

# REPUBLIC OF KENYA



## NAIROBI FLIGHT INFORMATION REGION (FIR)

### AIR TRAFFIC MANAGEMENT (ATM)

### CONTINGENCY PLAN

PREPARED BY

AIR NAVIGATION SERVICES DIRECTORATE

KENYA CIVIL AVIATION AUTHORITY

Version 2



## **DOCUMENT AMENDMENT PROCEDURES**





The Regional ATM Contingency Procedures may be amended by a meeting facilitated by an APIRG contributing body responsible for ATM. However, an amendment to the Nairobi FIR ATM contingency plan may also necessitate the amendment of the relevant portion of the Nairobi FIR plan as contained in the AFI Regional ATM Contingency Plan.

## **PROCEDURES FOR REVIEW OR AMENDMENT OF CONTINGENCY PLAN**

The Nairobi FIR Contingency Plan requires regular updating to accommodate changes in contingency arrangements and contact details. Nairobi FIR Contingency Plans shall be reviewed as necessitated by changes, and all major amendments promptly published and forwarded to the ESAF Regional Office for amendment in the Regional Plan as appropriate. Details of all such amendments shall be recorded as follows:



**APPROVALS PAGE**

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## **EXECUTIVE SUMMARY**

The Nairobi FIR ATM Contingency Plan is designed to provide guidance materials for ATS units within Kenya to enhance uniformity in the implementation of these ATM Contingency plans in accordance with the Kenya Civil Aviation (Air Traffic Services) Regulations.

The document also provides common definitions of the different levels of contingency within the Nairobi FIR, as well as recommended procedures for handling contingencies such as volcanic ash, public health emergencies, civil or industrial unrest, military conflicts, national security – normally political decisions, war, etc.

Contingency Routes designated and agreed between States/ACCs/FIRs, as well as contingency procedures for the control, coordination and transfer of flights during level 2 or 3 contingencies are well enumerated.

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## GLOSSARY

### DEFINITIONS

**Aircraft:** Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

**AIRPROX:** The code word used in an air traffic incident report to designate aircraft proximity.

**Air Navigation Services:** Services provided to air traffic during all phases of operations including air traffic management (ATM), communication, navigation and surveillance (CNS), meteorological services for air navigation (MET), search and rescue (SAR) and aeronautical information services (AIS).

#### **Airspace of a Sovereign State**

Sovereign airspace refers to airspace as established over the sovereign territory of a state or an FIR boundary as established by ICAO under the management or control of a State.

#### **Airspace over the High Seas**

Airspace over the High Seas refers to airspace over international waters and delegated to a state by ICAO for the provision of air traffic services or air navigation services.

#### **Airspace of Undetermined Sovereignty**

Airspace of Undetermined Sovereignty refers to airspace over a disputed territory or international waters that authority for the control or provision of air traffic services is not agreed on or is in dispute.

**Air Traffic:** All aircraft in flight or operating on the manoeuvring area of an aerodrome.

**Air Traffic Control Service:** A service provided for the purpose of:

- a) Preventing collisions:
  - 1) Between aircraft, and
  - 2) On the manoeuvring area between aircraft and obstructions; and
- b) Expediting and maintaining an orderly flow of air traffic.

**Air Traffic Flow Management (ATFM):** A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

**Air Traffic Management (ATM):** The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

#### **Delegated or Assigned Airspace of a Sovereign State**

Delegated airspace refers to airspace for which the provision of air traffic services or air navigation services have been delegated to a state or FIR either by ICAO or by a state due to contingency.

**Incident:** An occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of operation.

**Level 1 Contingency:** Partial system failure or degradation of ATM system that can be managed within the FIR or ACC with the local contingency plan or facilities.

**Level 2 Contingency:** Total failure of the entire ATM system or air navigation system requiring the assistance or intervention of adjacent FIR(s) for the provision of ATS.

**Level 3 Contingency:** Total failure of the entire ATM system or air navigation system requiring the avoidance of the concerned FIR or portion of airspace.

**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.

**Primary Surveillance Radar (PSR):** A surveillance radar system which uses reflected radio signals.

**Secondary Surveillance Radar (SSR):** A surveillance radar system that uses transmitters/receivers (interrogators) and transponders.

**Safety Management System:** A system for the management of safety at aerodromes including the organization structure, responsibilities, procedures, process and provisions for the implementation of aerodrome safety policies by an aerodrome operator, which provides for the control of safety at, and the safe use of the aerodrome.

**Safety:** The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

**State Safety Programme (SSP):** An integrated set of regulations and activities aimed at improving safety.

## ACRONYMS

<b>Abbreviation</b>	<b>Decode</b>
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AFI	Africa and Indian Ocean
AFTN	Aeronautical Fixed Telecommunication Network
AFICCT	AFI Regional Contingency Coordinating Team
AIDC	ATS Inter-facility Data Communications
AIM	Aeronautical Information Management
AIRAC	Aeronautical Information Regulation and Control
AMHS	ATS Message Handling System
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider
APIRG	AFI Planning and Implementation Regional Group
ASBU	Aviation System Block Upgrade
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service
ATS	Air Traffic Services
ATM	Air Traffic Management
ACDM	Airport Collaborative Decision-Making
AOCG	ATM Operational Contingency Group
CAR	Contingency Avoidance Route
CCC	Central Coordinating Committee
CCT	Contingency Coordination Team
CCA WG	Contingency Coordination Airlines Working Group
CDM	Collaborative Decision Making
CFIT	Controlled Flight into Terrain
CLAM	Cleared Level Adherence Monitoring
CNS	Communications, Navigation, Surveillance
CPDLC	Controller Pilot Data-link Communications
CTA	Control Area
CTR	Control Zone
CR	Contingency Route
DME	Distance Measuring Equipment
ESAF	East and Southern African Office
FIR	Flight Information Region
FLAS	Flight Level Allocation Scheme
FUA	Flexible Use Airspace
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
IATA	International Air Transport Association
IFALPA	International Federation of Airline Pilots' Association
IFATCA	International Federation of Air Traffic Controllers' Association
ICAO	International Civil Aviation Organization
IMC	Instrument Meteorological Conditions
KCAA	Kenya Civil Aviation Authority
LoA/P	Letter of Agreement/Procedure
MANSOPS	Manual of Air Navigation Services Operations
MET	Meteorological

METAR	Meteorological Aerodrome Report
MLAT	Multilateration
NAOCG	Nairobi ATM Operational Contingency Group
NOF	International NOTAM Office
PBN	Performance-based Navigation
RAM	Route Adherence Monitoring
RANP	Regional Air Navigation Plan
RNAV	Area Navigation
RNP	Required Navigation Performance
RVSM	Reduced Vertical Separation Minimum
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SBAS	Space Based Augmentation System
SIGMET	Significant Meteorological Information
SMS	Safety Management Systems
STCA	Short Term Conflict Alert
SUA	Special Use of Airspace
SWIM	System-Wide Information Management
TAF	Terminal Area Forecast
TMA	Terminal Control Area
TBO	Trajectory Based Operations
TCAS	Traffic Collision Avoidance System
TOC	Transfer of Control
VHF	Very High Frequency
VNAV	Vertical Navigation
VAAC	Volcanic Ash Advisory Centre
VMC	Visual Meteorological Conditions
VOLMET	Meteorological Information for Aircraft in Flight
VOR	Very High Frequency Omni-directional Radio Range
WACAF	West and Central African Region
WAFC	World Area Forecast Centre

## **1. OBJECTIVES OF THE NATIONAL ATM CONTINGENCY PLAN**

- 1.1 The objectives of the National Contingency Plan are to:
- a) Provide a contingency response framework for the State to ensure the safe, expeditious, effective and secure management of aircraft operations within the FIR including transiting between other FIRs, during contingency events;
  - b) Ensure timely, harmonized and appropriate responses to all events resulting in disruption to the provision of Air Traffic Services (ATS), or in which ATS is involved, and hence to normal aircraft movement; and
  - c) Provide a greater degree of certainty for airspace and aerodrome users during contingency operations.
  - d) Provide the ATS procedures and contingency route structure using existing airways in most cases that will allow aircraft operators to transit the Nairobi FIR.

## **2. REGULATORY REQUIREMENTS FOR IMPLEMENTATION OF CONTINGENCY PLANS**

The Civil Aviation Act and Civil Aviation (Air Traffic Services) Regulations require the appropriate air traffic services authority to develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption of air traffic services and related supporting services in the airspace for which they are responsible for the provision of such services.

The National Contingency plan shall be approved by the Authority pursuant to the procedures established by the Authority.

## **3. SCOPE OF THE REGIONAL CONTINGENCY PLAN**

3.1 The Nairobi FIR Contingency Plan is structured to provide contingency measures or procedures to manage the following contingencies:

- a) Breakdown or interruption of the ATM system (Communication Navigation, Surveillance, ATM Operations and Human Factors);
- b) Natural disasters (Volcanic Eruption, Earthquakes, Tsunami, Extreme Weather, etc.);
- c) Industrial action or labour unrest affecting Air Navigation Services;
- d) Security challenges affecting Air Navigation System (Military Conflict, Acts of Unlawful Interference, conflict zones, etc.),
- e) Public Health Emergencies;
- f) Facilitate waivers or timely approvals of over-flight permit or clearance during contingency,
- g) Facilitate the exchange of safety critical or operational information between affected States/FIRs and users, and
- h) State exercising its sovereignty, sanctions over a state or territory, etc.

- 3.2 The Plan is also structured to provide:
- a) Regional contingency planning elements;
  - b) Analysis of the current regional contingency planning status;
  - c) A performance improvement plan;
  - d) Considerations for research and future development; and
  - e) Milestones, timelines, priorities and actions.

#### **4. INTRODUCTION TO NAIROBI FIR ATM CONTINGENCY PLAN**

This document is produced in accordance with the requirement of Civil Aviation (Air Traffic Services) Regulations.

The Air Traffic Management (ATM) Contingency Plan (referred herein as 'The Plan') contains details of the arrangements in place to ensure, to the extent possible and as far as practicable, the continued safety of air navigation in the event of partial or total disruption of Air Traffic Services within the Nairobi FIR.

The plan may also be activated in cases where airspace users decided to circumnavigate airspace(s) due to conflict zones, weather, etc. which might significantly increase the air traffic flow in other airspace(s), thereby constraining ATC facilities in those airspace(s).

The plan details common procedures throughout Nairobi FIR, as well as Level 1 contingency procedures that are specific to individual ANS stations which may be found in the respective station MANSOPs.

A set of Contingency Routes (CRs) have been developed and are contained in this Plan, based on the major air traffic flows patterns in the AFI Region.

The Contingency Routes – CRs are based mainly on existing routes network. However, Nairobi FIR, in consultation with airspace users, may establish temporary routes to be able to accommodate extra traffic in a safe and expeditious manner.

ICAO may temporarily assign responsibility for providing air traffic services in airspace over the high seas in the event of a contingency or potential contingency to another State. Such decisions shall be taken in consultation with adjacent States and users.

##### **4.1 STRUCTURE OF THE NAIROBI FIR REGIONAL CONTINGENCY PLAN**

The appropriate ATS authority is responsible for providing air traffic services and related supporting services in the Nairobi Flight Information Region and also responsible, in the event of disruption or potential disruption of these services, for instituting measures to ensure the safety of international civil aviation operations and, where possible, for making provisions for alternative facilities and services. To that end the appropriate ATS authority has developed, promulgated and will implement these contingency plans. This Plan has been developed in consultation with authorities responsible for provision of air traffic services in neighboring States, airspace users concerned and with ICAO, as appropriate. This Plan also incorporates elements of the AFI Regional contingency plan falling within the Nairobi FIR.

The responsibility for appropriate contingency action in respect of airspace over the high seas for which Kenya is responsible shall continue to rest with the appropriate ATS authority until, and unless, that responsibility is temporarily reassigned by ICAO to (an)other State(s).

**4.2** The ATM Contingency Plan consist of:

- a) ICAO ESAF Regional Offices,
- b) Nairobi FIR Central Coordinating Committee (CCC),
- c) Nairobi FIR ATM Operations Coordination Group (NAOCG),
- d) ATM Contingency Focal Points.

## 5. STATES AND FLIGHT INFORMATION REGIONS AFFECTED

In the event KCAA activates this Contingency Plan, adjacent States and civil aviation authorities responsible for air navigation services in the adjacent FIRs will be notified in accordance with the Letters of Procedures (LoPs) established between KCAA and adjacent FIRs concerned. The adjacent States, FIRs and ATS units directly affected by this Contingency Plan are as follows:

- |                   |                      |
|-------------------|----------------------|
| <b>a) State:</b>  | <b>Tanzania</b>      |
| Name of FIR:      | Dar es Salaam        |
| Name of ACC:      | Dar Control          |
| <b>b) State:</b>  | <b>Uganda</b>        |
| Name of FIR:      | Entebbe              |
| Name of ACC:      | Entebbe Control      |
| <b>c) State:</b>  | <b>Sudan</b>         |
| Name of FIR:      | Khartoum             |
| Name of ACC:      | Khartoum Control     |
| <b>d) State:</b>  | <b>Ethiopia</b>      |
| Name of FIR:      | Addis Ababa          |
| Name of ACC:      | Addis Ababa Control  |
| <b>e) State:</b>  | <b>Somalia</b>       |
| Name of FIR:      | Mogadishu            |
| Name of ACC:      | Mogadishu Control    |
| <b>f) State:</b>  | <b>Seychelles</b>    |
| Name of FIR:      | Seychelles           |
| Name of ACC:      | Seychelles Control   |
| <b>g) State:</b>  | <b>Tanzania</b>      |
| Name of FIR:      | Dar es Salaam        |
| Name of ATS Unit: | Kilimanjaro Approach |
| <b>h) State:</b>  | <b>Seychelles</b>    |



Name of FIR: Seychelles  
Name of FIC: Seychelles Control

- i) State: South Sudan**  
Name of FIR: Juba  
Name of ATS Unit: Juba Approach/ Aerodrome

The contact details of the civil aviation authorities and organizations concerned are contained in Appendix A to this Document. These details will be kept up to date in accordance with Letters of Procedure and the Contingency Plan will be updated accordingly.

