



Australian Government  
Australian Transport Safety Bureau

*Safe Transport*

AVIATION SAFETY RESEARCH REPORT

# **Airspace-Related Occurrences Involving Regular Public Transport and Charter Aircraft within Mandatory Broadcast Zones**

December, 2003

## Executive Summary

Mandatory Broadcast Zones (MBZs) currently exist in 85 locations around Australia. Aircraft operating in MBZs must carry an operational VHF radio and aircrews are required to make several broadcasts and responses to facilitate mutual traffic separation.

The adequacy of MBZ procedures to ensure the safety of Instrument Flight Rules (IFR), Regular Public Transport (RPT) and charter aircraft has been questioned several times since their inception in 1991. The former Bureau of Air Safety Investigation (BASI) recommended in 1993 that, to enhance safety within MBZs (then called MTAFs), areas such as pilot education and training, along with stricter surveillance and enforcement of procedural compliance, be reviewed. BASI further recommended in 1997 that options for pilots to confirm the correct operation of communication equipment be examined.

The current study reviews the available data for airspace-related occurrences in MBZs since 1994. Given the limited detail available for the majority of occurrences, caution must be used when interpreting the results of the analysis. In particular, comparisons with CTAFs should not be made.

The available data indicates that within MBZs, airspace-related occurrences are reported at between one and two per week, with a relatively large proportion of these occurrences being reported by the RPT sector. The high reporting levels associated with the RPT sector are likely to be related to more active reporting behaviours rather than an increased risk within this sector.

The rate of total reported occurrences in MBZs has increased significantly over the period studied. This appears to be primarily the result of a significant increase in the rate of reported airspace-related occurrences involving RPT aircraft operating within MBZs. This pattern is generally reflected in the reporting rates of all RPT occurrences within Australian airspace, and is not specific to airspace-related occurrences within MBZs. These changes may be indicative of an improving reporting culture within the Australian aviation industry (including those operating within MBZs) rather than an increasing occurrence rate. The percentage of reported airspace-related occurrences which result in an airmisss has not changed significantly over the period studied.

Between 1994 and 2001, there were no accidents within MBZs which were related to airspace-related factors. All MBZ airspace-related occurrences reported during this period were classified as being Category 4 or 5. Due to limitations in recording and data retrieval, this analysis does not include occurrences which may have been linked to MBZ airspace procedures, but which occurred outside MBZ airspace.

An initial analysis of contributing factors was conducted and revealed that radio-related procedural issues (either intentional or unintentional) were the factors most commonly cited in airspace-related occurrences in MBZs. Radio factors contributed to 69.3% of all reported airspace-related occurrences in MBZs. Accordingly, the Civil Aviation Safety Authority and Airservices Australia may wish to further consider improved means for: providing traffic alerting services; compliance with radio procedures; and confirming the correct operation of communication equipment, for aircraft operating within MBZs.

## **1. Introduction**

### **1.1. Objectives of this study**

Given the process of airspace reform within Australia, the Australian Transport Safety Bureau (ATSB) has reviewed occurrence data from 1994 in an attempt to evaluate any continuing concerns for safety in MBZs.<sup>1</sup> The objectives of the current research were to examine occurrences associated with MBZs and to identify any major trends or factors contributing to them. Due to limitations in recording and data retrieval, this analysis does not include occurrences which may have been linked to MBZ airspace procedures but which occurred outside MBZ airspace. The current study is concerned primarily with the safety of fare-paying passengers and is accordingly focused on conflicts involving RPT or charter operations. The research follows a study by the Bureau of Air Safety Investigation (BASI)<sup>2</sup> in 1993. Due to changes in airspace designation, traffic levels and patterns, occurrence reporting rates and database classification, the current study does not provide data which can be directly compared with the earlier research.

### **1.2. History**

The term Mandatory Broadcast Zone (MBZ) was first officially used in December 1995. Prior to this the terminology used was Mandatory Traffic Advisory Frequency (MTAF) areas. The name change resulted from a desire to highlight and reinforce the mandatory requirements to make certain broadcasts. Whilst the majority of MTAF areas became MBZs, some were changed to other airspace procedures (such as Common Traffic Advisory Frequencies, or CTAFs) and some new MBZs were developed. These changes were based on airspace use and requirements at the time. Overall, no significant change in the number of MBZs/MTAF areas has occurred. There were no major procedural alterations associated with the name change from MTAFs to MBZs.

MTAF and CTAF procedures were first introduced in Australia with the Airspace Management and Air Traffic Services (AMATS) changes of 12 December 1991. The sufficiency of these procedures to ensure the safe operation of aircraft, particularly those operating under IFR (including RPT aircraft), has been questioned a number of times since.

In 1993 BASI was informed that airline pilots had considerable concerns over the safety of RPT operations in MTAF areas. It was reported that RPT aircraft were experiencing conflicts with other unannounced, unalerted traffic on a daily basis. BASI's records at the time did not support these claims. As a result, a research project, looking at the safety deficiencies for RPT aircraft operating in MTAF areas was commenced.

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<sup>1</sup> Although not the primary focus of the current research, some additional analysis looking at occurrence rates within CTAF areas has also been conducted and included as Appendix 1.

<sup>2</sup> BASI became part of the newly formed Australian Transport Safety Bureau on 1 July 1999.

Information was gathered from RPT companies operating in MTAFs through direct interviews and observation flights. Additionally, a six-week data gathering period was initiated during which all RPT occurrences in MTAF areas were investigated indepth.

Throughout this six-week period, BASI received reports of 17 occurrences involving RPT flights in MTAF areas. Investigations revealed that:

- all 17 were related to communication difficulties in obtaining proper traffic information;
- 11 of the 17 occurrences involved a pilot who either made no radio communication at all on the MTAF, or who failed to make appropriate responses to the broadcasts of other pilots;
- 2 other occurrences involved frequency congestion.

The BASI report identified that due to the broad mix of aircraft types operating in the MTAF area, it often rests with the least skilled pilot within the system to determine whether a possible conflict exists. That is, a private pilot operating under Visual Flight Rules (VFR) is often required to determine whether there will be conflict with a commercial passenger flight operating under IFR and whether it is necessary to make a corresponding broadcast.

The report concluded that although the operating principles of MTAF airspace were not unsound, they demanded competence, sound judgement, professionalism and compliance with communication and broadcast procedures from all pilots operating in the airspace.<sup>3</sup> In response to these findings and the corresponding recommendations, the then Civil Aviation Authority<sup>4</sup> agreed to pursue the areas of pilot education, situational awareness and airmanship in an attempt to reduce the potential collision risk in MTAF areas.

In May 1997, following several conflict incidents involving RPT aircraft, BASI again noted that the procedures for communications in MBZs were not fail safe, and suggested that there were insufficient defences to minimise the risk to RPT operations of a failure of communications.

BASI argued that besides receiving responses from other aircraft on the same frequency, there were no other procedures for a pilot to confirm the correct operation of communication equipment. It was therefore possible for mandatory broadcasts to go unheard due to the use of an incorrect frequency, or a faulty transmitter/receiver, with possible conflicts between aircraft occurring as a result. The only defence available to pilots operating in MBZs to counter such failures was *see-and-avoid*, the limitations of which have been well documented.<sup>5</sup>

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<sup>3</sup> See “The operation of Regular Public Transport (RPT) aircraft in Mandatory Traffic Advisory Frequency (MTAF) Airspace”, BASI, 1993.

<sup>4</sup> As a result of 1995 legislation, the Civil Aviation Authority was split between Airservices Australia and the Civil Aviation Safety Authority (CASA) from 1996.

<sup>5</sup> See “Limitations of the See-and-Avoid Principle”, BASI, 1991.

**Occurrence No. 199701646****MBZ**

The pilots of two aircraft operating low capacity RPT flights to Bundaberg received traffic information on a general aviation (GA) IFR aircraft inbound to the aerodrome. The estimated times of arrival for the three aircraft at the aerodrome were within a ten minute period. The pilots of the two RPT aircraft could not establish radio communications with the other pilot on the published MBZ frequency and could not ascertain that aircraft's position. The weather at the aerodrome was IMC requiring the pilots to conduct instrument approaches.

One of the RPT aircraft landed and the pilot observed the GA IFR aircraft in the circuit. After further attempts to establish radio communications the pilot was discovered to be operating on an incorrect frequency.

As a result, BASI recommended that Airservices Australia and CASA implement methods of providing to pilots confirmation of the correct selection and operation of a MBZ frequency and examine the requirement for the establishment and operation of traffic alerting services at all aerodromes during RPT operations.<sup>6</sup>

In response, CASA established regulatory requirements under CAO 82.3/5 for the provision of Frequency Confirmation Systems at all non-controlled aerodromes where there are RPT services operated by aircraft having certified passenger seating in excess of 9. Most applicable aerodromes have since installed Aerodrome Frequency Reporting Units (AFRU).<sup>7</sup> Such systems are yet to be incorporated into all Australian MBZs. Currently within Australia, AFRU (or Beepback systems) operate in 48 MBZs, while 9 MBZs have Unicom<sup>8</sup> systems available and 2 operate Certified Air/Ground Radio Services (CA/GRS).<sup>9</sup>

**1.3. What are Mandatory Broadcast Zones?**

A MBZ encompasses the airspace surrounding a designated, uncontrolled aerodrome, where pilots are required to make certain broadcasts to facilitate mutual separation. A MBZ may also exist at an airport outside the operating hours of an Air Traffic Control (ATC) service (such a system exists at Jandakot in Western Australia). The standard area of a MBZ extends to a 15 Nautical Mile radius of the aerodrome, and up to 5,000

<sup>6</sup> See Air Safety Interim Recommendation Number IR970110, BASI, 1997.

<sup>7</sup> To assist pilots awareness of inadvertent selection of an incorrect VHF frequency when operating into non-controlled aerodromes an AFRU or "Beepback" system may be installed. An AFRU will provide an automatic response when pilots transmit on the traffic frequency for the aerodrome at which it is installed.

<sup>8</sup> A Unicom (Universal Communications) is a non-ATS communications service provided on the MBZ frequency or CTAF to enhance the value of information available about a non-controlled aerodrome. Unicom services may be used to exchange messages concerning: fuel requirements; arrival and departure times; aerodrome information; aircraft maintenance and servicing requirements; passenger requirements; and general weather reports. The use of information obtained from a Unicom operator is at the discretion of the Pilot in Command.

<sup>9</sup> Certified Air/Ground Radio Operators (CA/GROs) hold an ATC or Flight Service Officer licence and are certified by CASA to provide advice on conflicting traffic; preferred runways; meteorological conditions; and can call out emergency services if required. CA/GROs are capable of making approved meteorological observations. CA/GRS differ from Unicom services primarily through a higher level of training and prior experience.

feet above ground level (AGL), unless otherwise specified in the En Route Supplement Australia (ERSA).<sup>10</sup> Currently 85 MBZs exist within Australian airspace. Appendix B lists these locations.

Historically, there appears to be little or no set structure to the development of a MBZ. However, the primary reason that the airspace surrounding an aerodrome would be designated as a MBZ is a high level of total movements, particularly those involving RPT aircraft. This is likely to be limited to low capacity RPT aircraft which includes the SAAB, DASH 8 and Metro, but may also include larger jet aircraft such as the BAe 146 and B737.

The Civil Aviation Safety Authority, through Civil Aviation Safety Regulation (CASR) Part 71, is currently proposing that an *Aeronautical Study* be conducted to determine whether an area should be designated as a MBZ. Such a study may be deemed necessary if the aerodrome in question has:

- a high level of total aircraft movements per year (greater than 20,000 total movements);
- greater than 3,000 IFR aircraft movements per year; and
- a high level of RPT movements in the area.

Aircraft operating within a MBZ must carry an operational VHF radio and are required to make at least four radio broadcasts. These include:

- Inbound at (or prior to) 15 nautical miles from the aerodrome;
- Joining the circuit or when commencing a straight-in final;
- Taxiing prior to departure/Entering the runway; and
- Lining up/rolling for takeoff.

These calls typically include an “All Stations” alert, the name of the MBZ being operated in, the aircraft registration, location and intentions. Responses to these calls are only required for an inbound, or taxiing call, or when a potential conflict exists. The purpose of these mandated broadcasts and responses is to allow pilots to arrange mutual traffic separation. The frequency on which these calls should be made, varies from location to location, and is listed in ERSA.

It has been suggested that additional operational calls are useful. However it is important to find a balance between providing useful information to other aircraft in the area, and blocking the frequency with unnecessary broadcasts.<sup>11</sup>

## 2. Method

Incidents, serious incidents and accidents reported to the ATSB, that meet relevant criteria, are recorded in the Occurrence Analysis and Safety Investigation System (OASIS) database. For the current study, the OASIS database was searched for all airspace-related occurrences which occurred in a MTAF area or MBZ between calendar years 1994 and 2001 inclusive.<sup>12</sup>

<sup>10</sup> The ERSA is a joint military/civil publication which provides: an aerodrome and facility directory; air traffic services frequencies; aerodrome information and; other notices to pilots operating in Australian airspace, as an aid to flight planning and safety.

<sup>11</sup> Doug Stott. *Flight Safety Australia*, May-June 2001, Civil Aviation Safety Authority Australia.

<sup>12</sup> For all statistics presented in this report, MBZ statistics include data for MTAF areas for the period January 1994 to December 1995.

