 A State/ANSP implements and operates a single independent ATFM/CDM system applicable to their environment which would comprise a single ATFM entity employing concepts as described in the Regional ATFM ConOps. Implementation of this concept does not require a "Node" and can be implemented by an ANSP that implements an ATFM measure for a single resource. Key components of the Cross Border Regional ATFM/CDM ConOps include:

- Regional acceptance of the APAC Regional ATFM ConOps
    - Stakeholders agree to the adoption of the APAC Regional ATFM ConOps irrespective of the ConOps adopted in their area of jurisdiction.
    - States commit to planning commitments for ATFM/CDM implementation.
    - All stakeholders commit to time lines set for APAC Cross-Border Regional ATFM implementation.
    - Agreement to a common set of procedures for departure, destination and en-route ANSPs, Airport Operators, and Aircraft Operators. Continued education of all stakeholders of the benefits, both qualitative and quantitative, of ATFM/CDM implementation. Participating ANSPs to initiate the effort to build their individual capabilities and practise ATFM in accordance to ICAO guidance to provide ATFM service
- Cross Border Regional ATFM ConOps
    - ANSP has an independent ATFM System.
    - An ANSP implements ATFM even though surrounding states have not done so.
    - ANSP independently manages demand/capacity of its own resources.
    - To achieve at least 70% flight participation, regional, international, and possibly airborne flights are required to be included in ATFM Measures.
    - Agreements with ANSPs having flights departing from their airspace to ANSPs with Cross Border Regional ATFM ConOps operating to respect CTOTs and Controlled Times Over (CTOs) as issued.
    - Implementation of this concept does not require a "Node" (as described in Cross-Border Multi-Nodal Regional ATFM/CDM).

- Agreement to a common set of procedures for departure, destination, and en-route ANSPs, Airport Operators, and Aircraft Operators.
- Participating ANSPs to initiate the effort to build their individual capabilities and practise ATFM in accordance to ICAO guidance to provide ATFM service.
- Participating stakeholders connected via Internet interfaces.
- Continued education of all stakeholders of the benefits both qualitative and quantitative of ATFM/CDM implementation.

- Specify Capacity and Predict Demand
  - Demand Prediction – Flight progress is via manual input or automated data feed (e.g., FDP or AFTN).
  - Capacity Management – Inputs from FMP and FOC are via ATFM web-based interface.
- Evaluate Alternatives, Initiate/Modify ATFM Measures
  - Aircraft Operators manage the ATFM Measures delay assigned to flights.
  - Aircraft Operators perform CDM with Airport Operators for ground/surface delay intent.

3.12 In addition to including airborne and international flights into ATFM measures, the Regional concept has a future enhancement which envisages Aircraft Operators may specify their assigned program delay to various stages of the flights; Gate, Surface (between gate and departure), or en-route. This ability for Aircraft Operators to specify their delay intent gives additional operational flexibility to achieve the same result.

<u>Cross-Border Multi-Nodal Regional ATFM/CDM</u>

3.13 A State/ANSP implements and operates an ATFM system based on the application of remote CTOT delivery impacting multiple FIRs/ sectors of airspace or airports coordinated via one single node within the country. See **Error! Reference source not found.**.

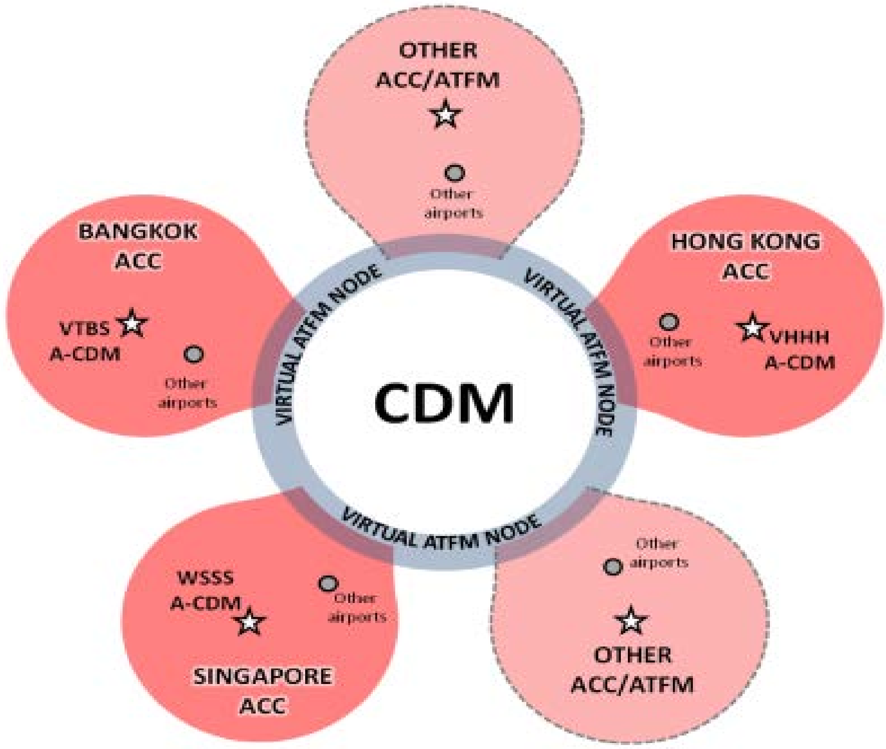


Figure 5: Distributed Multi-Nodal ATFM Network concept

3.14 In this concept, each ANSP operates an independent, virtual ATFM/CDM node (they are responsible for ATFM/CDM within their area of responsibility) supported by an interconnected information-sharing framework. The flows of air traffic will then be effectively managed based on a common set of agreed principles among the participating ANSPs and airports. A node comprising of the ANSP and associated airports will be able to manage the demand and capacity through adjustments in aircraft Calculated Landing Times (CLDTs) which will in turn generate CTOTs for particular aircraft at the departure airport.

3.15 An ANSP performs demand and capacity balancing within their own area of authority and where ATFM measures require participation of regional and international flights, the flows will be managed by the agreed coordination procedures.

Key components of the Cross-Border Multi-Nodal Regional ATFM/CDM concept

3.16 Key components of the cross-border ATFM/CDM concept, to be considered in conjunction with the Regional ATFM Conops and Regional ATFM Framework, are:

- Multi-Nodal Stakeholders interconnected via virtual communication framework
  - Each ANSP has an independent ATFM System.
  - Each ANSP independently manages demand/capacity of its own Airport(s).

- o Common agreement to share essential data for ATFM by all Multi-Nodal stakeholders.
- o Stakeholders/ANSPs communicate via existing Internet/Telecommunications networks.
- o Harmonized and integrated data exchange between all stakeholders in the Multi-nodal network.

- Specify Capacity and Predict Demand
  - o Demand Prediction – Flight progress is via manual input or automated data feed (e.g., FDP or AFTN).
  - o Capacity Management – Inputs from FMP and FOC are via ATFM web-based interface.
- Evaluate Alternatives, Initiate/Modify ATFM Measures
  - o Aircraft Operators manage the ATFM Measures delay assigned to flights.
  - o Aircraft Operators perform CDM with Airport Operators for ground/surface delay intent.
  - o Slot assignments can be viewed via software web interface and notifications.

Regulatory Aspects for ATFM/CDM Implementation

3.17 The support of the regulatory authority is critical for successful ATFM implementation. The regulator must be involved in ATFM planning an implementation at the very earliest opportunity. All ICAO and ANSP/Regulator requirements will need to be complied with prior to ATFM/CDM implementation. In addition, adherence to the Regional ATFM Framework ensuring a “seamless” ATFM/CDM process between FIRs in the region.

3.18 It will be a requirement to perform a safety assessment prior to implementation of ATFM/CDM as per ICAO Document *Annex 11* (Section 2.7).

Publication of information

3.19 ANSPs will be required to comply with normal Aeronautical Information Publication (AIP) processes to ensure the implementation of ATFM/CDM is communicated with the aviation community.

3.20 Experience shows that early and on-going communication in the form of written, workshop and training in addition to the required formal AIS process is a very important factor in gaining “buy-in”, acceptance and support from the operational stakeholder community.

It is also recommended that all stakeholders publish in-house in house education material and formal procedures for ATFM/CDM processes.

IMPLEMENTATION RISKS AND MITIGATION

General risks and mitigation of Cross-Border ATFM/CDM implementation

4.1 **Tables 2 - 14** summarise the general risks and mitigation for Cross-Border ATFM/CDM implementation.

Definition:	ANSP does not abide by regional ATFM procedures.
Result:	Aircraft departing from within the airspace of non-participating ANSPs.
Mitigation:	Education on benefits of participation for region
Probability/Impact:	Medium

Table 2: Risk 1 – Non-participation by ANSP in Regional ATFM ConOps

Definition:	Airline does not abide by Regional ATFM procedures
Result:	Aircraft are non-compliant.
Mitigation:	Urge participation by direct contact with concerned non-compliant airlines
Probability/Impact:	Medium

Table 3: Risk 2 – Non-participation by Airline in Regional ATFM ConOps

Definition:	Airport Authority does not accept ATFM concept and does not allow airlines to absorb delay at gate and on the ground either at the gate or between pushback and departure.
Result:	Aircraft unable to absorb delay on the ground and becoming non-complaint.
Mitigation:	Education and convincing airport authorities of network benefits for ATFM implementation.
Probability/Impact:	Medium

Table 4: Risk 3 – Non-participation by Airport Operator

Definition:	Cross-Border Multi-Nodal Regional ATFM/CDM is not implemented.
Result:	Safety impact of congested airspace leading to ATC/Pilot overload, inefficiencies, excessive fuel burn and carbon dioxide (CO_2) emissions.
Mitigation:	Popularise ATFM/CDM via all available means and to all possible stakeholders explaining benefits is very significant.
Probability/Impact:	High

Table 5: Risk 4 – Non-action with respect to Cross-Border Regional ATFM

Definition:	Awareness and hence commitment of one or more stakeholders is lacking during project planning or actual implementation.
Result:	Delayed or inefficient implementation.
Mitigation:	Comprehensive promoting and communication needed, early and continued benefits demonstrated at the airport to raise awareness.
Probability/Impact:	Low

Table 6. Risk 5 – ATFM/CDM awareness not sufficient amongst stakeholders

Definition:	Not adhering to functional requirements when defining system and implementation.
Result:	Implementation can be put in jeopardy, implementation may become fragmented.
Mitigation:	Basic and agreed principles and Regional ATFM procedures to be followed. The Regional ATFM Framework must be respected and maintained but can be enhanced in line with implementation maturity.
Probability/Impact:	Medium

Table 7: Risk 6 – Implementation not consistent with Cross-Border Regional ATFM principles or Regional ATFM procedures

Definition:	Stakeholders have different or even conflicting priorities and/or interests.
Result:	Difficult to convince all stakeholders to participate.
Mitigation:	Basic and agreed principles and Regional ATFM procedures to be followed. *The Regional ATFM Framework* document must be respected and maintained but can be enhanced in line with implementation maturity.
Probability/Impact:	Medium

Table 8: Risk 7 – Conflicting interests of stakeholders

Definition:	Stakeholders reluctant to release data.
Result:	Project can be put in jeopardy, implementation may become fragmented or non–consistent.
Mitigation:	Better Education and communication. Demonstrate security features.
Probability/Impact:	High

Table 9: Risk 8 – Requirement for non-disclosure

Definition:	Unforeseen withdrawal due to political, budget restrictions, changes of priority, etc.
Result:	Non-compliant operations.
Mitigation:	Relying on airline participation to meet compliance standards.
Probability/Impact:	Medium

Table 10 Risk 9 – One or more stakeholders/States withdraw from Cross-Border ATFM/CDM

Definition:	Project may be seen of less importance/priority and reduce availability of staff, finance and resources.
Result:	Slow or non-implementation.
Mitigation:	Education and convincing management of benefits of ATFM/CDM implementation.
Probability/Impact:	Medium

Table 11: Risk 10 – Insufficient cooperation/support from Airport/Airline/ANSP management

Definition:	Poor data quality or insufficient acquisition.
Result:	Unreliable project results, poor costs/benefit ratio.
Mitigation:	Education and communication, standard acronyms and definitions to be used, standard ICDs to be used.
Probability/Impact:	Medium

Table 12: Risk 11 – Data acquisition not satisfactory

Definition:	Following initial drive to consider implementation ATFM/CDM and project preparation, one or more major stakeholders decide to not participate.
Result:	Project will stall, or implementation will have reduced effectiveness.
Mitigation:	Continued collaboration and communication on benefits of regional implementation to be undertaken.
Probability/Impact:	Medium

Table 13: Risk 12 – No go decision

Definition:	Diverse systems communicate poorly or not at all.
Result:	Difficulty for uses to access CTOT, CTO and CLDT information on various ATFM systems. Loss of confidence, benefits reduced.
Mitigation:	Use standard ICD.
Probability/Impact:	Medium

Table 14: Risk 14 – Insufficient system integration

POST-IMPLEMENTATION ACTIVITIES

ATFM/CDM becomes a daily operation

5.1 ATFM/CDM, whether Domestic or Cross-Border, will become a daily operation undertaken by all the stakeholders. Successful implementation will have shown the aviation community that for the entire supply chain to succeed, all will need to participate in the CDM process. Continued momentum and active engagement will need to be maintained.

Continued education of all stakeholders

5.2 As there might be no or partial participation by some stakeholders, continued education and benefit-proving must take place to continually increase participation by stakeholders.

Preparing for new functions

5.3 For Cross-Border programs there will be varying levels of participation of ANSPs. Therefore, there is a need for ANSPs to regularly review and apply the ATFM/CDM implementation criteria to assess if their operational and ATFM requirements have changed.

TIME LINE

6.1 Aviation System Block Upgrade (ASBU) module B0-NOPS is one of the ten Regional priorities determined by APANPIRG, and is listed among the Seamless ATM Plan's highest priority ASBU modules. In the Regional ATFM Framework, regional collaborative ATFM objectives are arranged in ATFM Capability phases, aligned where practicable, with Phases I and II of the Seamless ATM Plan's Preferred Aerodrome/Airspace and Route Specification. ANSPS should develop their ATFM/CDM implementation strategy in alignment with this plan:

- **Phase IA** – expected implementation by 12 November 2015;
  - Enact regulations for the implementation of ATFM.
  - Conduct bi-annual strategic airport and airspace capacity and demand analysis.
  - Prepare for capacity demand balancing based on demand analysis.
  - Develop and distribute an ATFM Daily Plan (ADP).
- **Phase IB –** expected implementation by 25 May 2017; and
  - Analyse operational flight plan (FPL) and ATS message distribution systems.
  - Requirements for FPL to be submitted 3 hours prior to Estimated Off Block Time.
  - Integrate ATFM, AMAN/Departure Management (DMAN), and A-CDM systems through common fixes, terminology, and communication protocols.
  - Implement strategic airport slot allocation if necessary.
  - Pre-tactical modelling of expected airport and airspace configuration and capacity demand balancing.
  - Implementation, revision, or cancellation of GDPs for inbound traffic, or minutes-in-trail (MINIT) or miles-in-trail (MIT) where CTOT may not be applied.
  - Post-Operational analysis to provide feedback for procedures and processes.
- **Phase II** – expected implementation by 08 November 2018.
  - Distributed Multi-Nodal ATFM information distribution capability utilising Flight Information Exchange Model (FIXM) version 3.0 (or later) should be implemented.
  - Full interoperability of Cross-Border ATFM, A-CDM, AMAN, DMAN, ATM automation, and Airspace User systems should be implemented, utilising FIXM 3.0 (or later), to provide seamless gate-to-gate collaborative ATFM operations.
  - Implementation of pre-tactical and tactical capacity, and demand monitoring and analysis
  - Pre-tactical GDP using CTOT for capacity demand balancing measures.
  - Tactical ATFM measures including MIT, MINIT, and where necessary, CTO at the arrival fix (AFIX) or en-route Fix (RFIX), should be applied to flights throughout constrained airspace when a GDP is not implemented.

6.2 Refer to the Regional ATFM Framework document for further information on the ATFM Capability Phases and performance objectives.

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APPENDIX A - Assessment of Benefits

An interoperable network approach for the region will result in system-wide Demand Capacity Balancing. This approach enhances the safety and optimises the efficiency of airports and available airspace. As the Asia-Pacific region, the world's largest market for air transport, continues to grow, it becomes essential to optimise the use of available capacity through ATFM. In 2013, the APAC was one of the fastest growing regions by passengers in the world (see Table **15**). The region's passenger growth was 8.5%. Individual countries with notable passenger growth include: China (11.8%), Indonesia (20.4%), and Thailand (16.4%).

	Annual % Change	**Passenger Volume**
Indonesia	20.4	92,534,902
Thailand	16.4	62,831,288
China	11.8	404,174,939
Singapore	7.6	42,438,276
Malaysia	7.5	51,821,210
Japan	4.9	148,450,196
India	4.4	97,677,318
Hong Kong	3.9	44,399,060
Korea, Republic of	1.2	62,166,163
Australia	0.6	81,983,309
Asia/Southwest Pacific	8.5	1,075,572,893

Table 15: Top Passenger Countries 2013 *Source: WATS 58th edition, 1.4 Top Passenger Countries*

Throughout the Asia-Pacific region, individual States' ATM and ATFM equipment, services, procedures, airspace design, communications, and resources have a wide disparity in capabilities. These limitations often result in a less efficient operational environment. Prevalent throughout the study region are excessive MIT restrictions, fuel burn, CO_2 emissions, aircraft departure holding on the ground, airborne holding, and delays.

Weather and other system constraints increase schedule buffer, delayed flights, cancellations, and missed connections. Flight delays add costs to airlines, passengers, Airport Operators, and States. Aviation inefficiencies have trickle-down impacts on other sectors due to lost time and productivity. As traffic demand increases, delays will also increase if resource capacity is not increased.

The expectant results of an interoperable ATFM network of States will have potential benefits to airlines, passengers, Airport Operators, and States. Although we do not have any general figures for the region, our analysis identifies generic qualitative and quantitative benefits.

Qualitative Benefits

Regional Wide Benefits

Implementation of Regional ATFM will derive the following benefits:

- More timely and informed collaborative decision making, which takes the entire region's requirements into consideration.
- A coordinated networked ATFM approach to all air traffic flying in the region would result in a seamless optimised expeditious flow of traffic throughout the region.
- Presently there is little communication between the ANSPs relating to ATFM. With the implementation of ATFM, automated and procedural communication will be improved, enhancing not only ATFM communication, but also ATC communications.
- As ATFM develops in the region, States will be incentivised to collaborate on airspace design so as to accommodate better flows of traffic to accommodate ATM and ATFM procedures.
- Enhanced situational awareness for the region through shared information.
- As Regional ATFM matures, better planning and CDM in all phases of ATFM, including post-event analysis, will occur.
- The traditional model of ATFM implementation requires only domestic traffic to adhere to the controlled times issued. The *Regional ATFM Concept of Operations* requires all aircraft to adhere to controlled times. Therefore, States with no domestic flights, such as Hong Kong China and Singapore, can perform demand and capacity balancing.
- In the traditional model of ATFM implementation, only domestic traffic is subject to ATFM measures, therefore domestic traffic can be unfairly delayed while non-participating aircraft (international flights) are not. With the Regional ATFM Concept, all traffic is expected to be subject to ATFM measures, and the delay is distributed fairly and equitably amongst all traffic.
- Establishment of Regional ATFM will lead to enhanced information-sharing and CDM practices during extraordinary events such as volcanic eruptions (as the FAA ATCSCC and the EUROCONTROL Network Manager have collaborated during recent volcanic eruptions), disease, political unrest, and war.

ANSPs

- Smoother transition of DCB from strategic to pre-tactical and tactical phases of ATFM.
- Network-managed DCB brings about overall optimisation of airspace.
- Better planning due to accurate and common view of demand and capacity predictions.
- More timely and informed decision-making, taking the entire region's requirements into consideration

- Improved modelling and evaluation of proposed ATFM Measures in collaboration with stakeholders prior to implementation.
- Availability of a data platform that integrates various flight data sources and provides common situational awareness to the stakeholders.
- An environment in which ATFM Measures and other operational procedures can be improved through post-operational analysis.
- Improved special event and flexible usage of airspace planning.
- More efficient DCB at airports and in airspace.
- Optimisation and reduction of staffing. During peaks of un-metered traffic, ANSPs are often required to roster extra staff to cope with increased workloads. With metered flows of traffic, workload is reduced, therefore reducing staffing levels.
- Optimisation and allocation of resources (maintenance of equipment, Navigation Aid [NavAid] calibrations).
- Implementation of Performance-Based Navigation (PBN) procedures brings about many benefits to Airline Operators and ANSPs; however, if there is an un-metered flow of arrival or departure traffic, the effectiveness of PBN procedures could be negated. During times of high demand, ATC is required to vector aircraft off the PBN route in order to satisfy separation rules. Implementation of ATFM will ensure a steady stream of de-conflicted air traffic before entering the arrival phase, which will allow more aircraft to complete the full PBN approach and receive the maximum benefits. This results in reduced workload for the ATCOs and pilots.
- Improved safety.

Airline Operators

- Improved flexibility for Airline Operators to optimise their schedules through CDM.
- Improved flexibility for flights to absorb inevitable delay on the ground or efficiently through the en-route portion of the flight rather than by airborne holding in the terminal area.
- More reliable and timely access to information indicating stakeholder intent—this applies to Airline Operators sharing how they intend to operate the flights as well as to States and airports sharing any resource constraints.
- Reduced sector times resulting in reduction in schedule buffer times.
- Maximised benefits for aircraft with advanced avionics (PBN routings).
- Significant fuel savings.
- Significant reduction in CO_2 emissions.
- Better aircraft utilisation.
- Better passenger experience.
- Optimisation of staffing and allocation of resources.

- Improved safety.

Airport Operators

- With enhanced situational awareness of arrival and departure times, apron planners will be able to improve gate allocation, especially during constrained periods. This leads to better utilisation of ground resources (ground handling, catering, refuelling, etc.).
- Enhanced situational awareness assists the entire community in the airport precinct (passengers, immigration, customs, security, baggage handling, etc.).
- Optimisation of staffing.
- ATFM integrated with A-CDM will result in better turnaround times and on-time performance of Airline Operators.

Safety

- Standard ATM practices of separating and sequencing traffic by vectors, speed control, and airborne holding are carried out during un-metered peaks of traffic. These practices are proven safe and effective. However, during these peak periods, the workload on ATC and pilots can increase significantly, thereby reducing the margin for error. Through ATFM, a constant manageable flow of traffic is achieved, resulting in a more manageable workload and hence, a safer operation. A network approach to ATFM reduces sector/system saturation, increases efficiency, and enhances safety.
- Unstable approaches have been recognised as a causal factor in aircraft incidents. A possible cause of unstable approaches is excessive and unreasonable speed control and vectoring (late or greater than 30 degree Instrument Landing System [ILS] intercepts). With a metered flow of traffic, the requirement of ATCs to undertake excessive tactical sequencing management (vectors and speed control) is reduced with the possible result of fewer unstable approaches.
- As ATFM develops in the region, States will be forced to collaborate on airspace design so as to accommodate better flows of traffic to accommodate ATFM procedures.
- Often with the implementation of ATFM, States enhance their ability for severe weather detection. This earlier detection of weather is shared with Airline Operators and ANSPs, increasing situational awareness. In addition, this is taken into account when determining the capacity of resources, resulting in the correct ATFM measure being implemented, which can have a direct impact on safety.
- Communication networks will improve between States with ATFM implementation so as to accommodate CDM. A resultant benefit will be reduced coordination errors, which leads to enhanced safety.

Quantitative Benefits

The aviation industry contributes significantly to State economies. In the Asia-Pacific region, the air transport sector supported 4.8 million jobs (2012) and contributed US$265 billion to the Gross Domestic Product (GDP). Oxford Economics forecasts the number of jobs supported by aviation and tourism impacts will increase by 91% by 2032.[3]

A University of Westminster study comprehensively addresses European airline delay costs (passenger, crew, fuel, maintenance, reactionary). This study derived the average cost of delay to be US$103 per minute in 2010.4 Aviation impacts also have a trickle-down impact on other sectors due to lost time and productivity.

Successful ATFM is the optimisation of flows of traffic by balancing demand with the available system capacity. This is achieved through the implementation of flow management measures based on an accurate prediction and assessment of demand and capacity. These flow management measures transfer existing delay to a more efficient phase of operation. Efficiency encompasses many variables but typically focuses on fuel burn savings, which are impacted by aircraft type, configuration, weight, altitude, etc. While the goal is the elimination of delay, the benefit of transferring delay from the arrival phase (holding, speed control, vectoring) to ground delay for air carrier operations has resulted in an average savings of US$47 per minute in 2014. The Regional ATFM operational concept provides an additional mechanism to transfer assigned delay from the arrival phase to the en-route phase of flight. It is estimated that the benefit gained by absorbing assigned delay more efficiently is projected to yield an average savings of US$42 per minute.

Based on the IATA project team's understanding of the current (2014) Asia Pacific operating environments, publicly available and confidential assessments, a model was created to estimate fuel savings for Domestic and Regional ATFM within the Asia-Pacific region. The model assumes that under current 2014 air traffic demand and capacity, ATFM measures will be implemented, on average throughout the region, during 1.5–2 days per week. Air traffic demand in Asia Pacific is expected to grow significantly in the next five to ten years. While the growth is predicted to increase by approximately 5.5–6% annually, such an increase in demand would eventually lead to unsustainable levels of congestion and delay within the region's airport and airspace operating environments until capacity enhancements are operationally available. Based on the projected growth in the 2015–2019 timeframe, the model assumes that the frequency of ATFM measures will increase as well, on average to 2–2.5 days per week, until capacity enhancements are operationally available. Error! Reference source not found.**Table A1** summarises the projected quantitative benefits from ATFM in 2014 and in 2019.

[3] Aviation Benefits Beyond Borders, Air transport Action Group, April 2014.
[4] European airline delay cost reference values Final Report (version 3.2), University of Westminster, March 2011.

	2014	2019
Regional ATFM	US$250 – $300M	US$600M – $800M
Domestic & Regional ATFM	US$660 – $810M	US$1.1B – $1.4B

Table A1: Asia/Pacific Annual Fuel Savings Benefit Projection

Capitalising on this benefit opportunity through the network-based Asia Pacific Regional ATFM implementation is particularly important in the following airport operating environments, where international arrival traffic accounts for 35–100% of the total demand (an indication that Domestic ATFM deployments alone are not practical for demand capacity balancing at these airports):

- China - Shanghai Pudong International
- Indonesia - Ngurah Rai International
- Hong Kong - Hong Kong International
- Japan - Narita International
- South Korea - Incheon International
- Malaysia - Kuala Lumpur International
- Philippines - Ninoy Aquino International
- Singapore - Changi International
- Taiwan - Taiwan Taoyuan International
- Thailand - Suvarnabhumi Bangkok International
- Vietnam - Tan Son Nhat International and Nội Bài International

Within the remainder of the major Asia Pacific airport operating environments, international arrival traffic currently accounts for 20–30% of the total demand. Achieving the benefit of fuel savings in these environments is supported by Domestic ATFM deployments and enhanced through the Regional ATFM implementation.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC SEAMLESS ATM PLAN

Version 2.0, September 2016

This Plan was developed by the Asia/Pacific Seamless ATM Planning Group (APSAPG) and amended by APANPIRG

Approved by APANPIRG/27 and published by the
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CONTENTS

SCOPE OF THE PLAN

Plan Structure

1.1 The Seamless Air Traffic Management (ATM) Plan (hereinafter referred to as the 'Plan') references different levels. At the upper level is a global perspective, which is guided mainly by references to the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global ATM Operational Concept* (Doc 9854) and the *Global Aviation Safety Plan* (GASP). Beneath this level is regional planning primarily provided by this Plan and other guidance material, in order to define goals and means of meeting State planning objectives, such as:

- Asia/Pacific Regional Air Navigation Plan (RANP, Doc 9673) objectives;
- the Seamless ATM performance framework, with a focus on technological and human performance within Aviation System Block Upgrade (ASBU) Block 0 elements, non-ASBU elements (mainly emanating from the Concept of Operations – CONOPS, which is regional guidance material endorsed by APANPIRG/22), and civil/military cooperation elements;
- a deployment plan with specific operational improvements, transition arrangements, expected timelines and implementation examples; and
- an overview of financial outcomes and objectives, cross-industry business and performance/risk management planning.

1.2 The Plan incorporated the Asia/Pacific Air Traffic Flow Management (ATFM) Concept of Operations and the Asia/Pacific Air Navigation Concept of Operations (both hereinafter referred to as 'CONOPS'), and the Asia/Pacific PBN Plan, superseding these documents.

1.3 The RANP is expected to incorporate key components of this Plan and information on the mechanisms that enable these objectives to be met. High-level support may be necessary from regional bodies that can effectively support the Plan's implementation, such as the:

- Association of Southeast Asian Nations (ASEAN);
- Asia Pacific Economic Cooperation (APEC); and
- South Asian Association for Regional Cooperation (SAARC).

1.4 The Plan does not use 'continental', 'remote' and 'oceanic' areas to refer to an assumed geographical application area, as many Asia/Pacific States have islands or archipelagos that can support a higher density of Communications, Navigation, Surveillance (CNS) systems than in a purely 'oceanic' environment. In accordance with the CONOPS that air navigation services should be provided commensurate with the capability of the CNS equipment, it is important to categorise airspace in this manner, and simplify the numerous references to this capability throughout the Plan. Thus the Plan categorises airspace by reference to its CNS (Communications, Navigation and Surveillance) 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 direct (not dependent on a Communication Service Provider (CSP) ATS communications and surveillance; or

c) Category T: terminal operations serviced by direct ATS communications and surveillance.

1.5 The word 'States' in the Plan includes Special Administrative Regions and territories.

1.6 The Seamless ATM Plan is expected to be implemented in two phases. Neither phase, nor any element is binding on any State, but should be considered as a planning framework. The Seamless ATM Plan itself is therefore guidance material.

1.7 It was important to note that the Plan's Phase commencement dates are planning targets, and should not be treated like a 'hard' date such as the implementation of Reduced Vertical Separation Minimum (RVSM). In this case, there was a potential major regional problem if all States did not implement at the same time by the specific agreed date, which was clearly not the case for the start of the Plan's Phase I or II.

1.8 In that regard, although it would be ideal if all States achieved capability on day one of Phase I, this was probably not realistic. However States should consider the impact on stakeholders and improving capacity of the ATM system overall by not achieving target implementation dates. The draft Phase dates were chosen as being an achievable target for the majority of States. However the dates were not designed to accommodate the least capable State, otherwise the region as a whole would fall behind the necessary urgent ATM improvements required by the Director's General of Civil Aviation and APANPIRG.

1.9 **Appendix F** provides a map of ASBU Elements to Plan references.

<u>Plan Review</u>

1.10 The Plan needs to be updated to take into account ASBU Block 1, 2 and 3 modules, when these modules and their associated technology become mature.

1.11 Periodic updates to the Plan are also required in respect of the economic information contained therein.

1.12 As an iterative process, the Plan requires regular updating to keep current with aviation system changes. It is intended that APANPIRG and its contributory bodies conduct a complete review every three years (or a shorter period determined by APANPIRG) of the Plan to align with the review cycle of the GANP. The Plan and its subsequent revisions should be endorsed by APANPIRG.

1.13 Review of the Navigation and Surveillance strategies needs to result in the update to the Seamless ATM Plan to ensure consistency.

1.14 Current review of the Plan 2016, extends the expected implementation date of phase II PARS and PASL items by one year to 07 November 2019, which aligns with the GANP Block 1 implementation. Moreover new ASBU Block 1 elements are added to Phase II: B1-ACDM, B1-SURF, B1-RSEQ, B1-CDO, B1-TBO (only DCL) and B1-NOPS. In addition, new regional items were identified and added: B1-SAR, Ballistic rocket launches/space re-entry management planning, Voice communications over IP between ATS units (VoIP), Common aeRonautical Virtual private network (CRV), Airport Master Plan.

1.15 The planned 2019 review of the Plan will introduce new ASBU Block 1 modules: B1-SWIM, B1-DATM, B1-TBO, B1-RPAS, B1-SNET, B1-FICE, B1- APTA, B1-AMET, B1-WAKE, B1-ASEP. The phase III and phase IV of PARS and PASL implementation framework will be created.

PLAN OBJECTIVES AND DEVELOPMENT

Plan Objective

2.1 The objective of the Plan is to facilitate Asia/Pacific Seamless ATM operations, by developing and deploying ATM solutions capable of ensuring safety and efficiency of air transport throughout the Asia/Pacific region. The Plan provides a framework for a transition to a Seamless ATM environment, in order to meet future performance requirements.

2.2 The Plan provides the opportunity for the Asia/Pacific region to adopt the benefits from research and development conducted by various States including the NextGen programme (United States of America), the European Single European Sky ATM Research (SESAR), and Japanese Collaborative Actions for Renovation of Air Traffic Systems (CARATS).

2.3 ICAO Doc 9854 contains a vision of an integrated, harmonized, and globally interoperable ATM System, with a planning horizon up to and beyond 2025. In this context, the Plan is expected to encourage more partnering relationships among States within sub-regions.

Hierarchy of Plans

2.4 The Plan was developed as part of a suite of Asia/Pacific air navigation plans, and thus, the Plan should not be considered in isolation. The Regional Air Traffic Flow Management (ATFM), Framework, Asia/Pacific ATM Contingency Plan and Asia/Pacific Search and Rescue (SAR) Plan all form part of the aforementioned suite of planning and guidance material connected to the Plan (**Figure 1**).

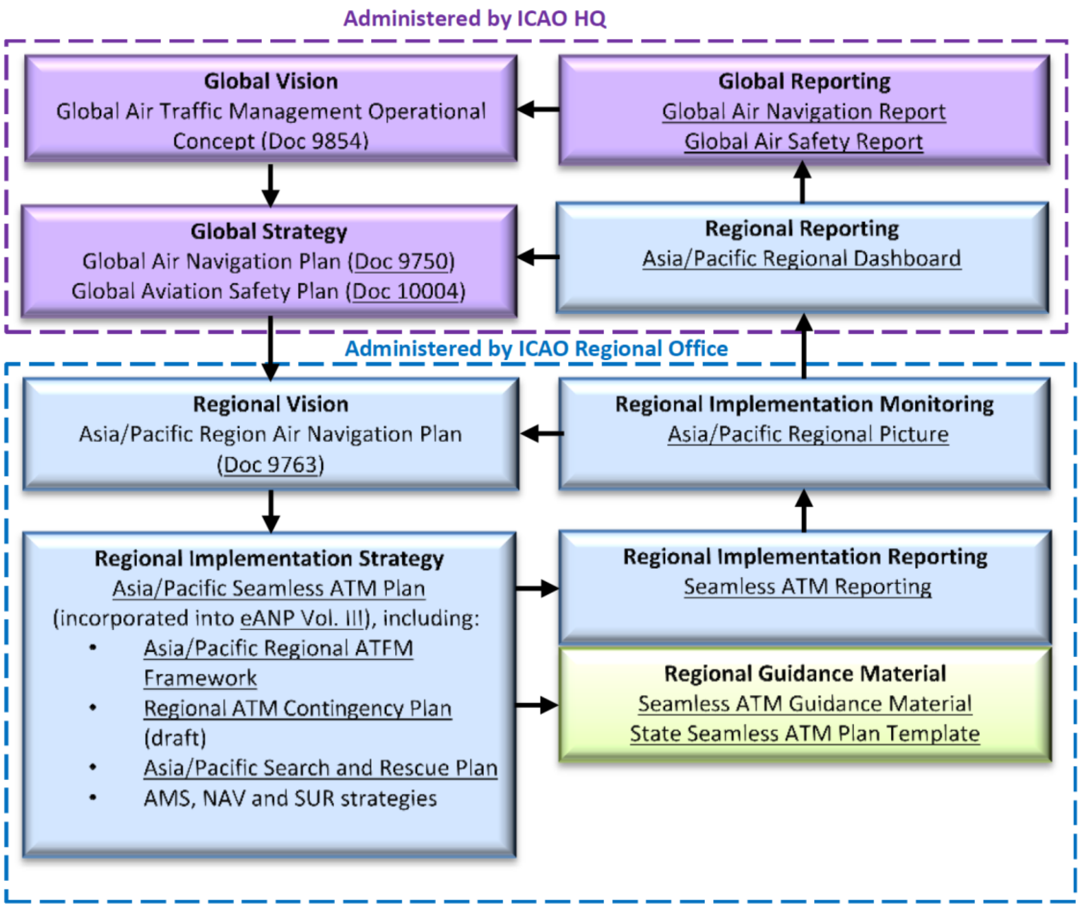


Figure 1: Structure of Global and Regional Planning and Reporting

2.5 This Plan addresses the full range of ATM stakeholders, including civil and military Air Navigation Services Providers (ANSPs), civil and military aerodrome operators as well as civil and military airspace users. The Plan has been developed in consultation with Asia/Pacific States, administrations and also with International Organizations (IO).

Note: civil airspace users include scheduled aviation, business aviation and general aviation.

2.6 States should consult with stakeholders and determine actions, in order to commit to achieving the objectives of Seamless ATM and the requisite performance objectives in the areas of safety, environment, capacity and cost-efficiency that flow from this Plan.

2.7 ASBU Block 0 modules contain technologies, systems and procedures which are expected to be available from 2013. However, the Plan also has references to ASBU Block 1, 2 and 3 modules, which are expected to be available from 2019, 2025 and 2031 respectively. Where such technology, systems, standards and procedures are available earlier than these dates and appropriate deliverables can be provided, the intention was to develop aggressive yet practical implementation schedules within this Plan in order to provide the earliest possible benefits.

2.8 The ICAO *Manual on Global Performance of the Air Navigation System* (ICAO Doc 9883) provides guidance on implementing a performance-oriented ATM System. The *Manual on ATM System Requirements* (ICAO Doc 9882) contains eleven Key Performance Area (KPA) system expectations, as well as a number of general performance-oriented requirements. In accordance with the expectations of these documents, the APSAPG developed the following performance objectives to facilitate Seamless ATM operations:

a) Preferred Aerodrome/Airspace and Route Specifications (PARS); and

b) Preferred ATM Service Levels (PASL).

2.9 The PARS/PASL introduced two Performance Objectives, which incorporate system expectations, such as general performance-oriented requirements. Each performance objective is composed of a list of expectations of different aspects of the aviation system.

2.10 In considering the planning necessary before the PARS/PASL Phase dates, it is important to ensure everyone in the planning process is aware that the necessary groundwork and capability building must take place as a priority, and that full operational capability by the Phase date commencement was a secondary consideration. It is recognised that it is possible a number of States would be working towards implementation during Phase I, in an effort to implement as soon as possible. Therefore it is considered that States in this position should not be identified as ‘deficient’ in regard to applicable elements.

2.11 Prior to implementation, each State should verify the applicability of PARS and PASL by analysis of safety, ATM capacity requirements to meet current and forecast traffic demand, efficiency, predictability, cost effectiveness and environment to meet the expectations of stakeholders. The PARS/PASL elements would be either:

a) not applicable; or

b) already implemented; or

c) not implemented.

2.12 The PARS and PASL are expected to be implemented in three phases, Phase I by 12 November 2015, Phase II by 07 November 2019, and Phase III by 01 December 2022. Recognising the economic and environmental costs associated with delay of system improvement using technologies available today, Phase I was considered to be the earliest date possible for ASBU elements and other non-ASBU elements, which mainly involved procedural changes and human training.

2.13 The PARS contain the expectations for airspace and ATS routes, including aircraft equipage to facilitate Seamless ATM operation, and is therefore a matter for the State regulator or the airspace authority, and is of primary interest to airspace planners, flight procedure designers and aircraft operators.

2.14 The PASL contain the expectations for Air Navigation Service Providers (ANSP), and is therefore a matter for the State regulator or the ATS authority. The PASL is of primary interest to ANSPs and aircraft operators. The PARS and PASL together form the foundation of Seamless ATM development, and as such should be enabled by national regulations, rules and policies wherever applicable to enable a harmonised effort by all stakeholders.

Seamless ATM Definition

2.15 The objective of Seamless ATM was agreed by the Asia/Pacific Seamless ATM Planning Group (APSAPG) as follows:

> *The objective of Seamless ATM is the safe and interoperable provision of harmonized and consistent air traffic management service provided to a flight, appropriate to the airspace category and free of transitions due to a change in the air navigation service provider or Flight Information Region.*

2.16 The APSAPG noted the following description as the CANSO definition of Seamless ATM:

> *Seamless ATM operations is defined as ATM operations in contiguous airspace that is technically and procedurally interoperable, universally safe, and in which all categories of airspace users transition between Flight Information Regions, or other vertical or horizontal boundaries, without requiring a considered action to facilitate that transition and without any noticeable change in:*
>
> *1) Type or quality of service received;*
>
> *2) Air navigation and communications performance standards; and*
>
> *3) Standard practices to be followed.*

2.17 The ICAO Twelfth Air Navigation Conference (AN-Conf/12, Montreal, 19-30 November 2012) endorsed 10 High Level Air Navigation Policy Principles in the GANP, and the Asia/Pacific Seamless ATM Principles are aligned with these high level principles.

EXECUTIVE SUMMARY

Seamless ATM

3.1 ICAO data indicates that the Asia/Pacific Region in 2011 was the busiest in the world in terms of Passenger Kilometres Performed (PKP): 1,496 billion compared to 1,434 for North America and 1,385 for Europe, with growth rates of 8.0 - 8.8%, 2.3 - 3.5% and 4.2 - 4.8% over the 2012-2014 period respectively. In 2015 Asia/Pacific accounted for the highest share of the world capacity offered, and grew by +5.9%. In 2012, the Asia/Pacific region had the largest regional market share of total domestic and international Revenue Passenger Kilometres (RPK) at 30%, compared to 27% for both Europe and North America. **Figure 2, Figure 3** and **Figure 4** indicating the projected air traffic growth which has necessitated the Seamless ATM approach.

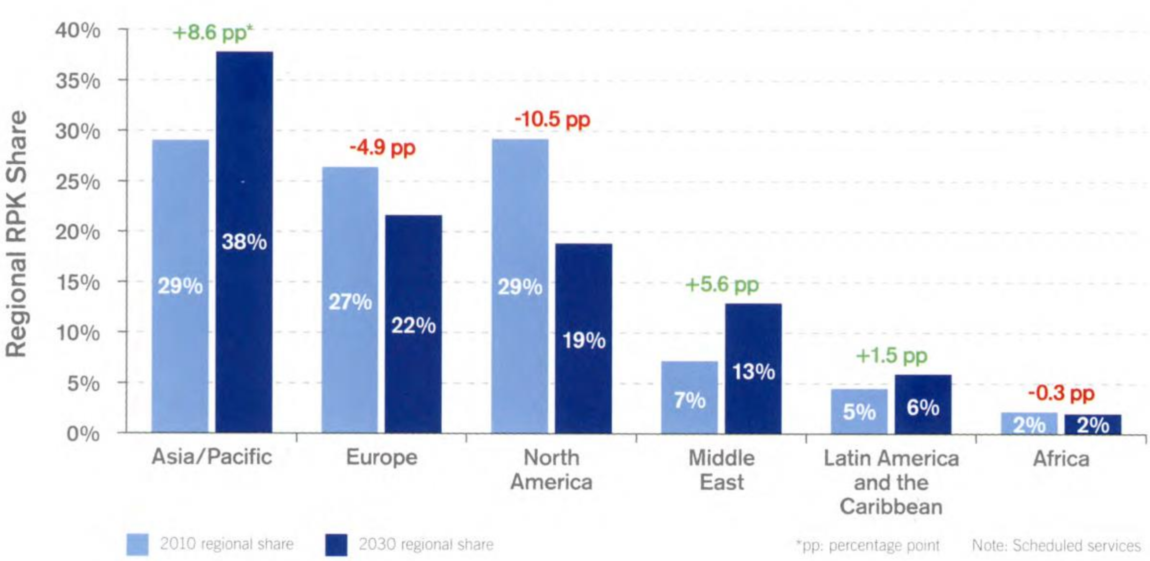


Figure 2: Regional Share of passenger traffic by airline of registration 2030 versus 2010

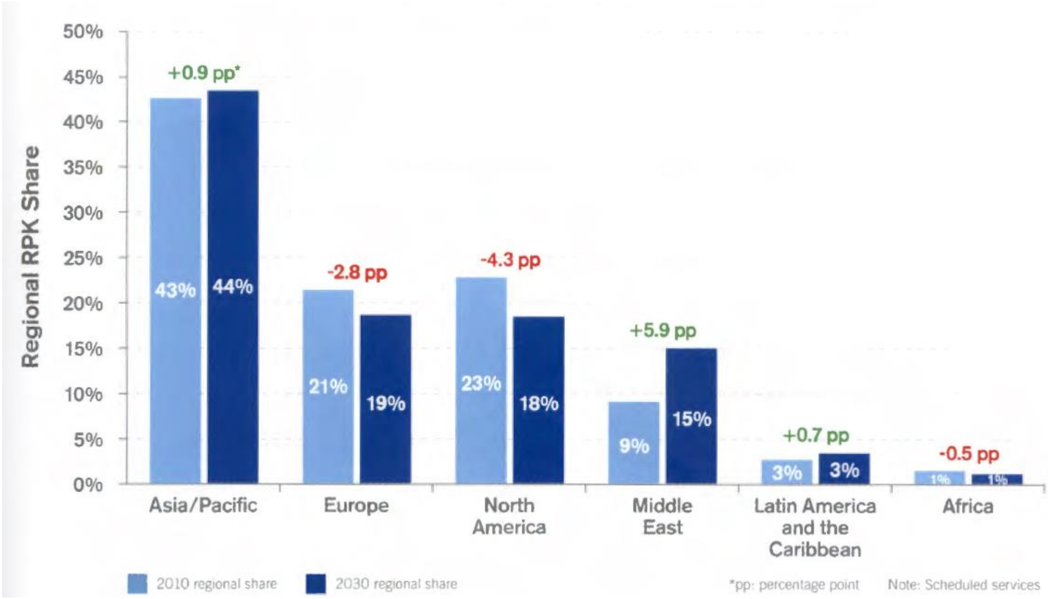


Figure 3: Regional Share of air cargo traffic by airline of registration 2030 versus 2010

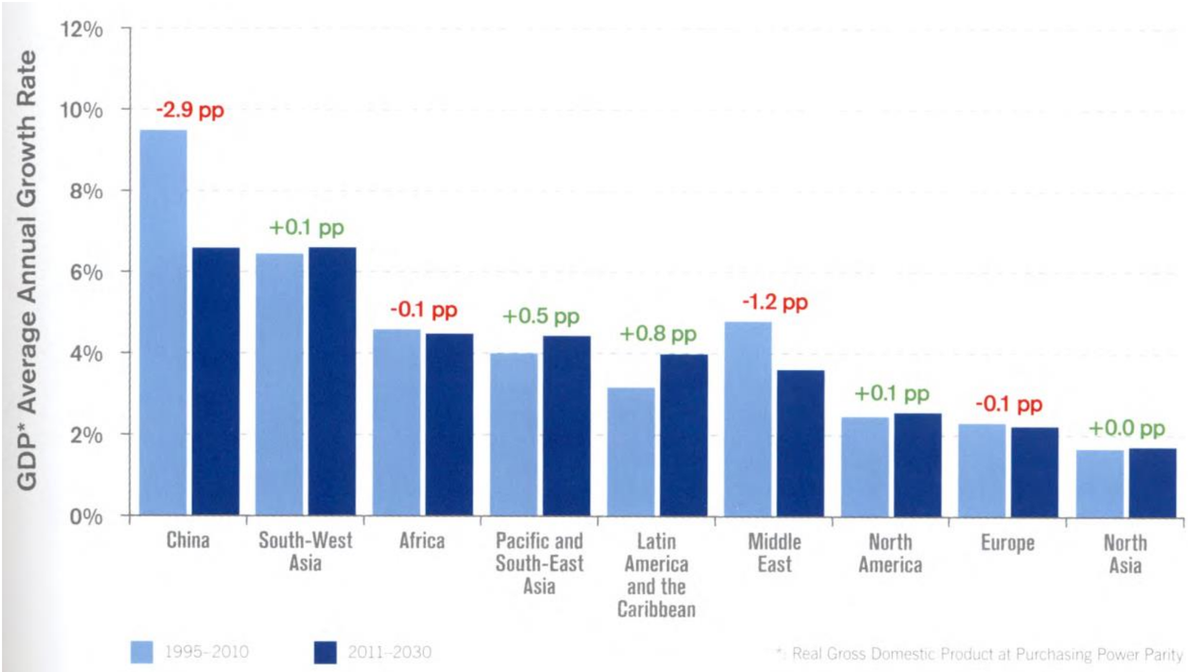


Figure 4: Regional economic growth: history and forecast

3.2 The 46th Directors General Civil Aviation (DGCA) Conference (Osaka, October 2009) was the genesis of Asia/Pacific Seamless ATM discussion, endorsing the Kansai Statement (**Appendix A**). The DGCA Conference requested the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) to take a lead role in development of Seamless ATM in the Asia/Pacific region.

3.3 The ICAO Asia/Pacific (APAC) Seamless ATM Symposium and Ad Hoc Meeting (Bangkok, Thailand, 15 to 17 August 2011) developed:

a) proposed APSAPG objectives;

b) draft Seamless ATM principles;

c) civil/military cooperation Seamless ATM aspects;

d) the requirement for ASBUs to form a key part of Seamless ATM planning; and

e) the requirement for a capabilities matrix to provide a target and means of progressing to the Seamless ATM objectives.

3.4 APANPIRG/22 created the APSAPG in 2011 under Decision 22/56, with a primary goal to develop an Asia/Pacific Seamless ATM Plan.

3.5 The Global Air Navigation Industry Symposium (GANIS, Montréal, 20-23 September 2011) introduced the ASBU concept. This inferred an iterative improvement, from Block 0 (zero) to 3. Although the implementation of all ASBU elements is not mandatory, it is intended to achieve the highest level of conformance; thus supporting global interoperability and Seamless ATM.

3.6 Subject to several recommendations (**Appendix B**), the AN-Conf/12 endorsed the ASBU concept and the consequential changes to the GANP. The AN-Conf/12 stressed that ASBU Block 0 implementation and requirements needed to be coordinated at a regional level based on operational requirements, and that action plans to address identified impediments to ATM modernization should be developed. This Plan is part of the Asia/Pacific strategy to address the requirement for action plans, and to guide Asia/Pacific administrations in their ATM planning.

Air Navigation Service Provider Summary

3.7 The safety and efficiency of flights transcend national borders and airspace boundaries. Seamless ATM is therefore possible only if there is close regional collaboration among States, their ANSPs and all stakeholders. Cooperation is the key to success.

3.8 Given the size and diversity of the region, ATM harmonisation efforts will require the needs of the least developed ANSPs to be addressed especially in the areas of technical assistance such as funding, expertise and training. Differences in economic development may also mean that traffic demands are not uniform in the region, and therefore ATM solutions should be driven by performance requirements appropriate to the traffic demands.

Aerodrome Operator Summary

3.9 Aerodrome operations are a key component for Seamless ATM, especially in regard to infrastructure and operational efficiencies. The collaborative interaction of various stakeholders is important to ensure that aerodrome operations, facilities and equipment are suitable for all aircraft operators. Aerodrome operators require the airspace, ATM, aerodrome and aircraft operations to be cohesive and interoperable. This includes not only the aerodrome movement areas but the terminal and ancillary services, which may include border protection, fuel, baggage and passenger facilitation, which need to be aware of the interaction of their services with the aircraft operations.

3.10 Short, medium and long term aerodrome planning needs to take into account the seamless system so that capital investment is aligned to ATM operational efficiencies. Aerodrome development and airline changes are catalysts for changes driven by the aerodrome operator, but there is a need to ensure enroute and terminal ATS efficiencies are not impacted or lost, due to poor aerodrome infrastructure and operations. A saving in aircraft flight time can easily be eroded by lack of gates, poor taxiway-runway interface and inadequate terminal facilities. Stakeholder involvement and infrastructure changes needs to be coordinated to maximise the efficiencies from a systemic approach to aerodrome, airspace, air traffic management and aircraft operations.

ABBREVIATIONS AND ACRONYMS

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

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

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

BACKGROUND INFORMATION

Principles

5.1 There were considered to be three major areas of Seamless ATM Principles, involving People (human performance), Facilities (physical equipment), and Technology and Information. The 37 Principles agreed by APSAPG and endorsed by APANPIRG are included as **Appendix C**.

Aviation System Block Upgrade (ASBU)

5.2 At the Global level, ICAO started the ASBU initiative as a programme framework that developed a set of aviation system solutions or upgrades intended to exploit current aircraft equipage, establish a transition plan and enable global interoperability. ASBUs comprised a suite of modules organised into flexible and scalable building blocks, where each module represented a specific, well bounded improvement. The building blocks could be introduced and implemented in a State or a region depending on the need and level of readiness, while recognizing that all the modules were not required in all airspaces. ASBUs described a way to apply the concepts defined in the Doc 9854 with the goal of implementing regional performance improvements, and were used in the new edition of the GANP to guide implementation. AN-Conf/12 agreed that the ASBUs and the associated technology roadmaps were integral parts of the GANP and a valuable implementation tool kit.

5.3 ICAO estimated that US$120 billion would be spent on the transformation of air transportation systems in the next decade. While NextGen and SESAR accounted for a large share of this spending, parallel initiatives were underway in many areas including the Asia/Pacific region, North and Latin America, Russia, Japan and China. ATM modernization is a very complex but necessary task, given the benefit of these initiatives as traffic levels increased. It is clear that to safely and efficiently accommodate the increase in air traffic demand — as well as respond to the diverse needs of operators, the environment and other issues, it is necessary to renovate ATM systems, in order to provide the greatest operational and performance benefits.

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

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

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

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

Asia/Pacific ASBU Implementation

5.6 ASBU Block 0 modules were incorporated into the Seamless ATM framework used to assess the uptake by Asia/Pacific States.

5.7 **Table 1** provides a summary of the Block 0 and 1 elements, and the expected priority for implementation within the Asia/Pacific region as discussed and agreed by APSAPG/2 (Tokyo, 6-10 August 2012). The allocation of priority was based on factors including its importance in promoting Seamless ATM (Priority 1 = critical upgrade, Priority 2 = recommended upgrade, Priority 3 = may not be universally implemented). A cost-benefit or economic analysis before implementation was identified as essential to determine whether to implement B0-SURF, B0-ASUR and B0-ACAS, but should not preclude an economic analysis of other elements as determined by the State.

5.8 The priorities were updated in accordance with input from the APANPIRG Chair's Meeting which recognised B0-APTA as a regional priority, and the Regional Aviation Safety Group, which agreed that B0-SNET B0-ACAS and B0-AMET were critical safety barriers for Control Flight into Terrain (CFIT), Runway Safety (RS) and Loss of Control (LOC).

PIA	**Element**	**Economic Analysis**	**Priority**
PIA 1	B0-APTA Optimization Of Approach Procedures Including Vertical Guidance	-	1
	B0-ACDM Improved Airport Operations Through Airport-Collaborative Decision-Making (A-CDM)	-	2
	B1-ACDM Enhanced Airport CDM	-	2
	B0-RSEQ Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN)	-	2
	B1-RSEQ Improved Airport Operations: through Departure, Surface and Arrival Management.	-	2
	B1-SURF Enhanced Safety and Efficiency of Surface Operations – SURF, SURF-1A and Enhanced Vision System (EVS).	-	2
	B0-SURF Safety and Efficiency Of Surface Operations (A-SMGCS)	Yes	3
	B0-WAKE Increased Runway Throughput Through Optimized Wake Turbulence Separation	-	3
PIA 2	B0-FICE Increased Interoperability, Efficiency And Capacity Through Ground-Ground Integration (AIDC)	-	1
	B0-DATM Service Improvement Through Digital Aeronautical Information Management	-	1
PIA 3	B0-FRTO Improved Operations Through Enhanced En-Route Trajectories (CDM, FUA)	-	1
	B0-NOPS Improved Flow Performance Through Planning Based On A Network-Wide View	-	1
	B1-NOPS Enhanced Flow Performance through Network Operational Planning.	-	1
	B0-ASUR Initial Capability For Ground Surveillance	Yes	1
	B0-ACAS ACAS Improvements	Yes	1
	B0-SNET Increased Effectiveness Of Ground-based Safety Nets	-	1
	B0-AMET Meteorological Information Supporting Enhanced Operational Efficiency and Safety	-	1

	B0-SAR[1] Enhanced Search and Rescue Provisions	-	1
	B0- ASEP Air Traffic Situational Awareness (ATSA)	-	2
	B0-OPFL Improved Access To Optimum Flight Levels Through Climb/Descent Procedures Using Automatic Dependent Surveillance – Broadcast (ADS-B)	-	3
PIA 4	B0-TBO Improved Safety And Efficiency Through The Initial Application Of Data Link En-Route	-	1
	B1-TBO Improved Traffic synchronization and Initial Trajectory-Based Operation	-	1
	B0-CDO Improved Flexibility And Efficiency In Descent Profiles (Continuous Descent Operations - CDO)	-	2
	B1-CDO Improved Flexibility and Efficiency in Continuous Descent Profiles (CDOs) using VNAV	-	2
	B0-CCO Improved Flexibility And Efficiency Departure Profiles - Continuous Climb Operations (CCO)	-	2

Table 1: Asia/Pacific ASBU Block 0 Priority

Critical ASBU Upgrades

5.9 The following ASBU Block 0 elements were considered by APSAPG and endorsed by APANPIRG as critical upgrades for Seamless ATM, and thus should be accorded the highest priority in terms of the earliest implementation and the resources required to support this.

Note: This did not suggest that 'critical' elements had a higher priority than safety critical improvements.

5.10 **B0-FRTO** *Enhanced En-route Trajectories*: Flexible Use Airspace (FUA), User Preferred Routes (UPR), Dynamic Airborne Re-route Planning (DARP) and CDM. These will allow the use of airspace which would otherwise be segregated, along with flexible routing adjusted for specific traffic patterns for greater routing possibilities, reducing flight time and fuel burn.

5.11 **B0-FICE** Ground – Ground Integration and Interoperability: ATS Inter-facility Data Communications (AIDC). AIDC application exchanges information between ATS units in support of critical ATC functions, including notification of flights approaching a Flight Information Region (FIR) boundary, coordination of boundary-crossing conditions, and transfer of control. AIDC application improves the overall safety of the ATM system, as well as increasing airspace capacity, as it permits the controller to simultaneously carry out other tasks.

5.12 **B0-DATM** *Digital Aeronautical Information Management* (AIM). AIM is one of the foundation elements that supports other aspects of ASBU, and as such requires a high priority. A key strategy activity during Block 0 may include the development of the System-Wide Information Management (SWIM) concept of operations to support the next phase of AIM development and integration within the future SWIM framework.

5.13 **B0-NOPS** *Network Flow Management* ATFM: ATFM is used to balance demand and capacity to manage the flow of traffic in a manner that minimises delay and maximises the use of the available airspace. ATFM is one of the solutions to ensure a sustainable air traffic growth for the future. Inter-linked and networked ATFM nodes between ANSPs should be developed to serve various sub-regions (refer Doc 9971 *Manual on Collaborative Air Traffic Flow Management*).

[1] B0-SAR is not included in ICAO Global Air Navigation Plan ASBU Framework

5.14 **B1-NOPS** *Enhanced Flow Performance through Network Operational Planning*. Introduces enhanced ATFM processes to improve the overall flow. The main improvement is the increased collaboration among stakeholders in real-time regarding use preferences and system capabilities. This results in better use of airspace with positive effects on the overall cost of ATM.

5.15 **B0-TBO** *En-route Data-link*: Automatic Dependent Surveillance-Contract (ADS-C), Controller Pilot Data-link Communications (CPDLC). Data-link application for ATC surveillance and communications supports flexible routing, reduced separation and improved safety. In areas where the provision of direct ATS surveillance is possible, ATC separation should be based on these surveillance systems (i.e. radar, multilateration and ADS-B), and that ADS-C and CPDLC with backup provided by High Frequency (HF) and/or Satellite Voice Communications (SATVOICE) were necessary elsewhere. Moreover, the Regional Surveillance Strategy states that ADS-C should be used where technical constraint or cost benefit analysis did not support the use of Automatic Dependent Surveillance-Broadcast (ADS-B), SSR or Multilateration (MLAT).

5.16 **B1-TBO** Improved Traffic synchronization and Initial Trajectory-Based Operation Improves the synchronization of traffic flows at en-route merging points and to optimize the approach sequence through the use of 4DTRAD capability and airport applications: DCL, D-TAXI. Trajectory Based Operations (TBO) are based on:

- **B1-RSEQ** (*extended arrival metering, integration of surface management with departure sequencing*);
- **B1-NOPS** (*integrated ATFM including airspace management, user driven prioritisation and collaborative ATFM solutions*);
- **B1-TBO** (*synchronisation of traffic flows at merge points through controlled time of arrival capability and airport applications such as D-TAXI*); and
- **B1-AMET** (*Enhanced Operational Decisions through Integrated Meteorological Information – Planning and Near-Term Service*).

5.17 **B0-ASUR** *Ground-Based ATS Surveillance*: ADS-B, MLAT. The Regional Surveillance Strategy stated that ADS-B should be used to support ATC separation service, while reducing dependence on Primary Radar for area surveillance and reliance on 4-digit SSR octal codes. ADS-B technology is an initial step in creating a more flexible air transportation system that will create seamless surveillance and shared situational awareness picture for both ground and air operations. Recommendation 1/7C adopted by the AN-Conf/12 urged States to share ADS-B data to enhance safety, increase efficiency, achieve seamless surveillance and work closely together to harmonize their ADS-B plans to optimize benefits. The provision of communication capability such as Very High Frequency (VHF) to support ATS surveillance is also necessary. Furthermore, APANPIRG/22 urged States to support provision of Very High Frequency (VHF) radio voice air/ground communication infrastructure for use by adjacent States to enable a reduction of ATS separation based on surveillance.

Recommended ASBU Upgrades

5.18 **B0-CDO** *Improved Flexibility and Efficiency in Descent Profiles* CDO and Standard Instrument Arrival (STAR). These arrival procedures allow aircraft to fly their optimum profile, taking into account airspace and traffic complexity by utilising Area Navigation (RNAV) and Required Navigation Performance (RNP) Standard Instrument Departures (SIDs) and STARs. This element has been accorded a high priority by ICAO HQ, due to the improvement in safety regarding Controlled Flight into Terrain (CFIT) and greater efficiency in terms of fuel usage and emissions.

Note: the terms 'Standard Terminal Arrivals' and 'Standard Instrument Arrival' from Doc 9750 and Doc 4444 respectively have the same meaning.

5.19 **B1-CDO** *Improved Flexibility and Efficiency in Continuous Descent Profiles (CDOs) using VNAV*. The arrival procedure with CDOs using VNAV allows the aircraft to fly close to its optimal profile enabling fuel savings and enhanced predictability. VNAV contributes to terminal airspace design and efficiency due to an aircraft's ability to maintain a vertical path during descent thus allows for development of vertical corridors for arriving and departing traffic thus increasing the efficiency of the airspace.

5.20 **B0-CCO** *Flexible and Efficient Departure Profiles* Continuous Climb Operations (CCO), SID. This element has been accorded a high priority by ICAO HQ, due to greater efficiency in terms of fuel usage and emissions.

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

5.22 **B0-APTA** Airport Accessibility: Performance-based Navigation (PBN) procedures with vertical guidance. The optimal use of appropriate PBN specification is a key enabler to progress Seamless ATM in the Asia/Pacific region. PBN lays the foundation for the airspace system for years to come as future navigation developments such as four-dimensional (4D) user prefer trajectories evolve. This element has been accorded a high priority by ICAO globally. Documents providing guidance on this subject were:

- *PBN Manual*, *GNSS Manual*, *Annex 10*, *PANS-OPS Volume 1 and 2*;
- *Manual on Testing of Radio Navigation Aids Volume 2* (Doc 8071);
- *Quality Assurance Manual for Flight Procedure Design Volume 5* (Doc 9906);
- and for avionics-
    - Basic IFR Avionics (TSO C129 with Receiver Autonomous Integrity Monitoring - RAIM);
    - Basic IFR Global Navigation Satellite System (GNSS) receivers with Baro-VNAV (Vertical Navigation), Satellite-based Augmentation System - SBAS avionics (TSO C145/146); and
    - GBAS receivers (TSO C161/162).

5.23 **B0-ACDM** *Airport CDM*: the decision making process at the airport is enhanced by sharing up-to-date relevant information and by taking into account the preferences, available resources and the requirements of the stakeholders at the airport. Material from the ICAO CDM Manual is being incorporated into a global manual on collaborative ATFM (Doc 9971).

5.24 **B1-ACDM** *Enhanced Airport CDM:* The decision making process at the airport is enhanced by sharing up-to-date relevant information and by taking into account the preferences, available resources and the requirements of the stakeholders at the airport. Material from the ICAO CDM Manual is being incorporated into a global manual on collaborative ATFM (Doc 9971). The collaborative Airport Operations Planning (AOP) and Airport Operations Centre (APOC) enhance the planning and management of the Airport operation and allow full integration with ATM.

5.25 **B0-ASEP** *Air Traffic Situational Awareness*: ADS-B OUT enabled for airborne surveillance. ATSA applications will enhance safety and efficiency by providing pilots with the means to achieve quicker visual acquisition of targets. These are cockpit based applications which do not require any support from ground, and hence can be used by any suitably equipped aircraft.

5.26 **B0-ACAS** *Airborne Collision Avoidance System Improvements*: ACAS (Airborne Collision Avoidance System). Traffic Collision Avoidance System (TCAS) version 7.0 or 7.1 is the expected standard. The requirement for forward fit from 01 January 2014 and retrofit by 01 January 2017 of aircraft ACAS installations with an upgraded collision avoidance logic known as TCAS V7.1 was adopted in 2010 by the ICAO Council. This element is designed to increase the effectiveness of surveillance and collision avoidance systems through mandatory use of pressure altitude reporting transponders, in accordance with the Regional Surveillance Strategy.

5.27 **B0-SNET** *Ground-Based Safety Nets*: Short Term Conflict Alert (STCA), Area Proximity Warning (APW), Minimum Safe Altitude Warning (MSAW).

5.28 **B0-AMET**: *Meteorological information supporting enhanced operational efficiency and safety* Global, regional and local meteorological information provided by world area forecast centres, volcanic ash advisory centres, tropical cyclone advisory centres, aerodrome meteorological offices and meteorological watch offices in support of flexible airspace management, improved situational awareness and collaborative decision making, and dynamically-optimized flight trajectory planning.

5.29 The future, net-centric oriented ATM system requires the smart use of uncertainty characteristics often associated with MET information, enabling decision-makers to make choices according to their own objectively determined thresholds for action. This needs a transition of MET information, specifically in table-driven data representation supporting ATM collaborative, knowledge-based, decision-making through free-flowing information exchange (ASBU B1-AMET).

5.30 The first evolutionary step in the improved provision of MET information included the provisions introduced in Amendment 76 to Annex 3 – *Meteorological Service for International Air Navigation* (applicable November 2013), which enabled the exchange of OPMET information (specifically METAR, SPECI, TAF and SIGMET) formatted in accordance with a globally interoperable information exchange model (i.e. IWXXM) using extensible markup language (XML)/geography markup language (GML), accompanied by the appropriate metadata, by States in a position to do so. These developments were designed to foster the future SWIM environment, which will include meteorological, aeronautical and flight information, amongst others.

5.31 Amendment 77 to Annex 3 (applicable 10 November 2016) is will elevate these particular provisions to the status of recommended practice and extend them to the provision of tropical cyclone and volcanic ash advisory information and AIRMET information. Amendment 78 to Annex 3 (intended applicability in November 2018) is expected to make these provisions an ICAO Standard . During Amendments 77 and 78 of Annex 3, and beyond, a significant portion of current MET information is envisaged to transition to IWXXM format in support of the SWIM environment. In addition, there will be an increased reliance on the automated relay of meteorological information to and from aircraft, including enhanced aircraft-based meteorological reporting capabilities (ASBU B3-AMET).

<u>ASBU Elements Which May Not Be Universally Implemented</u>

5.32 **B0-WAKE, B1-WAKE**: *Enhanced Wake Turbulence Separations*. As a function of local implementation plans, development of automation support (Decision Support Tools) is required to enable the display to ATC of the appropriate wake turbulence separation minima applicable between successive pairs of arriving and departing aircraft, to apply optimized wake turbulence standards. Such automation support is considered desirable for Block 0 (six wake turbulence category system), and necessary for Block 1 (pair-wise system).

5.33 **B0-SURF**: *Improved Runway Safety*: Advanced Surface Movements Guidance Control Systems (ASMGCS), where weather conditions and capacity warranted. Implementation of ASMGCS may not be a high priority in the Asia/Pacific except at high density aerodromes where the cost benefits of mandating this were positive.

5.34 **B1-SURF** *Enhanced Safety and Efficiency of Surface Operations* – SURF, SURF-1A and Enhanced Vision System (EVS). Provides enhancements to surface situational awareness, including both cockpit and ground elements, in the interest of runway and taxiway safety, and surface movement efficiency. Cockpit improvements including the use of surface moving maps with traffic information (SURF). The module implements additional capabilities by taking advantage of cooperative surveillance.

5.35 **B0-OPFL**: *Climb/Descent Procedures using ADS-B In-trail Procedure* (ITP). This element is applicable only for those ANSPs that provide services within Category R airspace, and may be rarely used in airspace where 30/30NM separation is applied using RNP4 or other more efficient standards, as ITP required a number of steps to apply correctly. Thus, ITP is optional, primarily for higher density Category R airspace with Organised Track Systems (OTS).

ASBU Elements Block 1 envisaged to be implemented from 2022

5.36 These elements are expected to be discussed during the 2019 review of the Seamless ATM Plan and implemented accordingly. States, international organizations and other stakeholders are expected to analyse these elements with regard to their own implementation strategy and actions, which may be earlier than 2022 as appropriate.

5.37 **B1-APTA** *Optimized Airport Accessibility*: Performance-based navigation (PBN) and Ground-based Augmentation System (GBAS) Landing System (GLS) Cat II/III approaches is a key enabler for the high density airports to increase the safety and the airport capacity by the increased runway throughput and more flexible use of terminal airspace.

5.38 **B1-SNET** *Ground Based Safety Nets on Approach*: introduction of Approach Path Monitor (APM).

5.39 **B1-FICE** *Ground-Ground Integration and Interoperability*: FF-ICE, Step 1 for ground-ground application facilitate the collaborative decision making (CDM), applicable between ATM service providers, airspace user operations and airport operations. Reduces controller workload and increases data integrity supporting improved capacity.

5.40 **B1-RPAS** *Remotely Piloted Aircraft*: Initial integration of RPA into non-segregated airspace applies to non segregated airspace and at aerodromes. Implementation will cover detect and avoid system introduction and all necessary security systems supporting the RPAS operations.

5.41 **B1-AMET** *Enhanced Operational Decisions through Integrated Meteorological Information (Planning and Near-Term Service)* Full ATM-Meteorology integration is needed to ensure that meteorological information is included in the logic of an ATM decision process, including the impact of meteorological conditions on operations such as cross-polar and trans-polar routes with space weather forecasts..

Note: the Asia/Pacific may develop a specific regional Seamless ATM element to incorporate B1-RPAS and in addition, small Unmanned Aircraft Systems (UAS).

5.42 **B1-DATM** *Integration of Digital Information Management (AIM) Information*. Service improvement through ATM information reference model, integrating all ATM information, using common formats (ULM/XML and WXXM) for meteorological information, FIXM for flight and flow information and internet protocols enables the up-to-date access to the information by the variety of stakeholders.

5.43 **B1-SWIM** Performance Improvement through the Application of System-Wide Information Management (SWIM). The System Wide Information Management (SWIM) will complement human-to-human with machine-to-machine communication, and improve data distribution and accessibility in terms of quality of the data exchanged. SWIM is a key enabler to facilitate the Global ATM Operational Concept is a net-centric operation, where the air traffic management (ATM) network is considered as a series of nodes, including the aircraft, providing or using information. The scope extends to all information that is of potential interest to ATM including: trajectories, surveillance data, aeronautical information of all types, meteorological information etc.

5.44 **B1-ASEP** *Increased Capacity and Efficiency through Interval Management.* Interval management improves management of air traffic flows and aircraft spacing. Is based on ADS-B IN applications to achieve or maintain an interval or spacing from a designated aircraft. ATC is provided with a new set of (voice or data link) clearances directing, for example, that the flight crew establish and maintain a given time spacing from a reference aircraft. These new clearances will reduce the use of ATC vectoring and speed control.

5.45 In addition the following element may be considered in the category of “May not be universally implemented”, in consideration during the review of 2019: **B1-RATS** *Remotely Operated Aerodrome Control.* Provides a safe and cost-effective air traffic services (ATS) from remote facility to one or more aerodromes. Can have also a significant importance in case of contingency situation occurrence.

Regional Elements

5.46 The Regional elements were incorporated into the Seamless ATM framework used to assess the uptake by Asia/Pacific States.

5.47 **Table 2** provides a summary of the Regional Seamless ATM elements, and the expected priority for implementation within the Asia/Pacific Region. The allocation of priority was based on factors including its importance in promoting Seamless ATM (Priority 1 = critical upgrade, Priority 2 = recommended upgrade, Priority 3 = may not be universally implemented).

PIA	Regional Seamless ATM Element	Priority
Aerodromes	Apron Management	3
	ATM-Aerodrome Coordination	3
	Aerodrome capacity	3
	Airport Master Plan*	3
Airspace Organization and Management	ATC Sector Capacity	2
	Performance-based Navigation (PBN) Visual Departure and Arrival Procedures	3
	Performance-based Navigation (PBN) Airspace	2
	Airspace classification	2
	Flight Level Orientation Scheme (FLOS)	2
	Flight Level Allocation Schemes (FLAS)	2
	Automated Transfer of Control	2
	ATS Surveillance data sharing	2
	ATC Horizontal separation	2
	Rocket launches/space re-entry management*	1
	Common aeRonautical Virtual private network*	1
	Voice communications over IP between ATS units*	2
Human Performance	ATM Managers’ Performance	2
	ATC simulators performance	2
	Safety assessment of changes	2
	ATM Operators’ performance	2

Civil military cooperation	Strategic Civil Military coordination	1
	Tactical Civil Military coordination	1
	Civil Military system integration	2
	Civil Military navaids joint provision	2
	Civil Military common training	2
	Civil Military common procedures	2

Table 2: Asia/Pacific Seamless Regional Elements Priority

Note: * New Seamless Elements planned to be incorporated in the 2016 Review

5.48 **Aerodrome Certification**. This element related to the implementation of management and design strategies to improve movement area utilization. ICAO Annex 14, Volume I required States to certify their aerodromes used for international operations in addition to aerodromes open for public use through an appropriate regulatory framework.

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

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

5.51 **The Airport Master Plan** development and regular updates are essential for the Seamless ATM alignment of the forecasted airport infrastructure development to introduce the applicable ASBU framework.

5.52 **Flight Information Regions** (FIRs). FIR boundaries should not limit the delivery of ATS surveillance-based separation services, and where possible the number of FIRs should be minimized, particularly along traffic flows.

Note: FIRs should not necessarily be based strictly on the boundaries of sovereign territories (Annex 11)

5.53 Recommendation 5/1 from the AN-Conf/12 (**Appendix B**) suggested that States fully assess the operational, safety, performance and cost implications of a harmonised transition altitude.

5.54 **Airspace Classification.** The harmonization of upper airspace and associated traffic handling through application of a common ICAO ATS Airspace Class in upper airspace is consistent with Seamless ATM principles.

5.55 **Reduced Vertical Separation Minimum** (RVSM). The optimization of the utilization of airspace and enhanced aircraft altimetry systems and the adoption by all States of the ICAO Flight Level Orientation Scheme (FLOS) based on feet as contained in Appendix 3a to Annex 2 is necessary for regional harmonisation. China is the only State that has adopted Appendix 3b to Annex 2, while some adjacent States continued to refer to the metre equivalent of feet (flight levels), as their domestic altimetry systems or regulations was commonly based on metres.

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

5.57 Affording priority for flight levels or making specified levels unavailable for certain ATS routes under a Flight Level Allocation Scheme (FLAS) needs to be minimised, as this may penalise flights without consideration of actual capacity at the time and does not necessarily take advantage of the tactical capability of ATM systems. Thus FLAS should only be imposed to enhance safety and/or capacity, or where there were systemic operational limitations, such as the ability to deliver ATS surveillance-based separation services.

5.58 Establishing equipage mandates requiring operators to equip with a specific technology is an acceptable concept, provided the timeline for compliance is developed after due consultation and the [safety and economic] benefits in equipage were clearly identified and agreed (CONOPS).

5.59 **ATS routes**. The CONOPS had established the expectation that in upper controlled airspace and within terminal controlled airspace (CTA and CTR) associated with major international aerodromes, ATS routes should be PBN based, with an appropriate specification determined by the Airspace Authority based on the GANP and the Regional Navigation Strategy as endorsed by APANPIRG. However, the RANP amendment of all conventional regional ATS routes to PBN routes would be very time consuming, so changes to PBN are being made on an opportunity basis, or when a new route is established, consistent with this Plan. A harmonised en-route PBN implementation is a key to achieving seamless ATM in order to cater to capacity growth.

5.60 The Plan advocated moving to take early advantage of GNSS so Asia/Pacific States do not need to undertake expensive ground-based navigation aid updates to support PBN ATS routes. For any move to a GNSS-based system, consideration must be made of the appropriate backup requirements. The following redundancy should be considered by States in their Safety Assessment with regard to reliance on GNSS:

- use of linked GNSS/Inertial Navigation Systems (INS) that provide a degree of accuracy commensurate with the navigation accuracy requirements until an alternative form of navigation is available;
- retention of terminal VOR/DME at major aerodromes only;
- retention of some radar or MLAT capability supporting terminal operations to provide a degree of navigation assistance if GNSS is not available; and
- the use of multi-modal receivers that can use different GNSS constellations.

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

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

5.63 **Surveillance strategy.** The Asia/Pacific Seamless ATM Plan and the Asia/Pacific Surveillance Strategy should be aligned:
http://www.icao.int/APAC/Documents/edocs/APX.%20J%20%20Revised%20Surveillance%20Strategy.pdf

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

5.65 **Search and Rescue. B1-SAR**[2] *Enhanced Search and Rescue provisions*. This module develops critical Search and Rescue features like: State SAR Plan, international SAR agreements, SAR exercise (SAREX), Rescue Coordination Centres (RCCs), centralised SAR information source, SAR Quality Assurance (QA) programmes. The importance of enhancement of SAR service. States should develop SAR Plan, international SAR agreements and SAR exercises (SAREX).

5.66 **Common aeRonautical Virtual private network (CRV)** The objective of the CRV is to offer a safe, secure, robust and cost effective telecommunications transport service to the States. The scope of the CRV is to provide a cross-border cost-effective telecommunications network for States in the ICAO Asia/Pacific Region.

5.67 **Voice over Internet Protocol (VoIP):** The VoIP technology is planned to be implemented by 2022 to replace the current analogical technology. States may choose to upgrade their ATM voice communication systems in compliance with the EUROCAE ED-137 standards before migrating to VoIP, or implement Analog/digital VoIP converters meanwhile. In addition, ANSPs should perform the safety case as Voice communications are a critical service.

5.68 **Launch/Space re-entry activity management:** the efficient management of rocket/missile launch and space re-entry activity to minimize disruption to other airspace users. The coordination of all the stakeholders will be enhanced by: coordination agreements between the State civil aviation authority, the ANSP, and the launch/re-entry agency concerned; strategic coordination conducted between the State civil aviation authority prior the activity and tactical management of the launch/re-entry activity.

Human Performance

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

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

5.70 The AN-Conf/12 emphasised the importance of human performance considerations by endorsing Recommendation 6/4 (**Appendix B**), which called for the integration of human performance as an essential element for the implementation of ASBU modules and in the planning and design phase of new systems and technologies, as part of a safety management approach.

[2] B0-SAR is not included in ICAO Global Air Navigation Plan ASBU Framework

5.71 The role of the human is especially important in delivering high quality and consistent services supporting Seamless ATM. Therefore it is crucial to ensure that, training and licensing requirements are developed using a competency-based framework, fatigue-related risk is managed appropriately, and safety data, including the reporting of hazards, is collected, analysed and acted upon within ATM systems that support Seamless ATM

5.72 One of the more important human performance aspects in order to deliver a consistent, harmonised and efficient service is ATC training, to change from a procedural mind set to one that used the tactical delivery of services based on ATS surveillance and automated safety net decision support tools (airborne and ground).

5.73 Moving from reliance on paper-based flight progress strips to an electronic equivalent connected to the ATS surveillance Flight Data Processing System (FDPS) or direct data inputs to the Aircraft Situation Display (ASD) support this paradigm shift. The use of paper flight progress strips in automated ATM environments reduces efficiency, increases transcription error/data mismatch, and artificially caps ATC capacity due to retention of manual tasks made redundant by the automation capability.

5.74 Controllers need to be trained on the application of tactical separation, including the use of positive control techniques, such as vectoring and speed control when conflict pairs approach minimum separation. In this regard, it is important that managers facilitate a modern operating environment in terms of air safety incidents and human factors, so personnel are confident using the full capability provided by the CNS facilities.

5.75 A critical human performance issue is the training of ANSP management and regulators in human performance issues. These decision-makers had an important influence on outcomes in terms of supporting the right environment for Seamless ATM activities, whether that is providing financial resources, or establishing high-level policies and procedures.

5.76 A key component of Seamless ATM is the ability of controllers to operate, and have confidence in, a new operating environment. The appropriate use of ATC simulators to enhance their learning experience is an essential part of the necessary training.

5.77 In planning to deliver Seamless ATM services, it is assumed that each State and aircraft operator will comply with the English language proficiency requirements in accordance with ICAO Standards and Recommended Practices. States should be considering the highest levels of English language proficiency for all operational controllers to ensure they can respond appropriately to irregular occurrences (e.g.: emergencies) by use of an internationally recognised system.

5.78 An optimal 'aviation culture' within regulators and service providers can only be implemented when top managers instil an understanding of a system-wide approach that creates an organic, learning and safe environment. When considering the key factors supporting an 'aviation culture', it is important to acknowledge that no 'national culture' is perfectly aligned with 'aviation culture', so there will always be a need for gap analysis and changes where development of an appropriate in culture is required. In focussing on management it is therefore important to train managers, and for managers to have a level of competency in the following areas (**Figure 5**):

a) the advantages of a responsible, informed and accountable management, which promotes a proactive organisational culture with safety as a first priority, using open communications and a team management approach; and

b) the implementation of an appropriate organizational culture which is effectively driven by management through embedded safety review and assessment teams, allowing the organization to respond organically to its operating environment;

c) the systematic application of human factors principles in –

- air safety investigation;
- system design (ergonomics, human-in-the-loop);
- effective training (including the use of simulators);
- fatigue management;
- automated safety nets; and
- contingency planning;

d) the implementation of effective safety reporting systems that –

- are non-punitive, supporting a 'Just Culture';
- promote open reporting to management; and
- focus on preventive (systemic), not corrective (individual) actions in response to safety concerns, incidents and accidents.

Figure 5: Optimal Aviation Culture Factors

Civil/Military Cooperation

5.79 One of the key enablers for improvement of ATM efficiencies supported by Doc 9854 (Global ATM Operational Concept) is the use of FUA. This is an airspace management concept based on the principle that airspace should not be designated as purely civil or military, but rather as a continuum in which all user requirements are accommodated to the greatest possible extent. FUA normally referred to the activation of Special Use Airspace (SUA), but could also include controlled airspace.

5.80 The establishment and operation of SUA required careful assessment, review and management, to ensure the most appropriate airspace designation is used, and the airspace is operated in a cooperative manner. This is ordinarily only possible through discussion between military and civil parties. Thus a key to the establishment of effective FUA is risk-based assessments, determining the risks or security issues involved through coordinated and cooperative methods if possible.

Note: Annex 2 Rules of the Air states that restricted areas were airspace of defined dimensions, above the land areas or territorial waters of a State, which means that restricted areas must not be designated over the high seas or in airspace of undetermined sovereignty

5.81 Restricted areas designed to segregate civil aircraft from airborne military operations or ordnance firing would be expected when the risk of an accident for non-segregated operations is higher than acceptable. However, lower risk military operations (such as using small calibre weapons at an established firing range) may only require the establishment of a danger area or even no SUA. Thus the type, dimensions, activation notice and duration of SUA activity should be appropriate and commensurate with the type of activity affecting the airspace.

5.82 APANPIRG/9 (August 1998) developed the following guidelines for civil/military cooperation in the following areas: military procedures, aeronautical facilities and ground services, civil and military ATS unit personnel, airspace, research and development, common terminology, abbreviations rules and procedures, military exercises, and non-sensitive military data.

- If at all possible, military training should be conducted in locations and/or at times that do not adversely affect civilian operations, particularly those associated with major aerodromes. This requires strategic planning by formal civil/military coordination bodies.

- Consideration of the interoperability and operations of military systems is an integral part of a Seamless ATM environment. With increasingly complex aircraft equipage civil requirements, non-compliant military or other State aircraft may become more difficult to manage using Special Handling Status (STS). The limitations or requirements of military aircraft cockpits, avionics and airframes may even preclude some civil systems, and yet military aircraft still need to transit airspace used predominantly by civil operations.

- Military participation at civil ATM meetings and within ATS Centres will often lead to a better understanding of civil needs, as well as military requirements, including the operation of Unmanned Aircraft Systems (UAS). UAS have been predominately used by the military in segregated airspace, but now many forms of State missions including customs, immigration and police operations are being planned, as well as a myriad of potential civil uses.

- Responses to Search and Rescue (SAR), Civil Defence (normally natural disaster emergencies), and national security events will inevitably require civil/military coordination so this needs to be taken into account during the planning for such operations. As these occurrences could involve a number of States, regional civil/military planning is crucial in order to reduce the response time for emergency services to aid those in need. The response to an international aviation SAR event may well involve a location over the high seas, so all States should have SAR agreements with neighbouring nations to ensure that SAR services were unimpeded to the maximum possible extent.

5.83 The Asia/Pacific Civil/Military Cooperation Seminar/Workshop (Bangkok, 28 February to 1 March 2012) recommended that the following civil/military cooperation/coordination principles and practices should be elevated to the highest political level in the Asia/Pacific regions:

- civil/military working arrangements should be enacted where discussion of both civil and military needs were able to be negotiated in a balanced manner;

- the importance of the interoperability of civil air transport infrastructure and national security was recognized;

- the interoperability of civil and military systems including data-sharing was emphasized; and

- regular review of controlled airspace and special use airspace was encouraged to be undertaken by States to ensure its establishment, size, activation and operation was appropriate in terms of optimal civil/military operations.

5.84 The Asia/Pacific Civil/Military Cooperation Seminar/Workshop requested ICAO to update existing provisions related to civil/military cooperation/coordination and further develop guidance material related to airspace planning and management, including FUA.

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

5.86 Aircraft operating ADS-B technology transmit their position, altitude and identity to all listeners, conveying information from co-operative aircraft that have chosen to equip and publicly broadcast ADS-B messages. Thus there should be no defence or national security issues with the use and sharing of such data.

Note: Some military transponders may support ADS-B using encrypted messages, but this data is not normally decoded or used at all by civil systems. In many cases, tactical military aircraft are not ADS-B equipped or could choose to disable transmissions. In future, increasing numbers of military aircraft would be ADS-B capable, with the ability to disable these transmissions. ADS-B data sharing should not influence the decision by defence agencies to equip or not equip with ADS-B. Moreover, it is possible for States to install ADS-B filters that prevent data from sensitive flights being shared. These filters can be based on a number of criteria and typically use geographical parameters to only provide ADS-B data to an external party if aircraft were near the boundary.

5.87 Ten civil/military elements were incorporated into the Seamless ATM framework after analysis of discussion of the APANPIRG/9 principles, and discussion from the Seamless ATM Symposium and Ad Hoc Meeting, APSAPG/1 and the Asia/Pacific Civil/Military Seminar/Workshop.

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

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

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

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

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

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

g) **Joint Civil/Military Aerodromes and Navigation Aids**: The operation of joint civil/military aerodromes if possible, and the provision of navigation aids that could be utilised by both civil and military aircraft where practical.

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

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

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

Airspace Equipage Mandates

5.88 From an operators' perspective, the following were important considerations:

- Preparation Time: Operators need time to prepare for any mandated equipage requirement – if new equipment is involved, several years may be required to allow fitment to take place during normal airframe maintenance cycles.

- Cost Benefit: Operational improvements, including the use of new technologies or implementing ASBUs, need to provide operational benefits that outweighed the total cost of implementation and operation. This included the airspace user side of the equation. States/ANSPs should carry out studies of the costs and benefits for all stakeholders.

- Education and promulgation: States/ANSPs should work with local airlines and International Organizations to ensure industry and other stakeholders are educated and informed regarding upcoming aircraft equipage mandates very early in the planning process. Ideally, the dialogue should begin with user consultation pertaining to the selection of appropriate solutions. Once a decision has been made, user education should include briefings, media notifications as well as required AIS promulgation.

- Service Outcomes: States/ANSPs must ensure the service delivery efficiencies enabled by an aircraft equipage mandate are actually delivered operationally coincident with the implementation date of the mandate. If service delivery is delayed, any related aircraft equipage mandate should also be delayed accordingly. States/ANSPs should consider offering operational advantages to early adopters of the desired equipage or capability to offset costs. This would enable operators to make at least partial use of the mandated capability in advance of the mandated date.

- Harmonization: it is essential that States/ANSPs harmonize requirements with neighbours as far as practicable, including implementation dates.

- Regulatory considerations: it is essential that regulators are involved very early in the planning process. Experience shows that regulatory approvals are often a problem with the introduction of aircraft equipage mandated environments.

- High Seas: Where airspace over the High Seas is affected, States must ensure appropriate ICAO processes are followed, including amendments to the required ICAO provisions.

CURRENT SITUATION

Aerodrome Analysis

6.1 In the 1990s and the first decade of the new millennium, aerodrome operators in Asia-Pacific invested billions of dollars to enhance capacity of existing aerodromes and to build new ones to meet increasing air traffic demand. Notable examples are the opening of Bangalore, Hong Kong, Incheon, Kuala Lumpur International, Shanghai Pudong and Suvarnabhumi airports and the expansion of New Delhi and Beijing Capital airports. The automation and the adoption of self-service technology for passenger handling such as check-in and automated border control has enabled many airports to build up capacity without expanding passenger terminal footprint.

6.2 However new capacities are often taken up quickly by tremendous traffic growth experienced by the Asia-Pacific region in the same period. From year 2000 to 2011, world passenger traffic increased by 56% while the Asia-Pacific region saw an increase of 139%. Runways are typically the capacity bottleneck of aerodromes but aircraft parking stands, baggage sorting and transfer facilities, aprons and passenger security screening points operating close to or over capacity are becoming choke points as well, especially at hub airports. A-CDM promises to alleviate congestion but the close collaboration between airport management and other stakeholders such as its shareholder, ATM and airlines is essential to a coordinated development of the capacity of the regional air transport network in the long-term.

Airspace and FIR Analysis

6.3 As a result of the 2013 Major Traffic Flow (MTF) study, there were several features of the lack of seamless ATM facilities and practices evident in the Asia Pacific region.

a) Size of FIR – fragmented FIRs resulting in flights transiting multiple FIRs with multiple TOC points.

b) Traffic density – the capacity of ANSP infrastructure and airspace had not kept up with traffic growth.

c) Airspace and Route design and capacity –

- route structure based on historical requirements and not on current aircraft navigational capability;
- ground-based navigation aid routes, around which SUAs have grown;
- crossing tracks with and without ATS surveillance, whereby States mainly rely on the use of FLAS for procedural flight level separation;
- requirement for vertical transitions because of the two different FLOS (metric and imperial) in the region;
- routes with flight level, direction, and time restrictions making flight planning more complex;
- routes with restrictions that are un-coordinated with neighbouring FIRs; and
- restrictive route structures agreed to in a historical context which is inadequate for today’s traffic requirements.

d) ATS surveillance and communications capability -

- Non- existent or unreliable surveillance or communications capability in critical locations;
- Capability not fully utilised to provide appropriate level of service; and
- Hand-off procedures not aligned to ATM facilities and capabilities.

e) Compatibility between FIRs –

- Infrastructure development based only on national requirements, resulting in duplicated and yet uncoordinated facilities; and
- Unnecessarily conservative separation requirements at TOC points (it was not clear if this is due to lack of confidence in adjacent FIRs capability to adhere to agreed procedures, or for other operational reasons).

f) ATC standards –

- Apparent reluctance in applying ICAO standard separation minima (it was not clear if this is due a lack of confidence in ATM competence or capability); and
- Although GNSS separation is available in Doc 4444, few ANSPs in the Asia/Pacific Region used this as an alternative means of providing longitudinal separation.

g) Focus groups

- Lack of effective focus groups to address airspace capacity and FIR issues, although there had been a recent increase in informal and bi-lateral ATM coordination;
- Lack of a requirement for regular review mechanisms of operational issues within an FIR, including feedback from aircraft operators.

h) Uncoordinated and limited use of AIDC.

6.4 Generally flights operating on MTFs between large FIRs (particularly where there were multiple FIRs being provided services by one State) in <u>Category R</u> airspace were already reasonably seamless, such as in the Pacific. However, apart from being largely oceanic in nature, these MTFs had the advantage of being usually in an east/west alignment between continents and not impacted by busy crossing routes.

6.5 In addition, lower traffic density MTF enabled flexible tracks such as UPR applications. It was notable that these MTFs tended to have dedicated focus groups like Informal South Pacific ATS Coordinating Group (ISPACG) and Informal Pacific ATC Coordinating Group (IPACG) conducting regular reviews of operational efficiency.

6.6 Where long and short haul routes crossed multiple smaller FIRs, particularly with busy regional flows, there was a greater likelihood of reduced efficiency caused by a combination of inconsistent application of ATM procedures and standards, non-harmonized infrastructure development, route structure, TOC and other legacy issues. However, there were also examples of partly seamless ATM between some busy city pairs (such as Singapore/Kuala Lumpur and the Kuala Lumpur/Bangkok) in the region, resulting from bilateral efforts between ANSPs.

