

**ICAO ASIA/PACIFIC
VOLCANIC ASH EXERCISE DIRECTIVE
APAC VOLCEX 18/02**



DOCUMENT CHANGE RECORD

DATE	PAGE (S) AFFECTED	

1. INTRODUCTION

- 1.1. “Volcanic ash exercises should be conducted by ICAO on a regional basis in order to practice and develop inter-agency response to volcanic activity, in order to maintain safety, regularity and efficiency of aviation in the event of a volcanic eruption”.¹
- 1.2. The ICAO APAC volcanic ash exercise to be conducted in 2018, named APAC VOLCEX 18/02, will involve the simulated eruption of Tandikat-Singgalang volcano in Indonesia affecting Indonesian, Singapore and Malaysian airspace. The simulated, high level volcanic ash cloud will contaminate three adjacent FIRs, Jakarta, Singapore and Kuala Lumpur; affecting major air traffic routes in Indonesia and between Indonesia, Singapore and Malaysia. Volcanic ash deposition will also be simulated at an aerodrome in Indonesia.
- 1.3. There will be no operational impact in this exercise; dedicated staff is expected to be available for participation in the exercise.
- 1.4. **Exercise date and time (UTC):** From **0050 UTC 20 September 2018** to **0830 UTC 20 September 2018**. Note: tentative back-up date in case of exercise NO GO decision is **19 September 2018** (see 11.1 for more details).
- 1.5. **Exercise Leader:** Ms. ASHRIAH Jumi Putri Andani, Aeronautical Meteorological Officer of Center for Aviation Meteorology, BMKG. The Exercise Leader is responsible for:
 - Reporting to the debriefing meetings for volcanic ash exercises in APAC Region (usually combined with the VOLCEX/SG meeting)
 - Publishing the exercise directive
 - Supervising the volcanic ash exercise
 - Reporting results of volcanic ash exercises including lessons learnt, as well as recommended improvements to the regional volcanic ash ATM contingency plan and global ICAO provisions, to appropriate groups in APANPIRG
 - Conducting the volcanic ash exercise in coordination with directing staff
 - Making the GO/NO decision for the volcanic ash exercise (see 11.1 for more details)
 - Conducting CDM activities during the volcanic ash exercise
- 1.6. **Location of Exercise Leader, and Secretariat:** The Exercise Leader will be at BMKG Head Office, Jakarta, Indonesia to conduct the pre-exercise coordination meeting and the volcanic ash exercise. The ICAO Secretariat will be at Bangkok, Thailand, remotely supporting the pre-exercise coordination meeting and the volcanic ash exercise. Coordination between the Exercise Leader, Secretariat and participants will be facilitated by the use of instant messaging applications, telephone and e-mail.

¹ ICAO Doc 9766 – *Handbook on the International Airways Volcano Watch*, Appendix F- *Guidance for Conducting Volcanic Ash Exercises in ICAO Regions*

- 1.7. **Pre-exercise coordination meeting:** Pre-exercise tele-conference/web-conference will be held on 19 July 2018 and 28 August 2018 to prepare initial requirements and needs of volcanic ash exercise. To be chaired by the Exercise Leader and supported by the ICAO Secretariat.
- 1.8. **Debrief meeting:** To be incorporated in the agenda of the volcanic ash exercises steering committee meeting, VOLCEX/SG/6. Note: VOLCEX/SG/6 shall also include planning for future ICAO APAC volcanic ash exercises.
- 1.9. **Exercise website:** A dedicated website for the exercise is not available. Other useful websites include:
- VAAC Darwin <http://www.bom.gov.au/info/vaac/> (for access to exercise VAA and VAG).
 - Hong Kong Observatory <https://sigmet.hko.gov.hk/apac-exercise-va/> (regional VA monitoring platform) and <https://sigmet.hko.gov.hk/va-exercise/> (regional SIGMET coordination platform).
 - Japan Meteorological Agency <http://ds.data.jma.go.jp/awfo/sigmet/sigco/app/> (regional SIGMET coordination platform)
 - Ministry of Transportation Republic of Indonesia <https://aimindonesia.dephub.go.id/iwish> (I-WISH website platform)

2. **PARTICIPATING AGENCIES**

2. 1. Agencies that have agreed to participate in the exercise are listed according to area of responsibility in **Appendix A**.
2. 2. Additional agencies that have agreed to observe in the exercise and provide input to the exercise debrief meeting are listed according to area of responsibility in **Appendix B**.

3. **AIMS AND OBJECTIVES**

3. 1. The volcanic ash exercise should demonstrate the practice of applicable global and regional procedures including the provision/exchange of volcanic ash information in support of flexible airspace management, improved situational awareness and collaborative decision making, and dynamically-optimized flight trajectory planning. In particular, the exercise should demonstrate:
- Provision/exchange of alerts (e.g., VONA) and AIS and MET information (e.g., VAA/VAG, SIGMET, NOTAM/ASHTAM, special air-report)
 - Collaboration between operational units (e.g., VO, MO, MWO, VAAC, ATM, AIS and AO) and other relevant authorities and regulators
 - Enhanced situational awareness and CDM (e.g., via a tele-conference/web-conference, website, or other media)
 - Responses by operational units (e.g., air traffic flow management measures, safety risk assessments, tactical re-routes, aerodrome management)
3. 2. 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.
3. 3. APAC VOLCEX 18/02 would examine the exchange of information related to volcanic ash activity using website platform namely I-WISH.

3. 4. APAC VOLCEX 18/02 would demonstrate flow of CDM process in accordance with Minister Decree number 108 year 2016 revision of CASR (Civil Aviation Safety Regulation) Part 174 Aeronautical Meteorological Information Services. The information flow is provided in **Appendix C**.

4. EXERCISE DURATION

4.1. The exercise shall be conducted over a period of approximately eight (8) hours commencing at 0050 UTC 20 September 2018.

5. EXERCISE VOLCANO²

5. 1. **Name:** Tandikat-Singalang Volcano, **Number:** 261150, **Position:** S0039 E10033, **Area:** Indonesia

6. EXERCISE SCENARIO

6. 1. Simulated eruption with volcanic ash cloud up to FL400 moving Northeast at 25 - 40 knots to impact ATS routes and airspace within Jakarta FIR (WIIF), Indonesia, Singapore FIR (WSJC), and Kuala Lumpur FIR (WMFC), Malaysia, volcanic ash deposition at an aerodrome (Pekanbaru) in Indonesia and subsequent impacts for operations at other aerodromes (e.g. Padang, Pelalawan, Dumai, Bengkalis).

6. 2. Schematics of the information flow between operational units in a volcanic ash exercise according to ICAO Doc 9766 Handbook on the International Airways Volcano Watch is provided in **Appendix C**.

7. EXERCISE SCHEDULE

7. 1. Participating agencies have agreed to the chronological list of the actions to be undertaken before and during the exercise, as provided in **Appendix D**.

7. 2. A schematic of the actions to be undertaken during the exercise is provided in **Appendix E**.

8. EXERCISE MESSAGES and COMMUNICATIONS

8. 1. Exercise messages comprising **VONA** start with “VA EXERCISE APAC VOLCEX 18/02” and end with “VA EXERCISE VA EXERCISE VA EXERCISE”. They should be based on the agreed exercise scenario. Template for VONA exercise message and distribution lists are provided in **Appendix F**.

8. 2. Exercise messages comprising **VAA** and **VAG** should include the use of “VA EXERCISE” and “APAC VOLCEX 18/02” (in accordance with ICAO Doc 9766, Part 4, 4.8) to highlight and emphasize that the advisory information refers to the volcanic ash exercise. They should be based on the agreed exercise scenario and the preceding exercise VONA messages. Template of VAA and VAG exercise messages and distribution lists are provided in **Appendix G** and **Appendix H**.

