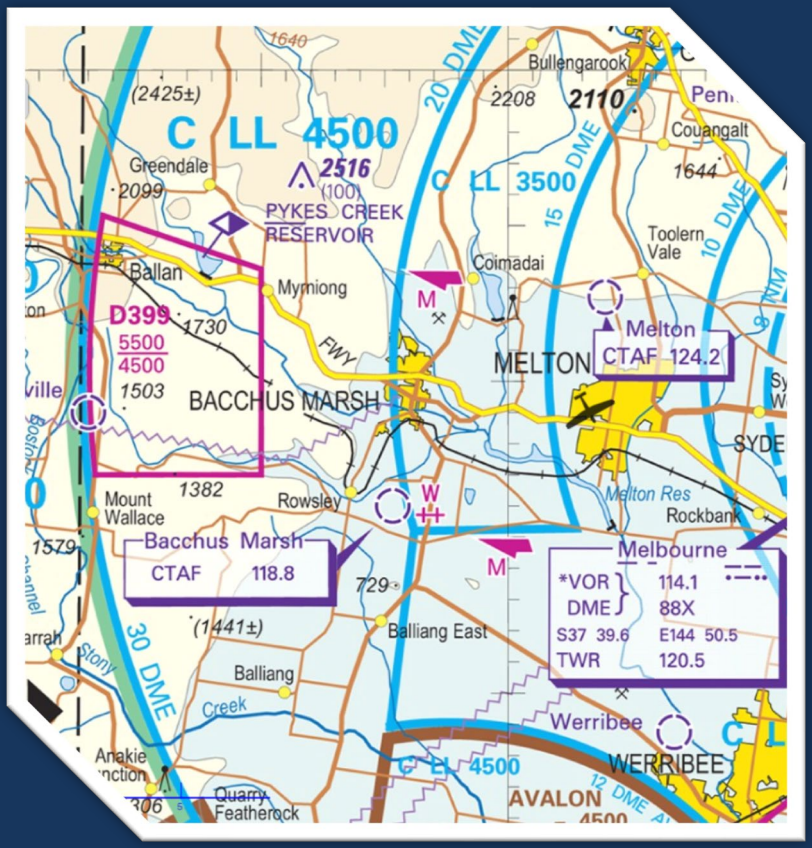
# The Gliding Federation of Australia Inc

(ABN 82 433 264 489)

# Airways and Radio Procedures for Glider Pilots

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# AIRWAYS AND RADIO PROCEDURES FOR GLIDER PILOTS

**Issue 12**

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## FOREWORD

Gliding in Australia is subject to the Civil Aviation Act 1988, Civil Aviation Regulations 1988, Civil Aviation Safety Regulations 1998 and other relevant Legislation as amended from time to time. Certain exemptions from the provisions of the Civil Aviation Regulations 1988 have been granted to members of The Gliding Federation of Australia Inc (GFA) by way of Civil Aviation Orders 95.4 and 95.4.1. Where exemptions exist, the practices adopted by GFA are outlined in the GFA Operational Regulations approved by CASA.

This document provides guidance for the conduct of gliding operations in Australian airspace and is to be read in conjunction with the Manual of Standard Procedures, Part 2 (Operations).

Where the requirements of this document differ from those contained in the GFA Operational Regulations or other Legislative documents, the GFA Operational Regulations and other Legislative documents shall take precedence.

Once printed, this is an uncontrolled version of the manual which will not be updated by GFA; it should not be relied upon for any regulatory purpose. The current manual can be viewed at any time via GFA's website at "http://www.glidingaustralia.org".

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## REVISION HISTORY

This document is periodically amended by the issue of replacement pages, each identified by page number, amendment number and effective date, or by total re-issue, as appropriate. Interim amendments may be by Operations Directives distributed to clubs.

