



VHF Airband Radio Syllabus and Textbook

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About this publication

This guide is produced by the Hang Gliding Federation of Australia (HGFA) for the information of HGFA members. If you want more information or copies of this guide please contact the HGFA office.

Disclaimer

The information contained in this operations manual is presented in good faith with the intention of:

- (a) promoting safety in the sports of hang gliding, paragliding and weightshift microlighting;

- (b) Providing course material for participants in these sports; and

As far as possible, this manual represents the best information available at the time of publication.

Note that hang gliding, paragliding and microlighting are considered adventure sports which may expose the participant to a higher level of risk, injury, or death compared to other low risk sports. Participants are reminded that it their responsibility to assess if the level of risk is acceptable to themselves.

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Introduction

About the VHF Airband Radio Operator Endorsement (VHF AROE)

Very high frequency (VHF) airband radios are becoming more common as a tool for aircraft pilots to identify the location and intention of other aircraft in their vicinity (for VHF use at non-controlled aerodromes see Civil Aviation Advisory Publication 166-1(3) and 166-2(2)).

In some classes of airspace the use of VHF airband radios is mandatory. Using a VHF airband radio requires a license endorsement. To obtain a VHF airband radio operators license you must satisfactorily (80% pass mark) complete both written and practical exams.

This manual provides you with information regarding VHF airband radio use in Australia for the satisfactory completion of the written VHF airband radio operator examination.

Radio communications in Australia are controlled by the Australian Communications and Media Authority (www.acma.gov.au).

Airband radio

Airband radios transmit and receive on a radio frequency between 108 and 137 Mhz. Radios are set to transmit and receive Amplitude Modulation (AM) signals from 118 – 136.975 MHz in 25 KHZ steps. [Frequencies from 108 – 118 MHz are reserved for navigation aids]

Airband radio use is different from Citizens Band Radio - People's lives may depend on the quality of communication using this Medium - as such all users of Airband radio must receive training in proper use.

VHF Radio operators endorsement syllabus

The following syllabus has been developed from the CASA Part 61 Aeronautical Radio Operator syllabus and other sources relevant to HGFA operations.

VHF Airband Radio Operator Endorsement (VHF AROE) Syllabus

Operation of aeronautical radio systems

2.1.1 Meets the English language to Aviation English language standard (AEL).
2.1.2 Recall the phonetic alphabet and the method of transmitting numerals.
2.1.3 Recall the correct use of aircraft call-signs.
2.1.4 State standard radio procedures for outside controlled airspace (OCTA).
2.1.5 State how transmission of time is conducted.
2.1.6 State how to listen to the radio.
2.1.7 State how to establish and maintain communications.
2.1.8 State the hazards of clipped transmissions and the consequences.
2.1.9 Demonstrate correct procedure for the conduct of a routine pre-flight test of an aircraft radio-telephone, including the following:
(a) use of radio transmit and receive selector switches;
(b) turning radio on;
(c) selecting correct frequencies;
(d) use of squelch control;
(e) selection of radio navigation equipment;
(f) correct use of a microphone;
(g) use of intercom and public address system;
(h) voice activated systems.
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(b) unauthorised transmissions.
2.1.13 Describe the function of each of the following components of an aeronautical radio system:
(a) power source/battery switch;
(b) radio master;
(c) fuses and circuit breakers;
(d) microphone;
(e) transmitter;
(f) receiver;
(g) antenna;
(h) headphones and speaker.
2.1.14 Describe the difference between a distress and an emergency message and the standard phrases used in both cases.
2.1.15 Accurately extract radio failure procedures from ERSA.
2.1.16 In relation to the use of an aeronautical radiotelephone, describe the controls used to transmit and receive, including audio panel selections

2. Radio use

2.2.1 Describe the basic principles and characteristics of radio waves, wave propagation, transmission and reception for the following:
(a) radio frequency band ranges (MF, HF, VHF, UHF);
(b) properties of radio waves and the effective range of transmissions;
(c) propagation of paths of radio waves:
(i) ground waves;
(ii) sky waves;
(d) factors affecting the propagation of radio waves and reception:
(i) terrain;
(ii) ionosphere;
(iii) sun spot activity;
(iv) interference from electrical equipment;
(v) thunderstorms;
(vi) power attenuation;
(e) radio antennas:
(i) characteristics of antennas;
(ii) use of antennas.
2.2.2 Describe the limitations of VHF and HF signals and factors affecting quality of reception and range of signal.

3. Emergency procedures

3.1 State the emergency radio procedures for declaring an emergency
3.2 State the emergency radio procedures for a Distress message ('Mayday' call)
3.3 State the emergency radio procedures for a Urgency Message ('Pan' call)
3.4 State the emergency radio procedures for use of 121.5 MHz
3.5 State the emergency radio procedures for "transmitting blind".

4. Non-controlled aerodromes

Non-controlled aerodromes
4.1 State the definition of a Non-controlled aerodrome
4.2 State the mandatory requirements for a Non-controlled aerodrome
4.3 State the pilot responsibilities of a Non-controlled aerodrome
4.4 State the size and limits of a Non-controlled aerodrome
4.5 State the general structure of a radio call.
4.6 State the general procedure of a radio call.
4.7 Demonstrate the correct syntax for the following radio calls at a non-controlled aerodrome
4.8 Demonstrate calling on CTAF.
4.9 Demonstrate taxiing radio call.
4.10 Demonstrate arriving aircraft call.
4.11 Demonstrate modified circuit call.
4.12 Demonstrate positional broadcast call
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4.14 Demonstrate entering runway call.
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4.16 Demonstrate joining circuit call .
4.17 Demonstrate straight-in approach call .
4.18 Demonstrate joining circuit on base leg call .
4.19 Demonstrate over-fly call .
4.20 State when certain radio calls are to be made at a Non-Controlled aerodrome.
4.21 State the purpose of a Unicom frequency.
4.22 State which aviation documents contain Unicom information .
4.23 State when it is most appropriate to monitor CTAF frequency.
4.24 State when it is most appropriate to monitor area frequency.
4.25 State the definition of a AFRU.
4.26 State how an AFRU is recognised when using VHF radio.
4.27 State where guidance material can be found (in aviation documents) regarding flying with an unserviceable radio in the vicinity of a non-controlled aerodrome.
4.28 State what the standard procedures are when it is suspected that you are flying with a non-serviceable radio in the vicinity of a Non-Controlled aerodrome.
4.29 State which aviation documents contain information and procedures on Non-controlled aerodromes.
4.30 Demonstrate the use of UTC times used in transmissions at Non-Controlled aerodromes.

Assessment

Assessment is performed using two methods: -

1 - A multiple choice exam consisting of 50 questions - to be completed within 2 hours under test conditions.

2. - a practical assessment of the skills used to operate radio equipment. This assessment is to be performed by a HGFA instructor or HGFA senior Safety Officer or delegate of the HGFA operations manager.

The Results of this assessment are to be forwarded to the HGFA office on the appropriate HGFA form.