## 6. NAIROBI FIR LEVEL 2 & 3 CONTINGENCY ROUTES STRUCTURE

- 6.1** In the event of disruption of the ATS provided by Nairobi ACC, contingency routes will be used to ensure safety of flights and to facilitate limited flight operations commensurate with the prevailing conditions. Existing ATS routes form the basis of the contingency routes to be used and a flight level assignment scheme shall be introduced to minimise potential points of conflict and to limit the number of aircraft operating simultaneously in the system under reduced air traffic services, including surveillance.
- 6.2** The contingency route structure for international flights is detailed in Appendix C to this document. Additional contingency routes will be introduced as and when circumstances require, such as in the case of volcanic ash formation.
- 6.3** In regard to domestic operations, if circumstances dictate, all flights shall be temporarily suspended until a full assessment of the prevailing conditions has been done and/or sufficient air traffic services restored. A decision to curtail or restart domestic operations will be made by the CCC.
- 6.4** Aircraft on long-haul international flights and special operations (e.g. Search and Rescue, State Aircraft, humanitarian flights etc.) shall be afforded priority for levels starting from FL290 and above.
- 6.5** International and domestic operators affected by the suspension of all operations from major airports in Kenya by the relevant ATS Units shall be informed when operations may be resumed, and flight planning information will be made available pertaining to those airports. International flights which have received such approval may be required to file flight plans via domestic routes to join international contingency routes.
- 6.6** International operators may elect to route around the Nairobi FIR if this will satisfy operational requirements of their companies. In such instances, the contingency routes to be used will be provided by States providing air traffic services in the adjacent FIRs concerned (*Appendix F Part 2*).

## **7. MANAGEMENT OF THE NAIROBI FIR ATM CONTINGENCY PLAN**

The contingency measures set out in this Plan are based on known, foreseeable or probable impact of interruptions in ATS, caused by natural occurrences or other circumstances, which, in one way or another may partially or totally disrupt the provision of ATS and/or related support services in the Nairobi FIR or make the airspace unavailable or unsafe for use.

The following arrangements have been put in place to support management of the Contingency Plan in order to ensure that international flights may continue in a safe and orderly manner through the Nairobi FIR.

### **7.1 ICAO ESAF**

ICAO will initiate and coordinate appropriate contingency action in the event of disruption of air traffic services and related supporting services affecting international civil aviation operations provided by a State wherein, for some reason, the authorities cannot adequately discharge the responsibility.

ICAO will also initiate and coordinate appropriate contingency action at the request of Nairobi FIR.

The ICAO ESAF Regional Office will coordinate with ICAO HQ and other relevant Regional Offices any amendment to the Regional Contingency Plan and will also distribute this contingency plan to all relevant States and international organizations within the region. All AFI States Contingency Plans will be posted in the ICAO website.

### **7.2 Central Coordinating Committee**

Whenever circumstances permit, as soon as practicable in advance of, or after a contingency event has occurred, the Director Air Navigation Services shall convene the Central Coordinating Committee (CCC) comprising of:

- 1) Director Air Navigation Services;
- 2) Manager Air Traffic Services;
- 3) Manager Air Navigation Services JKIA
- 4) Chief ATM En-route;
- 5) Aeronautical Search and Rescue (SAR) Coordinator
- 6) Safety Management System (SMS) Coordinator
- 7) Other agencies and stakeholders considered necessary and as may be appropriate (e.g. KAA, KDF, Police Service, Aircraft Operators, etc.).

The Central Coordinating Committee (CCC) shall oversee the conduct of the Contingency Plan and in the event that the Nairobi ACC premises are out of service for an extended period, make arrangements for and facilitate the temporary relocation of the Nairobi ACC to a **Temporary ACC** and the restoration of ATS services. The Terms of Reference (TOR) for the CCC will be determined by the Director ANS in consultation with applicable stakeholders and will be updated periodically and circulated to members of the CCC.

Contact details of the CCC members are provided in **Appendix B** to this document.

### **7.3 Nairobi ATM Operational Contingency Group**

The Nairobi ATM Operational Contingency Group (NAOCG) will be convened by the CCC with a primary responsibility to oversee the day-to-day operations under the contingency arrangements and coordinate operational ATS activities 24 hours a day, throughout the contingency period. The terms of reference of the NAOCG will be determined by the CCC. The members of NAOCG will include specialised personnel from the following disciplines:

- Air Traffic Management (ATM)
- Aeronautical Information Management (AIM)
- Communication, Navigation and Surveillance (CNS)
- Aeronautical Meteorology (MET)
- Aeronautical Search and Rescue (SAR)
- Safety Management Systems (SMS)

The tasks of the NAOCG shall include the following actions:

- (i) Review and update of the Nairobi FIR ATM Contingency Plan as necessary;
- (ii) Keep up to date at all times of the contingency situation;
- (iii) Organize contingency teams in each of the specialised areas;
- (iv) Keep in touch with and update the ICAO ESAF Regional Office, operators and IATA Regional office;
- (v) Exchange up to date information with adjacent ATS authorities concerned to coordinate contingency activities;
- (vi) Notify the designated ATM organisations in Tanzania, Uganda, Sudan, Ethiopia, Somalia and Seychelles of the contingency situation sufficiently in advance or as soon as practical thereafter; and
- (vii) Issue NOTAM according to the corresponding contingency situation related to this plan or as otherwise required. If the situation is foreseeable sufficiently in advance, a NOTAM will be issued at least 48 hours in advance.

The NAOCG shall also make assessment of risk to civil air traffic due to military conflict or acts of unlawful interference with civil aviation as well as a review of the likelihood and possible consequences of natural disasters or public health emergencies and take appropriate preparatory action.

### **7.4 HKNA ATM CONTINGENCY PLAN FOCAL POINT**

HKNA FIR shall appoint a Focal Point and an Alternate Focal Point for the purpose of liaising with ICAO AFI Contingency Coordinating Team (CCT), ICAO Regional Office, as well as IATA or other airline operators, etc.

The State/Focal Point shall serve as representatives of the HKNA FIR in the ICAO AFI CCT.

## **7.5 CONTINGENCY COORDINATION AIRLINES WORKING GROUP (CCAWG)**

The purpose of the group is to provide airlines with a platform to identify lessons learned during a contingency, undertake review of the planning, pre-activation, activation and post activation phases of the contingency and to contribute to the enhancement of the functions of the AFI Contingency Coordination Team (CCT), as well as safety and efficiency of flight operations.

## **8. LEVELS OF ATM CONTINGENCY**

### **8.1 Levels of ATM contingencies that determine the planning for the effective management of contingencies:**

#### **Level 1 Contingencies:**

This refers to partial system failure or degradation of the ATM system that can be managed within the FIR or ATS unit with the local contingency plan or facilities.

HKNA FIR level 1 contingencies such as failure of primary communication, navigation, surveillance or ATM system not requiring intervention of adjacent FIR or State are contained in the respective ANS Unit MANSOPS.

In level 1 contingency, users may expect to fly within the affected airspace but with limited ATS such as no surveillance services, limited voice communication, increased separation, delays or application of ATFM measures.

#### **Level 2 Contingencies:**

This refers to total failure of an entire ATM system or air navigation system requiring the assistance or intervention of an ATS Unit located in another FIR for the provision of ATS.

Under Level 2 Contingencies, the HKNA FIR is considered safe, but the responsible ATS Unit is unable to provide adequate ATS due to contingency events such as industrial action, public health emergency, earthquake, nuclear emergency, etc.

In level 2 contingency users may expect to fly within the affected airspace but with limited ATS within specified contingency routes or Simplified Route Network with the application of flight level allocation scheme.

#### **Level 3 Contingencies:**

Total unavailability of the HKNA airspace or FIR requiring the avoidance of the concerned FIR or portion of airspace.

Under level 3 contingency, the airspace is closed and users are required to avoid the HKNA airspace. Level 3 contingencies may include:

- a) Airspace Not Safe, due to causal events such as industrial action, earthquake, nuclear emergency, etc. affecting the provision of ATS.
- b) Airspace Not Secured due to contingency events such as military activity, military conflict, war, terrorist activities, unlawful interference, etc. necessitating the avoidance of such airspace.
- c) Airspace Not Available, due to causal events such as national security-political decisions, civil unrest, imposition of sanctions, etc. necessitating the avoidance of such airspace.

## **8.2 GUIDELINES FOR LEVEL 1 CONTINGENCY FOR NAIROBI FIR**

Each ANS station shall establish internal procedures for management of Level 1 or domestic contingencies that may not require the intervention of adjacent FIRs.

Each ANS station shall provide for the establishment and operation of an ATM Operational Contingency Coordination Group (AOCG). Contingency arrangements and procedures for the activation of the ATM Operational Contingency Group (AOCG) function should be developed and included in the station MANSOPs.

Human performance-based training and procedures for response to ATM contingency operations for all staff providing related ATS, Flight Information, Aeronautical Information, Aeronautical Telecommunication and CNS equipment maintenance staff should be developed and implemented.

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

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

NOTAM issuance on level 1 contingency shall indicate the ATS services available and the applicable separation minima, as well as airspace classification.

## **8.3 GUIDELINES FOR LEVEL 2 CONTINGENCIES (TEMPORARY DELEGATION OF PROVISION OF ATS)**

Nairobi FIR shall establish internal procedures for management of Level 2 contingencies requiring delegation of the provision of ATS to adjacent States/FIRs.

Sovereign airspace over Nairobi FIR can be used only with the consent of the relevant authorities of the State.

The delegation of airspace or FIR under level 2 contingency shall be as captured in the LOA/LOP between concerned States.

Human performance-based training and procedures for response to ATM contingency operations for all staff providing related ATS, Flight Information, Aeronautical Information, Aeronautical Telecommunication and CNS equipment maintenance staff should be developed and implemented.

Programmes for regular desktop and inter-unit coordinated exercises of all Level 2 contingency plans shall be developed and implemented.

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

Details of contingency ATS routes and associated flight level allocation schemes are published in Kenyan AIP (Section ENR 6.6.1).

Operational personnel such as ATM, AIM and other stakeholders shall be sensitized on the published Contingency Plans including the contingency routes.

Relevant sections of contingency plans that may have an effect on international flights shall be made available to airspace users on the air navigation service provider's public internet website, and the hyperlink provided to ICAO ESAC Regional Office for inclusion into the Regional ATM Contingency Plan.

States shall develop and implement Level 2 contingency arrangements and should be formalized through an MOU for all cases where the pre-activation or activation of a Level 2 contingency plan would impact upon ATS within the area of responsibility of a neighbouring State/FIR.

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

Nairobi FIR Contingency ATS Route and FLAS structures shall be harmonized with those of all neighbouring FIRs as captured in the LOAs/LOPs.

#### **8.4 GUIDELINES FOR LEVEL 3 CONTINGENCIES REQUIRING AVOIDANCE OF NAIROBI FIR**

Nairobi FIR shall develop and implement Level 3 contingency arrangements and shall be formalized for all cases where the pre-activation or activation of a Level 3 contingency plan would impact upon ATS within the area of responsibility of a neighbouring State.

Level 3 contingency arrangements shall include procedures for the tactical definition and promulgation by NOTAM of contingency ATS routes to avoid airspace affected by contingency requiring the avoidance of the Nairobi FIR.

Adjacent States affected by level 3 contingency: rerouting and traffic overload may apply appropriate ATFM measures to accommodate the increased traffic flow, where applicable.

Human performance-based training and procedures for response to ATM contingency operations for all staff providing related ATS, Flight Information, Aeronautical Information,

Aeronautical Telecommunication and CNS equipment maintenance staff shall be developed and implemented.

Programs for regular desktop and inter-unit coordinated exercises of all Level 3 contingency plans shall be developed and implemented.

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

Details of contingency ATS routes and associated flight level allocation schemes are published in Kenyan AIP (Section ENR 6.6.1).

State publication of Contingency Routes in the Kenyan AIP shall only include ATS Routes within the Nairobi FIR and not inclusive of any ATS Route in adjacent FIR or State, unless prior coordinated and agreed upon.

Nairobi FIR shall ensure that their National ATM Contingency Plans indicate where applicable, elements of deviation from the Regional Air Navigation Plan that will require the approval of the ICAO Council President. Such deviations may include delegation of the provision of ATS to adjacent State/FIRs, newly established Contingency Routes, etc.

## **8.5 PROCEDURES FOR ACTIVATION AND DEACTIVATION OF CONTINGENCY PLAN**

The Nairobi FIR ATM Contingency Plans shall provide procedures for activation or initiation of Contingency Plans as well as procedures for termination of such plans. The activation and termination of such plans shall be via NOTAM issued by Nairobi FIR.

The CCC shall inform ICAO, the AFI CCT and adjacent FIR as appropriate.

This NOTAM shall be issued at least 48 hours prior to the commencement of the contingency operations, where practicable. However, where the state activating the contingency is unable to issue NOTAM due to the failure or degradation of the AIM system, then the State delegated to provide the Air Traffic Services shall issue the NOTAM activating the contingency plan.

In the event that ATS cannot be provided in the HKNA FIR:

- i) The HKNA FIR, where practicable, shall issue NOTAM for the activation of the Contingency Plan after due consultations by the Central Coordinating Team.
- ii) The adjacent FIR assigned or delegated to provide ATS in the Contingency Plan, shall after due notification by appropriate ATS authority of the HKNA FIR, issue a NOTAM for the activation of the Contingency Plan.
- iii) Affected states in adjacent FIRs can inform ICAO to request them to issue a NOTAM activating the Contingency Plan.

A NOTAM shall be issued indicating the following, as a minimum requirement:

- a) Time and date of the beginning of the contingency measures;
- b) Airspace available for landing and overflying traffic and airspace to be avoided;

- c) Details of the facilities and services available or not available and any limitations on ATS provision (e.g., ACC, APP, TWR and FIC),
- d) Duration of the contingency or an expected date of restoration of services if available;
- e) Flight level allocation scheme (FLAS) if different from those defined in **Appendix C** to this document;
- f) Information on the provisions made for alternative services;
- g) Any changes to the ATS contingency routes contained in this Plan;
- h) Any special procedures to be followed by neighbouring ATS units not covered by this Plan;
- i) Any special procedures to be followed by pilots; and
- j) Any other details with respect to the disruption and actions being taken that aircraft operators may find useful.

In the event that the HKNA NOTAM Office is unable to issue the NOTAM, the delegated International NOTAM Office at adjacent FIRs will take action to issue the NOTAM pertaining to the status or closure of airspace upon notification by HKNA FIR or ICAO /ESAF Regional Office.

## 9. PILOT OPERATING PROCEDURES

### 9.1 Aircraft overflying the Nairobi FIR shall follow the following procedures:

All aircraft proceeding along the ATS routes established in this Contingency Plan will comply with the Instrument Flight Rules (IFR) and will be assigned and maintain a flight level in accordance with the flight level allocation scheme (FLAS) applicable to the route(s) being flown as specified in **Appendix C** to this document.

Flights are to file flight plans using the Contingency Routes specified in **Appendix C** to this document, according to their airport of origin, routing and destination.

Pilots are to keep a continuous watch on the specified contingency radio frequencies as specified in the Letters of Agreement and transmit position information and estimates in accordance with normal ATC position reporting procedures using the English language.