²Name and number as per Smithsonian database at <http://www.volcano.si.edu/>

- 8.3. Exercise messages comprising **SIGMET** should include the use of “VA EXERCISE” and “APAC VOLCEX 18/02” (in accordance with ICAO Doc 9766, Part 4, 4.8) to highlight and emphasize that the SIGMET information refers to the volcanic ash exercise. They should be based on the preceding exercise VAA messages. Template of SIGMET exercise messages and distribution lists are provided in **Appendix I**.
- 8.4. Exercise messages comprising **NOTAM/ASHTAM** start with “VA EXERCISE APAC VOLCEX 18/02” and end with “VA EXERCISE VA EXERCISE VA EXERCISE” (in Item F and K of ASHTAM, and in Item E of NOTAM). Template of NOTAM/ASHTAM exercise messages and distribution lists are provided in **Appendix J**.
- 8.5. Exercise messages comprising **special air-reports** end with “VA EXERCISE APAC VOLCEX 18/02 VA EXERCISE VA EXERCISE VA EXERCISE”. Template of special air-report exercise messages and distribution lists are provided in **Appendix K**.
- 8.6. Exercise messages comprising reports of routine/special meteorological observations (**METAR/SPECI**) issued in accordance with local arrangements include “VA EXERCISE APAC VOLCEX 18/02” in the supplementary information. Template of METAR/SPECI exercise messages are provided in **Appendix L**.
- 8.7. Exercise messages comprising **aerodrome warnings** issued in accordance with local arrangements include “VA EXERCISE APAC VOLCEX 18/02”. Template of aerodrome warning exercise messages are provided in **Appendix M**.
- 8.8. Any voice communicated exercise messages start with “VA EXERCISE APAC VOLCEX 18/02” and end with “VA EXERCISE VA EXERCISE VA EXERCISE”.
- 8.9. Other communications such as exercise tele-conferences/web-conferences, e-mail exchanges and instant messaging chats start with “VA EXERCISE APAC VOLCEX 18/02”.
- 8.10. Volcanic ash information is disseminated through e-mail (e.g. VONA, and Ground Observation report), AFTN (e.g. SIGMET, NOTAM/ASHTAM, VAA/VAG, SPECI, special air-report, Aerodrome Warning), website (e.g. VAA/VAG, SIGMET) and direct link/phone/voice.
- 8.11. Volcanic ash information is to be re-informed in the I-WISH system to support the CDM process, as well as to provide monitoring process carried out by the observers.
- 8.12. During the exercise, tele-conference sessions involving all participating and observing agencies would be using WebEx and I-WISH website platform (secondary platform).

9. DIRECTING STAFF

- 9.1. A list of all Directing Staff is provided at **Appendix N**.
- 9.2. A list of contacts for agencies observing the exercise is provided at **Appendix O**.

10. SPECIAL INSTRUCTIONS

- 10.1. **Exercise GO/NO decision** shall be made by the Exercise Leader one day before the planned exercise commencement date/time. In case of unforeseen circumstances, such as a real volcanic eruption or other significant event affecting the air transport system, the Exercise Leader may decide to either postpone the exercise to a later date or to cancel the exercise. A decision not to proceed, i.e., to postpone or cancel the exercise, shall be communicated to all participants and observers as early as possible before the exercise is due to commence.
- 10.2. In case of real volcanic eruption or other unforeseen circumstances occur within the exercise period, Exercise Leader have to raise views from all participating agencies and postpone or abort the exercise if undergoing exercise is considered to potentially affect the operation of aviation system. According to ICAO Doc 9766 Handbook on the IAVW, Appendix F, paragraph 2.3., “Exercises can only simulate a real event, while operation of the aviation system must continue normally and be unaffected by the exercise. The planning of the exercise needs to ensure that detrimental effects on the system performance are avoided, but that nevertheless useful experience and information is generated.”
- 10.3. **Exercise tele-conference/web-conference instructions:**
- A. Lead:** In this exercise, the lead of tele-conference/web-conference calls should be the exercise leader assisted by the ICAO Secretariat.
 - B. Expected participants and general information expected from each:**
 - VO – brief update on eruption status, latest height information, source of height information, duration of event, expected activity
 - VAA/VAG – brief update on VAA/VAG (as well as receipt of observations such as aircraft reports being used to update products)
 - MWO – brief update on SIGMET (if different from VAA/VAG, briefly explain why)
 - AMO – brief update on SPECI and Aerodrome Warning information
 - NOF – brief update on ASHTAM and NOTAM to publish reroutes
 - ACC – brief update on reroutes and coordination with ACCs and ATM units
 - AO – brief update on tactical reroutes, flight plan changes and satisfaction with reroutes
 - ACC – respond, if necessary, to AO
 - C. Information sharing:** Free to use Internet messaging and/or communications applications may be utilized as a supplementary means to share information between participants.
 - D. Language:** Each State should arrange to have participants speak in English during the tele-conference/web-conferences.
 - E. Microphones:** Each Participant should mute microphones to reduce background noise. The leader of the tele-conference/web-conference will instruct the participant when to speak.

11. ABBREVIATIONS, ACRONYMS and DEFINITIONS

- 11.1. A list of abbreviations, acronyms and definitions used in this directive is provided at **Appendix P**.



Area of responsibility	Agency	Unit/Division
Volcanic activity alerting	CVGHM	Head Office (Bandung)
Volcanic ash advisory information	BoM	VAAC Darwin
METAR/SPECI	BMKG	Pekanbaru Met Office and Padang Met Office
SIGMET	BMKG	MWO Jakarta
	MSS	MWO Singapore
	MMD	MWO Kuala Lumpur
Air Traffic Control	AirNav	ACC Jakarta
	CAAS	ACC Singapore
	CAAM	ACC Kuala Lumpur, airspace unit
	AirNav	APP Padang, APP Pekanbaru, APP Medan, TWR Batam, TWR Padang
Air Traffic Flow and Capacity Management	AirNav	ATFM unit Jakarta, ATFM Unit Pekanbaru
	CAAS	ATFM unit
Ground Observations at Airport	AP 2, DGCA	Padang Airport, Pekanbaru Airport, Batam airport*, Airport Authority (KOBU VI Padang, KOBU I Jakarta and KOBU II Medan)
		(Malaysia and/or Singapore airports)*
Aeronautical information service	AirNav	NOF Indonesia
	AirNav	AIS Regional Office
	CAAS	NOF Singapore, AIS unit
	CAAM	NOF Kuala Lumpur, AIS unit
Airport operator	DGCA Indonesia	Airport Authority (KOBU VI Padang, KOBU I Jakarta and KOBU II Medan)
	Angkasa Pura II	AP II Pekanbaru, AP II Padang
Aircraft operator response	AirAsia Indonesia	
	Garuda Indonesia	*
	NAM Air	
	Malindo Air	
	(International airlines, TBD by IFALPA, IATA and players if any)*	
Regulation	DGCA Indonesia	Director of Air Navigation
	(Malaysia and/or Singapore regulators)*	
Exercise coordination	ICAO	Asia and Pacific Office

