INTERNATIONAL CIVIL AVIATION ORGANIZATION

Fifth meeting of the AFI Volcanic Ash Exercises Steering Group

(AFI VOLCEX/SG5)

(Virtual, 9 June 2026)

Agenda Item 2: Update on the AFI Exercise VOLCEX 25/01

WP2: Update on the outcomes of the Third Volcanic Ash Exercise and Lessons Learned

(Presented by the Secretariat)

SUMMARY
This paper provides an update on the outcomes of the third AFI volcanic ash exercise (VOLCEX 25/01) conducted on 26 February 2026 under the leadership of Kenya, together with the lessons learned and the recommendations arising therefrom. Action by the meeting is in paragraph 3.
REFRENCE(S): ▪ AASPG1 Report ▪ AFI VOLCEX 25/01 Exercise Report ▪ AFI VA Exercises Directive for Exercise VOLCEX 25/01 ▪ AFI VA Exercises Operational Instructions (VOLCEX OPINS) ▪ Terms of Reference of the AFI VOLCEX Steering Group
Related ICAO Strategic Goal(s): ▪ **A** – *Every Flight is Safe and Secure* ▪ **C** – *Aviation delivers Seamless, Accessible and Reliable Mobility for All*

1. INTRODUCTION

1.1 The meeting may recall that the first AFI volcanic ash exercise (VOLCEX 21/01) was conducted in November 2021 under the leadership of Cabo Verde, and the second exercise (VOLCEX 23/01) was conducted in December 2023 under the leadership of the Democratic Republic of the Congo, both as Exercise Leader States.

1.2 The meeting may further recall that the AFI Volcanic Ash Exercise Steering Group (AFI VOLCEX/SG) approved the conduct of the third AFI volcanic ash exercise (VOLCEX 25/01) under the leadership of Kenya as the Exercise Leader State. Volcanic ash exercises are designed to test and validate end-to-end system readiness, including volcanic activity alerting, the routing of Aeronautical Information Service (AIS) and Meteorological (MET) messages, the dissemination of volcanic ash information, Air Traffic Management (ATM) procedures, aircraft operator response and collaborative decision-making among all stakeholders.

1.3 This working paper presents an update on the outcomes of the third AFI volcanic ash exercise (VOLCEX 25/01), conducted on 26 February 2026 under the leadership of Kenya, together with the lessons learned and the recommendations that were provided.

2. DISCUSSION

Volcanic ash exercise scenario and Exercise Leader

2.1 The third AFI volcanic ash exercise was conducted on 26 February 2026 from 0900 to 1500 UTC. The exercise had initially been scheduled for November 2025 but was rescheduled to accommodate the availability of the Volcanic Ash Advisory Centre (VAAC) Toulouse. It simulated the eruption of the Barrier Volcano (volcano number 222030, position N0219 E03634), located in Kenya at an elevation of 3,386 ft (1,032 m), within the ICAO Eastern and Southern African (ESAF) Region.

2.2 The simulated ash plume reached FL550, with ash clouds moving north-east at 20KT from the surface to FL160, east at 10KT between FL130 and FL250, and west at 20KT between FL200 and FL500. The plume affected the following States: Kenya, Ethiopia, South Sudan, Uganda, the Democratic Republic of the Congo, Rwanda and the United Republic of Tanzania.

2.3 The exercise was led by the Kenya Civil Aviation Authority (KCAA). Mr. Felix Odima, Principal Air Traffic Management Officer, served as the Exercise Leader, assisted by Ms. Esther Nyaga, also a Principal Air Traffic Management Officer.

Exercise objectives

2.4 The objectives of the exercise were to:

- demonstrate coordination procedures between all participating organizations, i.e. the Volcano Observatory (VO), Meteorological Watch Offices (MWOs), ATS Centres, NOTAM Offices (NOF), the Bulletin Compilation Centre (BCC), Rescue Coordination Centres (RCC), AIS, the Regional OPMET Data Banks (RODBs) Pretoria and Dakar, VAAC Toulouse and users;
- assess the timely distribution of messages, including VONA, SIGMET, NOTAM, ASHTAM, VAA and special air report messages;
- check and determine the availability of the existing communication links and networks, i.e. AMHS, AFTN, radio link and D-ATIS;
- check and demonstrate the efficiency of the State local contingency committee preparedness during the exercise;
- check the effectiveness of bilateral arrangements and agreements for the provision of information between neighbouring States in the event of a volcanic eruption;
- demonstrate the transmission of air-reports on volcanic ash in accordance with Annex 3 (Aircraft to ACC to MWO to VAAC); and
- provide recommendations for the amendment of procedures on the basis of lessons learned and conclusions formulated.