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## GLOSSARY OF TERMS USED IN THIS MANUAL

| | |
|---|---|
| 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 |
| ASRS | ATSB Aviation Self Reporting Scheme |
| ATC | Air Traffic Control |
| ATSB | Australian Transport Safety Bureau, the accident investigator |
| CAR | Civil Aviation Regulation |
| CAO | Civil Aviation Order |
| CASA | Civil Aviation Safety Authority |
| CASR | Civil Aviation Safety Regulation |
| CERT | Certified Aerodrome |
| CTAF | Common Traffic Advisory Frequency |
| DES | Designated Aerodrome |
| DRA | Designated Remote Area |
| 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 |
| FROL | Flight Telephone Operators License |
| GFA | Gliding Federation of Australia |
| ICAO | International Civil Aviation Organisation |
| IFR | Instrument Flight Rules |
| IMC | Instrument Meteorological Conditions |
| MIL | Military Aerodrome |
| NM | Nautical Mile |
| PLB | Personal Locator Beacon |
| 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 |

| | |
|---|---|
| REPCON | ATSB Aviation Confidential Reporting Scheme |
| 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 Meteorological Conditions |
| VNC | Visual Navigation Chart |
| VTC | Visual Terminal Chart |
| WAC | World Aeronautical Chart |

# 1. AIRSPACE CLASSIFICATION AND AIRWAYS PROCEDURES

## 1.1. 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 generally have a high degree of control applied to their operations, to small sport aviation craft, which need little or no control when operating outside controlled airspace.

Airliners, charter operators and quite a number of general aviation aircraft often operate in accordance with the Instrument Flight Rules (IFR). This means they may operate in reduced visibility, including in cloud (these conditions being known as Instrument Meteorological Conditions (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.

## 1.2. 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)

## 1.3. VISUAL FLIGHT RULES

Gliders are only permitted to fly VFR by day, in Visual Meteorological Conditions (VMC). The tables below shows the requirement for VMC for gliders in Class G (uncontrolled) and Class E (Controlled) airspace.

## 1.4. VISUAL METEOROLOGICAL CONDITIONS - CLASS G (UNCONTROLLED) AIRSPACE

See Section 1.7 for airspace classification.

| Height | Required Flight Visibility | 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 (whichever is the higher) of:<br>(a) 3000 ft AMSL;<br>(b) 1000 ft AGL | 5 kms | Clear of cloud and in sight of the ground or water. | Radio must be carried and used on the appropriate frequency |

## 1.5. VISUAL METEOROLOGICAL CONDITIONS - CLASS E (CONTROLLED) AIRSPACE

| Height | Required Flight Visibility | 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 |

## 1.6. SPECIAL VFR CLEARANCE

Subject to ATC clearance, operation under the special VFR may be available within a control zone. Special VFR is not permitted in Class E airspace. If VMC criteria cannot be met and a pilot wishes to enter Class C or Class D controlled airspace (See Section 1.7 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 1600 metres, and the low-flying regulation is not breached.

## 1.7. AIRSPACE CLASSIFICATION

### 1.7.1. Class A & C Airspace

Class A controlled airspace is above Flight Level (FL) 180 within radar coverage and above FL245 outside radar coverage (for explanation of Flight Levels, see Chapter 3, Altimetry). Class A and underlying C airspace extends downwards in “steps” reaching ground level in the immediate vicinity of major 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.

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., Block clearances often 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 Radiotelephone 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).

### 1.7.2. 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 that for Class C. VFR traffic (e.g. gliders) may receive traffic information on other aircraft but separation is the pilot's responsibility.

For gliders, VHF radio and Air Traffic Control clearance are 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.

### 1.7.3. Class E Airspace

This is controlled airspace which generally occupies the space between Class G (uncontrolled) airspace and Class C and D airspace in certain parts of Australia. The vertical extent of Class E airspace is generally from 8,500 feet to the base of Class C airspace. Class E airspace is depicted on ERCs (L), VNCs and VTCs. In Class E airspace, IFR and VFR flights are permitted. IFR flights are provided with an ATC service, are separated from other IFR flights, and receive traffic information on VFR flights as far as is practicable. VFR flights receive a Surveillance Information Service (SIS) on request.

