

Gliding Australia Training Manual

Pilot Guide



Unit 21

Radio Use and Endorsement

WHAT THIS UNIT IS ABOUT

To develop the skills and knowledge required to operate aircraft radio equipment during flight in the local area; and ensure that use of the radio conforms to CASA and GFA requirements including relevant terminology.

WHAT ARE THE PRE-REQUISITES FOR THIS UNIT?

- This unit should be delivered before GFA Unit 15 Break-off and Circuit Planning and subsequent units.
- Note: There is no need to complete this unit if you hold a CASA private pilot licence (or higher) or a recreational pilot licence with a flight radio endorsement.

COMPLEMENTARY UNITS

- This Unit is a pre-requisite for first solo and will be delivered closely with GPC Unit 23 Basic Rules of the Air as the two units are interlinked.

KEY MESSAGES

- The primacy of AVIATE-NAVIGATE-COMMUNICATE priorities.
- The responsibility of flight crew to see and avoid.
- The advantages of alerted see and avoid.
- Radios are used to resolve conflict and alert aircraft traffic.
- Use of standard procedures and phraseologies are essential for effective radio communication.

PILOT GUIDE FOR THIS UNIT

Radio Procedures General

- The major collision hazard for gliders is other gliders, in thermals, thermal streets and at turn points. Sensible use of the gliding frequencies to supplement "see and avoid" can minimise this risk.
- The risk of collision with powered aircraft has proven to be highly localised to regions of concentrated traffic. The risk of collision with powered aircraft en-route (i.e. away from points of concentration) is very small. However, this means that the TOTAL risk of collision with powered aircraft, although small, is nevertheless present and concentrated around places like active aerodromes and commonly used traffic lanes.
- It is essential that all glider pilots are aware of these points or areas of concentration and be prepared to use the radio on the appropriate Air Traffic Services frequency to assist in reducing the risk to an acceptable level. "See and avoid" on its own may not be reliable enough for collision avoidance in these areas.
- Many clubs have arranged with aerodrome co-users, local regional airlines or charter operators and have agreed radio or other procedures to suit all operations.

- The presence of a glider in an area into which a medium-sized aircraft may be descending at more than 200 knots is a clear case where "un-alerted" see and avoid is not sufficient and needs to be supplemented by use of radio.

Responsible use of the Radio.

- Pilots operating VHF radiotelephone equipment must hold a Flight Radiotelephone Operators License (FROL) or GFA Radiotelephone logbook endorsement, (refer CAO 95.4 Section 6.6). The training and qualification must be completed and the logbook endorsed prior to first solo.
- This requirement also applies when using one of the designated glider frequencies 122.5, 122.7 and 122.9, or the gliding competition frequency 122.025.
- Use of the above gliding frequencies is normally confined to purely gliding - related matters, such as routine messages during cross-country flights, special purposes during gliding competitions or for search and rescue purposes. However, some non-towered aerodromes where gliding is undertaken also use a gliding frequency as the local CTAF. Therefore, it is essential to maintain the highest standard and discipline when using the radio in the CTAF.
- When on gliding frequencies not used as a CTAF, the use of the radio is entirely optional and unrestricted. However, there are certain courtesies in radio use which make things better and easier for all concerned. Compulsive talkers on the radio seem to be a fact of life and it is sometimes difficult to get a word in edgeways when one of these people is in full song.
- When considering the effect this has on other people, think about this: a VHF radio operates on the principle of "line of sight". Ground to ground communications is usually poor and rarely exceeds 10km. However, with one set on the ground and another in the air, or two in the air, the picture changes dramatically, as follows:-
 - 1,000ft – 70Km
 - 3,000ft - 120km
 - 5,000ft - 160km
 - 8,000ft - 200km
- It will be seen that it is very easy to block the airwaves over a very large area. If someone is trying to transmit, say, a report that an outlanding is imminent and cannot get the message across, the frustration can be imagined.
- Even more importantly, a vital message concerning an accident (such as a mid - air collision observed from another glider) may be blocked. This could be a matter of life or death for the victims of such an occurrence and a radio call to summon up an ambulance could make the difference.
- Therefore, the first thing that must be learned in using a radio in a glider is the basic principle of talking only when necessary. Exactly how to do it will be covered later.
- Used properly, a radio in a glider is a very distinct asset. Used indiscriminately, it is a pest.
- One further thought while we are considering unnecessary use of radio. Most gliders have no means of replenishing their electrical supply in flight. A few have solar panels fitted, but such installations are still quite rare. Batteries therefore get flatter and flatter as the flight goes on. A lot of transmitting will flatten the battery far more quickly than just listening, by a factor of about 10 to 1. In addition, excessive transmitting flattens everybody else's batteries within radio range, because the current drawn by the radio increases as messages come in, the squelch lifts and the receiver amplifies the signal to drive the speaker.

Use of VHF Frequencies in the Aeronautical Communications Band.

