

EXERCISE DIRECTIVE FOR VOLCANIC EXERCISE IN CAPE VERDE

(AFI VOLCEX 21/01)

1. INTRODUCTION

- 1.1. A simulated eruption of a volcano in Cape Verde called [?Name] will produce volcanic ash to [FLxxx] where it will be transported by [wind direction] wind of [xx] km/hr (xx kt) in order to impact [xxxx] routes from [0045 UTC 13 September 2021 to 0645 UTC 14 September 2021].
- 1.2. The objectives to be tested are provided in section [nn] of this report.
- 1.3. The Exercise Leader will be Ms./Mr. [full name], [Job Title], [State]. The duties of the Exercise Leader are specified in the AFI VOLCEX OPINS. There will be no operational impact in this exercise (dedicated staff is expected to be available for the test).
- 1.4. The AFI volcanic ash contingency plan (AFI VCAP) template developed by EASF and WACAF Offices will be the contingency plan to be tested in this exercise.
- 1.5. Exercise date and time (UTC): [13 or 14 September, 0045 to 0645]
- 1.6. **Note:** *If one or more participants consider it difficult to continue this exercise due to severe events such as volcanic eruption or low pressure, they may advise the Exercise Leader to cancel the exercise. In response, the Exercise Leader will announce the cancellation where appropriate.*
- 1.7. A dedicated webpage for the exercise is available at www.xxxxxxxx.

2. PARTICIPATING AGENCIES

Agency	Contact name	Contact position	Primary telephone number	Secondary telephone number	Fax number	e-mails address
Volcano Observatory	...	...	...	...	...	...
VACC Toulouse	...	...	...	...	...	...
ATMC						
ACC						
FIC						
Regulatory						
MWO						
NOF						
Airlines						
Experts advisors						
International and inter-	RO/MET-ENV	ICAO ESAF	221776112699			gilboudo@gmail.com

<i>regional coordination</i>		<i>Office</i>				
	<i>RO/MET</i>	<i>ICAO WACAF Office</i>				

3. AIMS AND OBJECTIVES

- 3.1. Demonstrate coordination procedures between all participating parties (ANSPs, ATM Centres, AIS, VO, VAACs, MWO, Users)
- 3.2. Verify existing information and messages routing between all involved agencies and organizations.
- 3.3. Demonstrate transmission of air-reports on volcanic ash in accordance to Annex 3 (Aircraft ->ACC ->MWO ->VAAC)
- 3.4. Demonstrate information sharing via teleconferences and website
- 3.5. Provide, recommendations for amendment of the procedures, in accordance with the lessons learned and conclusions formulated.

4. EXERCISE DURATION

- 4.1. The exercise will be conducted on [Date] four (4) hours commencing at [xxxx UTC xx September 2021].
- 4.2. The first VONA is expected to be issued within 10 minutes of the exercise start. The second VONA, is to be issued nearing the exercise end time

5. EXERCISE VOLCANO

- **Official name of the volcano is: Vulcão do Fogo.**
- **Location: Long: 24.36° W; Lat: 14.95° N.**
- **Volcano number is: 384010**
- **The highest elevation: 2829 m**
- **Area : Cape Verde Islands**

6. EXERCISE SCENARIO

- 6.1. Simulated eruption with volcanic ash cloud up to [FLxxx] moving [direction] at [x-x knots] to impact ATS routes and airspace within [XXX FIR (CODE) and XXXX FIR (CODE)].
- 6.2. Volcanic ash deposition at [xxxx (CODE)] and xxxx aerodromes (CODE) in [State], will impact operations and airport closure.

