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 ON THE GLOBAL SPACE WEATHER ADVISORY SERVICE

(Presented by Australia)

SUMMARY

This paper provides an update on the first year of operation of the space weather advisory service, focusing on the Australian Bureau of Meteorology's operations contributing to the delivery of this new service to aviation.

1. INTRODUCTION

1.1 Amendment 78 of ICAO Annex 3 – *Meteorological Service for International Air Navigation* (effective 8 November 2018) established provisions for the introduction of space weather services in the form of a Space Weather Advisory (SWXA). Furthermore, from 7 November 2019 Space Weather Advisories were also recommended to be disseminated in ICAO Meteorological Information Exchange Model (IWXXM) Geography Markup Language (GML) form. As of 5 November 2020, in addition to abbreviated plain language, dissemination of space weather advisory information in IWXXM GML form is now a standard.

1.2 The 215th session of the ICAO Council agreed on the designation of the three global Space Weather Centres (SWXC), the ACJF (Australia, Canada, France and Japan) consortium, the European PECASUS consortium, and the United States, with two additional Regional Centres, (China/Russian Federation consortium and South Africa), to be established no later than November 2022.

1.3 The global centres commenced operations on 7 November 2019, operating on a two-week rotation cycle through three roles: On-Duty Centre (ODC) with primary responsibility to issue all space weather advisories, Primary Backup Centre (PBC) and Secondary Backup Centre (SBC).

1.4 In April 2020, ICAO Council Decision 219/7 agreed that the China/Russia Federation consortium (CRC) serve as a fourth global space weather information service provider. Work is ongoing within the ICAO Space Weather Centre Coordination Group (SWXC-CG) to integrate CRC into the global space weather information service.

2. DISCUSSION

2.1 Operation of the global service commenced on 7 November 2019, with PECASUS as the On-Duty Centre. Operational communication and coordination between the three global centres has been seamless with fortnightly handovers progressing smoothly. The Australian Bureau of Meteorology (BoM), as part of ACFJ has acted as the On-Duty Centre for a total of 17 weeks since commencement of the service.

2.2 A series of dissemination test messages were issued by the global service between September 2019 and May 2020 to test the global dissemination of SWXAs over the Aeronautical Fixed Service (AFS).

2.3 On 28 September 2020, the Australian Bureau of Meteorology, while ACFJ was acting in the ODC role, issued the first ever real High-Frequency Radio Communications (HF COM) SWXA for aviation. In total there were, 13 HF COM advisories (HF COM 2020/26 – 2020/38) were issued over the four-day period 28/09/2020 to 01/10/2020 (see Table 1). The advisories pertained to moderately disrupted HF COM conditions in the northern hemisphere, mostly over Europe resulting from a high-speed solar wind stream that increased space weather activity around the globe.

***Table 1**: HF COM Space Weather Advisories issued by the Australian Bureau of Meteorology between 28/09/2020 and 01/10/2020*

SWX Effect	Advisory number	Replaced	Issuance time	OBS SWX
HF COM MOD	2020/26	-	28-Sep-2020, 05:55:00 UTC	28/0532Z HNH MNH E000 - E060
	2020/27	2020/26	28-Sep-2020, 11:31:00 UTC	28/1124Z NO SWX EXP (end of event)
HF COM MOD	2020/28	-	28-Sep-2020, 23:19:00 UTC	28/2302Z HNH MNH E000 - E120
HF COM MOD	2020/29	2020/28	29-Sep-2020, 02:33:00 UTC	29/0228Z HNH MNH W120 - E020 (update)
	2020/30	2020/29	29-Sep-2020, 05:04:00 UTC	29/0500Z NO SWX EXP (end of event)
HF COM MOD	2020/31	-	29-Sep-2020, 19:24:00 UTC	29/1912Z HNH MNH EQN E015 - E060
	2020/32	2020/31	29-Sep-2020, 20:23:00 UTC	29/2012Z NO SWX EXP (end of event)
HF COM MOD	2020/33	-	30-Sep-2020, 04:15:00 UTC	30/0352Z HNH E000 - E075
	2020/34	2020/33	30-Sep-2020, 06:23:00 UTC	30/0612Z NO SWX EXP (end of event)
HF COM MOD	2020/35	-	30-Sep-2020, 23:12:00 UTC	30/2252Z HNH E000 - E045
	2020/36	2020/35	1-Oct-2020, 01:23:00 UTC	01/0112Z NO SWX EXP (end of event)
HF COM MOD	2020/37	-	1-Oct-2020, 20:08:00 UTC	01/1952Z HNH MNH EQN E000 - E060
	2020/38	2020/37	1-Oct-2020, 22:13:00 UTC	01/2202Z NO SWX EXP (end of event)

HNH – High (latitudes) Northern Hemisphere (> 60º latitude band)
MNH – Mid (latitudes) Northern Hemisphere (30 – 60º latitude band)
EQN – Equatorial (latitudes) Northern Hemisphere (0-30º latitude band)

2.4 A review of the space weather event and BoM operations throughout the event is underway to document lessons learned and to capture industry feedback on the issued advisories. A sub-team of the ICAO SWXC-CG is also reviewing the underlying ionospheric conditions during the event as the basis for the issued advisories with the aim of ensuring a high level of consistency between the global SWXCs for HF COM advisories.

2.5 On 5 November 2020, new updates to the space weather advisory information service became effective, as per Amendment 79 of ICAO Annex 3. These include:

- Dissemination of IWXXM GML format advisories as a standard, in addition to the text-format SWXAs.
- Updated WMO headers on both text and IWXXM GML format SWXAs to reflect a unique header for each of four different types of space weather effect.

2.6 From 5 Nov 2020 the program of dissemination testing for SWXAs re-commenced. Test messages will be issued over November – December 2020 in both text and IWXXM GML format.

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.

– – – – – – – – – – – – – – –