Pilots are to maintain during their entire flight time within Nairobi FIR, the flight level last assigned by the last ACC or ATS unit responsible for the provision of ATC service, prior to the aircraft entering the Nairobi FIR. In the event that the last assigned flight level does not correspond to the flight level allocation scheme (FLAS) applicable to the Nairobi Contingency Plan, the pilot should establish contact with the ATS unit responsible for the provision of service to clarify, and if unable, shall adjust to the FLAS as soon as possible once in the contingency airspace. The pilot shall, under no circumstances, change this level and Mach number, except in cases of emergency and for flight safety reasons. In addition, the last SSR transponder assigned shall be maintained or, if no transponder has been assigned, transmit on SSR code 2000.

Aircraft are to reach the flight level last assigned by the responsible ACC at least **10 minutes** before entering the Nairobi FIR or as otherwise instructed by the appropriate ATC unit in accordance with the Letters of Agreement.



Pilots are to include in their last position report prior to entering the Nairobi FIR, the estimated time over the entry point of the Nairobi FIR and the estimated time of arrival over the relevant exit points of the Nairobi FIR.

Pilots are to contact the next adjacent ACC as soon as possible, and at the latest, **10 minutes** before the estimated time of arrival over the FIR boundary exit points of Nairobi FIR whenever in-flight emergencies and/or flight safety reasons make it impossible to maintain the flight level assigned for transit of Nairobi FIR, pilots are to climb or descend well to the right of the centreline of the contingency route, and if deviating outside the Nairobi FIR, to immediately inform the ACC responsible for that airspace. Pilots are to make blind transmissions on 121.5 / 243 or 406 MHz and 126.9 MHz of the relevant emergency level change message, indicating the aircraft call sign, the aircraft position, the flight levels being vacated and crossed, etc ).

Cognizant of the fact that not all operational circumstances can be addressed by this Contingency Plan, pilots are to maintain a high level of alertness when operating in the Nairobi contingency airspace and take appropriate action to ensure safety of flight; and

Pilots need to be aware that in light of current international circumstances, a contingency routing requiring aircraft to operate off of normal traffic flows, could result in an intercept by military aircraft. Aircraft operators must therefore be familiar with international intercept procedures contained in ICAO Annex 2 – Rules of the Air, paragraph 3.8 and Appendix 2, Sections 2 and 3 and the requirement of Regulation 74 of the Civil Aviation (Rules of the Air) Regulations, 2013.

Pilots should maintain continuous listening watch on emergency frequencies 406 MHz and 121.5 MHz and IFBP frequency 126.9 MHz and should operate their transponder at all times during flight within the Nairobi FIR. Transponders should be set on a discrete code assigned by ATC or select code A2000 if ATC has not assigned a code.

If an aircraft is intercepted by another aircraft, the pilot shall immediately:

- a) Follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with international procedures;
- b) Notify, if possible, the appropriate ATS unit;
- c) Attempt to establish radio communication with the intercepting aircraft by making a general call on the emergency frequency 121.5MHz; and
- d) Set transponder code A7700, unless otherwise instructed by the appropriate ATS unit.
- e) If any instructions received by radio from any source conflict with those given by the intercepting aircraft, the intercepted aircraft shall request immediate clarification while continuing to comply with the instructions given by the intercepting aircraft.

## 10.COMMUNICATION PROCEDURES

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## **10.1 Procedures for Reduced/Loss of Radio Communication**

When operating within the contingency airspace of Nairobi FIR, pilots should use normal radio communication procedures where ATS services are available or as otherwise notified by NOTAM.

If communication is lost on the normal ATS frequencies allocated, pilots should try the next applicable frequency, e.g. if en-route contact is lost then try the next appropriate handover frequency. It should be expected that loss of communication may be temporary. As such, if following the loss of communication pilots are still unable to establish two-way radio communication on other frequencies, pilots should consider periodic attempts on the frequency on which two-way radio communication was lost. In any case, in the absence of two-way communication with ATC, pilots should continue to make routine position reports on the appropriate frequencies and broadcast positions on the specified contingency frequencies.

## **10.2 Communication frequencies**

A list of frequencies to be used for the contingency routes and the ATS units providing flight information service (FIS) and air-ground communication monitoring for the Nairobi FIR is detailed at **Appendix F** to this document.

## **11. OVERFLIGHT APPROVAL**

Aircraft operators should obtain overflight approval from States / Territories / International Organizations for flights operating through their jurisdiction of airspace, where required. In a contingency situation, flights may be rerouted at short notice and it may not be possible for operators to give the required advance notice in a timely manner to obtain approval.

States/Territories/International Organizations responsible for the airspace in which contingency routes are established should consider making special arrangements to expedite flight approvals in these contingency situations.

## **12. FLIGHT LEVEL ALLOCATION SCHEME**

HKNA FIR Flight Level Allocation Scheme (FLAS) is in Appendix C/D of this Contingency Plan. The FLAS provides strategic separation for aircraft operations within an airspace affected by a level 2 or 3 contingency. The objective of a FLAS is to de-conflict operations on crossing or converging contingency routes. Where possible, aircraft on long-haul international flights shall be given priority with respect to the assignment of cruising levels.

## **13. TRANSFER OF CONTROL POINTS**

The Transfer of Control Points between HKNA FIR and adjacent ACCs/FIRs in a level 2 or 3 contingency shall be the existing or designated Transfer of Control Points on the contingency

routes as shown on Appendix C to this plan. However, operational capacity may necessitate the designation of new transfer of control points during a contingency.

### **13. SEAMLESS SSR CODES ALLOCATION SCHEME**

The State/FIR/ATS Unit delegated to provide ATS within HKNA contingency airspace shall be responsible for the assignment of SSR Codes for flights operating in, out or over the HKNA, FIR or ATS Unit.

The SSR Codes to be assigned to flights into, out of, or over HKNA contingency airspace or FIR shall be in accordance with any existing Seamless SSR Codes Allocation Scheme between the HKNA FIR and adjacent ACC/FIR, provided the delegated ACC/FIR has radar coverage over the HKNA airspace or FIR. However, where contingency SSR Codes assignment is provided in the MOU between HKNA ACC/FIR and the delegated ACC/FIR, then the SSR Codes contained in the MOU shall supersede other SSR allocation schemes.

### **14. OVER-FLIGHT APPROVAL**

Aircraft operators are required to obtain over-flight approval from Nairobi FIR in accordance with the procedures and requirements.

In a Level 2 contingency situation, the State can delegate to another State the duty to transmit that a permit has been issued and flights can be continued in the Nairobi FIR in case of contingency but not the responsibility for approval for overflights requests.

The AFI CCT shall facilitate waiver or expeditious approval of over-flight permit or clearance in level 3 contingency with the other FIRs affected by deviations or re-routings.

Aircraft operators should note however that over-flight approval remains the responsibility of the State whose territory is to be overflown, except delegated to adjacent State.

### **15. NOTIFICATION PROCEDURES DURING LEVEL 1, 2 & 3 CONTINGENCY OPERATIONS**

In the event of activation of level 1, 2 or 3 contingency procedures, the HKNA FIR shall where practicable, notify ICAO, AFI CCT, all affected agencies, ACCs, FIRs and operators as appropriate. However, where this is not practicable due to the level of the contingency, then the delegated State/FIR shall notify ICAO, AFI CCT, all affected ACCs, FIRs and operators as appropriate.

In level 1 and 2 contingency events resulting in limited service situations, the CCC will decide upon the level of notification necessary and take action as required to disseminate the information.

In a level 2 and 3 contingencies events resulting in no service situations, the NAOCC will issue NOTAMS and broadcast on appropriate frequencies that contingency procedures have been initiated or activated.

IATA member airlines and other operators encountering contingency events within HKNA FIR affecting safety or security of flight operations are required to immediately report such events or occurrences to the ICAO Regional Office or IATA Regional Office for immediate mitigation action and dissemination to other airspace users and affected States/FIRs.

## **16. CONTINGENCY IMPLEMENTATION MONITORING**

The AFI Region Contingency Coordination Team (AFI CCT) headed by the relevant ICAO ATM/SAR Regional Officer shall be responsible for the coordination and monitoring of the implementation of contingency procedures as published by the HKNA FIR. The AFI CCT shall maintain close liaison with the Point of Contact designated by the HKNA FIR, as well as adjacent State/FIR designated or delegated to provide ATS on behalf of the HKNA FIR.

IATA representative in the CCT shall be responsible for the exchange and dissemination of safety critical information between operators and the CCT.

In a contingency situation whereby the HKNA FIR is unable to activate the contingency (level 2 or 3), the AFI CCT in coordination with adjacent States/FIRs, the Authority can advise the ICAO Regional Office and ICAO Headquarters Montreal, on the possibility of designating or delegating the provision of ATS in the HKNA FIR by an adjacent State/FIR or as stipulated in the contingency plan of the HKNA FIR.

The AFI CCT shall continuously coordinate with the HKNA Central Coordinating Committee. The AFI CCT shall also ensure the timely dissemination of information to all airspace users, especially international operators, through the IATA Representative in the AFI CCT, etc.

## **17. REPORTING PROCEDURES DURING AND AFTER CONTINGENCY OPERATIONS**

The Point of Contact at the State/FIR level shall ensure timely provision of updates or progress reports to the AFI CCT during and after the contingency situation. Thus, the HKNA FIR shall submit a comprehensive report to the ICAO ESAF Regional Office detailing the volume of traffic operations over the contingency airspace, operational challenges encountered, safety reports, as well as recommended action.

## **18. SWITCHOVER PLAN FOR TRANSITION FROM NORMAL PROVISION OF ATS TO DELEGATED PROVISION OF ATS**

States/FIRs, where practicable, are encouraged to develop Switchover Plans for transition from normal provision of ATS to delegated provision of ATS, and back to normal provision of ATS, in the event of a level 2 or 3 contingency.

The switchover plan shall where practicable, indicate the switchover date, switchover time, affected airspace/FIR, controlling authority, communication frequencies, contingency routes, transfer of control points, etc.

During times of uncertainty when airspace closure seem possible, aircraft operators should be prepared for a possible change in routing while en-route. They should therefore have

familiarization of the alternative routes outlined in the contingency plan as well as what may be promulgated by a State via NOTAM or AIP.

In the event of airspace closure that has not been promulgated, ATC will, if possible, broadcast to all aircraft in their airspace, what airspace is being closed and to stand by for further instructions.

ATS providers should recognize that when closures of airspace are promulgated, individual airlines might have different company requirements as to their alternative routings. ATC should be alert to respond to any request by aircraft and react commensurate with safety.

## **19. ATS SUPPORT SERVICES**

### **19.1 Aeronautical Information Management (AIM)**

NOTAM services will be used optimally to mitigate against loss of radio and other forms of communication in Nairobi FIR. NOTAMs will be used as necessary to support coordination and operational procedures that would be established before, during and after any contingency phase.

### **19.2 Aeronautical Meteorological Services (MET)**

It is expected that the aeronautical MET services provided by Kenya Meteorological Agency would continue to be available in the event of an ATS contingency situation. However, should ATS services for the Nairobi FIR be withdrawn, timely MET information may not be immediately available to aircraft in flight. Alternative means of obtaining up to date MET information concerning the Nairobi FIR will be provided to the extent possible through the adjacent ATS authorities.

## **20. SEARCH AND RESCUE**

### **20.1 Notification and Coordination**

The SAR authority responsible for the Nairobi SRR is:

Name: Kenya Civil Aviation Authority (KCAA) Address: P.O.  
Box 30163-00100  
Nairobi, Kenya

Telephone: +254(20) 6827026  
E-mail [sar@kcaa.or.ke](mailto:sar@kcaa.or.ke)

The SAR Point of Contact (SPOC) is:

Name: Mr. Alfred Wagura  
Tel: +254 722 331848;  
E-mail: [awagura@kcaa.or.ke](mailto:awagura@kcaa.or.ke)

In the event that the Nairobi ACC is not available to coordinate a given SAR operation, the responsibility for coordination will revert to Dar es Salaam ACC or Entebbe ACC.

## 21.VOLCANIC ASH CONTINGENCY PLAN

Within and adjacent to the Africa and Indian Ocean (AFI) Region) there are areas of volcanic activity which are likely to affect flights in the AFI Regions.

The major volcanoes in the region are located in the following States: Algeria, Cameroon, Cape Verde Islands, Chad, Comoros Island, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, France (Reunion Island), Kenya, Madagascar, Mali, Niger, Nigeria, Rwanda, Sao Tome and Principe, Spain (Canary Islands, Madeira), Sudan, Tanzania and Uganda. The names of the concerned volcano are listed in **Appendix H**.

This plan sets out standardised guidelines and procedures for the provision of information to airlines and en-route aircraft before and during a volcanic eruption. Volcanic contamination, of which volcanic ash is the most serious, is a hazard for safe flight operations. Mitigating the hazards posed by volcanic ash in the atmosphere and/or at the aerodrome cannot be resolved in isolation but through collaborative decision-making (CDM) involving all stakeholders concerned.

During an eruption volcanic contamination can reach and exceed the cruising altitudes of turbine-powered aircraft within minutes and spread over vast geographical areas within a few days.

This plan also sets out standardised guidelines for the coordination of information and the alerting of aircraft before and during a volcanic eruption and procedures to be followed. Volcanic ash is a hazard to flight operations. It is important to note that other contaminants are also associated with volcanic activity. To mitigate the hazards of volcanic contamination aircraft operators need to obtain information and support from many different sources including Air Traffic Management (ATM). The management of air traffic will be impacted proportionally to the extent and nature of the contamination. The issue cannot be resolved by individual stakeholders in isolation but needs collaborative decision making (CDM) involving all entities concerned.

Contingency planning for major service disruptions, such as that caused by volcanic ash, needs to encompass the whole ATM Community as defined in ICAO's *Global Air Traffic Management Operational Concept* (Doc 9854) . While general provisions exist for ATM Contingency Planning in Annex 11 [*Air Traffic Services*] and in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444), and some aspects are addressed in the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691 and in the *Handbook on the International Airways Volcano Watch* (IAVW Handbook, Doc 9766), ICAO's International Volcanic Ash Task Force (IVATF) developed comprehensive Guidance Material for ATM Volcanic Ash Contingency Planning in the form of a template.

This plan focuses on the provision of ATM related services to airspace users within the frameworks of International Airways Volcano Watch (IAVW). It also establishes the connection to all relevant interfaces, such as the International Airways Volcano Watch, Meteorological Services, Flight Operations and Aerodromes.

The aircraft operator/ PIC has the full and final responsibility for the safety of flight operations in accordance with their Safety Risk Assessment (SRA) as accepted by KCAA. This includes the decision about operation in airspace where volcanic ash is present or forecast (Annexes 6 [*Operation of Aircraft*], and 19 [*Safety Management*]; *Manual on Flight Safety and Volcanic Ash* (Doc 9974) refer).

The Air Navigation Service Providers (ANSP) act to achieve the objectives of the *Air Traffic Services* (Annex 11), which are (inter alia) to:

- a) prevent collisions between aircraft;
- b) expedite and maintain an orderly flow of air traffic;
- c) provide advice and information useful for the safe and efficient conduct of flights.