6.7 The Pearl River Delta airspace containing very dense air traffic served by Hong Kong, Macau, Shenzhen, and Guangzhou aerodromes, and associated heliports had Airspace Organization and Management (AOM) and civil/military coordination issues that stemmed largely from the division of responsibility between FIRs. Segregated SIDs and STARs, application of FUA and holistic 'Metroplex' planning principles as well as more integrated ATS systems are needed to achieve greater optimisation of the limited airspace available.

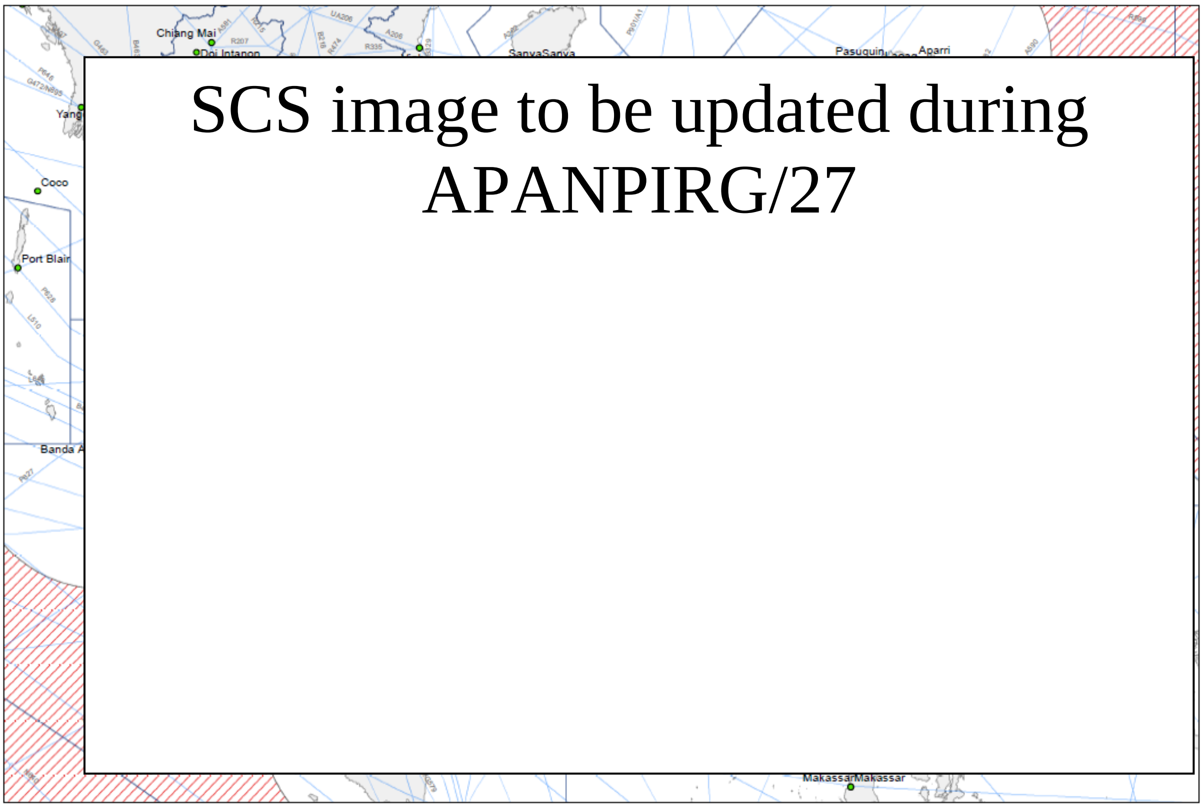


Figure 6: South China Sea ATS surveillance gaps (as at October 2015)

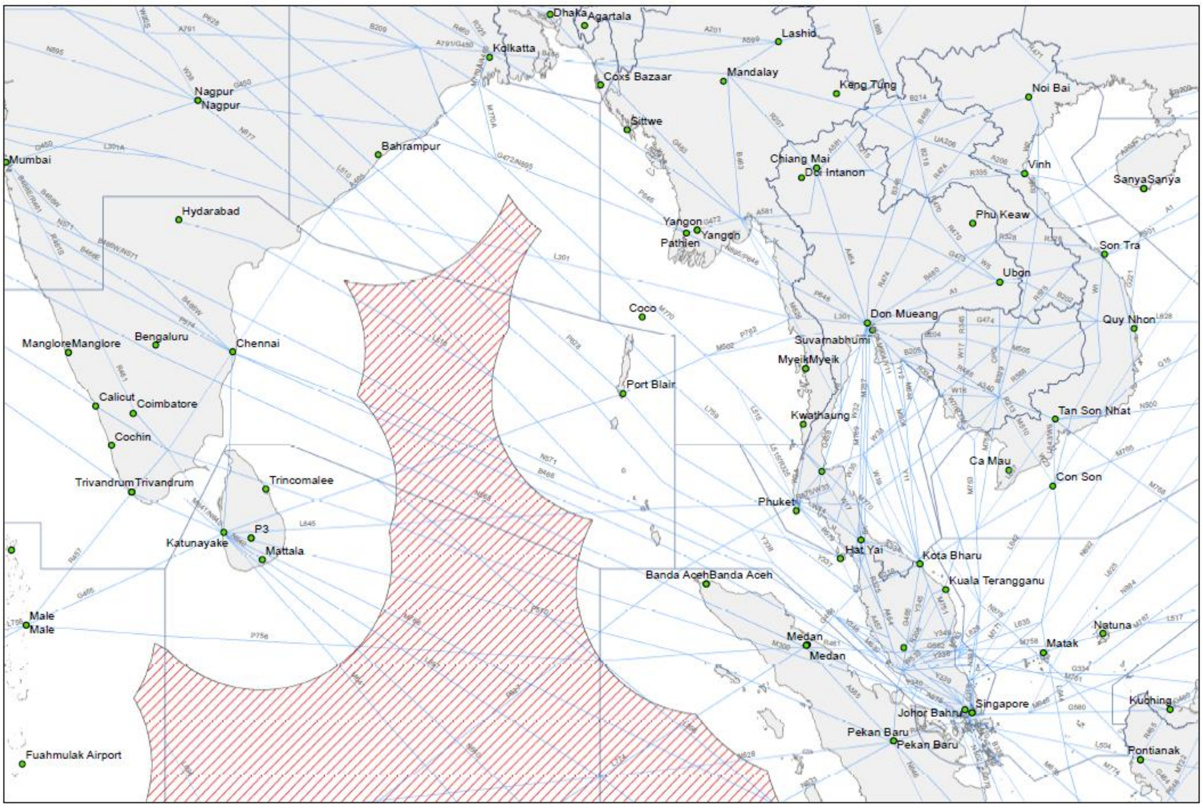


Figure 7: Bay of Bengal ATS surveillance gaps (as at December 2015)

6.8 The main areas of the Asia/Pacific region lacking ATS surveillance and communication coverage which need to be rectified due to traffic density, weather deviations and contingency responses are as follows:

a) highest priority: South China Sea airspace between Viet Nam, Brunei Darussalam and the Philippines (**Figure x**);

b) high priority: Bay of Bengal airspace between the Indian subcontinent and the Andaman Islands (**Figure x**);

c) medium priority:

- airspace between Indonesia and Australia (between Java and West Australia);
- airspace between the Philippines and Indonesia (**Figure x**); and

d) lower priority: Coral Sea between Papua New Guinea and Australia.

<u>Europe – Asia/Pacific Trans-Regional Issues</u>

6.9 A number of ATS routes from the Russian Federation converged within Mongolian airspace because of the limited number of entry/exit points on the Mongolian/Chinese airspace boundary. Military restrictions had affected ATS route development to China/Mongolia/DPRK and Japanese airspace. An enhancement of civil/military cooperation and ATM coordination is necessary to address these trans-regional issues.

6.10 There is a long-standing problem with the incompatibility of the some elements of the European On-Line Data Interchange (OLDI) system with the more global AIDC messages from the Russian Federation to China and Mongolia. It is possible that a solution may be determined by the Inter-Regional APAC/NAT AIDC Task Force.

6.11 Russia utilised a 30 km (16NM) separation within its upper airspace, while Mongolia initially used 80NM when ATS surveillance was implemented in mid-2012, with an intention to reduce this to a surveillance-based separation after appropriate training.

6.12 Given the need to minimise safety issues such as Large Height Deviations and to improve confidence in order to minimise trans-regional separations, ATS surveillance data-sharing between the Russian Federation and China/Mongolia is necessary in accordance with PASL Phase I, even if only based on ADS-B.

North/South America – Asia/Pacific Trans-Regional Issues

6.13 There were no major trans-regional issues between Asia and North America via the Anchorage Oceanic, Fukuoka and Oakland Oceanic FIR due to the continuing work at the IPACG involving Japan and the United States. The Cross-Polar Working Group (CPWG) also discussed operations extending into the area between Asia and North America. The Fukuoka and Oakland Oceanic FIRs had high-density Category R airspace but is served by an OTS (PACOTS; Pacific Organized Track System). ADS-C, CPDLC and AIDC were fully deployed in the Anchorage Oceanic, Fukuoka and Oakland Oceanic FIRs, and common procedures, including 30NM separation standards based on RNP4, DARP, UPR were applied.

6.14 The Oakland Oceanic FIR and South Pacific utilised technologies consistent with Block 0 and with Conflict Prediction and Resolution (CPAR), AIDC, CPDLC and ADS-C, were able to provide a Seamless ATM service already between Asia/Pacific and North America. This included the provision of UPRs and DARP where operationally possible. These developments had been managed through the ISPACG, and were a model for other oceanic regions in the Asia/Pacific.

6.15 The airspace between the Pacific and South America had very low density traffic. South American States had not yet developed the same Seamless ATM services capability in the trans-regional airspace to support ATM and essential SAR services. However, Chile is an active member of ISPACG, and Ecuador is enhancing services in the airspace adjacent to the Tahiti FIR.

Middle East/Africa – Asia Trans-Regional Issues

6.16 The transition of traffic from the Muscat FIR to the Mumbai FIR is identified as a contributing factor to the congestion in the Bahrain FIR and causal factor for the delayed departures from airports, particularly in the United Arab Emirates. India had recently reduced horizontal separation on some routes to 50/50NM. In addition, a FLAS is also used by India and applied to low density traffic from/to African Regions, against the higher density Middle East (MTF AR-10) routes.

6.17 Oman require 10 minute longitudinal separation between eastbound aircraft from the United Arab Emirates regardless of the level the aircraft were climbing to, with plans to reduce this to seven minutes, consistent with the 50NM standard applied within the Mumbai FIR. However this is still very restrictive, given the ATS surveillance coverage within the Muscat FIR and the fact that the aircraft were climbing to a number of different flight levels.

6.18 Complicating trans-regional operations is the configuration of the Sana'a FIR (OYCS), which projected a triangle of airspace between the Muscat FIR (OOMM) and Mumbai FIR (**Figure 5**). This required aircraft that were operating between the Muscat and Mumbai FIRs to transit a short segment of the Sana'a FIR, which used procedural ATC standards.

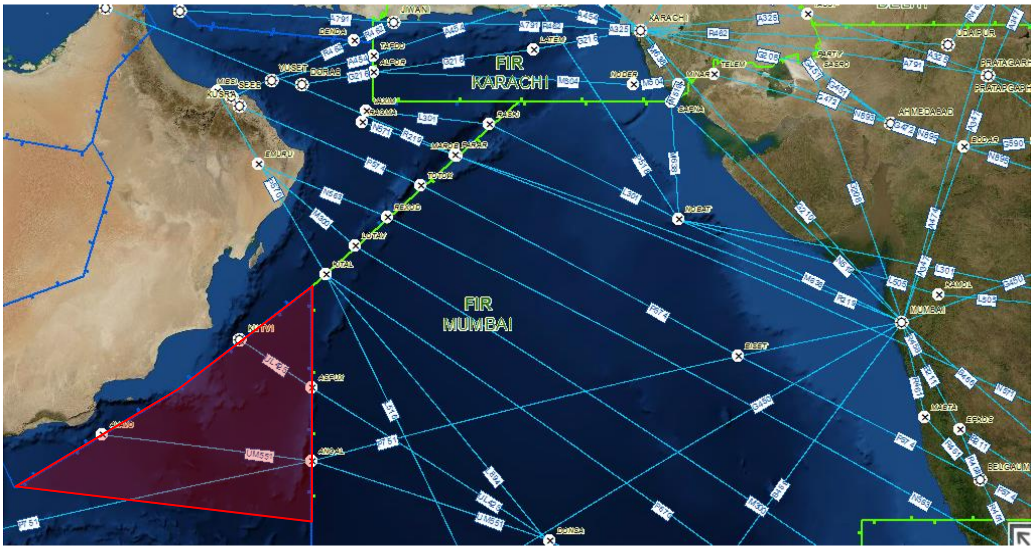


Figure 8: Middle East – Asia Trans-Regional Routes

6.19 The area shown in red in **Figure 8** had since been delegated to Muscat so ATS surveillance and VHF communications (Category S airspace services) could be provided from Oman. In addition, this reduced radiotelephone and TOCs, improving ATC workload.

6.20 The problem of OLDI conversions to AIDC between India and the Sultanate of Oman had prevented implementation of AIDC trans-regionally in this area thus far.

APSAPG Discussions on Economic Aspects

6.21 Action Item 48/2 from the DGCA/48 requested the APSAPG to study the ASBU elements and provide advice on the benefits, business case and implications to States and Administrations and explore formulating a regional position prior to the AN-Conf/12. APSAPG/1 discussed the economic aspects of ASBU and determined that the APSAPG itself would not provide detailed economic and business case data because each implementation situation would vary according to the operating environment; thus this is a matter for each State to analyse. However, the APSAPG agreed it is possible to provide high-level guidance such as guidance to States for the development of cost benefit analysis of implementation activity.

ADS-B South China Sea Cost-Benefit Study Summary

6.22 In 2009 CANSO and IATA agreed to conduct a cost-benefit study for the initial phase of the ADS-B project (**Figure 9**) over the South China Sea involving two trunk routes L642 and M771 (See Fig 6). . The study concluded that there was a strong business case for the project taking into account the economic savings in fuel burnt, carbon emissions, Aircraft Direct Operating Costs (ADOC) and Passenger Value of Time (PVT). The project involved the sharing of the ADS-B data and VHF communications among Indonesia, Vietnam and Singapore to cover gaps in radar surveillance and VHF communications over the two trunk routes L642 and M771. . The initial phase of ADS-B implementation over South China Sea had since been completed. Aircraft longitudinal separation was reduced from 80-50 NM to 40NM when the ADS-B mandated became effective in December 2013 followed by further reduction to 30NM in July 2014.

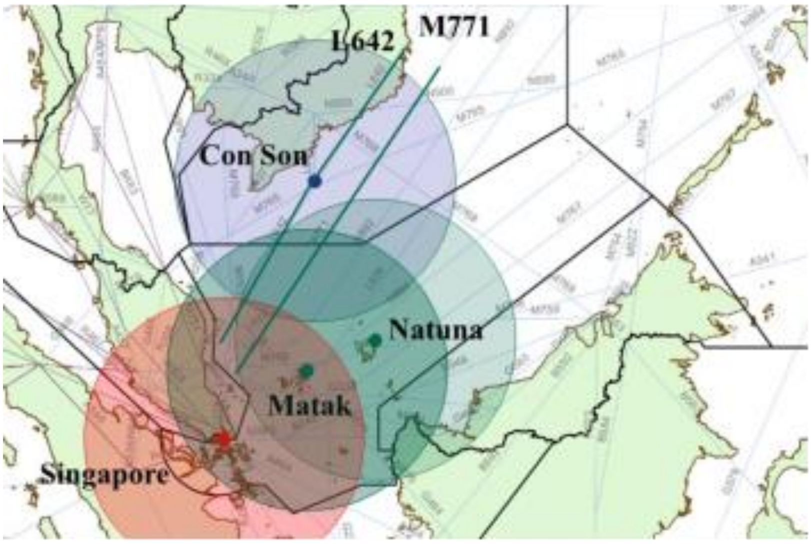


Figure 9: Initial Phase of ADS-B collaboration project over the South China Sea

Airborne Efficiency Savings

6.23 The implementation of the ADS-B exclusive airspace has led to enhancement in the allocation of cruising levels for flights that operate on the two trunk routes. Statistical samples of flight level allocation after implementation of ADS-B showed that approximately 5% of the flights achieved a more optimum level of between 1,000 to 5,000 feet above their assigned cruising levels prior to ADS-B implementation.

6.24 With the use of the ICAO Fuel Savings Estimation Tool (IFSET), the projected fuel savings achieved by these flights over the period of 1 year in 2014 amounts to 1.5 million kilograms of fuel. At an average fuel price of S$2.72 per US gallon, this amounts to about $2 million worth of fuel savings for the airlines.

6.25 In addition to fuel saved from the optimum cruising level allocation, the previous study by Singapore also took into account benefits from reduction of airborne delay from cruising at the optimum flight level. This equates to savings in passenger value of time (PVT) and aircraft direct operating cost (ADOC). The total PVT and ADOC savings is about $1 million. Overall the benefit yield amounts to about $3 million (**Table 3**).

Airborne Efficiency – Savings 2014	**12 months**
Fuel Burn Savings (kg)	1,567,920 kg
Fuel Burn Savings (2014 US$)	$1,966,694
Flight time savings (hours)	138
Airborne ADOC w/o fuel savings (2014 US$)	$411,499
PVT savings (2014 US$)	$576,513
CO2 Emissions Savings (kg)	4,938,948 kg
CO2 Savings (2014 US$)	$44,451
Total Economic Savings (2014 US$)	**$2,999,156**

Table 3: ADS-B Airborne Efficiency

Ground Data Savings

6.26 The previous study by Singapore also took into account potential reduction in ground delays arising from the elimination of queuing time for optimum levels. However, in reality the estimation of ground delay savings is complicated by many other factors contributing to ground delays at the airport. If we exclude these other factors the estimated economic benefits from ground delay savings is about to $1 million from savings in PVT, ADOC and fuel burn (**Table 4**).

Ground Delay –Savings 2014	
Fuel Burn Savings (kg)	275,700 kg
Fuel Burn Savings (2014 US$)	$345,820
Time savings (hours)	128
Ground ADOC w/o fuel savings (2014 US$)	$95,236
PVT savings (2014 US$)	$534,737
CO2 Emissions Savings (kg)	868,455 kg
CO2 Savings (2014 US$)	$7,816
Total Economic Savings (2014 US$))	**$981,992**

Table 4: Ground Delay Savings

Costs

6.27 The cost incurred in 2014 is based on the depreciation and recurrent cost of equipment used to support the ADS-B operations but excludes sunk costs of existing facilities prior to the project. These include the ADS-B stations in Singapore and Con Son, VHF radios in Con Son, Matak and Natuna, as well as the various telecommunications links. As with the original Cost Benefit Analysis, the costs exclude the ATC system cost and the ADS-B stations in Matak and Natuna which were already installed prior to the project and therefore considered as sunk cost. Avionics and aircraft equipage were also not included as the aircraft operate beyond the airspace concerned. The total cost incurred in 2014 amounts to about $3.5m (**Table 5**).

Cost Items – Savings 2014	
Facilities	Cost incurred in 2014
ADS-B stations in Singapore and Vietnam	$310,000
VHF radios in Indonesia and Vietnam	$1,030,000
Communication links to bring the ADS-B signals from Con Son and Jakarta to Singapore	$1,000,000
Communication links to bring the VHF signals from Con Son, Matak and Natuna to Singapore	$1,110,000
Total Cost	**$3,450,000**

Table 5: Cost Savings

6.28 Overall, the economic savings in 2014 exceeded the total cost by about $0.5m. In the 2009 cost benefit study, it was assumed that aircraft separation in the airspace concerned would be reduced to 5NM with the commencement of ADS-B operations. Based on this current study, it can be seen that even with 30NM separation, the annual benefits in 2014 alone already outweigh the cost. According to ACI, air traffic has been growing strongly in the region with Singapore and Hong Kong chalking up average growth rates of 9.1% and 7.4% per annum over the period 2009-2013. For the region as a whole, the average growth rate during the same period is 6.4%. Clearly, as air traffic continues to grow coupled with further reduction in aircraft separation one can expect the overall economic benefits to increase further.

Other Benefits

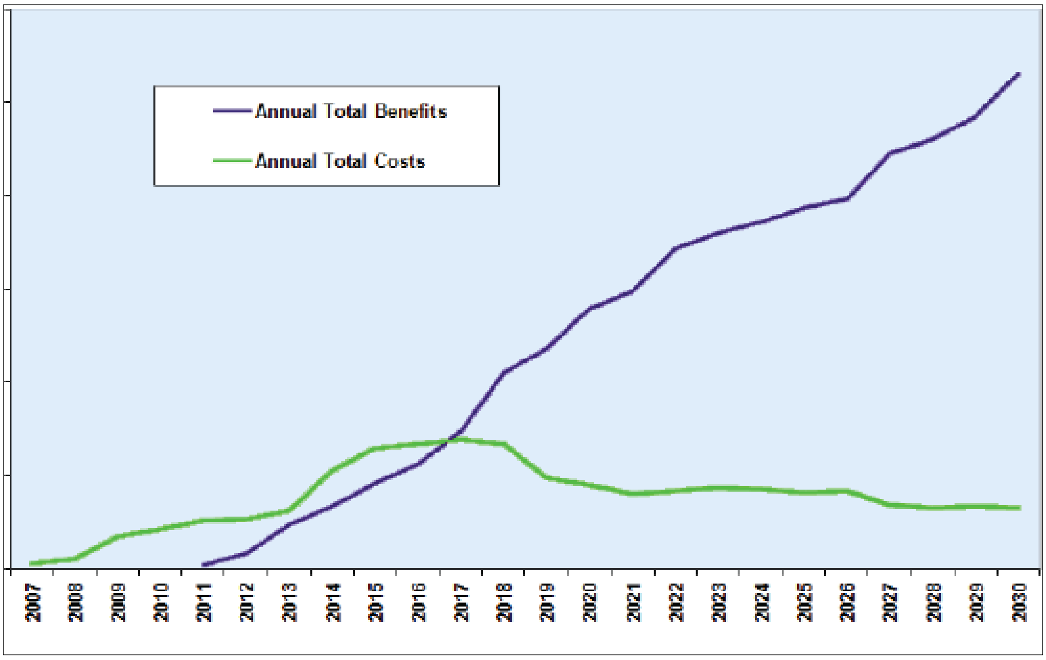
6.29 It should also be noted that there are other benefits apart from economic savings and these include improved safety with enhanced tracking of aircraft and safer and more efficient weather deviations; enhanced aircraft surveillance with increased situational awareness for ATC and the facilitation of search and rescue as well as enhanced flight data collection for better analysis and planning

Other Areas for ADS-B Collaboration

6.30 The successful implementation of the initial phase of the South China Sea should provide a strong impetus for similar collaborative arrangements in the Bay of Bengal and the rest of the South China Sea and indeed for the region as a whole. Potential projects highlighted in the past include ADS-B data sharing between Myanmar and India over the Bay of Bengal and among Singapore, Brunei Darussalam and the Philippines in the eastern part of the South China Sea.

6.31 In May 2015 the ANSPs of India and Myanmar signed an ADS-B data sharing agreement at the sidelines of the CANSO Asia Pacific Conference in Fukuoka, Japan thus establishing the collaborative framework for ADS-B data sharing involving ADS-B stations in India (Port Blair and Agartala) and ADS-B stations in Myanmar (Coco Island and Sittwe). The objective is to provide end to end surveillance for several busy airways over the Bay of Bengal similar to that accomplished over the South China Sea

6.32 ADS-B collaboration over the eastern part of the South China Sea has also been making good progress recently. Singapore is working closely with the Philippines and Brunei Darussalam to share ADS-B data and VHF communications to plug surveillance gaps on the trunk routes M767 and N884. When completed, these airways will have end to end surveillance coverage similar to that achieved in the initial phase of the South China Sea.



United States NextGen Economic Benefits

6.33 The Federal Aviation Administration had conducted a business case study for the Next Generation Air Transportation System (NextGen). NextGen is a wide-ranging transformation of the air transportation system, including ATM technologies and procedures; airport infrastructure improvements; and environmental, safety and security-related enhancements. It is consistent with the GANP and the ASBU initiative.

The cost and benefit calculations underlying the business case for NextGen were developed based on the FAA's 2011 Mid-Term Concept of Operations and the 2012 NextGen Implementation Plan. Modelling of NextGen benefits and costs was based on various inputs. For basic inputs, the USA used traffic data from 2010, along with traffic and fleet forecasts released in early 2011. Recommended economic values, such as those for passenger value of time, etc., were used from early 2011. Based on these inputs, the FAA's analysis showed that NextGen mid-term improvements (until 2020) would generate more than two-and-a-half times in benefits as costs (**Figure 10**).

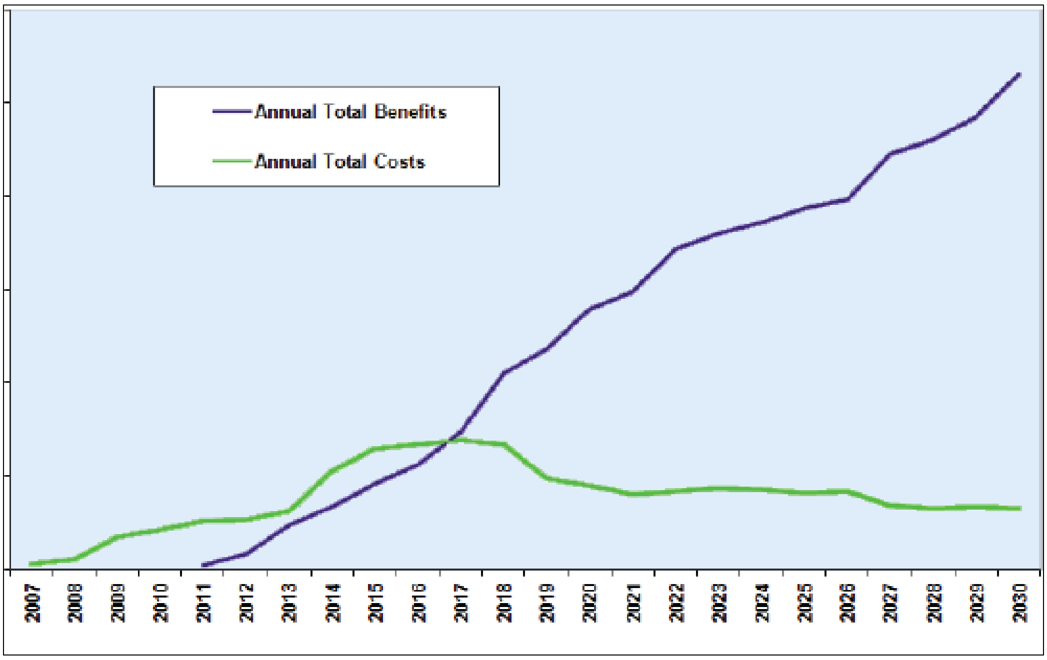


Figure 10: Annual Costs and Benefits

6.34 The NextGen business case focused on the direct benefits to aircraft operators, passengers, and taxpayers from the rollout of NextGen improvements. Benefits identified in the business case were:

- ADOC;
- PVT;
- Reduced FAA operating costs;
- Additional flights enabled by greater capacity;
- Reduced flight cancellations;
- Increased safety; and
- Environmental benefits from reduced aircraft emissions (CO_2 only).

6.35 Types of benefits that were **not** included in the business case were:

- New jobs and economic growth associated with major technology initiatives;
- environmental benefits of bio-fuels or improved engine/aircraft technologies; and
- Environmental benefits from reduced aircraft emissions (NO_X or SO_2).

6.36 The resulting benefit estimates are shown in **Figure 11**:

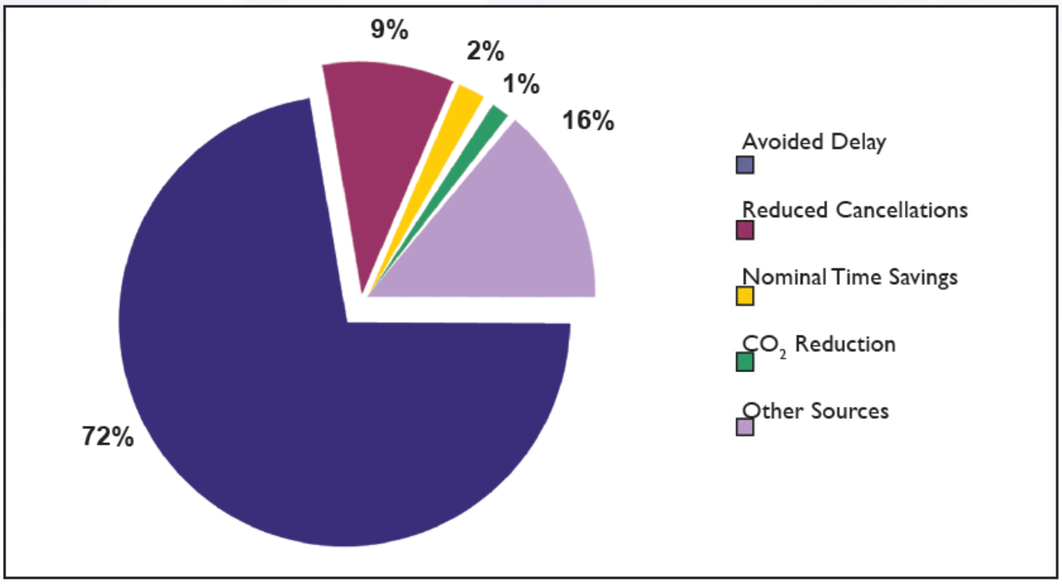


Figure 11: Types of NextGen Benefits until 2030

<u>IATA Seamless ATM Cost-Benefit Analysis</u>

6.37 As general rule, prior to any significant system change, a cost/benefit analysis (CBA) would be conducted to demonstrate the value, negative or positive, of the projected change.

6.38 A CBA of the transition to an Asia Pacific Seamless ATM environment will be developed when the Seamless ATM Plan has been accepted by APANPIRG on behalf of all Asia Pacific States. Although each State retains responsibility for their sovereign airspace, acceptance of the Seamless ATM Plan by APANPIRG, on behalf of all States, creates an obligation on each State to follow the agreed upgrade path. This agreed upgrade path will provide the basis for a Regional CBA.

6.39 Whilst the outcome of the CBA will be determined in future it was felt necessary to demonstrate, at a high level, the benefits of the proposed Seamless ATM Plan.

6.40 IATA conducted an initial economic analysis which was tabled at APSAPG/3 (Chennai, India, 21-25 January 2013).

6.41 Today, demand exceeds capacity at many locations and along some MTF. Many Asia Pacific airports have implemented slot management schemes for part of the day when demand exceeds supply. The consequence of this demand-supply gap is that many MTF are subjected to lengthy delays (e.g. Bay of Bengal) due to capacity limitations.

6.42 Any system delay causes the costs to increase exponentially. When the demand approaches the capacity limits, aircraft must wait to use the system, or various parts of it, until they can be accommodated. These delays impose costs both in terms of aircraft operating expenses and the value of wasted passengers' time.

6.43 In addition to the economic and cost benefits, the existing operational environment also causes longer flight trajectory, inefficient airport capacity usage, flight inefficiencies, higher CO2 emission impacting environment and lower predictability of flight operations.

6.44 IATA's initial economic analysis indicated that if the States in Asia Pacific do not implement the critical ICAO Aviation System Block Upgrade (ASBU) elements of the Seamless ATM Draft Plan, aviation's contribution to the Regional GDP will fall from today's **2.2%** to **0.81%** by 2030.

6.45 Although a "worst case" scenario this would represent a Regional potential economic benefit **loss** of **US$16.63 billion per annum** (based on 2012 data), which will reach an accumulated loss of **US$ 502 billion by 2030**. Upgrading the existing operational environment of ATM is essential in order to enhance the region's economic growth.

6.46 It can be argued that lack of investment in aviation infrastructure will result in this investment being diverted to sectors. However investment in aviation infrastructure, given the reliance in Asia Pacific on aviation, will yield a greater benefit than any other transport modality investment.

6.47 The IATA Economic Study is provided at **Attachment 1**.

PERFORMANCE IMPROVEMENT PLAN

Preferred Aerodrome/Airspace and Route Specifications (PARS)

Note: prior to implementation, the applicability of PARS should be verified by analysis of safety, current and forecast traffic demand, efficiency, predictability, cost effectiveness and environment to meet expectations of stakeholders.

PARS Phase I (expected implementation by 12 November 2015)

Aerodrome Operations

7.1 All high density international aerodromes (100,000 scheduled movements per annum or more) should:

a) provide an appropriate apron management service in order to regulate entry of aircraft into and coordinate exit of aircraft from the apron;

b) have appropriate ATM coordination (including meetings and agreements) related to:

- airport development and maintenance planning;
- coordination with local authorities regarding environmental, noise abatement, and obstacles;
- ATM/PBN procedures for the aerodrome;

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

d) provide electronic surface movement guidance and control.

Note 1: the 100,000 movement benchmark must not be viewed as lessening more stringent existing requirements and criteria established by the State, or superseding ICAO Annex 14 Volume I requirements, especially with regard to aerodrome certification.

Note 2: the provision of A-SMGCS should be subject to economic analysis.

7.2 All high density aerodromes should operate an A-CDM system serving the MTF and busiest city pairs, with priority implementation for the busiest Asia/Pacific aerodromes[3].

[3] Based on 2015 ICAO data, the 51 busiest Asia/Pacific aerodromes were:

- Australia (Sydney, Melbourne, Brisbane);
- China (Beijing, Shanghai Pudong and Hong Jiao, Guangzhou, Hong Kong, Xi'an, Shenzhen, Chengdu, Kunming, Hangzhou, Chongqing, Xiamen, Wuhan, Zhengzhou, Changsha, Nanjing, Qingdao, Urumqi, Dalian, Guiyang, Tianjin, Haikou, Sanya);
- India (New Delhi, Mumbai, Chennai, Bangalore);
- Indonesia (Jakarta, Surabaya, Bali, Makassar);
- Japan (Haneda, Narita, Fukuoka, Osaka, Sapporo, Naha);
- Malaysia (Kuala Lumpur);
- New Zealand (Auckland)
- Philippines (Manila);
- Republic of Korea (Incheon, Jeju, Seoul);
- Singapore (Changi);
- Thailand (Suvarnabhumi, Don Mueang);
- United States (Honolulu); and
- Viet Nam (Ho Chi Minh, Hanoi).

Terminal Operations (Category T airspace)

7.3 CCO and CDO operations should be considered for implementation at all high density international aerodromes after analysis, based on a performance-based approach.

Note: this does not preclude a State considering implementation of CCO/CDO at other aerodromes as appropriate.

7.4 All international high density aerodromes should have **RNAV 1** (ATS surveillance environment) or **RNP 1** (ATS surveillance and non-ATS surveillance environments) SID/STAR.

7.5 Where practicable, all high density aerodromes with instrument runways serving aeroplanes should have:

a) GBAS precision approaches; or ILS/MLS approaches (with APV approach as a backup); or

b) Approaches with Vertical Guidance (APV), either RNP APCH with Barometric Vertical Navigation (Baro–VNAV) or augmented GNSS (e.g. SBAS); or

c) if an APV is not practical, straight-in RNP APCH with Lateral Navigation (LNAV).

En-route Operations

7.6 Unless supported by alternative means of ATS surveillance (such as radar, where there are no plans for ADS-B), all Category S upper controlled airspace and Category T airspace supporting high density aerodromes should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B using 1090ES with DO-260/260A and 260B capability, with priority implementation for the following high density FIRs (**Figure 12**) supporting the busiest Asia/Pacific traffic flows (APANPIRG Conclusion 22/8 and 23/5 refer):

a) South Asia: Delhi, Mumbai;

b) Southeast Asia: Bangkok, Hanoi, Ho Chi Minh, Jakarta, Kuala Lumpur, Kota Kinabalu, Manila, Sanya, Singapore, Vientiane; and

c) East Asia: Beijing, Fukuoka, Guangzhou, Hong Kong, Kunming, Incheon, Shanghai, Shenyang, Taibei, Wuhan.

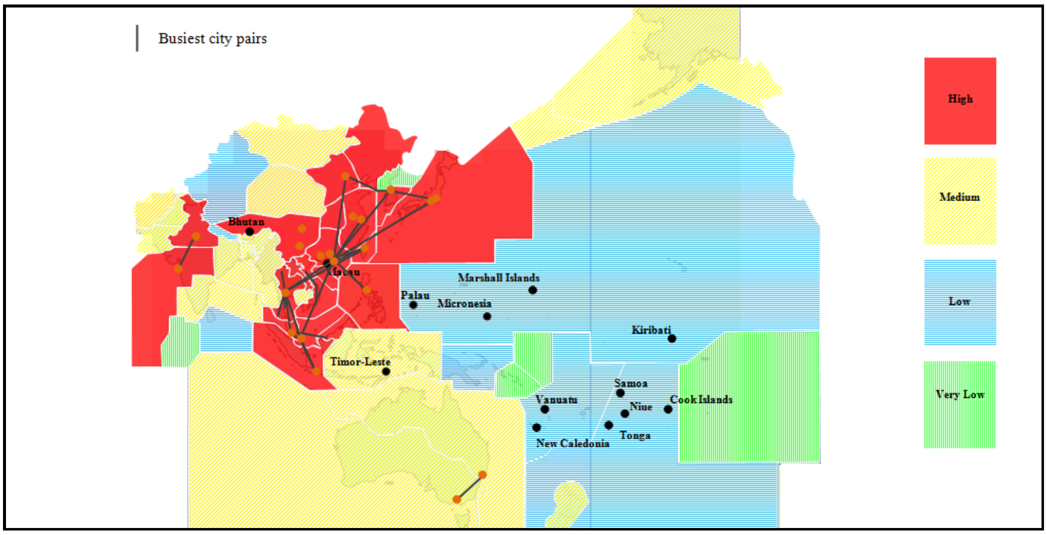


Figure 12: High Density FIRs

Note 1: in areas where ADS-B based separation service was provided, the carriage of ADS-B OUT using 1090ES with DO260/60A or 260B is recommended.

Note 2: States should refer to the ADS-B implementation in the ICAO ADS-B Implementation and Guidance Document (AIGD).

7.7 All Category R and S upper controlled airspace, and Category T airspace supporting high density aerodromes should require the carriage of an operable mode S transponder within airspace where Mode S radar services are provided.

7.8 All Category R and S upper controlled airspace, and Category T airspace supporting high density aerodromes should be designated as non-exclusive or exclusive PBN airspace as appropriate. This is to allow operational priority for PBN approved aircraft, harmonised specifications and to take into account off-track events such as weather deviations, with priority implementation for high density FIRs.

Note: Non-exclusive means that non-PBN aircraft may enter the airspace, but may be accorded a lower priority than PBN aircraft, except for State aircraft.

7.9 All ATS routes should be designated with a navigation performance specification to define the CNS/ATM operational environment. The ATS route navigation performance specification selected should be harmonised and utilise the least stringent requirement needed to support the intended operation. When obstacle clearance or ATC separation requirements demand, a more stringent navigation specification may be selected. As far as practicable, all new ATS Routes designed after June 2013 (adoption of the seamless ATM plan v1.0) should be PBN Routes in accordance with the following specifications :

- Category R airspace – **RNP 4**, **RNP 10** (RNAV 10) (other acceptable navigation specifications – RNP 2 oceanic); and
- Category S airspace –**RNAV 2** or **RNP 2** (other acceptable navigation specifications – RNAV 5).

Note 1: RNP 2 is expected to be utilised before Phase 2, when the RNP 2 instrument procedure design, ATC separation standards and operational approval are in place.

Note 2: within Category R airspace, transition to RNP 4 or RNP 2 oceanic specifications is recommended at the earliest opportunity. RNP 2 oceanic requires dual independent installations, plus CPDLC and ADS-C.

7.10 The ICAO Table of Cruising Levels based on feet as contained in Appendix 3a to Annex 2 should be used.

Civil/Military Cooperation

7.11 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; and
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.

PARS Phase II (expected implementation by 07 November 2019)

Aerodrome Operations

7.12 Where practicable, all high density aerodromes should provide the following infrastructure and facilities to optimise runway capacity:

a) additional runway(s) with adequate separation between runway centrelines for parallel independent operations;

b) parallel taxiways, rapid exit taxiways at optimal locations to minimize runway occupancy times and entry/exit taxiways;

c) rapid exit taxiway indicator lights (distance to go information to the nearest rapid exit taxiway on the runway);

d) twin parallel taxiways to separate arrivals and departures;

e) perimeter taxiways to avoid runway crossings;

f) taxiway centreline lighting systems;

g) adequate manoeuvring area signage (to expedite aircraft movement);

h) holding bays;

i) additional apron space in contact stands for quick turnarounds;

j) short length or tailored runways to segregate low speed aircraft;

k) taxi bots or towing systems, preferably controlled by pilots, to ensure efficiency and the optimal fuel loading for departure; and

l) advanced visual docking guidance systems.

7.13 All high density aerodromes should have a declared airport terminal and runway capacity based on a capacity and efficiency analysis, to ensure the maximum possible efficiency of aircraft and passenger movement. Sample runway capacity figures are provided from several States in **Appendix D**. In addition, all high density aerodromes should develop and regularly update the Airport Master Plan to align the airport infrastructure future planning with the Seamless ATM needs.

7.14 All high density international aerodromes should implement collaborative Airport Operations Planning (AOP) and where practicable an Airport Operations Centre (APOC).

7.15 All high density international aerodromes should integrate arrival/departure management (AMAN/DMAN) with the surface management systems: A-SMGCS with SMAN or ASDE-X.

7.16 All high density international (ICAO codes 3 and 4) aerodromes and aircraft operators operating from these aerodromes should implement EVS and runway safety alerting logic (SURF-1A) in accordance with EUROCAE document EUROCAE/RTCA documents ED-159/DO-312/ ED-165.

Terminal Operations (Category T airspace)

7.17 **RNP 0.3** arrival/departure, approach and/or en-route transiting procedures should be considered at high density aerodromes with rotary wing operations.

7.18 All international aerodromes should have **RNAV 1** (ATS surveillance environment) or **RNP 1** (ATS surveillance and non-ATS surveillance environments) SID/STAR.

7.19 Where practicable, all aerodromes with instrument runways serving aeroplanes should have:

a) GBAS precision approaches; or ILS/MLS approaches (with APV approach as a backup); or

b) APV, either RNP APCH with Barometric Vertical Navigation (Baro–VNAV) or augmented GNSS (e.g. SBAS); or

c) when an APV is not practical, straight-in RNP APCH with LNAV.

7.20 When establishing the implementation of PBN approach procedures in accordance with Assembly Resolution A37-11, States should first conduct an analysis of the instrument runway eligibility for APV approaches. This analysis should include the feasibility of the APV at a particular location, the presence of regular commercial operations and the current or projected user fleet capability for APV. The introduction of landing capability using GNSS and its augmentations such as GBAS Landing System (GLS) is recommended where these systems were economically beneficial. Locations where APV approach were either not feasible or where regular operators could not realise the benefit of APV should implement RNP APCH with LNAV minima instead of APV, to provide the safety benefits of straight-in approach procedures. Where a short length or tailored runway designed to segregate low speed aircraft is established, the runway should be served by PBN procedures including SID and STAR that provided segregation from the procedures serving other aerodrome runways as far as practicable.

7.21 PBN procedures that overlay visual arrival and departure procedures should be established where this provided an operational advantage.

7.22 Airspace and instrument flight procedures associated with high density international aerodromes should not be constrained by international borders and political barriers as far as practicable. Airspace and procedures should be established only after appropriate consideration of:

a) environmental efficiencies;

b) noise abatement and local authority regulations;

c) adjacent aerodromes;

d) conflicting instrument flight procedures; and

e) affected ATC units or ATM procedures.

En-route Airspace

7.23 All Category R and S upper controlled airspace, and Category T airspace should, unless approved by the State, require the carriage of an operable mode S transponder within airspace where Mode S radar services are provided.

7.24 All en-route controlled airspace should be designated as being exclusive PBN airspace with mandatory carriage of GNSS utilising RNP navigation specifications, except for State aircraft. Such implementation mandates should be harmonised with adjacent airspace. PBN ATS routes should be established in accordance with the following specification:

- Category R and S airspace – **RNP 2**.

Note: the Asia/Pacific recognises an equivalency for RNP 2 as being an aircraft approved for RNAV 2, RNP 1 and with GNSS. Prior to the ICAO standard flight plan being updated to recognise RNP 2, States should ensure that aircraft operators with RNP 2 approval file designator 'Z' in field 10 and 'NAV/RNP 2' in field 18.

7.25 All Category S upper controlled airspace and Category T airspace should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B using 1090ES with DO-260/260A or 260B capability.

7.26 In areas where ADS-B based separation service is provided, the mandatory carriage of ADS-B OUT using 1090ES with DO260/60A or 260B should be prescribed .

7.27 All high density international aerodromes should implement approaches with the Continuous Descent Operations (CDOs) using VNAV as far as practicable.

Note: Refer to RTCA DO-236CB, Minimum Aviation System Performance Standards: Required Navigation.

7.28 All high density FIRs should implement data-link Departure Clearance (DCL) compliant with EUROCAE WG78/RTCA SC 214 standards.

Common network services

7.29 All ANSPs serving high density FIR should connect to CRV (Common aeRonautical Virtual private network). ANSPs serving as Inter-regional Backbone Boundary Intermediate Systems should connect to the IP network infrastructure of other regions.

Preferred ATM Service Levels (PASL)

Note: prior to the implementation, the applicability of PASL should be verified by analysis of safety, current and forecast traffic demand, efficiency, predictability, cost effectiveness and environment to meet expectations of stakeholders.

PASL Phase I (expected implementation by 12 November 2015)

Aerodrome Operations

7.30 All high density aerodromes should have AMAN/DMAN facilities.

Terminal Operations

7.31 All high density aerodromes should have meteorological information provided by aerodrome meteorological offices (e.g., aerodrome meteorological forecasts and reports, aerodrome warnings and wind shear warnings) and automated equipment (e.g., wind shear alerts) as necessary supporting enhanced efficiency and safety of efficient terminal operations.

En-route Operations

7.32 High density FIRs (refer **Figure 9**) supporting the busiest Asia/Pacific traffic flows and high density aerodromes should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements.

7.33 Harmonization of upper airspace classification should be as follows:

a) Category R controlled airspace– **Class A**; and

b) Category S controlled airspace– **Class A**, or if there are high level general aviation or military VFR operations: **Class B** or **C**.

7.34 Where practicable, all ATC Sectors within the same ATC unit with ATS surveillance capability should have automated hand-off procedures that allow the TOC of aircraft without the necessity for voice communications, unless an aircraft requires special handling.

ATM Systems

7.35 The delivery of CNS/ATM services should be based primarily on the CNS/ATM capability. 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, taking into account such factors as:

a) the automation of the ATM system;

b) the capability of the ATC communications system;

c) the performance of the ATS surveillance system, including data-sharing or overlapping coverage at TOC points; and

d) ensuring the competency of air traffic controllers to apply the full tactical capability of ATS surveillance systems.

7.36 The efficacy, continuity and availability of ATM services should be supported by adherence with regional planning and guidance material regarding ATM automation and ATM contingency systems.

7.37 Paper flight progress strips should not be used in automated ATM environments due to efficiency and transcription error/data mismatch issues.

7.38 ADS-B (using 1090ES) or MLAT or radar surveillance systems should be used to provide coverage of all Category S-capable airspace as far as practicable. 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).

7.39 Mode S surveillance and the use of Mode S Downlinked Aircraft Parameters (DAPS) should be enabled in all upper level Category S airspace and all Category T airspace servicing high density city pairs. ATM automation system specifications should include the processing and presentation in ATC human-machine interfaces and decision support and alerting tools, the communications, navigation and approach aid indicators received in items 10 and 18 of FPL and ATS messages, where applicable, and the following Mode S or ADS-B downlinked aircraft parameters as a minimum:

- Aircraft Identification;
- Aircraft magnetic heading;
- Aircraft indicated airspeed or Mach Number; and
- Pilot selected altitude.

Note1: DAPS may not be present in downlinked reports from some aircraft ADS-B applications.

Note 2: Downlinking of correct Aircraft Identification (Flight ID) enables automated coupling of ATS surveillance system information with the flight plan, and unambiguous ATC identification of aircraft. States should undertake comprehensive education programs to ensure pilots set the correct Flight ID. Guidance on the correct use of the aircraft identification function is provided in the ADS-B Implementation and Operations Guidance Document, available on the ICAO Asia/Pacific Regional Office website.

7.40 All Category S upper controlled airspace, and Category T airspace supporting high density city pairs and wholly served by Mode S SSR and/or ADS-B surveillance should implement the use of a standard non-discrete Mode A code for Mode S transponder equipped aircraft to reduce the reliance on assignment of discrete Mode A SSR codes and hence reduce the incidences of code bin exhaustion and duplication of code assignment.

7.41 Within Category R airspace, ADS-C surveillance and CPDLC should be enabled to support PBN-based separations, as well as UPR and DARP.

7.42 Subject to appropriate filtering, ATS surveillance data, particularly from ADS-B, should be shared with neighbouring ATC units within high density FIRs (refer **Figure 5**). Direct speech circuits and appropriate handoff procedures should be implemented between controllers providing ATS surveillance in adjacent airspace.

7.43 ATM systems should enable AIDC (version 3 or later) between ATC units where transfers of control are conducted unless alternate means of automated communication of ATM system track and flight plan data are employed. As far as practicable, the following AIDC messages types should be implemented:

- Advanced Boundary Information (ABI);
- Coordinate Estimate (EST);
- Acceptance (ACP);
- TOC; and
- Assumption of Control (AOC).

Note: the 18th Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/18) determined that the following interface areas required AIDC priority implementation in order to reduce Large Height Deviations:

a) *Indonesia: between Jakarta and Chennai/Ujung Pandang/Brisbane/Melbourne FIRs;*

b) *India: between Chennai and Kuala Lumpur FIRs;*

c) *Philippines: between Manila and Fukuoka/Taibei/Hong Kong/Ho Chi Minh/Singapore/Kota Kinabalu/ Ujung Pandang FIRs; and*

d) *China: between –*

   i. *Urumqi and Lahore FIRs; and*

   ii. *Beijing and Ulaan Baatar FIRs.*

Note: States should note the necessity to utilise Logical Acknowledgement Message processing (LAM) when implementing AIDC (refer to guidance in Chapter XX in PAN ICD).

7.44 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. FLAS other than OTS should only be utilised for safety and efficiency reasons within:

a) Category R airspace with the agreement of all ANSPs that provide services:

- within the airspace concerned; and
- within adjacent airspace which is affected by the FLAS; or

b) Category S airspace with the agreement of all ANSPs that provide services:

- where crossing track conflictions occur within 50NM of the FIRB; and
- ATS surveillance coverage does not overlap the FIRB concerned, or ATS surveillance data is not exchanged between the ATC units concerned.

7.45 ATM systems, including communication and ATS surveillance systems and the performance of those systems, should support the capabilities of PBN navigation specifications and ATC separation standards applicable within the airspace concerned.

Note: guidance on the performance of ATS communication and surveillance systems is available in the Global Operational Data-link Document.

7.46 ATM systems should be supported by digitally-based AIM systems () through implementation of Phase 1 and 2 of the AIS-AIM Roadmap in adherence with ICAO and regional AIM planning and guidance material.

Each component of an ATM systems should be supplied with the meteorological information necessary for the performance of its respective functions, including *inter-alia,* meteorological reports , forecasts, warnings alerts, advisory and briefing information

Priority

7.47 Where a minimum aircraft equipage is specified, any aircraft that does not meet specified equipage requirements should receive a lower priority, except as prescribed (such as for State aircraft). States should require State aircraft to comply with equipage requirements as far as practicable.

Human Performance

7.48 The following should be established to support human performance in the delivery of a Seamless ATM 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 –
    - air safety investigation;
    - system design (ergonomics, human-in-the-loop);
    - effective training (including the improved application of simulators);
    - fatigue management;
    - automated safety nets; and
    - contingency planning;
- effective safety reporting systems that –
    - are non-punitive, supporting a 'Just Culture';
    - promote open reporting to management; and
    - focus on preventive (systemic), not corrective (individual) actions in response to safety concerns, incidents and accidents.

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.

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'.

Note: regarding ATM contingency operations, refer to the Regional ATM Contingency Plan.

Civil/Military Cooperation

7.49 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);

b) formal civil-military liaison should take place for tactical responses by encouraging military participation at civil ATM meetings and within ATC Centres;

c) integration of civil and military ATM systems using joint procurement, and sharing of ATS surveillance data (especially from ADS-B systems) should be provided as far as practicable;

d) joint provision of civil/military navigation aids should be encouraged;

e) common training should be conducted between civil and military ATM units in areas of common interest; and

f) civil and military ATM units should utilize common procedures as far as practicable.

PASL Phase II (expected implementation by 07 November 2019)

Aerodrome Operations

7.50 ATM system design (including ATS surveillance, ATS communication systems, ATC separation minimum, aircraft speed control and ATC training) should be planned and implemented to support optimal aerodrome capacity expectations for the runway(s) concerned.

Terminal Operations

7.51 All terminal 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.

*Note: A study of the terminal ATC Sector airspace capacity every 15 minutes is provided in **Appendix D**.*

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

En-route Operations

7.53 Where practicable, all ATC Sectors with adjacent ATC Centres using ATS surveillance capability should have automated hand-off procedures that allow the TOC of aircraft without the necessity for voice communications, unless an aircraft requires special handling.

7.54 All FIRs supporting Major Traffic Flows (detailed in the Asia/Pacific eANP) should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements.

Note: refer to the Asia/Pacific ATFM Framework on Collaborative ATFM for more details on Network Operations expectations.

7.55 All high density FIRs (detailed in the Asia/Pacific eANP) should enhance the ATFM and CDM in accordance with the ATFM Framework in order to enhance and monitor the airspace capacity.

Note: refer to the Asia/Pacific ATFM Framework for Collaborative ATFM paragraphs 7.6, 7.7, 7.8, 7.11, 7.18, 7.19, 7.21, 7.23, 7.26, 7.27, 7.28, 7.30, 7.31, 8.9.

Note: full flexible use of airspace (FUA) not yet incorporated into the Asia/Pacific ATFM Framework for Collaborative ATFM.

7.56 Subject to appropriate filtering, ATS surveillance data, particularly from ADS-B, should be shared with all neighbouring ATC units.

7.57 ATM systems should enable AIDC, 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.

7.58 To ensure the safety and efficiency of aircraft operations, a nominal aircraft capacity figure based on a scientific capacity study and safety assessment should be available for all enroute ATC sectors.

*Note: a study of the en-route ATC Sector airspace capacity every 15 minutes is provided in **Appendix D**.*

7.59 All States with Agencies that conduct ballistic launch or space 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;

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:

   i) three days for the defined launch window; and

   ii) 24 hours for the actual planned launch timing;

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

d) that communication is established with affected ANSPs to provide accurate and timely information on the launch/re-entry activity to manage tactical responses (for example, emergencies and activity completion).

ATM Systems

7.60 ATM systems should be supported by complete implementation of AIM Phase 3 (using at a minimum, version AIXM 5.1).

7.61 ATM systems providing services within Category R airspace should enable appropriate ATC capabilities including CPAR, which is a key enabler for UPR and DARP operations.

7.62 Electronic flight progress strips should be utilised wherever automation systems allow the capability.

7.63 Direct speech circuits or digital voice communications, meeting pre-established safety and performance requirements, and appropriate handoff procedures should be implemented between controllers providing ATS surveillance in adjacent airspace.

7.64 An agreement between the MET authority and the appropriate ATS authority should be established to cover the exchange of meteorological information obtained from aircraft.

7.65 All States should ensure appropriate SAR capability by complying with the provisions of the Asia/Pacific SAR Plan.

7.66 All States should upgrade their ATM voice communication systems or implement analog/digital VoIP converters in compliance with the EUROCAE ED-137 standards (interoperability standards for VOIP ATM components).

Safety Nets

7.67 ATS surveillance systems should enable STCA, APW and MSAW. Route Adherence Monitoring (RAM) should be utilised when monitoring PBN route separations. Cleared Level Adherence Monitoring (CLAM) should be utilised to monitor RVSM airspace.

Human Performance

7.68 Prevention of fatigue systems should be established to support human performance in the delivery of a Seamless ATM service. The systems should be consistent with guidance within ICAO Doc 9966 *FRMS – Fatigue Risk Management System*.

PASL Phase III (expected implementation by 03 November 2022)

7.69 Digital Clearance Delivery should be implemented for flights departing high density airports or operating on routes between the busiest Asia/Pacific city pairs.

En-Route Operations

7.70 Where practicable, free routes can be introduced in Category S controlled upper airspace, where the flight plan is not defined as segments of a published route network or track system, to facilitate user-preferred profiles.

ASBU Block 1 After 2019

7.71 In view that provisions for ASBU Block 1 modules would be available after 2019, the following ASBU Block 1 modules should be considered for implementation in PASL Phase III to enhance ATM services throughout the region:

a. **B1-NOPS** – Better use of the airspace and ATM network, with positive effects on the overall cost-efficiency of ATM. Optimization of DCB measures by using assessment of workload/complexity as a complement to capacity. Airspace users would have greater visibility and say on the likelihood to respect their schedule and can make better choices based on their priorities. The module is expected to further reduce the number of situations where capacity or acceptable workload would be exceeded.

b. **B1-FICE** – The use of a new mechanism for FPL filing and information sharing will facilitate flight data sharing among the actors. FF-ICE, Step 1 for ground-ground application will facilitate collaborative decision-making (CDM), the implementation or the systems interconnection for information sharing, trajectory or slot negotiation before departure providing better use of capacity and better flight efficiency. Reduced air traffic controller (ATC) workload and increased data integrity supporting reduced separations translates to cross-sector / cross-border capacity flow increases. Better knowledge of aircraft capabilities allows trajectories closer to airspace user preferred trajectories and better planning.

c. **B1-AMET** –Improvements in the content, format, quantity, quality, timeliness and availability of meteorological information (observations and forecasts) will lead to enhanced situational awareness of meteorological conditions, and in particular the location, extent, duration and severity of hazardous meteorological conditions, as well as space weather, and their impacts on airspace.

d. **B1-SWIM** – Implementation of system-wide information management (SWIM) services (applications and infrastructure) to create an aviation intranet based on standard data models, and internet-based protocols to maximize interoperability. Using better information allows operators and service providers to plan and execute better trajectories. There can be further reduction of costs when all information are managed consistently across the network, limiting bespoke developments. This module also allows that the right, up-to-date and accurate data is timely available to the right user with the required performance and quality. It represents the achievement of a significant paradigm shift in ATM and is the enabler, together with the appropriate telecommunication infrastructure, of the most advanced features of the Global concept, in particular seamless trajectory based operations.

e. **B1-DATM** – Aim is to provide greater and timelier access to up-to-date information by a wider set of users. Benefits include reduced processing time for new information, increased ability of the system to create new applications through the availability of standardized data, reduced probability of data errors or inconsistencies, reduced possibility to introduce additional errors through manual inputs etc.

RESEARCH AND FUTURE DEVELOPMENT POSSIBILITIES

Research and Development

8.1 To develop the tools and systems required to meet foreseeable long-term requirements, there is a need for States to undertake and co-operate on ATM Improvement. This includes major efforts to define concepts, to extend knowledge and invent new solutions to future ATM challenges so these new concepts are selected and applied in an appropriate timely manner. Such efforts could be forged through collaborative partnerships between, States, ANSPs, International Organizations, institutes of higher learning and specialised technical agencies. This concept is consistent with Seamless ATM Principle 36 (*Inter-regional cooperation ('clustering') for the research, development and implementation of ATM projects*).

8.2 The need for concepts beyond current technology and systems had been reinforced at APANPIRG/23. With the end goal of a globally interoperable ATM system in mind, the region will have to consider planning for a long term supporting concept and infrastructure. States should not overlook the need to include the development of future ATM concepts that will ensure the safety and fluidity of air transportation over the next few decades. The following are possible areas that should be considered for future development, in order to continue pursuance of seamless ATM beyond ASBU Block 0 implementations and global interoperability:

a. Space-Based ATS Surveillance - The AN-Conf/12 endorsed Recommendation 1/9 regarding space-based ADS-B systems being included in the GANP (**Appendix B**);

b. Sub-Regional ATFM - Inter-linked (data-sharing) ATFM units (which may be virtual offices) should be developed to serve various sub-regions. This concept is consistent with Seamless ATM Principle 8 (*Sub-regional ATFM based on system-wide CDM serving the busiest terminal airspace and MTF*). The Global ATM Operational Concept paragraph 2.4.3 states: *Demand and capacity balancing will be integrated within the ATM system*;

c. Collaborative Air Navigation Services - This concept is consistent with the following Seamless ATM Principles: 9 (*Cross-border/FIR cooperation for use of aeronautical facilities and airspace, collaborative data sharing, airspace safety assessment and ATM Contingency plannin*g) and 15 (*Collaboration by ANSPs for evaluation and planning of ATM facilities*). The AN-Conf/12 endorsed Recommendation 5/1, regarding collaboration in airspace organization and routing, which emphasised, *inter alia*, the need to take advantage of improved models for inter-regional coordination and collaboration to achieve seamless air traffic management and more optimum routes through airspace (**Appendix B**);

d. Airspace Optimisation - the CONOPS states: *Where possible the number of FIRs should be minimized particularly along traffic flows. FIRs should not necessarily be based strictly on the boundaries of sovereign territories*. This concept is consistent with and the following Seamless ATM Principles: 12 (*The optimisation of airspace structure through amalgamation and use of technology*) and 16 (*Optimization of ATM facilities through amalgamation and the use of technology, including automation, satellite-based systems and remote facilities*). The Global ATM Operational Concept paragraph 2.2.2 states: *While acknowledging sovereignty, airspace will be organized globally. Homogeneous ATM areas and/or routing areas will be kept to a minimum, and consideration will be given to consolidating adjacent areas*;

e. Consistent Operating Practices and Procedures - this is aligned with Seamless ATM Principle 3 (*Harmonised regional or sub-regional rules and guidelines*) and 4 (*Shared ATM operational standards, procedures, guidance materials through common manuals and templates*); and

f. Transition Altitude/Layer Harmonisation – this is consistent with AN-Conf/-12 Recommendation 5/1 b).

MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

Milestones

9.1 Section 7 (Performance Improvement Plan) provides milestones and timelines for a number of elements in the PARS and PASL Phase I and II, being effective 12 November 2015 and 07 November 2019 respectively.

9.2 It should be noted that States should commence planning for the various elements, such as PBN specifications detailed in the PARS to cover overall ATM operations, taking into account the whole phase of flight. This should be planned from the approval of this Plan, to ensure a smooth transition by the onset of Phase I, and should include consideration of issues such as:

- aircraft equipage and certification;
- safety/operational analysis and assessment;
- cost-effectiveness;
- budgetary issues;
- development of operational procedures; and
- training.

9.3 States should commence planning for PBN specifications detailed in the PARS and other initiatives which have been globally documented, to facilitate a smooth transition by the onset of Phase I. The Regional PBN Plan is expected to transition to a general guideline for implementation during this period, with the prescriptive PBN specifications being incorporated into this Plan.

9.4 Section 8 (Research and Future Development Possibilities) provides, subject to future agreement by concerned parties, possible Seamless ATM improvements beyond 2019 until 2031.

Priorities

9.5 It is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers. The ASBU Block 0 priorities determined by APSAPG/2 in Section 5 (Background Information) were used to determine the ASBU elements that should be contained within which PARS and PASL Phase.

Actions

9.6 This Plan necessitated a number of implementation actions. TheImplementation Guidance was developed by the ICAO Regional Office. It is expected that each Asia/Pacific State and administration will put high priority to develop Seamless ATM Implementation Planning based on applicable parts of the Implementation Guidance Material, and implementation progress be reported to APANPIRG.

9.7 The ICAO Seamless ATM Reporting System supports the implementation of the global and regional items by monitoring progress of States and administrations. The regional picture is updated periodically and available to access on the ICAO APAC website.

9.8 APANPIRG and its contributory bodies such as the ATM Sub-group and the CNS Sub-group are responsible for the oversight of air navigation issues within the Asia/Pacific, so these bodies needed to be made aware of State implementation progress of Seamless ATM initiatives. APANPIRG and its contributory bodies need to manage the implementation of Seamless ATM through the ASBU framework and this Plan.

9.9 Section 6 (Current Situation) provides detailed analysis and major concerns in the region. Some of the non-ICAO sub-regional collaborative frameworks or actions have successfully achieved ATM operational improvements in the past. These forums will continue to be important in Seamless ATM implementation in the future.

9.10 The ICAO Asia and Pacific Regional Office is responsible for taking actions that assisted the implementation of Seamless ATM within its accredited States. In addition, the Asia and Pacific Regional Office coordinated with adjacent ICAO regional offices on an ad hoc basis or at relevant trans-regional meetings.

Appendix A: KANSAI Statement

The Directors General of Civil Aviation (DGCA) of the Asia and Pacific Regions met for the 46th DGCA Conference in Japan, 12-16 October, 2009. Recalling that the 45th Conference had endorsed the Theme Topic for the 46th DGCA Conference as "Seamless Sky: Bringing Together the Asia/Pacific Regions," Directors General of the Region held a productive discussion focusing on three aspects of the "Seamless Sky," namely Air Traffic Management (ATM), Air Cargo Security, and Aviation Safety, and agreed to issue this Kansai Statement.

KANSAI STATEMENT

1. We recognized that as civil aviation develops and globalization progresses, harmonization in civil aviation systems is becoming critically important in the Asia and Pacific Region, which has been characterized by the diversities of the member States. What people expect from harmonization in civil aviation is that aircraft operators will become capable of seamlessly flying between regions, that the whole of the network will be secured at the agreed level, and that transparent and interoperable standards will be set among States and regions. In this regard, "Seamless Sky" is particularly important in the areas of air traffic management, aviation security and aviation safety.

2. Regarding Air Traffic Management (ATM), we recognized that the ICAO has been leading the development and implementation of the Global Air Traffic Management system with the implementation target of 2025. The Global Air Traffic Management system will be based on the components described in the Global ATM Operational Concept. We also recognized that the United States and Europe have been developing their future air traffic modernization programmes. Taking such global trends of future ATM system into consideration, we recognized the necessity of planning the future ATM system for the Asia and Pacific Region by the active collaboration and participation of the whole of the Region. In this regard, we agreed that APANPIRG be the starting platform to discuss and plan the future ATM system of the Asia and Pacific Region including targets and a time schedule.

3. Regarding aviation security, we recognized the significance of enhancing air cargo security. Such efforts will enable member States to protect the flow of air cargo, raise security standards and facilitate international trade in the Asia and Pacific Region. To achieve these desired outcomes effectively, member States are encouraged to collaborate with one another and with ICAO towards developing internationally harmonized measures and processes in air cargo security. We agreed that the further sharing of information and best practices should be promoted, and to consider including provisions on air cargo security into Annex 17, taking into account the need to protect the entire cargo supply chain.

4. Regarding the aviation safety, we acknowledged the ICAO's leadership in the improvement of aviation safety. We recognized the importance of the member States' role in ensuring that their air operators establish and maintain the highest standards in safety through the proper implementation of Safety Management System as envisaged under the State Safety Programme. In addition, we recognized the importance of the safety monitoring activities regarding foreign aircraft by the member States in the Region. We agreed to further enhance the cooperation in these efforts and activities in the Region in a harmonized manner.

5. We are determined to realize the Seamless Sky in the Asia and Pacific Region from this conference onwards. We agreed to make efforts to move forward toward the harmonized aviation in the Asia Pacific Region in cooperation with all the member States and the ICAO Asia Pacific Regional Office.

Appendix B: Relevant 12th Air Navigation Conference Recommendations

1 Recommendation 1/7 – Automatic dependent surveillance — broadcast

That States:

a) recognize the effective use of automatic dependent surveillance — broadcast (ADS-B) and associated communication technologies in bridging surveillance gaps and its role in supporting future trajectory-based air traffic management operating concepts, noting that the full potential of ADS-B has yet to be fully realized;

b) recognize that cooperation between States is key towards improving flight efficiency and enhancing safety involving the use of automatic dependent surveillance — broadcast technology.

That ICAO:

c) urge States to share automatic dependent surveillance — broadcast (ADS-B) data to enhance safety, increase efficiency and achieve seamless surveillance and to work closely together to harmonize their ADS-B plans to optimize benefits.

2 Recommendation 1/9 – Space-based automatic dependent surveillance — broadcast

That ICAO:

a) support, subject to validation, the inclusion in the GANP, development and adoption of space-based automatic dependent surveillance — broadcast surveillance as a surveillance enabler;

b) develop Standards and Recommended Practices and guidance material to support space-based automatic dependent surveillance — broadcast as appropriate; and

c) facilitate needed interactions among stakeholders, if necessary, to support this technology.

3 Recommendation 2/1 – ICAO aviation system block upgrades relating to airport capacity

That States:

a) according to their operational needs, implement the aviation system block upgrade modules relating to airport capacity included in Block 0;

b) endorse the aviation system block upgrade modules relating to airport capacity included in Block 1 and recommended that ICAO use them as the basis of its standards work programme on the subject;

c) agree in principle to the aviation system block upgrade modules relating to airport capacity included in Blocks 2 and 3 as the strategic direction for this subject.

4 **Recommendation 3/1 – ICAO aviation system block upgrades relating to Interoperability and data – through globally interoperable system-wide information management**

That States:

a) endorse the aviation system block upgrade module relating to interoperability and data – through globally interoperable system-wide information management included in Block 1, and recommend that ICAO use it as the basis of its work programme on the subject;

b) agree in principle with the aviation system block upgrade module relating to interoperability and data – through globally interoperable system-wide information management included in Block 2, as the strategic direction for this subject; and

That ICAO:

c) include, following further development and editorial review, the aviation system block upgrade modules relating to interoperability and data – through globally interoperable system-wide information management for inclusion in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP).

5 **Recommendation 4/2 – ICAO ASBU relating to ground surveillance using ADS-B/MLAT, air traffic situational awareness, interval management and airborne separation**

That States:

a) according to their operational needs, to implement the aviation system block upgrade modules relating to ground surveillance, improved air traffic situational awareness and improved access to optimum flight levels included in Block 0;

b) endorse the aviation system block upgrade modules relating to interval management included in Block 1 and recommend that ICAO use them as the basis of its work programme on the subject;

c) endorse the aviation system block upgrade modules relating to airborne separation included in Blocks 2 and 3 as the strategic direction for this subject;

That ICAO:

d) include, following further development and editorial review, the aviation system block upgrade modules relating to airborne separation in the draft Fourth Edition of the *Global Air Navigation Plan*;

e) adopt "airborne separation" concepts involving controllers assigning tasks to flight crews, with controllers able to apply different, risk-based separation minima for properly equipped ADS-B IN aircraft;

f) in the development of provisions, acknowledge the relationship between airborne separation and airborne collision avoidance system;

g) modify aviation system block upgrade (ASBU) Module B2-85 to reflect e) and f), modify ASBU Module B2-101 to reflect f); and

h) review the concept and terminology supporting B2-25 "airborne separation" and amend the module accordingly.

6 **Recommendation 5/1 - Improved operations through enhanced airspace organization and routing**

Considering that performance-based navigation (PBN) is one of ICAO's highest air navigation priorities and the potential benefits achievable through creation of additional capacity with PBN:

That States:

a) implement performance-based navigation in the en-route environment;

b) fully assess the operational, safety, performance and cost implications of a harmonization of transition altitude and, if the benefits are proven to be appropriate, undertake further action on a national and (sub) regional basis;

c) take advantage of improved models for inter-regional coordination and collaboration to achieve seamless air traffic management and more optimum routes through the airspace;

d) through the planning and implementation regional groups improve their methods of coordination to increase implementation of en-route performance-based navigation in order to achieve more optimum routes through the airspace;

That ICAO:

e) encourage the planning and implementation regional groups to support the early deployment of performance-based navigation.

7 **Recommendation 6/1 – Regional performance framework – planning methodologies and tools**

That States and PIRGs:

a) develop and maintain regional air navigation plans consistent with the Global Air Navigation Plan;

b) finalize the alignment of regional air navigation plans with the Fourth Edition of the *Global Air Navigation Plan* by May 2014;

c) focus on implementing aviation system block upgrade Block 0 Modules on the basis of operational requirements, recognizing that these modules are ready for deployment;

d) use the electronic regional air navigation plans as the primary tool to assist in the implementation of the agreed regional planning framework for air navigation services and facilities;

e) consider how the continuous monitoring approach to safety oversight maps to the evaluation of Member States' safety oversight capabilities concerning aviation system block upgrades;

f) involve regulatory and industry personnel during all stages of planning and implementation of aviation system block upgrade modules;

g) develop action plans to address the identified impediments to air traffic management modernization as part of aviation system block upgrade planning and implementation activities.

8 Recommendation 6/4 – Human performance

That ICAO:

a) integrate human performance as an essential element for the implementation of ASBU modules for considerations in the planning and design phase of new systems and technologies, as well as at the implementation phase, as part of a safety management approach. This includes a strategy for change management and the clarification of the roles, responsibilities and accountabilities of the aviation professionals involved;

b) develop guidance principles, guidance material and provisions, including SARPs as necessary, on ATM personnel training and licensing including instructors and assessors, and on the use of synthetic training devices, with a view to promoting harmonization, and consider leading this effort with the support of States and industry;

c) develop guidance material on using field experience and scientific knowledge in human performance approaches through the identification of human-centred operational and regulatory processes to address both current safety priorities and the challenges of future systems and technologies;

d) assess the impact of new technologies on competencies of existing aviation personnel, and prioritize and develop competency-based provisions for training and licensing to attain global harmonization;

e) establish provisions for fatigue risk management for safety within air traffic services operations;

f) develop guidance material on different categories of synthetic training devices and their respective usage;

provide human performance data, information and examples of operational and regulatory developments to ICAO for the benefit of the global aviation community;

h) support all ICAO activities in the human performance field through the contribution of human performance expertise and resources;

i) adopt airspace procedures, aircraft systems, and space-based/ground-based systems that take into account human capabilities and limitations and that identify when human intervention is required to maintain optimum safety and efficiency; and

j) investigate methods to encourage adequate numbers of high quality aviation professionals of the future and ensure training programmes are in line with the skills and knowledge necessary to undertake their roles within a changing industry.

9 Recommendation 6/12 – Prioritization and categorization of block upgrade modules

That States and PIRGs:

a) continue to take a coordinated approach among air traffic management stakeholders to achieve effective investment into airborne equipment and ground facilities;

b) take a considerate approach when mandating avionics equipage in its own jurisdiction of air navigation systems provision, taking into account of burdens on operators including foreign registry and the need for consequential regional/global harmonization;

That ICAO:

a) continue to work on guidance material for the categorization of block upgrade modules for implementation priority and provide guidance as necessary to planning and implementation regional groups and States;

b) modify the block upgrade module naming and numbering system using, as a basis, the intuitive samples agreed by the Conference; and

c) identify modules in Block 1 considered to be essential for implementation at a global level in terms of the minimum path to global interoperability and safety with due regard to regional diversity.

Appendix C: Seamless ATM Principles

People: Cultural and Political Background

1. High-level political support (including development of educational information for decision-makers) to support Seamless ATM initiatives, including military cooperation and AIM.
2. Education and implementation of non-punitive reporting and continuous SMS improvement systems.

Aviation Regulations, Standards and Procedures

3. Harmonised regional or sub-regional rules and guidelines, modelled on the regional application of common regulations incorporated by reference into local legislation.
4. Shared ATM operational standards, procedures, guidance materials through common manuals and templates.
5. The promotion of mutual recognition of ATM qualifications between States.
6. An emphasis on delivery of ATM services based on CNS capability, resulting in flexible, dynamic systems.
7. The use of high-fidelity simulators to train controllers on the optimal application of ATC separations and procedures that support Seamless ATM applications, emergency and contingency responses, testing of software releases, and may serve as a backup ATM platform.

ATM Coordination

8. Sub-regional ATFM based on system-wide CDM serving the busiest terminal airspace and MTF.
9. Cross-border/FIR cooperation for use of aeronautical facilities and airspace, collaborative data sharing, airspace safety assessment and ATM Contingency planning.
10. Encouragement of military participation in civil ATM meetings and in ATS Centres where necessary.

Airspace Organisation

11. Promoting flexible use airspace arrangements and regular review of airspace to ensure it is appropriate in terms of purpose, size, activation and designation.
12. The optimisation of airspace structure through amalgamation and use of technology.

Facilities: Aerodromes

13. To encourage aerodrome operators to actively participate in ATM coordination in respect of Airport CDM development and operational planning, including aerodrome complexity and capacity.
14. Planning and coordination with local authorities and government agencies to take into account environmental issues, obstacles, aerodrome and PBN development.

ATS Units

15. Collaboration by ANSPs for evaluation and planning of ATM facilities.
16. Optimization of ATM facilities through amalgamation and the use of technology, including automation, satellite-based systems and remote facilities.

Navigation Aids

17. The continued rationalisation of terrestrial navigation aids to satellite-based procedures, while retaining a minimum network necessary to maintain safety of aircraft operations.
18. Support for a GNSS-based global PBN approval standard.
19. Regional cooperation for augmentation systems in terms of interoperability and increased service areas, and a GNSS ionospheric monitoring network.

Telecommunication

20. Encouragement of the use of ground-ground ATN/AMHS and diverse satellite communication systems.
21. Enhancement of data-link capabilities (VHF including VDL M2, SATCOM).
22. Where cost beneficial and appropriate, the implementation of:
    - SATVOICE technologies and standards;
    - HF data-link;
    - VSAT networks in support of COM and SUR.
23. The prioritisation of AIDC systems to alleviate ATC coordination issues.

ATS Surveillance

24. The encouragement of ADS-B and/or MLAT implementation to improve ATS surveillance coverage, redundancy and multiple tracking capability.
25. Establishment of ADS-C where radar, ADS-B (including satellite –based ADS-B) and/or MLAT is not possible.
26. Expansion of ATS surveillance data-sharing initiatives.

Technology and Information: Flight Operations

27. Implementation of UPR and DARP where practicable.
28. Implementation of CDO and CCO where possible.
29. The encouragement of appropriate technologies that support Trajectory-Based Operations.

Aeronautical Data

30. Early implementation of AIM, including cooperative development of aeronautical databases and SWIM to support interoperable operations.

ATM Systems and Safety Nets

31. Application of ground-based safety nets, which includes tactical and strategic conflict probing (such as APW, STCA) and MSAW.
32. Support for Inter-facility Flight Data Processing System capability.
33. Collaborative development of CDM, ATFM, A/MAN and D/MAN support tools.
34. Encouragement of Digital ATIS and VOLMET information systems.
35. Encourage sharing of air traffic data between military ATM systems and civil ATM systems.

ATM Modernisation Projects

36. Inter-regional cooperation (‘clustering’) for the research, development and implementation of ATM projects.
37. A focus on technologies for earliest deployment and best cost benefits.

Appendix D: Capacity Expectations

1 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.

2 **Table D1** provides an indication of potential Aerodrome Arrival Rate (AAR) for a single runway, given aircraft ground speeds and aircraft spacing near the runway threshold (source: *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*).

Speed	3NM	3.5NM	4NM	4.5NM	5NM	6NM	7NM	8NM	9NM	10NM
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

Table D1: 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 ICAO *Manual on Collaborative Air Traffic Flow Management* (Doc 9971) contained guidelines for ATC sector capacity assessment. **Table G2** provides simplified ATC sector calculation guidance from Doc 9971.

Average sector flight time (minutes)	Optimum sector capacity value (aircraft)
3 minutes	5 aircraft
4	7
5	8
6	10
7	12
8	13
9	15
10	17
11	18
12 minutes or more	18

Table D2: Simplified ATC Sector Capacity Table (no complexity/automation allowance)

4 Australia, Japan, New Zealand, Singapore, Thailand and the United States 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.

<u>Australia</u>

5 Brisbane and Melbourne aerodrome 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

6 Aerodrome capacity expectations:

- Narita (dual runways): 56-64;
- Haneda (4 runways): 74.

New Zealand

7 Auckland aerodrome capacity expectations:

- single runway: **40** (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)

8 ATC Sector capacity expectations:

- terminal/low level Category T airspace: **12** aircraft; and
- en-route Category S airspace: **15** aircraft;
- en-route Category R airspace: **15** aircraft.

Singapore

9 Changi aerodrome capacity expectations:

- single runway: **30** (IMC); and
- two parallel/near parallel runways: **72** (IMC);
- three parallel/near parallel runways: to be confirmed, possibly 100+ (IMC).

10 ATC Sector capacity expectations:

- terminal/low level Category T airspace: **14** aircraft; and
- en-route Category S airspace (sector dimension of 150NM x 100NM): 7 aircraft (extrapolated √6.66 x airspace volume = 2.58 x 7 = **18**).

Thailand

11 Suvarnabhumi aerodrome capacity expectations:

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

United States of America

12 **Table D3** 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
ATL	5	104	126
ORD	5	84	112
DFW	5	90	96

ATL	4	92	112
DEN	4	-	114
LAX	4	64	80
ORD	4	-	92
ATL	3	76	96
DEN	3	-	96
IAD	3	72	100
ATL	2	68	82
JFK	2	-	58
SDF	2	40	52
ATL	1	34	42
SDF	1	20	26
SFO	1	25	27

Table D3: Capacity at selected US airports

13 Average aerodrome 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).

14 ATC Sector capacity expectations:

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

Summary

15 **Table D4** summarises 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	30	72				14	18	
Thailand	34							
USA	**61**	**95**	**150**	**177**	**211**	12-**18**	16-**20**	17-**24**
Doc 9971 Simplified Table Comparison						15	18	18

Table D4: Capacity Expectations 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

Appendix E: Elements Map TO BE UPDATED WITH BLOCK 1 ELEMENTS

ASBU Element	Global/Regional Element	Civil/Military Element	Plan	Reference/ Principle
B0-CDO: CDO, STAR			PARS I/II	28
B0-FRTO: FUA, UPR, DARP			PARS I	27, 11
B0-RSEQ: AMAN/DMAN			PARS I/II	8, 33
B0-CCO: CCO, SID			PARS I/II	28
B0-FICE: AIDC, ATN			PASL I	20, 23, 26
B0-DATM: AIM			PASL I/II	30
B0-NOPS: ATFM			PASL I	8
B0-TBO: ADS-C, CPDLC			PARS I PASL I	25, 29
B0-APTA: AIRPORT PBN			PARS I/II	17
B0-WAKE: WAKE TURB			-	3, 4
B0-SURF: ASMGCS, CMM			-	24
B0-ACDM AIRPORT CDM			PARS I/II	13
B0-ASUR: ATS SUR			PARS I PASL I	24, 29
B0- ATSA			PARS I	-
B0-OPFL ITP			-	-
B0-ACAS: ACAS			PARS I	Annex 6
B0-SNET: SAFETY NETS			PASL I/II	31
B0-AMET			PASL I	34
	AIRPORT CERT.		PARS I	Annex 14
	AIRPORT CAPACITY		PARS I/II	GPI 14
	AIRSPACE: FIRS		PASL 1	CONOPS
	AIRSPACE: CLASS		PASL I	GPI 4
	AIRSPACE: RVSM		PARS I	GPI 2
	AIRSPACE: PRIORITY		PASL I	CONOPS
	NAV: PBN ROUTES		PARS I/II	17, 18
	SUR: ATC STDS		PASL I	CONOPS, 2, 6
	SUR: DATA SHARING		PASL I	26
		STRATEGIC LIAISON	PASL I	10
		TACTICAL LIAISON	PASL I	10
		MILITARY SUA %	PARS I	11
		SUA REVIEW	PARS I/II	11
		INT. SUA	PARS I	11
		ATM INTEGRATION	PASL I	35
		JOINT AD/NAV AIDS	PASL I	-
		SHARED DATA	PASL I	35
		COMMON TRAINING	PASL I	4
		COMMON PROC.	PASL I	4

Appendix F: List of References

Global and Regional Framework

Doc 9673 *Asia/Pacific Regional Air Navigation Plan*
Doc 9750 *Global Air Navigation Plan*
Doc 9854 *Global Air Traffic Management Operational Concept*
Doc 10004 Global Aviation Safety Plan

Air Navigation Services

Annex 10 *Aeronautical Telecommunications*
Annex 11 *Air Traffic Services* (particularly Chapter 2 [2.1 and 2.30], and Attachment C)
ASBU Document
ASEAN *Master Plan on ASEAN Connectivity*
Asia/Pacific Air Traffic Flow Management Concept of Operations
Asia/Pacific Air Navigation Concept of Operations
Asia/Pacific Regional Performance-Based Navigation Implementation Plan (V4.0)
Circular 330 *Civil-Military Cooperation in Air Traffic Management*
Doc 4444 *Procedures for Air Navigation Services Air Traffic Management (PANS ATM)*
Doc 8071 Manual on Testing of Radio Navigation Aids Volume 2
Doc 9613 *Performance-based Navigation Manual*
Doc 9882 *Manual on ATM System Requirements*
Doc 9883 *Manual on Global Performance of the Air Navigation System*
Doc 9906 *Quality Assurance Manual for flight Procedure Design Volume 5*
Doc 9971 *Manual on Collaborative Air Traffic Flow Management*
Global Operational Data-link Document
ICAO AN-Conf/12 Yellow Cover Report on Agenda Item 1
Roadmap for the Transition from AIS to AIM

Flight Operations

Annex 6 *Operation of Aircraft*
Doc 8168 *Procedure for Air Navigation Service Aircraft Operations Volume I Flight Procedures*
Doc 8168 *Procedure for Air Navigation Service Aircraft Operations Volume II Flight Procedures*
Doc 9931 Continuous Descent Operations (CDO) Manual
Doc 9993 Continuous Climb Operations (CCO) Manual

Human Factors

Annex 1 *Personnel Licensing*
Circular 214 *Fundamentals on Human Factors*
Circular 227 *Training of Operational Personnel on Human Factors*
Circular 241 *Human Factors in ATC*
Circular 249 *Human Factors in CNS and ATM Systems*
Circular 318 *Language Testing Criteria for Global Harmonization*
Circular 323 *Guidelines for Aviation English Training Programmes*
Doc 9835 *Manual on the Implementation of ICAO Language Proficiency Requirements*
Doc 9966 *Fatigue Risk Management Systems*
Human Factors Digest No. 1

Terms of Reference

Asia/Pacific Unmanned Aircraft Systems Task Force (APUAS/TF)

Objectives: the objective of the APUAS/TF will be to develop guidance material that supports an Asia/Pacific Seamless ATM Plan element: B1-UAS. This element is expected to incorporate Aviation System Block Upgrade (ASBU) BI-RPAS (Remotely Piloted Aircraft Systems) but in addition, to include regional expectations for the regulation and safe operation of small UAS within national airspace from an ATM perspective by November 2019, for consideration by the ATM/SG and APANPIRG. The guidance material for small UAS (generally 25kg or less) may include, *inter alia*:

- reference to systems designed to ensure a commensurate safety against obstacles, protected airspace, aircraft and non-involved people;
- communication and surveillance systems for Air Traffic Services (ATS) that allow the effective management of safety risks in controlled and uncontrolled airspace; and
- model regulations that manage the manufacturing, sale and operation of UAS;
- education processes to provide all UAS users or potential users with information on appropriate UAS operations; and
- recommended methods of safety data collection and analysis for UAS incidents.

The APUAS/TF should report its progress with an interim update at the ATM/SG/5 (2017) and ATM/SG/6 (2018).

Meetings: the APUAS/TF will normally meet at least once a year, but twice a year when agreed by the APUAS/TF if required.

Membership:

The APUAS/TF membership will be formed by Asia/Pacific States/Administrations and International Organizations. Other non-Asia/Pacific States, and organizations involved in UAS manufacturing, regulation and operations may join the APUAS/TF at the invitation of the ICAO Regional Office.

Reporting: the APUAS/TF reports to the ATM/SG. The ATM/SG will coordinate with the RASMAG, CNS/SG, and the APRAST/RASG as appropriate before consideration by APANPIRG.

…………………………

Model Template

FLEXIBLE USE OF AIRSPACE MANUAL

Record of Amendments and Corrigenda

AMENDMENTS				CORRIGENDA			
Num.	Effective date	Date recorded	Recorded by	Num.	Effective date	Date recorded	Recorded by

INTRODUCTION

Objective

i) The Flexible Use of Airspace (FUA) Manual (henceforth referred to a ‘Manual’) for [State XYZ] has been prepared by [*Insert names of organizations…* CAA/ANSP/DGCA/AIR FORCE/NAVY/ARMY/…etc.,] It is aimed at providing comprehensive guidelines for matters pertaining to implementation of FUA in [State XYZ] in harmonic fashion.

ii) The FUA Manual has taken into consideration the recommendations of the International Civil Aviation Organization in this regard, [*Inset document references*…ICAO Cir 330, ICAO Doc 9750…etc.]. FUA shall be facilitated through both strategic coordination and dynamic interaction, thus allowing the implementation of optimal flight paths, reducing operating costs of airspace users while protecting the environment, whilst paying due heed to security considerations and providing for military operational requirements.

Scope

iii) The FUA Manual – [State XYZ], has been developed to be used in the [Insert the name of FIR/FIRs], taking into account the operational improvements and airspace optimization initiatives in the short and medium term, and particularly in accordance with ATS route network optimization in the region. This Manual will apply to all civil and military use of flexible airspace structures.

National Background

[NOTE: The following text is only indicative and may be expanded based on the State’s analysis of Civil Military Cooperation and Flexible Use of Airspace)

iv) Military aviation places a lot of emphasis on a secure national airspace. Civil Military Cooperation is based on effective real time communication.

v) The goal of civil-military cooperation and coordination should be based on a dialogue between civilian and military authorities, with a clear understanding that supporting the civil air navigation infrastructure is consistent with the military mission to defend the nation’s interests. The objective is to make better use of airspace using mechanisms such as the exchange of flight plan and surveillance data.

vi) One of the gaps identified in the current system is a lack of a policy and procedures for FUA, which hampers airspace design and management by not allowing the application of an optimal airspace structure and the use of optimum flight paths. The limitations that have been identified include the existence of permanently reserved airspace, primarily for military purposes, which although justified from a national security point of view, pose constraints on airspace planning, which prevents direct flights between airports of origin - destination and/or city pairs. The endeavour, made using FUA principles, should permit civil flights through such areas, when not being utilized by the military.

vii) Improved civil/military coordination and cooperation strengthens airspace safety, allows for a more efficient ATS route structure, reducing miles flown and fuel consumption and, consequently, CO_2 emissions into the atmosphere, and increases airspace capacity.

viii) It also increases the availability of additional airspaces for military usage, on a day to day basis, where the requirements cannot be met in the existing reserved airspaces should also be considered.

Basic Airspace Management Principles and Strategies

ix) States are suggested to include the following principles in compliance with ICAO:

- all available airspace should be managed in a flexible manner, whenever feasible;

- airspace management processes should incorporate dynamic flight paths and provide optimal operational solutions;

- when conditions require segregation, based on different types of operations and/or aircraft, the size, shape and time zones of said airspace should be determined to minimize impact on operations.

- the use of airspace should be coordinated and monitored in order to accommodate the conflicting requirements of all users and minimize any constrains on operations;

- Airspace reservation should be planned in advance with changes made dynamically whenever possible. The system also need to accommodate short-notice unplanned requirements ; and

- the complexity of operations may limit the degree of flexibility.

x) Coordination and cooperation between Civil and Military authorities shall be organized at Strategic, Pre-tactical and Tactical management level aimed at increasing airspace safety and capacity and improving the efficiency and flexibility of air operations;

xi) Consistency among Airspace Management, Air Traffic Management, Air Traffic Flow Management, and Air Traffic Service should be established and maintained at the three airspace management levels (strategic, tactical and pre-tactical);

xii) Airspace reservation for exclusive or specific use of certain user categories shall be temporarily applied only during limited periods of time depending on actual use and it shall be disregarded as the activity that motivated it ceases to be, and it shall follow the procedures set forth in ICAO documents and Annexes.

xiii) Air Traffic Service Units and users will make the best possible use of available airspace,

xiv) Coordination and Collaborative Decision Making by ATS, ATFM units, and effective application of the Flexible Use Of Airspace concept should be consistent and permanent during the strategic, pre-tactical and tactical phases of airspace management;

xv) Adequate resources should be allocated for an effective implementation of the Flexible Use of Airspace concept, taking into account both Civil and Military needs; and

xvi) Security of national airspace shall be paramount and will not be compromised at any stage.

FUA Manual – Structure and Content

xvii) The FUA Manual takes into consideration the National security situation), the national background on civil/military cooperation and the current and future requirements as well as the Global benchmarks and best practices and the principles of FUA enshrined in various ICAO Annexes and Documents.

xviii) The Manual is organized as follows:

- **Chapter - 1** contains definitions.

- **Chapter - 2** contains details of implementation of FUA in [**State XYZ**] and the ASM Level 1 embodies the three levels of Airspace Management; ASM Level 1, 2 & 3, Flexible Airspace Structure, Particular application of FUA concept, Priority Rules, Transition to FUA Concept.

- **Chapter - 3** contains procedures for Airspace Change Proposals, Joint Design of Airspace at ASM Level 1, Allocation of airspace at ASM Level 1, ATS-ASM-ATFM relationship (Subject to the implementation of ATFM)

- **Chapter - 4** contains procedures pertaining to ASM level 2 (Pre-tactical Management), details of airspace Management Cells (AMCs), Allocation and Notification process, based on Airspace requests.

- **Chapter - 5** contains procedures involved in publication, promulgation and dissemination of ASM information including AIP, airspace use plan, updated airspace use plan etc.

- **Chapter - 6** contains details of Air Defence Requirements, Cooperation between Civil and Military ATS Units in case of Air Defence violations, interception of civil aircraft etc.

- **Chapter - 7** contains processes and procedures at ASM Level 3 (Tactical Management).

- **Chapter - 8** contains details of Civil Military Cooperation and Interoperability of their systems.

Contents

Chapter 1: Definitions

[States are encouraged to use the terms in compliance with ICAO]

[States can adopt additional terms depending on their own needs and situations]

Chapter 2: General

Implementation of FUA

2.1 High level recommendations, master plans, national law on LUA, State adoption of FUA and establishment of a nation level CMAC body.