The public reports and other basic details from OASIS were reviewed by two ATSB Senior Transport Safety Investigators to determine whether the occurrences involved an airspace issue.<sup>13</sup> Each airspace occurrence was assessed in terms of being an *Airmiss* (separation less than 600 metres horizontally and 500 feet vertically) or *No Airmiss*.<sup>14</sup>

A taxonomy of contributing factors was developed based on a review of previous studies and the available information in the sample of incident reports. The taxonomy included:

- *Non-Performance*. This refers to non-performance of MBZ operational requirements and was broken down into the following three categories:
  - (A) *Incorrect or no radio procedures*: This includes those occurrences where the radio was unserviceable; the pilot claims to have made a broadcast; or where no broadcast was recorded/reported.
  - (B) *Other airspace procedures*: This includes non-performance occurrences where poor airmanship was evident.
  - (C) *Other*: This includes any other non-performance events which do not clearly fit into the above two categories.
- *Lack of Operational Awareness*. This refers to a lack of situational or operational awareness on behalf of the pilot(s).
- *Other Issues*. This refers to any other events which do not clearly fit into the above categories, but which contributed to an airspace-related occurrence.

Each airspace incident involving RPT or charter aircraft in a MBZ was classified in terms of these contributing factors. Due to the minimal detail included in the majority of occurrences reports, this taxonomy does not attempt to distinguish between those aviators who attempt to comply with procedures but for some reason the attempt is unsuccessful, and those who forget to comply or deliberately flaunt the system.

Rates of airspace-related occurrences were computed using total hours flown in Australia between 1994 and 2000, by General Aviation (GA) and Regional RPT aircraft.<sup>15</sup> This data was used as a proxy in the absence of an accurate measure of total aircraft movements or hours flown within MBZs. It was assumed that any activity trends appearing in this data would be indicative of activity trends within MBZs. However, the weakness of such an assumption must be highlighted and any results must be interpreted accordingly.

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<sup>13</sup> Incidents were included in the analysis if they were considered to be airspace requirement, judgement or procedural based, rather than mechanical based.

<sup>14</sup> *Airmiss* also included incidents where a Traffic alert and Collision Avoidance System (TCAS) Resolution Advisory (RA) resulted in evasive action.

<sup>15</sup> Hours flown for 2001 were not available at time of writing.

### 3. Results and discussion

#### 3.1. Overview

A search of the OASIS database identified a total of 573 airspace-related occurrences in MBZs during the calendar years 1994 to 2001.<sup>16</sup> For this period, there were no accidents within MBZs where airspace-related issues were found to be a contributing factor. All 573 occurrences were classified as being either a Category 4 or Category 5<sup>17</sup> occurrences.<sup>18</sup> Table 1 illustrates the total number of occurrences, occurrences involving RPT and occurrences involving charter aircraft in MBZs which were reported for the years 1994 to 2001.

**Table 1. Airspace-related occurrences in MBZs by year**

Year	1994	1995	1996	1997	1998	1999	2000	2001	Total
Total MBZ Occurrences	42	54	44	91	77	73	106	86	573
RPT Occurrences	11	30	14	48	46	43	50	48	290
Charter Occurrences	6	11	4	8	8	8	12	6	63

These figures indicate that airspace-related incidents occur, at a rate of between one and two per week in MBZs. This is of potential concern given the high volume of fare-paying passengers travelling in these areas. It can be seen that RPT aircraft are involved in approximately half of all reported occurrences in MBZs. Charter aircraft are involved in eleven percent of airspace-related occurrences. This is perhaps a function of the volume of RPT and charter traffic in these areas and possibly better RPT reporting cultures.

According to Table 1, the number of reported airspace-related occurrences in MBZs involving RPT aircraft increased over the period studied.<sup>19</sup> Similarly, as Table 2 shows, there has been a general upward trend in total RPT occurrences within Australia reported to the ATSB over the period 1994 to 2001. This could suggest that the apparent increase in the number of occurrences reported in MBZs between 1994 and 2001 (see table 1), is not specific to MBZ airspace and could instead be a reflection of an improving reporting culture within the Australian aviation industry,

<sup>16</sup> Given that the previous BASI study into RPT occurrences in MTAF areas found a significant amount of under-reporting of occurrences, despite improved reporting levels, the figures presented in this report should probably be considered as conservative.

<sup>17</sup> Category 4 occurrences are typically those where the facts do not indicate a serious safety deficiency but investigation is required to substantiate the initial reported facts. The circumstances are sufficiently complex to require detailed information from the pilot, operator and/or other involved parties. This category may also include a selection of occurrences identified as involving characteristics, which from trend or safety analysis, require investigation. While accidents may be categorised as Cat 4, this may reflect the likely safety value from a more detailed investigation and thus the priorities of ATSB investigation resources. Category 5 occurrences are those primarily of statistical interest and are generally not investigated.

<sup>18</sup> A number of more serious airspace-related incidents, such as at Port Macquarie (199901959) and Williamtown (199805078) occurred within Australia during this time period. These occurrences may have been linked to MBZ procedures, however, as they did not occur within MBZ airspace, these incidents were excluded from the current analysis.

<sup>19</sup> This trend was found to be significant.  $\chi^2=28.8$ ,  $df=1$ ,  $p<.005$ .



particularly within the RPT sector. A more definitive conclusion regarding the factors contributing to this increase cannot be drawn given the available data.

**Table 2. Total occurrences and RPT occurrences in Australia reported to the ATSB by year that met the criteria for database inclusion**

Year	1994	1995	1996	1997	1998	1999	2000	2001	Total
Total Occurrences Reported to ATSB	3,369	3,773	3,697	3,754	4,867	5,221	5,573	5,234	35,488
Total RPT Occurrences Reported to ATSB	1,168	1,174	1,199	1,440	1,912	2,372	2,393	2,309	13,967

The data in tables 1 and 2 illustrate that MBZ airspace-related occurrences involving RPT aircraft account for over 4 percent of total RPT occurrences reported to the ATSB.

Initial analysis of occurrences by MBZ location revealed Bundaberg, Ayers Rock, Devonport and Jandakot to be the locations with the highest number of reported occurrences. However, these findings must be interpreted with caution given that movement rates and reporting tendencies cannot be accounted for. There appeared to be no common trends in the number of reported occurrences for individual MBZs for the years 1996 to 2001.

### 3.2. Occurrence rates

The current study uses total aircraft activity levels within Australia to identify any trends in activity which may be influencing the occurrence of airspace-related issues within MBZs. One common measure of aircraft activity is hours flown. Figure 1 illustrates the rate of occurrences in MBZs per 100,000 hours flown by GA and regional airline aircraft within Australia for the period 1994-2000.

**Figure 1. MBZ Airspace-Related Occurrence Rates by GA and Regional Airline Hours Flown within Australia (with trend line)**

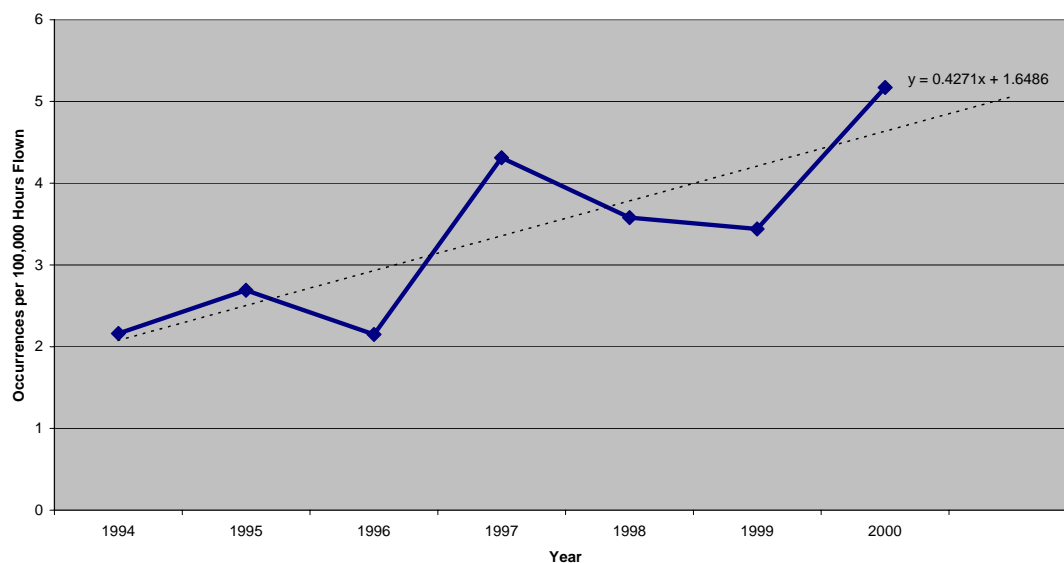


Figure 1 illustrates an upward trend in the rate of airspace related occurrences within MBZs since 1994. However, before drawing any conclusion regarding this trend it must be assumed that activity patterns in the total hours flown within Australia are indicative of the aircraft activity levels within MBZs.

The requirement to make this assumption weakens any conclusions that can be drawn. However, statistical analysis<sup>20</sup> revealed that the average increase in occurrence rates of 0.427 per year was significant.<sup>21</sup> The overall increase in rates may be indicative of:

- a reduction in compliance with airspace procedures by GA pilots using MBZ airspace;
- an increasing use of TCAS. This would allow RPT pilots, in particular, to identify and report occurrences which may have otherwise gone unnoticed; or
- the increase in total occurrence reporting in the Australian aviation industry particularly the RPT sector.

Further investigation revealed a statistically significant increase in the reported occurrence rate for RPT aircraft operating within MBZs.<sup>22</sup> The reported occurrence rates for charter and other aircraft were not found to vary significantly.<sup>23</sup> However, as stated above, the increase in RPT MBZ occurrences was broadly comparable to the increase in total reported RPT occurrences.

### 3.3. Airmis rates

Although occurrence rates are one measure of safety within these areas, a more direct measure of risk to the fare-paying passenger may be the occurrence of airmisses. Airmisses include those occurrences where the separation between two or more aircraft is less than 600 metres horizontally and 500 feet vertically. Table 3 lists the number of MBZ occurrences which resulted in an airmis for the years 1994-2001.

**Table 3. Airmisses in MBZs by operation type and year**

Year	1994	1995	1996	1997	1998	1999	2000	2001	Total
<b>Total Airmis</b>	10	19	24	27	18	23	26	29	176
<b>RPT Airmis</b>	5	12	10	19	11	13	17	17	104
<b>Charter Airmis</b>	4	7	2	2	1	4	1	3	24

Table 3 illustrates that:

- total airmisses reported within MBZs have increased over the period 1994-2001; and
- in MBZs, RPT aircraft are involved in a high proportion of airmisses (approximately 60%), while charter aircraft are involved in only a relatively small number (less than 14%) of reported airmisses.

<sup>20</sup> Chi-square ( $\chi^2$ ) analysis is used to determine whether a difference in observed and expected frequencies occurs as a result of chance. By convention, a probability (p) less than 0.05 indicates a statistically significant difference.

<sup>21</sup>  $\chi^2=31.2$ ,  $df=1$ ,  $p<.005$ .

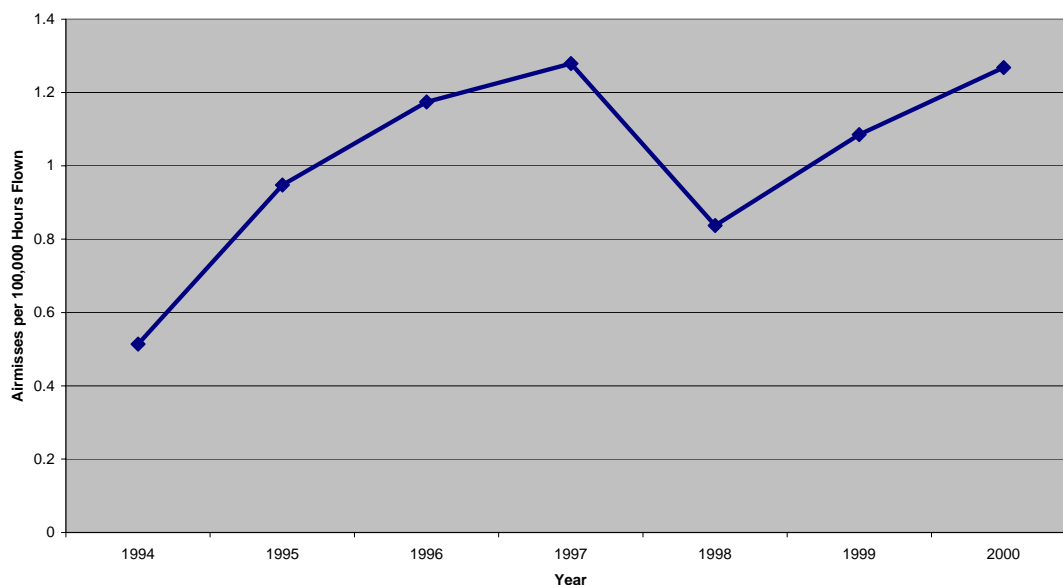
<sup>22</sup>  $\chi^2=25.9$ ,  $df=1$ ,  $p<.005$ .

<sup>23</sup>  $\chi^2=0.56$ ,  $df=1$ ,  $p>.05$ .

Although the total number of reported airmisses in MBZs is increasing, the percentage of occurrences which result in airmisses has remained relatively stable, with the exception of a spike in 1996. Statistical analysis revealed that for the two, four-year periods (1994-1997 & 1998-2001), there was no significant change in the ratio of airmisses to total airspace-related occurrences.<sup>24</sup>

Figure 3 illustrates the occurrence rate of airmisses within MBZs per 100,000 hours flown for the years 1994-2000.

