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MBZ Report

An Examination of Airspace-Related Occurrences in Mandatory Broadcast Zones between 2001 and 2004

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Abstract

This report follows a previous report published by the Australian Transport Safety Bureau (ATSB) in 2003 on airspace-related occurrences titled *Airspace-Related Occurrences Involving Regular Public Transport and Charter Aircraft within Mandatory Broadcast Zones*. The 2003 report provided a detailed examination of the ATSB's accident and incident data for airspace-related occurrences in Mandatory Broadcast Zones (MBZs), between 1994 and 2001. In recognition of changes in traffic levels, occurrence reporting rates and the classification of incidents following the enactment of the Transport Safety Investigation Act in 2003 (ATSB, 2003b), an update of the analyses was considered necessary. The purpose of the current report was to examine occurrences associated with MBZs in Australia using the ATSB aviation occurrence database. Specifically, the objectives of the report were to (i) examine the number of occurrences involving General Aviation (GA) aircraft in addition to occurrences involving Regular Public Transport (RPT) aircraft that occurred in MBZ airspace from 2001 to 2004, and (ii) examine the number of occurrences involving GA aircraft and RPT aircraft that were associated with intentional and unintentional non-compliance with MBZ procedures from 2001 to 2004. In total, 257 airspace-related occurrences in MBZ airspace involving GA aircraft and RPT aircraft for 2001 – 2004 were identified. Of these, 145 involved intentional non-compliance with MBZ procedures and 25 involved unintentional non-compliance with MBZ procedures. Examination of the data revealed that the number of airspace-related occurrences declined from 3.9 in 2001 to 3.1 per 100,000 hours flown by GA and RPT aircraft in 2002 and remained at 3.1 for 2003 and 2004. Furthermore, the number of intentional non-compliance occurrences decreased from 2.6 per 100,000 hours flown by GA and RPT aircraft in 2001 to 1.4 in 2004. Overall, the findings suggest that the number of MBZ airspace-related occurrences in Australia between 2001 and 2004, including those specifically relating to non-compliance with MBZ procedures, was relatively low. Importantly though, due to recent changes and potential inconsistencies in the reporting and recording of occurrences, the findings on which these conclusions are based need to be interpreted with caution.

EXECUTIVE SUMMARY

This report follows a previous report published by the Australian Transport Safety Bureau (ATSB) in 2003 on airspace-related occurrences titled *Airspace-Related Occurrences Involving Regular Public Transport and Charter Aircraft within Mandatory Broadcast Zones*. The 2003 report provided a detailed examination of the ATSB's accident and incident data for airspace-related occurrences in Mandatory Broadcast Zones (MBZs), between 1994 and 2001. In recognition of changes in traffic levels, occurrence reporting rates and the classification of incidents following the enactment of the *Transport Safety Investigation Act* in 2003 (ATSB, 2003b), an update of the analyses was considered necessary.

The purpose of the current report was to examine occurrences associated with MBZs in Australia. Specifically, the objectives of the report were to:

- examine the number of occurrences involving General Aviation (GA) aircraft in addition to occurrences involving Regular Public Transport (RPT) aircraft that occurred in MBZ airspace from 2001 to 2004; and
- examine the number of occurrences involving GA aircraft and RPT aircraft that were associated with intentional and unintentional non-compliance with MBZ procedures from 2001 to 2004.

MBZ occurrences were identified using the ATSB aviation occurrence database and subsequently validated by two ATSB Senior Transport Safety Investigators. The occurrences were then examined according to three different criteria. The first criterion encompassed all airspace-related occurrences within MBZs. The second criterion related to only those occurrences where the pilot intentionally mis-complied with MBZ procedures. In contrast, the third criterion related to only those occurrences where the pilot unintentionally mis-complied with MBZ procedures.

In total, 257 airspace-related occurrences in MBZ airspace involving GA aircraft and RPT aircraft for 2001 – 2004 were identified. The highest number of occurrences took place in 2001 and were classified as a Category 5. The number of airspace-related occurrences declined from 3.9 in 2001 to 3.1 per 100,000 hours flown by GA and RPT aircraft in 2002 and remained at 3.1 for 2003 and 2004. These findings suggest that the number of MBZ airspace-related occurrences declined slightly over the four-year period. The findings contrast with those presented in the 2003 report (Figure 1, page 9), which showed an increase in airspace-related occurrences between 1994 and 2001 (ATSB, 2003a).

Of the airspace-related occurrences identified, 145 involved intentional non-compliance with MBZ procedures and 25 involved unintentional non-compliance with MBZ procedures. Most of the non-compliance occurrences were in 2001 and were classified as a Category 5. The number of intentional non-compliance occurrences decreased from 2.6 per 100,000 hours flown by GA and RPT aircraft in 2001 to 1.4 in 2004. This finding suggests that the number of occurrences involving non-compliance generally declined over the 2001 – 2004 period. In contrast, the rate for unintentional occurrences remained below 1 per 100,000 hours flown and did not appear to vary across the four-year period.

Overall, the findings suggest that the number of MBZ airspace-related occurrences in Australia between 2001 and 2004, including those specifically relating to non-compliance with MBZ procedures, was relatively low. Furthermore, the findings

suggest that the rate of MBZ-related occurrences did not rise during this period. It may therefore be deduced that the risk due to MBZ-related occurrences did not increase. Importantly though, due to recent changes and potential inconsistencies in the reporting and recording of occurrences, the findings on which these conclusions are based need to be interpreted with caution.

ABBREVIATIONS

ATC	Air Traffic Control
ATSB	Australian Transport Safety Bureau
CTAF	Common Traffic Advisory Frequency
ERSA	En Route Supplement Australia
GA	General Aviation
MTAF	Mandatory Traffic Advisory Frequency
MBZ	Mandatory Broadcast Zone
NAS	National Airspace System
NM	Nautical Miles
RA	Resolution Advisory
RPT	Regular Public Transport
TCAS	Traffic Alert and Collision Avoidance System
TSI	Transport Safety Investigation
US	United States
VFR	Visual Flight Rules
VHF	Very High Frequency

INTRODUCTION

1.1 Objective of this Report

The purpose of this report was to examine occurrences associated with Mandatory Broadcast Zones (MBZs) in Australia. Specifically, the objectives of the report were to:

- examine the number of occurrences involving General Aviation (GA) aircraft in addition to occurrences involving Regular Public Transport (RPT) aircraft that occurred in MBZ airspace from 2001 to 2004; and
- examine the number of occurrences involving GA aircraft and RPT aircraft that were associated with intentional and unintentional non-compliance with MBZ procedures from 2001 to 2004.

