



Airspace Review of Ballina, New South Wales

November 2022

C I V I L A V I A T I O N S A F E T Y A U T H O R I T Y

safe skies for all

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Note – *This Review was undertaken at a time when COVID-19 was impacting the aviation industry. The consequent downturn in aviation activity across Australia and internationally has had a significant impact on the analysis, outcomes and projections used in this report. While the data used in this review considers the fluctuations due to COVID-19, its recommendations have equally considered the anticipated post-COVID traffic levels.*

Ballina Airport was serviced by a Certified Air/Ground Radio Service (CA/GRS) from March 2017 until 11 August 2021. A Surveillance Flight Information Service (SFIS) operated by Airservices Australia (Airservices) from the Brisbane Air Traffic Control Services Centre commenced on 12 August 2021, replacing the CA/GRS.

This report reflects the changes and outlines additional work being conducted.

1 Executive Summary

The Airspace Act 2007 (Act) provides the Civil Aviation Safety Authority (CASA) with authority to administer and regulate Australian-administered airspace and authorises CASA to undertake regular reviews of existing airspace arrangements.

The Office of Airspace Regulation (OAR) conducted an airspace review of the airspace architecture as well as the aircraft activity within the airspace surrounding Ballina, Lismore, Casino and Evans Head aerodromes from the surface up to 8,500 feet (ft) above mean sea level (AMSL). The scope of the review did not include aerodrome or infrastructure issues that may have been raised by stakeholders.

The review process included:

- An analysis of current passenger and aircraft movement numbers.
- A review of forecast air travel demand.
- Analysing aircraft operations and traffic mix operating within the airspace.
- Identifying the issues affecting stakeholders
- Consulting with local stakeholders, airline representatives and major flying schools from the Gold Coast, Port Macquarie and Coffs Harbour.
- Analysing the risks based on safety incident reports
- Assessing the effectiveness and compliance with the mandatory radio broadcast requirements within the Ballina Broadcast Area.
- Evaluating the impact, the Surveillance Flight Information Service (SFIS) has on operations.
- Exploring alternative means of enhancing safety for airspace users.

1.1 Summary of Conclusions

Considerable growth in aircraft movements, particularly passenger transport movements is apparent since 2017 in the Ballina airspace. The risk profile has altered during that period driven by the introduction of new carriers and the provision of additional airline services.

A number of successive risk mitigation measures have been introduced during that same period in a graduated fashion, with each intended to improve on the former. Incidents continue to be reported validating the concerns of many stakeholders and operators. Furthermore, these incidents indicate the prevalence of potentially unacceptable airspace risk despite the existing controls.

While frequency congestion is the primary consideration raised by airspace users, incidents related to airspace collision risk continue to be reported, with the rate of separation incidents or incidents commonly considered precursors to separation incidents increasing at a disproportionate rate to traffic growth.

1.2 Recommendations

The OAR applies a precautionary approach when conducting airspace reviews. The following recommendations are consistent with the CASA Board's direction that aviation safety risks must be reduced to the lowest practical and proportionate level.

Recommendation 1 *

CASA should prepare a Request For Change (RFC) to separate the Lismore and Casino Common Traffic Advisory Frequency (CTAF) from the Ballina CTAF by 16 June 2022.

Recommendation 2 *

Evans Head Airport should be allocated the common CTAF (126.7 MHz) by 16 June 2022.

Recommendation 3

CASA should direct AA to install an Automatic Dependent Surveillance - Broadcast (ADS-B) ground station in the vicinity of Ballina to improve surveillance as soon as practicable but no later than April 2023. The ground station should, as far as is practical, provide ADS-B surveillance capability to the runway surface.

Recommendation 4

CASA should explore a suitable regulatory framework that can safely authorise sport and recreational aircraft and pilot certificate holders to operate in the controlled airspace associated with Ballina where pilot certificate holders meet CASA specified competency standards and the aircraft are appropriately equipped.

Recommendation 5

CASA's Stakeholder Engagement Division (SED) should conduct additional safety promotion programs in relation to Ballina operations as soon as practicable. The programs should include, but are not limited to the following key elements:

- a. reinforce the mandatory radio calls required when operating within the Ballina MBA in the interim, pending the establishment of controlled airspace, and
- b. later, provide guidance as to how a Sport Aviation Body might develop a suitable scheme and make application to CASA for approval, under the regulatory framework identified in recommendation 4.

Recommendation 6

Uncertified aerodromes and flight training areas around Ballina should be promulgated in aeronautical publications to increase pilot situational awareness.

Recommendation 7

As an interim action pending the completion of Recommendation 8, CASA should make a determination to establish a control area around Ballina Byron Gateway Airport with a base which is as low as possible, and direct AA to provide services within the control area. The services should be provided during all periods of scheduled Air Transport Operations and include an Approach Control Service to aircraft operating under the Instrument Flight Rules (IFR), separation between IFR aircraft, VFR traffic information to all aircraft, and sequencing of all aircraft to and from the runway. CASA and AA should jointly explore opportunities to detect non-cooperative aircraft or vehicles in the immediate vicinity of the runway. The services should be established as soon as practicable but no later than 30 November 2023.

Recommendation 8

CASA should make a determination that Ballina Byron Gateway Airport will become a controlled aerodrome with an associated control zone and control area, and direct Airservices Australia (AA) to provide an Aerodrome Control Service¹ to the aerodrome. That service should be established as soon as practicable but no later than 13 June 2024.

Recommendation 9

CASA should prepare and finalise an Airspace Change Proposal (ACP) for a control zone and control area steps in preparation for the implementation of Recommendations 7 and 8.

* These actions were previously consulted and enacted on 16 June 2022, please refer to AIP/NOTAM for further details.

¹ Annex C – Air Traffic Control Service contains further information on the types of air traffic control.

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2 Introduction

The Office of Airspace Regulation (OAR) within the Civil Aviation Safety Authority (CASA) has carriage of the regulation to administer and regulate Australian-administered airspace, in accordance with section 11 of the *Airspace Act 2007* (Act). Section 12 of the Act requires CASA to foster both the efficient use of Australian-administered airspace and equitable access to that airspace for all users. CASA must also consider the capacity of Australian-administered airspace to accommodate changes to its use and national security. In exercising its powers and performing its functions, CASA must regard the safety of air navigation as the most important consideration.

Section 3 of the Act states that ‘the object of this Act is to ensure that Australian-administered airspace is administered and used safely, considering the following matters:

- a. protection of the environment.
- b. efficient use of that airspace.
- c. equitable access to that airspace for all users of that airspace.
- d. national security.

2.1 Overview of Australian Airspace

Australian airspace classifications accord with Annex 11 of the International Civil Aviation Organization (ICAO) and are described in the Australian Airspace Policy Statement (AAPS). Australian airspace is classified as Class A, C, D, E and G depending on the level of Air Traffic Service (ATS) required to best manage the traffic safety and efficiency. Government policy also allows the use of Class B and Class F airspace however, these are not currently used in Australia. The airspace classification determines the category of flights permitted, aircraft equipment requirements and the level of Air Traffic Services (ATS) provided. Annex B provides details of the classes of airspace used in Australia. Within this classification system, aerodromes are either controlled (i.e.: Class C or Class D) or non-controlled (Class G).

2.2 Purpose and Scope

The purpose of the review is to assess the airspace risk in the vicinity of Ballina and to determine if the current arrangements particularly the mitigation measures introduced in a graduated fashion, appropriately reduce those risks. The assessment considers the airspace architecture as well as the aircraft activity within the airspace surrounding Ballina, Lismore, Casino and Evans Head aerodromes from the surface up to 8,500 feet (ft) above mean sea level (AMSL). The scope of the review did not include aerodrome or infrastructure issues that may have been raised by stakeholders.

The review process included:

- An analysis of current passenger and aircraft movement numbers.
- A review of forecast air travel demand.
- Analysing aircraft operations and traffic mix operating within the airspace.
- Identifying the issues affecting stakeholders
- Consulting with local stakeholders, airline representatives and major flying schools from the Gold Coast, Port Macquarie and Coffs Harbour.
- Analysing the risks based on safety incident reports
- Assessing the effectiveness and compliance with the mandatory radio broadcast requirements within the Ballina Broadcast Area.
- Evaluating the impact, the Surveillance Flight Information Service (SFIS) has on operations.
- Exploring alternative means of enhancing safety for airspace users.

2.3 Objective

Serving the Purpose, the Objective of the review is to determine if the airspace still complies with the requirements of the Act for safe operations, efficiency and delivers equitable access to all airspace users where possible. Fundamentally the review seeks to assess the current risks and present a number of recommendations that have been identified through stakeholder engagement

and analysis that are intended to reduce the residual risk to as low as reasonably practicable and assuring compliance with those requirements.

3 Background

Ballina Byron Gateway Airport (hereafter referred to as Ballina) is a certified aerodrome operated by the Ballina Shire Council. The airport has one sealed runway (designated as 06/24) and an Aerodrome Rescue and Fire Fighting (ARFF) service.

Ballina is serviced by airlines including Jetstar Airways, Virgin Australia, Regional Express Airlines, Qantas, QantasLink and Fly Pelican. Additionally, a contingent of general aviation aircraft, including helicopter and fixed wing flying schools, operate from Ballina servicing the surrounding areas. Sport and recreational aviation, including ultra-light, sports rotorcraft, paragliding and hang-gliding operations which occur within the vicinity of Ballina and Lismore.

The airport provides local residents and tourists services to the Ballina Byron Bay region and is touted regularly as a holiday destination by the airlines that operate into Ballina. It is essentially this demand that is driving the aviation activity and has rendered the airport high on the list of the busiest non-towered locations in Australia.

3.1 Airspace Risk Mitigation Measures Introduced

From 2017 the aerodrome was supported by a Certified Air/Ground Radio Service (CA/GRS) which operated between 0800 hours and 1800 hours (local) when Air Transport Operations (ATO) aircraft greater than 30 seats operate. The service was established by the aerodrome operator as a control to reduce airspace risk in response to the increasing activity at and in the vicinity of the aerodrome.

In 2019 CASA was advised by the airlines operating in Ballina that they remained concerned about ongoing risks associated with their operations despite those measures adopted to date. The risk primarily related to potential conflicts with unknown VFR aircraft. To reduce this risk a CAR99(a)² Broadcast Area (BA) with mandatory radio broadcast requirements (described below) was established within 10nm Ballina.

In parallel, the OAR initiated a review intended to assess the airspace architecture and aircraft activity within the airspace surrounding Ballina, Lismore, Casino, and Evans Head aerodromes from the surface up to 8,500 feet (ft) above mean sea level (AMSL). Shortly after initiating the review, an incident occurred between a Jabiru aircraft and a Jetstar A320 aircraft on approach to Ballina outside the recently established BA which required immediate investigation.

A schedule of regular site visits, information exchange, forums and stakeholder engagement has ensued since 2019. As a result of that engagement CASA received information about an apparent increase in communication related incidents and separation issues. This was followed shortly after by a joint letter from the Australian Airline Pilots' Association (AusALPA) and the Civil Air Operations Officers' Association of Australia (Civil Air) requesting the OAR undertake an aeronautical risk assessment to consider a change in the airspace classification.

The clear message is that refinements to the adopted mitigation measures as well as the introduction of additional measures may be necessary to reduce the residual airspace risk. Since the initiation of the original review, there has been a significant shift in the risk profile driven by the increase in movements at Ballina, particularly post COVID. Furthermore, the ATO operator concerns regarding the level of residual risk, despite the measures that have been introduced, remain.

3.2 Broadcast Area

The establishment of the BA in conjunction with the CA/GRS, mandated the carriage and use of a Very High Frequency (VHF) radio. As a consequence, all aircraft are required to make at least one radio call - whether arriving, departing, or overflying Ballina intended to reduce the incidence of

² <https://www.legislation.gov.au/Details/F2020C00784>

unknown VFR operations. On 28 January 2021, the Ballina BA was expanded to 15nm to address some of the risks identified from the Jabiru incident and increase situational awareness of aircraft operating in the vicinity of Ballina.

3.3 Surveillance Flight Information Service (SFIS)

SFIS is a Flight Information Service (FIS) provided to both VFR and IFR aircraft on the Common Traffic Advisory Frequency (CTAF), it provides information to support pilot self-separation. On 12 August 2021, Airservices introduced SFIS which utilises a dedicated console and provides an enhanced flight information service within 15 nautical miles (nm) of Ballina from the surface to 8,500 ft AMSL. According to information published by Airservices prior to its implementation:

- *SFIS is the amalgamation of two existing services Flight Information Services (FIS) and Surveillance Information Service (SIS). The proposal is a SIS, in the vicinity of a non-controlled aerodrome.*
- *SFIS is proposed to be provided to VFR and Instrument Flight Rules (IFR) aircraft operating in the non-towered aerodrome's designated broadcast area using the discrete Common Traffic Advisory Frequency (CTAF). SFIS will be provided during prescribed hours of operation from the surface to 8,500 feet AMSL.*
- *Pilots broadcast and report to Air Traffic Control (ATC) on the CTAF when operating in the Broadcast Area.*
- *ATC provides full traffic information and alerting service premised on available surveillance data and pilot reports using the aerodrome's discrete CTAF.*
- *SFIS is not a separation service, it doesn't provide clearances, or sequence aircraft into an aerodrome.*
- *All aircraft operating within the Ballina Broadcast Area will receive a Traffic Information Service providing advice on conflicting traffic between:*
 - a) IFR and IFR flights;*
 - b) IFR and VFR flights; and*
 - c) VFR and VFR flights.*

This will enable ATS to provide enhanced traffic information to all pilots when surveillance and/or other information warrants.

The SFIS is a mitigation measure intended to provide traffic information to all aircraft within the Ballina BA and reduce risk by improving situational awareness. The SFIS commenced on 12 August 2021 replacing the previously established CA/GRS. The provision of both a SFIS and CA/GRS simultaneously on the CTAF was considered and disregarded due to the likelihood of pilot confusion resulting from more than one traffic information service. The lateral dimensions of the BA were also amended on 12 August 2021 to accommodate the introduction of the service.

3.4 SFIS: Initial observations

Following the introduction of SFIS many operators have commented about the improvement in safety as a result of its implementation. This was largely, but not solely, confined to the airlines and local commercial operators. Nevertheless, during its inception several stakeholders raised concerns about potential frequency congestion and the over-transmission of radio calls which is an issue that also existed prior to the introduction of the service. SFIS is seen by some stakeholders as exacerbating these existing issues. Having sought to increase situational awareness, SFIS may have inadvertently contributed to frequency congestion. Furthermore, the situation is aggravated by a number of adjacent aerodromes sharing the same radio frequency. A proposal to separate those aerodromes from the BA frequency has been consulted and is currently being pursued for urgent implementation.

Other concerns raised by stakeholders include the lack of visibility of the circuit area by the SFIS operators, awareness of procedures, inconsistent practices and less than adequate VHF and surveillance coverage in portions of the BA. The ATO and IFR aircraft often contacted the SFIS operator between 35 and 50 nm from Ballina, while still in controlled airspace (CTA). The aircraft

remained on the Ballina CTAF prior to leaving CTA. ATO aircraft exited CTA on descent, between 20 and 30 nm from Ballina. The SFIS operators appear to be providing a service to the ATO and IFR aircraft outside the Ballina Broadcast Area in Class G (uncontrolled) airspace. A summary of Observations and Stakeholder Feedback appears at Annex D.

3.5 Movements

The OAR adopts an evidence-based approach to assessing airspace risk. Movement information serves that purpose as a lead indicator that can identify an environment where heightened risk resides. This approach has been applied to the Ballina airspace to initially determine the “potential” level of airspace risk.

The COVID-19 pandemic resulted in a reduction in flights and passengers at Ballina particularly between March 2020 to April 2021. However, between June and August 2021, the number of total movements and passengers exceeded pre-COVID levels. This report applies the August 2021 figures, as the emergence of the Omicron variant of COVID resulted in a small downturn in aircraft movements and passenger numbers against the previous trend.

Also, the number of transiting aircraft could not be validated as the data is not readily available, nor complete. Airservices has provided movement data on those aircraft that have submitted flight plans and those identified through electronic surveillance. However, aircraft which are non-transponder equipped and have not submitted a flight plan are not represented. The OAR considered information gathered from incident reports, onsite observations, interviews and written feedback to develop an understanding of airspace utilisation.

Over the period (01 August 2019 to 31 August 2021), the 12 monthly total number of aircraft movements at Ballina has increased from 13,300 to 16,500 (24%). During the same period air transport movements increased from 5,400 to 8,100 (50%) movements. Refer to Table 1.

Between 01 August 2019 and 31 August 2021, the 12 monthly total passenger movement numbers at Ballina increased from 536,900 to 540,300 (1%). The effect of the COVID-19 downturn in travel is evident from March 2020, with a significant reduction in passengers (Refer to Figure 2).

Passenger numbers have now returned to and exceeded pre-COVID levels.

Over the period of 01 August 2019 to 31 January 2021, the total number of aircraft movements at Lismore increased from 19,063 to 20,165 (6%). Over the period of 01 August 2019 to 31 March 2020, air transport movements increased from 3,876 to 4,726 (22%) movements. The effect of the COVID-19 downturn in travel is apparent from March 2020, with a reduction in total aircraft movements. Refer to Table 1.

Between 01 April 2019 and 31 March 2020, passenger numbers at Lismore increased from 24,020 to 31,609 (32%). The effect of the COVID-19 downturn in passenger numbers has significantly impacted Lismore. Refer to Table 1.

Casino Airport is not serviced by airlines. The total movements are recorded as being approximately 3,800 movements per annum. This figure may increase due to increased circuit training by aircraft from the Gold Coast.

A comparison of movements, passenger numbers, incidents and serious incidents at Ballina and other aerodromes is reflected in Annex E.

Aerodrome	Total movements	Air Transport movements	Passengers
Ballina	16,500	8,100	540,300
Casino*	3,800	-	-
Lismore	16,513	3,950	22,692

Table 1: Movement data 01 September 2020 – 31 August 2021.

*Casino data 01 May 2020 – 30 April 2021.

