

**AIRWAYS AND RADIO PROCEDURES FOR GLIDER
PILOTS
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GLOSSARY OF TERMS

AA	Airservices Australia, the Air Traffic Control service provider
ADS-B	Automatic Dependent Surveillance – Broadcast
AGL	Above Ground Level
AFRU	Aerodrome Frequency Response Unit (“beeper”)
AIP	Aeronautical Information Publication
AM	Amplitude Modulation, used in aircraft VHF transmitter/receivers
AMSL	Above Mean Sea Level
ASA	Australian Spectrum Agency, the radio regulator
ATC	Air Traffic Control
ATSB	Australian Transport Safety Bureau, the accident investigator
CAIR	Confidential Aviation Incident Report
CAR	Civil Aviation Regulation
CAO	Civil Aviation Order
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation
CTAF	Common Traffic Advisory Frequency
CTAF<R>	Common Traffic Advisory Frequency <Radio>
DRA	Designated Remote Area
DOTARS	Department of Transport and Regional Services
ELT	Emergency Locator Transmitter
ERC(L)	En-Route Chart (Low)
EPIRB	Electronic Position Indicating Radio Beacon
ERSA	En-Route Supplement, Australia, part of the AIP
FLARM	Electronic aircraft awareness system
FL	Flight Level
GFA	Gliding Federation of Australia
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
NM	Nautical Mile
QFE	Altimeter setting with respect to aerodrome or area level
QNH	Altimeter setting with respect to mean sea level
RAAF	Royal Australian Air Force

RCC	Rescue Coordination Centre
RPT	Regular Public Transport
SAR	Search And Rescue
SSR	Secondary Surveillance Radar
VFG	VFR Flight Guide
VFR	Visual Flight Rules
VHF	Very High Frequency, as applied to radio equipment
VMC	Visual Flight Rules
VNC	Visual Navigation Chart
VTC	Visual Terminal Chart
WAC	World Aeronautical Chart

1. RULES OF THE AIR

A sailplane shall not operate lower than:

- (a) 1,000 feet over a built-up area, except in the course of taking off or landing at an aerodrome or gliding site, nor
- (a) 500 feet above the ground, except when taking off or landing as above, being retrieved following an outlanding, when completing an approved low level finish procedure, or when engaged in ridge or hill soaring.

When engaged in ridge or hill soaring, a sailplane shall not be flown at a height lower than 100 feet whilst it is within 100 metres of any person, dwelling or public road.

A sailplane which is required to give way to another aircraft shall do so by passing behind it or if passing in front or above or below that aircraft, shall keep well clear.

When two aircraft are on converging headings at approximately the same height, the aircraft which has the other on its right shall give way, except that:

- (b) Powered aircraft shall give way to airships, sailplanes and balloons;
- (c) Airships shall give way to sailplanes and balloons;
- (d) Sailplanes shall give way to balloons; and
- (e) Powered aircraft shall give way to aircraft that are seen to be towing sailplanes.

Where two aircraft are approaching head-on or approximately so and there is a danger of collision, each shall alter its heading to the right. A sailplane which is ridge soaring and has the ridge to its left shall give way by turning away from the ridge.

An aircraft being overtaken has right of way over the overtaking aircraft, which shall not overtake by climbing or diving to pass over or under the other aircraft. A sailplane which is ridge soaring shall overtake by passing between the ridge and the other sailplane. Other than a sailplane ridge soaring, an aircraft shall overtake another aircraft by passing to its right.

An aircraft in flight or on the ground shall give way to an aircraft landing or on final approach to land. Where two or more sailplanes are approaching to land, the lowest sailplane has the right of way but shall not use this rule to cut in front of or overtake another sailplane on final approach. A powered aircraft shall give way to a sailplane which is approaching to land.

Where two sailplanes are at approximately the same height and both are approaching to land, the higher-performance sailplane shall give way to the lower-performance sailplane.

An aircraft which is about to take off shall not do so until there is no apparent risk of collision with another aircraft.

When ridge soaring, all turns shall be away from the ridge.

Aerobatics, including stalling and spinning, shall not be carried out below 1,000ft AGL.

The minimum vertical or horizontal separation between gliders in a thermal is 200ft. The first glider in a thermal establishes the direction of turn. A joining glider must turn in the same direction.

2. AIRSPACE CLASSIFICATION AND AIRWAYS PROCEDURES

2.1 Introduction

Australian airspace is classified alphabetically into a number of categories, based on criteria established by the International Civil Aviation Organisation (ICAO). Alphabetic classification depends on the traffic operating within the airspace and the service needed for separation and control of that traffic.

Air traffic varies from large jet airliners, which need a high degree of control applied to their operations, to small sport aviation craft, which need little or no control.

With that in mind, airspace is split into two categories, controlled and uncontrolled, before having the alphabetic classification applied. Gliders are not permitted to enter controlled airspace unless they have a clearance from Air Traffic Control, but they have free access to Class "E" and "G" airspace.

Airliners, charter operators and quite a number of general aviation aircraft operate in accordance with the Instrument Flight Rules (IFR). This means they may operate in reduced visibility, even in cloud (these conditions being known as Instrument Meteorological Conditions, or IMC), hence the need for some external control and separation from each other.

Other aircraft, including gliders, operate in accordance with the Visual Flight Rules (VFR). These operations depend on being able to see far enough to provide self-separation by a combination of the "see and avoid" principle and sensible use of radio, if fitted.

Responsibility of flight crew to see and avoid aircraft

When weather conditions permit, the flight crew of an aircraft must, regardless of whether an operation is conducted under the Instrument Flight Rules or the Visual Flight Rules, maintain vigilance so as to see, and avoid, other aircraft. (CAR 163A)

2.2 Visual Flight Rules

Gliders are only permitted to fly by day under the VFR, in Visual Meteorological Conditions (VMC). The table overleaf shows the requirement for VMC for gliders in Class G (uncontrolled) airspace.

2.3 Visual Meteorological Conditions - Class G (Uncontrolled) Airspace Including CTAF<R> and CTAFs.

See Section 2.5 for airspace classification.

Height	Required Flight Visibility	Horizontal and vertical distance from cloud	Additional conditions
At or above 10,000 ft AMSL	8 kms	1.5 kms horizontal, 1,000 feet vertical	Nil
Below 10,000 ft AMSL	5 kms	1.5 kms horizontal, 1,000 feet vertical	Nil
At or below 3,000 ft AMSL or 1,000 ft AGL, whichever is the higher.	5 kms	Clear of cloud and in sight of the ground or water.	Carriage and use of radio required when operating to these conditions for communication on the CTAF<R> or CTAF when within the prescribed distance of an aerodrome, or on the area VHF when en-route.

2.4 Special VFR Clearance

If the above criteria cannot be met and a pilot wishes to enter Class C or Class D controlled airspace or a GAAP Control Zone (see Section 2.5 for airspace classification), Air Traffic Control (ATC) may permit operations under a procedure known as Special VFR. It is unlikely that a glider will require this service as such conditions are unlikely to be soarable. However, powered sailplanes and aircraft towing gliders may find the service useful on occasion.

Special VFR clearance should be requested from the ATC unit responsible for the controlled airspace and will only be granted if the Special VFR flight will not unduly delay an IFR flight, the flight can be conducted clear of cloud, the visibility is not less than 3000 metres and the low-flying regulation is not breached.

2.5 Airspace Classification

2.5.1 Class A & C Airspace

All airspace above Flight Level (FL) 200 is Class A controlled airspace (for explanation of Flight Levels, see Chapter 4, Altimetry). Class C airspace also extends downwards from FL200 in "steps" reaching ground level in the immediate vicinity of busy capital city airports which handle large public transport aircraft. Although VFR aircraft (including gliders) are permitted to operate in Class C airspace, VHF radio is mandatory and all aircraft must have an individual clearance from Air Traffic Control to enter the airspace. If the Class C airspace is within

radar coverage, a Secondary Surveillance Radar (SSR) transponder and/or ADS-B Out is required.

