

## SEVENTH MEETING

### INTERNATIONAL AIRWAYS VOLCANO WATCH OPERATIONS GROUP (IAVWOPSG)

(Bangkok, Thailand, 18 to 22 March 2013)

#### EXECUTIVE SUMMARY

#### 1. INTRODUCTION

1.1 The Seventh Meeting of the International Airways Volcano Watch Operations Group (IAVWOPSG/7), held at the ICAO Asia Pacific (APAC) Regional Office from 18 to 22 March 2013, was attended by thirty-four experts from eight volcanic ash advisory centre (VAAC) Provider States, user States, the International Air Transport Association (IATA), the International Coordinating Council of Aerospace Industries Associations (ICCAIA), the International Union of Geodesy and Geophysics (IUGG) and the World Meteorological Organization (WMO).

1.2 Mr. Peter Lechner, the Chairman of the IAVWOPSG, presided over the meeting during the opening day morning. Due to personal circumstances, Mr. Lechner was required to depart the meeting early. Mr. Nigel Gait and Dr. Andrew Tupper co-chaired the remainder of the meeting. Mr. Raul Romero, Technical Officer Meteorology, from ICAO Headquarters, Montréal was Secretary of the meeting, assisted by Mr. Peter Dunda, Regional Officer Meteorology, from the ICAO APAC Office.

#### 2. FOLLOW-UP OF IAVWOPSG/6 CONCLUSIONS

2.1 Regarding the follow-up action of IAVWOPSG/6 conclusions, the group noted that, except for Conclusions 6/23 b) and 6/33 which are still valid since work was still underway, action was considered to be complete on all the issues (Decision 7/1 refers).

#### 3. REVIEW OF ICAO PROVISIONS RELATED TO THE INTERNATIONAL AIRWAYS VOLCANO WATCH (IAVW)

3.1 The group reviewed the IAVW-related regional procedures contained in the Basic Air Navigation Plan (ANP) and Facilities And Services Implementation Document (FASID) to render them compatible with Annex 3 — *Meteorological Service for International Air Navigation*. In this regard, the group:

- a) agreed that the notation in FASID Table MET 3B should be consistent with Annex 3, Table A2-1 — Template for advisory message for volcanic ash, i.e. that latitude and longitude be given in degrees and minutes (Decision 7/2 refers); and
- b) amended the procedures which will be referred to the ICAO Regional Offices for processing (Conclusion 7/3 refers).

3.2 The group reviewed and endorsed a draft amendment to Annex 3 (Conclusions 7/4 and 7/5 refer) regarding:

- a) the requirement for selected State volcano observatories to send the notification of volcanic activity to flight information centres (FICs); and

- b) the introduction of a requirement for VAACs to monitor, where available, relevant ground-based and airborne data to detect the existence and extent of volcanic ash in the atmosphere.

3.3 With regard to IAVW-related guidance material, the group agreed to develop adequate guidance material for inclusion in the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691) to support VAAC monitoring of relevant ground-based and airborne data to detect the existence and extent of volcanic ash in the atmosphere (Conclusion 7/6 refers).

3.4 To ensure consistency between the IAVW-related operational procedures, the group tasked an ad-hoc working group to review Part 4 of the *Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List* (Doc 9766) and *Flight Safety and Volcanic Ash* (Doc 9974) (Conclusion 7/7 refers).

3.5 To support the VAACs, the group invited the World Meteorological Organization (WMO)-International Union of Geodesy and Geophysics (IUGG) Volcanic Ash Scientific Advisory Group (VASAG) to address follow-up work pertaining to training material to support the use of quantitative, satellite-derived, volcanic ash and gas products for operational use by VAACs (Conclusion 7/8 refers).

3.6 The group tasked the Secretary, after coordination with the IUGG, to include guidance regarding airborne instrumented measurements of volcanic ash clouds in Doc 9691 (Conclusion 7/9 refers).

3.7 To support volcanic ash exercises in ICAO regions, the group tasked the Secretary to include guidance material on conducting volcanic ash exercises in Doc 9766 (Conclusion 7/10 refers).

#### 4. OPERATION OF THE IAVW

4.1 The group reviewed the management reports prepared by all the VAAC Provider States, noted their content and expressed satisfaction with the scope of the information provided.

4.2 To support quality management of the meteorological information to be supplied to users, the group agreed with the inclusion, by VAACs, of information on QMS implementation status in the VAAC Management Reports (Conclusion 7/11 refers).