1.1.1 Background

This report follows a previous report published by the Australian Transport Safety Bureau (ATSB) in 2003 on airspace-related occurrences, titled *Airspace-Related Occurrences Involving Regular Public Transport and Charter Aircraft within Mandatory Broadcast Zones* (ATSB, 2003a). The previous report provided a detailed examination of the ATSB's accident and incident data for airspace-related occurrences in MBZs between 1994 and 2001. In recognition of changes in traffic levels, occurrence reporting rates and the classification of incidents following the enactment of the *Transport Safety Investigation (TSI) Act* in 2003, an update of the 2003 report was considered necessary (ATSB, 2003b). This includes an update of Figure 1 (page 9 of that report), which showed MBZ airspace-related occurrences for GA and RPT aircraft between 1994 and 2001.

1.1.2 Transport Safety Investigation Act (2003)

The *Transport Safety Investigation Act* came into effect on July 1, 2003. Following its enactment, the criteria for reporting aviation incident data to the ATSB was revised and Category 5[1] occurrences were redefined. These changes resulted in a decrease in the number of occurrences recorded by the ATSB.

Previously, under the *Air Navigation ACT 1920*, Category 5 occurrences included incidents where the facts, as revealed by the circumstances, clearly indicated no

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1 A Category 5 refers to:

- An accident (including with fatalities) or serious incident involving a sport aviation aircraft unless foreign and required to be investigated under Article 26 of the Chicago Convention.
- An accident involving aircraft without fatalities where the potential safety lessons do not, after initial review, justify the commitment of investigative resources. Basic incident data will be filed for statistical purposes.
- A serious incident or incident involving aircraft where the potential safety lessons do not, after initial review, justify the commitment of investigative resources. Basic incident data will be filed for statistical purposes.

Further information on the investigation categories is available from the ATSB website at http://www.atsb.gov.au/aviation/occurs/operates.cfm.

need for safety action. With the introduction of the TSI Act, however, many of the incidents that would have been classified as a Category 5 are no longer classified. These include occurrences that are not considered a transport safety matter as defined in the TSI Act but which have been notified to the ATSB. Such occurrences are neither investigated by the ATSB nor included in the occurrence database.

A number of MBZ occurrences are among the unclassified incidents received by the ATSB. These include, for example, incidents where two GA aircraft have come into close proximity with each other within an MBZ, but neither aircraft were required to take avoiding action. This is regardless of whether one of the aircraft had not complied with an MBZ procedure. With the exclusion of such incidents from the database, it is likely that the number of MBZ airspace-related occurrences recorded by the ATSB has declined since July 2003.

1.1.3 Mandatory Broadcast Zones

The term 'Mandatory Broadcast Zone' (MBZ) was first used in December 1995, following a legislative name change from Mandatory Traffic Advisory Frequency (MTAF) areas. The change resulted from a desire to highlight and reinforce the mandatory requirements to make certain radio broadcasts. While the majority of MTAF areas became MBZs, some areas were changed to other airspace procedures, including Common Traffic Advisory Frequencies (CTAFs)[2]. There were no major procedural alterations associated with the name change from MTAFs to MBZs.

The term 'MBZ' refers to the airspace that surrounds a designated, uncontrolled aerodrome. MBZs may also exist at a controlled airport outside the operating hours of an Air Traffic Control (ATC) service, such as that which exists at Jandakot, Western Australia. As shown in Figure 1, the MBZ boundary for designated MBZ aerodromes is marked on visual navigation charts with a blue dotted circle.

The standard area of a MBZ has a radius of 15 nautical miles (NM) and a height of 5000 feet above the airfield elevation (Figure 2). Each MBZ is allocated its own Very High Frequency (VHF), which pilots use to arrange mutual separation. The carriage and use of VHF radio is mandatory for all aircraft operating in MBZs. The frequency for individual MBZs, in addition to information about non-standard MBZ dimensions, is published by Airservices in the *En Route Supplement Australia* (ERSA).

Information about MBZ locations and operating times is published in the ERSA. Appendix A provides a list of the first MBZ locations proposed by CASA in 2000.

2 A CTAF is a radio frequency on which pilots make positional broadcasts when operating in the vicinity of a non-towered aerodrome.

Figure 1. The MBZ boundary on the Visual Navigation Chart for Wagga Wagga aerodrome. The boundary is indicated by the blue circle (Source: Airservices Australia, 2005).