An alternative to individual clearance for gliders to fly in Class C airspace is the so-called "block clearance". This is usually given for wave-flying purposes in high-altitude Class C airspace and is generally negotiated by the Airfields and Airspace Officer of each State Association, rather than by individual pilots. Block clearances will have designated vertical and horizontal boundaries and operations by gliders will require a VHF radio with the appropriate frequencies, but not a transponder or ADS-B Out. Block clearances sometimes require telephone contact with Air Traffic Control prior to operations commencing in that airspace.

Pilots of gliders operating in Class C airspace are required to hold a Flight Radio Telephone Operator's Licence or the equivalent GFA logbook endorsement.

Class C airspace is depicted on En-Route Charts, Low (ERCs(L)), Visual Navigation Charts (VNCs) and Visual Terminal Charts (VTCs).

2.5.2 Class D Airspace

This is controlled airspace which surrounds some airports with a control tower where the traffic density does not justify the installation of radar. Such airspace relies on specified procedures for traffic alerting and separation, and equipment requirements are less stringent than for Class C.

For gliders, VHF radio and Air Traffic Control clearance are required. A transponder or ADS-B Out is not required. Pilot radio-operating qualifications are the same as for Classes A and C.

Class D airspace is depicted on ERCs(L), VNCs and VTCs.

2.5.3 GAAP (General Aviation Airport Procedures) Airspace

This is controlled airspace, similar in its requirements to Class D, which surrounds tower airports without radar and at which GAAP procedures apply. This usually means contra-circuits and such procedures are in force at capital city secondary airports such as Moorabbin, Bankstown, Jandakot, etc. Equipment requirements and pilot qualifications are the same as for Class D.

GAAP airspace is depicted on VNCs, VTCs and Visual Pilot Guides.

Electronic copies of the Visual Pilot Guides for each GAAP aerodrome is available on: <http://casa.gov.au/pilots/pilotgde.htm>

2.5.4 Class E Airspace

This is controlled airspace which occupies the space between Class G (uncontrolled) airspace and Class C airspace in certain parts of Australia. The vertical extent of Class E airspace is from 8,500 feet to the base of Class C airspace at FL125. Gliders are encouraged, but not required, to monitor the area frequency when operating in Class E

Airspace. A clearance is not required. Transponder or ADS-B Out is not required.

Class E airspace is depicted on VNCs and VTCs.

2.5.5 Class G Airspace

This is uncontrolled airspace and is all that airspace below FL200 which is not covered by any of the previous categories. Radio, Transponder and ADS-B Out requirements do not apply to gliders.

Any glider operating in Class G airspace which has a radio is encouraged, but not required, to monitor the area VHF frequency (rather than a glider frequency) when above 5,000 feet AMSL. This is only expected if it is operationally expedient for the pilot to do so (GFA Operational Regulation 6.4.9).

A Radar Information Service (RIS) is provided for transponder-equipped aircraft in the vicinity of some capital city airports. This is unlikely to be of interest to gliders, but may be helpful to some tugs. The areas served by RIS are depicted on ERC(L), VNC and VTC charts.

Otherwise, Class G airspace is not marked on aeronautical charts. The upper vertical limit of Class G airspace is Flight Level 200 (20,000ft with the altimeter set on 1013.2 hPa), unless locally overlaid by controlled airspace down to a lower level. All airspace above FL200 is Class "A" controlled airspace.

2.5.6 Common Traffic Advisory Frequency <Radio> (CTAF<R>) Areas

These zones are immersed in Class G airspace and surround uncontrolled aerodromes which have sufficient traffic to justify mandatory carriage and use of radio by all aircraft operating there. Such aerodromes are rather few in number and are usually those served by turbine-powered Regular Public Transport (RPT) aircraft.

The CTAF<R> area may normally be regarded as the area contained within a circle of 10NM radius, but there are variations. Some aerodromes which have a Control Tower and a Control Zone during normal business hours revert to a CTAF<R> when the Tower closes for the day. In such cases the shape and dimensions of the CTAF<R> will be the dimensions of the previous Zone. This includes military Control Zones.

Exact details of dimensions and frequencies of CTAF<R>s will be found in the En Route Supplement, Australia (ERSA). CTAF<R>s are depicted on ERCs(L), VNCs and VTCs.

2.5.7 Common Traffic Advisory Frequency (CTAF) Areas

These are areas surrounding uncontrolled aerodromes, within which radio on a specified frequency is recommended for traffic information purposes. Radio is not mandatory for operations in a CTAF area, but gliders fitted with radio must monitor and broadcast on the CTAF

frequency and must not operate on the glider frequency within that area, except when the CTAF frequency happens to be one of the gliding frequencies.

The CTAF area may normally be regarded as the area contained within a circle of 10NM radius and the designated CTAF frequency is 126.7 MHz. There are some exceptions to the dimensions and frequencies of CTAF areas. For exact CTAF information, each club should consult the En-Route Supplement Australia (ERSA) and the information should be prominently displayed for the information of all club pilots.

2.5.8 CTAF<R>/CTAF Radio Calls

Required calls for all aircraft in a CTAF<R> and radio-equipped aircraft in a CTAF are:-

For Departing Aircraft

For powered sailplanes, a "taxying call", nominating the intended departure runway. In the case of gliders and/or tugs 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. Gliders shall prefix their callsigns with the word "glider". Tugs shall prefix their callsigns with the words "glider tug" and shall add at the end of the call "with glider in tow".

For powered sailplanes, a call should be made when entering the runway for take-off.

For Arriving Aircraft

An "inbound" call, which should be made before occupying the CTAF<R>/CTAF airspace.

A "joining circuit" call at a point appropriate to the joining pattern and preferably before entering the downwind leg.

Turning Base and Final calls are recommended, but only if operationally possible. Because of the combination of a short time in circuit and traffic density, it will frequently not be appropriate to make all the circuit calls (turning down wind, base and final) - however at an aerotow site, a call perhaps turning base may be important to alert powered aircraft (including tugs) on long final.

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, Glider X-ray Bravo Charlie, Ten miles north inbound for landing 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 separation using radio should not be needed.

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

2.5.9 Unusual 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.

2.5.10 Unicom

Unicom (Universal Communications) is a private communications service provided on the CTAF<R> frequency or CTAF to broadcast information to pilots on request. Air Traffic Services are not involved in the provision of Unicom facilities and the service is usually run by a regional airline or similar type of operator at the aerodrome. The operator is solely responsible for the accuracy of any information broadcast on the Unicom frequency. Unicom Services are required to be licensed by the appropriate Commonwealth department).

Unicom frequencies are notified in the ERSA document.

2.5.11 Aerodrome Frequency Response Unit

To assure pilots that they have selected the correct CTAF/CTAF<R> frequency when operating at uncontrolled aerodromes, an Aerodrome Frequency Response Unit (AFRU) will provide an automatic response when a broadcast is made on the designated aerodrome frequency.

The features of the AFRU are as follows:-

1. When the aerodrome traffic frequency has not been used for the past 5 minutes, the next transmission over 3 seconds long will trigger a response in the form of a voice identification to be transmitted in response, e.g. “Goulburn CTAF”.
2. When the aerodrome traffic frequency has been used within the previous 5 minutes, a 300 millisecond (one-third of a second) tone will be broadcast after each transmission over 3 seconds long.

3. A series of 3 microphone clicks within three seconds on the aerodrome frequency will also cause the AFRU to transmit a voice identification for that aerodrome.
4. In the event that the transmitter in the AFRU becomes jammed for a period of greater than one minute, the unit will automatically shut down.
5. The operation of the AFRU provides an enhancement to safety by confirming the operation of the aircraft's transmitter/receiver, the volume setting and that the correct frequency has been selected by the pilot

The Aerodrome Frequency Response Unit is informally known as the "Beepback" unit.