The plan includes interfaces with AIS and MET services. Distribution of applicable AIS and MET messages related to volcanic ash are set out in relevant ICAO Annexes— namely *Annex 15— Aeronautical Information Services* and *Annex 3 – Meteorological Service for International Air Navigation*.

While small eruptions might only need a local response, significant or major eruptions are likely to trigger national, sub-regional, Regional or even global activities. The plan aims to ensure the highest level of service possible, to support safe and efficient flight operations in adverse conditions. The plan gives sufficient information guidance to operational personnel, describing the end-to-end processes and information flows and referencing relevant Standard and Recommended Practices (SARPs) and guidance material.

While it is firmly rooted in the ICAO SARPs, this contingency plan is intended to provide the enabling support structure to implement best practices that serve the needs of the ATM Community. Desired developments (e.g. an action plan on arrangements that still need to be implemented) may be listed as an attachment to support the planning of amendments and improvements.

The guidelines provided in this plan assume that the operators follow the ICAO requirements regarding Safety Management Systems (SMS). Volcanic ash can also affect the operation of aircraft at aerodromes. Volcanic ash deposition at an aerodrome, even in small amounts, can result in the closure of the aerodrome until all the deposited ash has been removed. In extreme cases, the aerodrome may no longer be available for operation at all, resulting in repercussions on the ATM system, e.g. diversions, revised traffic flows, congestion at alternate aerodromes etc. Detailed procedures and guidelines are contained in Attachment A to this document.

#### **PUBLIC HEALTH CONTINGENCY PLAN (PHCP)**

This **follows** notification to ATC by the crew of suspected communicable diseases, or other public health risk, on board an aircraft.

Flight crew shall, upon identifying a suspected case(s) of communicable disease, or other public health risk, on board the aircraft, notify the ATS unit without delay passing the following information:

- a) Aircraft identification;
- b) Departure aerodrome;

- c) Destination aerodrome;
- d) Estimated time of arrival;
- e) Number of persons on board;
- f) Number of suspected case(s) on board; and
- g) Nature of the public health risk, if known.

The ATS unit, upon receipt of information from a pilot regarding suspected case(s) of communicable disease, or other public health risk, on board the aircraft, shall forward a message as soon as possible to the ATS unit serving the destination/departure, unless procedures exist to notify the appropriate authority designated by the State and the aircraft operator or its designated representative.

When a report of a suspected case(s) of communicable disease, or other public health risk, on board an aircraft is received by an ATS unit serving the destination/ departure, from another ATS unit or from an aircraft or an aircraft operator, the unit concerned shall forward a message as soon as possible to the public health authority (PHA) or the appropriate authority designated by the State as well as the aircraft operator or its designated representative, and the aerodrome authority (PABX).

*Note 1.— See Annex 9 — Facilitation, Chapter 1 (Definitions), Chapter 8, 8.12 and 8.15, and Appendix 1, for relevant additional information related to the subject of communicable disease and public health risk on board an aircraft.*

*Note 2.— The PHA is expected to contact the airline representative or operating agency and aerodrome authority, if applicable, for subsequent coordination with the aircraft concerning clinical details and aerodrome preparation. Depending on the communications facilities available to the airline representative or operating agency, it may not be possible to communicate with the aircraft until it is closer to its destination. **Apart from the initial notification to the ATS unit whilst En-route, ATC communications channels are to be avoided.***

*Note 3.—The information to be provided to the departure aerodrome will prevent the potential spread of communicable disease, or other public health risk, through other aircraft departing from the same aerodrome.*

*Note 4.— AFTN (urgency message), telephone, facsimile or other means of transmission may be used including Controller Pilot Data Link Communication (CPDLC)*



**APPENDIX A: Contact details for all concerned States, IATA and accredited ICAO Regional Office**

State/ Organization	Point of contact	Telephone	E-mail
Kenya	Kenya Civil Aviation Authority	Tel: +254 20 6827 470-5 Tel: +254 72 680 6586 Fax: +254 20 6822 300	<a href="mailto:info@kcaa.or.ke">info@kcaa.or.ke</a> ; <a href="mailto:ats@kcaa.or.ke">ats@kcaa.or.ke</a>
Uganda	Uganda Civil Aviation Authority	Tel: +256 414 320 906 Tel: +256 414 352 000 Tel: +256 414 321 401 Fax: +256 41 320 964	<a href="mailto:aviation@caa.co.ug">aviation@caa.co.ug</a>
Seychelles	Seychelles ACC/FIC	Tel: +248 384 193 Fax: +248 384 009	<a href="mailto:atcc@scaa.sc">atcc@scaa.sc</a>
Tanzania	Tanzania Civil Aviation Authority		<a href="mailto:tcaa@tcaa.go.tz">tcaa@tcaa.go.tz</a>
Ethiopia			
South Sudan			
Somalia	Somalia Civil Aviation Authority		
<b>IATA</b>			
	Tanja Grobotek	Tel: +271 152 32714	<a href="mailto:grobotek@iata.org">grobotek@iata.org</a>
	Gaoussou Konate	Tel: +271 1523 2732 Fax: +271 1523 2702	<a href="mailto:konateg@iata.org">konateg@iata.org</a>
<b>ICAO ESAF</b>			
	Keziah A. Ogutu, RO ATM/SAR	Tel: +254 20 762 2372 Fax: +254 20 762 1092	<a href="mailto:kogutu@icao.int">kogutu@icao.int</a>
	Mr. Colin Bryant RO ATM/SAR	Tel: +254 20 762 2368 Fax: +254 20 762 1092	<a href="mailto:cbryant@icao.int">cbryant@icao.int</a>

## APPENDIX B: Contact details of the CCC members

State/ Organization	Point of contact	Telephone	E-mail
Kenya	Ms. Anne Gitau DANS	Tel: +254 720 776 802 Fax:	<a href="mailto:agitau@kcaa.or.ke">agitau@kcaa.or.ke</a>
Kenya	Dr. Michael O. Aomo, Ph.D MATS	Tel: +254 720 731 892 Fax:	<a href="mailto:maomo@kcaa.or.ke">maomo@kcaa.or.ke</a>
Kenya	Mr. James Nderitu, MANS, JKIA	Tel: +254 722 395 200	<a href="mailto:jnderitu@kcaa.or.ke">jnderitu@kcaa.or.ke</a>
Kenya	Mr Andrew Ochieng CATCO Standards (Enroute)	Tel: +254 724 964 394 Fax:	<a href="mailto:aochieng@kcaa.or.ke">aochieng@kcaa.or.ke</a>
ICAO/ESAF	Ms. Lucy Ndung'u Regional Director	Tel: +254 20 762 2394 Fax: +254 20 762 1092	<a href="mailto:lmbugua@icao.int">lmbugua@icao.int</a>
ICAO	Ms. Keziah Ogutu RO ATM/SAR	Tel: +254 727 366 293 Fax: +254 20 762 1092	<a href="mailto:kogutu@icao.int">kogutu@icao.int</a>
Other agencies	To be notified	To be notified	To be notified

## APPENDIX C: CR and FLAS

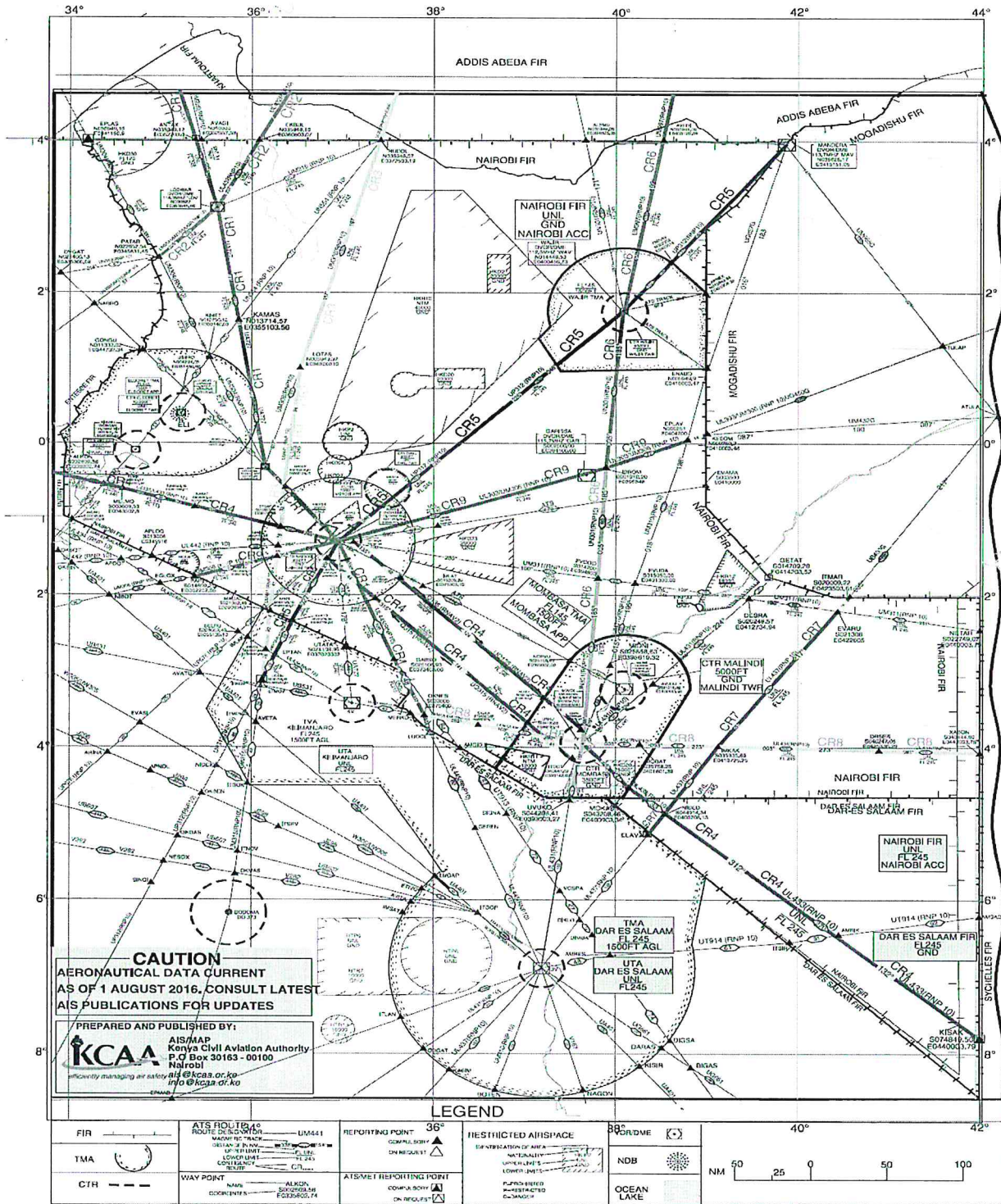
### Contingency Route Structure and Flight Level Allocation Scheme (FLAS) during partial or total unavailability of the Nairobi FIR

In the event of closure, the Nairobi FIR, aircraft operators should file their flight plans using the existing ATS routes (as contingency routes) listed in the scheme below in order to enter/ exit the Nairobi FIR.

CP ROUTE NUMBER	PRESENT ROUTE	REPORTING POINT	FLAS		SEPARATION	FIRs INVOLVED
			EAST	WEST		
CR1	UA727 UL445	ANTAX-LOV- KAMAS-NAK- NV-GABSO- DV	370 330	340	15 MINS.	HTDC HAAA
CR2	UL432 UM216 UN554	EKBUL LOV PATAR	350 310 230	380 320 240	15MINS	HAAA HUEC
CR3	UM308 UM441	LOSIN LOTAS RUDOL-	390	280	15MINS	HAAA HTDC
CR4	UL433	ALKON-NV- MOV-KISAK	310	300	15MINS	HUEC FSSS
CR5	UP312	LOSIN-NV- MAV	350	360	15MINS	HTDC HCSM
CR6	UN301 UM997	UVUKO-MOV- WAV-AVEDI	390 330	380 260	15 MINS	HTDC HAAA
CR7	UL437	ELAVA-ITMAR	350	360	15 MINS	HTDC HCSM
CR8	UL434	KV-MOV- XABON	290	320	15 MINS	HTDC FSSS
CR9	UM306	PARIN-NV - KESOM	290	320	15 MINS	HTDC HCSM

# APPENDIX D: NAIROBI FIR CONTINGENCY ROUTE CHART

## ATS CONTINGENCY MAP



## APPENDIX E: SAMPLE NOTAM

### NAIROBI FIR CONTINGENCY NOTAM

#### PARTIAL OR COMPLETE UNAVAILABILITY OF THE AIRSPACE

NOTAM ..... WEF ..... TO ..... NAIROBI AIRSPACE ALL FLIGHTS SHALL COMPLY WITH THE REQUIREMENT TO SELECT SPECIFIC CONTINGENCY ROUTES AND FLIGHT LEVELS APPLICABLE TO THE CONTINGENCY ROUTES AS DETAILED HERE BELOW. ADJACENT AREA CONTROL CENTRES OF DAR ES SALAAM, ENTEBBE, SUDAN, ADDIS ABABA, MOGADISHU, AND SEYCHELLES WILL ALLOCATE ONLY THE CONTINGENCY ROUTES AND FLIGHT LEVELS SPECIFIED AS FOLLOWS:

- A) **CR1 (UA727 and UL445)** ANTAX-LOV- KAMAS LANET – NAVEX-GABSO  
EASTBOUND FL370/330, WESTBOUND FL 340, MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.
- B) **CR2 (UL432, UN554, UM216)** EKBUL-LOV-PATAR. EASTBOUND FL350, FL310, FL230 WESTBOUND FL380, FL320, FL240 MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.
- C) **CR3 (UM308, UM441)** LOSIN – LOTAS-RUDOL  
EASTBOUND FL390, WESTBOUND FL 280, MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.
- D) **CR4 (UL433)** ALKON- NAVEX-MOVEX- KISAK  
EASTBOUND FL310 WESTBOUND FL300 MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.
- E) **CR5 (UP312)** LOSIN-NAVEX-WAV-MAV  
EASTBOUND FL350, WESTBOUND FL360. MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.
- F) **CR6 (UN301 and UM997)** UVUKO-MOV-WAV-AVEDI  
EASTBOUND FL390, FL330. WESTBOUND FL380, FL260 MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.
- G) **CR7 (UB400)** ELAVA - ITMAR  
EASTBOUND FL350, WESTBOUND FL360, MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.
- H) **CR8 (UA610)** KV-MOVEX-XABON

EASTBOUND FL390, WESTBOUND FL320, MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES.