2.1.1 Meets the English language to Aviation English language standard (AEL).

ICAO has directed its member states, including Australia, to assess and certify that all operational flight crews (and air traffic controllers) are competent in radiotelephony communications as well as proficient in the language used in aviation including ICAO approved phraseologies.

The aviation language used in Australia is aviation English; aviation English is also the standard international aviation language. Therefore the language used by CASA to assess flight crew aviation language proficiency is aviation English.

English Language proficiency is a mandatory prerequisite for the issue of an operational licence – including certificates issued by the HGFA.

How do a student / pilot demonstrate English proficiency?

The demonstration involves the following three steps which must be completed prior to the student undergoing their first solo flight:

The authorised person checks the background evidence provided by the applicant showing they meet general English language.

The authorised person then conducts an interview to make sure the applicant has an acceptable level of English.

If satisfied the applicant has an acceptable proficiency in general English, the authorised person may sign off this section of the HGFA form.

2.1.2 Recall the phonetic alphabet and the method of transmitting numerals.

Phonetic alphabet and numerals

Letters are spoken using the phonetic alphabet, e.g. PON is **'Papa Oscar November'**.

Numerals are slightly altered to improve clarity; they need not be exaggerated, just spoken clearly as shown below. If radio reception is poor, a word can be spelled out letter by letter using the phonetic alphabet.

Learn these thoroughly. You can practice by reading car number plates aloud.

A Alpha	B Bravo	C Charlie	D Delta
E Echo	F Foxtrot	G Golf	H Hotel
I India	J Juliet	K Kilo	L Lima
M Mike	N November	O Oscar	P Papa
Q Quebec	R Romeo	S Sierra	T Tango
U Uniform	V Victor	W Whisky	X X-ray
Y Yankee	Z Zulu		
0 Ze-ro	1 Wun	2 Too	3 Tree
4 Fow-er	5 Fife	6 Six	7 Sev-en
8 Ait	9 Nin-er		
Decimal Day-see-mal	Hundred Hun-dred	Thousand	Tou-sand

Transmission of numbers

All numbers used to transmit altitude, cloud height or visibility which contains whole hundreds and thousands are said using the words **hundred** or **thousand**, e.g.:

Altitudes (ft.)	800	'Eight hundred'
	1,500	'One thousand five hundred'
Cloud height (ft.)	4,300	'Four thousand three hundred'
Visibility (m)	3,000	'Three thousand'

For all other numbers say each digit separately, e.g.:

Altitude (ft.)	6,715	'Six seven one five'
Headings (towards)	180	'One eight zero'
Wind direction (from) 100°		'One zero zero degrees'
(always 3 figures)	020°	'Zero two zero degrees'
Wind speed (knots)	18KT, gusting 30	'One eight knots, gusting three zero'
Altimeter setting	1000	'One zero zero zero'
(or QNH)	1027	'One zero two seven'
Frequency	126.7	'One two six decimal seven'

2.1.3 Recall the correct use of aircraft call-signs.

Callsigns

An individual **callsign** identifies each ground station or aircraft using airband radio. A callsign will be a ground station name, a flight number or aircraft registration. Callsigns of Australian registered (VH) aircraft operating within Australia are the last three letters of the aircraft registration, preceded by the aircraft type. For aircraft/pilots registered with the HGFA the callsign for a hang glider pilot with a HGFA membership number 12345 is *'Hang glider two three four five'*. I.e. the last four digits of the HGFA membership number are used.

A radio **call** begins with the callsign of the station being called followed by your aircraft type, your callsign and then the message, e.g. **'Melbourne tower, Hang glider two three four five...'**

2.1.4 State standard radio procedures for outside controlled airspace (OCTA).

Listening watch

For the entire period from which you taxi a VHF radio-equipped aircraft onto the aerodrome's manoeuvring area (see page [1.25](#)) until the aircraft is brought to a complete stop at the point of termination of the flight, you must maintain a 'listening watch' using the aircraft's VHF radio (CAR 243).

Furthermore, whenever you are flying a VHF radio-equipped aircraft in the vicinity of a non-controlled aerodrome, you must make a broadcast whenever it is reasonably necessary to avoid a collision or the risk of a collision with another aircraft (CAR 166C).

Source: - <http://www.vfrg.com.au/operations/class-g-communications/listening-watch/>

Interpilot air-to-air communication

In accordance with regional agreements, 123.45 MHz is the designated air-to-air VHF communications channel. Use of this channel will enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and facilitate the resolution of operational problems (AIP GEN 3.4).

Source: - <http://www.vfrg.com.au/operations/class-g-communications/interpilot-air-to-air-communication/>

Broadcasts

A **broadcast** in the vicinity of an aerodrome begins with the aerodrome name followed by the word 'traffic', then your aircraft type and callsign, e.g. **'Corryong traffic, Hang glider two three four five...'**

A broadcast on an area frequency begins with 'all stations' followed by your aircraft type and callsign.

When reading back information to ATC, give the read back information first and finish with your callsign. To confirm you have received and understood a message, just give your callsign.

CASA have published an advisory guide on "Operations in the vicinity of non-controlled aerodromes" which includes guidance on radio procedures See <http://goo.gl/dM6uhA>

2.1.5 State how transmission of time is conducted.

Expressing time

The 24-hour clock system is used in R/T transmissions. The hour is indicated by the first two figures and the minutes by the last two figures, e.g.:

- (0001 hrs) – "ZERO ZERO ZERO ONE"
- (1920 hrs) – "ONE NINE TWO ZERO".

Time may be stated in minutes only (two figures) in R/T communications when no misunderstanding is likely to occur.

Current time in use at a station is stated to the nearest minute in order that pilots may use this information for time checks.

Australian civil aviation uses Coordinated Universal Time [UTC] for all operations. The suffix 'Zulu' is appended when procedures require a reference to UTC, e.g.:

- (0920 UTC or 0920Z) – "ZERO NINE TWO ZERO ZULU"
- (0115 UTC or 0115Z) – "ZERO ONE ONE FIVE ZULU".

To convert from Australian Standard Time to UTC:

- Eastern Standard Time subtract 10 hours
- Central Standard Time subtract 9.5 hours
- Western Standard time subtract 8 hours.

Example

Time is given in UTC (universal co-ordinated time). Say each figure separately, e.g. 55 minutes past the hour is **'time five five'** not *'fifty-five'*, 1400 is said **'time one four zero zero'**.

Say the minutes only, unless you are referring to a time more than an hour ahead; e.g., if the time is now 0830, you would refer to 0850 as **'time five zero'** but 1050 as **'time one zero five zero'**.

2.1.6 State how to listen to the radio.

In this section you need to demonstrate that you can:

- Configure the radioset for receiving a signal on ascertain frequency
- Set the squelch level at an appropriate level.
- Monitor the desired frequency for a period of no transmissions
- Begin your broadcast

Broadcast etiquette

There are a few unwritten rules that greatly aid understanding by those maintaining a listening watch on the frequency:

- Mentally compose your message using aviation English (but no jargon) before operating the press-to-talk switch avoiding a transmission containing lots of 'umms' and 'aahs' and long pauses. Transmit once and transmit succinctly!