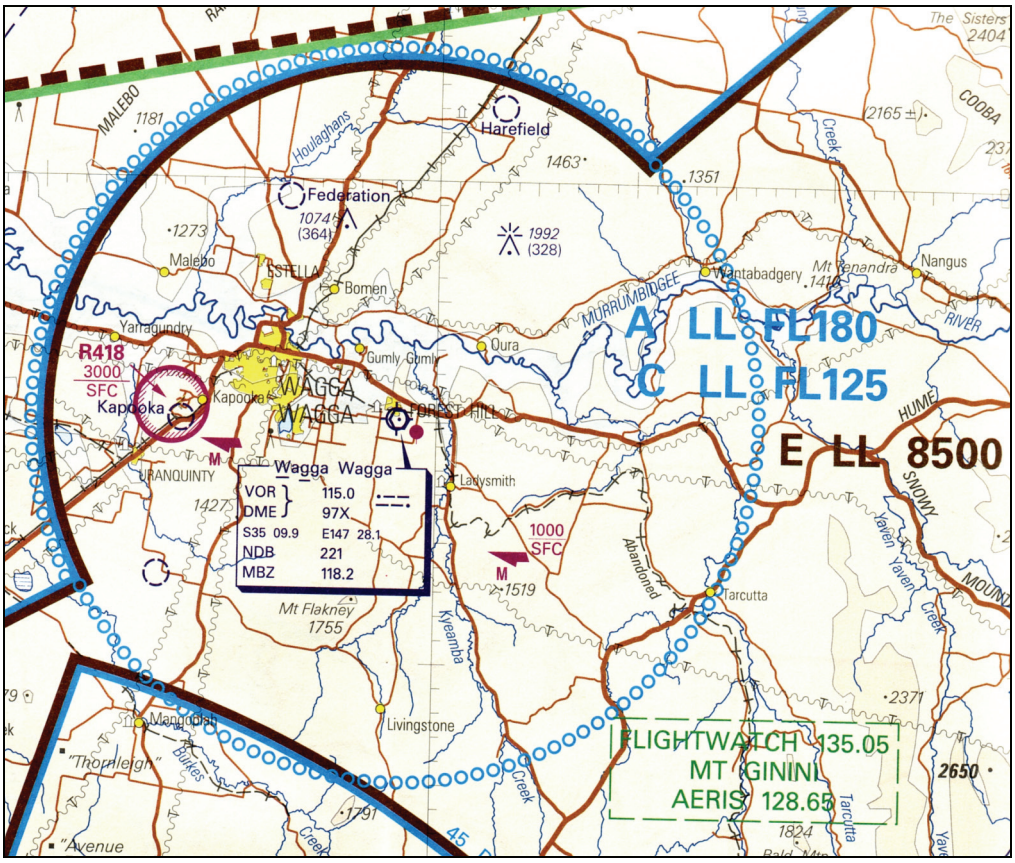
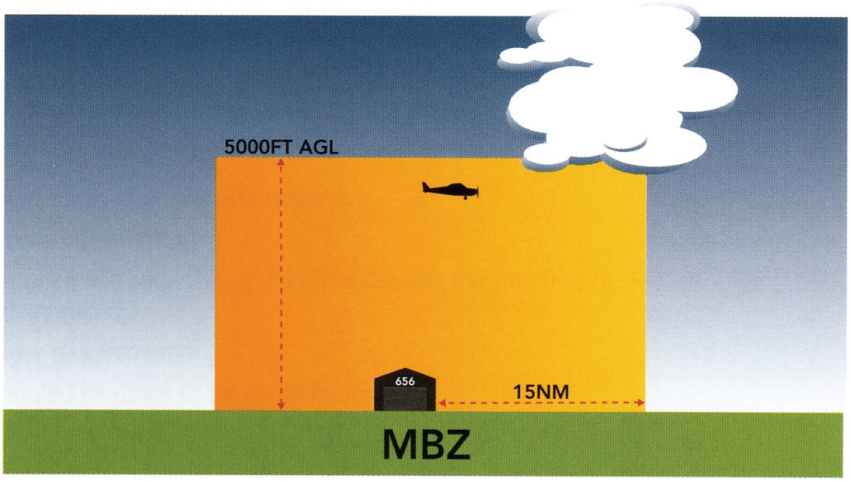


Figure 2. MBZ airspace boundaries (Source: CASA, 2001)



2 REVIEW OF THE LITERATURE

2.1 Previous ATSB Findings

In 2003, the ATSB published the report *Airspace-Related Occurrences Involving Regular Public Transport and Charter Aircraft within Mandatory Broadcast Zones*. Section 3 of that report examined all airspace-related occurrences involving GA (i.e. charter, private, business, and aerial work) and RPT aircraft within Australian MBZs (ATSB, 2003a).

The findings revealed that there were 573 MBZ airspace-related occurrences in the ATSB aviation occurrence database between 1994 and 2001. Of those identified, all were classified as either a Category 4 or Category 5 occurrence. No MBZ airspace-related accidents were identified.

Further examination of the data led to the following conclusions:

- Airspace-related incidents were reported at a rate between one and two per week between 1994 and 2001.
- RPT aircraft were involved in a large proportion of these occurrences.
- The rate of airspace-related occurrences reported in MBZs had increased significantly between 1994 and 2001.
- The percentage of airspace-related occurrences in MBZs which resulted in an air-miss did not significantly change over the 1994-2001 period.
- Non-performance of radio procedures within MBZs appeared to be the most common factor contributing to airspace-related occurrences.

Importantly, these findings must be interpreted with caution. As indicated throughout the 2003 report, there were significant limitations associated with the data. These limitations stemmed primarily from limited aircraft activity level data and reliance on reported occurrences. As such, it was not possible to account for movement rates and reporting tendencies.

2.2 Factors Contributing to MBZ Airspace-Related Occurrences

In the 2003 report, the ATSB presented a review of previous studies and a sample of ATSB aviation incident reports to determine the contributing factors of MBZ airspace-related occurrences (ATSB, 2003a). According to the review, the contributing factors can be classified into three broad groups. These include:

1. **Non-performance.** This refers to non-performance of MBZ operational requirements, and can be further divided into:
   a) Incorrect or no radio procedures – this includes non-performance occurrences where the radio was unserviceable; the pilot claims to have made a broadcast; or where no broadcast was recorded or reported.
   b) Other airspace procedures – this includes non-performance occurrences where poor airmanship was evident.

c) Other – this includes any other non-performance occurrences that do not clearly fit into the above two categories.

2. **Lack of operational awareness.** This refers to a lack of pilot situational or operational awareness.

3. **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.

These categories are important, because they provided a foundation upon which the occurrences involving MBZ airspace were examined in the current report.

3 METHODOLOGY

3.1 Analysis of the Occurrence Database

The analysis focussed on MBZ airspace-related occurrences involving GA (i.e. charter, private, business, aerial work) and RPT aircraft from 2001 to 2004. MBZ airspace-related occurrences were identified using the ATSB aviation occurrence database and subsequently validated by two ATSB Senior Transport Safety Investigators. Occurrences that involved non-compliance with MBZ procedures were then isolated from the data. These occurrences were divided into two different groups, which included occurrences involving intentional non-compliance with MBZ procedures and unintentional non-compliance.