4.3 In order to address the lack of coverage of areas where flight operations were performed that could possibly be affected by volcanic ash but for which there was currently no VAAC coverage (north of the existing VAAC Toulouse and VAAC Tokyo areas of responsibility limiting also on 60° East with VAAC London and on 150° East with VAAC Anchorage) the group established an ad-hoc group to develop proposals for consideration by the next meeting (Conclusion 7/12 refers).

4.4 To support operators' safety management systems/safety risk assessment, the group invited the VAAC Provider States to consider the provision of situational awareness information on volcanic activity relative to their area of coverage and ways it can be proactively obtained and presented in a consistent manner, and tasked an ad-hoc group to undertake further work in this regard (Conclusion 7/13 refers).

4.5 In view of the recent success of the three VAAC best practice seminars, assisted by the generous support of IATA, the group invited ICAO, in coordination with WMO, to consider the best practice seminars as a future mechanism for use by the IAVWOPSG for issues that need to be progressed

urgently, particularly where the active involvement of VAAC managers is required (Conclusion 7/14 refers).

4.6 Concerning the definition of “lead VAAC” (operational procedures for the coordination and transfer of responsibility between VAACs during large-scale volcanic ash events) the group tasked an ad-hoc group to develop examples and illustrations, which after further review, will be included by the Secretary in Doc 9766 (Conclusion 7/15 refers).

4.7 The group endorsed the definitions of “visible ash” and “discernible ash” for operational use by VAACs in volcanic ash forecasts and agreed with their inclusion in Doc 9691 (Conclusion 7/16 refers).

4.8 The group agreed to develop an IAVW roadmap for the provision of information services in support of the aviation system block upgrade (ASBU) methodology taking advantage of a draft version of a concept of operations for the IAVW (Conclusion 7/17 refers).

4.9 To support operational decision making within the framework of IAVW, the group agreed to invite the VASAG, in an effort to improve volcanic ash dispersion forecasts, to further work on reducing dispersion model output uncertainty (Conclusion 7/18 refers).

4.10 To perform an evaluation of forecast confidence to meet the needs of volcanic ash-related safety risk assessments, the group tasked an ad-hoc group to work on the definition of details concerning the inclusion of confidence in the volcanic ash advisory/volcanic ash advisory in graphical format (VAA/VAG), possible roll-out strategies to support implementation and guidance material (Conclusion 7/19 refers). The group also tasked an ad-hoc group to determine the scientific limitations for assigning confidence to volcanic ash analysis and forecasts and appropriate products to inform users (Conclusion 7/20 refers).

4.11 To continue progressing work towards the operational implementation of collaborative decision analysis and forecasting, the group tasked an ad-hoc group to further develop guidelines and procedures for its future inclusion in Doc 9766 (Conclusion 7/21 refers).

4.12 Regarding a proposal to use a common web page for VAACs to share their model output with each other, the group agreed to task an ad-hoc group to set up a password-protected test website as proof of concept and for demonstration purposes (Conclusion 7/22 refers).

4.13 With the purpose of enhancing data and information exchange within the IAVW, the group tasked an ad-hoc group to review existing and evolving aerosol observation capabilities, networks, future plans and associated applications (e.g. to support the definition of “discernible ash”) (Conclusion 7/23 refers).

4.14 To assist States during volcanic ash events and to support the implementation of Annex 3 provisions (Amendment 76 to become applicable on 14 November 2013), the group agreed to develop additional guidance material on the use of the volcano observatory notice for aviation (VONA) for inclusion in Doc 9766 (Decision 7/24 refers).

4.15 With regard to the possible use of a digital format for volcanic ash advisory information, the group endorsed the development of a digital format for the volcanic ash advisory, in an XML/GML format (Decision 7/25 refers). Additionally, the group endorsed the corresponding draft amendment to Annex 3 related to volcanic ash advisories in digital format (XML/GML) intended for applicability in November 2016 (Amendment 77) (Conclusion 7/26 refers).

4.16 Concerning SIGMET information for large, complex volcanic ash events, the group agreed to task an ad-hoc group to develop guidance material to be included in the *Manual of Aeronautical Meteorological Practice* (Doc 8896) and/or regional SIGMET guides on the issuance and interpretation of SIGMET information for a complex volcanic ash cloud (Conclusion 7/27 refers).

4.17 In an effort to meet evolving user requirements, the group tasked an ad-hoc group to develop a proposal on the provision of volcanic ash information beyond the current T+18 hours timeframe, taking into consideration any constraints and limitations as well as the quality of the information (Conclusion 7/28 refers).

4.18 Concerning a proposal for air reports of no ash, which could prove valuable for improving the accuracy of the VAA/VAG issued by the VAAC, the group tasked an ad-hoc group to further assess the feasibility and means to improve reporting within the IAVW, including the air-reporting of “no volcanic ash” in areas forecast to contain a volcanic ash (Conclusion 7/29 refers).