* to be confirmed

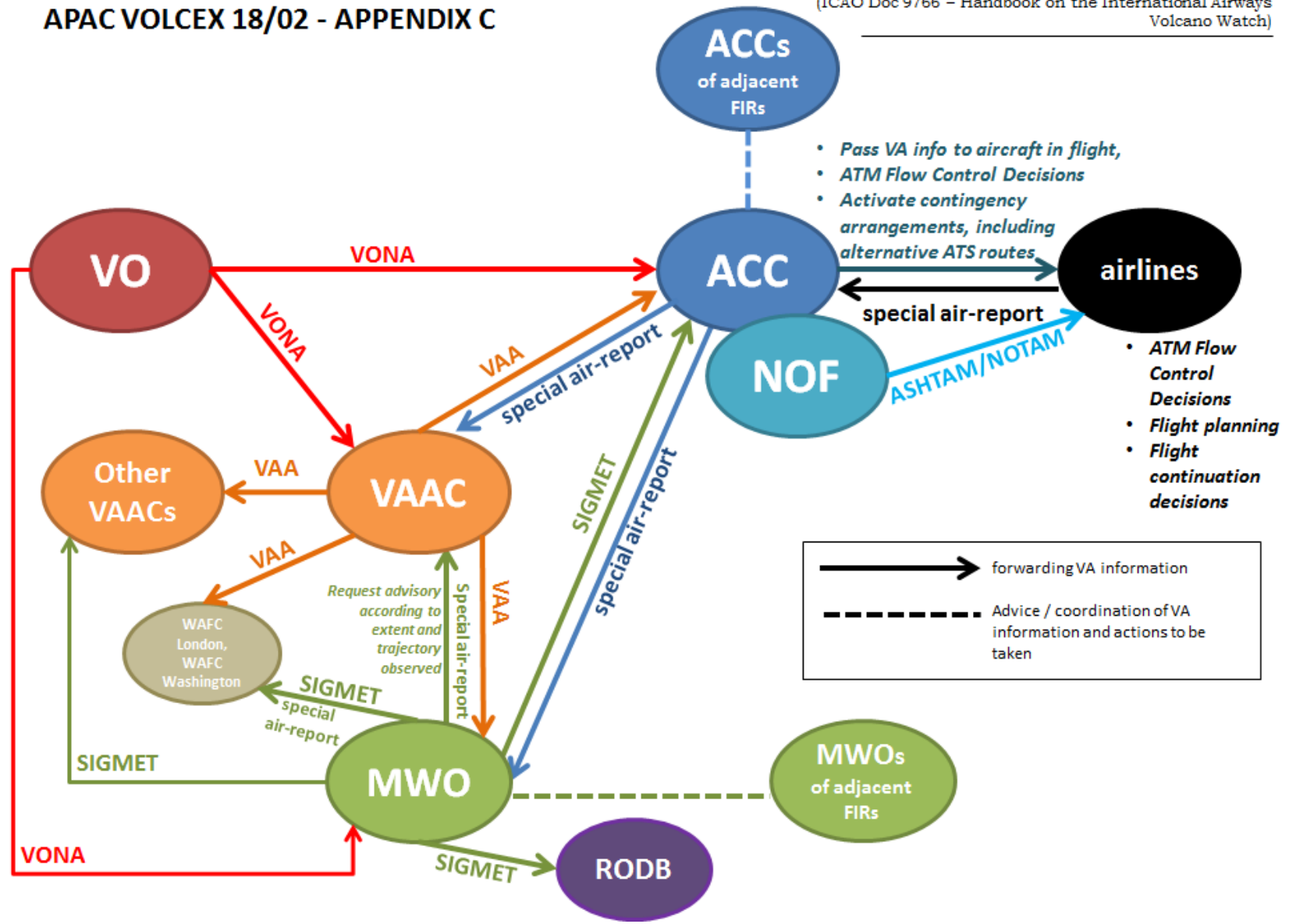


Area of responsibility	Agency	Unit/Division
Volcanic ash advisory information	JMA	VAAC Tokyo
RODB	MSS	Singapore RODB
SIGMET information	BMKG	MWO Ujung Pandang
	Hong Kong Observatory	MWO Hong Kong
	JMA	MWO Tokyo
	PAGASA	MWO Manila
METAR/SPECI and Aerodrome Warning	JMA	MET Authority
	BMKG	Medan Met Office, Batam Met Office, Tanjung pinang Met Office
ANSP	AirNav Indonesia	Ujung Pandang ACC, Tanjung Pinang APP, Palembang APP, Silangit TWR, AIS Regional Office Medan, AIS Regional Office Jakarta
	CAAM	BIT
Airport Authority	Directorate of Airport	KOBU VI Padang
Aircraft operator, airspace users	IFALPA*	Asia Pasific
	IATA	Indonesia
	QANTAS Australia (domestic and international airlines)*	Australia
Military	TNI AU*	
	RMAF	

* to be confirmed

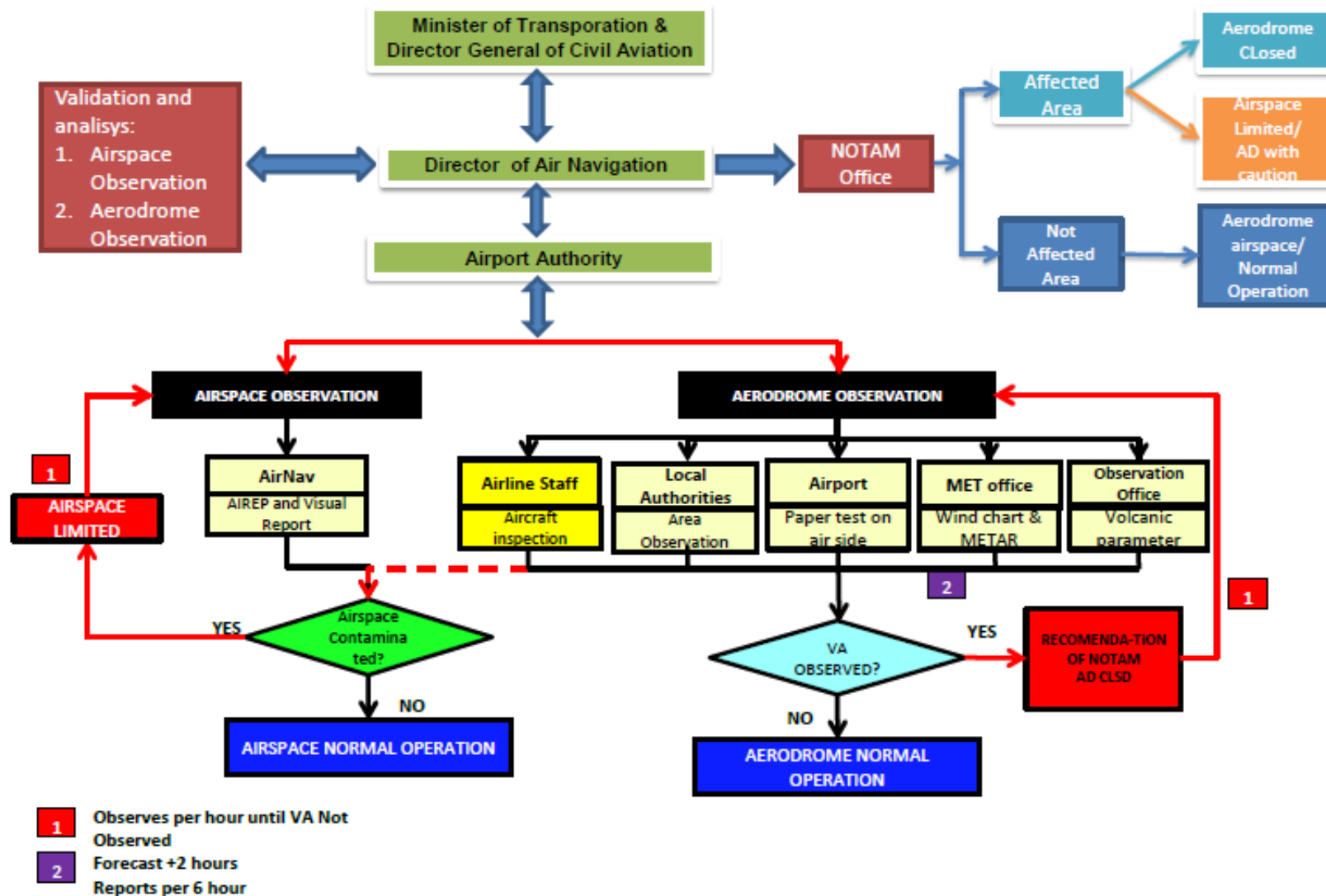
APAC VOLCEX 18/02 - APPENDIX C

VOLCANIC ASH INFORMATION FLOW (ICAO Doc 9766 – Handbook on the International Airways Volcano Watch)



APAC VOLCEX 18/02 - APPENDIX C

FLOW OF CDM PROCESS
 Minister Decree number 108 year 2016 revision of CASR
 (Civil Aviation Safety Regulation) Part 174 Aeronautical
 Meteorological Information Services.





DATE/TIME (UTC)	PLAYERS	EVENT/ACTIONS
<p>** Additional Actions All Units: In addition to the actions listed below, all units are to take further action as necessary, in accordance with ICAO Doc 9766 <i>Handbook on International Airways Volcano Watch</i> Part 4, and any relevant local instructions/procedures.</p>		
14 August 2018	Exercise Leader (BMKG)	Request AIS Center of Indonesia to publish Aeronautical Information Circular (AIC)
20 August 2018	AIS Center of Indonesia (NOTAM Office), in coordination with Directorate of Air Navigation	Publish AIC
20 August 2018	Exercise Leader	Send exercise directive to ICAO Secretariat
01 September 2018	Exercise Leader (BMKG)	Request NOF to issue preparatory NOTAM to inform the aviation community of the exercise
07 September 2018	ICAO Secretariat	Publish final version of exercise directive
13 September 2018	NOTAM Office Indonesia, in coordination with DAN	Publish preparatory NOTAMs to inform the aviation community of the exercise
19 September 2018, 23.00 UTC	Exercise Leader (BMKG)	GO/NO Decision, inform all participants
20 September 2018, 00.10 UTC	Exercise Leader (BMKG)	Send email message to all players to announce that the exercise will commence at 0050 UTC
20 September 2018, 00.50 UTC – 08.30 UTC		Simulate Tandikat-Singgalang eruption
	CVGHM	Issue VONA, twice during exercise. <ul style="list-style-type: none"> • 1st VONA for volcano eruption. • 2nd VONA for volcanic activity considered to have ceased.
	VAAC Darwin	Issue VAA/VAG, five times during exercise. <ul style="list-style-type: none"> • 1st VAA as an initial without an area of coverage corresponds to the VONA from CVGHM • Next VAAs (four times) with ash at