- Listen out for two seconds before transmitting so that you don't broadcast over someone else.
- Ensure you operate the press-to-talk switch a second or so before you start speaking; otherwise you are going to cut off the first word or part of it, probably making the broadcast useless to others. This is particularly so when the first word of the transmission is required to be the location.
- Speak distinctly and at a normal level (speaking loudly will distort the transmission) and at a normal pace (no-one appreciates a clipped, rapid-fire broadcast from the would-be 'hot-shot' pilot); and don't run the words together. The microphone must be squarely in front of the lips and 1–3 cm from them.
- Avoid using superfluous words like 'IS taxiing', 'IS entering' or 'TRACKING for Holbrook' or 'PLEASE' or 'THANKS'. The term 'tracking' is usually only associated with a VOR radial or magnetic track; e.g. TRACKING ZERO TWO ZERO.
- Don't use non-aviation English phrasing such as '(call-sign) TURNS base' instead of '(call-sign) TURNING base'. Such phrasing is confusing and may grate on the listeners; consequently a listener may not absorb the information. Avoid confusion.
- Ensure you are not inadvertently transmitting because of a stuck microphone switch. It is very annoying to others, possibly adding to stress. It can be extremely embarrassing to yourself if you happen to be transmitting the cockpit conversation.
- Listen carefully to any message being transmitted so that you fully understand it.
- If you don't understand a transmission ask for a repeat.
- And remember your own transmission must not include:
 - profane or obscene language
 - deceptive or false information
 - improper use of another call-sign.

2.1.7 State how to establish and maintain communications.

Once the radio is switched on and set up as required, a few basic procedures apply to its use. These can be listed as follows:-

Listen out carefully before transmitting. Nobody wins if two transmissions go out together; all that happens is that a squealing noise upsets everyone within radio range.

Hold the microphone two to five centimetres from the mouth when speaking. If you hold it too close, the transmission will be distorted and unclear, too far away and you simply won't be heard.

Press the transmit button BEFORE speaking (rather than AS you speak) and do not release it until AFTER speaking. Otherwise parts of your transmission will be lost.

If the microphone does not have a proper mounting, be sure you stow it in such a way as to avoid

inadvertent pressing of the transmit button. The same principle applies to hand-held radios used in flight.

Think about what you want to say before transmitting, to avoid "umm-ing and ah-ing" on the air.

Always address the station being called first, followed by your own callsign and the message. For example: *"Leeton Ground, Hotel Whisky, abeam Ardlethan at 5,000, ops normal"*.

When calling a non-gliding station, for example an Air Traffic Controller or a powered aircraft, prefix your callsign with the word "Hang-glider" (or Microlight). It helps the other party to visualise your situation and likely intentions, in particular alerting them to the fact that you have no power-plant and may of necessity behave less predictably than a powered aircraft when in the circuit area.

2.1.8 State the hazards of clipped transmissions and the consequences.

Front End Clipping - the correct procedure for beginning a transmission is to: -

key the PTT,
hesitate,
then talk.

Using this technique will avoid "front end clipping" your transmission. If a radio operator begins speaking at the same moment they key the PTT - valuable information such as the aircraft identifier, the intended recipient, or message content could be clipped from the transmission.

Rear End Clipping - When finished with your radio transmission you need to stop talking, hesitate, and release the PTT, this is to prevent "rear end clipping" or the annoying loss of often-vital information at the end of your transmissions.

2.1.9 Demonstrate correct procedure for the conduct of a routine pre-flight test of an aircraft radio-telephone, including the following:

This is covered in a practical demonstration with equipment relevant to the context the pilot will be operating in.

(a) use of radio transmit and receive selector switches;

The radio set may use a speaker microphone, a PTT on a handheld radio, or a PTT mounted on a helmet. Weightshift Microlight (WM) installations may have the PTT mounted on the basebar.

(b) turning radio on;

This may involve locating the power on switch on a hand held device, or going through pre take off / pre start procedures in a WM

(c) selecting correct frequencies;

Frequency selection may be via rotary control knob, direct keypad entry or thumb wheels.

(d) use of squelch control;

Some basic radios may have a squelch on/ off function, some may have a rotating knob to set the level of squelch.

(e) selection of radio navigation equipment;

Some setups may have a combination VHF and UHF CB radio setup and require the pilot to select the unit he wishes to use, WM installations may have dual channel radios or radios with VOR navigation built into them.

(f) correct use of a microphone;

Microphone use involves correct placement in front of the lips, use of a wind muffler, or use of a hand-held speaker mike.

(g) use of intercom and public address system;

Some radios have a PA/ intercom system that allows the use of the radio headsets to be used as an intercom to the passenger.

(h) voice activated systems.

Some radio-sets have a Voice activated system (VOX) in built. In open cockpit environments this is not useful and so the pilot should know how to disable this function.

2.1.10 Describe the correct procedure for routine fault finding and correction.

This is a practical demonstration where the pilot can demonstrate fault finding technique for: -

- No power
- No antenna connection
- Faulty headset mic connection.

Incorrect radio-set settings

Fault-finding a VHF radio installation is a necessary skill - quite often a minor configuration error or failure of headset wiring can render the VHF radio inoperative.

Headset/ mic equipment is usually connected to the VHF radio via plug and cable - these cables and plugs can fail.

It is a standard procedure then, to ensure that the radio installation is functioning as part of the pre-take off checks.

Radio check

- Ensure all connections (headset/mic, aerial, and power) are serviceable and connected to the radio properly.
- Check configuration - intercom switched master switch, power switch fuses
- Ensure power is getting to radio (power led, display lit, LCD active etc.)
- Ensure reception is routed to headset/ speaker (turn squelch off to hear hiss)
- Ensure correct frequency is selected
- Ensure aerial is connected and perform transmission radio check.
- Observe status/ transmit indicator on radio whilst transmitting.

Most faults encountered could be classified as Power / configuration / connection-cable problems and dealt with accordingly.

2.1.11 State the standard phraseology to be used to report aircraft positions in the circuit and the required calls for local flights.

Standard words and phrases

These are used to avoid misunderstanding and reduce communication time. Greetings like 'good morning' are used sparingly and best avoided if the channel is busy. If unsure of standard phrases use brief plain English. Never be afraid to speak just because you are not sure how to say something. Ask others to explain or '**say again**' if you did not understand.

