International Civil Aviation Organization

INFORMATION PAPER

Twenty-fourth Meeting of the Meteorology Sub-group (MET SG/24) of the Asia and Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG)

Web-conference, 16 – 20 November 2020

Agenda Item 5: Research, development and other initiatives

UPDATE OF THE SIGMET COORDINATION EFFORTS BY THE HONG KONG OBSERVATORY FOR THE COMPLIANCE OF AMENDMENT 79 TO ANNEX 3

(Presented by Hong Kong, China)

SUMMARY

This paper presents a summary of the efforts, outcomes, experiences in promoting SIGMET Coordination and the demonstration of the full-suite HKO SIGMET Coordination platform in support of regional SIGMET coordination activities over the APAC region under Amendment 79 to Annex 3.

1. INTRODUCTION

1.1 At the Twenty-Eighth meeting of the Asia and Pacific Air Navigation Planning and Implementation Regional Group held in 2017, Conclusion APANPIRG/28/30 encouraged states to participate in cross FIR boundary SIGMET coordination activities for seamless hazardous weather information in the APAC region.

1.2 Under Amendment 79 to Annex 3, SIGMET Coordination became a recommended practice effective on 20 July 2020 and applicable on 5 November 2020.

> *3.4.4 Recommendation --- An MWO should coordinate SIGMET with neighbouring MWO(s), especially when the en-route weather phenomenon extends or is expected to extend beyond the MWO's specified area of responsibility, in order to ensure harmonized SIGMET provision.*

1.3 Hong Kong Observatory (HKO), Hong Kong, China, as one of the resource agencies has been providing a web-based Regional SIGMET Coordination platform ("Platform") to support the operation and trials of SIGMET coordination as well as provided related trainings since 2016. This paper presents the progresses, outcomes and ongoing efforts by HKO in promoting harmonization of aviation meteorological services within the APAC region in the pursuit of the above Recommendation.

2. DISCUSSION

SIGMET coordination projects

2.1 The Meteorological Watch office (MWO) of Indonesia, Malaysia and Singapore commenced the Operational SIGMET Coordination (OSC) in August 2017 subsequent to the successful conclusion of the pilot project on SIGMET coordination under the World Meteorological Organization (WMO) in 2016. The HKO, as one of the resource agencies, provided the Platform to support OSC. In early 2018, the coordination was expanded with Vietnam joining as a trial member. Apart from monthly/bi-monthly review meetings, which found to be rather useful in improving the coordination effectively and efficiently. Medium term weather outlooks were also discussed among the group members during the meetings for better preparedness for the coordination in the next months. Details of the projects have been reported in MET SG/23 – IP/21.

2.2 To promote the extension of SIGMET coordination, a number of MWOs in the north and northwestern part of the South China Sea including Guangzhou (ZGZU), Hanoi (VVNB), Ho Chi Minh (VVGL), Hong Kong (VHHH) and Sanya (ZJSA) initiated the GHSV SIGMET Coordination project in November 2017, with HKO being the coordinator. Kunming (ZPKM) joined the project in June 2018 and Phnom-Penh (VDPP) also joined the project in October 2020 after the resumption of SIGMET issuance by State Secretariat of Civil Aviation (SCCA). The GHSV SIGMET Coordination was initiated as trial operation from 01 to 09UTC during weekdays initially and then extended to all days of the week from 00 to 13UTC beginning on 15 July 2019. Noting the fruitful outcomes and in compliance with ICAO Annex 3, the GHSV SIGMET Coordination transitioned to full operational 24 hours 7 days from 1 November 2020. There were a total of 784 coordinated cases from Nov 2017 to Sept 2020, with around 90% (702 cases) with consensus. Monthly regular teleconference meetings were arranged to review the coordination and consider need for improving the guiding principles and Platform. Ad hoc short web briefings to exchange views on the impact brought by tropical cyclones over the South China Sea that were expected to affect multiple FIRs were also held beforehand for common situational awareness, better preparedness and seeking mutual understanding of different operational practices. Details of the projects have been reported in MET/IE WG/18 & MET/S WG/10 - IP/07. Figure 1 show a coordinated case under the GHSV SIGMET Coordination project.