Name of National CMAC Body Establishment, Constitution and TORs

2.2 The Composition of the *[Name of National CMAC Body]* is as follows:

2.3 xxx

	Designation/Organization	Status
1		Chairman
2		Member
3		Member
4		Member
5		Member
6		Member/ Convener
7		Member

Major functions and responsibilities of *Name of National CMAC Body*

2.4 The *[Name of National CMAC Body]* is vested with the responsibility of implementation of Flexible Use of Airspace (FUA)

2.5 The *[Name of National CMAC Body]* is responsible for the formulation of National Airspace Use Policy and carries out necessary strategic planning work, taking into account national and international airspace requirement.

2.6 The body also shall develop policy guidelines and procedures for airspace allocation for ASM1, ASM2, ASM 3 levels.

[Name of National CMAC Body] Terms of Reference

[Considering inserting the TORs as deemed fit, the following texts are listed as an example for reference]

i) *continuous assessment/re-assessment of National airspace usage requirements of various stake holders and Route structures.*

ii) *establishment of Flexible Airspace Use (FUA) structures and the introduction of procedures for the allocation of these airspace structures.*

iii) *to improve safe and effective regulation and Management of airspace and its supporting infrastructure.*

iv) *to designate military Special Use Airspace (SUA), and to review the continuing use, dimensions and activation timing at regular intervals not exceeding five years.*

v) *to improve coordination for implementation and harmonization of Civil and Military ATC Systems with common features and applications.*

vi) *standardize CNS/ATM infrastructure where it supports a civil/military interface.*

vii) **to setup appropriate committees/sub-committees/advisory bodies at appropriate levels for implementation or taking suitable decisions for implementation of FUA [*if necessary].*

viii) *any other issue vital to Flexible Use of Airspace*

<u>Three ASM levels</u>

2.7 The FUA Concept is based on three Levels of ASM which have been identified as:

a) **Strategic ASM -** ASM Level 1,

b) **Pre-Tactical ASM -** ASM Level 2, and

c) **Tactical ASM -** ASM Level 3.

2.8 The three ASM Levels correspond with Civil/Military ATM coordination tasks. Each Level is related directly to, and impacts on, the others.

<u>ASM Level 1 – Strategic Management</u>

2.9 Strategic ASM at ASM Level 1 consists of a joint civil and military process within a [*Name of National CMAC Body*], which formulates the National ASM policy and carries out the necessary strategic planning work, taking into account National and International Airspace Users' requirements, within the framework of National security requirements.

2.10 In order to maintain a flexible airspace organization, there ought to be a continual assessment of the national airspace and route structures. At ASM Level 1, the working structures for ASM Levels 2 and 3, should be determined and authority required to carry out their tasks, should be given to them. The procedures to be followed at these pre-tactical and tactical levels and the priority rules and negotiation procedures for airspace allocation at ASM Levels 2 and 3 should be determined by the *[Name of National CMAC Body]*.

<u>ASM Level 2 – Pre-tactical Management</u>

2.11 2.4.4.1 Pre-Tactical - ASM Level 2 consists of the day-to-day management and temporary allocation of airspace through AMCs .

2.12 Airspace Management Cell（AMC) ***[The AMC should take the form of a joint civil-military cell, if both civil and military authorities are responsible for airspace management in the State,, or the civil/military Airspace Management entity should get their counterpart engaged in the process.]*** has the authority to conduct ASM within the framework of the State's airspace structures, priority rules and negotiation procedures as laid down by the National CMAC Body. The Airspace Management entity will collect and analyze airspace requests. After coordination the Airspace Management entity promulgates the airspace allocation. ***[For example, information can be promulgated as an airspace use plan, and changes thereto in an updated airspace use plan.]***

2.13 Airspace allocation information consolidated airspace use plan/updated airspace use plan is daily published on the ANSP's dedicated portal and provided to Aircraft Operators (AOs) for flight planning purposes.

ASM Level 3 - Real Time Use of Airspace

2.14 Tactical - ASM Level 3 consists of the real time activation, deactivation or real time reallocation of the airspace allocated at ASM Level 2 and the resolution of specific airspace problems and/or traffic situations between Civil and Military ATS Units and/or controlling military units and/or controllers, as appropriate.

2.15 Real time access to all necessary flight data, including controllers' intentions, with or without system support, permits the optimized use of airspace and reduces the need to segregate airspace.

Flexible and adaptable airspace structures and procedures

2.16 A FUA concept can be based on the potential offered by flexible and adaptable airspace structures and procedures that are especially suited to temporary allocation and utilization like conditional routes, temporary reserved area (TRA), temporary segregated airspace (TSA) and cross-border area (CBA).

2.17 ***Conditional route.*** A conditional route (Figure 3-2) is a non-permanent ATS route or portion thereof which can be planned and used under specified conditions. According to its foreseen availability, flight planning possibilities and the expected level of activity of the possible associated TSA, a conditional route can be divided into the following categories:

a) Category one: permanently plannable;

b) Category two: non-permanently plannable; and

c) Category three: not plannable.

2.18 ***Temporary reserved area (TRA).*** A TRA (Figure 3-2) is airspace temporarily reserved and allocated for the specific use of a particular user for a determined period of time and through which other traffic may be allowed to transit under ATC clearance.

2.19 ***Temporary segregated airspace (TSA).*** A TSA (Figure 3-2) is airspace temporarily segregated and allocated for the exclusive use of a particular user during a determined period of time and through which other traffic will not be allowed to transit.

2.20 ***Cross-border areas (CBA).*** A CBA (Figure 3-3) is an airspace reservation/segregation established for specific operational requirements over international boundaries. CBAs are established to allow military training and other operational flights on both sides of a border. CBAs, not being constrained by national boundaries, can be located so as to benefit both civil and military aviation. CBAs, combined with the potential use of conditional routes through them, permit the improvement of the airspace structure in border areas and assist in the improvement of the ATS route network. Political, legal, technical and operational agreements between the States concerned are required prior to the establishment of CBAs. Formal agreements for the establishment and use of CBAs have to address issues of sovereignty, defence, legality, operations, the environment and search and rescue.

Transition to the FUA concept

2.21 A State adopting the FUA concept is committed to reassess current national airspace and route structures with the aim of implementing a flexible airspace organisation.

Chapter 3: ASM Level 1

Airspace Change process

3.1 xxx

Joint Design of Airspace

3.2 The typical cycle of activities can be mainly classified as Planning, Design, Validation and Implementation. The Global best practices include joint design of airspace which may minimize the delays in the long process of Airspace Change proposals.

3.3 On completion of the planning stage of an Airspace Change Proposal, it may augur well to include a joint evaluation of the Airspace Design by airspace experts from the ANSP Headquarters, ATC Centres, and Military airspace experts from their Headquarters, Command Headquarters and affected Military ATS Units. A joint design effort will minimize the delays in validation and implementation, since the considerations of both Civil and Military stakeholders has been obtained and recorded and the design suitably reiterated.

Allocation of airspace in ASM Level 1

3.4 Major events planned well in advance, such as large scale military exercises, rocket launches etc., which require additional segregated airspace are subject to ***ASM Level 1*** coordination. Subsequently, these activities will be notified by AIS publication..

3.5 Military authorities or units which are involved in such well-planned Special Use of Airspace shall place their requirements before the Civil ANSP in adherence to prescribed lead times, as per norms laid down from time to time by the Civil ANSP and mutually agreed by all stakeholders.

General

3.6 As an integral part of ATM, ASM should work in close cooperation with both ATS and ATFM.

3.7 An airspace structure reorganized to increase the accessibility of more airspace is accepted as essential to increasing the capacity of the ATS system and reducing delays.

3.8 In order to achieve an improvement in airspace use, the link between ASM and ATFM is harmonized at all the three Levels including compatibility between ATS, ASM and ATFM procedures and timetables.

ASM/ATFM Relationship at Strategic Level - ASM Level 1

3.9 Both ASM and ATFM have a Planning Phase. In ASM Level 1, this consists of a periodical review of the use made of the airspace using traffic statistics and forecasts.

3.10 In this phase, ATFM identifies choke points, sector capacity and demand imbalances which should be examined in parallel with the ASM Level 1 review. This national periodical review process involving both airspace & route planners, ACCs/FMPs and Airspace Management Entity, should keep pace with the development of improved navigation capabilities, advanced ATC techniques and changes in user requirements.

3.11 The National Airspace Review including that of CDRs assists the airspace planning, to establish solutions to identified bottlenecks for the long term.

3.12 The Civil ANSP may consider the preparation and publication of a Route Availability Document (RAD) which enables ATC to maximise capacity by defining route restrictions that provide an organized system of major traffic flows while allowing aircraft operators flight planning flexibility. The RAD is therefore based primarily on permanent ATS routes and CDRs1 and includes route restrictions as published in the national AIPs, LoAs, NOTAMs and AIP Supplements. The RAD includes a number of permanent Routing suggestions to assist AOs in the preparation of their flight plans; these suggestions are advisory and not mandatory.

ASM/ATFM Relationship at Pre-Tactical Level - ASM Level 2

3.13 In the pre-tactical ATFM phase, the ATFM Centre highlights areas of insufficient ATC capacity. Routing scenarios have to be considered to solve capacity shortfalls in coordination with AMCs/ACCs/FMPs concerned.

3.14 User requirements necessitating segregated airspace form the basis for requests and allocation of Temporary Restricted Areas (TRAs) and Temporary Segregated Areas (TSAs).

ATC/ASM/ATFM Relationship at Tactical Level - ASM Level 3

3.15 If a reduction in the activation time of a TRA or TSA is agreed between units, the subsequent release of airspace enables civil ACCs to open certain CDRs and reroute traffic flows at short notice. Similarly, ATS units and/or controlling military units are able to use TRAs or TSAs at short notice taking into account the general ATFM plan. To enlarge or combine TRAs or TSAs civil ACCs may be able to allocate, at short notice, some flight levels of an ATS route segment for temporary use.

Chapter 4: ASM Level 2

ASM Level 2 – (Pre-tactical Management**)**

4.1 Pre-Tactical ASM at ASM Level 2 consists of the day-to-day management and temporary allocation of airspace through Airspace Management Cell AMC.

4.2 An AMC established with adequate representation from Civil and Military ANSP/ATSP/DGCA and Airlines, shall conduct the ASM Level 2 function.

4.3 The AMC shall have the authority to conduct the ASM function within the framework of airspace structures, priority rules and negotiation procedures as laid down in the FUA Manual approved by the *[Name of National CMAC Body]*.

4.4 The AMC shall have adequate authority to enable them to efficiently resolve conflicting airspace request and minimize the necessity for referral to higher authority.

4.5 The AMC shall strictly adhere to the policies formulated by the *Name of National CMAC Body]*, and engage in Collaborative Decision Making (CDM), within the framework of FUA and within the powers vested in it.

Organizational structure of the AMC

4.6 The AMC may comprise of a Civil ANSP nominee, representatives from the Air Force, Army and Navy, representatives of the airport operators, airline operators and a representative from the regulatory body.

Allocation & Notification process – General provisions

4.7 Agencies responsible for airspace activities should submit their requests for the allocation of airspace or routes - Temporary Segregated Areas (TSAs) or Conditional Routes (CDRs) - to the AMC, in adherence to the agreed conditions laid down in the SOP/LoA for the TSA/TRA activation and deactivation.

4.8 After the AMC has received, evaluated and de-conflicted the airspace requests, it will convey the allocation plan through a notification of the airspace allocation published in airspace use plan in advance.

Airspace Requests

4.9 The requests for airspace use could be presented as a block of airspace required during a specified period of time with the possibility of moving the request in terms of time and flight levels.

CDR requests

4.10 Requests for CDRs are normally based on capacity needs identified in the pre-tactical phase.

4.11 [Include here State procedures for managing CDR requests]

Chapter 5: FUA Information Management

Publication of ASM information

5.1 An important national task at ASM Level 1 is to publish in national AIPs the status of airspace structures and ATS routes under its jurisdiction.

5.2 Another task consists of the coordination of major events planned well in advance, such as large scale military exercises or air shows, which may require additional segregated airspace.

5.3 These particular activities need to be published by AIS publication such as NOTAM.

Publication of CDR routes, their availability and conditions

5.4 Provide information on how CDR systems are described in the AIP, including the timing and means of activation or availability.

Airspace use plan

5.5 The effective application of the FUA Concept requires that ASM Level 2 airspace allocation decisions are promulgated daily in an efficient, timely and accurate manner by the AMC by means of a airspace use plan message.

Updated Airspace use plan

5.6 After the AMC has completed the allocation process, modification of the airspace allocation might be necessary in order to take advantage of the cancellation of any previously reserved airspace structure. This may also have to be resorted to in case of sudden unexpected requirements of military to close certain routes/portions of routes, additional activation of TRAs/TSAs and/or increased timings for already activated TRAs/TSAs is to be effected. Changes to the airspace allocation will be effected by the Airspace Management Entity through updated airspace use plans.

5.7 Updated airspace use plans will replace the current airspace use plans and previous updated airspace use plans according to the validity time described in the procedure. .

ASM Level 2 Timetable

5.8 The application of the procedures described below will continue to allow the tactical management of CDRs and TRAs/TSAs according to the current procedures.

5.9 Outside the airspace use plan updated airspace use plan process the changes will continue to be treated at a tactical level and will be processed at the ATC level, informing the users tactically. Notification to pertinent ATC units will be provided tactically.

5.10 [Include here a description of how ASM Level 2 plans, decisions and advisories are managed in the State.]

Chapter 6: Air Defence Requirements

Air Defence Identification Zones (ADIZ)

6.1 Insert text on ADIZ

Requirement for Air Defence Clearance (ADC)

6.2 Insert text on action following failure to comply with any restriction or deviating from flight plan; interception etc.

Procedures for the issue of Air Defence Clearance (ADC)

6.3 x

Chapter 7: ASM Level 3

Tactical Management Functions (ASM Level 3)

General

7.1 Tactical ASM Level 3 consists of the real-time activation, deactivation or real time reallocation of the airspace allocated at ASM Level 2 and the resolution of specific airspace problems and/or traffic situations between civil and military ATS units, controllers and/or controlling military units as appropriate.

7.2 The real time access to all necessary flight data, including controller's intentions, ***with or without system support***, permits the optimized use of airspace and reduces the need to segregate airspace.

7.3 Adequate real time coordination facilities and procedures are required to fully exploit the FUA Concept at ASM Levels 1 and 2. Flexibility in the use of airspace is enhanced by real-time civil/military coordination capability.

Coordination Procedures for ATS Routes and Airspace Crossing

7.4 xxxx

Transfer of Control Responsibility

System Support Functions

7.5 At the tactical level the main requirement is to provide system support to create a traffic environment in which the FUA Concept can be applied efficiently, i.e. an environment in which the need to segregate traffic is reduced to a strict minimum. This can be achieved by:

- the provision of airspace use data;
- the exchange of flight data, as appropriate, between civil and military units;
- the provision of system support for airspace crossing.

Airspace Use Data Function

7.6 The Airspace Use Data Information Function should provide, in real time, all the parties concerned with up-to-date information on the current use of airspace, in addition to airspace use plan/updated airspace use plan information on allocated and scheduled use of airspace.

7.7 The supporting systems should assure common, secure and consolidated information exchange of the current airspace status.

7.8 At ASM level 3 airspace management, information should be available to Controllers on activation, deactivation, short-term cancellation or amendments to reservations and reallocation of the airspace structures.

7.9 The supporting systems should provide the real time airspace status on an airspace status display and should be capable of interfacing with the ATC systems.

7.10 Initially, real time information on the current use of airspace should be provided manually in each ATS unit on their own and for their individual system..

Basic Flight Plan Information - Identification Function

7.11 The Basic Flight Plan Data Information Function concerns the automatic exchange between civil and military control units of all necessary flight plan data.

7.12 This function will permit the creation of associated tracks/labels in both civil and military units for the display and identification of the overall traffic situation involved in a civil/military coordination process.

7.13 As a minimum, to permit the correlation of radar data with flight plan data, the aircraft identification/call sign, the SSR Mode and Code for each flight concerned in the coordination process shall be passed from civil to military units, and when required from military to civil units.

Chapter 8: Civil Military Cooperation and Interoperability

General

8.1 The ATM Operational Concept of ICAO presents a vision of an integrated, harmonized and globally interoperable ATM system — a system that meets agreed levels of safety, provides for optimum economic operations, is environmentally sustainable and meets national security requirements for all users during all phases of flight.

8.2 Communications, navigation and surveillance (CNS) systems, and advanced information management technology are to be used to functionally combine the ground-based and airborne system elements into a fully integrated, interoperable ATM system open to all users.

Strategic and Political Interoperability

8.3 Insert texts on harmonizing global or regional views and a regulatory framework

Operational & Technical Interoperability

8.4 [Insert text on joint procurement, data sharing, join provision of nav-aids, common procedure, common training, etc.]

Appendix: Acronyms and Abbreviations

ACC	Area Control Centre
AD	Aerodrome
ADC	Air Defence Clearance
ADIZ	Air Defence Identification Zone
ADS-B	Automatic Dependent Surveillance Broadcast
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
AMC	Airspace Management Cell (AMC)
ANSP	Air Navigation Service Provider
AO	Aircraft Operator/Airline Operating Agencies
ASM	Airspace Management
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATS	Air Traffic Services
ATZ	Aerodrome Traffic Zone
CBA	Cross Border Area
CDM	Collaborative Decision Making
CDR	Conditional Route
CNS/ATM	Communication, Navigation and Surveillance/Air Traffic Management
CTA	Control Area
CTR	Control Zone
CWP	Controller Work Position
DGCA	Director General of Civil Aviation
e-AIP	electronic AIP
ENR	En route
EOBT	Estimated Off Block Time
ETD	Estimated Time of Departure
FDPS	Flight Data Processing System
FIC	Flight Information Centre
FIR	Flight Information Region
FMU/FMP	Flow Management Unit/Flow Management Position
FPL	Flight Plan
FTP	File Transfer Protocol
FUA	Flexible Use of Airspace
GNSS	Global Navigation Satellite System
GPI	Global Plan Initiatives
HMI	Human Machine Interface
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
LoA	Letter of Agreement
MOU	Memorandum of Agreement
NOTAM	Notice to Airmen
PANS	Procedures for Air Navigation Services
PBN	Performance-Based Navigation
PSR	Primary Surveillance Radar
RAD	Route Availability Document
RPA	Remotely Piloted Aircraft
RRP	Re Routing Proposals
RTF	Radio Telephony Frequency
SAR	Search and Rescue

SARPS	Standards and Recommended Practices
SIDS	Standard Instrument Departures
SMS	Safety Management Systems
SOP	Standard Operating Procedures
SSR	Secondary Surveillance Radar
STARS	Standard Arrival Routes
SUA	Special Use Airspace
SUPPS	Regional Supplementary Procedures
TMA	Terminal Control Area
TMU	Traffic Management Unit
TRA	Temporary Reserved Areas
TSA	Temporary Segregated Areas
UACC	Upper Area Control Centres
UAS	Unmanned Aircraft System
VFR	Visual Flight Rules
WGS	World Geodetic System

INTERNATIONAL CIVIL AVIATION ORGANIZATION

D R A F T

ASIA/PACIFIC REGION ATM CONTINGENCY PLAN

DRAFT Version 1.0, MONTH YEAR

This Plan was developed by the Asia/Pacific Regional ATM Contingency Plan Taskforce

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

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SCOPE OF THE PLAN

Plan Structure

1.1 The Asia/Pacific Region ATM Contingency Plan (hereinafter referred to as the Plan) falls within a hierarchy of planning documents (**Figure 1**) defining global vision and strategy, and regional implementation action.

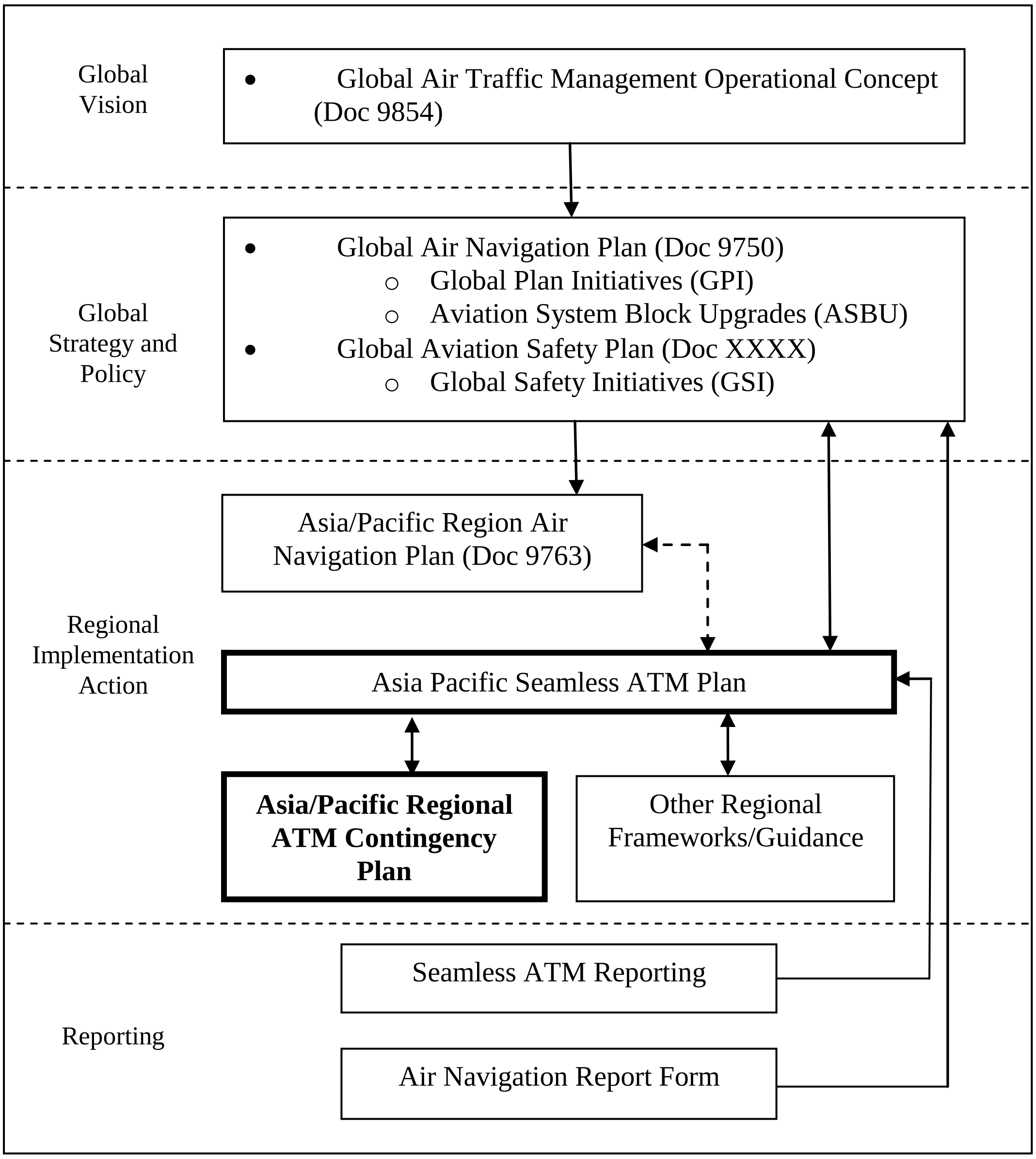

Figure 1: Regional Planning Documents and Linkages.

1.2 The Plan is structured to provide:

- Regional ATFM planning principles;
- Regional contingency planning elements;
- Analysis of the current Regional contingency planning status;
- A performance improvement plan;
- Considerations for research and future development; and
- Milestones, timelines, priorities and actions.

1.3 The plan describes a hierarchy of contingency plans, and categories of contingency events:

a) Hierarchy of contingency plans:

i. **Level 1**, for domestic (internal State) plans having little or no effect on external air navigation service providers;

ii. **Level 2**, for coordinated (inter-State) contingency plans involving two or more States; and

iii. **Level 3,** for sub-Regional or Regional contingency plans, detailing contingency arrangements affecting airspace users or services provided outside the contingency airspace.

b) Categories of contingency plans:

i. **Category A – Airspace Safe, but Restricted or No ATS**, due to causal events such as industrial action, pandemic, earthquake, nuclear emergency affecting the provision of ATS, or ATM system failure or degradation;

ii. **Category B – Airspace Not Safe**, due to causal events such as Volcanic Ash Cloud (VAC), nuclear emergency, military activity; and

iii. **Category C – Airspace Not Available**, due to causal events such as pandemic, national security – normally a political decision.

1.4 Level 1 Contingency Plans and Level 2 Contingency Arrangements are referenced but not included in the Plan. Level 3 (sub-Regional) ATS contingency route structures and flight level allocation schemes (FLAS), where established by coordinating States, are provided in the Appendices to the plan.

1.5 The Plan's appendices provide details of:

- **Appendix A -** ATM Contingency Planning Principles;
- **Appendix B -** Basic Contingency Plan Elements;
- **Appendix C -** Contingency Plan Template;
- **Appendix D -** List of Actions to be taken in the event of Volcanic Ash Cloud;
- **Appendix E** – Example of Volcanic Ash Cloud Contingency Plan;
- **Appendix F** – Sub-Regional ATM Contingency Routes and FLAS;
- **Appendix G** – Regional ATM Contingency Readiness Analysis; and
- **Appendix H** – State Contingency Points-of-Contact.

Asia/Pacific Regional ATM Contingency Plan

Plan Review

1.6 The plan requires regular updating to accommodate changes in contingency arrangements and contact details. Updating of the plan appendices is carried out by the ICAO Asia/Pacific Regional Office on receipt of updates from States, and is not dependent on re-versioning or APANPIRG approval. It is intended that APANPIRG and its contributory bodies conduct a complete review of the Plan every three years, or at shorter intervals as determined by APANPIRG.

…………………………

Asia/Pacific Regional ATM Contingency Plan

OBJECTIVES

Plan Objectives

2.1 The objectives of the Plan are to

i. provide a contingency response framework for Asia/Pacific States to ensure the managed continuation of aircraft operations in affected FIRs, including transiting between unaffected FIRs, during contingency events;

ii. ensure timely, harmonized and appropriate responses to all events resulting in disruption to the provision of Air Traffic Services (ATS), or in which ATS is involved, and hence to normal aircraft movement; and

iii. provide a greater degree of certainty for airspace and aerodrome users during contingency operations.

2.2 In order to meet these objectives the Plan:

i. Provides uniform policy and guidance for responding to reasonably foreseeable operational restrictions, including short, medium and long term actions, prevention of overload of the contingency system and guidance for implementation and resumption

ii. Reviews that status of ATM Contingency Plans and contingency preparedness of Asia/Pacific Region States;

iii. Identifies areas where ATM contingency planning requires improvement to comply with ICAO Standards and Recommended Procedures defined in Annex 11 *Air Traffic Services* and accepted best practices;

iv. analyses contingency procedures in use in other ICAO Regions and harmonizes where practicable with similar work in adjacent airspaces;

v. takes into account the varying levels of contingency response necessary for a range of precipitating events;

vi. provides principles for ATM contingency planning;

vii. details recommended contingency responses to events such as, but not limited to, severe meteorological and geological phenomena, pandemics, national security and industrial relations issues; and

viii. provides contingency planning templates for States.

…………………………

ABBREVIATIONS AND ACRONYMS

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

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

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

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EXECUTIVE SUMMARY

Executive Summary – Asia/Pacific Regional ATM Contingency Readiness

4.1 Amendment 40 to Annex 11 – *Air Traffic Services (ATS)*, applicable from November 2003, included requirements and guidance material for ATS contingency measures:

2.30 Contingency Arrangements

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

4.2 Analysis of the results of a survey of the ICAO Asia/Pacific (APAC) Region's ATM contingency readiness revealed a number of areas where improvement was required. Overall regional readiness was marginal for both Level 1 and Level 2 contingency arrangements, as was the regional status of 4 key areas of contingency planning; Addressing Category A and B Events, Level 1 Plans, Coordination, Testing and Review, and Basic Plan Elements, Noting that only a limited number of Asia/Pacific administrations responded to the survey, it is likely that contingency readiness among non-responding administrations is at best marginal, and probably incomplete.

4.3 All APAC administrations should examine the outcomes of the survey analysis which, together with the requirements and guidance material in Annex 11 and the information and performance objectives provided in this document, provide administrations with guidance for the analysis and improvement of contingency readiness

Asia/Pacific Regional ATM Contingency Plan

BACKGROUND INFORMATION

Requirement for Contingency Plans

5.1 Annex 11 to the Convention on Civil Aviation requires that ATS 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.

5.2 The 47th Conference of Directors General of the Asia/Pacific Region (Macao, China, October 2010) requested the ICAO Regional Office to consider the establishment of a task force for planning, coordination and implementation of a regional ATM Contingency Plan (Action Item 47/1).

5.3 Subsequently, the 22nd Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/22, Bangkok, Thailand, June 2011) formed a Regional ATM Contingency Planning Task Force (RACP/TF) for planning, coordination and implementation of a regional ATM contingency plan.

5.4 The RACP/TF Terms of Reference directed the Task Force to review the current status of ATM Contingency Plans and the contingency preparedness of Asia and Pacific Region States, and identify areas where ATM contingency planning requires improvement, and to make recommendations on those areas of improvement.

Contingency Planning Principles

5.5 ATM contingency planning principles form the basis for development of Level 1, Level 2 and Level 3 Contingency Plans in response to Category A, B and C contingency events, inter-State contingency agreements, contingency route structures, flight level allocation schemes and aircraft longitudinal spacing, communications transfer arrangements, and for any delegation of ATC separation, FIS and SAR alerting services:

5.6 Asia/Pacific Region Contingency Planning Principles as agreed by RACP/TF and endorsed by APANPIRG are included as **Appendix A.**

Basic Plan Elements

5.7 The plan includes Basic Plan Elements (BPE) which define the minimum recommended considerations for inclusion in Level 1 and Level 2 Contingency Plans. The BPE include Administration, Plan Management, Airspace, ATM Procedures, Pilot/Operator Procedures, Communications Facilities and Procedures, Aeronautical Support services including AIS and MET, and Contact Details. **Appendix B** lists the agreed BPE.

Contingency Plan Coordination and Operations Functions

5.8 Each State should establish an ATM contingency Central Coordinating Committee (CCC) function for the development, maintenance, activation and conduct of contingency plans, and for the forming and convening of an ATM Operational Contingency Group (AOCG) function.

5.9 The Central Coordinating Committee function should include relevant representation from the Regulatory Authority, Air Navigation Service Provider, Military Authority, Other relevant national authority, airspace user representatives, airport authorities meteorological authority, airport authority and other relevant authorities and agencies.

5.10 The ATM Operational Contingency Group (AOCG) function should be convened by the CCC with a primary responsibility to oversee the day to day operations under the contingency arrangements, and coordinate operational ATS activities, 24 hours a day, throughout the contingency period. The terms of reference of the AOCG will be determined by the CCC. The AOCG function will include any necessary specialist input from the following disciplines:

- Air Traffic Control (ATC)
- Aeronautical Telecommunication (COM)
- Aeronautical Meteorology (MET)
- Aeronautical Information Services (AIS)
- ATS equipment maintenance service provider

The AOCG functions shall include:

i) review and update of the Contingency Plan as required;

ii) keep up to date at all times of the contingency situation;

iii) organize contingency teams in each of the specialized areas;

iv) keep in contact with and update all affected airspace and system users, customers and other relevant stakeholders;

Note: Annex 11 provides guidelines for coordination of contingency matters with ICAO

v) exchange up-to-date information with the adjacent ATS authorities concerned to coordinate contingency activities;

vi) notify the designated organizations of the contingency situation sufficiently in advance and/or as soon as possible thereafter;

vii) take necessary action for issuing NOTAMs in accordance with the contingency plan or as otherwise determined by the particular contingency situation. Where the contingency situation is sufficiently foreseeable the relevant NOTAMs should be issued 48 hours in advance of the contingency events, using templates.

5.11 Terms of reference, and procedures for the activation of the ATM Operational Contingency Group (AOCG) function should be developed.

5.12 A template for Level 1 Contingency Plans and Level 2 Contingency Arrangements is provided in **Appendix C**.

Volcanic Ash Cloud Contingency Planning

5.13 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.

5.14 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.

5.15 The actions to be taken by relevant Volcanic Observatories, Volcanic Ash Advisory Centres, MWOs, AIS Units and ACCs are described in ICAO Doc 9766 – *Handbook on the International Airways Volcano Watch (IAVW)*. The relevant information from the handbook is provided in **Appendix D**.

5.16 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)

5.17 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

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.

5.18 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)[1] 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, 5.1.1.1, r and u;

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);

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[2].

5.19 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.

[1] ATFM capability for the Asia/Pacific Region is expected to be implemented under the provisions of the Asia/Pacific Regional Framework for Collaborative ATFM.

[2] 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.

5.20 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*. Colour-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.

5.21 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). Colour-coded activity level information may be included in NOTAM if available.

5.22 Examples of volcanic ash contingency plans are provided in provided in **Appendix E**.

Contingency ATS Routes and Flight Level Allocation Schemes

5.23 Where ATS contingency routes have been prepared in advance for the management of contingency events, details of the routes and associated flight level allocation schemes (FLAS) should be published in State AIP.

5.24 Except where a segment of an established ATS route forms part or all of the ATS Contingency Route, the AIP definition of the contingency route should include, in a continuous character string without spaces or other characters:

The ATS route designator CR:

The ISO3 Country Code; and

A 3-character numeric identifier of the route.

Example: CRAUS001

5.25 Where new waypoints are required to be established for contingency routes, 5-letter name code (5LNC) waypoint names for ATS contingency routes must be drawn from the ICAO International Codes and Route Designators (ICARD) application.

5.26 Coordinated Sub-Regional ATS Contingency Routes and FLAS, where available, are provided in **Appendix F**.

Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

Asia/Pacific Regional ATM Contingency Plan

CURRENT SITUATION

Analysis – Level 1 and Level 2 Contingency Plans

6.1 Asia/Pacific Region ATM Contingency Readiness was examined by RACP/TF in 2012 and 2013. States were requested to provide information on Level 1 (Internal State) and Level 2 (Inter-State) contingency planning, based on Basic Planning Elements (BPE) agreed by the Task Force.

6.2 The Task Force noted that Level 1 (*domestic* or *internal State*) plans would not be part of the Regional ATM Contingency Plan, but could be referred to in that document. Level 2 (*Inter-State*) Contingency Arrangements, should be harmonized on a sub-regional basis to form Level 3 Contingency Plan/s. Level 1 and 2 plans should address all three categories of contingency response (A, B or C), even if the Category B procedures (VAC, Nuclear emergency, etc.) were simple and of a tactical nature to deal with a changing situation.

6.3 Administrations were requested to provide information on a number of key areas:

- The percentage of ATS units with Level 1 (Internal State) Contingency Plans;
- Coordination, testing, review and amendment of Contingency Plans;
- The addressing of Category A and Category B causal events in Contingency Plans;
- Draft Basic Plan Elements (BPE) incorporated in Contingency Plans; and
- The existence of any formal Level 2 (Inter-State) Contingency Plan agreements, and their inclusions.

6.4 Responses were provided by 16 Administrations. Among the Administrations that did not respond to the questionnaire, 9 had previously reported having contingency plans in place.

6.5 Each responding Administration's overall contingency readiness was categorized as Robust, Marginal or Incomplete for both Level 1 and Level 2 plans, according to the following scale:

- Robust (80 - 100% implementation)
- Marginal (40 – 79%)
- Incomplete (0 – 39%).

Level 1 (Domestic or Internal State) Plans

6.6 Of the 16 responding Administrations there were:

- 7 with Robust Level 1 plans (~44%);
- 8 Marginal (50%); and
- 1 Incomplete (~6%).

6.7 Further detail of the analyzed results is provided in **Appendix G.** It should be noted that the percentage of non-respondent States with Robust or Marginal Level 1 and 2 contingency plans is expected to be considerably lower than respondent States.

6.8 The overall Regional status of each of the 4 key areas relating to Level 1 contingency plans was also analyzed and the results expressed as a percentage of full implementation, as were the results for individual elements within each key area.

6.9 Overall Regional status of all 4 of the key areas examined was found to be Marginal. Of the 20 elements within the 4 key areas, 1 was Incomplete, 14 were Marginal and 5 were Robust.

6.10 **Table 1** provides a summary of the reported overall Regional Level 1 contingency plan readiness.

Level 1 Plans - Summary Regional Contingency Readiness (%)			**AVG**
Addressing Category A and B Events	Nuclear Emergency	20	55%
	Pandemic	47	
	Staff Availability	53	
	Volcanic Ash Cloud	53	
	Inundation	53	
	National Security	53	
	Earthquake	67	
	ATM/CNS System Failure or Degradation	93	
Level 1 Plans	Percentage of ATSU with Level 1 Plan	63	63%
Coordination, Testing and Review	Internal Coordination of Plans	67	74%
	Regular Testing	67	
	Routine and Event Driven Review	87	
Basic Plan Elements (No. of sub-elements)	Airspace (1)	47	75%
	Communications Facilities and Procedures (4)	65	
	Pilot/Aircraft Operator Procedures (5)	72	
	Aeronautical Support Services (2)	77	
	ATM Procedures (7)	78	
	Contact Details (2)	80	
	Plan Management (2)	87	
	Administration (2)	90	

Table 1 – Level 1 Plans - Summary of Reported Regional Readiness

Level 2 (Inter-State) Plans

6.11 Analysis of the 16 questionnaire responses indicated that:

- 5 Administrations had Robust Level 1 plans (~31%);
- 5 were Marginal (~31%); and
- 6 were Incomplete (~38%).

6.12 5 Administrations had Robust Level 2 plans, 5 Marginal and 6 Incomplete.

6.13 **Table 2** summarizes the Regional Level 2 contingency readiness determined by State responses to the questionnaire, also expressed as a percentage of full implementation and presented in a potential order of priority for consideration by the Task Force.

Level 2 Plans – Summary of Overall Regional Readiness (%)	
Delegation of ATC Separation	33
Formal Inter-State Agreements (LoA or MoU)	47
Contingency Route Structure	47
Flight Level Allocation Scheme	47
Minimum Longitudinal Spacing	47
Frequency Transfer Arrangements	60
Delegation of FIS and SAR Alerting Services	60

Table 2 – Level 2 Plans – Summary of Regional Readiness[2].

[2] Delegation of ATC Separation, FIS and SAR responsibility in Level 2 plans is dependent upon both the legal and functional capacity for States to either delegate or accept delegation of separation or other ATS responsibility.

PERFORMANCE IMPROVEMENT PLAN

ATM Contingency Operations Capability

Note: prior to implementation, ATM Contingency plans should be verified by an appropriate safety assessment conducted under the State's Safety Management System.

- **Expected implementation by 10 November 2016**

Level 1 (Domestic or Internal State) Plans

7.1 Each State should establish an ATM contingency Central Coordinating Committee (CCC) function for the development, maintenance, activation and conduct of contingency plans, and for the forming and convening of an ATM Operational Contingency Group (AOCG) function.

7.1 Terms of reference and procedures for the activation of the ATM Operational Contingency Group (AOCG) function should be developed.

7.2 Level 1 contingency plans for Category A, B and C contingency events, conforming with the Principles and including the Basic Plan Elements of the Regional ATM Contingency Plan, should be developed and implemented for all ATS units.

*A template for Level 1 and Level 2 contingency arrangements is provided at **Appendix C.***

7.3 Human performance-based training and procedures for response to ATM contingency operations for all staff providing related ATS, including ATC, Flight Information, Aeronautical Information, Aeronautical Telecommunication and ATS equipment maintenance staff should be developed and implemented.

7.4 Programs of regular desktop and inter-unit coordinated exercises of all Level 1 contingency plans should be implemented.

7.5 Processes should be implemented to ensure the outcomes of any testing, pre-activation or activation of a contingency plan or any contingency exercise are reviewed and analysed, and lessons learned incorporated in contingency procedures and training.

7.6 Details of contingency ATS routes and associated flight level allocation schemes should be published in State AIP (Section ENR 3.5).

7.7 Relevant sections of contingency plans that may have an effect on international flights should be made available on the public internet website of the ANSP, and the hyperlink provided to ICAO Asia/Pacific Regional Office for inclusion in the Regional ATM Contingency Plan.

Note: A single combined document comprising information from all relevant Level 1 contingency plans may be suitable for this purpose.

Level 2 Contingency Arrangements

7.8 Level 2 contingency arrangements should be formalized for all cases where the pre-activation or activation of a Level 1 contingency plan would impact upon ATS within the area of responsibility of a neighbouring State.

7.9 Level 2 contingency arrangements should include procedures for the tactical definition and promulgation by NOTAM of contingency ATS routes to avoid airspace affected by Category B contingency conditions.

7.10 Details of contingency ATS routes and flight level allocation scheme details should be published in State AIP.

Level 3 Sub-Regional Contingency Plans

7.11 Where practicable, each State should harmonize its Contingency ATS Route and FLAS structures with those of all neighbouring States.

Volcanic Ash Contingency Planning

7.12 States' regulatory provisions and arrangements should be reviewed to ensure that, in accordance with the guidance provided in ICAO Doc 9974 – *Flight Safety and Volcanic Ash* :

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

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.

7.13 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)[3] 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, 5.1.1.1, r and u

d) Aerodromes should only be closed by NOTAM for periods of observed volcanic ash contamination of the surface of the aerodrome movement area

[3] ATFM capability for the Asia/Pacific Region is expected to be implemented under the provisions of the Asia/Pacific Regional Framework for Collaborative ATFM.

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)

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.

7.14 Each State should ensure that a list of ICAO registered volcanoes relevant to the State, drawn from ICAO Doc 9691 - *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* Appendix E – *Cross-reference list of volcanoes and navigation aids*, is maintained at all International NOTAM Offices, with volcano name, number and nominal position.

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.

7.15 A series of templates should be made available for different stages of volcanic activity to assist Meteorological Watch Office (MWO) and Aeronautical Information Service (AIS) staff in expediting the process of originating and issuing relevant MET and AIS messages.

7.16 Multi-lateral Volcanic Ash Cloud Exercises should be conducted by each State at least annually. Internal desktop contingency plan exercises should include volcanic ash cloud scenarios.

7.17 States should 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;

7.18 States should establish an internal crisis management centre 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 1: This information sharing process is supplemental to the mandatory provisions of Annex 3 and Annex 15 relating to the dissemination of volcanic eruption and ash cloud information.

Note 2: Information relating to volcanic eruption and ash cloud should be collaboratively shared through the State's CDM/ATFM processes, where established.

Promulgation and Status Reporting of State ATM Contingency Plans

7.19 National ATM Contingency Plans should be promulgated on the website of the Air Navigation Service Provider.

7.20 States should report the status of their contingency planning to the ICAO APAC Regional Office, as follows:

1. Promulgation of the national ATM Contingency Plan, together with the hyperlink to the website location of the Plan;

2. State Contingency Points-of-Contact

3. The establishment of contingency arrangements with each neighbouring State.

Note 1: Information of a sensitive nature such as that related to matters of national security need not be included in promulgated contingency plans.

Note 2: the Regional List of State Contingency Points-of-Contact is provided at ***Appendix H****.*

Note 3: APANPIRG Air Navigation Deficiencies may be raised against the provisions of Annex 11 paragraph 2.30 for States that do not report promulgation of their national ATS contingency plan.

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RESEARCH AND FUTURE DEVELOPMENT

8.1 Strategic capability to publish and activate collaborative trajectory options should be implemented through the multi-lateral cooperative design and publication in AIP of contingency routes for the avoidance of airspace affected by Category A or closed by Category C contingency events, using RNP 2 specifications (Seamless ATM Plan Category S airspace) or RNP 4 (Seamless ATM Plan Category R Airspace), or more efficient specifications that may become available.

Note: the decision to either transit or avoid airspace affected by Category A contingency events is a matter for the airspace user.

8.2 Capability for networked tactical ATFM measures should be implemented to manage access to Category A contingency airspace and regulate flows of traffic avoiding Category B or C contingency events.

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APPENDICES

APPENDIX A: ATM CONTINGENCY PLANNING PRINCIPLES

1. All ATS units, including ATC Sectors, Units, Centres and supporting Flight Information and Briefing Offices should have a Level 1 Contingency Plan to ensure the safe transit of international traffic in the event of disruption or withdrawal of ATS, or unsafe airspace conditions such as volcanic ash cloud, nuclear emergency or national security responses.

2. The overriding principle is that safety has primacy over efficiency and optimal levels and routes;

3. Contingency Operations will necessitate lower than normal airspace capacity to ensure safety.

4. System and ATC service redundancy is the most effective contingency capability.

5. All Contingency Plans should define the following where applicable:

   - A Contingency Route Structure supported by a Flight Level Allocation Scheme (FLAS) and minimum navigation and height-keeping (e.g. RVSM or non-RVSM) capability for access;

     Note: Contingency Route Structures and/or FLAS need not be defined where the Contingency Plan states that all routes and/or levels remain available during contingency operations.

   - 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;

   - Priority determination for routine scheduled and non-scheduled flights;

   - Flights excluded from operations in contingency airspace, and minimum navigation and height keeping (RVSM) capability required for access to the contingency airspace;

   - Specified minimum longitudinal spacing between consecutive aircraft entering the contingency airspace on non-separated ATS contingency routes;

   - Contingency communication arrangements including means of communication within contingency airspace and communications transfer arrangements for aircraft entering and leaving the airspace;

   - Details of delegation of air traffic services arrangements (if any);

   - Contingency points of contact

6. Level 2 Contingency Arrangements (arrangements between neighbouring administrations) should be included in bi-lateral or multi-lateral agreements between States in all cases where activation of any Level 1 Contingency Plan will impact upon a neighbouring State's ATSU.

7. Level 1 Contingency Plans should include, either in detail or by reference, any relevant Level 2 Contingency Arrangements.

8. Close cooperation between neighbouring administrations, together with supporting mechanisms for the tactical definition and promulgation of contingency routes for the avoidance of Category B and C contingency airspace.

9. Collaborative Air Traffic Flow Management Measures should be the first priority response to Category A contingency events, and for the management of deviating traffic during Category B and C events.

10. Contingency routes must be vertically separated whenever lateral route separation is less than the minimum specified by the State for contingency operations.

11. Contingency Flight Level allocation scheme 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.

12. Contingency ATS routes should provide minimum lateral separation of 100 NM between aircraft that are not vertically separated under a FLAS, except where the minimum aircraft navigational capability specified in the contingency plan permits reduced lateral separation specified in ICAO Doc 7030 *Regional Supplementary Procedures* Section 6.2 or ICAO Doc. 4444 *PANS-ATM*.

    States should specify any necessary buffers to minimum lateral separation requirements where meteorological phenomena may require aircraft to deviate from the ATS route to maintain flight safety. Information on the buffers should be provided in operational information provided on pre-activation or activation of the contingency plan.

13. Minimum longitudinal spacing 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 where authorized by the relevant authority and agreed in the appropriate LOA or other Contingency Arrangement.

14. Contingency ATS routes and FLAS, and contingency procedures, should be agreed between geographically grouped neighbouring States to form sub-regional contingency plans.

15. Contingency ATS routes should be published in State AIP to permit the storing of route details in airspace users' navigation databases.

16. Airspace classifications for ICAO Classes A, B and C airspace should remain unchanged 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.

17. Define ground and airborne navigation requirements if necessary

18. Alternate aerodromes should be specified where necessary in Level 1 contingency plans for airport control towers and terminal airspace.

19. Aircraft 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.

20. Airspace affected by volcanic ash cloud should not be closed to international civil aviation.

21. 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.

22. Aerodromes should only be closed by NOTAM for periods of observed volcanic ash contamination of the surface of the aerodrome movement area;

23. Closure of airports affected by volcanic ash deposition should be supported by a safety assessment conducted in collaboration between airport operator, aircraft operators and the air navigation service provider, in accordance with their respective safety management systems.

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APPENDIX B: BASIC PLAN ELEMENTS

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. provisions for a Central Coordinating Committee to authorize and oversee the activation of the plan and arrange for ATS restoration in the event of an extended outage;

ii. ATM Operational Contingency Group for 24 hour coordination of operational and supporting activities under the plan, and

iii. the terms-of-reference, structure and contact details for each.

e) Details of testing, review and reporting actions:

i. Schedule of desktop and simulator testing;

ii. Post-activation review (PAR) requirements:

- Completion of 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 contingency arrangements;

iii. Timely reporting to ICAO and other affected States of anticipated or experienced disruptions requiring activation of contingency plans.

Note: Annex 11 states that: States anticipating or experiencing disruption of ATS and/or related supporting services should advise, as early as practicable, the ICAO Regional Office and other States whose services might be affected. Such advice should include information on associated contingency measures or a request for assistance in formulating contingency plans.

f) Inclusion of contingency plans/procedures in ATS training and refresher training programs.

Element 3: Airspace

g) Procedures and determinants for implementation and activation of Special Use Airspace including, where necessary, Restricted or Prohibited Areas in territorial airspace, or Danger Areas over the high seas.

h) Criteria for airspace classification changes and associated separation and CNS requirements

i) Collaborative Trajectory Options for Category A, B and C events, and for Large Scale Weather Deviations (LSWD)

Element 4: ATM Procedures

j) Details of re-routing to avoid the whole or part of the airspace concerned, normally involving establishment of:

i. Strategic and Tactical Collaborative Trajectory Options 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 Flight Level Allocation Scheme, to ensure that a standard minimum vertical separation is applied where less than a specified minimum lateral separation exists between routes.

k) Details of how domestic traffic, departing and arriving flights and SAR, humanitarian and State aircraft flights will be managed during the contingency period.

l) Procedures for transition from normal services levels to contingency services, and resumption of normal service.

m) Procedures for joining or departing a contingency route.

n) Details of reduced levels of service, if any, within the affected airspace.

o) Establishment of arrangements 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.

p) Procedures for adjacent service providers to establish longitudinal spacing at the entry point, and to maintain such separation through the airspace;

q) 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

r) Coordination and communications transfer procedures for aircraft entering and leaving the affected airspace.

Element 5: Pilot/Operator Procedures

s) 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;

t) Emergency procedures, including In-flight requirements for broadcast of position and other information, and for continuous listening watch, on specified pilot-pilot and GUARD VHF frequencies;

u) Requirements for display of navigation and anti-collision lights;

v) Requirements for climbing and descending well to the right of the centreline of specifically identified routes;

w) 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 where modified by a Flight Level Allocation Scheme.

Element 6: Communications Facilities and Procedures

x) Provision and operation of adequate air-ground communications, AFTN and ATS direct speech links;

y) Specification of radio frequencies to be used for particular contingency routes.

z) Log-on and connection management for CPDLC aircraft, where appropriate;

aa) Use of ADS-C automatic position reporting in lieu of voice position reporting to ATS.

Element 7: Aeronautical Support Services including AIS and MET

bb) 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 cc) Reassignment to adjacent States of the responsibility for providing meteorological information and information on status of navigation aids.

Element 8: Contact Details

dd) Contact details for the RCC responsible for the affected FIR, and coordination arrangements.

ee) Contact details of adjacent States ANSPs and other international organisations participating in the contingency plan.

ff) Prior notification requirements for adjacent FIR activation of Level 2 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 PLAN TEMPLATE

Air Traffic Management Contingency Plan

[ATS UNIT NAME]

Version X.X

Effective: [DD Month YYYY]

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SIGNATORIES

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FOREWORD

(EXAMPLE)

1.1 This Contingency Plan forms part of the overall national contingency planning for [STATE], in accordance with the provisions of Annex 11 to the Convention on Civil Aviation, ICAO Doc 9462 *ATS Planning Manual* and Doc 9673 *Asia and Pacific Regions Air Navigation Plan*, and the *Asia/Pacific Region ATM Contingency Plan*. The Plan, and any activation of the Plan, is authorized by [AUTHORITY].

1.2 The Plan provides for the safe continuation of international air traffic through the [XXXX] FIR during periods when ATS may be disrupted or unavailable, or when airspace may be affected by volcanic ash cloud, radioactive cloud, severe weather events or military activity.

1.3 The Plan has been developed in close cooperation and collaboration with airspace users, military authorities and civil aviation authorities responsible for adjacent FIRs.

1.4 The Plan will be activated by NOTAM as far in advance as is practicable. In the event that such prior notification is impracticable the Plan will be activated by the designated authority using the most expeditious alternative means available.

1.5 The Plan serves as the formal agreement between the States listed in paragraph 2.1, when authorized by their signatory ***OR*** The Plan is supported by [OPERATIONAL LOA or SECTIONS XX XX XX OF THE OPERATIONAL COORDINATION LOA BETWEEN XXXX AND XXXX].

1.6 [THE FOLLOWING SECTIONS/APPENDICES OF THIS PLAN ARE INCLUDED IN THE OPERATIONAL LOA or OPERATIONAL COORDINATION LOA or MOU BETWEEN XXXX AND XXXXXX]

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RECORD OF AMENDMENTS

Amendment Number	Effective Date	Date Entered	Entered By	Paragraph/ Reference

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ATM CONTINGENCY PLAN FOR [ATS UNIT]

OBJECTIVE

1.1 The Air Traffic Management (ATM) Contingency Plan for the [FIR/ATS Centre/ATS UNIT] details arrangements to ensure the continued safety of air navigation in the event of partial or total disruption of air traffic services in the [AIRSPACE/SERVICE DESCRIPTION] in accordance with ICAO Annex 11 ─ *Air Traffic Services*. The Contingency Plan provides the ATS procedures and contingency route structure using published ATS routes, where practicable, that will allow aircraft operators to transit the [AIRSPACE DESCRIPTION] during periods of limited or no ATS.

[DESCRIBE HERE THE SCOPE OF THE PLAN, E.G. IF THE PLAN RELATES ONLY TO THE TRANSIT OF INTERNATIONAL AIR TRAFFIC]

[ATS UNITS, CENTRES, STATES AND FIRS AFFECTED]

2.1 In the event that the [AUTHORITY] activates this Contingency Plan, the civil aviation authorities of the [XXXX ADJACENT ATS UNITS, CENTRES, STATES OR FIRS AFFECTED] will be notified in accordance with the [LETTER OF AGREEMENT, MEMORANDUM OF UNDERSTANDNG OR OTHER CONTINGENCY ARRANGEMENT]. The adjacent [ATS UNITS, CENTRES STATES OR FIRS] directly affected by this Contingency Plan are as follows:

a) [STATE]

[FIR/ACC/ATS UNIT]

[FIR/ACC/ATS UNIT]

b) [STATE]

[FIR/ACC/ATS UNIT]

[FIR/ACC/ATS UNIT

c) [STATE]

[FIR/ACC/ATS UNIT]

[FIR/ACC/ATS UNIT

d) [STATE]

[FIR/ACC/ATS UNIT]

[FIR/ACC/ATS UNIT

e) [STATE]

[FIR/ACC/ATS UNIT]

[FIR/ACC/ATS UNIT]

2.2 The contact details of the civil aviation authorities, organizations and ATS units are contained in **Appendix X.** These details should be regularly reviewed, and relevant information provided to the [AUTHORITY] as soon as practicable**.**

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MANAGEMENT OF THE CONTINGENCY PLAN

3.1 The contingency measures set out in this Plan are applicable in cases of foreseeable events caused by unexpected interruptions in ATS caused by natural occurrences or other circumstances, which, in one way or another, may impair or totally disrupt the provision of ATS and/or of the related support services in the [AIRSPACE].

3.2 The following arrangements have been put in place to ensure that the management of the Contingency Plan provides for [INTERNATIONAL IF SO LIMITED] flights to proceed in a safe and orderly fashion through the [AIRSPACE].

Central Coordinating Committee

3.3 The Central Coordinating Committee (CCC) function shall oversee the conduct of the Contingency Plan and in the event that the [SERVICE] is disrupted for an extended period, make arrangements for and facilitate the temporary relocation of the [SERVICE] to the [ALTERNATE FACILITY OR ATS UNIT/CENTRE] and the restoration of [SERVICE]. The terms of reference for the CCC will be determined by the [AUTHORITY].

3.4 The Central Coordinating Committee is includes representation from the following:

1) [REGULATORY AUTHORITY OR ORGANIZATION]
2) [AIR NAVIGATION SERVICE PROVIDER]
3) [MILITARY AUTHORITY]
4) [OTHER RELEVANT NATIONAL AUTHORITY]
5) [AIRSPACE USER REPRESENTATIVE/S]
6) [AIRPORT AUTHORITIES]
7) [METEOROLOGICAL AUTHORITY]
8) [AIRPORT AUTHORITY]
9) [OTHER RELEVANT AUTHORITIES/AGENCIES[

3.5 Terms of Reference for the CCC and the contact details of its members are provided in **Appendix X**.

3.6 The CCC shall oversee the conduct of the Contingency Plan and in the event that the [SERVICE] is disrupted for an extended period, make arrangements for and facilitate the temporary relocation of the [SERVICE] to the [ALTERNATE FACILITY OR ATS UNIT/CENTRE] and the restoration of [SERVICE].

3.7 Under the circumstances described and when deemed necessary by the [AUTHORITY] (OR Under the circumstances described in its Terms of Reference and when deemed necessary) and as soon as practicable in advance of, or after the commencement of a contingency event causing disruption to [AIRSPACE/ATS SERVICE] has occurred, the [AUTHORITY] shall convene the Central Coordinating Committee, by the most expeditious means appropriate for the situation, e.g. by telephone or web-based conference.

Note: This depends on the scale of the plan. E.g. a remote regional control tower would not necessarily require re-convening of a CCC

ATM Operational Contingency Group

3.8 The ATM Operational Contingency Group (AOCG) function will be convened by the CCC with a primary responsibility to oversee the day to day operations under the contingency arrangements, and coordinate operational ATS activities, 24 hours a day, throughout the contingency period. The terms of reference of the AOCG will be determined by the CCC. The AOCG will include any necessary specialist input from the following disciplines:

- Air Traffic Control;
- Aeronautical Telecommunication (COM);
- Aeronautical Meteorology (MET);
- Aeronautical Information Services (AIS);
- ATS equipment maintenance service provider

3.9 The AOCG functions shall include:

viii) review and update of the Contingency Plan as required;

ix) keep up to date at all times of the contingency situation;

x) organize contingency teams in each of the specialized areas;

xi) keep in contact with and update all affected airspace and system users, customers and other relevant stakeholders.;

Note: Annex 11 provides guidelines for coordination of contingency matters with ICAO

xii) exchange up-to-date information with the adjacent ATS authorities concerned to coordinate contingency activities;

xiii) notify the designated organizations of the contingency situation sufficiently in advance and/or as soon as possible thereafter;

xiv) take necessary action for issuing NOTAMs according to this plan or as otherwise determined by the particular contingency situation. Where the contingency situation is sufficiently foreseeable vance the relevant NOTAMs will be issued 48 hours in advance of the contingency event s. NOTAM templates are provided in **Appendix X**.

xv) maintain an activity log using the form in **Appendix X.**

3.10 Terms of Reference for the CCC and the contact details of its members are provided in **Appendix X**.

Plan Testing and Review

3.11 The Plan shall be tested in desktop exercises, where necessary including telephone or web-based conference facilities, at least once per [TIMEFRAME].

3.12 ATC simulation testing of the plan should occur at least once per [TIMEFRAME], and whenever required by the [AUTHORITY].

3.13 A full review of the Plan shall be conducted at least once per [TIMEFRAME]. Provisions for the review of airspace, ATS route, co-ordination and communications details of the Plan shall be included in relevant ATS airspace, data and facility implementation plans.

3.14 A preliminary post-activation review (PAR) report shall be completed within [XX] days following completion of testing or resumption of normal operations. A more comprehensive report shall be completed and forwarded to [AUTHORITY] in any case where an air safety incident investigation related to the pre-activation or activation of the Plan has been conducted, or as otherwise determined by the [AUTHORITY].

CONTINGENCY ROUTE and FLIGHT LEVEL STRUCTURE

4.1 In the event of disruption of the ATC services provided by [ATS UNIT, CENTRE OR FIR], contingency routes will be specified to ensure safety of flight and to facilitate limited flight operations commensurate with the prevailing conditions. Existing ATS routes form the basis of the contingency routes to be used, and a flight level allocation scheme (FLAS) introduced to minimize potential points of conflict. and to limit the number of aircraft operating simultaneously in the system under reduced air traffic services. The contingency route structure [FOR INTERNATIONAL FLIGHTS if necessary] is detailed in **Appendix X.** Additional unpublished contingency routes may be developed tactically by the AOCG and promulgated by NOTAM as and when circumstances require, such as in the case of volcanic ash cloud, radioactive cloud or severe weather event. [INSERT IF RELEVANT, As and where dictated by circumstances domestic flights and international flights that have not yet departed may be temporarily suspended until a full assessment of the prevailing conditions has been determined and sufficient air traffic services restored. A decision to curtail or restart these operations will be made by the CCC.

4.2 Aircraft on long-haul international flights and special operations (e.g. Search and Rescue (SAR), State aircraft, humanitarian flights, etc), shall be afforded priority for levels at FL290 and above. Domestic and regional operators should plan on the basis that FL290 and above may not be available.

4.3 International operators affected by the suspension of all operations from [STATE OR FIR] airports will be notified by the relevant airport authority when operations may be resumed, and flight planning information will be made available pertaining to that airport. International flights that have received such approval may be required to flight plan via domestic routes to join international contingency routes.

4.5 International operators may elect to avoid the [AIRSPACE] by using ATS routes [DESCRIBE ATS ROUTES OR ADJACENT AIRSPACE AS PER AGREEMENT].

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AIR TRAFFIC MANAGEMENT AND CONTINGENCY PROCEDURES

Reduced ATS And Provision of Flight Information Services (FIS)

5.1 During the contingency period ATS including ATC may not be available, particularly communications and ATS surveillance services. In cases where services are not available, a NOTAM will be issued providing the relevant information. The contingency plan provides for limited flight information and alerting services to be provided by [ATS UNIT/S OR CENTRE/S].

5.2 [DESCRIBE ANY DIVISION OF RESPONSIBILITY OF ADJACENT ATS UNITS OR CENTRES FOR SERVICE PROVISION IN THE CONTINGENCY AIRSPACE]. [DESCRIBE THE LEVEL OF SERVICE AVAILABLE]. A chart depicting the airspace arrangement is provided in **Appendix X**.

ATS Responsibilities

5.3 During the early stages of a contingency event, ATC may be overloaded and tactical action may be taken to re-clear aircraft on alternative routes not included in this Plan.

5.4 In the event that ATS cannot be provided in the [AIRSPACE] a NOTAM shall be issued 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, APPROACH, TOWER and FIS), including an expected date of restoration of services if available;

d) information on the provisions made for alternative services;

e) Applicable ATS routes, AIP-published contingency routes, or tactically defined contingency routes;

f) any special procedures to be followed by neighbouring ATS units not covered by this Plan;

g) any special 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.

5.5 NOTAM templates are provided at **Appendix X**.

5.6 In the event that the [XXXX International NOTAM Office is unable to issue the NOTAM, the alternate International NOTAM Office at [INSERT ALTERNATE] and/or [INSERT ALTERNATE] will take action to issue the contingency NOTAM upon notification by the [AUTHORITY].

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Aircraft [SEPARATION OR SPACING]

5.7 Aircraft separation criteria, where applicable, will be in accordance with the *Procedures for Air Navigation Services-Air Traffic Management* (PANS-ATM, ICAO Doc 4444) and the *Regional Supplementary Procedures* (ICAO Doc 7030).

5.8 The minimum longitudinal [SEPARATION/SPACING] will be 15 minutes. However, this may be reduced to 10 minutes in conjunction with application of the Mach number technique where authorized by the [AUTHORITY] and agreed in the appropriate LOA or other Contingency Arrangement.

5.9 The contingency route structure provides for lateral [SEPARATION/SPACING] of 100 NM. In cases where the lateral spacing of contingency routes is less than 100NM, and for crossing routes, a minimum vertical [SEPARATION/SPACING] of [1000/2000] ft will be applied.

Priority for Flight Levels

5.10 Where possible, aircraft on long-haul international flights shall be afforded priority for cruising levels assigned in accordance with the (FLAS).

Airspace Classifications

5.11 Depending on the degree of disruption airspace classifications [OTHER THAN CLASS X, Y, Z – STATE ANY OTHER CONDITIONS RELATING TO NON-CONTINUOUS AIRSPACE, ETC] may be changed to reflect the reduced level of services. Changes to airspace classification will be notified by NOTAM.

Aircraft position reporting

5.12 The primary means of communication will be by VHF or HF radio except for aircraft operating Automatic Dependent Surveillance - Contract (ADS-C) and Controller-Pilot Data Link Communications (CPDLC) systems. When CPDLC has been authorized for use by the relevant ATC authority this will become the primary means of communication, with HF as secondary. ADS-C shall replace any requirement for voice position reporting to ATC for aircraft so equipped, and in this case CPDLC or HF will be the secondary means of communication.

5.13 Traffic Information Broadcast by Aircraft (TIBA) procedures shall apply in [DESCRIBE AIRSPACE/CIRCUMSTANCES]. Details of TIBA procedures and communications requirements are provided in [Attachment B to Annex 11 to the Convention on Civil Aviation *or* (STATE) AIP SECTION XXX] reproduced in **Appendix X.**

5.14 TIBA frequencies shall be as follows:

- [DESCRIPTION OF AIRSPACE] – [XXX.XX] MHz;
- [DESCRIPTION OF AIRSPACE] – [XXX.XX] MHz;
- [DESCRIPTION OF AIRSPACE] – [XXX.XX] MHz;
- [DESCRIPTION OF AIRSPACE] – [XXX.XX] MHz;

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Exclusions

5.15 [SPECIFY EXCLUDED FLIGHTS E.G. VFR, NON SCHEDULED, MILITARY, ETC] shall not operate in the [DESCRIBE AIRSPACE] during contingency operations, except for [SPECIFY FLIGHTS E.G. SAR, FFR, MEDICAL EVACUATION ETC] and any other flights as authorized by the [AUTHORITY].

Procedures for ATS Units

5.16 The ATS units providing ATC services will follow their unit emergency operating procedures and activate the appropriate level of contingency procedures in line with [THIS PLAN (*where it also serves as the formal LOA*) or THE OPERATIONAL LETTER OF AGREEMENT or MOU, ETC]. These procedures include the following:

a) Where ATS provided by the [ATS UNIT, CENTRE, FIR OR STATE] may be reduced or disrupted by a short-notice contingency event, ATC will inform pilots of the emergency condition and advise if it is likely that the ACC will be evacuated and ATS suspended. In the event of it becoming necessary to evacuate the ACC building, the unit evacuation procedures will be activated, and time permitting, controllers will make an emergency evacuation transmission on the radio frequency in use providing pilots with alternate means of communication;

b) during the period the contingency procedures are in effect, flight plan and other aircraft movement messages must continue to be transmitted by operators to the [ATS UNIT, CENTRE, FIR OR STATE] via the AFTN using normal procedures;

c) on notification by [AUTHORITY], the ATS authorities operating the [NEIGHBOURING ATS UNITS, CENTRES, FIRS OR STATES] will activate the contingency procedures in accordance with [THIS PLAN (*where it also serves as the formal LOA*) or THE OPERATIONAL LETTER OF AGREEMENT or MOU, ETC];

d) prior to entry to the [AFFECTED AIRSPACE] during contingency operations prior authorization must be obtained from [AUTHORITY], and flights must comply with the ATC [CLEARANCE/ROUTE, FLIGHT LEVEL] and communications instructions issued by the ATC authority responsible for the airspace immediately adjacent to the contingency airspace.

e) Coordination of aircraft boundary estimates and flight levels by the adjacent ATC authority responsible for aircraft entering the [AFFECTED AIRSPACE] shall be in accordance with [THIS PLAN (*where it also serves as the formal LOA*) or THE OPERATIONAL LETTER OF AGREEMENT or MOU, ETC].

f) the ACC responsible for aircraft entering the [AFFECTED AIRSPACE] will instruct pilots to maintain the last flight level assigned and speed (MACH number if applicable) while operating in the [AFFECTED AIRSPACE];

g) the ACC responsible for aircraft entering the [AFFECTED AIRSPACE] will not authorize any change in route, flight level or speed unless specifically authorized by the ATS unit normally responsible for the affected airspace, or under [THIS PLAN (*where it also serves as the formal LOA*) or THE OPERATIONAL LETTER OF AGREEMENT or MOU, ETC].

h) the ACC responsible prior for aircraft entering the [AFFECTED AIRSPACE] will inform aircraft that they must establish contact with the first ATS unit after transiting the [AFFECTED AIRSPACE] not less than [XX] minutes before the estimated time of entry to the [NEXT AIRSPACE/FIR],

i) aircraft may also chose to avoid the [AFFECTED AIRSPACE] by flight planning via published ATS routes, or via any alternative contingency ATS routes promulgated by NOTAM issued by the controlling authorities of the adjacent FIRs.

j) [DETAIL ANY ROUTE OR AIRSPACE –SPECIFIC ARRANGEMENTS]

<u>Transition To and From Contingency Operations</u>

5.17 During times of uncertainty when airspace closures seem possible, aircraft operators should be prepared for a possible change in routing while en-route, familiarization of the alternative routes outlined in this Contingency Plan, as well as those which may be promulgated by a State via NOTAM or AIP.

5.18 In the event of airspace closure that has not been promulgated, ATC should, if possible, broadcast to all aircraft in their airspace, what airspace is being closed and to stand by for further instructions.

5.19 ATS providers should recognize that when closures of airspace or airports are promulgated, individual airlines might have different company requirements as to their alternative routings. ATC should be alert to respond to any request by aircraft and react commensurate with safety.

<u>Transfer of control and coordination</u>

5.20 Unless otherwise specified in [THIS PLAN (*where it also serves as the formal LOA*) or THE OPERATIONAL LETTER OF AGREEMENT or MOU, ETC] transfer of control and communication should be at the common FIR boundary between ATS units.

PILOTS AND OPERATOR PROCEDURES

<u>Filing of flight plans</u>

6.1 Flight planning requirements detailed in [STATE] AIP continue to apply during contingency operations, except where modified by the contingency ATS routes and FLAS specified by ATC and/or in NOTAM.

<u>Overflight approval</u>

6.2 Aircraft operators must obtain over-flight approval from the [AUTHORITY] prior to operating flights through the [AFFECTED AIRSPACE]. During the period of activation of this Contingency Plan the adjacent ATS authority will provide normal ATC clearances for aircraft to enter the [AIRSPACE]. The adjacent ATS authority is not responsible for coordination or provision of overflight clearances for the [AIRSPACE]. The operator must ensure any required overflight approval has been obtained.

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CNS Capability

6.3 Flights operating through the [AFFECTED AIRSPACE] shall be equipped with the following minimum communications, navigation and surveillance capability:

a) [SPECIFY]

b) [SPECIFY]

c) [SPECIFY]

d) SPECIFY]

Pilot operating procedures

6.4 Pilots will continue to make or broadcast routine position reports in line with normal ATC reporting procedures~~.~~

6.5 Pilots of aircraft operating in the [AFFECTED AIRSPACE] during contingency operations shall comply with the following procedures:

a) all aircraft proceeding along the ATS routes established in this Contingency Plan will comply with the instrument flight rules (IFR) and will be assigned a flight level in accordance with the flight level allocation scheme applicable to the route(s) being flown as specified in **Appendix X**;

b) flights are to flight plan using the Contingency Routes specified in **Appendix X**, according to their airport of origin and destination;

c) aircraft are to operate as close as possible to the centre line of the assigned contingency route;

d) a continuous communications watch shall be maintained on the specified contingency frequency as specified in **Appendix X**.

e) aircraft position reports and other information as necessary shall be broadcast in accordance with TIBA procedures defined in AIP [STATE];

f) aircraft navigation and anti-collision lights shall be displayed;

g) except in cases of emergency or for reasons of flight safety, pilots are to maintain during their entire flight within [AFFECTED AIRSPACE], the last assigned flight level, mach number and SSR transponder code. If no transponder code has been assigned, aircraft shall squawk code [XXXX].

h) aircraft are to reach the flight level last assigned by the responsible ACC at least [XX] minutes before entering the [AFFECTED AIRSPACE] or as otherwise instructed by the ATC unit acting in accordance with the operational Letter of Agreement or other Contingency Arrangement;

i) pilots are to include in their last position report prior to entering the [AFFECTED AIRSPACE], the estimated time over the entry point of the [AFFECTED AIRSPACE] and the estimated time of arrival over the relevant exit point;

j) pilots are to contact the next adjacent ACC as soon as possible, and in any event not less than ten (10) minutes before the estimated time of arrival over the relevant exit point from the [AFFECTED AIRSPACE];

k) pilots are to strictly adhere to the ICAO Traffic Information Broadcasts by Aircraft (TIBA) procedures, reproduced in **Appendix X**, on the specified VHF and HF frequencies listed in **Appendix X**. When necessitated by emergency conditions or flight safety requirements, pilots are to transmit blind on these frequencies, their current circumstances and the commencement and completion of any climb and descent or deviation from the cleared contingency route;

l) whenever emergencies and/or flight safety reasons make it impossible to maintain the flight level assigned for transit of [AFFECTED AIRSPACE], pilots are to climb or descend well to the right of the centerline of the contingency route, and if deviating outside the [AFFECTED AIRSPACE], to immediately inform the ACC unit responsible for that airspace. Pilots are to broadcast details of any level change including aircraft identification, aircraft position and route, vacated flight level, intended flight level, flight level passed and cruising flight level maintained on [FREQUENCY];

m) pilots are to maintain own longitudinal separation of 15 minutes from preceding aircraft at the same cruising level; and

n) not all operational circumstances can be addressed by this Contingency Plan and pilots are to maintain a high level of alertness when operating in the contingency airspace and take appropriate action to ensure safety of flight.

Interception of civil aircraft

6.6 Pilots need to be aware that a contingency routing requiring aircraft to operate off normal traffic flows may result in interception by military aircraft. Aircraft operators must therefore be familiar with international intercept procedures contained in ICAO Annex 2 –*Rules of the Air*, paragraph 3.8 and Appendix 2, Sections 2 and 3.

6.7 Pilots are to comply with instructions given by the pilot of the intercepting aircraft. In such circumstances, the pilot of the aircraft being intercepted shall broadcast information on the situation.

6.8 If circumstances lead to the closure of the [AFFECTED AIRSPACE] and no contingency routes are available, aircraft will be required to remain clear of the [AFFECTED AIRSPACE]. As much warning as possible will be provided by the appropriate ATS authorities in the event of the complete closure of airspace.

6.9 Pilots shall continuously guard the VHF emergency frequency 121.5 MHz and should operate their transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where secondary surveillance radar (SSR) is used for ATS purposes. Transponders should be set on the last discrete code assigned by ATC or select code [XXXX] if no code was assigned.

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COMMUNICATION PROCEDURES

<u>Degradation of Communication - Pilot Radio Procedures</u>

7.1 When operating within the contingency airspace, pilots should use normal radio communication procedures where ATS services are available. Where limited or no ATS is available communications will conducted be in accordance with the procedures in this Plan, or as otherwise notified by NOTAM.

7.2 If communications are lost unexpectedly on the normal ATS frequencies, pilots should try the next applicable frequency, e.g. if en-route contact is lost then try the next appropriate frequency, that is, the next normal handover frequency. Pilots should also consider attempting to contact ATC on the last frequency where two-way communication had been established. In the absence of communication with ATC, the pilot should continue to make routine position reports on the assigned frequency, and also broadcast positions in accordance with the TIBA procedures.

<u>Communication frequencies</u>

7.3 A list of frequencies to be used for the contingency routes and the ATS units providing FIS and air-ground communication monitoring for the [AIRSPACE] is detailed at **Appendix X.**

AERONAUTICAL SUPPORT SERVICES

<u>Aeronautical Information Services (AIS)</u>

8.1 [DETAIL THE AVAILABILITY OR ALTERNATE ARRANGEMENTS FOR AIS]

<u>Meteorological Services (MET)</u>

8.2 [DETAIL THE AVAILABILITY OF METEROLOGICAL SERVICES AND THE METHODS OF DISTRIBUTION OF MET INFORMATION DURING CONTINGENCY OPERATIONS.]

SEARCH AND RESCUE ALERTING

<u>Notification and Coordination</u>

9.1 The SAR authority responsible for the [AFFECTED AIRSPACE] is the [XXXXX] Rescue Coordination Centre (RCC)

IDD: XXXXXXXXXX

Fax: XXXXXXXXXX

AFTN: XXXXXXXX

9.2 [INSERT SAR ALERTING ARRANGEMENTS AS NECESSARY. MAY INCLUDE CONSIDERATION OF NEIGHBOURING ATS UNITS PROVIDING FULL FLIGHT FOLLOWING, OR LIMITED TO RESPONSE TO IN-FLIGHT EMERGENCIES].

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SUB-PLANS

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Appendix X – Contact Details

Appendix X – Coordinating Bodies

Appendix X – Specimen NOTAMs

Appendix X – International Route Structure During Total Disruption

Appendix X – Chart of Contingency Routes

Appendix X – Contingency Frequencies for Control and/or Flight Monitoring

Appendix X – Flight Planning

Appendix X – Traffic Information Broadcasts by Aircraft Procedures

Appendix X – ICAO Interception Procedures

Appendix X – Recording and Reporting Form

Appendix X – Guidance for using the template

APPENDIX D – ACTIONS IN THE EVENT OF VOLCANIC ERUPTION OR VOLCANIC ASH CLOUD

The following pages are extracted from ICAO Doc 9766 – *Handbook on the International Airways Volcanic Watch (IAVW)*

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Part 4

INTERNATIONAL AIRWAYS VOLCANO WATCH

OPERATIONAL PROCEDURES FOR THE DISSEMINATION OF INFORMATION ON VOLCANIC ERUPTIONS AND ASSOCIATED VOLCANIC ASH CLOUDS IN AREAS WHICH COULD AFFECT ROUTES USED BY INTERNATIONAL FLIGHTS, AND NECESSARY ARRANGEMENTS PRIOR TO A VOLCANIC ERUPTION

4.1. PROCEDURES PRIOR TO A VOLCANIC ERUPTION

4.1.1 In order to permit efficient application of the measures noted in 4.2 to 4.8, States responsible for flight information regions (FIRs) in which there are active or potentially active volcanoes in proximity to routes used by international flights should make arrangements to ensure that:

a) active or potentially active volcanoes are instrumentally and visually monitored (e.g. by seismological means supplemented by other information available) by designated volcano observatories supported by appropriate authorities, resourcing and quality management systems;

b) systems and channels of communication are in place to make available appropriate meteorological data on volcanic plume height or resuspended ash (in particular radar data, but also lidar, satellite remote sensing and visual observations by trained meteorological observers);

c) 24-hour contact details are shared between the area control centre/flight information centre (ACC/FIC), meteorological watch office (MWO) and volcano observatories and relevant volcanic ash advisory centre (VAAC);

d) information on increasing volcanic activity, volcanic eruption[1] or volcanic ash cloud in areas which could affect routes used by international flights, available from one or more observing sources, such as vulcanological, seismological, geological, meteorological, or the police/military networks and domestic aviation, is passed **immediately** to the ACC/FIC and the MWO concerned;

Note.— Where information comes from supplementary sources such as the research community, States are strongly encouraged to make arrangements consistent with the appropriate scientific protocols as advised by the International Union of Geodesy and Geophysics (*IUGG).*

e) the State international NOTAM office personnel are familiar with the issuance of ASHTAMs[2] (or NOTAMs for volcanic ash);

f) information, preferably supplemented by charts, concerning volcanoes in the FIRs for which the State is responsible is included in the State aeronautical information publication in accordance with Annex 15, Appendix 1, Section ENR 5.3.2; and

g) air traffic management (ATM) contingency arrangements in respect of volcanic ash are made and promulgated, as necessary, for air routes crossing FIRs for which the State is responsible, in coordination with adjacent FIRs.

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1 The term “eruption” in Part 4 of this document refers to the start or continuation of an eruption, or its cessation.
2. The ASHTAM is a special series NOTAM specifically for volcanic activity.

4.1.2 States must promulgate a requirement for pilots to make and transmit a special aircraft observation, in accordance with Annex 3, 5.5 h), in the event that pre-eruption volcanic activity or a volcanic eruption is observed or a cloud of volcanic ash is encountered or observed which may affect the safety of other aircraft operations, and to record a special air-report in accordance with Annex 3, 5.9. In addition, the International Air Transport Association (IATA), the International Federation of Air Line Pilots' Associations (IFALPA) and the International Council of Aircraft Owner and Pilot Associations (IAOPA) should bring this requirement to the attention of pilots and airline operating centres and highlight its significance for the international airways volcano watch (IAVW) and the importance of transmitting these observations in a timely manner.

Note.— Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

4.1.3 It is essential that the foregoing arrangements be made in every State concerned and their efficacy continually maintained. In the case of volcanic ash, the hazard to jet transport aircraft is greatest within the first few hours following an eruption; hence speed of notification between all links in the chain of communication is critical. States may wish to consider drawing up letters of agreement between the parties involved, in particular, the civil aviation and meteorological authorities and the vulcanological agency, to record the agreed responsibilities of each party.

4.1.4 In order to assist States in enhancing the coordination between the different States' authorities/agencies involved in the IAVW, a sample letter of agreement covering the coordination and responsibilities between meteorological authorities, ATS authorities and vulcanological authorities for the provision and exchange of information relevant to volcanic ash is provided in Appendix A.

Note 1.— Consistent with the Hyogo Framework for Disaster Risk Reduction 2005-2015, States may wish to consider the above as part of an integrated suite of arrangements for other related volcanic hazards, such as ashfall on airports, populated areas and agricultural zones, shipping hazards, volcanic tsunami, and rainfall that may induce dome collapse, lahar activity or slope failure.

Note 2.— Given the variation between States in capacity and the cross-border nature of the volcanic ash hazard, all States are encouraged to take note of arrangements in the surrounding regions, and where appropriate and invited, to assist in any reasonable manner.

4.2 ACTION TO BE TAKEN BY THE STATE VOLCANO OBSERVATORY IN THE EVENT OF A VOLCANIC ERUPTION

4.2.1 In the event of significant pre-eruption volcanic activity, a volcanic eruption occurring or a volcanic ash cloud being formed over a volcano under its vigilance, the State volcano observatory should take the following actions:

a) immediately forward the available information to its associated ACCs, MWOs and VAACs by telephone to verbally inform them of the significant activity, and then follow up with a faxed or e-mailed volcano observatory notice for aviation (VONA). This will enable rapid notification of air traffic control (ATC) authorities about operationally critical information. VONA may also be distributed directly to interested operators in accordance with local arrangements; and

b) maintain an up-to-date contact list of relevant agencies and conduct routine testing of the agreed dissemination pathway.

Note 1.— The key role of State volcano observatories in providing timely reports of volcanic unrest and eruptions to the aviation sector has been well established within the framework of the IAVW. Each State is required to provide information on volcanic activity to its associated ACCs, MWOs and VAACs in accordance with Annex 3.

Note 2.— The map of VAAC areas of responsibility is shown in Part 2. A list of State volcano observatories, ACCs, MWOs and FIRs is given in Part 5.

Note 3.— The VONA has been developed for State volcano observatories (or equivalent scientific agencies) to disseminate critical, operationally relevant information about volcanic activity.

Note 4.— A State may wish to further strengthen coordination among the agencies involved in dissemination and exchange of information relevant to volcanic ash, including the issuance of VONA, by drawing up a letter of agreement between the civil aviation and meteorological authorities and the volcanological agency. A sample letter of agreement is provided in Appendix A.

4.2.2 The VONA is used to report significant changes in activity of a volcano such as:

a) escalation of precursory unrest;

b) eruption onset;

c) significant ash emission; and

d) eruption cessation.

4.2.3 Along with basic volcano information (name, identifying number and location), the VONA is a brief summary of volcanic activity and observations about ash emission (or lack thereof). The VONA is intended for aviation users and not scientists.

4.2.4 The VONA includes fields for the current and previous volcano level of alert color codes for aviation, which is a green-yellow-orange-red ranking that explicitly addresses airborne ash hazards (see Table 4-4). Color codes help dispatchers, pilots and air traffic controllers to quickly ascertain the status of numerous volcanoes as they plan and execute flights over broad regions of the globe. The volcano level of alert color codes for aviation are a key component of the global standardization of information provided by volcanological agencies to aviation users.

4.2.5 A State volcano observatory should issue a VONA under the following circumstances:

a) when volcano level of alert color code is changed; or

b) within a color-code level when an ash-producing event or other significant change in volcanic behavior occurs.

4.2.6 Although it is recommended that State volcano observatories assign volcano level of alert color codes for aviation, if they do not, a VONA may still be issued leaving the color-code fields blank.

4.2.7 A VONA is to be disseminated to the requisite ACCs, MWOs and VAACs using the following media:

a) e-mail;

b) fax;

c) telephone; or

d) public website.

4.2.8 In accordance with *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082), the costs associated with the transmission of information from State volcano observatories to their associated ACCs, MWOs and VAAC are subject to cost recovery. Guidance on cost recovery by State volcano observatories is provided in Appendix G.

4.3 ACTION TO BE TAKEN BY THE ACC IN THE EVENT OF A VOLCANIC ERUPTION

In the event of significant pre-eruption volcanic activity, a volcanic eruption occurring or a volcanic ash cloud being reported in areas which could affect routes used by international flights, the ACC/FIC responsible for the FIR concerned, on receiving information of the occurrence, should take the following actions:

a) Pass this information **immediately** to aircraft in flight which could be affected by the volcanic ash cloud and advise ACCs in relevant adjacent FIRs. Issue an ASHTAM or a NOTAM through the State International NOTAM Office (NOF), in accordance with Annex 15, Chapter 5, giving details of the pre-eruption activity, volcanic eruption and ash cloud, including the name and geographical coordinates of the volcano, the date and time of the eruption, the flight levels and routes or portions of routes which could be affected and, as necessary, routes temporarily closed to air traffic. Include in the address list for ASHTAMs or NOTAMs concerning volcanic activity the associated MWO (see Part 2 of this document), all VAACs and the SADIS WIFS gateway at EGZZVANW.

Note 1.— In issuing an ASHTAM or a NOTAM concerning significant pre-eruption volcanic activity, or for volcanic eruptions **not** *producing ash plumes, it is recommended that the ASHTAM or NOTAM text include the following actual wording, as appropriate:*

"INCREASED VOLCANIC ACTIVITY REPORTED FOR VOLCANO (NAME AND LAT/LONG) AIRCRAFT ADVISED TO EXERCISE CAUTION UNTIL FURTHER NOTICE AND MAINTAIN WATCH FOR ASHTAM/NOTAM/ SIGMET FOR AREA".

or

"VOLCANO (NAME AND LAT/LONG) ERUPTED (DATE/TIME UTC) BUT NO ASH PLUME REPORTED, AIRCRAFT ADVISED TO AVOID FLYING WITHIN ... KM OF THE VOLCANO UNTIL FURTHER NOTICE, MAINTAIN WATCH FOR ASHTAM/NOTAM/SIGMET FOR AREA".

Use of such language in an ASHTAM or a NOTAM ensures that large volumes of airspace are not rendered unavailable to aircraft unnecessarily until such time as a volcanic ash plume/cloud is actually reported, or observed from satellite data.

Note 2.— In order to ensure speedy transmission of initial information to aircraft, the first ASHTAM or NOTAM issued may simply contain information that an eruption and/or ash cloud has been reported and the date/time and location. It is not necessary to await further detailed information; this may be included in subsequent ASHTAMs or NOTAMs as it becomes available.

Note 3.— Volcano level of alert colour codes for aviation should be used by some vulcanological agencies to report volcanic activity information (see 4.2.4). In States where the volcano level of alert colour codes for aviation have been introduced by the vulcanological agency, it is highly desirable to include the reported colour code in ASHTAMs or NOTAMs issued for volcanic activity.

b) Activate contingency arrangements, including the implementation of alternative routes bypassing the area likely to be affected by the volcanic ash cloud, in coordination with ACCs and FICs responsible for adjacent FIRs.

c) Advise the associated MWO(s) and VAAC of the volcanic eruption and/or the existence of volcanic ash cloud (including the forwarding of all special air-reports in accordance with existing provisions in Annex 11, 4.2.3) and maintain continuous coordination with the MWO to ensure consistency in the issuance and content of ASHTAMs or NOTAMs and SIGMETs.

d) Cancel the ASHTAM or NOTAM as soon as it is considered that the volcano has reverted to its normal state and the airspace is not contaminated by volcanic ash.

4.4 ACTION TO BE TAKEN BY THE NOF IN THE EVENT OF A VOLCANIC ERUPTION

4.4.1 In the event of significant pre-eruption volcanic activity, a volcanic eruption occurring or a volcanic ash cloud being reported in areas which could affect airspace in the FIRs of the State in which the NOTAM Office (NOF) is designated, the NOF should issue an ASHTAM (or a NOTAM for volcanic activity) based on information provided by the ACC responsible for the FIR concerned. The ASHTAM or NOTAM must be cancelled, in consultation with the ACC, as soon as it is considered that the airspace is not contaminated by volcanic ash. Include in the address list for ASHTAM or NOTAM concerning volcanic activity the associated MWO (see Part 2 of this document), all VAACs and the SADIS WIFS gateway at EGZZVANW.

4.4.2 In addition to addressing the ASHTAM (or NOTAM) to other NOFs for whom the information is of direct operational significance, the NOF should include in the address list the VAAC responsible for the FIRs concerned. The States responsible for FIRs in which there are active volcanoes and the AFTN switching centres designated to receive NOTAM or ASHTAM are listed in Table 4-1.

As an example, an ASHTAM issued by the Tegucigalpa NOF would be sent to VAAC Washington as follows:

ZCZC
GG KWBCYMYX
170630 MHTGYNYX
VAMH0001 MHTG 04170630

ASHTAM

A. CENTRAL AMERICAN FIR
B. 04170555
C. VOLCAN SAN CRISTOBAL.14004-02
D. 124211N0870024W
E. YELLOW ALERT
F. SFC/11000FT
G. E/SE
H. VOR/DME MGA A317 TUKOR CNL
I. VOR/DME MGA A317 TUKOR RTE AVBL. ALT RTE
MGA VOR/DME A502 BERTA GABOS A317.
VOR/DME/CAT/ABVL
J. INSTITUTO NACIONAL DE ESTUDIOS TERRITORIALES. DPTO. DE SISMOLOGÍA
K. GNE AVIATION CTN WIND 60KM/H E/SE FM VOLCANO

NNNN

A similar example, this time showing a NOTAM issued by Guayaquil NOF, would be sent to VAAC Washington as follows, showing the three sections of the message:

1 ZCZC USUAL AFTN HEADER ENVELOPE
GG KWBCYMYX
151840 SEGUYNYX

2	A0623/00 NOTAMN Q) SEGU/QWWXX/IV/NBO/W/000 /250/0128S 07826W030 A) SEGU B) 0002151830 C) 0002171830 E) SIGNIFICANT VOLCANIC ACT TUNGURAHUA VA MOV W. AWY RESTRICTIONS AND ALT RTE NOTIFIED BY ATC	ACTUAL NOTAM
3	NNNN	USUAL AFTN ENDING ENVELOPE

4.4.3 In case of a need to issue a NOTAM regarding volcanic ash deposition at an aerodrome, the following guidelines are suggested:

a) in cases when a forecast of impending ash deposition is available, a NOTAM should be issued stating the time period when ash is expected to commence at an aerodrome;

b) a NOTAM should be issued when ash reaches an aerodrome or begins to accumulate on the ground at an aerodrome. The NOTAM should report if the aerodrome is still open for operation;

c) a new NOTAM should be issued every 4 hours while deposition is occurring or present in the air at the aerodrome, or more frequently as needed for occurrence of heavy ash deposition. If a friction test of runway surfaces has been made with a mu-meter, that value and the time it was made should be reported; and

d) a final NOTAM should be issued when clean-up activities are completed and operations have resumed.

4.4.4 Since volcanic ash deposition at an aerodrome is a phenomena which could prompt the issuance of an aerodrome warning, close coordination is recommended between each NOF and the aerodrome meteorological office(s) in its area of responsibility concerning the issuance of such warnings.

4.5 ACTION TO BE TAKEN BY THE MWO IN THE EVENT OF A VOLCANIC ERUPTION

4.5.1 On receipt from the ACC/FIC of information concerning a volcanic eruption and/or the existence of a volcanic ash cloud, the MWO should take the following steps:

a) notify the VAAC designated to provide advice on volcanic ash trajectories for the FIR for which the State is responsible that a volcanic eruption and/or ash cloud has been reported, provide available relevant details and request advisory information on the extent and trajectory of volcanic ash. In particular, special air-reports of pre-eruption volcanic activity, a volcanic eruption, volcanic ash cloud or aircraft encounter with volcanic ash received by MWOs should be transmitted to their associated VAACs, WAFC London SADIS at the address specified in Appendix B according to the region containing the area affected and WAFC Washington at KWBCYMYX;

Note 1.— The area of responsibility of the VAACs and the MWOs to which volcanic ash advisory information is to be sent are given in the ICAO regional air navigation plans and in Part 2 of this document.

Note 2.— The contact numbers that the MWOs should use to notify volcanic eruptions/volcanic ash cloud to the VAAC are given in Table 4-2.

b) as soon as practicable, advise the associated ACC/FIC whether or not the volcanic ash cloud is identifiable from satellite images/data and, if possible,

c) provide regular information based on advice received from the VAAC on the horizontal and vertical extent of the cloud and the trajectory of the cloud; and

d) issue a SIGMET message for volcanic ash for a validity period of 6 hours in alphanumerical message format and, if in a position to do so, in graphical format based on the advisory information provided by the VAAC concerned. Update SIGMET information at least every 6 hours. Include in the SIGMET address all VAACs, WAFC London at the address specified in Appendix B according to the region containing the area affected, WAFC Washington at KWBCYMYX and the regional OPMET data bank(s) responsible. Maintain continuous coordination with the associated ACC/FIC to ensure consistency in the issuance and content of SIGMETs, and ASHTAMs or NOTAMs. SIGMET messages for volcanic ash issued outside the EUR Region to be transmitted to the EUR Region should be addressed in accordance to the EUR FASID Table MET 2B as follows:

Source	**Responsible EUR Gateway and Address to be used**	
AFI	France	LFZZMAFI
MID	Austria	LOZZMMID
ASIA	UK	EGZZMASI
CAR	UK	EGZZMCAR
NAM	UK	EGZZMNAM
NAT	UK	EGZZMNAT
PAC	UK	EGZZMPAC
SAM	UK	EGZZMSAM

Note 1.— The associated ACC/FIC should automatically be on the address list for all SIGMETs issued by the MWO.