The following words and phrases are to be used in radiotelephony communications, as appropriate, and have the meaning given:

ACKNOWLEDGE	Let me know that you have received and understood this message.
AFFIRM	Yes.
APPROVED	Permission for proposed action granted.
BREAK	I hereby indicate the separation between portions of the message (to be used where there is no clear distinction between the text and other portions of the message).
CANCEL	Annul the previously transmitted clearance.
CHECK	Examine a system or procedure (no answer is normally expected).
CLEARED	Authorised to proceed under the conditions specified.
CONFIRM	Have I correctly received the following..? or Did you correctly receive this message ?
CONTACT	Establish radio contact with ...
CORRECT	That is correct.
CORRECTION	An error has been made in this transmission (or message indicated) the correct version is ...
DISREGARD	Consider that transmission as not sent.
HOW DO YOU READ	What is the readability (i.e. clarity and strength) of my transmission? See ' clarity of transmission '.
I SAY AGAIN	I repeat for clarity or emphasis.
MAINTAIN	Continue in accordance with the condition(s) specified or in its literal sense, e.g. "Maintain VFR".
MAYDAY	My aircraft and its occupants are threatened by grave and imminent danger and/or I require immediate assistance.
MONITOR	Listen out on (frequency).
NEGATIVE	"No" or "Permission is not granted" or "That is not correct".
OVER	My transmission is ended and I expect a response from you (not normally used in

	VHF communication).
OUT	My transmission is ended and I expect no response from you (not normally used in VHF communication).
PAN PAN	I have an urgent message to transmit concerning the safety of my aircraft or other vehicle or of some person on board or within sight but I do not require immediate assistance.
READ BACK	Repeat all, or the specified part, of this message back to me exactly as received.
REPORT	Pass me the following information.
REQUEST	I should like to know or I wish to obtain.
ROGER	I have received all of your last transmission (under NO circumstances to be used in reply to a question requiring READ BACK or a direct answer in the affirmative or negative).
SAY AGAIN	Repeat all or the following part of your last transmission
SPEAK SLOWER	Reduce your rate of speech.
STANDBY	Wait and I will call you.
VERIFY	Check and confirm with originator.
WILCO	I understand your message and will comply with it.

Clarity of transmission

The response to the query 'HOW DO YOU READ?' or 'REQUEST RADIO CHECK' is phrased in accordance with the following **readability scale**:

1. Unreadable
2. Readable now and then
3. Readable but with difficulty
4. Readable
5. Perfectly readable.

Broadcasting in the circuit area

Pilots may be operating at uncertified or unregistered aerodromes - where radio carriage is not mandatory (unless required by the aerodrome operator or designated by CASA in indicated in ERSA by UNCR in the top right hand corner).

But remember the issue is to improve safety by alerting other aircraft to your location, so using a radio to achieve this is good practice irrespective of where you are in the sky.

CAR 166C requires a pilot to make a broadcast whenever it is reasonably necessary to do so to avoid a collision, or the risk of a collision, with another aircraft.

A broadcast must include:

- the name of the aerodrome (your location);
- the aircraft's type; call sign;
- call sign;
- the position of the aircraft;
- the pilot's intentions; and
- repeat the name of the aerodrome (your location)

Effective radio communication involves using standard aviation phraseology as detailed in the Flight Radiotelephone Operator License (FROL) syllabus and in AIP. Pilots are expected to maintain a listening watch and respond appropriately to applicable transmissions.

Examples of broadcasts on the CTAF (common traffic advisory frequency) in the vicinity of an aerodrome (Corryong):

<u>Entering 10nm of the aerodrome</u>	Hang glider pilot:	<i>'Corryong traffic, Hang glider two three four five, ten miles south west tracking north climbing to four thousand to overfly Corrvona'</i>
<u>Before launching within 10nm</u> (Call again as soon as you climb out to advise 'airborne' in case the launch call was not heard)	Hang glider pilot:	<i>'Corryong traffic, Hang glider two three four five ready for takeoff four miles south east at Mt Elliot, tracking south not above eight thousand. Corrvona'</i>
<u>Entering 10nm of the aerodrome</u> Respond to other traffic, if appropriate to maintain operational safety and avoid conflict	Hang glider pilot:	<i>'Corryong traffic, Hang glider two three four five, three miles north Corryong tracking south at four thousand, Corryong'.</i>
<u>Report landed</u>	Hang glider pilot:	<i>'Corryong traffic, Hang glider two three four five landed three miles south east Corrvona'.</i>

When operating in the vicinity of non-controlled aerodromes it is expected that all pilots make positional broadcasts including broadcasts immediately before, or during, taxiing, immediately before entering a runway, 10nm or earlier from the aerodrome, immediately before joining the circuit and prior to joining other circuit legs. Remember the issue is to improve safety in the skies through the use of VHF radios.

2.1.12 State the responsibilities of an aeronautical radio operator in relation to the following:

(a) secrecy of communications;

VHF endorsed pilots are legally bound not to divulge, without authority, the content of any radiotelephony message sent or received.

(b) unauthorised transmissions.

an aircraft station may not transmit private or personal messages; i.e. information not pertaining to operational requirements.

VHF transmissions must be:

- related to aircraft operational needs
- in English (the international language for aviation)

and must NOT:

- be profane or obscene
- be false or intended to deceive
- involve improper use of callsigns, or
- involve social communication.

Nor can an unallocated frequency within the aviation VHF band be used for communications.

2.1.13 Describe the function of each of the following components of an aeronautical radio system:

(a) power source/battery switch;

For handheld units this may be a separate switch or integrated with the volume knob

For dash mounted units there may be a separate power switch to the radio elsewhere on the dash.

(b) radio master;

For dash mounted unit there may be a separate switch that powers all radio equipment installed in the aircraft.

(c) fuses and circuit breakers;

Some aircraft have a fuse or circuit breaker bank on the dashboard - a standard part of a pre-flight check is to check the status of these circuit breakers/fuses.

(d) microphone;

For handheld units a small hole in the casing is where a condenser microphone may be housed, or alternatively a handheld speaker/microphone may be plugged into the hand held radio. Hand held and dash-mounted radios may be integrated with helmets that have speakers and microphones installed in the helmets.

Some of the latest helmets may connect to the radio using Bluetooth technology.

(e) transmitter;

The transmitter is contained within the radioset, and is enabled when the Push-to-talk (PTT) button is pressed

(f) receiver;

The receiver is contained within the radioset, and is enabled when the Push-to-talk (PTT) button is released

(g) antenna;

In a hand held unit, the antenna is usually a rubberised stalk on the top of the unit. For dash-mounted radios an external antenna is connected to the radio via a coaxial cable.

Some hand held units have a provision for an external antenna

(h) headphones and speaker.

Both hand held and dash mounted units have a provision for connecting headphones - handheld units also have an integrated speaker.

Operating the controls

This section is important for the practical exam. It is recommended to practice with a VHF radio handset. You can switch on, select a frequency and listen, but you must not transmit until you have an airband radio license and you are in the relevant aircraft.

The radio you use should be a **transceiver**, i.e. able to transmit as well as receive signals. A **scanner**, which is only able to receive a range of frequencies but cannot transmit, is sometimes used by a balloon crew to listen to the pilot's VHF broadcasts.