Exercise preparation and conduct

2.5 Pre-exercise preparations commenced in mid-2025. The Exercise Directive was developed on the basis of the AFI Volcanic Ash Operational Instructions (OPINS) and disseminated to the cooperating agencies. It was submitted to the ICAO ESAF Office on 11 February 2026 for uploading to the ICAO website and was also published on the Kenya State Volcano Observatory website. NOTAM A0036/26 was issued one week prior to the exercise to inform the aviation community of the forthcoming tabletop simulation, and stakeholder sensitization was conducted on 24 February 2026.

2.6 Safety risk assessments were undertaken by the aircraft operator (Kenya Airways) in accordance with ICAO Doc 9974 and by the Air Navigation Service Provider in accordance with Annex 19 and ICAO Doc 9859 (Safety Management Manual). In consultation with the AFI VOLCEX Steering Group Chairperson, the GO decision was made on the eve of the exercise, on confirmation that no actual volcanic activity or safety concerns were affecting aviation operations at the time.

2.7 The exercise was conducted on a regional basis and coordinated through the Zoom platform hosted by the ICAO ESAF Office. The eruption details and the Volcano Observatory Notice for Aviation (VONA) were communicated by the Nairobi State Volcano Observatory to the Nairobi ACC, the Nairobi MWO and VAAC Toulouse. SIGMET and NOTAM were handled via the AMHS and AFTN platforms, and special air reports were transmitted by Kenya Airways flights using the special call sign KQA 333. The cooperating organizations that participated in the exercise are listed in the exercise report at Appendix A.

Achievements

2.8 The main achievements of the exercise included:

- successful simulation of the response to the eruption of the Barrier Volcano, testing inter-agency coordination, operational readiness and the application of regional volcanic ash contingency procedures;
- effective activation of communication protocols and dissemination of critical information, including VONA, VAA/VAG, SIGMET, NOTAM, ASHTAM and special air reports, via AFTN/AMHS;
- timely issuance and acknowledgement of the VONA, VAA/VAG, SIGMET and NOTAM by the Nairobi units and VAAC Toulouse during both eruption sessions;
- activation of the Nairobi FIR ATM contingency plan and effective participation of the Rescue Coordination Centre in placing search and rescue resources on standby;
- application of ATC measures and broadcasts to traffic by several area control centres, including Nairobi, Juba, Addis Ababa, Dar es Salaam and Kigali; and
- validation of the collaborative decision-making processes essential to maintaining the safety, regularity and efficiency of air navigation in the event of an actual volcanic eruption.

Lessons learned

2.9 The exercise also highlighted a number of areas requiring improvement. The lessons learned included:

- the 7th edition of the AMBEX handbook does not contain all the addresses required for the exchange of messages, and some unknown addresses resulted in non-routing of messages;
- not all States are connected to the AFTN/AMHS network, which constrained message exchange with certain States;
- the transition from Microsoft Teams to Zoom affected the ability of certain participants to join and actively participate;
- effective coordination among the participating agencies is essential to the successful delivery of the exercise, and the Exercise Leader should be an officer from the ATM domain, supported by an assistant where many States are participating;
- despite sensitization, some stakeholders were not fully aware of the exercise, and changes in flight scheduling affected the transmission of special air reports;

- although Kenya has established Letters of Agreement with neighbouring States, these do not include provisions for volcanic ash;
- the coded format of the special air report provided in the AFI Volcanic Ash Contingency Plan (VACP), as transmitted by the MWO, is at variance with Annex 3 (paragraph 5.9.6) and ICAO Doc 10157 (PANS-MET, paragraph 3.1.3);
- while the Nairobi FIR ATM contingency plan incorporates the Volcanic Ash Contingency Plan, it was not fully activated during the exercise;
- there is no specific guidance in the AFI VOLCEX OPINS on how to communicate the GO/NO GO decision;
- the correct NOTAM/ASHTAM series were not used by some States, and these series should be promulgated in States' AIPs under GEN 3.1;
- the establishment of points of contact with some State volcano observatories in the AFI Region (for example, Cabo Verde, Eritrea and the Comoros) was unsuccessful; and
- the unexpected non-participation and early withdrawal of some key States, including constraints experienced by the Democratic Republic of the Congo, negatively affected the smooth progression of the exercise.

