



International Civil Aviation Organization

INFORMATION PAPER

**TWENTIETH MEETING OF THE METEOROLOGY SUB-GROUP
(MET SG/20) OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP (APANPIRG)**

Bangkok, Thailand, 6 – 9 June 2016

Agenda Item 6: Research, development and implementation issues in the MET field

6.3: MET/ATM coordination (including MET/R WG Report)

REVIEW OF THE THIRD MEETING OF VOLCEX/SG

(Presented by Chairperson of the VOLCEX/SG)

SUMMARY

This paper presents a summary of the Third Meeting of the ICAO Asia/Pacific (APAC) Volcanic Ash Exercises Steering Group (VOLCEX/SG), held in the ICAO APAC Regional Office, Bangkok, Thailand, from 14-16 March 2016.

1. INTRODUCTION

1.1 The Third Meeting of the Asia/Pacific Volcanic Ash Exercises Steering Group (APAC VOLCEX/SG/3) of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held at the Koitate Wing, ICAO Asia and Pacific Regional Office, Bangkok, Thailand, from 14 to 16 March 2015.

1.2 The meeting was attended by thirty-nine participants from ten States and two International Organizations, including Australia, Indonesia, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, the International Air Transport Association (IATA), and ICAO.

1.3 The final report of the meeting is attached to this paper as the Appendix A. The report and the relevant meeting information are available at the following website: <http://www.icao.int/APAC/Meetings/Pages/2016-VOLCEX-SG3.aspx>.

2. DISCUSSION

Review Terms of Reference

2.1 The Terms of Reference (TOR) of the VOLCEX/SG, which were originally based on the guidance contained in ICAO Doc 9766 – Handbook on the International Airways Volcano Watch,

Appendix F – Guidance for conducting volcanic ash exercises in ICAO Regions, were revised to include linkages with the Regional ATM Contingency Plan Task Force (RACP/TF) and the Aeronautical Information Services – Aeronautical Information Management Implementation Task Force (AAITF), and to note that outcomes of VOLCEX/SG would be reported to the Air Traffic Management Sub-Group (ATM/SG) of APANPIRG. The revised TOR as agreed by the meeting are provided at Appendix C to the final report.

Report on VOLPHIN 16/01

2.2 Indonesia presented information on the outcomes of the ICAO APAC volcanic ash exercise VOLPHIN 16/01, held in Bali, Indonesia from 16 – 17 February 2016.

2.3 The exercise aimed to demonstrate application of global and regional procedures related to volcanic activity and volcanic ash (VA) including:

- a) Distribution of alerts (e.g., volcano observatory notice for aviation (VONA));
- b) Distribution of messages (e.g., VA advisory information issued in abbreviated plain language (VAA) / graphical format (VAG), information concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations (SIGMET), information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard (NOTAM), special series NOTAM for volcanic activity/eruption and/or VA cloud (ASHTAM) and air-report (AIREP));
- c) Responses by Jakarta Area Control Centre (ACC), Ujung Pandang ACC, Air Traffic Flow Management (ATFM) Unit and Aircraft Operator (AO) (e.g., safety risk assessment and tactical re-route);
- d) Enhance situational awareness and collaborative decision making (CDM) (e.g., tele-, web- conference, website or other media).

2.4 The exercise scenario involved the simulated eruption of Mount Merapi volcano, with VA cloud up to FL350 and above, moving northeast at 20 knots and impacting ATS routes and airspace in the Jakarta and Ujung Pandang flight information regions (FIRs).

2.5 The secretariat introduced the draft report of the exercise and the exercise reports from each participating organizations. The meeting finally made 15 Actions from the outcomes and the lessons learned from the exercise VOLPHIN16/01.

Preparations for volcanic ash exercise

2.6 Two breakout groups were formed during the meeting to draft a preliminary plan and an exercise directive for the next (two) VA exercises to be conducted in Indonesia and Philippines. The reports of the discussions of the breakout groups are provided at Appendix D (Indonesia) and Appendix E (Philippines) to the report.

RACP/TF Outcomes

2.7 The Secretariat provided information on outcomes from the Regional ATM Contingency Plan Task Force (RACP/TF), which included recommendations arising from the VOLCEX/SG/2

meeting, including information on ATM contingency response to VA cloud, and related performance objectives included in the draft RACP. (VOLCEX/SG/3 WP/05 Attachments A, B and C).

2.8 Previous discussion of the VOLCEX/SG indicated that Philippines did not provide colour codes in VONA information. Japan confirmed that the VAAC Tokyo did not report colour codes in VAA and that ASHTAM was not used to disseminate aeronautical information on VA clouds. The meeting was informed that New Zealand and Australia did provide colour codes in VONA, VAA and VAG, but did not use ASHTAM. The meeting agreed to refer the matter to the AAITF for determination of a regional position on the use of ASHTAM – and then to provide some clarity on the issue to the VOLCEX/SG (see paragraphs 3.6 and 3.17 for further discussion by the meeting).

2.9 Further to the discussion on alert colour codes, Japan pointed out that colour codes used in VONA and VA advisory information should be considered separately because the colour codes in VONA relate to volcano activity, but the main impact that volcano activity has on aviation operations is the emission of high altitude VA cloud rather than the volcano activity itself. For example, in a volcano eruption, when the volcano activity subsides and the level of alert colour code for the VONA changes from “orange” to “yellow” accordingly, the high altitude VA cloud may still continue to exist from the eruption and continue to have a significant impact on aviation operations – in which case the change of alert colour code in the VONA (i.e., from orange to yellow) may not appropriately reflect the significance of the existing high altitude VA cloud to operators if the same alert colour code is conveyed in the VA advisory information.

2.10 To further support the development of the RACP, the meeting agreed that the guidance provided in Doc 9766 should be used as the basis for a list of actions (for use in the RACP) to be taken by relevant VOs, VAACs, MWOs, AIS Units and ACCs in the event of a volcanic eruption.

2.11 The work programme of the APAC VOLCEX/SG would also support the Regional ATM Contingency Performance Improvement Plan insofar that ICAO APAC VA exercises would fulfil (to some extent) the Regional ATM Contingency Performance Improvement Plan’s requirement for “Multi-lateral Volcanic Ash Cloud Exercises”, which should be conducted by each State at least annually.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**REPORT OF THE THIRD MEETING OF THE ASIA/PACIFIC VOLCANIC ASH
EXERCISES STEERING GROUP (APAC VOLCEX/SG/3)**

Bangkok, Thailand, 14 – 16 March 2016

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

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

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INTRODUCTION

1. Meeting

1.1 The Third Meeting of the Asia/Pacific Volcanic Ash Exercises Steering Group (APAC VOLCEX/SG/3) of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held at the Koitate Wing, ICAO Asia and Pacific Regional Office, Bangkok, Thailand, from 14 to 16 March 2015.