Note 2.— In order to ensure speedy transmission of initial information to aircraft, the first SIGMET issued may simply contain information that an ash cloud has been reported and the date/time and location. It is not necessary to await further detailed information before issuing the first SIGMET. Such information may be included in subsequent SIGMETs as it becomes available.

4.5.2 In the event that the MWO becomes aware of the occurrence of pre-eruption activity, a volcanic eruption or ash cloud from any source other than its associated ACC/FIC, that information should be passed **immediately** to the associated ACC/FIC. The procedures in 4.5.1 should then be followed, as necessary.

4.5.3 In the event that a meteorological office becomes aware of the occurrence of pre-eruption activity, a volcanic eruption or ash cloud from any source, the information should be passed **immediately** to its associated MWO for onward transmission to the ACC/FIC.

4.6 ACTION TO BE TAKEN BY VAACs IN THE EVENT OF A VOLCANIC ERUPTION

4.6.1 On receipt of information from an ACC, MWO, volcano observatory or any other source[3] that a volcanic eruption has been reported and/or a volcanic ash cloud has been observed in the FIR for which the MWO is responsible, the VAAC should:

a) initiate the volcanic ash computer trajectory/dispersion model in order to provide advisory information[4] on volcanic ash trajectories to the MWOs, ACCs and, to the extent possible, to the operators[5] concerned;

b) review satellite images/data of the area for the time of the event to ascertain whether a volcanic ash cloud is identifiable and, if so, its extent;

c) prepare and issue advisory information on the extent and forecast trajectory of the volcanic ash cloud, in alphanumerical message format, as shown below, and graphical format[6] (using the PNG format) for transmission to the MWOs, ACCs and, to the extent possible, the operators[3] concerned in the VAAC area of responsibility, to WAFC London at the address specified in Appendix B according to the region containing the area affected, WAFC Washington at KWBCYMYX, and other VAACs. Advisory information on volcanic ash issued outside the EUR Region to be transmitted to the EUR Region should be addressed in accordance with EUR FASID Table MET 2B (see 4.5.1 c).

The volcanic ash advisory message should contain the following information:

message type
— VOLCANIC ASH ADVISORY

issue time, date and name of issuing VAAC
— time (UTC), day/month/year; volcanic ash advisory centre issuing advisory

name of volcano and volcano reference number
— volcano name (if known) and reference number (International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI))

the State or area in which the volcano is located and the latitude/longitude
— name of State or area (e.g. oceanic) and latitude/longitude of volcano

source(s) of information
— volcano agency (see Appendix E) or special air-report, etc.

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3. When initial notification of the eruption is received from a source other than an ACC/MWO, this information should be passed **immediately** by telephone to the relevant ACC and/or MWO. Thereafter, the procedures in a) to h) should be followed.

4 On some occasions, the volcanic ash advisory could be the first information received by ACC/FIC concerning hazardous conditions which may be encountered by an aircraft in flight. The VAAC has the option to issue a volcanic ash advisory without forecast as a first piece of information to quickly warn the ACC/FIC. The first advisory will, as soon as possible, be followed by a volcanic ash advisory with complete forecast information included.

5. Advisory information from VAACs is intended to assist MWOs in the preparation of the SIGMET. However, in order to provide operators with the earliest possible advance information on volcanic ash, an AFTN address (EGLLSITV) has been provided on the SITA network to which VAACs may send their advisories for onward distribution to operators by SITA. SIGMETs for volcanic ash will, of course, be disseminated in accordance with the relevant regional air navigation plan OPMET exchange tables.

6. Volcanic ash advisories in graphical format will be included on the London and Washington satellite broadcasts. An example of the graphical format is given in the Appendix 1 to Annex 3.

details of eruption
— time (UTC), day/month/year of the eruption

details of ash cloud
— vertical extent in flight levels and horizontal extent in kilometres (nautical miles) and boundary of ash cloud in degrees and minutes

trajectory of ash cloud
— indication of direction and speed of movement of ash cloud at selected flight levels in broad descriptive terms

forecast movement of ash cloud
— forecast boundaries of ash cloud in degrees and minutes at selected flight levels for 6, 12 and 18 hours following time of issuance of advisory message

next advisory
— expected time of issuance of next advisory.

In order for the VAAC to initiate the monitoring of volcanic ash from satellite data and the forecast of volcanic ash trajectories, MWOs are expected to notify the relevant VAAC immediately on receipt of information that a volcanic eruption has occurred or volcanic ash has been observed in the FIR for which they are responsible in accordance with 4.5.1 a). In particular, any special air-reports of pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, received by MWOs, should be transmitted without delay to the associated VAAC and to other addresses in accordance with 4.5.1 a);

d) monitor subsequent satellite information to assist in tracking the movement of volcanic ash cloud;

e) continue to issue updated advisory information to MWOs, ACCs and operators[7] concerned at least at 6-hour intervals, and preferably more frequently, until such time as it is considered that the volcanic ash cloud is no longer identifiable from observations, no further reports of volcanic ash are received from the area and no further eruptions of the volcano are reported;

Note.— If volcanic ash is not identifiable from satellite data and the VAAC has reasonable doubts about the existence of volcanic ash in the atmosphere, it should be indicated in the REMARKS section of the volcanic ash advisory.

f) maintain regular contact with other VAACs, as necessary, and the Smithsonian Institution Global Volcanism Network, in order to keep up to date on the activity status of volcanoes in the VAAC area of responsibility. In the specific case of reception of information regarding an aircraft encounter with volcanic ash (Annex 3, 5.9 refers), the information should be sent to the Smithsonian Institution Global Volcanism Network and to ICAO in order to keep up to date the database for encounters between aircraft ash clouds (Doc 9691, Appendix D refers). To that end the following e-mail addresses should be used:

gvn@volcano.si.edu
iavwopsgsec@icao.int;

g) undertake a collaborative decision analysis and forecasting process when volcanic ash is approaching an adjacent FIR outside of a VAAC's area of responsibility;

Note.— Collaborative decision analysis and forecasting procedures are described in 4.10.

7. Advisory information from VAACs is intended to assist MWOs in the preparation of the SIGMET. However, in order to provide operators with the earliest possible advance information on volcanic ash, an AFTN address (EGLLSITV) has been provided on the SITA network to which VAACs may send their advisories for onward distribution to operators by SITA.

h) in cases where a volcanic ash cloud is expected to approach within 300 NM of the boundary of another VAAC area of responsibility, the first (primary) VAAC will initiate the operational procedures for the coordination and may request transfer of responsibility between VAACs for volcanic ash events; and

Note 1.— Standardized operational procedures for the coordination and transfer of responsibility between VAACs for volcanic ash events are provided in Appendix C.

Note 2.— To facilitate VAACs' rapid access to volcanic ash advisories issued by other VAACs, Table 4.3 provides a listing of the WMO bulletin headers, for each product (volcanic ash in the advisory in the alphanumeric and graphical format, respectively) being used by the VAACs.

i) in the event of long-lived volcanic ash clouds no longer being identifiable on satellite imagery, use the method of "gradual" advisory cessation by extrapolating forecast ash boundaries such that the previous 6-, 12- and 18-hour forecasts become the current analysis position in 6-and 12-hour forecasts respectively, with no ash boundary specified for the 18-hour forecast.

Note 1.— The above procedure (which is reducing the outlook period of 6 hours at each issue) should be applied unless remote sensing data or air-reports suggest there has been an error in the forecasts issued.

Note 2.— To provide rapid access to eruption source parameters data for immediate use by forecasters in ash transport and dispersion models, a preliminary spreadsheet of eruption source parameters of the world is available at http://www.icao.int/safety/meteorology/iavwopsg.

4.6.2 In the event of interruption of operation of one VAAC, its functions should be carried out by another VAAC or another meteorological centre, as designated by the VAAC Provider State concerned. The back-up procedures agreed by the VAACs given in Appendix D should be applied in order to provide the VAAC services as needed.

4.6.3 For those VAACs which have not yet implemented a computer volcanic ash dispersion forecast model, on receipt of information from an MWO or any other source in its area of responsibility that a volcano has erupted and/or volcanic ash cloud has been reported from the FIR for which the MWO is responsible, the VAAC should immediately contact VAAC Washington at the following 24-hour contact numbers:

Tel.: +1 (301) 683-1401
Fax: +1 (301) 683-1405

to request initiation of the United States Volcanic Ash Forecast Transport and Dispersion (VAFTAD) model and the provision of the necessary trajectory forecasts. Alternatively, VAACs may interactively run a dispersion model via the Internet at the following web site: http://www.arl.noaa.gov/index.php. This site also contains a number of model runs of hypothetical volcanic eruptions, generally of recently active volcanoes or those suspected to become active. If for any reason VAAC Washington is unable to respond or contact cannot be achieved, recourse should be made to VAAC London, VAAC Montreal or VAAC Toulouse at the 24-hour contact numbers given in 4.5.1 to run their dispersion models.

4.7 ACTION TO BE TAKEN BY OPERATORS IN THE EVENT OF A VOLCANIC ERUPTION

In the event of an eruption, operators should request their pilots to report, when appropriate, any observation related to a volcanic ash cloud including the absence of visible ash and all other relevant information such as observational conditions. The operator should then forward this information to the association VAAC in a timely manner.

Note.— Visible ash is defined in the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds *(Doc 9691).*

APPENDIX E – EXAMPLES OF VOLCANIC ASH CLOUD CONTINGENCY PLAN

The following pages provide examples of Volcanic Ash Cloud Contingency Plans provided by the U.S. Federal Aviation Administration (FAA).

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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Anchorage Air Route Traffic Control Center

ZAN ORDER 1900.2H

Effective Date:
January 3, 2011

SUBJ: EMERGENCY PLAN FOR VOLCANIC ERUPTIONS AFFECTING ALASKAN AIRSPACE

1. PURPOSE: This order revises procedures established by ZAN Order 1900.2G, Emergency Plan for Volcanic Eruptions Affecting Alaskan Airspace. This order establishes the notification procedures in the event of increased volcanic activity.

2. DISTRIBUTION: This order is distributed to the Air Traffic Manager's Library, Watch Desk Library and ZAN-540.

3. CANCELLATION: This order cancels ZAN Order 1900.2G, effective February 15, 2010.

4. EFFECTIVE DATE: January 3, 2011.

5. BACKGROUND: Volcanic eruptions and subsequent ash drift/fallout have caused delays and damage to aircraft and equipment. There is a continuing possibility of further eruptions, particularly in the Cook Inlet and Aleutian Chain areas of Alaska, and the Kamchatka Peninsula and Kurile Islands of the Russian Far East. Notification of activity could be received from several sources, which include the Alaska Volcano Observatory (AVO), the Regional Operations Center (ROC), the Regional Air Operations Center (RAOC), the Anchorage Volcanic Ash Advisory Center (VAAC), the Tokyo VAAC, the Kamchatkan Volcanic Eruption Response Team (KVERT), Sakhalin Volcanic Eruption Response Team (SVERT), airline operators, pilot report, other FAA facilities, or the general public.

6. RESPONSIBILITIES: Upon receiving notification of an eruption or possible eruption:

a. The Watch Supervisor must:

(1) Verify the occurrence of volcanic activity with the AVO at (907) 786-7497. Additional contact numbers can be found in Appendix E of this document and the Alaska Interagency Plan for Volcanic Ash Episodes.

(a) <u>Non Eruptive event (Cook Inlet – Augustine/Iliamna/Redoubt/Spurr)</u>

(i) If the AVO advises there is increased seismic or other precursory activity of a Cook Inlet volcano, but an eruptive event has ***not*** occurred, issue an Increased Volcanic Activity NOTAM (See Appendix A, Example 1), and notify personnel and facilities listed in 6.a.(2).(a). If the aviation color code has been elevated to "orange" or "red" notify personnel and facilities listed in 6.a.(2).(b) of this order as well.

(b) Non eruptive event (All other volcanoes)

(i) If the AVO advises there is increased seismic or other precursory activity of any volcano from anywhere other than Cook Inlet, but an eruptive event has ***not*** occurred, issue an Increased Volcanic Activity NOTAM (See Appendix A, Example 1), and notify personnel and facilities listed in 6.a.(2)(a) of this order.

(2) If a volcanic eruption is verified by the AVO, the Watch Supervisor must take the following action:

(a) All volcanoes, notify:

- The Center Weather Service Unit (CWSU) Meteorologist who will issue an Urgent Pilot Report (UUA). (See Appendix B.) If an eruption occurs when the CWSU meteorologist is not on duty, the WC must issue the UUA, contact the Alaskan Aviation Weather Unit (AAWU) and if required, contact a CWSU Meteorologist to report immediately to Anchorage Air Route Traffic Control Center (ARTCC).
- FLM/Controller-in-Charge (CIC).
- Regional Operations Center (ROC).
- Traffic Management Unit (TMU).

(b) Cook Inlet volcano or other volcanic eruptions affecting air traffic within ZAN FIR, notify:

- Anchorage ARTCC Air Traffic Manager (ATM).
- Anchorage ARTCC Staff Manager.
- Traffic Management Officer (TMO).
- Operations Manager (OM) of affected area.
- Flight Service Station (FSS) closest to the volcanic activity.
- Anchorage Approach (A11) Watch Supervisor.
- Service Operations Center (SOC).
- Air Traffic Control System Command Center (ATCSCC).

(c) In accordance with 14 CFR Section 91.137(a) (1), and after coordination with Western Service Center (see JO 7210.3V ZAN SUP 2), issue an FDC Flight Restriction NOTAM (TFR) if it is determined that the volcanic event could endanger airborne aircraft and occupants. (See Appendix A, Example 2).

(d) Designate a Weather Coordinator (WC) if necessary.

(e) Issue a Volcanic Ash Advisory NOTAM, including the aviation color code "orange" or "red", if any ash may be present. (See Appendix A, Example 3). (See Appendix C for AVO Alert Levels).

(f) When requested by AVO, assist them in relaying and/or obtaining information from KVERT through coordination with Petropavlovsk-Kamchatsky ACC.

b. FLM/CIC must:

(1) Ensure that Pilot Reports (PIREPs) are solicited by controllers and recorded on a PIREP form.

NOTE: *Pilots may forward PIREPs regarding volcanic activity using the format described in the Volcanic Activity Reporting Form (VAR), see Appendix D.*

(2) Disseminate NOTAM, PIREP, TFR, MIS, SIGMET and current conditions information to controllers on duty.

c. Traffic Management Unit must:

(1) Provide assistance to the Watch Supervisor as needed.

(2) Evaluate the areas impacted by volcanic activity to determine if any Traffic Management Initiatives (TMIs) are required.

(3) Prior to initiating TMIs, advise the Watch Supervisor and FLM/CIC.

(4) Coordinate TMIs with affected facilities and the ATCSCC.

(5) Monitor the affected area and any resulting TMIs, and modify as needed.

(6) Request AVO to participate in Telcons to provide volcanic activity updates as needed.

d. Controllers must:

(1) Ensure that all aircraft in the affected area are aware of the most current information available concerning the volcanic eruption and any resultant ash dispersal.

(2) With pilot concurrence, suggest headings or reroutes around known ash or possible ash cloud locations.

(3) Assist VFR aircraft to the extent possible in avoiding known ash cloud locations.

(4) Solicit PIREP information and record on a PIREP form. Forward this information to the FLM/CIC.

(5) Broadcast information received relating to the volcanic event/ash drift.

APPENDIX A

VOLCANO NOTAM EXAMPLES

Templates are located on the share drive at: S:\ZAN_AT\OPSSHARE\VOLCANO NOTAMS

EXAMPLE 1: Increased Volcanic Activity NOTAM

PLEASE ISSUE THIS INTERNATIONAL NOTAM WITH THE FOLLOWING TEXT (INCLUDE AVIATION COLOR CODE IF EITHER "ORANGE" OR "RED"):

______/____ ZAN FI/T /ZAN/ VOLCANIC ACTIVITY ADVISORY FOR ______name_____ VOLCANO AK/___(latitude and longitude of volcano)__ /ALASKA VOLCANO OBSERVATORY HAS REPORTED INCREASED VOLCANIC ACTIVITY IN THE VICINITY OF _____name___ VOLCANO WHICH INDICATES THE POSSIBILITY OF A VOLCANIC ERUPTION. (AVIATION ALERT COLOR CODE __(orange/red)__ IS IN EFFECT). AIRCRAFT SHOULD REMAIN ALERT FOR POSSIBLE ERUPTION, STEAM OR ASH CLOUDS AND REPORT ANY SIGHTINGS TO ATC IMMEDIATELY. CONTACT ANCHORAGE ARTCC AT 907-269-1103 FOR ADDITIONAL INFORMATION.

EXAMPLE 2: FDC Flight Restrictions NOTAM

PLEASE ISSUE THE FOLLOWING TEMPORARY FLIGHT RESTRICTION (TFR):

FDC ___/______ ZAN AK. FLIGHT RESTRICTIONS __(name)____ VOLCANO, AK. EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE. PURSUANT TO 14 CFR SECTION 91.137 (A) (1). TEMPORARY FLIGHT RESTRICTIONS ARE IN EFFECT FROM SURFACE TO ___(affected altitude)__ WITHIN __(number of nautical miles)__ NAUTICAL MILE RADIUS OF ___(fix/radial distance or latitude/longitude)__. PILOTS ARE ADVISED TO EXERCISE EXTREME CAUTION WHEN OPERATING NEAR THIS RESTRICTED AREA PARTICULARLY WHILE DOWNWIND FROM THE VOLCANO. CHECK CURRENT CWA, SIGMET AND PIREP INFORMATION. ANCHORAGE /ZAN/ ARTCC 907-269-1103 IS THE FAA COORDINATION FACILITY. WIE UNTIL UFN.

EXAMPLE 3: Volcanic Ash Advisory NOTAM

This type of NOTAM should be issued, including the aviation color code, when advised the volcano status has been upgraded to "ORANGE" or "RED" and ash may be present. If a "RED volcano is subsequently downgraded to "ORANGE" but ash may be present, the NOTAM should be modified to reflect the change in color code. This NOTAM should be cancelled when the volcano is further downgraded to "YELLOW" or "GREEN," or when ash is no longer expected to be present. If the volcano remains restless and no ash emissions are present or expected, issue the NOTAM shown in Appendix A, Example 1.

A0294/07 - VOLCANIC ADVISORY FOR KLYUCHEVSKOY VOLCANO, KAMCHATKAN PENINSULA, RUSSIA, 5603N16039E. EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE. KLYUCHEVSKOY VOLCANO HAS BEEN IN AN ACTIVE STATE. HAZARDOUS EMISSIONS OF VOLCANIC ASH HAVE INTERMITTENTLY COMPLICATED AIR TRAVEL IN THE AREA. ANY IMPACT ON AIRCRAFT OPERATIONS IS DESCRIBED IN CURRENT SIGMET, CWA OR PIREP INFORMATION. AIRCRAFT SHOULD REMAIN ALERT FOR POSSIBLE ASH CLOUDS AND REPORT ANY SIGHTINGS TO ATC. AIRCRAFT OPERATORS SHOULD CONTINUALLY EVALUATE OPERATION IN THE SIGMET AREA. AVIATION ALERT COLOR CODE (ORANGE/RED) IS IN EFFECT. FLIGHT INTO VOLCANIC ASH MAY CAUSE ENGINE DAMAGE/FAILURE AND ABRASION DAMAGE TO AIRFRAME AND WINDSHIELD SURFACES. ANY AIR CARRIERS, INCLUDING FOREIGN AIR CARRIERS THAT OBSERVE OR EXPERIENCE ANY DIFFICULTIES RESULTING FROM AN ENCOUNTER WITH VOLCANIC ASH, PLEASE NOTIFY ATC IMMEDIATELY IN ACCORDANCE WITH FAR 121.561 AND ICAO, ANNEX 3, PARAGRAPH 5.5 (SPECIAL AIRCRAFT OPERATIONS), AND ANNEX 6 PARAGRAPH 4.4.3 (HAZARDOUS FLIGHT CONDITIONS). CONTACT ANCHORAGE ARTCC, 907-269-1103 FOR ADDITIONAL INFORMATION. WIE UNTIL UFN.

APPENDIX B

FORMAT FOR VOLCANO URGENT PIREP (UUA) WHEN CWSU IS NOT STAFFED

If a pilot report is received on a volcanic eruption and the presence of ash is suspected or confirmed, prepare an Urgent PIREP (UUA) in the following format:

UUA/OV ____(CDB or ANC)____ /TM ____(time in four digits UTC)____ /FL ___(in three digits or UNKN)___ /RM AN ERUPTION OF ___(name of volcano)___ OCCURRED AT _____ UTC. EXTENT OF PLUME IS NOT IMMEDIATELY KNOWN. A CWA OR SIGMET WILL BE ISSUED WHEN MORE INFORMATION BECOMES AVAILABLE. (ZAN)

For ease of PIREP input and dissemination, use the following location identifiers when recording volcanic activity:

ANC - for all volcanoes in Cook Inlet and Southeast Alaska.

CDB - for all volcanoes in Western Alaska, the Aleutian Chain, Kamchatka Peninsula and the Kurile Islands.

APPENDIX C

ALASKA VOLCANO OBSERVATORY AVIATION COLOR CODES

To more concisely describe the level of concern about possible or ongoing eruptive activity from an Alaskan volcano, the Alaska Volcano Observatory (AVO) uses the following color-coded classification system. Definitions of the colors reflect AVO's interpretations of the behavior of the volcano. Definitions are listed below, followed by general descriptions of the typical activity associated with each color.

Aviation Color Code Used by USGS Volcano Observatories

Color codes, which are in accordance with recommended International Civil Aviation Organization (ICAO) procedures, are intended to inform the aviation sector about a volcano's status and are issued in conjunction with an Alert Level. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details (as known) about the nature of the unrest or eruption, especially in regard to ash-plume information and likely outcomes.

Color	Description
GREEN	Volcano is in typical background, noneruptive state or, *after a change from a higher level,* volcanic activity has ceased and volcano has returned to noneruptive background state.
YELLOW	Volcano is exhibiting signs of elevated unrest above known background level or, *after a change from a higher level,* volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
ORANGE	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, **OR** eruption is underway with no or minor volcanic-ash emissions [ash-plume height specified, if possible].
RED	Eruption is imminent with significant emission of volcanic ash into the atmosphere likely **OR** eruption is underway or suspected with significant emission of volcanic ash into the atmosphere [ash-plume height specified, if possible].

ALASKA VOLCANO OBSERVATORY VOLCANIC ALERT LEVELS FOR GROUND-BASED HAZARDS

Volcano Alert Levels Used by USGS Volcano Observatories

Alert Levels are intended to inform people on the ground about a volcano's status and are issued in conjunction with the Aviation Color Code. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details (as known) about the nature of the unrest or eruption and about potential or current hazards and likely outcomes.

Term	Description
NORMAL	Volcano is in typical background, noneruptive state or, *after a change from a higher level,* volcanic activity has ceased and volcano has returned to noneruptive background state.
ADVISORY	Volcano is exhibiting signs of elevated unrest above known background level or, *after a change from a higher level,* volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
WATCH	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, **OR** eruption is underway but poses limited hazards.
WARNING	Hazardous eruption is imminent, underway, or suspected.

APPENDIX D

VOLCANIC ACTIVITY REPORTING FORM (VAR)

Date ____________________

SECTION 1 - Transmit to ATC via radio

1. Aircraft Identification	
2. Position	
3. Time (UTC)	
4. Flight level or altitude	
5. Position/location of volcanic activity or ash cloud	
6. Air temperature	
7. Wind	
8. Supplementary Information (Brief description of activity including vertical and lateral extent of the ash cloud, horizontal movement, rate of growth, etc., as available).	

Mark the appropriate box(es).

SECTION 2 - Complete and forward

9. Density of ash cloud	☐ wispy	☐ moderately dense	☐ very dense
10. Color of plume or cloud	☐ white ☐ black	☐ light gray	☐ dark gray
11. Eruption	☐ continuous	☐ intermittent	☐ not visible
12. Position of activity	☐ summit ☐ multiple	☐ side ☐ not observed	☐ single
13. Other observed features of eruption	☐ lightening ☐ ash fallout	☐ glow ☐ mushroom cloud	☐ large rocks ☐ none
14. Effect on aircraft	☐ communications ☐ pilot static ☐ windows	☐ navigation systems ☐ windscreen ☐ none	☐ engines ☐ other
15. Other effects	☐ turbulence ☐ ash deposits	☐ St. Elmo's Fire	☐ fumes
16. Other information deemed useful			

Forward completed form via mail to:
Global Volcanism Program
NHB-119
Smithsonian Institution
Washington, DC 20560

Fax to:
Global Volcanism Program
(202) 357-2476

APPENDIX E
AVO POINTS OF CONTACT AND WEB ADDRESSES

AVO PRINCIPLE CONTACTS AND PHONE NUMBERS:

24 Hour Access:	907-786-7497
AVO Duty Scientist:	907-632-2275
AVO Scientist-In-Charge	907-632-2276

VOLCANO INFORMATION WEBSITES:

SIGMET/AIRMET Information:	http://aawu.arh.noaa.gov/
NOTAM Information:	https://www.notams.faa.gov
PIREP Information:	http://aawu.arh.noaa.gov/pireps/webPirep.htm
Anchorage VAAC:	http://aawu.arh.noaa.gov/vaac.php
Alaska Volcano Observatory:	http://www.avo.alaska.edu/
Ash Fall and Marine Advisories:	http://cwsu.arh.noaa.gov/
HYSPLIT Trajectories: (Alaska Volcanoes)	http://ready.arl.noaa.gov/READY_traj_alaska.php
Temporary Flight Restrictions:	http://tfr.faa.gov/tfr2/list.jsp
PUFF Model:	http://pafc.arh.noaa.gov/puffweb2/puffweb.php
KVERT (Current Volcanic Activity):	http://www.kscnet.ru/ivs/kvert/current/index_eng.php
NOAA Satellite & Information Service: (Split Window Loops/Kamchatka)	http://www.ssd.noaa.gov/VAAC/BEZY/SPLT/sploop.html
NOAA Satellite & Information Service: (Split Window Loops/Aleutians)	http://www.ssd.noaa.gov/VAAC/ALEUT/SPLIT/splitloop.html
NOAA Satellite & Information Service: (Aleutian Islands Volcano Watch)	http://www.ssd.noaa.gov/VAAC/aleut.html
NOAA Satellite & Information Service: (Kamchatka Volcano Watch)	http://www.ssd.noaa.gov/VAAC/kamchatka.html
Volcanic Ash Transport & Dispersion: (VAFTAD)	http://www.arl.noaa.gov/ready/ash.html
Tokyo VAAC	http://ds.data.jma.go.jp/svd/vaac/data/index.html

ORDER

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ZOA AT 7110.??

Oakland Air Route Traffic Control Center
Fremont, California

SUBJ: OAKLAND ARTC CENTER VOLCANIC ASH AND TRAFFIC MANAGEMENT UNIT PACOTS TRACK GENERATION PROCEDURES

1. **PURPOSE**. This order establishes procedures for Volcanic Ash Information dissemination, handling airborne aircraft and generating the PACOTS Tracks when Volcanic Ash is present.

2. **DISTRIBUTION**. This order is distributed to Flight Data, Traffic Management and Oceanic personnel at Oakland Center as well as selected offices in the Western-Pacific Regional Office.

4. **BACKGROUND**. Volcanic Ash (VA) has caused engine failure on airborne aircraft and poses a serious risk to aircraft. This Order establishes procedures to be used when Volcanic Activity affects or will have an impact on Oakland ARTCC.

6. **PROCEDURES**.

a. When Flight Data receives Volcanic Ash Advisories (VAA) or other volcanic information, it shall immediately be distributed to the Operational Manager In Charge (OMIC).
b. The OMIC, as a top priority, shall determine the affected airspace and distribute the information to TMU and the affected Areas.
c. Volcanic Activity Contact and Information Websites are listed in Appendix 2.
d. If Volcanic Ash is present that indicates the current PACOTS Tracks may be affected, TMU must take the following actions:
   (1) Plot the current affected area to determine the affected area and altitudes. Consider how the forecasted ash cloud drift (6, 12 and 18 hour forecasts) will affect traffic.
   (2) Volcanic Ash plumes at F240 and below are not a factor for PACOTS Tracks.
   (3) Issue a NOTAM advising of the potential risk if a PACOTS track is affected by Volcanic Ash (VA). A sample NOTAM is included in Attachment 1.
   (4) Determine if published PACOTS tracks are affected by the VA.
      (a) If the published PACOTS are affected consult with the Oceanic FLM.
      (b) If aircraft for the affected PACOTS are airborne it will be necessary for the controller to issue advisories of the Ash Plume to the aircraft. This will likely cause aircraft to request re-routes away from the VA.
      (c) If time permits, have the ATCSCC schedule a teleconference with the International Operators, Japan ATMC and Anchorage ARTCC. The telecon would ideally be at least 1 hour from the current time to allow the operators to get the correct personnel on the telecon, however timing may not permit advance notification to the operators.
      (d) When conducting a Volcanic Ash Telecom send a High Priority email to the Oceanic Critical Event Contact List advising of the telecom details.
      (e) On the telecom discuss the VA plume and options for managing the traffic. Get operator feedback and develop a plan.

Distribution: All ZOA AT Personnel, AWP-503 **Initiated By:** ZOA-520

Note: ICAO Documents require Operators to have an SMS process in place to determine if it is safe to fly through airspace contaminated by VA.

(i) How will airborne aircraft be managed?

(ii) Do the published PACOTS need to be republished in a different location.

(iii) Instead of moving PACOTS Tracks an alternative is to publish an additional avoidance Track(s) and issue a NOTAM that states that certain Tracks may be affected by VA. A sample NOTAM is included in Appendix 1.

(5) Determine if future PACOTS tracks will be affected by the VA.

(a) Volcanic Ash plumes at F240 and below are not a factor for PACOTS Tracks.

(b) Determine the PACOTS Track effective times and ensure the VAA ash plume forecast covers all of the effective times of the PACOTS Track. If necessary, delay PACOTS generation until the VAA forecast covers the entire effective times of the PACOTS Tracks being generated.

(c) Plot the VAA to determine the affected area and altitudes.

(d) Determine if PACOTS to be generated are affected by the VA.

(f) If the PACOTS will be affected by the VA:

a. consult with the Oceanic FLM, and:

b. TMU will coordinate with the ATCSCC to schedule a telecom with the International Operators, Japan ATMC, the (VAC) and Anchorage ARTCC. The telecom would ideally be at least 1 hour from the current time to allow the operators to get the correct personnel on the telecom.

c. When conducting a Volcanic Ash Telecom TMU will send a High Priority email to the Oceanic Critical Event Contact List advising of the telecom details.

*(g)*On the telecom discuss the VA plume and options for managing the traffic. If the determination is made that the PACOTS Tracks will be affected, suggest on the telecom that Oakland will generate the PACOTS Tracks 25 nm clear of the VAA forecast. Get operator feedback on the proposed plan and attempt to develop a consensus plan.

Note: ICAO Documents require Operators to have an SMS process in place to determine if it is safe to fly through airspace contaminated by VA.

Appendix 1

ATTN AIRCRAFT OPERATORS AND FLIGHT DISPATCHERS. DUE TO SHEVELUCH VOLCANIC ACTIVITY AIRCRAFT TRANSITING BETWEEN NORTH AMERICA AND JAPAN/ASIA SHOULD USE SMS PROCESS TO DETERMINE WHETHER TO USE PUBLISHED PACOTS TRACKS C, E, F OR M FOR PACIFIC OCEAN CROSSING. AN ALTERNATE TRACK G HAS BEEN PUBLISHED WHICH AVOIDS CURRENT FORECAST FOR ASH CLOUD MOVEMENT. OPERATORS MAY ALSO ELECT TO FLY A USER PREFERRED ROUTE IN PLACE OF A PACOTS TRACK. QUESTIONS REGARDING FLIGHT PLANNED ROUTES CAN BE DIRECTED TO THE OAKLAND OCEANIC SUPERVISOR AT (510) 745-3342

ZOA AT 7110.22G
Appendix 2

VOLCANIC POINTS OF CONTACT AND WEB ADDRESSES

AVO PHONE NUMBERS:
24 Hour Access: 907-786-7497
AVO Duty Scientist: 907-632-2275
AVO Scientist-In-Charge 907-786-7488

VOLCANO INFORMATION WEBSITES:
SIGMET/AIRMET Information: http://aawu.arh.noaa.gov/

NOTAM Information: https://www.notams.faa.gov/

PIREP Information: http://aawu.arh.noaa.gov/index.php?tab=4&hour=3

Anchorage VAAC: http://vaac.arh.noaa.gov/

Alaska Volcano Observatory: http://www.avo.alaska.edu/

Ash Fall and Marine Advisories: http://cwsu.arh.noaa.gov/

HYSPLIT Trajectories: http://ready.arl.noaa.gov/READY_traj_alaska.php
(Alaska Volcanoes)

Temporary Flight Restrictions: http://tfr.faa.gov/tfr2/list.jsp

PUFF Model: http://avo-volcview.wr.usgs.gov/puff/main.pl

KVERT (Current Volcanic Activity): http://www.kscnet.ru/ivs/kvert/index_eng.php

NOAA Satellite & Information Service: http://www.ssd.noaa.gov/VAAC/kamchatka.html
(Split Window Loops/Kamchatka)

NOAA Satellite & Information Service: http://www.ssd.noaa.gov/VAAC/ALEUT/SPLIT/splitloop.html
(Split Window Loops/Aleutians)

NOAA Satellite & Information Service: http://www.ssd.noaa.gov/VAAC/aleut.html
(Aleutian Islands Volcano Watch)

NOAA Satellite & Information Service: http://www.ssd.noaa.gov/VAAC/kamchatka.html
(Kamchatka Volcano Watch)

Volcanic Ash Transport & Dispersion: http://www.arl.noaa.gov/ready/ash.html
(VAFTAD)

Tokyo VAAC: http://ds.data.jma.go.jp/svd/vaac/data/index.html

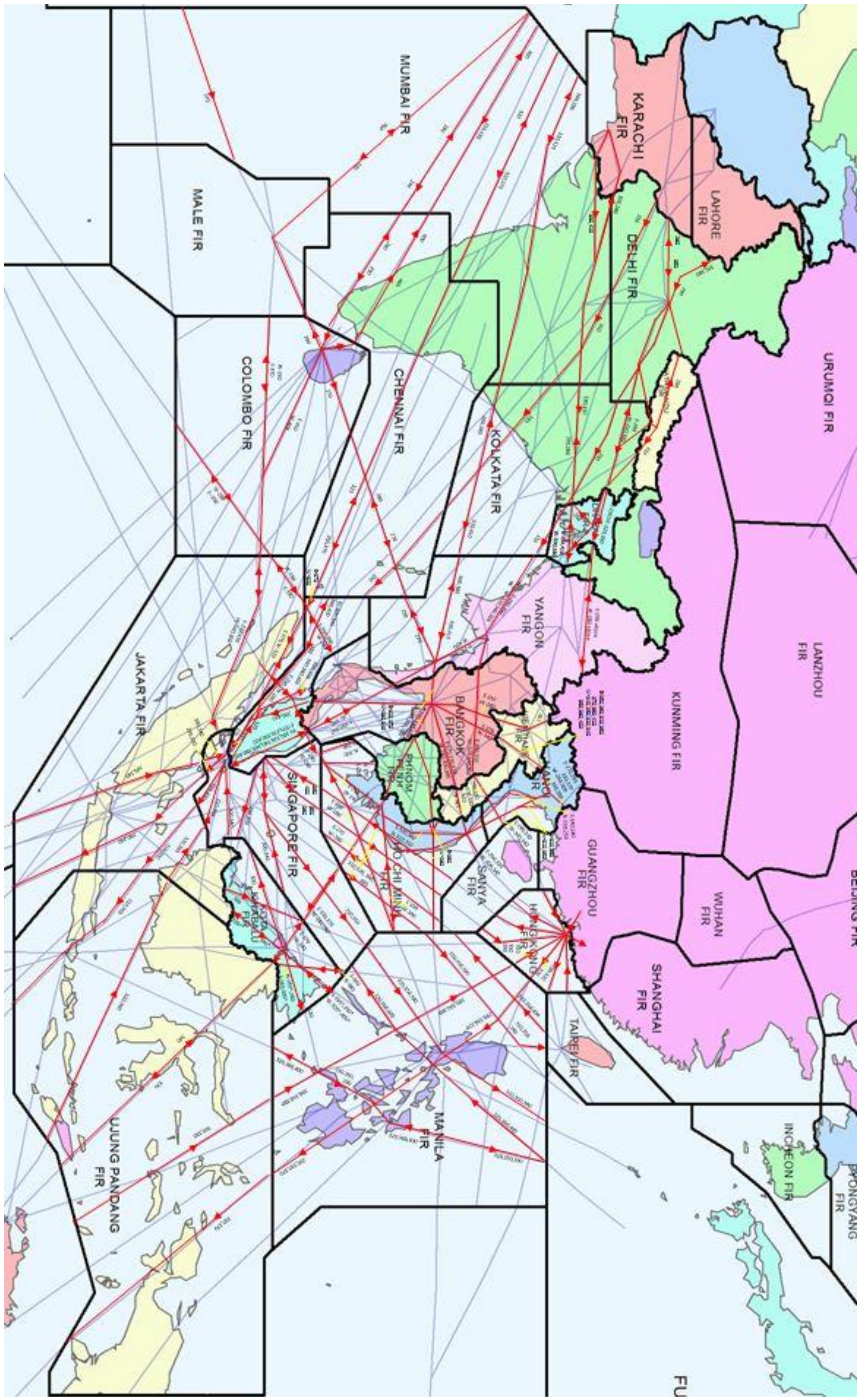
Washington VAAC: http://www.ssd.noaa.gov/VAAC/washington.html

APPENDIX F – SUB-REGIONAL CONTINGENCY ROUTES AND FLIGHT LEVEL ALLOCATION SCHEMES

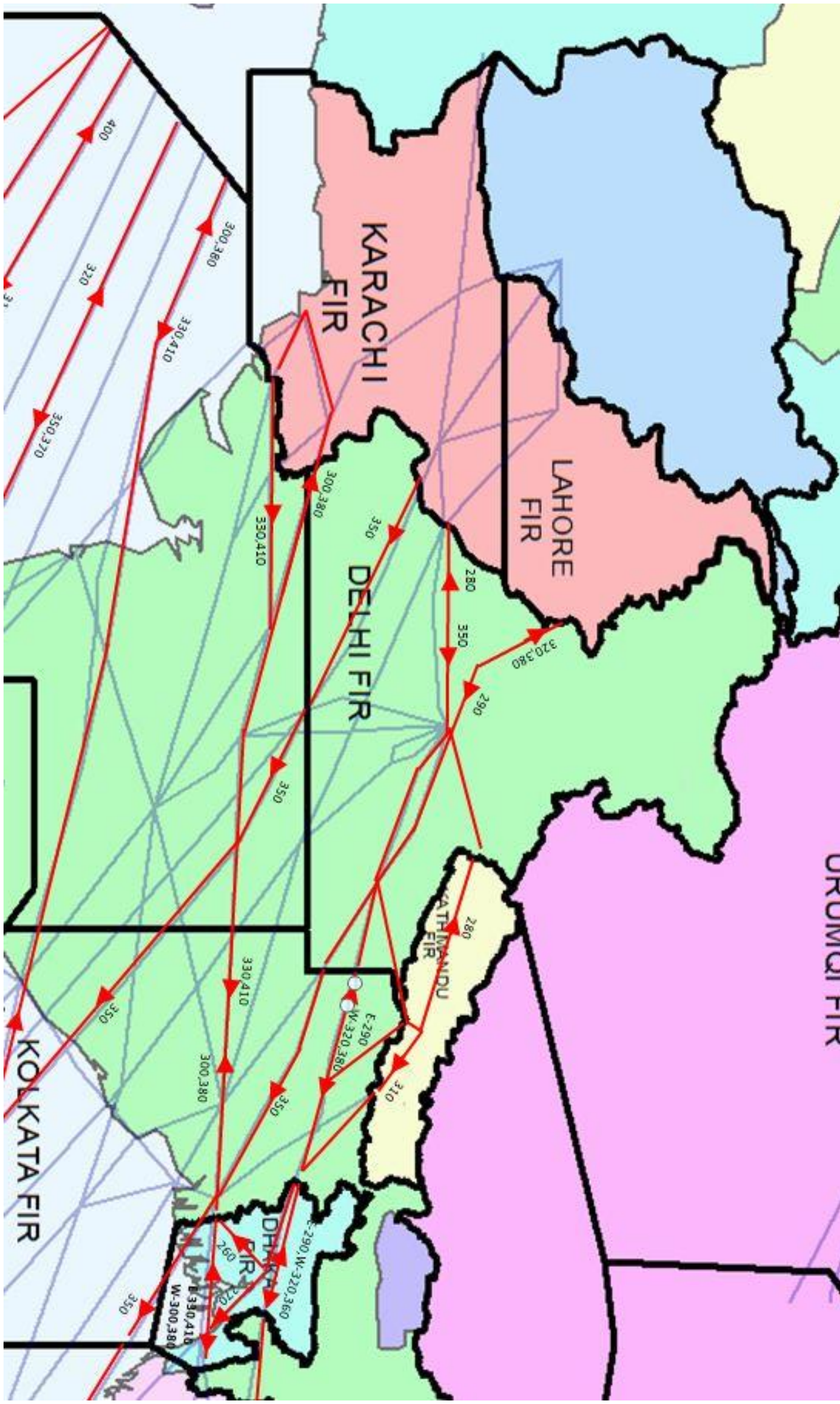
** UNDER DEVELOPMENT **

SOUTH AND SOUTH EAST ASIA

Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

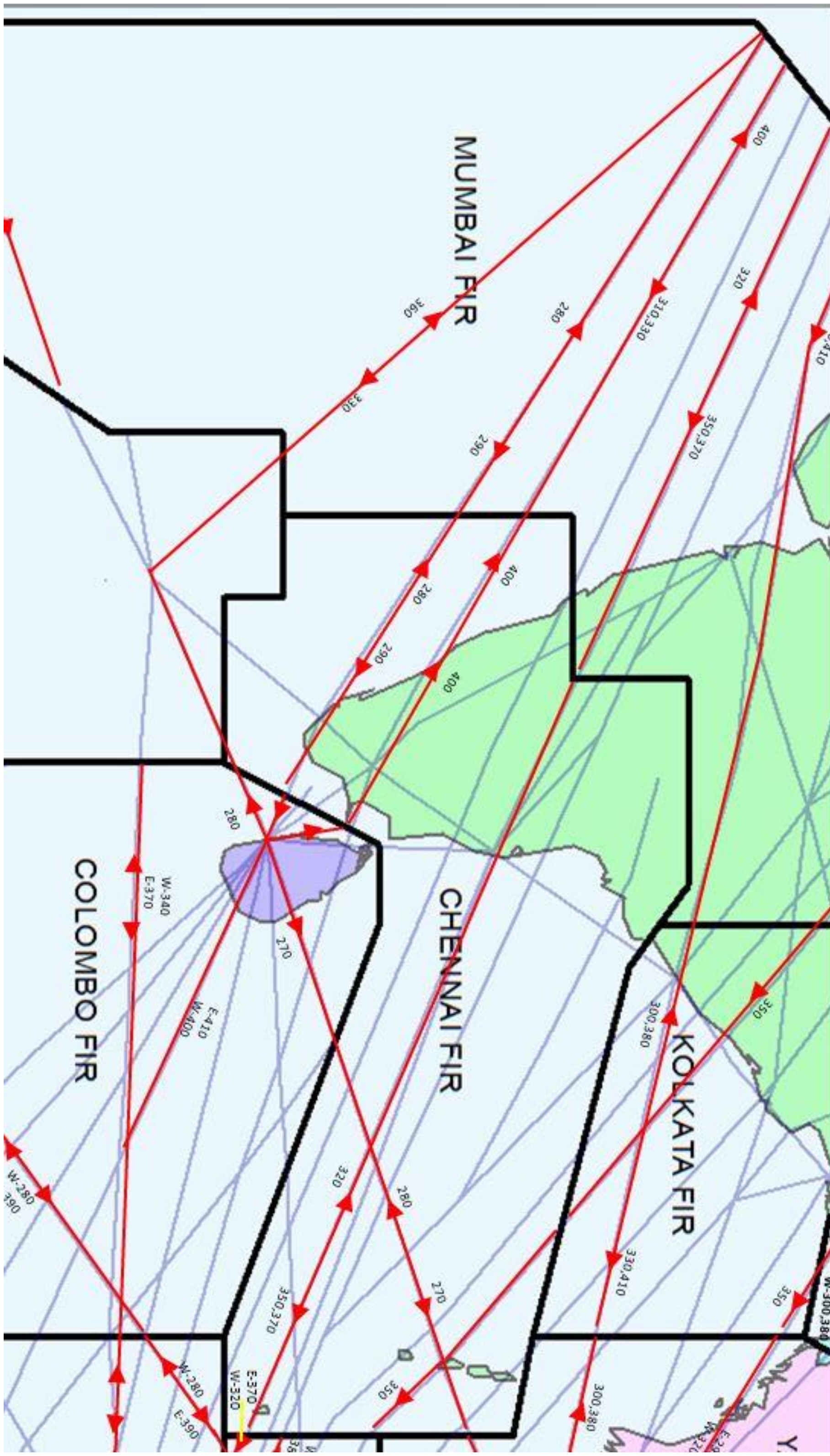


DELHI KOLKATA DHAKA FIRS



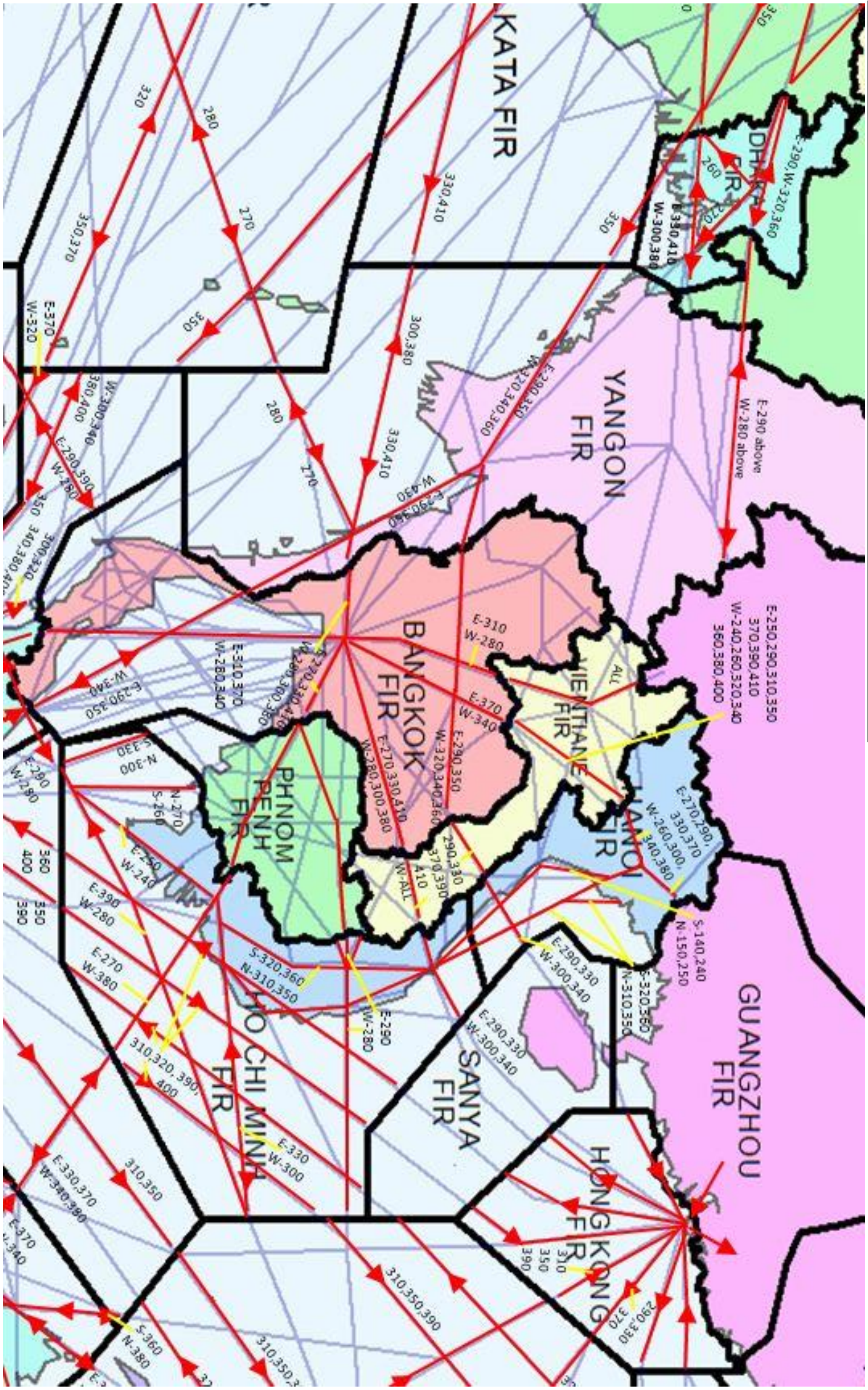
Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

MUMBAI CHENNAI COLOMBO FIRS



Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

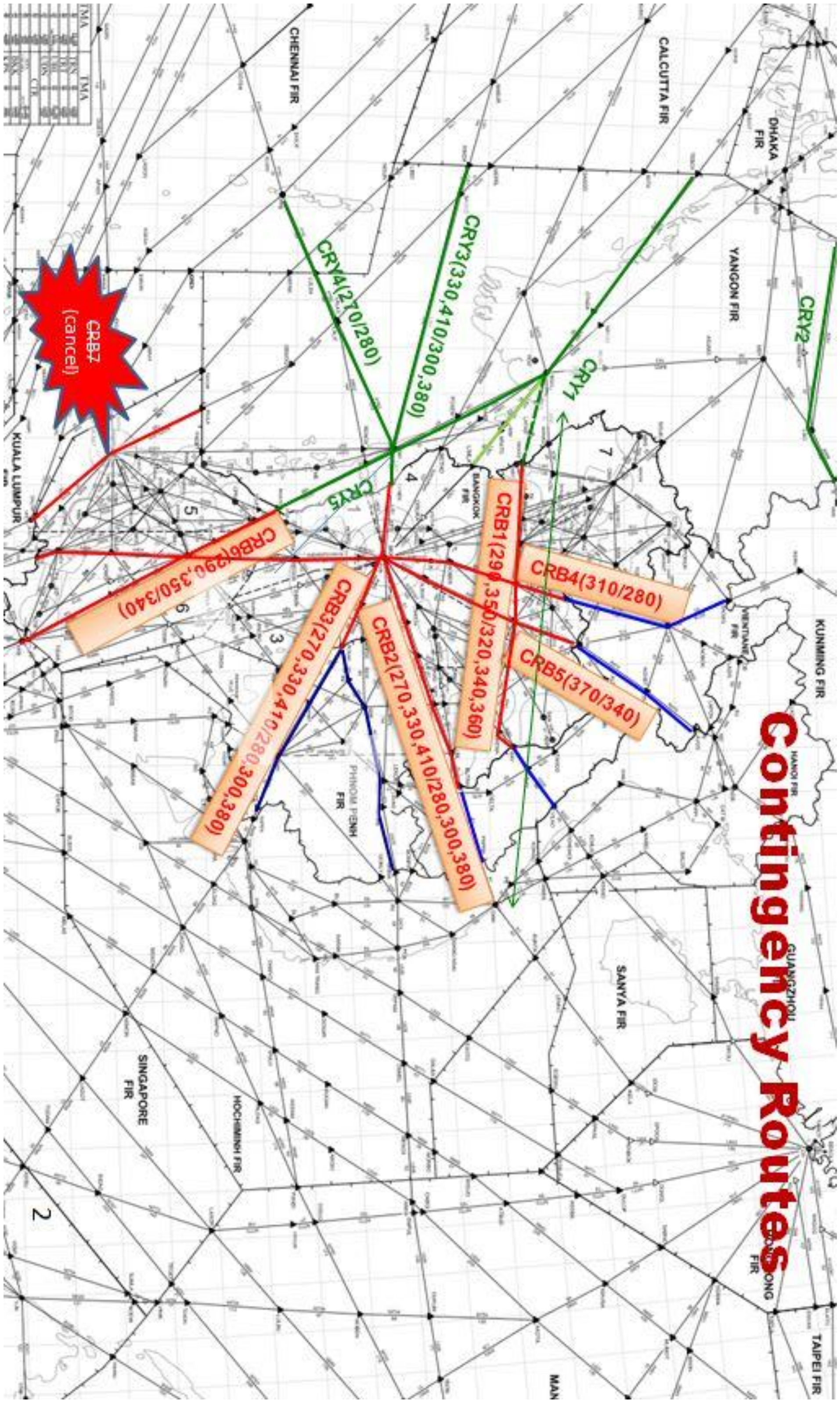
SOUTH EAST ASIA FIRS



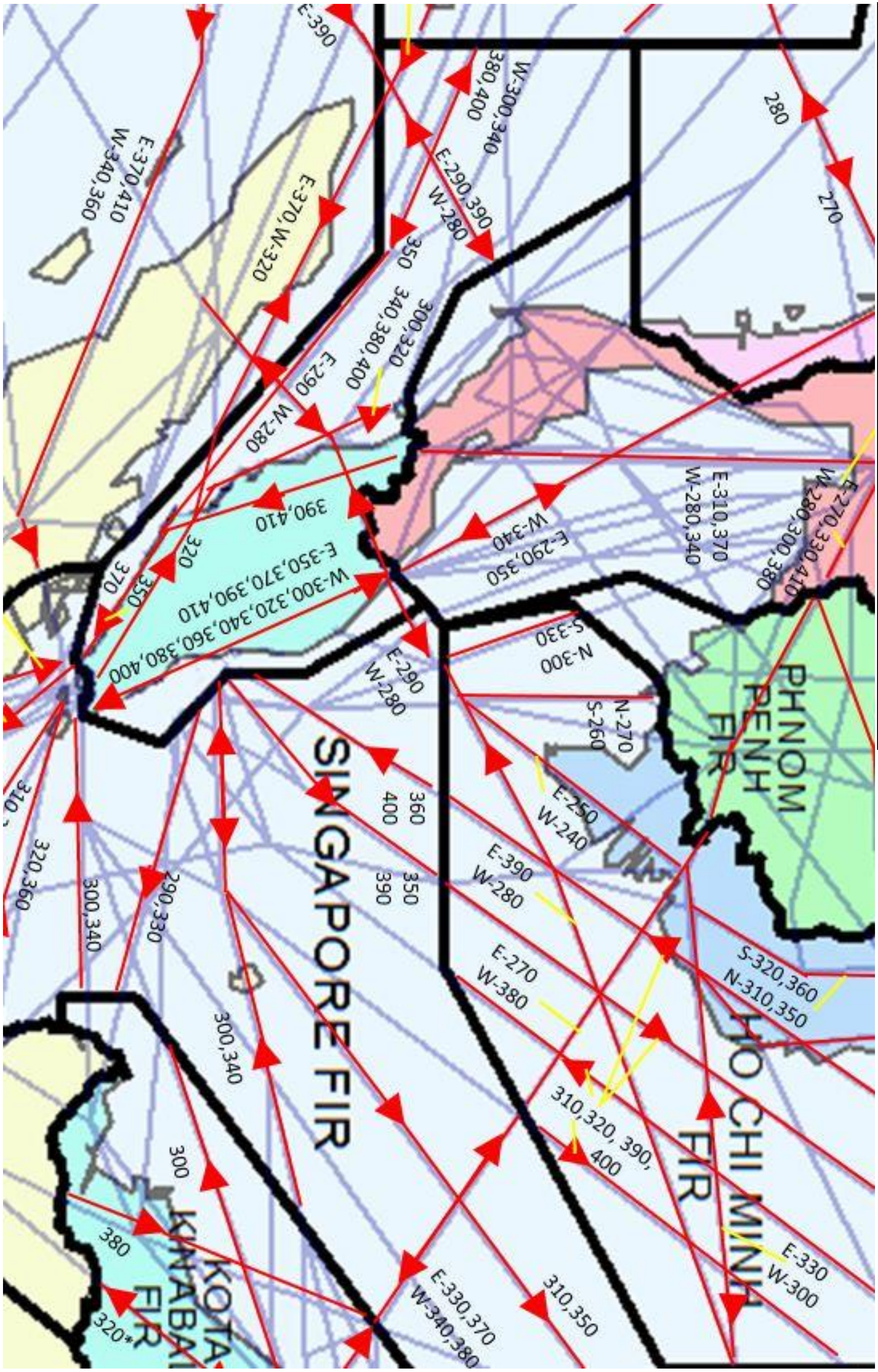
Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

BANGKOK YANGON FIRS

Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.



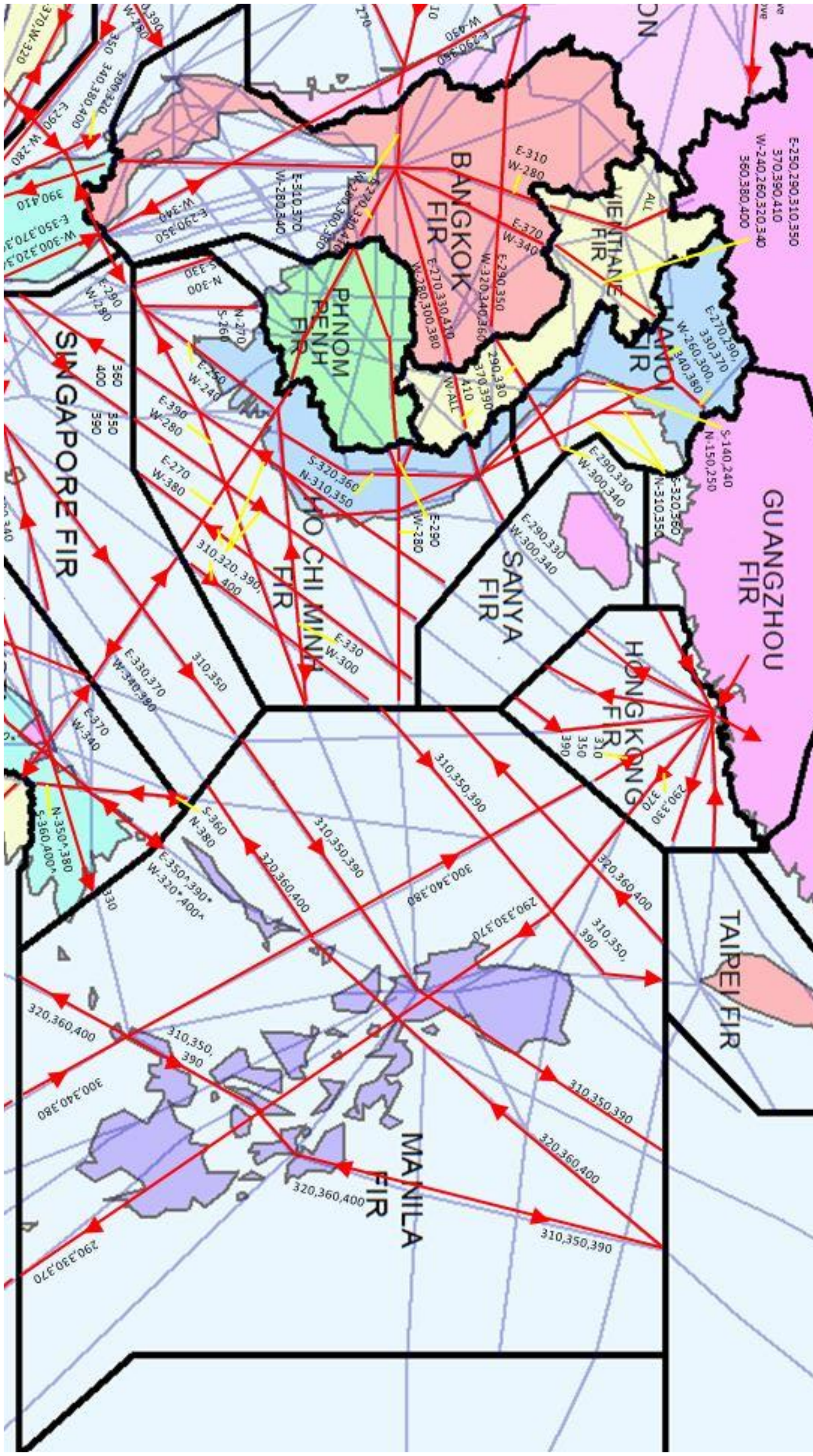
KUALA LUMPUR SINGAPORE HO CHI MINH FIRS



Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

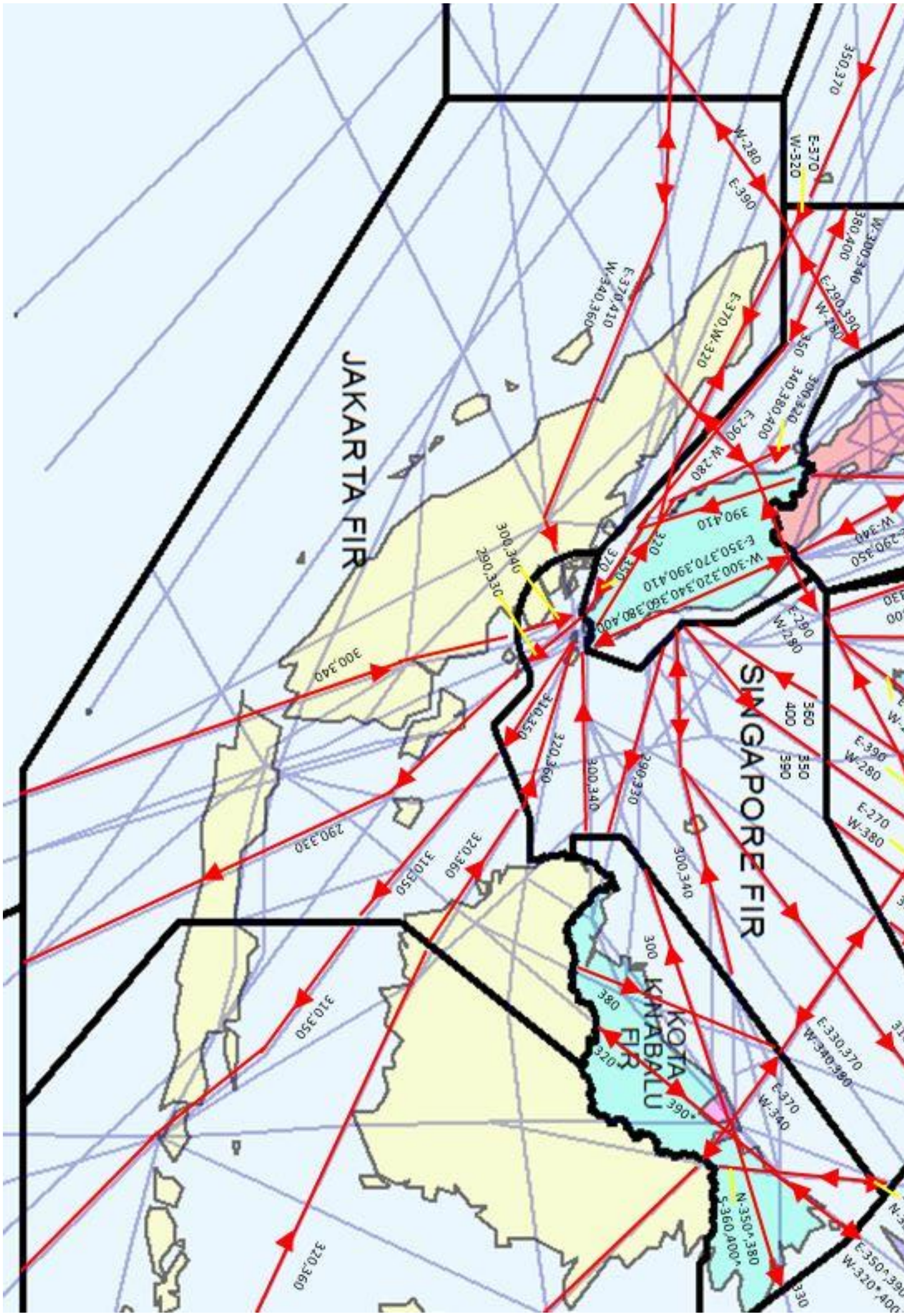
HO CHI MINH MANILA HONG KONG FIRS

Asia/Pacific Regional ATM Contingency Plan
Appendix F



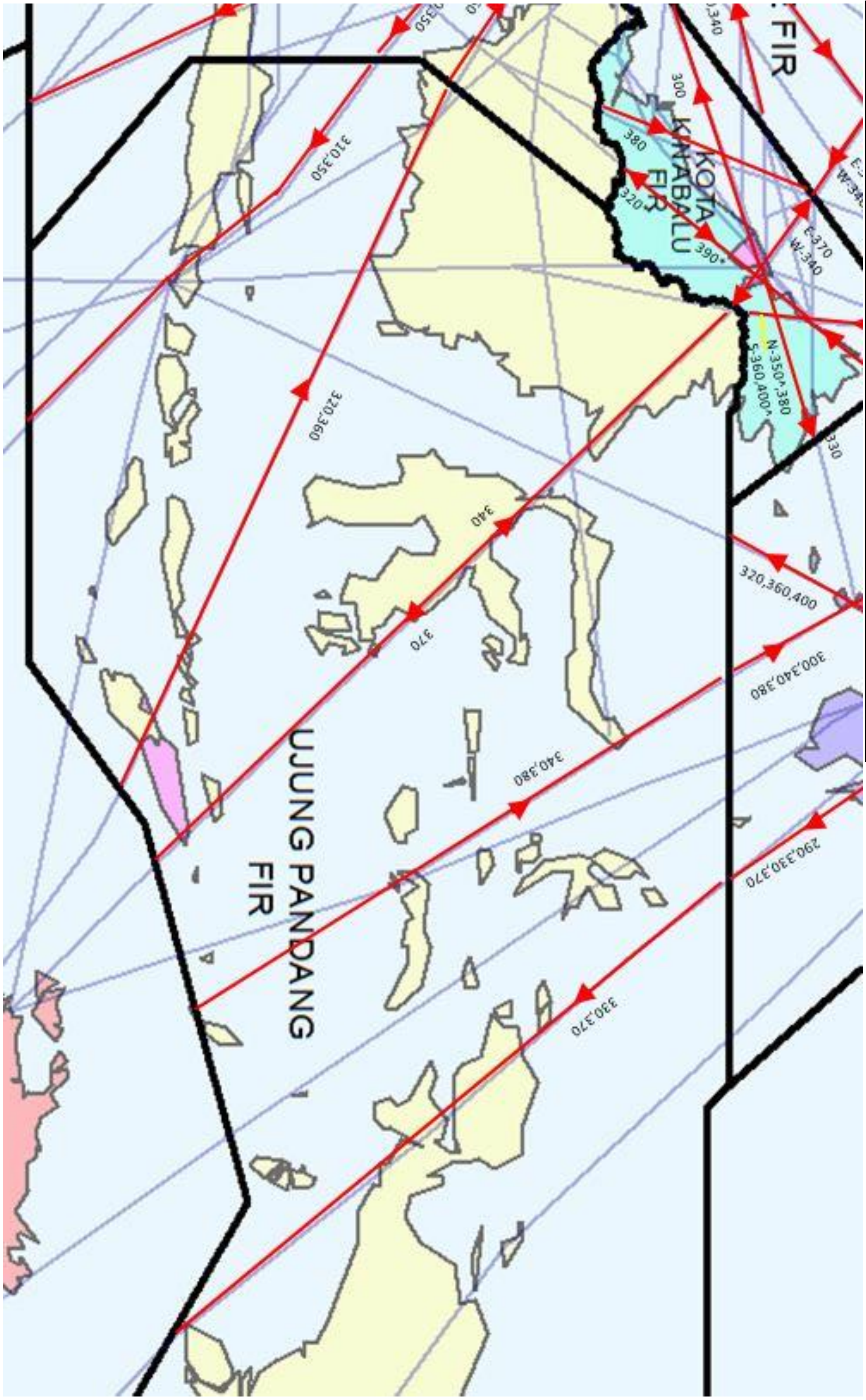
Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

JAKARTA FIR



Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

UJUNG PANDANG FIR



Note: ATS contingency routes and FLAS provided in this plan are for general information and guidance only. Airspace users must refer to State AIP and NOTAM for authoritative information on ATS contingency routes and FLAS.

		Examples			Afghanistan	Australia	Bangladesh	Bhutan	Brunei Darussalam	Cambodia	China	Hong Kong, China	Macao, China	Cook Islands	DPR Korea	Fiji	French Polynesia	India	Indonesia	Japan	Kiribati	Korea, Republic of	Lao PDR	Malaysia	Maldives	Marshall Islands	Micronesia, Fed States of	Mongolia	Myanmar	Nauru	Nepal	New Zealand	Pakistan	Palau	Papua New Guinea	Philippines (working draft)	Samoa	Singapore	Solomon Islands	Sri Lanka	Thailand	Timor - Leste	Tonga	U.S.A	Vanuatu	Viet Nam	Reported States Preparedness (percentage)	Regional Preparedness (percentage)		
Reported Contingency Plan Status		1	1	0		1	1				1	1	1			1	1	1	1	1		1		1	1				1		1	1	1			0		1		1	1		1	1		1	X	55	**Reported Contingency Plan Status**	
Level 1 Plans																																																	**Level 1 Plans**	
Level 1 Plans	Percentage of ATSU with Level 1 Plan	2	1	1		2						2	2				2	0	1					0					2			2	2			0		2		0	0		2	2			63	25		
Coordination, Testing and Review	Internal Coordination	1	1	0		1						0	0				0	1	1					1					0			1	1			0		1		1	1		1	1			73	26	Internal Coordination	**Coordination, Testing and Review**
	Regular Testing	1	0	0		1						1	0				1	1	1					0					1			1	1			0		1		0	0		1	1			73	26	Regular Testing	
	Routine and event driven review	1	0	0		1						1	0				1	1	1					1					1			1	1			0		1		1	1		1	1			93	33	Routine and event driven review	
Category 1 and 2 Events	ATM/CNS System Failure or Degradation	1	1	1		1						1	1				1	1	1					1					1			1	1			1		1		0	1		1	1			###	36	ATM/CNS System Failure or Degradation	**Category 1 and 2 Events**
	Staff Availability	1	1	1		1						1	0				1	1	0					0					1			0	0			0		1		0	1		1	1			60	21	Staff Availability	
	Volcanic Ash Cloud	1	0	0		1						0	0				1	0	1					1					1			1	0			1		1		0	0		0	1			60	21	Volcanic Ash Cloud	
	Earthquake	1	0	0		1						0	0				1	1	1					0					1			1	0			1		1		0	1		1	1			73	26	Earthquake	
	Inundation	1	1	0		1						0	0				1	1	0					0					1			1	0			0		1		0	1		1	1			60	21	Inundation	
	Nuclear Emergency	1	1	0		0						0	0				0	1	0					0					0			0	0			0		1		0	0		0	1			20	7	Nuclear Emergency	
	Pandemic	1	1	0		1						1	0				0	1	0					0					1			1	0			0		1		0	1		0	1			53	19	Pandemic	
	National Security	1	1	0		1						0	0				0	1	1					1					1			1	0			0		1		0	1		0	1			60	21	National Security	
DRAFT Basic Plan Elements (No. of sub-elements)	Administration (2)	2	1	0		2						0	1				2	2	2					2					2			2	2			2		2		2	2		2	2			97	35	Administration (2)	**DRAFT Basic Plan Elements**
	Plan Management (2)	2	1	0		2						2	0				2	2	2					2					2			2	2			1		2		2	2		1	2			93	33	Plan Management (2)	
	Airspace (1)	1	1	0		1						0	0				1	1	0					1					1			1	0			0		1		0	1		0	0			53	19	Airspace (1)	
	ATM Procedures (7)	7	2	1		4						3	0				5	7	7					7					7			6	5			5		7		6	7		6	4			82	29	ATM Procedures (7)	
	Pilot/Aircraft Operator Procedures (5)	5	2	1		3						5	0				3	5	4					3					5			4	4			5		3		5	5		1	2			76	27	Pilot/Aircraft Operator Procedures (5)	
	Communications Facilities and Procedures (4)	4	2	1		2						2	0				4	4	4					4					4			4	2			2		4		1	2		2	0			68	24	Communications Facilities and Procedures (4)	
	Aeronautical Support Services (2)	2	2	0		1						0	0				2	2	2					2					2			2	2			2		1		1	2		2	1			80	29	Aeronautical Support Services (2)	
	Contact Details (2)	2	2	0		0						0	0				2	2	2					2					2			2	2			2		1		2	2		2	1			80	29	Contact Details (2)	
LEVEL 1 PLANS SCORES		**39**	**21**	**6**		**27**						**20**	**5**				**31**	**36**	**32**					**29**					**37**			**35**	**26**			**22**		**35**		**22**	**32**		**26**	**26**			**75**	**27**	**LEVEL 1 PLANS SCORES**	
Level 1 Readiness (Incomplete, Marginal or Robust)		R	M	I		M						M	I				R	R	R					M					R			R	M			M		R		M	R		M	M					**Level 1 Readiness (Incomplete, Marginal or Robust)**	
Level 2 Plans																																																	**Level 2 Plans**	
Level 2 Inclusions	Formal Inter-State Agreements (LoA or MoU)	1	1	0		1						0	0				1	1	0					0					1			1	0			1		0		0	0		1	1			53	19	Formal Inter-State Agreements (LoA or MoU)	**Level 2 Inclusions**
	Contingency Route Structure	1	0	0		1						0	0				1	0	1					0					1			0	0			1		1		1	1		0	0			53	19	Contingency Route Structure	
	Flight Level Allocation Scheme	1	0	0		1						0	0				1	0	1					0					1			0	0			1		1		1	1		0	0			53	19	Flight Level Allocation Scheme	
	Minimum Longitudinal Spacing	1	0	0		1						0	0				1	0	1					0					1			0	0			1		1		1	1		0	0			53	19	Minimum Longitudinal Spacing	
	Frequency Transfer Arrangements	1	1	1		1						0	0				1	0	1					0					1			1	0			1		1		1	1		1	0			67	24	Frequency Transfer Arrangements	
	Delegation of ATC Separation	1	1	0		0						0	0				1	0	0					0					1			0	0			0		1		1	0		1	0			33	12	Delegation of ATC Separation	
	Delegation of FIS and SAR Alerting Services	1	1	1		1						0	0				1	0	1					0					1			1	0			1		1		1	1		1	0			67	24	Delegation of FIS and SAR Alerting Services	
Level 2 Plan Scores		**7**	**4**	**2**		**6**						**0**	**0**				**7**	**1**	**5**					**0**					**7**			**3**	**0**			**6**		**6**		**6**	**5**		**4**	**1**			**54**	**19**	**Level 2 Plan Scores**	
Level 2 Plan Readiness		R	M	I		R						I	I				R	I	M					I					R			M	I			M		R		R	M		M	I					**Overall State Readiness**	

Level 1 Plans
0 to 15 = Incomplete
16 to 29 = Marginal
30 - 39 = Robust

Level 2 Plans
Incomplete: 0 - 2
Marginal: 3 - 5
Robust: 6 - 7

Decision 1/1 - ATM Contingency Plan Review Team Formation

That, an ATM Contingency Plan Task Force Review Team be established from the Task Force, that considered relevant portions of Level 1 (internal State) and Level 2 (Inter-State) ATM Contingency Plans, and identified areas where ATM contingency planning required improvement, in order to support the development of a Level 3 (Regional) ATM Contingency Plan, based on Basic Planning Elements agreed by the Task Force.

APPENDIX H – STATE CONTINGENCY POINTS OF CONTACT

State or Administration	Point of Contact Name/Position	Contact Phone and Email

…………………………

South China Sea Operational Concept

Expected Implementation: 09 November 2017

Communication: VHF, either direct or using a shared facility (therefore States are encouraged to provide shared transceivers where they are required)*

Navigation: using the Seamless ATM Plan's expectations:

- RNAV 2/ RNP 2 – near parallel or parallel routes spaced 20NM apart for the major traffic routes to increase capacity where required (note: this is a procedural separation, and is not the determinant of the ATC separation, which is based on ATS surveillance);
- implementation of extra RNAV 2/ RNP 2 routes where required which are not necessarily based on existing routes; and
- the new routing structure to be based on the most direct routes possible, using key entry/exit waypoints to/from the South China Sea, or SID/STAR waypoints.

Surveillance: using the Seamless ATM Plan's expectations:

- coverage by ADS-B and SSR*;
- ADS-B data to be shared wherever this data is required.

ATM: using the Seamless ATM Plan's expectations:

- operationalization of 5-10NM ATC separation;
- 10-20 NM separation at Transfer of Control Points (TOC);
- removal of the Flight Level Allocation Scheme (FLAS);
- ATFM measures such as Miles-in-Trail or Minutes-in-Trail to be applied where required for tactical capacity/demand balancing; and
- an update of ATC LOAs and contingency plans as required.

**ICAO encourages states to share surveillance and communications capabilities wherever possible, and in instances where necessary, establish new capabilities to plug the gaps in surveillance and VHF communications within the South China Sea. It is suggested that 09 November 2017 be set as preliminary target for full surveillance and communications within the South China Sea area.*

Proposed Aerodrome Collaborative Decision Making Task Force (A-CDMTF)
Terms of Reference

The scope and objective of the A-CDMTF is to identify, plan and assist in implementation of A-CDM at high density international aerodromes (100,000 scheduled movements per annum or more).

To achieve the above objectives, the Task Force shall consider to:

- ✓ review the current status of A-CDM implementation in APAC Region;
- ✓ review the effectiveness of existing and planned A-CDM programmes in the APAC Region;
- ✓ Conduct workshop on the ICAO guidance manual for A-CDM in the APAC Region;
- ✓ Assist States in capacity assessments;
- ✓ Assist States to implement A-CDM at high density aerodromes and monitor the progress of implementation;
- ✓ Ensure the requirement for interoperability of A-CDM systems with tactical ATM (AMAN and DMAN) ATM automation and ATFM systems; and
- ✓ Establish close working arrangements with Air Traffic Flow Management Steering Group (ATFMSG) and other groups working on similar issues.

Composition: The A-CDM Task Force will be a multidisciplinary group composed of subject matter experts in aircraft operations, air traffic management and aerodrome operations supplemented with other members as and when required.

Working Methods: The Task force will hold at least one three day face to face meeting in a year.

Time Lines: Tasks are expected to be delivered by November 2019.

CHAPTER 3

OPERATING PROCEDURES

FOR

AIS DYNAMIC DATA

(OPADD Edition 4.0)

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 Preface

Within the Asia and Pacific Region, the AIS-AIM Implementation Task Force (AAITF), which is a sub-group of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) ATM/AIS/SAR Sub-Group, has been monitoring the international and automation developments that relates to the NOTAM domain.

In particular, revisions to the EUROCONTROL Operation Procedures for AIS Dynamic Data (OPADD) have been tracked and compared to operating procedures used in the Asia Pacific region.

Principally, this work has been culminated in the eleventh meeting of the AIS/AIM Implementation Task Force (AAITF/11, June 2016) where the Task Force formally agreed that EURO OPADD 4.0 excluding its Chapter 6 be adopted by APANPIRG for use as the Asia/Pacific OPADD.

Chairman of the AAITF

1.2 Context

1.2.1 The document ‘EUROCONTROL Guidelines - Operating Procedures for AIS Dynamic Data (OPADD)’ was developed for the benefit of the member States of the European Civil Aviation Conference (ECAC).

1.2.2 However, whilst elaboration of the document took place in the European context the world-wide implication of AIS has been borne in mind during its development. The Standards and Recommended Practices (SARPs) of the Annex 15 to the Chicago Convention on International Civil Aviation form the basis on which the Operating Procedures were detailed. Where elaboration of the definitions of the ICAO SARPs was found to be essential for the harmonised and coherent application of the Operating Procedures, these were collated to form ICAO Annex 15 Amendment Proposals and submitted to the ICAO EANPG.

1.2.3 OPADD is intended to complement ICAO Standards and Recommended Practices. The latest version of ICAO Annex 15 and ICAO Doc 8126 (Ref [1] and [2]) reflected a number of OPADD-derived proposals. ICAO text is cited when deemed necessary for readability reasons or when not consistently adhered to.

1.3 Purpose

1.3.1 These procedures correspond to the elaboration of the Specialist Task "Develop AIS Operating Procedures". Their objective is "*The provision of standardised procedures to improve the quality of AIS*" and they concur with the overall objectives:

"*To promote uniformity in the collection and dissemination of aeronautical data and aeronautical information, in the interest of safety, quality, efficiency and economy*" and,

"*To improve overall efficiency of AIS, in terms of speed, accuracy and cost effectiveness, by the increased use of automation*".

1.3.2 In addition to the appropriate procedures, it is essential that NOF specialists are adequately trained, qualified and experienced.

1.3.3 Whilst all ECAC States consider that they act in conformity with the Annex 15 Integrated Aeronautical Information Package provision, significant differences of interpretation of the SARPs had been identified and it was acknowledged that a common understanding of procedures for NOTAM creation was a prerequisite for successful automated processing.

.

1.3.4 Therefore, the Operating Procedures were developed to reach this common understanding

1.3.5 OPADD also provides enhanced explanations to better take into account of the main deficiencies reported by users on PIB content [source: Airspace Infringements report]. Upon NOTAM creation and PIB production, awareness should be given to issues that have an impact on PIB readability and understanding:

- Reduction of irrelevant NOTAM: publishing NOF without allocating proper qualifiers and rather taking the default values given without taking into account the actual situation as stated in item E).

- Lack of graphical presentation: providing the description of active danger or other areas in numerical form (LAT/LONG) makes it difficult for pilots to understand the actual dimensions and location of the areas.

- Lack of integrated aeronautical information briefing facility: no single source (portal) for relevant information e.g. free of charge (or low cost) on-line portal for GA pilots.

- Use of abbreviations in NOTAM.

- NOTAM are difficult to read and to understand: many problems are already dealt with in Chapter 2 of OPADD but those rules are not consistently applied (e.g. text not clear without reference to the AIP; essential information missing e.g. which specific procedure is affected).

- Users' preference for a simpler NOTAM text in item E) and with a harmonised structure.

1.4 Scope

1.4.1 The Operating Procedures for AIS Dynamic Data detail the procedures related to NOTAM in general. Examples of SNOWTAM and ASHTAM as well as specific rules or guidance for the harmonisation of these AIS messages are also covered.

1.4.2 The ECAC States agree to follow them for NOTAM creation, as expressed in Chapter 2. The procedures are intended for guidance and may be implemented immediately – see applicability under 1.5.2.

1.4.3 The procedures for NOTAM creation detailed in Chapter 2 will also serve as a benchmark for the processing of incoming international NOTAM, in the sense that where incoming international NOTAM are not prepared in line with these procedures, they may be manually processed in accordance with the principles and procedures laid down in Chapter 3 NOTAM Processing. Chapter 3 is intended to be used as the default for harmonised NOTAM processing by a NOTAM Processing Unit (NPU).

1.4.4 The principles and procedures related to maintaining database completeness and coherence, along with the description of messages associated with this function, are provided in Chapter 1. These messages, such as request and reply messages are required to fulfil the maintenance function. They messages are based upon the use of AFS, whereas the use of other communication means, using alternative formats, could be envisaged.

1.5 Applicability

1.5.1 Most changes to the guidelines address procedural improvements and clarifications. Chapter 7 provides guidance only, however, the outlined propositions should nevertheless be applied whenever possible to ensure the harmonised provision of briefing services.

1.5.2 It is recommended that OPADD Edition 4.0 is implemented by the States' NOFs and relevant Service Providers (e.g. the EAD) as soon as possible. In order to ensure a harmonised application, the following common implementation dates have been established:

- Integration of procedural changes in working procedures and manuals, not dependent on system changes, as required. To be implemented without delay with a recommended common application date of <u>September 2015</u>.

- Items requiring system changes to States' systems and the EAD have a recommended common application date of <u>November 2016</u>.

1.5.3 The introduction of OPADD Ed. 4.0 will not necessitate extensive system changes as the newly edition primarily introduces procedural modifications and the adoption of ICAO Annex 15 amendments implemented since OPADD Ed. 3.0, rather than new functions. However, the following subjects may need system adaptations although none considered critical to the overall application of the OPADD or NOTAM operations in general:

- Removal of space in Item C) between the date-time group and ‘EST’.

- End-time in item C) from Trigger NOTAM changed from 0000 to 2359.

- NOTAM code application.

- Revision of Item D) rules.

- Examples in Item E) for description of NOTAM text.

1.6 Referenced Documents

The following documents were used during the production of this edition:

Nº	Title	Edition	Date
1	ICAO International Standards and Recommended Practices Aeronautical Information Services - Annex 15	14th, incl. Amdt°38 13/11/14	July 2013
2	ICAO Aeronautical Information Services Manual – Doc 8126-AN/872	Sixth Amdt N°2	28 Sep 2009
3	ICAO Abbreviations and Codes – Doc 8400	Eighth	2010
4	ICAO International Standards and Recommended Practices Meteorological Services for International Air Navigation - Annex 3	18th	July 2013
5	ICAO Location Indicators – Doc 7910	Latest edition	Sep 2014
6	ICAO Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds, Appendix F - Doc 9691	Second edition	2007
7	ICAO Handbook on the International Airways Volcano Watch (IAVW), Operational Procedures and Contact List - Doc 9766	Second AMDT	5 November 2007
8	ICAO EUR Doc 019/NAT Doc 006 Volcanic Ash Contingency Plan		Dec 2010
9	EUROCONTROL GNSS NOTAM in Europe – State of the Art	V 2.8	29 March 2013
10	Commission Regulation (EU) No 73/2010 on quality of aeronautical data and aeronautical information (ADQ).		26 January 2010

The following website contains the latest information related to operating procedures for AIS dynamic data:

http://www.eurocontrol.int/publications/opadd-operating-procedures-ais-dynamic-data

1.7 Other publications to consider in NOTAM preparation

1.7.1 Apart from the documents referred to in 1.5 above, the following documents provide details on general subjects related to AIS provisions:

- EUROCONTROL AIS Data Process (ADP and Static Data Procedures (SDP) documents provide a set of harmonised guidelines agreed by ECAC States, representing AIS best practices for the receipt, storage and publication of AIS data.
- EUROCONTROL specifications for Data Assurance Levels (DAL), Data Quality Requirements (DQR) and Origination of Aeronautical Data Origination (DO) provide means of compliance to Commission Regulation (EU) No 73/2010 on the quality of aeronautical data and aeronautical information (ADQ) (Ref. [10]).

  Note: In terms of the application of EU Regulation No 73/2010, this edition of OPADD indicates contradictions to the implementing rule (IR) in particular Chapter 3 which instructs on manual interventions. At this early implementation stage, it is considered too early to propose any revisions to Chapter 3 in this respect. The OPADD is in general not impacted by EU Regulation No 73/2010. Once implementation guidance related to the IR is further progressed, the impact on OPADD may be reconsidered.

1.8 Digital NOTAM Event Specification and Pre-digital NOTAM Templates

1.8.1 The Digital NOTAM Event Specification contains guidelines for the production and encoding of AIXM 5 for the most common events currently notified by NOTAM. The Digital NOTAM Event Specification also contains a dedicated part for the automatic generation of Item E) of the ICAO NOTAM from the AIXM encoded data, with NOTAM text generation rules described for each scenario.

1.8.2 This part of the Digital NOTAM Event Specification has been further developed into a separate EUROCONTROL guidelines document called 'EUROCONTROL Guidelines for Pre-digital NOTAM Templates'. The pre- digital NOTAM templates are intended for use by NOTAM officers for familiarisation with standardised NOTAM input forms and in order to achieve harmonisation in Item E) even before digitalisation is fully implemented.

1.8.3 Where OPADD Chapter 2 provides examples for Item E) text which are included in the Pre-digital NOTAM Templates document, the text is provided in accordance with the templates.

2 NOTAM CREATION

2.1 Introduction

2.1.1 A NOTAM is issued to notify information of a temporary nature and of short duration, or when operationally significant information is permanently changed, or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.

2.1.2 OPADD Chapter 2 provides extensive rules and best practices for the issuance of such information in terms of completion of the NOTAM format.

2.1.3 To avoid excessive publication of NOTAM, the listed events in ICAO SARPs for which a NOTAM shall be issued must be strictly adhered to. Issuance of unnecessary or irrelevant NOTAM contributes to a greater pressure on the end-user and NOTAM providers during the filtering stage, generating a growing risk of missing vital information that could have a flight safety impact.

2.1.3.1 When information of a permanent character is required to be published by NOTAM, it shall be assured that the information is transferred to AIP in a timely manner (and the NOTAM is cancelled) to further reduce excessive NOTAM publication.

2.1.3.2 It shall be noted that the negative impact on end-users caused by NOTAM proliferation is not to be solved by including more information in a single NOTAM, but that this fact further increases the difficulty for end-users. More information in one NOTAM makes the message less readable and essential information more difficult to detect.

2.1.4 The international standard NOTAM format is contained in Annex 15 (Ref. [1]) to the ICAO Convention. This is the reference format for NOTAM and forms the baseline on which the OPADD document is developed.

2.1.5 The different types of NOTAM are identified by suffix letters 'N' (New), 'R' (Replacement) and 'C' (Cancellation) and the resulting identifier appears after the reference number as follows:

- NOTAMN (New NOTAM)
- NOTAMR (Replacement NOTAM)
- NOTAMC (Cancellation NOTAM)

<u>Example</u>: `A0123/14 NOTAMN`

2.1.6 Unless otherwise specifically stated in the text, the procedures described In this Chapter refer to NOTAMN (New NOTAM); most of them also apply to NOTAMR and to NOTAMC.

2.1.7 However, there are some particularities specific to NOTAMR (Replacement NOTAM) and NOTAMC (Cancellation NOTAM) creation. These are described in this Chapter, under paragraph 2.4.

2.1.8 This Chapter contains the operating procedures to be applied for the creation of NOTAM, and provides:

- Basic rules for NOTAM creation (paragraph 2.2).
- Detailed procedures relative to each NOTAM item (paragraph 2.3).
- Procedures for NOTAMR and NOTAMC creation (paragraph 2.4).

- Procedures for Checklist production (paragraph 2.5).
- Procedures for the publication of permanent information (paragraph 2.6).
- Procedures for Trigger NOTAM creation (paragraph 2.7).
- Procedures for NIL notification (paragraph 2.8).

2.1.9 The procedures relative to the processing of NOTAM are described in Chapter 3.

2.2 Basic rules for NOTAM Creation

2.2.1 The ICAO NOTAM format shall be strictly adhered to and the only NOTAM types allowed are NOTAMN, NOTAMR and NOTAMC.

2.2.2 NOTAM intended for international distribution shall include English text for those parts expressed in plain language.

2.2.3 A NOTAM shall deal only with one subject and one condition of that subject. [Note exceptions in accordance with paragraph 2.3.6 and paragraphs 2.7.2.10 - 2.7.2.14 for Trigger NOTAM.]

2.2.4 Terms such as a planned alternative date or alternative dates shall not be used in a NOTAM. Such dates shall be published as any normal date of activity [refer to paragraph 2.4 for NOTAMR].

2.2.5 Erroneous NOTAM shall be replaced; or they may be cancelled and a new NOTAM issued. No 'correct version' NOTAM shall be issued.

2.2.6 Renumbering of existing NOTAM (containing identical information, but with a new number) is not allowed. Renumbering at the beginning of each year is therefore not permitted either.

2.2.7 NOTAM shall be qualified according to the NOTAM Selection Criteria (NSC), as published in ICAO Doc 8126.

2.2.8 All published times shall be in UTC.

2.2.9 If Item C) contains ‘EST’, the NOTAM requires the later issue of a NOTAMR or NOTAMC.

2.2.10 A NOTAMR shall replace only one NOTAM. Both shall belong to the same NOTAM series.

2.2.11 A NOTAMC shall cancel only one NOTAM. Both shall belong to the same NOTAM series.

2.2.12 A NOTAM shall be cancelled only by a NOTAMC and never by a Checklist.

2.2.13 For NOTAMR and NOTAMC, the date/time in Item B) shall be equal to the actual date/time of creation of that NOTAMR and NOTAMC.

2.2.14 Item C) shall contain ‘PERM’ solely for NOTAM information that will be incorporated in the AIP. These NOTAM shall be cancelled according to the rules described in paragraph 2.6.3 when the AIP is updated.

2.2.15 Item E) should be composed by the Publishing NOF in such a way that it will serve for direct Pre-flight Information Bulletin entry without requiring additional processing by the receiving unit.

2.2.16 The following table shows the necessary data Items for each NOTAM type and for the Checklist:

	NOTAMN	NOTAMR	NOTAMC	Checklist
Series/Nr/Type	Yes	Yes	Yes	Yes
Ref to Series/Nr	No	Yes	Yes	Yes
FIR	Yes	Yes	Yes	Yes
NOTAM Code	Yes	Yes	Yes	Yes
'Traffic'	Yes	Yes	Yes	Yes
'Purpose'	Yes	Yes	Yes	Yes
'Scope'	Yes	Yes	Yes	Yes
Lower/Upper	Yes	Yes	Yes	Yes
Lat/Long/Radius	Yes	Yes	Yes	Yes
Item A)	Yes	Yes	Yes	Yes
Item B)	Yes	Yes	Yes	Yes
Item C)	Yes	Yes	No	Yes
Item D)	Optional	Optional	No	No
Item E)	Yes	Yes	Yes	Yes
Items F) & G)	Optional	Optional	No	No

Yes = Entry in Item is compulsory.
No = Entry in Item is not allowed.
Optional = Entry depending on the NOTAM contents.

2.3 Detailed Procedures

2.3.1 NOTAM Series Allocation

2.3.1.1 The use of a NOTAM Series identifier is always required, even for countries publishing only one single NOTAM Series.

2.3.1.2 Letters A to Z (1 character) are allowed, except S and T.

2.3.2 NOTAM Number

2.3.2.1 Consists of NOTAM number/year (4 digits/2 digits). For Multi-part NOTAM refer to the procedures detailed in Chapter 6.

