



Australian Government
Civil Aviation Safety Authority

DISCUSSION PAPER



Frequency use at low level in Class G airspace

Issued for public consultation by
CASA's Aviation Group

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Audience

This Discussion Paper will be of interest to:

- air transport pilots
- commercial pilots
- regional airline operators
- pilots conducting aerial work and private flights
- sport and recreational pilots
- operators and pilots of remotely piloted aircraft
- publishers of aeronautical information products
- Regional Airspace and Procedures Advisory Committee (RAPAC) members
- Australian Aircraft Owners and Pilots Association
- Regional Aviation Association of Australia
- Aerial Application Association of Australia
- Australian Federation of Air Pilots
- Australian Association of Flight Instructors
- Australian Warbirds Association Limited
- Recreational Aviation Australia (RAAus)
- Royal Federation of Aero Clubs Australia
- Sport Aviation Association of Australia
- Hang Gliding Federation of Australia
- Australian Ballooning Federation
- Australian Parachuting Federation
- Honourable Company of Air Pilots
- Royal Flying Doctor Service
- Airservices Australia
- Australian Maritime Safety Authority
- Australian Defence Force.

Response date

The Civil Aviation Safety Authority (CASA) is responsible under the *Civil Aviation Act 1988* for, amongst other functions, developing and promulgating appropriate, clear and concise aviation safety standards. CASA must, where appropriate, consult with government, commercial, industrial, consumer and other relevant bodies and organisations in the performance of this function and the exercise of its powers.

Civil Aviation Act 1988 Subsection 9(1)(c) and Section 16

This Discussion Paper (DP) contains options that might be pursued in a future regulatory change proposal e.g. Notice of Proposed Rule Making (NPRM). These documents all form part of the consultation process.

No action will be taken until all responses and submissions have been considered. To ensure clear and relevant safety standards, CASA needs the benefit of your knowledge as an aviator, aviation consumer and/or provider of related products and services.

You can help by completing the [online response form](#) by **28 April 2017**.

Foreword

The purpose of this Discussion Paper (DP) is to consider the most appropriate very high frequency (VHF) radio frequency for pilots to use at low level in Class G airspace. Under regulation 166C of the Civil Aviation Regulations 1988 (CAR), pilots must make a radio broadcast when operating in the vicinity of a non-controlled aerodrome whenever it is reasonably necessary to avoid a collision or the risk of a collision. The regulation does not specify which frequency to use, other than 'the VHF frequency in use for the aerodrome'.

Before 30 May 2013, MULTICOM (126.7 MHz) was the VHF frequency used by pilots in the vicinity of non-towered aerodromes that did not have a discrete common traffic advisory frequency (CTAF). In early 2013, CASA received feedback from recreational pilots, local aero clubs, flight schools and pilots involved in fire-bombing operations, expressing confusion about the appropriate VHF frequencies to be used. To resolve the safety concerns, CASA differentiated between aerodromes that are published on a chart and therefore known to all airspace users, and those that are not and are therefore only known to local operators.

On 30 May 2013, CASA advised and published in the Aeronautical Information Publication (AIP), that area VHF was the appropriate frequency on which to monitor and, if necessary, make a broadcast when operating in the vicinity of aerodromes that are **not published** on an aeronautical chart. The clarification sought to address the risk that transiting pilots may not be aware of aircraft operating to, at, or from aerodromes that are not published on aeronautical charts. In the vicinity of aerodromes not published on aeronautical charts, transiting pilots were on area VHF and local pilots were on MULTICOM, which meant the safety benefits of 'alerted see-and-avoid' procedures were not available to pilots operating on separate frequencies.

Some members of the aviation community—including the Regional Airspace and Procedures Advisory Committees (RAPACs)—have expressed concerns about the absence of consultation that led to the AIP amendments made on 30 May 2013. The RAPACs have also advised CASA that the current procedures introduce risks associated with:

- non-relevant radio broadcasts overriding higher altitude communications on frequencies used by air traffic control (ATC) and commercial passenger aircraft
- lack of area VHF contact with ATC at lower altitudes in rural and remote Australia
- frequency confusion where some aerodromes are printed on one type of chart but not another type
- frequency confusion where aerodromes are located close together or close to the area VHF boundaries marked on charts—particularly when aircraft can only monitor one VHF frequency.

RAPAC convenors recommended MULTICOM as the common low-altitude visual flight rules (VFR) frequency and have requested that CASA review frequencies used in Class G airspace.

CASA seeks to address this issue by providing options for industry to consider. This DP will look at the two options described below:

- maintain the current policy whereby area VHF is recommended as the appropriate VHF frequency in the vicinity of an aerodrome not published on an aeronautical chart
- promulgate MULTICOM as the common low-altitude VFR frequency for use in Class G airspace.

The safety benefits and risks associated with each option are discussed in this DP. CASA recognises the valuable contribution that industry consultation makes to the regulatory development process and issues this DP as the basis for CASA to make an informed decision about the appropriate frequency to use at low altitudes in Class G airspace. An industry working group may be established to help CASA review responses to this DP.

I would like to thank you in advance for taking time to consider and respond to this DP.

Jason McHeyzer
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Aviation Group

February 2017

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1 Reference material

1.1 Acronyms and abbreviations

The acronyms and abbreviations used in this DP are listed in the table below.

Acronym / abbreviation	Description
ADS-B	automatic dependent surveillance - broadcast
AGL	above ground level
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
ALA	aircraft landing area
AMSA	Australian Maritime Safety Authority
AMSL	above mean sea level
ATC	air traffic control
ATF	aerodrome traffic frequency
ATS	air traffic service
CAA NZ	Civil Aviation Authority of New Zealand
CAAP	Civil Aviation Advisory Publication
CAO	Civil Aviation Order
CAR	<i>Civil Aviation Regulation 1988</i>
CASA	Civil Aviation Safety Authority
CFZ	common frequency zone (CAA NZ)
CTAF	common traffic advisory frequency
CTAF(R)	common traffic advisory frequency (mandatory carriage and use of radio applies)
DP	Discussion Paper
ERC	En Route Chart
ERSA	En Route Supplement Australia
FAA	Federal Aviation Administration (of the United States of America)
FIA	flight information area
FIS	flight information service
FISCOM	flight information service communications (CAA NZ)
FPC	flight planning chart
IFR	instrument flight rules
IMC	instrument meteorological conditions

Acronym / abbreviation	Description
MBZ	mandatory broadcast zone
MET	meteorological
MF	mandatory frequency (Transport Canada)
MHz	megahertz
NOTAM	notice to airmen
NPRM	Notice of Proposed Rule Making
PCA	planning chart Australia
RAPAC	Regional Airspace and Procedures Advisory Committee
RPT	regular public transport
SCC	Standards Consultative Committee
SIS	surveillance information service
VFR	visual flight rules
VHF	very high frequency
VMC	visual meteorological conditions
VNC	visual navigation chart
VTC	visual terminal chart
WAC	world aeronautical chart

1.2 Definitions

Terms that have specific meaning within this DP are defined in the table below.

Term	Definition
aerodrome	A defined area of land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and movement of aircraft.
Aeronautical Information Publication (AIP)	A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.
aircraft landing area (ALA)	Aircraft Landing Area for the purpose of paragraph 92 (1) (d) of CAR.
alerted see-and-avoid	A procedure where flight crew, having been alerted to the existence and approximate location of other traffic in their immediate vicinity, seek to sight and avoid colliding with those known aircraft.
alerting service	A service provided to notify appropriate organisations of aircraft in need of search and rescue aid, and to assist such organisations as required.
area QNH	A forecast altimeter setting which is representative of the QNH of any location within a particular area.