2.3 To extend the SIGMET Coordination efforts to the Indian Ocean, a South and South-eastern Asia (SSEA) SIGMET coordination project was set up between Indonesia and Sri Lanka since December 2019, with HKO as the coordinator. The SSEA SIGMET Coordination initiated as trial operational from 04Z to 12Z initially and extended to 00Z to 12Z daily after a 3-month trial period. Noting the positive outcomes, the project entered into semi-operation status since 2 June 2020 with coordination from 00Z to 15Z daily. There was a total of 27 coordinated cases in 10 months' time. Details of the project have been reported in MET/IE WG/18 & MET/S WG/10 - WP/20.

2.4 Apart from the operation/trial of the above projects, HKO has also organized a few online trainings since the coordination training workshop held in Hong Kong in December 2017. A total number of 6 face-to-face trainings and 12 online trainings for various MWOs in the APAC region were provided. Some positive feedbacks from the participants were also collected on improving mutual understanding between MWOs and enhancing the Platform to suit the MWOs' needs.

2.5 The above activities help in achieving harmonized SIGMET provision as envisioned under Amendment 79.

Full suite HKO SIGMET Coordination platform

2.6 The Platform is developed to promote common situation awareness, online communication and interactive collaborations among the participants as well as reduce format error during encoding. Features of the Platform includes: display of real-time and past information for hazardous weather, interactive manipulation of SIGMET polygon to encode SIGMET message for individual FIR (comply with ICAO Annex 3) and chat room for MWOs to communicate and harmonize the SIGMET messages before issuance individually. Real-time satellite and radar imageries, lightning, cloud top height, convection nowcast guidance, wind field, pilot reports, AMDAR, latest issued SIGMET as well as system alerts were updated frequently.

2.7 The Platform was designed initially for WS SIGMET coordination but was enhanced later for the issuance of WV SIGMET to support APAC VOLCEX 18/02 (VOLCEX/SG/6 IP/2). In view of the Recommendation 3.4.4 in Amendment 79 to ICAO Annex 3 on the coordination of SIGMET, the Platform was further enhanced in Oct 2020 to cover other hazardous weather, including turbulence, icing in WS SIGMET and tropical cyclones (TC) in WC SIGMET.

2.8 Under the turbulence module, the Platform provides turbulence indices and vertical wind shear information extracted from NWP for MWOs' reference. Under the icing module, icing potential utilizing relative humidity and temperature extracted from NWP were displayed. Both modules provide automatic alerts of moderate or above intensity turbulence/icing whenever relevant pilot report is received. This helps the users to remain vigilant on the observations. As for significant convective weather, a combined thunderstorms and tropical cyclone module, with TC tracks from Tropical Cyclone Advisory Centre (TCAC), was developed to facilitate the issuance of WS and WC SIGMET. HKO will continue to enrich the range of guidance forecast in these modules.

2.9 Meanwhile, to facilitate the transition of SIGMET from TAC to XML format, which is to be effective in November 2021, provision has also been included on the Platform to facilitate MWOs to issue both TAC and IWXXM coded SIGMET message. Users can simply copy and paste the relevant codes generated by the Platform to their dissemination system. Details of the IWXXM encoding function of the Platform have been reported in MET/IE WG/18 & MET/S WG/10 – IP/06.

2.10 A few screenshots of the Platform for full-suite (thunderstorm, tropical cyclones, turbulence, icing and volcanic ash) of en-route hazards are shown in Figure 2.

2.11 The Platform is also linked to the SIGMET Monitoring web page which displays all latest SIGMET messages within the APAC region (TS, Turb, ICE, WC, VA), satellite, radar and other weather information to enhance common situation awareness and to improve on the quality control of SIGMET. Some other useful information includes: ATS Route, Airport weather, HKO Turbulence (EDR) forecast, WAFC SIGWX CAT, etc. This monitoring page also has a timeline feature which allows users to review the weather situation in the past two days. Figure 3 show a screen shot of the SIGMET monitoring webpage.

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.