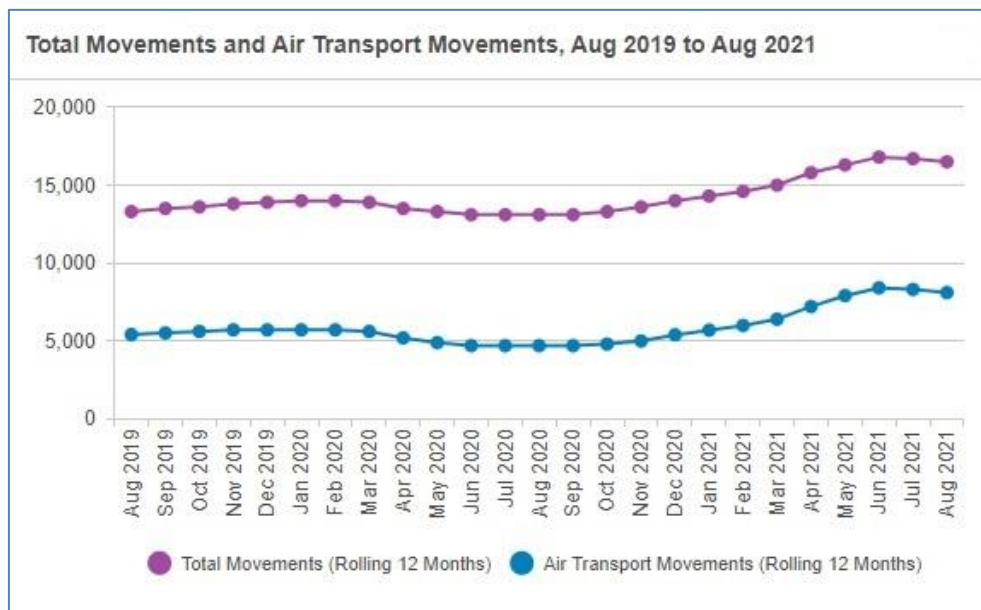


Figure 1: Ballina movement data 01 August 2019 – 31 August 2021.

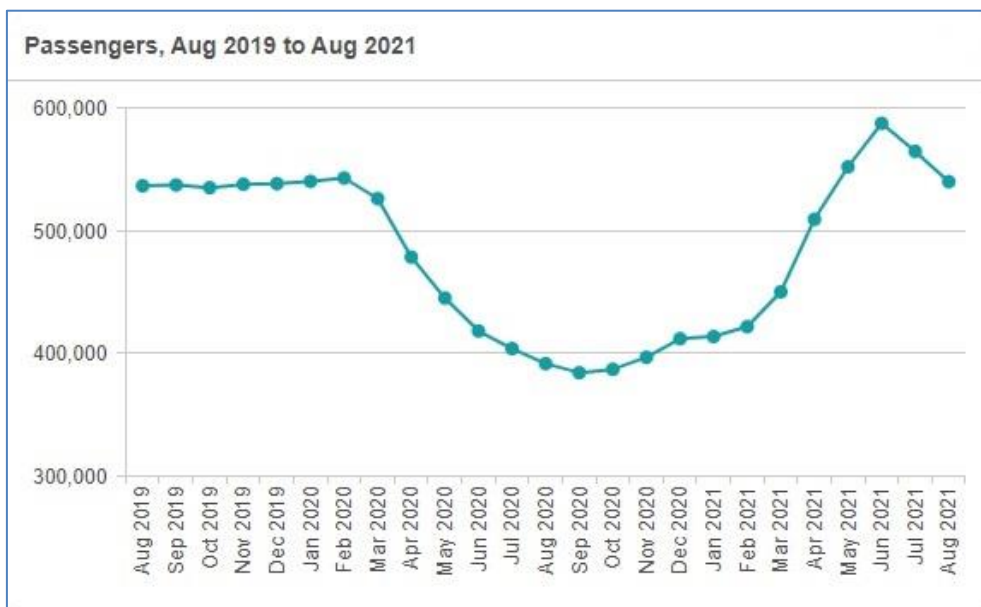


Figure 2: Ballina passenger data 01 August 2019 – 31 August 2021.

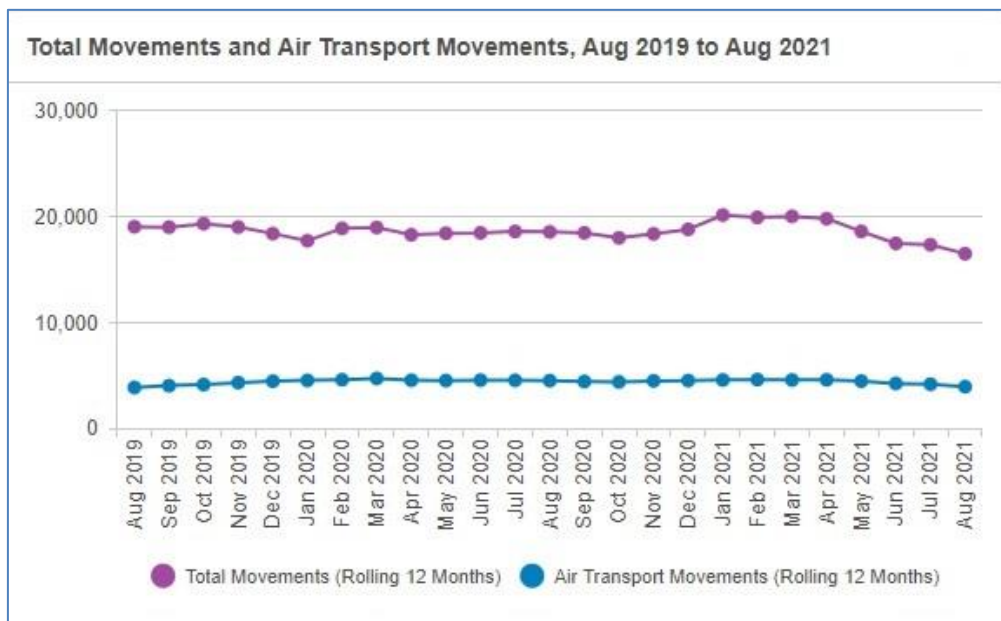


Figure 3: Lismore movement data 01 August 2019 – 31 August 2021.

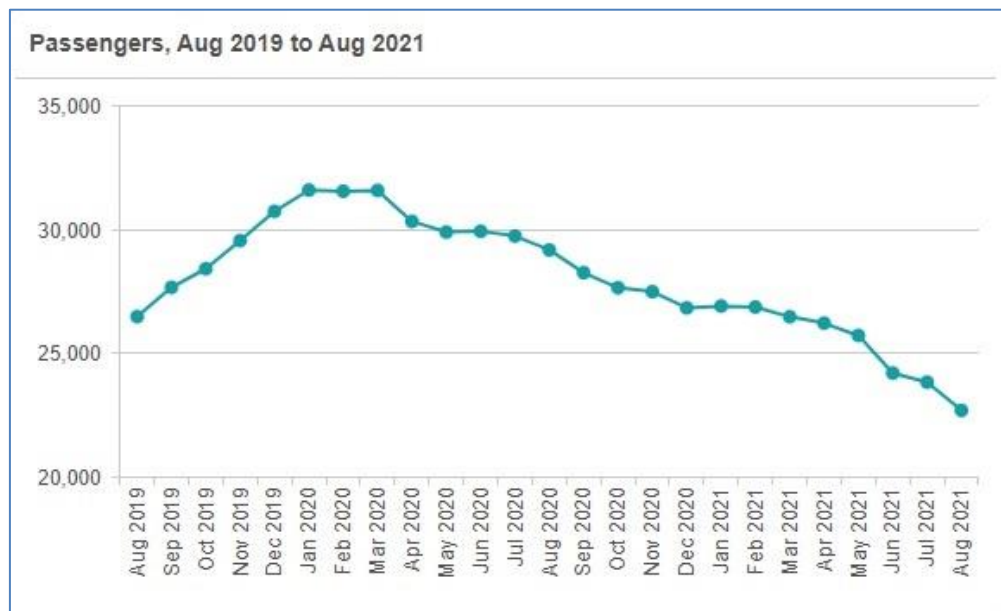


Figure 4: Lismore passenger data 01 August 2019 – 31 August 2021.

The movement information, particularly the increase in passengers and passenger transport movements at Ballina, tends to demonstrate that the environment of heightened risk may prevail notwithstanding the impact of COVID. However, while movement data might indicate that environment exists, a review of the ASIR data can serve to validate the prevalence of airspace risk.

4 Aviation Safety Occurrences

During the period 01 July 2020 to 31 July 2021, 41 occurrences within 20 nm of Ballina were recorded by the Australian Transport Safety Bureau (ATSB). The table below illustrates the number of incidents.

Incident	Number
Communication issues (includes 3 Frequency congestion)	15
Bird strikes / Animal strike	10
Mechanical (Aircraft)	8
Aircraft separation	5
Collision with terrain	1
Environment (Lightning strike)	2

Table 2: Incidents at Ballina 01 July 2020 – 31 July 2021.

A review of the 15 communication incidents revealed the following:

- The majority of incidents (11) related to aircraft not making a radio call on the CTAF.
- Three incidents related to frequency congestion.

A review of the incident data also reveals that five were classified by the ATSB as aircraft separation issues. Details of each incident as transcribed from the Incident Reports are noted below:

- 28 November 2020: During approach, the crew of the Airbus A320 (A320) received a traffic alert and collision avoidance system (TCAS) traffic advisory (TA) on a Jabiru aircraft flying 600 ft above. While the A320 was approaching runway 06 to land at Ballina, the Jabiru aircraft was tracking south from Lismore toward Evans Head Airport, NSW. About 22 km south-west of Ballina, the two aircraft's flight paths intersected, resulting in the reported generation of a TCAS TA indication to the A320 crew. The A320 passed beneath the Jabiru aircraft and continued to Ballina. The ATSB have commenced an investigation into the incident.³
- 22 July 2021: There were two Cessna 172 (C172) aircraft operating in the circuit. The Jetstream 32 (Jetstream) crew called taxiing for runway 24 just prior to the second C172 making the turning base runway 24 for full-stop radio call. The first C172 made a touch and go. The second C172 was following approximately 1 nautical mile behind the first C172. As the second C172 crossed the threshold, the Jetstream crew called entering and backtracking runway 24 as they entered from taxiway Bravo. As the Jetstream turned down the runway, the C172 was already conducting a go-round from approximately 25 feet above ground level.
- 4 January 2021: The crew of the C172 was using the incorrect frequency while transiting the Ballina broadcast area and was unable to be contacted via radio. This resulted in the Tecnam P2002 operating in the area unable to coordinate separation with the C172. The CA/GRS provided a traffic alert to the Tecnam pilot, who turned to increase separation.
- 25 January 2021: During descent, the crew of the Jetstream were unable to understand the radio calls from the CT-4. Turning final, the Jetstream crew observed the CT-4 on a converging track. The CT-4 pilot sighted the Jetstream and maneuvered to maintain separation.
- 22 February 2021: During approach, the crew of the CT-4 observed a Cessna C208 (C208) on a missed approach for the reciprocal runway.

Notably, four of the five separation issues occurred within the Ballina circuit area. Having stated that though, it is acknowledged that the CA/GRS was not in operation when the incidents in July 2021,

³ [Investigation: AO-2020-062 - Separation occurrence involving Airbus A320, VH-VGP, and Jabiru J230-D, 24-7456, near Ballina Byron Gateway Airport, New South Wales, on 28 November 2020 \(atsb.gov.au\)](https://www.atsb.gov.au/publications/investigations-reports/ipr/2020/062/AO-2020-062_-_Separation_occurrence_involving_Airbus_A320,_VH-VGP,_and_Jabiru_J230-D,_24-7456,_near_Ballina_Byron_Gateway_Airport,_New_South_Wales,_on_28_November_2020)

February 2021 or 25 January 2021 occurred. The 28 November 2020 incident occurred outside of the Ballina broadcast area and the area of responsibility of the CA/GRS.

During the first five weeks of SFIS operation, CASA staff observed the following:

30 August 2021: An RPT aircraft gave an inbound call. The SFIS operator stated that there was “No observed traffic”. This was despite a vehicle (Car 1) conducting an inspection and was occupying the runway.

16 September 2021: An observation relating to a departing C208, an arriving Virgin Airlines Boeing 737 (B737) and an arriving Jetstar A320. While the B737 was approaching runway 24 to land, the C208 commenced a take-off roll on the reciprocal runway (06). The crew of the B737 then conducted a missed approach during which they received a TCAS TA. A short time later, the crew of the A320 that was inbound to the airport requested the pilot of the C208 to maintain 2,000 ft AMSL to provide separation between their two aircraft. Subsequently, the A320 crew observed the C208 climb to 2,500 ft AMSL before descending to 2,000 ft AMSL. The incident is being investigated by the ATSB.⁴

4.1 Other Notable Events

19 September 2021: A Cessna Caravan taxied onto the runway while a helicopter was on short final. Although the SFIS alerted the Caravan pilot to the other aircraft in the vicinity of Ballina, they were unable to prevent the pilot from entering the runway. This incident is similar to those of 22 July 2021, 16 September 2021 and 9 December 2021 (described below).

28 October 2021: A Jetstar A320 aircraft conducted a missed approach as the preceding Virgin B737 was occupying the runway.

11 November 2021: Due to a telecommunications issue with the Telstra line, Ballina SFIS frequencies were temporarily unavailable.

18 November 2021: A Jetstar A320 aircraft conducted a missed approach due to a VFR aircraft transiting along the coast.

21 November 2021: A QantasLink DHC8-400 conducted an approach to runway 24, whilst a Virgin B737 aircraft conducted an approach to runway 06.

3 December 2021: For approximately 10 minutes around 10:40am (Local) the SFIS operator considered the Ballina broadcast area to be running with unsustainably high workload “due to multiple aircraft taxiing, arriving and departing, mostly without flight plans and mostly not in surveillance coverage”. **Note:** *The Review acknowledges that VFR aircraft are not required to lodge a flightplan.*

Aircraft included:

- Helicopter (VFR) - no flight plan, not in surveillance.
- Ultralight (VFR) - no flight plan, not in surveillance.
- Ultralight (VFR) - no flight plan, not in surveillance.
- Qantas B737 (IFR) - outbound.
- Virgin B737 (IFR) - inbound.
- Helicopter (VFR) - no flight plan, not in surveillance.
- Citation jet (IFR) - initially not in surveillance.

It is noted that the reported congestion was due to aircraft operating only at Ballina. If other aircraft been operating at Lismore or Casino, the congestion would have been increased.

9 December 2021: An arriving Jetstream aircraft was in communication with Ballina SFIS and a C172 operating in the circuit area. At 3 nm from the runway, the pilot of the Jetstream made a final, straight in, radio call. A helicopter then made a call on CTAF, stating they intended to taxi for a

⁴ [Investigation: AO-2021-038 - Separation occurrence involving Cessna 208, VH-YMV, Ballina Airport, 16 September 2021 \(atsb.gov.au\)](https://www.atsb.gov.au/publications/investigations-and-safety-reports/Investigation%20-%20AO-2021-038%20-%20Separation%20occurrence%20involving%20Cessna%20208%20VH-YMV%20Ballina%20Airport%2016%20September%202021)

departure on runway 06 to the south. The SFIS provided them with a transponder code and traffic (the C172 in the circuit and the arriving Jetstream on a 3nm final). The pilot of the helicopter acknowledged the traffic.

The pilot of the Jetstream then observed the helicopter transit across their flight path to the northern side of the airfield when they had approximately 1.1 nm to run to the runway. The Jetstream pilot reported that due to the chatter of Ballina SFIS giving the same traffic to the helicopter as he had given to the C172 and to them, the pilot was unable to make a radio call to alert the helicopter of their position. The pilot of the helicopter did not make a radio broadcast upon entering the runway.

Analysis of the above four incidents showed that they may have been avoided if the aircraft had been under positive air traffic control and had been sequenced.

15 December 2021: The SFIS operator considered the workload in Ballina broadcast area to be very high for a period of approximately 20 minutes commencing at 10.00am (Local) Multiple aircraft were operating without flight plans and not in surveillance coverage while there were several RPT movements. Factors included aircraft not equipped with transponders, aircraft unable to use their transponder, aircraft not filing flight plans, and several RPT movements at similar times.

Note: The Review acknowledges that the lodging of flight plans and the fitment of transponders is not mandatory. The airlines are responsible for flight schedules.

15 December 2021: An aircraft departed Ballina for a local flight. The aircraft did not operate in accordance with the AIP SUP procedures. The SFIS operator reported that the non-compliance caused frequency congestion with Lismore and Ballina traffic stepping over each other. The SFIS operator had to request details and intentions in order to provide a service.

16 December 2021: An aircraft departed Ballina for a local flight. The aircraft did not operate in accordance with the AIP SUP procedures. The aircraft failed to report departure, failed to respond to calls, did not follow AIP SUP requirements for the area and did not advise clear of the runway. The SFIS operator was unable to pass traffic to the aircraft and was unaware of the aircraft's intentions.

19 December 2021: A powered paraglider conducted a flight from Flat Rock to Evans Head Beach. The pilot submitted a flight plan the day before the flight. The pilot contacted the SFIS operator and informed them of the flight (Flat Rock to Wooli via the coast, call sign, not above 500 feet, and that the flight plan had been submitted). The SFIS operator provided advise of no traffic. The pilot contacted the SFIS again when they passed south of Richmond River, south of Ballina. Due to limitations in VHF coverage, the pilot was out of range when SFIS called to inform the pilot of approaching aircraft being a Jetstream. The pilot landed at Evans Head Beach due to poor weather. The pilot broadcast their landing when on the beach, but no reply from SFIS was received.

20 December 2021: VFR aircraft failed to comply with the broadcast requirements of the Ballina Broadcast Area. The aircraft mistakenly entered the northeast corner of the Broadcast Area.

23 December 2021: A VFR radar return was observed overhead Ballina township. It proceeded in a south westerly direction before fading from radar approximately 6 nm from Ballina. Several broadcasts were made by the SFIS operator, but no contact was made.

27 December 2021: VFR aircraft called Ballina SFIS to advise that they were departing Ballina tracking North. The aircraft had nil transponder and radio was mostly unreadable. This created a safety issue with inbound RPT aircraft. Ballina SFIS operator broadcast requests for the aircraft to vacate Ballina Broadcast Area due to aircraft inability to meet minimum communications requirements. As status was unknown, Ballina SFIS operator continued to direct traffic information to other traffic on the potential for this aircraft to be in the airspace although not on frequency or under surveillance. The pilot phoned to advise they landed safely at Tyagarah.

3 January 2022: Due to a telecommunications issue with the Telstra line, Ballina SFIS frequencies were temporarily unavailable.