Term	Definition
area VHF	The appropriate flight information area VHF channel for a location.
air traffic service (ATS)	A generic term for flight information service, alerting service, air traffic advisory service, air traffic control service, area control service, approach control service or aerodrome control service.
broadcast	A transmission of information relating to air navigation for which an acknowledgement is not expected.
broadcast area	Broadcast Areas are defined airspace volumes in Class G airspace for which a discrete frequency (CTAF) has been allocated.
certified aerodrome	A place that is certified as an aerodrome under the <i>Civil Aviation Safety Regulations 1998</i> .
common traffic advisory frequency (CTAF)	A designated frequency on which pilots make positional broadcasts when operating in the vicinity of a non-controlled aerodrome.
flight following	The provision of an ongoing Surveillance Information Service (SIS).
flight information	Information useful for the safe and efficient conduct of flight, including information on air traffic, meteorological conditions, aerodrome conditions and airways facilities.
flight information area (FIA)	An airspace of defined dimensions, excluding controlled airspace, within which flight information and search and rescue alerting services are provided by an ATS unit. Note: FIAs may be sub-divided to permit the specified ATS unit to provide its services on a discrete frequency or family of frequencies within particular areas.
flight information service (FIS)	A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.
hazard alert	ATC notification of sudden changes, not included in a current MET product or NOTAM, which has an immediate and detrimental effect on the safety of an aircraft.
in the vicinity	An aircraft is in the vicinity of a non-controlled aerodrome if it is within a horizontal distance of 10 miles; and within a height above the aerodrome reference point that could result in conflict with operations at the aerodrome.
low jet route	A route, or part of a route, at or below 5,000 ft above ground level (AGL) used by military low jet aircraft for low level, high speed navigation and/or terrain following exercises.
monitor	Listen out on a VHF frequency.
MULTICOM	The frequency (126.7 MHz) used for broadcasts while operating to or from a non-controlled aerodrome depicted on an aeronautical chart that does not have a discrete CTAF assigned.
non-controlled aerodrome	An aerodrome at which air traffic control is not operating.
Regional airspace and procedures advisory committee (RAPAC)	A national group of aviation industry stakeholders who meet at least once a year in each state and territory for consultation, discussion, and to make recommendations to CASA, Airservices Australia, Department of Defence, and the Bureau of Meteorology on any airspace and procedures matters.
RAPAC convenor	An industry-appointed representative (an honorary role) for each state and

Term	Definition
	territory's RAPAC(s) to provide a conduit and advocacy between the aviation industry and government aviation authorities.
search and rescue	The act of finding and returning to safety, aircraft and persons involved in an emergency phase.
surveillance information service (SIS)	An on-request service provided to assist pilots of VFR flights, within ATS surveillance system coverage in Class E and Class G airspace, to avoid other aircraft or to assist in navigation.
unalerted see-and-avoid	A procedure where flight crew, who have no specific knowledge of other aircraft in their vicinity, rely solely on their ability to physically sight and avoid colliding with aircraft that may be in their vicinity.
visual flight rules (VFR) regular public transport (RPT)	An RPT service operating under VFR, in accordance with Civil Aviation Order (CAO) 82.3, where the flight crew must be able to communicate at all times with ATC or the operator.

1.3 References

Regulations

Regulations are available on the ComLaw website <http://www.comlaw.gov.au/Home>

Document	Title
Paragraph 92 (1) (d) of CAR	Use of aerodromes
Regulation 166 of CAR	Definitions for Subdivision 2
Regulation 166A of CAR	General requirements for aircraft on the manoeuvring area or in the vicinity of a non-controlled aerodrome
Regulation 166B of CAR	Carrying out a straight-in approach
Regulation 166C of CAR	Responsibility for broadcasting on VHF radio
Regulation 166D of CAR	Designation of non-controlled aerodromes
Regulation 166E of CAR	Requirements for operating on or in the vicinity of certified, military, registered or designated non-controlled aerodromes
Regulation 173 of CAR	Cruising level to be appropriate to magnetic track (VFR)
Regulation 180 of CAR	Cruising levels for I.F.R. flights
Regulation 243 of CAR	Listening watch
Clause 7.3 and 7.4 of CAO 82.3	Conditions on Air Operators' Certificates authorising regular public transport operations in other than high capacity aircraft
Directorate of Aviation Safety Regulation (DASR) 2/1994	Part 1—Radio communication equipment

Aeronautical Information Publication (AIP)

The AIP is available online at <http://www.airservicesaustralia.com/aip/aip.asp>

Part	Section
GEN 0.1	Paragraph 3 – Integrated AIP Australia, documents involved
GEN 0.1	Paragraph 9 – Relevant documents and charts
GEN 1.5	Paragraph 1 – Radio communication systems
GEN 2.2	Definitions and Abbreviations
GEN 3.4	Paragraph 3.1.5 – Interpilot Air-to-Air Communication
GEN 3.4	Appendix 2 – Full position report, format
GEN 3.6	Paragraph 8.2 – Monitoring 121.5 MHZ
ENR 1.1	Paragraph 19.1.1c – Flight under the IFR
ENR 1.1	Paragraph 19.2.1a – Flight under the VFR
ENR 1.1	Paragraph 21.1.9 - Reporting changing to CTAF
ENR 1.1	Paragraph 21.1.11 – Maintaining a listening watch on other than Area VHF
ENR 1.1	Summary of Reports tables associated with paragraphs 21.1.15.1 and 21.1.15.2
ENR 1.1	Paragraph 45.1 – Climb and cruise procedures
ENR 1.4	Paragraph 3.2 – Broadcast Areas
ENR 1.4	Paragraph 4 – Classes of Airspace, Services and Requirements
ENR 1.6	Paragraph 6.4.1 – SSR Emergency Codes
ENR 1.7	Section 6 – Table of Cruising Levels
ERSA - EMERG	Section 1, paragraph 1.1.1 - Aircraft Emergency Procedures
Federal Aviation Administration (FAA) Aeronautical Information Manual	Paragraph 4-1-9 b, g 3 - Self-Announce Position and/or Intentions Pilot/Controller Glossary
Transport Canada Aeronautical Information Manual	RAC section 4.5 - Aircraft Operations-Uncontrolled Aerodromes, paragraphs 4.5.1, 4.5.5, 4.5.6 RAC section 5.1 - Monitoring, Broadcasting on 126.7 MHz and Position Reporting En route
New Zealand Aeronautical Information Publication	GEN 3.4 - Communication Services ENR 1.4 - ATS Airspace Classification

CASA advisory material

Advisory Circulars are available at <http://www.casa.gov.au/AC>

Civil Aviation Advisory Publications (CAAPs) are available at <http://www.casa.gov.au/CAAP>

Document	Title
CAAP 166-1(3)	Operations in the vicinity of non-controlled aerodromes
CAAP 166-2(1)	Pilots' responsibility for collision avoidance in the vicinity of non-controlled aerodromes using 'see-and-avoid'
VFRG	Visual Flight Rules Guide https://www.casa.gov.au/standard-page/visual-flight-guide
Information booklet	Operations at non-controlled aerodromes https://www.casa.gov.au/airspace/standard-page/operations-non-controlled-aerodromes

Other material

Document	Title
CASA Survey (August 2005)	General Aviation and Sport Aircraft Equipment Survey 2004
NZ CAA Discussion Document (12 April 2013)	Radio frequency use in uncontrolled airspace
ATSB Investigation Report 200402065	Cirrus Design Corporation SR20, VH-SJA
Airservices Australia Quick Reference Guide (25 November 2004)	November 25 National Airspace System Changes
AIC H4/04	Frequency Planning Chart

2 Industry consultation

2.1 Consultation process

CASA is committed to working cooperatively with the aviation community to maintain and enhance aviation safety. Carriage and use of radio at, or in the vicinity of, non-towered aerodromes has been the subject of a number of discussions with industry. Many amendments to regulation 166 of CAR have been made as a result of consultation processes, including the transition from mandatory broadcast zones (MBZs) and common traffic advisory frequencies (CTAFs) to CTAFs and CTAF(R).

In **2008**, CASA initiated changes for radio broadcasts by pilots overflying any non-controlled aerodromes. However, this consultation was replaced in 2010 by the latest amendments to regulation 166 of CAR, which covered the mandatory carriage and use of radio at certified, registered and military aerodromes.

Regulatory requirements for determining which VHF frequencies to use in Class G airspace were not considered during any of the previous regulation amendments. In **2013**, CASA sought to clarify the frequency to be used at aerodromes in Australia that are not published on a chart. The definition of 'in the vicinity' of an aerodrome can apply at all non-controlled aerodromes in Class G airspace—regardless of whether or not the aerodrome is published on an aeronautical chart—and there are many aerodromes in Australia that are not published on a chart or in En Route Supplement Australia (ERSA) (nor are they required to be).

On **30 May 2013**, CASA published advice in the AIP that area VHF was the appropriate frequency to monitor and, if necessary, to make a broadcast on when operating in the vicinity of such aerodromes. The amended AIP guidance was based on industry feedback; however, a specific consultation was not undertaken at the time. Complaints were lodged by industry stakeholders, including members and convenors of RAPAC, about the absence of consultation and the effect of the AIP changes on safety.

