*International Civil Aviation Organization*

**Fifth Meeting of the Surveillance Implementation Coordination Group (SURICG/5)**

Web-conference, 22 – 24 September 2020

**Agenda Item 3: Review of regional requirements for Surveillance in the e-ANP, Seamless ANS Plan and the reported implementation status**

# PNG DEPLOYMENT OF SPACE BASED ADS-B

Present by PNG and Aireon LLC (a member of ICCAIA)

**SUMMARY**

This paper presents the status of Space based ADS-B deployment in PNG

## 1. INTRODUCTION

NiuSky Pacific Limited (formally PNG Air Services Limited - PNGASL) has designed and is in the final stages of implementing a country-wide CNS/ATM modernisation program including:

- Thales TopSky ATM system
- Mode S radar
- Terrestrial ADS-B network
- ADS-C/CPDLC
- Redundant Wide Area Network (WAN) – data/voice communications
- New HF TX/RX site
- GNSS Instrument Approach Procedure

The drivers for modernisation were:

- Enhanced safety and service provision
- Old systems of different manufacturers/types, unable to be integrated and no longer maintainable
- Allow operators to realise the benefits of their significant investments
- Regional compatibility to support seamless services from DEP to DEST.

## 2. Remote facilities

In PNG the support of remote facilities has been plagued with difficulties such as :

- Access to sites
- Unreliable power systems
- Security & theft
- Unreliable data communication

As a result, PNG is transitioning to satellite based systems including:

- VSAT digital communication
- GNSS
- ADS-C/CPDLC and more recently
- Space based ADS-B

## 3. Surveillance and Space based ADS-B

3.1 The current operational surveillance is one radar at Port Moresby Airport and one ADS-B ground station at Burns Peak. Some additional ground based ADS-B stations are under test or planned for remote airports. Approximate current operational surveillance coverage at FL200 is shown as shaded pink in Figure 1 below. The white line is the FIR boundary.

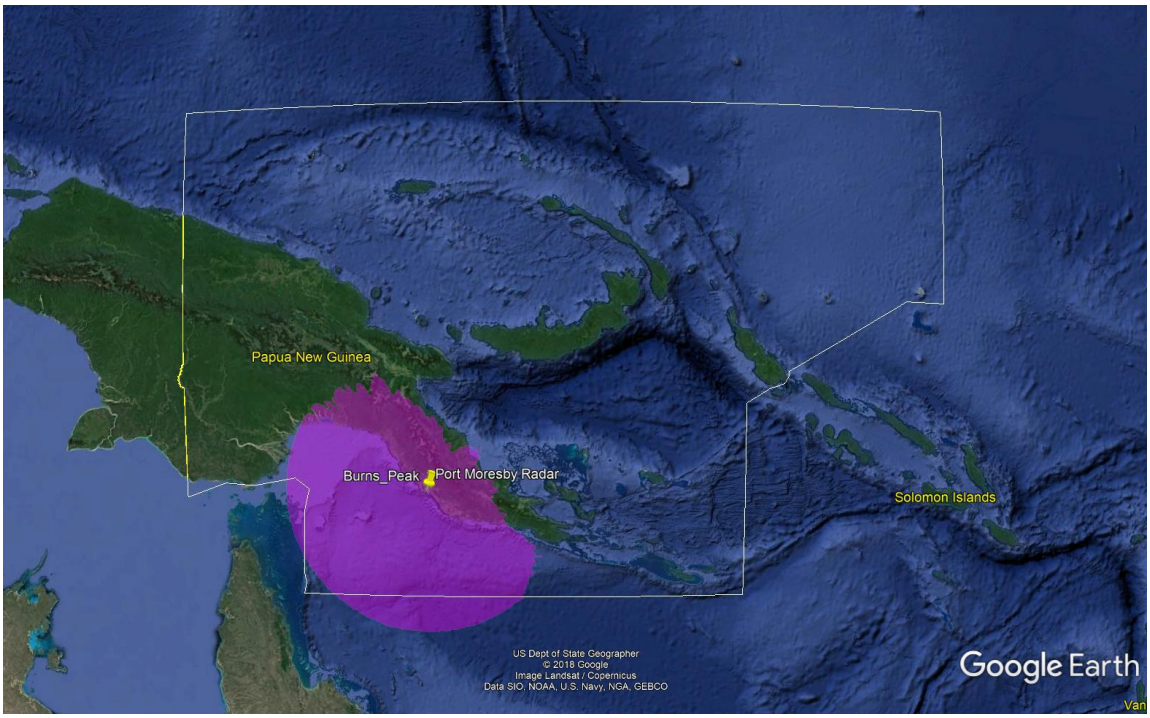


Figure 1 : Surveillance at FL200

3.2 In 2019, Aireon and NiuSky Pacific conducted a trial of Space based ADS-B using a VPN (internet data communication) in which Aireon delivered ADS-B data to the Port Moresby Test and Evaluation system.

