EUR Doc 019

INTERNATIONAL CIVIL AVIATION ORGANIZATION

VOLCANIC ASH CONTINGENCY PLAN

EUR REGION

Second Edition

September 2009

THIS DOCUMENT IS ISSUED BY THE ICAO EUR/NAT OFFICE, PARIS

TABLE OF CONTENTS

FOREWORD

The North Atlantic (NAT) and European (EUR) regions include areas of volcanic activities; this contingency plan considers, in particular, volcanic activities in Iceland which are likely to affect flight in the NAT and EUR regions. Also taken into consideration are possible eruptions in Italy, Canary Islands and Portugal (the Azores). The plan sets out standardised guidelines for the alerting of aircraft when eruptions occur, and procedures to be followed by the area control centres (ACCs) when planning routings around the ash cloud.

Considering that a commercial aircraft will travel about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by turbine-engine aeroplanes in half that time, timely response to reports of volcanic ash is essential.

The response to a volcanic event has been divided into three distinct phases described briefly below.

ALERTING PHASE The initial emergency response, "raising the alert". Alerting information will be provided with SIGMET, NOTAM and to affected aircraft in flight by the most expeditious means, The NOTAM will be addressed to meteorological/volcanological agencies.

A temporary danger zone of 120 nm radius will be declared by NOTAM around the volcanic source. No clearances will be issued through the danger zone.

REACTIVE PHASE The Reactive Phase commences at the outbreak of volcanic eruption and entrance of volcanic ash into the atmosphere. A "Start of eruption SIGMET" will be issued and a temporary danger zone of 120 NM radius centred on the volcanic source, or centred 60 NM downwind will be declared by NOTAM, No clearances will be issued through the danger zone.

Once the VAA with +6, +12, +18 hrs forecasts of contaminated areas has been issued, SIGMETs and NOTAMs based on the VAA will be issued.

PROACTIVE PHASE The Proactive phase commences with the issuance of the first VAA after completion of reactive responses. The +6 hrs forecast of the contaminated area is to be issued as SIGMET. The +12 and +18 hrs forecasts of contaminated areas are to be issued as NOTAM. Significant changes revert to a temporary Reactive Phase situation and unscheduled issuance of VAA, SIGMET and NOTAM.

It should be noted that this document is an air traffic services (ATS) contingency plan. Where actions by the Meteorological Watch Offices (MWOs) and VAACs are described, this is for clarification only; this document does not prescribe actions by any entity other than the ATS units concerned.

In order to ensure the smooth implementation of the contingency plan in case of an actual volcanic eruption, annual VOLCEX exercises should be conducted.

1. ALERTING PHASE

1.1 This phase is characterised by a limited availability of information on the extent and severity of the volcanic event. The purpose of this phase is to ensure the safety of aircraft in flight and to promulgate information as a matter of urgency. It is anticipated that this phase will last between 30 minutes and one hour. Regardless of the extent of information available the alerting phase actions should be carried out for every event.

1.2 **ORIGINATING ACC ACTIONS** (eruption in its own flight information region)

1.2.1 In the event of significant pre-eruption volcanic activity, a volcanic eruption occurring, or a volcanic ash cloud being reported in areas which could affect ATS routes used by civil aviation, an ACC, on receiving information of an occurrence, should carry out the following:

a) Define an initial danger zone of a circle with a radius of 222 km (120 NM). If the eruption has not commenced or if no information on upper winds is available, the circle should be centred on the estimated location of the volcanic activity. If the eruption has started and predicted upper wind information is available, the circle should be centred 60 NM downwind from the volcano. The size and location of the danger zone are intended to ensure that air traffic remains clear of any contaminated area by at least 111 km (60 NM). The purpose of this initial danger zone is to ensure safety in the absence of any prediction from a competent authority of the extent of contamination.

b) Advise the associated MWO and the VAAC by telephone (unless initial notification was received from either of these entities). The VAAC will then inform the Central Flow Management Unit (CFMU) in Brussels, which will issue an Air Traffic Flow and Capacity Management Information Message (AIM).