2. Attendance

2.1 The meeting was attended by thirty-nine participants from ten States and two International Organizations, including Australia, Indonesia, Japan, Malaysia, New Zealand, Philippines, Republic of Korea, Singapore, Thailand, United States, the International Air Transport Association (IATA), and ICAO. A list of participants is provided at **Appendix A** to this Report.

3. Officers and Secretariat

3.1 Mr Koichiro Kakihara, Senior Coordinator for International Aeronautical Meteorology, Japan Meteorological Agency presided as Chair of the meeting.

3.2 Mr. Peter Dunda, Regional Officer Aeronautical Meteorology and Mr. Shane Sumner, Regional Officer Air Traffic Management/Aeronautical Information Management, ICAO Asia and Pacific Office, acted as the Secretariat and ICAO Coordinators for the meeting.

4. Language and Documentation

4.1 The APAC VOLCEX/SG met as a plenary throughout the meeting. The working language of the meeting was English inclusive of all documentation and this Report. A total of five working papers (WP), two information papers (IP), one presentation (SP) and one flimsy were considered by the meeting. The list of working papers, information papers, presentation and flimsy is attached at **Appendix B** to this report.

REPORT ON AGENDA ITEMS

Agenda Item 1: Organizational Matters

1.1 On behalf of Mr. Arun Mishra, Regional Director of the ICAO Asia and Pacific Office, Mr. Peter Dunda welcomed all the participants to the meeting.

Provisional agenda (WP/01)

1.2 The provisional agenda was adopted by the meeting

- Agenda Item 1: Organizational Matters
- Agenda Item 2: Review Terms of Reference of APAC VOLCEX/SG
- Agenda Item 3: Debrief and Review of Volcanic Ash Exercise VOLPHIN 16/01
- Agenda Item 4: Planning for Future ICAO Volcanic Ash Exercises in the APAC Region
- Agenda Item 5: Future Work Schedule of APAC VOLCEX/SG
- Agenda Item 6: Any other business
- Agenda Item 7: Date and venue for the next meeting

Agenda Item 2: Review Terms of Reference of APAC VOLCEX/SG

Review Terms of Reference (WP/02)

2.1 The Secretariat presented the Terms of Reference (TOR) of the VOLCEX/SG, and a proposed update (**VOLCEX/SG/3 WP/02 Attachments 1 and 3**) for consideration by the meeting. The TOR were based on the guidance contained in ICAO Doc 9766 – *Handbook on the International Airways Volcano Watch*, Appendix F – *Guidance for conducting volcanic ash exercises in ICAO Regions (VOLCEX/SG/3 WP/02 Attachment 2)*.

2.2 The TOR were revised to include linkages with the Regional ATM Contingency Plan Task Force (RACP/TF) and the Aeronautical Information Services – Aeronautical Information Management Implementation Task Force (AAITF), and to note that outcomes of VOLCEX/SG would be reported to the Air Traffic Management Sub-Group (ATM/SG) of APANPIRG.

2.3 The revised TOR as agreed by the meeting are provided at **Appendix C** to this report

Agenda Item 3: Debrief and Review of Volcanic Ash Exercise VOLPHIN 16/01

Report on VOLPHIN 16/01 (Indonesia, WP/04)

3.1 Indonesia presented information on the outcomes of the ICAO APAC volcanic ash exercise VOLPHIN 16/01, held in Bali, Indonesia from 16 – 17 February 2016.

3.2 The exercise aimed to demonstrate application of global and regional procedures related to volcanic activity and volcanic ash (VA) including:

- a) Distribution of alerts (e.g., volcano observatory notice for aviation (VONA));
- b) Distribution of messages (e.g., VA advisory information issued in abbreviated plain language (VAA) / graphical format (VAG), information concerning the occurrence

or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations (SIGMET), information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard (NOTAM), special series NOTAM for volcanic activity/eruption and/or VA cloud (ASHTAM) and air-report (AIREP));

- c) Responses by Jakarta Area Control Centre (ACC), Ujung Pandang ACC, Air Traffic Flow Management (ATFM) Unit and Aircraft Operator (AO) (e.g., safety risk assessment and tactical re-route);
- d) Enhance situational awareness and collaborative decision making (CDM) (e.g., tele-, web- conference, website or other media).

3.3 The exercise scenario involved the simulated eruption of Mount Merapi volcano, with VA cloud up to FL350 and above, moving northeast at 20 knots and impacting ATS routes and airspace in the Jakarta and Ujung Pandang flight information regions (FIRs). The actions expected under the exercise scenario are illustrated in **Figure 1**.

VOLPHIN16/01 SCENARIO

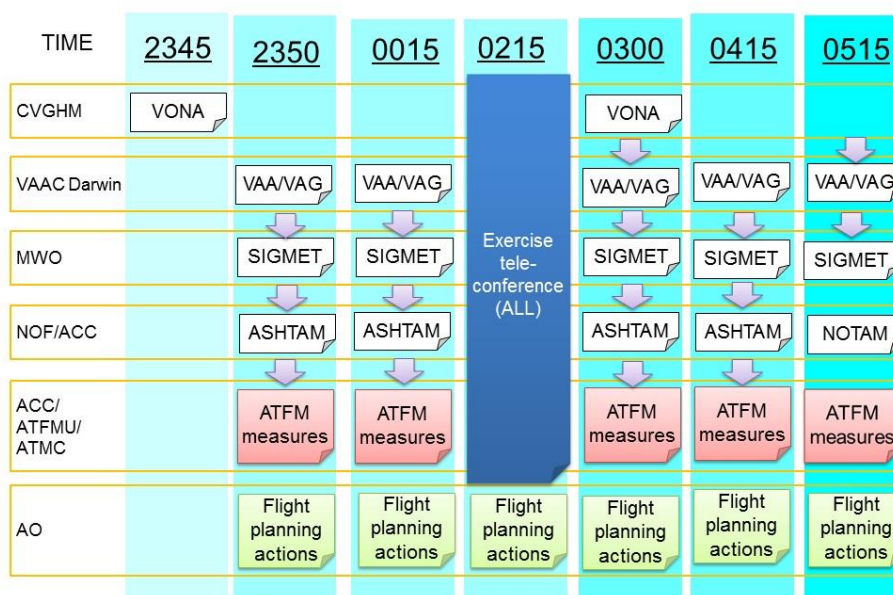


Figure 1: VOLPHIN 16/01 Exercise Expected Actions

3.4 The following significant points were noted by Indonesia and discussed by the meeting:

- a) The Indonesia NOTAM Office (NOF) issued ASHTAM, rather than NOTAM. It was noted that the provisions for ASHTAM in Annex 15 – *Aeronautical Information Services*, Appendix 3 – *Instructions for the completion of the ASHTAM format*, which refer to the list of volcanoes included in ICAO Doc 9691 – *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds*, incorrectly refer to Doc 9691, Appendix H, whereas the list of volcanoes in Doc 9691 is in Appendix E – *Cross-reference list of volcanoes and navigation aids*. Additionally, the aforementioned is no longer the definitive list of volcanoes used for VA advisory information and the meeting noted that the note provided in Doc 9691, Appendix E, requires that another list, the *List of Volcanoes of the World for VAAC Use* database at <http://www.volcano.si.edu/projects/vaac-data/>, which is maintained by the Global