11 January 2022: Ballina SFIS frequency 124.2 MHz failed at approximately 2:40pm. Since there is no redundancy for this frequency, the failure resulted in a termination of the SFIS service.

16 January 2022: VFR aircraft transited the Ballina broadcast area without complying with the broadcast requirements. The pilot failed to make initial calls; however, they did respond after the Ballina SFIS operator made several calls to raise the pilot.

1 February 2022:

At approximately 2301 the Ballina SFIS experienced an excessive workload that persisted for approximately 25 minutes. During this period the controller was managing approximately 9 aircraft in or of immediate interest to the Ballina volume, primarily VFR aircraft operating without flight plans. The workload was such that a Handover / Takeover was abandoned at 2314. At time 2316 the controller had 28 pairs of traffic marked in the Directed Traffic Information (DTI) window as traffic passed. At time 2318 the controller had passed 38 pairs of traffic recorded in the DTI window and was managing 4 jurisdiction tracks (not in surveillance), 3 jurisdiction tracks (in surveillance) and 1 announced track (not in surveillance). At 2324 the DTI window had 38 traffic pairs marked as passed and a further 2 pairs marked as pending traffic.

4.2 Findings from reviewing the incidents, stakeholder comments and site observations

- Several incidents occurred in the circuit area over a 3-week period. Two incidents involved an ATO aircraft, one incident being categorised as serious. The lack of ability to direct co-operative and non-co-operative aircraft or vehicles on the runway and manoeuvring area may have contributed to the incidents.
- Awareness of the procedures to be used in the Ballina area by industry could be improved by an education program targeted at itinerant airspace users.
- Procedures and radio broadcasts made by air traffic controllers providing the SFIS varied from operator to operator.
- Due to surveillance limitations, the ability of SFIS to *provide a “full traffic information and alerting service premised on available surveillance data and pilot reports using the aerodrome’s discrete CTAF”* is limited, particularly at low level and within the circuit area.
- The current dimensions of the Ballina BA require radio broadcasts by aircraft not operating into Ballina. Typical among those are:
 - Rescue helicopter operations south of Byron Bay Lighthouse.
 - Aircraft tracking from Tyagarah to Lismore that enter the Ballina BA for a short duration during transit.
 - IFR aircraft conducting an instrument approach onto Lismore (runway 33).
- Based upon a comparison of the recordings prior to and following the introduction of SFIS, the number of radio broadcasts appears to have increased.
- ATO traffic levels are scheduled to increase commencing early 2022, to 96 RPT flights a week – including 65 jet services.
- Flight training will increase from early October 2021 resulting in 300 flying training hours per month (including ab initio).

4.3 Summary of matters from the incident data

A 2004 review by the ATSB of mid-air collisions between 1961 and 2003⁵ found that almost 80 per cent of mid-air collisions occurred in or near the circuit area. This reflects the higher traffic density in this area. A high proportion of the collisions (35 per cent) occurred on final approach or the base-to-final turn.

⁵ [Review of midair collisions involving general aviation aircraft in Australia between 1961 and 2003 \(atsb.gov.au\)](https://www.atsb.gov.au/publications/2004/Review_of_midair_collisions_involving_general_aviation_aircraft_in_Australia_between_1961_and_2003.aspx)

The introduction of the Ballina BA, CA/GRS and subsequent SFIS, have addressed some issues in the vicinity of Ballina but may not have addressed all to an acceptable level. It is noted that SFIS has limitations due to surveillance and communications at low levels within 5 nm of Ballina. The inability of the CA/GRS or SFIS operator to direct traffic or 'control' operations in the circuit area is viewed as a critical shortcoming. Most incidents in the circuit area and on the runway may have been prevented if sequencing and control of aircraft was available.

CASA observes the frequency of separation incidents, which had previously remained at approximately 2 per year since 2010, has significantly increased since November 2020. Many of the incidents listed above occurred within the circuit area at Ballina. Given the increasing traffic levels, CASA expects the heightened rate of separation events per year to continue.

The incidents, observations and findings outlined above tend to demonstrate an ongoing and unacceptable risk in the airspace volumes being present despite the measures that have been introduced. A comprehensive review and analysis of the issues and concerns raised by stakeholders is therefore a logical next step.

5 Issues and Analysis

Stakeholders were invited to provide information about their experiences operating in the vicinity of Ballina, Lismore, and Casino aerodromes. The list of stakeholders is in Annex G. Comments from stakeholders is contained in Annex H. A description of the feedback and the concerns raised by stakeholders follows.

5.1 Issues

5.1.1 Frequency congestion and over transmission of radio calls:

Frequency congestion and the over transmission of radio calls were the main issues raised by stakeholders. Ballina, Evans Head, Lismore and Casino aerodromes share the same CTAF. Frequency congestion prevents pilots from making radio calls, reducing situational awareness and effectively arranging separation with other aircraft. The matter has been reported at Ballina, Lismore and Casino in Aeronautical Studies and Airspace Reviews since 2009 and has been the focus of many safety seminars at Ballina and surrounding aerodromes. The issue has prevailed regardless. OAR staff members were granted permission by some of the operators to observe arrivals and departures from the cockpit as a means of experiencing the reported congestion among the other reported issues.

The OAR has monitored and analysed CTAF recordings to verify these concerns. The results showed periods where the radio broadcasts were close to constant and almost entirely saturating the frequency. This congestion adds to the workload of pilots and SFIS operators and reduces situational awareness. SFIS operators have also reported that the BA *“to be running with unsustainably high workload”*.

Traffic information services such as CA/GRS or SFIS inform each aircraft of their respective traffic and then those aircraft must arrange their own separation via radio. In the case of Ballina, this results in a significant number of broadcasts. The introduction of controlled airspace would reduce the number of radio calls made in total and therefore would reduce congestion.

Frequency congestion is being reported by operators under the following typical circumstances:

- when as few as three aircraft operate in the circuit at Casino; and
- an aircraft is conducting circuits at Lismore; and
- helicopters operating at Ballina and fixed wing aircraft are conducting training at Ballina.

This situation is further complicated by arriving or departing ATO aircraft at Lismore or Ballina.

Some pilots are reportedly making too many radio calls e.g. making calls on each segment/leg (Crosswind, Downwind, Base and Final) during circuit operations. Over transmission of radio calls from Ballina, Lismore and Casino (and to a lesser extent, Evans Head) also increases frequency congestion and reduces situational awareness.

Aircraft on the ground at Lismore and Casino are unable to hear the SFIS or an aircraft on the ground at Ballina. The escarpment between Lismore and Ballina prevents radio broadcasts on the ground at one aerodrome being received by an aircraft on the ground at the other. Pilots may believe they have performed a successful transmission without realising it has over transmitted another broadcast. In the absence of additional radio transmissions, pilots may fail to establish appropriate situational awareness until airborne. Separating the Ballina CTAF from the Lismore and Casino CTAF would reduce the likelihood of over transmission.

The 2004 review by the ATSB of mid-air collisions between 1961 and 2003 identified that radio problems, use of the wrong frequency, or failure to make the standard positional broadcasts led to many of these collisions.

The OAR conducted an industry survey to determine whether frequency congestion could be reduced through the allocation of a separate CTAF for Lismore and Casino, or the establishment of a separate broadcast area. The survey was conducted between 9 June 2021 to 11 July 2021, with most respondents (83%) supporting a discrete frequency for Ballina.

As a result, a recommendation that Lismore and Casino be allocated a new, separate frequency to Ballina, and Evans Head be allocated the Multicom frequency (126.7 MHz), the same as nearby Swan Bay airfield will be pursued. The target date for implementation is June 2022, to enable the applicable aeronautical publications to align. It should also involve a comprehensive education program.

5.1.2 Tyagarah and Gold Coast Training Areas

The Tyagarah Airfield and Gold Coast Flight Training Areas are adjacent to the northern lateral boundaries of the review area. The following information is contained for completeness of the report.

In October 2019, a proposal was raised by Australian Wings Academy to implement a discrete frequency or a Broadcast Area, south of the Gold Coast aerodrome due to frequency congestion. The Broadcast Area was proposed to cover the training areas (Danger Areas D656A, D656B, D656C and D656D), Nobbys Creek airfield, Murwillumbah aerodrome and Tyagarah airfield.

The proposal was consulted with industry and accepted. The Broadcast Area and frequency changes were affected and have been incorporated into the AIP including the appropriate aeronautical charts from December 2021.

5.1.3 Radio discipline and etiquette

The standard of radio etiquette (i.e. pilots making long non-standard radio transmissions) is an issue. Stakeholders report that other pilots ignore the correct radio call format, requiring additional radio calls to clarify the other pilot's intentions.

Stakeholders believe there is a misunderstanding in relation to the necessary radio broadcasts and this in turn is leading to the unnecessary transmissions. Stakeholders stated that if all airspace users utilised standardised transmissions, and listened to (and understood) transmissions, the total number of transmissions would reduce, alleviating frequency congestion. The issue could possibly be addressed during Flight Reviews with testing officers reaffirming the correct radio phraseology.

Stakeholders advised that itinerant student pilots often gave inaccurate position reports, which makes it difficult to gain situational awareness.

5.1.4 Lismore aerodrome upgrades

The following text was prepared before the extreme weather events of early 2022 which caused significant damage to Lismore aerodrome. CASA acknowledges the uncertainty around future repairs and previously proposed upgrades at Lismore.

The Lismore City Council is actively encouraging aviation and non-aviation businesses to relocate to the aerodrome.

Lismore aerodrome has undergone several minor upgrades in recent years, including the resealing of the runway, new runway lighting, new windsock, street lighting in the general aviation area and security fencing around the aerodrome.

The aerodrome is expected to become busier with the introduction of another flying school (Airways Aviation)⁶ and the proposed installation of an instrument landing system (ILS)⁷. The installation of an ILS will require extensive ground works at the aerodrome to meet current Regulations and it is not expected to occur in the short term. However, it is a reasonable expectation that air traffic will increase at Lismore when the ILS becomes operational. Stakeholders are concerned that should traffic significantly increase at Lismore, frequency congestion and the over transmission issues will subsequently increase.

⁶ https://lismore.nsw.gov.au/cp_themes/news/page.asp?p=DOC-NJW-63-57-38

⁷ <https://www.kevinhogan.com.au/4-5-million-investment-in-lismore-airport/>

5.1.5 Local features

Some pilots report that they are operating in a training area as identified in the flying training organisation's Operations Manual, that are not promulgated in various aeronautical publications. Having the training areas included in these publications would assist situational awareness, particularly for itinerant pilots.

There are four aircraft landing areas (ALAs) within 10 nm of Ballina. The ALAs are located at Alstonville, Wardell, Empire Vale and west of Lennox Head. There is also a private helicopter landing site to the West of Alstonville. Stakeholders stated that having the ALAs marked on charts would be desirable. A radio call which includes a distance and bearing from a known feature/aerodrome (e.g. Ballina Airport) would enhance situational awareness.

5.1.6 Unreported Incidents

Stakeholders have stated that incidents are not being reported. Unreported incidents are a concern, as it affects the results of risk assessments and can lead to an unrealistic perception of safety. While examples of unreported incidents are difficult to quantify, OAR staff has observed a number of events that may have prompted operators to submit a report. One such example, which was not observed by the OAR Officers, was relayed on from a service provider related to an impending runway incursion with potential serious consequences. Reporting fatigue is recognised as the contributing factor to under reporting.

5.2 Ballina Broadcast Area Feedback

A meeting was held in August 2019 with CASA, Airservices, Landrum and Brown (CA/GRS operator), Ballina Airport and the airlines operating into Ballina and Lismore. The main concern at that time, was the presence of unknown (non-broadcasting) VFR aircraft in the vicinity of Ballina. To address the issue, the OAR declared a BA within 10 nm of Ballina, to enhance communication in the vicinity of Ballina and reduce the incidence of unknown VFR aircraft conflicting with ATO and other aircraft.

The BA was designated on 7 November 2019. The mandatory radio broadcast requirements subsequently came into effect on 5 December 2019.

Stakeholders were asked to provide feedback on the BA, particularly whether the designation of the BA had increased situational awareness or frequency congestion.

Stakeholder feedback was mixed and at times, opposite. Stakeholders reported the following:

- The establishment of the BA has not necessarily increased the number of radio calls. However, the mandatory radio calls required when operating in the BA has increased the number of broadcasts.
- If pilots adopted the mandatory radio calls and kept other non-essential radio calls to a minimum, the frequency congestion would likely be reduced.
- Increased numbers of transmissions (in addition to the required calls) contributes to frequency congestion.

Most stakeholders viewed the new BA as working well. They reported that there have been less VFR aircraft transiting the area without making the required broadcasts. However, some itinerant pilots do not always make 10 nautical mile radio calls.

On 28 January 2021, the BA was expanded in size from 10 nm to 15 nm centred on Ballina to improve situational awareness for aircraft operating in the vicinity of Ballina. An AIP SUP was published on 13 January 2021⁸.

The AIP SUP was published to inform pilots:

- of the increased volume of the BA;
- of the radio calls mandated within the BA;

⁸ <https://www.airservicesaustralia.com/aip/current/sup/s21-h03.pdf>

- that a Flight Following Surveillance Information Service (SIS) is available and recommended.
- of the use of transponders and/or ADS-B (if fitted); and
- of the Instrument Approaches and conflict hotspots.

CASA conducted an education program in parallel to inform pilots about the expanded BA and their requirements to make radio broadcasts.

During a site visit (February 2021), some stakeholders reported issues with the BA to the south of Byron Bay Lighthouse, as it was affecting operations.

Stakeholders reported that the size of the BA results in additional radio calls from aircraft transiting outside 10 nm of Ballina, affecting operations at Lismore and should therefore be reduced in size.

5.3 Current situation

Drawing together all the information presented above the following situation emerges:

Considerable growth in aircraft movements, particularly passenger transport movements is apparent since 2017 in the Ballina airspace. Furthermore, the risk profile has altered during that period driven by the introduction of new carriers and the provision of additional airline services.

A number of successive risk mitigation measures have been introduced during that same period in a graduated fashion, with each intended to improve on the former. Several issues prevail however despite the introduction of these measures, and in some cases may have been errantly aggravated by their introduction.

ASIR Incidents continue to be reported tending to validate the concerns of many stakeholders and operators. Furthermore, these incidents indicate the prevalence of potentially unacceptable airspace risk despite the existing controls.

While frequency congestion is the primary consideration (which is likely to be reduced by separating the CTAFs) raised by airspace users, incidents continue to be reported in some portions of the BA (typically in the circuit area or below 1500FT AMSL). Furthermore, those incidents relate to airspace collision risk, with the rate of separation incidents or incidents commonly considered precursors to separation incidents increasing at disproportionate rate to traffic growth.

Stakeholders have provided feedback contextualising the issues that the data tends to indicate.

Having considered all the information presented to date it is apparent that additional safety mitigation measures can be justified to reduce the residual risk in the Ballina airspace.

These measures are discussed below.

5.4 Options for enhancing safety for airspace users

5.4.1 Frequency congestion and over transmission of radio calls

Frequency congestion could be reduced by the following:

- removing Lismore, Casino and Evans Head from the BA;
- pilots making the recommended radio calls only; or
- pilots following the standard radio telephony format and phraseology.

Changing the CTAF of Lismore and Casino

Removing the Lismore and Casino CTAF from the Ballina BA (and Evans Head) will reduce frequency congestion and the over transmission of radio calls. The stakeholder consultation, described at length earlier, revealed that the majority of respondents supported this measure.

A component of this proposal is the possible modifications to the BA dimensions. These modifications are targeted specifically at the Lismore Instrument Flight Procedure (IFP) to runway 33 that currently transits the BA for a very short segment along its notional path. Modifying the BA would remove that transit and the corresponding broadcast requirements. Stakeholder acceptance is critical to the success of this initiative. The specific purpose of the proposal is to reduce

frequency congestion at Ballina to the greatest extent possible, which has been accepted and agreed by all stakeholders. However, the modification to the boundary of the BA has not been agreed to by key stakeholders on the grounds that the current ATC and airline procedures have been designed around the existing boundary dimensions and therefore further changes at this time are being resisted. Modifying the BA boundary requires careful consideration to realise the full safety potential of the frequency changes while avoiding any negative impact on the safety to IFR operations.

An analysis of the appropriate regulations, however, as well as discussions with Airservices reveal that a procedural solution may be available. The solution provides an operational remedy for aircraft performing an approach along the IFP while remaining compliant with the Civil Aviation Safety Regulation 1998 (CASR) Part 91 broadcasting obligations.

Effective 16 June 2022, the CTAF for Lismore (YLIS) and Casino (YCAS) will be altered to 132.45MHz. At this time the CTAF for Evans Head (YEVD) will also be altered to 126.7MHz. The CTAF changes will be effected by NOTAM. The YBNA CTAF frequency will remain as 124.2MHz. Please refer to AIP SUP H50/22 and NOTAM for details of the change.

Recommended radio calls

There is confusion within the GA community as to the mandatory radio calls which must be made within the vicinity of non-controlled aerodromes. To educate pilots, CASA has produced an information booklet called *“Be Heard, Be Seen Be Safe – Radio procedures in non-controlled airspace”*⁹. The ATSB (2013) have also published *A pilot’s guide to staying safe in the vicinity of non-towered aerodromes*.¹⁰

Civil Aviation Safety Regulation 1998 (CASR) Part 91 covers the procedures for operating on and in the vicinity of non-controlled aerodromes. The CASR states that the pilot **must** make a broadcast whenever it is reasonably necessary to do so to avoid a collision, or the risk of a collision, with another aircraft.

In any non-controlled airspace, when departing, arriving or overflying an aerodrome or switching frequency, you should always let other traffic know you are there by making a broadcast.

5.4.2 Introducing aerodrome control services at Ballina

An aerodrome control service is an air traffic control service for aerodrome traffic including aircraft flying in a designated volume of airspace in the vicinity of the aerodrome, the circuit area and operating on the manoeuvring area.

Aerodrome control services have historically been provided from air traffic control towers; however, the service could be provided remotely via visual surveillance system and other supporting systems.

The aerodrome control service nominates the runway-in-use, issues taxi, take-off, and landing clearances as well as providing essential local traffic information. Annex C – Air Traffic Control Service contains further information on the types of air traffic control.

Australia does not have trigger criteria based solely on aircraft and/or passenger movements for the establishment of an aerodrome control service. Rather, the introduction of an aerodrome control service is based on risk.