c) Alert flights already within the danger zone and offer them vectors to expedite evacuation out of the area. Also, aircraft that are close to the danger zone should be vectored clear of the area. Tactically re-clear flights which would penetrate the zone onto routes that will keep them clear. The ACC should immediately notify other affected centres of the event and the dimensions of the danger zone. It should also negotiate any re-routings necessary for flights already coordinated but still within adjacent flight information regions (FIRs). It is also expected that adjacent ACCs will be asked to reroute flights not yet coordinated to keep them clear of the danger zone.

d) Issue a NOTAM. This must provide as precise information as is available regarding the activity of the volcano. The name (where applicable), reference number and position of the volcano should be included along with the date and time of the start of the eruption (if appropriate), levels and routes or portions of routes which could be affected and, as necessary, routes temporarily closed to air traffic. It is imperative that this information is disseminated as soon as possible.

e) In order to assist the staff in expediting the process of composing the NOTAM, a series of templates should be available for different stages of the volcanic activity, such as alerting, eruption commenced, centre of temporary danger zone moved 60 NM downwind, contaminated area based on local MWO SIGMET, contaminated area based on VAA. A list of ICAO registered volcanoes should be available at the NOTAM office with volcano name, number and nominal position. An example alerting NOTAM announcing pre-eruption activity in volcano Katla is shown below:

```
(A0777/04 NOTAMN
Q) BIRD/QWWXX/IV/NBO/W/000/999/6337.5N01901.5W120
A) BIRD
B) 0402260830 C) 0402261100
```

```
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. IFR AIRCRAFT ARE REQUIRED TO FLIGHT PLAN TO REMAIN AT LEAST
120NM CLEAR OF VOLCANO AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR AREA. NO
IFR CLEARANCE WILL BE ISSUED PENETRATING THE TEMPORARY DANGER ZONE.
F) GND G) UNL)
```

1.2.2 In addition to sending the NOTAM (and any subsequent NOTAM) to the normal distribution list, it will be sent to the relevant meteorological agencies after adding the WMO header "NWIL31 BIRK ddhhmm" (where ddhhmm represents a date/time group).

1.3 ADJACENT ACC ACTIONS

1.3.1 During the Alerting Phase aircraft will be tactically rerouted to avoid the danger zone. As this phase will only last for a short period, any ash cloud would be contained within a limited area and disruption to traffic should not be excessive. Adjacent ACCs should take the following action to assist:

a) When advised, re-clear flights which will be affected by the danger zone but are still under your control.

b) Unless otherwise instructed, continue normal operations except:

i) if one or more routes are affected by the danger zone, stop clearing aircraft on these routes and take steps to reroute onto routes clear of the area; and

ii) initiate a running plot of the affected area.

1.4 FLOW MANAGEMENT UNITS' ACTION

1.4.1 Upon reception of information on volcanic activity from the VAAC the flow management unit in Brussels will issue an AIM. CFMU and the VAACs will determine how the initial communications will take place on the basis of bilateral agreements.

1.4.2 During the Reactive phase, depending on the impact of the volcanic ash, CFMU may take the initiative to organise teleconferences to exchange latest information on the developments with the VAACs, Air Navigation Service Providers (ANSPs) concerned and aircraft operators.

2. REACTIVE PHASE

2.1 This phase will last until such time as proactive standing procedures can be adopted. The phase commences at the outbreak of volcanic eruption. Major activities of the phase are: Issuance of an "eruption commenced SIGMET", "eruption commenced NOTAM", rerouting of airborne traffic, first VAA and issuance of SIGMET/NOTAM based on the first VAA.

2.2 ORIGINATING ACC ACTIONS (eruption in its own FIR)

2.2.1 This phase begins at the outbreak of volcanic eruption. Rerouting of traffic commences immediately or may be in progress if the alerting time has been sufficient to facilitate activation of the Alert Phase. Air Traffic Controllers should reroute aircraft around the danger zone as expeditiously as possible. Air Traffic Controllers in adjacent areas should also take the danger zone into account and reroute aircraft as early as possible.