Volcanism Program of the Smithsonian Institution, should be used in case of discrepancy between the Smithsonian database and the list published in Doc 9691, Appendix E. Furthermore, the meeting noted that Doc 9766, Appendix A – *Sample letter of agreement between the air traffic services, meteorological authorities and volcanological authorities*, paragraph 3.1.1, provided guidance on the promulgation of an ASHTAM/NOTAM for VA, which requires that the Smithsonian Tables be used for name and number of the volcano. In order to avoid further confusion for operational units preparing ASHTAM information using guidance provided in Annex 15/Doc 9691 and Doc 9766, the meeting agreed to recommend ICAO to address the discrepancies between the documents. The meeting also agreed that NOFs should review standard operating procedures (SOPs) to ensure that the Smithsonian database is used in case of discrepancy between the list of volcanoes at Doc 9691, Appendix E, and the Smithsonian database.

ACTION: Request ICAO to address the discrepancies with respect to the lists of volcanoes referred to in Annex 15/Doc 9691 and Doc 9766.

ACTION: Ensure that the Smithsonian database is used by NOFs in case of discrepancy between the list of volcanoes at Doc 9691, Appendix E, and the Smithsonian database.

b) The email distribution of VONA by Centre of Volcanology and Geological Hazard Mitigation (CVGHM) failed. It was considered that this was likely to be due to the email service (Gmail) and the large number of addressees resulting in the email being identified as SPAM by receiving email services.

c) The exercise directive did not include coordinated activities with terminal control area (TMA) units which would normally be expected to be affected by an eruption of Mount Merapi.

d) The exercise directive did not include clear information on the communication method to disseminate information.

e) Some information in the VAA/VAG was not clearly understood in the NOF (i.e., the use of the term "unknown").

f) A number of airspace user organizations queried the VAG, possibly misunderstanding that it was for use in the exercise only. The VAG should display a watermark 'EXERCISE'.

3.5 Indonesia presented a number of lessons learned and recommendations, which resulted in the following Actions as agreed by the meeting:

3.6 Lesson 1: Notification for Volcanic Ash Activity

ACTION: Advise the AAITF that a Regional position on the issuance of ASHTAM vs. NOTAM be established to promote a coordinated Regional response to VA events.

3.7 Lesson 2: Mutual Agreement

ACTION: Operational units to review existing SOPs to ensure coordinated response to VA events within FIRs and between neighbouring FIRs in accordance with local, regional and global requirements.

Note: A sample letter of agreement between ATS, meteorological authorities and volcanological authorities is provided in Doc 9766; and the RACP performance objectives include the establishment of formal ATM contingency agreements.

- 3.8 Lesson 3: Effect of Volcanic Ash Exercise
ACTION: Consider inclusion of an aerodrome impact in a future VA exercise, including CDM process addressing the possible closure of an affected aerodrome.

Note: There is a need to establish what the existing CDM process is, which is to be demonstrated in the VA exercise.
- 3.9 Lesson 4: Exercise Directive should be finalized early
ACTION: Exercise directive to be finalized at least 1 month before exercise; and circulated broadly to ensure visibility to all necessary players [Chairperson, Secretary, Exercise leader with assistance from Members as agreed]
- 3.10 Lesson 5: Watermark on VAG
ACTION: Volcanic ash advisory centres (VAACs) Tokyo, Darwin and Wellington to support use of the watermark “EXERCISE” in future VA exercises where possible*.

*Note: Preparation of VAG with the watermark “EXERCISE” would require additional time and resources to the normal operational systems used; hence it would not be possible to issue VAG with the watermark “EXERCISE” if required to at short notice.
- 3.11 Lesson 6: The VOLPHIN Sheet (for recording information during the VA exercise)
ACTION: Incorporate exercise sheet as part of exercise directive requirements.

VOLPHIN 16/01 – Summary Report (WP/03)
- 3.12 The Secretariat presented a summary report of the VA exercise VOLPHIN 16/01 for review by the meeting and identification of issues to be addressed by the group. A copy of the VOLPHIN 16/01 VA exercise directive was provided at **VOLCEX/SG/3 – WP/03 Attachment**.
- 3.13 Several of the issues identified in the summary report were already discussed, and Actions subsequently determined, under WP/04.
- 3.14 The meeting agreed to the following additional actions in response to the highlights and issues noted during the exercise:

ACTION: Consider participation of vulcanological agency operational unit in future VA exercise to more closely simulate operational response and dissemination of VONA information in accordance with SOPs.

Note: Operational units should consider routine or ad-hoc testing of message dissemination to support operations in VA events, e.g. VAAC Tokyo and Philippine Institute of Volcanology and Seismology (PHIVOLCS) have an existing routine VONA issuance drill to practice procedures of VONA information issuance.

ACTION: Operational units ensure message addressing is up-to-date with ICAO requirements for dissemination of VA related information.

ACTION: Remove addresses from the exercise directive.

Note: VAACs requested that their operational email addresses be included in the distribution list for all VONA information issued to support the provision of VAA within the area of responsibility of their partner back-up VAACs. This would support the established VAAC back-up arrangements between the VAACs.

ACTION: Clarify the requirements for issuance of volcanic ash exercise special air reports in the exercise directive

Initial Exercise Reports from VOLPHIN 16/01 (IP/02)

3.15 The Secretariat provided the initial exercise reports from VOLPHIN16/01, with no further editing, analysis or discussion provided, as a resource for the VOLCEX/SG on which to base the debrief meeting discussions on VOLPHIN16/01.