As a result of discussions between RAPAC convenors and CASA's former Chief Executive Officer and Director of Aviation Safety, publication of this DP will constitute public/industry consultation on issues and proposals related to the appropriate frequency to use at low altitude in Class G airspace.

CASA provided a draft copy of the DP to the RAPAC convenors for comment and to expand on the safety benefits of using MULTICOM and the risks of using area VHF. The RAPAC convenors' comments have been incorporated in this DP where appropriate.

2.2 What we do with your comments

At the end of the response period for public comment, we will register and review each comment and submission received through the online response form, but will not acknowledge individual responses. We will make all submissions publicly available on the CASA website unless a respondent requests that their submission remain confidential. Information about making a confidential submission is available on the [CASA website](#).

When the DP submissions are published we will also publish a summary of consultation, which will summarise the feedback received and detail our plans for future policy and consultation on this subject.

We will consider the submissions to this DP before making any plans to change the regulations, other legislative instrument or the AIP. Rule change proposals will usually be issued for subsequent consultation as an NPRM or Consultation Draft.

3 Discussion

3.1 Objectives

The objectives of this DP are to:

- outline two options for industry to consider in relation to the most appropriate VHF frequency for pilots to use at low altitude in Class G airspace
- identify the safety benefits and risks associated with each option
- use the responses to this DP to inform our decision on the appropriate VHF frequency to use in Class G airspace.

This DP only focuses on understanding the risks associated with the current procedures published in the AIP and evaluating this against the option of MULTICOM as the common low-altitude VFR frequency. It identifies and examines the safety benefits and risks associated with both options in the current Australian airspace environment. The DP assumes existing procedures for use of 126.7 MHz or discrete frequencies for CTAFs and use of Broadcast Areas are acceptable.

In accordance with [CASA's regulatory philosophy](#), CASA will adopt a regulatory approach based on a sound assessment of the level of risk associated with particular aviation operations. The highest safety priority will be afforded to:

- passenger transport operations
- operations where passengers and others are exposed to high levels of risk and are not in a position to make informed judgements and effective decisions about those risks.

3.2 Background

In discussions with CASA about airspace frequency use, RAPAC convenors have referenced historic publications such as the 2001 National Airspace System, which recommended adopting the Federal Aviation Administration (FAA) airspace model, and industry guidance material from 2003/2004 that advocated the use of MULTICOM 126.7 MHz below 3,000 ft AGL. However, on 18 March 2004, an Aeronautical Information Circular (AIC H4/04) was published to advise all pilots that they would receive a Frequency Planning Chart (FPC) for Class G airspace and Class E airspace that would assist pilots to identify the appropriate ATS frequency. The FPC was published on 25 November 2004. A Quick Reference Guide¹ to the National Airspace System was also published by Airservices Australia, effective 25 November 2004. The guide provided advice to VFR pilots that the appropriate VHF frequency, referred to in the AIP, for Class G airspace was the ATS frequency. MULTICOM was only for operations at an aerodrome without a designated CTAF or MBZ frequency. The guide also provided advice that, when choosing to use a frequency other than the ATS frequency (i.e. CTAF or MULTICOM), pilots should consider all circumstances including proximity to airspace boundaries, CTAFs and other aerodromes.

The Australian Transport Safety Bureau released an aviation safety investigation report on 28 October 2004 (report number 200402065) about a serious incident that occurred on 6 June 2004. The report drew attention to published and non-published frequencies and specifically

¹ Airservices Australia (2004) Quick Reference Guide: November 25 National Airspace System Changes

identified AIC H4/04 as providing clarity around Class G and Class E airspace radio frequencies and frequency boundaries.

Today, area VHF frequencies are published on the En Route Charts (ERCs)—High and Low, Visual Navigation Charts (VNCs), Terminal Area Charts (TACs) and Visual Terminal Charts (VTCs). The AIP (GEN 0.1) states that:

the pilot in command must have access during flight to the appropriate documents and charts to be carried for VFR operations selected from the following: comprise of the ERCs, World Aeronautical Charts (WACs), VNCs, and VTCs and ERSA for the route being flown..

Before 30 May 2013, MULTICOM was defined in the AIP as the frequency to use when operating from a non-towered aerodrome. The definition of 'non-towered aerodrome' was an aerodrome where ATC were not operating. CASA understood that it was not clear to industry that a non-towered aerodrome included aircraft landing areas (ALAs) or any landing strip or helicopter landing site not published on an aeronautical chart. Transiting pilots, without local knowledge, could not be aware of all aerodromes, ALAs and landing strips that are not published on a chart. Pilots would have been operating under 'unalerted see-and-avoid'² procedures, with no specific knowledge of other aircraft in their vicinity, and relying solely on their ability to physically sight and avoid colliding with any aircraft in their vicinity. The discrepancy between users of unpublished aerodromes using MULTICOM, whilst transiting aircraft were monitoring area VHF, caused an unnecessary degradation of alerted see-and-avoid.

RAPAC convenors advised CASA that they believed that only a minority of Area VHF users operated at lower altitudes in Class G airspace. They also believed that an aircraft on the 'wrong' frequency was effectively no more of a risk than a non-radio-equipped aircraft operating legitimately in Class G airspace—in that situation pilots operating in Class G airspace are expected to always be cognisant of non-radio equipped aircraft, as these aircraft are permitted to fly in the same airspace as VFR and instrument flight rules (IFR) radio-equipped aircraft. The convenors also pointed out that it was not the low altitude transiting aircraft that lacked situational awareness—having been flying visually for some time—but the pilot on the ground about to take off into Class G airspace who has little traffic awareness. In other words, the RAPAC convenors believed that the aircraft taking off was of concern, as it required an update on the traffic situation immediately above and in the vicinity of the aerodrome.

CASA maintains that the widespread use of MULTICOM and existence of unpublished aerodromes requires pilots to be constantly looking below them for unmarked aerodromes or landing strips, instead of concentrating on flying the aircraft. If pilots are unaware of an aerodrome, it is likely that they would encounter traffic too late to make appropriate broadcasts. CASA does not consider it appropriate, on a safety basis, to return to the situation that existed before 30 May 2013 and CASA has provided a comprehensive safety education program to support the procedures published in May 2013.

RAPAC members have suggested, through their monitoring of the Area VHF's around Australia, that there has been almost no use of Area VHF by industry, and have queried the effectiveness of the education program. For example, RAAus has advised RAPAC convenors that the majority of their regional membership continues to monitor and call on MULTICOM 126.7 MHz.

² Bureau of Air Safety Investigation (1991) Limitations of the see-and-avoid principle (BASI Research Report), Canberra: BASI.

3.3 Key considerations

This DP is limited in scope to aircraft that are equipped with radios. In a survey³ of over a third of the general aviation and sport fleet (IFR and VFR), CASA identified that 98.6% of aeroplanes and 98.2% of helicopters were equipped with radios, with gliders and balloons averaging 90%.

The maximum safety benefits are to be realised from alerted see-and-avoid in low-altitude Class G airspace. As pilots operating under VFR in Class G airspace are not required to carry a radio when operating below 5,000 ft above mean sea level (AMSL), it is important that all pilots operating in Class G airspace maintain a visual scan to physically sight and avoid colliding with aircraft in their vicinity that may not be able to hear or respond to radio broadcasts.

The key consideration in determining the most appropriate VHF frequency to use in Class G airspace is the one that provides the maximum safety benefits from Alerted See-and-Avoid. Therefore, the frequency that is determined to be appropriate for use in Class G airspace must be one that is clearly published in the AIP and one that is operationally suitable for all pilots. All pilots must be on the same frequency in order to gain the maximum safety benefits of Alerted See-and-Avoid.

Aerodromes and ALAs where there is significant aviation activity, and/or multiple aerodrome and ALA users, should be published on an aeronautical chart. One of the components of Alerted See-and-Avoid is 'having been alerted to the existence of other traffic'. This is not reliant only on broadcasts on the same frequency, but also ensuring that Class G airspace users are alerted to the potential for aviation activity in the vicinity of an aerodrome or ALA. Airspace users should be aware of the existence of aerodromes and ALAs with significant aviation activity through publication on an aeronautical chart.