		<p>SFC/FL400 move to Northeast at 25 - 40 knots, aviation colour code RED</p> <ul style="list-style-type: none"> • Last VAA issued for dissipated volcanic ash.
	MWO Jakarta	<ul style="list-style-type: none"> • Issue SIGMETs • Coordinate cross-FIR-border SIGMETs • Request updated advisory due to special air report outside initial area advisory • Transmit special air-report
	MWO Kuala Lumpur	
	MWO Singapore	
	NOF Indonesia	<ul style="list-style-type: none"> • Publish ASHTAM/NOTAM. • Coordinate with adjacent NOFs
	NOF Singapore	
	NOF Kuala Lumpur	
	ACC Jakarta, ACC Singapore, ACC Kuala Lumpur	<ul style="list-style-type: none"> • CDM process and ATM/ATFM measure • Transmit special air-report • Coordinate with adjacent ACCs
	Airlines Operators	Transmit special air-report, risk assessment and flight planning
	APP Padang, APP Pekanbaru	Conduct visual airspace observation surround airport
	Airport Operators (Padang, Pekanbaru)	Conduct visual aerodrome observation reported by paper test
	Met Offices (Padang, Pekanbaru)	Issue METAR/SPECI and/or Aerodrome Warning for VA
	Airport Authority Region VI Padang	Instruct its associated stakeholders (airport operators, APP, MET Office) to monitor and remind awareness among stakeholders
	Airport Authority Region II Medan	<ul style="list-style-type: none"> • Instruct its associated stakeholders (airport operators, APP, MET Office) to monitor and remind awareness among stakeholders • CDM (airport closure) coordinator
20 September 2018, 03.30 – 04.30 UTC	All Player	Teleconference (initial evaluation)



APAC VOLCEX18/02 actions

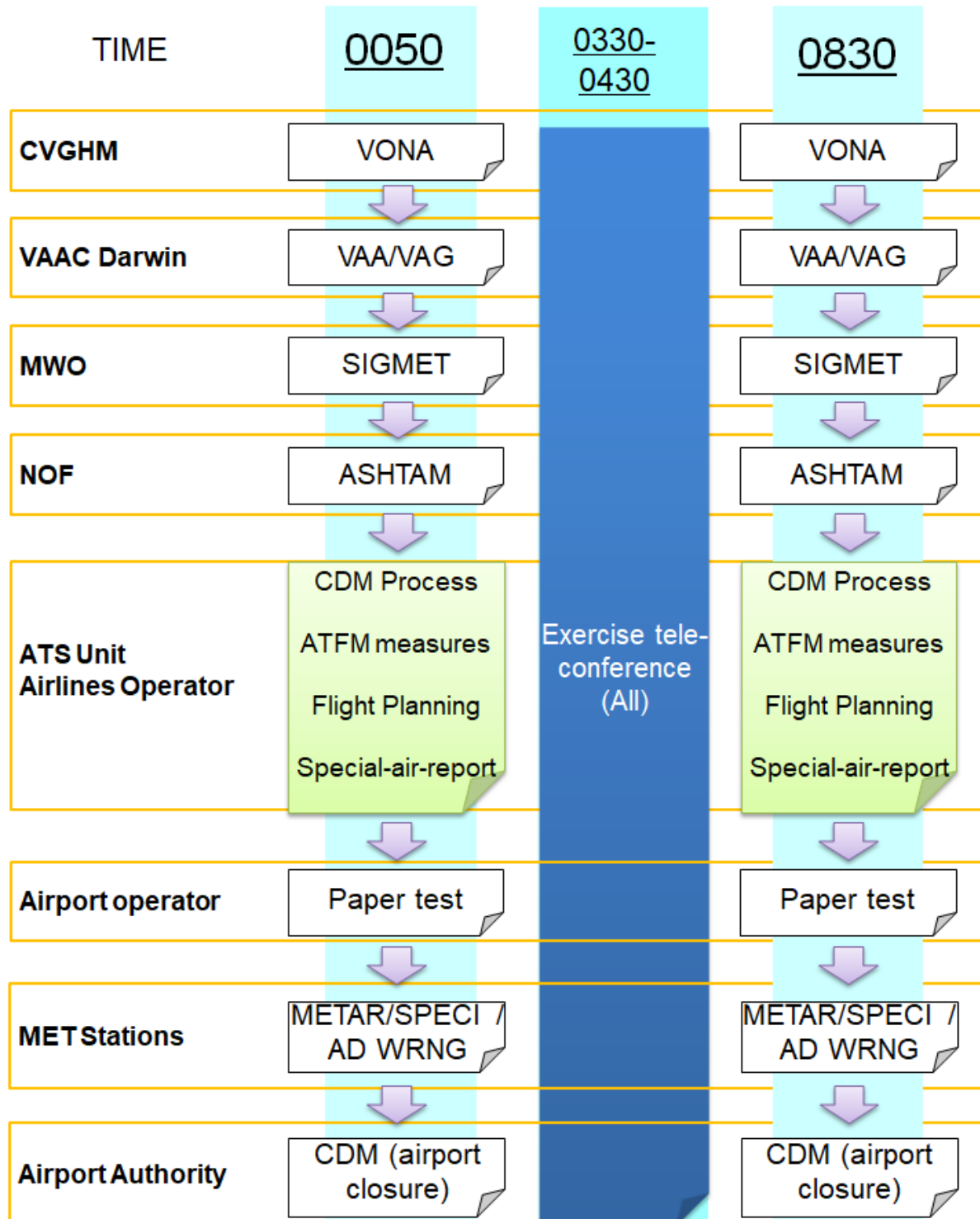




Table 1: VONA exercise template

VA EXERCISE APAC VOLCEX 18/02	
(1)	VOLCANO OBSERVATORY NOTICE FOR AVIATION — VONA
(2)	Issued: Universal (Z) date and time (YYYYMMDD/HHMMZ).
(3)	Volcano: TANDIKAT-SINGGALANG 261150
(4)	Current aviation colour code: GREEN, YELLOW, ORANGE OR RED in upper-case bold font
(5)	Previous aviation colour code: Lower-case font, not bold
(6)	Source: Name of volcano observatory (volcanological agency)
(7)	Notice number: Create unique number for each VONA that includes year
(8)	Volcano location: S0039 E10033
(9)	Area: Regional descriptor
(10)	Summit elevation: 2854M
(11)	Volcanic activity summary: Concise statement that describes activity at the volcano. If known, specify time of onset and duration (local and UTC) of eruptive activity. If the eruption is ongoing at the time of VONA release, indicate “eruption and ash emission is continuing”.
(12)	Volcanic cloud height: Brief summary of relevant cloud characteristics (colour of cloud, shape of cloud, direction of movement, etc.) Specify if cloud height is obscured or suspected to be higher than what can be observed clearly. “UNKNOWN” if no data available or “NO ASH CLOUD PRODUCED” if applicable.
(13)	Other volcanic cloud information: Optional. Brief comments on related topics (monitoring data, observatory actions, volcano’s previous activity, etc.)
(14)	Remarks: Volcanic tremor recorded continuously
(15)	Contacts: Names, telephone and fax numbers, e-mail addresses.
(16)	Next notice: “A new VONA will be issued if conditions change significantly or the colour code is changed.” Include URL of website where latest volcanic information is posted.
VA EXERCISE VA EXERCISE VA EXERCISE	

Table 2: Distribution list of exercise VONAs

Notes:	
1.	Information from State volcano observatories is required to be sent to their associated ACCs, MWOs and VAACs [Annex 3, Appendix 2, 4.1]
2.	Information on volcanic eruptions from State volcano observatories should be forwarded and telephoned to verbally inform the associated ACCs, MWOs and VAACs of the significant activity, and then followed up with a faxed or e-mailed VONA [Doc 9766, Part 4, 4.2.1 a)]
3.	A VONA is to be disseminated to the requisite ACCs, MWOs, and VAACs using the following media: <ul style="list-style-type: none"> a) E-mail; b) Fax; c) Telephone; or d) Public website



[Doc 9766, Part 4, 4.2.7]

4. VONA from State volcano observatories **may** also be distributed directly to interested operators in accordance with local arrangements [Doc 9766, Part 4, 4.2.1 a)]

Distribution list:

VONA to:

- ACC Jakarta
- MWO Jakarta
- VAAC Darwin
- NOF Jakarta



Table 1: VAA exercise template

<p>FVAU02 ADRM XXXXXX VA ADVISORY DTG: nnnnnnnn/nnnnZ VAAC: DARWIN VOLCANO: TANDIKAT-SINGGALANG 261150 PSN: S0039 E10033 AREA: INDONESIA SUMMIT ELEV: 2854M ADVISORY NR: nnnn/nnnn INFO SOURCE: VA EXERCISE APAC VOLCEX 18/02</p> <p>AVIATION COLOUR CODE: RED <i>or</i> ORANGE <i>or</i> YELLOW <i>or</i> GREEN <i>or</i> UNKNOWN <i>or</i> NOT GIVEN <i>or</i> NIL ERUPTION DETAILS: VA EXERCISE APAC VOLCEX 18/02 <i>Free text up to 64 characters or UNKNOWN</i> OBS VA DTG: nn/nnnnZ OBS VA CLD:</p> <p>FCST VA CLD +6 HR: FCST VA CLD +12 HR: FCST VA CLD +18 HR:</p> <p>RMK: VA EXERCISE APAC VOLCEX 18/02<i>Free text up to 256 characters</i> VA EXERCISE VA EXERCISE VA EXERCISE VA EXERCISE VA EXERCISE VA EXERCISE VA EXERCISE VA EXERCISE VA EXERCISE VA EXERCISE NXT ADVISORY: nnnnnnnn/nnnnZ <i>or</i> NO LATER THAN nnnnnnnn/nnnnZ <i>or</i> NO FURTHER ADVISORIES <i>or</i> WILL BE ISSUED BY nnnnnnnn/nnnnZ</p>



Table 2: Distribution list (including AFTN addresses and WMO headings) of exercise VAAs

Notes:

- A Volcanic Ash Advisory Centre (VAAC) is responsible for issuing advisory information regarding the extent and forecast movement of the volcanic ash “cloud” to:
 - MWOs, ACCs and FICs serving FIRs in its area of responsibility which may be affected;
 - other VAACs whose areas of responsibility may be affected;
 - WAFCs, international OPMET databanks, international NOTAM offices, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and
 - airlines requiring the advisory information through the AFTN address provided specifically for this purpose.
[Annex 3, Chapter 3, 3.5.1 c)]
- AFTN Addresses *[Doc 9766]*

AGGHYMYX	ANYNYOYX	AYPMYMYX	AYPMYSYX	AYPMZGZX
AYPYANGM	AYPYANGO	EGKKVIRW	EGLLSITV	EGZZMASI
EGZZMPAC	EGZZVANW	EHAMKLMD	EHAMKLMK	EHAMKLMW
ELLXCLXB	KDENXLDW	KJFKGTIW	KWBCYMYX	LOZZMMSS
LSZHSWRW	NFFNYPYX	NZAAANZO	NZKLYMYX	RJAAANAO
RJAAJALO	RJAANCAO	RJAAAYMYX	RKSIYPYX	RPHIZRZX
RPLLYMYX	VCBIYMYX	VCBIZQZX	VHHHCPAO	VHHHYMYX
VOMFZQZX	VOMMYMYX	VTBBYPYX	VTBDYMYX	VTBSYMYX
VVGLYMYX	VVNBZRZX	VVTSYMYX	VVTSZRZX	VYYYYMYX
VYYYYZQZX	WAAAYMYX	WAAAZQZX	WABBYMYX	WADDYMYF
WADDYMYX	WADDYOYX	WBFCZQZX	WBKKYMYX	WBSBYMYX
WIHHYMYX	WIIHYMYX	WIIIZQZX	WMFCZQZX	WMKBYMYX
WMKBYWYX	WMKKMASD	WMKKYMYX	WPDLTZTX	YPTNZTZX
YSSYQFAM	WRRRYNYX	WSATYMYX	WSJCZQZX	WSSSSIAO
WSSSYMYW	WSSSYMYX	WSZZYMYR	YAMBZAZX	YAMBZGZA
YAMBZTZX	YBBBNCYM	YBBBVOZM	YBBBZRZA	YBBBZRZB
YBBBZRZG	YBBBZRZX	YMMLJSTX	YMMMZRZA	YMMMZRZB
YMMMZRZG	YMMMZRZX	YPDNZAZX	YPDNZGZA	YPDNZTZX
YPTNZAZX	YPTNZGZA			
- All VAA will be available from the Darwin VAAC webpage:
<http://www.bom.gov.au/info/vaac/advisories.shtml>



Table 1: VAG exercise template

Graphic	Graphic
Graphic	Graphic

VOLCANIC ASH ADVISORY			
DTG:	[date/time]	ADVISORY:	
VAAC:	DARWIN	INFO SOURCE:	VA EXERCISE APAC VOLCEX 18/02
VOLCANO:	TANDIKAT-SINGGALANG 261150	AVIATION COLOR CODE:	
PSN:	S0039 E10033	ERUPTION DETAILS:	VA EXERCISE APAC VOLCEX 18/02
AREA:	INDONESIA	RMK:	VA EXERCISE APAC VOLCEX 18/02
SUMMIT ELEV:	2854M		VA EXERCISE VA EXERCISE VA EXERCISE
		NXT ADVISORY:	



Table 3: Distribution list (including AFTN addresses and WMO headings) of exercise VAAs

Notes:

4. A Volcanic Ash Advisory Centre (VAAC) is responsible for issuing advisory information regarding the extent and forecast movement of the volcanic ash “cloud” to:

- 5) MWOs, ACCs and FICs serving FIRs in its area of responsibility which may be affected;
- 6) other VAACs whose areas of responsibility may be affected;
- 7) WAFCs, international OPMET databanks, international NOTAM offices, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and
- 8) airlines requiring the advisory information through the AFTN address provided specifically for this purpose.

[Annex 3, Chapter 3, 3.5.1 c)]

5. AFTN Addresses *[Doc 9766]*

AGGHYMYX	ANYNYOYX	AYPMYMYX	AYPMYSYX	AYPMZGZX
AYPYANGM	AYPYANGO	EGKKVIRW	EGLLSITV	EGZZMASI
EGZZMPAC	EGZZVANW	EHAMKLMD	EHAMKLMK	EHAMKLMW
ELLXCLXB	KDENXLDW	KJFKGTIW	KWBCYMYX	LOZZMMSS
LSZHWRW	NFFNYPYX	NZAAANZO	NZKLYMYX	RJAAANAO
RJAAJALO	RJAANCAO	RJAAAYMYX	RKSIYPYX	RPHIZRZX
RPLLYMYX	VCBIYMYX	VCBIZQZX	VHHHCPAO	VHHHYMYX
VOMFZQZX	VOMMYMYX	VTBBYPYX	VTBDYMYX	VTBSYMYX
VVGLYMYX	VVNBZRZX	VVTSYMYX	VVTSZRZX	VYYYYMYX
VYYYYZQZX	WAAAYMYX	WAAAZQZX	WABBYMYX	WADDYMYF
WADDYMYX	WADDYOYX	WBFCZQZX	WBKKYMYX	WBSBYMYX
WIHHYMYX	WIIHYMYX	WIIIZQZX	WMFCZQZX	WMKBYMYX
WMKBYWYX	WMKKMASD	WMKKYMYX	WPDLTZX	YPTNZTZX
YSSYQFAM	WRRRYNYX	WSATYMYX	WSJCZQZX	WSSSSIAO
WSSSYMYW	WSSSYMYX	WSZZYMYR	YAMBZAZX	YAMBZGZA
YAMBZTZX	YBBBNCYM	YBBBVOZM	YBBBZRZA	YBBBZRZB
YBBBZRZG	YBBBZRZX	YMMLJSTX	YMMMZRZA	YMMMZRZB
YMMMZRZG	YMMMZRZX	YPDNZAZX	YPDNZGZA	YPDNZTZX
YPTNZAZX	YPTNZGZA			

6. All VAA will be available from the Darwin VAAC webpage:
<http://www.bom.gov.au/info/vaac/advisories.shtml>



Table 2: SIGMET exercise template

```

T1T2A1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-

CCCC <FIR name> FIR VA EXERCISE APAC VOLCEX 18/02 VA ERUPTION MT
TANDIKAT-SINGGALANG PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn] VA CLD
OBS AT GGggZ or FCST AT GGggZ WI <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]>
or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
<Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or
<Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]>
<Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>
SFC/FLnnn MOV <direction> <speed> KMH[KT]or STNR
INTSF or WKN or NC
FCST AT nnnnZ WI <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
<Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or
<Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]>
<Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
<Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
<Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> or NO VA EXP

```

Table 3: Cancellation of SIGMET exercise template

```

T1T2A1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-

CCCC <FIR name> FIR VA EXERCISE APAC VOLCEX 18/02 CNL SIGMET nn
nnnnnn/nnnnnn

```



Table 3: Distribution list of exercise SIGMET messages

Note:

1. Technical specifications related to SIGMET message provision are detailed in Annex 3 Chapter 7, 7.1, Annex 3 Appendix 6, 6.1, and Asia/Pacific Regional SIGMET Guide 6th Edition, 2017
2. In accordance with Annex 3, Appendix 6, 1.2, and the Regional SIGMET Guide, SIGMET messages **shall** be disseminated to:
 1. Local ATS users
 2. Aerodrome meteorological offices
 3. Adjacent MWOs and ACCs;
 4. WAFCs (via the RODBs/ROBEX scheme);
 5. Responsible VAACs;
 6. RODBs (via the RODBs/ROBEX scheme); and
 7. SADIS and WIFS gateways (via the RODBs/ROBEX scheme).