3.16 Reports were received from the following exercise participants and observers in VOLPHIN16/01:

MWO* Jakarta and Ujung Pandang	VOLCEX/SG/2 IP/02 Attachment 1
Malaysian Airlines	VOLCEX/SG/2 IP/02 Attachment 2
NOF Jakarta	VOLCEX/SG/2 IP/02 Attachment 3
Hong Kong Observatory	VOLCEX/SG/2 IP/02 Attachment 4
Darwin VAAC	VOLCEX/SG/2 IP/02 Attachment 5
RODB† Singapore	VOLCEX/SG/2 IP/02 Attachment 6
Wellington VAAC	VOLCEX/SG/2 IP/02 Attachment 7
Virgin Australia	VOLCEX/SG/2 IP/02 Attachment 8
IATA	VOLCEX/SG/2 IP/02 Attachment 9

3.17 The following Actions in response to the exercise reports were agreed by the meeting:

ACTION: Clarify the simulated information sharing arrangement to be tested in the exercise directive.

ACTION: Clarify the exercise teleconference arrangement in the exercise directive.

ACTION: Clarify the requirement for issuance of ASHTAM/NOTAM in the exercise directive.

Agenda Item 4: Planning for Future ICAO Volcanic Ash Exercises in the APAC Region

Preparations for volcanic ash exercise (SP/01)

4.1 Philippines presented results of preparations conducted thus far for the next VA exercise,

* Meteorological watch office

† Regional OPMET Databank; OPMET – Operational meteorological (information)

VOLPHIN16/02, to be conducted in Philippines in August 2016.

Breakout Groups

4.2 Two breakout groups were formed during the meeting to draft a preliminary plan and an exercise directive for the next (two) VA exercises to be conducted in Indonesia and Philippines. The reports of the discussions of the breakout groups are provided at **Appendix D** (Indonesia) and **Appendix E** (Philippines) to this report.

Agenda Item 5: Future Work Schedule of APAC VOLCEX/SG

5.1 Following the discussions above on planning the next ICAO APAC VA exercises, and taking into consideration the proposals by the Secretary with respect to the schedule of VA exercises and meetings of the APAC VOLCEX/SG, and a proposal for the scheduling of the next meetings submitted by Japan (Flimsy 1 refers), the meeting considered the tentative future work plan at **Appendix F** to this report.

5.2 The meeting noted that the planning/debrief process for each VA exercise may be supported by additional meetings via tele- or web- conferencing, which would be incorporated, as necessary, in the future work plan.

5.3 The discussion revisited the need for the group to operate as efficiently as possible and therefore limit the number of face-to-face meetings. The current practice (i.e., in 2015 and 2016) to conduct VA exercises at 6-monthly intervals (i.e., in August 2015 and February 2016) necessitated debrief meetings at a similar frequency (i.e., September 2015 and March 2016) – noting that debrief meetings should be held soon after the VA exercises to discuss the exercise reports. In view of the above, the meeting agreed to a future programme incorporating one annual face-to-face meeting of the VOLCEX/SG, with additional tele- or web- conferences, as necessary, to support the VA exercise review, debriefing and planning processes.

Agenda Item 6: Any other business

RACP/TF Outcomes (WP/05)

6.1 The Secretariat provided information on outcomes from the Regional ATM Contingency Plan Task Force (RACP/TF), which included recommendations arising from the VOLCEX/SG/2 meeting.

6.2 The outcomes included information on ATM contingency response to VA cloud, and related performance objectives included in the draft RACP. (**VOLCEX/SG/3 WP/05 Attachments A, B and C**).

6.3 The meeting proposed minor editorial changes to the draft RACP (at paragraphs 5.18 and 7.15 of the plan) relating to the use of volcano level of alert colour codes for aviation in the APAC Region, and to reflect the use of the Smithsonian Institution Global Volcanism Network Tables as the definitive global list of volcanoes (names and numbers) within the IAVW framework (Doc 9766 refers).

6.4 Previous discussion of the VOLCEX/SG indicated that Philippines did not provide colour codes in VONA information. Japan confirmed that the VAAC Tokyo did not report colour codes in VAA and that ASHTAM was not used to disseminate aeronautical information on VA clouds. The meeting was informed that New Zealand and Australia did provide colour codes in VONA, VAA and VAG, but did not use ASHTAM. The meeting agreed to refer the matter to the AAITF for determination of a regional position on the use of ASHTAM – and then to provide some clarity on the issue to the VOLCEX/SG (see paragraphs 3.6 and 3.17 for further discussion by the meeting).

6.5 Further to the discussion on alert colour codes, Japan pointed out that colour codes used in VONA and VA advisory information should be considered separately because the colour codes in VONA relate to volcano activity, but the main impact that volcano activity has on aviation operations is the emission of high altitude VA cloud rather than the volcano activity itself. For example, in a volcano eruption, when the volcano activity subsides and the level of alert colour code for the VONA changes from “orange” to “yellow” accordingly, the high altitude VA cloud may still continue to exist from the eruption and continue to have a significant impact on aviation operations – in which case the change of alert colour code in the VONA (i.e., from orange to yellow) may not appropriately reflect the significance of the existing high altitude VA cloud to operators if the same alert colour code is conveyed in the VA advisory information.

6.6 To further support the development of the RACP, the meeting agreed that the guidance provided in Doc 9766 should be used as the basis for a list of actions (for use in the RACP) to be taken by relevant VOs, VAACs, MWOs, AIS Units and ACCs in the event of a volcanic eruption.

ACTION: Provide the RACP/TF with a list of actions to be taken by relevant VOs, VAACs, MWOs, AIS Units and ACCs in the event of a volcanic eruption.

6.7 The work programme of the APAC VOLCEX/SG would also support the Regional ATM Contingency Performance Improvement Plan insofar that ICAO APAC VA exercises would fulfil (to some extent) the Regional ATM Contingency Performance Improvement Plan’s requirement for “Multi-lateral Volcanic Ash Cloud Exercises”, which should be conducted by each State at least annually.

APAC VOLCEX/SG task list

6.8 Action agreed to be conducted by APAC VOLCEX/SG members and/or VA exercise participants is recorded in the Task List at **Appendix G** to this report.

Agenda Item 7: Date and venue for the next meeting

7.1 The next meeting was tentatively scheduled for March 2017 in Bangkok, Thailand, and could possibly be held back-to-back with another ICAO meeting (e.g. Meteorological Services Working Group), which would enable at least some participants to consolidate their travel requirements.