Despite incremental changes and enhancements to aviation safety around Ballina over the last eight years, there is an upward trend in incidents which demonstrate that pilot self-separation at Ballina is no longer effective. Changes are required to ensure the safety of ATO operations and to enhance services to all airspace users.

The runway and immediate surrounding airspace at Ballina present the highest risk of collision. All current risk mitigation strategies have delivered incremental enhancements to aviation safety, but they are being outpaced by changes in the nature and volume of activity including itinerants, increasing sport and recreational aviation, new airspace users and more ATO. Incremental safety

⁹ <https://www.casa.gov.au/sites/default/files/radio-procedures-in-non-controlled-airspace.pdf>

¹⁰ [https://www.atsb.gov.au/media/4117372/AR-2008-044\(1\).pdf](https://www.atsb.gov.au/media/4117372/AR-2008-044(1).pdf)

improvements are assessed as not sufficiently capable of delivering the level of safety performance required for Ballina airspace users.

Therefore, the establishment of an approach control service and an aerodrome control service as an enduring solution at Ballina is assessed as required to mitigate those risks to an acceptable level of safety as soon as practicable. The enduring solution should include a separation service for IFR aircraft within a control area (CTA) and control zone (CTR) steps.

The current level of risk in the circuit area of Ballina should also be managed in the short-term using an interim solution that is designed as a graduated step toward the enduring service. The continued growth in volume and complexity of operations at Ballina requires an interim separation capability to be developed with Airservices for implementation within the next 12 months. The declaration of associated controlled airspace should be considered with this interim solution.

The introduction of an interim capability to observe the runway, apron, taxiways, final approach, and departure paths that mitigate the circuit area and runway issues must be considered. The incident data and observations demonstrate that a heightened level of risk exists within the runway environment from a combination of co-operative and non-co-operative vehicles and aircraft. Airservices and CASA should work together to develop a solution which addresses the residual risk generated by non-cooperative vehicles and aircraft entering the runway.

Under the AAPS, CASA must consider cost implications for all airspace users. The cost to establish and maintain an aerodrome control service is considerable. Airservices have estimated the cost to establish a new on-airport aerodrome control service between \$17 - \$20 million. Ongoing annual costs are between \$2 - \$4 million. Airservices have stated that these costs are similar whether a traditional tower (i.e. solid structure) is built or if a remote tower (i.e. digital tower¹¹) is established. Estimated costs, provided by industry, suggest a digital tower could be established between \$4 and \$5 million. Allowing for Airservices project and internal costs, an overall total cost of around \$10 million could be achievable. The biggest cost to industry will fall to Airservices who will be required to establish an ATC capability at Ballina. This cost may eventually flow to the airspace users through the Airservices pricing agreement. It has been reported that the domestic airlines have indicated strong support for funding the cost of an aerodrome control service at Ballina.

The Act requires airspace to be administered and used safely, considering such matters as the efficient use of the airspace and equitable access to that airspace for all users of that airspace. Changes to the airspace classification must ensure safety and consider efficiency and equitable access for all pilots.

Given the existing radio carriage requirements, the determination that Ballina receive an Aerodrome Control Service will have limited negative impact on most airspace users. Most will retain their access to the airspace. Airspace users will not require any additional equipment to operate in the Ballina controlled airspace. However, consideration of a suitable regulatory framework that can safely authorise sport and recreational aircraft and pilot certificate holders to operate in controlled airspace associated with Ballina may be required. Aircraft not equipped with a radio, or not approved to operate in Class D airspace would be excluded from the airspace.

The establishment of a CTR around Ballina may also have a detrimental effect on operations from the private airfields in the area. The sport and recreational aircraft which operate from these airfields may require an airways clearance when the aerodrome control service is active.

The hang-gliding and paragliding operations at Pat Morton Lookout (Lennox Head) would be affected by the declaration of a CTR due to the proximity to Ballina, approximately 2.7 nm northeast of the Ballina non-directional beacon (NDB). Consideration of a Letter of Agreement between the hang-gliding club and Airservices or an exemption issued by CASA may address access issues for the club. Similarly, RPAS operated within the 3NM of the airport would require CASA approval and coordination with Airservices.

¹¹ Digital towers have been commissioned overseas. There are no digital towers approved or in use in Australia.
<https://www.nats.aero/services-products/n/digital-towers/>

All the measures to date intended to improve aviation safety around Ballina have provided incremental improvements on the previous measures. However, CASA has determined there is justification to mitigate the risk of mid-air collision around Ballina by determining that an aerodrome control service be provided at Ballina. This implements controlled airspace procedures that leverage the systems, procedures, and expertise of ATC to separate, sequence and inform pilots, thus improving aviation safety.

5.4.3 Lowering controlled airspace

The current lower level of controlled airspace (Class C) above Ballina, Lismore and Casino is 8,500 ft AMSL. Above Ballina, the existing BA abuts the base of controlled airspace and obliges all aircraft to make radio calls and to participate with the SFIS to reduce the risk of collision with unknown VFR aircraft. However, non-cooperative VFR aircraft may remain unknown to SFIS and therefore will not be provided as traffic to other aircraft.

As traffic grows and with the introduction of an aerodrome control service, there is a need to extend the IFR-to-IFR separation service to fill the gap between the aerodrome and the existing controlled airspace, such that there is sufficient airspace volume for the controller to manage traffic. The effective management of traffic will require all VFR aircraft to be known to the controller. Consideration was given to the introduction of a Class E step; however, such an airspace step would require additional SSR transponder equipment, would not provide sufficient operational flexibility for ATC, and may increase frequency congestion.

Alternatively, the establishment of Class D airspace between the existing Class C and the aerodrome would require that all aircraft obtain an airways clearance. The risk of unknown VFR aircraft conflicting with IFR aircraft would be appropriately mitigated. The airspace would protect all IFR arrival and departure paths and descent profiles. The control service would ensure IFR aircraft are separated from other IFR aircraft and be provided with traffic information on all VFR aircraft. VFR aircraft would receive traffic information on all other aircraft but would not be separated by ATC.

The Civil Aviation Orders apply specified conditions in relation to certain sport and recreational operations in relation to Class D airspace. A lowering of controlled airspace may cause airspace congestion in Class G airspace for sport and recreational VFR aircraft which are unable to access controlled airspace. It is acknowledged that the introduction of controlled airspace would have a detrimental effect on some of the local stakeholders. Where practicable, issues could be resolved during the consultation process.

5.4.4 ADS-B Avionics and mandates

The installation of an ADS-B ground station will improve surveillance for IFR aircraft in the vicinity of Ballina and address the limitations of the current surveillance capability. It is recommended that an ADS-B ground station be installed in the vicinity of Ballina as soon as practicable.

Some stakeholders suggested the mandating of a transponder veil or ADS-B veil within the vicinity of Ballina may assist operations. A transponder or ADS-B veil would require all aircraft to be fitted with the appropriate avionics and would exclude some aircraft from operating in the area. CASA does not agree a veil could be justified at this time and therefore it does not recommend the introduction of a transponder or ADS-B veil.

The introduction of avionics mandates will impose a cost to local stakeholders who are not required to be fitted with a transponder or ADS-B. The avionics may assist situational awareness for airline pilots; however, they will not address the issues associated with radio transmissions.

CASA supports the voluntary fitment of ADS-B avionics in VFR aircraft. Situational awareness of ATC would be improved if an ADS-B ground station was commissioned at Ballina and VFR aircraft were fitted with ADS-B avionics.

5.4.5 ALAs and flight training areas marked on charts

Changes in the traffic mix, nature and volume of activity in the vicinity of Ballina are creating complexity leading to poorer than desired situational awareness outcomes. Some operators have reported that itinerant pilots have errantly provided inaccurate or poorly described position

broadcasts. Promulgating uncertified aerodromes and flight training areas that are currently not published on aeronautical charts is considered an appropriate measure to improve pilot situational awareness.

5.4.6 Summary of final proposed solutions

Issue	Proposed Solutions	Outcome
Frequency Congestion	<ol style="list-style-type: none"> 1. Separate the Ballina CTAF from the Lismore and Casino CTAF to reduce the volume of airspace using the same frequency. 2. Increase pilot knowledge and proficiency of required radio calls within the BA to reduce the number and duration of calls. 3. Introduce Class D airspace to reduce the number of calls required to achieve separation. 	Frequency congestion reduced as far as is practical.
Heightened risk of separation incidents	<ol style="list-style-type: none"> 1. Introduce an IFR-to-IFR separation service to actively separate IFR aircraft. 2. Sequence all aircraft to and from the runway and within the circuit area to proactively manage runway usage. 3. Require all VFR aircraft to be known to ATC to enable effective management of airspace. 4. Install an ADS-B ground station to increase ATC surveillance capability. 5. Establish capability to detect non-cooperative aircraft and vehicles in the immediate vicinity of the runway to enable corrective action. 	Significantly reduced risk of separation incidents.
Situational Awareness	<ol style="list-style-type: none"> 1. Provide traffic information to VFR aircraft. 2. Publish uncertified aerodromes and flight training areas on charts to increase pilot situational awareness for itinerant airspace users. 	Increased awareness.

6 Recommendations

The OAR applies a precautionary approach when conducting airspace reviews. The following recommendations are consistent with the CASA Board's direction that aviation safety risks must be reduced to the lowest practical and proportionate level.

Recommendation 1 *

CASA should prepare a Request For Change (RFC) to separate the Lismore and Casino Common Traffic Advisory Frequency (CTAF) from the Ballina CTAF by 16 June 2022.

Recommendation 2 *

Evans Head Airport should be allocated the common CTAF (126.7 MHz) by 16 June 2022.

Recommendation 3

CASA should direct AA to install an Automatic Dependent Surveillance - Broadcast (ADS-B) ground station in the vicinity of Ballina to improve surveillance as soon as practicable but no later than April 2023. The ground station should, as far as is practical, provide ADS-B surveillance capability to the runway surface.

Recommendation 4

CASA should explore a suitable regulatory framework that can safely authorise sport and recreational aircraft and pilot certificate holders to operate in the controlled airspace associated with Ballina where pilot certificate holders meet CASA specified competency standards and the aircraft are appropriately equipped.

Recommendation 5

CASA's Stakeholder Engagement Division (SED) should conduct additional safety promotion programs in relation to Ballina operations as soon as practicable. The programs should include, but are not limited to the following key elements:

- a. reinforce the mandatory radio calls required when operating within the Ballina MBA in the interim, pending the establishment of controlled airspace, and
- b. later, provide guidance as to how a Sport Aviation Body might develop a suitable scheme and make application to CASA for approval, under the regulatory framework identified in recommendation 4.

Recommendation 6

Uncertified aerodromes and flight training areas around Ballina should be promulgated in aeronautical publications to increase pilot situational awareness.

Recommendation 7

As an interim action pending the completion of Recommendation 8, CASA should make a determination to establish a control area around Ballina Byron Gateway Airport with a base which is as low as possible, and direct AA to provide services within the control area. The services should be provided during all periods of scheduled Air Transport Operations and include an Approach Control Service to aircraft operating under the Instrument Flight Rules (IFR), separation between IFR aircraft, VFR traffic information to all aircraft, and sequencing of all aircraft to and from the runway. CASA and AA should jointly explore opportunities to detect non-cooperative aircraft or vehicles in the immediate vicinity of the runway. The services should be established as soon as practicable but no later than 30 November 2023.

Recommendation 8

CASA should make a determination that Ballina Byron Gateway Airport will become a controlled aerodrome with an associated control zone and control area, and direct Airservices Australia (AA) to provide an Aerodrome Control Service to the aerodrome. That service should be established as soon as practicable but no later than 13 June 2024.

Recommendation 9

CASA should prepare and finalise an Airspace Change Proposal (ACP) for a control zone and control area steps in preparation for the implementation of Recommendations 7 and 8.

* These actions were previously consulted and enacted on 16 June 2022, please refer to AIP/NOTAM for further details.

Annex A Acronyms and Abbreviations

Acronym/abbreviation	Explanation
A320	Airbus A320
AAPS	Australian Airspace Policy Statement 2021
ACP	Airspace Change Proposal
Act	<i>Airspace Act 2007</i>
ADO	Aeronautical Data Originator
ADS-B	Automatic Dependent Surveillance - Broadcast
AFIS	Aerodrome Flight Information Service
Airservices	Airservices Australia
AIP	Aeronautical Information Publication
AIP SUP	Aeronautical Information Publication Supplement
ALA	Aircraft Landing Area
AMSL	Above Mean Sea Level
ANSP	Air Navigation Service Provider
ARFF	Aerodrome Rescue and Fire Fighting
ARMS	Airspace Risk Modelling System
ASIR	Aviation Safety Incident Report
ATC	Air Traffic Control
ATS	Air Traffic Services
ATSB	Australian Transport Safety Bureau
ATO	Air Transport Operation
AusALPA	Australian Airline Pilots' Association
B737	Boeing 737
CA/GRS	Certified Air/Ground Radio Service
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation 1998
C172	Cessna 172
C208	Cessna 208
Civil Air	Civil Air Operations Officers' Association of Australia
CTA	Controlled Airspace
CTAF	Common Traffic Advisory Frequency
CTR	Control Zone
DPS	Data Product Specification
DTI	Directed Traffic Information
ERSA	En Route Supplement Australia
FIS	Flight Information Service
ft	feet
GA	General Aviation
Jetstream	Jetstream 32
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
kt	knot
NAIPS	National Aeronautical Information Processing System
nm	nautical miles
OAR	Office of Airspace Regulation
RNAV	Area Navigation
RPT	Regular Public Transport

SED	Stakeholder Engagement Division
SFIS	Surveillance Flight Information Service
SIS	Surveillance Information Service
TA	Traffic Advisory
TCAS	Traffic Alert and Collision Avoidance System
TIFPs	Terminal Instrument Flight Procedures
TSAD	Tower Situational Awareness Display
UHF	Ultra High Frequency
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions

Annex B Australian Airspace Structure

Class	Description	Summary of Services/Procedures/Rules
A	All airspace above Flight Level (FL) 180 (east coast) or FL245 elsewhere	Instrument Flight Rules (IFR) only. All aircraft require a clearance from Air Traffic Control (ATC) and are separated by ATC. Continuous two-way radio and transponder required. No speed limitation.
B		IFR and Visual Flight Rules (VFR) flights are permitted. All flights are provided with ATS and are separated from each other. Not currently used in Australia.
C	In control zones (CTRs) of defined dimensions and control area steps generally associated with controlled aerodromes	<ul style="list-style-type: none"> All aircraft require a clearance from ATC to enter airspace. All aircraft require continuous two-way radio and transponder. IFR separated from IFR, VFR and Special VFR (SVFR) by ATC with no speed limitation for IFR operations. VFR receives traffic information on other VFR but are not separated from each other by ATC. SVFR are separated from SVFR when visibility (VIS) is less than Visual Meteorological Conditions (VMC). VFR and SVFR speed limited to 250 knots (kt) Indicated Air Speed (IAS) below 10,000 feet (FT) Above Mean Sea Level (AMSL)*.
D	Towered locations such as Bankstown, Jandakot, Archerfield, Parafield, and Alice Springs.	<ul style="list-style-type: none"> All aircraft require a clearance from ATC to enter airspace. For VFR flights this may be in an abbreviated form. As in Class C airspace all aircraft are separated on take-off and landing. All aircraft require continuous two-way radio and are speed limited to 200 kt IAS at or below 2,500 FT AMSL within 4 NM of the primary Class D aerodrome and 250 kt IAS in the remaining Class D airspace**. IFR are separated from IFR, SVFR, and provided with traffic information on all VFR. VFR receives traffic on all other aircraft but is not separated by ATC. SVFR are separated from SVFR when VIS is less than VMC.
E	Controlled airspace not covered in classifications above	<ul style="list-style-type: none"> All aircraft require continuous two-way radio and transponder. All aircraft are speed limited to 250 kt IAS below 10,000 FT AMSL*. IFR require a clearance from ATC to enter airspace and are separated from IFR by ATC and provided with traffic information as far as practicable on VFR. VFR do not require a clearance from ATC to enter airspace and are provided with a Flight Information Service (FIS). On request and ATC workload permitting, a Surveillance Information Service (SIS) is available within surveillance coverage.
F		IFR and VFR flights are permitted. All IFR flights receive an air traffic advisory service, and all flights receive a flight information service if requested. Not currently used in Australia.
G	Non-controlled	<ul style="list-style-type: none"> Clearance from ATC to enter airspace not required. All aircraft are speed limited to 250 kt IAS below 10,000 FT AMSL*. IFR require continuous two-way radio and receive a FIS, including traffic information on other IFR. VFR receive a FIS. On request and ATC workload permitting, a SIS is available within surveillance coverage. VHF radio required above 5,000 FT AMSL and at aerodromes where carriage and use of radio is required.

* Not applicable to military aircraft

** If traffic conditions permit, ATC may approve a pilot's request to exceed the 200 kt speed limit to a maximum limit of 250 kt unless the pilot informs ATC a higher minimum speed is required.

Annex C Air Traffic Control Service descriptors

The following plain language descriptions are based on ICAO Doc 4444 Procedures for Navigation Services – Air Traffic Management (PANS-ATM).

Air Traffic Control service

A service provided for the purpose of:

- a) preventing collisions:
 - 1) between aircraft, and
 - 2) on the manoeuvring area between aircraft and obstructions; and
- b) expediting and maintaining an orderly flow of air traffic.

Area Control Service

Air traffic control service for controlled flights in control areas usually in the enroute phase of flight. Controlled flights are subject to airways clearances.

Approach Control Service

Air traffic control service for arriving or departing controlled flights. Controlled flights are subject to airways clearances.

Aerodrome control service

Air traffic control service for aerodrome traffic.

Aerodrome traffic includes aircraft flying in a designated volume of airspace in the vicinity of the aerodrome inclusive of the circuit area and operating on the manoeuvring area.

Aerodrome Control Services have historically been provided from air traffic control towers; however, the service could be provided remotely via Visual Surveillance System and other supporting systems.

The Aerodrome Control Service nominates the runway-in-use, issues taxi, take-off, and landing clearances as well as providing essential local traffic information.