Figure 2. MBZ Airmis Rate per 100,000 Hours Flown (1994-2000)



As can be seen, the rate of reported airmisses per 100,000 hours seems to be increasing in MBZs. However, the trend was not found to be statistically significant.<sup>25</sup> A closer analysis of airmis rates for charter and RPT operations in MBZs revealed that airmis rates within these sectors had not changed significantly since 1994.<sup>26</sup>

### 3.4. Contributing factors

The majority of incident reports contain only limited information regarding the circumstances leading up to an occurrence. Due to the nature of airspace incident reports, this information was often unverified. However, a limited analysis of the contributing factors was conducted.

Over the period of the current research:

- 89.4% of airspace-related occurrences in MBZs involved *Non-Performance* of airspace procedures;
- 3.8% of airspace-related occurrences in MBZs involved *Lack of Operational Awareness*; and
- 7.2% of airspace-related occurrences in MBZs involved some *Other* form of contributing factor.

<sup>24</sup>  $\chi^2=1.47$ ,  $df=1$ ,  $p>.05$

<sup>25</sup>  $\chi^2=2.86$ ,  $df=1$ ,  $p>.05$ .

<sup>26</sup>  $\chi^2=3.21$ ,  $df=1$ ,  $p>.05$ ;  $\chi^2=3.29$ ,  $df=1$ ,  $p>.05$  respectively.

As can be seen, Non-Performance of airspace procedures was by far the most common contributing factor. Further analysis of the type of non-performance involved revealed that over the period of the current study:

- *Incorrect or no radio procedures* contributed to 77.5% of occurrences involving non-performance in MBZs;
- *Other Airspace Procedures* contributed to 17.4% of non-performance occurrences in MBZs; and
- *Other factors* contributed to 5.3% of non-performance occurrences in MBZs.

From these figures, it can be seen that *non-performance – incorrect or no radio procedures* is the factor most commonly contributing to airspace-related occurrences. Radio factors contributed to 69.3% of all airspace-related occurrences in MBZs.

**Occurrence No. 200101900**

**MBZ**

The crew of a DASH-8 reported that while on descent for landing in the MBZ, the aircraft's Traffic alert and Collision Avoidance System (TCAS) activated a Resolution Advisory (RA) regarding a VFR aircraft climbing towards them in the opposite direction. The DASH-8 crew reported that all the appropriate broadcasts had been made with no response from the other aircraft. The crew responded to the TCAS by climbing. When the other aircraft had passed, they descended again for an uneventful landing.

**Occurrence No. 200102041**

**MBZ**

While taxiing for take-off, the crew of a Jetstream 3200 made the necessary MBZ radio calls and had no responses from any aircraft. During the initial climb at 900 feet, the crew of the Jetstream observed a Rans S7 aircraft joining the circuit on the downwind leg at 1000 feet. Evasive action was taken by the crew of the Jetstream to avoid a collision. The pilot of the S7 did not have the aircraft's transponder turned on and therefore the Jetstream's TCAS did not activate.

The analysis was unable to determine the local contributing factors, such as "selecting the incorrect frequency" or "purposefully not making a broadcast" for the majority of occurrences. However, the analysis still provides some useful direction for authorities in determining the major factors involved.

### **3.5. Safety developments**

A number of steps have already been taken towards the improvement of aviation safety within Australian uncontrolled airspace. Some airspace risk assessment has been undertaken by Airservices Australia as part of the now suspended Low-level Airspace Management Plan (LAMP). Furthermore, the recently endorsed National Airspace System (NAS) has again raised the issue of Unicom's and other non-ATS services at uncontrolled aerodromes.

In addition to the requirement to provide a Frequency Confirmation System at all non-controlled aerodromes where there are RPT services operated by aircraft having

certified passenger seating in excess of 9 seats, CASA has also established regulatory requirements for the provision of a Certified Air/Ground Radio Service (CA/GRS) at those MBZs in which there is in excess of 10 movements of high capacity RPT aircraft per day.<sup>27</sup>

#### 4. Conclusions

Due to the limitations of the data used in this analysis (primarily, the limited aircraft activity level data and the reliance on reported occurrences), caution must be exercised when interpreting the following conclusions.

- Within MBZs over the past eight years, airspace-related incidents have been reported at a rate between one and two per week.
- RPT aircraft are involved in a large proportion of these occurrences. However, this is likely to be a result of better reporting practices.
- The rate of airspace-related occurrences reported in MBZs has increased significantly over the period studied (1994-2001). This appears to be primarily the result of a significant increase in the rate of reported occurrences involving RPT aircraft in MBZs. A similar increase in total reported RPT occurrences occurred in the same period.
- The percentage of airspace-related occurrences in MBZs which resulted in an airmiss has not changed significantly over the period 1994 to 2001.
- It appears that *non-performance of radio procedures* within MBZs is by far the most common factor contributing to airspace-related occurrences reported to the ATSB. The analysis was unable to determine the exact nature of these radio issues, however, they are likely to include: not making broadcasts or responses; using the incorrect frequency; having an unserviceable radio; or transmitting at the same time as another airspace user.
- Some steps have already been taken in an attempt to increase the safety of aircraft operating within some MBZs. However, airspace-related occurrences within MBZs, particularly those relating to radio usage, continue to be of safety concern.

#### 5. Safety actions

In addition to earlier safety developments, the Civil Aviation Safety Authority and Airservices Australia may wish to further consider improved means for: providing traffic alerting services; increasing compliance with radio procedures; and confirming the correct operation of communication equipment, for aircraft operating within all MBZs.

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<sup>27</sup> This regulation is only applicable to a small percentage of Australian MBZs. Currently there are 2 locations with CA/GRS: Ayres Rock and Broome.

This may include, but should not be limited to, further investigating the utility of AFRU, Unicom, CA/GRS or other systems currently used within Australian MBZs or comparable overseas airspace, to determine whether such systems may cost effectively minimise the occurrence of radio-related incidents, particularly during RPT operations.

## **6. Acknowledgments**

The ATSB would like to acknowledge the valuable input and comments provided by CASA, Airservices Australia and The Ambidji Group in the development of this paper.

## Appendix A

### Common Traffic Advisory Frequency Data.

Although the primary focus of the current research was Mandatory Broadcast Zones (MBZs), similar analysis was also conducted for Common Traffic Advisory Frequency (CTAF) areas. The following presents the results of that analysis.

#### What is a CTAF?

Common Traffic Advisory Frequency (CTAF) procedures are very similar to those for MBZs. The primary difference is that aircraft operating in CTAF areas are not required to carry a VHF radio. If such a device is carried, however, it is required to be used to make the same calls as those required in a MBZ.<sup>28</sup> Furthermore, CTAF areas are somewhat smaller than MBZs, with a standard radius of 5 nautical miles and extending up to around 3000 feet AGL. CTAF areas are most likely to exist at uncontrolled aerodromes that have a lower level of RPT activity than MBZs.

#### **Occurrence No. 200100317**

##### **CTAF**

Passing 1,200 feet during the climb, the pilot of a Cessna 206 heard an engine noise and looked up to see a Cessna 172 pass overhead with a vertical separation of less than 10 feet. The pilot of the 206 reported that he had made all appropriate radio broadcasts on the CTAF. However the 206 was at the CTAF boundary and the pilot of the 172 was operating on the surrounding area frequency. The pilot of the 206 noted that both pilots heard the other aircraft pass before visually acquiring each other.

#### **Results and Discussion.**

Between 1994 and 2001, there were a total of 267 airspace-related occurrences in CTAF areas.<sup>29</sup> A CTAF area is generally smaller than that of an MBZ, however the number of CTAFs within Australia is much greater. Despite this, the total volume of MBZs within Australia is around 4 times that of CTAFs. Although it cannot be conclusively determined, the greater number of occurrences in MBZs is likely to be due to the different reporting rates of aircraft operating within these areas. In particular, the higher volume of RPT aircraft operating in MBZs is likely to increase the number of incidents which are reported to the ATSB.

Table 4 illustrates the number of airspace-related occurrences within CTAF areas by year and operation type.

<sup>28</sup> It is probable that most of the aircraft operating in CTAF areas do carry a VHF radio. Despite the broadcast requirement, anecdotal evidence suggests that the requirement may not be followed to the same extent as in MBZs, and where broadcasts are not made, occurrences may not be reported to the ATSB to the same extent as in MBZs.

<sup>29</sup> Due to limitations in recording and data retrieval, this analysis does not include occurrences which may have been linked to CTAF airspace procedures, but which occurred outside CTAF airspace.

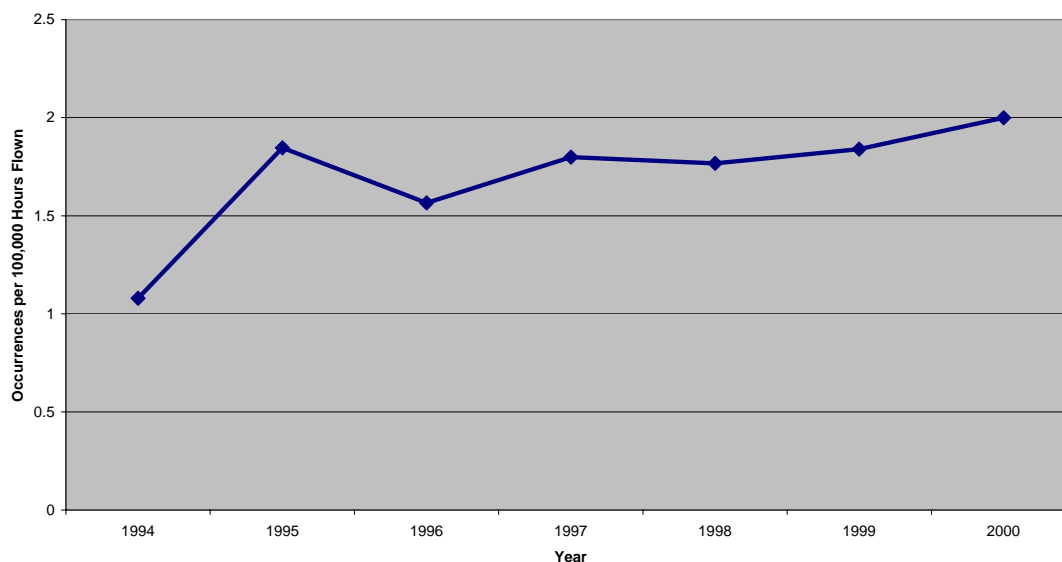
**Table 4. CTAF airspace-related occurrences by year.**

Year	1994	1995	1996	1997	1998	1999	2000	2001	Total
Total Occurrences	21	37	32	38	38	39	41	21	267
RPT Occurrences	5	14	10	9	18	12	18	7	93
Charter Occurrences	1	4	5	9	7	4	4	1	35

As can be seen, RPT aircraft are involved in approximately one third of all reported occurrences within CTAF areas. Given that only a limited number of RPT aircraft operate within CTAFs, it is likely that this is indicative of the RPT reporting culture.

Figure 3 illustrates the rate of reported airspace-related occurrences in CTAF areas per 100,000 hours flown, for the years 1994-2000.

Figure 3. CTAF Occurrence Rates per 100,000 Hours Flown by GA and Regional Airline Aircraft within Australia



According to the graph, there appears to be a steady increase in airspace-related occurrences within CTAF areas. Closer analysis revealed that this increase did not reach statistical significance.<sup>30</sup>

Table 5 illustrates the number of reported occurrences which resulted in an airmiss for the years 1994-2001.

<sup>30</sup>  $\chi^2=3.15$ ,  $df=1$ ,  $p>.05$ .



**Table 5. CTAF airmisses by year.**

Year	1994	1995	1996	1997	1998	1999	2000	2001	Total
Total Airmiss	10	20	17	14	12	16	9	9	107
RPT Airmiss	3	8	7	3	5	6	5	4	41
Charter Airmiss	1	2	2	4	2	2	2	0	15

For CTAF areas, the percentage of occurrences which result in an airmiss has shown a slight decline over the time period. This may be a result of an improved reporting rate for other occurrences in CTAF areas.

### Contributing Factors.

Analysis of the contributing factors revealed that:

- *Non-Performance* of airspace procedures contributed to 78.7% of airspace-related occurrences in CTAF areas;
- *Lack of Operational Awareness* contributed to 8.2% of airspace-related occurrences in CTAF areas; and
- *Other issues* contributed to 13.1% of airspace-related occurrences in CTAF areas.

Further analysis of CTAF occurrences involving non-performance revealed that:

- *Incorrect, or no radio procedures* were indicated in 64.3% of non-performance occurrences;
- *Other airspace procedural issues* were indicated in 32.9% of non-performance occurrences; and
- *Other issues* were indicated in 2.9% of non-performance occurrences.

From this analysis, it can be seen that radio-related procedural issues (either intentional or non-intentional) were the factors most commonly cited in airspace-related occurrences reported in CTAF areas, accounting for approximately half of all occurrences.

### Conclusions.

- The rate of airspace-related occurrences in CTAF areas has not varied significantly over the time of the study.
- Non-Performance of required radio procedures, is the contributing factor most commonly cited in CTAF airspace-related occurrences.