3.1.1 Airspace-Related Occurrences within MBZs

Airspace-related occurrences were defined as those occurrences where there was a breakdown of defences relating to the use of airspace. This included occurrences where a pilot did not comply with MBZ procedures. It also included occurrences where a pilot did comply with MBZ procedures, but:

- incorrectly determined another aircraft's position;
- was unable to determine another aircraft's position;
- violated other airspace procedures; or
- did not visually identify an aircraft which had triggered a Traffic Alert and Collision Avoidance System (TCAS) Resolution Advisory (RA).

This definition was developed in order to calculate a comparable rate of occurrences to that reported in Figure 1 (p. 9) of the previous ATSB report (ATSB, 2003a).

3.1.2 Intentional Non-Compliance with MBZ Procedures

Occurrences specifically related to intentional non-compliance with MBZ procedures were isolated from the MBZ airspace-related data. Occurrences were categorised as intentional non-compliance with MBZ procedures if, based on the information available in the occurrence reports, all three of the following conditions were met:

1) the pilot was probably aware that MBZ procedures applied; and
2) the pilot should have been aware of not complying with mandatory procedures; and
3) there was no indication in the information that non-compliance was unintentional.

Examples of occurrences involving intentional non-compliance with MBZ procedures included those where:

- the pilot did not select the aircraft transponder in an MBZ;

- the pilot did not make the mandatory broadcasts;
- the broadcast content did not comply with MBZ requirements; or
- the pilot was operating contrary to circuit procedures.

3.1.3 Unintentional Non-Compliance with MBZ Procedures

In addition, occurrences specifically related to unintentional non-compliance with MBZ procedures were isolated from the MBZ airspace-related data. The reason for the non-compliance was evident in the limited information available in the unverified occurrences reported to the ATSB. Examples of occurrences involving unintentional non-compliance with MBZ procedures included those where:

- the pilot experienced radio frequency congestion;
- the radio failed;
- the aircraft radio transmission was intermittent;
- the pilot was monitoring incorrect radio frequency;
- the pilot selected the incorrect radio frequency;
- the MBZ broadcast was unreadable; or
- the pilot's headset was unserviceable.

3.1.4 Rate of MBZ Occurrences

In addition to determining the number of MBZ-related occurrences that took place between 2001 and 2004, aircraft activity levels were used to identify trends in activity that may have influenced the occurrence of airspace-related issues during this period.

The rate of aircraft activity was based on total hours flown in Australia by GA aircraft and regional airlines for 2001– 2004[3]. This rate was based on the assumption that trends in activity in the whole of Australia equated with trends in activity within MBZs. Although this approach is limited, it provided a proxy in the absence of a more accurate measure of total aircraft movements or hours flown within MBZs. More importantly, it replicated the approach used in the 2003 report, which also examined the rate of MBZ airspace-related occurrences (ATSB, 2003a). As such, it provided a useful rate for comparison.

3 The data for hours flown were based on estimates provided by the Bureau of Transport and Regional Economics (BTRE).

4 RESULTS AND DISCUSSION

The MBZ-related occurrences were examined according to three different criteria. These included: (1) airspace-related occurrences within MBZs; (2) intentional non-compliance with MBZ procedures; and (3) unintentional non-compliance with MBZ procedures. Due to limitations associated with movement rates, variations in accident and incident reporting, and recent changes to the system of Australian airspace system, the findings presented in this section need to be interpreted with caution.

4.1 Number of MBZ Occurrences

An examination of the ATSB aviation occurrence database identified a total of 257 airspace-related occurrences in MBZ airspace involving GA aircraft and RPT aircraft for 2001 – 2004 (Table 1). Most of the occurrences were classified as a Category 5 (n = 253). The remaining occurrences were classified as either a Category 4 (n = 3) or a Category 3 (n = 1). Appendix B provides a summary of the Category 3 and 4 occurrences that took place during the four-year period.

Table 1. Summary of MBZ occurrences associated with airspace and non-compliance for the period 2001 – 2004.

Year	2001	2002	2003	2004	Total
MBZ airspace*	78	60	59	60	257
Intentional non-compliance	53	32	34	26	145
Unintentional non-compliance	7	4	6	8	25

*Note: These categories are not mutually exclusive.

Of the 257 occurrences identified in the database, 145 involved intentional non-compliance with MBZ procedures. Since the ATSB generally does not verify the information provided in occurrence reports, the 145 that were categorised as intentional non-compliance with MBZ procedures were determined on the limited information available in the unverified occurrences that were reported to the ATSB. The highest number of occurrences were attributed to the pilot not making a mandatory broadcast (n = 111). In addition, a significant number of occurrences arose because the pilot did not monitor the MBZ frequency (n = 8), the pilot operated contrary to circuit procedures (n = 6), and the pilot did not turn the aircraft transponder on (n = 5). All of the intentional non-compliance occurrences were classified as a Category 5.

In addition, 25 occurrences between 2001 and 2004 involved unintentional non-compliance with MBZ procedures. Except for one Category 4 occurrence, all occurrences were classified as Category 5. Most of the occurrences were linked to a radio problem. For example, these included situations where the pilot selected the incorrect radio frequency (n = 7), the radio was unserviceable (n = 4), and the mandatory broadcast was restricted by frequency congestion (n = 2).

