



International Civil Aviation Organization

**The Third Meeting of the APANPIRG ATM Sub-Group
(ATM /SG/3)**

Bangkok, Thailand, 03-07 August 2015

Agenda Item 5: ATM Coordination (Meetings, Route Development, Contingency Planning)

REGIONAL ATM CONTINGENCY PLAN TASK FORCE OUTCOMES

(Presented by the SECRETARIAT)

SUMMARY

This paper presents the outcomes of the Regional ATM Contingency Plan Task Force, including the draft Regional ATM Contingency Plan for review by the meeting.

1. INTRODUCTION

1.1 The 4th Meeting of the Regional ATM Contingency Plan Task Force (RACP/TF/) was held in Bangkok, Thailand, from 26 to 30 January 2015.

1.2 The 4th Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/4) was held in Bangkok, Thailand, from 1 to 5 December 2014. ATFM/SG/5 was held in Bangkok, Thailand, from 30 March to 3 April 2015.

1.3 RACP/TF/4 was briefed on relevant outcomes from ATFM/SG/4. Some of the information provided has since been superseded by amendments to the draft Regional Framework for Collaborative ATFM made by ATFM/SG/5.

1.4 RACP/TF/4 conducted further review of the draft Regional ATM Contingency Plan. The latest version of the plan, including appendices, is provided at **Attachment A**.

2. DISCUSSION

Status Updates of Asia/Pacific ATM Contingency Plans

2.1 Contingency plan status updates were provided to RACP/TF/4 by Australia, Indonesia, Myanmar and Singapore.

Australia

2.2 Australia presented an overview of the Business Continuity Plan (BCP) and Contingency Plan (CP) structure adopted by Airservices Australia. It was intended that BCPs and CPs provided a flexible basis for the provision of the highest level of service achievable with the extant operational restrictions.

2.3 The classification of airspace specified in AIP as H24 did not change during contingency events. The classification of non-continuous airspace during contingency events depended upon the availability of services higher than Class G.

2.4 Pre-defined contingency routes were published as an AIP SUP 'Contingency Route Flight Planning - Requirements'. Activation of pre-defined routes and promulgation/activation of improvised alternative routes was by NOTAM.

2.5 The meeting noted that Australia conducted a review of plans every 3 months to ensure that contact details were up-to-date, and further reviewed plans at each AIRAC date to ensure any data changes such as ATS route designators were actioned.

Indonesia

2.6 Indonesia provided an update of the Jakarta FIR and Ujung Pandang FIR ATM Contingency Plans, which aimed to ensure the continued safety of air navigation in the event of partial or total disruption of air traffic services in the Jakarta FIR or Ujung Pandang FIR. The Contingency Plan included the ATS procedures and contingency route structure using existing airways in most cases that would allow aircraft operators to transit the Jakarta or Ujung Pandang FIR. The updated plans included changed routes structures drafted to harmonize with neighbouring States.

2.7 Recognizing the difficulties between neighbouring States in making an agreement for delegation of responsibility under Level 2 (inter-State) contingency arrangements, the contingency plans included arrangements for international traffic to be managed by Ujung Pandang Area Control Centre (ACC) or Jakarta ACC in the event of either ACC being out of service.

2.8 The revised Indonesia ATM Contingency Plan provided for Level 2 contingency arrangements involving two or more States / FIRs for Category A contingency events (airspace safe, but restricted or no ATS.)

2.9 The meeting noted that unless fully coordinated contingency routes to pass around the FIR were agreed, airspace users would either flight plan via the normal ATS route network to avoid the FIR, or elect to not fly.

Myanmar

2.10 Myanmar presented information on proposed addition of RNAV route P762 as a cross-boundary contingency route connecting the contingency routes of India, Myanmar and Thailand. The route had been proposed by India during the Fourth ATS Coordination Meeting of Bay of Bengal, Arabian Sea and Indian Ocean Region (BOBASIO/4, Kolkata, India, 22 – 24 September 2014).

2.11 As the contingency routes promulgated in India's ATM contingency plan provided connectivity to Yangon FIR and other neighbouring States, it was suggested that these routes may be agreed for the Regional ATM Contingency Plan.

Singapore

2.12 The meeting was provided with background information on the Singapore ATM Contingency Plan, and its contingency routes and Flight Level Allocation Scheme (FLAS).

2.13 Singapore had reviewed and revised its contingency plan based on the draft template for ATM contingency plans presented at RACP/TF/3.

2.14 The meeting reviewed the Draft Contingency Plan Template, which would form an appendix to the Regional ATM Contingency Plan. The finalized template is included in **Attachment A**.

Air Traffic Flow Management Steering Group Outcomes

2.15 The Second Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/2) was held in Hong Kong, China, from 1 to 4 October 2013. ATFM/SG/3 was held in Singapore from 10 to 14 March 2014, and ATFM/SG/4 in Bangkok, Thailand, from 1 to 5 December 2014.

2.16 The RACP/TF/4 meeting was briefed on the outcomes of the Asia/Pacific Region Air Traffic Flow Management Steering Group (ATFM/SG), which was tasked by APANPIRG to develop an Asia/Pacific Regional ATFM Framework which addressed ATFM implementation and operational issues in the Region. There is a linkage between ATFM/SG and RACP/TF, reflected in the updated Terms of Reference (TOR) of ATFM/SG.

2.17 The application of ATFM measures can be an effective ATM contingency response where airspace capacity may be constrained by reduced ATM capability, airspace closures or adverse meteorological conditions. The RACP/TF/4 noted that the Asia/Pacific Region did not yet have the benefit of a networked ATFM capability that would help to manage contingency events. The meeting supported the addressing of Large Scale Weather Deviation (LSWD) considerations in the Regional ATM Contingency Plan.

