International Civil Aviation Organization

THE SIXTH MEETING OF THE ASIA/PACIFIC GBAS/SBAS IMPLEMENTATION TASK FORCE (GBAS/SBAS ITF/6)

(Bangkok, 7- 9 May 2024)

Agenda Item 3: Updates from States/Administrations about GBAS/SBAS Implementation

SouthPAN status update

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SUMMARY

This paper presents a brief summary of the SouthPAN program, which will provide a SBAS aeronautical radio navigation service to Australia and New Zealand by 2028.

1. INTRODUCTION

1.1 The Southern Positioning Augmentation Network (SouthPAN) is a SBAS that is being developed by the Australian and New Zealand governments. When complete, it will support en-route, terminal, NPA, and APV flight operations across Australia and New Zealand. The service is currently broadcasting Early Open Services on the L1 and L5 navigation signals. More information on SouthPAN can be found at www.ga.gov.au/southpan and www.linz.govt.nz/southpan.

2. SOUTHPAN NAVIGATION SERVICES

2.1 SouthPAN commenced service delivery on 26 September 2022 and provides a number of Early Open Services:

2.1.1 L1 SBAS Open Service (on the L1 navigation signal and as a Data Access Service), augmenting the L1 C/A GPS signal;

2.1.2 DFMC SBAS Open Service (on the L5 navigation signal and as a Data Access Service), augmenting the L1 C/A and L5 GPS signals, and the E1 and E5a Galileo signals; and

2.1.3 Precise Point Positioning (PPP) Via SouthPAN (PVS) (on the L5 navigation signal and as a Data Access Service), augmenting the L1 C/A and L5 GPS signals, and the E1 and E5a Galileo signals.

2.2 The L1 SBAS and DFMC SBAS Open Services are marked as not-for-use by aviation, through the use of Message Type 0. This prevents aircraft from using the SBAS navigation signals.

2.3 The L1 SBAS service will be available for use by aviation in 2028. There will be a limitation on the service north of approximately 20° South latitude due to ionospheric activity. The actual Service Volume will be maximised and determined during the design process.

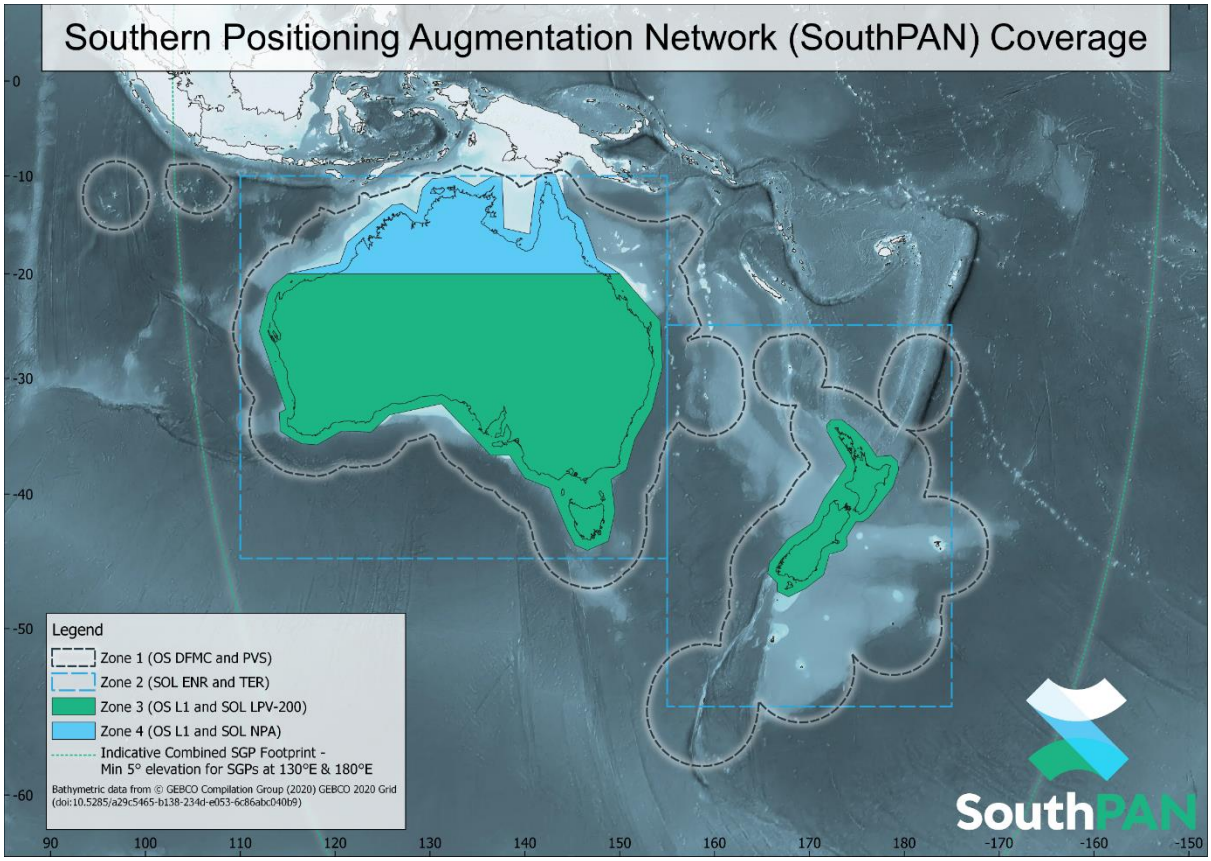
2.4 There are currently no plans to certify the DFMC SBAS service for use by aviation. This may be the subject of a future government decision based on the availability and adoption of avionics by aircraft and airlines flying in Australia and New Zealand.