During this phase the ACC should:

a) Maintain close liaison with its associated MWO and the appropriate VAAC. The MWO should issue a SIGMET message on the forecast movement of the ash cloud at least every 6 hours, valid for 6 hours.

b) Based on these forecasts and in cooperation with the adjacent ACCs, air traffic flow management measures should be devised and updated when necessary to ensure that aircraft are cleared from the perimeter of the forecast furthest extent of the ash cloud.

c) Issue a NOTAM. Depending on the issuance time of VAA, NOTAM should be issued with 120NM radius temporary danger zone, or contaminated area based on SIGMET or VAA.

120 NM temporary danger area:

```
(A0778/04 NOTAMR A0777/04
Q) BIRD/QWWXX/IV/NBO/W/000/999/6337.5N01901.5W120
A) BIRD
B) 0402260900 C) 0402261200
VOLCANIC ERUPTION REPORTED IN VOLCANO KATLA 1702-03 6337.5N01901.5W
ICELAND-S. VOLCANIC ASHCLOUD REPORTED REACHING FL500. AIRCRAFT ON
IFR CLEARANCE ARE REQUIRED TO REMAIN AT LEAST 120NM CLEAR OF VOLCANO
AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR BIRD AREA. NO IFR CLEARANCE
WILL BE ISSUED PENETRATING THE TEMPORARY DANGER ZONE.
F) GND G) UNL)
```

Or

Contaminated area based on SIGMET:

```
A0778/04 NOTAMR A0777/04
Q) BIRD/QWWXX/IV/NBO/W/000/999/
A) BIRD
B) 0402261100 C) 0402261300
E) VOLCANIC ERUPTION IN VOLCANO KATLA 1702-03 6337.5N01901.5W
ICELAND-S. THE FORECASTED ASHCLOUD IS ESTIMATED TO HAVE REACHED
SFC/FL500 N6335W01930 - N6500W01940 – N6500W02100 – N6300W02100 –
N6335W01930. NO IFR CLEARANCE WILL BE ISSUED PENETRATING THE
CONTAMINATED AREA.
F) SFC G) UNL.
```

Or

Contaminated area based on VAA:

```
A0779/04 NOTAMR A0778/08
Q) BIRD/QWWXX/IV/NBO/W/000/999/
A) BIRD
B) 0402261200  C) 0402261800
E) VOLCANIC ERUPTION IN VOLCANO KATLA 1702-03 6337.5N 01901.5W.
CONTAMINATED AREA:
SFC/FL200
6416N01716W – 6100N01930W – 6100N02800W – 7200N02800W – 7800N01000W
– 7800N0L- 7230N0L – 7300N00800W – 6416N01716W.
FL200/350
7500N02800W – 7900N01000W – 7230N0L – 7900N0L – 7000N0L –
7000N01600W – 7500N02800W.
FL350/550
6700N01700W – 7000N01900W – 7400N01000W – 7400N0L – 6900N0L –
6900N02000W – 6700N01700W .
NO IFR CLEARANCE WILL BE ISSUED PENETRATING THE CONTAMINATED AREA.
F) SFC  G) UNL
```

d) Should the volcano revert to its dormant state during this phase and the airspace no longer is contaminated by volcanic ash, a NOTAMC cancelling the last active NOTAM shall be issued stating the cause for cancellation. Otherwise, begin planning for the Proactive Phase in conjunction with CFMU and the affected ACCs.

2.3 ADJACENT ACC ACTIONS

2.3.1 During the Reactive Phase the adjacent ACCs should take the following action:

a) Maintain close liaison with the appropriate ATFM unit and the originating ACC to design, implement and keep up to date ATFM measures which will ensure aircraft are cleared from the perimeter of the forecast furthest extent of the ash cloud

b) In the event that tactical measures additional to those issued by the appropriate ATFM unit are required, the air traffic control (ATC) watch supervisors should, in cooperation with the originating ACC, impose such measures. Details are included in the ATFM measures section of this document.

c) Maintain a running plot of the affected area.

d) Begin planning for the Proactive Phase in conjunction with the appropriate ATFM unit and ACCs concerned.

2.4 ATFM UNIT ACTIONS

2.4.1 During the Reactive Phase, depending on the impact of the volcanic ash, the appropriate ATFM unit may take initiative to organise teleconferences to exchange latest information on the developments with the VAACs, Air Navigation Service Providers (ANSPs) concerned and aircraft operators.