The trial demonstrated that the performance of the Aireon data was “rock solid” and that the plan to implement and utilise space-based ADS-B across the FIR was justified. The benefits were assessed as :

- Reliability of data
- Confidence in application of surveillance-based separation
- Enables more efficient flight through less restrictive separation standards, flexible routing etc.
- Cost effective when balanced against previous costs with ground-based systems

3.3 A full-service Space based ADS-B service contract has been signed. The system has now been installed and data is flowing from Aireon.

The installation was performed by NiuSky Pacific instead of the vendor due to COVID-19 travel restrictions.

Technical training is underway and Service Acceptance testing will soon be performed by NiuSky Pacific staff in Port Moresby and Aireon staff remote in USA.

3.4 The initial service will use two new MPLS connections to ensure that the service was operational in 2020.

3.5 Space Based ADS-B will provide ADS-B coverage over the complete PNG FIR, and also in the 50 NM outside the FIR to support FIR boundary safety as shown by the red polygon in Figure 2.

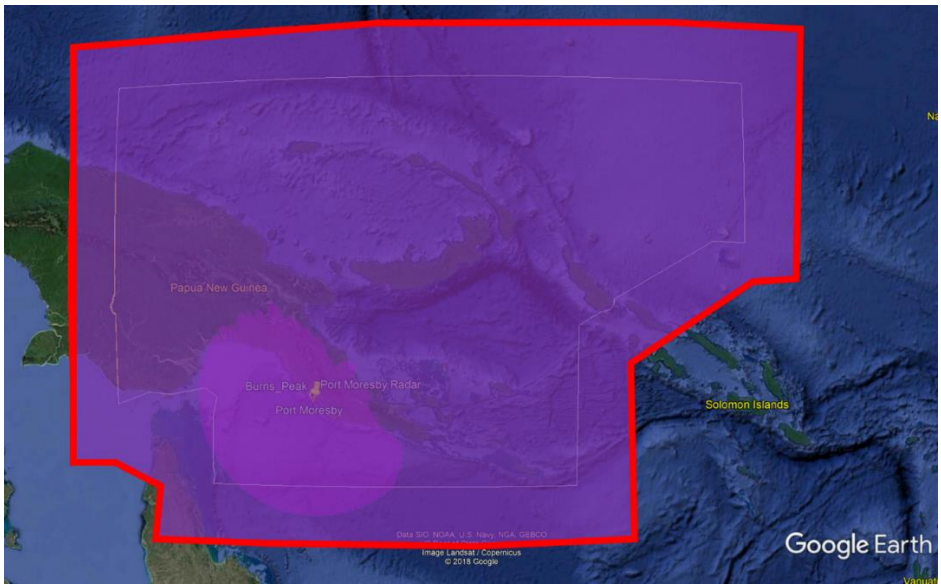


Figure 2 : Complete FIR coverage plus 100 NM

3.6 Space based ADS-B will operate in tandem with the existing radar and ADS-B ground stations. This deployment, in 2020 will significantly improve coverage, safety and efficiency within this airspace.

## 4. CRV

4.1 NuiSky Pacific Limited has signed a contract with PCCW for a CRV connection and will use it for the following applications:

- AFTN/ AMHS
- Voice coordination with Australia, Indonesia, Oakland
- ADS-B data sharing with Australia & Indonesia
- AIDC with Australia, Indonesia, Oakland
- Space based ADS-B

4.2 PNG supported by Indonesia proposed to the ICAO CRV Operations Group that Aireon be allowed to connect to CRV with the objective of lowering the costs of Space based ADS-B. Following submittal of appropriate documentation, the CRV Operations Group authorised Aireon to connect.

4.3 PNG has chosen a dual CRV package C. A dual package C means that both A and B channel are always active and there is no surveillance outage if one path fails. Other packages have a short outage during changeover which is unacceptable for a Tier 1 service. No additional bandwidth is required to serve Space based ADS-B.

One path of the dual CRV uses a MPLS line to Hong Kong (PCCW node) and the other path will be via VSAT to Hong Kong.

The CRV connections are expected to replace the dual MPLS circuits in 2021.

Of course, PNG will include consideration of the dual CRV solution in the safety case.

4.4 Thanks to this work, Space based ADS-B data can now be delivered to other Aireon customers in Asia Pacific via CRV, potentially without need for any additional communication link or telecommunications costs!

4.5 An additional benefit flows to NiuSky Pacific because the same CRV physical connection could be used to exchange ADS-B ground station data with both Australia and Indonesia. This is likely to remove the need for the existing point to point circuit between Australia & PNG.[1]

## 5. ACTION BY THE MEETING

5.1 The meeting is invited to take note of the implementation of Space-Based ADS-B system in PNG and

5.2 Note the PNG plan to use CRV to allow data sharing between FIRs; and

5.3 Discuss any relevant matter as appropriate.

[1] This is a benefit of ADS-B on CRV rather than Space based ADS-B on CRV.