VFR flights entering and operating in Class E airspace should:

(a) avoid published IFR routes, where possible;
(b) monitor the appropriate Class E frequency and announce if in potential conflict; and
(c) take appropriate action to avoid potential conflict.

Pilots of VFR flights should avoid IFR holding patterns.

**NOTE:** CASA and GFA have agreed some formal processes that allow glider pilots to use a discreet frequency while providing greater situational awareness to other airspace users as follows:

- When flying in groups, glider pilots can nominate one aircraft to monitor air traffic control and pass on traffic information to other gliders using a discrete glider frequency.
- Special arrangements can also be made for gliding competitions or events, with authorisation to be provided through a NOTAM issued by Airservices Australia.
- For single glider operations in Class E airspace operations not in accordance with a published NOTAM, glider pilots will maintain a listening watch on the appropriate ATC frequency.

### 1.7.4. Class G Airspace

This is uncontrolled airspace and is all that airspace which is not covered by any of the previous categories.

It is required (unless operating in accordance with the above formal procedures) that gliders operating above 5,000FT in Class G airspace monitor the Area VHF.

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.

### 1.7.5. Operations in the Vicinity of Non-Controlled Aerodromes (Refer AC 91-10)

Non-Controlled aerodromes are those at which an aerodrome control service is not operating. This can be any of the following:-

- an aerodrome that is always in Class G airspace;
- an aerodrome that would no rmally have an aerodrome control service but such services are temporarily unavailable.

#### 1.7.5.1. Mandatory broadcasts

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

For non-controlled aerodromes not located in Mandatory Broadcast Areas, the pilot is required to make a broadcast whenever it is reasonably necessary to do so to avoid a collision, or the risk of a collision, with another aircraft. Pilots who intentionally avoid broadcasting – for whatever reason – must keep in mind that such action may increase the risk of a collision, with the potential for serious consequences.

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

The recommended broadcast format for low and medium performance aircraft is:

- location Traffic (e.g. ‘Parkes Traffic’)
- aircraft Type (e.g. ‘Cessna 172’)
- call sign (e.g. ‘Zulu Foxtrot Romeo’)
- flight rules if IFR
- position/Level/Intentions (e.g. ‘One-zero miles north passing four thousand two hundred, on decent, inbound, circuit three-six’)
- location (e.g. Parkes).

#### 1.7.5.2. Radio Procedures

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-Controlled aerodrome. An aircraft is defined as operating at the aerodrome whenever it is within the active areas of the aerodrome - when the aircraft is located within the aerodrome runway, or taxiway markers. In the vicinity of an aerodrome is defined as within a horizontal distance of 10 nm of the aerodrome reference point and at a height above the aerodrome reference point that could result in conflict with operations at the aerodrome. The height may vary considerably in consideration of local traffic and other circumstances at particular aerodromes. However, all aircraft are expected to be operating on the CTAF frequency whenever at or below 3,000ft as a minimum above the aerodrome reference point and higher when appropriate.

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.

| Item | Circumstance (Non-Controlled aerodromes) | Pilot's radio broadcasts |
|---|---|---|
| **Recommended calls in all circumstances** | | |
| 1 | The pilot intends to take-off. | Immediately before, or during, taxiing. |
| 2 | The pilot is inbound to an aerodrome. | 10 NM from the aerodrome, or earlier, commensurate with aeroplane performance and pilot workload, with an estimated time of arrival (ETA) for the aerodrome. |
| 3 | The pilot intends to fly through the vicinity of, but not land at, a non-controlled aerodrome. | 10 NM from the aerodrome, or earlier, commensurate with aeroplane performance and pilot workload, with an estimated time of arrival. |
| **Recommended calls dependent on traffic** | | |
| 4 | The pilot intends to enter a runway. | Immediately before entering a runway. |
| 5 | The pilot is ready to join the circuit. | Immediately before joining the circuit. |
| 6 | The pilot intends to make a straight-in approach. | On final approach at not less than 3 NM from the threshold. |
| 7 | The pilot intends to join on base leg. | Prior to joining on base. |
| 8 | The aircraft is clear of the active runway(s). | Once established outside the runway strip. |

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).