Distribution list:

Local ATS users: Pekanbaru, Padang, and other impacted aerodromes

Aerodrome meteorological offices: Pekanbaru, Padang, and other impacted aerodromes

MWOs and ACCs: Jakarta, Ujung Pandang, Kuala Lumpur, Singapore

RODBs: Singapore

VAACs: Darwin

WAFC London

Dedicated webpages for SIGMET Coordination:

- Hong Kong Observatory <https://sigmet.hko.gov.hk/apac-exercise-va/> (regional VA monitoring platform) and <https://sigmet.hko.gov.hk/va-exercise/> (regional SIGMET coordination platform).
- Japan Meteorological Agency <http://ds.data.jma.go.jp/awfo/sigmet/sigco/app/> (regional SIGMET coordination platform)



Table 4: Preparatory NOTAM (issued 1 week prior to exercise)

(AXXXX/18 NOTAMN
Q)WIIF/QWWXX/IV/NBO/W/000/999/0039S10033E999
A)WIIF
B)1809200050
C)1809200830EST
E)VA EXERCISE APAC VOLCEX 18/02. VOLCANIC ASH EXERCISE TAKE PLACE 20 SEPTEMBER FROM 0050Z TO APRX 0830Z. EXERCISE NAME: APAC VOLCEX 18/02. EXERCISE VOLCANO: TANDIKAT-SINGGALANG 261150 S0039 E10033 INDONESIA. FREE TEXT OF PROMULGATED EXERCISE MESSAGES STARTS WITH: VA EXERCISE APAC VOLCEX 18/02. FREE TEXT OF EXERCISE MESSAGES ENDS WITH: VA EXERCISE VA EXERCISE VA EXERCISE.
VA EXERCISE VA EXERCISE VA EXERCISE
F)SFC
G)UNL)

Table 5: exercise ASHTAM

VAWRxxxx WIIF [date/time of observation]
ASHTAM xxxx
A)WIIF
B)[date/time of eruption]
C)TANDIKAT-SINGGALANG 261150
D)S0039 E10033
E)[volcano level of alert colour code]
F)VA EXERCISE APAC VOLCEX 18/02. [existence and horizontal/vertical extent of volcanic ash cloud]
G)[direction of movement of ash cloud]
H)[air routes or portions of air routes and flight levels affected]
I)[closure of airspace and/or air routes or portions of air routes, and alternative air routes available]
J)VA EXERCISE APAC VOLCEX 18/02 [source of information]
K)VA EXERCISE APAC VOLCEX 18/02 [plain-language remarks]
VA EXERCISE VA EXERCISE VA EXERCISE

Table 3: Final exercise NOTAM

(Axxxx/18 NOTAMC Axxxx/18
Q)WIIF/QWWCC/IV/NBO/W/000/999/0039S10033E999
A)WIIF
B)[date/time end of activity]
E)VA EXERCISE APAC VOLCEX 18/02. ERUPTION OF TANDIKAT-SINGGALANG 261150 S0039 E10033 INDONESIA HAS CEASED AS REPORTED BY VOLCANO OBSERVATORY AT xx.xx VOLCANIC ASH CLOUD HAS DISSIPATED. VOLCANIC ASH CLOUD NO LONGER VISIBLE. VOLCANIC ASH EXERCISE APAC VOLCEX 18/02 HAS CONCLUDED.
VA EXERCISE VA EXERCISE VA EXERCISE.



Table 4: Distribution list (including AFTN addresses) of exercise NOTAMs

WIIIIYOYW	WIIIIYFYB	WIIIGIAX	WIJJYOYW	WIEEYOYW	WIGGYOYW	WIBBYOYW
WICCYOYW	WARRYOYW	WAHQYOYE	WAHSYOYE	WAHHYOYE	WADDYOYE	WADLYOYE
WIRRYOYW	WILLYOYW	WAAAYOYE	WAOOYOYE	WALLYOYE	WAMMYOYE	WAMGYOYE
WAWWYOYE	WAPPYOYE	WASSYOYE	WABBYOYE	WAQQYOYE	EFZZNOWI	EHZZNTXX
ESZZNAWI	LIZZNBWI	OBZZNAXX	OEJDYNYX	OJZZNJXX	OKNOYNYX	OOZZNDNX
OPZZNAXX	RCZZNMXX	RJZZNAXX	RPZZNANX	RPLLYNYX	UUZZNINX	VEZZNAXX
VGZZNAXX	VMMCYNXX	VRMMYNYX	WMZZNAXX	ZGZZNFXX	WBSBYOYX	EUECYIYN
EBZZNAWI	EDZZNLWI	EGZZNWII	EKZZNAWI	FSSSYNYX	LSZZNAWI	OMZZNGXX
RKZZNKXX	VAZZNAWI	VCZZNOAX	VHZZNMXX	VVZZNAXX	VTBDYNYX	VOZZNAVA
RKSSAARO	VTZZNTXX	VVZZNANX	WSZZNAXX	OIIIIYNYX		



Table 1: Template for the special air-report (downlink)

Elements	Detailed content	Template(s)	Examples
Message type designator (M)	Type of air-report (M)	ARS	ARS
Aircraft identification (M)	Aircraft radiotelephony call sign (M)	nnnnnn	VA812
DATA BLOCK 1			
Latitude (M)	Latitude in degrees and minutes (M)	Nnnnn or Snnnn	S4506
Longitude (M)	Longitude in degrees and minutes (M)	Wnnnnn or Ennnnn	E01056
Level (M)	Flight level (M)	FLnnn or FLnnn to FLnnn	FL330 FL280 to FL310
Time (M)	Time of occurrence in hours and minutes (M)	OBS AT nnnnZ	OBS AT 1216Z
DATA BLOCK 2			
Wind direction (M)	Wind direction in degrees true (M)	nnn/	262/
Wind speed (M)	Wind speed in metres per second (or knots) (M)	nnnMPS (or nnnKT)	040MPS (080KT)
Wind quality flag (M)	Wind quality flag (M)	n	1
Air temperature (M)	Air temperature in tenths of degrees C (M)	T[M]nnn	T127 TM455
Turbulence (C)	Turbulence in hundredths of m _{2/3} s ⁻¹ and the time of occurrence of the peak value (C) ¹	EDRnnn/hn	EDR064/08
Humidity (C)	Relative humidity in per cent (C)	RHnnn	RH054
DATA BLOCK 3			
Condition prompting the issuance of a special air-report (M)		SEV TURB [EDRnnn] ₂ or SEV ICE or SEV MTW or TS GR ₃ or TS ₃ or HVY SS ₄ or VA CLD [FL nnn/nnn] or VA ₅ [MT nnnnnnnnnnnnnnnnnnnnn] or MOD TURB [EDRnnn] ₂ or MOD ICE	SEV TURB EDR076 VA CLD FL050/100

Example:

ARS nnnnnn Nnnnn Ennnn FLnnn [or FLnnn to FLnnn] OBS AT 0200Z nnn/nnnKT n TMnnn VA CLD [FLnnn/FLnnn] [or VA MT TANDIKAT-SINGGALANG] VA EXERCISE APAC VOLCEX 18/02 VA EXERCISE VA EXERCISE VA EXERCISE



Table 2: Template for the special air-report (uplink)

<i>Element</i>	<i>Detailed content</i>	<i>Template^{1,2}</i>	<i>Examples</i>
Identification (M)	Message identification	ARS	ARS
Aircraft identification (M)	Aircraft radiotelephony call sign	nnnnn	VA812 ₃
Observed phenomenon (M)	Description of observed phenomenon causing the issuance of the special air-report ⁴	TS TSGR SEV TURB SEV ICE SEV MTW HVY SS VA CLD VA [MT nnnnnnnnn] MOD TURB MOD ICE	TS TSGR SEV TURB SEV ICE SEV MTW HVY SS VA CLD VA VA MT ASHVAL ₅ MOD TURB MOD ICE
Observation time (M)	Time of observation of observed phenomenon	OBS AT nnnnZ	OBS AT 1210Z
Location (C)	Location (referring to latitude and longitude (in degrees and minutes)) of observed phenomenon	NnnnWnnnn or NnnnEnnnn or SnnnWnnnn or SnnnEnnnn	N2020W07005 S4812E01036
Level (C)	Flight level or altitude of observed phenomenon	FLnnn or FLnnn/nnn or nnnnM (or [n]nnnnFT)	FL390 FL180/210 3000M 12000FT