4.19 Concerning the on-going work to develop a standardized international volcano database for VAACs, the group agreed that the IUGG and Canada should continue to aid the Smithsonian Institution to complete such a database, to make it available to the VAACs and that, upon completion, a link to the database and necessary explanatory text, be included in Doc 9766 (Conclusion 7/30 refers).

## 5. DEVELOPMENT OF THE IAVW

5.1 Concerning the current best estimate of the minimum satellite detection threshold for ash mass loading of  $0.2 \text{ g/m}^2$ , the group invited the WMO-IUGG VASAG to work on the establishment of a validation dataset for benchmarking current and future satellite-based retrieval schemes, and maintenance and improvement of current and future global coverage at infrared wavelengths by space-based earth observation programs (Conclusion 7/31 refers).

5.2 To improve the definition of the three-dimensional geometry of volcanic ash clouds to support the VAACs, the group invited the WMO-IUGG VASAG to work on the encouragement of further scientific investigations into volcanic cloud thickness and stratification (Conclusion 7/32 refers).

5.3 With regard to global volcanic risks and monitoring capabilities, the group invited the WMO-IUGG VASAG to interact with related scientific groups by providing advice on appropriate methods for assessing aviation hazards and risks assessment (Conclusion 7/33 refers).

5.4 In the context of the hazards posed by sulphur dioxide ( $\text{SO}_2$ ) and other hazardous gases in the atmosphere, the group tasked the Secretariat to consult with the appropriate ICAO expert group, to determine the thresholds for volcanic gases in the atmosphere that, after passing through an aircraft ventilation system, could pose a health risk to aircraft occupants (Conclusion 7/34 refers). Additionally, the group endorsed the inclusion of a new deliverable (Health risks to aircraft occupants posed by sulphur dioxide ( $\text{SO}_2$ ) and other hazardous gases in the atmosphere) in the IAVWOPSG work programme. (Decision 7/35 refers).

5.5 With regard to the use of infrasound data in support of the IAVW, the group tasked an ad-hoc group to pursue the development and testing of a prototype, real-time “significant” eruption notification system for the VAACs using infrasound data and collaborative work between the VAACs and the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) (Conclusion 7/36 refers).

**6. IMPROVED NOTIFICATION CONCERNING THE ACCIDENTAL RELEASE OF RADIOACTIVE MATERIAL INTO THE ATMOSPHERE**

6.1 With regard to the provision of information on the release of radioactive material into the atmosphere, the group agreed to establish an ad-hoc group to further develop the draft concept of operations for the provision of such information in support of international air navigation; to assess the provision of information and related guidance material; to consult with the appropriate WMO task team on the possible role of the WMO Regional Specialized Meteorological Centres in the provision of related guidance; and to review related provisions in Annex 3 with a view to proposing changes (Conclusion 7/37 refers).

**7. MATTERS RELATED TO THE ASSESSMENT OF THE NEED TO PROVIDE INFORMATION ON SOLAR RADIATION STORMS AND OTHER BIO-HAZARDS**

7.1 With regard to the development of operational requirements for information on space weather, the group reviewed a draft set of product requirements intended for international air navigation flight planning purposes to provide operators, air navigation service providers and flight crew with a notice that a geomagnetic storm or solar radiation storm event had occurred or was expected to occur that may impact communications, navigation, avionics and pose a hazard to human health, and agreed with its inclusion in draft Amendment 77 to Annex 3 (Conclusion 7/38 refers). Additionally, the group tasked an ad-hoc group to review existing related documentation to ensure that its content supports the proposed amendment to Annex 3 and to provide a final draft document to the Secretary with a view to forming the basis of an ICAO manual supporting potential future provisions on space weather (Conclusion 7/39 refers).

7.2 In a related issue, the group supported a draft concept of operations for the provision of space weather information in support of international air navigation and tasked an ad-hoc group to review the concept of operations and propose further changes, as necessary, in time for IAVWOPSG/8 with a view to providing a final version to the proposed Meteorology (MET) Divisional Meeting (2014) (Conclusion 7/40 refers).

**8. FUTURE WORK PROGRAMME**

8.1 The group agreed that minor changes to the terms of reference of the IAVWOPSG were needed to reflect the introduction of Internet-based services and improvements in the international arrangements for the provision of information to aircraft regarding the release of radioactive material into the atmosphere (Decision 7/41 refers).

8.2 Regarding the future work programme, the group reviewed the work programme and proposed changes based on the discussions under Agenda Items 4 to 8 (Decision 7/42 refers).