8. Closing

8.1 The Chairman thanked the meeting participants for their valuable contributions.

**Third Meeting of the Asia/Pacific
Volcanic Ash Exercises Steering Group (VOLCEX/SG/3)**

(Bangkok, Thailand, 14 – 16 March 2016)

LIST OF PARTICIPANTS

Appendix A to the Report

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International Civil Aviation Organization

THIRD MEETING OF THE ICAO ASIA/PACIFIC (APAC) VOLCANIC ASH EXERCISES STEERING GROUP (VOLCEX/SG/3)

Bangkok, Thailand, 14 – 16 March 2016

WP/IP No.	Agenda Item	Subject	Presented by
WORKING PAPERS			
WP/1	-	Provisional Agenda	Secretariat
WP/2	2	Review Terms of Reference	Secretariat
WP/3	2	VOLPHIN 16/01 – Summary Report	Secretariat
WP/4	3	Report on VOLPHIN 16/01	Indonesia
WP/5	6	Regional ATM Contingency Plan Task Force Outcomes	Secretariat
INFORMATION PAPERS			
IP/1	-	Meeting Bulletin	Secretariat
IP/2	3	Initial Exercise Reports from VOLPHIN16/01	Secretariat
PRESENTATIONS			
SP/1	3	VOLPHIN 16/02 – Preparations for Volcanic Ash Exercise	Philippines
FLIMSY			
Flimsy 1	5	Proposal for the Next Meeting	Japan

VOLCEX/SG/3
Appendix C to the Report

TERMS OF REFERENCE	
Name of group	<p>The Asia/Pacific volcanic ash exercises steering group (APAC VOLCEX/SG).</p> <p>The APAC VOLCEX/SG was established at the twenty-fifth meeting of the APAC Air Navigation Planning and Implementation Regional Group (APANPIRG/25) [Decision 25/47 – <i>Establishment of a Volcanic Ash Exercises Steering Group in the APAC Region</i>, refers].</p>
Objective	Maintain safety, regularity and efficiency of aviation in the event of a volcanic eruption.
Benefits	Demonstrated, coordinated provision and exchange of, and response to, volcanic ash/activity information within the international civil aviation system.
Membership and appointment	<p>Open to all ICAO Contracting States providing or using air navigation services in the Asia/Pacific Region, international organizations recognized by the Council and other international organizations and/or bodies invited specifically by the APANPIRG.</p> <p>Representation should be by specialists in the provision and exchange of, or operational response to, or regulatory governance of, volcanic ash information for international civil aviation.</p> <p>Composition shall be such that, while being kept as small as possible to ensure the efficiency of the steering group’s work and the informality of proceedings, all States and organizations that can make valid contributions are given the opportunity to participate in the steering group.</p>
Chairing	<p>A Chairperson shall be elected from the representatives designated by member States of the steering group. A Vice-Chairperson may be elected from the said representatives if necessary.</p> <p>The term of the Chairperson/Vice-Chairperson shall be for a maximum period of four years.</p>
Frequency of meetings and quorum	<p>The Chairperson, in consultation with Members and the Secretary of the steering group, shall call meetings of the steering group when deemed necessary to do so, and determine the date and duration of meetings.</p> <p>As a rule, the steering group should agree, at each meeting, on the date and duration of the next meeting.</p> <p><u>Quorum</u> Representation at meetings should consist of at least: the volcanic ash advisory centres (VAACs) concerned; air navigation service providers (ANSPs); airspace users and regulators.</p>
Record of meetings	Proceedings of meetings of the steering group should be recorded in the form of a Report or a Summary prepared by the Chairperson (or Vice-Chairperson) and the Secretary with assistance from the meeting.
Reporting mechanism	<p>Reports or Summaries on meetings of the steering group shall be posted on the ICAO APAC Office website and submitted to the Meteorology Sub-group (MET SG) and the Meteorological Services Working Group (MET/S WG) for review and further action.</p> <p>The steering group has linkages to the Regional ATM Contingency Plan Task Force (RACP/TF) and the Aeronautical Information Services – Aeronautical Information Management Implementation Task Force (AAITF) through their common subject matter areas. Relevant outcomes from the steering group will also be reported to the Air Traffic Management Sub-group (ATM/SG).</p>

Functions & delegated authority	<p>The steering group shall coordinate all aspects of the organization and conduct of volcanic ash exercises in the APAC region, which are designed to practice and develop inter-agency response to volcanic activity and mitigate the risks to aviation. Specifically, the steering group shall:</p> <ol style="list-style-type: none">1. Decide on a programme for volcanic ash exercises to address the challenges faced by the APAC Region in responding to volcanic ash events;2. Design the volcanic ash exercises in accordance with ICAO Doc 9766 – <i>Handbook on the International Airways Volcano Watch</i>, Appendix F – <i>Guidance for conducting volcanic ash exercises in ICAO Regions</i>;3. Conduct planning meetings for volcanic ash exercises to:<ol style="list-style-type: none">3.1. Appoint a volcanic ash exercise leader;3.2. Develop and publish a volcanic ash exercise directive (including scenario, procedures, instructions, participants);4. Conduct volcanic ash exercises in the APAC Region;5. Conduct debrief meetings for volcanic ash exercises to:<ol style="list-style-type: none">5.1. Discuss reports (from participants);5.2. Review the lessons learned;5.3. Revise and improve the volcanic ash exercise directive (based on lessons learned);5.4. Recommend improvements, as necessary, to the regional volcanic ash ATM contingency plan and other regional and global provisions; and6. Provide advice, as necessary, to support the development of the APAC Regional Air Navigation Plan and the implementation of air navigation services in the APAC Region. <p>Note: In accordance with Doc 9766, the steering group shall ensure that detrimental effects of volcanic ash exercises on the aviation system performance are avoided, but that nevertheless useful experience and information is generated.</p>
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VOLCEX/SG/3
Appendix D to the Report

OUTCOMES FROM
BREAKOUT GROUP
DISCUSSION – INDONESIA
VOLCANIC ASH EXERCISE

Bangkok, 15 March 2016

D-1

PROPOSAL OF
VOLCANIC ASH EXERCISES
VOLPHIN 17/01

Bangkok, 15 March 2016

Introduction

Exercise objective :

1. Demonstrate volcanic ash impact airport closure
2. Demonstrate CDM process
3. Multi FIR different country coordination

Implementation

- Held in Lombok on..... February 2017, at 2300 - 0500 UTC
Exercise Leader : Mrs DINNI NOERDIANI, Deputy Director of Air Navigation, DGCA Indonesia
~~Exercise (in-state) Co-Leader : Mrs DINNI NOERDIANI, Deputy Director of Air Navigation, DGCA Indonesia~~
- The exercise scenario simulated eruption of SANGEANG API Volcano with volcanic ash cloud of up to FL 350 and above moving to South speed 120 Knots impacted on ATS Route (domestic and International Routes), Airports Closure (Lombok, Bima) and airspace within Ujung Pandang FIR and Brisbane FIR
- Communication facilities during exercise use Whatsapp (Volphin 17/01) as the primary media and Skype prepared standby

Implementation

- The exercise begin at 10 hours after first eruption;
- Based on first VONA and VAA, ATM implemented ATM CP associated with forecast +6 hours and +12 hours (not demonstrated on exercise);
- Exercise starting with VONA of third eruption;
- 120 Kts and 150 Kts (to be confirm);
- Below FL 200 MOV to SW 10 Kts (to be confirm);
- Ash cloud expect to be covered Lombok at 0330
- The finish of exercise by announcement of leader incase there is no eruption report from VO but the VA still spread in the air and the area which affected has been decrease

Cont...

