International Civil Aviation Organization

Volcanic Ash Challenge Team

20 September 2011

Ground to Cover

- Status of the work of the International Volcanic Ash Task Force
- Institutional issues – roles and responsibilities
- Engine/airframe susceptibility to volcanic ash
- Volcanic Ash Advisory Centre products, plus
  - Detection of volcanic ash by satellite
  - Areas of research
- Volcano observatory arrangements
- Aeronautical information
- *FLIGHT SAFETY AND VOLCANIC ASH – guidance*

Objective of the IVATF

International Volcanic Ash Task Force (IVATF)

Established 18 May 2010

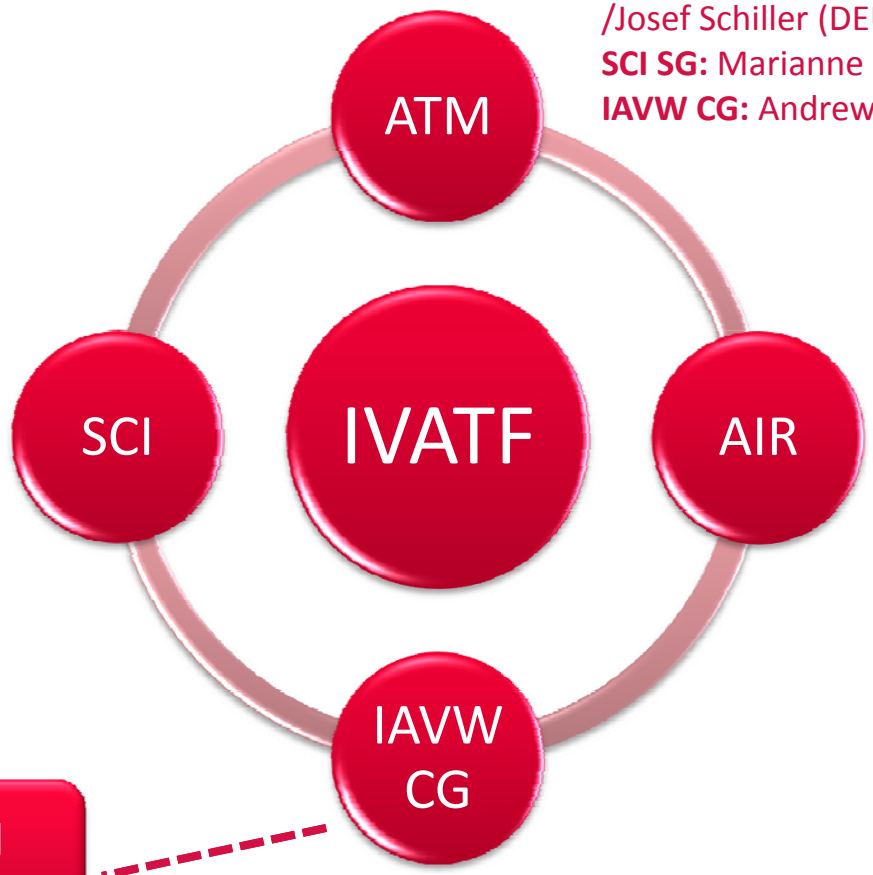
To assist the Secretariat to develop a **global safety risk management framework** that will make it possible to determine the **safe levels of operation** in **airspace contaminated** by **volcanic ash**

Complementary to the work of the International Airways Volcano Watch Operations Group (IAVWOPSG)

IVATF structure

- Multi-disciplinary work streams
- Programme Coordinator
- 4 x Project Managers
- Secretariat support MET, OPS, ATM, AIM, MED

Prog Coord: Peter Lechner (NZL)
ATM SG: Larry Lachance (CAN)
AIR SG: Rob Van Der Boom (NED) /Josef Schiller (DEU)
SCI SG: Marianne Guffanti (USA)
IAVW CG: Andrew Tupper (AUS)