- A pass in the online theory examination is required which is accessed through the Online Exams and Courses option in the Member Area of Go Membership. Your demonstrated radio usage and procedures will be assessed by your Level 1 or higher rated instructors, who will test your ability to communicate, announce and articulate using the radio (where English is a second language, refer also to MOSP 2, Section 15.3).
- The practical examination will be carried out by.

Candidates who successfully pass the theory exam and practical assessment will have their logbooks endorsed as follows:-

"This is to certify that (name)..... has demonstrated competence to operate R/T equipment onboard aircraft in the English language."

The logbook endorsement should carry the instructor's name, instructor level, signature, club and date.

- The informality which is characteristic of glider-to-glider communication on the glider frequencies is not appropriate when operating on any other aeronautical frequency. There are procedures to be followed; otherwise chaos and possibly danger may result. Knowledge of correct radio procedures and terminology is required. This must be accompanied by the discipline to listen out and reply promptly and concisely when necessary, broadcast when appropriate, and pass only that information which is strictly necessary.
- Thinking pilots will realise that the background and discipline described above could be used with advantage by glider pilots on GFA's own frequencies.

Procedures and Terminology

Procedures.

Your instructor will show you how to operate your particular radio in your glider. This information will include operation of a VHF radio to:

- Change frequencies,
- Set volume & squelch levels,
- Press to transmit and use the microphone.

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.

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- 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 "glider". 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.
- It is illegal to broadcast messages that:
 - Contain obscene or profane words or language.
 - Are of a personal or private nature.
 - Use the callsign of another station improperly.
 - Are false or intended to deceive.
 - Are superfluous and do not pertain to operational requirements.

Terminology

The international Air Traffic language is English. To avoid confusion caused by distortion, weak signals or limited understanding of the language, a system of standardised words and terminology has been created. This consists of a phonetic alphabet, numbers which are spoken in a particular way and some words which have very specific meanings and uses.

The phonetic alphabet is as follows:-

A	ALPHA	AL fah	N	NOVEMBER	no VEM ber
B	BRAVO	BRAH voh	O	OSCAR	OSS cah
C	CHARLIE	CHAR lee	P	PAPA	pah PAH
D	DELTA	DELL tah	Q	QUEBEC	keh BECK
E	ECHO	ECK ho	R	ROMEO	ROW me oh
F	FOXTROT	FOKS trot	S	SIERRA	see AIR rah
G	GOLF	GOLF	T	TANGO	TANG go
H	HOTEL	hoh TELL	U	UNIFORM	YOU nee form
I	INDIA	IN dee A	V	VICTOR	VIK tah
J	JULIETT	JEW lee ETT	W	WHISKY	WISS key
K	KILO	KEY loh	X	X-RAY	ECKS ray
L	LIMA	LEE mah	Y	YANKEE	YANG key
M	MIKE	MIKE	Z	ZULU	ZOO loo

Numbers are spoken as follows:-

0	ZE-RO	5	FIFE	DECIMAL	DAY SEE MAL
1	WUN	6	SIX	HUNDRED	HUN dred
2	TOO	7	SEV en	THOUSAND	TOU SAND
3	TREE	8	AIT		
4	FOW er	9	NIN er		

Standard words and phrases should be used as follows:-

Affirm	Yes, or permission granted, or that is correct.
Negative	No, or permission denied or that is not correct.
Correction	An error has been made, correct message follows.
Acknowledge	Confirm that you have received and understood my message.
Roger	Message received and understood.
Wilco	Message received, understood and will be complied with.
Go ahead	Transmit your message.
Verify	Check that the transmission is correct.
Say again	Self-explanatory.
I say again	Self-explanatory.
Speak slower	Self-explanatory.
Stand by	Self-explanatory.
That is correct	Self-explanatory.
How do you read?	Used to gauge effectiveness or serviceability of radio and should not be used in normal transmissions. Answered by "Reading you strength...." One: Your transmissions are unreadable. Two: Your transmissions are readable now and then. Three: Your transmissions are readable with difficulty. Four: Your transmissions are readable. Five: Your transmissions are perfectly readable. "Loud and clear" is often used instead of this expression.
Break	Used to terminate one transmission and start another (to another station) without releasing the transmit button.
Height broadcast.	When operating below 10,000 feet and broadcasting height or altitude over the radio, use normal terminology, e.g. "three thousand, five hundred" (not "three five zero zero"). If above 10,000ft and flying at, for example, 13,500ft on 1013.2HPa, you would broadcast this as "Flight Level One

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	Three Five" and 26,000ft would be broadcast as "Flight Level Two Six Zero".
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Units of Measurement

Units of measurement to be used in airways operations and air-ground communications are as follows:

Measurement	Units
Distances used in navigation (generally in excess of 2NM)	nautical miles and tenths
Short distances	metres
Altitudes, elevations and heights	Feet
Horizontal speed, including wind speed	Knots
Vertical speed	Feet per minute
Wind direction for runway operations	Degrees Magnetic
Wind direction except for runway operations	Degrees True
Visibility, including runway visual range	kilometres or metres
Altimeter setting	hectopascals
Temperature	degrees celsius
Weight (Mass) Metric	tonnes or kilograms
Time	hours and minutes
Time System	Coordinated Universal Time (UTC)