7. EXERCISE SCHEDULE

Date /Time (UTC)	Players	Event /Action
[1 month prior to the exercise]	<ul style="list-style-type: none"> • Exercise leader • ICAO Secretariat 	Publish final version of exercise directive
[1 week prior to the exercise]	NOF/s [name/s]	Issue preparatory NOTAMs to inform the aviation community of the exercise
[Exercise date, 0100]	Exercise leader	Send email message to all players to announce commencement of the exercise
[Exercise date, 0100]	VO [name]	Issue 1st exercise VONA (initial eruption details)
[Exercise date, 0100+]	VAAC Toulouse	Issue 1 st exercise VAA[/VAG] based on VONA
[Exercise date, 0100+]	MWO Antananarivo	Issue 1 st exercise SIGMET based on VONA
[Exercise date, 0100+]	ACC/NOF [name/s]	Issue 1 st exercise NOTAM based on SIGMET
[Exercise date, 0200]	VAAC Toulouse	Issue 2 nd exercise VAA/VAG based on observations/reports
[Exercise date, 0200+]	MWO Antananarivo	Issue 2 nd exercise SIGMET based on VAA/VAG
[Exercise date, 0200+]	Exercise leader	Send email message inviting [selected players] to join [teleconference/web conference] at [time]
[Exercise date, 0200+]	ACC/NOF [name/s]	Issue 2 nd exercise NOTAM based on SIGMET
[Exercise date, 0200+]	ACC/ATM Centre/s [names]	Apply ATFM measures based on SIGMET
[Exercise date, 0200+]	AOs [name/s]	Take appropriate flight planning actions: e.g. reroute or cancel flights
[Exercise date, 0215]	AO [name]	Report aircraft observation [volcanic ash/no volcanic ash] as special air-report
[Exercise date, 0215+]	ATS unit/s [name/s]	Relay and record special air-report
[Exercise date, 0230]	VO [name]	Issue 2nd exercise VONA (updated eruption details)
[Exercise date, 0245]	Exercise leader, [list selected players]	Exercise [teleconference/web conference] to discuss the latest situation
[Exercise date, 0300]	VAAC Toulouse	Issue 3 rd exercise VAA/VAG based on observations/reports
[Exercise date, 0300+]	MWO Antananarivo	Issue 3 rd exercise SIGMET based on VAA/VAG
[Exercise date, 0300+]	ACC/NOF [name/s]	Issue 3 rd exercise NOTAM based on SIGMET
[Exercise date, 0300+]	ACC/ATM Centre/s [names]	Apply ATFM measures based on SIGMET
[Exercise date, 0300+]	AOs [name/s]	Take appropriate flight planning actions: e.g. reroute or cancel flights

[Exercise date, 0600]	VAAC Toulouse	Issue 4 th exercise VAA and VAG based on observations/reports
[Exercise date, 0600+]	MWO Antananarivo	Issue 4 th exercise SIGMET based on VAA/VAG
[Exercise date, 0600+]	ACC/NOF [name/s]	Issue 4 th exercise NOTAM based on SIGMET
[Exercise date, 0600+]	ACC/ATM Centre/s [names]	Apply ATFM measures based on SIGMET
[Exercise date, 0600+]	AOs [name/s]	Take appropriate flight planning actions: e.g. reroute or cancel flights
[Exercise date, 0645]	Exercise leader	Send email message to all players to announce cessation of the exercise
[Exercise date, 0645]	VO [name]	Cancel exercise VONA
[Exercise date, 0645]	VAAC Toulouse	Cancel exercise VAA/VAG
[Exercise date, 0645]	MWO Antananarivo	Cancel exercise SIGMET
[Exercise date, 0645]	ACC/NOF [name/s]	Cancel exercise NOTAM

8. EXERCISE SCENARIO MESSAGES

AFI VOLCEX 21/01 EXERCISE DIRECTIVE Appendix H - Exercises SIGMET Templates

Table 1. SIGMET based on VONA:

WVPH31 GVAC nnnnnn
 GVSC SIGMET nn VALID nnnnnn/nnnnnn GVAC-
 GVSC SAL FIR VA EXERCISE AFI VOLCEX 21/01 VA ERUPTION MT Vulcão do Fogo PSN N1495
 W2436 VA CLD OBS AT nnnnZ SFC/FL350 MOV S INTSF EXERCISE EXERCISE EXERCISE=

Table 2. SIGMET based on VAA when VA is not identifiable from satellite but with wind speed at significant FL:

WVPH31 RPLL nnnnnn
 GVSC SIGMET nn VALID nnnnnn/nnnnnn GVAC-
 GVSC SAL FIR VA EXERCISE AFI VOLCEX 21/01 VA ERUPTION MT Vulcão do Fogo PSN N1495
 W2436 VA CLD OBS AT nnnnZ SFC/FL350 MOV S nnKT INTSF EXERCISE EXERCISE EXERCISE=

Table 3. SIGMET based on 1st VAA when VA is identifiable from satellite :

WVPH31 GVAC nnnnnn
 GVSC SIGMET nn VALID nnnnnn/nnnnnn GVAC-
 GVSC SAL FIR VA EXERCISE AFI VOLCEX 21/01 VA ERUPTION MT Vulcão do Fogo PSN N1495
 W2436 VA CLD OBS AT nnnnZ WI Nnnnn Ennnnn - Nnnnn Ennnnn - Nnnnn Ennnnn - Nnnnn
 Ennnnn SFC/FL350 MOV S nnKT NC FCST nnnnZ VA CLD WI Nnnnn Ennnnn - Nnnnn Ennnnn -
 Nnnnn Ennnnn - Nnnnn Ennnnn - Nnnnn Ennnnn SFC/FL350 MOV S nnKT INTSF
 EXERCISE EXERCISE EXERCISE=

Table 4. SIGMET based on 2nd VAA when VA is identifiable from satellite:

WVPH31 GVAC nnnnnn
 GVSC SIGMET nn VALID nnnnnn/nnnnnn GVAC-
 GVSC SAL FIR VA EXERCISE AFI VOLCEX 21/01 VA ERUPTION MT Vulcão do Fogo PSN N1495
 W2436 VA CLD OBS AT nnnnZ WI Nnnnn Ennnnn - Nnnnn Ennnnn - Nnnnn Ennnnn -
 Nnnnn Ennnnn SFC/FL350 MOV S nnKT NC FCST nnnnZ VA CLD WI Nnnnn Ennnnn - Nnnnn
 Ennnnn - Nnnnn Ennnnn - Nnnnn Ennnnn SFC/FL350 MOV S nnKT NC
 EXERCISE EXERCISE EXERCISE=

Table 5. SIGMET based on succeeding VAA (source: VAAC T or VAAC D) when VA is identifiable from satellite:

WVPH31 RPLL nnnnnn
 GVSC SIGMET nn VALID nnnnnn/nnnnnn GVAC-
 GVSC SAL FIR VA EXERCISE AFI VOLCEX 21/01 VA ERUPTION MT Vulcão do Fogo PSN N1495
 W2436 VA CLD OBS AT nnnnZ WI Nnnnn Ennnnn - Nnnnn Ennnnn - Nnnnn Ennnnn -
 Nnnnn Ennnnn SFC/FL350 MOV S nnKT NC FCST nnnnZ VA CLD WI Nnnnn Ennnnn - Nnnnn
 Ennnnn - Nnnnn Ennnnn - Nnnnn Ennnnn SFC/FL350 MOV S nnKT NC
 EXERCISE EXERCISE EXERCISE=

Table 6. SIGMET Cancellation

WVPH31 GVAC nnnnnn
 GVSC SIGMET nn VALID nnnnnn/nnnnnn GVAC-
 GVSC SAL FIR VA EXERCISE AFI VOLCEX 21/01 CANCEL SIGMET nn nnnnnn/nnnnnn
 EXERCISE EXERCISE EXERCISE=

Table 1 AFI VOLCEX 21/01 EXERCISE DIRECTIVE - Appendix I-. Distribution List for SIGMET

AFI VOLCEX 21/01 EXERCISE DIRECTIVE Appendix J - Exercises NOTAM Templates

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

<p>(Bxxxx/19 NOTAMN Q) GVAC/QWWWXX/IV/NBO/W/000/999/1025N12308E999 A) GVAC B) 1909120000 C) 1909120400 D) E) VA EXERCISE AFI VOLCEX 21/01 VOLCANIC ASH EXERCISE TAKES PLACE dd SEPTEMBER FROM 00:00 TO APPROX. 4:00 UTC. EXERCISE NAME AFI VOLCEX 21/01. EXERCISE VOLCANO: MT Vulcão do Fogo PSN N1495 W2436. FREE TEXT OF PROMULGATED EXERCISE MESSAGES START WITH: VA EXERCISE AFI VOLCEX 21/01. FREE TEXT OF EXERCISE MESSAGES END WITH: EXERCISE EXERCISE EXERCISE. F) SFC G) UNL)</p>
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Table 2: 1ST exercise NOTAM

<p>(Bxxxx/19 NOTAMN Q) RPHI/QWWWXX/IV/NBO/W/000/999/1025N12308E999 A) GVAC B) 190912XXXX C) 190912XXXXEST (24hr) D) E) VA EXERCISE AFI VOLCEX 21/01. ERUPTION OF VOLCANO MT Vulcão do Fogo PSN N1495 W2436 Cape Verde AS REPORTED BY VOLCANO OBSERVATORY AT 0000 UTC. VOLCANO ASH CLOUD REPORTED BY GROUND OBSERVER. EXERCISE EXERCISE EXERCISE. F) SFC G) 35000FT AMSL)</p>

Table 3: 1ST exercise ASHTAM

<p>(Bxxxx/19 NOTAMN Q) RPHI/QWWWXX/IV/NBO/W/000/999/1025N12308E999 A) GVAC B) (date/time of eruption) C) MT Vulcão do Fogo D) PSN N1495 W243608 E) (volcano level of alert color code) F) VA EXERCISE AFI VOLCEX 21/01. (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 AFI VOLCEX 21/01 (source of information) K) VA EXERCISE AFI VOLCEX 21/01 (plain language remarks) EXERCISE EXERCISE EXERCISE</p>
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Table 4: Final Exercise NOTAM