Status of work of the IVATF

IVATF/1 – July 2010

- Approx. 100 participants
- Review of April/May 2010 events
- Future work programme – 25 tasks assigned across 4 project areas
- Quarterly progress reporting

IVATF/2 – July 2011

- Approx. 90 participants
- 'Year-ending' progress reports on tasks assigned
- Future work programme
- Critical issues identification
- Conclusion of activities by June 2012

IVATF/2 Recommendations

30 Recommendations by IVATF/2 across all four project areas

- 17 for consideration by IAVWOPSG
  - Including link to:
    WMO/IUGG Volcanic Ash Scientific Advisory Group
    World Organization of Volcano Observatories (WOVO)
- 13 for consideration by other ICAO groups
  - Such as:
    OPS Panel
    OPLINK Panel
    AIS-AIM SG

Completed tasks at IVATF/2

ATM SG	AIR SG	SCI SG	IAVW CG

• Draft ATM Volcanic Ash Contingency Plan template – to be further developed (see next slide)	• Guidance material:
	  • Airframe, engine and components susceptible to ash/ gas contamination
	  • Airworthiness criteria as a component of decision making
	  • Airworthiness effects information for risk assessment process
	• An “OEM crisis response plan”
		• Supporting requirements for airworthiness determination
		• Guidance material:
		  • Technologies and systems to characterize eruption source parameters
		  • Model improvements and validation considerations
		  • Health effects of sulphur dioxide on aircraft occupants
			• Identification of volcanic ash-related guidance which need to be updated
			• Transport and dispersion model assessment
			• Arrangements necessary to develop close cooperation between volcanological and meteorological agencies

Maintained or updated tasks at IVATF/2

ATM SG	AIR SG	SCI SG	IAVW CG
• Maturation of the ATM volcanic ash contingency plan template – including response phases *(June 2012)* • Review of other ICAO volcanic ash-related activities *(October 2011)* • Review of pilot reporting communication chain *(June 2012)*	• *Development of operationally applicable VA characteristic(s) that can be used as a threshold for the concept of "visible ash" (Feb 2012)* • Maturation of guidance to operators document (Feb 2012) • Guidance for flight into Sulphur Dioxide clouds *(June 2012)* • Maintenance and operations considerations for General Aviation *(Feb 2012)* • Emerging technologies that measure volcanic ash characteristics of concern to aircraft airworthiness *(June 2012)*	• Finalize guidance on capabilities and accuracies of ground-based detection methods *(June 2012)* • Training material on satellite remote-sensing techniques *(June 2012)* • Finalize guidance concerning airborne sampling *(June 2012)* • Evaluate volcano monitoring gaps worldwide *(June2012)* • Develop guidance on the use of aviation colour code among Volcano Observatories *(June 2012)* • Quantify the detectability of "*visible ash*" *(June 2012)* • Evaluate MET data gathered during a volcanic event *(June 2012)*	• Enhancement of VAAC products *(June 2012)* • Improved integration of collaborative decision making within the international airways volcano watch *(June 2012)* • Development of standardized volcanic ash data files within the VAACs *(June 2012)* • Consideration of incorporating uncertainty in SIGMETs *(June 2012)* • Improvement to Volcano Observatory provisions *(June 2012)* • Further development of a Concept of Operations for the IAVW *(June 2012)*

New tasks at IVATF/2

ATM SG	AIR SG	SCI SG	IAVW CG
• Clarification on the issuance of clearances through Danger Areas *(June 2012)* • Investigate the terminology Danger Area and its relevance in today's operating environment *(June 2012)* • Review the current processes regarding the issuance of NOTAM, ASHTAM, VAA/VAG, SIGMET *(June 2012)*	• No new tasks added	• No new tasks added	• Development of volcanic ash exercise guidance to support regional volcanic exercises *(June 2012)* • Improvements to Volcanic Activity Report (VAR) form, including taxonomy and transmission, in support of the IAVW *(June 2012)*