Recommendations for publication of an aerodrome can be progressed through the RAPACs, however RAPAC Convenors believe that it is up to the owner of an aerodrome or landing strip to have details published on a chart or in ERSA. CASA, industry or the RAPACs cannot compel an aerodrome operator to publish the aerodrome's location. RAPACs are aware of some owners of aerodromes who want their charted symbology removed. This means not all busy aerodromes or ALAs will be published on aeronautical charts. RAPACs believe that it might be difficult to get private aerodromes published and there are long lead times before first publication occurs.

In this DP, the option of 2,000 ft AGL is included along with 3,000 ft AGL as 2,000 ft above the aerodrome elevation is the recommended overfly height within the circuit area. Therefore this level will more likely only capture aircraft in the vicinity of an aerodrome.

CASA believes the current procedures provide a good incentive for the owner of a busy aerodrome or ALA to publish details on aeronautical charts. This facilitates operations using MULTICOM. Aerodrome owners also have a duty of care to users of their aerodrome to ensure that their aerodrome is not 'invisible' to other airspace users. RAPAC convenors are of the opinion that visual meteorological conditions (VMC) predominantly exist everywhere they operate below 3,000 ft or 2,000 ft AGL. However, IFR aircraft can be flying in and out of instrument meteorological conditions (IMC) and VMC and could come across a busy aerodrome from an IMC sector where they don't have an opportunity to see that there is significant traffic beneath them.

³ General Aviation and Sport Aircraft Equipment Survey 2004, CASA August 2005.

CASA believes that most operations conducted below 3,000 ft or 2,000 ft AGL are associated with take-offs, landings and circuit operations at aerodromes. RAPAC convenors maintain that most operations conducted at those lower altitudes are recreational, agricultural or mustering operations by either fixed-wing and rotary-wing aircraft that are either manoeuvring locally or moving from place to place, close to the ground. In any case, the primary consideration should be given to ensuring that any procedures published in the AIP provide the maximum safety benefit of the alerted see-and-avoid procedure at or in the vicinity of an aerodrome.

3.4 Options for discussion

This DP presents 2 options to address these issues:

- Option 1: use of the relevant Area VHF in Class G airspace for aerodromes not published on an aeronautical chart.
- Option 2: use MULTICOM as the common low-altitude VFR frequency.

The above options do not apply at aerodromes that are published on an aeronautical chart or within a Broadcast Area.

3.4.1 Option 1 – Area VHF

3.4.1.1 Area VHF safety benefits

Alerted see-and-avoid

In order to gain the maximum safety benefits of alerted see-and-avoid, pilots must be monitoring and, when necessary, broadcasting on the same frequency. CASA publishes guidance on the safety benefits of alerted see-and-avoid in CAAP 166-2(1). In order to be monitoring the same frequency, the details of those frequencies must be clearly understood and interpreted by all pilots and published in the AIP and on aeronautical charts. Currently the appropriate frequency to use in Class G airspace is Area VHF⁴, except where an aerodrome symbol, CTAF frequency label or Broadcast Area is published on an aeronautical chart.

Alerted see-and-avoid is also dependent on pilots being aware of the potential existence and approximate location of other traffic in their immediate vicinity. This is achieved under the current procedures whereby pilots can monitor MULTICOM or a CTAF in the vicinity of an aerodrome published on aeronautical charts, or otherwise by monitoring the Broadcast Area or the Area VHF frequency.

CASA believes that, for a significant number of remote single user ALAs throughout Australia, there would be no benefit from broadcasts on MULTICOM if pilots in the area are en route to another aerodrome or even operating locally. If pilots are operating on their own, broadcasts on MULTICOM would not serve any purpose as there would be no conflicting traffic in the vicinity of their operations. Monitoring, and broadcasting when necessary, on Area VHF provides other pilots and ATC with traffic information about their operation. When conducting local low-altitude flights in the vicinity of their remote ALA there would be no safety benefit in using MULTICOM if there are no aircraft in the vicinity, and the benefits of reporting an inflight emergency to a monitored frequency would also be lost.

⁴ AIP ENR 1.1 Paragraph 45.1.1.

RAPAC Convenors maintain that pilots in rural and remote Australia have been using MULTICOM successfully at all lower altitudes and for terrain-following flying for more than a decade. They believe this recommended system has worked with no reported safety incidents for more than ten years, whereas use of Area VHF has less than three years of operation with little industry uptake and no known enforcement action by CASA for pilots using MULTICOM exclusively.

CASA believes when VFR pilots use Area VHF away from the vicinity of aerodromes published on a chart, there could be a tendency for their broadcasts to be more disciplined and only made when operationally required. This has a positive effect on Alerted See-and-Avoid by reducing the potential frequency congestion of unnecessary broadcasts. In contrast, VFR pilots might not make calls on Area VHF due to the fear of being wrong and this could result in other pilots missing the safety benefits of Alerted See-and-Avoid. RAPACs Convenors contend that the establishment of a sound culture in the use of radio, through appropriate education and exercising of good airmanship, would see appropriate calls made as recommended.

One benefit of aerodromes being published on an aeronautical chart is that an aerodrome with an unusual name will be readily identifiable to itinerant pilots not familiar with the locality. Having the aerodrome name published on a chart would help alert other pilots to its location.

The AIP currently recognises that pilots might use 'other than the Area VHF' for operations under paragraph 21.1.11 of ENR 1.1—*Aircraft may maintain a listening watch on other than the Area VHF for operations below 5,000 ft in Class G airspace such as parachuting, gliding, agricultural operations and circuit training or local flights at non-controlled aerodromes.* Paragraph 3.1.5 of GEN 3.4 also recognises that 123.45 MHz is available for pilot-to-pilot communications when not in the vicinity of an aerodrome published on an aeronautical chart. This frequency can be used to exchange operational information and to facilitate the resolution of operational problems.

RAPAC convenors maintain that, with all of these alternatives permitted to the Area VHF, together with the existence of non-radio equipped aircraft below A050 in Class G airspace, a pilot cannot depend on the Area VHF as the sole source of alerted situational awareness.

Air traffic services provided in Class G airspace

Australia has adopted the ICAO airspace classification system. Air traffic services are not provided in Class G airspace, including aircraft separation. However, aircraft operating under IFR and VFR are provided with a Flight Information Service (FIS). Services provided under the FIS include essential aerodrome information, Search and Rescue Alerting Services and Hazard Alerts. Where ATS surveillance is available, ATC are able to provide a Surveillance Information Service (SIS) on request. VFR aircraft can be provided with an ATS surveillance service by requesting 'Flight Following'.

A traffic information service is provided to IFR flights in Class G airspace regarding other conflicting IFR and observed VFR flights, including on Military Low Jet routes. VFR flights monitoring Area VHF would also be able to benefit from this traffic information—as these military aircraft operate at or below 5,000 ft AGL at very high speed.

It is important to note that a FIS, SIS and Alerting Service **is not available** when operating on MULTICOM, a CTAF (126.7 MHz or discrete) or in a Broadcast Area. Pilots familiar with Class G operations would be aware of those service delivery limitations and consider them in the risk management of their flights.

ATC can provide additional assistance which deliver safety benefits to VFR pilots in Class G airspace. ATC provide direct assistance during emergencies or when pilots enter dangerous situations, such as becoming lost, disoriented, encountering IMC or equipment failure (e.g. undercarriage failing to deploy) or running low on fuel. Where surveillance is available, ATC can provide vectors or directions to assist the pilot to safe environments or landing sites. ATC can also alert emergency authorities at an aerodrome or any location (e.g. road or open field) to prepare for an abnormal landing. Even where surveillance is not available, ATC can request other pilots to assist in locating an aircraft in distress and provide assistance.

When in distress, or in an urgent or emergency situation, pilots should contact ATC as soon as possible and ask for assistance. It is beneficial to already be on the ATC frequency at the time, rather than having to determine and then switch from MULTICOM to a useful ATS frequency. A broadcast on 121.5 MHz might not receive a response in a remote area or in rugged terrain.