2.5 More detail on individual services can be found on the GA and LINZ websites, including the Service Definition Documents (SDD) for the Signals-in-Space and the Data Access Services. The SDDs describe the target levels of performance and how users can access the services.

2.6 The target Service Area is shown in Figure 1 below. SouthPAN will support Vertical Protection Levels of less than 35 metres within the green area.

3. INSTRUMENT FLIGHT PROCEDURES

3.1 Locations where LPV-200, LPV-250, and LNAV/VNAV (SBAS) instrument flight procedures are published will depend on a number of factors including runway lighting, approach lighting, traffic rates, aircraft types, and other extant navigation services.



4. PROGRAM UPDATE

4.1 The Preliminary Design Review was completed in February 2023 and the Critical Design Review is scheduled for June 2024. Site selection for the GNSS Reference Stations is largely complete, with a small number requiring re-survey to validate the acceptability of the Radio Frequency environment and site logistics.

4.2 The sites for the two Uplink & Processing Centres have been established and site civil works has commenced. The first dedicated navigation Radio Frequency Uplink has been constructed near Armidale in New South Wales, Australia. A second RFU will be complete in May 2024. This infrastructure will be duplicated to achieve the high availability required of ARNS.

4.3 A contract for the first new satellite (SouthPAN GEO Payload—SGP) was awarded to industry in May 2023. A procurement for SGP-02 is currently open for tender (https://www.tenders.gov.au/). The current satellite is Inmarsat 4F2 located at 143.5° East longitude, which replaced 4F1 as the active satellite on 20 November 2023. This change was coordinated with the PNT Spectrum Management Section of the USSF, in accordance with the PRN Code Assignment Process document. Procurement for a second satellite is ongoing.

4.4 A preliminary probabilistic analysis has identified potential challenges with meeting the ICAO Annex 10, Volume 1 Continuity of Service navigation performance requirements for specific types of approaches with vertical guidance enabled by SouthPAN. This is primarily due to the inability to deploy GNSS Reference Stations to the west of Australia, south of Australia and the east of New Zealand (oceanic areas). This impacts the ability to effectively characterise the ionosphere in coastal regions resulting in inflated Ground Ionosphere Vertical Error (GIVE) values. Australia plans to establish a Technical Working Group to establish a clear understanding of the effect of a lower level of Continuity of Service for SBAS enabled approaches with vertical guidance to the Australian aviation industry and any specific operational mitigations that may be required at locations that may not meet the Continuity of Service performance requirements.

4.5 Australia is currently exploring available options to notify pilots of predicted periods when specific types of SBAS enabled approaches may be unavailable. Currently Australia is considering the use of the NOTAM system for publishing prediction outages or using an established web service (similar to the RAIM outage notification system) for notifying pilots of predicted outages.

5. ACTION BY THE MEETING

5.1 The meeting is invited to:

- Note the contents of this paper; and
- Discuss any issues as appropriate including:
  - whether other SBAS service providers in the region have challenges meeting the ICAO Annex 10, Volume 1 Continuity of Service navigation performance requirements; and
  - existing practices in the region for notifying pilots of predicted periods when specific types of SBAS enabled approaches will be unavailable.

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