**Appendix B.****Australian MBZ Locations.**

<b>MBZ Location</b>	<b>MBZ Location</b>
Albany (AFRU + Unicom)	Albury
Amberely	Alice Springs (AFRU)
Archerfield	Argyle
Avalon (Unicom)	Ayers Rock (AFRU)
Ballina/Casino (AFRU)	Bamyili
Bankstown (AFRU)	Barrow Island/Onslow (AFRU)
Broken Hill (AFRU)	Broome (AFRU + Unicom)
Bundaberg (AFRU)	Camden
Canberra (AFRU)	Carnarvon (AFRU)
Christmas Island (Unicom)	Cloncurry (AFRU)
Cocos Island (Unicom)	Coffs Harbour (AFRU)
Coolangatta	Cooma (Unicom)
Curtin/Derby (AFRU)	Devonport/Wynyard
Dubbo (AFRU)	East Sale
Edinburgh	Elcho Island
Emerald (AFRU)	Esperance
Geraldton (AFRU + Unicom)	Gladstone (AFRU)
Gove (AFRU)	Griffith
Groote/Bickerton Island (AFRU)	Jandakot (AFRU)
Hobart	Kalgoorlie/Boulder (AFRU + Unicom)
Karratha (AFRU)	King Island (AFRU)
Kingscote (AFRU)	Kununurra (AFRU)
Launceston (AFRU)	Leonora/Laverton
Learmonth	Leinster (AFRU)
Longreach	Lord Howe Island (AFRU)
Mackay	Maningrida
Maroochydore (AFRU)	Maryborough/Hervey
Meekatharra (AFRU)	Mildura (AFRU)
Morrabbin	Mount Gambier (AFRU)
Mount Hotham	Mount Isa
Newman (AFRU)	Nowra/Jervis Bay
Norfolk Island	Paraburdoo (AFRU)
Parafield	Pearce
Point Cook	Port Headland (AFRU)
Port Lincoln	Port Macquarie (AFRU)
Richmond (NSW)	Rockhampton (AFRU)
Southport	Tamworth (AFRU)
Telfer (Unicom)	Tindal
Toowoomba (AFRU)	Torres Strait
Townsville (AFRU)	Wagga Wagga (AFRU)
Weipa/Scherger (AFRU)	Whitsunday (AFRU)
Whyalla (AFRU)	Williamstown (AFRU)
Woomera (AFRU)	

## Appendix C.

### Summary of Category 4 Occurrences<sup>31</sup> within Mandatory Broadcast Zones from 1994 to 2001.

199500109	<p>The crew of VH-EKD decided to make an NDB approach. Two other aircraft were contacted to advise of the approach. The approach was commenced and VH-EKD turned to track inbound. During the approach the cloud base lowered to the published minima.</p> <p>VH-NIT, which was rolling for take off on runway 32, called. In response the crew of VH-EKD advised they were established inbound. VH-NIT continued descent to the minimum altitude of 830 feet, while tracking towards the NDB and the aircraft became visual.</p> <p>At this stage the crew of VH-EKD saw VH-NIT about 60 metres away on their right. VH-EKD turned left and flew a visual circuit for landing on runway 24. VH-NIT continued in the circuit and landed on runway 32.</p>
199604066	<p>During arrival, the flight crew of the Bae146 heard the pilot of the C207 transmit a taxi call with a destination of Gibb River. The crew of the Bae146 made a 30 NM transmission without any acknowledgment and again at 25 NM. At 15 NM, a response was finally received from the pilot who then stated that his aircraft was 12 NM on a radial of 242 at 5,500 ft. The BAe146 was 13 NM on the 250 radial and descending through 4,000 ft. The BAe entered cloud tops at approximately 7,000 to 7,500 ft and was clear of the lower patches at 3,800 ft.</p> <p style="text-align: center;">The incident was reported to Perth control.</p>
199700777	<p>The captain of VH-KDO gave taxiing calls on both MBZ and FS frequencies, advising they were taxiing for runway 09. Shortly before commencing their take-off roll, the crew of KDO heard the pilot of VH-PRN advise he was taxiing for runway 36. As they commenced their take-off roll, the captain made a call to "all stations Mildura and PRN - KDO is rolling runway 09". The pilot of PRN acknowledged that call. After they had passed V1 and rotated, they saw PRN becoming airborne from runway 36. The crew of KDO took avoiding action, passing above and behind PRN. The pilot of PRN reported later that he had misinterpreted the "rolling" call from KDO.</p>
199701646	<p>"The pilot of a Brasilia aircraft reported that his ETA over Bundaberg NDB was 0920 UTC. On descent he was given traffic on a Shorts 360 inbound from Gladstone ETA 0917 and VH-ILG inbound from Hervey Bay ETA 0927.</p> <p>On changing to MBZ frequency 126.9 the Shorts pilot advised that he was on the inbound leg of the runway 14 NDB approach. As VH-ILG was several minutes behind the Brasilia he was not in conflict at that time.</p> <p>When the Brasilia was approaching the NDB the Shorts pilot advised he was at the minima and not visual and was executing a missed approach. The Brasilia pilot maintained 3,600 ft and tracked over the aid.</p> <p>The Shorts pilot advised that he was now 5 miles by GPS south of the NDB and maintaining 2,600 ft, so the Brasilia pilot commenced an NDB approach. When the Brasilia was turning inbound the Shorts pilot advised he was over the aid and would commence an approach and follow the Brasilia in the procedure.</p> <p>At the minima the Brasilia crew were not visual with the runway and commenced a missed approach in heavy rain at 0927. The Brasilia pilot was aware that VH-ILG was now in conflict (ETA 0927) and tried to contact the pilot of VH-ILG on both the MBZ and area frequencies without any response. Brisbane Centre was then contacted to</p>

<sup>31</sup> There were no category 3 or other more serious incidents and no accidents in MBZs related to airspace procedures from 1994 to 2001.

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ascertain the whereabouts of VH-ILG. Brisbane centre said that the pilot of VH-ILG had last reported when he changed to the MBZ frequency. Brisbane Centre then passed traffic on a DHC8 inbound from Brisbane to Bundaberg ETA 0935. Communications was then established between the Brasilia and the DHC8 on the MBZ frequency.

The Brasilia pilot then executed a sector entry for a further attempt at the NDB approach. As the Brasilia approached the aid the Shorts pilot advised going around at the minima, and he also tried to contact the pilot of VH-ILG. As the Brasilia pilot commenced the second approach the Shorts pilot advised that he was diverting to Brisbane. When the Brasilia pilot was turning inbound the DHC8 pilot advised that he was over the aid and would follow the Brasilia in the procedure.

The Brasilia pilot said that approaching 800 ft they noticed the weather was improving and became visual at approximately 700 ft. After landing on an extremely wet runway 14, the Brasilia pilot executed a 180-degree turn to backtrack, and was confronted with a set of landing lights on short final. The DHC8 pilot had just reported inbound in the procedure. The Brasilia pilots turned on all landing lights to illuminate themselves to the oncoming aircraft, then expedited to the taxiway as the other aircraft executed a low level go-around and joined left downwind. The Brasilia pilot said he assumed the aircraft they had seen was VH-ILG, and he then made a broadcast to the pilot of the DHC8 to alert him of the circuit traffic. VH-ILG was still unable to be recontacted on the radio, and landed in front of the DHC8, taxied off the runway and parked. Prior to shutdown the Brasilia pilot heard Brisbane Centre ask the DHC8 pilot to attempt to contact the pilot of VH-ILG on the old frequency of 119.1. The pilot of ILG was on the old (incorrect) frequency, and the pilot of the DHC8 advised him of his error.

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| 199702718 | 'An aircraft was approaching to land via a straight-in approach in accordance with the published procedures and criteria. At about 2 NM on final approach, another aircraft reported on base. Although an attempt to contact the aircraft on base by radio was made, it continued and joined final about 500 m in front of the aircraft conducting the straight-in approach. The pilot flying the straight-in approach conducted a go-around and landed off a normal circuit.  |
| 199702879 | 'After landing at Albany, a Jetstream aircraft rolled through to the threshold to allow a formation of eight PC-9 aircraft to enter the runway. There were two other aircraft in the circuit one of which was a Cessna 172. Radio traffic was heavy amongst the aircraft. The pilot of the Jetstream reported that the Cessna 172 had made an approach to the runway and had to be told to go round to prevent the Cessna landing whilst the Jetstream occupied the runway.  |
|           | During the subsequent investigation, the pilot of the Cessna 172 reported that he had lost sight of the Jetstream during the downwind leg due to the lack of contrasting colour between the aircraft and threshold markings. It was possible that the significant cloud cover may have reduced the contrast between the Jetstream and threshold markings. He reported that he again sighted the Jetstream after rolling out on finals and had commenced a go round just prior to the Jetstream pilot calling.  |
| 199703101 | 'On descent to Mildura, the pilot of VH-WZS acquired IFR traffic information from flight service and queried two VFR aircraft in the MBZ. As there was 6/8ths of cloud at 1,000 ft with tops to above 6,000 ft, he elected to fly the VOR/DME approach, after a sector entry. Over the aid he queried the whereabouts of ZCR which had given a taxiing call earlier but no further calls. The pilot of ZCR then advised that he was tracking southeast and passing 4,500 ft in the climb. Although there was no breakdown in separation, there could have been if the pilot of WZS had not elected to fly a sector entry before commencing the approach. |
| 199703142 | 'The pilot of a Bandeirante aircraft reported that when joining on a right downwind for runway 34 at Mount Isa, a Mooney aircraft was noticed about 200 metres away in the 4 o'clock position. That aircraft then made a sharp left turn and passed close behind the Bandierante. No radio calls were heard before or after the incident from the Mooney aircraft which was not identified.  |
| 199703169 | 'A C130, which had been told of possible traffic (2 aircraft) in the Pearce MBZ, was unable to make contact with one of them, a Christen Eagle. As a result, the C130 crew assumed that only one aircraft was in the circuit area and this was identified during the   |
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arrival. As the C130 turned downwind the second aircraft (the Eagle) was observed to pass approximately 500 ft behind the C130. The C130 crew heard from the pilot of the Eagle for the first time shortly after their aircraft had touched down. He indicated that he was joining the circuit for a landing.

A ground witness reported that the Eagle had been engaged in low level aerobatics (down to 500 ft agl), in the circuit area at the time the C130 made its approach and only stopped once the aircraft turned on to its final leg.

The Eagle owner could not be contacted for comment however, he is known to conduct aerobatic displays, in the Eagle, at various local air shows and is a member of the Pearce Flying Club. It is not known if he was flying the aircraft at the time of the incident.

The Pearce MBZ is immediately below the Perth CTA, when it has been released by the RAAF. As a result the manoeuvring area is restricted and resolution of traffic conflicts depends on satisfactory air to air communications. If an aircraft fails to respond to transmissions from other traffic this places the see and be seen separation environment in jeopardy.

The C130 crew indicated they would use the incident to highlight the need for extra care at MBZs where manoeuvring was restricted and there was a mix of military and civil traffic.

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199703197 'A Cessna 182 had departed Ayers Rock and had not broadcast details on the MBZ frequency. Flight Service had no information on the aircraft. However, a faint broadcast was later heard on a HF frequency advising the callsign and that the Cessna was outbound to the Olgas.

A BAe146 taxied at Ayers Rock and Adelaide FS requested that the crew make a general broadcast on the MBZ frequency advising other traffic of details on the Cessna. Following departure from Ayers Rock, the BAe146 came into close conflict with the Cessna. Another broadcast was made by the pilot of the Cessna on HF 4693 declaring his flight details. Adelaide ATS requested that the BAe146 re-broadcast these details on the MBZ frequency for the benefit of other aircraft in the area. Following this, the Cessna pilot reported on the MBZ frequency stating that he had experienced a VHF problem.

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199703345 'The pilot of a Jetstream 31 inbound to Dubbo from the East, broadcast details on the MBZ frequency. At approximately five miles from the airfield, the pilot in command sighted an airship manoeuvring over the Dubbo city. The Jetstream turned right to avoid the airship and the pilot requested if the airship crew had heard his previous radio calls. Communications were then established between the Jetstream and the airship. However, when the Jetstream taxied for departure and broadcast flight details on the MBZ frequency, there were no responses monitored. The pilot of the airship had heard the broadcast but understood that it was not necessary to respond.

During the investigation, the airship pilot reported that he had broadcast his position reports every 30 minutes during the time in which he was airborne. He had also broadcast airborne reports each time that the airship travelled a distance of two miles. The airship pilot and the airfield manager, who had been recording the MBZ frequency in the area at the time of the incident, both reported that they had not monitored the broadcasts made by the pilot of the Jetstream. Use of non-standard phraseology by one of the parties and weak transmissions from the Jetstream may have been contributing factors in the incident.

The AVDATA tape that was in use at Dubbo airport on the day of the incident was examined during the investigation. The first recorded transmission from the Jetstream was made at 0320 but was almost inaudible. The Jetstream reported overhead (the place name was not understood) - passing FL110 on descent and 10 minutes from Dubbo. The tape was then rewound to time 0149 and monitored. In the intervening period between 0149 and the first time the Jetstream was recorded (0320), there were numerous broadcasts made by arriving and departing aircraft at Dubbo. The airship

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responded with position and intention calls to each of these transmissions. The investigation also revealed that non-standard phraseology was used in the exchange from the Jetstream to the airship.

The reference made by the pilot in command of the Jetstream that broadcasts had been made at various distances inbound to Dubbo cannot be discounted. However, given that the transmission by the Jetstream at 0320 (or 10 minutes from Dubbo circuit) was almost inaudible, calls that were made at a greater distance obviously failed to activate the recording apparatus at Dubbo aerodrome. Therefore, other aircraft operating in the area may not have heard any of the Jetstream's broadcasts before time 0320.