2.5.12 Prohibited, Restricted and Danger (PRD) Areas

Prohibited Area

Flight within a Prohibited Area is not permitted under any circumstances.

Restricted Area

Flight within a Restricted Area (e.g. military flying training area or gun-firing range) is normally only permitted outside the hours of activation of the area. In special circumstances, operations may be permitted within the hours of activation on the basis that the aircraft must operate within the terms of the clearance given by the controlling authority in charge of the area and the flight path will comply with controlled airspace procedures. However, some Restricted Areas do not allow flight at any time though the areas (e.g. Australian Defence Force munitions factories.)

Danger Area

Flight in a Danger Area (e.g. civil flying training area, light aircraft lane of entry or Mining site where blasting takes place) implies acceptance of a higher degree of Aviation risk and does not require a clearance.

Danger, Restricted and Prohibited Areas are marked on ERCs(L), VNCs and VTCs

2.6 Documentation

As well as the normal WAC charts for visual navigation, up-to-date airspace, aerodrome and radio frequency information is important. Airservices Australia (AA) provides a publications service which can supply all the necessary documentation. As a minimum, it is strongly recommended that all gliding clubs obtain the En-Route Supplement Australia (ERSA) with its associated amendment service. The ERSA should be readily available to all club cross-country pilots. In the ERSA will be found details of all aerodromes which meet the Licensed or ALA (Aircraft Landing Area) standard, including diagrams of each aerodrome layout and the local radio frequencies in use.

Either the club or individual pilots should obtain En-Route Chart (Low-level) and Visual Terminal Chart (ERC(L) and VTC) packages appropriate to the intended area of operation, as well as Visual Navigation Charts (VNCs) where available. These charts depict controlled airspace and en-route radio frequencies; they also come with an optional amendment service. If they are purchased by the club, the charts should be available to all cross-country pilots for flight-planning purposes.

An excellent publication, strongly recommended for all glider pilots, is the VFR Flight Guide, usually known as the VFG, published by CASA and available from the AA Publications Centre.

The AA Publications Centre is at:

Alan Woods Building

25 Constitution Avenue

Canberra, Australia 2601

Postal Address: Locked Bag 8500 Canberra, ACT, 2601.

Australia-wide free call 1300 306630.

Fax number: (02) 6268 5111.

Email: <mailto:publications.unit@airservicesaustralia.com>

Contact the Centre for information on "packages" of charts applicable to the area in which you fly and the price of the packages you need.

3. RADIO PROCEDURES

3.1 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 country 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.

It is a good idea for the club to contact any aerodrome co-user, local regional airline or charter operator and agree radio or other procedures which suit both your operations.

A special case is an uncontrolled aerodrome which is not a CTAF<R> but has an RPT (Regular Public Transport) service using aircraft of 30 seats or more. In this case (Parkes is an example) a glider intending to approach within 5NM of the aerodrome and up to 3,000ft must broadcast its presence and intentions at the 5NM point. This broadcast is made on the area VHF frequency, not on the gliding frequency.

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 "unalerted" see and avoid is not sufficient and needs to be supplemented by use of radio. This is especially true since the introduction of straight-in approaches for aircraft at non-controlled aerodromes. A non-radio glider should avoid the circuit area of such RPT served aerodromes.

3.2 Responsible use of radio

The use of VHF radio in gliders can be considered in two parts, viz.:

3.2.1 Use of one of the designated glider frequencies.

Pilots using any one of the "gliding" frequencies (122.5, 122.7, 122.9 MHz) do not need to hold a Flight Radiotelephone Operator's Licence (FROL), nor do they need a GFA logbook endorsement to operate a radio. Use of these 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. The exception to this is in a CTAF or CTAF<R> area where the frequency allocated to that area is one of the gliding frequencies. In this case, because other airspace users are involved, glider pilots using the radio are required to hold a FROL or GFA logbook endorsement.

On the gliding frequencies, the use of the radio is entirely optional and unrestricted (except in the case of a CTAF/CTAF<R> area on one of the gliding frequencies, as previously described). However, like life itself, 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 in the gliding fraternity 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 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.

3.2.2 Use of All Other VHF Frequencies in the Aeronautical Communications Band.

Use of these frequencies requires the pilot to hold a Flight Radiotelephone Operator's Certificate or the equivalent GFA logbook

endorsement. A pilot may obtain such an endorsement at any stage of training. Following the guidelines provided in this document, an oral examination on radio usage and procedures will be conducted and, if the level of competence is satisfactory, the pilot's logbook is endorsed.

Oral examinations may be carried out and logbook endorsements made by Level 1 or higher rated instructors who themselves hold either a Flight Radiotelephone Operator's licence or a GFA logbook endorsement.

Candidates who successfully pass the oral examination will have their logbooks endorsed as follows:-

"This is to certify that (name).....has successfully passed an oral examination on radio usage and procedures and is approved to operate VHF flight radiotelephone equipment carried in gliders".

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 is not appropriate when operating on any aeronautical frequency other than our "own". 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.

3.3 Procedures and Terminology

3.3.1 Procedures

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 "umming and ah-ing" on the air.

Always address the station being called first, followed by your own callsign and the message. For example: *"Leeton Base, 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.

3.3.2 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 " <i>Reading you strength....</i> " <u>One:</u> Your transmissions are unreadable. <u>Two:</u> Your transmissions are readable now and then. <u>Three:</u> Your transmissions are readable with difficulty. <u>Fower:</u> Your transmissions are readable. <u>Fife:</u> Your transmissions are perfectly readable. " <i>Loud and clear</i> " 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 Three Fife" and 26,000ft would be broadcast as "Flight Level Two Six Zero".
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3.3.3 Obtaining an Airways Clearance

No aircraft is permitted to enter controlled airspace (except Class "E") without a clearance from Air Traffic Control. This is known as an airways clearance. Glider pilots generally do not get much practice in requesting airways clearances. There are a few hints which will prove useful.

Firstly, allow plenty of time for the controller to react to a request for a clearance. Do not wait until you are very close to the controlled airspace boundary before requesting the clearance. If you are travelling at 60 knots and you leave it until you are 1NM from the boundary before requesting a clearance, the controller only has 1 minute to process your request. If you make the request at 5NM from the boundary, this gives the controller 5 minutes. Anything under 5 minutes needs the first call to be successful and allows no slack for radio problems or the need for one or other party to ask the other to "say again". When you add this need for forward planning to all the other things a glider pilot has to think about on a cross-country flight, you will appreciate the need to be very well organised in the cockpit.

If you arrive at the boundary and you do not have a clearance, **YOU MUST NOT ENTER CONTROLLED AIRSPACE.**

Secondly, be quite sure what you want and ask for it clearly and without hesitation. There is certain standard terminology which enables other parties to discern clearly what pilots are asking for and it makes sense to use this terminology. However, don't get hung up on precise terminology to the extent of getting so confused that you fail to get your message across. As long as you have clearly identified yourself and a controller or other pilot is clear about what you are requesting, you should not have any trouble. In other words, speak and make yourself heard rather than be scared of talking on the radio in case someone laughs at you.

3.3.4 Sample Airways Clearance

An example of the kind of airways clearance required by a glider pilot might be: *"Albury Tower, Glider Golf Yankee Charlie, 3 miles (do not use kms) west of Beechworth at 5,000, request clearance to enter controlled airspace on track Benalla to Tallangatta, operating between 4,000 and 7,500"*.

Albury Tower would probably say: *“Glider Golf Yankee Charlie, Albury Tower, clearance, enter controlled airspace on track Benalla to Tallangatta, not above 7,500, QNH 1014”*.

When acknowledging clearances, you are required to read back the important points of the message, with your callsign last. Therefore you should reply: *“On track Benalla to Tallangatta, not above 7,500, 1014, Glider Golf Yankee Charlie”*.