**Miles must be read as meaning nautical miles unless otherwise stated. The word "nautical" may be omitted from air-ground communications.*

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 (3 Times)

- Derived from the French "m'aidez" (help me), this is used when the pilot experiences a serious in-flight emergency.
- A tug 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, either to announce that the aircraft is about to be abandoned or an attempt made to land it.
- Note on the above points. Naturally a pilot would not hang around to go through the protocol of making a radio call if the severity of the emergency demanded, for example, immediate abandonment of the aircraft. Preserve life as a first priority and only make the call if you have time.
- 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 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 tug-pilot would use 'Pan Pan', 'Pan Pan', 'Pan Pan', for example, if he notices that the aircraft is indicating a rising oil temperature and a falling oil pressure. As such symptoms may indicate an imminent engine failure; this situation would justify waving off the glider and making a Pan call to announce the aircraft's situation.
- A glider pilot might use 'Pan Pan' in the case of a bird-strike, where damage had been caused but the glider is still controllable.
- The purpose of the 'Pan 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 Pan' call to a Mayday call.
- Rather than try to describe here each possible emergency that might be encountered in flight, pilots are encouraged to use their imagination in thinking about the kinds of emergencies which might crop up.

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."

International Distress Frequency

- By international agreement, certain frequencies have been set aside for use by pilots in distress. In the VHF band, the international distress frequency is 121.5 MHz.
- A glider pilot in an emergency situation, as described earlier in this chapter, should not hesitate to use 121.5 MHz to make an emergency call if it is appropriate. The frequency is constantly monitored by most large commercial aircraft and the satellite systems dedicated to search and rescue purposes.
- The warning about frivolous use of the word "Mayday" also applies to the use of 121.5 MHz. Under no circumstances should the frequency be used for anything other than emergency broadcasts. On the other hand, if an emergency crops up, it is there to be used and a pilot should do so without fear.

When to Use the Radio.

- Note: If your gliding club is operating inside controlled airspace your instructor will brief you on the radio calls required in that situation.
- If outside controlled airspace all pilots must monitor and communicate on the CTAF frequency (including those assigned MULTICOM 126.7) whenever they are operating at or in the vicinity of a non-towered 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.
- The following table sets out the recommended broadcasts, but pilots may use discretion in determining the number and type of broadcasts they make. For example, when operating from a private or remote airstrip, a single broadcast declaring an intention to take-off and track in particular direction may be all that is required where there is no response to the initial transmission.

Circumstance Item (non-towered 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.

- In addition to making positional broadcasts, pilots should listen to other broadcasts to increase situational awareness. This 'alerted see-and-avoid' strategy results in an eight-fold increase in the likelihood of seeing another aircraft.
- Whenever pilots determine that there is a potential for traffic conflict, they should make radio broadcasts as necessary to avoid the risk of a collision or an Airprox event. Pilots should not be hesitant to call and clarify another aircraft's position and intentions if there is any uncertainty.
- It is essential that pilots maintain a diligent lookout because other traffic may not be able to communicate by radio (e.g. the other pilot may be tuned to the wrong frequency, selected the wrong radio, have a microphone failure, or have the volume turned down).

Unserviceable radios:

- An aircraft must not take-off from a non-towered aerodrome with an unserviceable radio. However, if the radio becomes unserviceable during flight the pilot may continue the flight and

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land at the aerodrome or another non-towered aerodrome if it is appropriate to do so. Refer (CAR 166E and CAAP 166-1).

FLIGHT EXERCISES FOR THIS UNIT

Once you have received this lesson the instructor will be asking you to make the appropriate calls. Initially the instructor will help you with these but as your experience grows you will be expected to make these calls unaided.

THINGS YOU MIGHT HAVE DIFFICULTY WITH

Depending on your background you may have problems initially with the aviation standard phraseology and where to make the calls.

HOW DO YOU DEMONSTRATE COMPETENCE?

You should be able to:

- Communicate, announce and articulate using standard phraseologies on a VHF radio.
- Demonstrate operation of a VHF radio controls to:
 - o select and change frequencies,
 - o set volume & squelch levels,
 - o press to transmit and
 - o use microphone.
- Achieve a pass on a theory Radio Telephone Operator endorsement examination which is accessed through Go Membership/Online Exams and Courses/. You will need to log in with your GFA Member Number.

RESOURCES & REFERENCES

- GFA MoSP 2 Operations
- CASA AIP ENR 10.1.17 Radio Calls
- CASA CAAP 166 Operations in the vicinity of non-controlled aerodromes
- GFA "Airways and Radio Procedures for Glider Pilots" Manual

SELF-CHECK QUESTIONS

Use these questions to test your knowledge of the unit.

- Q1. What range of your VHF radio would you expect if you transmitted a call at 5000'?
- Q2. Can you go solo without a logbook endorsement of radio procedures?
- Q3. What is the unit of measurement for wind speed?