<p>(Bxxxx/19 NOTAMC Q) GVAC /QWWWXX/IV/NBO/W/000/999/1025N12308E999</p> <p>A) GVAC</p> <p>B) 190912XXXX C)</p> <p>D)</p> <p>E) VA EXERCISE AFI VOLCEX 21/01. ERUPTION OF VOLCANO MT Vulcão do Fogo PSN N1495 W2436 HAS CEASED AS REPORTED BY VOLCANO OBSERVATORY AT 0400 UTC. VOLCANIC ASH CLOUD HAS DISSIPATED. VOLCANIC ASH CLOUD NO LONGER VISIBLE. EXERCISE EXERCISE EXERCISE.</p> <p>F)</p> <p>G)</p>
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Table 2 Addresses for NOFs to use to send ASHTAMs or NOTAMs on volcanic activity to their associated VAAC in The AFI Region

NOF States	Addresses for NOFs to use to send ASHTAMs or NOTAMs on volcanic activity to their associated VAAC in AFI Region
Cameroon	LFPWYMYX EGZZVANW
Cape Verde	LFPWYMYX EGZZVANW
Comoros	LFPWYMYX EGZZVANW
Democratic Republic of Congo	LFPWYMYX EGZZVANW
Eritrea	LFPWYMYX EGZZVANW
Ethiopia	LFPWYMYX EGZZVANW
French	LFPWYMYX EGZZVANW
Kenya	LFPWYMYX EGZZVANW

Table 1. Special air-report as spoken in radiotelephony

AIREP SPECIAL aircraft identification POSITION latitude and longitude time FLIGHT LEVEL number CLIMBING [DESCENDING] TO FLIGHT LEVEL number ASH CLOUD VA EXERCISE APAC VOLCEX19/02 EXERCISE EXERCISE EXERCISE

Table 2. Special air-report as recorded by the ATS unit and forwarded to the MET office concerned

ARS nnnnnn nnnn Nnnnnn E hhmm Fnnn ASC [DES] Fnnn VA CLD VA EXERCISE AFI VOLCEX 21/01 EXERCISE EXERCISE EXERCISE

9. DIRECTING STAFF

Role	Names	Agency	e-mails address
Exercise Leader	??	??	??
Lead Volcano Observatory	??	VO Cape Verde	??
Lead VAAC	??	VAAC Toulouse	??
Lead ACC	??	ACC SAL/Grant Canary (GVSC)	??
Lead MWO	??	MWO SAL/Grant Canary (GVAC)	??
Lead NOF	??	NOF SAL/Grant Canary (GVAC)	??
Nation Supervisory Authority	??	National Authority	??
...	??		??
Coordination	??	ESAF RO, ENV/MET WACAF RO, MET	??
Airlines	??	IATA /Cape Verde Airlines	??
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10.SPECIAL INSTRUCTIONS

- a) **Lead:** The lead of teleconference calls should be the ATMC of the State where the volcano is erupting (e.g. a volcano eruption in Cape Verde).
- b) **Expected Participants and general information** expected from each:
 - a. **VO** – Brief update on eruption status, latest height information, source of height information; duration of event, expected activity
 - b. **VAAC** – Brief update on VAA/VAG (are observations such as aircraft reports being used to update products)
 - c. **MWO** – Brief update on SIGMET (if different from VAA/VAG, briefly explain why)
 - d. **NOF** – Brief update on NOTAM and published reroutes
 - e. **ACC** – Brief update on reroutes and coordination with ACCs and ATMCs
 - f. **ATMC** – Brief update on overall strategy (coordination with other ATMCs and ACCs)
 - g. **Airlines** – Brief update on tactical reroutes, flight plan changes and satisfaction with reroutes
 - h. **ATMC** – Response, if necessary, to airlines
 - i. **ACC** – Response, if necessary, to ATMCs and airlines
- c) **Information sharing:**
 - Web portal should be available to obtain volcanic ash related products and information:
- d) **Language:**
 - English and French.
- e) **Microphones:**
 - Each Participant should mute microphones to reduce back ground noise.
 - The Leader of the teleconference will instruct the participant when to speak. When other features are available, the Leader would mute and controls when participants speak.

11. Useful websites (as an example):

Global Volcanism Network Bulletin

<http://www.nmnh.si.edu/gvp/>

<http://www.osei.noaa.gov/TOMS/>

<http://toms.gsfc.nasa.gov>

http://www.geo.mtu.edu/~boris/ETNA_news.html

World Organization of Volcano Observatories (WOVO)

<http://wovo.org>

<http://www.wovo.org/dir-contents.htm> (contacts)

Actions by the Exercise Leader:

In coordination with the Directing Staff (*to be established*), the PTC of APIRG IMSG MET Project 2 and the ESAF and WACAF Offices:

- 1) Establishing the **Directing Staff** by designating the members
- 2) Identifying and getting the **buy-in** of **all stakeholders**
- 3) Establishing the **list of the participating agencies**
- 4) Finalizing and editing the **draft of AFI Volcanic Exercise Directive for Volcanic Ash Exercise in Cape Verde** and submit it to the Secretariat, no later than 31 May 2021
- 5) Liaise with the Secretariat for any other **AFI VOLCEX related matters**