IFR aircraft operating at low altitudes in Class G airspace

RAPAC convenors believe that the numbers of IFR aircraft operating at low altitudes in Class G airspace—needing to be on Area VHF that would impact on VFR operations—are not significant. In order to confirm this, CASA sought data on the number of IFR flight plans submitted at very low altitudes over a six month period⁵. This data is represented in Table 1 and while the flight plans do not guarantee that an IFR flight would be operating below 3,000 ft AGL, it could be very likely as the lowest safe altitude only needs to be 1,000 ft above terrain and obstacles. The number of flight plans, including A030 or A035, is 9% of all IFR flight plans (or 46,668 flight plans) over 6 months which is a significant number of flights.

Table 1: Number of IFR flight plans at low altitude

Number of IFR Flight Plans at Low Altitude				
<i>Altitude</i>	<i>Civil</i>	<i>Military</i>	<i>Civil + Military</i>	<i>% of IFR Flights</i>
A030	32,392	1,631	34,023	6.6
A035	10,911	1,734	12,645	2.4
A040	1,927	130	2,057	0.4
A045	13,198	693	13,891	2.7
A050	1,624	48	1,672	0.3
Total	60,052	4,236	64,288	12.4
Total Number of IFR Flight Plans (6 months to 27 October 2016) – 519,088				

Note: The IFR flight plans included above contain a level request at the altitudes listed in the table. This does not mean that aircraft, if flying in accordance with their flight plan, would be below 3,000 ft AGL but it is very likely in the case of operations at A030 and A035 and is also likely at the other altitudes, depending on height of terrain along the route.

CASA risk assessment

The safety benefits of the procedures published in the AIP on 30 May 2013 sought to address the risk that transiting pilots would not be aware of an aerodrome that was not published on an

⁵ 6 months to 27 October 2016.

aeronautical chart. However, CASA received feedback from some members of the pilot community stating that the AIP amendments could not be justified on the basis of risk. In order to ensure the procedures published in the AIP did not introduce any new risks, CASA conducted a risk assessment in early 2015 (Annex A).

One of the key findings of the risk assessment was that there were no major risks in relation to use of Area VHF at aerodromes not published on an aeronautical chart. The highest residual risk related to pilots deliberately ignoring these procedures and using MULTICOM. In relation to the use of MULTICOM as a blanket frequency below a certain altitude, the risks were assessed as much higher (an extreme risk level in some cases) and could only be mitigated to an acceptable level (medium) by adopting the use of Area VHF.

CASA presented its risk assessment to the Operational Standards Sub-committee in March 2015 and raised the question 'who believes MULTICOM should be used as a blanket low-altitude flying frequency?' Only one organisation agreed and the consensus was that Area VHF should be used en route and it is preferable that either a discrete CTAF or MULTICOM frequency is used in the vicinity of aerodromes. This was also discussed at the SCC Plenary in March 2015, with the undertaking by CASA to continue to educate the aviation community. CASA have since developed a range of communication activities including:

- links under <https://www.casa.gov.au/airspace/standard-page/operations-non-controlled-aerodromes> to 'Operations at Non-controlled aerodromes' which contains booklet, poster and CAAPs 166-1(3) and 166-2(1)
- On Track - <https://www.casa.gov.au/education/standard-page/ontrack>
- articles in *Flight Safety Australia* magazine
- messages in the 'LCD screen program' (i.e. revolving digital advertising style messages issued to flying schools etc. that can be plugged into TVs)
- updated information in the new VFRG.

3.4.1.2 Area VHF risks

Frequency congestion - VFR broadcasts on Area VHF can cause frequency congestion and potential blocking of calls from ATC to the airlines.

Some members of the aviation community have expressed concern about frequency congestion on Area VHF. However, CASA has only received anecdotal evidence of the possibility of congestion occurring and has not received evidence of a specific or widespread problem. Additionally, Airservices Australia has not reported any systemic issues of frequency congestion to CASA and has procedures in place to split ATC frequencies should congestion occur.

RAPAC convenors believe that using a lack of reported congestion to justify the 2013 AIP amendment was the wrong metric—a lack of pilot compliance also presents as a lack of congestion. RAPAC convenors have stated that broadcast traffic and collision avoidance calls on Area VHF will, and have, overridden and distracted from calls between ATC and aircraft under their control. Although heard by pilots, those occurrences have not been formally reported by ATC staff as congestion which means there is no data recorded. There are many locations where operations are below the level of the ATS VHF coverage in Class G airspace. The level of transmissions and frequency used in such areas is unknown to ATS unless it is reported.

CASA maintains that it is more likely for frequency congestion to occur on Area VHF where there is a busy aerodrome. If an aerodrome has elevated traffic patterns over time, it should be published on an aeronautical chart. Publishing the aerodrome on an aeronautical chart would mean that the MULTICOM frequency would be used and congestion on the Area VHF would not become a safety issue.

As a result of this clarification, and ensuing awareness of frequency congestion, a number of aerodromes have been published on aeronautical charts or Broadcast Areas have been established.

RAPAC convenors believe that before 30 May 2013 many VFR cross-country flights could be conducted without having to change from monitoring the single MULTICOM frequency of 126.7 MHz, as it didn't matter whether or not an aerodrome was on a chart. After 30 May 2013, those flights involved multiple frequency changes between 126.7 MHz and the Area VHF—due to CASA's decision to differentiate between charted and uncharted aerodromes. In addition, many aerodromes appear on one type of chart (e.g. a WAC) but not another (e.g. a VNC). RAPAC convenors also highlighted that a large enough Broadcast Area on 126.7 MHz would become a *de facto* MULTICOM again, and could be labelled on charts as such (see Figure 1).

FOR OPERATIONS IN THIS AREA
SFC-3000FT AGL USE MULTICOM 126.7

Figure 1: Example label for charts

As discussed later in this DP, CASA has already informed Airservices Australia of the need to ensure all aerodromes and ALAs are published on each chart if the aerodrome or ALA is within the coverage area of the chart. The Broadcast Area frequency boxes are not referenced to a height above ground level (AGL) but a height above mean sea level (AMSL) altitude – as aircraft fly at altitudes. Most Broadcast Areas are also allocated a discrete frequency to avoid frequency congestion.

Area VHF boundaries - For aerodromes that are located close to FIA boundaries, there is confusion as to which Area VHF frequency to use. For example, Mittagong YMIG in New South Wales; Sydney Centre is the FIA frequency to the immediate northeast, and Melbourne Centre to the southwest.

CASA's expectation is that when pilots are exercising good airmanship, they would consider the nature of their operation in order to determine which of the Area VHF frequencies is the most appropriate.

RAPAC convenors point out that one pilot's good airmanship could result in a different frequency selection to another pilot's. To justify CASA's alerted see-and-avoid argument (mentioned earlier in this section), the procedure for frequency selection should be simple and definitive so that all pilots exercising their own version of good airmanship come to the same conclusion.

Area VHF frequency coverage - There are certain Area VHF frequencies that have limited coverage at low-altitudes and others where the published frequency is not the closest one to the VHF transmitter.

CASA acknowledges that there are locations in rural and remote Australia where low-altitude broadcasts on Area VHF cannot be heard by ATC, however broadcasts made on Area VHF would be able to be monitored by other pilots within the same FIA boundary and heard by potentially conflicting pilots—hence still contribute to Alerted See-and-Avoid. Additionally, if an aircraft was in an emergency situation it would be more likely for a call on Area VHF to be relayed to the appropriate ATC unit. If operating on MULTICOM, there would be a reduced chance of an emergency call being relayed by other aircraft and no chance of an emergency call being heard by ATC or other VFR and IFR aircraft operating at higher altitudes with better VHF reception.

CASA believes that if VFR pilots became accustomed to continuously monitoring the MULTICOM below 3,000 ft or 2,000 ft AGL, they would be less familiar with the appropriate overlying Area VHF frequencies.

RAPAC Convenors maintain that, over the past decade, VFR aircraft have been monitoring MULTICOM at lower altitudes in Class G rural and remote Australia, and continue to do so. They also state that the best way to alert search and rescue authorities whilst maintaining control of the aircraft is to immediately activate the 406 MHz emergency beacon and, if a transponder is fitted and operating in the vicinity radar coverage, squawking code 7700.

CASA maintains that VFR aircraft operating outside the secondary surveillance radar east coast 'J curve' and around Perth and Darwin, and not equipped with Automatic Dependent Surveillance - Broadcast (ADS-B), will not be visible to the ATS surveillance system. This would apply to large areas of remote and central Australia. Accordingly, squawking a transponder emergency code might not be of assistance to an aircraft. In this situation, pilots would benefit from being in direct (or even indirect through another pilot) communications with ATC. In areas where there is secondary surveillance radar coverage and a VFR aircraft is fitted with a transponder, ATC would not be able to provide assistance if not communicating with the pilot.