2.3.2.2 Each series shall start on January 1st of each year with number 0001.

2.3.2.3 The NOTAM are issued in ascending and continuous sequence in each and every series.

2.3.3 NOTAM Type

2.3.3.1 Letters 'N' (new), 'R' (replace) and 'C' (cancel) are added as a suffix to the designator 'NOTAM' to indicate the NOTAM type or function.

Examples:
```
A0123/14 NOTAMN
A0124/14 NOTAMR A0123/14
A0125/14 NOTAMC A0124/14
```

2.3.4 NOTAM Qualification Item Q) – General rules

2.3.4.1 The NOTAM Selection Criteria (NSC) tables form the basis for NOTAM qualification. Guidance for their use is contained in ICAO Doc 8126 (Ref. [2]) Chapter 6 Appendix B.

2.3.4.2 NSC is used for the following:

a) the storage and retrieval of information;

b) to associate a NOTAM to particular purposes; and

c) to determine the relevance of a NOTAM for a given context (aerodrome, FIR, area, IFR or VFR flight, …).

2.3.4.3 Publishing NOF shall normally apply the qualifiers associated with the NOTAM Code combinations in accordance with the NSC. Deviation from the corresponding 'Traffic', 'Purpose' and 'Scope' qualifiers is allowed only in exceptional cases, e.g. When required by national regulations or imposed by operational needs (refer to paragraphs 2.3.6.12 - 2.3.6.13, 2.3.7.3, 2.3.9.4 and 2.8.3 for guidance).

2.3.4.4 All fields of Item Q) shall be completed for each NOTAM type.

2.3.5 Qualifier 'FIR'

2.3.5.1 This Item shall normally contain the ICAO location indicator of the FIR within which the subject of the information is located geographically.

Example:
```
Q) RJJJ/QWELW/…..
A) RJAA
```

2.3.5.2 If more than one FIR of the same country is concerned, the ICAO nationality letters of that country (e.g. ED) shall be followed by 'XX'.

Example:
```
Q) ZXXX/QWELW/…..
A) ZGZU ZSHA ZBPE…..
```

2.3.5.3 If more than one FIR of different countries are concerned the ICAO nationality letters of the responsible State (e.g. LI) shall be followed by 'XX'.

Example:
```
Q) LIXX/QWELW/…..
A) LIRR LIBB LATI…..
```

2.3.5.4 A location indicator allocated to an overlying UIR shall not be used.

Example: If the information relates to Karlsruhe UAC, the allocated indicator 'EDUU' is not to be used in Item Q):
```
Q) EDXX/.....
A) EDGG EDMM
```

2.3.5.5 When a subject aerodrome is situated within the overlying FIR of another State, Item Q) shall contain the code for that overlying FIR (paragraph 2.3.14.2 refers).

Example:
```
Q) LMMM/ …..
A) LICD
```

2.3.6 Qualifier 'NOTAM CODE'

2.3.6.1 This Item shall contain the ICAO Doc 8126 (Ref. [2]) rationalised versions of NOTAM Codes published in ICAO Doc 8400 (Ref. [3).

2.3.6.2 The NOTAM Selection Criteria (NSC) set out in ICAO Doc 8126 provide a subject-related association of NOTAM Codes with the qualifiers 'Traffic', 'Purpose' and 'Scope'.

2.3.6.3 If ICAO introduces new NOTAM Code subjects in Doc 8400 (Ref. [3) before amending Doc 8126 (Ref. [2]), the allocation of the qualifiers 'Traffic', 'Purpose' and 'Scope' shall be based on operational experience and related to similar subjects contained in the existing Doc 8126 NSC.

2.3.6.4 Publishing NOF shall ensure that the NOTAM Code selected from the NSC describes the operationally significant information to be promulgated.

Example: If required text is 'parking area closed due to work in progress'

use QMK**LC** (parking area closed) instead of QMK**HW** (parking area work in progress): `Q) EGKA/`**`QMKLC`**`/IV/BO/A/.....`

`Q) WSJC/`**`QMKLC`**`/IV/BO/A/.....`

Instead of:

*Q) WSJC/**QMKHW**/IV/**M**/A/.....*

Note: by selecting the operationally significant code for the event, the PURPOSE has changed.

2.3.6.5 While selecting the most precise code enables quick information identification, in some cases a more general approach provides the end- user with sufficient relevant information in a single NOTAM with no negative impact on briefing. For example, if a displaced threshold results in a change in declared distances, it may be more appropriate to use the code QMDCH (rather than QMTCM) and include in Item E) the information on the displaced threshold and declared distances.

If a VOR/DME outage affects published instrument procedure(s) (e.g. STAR/SID), issuing this information together as one NOTAM is not the best approach, as different NOTAM codes and qualifiers apply. Multiple NOTAM should be published for the navigation aid outage and the affected flight procedures, which allow for tailored briefings of the required information.

2.3.6.6 If the NSC tables do not contain an appropriate 'Subject/Condition' combination for the information to be promulgated, the letters 'XX' shall be used. However, <u>every effort shall be made</u> to use 'Subjects' and 'Conditions' listed in the NSC before deciding to use 'XX' as detailed in the following paragraphs.

2.3.6.7 If the Subject is not directly contained in the NSC, an overall term (such as 'FA' or 'AF') or a code which best fits the situation shall be chosen whenever possible instead of 'XX'.

Examples:

- QFALT (AD limited) may be used if handling service is not available.
- QFALT (AD limited) may not be used for fire fighting service. Instead use QFFAU.
- QFAXX may be used if main airport telephone numbers are unserviceable.
- QLAAS (approach light system) may not be used for alignment indicator lights. Instead use QLJAS.
- QLAAS (approach light system) may be used for circling lights (no more precise code available)

2.3.6.8 If a specific Subject code as well as an overall term is available, the specific Subject code shall be used.

2.3.6.9 If an available Subject code is not literally the same as the event to be published but coincides well, the coinciding code shall be used (if there isn't a more suitable code). However, attention should be paid to the fact that even if the code's *signification* fits well with the event, the code may be very specific and refer to a different aspect than the intended event. In such cases, a different code should be chosen.

Examples:

- QFWAS (wind direction indicator U/S) shall not be used for anemometer. The general MET code QFM shall be used instead.
- QFTAS (transmissometer U/S) shall be used for other RVR measurement devices/instrument RVR.
- QLJAS (runway alignment indicator lights U/S) shall not be used for circling lights, use general code QLAAS (approach lighting system U/S) instead.

2.3.6.10 Separate NOTAM are issued for individual elements. General rules which dictate multiple NOTAM:

- Different NOTAM series.
- Different timeframes (Items B, C and D).
- Different geographical location.
- Different traffic.
- Different scope.
- Different vertical limits.
- Different reserved/restricted areas (incl. P/R/D-areas).

2.3.6.10.1 Exceptions to the list that dictate multiple NOTAM may be applied to events which involve different elements (e.g. sub-sectors belonging to the same TMA, activation of reserved/restricted areas with an associated FPL buffer zone, opening/closure of multiple routes), if the same subject/condition and timeframes apply (e.g. same restriction, same activation event). In such cases, a combined NOTAM may be regarded as more appropriate.

In case of the event of non-availabilities of several instrument flight procedures caused by the same event or if the same change applies to all procedures, exceptions from the rule to issue separate NOTAM for each procedure may be applied. [Note exceptions also apply to Trigger NOTAM
- paragraphs 2.7.2.10 - 2.7.2.14 refer.]

2.3.6.11 More than one occurrence of one subject may exist and can be combined in one NOTAM, if there is a link:

- Several elements of the same TWY.
- Several TWY closures/limitations serving the same RWY.
- TWY closures/limitations caused by the same reason.
- Limitations on the same apron.
- Limitations on the same RWY.

2.3.6.11.1 Facilities consisting of several elements are issued in one NOTAM if all elements are unserviceable, and the general Subject code is used, e.g. ‘IC’ or ‘NM’. For outages of one or more sub-element, separate NOTAM are issued. Subject code is the one of the sub-element, where such a code is available.

Examples:

- `VOR/DME is unserviceable: one NOTAM, code QNMAS.`
- `DME of a VOR/DME is unserviceable: one NOTAM, code QNDAS.`
- `ILS is unserviceable (all sub-parts): one NOTAM, code QICAS.`
- `ILS GP is unserviceable, but LOC is operating: one NOTAM, code QIGAS.`
- `ILS GP and ILS LOC are unserviceable, but ILS DME is operational: one NOTAM, code QICAS.`

2.3.6.12 If the Condition is not listed: use ‘XX’ as the 4th and 5th letters of the NOTAM code with the exception of Trigger NOTAM where ‘TT’ is always used (ref. 2.7.2.8).

Association with ‘Traffic’, ‘Purpose’ and ‘Scope’ is fixed by the NOTAM subject 2nd and 3rd letter combination taking into account the requirements mentioned in paragraph 2.3.7.3 and 2.3.9.4.

2.3.6.12.1 In situations where more than one Condition seems appropriate, e.g. ‘LT’ (‘limited’) or ‘LC’ (‘closed’): use the condition which best qualifies the status of the subject:

If the main purpose of a subject is affected, use ‘LC’ (or ‘AU’ or ‘AS’) rather than ‘LT’. If the subject is limited only for certain types of users, use ‘LT’ rather than ‘LC’ (or ‘AU’ or ‘AS’).

For additional usage limitations (apart from those already published in the AIP), use condition ‘LT’ or a specific condition if available.
Item E) reads: ‘<*subject*> CLSD TO … (or: not available/unserviceable to)’.

For closures involving a complete replacement of the usage limitations published in the AIP, use 'LC' ('AU' or 'AS'). Item E) reads: '<*subject*> CLSD (or: not available/unserviceable)' or '<*subject*> CLSD (not available/ unserviceable) EXC …'.

Examples:

- `'TWY A CLSD', use QMXLC.`
- `'TWY A CLSD BETWEEN TWY A1 AND TWY A3', use QMXLC.`
- `'TWY A CLSD TO ACFT WITH MAX WINGSPAN ABOVE 25M', use QMXLT.`
- `'AD CLSD TO VFR FLT', use QFALV.`
- `'AD CLSD TO CIVIL ACFT', use QFALT.`

Insert 'LC' for closure with exceptions related to special handling by ATS (status such as HUM, STATE). If PPR is the only exception, use 'AP'.

- `'RWY 10/28 CLSD EXC PPR 1HR', use QMRAP..`
- `'RWY 10/28 AVBL PPR 1HR FOR CIV ACFT', use QMRAP for an additional PPR requirement for a specific user only.`
- `'AD CLSD EXC HOSP AND STATE ACFT', use QFALC.`

2.3.6.13 If, exceptionally, the Subject is not listed, use 'XX' as the 2nd and 3rd letters of the NOTAM Code and use 'XX' also for the Condition. Free association of the qualifiers 'Traffic', 'Purpose' and 'Scope' is possible. The qualifiers shall reflect the content of the NOTAM.

Example 1:

```
Q) EKDK/QXXXX/IV/M/E/000/999/5533N00940E999

E) ACCORDING TO RESOLUTION 781 UNITED NATION HAS DECIDED TO
ESTABLISH A BAN ON MIL FLIGHTS IN …..
```

Example 2:

```
Q) CZXX/QXXXX/IV/NBO/E/000/999/6957N12225W999
A) CZVR CZEG B)1401061304 C)1401162329EST
E) EMERG SECURITY CTL OF AIR TFC (ESCAT) PHASE ONE
HAS BEEN INVOKED BY THE CHIEF OF DEFENSE STAFF. ESCAT
PHASE ONE REQUIRES THAT ALL FLT WITHIN ESCAT ZONE 1, 2A
AND 2D FILE AN IFR OR DEFENCE VFR (DVFR) FLT PLAN. (REF
...)
```

Example 3:

```
Q) LFXX/QXXXX/IV/NBO/E/000/999/4504N00053E999
A) LFMM LFRR LFBB LFEE LFFF B)1404100400 C)
1404101800
E) FRENCH CIV AVIATION SERVICES AFFECTED BY STRIKE. SOME
DISTURBANCES MIGHT AFFECT ATS, AIS AND COM SERVICES: 1-
MINIMUM SERVICE WILL BE ENSURED IN ACC AND….
```

2.3.7 Qualifier 'TRAFFIC'

2.3.7.1 This qualifier relates the NOTAM to a type of traffic and thus allows retrieval according to the user requirements:

I	=	IFR Traffic
V	=	VFR Traffic
IV	=	IFR and VFR Traffic
K	=	NOTAM is a checklist, see paragraph 2.5.

2.3.7.2 The appropriate type of traffic should be taken from the NOTAM Selection Criteria (NSC).

2.3.7.3 However, the NSC contains certain subjects (2nd and 3rd letters) where the NOTAM subject/text may demand a different choice of 'Traffic' qualifier (I, V or IV). In these cases, the correct 'Traffic' entry shall be determined by the Publishing NOF.

Example:
NOTAM Code for '`VFR REPORTING POINT ID CHANGED`' is 'QAPCI'

The given NSC 'Traffic' Qualifier for 'QAPCI' is 'IV'

But as the Reporting Point is for VFR use only;

Entry in Item Q) shall be: '`Q) LFFF/QAPCI/`**`V`**`/BO/E/000/200....`'

2.3.8 Qualifier 'PURPOSE'

2.3.8.1 This qualifier relates a NOTAM to certain purposes (intentions) and thus allows retrieval according to the user's requirements.

2.3.8.2 The appropriate 'Purpose' qualifier(s) should be taken from the NSC. Consider the impact on the purpose when selecting the NOTAM code. The following entries and combinations are allowed: K, M, B, BO and NBO,
where the order in the list reflects the grading in terms of operational significance from the lowest to the highest. Refrain from up- or downgrading the ICAO classification in NOTAM publication. For a NOTAM Checklist, only K shall be used.

2.3.8.3 'PURPOSE' meanings:

N = NOTAM selected for the immediate attention of flight crew members.

Due to their importance, these NOTAM require the immediate attention of flight crew members. Flight crew members may request specific delivery of such NOTAM or their inclusion in specific Pre-flight Information Bulletins.

A specific Pre-flight Information Bulletin contains only NOTAM related to subjects of extreme importance (qualified NBO).

B = NOTAM of operational significance selected for PIB entry.

The NOTAM will appear in a Pre-flight Information Bulletin containing all NOTAM relevant to a general Pre-flight Information Bulletin query. NOTAM qualified B, BO, or NBO will appear in the Pre-flight Information Bulletin.

O = NOTAM concerning flight operations.

The NOTAM will appear in a PIB containing all relevant NOTAM. NOTAM with qualifiers BO or NBO will appear in the PIB.

M = Miscellaneous NOTAM, not the subject of a briefing but available on request.

The NOTAM is for a ‘miscellaneous’ purpose and will not appear in a Pre-flight Information Bulletin, unless specifically requested.

Note: In Europe, a default briefing is recommended to include NOTAM with purposes B, BO, NBO and M (ref: paragraph 7.5.2.1).

K = The NOTAM is a checklist.

2.3.9 Qualifier ‘SCOPE’

2.3.9.1 This qualifier relates the NOTAM subject (2nd and 3rd letters) to a specific scope. This qualifier is used to determine under which category a NOTAM is presented in a Pre-flight Information Bulletin, i.e. under ‘Aerodrome’, ‘Enroute’ or ‘Navigation Warning’.

2.3.9 2 The ICAO NOTAM Selection Criteria provide some guidance for selecting the scope but do not provide guidance if combinations such as ‘AE’ are intended as either/or, or as both. General rules are provided in OPADD on the application of scopes ‘A’, ‘E’ and ‘W’ in 2.3.9.3 and more details for scopes ‘AE’ and ‘AW’ are provided in 2.3.9.5.

2.3.9.3 The following entries are permissible:

A = Aerodrome

Relates the NOTAM to the scope of ‘Aerodromes’. Entry of an aerodrome (e.g. EGLL) in Item A) is compulsory.

E = Enroute

Relates the NOTAM to the scope of ‘Enroute information’. Entry of one or more FIR in Item A) is compulsory.

W = Warning

Relates the NOTAM to the scope of ‘Navigation Warnings’ (’Airspace Restrictions’ (QR…) and ‘Warnings’ (QW…)). A Navigation Warning affects airspace and is normally ENR information in AIP. Entry of one or more FIR in Item A) is compulsory.

AE = Aerodrome/Enroute

Relates the NOTAM to both scopes ‘A’ and ‘E’.

Scope ‘AE’ is used whenever a NOTAM (e.g. certain Navigation Aids, CTR) affects both aerodrome and Enroute operations. For selection of scope, see 2.3.9.6.

Item A) shall contain the location indicator of the Aerodrome (e.g. EHAM).

Example:

```
Q) EHAA/QNMAS/IV/BO/AE/000/999/5216N00442E025
A) EHAM B) 1404170500 C) 1404170700
E) VOR/DME AMS 113.95MHZ/CH96Y U/S
```

In this example, Item Q) shall contain geographical co-ordinates and a radius centred on the Navigation Aid.

When such a Navigation Aid is serving two or more aerodromes, only one NOTAM shall be published with scope ‘AE’. NOTAM for the other aerodromes concerned shall be published with scope ‘A’ only to prevent duplication in the Enroute part of the PIB. All scope ‘A’ NOTAM, shall contain ARP as the geographical reference.

In the rare event that a Navigation Aid coverage affects more than one FIR, all affected aerodromes are issued with scope ‘A’ and with ARP as the geographical reference. A separate NOTAM is issued with scope ‘E’ only, Item A) to contain all affected FIR.

Note: The lower and upper limit shall always be provided for the area and service concerned, in accordance with OPADD 2.3.10.2.

AW = Aerodrome/Warning

Relates the NOTAM to both scopes ‘A’ and ‘W’.

Although scope ‘AW’ is not explicitly listed in the ICAO NSC tables, it shall be used whenever a single NOTAM is used for both aerodrome and Enroute traffic affected by a Navigation Warning taking place on or in the near vicinity of an aerodrome.

Item A) shall contain the aerodrome location indicator, and Item Q) shall contain the geographical co-ordinates of the location where the activity is taking place, followed by the radius.

Example:

```
Q) LOVV/QWPLW/IV/M/AW/000/160/4720N01113E010
A) LOWI  B) 1410201400  C) 1410202200
E) MIL PJE WILL TAKE PLACE WITHIN:
10NM RADIUS CENTRED ON 471940N 0111300E (SEEFELD).
F) GND G) FL160)
```

Note that co-ordinates for LOWI AD are 471539N 0112040E, but the actual co-ordinates of the site where the activity is taking place are entered in Item Q).

In the rare event that a Navigation Warning affects two or more aerodromes, only one NOTAM shall be published with scope 'AW' in order to prevent duplicated information in the Navigation Warnings section of the Enroute part of the PIB. NOTAM for other aerodromes concerned shall be published with scope ‘A’ only, ARP as the geographical reference and NOTAM Code QFALT (aerodrome limited) and without Item F) and G). If required, the vertical limits are inserted in Item E).

When the area concerned affects one or several AD and more than one FIR, one NOTAM is issued with scope ‘W’, Item A) to contain all affected FIR. For every affected AD, a separate NOTAM with scope ‘A’ only is issued in order to provide correct information in all PIB sections for all concerned FIR and AD and to avoid duplications. All scope ‘A’ NOTAM to contain ARP as the geographical reference and

NOTAM Code QFALT (aerodrome limited) without Item F) and G). If required, the vertical limits are inserted in Item E).

K = Checklist

Relates the NOTAM to a checklist, which will not appear in a Pre-flight Information Bulletin. Entry in Item A) of the FIR(s) valid for the Publishing NOF is compulsory (ref paragraph 2.5).

2.3.9.4 The appropriate entries should be taken from the NOTAM Selection Criteria.

2.3.9.5 However, the NSC contains certain subjects (2nd and 3rd letters) where the 'Scope' (A, E, W, AE or AW) depends on the NOTAM text. In such cases, the correct 'Scope' entry shall be determined by the Publishing NOF according to NOTAM text.

Examples: 'QOB . .' = Obstacle = 'AE' in NSC but could also be 'A' or 'E' only.

'QWA . .' = Air Display = 'W' in NSC but could also be 'AW'.

'QNV . .' = VOR = 'AE' in NSC but could also be 'E'.

'QOA . .' = AIS = 'A' in NSC but could also be 'AE' (e.g. if AIS is also responsible for other aerodromes in the FIR) or 'E' if the NOTAM refers to national NOF or information provision.

'QST . .' = TWR = 'A' in NSC but could also be 'AE' (e.g. if TWR also serves Enroute traffic).

2.3.9.6 Scope entries shall always be considered in relation to the subject, and therefore the use of 'A' or 'E' instead of 'AE' (which may be a default scope given in the NSC) is allowed.

Below are examples of Q-codes which have a default scope 'AE'; however if the subject is clearly only related to departing and/or arriving traffic, the selected scope shall be 'A' (aerodrome); if the subject relates only to overflying traffic, the selected scope shall be 'E':

QAT..(TMA), QAC.. (CTR), QCA.. (A/G FAC), QCC.. (computer-pilot data link communication), QSP.. (APP), QOB.. (OBST), QOL..(OBST Lights).

For selecting the Scope for the subjects *obstacle* and/or *obstacle lights*, Item E) can provide indications if the events are only aerodrome related, e.g. through the geographical location or reference to OCA penetrations or similar.

2.3.9.7 If the letters 'XX' are used as 2nd and 3rd letters of the NOTAM Code, the appropriate Scope must be derived from the text of the NOTAM. If the letters 'XX' are inserted as 4th and 5th letters of the NOTAM Code, the appropriate 'Scope' must be derived from the NOTAM-subject (2nd and 3rd letters of the NOTAM Code) according to the NSC.

2.3.9.8 Recapitulation of ‘Scope’ qualification possibilities and respective Item A) contents:

Qualifier ‘SCOPE’	Item A) contents
A	Aerodrome
AE	Aerodrome
E	FIR(s)
W	FIR(s)
AW	Aerodrome
K	FIR(s)

2.3.10 Qualifiers ‘LOWER/UPPER’

2.3.10.1 These qualifiers relate a NOTAM to a vertical section of airspace by reference to specific lower/upper limits. This allows lower/upper limits to be specified in requests for pre-flight information and, by doing so, any NOTAM not relating to all or part of the requested vertical section may be excluded from the retrieved Pre-flight Information Bulletin obtained.

2.3.10.2 Lower and Upper limits are linked to the Scope. Whenever the scope classifies a NOTAM as airspace information (Enroute or Warning) or a combination of aerodrome and airspace information (Enroute or Warning), Lower and Upper limits shall be designated by the corresponding vertical values of the defined airspace. Whenever the scope classifies a NOTAM as aerodrome information only, the default values 000/999 shall be inserted.

2.3.10.3 The limits specified in these qualifiers are given as ‘flight levels’ only.

Example: ‘Q) …/090/330/…’ = from ‘Lower’ FL090 up to ‘Upper’ FL330

2.3.10.4 The ‘Lower’ limit shall be inferior or equal to the ‘Upper’ limit.

2.3.10.5 Whenever the NOTAM information refers to an airspace, Lower and Upper limits shall be designated by the corresponding vertical values of the defined airspace.

2.3.10.6 Whenever NOTAM information refers to obstacles, Lower and Upper limits shall be designated by the corresponding vertical values of the obstacle unless the obstacle is classified as aerodrome information only.

2.3.10.7 In the case of Navigation Warnings (NOTAM Codes ‘QW’ and ‘QR’), the values specified in ‘Lower’ and ‘Upper’ shall correspond to the values specified in Items F) and G) (paragraph 2.3.23 refers). The values entered in the qualifier ‘Lower’ shall be rounded down to the nearest 100ft increment and the values entered in the qualifier ‘Upper’ shall be rounded up to the nearest 100ft increment.

Examples:

Lower/Upper 1400ft/1900ft	1400/1900	= 014/019
Lower/Upper 1350ft/2000ft	1300/2000	= 013/020
Lower/Upper 1850ft/2020ft	1800/2100	= 018/021

2.3.10.8 The addition of ‘buffers’ to these qualifiers, either manually or within system software, which increases the airspace to be considered for PIB purposes, shall be avoided.

2.3.10.9 When the values in F) and G) are expressed as 'flight levels' (FL), then the same FL values will be entered respectively as the 'Lower/Upper' values in Item Q).

2.3.10.10 When the values in F) and G) are expressed as an 'altitude' (AMSL), then the corresponding FL values (based on the standard atmosphere) will be entered as the 'Lower/Upper' values in Item Q).

<u>Example</u>: `F) 2000FT AMSL G) 7500FT AMSL`

=> 'Lower/Upper' = '020/075'

2.3.10.11 When the values in F) and G) are expressed as a 'height' (AGL), and when the corresponding altitude can be calculated based on the terrain elevation of the affected area, then the corresponding FL values (based on the standard atmosphere and AMSL values) will be entered as the 'Lower/Upper' values in Item Q).

<u>Example</u>: `F) 2000FT AGL   G) 7500FT AGL`

Lowest terrain elevation = 500FT AMSL Upper terrain elevation = 1000FT AMSL

=> 'Lower/Upper' = '025/085'.

2.3.10.12 When the values in F) and G) are expressed as a 'height' (AGL), and no corresponding flight levels can be defined (i.e. the terrain elevation of the affected area is unknown to the Publishing NOF despite all possible attempts to obtain the data), the highest terrain elevation of the State, or the FIR, or the region concerned shall be added to the value in Item G) for calculating the qualifier 'Upper' in Item Q) and the default value '000' shall be entered in the qualifier 'Lower' in Item Q).

<u>Example</u>: `F) 2000FT AGL  G) 7500FT AGL`

Highest terrain elevation = 9000FT

= 'Lower/Upper': 000/165.

2.3.10.13 In the case of Airspace Organisation (NOTAM related to structure of ATS Routes, TMA, CTR, ATZ etc.), the specified 'Lower/Upper' values shall correspond to the vertical limits of the affected airspace concerned. This also includes information about ATS units (e.g. APP) providing a service and their systems (e.g. TAR), provided there is an impact. For ATS units and their systems, the corresponding limits of the referring airspace are inserted. The use of default values 000/999 shall be avoided whenever possible except where NOTAM information is published for an aerodrome only (paragraph 2.3.9 2 refers).

<u>Example</u>:

```
Q)LFFF/QACCA/IV/NBO/AE/000/055/4929N00212E027
A) LFOB B)1402010630 C) 1403262130
E) CTR BEAUVAIS ACTIVATED.
```

If the vertical limits of an Airspace organisation are only partly affected, lower and upper limits shall be limited to the affected part only.

Example:

```
Q) LFFF/QATCA/IV/NBO/AE/015/035/4929N00212E027
A) LFOB B) 1402010630 C) 1403262130
E) TMA 1, TMA 2 AND TMA 3 BEAUVAIS:
SPEED LIMITATIONS OF 150KT IN FORCE FOR ALL FLIGHTS BELOW 3500FT
AMSL.
```

2.3.10.14 In the case of changes to vertical limits, lower and upper limits shall cover the extended or not affected part.

Example:

```
Q) LFFF/QATCH/IV/NBO/AE/025/070/4935N00219E015
A) LFOB B) 1405100400 C) PERM
E) TMA 3.2 BEAUVAIS VERTICAL LIMITS CHANGED: LOWER LIMIT
RAISED TO 3000FT AMSL, UPPER LIMIT RAISED TO FL070.
```

Note: published lower/upper limit in AIP for TMA 3.2 is 2500FT AMSL/FL065.

2.3.10.15 In the case of Enroute obstacles (e.g. TV masts) no Items F) and G) are included, but appropriate values shall be used in Item Q), based on local elevation. Use of default value '000/999' shall be avoided.

If several (grouped) obstacles (in close proximity) are published with one NOTAM, the upper limit shall reflect the highest obstacle.

Example:

```
B0120/14 NOTAMN
Q)LSAS/QOBCE/V/M/AE/000/030/4631N00839E001
A) LSPM B) 1402250557 C) 1406300000EST
E) OBSTACLES ERECTED 2.5KM 280DEG GEO ARP AMBRI-PIOTTA:
463103N0083927E ELEVATION 880M / 2914FT AMSL (54.0M /
177.2FT AGL).
```

2.3.10.16 Most aerodrome-related information, 'Scope' 'A', refers to ground installations for which the insertion of an Upper Limit is not relevant. Therefore, if specific height indications are not required, these NOTAM shall include the default values '000/999'.

2.3.10.17 Whenever the aerodrome-related information also affects the overlying or surrounding airspace, the Lower/Upper Limits need to be specified; and the 'Scope' qualifier shall read 'AE' or 'AW'.

2.3.11 Qualifier 'GEOGRAPHICAL REFERENCE' – General rules

2.3.11.1 This qualifier allows the geographical association of a NOTAM to a facility, service or area that corresponds to the aerodrome or FIR(s) given in Item A), and is composed of two elements.

2.3.11.2 The first element contains one set of co-ordinates comprising 11 characters rounded up or down to the nearest minute; i.e. Latitude (N/S) in 5 characters; Longitude (E/W) in 6 characters.

2.3.11.3 The second element contains a radius of influence comprising three figures rounded up to the next higher whole Nautical Mile encompassing the total area of influence measured from the rounded coordinate: e.g. 10.2NM shall be indicated as 011.

Example: `Q) EDWW/QWELW/IV/BO/W/000/310/5410N00845E011`.

2.3.12 Qualifier 'GEOGRAPHICAL REFERENCE' – Co-ordinates

2.3.12.1 For NOTAM with 'Scope' 'A' the Aerodrome Reference Point (ARP) co- ordinates shall be inserted.

2.3.12.2 For NOTAM with 'Scope' 'AE' or 'AW' the appropriate co-ordinates shall be inserted. These coordinates may be different from the ARP.

E.g. a VOR situated at an aerodrome will not necessarily have the same coordinates as the ARP. The same applies for a Navigation Warning that affects the aerodrome traffic, at or in the close vicinity of an aerodrome, and whose coordinates may also be different from the ARP.

2.3.12.3 For NOTAM with 'Scope' 'E' or 'W' referring to a given/known point (Navigation Aid, Reporting point, City, etc.) these co-ordinates shall be inserted.

2.3.12.4 If a NOTAM with 'Scope' 'E' or 'W' refers to an area (FIR, Country, Danger Area etc.), the coordinates represent the approximate centre of a circle whose radius encompasses the whole area of influence.

2.3.12.5 For NOTAM with 'Scope' 'E' or 'W' containing information that cannot be allocated a specific geographical position, the coordinates represent the approximate centre of a circle whose radius encompasses the whole area of influence (this may be the centre of an FIR or multiple FIR, e.g. for an entire State).

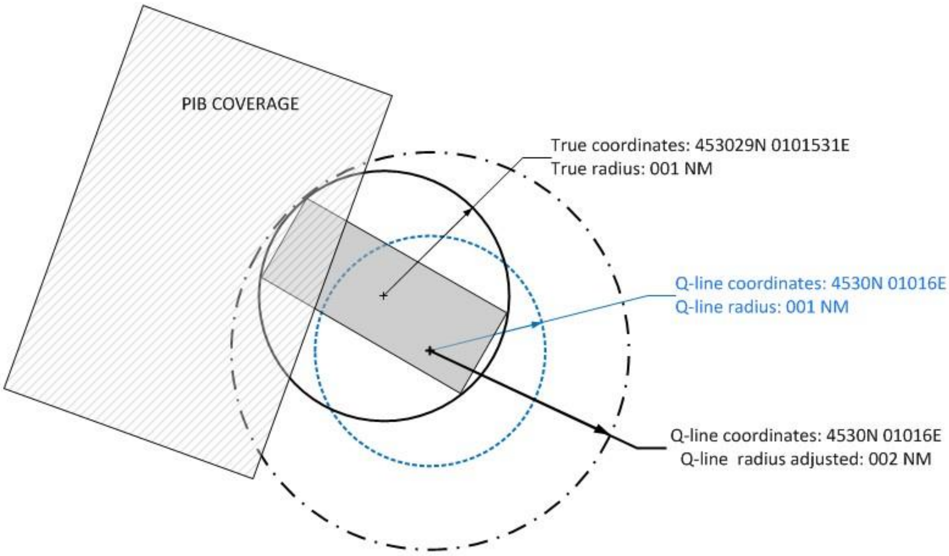
2.3.13 Qualifier 'GEOGRAPHICAL REFERENCE' – Radius

2.3.13.1 For NOTAM with 'Scope' 'A', the default value 005 shall be inserted.

2.3.13.2 For NOTAM with 'Scope' 'E', 'W', 'AE', 'AW', the radius shall be used in such a way that it encompasses the total area of influence of the NOTAM. The radius entered shall be as precise as possible. Use of an excessive radius indication (e.g. by entering the default '999') causes unnecessary PIB coverage and shall be avoided.

2.3.13.3 When rounding up or down coordinates for inclusion in appropriate format in the Q-line, the centre of the radius is moved, which may cause the PIB not to cover the complete area of influence of the NOTAM. In this case, the Q-line radius must be increased.

In the example below, the NOTAM area is represented by the smaller and darker rectangle. The true coordinates are rounded to fit the Q-line format, whereas the centre point of the radius has shifted (smaller dotted circle). If the radius of the Q-line remained 1NM, the PIB would not contain the NOTAM. Therefore, the radius is adjusted to 2NM.



Note: In the case of an adjusted radius in the qualifier to allow inclusion of the NOTAM in the PIB, the radius provided as information in Item E) may differ slightly.

2.3.13.4 For simplification in system calculations of an adjusted radius, it is recommended to add 0.71NM to the calculated radius (0.71NM being the maximum possible displacement vector (the Equator). A more precise algorithm/method may also be applied provided it ensures that the whole area of influence is completely covered.

2.3.13.5 Whenever a NOTAM concerns an entire FIR or several FIR, then '999' shall be entered as the radius.

Example:

```
Q) EDXX/QXXXX/IV/BO/E/000/999/5120N01030E999
A) EDWW EDGG EDMM B) 1401010000 C) PERM
E) FLIGHTS TO/FROM THE CONTRACTING STATES OF THE SCHENGEN REGIME
MAY BE CONDUCTED TO/FROM ANY AERODROME WITHIN THE FEDERAL
REPUBLIC OF GERMANY. THE OBLIGATION TO USE A DESIGNATED CUSTOMS
AERODROME IS WITHDRAWN.
```

2.3.13.6 For certain specific NOTAM subjects, the radius should be standardised for the sake of uniformity and simplicity. A list of default radius per NOTAM Code is given in the following table.

Table of default radius indicators for NOTAM Creation

NOTAM Code	**Plain language**	**Radius (NM)**
Q - - - -	All Aerodrome-related NOTAM with 'Scope A' only. Note: this default value applies also for the following listed specific subjects in the table, when issued as Aerodrome-related with 'Scope A' only. The default value shall also be used for 'Scope' 'AE'/'AW', but only if a precise value cannot be defined.	005 005 if no precise value can be found

QN - - -	All Navigation Aids (VOR/DME, NDB ...)	025
QOB - -	OBST for a single structure, chimney, mast, etc. OBST for multiple structures, e.g. windmill parks, line of obstacles (cables) the actual radius of the whole structure shall be used.	001 001-025
QOL - -	OBST LIGHT for a single structure, chimney, mast, etc. For multiple structures, e.g. windmill parks, the actual radius of the whole structure shall be used.	001 001-025
QPH - -	Holding Procedure	025
QPX - -	Minimum Holding Altitude	025
QAP - -	Reporting Point	001
QAX - -	Significant Point	001
QWC - -	Captive Balloon	001

Note: Due to the dense network of ground-based navigation aids in Europe, these default values should be used by the publishing NOF in order not to overload Pre-flight Information Bulletins with superfluous information.

Note: Full coverage of Navigation Aids might be inserted instead of 025, in the event of low density of Navigation Aids coverage.

2.3.14 Item A) – Single Location (FIR or AD)

2.3.14.1 In the case of a single FIR, the Item A) entry must be identical to the 'FIR' qualifier entered in Item Q).

2.3.14.2 When an aerodrome indicator is given in Item A), it must be an aerodrome/heliport situated in the FIR entered in Item Q). This shall apply even when the aerodrome/heliport is situated within an overlying FIR of another State, e.g. NOTAM for EGJJ shall have LFRR in Item Q).

2.3.14.3 If no 4–letter ICAO location indicator for an aerodrome/heliport exists, Item A) shall contain either the two ICAO nationality letters + XX (EDXX) or the single ICAO nationality letter + XXX (KXXX); with the full name of the aerodrome/heliport as the first element in Item E).

2.3.14.4 States shall take steps to ensure that:

- All aerodromes which may be the subject of NOTAM have an ICAO location indicator.
- The same location indicator is not used for an aerodrome and an FIR.
- All NOTAM published with XX in Item A) shall be cancelled (NOTAMC) and published as NOTAMN as soon as possible after the new location indicator has been published and has reached its effective date.

Examples: `A) EBBU` (ICAO location indicator for a single FIR)

```
A) LFPO
```
(ICAO location indicator for an Aerodrome)

```
A) EDXX
E) SACHSENRING-HOHENSTEIN-ERNSTTAL
```
<text to be continued in new line>

2.3.15 Item A) – Multi-Location (FIR or AD)

2.3.15.1 If more than one AD is affected, separate NOTAM shall be issued.

2.3.15.2 If more than one FIR is concerned:

(a) All FIR location indicators affected by the information shall be entered in Item A), each separated by a space.

(b) The number of FIR in Item A) is restricted to 7 by the current ICAO NOTAM format.

(c) In the case of multiple FIR in Item A), the FIR qualifier of the Item Q) contains the ICAO nationality letter(s) + XX (or XXX). In the event of more than one FIR belonging to several countries, the ICAO nationality letter of the Publishing NOF (followed by XX or XXX) must be entered as the 'FIR' qualifier in Item Q). In both cases, Item A) contains all FIR.

The first FIR in item A) shall always be a FIR of the publishing State.

Example 1: Multiple FIRs in one country:
Item Q) `LFXX`

Item A) `LFFF LFBB LFRR`

Example 2: Multiple FIRs in different countries:
Item Q) `EDXX` *(if the NOTAM is originated by the German NOF)*

Item A) `EDGG EBBU LFFF`

2.3.15.3 If referring to a navigation aid serving more than one AD or to a navigation warning affecting several AD, issue separate NOTAM for each AD.

2.3.16 Item B) – Start of Activity

2.3.16.1 A ten-digit date-time group giving the year, month, day, hour and minutes at which the NOTAM comes into force.

Example: `B) 1407011200` (1 July 2014, 12:00 UTC)

2.3.16.2 Insertion of 'WIE' or 'WEF' is not permitted.

2.3.16.3 The start of a UTC day shall be indicated by '0000' (i.e. do not use '0001').

2.3.16.4 A NOTAM is 'valid' from the moment it is published, whereas it only comes 'into force' at the date-time group specified in Item B).

2.3.16.5 The Item B) date-time group shall be equal to or later than the actual date/time of creation of the NOTAM.

2.3.16.6 However, for NOTAMR and NOTAMC, the Item B) time shall correspond to the actual date-time of creation of that NOTAMR or NOTAMC. No future coming into force is permitted (paragraph 2.4.1.5 refers).

Note: The date-time of creation may precede the date-time of transmission by a few minutes, due to the time required for the full completion and review of the NOTAM data.

2.3.16.7 Refer to paragraph 2.3.18.20 for NOTAM advising changes to previously published operating or activity hours.

2.3.17 Item C) – End of Validity

2.3.17.1 For NOTAM of a known duration of validity, a ten-digit date-time group giving the year, month, day, hour and minute at which the NOTAM ceases to be in force and becomes invalid. This date and time shall be later than that given in Item B).

Example: `C) 1407022030`

2.3.17.2 The end of a UTC day shall be indicated by ‘2359’ (i.e. do not use ‘2400’).

2.3.17.3 For NOTAM of uncertain duration of validity, the date-time group shall be followed by ‘EST’ (estimate). There shall be no space between the ten digits and ‘EST’.

Example: `C) 1407031230EST`

If dates are used in Item D), ‘EST’ in Item C) shall not be used.

2.3.17.4 Insertions of ‘UFN’ or ‘APRX DUR’ are not permitted.

2.3.17.5 For NOTAM containing information of permanent validity that will be incorporated in the AIP, the abbreviation ‘PERM’ is used instead of a date- time group.

Example: `C) PERM`

2.3.17.6 Item C) shall not be included in a NOTAMC.

2.3.17.7 Refer to paragraph 2.3.18.20 for NOTAM advising changes to previously published operating or activity hours.

2.3.18 Item D) – Day/Time Schedule – General Rules

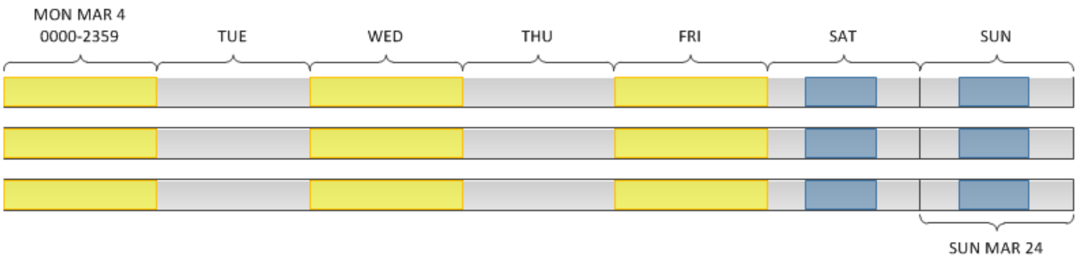
2.3.18.1 This Item needs to be inserted only when the information contained in a NOTAM is relevant for users only at certain periods within the overall 'in force' period, i.e. between the dates and times given in Items B) and C). In these cases, Item D) will detail the actual periods of activation with the exception referred to in paragraph 2.3.18.20.

2.3.18.2 The start of the first activity in Item D) shall always correspond to the Item B) date and time. This period shall always appear as the first entry in Item D) – see paragraph 2.3.21 Examples.

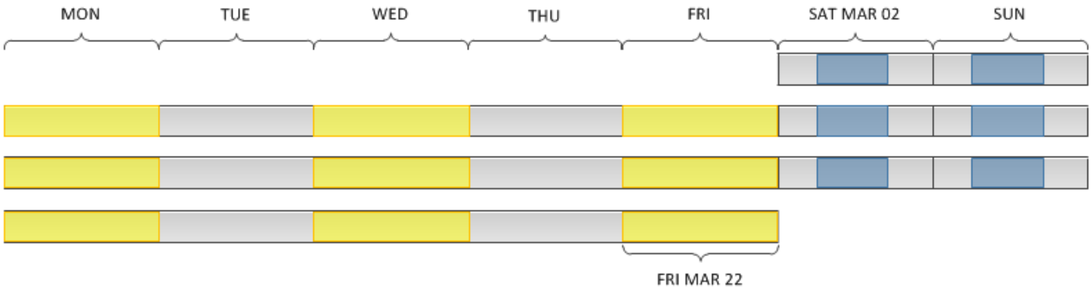
2.3.18.3 If the NOTAM is issued during an activity period that is defined by days of the week and that will be repeated, then the first day given in Item D) may not equate literally to the date in Item B).

In the illustration below, Item D) is the same, but Item B) and C) differ:

```
B) 1303040000 C) 1303241700

D) MON WED FRI H24, SAT SUN 0600-1700
```



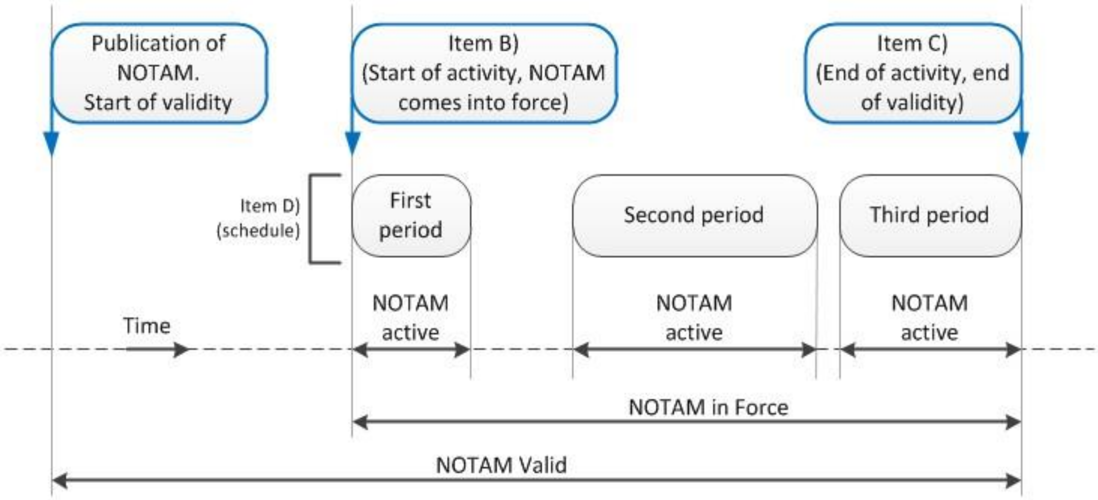

```
B) 1303020600 C) 1303222359
D) MON WED FRI H24, SAT SUN 0600-1700
```



2.3.18.4 The end of the latest activity period notified in Item D) shall always correspond to the end of the validity of the NOTAM given in Item C). Note that this period may not always be listed as the final entry in Item D) – see paragraph 2.3.21 Examples.

2.3.18.5 Syntaxes or rules referring to a date also apply to days of the week.

2.3.18.6 The following diagram illustrates the relationship between the time-related expressions used in the OPADD:



2.3.18.7 Automated processing (and to a certain extent manual processing) thus allows exclusion of a NOTAM from PIB whenever it is inactive between the dates and times given in Items B) and C).

2.3.18.8 Item D) shall be structured according to the following rules. These provide clear and unambiguous standard expressions allowing automated processing for Pre-flight Information Bulletin production, while maintaining a good and clear readability in manual environments.

2.3.18.9 A time indication shall be inserted for each period of activity. When the activity covers a full day, H24 shall be inserted after the date(s).

2.3.18.10 A date shall appear only once (refer to paragraph 2.3.21.1 Example 14).

2.3.18.11 When the activity covers more than 24 hours, the following syntax is recommended:
(start date) (start time)-(end date) (end time)

2.3.18.12 When the activity covers less than 24 hours on particular days, the following syntax is recommended:
(date) (start time)-(end time)

2.3.18.13 When the activity is a succession of identical periods of less than 24 hours on consecutive days, the following syntax is recommended:
(start date)-(end date) (start time)-(end time)

2.3.18.14 When entering a succession of activities that span midnight UTC, the following syntaxes are recommended:

a) (start date) (start time)–2359 (end date) 0000-(end time)

b) (start date) (start time)-(end time)

Note that the end date in b) above is omitted from Item D) but that it will appear in Item C). Dates are always in relation to the starting times of the period(s).

2.3.18.15 When the activity spans midnight UTC on successive days, the following syntaxes are recommended:

a) (start date first period) (start time)–2359, (start date next period(s))-(end date next period(s) 0000-(end time) (start time)-2359, (start date last period) 0000-(end time)

b) (start date)-(start date of last period) (start time)-(end time)

Note that the period end dates in b) above are omitted from Item D) but that the last one will appear in Item C).

2.3.18.16 Item D) shall contain either days of the week (MON, TUE,...) or dates (01 02 03...). When days are used, dates may follow the expression 'EXC'.

Example: D) MON-FRI 0600-1700 EXC DEC 05

2.3.18.17 If all periods of activity start in the same month, it is not necessary to include the name of the month in Item D).

2.3.18.18 Item D) shall not exceed 200 characters. If it exceeds 200 characters, additional NOTAM shall be issued.

2.3.18.19 The maximum time period between two consecutive activity periods shall not exceed 7 days. If the time gap between consecutive activity periods is
8 days or more, additional NOTAM shall be issued.

2.3.18.20 When a NOTAM is issued to notify a change to previously published operating or activity hours, the time range indicated by Items B) and C) shall, if necessary, combine the new and previous periods to encompass the widest time period. The new schedule shall be presented in Item E) and not in Item D).

Example 1: Operating hours of ATC are changed from **1000-2000** to 1200-1900:

```
B) YYMMDD1000
C) YYMMDD2000
E) OPERATION HOURS OF ATC CHANGED TO 1200-
   1900
```

Example 2: Operating hours of ATC are changed from **1000**-1800 to 1200-**1900**:

```
B) YYMMDD1000
C) YYMMDD1900
E) OPERATION HOURS OF ATC CHANGED TO 1200-
   1900
```

Example 3: Operating hours of ATC are changed from 1000-1800 to **0800**-**1900**:

```
B) YYMMDD0800
C) YYMMDD1900
E) OPERATION HOURS OF ATC CHANGED TO 0800-
   1900
```

2.3.19 Item D) – Day/Time Schedule – Abbreviations and symbols used

2.3.19.1 Abbreviations and punctuation when used in Item D) shall be applied as described in the following paragraphs.

2.3.19.2 Abbreviations for Dates and Times:

Year: The year shall not be inserted in Item D), as it is stated in Items B) and C).

When the planned time schedule goes from one year into another, the displayed data shall remain in chronological order; i.e. December of this year shall precede January of next year.

Months: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Dates: 01 02 03 .... 29 30 31

Days: MON TUE WED THU FRI SAT SUN

Times: Written as 4 digits (e.g.: 1030)

2.3.19.3 Abbreviations for Time Periods and associated text:

'EXC' for designating a full day or a series of full days when the NOTAM is NOT active.

Note: Full day exceptions are not allowed for timeframes spanning midnight. Using 'recurrent' exceptions such as 'except every Monday' or 'except Saturdays and Sundays' shall be avoided.

'DAILY' is optional, but recommended for activities applied every day from Item B) to Item C) inclusive. The expression 'nightly' shall not be used.

'EVERY' for a schedule on fixed days.

'H24' for the period 0000-2359 on the day/dates concerned. Not to be used as a single entry.

'SR' and/or 'SS' if appropriate to indicate Sunrise or Sunset.

2.3.19.4 Punctuation:

' , ' (comma) for separation of the schedule elements:

- groups of dates or days to which the same time periods apply.

- groups of time periods that all apply to the preceding and qualifying dates or days.

(refer to paragraph 2.3.19.5 for the recommended syntax and paragraph 2.3.21.1 for clarification).

The use of the comma for enumeration is not allowed.

‘ - ’ (hyphen) means ‘TO’ or ‘FROM-TO’

Note: *‘/’* (oblique) shall not be used in Item D).

2.3.19.5 The use of the commas in Item D) is recommended as it helps both human and system readability. If used, a comma shall be placed, always and only, after a time schedule and only if the latter is immediately followed by a date.

The following syntaxes are recommended. They are followed by examples (where dates could be presented as days of the week, two examples are given):

a) Separation of groups of dates to which the same time periods apply: (start date) (start time)-(end date) (end time)**,** (start date) (start time)-(end date) (end time)

Example: `D) 04 1000-06 1200, 08 1200-10 0700`

(date) (date) (date) (start time)-(end time)**,** (date) (date) (date) (start time)- (end time)

Example: `D) 12 14 15 0900-1300, 17 18 21 0800-2000`

Example: `D) MON WED THU 0900-1300, TUE FRI SAT 0900-2000`

(start date)-(end date) (start time)-(end time)**,** (start date)-(end date) (start time)-(end time)

Example: `D) 13-18 0700-1000, 21-28 0800-1000`

b) Separation of groups of time periods that all apply to the preceding and qualifying dates:

(date) (start time)-(end time) (start time)-(end time)**,** (date) (start time)-(end time) (start time)-(end time)

Example: `D) 11 1000-1130 1230-1800, 14 0700-0800 1030-1145`

Example: `D) MON 0900-1300 1400-1430, TUE 0900-1000 1245-1400`

(start date)-(end date) (start time)-(end time) (start time)-(end time)**,** (date) (start time)-(end time) (start time)-(end time)

Example: `D) 23-26 1000-1130 1230-1800, 27 0730-0800 1200-1300`

Example: `D) MON-FRI 0800-1100 1230-1300, SAT 1000-1100 1230-1300`

(date) (date) (date) (start time)-(end time) (start time)-(end time)**,** (date) (date) (date) (date) (start time)-(end time) (start time)-(end time)

Example: `D) 04 09 13 0900-1300 1400-1430, 07 10 14 16 0700-0800 1030-1145`

Example: `D) MON TUE FRI 0900-1300 1400-1430, WED THU SAT SUN 1000-1100 1230-1300`

c) Combinations regarding separation of several different time frames within different time periods:

(start date) (start time)-(end date) (end time)**,** (date) (date) (start time)-(end time) (start time)-(end time)**,** (start date)-(end date) (start time)-(end time)

Example: `D) 06 0500-09 2000, 11 14 0930-1100 1600-2300, 21-25 0300-0430`

Example: `D) MON 0800-WED 1100, THU FRI 1000-1130 1230-1800, SAT-SUN 1000-1100`

2.3.20 Item D) – Day/Time Schedule – Special cases

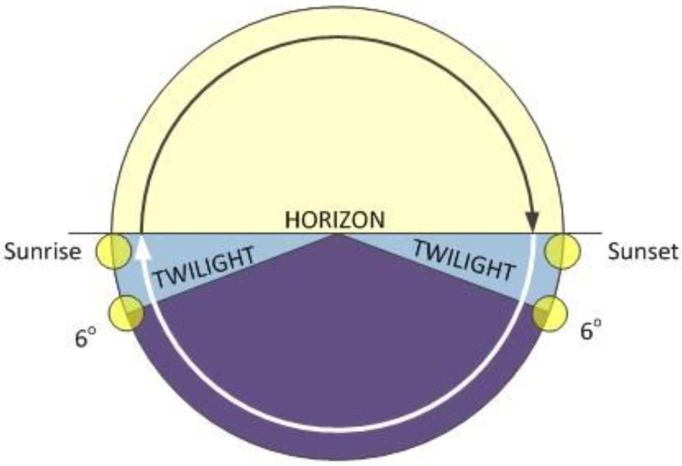
2.3.20.1 Sunrise (SR) and Sunset (SS): If the active time of a NOTAM corresponds to sunrise or sunset, the actual times of sunrise on the first day of validity and of sunset on the last day of validity should be inserted in Items B) and C) respectively.

Example: `B) 1405151920    C) 1405200437     D) SS-SR`

2.3.20.2 Twilight Periods: The keywords for expressing the beginning and end of twilight periods, are 'SR MINUS**mm' and 'SS PLUS**mm' (** mm= number of minutes up to a maximum of 99). There shall be a blank space after 'SR' and 'SS' and the number of minutes shall be inserted immediately after 'MINUS' or 'PLUS'.

Example:

`B) 1405110413 C) 1405211701 D) SR MINUS30-SS PLUS30`



2.3.20.3 Processing of SR and SS formats: Due to the daily variation of SR and SS times, it may not be possible to automatically interpret the special formats as actual times for PIB output. If this is the case, the NOTAM will be displayed in the PIB for the whole day concerned.

2.3.20.4 Legal or public holidays: The dates must be stated explicitly due to differences existing between States.

2.3.20.5 Long or complicated schedules: These should not be given in a structured Item D). Such schedules should be 'split' and separate NOTAM should be issued.

2.3.21 Item D) – Day/Time Schedule – Examples

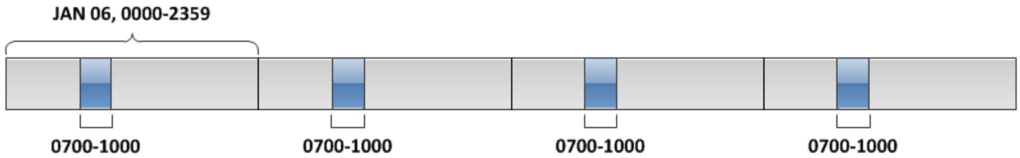
2.3.21.1 The following examples pre-suppose a correct calendar and the application of the rule that the start of the first activity in Item D) coincides with the Item B) date and time, and the end of the last activity with that in Item C). Therefore, Items B) and C) (i.e. the defined time periods) are not shown in the examples unless required for clarification.

Example 1: **Repetitive event active every day:**

D) 0700-1000

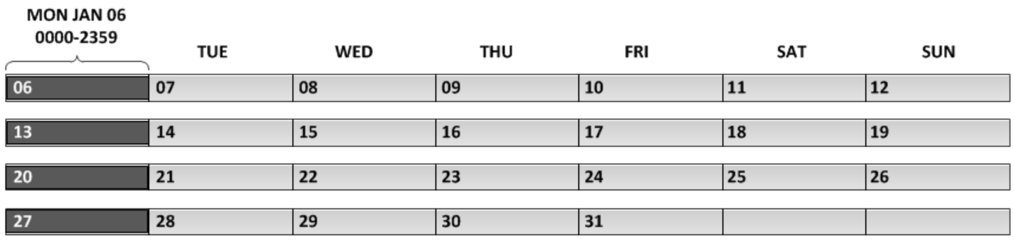
or

D) DAILY 0700-1000



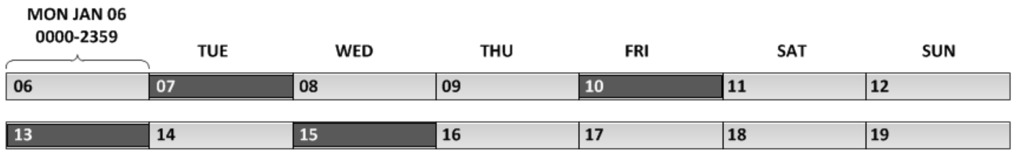
Example 2: **Repetitive event active on a certain weekday:**

B) 1401060000 C) 1401272359
D) EVERY MON H24



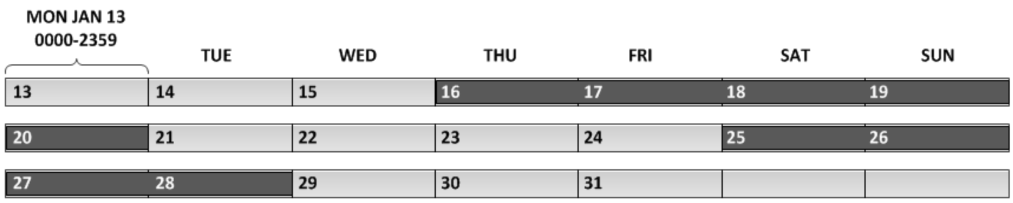
Example 3: **Activity only on specific days within the period**:

B) 1401070000 C) 1401152359
D) 07 10 13 15 H24



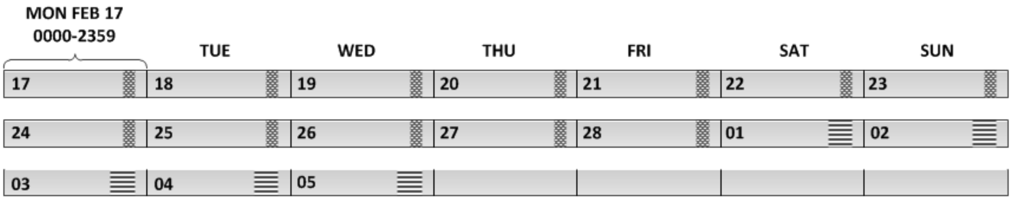
Example 4: **Various day-periods explained by FROM-TO:**

D) 16-20 25-28 H24

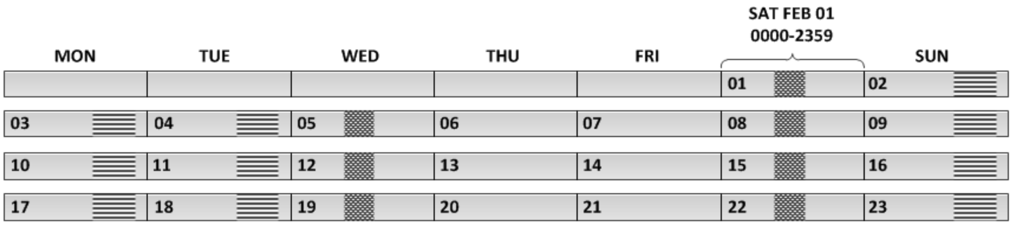


Example 5: **Combination of day-periods and time-periods:**

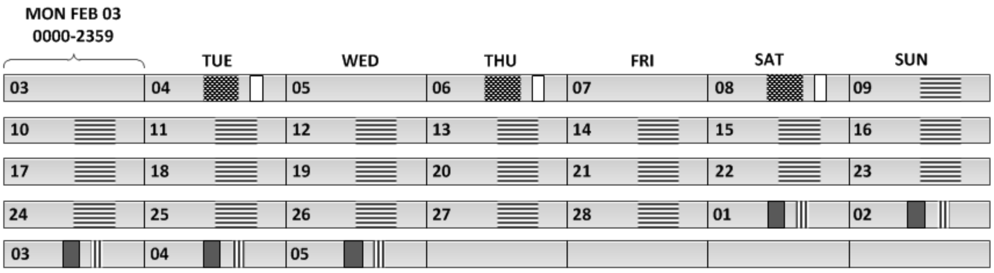
```
D) FEB 17-28 2000-2200, MAR 01-05 1800-2200
```




```
D) WED SAT 0900-1400, SUN-TUE 1500-2200
```




```
D) FEB 04 06 08 1000-1600 1800-2000, 09-28
1200-1900, MAR 01-05 1000-1300 1500-1700
```



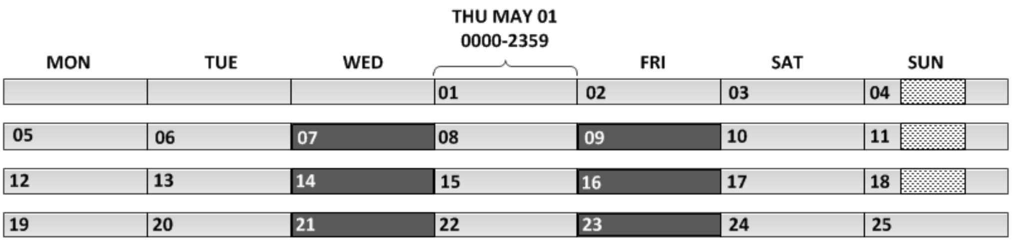
Example 6: **Combination of whole day-periods (H24) with part day- periods:**

Activity H24 on WED and FRI, and from 0600 to 1700 on SUN:

```
B) 1405040600 C)1405232359
D) SUN 0600-1700, WED FRI H24
```

or

```
D) 04 11 18 0600-1700, 07 09 14 16 21 23 H24
```



Example 7: **Day-period and time-period with specific exceptions**:

```
B) 1409060700 C) 1410261800
D) SAT-SUN 0700-1800 EXC SEP 20 OCT 05
```

September 14						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October 14						
Mo	Tu	We	Th	Fr	Sa	Su
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Day period and time-period with specific exception when alternative times apply on the exception date:

NOTAM 1:

```
B) 1409010300 C) 1409261200
D) MON-FRI 0300-1200 EXC 11
```

September 14						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

NOTAM 2:

```
B) 1409111400 C) 1409111600
```

September 14						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Avoid using “recurrent” exceptions such as “except every Monday” or “except Saturdays and Sundays”

```
B) 1409020600 C) 1409301600
```

D) TUE-SUN 0600-1600

Instead of:
D) 0600-1600 EXC EVERY MON

September 14						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

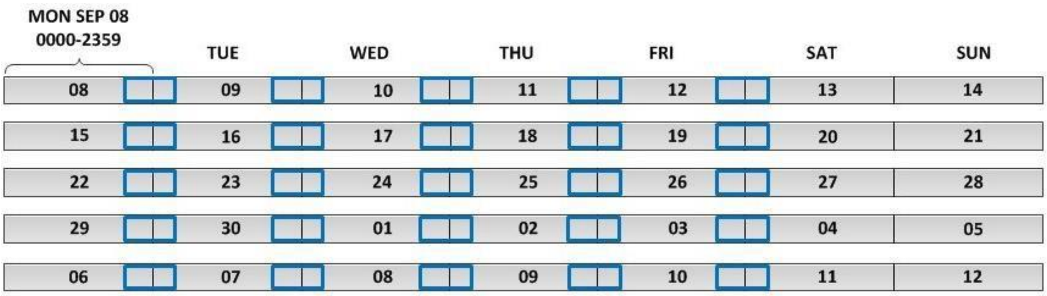
Exceptions with periods spanning midnight:

B) 1409081800 C) 1410110700
D) MON 1800-2359, TUE-FRI 0000-0700 1800-2359, SAT 0000-0700

or

B) 1409081800 C) 1410110700

D) MON-FRI 1800-0700

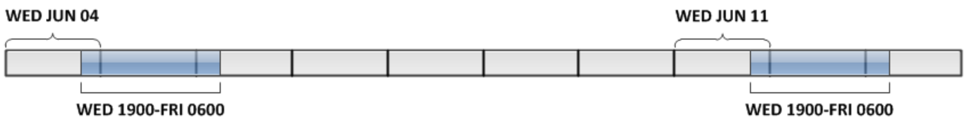


<u>Example 8</u>: Activity from WED 1900 to FRI 0600, during two consecutive weeks.

B) 1406041900 C) 1406130600
D) WED 1900-FRI 0600

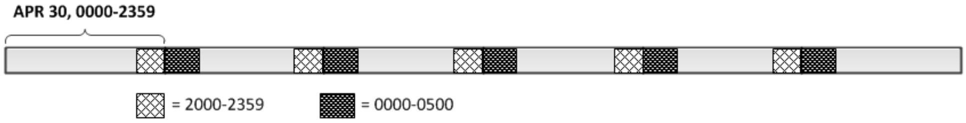
or

D) 04 1900-06 0600, 11 1900-13 0600



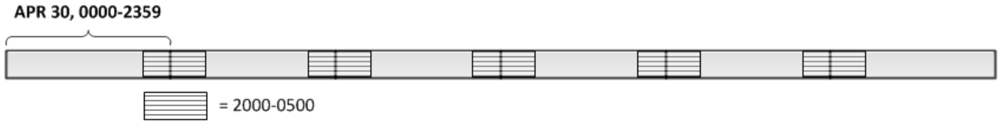
Example 9: The activity takes place every day between 2000 and 0500. The periods start on April 30 at 2000 and ends on May 05 at 0500:

```
B) 1404302000 C) 1405050500
D) APR  30 2000-2359,  MAY  01-04  0000-0500
2000-2359, 05 0000-0500
```



or

```
D) DAILY 2000-0500
```



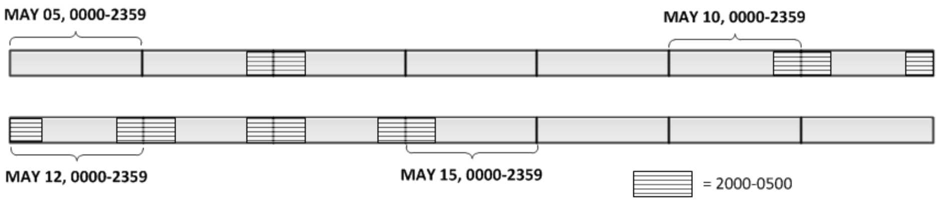
Instead of:
D) APR 30-MAY 04 2000-0500

Example 10: a) First period of activity starts on May 06 at 2000 and ends on May 07 at 0500 and a series of subsequent 2000-0500 periods start on May 10 at 2000 and ends on May 15 at 0500:

```
B) 1405062000 C) 1405150500
D) 06 2000-2359, 07 0000-0500, 10 2000-2359,
11-14 0000-0500 2000-2359, 15 0000-0500
```

or

```
B) 1405062000 C) 1405150500

D) 06 10-14 2000-0500
```



b) A series of 2300-0500 periods' starts on May 06 at 2300 and ends on May 10 at 0500 and the final period starts on May 10 at 2200 and ends on May 11 at 0600:

```
B) 1405062300          C) 1405110600
D) 06 2300-2359, 07-09 0000-0500 2300-
2359,
10 0000-0500 2200-2359, 11 0000-0600
```

or

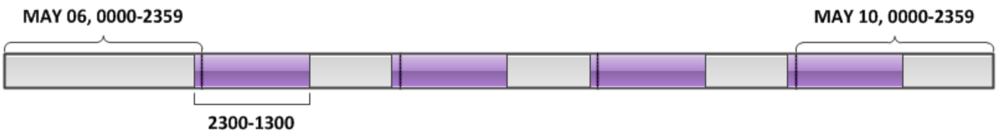
```
B) 1405062300          C)1405110600
D) 06-09 2300-0500, 10 2200-0600
```

Example 11: If the more descriptive schedule is used, the periods of activity may have to be split into several NOTAM:

```
B) 1405062300 C) 1405101300
D) 06-09 2300-1300
```

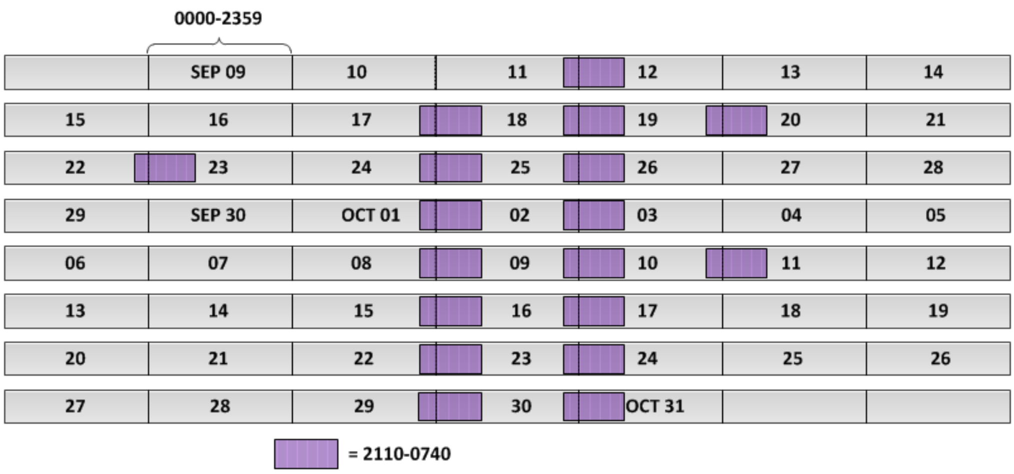
or

```
B) 1405062300 C) 1405101300
D) 06 2300-2359, 07-09 0000-1300 2300-2359
10 0000-1300
```



and

```
B) 1409112110 C) 1410310740
D) SEP 11 17-19 22 24 25 OCT 01 02 08-10 15
16 22 23 29 30 2110-0740
```



or

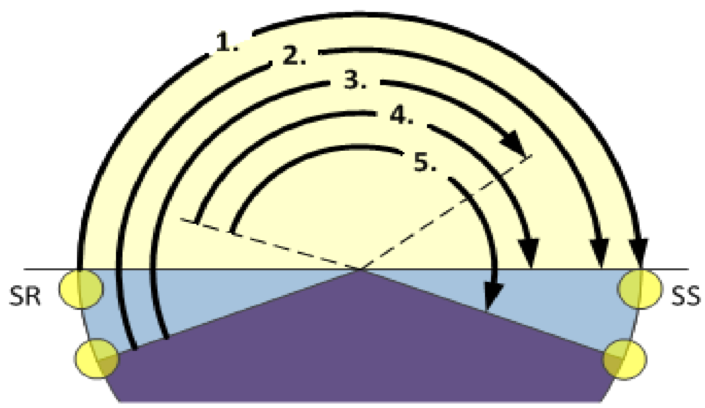
```
NOTAM 1:
B) 1409112110 C) 1409242359
D) 11 2110-2359, 12 0000-0740, 17 2110-2359,
18-19 0000-0740 2110-2359, 20 0000-0740, 22
2110-2359, 23 0000-0740, 24 2110-2359

NOTAM 2:

B) 1409250000 C) 1410110740
D)SEP 25 0000-0740 2110-2359, 26 0000-0740, OCT 01
2110-2359, 02 0000-0740 2110-2359, 03
0000-0740, 08 2110-2359, 09-10 0000-0740
2110-2359, 11 0000-0740

NOTAM 3:
B) 1410152110 C) 1410310740
D)15 2110-2359, 16 0000-0740 2110-2359, 17
0000-0740, 22 2110-2359, 23 0000-0740 2110-
2359, 24 0000-0740, 29 2110-2359, 30 0000-
0740 2110-2359, 31 0000-0740
```

Instead of:

```
D) SEP 11 17-19 22 24 25 OCT 01 02 08-10 15
16 22 23 29 30 2110-2359, SEP 12 18-20 23 25
26 OCT 02 03 09-11 16 17 23 24 30 31 0000-
0740
```

Example 12: Activity relative to Sunrise and/or Sunset:

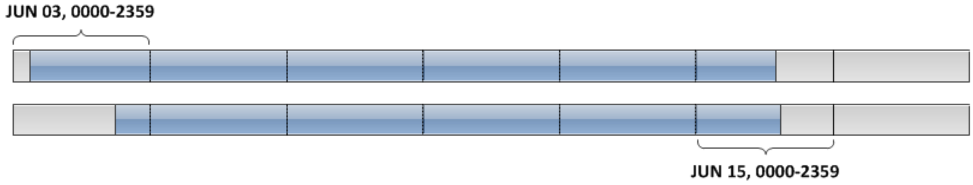
```
1: D) SR-SS
2: D) SR MINUS30-SS
3: D) SR MINUS30-1500
4: D) 0800-SS
5: D) 0800-SS PLUS30
```



Example 13: Periods of activity longer than 24 hours:

```
B) 1406030300 C) 1406151450
D) 03 0300-08 1400, 10 1800-15 1450
```

This Item D) indicates two periods of continuous activity: the first starting on the 3rd at 0300 and ending on the 8th at 1400; the second from the 10th at 1800 to the 15th at 1450.



Example 14 Repetitions of a date are not allowed to avoid that any activities following later for the same date are overlooked:

```
B) 1405050800 C) 1405231500
D) 05-08 0800-1100, 09 10 0800-1100 1300
1500, 11-20 1330-1500, 21-23 0800-1100 1330-
1500
```

Instead of:
D) 05-10 0800-1100, 11-20 1330-1500, 21-23 0800-1100 1330-1500, 09 10 1300-1500

2.3.22 Item E) – NOTAM Text

2.3.22.1 Item E) is free text in plain language and shall not contain NOTAM Code.

2.3.22.2 In NOTAM intended for international distribution the plain language text shall be in English. For the creation of the plain language text, the decoded standard expressions contained in the NOTAM Selection Criteria shall preferably be used.

Examples:

```
E) ILS RWY 14 U/S.
E) ILS RWY 14, DME PART U/S.
E) DVOR/DME ZUE 112.650MHZ/CH75X U/S.
E) NDB MUR 310.5KHZ FREQ CHANGED TO 312KHZ. E) RWY
10/28 CLSD.
E) RWY 07L/25R CLSD.
E) TWY A, B AND T CLSD. E) ALS
RWY 10 U/S.
E) EDGE LGT RWY 10/28 U/S. E) CL
LGT TWY A U/S.
E) DME CVA CH57Y U/S.
```

When one part of a collocated Navigation Aid is unserviceable, use the following:

```
E) DVOR/DME ZUE 112.650MHZ/CH75X, DME PART U/S. E)
TACAN BNK CH47X U/S.
```

2.3.22.3 Item E) text should be kept as short and concise as possible and compiled in such a way that its meaning is clear without the need to refer to another document.

Example 1:

```
….. C) PERM
E) MILAN LINATE CTR. SPECIAL VFR HEL OPS MET MINIMA
REQUIREMENTS CHANGED: SPECIAL VFR HEL OPS ACCEPTED IF GND
VIS IS NOT LESS THAN 3KM. REF AIP ENR 2.1.2.23-2
ITEM 7.3.
```

Note: Reference to AIP as NOTAM is of permanent character.

Instead of:
E) REF AIP ENR 1-1-4.3 ITEM 6.3. MILAN CTR. CANCEL THE REMARK.

Example 2:

```
….. C) PERM
E) CARRIAGE OF 8.33 CHANNEL SPACING RDO EQPT MANDATORY FOR
ACFT OPR ABV FL195. REF AIP GEN 1.5-1 ITEM 3.
```

Instead of:
E) PLEASE MAKE HAND AMENDMENT IN AIP ON PAGE GEN 1.5-1 ITEM 3. RADIO EQUIPMENT REQUIREMENTS. DELETE: 'AND FURTHER TO THE EUROCONTROL DELAY DECISION AGREED ON 23 JUL 98' AND AMEND TO READ: 'CHAPTER 4.0 ON AIR-GROUND COMMUNICATIONS AND IN-FLIGHT REPORTING' DELETE: 'AS OF 7 OCT 99 FOR AIRCRAFT OPERATING ABOVE FL245' AND AMEND TO READ: 'AS OF 15 MAR 07 FOR AIRCRAFT OPERATING ABOVE FL195'

LAST PARAGRAPH CHANGE, DELETE: 'FL245' AND AMEND TO READ: 'FL195'.

Example 3:

….. C) PERM
E) MISSED APCH **PROC** FOR **RWY 34 LOCALIZER** AND **ILS** APCH **CHANGED** AS FOLLOWS: CLIMB STRAIGHT AHEAD. INITIAL CLIMB TO 5000FT AMSL. AT DME 5.5 IZS PAST THE STATION TURN LEFT. CONTINUE CLIMB TO 7000FT AMSL. INTERCEPT RDL 261 FROM ZUE. PROCEED TO GIPOL. REF AIP AD LSZH 2.24.10.9-1 AND 2.24.10-1.

Instead of:
….. C) PERM
E) REF AIP PAGE LSZH AD 2-24.10.9-1 AND 2-24.10.10-1. MISSED APPROACH TO READ AS FOLLOWS: CLIMB STRAIGHT AHEAD. INITIAL CLIMB TO 5000FT. AT D5.5 IZS PAST THE STATION TURN LEFT. CONTINUE CLIMB TO 7000FT. INTERCEPT R261 FROM ZUE. PROCEED TO GIPOL

2.3.22.4 Publishing NOF should endeavour not to exceed 300 characters; whilst ensuring that all essential information needed for the safe conduct of flight is included.

2.3.22.5 Consider avoiding unnecessary information such as rationale, background information and other text additions with no direct impact on aircraft operations or not containing any flight restrictions or other clear limitation.

Example:

E) ACFT STANDS 25 TO 30 AND 37 TO 40 CLSD.

Instead of:
E) USE CAUTION WHEN TAXIING DUE TO WIP BEHIND ACFT STANDS 37 AND 40 AND FM 30M EAST OF TWY E TO STAND 20. WIP ALSO BTN ACFT STANDS 25 AND EAST OF STAND 27 ON APRON 1. APRON 2 NOT AFFECTED. ACFT STANDS 25 TO 30 AND 37 TO 40 CLSD AS CONSEQUENCE

2.3.22.6 The essentials of the information (i.e. translated and amplified NOTAM code Subject and Condition) shall be given in the beginning of the Item E).

Example:

E) ACFT STANDS 25 TO 30 AND 37 TO 40 CLSD DUE TO WIP ON APRON 1.

Instead of:

E) DUE TO WIP ON APRON 1, ACFT STANDS 25 TO 30 AND 37 TO 40 CLSD.

2.3.22.7 Insert the type of equipment instead of the name of the equipment or manufacturer.

Example:

E) ANEMOMETER U/S.

Instead of:
E) VAISALA U/S.

2.3.22.8 Item E) text shall be related to one NOTAM subject only. (Except in case of a Trigger NOTAM, ref paragraph 2.7.2.10 - 2.7.2.12).

Example 1:

NOTAM 1: `E) PJE WILL TAKE PLACE ….`

NOTAM 2: `E) AWY G5 MINIMUM USABLE FL RAISED TO FL070.`

Instead of:
E) PJE WILL TAKE PLACE WITHIN RADIUS 5KM CENTRED AT 4608N 00751E (HUTTWIL). AWY G5 MINIMUM USABLE FL RAISED TO FL070.

Example 2: NOTAM

1:

```
….. C) PERM
E) MINIMUM SECTOR ALTITUDE SW SECTOR RAISED TO 1700FT
AMSL. REF AIP AD 2-9.
```

NOTAM 2:

```
….. C) PERM
E) DECLARED DIST RWY 09 CHANGED: TORA
2450M
TODA 2450M ASDA
2450M
TKOF FROM INTERSECTION WITH TWY C. REF
AIP AD 2-13.
```

Note: Reference to AIP as the NOTAM is of permanent character.

Instead of:
….. C) PERM
E) MINIMUM SECTOR ALTITUDE SW SECTOR RAISED TO 1700FT AMSL
PLS ADD IN AIP XXXXXXXX, ON PAGE ZZZZ AD 2-9, ITEM
ZZZZ AD 2.13(TABLE FOR DECLARED DISTANCES) A NEW ROW
WITH FLW DATA:
COLUMN 1- RWY 09
COLUMN 2- TORA(M) 2450
COLUMN 3- TODA(M) 2450
COLUMN 4- ASDA(M) 2450
REMARKS: TAKE-OFF FROM INTERSECTION WITH TWY C

2.3.22.9 Item E) may contain ICAO abbreviations (Doc 8400, Ref. [3]). For abbreviations used for directions and units of measurements (e.g. N, SE, FT, GND, AMSL, NM, DEG etc.), there shall be no blank between the value and the unit of measurement (e.g. 3000FT). A reference datum shall be separated from the unit of measurement by a blank (e.g. 3000FT AMSL). No other character (e.g. '/', '-'...) shall be used.

Non-common abbreviations and those abbreviations listed at GEN 2.2 in AIP but marked as 'not included in Doc 8400' shall not be used in item E).

The NOTAM users' understanding of the text in Item E) shall always be considered, by which inclusion of rarely used abbreviations shall be avoided or the use of abbreviation that is likely to result in confusion/queries, e.g. 'CW' and 'CCW' for 'clockwise' and 'counter- clockwise'. In these cases, spelled out text in Item E) is preferred.

Examples:

`E) ILS RWY 25R U/S.`

E) CRANE PSN 500545.12N 0141556.19E ERECTED 190M S OF RWY 13/31 AXIS, 1300M BEHIND THR RWY 31, MAX ELEV 390.3M, MAX HGT 20.7M AGL.

2.3.22.10 The cardinal points and their combinations shall not be abbreviated when there is an imminent risk of misunderstanding, e.g. in connection with TWY using letters as designators.

Example:

E) TWY A **EAST** OF RWY 10/28 CLSD.

Instead of:
E) TWY A E OF RWY 10/28 CLSD.

2.3.22.11 The coordinates of known subjects shall not be provided.

In the case of relocations, realignments and new installations the location is usually provided by coordinates. For these cases the coordinates shall be indicated in degrees, minutes and, if required, seconds. Degrees shall always be indicated by 2 digits for N/S and 3 digits shall be used for W/E. Minutes and seconds are displayed in 2 digits. If more precision is required, the seconds are followed by a dot and tenth of seconds. The resolution shall be in accordance with the minimum requirements in Annex 15 Appendix 7 *Aeronautical data publication resolution and integrity classification – Latitude and Longitude.*

Examples 1:

P-area outside CTA (resolution 1 min): 4635N 00825E ARP position (resolution 1 sec): 463542N 0082537E

En-route VOR (resolution 1 sec): 463542N 0082537E

Localizer position (resolution 1/10 sec): 463542.3N 0082537.8E

Note: Assure that North/South and East/West coordinate-pair is not separated by the automatic carriage return.

Coordinates shall be converted to degrees, minutes and seconds for the publication in order to prevent misunderstanding.

Example 2:

4635**42N**

Instead of: 4635.7N

2.3.22.12 Areas are described by coordinates. Coordinates are separated by hyphens and may be accompanied by location indicators, navigation aids and geographical indications. Geographical indications may be indicated only as displayed on aeronautical chart.

2.3.22.13 Geographical coordinates for the lateral limits of an area are expressed in accordance with Annex 15 minimum requirements for aeronautical data:

– if inside CTA/CTR, with resolution of 1 second; e.g. 445600N 0200941E

– if outside CTA/CTR, with resolution of 1 minute; e.g. 4456N 02010E

2.3.22.14 If coordinates of an area are published in AIP or AIP SUP, the lateral limits shall not be repeated in Item E), the name of this area should be referred to, instead.

Example:

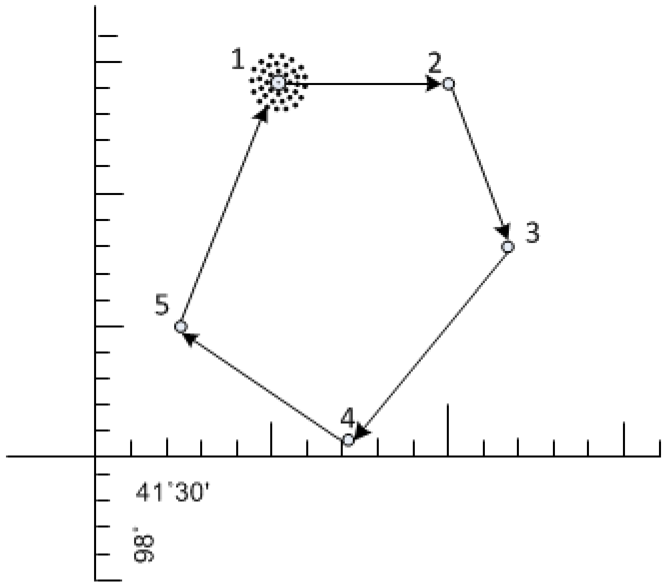
E) DANGER AREA LYD12 ACT.

Instead of:
E) DANGER AREA LYD12 PLACED WITHIN LATERAL LIMITS:
451700N 0201141E - 451600N 0201641E - 451300N 0201941E
- 451400N 0201241E - 451700N 0201141E ACTIVE.

2.3.22.15 If coordinates of an area are not published in AIP or AIP SUP, the lateral limits should be expressed in accordance with the following:

a) Polygon

Points defining lateral limits of an area shall be enumerated in clockwise order, each point separated by a hyphen. The last and the first points of the list shall be the same. Coordinates may be followed, when available, by geographical indications between brackets (see paragraph 2.3.22.9).



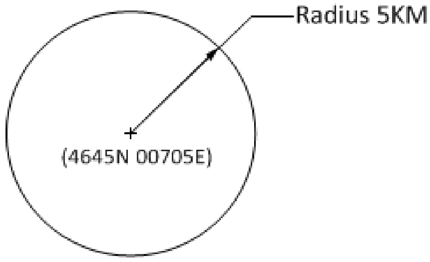
Example:

```
E) AIR DISPLAY WILL TAKE PLACE WITHIN:
414407N 0975500W (NDB JUH) - 414407N 0975000W -
413800N 0974815W (MOUNT HABBS)- 413042N 0975251W -
413458N 0975740W - 414407N 0975500W (NDB JUH).
```

b) Circular shape

A circular shape is defined by the value of the radius and its abbreviated unit of measurement, followed by the word ‘RADIUS’, followed by the words ‘CENTRED ON’, followed by coordinates of the centre of the circle.

The point defining the centre of the circle may be complemented (in brackets) by geographical indications (see paragraph 2.3.22.12).



<u>Example:</u>

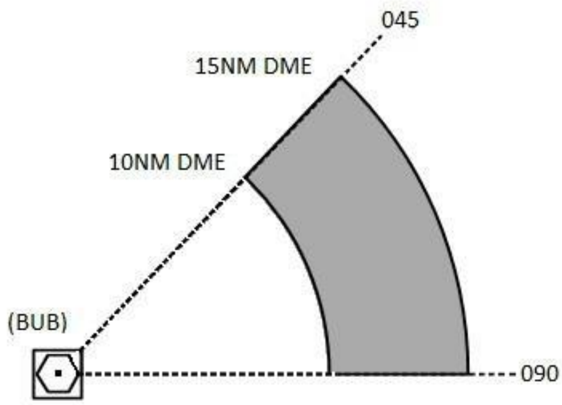
```
E) AIR DISPLAY WILL TAKE PLACE WITHIN:
5KM RADIUS CENTRED ON 4645N 00705E (ECUVILLENS AD).
```

The lateral limits of the affected area can also be defined by the appropriate radial and distance from a navigation aid.

c) Circle Sector

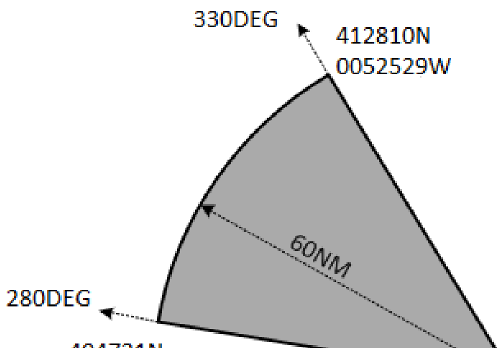
A circle sector is a part of a disc between two specified angular values and between an inner and outer arc of a circle.

<u>Example 1:</u>




```
E) EXERCISE X WILL TAKE PLACE WITHIN A SECTOR DEFINED BY:
505407N 0043217E (BUB VOR/DME) BETWEEN BUB RDL 045
BUB AND RDL 090, INNER ARC 10NM RADIUS OUTER ARC 15NM RADIUS
CLOCKWISE.
```

<u>Example 2:</u>

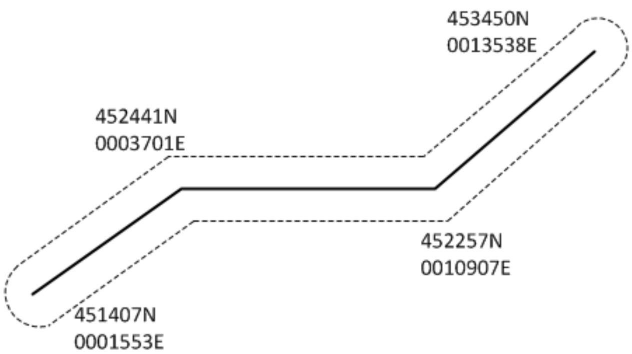


```
E) EXERCISE X WILL TAKE PLACE WITHIN A SECTOR CENTRED
ON 403546N 0044548W BTN BRG 280 AND 330DEG AND ARC 60NM RADIUS
CLOCKWISE.
```

d) Corridor

A corridor is a type of polygon defined by a line between points and a lateral distance on either side of the line. The lateral limits are at the end points connected by arcs of circle.

<u>Example:</u>




```
E) SAR EXERCISE WILL TAKE PLACE WITHIN AREA 5NM EITHER SIDE
OF A LINE: 451407N 0001553E - 452441N 0003701E –
452257N 0010907E - 453450N 0013538E.
```

2.3.22.16 Description of an area by the use of geographical or administrative features, such as State borders, rivers, sea shores etc. is not recommended. If operationally necessary, this can be defined by describing a simplified larger area, and exclude the excessive airspace.

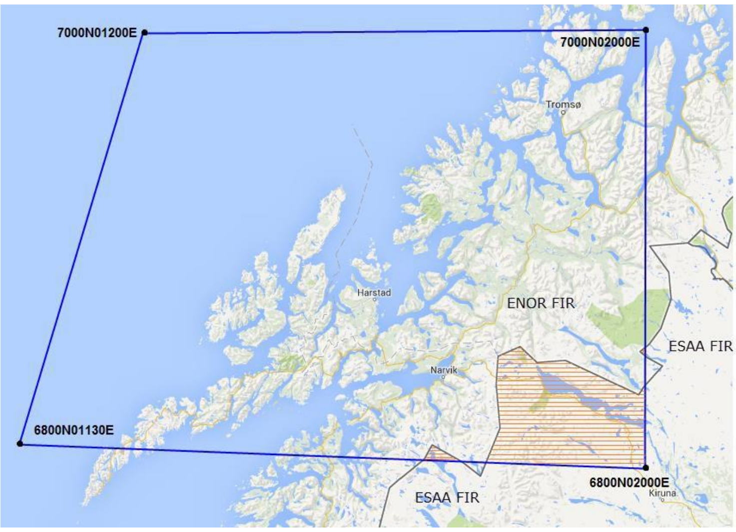
<u>Example 1:</u>

```
E) PJE WILL TAKE PLACE WITHIN:
20KM RADIUS CENTRED ON 460939N 0085243E (LOCARNO)
EXCLUDING CTR LSZL AND CTR LSZA AND FIR LIMM.
```

<u>Example 2:</u>

```
E) TEMPORARY DANGER AREA ESTABLISHED WITHIN:
7000N 01200E - 7000N 02000E - 6800N 02000E -
6800N 01130E - 7000N 01200E EXCLUDING FIR ESAA.
```

Instead of: TEMPORARY DANGER AREA ESTABLISHED WITHIN:
7000N 01200E - 7000N 02000E - 6820N 02000E ALONG NORWEGIAN/ SWEDISH BORDER TO 6800N 1700E - 6800N 01130E - 7000N 01200E.



2.3.22.17 The position of an obstacle or a group of obstacles is indicated by means of a single coordinate, a set of coordinates forming a polygon or line or by a circle radius.

<u>Examples</u>:

```
E) CRANE (CONSTRUCTION):
492623N 0073604E ELEVATION 858FT AMSL (HEIGHT 85FT
AGL). LIGHTED.

E)CRANE LOCATED AT 3.2KM 236DEG GEO ARP LSGP:
462324.1N 0061324.1E ELEVATION 497.6M/1632.5FT AMSL,
(HEIGHT 77.0M/252.7FT AGL). LIGHTED AND MARKED.

E) WIND FARM (72 TURBINES UNDER CONSTRUCTION) WITHIN AREA:
513922N 0025425E - 513733N 0025756E -
513534N 0025244E - 513922N 0025425E. ELEVATION
1000FT AMSL. LIGHTED RED OBST LGT.

E) MOBILE CRANE WITHIN SAFETY ZONE OF AD KLAGENFURT NE OF
THR RWY 01L:
463853N 0141949E - 463853N 0141948E –
463852N 0141951E - 463853N 0141919E.        ELEVATION
1614FT AMSL (HEIGHT 492M AGL). MARKED.

E) CABLEWAY GROEBMING ALONG A LINE:
472642N 0135121E ELEVATION 975M/3198FT AMSL (HEIGHT
102M/335FT AGL) - 472645N 0135037E ELEVATION
1244M/4081FT AMSL (HEIGHT 102M/335FT AGL)-
472714N 0134943E ELEVATION 1551M/5090FT AMSL. OBST
DAY MARKED.
```

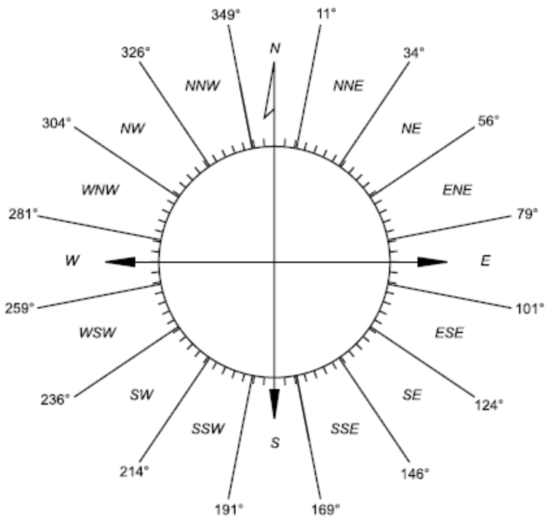
2.3.22.18 In addition to obstacle coordinates (e.g. for visualisation), a descriptive relative location may be inserted, as directional and distance information from a known reference point:

Examples:
- 500FT SOUTH OF TWR.
- 250M 023DEG FM ARP.
- 3.5KM NE OF ARP LSPV.