2.18 RACP/TF4 was informed of ATFM/SG/4 (Bangkok, Thailand, 1 to 5 December 2014) outcomes relating to the implementation dates for ATFM performance objectives for the Region:

- Expected implementation by **12 November 2015**:
 - Regional ATFM Capability **Phase 1A**
- Expected implementation by **10 November 2016**
 - Regional ATFM Capability **Phase 1B**
- Expected implementation by **08 November 2018**
 - Regional ATFM Capability **Phase 2**

2.19 The content and timing of ATFM performance objectives reported to RACP/TF/4 were subsequently amended by ATFM/SG/5. The following summarizes the ATFM performance objectives relevant to contingency planning that are included in the latest draft Regional Framework for Collaborative ATFM, and the amended implementation timing of ATFM Capability Phase 1B:

- ATFM Capability **Phase 1A – 12 November 2015**:
 - Initial Strategic and Pre-Tactical¹ capacity and demand monitoring and analysis;
 - Preparation and distribution of ATFM Daily Plan;
 - Initial post-operations analysis;

¹ The Strategic, Pre-Tactical and Tactical ATFM phases are described in ICAO Doc 9971 – *Manual on Collaborative Air Traffic Flow Management*.

- ATFM Capability **Phase 1B – 25 May 2017**;
 - Improvement in FPL and ATS message compliance;
 - Pre-tactical modelling of airspace configuration and traffic demand and the effect of ATFM measures;
 - CDM capability for sharing information with all stakeholders;
 - Dynamic updating of airport and airspace capacity constraints and calculations, and demand information.
 - Ground delay programs (CTOT) for airports;
 - Further development of post-operations analysis capability;
- Regional ATFM Capability **Phase 2 – 8 November 2018**;
 - Distributed multi-nodal ATFM information distribution;
 - Interoperability of ATFM and other ATM systems;
 - Automated airport and airspace capacity and demand modelling;
 - Ground delay programs to meet CTO for entry into constrained airspace.

2.20 The complete list of ATFM performance objectives and considerations for research and future development of ATFM, extracted from the draft Regional Framework for Collaborative ATFM, are provided at **Attachment B**.

2.21 The performance objectives of the ATFM Framework relevant to RACP/TF include the use of departure and en-route “slots” for management of traffic flows:

CTOT – Calculated Take-off Time¹ (Phase 1B); and

CTO – Calculated Time Over (an en-route fix or arrival fix – Phase 2).

2.22 The draft Regional ATM Contingency Plan defines 3 categories of contingency events:

Category A – Airspace Safe, but Restricted or No Air Traffic Service (ATS), due to causal events such as industrial action, pandemic, earthquake, nuclear emergency affecting the provision of ATS, or ATM system failure or degradation;

Category B – Airspace Not Safe, due to causal events such as Volcanic Ash Cloud (VAC), nuclear emergency, military activity; and

Category C – Airspace Not Available, due to causal events such as pandemic, national security – normally a political decision.

¹ ATFM Terminologies for the Asia/Pacific Region were developed by ATFM/SG, and are included in the draft Regional Framework for Collaborative ATFM

2.23 *Collaborative trajectory options*, discussed in the Research and Future Development section of **Attachment B**, provide the capability to re-route traffic around airspace constraints using collaboratively developed pre-defined or tactically determined routes. For example, collaborative trajectory options could provide an effective tool for management of Large Scale Weather Deviations (LSWD) related to tropical cyclones, or for the avoidance of volcanic ash clouds.

2.24 For contingency planning purposes, such routes could be either ATS routes published in AIP for routine flight planning and forming the regional ATS route network, or dedicated ATS contingency routes (Annex 11 Attachment C).

2.25 The concept of collaborative trajectory options should be included in Regional ATM contingency planning to facilitate the safe continuation of international air traffic when normal ATS routes are affected by Category B or C contingency events. However, the draft Regional Framework for Collaborative ATFM notes that implementation of multi-FIR collaborative trajectory options capability, particularly in South East Asia, will require a coordinated multi-partite effort to develop full understanding of airspace capacity improve the regional ATS route network and ATS surveillance infrastructure, and provide sufficient ATS route options for the program.

2.26 ATS route specifications and expectations for the implementation of surveillance and communications infrastructure are included in the performance objectives of the Asia/Pacific Seamless ATM Plan.

2.27 RACP/TF/4 considered that development of ATS routes for the purpose of contingency management of Category B and Category C events should be conducted between States on bi-lateral or sub-Regional bases.

2.28 It was proposed that RACP/TF should continue to monitor the outcomes from ATFM/SG, and consider implementing Regional ATM Contingency Plan performance objectives aligned with and supported by ATFM/SG outcomes.

ATS Contingency Routes

2.29 The current regional ATS contingency route structures as developed by the RACP/TF Small Working groups and collated by Singapore were presented to the meeting. The routes had been developed with the aim of harmonizing contingency route and flight level allocation scheme structures among defined groups of States. Individual State contingency route plans were also included. The collation of the information required its translation from a range of graphical and tabular formats.

2.30 Some areas where amendment or further harmonization may be necessary were noted. The meeting conducted some workshop activities to further develop and harmonize the contingency routes and FLAS, which would be updated by Singapore.

2.31 A contingency route naming convention was discussed, and it was agreed that the identifiers of contingency routes should be allocated from the Regional ATM Contingency Plan. A naming convention would be developed.

2.32 The meeting again noted that ATS contingency routes and FLAS should be harmonized where practicable.

2.33 The meeting discussed the need for harmonized ATS contingency routes. It was suggested that some States could accept traffic on all published routes and at all normal flight levels during contingency operation and may therefore not require information regarding neighbouring States' contingency routes and FLAS. However, it was also considered by the meeting that knowledge of contingency routes and FLAS of the neighbouring States would permit States to more effectively and safely plan for the entry and exit of aircraft to/from neighbouring contingency airspace when limited or no ATC coordination was received.

2.34 *Secretariat Comment:* RACP/TF/3 (Bangkok, Thailand, 12 – 15 November 2013) noted that, while there was a clear need for each State's ATS contingency routes to be understood and agreed by neighbouring States, the benefits and need for fully *harmonized* contingency routes needed to be clearly defined. The circumstances and likelihood of contiguous FIRs of neighbouring States simultaneously experiencing disrupted or withdrawn ATS needed to be discussed and understood.