Annex D Summary of Observations and Feedback

CASA staff were on-site for the first five weeks of the SFIS. They observed operations and reported on the effectiveness of the new service. CASA identified the following issues:

- Awareness of the SFIS and the procedures are not adequately understood by industry.
- Procedures and radio broadcasts by SFIS operators are not consistent.
- The hours of operation do not cover all RPT services. In November 2021, RPT services increased and many RPT (including jet) services arrive and depart outside the hours of SFIS operation.
- The SFIS ceased operation whilst RPT aircraft were within the circuit area of Ballina or established within the BA, on approach. For example: On Friday 20 August 2021, the SFIS ceased services while an IFR aircraft was conducting an instrument approach and a QantasLink aircraft was within 10 nm of Ballina. On Friday 27 August, the SFIS ceased services with a QantasLink aircraft within 10 nm of Ballina.
- Aircraft are not within radar coverage throughout the Ballina BA. Due to terrain shielding and site location, radar and Automatic Dependent Surveillance - Broadcast (ADS-B) surveillance coverage is poor at low level. There were many occasions where an aircraft was contacted by the SFIS operator and told that they had “left radar coverage and to report 15 nm from Ballina”. ADS-B and radar coverage charts are depicted in Annex F.
- VHF radio communications within the BA are poor at low level.
- Situational awareness of SFIS operators of the circuit area and local operations is inhibited.
- Terrain shielding occurs between SFIS and aircraft on the ground at Lismore, which leads to over transmission of radio broadcasts.
- Frequency congestion has increased due to new mandated calls and position reports of aircraft required due to a lack of surveillance at lower levels. Numerous additional radio calls by the SFIS increased frequency congestion. These calls included:
 - Queries regarding flight plans (whether a flight plan had been submitted and flight details provided over the radio to enable a flight plan to be created).
 - The issuing and readback of transponder codes.
 - Broadcasts regarding pilots leaving the Ballina Broadcast Area and that services would be terminated, and frequency change was approved.
 - Radio broadcasts by IFR aircraft to cancel SARWATCH.
 - Departure calls from IFR aircraft.
 - Broadcasts to inform IFR pilots to contact Centre.
 - Requests for pilots to report reaching a location.
- The size of the Ballina Broadcast Area results in additional radio calls from aircraft transiting outside of 10 nm of Ballina, affects operations at Lismore and increases frequency congestion.
- The SFIS operators instructed VFR pilots to lodge a flight plan when they were flying circuits using an IFR waypoint. The SFIS operator broadcast that “my suggestion would be position PUMIP – Papa Uniform Mike India Papa, and that puts you on about a four mile final for runway zero six”. The pilot asked about circuits on runway 24 and was told “it doesn’t really matter but if you try position November Alpha four seven zero. It is on the RNAV X-Ray for two four and that will work as well. Actually, you could use NA four ninety or NA four seventy. Just have a look at the RNAV X-Ray for two four and you’ll [see] those points.”

[NOTE: The National Aeronautical Information Processing System (NAIPS) is not designed for a pilot to lodge a flightplan from one place back to the same place without

going to another point or location. Pilots flying circuits are not leaving the vicinity of the airport. A flightplan is not required for VFR operations or operations within the circuit area.

At an industry meeting in Ballina (13 May 2021), Airservices informed those present that circuit operations would not require a transponder code. Pilots asked if they were required to lodge a flight plan if they were doing a local flight around an airstrip. They were told “No” – but SFIS will want flight details to put into the system.]

Annex E Comparison of movement data

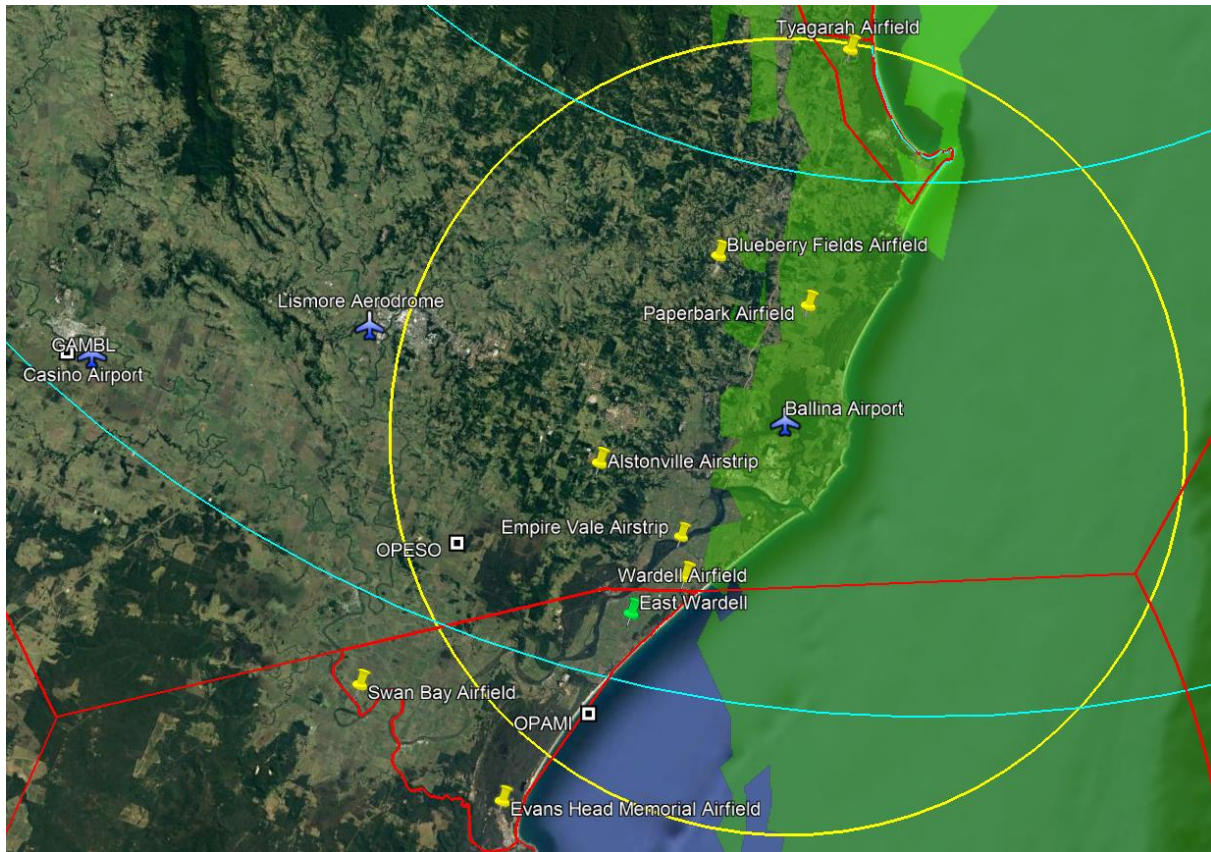
The following table has been sorted according to Incidents. Ballina features at the top of that cohort. Passenger Numbers also feature near the top of the list.

Note: PTO movements are Passenger Transport Operations – which include airline flights and all non-freight-only charter operations. The list of aerodromes is a sample and not a definitive list.

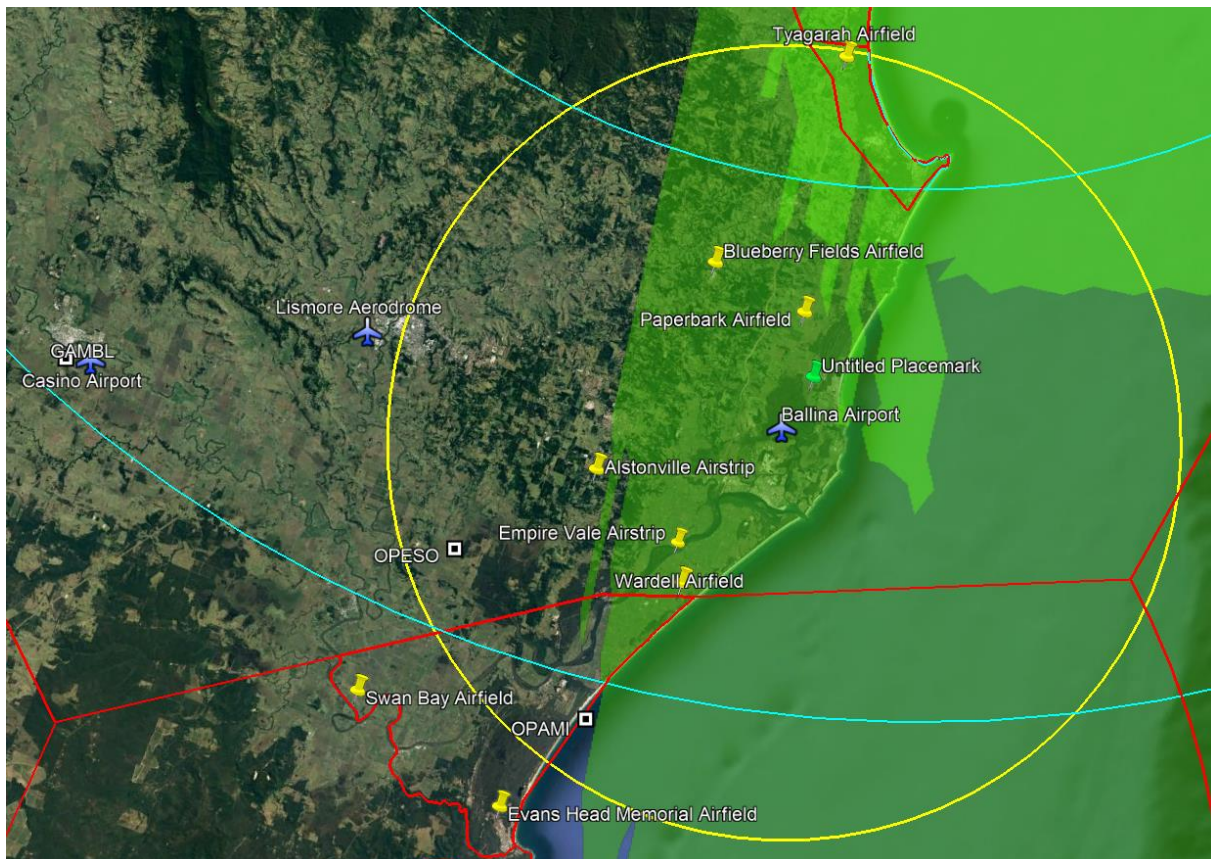
01 September 2020 - 31 August 2021						
Aerodrome	Service Provided	Total Movements	PTO Movements	Passenger numbers	Incidents	Serious Incidents
Sunshine Coast	D	59,396	14,529	639,735	9	0
Ballina	SFIS	16,500	8,100	540,300	7	0
Gold Coast	C	74,980	24,369	2,065,326	6	0
Alice Springs	D	20,334	13,229	377,731	5	0
Coffs Harbour	D	22,342	7,031	150,524	5	0
Launceston	D	25,583	14,590	617,568	4	0
Albury	D	38,366	6,500	93,834	4	0
Wagga Wagga	CTAF	31,796	6,595	92,176	4	0
Port Macquarie	CTAF	33,872	6,532	89,604	4	0
Brisbane West Wellcamp	CTAF	6,692	4,100	44,500	4	0
Mackay	D	27,091	18,380	689,101	3	0
Horn Island	CTAF	33,554	17,899	166,395	3	0
Dubbo	CTAF	28,593	12,463	118,627	3	1
Tamworth	D	16,154	7,465	91,552	3	0
Mildura	CTAF	18,800	5,900	81,300	3	0
Broome	D	32,766	22,764	561,403	2	0
Rockhampton	D	28,313	16,627	460,584	2	0
Avalon	D	8,912	3,349	154,464	2	0
Bathurst	CTAF	19,005	2,118	8,685	2	1
Hobart	D	22,514	17,617	1,186,600	1	0
Karratha	D	22,153	19,217	521,186	0	0
Port Hedland	AFIS	27,109	10,435	408,772	0	0
Proserpine	CTAF	10,623	4,371	282,775	0	0
Ayers Rock	CA/GRS	20,631	3,000	88,900	0	0

Aerodromes sorted by total incidents.

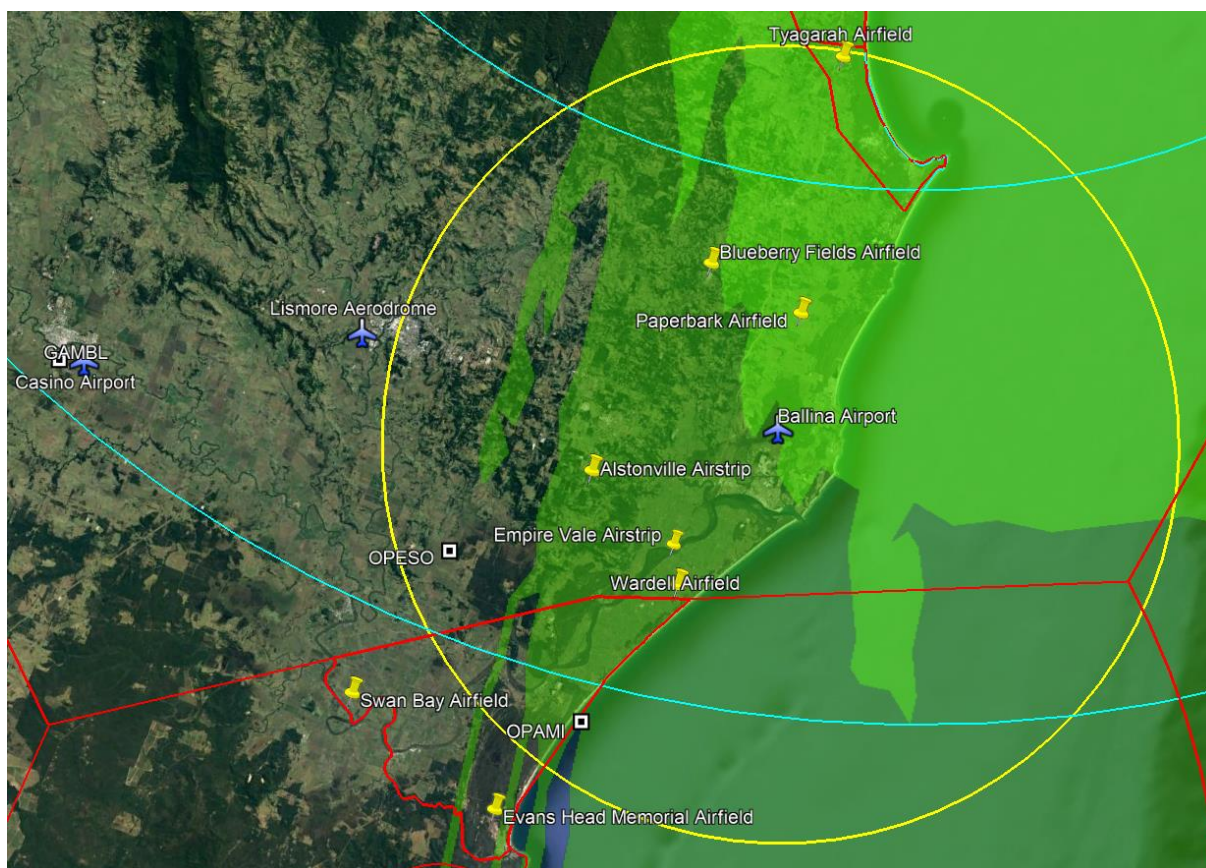
Annex F ADS-B and radar surveillance charts



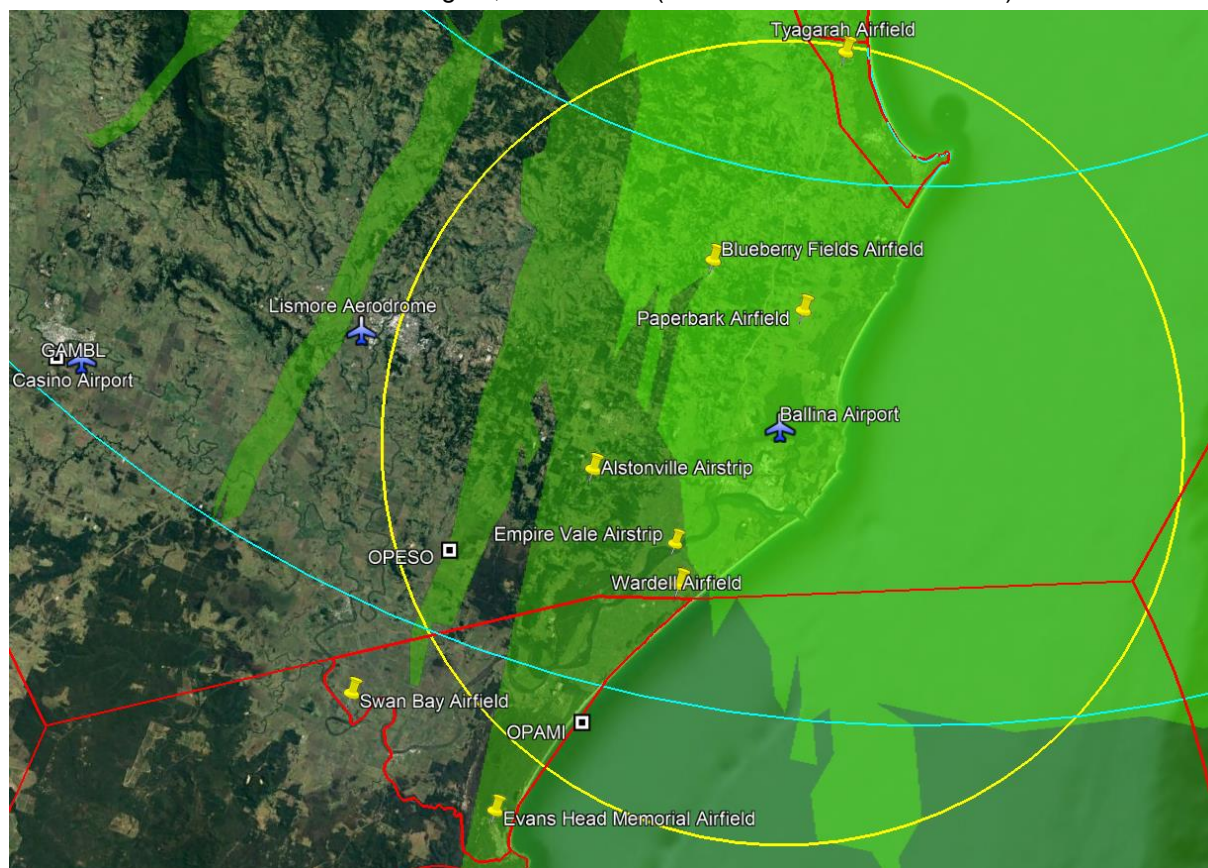
Radar coverage 500 ft AMSL (Source: Airservices Australia).