#### 1.7.5.3. Mandatory Broadcast Areas

Certain volumes of Class G airspace are legally designated as Mandatory Broadcast Areas. Special rules for these areas are contained in Chapter 11 of the Part 91 Mamual of Standards (MOS) and the required radio broadcasts and reports for Mandatory Broadcast Areas are contained in Chapter 21 of the Part 91 MOS. The horizontal and vertical boundaries of Mandatory Broadcast Areas are on aeronautical charts. The vertical boundary of a Mandatory Broadcast Area can be one of the following:

- surface to 5 000 ft above mean sea level
- surface to the base of controlled airspace if 8500 ft or less
- surface to a designated level.

There is usually more than one aerodrome within a Mandatory Broadcast Area, and pilots operating within the area must be monitoring the published CTAF for the Mandatory Broadcast Area and make the required broadcasts and reports

#### 1.7.5.4. Radio endorsements

Pilots communicating on CTAF frequencies must hold a CASA Pilot Licence or an equivalent GFA logbook endorsement. GFA Radiotelephone Operator Authorisation endorsement requirements are contained in the GFA Operational Regulations 3.5.

**NOTE: All pilots must be endorsed prior to first solo.**

#### 1.7.5.5. Unserviceable radios

An aircraft must not take-off from a Non-controlled aerodrome with an unserviceable radio. However, if the radio becomes unserviceable during flight the pilot may continue the flight and land at the aerodrome or another Non-Controlled aerodrome if it is appropriate to do so (refer (AC 91-10, Section 8.6).

#### 1.7.5.6. Cross-country soaring flights

Pilots flying on cross-country flights must ensure they comply with mandatory radio requirements when in the vicinity of Non-Controlled aerodromes. When flight planning for cross-country flights, pilots should check NOTAMs and charts to ensure frequencies and specific reqirements at Non-Controlled aerodromes within the proposed flight path are noted and appropriately complied with during the flight.

#### 1.7.5.7. Calling on the CTAF

Taxying/Departing

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

Arriving Aircraft

An "inbound" call should be made at 10 nautical miles and standard circuit broadcasts made in accordance with the table at Radio Procedures1.7.5.2.

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 Quebec Kilo, Ten miles north inbound at four thousand, Horsham”*. Then listen out carefully in case someone else reports around the aerodrome so you can build up a “picture” of the traffic. Self-arranged separation using radio should not be needed but should be used if necessary for safety.

Ideally, pilots should make circuit broadcasts prior to making a turn because banking aircraft are easier to see. A simple strategy to remember when flying in the circuit is 'Look, Talk and Turn'.

Modified Circuits

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

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

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

## 1.8. UNICOM

Unicom (Universal Communications) is a private communications service provided on a 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 commercial aviation 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 frequencies are notified in the ERSA document.

## 1.9. AERODROME FREQUENCY RESPONSE UNIT

At aerodromes with an Aerodrome Frequency Response Unit, pilots will receive confirmation that they are broadcasting on the relevant CTAF. This will be either the name of the aerodrome and the word "CTAF" or, if any aircraft transmissions have been received by the AFRU within the last five minutes, a low volume 300 millisecond tone burst. This helps pilots to both confirm they are using the right frequency and makes them aware of potential traffic in the area.

## 1.10. PROHIBITED, RESTRICTED AND DANGER (PRD) AREAS

### 1.10.1. Prohibited Area

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

### 1.10.2. 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.)

### 1.10.3. 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 ERC(L), VNCs and VTCs and details are published in ERSA.

## 1.11. 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 pilots and 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 aerodromes, their categories, and details of those which meet the standard for ALA (Aircraft Landing Area), 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 (ERC(L)) and Visual Terminal Chart (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. On any flight likely to be in the vicinity of controlled airspace the pilot should carry any charts necessary to navigate without violating the control zone.

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.