In summary, aircraft crews should be conversant with the many aspects that can affect radio transmissions. Whilst weather, distance and altitude are several of the more easily recognisable constraints, poor microphone technique may also severely impair the strength and clarity of a transmission. Considering the increase in air traffic using MBZs, pilots should be mindful of the importance in understanding procedures and using correct phraseology in these areas.

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199703361 'A SAAB 340 aircraft had departed Wagga Wagga on track to Sydney when the co-pilot observed a landing light ahead and at a lower altitude relative to their aircraft. The other aircraft was recognised as a P68 Partenavia . A broadcast on the MBZ frequency was initiated but there was no response from the other aircraft.

The pilot of the Partenavia reported that he had only seen the SAAB 340 in the distance. He was unable to estimate the distance between his aircraft and that of the SAAB 340. He had heard the Flight Service operator passing details on the position of his aircraft to the SAAB 340 crew. He then called Melbourne Flight Service and updated his position information, which was approximately one mile to the north of Gundagai and at the same time switching on his landing lights . He had not tried to make contact with the crew of the SAAB 340 at that time. There were no other witnesses to the incident. The CFI at the flying club which operates the Partenavia intends to revise MBZ procedures with the pilot.

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199703602 'The crew of an RPT jet aircraft complained that a light aircraft taxied and took off without using radio in the MBZ. The crew then advised Adelaide Flight Service that an aircraft was operating in the MBZ without radio.

There were no known conflictions.

The operator of the light aircraft said that the pilot had made the required radio transmissions but that he was unaware that the radio was not working. However, an after-flight inspection of the radio revealed that it was operating normally.

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199703644 'The crew of an F111 aircraft enroute to Ballina broadcast intentions, to overfly the airport, on the MBZ frequency of 124.2 MHz. The crew coordinated separation with traffic at Casino, which was encompassed by the MBZ. There were no transmissions heard from traffic in the Ballina area. A Lightwing ultralight aircraft was observed to be conducting flying training in the Ballina aerodrome circuit area at the time. The crew of the F111 reported their estimate for overhead Ballina and shortly after the aircraft passed close to the airport from west to east while remaining south of the runway. The ultralight was turning downwind for runway 24 and the two aircraft were observed to pass at the same level in close proximity. Subsequent radio transmissions indicated that both the crew of the F111 and the pilot of the light aircraft were surprised to see the other aircraft. Both reported to be maintaining 1000 ft.

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199703724 'The crew of the air transport flight complained that the pilot of a Jabiru aircraft had not responded to their radio transmissions for taxiing, back-tracking and rolling. The air transport crew were not aware of the other aircraft's presence until they saw it in the circuit. There was no breakdown in separation.

The pilot of the Jabiru was a solo student who was aware of the air transport aircraft. She reported that she did not transmit her position or acknowledge the other aircraft because it was not a potential confliction for her.

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199703819 'As VH-EWR approached the MBZ from the south-east the crew became aware of VH-

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	<p>FXW taxiing for departure to the east. Arrangements were made between the crews whereby FXW would depart but limit climb while EWR maintained a higher altitude until the aircraft had passed. When EWR was on high downwind, the crew asked the other pilot what his intentions were. The pilot of FXW indicated that he would remain on the dead side of the circuit until EWR had landed. At no time had he indicated that he would do something other than depart on his intended track. The crew of EWR conducted a go-around to confirm the position of FXW before rejoining the circuit for landing.</p>
199703862	<p>'The crew of a SAAB 340 aircraft reported downwind at Ballina NSW for runway 24, in marginal VMC with passing showers. A Mitsubishi MU-2 aircraft was also operating within the MBZ and the two aircraft had established two way communications.</p> <p>The SAAB crew reported that they were established on final approach for runway 24 when the MU-2 turned for a tight base leg in front of them. The crew of the SAAB broadcast their position on short final for runway 24. Although they state the pilot of the MU-2 did not respond to this call, the MU-2 aircraft was observed to fly through the centre line of the runway and continue north with the landing gear extended.</p> <p>The pilot of the MU-2 reported, that he had broadcast his position joining downwind. As he received no reply to this call, he assumed that the SAAB had already landed and continued the approach. He also made a broadcast turning base, and received a reply from the SAAB that they were established on final. Realising that he had inadvertently cut in front of another aircraft, he immediately initiated a missed approach and climbed back into IMC.</p>
199703863	<p>'An RV4 was observed to taxi, line up, take off and commence practice circuits without making any radio transmissions. At the time, a Cessna 182 was completing a landing and a B737 was tracking for a 5NM final. The pilot of the RV4 finally made radio contact with the crew of the B737 after they had joined final and the RV4 was on late downwind. Had contact not been made, the reporting pilot believed there was serious potential for a mid-air collision on final approach.</p>
199703958	<p>'The chieftain pilot reported that while he was preparing to take off, the first radio call he received from an inbound SAAB 340 crew was when that aircraft was lined up on finals for runway 35 at 7 miles. The chieftain pilot then decided to use runway 23 for takeoff instead of runway 17 to avoid a confliction.</p> <p>This incident has been referred to CASA for further investigation.</p>
199703974	<p>'The pilot of KD6203 (VH-LPI) reported that while taxiing for departure from Mildura he made the normal MBZ broadcast and received a response from Southern 622. He established that</p> <p>VH-NMH landed on runway 27 while it was occupied by a Cessna 414 aircraft which was back-tracking towards the terminal. The pilot of NMH had earlier reported overhead Mildura at 2,000 ft. The crew of a SAAB S40 aircraft which had departed from Mildura a short time earlier reported that this was the first and only broadcast from NMH.</p>
199704022	<p>'VH-IMS was inbound for a landing on runway 12 and the pilot had broadcast his intention to join on a five mile final approach. Another aircraft, VH-TQJ, commenced taxiing for takeoff on runway 30 soon after. The pilot of IMS indicated that it would be about two minutes before he was at five miles so the crew of TQJ lined up and completed their checks. As the takeoff was commenced the pilot of IMS reported about to turn on to final approach at five miles. As TJQ was passing 500 ft in the climb, the crew observed IMS turning left to avoid the departure path. The pilot of TQJ turned left to parallel the other aircraft and maintain separation visually. The crew of IMS continued the circuit to land on runway 12. They had not expected to see the other aircraft become airborne while they were on approach.</p>
199704105	<p>'The pilot of a DHC-8, VH-XFU, reported that he was 25 NM south-east of Bundaberg when he heard the pilot of a Cessna 172, VH-MEN, report on the MBZ frequency that he was taxiing at Bundaberg for runway 32. There was no response to the inbound call from XFU at 25 NM. The pilot of MEN was then heard to make a departure report,</p>

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climbing overhead to 3,500 ft. There was no response to further attempts to contact the pilot of MEN. The pilot of XFU immediately climbed to 4,500 ft from 3,300 ft and positioned overhead at 4,500 ft to join crosswind for runway 32. After making visual contact with MEN just prior to arriving overhead, the pilot of XFU advised the pilot of another inbound DHC-8 which was following XFU's inbound track of the traffic. The pilot of the following DHC-8 was finally able to make contact with the pilot of MEN on the Brisbane Centre frequency 124.1 Mhz, and advised him that they had been unable to contact him on the MBZ frequency 126.9 Mhz.

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199704234 'On four occasions in three months, pilots from the same local company have reported difficulties communicating on the Whyalla MBZ frequency with the flight crews of one particular RPT operator. Following these incidents, the local company raised the following concerns:

(1) crews of the RPT aircraft do not always provide an initial taxi call on the MBZ frequency when preparing for departure from Whyalla;

(2) crews of the RPT aircraft appear to change to the Whyalla MBZ frequency at approximately 10 NM rather than the required 15 NM; and,

(3) crews of the RPT aircraft are often not contactable on the MBZ frequency following an initial inbound broadcast at 25 NM from Whyalla.

The RPT operator's standard operating procedure required crews to monitor the MBZ frequency within 25 NM of Whyalla. Any company calls were to be completed during cruise and not during the approach and arrival phases. The aircraft were equipped with dual VHF radios so that a continuous listening watch was maintained on both the MBZ and flight service frequencies. The report to flight service that the crew were switching to the MBZ frequency was a formality and indicated that this was the prime frequency for communication during the arrival and departure.

The pilot of the RPT aircraft recalled that, on 19 December 1997, all the standard reports and broadcasts were given. He also recalled that a pilot of one aircraft in the area was referring to the company name and not the aircraft's specific identification. This did not immediately attract the pilot's attention because the flight number was not specifically mentioned and several aircraft of the same company were operating in the area at the time.

The airspace around Whyalla can be congested at certain times with the arrival and departure of several aircraft as well as local aircraft operating in the area. It is not uncommon for radio communications to be overtransmitted as appeared to have occurred in one of the reported incidents. There were also a number of nearby CTAFs which utilise the same frequency as the Whyalla MBZ, which adds to the communication congestion.

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199704280 'The pilot of VH-LPI reported that he commenced a descent into Mildura from 8,000 ft about 15 DME SE of Mildura after the pilot of VH-STV stated he was 20 NM SE of Mildura, tracking for Wangaratta. When LPI was at 12 DME SE of Mildura at about 5,500 ft, STV passed directly underneath LPI with vertical separation of 1,000 to 1,500 ft. The pilot of STV subsequently stated that at the time, he was using a GPS with Bendigo set as the way point and that he had miscalculated his distance from Mildura when reporting 20 NM SE.

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199704286 'The pilot of an A320 aircraft reported that after touchdown on runway 34 at Mount Isa and whilst decelerating through about 80 knots, the crew noticed a Beechcraft Baron ahead of them about to touchdown on runway 16. The pilot of the Baron instigated a go-around at approximately 20 feet and about 100 metres ahead. The visibility was extremely poor for an approach onto runway 16 with heavy rain. The pilot of the Baron had made no contact and no calls were heard on the MBZ frequency 126.7 Mhz.

The pilot of the Baron later reported that he was aware of the A320 but did not hear the pilot transmit his intention to use runway 34. The aircraft had recently been fitted with an intercom system which appeared to have rendered the VHF transmitters

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unserviceable. The weather at the time was poor, with thunderstorms, low cloud, and heavy rain in the area.

Safety action

The Bureau of Air safety Investigation is investigating a possible safety deficiency with the procedures required of pilots operating to or from an MBZ. Specifically, the absence of any mandatory requirement for pilots to verify the serviceability of radio equipment before commencing operations at MBZ destinations served by RPT operators.

Any safety output from this investigation will be addressed to the relevant organisations for their action. Copies of any safety output will also be sent to RPT operators for their information.

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199704287 'The pilot of a Beech 200 aircraft reported that a Beech 58 taxied for departure at the same time, and no VHF communication was made by the other pilot. The Beech 58 entered the runway, lined up behind the Beech 200 and commenced take-off, thereby cutting off a landing Metroliner which was on final approach. No contact was made by the Beech 58 pilot on the MBZ frequency at any time. The pilot of the Metroliner said he saw the aircraft line up at the intersection and depart. The Beech 58 was airborne by the time the Metroliner touched down. The departing Beech 58 was subsequently identified as VH-EVE.

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199800173 'The crew of a Boeing 737 inbound to Ballina sighted conflicting traffic approximately 10 NM south west of the aerodrome. The crew attempted to contact the aircraft on numerous occasions and no reply was received. Separation between the two aircraft was reduced. Identification of the aircraft was not possible.

Additional problems were experienced with aircraft failing to comply with MBZ operating procedures as the Boeing was taxiing for departure. A Light Wing aircraft operating in the traffic pattern at Ballina failed to respond to directed calls within the circuit and did not make the prescribed broadcasts. A second aircraft attempted to establish visual communication with the pilot of the Light Wing and formed with the aircraft. The two aircraft landed simultaneously and vacated the runway before the Boeing 737 departed.

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199800176 'Just after touchdown on Runway 13, the crew of the BAE146 saw a blue Jet Ranger take off and cross the apron, heading towards the active runway. The helicopter then turned sharply around the eastern-most light stand and departed to the south-east. The pilot of the helicopter did not respond to radio transmissions on the MBZ or area frequency.

The crew of the BAE146 later reported that the helicopter came within 300 m of their aircraft but that it did not infringe the flight strip.

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199800195 'The pilot of the Cessna Conquest that was inbound to Jandakot from Bunbury with a Medical One Priority reported having a potential near miss with a Beech Bonanza that was inbound to Jandakot from Perth.

The pilot of the Conquest was intending to join the circuit on a high downwind for runway 24R. When the Conquest was approximately 6 NM south of Jandakot, Perth Approach advised the Conquest pilot that there was a Beech Baron in the Jandakot circuit and a Bonanza inbound to Jandakot from Perth. He was then instructed to change to the Jandakot MBZ frequency. When the Conquest pilot made his initial MBZ radio call, he received an acknowledgment from the pilot of the Baron but not from the pilot of the Bonanza. The Conquest pilot then decided to join overhead the field at 2,000 ft to establish visual contact with the other circuit traffic before commencing a gradual descent into the circuit. He reported that he had adopted this non-standard procedure due to the large number of training aircraft that sometimes occupy the circuit at night at Jandakot and because of the difficulty of sighting circuit aircraft against the residential and city lighting.