Before starting to use any VHF transceiver you should locate and be familiar with the:

Aerial – should be fitted before transmitting or the set may be severely damaged. A 'higher gain' aerial gives more transmitting power. The set will operate best in an upright position with the aerial clear of significant metal objects. If signals are unclear try transmitting from a different position. For permanently affixed antenna on microlights the best place for mounting is vertically above the king post.

ON/OFF switch – When ON, the radio is normally in **standby** mode, i.e. will receive incoming signals. Power use on standby is quite low compared with transmitting.

PTT (push to talk) or talk switch – Radios cannot receive and transmit at the same time, so this switch must be held down while transmitting a message and then released as soon as you finish speaking so that the set returns to standby (receive) mode. Be careful to avoid holding the talk switch down by mistake, for example by stuffing the radio in a tight pocket. If the switch is held down, the set will transmit a signal even if you are not speaking.

While you are transmitting, no-one else can use the frequency - and it is impossible to contact you. This potentially dangerous situation is known as 'open mike'.

Microphone – Locate the 'mike' and hold it close in front of your mouth. Some handheld radios may be supplied with a separate mike that plugs into the set.

Squelch (switch or knob) – To remove unwanted background noise known as static or 'hash', switch on the squelch switch. If there is a squelch knob, turn it *until the hash just disappears*, but not too far or it may also cut out the signal. If the signal is weak, it may be easier to understand without using squelch.

Note: if you leave a radio on standby with hash noise, it will flatten the battery quicker.

Frequency control – This may be a rotating switch, a set of separate switches for each digit, or a keypad. Some sets have options such as **preset** frequencies, frequency **lock** and **scan** facilities. Make sure you know how to use these, especially how to unlock them! Be able to change frequencies accurately and quickly when needed.

Power source – **Pilots are required to carry spare batteries or other power source for handheld VHF radios** (refer AIP GEN 1.5). Know how to change them if a low battery indicator shows or signals become weak. The **output** of a radio is a measure of the signal strength, usually expressed in watts (W).

Fuses – Some radios are fitted with a fuse. Know their location and how to change them if fitted (not usual in a handset type radio).

2.1.14 Describe the difference between a distress and an emergency message and the standard phrases used in both cases.

IN-FLIGHT EMERGENCIES

There are special words for use in the event of having an emergency in flight. Use of these words will guarantee you sufficient air time to get your message across. Because they are allocated for the exclusive use of pilots in some kind of distress, it goes without saying that they should not be used lightly.

The key words and their uses are as follows:-

MAYDAY (Three Times)

Derived from the French "m'aidez" (help me), this is used when the pilot experiences a serious in-flight emergency.

A Microlight pilot would use Mayday, Mayday, Mayday, to announce, for example, an in-flight fire or some equally serious problem.

An example of a glider pilot's use of Mayday would be in the event of a mid-air collision.

Pilots must exercise discretion in the use of the Mayday call. Frivolous use of the word ultimately discredits it and nobody takes any notice. On the other hand, don't ever be afraid to use it if you are really in trouble.

The Mayday call may be made on the frequency in use at the time the emergency occurs, or it may be made on the international distress VHF frequency (see next section)

PAN (Three Times)

This word means, loosely, "breakdown" and is used for an in-flight emergency less serious than one which demands instant attention by the use of Mayday.

A microlight would use Pan, Pan, Pan, for example, if he notices that the aircraft is indicating a rising oil temperature and a falling oil pressure.

A glider pilot might use Pan in the case of a bird-strike, where damage had been caused but the glider is still controllable.

The purpose of the Pan call is to alert anyone who is listening that a problem has been encountered, but there is no immediate danger. It is usually made on the frequency being used at the time, and rarely on the distress frequency, although this should not by any means be ruled out. If things get worse, don't hesitate to change the Pan call to a Mayday call.

Stop Transmitting – Distress Traffic (Callsign)

This radio call is used if your broadcast is interfering with radio communication between stations dealing with a Mayday or Pan situation. If it is directed to you, you must stop transmitting unless you are in distress yourself.

e.g. "Glider ABC Melbourne Centre Stop Transmitting – Distress Traffic Qantas 521."

2.1.15 Accurately extract radio failure procedures from ERSA.

These procedures can be found at : -

- Go to www.airservicesaustralia.com
- Select tab Publications
- Select Aeronautical Information Products (AIP)
- Scroll Down to the bottom and select “1 Agree”
- Select En Route Supplement Australia (ERSA) (Current issue e.g. 01 MARCH 2018 OR MORE RECENT)
- Select EMERG –EMERGENCY PROCEDURES
- Go to Communication Failure

2.1.16 In relation to the use of an aeronautical radiotelephone, describe the controls used to transmit and receive, including audio panel selections

Most aircraft used by the HGFA are simple aircraft with a minimum of equipment. Some Microlights and PPGs may use an integrated intercom with their radio installation and of course the configuration of these units would be very specific to that aircraft.

Some “top of the line” LSA aircraft may use a standard audio panel from a manufacturer such as Garmin



Above is a Garmin audio panel for light sport aircraft. It has volume and squelch for pilot and co-pilot and can route music, phone, radio, navigation ident etc to the headphones plugged in.

To route the microphone and headphones to the com1 (airband) radio all the pilot needs to do is press the two buttons labelled “com 1” and “com 1 mic” so that their indicator light shows green.

With any VHF radioset - (hand held or panel mounted), the configuration procedure is the same

1. Check that the radioset has power and it switched on at the power/on-off switch.
2. Check that all controls, cables, connectors are properly seated and correctly configured.
3. Adjust squelch so that radio reception is possible
4. Select the appropriate frequency (channel).

5. Listen on frequency

6. Perform transmission as required - monitor radio set indicators that transmission is occurring.

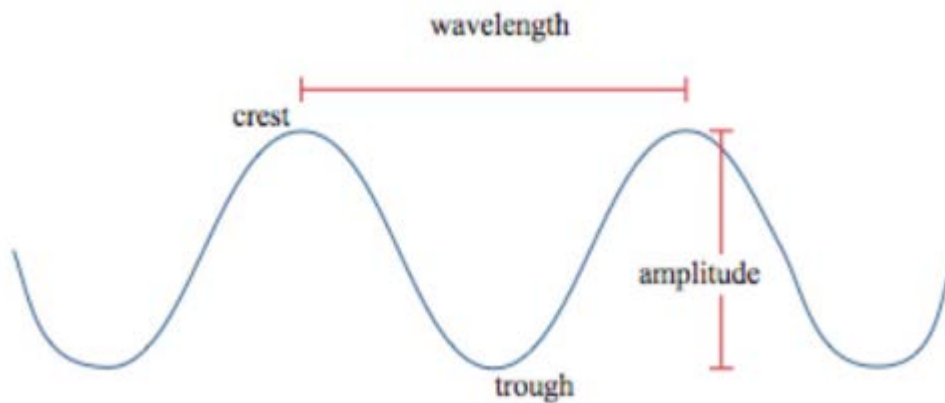
Radio Use/Theory

2.2.1 Describe the basic principles and characteristics of radio waves, wave propagation, transmission and reception for the following:

- (a) radio frequency band ranges (MF, HF, VHF, UHF);**
- (b) properties of radio waves and the effective range of transmissions;**
- (c) propagation of paths of radio waves:**
 - (i) ground waves;**
 - (ii) sky waves;**
- (d) factors affecting the propagation of radio waves and reception:**
 - (i) terrain;**
 - (ii) ionosphere;**
 - (iii) sun spot activity;**
 - (iv) interference from electrical equipment;**
 - (v) thunderstorms;**
 - (vi) power attenuation;**
- (e) radio antennas:**
 - (i) characteristics of antennas;**
 - (ii) use of antennas.**

(a) radio frequency band ranges (MF, HF, VHF, UHF);

Airband radios transmit and receive a radio frequency. Radios are set to transmit and receive on specific frequencies across a band of frequencies. The radio waves that are transmitted and received are based on wavelengths and amplitudes.