As shown in Table 1, the greatest number of occurrences associated with MBZ airspace and non-compliance with MBZ procedures occurred in 2001. This may suggest that a higher number of MBZ-related occurrences took place in 2001 or it

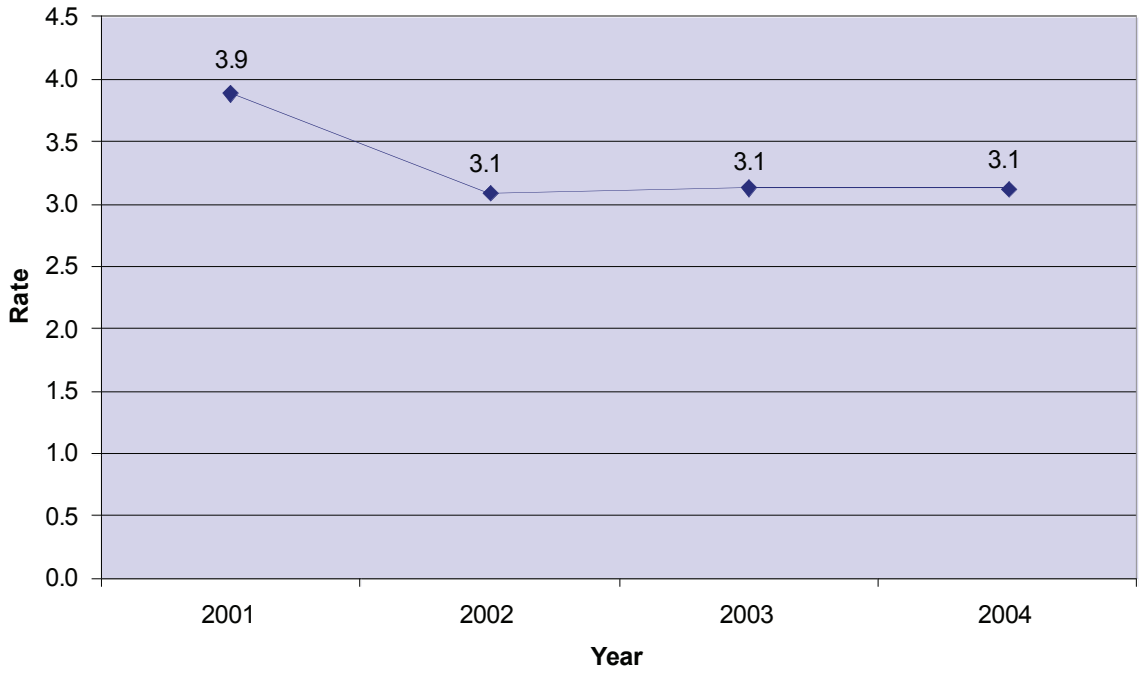
may be indicative of a higher reporting rate. The decrease in the number of MBZ non-compliance occurrences across 2001 – 2004 may reflect the change in the type of incidents collected by the ATSB following the enactment of the TSI Act in 2003.

4.2 Rate of MBZ Occurrences

4.2.1 Airspace-Related Occurrences within MBZs

Figure 3 presents the rate of airspace-related occurrences within MBZ airspace per 100,000 hours flown by GA and RPT aircraft in Australia for 2001– 2004. As indicated by the graph, the rate of airspace-related occurrences decreased from 3.9 to 3.1 in 2002 and remained at 3.1 in 2003 and 2004.

Figure 3. Number of airspace related occurrences within MBZs per 100,000 hours flown by GA and RPT aircraft.

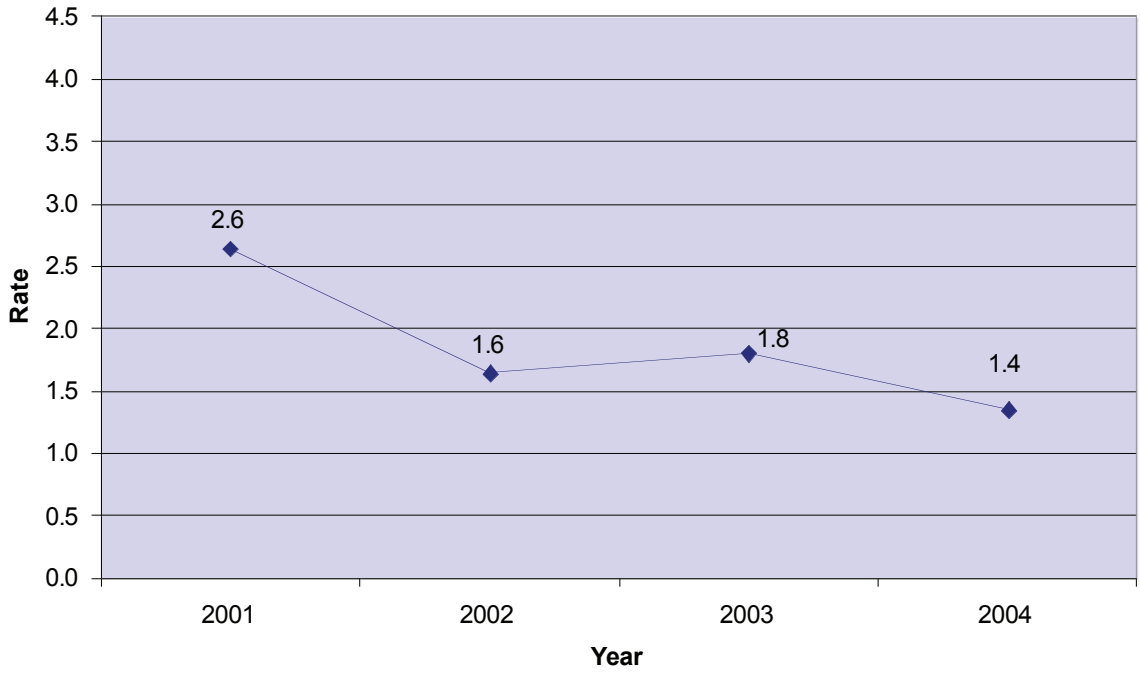


It is interesting to note that the decreasing trend in MBZ airspace-related occurrences for the 2001 – 2004 period contrasts markedly with the increasing trend for the 1994 – 2001 period, as shown in the 2003 report (ATSB, 2003a). The reason for the recent decline is difficult to determine. It may be indicative of changes in reporting practices, such that less MBZ airspace-related occurrences were reported to the ATSB for 2001 – 2004. Such a decrease in reporting may be linked to the introduction of the TSI Act in July 2003 and the changes that it imposed in the way that accidents and incidents were defined and collected by the ATSB.

4.2.2 Intentional Non-Compliance with MBZ Procedures

Figure 4 presents the rate of occurrences involving intentional non-compliance with MBZ procedures per 100,000 hours flown by GA and RPT aircraft in Australia for 2001– 2004. According to the graph, the rate of occurrences decreased from 2.6 per 100,000 hours flown in 2001 to 1.4 in 2004.