2.35 The RACP/TF/3 meeting noted that the development of contingency route structures did not constrain states from making changes as required to ATS routes or airspace, with subsequent amendment to contingency routes.

2.36 The RACP/TF/3 meeting discussed whether it was either practicable or desirable to develop a fully harmonized Regional network of contingency routes, recognizing it was unlikely that there would be a circumstance of neighbouring States simultaneously experiencing an ATM contingency event. A fully harmonized network of contingency routes/FLAS could also reduce the flexibility that would be essential in tactical management of contingency situations. It was further recognized that managing the routing of aircraft that must first join a contingency route from the normal ATS route network and then re-join that network after exiting the affected airspace could be flexibly achieved through robust and up-to-date contingency coordination processes and contact details.

2.37 ATM/SG is also invited to note the outcomes of the Ad Hoc Afghanistan Contingency Group (AHACG) provided in WP/19, detailing the significant, coordinated effort over a period of 3 meetings to develop contingency plans, including contingency ATS route structures, for 1 FIR.

Draft Asia/Pacific Regional ATM Contingency Plan

2.38 The RACP/TF/4 meeting reviewed the draft Regional ATM Contingency Plan (**Attachment A**).

2.39 In response to a query it was confirmed, through IATA, that contingency routes defined in State AIP did not need to have an Annex 11-compliant ATS route designator. The contingency routes could be stored in navigation databases in readiness for their use as required and flagged in flight planning systems as not to be used unless directed by notification of contingency plan activation.

2.40 It was noted by the meeting that ATS contingency routes could be pre-defined for Category A contingency events (routes through airspace with limited or no ATS) and Category C events (routes around unavailable airspace), but not for Category B events (ATS and airspace available, but airspace not safe). In the latter case tactical route management was required.

2.41 The meeting discussed Post Activation Review (PAR) of contingency plan testing and contingency events, and noted that for major, complex events a full analysis could take 1 year or more. It was considered more feasible to expect a preliminary PAR within 28 or 30 days, with a more comprehensive PAR only required in cases where a major event or one involving an air safety investigation had occurred. A copy of a routine PAR pro-forma was provided as an example for inclusion in the Regional ATM Contingency Plan.

2.42 It was considered that the specification of particular ATFM measures for contingency response in the BPE was not appropriate, and a more generic statement regarding the use of ATFM should be used. The description of communications facilities that could be applicable to contingency events, such as satellite telephone systems, should be included.

2.43 Rather than specifying that BPE should include direction on the exclusion or inclusion of VFR or other specified flights, it was agreed that a more generic statement would be more useful. It was also suggested that the terms ‘not available’ or ‘restricted’ should be used to describe airspace, rather than ‘closed’.

2.44 The *Current Situation* section of the Draft Plan includes the analysis of the Asia/Pacific Region’s contingency readiness, based on responses to a survey of Asia/Pacific administrations. Information was provided on Level 1 Contingency Plans and Level 2 (inter-State) Contingency Arrangements, assessing each administration’s contingency planning status as *robust, marginal or incomplete*.

2.45 The need for a further follow-up survey of non-respondent States, and those States assessed as marginal or incomplete was discussed. It was noted that the RACP/TF TOR did not require ongoing monitoring of regional ATM contingency planning status, but rather required a ‘snapshot’ analysis of status at the time of the survey.

Draft Regional ATM Contingency Plan - Performance Improvement Plan

2.46 The meeting considered a draft performance improvement plan for inclusion in the Regional ATM Contingency Plan. The proposed performance objectives were aligned, where practicable, with those of the Seamless ATM Plan and those being considered for the Regional Framework for Collaborative ATFM. It was proposed that the performance objectives should be expected to be implemented in accordance with the following schedule:

- ATM Contingency Operations Capability Phase 1A – 12 November 2015;
- ATM Contingency Operations Capability Phase 1B – 10 November 2016; and
- ATM Contingency Operations Capability Phase 2 – 8 November 2018.

2.47 The meeting considered that implementation of performance objectives by November 2015 (Phase 1A) may not be a reasonable expectation. It was also considered that the performance objectives proposed for Phase 2 should not include technical terminology that was more specific to ATFM matters, and that the proposed Phase 2 objectives were not yet supported by ATFM/SG. These objectives should more appropriately be placed in the Research and Future Development section of the Plan.

2.48 The meeting is invited to note that the earlier planned phased implementation of contingency operations capability was based on the assumption that performance objectives would be closely linked with those of the Regional Framework for ATFM. The draft performance objectives of the Regional ATM Contingency Plan are no longer closely linked to objectives, due to the exclusion of technical terminology more appropriately confined to the Framework.

2.49 The performance improvement plan as updated by the RACP/TF/4 meeting, with a provisional implementation target of 10 November 2016 is included in **Attachment A**.

Meteorological Information for Contingency Planning

2.50 ICAO provided RACP/TF with information discussing aeronautical meteorological information in support of contingency planning, in particular the progress made in the Asia/Pacific Region and work still to be done.

2.51 To address the need for effective coordination between States in the event of significant hazardous meteorological events (e.g., volcanic ash in Southeast Asia) the Meteorology Sub Group (MET SG) was tasked with developing a framework for contingency plans in the APAC Region for specific phenomena including volcanic ash, tropical cyclone, radioactive cloud and tsunami.

2.52 It was envisaged that consideration of existing bilateral and multilateral contingency arrangements, which were practiced by some APAC States (e.g. ATM coordination between Singapore and Indonesia in case of a volcanic ash event), would support development of the regional contingency plans.

2.53 The list of State Contingency Points of Contact for Volcanic Ash Events could be accessed at the ICAO APAC eDocuments website: <http://www.icao.int/APAC/Pages/edocs.aspx>, under the heading ‘MET’.