If there is a delay in obtaining a clearance for you, for example if there is another aircraft operating close to where you want to go or perhaps you have left your request until a bit too close to the boundary, the reply might be *“Glider Golf Yankee Charlie, Albury Tower, clearance not available, remain outside of controlled airspace”*. Irritating as this might be, you have no choice but to comply. However, if you are having difficulty with the instructions, for example you are in an area of strong sink, do not hesitate to acquaint the controller with your problem and he/she will do everything possible to help you out.

3.4 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:-

3.4.1 MAYDAY (Three 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 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)

3.4.2 PanPan (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 PanPan, 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 PanPan call to announce the aircraft's situation.

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

The purpose of the PanPan 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 PanPan 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.

3.4.3. 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 PanPan 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."*

3.5 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.

An example of a glider pilot making use of this frequency in a sensible and responsible way is an outlanding in a very remote area, where use of any other frequencies does not appear to have achieved any result. Make a call to anyone who might be listening on 121.5 MHz and the chances are that you will receive a reply.

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.

Disclaimer: Warning on airspace and radio procedures

Although radio procedures and terminology are likely to remain fixed, the information contained here on the types of airspace and the rules applicable within them may change from time to time. For cross-country flying, pilots are urged to check very carefully, either through their clubs or by means of individual subscription to the Airservices Australia publications service, that the information they need for each planned cross-country flight is as up-to-date and accurate as possible. The person ultimately responsible for the safety of each flight is the pilot.

THE FOLLOWING PARAGRAPHS DESCRIBE THE ANTI-COLLISION SYSTEMS AVAILABLE IN AUSTRALIAN AIRSPACE.

3.6 Secondary Radar Transponders

In some controlled airspace, especially around capital cities but maybe in other areas too, Air Traffic Services will not permit entry into that airspace unless the aircraft carries a secondary radar transponder. Although very few gliders carry these devices, it is worth knowing what they are and what they do.

It all starts with the ground-based radar systems used by controllers for the control and separation of aircraft. There are two kinds of radar in general use.

The first kind, known as "primary" radar, sends out a pulse of microwave energy which reflects off the aircraft's skin and produces a dot (known as a "blip" or a "paint") on the controller's radar screen, thus giving its position. This system suffers the limitation that the controller may not be able to identify that the blip he is looking at is exactly the one he wants to see, especially if there is a lot of traffic about and the controller's screen is cluttered. In addition, some aircraft skin surfaces are good reflectors of radar energy, others are poor; metal surfaces are very good, wood and glassfibre are very poor.

These limitations led to the development of "secondary" radar, properly called Secondary Surveillance Radar (SSR). In this type, the aircraft carries a microwave receiver-transmitter, known as a "transponder", derived from a military system known as "Identification Friend or Foe" (IFF). This transponder is interrogated by the ground-based radar. The pilot dials into the transponder a unique code, assigned by the air traffic controller (a process known as "squawking"). Every time the ground radar sweeps past the aircraft, it interrogates the transponder, which "squawks" the coded reply to the controller.

If the ground-based radar is purely of the "secondary" type (typical of the new radars installed all around Australia in recent years), there appears on the controller's screen the coded reply from the aircraft, thereby providing positive identification. There is no primary "blip", nor is one needed for identification.

Ground-based secondary radar is not capable of producing a return from an aircraft which is not fitted with a transponder.

A transponder giving only the coded reply and nothing else is known as a "Mode A" transponder.

A refinement of the transponder system is the fitment of a altitude-encoding device to the aircraft. This may be either in the form of an "encoding" altimeter or a device known as a "blind encoder", separate from the altimeter. Both these devices are capable of providing altitude information in electronic form to the transponder, for onward transmission to the ground when interrogated. A transponder fitted with one of these devices and therefore capable of giving continuous altitude readout to a controller is known as a "Mode C" transponder. Most Australian controlled airspace which requires a transponder to enable a clearance to be obtained requires that the transponder be Mode C.

Another feature of transponders is an "Ident" button. If the controller wants to be absolutely sure about an identification, a pilot will be asked to "squawk ident". All the pilot does is press the "Ident" button and the controller will see the "Ident" mark on the radar screen.

For gliders, the main drawback of a transponder and its associated altitude-encoder is its electrical power requirement. This is difficult to accommodate in a glider without considerable effort and loss of payload, as the battery needed to meet such demands is necessarily large and heavy. Many gliders have neither the space nor the weight-carrying capacity to cope. As a result, gliders have a dispensation against the carriage of transponders in "E" and "G" Airspace.

It goes without saying that, if a pilot flying a non-transponder glider requests a clearance to enter controlled airspace and is denied such a clearance without a transponder, the pilot must not enter that airspace.

3.7 Automatic Dependent Surveillance – Broadcast (ADS-B)

Automatic Dependent Surveillance – Broadcast is a system that Airservices Australia is in the process of adopting to replace or supplement their aging Secondary Radar ground sites. The ADS-B "Out" aircraft equipment consists of an approved standard of GPS receiver and radio transmitter to relay the aircraft's position either to an Airservices ground station, or another aircraft.

The receiving aircraft must be additionally equipped with an ADS-B "In" system to display any confliction.

The controller's display is identical to SSR, excepting that the aircraft is represented by a different symbol.

At the time of publishing this booklet, GFA expects that the glider dispensation against the carriage of SSR Transponders will be extended to the carriage of ADS-B.

3.8 FLARM

FLARM is an electronic aircraft awareness system that warns of the proximity of another FLARM carrying aircraft. It consists of a small box which contains a GPS receiver and a small radio transmitter with a range of a few kilometres, with a small power drain. The system has many optional methods of display, ranging from the basic small clock-like LED display, to PDA or voice alert. At present, GFA recommends its usage, but has not made it mandatory. Some GFA Competition organisers may make its usage mandatory as a condition of entry into their competitions. FLARM is NOT part of the National Airspace System (NAS).

Neither ADS-B nor FLARM are designed to replace adequate lookout to ensure seeing and avoiding conflicting traffic in VMC.



4. ALTIMETRY

4.1 General

An altimeter depends for its operation on the change in atmospheric pressure with height. It is in fact nothing more than a simple aneroid barometer, calibrated to read in feet instead of hectapascals (hPa) or inches of mercury.

The settings and procedures described here apply to aircraft operating under the Visual Flight Rules (VFR).

4.2 Altimeter Settings

To be of any use, the altimeter must have a reference pressure from which to measure. There is a sub-scale on the dial of the altimeter on which to set this reference pressure. Once it is set, the instrument will measure with reasonable accuracy the vertical distance above that reference. This is measured in feet.

The pilot may set one of three reference pressures on the altimeter:

Aerodrome level pressure, known as QFE, at which the altimeter will read zero when the glider is on the ground at the aerodrome. This setting is no longer in common use.

Mean sea level pressure, known as QNH, at which the altimeter will read either the aerodrome's level or a specified area's level above sea level when the glider is on the ground. This is the setting used by all aircraft operations below 10,000ft, INCLUDING GLIDERS.

Standard atmospheric pressure, at which the internationally-agreed standard setting of 1013.2 hPa is set in the altimeter sub-scale. All aircraft flying above 10,000ft are required to operate with this setting on their altimeters, INCLUDING GLIDERS.

If QFE (aerodrome level pressure) is set, the altimeter is said to measure **height**.

If QNH (mean sea level pressure) is set, the altimeter is said to measure **altitude**.

If the Standard Pressure Setting (1013.2 hPa) is set, the altimeter is said to measure **flight level**.

4.3 Altimetry Procedures

Glider pilots do not regard the altimeter as a dependable aid to accurate height measurement. The reason for this is the nature of cross-country flying in gliders, which may result in an outlanding in strange terrain with very little warning. The terrain over which they are flying may be at quite a different level from the terrain at the takeoff point. Pilots are therefore trained to estimate their height above the local terrain by eyeball alone and they become surprisingly accurate at doing this. The altimeter is used as a "coarse" guide to height and the justification for the past use of the QFE setting has always been that it is used principally as a back-up for the visual judgement which is a glider pilot's primary aid.