- 1) **CR9 PARIN-NAVEX-KESOM** EASTBOUND FL290, WESTBOUND FL320, MINIMUM LONGITUDINAL SEPARATION APPLICABLE IS 15 MINUTES

PILOTS WHO HAVE BEEN ASSIGNED WITH A FLIGHT LEVEL NOT IN ACCORDANCE WITH THE FLAS, SHOULD TRY TO ESTABLISH CONTACT WITH THE ATS UNIT RESPONSIBLE FOR THE PROVISION OF SERVICE TO CLARIFY, AND IF UNABLE, ADJUST TO THE FLAS AS SOON AS POSSIBLE ONCE IN THE CONTINGENCY AIRSPACE.

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## **APPENDIX F: FREQUENCIES TO BE USED FOR THE CONTINGENCY ROUTES AND THE ATS UNIT**

Frequencies to be used for the Contingency Routes and the ATS unit providing Flight Information Service (FIS) and air-ground communication monitoring for the Nairobi FIR is as follows:

### **Nairobi Area Control Centre (ACC)**

- a) Day: HF 11300 KHz or 13288 KHz
  - b) Night: HF 11300 KHz or 5517 KHz
-

**PART 2: UNAVAILABILITY OF HKNA (NAIROBI) FIR – EXCLUDING AIRSPACE OVER HIGH SEAS**

Region	Route	Route no.	FLAS	Communications	FIRs
FROM MIDDLE EAST TO SOUTH AFRICA	MOGDU – UB400 - DV	CAR 1	FPL FL	AS PER LoP	HCSM, HTDC
FROM WEST AFRICA TO ASIA AND THE EAST	B535 – SAGBU-JUB –APKOD - MAV	CAR 2	FPL FL	AS PER LoP	HUEC, HAAA, HSSS
FROM THE EAST TO THE WEST	RAGGS – UB400 – DV UA401 - NN	CAR 3	FPL FL	AS PER LoP	HCSM, HTDC, HUEC
FROM THE SOUTH TO THE NORTH	MB- UG656-NN-UG656- JUB	CAR4	FPL FL	AS PER LoP	HTDC, HUEC, HSSS
FROM SOUTHEAST TO NORTH WEST	DV-NN	CAR..	FPL FL	AS PER LoP	HTDC, HUEC,



## CONTINGENCY AVOIDANCE ROUTE FOR NAIROBI FIR

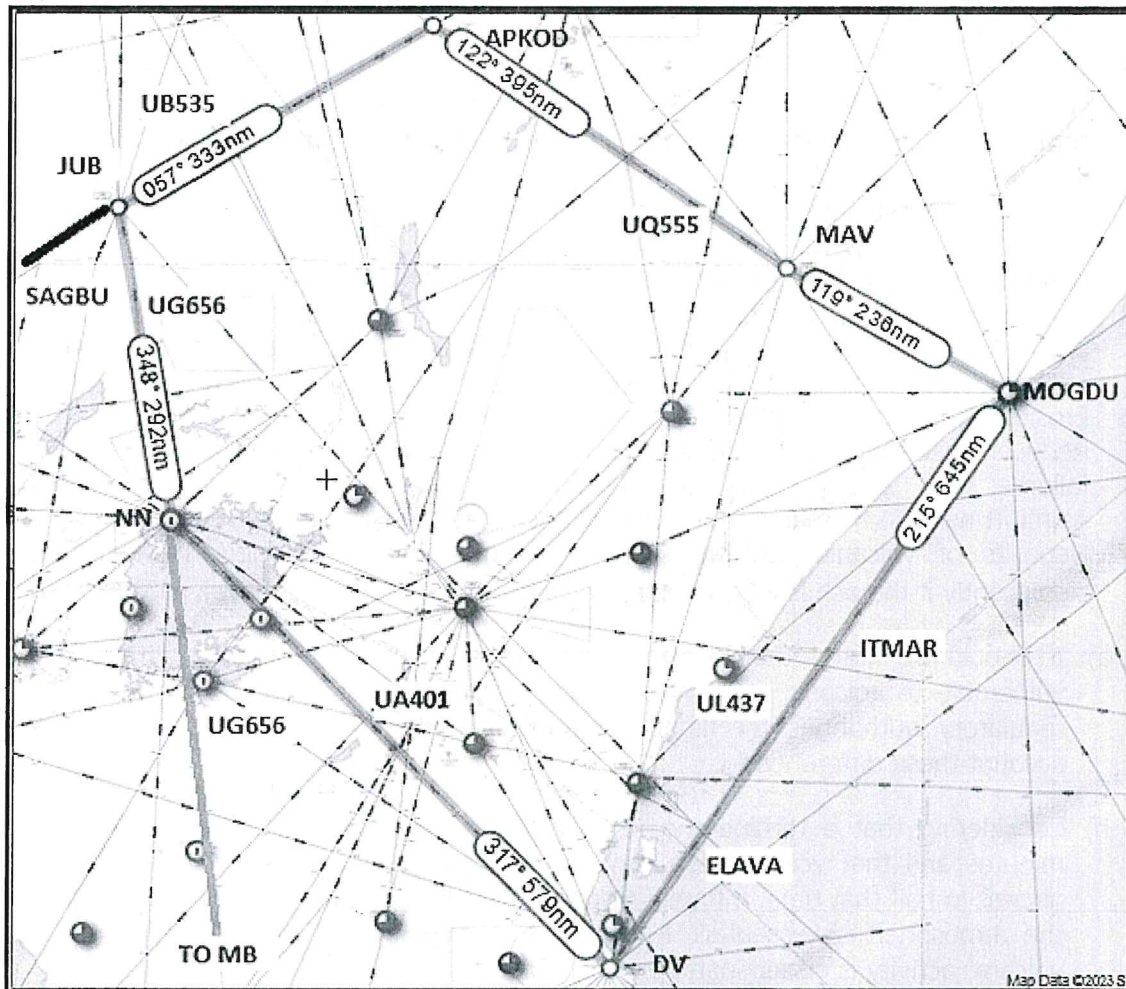


Figure1: Nairobi FIR Contingency Avoidance Routes

Way points	Coordinates
MOGDU	N 02°00.40' E 045°17.60'
RAGGS	N 00°19.50' E 044°09.60'
ITMAR	S 02°00.15' E 042°35.06'
ELAVA	S 05°07.14' E 040°23.06'
DV	S 06°53.28' E 039°11.56'
JUB	N 04°52.56' E 031°35.98'
NN	N 00°03.18' E 032°26.28'
MB	S 08°55.37' E 033°27.49'
APKOD	N 07°40.88' E 036°24.80'
MAV	N 03°56.42' E 041°51.85'
SAGBU	N 04°00.00' E 030°23.00'

## APPENDIX G: VOLCANIC ASH HAZARD

### INTRODUCTION

During an eruption volcanic ash can reach and exceed the cruising altitudes of turbine-powered aeroplanes within minutes and spread over vast geographical areas within a few days. Encounters with volcanic ash may result in one or more of the following and other problems:

- 1.1 Malfunction, or failure, of one or more engines leading not only to reduction, or complete loss, of thrust but also to failures of electrical, pneumatic and hydraulic systems;
  - 1.2 Blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;
  - 1.3 Windscreens rendered partially or completely opaque;
  - 1.4 Smoke, dust and/or toxic chemical contamination of cabin air requiring crew use of oxygen masks, thus impacting communications; electronic systems may also be affected;
  - 1.5 Erosion of external and internal aircraft components;
  - 1.6 Reduced electronic cooling efficiency leading to a wide range of aircraft system failures;  
Aircraft need to be manoeuvred in a manner that conflicts with other aircraft;
  - 1.7 Deposits of volcanic ash on a runway degrading braking performance, most significantly if the ash is wet; in extreme cases, this can lead to runway closure.
- a) It should be noted that some aircraft types or engine technologies are more vulnerable to volcanic contaminants; any specific measures to be applied by the regulatory authorities for flight operations, would therefore need to take into account these differences.
  - b) Considering that a turbine-engine aircraft travels about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by these aircraft in half that time, a timely response to volcanic eruptions and volcanic ash in the atmosphere is essential. It is therefore imperative that information on the volcanic activity is disseminated as soon as possible.
  - c) In order to ensure the smooth implementation and effectiveness of the contingency plan in case of an actual volcanic eruption, volcanic ash training and exercising should be conducted. In accordance with ICAO DOC 9766 Appendix M [*VOLCEX Arrangements*]
  - d) ICAO has set up the International Airways Volcano Watch (IAVW) to provide near-real-time information on the largest possible number of volcanic events that affect aviation. US geological survey will monitor active or potentially active volcanoes and provide information to Meteorological Watch Offices (MWO) who will in turn pass the information to Flight information Center (FIC)/ Area Control Centres (ACC), and Volcanic Ash Advisory Centres (VAAC) in Toulouse-France.
  - e) VAAC will detect the existence and extent of discernible volcanic ash in the atmosphere within Kenya and issue advisory information regarding the extent and forecast movement of the volcanic ash cloud.
  - f) Special air-reports on volcanic activity (prescribed in PANS-ATM – Doc 4444) and the information collected by the IAVW (detailed in IAVW Handbook – Doc 9766) in accordance with SARPs of ICAO Annex 3 are elements of the input for the

generation of volcanic ash advisories in alphanumeric (VAA) and graphic (VAG) forms. These are used by

MWOs to derive Significant Meteorological information (SIGMET)  
 airspace users for flight planning  
 Air Traffic Service (ATS) units for contingency planning

- g) FIC /ACC unit will inform affected aircraft during a volcanic eruption. The operators will coordinate actions with their flight crews en-route including ATC. Refer to provisions of Annexes 3 [*Meteorological Services for International Air Navigation*], 15 [*Aeronautical Information Services*] (AIS), for detailed instructions
- h) ACC/FIC and MWO will ensure that all airspace users are given advance notification as possible on the status of a volcano and/or volcanic ash airspace contamination and/or volcanic ash deposition at airports for strategic planning and the execution of flights to ensure the safety of the flight.

1.8 This contingency plan gives guidance on airspace management measures that might be taken including establishment and withdrawal of Danger Area and the creation and dissemination of Notices to Airmen (NOTAM)/ASHTAM and special air-reports on volcanic activity. Examples of NOTAM/ ASTAM are contained in section V Attachment A.

#### REGIONAL PREPARATION

The successful operation of air traffic in case of a volcanic ash event depends on coordinated arrangements. Common issues to be agreed upon by ANSPs are contained herein and will be further developed through respective coordination procedures.

#### INTERNATIONAL AIRWAYS VOLCANO WATCH (IAVW)

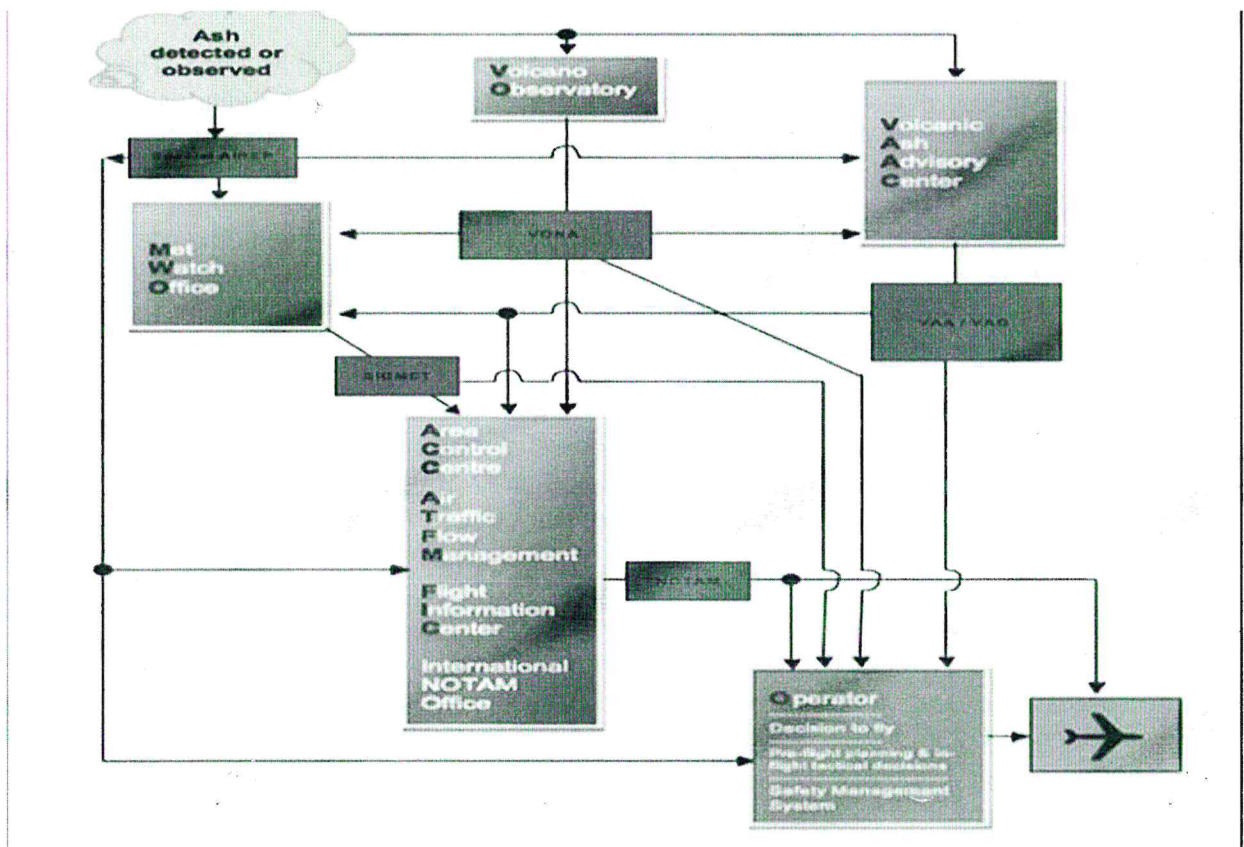
- a) Through US geological survey Kenya has arranged for the monitoring of active and potentially active volcanoes.
- b) Observation by satellites is provided by VAAC- Toulouse, while pilot reports will serve as the main sources of information about eruptions and volcanic ash.
- c) Flight crews are required to report observations of volcanic activity by means of a special air-report. FIC/ ACC shall pass this information to MWO who will in turn coordinate with VAAC- Toulouse.
- d) VAAC- Toulouse will generate the special air-report of volcanic activity form (Model VAR) which will be transferred to MWO, MWO will then generate a SIGMET for airspace users.

#### INFORMATION FLOW

1. Information flow will be concentrated between the units listed below as appropriate, this will be extended to the air report as described in Attachment A section II.