2.54 In 2011, under direction from the MET SG, the Meteorological Advisories and Warnings Implementation Task Force (METWARN/I TF, now the Meteorological Hazards Task Force – MET/H TF) in coordination with the Meteorology / Air Traffic Management Task Force (MET/ATM TF, now Meteorological Requirements Task Force – MET/R TF) developed a draft framework for APAC regional contingency plans for phenomena that include volcanic ash, tropical cyclone, radioactive cloud and tsunami (**Attachment C**).

2.55 In subsequent reviews it was noted that a detailed set of requirements from RACP/TF with respect to the MET input necessary for development of regional ATM contingency plans, would assist the MET/H TF in progressing development of the framework for APAC regional contingency plans for phenomena that include volcanic ash, tropical cyclone, radioactive cloud and tsunami.

2.56 The meeting was reminded of the Air Traffic Management Volcanic Ash Contingency Plan (ATM VACP) template. The ATM VACP template was finalized and made available to all ICAO Planning and Implementation Regional Groups (PIRGs) in 2012 for use in the preparation of regional volcanic ash contingency plans.

2.57 Noting that the APAC Region was preparing to conduct an APAC volcanic ash / ATM exercise in 2015 the RACP/TF was invited to consider utilizing experience from the proposed APAC volcanic ash exercise to assist with its development of the Regional ATM Contingency Plan.

Volcanic Ash Cloud Contingency Planning

2.58 The RACP/TF/4 meeting was reminded of the RACP/TF TOR requirement that development of the Regional ATM Contingency Plan detailed recommended Regional contingency practices to events such, as severe meteorological and geological phenomena, health emergencies (pandemics, etc), military onlicts and industrial relations issues.

2.59 Noting that a volcanic ash exercise was planned for the Asia/Pacific region in 2015 (IP/03), it was agreed that RACP/TF would examine documents including ICAO Doc 9691 *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds*, the ICAO *Volcanic Ash Contingency Plan Template*, the EUR Region Doc. 019 – *EUR Volcanic Ash Contingency Plan* and the *Volcanic Ash Contingency Informal Arrangement (Indonesia and Singapore)*, with a view to developing regional volcanic ash contingency guidance which, as suggested in Doc 9691, could also be used to respond to radioactive cloud and toxic chemical cloud events. Further development of the guidance would be supported by the outcomes of the volcanic ash exercise.

2.60 The 1st Meeting of the Asia/Pacific Volcanic Ash Exercises Steering Group (APAC VOLCEX/SG/1) was held in Manila, Philippines, from 27 to 29 May 2015. The VOLCEX/SG meeting agreed to conduct two volcanic ash exercises. The first exercise, VOLPHIN15/01, is scheduled to be held on August 11 2015. The second meeting of the VOLCEX/SG, scheduled for 14 – 16 September 2015 will include an exercise debrief of VOLPHIN/15/01, and conduct planning for VOLPHIN/15/02, tentatively scheduled for mid-December 2015.

2.61 The overall objective of the VOLPHIN/15/1 exercise is to maintain enhanced safety, regularity and efficiency of aviation in the event of a volcanic eruption by demonstrating the provision and exchange of volcanic ash information in support of flexible airspace management, improved situational awareness and collaborative decision making, and dynamically-optimized flight trajectory planning.

2.62 In particular, the exercise aims to demonstrate the practice of applicable global and regional procedures related to volcanic activity and volcanic ash, including:

- a) Distribution of alerts (e.g., VONA)
- b) Distribution of AIS and MET messages (e.g., VAA/VAG, SIGMET, NOTAM, AIREP)
- c) Responses by air traffic control and air traffic flow and capacity management units and aircraft operators (e.g., safety risk assessments, tactical re-routes)
- d) Enhanced situational awareness and CDM (e.g., via a teleconference, website, or other media)

2.63 The exercise shall be planned and conducted to ensure that detrimental effects on the aviation system performance are avoided, but that nevertheless useful experience and information is generated.

2.64 The exercise is envisaged as the first of two or more exercises based in Philippines, to identify and address local and sub-regional issues. The first exercise shall be confined to the Manila FIR. The primary objective of the first exercise is to test information flows by checking AFTN addressing, message distribution, information handling and coordination between agencies.

2.65 The exercise shall be conducted over a period of approximately six (6) hours on 11 August 2015, with the first VONA to be issued at 0045 UTC and message/s to announce cessation of the exercise at 0645 UTC.

2.66 The exercise scenario involves the eruption of the TAAL volcano near Manila, Philippines (Name: TAAL, Number: 273070, Position: N1400 E12100, Area: Philippines) with volcanic ash cloud up to FL370 and above moving north at 45 knots to impact ATS routes and airspace within the Manila FIR close to and north of Manila.

2.67 The exercise scenario for the VOLPHIN/15/2 exercise will involve the volcanic ash cloud impacting upon multiple FIRs.

2.68 Lessons learned from the volcanic ash exercises will be used to develop specific guidance and performance objectives for inclusion in the Regional ATM Contingency Plan.

Further Development of the Regional ATM Contingency Plan

2.69 The contingency plan in its current form includes key information for the guidance of States, and the agreed performance improvement plan with an expected implementation date of 10 November 2016. It is proposed that the Plan in its current form should be uploaded to the ICAO Asia/Pacific Regional Office website for immediate use by States in planning their development of ATM contingency plans.

2.70 Further development of the plan will require at least one further meeting of the RACP/TF. Items to be finalized or developed include:

- Collation and presentation of sub-regional ATS contingency route information;
- Regional contingency guidance for volcanic ash, radioactive cloud and toxic chemical cloud;

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) consider drafting a Conclusion making the Regional ATM Contingency Plan at **Attachment A** available on the ICAO Regional Office web site. and
- c) discuss any relevant matters as appropriate.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

D R A F T



ASIA/PACIFIC REGION ATM CONTINGENCY PLAN

DRAFT Version 0.2, 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

ATM/SG/3-WP18
Attachment A
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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.

