



*International Civil Aviation Organization*

**ELEVENTH MEETING OF THE SOUTHEAST  
ASIA AND BAY OF BENGAL SUB-REGIONAL  
ADS-B IMPLEMENTATION WORKING GROUP  
(SEA/BOB ADS-B WG/11)**



New Delhi, India 17 – 19 November 2015

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**Agenda Item 4: Report on ground system and avionics performance monitoring and improvement in compliance**

**AUSTRALIAN PLANS TO DECOMMISSION SOME RADARS**

(Presented by Australia)

**SUMMARY**

Australia plans to decommission 3 radars in 2017.

**1. Introduction**

The Australian Surveillance deployment strategy now calls for the decommissioning of 3 monopulse SSR radars and plans to use ADS-B instead. Previous advice was that 4 radars would be decommissioned.

**2. The Radar Environment**

Australia installed 11 monopulse SSR only enroute radars and 8 primary + SSR terminal area radars in the 1990s. These radars are at the end of life and the last extension to their maintenance contracts expire in 2017.

All terminal area radars have now been replaced with P+S (Mode S) radars.

A project called ERRP (Enroute radar replacement project) is currently replacing most enroute SSR radars. This project is more than 80% complete and will complete before 2017. However, the plan is to NOT replace all these radars. As described below, existing radars will receive ADS-B receivers instead of replacement radars.

### **3. The ADS-B Environment**

Airservices Australia has been providing operational services using ADS-B for a decade. In 2017 it is expected that all almost all IFR operations will be ADS-B capable.

The following key activities in the last decade allow the removal of the radars:

- The regulator published technical standards for ADS-B
- The domestic jet fleet and the international airline fleet visiting Australia is equipped with ADS-B following the introduction of a mandate for operational at/above FL290 which commenced in December 2013.
- In Feb 2014 all IFR flights by new registrations were required to have ADS-B (forward fit requirement).
- In Feb 2016 all IFR flights are required to have suitable GNSS or approved equivalent equipment fitted (A GNSS mandate in support providing better navigation performance & allowing removal of a large number of conventional nav aids)
- In Feb 2016 all IFR flights near Perth Western Australia are required to have ADS-B at all flight levels
- In Feb 2017 all IFR flights countrywide, at all flight levels, and applying to both foreign & domestic registrations, must be ADS-B capable.

Australia also has a significant number of VFR aircraft which are not subject to the ADS-B mandate. Within radar coverage these aircraft will be notified as traffic to IFR aircraft in Class E and G airspace, as well as receiving an on-request Surveillance Information Service. Where ADS-B surveillance replaces radar, this capability will be lost for non-equipped VFR aircraft.

### **4. The Sites**

#### **4.1 Mt Boyce**

Mt Boyce is an enroute SSR only radar some 50 miles west of Sydney (Australia's major international airport). It was deployed in the 1990s as the backup radar to Sydney airport. At that time Sydney was served by a single P+S radar on airport, and Mt Boyce 50 miles to the west as the supporting radar. Note that Australia rotates ALL civilian radars at 15 r.p.m. and uses fully digital multiradar tracking in the terminal area. The Mt Boyce radar is used in both Sydney TCU and in the Enroute centres.

Since Mt Boyce was installed, Airservices Australia has installed the following additional surveillance sensors in the Sydney area :

- Wide area multilateration (with ADS-B) primarily to provide a Parallel Runway Monitoring (PRM) service, but as a byproduct provides SSR coverage within 40nm Sydney as well as extensive ADS-B coverage (to approx 300nm from Sydney).
- An additional Primary +Mode S radar at Cecil Park some 20 miles west of Sydney

ADS-B from a network of ADS-B ground stations, together with the remaining radars will provide adequate surveillance into the future at Sydney. It is planned to decommission this radar site sometime in 2017 after the ADS-B IFR mandate takes effect and after the radar maintenance contract expires. An additional ADS-B ground station will be installed to cover the surveillance airspace currently seen by Mt Boyce radar alone – ensuring no reduction in surveillance coverage for IFR aircraft.