CASA acknowledges that 121.5 MHz is available for emergencies, however the Australian Maritime Safety Authority (AMSA) provide advice on their website that states:

in the event of an emergency, get out a MAYDAY or PAN call. If not operating on an ATS frequency, always have the area or overlying frequency set for immediate use. This is the most responsive method to alert the search and rescue system.

AMSA have confirmed that the use of 121.5 MHz is not the preferred distress call broadcast frequency. Aircraft emergency frequencies are also published in paragraph 1.1.1 of the AIP ERSA - EMERG.

CASA advises that if there are FIA boundaries that appear to have a VHF transmitter operating on a different Area VHF, and in closer proximity to the FIA boundaries, then specific examples should be raised with the local RAPAC. Airservices take into consideration a range of factors in determining FIA boundaries and can review these situations as they arise.

RAPAC Convenors advise that FIA charted boundary issues have been raised previously and changes have been unsuccessful – the air traffic control sector boundaries accommodate the IFR route structure and staffing levels, rather than reliable VHF coverage for all aircraft. Flight

and ground mapping of VHF transmitter coverage should be conducted by CASA or Airservices – the Planning Chart Australia (PCA) chart is intended to reliably show expected coverage at various altitudes. It is noted that on the existing PCA chart, VHF coverage below 5,000 ft is not provided.

3.4.1.3 Case study 1

Busy ALA

Note: The following is a real-life example; however the aerodrome has been de-identified.

ABC aerodrome is located close to an FIA boundary. It is busy with various types of aviation activities including, but not limited to, model aircraft, paramotor aircraft, gyroplanes, ultralights and aerobatics. The aerodrome was previously not published on an aeronautical chart and, while close to an FIA boundary, it is also in the vicinity of a number of other aerodromes and not far from a major capital city airport. Transiting pilots, monitoring Area VHF, would not be aware of its existence or the intense nature of its aviation activities. In 2013, other aerodromes that are published on aeronautical charts were identified as being subject to frequency congestion and allocated a discrete frequency. It wasn't until 2015 that a local RAPAC discussed ABC aerodrome and recommended that it be published on the aeronautical charts, and be allocated the same discrete frequency as the other nearby aerodromes. If ABC aerodrome had already been published on the aeronautical charts it would have been identified as needing to be on the same discrete frequency as the other nearby aerodromes.

This demonstrates the safety benefits of busy aerodromes being published on aeronautical charts and therefore alerting other airspace users to their existence.

3.4.1.4 Case study 2

Local knowledge

Note: The following is a real-life example; however the landing strip has been de-identified.

XYZ landing strip is located close to a large mountain that is a sightseeing destination for visiting pilots. It is also located 15 nm from a regional aerodrome. If MULTICOM was in use everywhere at low-altitudes, local pilots would switch to MULTICOM in the vicinity of XYZ. However visiting pilots departing from the regional aerodrome, and other pilots unfamiliar with the area, would be on the regional aerodrome CTAF while in the vicinity of the aerodrome and then Area VHF. The XYZ landing strip is a small grass strip so is not easy to observe when flying in the vicinity. It also hosts fly-ins which have the potential to cause frequency congestion on the Area VHF.

This demonstrates the safety benefit for any aerodrome that is busy—even if it is only occasionally busy, such as an annual fly-in—to be published on aeronautical charts, therefore alerting other airspace users to its existence.

3.4.2 Option 2 – MULTICOM

3.4.2.1 MULTICOM safety benefits

Alerted see-and-avoid

A common low-altitude VFR frequency would allow for both VFR and IFR pilots to have a common frequency to monitor and broadcast on when below 3,000 ft or 2,000 ft AGL. Pilots

would not need to be familiar with FIA boundaries or Area VHF frequencies when operating continuously below 3,000 ft or 2,000 ft AGL. Additionally, pilots would not need to be aware of aerodromes not published on an aeronautical chart, as all aircraft operating at these unpublished aerodromes, along with those without a discrete CTAF, would be monitoring MULTICOM. However, in order to gain the maximum safety benefit from Alerted See-and-Avoid, busy aerodromes would still need to be published on aeronautical charts to alert pilots to specific activity in the vicinity of those aerodromes.

IFR aircraft to be capable of monitoring and broadcasting on two VHF frequencies

In order for pilots operating under IFR, below 3,000 ft or 2,000 ft AGL, to continue to receive the necessary traffic information and a FIS, this option would require IFR aircraft to be able to monitor and broadcast on two frequencies – the Area VHF and MULTICOM.

Currently pilots monitor Area VHF and for a short period switch to MULTICOM or the CTAF (126.7 MHz or discrete) when in the vicinity of published aerodromes, or the Broadcast Area frequency within a Broadcast Area. Under the MULTICOM proposal IFR aircraft would need to continuously monitor 126.7 MHz when operating below 3,000 ft or 2,000 ft AGL, which could be above the lowest safe altitude, and this could require them to have the capability to monitor and broadcast on two VHF frequencies. This might require a legislative amendment in order to ensure all IFR aircraft were capable of monitoring the appropriate air traffic control frequency, as well as MULTICOM, when operating below 3,000 ft or 2,000 ft AGL. Currently, IFR aircraft with only one radio can stop monitoring Area VHF when in the vicinity of an aerodrome or when operating within the limits of a Broadcast Area. The MULTICOM option, permitting low altitude enroute IFR operations with only one radio, would need to be assessed for safety if they were not being provided with a FIS.

RAPAC Convenors believe that most IFR-equipped aircraft in Australia already have two VHF radios (or two-frequency capability) and therefore any cost to industry should be minimal due to existing voluntary fitment.

CASA advises that regulatory changes that could arise from the introduction of MULTICOM at low-altitude everywhere in Australia, that require any IFR aircraft to be equipped with two VHF radios or with two frequency capability, would need to be consulted with industry prior to the introduction of MULTICOM.

3.4.2.2 MULTICOM risks

Air traffic services provided in Class G airspace

IFR pilots are provided with a FIS, including traffic information in Class G airspace wherever radio communications exist. If VFR aircraft were operating below 3,000 ft or 2,000 ft AGL, outside of secondary surveillance radar or ADS-B coverage, they would be unknown to ATC and no traffic information would be available to IFR pilots descending below these altitudes. Additionally, VFR pilots making broadcasts on MULTICOM and then operating above 3,000 ft or 2,000 ft AGL would not be heard by either ATC or IFR pilots. Further, VFR pilots would not gain situational awareness of arriving and departing IFR aircraft. Alternatively, IFR pilots may need to make additional broadcasts, apart from current MULTICOM, CTAF and Broadcast Area broadcasts, resulting in an increased workload.

CASA maintains that VFR aircraft operating on MULTICOM below 3,000 ft or 2,000 ft AGL would be unable to receive a FIS and Alerting Service. If they suffer an emergency they might not have time to identify the correct Area VHF frequency, select the frequency and make a broadcast. If there was a hazardous weather event in their vicinity that was not forecast, VFR aircraft would not receive a Hazard Alert broadcast by ATC. Additionally, advice provided by ATC on NOTAM, which could have an immediate and detrimental effect on the safety of the aircraft, would not be heard on MULTICOM, nor would advice be received on military low jet routes.

RAPAC Convenors believe that no ATC service is assured, nor should it be expected in Class G airspace. There are currently non-radio equipped aircraft legitimately operating VFR in Class G airspace that will **never** receive a traffic alert, a Hazard Alert, advice on low jet routes or a NOTAM update from ATC, nor will they be able to call ATC in an emergency. An aircraft on the wrong frequency, or not listening, or busy with another task, is effectively a 'no radio' aircraft to all other aircraft.

RAPAC Convenors argue that pilots cannot rely on useful help from ATC in an emergency situation when they are out of range of a VHF transmitting outlet or when time to impact is imminent. Instead, RAPAC Convenors recommend pilots activate the emergency beacon in their aircraft immediately (which will transmit on 121.5 MHz to overflying commercial airliners, with an identifying signal shortly thereafter on 406 MHz to search and rescue authorities) and set their transponder (if fitted) to code 7700 so that they can concentrate on managing the emergency without being distracted by radio calls. RAPAC Convenors also suggest that Class F airspace should be considered by CASA around the lower steps of Class C airspace if a higher level of ATC service is considered desirable.