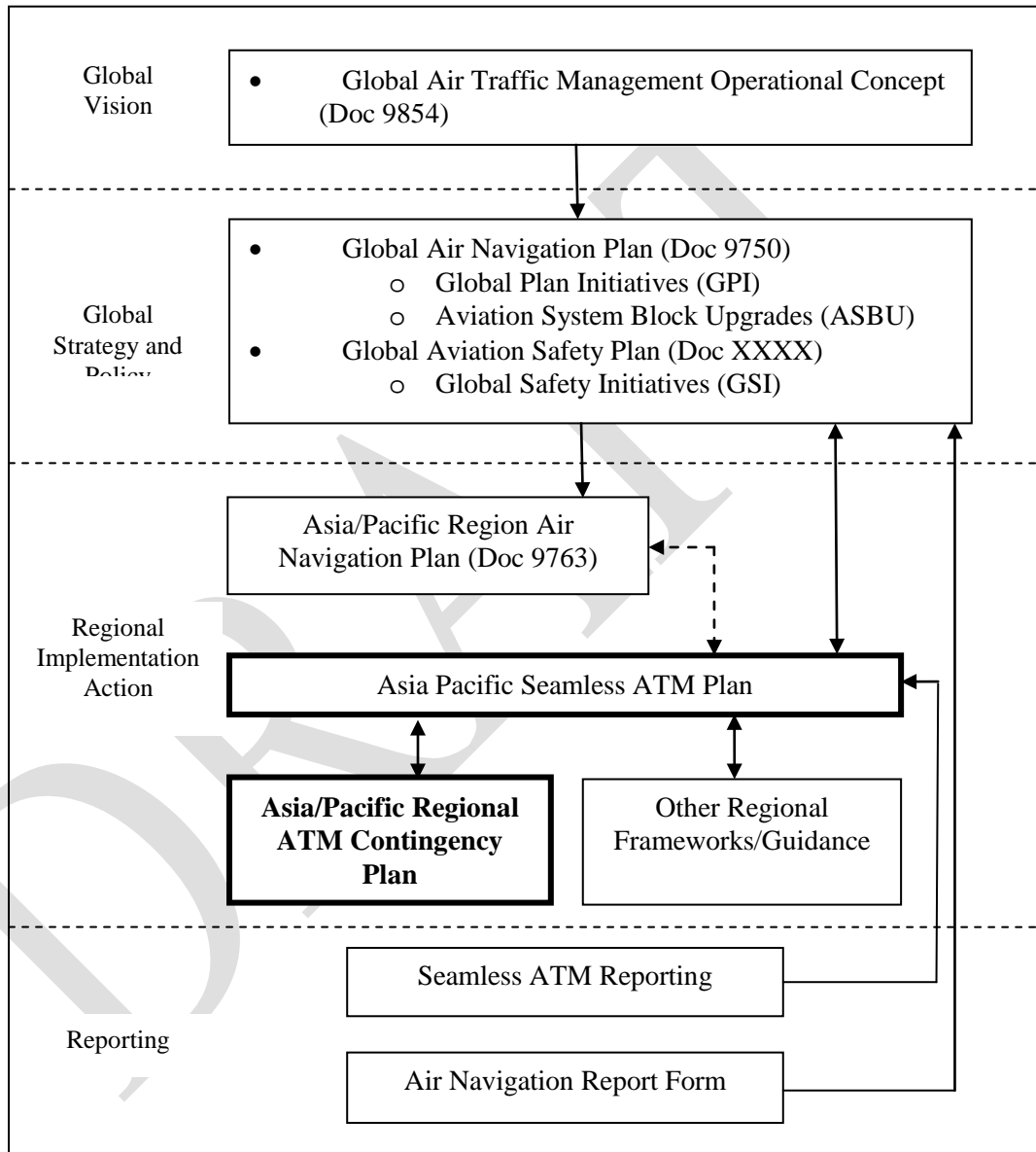


Figure 1: Regional Planning Documents and Linkages.

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 are provided in the Plan Appendices.

1.5 Appendices to the Plan provide details of:

- ATM Contingency Planning Principles
- Basic Contingency Plan Elements
- Level 1 Contingency Plan Template
- Volcanic Ash Cloud (VAC) Contingency Plan Template
- State Contingency Contact Points.
- Sub-Regional ATM Contingency Routes and FLAS.

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 from time to time).

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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. provides 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 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

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	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	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 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
VMC	Visual Meteorological Systems
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
WAFC	World Area Forecast Centre

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 X**.

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 X** 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 . NOTAM templates are provided in **Appendix X**.

5.11 Terms of reference, and procedures for the activation of the ATM Operational Contingency Group (AOCG) function should be developed.

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 X**. 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	
DRAFT 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 Readiness¹.

¹ 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.

7.2 Terms of reference and procedures for the activation of the ATM Operational Contingency Group (AOCG) function should be developed.

7.3 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.

7.4 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.

7.5 Programs of regular desktop and inter-unit coordinated exercises of all Level 1 contingency plans should be implemented.

7.6 Processes should be implemented to ensure the outcomes of any testing, pre-activation or activation a contingency plan or any contingency exercise are reviewed and analysed, and lessons learned incorporated in contingency procedures and training.

7.7 Details of contingency ATS routes and associated flight level allocation schemes should be published in State AIP (Section ENR 3.5).

7.8 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

7.9 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.

7.10 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.

7.11 Details of contingency ATS routes and flight level allocation scheme details should be published in State AIP.

Level 3 Sub-Regional Contingency Plans

7.12 Where practicable, each State should harmonize its Contingency ATS Route and FLAS structures with those of all neighbouring States.

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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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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.

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.
 - iii. Timely reporting to ICAO and other affected States of anticipated or experienced disruptions requiring activation of contingency plans.

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;

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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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]

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 UNDERSTANDING 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.

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 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].

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 pro-forma 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].

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;

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]

Transition To and From Contingency Operations

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.

Transfer of control and coordination

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

Filing of flight plans

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.

Overflight approval

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.

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 1D;
- b) flights are to flight plan using the Contingency Routes specified in Appendix 1D, 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.

COMMUNICATION PROCEDURES

Degradation of Communication - Pilot Radio Procedures

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 be conducted 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.