Recommendations

2.10 On the basis of the lessons learned, the following recommendations were formulated:

- install an AMHS position at the Nairobi State Volcano Observatory to facilitate the direct receipt and distribution of VONA messages;
- establish a Letter of Agreement between the KCAA, the meteorological service provider for air navigation and the State Volcano Observatory regarding volcanic ash, as provided in ICAO Doc 9766;
- review the Nairobi FIR ATM contingency plan to incorporate all provisions of ICAO Doc 9766, and review Letters of Agreement with neighbouring States to include provisions for volcanic ash;
- conduct regular refresher training and bi-annual simulation exercises, interfaced with the ICAO calendar, to strengthen coordination and response times, and ensure the State ATM contingency plan (incorporating the VACP) is fully activated during exercises and actual events;
- use the ongoing update of the AMBEX handbook to ensure correct addresses are used for aeronautical messages, and encourage MWOs to use the correct channels of transmission rather than email;
- ICAO to pursue AFTN/AMHS connectivity among all States, for example between the Nairobi FIR and the Juba FIC and Djibouti;
- revise the AFI VOLCEX OPINS to specify that the Exercise Leader should be from the ATM service provider, to provide for an assistant to the Exercise Leader, to include standardized message templates (for example for VONA and special air reports), and to include specific guidance on communicating the GO/NO GO decision;
- onboard participating airlines at the onset of exercise preparation through IATA, and put in place effective mechanisms to ensure all aviation stakeholders are adequately sensitized regarding volcanic ash exercises and actual events;
- schedule a pre-exercise teleconference on the day prior to the exercise, using the ICAO platform, to allow participants to familiarize themselves with the platform;

- review the AFI VACP to align it with Annex 3 (paragraph 5.9.6), so that MWOs transmit special air reports received from the ACC in the format in which they are received, and align the VONA template with ICAO Doc 10157 (PANS-MET, Appendix 7);
- promulgate the ASHTAM/NOTAM series to be used during exercises and actual events in the respective States' AIPs under GEN 3.1;
- State volcano observatories within the AFI Region to update their focal point details in ICAO Doc 9766 to facilitate effective participation;
- make provision for the delay or temporary suspension of a unit's exercise action where operational circumstances, not warranting suspension or cancellation of the exercise, take priority for that unit;
- VAAC Toulouse to update its AMHS/AFTN address in ICAO Doc 9766, as the address used (LFPWYMEU) was at variance with the documented addresses, and the reported message delays between VAAC Toulouse and RODB Dakar (advisory messages received approximately seven minutes later) to be investigated, together with the non-receipt of a SIGMET at RODB Pretoria;
- include the Johannesburg Communication Centre and NOTAM office as participants in future exercises for monitoring purposes; and
- participating States identified during the planning process, based on the VAAC Toulouse exercise scenarios, to ensure full and active engagement, as early withdrawal negatively affected the progression of the exercise.

2.11 The detailed report of the outcomes of the third AFI volcanic ash exercise (VOLCEX 25/01), including the full log of the exercise operation, the exercise message log, the list of cooperating agencies and the safety assessments, is provided in Appendix A to this working paper.

Conclusion

2.12 The third AFI volcanic ash exercise (VOLCEX 25/01) proved to be a valuable and successful event for all participating agencies in the AFI Region. It successfully achieved its primary objective of simulating the response to the eruption of the Barrier Volcano in Kenya and provided a critical platform to test and enhance inter-agency coordination, operational readiness and the application of regional volcanic ash contingency procedures. The exercise served as a crucial diagnostic tool that confirmed the effectiveness of existing communication infrastructure and procedures, while identifying concrete steps to strengthen the resilience and efficiency of the volcanic ash information chain in the AFI Region.

2.13 The lessons learned and the recommendations arising from the exercise are instrumental in strengthening regional cooperation, improving communication networks and ultimately enhancing the safety, regularity and efficiency of international air navigation against the hazard of volcanic ash. The cooperation demonstrated by all participants reaffirms the collective commitment to continuous improvement and operational preparedness.

3. ACTIONS BY THE MEETING

3.1 The meeting is invited to:

- note the information contained in this paper;
- endorse the lessons learned and the recommendations arising from the exercise as provided in this Paper; and
- provide guidance as appropriate.

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