Gliding Australia Training Manual

Pilot Guide

Unit 36

Airspace and Navigation

WHAT THIS UNIT IS ABOUT

To develop the skills and knowledge to operate in uncontrolled airspace, complying with "Rules of the Air" Regulations, Radio procedures, Altimetry, Flight planning, Search and Rescue requirements, as well as basic navigation skills without use of electronic navigation aids.

WHAT ARE THE PRE-REQUISITES FOR THIS UNIT?

- GPC Unit 21 Radio Use and Endorsement
- GPC Unit 23 Rules of the Air
- GPC Unit 35 Flight Preparation

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

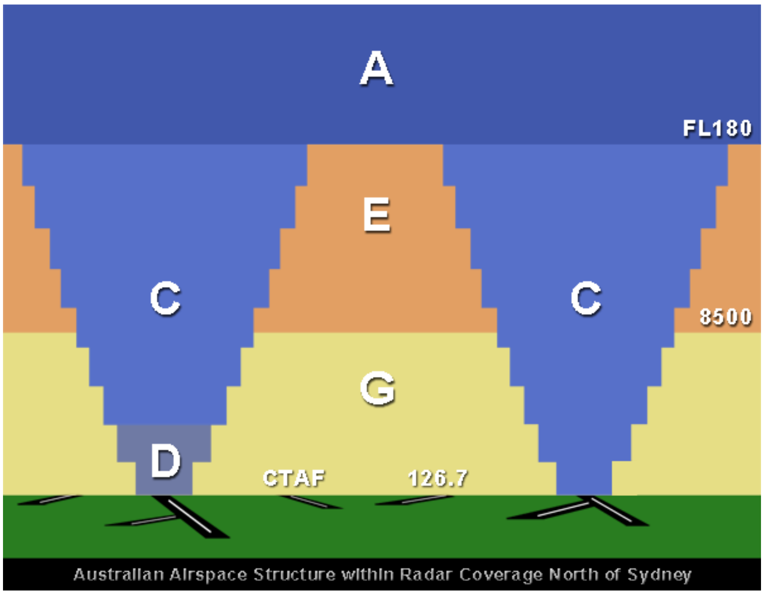
- GPC Unit 38 Meteorology and Flight Planning
- GPC Unit 39 Advanced Soaring Instruments and Flight Computers
- GPC Theory Lesson #11

KEY MESSAGES

- Flight within a broader range of airspace increases exposure to other aircraft types, requiring compliance with rules and procedures designed to keep all forms of aviation safe.
- Pilots must be able to navigate and communicate effectively within Australia's Airspace.
- Pilots must be able to obtain all the prefight information for a planned task and provide notification of their plans.
- Pilots must be able to navigate a planned cross-country flight

PILOT GUIDE FOR THIS UNIT

Australian Airspace



- From your training so far, you would have noticed that a large proportion of your flying has been in G class airspace perhaps with a small proportion in E and for a couple of clubs, operations from D class aerodromes.
- No aircraft is permitted to enter controlled airspace (except Class “E”) without a clearance from Air Traffic Control. If your operation requires you to obtain a clearance from Air Traffic Control in either C or D class airspace then you will need to complete the Touring Motor Glider training which is beyond the scope for this unit.

Prohibited, Restricted and Danger areas

- The following link provides detail of Prohibited, Restricted and Danger areas and pilot responsibilities in entering this airspace. https://www.casa.gov.au/search-centre/visual-flight-rules-guide - Prohibited, restricted and danger areas

Visual Charts

- It’s important to understand your rights and privileges as a pilot. We are using the same airspace and sometimes landing at the same aerodromes as aeroplanes carrying passengers. None of us want to unwittingly fly into Controlled, Restricted or Danger areas without the appropriate clearance or knowledge.
- This means learning navigation by more traditional methods is essential. If you are flying anywhere near controlled airspace, you must make sure that your paper charts are up to date and that you’ve been properly briefed on NOTAMS and any recent changes to airspace.