However, the purpose of the altimeter is not solely to provide a height readout to the pilot for his/her own purposes. An aircraft in any given piece of airspace may be interested, for collision avoidance reasons, in the altitude of other aircraft in close proximity. For this reason, the various settings were devised and must be used in the normal course of flying by all aircraft.

It is essential that glider pilots integrate with the procedures used by other airspace users, in order to fit into the total system as smoothly as possible. The system works as follows:-

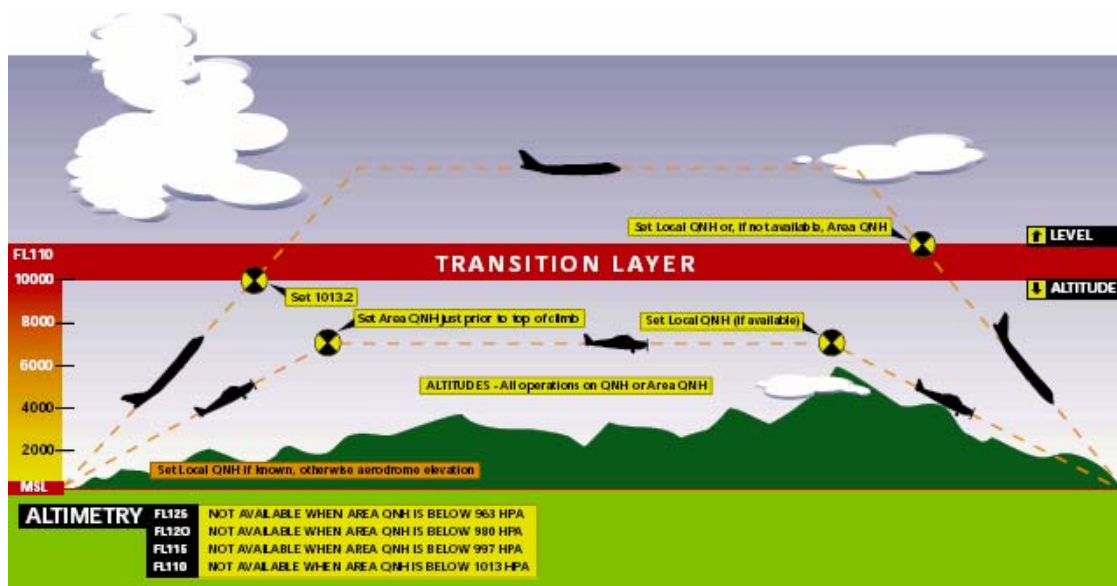
All aircraft (including gliders) cruising, climbing or descending below 10,000ft will be on the QNH (mean sea level) altimeter setting. This may be an aerodrome QNH if the aircraft has departed from a major aerodrome with tower facilities or it may be an "Area" QNH given for a designated area by the Air Traffic Services personnel. The Area QNH may be obtained on request on the Area VHF frequency. When the QNH setting is in use, all levels are **altitudes**.

For aircraft climbing, 10,000ft is the upper limit of operations on the QNH altimeter setting and is known as the **transition altitude**. Any aircraft climbing above this level will re-set the altimeter to the standard setting of 1013.2 hPa.

For aircraft descending, 11,000ft is the lower limit of operations on the standard pressure setting of 1013.2 hPa and is known as the **transition level**. Any aircraft descending below this level will re-set the altimeter to the Area QNH.

Since 11,000ft is the first of the "Flight Levels" it is referred to, not as 11,000ft, but as Flight Level One-one-zero (FL110). All Flight Levels are referred to in a similar way.

The airspace between the transition altitude and the transition level is known as the **transition layer**. It varies in thickness according to the Area QNH and is not available for cruising flight.



To re-cap, aircraft (including gliders) operating below the transition altitude use the QNH altimeter setting and refer to their vertical positions as altitudes. Aircraft (including gliders) operating above the transition level use the standard pressure setting (1013.2 hPa) and refer to their vertical position as flight levels.

4.3.1 Cruising levels

It is obvious that gliders are unable to cruise at constant heights, altitudes or flight levels. They are always in climbing or descending flight. Powered aircraft are however required to adhere to certain procedures when in cruising flight, as follows:-

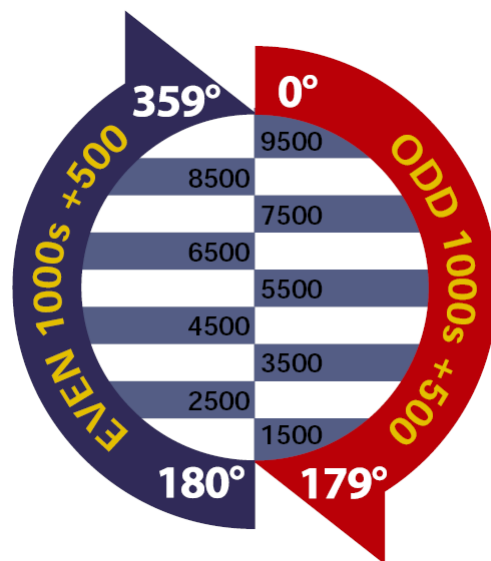
Above 5,000ft altitude, up to FL195, aircraft operate in accordance with a principle known as "ICAO Cruising Levels". The International Civil Aviation Organisation (ICAO) has decreed that all aircraft operating under the Visual Flight Rules (VFR) will do so as per the table below.

Magnetic tracks	From 000° through East to 179°	From 180° through West to 359°
Cruising altitudes (area QNH)	1,500 3,500 5,500 7,500 9,500	2,500 4,500 6,500 8,500
Cruising Flight Levels (1013 hPa)	115 (not available if area QNH less than 997 hPa) 135 155, 195 etc	125 (not available if area QNH less than 963 hPa) 145 155 185 etc

Below 5,000ft, the ICAO Cruising Levels are not mandatory for VFR aircraft, but strongly recommended.

Note that a tug/glider combination must adhere to the cruising level guidelines when carrying out any towing operations involving level flight. The same applies to powered sailplanes and power-assisted sailplanes used for engine-on cruising.

Gliders being unable to maintain a level, in controlled airspace they will be assigned an upper level of operation.



5. SEARCH AND RESCUE (SAR)

5.1 General

The purpose of the SAR organisation is to provide assistance to aircraft in distress and to search for, provide aid to and organise the rescue of survivors of aircraft accidents and forced landings (Extract from AIP Australia).

Responsibility for the overall coordination of SAR action rests with Australian Search and Rescue (AusSAR). Gliders are recognised as being a somewhat special case for SAR, as they generally operate under the close supervision of gliding clubs. Part of the SAR process is therefore left to clubs to organise in the way best suited to the mode of our operations. Only if the club is unable to achieve the required result is the SAR organisation called upon, in the form of the Canberra-based Rescue Coordination Centre.

5.2 SAR Phases

There are three phases of SAR action, in ascending order of urgency. The following descriptions apply to gliders and differ somewhat from the requirements which apply to powered aircraft.

5.2.1 Uncertainty Phase (INCERFA)

This phase is declared when a glider cannot be accounted for. The glider may have outlanded and the pilot may be safe, lack of communication with base being caused by a flat radio battery and/or a long walk to the nearest telephone. On the other hand, the pilot may have been injured or incapacitated in an outlanding which did not go according to plan.

Whatever the eventual explanation for the glider being missing, the club organisation cannot take a chance on a pilot's life. Given the nature of cross-country glider operations, a compromise has to be reached between over-reacting to an overdue glider and taking action to preserve life. The compromise in the case of gliders is that, having exhausted all possible avenues of trying to find out what has happened to the glider, the AusSAR organisation must be alerted at 2100hrs (9pm) local time regardless.