VAAC- Toulouse	<a href="http://www.meteo.fr/vaac/">www.meteo.fr/vaac/</a>
US- Geological Survey	<a href="http://www.usgs.gov/">www.usgs.gov/</a>
MWO- JKIA	<a href="http://www.meteo.go.ke">www.meteo.go.ke</a>
FIC/ ACC-JKIA	<a href="mailto:info@kcaa.or.ke">info@kcaa.or.ke</a>

a) Information Flow Arrangements and Model Templates Diagram



B) Example of air report is described in Attachment A section III

## INFORMATION CONTROL

The appropriate checklist will be applied during dissemination of information for control purposes. The checklists for *State*, *ANSP* and action to be taken by MWO are contained in Attachment A section IV.

## AIRSPACE MEASURES

1. A temporary prohibited/ danger area may be implemented over a volcanic eruption area following evaluation by KMD in conjunction with KCAA.
2. VAAC- Toulouse will provide model information to be used for determination of the extent of the prohibited/ danger area.
3. Prohibited/ Danger area should be avoided by all flights, however operator safety management practices might allow operation of (certain) aircraft in accordance with an appropriate Safety Risk Assessment (SRA).
4. ATM will expect an aircraft to avoid such prohibited/ Danger Areas, however the final decision regarding the route to be flown, whether it will be to avoid or proceed through an area of volcanic ash or activity, is the flight crew's responsibility. Procedures for the

use of such prohibited/ danger Areas are contained in Section VI Attachment A  
[*Guidance on the Establishment, Amendment and Withdrawal of Danger Areas*]

## **APPENDIX H: AIR TRAFFIC FLOW MANAGEMENT – ATFM**

*To Be Developed*

### **CRISIS MANAGEMENT ARRANGEMENTS**

1. MWO/ KCAA shall share relevant information with NODC including relevant administrative arms of the government.
2. FIC/ACC will originate relevant NOTAM to inform neighboring FIRs of the events (pre-eruption/ eruption/ ongoing eruption and recovery phases)
3. Such arrangements are detailed in section VII Attachment A [*Crisis Management Arrangements*].

### **TRAINING AND EXERCISING**

- a) Regular exercises will be carried out to ensure personnel in various areas associated with dissemination of information are kept aware of their responsibilities and have awareness of the information needed and the impact of such information to stakeholders.
- b) The exercises will be conducted in accordance with Doc 9766 (*Guidance for conducting volcanic ash exercises in ICAO Regions*)
- c) FIC/ ACC and the collection and documentation of relevant data on system performance is a key objective of exercising. Subsequent analysis of exercises and actual events will be used to develop improvements to the volcanic ash contingency procedures.

### **REGULATIONS, MEANS OF COMPLIANCE AND GUIDANCE MATERIAL**

Relevant state regulations including MoUs will be the used as the *means of Compliance and Guidance Material respectively*.

### **OPERATORS FROM OUTSIDE THE REGION**

State aviation regulations are available to all users, this will ensure that all operators from outside the region remain familiar with national operations.

### **RESPONSE TO A VOLCANIC ASH EVENT**

#### **PHASES OF AN EVENT**

The response to a volcanic event impacting on air traffic is divided into four distinct phases; a Pre-Eruption, Eruption, On-going Eruption and Recovery:

#### **PRE-ERUPTION PHASE** (when applicable):

1. This is the initial response, "raising the alert", commences when a volcanic eruption is expected. It should be noted that sometimes volcanoes erupt unexpectedly without any alert being raised; rendering this phase obsolete.
2. Following information from US geological survey, MWO should then raise awareness for FIC/ ACC to using the Volcano Observatory Notice for Aviation (VONA), raising awareness of the potential hazard

3. Action during the pre-eruption phase actions include:
4. US geological survey (Volcano observatory) shall provide the information on the state of the volcano showing pre-eruptive activity and notify MWO who will intern notify FIC/ACC and VAAC –Toulouse using the Volcano Observatory Notice for Aviation (VONA), as described in Appendix E of ICAO Doc 9766 (IAVW Handbook).
5. If suspected volcanic activity is within the jurisdiction of Nairobi FIC/ACC, FIC/ ACC shall be notified so as to solicit Special air-reports on volcanic ash from aircraft (route and altitude) at appropriate time intervals (e.g. every half hour).
6. Initial awareness of the event may be provided by means of a Special AIREP, VONA, satellite data, as well as other remote sensors. This information may lead to the production of the initial SIGMET, VAA/VAG, and NOTAM as per the On-Going Eruption Phase.
7. FIC/ACC will ensure that alerting information is distributed expeditiously by the most appropriate means to allow for the early warning of aircraft in flight.
8. VAAC- Toulouse will consider whether the information warrants the issuance of an initial Volcanic Ash Advisory (VAA).
9. Based on operator's Safety Risk Assessment and standard operating procedures, operators and flight crews are expected to consider the potential effect of the eruption before venturing into such airspace.
10. In addition, ACC/FIC shall ensure:
  - a) Appropriate AIS messages are originated providing precise information as is available regarding the activity of the volcano.
  - b) Precautionary prohibited/ danger area is defined (including dimensions) in accordance with the information available. This may include a circle radius of (60 NM). Over a known location of the volcanic activity and in case of wind speeds exceeding 30 kts the danger area should be extended downwind by maximum half an hour of wind influence.
  - c) ATC would NOT initiate a clearance through a prohibited/danger area, but will inform aircraft about the potential hazard and continue to provide normal services, leaving the responsibility to the pilot-in-command to determine the safest course of action.
  - d) MWO is advised in accordance with the MoU (unless the initial notification is originated from MWO) who will in turn inform the associated VAAC- Toulouse.
  - e) Flights already within the area concerned are alerted and accorded the necessary assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. (Flight crews should be provided with all necessary information required to make safe and efficient decisions in dealing with the hazards in the defined area)
  - f) Flights close to the area should be offered assistance to remain clear of the area.
  - g) Neighboring FIC/ACC are alerted of the event and the location and dimensions of the area concerned, providing information on potential implications on traffic flow and capability to handle such traffic. FIC/ ACC may request rerouting of flights not yet coordinated to keep them clear of the area.(flight crew may make the decision on whether or not to completely avoid the area based on operator safety assessment or visual observations;

### ***Action by adjacent FIC/ ACC***

1. Obtain and maintain awareness of the affected area and inform pilots that will or might be affected.

2. When requested by pilots of aircraft advised that they will be affected obtain alternative clearance from affected FIC/ACC and issue the alternative clearance as appropriate.

**START OF ERUPTION PHASE** (when applicable):

This is when information about the outbreak of a volcanic eruption becomes available with volcanic ash being ejected into the atmosphere. *When an eruption does not impact the airspace above and around the volcano (e.g. lava flow) the processes described in the pre-eruption phase may be applicable.*

- i) US geological survey will assess the information on the state of the volcano showing eruptive activity and provide notification to MWO who will in turn inform ACC. MWO will also inform VAAC - Toulouse. Subsequently US geological survey will issue VONA as described in Appendix E of the IAVW Handbook (Doc 9766).
- ii) VAAC - Toulouse will collect all relevant information pertaining to the volcanic eruption. This will result to issuance of relevant AIS and MET messages leading to declaration temporary prohibited/ danger area by FIC/ ACC and publication of relevant NOTAM.

***Originating ACC/FIC actions (eruption in its own FIR)***

- a) FIC/ACC will inform flights about the existence, extent and forecast movement of volcanic ash and provide information useful for the safe and efficient conduct of flights.
- b) Where necessary flights will be rerouted as appropriate and notify neighboring FIRs.
- c) During the start of eruption phase, aircraft will be informed of the hazard and clearance issued to avoid such areas unless, the crew insists on operation based on operator safety assessment.
- d) FIC/ ACC will also ensure:
  - i) A NOTAM is originated to defining the prohibited/danger area and its dimensions. Guidance for precautionary prohibited/ danger Areas should be followed in the absence of reliable information.
  - ii) Close liaison with MWOs is maintained for issuance of SIGMET.
  - iii) Special air-reports are obtained from flights as far as practicable on volcanic activity.

***Actions by adjacent FIC / ACC***

1. During the start of eruption phase, adjacent ACCs/FICs should take the following actions:
2. Obtain and maintain awareness of the affected area and inform pilots that will or might be affected.
3. Maintain close liaison with FIC/ ACC so as to implement and update flow of traffic so as to enable safe and efficient flight operations; and
4. Begin planning for the on-going eruption phase in conjunction with the aircraft operators, FIC/ACC unit affected.
5. When requested by pilots of aircraft advised that they will be affected obtain alternative clearance from affected FIC/ACC and issue the alternative clearance as appropriate.



### **ON-GOING ERUPTION PHASE:**

1. The on-going eruption phase commences with the issuance of the first complete volcanic ash advisory (VAA) containing information on the extent and forecast movement of the volcanic ash cloud. It may take up to 3 hours after start of eruption to issue the first complete VAA.
2. *Volcanic ash advisory information in graphical format (VAG) will also be issued by the VAAC-Toulouse and will, contain the same information as its text-based VAA.*
3. FIC/ ACC and MWO will use the VAA/VAG to:
  - a) prepare appropriate AIS and MET messages.
  - b) plan the provision of air traffic services, including the application of appropriate traffic control measures.

### ***FIC/ ACC will also:***

4. Continue to act in accordance with the ATS Contingency Procedures contained in PANS-ATM (Doc 4444) Chapter 15.8
5. Ensure that neighboring FIRs affected by the movement of the volcanic ash are updated so as to ensure appropriate AIS messages are originated.
6. Request for special air-reports on volcanic activity and update MWO who will in turn furnish the VAAC –Toulouse with the information.
7. Note that for the purpose of flight planning operators could treat the horizontal and vertical extent of the volcanic ash contaminated area as a mountainous terrain to be overflown.
8. Report any difference between published information and observations (pilot reports, airborne measurements, etc.).

### **RECOVERY PHASE:**

1. The recovery phase commences with the issuance of the first VAA containing the statement "NO VA EXP" (i.e. "no volcanic ash expected") which normally occurs when it is determined that no volcanic ash is expected in the atmosphere and the volcanic activity has reverted to its non-eruptive state.
  2. US geological survey/ VAAC- Toulouse will issue the first VAA/VAG containing the statement "NO VA EXP" (i.e. "no volcanic ash expected") to signify commencement of this stage.
  3. MWO will then issue appropriate SIGMET message and AIS will issue a NOTAM cancelling the volcanic activity.
  4. FIC/ACC will revert to normal operations as soon as practical.
-

### Section 1: Major Volcanos in the AFI Region

	Volcano Name	Volcano Type	Volcano Status Location	Location
1.	TAHALRA VOLCANIC FIELD	Pyroclastic cones	Holocene	Algeria
2.	ATAKOR VOLCANIC FIELD	Scoria cones	Holocene	Algeria
3.	MANZAZ VOLCANIC FIELD	Scoria cones	Holocene	Algeria
4.	IN EZZANE VOLCANIC FIELD	Volcanic field	Holocene	Algeria-Niger border
5.	CAMEROON	Stratovolcano	Historical	Cameroon
6.	TOMBEL GRABEN	Cinder cones	Holocene	Cameroon
7.	MANENGOUBA	Stratovolcano	Holocene	Cameroon
8.	OKU VOLCANIC FIELD	Stratovolcano	Holocene	Cameroon
9.	NGAOUNDERE PLATEAU	Volcanic field	Holocene	Cameroon
10	LA PALMA	Stratovolcanoes	Historical	Canary Islands
11	HIERRO	Shield volcano	Radiocarbon	Canary Islands
12	TENERIFE	Stratovolcano	Historical	Canary Islands
13	GRAN CANARIA	Fissure vents	Radiocarbon	Canary Islands
14	FUERTEVENTURA	Fissure vents	Holocene	Canary Islands
15	LANZAROTE	Fissure vents	Historical	Canary Islands
16	FOGO	Stratovolcano	Historical	Cape Verde Islands
17	BRAVA	Stratovolcano	Holocene	Cape Verde Islands
18	SAO VICENTE	Stratovolcano	Holocene Cape	Verde Islands
19	TARSO TOH	Volcanic field	Holocene	Chad
20	TARSO TOUSSIDE	Stratovolcano	Stratovolcano	Holocene Chad
21	TARSO VOON	Stratovolcano	Fumarolic	Chad
22	EMI KOUSSI	Pyroclastic shield	Holocene	Chad
23	LA GRILLE	Shield volcano	Holocene	Comore Island
24	KARTHALA	Shield volcano	Historical	Comore Island
25	KARISIMBI	Stratovolcano	Potassium- Argon	Democratic Republic Congo- Rwanda border
26	VISOKE	Stratovolcano	Historical	Democratic Republic Congo- Rwanda border
27	MAY-YA-MOTO	Fumarole field	Fumarolic	Democratic Republic of Congo
28	NYAMURAGIRA	Shield volcano	Historical	Democratic Republic of

29	NYIRAGONGO	Stratovolcano	Historical	Congo Democratic Republic of Congo
30	TSHIBINDA	Cinder cones	Holocene	Congo Democratic Republic of Congo
31	ARDOUKOBA	Fissure vents	Historical	Djibouti
32	GARBES	Fumarole field	Pleistocene	Djibouti
33	BOINA	Fumarole field	Pleistocene	Djibouti-Ethiopia border
34	JALUA	Stratovolcano	Holocene	Eritrea
35	ALID	Stratovolcano	Holocene	Eritrea
36	DUBBI	Stratovolcano	Historical	Eritrea
37	NABRO	Stratovolcano	Holocene	Eritrea
38	ASSAB VOLCANIC FIELD	VOLCANIC FIELD	Holocene	Eritrea
39	GUFA	Volcanic field	Holocene	Eritrea-Djibouti border
40	DALLOL	Explosion craters	Historical	Ethiopia
41	GADA ALE	Stratovolcano	Holocene	Ethiopia
42	ALU	Fissure vents	Holocene	Ethiopia
43	DALAFFILLA	Stratovolcano	Historical	Ethiopia
44	BORALE ALE	Stratovolcano	Holocene	Ethiopia
45	ERTA ALE	Shield volcano	Historical	Ethiopia
46	ALE BAGU	Stratovolcano	Holocene	Ethiopia
47	HAYLI GUBBI	Shield volcano	Holocene	Ethiopia
48	ASAVYO	Shield volcano	Holocene	Ethiopia
49	MAT ALA	Shield volcano	Holocene	Ethiopia
50	TAT ALI	Shield volcano	Holocene	Ethiopia
51	BORAWLI	Stratovolcano	Holocene	Ethiopia
52	AFDERA	Stratovolcano	Holocene	Ethiopia
53	MA ALALTA	Stratovolcano	Holocene	Ethiopia
54	ALAYTA	Shield volcano	Historical	Ethiopia
55	DABBAHU	Stratovolcano	Historical	Ethiopia

## Section II : VOLCANIC ASH REPORTING AND DATA COLLECTION

Purposes for volcanic ash reporting and data collection are to:

1. Locate the volcanic hazards;
2. Notify immediately other aircraft (in-flight) about the hazard;
3. Notify other interested parties: ANSPs (ATC, AIS, ATFM), VAACs, MWO, etc to ensure the consistent production of appropriate information and warning products in accordance with existing provisions;
4. Analyse collected reports from the post-flight phase in order to:
  - i) identify areas of concern;
  - ii) validate and improve volcanic ash forecasts;
  - iii) improve existing procedures;
  - iv) assist in defining better airworthiness requirements; and
  - v) share lessons learned, etc.