Critical issues identified at IVATF/2

ATM SG

- The term **Danger Area requires review** as it appears to be inappropriate for ATM with respect to volcanic ash
- **Information overload**, especially when multiple FIRs affected – plus, products not harmonized in their use

AIR SG

- Necessity, or otherwise, for **additional thresholds** in dense airspace during prolonged eruptions
- **Difficulty to gain consensus** on **numerical value(s)**/threshold(s) of volcanic ash concentration - which may form guidance for VAAC to globally assist in harmonizing forecast products

SCI SG

- **Absence of credible (consensus) criteria** regarding **acceptable volcanic ash contamination levels**
- Scientific progress **reliant on unfunded voluntary work** by scientists in multiple agencies and States
- **Many unmonitored, high risk, volcanoes** that exist can take aviation by surprise

IAVW CG

- Need for **integrated communications and CDM between all stakeholders** for tactical operations and strategic flight planning
- **Issues with special reports from aircraft in flight** and **distribution** to MET service providers
- **Lack of monitoring, by States, of many potentially active volcanoes**

Next steps for the IVATF

Quarterly progress reporting		
19 October 2011	18 January 2012	18 April 2012

IVATF/3		
Tentatively February 2012	Inputs/progress by the VACT	Task status and update to work programme

IVATF/4		
Tentatively June 2012	Final task status	**Assignment of incomplete tasks to other ICAO groups**

IVATF website

- For more information on the IVATF, please visit:
  - www.icao.int/anb/ivatf
    - Unrestricted access
    - Meeting reports and documentation
    - Quarterly progress reports
    - Memos
    - Member list

Institutional Issues

- State of the Operator
- Provider State
- Air Operator

Institutional Issues

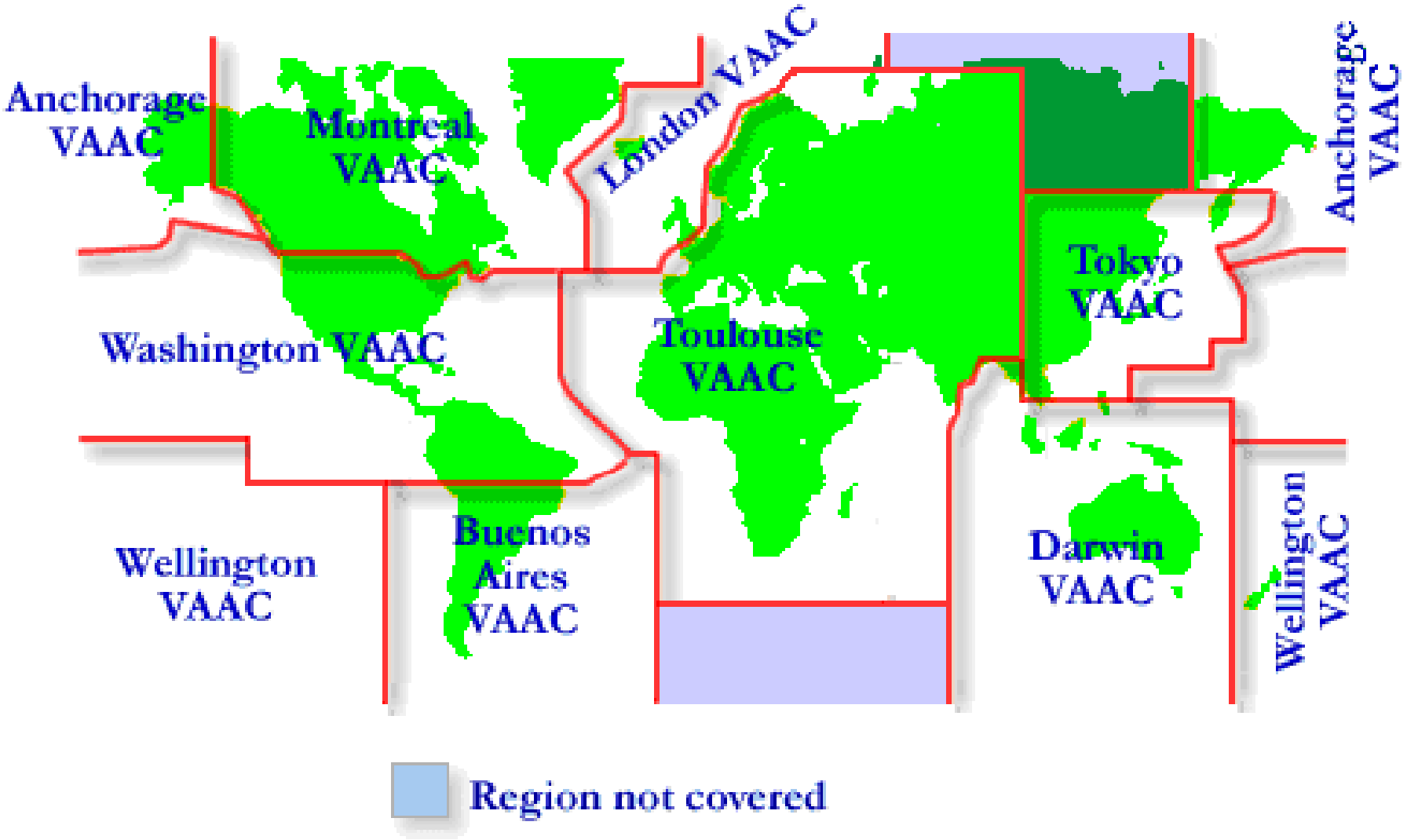
- The State of the Operator
  - Air Operator's Certificate – AOC
  - regulation and oversight of flight operations
  - approval of the SMS of the Operator
- The Provider State
  - regulation and oversight of air navigation services
- The Air Operator
  - operational decisions to ensure planning and conduct of safe flight operations
- ***Endorsed principle***
  - ***Except in unique circumstances, airspace should be closed only for reasons of national security***