When the club has done all it reasonably can and the SAR system is finally notified, the INCERFA phase is initiated. During this phase, everything possible is done to ascertain the whereabouts of the glider, based on information on its last known position and intended track. Actions will include telephone contact with police stations in the vicinity of the known track, the police then venturing out to search for the missing glider and crew, asking around local farms, pubs, etc, to get all the information they can. Broadcasts on local radio stations are also used. These actions have a high success rate in locating the glider or its pilot(s).

If the Uncertainty phase fails to turn up any information on the glider or its crew, the next phase is declared, viz.

5.2.2 Alert phase (ALERFA)

This phase is declared when, following the uncertainty phase, all checks and enquiries fail to locate the glider or its crew. Actions may include an air search (usually initiated the next day at first light, for obvious reasons), or an extended ground search based on the possibility of a local resident seeing or hearing something unusual.

Although the SAR action has been handed over to the Rescue Coordination Centre (RCC), the gliding club's assistance will probably be called upon, possibly in the form of a tug aircraft to take part in the search. If this is the case, those gliding personnel will be under the overall control of the RCC and will be expected to cooperate fully.

There may be a fine line between the ALERFA and the next phase of SAR, which is -

5.2.3 Distress Phase (DETRESFA)

SAR action enters this phase when there is reasonable certainty that the glider and crew are threatened by grave and imminent danger and require immediate assistance. It may occur that a club knows or has every reason to suspect that the glider is in deep trouble right from the time they realise it is missing, in which case the SAR number should be contacted without delay. This initiates the distress phase immediately.

A call on the number shown below will initiate the SAR action you require.

1800 815 257

Staff members of the Rescue Coordination Centre have specialist SAR qualifications obtained at the National SAR School and International training courses.

5.2.4 Civil SAR Units

AusSAR currently has Civil SAR Units at strategic locations around Australia.

These units have been trained by AusSAR in aerial search, flying search patterns and homing on emergency radio beacons. Many have also been trained in supply-dropping, and hold air-drop supplies provided by AusSAR.

Civil SAR Units include local charter operators, Royal Flying Doctor Service, aero clubs, police air wings and other state-based agencies.

They represent a first-response capability. All have access to trained observers, and dropmasters if supply-drops are required. If additional civil resources are required, these are chartered from local aircraft operators.

5.2.5 Common SAR Radio Callsigns

POLAIR – Police Aircraft (suffixed RED if a priority flight)

RESCUE – Rescue Mission

6. SURVIVAL TIPS

6.1 General

Cross-country flying in Australia can take a pilot across some very inhospitable terrain. Combined with summer temperatures in the high 30s or low 40s, this makes survival a real problem if the pilot is forced to outland.

There are some Designated Remote Areas (DRAs) in Australia, which are obviously hazardous places to be and demand certain precautions to be taken. However, some areas which have not been traditionally regarded as remote can also be hazardous if not treated with the right attitude of mind. An example of this is the tendency in recent years for pastoral properties to be abandoned because of the recession and homesteads which look inhabited from the air turn out to be deserted. This can raise the prospect of a walk of several kilometres in searing temperatures in order to reach habitation.

There are some very basic precautions to take before venturing on a long cross-country flight, during the flight itself and after landing in a remote and inhospitable area. A few tips are in order.

6.2 Before Flight

Sensible precautions which can be taken before flight include the following :-

1. Make a detailed flight plan and ensure that you leave those details with someone at the club before you depart. "Someone" may be the Duty Instructor or it may be a relative or friend. If using, say, your wife or husband for the purpose of lodging flight details, do ensure that you inform the club which launches you that responsibility for SAR action rests with the person you nominate. This ensures the club knows that someone is in fact responsible and will take the necessary actions if you are overdue.
2. As well as your usual maps and charts, take with you in the cockpit a list of frequencies carried by other aircraft such as domestic and international airliners and commuter traffic. These frequencies can be obtained by your club and made available to all their pilots. Remember the international distress frequency of 121.5 MHz, which is monitored by most airliners and military transport and maritime reconnaissance aircraft. Don't be afraid to use this frequency if you really need to - it's better than frying in the desert.
3. It sounds obvious, but take plenty of drinking water with you. If flying a ballasted glider, give some thought to retaining some water ballast if forced to outland. The small risk of over-stressing the undercarriage is greatly outweighed by the thought of plenty of water to keep you alive after landing.
4. An Emergency Locator Transmitter (ELT) is a sensible piece of equipment to carry, if venturing into remote areas. Aircraft-grade ELTs operate on the VHF international distress frequency of 121.5 MHz and the UHF distress frequency of 243.0 MHz. They are satellite-compatible and this means that you will be located within minutes of beginning a

transmission. Such ELTs and their associated antennas are installed permanently in the aircraft and have G-actuated switches which will automatically switch on the transmitter in the event of a crash.

Also available are marine EPIRB (Electronic Position Indicating Radio Beacon) units, at about half the price of ELTs. They are also dual-frequency and satellite-compatible. They do not have the G actuated switch and must be switched on manually. They are therefore useful in a controlled outlanding, but less useful in a crash, where you might be incapacitated. To counter that disadvantage, they are less likely to switch themselves on accidentally, a known problem with ELTs and one which is likely to be worse in gliders because of their lack of suspension on the undercarriage and the rather rough ride they get in their trailers. Either of these may actuate the G switch without the pilot knowing and the first you will know about it is when you notice that you are being followed along the highway by a RAAF Orion with all its lights on!

ELTs are available at about the same price as a modern, very basic, electronic variometer, EPIRBs at about half that price. Not bad insurance.

5. Fold up a couple of square metres of aluminium foil and slip it into the kit. This will come in handy as a ground plane for the beacon and will greatly increase its effective range. If you have a mobile phone, take it along (see page 32 for further details).
6. Material for a water still ([see page 36](#)) is simple and light. Stow it somewhere in the glider, among the tie-down gear perhaps, and someday you will be glad you did.
7. Even if the glider is equipped with a panel-mounted radio, an additional hand-held radio is an advantage for use in remote areas. They are very small and light and can be obtained for as little as \$600. Make sure the unit is fully-charged before departure and stow it in a safe place. It may prove very useful after landing, when the battery of your main radio has gone flat. It has the additional advantage that you can take it with you when you leave the glider to find the nearest farmhouse. You will find this invaluable if you see a tug flying overhead looking for you and you are able to communicate directly with the pilot as you trudge around the paddocks.
8. A long flight over remote areas may result in an overnight stay with the glider if you outland. Mosquitos and other biting insects can make life a misery after dark, to say nothing of the risk of picking up some disease from one of these creatures. Add insect repellent to your list of essentials to carry in your survival kit.

The most effective way of curing insect bites is to stop them biting you in the first place. With this in mind, long-sleeved shirts and long pants make more sense than t-shirts and shorts, as well as providing better sun protection.

9. Anybody who has done a retrieve after dark, and been faced with hunting far and wide for their glider, will know how frustrating it can be.

White emergency strobe lights are very effective in guiding a retrieve crew to the exact location of the glider after dark. These are available from pilot shops all round the country and are highly recommended for any glider survival kit.

10. Smoke flares are useful for helping a search aircraft or ground party find you after radio contact has been established and they are starting to get close.

6.3 In Flight

6.3.1 Keeping in Touch

There is an old saying "Plan the flight and fly the plan". It's a very good saying. Gliders obviously cannot stick strictly to any particular plan, as they are dependent upon the vagaries of the weather in order to stay in the air at all.

However it makes sense to report on the radio if you find it necessary to make major deviations from your intended task. Make the report on the gliding frequency in use at your base; if you cannot raise the base station, an "all stations" call on the gliding frequency will probably find someone who will relay the message for you.

On a long cross-country flight, periodic "ops normal" calls are a good idea. These can be pre-arranged to be made on the hour, or at any interval you think is appropriate to your task. Once again, if you cannot get through to your base, make a general broadcast and get someone to relay for you. In this way, the club has a progress report on you and this greatly assists in any eventual SAR action which may be necessary.