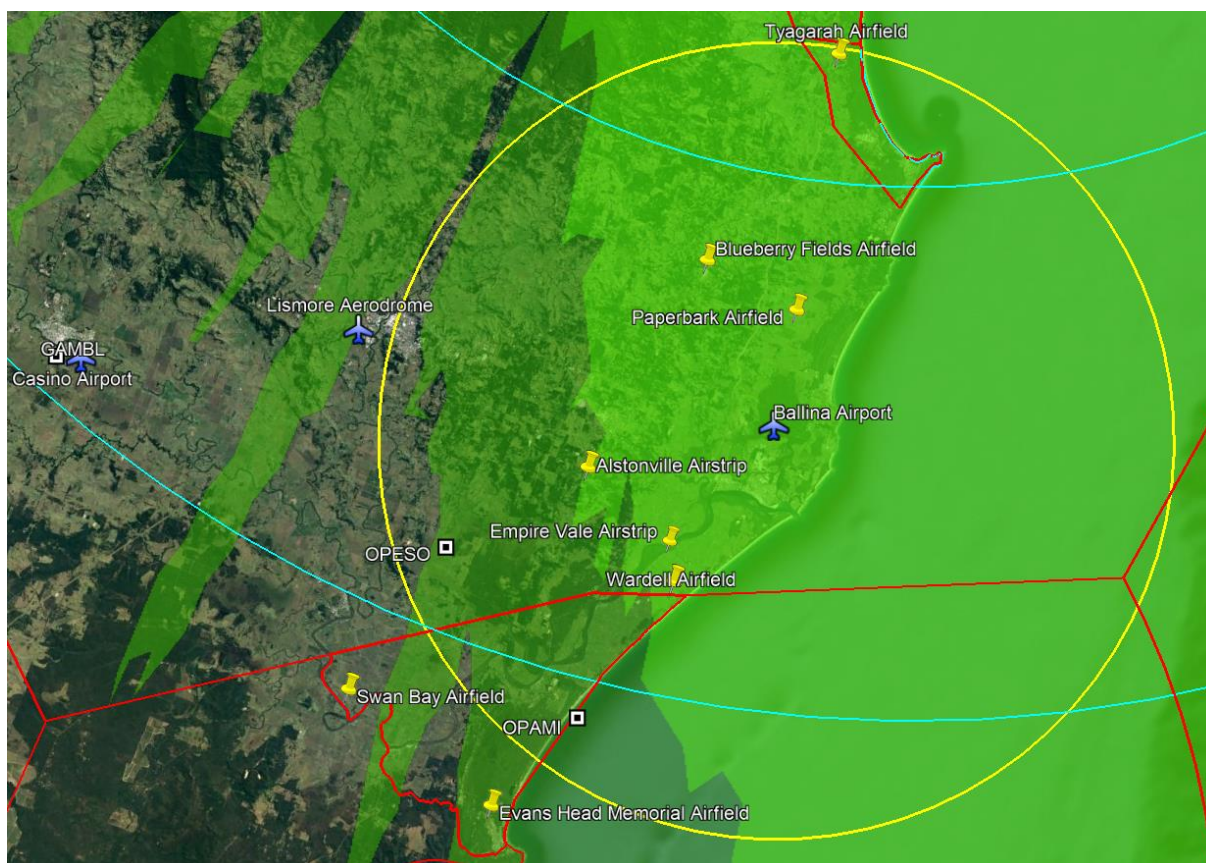
Radar coverage 1,000 ft AMSL (Source: Airservices Australia).



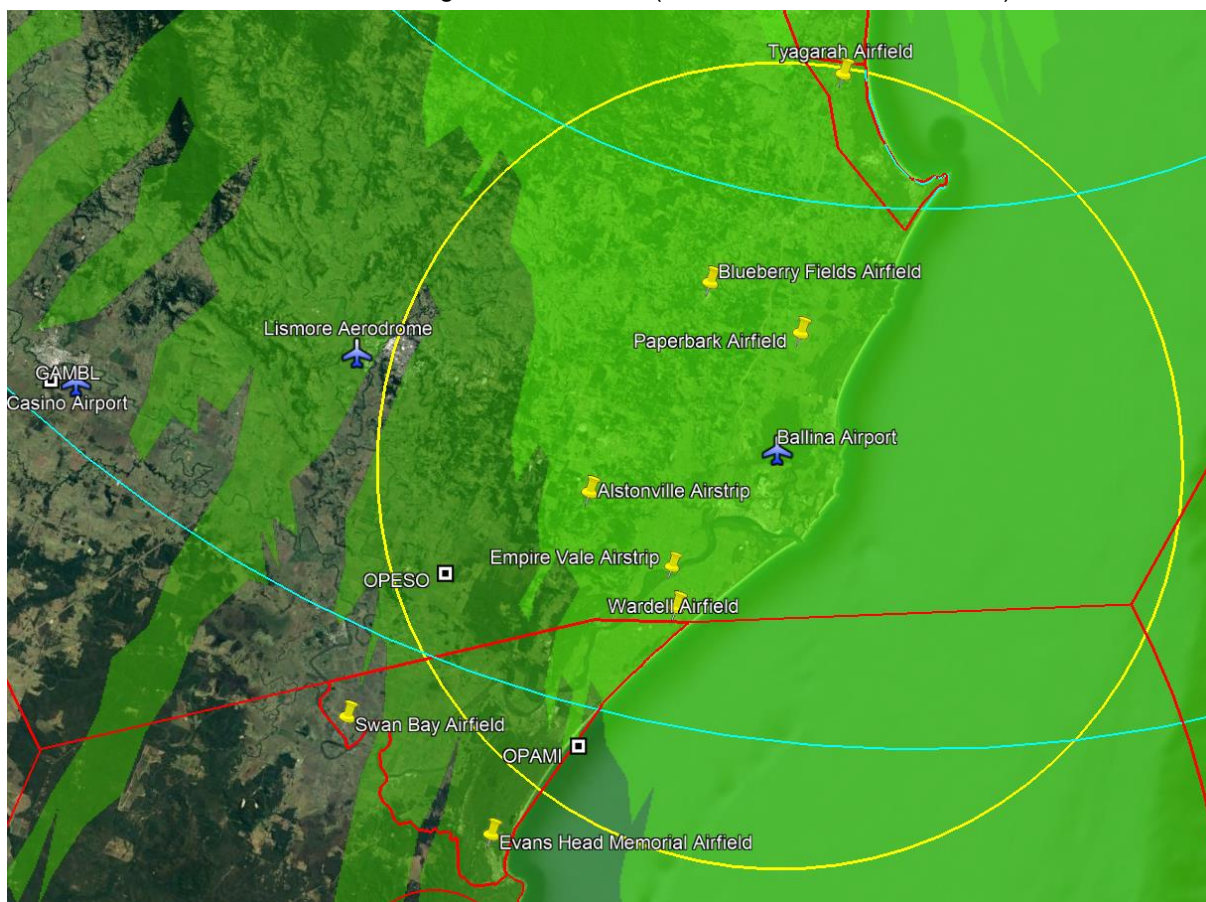
Radar coverage 1,500 ft AMSL (Source: Airservices Australia).



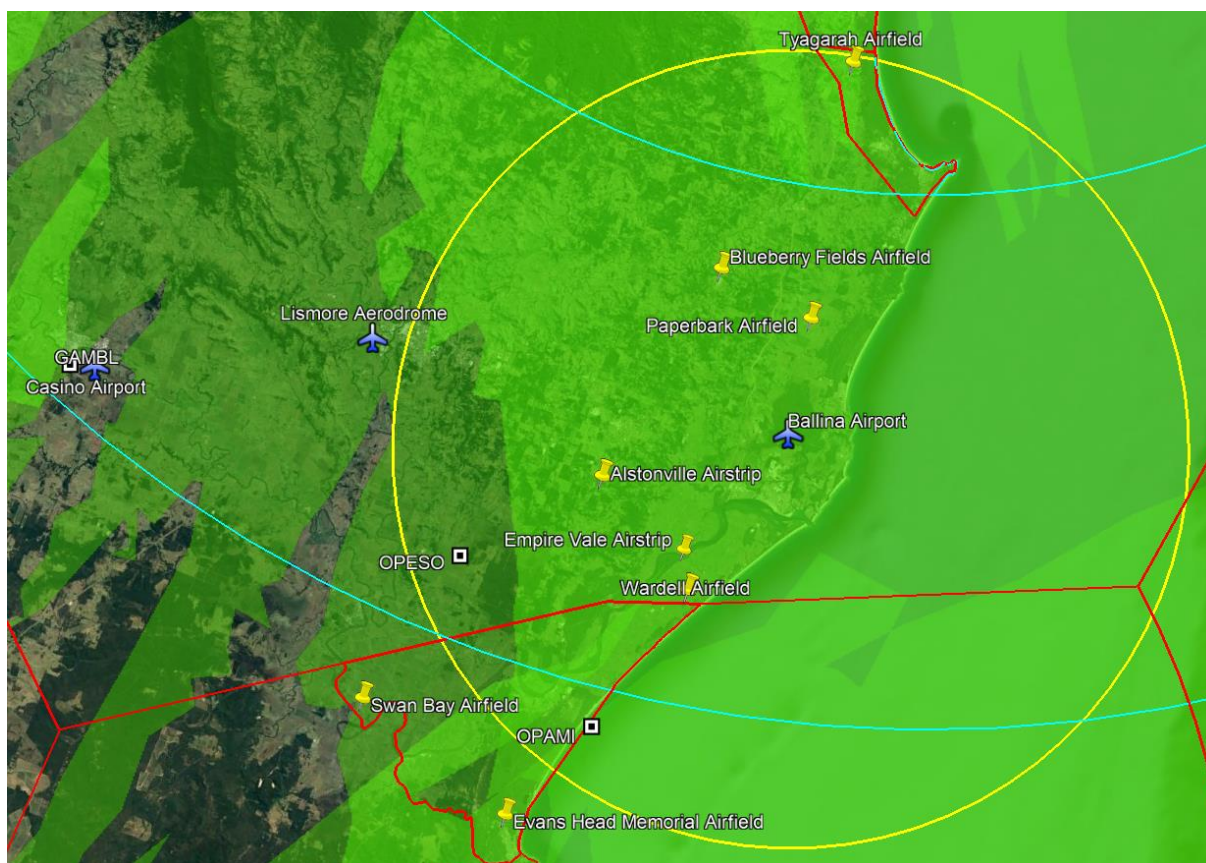
Radar coverage 2,000 ft AMSL (Source: Airservices Australia).



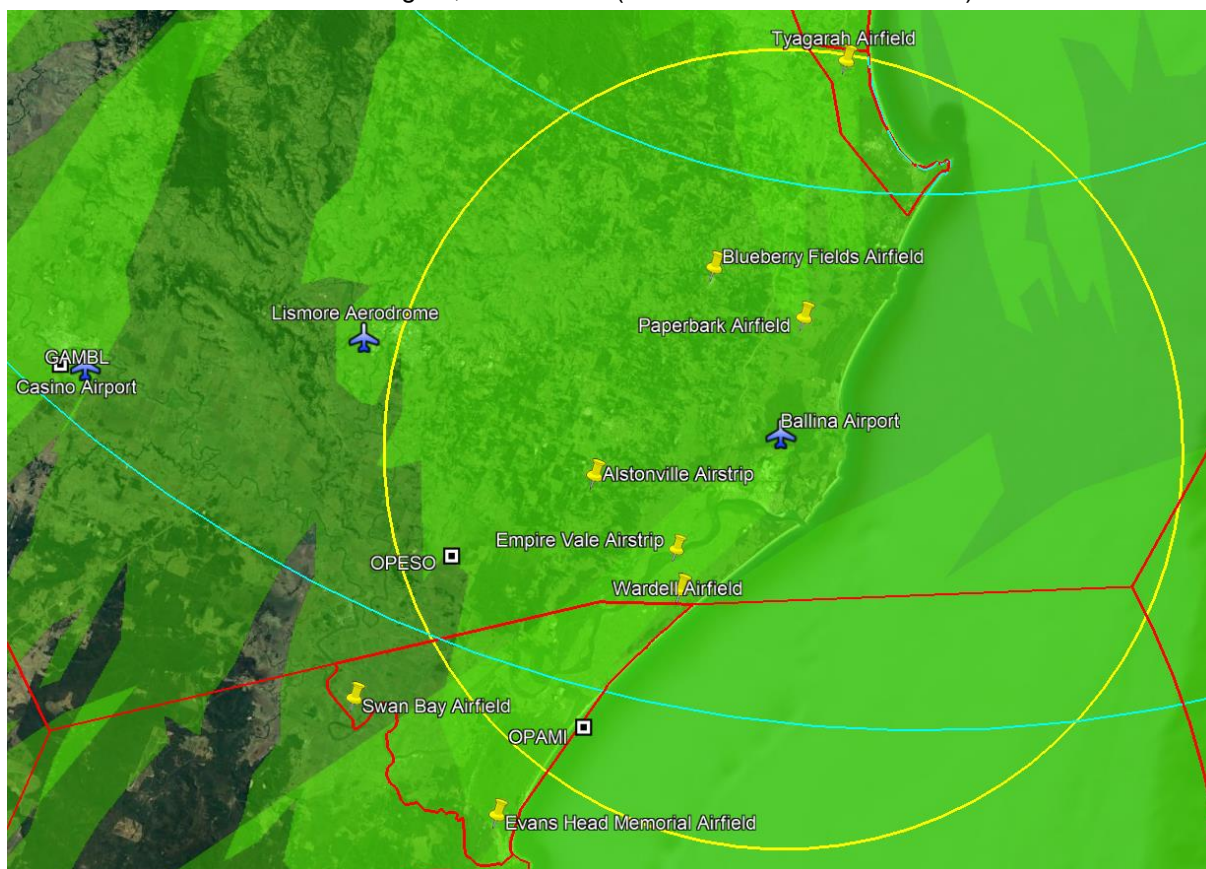
Radar coverage 2,500 ft AMSL (Source: Airservices Australia).



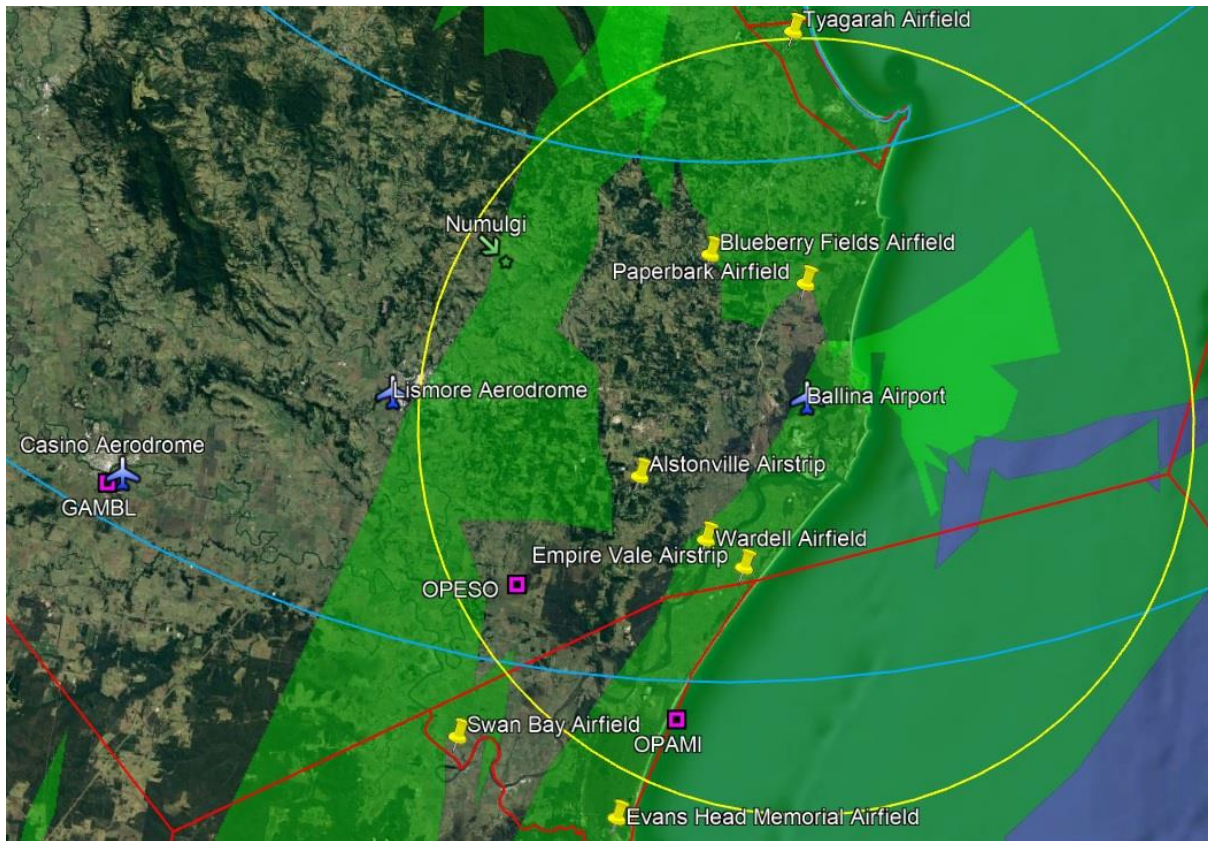
Radar coverage 3,000 ft AMSL (Source: Airservices Australia).