3. PROACTIVE PHASE

3.1 Following the Reactive Phase, standing procedures should be adopted to route traffic clear of the affected area. VAA is issued every 6 hours at, for example, 00:01 – 06:00 – 12:00 – 18:00. VAA +6hr forecast should be issued as SIGMET, VAA +12hr and +18hr forecasts should be issued as NOTAM. ATC should use the SIGMET area to route traffic around the contaminated area and Aircraft Operators should use the NOTAMs to plan their flight paths to remain clear of the forecast contaminated area. The ash cloud may affect any combination of airspace; therefore, it is impossible to prescribe measure to be taken for any particular situation. Nor is it possible to detail the actions to be taken by any particular ACC.

3.2 The following guidance may prove useful during the proactive phase but should not be considered mandatory:

a) ACCs affected by the movement of the ash cloud should continue to issue NOTAMs at appropriate intervals. ACCs concerned and CFMU should continue to publish details on measures taken.

b) Should the ash cloud move wholly outside the originating ACC's airspace to affect adjacent or other FIRs only, the ACCs in charge of that airspace should take over responsibility for the promulgation of NOTAMs.

c) Depending on the impact of the volcanic ash, CFMU may take the initiative to organise teleconferences to exchange latest information on the developments with the VAACs, ANSPs concerned and aircraft operators.

d) During this phase it may be possible for the VAAC to assess the vertical extent of the ash cloud. While operators cannot be prevented from flight planning routes predicted to be above the ash cloud, such routes should not be proposed by ATC. Operators are cautioned against the risk of engine failure resulting in the inability to maintain level above such a cloud, especially where ETOPS aircraft are involved.

e) When the airspace is no longer contaminated by volcanic ash, a NOTAMC cancelling the active NOTAM shall be promulgated.

4. ATFM PROCEDURES

4.1 Upon reception of information on volcanic activity from the VAAC, CFMU will issue an AIM as appropriate.

4.2 In close coordination with ACCs concerned CFMU may apply ATFM measures to ensure that aircraft are cleared from the perimeter of the forecast furthest extent of the ash cloud. The measures should be reviewed and updated in agreement with respective ACCs on receipt of any forecast from the VAAC.

4.3 When ATFM measures are applied, CFMU should issue an AIM, explaining in plain language why the measures have been implemented. Operators should also be advised to maintain watch for NOTAMs and SIGMETs for the area.

4.4 Depending on the impact of the volcanic ash CFMU may take initiative to organise teleconferences to exchange latest information on the developments with the VAACs, ANSPs concerned and aircraft operators.

5. AIR TRAFFIC CONTROL PROCEDURES[1]

5.1 AIR TRAFFIC CONTROL PROCEDURES FOR ACCS

5.1.1 If a volcanic ash cloud is reported or forecast in the FIR for which the ACC is responsible, the following procedures are followed:

a) relay all available information immediately to pilots whose aircraft could be affected to ensure that they are aware of the ash cloud's position and the flight levels affected;

b) suggest appropriate rerouting to avoid area of known or forecast ash clouds;

c) remind pilots that volcanic ash clouds are not detected by airborne or air traffic radar systems. The pilot should assume that radar will not give them advanced warning of the location of the ash cloud;

d) if the ACC has been advised by an aircraft that it has entered a volcanic ash cloud and indicates that a distress situation exists:

i) consider the aircraft to be in an emergency situation;

ii) do not initiate any climb clearances to turbine-powered aircraft until the aircraft has exited the ash cloud; and

iii) do not attempt to provide escape vectors without pilot concurrence.

5.1.2 Experience has shown that the recommended escape manoeuvre for an aircraft which has encountered an ash cloud is to reverse its course and begin a descent (if terrain permits). However, the final responsibility for this decision rests with the pilot.

---

[1] This information is adapted from ICAO Doc 9691 - *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds*. Refer to the master document for full details.