According to the AIP, pilots should monitor 121.5 MHz before engine start and after shutdown. Reception of an Emergency Locator Transmitter should be reported immediately to ATC or the Rescue Coordination Centre. There is no requirement to monitor 121.5 MHz when airborne and ATC does not monitor 121.5 MHz.

CASA maintains that IFR aircraft with only one radio monitoring the MULTICOM would be facing a similar risk in the same situation.

VFR regular public transport operations

In accordance with CAO 82.3, for an RPT service that is operating under VFR, the flight crew must be able to communicate at all times with ATC or the aircraft operator. The MULTICOM option in this DP would only be permissible if the aircraft could monitor both Area VHF and MULTICOM. This would require a legislative amendment, requiring the carriage of two radios at all times or a radio capable of monitoring two frequencies simultaneously.

Currently, VFR aircraft conducting RPT operations are permitted to have either one VHF and one HF radio, or two VHF radios. Therefore, CASA advises that requiring two-frequency capability introduces a regulatory cost.

RAPAC Convenors argue that CASA has the capacity to survey the current Australian VFR regular public transport fleet to determine current VHF radio fitment capability and then accurately determine the total fleet cost of upgrading (if any). CASA advises that any regulatory changes that require an aircraft to be equipped with two VHF radios, or with two-frequency capability, would be consulted with industry prior to the introduction of MULTICOM at low-altitude everywhere in Australia.

'Chat' frequency

If a low-altitude frequency was provided for VFR aircraft it could lead to broadcasts being made that are not required operationally and frequency congestion would most likely increase.

CASA contends that if pilots are aware that their calls are not being monitored by ATC, they would not feel inhibited or restricted by a third party monitoring their calls. Under the current procedures published in the AIP, pilots can already use an alternative frequency to Area VHF for operations such as parachuting, gliding, agricultural operations and circuit training or local flights at non-controlled aerodromes, and 123.45 MHz for pilot-to-pilot communications.

RAPAC Convenors maintain that MULTICOM has and continues to be used appropriately in rural and remote Australia as a broadcast channel and not a 'chat' channel. Most pilots know that 123.45 MHz is the 'chat' channel. There are industry associations urging CASA to educate pilots to make less radio calls (just the important trigger calls) which, if carried out successfully, would further discourage any chatter on the MULTICOM and make congestion less likely.

RAPAC Convenors also point out that, if CASA formally defined a 'local' flight to be *'any aviation activity in Class G airspace up to 2,000 ft or 3,000 ft AGL, away from a discrete CTAF and Broadcast Area'*, it could require all such activity to use MULTICOM 126.7 MHz and publish it in the AIP with minimal other changes to procedures. Labelling charts with a frequency box as illustrated in Figure 1 of this DP would also promulgate appropriate frequency use.

Unalerted see-and-avoid

The safety benefits of Alerted See-and-Avoid are only realised through the use of the same frequency, but also by being aware of the existence and approximate location of other traffic. Area VHF frequencies are allocated to specific FIA boundaries which means broadcasts made on Area VHF are limited geographically.

CASA maintains that using MULTICOM could make it difficult for pilots to know where the broadcasts are coming from, as the call might be from an aircraft that is geographically remote or from an aerodrome whose name is not published on an aeronautical chart.

RAPAC Convenors maintain that the loudness of the received signal on MULTICOM (i.e. the signal-to-noise ratio) gives a truer indication of the closeness of the station, whereas on Area VHF the signal heard might be a re-transmitted signal via the ATC communications network many hundreds of miles away. RAPAC Convenors also maintain that the ready identification of a location not on a chart is just as likely to be unknown if listening to the Area VHF as it is if listening on MULTICOM—being on the Area VHF does not make an unknown location any more known.

Frequency congestion

MULTICOM, or use of 126.7 MHz for CTAFs, is already subject to congestion at certain locations and as a result of consultation through the RAPACs, discrete frequencies are allocated or Broadcast Areas are established.

CASA maintains that adopting MULTICOM as the common low-altitude VFR frequency could see an increase in broadcasts heard by pilots who then need to assess and determine if operationally relevant to their situation or location. Aircraft on descent from higher altitudes that are making broadcasts on MULTICOM to advise of their arrival will have greater radio coverage, potentially over hundreds of miles, resulting in pilots receiving transmissions that are not relevant

to their area of operation—this adds to frequency congestion and potentially adds confusion as to aircraft location.

RAPAC Convenors believe that the same issues of irrelevance and unintended congestion can occur on Area VHF (because the same aircraft will be making the same calls on Area VHF frequencies instead of on MULTICOM), made worse when ATC automatically re-transmit aircraft onto other Area VHF frequencies. This in itself is believed to be a far greater hazard than random pilot broadcasts.

Operations under 3,000 ft or 2,000 ft AGL

Aerodrome circuit operations should be conducted at 500 ft, 1,000 ft and 1,500 ft above the aerodrome elevation. Aerodrome elevations for certified, registered, military and some ALAs are published in ERSA FAC and are known to all pilots operating at those locations, so height above ground is easy to determine.

CASA maintains that having a VFR frequency ceiling of 3,000 ft or 2,000 ft AGL across the whole of Australia could be very difficult for IFR and VFR pilots to determine, monitor and maintain operationally. IFR pilots must operate in accordance with the table of cruising altitudes published in the AIP under regulation 180 of CAR and cruise at A020, A030, A040 or A050. Below 5,000 ft AMSL, VFR pilots are required, when practical, to operate in accordance with the table of cruising altitudes published in the AIP under regulation 173 of CAR and cruise at A015, A025, A035 or A045. The hemispherical cruising levels also assist with vertical separation. Introducing MULTICOM everywhere would require **all** aircraft operating at low altitudes to be aware of the elevation of terrain below them and to calculate an AGL height, with the potential for one pilot being on Area VHF and the other on MULTICOM. This introduces a risk that doesn't exist under the current procedures as the appropriate frequency is clearly published.

RAPAC convenors believe that flying **above** terrain is a basic principle of flying visually and shouldn't be a problem for any pilot exercising good airmanship in VMC. The VMC criteria in ENR 1.2 of the AIP is defined as *2,000 ft above ground or water*. Any difficulty that CASA perceives pilots will have should be less for IFR (and night VFR) pilots who are required to plan their minimum altitude based on the highest terrain and obstacles along their path. Formal definitions of lowest safe altitude, minimum sector altitude and segment minimum safe altitude, and how IFR pilots determine how high they have to fly, are provided in Gen 2.2 of the AIP – they are not terrain-following close to the ground.

CASA agrees that IFR aircraft are not terrain-following but are operating above lowest safe altitudes, which provide a minimum of 1,000 ft clearance above terrain and obstacles. However, this clearly places them below the VFR low-altitude frequency ceiling of 3,000 ft or 2,000 ft AGL, therefore they would need to monitor not only the elevation of terrain, but the existence of busy ALAs that are not published on any aeronautical charts. RAPAC Convenors believe that this is part of a normal visual lookout by VFR (and IFR) pilots. IFR pilots descending to the lowest safe altitude using MULTICOM would conduct procedures similar to entering a CTAF or broadcast area.

All pilots would need to be aware of the elevation of terrain away from the vicinity of an aerodrome in order to assess their height above ground. Pilots using altimeters are familiar with operations being conducted below 3,000 ft or 5,000 ft AMSL so it might be more appropriate for a low-altitude VFR frequency ceiling of not above 3,000 ft (A030) or 5,000 ft (A050) altitude based on area QNH.

Selecting a low-altitude VFR frequency height of A030 could be problematic in areas of high elevation. As an example, there are a number of aerodromes whose elevation is above 3,000 ft (e.g. Armidale – 3,556 ft, Cooma – 3106 ft, Glen Innes – 3,433 ft and Mount Hotham – 4,260 ft). Selecting A050 as the low-altitude VFR ceiling height might be too high and include too many aircraft that are not conducting operations within the vicinity of an aerodrome. It is for this reason that the RAPAC convenors prefer the MULTICOM upper limit to be based on AGL rather than AMSL and ask CASA not to underestimate a VFR pilot's ability to avoid terrain. CASA points out that IFR pilots would need to operate in accordance with these same VFR procedures to ensure they are monitoring 126.7 MHz at the appropriate above ground level heights.