Guidance for direction information:

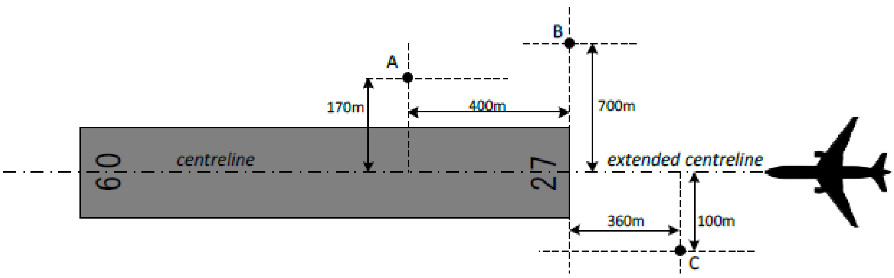
a) indicating the exact number of degrees for direction

b) using terms in accordance with the compass rose, e.g. NORTH- NORTH-EAST (or NNE), used between 11 and 34 degrees.



c) only if the viewing direction is clear for the user, can the terms 'BEYOND', 'BEFORE', 'ABEAM' runway threshold be used. Otherwise indication by compass rose or by degrees should be used.

The graphic below illustrates how to use the terms beyond, before and abeam threshold, when describing the relative location of an obstacle. The location is described in relation to the closest threshold seen from an aircraft on final approach.



Obstacle A: '400M BEYOND THR 27, 170M NORTH OF CENTERLINE.' Obstacle B: 'ABEAM THR 27, 700M NORTH OF CENTERLINE.' Obstacle C '360M BEFORE THR 27, 100M SOUTH OF EXTENDED CENTERLINE.'

2.3.22.19 Whenever an airspace is affected (relevant scopes AE, E, AW and W), the location reference (e.g. aerodrome, identification, area) has to be mentioned in Item E.

2.3.22.20 For airspace organisation subjects, the name of airspace organisation has to be present whenever it is intended also as En-route NOTAM (scope E and AE).

Examples:

```
E) TMA 14 ZURICH DEACTIVATED.

E) CTR 12 ZURICH ACTIVATED.

E) APP GENEVA 131.325MHZ HOURS OF SERVICE ARE NOW…

E) AWY G5 CLOSED BTN WIL AND FRI.

E) RNAV RTE N850 CLOSED BTN GERSA AND ODINA.
```

2.3.22.21 GPS RAIM and EGNOS NOTAM and procedures based on GNSS.

Examples for events of GPS and EGNOS signal non-availability predictions:

Q)LSAS/**QGAAU**/I/NBO/A/000/999/4729N00933E005
A)LSZR B) 1401071300 C) 1401071458
E)EGNOS IS NOT AVAILABLE FOR LPV.

Q)LSAS/**QGAAU**/I/NBO/A/000/999/4711N00725E005
A)LSZG B) 1312032116 C) 1312040532
D)03 2116-2122, 04 0329-0338 2112-2118, 05 0325-0333
E)GPS RAIM IS NOT AVAILABLE FOR LNAV

Example of (GNSS) instrument procedures change:

Q)LFMM/**QPIAU**/I/NBO/A/000/999/4345N00425E005
A)LFTW B) 1401010000 C) 1406302359
E)IAP RNAV (GNSS) RWY 36 NOT AVAILABLE WHEN CTA RHONE
3 AND 3.1 ACT.

2.3.22.22 GNSS Radio Frequency Interference (RFI) events notified by NOTAM

Example:

```
Q) EGGX/QGWAU/IV/NBO/E /000/400/5800N01413W186
A) EGGX B) 1411181100 C) 1411181500
E) GPS UNRELIABLE AND MAY BE UNAVAILABLE WITHIN: …
```

The location (area, position) of the event shall be described in accordance with the relevant paragraphs in 2.3.22.

If information is provided on clear situations of interference, insert ‘GPS NOT AVAILABLE’ in Item E) and Q-code QGWAU.

2.3.22.23 Frequencies and channels for navigation aids in Item E) shall display the number of characters as published in States AIP and shall follow ICAO provisions.

Examples:
VHF: `121.025MHZ` (Berne TWR), `124.675MHZ` (Goteborg CTL) UHF: `336.400MHZ` (Laage TWR)
HF: `5598KHZ, 13306KHZ` (Gander RDO)
EMERG: `121.500MHZ` (VHF), `243.000MHZ and 406MHZ` (UHF)
Channels: `38X,        103Y`

2.3.22.24 As entries in Items F) and G) are required only for Navigation Warnings – (NOTAM Codes 'QW' and 'QR') and the 'Lower/Upper' indication in Item Q) is usually not visible in a PIB, inclusion of applicable vertical limits in Item E) shall be considered whenever appropriate, e.g. for changes to the Airspace Organisation (QA subjects).

2.3.22.25 When an e-mail address is included in the Item E) text, the @ symbol shall be represented by the string '(A)'.

2.3.22.26 Item E) should be composed by the Publishing NOF in such a way that it will serve as a direct Pre-flight Information Bulletin entry without requiring additional processing by the receiving Unit.

2.3.22.27 Unclear and/or incomplete NOTAM text shall be avoided.

Example:

```
… C) PERM
E) ULTRALIGHT AREA SAN TEADORA 5048N 09339E COMPLETELY
WITHDRAWN. REF AIP ENR 5.5.3.
```

Instead of:
….. C) PERM
E) WARNING WITHDRAWN REF AIP ENR 4-2-7.3 PARA 6.5.

2.3.22.28 AIP references, in NOTAM other than PERM, should be avoided (paragraph 2.3.22.4 above also refers to this).

Example:

```
E) TACAN ALA CH88X U/S.
```

Instead:
E) TACAN ALA CH88X U/S. REF AIP ENR 4-1.

However, when required, AIP references shall include AIP section/sub-section/paragraph numbers and not the page number(s) alone.

2.3.22.29 Dates in Item E) shall be presented in day-month-year sequence DD MMM YYYY (e.g. for Trigger NOTAM, AIRAC NIL NOTAM) as follows:

DD – to designate a day in a month, two digits shall always be used.

MMM – to designate the month with three-letter abbreviation from ICAO Doc 8400: JAN, FEB … NOV, DEC.

YYYY – to designate the year with four digits: 2013, 2014, 2015 etc.

Example:

E) TRIGGER NOTAM - AIRAC AIP SUP 2/14 WEF **06 MAR 2014** UNTIL 03 APR 2014: ANNEX LY TO ROUTE AVAILABILITY DOCUMENT.

2.3.22.30 Schedule inside Item E) shall be presented in accordance with Item D) rules.

Example:

```
E) ATC OPERATING HOURS CHANGED AS FOLLOWS: 01 03 05
1000-1600 02 04 06-31 0800-2200.
```

2.3.23 Items F) and G) – Lower and Upper limit

2.3.23.1 Lower and Upper limits shall be inserted in Items F) and G) only for Navigation Warnings (NOTAM Codes ‘QW’ and ‘QR’).

2.3.23.2 If entries are required (ref 2.3.23.1), then both Items F) and G) shall always be included.

2.3.23.3 Items F) and G) shall contain an altitude (Above Mean Sea Level – AMSL) or a height (Above Ground or Sea or Surface Level – AGL) expressed in metres or feet, or a Flight Level (always expressed in 3 digits). In addition, SFC and GND shall be used in Item F) to designate surface and ground respectively, UNL shall be used in Item G) to designate unlimited.

2.3.23.4 Reference datum (AGL or SFC or AMSL) and units of measurement (FT or M) shall be clearly indicated.

2.3.23.5 Only a single entry is permitted in each Item, i.e. G) 10000FT (3048M) AGL shall not be used.

2.3.23.6 There shall be no blank between the value and the unit of measurement (e.g. 3000FT). But a reference datum shall be separated from the unit of measurement by a blank (e.g. 3000FT AMSL).

2.3.23.7 Abbreviations FT or M shall be divided from AGL or AMSL by a blank character. No other character (e.g. ‘/’, ‘-‘...) shall be used. The correct annotation is ‘3000FT AMSL’ (i.e. ‘3000FT/AMSL’ shall not be used).

2.3.23.8 Acceptable entries and formats are therefore as follows:

Item F):
SFC
GND
XXXXXFT AGL
XXXXXFT AMSL
XXXXXM AGL
XXXXXM AMSL
FLXXX (see 2.3.23.9)

Item G):
UNL
XXXXXFT AGL
XXXXXFT AMSL
XXXXXM AGL
XXXXXM AMSL
FLXXX (see 2.3.23.9)

2.3.23.9 The Item Q) default FL values 000 and 999 shall not be used in Items F) and G). The abbreviations GND or SFC shall be used in Item F) and UNL in Item G) instead.

2.3.23.10 The values in the qualifiers 'Lower' and 'Upper' of Item Q) must correspond to the flight levels or altitudes specified in Items F) and G). If Items F) and/or G) are expressed as a height, the values specified in the 'Lower' or 'Upper' qualifiers in Item Q) shall indicate the equivalent FL and may therefore require calculation. For detailed conversion procedures see paragraph 2.3.10.

2.3.23.11 Where an event is notified in a form such as 'ACTIVITY UP TO FL040, AFTER ATC APPROVAL UP TO FL080', the higher value (FL80) shall be used in Item G) and the 'Upper' qualifier in Item Q) shall read '080'.

2.3.23.12 Similarly, where the lower limit of activity is variable, the lowest limit shall be used in Items Q) and F).

2.4 Creation of NOTAMR and NOTAMC

2.4.1 General procedures related to NOTAMR and NOTAMC creation

2.4.1.1 NOTAMR and NOTAMC are issued in the same series as the NOTAM to be replaced or cancelled.

2.4.1.2 NOTAMR and NOTAMC respectively replace and cancel only one NOTAMN or NOTAMR.

Example 1: `A0124/14 NOTAMR A0106/14`

Example 2: `A0234/14 NOTAMC A4567/13`

2.4.1.3 NOTAMR and NOTAMC deal with precisely the same subject as the NOTAM to be replaced or cancelled. Therefore the 2nd and 3rd letters of the NOTAM Code in Item Q) shall be the same as those in the NOTAM to be replaced or cancelled.

2.4.1.4 NOTAMR and NOTAMC have the same Item A) contents as the NOTAM to be replaced or cancelled.

2.4.1.5 The date-time group in Item B) of a NOTAMR or NOTAMC shall be the actual date and time that this NOTAMR or NOTAMC is created.

i.e. NOTAMR and NOTAMC shall take effect immediately and no future start of coming into force is permitted. The replaced or cancelled NOTAM cease to be valid from the very moment their replacing NOTAMR or NOTAMC are issued. This is done to assure the correct processing in all systems regardless of their design.

2.4.1.6 One of the following procedures shall be applied instead of issuing a NOTAMR or NOTAMC with Item B) in the future.

2.4.1.7 If the condition described in a NOTAM to be replaced is to remain valid for a period before being changed, then a NOTAMR shall be issued for the period up to the intended date and time of the change provided the NOTAM to be replaced is in force at the time of replacement. This NOTAMR shall immediately replace the existing NOTAM and shall notify the same conditions but with a changed Item C). A NOTAMN detailing the intended change in condition shall then be issued with a future date and time in Item B).

Example:

```
261637 LIIAYNYX
(B1826/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1401150500 C) 1403311100EST
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

On MAR 01 it is known that DTHR will be 200M only from MAR 07 until about APR 15. NOTAM are issued as follows:

```
011035 LIIAYNYX
(B1893/14 NOTAMR B1826/14
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1403011035 C) 1403062359
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)

011035 LIIAYNYX
(B1894/14NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1403070000 C) 1404152359EST
E) THR RWY 14 DISPLACED 200M. DECLARED DIST
CHANGED: ……)
```

If the NOTAM to be replaced is not in force at the time of replacement, 2.4.1.9 applies.

2.4.1.8 If the condition described in a NOTAM to be cancelled is to remain valid for a period before Item C) is reached, then a NOTAMR shall be issued with the new end time in Item C).

Example:

```
261637 LIIAYNYX
(B1826/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1401150500 C) 1403311100EST
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

On MAR 01 it is known that the RWY will be back to normal from MAR 07. NOTAM is issued as follows:

```
011035 LIIAYNYX (B1893/14NOTAMR
B1826/14
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1403011035 C) 1403062359
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

2.4.1.9 If the condition described in a NOTAM to be replaced is a postponement, a correction of Item B), an interruption or a temporary suspension (taking place immediately) of the present situation, then a NOTAMC shall be issued to immediately cancel the NOTAM. This shall be followed by a NOTAMN dealing with the new situation and a new Item B).

Example:

```
(W0280/14 NOTAMN
Q) HECC/QRDCA/IV/BO/W/000/040/3024N03141E003
A) HECC B) 1406111300 C) 1406201500
D) 11-13 1300-1800, 15-20 0800-1500
E) DANGER AREA HED9 ACT. F) GND
G) FL040
```

On JUN 13 at noon D-Area is deactivated immediately and will be active again on Jun 15. NOTAM are issued as follows:

```
131213 HECAYNYX
(W0285/14 NOTAMC W0280/14
Q) HECC/QRDXX/IV/BO/W/000/040/3024N03141E003
A) HECC B) 1406131213
E) DANGER AREA HED9 DEACTIVATED.
```

```
121214 HECAYNYX
(W0286/14 NOTAMN
Q) HECC/QRDCA/IV/BO/W/000/040/3024N03141E003
A) HECC B) 1406150800 C) 1406181600
D) 15-18 0800-1600
E) DANGER AREA HED9 ACT. F) GND
G) FL040
```

2.4.1.10 If the condition described in a NOTAM to be replaced is a temporary suspension or change of the present situation for a certain period in the future, then a NOTAMR shall be issued to immediately replace the NOTAM. This shall be followed by a NOTAMN dealing with the temporary change. NOTAMR to specify the dates/times of activation for the periods the situation is as in the replaced NOTAM and NOTAMN to cover dates/times dealing with the different situation. No NOTAMN is issued for a temporary 'back to normal' situation.

Example for a temporary suspension taking place in the future:

```
261637 LIIAYNYX
(B1826/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1401150500 C) 1403311100EST
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

On FEB 27 it is known that the RWY will be made available for normal operations for the next weekend (MAR 01+02):

Option 1 (Item D) including dates after the suspension):

```
271035 LIIAYNYX
(B1893/14 NOTAMR B1826/14
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1402271035 C) 1403312359
D) FEB 27 1035-2359, FEB 28 MAR 03-31 0000-2359
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

Option 2 (Separate NOTAM for dates after the suspension):

```
271035 LIIAYNYX
(B1893/14 NOTAMR B1826/14
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 142271035 C) 1402282359
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)

271036 LIIAYNYX
(B1894/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1403030000 C) 1403312359EST
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

For Option 2, the second NOTAM should also be issued as soon as possible but may also be done after FEB 27 (latest before Item B).

Depending on how well the situation is known, NOTAMR may deal only with the situation until the change occurs, followed by two NOTAMN; one to cover the period for the changed situation and one for the period afterwards.

Example for a temporary change taking place in the future:

```
261637 LIIAYNYX
(B1826/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1401150500 C) 1403311100EST
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

On FEB27 it is known that the DTHR will be reduced to 150 M for the next weekend (MAR 01+02):

```
Option 1:
271035 LIIAYNYX
(B1893/14 NOTAMR B1826/14
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1402271035 C) 1403312359
D) FEB 27 1035-2359, FEB 28 MAR 03-31 0000-2359
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)

271035 LIIAYNYX
(B1894/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1403010000 C) 1403022359
E) THR RWY 14 DISPLACED 150M. DECLARED DIST
CHANGED: ……)
```

```
Option 2:
271035 LIIAYNYX
(B1893/14 NOTAMR B1826/14
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1402271035 C) 1402282359
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)

271035 LIIAYNYX
(B1894/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1403010000 C) 1403022359
E) THR RWY 14 DISPLACED 150M. DECLARED DIST
CHANGED: ……)

271035 LIIAYNYX
(B1895/14 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B) 1403030000 C) 1403312359EST
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED: ……)
```

2.4.1.11 Any NOTAM which includes an ‘EST’ shall be replaced by NOTAMR or cancelled by NOTAMC before the ‘estimated’ end date specified in Item C).

2.4.1.12 Refer also to the procedures for handling ‘Multipart’ NOTAM in Chapter 6.

2.4.2 Specific Procedures Related to NOTAMR Creation

2.4.2.1 NOTAMR are Replacement NOTAM.

2.4.2.2 NOTAM which are to become invalid before their given End of Validity, or did not have a defined End of Validity (i.e. have ‘EST’ or ‘PERM’ in Item C) may be replaced, provided they are ‘in force’ at the time of replacement.

2.4.3 Specific Procedures Related to NOTAMC Creation

2.4.3.1 NOTAMC are Cancellation NOTAM.

2.4.3.2 NOTAM which are to become invalid before their given End of Validity, or did not have a defined End of Validity (i.e. have ‘EST’ or ‘PERM’ in Item C) may be cancelled at any time.

2.4.3.3 NOTAMC shall be published whenever NOTAM are incorporated in an AIP AMDT (see Chapter 2.6.3).

2.4.3.4 NOTAMC Qualifier ‘NOTAM Code’ shall be as follows:

Subject: 2nd and 3rd letters shall be identical to the original NOTAM (ref paragraph 2.4.1.3).

Condition: permitted 4th and 5th letters are as follows:

Q - - AK = RESUMED NORMAL OPS

Q - - AL = OPERATIVE (or RE-OPERATIVE) SUBJECT PREVIOUS PUBLISHED LIMITATIONS /CONDITION

Q - - AO = OPERATIONAL

Q - - CC = COMPLETED

Q - - CN = CANCELLED

Q - - HV = WORK COMPLETED

Q - - XX = OTHER (Plain Language – ref paragraph 2.4.3.8)

2.4.3.5 The code Q - - AO is intended for NOTAMC and to be used only to inform that the equipment or service is 'now operational', compared to the previous notified status (e.g. 'unserviceable', 'not available') which the NOTAMC is cancelling. The code is not intended to be used to notify about a new equipment or service in a NOTAM. For this purpose code Q - - CS *Installed* shall be used.

2.4.3.6 The code Q - - CN shall be used when cancelling a planned event published by NOTAM, such as navigation warning, planned exercises or work. The code Q - - CN is not intended to be used as a general code for all NOTAMC. To cancel NOTAM events such as closed RWY the use of Q - - AK or Q - - AL is preferred.

2.4.3.7 The code Q - - HV ('work completed') shall be used when cancelling the condition Q - -HW ('work in progress").

2.4.3.8 NOTAMC Qualifiers 'Traffic', 'Purpose', 'Scope', 'Lower/Upper' and 'Coordinates/Radius' shall be identical to the cancelled NOTAM. Maintaining the original qualifiers allows additional use of NOTAMC for the preparation of 'Updates' to Pre-flight Information Bulletins.

2.4.3.9 NOTAMC shall not contain Items C), D), F) and G).

2.4.3.10 For all NOTAMC, the text of the decoded NOTAM Code shall be inserted in Item E) together with details of the NOTAM subject.

Example: NOTAM Code = QNVAK

`Item E) = VOR DKB RESUMED NORMAL OPS.`

2.4.3.11 In order to facilitate work in manual environments, NOTAMC, which are to be followed immediately by a NOTAMN (instead of a NOTAMR), shall contain XX as the 4th and 5th letters of the NOTAM Code and, at the end of the text in Item E), the remark: 'NEW NOTAM TO FOLLOW'.

Example: NOTAM Code = QMRXX

`Item E) = RWY 07L/25R NEW NOTAM TO FOLLOW.`

2.4.3.12 Cancellation of NOTAM solely on the basis of a Checklist is not allowed (ref para **Error! Reference source not found.**).

2.4.3.13 Once the immediate cancellation has been effected, the cancelling NOTAMC ceases to be valid.

2.5 Checklist production

2.5.1 Checklists – General

2.5.1.1 Checklists are issued as a NOTAM in the series that they refer to.

2.5.1.2 A separate Checklist shall be issued for each NOTAM Series.

2.5.1.3 The first Checklist in a new NOTAM series shall be issued as a NOTAMN.

2.5.1.4 Subsequent Checklists shall be issued as NOTAMR, replacing the previous Checklist with immediate effect. Consequently Item B) is the issuing time of the Checklist and supersedes the previous one immediately.

2.5.1.5 Item A) shall contain the FIR, or a list of all FIR, or the location indicator covered by the Checklist. The third and fourth letters ‘XX’ shall not be used.

2.5.1.6 Item C) shall contain the estimated (EST) end of validity, normally not more than one month after the Checklist is issued.

2.5.1.7 Checklists shall contain the numbers of the NOTAM incorporated in a normal AIP AMDT or AIP SUP until the time that these NOTAM are specifically cancelled by the publication of a NOTAMC.

2.5.2 Checklist qualification – Item Q)

2.5.2.1 Qualifier ‘FIR’ shall be either:

- the FIR indicator, or

- the country nationality letters followed by ‘XX’ (or “XXX”) if there is more than one FIR concerned, or

- the country nationality letters of the Publishing NOF followed by ‘XX’ if publishing for FIR in different countries.

2.5.2.2 Qualifier ‘NOTAM Code’ shall be the special dedicated code ‘QKKKK’.

2.5.2.3 Qualifiers ‘Traffic’, ‘Purpose’ and ‘Scope’ shall be given the artificial value ‘K’.

2.5.2.4 Qualifiers ‘Lower’/’Upper’ shall be the default values ‘000/999’.

2.5.2.5 Qualifier ‘Geographical Reference’ shall always contain the geographical co-ordinates of the centre of the FIR(s) listed in Item A), followed by the default radius ‘999’.

<u>Example</u>: `Q) LIXX/QKKKK/K/K/K/000/999/4323N01205E999`

2.5.2.6 Qualifiers ‘QKKKK’ (NOTAM Code) and ‘K’ (‘Traffic’, ‘Purpose’, ‘Scope’) are used to allow selective retrieval of the Checklist. This also prevents the Checklist from appearing in a Pre-flight Information Bulletin.

2.5.3 Checklist format – Item E)

2.5.3.1 Item E) shall be divided into two sections.

2.5.3.2 First section, identified by the keyword ‘CHECKLIST’

a) This contains the list of the valid NOTAM numbers which have been promulgated in the same series as the Checklist, in a specific format. Note that the list shall not contain the number of the replaced NOTAM checklist nor its own NOTAM checklist number.

b) The text in Item E) shall start with the word ‘CHECKLIST’.

c) The numbering of NOTAM is grouped by year (indicated by 4 digits) using the word ‘YEAR’ plus the ‘=’ sign, followed by the year of publication without blanks (e.g. YEAR=1999).

d) Each NOTAM number (always 4 digits) is separated by a blank with no other punctuation mark.

e) Each indicator of a different year shall start on a new line.

f) If no NOTAM number is valid, insert current year and ‘NIL‘ (e.g. YEAR=2014 NIL)

2.5.3.3 Second section, identified by the keywords ‘LATEST PUBLICATIONS’

a) This contains the list of the latest publications issued, in a format suitable for manual processing.

Example:

```
A0512/14 NOTAMR A0001/14
Q) LIXX/QKKKK/K/K/K/000/999/4323N01205E999
A) LIBB LIMM LIRR B) 1402010002 C) 1402282359EST E)
CHECKLIST
YEAR=2011 3308
YEAR=2012 1283 4754 4763 5200 5460 5827 5829 6279
6411 7201
YEAR=2013 0908 1242 1303 1313 1444 1520 1885 2345
2436 2442 2597 2657 2873
YEAR=2014 0004 0005 0331 0332 0333 0334 0444 0445
0451 0452 0453 0454 0455 4915 5128 5194 5204
LATEST PUBLICATIONS AIP
AMDT 1/2014
AIP AIRAC AMDT 1/2014 EFFECTIVE 06 MAR 2014
AIP AIRAC SUP 1/2014 EFFECTIVE 06 MAR 2014
AIC SERIES A2/2014
```

b) Additional possibilities to differentiate between IFR or VFR publications (volumes) can be stated, if so required:

```
AIP AMDT        01/14
AIP SUP         13/13
AIC IFR         08/13
AIP VFR AMDT    01/14
AIP VFR SUP     01/14
AIC VFR         01/13
```

Note: Whenever the numbering of AIP AMDT takes place on a yearly basis, a reference to the year of publication will be added to the number.

2.5.4 Checklist Errors

2.5.4.1 When the publication of the Checklist contains an error, the following procedures will apply.

2.5.4.2 Whenever a valid NOTAM number is omitted from the Checklist:

a) if the omitted NOTAM is in force, a NOTAMR shall be issued replacing the omitted NOTAM with the new number;

b) if the omitted NOTAM is not yet in force, a NOTAMC and NOTAMN shall be issued.

This procedure will allow consistency of the data in the database of all recipients, whatever the method of processing of Checklists.

2.5.4.3 Whenever an invalid NOTAM number is erroneously inserted in the Checklist, a revised Checklist (NOTAMR replacing the erroneous Checklist) shall be published without the invalid NOTAM number (no correct version).

2.6 Publication of Information by NOTAM, AIP Amendment or AIP Supplement

2.6.1 Permanent information shall not be distributed by means of a NOTAM only. This information shall be incorporated in an AIP Amendment.

2.6.2 Publication of permanent information by NOTAM

2.6.2.1 When the urgency of publication of an Amendment to the AIP is such that the 'normal' AIRAC or Non-AIRAC Amendment publication is considered to be unsuitable, the responsible NOF issues a NOTAM 'PERM' according to the following rules.

2.6.2.2 Item Q) shall be completed according to the NOTAM Selection Criteria.

2.6.2.3 Item B) of the NOTAM shall contain the effective date of the change.

2.6.2.4 Item C) of the NOTAM shall contain the term 'PERM' to indicate that the change itself is of a permanent nature. Note that Item C) shall never include the expected publication date or the effective date of the Amendment.

2.6.2.5 Item E) shall contain the operational changes as for normal NOTAM. Special care shall be taken to assure that the phrasing is clear without AIP consultation. For the benefit of users specifically interested in NOTAM that will later be transferred to the AIP, a reference to the AIP is added at the end of Item E).

AIP references shall include AIP section/sub-section/paragraph numbers, not the page number(s) alone.

For examples refer to paragraphs 2.3.22.3, 2.3.22.8 example 2, 2.3.22.27 and 2.3.22.28.

2.6.2.6 In cases where a NOTAM is issued to correct a mistake in an AIP AMDT, Item E) shall provide a reminder of the operational content of the AMDT and not only of the mistake.

Example text shall read correctly:

```
E) RWY 08/26 EXTENSION, AIRAC AIP AMDT 10/08 PART AD: EGNX
2-12 RWY 08 READ 1850M INSTEAD OF 1805M.
```

Instead of:
'E) AIRAC AIP AMDT 10/08 PART AD: EGNX 1-12 RWY 08 READ 1850M INSTEAD OF 1805M'

This allows users to be aware of the subject when reading the PIB and to refer to the AIP AMDT content only if necessary.

2.6.2.7 In cases where a NOTAM is issued to correct a mistake in an AIP AMDT:

- Item B) contains current date and time if the AMDT is already in force.
- In case of a correction to an AMDT not in force yet, Item B) is the effective date of the AMDT.
- Item C) shall be PERM.

2.6.3 Incorporation of NOTAM information in AIP Amendment

2.6.3.1 Permanent information should be incorporated in the AIP within 3 months after NOTAM publication. As re-issuing of NOTAM with the same contents is not permitted, the interim use of an AIP SUP should be considered. (ICAO Doc 8126 Ref. [2] refers).

2.6.3.2 When permanent (PERM) information has been published in a NOTAM, the NOTAM will require cancellation after an appropriate AIP Amendment has been issued to formally amend the AIP (ref paragraph 2.4.3.3).

In this case, the NOF shall issue a NOTAMC which cancels the NOTAM 'PERM', 15 days after the effective date of the AIP Amendment that contains the 'PERM' information.

Note 1: 'Effective date' in this instance can be equal to an AIP Amendment publication date. This broadens the Annex 15 use of this expression which relates currently to AIRAC AIP Amendments only.

Note 2: It is assumed that the AIP Amendments will be available at all receiving units by the time the NOTAMC is sent.

2.6.3.3 The NOTAMC shall contain in Item E) a reference to the AIP Amendment that incorporates the originally published NOTAM.

Example:

```
'INFORMATION INCORPORATED IN AIP AMDT 4/08 WEF 14 APR
2014.'
```

2.6.3.4 The numbers of the NOTAM incorporated in the AIP Amendment shall be published on the cover page of the AIP Amendment.

2.6.3.5 The date on which NOTAMC will be issued to cancel NOTAM incorporated in the AIP Amendment shall be published on the cover page of the AIP Amendment.

Example: 'NOTAM incorporated to this AMDT will be cancelled by NOTAMC on the 29 APR 2014.'

2.6.4 Incorporation of NOTAM information in AIP Supplement

2.6.4.1 Publication of an AIP Supplement to replace and/or modify information in an existing NOTAM may occur at any time. A Trigger NOTAMN shall be published to refer to this AIP Supplement (ref paragraph 2.7.4).

2.6.4.2 The previously published NOTAM containing the affected information shall be cancelled by a NOTAMC.

2.7 Trigger NOTAM and related procedures

2.7.1 Trigger NOTAM – Definition

2.7.1.1 NOTAM used to announce the existence and subject contents of AIRAC AIP Amendments or AIP Supplements of operational significance are referred to as 'Trigger NOTAM'.

2.7.1.2 The text of Trigger NOTAM is included in Pre-flight Information Bulletins (PIB) to ensure that pilots and operators are advised or reminded that permanent changes of operational significance take effect from the given date or that details of temporary changes of operational significance are to be found in an AIP Supplement.

2.7.2 Trigger NOTAM – General rules

2.7.2.1 AIRAC AIP Amendments and AIRAC AIP Supplements shall always be triggered by a NOTAM. Note that information concerning any circumstances listed in Annex 15 (Ref. [1]), Appendix 4, Parts 1, 2 and 3 shall be disseminated under the regulated 'AIRAC' system, either as an AIRAC AIP Amendment or as an AIRAC AIP Supplement.

2.7.2.2 The text in Item E) should not exceed 300 characters and must always start with the words 'TRIGGER NOTAM' (followed only in the case of an AIP Amendment by the abbreviation PERM), the reference number of the published AIP Amendment or AIP Supplement concerned, the effective date and a brief description of its contents. Effective time will be omitted in Item E) unless it differs from the default AIRAC effective time of 0000 UTC.

2.7.2.3 Trigger NOTAM must come into force on the effective date and time of the Amendment or Supplement they refer to. The Trigger NOTAM shall be issued as soon as possible, preferably at the publication date of the AIRAC AIP Amendment or the AIP Supplement.

2.7.2.4 Trigger NOTAM shall remain in force for 14 days.

<u>Example</u>:

`B) 1402060000` (AIRAC effective date and time)

`C) 1402192359` (AIRAC effective date and time + 14 days)

If the effective time of the Trigger NOTAM is defined to the beginning of the day (first minute of the day=0000), use 2359 as end-time to correspond to the end-time rule for a 24 hour period.

If the effective time of the Trigger NOTAM is not at the beginning of the day, the end-time shall equal the start time.

Example:

B) 1403061000 C)1403201000

2.7.2.5 Trigger NOTAM shall be issued in the appropriate NOTAM series, according to the information to be promulgated.

2.7.2.6 Trigger NOTAM shall follow the normal NOTAM procedures (but see following paragraphs for exceptions).

2.7.2.7 The NOTAM Code 2nd and 3rd letters (= ‘Subject’) shall be selected from the NSC and shall never be ‘XX’. If no suitable 2nd and 3rd letter combination exists then use ‘FA’ for Aerodrome or ‘AF’ for FIR.

2.7.2.8 The NOTAM Code for a Trigger NOTAM shall always contain ‘TT’ as 4th and 5th letters (= ‘Condition’). This exclusive ‘TT’ ‘Condition’ indicator shall be used with all subjects of the NOTAM Codes, even if not explicitly listed in the NSC tables.

2.7.2.9 The exclusive ‘TT’ ‘Condition’ indicator can be used to retrieve specific Trigger NOTAM from any Publishing NOF, and can additionally be used for the inclusion (or non-inclusion) of Trigger NOTAM in PIB, at a specific time before their effective date.

2.7.2.10 In the case of Amendments or Supplements containing information dealing with different subjects and/or locations, a single Trigger NOTAM dealing with multiple subjects and/or locations may be issued [Note exception to Basic Rule – ref. paragraph 2.2.3.

2.7.2.11 For FIR, Publishing NOF may group all the information that relates to one or several FIR, regardless of the subject, in order to reduce the amount of NOTAM to be published [Note exception to Basic Rule – ref. paragraph 2.2.3.

Example:

```
Q) LEXX/QAETT/IV/BO/E/065/660/4229N00152E999
A) LECB LECM B) 1402060000 C) 1402192359
E) TRIGGER NOTAM - PERM AIRAC AIP AMDT 2/14 WEF 06 FEB
2014.        CHANGES TO AIRSPACE CLASSIFICATION AND
             UPPER LIMIT OF CONTROLLED AIRSPACE.
```

2.7.2.12 For Aerodromes, a separate Trigger NOTAM shall be issued for each aerodrome. Different subjects relating to the same aerodrome, may nevertheless be grouped in the same NOTAM [Note exception to Basic Rule – ref. paragraph 2.2.3.

Example:

```
Q) EFIN/QPATT/I/BO/A/000/999/6031N02216E005
A) EFTU B) 1402060000 C) 1402192359
E) TRIGGER NOTAM - PERM AIRAC AIP AMDT 2/14 WEF 06 FEB
2014. CHANGES TO STAR AND TO WGS 84 COORDINATES.
```

2.7.2.13 In the case of Amendments or Supplements containing information about a new location indicator or a changed one, the related Trigger NOTAM has to be issued as FIR information: Scope E, Item A) location indicator of the FIR affected and Item E) information about the new or changed location indicator. Other information related to this aerodrome and subject to trigger procedures is published in accordance with paragraph 2.7.2.12, Item A) to contain the new location indicator.

2.7.2.14 In the cases described in paragraphs 2.7.2.10-2.7.2.12, the NOTAM qualifiers 'Traffic', 'Purpose' and 'Scope' shall be filled in according to the subject of highest operational importance.

When grouping different subjects it may happen that the subject of highest operational importance does not cover qualifiers 'Traffic' and 'Scope' for all the subjects. For example, the Q-lines for two AD subjects (ILS, VFR APCH PROC) read as follows: …/QICTT/I/BO/A/… and …/QPKTT/V/BO/A…. Whichever is taken as highest, both traffic types (I and V) concerned are never covered. In this special case a deviation from NSC is permitted to guarantee the necessary bulletin entries.

<u>Example</u>: In the following case, the 'Traffic' qualifier 'IV' is a combination to cover both subjects (QICTT and QPKTT):

```
Q) EFIN/QICTT/IV/BO/A/000/999/6240N02937E005
A) EFJO B) 1402060000 C) 1402192359
E) TRIGGER NOTAM - PERM AIRAC AIP AMDT 2/14 WEF 06 FEB
2014. INTRODUCTION OF ILS RWY 28 AND REVISED VFR APCH
PROC.
```

2.7.3 Trigger NOTAM relative to AIRAC AIP AMDT

2.7.3.1 AIRAC Amendments represent permanent changes to the AIP on a predefined date.

2.7.3.2 <u>Effective Date</u>: AIRAC AIP Amendments become effective on the AIRAC cycle date. Item B) shall always contain the AIRAC effective date and time.

2.7.3.3 <u>Example</u>:

```
Q) LOVV/QARTT/I/BO/E/245/999/4720N01330E999
A) LOVV B) 1408210000 C) 1409032359
E) TRIGGER NOTAM - PERM AIRAC AIP AMDT 6/14 WEF 21 AUG
2014. IMPLEMENTATION OF NEW ATS ROUTE UA15.
```

Note that the term 'PERM' is inserted in Item E) to stress that Item C) contains an artificial end-date and that the information is of a permanent nature.

2.7.4 Trigger NOTAM relative to AIP SUP (AIRAC and Non-AIRAC)

2.7.4.1 Whilst current ICAO SARPs do not specify a requirement for Non-AIRAC AIP Supplements to be triggered, Publishing NOF shall trigger all Operationally Significant AIP SUP to ensure that all relevant elements of the integrated aeronautical information package are available for inclusion in PIB.

2.7.4.2 <u>Effective date:</u> AIP Supplements become effective at the date and time stated in the Supplement. Information to be published under the AIRAC system does not always start on an AIRAC cycle date (e.g. major works, large air exercises, etc. ...). Consequently, both the AIP Supplement and the Item B) of the Trigger NOTAM shall contain the effective date and time of the start of the information.

2.7.4.3 Triggering of AIRAC information in Non-AIRAC Supplements: Due to time constraints, AIP Supplements are sometimes published to promulgate information that should have been published as an AIRAC AIP Supplement. In such exceptional cases, the operational nature of the information shall prevail and a Trigger NOTAM shall be issued for this Non-AIRAC AIP Supplement. The 'Subject' and 'Condition' shall relate the information to at least the 'Purpose' 'BO', according to the NOTAM Selection Criteria.

2.7.4.4 Period of validity: The general rule as stated in paragraph 2.7.2.4 shall apply. However, if the information has a duration that is shorter than 14 days, Item C) shall reflect the date and time when the information published in the AIP Supplement will expire. If the information has a duration that is longer than 14 days, the period for which the SUP is in force shall be indicated in Item E).

Example 1:

```
Q)EFIN/QRDTT/IV/BO/W/000/040/6637N02825E016
A) EFIN B) 1402062200 C) 1402111200
E)TRIGGER NOTAM - AIP SUP 68/14 WEF 06 FEB 2014.
TEMPO DANGER AREA EFD148 SALLA ACT.
F) SFC G) 4000FT AMSL
```

Example 2:

```
Q) EFIN/QRDTT/IV/BO/W/000/040/6637N02825E016
A) EFIN B) 1401172200 C) 1401312200
E) TRIGGER NOTAM - AIP SUP 68/14 WEF 17 JAN 2014 TIL 20
FEB 2014. TEMPO DANGER AREA EFD148 SALLA ACT.
F)SFC G)4000FT AMSL
```

2.7.4.5 Supplements requiring activation: Some (AIRAC) SUP require activation by NOTAM, such as: description of major works at aerodromes, establishment of large-scale military exercise areas or other related (AIRAC) SUP covering work progress or modifications.

These SUP usually cover long periods and are published with remarks such as: 'detailed dates and times of activation will be published by NOTAM', 'individual phases will be activated by NOTAM", 'operational limitations will be published by NOTAM'.

Such (AIRAC) SUP are triggered according to procedures for Trigger NOTAM.

If required, one or more additional activation NOTAM are issued according to NOTAM procedures for the periods the restrictions apply.

2.7.5 Notification of changes to AIP SUP

2.7.5.1 Changes: Any change to an AIP Supplement and its associated Trigger NOTAM, shall be published by the Publishing NOF in such a way that the information itself is always clear and without any ambiguities.

Normally, changes to an AIP Supplement (such as corrections) are announced by replacing the AIP Supplement in due time by another Supplement. The procedure described in paragraph 2.7.5.3 shall be applied to announce the cancellation of the replaced SUP. The new SUP will be triggered according to the normal procedure.

The same procedure applies to Supplements of 'unknown' or 'estimated' duration or in the case of notifications of a postponed end date/time.

If time constraints do not allow a replacement by another SUP, the change is published by NOTAM. Refer to 2.7.5.2 for details.

2.7.5.2 Notification of changes by NOTAM: Changes at short notice as well as temporary suspensions of a SUP are published by NOTAM. The Q-line is completed according to normal NOTAM rules. Item B) is the effective date of the Supplement or current date/time, Item C) the published end of validity of the SUP. If the change is only of a temporary nature, Item C) is limited to the validity of the change. Apart from the change, Item E) contains a reference to the Supplement.

Example:

```
(A0115/14 NOTAMN
Q) ESAA/QMDCH/IV/BO/A/000/999/5739N01217E005
A) ESGG B) 1404120637 C) 1405112359
E) RWY 03/21 TORA 2800M. REF AIRAC AIP SUP 14/14.
```

Long-term changes issued by NOTAM shall be replaced by a SUP in due time.

2.7.5.3 Notification of an earlier end date or time: exceptionally, the original end date specified in the AIP SUP may be changed to an earlier date by NOTAM. If such earlier cancellations are known well in advance they are treated as changes to a SUP and the rules of paragraph 2.7.5.1 apply.

The cancellation of a SUP at short notice is always published by NOTAMN (ref 2.7.5.3.1). If necessary, in addition to the NOTAMN the associated Trigger NOTAM has to be cancelled or replaced (ref 2.7.5.3.2) and the validity of any other existing NOTAM referring to the SUP must be verified (ref 2.7.5.3.3).

2.7.5.3.1 A NOTAMN shall be issued according to NOTAM procedures to announce the cancellation of a SUP at short notice.

Item B) is the new expiring date/time of the SUP.

Item C) is the original end of validity of the SUP or the next AIP SUP checklist or monthly plain-language list of valid NOTAM or AIP GEN 0.3 if it serves as checklist of SUP, whichever is the most suitable means.

Example:

```
NOTAMN 151830 EUECYIYN
A0127/14 NOTAMN
Q) ESAA/QFALT/IV/BO/A/000/999/5739N01217E005
A) ESGG B) 1404230000 C) 1405112359
E) REF AIRAC AIP SUP 14/14 WORKS COMPLETED.
RESTRICTIONS ON THE USE OF AERODROME NO LONGER IN
FORCE.
```

Note that Item E) shall always contain text clearly indicating that the planned end date has been brought forward.

Note that if the AIP SUP was not originally triggered, a NOTAMN may also be issued exceptionally to announce the cancellation in accordance with the above validity and Item E) procedures.

Note the use of Condition ‘LT’ (instead of ‘TT’) in the NOTAM**N** to indicate more precisely the nature of the information.

2.7.5.3.2 If the Trigger NOTAM is still valid at the time the information about the early cancellation is received, the Trigger NOTAM is cancelled or replaced, depending on the new expiry date/time. The Trigger NOTAM is not affected by the cancellation of the SUP if the new expiry date is later than Item C) of the Trigger NOTAM.

Example: Original Trigger:

```
A0034/14 NOTAMN
Q) ESAA/QFATT/IV/BO/A/000/999/5739N01217E005
A) ESGG B) 1404100600 C) 1404240600
E) TRIGGER NOTAM – AIRAC AIP SUP 14/14 WEF 10 APR 2014
TIL 11 MAY 2014. USE OF AERODROME RESTRICTED DUE TO
MAJOR CONSTRUCTION WORKS.
```

New end of SUP: after 24 April 2014: Trigger not affected.
New end of SUP: before 24 April 2014: Trigger replaced or cancelled

Example: Notification about early cancellation received 15 APR 2014, SUP cancelled as of 22 APR 2014 2359.

Replacement:

```
(APR 2014)
151828 EUECYIYN
A0126/14 NOTAMR A0034/14
Q) ESAA/QFATT/IV/BO/A/000/999/5739N01217E005
A) ESGG B) 1404151828 C) 1404222359
E) TRIGGER NOTAM – AIRAC AIP SUP 14/14 WEF 10 APR 2014. USE
OF AERODROME RESTRICTED DUE TO MAJOR CONSTRUCTION WORKS. AIP
SUP VALID TIL 22 APR 2014.
```

2.7.5.3.3 If the SUP is subject to a valid activation NOTAM or any other NOTAM referring to it (e.g. temporary suspensions, changes published by NOTAM), the validity of these NOTAM have to be verified. If necessary, these NOTAM are cancelled or replaced depending on the new expiry date and time. If an activation NOTAM or any other NOTAM referring to the SUP is not yet in force at the time the earlier end is known, the activation NOTAM is cancelled and a new one is published reflecting the new date/time.

Example:

```
151830 EUECYIYN
(A0128/14 NOTAMR A0115/14
Q) ESAA/QMDCH/IV/BO/A/000/999/5739N01217E005
A) ESGG B) 1404151830 C) 1404222359
E) RWY 03/21 TORA 2800M. REF AIRAC AIP SUP 14/14.
```

2.8 NIL notification

2.8.1 A NIL notification to announce that an AIRAC AIP Amendment will not be published at the established interval or publication date, shall be distributed by Trigger NOTAM or by NOTAM checklist or by both (ICAO Annex 15 paragraph 4.3.7, 5.2.13.3 and 6.1.3 - Ref. [1]).

2.8.2 The distribution of a NIL notification shall be done at least 42 days in advance of the AIRAC date (compliant with ICAO Annex 15 paragraph 6.2.1 - Ref [1]).

2.8.3 If the use of a Trigger NOTAM for the distribution of a NIL notification is preferred, this NOTAM shall use:

- NOTAM Code 2nd and 3rd letters ‘OA’;
- NOTAM Code 4th and 5th letters ‘TT’ to identify that it relates to information about the announcement of availability (in this case non-availability) of printed publication; and
- Purpose ‘M’; and
- Scope ‘E’; and
- Item B) shall contain the AIRAC effective date; and
- Duration shall be 14 days as for the regular Trigger NOTAM.

Note: The use of scope E for subject OA as well as purpose M for this type of message is an intentional deviation from the NSC for the benefit of PIB retrieval.

Example: Italian NOTAM issued in August

```
070900 LIIAYNYX
A1000/14 NOTAMN
Q) LIXX/QOATT/IV/M/E/000/999/4323N01205E999
A) LIMM LIBB LIRR B) 1409180000 C) 1410022359
E) AIRAC EFFECTIVE DATE 18 SEP 2014 NIL
```

2.8.4 If the use of a NOTAM checklist for the announcement of a NIL notification is preferred, this notification shall be included in the NOTAM checklist with the following guidance:

- publish at least 42 days before the AIRAC effective date; and
- clearly identify in the text which AIRAC effective dates are affected by the NIL notification

Example: Latvian checklist issued in May

```
010920 EVRAYNYX
(A1000/14 NOTAMR A0890/14
Q) EVRR/QKKKK/K/K/K/000/999/5702N02322E999
A) EVRR B) 1405010920 C) 1406011500EST
E) CHECKLIST
YEAR=2014 0016 0021 0023 0024 0025 0028 0029 0032
0036 0040 0042 0043 0044
LATEST PUBLICATIONS
AIRAC AIP AMDT 03/14 WEF 01 MAY 14
AIP AMDT              1/14
AIRAC AIP SUP         01/14 WEF 01 MAY 14
AIP SUP               8/14
AIC                   A 05/14 01 NOV 14
AIRAC EFFECTIVE DATE 29 MAY 14 – NIL AIRAC
EFFECTIVE DATE 26 JUN 14 – NIL.
```

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3 NOTAM PROCESSING

3.1 Introduction

3.1.1 The current standard NOTAM format was introduced in ICAO Annex 15, 8th Edition promulgated on 14 November 1991. All NOTAM should be produced in this format, following the procedures on NOTAM creation Explained in Chapter 2 of this document.

3.1.2 Some States are not adhering completely to the Integrated Aeronautical Information Package and do not publish Trigger NOTAM for operationally significant publications.

3.1.3 Other States publish those NOTAM selected for international distribution in an official ICAO language other than English. In order to make this information available to the NOTAM Processing Unit (NPU) Clients in accordance with Annex 15 (Ref. [1]) paragraph 5.2, a translation into English is required.

3.1.4 Conclusively, there are differences in the interpretation of ICAO Standards and Recommended Practices and guidelines causing inconsistent, inaccurate or even false PIB output.

3.1.5 As a result, differences and discrepancies exist internationally in published NOTAM. NOTAM have to pass through a series of phases where their conformity to the ICAO format is analysed and their contents are assessed prior to their storage in automated NOTAM processing systems. The purpose of this Chapter is to define and describe the principles and detailed procedures applied throughout these different phases.

3.2 Objective

3.2.1 The goal of NOTAM processing is to process all received NOTAM in accordance with the procedures laid down in Chapter 2 of this manual on NOTAM creation, so as to allow their storage in automated pre-flight information systems in order to provide correct and harmonised PIB output for the benefit of the end user.

3.2.2 Processed NOTAM shall be distributed or made available as soon as possible after receipt of the original NOTAM by the NOTAM Processing Unit.

3.2.3 NOTAM processing should result in a standardised level of service, regardless of which Unit was responsible for the processing.

3.2.4 In order to ensure the quality of the NOTAM and the consistency of the database, quality review procedures shall be agreed between Client NOF and NOTAM Processing Unit.

3.2.5 It is essential that NOTAM Processing Units ensure that their Clients are made fully aware of the NOTAM processing procedures being applied.

3.2.6 This Chapter addresses NOTAM processing principles and procedures which support NOTAM storage.

3.3 Applicability

3.3.1 Chapter 3 links the NOTAM publication with the retrieval of NOTAM (Chapter 7 PIB). The processing of incoming NOTAM therefore constitutes an essential part in order to achieve correct and harmonised PIB. Chapter 3 provides guidelines for the processing of NOTAM deviating from ICAO or OPADD standards as outlined in Chapter 2 (NOTAM creation).

3.3.2 However, non-adherences vary a lot and not every specific case can be covered. Incoming messages must be modified whenever they cannot be processed or when they would otherwise have a negative impact on the production of the Pre-flight Information Bulletin.

3.4 Procedures for the processing of NOTAM

3.4.1 The procedures described in this Chapter refer to NOTAMN (New NOTAM). Most of them apply also to NOTAMR and NOTAMC.

3.4.2 Specific procedures relative to NOTAMR (Replacement NOTAM) and NOTAMC (Cancellation NOTAM) and the particulars of their processing are described in this Chapter after the NOTAMN procedures.

3.5 General principles

3.5.1 Whilst it is expected that most Clients will work with the processed version of the NOTAM, the NOTAM Processing Unit shall be able to make the original version available in accordance with the requirements of its Clients.

3.5.2 The NOTAM Processing Unit shall keep track of any message (free text or 'correct version' NOTAM) which is related to the original NOTAM.

3.5.3 NOTAM processing functions are as follows:

Conversion into the standard format.

Triggering of information of operational significance.

Translation into English.

Syntax correction of obvious detected mistakes in syntax.

Data correction of detected mistakes in data.

Editing text in order to clarify it.

3.5.4 A NOTAM Processing Unit shall perform all of the above listed functions.

3.5.5 The following table shows the applicable processing functions to be performed on the respective NOTAM data and Items (Note that the matrix is not applicable to Triggering:

NOTAM Items	**Conversion**	**Translation**	**Syntax Correction**	**Data Correction**	**Editing**
Series/Nr/Type	No	No	Yes	Yes	No
Ref Series/Nr	No	No	Yes	Yes	No
FIR	Yes	No	Yes	Yes	No
NOTAM Code	Yes	No	Yes	Yes	No
Traffic	Yes	No	Yes	Yes	No
Purpose	Yes	No	Yes	Yes	No
Scope	Yes	No	Yes	Yes	No
Lower/Upper	Yes	No	Yes	Yes	No
Lat/Long	Yes	No	Yes	Yes	No
Radius	Yes	No	Yes	Yes	No
Item A)	No	No	Yes	Yes	No
Item B)	No	No	Yes	Yes	No
Item C)	No	No	Yes	Yes*	No
Item D)	No	Yes**	Yes	Yes	No
Item E)	Yes	Yes	Yes	Yes	Yes
Items F) & G)	No	No	Yes	Yes	No

Yes = Processing function to be performed, if necessary
No = Processing function not applicable
* = exc. EST/PERM
** = Only if names of weekdays, months etc., are not used in
English language

3.6 Conversion of original NOTAM

3.6.1 On reception of NOTAM from countries that do not adhere to the NOTAM format, the NOTAM Processing Unit shall convert these into the correct ICAO Annex 15 (Ref. [1]) NOTAM format before storing and making them available.

3.6.2 In converted NOTAM, each Item of the original NOTAM shall be transposed into the appropriate standard NOTAM Item, and those not present (e.g. Item Q) shall be added.

3.6.3 Converted NOTAM shall be qualified according to the NOTAM Selection Criteria published in ICAO Doc 8126 (Ref. [2]). For this purpose, the NOTAM Code must be identified from Item E).

3.6.3.1 If the NOTAM Code is present in Item E), it shall be moved into the Item Q) for further qualification, and decoded in Item E) according to the text provided in the NOTAM Selection Criteria.

3.6.3.2 If no NOTAM Code is contained in Item E), the subject and condition shall be derived from the NOTAM contents.

Example 1: Incoming original NOTAM

```
A1324/14 NOTAMN
A) KJFK
B) 1407231000
C) 1407231700
E) QMRLC 13L/31R CLSD)
```

Corrected NOTAM

```
(A1324/14NOTAMN
Q) KZNY/QMRLC/IV/NBO/A /000/999/4038N07347W005
A) KJFK B) 1407231000 C) 1407231700
E) RWY 13L/31R CLSD)
```

Example 2: Incoming original NOTAM

```
231639 KDZZNAXX
(A1326/14 NOTAMC A1324/14
A) KJFK)
```

Corrected NOTAM

```
A1326/14 NOTAMC A1324/14
Q) KZNY/QMRXX/IV/NBO/A /000/999/4038N07347W005
A) KJFK B) 1407231639
E) REF RWY 13L/31R
NOTAM CANCELLED)
```

3.7 Triggering of printed publications

3.7.1 **Triggering** - the issuing of a Trigger NOTAM in Series 'T', by the NOTAM Processing Unit, relative to AIRAC AIP Amendments and operationally significant AIP Supplements for which no Trigger NOTAM has been issued by the Publishing NOF.

3.7.2 The NOTAM Processing Unit cannot use any of the Publishing NOF's NOTAM series because the NOTAM numbering consistency would not be preserved. Therefore, the Series 'T' is allocated and reserved for this type of Trigger NOTAM.

3.7.3 A Trigger NOTAM in Series 'T' shall be created on the initiative of the NOTAM Processing Unit whenever an AIRAC AIP Amendment or AIP Supplement containing operationally significant information is received for which it is established that no associated Trigger NOTAM is normally issued by the responsible NOF (paragraph 2.7 refers).

3.7.4 Refer to paragraph 3.13.2 for details of the procedures to be applied.

3.8 Translation of NOTAM

3.8.1 **Translation** - A NOTAM originated in French or Spanish, shall be translated to English.

3.8.2 Translation shall be carried out in the same spirit as the translation of a technical document. The objective is to provide a text in the English language which corresponds as closely as possible to the original.

3.9 Syntax correction

3.9.1 **Syntax correction -** changing the published format structure of the NOTAM where these are obviously wrong.

This may be carried out automatically by a system or manually by an operator.

3.9.2 Correction of syntax shall be based on the format described in ICAO Annex 15 (Ref. [1]) and in Chapter 2 of this manual.

Example 1: Incoming original (incorrect) NOTAM

```
A00123/14 NOTARM A00122/14
Q) EDGG/QQMRLC/IV/NBO/A/000/999/4841N00913E005
EDDS  A) 1401121000  C) 1401131800
E) RWY 17/35 CLSD
```

Corrected NOTAM

```
A0123/14 NOTAMR A0122/14
Q) EDGG/QMRLC/IV/NBO/A/000/999/4841N00913E005
A) EDDS B) 1401121000  C) 1401131800
E) RWY 17/35 CLSD
```

Example 2: Incoming original (incorrect) NOTAM

```
A0101/14 NOTAMR A0100/14
Q) OJAC/QXXXX/IV/M/E/000/999/3116N03706E999
A) OJAC        B) 1401010001  C) 1401310001EST
E) THE FOLLOWING NOTAM ARE STILL IN FORCE:
2012 :- 0020.
2013 :- 0023.
2014 :- 0052 0066 0067 0068 0069 0070
LAST AIP AMDT :- 32/14.
```

Corrected NOTAM

```
A0101/14 NOTAMR A0100/14Q)
OJAC/QKKKK/K/K/K/000/999/3116N03706E999
A) OJAC        B) 1401010001  C)
1401310001EST E) CHECKLIST
YEAR=2012 0020
YEAR=2013 0023
YEAR=2014 0052 0066 0067 0068 0069 0070
LATEST PUBLICATIONS
AIP AMDT 32/14
```

3.10 Data correction

3.10.1 **Data correction** - changing data elements where these are obviously wrong.

This may be carried out automatically by a system or manually by an operator (and does not include correction by the Publishing NOF).

3.10.2 Correction of data shall be carried out only when the error is such that there can be no possible ambiguity. Where appropriate, corrections shall be made using validated static data. Where there is ambiguity or any doubt whatsoever the

Publishing NOF shall be consulted and the paragraph 3.12 procedures for ‘NOTAM Subject to Query’ shall be applied.

Example: Incoming original NOTAM

```
A0100/14 NOTAMN
Q) EDGG/QMRXX/I/BO/A/000/999/4841N00913E999
A) RDDS         B) 1401011000  C) 1401011800
E) RWY 007 AVAILABLE FOR LANDINGS ONLY
```

Corrected NOTAM

```
A0100/14 NOTAMN
Q) EDGG/QMRLT/IV/NBO/A/000/999/4841N00913E005
A) EDDS         B) 1401011000  C) 1401011800
E) RWY 07 AVAILABLE FOR LANDINGS ONLY
```

3.11 Editing

3.11.1 **Editing** - changing the Item E) wording and/or layout to make it clearer or to more explicitly express ideas that are implicit in that text.

E.g. Correcting spelling or abbreviation errors and editing layout or changing line length in order to make it more readable.

3.11.2 Editing might be carried out in order to clarify text, or to draw specific attention to important elements which are implied by the original text but not stated explicitly. Under no circumstances shall editing change the sense of the original NOTAM.

Example: Incoming original NOTAM (Item E) only)

```
E) MIL PJE WILL TAK PLAC AT BLOHFELD 471940N
0111300E RDS 10NM. INF ABOUT THE DROPING
ZONE MAY BE
OBTAI-
NED BY LOWI TWR 120.100MHZ OR BY WIEN
INFORMATION ON 124.400MHZ.
```

Corrected NOTAM (Item E only)

```
E) MIL PJE WILL TAKE PLACE AT BLOHFELD 471940N
0111300E RADIUS 10NM. INFORMATION ABOUT THE DROPPING ZONE
MAY BE OBTAINED BY LOWI TWR 120.100MHZ OR BY WIEN
INFORMATION ON 124.400MHZ.
```

Note: The line lengths in this example (maximum number of characters per line) do not reflect real NOTAM processing because of the format used to present the example; nevertheless, the erroneous carriage returns/line feeds in the example of the incoming NOTAM are made intentionally to show editing needs.

3.11.3 When the sense of the original NOTAM is not clear, the paragraph 3.12 procedures for ‘NOTAM Subject to Query’ shall be applied. For examples of unclear NOTAM refer to 2.3.22.24.

3.12 Procedures for dealing with NOTAM Subject to Query

3.12.1 If a received NOTAM contains ambiguities that cannot be clarified by the NOTAM Processing Unit, a query shall be addressed to the Publishing NOF. However, such NOTAM shall be stored and made available as 'NOTAM Subject to Query' by the NOTAM Processing Unit.

3.12.2 The NOTAM Processing Unit shall add the reason for the query after the statement 'NOTAM Subject to Query' in Item E). In this case the original Item E) should not be altered until a clarification on the intended content and meaning has been reached with the Publishing NOF.

3.12.3 If the Publishing NOF follows ICAO procedures the corrected version will consist of a NOTAMR (if the queried NOTAM is already in force) or a NOTAMC followed by a NOTAMN (if the queried NOTAM is not in force). In either case the new NOTAM shall be processed normally by the NOTAM Processing Unit.

3.12.4 If the reply is in the form of a 'Correct Version' NOTAM retaining the Series and Number of the queried NOTAM, the NOTAM Processing Unit shall store it, overwriting the original NOTAM and make it available as an ordinary NOTAM. The words 'Correct Version' shall be removed.

3.12.5 If the reply is in the form of a free text message, the NOTAM Processing Unit shall edit the last processed version of the queried NOTAM in accordance with the information provided, and the statement 'NOTAM Subject to Query' shall be removed.

3.13 Procedures for the creation of NOTAM Series 'T'

3.13.1 General procedures

3.13.1.1 NOTAM Series 'T' shall be created by the NOTAM Processing Unit in accordance with OPADD rules.

3.13.1.2 The NOTAM Processing Unit is responsible for the follow-up of the NOTAM Series 'T' that it issues, and, if appropriate, may replace it with a NOTAMR and shall in due course cancel it with a NOTAMC unless the information time expires beforehand.

3.13.1.3 The NOTAM Processing Unit shall make NOTAM Series 'T' available to their Clients only.

3.13.1.4 No monthly checklist of Series 'T' NOTAM is issued by the NOTAM Processing Unit. Automatically produced 'ad hoc' Checklists, shall be made available upon request at any time.

3.13.1.5 In addition to normal NOTAM creation rules (Chapter 2 refers), the basic procedures listed in the following paragraphs 3.13.2 and 3.13.3 shall be observed.

3.13.2 Trigger NOTAM in Series 'T'

3.13.2.1 Trigger NOTAM in Series 'T' are created by the NOTAM Processing Unit to trigger specific printed AIS publications, for which no Trigger NOTAM is normally issued by the Publishing NOF.

3.13.2.2 The State to which the Trigger NOTAM Series ‘T’ relates shall be identified by the FIR in Item Q) and by the content of Item A).

3.13.2.3 Item B) of a Trigger NOTAM in Series ‘T’ for AIRAC AIP Amendments should contain the effective date of the Amendment. If the information is received after the effective date of the Amendment, the date in Item B) shall be the issue date of the Trigger NOTAM.

3.13.2.4 Item C) of a Trigger NOTAM in Series ‘T’ for AIRAC AIP Amendments and AIP Supplements shall contain the effective date +14 days. However, if the information has a duration that is shorter than 14 days, Item C) shall reflect the date and time when the published information will expire.

3.13.2.5 The Item Q) NOTAM Code shall be compiled in accordance with the guidance at paragraphs 2.7.2.8 and 2.7.2.7. The Qualifiers shall then be chosen according to the prevailing association.

3.13.3 NOTAM in Series ‘T’

3.13.3.1 NOTAM in Series ‘T’ are created by the NOTAM Processing Unit to deal with exceptional formatting errors, if the format of a received NOTAM does not allow standard processing.

3.13.3.2 The original Publishing NOF shall be identified by the FIR in Item Q) and by the content of Item A).

3.13.3.3 A reference to the original NOTAM shall be included at the end of Item E).

3.13.3.4 A NOTAM series 'T' shall be system linked to the original NOTAM to keep track of the source and to assure its replacement or cancellation.

3.13.3.5 If multiple aerodrome location indicators are listed in Item A), the original NOTAM shall be processed keeping only the first AD. In addition, NOTAM Series ‘T’ shall be created for the remaining aerodromes with data identical to the original NOTAM.

3.13.3.6 If combinations of Aerodrome and FIR are listed in Item A), the original NOTAM shall be processed, according to the relevance of the NOTAM subject. In addition, NOTAM Series ‘T’ shall be created for the other entries, e.g. original NOTAM shall be processed with the FIR(s) in Item A), and, if relevant, Series ‘T’ NOTAM shall be created for each.

3.13.3.7 When a NOTAM Series ‘T’ is published by a NOTAM Processing Unit, the related Publishing NOF shall be informed that such a NOTAM has been created and why.

3.14 Procedures for Correction of NOTAM

3.14.1 If an error is detected by the NOTAM Processing Unit, appropriate action shall be taken to correct the received NOTAM and a query shall additionally be sent to the Publishing NOF.

3.14.2 If the NOTAM Processing Unit detects re-occurring errors, it shall inform the Publishing NOF, indicating the correct procedure.

3.14.3 If a NOTAM Processing Unit is alerted that an error has occurred in a NOTAM that it has processed, the NOTAM Processing Unit shall determine the origin of the error, and:

- if the error was made by the NOTAM Processing Unit: correct and re- send the NOTAM; or

- if the error was already contained in the original NOTAM: proceed with a request to the Publishing NOF (paragraph 3.12 rules for ‘NOTAM Subject to Query’ shall be applied).

3.14.4 All NPU Clients shall be aware that only the last version received from the NOTAM Processing Unit is the valid version.

3.15 NOTAM Verification

3.15.1 In addition to the rules described in Chapter 2, the following general verification shall be performed by the NOTAM Processing Unit:

a) Check if the NOTAM has already been received and differentiate between a ‘Dupe’ and a ‘Correct Version’ NOTAM.

b) Check if there is a logical sequence in the origin time of the AFS messages whenever an ‘identical’ NOTAM is received.

c) NOTAM Series/Number/Year/Sub-number, relative to the Publishing NOF, are valid and in logic ascending sequence. If not, appropriate request for the missing NOTAM is sent by the NOTAM Processing Unit to the Publishing NOF (see Chapter 4).

d) NOTAM number referred to in a NOTAMR or NOTAMC is a valid NOTAM from the same Publishing NOF.

3.16 NOTAM Identification

3.16.1 For storage in automated systems, the NOTAM identification consists of establishing the relation between the NOTAM series, number and the “Numbering Reference” it refers to, which is the issuing Publishing NOF.

Establishing correct relations and storage allows a unique identification of a NOTAM and easy tracking of missing numbers.

3.16.2 Publishing NOF identification

3.16.2.1 The identification of the Publishing NOF is not straightforwardly contained in the NOTAM format but is usually identified by the Publishing NOF's AFS message origin (a 4-letter location indicator).

3.16.2.2 Whenever third parties are transmitting or making available a NOTAM via AFS on behalf of the Publishing NOF, that station enters its own AFS address into the message origin line according to ICAO Annex 10 SARPs. As a consequence, the information about the ‘Numbering reference’ is not present in the origin. For such NOTAM, the information about the ‘Numbering reference’ must be deduced from the FIR Qualifier in the Q) line and Item A) of the NOTAM instead. Additionally, the NOTAM number sequence and/or NOTAM series in use by a Publishing NOF may provide further help when allocating the NOTAM to the Publishing NOF.

Similar identification and allocation procedures may have to be applied for NOTAM issued by a publishing NOF without a designated 4-letter location indicator or for States also using origins other than that of the Publishing NOF.

3.16.3 NOTAM Series allocation

3.16.3.1 The NOTAM Processing Unit retains the Series and NOTAM number of the original NOTAM when making it available.

3.16.3.2 If the NOTAM Series letter has been omitted, the NOTAM Processing Unit shall try to derive it from the NOTAM sequence number and include this series.

3.16.4 NOTAM Number

3.16.4.1 If a NOTAM is received that is out of the numerical sequence, a query for the missing NOTAM number(s) shall be initiated, according to Chapter 1 procedures (Database Completeness and Coherence Messages).

3.16.4.2 If the NOTAM number consists of less than 4 digits, the NOTAM Processing Unit shall add the leading zeros. If the 'Year' indicator is missing, it shall also be added.

3.16.4.3 If a NOTAM with the same number is received twice but with different contents, paragraph 3.12 rules for 'NOTAM Subject to Query' shall be applied.

3.16.5 NOTAM Multi-part indicator

3.16.5.1 If a Multi-part NOTAM is received without the format specified in paragraph 6.2.2, it shall be converted into this format by the NOTAM Processing Unit.

3.17 NOTAM Type

3.17.1 If the Publishing NOF did not include the NOTAM type in the original NOTAM, the NOTAM Processing Unit shall insert the appropriate NOTAM type letter.

3.17.2 If the Publishing NOF originally allocated the wrong type, the NOTAM Processing Unit shall insert the appropriate type.

3.17.3 In both cases, the Publishing NOF shall be informed about the change.

3.18 NOTAM Qualification (Item Q)

3.18.1 General rule

3.18.1.1 If Item Q) is missing, it shall be inserted by the NOTAM Processing Unit.

3.18.1.2 If Item Q) is obviously wrong, it shall be corrected by the NOTAM Processing Unit in accordance with the following paragraphs (3.18.2 to 3.18.8).

3.18.2 Qualifier 'FIR'

3.18.2.1 Item Q) may contain location indicators that indicate applicability to more than one FIR. The ICAO location indicators of all FIR concerned shall appear in Item A).

3.18.2.2 The NOTAM Processing Unit shall check that this field correctly applies to the location indicator(s) of the FIR(s) entered in Item A). If not, the correct location indicator shall be inserted.

3.18.2.3 Fictitious airspaces UUUU, ZBBB, KFDC and KNMH are used by the originating NOF to cover/ imply the whole country.

3.18.3 Qualifier 'NOTAM CODE'

3.18.3.1 The NOTAM Selection Criteria are the basis for NOTAM Code allocation and qualification as described in paragraph 2.3.6.

3.18.3.2 If the NOTAM Code is not entered in Item Q), the NOTAM Processing Unit shall include the NOTAM Code, corresponding to the Item E) content, together with the appropriate Qualifiers.

3.18.3.3 If the NOTAM Code does not correspond to the text of Item E), and the text of Item E) is clear and unambiguous, the Code shall be brought into line with the text, provided that this does not imply a downgrading of the 'Purpose' Qualifier.

Example: Incoming original NOTAM

```
Q) EDXX/QAFXX/I/B/W/000/120/5023N01021E030
A) EDGG EDMM        B) 1403011000  C) 1404011800
E) ATS ROUTE XYZ11 CLSD BETWEEN XXX and YYY BETWEEN GND
AND FL120
```

Corrected NOTAM

```
Q) EDXX/QARLC/IV/NBO/E/000/120/5023N01021E030
A) EDGG EDMM B) 1403011000         C) 1404011800
E) ATS ROUTE XYZ11 CLSD BETWEEN XXX and YYY BETWEEN GND
AND FL120
```

3.18.3.4 Overwriting of the original Qualifiers ('Traffic', 'Purpose' and 'Scope') (in accordance with paragraphs 3.18.4 to 3.18.6) should be avoided, unless to correct obvious mistakes.

3.18.3.5 If the original NOTAM has been coded 'QXXXX' and a more appropriate NOTAM Code exists, the NOTAM Processing Unit shall replace the Code and its associated Qualifiers (subject to the limitations specified in paragraphs 3.18.4 to 3.18.8).

3.18.3.6 The NOTAM Processing Unit may also use 'QXXXX' to upgrade 'Scope' and 'Purpose' Qualifiers or for NOTAM where 'AG', 'CO' or 'RC' have been used as 2nd and 3rd letters

3.18.3.7 For NOTAM received with a NOTAM Code that is not contained in the NSC, the NOTAM Processing Unit shall allocate a Code in accordance with the subject and the condition of that subject specified in the Item E) text (refer to paragraph 2.3.6 for further guidance).

3.18.3.8 If a Trigger NOTAM is received without the 4th and 5th letter 'Condition' indicator 'TT', the NOTAM Processing Unit shall replace it with 'TT'. Similarly, if the 2nd and 3rd letter 'Subject' indicator is received as 'XX', the NOTAM Processing Unit shall change it in accordance with paragraph 2.7.2.7 (Note also the guidance at paragraphs 2.7.2.8 and 2.7.2.14).

Example: Incoming original NOTAM

```
Q) EDMM/QXXTT/I/BO/E/000/240/4841N00913E250
A) EDMM  B) 1402200100  C) 1403050100
E) TRIGGER NOTAM – PERM AIRAC AMDT 02/14 WEF 20 FEB
   2014: NEW ATS ROUTE XYZ123 ESTABLISHED.
```

Corrected NOTAM

```
Q) EDMM/QARTT/I/BO/E/000/240/4841N00913E250
A) EDMM         B) 1402200100  C) 1403050100
E) TRIGGER NOTAM – PERM AIRAC AMDT 02/14 WEF 20 FEB
   2014: NEW ATS ROUTE XYZ123 ESTABLISHED.
```

3.18.4 Qualifier 'TRAFFIC'

3.18.4.1 If the 'Traffic' Qualifier is missing, it shall be filled in according to the NOTAM Selection Criteria, or, if not specified therein, according to the NOTAM contents.

3.18.4.2 If the 'Traffic' Qualifier is not according to the NOTAM Selection Criteria, the NOTAM Processing Unit may adapt it to the NSC, taking into account the entry in Item E) and guidance at paragraphs 2.3.7.3 and 2.7.2.14.

3.18.5 Qualifier 'PURPOSE'

3.18.5.1 If the 'Purpose' Qualifier is missing, it shall be filled in according to the NOTAM Selection Criteria, or, if not specified therein, according to the NOTAM contents.

3.18.5.2 The 'Purpose' Qualifier of a NOTAM shall not be modified by a NOTAM Processing Unit, unless it implies an upgrading. For example, Purpose 'M' may be changed to 'B', 'BO', or 'NBO'; Purpose 'B' may be changed to 'BO', or 'NBO' and Purpose 'BO' may be changed to 'NBO.

3.18.6 Qualifier 'SCOPE'

3.18.6.1 If the 'Scope' Qualifier is missing or is not filled in according to the NOTAM Selection Criteria, it shall be filled in according to the NOTAM contents, following the procedures described in paragraph 2.3.9.

3.18.7 Qualifiers 'LOWER/UPPER'

3.18.7.1 The logical order of the vertical limits indicated in Qualifiers 'Lower' and

‘Upper’ shall be verified and corrected; these should also correspond to the values specified in Items F) and G) for Navigation Warnings and Airspace Restrictions.

Example: If ‘F) GND’ and ‘G) 7500FT AMSL’, then ‘Q) for Lower/Upper = ‘000/075’

3.18.7.2 If vertical limits have been entered in Items F) and G) and:

- the limits in Item Q) extend beyond those given in Items F) and G), they shall be left unchanged unless the 000/999 default has been used;

- the limits in Item Q) do not equate but lie between the limits given in Items F) and G), they shall be modified to correspond to Items F) and G):

- if the limits in Item Q) are 000/999, they shall be modified to correspond to Items F) and G) if the actual limits stated there are in FL or in FT or M AMSL (i.e. not for those stated in FT or M AGL – see below);

  - if the limits in Items F) and G) are given as FT or M AGL (or FT or M SFC), Item Q) shall be left unchanged unless the LOWER/UPPER limits are obviously wrong or are missing. If the LOWER/UPPER values are obviously wrong or missing, the lower value shall be Item F), rounded down to the nearest FL. The upper value shall be the sum of Item G) and the highest terrain elevation of the State (or the FIR, or the region concerned), rounded up to the nearest FL.

Example: Incoming original NOTAM from Kuwait, which has 922FT as its highest terrain elevation:

```
A0264/14 NOTAMN
Q) OKAC/QRACA/IV/NBO/W/000/200/2925N04708E006
A) OKAC B) 1403011000 C) 1404011800
E) AREA XYZ11 ACTIVATED. F)
5500FT G) 8000FT AGL
```

Corrected NOTAM:

```
A0264/14 NOTAMN
Q) OKAC/QRACA/IV/NBO/W/055/090/2925N04708E006
A) OKAC B) 1403011000 C) 1404011800
E) AREA XYZ11 ACTIVATED
F) 5500FT AMSL G) 8000FT AGL
```

3.18.7.3 If vertical limits also appear in Item E), these shall be consolidated with Items Q), F) and G).

Example: Incoming original NOTAM:

```
A0564/14 NOTAMN
Q) EDXX/QARLC/IV/NBO/E/000/999/5023N01021E030
A) EDGG EDMM B) 1403011000        C) 1404011800
E) ATS ROUTE XYZ11 CLSD BETWEEN XXX and YYY BETWEEN
FL055 AND FL120
```

Corrected NOTAM

```
A0564/14 NOTAMN
Q) EDXX/QARLC/IV/NBO/E/055/120/5023N01021E030
A) EDGG EDMM B) 1403011000        C) 1404011800
E) ATS ROUTE XYZ11 CLSD BETWEEN XXX and YYY BETWEEN
FL055 AND FL120
```

3.18.8 Qualifier 'GEOGRAPHICAL REFERENCE'

3.18.8.1 The Geographical Reference shall be present in each NOTAM made available by a NOTAM Processing Unit. If this value is not contained in a received NOTAM, the NOTAM Processing Unit has to add it, following the procedures described in paragraph 2.3.11 (General Rules), 2.3.12 (Co- ordinates) and 2.3.13 (Radius).

3.18.8.2 If coordinates and radius are given, the NOTAM Processing Unit shall change the entry only if it contains an obvious error and the area covered by the given values is greater or less than necessary (e.g. when the whole FIR default 999 is used for a small danger area located within it or when an insufficient radius is used for a Navigation Aid coverage).

3.18.8.3 If a NOTAM is received without geographical reference, and no positional information appears in Item E), the entry in Item A) should permit the coordinates to be derived from the Unit's available static data.

3.18.8.4 If a NOTAM is received without a radius, it shall be derived from the Static Database whenever possible. If the radius cannot be derived, the NOTAM Processing Unit shall include a default radius, as specified in the table at paragraph 2.3.13.6 for Europe and dense areas or '999' for other areas.

3.18.8.5 If Item E) contains a reference to a published area or facility or the definition of a temporary area or facility, this shall be used to correct or determine an appropriate entry in Item Q).

3.19 NOTAM Items

3.19.1 Item A) – Location 'FIR/AD' – General

3.19.1.1 The given aerodrome or FIR(s) shall be valid for the country and for the Publishing NOF. If not, paragraph 3.12 'Procedures *for dealing with NOTAM Subject to Query*' shall be applied.

3.19.1.2 If the location indicator is not filled or contains a typing error, the NOTAM Processing Unit shall try to deduce it from Item Q) and from Item E) content. Paragraph 3.12 '*Procedures for dealing with NOTAM Subject to Query*' shall be applied.

3.19.1.3 If the location indicator is unknown to the NOTAM Processing Unit (i.e. the aerodrome location indicator is not listed in ICAO Doc 7910 or the national AIP, SUP or NOTAM), the NOTAM Processing Unit shall replace the location indicator by the nationality indicator followed by 'XX' or 'XXX' (e.g. EDXX or CXXX). Paragraph 3.12 '*Procedures for dealing with NOTAM Subject to Query'* shall be applied, mentioning 'ICAO LOCATION INDICATOR UNKNOWN'.

3.19.1.4 If a new location indicator or a change of a location indicator is announced by a NOTAM, the Processing Unit shall proceed as follows:

1. Store NOTAM with scope E to assure that users are informed about the change. Item A) to contain the location indicator of the FIR and Item E information about the new or changed location indicator as well as other information from NOTAM. Additionally, insert an instruction in Item E to retrieve NOTAM by selecting the new and old location indicator until all valid NOTAM have been replaced or cancelled by the Publishing NOF.

2. Add the new or changed location indicator to the database.

3. Delete old location indicator from database as soon as there are no more valid NOTAM for this Item A and delete retrieval instruction from the NOTAM announcing the change of location indicator.

3.19.1.5 If the Publishing NOF has no discrete FIR (e.g. Swaziland FD, Lesotho FX, Macau VM), Item Q) shall contain the appropriate overlying FIR Indicator. If an aerodrome is used in Item A) and the NOTAM subject/contents is Enroute or Navigation warnings, the NOTAM Processing Unit shall also change Item Q) 'Scope' to read 'AE' or 'AW'.

3.19.1.6 If a CTA or TMA indicator is used as pseudo FIR in Item A), the NOTAM Processing Unit shall replace it with an indicator that reflects the Item E) text (for example by using the main aerodrome within a TMA or the area affected).

Example: Incoming original NOTAM:

A7333/14 NOTAMN
Q) RJDG/QRACH/IV/NBO/**EW**/220/230/
A) **RJTD** B) 1412272315 C) 1412280515
E) TOKYO FIR MULTIPLE U.S.MIL ACT WILL BE CONDUCTED WI TOKYO FIR AS FLW, BOUNDED BY THE POINTS
3201N 12633E - 3230N 12650E - 3230N 12712E -
3025N 12752E - 3015N 12708E - 3201N 12633E. ATC WILL NOT CLEAR NON-PARTICIPATING IFR FLT THRU THIS AREA. F) FL220
G) FL230)

Corrected NOTAM

A7333/14NOTAMN
Q) RJTG/QRACH/IV/NBO/**W**/220/230/3533N15022E999
A) **RJTG** B) 1412272315 C) 1412280515
E) TOKYO FIR MULTIPLE U.S.MIL ACT WILL BE CONDUCTED WI TOKYO FIR AS FLW, BOUNDED BY THE POINTS
3201N 12633E - 3230N 12650E - 3230N 12712E -
3025N 12752E - 3015N 12708E - 3201N 12633E. ATC WILL NOT CLEAR NON-PARTICIPATING IFR FLT THRU THIS AREA. F) FL220
G) FL230

3.19.1.7 If a NOTAM is received with 'Scope' 'A' and an FIR in Item A), and if Item E) confirms the NOTAM applicability to an FIR, the NPU shall modify the 'Scope' to 'W' or 'E', whichever is more appropriate. If the NSC do not provide for 'Scope' 'W' or 'E' to be applied, the 2nd and 3rd letters shall be modified to read 'XX'. However, if Item E) indicates applicability to an Aerodrome, changes to Item A) and to Item Q) ('Scope' 'AE' or 'AW') might be necessary.

3.19.1.8 If a NOTAM is received with 'Scope' 'E' or 'W' and an aerodrome in Item A), and if Item E) confirms the NOTAM applicability to an aerodrome, the NPU shall modify the 'Scope' to 'AW' or 'AE', whichever is more appropriate. However, if Item E) indicates applicability to an FIR, a change to Item A) might be necessary.

Example: Incoming original NOTAM:

A2222/14 NOTAMN
Q) MUFH/QRACA/IV/BO/**W**/000/180/1918N10013W025
A) **MUHA** B) 1401211500 C) 1401312359
D) DAILY 1500-2359
E) AIRSPACE RESERVATION BTN UNG AND UCA, ACTIVITY

```
COORD WITH TWR MUHA.
F) GND G) 18000FT AMSL
```

Corrected NOTAM

```
A2222/14 NOTAMN
Q) MUFH/QRACA/IV/BO/AW/000/180/1918N10013W025
A) MUHA B) 1401211500 C) 1401312359
D) DAILY 1500-2359
E) AIRSPACE RESERVATION BTN UNG AND UCA, ACTIVITY
COORD WITH TWR MUHA.
F) GND G) 18000FT AMSL
```

3.19.2 Item A) – Location 'FIR/AD' – Single-location NOTAM

3.19.2.1 This shall always be the ICAO location indicator of one aerodrome or FIR.

3.19.2.2 In the case of one FIR, the entry must be identical to the Qualifier 'FIR' in Item Q). If not, this entry shall be corrected by the NOTAM Processing Unit.

3.19.2.3 If an aerodrome indicator is given, it must be an aerodrome situated in the FIR inserted in Item Q). If not, the FIR in Item Q) shall be changed according to the static database.

3.19.2.4 For aerodromes without an ICAO location indicator, Item A) shall contain the nationality indicator followed by 'XX' or 'XXX' (e.g. EDXX or CXXX), with the full name of the aerodrome as the first element in Item E).

3.19.2.5 If Item A) of a received NOTAM contains the full name of an aerodrome, the NOTAM Processing Unit shall replace it by a 4–letter code consisting of the nationality indicator followed by 'XX' or 'XXX' (e.g. LFXX or CXXX), and shall enter the full name in Item E).

Examples:

`A) EBBU` (ICAO location indicator for a single FIR)

`A) LFPO` (ICAO location indicator for an aerodrome)

`A) FBXX` (no location indicator published by Botswana)

In the latter example, Item E) shall contain the full name of the aerodrome as its first element, e.g.:

`E) BOTTLEPAN …..`

3.19.3 Item A) – Location 'FIR/AD' – Multi-location NOTAM

3.19.3.1 If multiple aerodromes are inserted in Item A), the NOTAM Processing Unit shall retain only the first indicated aerodrome. For the remaining aerodromes, one or more NOTAM Series 'T' shall be issued with identical data as in the original NOTAM until all original indicated aerodromes are covered.

3.19.3.2 Such NOTAM Series 'T' shall follow the rules described in paragraph 3.13.

3.19.3.3 In cases where a NOTAM contains information covering several FIR belonging to more than one country, the Qualifier 'FIR' in Item Q) shall contain the Publishing NOF's nationality Code followed by 'XX' or 'XXX' (e.g. EDXX or CXXX). If this procedure is not applied by the Publishing NOF, the NOTAM Processing Unit shall correct the Item Q).

3.19.4 Item B) – Start of activity

3.19.4.1 This shall be a 10 figure date-time group, giving the year, month, day, hour and minutes at which the NOTAM comes into force (paragraph 2.3.16 refers).

3.19.4.2 If 'WIE' (With Immediate Effect) appears in Item B), the NOTAM Processing Unit shall replace it with a 10 figure date/time group corresponding to the time of origin of the original NOTAM.

3.19.4.3 If Item B) contains 'SR' or 'SS' and the NOTAM Processing Unit can calculate an actual time, it shall replace the letters with that time. If, however, the actual time cannot be calculated, the NOTAM Processing Unit shall insert '0000' and add or complete an Item D) with the given 'SR' or 'SS'.

3.19.5 Item C) – End of validity

3.19.5.1 This shall be a 10 figure date-time group, giving the year, month, day, hour and minutes at which the NOTAM ceases to be in force and becomes invalid (ref paragraph 2.3.17).

3.19.5.2 If 'UFN' (Until Further Notice) appears in Item C), the NOTAM Processing Unit shall process the NOTAM with an Item C) changed to an 'EST' time of 48 hours added to the DTG indicated in Item B).

3.19.5.3 If 'APRX DURATION' appears in Item C), the NOTAM Processing Unit shall change it into a Date/Time Group of 10 figures, corresponding to the approximate duration given, followed by 'EST'.

3.19.5.4 If the end of the day is expressed as '2400', the NOTAM Processing Unit shall change it to read '2359'

3.19.5.5 If Item C) contains 'SR' or 'SS' and the NOTAM Processing Unit can calculate an actual time, it shall replace the letters with that time. If, however, the actual time cannot be calculated, the NOTAM Processing Unit shall insert '2359' and add or complete an Item D) with the given 'SR' or 'SS'.

3.19.5.6 NOTAM containing 'EST' or an approximate duration should, at the end of the estimated validity, be replaced by NOTAMR or cancelled by NOTAMC. If the Publishing NOF does not react at the end of the estimated validity, the NOTAM Processing Unit shall request action from all the Publishing NOF concerned at least once a month.

3.19.6 Item D) – Day/Time schedule

3.19.6.1 If the Item D) of the original NOTAM is not structured according to the procedures as detailed in paragraph 2.3.18 till 2.3.21, and if no ambiguity about the originator's intention is present (for example Item E) may contain clear specification), it shall be edited by the NOTAM Processing Unit in accordance with these specifications.

3.19.6.2 If PIB service is provided based on active NOTAM, it is recommended to assure that Item D) does not contain operating hours or other dates/times where the NOTAM would appear at date/times for which there is no restriction.

3.19.6.3 Item D) shall not exceed 200 characters. If it does, then the Item D) time schedule shall be removed and inserted at the end of Item E). This procedure will, however, exclude automatic retrieval into Pre-flight Information Bulletins on the specified days and times.

3.19.7 Item E) – NOTAM text

3.19.7.1 The NOTAM Processing Unit shall check the correspondence between the Item E) text and the NOTAM Code.

3.19.7.2 If a NOTAM is received in a non-standard format, the NOTAM Processing Unit must identify the subject and select the relevant NOTAM Code. If Item E) contains more than one subject, the subject of highest operational importance, based on the appropriate 'Purpose' Qualifier, shall be inserted in Item Q).

3.19.7.3 If the NOTAM Code is already present in Item E) of the original NOTAM, it shall be moved to Item Q) and decoded in Item E); using the text provided in the NOTAM Selection Criteria.

3.19.7.4 If the text in Item E) contains clear restrictions or limitations for an aerodrome or FIR not covered by Item A), the NOTAM Processing Unit shall add the missing FIR in Item A) and/or shall issue one or more NOTAM Series 'T' with identical data as in the original NOTAM until all originally indicated aerodromes and/or FIR are covered and with reference to the original NOTAM. Refer also to paragraph 3.13 for the creation of NOTAM Series 'T'.

3.19.7.5 All navigational data, navigation aids, frequencies, location indicators, heights and any logical combinations shall be verified.

3.19.7.6 If the text in the Item E) is ambiguous, the NOTAM Processing Unit shall make the original NOTAM available with the text 'NOTAM Subject to Query' added to the beginning of Item E) according to the procedures described in paragraph 3.12.

3.19.8 Items F) and G) – Lower and Upper LImit

3.19.8.1 If Item F) and G) appear in the NOTAM, refer to guidance at paragraph 2.3.23.

3.19.8.2 NOTAM Processing Unit shall make sure that Lower and Upper limits in Items F) and G) are inserted for Navigation Warnings (NOTAM Codes 'QW...' or 'QR…'). If these Items are missing, the NOTAM Processing Unit shall add them after verification of the data in Item E), or in the Item Q) 'Lower/Upper' Qualifiers, or in the Static Database, and/or after consultation with the Publishing NOF. Use of the paragraph 3.12 'NOTAM Subject to Query' procedure may be required.

3.19.8.3 If NOTAM other than Navigation Warnings (NOTAM Codes 'QW...' or 'QR…'). are received with Items F) and G), the vertical limits shall be transferred to Item E) using the keywords 'FROM' and 'TO' followed by the appropriate values (e.g. 'FROM 1000FT AMSL TO FL100').

3.19.8.4 If the values specified in Items F) and G) do not cover the limits mentioned in Item E), the NOTAM Processing Unit shall:

-change the values in Item F) or in Item G) to correspond to the lowest (Item F) or the highest (Item G) value mentioned in Item E); and

-use 'NOTAM Subject to Query' procedure in paragraph 3.12 and contact the Publishing NOF to clarify the content of the NOTAM.

3.19.8.5 The values specified in Items F) and G) shall not be changed, whenever the limits in Item F) or G) are respectively lower or higher than the limits specified in Item E).

3.19.8.6 If no Item F) (Lower limit) has been specified in a NOTAM that contains an Item G), but from Items Q) or E) it is obvious that the Lower limit is sea or ground, then the term 'SFC' (surface) shall be inserted in Item F). 'SFC',will be used instead of 'GND' because precise topographic information concerning the area of influence of the NOTAM may not be available.

3.19.8.7 If 'AGL' or 'AMSL' is omitted and the datum cannot be determined, the NOTAM Processing Unit shall add 'AMSL' to the lower limit and 'AGL' to the upper limit.

3.20 Procedures Related to NOTAM 'R' Processing

3.20.1 NOTAMR are issued in the same series as the NOTAMN or NOTAMR referred to. If this is not the case, the NOTAM Processing Unit shall verify whether the Items of the 'to be replaced' NOTAM correspond to the NOTAMR. If the Items correspond, the NPU shall make the NOTAM available as a NOTAMN and shall delete the 'to be replaced' NOTAM. The paragraph 3.12 procedure for 'NOTAM Subject to Query' shall be applied.

3.20.2 NOTAMR should replace only one NOTAMN or NOTAMR. If more than one NOTAM are replaced by one NOTAMR, the NOTAM Processing Unit shall change the NOTAMR to replace only the first one in the list and shall delete all the others. If it is identified that this is a recurring error, the Publishing NOF shall be requested to adhere to the published ICAO Standards (ICAO Annex 15, Ref. [1] paragraph 5.2.7 and Doc 8126, Ref. [2] Chapter 6 refer).

3.20.3 NOTAMR should relate to the same subject (2nd and 3rd letters of the NOTAM Code) as the NOTAMN or NOTAMR referred to. If this is not the case, the NOTAM Processing Unit shall compare the two NOTAM subjects, and make the potential necessary changes, when these are obvious from the message contents.

3.20.4 NOTAMR shall have the same Item A) content as the NOTAMN or NOTAMR referred to. If this is not the case, the NOTAM Processing Unit shall compare the Item A) of both NOTAM with the data in Item E) and make any necessary changes. If Item A) of the NOTAMR should be changed to the same value as the NOTAM it replaces, the change will be done in the processed NOTAMR. If, however, Item A) of the NOTAMR cannot be changed (e.g. if the activity has moved to a separate FIR), this NOTAMR shall be processed as a NOTAMN and the 'to be replaced' NOTAM shall be deleted. If Item Q) 'Scope' contains 'A', the paragraph 3.12 procedure for 'NOTAM Subject to Query' shall be applied.

3.20.5 According to paragraph 2.4.1.5, Item B) of a NOTAMR is equal to the date/time the NOTAMR is created. The NOTAM replaced by a NOTAMR ceases to exist the moment its replacing NOTAM is received.

Although ICAO does not allow for the creation of NOTAMR coming into force at a future date, some States may continue to use this practice. There is no clear guidance on the handling of the NOTAM being replaced. If a NOTAMR with an Item B) in the future is received, automated processing of the NOTAM shall be discontinued for further analysis to ensure correct database storage. Ensure the intent of the issuing State is understood prior to processing the NOTAM.

3.20.5.1 In a first step, NOTAM Items B), through G) (as applicable) of the newly received NOTAMR shall be compared with the NOTAM being replaced to analyse the intention of the originator with respect to the validity of the replaced NOTAM. Possible scenarios:

a) Case 1:

The replaced NOTAM ceases to exist at the very moment the NOTAMR is created. The replaced NOTAM does not appear in a PIB or checklist anymore.

This case usually applies when Item B) of the replaced NOTAM and Item B) of the NOTAMR are identical or if no other changes can be identified apart from the changes in Item B) (and D). The NOTAM can be considered as referring to a situation where the activity is suspended.

b) Case 2:

The replaced NOTAM remains valid until item B of the NOTAMR is reached. In PIB, the replaced NOTAM will appear until item B of the replacing NOTAM is reached. Item C) of the replaced NOTAM shows the new end date/time. Both NOTAM appear in a checklist created before Item B) of the NOTAMR.

<u>Example:</u>