6. GENERAL GUIDANCE FOR THE DEVELOPMENT OF ATS CONTINGENCY PLANS FOR VOLCANIC ASH CLOUDS[2]

6.1 In an emergency plan relating to volcanic ash clouds certain steps need to be taken to provide a coordinated and controlled response for dealing with an event of this nature. Responsibilities should be clearly defined for the manager in charge, supervisors and air traffic controllers. The plan should also identify the officials who need to be contacted, the type of messages that are to be created, and how to conduct business.

6.2 Controllers need to be trained and be made aware that aircraft which encounter a volcanic ash cloud can suffer a complete loss of power and that extreme caution needs to be taken to avoid entering an ash cloud. Since there is no means to detect the density of the ash cloud and size distribution of the particles, and their subsequent impact on engine performance and the integrity of the aircraft, controllers need to be aware of the serious consequences for an aircraft that may encounter an ash cloud.

6.3 Some particular points of guidance are as follows:

a) Volcanic ash clouds may extend for hundreds of miles horizontally and reach the stratosphere vertically, therefore pilots should not attempt to fly through or climb out of the cloud;

b) Volcanic ash may block the pitot-static system of an aircraft, resulting in unreliable airspeed indications; and

c) Braking conditions at airports where volcanic ash has recently been deposited on the runway will affect the braking ability of the aircraft. This is more pronounced on runways contaminated with wet ash. Pilots and controllers should be aware of the consequences of volcanic ash being ingested into the engines during landing and taxiing. For departure it is recommenced that pilots avoid operating in visible airborne ash; instead they should allow sufficient time for the particles to settle before initiating a take-off roll, in order to avoid ingestion of ash particles into the engine. In addition, the movement area to be used should be carefully swept before any engine is started.

6.4 The ACC in conjunction with CFMU serves as the critical communication link between the pilot, dispatcher and meteorologists during a volcanic eruption. During episodes of volcanic ash clouds within the FIR, the ACC has two major communication roles. First and of greatest importance is its ability to communicate directly with aircraft en route which may encounter the ash cloud. Based on the information provided in the volcanic ash SIGMET and volcanic ash advisory message and working with MWO meteorologists, the air traffic controllers should be able to provide the pilot with flight levels that are affected by the ash cloud and the projected trajectory and drift of the cloud. Through the use of radio communication, ACCs have the capability to coordinate with the pilot alternative routes which would keep the aircraft away from the volcanic ash cloud.

6.5 Similarly, through the issuance of a NOTAM for volcanic activity (or an ASHTAM) the ACC can disseminate information on the status and activity of a volcano even for pre-eruption increases in volcanic activity. NOTAM, (ASHTAM) and SIGMETs together with special air reports (AIREPs) are critical to dispatchers for flight planning purposes. Airlines need as much advance notification as possible on the status of a volcano for strategic planning of flights and the safety of the flying public. Dispatchers need to be in communication with pilots en route so that a coordinated decision can be made between the pilot, the dispatcher and air traffic control regarding alternative routes that are available. It cannot be presumed, however, that an aircraft which is projected to encounter an ash cloud will be provided with the most

[2] This information is adapted from ICAO Doc 9691 - *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds*. Refer to the master document for full details.

desirable route to avoid the cloud. Other considerations have to be taken into account such as existing traffic levels on other routes and the amount of fuel reserve available for flights which may have to be diverted to other routes to allow for the affected aircraft to divert.

6.6 The NOTAM for volcanic activity (and the ASHTAM) provides information on the status of activity of a volcano when a change in its activity is, or is expected to be, of operational significance. They are issued by the ACC through the respective international NOTAM office based on the information received from any one of the observing sources and/or advisory information provided by the associated VAAC. In addition to providing the status of activity of a volcano, the NOTAM (or ASHTAM) also provides information on the location, extent and movement of the ash cloud and the air routes and flight levels affected. The NOTAM can also be used to close the airspace affected by the volcanic ash cloud. Complete guidance on the issuance of the NOTAM (and ASHTAM) is provided in Annex 15 — *Aeronautical Information Services*. Included in Annex 15 is a volcano level of activity colour code chart. The colour code chart alert may be used to provide information on the status of the volcano, with "red" being the most severe, i.e. volcanic eruption in progress with an ash column/cloud reported above flight level 250, and "green" at the other extreme being volcanic activity considered to have ceased and volcano reverted to its normal pre-eruption state. It is very important that NOTAM for volcanic ash (and ASHTAM) be cancelled as soon as the volcano has reverted to its normal pre-eruption status, no further eruptions are expected by vulcanologists and no ash cloud is detectable or reported from the FIR concerned.