Additionally, in an emergency, distress or urgent situation, pilots should climb to enhance communications, surveillance detection or direction finding when possible. This would automatically put them in potential conflict with aircraft operating above 3,000 ft or 2,000 ft AGL on Area VHF and most importantly means that they would not be able to receive the necessary ATC assistance.

3.5 Overseas practice

3.5.1 USA

The FAA publishes traffic advisory practices in its Aeronautical Information Manual (AIM). The FAA rules governing VFR flight have been adopted to assist the pilot in meeting their responsibility to see and avoid other aircraft. CTAFs are used for operations to or from an airport without an operating control tower. The CTAF can be a UNICOM, MULTICOM, Flight Service Station or control tower frequency. Importantly, the AIM states:

'where there is no tower, Flight Service Station or UNICOM station on the airport, use MULTICOM frequency 122.9 MHz for self-announce procedures. Such airports **will be identified** in appropriate aeronautical information publications'.

This is reiterated again in their AIM that, in order to be communicating on a common frequency, 'while operating to or from an airport without an operating control tower' that 'the CTAF ... is identified in appropriate aeronautical publications'.

Importantly, the FAA requires aerodromes using MULTICOM to be identified in appropriate aeronautical information publications.

RAPAC convenors believe that the statement above is misleading. Contemporary information they have received from the USA is that the FAA does not require VFR aircraft in Class E or Class G airspace to use or monitor any frequency. The CTAF is available and compliance with the FAA's recommended practice is very high, but away from an aerodrome VFR pilots typically turn down the volume on their radios and don't monitor any frequency. RAPAC Convenors also note that traffic levels in Australia are much less than in the USA.

3.5.2 Transport Canada

Transport Canada publishes information relating to aircraft operations at uncontrolled aerodromes in its AIM. It states that it is essential that all radio-equipped aircraft monitor a common designated frequency. A Mandatory Frequency (MF) is designated for use at selected uncontrolled aerodromes. An Aerodrome Traffic Frequency (ATF) is designated for active uncontrolled aerodromes that do not meet the criteria for an MF.

At uncontrolled aerodromes without a published MF or ATF, it stipulates a common frequency of 123.2 MHz for the broadcast of aircraft position and the intentions of pilots flying in the vicinity of those aerodromes. Transport Canada also provide advice that pilots should continuously monitor 126.7 MHz in Class G airspace, whenever practicable, due to the lack of information on the movements of other aircraft operating in close proximity which might create a potential hazard. It is not mandatory for pilots monitor and broadcast reports on 126.7 MHz in Class G airspace.

ATFs might also be used in certain areas other than the area immediately surrounding an aerodrome, where VFR traffic activity is high and there is a safety benefit in ensuring that all traffic monitor the same frequency.

3.5.3 Civil Aviation Authority of New Zealand

The Civil Aviation Authority of New Zealand (CAA NZ) publish its instructions to pilots in its AIP. Its Class G airspace communications are established through use of Flight Information Service Communications (FISCOM), MBZ or Common Frequency Zone (CFZ) frequencies. In uncontrolled airspace, when not within an MBZ or CFZ, pilots are instructed to operate on the appropriate FISCOM frequency. CFZs have been created in certain areas of New Zealand and are not mandatory but advisory in nature. CFZs generally depict areas of concentrated recreational aviation activity. En route IFR and VFR aircraft are advised to maintain a listening watch on the appropriate FISCOM frequency unless operating within an MBZ or CFZ.

Similar to CASA, the CAA NZ released a discussion document in April 2013⁶ on radio frequency use in uncontrolled airspace. One of the safety issues identified was the increasing use of 119.1 MHz, which was an unattended aerodrome frequency, as an en route frequency. The document stated that 119.1 MHz was being used inappropriately outside the vicinity of uncontrolled aerodrome traffic areas. The proposed CAA NZ solution was:

'to increase coverage and use of the flight information service using FISCOM frequencies which provide the advantages sought in the nationwide CFZ network proposal by using the system that pilots should currently be using'.

This would also reduce the duplication of a nationwide CFZ network and a nationwide flight information service. Accordingly the proposed solution is that pilots use the FISCOM frequency outside of controlled airspace or the aerodrome traffic zone, unless a CFZ or MBZ is in place. No changes in procedures or to the AIP resulted from the discussion document.

RAPAC convenors believe the CAA NZ comparison is not valid because, at only one-eighth larger area than our State of Victoria, the surveillance and radio repeater capability is entirely different to our wide open areas where MULTICOM is the solution.

3.6 Assessment of options

CASA's assessment of the safety benefits and risks associated with the two options in this DP is that the maximum safety benefits of Alerted See-and-Avoid are provided by Option 1—the use of Area VHF in the vicinity of an aerodrome not published on an aeronautical chart.

The procedures currently published in the AIP provide both IFR and VFR pilots with appropriate and clear guidance as to what frequency to use in Class G airspace at aerodromes published on

⁶ Civil Aviation Authority of New Zealand: Radio frequency use in uncontrolled airspace - Discussion document (12 April 2013).

aeronautical charts and in Broadcast Areas, and on the use Area VHF. Frequency congestion on ATC frequencies will not occur if busy aerodromes are published on aeronautical charts and pilots can monitor and broadcast, when necessary, on MULTICOM.

CASA believes that selection of a low-altitude VFR frequency height above ground could be difficult for pilots to manage operationally and selection of a height based on altitude could be either too low or too high, taking into account Australian terrain.

FIA boundaries for all of Australia are published on ERCs which are used by both VFR and IFR pilots. FIA boundaries are also published on VNCs and VTCs, however the coverage of the VNCs and VTCs is limited to locations with the highest density of air traffic—predominantly the eastern seaboard from Cairns to Adelaide and Perth and Darwin.

If Option 1 is preferred CASA will consult with Airservices Australia, as the publisher of the AIP, to consider the safety benefits of including FIA boundaries on the WACs in order to reduce the risk of VFR pilots not knowing the appropriate Area VHF frequency. This also has the potential to provide cost savings to VFR pilots who would not need to buy ERCs.

RAPAC Convenors maintain that the 4 year rolling amendment cycle for WACs is not appropriate for showing FIA boundaries. CASA agrees and would request that Airservices review the frequency of publication of the WACs to be at least annual to allow for regular updating of the information published, rather than having pilots relying on updates provided by AIP Supplements. CASA acknowledges, however, that many pilots are already using approved aeronautical chart software products that include the FIA boundaries on their map displays.

RAPAC Convenors also believe it would be useful to show air traffic control VHF transmitter stations on WACs – similar to Broadcasting Stations.

CASA has already advised Airservices Australia that aerodromes should be published on each aeronautical chart that has the same area of coverage, including the aerodrome location. This would ensure that all pilots would be aware of a published aerodrome and know to monitor MULTICOM in the vicinity of that aerodrome.

RAPAC Convenors acknowledge that whilst the location of aerodromes might be able to be printed on charts, aerodromes with long names (such as Cardwell/Dallachy) might not be included due to chart clutter, unless the scale of the charts is changed. Not including names on charts makes it difficult for itinerant pilots to call out their position using readily-identifiable locations.

CASA will consult with Airservices Australia to review the FIA boundaries and ensure that the published Area VHF frequency is appropriate in accordance with the location and range (at lower altitudes) of VHF transmitters.

A review of comparable overseas practice indicates that the current procedures published in the AIP for Australia are consistent and there is a reliance on aerodromes, areas of significant VFR traffic and common frequencies being published in the AIP. Whether it is a specific aerodrome or Broadcast Area, in order to obtain the maximum safety benefit of Alerted See-and-Avoid the important requirement is for these details to be clearly published in the AIP.

3.7 CASA's preferred option

CASA has proposed to retain, but enhance, the current practice of using the relevant Area VHF in Class G airspace for aerodromes not published on an aeronautical chart. The RAPAC conveners, advocating for a specific segment of the aviation industry, propose the use of MULTICOM as the common low-altitude VFR frequency across Australia.

Ultimately, the system employed in Australia will have its greatest impact on **all** low-altitude airspace users. It is important that all airspace users contribute to the discussion and selection of an option. CASA encourages and requests a high level of engagement and input from all airspace users—from airline pilots to general aviation and recreational flyers—in reaching a final decision about an acceptable frequency for use at low altitude in Class G airspace.