- Participating agencies consist of :
 - ACC Ujung Pandang
 - MWO Ujung Pandang
 - ACC Brisbane and ACC Melbourne
 - CASA
 - ASA NOC
 - Darwin Airport
 - Airport Operator (AP I and DGCA)
 - MWO Brisbane
 - VAAC Darwin
 - NOF Jakarta
 - CVGHM
 - Aiport Authority Bali
 - Airline Operators : TBN
 - ICAO – APAC
- Observer :
 - TBN

Cont...

- Observer (TBN):

 - Hongkong Observatory

 - JMA;

 - VAAC Wellington

 - ACC Jakarta;

 - ACC Kinabalu;



THANK YOU

OUTCOMES FROM BREAKOUT GROUP DISCUSSION – PHILIPPINES VOLCANIC ASH EXERCISE

Draft list of Actions – VOLPHIN16/02		
<i>Date/Time (UTC)</i>	<i>Player/s</i>	<i>Event/Action</i>
(1 month before)	Exercise leader, ICAO Secretariat	Confirm and publish final version of exercise directive
(1 week before)	NOF Manila	Issue preparatory NOTAM to inform the aviation community of the exercise
(24 hours before)	Exercise Co-leader	GO/NO decision
(24 hours before)	PHIVOLCS	Issue pre-eruption bulletin
xx/08/2016, (tentative)	0000 Exercise Co-leader	Send e-mail message to all players to announce commencement of the exercise
xx/08/2016, (tentative)	0000 ---	Simulated Taal volcano eruption
xx/08/2016, (tentative)	0010 PHIVOLCS	Issue 1 st exercise VONA (initial eruption details)
Sequential	VAAC Tokyo, MWO Manila and ACC Manila / NOF Manila	Issue 1 st exercise VAA, SIGMET and NOTAM based on VONA
xx/08/2016, (tentative)	0040 VAAC Tokyo	Issue 2 nd exercise VAA and 1 st exercise VAG based on observations/reports
Sequential	MWO Manila	Issue 2 nd SIGMET based on VAA/VAG
Sequential	MWO Hong Kong / MWO Tokyo	Issue 1 st SIGMET based on VAA/VAG
Sequential	ACC Manila / ACC Hong Kong / ATMC	Coordination via e-mail
Sequential	ACC Manila / NOF Manila	Issue 2 nd exercise NOTAM announcing re-routing based on VAA/VAG
Sequential	ACC Hong Kong??	??? CAAP will confirm

VOLCEX/SG/3
Appendix E to the Report

Draft list of Actions – VOLPHIN16/02		
<i>Date/Time (UTC)</i>	<i>Player/s</i>	<i>Event/Action</i>
Sequential	ACC Manila / AFTMU Manila	Apply (simulated) ATFM measures based on SIGMET
xx/08/2016, 0045 - 0115 (tentative)	ANSPs	Exercise teleconference to - confirmation of VAA / SIGMET No. and participants - sharing information that an airport north in the Philippines has reduced its capacity; also sharing information about the coordination between ACCs as well as between ACCs and airlines. Exercise Co-leader will take lead. Secretariat and other participants can attend to listen.
Sequential	ACCs and airlines if necessary	Coordination between ACCs and airlines via e-mail (back-up: telephone)
Sequential	Philippine Airlines / Cebu Pacific	Take appropriate (simulated) flight planning actions via email: e.g. reroute
Sequential	Manila ACC	Relay and record exercise special air-report CAAP will confirm if Philippine Airlines can send an exercise special air-report [Information flow] Philippine Airlines → ACC Manila → PAGASA → VAAC Tokyo via e-mail
xx/08/2016, (tentative)	0200 AO (Thai Airways)	Report aircraft observation [volcanic ash/no volcanic ash] as exercise special air-report via e-mail from a participant (supposed to be Thai Airways) → ATMC → VAAC Tokyo & aircrafts via e-mail
xx/08/2016, (tentative)	0215 All	Exercise teleconference to share the latest information related to volcanic eruption, volcanic ash, rerouting and any other responses taken.
xx/08/2016, (tentative)	0300 VAAC Tokyo	Issue 3 rd exercise VAA and 2 nd exercise VAG based on observations/reports
Sequential	MWO Manila	Issue 3 rd SIGMET based on VAA/VAG
Sequential	MWO Hong Kong / MWO Tokyo	Issue 2 nd SIGMET based on VAA/VAG
Sequential	ACC Manila / ACC Hong Kong / ATMC	Coordination via e-mail
Sequential	ACC Manila / NOF Manila	Issue 3 rd exercise NOTAM based on VAA/VAG
Sequential	ACC Hong Kong??	??? CAAP will confirm

VOLCEX/SG/3
Appendix E to the Report

Draft list of Actions – VOLPHIN16/02		
<i>Date/Time (UTC)</i>	<i>Player/s</i>	<i>Event/Action</i>
Sequential	ACC Manila / AFTMU Manila	Apply (simulated) ATFM measures based on SIGMET
xx/08/2016, (tentative)	0315 ACCs and airlines if necessary	Coordination between ACCs and airlines via e-mail (back-up: telephone)
xx/08/2016, (tentative)	0400 All	Exercise teleconference to share the latest information related to volcanic eruption, volcanic ash, rerouting and any other responses taken.
xx/08/2016, (tentative)	0445 Exercise leader	Send e-mail message to all players to announce cessation of the exercise
Sequential	PHIVOLCS	Issue VONA update (to effectively cease the exercise)
Sequential	VAAC Tokyo	Issue final exercise VAA
Sequential	MWO Manila / MWO Hong Kong / MWO Tokyo	Issue cancellation exercise SIGMET
Sequential	ACC Manila / NOF Manila	Issue cancellation exercise NOTAM

**ICAO ASIA/PACIFIC
VOLCANIC ASH EXERCISES STEERING GROUP (APAC VOLCEX/SG)**

WORK PROGRAMME

(Updated 25/03/2016 – highlighted text indicates updated information)