Alternatively all charts, ERSA and the VFG can be purchased on-line through the Airservices Australia web site at:-

www.airservicesaustralia.com/store/default.asp

An excellent publication, strongly recommended for all glider pilots, is the Visual Flight Rules Guide, usually known as the VFG, published by CASA and available online at:

http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_90008

# 2. RADIO PROCEDURES

## 2.1. 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 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.

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.

## 2.2. RESPONSIBLE USE OF RADIO

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

### 2.2.1. Use of one of the designated glider frequencies.

Pilots operating VHF radiotelephone equipment must hold a Flight Radiotelephone Operators License (FROL) or GFA Radiotelephone log book endorsement, (refer CAO 95.4 Section 6.6). This requirement also applies when using gliding frequencies 122.5, 122.7 and 122.9. The training and qualification must be completed and the log book endorsed prior to first solo.

Use of the above three 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-Controlled 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.

### 2.2.2. Use of VHF Frequencies in the Aeronautical Communications Band.

Use of these frequencies requires the pilot to hold a CASA Flight Crew Licence or the equivalent GFA Radiotelephone logbook endorsement. A pilot must obtain such an endorsement prior to solo as stated previously in 2.2.1. Following the guidelines provided in this document, both an online and a practical examination on radio usage and procedures will be conducted before the pilot's logbook is endorsed.

An online examination on airways and radio procedures is to be completed by the applicant as a prerequisite to the practical examination. A practical examination will be carried out by Level 1 or higher rated instructor, who will test the applicant's ability to communicate, annunciate and articulate using the radio (where English is a second language, refer also to MOSP 2, Section 15.3).

Candidates who successfully pass the online and practical examinations 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 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.

### 2.2.3. Procedures and Terminology

#### 2.2.3.1. 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 "umm-ing and ah-ing" on the air.

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

When calling a non-gliding station, for example an Air Traffic Controller or a powered aircraft, prefix your callsign with the word "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.

#### 2.2.3.2. 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 *"Reading you strength...."*<br>One: Your transmissions are unreadable.<br>Two: Your transmissions are readable now and then.<br>Three: Your transmissions are readable with difficulty.<br>Fower: Your transmissions are readable.<br>Fife: 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 Three Fife" and 26,000ft would be broadcast as "Flight Level Two Six Zero". |

### 2.2.4. 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.* | |

### 2.2.5. Obtaining an Airways Clearance

No aircraft is permitted to enter controlled airspace (except Class "E") without a clearance from Air Traffic Control. Glider pilots generally do not get much practice in requesting 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; usually 5 to 10 minutes. 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 reluctant to talk on the radio.

### 2.2.6. 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"*. You must 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 they will do everything possible to help you out.

## 2.3. 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:-

### 2.3.1. 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, 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)

### 2.3.2. 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.

### 2.3.3. 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 Pan situation. If it is directed to you, you must stop transmitting unless you are in distress yourself.

e.g. *“Glider ABC Melbourne Centre Stop Transmitting – Distress Traffic Qantas 521.”*

## 2.4. 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.

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.*

## 2.5. ANTI-COLLISION SYSTEMS AVAILABLE IN AUSTRALIAN AIRSPACE.

### 2.5.1. Secondary Radar Transponders

In some controlled airspace, especially around capital cities but possibly 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 “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 an 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 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.

### 2.5.2. 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.

### 2.5.3. FLARM

FLARM (**FL**ight al**ARM**) 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.**