```
012056 OSDIYNYX
(A0111/14 NOTAMN
Q) OSTT/QXXXX/IV/M/E/000/999/…….. 
A) OSTT B) 1411010001 C) 1403312359EST
E) WINTER LOCAL TIME UTC PLUS 2HR WILL BE USED.)
```

NOTAM created 29 MAR 2014:

```
290908 OSDIYNYX
(A0038/14 NOTAMR A0111/14
Q) OSTT/QXXXX/IV/M/E/000/999/………...
A) OSTT B) 1404032200 C) 1410312100EST
E) SUMMER LOCAL TIME UTC PLUS 3HR WILL BE USED.)
```

In this specific example case 1 can be excluded as the content of the NOTAM describes a phenomena that is globally known, the NOTAMR can be considered as referring to a situation where the condition in the replaced NOTAM remains valid for a certain period before being replaced by a new situation and that the new situation ends earlier or later than originally planned. Case 2 has to apply or no time is applicable between MAR 29 0908 and APR 03 2200 or the time published in AIP which is not likely to be the case.

Note: for the example provided, this means that as soon as A0038/14 is stored in the database, Item C) of A0111/13 is replaced by Item B) of the NOTAMR and shows the new expiry date C) 1404032200.

c) Case 3:

The situation is unclear. The operator is unable to identify if the NOTAM being replaced is superseded immediately or if both NOTAM remain valid until Item B) of the NOTAMR is reached and the originator's system design is unknown.

Example:

NOTAM created 26 DEC 2012:

```
261637 LIIAYNYX
(B3326/12 NOTAMN
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B)1301150500 C) 1303311100EST
E) THR RWY 14 DISPLACED 300M. DECLARED DIST
CHANGED:          …….)
```

NOTAM created 01 MAR 2013:

```
011035 LIIAYNYX
(B1893/13 NOTAMR B3326/12
Q) LIMM/QMDCH/IV/NBO/A/000/999/4525N01019E005
A) LIPO B)1303070000 C) 1304101800
E) THR RWY 14 DISPLACED 200M. DECLARED DIST
CHANGED:         …….)
```

Note: The situation could refer to a situation where the condition in the replaced NOTAM remains valid for a certain period before being replaced by a new situation and that the new situation ends later than originally planned or it could refer to a situation where the planned works are suspended (or Item B) was incorrect) and restart from a later date with changed limitations (or 300 M was a typing error).

3.20.5.2 In a second step, appropriate action is taken by the operator to assure correct storage. Different procedures apply for cases 1 and 2. No specific further procedures are provided for these cases as all actions depend on what the system is designed to do without operator intervention and on the extent of manual intervention a system allows. Any operator action should be traceable.

For case 3, the ‘NOTAM Subject to Query’ procedure shall be applied to clarify the situation. Depending on the analysis, clarification must be reached with the originating NOF whether the NOTAMR was intended to be a continuation of the NOTAM to be replaced, a suspension, an error, a completely different time schedule etc.

3.20.6 In case a NOTAMR is received that replaces only an individual part of a Multi-part NOTAM, the NOTAM Processing Unit shall amend the original Multi-part NOTAM and make all parts of it available to its Client as NOTAMR. If ambiguity is detected the paragraph 3.12 procedure for ‘NOTAM Subject to Query’ shall be applied.

3.20.7 In case of a NOTAMR replacing an AIP Supplement, the NOTAM Processing Unit shall change the original NOTAMR into a NOTAMN; and, if appropriate, issue a NOTAMC in Series ‘T’ to cancel any previously issued Trigger NOTAM in Series ‘T’.

3.21 Procedures Related to NOTAM ‘C’ processing

3.21.1 NOTAMC are issued in the same series as the NOTAMN or NOTAMR referred to. If this is not the case, the NOTAM Processing Unit shall verify whether the Items of the ‘to be cancelled’ NOTAM correspond to the NOTAMC. If the Items correspond, the NPU shall make the NOTAM available as a NOTAMN and shall delete the ‘to be cancelled’ NOTAM.

3.21.2 NOTAMC should cancel only one NOTAMN or NOTAMR. If more than one NOTAM are cancelled by one NOTAMC, the NOTAM Processing Unit shall change the NOTAMC to cancel only the first one in the list and shall delete all the others.

3.21.3 NOTAMC should come into force at the time they are issued, and immediately cancel the NOTAMN or NOTAMR referred to.

3.21.4 According to paragraph 2.4.1.5, Item B) of a NOTAMC is equal to the date/time the NOTAMC is created. The NOTAM replaced by a NOTAMC ceases to exist the moment its cancelling NOTAM is received.

3.21.4.1 Contrary to NOTAMR with an Item B) in the future, a NOTAMC with Item B) in the future is always a change to Item C) of the cancelled NOTAM and may be a prolongation or a shortening. Item B) of the NOTAMC is equal to or later than Item B) of the cancelled NOTAM.

Similar procedures as for case 2 for NOTAMR with Item B) in the future can be applied (the cancelled NOTAM remains valid until Item B) of the NOTAMC is reached).

However, ‘NOTAM Subject to Query’ procedure shall be applied to obtain confirmation from the Publishing NOF and to exclude that item B) of the NOTAMC had been a typing error.

3.21.4.2 If Item B) of the NOTAMC is later than the date/time of reception but earlier than Item B) of the cancelled NOTAM, procedures in force for case 1 have to be applied and the cancelled NOTAM is cancelled with immediate effect. The NOTAMC was obviously issued in error or should have been a NOTAMR instead. ‘NOTAM Subject to Query’ procedure applies to clarify the status of the cancelled NOTAM with the Publishing NOF.

If clarification results in a reply that the NOTAMC should have been a NOTAMR instead, a NOTAM series ‘T’ has to be issued if the publishing NOF does not correct the erroneous NOTAMC by publishing a NOTAMN. The same applies if a ‘correct version’ is published instead of NOTAMN. The series ‘T’ NOTAM contains all data from the erroneously cancelled NOTAM, Item B) the date and times from the NOTAMC.

3.21.5 For all NOTAMC, the text of the decoded NOTAM Code shall be inserted in Item E) together with details of the NOTAM subject. If no text is inserted by the Publishing NOF, the NOTAM Processing Unit shall insert a reference to the cancelled NOTAM subject followed, in a new line, by the text ‘NOTAM CANCELLED’.

3.21.6 If a NOTAMC contains an Item A) but does not contain Items Q), B) or E), the NOTAM Processing Unit shall fill in the missing compulsory Items.

- Item Q) NOTAM Code 2nd and 3rd letters shall be derived from the NOTAM to be cancelled.

- Item Q) NOTAM Code 4th and 5th letters shall be ‘XX’ (unless an Item E) text had been provided to confirm use of ‘AK’, ‘AL’, ‘AO’, ‘CC’, ‘CN’ or ‘HV’.).
- Item Q) other Qualifiers shall be identical to those in the cancelled NOTAM (ref. paragraph 2.4.3.8).
- Item B) shall be the date and time of filing the NOTAMC.
- Item E) shall contain a reference to the cancelled NOTAM subject followed, in a new line, by the text ‘NOTAM CANCELLED’.

Example: Incoming original NOTAM

```
231639 KDZZNAXX
A1326/14 NOTAMC A1324/14
A) KJFK
```

Corrected NOTAM

```
A1326/14 NOTAMC A1324/14
Q) KZNY/QMRXX/IV/NBO/A/000/999/4038N07347W005
A) KJFK B) 1407231639
E) RWY 13L/31R NOTAM
CANCELLED
```

3.21.7 If a NOTAMC cancels an AIP Supplement, the NOTAM Processing Unit shall:

- Change the original NOTAMC into a NOTAMN.
- Insert an Item C) according to paragraph 2.7.5.3.1.
- Issue a NOTAMR or a NOTAMC in Series ‘T’ in accordance with the rules described in paragraph 2.7.5 to cancel previously issued Trigger NOTAM in Series ‘T’, if any.

3.22 Checklist Processing

3.22.1 General principles

3.22.1.1 A received Checklist shall be processed and made available to all Clients by the NOTAM Processing Unit.

3.22.1.2 Checklists may also be received as NOTAMN and/or without an ‘EST’ indication in Item C) (ref paragraph 2.5.1.6 and 3.22.2.9).

3.22.1.3 Checklists shall be edited and corrected.

3.22.1.4 In the event of any ambiguities, e.g.:

- a valid NOTAM is not included in the Checklist; or
- a NOTAM included in the Checklist is not in the database, etc.

The NOTAM Processing Unit shall request clarification from the Publishing NOF and analyse the differences (paragraph 3.12 procedures for ‘NOTAM Subject to Query’ refers).

Procedures described in paragraph 3.23 and 3.24 are applied in order to resolve the ambiguities.

3.22.2 Checklist received as a NOTAM

3.22.2.1 If a Checklist is received as a NOTAM, but it is not in the agreed NOTAM Checklist format (paragraph 2.5 refers), the NOTAM Processing Unit shall convert it as described hereafter:

3.22.2.2 The NOTAM Series, Number and Type shall be retained.

3.22.2.3 Item Q)'FIR' Qualifier shall be:

- the FIR of the Publishing NOF, if responsible for only one FIR; or
- the 2–letter country indicator of the Publishing NOF followed by 'XX', if the Publishing NOF is responsible for multiple FIR (in the same or in different countries).

3.22.2.4 The NOTAM Code shall always be 'QKKKK'.

3.22.2.5 Item Q) 'Traffic', 'Purpose' and 'Scope' Qualifiers shall be given the artificial value 'K', even if another Qualifier was included by the Publishing NOF.

3.22.2.6 Item Q)'Lower/Upper' Qualifiers shall be the default values '000/999'.

3.22.2.7 Item Q) geographical reference and radius Qualifiers are required and, if missing, they shall be entered by the NOTAM Processing Unit.

3.22.2.8 Item A) should contain the list of all valid FIR for the Publishing NOF and, if any are missing, they shall be added by the NOTAM Processing Unit.

However, for States with a NOF but no own FIR (e.g. Swaziland, Lesotho, Macao), the location indicator of the main aerodrome will be entered in Item A). Otherwise the Checklist cannot be associated with the Publishing NOF (e.g. Lesotho would have a Series A Checklist with Q-FIR + Item A) FAJS which is the same as for South African A Series).

3.22.2.9 Item C) should indicate the estimated time of validity, usually exactly one month after the date and time of the publication of the current Checklist, followed by 'EST'. Whenever another date/time group is entered by the Publishing NOF, the NOTAM Processing Unit shall not change it.

3.22.2.10 Item E) should be divided into two parts:

NOTAM Number part, identified by 'CHECKLIST'

Should contain a list of the valid NOTAM issued in a particular series, in a format suitable for automatic and manual processing as described in paragraph 2.5.

If necessary, the NOTAM Processing Unit shall convert the Checklist into this format.

Latest publication part, identified by 'LATEST PUBLICATIONS'

Should contain a list of the latest publications (Amendments, Supplements and AIC).

This part shall be made available as received. If this part is not present in the original NOTAM, the NOTAM Processing Unit shall make the Checklist available without this Latest Publication Part.

3.22.3 Checklist Not Received as a NOTAM

3.22.3.1 If a NOTAM Checklist is not received as a NOTAM (i.e. when no NOTAM number has been allocated to the Checklist), the NOTAM Processing Unit shall create a series T NOTAM applying the regulations in 3.22.2.

3.23 Missing NOTAM

3.23.1 If NOTAM are missing, the NOTAM Processing Unit shall request them from the Publishing NOF using a Request message. Chapter 4 details the procedure but the syntax requirements of the Publishing NOF shall be observed.

3.23.2 Time parameters for initiating the first request message and successive repetitions of the message shall be defined by the NOTAM Processing Unit and may vary depending on the Publishing NOF.

3.24 NOTAM Deletion

3.24.1 The processing of NOTAM not adhering to the ICAO Standard may force a NOTAM Processing Unit to delete NOTAM by means other than a NOTAMR or a NOTAMC if:

a) The NOTAM is cancelled by a printed publication (AIP AMDT, AIP SUP, etc.).

b) The NOTAM is cancelled by a checklist.

c) The NOTAM is cancelled by an AFS free text message from the Publishing NOF.

d) The NOTAM is cancelled or replaced by a NOTAMC or a NOTAMR with more than one NOTAM to be cancelled or replaced.

e) The NOTAM is deleted because an updated/corrected version of the NOTAM is to follow.

3.24.2 NPU Clients shall receive notification of deletion of a NOTAM (see chapter 6 for notification mechanism).

4 DATABASE COMPLETENESS AND COHERENCE MESSAGES

4.1 General principles

4.1.1 The maintenance of dynamic data is essential for the efficient operation of a NOTAM Processing Unit, a Publishing NOF or for an aeronautical database administrator. The application of ‘query messages’ is required to ensure the database completeness and coherence. Query messages based upon the use of AFS (but not restricted to AFS) are described in this Chapter. They were developed so as to permit automatic and manual processing of queries.

4.1.2 The basic requirements for messages destined for the maintenance of the dynamic data are:

- Request for one or more NOTAM.
- Request for the original version of a NOTAM.
- Request for an intermediate Checklist of valid NOTAM.

4.1.3 In order to facilitate automatic processing, the requests and the replies to the requests are identified by means of 3–letter identifiers.

Request for NOTAM:	‘RQN’
Request for ‘original version’ NOTAM:	‘RQO’
Request for ASHTAM:	‘RQA’
Request for an intermediate Checklist:	‘RQL’
Reply to these requests:	‘RQR’

4.1.4 For the avoidance of network overload, the number of requested NOTAM in a single request message shall be limited in ‘RQN’ or in ‘RQO’. It is recommended that the maximum is set to 100.

4.1.5 Request shall include the 4-letter indicator of the Publishing NOF or any other location indicator to which the numbering of the required NOTAM refers (e.g. an automated system with another AFS address than the Publishing NOF location indicator).

4.1.6 A reply message shall contain only one NOTAM (or several messages in the case of a multi-part NOTAM), or a status text regarding the requested NOTAM, normally followed by the requested NOTAM.

4.1.7 A request shall refer to only one Publishing NOF.

4.1.8 If a request contains a syntax error, the recipient of the request will inform the originator that an error has been detected in the request message.

4.2 Request for the repetition of NOTAM (RQN)

4.2.1 Codes and symbols used

4.2.1.1 Note that no brackets shall be used when transmitting a ‘Request NOTAM’ message. The following codes and symbols are used in requests for repetition:

‘RQN’	the designator for ‘Request NOTAM’.

'LFFA'	the 4-letter indicator of the Publishing NOF or other location indicator to which the numbering of the NOTAM refers.
'A0123/00'	the NOTAM Series Identifier and NOTAM Number.
' - '	(hyphen) is used to indicate 'TO' or 'FROM-TO'.
' '	(blank) is interpreted as 'AND'.
'RQR'	the designator for the reply.

4.2.2 Examples of the request for NOTAM

4.2.2.1 Request for a single NOTAM

Example 1: French NOF requests from Italian NOF the Italian NOTAM A0123/14.

Request:

```
        ZCZC ...
    GG LIIAYNYX
160830 LFFAYNYX RQN LIIA
A0123/14
```

Reply:

```
        ZCZC ...
    GG LFFAYNYX
160835 LIIAYNYX RQR LIIA
A0123/14 (A0123/14
NOTAMN
Q) .../..../....          etc.)
```

Example 2: French NOF requests from German NOF the Polish NOTAM A1253/14.

Request:

```
        ZCZC ...
    GG EDDZYNYX
160900 LFFAYNYX RQN EPWW
A1253/14
```

Reply:

```
        ZCZC ...
    GG LFFAYNYX
160905 EDDZYNYX RQR EPWW
A1253/14 (A1253/14
NOTAMN
Q) .../..../....          etc.)
```

4.2.2.2 Request of several NOTAM with continuous numbering

Example 3: French NOF requests from German NOF the Cypriot NOTAM between A0199/14 and A0210/14.

Request:

```
        ZCZC ...
    GG EDDZYNYX
    281030 LFFAYNYX
```

```
RQN LCNC A0199/14-A0210/14
```

Reply:

```
    ZCZC ...
  GG LFFAYNYX
  281035 EDDZYNYX
RQR LCNC A0199/14
(A0199/14 NOTAMN
Q) .../..../....        etc.)
```

Note: The full Reply consists of 12 messages containing one NOTAM each.

4.2.2.3 Request for several NOTAM with discontinuous numbering

Example 4: French NOF requests from German NOF the Russian Federation NOTAM A0400/14, A0410/14 and NOTAM between A0420/14 and A0425/14.

Request:

```
    ZCZC ...
  GG EDDZYNYX
  281530 LFFAYNYX
RQN UUUU A0400/14 A0410/14 A0420/14-
A0425/14
```

Reply:

```
    ZCZC ...
  GG LFFAYNYX
281540 EDDZYNYX RQR UUUU
A0400/14 (A0400/14
NOTAMN
Q) .../..../....        etc.)
```

Note: The full Reply consists of 8 messages containing one NOTAM each.

4.3 Request for the original version of NOTAM (RQO)

4.3.1 General specification

4.3.1.1 A NOTAM Processing Unit will normally transmit only the processed version of NOTAM to its clients. Whenever a NPU client needs the original version of a NOTAM, it can be obtained by sending a ‘Request for Original NOTAM’ message (RQO) to the NOTAM Processing Unit.

4.3.1.2 RQO is to be used only in data exchange between the NPU Client and NOTAM Processing Unit.

4.3.1.3 A reply message shall contain the ‘status line’: ‘ORIGINAL NOTAM’, followed by a single NOTAM.

4.3.1.4 The reply message of an original NOTAM shall always include the original origin line (DTG + Publishing NOF address).

4.3.2 Codes and symbols used

4.3.2.1 The following codes and symbols are used in requests for the original version:

‘RQO’ the designator for ‘Request Original NOTAM’.

'LFFA'	the 4-letter indicator of the Publishing NOF or other location indicator to which the numbering of the NOTAM refers.
'A0123/14'	NOTAM Series Identifier and NOTAM Number.
' - '	(hyphen) is used to indicate 'TO' or 'FROM-TO'.
' '	(blank) is interpreted as 'AND'.
'RQR'	the designator for the reply.

4.3.3 Example of the request for original NOTAM

Example 5: French NOF requests from German NOF the Original NOTAM KJFK A0553/14.

Request:
```
ZCZC ...
GG EDDZYNYX
160900 LFFAYNYX RQO KJFK
A0553/14
```

Reply:
```
ZCZC ...
GG LFFAYNYX
160910 EDDZYNYX RQR KJFK
A0553/14
ORIGINAL NOTAM
052255 KDZZNAXX
(A0553/14 NOTAMN
A) KJFK B) WIE C) UFN E)
...etc.
```

4.4 Request for the Repetition of ASHTAM (RQA)

4.4.1 Codes and Symbols used

4.4.1.1 Note that no brackets will be used when transmitting a 'Request ASHTAM' message. The following codes and symbols are used in requests for repetition:

'RQA'	the designator for 'Request ASHTAM'.
'SAEF'	the 4-letter indicator of the FIR to which the numbering of the ASHTAM refers.
'0134'	ASHTAM Number.
' - '	(hyphen) is used to indicate 'TO' or 'FROM-TO'.
' '	(blank) is interpreted as 'AND'.
'RQR'	the designator for the reply.

4.4.1.2 RQA followed by the 4-letter indicator of an FIR will result in the repetition of all valid ASHTAM for the FIR requested.

4.4.1.3 RQA followed by the 4-letter indicator of an FIR and ASHTAM number will result in the repetition of the requested ASHTAM only.

4.4.2 Examples of the Request for ASHTAM

4.4.2.1 Request of all valid ASHTAM for an FIR

Example 6: French NOF requests from Italian NOF all valid ASHTAM for SAVF.

Request:
```
ZCZC ...
GG LIIAYNYX
161600 LFFAYNYX
RQA SAEF
```

Reply:
```
ZCZC ...
GG LFFAYNYX
161601 LIIAYNYX
RQR SAEF
VASA0123 SAEF 14161515
ASHTAM 0123
A) ...   etc.

ZCZC ...
GG LFFAYNYX
160835 LIIAYNYX
RQR SAEF
VASA0121 SAEF 14152225
ASHTAM 0121
A) ...   etc.
```

Example 7: French NOF requests from Italian NOF all valid ASHTAM for WAAF.

Request:
```
ZCZC ...
GG LIIAYNYX
161600 LFFAYNYX
RQA WAAF
```

or ….. /
Reply:
```
ZCZC ...
GG LFFAYNYX
161601 LIIAYNYX
RQR WAAF
NO VALID ASHTAM IN DATABASE
```

4.4.2.2 Request fora single ASHTAM

Example 8: French NOF requests from Italian NOF the SAEF ASHTAM 0123.

Request:
```
ZCZC ...
GG LIIAYNYX
161600 LFFAYNYX
RQA SAEF 0123
```

Reply:
```
ZCZC ...
GG LFFAYNYX
161601 LIIAYNYX
RQR SAVF 0123
VASA0123 SAEF 14161515
```

```
ASHTAM 0123
A) ...   etc.
```

4.5 Content of the reply messages (RQR)

4.5.1 General specification

4.5.1.1 A Reply message to RQN and RQO contains only one NOTAM (or one part of a Multi-part NOTAM).

4.5.1.2 A single ‘RQN’ or ‘RQO’ request for multiple NOTAM shall result in multiple reply messages unless the requested NOTAM are not available for a reply (exception paragraph 4.5.1.7 refers).

4.5.1.3 In reply to a RQN, if the queried NOTAM has been processed by the NPU, the reply message shall contain the location indicator of the NPU as the originator instead of the code of the Publishing NOF.

4.5.1.4 In reply to a RQO, the status line with the status expression 'ORIGINAL NOTAM’ shall precede the original NOTAM. No additional information about the current status/validity of this NOTAM shall be provided.

4.5.1.5 If the queried NOTAM is no longer valid or not available, this status will be communicated through the reply as follows:

a) if the NOTAM is no longer valid, a ‘status line’ will precede the transmission of the requested NOTAM.

b) if the NOTAM is not available, only a relevant ‘status line’ will be transmitted.

4.5.1.6 Only one ‘status line’ shall be included in the reply and it shall contain only one status expression.

4.5.1.7 In order to limit the number of RQR messages in reply to a RQN for more than one NOTAM and when these NOTAM are not available in the NPU’s database, the RQR shall contain all NOTAM numbers concerned by the same reply: ‘NOTAM REQUESTED’ or ‘NOTAM NO LONGER IN DATABASE’ or ‘NOTAM NOT ISSUED’. For example, instead of 99 RQR messages with ‘NOTAM NOT ISSUED’, only one RQR shall be sent.

4.5.1.8 The database should allow repetition of no longer valid NOTAM for a period of 3 months.

4.5.1.9 NOTAM Processing Unit shall provide their NPU Clients with a list of the available NOTAM series for each Publishing NOF. This list shall contain the 4-letter indicators that uniquely identify the Publishing NOF or any other location indicator to which the numbering of the NOTAM in the series refers.

4.5.2 Standard expressions in reply messages

4.5.2.1 The following mandatory statements shall be mentioned in the reply when appropriate:

'NOTAM EXPIRED'	Item C) time was reached.
'NOTAM REQUESTED'	The NOTAM Processing Unit has requested the requested NOTAM but not yet received it.
'NOTAM CANCELLED BY A1324/14'	The NOTAM was cancelled by a NOTAMC.
'NOTAM DELETED'	The NOTAM was deleted by the NOTAM Processing Unit. Reasons for deletion might be for example that the NOTAM was omitted from the Checklist, deleted by printed publication, or other information was received from Publishing NOF.
'NOTAM NO LONGER IN DATABASE'	The NOTAM has expired, been replaced, cancelled or deleted more than 3 months ago.
'NOTAM NOT ISSUED'	The Publishing NOF has not issued the requested NOTAM.
'NOTAM REPLACED BY C3042/14'	The NOTAM was replaced by a NOTAMR.
'ORIGINAL NOTAM'	Original version of the NOTAM.
'NO VALID NOTAM IN DATABASE'	For reply on a RQL if no valid NOTAM is available.
'NO VALID ASHTAM IN DATABASE'	For reply on a RQA if no valid ASHTAM is available.

4.5.3 Examples for status of NOTAM

Example 9: The requested Egyptian NOTAM A0400/14 is expired.

Reply:
```
ZCZC ...
GG LFFAYNYX
281600 LIIAYNYX
RQR HECA A0400/14
NOTAM EXPIRED
(A0400/14 NOTAMN
Q) .../.../.... etc.)
```

Example 10: The requested Senegal NOTAM A0213/14 was not received by the NOTAM Processing Unit.

Reply:

If a gap in the NOTAM numbers is detected:
```
ZCZC ...
GG EDDZYNYX
091430 LFFAYNYX
RQR GOOO A0213/14
NOTAM REQUESTED
```

or if the NOTAM number is greater than the last one received :
```
ZCZC ...
GG EDDZYNYX
091430 LFFAYNYX
RQR GOOO A0213/14
NOTAM NOT ISSUED
```

or if the NOTAM was cancelled, replaced or deleted
```
ZCZC ...
GG EDDZYNYX
091430 LFFAYNYX
RQR GOOO A0213/14
NOTAM CANCELLED BY A0222/14
```
or … `NOTAM REPLACED BY A0233/14`
or … `NOTAM DELETED`

Example 11: The requested Tahiti NOTAM A0021/14 was cancelled.

Reply:
```
ZCZC ...
GG LIIAYNYX
301235 LFFAYNYX
RQR NTAA A0021/14
NOTAM CANCELLED BY A0023/14
(A0021/14 NOTAMR A0017/14
Q) .../.../.../   etc.
```

Example 12: The requested Cuban NOTAM A1577/14 was not issued.

Reply:

```
ZCZC ...
GG EDDZYNYX
110925 LEANYNYX
RQR MUHA A1577/14
NOTAM NOT ISSUED
```

Example 13: The requested Korean NOTAM A0449/14 was replaced.

Reply:

```
ZCZC ...
GG LFFAYNYX
282055 LIIAYNYX
RQR RKRR A0449/14
NOTAM REPLACED BY A0452/14
(A0449/14 NOTAMN
Q) ../../../   etc.)
```

The importance of transmitting the requested NOTAM is emphasised, even when it has already been cancelled, replaced or deleted. Otherwise, there might be inconsistencies in the database, as NOTAM could not then be removed, (NOTAM A0017/14 in Example 8).

In the exceptional case that a cancelled, replaced or deleted NOTAM was not received, the RQR shall contain the status line only.

Example 14: The requested (RQO) United States NOTAM A0092/14 is an Original NOTAM.

Reply:

```
ZCZC ...
GG LIIAYNYX
031755 EDDZYNYX
RQR KJFK A0092/14
ORIGINAL NOTAM
010025 KDZZNAXX
(A0092/14 NOTAMN
A) KJFK B) ...C) ...  etc.)
```

4.6 Request for a List of valid NOTAM (RQL)

4.6.1 General Specification

4.6.1.1 The ‘List of valid NOTAM’ is a free text message. Contrary to the regular checklist, this intermediate checklist is not a NOTAM itself, as it does not receive a number in the series to which it refers.

4.6.1.2 Note that the last regular checklist is a valid NOTAM and therefore, its number shall appear in the RQL.

4.6.1.3 Multiple series of the same Publishing NOF may be requested in one message.

4.6.1.4 A reply message shall contain the checklist of only one NOTAM Series.

4.6.1.5 A request for multiple NOTAM series shall result in multiple reply messages each containing one series checklist.

4.6.1.6 The reply message is identified by the unique 4-letter indicator and the NOTAM series identifier. The 'List of valid NOTAM' according to the NOTAM Processing Unit database content is provided in a way similar to the structure of Item E of a regular NOTAM checklist, without the latest publication part.

4.6.1.7 Whenever the regularly published NOTAM checklist is requested, the Client should use the RQN procedure, clearly indicating both NOTAM series and number.

4.6.2 Codes and symbols used

4.6.2.1 The following codes and symbols are used in requests for a list of valid NOTAM:

'RQL'	is the designator for 'request list'.
'LFFA'	the 4-letter indicator of the Publishing NOF or other location indicator to which the numbering of the NOTAM refers to.
'A'	the NOTAM Series Identifier.
' '	(blank) is interpreted as 'AND'.
'RQR'	is the designator for the reply.

4.6.3 Examples of the request for a list of valid NOTAM

4.6.3.1 Request of a single NOTAM Series

Example 15: French NOF requests from Italian NOF the list of valid Cypriot NOTAM in series Alpha:

Request:

```
ZCZC ...
GG LIIAYNYX
281040 LFFAYNYX
RQL LCNC A
```

Reply:

```
ZCZC ...
GG LFFAYNYX
281055 LIIAYNYX
RQR LCNC A
YEAR=2013 0322 0452
YEAR=2014 0001 0006 0010 0015 0016
 0021 0035 0039
```

or ….. /
Reply:

```
ZCZC ...
GG LFFAYNYX
281055 LIIAYNYX
RQR LCNC A
NO VALID NOTAM IN DATABASE
```

Example 16: French NOF requests from Italian NOF the list of valid Guyana NOTAM in series Alpha, but last Checklist A0011/14 is the only valid NOTAM.

Request:
```
ZCZC ...
GG LIIAYNYX
281040 LFFAYNYX
RQL SYCJ A
```

Reply:
```
ZCZC ...
GG LFFAYNYX
281055 LIIAYNYX
RQR SYCJ A
YEAR=2014 0011
```

4.6.3.2 Request for multiple NOTAM Series

Example 17: Italian NOF requests from German NOF the list of valid NOTAM from the United Kingdom in series Bravo and Golf:

Request:
```
ZCZC ...
GG EDDZYNYX
310840 LIIAYNYX
RQL EGGN B G
```

Reply:
```
ZCZC ...
GG LIIAYNYX
310850 EDDZYNYX
RQR EGGN B
YEAR=2013 1678 1789
YEAR=2014 0012 0022 0056 0057 0058
 0123 0124 0125
```

The full reply consists of two messages containing one NOTAM Series in each.

4.7 Incorrect requests (RQN, RQO, RQL)

4.7.1 General specification

4.7.1.1 If a RQN, RQO, RQA or RQL message has been received that does not adhere to the published syntax format or content, the recipient of the request will send a reply message informing the originator about the error.

4.7.2 Standard expressions

4.7.2.1 For a request received with an incorrect format

INCORRECT REQ MSG FORMAT PLEASE CORRECT AND RPT. FOR DETAILS SEE HTTP://WWW.EUROCONTROL.INT/PUBLICATIONS OPADD-OPERATING-PROCEDURES-AIS-DYNAMIC-DATA	The recipient of the request has detected an error in the format of the

4.7.2.2 For a request received referring to an unknown or incorrect NOF designator or series

REQUESTED NOF OR SERIES NOT MANAGED	The recipient of the request has received a request for a NOF or series which is not contained in the database

4.7.2.3 For a request exceeding the maximum number allowed for a single request

YOUR REQ MSG EXCEEDS MAX NR OF 100	Number of requested NOTAM limit is exceeding.

4.7.2.4 Examples

Example 18:

Request:

```
ZCZC …
GG LEANYNYX
151030 EDDZYNYX
RQN LEMD LEBL
```

Reply:

```
ZCZC …
GG EDDZYNYX
151035 LEANYNYX
RQR
RQN LEMD LEBL
INCORRECT REQ MSG FORMAT PLEASE CORRECT AND
RPT.
AND RPT. FOR DETAILS SEE
HTTP://WWW.EUROCONTROL.INT/PUBLICATIONS
OPADD-OPERATING-PROCEDURES-AIS-DYNAMIC- DATA
```

Example 19:

Request:

```
ZCZC …
GG EBBRYNYN
151030 LOWWYNYX
RQN EBBR A0523/14-A0626/14
```

Reply:

```
ZCZC …
GG LOWWYNYX
151035 EBBRYNYN
RQR
RQN EBBR A0523/14-A0626/14
YOUR REQ MSG EXCEEDS MAX NR OF 100 NOTAM
```

Example 20:

Request:

```
ZCZC …
```

```
GG EBBRYNYN
151030 LOWWYNYX
RQN EBBA A0523/14-A0626/14
```

Reply:

```
ZCZC …
GG LOWWYNYX
151035 EBBRYNYN
RQR
RQN EBBA A0523/14-A0626/14
REQUESTED NOF OR SERIES NOT MANAGED
```

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5 PROCEDURES FOR SNOWTAM, ASHTAM AND SPECIAL CONDITIONS

5.1 Introduction

5.1.1 Two types of operationally relevant messages are described in the ICAO documentation and distributed via the AFS. As these messages are operationally relevant, their processing is required to enable database storage and consequently further retrieval for their incorporation in PIB. The concerned messages are:

SNOWTAM and ASHTAM

5.1.2 SNOWTAM and ASHTAM are expected to be received in their defined format. Therefore, it is anticipated that they shall neither be edited nor corrected nor summarised. However, some formatting (line return, additional or removal, etc.) may be required. If a received message is detected as obviously incorrect (e.g. garbled), a query shall be addressed to the originator for clarification. This processing can be done by individual or centralised units.

5.1.3 Hazardous winter conditions, bird hazards or changes in volcanic activity (if operationally significant) can also be published by means of NOTAM.

5.2 SNOWTAM

5.2.1 Definition

5.2.1.1 'A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area by means of a specific format.'[1]

5.2.1.2 During periods when deposits of snow, ice, slush or water associated with these conditions remain on the aerodrome pavements, information on such conditions should be disseminated to all to whom the information is of direct operational significance. Use of the ICAO Doc 8400 abbreviations (Ref [7]) and plain language is also permissible.

5.2.1.3 For details of SNOWTAM Items, refer to ICAO Annex 15 (Ref. [1]), Appendix 2 and Doc 8126 (Ref [2]).

Note: For details on clearing requirements refer to ICAO Doc 9137 AN/898/Airport Service Manual, Part 2.

[1] Source: Annex 15, 12th Edition, chapter 2.

5.2.2 Procedures for SNOWTAM creation

5.2.2.1 SNOWTAM identification shall appear in the first line of the AFS message text (Abbreviated heading) and shall start with the SNOWTAM indicator 'SW' followed by the designator for the State, e.g. 'EF', and a serial Number in a four-digit group, followed by a space and followed by the four- letter location indicator to which the SNOWTAM refers. An eight-digit date- time group follows, based on Item B) (if only one runway is listed) or the latest observation in Item B) (when multiple Item B) are listed).

Example: `SWEF0001 EFTP 11250800`

Note: Contrary to NOTAM, the serial number refers to the aerodrome.

5.2.2.2 The maximum validity of an SNOWTAM is 24 hours.

5.2.2.3 It is recommended to adopt a numbering sequence starting at the beginning of the year.

5.2.2.4 Examples

Example 1:

```
SWEF0587 EFTP 11291215
(SNOWTAM 0587
A) EFTP
B) 11291215 C)06 E)30 F)47/47/47 G)3/3/3 H)4/5/4 N)7
R) 47
T) RWY CONTAMINATION 100 PERCENT. SURFACE FRICTION:
   ON TWY MEDIUM TO GOOD, ON APRON MEDIUM TO POOR)
```

Where the Abbreviated heading is composed of:

SWEF0587	= SW is the data designator for SNOWTAM; EF are the nationality letters for the State; =0587 is a four-digit serial number.
EFTP	= Four-letter location indicator of the aerodrome to which the SNOWTAM refers.
11291215	= date-time of the latest observation as month, day, hour and minute in UTC, all by two digits (in this case 29 November, 1215 UTC).
(COR)	= optional group in case there is a need to correct a SNOWTAM previously sent with the same serial number

If there is reporting on two or more runways, the observation time in the Abbreviated heading shall be the latest Item B) time.

Where the message is composed of:

SNOWTAM	= designator for the SNOWTAM.
0587	= the SNOWTAM number (the same four-digit serial number as in the abbreviated heading).

A) EFTP	= Item A) aerodrome location indicator (the same as in the abbreviated heading).
B) 11291215	= Item B) date-time of observation of each runway listed in Item C).
C) 06	= Item C) lower runway designator number (for RWY 06/24 the lower runway designator number is 06).
E) 40	= Item E) cleared runway width in metres, if less than published width (in this case, the published width is 45 metres and cleared width is 40 metres only).
F) 47/47/47	= Item F) deposits over the total runway length, observed on each third part of the runway starting from the threshold with lower runway designator number (in this case a combination of dry snow (4) over ice (7) on each third). If more than one deposit is present on the same portion of the runway, they should be reported in sequence from the top (closest to the sky) to the bottom (closest to the runway).
G) 3/3/3	= Item G) depth of the deposit(s) in millimetres for each third of the total runway length (in this case the mean depth of the deposits is 3 millimetres on each third).
H) 4/5/4	= Item H) estimated friction on each third of the runway (in this case the estimated values are respectively 4, 5 and 4 starting from the threshold with lower runway designator).
N) 7	= Item N) taxiway conditions (in this case ice – deposit code for ice (7) as described in Item F) of the SNOWTAM format).
R) 47	= Item R) apron conditions (in this case a combination of dry snow over ice – deposit codes for dry snow (4) and ice (7) as described in Item F) of the SNOWTAM format)
T)	RWY CONTAMINATION 100 PERCENT. SURFACE FRICTION: ON TWY MEDIUM TO GOOD, ON APRON MEDIUM TO POOR = Item T) plain language field for any additional information (in this case the percentage of the runway contamination (Item F above) is between 51 and 100 %. The estimated surface friction for taxiways and apron are also given).

<u>Example 2:</u>

'When reporting on two runways or more, repeat Items B) to P) inclusive':

```
SWED0012 EDDK 12300630
(SNOWTAM 0012
A) EDDK
B) 12300630 C) 14L F) 2/2/2 G) 30/30/40 H) 5/5/5
B) 12300625 C) 14R F) 5/5/5 G) 30/30/40 H) 3/3/3
B) 12300620 C) 07 F) 5/5/5 G) 40/30/30 H) 2/3/2
```

```
R) 2 S) 12300800
T) RWY CONTAMINATION 100 PERCENT. SNOW REMOVAL IN
   PROGRESS)
```

Example 3:

```
GG EKZZ…. ........
130429 ESSAYNYX SWES0051
ESSA 01130400 (SNOWTAM 0051
A) ESSA
B) 01130400 C) 01L E) 50 F) 17/17/17 G) 01/03/02 H) 4/4/4
L) TOTAL M) 0500 N) 127/GOOD
B) 01130352 C) 08 D) 2300 E) 30 F) 17/17/17 G) 01/01/01
H) 4/4/3 J) 60/5LR K) YESL L) 2500/45 M) 0500 N) 127/GOOD
P) YES8
R) 127/MEDIUM-GOOD S) 01131000
T) RWY 01L CONTAMINATION 10 PERCENT, RWY EDGES
CONTAMINATION 60 PERCENT F) 5 G) 30,
RWY 08 CONTAMINATION 50 PERCENT UNCLEARED PARTS
CONTAMINATION 100 PERCENT F)5 G) 50, TWY
CONTAMINATION 10 PERCENT 1MM.
TWY S CONTAMINATION 50 PERCENT F)56 G)20 H)2, APRON
CONTAMINATION 25 PERCENT 1MM.
DEICING CHEMICALS USED ON RWY 01L AND 08.
```

Note: Item D is rarely used in SNOWTAM as the RWY is normally cleared full length. A reduction in length for IFR RWY affects declared distances.

5.2.3 Procedures for SNOWTAM processing

5.2.3.1 The format detailed in Annex 15 (Ref. [1]) Appendix 2 shall be strictly adhered to.

5.2.3.2 A list of aerodromes for which SNOWTAM are likely to be issued shall appear in an AIS publication (AIP, AIP SUP or AIC) together with details of the originators and of the numbering system to be used.

5.2.3.3 It will be necessary for systems to identify the latest SNOWTAM for each affected aerodrome by reference to the serial number and observation time.

5.2.3.4 Only one SNOWTAM can be valid for each affected aerodrome at any one time.

5.2.3.5 The next planned observation may be declared in Item S).

5.2.3.6 At aerodromes where snow removal is not organised and not expected to be performed (e.g. in maritime climate areas), information about hazardous winter conditions may be issued by NOTAM.

5.2.3.7 The maximum validity of a SNOWTAM is 24 hours. The SNOWTAM self- expires after 24 hours, unless replaced earlier by a new SNOWTAM or a corrected one (COR).

5.2.3.8 The incorporation of SNOWTAM in PIB is highly recommended, as it improves pre-flight briefing and provides airline operators with more comprehensive information.

5.3 ASHTAM

5.3.1 Definition

5.3.1.1 "A special series NOTAM notifying by means of a specific format change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations."

5.3.1.2 When notification of such activity is made, the ASHTAM provides information on the status of activity using a 'volcano level of alert colour code'.

5.3.1.3 The ASHTAM also provides information on the location, extent and movement of the ash cloud and on the air routes and flight levels affected.

Example:

```
161143 WRRRYNYX
VAWR0004 WAAF 05161137
(ASHTAM 0004
A) UJUNG PANGDANG FIR
B) 1405161137
C) AWU 0607-04
D) 0340N12530E
E) YELLOW
F) 1320M/4331FT
G) SFC/FL100 WINDS SFC/FL100 260/10KT
I) CTN ADZ OVERFLYING FOR R590 R342
J) YMMCYMYX
```

5.3.1.4 For details of the format refer to ICAO Annex 15 (Ref. [1]).

5.3.2 Procedures for ASHTAM creation

5.3.2.1 ASHTAM identification shall appear in the first line of the AFS message text and shall start with the ASHTAM indicator 'VA' followed by the designator for the State, e.g. 'LI', and a serial number in a four-digit group. The FIR to which the ASHTAM refers is indicated with its four-letter location indicator. The observation time is shown as an eight-digit group.

Example: `VALI0001 LIRR 11250800`

5.3.2.2 Item C) shall contain both the volcano name and its unique identification number as listed in ICAO Doc. 9691 (Ref. [6] Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds, Appendix F.

The name and identification number shall be separated by a space.

Example: `C) AWU 0607-04`

5.3.2.3 The maximum validity of an ASHTAM is 24 hours.

5.3.2.4 Whenever there is a change in the level of alert, a new ASHTAM shall be published.

5.3.2.5 If an ASHTAM is created for a volcano not listed in ICAO Doc. 9691, the 'existence' of the volcano shall be promulgated by normal NOTAM, Item C) to contain PERM.

Any observations on volcanic activities for this volcano shall also be published by normal NOTAM until ICAO Doc. 9691 (Ref. [6]), Appendix F

is updated. The NOTAM on observations remains in force for 24 hours (Item C) as for ASHTAM.

If information on observations is intended to be published by means of ASHTAM instead, this intention shall be clearly stated in the NOTAM containing the general information on the volcano, so the list of existing volcanoes can be manually updated in processing systems to allow for auto-processing.

5.3.2.6 Information about volcanic activity or the presence of volcanic ash plumes may also be reported by NOTAM.

Item B) actual date/time of NOTAM creation.

Item C) actual date/time of NOTAM creation + 24 hours.

Item E) the relevant information as contained in the ASHTAM.

Further guidance on information to be reported in NOTAM item E) for volcanic activity is provided in ICAO EUR Doc 019/NAT Doc 006 Volcanic Ash Contingency Plan (Ref. [8]).

To ensure the speedy transmission of the initial information to aircraft, the first ASHTAM or NOTAM issued may simply contain information that an eruption and/or ash cloud has been reported and the date/time and location. For further details and additional distribution addresses refer to ICAO Doc 9766 (Ref. [7]) International Airways Volcano Watch, Part 4.

5.3.3 Procedures for ASHTAM processing

5.3.3.1 The incorporation of ASHTAM in PIB is highly recommended, as it improves pre-flight briefing and provides airline operators with more comprehensive information.

5.3.3.2 An ASHTAM is normally auto-processed. Its abbreviated heading, Item C) and Item A) are checked before storage.

5.3.3.3 The identification (name and number) of the volcano in Item C) of an incoming new ASHTAM is compared with the volcanoes listed in ICAO Doc. 9691 (Ref. [6]), Appendix F.

5.3.3.4 A volcano is identified if its name and identification number refer to the same volcano. The ASHTAM is stored in the database and made available for the FIR indicated in the abbreviated heading. Its storage will completely replace any ASHTAM previously issued for the same volcano. ASHTAM for other volcanoes remain valid instead.

5.3.3.5 An incorrect syntax in an ASHTAM Item used for identification or storage is corrected before further processing.

5.3.3.6 Item A) is roughly checked by the system before storage. If the system recognises FIR location indicator(s) in Item A) rather than plain language, automated processing of ASHTAM is discontinued if the FIR location indicator is different from the one in the Abbreviated heading or if Item A) contains more than one FIR.

If the location indicator indicated is different, it is either corrected or the 'NOTAM SUBJECT TO QUERY' procedure applies. If the ASHTAM is received with more than one FIR in Item A), a NOTAM series T shall be created for all FIR except for the one given in the abbreviated heading. Item E) of this series T NOTAM shall contain all Items from A) to K) inclusive. Items not completed by the Publishing NOF in the original ASHTAM shall be left blank.

5.3.3.7 An ASHTAM is self-expiring 24 hours after its creation unless it is replaced earlier by a new ASHTAM for the same volcano.

5.3.3.8 If the volcano cannot be clearly identified, 'NOTAM SUBJECT TO QUERY' procedure shall be applied.

5.4 Bird hazards

5.4.1 Definition

5.4.1.1 A bird hazard designates the presence of birds constituting a potential hazard to aircraft operations.

5.4.1.2 The permanent presence of birds is contained in the AIP, whereas the notification of such activities atshort notice shall be published by NOTAM.

5.4.2 Procedure

5.4.2.1 Bird hazards, if operationally significant, shall be communicated by means of NOTAM.

5.4.2.2 The 4^{th} and 5^{th} letter 'HX' of the NOTAM Code serves as a means of identification for the publication of bird hazards, e.g. QFAHX.

5.4.2.3 Item E) shall contain clear text with standard ICAO abbreviations. Specific bird related abbreviations should be avoided to facilitate readability and to prevent queries.

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6 OTHER PROCEDURES

6.1 Multi-part NOTAM

6.1.1 General principles

6.1.1.1 In accordance with ICAO Annex 15, each NOTAM shall be as brief as possible. In some cases, due to the nature of the information, the length of the AFS message exceeds 1800 characters including spaces (some states are limited to 1200 characters). When the AFS message exceeds the maximum number of characters permissible, the Multi-part NOTAM procedure shall be applied.

6.1.1.2 Even though the recommendation is that every endeavour should be made in order to avoid the creation of Multi-part NOTAM, a standard numbering scheme will facilitate the processing of Multi-part NOTAM when they are used.

6.1.2 Procedures for Multi-part NOTAM

6.1.2.1 Each part of the Multi-part NOTAM is a separate NOTAM message with each Item present from Item Q) to Item D) (if present) inclusive, and Item E) continuing text. Each part shall have the same NOTAM type and has the same NOTAM number followed by a Multi-part indicator. If present, Items F) and G) are transmitted with the last part only.

6.1.2.2 NOTAMR is not permitted for the replacement of an individual part of a Multi-part NOTAM.

6.1.2.3 In case of a Multi-part NOTAM is cancelled, all parts are cancelled by the NOTAMC. Cancellation of individual parts is not permitted.

6.1.2.4 The Multi-part indicator is placed immediately behind the year of the number/year combination, without a space.

6.1.2.5 The Multi-part indicator is identified by one letter ('part identifier' e.g. A = Part 1, B = Part 2, etc.) and a number, always consisting of 2 digits (‘number of parts’, e.g. 05 = 5 parts). This enables up to 26 part Multi-part NOTAM.

6.1.3 Examples

`A1234/14A02`(means Part 1 of 2)

`B1235/14B05`(means Part 2 of 5)

`A5678/14C03`(means Part 3 of 3)

`B6453/14D06`(means Part 4 of 6)

The following example shows the NOTAM Identification of a Multi-part NOTAM consisting of 4 parts.

```
(A1234/14A04 NOTAMN
Q) .........................
A)  ......
B)  ......
C)  ......
E)  ......            )

(A1234/14B04 NOTAMN
Q) ...........................
A)  ......
B)  ......
C)  ......
E)  ......            )

(A1234/14C04 NOTAMN
Q) ...........................
A)  ......
B)  ......
C)  ......
E)  ......            )