Figure 4. Number of occurrences relating to intentional non-compliance with MBZ procedures per 100,000 hours flown by GA and RPT aircraft.

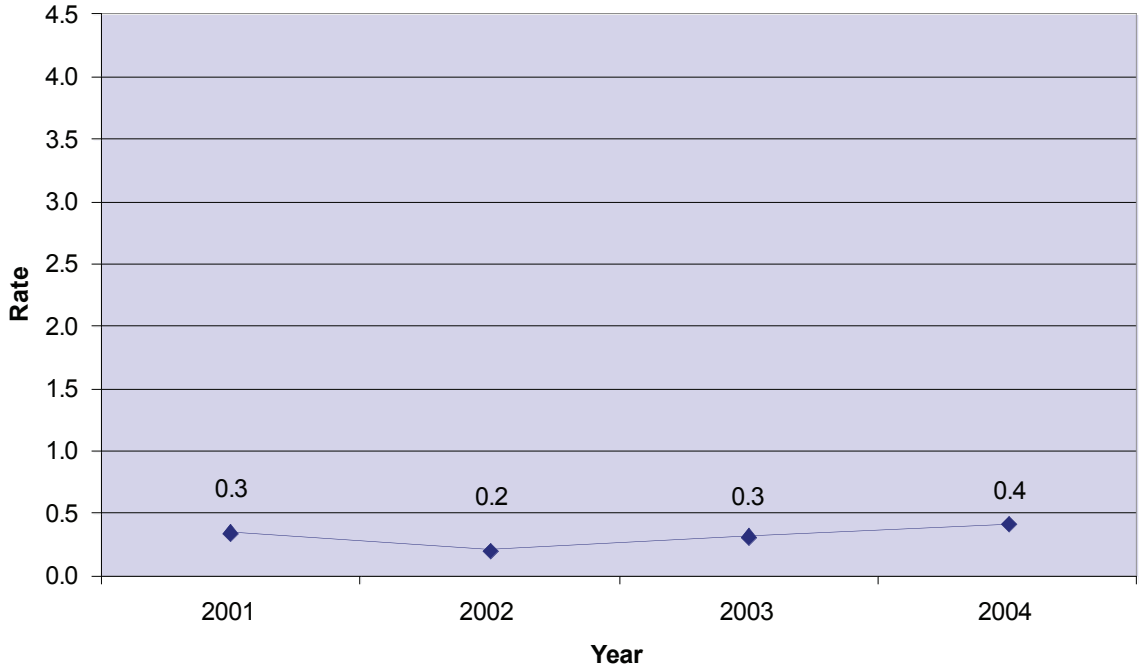


It is important to note that the data in Figure 4 demonstrate the changes in the rate of occurrences where a pilot did not intentionally comply with an MBZ procedure. It is therefore likely that the introduction of the TSI Act, and in particular the criteria for reporting occurrences involving non-compliance with MBZ procedures, had an impact on the number of occurrences that were reported. Furthermore, since the majority of non-compliance reports were limited in detail, there was often insufficient information from which to accurately determine whether the pilot did not comply with an MBZ procedure. However, the possibility that the decline may in fact reflect a real decrease in the rate of occurrences relating to MBZ procedures cannot be ruled out.

4.2.3 Unintentional Non-Compliance with MBZ Procedures

Figure 5 shows the rate of occurrences for unintentional non-compliance with MBZ procedures per 100,000 hours flown by GA and RPT aircraft in Australia for 2001– 2004. According to the graph, the rate of occurrences remained below 1 per 100,000 hours flown by GA and RPT aircraft and did not appear to vary across the four-year period.

Figure 5. Number of occurrences relating to unintentional non-compliance with MBZ procedures per 100,000 hours flown by GA and RPT aircraft.



It is possible that the number of occurrences is higher than that depicted in Figure 5. However, due to the lack of reporting detail for many of the less serious occurrences received by the ATSB, it was not possible to determine conclusively whether the occurrences involved pilot non-compliance with MBZ procedures. Consequently, these occurrences were excluded from the analyses relating to non-compliance.

5 GENERAL DISCUSSION

The primary purpose of this report was to examine the number of aviation occurrences involving GA aircraft and RPT aircraft that occurred in MBZ airspace for 2001 – 2004. This involved an examination of the ATSB's accident and incident database. A total of 257 MBZ-related occurrences were identified, including one accident and three serious incidents. The findings showed that the occurrence rate declined from 3.9 per 100,000 hours flown in 2001 to 3.1 in 2002 and remained at this lower level for 2003 and 2004. These findings contrast with those of the analysis conducted in 2003, which showed an increase in occurrences between 1994 and 2001 (ATSB, 2003a).

It is not possible to draw any firm conclusions about the difference in findings between the 2003 report and the findings presented here. Although the same measure was used to calculate the rate of occurrences in both analyses (i.e. hours flown by GA aircraft and regional airlines), the quality of the data used to calculate the rates may have changed in recent years. Indeed, the ATSB's *Annual Review* publications indicate that reporting rates for aviation accidents and incidents have varied over time. It is also possible that the data presented in the current report were influenced by the introduction of the *Transport Safety Investigation Act.*

An additional purpose of this report was to narrow the examination of MBZ-related occurrences to only those that involved non-compliance with MBZ procedures. The findings revealed that 25 unintentional occurrences with MBZ procedures had taken place over the 2001 – 2004 period. The majority of occurrences were classified as Category 5 and were associated with a radio problem. The findings revealed that the occurrence rate of reported incidents was less than 1 per 100,000 hours flown across the four-year period. Importantly though, these findings must be interpreted with caution due to reporting limitations and the inability to account for movement rates.

In comparison to the relatively low number of occurrences involving unintentional non-compliance with MBZ procedures reported to the ATSB, 145 occurrences associated with intentional non-compliance were received. All of the intentional occurrences were classified as Category 5. The most common situation involving intentional non-compliance was associated with the pilot not making a mandatory broadcast. Other situations arose as a result of the pilot not monitoring the MBZ frequency, the pilot not operating in accordance with circuit procedures, and the pilot not turning on the aircraft transponder.