A **cycle** is one complete wave action. The **frequency, measured in Hertz**, is the number of cycles passing a given point in one second.

One cycle per second = 1 Hertz (Hz)

1,000 Hz = 1 kilohertz (KHz)

1,000 KHz = 1 megahertz (MHz)

1,000 MHz = 1 gigahertz (GHz)

The **wavelength** is the length of one cycle. The height of the peak or trough from the centreline is called the **amplitude**; the greater the amplitude, the stronger the signal. Signal strength reduces gradually with distance, or more quickly when the signal passes through a more solid barrier – this reduction is called **attenuation**.

Amplitude modulation (AM) is where the amplitude of the signal is varied while its frequency remains constant.

Frequency modulation conveys information over a carrier wave by varying its instantaneous frequency.

To give consistency across countries the International Telecommunications Union controls broadcasting in various frequency bands.

These include:

- HF (High Frequency) 3-30MHz
- VHF (Very High Frequency) 30-300MHz
- UHF (Ultra High Frequency) 300-3000MHz

Within the VHF band, aviation is assigned **118.00 to 135.95 MHz** for voice communication. Airband radios are AM radios. Many radios may either receive and/or transmit on the airband frequency but they need to be AM radios to receive and transmit to other airband radios.

That is, radios that are FM radios do not work on the AM airband.

Other frequencies used for aeronautical work:

UHF CB radios- used mainly for retrievals and pilot-to-pilot communications.

The HGFA has an allocated frequency (472.125MHz).

HF- used by the Flying Doctor Service.

(b) properties of radio waves and the effective range of transmissions

VHF radios generally give good clear communication with very little distortion. They operate by 'line of sight', i.e. a straight line path through the atmosphere between sender and receiver (even if they can't actually see each other). Due to the curvature of the earth's surface and objects such as buildings and hills, the higher you are in the atmosphere, the further you can transmit. The table below gives fairly conservative range. When flying at low level (e.g., during take-off and landing), terrain and buildings may obstruct the line of sight and reduce VHF signal quality and range.

Altitude (feet) above ground level	VHF range (aircraft to ground)
1,000 FT	40 NM
5,000 FT	90 NM
10,000 FT	120 NM

(c) propagation of paths of radio waves

Radio waves are a form of electromagnetic radiation - as are light waves, X-rays, but at a different frequency. Radio waves radiate out from a source (such as your transceiver (radioset) antenna in a straight line.

You may hear of VHF (and UHF) communication referred to as " line-of-sight" communications - because the primary path of the radio waves from one transceiver to another is a direct line so if you can see the other transceiver you can communicate with it.

Not all forms of electromagnetic radiation are the same - we know that light cannot pass through brick walls, but X-rays and radio waves can! Some low frequency radio waves can be bent around the earth, or be bounced off of objects - these processes are called reflection, refraction and diffraction.

Propagation of VHF band radio waves is mostly via direct path (line of sight) it is relatively unaffected by reflection, refraction and diffraction within the earth's atmosphere but is readily blocked, diffracted or reflected by terrain or obstacles.

(i) ground waves;

Because of a number of factors - including atmospheric density and conductivity, it's possible for radio waves of frequencies below 300 KHz to follow the curvature of the earth. As HF uses much higher frequencies ground waves are not relevant to VHF communications.

(ii) sky waves;

Skywave or skip refers to the propagation of radio waves reflected or refracted back toward the earth from the ionosphere (an electrically charged layer of the atmosphere) since it is not limited by the curvature of the earth , skywave propagation can be used to communicate beyond the horizon (i.e. Beyond line of sight) it is mostly used in shortwave (3 to 30 MHz) bands.

Factors affecting the propagation of radio waves and reception:

As radio waves radiate out in all directions from a point source (antenna) the further away the transmitting station, the less signal strength is received. This is the primary factor affecting radio wave reception in the VHF band other factors are: -

(i) terrain;

A radio signal will travel further over a flat surface than over mountainous terrain.

(ii) ionosphere;

The electrically charged layer of the atmosphere allows the creation of skywaves.

(iii) sun spot activity;

Sun spot activity affects the ionisation of the ionosphere thereby affecting the availability of skywaves

(iv) interference from electrical equipment;

Radio frequency interference - i.e. radio "noise" created by electrical noise is a factor in the reception of radio signals. Unshielded ignition noise from petrol motors is a common source of interference.

(v) thunderstorms;

Thunderstorms produce huge amounts of electrical energy – enough to disturb or completely block radio communications.

(vi) power attenuation;

It is possible that due to configuration issues with a transmitter's antenna system less than the optimum power may be transmitted.

(e) radio antennas:

For the most part, with VHF airband communications we are most likely encounter two types of antenna - a $\frac{1}{4}$ wave ground plane antenna connected to the transmitter via coaxial cable e.g. the antenna used on most Microlights, or the coiled (loaded) "rubber-ducky" antenna found on handheld devices.

(i) characteristics of antennas;

In VHF radio an antenna is a metal rod "tuned" to a frequency by its length and connected via a (coax) cable to a transmitter. If an antennae has the correct length, and meets other properties almost all of the energy sent by the transmitter is radiated out of the antenna rod.

If the antenna is not at a tuned length then some or all of the power sent via the transmitter may be reflected back to the transmitter and NOT radiated out into the atmosphere.

(ii) use of antennas.

Of course antenna are used for the transmission and reception of Radio.

2.2.2 Describe the limitations of VHF and HF signals and factors affecting quality of reception and range of signal

- Line of sight (altitude)

VHF radio transmissions follow a straight path from transmitter to receiver. Line of sight infers that if you can see the aircraft you want to transmit to they should be able to see your signal.

- Terrain,

If terrain eg hills, mountains etc are between transmitter and receiver it is unlikely a VHF signal will get to the receiver, although sometimes a signal can be bounced off an object and be received even though the transmission path is not line-of-sight

- Radio frequency interference

The most common interference in a HGFA context is ignition noise from an aircraft ignition system. Creating a spark at a spark plug generates significant radio noise unless the ignition is shielded.