However, the pilot of the Bonanza had also decided to join the circuit at 2,000 ft but on

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the crosswind leg to runway 24R and remain at that altitude until he also had identified all the traffic. He was on descent from controlled airspace and had not yet transmitted his circuit intentions. The Conquest pilot did not initially see the Bonanza because he had expected the Bonanza to be at 1,000 ft. The Bonanza pilot then transmitted on the MBZ frequency a request to the Conquest pilot to advise his level. The Conquest pilot replied as that he was 1,700 ft and descending. The Bonanza pilot then reported that he had the Conquest visual and was taking avoiding action.

When Jandakot reverts to MBZ operations after the CTR is de-activated at night, there are reported occasions that up to nine training aircraft occupy the circuit. It was also reported that some of the training aircraft were not adopting adequate radio procedures during the MBZ operations. Pilots of higher performance aircraft were experiencing difficulty in identifying circuit traffic and sequencing themselves into the circuit. As a result of these difficulties, some pilots had adopted non-standard procedures.

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199704306 'After the pilot of VH-OZG joined downwind for a right circuit on runway 27, VH-MKQ lined up and took off from runway 09 for which a left circuit applies. When MKQ called rolling, OZG attempted several times to contact MKQ to request that he maintain runway heading for separation. When OZG was about to turn base for runway 27, MKQ turned left towards OZG. OZG extended his downwind leg to maintain separation. At the time MKQ was being flown by a student on a solo flight.

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199704307 'The pilot of a Baron 58 (B58) was inbound to Whyalla from the north when he heard the crew of an RPT aircraft report taxiing on the area frequency. He reported that he then heard a brief 'hash' sound on the MBZ frequency. Shortly after, the RPT crew broadcast on the MBZ frequency that their aircraft was airborne. The B58 pilot was concerned that local aircraft monitoring only the MBZ frequency, may not have been alerted to the presence of the RPT aircraft and that this could result in a traffic conflict.

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199800253 'The pilot of a Brasilia aircraft VH-XFW was enroute from Brisbane to Bundaberg, and reported that his ETA for Bundaberg was 0915. He was aware of three other aircraft in the area. The first aircraft SS304, was also enroute from Brisbane to Bundaberg, ETA Bundaberg at 0923. The pilot of the second aircraft VH-WIA, had reported 18 NM west with an ETA Bundaberg of 0920, and the pilot of the third aircraft VH-MEN, reported taxiing at Bundaberg and was holding at the holding point. The pilot of XFW reported that the surface wind velocity was approximately 360/12 knots, and after appropriate radio transmissions were made, the aircraft was positioned for a 5 mile straight in approach for runway 32. At approximately 3 NM final, the pilot of MEN reported that there was an aircraft on base for runway 32. The aircraft was not sighted by the crew of XFW, and a missed approach was initiated. At the same time the other aircraft was sighted by the crew of XFW at the 11 o'clock low position. The pilot of VH-LYF then reported on final approach for runway 32. This was the first transmission heard from the pilot of this aircraft. There was no response to the transmissions made by the pilot of XYF during his approach and in particular the 5 mile transmission.

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199800280 'The pilot of the charter flight transmitted taxiing information on the MBZ and Area frequencies. There was no response from any other aircraft. When the aircraft arrived at the holding point on taxiway "E", prior to back-tracking for Runway 30, the pilot checked both approach ends for any unnotified traffic. He saw a light aircraft at 2 - 3 NM on final approach to runway 12. The aircraft did not respond to radio transmissions. It landed and taxied off the runway.

An after-flight inspection by the operator of the light aircraft found that the pilot had inadvertently selected HF instead of VHF on the communication control panel. This meant that the pilot heard the transmissions directed to his aircraft on VHF but answered with a transmission on HF.

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199800535 'The pilot of VH-FNH reported that during his approach to Kalgoorlie he reported on the MBZ frequency at 30 miles by DME. Communication was made with other traffic which was also inbound to Kalgoorlie but not conflicting. The pilot said he reported at 6 DME on final approach for runway 11. When FNH was at 2 DME the pilot of VH-CRP reported that he was carrying out circuits on runway 11.

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199800860 'The crew of scheduled air transport flight taxiing for takeoff saw a Cessna 172 aircraft in the circuit following another aircraft. The pilot of the Cessna did not respond to radio transmissions on the MBZ and Area frequencies. The crew of the aircraft on the ground

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was able to identify the Cessna after it landed. No transmissions from the Cessna 172 were heard.

The pilot of the Cessna 172 later said that his radio had failed without him realising until he saw the other aircraft in the circuit. He indicated that the aircraft was fitted with one VHF radio. After the flight, the upper band module of the VHF radio was found to be unserviceable.

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199801113 'Enroute from Perth to Kalgoorlie, the crew of the Fokker F28 began monitoring the MBZ frequency approximately 48 NM from Kalgoorlie. They subsequently gave a standard MBZ call at approximately 34 NM, advising of their intentions. The crew later heard the pilot of a Cessna reporting his departure from Kalgoorlie, when he called on the FIS frequency. At that point the Cessna was approximately 13 NM from Kalgoorlie, climbing to 8,500 ft. The F28 crew reported that they had not heard any taxi or departure calls from the pilot of the Cessna on the MBZ frequency.

The F28 had been maintained at a higher than normal descent profile to avoid low level turbulence and subsequently passed within 1 NM laterally, and approximately 1,000 ft vertically, from the Cessna. The F28 flight crew reported they were concerned that had they not maintained the higher profile the two aircraft may have collided.

The identity of the potentially conflicting Cessna could not be determined because the aircraft associated with the reported callsign was in maintenance at the time of the incident.

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199801489 'The pilot of the BAe 146 made his taxi call at Argyle on the MBZ frequency and heard no response. He then made a similar taxi call to Perth FIS who also advised that there was no other traffic. The BAe 146 was climbing through 2,000 ft when the crew heard a transmission from the pilot of a Cessna 206 reporting overhead Argyle Minesite at 3,000 ft. The pilot of the BAe 146 immediately stopped the climb and returned to 2,000 ft as the Cessna passed overhead. Communications were then established with the Cessna pilot.

The pilot of the Cessna had been conducting a scenic flight in the local area and had turned down the radio volume to allow him to communicate with a passenger. He realised that he had not heard any traffic for awhile and made the position report overhead the Argyle Minesite, which is near the airfield. The Cessna pilot was then advised of the close proximity of the BAe 146 .

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199801530 'VH-AZX, a Beech 76, was taxiing for takeoff at the same time as VH-NJU, a British Aerospace 146. Both aircraft had made the appropriate mandatory broadcast zone (MBZ) calls. While lining up for takeoff, the crew of NJU noticed AZX at taxiway E approaching the runway. The crew of NJU broadcast "rolling" and AZX stopped. Immediately, another voice broadcast that AZX had infringed the flight strip and suggested that the pilot should take off. This call was acknowledged by the pilot of AZX, who taxied onto the runway and took off. The crew of NJU had only just commenced the take-off roll and rejected the takeoff.

The other voice was that of the airport safety officer, who was in a vehicle near taxiway E. He saw AZX cross the holding point and enter the flight strip. He believed that the crew of NJU had not seen AZX, and that a dangerous situation existed. This was the basis for his radio call to the pilot of AZX.

The investigation found that there were no published procedures or guidelines for airport safety officers to follow in situations perceived to require immediate action. On this occasion, the safety officer made a radio transmission which the pilot interpreted as an air traffic control instruction which he subsequently followed.

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199801545 'The crew of VH-NEK had been advised that Tamworth Tower would be closed at the time of the aircraft's arrival. The crew reported at 30 DME inbound on the MBZ frequency. VH-YTP responded, advising that he would be conducting left hand circuits on runway 12, and that there were two other aircraft conducting similar circuits. NEK reported joining right downwind and the crew observed one aircraft on mid downwind and one on base. When NEK was turning final, another aircraft (the callsign of which could not be understood) reported turning base, adding that the pilot did not have NEK

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	sighted. The crew of NEK immediately initiated an overshoot and flew another circuit for a normal approach and landing.
199802355	<p>'The crew of the Dash 8 did not sight the Beech 1900 on final for runway 03 and subsequently entered the runway and commenced backtracking for a departure from runway 21. The Beech 1900 was configured for landing with recognition, taxi and landing lights on.</p> <p>The parking bay used by the Dash 8 at Port Macquarie was close to the threshold of runway 21 and required only a short taxi distance to the holding point. The runway is 1,586 metres long. Therefore, the head on profile of the Beech 1900 aircraft would have made it difficult to sight, particularly in an "un-alerted see and avoid" environment. The pilot of the Beech 1900 commenced a go-around from final for runway 03 at 300 ft above ground level (AGL).</p> <p>The crew of the Dash 8 reported taxiing at Port Macquarie to Sydney flight service but was not advised of IFR traffic because the crew of the Beech 1900 had already transferred to the MBZ frequency. The investigation revealed that the crew of the Beech 1900 reported "on final" at the same time as the crew of the Dash 8 made their taxi call. The investigation was not able to determine why neither crew heard the transmission of the other.</p>
199802387	<p>'The crew of VH-KEQ contacted Melbourne Centre at their descent point, 30 NM south of Wagga Wagga and were advised that there was no IFR traffic. The crew completed their pre-descent checklist, briefed for a runway 05 VOR/DME approach and commenced descent. At 28 NM Wagga and descending through 8,000 ft, the crew broadcast their position on the Wagga MBZ frequency. They received a response from the Wagga Aerodrome Frequency Response Unit, that indicated the frequency had not been used within the preceding five minutes.</p> <p>The crew of KEQ continued their descent and contacted Melbourne Centre at 18 NM and advised they were transferring to the Wagga MBZ. The crew joined the 05 VOR/DME approach on the 10 DME arc and reported their intentions to Melbourne Centre, nominating a time for an operations normal call. Following this transmission, the crew of a second aircraft VH-EKH, broadcast their position 7 NM south west of Wagga, approaching 3,000 ft. They reported having conducted an overshoot from the runway 23 VOR/DME approach and requested that KEQ climb to 4,000 ft to facilitate separation. Both aircraft subsequently landed safely from the runway 05 VOR/DME approach.</p> <p>At the time of the occurrence, the ATS Sector 2 and 8 positions were combined. The two crews' initial estimates for Wagga Wagga differed by 8 minutes and the controller's expectation was that the first SAAB would have already landed by the time the second SAAB transferred to the MBZ. The controller is reported to have recognised the conflict between the aircraft and had passed traffic information to the crew of EKH as they initiated a missed approach from the runway 23 VOR/DME procedure. Communication between the two crews was subsequently established on the area VHF frequency with EKH at 7 DME on the overshoot from runway 23 and KEQ on the 10 DME arc and inbound for runway 05. The controller did not pass traffic information to the crew of KEQ.</p> <p>Following this occurrence, ATS team leaders briefed controllers on the importance of anticipating aircraft separation when issuing traffic information.</p>
199802455	'The aircraft was observed to overfly the aerodrome and make a left circuit for a landing on runway 08, contrary to the instruction published in the ERSA. On the following day, a second aircraft was observed to make a left turn after take-off from runway 08.
199802974	'A foreign military transport aircraft with no external lighting departed Kalgoorlie on a westerly track without making any transmissions on the MBZ frequency. The first broadcast from this aircraft, on the area frequency, gave its position as 10 miles west of Kalgoorlie and maintaining 4,000 ft. The pilot of a Cessna Corsair, inbound to Kalgoorlie from the west, was descending through 4,500 ft when he heard this transmission. The Corsair pilot climbed his aircraft to 5,000 ft and maintained this altitude until he visually confirmed that he had passed the outbound military aircraft.