Interestingly, the rate of occurrences involving intentional non-compliance with MBZ procedures appears to have declined since 2001. Specifically, the findings indicated that the rate of occurrences decreased from 2.6 per 100,000 hours flown in 2001 to 1.4 in 2004. Before any conclusions can be drawn from these data, however, it must be assumed that activity patterns in the total hours flown within Australia are indicative of the aircraft activity levels within MBZs. It is also important to acknowledge that changes to the criteria of Category 5 incidents may have led to a decrease in the reporting and recording of occurrences following the implementation of the TSI Act in July 2003.

Notwithstanding the possibility that the introduction of TSI legislation may have led to a decrease in reporting for 2003 and 2004, there still remains an unexplained decrease in MBZ occurrences relating to procedural non-compliance from 2001 to 2003. It is possible that the decline is associated with changes in traffic operating in MBZ airspace or a decrease in the reporting of non-compliant occurrences to the ATSB. Importantly though, the decline may also represent a real increase in pilot compliance with MBZ procedures during these years.

In terms of air safety, the findings presented in this report suggest that the occurrence of MBZ airspace-related accidents and incidents is relatively low. In fact, the number of occurrences reported to the ATSB for 2001 – 2004 contributed to only a small fraction of the total number of aviation accident and incident reports received by the ATSB for this period. Of those relating to MBZ airspace, almost all were classified as Category 5, such that the commitment of investigative resources for the purposes of increasing air safety was considered unjustified by the ATSB.

6 THE FUTURE OF AUSTRALIAN AIRSPACE

From 24 November 2005, all MBZs in Australia will no longer exist. Instead, all MBZs will be redesignated as CTAFs. The change is part of the implementation of the next stage of the National Airspace System, referred to as NAS Stage 2c. This stage introduces new procedures for operations at Australian non-towered aerodromes. Under these procedures, there will be no defined volumes of airspace associated with non-towered aerodromes. As such, MBZs and CTAF boundaries will not be depicted on navigational maps and charts.

Importantly, current operations under CTAF do not require the carriage and use of a radio. Under the new system, however, there will be some designated aerodromes where only those aircraft fitted with a working radio will be permitted to operate. These aerodromes will be depicted as CTAF(R). As part of the new procedures, pilots of radio-equipped aircraft must continuously monitor and broadcast on CTAF by 10 NM when operating in the vicinity of an aerodrome (Australian Government, 2005).

The basis for the changes to Australia's uncontrolled airspace is part of the government's policy to align Australian airspace procedures with those currently used in the United States (CASA, 2004). At present, relevant Civil Aviation Regulations (i.e. CAR 166) preclude US CTAF procedures from being introduced. Specifically, US CTAF procedures permit pilots to fly straight-in approaches to non-controlled aerodromes, whereas current Australian procedures restrict straight-in approaches only to certain aircraft under certain conditions (CASA, 2004).

It is proposed that the new procedures will give pilots greater operational flexibility and efficiency at non-towered aerodromes (Australian Government, 2005). The impact that the changes will have on air safety in Australia, however, remains unclear. However, the procedures are based on what are considered to be "proven, safe and efficient practices used for more than 40 years at over 12,000 non-towered aerodromes in the US" (Australian Government, 2005).

7 REFERENCES

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8 APPENDIX A

List of the first Mandatory Broadcast Zone Aerodromes proposed for Australia (CASA, 2000)

MBZ Locations in Australia			
1	ALBANY	44	KUNUNURRA
2	ALBURY	45	LAUNCESTON
3	ALICE SPRINGS	46	LEARMONTH
4	AMBERLEY	47	LEINSTER/MT KEITH/BRONZEWIN
5	ARCHERFIELD	48	LEONORA/LAVERTON/SUNRISE DAM
6	ARGYLE	49	LONGREACH
7	AVALON	50	LORD HOWE IS
8	AYERS ROCK	51	MACKAY
9	BALLINA/CASINO/LISMORE	52	MANINGRIDA
10	BAMYILI	53	MAROOCHYDORE
11	BANKSTOWN	54	MARYBOROUGH/HERVEY BAY
12	BARROW IS/ONSLOW	55	MEEKATHARRA
13	BROKEN HILL	56	MILDURA
14	BROOME	57	MOORABBIN
15	BUNDABERG	58	MOUNT GAMBIER
16	CAMDEN	59	MOUNT HOTHAM
17	CANBERRA	60	MOUNT ISA
18	CARNARVON	61	NEWMAN
19	CHRISTMAS IS	62	NORFOLK IS
20	CLONCURRY	63	NOWRA/JERVIS BAY
21	COCOS IS	64	PARABURDOO
22	COFFS HARBOUR	65	PARAFIELD
23	COOLANGATTA	66	PEARCE
24	COOMA	67	POINT COOK
25	CURTIN/DERBY	68	PORT HEDLAND
26	DEVONPORT/WYNYARD	69	PORT LINCOLN
27	DUBBO	70	PORT MACQUARIE
28	EAST SALE	71	RICHMOND (NSW)
29	EDINBURGH	72	ROCKHAMPTON
30	ELCHO ISLAND	73	SOUTHPORT
31	EMERALD	74	TAMWORTH
32	ESPERANCE	75	TELFER
33	GERALDTON	76	TINDAL
34	GLADSTONE	77	TOOWOOMBA
35	GOVE	78	TORRES STRAIT
36	GRIFFITH	79	TOWNSVILLE
37	GROOTE/BICKERTON IS	80	WAGGA WAGGA
38	HOBART	81	WEIPA/SCHERGER
39	JANDAKOT	82	WHITSUNDAY
40	KALGOORLIE/BOULDER	83	WHYALLA
41	KARRATHA	84	WILLIAMTOWN
42	KING IS	85	WOOMERA
43	KINGSCOTE		