### PHASE OF OPERATIONS

The roles and responsibilities of the participants in the collection, exchange and dissemination of the volcanic information are distinctly different in two distinct phases:

1. in-flight; and
2. Post-flight.

The following section analyses these separately.

### PARTICIPANTS IN THE REPORTING PROCESS, THEIR ROLES AND RESPONSIBILITIES

Identification of the participants as well as their roles and responsibilities in general, but specifically during the two different phases of operations, is an important element in improving collection, exchange and dissemination of volcanic information. The number of participants and their roles and responsibilities depends on the phase of operations (in-flight, post-flight), their position in the information chain within one of these two phases and national/regional arrangements. One of the main issues regarding participants' roles and responsibilities is that each of them is, at one time or another, both a data/information provider and user of the information.

#### a) *In-Flight Phase:* (Participants, Roles & Responsibilities)

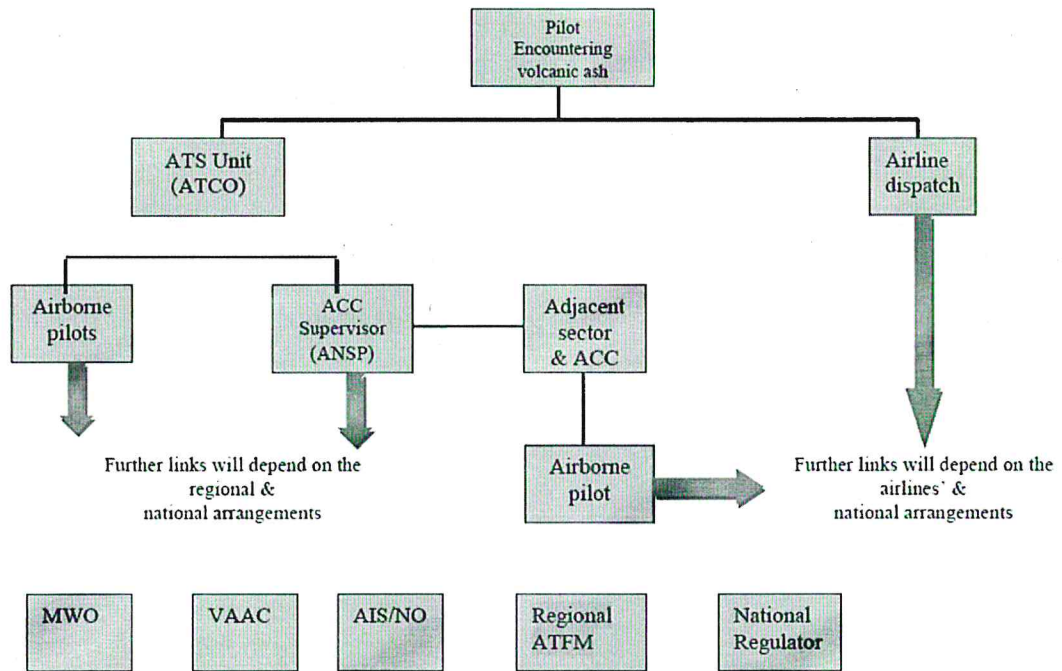
	Participants	Roles and Responsibilities
1	Pilots, civil and/or military, observing and/or encountering volcanic activity	To provide as much detailed information as possible about the type, position, colour, smell, dimensions of the volcanic contamination, level and time of the observation and forward VAR Part I immediately to the ATS unit with which the pilot is in radiotelephony (R/T) communication. Record the information required for VAR Part II on the appropriate form as soon as possible after the observation or encounter, and file the report via data link, if available.
2	ATS unit receiving the information from the pilot encountering volcanic event	To ensure that information received by an air traffic controller from the pilot has been copied, clarified (if necessary) and disseminated to other pilots as well as to the ACC Supervisor. In addition, air traffic controllers could ask other

		pilots flying within the same area if they have observed any volcanic activity
3	ATS unit/ACC Supervisor (if applicable) or other responsible person within the Air Navigation Service Provider	To use all means of communication and available forms to ensure that the information received from the air traffic controller has been: <ul style="list-style-type: none"> <li>passed on to the associated Meteorological organizations in accordance with national/regional arrangements;</li> <li>fully and immediately disseminated across the organization, in particular to adjacent sectors and the associated NOTAM Office (NOF);</li> <li>passed on to the neighboring sectors and ACCs (if necessary);</li> <li>passed on to the regional ATFM center if existing (e.g. CFMU in AFI);</li> <li>passed on to the national/regional authority responsible for the handling of contingency situations</li> </ul>
4	Neighboring ANSPs (ACCs etc.)	To ensure that information is provided to flight Crews flying towards the area affected by the volcanic contamination; disseminated across the organization and the system prepared to cope with the possible changes of the traffic flows; and that the information is provided to the national authority responsible for the handling of contingency situations and passed on to the NOF and MWO as required
5	MET Watch Office	To use the information originated by flight crews and forwarded by the ATS unit which received the information in accordance with Annex 3
6	VAAC	To use the information originated by flight crews, MWOs and other competent sources in accordance with Annex 3
7	AIM / NOF	To publish appropriate AIS messages in accordance with Annex 15
8	ATFM unit or center (if existing)	To ensure that information received is stored and made available for information to all partners in its area of responsibility (ANSPs, airlines, VAAC, MET etc.). As part of the daily activity, coordinate ATFM measures with ACCs concerned.

*In-flight reporting – Sample Flow Chart of the volcanic ash information*

The chart below is a graphical representation of a possible path of the in-flight volcanic ash information and may differ between regions depending on regional arrangements. It also gives the position of the volcanic ash participants in the reporting chain. The flow chart is not exhaustive and the path of the information can be extended and new participants could be added depending of the national and regional requirements.

*Post-Flight Operations Roles & Responsibilities and order of reporting flow chart.*



Links to the database will depend on national regional & global arrangements!

National/  
regional/  
Global  
database

*b) Post-Flight (Operations Roles & Responsibilities) and order of reporting*

	Participants	Roles and Responsibilities
1	Civil and/or military pilots/airlines having observed or encountered an eruption or volcanic contamination	To file the volcanic ash report with as much detailed information as possible about the volcanic activity and/or encounter (position, colour, smell, dimensions, FL, time of observation, impact on the flight, etc.). Ensure that the VAR is filed and transmitted to the relevant recipients as soon as possible after landing (if not filed via data link already during the flight). Make an entry into the Aircraft Maintenance Log (AML) in case of an actual or suspected encounter with volcanic contamination.
2	ANSP	To provide a summary report of effects of the volcanic activity that affected its operations at least once per day to the national authority with as much detailed information as possible about the number of encounters, impact on air traffic management, etc.)
3	AOC Maintenance - Post flight Inspection	To report about the observation of the aircraft surfaces, engine, etc, and to provide the information to the

		national (or regional or global, where applicable) central data repository
4	Investigation authority	All aeronautical service providers (including operators, ANSPs, airports, etc) shall investigate the effects of a volcanic activity, analyze the information and search for conclusions; and report the investigation results and relevant information to the national supervisory authority and any central data repository.
5	National Authority	To handle the national central data repository and report to the regional/global central data repository if any. To analyze reports from its aeronautical service providers and take action as appropriate
6	Regional Central Data Repository	To collect the national data and make them available to interested stakeholders under agreed conditions
7	MWO	To use the national and regional information coming from national and regional central data repositories
8	VAAC	To use the information originated by flight crews, and other competent sources to: a) validate its products accordingly and; b) improve the forecast
9	Global Data Repository (and research institutes - where appropriate)	To analyse the information stored in the regional central data repository and provide the research outcomes for lessons learnt process.
10	Knowledge management (e.g. SKYbrary)	To use the post-flight lessons learnt and disseminate them to interested stakeholders.
11	ICAO	To review/revise ATM volcanic ash contingency plans.

### c) Tools for presenting and sharing the volcanic ash information

To report, transmit and disseminate the volcanic ash encounter information, different types of tools can be used. The list below is provided to give ideas as to what tools can be used. It could also be split into regulatory and general information tools. At any case, it is not an exhaustive list and can be updated with new elements depending on regional experiences.

1. Radiotelephony and Data link Communications
2. VAR
3. NOTAM/ASHTAM
4. SIGMET
5. VAA/VAG
6. Central data repository e.g. CFMU Network Operations Portal (NOP)
7. Centralized web-based sites with regularly updated information and maps – e.g. EVITA  
- <http://www.eurocontrol.int/services/evita-european-crisis-visualisation-interactive-tool-atfcm>
8. Teleconferences
9. Periodic Bulletins with the set of information defined by the data providers and data users; e.g. Smithsonian Institution Weekly Bulletin.
10. Centralized internet-based sites for the sharing of lessons learnt (Knowledge management – e.g. SKYbrary [http://www.skybrary.aero/index.php/Main\\_Page](http://www.skybrary.aero/index.php/Main_Page))

### Section III: Air Report

#### Introduction

1. Volcanic ash clouds, volcanic eruptions and pre-eruption volcanic activity, when observed, shall be reported by all aircraft. "NO VISIBLE ASH OBSERVED" or "NO ASH VISIBLE" shall be reported in the "Other" plain text field of item 8 of the Special air-report of volcanic activity or VAR Form.
2. When a flight is observing volcanic activity or contamination over a prolonged period during flight, a series of special air-reports on volcanic ash shall be made, so that a four-dimensional representation of the situation is created.
3. Pilots should be trained for airborne observations of volcanic activity/contamination to avoid an erosion of the credibility of special air-reports on volcanic ash. Improved instructions on the use of the Volcanic Activity Report Form are required to achieve high quality of information for the VAR users.

#### VAAC requirements

VAAC Toulouse requirements for receiving Special Air-Reports of Volcanic Activity are listed in Appendix-04 of DOC 9766.

#### Format and Routing instructions

For in-flight Special Air-Reports on Volcanic Activity and post-flight Volcanic Activity Reports, the form provided in PANS-ATM (Doc 4444) Appendix 1, section 2 shall be used.

#### Examples

##### *Pilots:*

Example referencing PANS-ATM (Doc 4444) Appendix 1, Part 1-Reporting instructions sections 1-4 and 9 is provided:

"AIREP SPECIAL UNITED AIRLINES TREE TOO TOO POSITION FIFE FIFE ZERO TREE NORTH WUN SEVEN ZERO TOO ZERO EAST FLIGHT LEVEL TREE ZERO ZERO CLIMBING TO FLIGHT LEVEL TREE FIFE ZERO VOLCANIC ASH CLOUD"

ATS unit:

- 1) ATS personnel should be aware that flight crews will be immediately dealing with some or all of the following issues when they encounter volcanic ash:
  - a) smoke or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (could interfere with the clarity of voice communications);
  - b) acrid odour similar to electrical smoke;
  - c) multiple engine malfunctions, such as stalls, increasing exhaust gas temperature (EGT), torching, flameout, and thrust loss causing an immediate departure from assigned altitude;
  - d) on engine restart attempts, engines may accelerate to idle very slowly, especially at high altitudes (could result in inability to maintain altitude or Mach number);
  - e) at night, St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright orange glow in the engine inlet(s);



- f) possible loss of visibility due to cockpit windows becoming cracked or discoloured, due to the sandblast effect of the ash;
  - g) because of the abrasive effects of volcanic ash on windshields and landing lights, visibility for approach and landing may be markedly reduced. Forward visibility may be limited to that which is available through the side windows; and/or
  - h) sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds (this affects visual perception of objects outside the aircraft).
- 2) Simultaneously, ATS personnel can expect flight crews to be executing contingency procedures such as the following:
- a. if possible, the flight crew may immediately reduce thrust to idle;
  - b. exit volcanic ash cloud as quickly as possible. The shortest distance/time out of the ash may require an immediate, descending 180-degree turn (terrain permitting);
  - c. don flight crew oxygen masks at 100 per cent (if required);
  - d. monitor airspeed and pitch attitude. If unreliable airspeed is suspected, or a complete loss of airspeed indication occurs (volcanic ash may block the pitot system), the flight crew will establish the appropriate pitch attitude;
  - e. land at the nearest suitable airport; and on landing, reverses may be used as lightly as feasible

The format used for forwarding of meteorological information received by voice communications to the associated meteorological watch office (MWO) is provided in subtitle 3 of Appendix 1 of PANS-ATM. An example is provided based on the information given by the pilot.

*ARS UAL322 5503N17020E 0105 F300 ASC F350 VA CLD=*

MWO:

- a) Example referencing Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 6, Table A6-1 is provided based on information given by the ATS unit:

*ARS UA322 VA CLD FL300/350 OBS AT 0105Z N5503E17020=*

- i) The MWO should send this message in accordance with regional dissemination schema to:

Appropriate Regional OPMET Data Bank.  
Appropriate Volcanic Ash Advisory Centre

*Example: **SIGMET, NOTAM, ASHTAM***

1. Guidance on WMO headers referred to in Alerting Phase, paragraph 1.2.2 refers can be found in WMO No.386 Volume I (*Manual of Global Telecommunications System*) Part II (*Operational Procedures for the Global Telecommunications System*)

2. NOTAM Offices are reminded that ASHTAM (or NOTAM for volcanic ash) should be distributed via AFTN to their associated MWO, the SADIS Gateway and all the VAAC, in accordance with guidelines contained in ICAO Doc 9766 Chapter 4 paragraph 4.3.