Airframe/engine susceptibility

Airframe/engine susceptibility

- ***Agreement***
  - ***Manufacturers agree to work with airlines to develop criteria for night/IMC operations to avoid volcanic ash***
  - ***Manufacturers agree to review the work underway in the IAVWOPSG for potential involvement towards improving VAAC products for operators, noting that the manufacturers consider the IAVWOPSG as the preferred venue in which to further develop reliable information more accurately indicating areas of ash cloud with associated probabilities***
  - ***Manufacturers agree to continue to provide operators data to support safe operations following a volcanic eruption. This includes:***
    - ***awareness of potential system effects should ash be encountered***
    - ***signs that indicate hazardous levels of ash have been encountered in flight***
    - ***appropriate maintenance actions following an ash encounter***

Volcanic Ash Advisory Centres



Volcanic Ash Advisory Centres

- The advisory product:
  - Need for improved continuity between adjacent VAAC areas of responsibility
  - Need to clarify user requirement
  - Need to assist VAAC development and deployment of existing and new products
- ***Agreement***
  - ***That the industry (IATA, ICCAIA, IFALPA) will work with the VAACs, through the IAVWOPSG, to develop a standardized product by June 2012 that meets the user requirements so as to allow for safe and efficient flight operations***

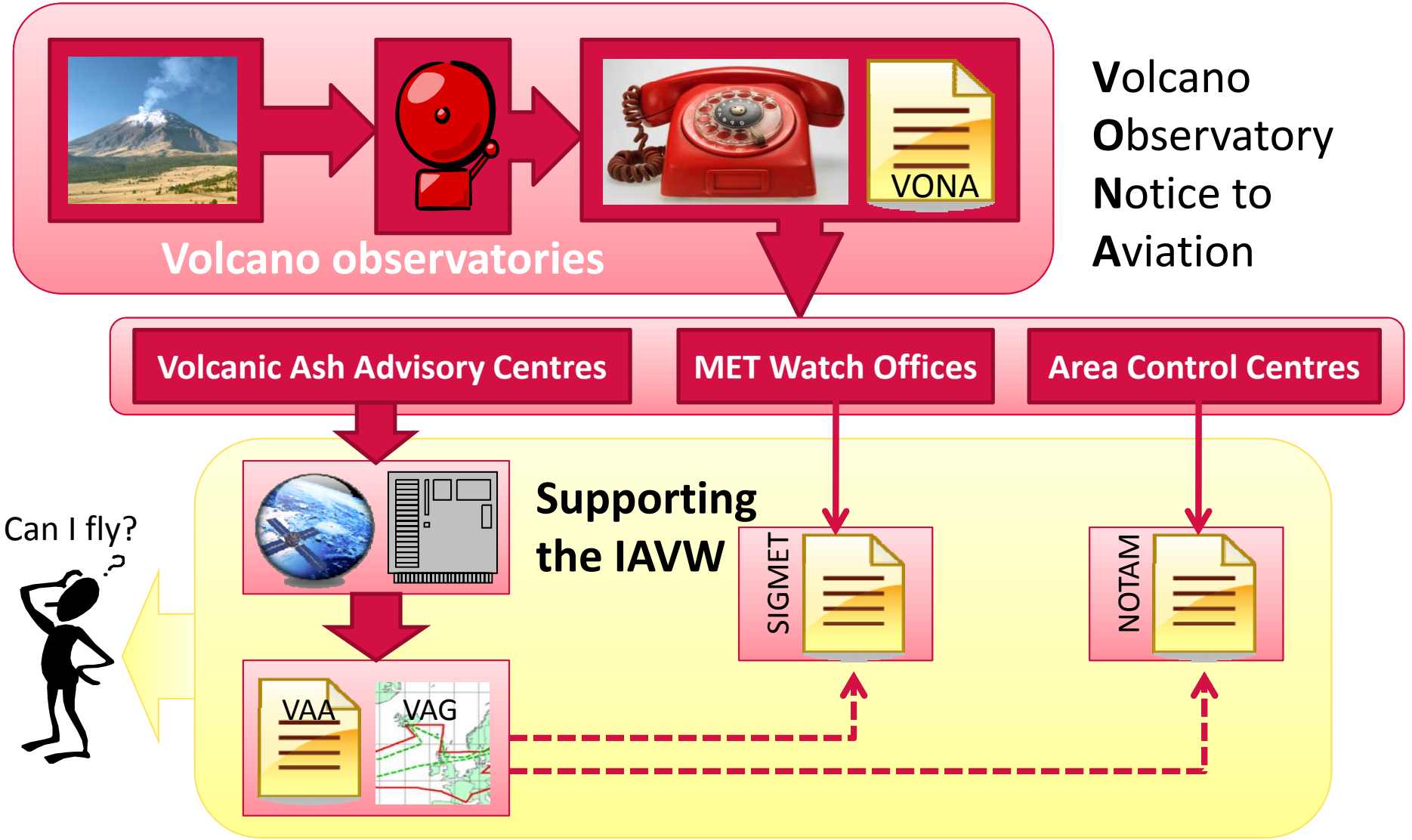
Volcanic Ash Advisory Centres

- Volcanic ash detection by satellite:
  - One of several crucial tools for VAACs (data assimilation)
  - Re-purposing of on-board sensors to environmental monitoring
    - Reducing their volcanic ash detection capability
  - Existing sensors need enhancement
  - Often State/Regional level scientific research domain rather than operational domain
- ***Agreement***
  - ***To develop a proposal for lobbying the satellite community (US, Europe, Japan, China) to enhance satellite coverage, resolution and availability of data, to enhance the capabilities of the VAACs***
    (ICAO to initiate the process by end October 2011)