Communication frequencies

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

Aeronautical Information Services (AIS)

8.1 [DETAIL THE AVAILABILITY OR ALTERNATE ARRANGEMENTS FOR AIS]

Meteorological Services (MET)

8.2 [DETAIL THE AVAILABILITY OF METEOROLOGICAL SERVICES AND THE METHODS OF DISTRIBUTION OF MET INFORMATION DURING CONTINGENCY OPERATIONS.]

SEARCH AND RESCUE ALERTING

Notification and Coordination

9.1 The SAR authority responsible for the [AFFECTED AIRSPACE] is the [XXXXX] Rescue Coordination Centre (RCC)

IDD: XXXXXXXXXXXX

Fax: XXXXXXXXXXXX

AFTN: XXXXXXXXXX

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].

SUB-PLANS

LIST OF APPENDICES

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

Excerpt from Draft Regional Framework for Collaborative ATFM

PERFORMANCE IMPROVEMENT PLAN

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

Structure of the Performance Improvement Plan

7.1 Regional collaborative ATFM performance objectives are arranged in *Regional ATFM Capability* phases aligned, where practicable, with Phases I and II of the Seamless ATM Plan's Preferred Aerodrome/Airspace and Route Specifications (PARS) and Preferred ATM Service Levels (PASL):

- PARS/PASL Phase I – expected implementation by 12 November 2015; and
- PARS/PASL Phase II – expected implementation by 08 November 2018.

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

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

- ATFM Regulations
- ATFM Systems
- (Strategic ATFM, Pre-Tactical ATFM or Tactical ATFM)
 - Capacity and Demand Monitoring and Analysis
 - Capacity Improvement
 - ATFM Execution
 - ATFM Measures
 - Post-Operations Analysis

ATFM Program Airports

7.4 *ATFM Program Airports*, referenced in the performance objectives, are:

- The busiest Asia/Pacific Region aerodromes as defined in the Asia/Pacific Region Seamless ATM Plan;
- Airports where strategic slot allocation is implemented under these performance objectives; and
- All other airports designated by the relevant authority as requiring or potentially requiring ATFM implementation.

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

REGIONAL ATFM CAPABILITY PHASE IA

Expected implementation by 12 November 2015

ATFM Regulations

7.5 All States where air traffic demand at times exceeds, or is expected to exceed declared capacity, should enact regulations for the implementation of ATFM.

Annex 11 to the Convention on Civil Aviation section 3.7.5 refers.

Strategic Capacity and Demand Monitoring and Analysis

7.6 A regular program of bi-annual strategic airport and airspace capacity and demand analysis should be implemented for all international airports and associated terminal area airspace, and for all en-route ATC sectors supporting the busiest Asia/Pacific city pairs¹ (**Figure 13**), including consideration of:

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

¹ The Asia/Pacific Seamless ATM Plan lists the busiest Asia/Pacific aerodromes:

- Australia (Sydney, Melbourne);
- China (Beijing, Shanghai Pudong and Hong Jiao, Guangzhou, Hong Kong, Xi'an, Shenzhen, Chengdu, Kunming);
- India (New Delhi, Mumbai);
- Indonesia (Jakarta);
- Japan (Haneda, Narita);
- Malaysia (Kuala Lumpur);
- Philippines (Manila);
- Republic of Korea (Incheon);
- Singapore (Changi); and
- Thailand (Suvarnabhumi).

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

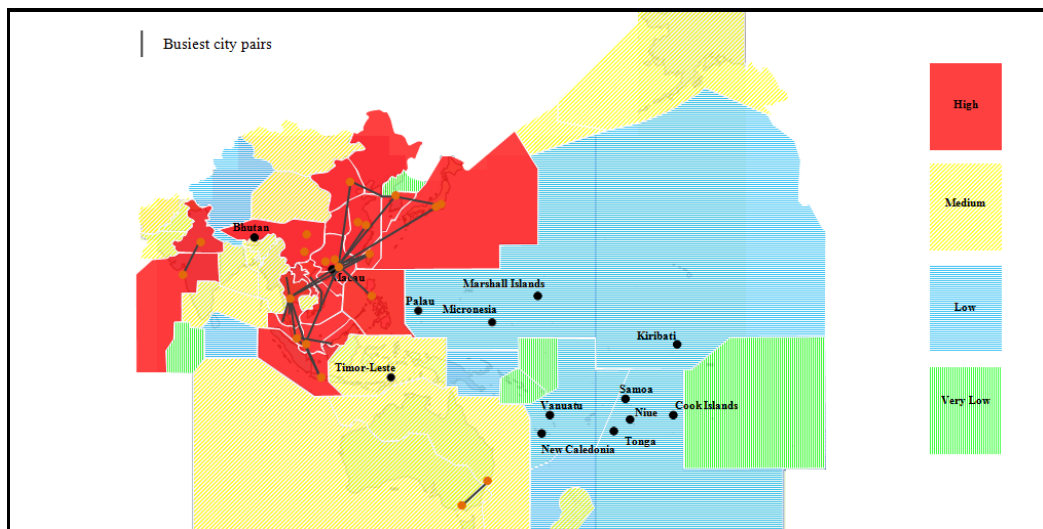


Figure 13: Asia/Pacific High Density FIRs, showing Busiest City Pairs
(Source: Asia/Pacific Seamless ATM Plan)

Pre-Tactical Capacity and Demand Monitoring and Analysis

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

- i. expected runway and airspace configurations;
- ii. forecast meteorological phenomena;
- iii. ATC resources, facilities and equipment;
- iv. other known or expected capacity constraints; and
- v. updated flight schedule and flight plan information.