6.7 It is essential that the procedures which the ACC personnel should follow during a volcanic eruption/ash cloud event described in the foregoing paragraphs are translated into the local staff instructions (adjusted as necessary to take account of local circumstances). It is also essential that these procedures/instructions form part of the basic training for all air traffic services personnel whose jobs would require them to take action in accordance with the procedures. Background information to assist the ACC or Flight Information Centre (FIC) in maintaining an awareness of the status of activity of volcanoes in their FIR(s) is provided in the monthly Scientific Event Alert Network Bulletin published by the U.S. Smithsonian Institution and sent free of charge to ACCs/FICs requesting it.

APPENDIX A

ANTICIPATED PILOT ISSUES WHEN ENCOUNTERING VOLCANIC ASH CLOUDS

1. Air Traffic Controllers 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) cockpit windows could be rendered completely opaque; 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, ATC can expect pilots to be executing contingency procedures. This may include a possible course reversal and/or an emergency descent.

APPENDIX B

ACTION TAKEN BY METEOROLOGICAL WATCH OFFICES IN THE EVENT OF A VOLCANIC ERUPTION[3]

1. On receipt of information from an ACC of a volcanic eruption and/or the existence of a volcanic ash cloud, the MWO will:

a) notify the VAAC designated to provide advice on volcanic ash trajectories for the FIR for which the ACC is responsible that a volcanic eruption and/or ash cloud has been reported, provide available relevant details and request advisory information on the extent and trajectory of volcanic ash;

b) as soon as practicable, advise the ACC whether or not the volcanic ash cloud is identifiable from weather radar images or satellite images/data and, if possible, provide regular information based on advice received from the VAAC on the horizontal and vertical extent of the cloud and the trajectory of the cloud; and

c) issue a SIGMET message warning of volcanic ash for a validity period of 6 hours, to which is appended an 'outlook' providing information for up to 12 hours beyond the initial 6 hour validity period concerning the trajectory of the ash cloud based on the advisory information provided by the VAAC concerned. Include in the SIGMET address all VAACs, the London World Area Forecast Centre (WAFC), the Vienna International Operational Meteorological (OPMET) data bank and regional OPMET data bank. Maintain continuous coordination with the ACC to ensure consistency in the issuance and content of SIGMETs and NOTAMs.

2. In the event that the MWO becomes aware of the occurrence of pre-eruption activity, a volcanic eruption or ash cloud from any source other than the ACC, the information will be passed immediately to the ACC. The procedure above will then be followed.

3. In the event that any other meteorological office becomes aware of the occurrence of pre-eruption activity, a volcanic eruption or ash cloud from any source, the information will be passed immediately to the MWO for onward transmission to the ACC and appropriate VAAC.

---

[3] This information is adapted and condensed from ICAO Doc 9766 - *Handbook on the International Airways Volcano Watch (IAVW)*. Refer to the master document for full details.

APPENDIX C

ACTION TO BE TAKEN BY THE VAAC IN THE EVENT OF A VOLCANIC ERUPTION[4]

1. 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, CFMU and aircraft 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;

c) prepare and issue advisory on the extent, and forecast trajectory, of the volcanic ash cloud in message format for transmission to the MWOs, ACCs, CFMU and aircraft operators concerned in the VAAC area of responsibility, to the London WAFC, and to the Vienna International (OPMET) data bank and to other VAACs;

d) monitor subsequent satellite information to assist in tracking the movement of the volcanic ash cloud;

e) continue to issue advisory information to MWOs, ACCs, CFMU and aircraft operators concerned at least at 6 hour intervals, and preferably more frequently, until such time as it is considered that the volcanic ash cloud 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;

f) maintain regular contact with other VAACs, as necessary, and 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.

– END –

[4] This information is adapted and condensed from ICAO Doc 9766 - *Handbook on the International Airways Volcano Watch (IAVW).* Refer to the master document for full details.