# 3. ALTIMETRY

## 3.1. 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 hectopascals (HPa) or inches of mercury.

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

## 3.2. 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 based on the reference location on the aerodrome.**

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.**

## 3.3. 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 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.

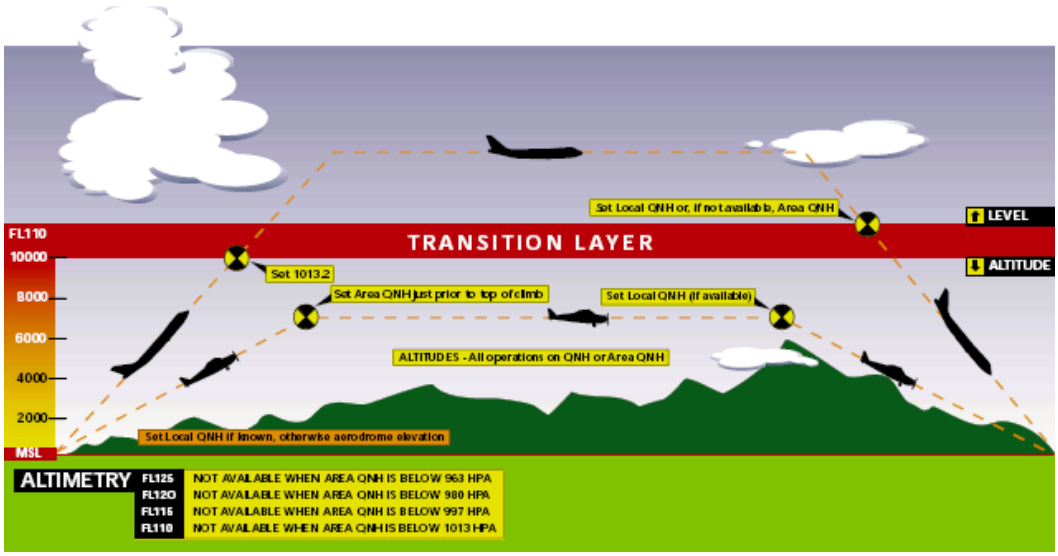
It is essential that glider pilots integrate with the procedures used by other airspace users in order to fit into the total system as smoothly as possible. The system works as follows:-

- 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.

### 3.3.1. 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 and touring motor gliders operating engine-on are however required to adhere to certain procedures when in cruising flight, as follows:-

Above 5,000ft altitude, up to FL235, 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) | 1500<br>3500<br>5500 | 7500<br>9500 | 2500<br>4500<br>6500 | 8500 |
| **Cruising flight levels** (1013 hPa) | *115<br>135<br>155<br>175 | 195<br>215<br>235 | †125<br>145<br>165<br>185 | 205<br>225<br>245 |

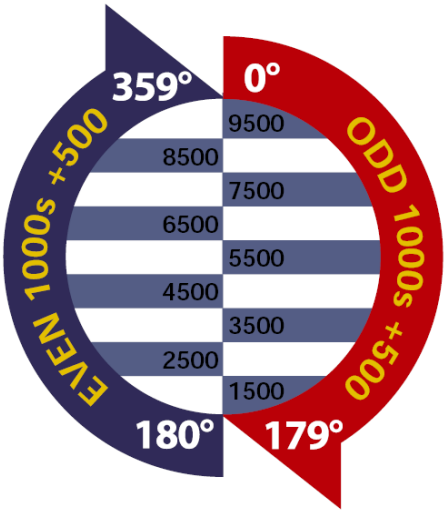
**Notes**

* FL115 is not available for level flight when the Area QNH is less than 997 hPa.

† FL125 is not available for level flight when the Area QNH is less than 963 hPa.

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



# 4. SEARCH AND RESCUE (SAR)

## 4.1. 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.

## 4.2. 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.

### 4.2.1. 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 by one hour after last light or by 2100hrs (9pm) local time (whichever is the earlier).

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. the alert phase.

### 4.2.2. 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 the distress phase.

#### 4.2.3. 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.

### 4.3. 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.

### 4.4. COMMON SAR RADIO CALLSIGNS

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

RESCUE – Rescue Mission

# 5. SURVIVAL TIPS

## 5.1. 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.

## 5.2. 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 ELTs operate on 406 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) and PLB's (Personal Locator Beacon) units, at about half the price of ELTs. They also operate on 406 MHz. 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 and PLB's at about half that price. The above units are registered

with AMSA (Australian Maritime Safety Authority) and if deployed will transmit the distress and also the registered information and identification. 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 34 for further details).
6. Material for making a water still (see page 34) 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.