#### **4.2 Kalamunda**

Kalamunda is an enroute SSR only radar in the hills to the east of Perth, Western Australia. It was originally the main Perth radar before the deployment of an on-airport terminal area radar in the 1990s. During the 1990s, a SSR only radar was installed as the backup radar to Perth airport. At that time Perth was served by a single P+S radar on airport, and Kalamunda as the supporting radar. The Kalamunda radar is used in both Perth TCU and in the Enroute centre.

Since Kalamunda was installed, Airservices Australia incorporated a Department of Defence P+S radar located at the Pearce Air Force base about 30nm north of Perth. This radar provides coverage over the TMA and to the north of Perth. This radar was incorporated into the Perth TCU when Military ATC commenced using the Civilian ATC system capabilities at Perth.

ADS-B from a network of ADS-B ground stations, together with the remaining radars will provide adequate surveillance into the future at Perth. The overall ADS-B fitment rate of flights is already 80%. An ADS-B receiver is installed at the Kalamunda radar site. For the Perth TCU, this data will be converted to Cat 48 and processed via the radar tracking system (the current Eurocat ATM system does not process Cat 21 ADS-B data in TCUs) It is currently planned to decommission this radar site sometime in 2017 after the ADS-B IFR mandate takes effect and after the radar maintenance contract expires.

It may be retained for a period after 2017 to support transition of the nearby Defence radar but that is not yet clear.

#### **4.3 Paraburdoo**

Paraburdoo is a new, modern mode S, enroute SSR only radar in a remote region in Western Australia. It was installed just a few years ago in response to dramatic traffic growth in the region. Because of the urgent need at the time, this radar is a containerized “transportable” radar.

ADS-B from a network of ADS-B ground stations will provide adequate surveillance into the future in this region since the traffic of concern is primarily IFR and hence will be captured by the ADS-B mandate. The overall ADS-B fitment rate of flights is already 80%.

An ADS-B receiver system was installed at Paraburdoo earlier this year. It is planned to decommission this radar site sometime in 2017 after the ADS-B IFR mandate takes effect. It may be possible to decommission this radar sites earlier as ADS-B equipage rates in the region are very good.

This transportable radar will be retained, and possibly used in locations where VFR traffic surveillance is required.

## **5. Previous papers**

Previous advice to ICAO was that Swampy Ridge radar would be decommissioned in 2017.

Subsequent analysis has shown that it remains cost effective and desirable to replace this radar with a new Mode S radar

Swampy Ridge is an enroute SSR only radar some 50 miles west of Mackay, Queensland. It was deployed in the 1990s as part of a chain of radars between Brisbane and Cairns. It's prime purpose at that time was high level enroute coverage, but as a byproduct provided low level coverage to the Queensland coastal communities. It is used in the enroute centre and also provides surveillance data for situational awareness displays in 2 control towers (Mackay and Hamilton Island).

Two factors that influenced this decision to retain the radar are

- a) A cost effective solution for transition of the existing radar site from the existing old SSR to a new generation Mode S radar was found by installing a new tower in the same compound and using the new tower for the new radar – and then removing the old radar. During transition two SSR only radars will be operating side by side at the same site. This strategy removed the need for a transportable radar deployment.
- b) A decision that the traffic at low flight levels in the coastal strip near Mackay warranted the provision of a radar to provide surveillance of VFR traffic not equipped with ADS-B.

## **6. Issues**

The ability to not replace these radars will result in significant savings to Industry

The ability to remove radars has built on years of work establishing ADS-B standards, ADS-B fitment regulations and on a decade of operational ADS-B experience to provide the confidence for Australia to take this action.

One issue remaining is that the existing ruleset does not require VFR aircraft within controlled airspace to equip with ADS-B. However, Australia is hopeful that lower cost ADS-B avionics (perhaps with lower capability) will become available that will allow the VFR community to take advantage of ADS-B technology.

Australia is working now on the possibility of lower cost avionics being used to support “situational awareness” only (not separation) of VFR operations.

## **7. Action by the Meeting**

The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

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