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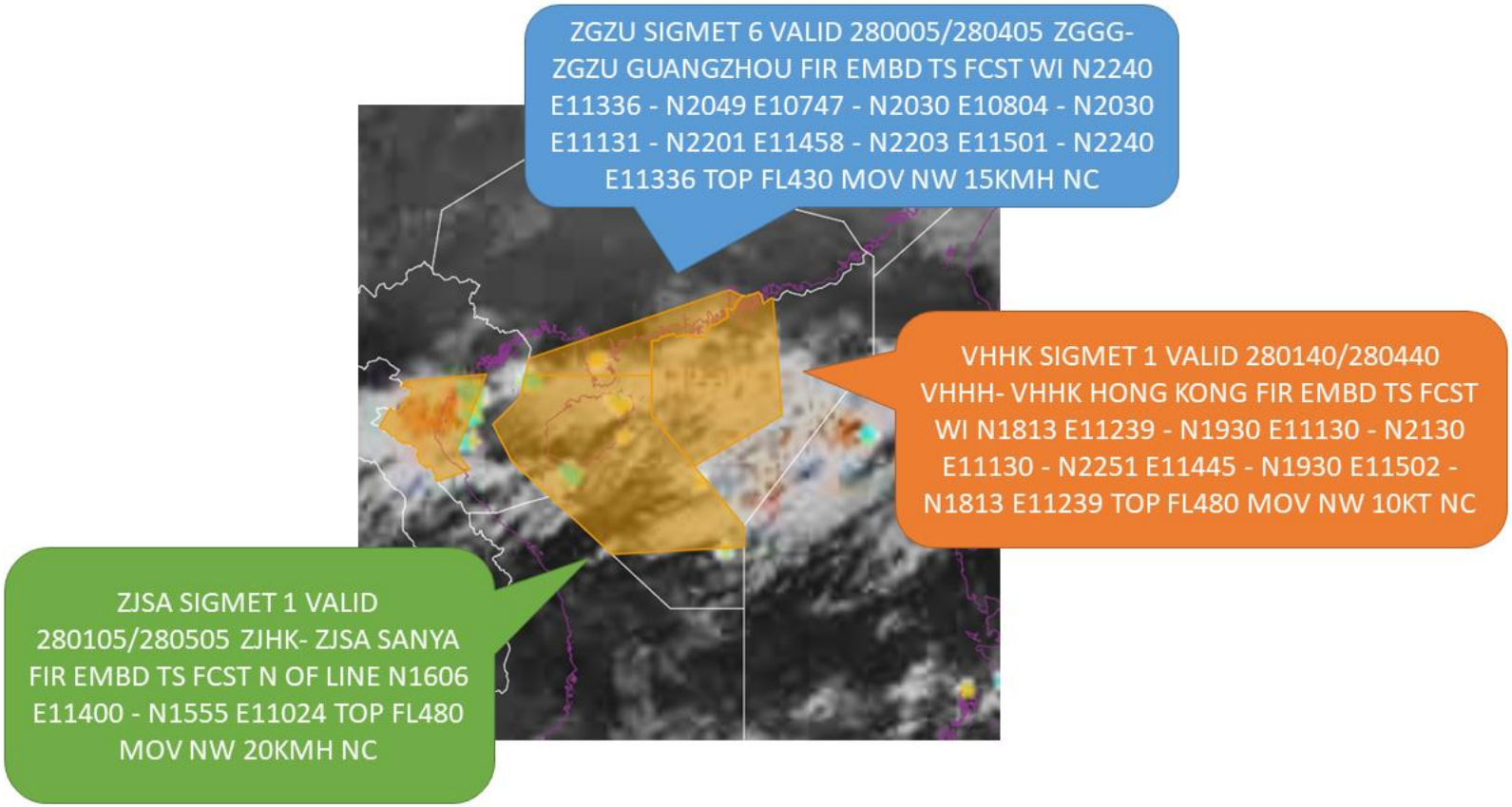

Figure 1 A coordination case between Guangzhou FIR, Hong Kong FIR and Sanya FIR on 28 Sept 2020. The SIGMETs (orange polygons) issued by the MWOs aligned well in terms of spatial coverage and movement. The differences in the cloud top heights in the SIGMET messages were considered to be due to various development stage of the convection which were agreed by the relevant MWOs in the chatroom.

