



ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda Item 30: Other issues to be considered by the Technical Commission

SPACE WEATHER REQUIREMENTS FROM SOUTH AFRICA

(Presented by South Africa)

EXECUTIVE SUMMARY

This paper discusses the requirements for the provision of a space weather information service to support international air traffic navigation as part of ICAO's *Global Air Navigation Plan* (GANP, Doc 9750). ICAO has recently amended Annex 3 — *Meteorological Service for International Air Navigation* with consequential amendments to Annex 15 — *Aeronautical Information Services, Procedures for Air Navigation Services — ICAO Abbreviations and Codes* (PANS-ABC, Doc 8400) and *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444). These amendments deal with the provision of a space weather information service to national and regional air navigation service providers (ANSPs) and operators. In November 2018, South Africa, through the South African National Space Agency (SANSA), was designated as an ICAO Regional Centre for the provision of space weather information as per the Annex 3 amendments. The discussion point of this paper will deal with the requirements that these amendments will impose and subsequent implications for civil aviation.

<i>Strategic Objectives:</i>	This paper relates to Strategic Objective: Safety.
<i>Financial implications:</i>	Cost recovery mechanisms will be implemented from 2022.
<i>References:</i>	Annex 3 — <i>Meteorological Service for International Air Navigation</i> Annex 15 — <i>Aeronautical Information Services</i> Doc 8400, <i>Procedures for Air Navigation Services — ICAO Abbreviations and Codes</i> (PANS-ABC) Doc 4444, <i>Procedures for Air Navigation Services — Air Traffic Management</i> (PANS-ATM)

1. INTRODUCTION

1.1 Annex 3 provides Standards and Recommended Practices (SARPs) for Contracting States in the provision of meteorological information for international air navigation. The requirement for the provision of space weather services to be included as part of air navigation plans was initially set for 2018 and has been delayed until November 2019. These requirements have been incorporated into Annex 3, which now puts forward measures of safety that emphasises the ability of operators and ANSPs to effectively manage the risks of space weather impact on communications, navigation and surveillance systems, as well as radiation exposure.

1.2 The International Civil Aviation Organization (ICAO) issued State letter AN 10/1-17/41, dated 7 April 2017, requesting comments on proposed amendments to Annex 3 and consequential amendments to Annex 15, PANS-ABC and PANS-ATM.

1.3 In response to ICAO State letter AN 10/1-IND/17/11, dated 9 June 2017, calling for States to indicate their candidature to be designated centres for the provision of space weather information, South Africa put forward the South African National Space Agency (SANSA) as a viable candidate to become a designated centre. On 13 November 2018, ICAO announced five designated centres (AN 10/1-IND/18/9, dated 21 December 2018) for the provision of space weather information to the aviation sector, of which South Africa, through SANSA, is one of the Regional Centres.

1.4 This paper highlights the implications of these amendments for the aviation sector, and the role that South Africa will be playing as the ICAO designated regional space weather information provider for Africa.

2. DISCUSSION

2.1 ICAO has recognised the need for the adoption of procedures related to mitigating the impact of space weather on civil aviation. The ICAO Meteorology Divisional Meeting that took place in Montréal in 2014 adopted a recommendation regarding the development of provisions for information concerning space weather. Subsequently, in 2017, amendments to Annex 3 and related documentation were made. Included in the amendments is the requirement that space weather information be integrated into global air traffic navigation information systems. All aviation providers and users are required to be familiar with the impacts of space weather on the aviation sector and all concerned should ensure that pertinent space weather information is filed with all flight plans.

2.2 SANSA has been given the mandate to operate the Space Weather Regional Warning Centre for Africa, under the International Space Environment Service (ISES), which aims to coordinate global space weather activities. Since 2014 SANSA has been working with ICAO and ISES to understand the impact that space weather events can have on the aviation sector and to advise these global organisations on the provision of space weather information to the aviation sector.

2.3 In 2018, SANSA was designated by ICAO as a Regional Centre for the provision of space weather information. Since the designation was announced, SANSA has been participating in the ICAO Coordination Committee on Space Weather and working with the other designated centres to develop a global accredited service that complies with ICAO regulations.

2.4 It is important to note that space weather is a global phenomenon with regional impact and the impact from a space weather event can be detrimental to resources used by air traffic navigation services. SANSA has been collaborating with the Air Traffic and Navigation Services Company (ATNS) and the South African Weather Service (SAWS) for the past three years on the Space Weather for Aviation Project, in a bid to prepare the South African aviation community for the amendments.

2.5 In April 2016, SANSA published a policy brief entitled “Space Weather Impacts on Aviation”¹ which can be used as background information to the amendments and South Africa’s ability to comply with the amendments. This document can assist African States in dealing with the amendments.

2.6 In terms of the amendments to Annex 3 and consequential amendments to Annex 15, PANS-ABC and PANS-ATM, the requirement is for the provision of space weather information on impacts that are expected to affect communications, navigation and surveillance systems and/or pose a radiation risk to flight crew members and passengers.

2.7 Designated space weather service providers will support the aviation sector with compliance to Annex 3 through monitoring the existence and extent of relevant space weather phenomena, as well as the issue and supply of advisory information in the prescribed formats.

2.8 Operators and flight crew members will be required to include in their flight documentation information pertaining to space weather phenomena relevant for the entire route. The details of what is required, when the information should be updated, and the format to provide the information are given in Annex 3, and details on the interpretation of these requirements are being discussed with ICAO Coordination Committee for space weather.

2.9 With the addition of space weather information to the existing suite of meteorological information, as defined in Annex 3, there is a need for operators and regulatory authorities to include space weather in their operational policies.

2.10 Since November 2018, SANSA has been preparing to provide space weather services in the four domains (communications, navigation, surveillance and radiation) required by the aviation sector for the African Region. This preparation includes but is not limited to the development of operational products that will feed into the advisories; the expansion of ground-based infrastructure; and the growth of the capability needed to deliver the service 24/7.

2.11 Partnerships are an essential component and SANSA will be addressing various sectors throughout the African continent to identify key stakeholders who can partner in the implementation of the ICAO requirements for the continent.

3. CONCLUSION

3.1 As per item 2.10 and 2.11 above, SANSA is preparing to provide the African aviation sector with the required information as stipulated by ICAO. To this end, interested and appropriate stakeholders are invited to partner with SANSA in the following areas:

- a) training of local aviation users on the interpretation and use of the space weather information provided;

¹ <https://www.sansa.org.za/wp-content/uploads/2018/05/Policy-Brief-Space-Weather-Impacts-on-Aviation-2016.pdf>

- b) hosting of ground based instrumentation for the monitoring of space weather conditions; and
- c) identification of local partners to participate in research campaigns to effectively monitor the impact from space weather on African aviation users as well as undertaking forecast verification studies with the intention to continuously improve the forecasts and predictions.

3.2 The participants of the 40th ICAO Assembly Session are invited to take into consideration the information contained in this paper.

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