That person does not have to be from your club, nor even report back to your own club. As long as someone gets a message from you, follow-up action can be taken later if your flight turns to worms.

If you think about the above recommendations, you will see the sense in maintaining good radio discipline, using correct terminology and keeping quiet for as much of the time as possible.

If you are still in the air, but conditions are failing and an outlanding in a remote area appears to be imminent, a general broadcast on the gliding frequency is a good idea. Having said that, remember to keep your priorities - "aviate, navigate, and communicate" in that order. Don't lose control of your glider because you are preoccupied with making a radio call.

6.3.2 Making Hay While the Sun Shines

A private pilot on his way to the rural community of Hay in NSW made an en-route position broadcast. Flightwatch took a look at the time left until last light and worked out that it would be dark by the time the aircraft got to its destination. Not knowing whether the pilot was night-rated or not, but having a wry sense of humour, he gently reminded the

pilot of the march of time by asking him "Can you make Hay while the sun shines"?

It takes a glider like a Discus some 40 minutes to descend from 8,000 feet to ground level at minimum sink speed. While you are struggling to remain airborne in weakening conditions, it can easily get dark on the ground while it is still quite light at your altitude. You will then be faced with a landing, not only in unfamiliar bush country, but also in the dark. This is a recipe for a serious accident.

Know the time of last light every time you fly cross-country, keep an eye on lengthening shadows and darkening valleys when you are airborne, and make a determined effort to get down to circuit height well before it gets dark on the ground.

6.3.1 After Landing

6.4.1 Simple Precautions

Landing in a remote area means that you will probably spend much more time waiting for a retrieve than you are accustomed to. You might even have outlanded without being able to get a message to anyone that your landing was imminent.

Each year a number of people die in remote areas because they do not take simple precautions. We have seen at least one example of a visiting overseas pilot setting out on a long cross-country flight from Alice Springs without even a bottle of drinking water. He outlanded and was fortunately found before he died of thirst, but it was not a very smart way to treat outback flying. It is worth repeating that outback Australia can be very inhospitable and potentially dangerous in the summer months.

6.4.2 A Possible Scenario

Let us imagine that you have outlanded in a remote area, many kilometres from civilisation. Let us also imagine that you equipped yourself as well as you can afford to for such a flight before you took off. Finally, let us imagine that you were unhurt in the landing, but your aircraft radio battery is very low, you don't have a hand-held radio and you have only your ELT or EPIRB to assist you.

When you land, it will probably be only a couple of hours before last light. You are not sure exactly where you are, but you have maps with you and your last "ops normal" call was about an hour ago. You are in a good position to be found fairly quickly, so don't panic.

6.4.3 Don't leave the aircraft

You know that the country has been totally uninhabited for the last 100km or so, so there is no point in trying to walk anywhere. This is rule number one for survival in real outback areas - don't leave the aircraft unless you have a very good reason for doing so. You have

everything you need at the aircraft, so settle down to make good use of it.

Firstly dial up the area frequency on your radio and, if your battery is up to it, make an "all stations" call that you need assistance. In a case like this, the words don't matter very much, get the message across to an overflying aircraft that you are down in the middle of nowhere and ask them to relay a similar message on your gliding frequency. This may bring immediate success and your club will know pretty soon that you are OK but a long way from home.

If the battery is not up to it, or goes flat while you are trying to get the message across, don't panic. Prepare yourself for a night in the glider and in particular prepare your ELT or EPIRB for its job. This means unfolding the aluminium foil and laying it flat on the ground. Place the beacon right in the middle of the sheet of foil. At 9pm, switch on the beacon and wait.

In the meantime, your club or your private retrieve crew will have been trying for some time to locate you. If they have drawn a blank by 9pm, they will advise AusSAR on 1800 815 257 that they have a glider adrift. The SAR organisation then swings into action as previously described.

By first light, the chances are that that your actions at the glider, combined with AusSAR's endeavours on your behalf, will result in the sound of aircraft engines being heard, getting closer as they home in onto your beacon. It's time to stir yourself into action again.

6.4.4 Emergency Ground signals

There is a system of ground signals which can be used to communicate with an aircraft overhead. These signals can be made out of fabric, rocks or logs, but must contrast with the ground, for obvious reasons. Signals must be at least 3 metres in size to be of any use. Standard signals are as follows:-

GROUND - AIR VISUAL SIGNAL CODE FOR USE BY SURVIVORS		
NO	Message	Code Signal
1	Require Assistance	V
2	Require Medical Assistance	X
3	Proceeding in this Direction	→
4	Yes or Affirmative	Y
5	No or Negative	N
	If in doubt use International Symbol	SOS

GROUND - AIR VISUAL SIGNAL CODE FOR USE IN CIVIL EMERGENCIES		
NO	Message	Code Signal
1	Require Fodder	FF
2	Require Evacuation	III
3	Power Failure	VI

Acknowledgments by an Aircraft

In Flight

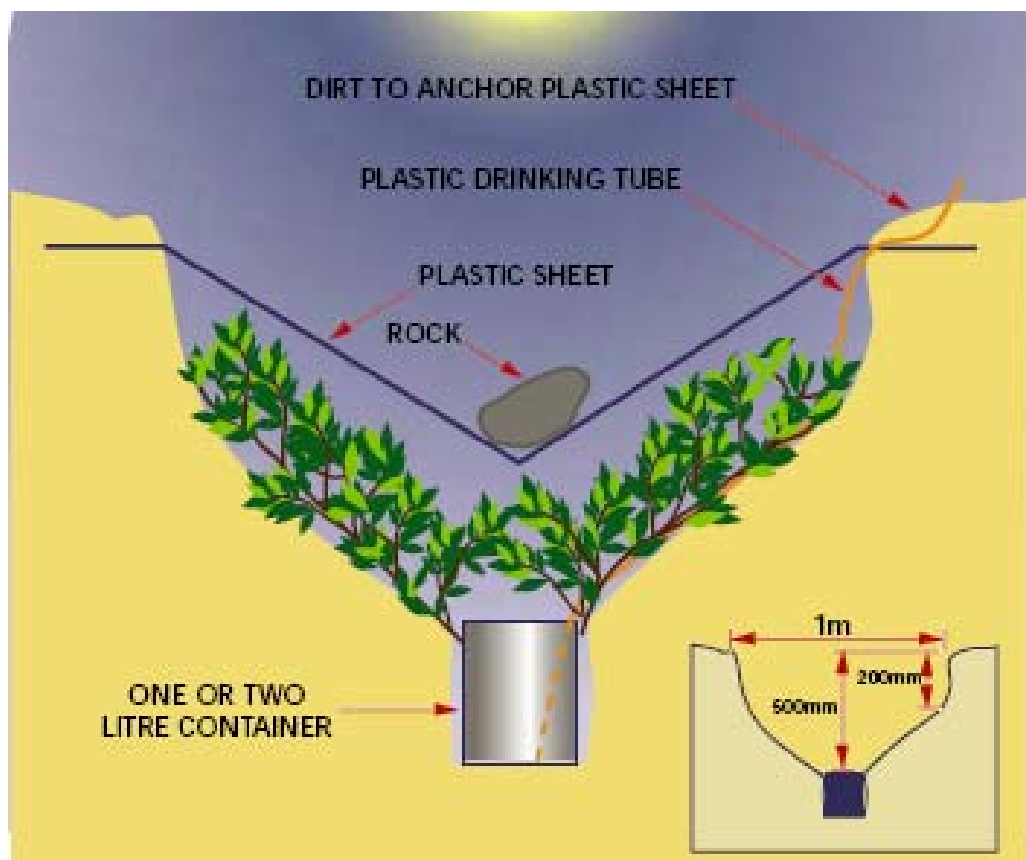
- During the hours of daylight: by rocking the aircraft wings.
NOTE: This signal should not be expected on the base and final legs of the approach.
- During the hours of darkness: by flashing on and off twice, the aircraft's landing lights or, if not so equipped, by switching on and off twice, its navigation lights.