- Atmospheric effects.

Atmospheric effects can affect the quality of reception of a signal.

- Obstacles e.g. vegetation

Trees can also obscure VHF radio signals

- Thunderstorms

Significant radio interference can be generated by thunderstorms. Even though you may have line of sight to the receiver a thunderstorm can generate so much radio interference communication is impossible.

State the emergency radio procedures for declaring an emergency

Distress call - If no answer to a distress or urgency call, advise frequency change and then repeat your broadcast on 121.5 MHz.

State the emergency radio procedures for a Distress message ('Mayday' call)

'MAYDAY MAYDAY MAYDAY <station being called><your callsign><nature of distress><intentions><position, altitude, heading><other useful information>'

State the emergency radio procedures for a Urgency Message ('Pan' call)

'PAN PAN PAN PAN PAN PAN <station being called><your callsign><nature of urgency><intentions><position, altitude, heading><other useful information>'

State the emergency radio procedures for use of 121.5 MHz

The aircraft emergency frequency (also known as guard) is a frequency used on the aircraft band reserved for emergency communications for aircraft in distress. The frequencies are 121.5 MHz for civilian, also known as International Air Distress (IAD) or VHF Guard.

121.5 MHz can be used by any aircraft in distress or an emergency and in addition it can be used by air traffic control to warn aircraft if they are about to fly into [restricted](#) or [prohibited airspace](#).

Aircraft will also be contacted on 121.5 MHz when intercepted by air defence aircraft, to ask for identification and intentions and to pass on instructions.

State the emergency radio procedures for “transmitting blind”.

Communication failure

If you are unable to establish or maintain VHF contact you should:

- i) check your radio has power, then check the control settings and any connections.
 - ii) if still no contact, assume your transmitter is OK and prefix calls with ‘transmitting blind’ to indicate you are not receiving incoming signals.
 - iii) continue to transmit your position and intentions as appropriate to keep ATC or other aircraft informed- include ‘transmitting blind’ at the end of the broadcast.
 - iv) make a safe landing as soon as practicable if you are flying in an area where radio is required.
 - v) if another pilot or your retrieve crew can receive VHF, use your CB radio to check that your VHF transmitter is operating correctly and, in particular, is not “open mike”.
-

Non-controlled aerodromes

State the definition of a Non-controlled aerodrome

Non-controlled aerodromes are those at which air traffic control is not operating. This can be any of the following:-

- an aerodrome that is always in Class G airspace;
- an aerodrome with a control tower where no air traffic control (ATC) service is currently provided; or
- an aerodrome which would normally have ATC services provided but such services are presently unavailable.

State the mandatory requirements for a Non-controlled aerodrome

All aircraft operating at, or in the vicinity of any certified, registered and military Non-controlled aerodrome, as identified and published in ERSA and any other aerodrome designated by CASA on a case by case basis, as published in ERSA or NOTAM, must be operated with a serviceable VHF radio. The radio must be fitted with the common traffic advisory frequency (CTAF) designated for use at the aerodrome as published in ERSA.

The pilot must be qualified and endorsed to operate the radio and must maintain a listening watch and make radio calls whenever it is reasonably necessary to do so to avoid a collision, or risk of a collision with another aircraft.

These calls must include:

- The name of the aerodrome
- The aircraft's type and call sign; and
- The position and intentions (refer CAR 166C)

State the pilot responsibilities of a Non-controlled aerodrome

All pilots must monitor and communicate on the CTAF frequency whenever they are operating at or in the vicinity of a non-controlled aerodrome. An aircraft is defined as operating at the aerodrome whenever it is within the active areas of the aerodrome - when the aircraft is located within the aerodrome runway, or taxiway markers. In the vicinity of an aerodrome is defined as within a horizontal distance of

10 nm of the aerodrome reference point and at a height above the aerodrome reference point that could result in conflict with operations at the aerodrome. The height may vary considerably in consideration of local traffic and other circumstances at particular aerodromes. However, all aircraft are expected to be operating on the CTAF frequency whenever at or below 3,000ft as a minimum above the aerodrome reference point and higher when appropriate.

Pilots should make the following minimum positional broadcasts as appropriate along with any additional calls that may be necessary to provide improved situational awareness and safety for yourself and others.

Item	Circumstance (non-controlled aerodromes)	Pilot's radio broadcasts
1	The pilot intends to take-off.	Immediately before, or during, taxiing.
2	The pilot intends to enter a runway.	Immediately before entering a runway.
3	The pilot is inbound.	10 NM or earlier from the aerodrome, commensurate with aircraft performance and pilot workload, with an estimated time of arrival (ETA) for the aerodrome
4	The pilot is ready to join the circuit.	Immediately before joining the circuit.
5	1. The pilot intends to carry out a straight-in approach; or 2. Join on base leg.	On final approach at not less than 3 NM from the threshold. Prior to joining on base
6	The pilot intends to fly through the vicinity of, but not land at, a non-controlled aerodrome.	When the aircraft enters the vicinity of the aerodrome (as defined).

State the size and limits of a Non-controlled aerodrome

Broadcast areas are defined as airspace volumes in class G airspace for which a discrete frequency (CTAF) has been allocated. All operations including those at aerodromes (charted and uncharted) and those landing sites within this area shall use this CTAF as the broadcast frequency. A note on charts states 'for operations in this area SFC- (altitude) use CTAF (frequency).'

For broadcast areas, the lateral and vertical boundaries are defined in AIP MAP. The vertical boundaries area of a broadcast area can be:

- a) Surface to 5000FT AMSL; or
- b) Surface to base of CTA if 8500FT or less; or
- c) Surface to a nominated level.

Glider or microlight pilots operating within a broadcast area are to maintain a listening watch on the broadcast area CTAF depicted in the AIP MAP. Pilots are reminded that they are to make the recommended broadcasts (in the table above) any time they are in the vicinity of any non-controlled aerodrome and within the broadcast area.

State the general structure of a radio call.

Demonstrate the correct syntax for the following radio calls at a Non-controlled aerodrome

Demonstrate taxiing radio call.

For powered aircraft, a "taxiing call" should be made nominating the intended departure runway.

In the case of gliders operating from a fixed point on or near one of the runways and which do not do any taxiing, a "taking off" or "departing" call is sufficient. Hang Gliders shall prefix their callsigns with the word "Hang Glider". Microlight shall prefix their callsigns with the words microlight.

Demonstrate arriving aircraft call.

Arriving Aircraft

An "inbound" call should be made at 10 nautical miles.

Turning Downwind, Base and Final calls are recommended, if operationally possible.

If making a straight-in approach, radio calls are recommended at 3nms and 1nm to correspond with "Downwind" and "Base" calls.

