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Agenda Item 6: Research, development and other initiatives

VOLCANIC ASH EXERCISE IN THE PACIFIC

(Presented by United States)

SUMMARY

During 4-5 March 2025, a Volcanic Ash Exercise in the Pacific (VOLPAC25) was developed and coordinated by the Japanese, Canadian, and American air navigation service providers: Japan Civil Aviation Bureau (JCAB), Nav Canada (NAVCANADA) and the Federal Aviation Administration (FAA). The exercise scenario involved four simulated eruptions from the following ICAO regions: APAC (Mount Fuji), EUR (Raikoke), and NAM (Mount Baker and Shishaldin).

1. INTRODUCTION

1.1 The 2025 Informal Pacific Air Traffic Control (ATC) Coordinating Group (IPACG) Volcanic Ash Exercise in the Pacific (VOLPAC25) simulated the eruption of several volcanoes in the North Pacific.

1.2 VOLPAC25 was conducted jointly by the Japan Civil Aviation Bureau (JCAB), NAV CANADA, and the United States Federal Aviation Administration (FAA). The exercise was held from 2200 UTC on 4 March 2025 to 0200 UTC on 5 March 2025 as a virtual tabletop exercise, with most participants joining from their regular duty stations.

1.3 Participating air traffic management (ATM) facilities were located in Japan (JCAB Headquarters, Fukuoka Area Control Center (ACC), Tokyo ACC, Air Traffic Management Center), Canada (Edmonton ACC, Vancouver ACC), and the United States (FAA Headquarters, Air Traffic Control System Command Center, Anchorage Center, Oakland Center, and Seattle Center).

1.4 Participating Meteorological (MET) facilities were located in Japan (Japan Meteorological Agency (JMA), MET Watch Office (MWO) Tokyo, Tokyo Volcanic Observation and Warning Center, Volcanic Ash Advisory Center (VAAC) Tokyo), Canada (MWO Edmonton, VAAC Montreal), and the United States (Alaska Volcano Observatory, Cascades Volcano Observatory, United States National Weather Service (NWS), VAAC Anchorage, and VAAC Washington).

1.5 Participating airspace operators were based in Japan (All Nippon Airways, Japanese Airlines, Nippon Cargo), Canada (WestJet), and the United States (American Airlines, Atlas Air, and

United Airlines). Other industry participants included MeteoStar, The Weather Company, and Collins Aerospace (San Francisco Radio).

2. DISCUSSION

2.1 The exercise was prepared by a small group of planners at FAA and JCAB headquarters. Planning for VOLPAC25 began at IPACG meetings between JCAB and FAA in 2024, followed by email coordination and virtual meetings with NAV CANADA in October 2024 and January 2025. Guidance material developed by the APAC MET Exercise Advisory Group and materials from a VOLCEX24 workshop in Lisbon, Portugal were reviewed and used as reference when preparing for VOLPAC25. Coordination throughout the year was done with the United States MET Authority (FAA) and the United States MET Service Provider representing the VAACs, MWO, and the State Volcano Observatories. VAAC Montreal and Toulouse were also consulted. All of these participants played a role in the preparation of the volcanic ash exercise products that were issued to the operators. In a real-world event, the four VAACs work together to handoff and discuss information related to the Volcanic Ash Advisories (VAA) and VAA in graphic form (VAG) as well as Volcanic Ash (VA) SIGMETs that the MWO issues in response to an eruption.

2.2 JCAB led Scenario 1, an eruption of Mount Fuji, about 100 km west southwest of Tokyo. An eruption Volcano Observatory Notice for Aviation (VONA) and several VA SIGMETs, and NOTAMs, VAAs, and VAGs were issued, including changes to the eastbound Pacific Organized Track System (PACOTS) tracks between Southeast Asia and North America. A discussion topic during Scenario 1 involved the slight (less than 0.1mm) ashfall at Tokyo International Airport (RJTT) and Narita International Airport (RJAA). Although the airports remained open (because JCAB was able to provide its regular air navigation service), it is interesting to note that all operators still chose to avoid landing at those airports.

2.3 The FAA led Scenario 2, an eruption of Shishaldin in the Aleutian Islands. As in Scenario 1, an eruption VONA and several VA SIGMETs, and NOTAMs, VAAs, and VAGs were issued. The participants also reviewed the Alaska Volcano Observatory's call-down list of facilities to be notified in case of a volcanic eruption. Scenario 2 showed the importance of keeping such lists up-to-date.

2.4 JCAB led Scenario 3, an eruption of Raikoke in the Kuril Islands. Unlike the earlier scenarios, this scenario did not involve the issuance of VONAs, VA SIGMETs, VAAs, or VAGs; Quantitative Volcanic Ash (QVA) graphical information was issued instead. A NOTAM for changes to the eastbound PACOTS tracks between Japan and North America was also issued. QVA information was issued three times: soon after the eruption, three hours after the eruption, and six hours after the eruption. This scenario provided an opportunity to discuss a future in which QVA has replaced current products such as VA SIGMETs, VAAs, etc.

2.5 The FAA led Scenario 4, an eruption of Mount Baker in the state of Washington. As in Scenario 1 and 2, an eruption VONA and several VA SIGMETs, NOTAMs, VAAs, and VAGs were issued. Since Mount Baker is located only 16 km south of the U.S.-Canada border, the ash quickly moved from the FAA/VAAC Washington's area of responsibility to NAV CANADA/VAAC Montreal's area of responsibility. Consequently, this scenario provided an opportunity to practice cross-boundary coordination for both ANSPs and VAACs. The participants also reviewed a call-down list from the Cascades Volcano Observatory.

2.6 The FAA quickly led a short scenario for a space weather event, a large solar flare accompanied by X-ray radiation. This scenario was based on a space weather event message issued by the Space Weather Prediction Center (SWPC) in Boulder, Colorado, United States. A discussion topic

during this scenario was the possibility of adding probability or likelihood information to the event message.

2.7 One positive takeaway from the exercise was that having several short scenarios, rather than a single, extended scenario, made the exercise more interactive and prevented "exercise fatigue." Although the plan was to show the affected airspace and aircraft on the virtual meeting platform (Zoom) using FlightRadar24, there was a technical issue with FlightRadar24 being unable to display aircraft positions at the time of the exercise. Fortunately, the airspace operators were able to use their flight planning systems to identify the aircraft affected in each scenario. Given the sizes of the ash clouds, there were more diversions and turnarounds than expected.

2.8 One disappointment was that there was insufficient time to discuss the details of cross-border coordination, especially for VAACs and volcano observatories. From the exercise as well as meetings afterwards, it also seems clear that the transition from "legacy" products such as VAAs and VA SIGMETs to QVA will require significant operator familiarization and agreement on any required airframe or engine certifications.

3. ACTION BY THE MEETING

The meeting is invited to note the information contained in this paper.

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