## 5.3. IN FLIGHT

### 5.3.1. 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.

#### 5.3.2. 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.

### 5.4. AFTER LANDING

#### 5.4.1. 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.

#### 5.4.2. 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.

#### 5.4.3. 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 distress beacon 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. One hour after last light or by 2100hrs (9pm) local time (whichever is the earlier), 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 one hour after last light or by 2100hrs (9pm) local time (whichever is the earlier), 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.

### 5.4.4. 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 |

### 5.4.5. Acknowledgments by an Aircraft

#### 5.4.5.1. In Flight

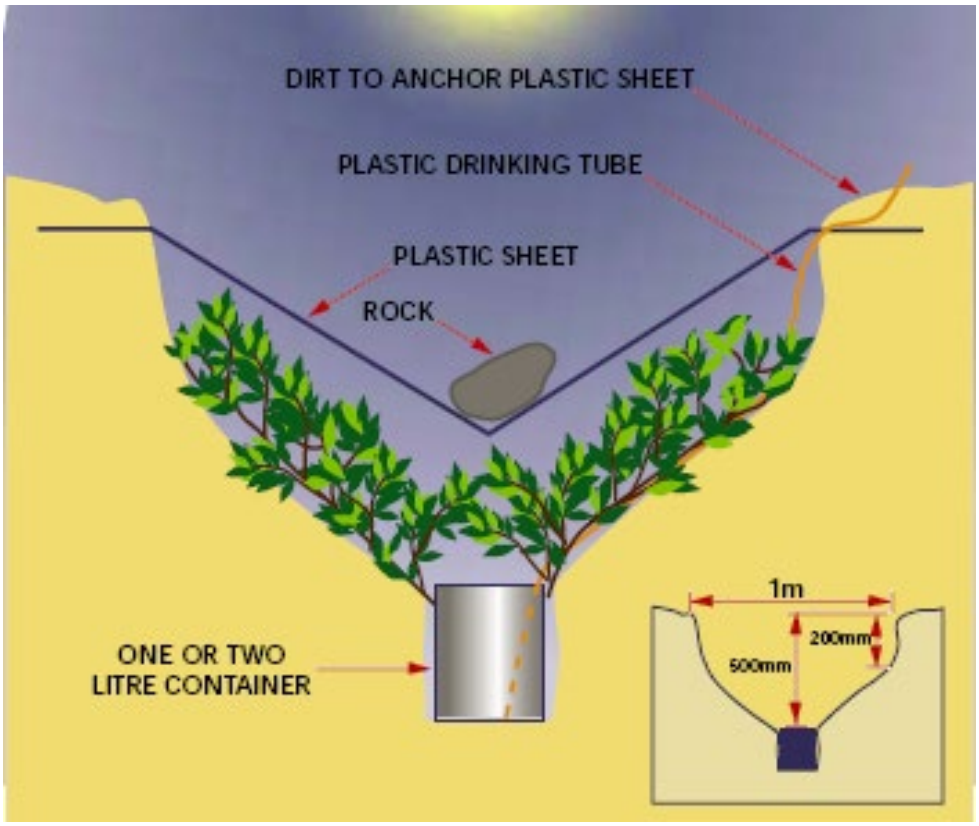
- During the hours of daylight: by rocking the aircraft wings. NOTE: This signal should not be expected on the base and final legs of the approach.
- During the hours of darkness: by flashing on and off twice, the aircraft's landing lights or, if not so equipped, by switching on and off twice, its navigation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

#### 5.4.5.2. 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.

### 5.4.6. 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.

### 5.4.7. 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.

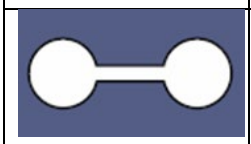
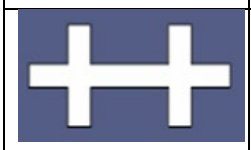
However, it is possible to obtain permission to use mobile phones in flight. To avoid chaos, it is better that such permission be applied for on a club basis, rather than by individuals. The person to address queries to is the Regional Manager of the relevant service provider.

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.

## 6. 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 | 1. Adjacent to windsock.<br>2. On manoeuvring area. | 1. Aerodrome completely unserviceable.<br>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. |