MEMBERSHIP				
State/Organization	Name	Field/s	Position/ telephone	Email
AUSTRALIA	JANSONS, Mr. Emile	VAAC	TBA	TBA
AUSTRALIA	McALPINE, Mr. Ashley	Regulator	TBA	TBA
INDONESIA	TBA	MET Service	TBA	TBA
INDONESIA	TBA	Volcano Observatory	TBA	TBA
INDONESIA	TBA	ANSP	TBA	TBA
JAPAN	IGARASHI, Ms. Yohko	VAAC	TBA	TBA
JAPAN	TBA	ANSP	TBA	TBA
JAPAN (Chairperson)	KAKIHARA, Mr. Koichiro	MET Service	TBA	TBA
MALAYSIA	TBA	TBA	TBA	TBA
NEW ZEALAND	MACKERSY, Mr. Keith	VAAC MET Service	TBA	TBA
PHILIPPINES	TBA	MET Service	TBA	TBA
PHILIPPINES	TBA	Volcano Observatory	TBA	TBA
PHILIPPINES	TBA	ANSP	TBA	TBA
SINGAPORE	TBA	TBA	TBA	TBA
THAILAND	TBA	TBA	TBA	TBA
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COMMUNICATION STRATEGIES				
Description	Target Audience	Delivery Method	Frequency / Date	Responsibility
Work Plan	VOLCEX/SG Members	Document via email and VOLCEX/SG Meeting	As required, but reviewed at VOLCEX/SG, MET/S WG, MET SG meetings	Chair
General correspondence	VOLCEX/SG Members	Email	As required	VOLCEX/SG Members
Volcanic ash exercise planning	VOLCEX/SG Members	Tele/web conferences	As required	Exercise leader
Steering Group Meeting	VOLCEX/SG Members	Meeting	At least annually	Chair
Status and Milestone Reports	VOLCEX/SG Members	Email and working paper at VOLCEX/SG meeting	At least annually	Chair and Secretary

VOLCEX/SG/3
Appendix F to the Report

VOLCEX/SG meeting report/summary	All APAC States	ICAO website and working paper at MET/SWG, MET SG meetings	Following each VOLCEX/SG meeting	Chair and Secretary
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MILESTONES – organize, conduct and follow-up on volcanic ash exercise	By date	Status
Milestone 1: Philippines	11/08/15	COMPLETED
Milestone 2: Indonesia	17/02/16	COMPLETED
Milestone 3: Philippines	Aug 2016	IN PROGRESS
Milestone 4: Indonesia	Feb 2017	IN PROGRESS
Milestone 5: Papua New Guinea or South West Pacific	2017 TBC	TO BEGIN
Milestone 6: Location TBD	2018 TBD	TO BEGIN
Milestone 7: Location TBD	2018 TBD	TO BEGIN
Milestone 8: Location TBD	2019 TBD	TO BEGIN
Milestone 9: Location TBD	2019 TBD	TO BEGIN

TASKS	Responsibility	Predecessors	By date	Status
Milestone 3: Organize, conduct and follow-up on volcanic ash exercise in Philippines				
Task 3.1 Conduct planning meeting	Chairperson	-	16/03/16	COMPLETED
Task 3.2 Appoint leader	VOLCEX/SG	3.1	16/03/16	COMPLETED
Task 3.3 Set core objectives	Exercise leader	3.1-2	16/03/16	COMPLETED
Task 3.4 Finalize scenario	Exercise leader	3.1-3	16/03/16	COMPLETED
Task 3.5 Set date	Exercise leader	3.1-4	30/04/16	IN PROGRESS
Task 3.6 Finalize list of participants	Exercise leader	3.1-5	31/05/16	IN PROGRESS
Task 3.7 Finalize list of actions	Exercise leader	3.1-6	30/06/16	IN PROGRESS
Task 3.8 Establish roles/responsibilities	Exercise leader	3.1-7	30/06/16	IN PROGRESS
Task 3.9 Establish communication methods	Exercise leader	3.1-8	30/06/16	IN PROGRESS
Task 3.10 Publish directive	Exercise leader	3.1-9	??/07/16	IN PROGRESS
Task 3.11 Conduct exercise	Participants	3.1-10	??/08/16	TO BEGIN
Task 3.12 Submit reports	Participants	3.11	??/08/16	TO BEGIN
Task 3.13 Conduct debrief tele-/web- conf.	Exercise leader	3.11-12	??/09/16	TO BEGIN
Task 3.14 Conduct debrief meeting	Chairperson	3.11-13	??/03/17	TO BEGIN
Task 3.15 Finalize debrief report	Chairperson	3.11-14	??/03/17	TO BEGIN
Milestone 4: Organize, conduct and follow-up on volcanic ash exercise in Indonesia				
Task 4.1 Prepare preliminary proposal	VOLCEX/SG	-	16/03/16	COMPLETED
Task 4.2 Appoint leader	VOLCEX/SG	-	16/03/16	COMPLETED
Task 4.3 Set core objectives	VOLCEX/SG	-	16/03/16	COMPLETED
Task 4.4 Conduct planning tele-/web- conf.	Exercise leader	4.1-3	??/09/16	TO BEGIN
Task 4.5 Finalize scenario	Exercise leader	4.1-4	30/09/16	TO BEGIN