Volcanic Ash Advisory Centres

- Supporting research initiatives
  - State/Regional level scientific research has not been fully assimilated into the operational environment
  - Insufficient funding opportunities to further research
- ***Agreement:***
  - ***To develop a proposal to lobby the research community to raise the profile of volcanic ash, in order to improve the capabilities of the VAACs by making data available from ground-based and airborne detection systems***
    (ICAO to initiate the process by end October 2011)

Volcano Observatories



Volcano Observatories

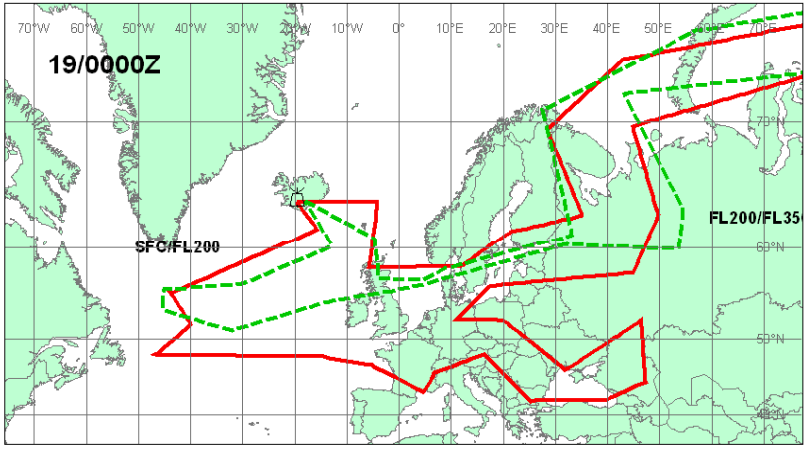
- Volcano observatory information *crucial* for aviation – the first “link in the chain”
- One-third of all potentially explosive volcanoes worldwide are not monitored on a continuous basis
- Often reside in scientific/academic research domain and/or for State-level civil/public contingency
  - Aviation a beneficiary of the volcano observatory information rather than the main driver

Volcano Observatories

- ***Agreement:***
  - ***The Challenge Team members will lobby selected States together with ICAO to ensure adequate volcano monitoring and communication links to the aviation community, in particular in areas with active volcanoes. This may be done through the World Organization of Volcano Observatories and the World Meteorological Organization / International Union of Geodesy and Geophysics.***
    (ICAO to initiate the process by end September 2011)

Aeronautical Information

- Aeronautical information, including warnings, to be issued for each FIR affected by volcanic ash
- Different interpretation of the volcanic ash advisory and other information may result in inconsistencies/ambiguities



VA ADVISORY
DTG: 20100418/1200Z
VAAC: LONDON
VOLCANO:
EYJAFJALLAJOKULL
PSN: N6338 W01937
AREA: ICELAND

SUMMIT ELEV: 1666M
ADVISORY NR: 2010/018
INFO SOURCE: ICELAND MET OFFICE
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: SIGNIFICANT ERUPTIO
IS CONTINUING. PLUME HEIGHT VARYING
BETWEEN FL150 AND FL250.

- SIGMET
- NOTAM/ASHTAM
- Supplementary information

Aeronautical Information

- Progress by IVATF dependent on:
  - Clear definition of user requirement for volcanic ash-related aeronautical information; and
  - Determination of the optimum service (i.e. minimum number of products)

- ***Endorsed long-term goal***
  - ***One set of aeronautical information for one eruptive event***

Guidance for Operators

- The guidance document:

FLIGHT SAFETY AND VOLCANIC ASH

Risk Management of Flight Operations with Known or Forecast Volcanic Ash Contamination

will be finalised and published as a living document

- ***Agreement:***
  - ***Stakeholders will continue to support updates of the document, as/when required (ICAO, CANSO, IATA, IFALPA, IFATCA, ICCAIA, ACI)***
  - ***Document will be co-branded by stakeholders***