Example:

ARS nnnnn VA CLD [FLnnn/FLnnn] [or VA MT TANDIKAT-SINGGALANG] OBS AT 0200Z Nnnnn
 Ennnn FLnnn VA EXERCISE APAC VOLCEX 18/02 VA EXERCISE VA EXERCISE VA EXERCISE



Table 3: Distribution list of exercise special air-report messages

Distribution list:

From ACC:

ACC should advise the associated **MWO(s)** and **VAAC** of the volcanic eruption and/or the existence of volcanic ash cloud (including the forwarding of **all special air-reports** in accordance with existing provisions in Annex 11, 4.2.3) and maintain continuous coordination with the MWO to ensure consistency in the issuance and content of ASHTAMs or NOTAMs and SIGMETs. [*ICAO Doc 9766, Part 4.3.c*]

From ATS units:

ATS units shall transmit without delay the special air-reports to associated **MWOs**, the **WAFCs**, and the centres designated by regional air navigation agreement by voice communications and/or data link communications [*Annex 3, Chapter 5, 5.3*]

From MWOs:

MWO should In particular, special air-reports of pre-eruption volcanic activity, a volcanic eruption, volcanic ash cloud or aircraft encounter with volcanic ash received by MWOs should be transmitted to their associated **VAACs**, **WAFc** London SADIS at the address specified in Appendix B according to the region containing the area affected and **WAFc** Washington at KWBCYMYX; [*Annex 3, Appendix 4, 5.1*]

3.1.1. The meteorological watch office shall transmit without delay the special air-reports received by voice communications to the world area forecast centres (**WAFCs**) and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services.

3.1.2. The meteorological watch office shall transmit without delay special air-reports of pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud received to the associated **VAAC(s)**.

3.1.3. When a special air-report is received at the meteorological watch office but the forecaster considers that the phenomenon causing the report is not expected to persist and, therefore, does not warrant issuance of a SIGMET, the special air-report shall be disseminated in the same way that SIGMET messages are disseminated in accordance with Appendix 6, 1.2.1, i.e. to meteorological watch offices, WAFCs, and other meteorological offices in accordance with regional air navigation agreement.

[*Annex 3, Appendix 4, 3.1*]



Table 1 : METAR/SPECI exercise template

METAR CCCC YYGGggZ dddffKT VVVV w'w' N _s N _s N _s h _s h _s h _s TT/T _d T _d QP _H P _H P _H P _H REw'w' or SPECI TTTTT RMK VA EXERCISE APAC VOLCEX 18/02=
Example: SPECI WADB 230220Z 01015KT 2000 VA FEW007CB BKN014 27/25 Q1009 RMK VA EXERCISE APAC VOLCEX 18/02=



Table 1 : aerodrome warning exercise template

<p>CCCC AD WRNG [n]n VA EXERCISE APAC VOLCEX 18/02 VALID YYG₁G₁g₁g₁/YYG₂G₂g₂g₂</p>	
<p>TC nnnnnnnnnn or TS or GR or SFC WSPD nn[n]KT MAX nn[n] or SQ or TSUNAMI or VA or TOX CHEM or Free text up to 32 characters</p>	<p>OBS [AT GGggZ] or FCST</p>
	<p>INTSF or WKN or NC</p>
<p>Cancellation of aerodrome warning:</p> <p>CNL AD WRNG [n]n VA EXERCISE</p>	
<p>Example: WIBB AD WRNG 01 VA EXERCISE APAC VOLCEX 18/02 VALID 200230/200430 VA OBS AT 0220Z WKN</p>	
<p>Example of cancellation aerodrome warning: CNL AD WRNG 02 VA EXERCISE APAC VOLCEX 18/02 200230/200430</p>	



Table 6: Directing Staff

Role	Organization	Unit	State		Contact name	Contact position	Telephone numbers	E-mailaddress/es
In-State Exercise leader	BMKG		Indonesia		Ashriah Jumi Putri Andani	Sub Division for Aeronautical Meteorology Operational Management	+6289693477303	ashriah.andani@bmgk.go.id
Lead Regulator	CASA		Australia		Ashley McAlpine	Safety Management & Performance Specialist	+61(7)31447411	Ashley.mcalpine@casa.gov.au
	DGCA		Indonesia					
			Singapore					
			Malaysia					
Lead VAAC	BoM	VAAC Darwin	Australia		Jarrad Denman			
					Emile Jansons	En Route Aviation Services Manager	+61424849064	emile.jansons@bom.gov.au
Lead VO	CVGHM		Indonesia	PIC	Wawan Irawan	Head of Division for Volcano	+6281222675137	
				Player 1	Devi Kamil Syahbana		+628112223009	devy.syahbana@gmail.com
				Player 2	Martanto		+6285236600055	martanto@live.com
Lead MWO	BMKG	MWO Jakarta	Indonesia	PIC	Rekso Hartono	Coordinator for data and information	+6281283802869	rekso.hartono@yahoo.com ; forecastersoetta@yahoo.co.id
				Player 1	Edy Miswanto	Aeronautical Meteorological Forecaster	+6281368355055	edymist_35@ymail.com



Role	Organization	Unit	State		Contact name	Contact position	Telephone numbers	E-mailaddress/es		
				Player 2	Tri Suwito	Aeronautical Meteorological Forecaster	+628194061970	trisuwito@yahoo.co.id		
	MSS	MWO Singapore	Singapore	PIC						
				Player 1	Gan Bee Hong			GAN_Bee_Hong@nea.gov.sg		
				Player 2	Goh Wee Poh	Senior Meteorologist	+6598790461	GOH_Wee_Poh@nea.gov.sg		
	MMD	MWO Kuala Lumpur	Malaysia	PIC	Sarimah Sulaiman		+60193106781	sarimah@met.gov.my		
							+60387872388 (office)	kliia@met.gov.my		
				Player 1	Suhaily Binti Sahat		+60129573682	suhaily@met.gov.my		
				Player 2	Siti Noorfaizah Bt. Muhamad Fadzil		+60194926345	faizan@met.gov.my		
Lead ACC, ANSP	AirNav	ACC Jakarta	Indonesia	PIC	Ahmad Rizal	Deputy of Operation	+6281298283098	ahmadrizal62@gmail.com		
				Player 1	Anang Julianto	Supervisor	+6287877173311	juliantoanang@gmail.com		
				Player 2						
		ATFM Unit Jakarta		PIC						
				Player 1	Hafidz		+6281297949709	Hfidzka@gmail.com		
		APP Padang		Player 2						
				PIC	Adi Nasjaya		+6281356591977	adinasjaya@ymail.com		
				Player 1	Syafrinaldi		+6285263593593	inal_21@yahoo.com		
				Player 2						
APP Pekanbaru	PIC	Adriawan Anugrah		+6281364112333	adriawan.a@gmail.com					



Role	Organization	Unit	State		Contact name	Contact position	Telephone numbers	E-mailaddress/es
				Player 1	Mabrur	ARO Airnav Indonesia Pekanbaru	+6285395769480	mabrurmhoe@gmail.com
				Player 2				
		ATFM Unit Pekanbaru		PIC	Adriawan Anugrah		+6281364112333	adriawan.a@gmail.com
				Player 1				
				Player 2				
		APP Medan		PIC	Abdul Rahman		+628126550384	abdulrachman10@gmail.com
				Player 1	M Wira Gunawan		+6281397833326	mw.gunawan2@gmail.com
				Player 2	Ali Ahmad Hakim		+6281260889061	hakim_mnemonic@yahoo.com
		TWR Batam		PIC	Edward F Marpaung		+6285372400315	edofmarpaung@yahoo.com
				Player 1				
				Player 2				
		TWR Padang		PIC	Syafrinaldi		+6285263593593	inal_21@yahoo.com
				Player 1				
				Player 2				
		NOTAM Office		PIC	Tri Setyani	Head of NOTAM Office	+628211349 3372	setyanitri@yahoo.co.id
				Player 1	Susi Sintoarti		+6281219222963	susi_sintoarti@yahoo.com
				Player 2	Ni Komang Widyastini		+6281368909383	oming291186@gmail.com
		AIS Regional Office		PIC	Adi Prasetyo	Head of AIS Regional Medan	+6282145686263	frastyoadi@yahoo.com
				Player 1				
				Player 2				
	CAAS	ACC Singapore	Singapore	PIC				
				Player 1	Michael Shee	Senior Air Traffic Control Manager		Michael_SHEE@caas.gov.sg