All the above calls are recommended broadcasts, prefixed by the words "(Location) Traffic" and suffixed by (Location). After "Traffic", keep to a consistent pattern of broadcast, based on the following sequence - aircraft type, callsign, position/intentions, and altitude. For example, "Horsham Traffic, Microlight X-ray Bravo Charlie, Ten miles north inbound at four thousand, Horsham". Then listen out carefully in case someone else reports around the aerodrome so you can build up a "picture" of the traffic. Self-arranged separation using radio should not be needed but should be used if necessary for safety.

A simple strategy for making circuit calls is "Look" "Talk" then "Turn", maintaining Lookout at all times.

Demonstrate modified circuit call.

Modified Circuits

One particular situation unique to gliders is their tendency to be affected by changing weather conditions much more than powered aircraft. Modified circuits are a fact of life for gliders, as their pilots have no means of counteracting the effects of lift, sink or wind-shear except by changing the shape of circuits to remain within a safe distance of the landing area.

This is acceptable to other airspace users, with two provisos:-

1. If a radio is carried and a circuit modification is required that may affect other traffic or create a conflict, a broadcast should be made to alert the traffic to the glider pilot's intentions.
2. If a radio is not carried and a circuit modification is carried out, the pilot is required to comply with the legal requirements to:
 - (a) Avoid conflict with other traffic; and
 - (b) Comply with the published circuit procedures as far as practicable.

Demonstrate positional broadcast call

For example: - 'Corryong traffic, Microlight two three four five is 5 miles south of Corryong airstrip altitude 1500'

Demonstrate take off call.

For example: - *'Corryong traffic, Microlight two three four five taking off Corryong airstrip runway 06'*.

Demonstrate entering runway call.

For example: - *'Corryong traffic, Microlight two three four five taking off Corryong airstrip - entering runway 06'*

Demonstrate inbound radio call.

For example: - *'Corryong traffic, Hang glider two three four five, inbound to Corryong strip estimate circuit area Corryong at time 25.*

Demonstrate joining circuit call.

For example: - *'Corryong traffic, Hang glider two three four five, joining downwind runway 06.*

Demonstrate straight-in approach call.

For example: -

'Corryong traffic, Microlight two three four five inbound 10 miles west for straight in approach runway 06 - estimate late final runway 06 at time 25

Demonstrate joining circuit on base leg call.

For example: - *'Corryong traffic, Hang glider two three four five, joining base runway 06.*

Demonstrate over-fly call.

For example: - *'Corryong traffic, Hang glider two three four five, ten miles south west tracking north climbing to four thousand to overfly Corryong'*

State when certain radio calls are to be made at a Non-controlled aerodrome.

CAR 166C requires a pilot to make a broadcast whenever it is reasonably necessary to do so to avoid a collision, or the risk of a collision, with another aircraft.

When operating in the vicinity of Non-controlled aerodromes it is expected that all pilots make positional broadcasts including broadcasts immediately before, or during, taxiing, immediately before entering a runway, 10nm or earlier from the aerodrome, immediately before joining the circuit and prior to joining other circuit legs.

Remember the issue is to improve safety in the skies through the use of VHF radios.

State the purpose of a Unicom frequency.

UNICOM: A non-ATS communication service provided by an aerodrome operator or user to enhance the value of information normally available about a non-controlled aerodrome

State which aviation documents contain Unicom information.

Any Unicom facility and call-sign would be indicated in ERSA. Refer to AIP GEN 3.4 sub-section 3.3.

- Go to www.airservicesaustralia.com
- Select tab Publications
- Select Aeronautical Information Products (AIP)

- Scroll Down to the bottom and select “1 Agree”
- Select AIP Book (01 MARCH 2018 or More recent)
- Select General
- Go to 3.4 Sub-Section 3.3

State when it is most appropriate to monitor CTAF frequency.

VFR aircraft reaching the vicinity of an aerodrome within Class G airspace, and intending to land, must monitor the designated airfield frequency (otherwise the multicom frequency) and should make these broadcasts on that frequency:

an inbound broadcast — by 10 nautical miles from the airfield

a joining circuit broadcast immediately before joining the circuit

if making a straight-in approach, broadcast on final approach not less than 3 nm from the threshold

if joining on base leg, broadcast joining base leg prior to joining on base.

(Note: straight-in approaches and joining the circuit on the base leg, though acceptable, are not recommended procedures.)

If intending to operate in the vicinity of an aerodrome, rather than land, the aircraft must monitor the appropriate frequency and broadcast:

(a) if in transit, an overflying report — by 10 nm from the airfield.

(b) if operating from a private airstrip less than 10 nm from the aerodrome, an intentions report once airborne.

State when it is most appropriate to monitor area frequency.

There are no mandatory reports for VFR aircraft operating en route in Class G airspace. Thus after departing the airfield vicinity, such aircraft are only required to maintain a listening watch on the 'appropriate frequency' and announce if in potential conflict with other aircraft — see AIP ENR 1.1 section 44.

State the definition of an AFRU.

To assist pilots' awareness of inadvertent selection of an incorrect VHF frequency when operating into non-controlled aerodromes, a device known as an Aerodrome Frequency Response Unit (AFRU) may be installed. Ref. - AIP GEN 3.4

State how an AFRU is recognised when using VHF radio.

The features of an AFRU are as follows:

a. when the aerodrome traffic frequency has not been used for the past 5 minutes , the next transmission over 2 seconds long will cause a voice identification to be transmitted in response e.g. “GOULBURN CTAF”.

b. When the aerodrome traffic frequency has been used within the previous 5 minutes, a 300 millisecond tone will be generated after each transmission over two seconds long. Ref. - AIP GEN 3.4.2

State where guidance material can be found (in aviation documents) regarding flying with an unserviceable radio in the vicinity of a Non-controlled aerodrome.

CAAP 166-1(3)

State what the standard procedures are when it is suspected that you are flying with a non-serviceable radio in the vicinity of a Non-controlled aerodrome.

If a radio failure occurs either en route to, or in the circuit of, the aerodrome then the pilot may continue to land at that aerodrome provided:

- the aircraft's landing lights, anti-collision lights and transponder are turned on, if fitted to the aircraft.
- the pilot uses the overfly procedure for joining the traffic circuit on arrival [appendix 1 CAAP 166-1(3)]

State which aviation documents contain information and procedures on Non-controlled aerodromes.

CAAP 166-2(1)

CAAP 166-01 v4.1 - <https://goo.gl/dM6uhA>

Demonstrate the use of UTC times used in transmissions at Non-controlled aerodromes.

Time is given in UTC (universal co-ordinated time).

Say each figure separately, e.g. 55 minutes past the hour is 'time five five' not 'fifty-five', 1400 is said 'time one four zero zero'.

Say the minutes only, unless you are referring to a time more than an hour ahead; e.g., if the time is now 0830, you would refer to 0850 as 'time five zero' but 1050 as 'time one zero five zero'.

Australian Eastern Standard Time (EST) is UTC+10 hours. Australian Eastern Standard (Daylight Saving) Time (EDT) is UTC+11 hours.

For example: - 'Corryong traffic, Hang glider two three four five, inbound to Corryong strip estimate circuit area Corryong at time 25.'

End of document.