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TASKS		Responsibility	Predecessors	By date	Status
Task 4.6	Set date	Exercise leader	4.1-5	31/10/16	TO BEGIN
Task 4.7	Finalize list of participants	Exercise leader	4.1-6	30/11/16	TO BEGIN
Task 4.8	Finalize list of actions	Exercise leader	4.1-7	31/12/16	TO BEGIN
Task 4.9	Establish roles/responsibilities	Exercise leader	4.1-8	31/12/16	TO BEGIN
Task 4.10	Establish communication methods	Exercise leader	4.1-9	31/12/16	TO BEGIN
Task 4.11	Publish directive	Exercise leader	4.1-10	??/01/17	TO BEGIN
Task 4.12	Conduct exercise	Participants	4.1-11	??/02/17	TO BEGIN
Task 4.13	Submit reports	Participants	4.12	??/02/17	TO BEGIN
Task 4.14	Conduct debrief meeting	Chairperson	4.12-13	??/03/17	TO BEGIN
Task 4.15	Finalize debrief report	Chairperson	4.12-14	??/03/17	TO BEGIN
Milestone 5: Organize, conduct and follow-up on volcanic ash exercise in Papua New Guinea or South West Pacific (e.g., Solomon Islands, Vanuatu or Tonga)					
Task 5.1	Engage with candidate States	Secretary	-	30/05/16	TO BEGIN
Task 5.2	Decide on host State	Chairperson	5.1	??/??/16	TO BEGIN
Task 5.3	Identify participating agencies	Chairperson	5.1-2	??/??/16	TO BEGIN
Task 5.4	Prepare preliminary proposal	Chairperson	5.1-3	??/??/16	TO BEGIN
Task 5.5	Conduct planning meeting	Chairperson	5.1-4	??/??/17	TO BEGIN
Task 5.6	Appoint leader	VOLCEX/SG	5.5	??/??/17	TO BEGIN
Task 5.7	Set core objectives	Exercise leader	5.5-6	??/??/17	TO BEGIN
Task 5.8	Finalize scenario	Exercise leader	5.5-7	??/??/17	TO BEGIN
Task 5.9	Set date	Exercise leader	5.5-8	??/??/17	TO BEGIN
Task 5.10	Finalize list of participants	Exercise leader	5.5-9	??/??/17	TO BEGIN
Task 5.11	Finalize list of actions	Exercise leader	5.5-10	??/??/17	TO BEGIN
Task 5.12	Establish roles/responsibilities	Exercise leader	5.5-11	??/??/17	TO BEGIN
Task 5.13	Establish communication methods	Exercise leader	5.5-12	??/??/17	TO BEGIN
Task 5.14	Publish directive	Exercise leader	5.5-13	??/??/17	TO BEGIN
Task 5.15	Conduct exercise	Participants	5.5-14	??/??/17	TO BEGIN
Task 5.16	Submit reports	Participants	5.15	??/??/17	TO BEGIN
Task 5.17	Conduct debrief tele-/web- conf.	Exercise leader	5.15-16	??/??/17	TO BEGIN
Task 5.18	Conduct debrief meeting	Chairperson	5.15-17	??/03/18	TO BEGIN
Task 5.19	Finalize debrief report	Chairperson	5.15-18	??/03/18	TO BEGIN

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APAC VOLCEX/SG/3 — TASK LIST

TASK	DESCRIPTION	TIME FRAME	RESPONSIBILITY	REMARKS/STATUS
1	Request ICAO to address the discrepancies with respect to the lists of volcanoes referred to in Annex 15/Doc 9691 and Doc 9766	June 2016 (MET SG/20)	Secretary and chair	[Ref: Report, para. 3.4 a]
2	Ensure that the Smithsonian database is used by NOTAM Offices (NOFs) in case of discrepancy between the list of volcanoes at Doc 9691, Appendix E, and the Smithsonian database.	June 2016 (MET SG/20)	Members	[Ref: Report, para. 3.4 a]
3	Operational units to review existing SOPs to ensure coordinated response to volcanic ash events within FIRs and between neighbouring FIRs in accordance with local, regional and global requirements.	June 2016 (MET SG/20)	Members	[Ref: Report, para. 3.7] [Ref: WP/4, para. 3.11, ii] [Ref: WP/3, para. 2.2.15.] [IP/2, Attachment 9]
4	Operational units ensure message addressing is up-to-date with ICAO requirements for dissemination of volcanic ash related information.	June 2016 (MET SG/20)	Members	[Ref: Report, para. 3.14] [Ref: WP/3, para. 2.2.2., 2.2.4. and 2.2.6.]
5	Advise the Aeronautical Information Services – Aeronautical Information Management Implementation Task Force (AAITF) that a Regional position on the issuance of ASHTAM vs. NOTAM be established to promote a coordinated Regional response to volcanic ash events.	June 2016 (AAITF/11)	Secretary and chair	[Ref: Report, para. 3.6] [Ref: WP/4, para. 3.11, i] [Ref: WP/3, para. 2.2.11. – 2.2.12.]
6	Provide the Air Traffic Management Sub-group (ATM/SG) with the Doc 9766 references to information to be disseminated on volcanic eruptions/volcanic ash clouds, and necessary arrangements prior to a volcanic eruption to be taken by volcano observatories, volcanic ash advisory centres (VAACs), meteorological watch offices (MWOs), NOFs and area control centres (ACCs).	July 2016 (ATM/SG/4)	Secretary and chair	[Ref: Report, para. 6.6] [WP/4, para. 3.1]
7	Clarify the requirements for issuance of ASHTAM/NOTAM in the exercise directive.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.17] [IP/2, Attachment 9]
8	Incorporate exercise sheet as part of exercise directive requirements.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.11] [Ref: WP/4, para. 3.11,vi]
9	Consider participation of vulcanological agency operational unit in future VA exercise to more closely simulate operational response and dissemination of VONA information in accordance with SOPs.	1 month prior to exercise	Exercise leader	To facilitate end-to-end testing of VO functions. [Ref: Report, para. 3.14] [Ref: WP/3, para. 2.2.1.- 2.2.4.]

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TASK	DESCRIPTION	TIME FRAME	RESPONSIBILITY	REMARKS/STATUS
10	Remove AFTN, email, etc., addresses from the exercise directive.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.14] [Ref: WP/3, para. 2.2.2., 2.2.4. and 2.2.6.]
11	Clarify the requirements for issuance of volcanic ash exercise special air-reports in the exercise directive.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.17] [Ref: WP/3, para. 2.2.7.] [Ref: WP/3, para. 2.2.16.]
12	Clarify the requirement for issuance of ASHTAM/NOTAM in the exercise directive.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.17] [Ref: WP/3, para. 2.2.8., 2.2.9. and 2.2.14.] [IP/2, Attachment 9]
13	Clarify the simulated information sharing arrangement to be tested in the exercise directive.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.17] [IP/2, Attachment 9]
14	Clarify the exercise teleconference arrangement in the exercise directive.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.17] [IP/2, Attachment 9]
15	Exercise directive to be finalized at least 1 month before exercise; and circulated broadly to ensure visibility to all necessary players.	1 month prior to exercise	Exercise leader	[Ref: Report, para. 3.9] [Ref: WP/4, para. 3.11, iv] [IP/2, Attachment 9]
16	VAACs Tokyo, Darwin and Wellington to support use of the watermark “EXERCISE” in future VA exercises where possible.	August 2016 February 2017	VAACs	[Ref: Report, para. 3.10] [Ref: WP/4, para. 3.11, v] [Ref: WP/3, para. 2.2.13.] [IP/2, Attachment 9]
17	Consider inclusion of an aerodrome impact in a future volcanic ash exercise, including a collaborative decision making (CDM) process addressing the possible closure of an affected aerodrome.	November 2016 (planning tele- /web- conf.)	Exercise leader and Secretary	[Ref: Report, para. 3.8] [Ref: WP/4, para. 3.11,iii]