Pre-Tactical ATFM Execution

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

ADP should be distributed to stakeholders by either:

- i. Web-based ATFM network; or*
- ii. Web-pages hosted by each participating ANSP; or*
- iii. Email distribution.*

Relevant stakeholders include:

- iv. Neighbouring ATFMUs or, where not provided, ATSU*
- v. ATSU supported by the originating ATFMU;*
- vi. Relevant airport operators; and*
- vii. Participating aircraft operators.*

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

Post-Operations Analysis

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

REGIONAL ATFM CAPABILITY PHASE IB

Expected implementation by 25 May 2017

ATFM Systems

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

7.13 Requirements should be published in all relevant State AIP, specifying that 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.

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

7.15 Where the delay is the result of a GDP, the DLA message should be sent by the ATFMU responsible for the destination airport, addressed to the ATS unit serving the departure aerodrome for subsequent transmission in accordance with the provisions of ICAO Doc 4444 PANS-ATM.

7.16 Appropriate procedures should be implemented to ensure that FPL are not discarded from other ATM systems as a consequence of ATFM delay.

7.17 ATFM, AMAN/DMAN and A-CDM systems should be integrated through the use of common fixes, terminology and communications protocols to ensure complementary operations.

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

Where full ATFM network communications capability is not yet established, ATFM messages conforming to ADEXP version 3.1 may be used for distribution of ATFM measures.

Capacity Improvement

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

7.19 Where necessitated by demand, and using a performance-based approach, terminal area ATS route structure improvements including CCO/CDO should be implemented to reduce ATC and pilot workload and enable better use of aircraft capability to meet ATFM measures.

Strategic ATFM Execution

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

Pre-Tactical Capacity and Demand Monitoring and Analysis

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

Pre-Tactical ATFM Execution

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

Tactical Capacity and Demand Monitoring and Analysis

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

7.24 Tactical ATFM at ATFM Program Airports should be implemented using:

- i. Ground Delay Programs (CTOT) for aircraft inbound from:
 - a. domestic airports;
 - b. international airports sufficient to ensure participation of more than 70% of total inbound traffic;
- ii. Minutes in trail (MINIT) or miles in trail (MIT) for aircraft inbound from airports where CTOT may not be applied.

7.24 CTOT for individual aircraft should, where necessary, be revised, cancelled, suspended or de-suspended.

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

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

Post-Operations Analysis

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

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

ICAO Doc 9971 – Manual on Collaborative ATFM Part II-4-8 provides guidance on post-operations analysis

REGIONAL ATFM CAPABILITY PHASE II

Expected implementation by 08 November 2018

ATFM Systems

7.28 Distributed multi-nodal ATFM information distribution capability utilizing FIXM version 3.0 (or later) should be implemented, including:

- i. Sharing of ADP and dynamically updated demand and capacity data for all ATFM program airports, and for en-route airspace supporting the busiest city pairs and high density major traffic flows;
- ii. Slot allocation information for all flights subject to ATFM programs, including as a minimum CTOT, CTO and CLDT information;
- iii. Authorized user functions for slot amendment, cancellation or suspension (ATFMU), and slot-swapping (aircraft operator and ATFMU); and
- iv. Automated slot compliance monitoring and reporting, supplemented where necessary by authorized inputs by ATFMU, ATSU or airspace operator.

7.29 Full interoperability of cross border ATFM, A-CDM, AMAN, DMAN, ATM automation and airspace user systems should be implemented, utilizing FIXM 3.0 (or later) , to provide seamless gate-to-gate collaborative ATFM operations.

Pre-Tactical Capacity and Demand Monitoring and Analysis

7.30 Automated modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures, should be implemented for all ATFM Program Airports and associated terminal area airspace and, where possible, en-route airspace supporting the busiest Asia/Pacific Region city pairs and high density major traffic flows.

Tactical Capacity and Demand Monitoring and Analysis

7.31 Meteorological services to support ATM in the terminal area (MSTA) should be implemented, including near-term or *now-casting* forecasts of convective weather activity at or affecting ATFM Program Airports and associated instrument approach procedures, terminal area ATS routes and holding points and other significant locations.

Note: Annex 3 requires that States ensure the quality management of meteorological information.

Tactical ATFM Measures

7.32 ATFM measures including MIT, MINIT and, where necessary, CTO at AFIX or RFIX, should be applied to flights through constrained airspace.

7.33 Ground Delay Programs utilizing CTOT should be applied to:

- i. aircraft destined for constrained ATFM Program Airports, that have not yet departed; and
- ii. aircraft planned to operate through constrained airspace where tactical ATFM measure CTO at RFIX or AFIX is in place, that have not yet departed.

7.34 ATFM systems should have the capability to take into account long haul flights.

7.35 Systems should be in place to ensure the timely update of estimate information for airborne aircraft.

RESEARCH AND FUTURE DEVELOPMENT POSSIBILITIES

Research and Development

8.1 Version 1.0 of the Regional Framework for Collaborative ATFM provides the initial framework for implementation of a distributed multi-nodal ATFM network, as envisaged in the *Regional ATFM Concept of Operations*. This concept, being untried elsewhere, will continue to develop as experience is gained through trials and subsequent operational implementation. The Framework is therefore iterative in nature, and will require regular update in the medium term.

8.2 Further research and development of the distributed multi-nodal ATFM network concept will largely be conducted by ATFM/SG participating States through their operations trial programs, consistent with Principle 36 of the Asia/Pacific Seamless ATM Plan Principle 36 – ‘Clustering’ for the *research, development and implementation of ATM projects*. The outcomes of trials and lessons learned from operational deployment will be considered by ATFM/SG for the improvement and updating of the Framework.

ATFM Interface Control Document

8.3 The ATFM Information Requirements Small Working Group (ATFM/IR/SWG) will develop an operational requirements document and an ICD for networked, cross-border multi-nodal ATFM information exchange, to be delivered to ATFM/SG for consideration before then being referred to the 4th Meeting of the ATM Sub-Group of APANPIRG (ATM/SG/4) in August 2016.