199803845	'The pilot had landed the aircraft on runway 14 and while backtracking along the runway, he noticed a Cessna 210 on late finals to the same runway. Despite being advised that the runway was occupied, the pilot of the Cessna reported that he was continuing with the landing. The Cessna landed while the Piper still occupied the runway.
199804347	'VH-KEU was conducting GPS approaches to runway 18 at Avalon airport. While in the holding pattern north of Avalon the crew heard VH-WXY taxiing at Avalon. On leaving the holding pattern the crew made an broadcast on the Avalon MBZ frequency advising intentions. There was no response from any other traffic. At 5NM on final for runway 18 the crew made a 5 mile final broadcast advising the intention to conduct a missed approach over the runway 18 threshold. Again there was no response from any other traffic.  Overhead the threshold at approximately 500ft AGL the crew heard a broadcast from Avalon flying operations to WXY advising that there was a Metro inbound to his right. WXY had just become airborne from a grass strip, tracking to the west. The Metro crew sighted WXY and had to make a hard right turn and climb to avoid the aircraft.  WXY was being operated by a flying training organisation based at Avalon. The aircraft was on a training flight and had departed from an east/west grass strip located to the east of the runway 18 threshold. The grass strip was one of a series of strips that were prepared and used by a previous manufacturer based at Avalon; however none of the strips were depicted on any of the relevant aerodrome charts.  The Metro crew advised that they were not aware of any grass strips at Avalon. Accordingly, even if the Metro crew had heard a broadcast from WXY they may not have associated any broadcasts that included reference to runway 27 as being applicable to Avalon.  The pilot of WXY advised that he made taxiing, entering and backtracking, and departure calls but did not get a response, nor did he hear any broadcasts from the Metro. He did however, receive and respond to a broadcast from the Metro crew while in flight after the incident. Although the Metro crew heard the taxiing call extensive hangarage may have masked radio reception by both aircraft when WXY was in the area of the grass strips.
199804584	'The Beech B58 aircraft was observed by radar to pass through the Ballina MBZ at 1,500 ft. The crew of an inbound Regular Public Transport (RPT) aircraft decided to maintain 2,000 ft when they could not make contact with the pilot of the B58. Communication between the two crews was established when both were overhead Ballina airfield. The B58 pilot reported that he had made the required radio call when he entered the Ballina MBZ.
199804976	'The crew of the Shorts 360 was aware that an ultralight aircraft was also in the circuit when they landed. They indicated by radio that they would need to backtrack after landing and cautioned the ultralight pilot about wake turbulence from their aircraft. When the crew turned the aircraft to backtrack, they found that the ultralight had landed on the same runway behind them. Another ultralight pilot at Bundaberg debriefed the ultralight pilot on his actions soon after the incident. The occurrence was also reported to the AUF.
199804984	'Prior to departing Lismore the pilot of VH-AMB transmitted taxi and departure reports on the Lismore/Casino/Ballina MBZ frequency but received no replies. He then contacted Brisbane centre for a radar information service and was advised that there was no radar observed traffic. Following his departure report to Brisbane Centre the pilot of AMB was contacted by the pilot of VH-SBA to arrange separation. SBA had departed from Casino. Subsequently, the pilots established that they had both transmitted the required MBZ reports but neither had heard the others transmissions. The pilot of AMB saw SBA pass underneath his aircraft.
199805377	'After departure the pilot contacted ATC and was informed that VH-CZE had been in potential conflict with an RAAF F111 which had briefly entered the Ballina MBZ from the Evans Head restricted area before abruptly turning to leave the MBZ. The two aircraft had been about four miles apart at the same altitude as CZE turned left after

	takeoff on runway 24. The pilot of CZE indicated that the F111 had not reported on the MBZ frequency; nor had the crew seen it.
199805536	<p>'VH-TQL was inbound to Williamtown from Sydney and the crew monitored the mandatory broadcast zone (MBZ) frequency to determine the Williamtown traffic situation. VH-ZMI was taxiing for a local flight and subsequently departed from overhead Newcastle on climb to 1,500 ft. When TQL entered the MBZ the crew limited their descent to 2,500 ft and attempted to contact the pilot of ZMI on both the MBZ frequency and the national advisory frequency (NAF) without success. The crew descended and subsequently heard the pilot of ZMI report overhead the airfield at 4,000 ft, on the MBZ frequency</p> <p>The investigation revealed that the pilot of ZMI departed Williamtown for Newcastle City, then tracked across to Mt Sugarloaf, then back to Raymond Terrace and then overhead Williamtown. The pilot of ZMI did not hear the inbound call of TQL because he would have been on the Pelican CTAF frequency of 126.0 MHz when that call was made. The vertical dimensions of the Pelican CTAF was to 3,000 ft. The pilot of ZMI was sure that he would have made an inbound call on the Williamtown MBZ frequency. He did not monitor the NAF.</p>
199805537	'The pilot of VH-SLJ lined up and commenced a take-off run from runway 12 at Williamtown. The crew had broadcast on the mandatory broadcast zone (MBZ) frequency, that their aircraft was lining up and rolling. As the crew commenced the take off roll, they sighted a Navajo entering the reciprocal runway 30 threshold.
199805572	'The crew of an RPT aircraft on the ground at the terminal reported that the pilot of VH-HWC flew across runway 29 at 50-100 ft AGL in front of parachutists who had earlier jumped from the aircraft. The pilot then performed a steep climbing turn on to an upwind leg for runway 11. The incident was reported to CASA.
199805845	'VH-PNV was preparing to depart Wynyard Aerodrome. The pilot made the necessary MBZ broadcasts and received replies from VH-EXC and VH-OZT. As PNV was taxiing and approaching the abandoned runway 27 the pilot heard a broadcast from HTL advising it was departing from 27. The pilot of PNV could not see HTL at the threshold of the active runway 27 and subsequently stopped just short of the abandoned 27 to determine HTL's position. The pilot called HTL and received confirmation from HTL of his position on 27. The pilot advised HTL he was located on the abandoned runway and that the departure runway was 200 metres to his left. HTL then departed from the abandoned runway, passing 5 metres from the nose of PNV. The pilot did not respond to further radio calls. PNV broadcasted a caution to the arriving aircraft EXC and OZT.
199900753	'VH-TNU was established on final approach for runway 14 when the crew noticed that a Cessna 172 (VH-KZG) was taking off from runway 07. KZG then turned right at about 500 ft after takeoff. The crew of TNU did not hear any response to radio transmissions they made during descent and circuit entry. The pilot of KZG later said that he had responded to most of the transmissions from TNU.
199900998	<p>'The crew of the Embraer Brasillia were unable to contact the pilot of an inbound aircraft that had been passed as traffic for their departure. The Brasillia had lined up for departure on runway 28 and requested the radar controller provide the radar position of the inbound aircraft. As the inbound aircraft appeared to be tracking for a straight in approach on runway 10, the crew vacated the runway.</p> <p>The pilot of the inbound aircraft stated that he established communication with the crew of the Brasillia at approximately 3 NM and established the runway in use. He was aware that the aircraft was holding position and was keen to expedite his arrival. He joined the circuit at low level and completed a circling approach.</p> <p>The pilot of the inbound aircraft was aware of the taxiing aircraft and indicated that he had made the usual broadcasts on the MBZ frequency. He indicated that terrain shielding often makes radio communication difficult in this area, especially when conducting an approach in VMC at low level.</p>
199901283	'A witness reported that the Partenavia PN68 entered runway 36 at high speed from taxiway Whiskey at Learmonth. The Fokker F27 that was exiting runway 36 at taxiway Whiskey had to brake hard to avoid a collision.

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	<p>The investigation revealed that the terminal area was busy at the time of the occurrence and that the pilot of the PN68 reportedly did make a taxiing call. Learmonth is an uncontrolled aerodrome and mandatory broadcast zone procedures were to be used to enable crews to self-separate. The PN68 pilot considered that there was ample time and separation, and suggested that the crew of the F27 over-reacted.</p>
199901410	<p>'The pilot of the DHC-8 reported that while conducting operations in the MBZ, he decided to execute a missed approach after being advised that following traffic was at a distance of 4 NM in his 4-o'clock position.</p> <p>The operator advised that the crews of the two aircraft did not adequately resolve the apparent traffic conflict that existed.</p>
199901622	<p>'While VH-JJT was backtracking on runway 13 at Gove after conducting an instrument approach, VH-NJN became visual on final approach, also for runway 13. The airport safety officer reported that NJN continued the approach until very late final before executing a missed approach.</p> <p>The crews of both aircraft were in radio contact with each other on the Gove MBZ frequency. After landing, the crew of JJT advised the crew of NJN that JJT was backtracking on runway 13 and would shortly be clear of the runway. The pilot in command of NJN elected to continue the approach, anticipating that JJT would clear the runway in sufficient time to permit NJN to land. When it became apparent that JJT would not be clear of the runway, the pilot in command of NJN discontinued the approach.</p> <p>Examination of the Flight Recorder data from NJN revealed that the vertical separation between the aircraft during the missed approach was not less than 300 ft.</p>
199901746	<p>'The pilot of a Cessna 172 (C172) inbound to Mount Isa from the north-east alerted the crew of a departing Airbus Industrie A320 of the C172's position and intentions. The A320 crew was further assisted by the traffic alerting and collision avoidance system (TCAS) and the C172 was visually sighted and avoided. A TCAS traffic advisory sounded as the C172 passed below and to the left at approximately half of one mile. The pilot of the C172 had sighted the A320.</p> <p>The pilot of the C172 was a local pilot, who had been conducting some familiarisation flying in the local training area (Danger Area D738) near Lake Moondarra to the north-east. The danger area was within the confines of the mandatory broadcast zone (MBZ). Aeronautical Information Publication (AIP) Australia GEN 3.3 -17 Section 4.6 detailed MBZ procedures and states that MBZ frequencies "are used by pilots to provide advisory traffic information to other aircraft and to arrange mutual segregation". There was no AIP requirement for the C172 pilot to respond to broadcasts made by the A320 if he considered his aircraft was segregated.</p> <p>The investigation revealed that the A320 became airborne from runway 34 with a slight downwind. This resulted in the aircraft tracking lower and further out than normal before commencing the right turn. The low departure was exacerbated by the A320 levelling out in an attempt to visually acquire the C172. The pilot of the C172 had been operating in a published danger area and was monitoring the MBZ frequency. Although in a non-radar environment, the C172 pilot had activated the aircraft's transponder to alert TCAS equipped aircraft of his presence. The pilot of the C172 did not consider that the A320 would conflict with his aircraft based on his experience with large aircraft departure profiles. The pilot of the C172 made an inbound call as an "all stations" broadcast when departing the training area 7 NM north-east of Mt Isa in accordance with the AIP.</p>
199901910	<p>'The pilot of the Cessna 182 reported that shortly after takeoff, he saw a Beechcraft Kingair on short final for the reciprocal runway. The pilot of the Cessna had to turn sharply to avoid the other aircraft. The Cessna pilot reported that he had made the appropriate radio transmission while taxiing for departure, but had not heard any broadcasts from the pilot of the Kingair. The Cessna pilot also stated that he had completed his preflight preparations and engine run-ups earlier. Therefore he had only been taxiing for a short period of time before takeoff.</p>

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The pilot of the Kingair reported that he had not heard any radio broadcasts from the pilot of the Cessna. Maintenance personnel carried out an inspection of the Cessna's radio system and it was established that the push to talk switch had failed. This resulted in all of the pilot's radio broadcasts being unmodulated carrier wave transmissions.

As a result of this and other occurrences regarding self-separation procedures at uncontrolled aerodromes, the Bureau has issued several interim recommendations and recommendations to the Civil Aviation Safety Authority. Recommendation R199800071 concerns identification of radio failures.

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199902409 'The crew report that on several occasions their radio broadcasts on the MBZ frequency were over transmitted by a recorded message from the Aerodrome Frequency Response Unit (AFRU). The aerodrome operator reported that other aircraft had previously experienced similar problems with the unit.

An upgrade to the equipment's hardware was carried out in an attempt to rectify the situation.

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199902529 'The crew of VH-NJW were on descent into Proserpine and received a TCAS alert on another aircraft 7 NM ahead and 1,000 ft below. The crew of NJW took avoiding action and attempted to establish contact with the other aircraft on the MBZ frequency. ATC later identified the other aircraft as VH-NFP. The pilot of NFP reported having radio problems at the time and subsequently discovered that the headset jack was faulty.

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199903404 'Prior to their departure for Coffs Harbour, the crew of a BE1900 reported they did not receive any responses to their traffic broadcasts on either the area frequency or the MBZ frequency. The only response to their transmissions on the MBZ frequency was from the Aerodrome Frequency Response Unit (ARFU).

Just after takeoff, the crew observed a single-engine aircraft in their 12 o'clock position, at approximately 1,200 ft AGL. They identified the aircraft as a Mooney type. They manoeuvred clear of the other aircraft and attempted, unsuccessfully, to make radio contact with its pilot.

The identity of the Mooney aircraft could not be positively determined. FS had advised it was probably VH-ERS, a VFR Mooney tracking south to Taree. The pilot of ERS stated that at approximately 10 NM from Port Macquarie he had broadcast his intentions on the MBZ frequency, shown on the VNC, but had not heard any other traffic. He could not recall hearing any AFRU response. He had tracked coastal, to the east of Port Macquarie airfield, to avoid low cloud. The Port Macquarie aerodrome 'logger', which records all radio transmissions on the MBZ frequency, had not recorded any transmissions from ERS on that day.

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199904103 'The crew of the B1900 reported that they passed approximately 200 ft above a C152 at a position 5 NM northwest of the aerodrome. At the time they were passing 2,200 ft on descent and tracking to join downwind for runway 03. They had made 3 transmissions to other traffic on the MBZ frequency but had not heard any transmissions from the C152. Radio contact with the C152 was subsequently established and the aircraft identified.

The C152 was conducting dual flying training in the training area associated with Port Macquarie aerodrome. The instructor reported there had been frequent dialogue between himself and the student via the aircraft intercommunication system and this may have masked the radio reception. The instructor made the observation that the direct track from Kempsey to Port Macquarie passed through the training area.

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199904196 'When VH-XFB, a Jetstream 32, was inbound to the airport the crew made radio transmissions to advise other traffic of their presence. Other pilots in the area responded, including the pilot of VH-DMP. The pilot of XFB indicated that they would conduct a practice NDB approach and asked other traffic to remain below 2,000 ft. The pilot of DMP reported that he would conduct a touch and go then depart for Gayndah. Subsequently, communications with DMP were lost. When XFB was passing 3,000 ft on descent their TCAS system commanded a climb to avoid other traffic. The aircraft

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was climbed to 4,800 ft before the confliction was cleared.

The pilot of DMP was on his first solo navigation exercise, having previously conducted training navigation exercises to Bundaberg. He had conducted a touch and go and then had turned to set heading from overhead the airport, while climbing to 4,500 ft. He had XFB in sight and indicated that by radio.

