



ICAO

International Civil Aviation Organization

**THE THIRTIETH MEETING OF THE
COMMUNICATIONS / NAVIGATION AND
SURVEILLANCE SUB-GROUP (CNS SG/30)
OF APANPIRG**

Bangkok, Thailand, 06 - 10 July 2026

Agenda Item 4: Navigation

4.3. Other navigation-related matters

**SOUTHERN POSITIONING AUGMENTATION NETWORK (SOUTHPAN)
IMPLEMENTATION UPDATE**

(Presented by Australia)

SUMMARY

The Southern Positioning Augmentation Network (SouthPAN) is a Satellite Based Augmentation System (SBAS) programme led by Australia and New Zealand to enhance Global Navigation Satellite System (GNSS) performance across multiple sectors including aviation. This paper presents the current implementation status of SouthPAN. Furthermore, this paper provides information on challenges with meeting the Continuity of Service standards stipulated in ICAO Annex 10, Volume I and how this will be addressed in Australia.

1. INTRODUCTION

1.1 The Southern Positioning Augmentation Network (SouthPAN) is a Satellite Based Augmentation System (SBAS) that is being developed by the Australian and New Zealand governments. When complete, it will support en-route, terminal, Non-Precision Approach (NPA), and Approach with Vertical guidance (APV) 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 <http://www.ga.gov.au/southpan> and <http://www.linz.govt.nz/southpan>.

2. DISCUSSION

2.1 SouthPAN services and implementation status

2.1.1 SouthPAN commenced service delivery on 26 September 2022 and provides several Early Open Services which are listed below. Service Performance to date has met requirements.

- a) L1 SBAS Open Service (on the L1 navigation signal and as a Data Access Service), augmenting the L1 Coarse Acquisition (C/A) GPS signal;
- b) Dual Frequency Multi-Constellation (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

- c) 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.

2.1.2 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 SouthPAN for navigation.

2.1.3 The L1 SBAS service will be available for use by aviation from 2028. There will be a limitation on the service north of approximately 20° South latitude due to ionospheric activity.

2.1.4 There is a potential for Required Navigation Performance (RNP) procedures to Localizer Performance with Vertical Guidance (LPV) minima to be published at over 240 aerodromes across Australia.

2.1.5 More detail on individual services can be found on the Geoscience Australia (GA) and Toitū Te Whenua Land Information New Zealand (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.

2.2 SouthPAN system configuration

2.2.1 The SouthPAN system configuration will include the following elements which are currently under development with some elements progressing a system upgrade from the Early Open Services:

- a) two Ground Control Centres comprised of Uplink and Correction Processing;
- b) 35 Global Navigation Satellite System (GNSS) Reference Stations (GRS) including a combination of both Signal Quality Monitoring (SQM) and Continuously Operating Reference Stations (CORS);
- c) dedicated SouthPAN Wide Area Network;
- d) two new SouthPAN navigation payloads on the new Viasat I-8 constellation; and
- e) Data Access Services for internet delivery of services provided via Geoscience Australia Positioning Operations Support Centre.

2.2.2 System Critical Design Review was completed in April 2025. Civil Works and Site Acceptance Testing of the GRS is currently underway. The Safety computer software applications have commenced development. The satellite payloads are progressing towards Critical Design Reviews (SGP-01 and SGP-02).

2.3 Continuity of Service performance requirements

2.3.1 There are potential challenges with meeting the ICAO Annex 10, Volume I Continuity of Service performance requirements for different types of operations within Australia. 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 resulting in inflated Grid Ionosphere Vertical Error (GIVE) values.

2.3.2 Australia notes however that the ICAO Annex 10, Volume I guidance material includes provisions to allow states to publish procedures in areas that do not meet the Continuity of Service

performance requirements. Specifically, paragraph 3.4.3.4 in Attachment D of ICAO Annex 10, Volume I, states that for those areas where the system design does not meet the average continuity risk specified in the Standards And Recommended Practices, it is still possible to publish procedures. However, specific operational mitigations should be put in place to cope with the reduced continuity expected.

2.3.3 Australia is currently exploring the following operational mitigations to address reduced Continuity:

- a) **Prohibit use of SouthPAN for alternate planning.** Preclude any operational credit being given for alternate aerodrome provision during the flight planning process. Planning for an alternate aerodrome should not be based on SouthPAN being available. This ensures that in the event of a widespread SouthPAN outage, an airspace user can revert to a different navigation system and proceed to a suitable airport.
- b) **Instrument Flight Procedure Unavailability Notification system.** Australia plans to implement a system that provides users with information on the availability of different types of SouthPAN enabled operations at an aerodrome. If the intended operation is planned to be unavailable, the user should plan accordingly, which may include using alternate approach types. Note, on arrival at the destination aerodrome, if the SBAS avionics equipment indicates the intended operation is available, then the user will be permitted to perform the intended operation.
- c) **Receiver Autonomous Integrity Monitoring (RAIM) continues to be available.** RAIM continues to be available to allow users to navigate to an alternate and perform a RNP approach to Lateral Navigation (LNAV) minima. Australia continues to provide a RAIM prediction service to provide pilots with information on potential RAIM outages.

2.3.4 In addition to the operational mitigations articulated above, Australia has established a Backup Navigation Network (BNN), which is intended to support the safe completion of flight in the event of a GNSS outage. Further information on Australia's Backup Navigation Network is available in [IP04 AUS-AI.7.4](#) from CNS Sub-Group 29.

2.3.5 These potential Operational Mitigations will be presented to operators at the next industry forum and feedback sought on their feasibility and viability. The outcomes will be communicated in subsequent status updates.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) note the operational mitigations being explored by Australia to cope with reduced Continuity;
- c) encourage other states to share their SBAS implementation experience, specifically any operational mitigations to cope with reduced Continuity; and
- d) discuss any other matters as relevant.