Collaborative ATFM Concept Developments

8.4 The following concepts should be researched, and developed, for implementation in the Asia/Pacific Region:

8.5 **Delay Absorption Intent** – included in the *Regional ATFM Concept of Operations*, provides aircraft operators with the flexibility to choose how to distribute the delay assigned by an ATFM measure to various phases of flight. Not yet included in the ATFM Performance Improvement Plan, this concept has the potential to improve outcomes by increasing the number of aircraft participating in the program, through the application of ATFM delays to longer distance flights that are currently exempt from ground delay programs. The development of this concept will be undertaken in trials before then being potentially included in the broader Framework.

8.6 **FIXM Extension** – may be required for implementation of any Asia/Pacific region ATFM practices or procedures that are not covered in FIXM version 3.0 or later versions deployed by States.

8.7 **Application of ATFM Measures to Long Range Flights** – will improve equity in ATFM processes, and contribute to better outcomes in those ATC sectors where long range flights are currently exempt from all but minimal en-route delays. This will require further development of ATFM measures the CTO ATFM measure, and the formulation of regionally agreed limits on the total ATFM+AMAN delay that may be applied to long range and ultra-long range flights.

8.8 **Interoperability of ATFM, AMAN/DMAN and A-CDM systems** – will require ANSPs and airport operators to collaboratively develop their local operational letters-of-agreement to incorporate procedures and practices optimizing gate-to-gate flow management of flights.

8.9 **Collaborative Trajectory Options** – provide for flexible routing options that permit aircraft operators to elect to re-route flights via longer trajectories to avoid constrained airspace and take advantage of the reduction or removal of ground delay (or en-route delay, where implemented) that would be imposed if the flight continued through the constrained airspace. A collaborative trajectory options program would significantly improve the safety and efficiency of ATM in cases of large scale weather deviations (LSWD) such as those experienced in the cyclonic weather season in the Bay of Bengal and South China Sea areas, and contingency operations including the avoidance of airspace that is either unsafe (e.g. volcanic ash cloud) or unavailable. A collaborative trajectory options program would first require a full understanding of airspace capacity, which should be supported by a comprehensive study.

8.10 The development of a collaborative trajectory options program in the Asia/Pacific Region, particularly in South East Asia, will require a coordinated multi-partite effort to improve the regional ATS route network and ATS surveillance/communications infrastructure, and to provide sufficient ATS route options for the program. ATS route specification and implementation of surveillance and communications infrastructure are included in the performance objectives of the Seamless ATM Plan.

8.11 **Network Collaborative Decision-Making** – to provide mechanisms within the distributed multi-nodal ATFM network for the formulation of executive flow management decisions in the event of competing stakeholder priorities. This will require research and development of network-suitable automated decision-support tools and associated business rules. Operational experience in the distributed multi-nodal ATFM network environment will be key to identifying the potential challenges, and formulating and testing strategies.

8.12 **Harmonization of Multiple Flow Management Programs** – will ensure that all ATFM measures applied are collaboratively managed to ensure that individual flights are not unduly penalized by multiple measures in one flight, and that ATFM network outcomes are more predictable. Currently aircraft may be subject to independently applied en-route and airport ATFM delays, resulting in potentially unreasonable cumulative delay over the course of a flight. A significant amount of research is being conducted, and needs to be conducted, into the effects and harmonization of multiple flow programs in multiple FIRs.

Framework for APAC Regional Contingency Plans (Volcanic Ash or Radioactive Cloud)

(adapted from ATM/AIS/SAR/SG/21 – WP/5)

Representatives

Singapore (Rapporteur), Australia, New Zealand, United States; Indonesia; Philippines; Malaysia; Thailand

Critical topics:

What is the purpose of contingency plan for Volcanic Ash and Radioactive Cloud?

- To ensure the continued safety of air transport in the event of volcanic ash (VA)/radioactive cloud/tsunami/tropical cyclone.

The Asia Pacific Contingency plan:

- Needs to give direction/guidance to someone who isn't an expert/has no knowledge of the situation
- Should show the end-to-end progress and shows how information can flow between agencies and States
- Should avoid duplicating information but make reference/point to it (There is already SARPS in Annex 3, IVA operations manual; PANS-ATM; regional SIGMET guide). A consolidated document is needed – but needs Secretariat support to ensure it remains up to date.
- Should be applicable for more than one phenomenon: initially only for phenomena VA, radioactive cloud; tsunami and tropical cyclone. As they have advisory centres, Area Control Centre/RSMC or equivalent
- **Should this really be about contingency plan or rather how collaborative decision making will work within a region?**
- Needs a common definition so that people understand its purpose and role and what information will be covered
- Needs to define what the operational need is for a contingency plan for each State
- Needs to identify what is the critical information that different organisations/States need

Identify procedures and requirements that are unique to the Asia Pacific region. e.g.: those not defined by Annex 3,

- **Collaborative decision making**

The Contingency Plan needs to define how collaborative decision making works for VA for Asia Pacific.

The Contingency plan needs to capture work already underway to promote CDM and suggest improvements.

- **Dissemination of information**

The Contingency plan needs to define information flows.

The Contingency plan needs to identify operational focal points.

The Contingency plan needs to establish a forum for discussion – virtual, teleconference, etc.

The Contingency plan needs to outline the management of timeliness of decisions, especially in adjoining airspace.

- **Action plans** – Not for intra-state activities, but action plans for regional and interactions between States.

The Contingency plan needs to address what is not working currently

- **VONA** (Volcano Observatory Notice for Aviation) – No reference in Annex 3, only in the handbook which is guidance not binding.
- **Provide guidance on what to do if SIGMETs don't agree cross FIRs.**
- **Define handover processes for MWO for SIGMETs as phenomena cross FIR**
- **Consider potential role of Regional Watch offices**

Who else needs to be involved?

- ATM (Air Traffic Management)
- AOC (Airline Operations Centre)
- Advisory Centres
- Weather Observatories
- RSMC (Regional Specialized Meteorological Centre)
- RODB (Regional OPMET Data Bank)
- MWO (Meteorological Watch Office)
- ANSP (Air Navigation Service Provider)

Additional Specialist advice required:

- IVATF (International Volcanic Ash Task Force)
- Medical (radioactive)
- Tsunami Warning Centres
- IATA

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