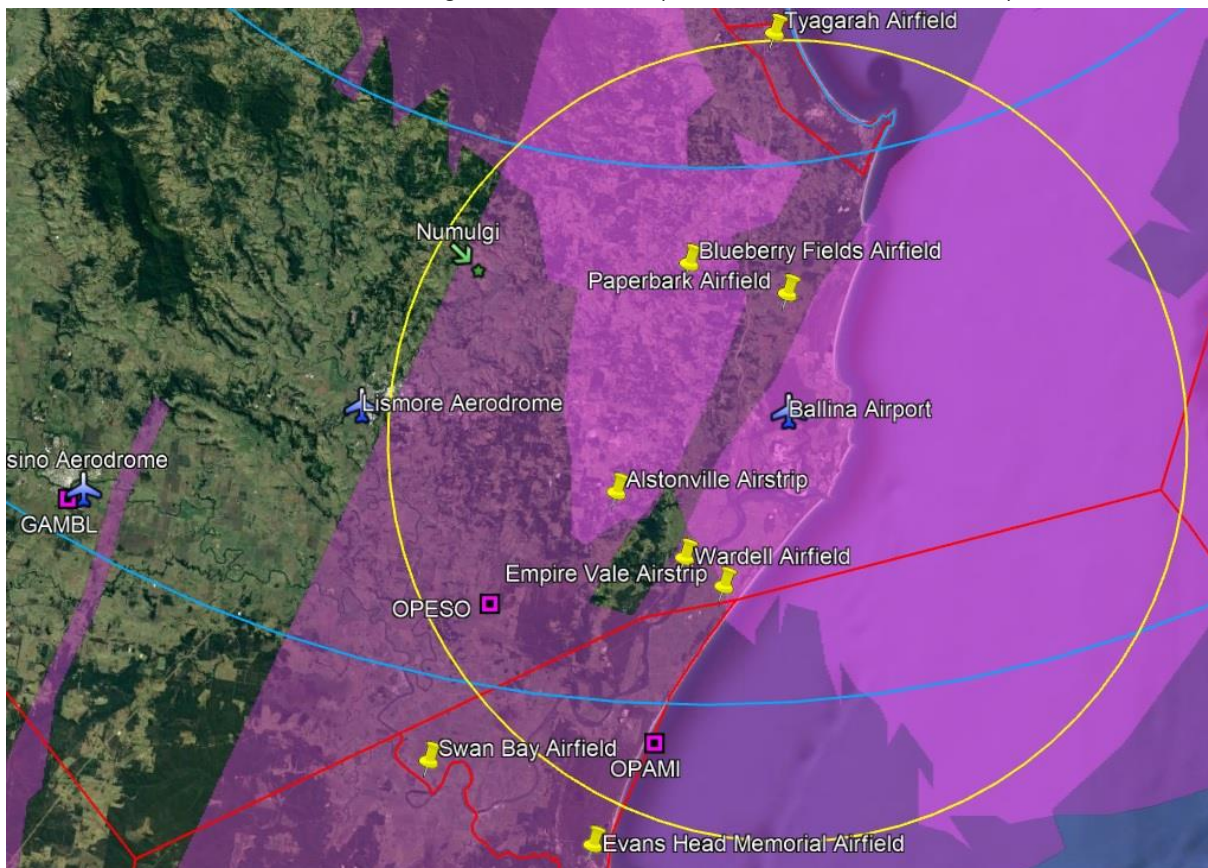
Radar coverage 3,500 ft AMSL (Source: Airservices Australia).



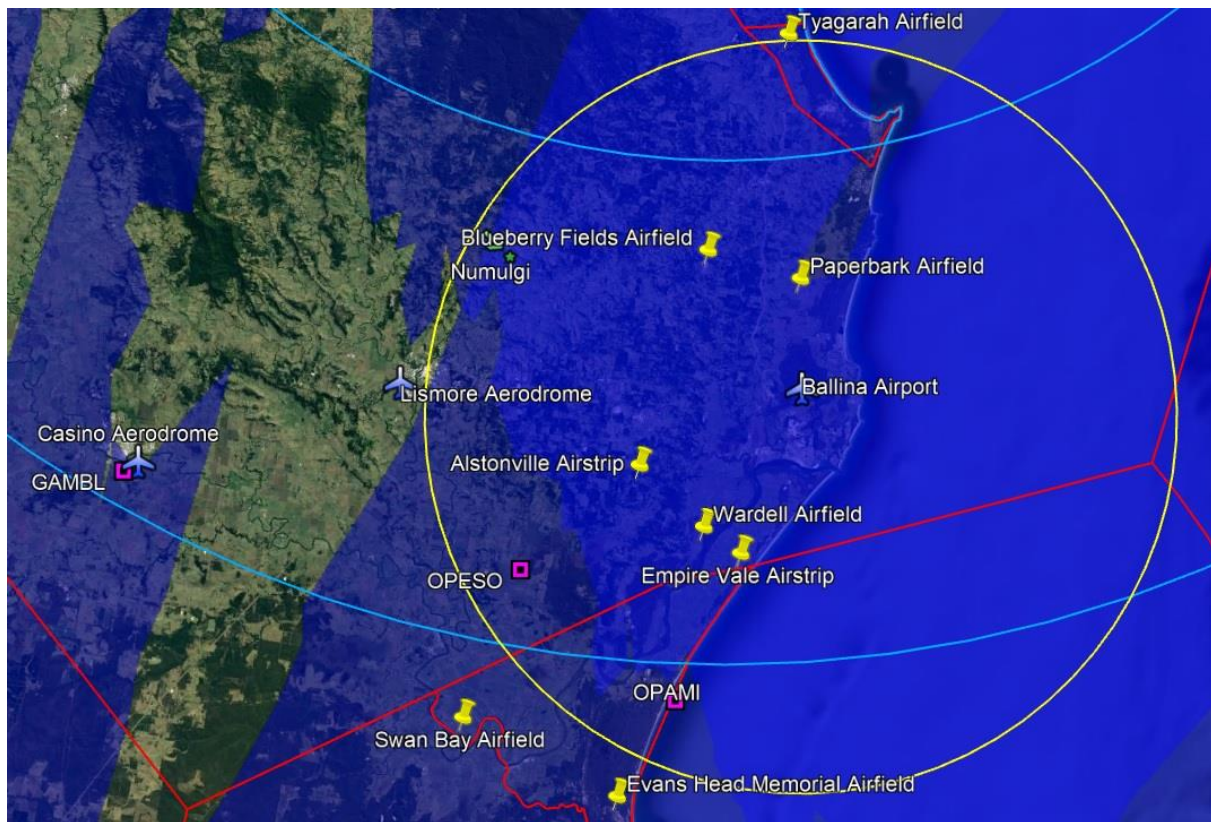
Radar coverage 4,000 ft AMSL (Source: Airservices Australia).



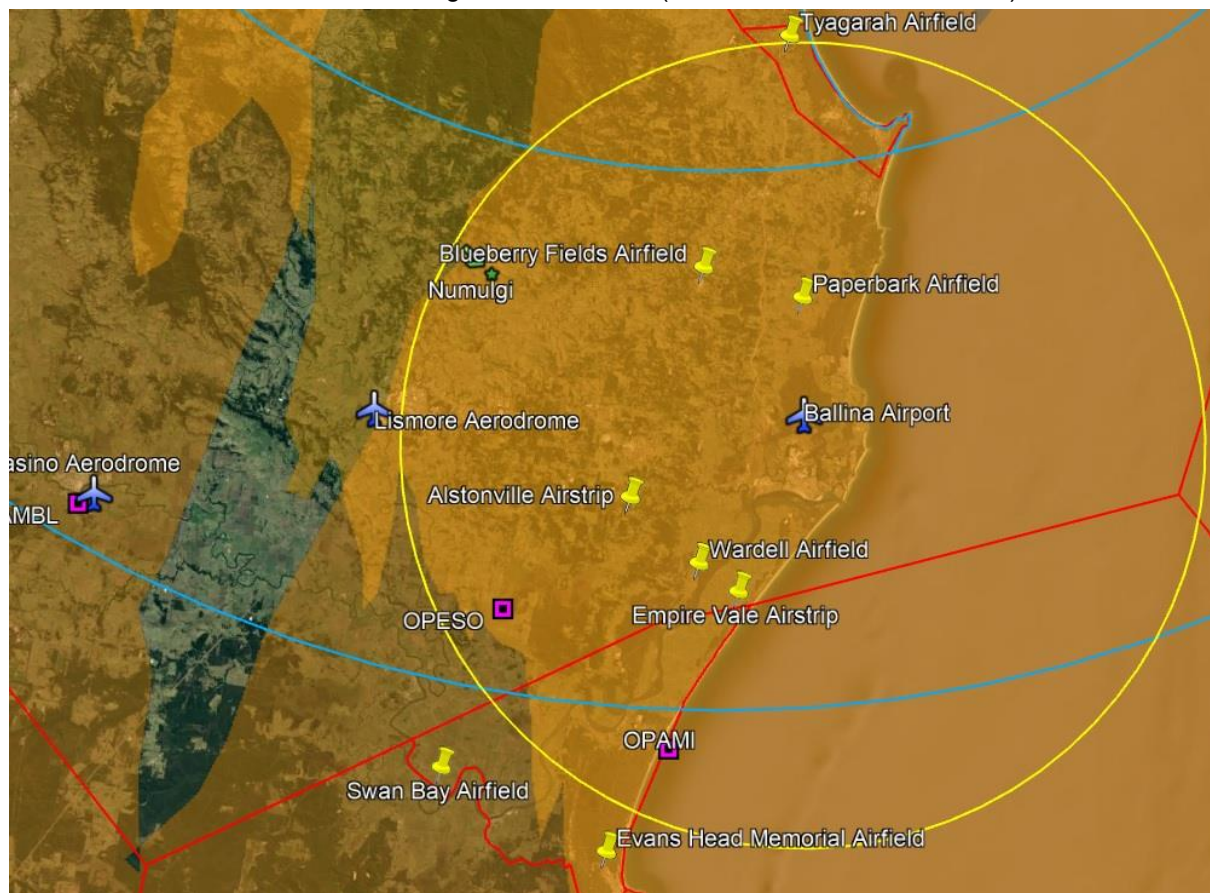
ADS-B coverage 1,500 ft AMSL (Source: Airservices Australia).



ADS-B coverage 2,500 ft AMSL (Source: Airservices Australia).



ADS-B coverage 3,500 ft AMSL (Source: Airservices Australia).



ADS-B coverage 4,500 ft AMSL (Source: Airservices Australia).

Annex G Stakeholders

The following stakeholders were contacted to contribute to this review.

Organisation	Position
Air Gold Coast	General Manager
Air T&G Helicopter Services	Manager
Airways Aviation	Chief Pilot
Aussie Air Charter & Training	Instructor
Australian Airline Pilots' Association	Safety and Technical Officer
Australian International Aviation College	Chief Pilot
Ballina Aero Club	President and Club members
Ballina / Byron Gateway Airport	Airport Manager
Ballina Ultralight Flying Club / Flight North	Chief Flying Instructor
Black Swan Aviation (Aircraft Maintenance)	Owner
Byron Airwaves Hang Gliding School	Chief Pilot
Byron Bay Ballooning	Secretary
Byron Bay Lennox Head Hang Gliding School	Chief Pilot
Byron Bay Microlights	Chief Flying Instructor
Byron Gliding Club (Tyagarah)	Club members
Casino Aero Club	Club member
Classic Aero Adventure Flights	Chief Pilot
Coffs Harbour and District Aero Club	President and Club members
Empire Vale Airfield	Owner
Fast Aviation	Chief Pilot
Fly Pelican Airlines	Chief Pilot
Grafton Aero Club	President and Club members
Jetstar Airways	Senior Manager Flying Operations
Kempsey Flying Club	President and Club members
Landrum and Brown	CA/GRS operator
Lismore City Council	Airport Coordinator
Local pilots	Various (Ballina, Lismore, Casino)
Murwillumbah Aero Club	Club members
Northern Rivers Aero Club	Chief Pilot / Flight Instructor
Northern Rivers Hanggliding and Paragliding Club	Safety Officer
Poliglidge Hang Gliding	Chief Flying Instructor
Precision Helicopters	Chief Pilot
Professional Pilot Training	Chief Pilot / Chief Flying Instructor
QantasLink Airlines	Acting Chief Pilot
Regional Express Airlines	Flight Operations Manager (Sydney)

Organisation	Position
Richmond Valley Council	Manager Assets and Planning
Royal Flying Doctor Service (NSW and QLD)	Base Managers
Skydive Byron Bay	Office Manager
Tiger Moth Byron Bay	Chief Pilot
Tyagarah Aero Club	Secretary and club members
Westpac Lifesaver Rescue Helicopter Service	Lismore Base Manager / Pilot
Virgin Australia	Head of Line Operations and Policy
White Star Aviation	Chief Executive Officer / Flight Instructor

Annex H Comments from stakeholders

Note: *The following comments have been recorded verbatim. Conflicting statements under each topic were received from different stakeholders.*

Radio etiquette:

- Radio etiquette (pilots making very long transmissions) is an issue. Possibly could be addressed at Flight Reviews.
- Poor radio etiquette by pilots is the main issue:
- English language standard of some pilots is poor.
- Some pilots do not use the standard phraseology or include their intentions, which leads to additional radio calls.
- Poor radio etiquette by pilots is the main issue:
 - Pilots ignore the correct radio call format, which leads to additional calls to clarify intentions.
 - Standard format radio calls would help reduce the length of radio calls and reduce frequency congestion.
 - Pilots should give Position / level / direction / intentions.
 - Have flown two circuits without being able to get a radio call in – due to prolonged radio calls by other aircraft.

Frequency congestion:

- Overtransmission of radio calls between Lismore and Ballina (and to a lesser degree, Casino) is a problem.
- Frequency congestion can be a problem with three aircraft in the circuit at Casino; an aircraft doing circuits at Lismore; Helicopters operating at Ballina and White Star Aviation doing training at Ballina. This can be further congested/complicated by RPT aircraft arriving into Lismore or Ballina (or both in some instances). It is hard to get a radio call in. Over transmission still occur
- The Ballina, Lismore and Casino area often has frequency congestion.
- Frequency congestion prevents pilots making radio calls.
- Separating Casino and Lismore from the Ballina CTAF will help. Understands the issues with overlapping instrument approaches.
- Retransmission of radio broadcasts won't work in the longer term due to increased traffic.
- Having Evans Head and Casino aerodromes on a separate frequency would help frequency congestion at Ballina.
- A discrete frequency for Ballina would be good. Understands issues with Instrument approaches overlapping at Ballina and Lismore.
- Airspace classification:
- The designation of Class E to a lower level or the introduction of an air traffic control tower within the next few years is seen as the next step in increasing safety, particularly for IFR traffic.
- Lismore and Casino must be on the same CTAF. There is a lot of interaction between the two aerodromes. The Lismore flying training goes close to Casino.
- Over transmission of radio calls from Ballina/Lismore and Casino (and to a lesser extent, Evans Head). A large contributing factor to the over-transmissions is the inability for aircraft on the ground in Lismore and Casino to hear the CA/GRS. It is often difficult to arrange separation with other aircraft.

- Having Evans Head and Ballina aerodromes on a separate frequency to Lismore and Casino would help frequency congestion at Ballina. The overlapping instrument flight procedures at Ballina and Lismore complicate the matter. Casino must stay on the same CTAF as Lismore
- There is a lot of unnecessary chatter at Ballina (e.g.: there have been occasions where aircraft within the vicinity of Ballina have asked the CA/GRS to contact inbound RPT aircraft and request if they can provide wind checks at various heights (e.g. 1,500 ft). This is just one example – previously there have also been conversations regarding the opening hours of the terminal café, etc.)
- The lack of positive directions on transmissions is leading to “interpretation” of the rules and this in turn is leading to the unnecessary transmissions. In summary, it is believed that if all airspace users utilised standardised transmissions, and listened to (and understood) transmissions as much, or as often, as they make radio calls, the total number of transmissions would reduce, alleviating frequency congestion

Control services:

- An air traffic control tower may benefit Ballina. This will however have a detrimental effect on some GA operations.
- The implementation of a Class D control zone at Ballina is almost certainly an option that has to be considered. It would be interesting to compare traffic loads at Coffs Harbour with Ballina. The Northern Rivers CTAF, and the Lismore Area Navigation (RNAV) RWY 33 approach, would be underneath and around the Class D steps.

Broadcast Area:

- Unknown VFR aircraft are less of a problem with the Broadcast Area.
- Poor airmanship is still a problem. Mainly by itinerant pilots.
- Haven't noticed an increase in frequency congestion/radio transmissions due to the declaration of the Broadcast Area.
- The Broadcast Area hasn't increased the number of radio calls.
- No noticeable increase in radio calls from the introduction of the Broadcast Area.
- There have been less VFR aircraft transiting without making radio calls.
- The new Broadcast area works well (particularly with the CA/GRS).
- Some itinerant pilots don't always make 10 nautical mile radio calls.
- The establishment of the Broadcast Area hasn't increased the number of radio calls. It is not felt that the Mandatory Calls required when operating in the Broadcast Area has increased the number of radio calls. If pilots utilised the Mandatory Calls and kept other non-essential radio calls to a minimum, the frequency congestion would likely be reduced. Increased numbers of transmissions (in addition to the required calls) does contribute to frequency congestion.
- No noticeable increase in radio calls from the introduction of the Broadcast Area. It seems to work well.

Additional comments / concerns:

- There are not too many issues at Ballina, everything runs smoothly.
- Some airlines work on deconfliction of 10/10/1. The airlines will deconflict with other traffic that is:
 - Within 10 minutes flight time of their position; or
 - Within 10 nautical miles of their position; or
 - Within 1,000 ft vertically of their altitude.

- In the longer term, ADS-B may be beneficial after the full roll-out to GA (noting the need for practical and affordable ADS-B solutions for GA).
- Local pilots tend to keep out of the way of the airlines and are generally courteous.
- Foreign itinerant student pilots are difficult to understand on the radio. The level of English is poor.
- Biggest issues:
 - Radio calls by itinerant pilots are poor quality (Poor radio etiquette).
 - The CA/GRS is good – but still talks too much on the radio at incorrect times.
 - There are still over transmission of radio calls from Ballina/Lismore and Casino (and to a lesser extent, Evans Head).
- The Lismore City Council is actively pursuing businesses to the airport.
 - Frequency congestion will get worse with increased training traffic and other businesses.
 - The introduction of an Instrument Landing System (ILS) at Lismore will increase training aircraft and frequency congestion.
- IFR and VFR training traffic is increasing at Casino, Lismore and Ballina.
- Lismore is scheduled to get upgraded runway lights and a PAPI lighting which will increase night training flights.
- Foreign itinerant student pilots often give incorrect position reports, which makes it difficult to gain situational awareness.
- Queensland (QLD) flying school students add to confusion due to a lack of situational awareness:
 - Pilots state that they are conducting an RNAV approach to runway 15 at Lismore but conduct a circling approach to runway 33 instead.
 - IFR terminology confuses VFR and student pilots. Radio calls should include bearing and distance from aerodrome.
 - Students sometimes “push in” and land in opposite direction to aircraft established in the circuit.
- Having flight training areas marked on charts would assist situational awareness.
- Having aircraft landing areas (ALAs) marked on charts would be good. If they aren’t then a radio call which includes a distance and bearing from a known feature/aerodrome would be beneficial.
- Biggest issues:
 - Radio calls by itinerant pilots are poor quality (Poor radio etiquette).
 - Some pilots are making too many radio calls (Crosswind / Downwind / Base and Final).
 - Over transmission of radio calls.
- IFR position reports (waypoints) don’t make sense to VFR pilots. IFR radio calls should include distance and bearing from the aerodrome.