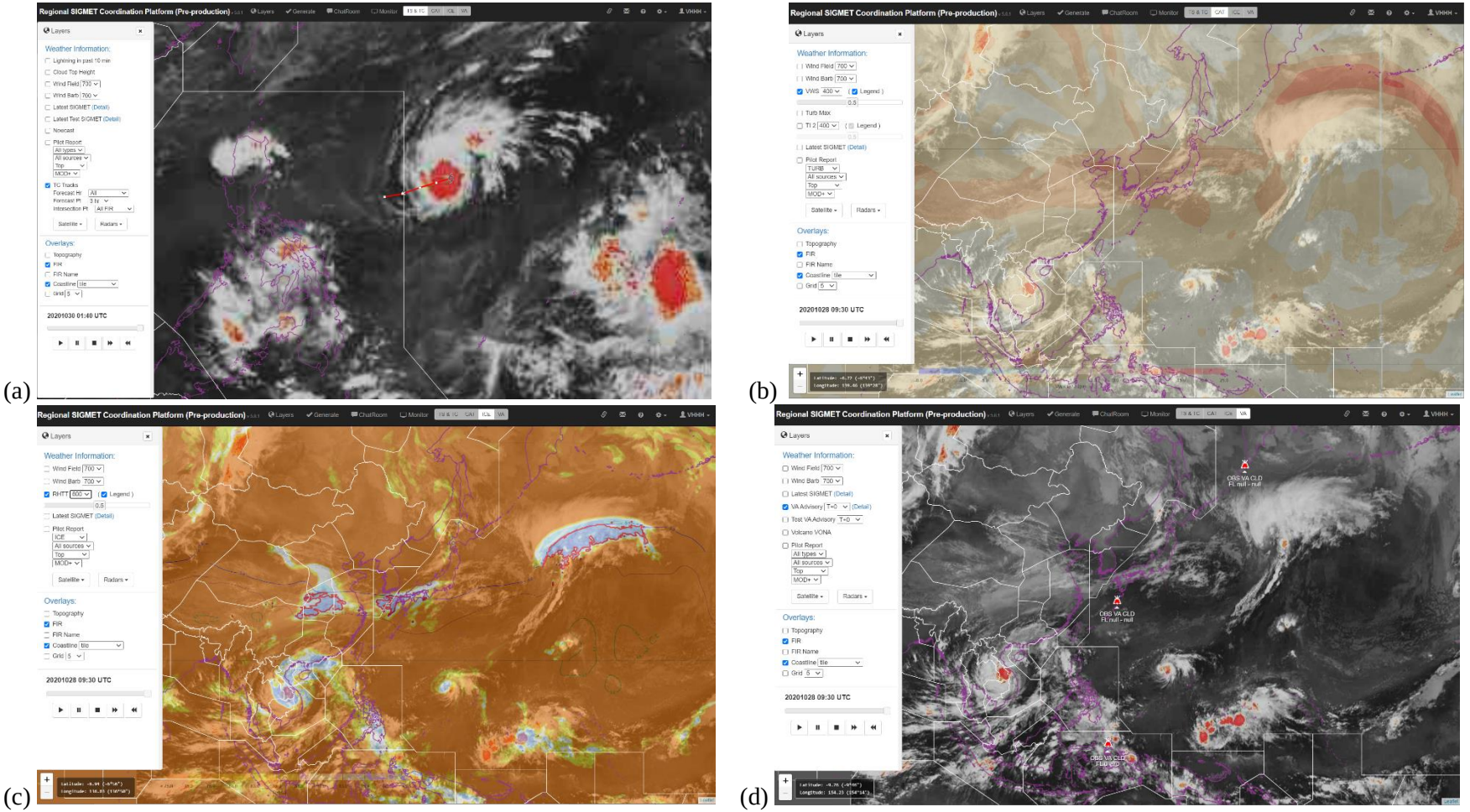

Figure 2 Screenshot of the full suite HKO SIGMET coordination web platform: (a) Combined TS and TC module, (b) turbulence module, (c) icing module and (d) volcanic ash module