(A1234/14D04 NOTAMN
Q) ...........................
A)  ......
B)  ......
C)  ......
E)  ......
X)  ......            )
```

7 GUIDELINES FOR THE CREATION AND PROVISION OF PRE-FLIGHT INFORMATION BULLETINS (PIB)

7.1 Introduction

This Chapter is intended to present guidelines concerning the provision of Pre-flight Information Bulletin, focusing on:

- Bulletin types.
- Filtering for NOTAM based on the NSC and other related filters.
- The main PIB structure and layout when integrating various messages into the PIB.

Additionally, some aspects in relation to 'Integrated Briefing' are presented in order to enable addressing key user requirements for enhanced briefing services.

Relevant references are provided to existing EUROCONTROL documents covering the function of 'Integrated Briefing'. Requirements for automated pre-flight information systems are contained in ICAO Annex 15 (Ref. [1]) Chapter 8 and ICAO Doc 8126 (Ref. [2]) Chapter 9. Where Doc 8126 Chapter 9 did not provide any guidelines, Doc 8126 Chapter 8 has been taken into consideration.

7.1.1 Understanding and Background

An aeronautical information service (AIS) is obliged to provide relevant aeronautical data and aeronautical information which is mainly available in the form of the Integrated Aeronautical Information Package (IAIP). The pilot is obliged to obtain and prepare before conducting a flight.

The process whereby a user, depending on flight intent or an ad-hoc need, is supplied with or obtains all relevant aeronautical data and aeronautical information in order to plan or execute a flight or to obtain generic information related to flight operations, is known as briefing. The facts and knowledge obtained support the process of taking the decision if a flight or flight related action can be performed safely and efficiently or not.

In an automated environment, AIS is often not personally present at aerodromes and the provision of relevant data is assured through (self-) briefing systems supported by means of consultation.

The typical system output of a briefing process concerning dynamic data (NOTAM and related special series NOTAM such as SNOWTAM and ASHTAM) is the 'Pre- flight Information Bulletin (PIB)'. Additionally, static data such as AIP, AIP SUP or AIC is provided either through consultation or in electronic format through briefing systems or is made available in paper form at the AIS or/and ARO offices.

7.1.2 The basic user requirements related to Briefing

Many users are currently 'over-supplied' with a large amount of information. Therefore, the obligation for any briefing function, whether automated or not, is to be able to support the pilot (user) with specific and relevant information whilst avoiding information overload through maximum customisation and filtering support.

The basic user requirements for a briefing facility/service can be summarised as follows:

- Enable a standard product to be produced as a minimum service.

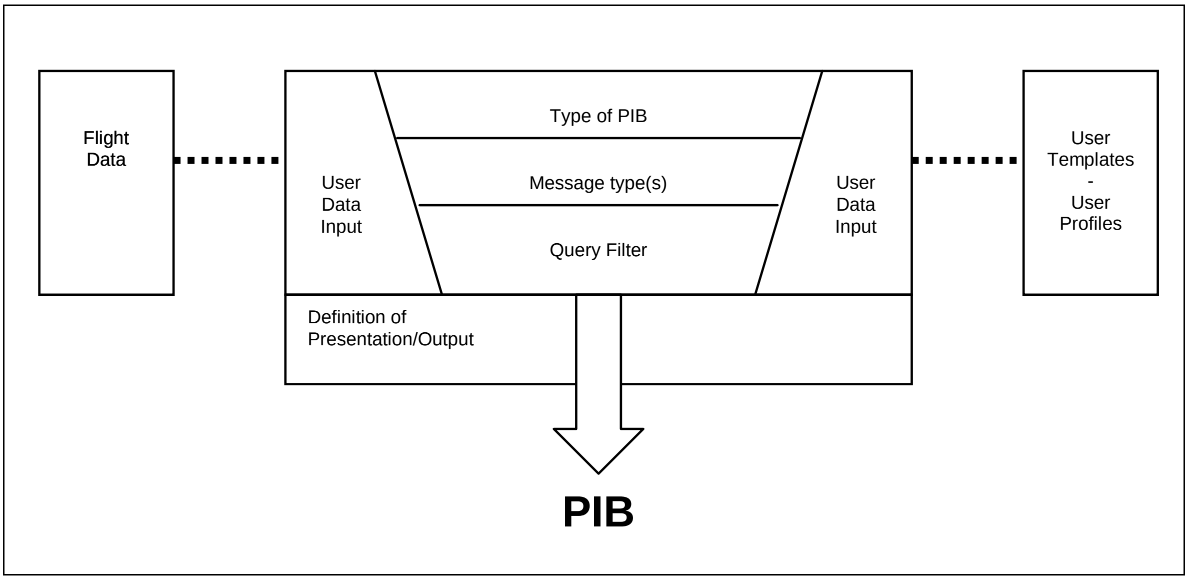
- Provide the pre-flight information which is relevant to a flight (user), on request.
- Enable the pilot to obtain a briefing that is structured to suit their particular needs.
- Improve the ways briefings are conducted and delivered.
- Reduce the amount of time taken to obtain a briefing.
- Provide easy access to information incl. updates thereafter.
- Provide this information at any time and location the pilot wishes.

7.2 Data selection layers

The user will be able to select the information that will be included in the PIB at various levels. Those levels are:

- PIB type
- Message types
- Message filters
- User data/input.

In order to retrieve NOTAM from a database, a range of criteria and filters shall be applied to enable customised and tailored briefing output based on individual user requirements.In addition, default settings would cater for standardised/generic output. The following figure shows the relationship between the different information selection levels that may be employed by the User for the retrieval of a PIB.



7.3 Types of Bulletins - PIB

The following main bulletin types are defined by ICAO.

- Area type Bulletin;
- Route type Bulletin;
- Aerodrome type Bulletin;
- Administrative Bulletins.

A general description of each of these types is given below. For further reference see ICAO Doc 8126 (Ref. [2]), Chapter 8.

7.3.1 Area type Bulletin

Area type bulletins consist of relevant information such as NOTAM, SNOWTAM and ASHTAM containing information on facilities, services, procedures and possible hazards related to a specified area. They may also include selected aerodromes situated inside a selected area. The PIB shall only present NOTAM inside the selected area.

An Area type PIB may present:

- One or more FIR.
- A user defined area by:
  - Pre-defined (adjustable) areas or groups of countries (e.g. Benelux, Alpine, Central Europe).
  - Given airspace or special areas (special areas, TMA, CTR, ACC sectors etc.).
  - Single aerodrome information plus information from surrounding vicinity (selection of AD, range plus ground up to selected flight level). If range is requested, NOTAM irrespective of national boundaries are to be provided, including those of relevant fictitious airspaces.
  - Coordinates or AD names or AD location indicators plus radius.
  - A polygon.

The PIB will present NOTAM containing, if selected:

- NSC scope for Enroute information: E, W, AE, AW.
- NSC scope for aerodrome information: A, AE, AW.
- Requested FIR in Item A).
- Qualifying criteria in accordance with the filters applied (refer to paragraph 7.5).
- For inclusion of Aerodrome information refer to paragraph 7.3.3.

When a fictitious airspace UUUU, ZBBB, KFDC or KNMH is selected, or if an area intersects a FIR that lies within one of these countries, information of the fictitious airspace shall be provided.

The use of the radius value '999' shall allow an automated pre-flight information system to retrieve such information only against the FIR indicated in Item A). Adjacent FIR even within the radius of influence is never affected by this information.

7.3.2 Route type Bulletin

A Route type bulletin is a bulletin based on a generalised flight route that may also be the route information as contained in FPL field 15. It provides relevant NOTAM, SNOWTAM and ASHTAM containing information on facilities, services, procedures and possible hazards along the specific route flown. It presents the FIR crossed in the sequence of flight, plus the selected aerodromes.

For Route type bulletins based on FPL for IFR and mixed FPL, the acknowledged (ACK) route shall be taken into account, whenever possible.

A Route PIB presents information based on the following principle:

- Aerodrome information: aerodrome of departure, destination, alternate(s).
- Route information. FIR or the sequence of FIR crossed by the intercepted flight route (source FPL/RPL or user input).

The PIB will present NOTAM containing, if selected:

- NSC scope for Enroute information: E, W, AE, AW.
- NSC scope for aerodrome information: A, AE, AW.
- Requested FIR or country location indicator in Item A).
- Qualifying criteria in accordance with the filters applied (ref. paragraph 7.5).

For inclusion of Aerodrome information refer to paragraph 7.3.3.

When a fictitious airspace UUUU, ZBBB, KFDC or KNMH is selected, or if an area intersects a FIR that lies within one of these countries, information about the fictitious airspace shall be provided.

7.3.2.1 Narrow Route type Bulletin:

A Narrow Route Bulletin is a bulletin based on a specific flight route usually based on the route information as contained in FPL field 15. It may also be based on a flight path with a defined width along: significant points; airways; navigation aids; coordinates; direct between the aerodrome of departure (DEP) and the aerodrome of destination (DEST). Only NOTAM that intersect with the narrow route path and meet the other related filter criteria are included in the ‘Narrow Route (path) PIB’.

The recommended default value for a route width is 20 NM (meaning 10NM left and right of the calculated flight path).

A Narrow Route PIB presents information based on the following principle:

- Aerodrome information: aerodrome of departure, destination, alternate(s).
- Route information (source FPL/RPL or user input).

The PIB will present only those NOTAM containing:

- A geographical reference intersecting with the defined route corridor.
- NSC scope for Enroute information: E, W, AE, AW.
- NSC scope for aerodrome information: A, AE, AW.
- A geographical reference intersecting with the route to the first alternate AD (ALTN) if not on the intersected flight path.

- Qualifying criteria in accordance with the filters applied (refer to paragraph 7.5).

For inclusion of Aerodrome information refer to paragraph 7.3.3.

Note: Departure and arrival aerodromes must be taken into account. Depending on the level of the briefing system, special filtering is to be applied so that either the flight level filtering takes full account of the SID/STAR flown, or within a radius or cylinder around the AD of DEP/DEST the flight-level limitation is neglected (irrespective of FIR boundaries).

When a fictitious airspace UUUU, ZBBB, KFDC or KNMH is selected, or if an area intersects an FIR that lies within one of these countries, information about the fictitious airspace shall be provided.

7.3.3 Aerodrome type Bulletin

Aerodrome type bulletins consist of dynamic messages such as NOTAM and SNOWTAM containing information on facilities, services and procedures related to an aerodrome/heliport and its vicinity.

This bulletin provides messages for aerodromes covering at least the following options:

- Single aerodrome information only (selecting aerodrome name or location indicator).
- All aerodromes within one or more FIR.

The PIB will present only those NOTAM containing:

- NSC scope for aerodrome information: A, AE, AW.
- An aerodrome indicator in Item A) plus those with country code and XX in Item A). Refer to paragraph 7.7.3 for the selection of aerodromes with country code and XX.
- If selected, NSC scope AE, AW if the geographical reference intersects with the defined area surrounding an AD.
- Qualifying criteria in accordance with the filters applied (refer to paragraph 7.5).

7.3.4 Administrative Bulletins

Administrative bulletins are reports that provide a list of valid NOTAM offering further selection options. This type of bulletin is foreseen mainly for AIS/NOF officers but also other users who are familiar with NOTAM procedures, the NOTAM format and the query procedures for PIB/reports.

Specialised functions should allow additional filter criteria enabling to retrieval by e.g.:

- NOTAM number or range of numbers
- All NOTAM in force
- Country(ies)
- NOF
- NOTAM series
- all PERM NOTAM
- Trigger NOTAM (all valid; effective from (AIRAC date or user defined)
- NOTAM by subject

- EST NOTAM.
- Checklist

7.4 Types of messages/elements to be included in the PIB

Following types of dynamic messages shall be selectable for inclusion in the PIB.

- Civil / Military NOTAM (if available), or combinations;
- International series or national series, or combinations;
- National NOTAM in national language;
- Types of messages:
    - NOTAM
    - SNOWTAM
    - ASHTAM
- Other elements such as predefined maps or local information.

7.5 Criteria for PIB customisation – Query Filters

Apart from the selection based on PIB types and type specific entries (FIR(s) and/or AD, selection or definition of area or route), the following filters are applied to reduce the PIB output:

- Time window for PIB validity
- NSC qualifiers applied
- Vertical criteria (flight levels)
- Geographical criteria

7.5.1 Time window for PIB validity:

- At a given date and time = current (time of retrieval)

  Content: valid NOTAM.

  Main purpose: overview/general planning.

  Main users: airport authorities and other NOTAM originators, dispatcher/station manager/business aviation and other long term planning units, NOF, CAA.

  PIB types: all PIB types and administrative bulletins (e.g. checklists).

- FPL based, i.e. for a given EOBT, all NOTAM that are active in the period between the time of retrieval and the next given number of hours.

  Content: active NOTAM.

  Main purpose: performing a flight. Main

  users: crew/pilots.

  PIB types: FPL based PIB (usually Route or Narrow Route PIB).

Possible default setting for a FPL based time window: PIB

validity by default: (EOBT-1 HR) till (ETA + 4HR).

A system should offer the possibility to adjust the default for a FPL based time window.

- For time periods e.g. current date/time plus 'x' hours, from-to.
  Content: active NOTAM active.
  Main purpose: performing a flight, specific overview.
  Main users: crew/pilots, dispatcher/station manager/business aviation for short-term planning.
  PIB types: all PIB types except for administrative bulletins.

For administrative bulletins the default values depend on the type of bulletin.

Further selection option for PIB types:

- Excluding those NOTAM active since more than a given time period.

7.5.2 NSC qualifiers applied

For NOTAM, NSC qualifiers including NOTAM code act as retrieval filters to tailor PIB content.

Specifics rules for the Qualifiers Traffic, Purpose and Scope:

- Traffic:
  - IFR: IFR PIB to include all NOTAM with traffic I and IV;
  - VFR: VFR PIB to include all NOTAM with traffic V and IV;
  - Combination IFR/VFR: PIB to include all NOTAM with traffic I, V and IV;
  - Mixed flight rules (ref. FPL): for each portion of the flight only NOTAM with the traffic corresponding to the flight rules of the respective portion of flight shall be included.
- Purpose:
  - N - NOTAM selected for the immediate attention of flight crew members.
  - B - NOTAM of operational significance selected for PIB entry.
  - O - NOTAM concerning flight operations.
  - M - NOTAM carrying miscellaneous information.
- Scope:
  This qualifier relates the NOTAM subject (2nd and 3rd letter) to a specific scope. This qualifier is used to determine under which category/section a NOTAM is presented inside a PIB
  - A refers the NOTAM to the scope of Aerodromes.
  - E refers the NOTAM to the scope of 'Enroute information'.
  - W refers the NOTAM to the scope of 'Navigation Warnings'.
  - or the combinations AE, AW.
- Exclusion of Trigger NOTAM as option (system selection by condition 'TT').
- Exclusion of obstacles (system selection by subjects 'OB' and 'OL').

7.5.2.1 Purpose related PIB output

- Immediate Notification: filters set to include N will present active NOTAM with purpose NBO.
- Operationally significant information: filters set to include O will include active NOTAM with purpose BO and NBO.
- Bulletin: filters set to include B will include active NOTAM with purpose B, BO and NBO.
- Miscellaneous: filters set to include M will present active NOTAM with purpose M.
- All NOTAM: Filters set to B, BO, NBO and M will present all active NOTAM.

In a ‘default briefing’ (default filter setting; modifiable by a user) no filtering is performed by the system on the qualifier ‘Purpose’ and the PIB will display all NOTAM.

Note: The recommended ‘default filter setting’ is based on the fact that the NSC in their current form raise concerns by service providers and users and shortcomings are observed with respect to the qualification of the purpose for some subjects. Even if detailed filtering explanations are made available on briefing systems, the end-users’ perception of what is operationally relevant and what is ‘nice to know’ varies considerably and is often not aligned with the ICAO NOTAM Selection Criteria. Therefore, contrary to ICAO provisions, OPADD suggests providing ‘all NOTAM’ as the default PIB setting with the possibility left to the individual user at its own discretion to change the default briefing output to a different setting via personal preferences or decide individually depending on the type of flight performed. The application of this default is also left for the individual service providers at their own discretion in interaction with their clients.

7.5.3 Vertical criteria (Flight Levels)

Flight levels will make it possible to tailor the PIB content whenever appropriate (lower/upper). System selection is based on the lower and upper limits of the Q-Line.

7.5.3.1 Departure and arrival

Departure and arrival aerodrome must be taken into account. Depending on the briefing system, special filtering is to be applied so that either the flight level filtering takes full account of the SID/STAR flown, or within a radius or cylinder around the AD of DEP/DEST the flight level limitation is neglected (irrespective of FIR boundaries).

7.5.4 Geographical criteria

System selection is done by the geographical reference of the Q-Line (coordinate and radius) and applies only to those area or route type PIB requiring more precise information about the location than Item A) provides, e.g. Narrow Route, user- or system defined areas. NOTAM are only provided if the geographical reference intersects with the location of the selected area.

Fictitious FIRs or NOTAM applicable to a whole country (radius 999) shall also be taken into account by the system if the area or route intersects with this country.

7.6 Principle structure of a PIB

A PIB (report) should be structured into the following main sections/parts and sequence:

- The PIB header:
  - PIB header provides information on the service provider, date and time of the PIB query, PIB validity, requested PIB type and content (e.g. requested aerodromes), selection criteria/filters applied as well as any other information regarding the PIB content, special symbols used, if applicable, e.g. PIB ID.
  - The chosen time window must be clearly indicated in the PIB header as PIB validity, e.g.: From 10 DEC 2008 11:55 To 12 DEC 2008 06:00.
- The Aerodrome section:
  - Departure
  - Destination
  - Alternate(s) according the FPL (including En-route alternatives).
- The Enroute (FIR) section:
  - FIR of departure.
  - FIRs in sequence of the flight.
  - FIR of destination.
  - Additional Information.
- The Navigation Warning section:
  - FIR of departure.
  - FIR in sequence of the flight.
  - FIR of destination.
  - Additional information.

Note 1: The Navigation Warning section may also be included in the Enroute section of the PIB.

Note 2: The FIR-sequence listed applies for Narrow Route PIB only. For all the other PIB types the sequence is based on the input form entries.

7.6.1 NOTAM sorting

Based on the above main PIB sections further default sorting criteria apply:

- NOTAM shall be sorted into the separate sections in the following order: Aerodrome, FIR, Additional Information.
- NOTAM shall be sorted in sequence by number within each section, with the most recent (newest) NOTAM on top.
- Enroute FIR NOTAM shall be split into separate sections: ‘Enroute’ (scope E and AE) and ‘Navigation Warnings’ (scopes W and AW).

- The same NOTAM should appear only once in a PIB, i.e. no duplication over the different sections. In further FIRs, if relevant, only a reference to the NOTAM number shall be provided. The (online) system may offer a hyperlink to this NOTAM.
- Further sorting options should be offered for all PIB types e.g.: sorting according to effective date, NOTAM Codes' by subject group, by flight route, default by briefing type or user preferences, etc.

7.7 PIB - specific presentation considerations

PIB sections cluster the message sub-sections (see also paragraph 7.12.2.1) which themselves contain the message groups. Messages are integrated depending on the actual PIB type, e.g. a RWY NOTAM does not appear in the FIR section.

7.7.1 General layout considerations

The PIB shall be produced based on queried types of messages/elements, selected PIB type on the basis of the chosen time window, other customisation criteria and query filters applied.

In general all Items are presented in a self-explanatory form with the following exceptions:

- the Q-line which serves only as filtering feature and may be confusing for users; and
- Item A which is already present in the header and/or item E).

For the printed PIB, the pages must be clearly indicated in the form of 'page of pages' e.g. 01/15.

If no NOTAM is valid for a requested aerodrome or FIR, the PIB would indicate 'no data available' for a requested aerodrome or FIR or area.

A 'disclaimer' section at the end of the PIB should provide a reminder of other parts of the IAIP also clearly indicating that trigger NOTAM will be listed for a period of 14 days only. Following this, other means than the PIB will have to be used to get access to the full IAIP information.

Example: 'Permanent and long - term information as well as short- term information containing extensive text and/or charts are not included. Consult AIP and AIP SUP in force for this type of information. A reminder (trigger NOTAM) of such data is usually only provided in PIB for 14 days.'

'End of PIB' is to be indicated.

7.7.2 Presentation of dates/times

Dates/times shall be generally encoded, e.g.: the 8th of August 2014 at 6h35 in the morning would be displayed in the PIB as: 08 AUG 2014 06:35.

7.7.3 Location Indicators

Location indicators should be translated into plain language whenever possible. System help functions must be provided to enable flexible entry of the plain name, ICAO code or IATA code supported by search features.

Aerodromes without an allocated location indicator cannot be identified by Item A) of the NOTAM (country code and XX/XXX). They are stored by their plain name which is provided on the first line of Item E). Selection is in this case done by the aerodrome's plain name. System features may also allow entering a country code and XX and provide a list of available aerodromes for further selection.

7.8 Delivery of PIB

A choice of methods or interfaces for (automatic) PIB delivery shall be provided to the customers e.g.:

- Fax
- World Wide Web
- Email
- Remote print
- Streaming service via system-to-system interfaces
- Scheduled delivery for large scale customers.

7.9 PIB - additional elements to be considered

7.9.1 Provision of AIP Supplement in relation to PIB

In order to remain compliant with Annex 15, pilots need access to relevant AIP Supplement
(SUP). Different means may apply and in the first instance it is the briefing officer who selects those elements for a briefing. However, considering the extensive use of location- independent means or self-briefing systems, a more user-friendly approach is required.

Recommendation: The system shall enable the user to select further elements such as AIP SUP.

In relation to automated pre-flight information systems it is to be noted that SUP do not have a structured field usable by a system which enables selective retrieval of this kind of information for a given pre-flight information bulletin.

The eAIP may serve such a need concerning rapid and easy access enabled by hyperlinked information. However, this is only relevant if those elements are integrated through the self- briefing system or relevant portal. On the contrary, it may be that a briefing service pre- selects specific SUP which may then be automatically annexed to PIB.

Further considerations should be given as to whether special selection features can be provided to enable an end user to access SUP directly e.g. through the inclusion of an URL in Trigger NOTAM.

7.9.2 Special areas

Special areas (incl. shooting areas) in graphical form may either be directly attached to the PIB by default or may be referred through the system via web links, Trigger NOTAM or by storing AIP Supplement (SUP) in briefing systems including associated criteria such as NOTAM subject code(s) and traffic for direct inclusion in PIB if SUP is selected.

7.9.3 User information

An automated PIB pre-flight information system shall at the least provide user information on: service provision; available PIB types; default settings and explanations of selection options. An explanation of the meaning of and intention behind NOTAM qualifiers (NOTAM codes, Traffic, Purpose, Scope) shall be made available to the users.

Further useful information should be considered e.g. an explanation of IAIP package, a list of subjects (plain name) included in the available PIB types indicating the NSC qualifier purpose, a list of ICAO abbreviations and NOTAM/SNOWTAM/ASHTAM explanations. For systems allowing FPL filing, other information may be of help, e.g. ICAO aircraft type abbreviation, Route Availability Document (RAD), explanations on the FPL form.

Help desk: contact details shall be provided for further enquiries and/or where relevant parts of the IAIP not contained in the briefing system may be obtained from.

7.10 Update Services

7.10.1 Notification

An immediate automatic notification service may be offered either to supplement a PIB or for the provision of specific messages. It covers messages issued since the retrieval of a PIB or since subscription to the notification service and consists of single messages informing users directly for example about a hazard.

If a ‘notification service’ is available, it will provide single messages received after the initial briefing (lag time). For example, a NOTAM received after the initial PIB production, which fits the filtering criteria, will automatically be forwarded via the means specified by the user. The end date/time of the notification service is based upon the initial PIB query. All underlying notification criteria (type of message, type of event, filter, scope, end of notification period, etc.) must be defined by the user through an appropriate user profile. It should be possible to

specify the transmission means for the notification, e.g. fax, SMS, email or data link when available.

The maximum lag time should be limited to a certain (default) number of hours and be adjustable by the user.

A typical example may be the event of a runway closure at a defined aerodrome or a SNOWTAM published for a defined aerodrome. Automatic notification will also provide NOTAMR and NOTAMC, in the case of NOTAM being selected. They are forwarded also displaying the relevant NOTAM number of the replaced/cancelled NOTAM.

Note: The ICAO term used for 'update notification service' is 'Immediate automatic notification of items of urgent operational significance'. This term suggests a limitation to NOTAM containing purpose 'N' only and would exclude other NOTAM of operational impact. Using the more general term 'Update Services' better reflects the use of the purpose letters and allows a wider, more user-friendly provision of such a customised service.

7.10.2 Update PIB

More sophisticated systems should support updates to previously requested PIBs in the form of an update briefing. If 'Update PIB' is selected, the user will have to specify the 'Master PIB reference' for which the update shall be generated.

Creation of an Update PIB will be possible only if:

- The same briefing system has been used for production of the Master PIB.
- The Master PIB has not been retrieved longer ago than a certain number of hours or days in the past (e.g. 12 hours or 1 day).
  Note: The definition of hours/days will depend on the storage capabilities of the Master PIB and the relevant underlying NOTAM. Considering the mass of messages published, the maximum should be limited to a few days.
- The basic filter settings are unchanged (e.g. traffic, route or level bands).
- The user specifies the criteria and type of transmission inside the master PIB.

For Update briefings NOTAMR as well as NOTAMC must be displayed with relevant numbers of the replaced/cancelled NOTAM.

7.11 User specific data

Modern briefing facilities are capable of providing a vast amount of information. It is essential to avoid overloading users as preparation time is limited.

This may be achieved by providing means whereby users may pre-select the type of information they receive in response to PIB query. For example, high-level wind information is not likely to be of any interest to a pilot flying VFR, whereas visibility condition information is essential.

Once set up by a user, such settings should be maintained as part of the 'user's profile' so that this user can apply them again for any future briefings. Profiling addresses:

- Personal Information (e.g. contact details).
- Product-relevant information (e.g. predefined PIB queries, sorting criteria) in the form of templates accessible at any time by the user.
- Standard message types which are part of the PIB.

- Default filters applied.
- Display format of messages and PIB structure (specific sorting of main parts e.g. AD of DEP – ENR – AD of DEST, ALTN, etc.)
- Notification/Update criteria.

More detailed reference on such data may be found in Chapter 5.3 of 'Integrated Briefing - Technical Concept Document' [AIM/AEP/BRIEF/0025] available at:

http://www.eurocontrol.int/articles/integrated-briefing-phase-3-p-12

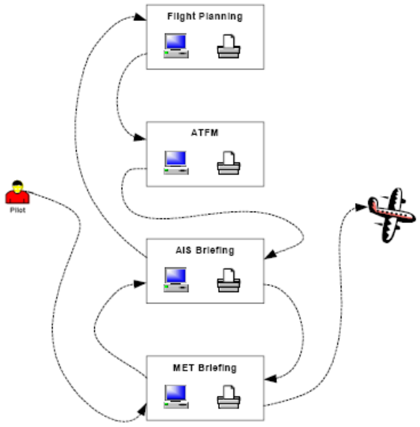
7.12 Possible evolution of Briefing services

7.12.1 Integrated Briefing - the concept of the 'One Stop Shop'

Integrated Briefing is a system or service fulfilling the generic Briefing process and enhancing it by integrating access to and provision of additional data elements such as AIS, ARO (FPL), MET, ATFCM or other information, as required (see paragraph 7.12.2).

> Note: By providing Integrated Briefing the process will seem to the end user to function as 'single entity'.

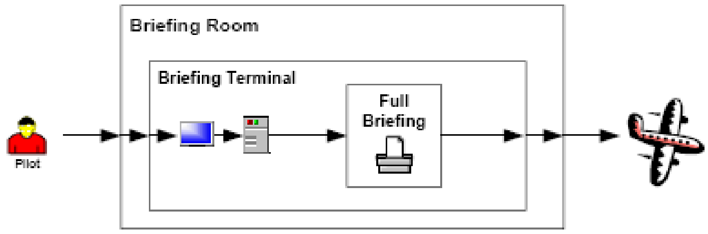
Today, the following briefing infrastructure prevails and it may be described as 'distributed Briefing service':



- Facilities/services are often in different locations (offices).
- Each 'facility' has to be visited at least once.
- Time taken to visit each facility may be extensive.
- Multiple entry of flight details may lead to errors.
- Multiple (briefing) reports are complex for a user.

The ultimate future solution may be the 'integration' of services at the system layer (portals), having the following advantages:

- Facilities/services with one application at one terminal (one-stop-shop).
- Single entry of flight details reducing the possibility of errors.
- Enabled user profiling and online services.
- Single, tailored briefing reports.


Briefing Room
Briefing Terminal
Full
Briefing
Pilot

7.12.2 Data elements:

- AIS (NOTAM, SNOWTAM, ASHTAM, static data elements of AIP, SUP etc.).
- ARO (flight plan and all related messages).
- MET (SIGMET, METAR, SPECI, TAF, upper wind and temperature, etc.).
- ATFCM (Flow messages related to the flight plan such as AIM, AUP/UUP or flight plan updates); if update notification service or update briefing is available this would also include slot messages (SAM, SRM, FLS etc.).
- Other information such as local service notes etc.

7.12.2.1 Integrating AIS and MET messages

The different message entities are selected differently for PIB entry.

For example:

- SNOWTAM and METAR are retrieved on the basis of their existence for a specific aerodrome and are presented in the PIB section for that specified aerodrome.
- SIGMET and TAF are retrieved on the basis of their existence for a specific area or FIR and are presented in the PIB section for that specified area/FIR.
- NOTAM allow most selective retrieval, such as Area (Aerodrome and FIR), Traffic, Purpose, Scope. They also allow specific output based on message, subject or condition if required as defined by the NOTAM selection criteria.

Note: The MET data/messages required for Integrated Briefing are described in CAO Annex 3 (Ref. [4]) which should be applied for system development.

7.12.2.2 Message subsections and the relevant message groups

Messages are integrated depending on the actual PIB type e.g. a METAR does not appear in the FIR section.

A user may prefer to sort subsections differently. The following default structure applies but should be customisable through user profiles.

For examples of a possible integrated PIB refer to ‘Integrated Briefing – iPIB Guide’ [AIM/AEP/BRIEF/0029] available on:
http://www.eurocontrol.int/articles/integrated-briefing-phase-3-p-12

7.12.2.2.1 MET messages:

- METAR
- SPECI
- TAF
- SIGMET
- GAMET

- AIRMET (IFR, turbulence, icing).

7.12.2.2.2 AIS messages:

- SNOWTAM
- ASHTAM
- NOTAM

7.12.2.2.3 ATFCM information:

- AUP/UUP
- ATFCM information Message (AIM)
- ATFCM Notification Message (ANM)

7.12.2.2.4 Other information:

- Specific message text (domestic procedures, local service notes etc.).
- MET charts and AIP charts.
- Etc.

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APPENDIX A1 – SYSTEM PARAMETERS

Data Definition

Databases used for dynamic data storage must contain the necessary static data, so that procedures for NOTAM Creation (Chapter 2), NOTAM Processing (Chapter 3) and NOTAM storage can be performed.

Static Data

The data usually designated by the term ‘Static Data’ is the data known to the aviation world and documented in publications such as AIP, e.g. FIR(s), Aerodromes, Navigation Aids, Areas, Maps, Rules, Subjects to which a NOTAM may be related and other aeronautical information such AIC, etc.

and,

Data required to enable NOTAM creation and processing, e.g. reference lists, standard routes, distribution files, selection criteria, association criteria, etc.

Dynamic Data

The data usually designated by the term ‘Dynamic Data’ is data conveyed by the means of NOTAM, SNOWTAM, ASHTAM, Checklists received or coherence messages.

The list of static data which might be used for NOTAM processing is contained in Chapter 9.5 'database content' of ICAO Doc 8126 (Ref. [2]). Elements of this list will also be used for NOTAM Creation, as well as for the creation of ASHTAM and SNOWTAM.

System Parameters

NOTAM database management is governed by a certain number of system parameters.

System Parameters for Data Storage

NOTAM are stored in the database from their publication/reception until their indicated end of validity, replacement or cancellation (including. removal from the monthly checklist).

Expired, replaced or cancelled NOTAM shall no longer appear in Pre-flight Information Bulletins, nor in the checklist.

Expired, replaced or cancelled NOTAM shall remain available from the database for a period of 3 month.

SNOWTAM and ASHTAM shall also be stored for a period of at least 30 days from their expired validity.

System Parameters for Data Archiving

When NOTAM and other messages are no longer valid for operational database needs (e.g. Pre-flight Information Bulletin production) storage is required to comply with legal obligations.

Long-term storage is possible on various media. The duration of the storage can vary from one Administration to another, depending upon the type of data and upon national legal requirements.

It is recommended that a NOTAM Processing Unit will store NOTAM for a period of time (one to several years) to be defined, depending upon the source of information, i.e.:

- NOTAM produced by a client-NOF and retransmitted by the NPU.
- Original NOTAM received from a non-client NOF.
- Processed NOTAM version from the NOTAM Processing Unit.

Processing of 'EST' NOTAM by the Publishing NOF

NOTAM that contain 'EST' in the Item C (end of validity) require an action by the Publishing NOF for their replacement or cancellation before the 'EST' time is reached.

The NOF System shall ensure that a reminder is provided before the 'estimated' end of validity, to produce a NOTAMR or a NOTAMC. Individual parameters can be installed, depending upon the type of information, and the operational possibilities of the Unit.

The following parameters are indicative, depending on the estimated validity of the NOTAM:

- Up to 1 day : 6 hours before EST time
- More than 1 day and up to 1 month : 1 day before EST time
- More than 1 month and up to 3 months : 3 days before EST time

Processing of 'EST' NOTAM by a NOTAM Processing Unit

See Chapter 3.

APPENDIX A2 - GLOSSARY

ACTIVE NOTAM
A NOTAM is active between the dates and times stated in Items B) and C) subject to the time schedule in Item D).

AIP
Aeronautical Information Publication

AIRAC AIP AMENDMENT
Permanent changes to operationally significant information contained in the AIP which are published in accordance with AIRAC procedures.

AIRAC AIP SUPPLEMENT
Temporary changes to operationally significant information contained in the AIP which are published by means of special pages in accordance with AIRAC procedures.

AIRSPACE RESERVATION
Term used in the NSC to define a group of Navigation Warning activities.

AIRSPACE RESTRICTION
Any changes to the limits, structure and/or availability of airspace.

AIS MESSAGE
AFS message composed according to the rules in Annex 10, made up of a maximum of 1800 characters and containing a single NOTAM or an ASHTAM or a SNOWTAM or an unformatted service message inherent to AIS operative requests interchanged between NOF, originators, clients and/or NPU

ANSP
Air Navigation Services Provider.

ATFCM
Air Traffic Flow Capacity Management.

AUP/UUP
Airspace Use Plan/Updated Airspace Use Plan.

AUTOMATIC PROCESSING
The processing and storing of NOTAM received from Publishing NOF without any human intervention.

CANCELLED NOTAM
A NOTAM that has been cancelled by another NOTAM before the Item C) date and time has been reached.

CHECKLIST
A NOTAM published regularly in each NOTAM series containing a list, grouped by year, of valid NOTAM numbers promulgated in that series.

CONVERSION
Transposition of a NOTAM received in the old format into a correctly formatted ICAO NOTAM.

DATA CORRECTION
Changing data elements where these are obviously wrong.

DEFAULT VALUES
A predetermined and agreed value to be inserted in fields that need to be filled but for which a specific value could not be defined.

EAD
European AIS Database.

EDITING
Changing the Item E) wording and/or layout of a NOTAM to make it clearer or to more explicitly express ideas that are implicit in that text.

END OF VALIDITY (NOTAM Item C))
The ten figure date-time group at which the NOTAM ceases to be in force and valid.

EST
Suffix added to the ten figure date-time group in Item C) for NOTAM with an estimated date and time of end of validity.

EXPIRED NOTAM
A NOTAM for which the date and time of end of validity stated in Item C) has been reached.

GEOGRAPHICAL REFERENCE
Eighth field of the NOTAM Item Q) which contains one set of coordinates and a radius. Associates the NOTAM with the geographical coordinates of a centre point and a radius (to a precision of 1 nautical mile) that defines the sphere of influence to which the NOTAM refers.

MULTI-PART NOTAM
A NOTAM exceeding the AFS message length (normally 1800 characters) and therefore requiring more than one message.

NOF
A NOTAM Office.

NOTAM CODE
A code group containing a total of five (5) letters, always starting with ‘Q’, to indicate the coding of information regarding the establishment, condition or change of radio aids, aerodrome and lighting facilities, dangers to aircraft in flight, or search and rescue facilities.

NOTAM CONDITION
Defined by the 4th and 5th letters of the NOTAM Code, which decode to describe the status of the NOTAM Subject (2nd and 3rd letters of the NOTAM Code) being reported on.

NOTAM IN FORCE
A NOTAM is in force once it has reached the date stated in Item B) and has neither been cancelled nor replaced nor reached its end of validity stated in Item C).

NOTAM PROCESSING UNIT (NPU)
Any Unit that is responsible for the reception, processing and further distribution of AIS messages to its Clients.

Note that this Unit may perform these functions for its own purposes only or may act on behalf of one or more Client.

The EAD (European AIS Database) is an example of a NOTAM Processing Unit.

NOTAM SELECTION CRITERIA (NSC)
The basis for the assignment of NOTAM Codes. The association criteria defined provide a subject related association of NOTAM with the qualifiers ‘Traffic’, ‘Purpose’ and ‘Scope’.

NOTAM SUBJECT
Defined by the 2nd and 3rd letters of the NOTAM Code, which decode to identify the facility, service or hazard being reported upon.

NOTAM SUB-NUMBER
In the case of Multi-part NOTAM, a 3-character group placed immediately behind the year of the number/year combination and composed of one letter and a number consisting of 2 digits.

NPU
See ‘NOTAM PROCESSING UNIT’.

NPU CLIENT
Any organisation which has subscribed to the services provided by a NOTAM Processing Unit.

NSC
See ‘NOTAM SELECTION CRITERIA’.

OPERATIONAL SIGNIFICANCE
Information essential for the safe and efficient conduct of a flight.

ORIGINAL NOTAM
A NOTAM as received by the NOTAM Processing Unit.

PAMS
Published AIP Management System (PAMS). A complete library available in the European AIS Database (EAD) of AIP and aeronautical charts for ECAC (European Civil Aviation Conference) States, also enabling the storage and management of aeronautical publications such as AIP, Amendments, Supplements, AIC and charts.

PROCESSING
The examination of NOTAM received from Publishing NOF in order to verify suitability for acceptance into an automated AIS system; undertaking conversion, translation, syntax correction, data correction, editing and/or summarising as required.

PUBLISHING NOF
The NOF (NOTAM Office) or non-governmental agency responsible for the creation of the original NOTAM.

QUALIFIER LINE (NOTAM Item Q)
This Item is divided into eight fields, each separated by a stroke, and contains the necessary qualifiers to facilitate data retrieval.

RADIUS
A three digit figure in nautical miles to be used in Item Q) that, together with the co-ordinates, defines a circle which encompasses the whole area of influence of the NOTAM.

REPLACED NOTAM
A NOTAM that has been replaced by another NOTAM before the Item C) date and time has been reached.

SUMMARISING
Reducing text in order to make it more readable in a Pre-flight Information Bulletin (PIB).

SYNTAX CORRECTION
Changing the published format structure of the NOTAM where these are obviously wrong.

START OF ACTIVITY
The ten-figure date-time group indicating the date and the time at which the NOTAM comes in force.ng the published format structure of the NOTAM where these are obviously wrong.

START OF VALIDITY
The date and time at which the NOTAM message is published or issued.

TRANSLATION
Rendering the text of a NOTAM originated in French or Spanish, into the English language, while maintaining the original sense of the text.

TRIGGER NOTAM
A NOTAM alerting recipients and PIB users of the existence and subject content of AIP Amendments and Supplements.

VALID NOTAM
A NOTAM which has been published and has not yet reached the end of its validity, and has neither been cancelled nor replaced.

- End of Document -

PROPOSAL FOR AMENDMENT OF THE ASIA AND PACIFIC REGIONS AIR NAVIGATION PLAN

(Serial No.: APAC XX/X – ATM)

a) **Plan:**

Asia and Pacific Regions Air Navigation Plan Volume II Part VII Section 3

b) **Proposed by:**

(Name of State or Organisation)

c) **Proposed amendment:**

Add paragraphs as follows:

3.1 The priority regional requirements for AIM implementation are:

a) Establishment of AIS either as a separate entity within or, ideally, separated from the civil aviation administration in accordance with the guidance provided in ICAO Doc 8126 – AIS Manual Chapter 3.

b) Implementation of Quality Management Systems for aeronautical information;

c) Establishment of formal agreements between AIS providers and aeronautical data originators specifying the content, quality, maintenance and timing of provision of aeronautical data that is required to be promulgated in AIP, and the quality management process that shall be applied.

d) Implementation of internet-accessible electronic AIP generated from a digital database of aeronautical information.

Note: some existing aeronautical information products may not be suitable for migration into digital datasets.

e) The taking of all necessary measures to develop and implement AIM training programs for AIS personnel, including training in digital data management, and end-to-end quality management processes.

f) Provision of full access to the relevant ICAO Annexes and Documents to all personnel having responsibility for the origination, reception, management and/or distribution of aeronautical information and aeronautical data.

d) **Date when proposal received:**

[Regional Office Use Only]

e) **Proposers reason for amendment:**

xxxxxx

Note: Where the amendment affects adjacent FIRs, the proposer should provide information on consultation and agreement.

f) **Proposed implementation date of the amendment:**

Upon approval by the Council.

g) **Action by the Regional Office:**

The proposal is circulated to the following States.

(i) xxxx, (ii) xxxx, (iii) xxxx, (iv) xxxx, ……

Note: The list should include the States or organisations affected by the route change. The proposal for amendment may also be circulated to some interested states, for information.

h) **Secretariat's comments:**

1. xxxxxxxxxxxxxxxx
2. xxxxxxxxxxxxxxxx

Note: States should ensure that-

a) detailed and accurate information with regard to the route is provided;

b) an appropriate chart be provided for reference; and

c) prior consultation and agreement is sought with the affected FIRs, and information on such consultation and agreement be provided (joint proposals are recommended).

Terms of Reference of the AIS-AIM Implementation Task Force (AAITF)

The objectives of the Task Force are to:

a) study means of aeronautical data management by civil aviation authorities and/or ATS providers in other regions including the aeronautical information exchange model (AIXM) and the electronic AIP (eAIP), ~~and consider the feasibility in making use of~~ promote the implementation of these methods/models in the Asia/Pacific Region;

b) examine the means of aeronautical data exchange used in other regions and application in the Asia/Pacific Region;

c) assist States to implement Quality Management Systems for aeronautical information in an expeditious manner;

d) develop training material and conduct workshops on the Guidance Manual for AIS in the Asia/Pacific Region;

e) develop guidance material for Static Data Procedures and the AIS Automation Plan;

f) review and update the Guidance Manual taking into account amendments to ICAO SARPs, guidance material;

g) monitor and review technical and operating developments in the AIS field especially in the area of automation and database management; and

h) monitor the transition from AIS to AIM, and in particular monitor development of the replacement of Annexes 4 & 15 and guidance documents under development by ICAO.

To achieve the above objectives, the Task Force shall consider:

1. results of the ICAO ~~Aeronautical Information Services – Aeronautical Information Management Study Group (AIS-AIMSG)~~ Information Management Panel (IMP);

2. amendments to Annex 4, Annex 5, the AIS Manual (Doc 8126), and the Aeronautical Chart Manual (Doc 8697); and

3. revisions to the EUROCONTROL *Operating Procedures for AIS Dynamic Data* (OPADD); and

4. implementation of the regional priorities and the performance objectives of the Asia/Pacific Seamless ATM Plan ~~performance framework performance objectives contained in the Performance Framework Form (PFF)~~.

The Task Force will report to the ATM Sub-Group of APANPIRG

(Adopted by the 14th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group, 2003, and amended by the 20th and 21st Meetings of the ATM/AIS/SAR/SG and the 4th Meeting of the ATM/SG)

SAR Capability Matrix (Last Update: 18 August 2016)

	Training	Alerting	Legislative	SAR Committee	SAR Agreements	Relationships	Communications	Quality Control	Civil Military	Resources	SAREX	Library	Computerisation	SAR Programme	Supply Dropping	Special Equipment	SAR aircraft	Navigation	ELTs	COSPAS-SARSAT Alerts	Capability (A=5, B=4) %
Afghanistan																					0
Australia	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	B	A	98
Bangladesh	D	B	B	E	C	B	B	A	A	B	B	B	C	B	B	B	A	B	A	A	69
Bhutan																					0
Brunei	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	E	93
Cambodia	B	B	C	B	C	B	C	E	B	C	C	C	D	C	E	E	D	D	E	B	24
China	A	A	A	A	A	A	B	B	A	B	B	C	D	E	A	A	A	A	A	E	76
Cook Islands	E	D	D	E	E	C	C	C	D	E	D	E	E	E	E	D	D	E	A	E	5
DPR Korea	D	B	D	B	E	D	B	B	B	C	D	E	E	E	D	E	C	C	E	E	20
Fiji	D	A	C	C	C	C	B	C	B	C	B	C	C	B	D	C	C	C	B	A	30
French Polynesia	A	A	A	B	C	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	93
Hong Kong, China	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	99
India	B	A	A	B	C	B	A	D	A	A	A	A	B	B	A	B	A	A	A	A	84
Indonesia	A	A	A	A	A	A	B	B	A	A	A	B	B	B	A	B	B	B	B	B	90
Japan	A	A	A	A	B	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	98
Kiribati																					0
Lao PDR	C	B	C	B	B	B	B	D	B	B	C	C	C	C	B	D	D	B	D	A	41
Macau, China	A	A	A	B	A	-	A	-	-	-	A	-	-	-	-	-	A	-	A	A	49
Malaysia	A	A	C	A	B	A	A	A	A	A	A	B	A	A	A	A	A	A	A	D	88
Maldives	C	A	C	E	B	A	B	C	A	C	B	B	B	A	C	C	C	A	C	A	50
Marshall Islands																					0
Micronesia	C	D		E	E	D	C					E		D	D						0

Mongolia	A	A	B	A	B	B	A	A	A	B	A	A	A	B	**D**	B	A	B	A	A	88
Myanmar	**D**	**E**	**D**	**C**	**E**	B	**C**	**C**	B	**E**	**E**	**E**	**E**	**E**	**C**	**E**	B	**C**	**E**	**E**	12
Nauru																					0
Nepal	B	B	**C**	**D**	**E**	**C**	**C**	**D**	B	**D**	**E**	**D**	**E**	B	B	**C**	B	B	B	**D**	32
New Caledonia	A	B	B	B	**C**	B	A	B	A	B	A	A	B	**E**	A	B	A	A	A	A	82
New Zealand	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	99
Pakistan	A	B	B	A	**C**	A	B	A	A	A	A	A	**D**	B	B	A	A	A	A	A	85
Palau																					0
Papua New Guinea	B	A	B	**C**	B	B	**C**	**C**	B	**C**	**C**	B	**C**	**C**	**C**	**E**	**E**	**E**	A	**E**	34
Philippines	**C**	B	A	**C**	B	**C**	B	**C**	**C**	**C**	**C**	**D**	**C**	**C**	**D**	**C**	B	A	A	A	36
Republic of Korea	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	100
Samoa																					0
Solomon Islands																					0
Singapore	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	100
Sri Lanka	**C**	B	B	**C**	B	B	A	B	A	B	B	A	**D**	**D**	B	B	**C**	A	A	A	66
Thailand	B	A	A	A	B	A	A	A	A	A	A	B	B	B	A	A	A	A	A	A	95
Timor Leste																					0
Tonga	**C**	**D**	**E**	**E**	**D**	**C**	**C**	**E**	B	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**C**	**E**	A	**E**	9
United States	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	99
Vanuatu																					0
Viet Nam	A	A	A	A	B	A	A	B	A	A	A	A	B	A	A	A	A	A	A	A	97
	Training	Alerting	Legislative	SAR Committee	SAR Agreements	Relationships	Communications	Quality Control	Civil Military	Resources	SAREX	Library	Computerisation	SAR Programme	Supply Dropping	Special Equipment	SAR aircraft	Navigation	ELTs	COSPAS-SARSAT Alerts	

A = Fully meets Annex 12 requirements, B = Meets Annex 12 requirements in most areas,
C = Meets Annex 12 requirements in some areas, D = Initial implementation, E = Not implemented, Blank = No response

SAR Matrix Element Descriptions

Training: The appropriate level and type of training for SAR coordinator, SAR mission coordinator, on-scene coordinator, and operational facilities. (IAMSAR Manual Vol. 1, Chapter 3)

Alerting: Fast and reliable means for the rescue coordination center to receive distress alerts. (IAMSAR Manual Vol. 1, Chapter 2)

Legislative: Statutes and related provisions that establish a legal foundation for establishing a SAR organization and its resources, policies, and procedures. (IAMSAR Manual Vol. I, Chapter 1)

SAR committee: Typically established under a national SAR plan, the SAR coordinating committee is comprised of SAR system stakeholders. (IAMSAR Manual Vol. 1, Chapter 6 and Appendix J)

Agreements : States should enter into agreements with neighboring States to strengthen SAR cooperation and coordination. (Chapter 3 – *Cooperation*, in both Annex 12 – Search and Rescue, and the International Convention on Maritime SAR)

Relationships: Close cooperation between services and organizations which may contribute to improving SAR service in areas such as operations, planning, training, exercises and research and development.

Communications: Communication capability for receipt of distress alerts and operational coordination among the SAR mission coordinator, the on-scene coordinator and SAR facilities. (IAMSAR Manual Vol. 1, Chapter 3)

Quality Control: Procedures to focus on improving the quality of SAR services so as to improve results and reduce costs. (IAMSAR Manual Vol. 1, Chapter 6)

Civil/Military: Close cooperation between the various civilian and military organizations.

Resources: The primary operational facilities made available to the national SAR system by various authorities and arrangements with others. (IAMSAR Manual Vol. 1, Chapter 5 and Appendix C)

SAR Exercise: Exercise to test and improve operational plans, provide learning experience and improve liaison and coordination skills. (IAMSAR Manual Vol. 1, Chapter 3; Annex 12, and Annex 14 regarding Airport Emergency Plan)

Library: Quick access to the applicable international, national, and agency SAR publications that provide standards, policy, procedures and guidance.

Computerization: Use of or access to output of various computer resources including databases, computer aids for SAR system management, search planning software, etc. (IAMSAR Manual Vol. 1, Chapter 2)

SAR programme: National structure to establish, manage and support the provision and coordination of SAR services. (IAMSAR Manual Vol. 1, Chapter 1)

Supply dropping: Supplies and survival equipment carried by air and maritime SAR facilities to aid survivors and facilitate their rescue, as appropriate. (IAMSAR Manual Vol. 1, Chapter 2 and Appendix B)

Special equipment: Equipment created for specific rescue scenarios (such as mountain or desert rescue) and equipment typically carried on designated SAR units to support coordination and locating functions as well as special supplies and survival equipment to aid survivors and facilitate their rescue. (IAMSAR Manual Vol. 1, Chapter 2 and 4)

SAR aircraft: An aircraft provided with specialized equipment suitable for the efficient conduct of SAR missions (Annex 12, Chapter 2 - *Organization*)

Navigation: Suitable means provided within the SAR region to determine position, and the responding SAR facilities have the appropriate equipment on board to determine their position in the SAR region they are likely to operate. (IAMSAR Manual Vol. 1, Chapter 2)

ELT: National regulations for carriage of ELTs, and arrangements for registration of the 406 MHz beacon and rapid access to the beacon registration database. (Annex 6 – Operation of Aircraft and Annex 10 - Aeronautical Telecommunications; and IAMSAR Manual Vol. 1, Chapter 4)

Cospas-Sarsat Distress Alerts: A SAR Point of Contact (SPOC) designated for receipt of Cospas-Sarsat distress data, and arrangements for efficient routing of the distress data to the appropriate SAR authority (the aeronautical emergency locator transmitter ELT), maritime emergency position-indicating beacon (EPIRB), and personal locator beacon (PLB)). (Annex 12, paragraph 3.2.5 and Section 2.4; and, IAMSAR Manual Vol. 1, Chapter 4)

ATM/AIM/SAR Deficiencies List (Updated 16 June 2016)

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
WGS-84								
Requirements of Paragraph 3.7.1 of Annex 15	Afghanistan	WGS-84 - Not implemented	24/6/2014			Afghanistan	TBD	A
	Bangladesh	WGS-84 - Not implemented	24/6/2014			Bangladesh	TBD	A
	Bhutan	WGS-84 - Not implemented	2/7/1999	Data conversion completed, but not published		Bhutan	TBD	A
	Brunei Darussalam	WGS-84 - Not implemented	24/6/2014			Brunei Darussalam	TBD	A
	Cook Islands	WGS-84 - Not implemented	24/6/2014			Cook Islands	TBD	A
	Kiribati	WGS-84 - Not implemented				Kiribati	TBD	A
	Marshall Islands	WGS-84 - Not implemented	24/6/2014			Marshall Islands	TBD	A
	Micronesia	WGS-84 - Not implemented	24/6/2014			Micronesia	TBD	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Nauru	WGS-84 - Not implemented		Conferring with consultant		Nauru	TBD	A
	~~Pakistan~~	~~WGS-84 - Not implemented~~	~~24/6/2014~~			~~Pakistan~~	~~TBD~~	~~A~~
	Palau	WGS-84 - Not implemented	24/6/2014			Palau	TBD	A
	Philippines	WGS-84 - Not implemented	24/6/2014			Philippines	TBD	A
	Samoa	WGS-84 - Not implemented	24/6/2014			Samoa	TBD	A
	Thailand	WGS-84 - Not implemented	24/6/2014			Thailand	TBD	A
	Vanuatu	WGS-84 - Implemented at main airports	2/7/1999			Vanuatu	1999	A
<u>Airspace Classification</u>								
Requirements of Paragraph 2.6 of Annex 11	China	Airspace Classification - Not implemented	7/7/99		Difference to Annex 11 is published in AIP, China.	China	APANPIRG/19 updated, implementation planned by end	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
							2010.	
	Kiribati	Airspace Classification - Not implemented	7/7/99			Kiribati	TBD	A
	Nauru	Airspace Classification - Not implemented	7/7/99			Nauru	TBD	A
	Papua New Guinea	Airspace Classification - Not implemented	7/7/99			Papua New Guinea	Project in place	A
	Solomon Islands	Airspace Classification - Not implemented	7/7/99			Solomon Islands	TBD	A
<u>AIP Format</u>								

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Requirements of Chapter 4 of Annex 15	Cook Islands	AIP Format - Not implemented	7/7/99			Cook Islands	ATM/AIS/SAR/G/16 (June 2006) updated - AIP COOK ISLANDS in new format in progress with assistance of New Zealand	A
	Kiribati	AIP Format - Not implemented	7/7/99			Kiribati	ATM/AIS/SAR/SG/18 (June 2009) was advised AIP in draft stage	A
	Nauru	AIP Format - Not implemented	7/7/99			Nauru	ATM/AIS/SAR/SG/18 (June 2008) was advised work soon to start	A
	Papua New Guinea	AIP Format - Not implemented	7/7/99			Papua New Guinea	TBA	A
AIS Quality Management System								
Requirements of Paragraph 3.2.1 of Annex 15 Quality Management System - Not implemented	Afghanistan	AIS Quality Management System - Not implemented	24/6/2014			Afghanistan	TBD	A
	Bangladesh	AIS Quality Management System - Not	24/6/2014			Bangladesh	TBD	A

Identification		**Deficiencies**			**Corrective Action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
		implemented						
	Bhutan	AIS Quality Management System - Not implemented	24/6/2014			Bhutan	TBD	A
	Brunei Darussalam	AIS Quality Management System - Not implemented	24/6/2014			Brunei Darussalam	TBD	A
	Cambodia	AIS Quality Management System - Not implemented	24/6/2014			Cambodia	TBD	A
	Cook Islands	AIS Quality Management System - Not implemented	24/6/2014			Cook Islands	TBD	A
	~~DPR Korea~~	~~AIS Quality Management System - Not implemented~~	~~24/6/2014~~			~~DPR Korea~~	~~TBD~~	~~A~~
	Indonesia	AIS Quality Management	24/6/2014			Indonesia	TBD	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
		System - Not implemented						
	Kiribati	AIS Quality Management System - Not implemented	24/6/2014			Kiribati	TBD	A
	Lao PDR	AIS Quality Management System - Not implemented	24/6/2014			Lao PDR	TBD	A
	Maldives	AIS Quality Management System - Not implemented	24/6/2014			Maldives	TBD	A
	Marshall Islands	AIS Quality Management System - Not implemented	24/6/2014			Marshall Islands	TBD	A
	Micronesia	AIS Quality Management System - Not implemented	24/6/2014			Micronesia	TBD	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	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
	~~Pakistan~~	~~AIS Quality Management System - Not implemented~~	~~24/6/2014~~			~~Pakistan~~	~~TBD~~	~~A~~
	Palau	AIS Quality Management System - Not implemented	24/6/2014			Palau	TBD	A
	Papua New Guinea	AIS Quality Management System - Not implemented	24/6/2014			Papua New Guinea	TBD	A
	Philippines	AIS Quality Management System - Not	24/6/2014			Philippines	TBD	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
		implemented						
	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
	Thailand	AIS Quality Management System - Not implemented	24/6/2014			Thailand	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

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	~~Viet Nam~~	~~AIS Quality Management System – Not implemented~~	~~24/6/2014~~			~~Viet Nam~~	~~TBD~~	~~A~~

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
SAR capability								
Requirements of Annex 12	Afghanistan	SAR Capability Matrix	6/07/2015	SAR Capability (no data)		Afghanistan	2016	U
	Bhutan	SAR Capability Matrix	6/07/2015	SAR Capability (no data)		Bhutan	2016	U
	Cambodia	SAR Capability Matrix	6/07/2015	SAR Capability (14 of 20)		Cambodia	2016	U
	Cook Islands	SAR Capability Matrix	6/07/2015	SAR Capability (19 of 20)		Cook Islands	2016	U
	Cook Islands	Annex 12 requirements not implemented. No agreements with adjacent States.	31/1/95		Cook Islands - implement Annex 12 requirements and co-ordinate LOA with adjacent States ICAO - assist to develop SAR capability and to co-ordinate with adjacent States	Cook Islands	2009. SAR agreement with New Zealand completed 2007.	U
	DPR Korea	SAR Capability Matrix	6/07/2015		SAR Capability (15 of 20 elements non-compliant)	DPR Korea	2016	U

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Fiji	SAR Capability Matrix	6/07/2015		SAR Capability (13 of 20 elements non-compliant)	Fiji	2016	U
	Kiribati	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Kiribati	2016	U
	Lao PDR	SAR Capability Matrix	6/07/2015		SAR Capability (10 of 20 elements non-compliant)	Lao PDR	2016	U
	Macau, China	SAR Capability Matrix	6/07/2015		SAR Capability (10 of 20 elements non-compliant)	Macau, China	2016	U
	Maldives	SAR Capability Matrix	6/07/2015		SAR Capability (9 of 20 elements non-compliant)	Maldives	2016	U

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Maldives	Annex 12 requirements not implemented. No agreements with adjacent States.	24/4/97	SAR services and facilities provided (details to be confirmed). SAR agreements with neighbouring States under development	Maldives - implement Annex 12 requirements and co-ordinate LOA with adjacent States ICAO - assist to develop SAR capability and to co-ordinate with adjacent States	Maldives	2009	U
	Marshall Islands	SAR Capability Matrix	6/07/2015		SAR Capability (no data elements non-compliant)	Marshall Islands	2016	U
	Micronesia	SAR Capability Matrix	6/07/2015		SAR Capability (20 of 20 elements non-compliant)	Micronesia	2016	U
	Myanmar	SAR Capability Matrix	6/07/2015		SAR Capability (17 of 20 elements non-compliant)	Myanmar	2016	U
	Nauru	SAR Capability Matrix	6/07/2015		SAR Capability (no data elements non-compliant)	Nauru	2016	U
	Nepal	SAR Capability Matrix	6/07/2015		SAR Capability (12 of 20 elements non-compliant)	Nepal	2016	U
	New	SAR Capability	6/07/2015		SAR Capability (8 of 20	New	2016	U

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Caledonia	Matrix			elements non-compliant)	Caledonia		
	Palau	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Palau	2016	U
	Papua New Guinea	SAR Capability Matrix	6/07/2015		SAR Capability (11 of 20 elements non-compliant)	Papua New Guinea	2016	U
	Philippines	SAR Capability Matrix	6/07/2015		SAR Capability (12 of 20 elements non-compliant)	Philippines	2016	U
	Samoa	SAR Capability Matrix	6/07/2015		SAR Capability (no data elements non-compliant)	Samoa	2016	U
	Solomon Islands	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Solomon Islands	2016	U
	Timor Leste	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Timor Leste	2016	U
	Tonga	SAR Capability Matrix	6/07/2015		SAR Capability (18 of 20 elements non-compliant)	Tonga	2016	U
	Vanuatu	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Vanuatu	2016	U

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Non Provision of Safety-related Data								
Requirement of Paragraph 3.3.5.1 of Annex 11 (provision of data for monitoring the height-keeping performance of aircraft)	India	Annex 11 requirement not implemented.		Established by RASMAG/20- failure to provide RVSM approvals summary data	Lack of	India		U
~~Requirement of Paragraph 3.3.5.1 of Annex 11 (provision of data for monitoring the height-keeping performance of aircraft)~~	~~Philippines~~	~~Annex 11 requirement not implemented.~~		~~Established by RASMAG/20- failure to provide RVSM approvals summary data~~	RMA reports data now provided.	~~Philippines~~		~~U~~

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Failure to provide RVSM Approval Data to the RMA	India	Annex 6 paragraph 7.2.6	RASMAG/ 20 and 21	Established by RASMAG/21 - Relevant APANPIRG Conclusions: *19/15* **(***Enhanced communications between States and RVSM RMAs)*; *23/15* **(***Long-Term Non-RVSM Approved Aircraft)*; and *23/16 (Safety Monitoring Data Provision).*		India		U
Data Link Performance Monitoring and Analysis								
Requirements of Paragraph 2.27.5 of Annex 11 not met.	China	Post-implementation monitoring not implemented	29/5/2015	Problem Reports not provided to CRA		China	TBD	A
	Indonesia	Post-implementation monitoring not implemented	29/5/2015	Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.		Indonesia	TBD	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Malaysia	Post-implementation monitoring not implemented	29/5/2015	Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.		Malaysia	TBD	A
	Myanmar	Post-implementation monitoring not implemented	29/5/2015	Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.		Myanmar	TBD	A
	Maldives	Post-implementation monitoring not implemented	29/5/2015	Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.		Maldives	TBD	A

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
	Sri Lanka	Post-implementation monitoring not implemented	29/5/2015	~~Not registered with competent CRA.~~ Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.	Agreed by FIT-Asia/5, endorsed by RASMAG/21	Sri Lanka	TBD	A
	Viet Nam	Post-implementation monitoring not implemented	29/5/2015	Problem Reports not provided to CRA. Performance monitoring and analysis not reported to FIT.	Agreed by FIT-Asia/5, endorsed by RASMAG/21	Viet Nam	TBD	A

SAR Plan Capability Measurement System

Following is a bank of indicators based on the Asia/Pacific Plan's performance improvement section (which should be read in conjunction) than can be used to assess whether an administration is either compliant or not and to internally evaluate their implementation status of the Asia/Pacific SAR Plan.

1. Enacted legislation that incorporates or is aligned to applicable international Conventions	0
2. Unless delegated, established an entity that provides H24, SAR services within its area of responsibility/SRR	0
3. Established a national SAR committee	0
4. Empowered SAR Mission Coordinators with the authority to adequately carry out their responsibilities	0
5. Established an Administrative Single Point of Contact for SAR (ASPOCS) for non-urgent, administrative matters	0
6. Conducted studies to integrate aviation and maritime SAR, and as far as practicable, civil and military activities	0
7. Conducted studies to align, as far as practicable, aeronautical and maritime SRRs, and SRRs and FIRs	0
8. Established a single State SAR Plan	0
9. Established aerodrome emergency plans that provide for co-operation and co-ordination with RCCs	0
10. Established SAR agreements with States having adjoining SRRS or FIRs	0
11. Provided up to date cross-border information on SAR capability to adjoining States	0
12. Pre-arranged procedures for cross-border SAR responses	0
13. Established RCC plans for response to Mass Rescue Operations (MROs) integrated with national disaster plans	0
14. Established operational plans and procedures for SRUs, provision of support, communication and reporting	0
15. Established SAR Alerting procedures which are tested, integrated and include civil/military protocols	0
16. Provided a fully equipped RCC of sufficient size with adequate provision for operational positions and human factors	0
17. Provided adequate supervisory ATC resources to allow timely SAR alerts and information to RCCs	0
18. Provided sufficient RCC staffing	0
19. Provided a sufficient number of trained specialist RCC officers including SMCs and A/SMCs	0
20. Availability of a pool of RCC support staff who are familiar with RCC operations, but not trained as coordinators	0
21. Developed SAR personnel position descriptions detailing responsibilities and eligibility criteria	0
22. Developed a comprehensive training programme that includes SAR training for SAR Coordinators and SRU staff	0
23. Facilitated RCC staff to be proficient in the English language	0
24. Facilitated a programme of regular liaison visits between relevant RCCs, ATC units and airline operating centres	0
25. Established additional oceanic SAR capability as far as practicable to ensure a timely and adequate SAR response	0
26. Established sufficient SRU capabilities (crews, availability, military assets, communications, authority, etc.)	0

27. Established procedures and necessary infrastructure to coordinate distress beacon alert responses	0
28. Established a reliable distress beacon registration system	0
29. Planned and prepared for the implemention of next generation beacons	0
30. Established an appropriate nationwide means of disposal for old distress beacons	0
31. Established contingency facilities, or procedures for the temporary delegation of SAR to another body or State	0
32. Established a centralised information source publishing all AIP information required on SAR	0
33. Established an Internet-based SAR information sharing system	0
34. Established systems for the maximum practicable cooperation between State entities for information when required	0
35. Developed and maintained a current, comprehensive electronic list of State SAR Facilities, SAR Equipment, and SRUs	0
36. Established an Internet-based SAR Library, or cooperate by contributing to an Internet-based Asia/Pacific resource	0
37. Provided each RCC and SAR Authority with ready access to a current copy of SAR reference documents	0
38. Conducted regular SAREX to test and evaluate coordination procedures, data and information sharing and SAR responses	0
39. Implemented SAR System Improvement and Assessment measures, including Safety Management and QA systems	0
40. Conducted an annual or more frequent analysis of their current State SAR system to identify specific gaps in capability	0
41. Conducted SAR promotional programs	0
Total (of 41)	0

APSAR/WG/1
Appendix H to the Report

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC SEARCH AND RESCUE (SAR) PLAN

Version 2.0, September 2016

This Plan was developed by the Asia/Pacific Search and Rescue Task Force (APSAR/TF) and the Asia/Pacific Search and Rescue Work Group (APSAR/WG)

Approved by APANPIRG/27 and published by the
ICAO Asia and Pacific Office, Bangkok

CONTENTS

SCOPE OF THE PLAN

Plan Structure

1.1 The Asia/Pacific Search and Rescue (SAR) Plan (hereinafter referred to as the 'Plan') references different levels. At the higher level are global requirements established by the ICAO Annex 12 to the ICAO Convention on International Civil Aviation (ICAO Doc 7300). Global guidance material is provided by the International Maritime Organization (IMO) and ICAO's joint publication, the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual. Beneath this is regional planning guidance primarily provided by this Plan and other regional guidance material, in order to enable States to define the goals and means of meeting objectives for State planning towards improving State SAR System capability, such as Regional Air Navigation Plan (RANP, ICAO Doc 9673) objectives.

1.2 The global air navigation perspective is guided mainly by the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global ATM Operational Concept* (Doc 9854) and the *Global Aviation Safety Plan* (GASP).

1.3 The scope of the Plan is the identification of:

- the current status of SAR preparedness of Asia/Pacific Region States and State SAR arrangements; and
- recommendations for SAR planning and preparedness enhancements, in terms of compliance with Annex 12 of the ICAO Convention, IAMSAR Manual guidance, and accepted best international practice.

1.4 References in the Plan to 'States' are intended to include Special Administrative Regions and territories.

Plan Review

1.5 As an iterative process, the Plan requires regular updating to keep current with changes in ICAO Annexes and guidance material, the IAMSAR manual, regional aviation activity, developments in the Air Traffic Management (ATM) system, new technology, political considerations, human performance and lessons learned from actual SAR responses. Plan updates should also focus on the SAR system being an important component of an integrated regional and global air navigation system. It is intended that APANPIRG and its contributory bodies conduct a complete review every three years from 2019 (or a shorter period determined by Asia/Pacific Air Navigation Planning and Implementation Regional Group - APANPIRG) of the Plan to align with the review cycle of the GANP and the IAMSAR Manual. The review should be guided by a consultative process involving States and relevant International Organisations such as the IMO and other technical bodies.

OBJECTIVES

Introduction

2.1 Asia/Pacific States who are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of its Annex 12 - Search and Rescue. Increases in both aviation and maritime traffic throughout the Asia/Pacific region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical and maritime SAR services.

2.2 The world's citizens, who frequently fly over or sail through the Asia/Pacific, expect a timely and adequate SAR response to be provided should it be required. States in the region need to be adequately prepared for the provision of efficient and effective SAR services. To assist in achieving this, it is essential for States to cooperate, collaborate and in some cases assist with resources to neighbouring and sub-regional RCCs.

2.3 ICAO Regional Office maintains a record, as reported to ICAO by the States themselves, of the status of individual State SAR compliance against Annex 12 requirements. There are significant variations in the level of State SAR capability across the region with significant gaps requiring urgent action, especially in oceanic areas. A number of States have not reported their status at all to ICAO. The ICAO Universal Safety Oversight Audit Programme – Continuous Monitoring Approach (USOAP-CMA) also provides a useful tool to States to self-assess their individual SAR system status.

2.4 There is a high risk of negative consequences to a State which does not provide an adequate SAR response to an aircraft or vessel in distress. The primary concern is the higher probability for loss of lives which may have been saved. The ability for news to spread rapidly in today's technologically connected world also provides the opportunity for a poor or ineffective SAR response to quickly reach a global audience resulting in damage to that State's reputation internationally and potential economic loss to sensitive State industries such as tourism and transport. However, the benefits of an effective and reliable SAR service to States offers many advantages. Besides reduction of loss of life and human suffering, other advantages include the following aspects.

a) Safer and more secure environment for aviation and maritime related industries, commerce, recreation and travel. Increased safety may promote use and enjoyment of aviation and maritime environments, tourism and economic development. This is especially true when the SAR system is associated with programmes aimed at preventing or reducing the effects of mishaps, sometimes referred to as "Preventative SAR."

b) Availability of SAR resources often provides the initial response and relief capabilities critical to saving lives in the early stages of natural and man-made disasters. SAR services offer an integral part of local, national and regional emergency management systems.

c) Well performed SAR operations can provide positive publicity about situations which may otherwise be viewed negatively. This can lead to improved public confidence in that State's reputation and commitment to providing a safe environment, leading to increased confidence to conduct activities beneficial to that State's economy.

d) As SAR is a relatively non-controversial and humanitarian mission, it provides an excellent opportunity to enhance cooperation and communication in general between States and organisations, not only for SAR. It can also foster better working relationships between States and organisations at the local, national and international levels, including civil/military cooperation.

2.5 In 2014 Malaysia Airlines flight MH370, a Boeing 777 with 239 persons on board, disappeared when flying from Kuala Lumpur, Malaysia to Beijing, China, and Air Asia QZ8501 was lost on a flight from Surabaya to Singapore. The MH370 event resulted in probably the largest and most expensive search response for a missing aircraft in human history. Together with Air France flight AF447, which crashed into the Atlantic Ocean in 2009, these tragedies have highlighted vulnerabilities in the current air navigation system, including the SAR system, which have hampered timely identification and localisation of aircraft in distress, hindering effective response efforts. ICAO is taking measures to assist with addressing these vulnerabilities through the Global Aeronautical Distress and Safety System (GADSS) concept; however this also requires improvements in global SAR capability.

2.6 The Plan is designed to address both civil and military SAR authorities and has been developed in consultation with Asia/Pacific States, SAR administrations and relevant International Organisations. States should consult with stakeholders nationally, regionally and internationally as appropriate and determine actions in order to commit to achieving the objectives of this Plan in order to meet the minimum SAR service requirements in accordance with ICAO Annex 12. It is noted that where a State is unable to meet minimum SAR Standards and Recommended Practices (SARPs) of ICAO Annex 12, Article 38 to the ICAO Convention requires notification to ICAO of the differences between its own practice and that established by the international standards.

2.7 States should aim to meet their obligations progressively in a strategically structured and planned manner with improvement goals set for short term, medium term and long term implementation. It may be more productive to make gains in small steps commencing with measures that are more easily achievable in the short term and have a minimal cost, progressing to measures which will take longer to implement over the medium to long term. Short term measures that may be implemented relatively easily include the establishment of a national SAR Committee and ensuring SAR Agreements are in place with neighbouring States allowing for seamless cross-border transit of search assets engaged in SAR activity. A SAR agreement can be in the form of ‘Letter of Agreement’ (LOA) or a Memorandum of Understanding or other acceptable term indicating a lower form of arrangement for operational matters between SAR service providers (such as RCCs and/or RSCs) or a more formal agreement for arrangements between governments concerned.

2.8 All States are encouraged to use the guidance provided within this Plan as a way forward, thus ensuring a timely, well-coordinated response to any SAR incident within their area of responsibility, or during cooperative responses involving more than one Search and Rescue Region (SRR).

Plan Objective

2.9 The objective of this SAR Plan is to provide a framework to assist Asia/Pacific States to meet their SAR needs and obligations accepted under the Convention on International Civil Aviation and for the harmonised and interoperable delivery of both aeronautical and maritime SAR services within the region, and across other ICAO regional boundaries, where practicable.

2.10 The Plan is to be consistent with the SARPs of ICAO Annex 12 - Search and Rescue, and aligned where appropriate with the SAR technical and operational standards and guidance of the IMO.

2.11 The Plan recognizes that ICAO serves as the forum for the implementation of practical and achievable measures to improve SAR services for international civil aviation. The Plan also recognizes that the IMO provides a similar forum for SAR services to maritime shipping.

2.12 Both ICAO and IMO share the same goal of ensuring that SAR services are available globally wherever people sail or fly. The SAR services that ICAO and IMO promote are complementary and offer tangible opportunities to derive mutually beneficial efficiencies for both the aviation and maritime transportation SAR systems globally, regionally and nationally.

2.13 The objective of this Plan includes encouraging States to take advantage of such efficiencies. States should, where practicable, align their SAR systems with the guidance provided by the IAMSAR Manual, which also provides the benefit for standardised SAR coordination between RCCs and across SRR lines of delineation.

2.14 State SAR plans describe how SAR services will be provided, organized and supported in order for States to meet their obligations under the relevant Conventions. Search and Rescue Coordinators (SC) and SAR managers oversee and implement these plans. National SAR plans should be signed by all Government agencies which can provide or support SAR services. These agencies should all be represented on the State's Search and Rescue Coordinating Committee (SCC), which oversees these plans.

Note: The SC should not be confused with the operational nature of the SAR Mission Coordinator (SMC). The primary purpose of the national SC is to enable a whole-of-government approach to make efficient and effective use of a State's capabilities for SAR.

Plan Development

2.15 The Plan was developed as part of a suite of Asia/Pacific air navigation plans, including the Seamless ATM Plan, the Air Traffic Flow Management (ATFM) Framework, and the Regional ATM Contingency Plan, so the Plan should not be considered in isolation.

2.16 The Plan is expected to provide guidelines and recommendations for Asia/Pacific States to consider for the enhancement and improvement of national, sub-regional and regional SAR capability including:

a) compliance with Annex 12 SARPs;

b) identification and addressing of deficiencies in SAR capability;

c) continuous and coherent development of SAR capability;

d) harmonisation of aeronautical and maritime SAR services;

e) civil/military cooperation and coordination (including SAR response, information sharing and use of airspace);

f) remote oceanic SAR response capability (including provision for Mass Rescue Operations (MRO);

g) establishment and review of arrangements between neighbouring States to expeditiously facilitate SAR coordination, operations and cooperation across regional boundaries including contingency procedures;

h) facilitation of the implementation of SAR systems and services including the establishment of JRCCs where suitable and practicable;

i) supporting the sharing of SAR information, data and expertise;

j) integration with ATM systems and future ATS developments, where appropriate;

k) monitoring of outcomes from APANPIRG Sub-Groups, other ICAO Region SAR groups, ICAO/IMO Joint Working Group on Harmonisation of Aeronautical and Maritime SAR (JWG) and related forums for issues that may affect the Plan;

l) facilitation of a continuous reporting mechanism of State SAR capability, Annex 12 compliance and SAR performance data to the APAC Regional Office through the APANPIRG Air Traffic Management Sub-Group (ATM/SG);

m) implementation of a SAR System Improvement and Assessment measures, including Safety Management System, Quality Assurance programme and risk assessment;

n) coordinating the introduction of new technology affecting the regional SAR system;

o) sharing future research and development concepts;

p) seeking efficiencies, through the coordination and facilitation of concurrent regional SAR meetings, seminars, workshops and exercises, including joint ICAO and IMO, and sub-regional forums where practicable; and

q) conducting efficient SAR Exercises (SAREXs) that identify improvements and latent problems.

2.17 The Plan elements should be periodically reviewed by APANPIRG to ensure that they remain relevant to the SAR system, particularly for new technology developments and alignment with other relevant global SAR plans.

EXECUTIVE SUMMARY

3.1 ICAO reported the following statistics regarding global civil aviation in 2014:

- 3.3 billion passengers;
- 50 million tonnes of freight;
- over 1 000 scheduled airlines; and
- 26,700 aircraft in service.

3.2 The Asia/Pacific region was the world's largest air transport market in 2014, with a 32 per cent share in terms of world Revenue Passenger Kilometres (RPKs).

3.3 Maritime traffic in the Asia/Pacific region is also increasing and whilst IMO assists the Parties to the Maritime SAR Convention, particularly their implementation related to the provision of maritime SAR services, the demand for aeronautical SAR services which frequently support responses to maritime SAR incidents is also likely to rise.

3.4 Asia/Pacific States who are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of Annex 12 - Search and Rescue. Increases in both aviation and maritime traffic throughout the Asia/Pacific region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical and maritime SAR services.

3.5 Considering that many of the Asia/Pacific States have the challenging responsibility for providing a SAR service over vast and remote areas, including three of the world's five oceans, the importance for States with oceanic SAR responsibility to cooperate, collaborate and share resources with their neighbouring and regional/sub-regional RCCs is essential.

3.6 High-level support might be necessary from regional bodies that can effectively support the Plan's implementation, such as the:

- Association of Southeast Asian Nations (ASEAN) and ASEAN Regional Forum (ARF);
- Asia Pacific Economic Cooperation (APEC);
- South Asian Association for Regional Cooperation (SAARC);
- Secretariat of the Pacific Community (SPC); and
- Indian Ocean Rim Association (IORA).

<u>SAR System Funding</u>

3.7 The level of funding provided for effective SAR systems is a matter of concern for all senior decision-makers. The resources should be sufficient to develop and/or maintain the required SAR service per their obligations as signatories to the relevant aeronautical and maritime SAR conventions. This may require the development of business cases to governments outlining where additional funding is required.

3.8 Such business cases should include consideration of amendments to existing State SAR arrangements which may provide more efficient delivery of the SAR service by better utilisation of existing resources (for example by establishing Joint RCCs (JRCCs), or additional funding sources where required (for example charging a levy to aircraft operators for providing the SAR service or seeking company sponsorship for SRUs).

Joint Rescue Coordination Centres (JRCCs)

3.9 Where practicable, States are encouraged to examine the potential benefits that may be derived by the establishment of JRCCs to incorporate the aeronautical and maritime SAR activities and/or facilities of ARCCs/ARSCs and MRCC/MRSCs. JRCCs have the potential to not only provide a more effective SAR service to both the aeronautical and maritime industries, but also offer potential financial efficiencies by releasing funds for improvements in other SAR areas.

Note: Where JRCCs are not practicable, development of facilities and procedures which provide and/or enhance effective SAR coordination and collaboration between the ARCCs and MRCCs in support of each other, to provide an efficient and integrated State SAR system for both aeronautical and maritime SAR incident response.

3.10 Where practicable, the JRCC evaluation may consider consolidation of two or more different State RCCs into single sub-regional JRCCs~~.~~

Note: a single sub-regional JRCC may be established in partnership with a group of States and serve as a 24 hour nodal JRCC supported by Joint Rescue Sub-Centres (JRSCs) of the other partner States which may not necessarily need to be manned 24 hours but could be activated when required.

ABBREVIATIONS AND ACRONYMS

ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
ANRF	Air Navigation Reporting Form
ANSP	Air Navigation Service Provider
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
APEC	Asia Pacific Economic Cooperation
APSAR/TF	Asia/Pacific SAR Task Force
ARCC	Aeronautical Rescue Coordination Centre
ARF	ASEAN Regional Forum
ARSC	Aeronautical Rescue Sub-Centre
A/SMC	Assistant SMC
ASEAN	Association of Southeast Asian Nations
ASPOCS	Administrative Single Point of Contact for SAR
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
CONOPS	Concept of Operations
COSPAS-SARSAT	**Co**smicheskaya **S**istema **P**oiska **A**variynyh **S**udov-Search and Rescue Satellite-Aided Tracking
EI	Effective Implementation
ELT	Emergency Locator Transmitters
GADSS	Global Aeronautical Distress and Safety System
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GLONASS	GLObal NAvigation Satellite System
GPS	Global Positioning System
IAMSAR	International Aeronautical and Maritime SAR (Manual)
IMO	International Maritime Organization
IORA	Indian Ocean Rim Association
iSTARS	Integrated Safety Trend Analysis and Reporting System
JRCC	Joint (aeronautical and maritime) Rescue Coordination Centre
JRSC	Joint Rescue Sub-Centre
JWG	ICAO/IMO Joint Working Group on the Harmonisation of Aeronautical and Maritime Search and Rescue
LOA	Letter of Agreement
MCC	Mission Control Centres
MEOSAR	Medium-altitude Earth Orbit Search and Rescue
MRCC	Maritime Rescue Coordination Centre
MRO	Mass Rescue Operations
MRSC	Maritime Rescue Sub-Centre
OJT	On-the-Job Training
PQs	Protocol Questions
PSCS	Preferred SAR Capability Specifications
RANP	Regional Air Navigation Plan
RCC	Rescue Coordination Centre
RPK	Revenue Passenger Kilometres
RPAS	Remotely Piloted Aircraft Systems
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SAARC	South Asian Association for Regional Cooperation
SAREX	SAR Exercises
SC	Search and Rescue Coordinator

SCC	Search and Rescue Coordinating Committee
SMC	Search and Rescue Mission Coordinator
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea
SPC	Secretariat of the Pacific Community
SPOC	SAR Point of Contact
SRR	Search and Rescue Region
SRU	Search and Rescue Unit
SWIM	System Wide Information Management
UNCLOS	United Nations Convention on the Law of the Sea
USOAP-CMA	Universal Safety Oversight Audit Programme – Continuous Monitoring Approach
VSP	Variable Set Parameter

BACKGROUND INFORMATION

Improvement Drivers

5.1 The ICAO USOAP-CMA focuses on a State's capability in providing safety oversight by assessing whether the State has effectively and consistently implemented the critical elements of a safety oversight system and determining the State's level of implementation of ICAO's safety –related SARPs, including Annex 12 Search and Rescue, and associated procedures and guidance material.

5.2 ICAO APAC Regional Office maintains an Air Navigation Deficiencies List. This list is based on the uniform methodology for identification, assessment and reporting of such deficiencies as described in Part V of the APANPIRG Procedural Handbook. By identifying and addressing specific deficiencies, APANPIRG and its Sub-groups facilitate the development and implementation of action plans by States to resolve identified deficiencies, where necessary.

5.3 The ANS Deficiency information had been populated into the ICAO iSTARS (Integrated Safety Trend Analysis and Reporting System) database and was accessible through the ICAO Secure Portal. The intention is to merge this data with the CMA Data, and manage the deficiencies using a single web-based process.

Asia/Pacific SAR System Monitoring

5.4 Significant Annex 12 compliance weaknesses had been identified within the Asia/Pacific region based upon information provided (and in many cases not provided) by States to the ICAO Regional Office. This regional information status of the SAR capability and SAR agreements was recorded in tables made available to APANPIRG, which was expected to be enhanced with the integration of SAR elements into the Seamless ATM on-line monitoring system.

Recent ICAO SAR Initiatives

5.5 The tragedies of Malaysia Airlines flight MH370 in 2014 and Air France flight AF447 in 2009 had highlighted vulnerabilities in the current air navigation system which had hampered timely identification and location of aircraft in distress, particularly remote oceanic areas. This had significantly hindered effective SAR efforts and recovery operations.

5.6 As part of the response to the Conclusions and Recommendations from the ICAO Multi-disciplinary Meeting on Global Tracking, ICAO developed a Concept of Operations (CONOPS) for a GADSS. The implementation of this target concept will have implications for the provision of services such as air traffic control, SAR and accident investigation. It contained a large number of measures targeting improvements in SAR system response integrated within the wider ATM and aircraft/airline operations systems.

5.7 The CONOPs noted that the effectiveness of the current alerting and SAR services should be increased by addressing a number of key improvement areas. The ICAO GADSS CONOPS also included aspects which potentially involve use of different distress systems, including for example 406 MHz Emergency Locator Transmitters (ELTs) and the Cospas-Sarsat system as part of the proposed GADSS solution.

Cospas-Sarsat System

5.8 Cospas-Sarsat had been developing two major enhancements to its distress-alerting System of value to all System users, including the aviation industry. One is the introduction over the period of approximately 2016 to 2018, and beyond, of a new space-segment architecture based primarily on Medium-altitude Earth Orbit Search and Rescue (MEOSAR) payloads aboard the European Commission's Galileo system, the Russian Federation's GLObal Navigation Satellite System (GLONASS) and the United States' Global Positioning System (GPS) satellites.

5.9 This architecture would permit determination of a distress incident location (independent of any location data transmitted in the beacon message) beginning with the first burst from the distress beacon. This could mean near real-time and very frequent delivery of distress alerts.

5.10 The SAR/Galileo space segment would also provide a Return Link Service (RLS) that, among other possible future uses, would provide an acknowledgment back to the beacon to confirm when the distress message has been received.

5.11 The other major development was the completion in the next couple of years of specifications for the next generation of 406 MHz distress beacons, including ELTs. This new generation of beacons should further improve speed and accuracy in locating an activated distress beacon. The period from beacon activation to first transmission was expected to be reduced from 50 seconds to three seconds. The specification would consider in-flight activation of ELTs when certain flight parameters were exceeded. The RLS was also being considered as part of the GADSS Concept, being a means of remotely activating an ELT in the case of an unresponsive or uncooperative cockpit.

5.12 States needed to continue to ensure that aviators were aware that 121.5 MHz beacons cannot be detected by the global Cospas-Sarsat System and were only intended as a final homing signal for 406 MHz beacons.

5.13 States also need to ensure the critical requirement to provide for a suitable, clear and simple means for aircraft owners to register and keep updated their 406 MHz distress beacon details.

Note: information on beacon registration is at: http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals).

5.14 Entries in the beacon register should be available to both aeronautical and maritime RCCs on a 24 hour basis (Annex 12 – *Search and Rescue* refers, although Annex 10 establishes the registration requirement). States should note that Annex 12 should be read in conjunction with elements of the following ICAO Annexes:

Annex 6 – *Operation of Aircraft*;

Annex 10 – *Aeronautical Telecommunications*;

Annex 11 – *Air Traffic Services;* and

Annex 14 – *Aerodromes*.

CURRENT SITUATION

Global Situation

6.1 The ICAO USOAP Report of audit results, 3rd Edition, April 2005 to August 2010 revealed a number of SAR deficiencies during the audits of 165 Member States:

- 38% of States had not laid down provisions for entry into their territory of SAR units (SRU) of other States for the purpose of search for the site of aircraft accidents and rescuing survivors;
- 44% of States had not developed a detailed plan on operation for the conduct of SAR operations within their respective Search and Rescue Regions (SRRs); and
- 67% of States had not established the necessary coordination of their SAR organisations with those of neighbouring States, including the conclusion of bi-lateral SAR agreements in order to coordinate SAR operations; and
- regarding RCCs –
  i. about 40% of States had not developed job descriptions for their technical staff;
  ii. 45% did not ensure that RCC personnel using radiotelephony communications were proficient in the use of the English language; and
  iii. about 56% of States do not regularly train their SAR personnel, and nor did they conduct SAREXs.

Asia/Pacific SAR Analysis

6.2 The last decade has seen a steady increase in air traffic in the Asia/Pacific Region. Maritime traffic is also increasing, adding further urgency to ensure that States with oceanic SAR responsibilities in the region meet the requirements of both ICAO and IMO for the provision of aviation and maritime SAR services.

6.3 An analysis of the 35 USOAP Protocol Questions (PQs) in August 2016 that involved SAR (7.182, 7.184, 7.481, 7.483, 7.485, 7.487, 7.489, 7.491, 7.493, 7.494, 7.495, 7.497, 7.499, 7.501, 7.503, 7.505, 7.507, 7.511, 7.513, 7.515, 7.517, 7.519, 7.521, 7.523, 7.525, 7.527, 7.529, 7.531, 7.533, 7.535, 7.537, 7.539, 7.541, 7.543, 7.545) resulted in an overall Effective Implementation (EI) of 54.8% for the Asia/Pacific Region. When analysed for 35 Asia/Pacific States and administrations, 12 SAR-related questions indicated EIs of below 50% (**Figure 1** refers):

- 23% - PQ 7.517 (SAR coordination with neighbouring States);
- 29% - PQ 7.505 (effective SAR safety oversight);
- 31% - PQ 7.495 (SAR inspectorate training programme);
- 34% - PQs 7.497, 7.501 (SAR inspectorate periodic training plan and OJT);
- 37% - PQs 7.499, 7.545 (SAR inspectorate training implemented; and SAR personnel regular training and appropriate SAR exercises arranged);
- 40% - PQ 7.507 (elimination of deficiencies identified by SAR inspectors); and
- 49% - PQs 7.487, 7.491, 7.503 (sufficient SAR safety oversight staff, functions and responsibilities of the SAR inspectorate, SAR inspector job descriptions and SAR inspectorate training records system).

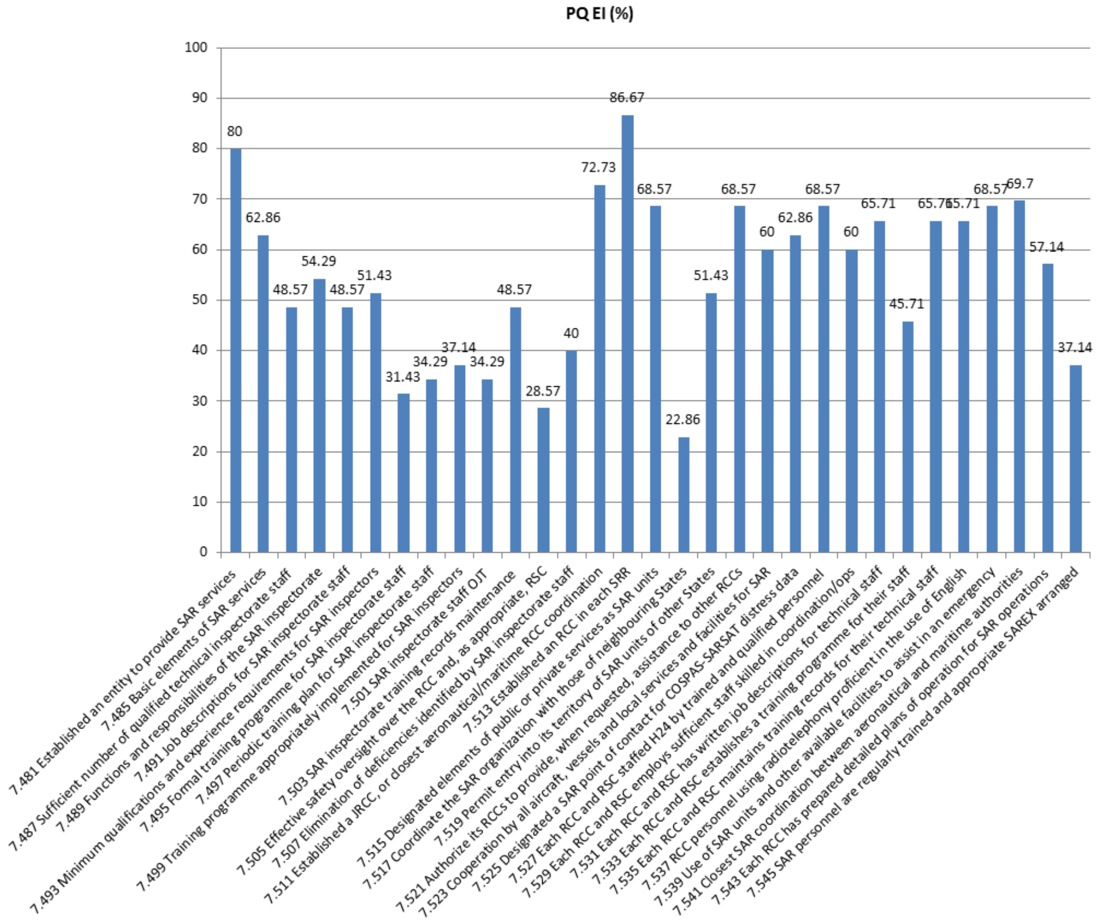

Figure 1: USOAP CMA SAR PQ Compliance (average: 54.8%, as at August 2016))

6.4 From this analysis, it appeared that the major areas of weakness is in coordination with adjacent States, effective SAR oversight, and training of SAR staff that provide the SAR services. Therefore, a focus on the minimisation of barriers associated with the efficient cross-border coordination of SRU (such as pre-arranged approval) and other coordination mechanisms, including updates of SAR agreements (whatever their form) was vital. Finally, there was a need for improved systemic approaches to training for both SAR inspectors and personnel responsible for the provision of SAR services, including the regular organisation of effective SAR exercises that test systems and personnel. It should be noted that the training of SAR inspectors did not require SAR-specific technical training, but was more focused on effective audit and inspection techniques, etc.

6.5 The 2015 SAR/TF/4 analysis indicated significant Annex 12 compliance weaknesses remained in the South Asia area and the Southwest Pacific. In addition, there were parts of Southeast Asia and East Asia that indicated a need for compliance improvement.

6.6 The overall SAR capability ranking of Asia/Pacific States (using a metric of 5% for an A = full Annex 12 compliance as advised by the State and 4% for a B = meets Annex 12 requirements in most areas) is indicated in **Figure 2**:

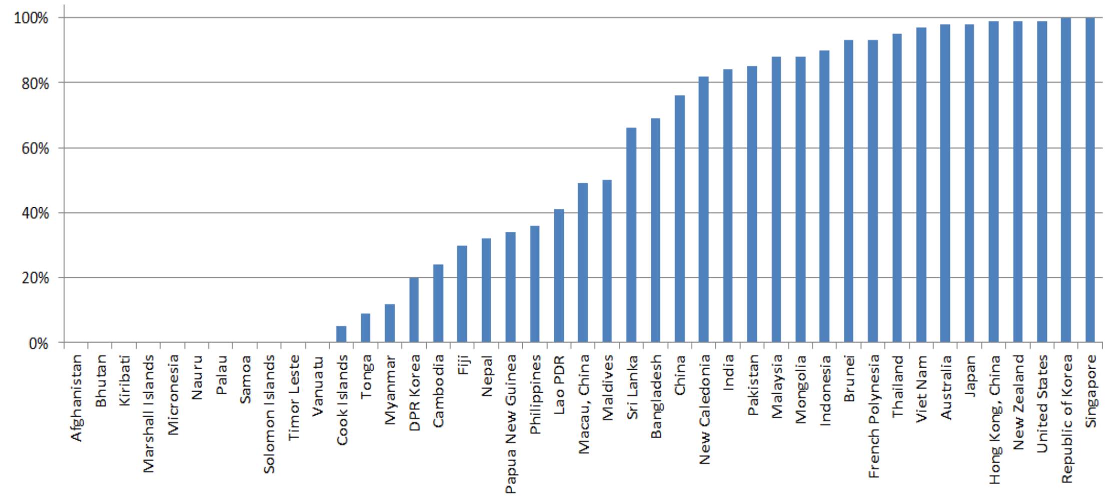

Figure 2: Asia/Pacific SAR Capability Ranking (as at June 2015)

Asia/Pacific SAR Coordination Forums

6.7 The Asia/Pacific Region will benefit from the cooperation and coordination of States and International Organizations involved in the APSAR/TF. After the APSAR/TF completes its tasks, the establishment of permanent joint ICAO/IMO Regional SAR Forums to enable collaboration and cooperation on oceanic SAR matters across the specific oceanic regions and including adjacent ICAO regions should be considered, such as:

a) Pacific Ocean SAR Forum – including Pacific States of the Asia/Pacific, North American and South American regions;

b) Indian Ocean SAR Forum – including Indian Ocean States of the Asia/Pacific, South and East African and Middle East regions; and

c) Secretariat of the Pacific Community (SPC) – an existing forum which could include these matters on its work programme.

6.8 There were several regional initiatives for cooperative support and development already being undertaken in the Asia/Pacific Region to assist with SAR capability enhancement. For example Australia was sponsoring programmes in partnership with Indonesia through the Indonesian Transport Safety Advancement Program (ITSAP) and with the Maldives, Mauritius and Sri Lanka through a SAR Capability Partnership Program (SCPP).

6.9 Such improvement programmes could result from a request by a State needing assistance, ICAO/IMO oversight, the users of the SAR system itself, an audit or following a SAR 'Go-Team' visit that identifies weaknesses in the State's SAR capability (a 'Go Team' normally consists of external SAR experts from ICAO/IMO, more advanced 'champion' States or external agencies such as Cospas-Sarsat). The programs can be conducted by experts from a 'champion' State, or through a cooperative effort by several States or a regional body.

Barriers

6.10 The following potential issues should be considered to ensure they do not become barriers to the achievement of the expected SAR capability:

a) absence of established appropriate legal framework designating, recognizing, supporting and giving authority to national SAR authorities, RCCs and SMCs;

b) inadequate funding and equipping of SAR authorities and in particular, resourcing of RCCs;

c) absence of an appropriate SAR organizational framework;

d) absence of a national SAR committee;

e) lack of clarity of responsibilities for each component of the SAR system;

f) absence of bilateral/multi-lateral/international SAR Agreements;

g) inadequate civil/military cooperation; and

h) complacency about, or lack of recognition of, the importance or priority given to SAR.

Global and Regional SAR Issues

6.11 States should monitor outcomes from global and regional ICAO and IMO SAR forums to ensure their State SAR authorities are updated on relevant SAR developments, otherwise State planning may not be synchronized with external international expectations, including users. Such forums may include APANPIRG and its Sub-Groups, other ICAO Region SAR groups, the JWG, ICAO High Level Safety Conferences, etc.

6.12 The provision of sufficient resources was critical in a number of areas, including:

a) Financial-
- funding for 24 hour RCC facility and staff;
- funding for use/hire of search and rescue units; and
- Provision of a suitable administrative process enabling financial support including the ability for SAR authorities to quickly authorise payments required for emergency response aircraft, vessels and supporting logistics such as fuel.

b) RCC personnel- a suitable number of trained and skilled staff, supplemented by a pool of trained RCC support staff where appropriate;

c) RCC facilities-
- appropriate RCC facility space;
- minimum RCC tools (such as current charts, plotting equipment, documentation, etc.);
- identify and task available SRUs;
- Aircraft and vessel tracking information including ADS-B, Automatic Identification System, etc.;
- reliable and rapid H24 communications, and a suitable means to-
  - receive and communicate distress alerts
  - communicate with ATS units, other RCCs/RSCs, Coast Radio Stations, COSPAS-SARSAT Mission Control Centres (MCCs), military units, medical services, meteorological offices, etc.;
- information technology-
  - RCC workstation computers;
  - Software including basic databases, drift modelling, incident management, etc.;

d) Contingency- back-up RCC facility, or arrangement with another RCC as a contingency against inability to operate from the primary RCC due to the need to evacuate or loss of systems, etc.;

e) Search and Rescue Units (SRUs)-

- available and suitable SAR aircraft and crews;
- funding arrangements/agreements for hiring/payment/sharing of SRUs to permit rapid deployment; and
- Available and suitable SAR survival equipment for delivery by aircraft to survivors and to assist SAR coordination efforts (e.g.: SAR Datum Buoys, droppable life rafts and survival supplies, etc.);

f) Training support-

- RCC staff – basic and ongoing;
- SRU crews – pilots, air crew and air observers; and
- RCC support staff – basic and refresher.

PERFORMANCE IMPROVEMENT PLAN

Preferred SAR Capability Specifications (PSCS)

Note: PSCS are the non-mandatory expectations on all Asia/Pacific Region States to enhance SAR systems in order to meet a minimum level of SAR capability, with a high degree of interoperability and harmonisation, and interoperability with other ATM components such as Air Navigation Service Providers (ANSPs) and aerodrome operators. PSCS were not expected to contravene existing Annex 12 standards.

PSCS (expected implementation by 07 November 2019)

Note: Guidance Material for the implementation and monitoring of PSCS is expected to be developed by APANPIRG to align with the established Asia/Pacific Seamless ATM Implementation Guidance Material.

7.1 *Legal Framework and Structure Planning*: All States should develop statutes and related provisions that establish or enhance the legal foundation for a State SAR organization and its framework, resources, policies and procedures to, where appropriate to:

a) ensure that it is party to, and/or aligned with the following Conventions, as applicable –

iv. Convention on International Civil Aviation 1944;

v. International Convention on Maritime Search and Rescue, 1979;

vi. International Convention for the Safety of Life at Sea (SOLAS), 1974;

vii. Convention on the High Seas, 1958; and

viii. United Nations Convention on the Law of the Sea (UNCLOS), 1982;

b) unless delegated by written agreement, establish an entity that provides, on a 24-hour basis, SAR services within its territories and designated area of responsibility/SRR;

c) establish a national SAR committee consisting of civil and where appropriate, military members to enable a whole-of-government approach;

d) empower SAR Mission Coordinators with the authority to adequately carry out their responsibilities;

e) establish an Administrative Single Point of Contact for SAR (ASPOCS) for non-urgent, administrative matters, such details to be submitted to the ICAO Regional Office;

f) conduct studies to check the feasibility for, and develop an implementation plan if practicable, the integration of aviation and maritime SAR activities, and as far as practicable, civil and military activities, including joint training and familiarisation of staff and review of documentation to ensure harmonisation of procedures, and joint exercises;

g) conduct studies to align, as far as practicable, aeronautical and maritime Search and Rescue Regions (SRRs); and SRRs and Flight Information Regions (FIRs); and

h) establish a single State SAR Plan that –

i. designates the responsible RCC(s), RSC(s) and 24-hour SPOC/ASPOC;

ii. describes the relevant SRRs, including the coordinates and geographical chart depiction of the SRR and neighbouring SRRs;

iii. details the National SAR Committee;

iv. details the governmental and non-governmental agencies with authority and responsibility for SAR coordination within its territories and designated area of responsibility;

v. details required and available SAR facilities, personnel, and equipment;

vi. details the SAR manuals, plans and procedures for national and regional cooperative SAR response arrangements;

vii. details the SAR personnel training and competency programme, qualification standards, SAR certification if applicable and SAR cooperation training;

viii. details the SAR agreements required;

ix. is electronic and accessible on the Internet, such details to be submitted to the ICAO Asia/Pacific Regional Office; and

x. is monitored by quality assurance processes.

7.2 *SAR Standards and Procedures*: All States should:

i) establish aerodrome emergency plans that provide for co-operation and co-ordination with RCCs;

j) establish SAR agreements with States having adjoining SRRS or FIRs, including trans-regional neighbours (the agreements should include clear responsibilities for overlapping or non-adjoining aeronautical and maritime SRRs);

k) provide up to date cross-border information on SAR capability (this should be included in bilateral SAR agreements);

l) pre-arrange procedures for cross-border SAR responses (this should be included in bilateral SAR agreements);

m) establish contingency procedures for delegation of SAR responsibility where such service is not able to be provided, or in contingency (temporary) circumstances;

n) establish a program for regular SAREX, which may be a desktop communications exercise, with each alternate SAREX being a full exercise (this expectation may be fulfilled by participating in a sub-regional SAREX that tests the State's SAR system; and

o) establish RCC plans for response to Mass Rescue Operations (MROs) integrated with national disaster plans;

p) establish SAR Operations Plans to include:

i. procedures for cooperation and deployment of foreign SRUs;

ii. provision for translators/liaison Officers/Embassy Officers for the daily tasking of the SRUs at the RCC;

iii. provision of information for logistic and administrative support (hotels, fuel, security passes, food, medicine, etc.);

iv. instructions on communication (ops normal reports, sightings, etc.) for search planning, command and control to foreign SRUs;

v. daily end of day report by SRUs to the RCC (via mobile, email, fax, etc.); and

q) establish SAR Alerting procedures which:

i. are tested and fully integrated with RCC procedures so that RCCs are rapidly notified of any SAR event 24 hours a day;

ii. include procedures for joint aeronautical and maritime distress alert notification, including reliable delivery and acknowledgement of Cospas-Sarsat distress alerts, support and response to both aviation and maritime SAR incidents; and

iii. where applicable, include protocols for civil and military support and sharing of information.

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SAR Facilities and Resources

7.3 *RCC Facility*: All States should ensure that RCCs are of sufficient size with adequate provision for operational positions designed in accordance with human factors principles (such as human machine interface) for a major search involving civil and military assets where applicable, and facilities such as:

a) Workstations, telephones (with international access), plotting tables, wall notice/status boards, computer~~,~~ and communications equipment and systems, briefing/debriefing areas room for storage including incident records and recorders, RCC staff break and rest facilities;

b) computer resources which may provide support to RCCs with incident management, plotting, search planning, mapping, contact databases, web-based information, etc.;

c) charts, electronic or paper, which:

   i. apply to SAR (aeronautical, nautical, topographic and hydrographic);

   ii. depict SRR, neighbouring SRRs, FIR(s), SAR resources and made available for all relevant aeronautical and maritime RCCs, ATS units, aircraft operators; and

   iii. provide a means of plotting;

d) ability to reliably receive and acknowledge distress alerts 24 hours a day;

e) maritime broadcast facilities;

f) a means of recording, playback and archiving of communications;

g) shipping/vessel communications and maritime broadcast facilities such as Coast Radio Stations, RCC radio and satellite communications, marine radio networks;

h) aircraft communications – via ATS units, aircraft operators, satellite communications or direct between RCC and aircraft;

i) access to aircraft and ship tracking data, e.g. ADS-B, Automatic Identification System and Long Range Identification and Tracking of Ships (LRIT) allowing rapid identification of potential aircraft and vessels that may divert to assist;

j) a means of obtaining meteorological information – forecast, present and historical data;

k) if applicable drift modelling software;

l) if applicable, ocean data including sea temperature, currents, winds, tides, etc.;

m) if applicable, SAR Datum Buoys, preferably with satellite tracking capability; and

n) RCC documentation and reference material such as plans of operation, procedures manuals, guidance material, ICAO and IMO references, SAR agreements; and

o) Cospas-Sarsat equipment and reference material.

7.4 *Personnel and Training* All States should, where applicable to maintain a 24 hour service:

a) provide adequate ATC resources (either an ATS supervisor or other staff) that can provide relief within Area Control Centres (ACCs) to allow timely SAR alerts and information to RCCs;

b) provide sufficient RCC staffing;

c) provide a sufficient number of trained specialist RCC officers including SMCs and Assistant SMCs (A/SMCs);

d) provide availability of a pool of RCC support staff who are familiar with RCC operations, but not trained as coordinators, that can assist with the functioning of the RCC during SAR incident response;

e) develop SAR personnel position descriptions that detail responsibilities and eligibility criteria for recruitment of operational staff;

f) develop a comprehensive training programme that includes SAR training for:

  i. RCC SAR Coordinators (SCs) based on a competency-based assessment approach to ensure technical and English language proficiency, cyclical (periodic) instruction that provides continuous training to ensure competency is maintained, and a system for maintaining training records; and

  ii. SRU staff, including military personnel.

g) facilitate RCC staff to be proficient in the English language; and

h) facilitate a programme of regular liaison visits between relevant RCCs, ATC units and airline operating centres in order to understand those organizations, facilities and capabilities (reference Annex 12, paragraph 3.1.9).

7.5 *Oceanic Capability*: Where applicable, States should establish additional oceanic SAR capability as far as practicable to ensure a timely and adequate SAR response is available to all oceanic areas of their SRRs. This may be met through cooperative arrangements with neighbouring States or other RCCs.

7.6 *Search and Rescue Units*: All States should establish capabilities enabling:

a) availability and deployment of suitably crewed, trained and equipped SRUs (including a pool of air search observers trained in visual search techniques), public and/or private, civil and military, for rapid SAR response;

b) availability and deployment of SRU craft that may be in use for another primary purpose but made available to RCCs for SAR purposes on an as needed emergency basis (vessels, aircraft and land units);

c) protocols for civil SAR authorities to request the assistance of military assets, and similarly military SAR authorities to request civil assets;

d) a communication means and information protocols between the State’s Aeronautical and Maritime SAR Authorities;

e) cooperative use and/or sharing of SAR assets with protocols incorporated within National SAR Plans and bilateral SAR Agreements;

f) pre-arranged government authority for funding of costs associated with hiring of SRUs, and payment for critical supporting logistics such as fuel, to avoid any delays in response availability;

g) aircraft with the ability and regulatory approval to safely conduct SAR missions.

Note: guidance material on SAR aircraft capability is found in the IAMSAR.

7.7 *Distress Beacons*: All States should :

a) where separate ARCCs and MRCCs exist with responsibility for coincident aviation and maritime SRRs, coordinate distress beacon alert procedures to ensure both RCCs are aware of any distress beacon activations within their areas to avoid duplication of response. For example, MRCCs should ensure their procedures alert ARCCs and ATS units to any EPIRB activations;

b) have a reliable distress beacon registration system that:

i) provides a readily-accessible mechanism (preferably one that is available by Internet as well as other conventional means) to enable distress beacon owners to fulfil their obligation to register ELTs, EPIRBs and PLBs, and update the registration data as information changes (e.g., change in ownership);

ii) is available to RCCs 24 hours a day and includes up-to-date registration details for all national civil and military ELTs, EPIRBs and PLBs;

c) take steps (including education) required to prepare for, and to implement changes related to, the introduction of next generation beacons (e.g.: update beacon registration systems to be compatible with new beacon hexadecimal identifications) and the transition to the MEOSAR satellite architecture (e.g.: update local user terminals and mission control centres to properly receive and manage MEOSAR data), in accordance with Cospas-Sarsat specification documents (http://www.cospas-sarsat.int/en/documents-pro/system-documents); and

d) establish an appropriate nationwide means of disposal for old distress beacons.

Note 1: Information on beacon registration is at: http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals.)

Note 2: Incorrect disposal of distress beacons often causes the deployment of scarce and often expensive SAR resources only to have the beacon located as a non-distress event in a rubbish dump or similar location. This also creates the risk of SAR resources being diverted away from a real emergency should it arise at the time. Beacon batteries are hazardous items which should be disposed of in an environmentally friendly manner.

7.8 *Contingency Facilities*: All States should ensure there are established contingency facilities, or when a SAR service is not able to be provided, procedures in place for the temporary delegation of the SAR responsibility to another appropriate national body or State. All States should test their contingency arrangements periodically, but not less than once every six months.

SAR Information

7.9 *Provision of Information*: All States should ensure the:

a) establishment of a centralised information source publishing all Asia/Pacific State Aeronautical Information Publication (AIP) information as required by ICAO Annex 15 Appendix 1, page APP 1-8 including:

i. The agency responsible for providing SAR services;

ii. The area of SAR responsibility where SAR services are provided;

iii. The type of SAR services and facilities provided including indications where SAR aerial coverage is dependent upon significant deployment of aircraft;

iv. SAR agreements;

v. The conditions of SAR facility and service availability; and

vi. SAR procedures and signals used;

b) establishment of an Internet-based SAR information sharing system (with security protocols as required and in accordance with the emerging System Wide Information Management – SWIM concept as applicable) to share SAR activity with States and key stakeholders participating in a SAR activity (the information sharing system should include a means of handling media and next of kin enquiries, and recognise the need to avoid premature media statements); and

c) maximum practicable cooperation between State entities in the provision of accurate and timely information when required, including from military sources except where national security could be adversely affected.

7.10 *SAR Facilities and Equipment Lists*: All States should develop and maintain a current, comprehensive electronic list of State SAR Facilities, SAR Equipment, and SAR Units (SRUs), including joint or shared facilities and equipment, and provide the Internet link to that list to the ICAO Asia/Pacific Regional Office.

7.11 *SAR Library*: All States should:

a) establish a web-based SAR Library, or cooperate by contributing to an Internet-based Asia/Pacific resource (such as [www.uscg.mil/nsarc)](www.uscg.mil/nsarc); and

b) ensure that each RCC and SAR Authority has ready access to a current copy (either electronic or hard copy) of the following reference documents at a minimum:

i. ICAO Annex 12;

ii. IAMSAR Manual Volumes I, II and III;

iii. International Convention on Maritime SAR (SAR Convention);

iv. Asia/Pacific SAR Plan/electronic Air Navigation Plan; and

v. relevant regional, national and agency SAR documents.

Note: The Asia/Pacific SAR Library hosted by the US Coast Guard contains a list of documents that may be held by RCCs and JRCCs as appropriate. In addition, a list of documents (SAR.7/Circ.12) would be available on the IMO web site at: (http://www.imo.org/en/OurWork/Safety/RadioCommunicationsAndSearchAndRescue/SearchAndRescue/Pages/Default.aspx).

SAR Improvement

7.12 *Search and Rescue Exercises (SAREX)*: All States should conduct regular SAREX (at least once every two years) to test and evaluate existing coordination procedures, data and information sharing and SAR response arrangements involving:

a) both aeronautical and maritime SAR authorities including both civil and military agencies as applicable, and related bodies such as Air Navigation Service Providers (ANSPs) and Airline Operations Centres (AOCs);

b) where appropriate, cross-aeronautical SRR coordination (SAREX should routinely involve SAR authorities of adjacent SRRs, especially if the SAREX area concerned is within 50NM of the adjoining SRR); and

c) SAREX effectiveness through a post-SAREX review and written report, completed to ensure that deficient areas or latent problems are identified and remedied.

Note 1: a SAREX template is provided at ***Appendix 1****.*

Note 2: SAREX should test the SAR system, including unannounced alerts that allow an actual search (whether it is a desktop or a physical operation), to be conducted which will indicate weaknesses in the system. SAREX should not be confused with, or take the form of, simulated crash fire exercises such as for Aerodrome Emergency Procedures that do not have a search component.

Note 3: Real SAR incident responses which include an adequate post-response review and evaluation with lessons learned may replace the need for a SAREX.

7.13 *SAR Quality Assurance*: All States should implement SAR System Improvement and Assessment measures, including Safety Management and Quality Assurance systems, that:

a) provide performance and safety indicators, including post-incident/accident lessons learned and management reviews (RCC and SAR System Continuous Improvement process), and feedback from RCC staff, SAR system users or SAR stakeholders;

b) identifies risk and corrective and preventive actions that prevent or minimise risk and the possibility of substandard SAR performance;

c) establishes an internal quality assurance programme, which includes regular internal audits of the RCC, SAR operations, SAR facilities and procedures that are conducted by trained auditors;

d) ensures the person responsible for internal quality assurance within the entity responsible for SAR services has direct access to report to the Head of the entity responsible for SAR services on matters of quality assurance; and

e) where appropriate, provides submissions to the JWG to share lessons learned and experiences with other global States for the continuous improvement of the worldwide SAR system.

Note 1: Resourcing of SAR system audit arrangements could be mitigated by States entering cooperative arrangements, including sub-regional regulation, between States for auditing of each other's SAR systems to share expertise and costs.

Note 2: Provisions of Annex 19 for a Safety Management System (SMS) may apply where a SAR service is provided under the authority of an ATS provider (Annex 19, Chapter 3, 3.1.3 e refers).

Note 3: Peer review, either external or internal, may provide a useful internal quality assurance tool.

7.14 *SAR Management Review*: All States should conduct an annual or more frequent analysis of their current State SAR system to identify specific gaps in capability against the minimum requirements of Annex 12 and the guidelines of the IAMSAR Manual to:

a) enable the ICAO Asia/Pacific SAR data to be updated to accurately reflect the State's capability;

b) be informed regarding the availability and capability of SAR services in neighbouring States;

c) identify SAR research and development programmes, especially those which could be conducted if possible in cooperation with other States;

d) establish a common set of basic SAR system statistics, which include-

    i. number of SAR incidents per year;

    ii. number of lives at risk versus number of lives saved;

    iii. time from first alert to tasking the SRU;

    iv. time from first alert to arrival on scene of first SRU; and

    v. time from first alert to rescue.

e) plan for any necessary improvements to gradually build and improve capability over time, which would be detailed in the State SAR Plan; and

f) regularly review and update SAR agreements as appropriate.

Note 1: The National Self-Assessment found in IAMSAR Manual Vol I Appendix H and the ICAO USOAP-CMA Protocol Questions for SAR may assist States with their reviews.

Note 2: The number of incidents should identify the type (e.g.: Cospas-Sarsat alert, ATS alerts, etc.) and outcome of SAR incidents.

7.15 <u>*SAR Promotion*</u>: All States should conduct SAR promotional programs (e.g. Seminars, Workshops and public safety campaigns) to:

a) encourage higher SAR preparedness by persons that may require SAR services through public safety campaigns aimed at preventing persons getting into distress situations (i.e.: ‘preventative SAR’);

b) ensure the support of government decision-makers for SAR facilities and improvements, in particular adequate funding availability;

c) assist media to understand SAR operations in order to minimise the need for explanations during SAR responses;

d) recognise improvement in State SAR systems;

e) enhance cooperation between SAR services and –

   i. civil, military and police agencies;

   ii. ANSPs;

   iii. aerodrome and port operators;

   iv. aircraft and shipping operators;

   v. meteorological agencies;

   vi. accident investigation agencies;

   vii. government and non-government agencies affected by SAR operations, in particular large scale national and international responses involving whole of government agencies and

   viii. other States.

Note: social media may be an effective means of SAR promotion that reduces the workload of SAR staff during major SAR responses.

RESEARCH AND FUTURE DEVELOPMENT

Research and Development

8.1 To develop the tools and systems required to meet foreseeable long-term requirements, there is a need for States to undertake planning and co-operation on SAR matters. This includes major efforts to define concepts, to extend knowledge and invent new solutions to future SAR challenges so these new concepts are selected and applied in an appropriate timely manner. Such efforts could be forged through collaborative partnerships between, States, ANSPs, International Organizations, institutes of higher learning and specialised technical agencies. This concept is consistent with Seamless ATM Principle 36 (*Inter-regional cooperation ('clustering') for the research, development and implementation of ATM projects*), and may manifest itself in joint projects such as:

- ICAO and/or IMO regional SAR training opportunities where provided to assist States that are unable to provide their own SAR training;
- Joint Sub-regional RCCs (ASEAN States in particular may be candidates for a single centre of excellence that brings together civil and military SAR experts from all ASEAN States and provides a single SAR facility that is cost-effective and has a level of resources and facilities that would be difficult for all States to maintain by themselves); and
- Regional online eLearning packages.

Note: Appendix 2 provides a summary of benefits to the SAR System of States assisting other States.

8.2 With the end goal of a globally interoperable SAR system in mind, the region will have to consider planning for a long term supporting concept and infrastructure. The following are possible areas that should be considered for future SAR research and development, in order to promote the maximum possible harmonisation and interoperability of SAR systems:

a) data sharing such as aircraft and ship tracking information;

b) automated data link communication to RCCs when an aircraft or ship exceeds a Variable Set Parameter (VSP) in terms of its operating envelope, or activation of an emergency status (could be displayed as a symbol, and the data could include certain operating parameters such as acceleration and altitude for an aircraft) – note the ICAO GADSS includes this concept;

c) regional Remotely Piloted Aircraft Systems (RPAS) SAR capability;

d) inclusion of the SAR system and RCC access as a component of the new ICAO SWIM concept of operation and implementation;

e) on-going development of standardised SAR training objectives and advanced training systems, including the use of high fidelity simulators; and

f) enhanced technology oriented systems to improve SAR system effectiveness.

MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

Milestones

9.1 Section 7 (*Performance Improvement Plan*) provides a scheme for the implementation of a collective set of enhancements for a number of elements in the PSCS, effective 08 November 2018 .

9.2 States should commence planning for the various PSCS elements from the approval of this Plan, to ensure a smooth transition by 08 November 2018, and should include consideration of issues such as:

- safety/operational analysis and assessment;
- cost-effectiveness;
- budgetary issues;
- development of operational procedures; and
- training.

9.3 Section 8 (*Research and Future Development*) provides, subject to future agreement by concerned parties, possible SAR improvements beyond 2018 until 2028.

Priorities

9.4 It is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers.

Actions

9.5 This Plan necessitates a number of implementation actions. It is expected that each Asia/Pacific State report progress on each applicable element to APANPIRG. All States should note the importance of SAR status monitoring, which is expected to be conducted as part of the Seamless ATM on-line monitoring. Reporting of implementation progress of SAR elements from this Plan is expected to be conducted by the on-line Seamless ATM Reporting and Monitoring system, using the following categories in accordance with the SAR Air Navigation Reporting Form (ANRF) B0-SAR:

- SAR Regulatory and Coordination Mechanisms ;
- SAR Facilities and Assets;
- SAR Information; and
- SAR Improvement.

9.6 Section 6 (*Current Situation*) provides analysis and major concerns in the region, which should be considered in the formulation of specific State plans.

9.7 SAR Coordination Forums, which are likely to be based on sub-regional development (such as a Pacific Ocean SAR Forum and Indian Ocean SAR Forum) need to be promoted, established and supported to ensure the on-going implementation work and future review of SAR expectations linked to this Plan are conducted.

SAREX

9.8 A program is expected to be established for an annual SAREX in each sub-region (South Asia, Southeast Asia, East Asia and the Pacific), with every second year being a desktop communications exercise, and alternate years being a full exercise. The SAREX outcomes and lessons learned should be reported to APANPIRG through the ATM Sub-Group.

9.9 The ICAO Asia and Pacific Regional Office was responsible for taking actions that assist the implementation of SAR within its accredited States, in cooperation with the IMO. In addition, the Asia and Pacific Regional Office was responsible for coordinating with adjacent ICAO regional offices on an ad hoc basis or at relevant trans-regional meetings.

APPENDIX 1: WORK PLAN FOR THE [[JOINT]] SAREX COORDINATION MEETING

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1. OBJECTIVES

State the objectives of the [joint] SAREX and what are to be achieved out of the SAREX by all participants.

1.1 The objectives of the [joint] SAREX are:

a) To provide continuation of SAR exercise and improve cooperation between …………… (participating agencies or State RCC) and ……………….. (participating agencies or State RCC).

b) To provide continuation training for personnel of SAR organisations from both …………… (participating agencies or State RCC) and ………………. (participating agencies or State RCC)

c) To test the communication facilities and procedures between ………. (participating agencies or State RCC) and ………………… (participating agencies or State RCC); and

d) To test and determine the effectiveness of the Search and Rescue Units of ………………… (participating agencies or State RCC) and …………………… (participating agencies or State RCC).

2 DATE AND TIMING OF SAREX

State the agreed date, time and year for the [joint] SAREX. Have alternate or contingency plan in the event that the full scale SAREX cannot be conducted due to weather or any unforeseen circumstances. It is recommended that a pre-SAREX brief be conducted to ensure all participants understand their roles and the required actions to be taken. State the agreed time for a pre-SAREX brief to be carried out for all participants and States may conduct simultaneous pre-SAREX brief at their own location for their local participants. For standardization and to avoid confusion, it is recommended that all timing and dates used should be in UTC as there may be difference in time and day for different States. After the SAREX, it is also recommended to conduct a de-brief for all participants.

For example:

2.1 Table Top SAREX or A Full Scale Exercise will be held between ………….. (participating agencies or States) and …………… (participating agencies or State) on ………….(date/month/year according to UTC) ……….(day of the week according to UTC) from ……… (time in UTC) to ………. (time in UTC).

2.2 In the event of bad weather, the Full Scale SAREX will be converted into a Table Top SAREX. The cut off time will be at ……….. (time in UTC).

2.3 A Pre-SAREX brief will be held on …………… (day/month/year according to UTC) …………. (day of the week according to UTC) in …………. (location of the pre-SAREX brief) at …….. (time in UTC).

2.4 De-Brief will be held on ………… (day/month/year according to UTC) ……….. (day of the week according to UTC) in …………. (location of the de-brief) at ………….. (time in UTC).

3 SCENARIO

Discussion and development of exercise scenario with participating State or States and agencies involved. Scenario created should be as realistic as possible to simulate close to a real incident. A fictitious flight plan can be included to provide additional information pertaining to the distressed aircraft as required by the RCCs. Using fictitious call signs or airlines for distressed aircraft will avoid complication or confusion especially if it involves the social media.

For example:

3.1 At ………… (time in UTC), a chartered ………….(type of aircraft) …………… (callsign of distressed aircraft) departed from …………. (point of departure) to ……………. (destination) with …………. (POB). At ………. (time in UTC), aircraft declared **"MAY DAY"** due to ………… (nature of emergency) at ………….. (location in Lat and Long or with reference to a prominent location known to all). …………………………………..

3.2 Other information like Pilot-in-command …......... equipment carried on board …………, colour of aircraft fuselage or tail.

4 PARTICIPATING ORGANISATIONS OR UNITS

Identify and list all participating agencies or agencies from both States. Agencies should include both government and private. ANSP, Aircraft Investigation Bureau, Airlines etc should be involved in a SAREX as they are directly involved in any real air incident

For example:

4.1 From ………….. (participating local agencies or States)

1) Civil Aviation Authority of ……………
2) Local Air Force
3) Local Navy
4) …………………….
5) …………………….

From …………….. (the other participating local or States):

1) Civil Aviation Authority of ……………..
2) Local Air Force
3) Local Navy
5) ……………………………
6) …………………………….

5 DEPLOYMENT OF EXERCISE SAR UNITS (SRUs) AND CALLSIGNS

State all the SAR assets that will take part in the SAREX. It is recommended that the callsigns of the SRUs should be pre-fixed with the word "SAREX" to indicate that it is an exercise aircraft or surface vessel. This will not create any confusion between a SAREX and a real incident. Callsign assigned to a particular SAR asset should not be changed and to be used throughout the exercise. Different SAR asset should be assigned with an individual flight number.

5.1 SRUs from ………… (participating State) and their callsigns are as follows:

Type of SRUs	Callsign	Remarks
Fokker 50	SAREX 01	Search
C130	SAREX 02	Search
Dolphin Helicopter	SAREX 03	Search and Rescue
…………………………	SAREX……..	………………………..
…………………………	SAREX……..	………………………..
…………………………	SAREX……..	………………………..

5.2 SRUs from ………… (the other participating State) and their callsigns are as follows:

Type of SRUs	Callsign	Remarks
Helicopter	SAREX 04	Search and Rescue
Ship	SAREX 05	Search and rescue
……………….	SAREX….	…………………..

6 COMMUNICATIONS

State the agreed radio frequencies to be used in the SAREX. Make communication arrangements between the two RCCs as well as between the RCCs and the SRUs. It is recommended that a communication check be conducted between all parties before the SAREX to ensure serviceability of communication equipment. A standby day may be necessary if the communication check is found not satisfactory or unsuccessful.

6.1 The communications arrangement will be as follows:

a) Between …………. (participating agency or State RCC) and …………. (the other agencies or participating State RCC)

Primary communication	-	…….KHz or …..Mhz or landlines
Secondary communication	-	…….KHz or …..Mhz or landlines
Standby communication	-	…….KHz or …..Mhz or landlines

b) Between ……………(participating agencies or State RCC) and SRUs)

Primary communication	-	……. KHz or …….MHz
Secondary communication	-	……. KHz or …….MHz
Standby communication	-	….….KHz or …....MHz

6.2 A communication test between …………… (participating agency or State RCC) and …………… (the other participating agencies or State RCC) will be conducted prior to the SAREX. The date for the test is on ………………. (date/month/year according to UTC) between ……… (time in UTC) to ……..….. (time in UTC).

6.3 In the case of unsatisfactory communication test, another test will be conducted on ………………. (date/month/year according to UTC) between ……… (time in UTC) to ……..….. (time in UTC). .

6.4 All messages pertaining to the exercise shall be prefixed with the words "SAREX SAREX SAREX"

7 SEARCH OBJECT

In a Full Scale SAREX, States can consider the deployment of a search object to add realism to the exercise. This will enable participating SRUs to practice visual search from air as well as on from the surface of the sea. If the homing capability of the SRUs is desired, a beacon can be placed on the search object for electronic search. Arrangement can be made for the search object to be deployed at the proposed distress location at the activation time of the SAREX. A search object with some significant marking or markings on it will enable easier visual sighting of search target on land or on water.

7.1 The search object will be provided by …………… (one of the participating agency or State RCC) and will be deployed at ………. (time in UTC) on …………..(date of the SAREX according to UTC) at the position in which the distressed aircraft is assumed to have crashed.

7.2 Search target is marked with…………… (bright colour or with the words "SAREX" or some significant marking).

8 ALERTING AND ACTIVATION

State clearly on the alert and activation processes for the SAREX. Decide on which agency or State would initiate the distress phase and notify the other participating agencies or State or States so that [joint] SAR effort can be carried out. In a joint SAREX, if the distressed location is within the area of responsibility of a particular State, the State concern should carry out the alerting and activation phase. The other participating State or States should be notified and [joint] SAR operations can be carried out.

8.1 Since the crash will occur in ………… (location or name the State FIR) or area of responsibility, ………… (State concern) RCC will notify ………….. (participating State) . Both RCCs will coordinate the SAR Operations.

9 SEARCH AREA

Discuss on how to determine the search area or which State should determine the search area. In a joint SAR effort, the two RCCs can determine their own search areas and agree on a common search area.

9.1 The respective Search Mission Coordinators (SMCs) will work out a search area upon receipt of the distress location or crash report.

9.2 The two SMCs shall discuss with each other and agree on a common search area.

9.3 If there is a great difference between the two search areas, the controlling RCC shall decide on the most probable area and take the necessary action to promulgate the area as a restricted area for SAR operations accordingly.

10 DIPLOMATIC CLEARANCE

In a joint SAREX, make necessary arrangement for the application of Diplomatic Clearance required if State assets may or are required to enter into another State's territorial airspace or waters. The process for application should be made known or if there is an agreement in place between the two States, then the agreed procedure should be followed. Provide information regarding the SRUs and particulars of the personnel on board. It is recommended that particulars of the SRUs be provided to the State concern prior to the SAREX. This will assist in the Diplomatic Clearance process.

10.1 …………… (State) SMC will request to ………… (State) for diplomatic clearance to allow …………… (State's) SRUs to enter …………. (State's) territorial airspace and waters.

10.2 To obtain diplomatic clearance for ……….. (State's) SRU, ……….. (State) SMC shall provide the following particulars:

a) Registration of SRU

b) Type of aircraft or vessel

c) Name of Captain/Pilot in Command

d) Names of crew on board (not required for sea asset)

e) Area of operation

f) Date and time of operation

10.3 The details of the …………. (State's) SRU shall be provided to ……….. (State) one or two weeks before the exercise. Application for diplomatic clearances through the normal channel via the …………… (agency for the process of the Diplomatic Clearance) is advised in order to accelerate the diplomatic clearance process.

11 SEARCH OPERATIONS

Note: Ensure the safe conduct of the SAREX especially with the air assets. It is recommended that there should be one controlling RCC providing instructions to search aircraft prior to entering the search area. It is also recommended that an Air Coordinator be deployed to provide instructions to search aircraft during transit to and fro from the search area as well as within the search area if the RCC personnel have no knowledge of Air Traffic Control.

11.1 All SRUs shall report to the controlling RCC or On Scene Coordinator (OSC) prior to entering the Search Area and while conducting search in the Search Area to ensure safety and efficiency in the [joint] SAR effort. All air search assets must observe and adhered to ATC instructions.

11.2 Non exercise aircraft shall keep clear of the search area unless clearance has been obtained for these aircraft to transit through.

12 RESCUE OPERATIONS

Note: Discuss on how the rescue operation is to be executed. Agency or States can decide on a simulated rescue operation by taking photographs of the search object once sighted or if actual personnel are deployed at the distressed location as survivors, actual rescue operations can be conducted. Actual rescue operation will provide training for the rescue of survivors from sea or land to hospitals or landing sites. If possible, recover the search object from the land or sea after the exercise, this will help to avoid the search object becoming an obstacle to others on land or sea. If recovering is not possible, make a general broadcast to warn others of the objects.

12.1 When the search object is sighted, the SRU shall inform the ……… (State) RCC. The ……… (State) RCC will disseminate the information to all other SRUs.

12.2 The SRUs to take photographs of the search object to simulate the rescue of the survivors.

12.3 Recovery of the search object will be by …………………….. (agency that is recovering the search object).

12.4 If the search object is unable to be recovered due to sea state or weather, an Urgent Marine Information Broadcast is provided by ……….. (maritime agency responsible for the area).

13 EMERGENCY LANDING OF SEARCH AIRCRAFT

Note: In a joint SAREX, make arrangement for search aircraft to land in airport or airfield of another State in the event of an emergency encountered by the search aircraft where immediate landing is required.

13.1 ………… (State's) search aircraft will be given permission to land in …………….. (name of airport or airfield) if an emergency landing is required.

14 TERMINATION OF SAREX

Note: State the requirements or under what circumstances that will terminate the SAREX. Make arrangement in the event of a real incident that might occur during the SAREX. Consideration can be given to have a code word or words which are understood by all participating agencies and SRUs in the event of a real incident. Once the code word is broadcast to all concern, it will be understood by all participants and the SAREX will be converted into real SAR operations.

14.1 The SAREX will be terminated under any one of the following circumstances:

a) When the all the SRUs have returned to base.

b) When the time for the SAREX has expired and no search object is sighted.

c) When there is an actual emergency.

14.2 In the case of a real emergency, the exercise will be converted into a real SAR Operations. The code word **"NO DUFF NO DUFF"** will be broadcast and all agencies to terminate the exercise immediately and prepare and convert it into a real SAR Operations.

15 SAREX De-brief

Note: Conduct of a SAREX de-brief is important as this is where the evaluation process of the exercise is presented by evaluation experts who observed the exercise and observations by people who actually participated in the exercise scenarios. This is the final step to identify weaknesses and development of recommendations for improvement. Agree on a date and venue to conduct a SAREX de-brief to all participants from both States.

15.1 SAREX Debrief will be held in on ………….. (date/month/year according to UTC) at …………. (time in UTC).

15.2 The venue for the SAREX De-brief will be at ……………. (name the venue).

16 SAREX CONTROLLERS/EVALUTORS/OBSERVERS

Note: Name the personnel who will be involved in the SAREX as observers, evaluators and controllers. As for evaluators and controllers, they must have expertise in the areas of SAR as they will understand what is to be evaluated and how to control the exercise to maximize the training value.

16.1 Personnel involved in the SAREX will be as follows:

From	SAREX Controllers/Evaluators/Observers
……………. (Agency or State)	……………….. (name of personnel and their role)

17 INVITATION TO FOREIGN OBSERVERS

Note: Agency or States may consider inviting observers from other agencies or foreign countries or international organizations to attend and observe the SAREX. These personnel can provide valuable feedbacks for improvement to the system. Arrangement to be made as to which State will do the invitation and who should be invited to attend.

17.1 Invitation to foreign observers to observe the SAREX at ………… (state the venue for the observation of the SAREX) will be provided ……… (State that is providing the invitation) on behalf of …………. (the other State).

17.2 The following countries and organizations will be invited to attend:

a) ………………. (name of country or organization)

b) ………………. (name of country or organization)

c) ………………. (name of country or organization)

d) ………………. (name of country or organization)

18 PRESS COVERAGE

Note: If there provision for any press coverage for the SAREX, made the arrangement for drafting of press release.

18.1 If there is a requirement for a [joint] press release on the SAREX to be issued, ………..(Agency or State that will produce the draft) will draft the press release and forward to ……… (the other participating agencies or State) for concurrence.

19 SAREX REPORT

Note: SAREX Report is important as it serve as a permanent record of the exercise. Each element of the exercise is recorded and lesson learnt during the exercise is captured. Make arrangement on who should produce the SAREX Report for dissemination to all participating agencies as well as others who may be interested.

19.1 ……….. (Agency or State) will produce the SAREX Report with assistance from ……… (the other participating agencies or State). Photographs will be made available for the SAREX Report.

19.2 A copy of the report will be sent to each of the following countries and International Organizations.

a) ………………………….. (agency or country or International Organization)

b) ………………………….. (agency or country or International Organization)

20 VENUE FOR THE NEXT SAREX

Note: It will be good to plan for an annual [joint] SAREX with relevant agencies or neighbouring State or States. State the tentative date and venue if possible for the next SAREX coordination meeting and SAREX.

20.1 The next SAREX Coordination Meeting will be held at ……………. (venue) on ……….. (date/month/year).

20.2 The next Full Scale SAREX will be held on ………… (date/month/year).

APPENDIX 2: BENEFITS TO THE SAR SYSTEM OF STATES ASSISTING OTHER STATES

APAC States Face Demanding SAR Responsibilities with Few Resources

2.1 Many APAC States have the challenging responsibility of providing SAR services over vast and remote land and oceanic areas and several have few resources available to meet Annex 12 requirements.

Taking A Regional Approach Improves Effectiveness and Efficiency

2.2 To provide an effective and efficient SAR service in the region it is important that States focus not only on meeting their own national obligations, but also take the broader view that their State SAR system is only one part of the wider regional SAR system. States therefore need to cooperate, collaborate and share resources and technical expertise with their neighbouring and regional RCCs, with the more developed SAR States in particular looking for opportunities to assist their lesser developed State neighbours.

When Developed SAR States Support Less Developed Neighbours, Everyone Wins

2.3 Sometimes simple measures can reduce the incidence of SAR operations in a State's Area of Responsibility.

2.4 An example of this is where New Zealand has been regularly requested to send resources to Kiribati, which is not in New Zealand's SRR, to conduct aerial searches for people missing in small vessels at sea. New Zealand recognised that with the provision of basic aids, the number of people going missing at sea could be reduced. The work was completed through an aid program and the benefit was immediate and twofold. There has been a large reduction in the number of people going missing at sea and New Zealand has reduced costs through less aerial searches being required.

2.5 Another example is where Australia has recognised that increasing aircraft and vessel traffic in the north and western areas of its SRR in the Indian Ocean region comes with increased likelihood of more frequent SAR responses in that region. As a result, Australia has commenced a new project in partnership with the Maldives, Mauritius and Sri Lanka to fund and provide technical assistance to improve the SAR capabilities of those countries that will also assist Australia's SAR response obligations in that area of its SRR. Similarly, since 2008 Australia has been providing funding and development assistance to Indonesia to improve SAR capability and cooperation.

2.6 States who aren't compliant with Annex 12 SARP's and who are unable to meet the minimum SAR service requirements could consult and seek assistance from 'champion' States who are compliant and have well developed SAR systems in place.

2.7 Examples of assistance that could be provided by States, International Organisations (such as IMO/ICAO) or multi-lateral initiatives include:

a) conduct of a SAR Gap Analysis;

b) advice on the establishment of a SAR organisational framework;

c) advice for the establishment of a National SAR Committee;

d) technical assistance in the development of a National SAR Plan;

e) providing copies of relevant SAR documents to be used as templates;

f) technical assistance on the establishment of SAR agreements;

g) technical assistance in the development of RCC position descriptions;

h) training of SAR personnel;

i) provision of SRU where appropriate and training of SRU crews;

j) provision/sharing of computerised SAR tools including incident management systems, databases, maritime drift modelling software, etc.;

k) establishing data and information sharing agreements between RCCs;

l) the provision of operational search plan data;

m) provide advice on how to conduct a SAREX and post-SAREX analysis; and

n) set up of SAR system publicity and safety awareness campaigns.