INTERNATIONAL CIVIL AVIATION ORGANISATION

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG)
METEOROLOGY SUB-GROUP ELEVENTH MEETING (MET/SG/11)
(Nairobi, Kenya, 8-10 July 2013**)**

Agenda Item : VAAC Toulouse report

VAAC TOULOUSE REPORT

(Presented by France)

SUMMARY

This paper presents the Management report for VAAC (Volcanic Ash Advisory Centre) Toulouse for the period from June 2011 until May 2013 for consideration by the Group.

1. INTRODUCTION

1.1 France has accepted, by regional air navigation agreement, the responsibility for providing a VAAC within the framework of the international airways volcano watch for continental Europe, Africa, a large part of Indian Ocean, as well as for the western part of Asia. VAAC Toulouse is operated by the aviation weather department which is part of the National Forecast Centre of MeteoFrance in Toulouse, working in close collaboration with the Direction of Information Systems, for the information exchange aspects.

1.2 The area of responsibility of VAAC Toulouse encompasses therefore 192 FIRs (Flight Information Regions) on three continents and five different Air Navigation Regions (EUR, NAT, MID, AFI, ASIA). VAAC Toulouse has common borders with six other VAACs in both hemispheres (Buenos Aires, Darwin, London, Montréal, Tokyo and Washington.

2. OPERATIONS OF THE VAAC

2.1 Detection capability

2.1.1 To improve the modelling of volcanic pollutants by MOCAGE, a better knowledge of the source term is necessary. MeteoFrance has decided to create a network of LIDARs on the French Metropolitan area, in order to collect data on aerosols such as volcanic ash. This project started in 2012 by a validation phase with a planned operational implementation between 2013 and 2014.

2.1.2 The Meteo-France spatial Centre in Lannion has developed from Meteosat raw data a 4 channels discrimination ash/water algorithm based on channels 12.0 µm, 10.8 µm, with the addition of the 3.9 µm channel at night and twilight and of a threshold between two visible channels 0.6 µm

and 1.6 µm at day time. These images, called ash flag, have been provided in real time every 15 minutes to the VAAC Toulouse forecasters on their integrated production/visualisation workstation since July 2003.

2.1.3 Two other 3 channel algorithms are used in routine in the Toulouse VAAC, the Ash algorithm based on channels nr 7, nr 9 and nr 10 of Meteosat9 and the Dust algorithm based on the same channels. The VAAC forecasters use in priority a combination of the DUST image and of the ash flag.

2.1.4 A SO2 image based on channels 10.8 and 8.7 µm is processed and provided by the MeteoFrance spatial Center in Lannion every 15 minutes.

2.1.5 The VAAC receives data on high signals on SO2 or aerosols from several research institutes in Europe, including BIRA (Belgian Institute for Space Aeronomy), DLR (German Aerospace Center), KNMI (Royal Netherlands Meteorological Institute), and ESA (European Space Agency).

2.1.6 The synergy between ground LIDAR and in situ plane measurement by the ATR42 have been tested during the HYMEX campaign that started on the 6th of September 2012 in Candillargues in the south of France.

2.2 Issuance of Volcanic Ash Advisories

Operational advisories

From June 2011 until May 2013, VAAC Toulouse issued 187 operational advisories both in text and graphical format:

- 71 VAA/VAG for CORDON CAULLE (Chile)
- 65 VAA/VAG for ETNA (Italy)
- 42 VAA/VAG for NABRO (Eritrea)
- 6 VAA/VAG for NYAMURAGIRA (DR Congo)
- 1 VAA/VAG for NYIRAGONGO (DR Congo)
- 1 VAA/VAG for STROMBOLI (Italy)
- 1 VAA/VAG for an UNKNOWN volcano (Red Sea)

Exercise advisories

From June 2011 until the end of 2012, VAAC Toulouse issued 11 test/exercise advisories in text and 7 graphics for exercise purpose:

- 7 VAA/VAG issued for FURNAS (Azores) for the VOLCEX12/01 exercise
- 2 VAA issued for ASIA/PAC VA SIGMET routine test
- 2 VAA issued for AFI VA SIGMET routine test (20/11/2012)

In 2013, VAAC Toulouse issued 3 test/exercise advisories in text and 3 graphics for exercise purpose:

- 3 VAA/VAG issued for KATLA (Iceland) for the VOLCEX13/01 exercise

2.3 Significant eruptions in the VAAC area

2.3.1 In June 2011, just a few days after the GRIMSVÖTN had resumed to a quiet state, an eruption occurred from the Chilean CORDON CAULLE. The VA cloud reached the VAAC Toulouse area on 6 June. On 13 June an eruption from the Eritrean NABRO started, making the VAAC deal with the two eruptions for a number of days, and even with three ones when the ETNA gave small puffs on 16 June.

2.3.2 In July 2011, while NABRO continued to be active, ETNA had a succession of small eruptions.

2.3.3 In 2012 volcanic activity in the VAAC Toulouse was weaker with mainly short duration eruptions from ETNA with limited impact. In 2013, ETNA had as well some short duration eruptions with some ash clouds for short periods.

2.4 Significant operation or technical changes

2.4.1 The VAAC Toulouse is one of the end users of the European project EVOSS (European Volcano Observatory Space Services) in FP7 (7th Framework Programme for Research and Technological Development). One objective of this project is to provide the VAAC in near real time with quantitative information calculated from radiometric and spectrometric measurements of polar orbiting satellites or geostationary Meteosat9. The whole set of data is not yet calculated but some are already available on he EVOSS web portal.

