

# Volcanic Ash

## work undertaken and developments since May 2010

**Forces of nature, such as volcanoes, cannot be controlled or predicted with 100% accuracy. Should ash affect UK airspace again, some disruption is likely, particularly if a larger volcano erupts. However, Icelandic eruptions will only affect UK airspace if the prevailing winds are unfavourable.**

**In issues of aviation hazard, it's the job of the independent regulator to put the safety of passengers and the overflown first; whilst minimising disruption.**

**Volcanic ash as a hazard to aircraft is an international aviation issue requiring the development of safety arrangements by the international regulators the European Aviation Safety Agency (EASA) and the International Civil Aviation Organisation (ICAO). National regulators, including experts at the CAA, make an important contribution to this work and the CAA has continued to make ash one of its key priorities.**

**The CAA is a leading player in the ICAO ash taskforce.**

## Key work completed and underway

### Ash measurement:

The CAA has been working with ICAO, and the Italian and Icelandic authorities to locate a mobile radar on site in Iceland. This radar will increase the accuracy and rate of update of information on the initial height of the ash cloud rising from the volcano, from which the amount of ash being emitted by the volcano can be derived. This increased knowledge will allow better forecasting and prediction of ash trajectory and dispersion. The CAA has also been assisting in the development of a specification for new ground based radar that will be permanently based in Iceland to measure volcanic ash plumes.

### Dispersion predictions:

The CAA is working closely with the Met Office to ensure that the dispersion model used for predicting the whereabouts of volcanic ash is as accurate as possible. Work is underway that will see developments in a number of areas including improved use of satellite imagery, greater use of land-based technology (Lidar), enhancements to the science used in the dispersion models, and a review of the volcanic ash forecast charts that are currently produced.



### **Charting:**

In anticipation of additional sources of observational information being available, the CAA is working with the Met Office to develop processes that will increase the accuracy of the Volcanic Ash Advisory Centre (VAAC) charts. Additionally, a process is being developed that will enable the forecaster to update the forecasts to take account of observational data, such as instrumented research aircraft or ground-based Lidar, received subsequent to dispersion model runs. In addition, changes to the colours used on the charts to promulgate the location of low, medium and high contamination areas of ash are being considered to make them easier to interpret during the flight planning process.

### **Increasing engine ash tolerance:**

Engine manufacturers have made some progress towards increasing the tolerance of engines to volcanic ash but there is still no easy answer to the problem. Whilst manufacturers continue to work on this issue it is unlikely that any significant further increase in engine ash tolerance will be achieved in the short to medium term. The CAA is participating in this work through its involvement in the ICAO Volcanic Ash Task Force (IVATF) Airworthiness teams.

### **Improved operational planning:**

The framework of zones of predicted low, medium and high concentration levels of ash assists airlines to plan and operate flights safely in airspace with low and medium concentrations of ash, in line with an agreed safety cases.

The CAA has prepared a draft document, currently being reviewed by the IVATF, that is intended to provide internationally agreed guidance for airlines to conduct risk assessments for planned flights into airspace predicted to contain high concentrations of ash. The risk assessments will use data from the ash dispersion model and the



current knowledge of the impact of ash on aircraft. In drawing up the draft, the CAA's material was informed by the experience of the UK airline industry this Summer and by inputs from the FOLG.

In consultation with industry, the CAA has produced a set of guidelines intended to help airlines and other operators to determine whether it is safe to operate certain types of aircraft (typically non-turbine aircraft, but turbine-powered helicopters are included) in airspace in which high concentration levels of ash are predicted.

UK airline easyJet is also developing an airborne system to conduct real-time assessment of the levels of ash in an aircraft's projected flight path. The CAA is monitoring this work, which will need approval from EASA.

### **International work:**

The CAA has been active in many international fora. Its main objectives and activities in this field include:



- Supporting ICAO in developing a Volcanic Ash contingency plan for Europe and the North Atlantic (EUR/NAT).
- Supporting ICAO in the work of its new IVATF that was formed in July (The CAA is leading some work streams, is participating in others, and plays a leading role in coordinating the work of the different groups).
- Seeking to secure a robust common repository in Europe for reports of aircraft encounters with ash.
- Seeking to help secure means that will best ensure a coordinated European response to any future Icelandic volcanic events.
- Working with other European partners to ensure data from in-flight measurements of ash concentrations are shared.
- Working with other NAAs and EASA to ensure better communications in future events.

### **What does all this mean: what will be different in any future Icelandic volcano event?**

In the event of any future Icelandic volcanic events, during which the prevailing weather conditions contrive to leave large volumes of UK airspace contaminated with ash for prolonged periods, airlines and other aircraft operators:

- Will retain the responsibility for determining whether their planned flights can be conducted safely.
- Will have access to VAAC charts that are more accurate, and which show volumes of airspace contaminated with low, medium and high concentrations of ash,
- Can be assured that the VAAC charts have been regularly validated against various data sources,
- Will be notified via NOTAMs which volumes of airspace are predicted to be contaminated with high concentrations of ash: these will be declared as Temporary Danger Areas (TDAs),
- Will, early in 2011, have access to internationally agreed guidance on how to conduct a risk assessment that provides for an auditable and consistent method to make good safety decisions when contemplating flight close to, or into, airspace or aerodromes with known or forecast ash cloud contamination. (n.b. flight through airspace contaminated by medium concentrations of ash will in the meantime continue to need to be supported by a safety case – most major UK airlines have already established such cases.)

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