Paragliding and Hang-Gliding operations

- Flying from Pat Morton Lookout (Lennox Head) occurs often (most days when there is a North-East wind). Paragliders usually take-off before the wind is greater than 20 knots. Hang gliders can operate in higher winds.
- The local club has 80 members – including approximately 50 active members.
- There are 3 commercial operators, (1 paragliding and 2 Hang-gliding) in the Region. They mainly use other launch sites, including Cape Byron Lighthouse (in South to South-East wind direction).
- Paragliders / Hang gliders operate between sea level and 400 ft AMSL. This is believed to be due to an agreement with the aerodrome.
- Current procedures:
 - Prior to first flight of the day, a phone call is made to the SFIS.
 - SFIS makes a broadcast on the CTAF – or informs other aircraft of the paragliding/hang-gliding activities.
 - The Safety Officer (or their delegate) has a very high frequency (VHF) radio and monitors the CTAF. They also have an ultra high frequency (UHF) radio.
 - All paragliders/Hang gliders have a UHF radio. Safety officer can contact paraglider/hang glider pilots if necessary.
 - Phone call is made to SFIS when flying for the day has been completed.
- GA/RPT pilots don't affect paragliding or hang-gliding activities at Lennox Head.
- The occasional Royal Australian Air Force jet – or Life Saver Rescue Helicopter may come close during Search and Rescue operations.
- The hang-gliding symbol on the VFR and IFR charts is a good way to inform other pilots of activities. Martin to investigate having the altitude added to the symbol on charts.
- The hang-gliders/paragliders don't experience any issues from the airport or aircraft.

Annex I Instrument approach procedures



Ballina Broadcast Area – Ballina runway 06 and Lismore runway 33 approaches.

Annex J Consultation Hub Analysis

General

The OAR sought feedback from airspace users via a CASA Consultation Hub Survey drawing on the contents of the airspace review. The review had identified three areas of concern:

- Frequency congestion
- Heightened risk of separation incidents
- Situational awareness

9 recommendations to improve safety and address these concerns are contained within the review. These recommendations represent a graduated approach to reducing airspace risk at Ballina, intending to build up to a controlled aerodrome service with an associated control zone and control area steps. The survey therefore sought stakeholder opinion on the following specific questions related to the 9 recommendations:

- Do you agree there is a need to install an Automatic Dependent Surveillance - Broadcast (ADS-B) ground station in the vicinity of Ballina to improve surveillance? When do you think an ADS-B ground station is required in the vicinity of Ballina?
- Do you agree there is a need to provide an Approach Control Service to IFR aircraft operating into Ballina Byron Gateway Airport? When do you think an Approach Control Service for IFR into Ballina is required?
- Do you agree there is a need to provide a separation service between IFR aircraft operating into Ballina Byron Gateway Airport? When do you think a separation service between IFR aircraft operating into Ballina is required?
- Do you agree there is a need to sequence all aircraft to and from the runway and within the circuit area to proactively manage runway usage at Ballina Byron Gateway Airport? When do you think a sequencing service is required?
- Do you agree there is a need to provide traffic information on known VFR traffic to all aircraft operating into Ballina Byron Gateway Airport? When do you think a traffic information service should be available?
- If controlled airspace was established, do you agree there is a need for all VFR aircraft operating into Ballina Byron Gateway Airport to be known to ATC? When do you think a controlled airspace service should be available?
- Do you agree there is a need to establish a capability to detect non-cooperative aircraft and vehicles in the immediate vicinity of the runway at Ballina to enable corrective action? When do you think a non-cooperative aircraft and vehicle detection service should be available?
- Do you agree there is a need to provide an Aerodrome Control Service to aircraft operating into or out of Ballina Byron Gateway Airport? When do you think an Aerodrome Control Service is required?
- Do you agree that uncertified aerodromes and flight training areas around Ballina should be promulgated in aeronautical publications to increase pilot situational awareness?

The survey period commenced on 16 June 2022 closing 1 month later, 17 July 2022. 148 submissions in total were received through a combination of the CASA Consultation Hub and via email.

Responses were received from a wide variety of airspace users with airlines, aerial work operators, flight training, air transport licence holders, commercial licence holders, private/recreational pilots, sports aviation pilots and air navigation service provider staff providing the bulk of the responses.

Overview of comments: safety efficiency and equitable access

The reduction of airspace risk was widely supported. There was virtually no opposition to the primacy of airspace safety in any of the comments received. Furthermore, it is fair to conclude that

all are in favour of the measures which are intended to improve safety at and in the vicinity of Ballina. The differences reside more in the appropriateness of the measures recommended, the timing and ultimate phasing of their implementation. As could be anticipated the PTO, who will arguably derive the greatest benefit, strongly favour the introduction of services. However, other non-PTO users who will also accrue safety benefits, harbour concerns about the effect on their activities including the potential economic impact. While comparatively few, there were remarks regarding the cost associated with these measures. Some preferred more cost-effective solutions such as the existing SFIS services. That said, the primary concern among the non-PT operators remains the balance between retaining the current level of access and amenity while deriving the safety dividend.

Some concerns about airspace efficiency were also expressed in terms of the constraints inherent with controlled airspace that may result in capacity reductions from time to time. Some expressed the view that the introduction of ATS reduces the efficiency of the airspace due to the separation standards applied to aircraft operating in the area compared to uncontrolled airspace. Some users harboured concerns about potential delays in obtaining clearances to operate in their usual volumes of airspace.

A common theme among stakeholders is that interim solutions should not be an orphan type rather a “full blown” ICAO compliant solution that forms a part of the enduring solution. Any interim measure should not have to be wound back as subsequent measures are phased in.

Timing of the measures is a critical consideration. Many stakeholders favour the earliest practical adoption of the measures with as little delay as possible. There were no comments seeking to delay the initiatives among the vast majority that support the measures notwithstanding that some respondents preferred the status quo. A comprehensive analysis of the survey responses follows.

Analysis of the survey responses

Considering all the responses received several trends emerged. Broadly speaking, the survey responses indicate a strong inclination in favour of all the feedback questions. Looking at each of the survey questions, the establishment of an ADSB ground station, provision of known VFR traffic to all aircraft operating into Ballina Airport as well as being known to ATC and publishing uncertified aerodromes on charts, generated the most prominent positive responses.

The provision of the approach control service, the establishment of an IFR separation service, a runway sequencing service, ability to detect non-co-operative aircraft and vehicles and an aerodrome control service were also favoured albeit to a lesser extent, with a considerable number of respondents taking a neutral position.

An analysis of the statistical data reveals the following:

- The establishment of an ADSB ground station and the VFR related questions as well as the charting question elicited similar responses with in excess of 85% strongly agreeing or agreeing with the measure and as few as 9% (less in some instances) not in favour of the measure. A small number of neutral responses were received.
- The establishment of an approach control service, while favoured by 64% of respondents, saw around 29% of respondents taking a neutral position. 7% of respondents disagreed with the initiative.
- Similarly, the provision of a separation service between IFR aircraft demonstrated the same trend with 65% in favour, less than 5% disagreeing and 30% taking a neutral position.
- The question regarding the runway sequencing service drew 58% in favour with 31% taking a neutral position and 11% disagreeing with the initiative.
- The establishment of the non-cooperative aircraft and vehicle detection demonstrated a similar trend to others with 61% agreeing with the initiative compared to 30% remaining neutral and 9% opposed to the initiative.
- The establishment of the aerodrome control service reflected a similar outcome as others with 61% of respondents in favour, 9% opposed (almost half of those strongly disagreeing) and 30% remaining neutral.

- The survey questions regarding the timing of all these initiatives tended heavily toward sooner rather than later, with many commenting that some of the initiatives are well overdue and some questioning the delay to date in progressing these measures.

While the statistical information presented in the consultation demonstrate a strong trend in favour of all the initiatives the statistics can nevertheless obscure some of the underlying themes. An analysis of the comments received by respondent groups reveals a clearer picture.

Analysis of responses and comments by primary category

A variety of airspace users provided submissions. Under analysis it became apparent that a number of common themes emerged when reviewing the comments included in each submission. Of the 143 Consultation Hub submissions approximately 3/4 of the responders provided additional comments.

For the sake of the analysis, responses were grouped into categories by their primary role as follows.

Air transport operations IFR

This category contains several subgroups which have been analysed separately as follows:

ATPL pilot: The disparity between aircraft performance as a result of the mix and variety of operations coupled with the traffic density in the vicinity of Ballina was a common theme among this category.

The limitations of see and avoid are amplified where passenger transport turbo prop and jet operations are being conducted among general recreational and sport aviation operations in a non-towered CTAF environment. The cognitive capacity of the PTO crew during a high cockpit workload phase of flight can be compromised leading to higher airspace risk. The situation is complicated by alleged inadequate position reporting, potential lack of understanding of the local procedures, frequency chatter and errant judgement regarding the differing aircraft performance characteristics. Airport infrastructure and facilities was also reported as a constraint particularly the lack of a full-length taxiway. The group was not only overwhelmingly in favour of the provision of services as soon as practicable, but most also commented on the apparent delays in reaching these recommendations. Furthermore, the primacy of safety over cost was highlighted. There was a strong preference among the group to progress to the final solution rather than establish an interim measure.

AusALPA: AusALPA strongly support the end-state proposal of a combined control zone and approach service for the Ballina airspace notwithstanding concerns regarding the proposed piecemeal and stepped solution timeline for implementing the recommendations. Emphasis on the required end state is favoured rather than introducing unintended consequences and potential completion risks by adopting interim solutions in the meantime. A holistic approach to reform of the airspace is favoured to reduce the risk of further loss of separation events. AusALPA have addressed each recommendation separately with broad support for most however concerns regarding the Lismore RWY 33 approach following the separation of Lismore CTAF from the Ballina Broadcast Area were nonetheless raised. AusALPA does not support the interim measures as described in Recommendation 7 though, favouring a concurrent establishment of both the aerodrome control service and an approach control service for Ballina.

High-capacity airlines: General support for all recommendations was received from those airlines that provided responses. The PTO operators have been actively supportive of the recommendations made in the review and remain very vocal in public and industry discussions on the need to enhance / increase surveillance and separation services both on the ground and in the airspace surrounding Ballina Airport. The traffic increases observed over recent years warrant a commensurate level of service and the graduated improvements that have been implemented over the past 18 months have been well received.

Chief Pilot commercial operations and training (IFR and VFR)

Responses from this category were divided in almost all of the survey questions. A trend of neutrality coupled with equal degrees of support and opposition regarding the establishment of an approach control service for IFR traffic, an IFR separation service and an aerodrome control

service were expressed. The cohort was mostly in favour of a VFR traffic service despite some neutrality and opposition, and mainly in favour of all VFR aircraft being known to ATC despite some opposition. This was also the case with the provision of the non-cooperative aircraft and traffic capability. The establishment of an ADSB ground facility was generally favoured although some opposed this measure. More disagreed with the sequencing service than favoured it with a number remaining neutral. All were in favour of the charting initiatives.

The common themes among the cohort were that air traffic services are not necessary at this stage, preferring the existing SFIS remain in place. A lack of understanding of procedures and poor airmanship is cited as the causal factors driving the airspace risk. Education and reinforcement are considered an appropriate and cost-effective solution. A CTR is not unanimously supported among the group. There was a clear acknowledgement that while it may be of marginal benefit to their own operations, they equally recognise that PTO are the primary beneficiaries. Inclusion of a VFR corridor adjacent to the airspace was raised as well as a strong preference to retain the status quo regarding access.

Commercial aerial work IFR and VFR

Responses from this category generally echoed those of the air transport category including comments surrounding the urgency of these measures. The challenges of single pilot IFR operations, avoiding excessive frequency changes, perceived lack of awareness of PTO and IFR operations among some airspace users and the need to provide surveillance in the circuit area where some of the key themes. While the previous CAGRS and current SFIS are providing a level of service, their reliance upon transponder equipment and adherence to procedures is deemed to be flawed in the complex environment. Some expressed the view that having “eyes on the ground” was key to the success of these measures, coupled with other initiatives such as a circuit booking system, equipage requirements, publishing VFR routes and co ordinating local operations to avoid peak periods to reduce congestion. While the establishment of services is likely to improve safety, there was some concern about a consequent impact on efficiency.

Predominantly private and recreational flying VFR

Responses from this category included private and recreational airspace users as well as the Recreational Aviation Australia community. Generally, the cohort supported the measures however some commented that services should be constrained to those periods when PTO were operating. The group expressed a strong desire to “stick with” ICAO categories and oppose hybrid versions. Some held the view that the current Class G is pseudo Class F. There was general acceptance with a graduated approach. The predominant concern among this group is access. Many expressed the view that Ballina has a long history as a general aviation location and that legacy needs to be protected and preserved despite the changing operating environment. The placement of ALA's on charts was not universally agreed as some formed the opinion that it might introduce radio chatter. Some expressed the view that the existing Ballina footprint is too large and future changes should minimise the CTA/CTR footprint to permit transit in the periphery in Class G. The current SFIS system was also deemed sufficient by some. Forecast movements were viewed as being overstated and a CTR would prove detrimental to the RAAus community who are concerned about being restricted.

Clever airline scheduling might assist with reducing congestion. Many favoured an ADSB mandate while others expressed the view that VFR tracks at altitude directly over the field (3500FT for e.g.) and IFR points published on the chart may represent appropriate risk mitigation measures.

The RAAus Executive provided a comprehensive response supporting the measures, yet urging involvement with the general aviation community at large. Although SFIS had produced some benefits within the airspace, the lack of visibility of the runway and surrounds limits the ability of ATC to provide an assured sequence to the runway. Large air transport aircraft, travelling at high speed have limited ability to effectively apply alerted see and avoid. Given the significant VFR traffic movements at Ballina and its surrounds, the provision of traffic is essential. A comprehensive education and training program designed to transition RAAus operators is supported. RAAus expressed the view that number of ALA's in the vicinity, meant publishing their location would be appropriate. However, the promulgation of flight training areas is not considered so necessary. RAAus cautions that the solution going forward needs to be pragmatic with the intention of

ensuring existing airspace users can continue to operate without unnecessary restrictions. Of particular concern is the potential for imposition of additional and unnecessary medical requirements on Recreational Pilot Certificate holders to operate within the CTA and CTR.

Air navigation service provider staff

A small number of responses were received from this category. The responses followed common themes particularly concerns about the surveillance coverage even considering the proposed ADSB installation. The group expressed the view that there is insufficient system capacity or expertise within the working group to provide approach type services at this stage. Some commented that non compliance has not reduced with the introduction of the SFIS. There was unanimous support for the introduction of services, however the airspace should be minimised to facilitate transits without requiring a clearance, especially recreational aviation or non-CTA endorsed pilots. Sequencing onto the preferred runway and a separation service is favoured. Class D tower services were supported although some suggested Class C as an option. An aerodrome control service (Tower) was favoured as the initial step with the approach phase to follow. The proposed charting modifications and information publications were also supported as well as a transponder or ADSB veil.

Sports aviation

Responses from this category included sports aviation operators, hang gliders, paragliders and unmanned aerial vehicle (UAV) or remotely piloted aircraft (RPA) users. A standard form response was provided by most SAFA members although some within the group elected to provide additional comments or their own submission. The primary theme among the group related to airspace access. SAFA members operations currently comply with all that is required of them and have a long history of operating at their location without interfering with Ballina operations. Most in the group agree that SAFA aircraft would be observable if fitted with ADSB and accept that as a reasonable measure. However, the current ADSB rebate excludes SAFA members. The view that a tower may be cost prohibitive and is not required was expressed. Members of SAFA and NRHGP Club request that the status quo of operational procedures and restrictions be retained for any increase in airspace classification. This may involve an exemption for transit operations. Currently, SAFA aircraft operate within the BA using two methods: SAFA aircraft operate at Lennox Head and Numulgi, not above 400ft AGL IAW CASA EX123/21, or for transit and within the BA, as well as, within the CTAF areas, using standard non-controlled airspace broadcast procedures. Members have stated that to their collective knowledge there have been no recorded incidents of traffic conflict between SAFA aircraft and other IFR/VFR aircraft within the BA. SAFA members propose that the controlled airspace be confined to the south of a direct line from BBAY to YLIS to allow VFR pilots to avoid the proposed airspace. This would also allow members to transit to the west from the club sites. An added benefit would be that RAAus pilots could also transit from Tyagarah to Lismore or Casino outside controlled airspace.

Responses from a small number of UAV operators including community service providers expressed the view that they will be barely impacted if at all, however, recognise the benefits, nonetheless. A clear intention to work with AA and CASA on these initiatives was articulated

Other Comments

A number of themes emerged among a variety of other respondents as follows:

- The interim measures described should be a stop gap only.
- Radio equipage needs to be factored into any of the considerations.
- The view that sport and recreational aircraft operators are tested regularly for competency to transit and or operate within controlled airspace should not be underestimated. Normal access must be retained.
- General aviation, sport and recreational aircraft are currently mixing safely with PTO in the Class G / CTAF. Modifying the Ballina airspace alters the management rather than the pilot capability.
- A transponder veil or ADS-B veil is supported by some.
- Concerns that electronic conspicuity may lead to saturation clutter particularly within the circuit area to both pilots and ATC were expressed.

- ICAO standardisation is considered vital. There is some resistance to orphan solutions.
- Consideration should be given to the merits of a virtual tower.
- The use of the current AA facilities at Ballina such as the ARFF to provide compliant services was suggested.
- Budgetary constraints should not be the driving factor in regard to the implementation time frame.

Having analysed the statistical data as well as the underlying comments, conclusions can be drawn considering the fundamental elements of airspace safety, efficiency, and equitable access.

Conclusions

Based upon the responses received, there is clear support to proceed with the recommendations contained within the report and in some cases a “demand” for action. However, the timelines and milestones for implementation of the recommendations must be determined through engagement with the stakeholders.