Role	Organization	Unit	State	Contact name	Contact position	Telephone numbers	E-mailaddress/es	
		NOF and AIS Singapore		Player 2				
				PIC	Ravichandran Vevaganandam			Ravichandran_VEVAGANANDAM@caas.gov.sg
		ATFM Unit		Player 1				
				Player 2				
				PIC	Foo Kaiyu			foo_kaiyu@caas.gov.sg
				Player 1	ZHANG Huanbin			ZHANG_Huanbin@caas.gov.sg
		Player 2						
	CAAM	ACC Kuala Lumpur	Malaysia	PIC	Nasuruddin Zainol Abidin	Deputy Director (Operation) Air Traffic Management Sector	H/P: +60123247089 Tel. (office) : +603 8871 4210 Fax : +603 8881 0530	nasuruddin@caam.gov.my
				Player 1	Mohd Rahimi Jamaludin	Senior Assistant Director (Meteorology) Air Traffic Management Sector	H/P: +60137702445 Tel. (office): +603 8871 4363/4275	rahimi@caam.gov.my
				Player 2				
		NOF Kuala Lumpur		PIC	Mohd Fairuz Zaki bin Mohd Zakri		+60168247705	fairuz.zaki@caam.gov.my
				Player 1				
				Player 2				
		AIS Kuala Lumpur		PIC	Haizar Abd Halim		+60192838029	haizar@caam.gov.my
				Player 1				
				Player 2				



Role	Organization	Unit	State	Contact name	Contact position	Telephone numbers	E-mailaddress/es	
		Airspace unit		PIC Mohd Adelin Md. Yusop	Senior Assistant Director (Airspace & Procedures) Kuala Lumpur Air Traffic Control Center	H/P: +60192591752 Fax: +603 7846 5233	adelin@caam.gov.my	
				Player 1				
				Player 2				
Airport Operator	DGCA Indonesia	KOBU Wil I Jakarta	Indonesia	PIC	Erna Astuti		+6287882240346	Erna.lastuti@gmail.com
				Player 1	Anaria Carini Melissa		+6281386805362	Anaria.carini@gmail.com
				Player 2	A Tega Dimarcia		+6282137509696	dimarciaega@gmail.com
		KOBU Wil II Medan		PIC	Cici Purwania		+628192556356	ci_090684@yahoo.com
				Player 1	Arya Dwipayana		+6282181742212	jatc_46@yahoo.co.id
				Player 2	Oki Ardhian Fibianto		+628116191817	okiardhian@gmail.com
		Kobu Wil VI Padang		PIC	Yudha Inderawan	Air Navigation Inspector	+628126625544	y_inderawan@yahoo.co.id
				Player 1	Rhoben Tampubolon	Air Navigation Inspector	+6282164555616	tampoemkq@gmail.com
				Player 2	Desti Surantiningsih	Air Navigation Inspector	+62812607691	desti.atc@gmail.com
	Angkasa Pura II	AP II Padang	PIC					
			Player 1					
			Player 2					
		AP II Pekanbaru	PIC	Imran Chandra		+6282114457700	imran.chandra@yahoo.co.id	
Player 1			Alyudha Heru		+6281210940670	alyudhaeru@yahoo.com		



Role	Organization	Unit	State		Contact name	Contact position	Telephone numbers	E-mailaddress/es	
					Librawan				
		AP II Batam*		Player 2	Raden Bambang Adiwibowo		+628119475391	adiwibowo15979@gmail.com	
				PIC					
				Player 1					
				Player 2					
Aircraft Operator	Airlines	Air Asia	Indonesia	PIC	Achmad Sadikin	Director of Safety	+628161924214	achmadsadikin@airasia.com	
				Player 1	Rihardi Laras			rihardilaras@airasia.com	
				Player 2	Irlandi Paul Frederick			irlandipaulfrederick@airasia.com	
		Garuda Indonesia		PIC	Intar Abimantrana			Intar_a@yahoo.com Intar.abimantara@garuda-indonesia.com	
				Player 1	Dodi Subiyakto		+6281288490761	Dodi.subiyakto@garuda-indonesia.com	
		NAM Air		Player 2					
				PIC	Endro Martono			enmart17@gmail.com	
				Player 1	Fendrik Suryadi			fendrixsurya@gmail.com	
		Lion Air		Player 2					
				PIC	Capt. Paulus Novifiventi L	Deputy Director Operation		Deputy.dojt1@lionair.co.id	
	Player 1	Abraham Christy	Chief FOO	+62 813-8036-9832	Abraham.christy@lionair.co.id				



Role	Organization	Unit	State		Contact name	Contact position	Telephone numbers	E-mailaddress/es		
				Player 2						
			Singapore airlines*	PIC						
				Player 1						
				Player 2						
		Malindo Air	Malaysia	PIC	Azizul Hakim		+60166382438	azizul.hakim@malindoair.com		
				Player 1						
				Player 2						
MET Service Provider	BMKG	Padang MET Station	Indonesia	PIC	Yudha Nugraha		+6285766503086	yudha.nugraha89@yahoo.com		
				Player 1	Aulia Rinadi		+6281364428398	ar_sapat@yahoo.com aulia.rinadi86@gmail.com		
				Player 2						
				Pekanbaru MET Station		PIC	Marzuki	Head of Section of Data and Information	+6281275655517	mzkbmkg@gmail.com
					Player 1	Bibin Sulianto	Coordinator for analysis	+6281212223932	bimono1@gmail.com	
					Player 2	Sanya Gautami	Forecaster	+6285365911611	nyamet40@gmail.com	
				Batam MET Station	PIC	Ibnu Susilo	Forecaster	+62 85768921744	ibnuibanez@gmail.com	
					Player 1					
					Player 2					



Table 7: Observing Staff

<i>Role</i>	<i>Organization</i>	<i>State</i>	<i>Contact name</i>	<i>Contact position</i>	<i>Telephone/Fax numbers</i>	<i>Email address/es</i>
VO						
VAAC Tokyo	Japan Meteorological Agency	Japan	Kazuki Ito		Tel: +81-3-3212-8341(ext. 4727)	kazuki.ito@met.kishou.go.jp
MET Authority	Japan Meteorological Agency	Japan	Jun Ryuzaki	Senior Coordinator for International Aeronautical Meteorology	Tel : +81-3-3212-8341(ext. 2298)	jryuzaki@met.kishou.go.jp
RODB	Singapore RODB: MSS	Singapore	Chow Kwok Wah		+6598574626	CHOW_Kwok_Wah@nea.gov.sg
MWO	Hong Kong Observatory	Hong Kong, China	Jeffrey Chi-wai LEE	Scientific Officer	Tel: +85229268642	jeffreylee@hko.gov.hk
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Table 8: Abbreviations, acronyms and definitions

Abbreviation or acronym	Definition
ACC	Area control centre
AirNav	AirNav Indonesia (Government business entity that organizes flight navigation services)
AIC	Aeronautical Information Circular. A notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters.
AIS	Aeronautical information service
AO	Aircraft operator
APAC	Asia and Pacific
APANPIRG	APAC air navigation planning and implementation regional group
APP	Approach Control
ATFMU	Air traffic flow management unit
ATM	Air traffic management
ATS	Air traffic services
BMKG	<i>Badan Meteorologi, Klimatologi, dan Geofisika</i> (Indonesian agency for meteorology, climatology and geophysics)
BoM	Bureau of meteorology (Australian Government)
CAAM	Civil Aviation Authority of Malaysia
CAAS	Civil Aviation Authority of Singapore
CASA	Civil Aviation Safety Authority (of Australia)
CDM	Collaborative decision making
DCA	Department of Civil Aviation
DGCA	Director General of Civil Aviation
FIR	Flight information region
FL	Flight level
HKO	Hong Kong Observatory
ICAO	International civil aviation organization
JMA	Japan meteorological agency
MET	Meteorological
MMD	Malaysia Meteorological Department
MO	Meteorological office
MSS	Meteorological Service Singapore
MWO	Meteorological Watch Office
NOF	International NOTAM office
NOTAM	A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
SIGMET	Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations
UTC	Coordinated universal time
VA	Volcanic ash
VAA	Volcanic ash advisory information (issued in abbreviated plain language)
VAAC	Volcanic ash advisory centre
VAG	Volcanic ash advisory information (issued in graphical format)
VO	Volcano observatory
VOLCEX/SG	(APAC) volcanic ash exercises steering group
VONA	Volcano observatory notice for aviation