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199904524 "The Jetstream and the Seneca were estimating the circuit area at Bundaberg at approximately the same time. The crew of each aircraft was in radio contact with the other. The crew of the Jetstream elected to carry out a straight-in approach to runway 32 and requested that the pilot of the Seneca allow the Jetstream to land first. The pilot of the Seneca concurred with the request and acknowledged that the Jetstream was in sight. When the Jetstream was on final for runway 32 at 3 GPS, the crew received a TCAS resolution advisory (RA) to climb. The crew then observed the Seneca pass underneath their aircraft passing from left to right in a descending turn onto final for runway 32. The crew of the Jetstream climbed in accordance with the RA and joined the circuit upwind to land after the Seneca. The pilot of the Seneca maintained visual contact with the Jetstream at all times and did not believe it was necessary for the crew of the Jetstream to climb and conduct an overshoot. The pilot of the Seneca estimated that his aircraft was 100 ft lower than the Jetstream with 400 ft horizontal separation when the crew of the Jetstream initiated the climb.

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199904571 "The air/ground radio service operator reported that the aircraft taxied and departed without the crew making the appropriate MBZ radio transmissions. There were no other aircraft in the area at the time.

Operating procedures required the crew to tune the aircraft's No 1 VHF set to the flight service area frequency and the No 2 set to the company frequency. Immediately prior to taxiing the crew would normally select the MBZ frequency on the No 2 set and make a taxi broadcast. The operator believes that the crew probably did not confirm the frequency selection on the No 2 VHF radio prior to making the MBZ taxi broadcast. Consequently, this transmission was transmitted on the company frequency instead of the MBZ frequency.

During the remainder of the air/ground radio service trial period, the aircraft operator has requested that the air/ground radio service operator notify flight service to enable officers to advise flight crews of non-compliance with MBZ procedures.

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199904771 "The crew of a Dash 8 reported on the mandatory broadcast zone frequency that they were inbound to Dubbo, at a position 40 NM south-east, and on descent from FL180. The only response to this transmission was from the pilot of a Piper Cherokee who advised that he was approximately 15 NM east of Dubbo at 4,000 ft and inbound. Approaching 4,000 ft the crew of the Dash 8 requested the position of the Cherokee. The pilot advised that he was now 8 NM from Dubbo and descending to 2,400 ft. They then asked the pilot if he was south of "the highway".

The pilot of the Cherokee confirmed that he was south of "the highway". The crew of the Dash 8 indicated that they would remain north of the highway and join a 5 NM final approach to runway 23, and requested that he remain south.

When the crew subsequently reported that they were 5.5 NM from Dubbo and about to turn final for a straight-in approach to runway 23, they observed a Piper Cherokee pass from their right to left at an estimated distance of 400 m and 200 ft below.

Weather conditions at the time were reported to be CAVOK.

"The highway" to which the crew was referring was the Mitchell Highway that runs south-east from Dubbo to Wellington, almost directly beneath their track.

The pilot of the Cherokee, who held a private licence, was undertaking a solo navigation exercise as part of the training for upgrading to a commercial licence. He reported that he was just north of his planned track from Gulgong to Dubbo. When asked by the crew of the Dash 8 if he was south of the highway he assumed that they

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were referring to the Dubbo to Dunedoo road, aligned east-north-east from Dubbo and that he could see to his north. He was not familiar with the Dubbo area and was not aware of the existence of the Mitchell Highway although this road was annotated as a highway on his visual navigation chart. Additionally, he thought that the Dash 8 would pass behind him and join for a 5 NM final north of this road.

The use of a line feature to assure separation between aircraft is an accepted and generally sound technique. However, the use of the generic term "the highway" by the crew of the Dash 8 introduced an ambiguity that neither the crew of the Dash 8 nor the pilot of the Cherokee was aware of at the time. Specifying the road by name or description should have removed this ambiguity.

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199904832 'The pilot of VH-EWV was taxiing towards the runway when he looked and saw VH-UAA taking off in front of him. He stopped immediately, and UAA took off in front of him. The pilot had not noticed a take off broadcast from UAA.

An air-ground radio operator trial was in progress at the time. The air-ground radio operator issued an instruction to the pilot of EWV to hold position. The role of an air-ground radio operator is to provide information and not to give instructions, however the air-ground radio operator considered his actions to be reasonable in the circumstances.

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199905231 'The pilot of a Chieftain conducting a scheduled passenger service reported inbound to Dubbo at 15 NM west, and advised that he intended to make a straight-in approach to runway 05. At the time there were several other aircraft also inbound to Dubbo, including a Gazelle returning from a local training flight. At 1642 eastern summer time, the pilot of the Gazelle reported that he was joining downwind for runway 05. Thirty seconds later the pilot of the Chieftain advised that he was on a 5 NM final to runway 05. He then interrogated the pilot of another inbound company aircraft as to his intentions but did not acknowledge the report from the pilot of the Gazelle.

The pilot of the Chieftain later reported that he saw the two other aircraft that were established on downwind but had not sighted the Gazelle. He reported that the small size of the Gazelle and its green colour made it difficult to see. He was expecting the Gazelle to land ahead of him and asked its pilot if he intended to backtrack on the runway after landing. The transmission did not include the callsign of his aircraft. The pilot of the Gazelle indicated that he would not backtrack, and thought that this request was from the pilot of one of the aircraft on downwind. These transmissions were followed by further requests from other aircraft relating to position information, causing frequency congestion and some jamming. During these transmissions the pilot of the Gazelle advised that he was on downwind abeam the threshold, and later that he was on base leg.

The pilot of the Chieftain sighted the Gazelle as it turned onto final, he immediately banked right away from the Gazelle and advised that he had the aircraft in sight. The pilot of the Gazelle initiated a go-around, while the pilot of the Chieftain continued his approach and landed normally.

The procedure for a straight-in approach in the Aeronautical Information Publication (AIP ENR 1.1-62 para. 59.6 (f)) stated quite clearly that the landing priority be given to traffic established on base leg or final approach. In this instance the pilot of the Gazelle had provided adequate position information for the pilot of the Chieftain to be able to establish that relationship even though frequency congestion at the time did not permit the pilots to respond directly to one another's transmissions.

Notwithstanding this requirement the traffic density and the mix of aircraft types of different performance approaching to land at that time, was such that it would have made compliance with straight-in approach procedures almost impossible. Further, the pilot of the Chieftain continued his approach despite having failed to see and positively identify all the conflicting traffic.

Following this incident the Chief Pilot of the airline emphasised to all the company pilots the requirements of the straight-in approach procedure and the need to resolve

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	traffic conflicts. This aspect will be emphasised in the company training and checking program.
200000167	'The crew of a Dash 8 on long final approach to runway 36 were unable to clearly establish the intentions of the pilot of an RV-6, who had reported being established on the downwind leg for runway 27. Consequently, the crew of the Dash-8, unable to sight the aircraft, conducted an overshoot and climbed to 2,000 ft as a precautionary measure. Witnesses on the ground reported sighting the RV-6 behind and below the Dash-8 on the extended centreline of runway 36, when the Dash-8 commenced its overshoot. The Dash-8 subsequently landed on runway 09 after the pilot of the RV-6 had reported landing on runway 36.
200000290	'The crew of the Saab 340 started monitoring the MBZ frequency 33 NM from the airfield while the aircraft was on descent. When the aircraft was 20 NM from the airfield, the crew made an inbound radio broadcast and advised their intentions on the MBZ frequency, but did not receive a response from the Aerodrome Frequency Response Unit (AFRU). The crew noted that there was a current NOTAM that reported that the AFRU was operating intermittently on reduced range. No other traffic responded to the inbound radio broadcast. The crew made a further radio broadcast when the aircraft was approaching an altitude of 3,000 ft. The pilot of a helicopter responded to this broadcast and advised that the helicopter had departed the airfield. The crew of the Saab advised that they would maintain 2,800 ft until they had passed the helicopter. The helicopter pilot responded that he was also maintaining 2,800 ft and was 7 NM from the airfield. The Saab was also at 7 NM and was maintaining 2,800 ft in cloud. The pilot of the helicopter subsequently advised that he had the Saab in sight. A review of audio recordings indicated that the pilot of the helicopter made taxi and departure broadcasts on the MBZ frequency. It is likely that these broadcasts were made after the time that the crew of the Saab started monitoring the MBZ frequency. The investigation did not determine why the crews of both aircraft did not appear to hear radio broadcasts from each other.
200000309	'The Jandakot GAAP CTR was deactivated and aircraft were operating at night in accordance with the local aerodrome MBZ procedures.  The crew of Beechcraft Bonanza VH-SIB had been conducting circuit operations within the Jandakot MBZ and had broadcast their intention to conduct a full stop landing. After landing, they taxied their aircraft along the runway to vacate via the next lighted taxiway. They had initiated a turn off the runway centre-line, when the instructing pilot observed Mooney aircraft VH-SPN passing directly overhead. He estimated that there was approximately 10 ft of vertical separation between the tail of his aircraft and the Mooney, which had just become airborne. A witness estimated that the Mooney became airborne 100 - 200 metres before the taxiway and confirmed that the Mooney had overflown the Bonanza while it was still on the runway.  The pilot of the Mooney reported that he did not see another aircraft on the runway at any stage during his take-off and was unaware that the runway was occupied. He reported that he is required to wear glasses while operating an aircraft and confirmed that he was wearing these on the evening of the occurrence. The pilot of the Bonanza indicated that his aircraft's strobe lighting, navigation lights and rotating beacon were all working at the time of the incident. A witness verified that the Bonanza's external lighting was operating normally and visible at the time of the incident.  The pilot of the Mooney had made a broadcast on the MBZ frequency to indicate that he was lining up on the runway. The Bonanza pilot did not hear this transmission and was unaware another aircraft had lined up behind them. There was no direct communication between the pilots of the two aircraft.  The Mooney pilot had failed to detect the presence of another aircraft on the runway prior to initiating and then during his take-off roll.
200000637	'VH-TQS, a de Havilland Dash 8 (Dash 8) was inbound to the Port Macquarie mandatory broadcast zone. The pilot in command transmitted a broadcast that they would be conducting a straight in approach for runway 03. The pilot of another aircraft responded that they were conducting circuits from runway 03. The pilot of VH-SMH, a

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Beechcraft 1900 (Beech), then replied that they were taxiing for runway 21 in preparation for takeoff for Kempsey. Because of the other aircraft, the pilot of the Dash 8 broadcast that they would conduct a standard circuit prior to landing. However, the pilot of the Beech later reported that while their aircraft was accelerating for take off they heard a radio transmission but did not note what was said as they were busy with the takeoff and believed that the transmission was intended for the aircraft conducting circuits.

The pilot of the Dash 8 joined the upwind leg of runway 03 and remained at 2,500 feet in anticipation of the Beech remaining below 2,500 feet until clear of the circuit area. The pilot of the Dash 8 then observed the Beech aircraft about 400 feet directly ahead of them and climbing through their level. They immediately received a traffic alert and collision-avoidance system alert with a full red arc above level flight resolution advisory. The pilot of the Dash 8 reported that the Beech continued to climb away from them.

The pilot of the Beech reported that while turning left after takeoff, they observed the Dash 8 about three to four miles away. The pilot of the Beech reported that they believed that the Dash 8 was conducting a straight-in approach therefore they had conducted a climbing turn to the left with the intention of departing the circuit area before the Dash 8 arrived.

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20000679 'The crew of VH-OLM made the standard radio transmissions when departing from Casino for Sydney. Passing 4,200 ft in the climb they heard the pilot of VH-SCN report south of Casino at 4,800 ft. The crew of OLM maintained 4,300 ft and sighted SCN in their left front at about 500 metres distance. The pilot of SCN claimed to have made all standard radio transmissions, including a departure report from Lismore. His aircraft was equipped with two radios and he routinely listened out on two frequencies. He had seen the aircraft taking off at Casino but did not see the aircraft in the air. He had made the radio transmission to alert the other crew of his presence. Since this incident he has adopted a practice of submitting a flight notification.

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200006013 'The pilot in command of a Sikorsky (S-76C) helicopter reported that an aircraft had passed the helicopter at the same level, with 200-300 ft lateral separation, while operating in the vicinity of East Sale aerodrome. The aircraft was subsequently identified as a RAAF HS-748, callsign Hudson 505. At the time of the occurrence, East Sale airspace was uncontrolled, and Mandatory Broadcast Zone (MBZ) procedures were in place on frequency 118.3 MHz.

The S-76C had departed Longford Heliport, located approximately 7 NM south of East Sale. It was proceeding to East Sale on climb to 2,500 ft above ground level (AGL) to conduct a practice instrument landing system (ILS) approach for runway 22. Another RAAF HS-748, callsign Hudson 24, was operating in the circuit at East Sale and preparing to conduct an ILS approach for runway 22.

As the S-76C approached East Sale, the crew of Hudson 24 broadcast that they were turning inbound on the ILS, and would be making a full stop landing. At about the same time, the crew of Hudson 505 broadcast that they were departing to the north-east of East Sale and passing 1,700 ft AGL. However, Hudson 505 was actually to the south-west of the aerodrome, and was turning to the left to track back over the East Sale non-directional beacon (NDB) prior to its departure to the north-east.

The S-76C crew, believing that Hudson 505 was north-east of East Sale and clear of their approach, continued inbound to overhead the East Sale NDB. When the S-76C was approximately 3 nm south of the East Sale NDB, maintaining 2,500 AGL, the crew observed Hudson 505 passing in front of the S-76C from left to right, at the same level and in close proximity. At the same time Melbourne Centre called Hudson 505 on frequency 124.0 MHz and advised the crew that unidentified traffic was half a mile to the south-west of the aircraft. The crew of Hudson 505 subsequently reported that they did not see the S-76C.

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A full report is available on the ATSB website [www.atsb.gov.au](http://www.atsb.gov.au) or from the Bureau on

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