On the Ground

- During the hours of daylight: by moving aircraft's ailerons or rudder.
- During the hours of darkness: by flashing on and off twice, the aircraft's landing lights or, if not so equipped, by switching on and off twice, its navigation lights.

6.4.5 Running Out Of Water?

If there is no action the next day, or if you have outlanded with no radio and no beacon, you could be in for an extended stay. You will probably exhaust your water supply in the harsh outback conditions, and you will need to supplement it by making yourself a water still.



Your survival kit contains the basic materials, a mug or can and a sheet of plastic about 2 metres square. Dig a hole about half a metre deep and 1 metre across. Put the mug or can in the bottom of the hole and surround it with green leaves. Stretch the plastic over the hole, securing it by piling earth or rocks around the edges. Place a small rock in the middle of the plastic sheet, above the mug.

The still should be constructed before first light and checked at midday. Repack at least once daily.

A still of this kind is capable of producing up to 2 litres of water per day, just enough to stay alive if you keep out of the sun and use the wings of the glider for shelter.

Another possible source of water is the dew off the surface of the glider and from rocks and leaves, which should be wiped off and collected before sunrise. An apparently dry creek bed may also provide some water, especially if there are plants growing in it. Dig a hole about 100mm across in the sand at the lowest part of the creek bed.

6.4.6 Mobile phones

These can be a useful tool for search and rescue purposes. They require the user to be within line-of-sight of the nearest ground antenna. This means that range is restricted with the hand-held phone at ground level, but greatly increased with height.

The major problem with the use of these phones is that each "cell" and handset operates multiple channels, at low power. Where a handset is in range of multiple cells, it is possible for the call to be routed through more than one cell, causing crossed lines or other interference. One example of a likely problem is that pressing "End" may terminate a number of conversations in addition to your own. For this reason it is generally frowned upon to indulge in indiscriminate use of mobile phones in flight.

However, it is possible to obtain permission to use mobile phones in flight. To avoid chaos, it is better that such permission be applied for on a club basis, rather than by individuals. The person to address queries to is the Regional Manager of the relevant service provider.

Note that, if granted, permission will be restricted to use of the phone in flight for life-threatening situations only.

On the ground, an SMS message which includes your GPS location may be able to be transmitted successfully in an area of marginal coverage, where voice communication is breaking.

7. ACCIDENTS AND INCIDENTS

Any accident or incident occurring to an Australian-registered aircraft (including gliders) must be reported.

Reports are made to the Australian Transportation Safety Bureau (ATSB). ATSB is an agent of the Department of Transport and Regional Services (DOTARS) and is directly responsible to the Minister for the investigation of all civil aircraft accidents and incidents.

7.1 Definitions

Accident

An occurrence associated with the operation of the aircraft in which:

1. Any person suffers death or serious injury.
2. The aircraft incurs substantial damage or structural failure.
3. The aircraft is missing or inaccessible.

Incident

An occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of operation of the aircraft. In practice, this definition is broadly interpreted and the incident reporting system accepts any reports, requests, complaints and suggestions which relate to aviation safety.

7.2 Notification

7.2.1 Accidents

The pilot in command, the owner, the operator and (if applicable) the hirer are each responsible for ensuring that notification of an accident to ATSB occurs **with the minimum possible delay**. This may be done by telephone, but it is also a requirement that a written report be submitted to ATSB as soon as practicable after the accident.

The telephone numbers for initial reporting of an accident to ATSB are:-

All states 1800 011 034

This number operates 24 hours a day, every day of the year. If there is any difficulty with this number, initial notification may be made to the nearest ATC unit or the local police, who will notify ATSB on your behalf.

The minimum information required in the initial report is:-

- Aircraft make, model and registration
- Names of owner and operator
- Full name of pilot in command
- Date and time of the accident

- Last point of departure, point of intended landing and nature of the flight
- Location of the accident
- Number of persons on board and number/names of injured persons
- Nature and cause of the accident, as far as is known
- Description of damage to the aircraft
- Description of the terrain at accident site, in terms of accessibility

7.2.2 Incidents

The pilot in command, the owner, the operator and (if applicable) the hirer are each responsible for ensuring that written notification of an incident is forwarded to ATSB within 48 hours of the incident, using the same guidelines and telephone number as for accidents.

7.2.3 Additional Comment on Accidents and Incidents

In addition to the above statutory requirements, it is a GFA requirement that accidents and incidents are reported to the RTO/Ops of the appropriate region at or around the time they are reported to ATSB. With this in mind, triplicate accident/incident reporting forms are provided to clubs (for forwarding 1 to ATSB, 1 to RTO/Ops, 1 retained by club)

7.2.4 Custody

When an accident occurs, the aircraft is deemed to come into the custody of the Secretary of DOTARS and it must not be moved except with the permission of the Secretary or authorised representative (usually ATSB). However it is permissible to extricate persons or animals and to "take such action as is necessary to protect the wreckage from further damage and to prevent danger to aircraft, other transport or the public". Other items, goods, baggage, etc, may only be removed from the wreckage under the supervision of the police or an authorised officer.

On completion of the investigation of an accident, the aircraft will be released to the owner/operator.

7.2.5 Aviation Self Reporting Scheme

The Aviation Self Reporting Scheme (ASRS) commenced operation on 21 February 2004.

Under the ASRS, the holder of a Civil Aviation Authorisation may report a reportable contravention committed by the holder. Reports pertaining to third parties are ineligible and will be returned to reporters. No action will be taken in response to ineligible reports.

Reporters submitting eligible reports can claim protection from administrative action by CASA, in accordance with section 30DO of the *Civil Aviation Act 1988*, once every five years.

For an ASRS report your identity will be kept confidential in accordance with Division 3C of the *Civil Aviation Amendment Act 2003* and Division 13.K.1 of Subpart 13.K of the *Civil Aviation Safety Regulations 1998*.

No postage stamp is required if any report or material is mailed.

Mail address:

Reply Paid 600, ASRS, PO Box 600, Civic Square ACT 2608

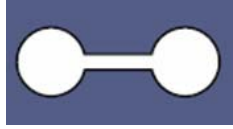


Contact phone number:

Australia-wide 24-hour toll-free **1800 020 505**

The Confidential Aviation Incident Reporting (CAIR) system has been discontinued.

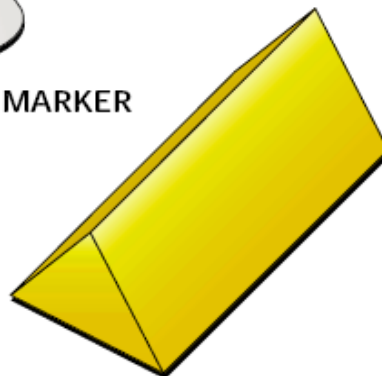
8. AERODROME GROUND SIGNALS TO AIRCRAFT

The following signals may be found on an aerodrome:-

Ground signal	Description	Where displayed	Meaning
	Horizontal white dumb-bell, with circular ends 1.5m in diameter, 1.5m apart	Adjacent to windsock	Use only hard surface movement areas. Where there are sealed and gravel manoeuvring areas, use only the sealed surfaces. Where there are constructed gravel and natural surface manoeuvring areas, use only the gravel surfaces. En Route Supplement Australia (ERSA) contains further information on aerodromes with dumb-bell signals.
	White cross of 6m span	<ol style="list-style-type: none"> 1. Adjacent to windsock. 2. On manoeuvring area. 	<ol style="list-style-type: none"> 1. Aerodrome completely unserviceable. 2. Area marked by a cross or crosses within the limits delineated by markers is unfit for use by aircraft.
	White double cross 5m long by 2.5m across	Adjacent to windsock	Gliding operations in progress.



UNSERVICEABLE MARKER



BOUNDARY MARKERS