2.4.2 A service provided by EUMETSAT is currently developed as well to provide the Toulouse VAAC with quantitative data from Meteosat in near real time. The values are the mean particle radius (m), the cloud top altitude (ft or km) and the load mass (g/m2). Such information could be as well available from US NOAA.

2.5 A cooperation with NOAA (USA) and a service provided by EUMETSAT are currently developed as well to provide the Toulouse VAAC with quantitative data from Meteosat in near real time. The values are the mean particle radius (m), the cloud top altitude (ft or km) and the load mass (g/m2).

2.6 The VAAC Toulouse participates to the WEZARD (WEather HaZARDs for Aviation Aviation Project) project as a member of EUMETNET.

2.6.1

2.7 VAAC back-up

2.7.1 VAAC London and VAAC Toulouse are mutual backups.

2.7.2 A bilateral meeting with VAAC London was organized in Toulouse, on the day following the VOLCEX13/01 planning meeting. Operating modes from the two VAACs will be exchanged and a

back-up test is planned for 2013. A visit of VAACs by the other VAAC forecasters will be organized in the second half of 2013.

2.8 Southern Hemisphere VAAC coordination

2.8.1 The need of better coordination tools between VAACs has been identified during the 2011 Chilean Cordon Caulle eruption when the same volcanic ash cloud spread all around the globe. Four VAACs (Buenos Aires, Darwin, Toulouse and Wellington) AoR (areas of responsibility) were impacted.

2.8.2 Due to their respective satellite watch capabilities, each VAAC had to produce advisories on their own area. Inconsistencies at the border between adjacent VAACs appeared in some occasions.

2.8.3 A template for a text and a graphic in support to the exchange of information between neighbouring VAACs has been developed in collaboration between VAACs Buenos Aires, Darwin, Toulouse and Wellington. An exercise (SHAPE : Southern Hemisphere Ash Propagation Exercise) aiming at testing these tools and the benefit on VAACs coordination is planned for 2013.

2.9 VOLCEX exercises

2.9.1 In 2012 a two days EUR/NAT volcanic exercise (VOLCEX12/01) was conducted for a simulated eruption from Azores.

2.10 VAAC Toulouse was the VAAC leader in this exercise and got the first opportunity to test the processing of (fake) special air-reports sent by Air Operators by the forecasters to improve advisories. This part of exercise was very successful from the VAAC's perspective and four amended advisories taking into account all consistent reports were issued.

2.10.1 The exercise VOLCEX 13/02 would probably be based on a simulated eruption from Azores and some Firs in the North of Africa will probably be part of this exercise.

3. FUTURE DEVELOPMENTS

3.1 Meteo-France in collaboration with the the CNRS (Centre National de la Recherche Scientifique) and the CNES (Centre National d'Etudes Spatiales) operates the three instrumented aircraft of the SAFIRE unit (Airborne Environment Research Services). In particular, the fleet includes an ATR42 capable of providing in-situ microphysics measurements of high interest as a complement to ground based LIDARs.

3.2 On request, the ATR can be equipped with relevant sensors and flew through a suspected or observed ash area. Depending on his availability (the plane can be already engaged in another measurement campaign) the notice between the request and the effective flight can be around a couple.

4. PARTICIPATION OF VAAC TOULOUSE TO INTERNATIONAL MEETINGS AND WORKSHOPS SINCE OCTOBRE 2011 :

- EVOSS (European Volcano Observatory Space Services) Progress meeting (IPGP, Paris, 19/10/2011, P Husson)
- ICAO WAFI (West AFI) Workshop on Volcanic Ash and SIGMETs (Douala, 29 and 30/11/2011, P Husson)
- VOLCEXSG8 (European and North Atlantic Volcanic Ash Exercises Steering Group**)**, and VOLCEX12/01 (VOLCanic EXercise) Planning Meeting (Lisboa, 5 to 7/12/2011, P Husson, P Simon)
- General Assembly WEZARD (WEather haZARD) (WMO, Genève, 14 and 15/12/2011, P Husson)
- 1st VAAC Best Practices Seminar (ICAO HQ, Montreal, 13 and 14/02/2012, P Simon, P Husson)
- IVATF3, International Volcanic Ash Task Force (ICAO HQ, Montreal, 15 to 17/02/2012, P Simon, P Husson)
- Crisis management workshop (Eurocontrol, 22 and 23 May 2012, P Husson)
- VOLCEX12/01 debrief (Bodo, CAA, 30/05 – 01/06/2012, P Simon, P Husson))
- 2nd VAAC Best Practices Seminar (ICAO HQ, Montreal, 12 and 13/06/2012, P Simon, P Husson)
- IVATF3, International Volcanic Ash Task Force (ICAO HQ, Montreal, 13 to 15/06/2012, P Simon, P Husson)
- ICAO EANPG/METG22 (Meteorology Group of the European Air Navigation Planning Group) (Paris, 4-7/09/12 P Simon, P Husson)
- ICAO Cape Verde Special Implementation Project (25-28/09/12, P Husson)
- EVOSS (European Volcano Observatory Space Services) users Workshop (Nottingham, UK, 02-03/10/12, P Husson)
- VOLCEXSG9 (European and North Atlantic Volcanic Ash Exercises Steering Group**)** and VOLCEX13/01 (VOLCanic EXercise) planning meeting (Meteo-France Toulouse, 19-20/11/2012, P Husson, P Simon)
- IAVWOPSG/7 (Bangkok, 18-22/03/2013, P Husson, P Simon)

5. ACTION BY THE MEETING

5.1 The meeting is invited to take into consideration the information in this paper.

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