9 APPENDIX B

Summary of Category 3 and 4 Occurrences within Mandatory Broadcast Zones from 2001 to 2004	
Category 3 200203449	At approximately 1840 Eastern Standard Time on Monday 29 July 2002, two Cessna Aircraft Company 172Rs, registered VH-CNW and VH-EUH, collided while on short final approach to runway 17 left (17L) at Moorabbin airport, Victoria. The two aeroplanes were entangled, with CNW on top of EUH, when they impacted the runway. The student pilot and instructor of EUH, conducting night circuit training, were able to exit their aeroplane before fire engulfed both aeroplanes. The solo pilot of CNW, conducting night circuits, sustained fatal injuries. Both aeroplanes were based at Moorabbin airport. The Moorabbin Air Traffic Control Tower was not in operation at the time of the accident and mandatory broadcast zone (MBZ) procedures were in use. The investigation identified the following contributing factors: • The different circuit dimensions negated the natural spacing provided by the difference in take-off times, even though both EUH and CNW were the same aircraft type and were operating in the circuit at similar speeds. • None of the pilots involved in the accident saw the other accident aircraft in sufficient time to enable either of them to avoid the collision. • The broadcasts made by the pilots did not assist their situational awareness. Additionally, the investigation found deficiencies in the evaluation of risks associated with the reduction in the Moorabbin airport air traffic control tower hours of operation. Since the accident Airservices Australia introduced procedures to address those deficiencies. It is unlikely that any of the pilots involved in the accident were aware of the proximity of the other aeroplane before the accident. The pilots were relying on alerted see-and-avoid to enhance the safety of their operations. Given the difference in the circuit dimensions flown by the two accident aeroplanes, it is likely that the alert provided by the discretionary base broadcasts unknowingly provided incorrect information to the recipients of those broadcasts. The provision of incorrect or misleading information has the potential to increase the risk of a collision. The practice of routinely re-analysing the information, on which decisions are made, might help to compensate for the inherent human performance limitations of the human visual and information processing system.
Category 4	The Piper Chieftain was being flown as a single-pilot operation to conduct a scheduled passenger flight from Adelaide to

200105698	Kingscote. The Chieftain was one of six aircraft being used by the operator on the route at the time. The other aircraft were involved in passenger charter operation. The six aircraft departed Adelaide at about the same time for Kingscote and the Chieftain was the first to approach the airfield. The pilot reported that he decided, based on the Kingscote Automatic Weather Service reports and the weather forecast for the area, to descend to the sector's Lowest Safe Altitude. He intended to descend clear of cloud and approach the airfield to land on Runway 19 via a 5 NM straight-in visual approach. He had also planned to conduct a Sector A Global Positioning System (GPS) instrument arrival should the aircraft not break clear of cloud in sufficient time for a normal visual approach. Due to the weather conditions, the pilot decided to make the Sector A GPS arrival. The pilot reported that during the descent and approach, the pilots of the other aircraft were querying him about the cloud base and weather so that they could plan their arrivals. The pilot reported that, during the GPS arrival, he had configured the aircraft in accordance with the operator's requirements and aircraft checklist, including lowering the landing gear. The aircraft broke clear of cloud at about 1,000 ft and 2 NM from the airfield. The pilot decided that the aircraft would require excessive manoeuvring to land directly from the approach and chose, instead, to conduct a left circling approach to Runway 19. He reported that he raised the landing gear to reduce the chance of large power changes that may have alarmed the passengers. He then flew the circling approach but did not lower the landing gear. While the pilot was answering queries from other pilots about the weather conditions on the MBZ frequency, he was also listening to radio traffic on the ATC frequency. He also reported that there was light rain falling and running along the windscreen, reducing visibility and increasing his workload. The pilot reported that late in the landing flare, he heard the landing gear warning horn and the scraping of the aircraft on the runway. He initiated a go around and advised the following aircraft of the event, however he did not receive a reply because the aircraft's VHF antennas had been damaged during the scrape on the runway. He then lowered the landing gear and landed without further incident on Runway 24 to help ensure separation from the following aircraft. The Chieftain sustained damage to both propellers, the VHF radio aerials on the underside of the aircraft fuselage and the inboard sections of the flaps. The pilot was in a high workload situation, manoeuvring the aircraft in order to set it up for landing, and was probably distracted by the radio broadcasts and weather conditions at the time, which resulted in him forgetting to lower the landing gear before landing. LOCAL SAFETY ACTION The operator has introduced three Company Standing Orders

	detailing new procedures for traffic separation procedures between company aircraft, radio procedures to reduce frequency congestion, and procedures to be followed after a propeller strike.
Category 4 200200548	A Cessna 172P (C172) aircraft, registered VH-KTV and a foreign registered TL Ultralight Sting aircraft, OK-GUU39, converged and collided at low altitude in the vicinity of the threshold of runway 24 right at Jandakot, WA. The occupants of both aircraft were uninjured. The TL Ultralight Sting was substantially damaged and the C172 sustained only minor damage. Jandakot tower was active until a short time before the collision and both aircraft conducted their arrival to the airport under General Aviation Aerodrome Procedures (GAAP). The GAAP control zone was deactivated at the scheduled time (1800 WST) and the aircraft were operating under Mandatory Broadcast Zone procedures for the final stages of their flights. At the time of the collision a certified air-ground radio operator (CAGRO) was providing operational information to pilots. Although the CAGRO used the facilities of the control tower to provide this service, this did not include any function of air traffic control. The investigation determined that the pilot of the C172 had probably sighted the wrong aircraft to follow when provided with sequencing instructions by the aerodrome controller. The pilot of the C172 did not see GUU39 during his base and final approach. This task was made more difficult by a number of factors including the lack of contrast between GUU39 and the background terrain, the relative position between the two aircraft during the final stages of the approach and possibly the effects of sunglare. This was compounded by the pilot's perception that the aircraft ahead had already landed. A short time after the collision the airport operator withdrew the CAGRO service. The tower operator subsequently reviewed the provision of air traffic services and extended tower hours of operation.
Category 4 200401411	The de Havilland DHC-8 aircraft departed Mildura and was within the MBZ when it came into conflict with a Cessna 150 aircraft. The Cessna did not appear on the Dash 8’s traffic alert and collision avoidance system. Subsequent examination of the transponder fitted to the Cessna revealed that a power fuse had blown. During the investigation, it became apparent that there was misinformation among some pilots regarding the use of transponders in class G airspace.