**SIGMET**

WVUK02 EGRR 180105

EGGX SIGMET 2 VALID 180105/180705 EGRREGGX

SHANWICK OCEANIC FIR VA ERUPTION MT KATLA PSN N6337 W01901 VA CLD OBS AT 0100Z N6100 W02730 - N6100 W02230 - N5800 W01730 - N5630 W02000 FL200/350 MOV SE 35KT FCST 0705Z VA CLD APRX N5800 W02000 - N5730 W01200 - N5500 W00910 - N5430 W01530 - N5800 W02000=

Note: PSN replaces LOC as per Amendment 75 to Annex 3 (applicable 18 November 2010)

**NOTAM alerting pre-eruptive activity**

(A0777/10NOTAMN

Q) BIRD/QWWWXX/IV/NBO/W/000/999/6337N01901WXXX

13. BIRD B) 1002260830 C) 1002261100 E) INCREASED VOLCANIC ACTIVITY, POSSIBLY INDICATING IMMINENT ERUPTION, REPORTED FOR VOLCANO KATLA

1702-03 6337.5N01901.5W ICELAND-S. VOLCANIC ASHCLOUD IS EXPECTED TO REACH 50,000 FEET FEW MINUTES FROM START OF ERUPTION. AIRCRAFT ARE REQUIRED TO FLIGHT PLAN TO REMAIN AT LEAST XXXNM CLEAR OF VOLCANO AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR AREA.

i) GND G) UNL)

Note: XXX is a distance established by the Provider State in accordance with paragraph 1.2.1

a)

**NOTAM establishing Danger Area after initial eruption**

(A0778/10 NOTAMR A0777/10

iii) BIRD/QWWWXX/IV/NBO/W/000/999/6337N01901WXXX

vi) BIRD

vii) 1002260900 C) 1002261200

vii) VOLCANIC ERUPTION REPORTED IN VOLCANO KATLA 1702-03 6337.5N01901.5W

ICELAND-S. VOLCANIC ASHCLOUD REPORTED REACHING FL500. AIRCRAFT ARE REQUIRED TO REMAIN AT LEAST XXXNM CLEAR OF VOLCANO AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR BIRD AREA.

viii) GND G) UNL)

Note: XXX is a distance established by the Provider State in accordance with paragraph 1.2.1

a)

NOTAM establishing Danger Area to include Area of High [or High/Medium or High/Medium/Low] Contamination.

A0503/10 NOTAMN

Q)EGGN/QWWWXX/IV/NBO/AE/000/350

A) EGPX B) 1005182300 C) 1005190500

x) TEMPORARY DANGER AREA HAS BEEN ESTABLISHED FOR VOLCANIC ASH AREA OF HIGH CONTAMINATION IN AREA 5812N00611W 5718N00216W 5552N00426W 5629N00652W

xi) SFC

xii) FL350)

**NOTAM to define Area of Medium Contamination for which a Danger Area has not been established**

Q) EUEC/QWWWXX/IV/AE/000/200  
A) EIAA B) 1005190700 C) 1005191300  
xii) VOLCANIC ASH AREA OF MEDIUM CONTAMINATION FORECAST IN AREA  
5243N00853W 5330N00618W 5150N00829W  
xiii) SFC  
xiv) FL200)

**ASHTAM alerting pre-eruptive activity**

VALI0021 LIRR 01091410  
ASHTAM 005/10  
xvi) ROMA FIR B) 01091350 C) ETNA 101-06 D) 3744N01500E  
xix) YELLOW ALERT  
xxiv) VULCANOLOGICAL AGENCY

**ASHTAM alerting eruptive activity**

VALI0024 LIRR 01151800  
ASHTAM 015/10  
A) ROMA FIR B) 01151650 C) ETNA 101-06 D) 3744N01500E  
xxix) RED ALERT F) AREA AFFECTED 3700N01500E 3900N01600E 3800N001700W  
SFC/35000FT G) NE H) ROUTES AFFECTED WILL BE NOTIFIED BY ATC J)  
VULCANOLOGICAL AGENCY

**ASHTAM alerting reduction in eruptive activity**

VALI0035 LIRR 01300450  
ASHTAM 025/10  
A) ROMA FIR B) 01300350 C) ETNA 101-06 D) 3744N01500E YELLOW ALERT FOLLOWING  
ORANGE J) VULCANOLOGICAL AGENCY

**Tools and media for presenting and sharing the volcanic ash information**

To report, transmit and disseminate information about visible or discernible ash, the following tools are used in the AFI Regions:

- a) VAA/VAG ('Info Source' and 'Remark' sections)
- b) Radiotelephony and Data link Communications (Special Air Report) VAR
- c) NOTAM is issued for change in volcanic eruption status and is therefore possible that a special air-report could contribute to the evidence that would warrant a change in volcanic eruption status
- d) SIGMET is issued by the MWO when volcanic ash is observed by aircraft, volcano observatory, ground-based radars, lidars or ceilometers or discernible on satellite.
- e) Central data repository e.g. Network Manager (NM) Network Operations Portal (NOP) (To be developed)
- f) Teleconferences
- g) Summaries containing general information and lessons learned from previous experience.

**Section IV: Sample VAAC Checklist**

VAACs and Volcano Observatories are elements of the Air Navigation Plan (ANP) Vol I  
Detailed VAAC responsibilities and procedures are contained in Annex 3 [Meteorological Services for International Air Navigation] to the convention on International Civil Aviation Standards and Recommended Practices (Annex 3 chapter 3.5)

- a) Technical specifications (Annex 3 Appendix 2.3)
- b) Volcanic Ash Advisory Example (Annex 3 Appendix 2 Example A2-1)
- c) Volcanic Ash Advisory Template (Annex 3 Appendix 2 Table A2-1)

Operational procedures and contact lists are documented in the Handbook on the International Airways Volcano Watch (IAVW Handbook, Doc 9766)

VAAC Toulouse : <http://www.meteo.fr/vaac/>

On receipt of information from a MWO or any other source, of significant pre-eruptive/eruption activity and/or a volcanic ash cloud observed, the VAAC should:

- a) Initiate the volcanic ash computer trajectory/dispersal model in order to provide advisory information on volcanic ash trajectory to MWOs, ACCs and operators concerned;
- b) Review satellite images/data and any available pilot reports of the area for the time of the event to ascertain whether a volcanic ash cloud is identifiable and, if so, its extent and movement;
- c) Prepare and issue advisories on the extent, and forecast trajectory, of the volcanic ash contamination in message format for transmission to the MWOs, ACCs and operators concerned in the VAAC area of responsibility, and to the two Regional OPMET Data Banks (RODB) in Dakar and Pretoria. As well as inter-regional distribution, the RODBs will ensure dissemination of the advisory to all VAACs, the London World Area Forecast Centre (WAFC);
- d) Monitor subsequent satellite information or other available observations to assist in tracking the movement of the volcanic ash;
- e) Continue to issue advisory information (i.e. VAA/VAG), for validity periods T+0, T+6, T+12 and T+18 hours after data time, to MWOs, ACCs and operators concerned at least at 6 hour intervals, and preferably more frequently, until such time as it is considered that the volcanic ash is no longer identifiable from satellite data, no further reports of volcanic ash are received from the area and no further eruptions of the volcano are reported; and
- f) Maintain regular contact with other VAACs and meteorological offices concerned, and, as necessary, the Smithsonian Institute Global Volcanism Network, in order to keep up to date on the activity status of volcanoes in the VAAC area of responsibility

## **VA ADVISORY**

AA examples: VA ADVISORY

Example 1

DTG : 20100101/0605Z

VAAC : TOULOUSE

VOLCANO : ETNA 211060

PSN: N3744 E01500

AREA: ITALY

SUMMIT ELEV: 3330M

ADVISORY NR: 2015/12

INFO SOURCE: INGV, WEBCAM

AVIATION COLOUR CODE: RED

ERUPTION DETAILS: ERUPTION STARTED AT 0600Z

OBS VA DTG: 02/0600Z

OBS VA CLD: SFC/FL130 N3750 E01500 - N3800 E01550 -

N3735 E01550 -

N3750 E01500 MOV E 45KT

FCST VA CLD +6HR: 02/1200Z SFC/FL130 N3750 E01505 -  
N3840 E01950 -

N3710 E01945 - N3750 E01505

FCST VA CLD +12HR: 02/1800Z NOT PROVIDED

FCST VA CLD +18HR: 03/0000Z NOT PROVIDED

RMK: PLEASE CHECK SIGMET FOR CURRENT WARNINGS.

NXT ADVISORY: NO LATER THAN 20150202/1200Z=

### **Example 2**

DTG: 20100101/1500Z

VAAC: LONDON VOLCANO: ORAEFAJOKULL 374010

PSN: N6400 W01639 AREA: ICELAND

SUMMIT ELEV: 2119M

ADVISORY NR: 2010/002

INFO SOURCE: IMO

AVIATION COLOUR CODE: RED

ERUPTION DETAILS: OBS ASH PLUME, EST 12KM FROM  
RADAR.

OBS VA DTG : 10/1500Z

OBS VA CLD : NO VA EXP

FCST VA CLD +6HR : 10/2100Z SFC/FL200 N6329 W01651 -  
N6517 W01614 - N6849 E00351 - N6742

E01549 - N6329 W01651

FL200/350 N6327 W01656 - N6600 W01444 - N6750

W00307 - N6854 E01550 - N6718 E01833 - N6327

W01656

FL350/550 N6325 W01635 - N6450 W01625 - N6812

W00004 - N6841 E01441 - N6726 E01653 - N6325

W01635

FCST VA CLD +12HR : 11/0300Z SFC/FL200 N6334 W01640

- N6526 W01629 - N6945 E00502 - N6658

E03036 - N6327 E03908 - N6629 E00931 - N6334 W01640

FL200/350 N6329 W01701 - N6556 W01624 - N7009

E00806 - N6431 E04310 - N6026 E04358 - N6709

E00854 - N6329 W01701

FL350/550 N6334 W01650 - N6551 W01547 - N6931

E01235 - N6439 E03929 - N6128 E04027 - N6634

E01013 - N6334 W01650

FCST VA CLD +18HR : 11/0900Z SFC/FL200 N6327

W01717- N6517 W01706 - N6905 E00017 - N6949

E02107 - N6024 E05301 - N5804 E05147 - N6630 E01612 -

N6327 W01717 FL200/350 N6327 W01645 -

N6556 W01613 - N7054 E01405 - N5925 E05658 - N5421

E04829 - N6717 E01018 - N6327 W01645

FL350/550 N6327 W01634 - N6634 W01510 - N7012

E01458 - N5953 E05349 - N5558 E04930 - N6630

E01405 - N6327 W01634

RMK: ASH PLUME NOW OBS, ESTIMATED HEIGHT 12KM

FROM RADAR. INCREASING SEISMIC

ACTIVITY. NXT ADVISORY: WILL BE ISSUED BY

20150210/1800Z =

## APPENDIX I : ATM CONTINGENCY PLANNING PRINCIPLES

1. All ATS units, including ATC Sectors, Units, Centres and supporting Flight Information and Briefing Offices should have a Level 1 Contingency Plan to ensure the safe transit of international traffic in the event of disruption or withdrawal of ATS, or unsafe airspace conditions such as volcanic ash cloud, nuclear emergency or national security responses.
2. The overriding principle is that safety has primacy over efficiency and optimal levels and routes;
3. Contingency Operations will necessitate lower than normal airspace capacity to ensure safety.
4. System and ATC service redundancy is the most effective contingency capability.
5. All Contingency Plans should define the following where applicable:
  - i) A Contingency Route Structure supported by a Flight Level Allocation Scheme (FLAS) and minimum navigation and height-keeping (e.g. RVSM or non-RVSM) capability for access;
  - ii) Note: Contingency Route Structures and/or FLAS need not be defined where the Contingency Plan states that all routes and/or levels remain available during contingency operations.
  - iii) Provisions for tactical definition and coordination of additional routes/FLAS and priority for access to accommodate selected non-scheduled operations such as humanitarian, medical evacuation and flood and fire relief (FFR) flights;
  - iv) Priority determination for routine scheduled and non-scheduled flights;
  - v) Flights excluded from operations in contingency airspace, and minimum navigation and height keeping (RVSM) capability required for access to the contingency airspace;
  - vi) Specified minimum longitudinal spacing between consecutive aircraft entering the contingency airspace on non-separated ATS contingency routes;
  - vii) Contingency communication arrangements including means of communication within contingency airspace and communications transfer arrangements for aircraft entering and leaving the airspace;
  - viii) Details of delegation of air traffic services arrangements (if any); and
  - ix) Contingency points of contact.
6. Level 2 Contingency Arrangements (arrangements between neighbouring administrations) should be included in bi-lateral or multi-lateral agreements between States in all cases where activation of any Level 1 Contingency Plan will impact upon a neighbouring State's ATSU.
7. Level 1 Contingency Plans should include, either in detail or by reference, any relevant Level 2 Contingency Arrangements.
8. Close cooperation between neighbouring administrations, together with supporting mechanisms for the tactical definition and promulgation of contingency routes for the avoidance of Category B and C contingency airspace.
9. Collaborative Air Traffic Flow Management Measures should be the first priority response to Category A contingency events, and for the management of deviating traffic during Category B and C events.

10. Contingency routes must be vertically separated whenever lateral route separation is less than the minimum specified by the State for contingency operations.
11. Contingency Flight Level allocation scheme planning should include consideration of allocating the optimum flight levels to routes used by long haul aircraft, depending on the traffic density on the route, wherever practicable.
12. Contingency ATS routes should provide minimum lateral separation or longitudinal separation of 15 minutes between aircraft that are not vertically separated under a FLAS, except where the minimum aircraft navigational capability specified in the contingency plan permits reduced lateral separation specified in ICAO Doc 7030 Regional Supplementary Procedures Section 6.2 or ICAO Doc. 4444 PANS -ATM. States should specify any necessary buffers to minimum lateral separation requirements where meteorological phenomena may require aircraft to deviate from the ATS route to maintain flight safety. Information on the buffers should be provided in operational information provided on pre-activation or activation of the contingency plan.
14. Minimum longitudinal spacing between aircraft operating on the same contingency route and not vertically separated should be 15 minutes or 120 NM. However, this may be reduced to 10 minutes or 80 NM in conjunction with application of the Mach number technique where authorized by the relevant authority and agreed in the appropriate LOA or other Contingency Arrangement.
15. Contingency ATS routes and FLAS, and contingency procedures, should be agreed between geographically grouped neighbouring States to form sub-regional contingency plans.
16. Contingency ATS routes should be published in State AIP to permit the storing of route details in airspace users' navigation databases.
17. Airspace classifications for ICAO Classes A, B and C airspace should remain unchanged during contingency operations to facilitate managed access to the airspace in accordance with the contingency plan. Classes D and E airspace may be reclassified as Class C or higher where necessary to preclude VFR operations.
18. Define ground and airborne navigation requirements if necessary.
19. Alternate aerodromes should be specified where necessary in Level 1 contingency plans for airport control towers and terminal airspace.
20. Aircraft operators are required by ICAO Annex 6 – Operation of Aircraft to implement appropriate mitigation measures for volcanic ash in accordance with their safety management system (SMS), as approved by the State of the Operator/Registry.
21. Airspace affected by volcanic ash cloud should not be closed to international civil aviation.
22. Amended ATS routes, whether published or promulgated ad-hoc, may be prescribed as part of the air traffic flow management (ATFM) response to expected demand and capacity imbalance caused by aircraft avoiding volcanic ash cloud.
23. Aerodromes should only be closed by NOTAM for periods of observed volcanic ash contamination of the surface of the aerodrome movement area;



24. Closure of airports affected by volcanic ash deposition should be supported by a safety assessment conducted in collaboration between airport operator, aircraft operators and the air navigation service provider, in accordance with their respective safety management systems.
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