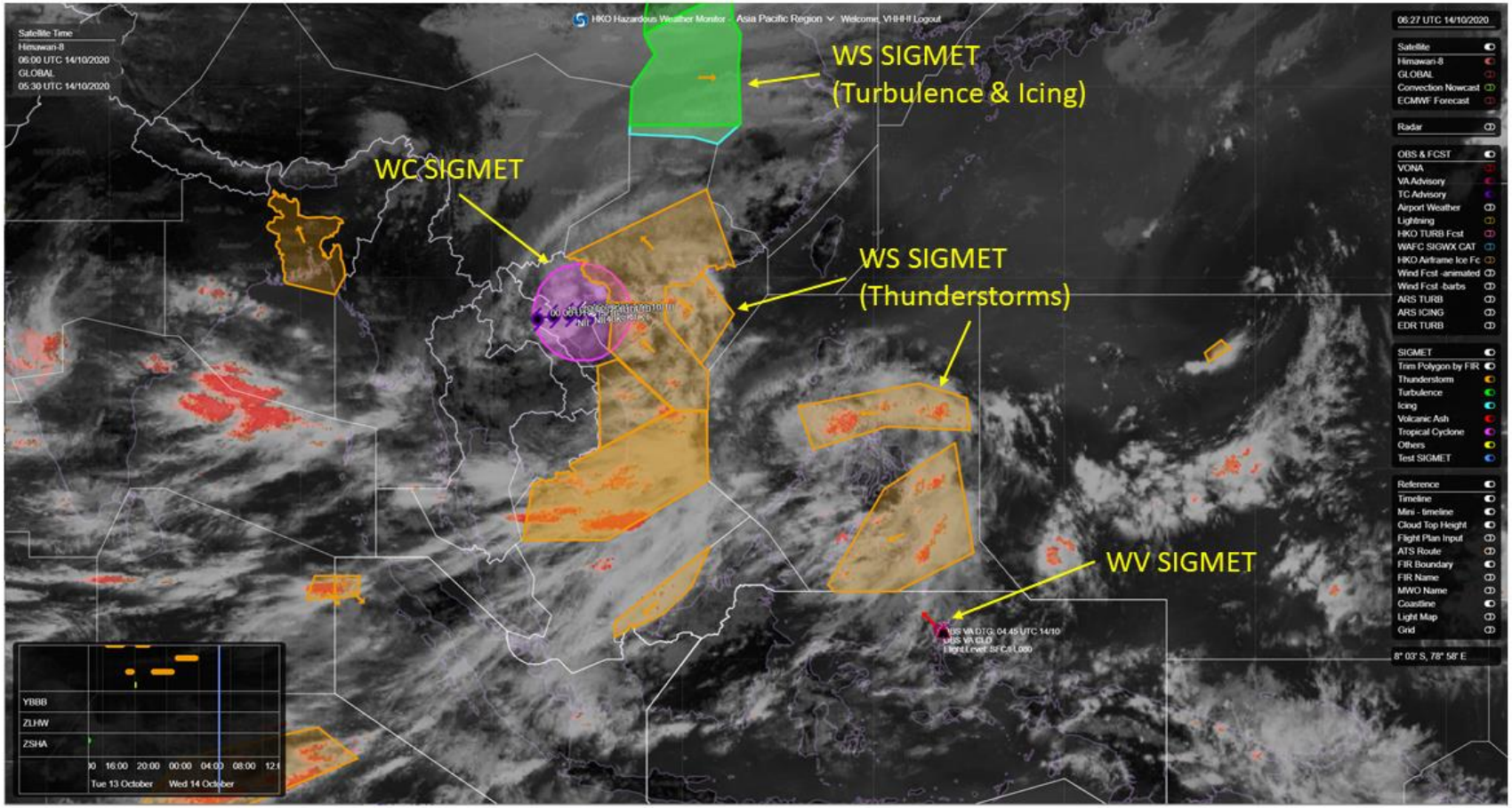

Figure 3 Screenshot of the HKO SIGMET Monitoring web page.