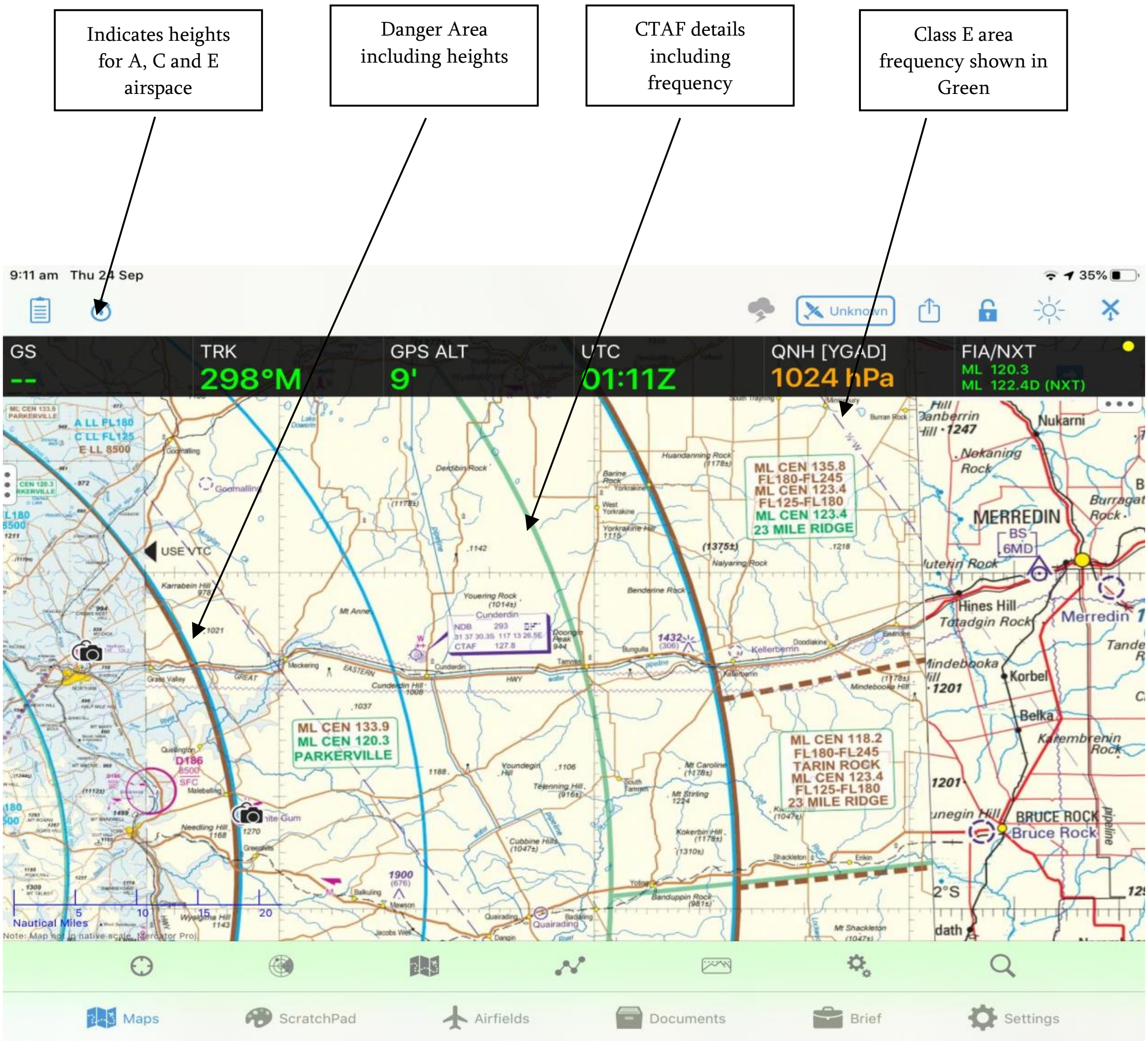
The charts you will need are:

- **World Aeronautical Charts (WACs)** (scale 1:1,000,000) are designed for pre-flight planning and pilotage. They are constructed on Lambert’s Conformal Conic Projection. Australian coverage is shown on the front of each chart.

- **Visual Navigation Charts (VNCs)** (scale 1:500,000) are designed for VFR operations. They contain an aeronautical overlay of controlled airspace over a topographical base and contain some radio communication and other navigational data appropriate for visual navigation. Map coverage is shown on the front of each map.
- **Visual Terminal Charts (VTCs)** (scale 1:250,000) are designed for visual operations near terminal areas. They contain some topographical detail and appropriate airspace, radio communication and navigation aid information. VTCs are intended for use up to and including FL180.
- WAC or World Aeronautical Charts, which are very useful for gliding can be bought, downloaded and printed out, remembering always to check currency before using any chart.
- WAC charts look a little like a conventional road map in that they show larger towns, roads, aerodromes, rivers and contours but importantly, they don't show airspace or many of the smaller strips used by gliders, sports and General Aviation (GA) aircraft.
- WAC charts are available in electronic (pdf) - ideal for self-printing, and paper format but at this moment, they all must be purchased. These charts have a reasonably long-life span and at the time of writing, most of the downloadable charts were published at least two years earlier.

Printing Charts

- If you download charts in digital format, you can print sections to the size you need. All charts get out of date due to changes in airspace etc. and need to be renewed before they expire, but the cost of printing your own digital maps should be well below the cost of buying the paper version.
- If digital maps is the way you decide to go, tough waterproof plastic paper is available which is perfect for charts. If you print on ordinary paper, you run the risk of having your maps decompose in flight when you have a leak from a water bottle (and you will have a leak!)
- Electronic Flight Bag apps have printing features and as long as the app and databases are kept up to date, you can be sure that the printouts are current (at least at the moment you press print). The printout is great for things like runway diagrams but it doesn't seem to be great for printing large areas of WAC or VNC because the print resolution is only adequate and no substitute for the higher resolution downloaded charts.
- Visual Navigation Charts (VNC) are another useful chart for VFR and glider flights. VNC are made to a scale of 1:500,000 (2 millimetres on the chart to one kilometre on the ground).
- Unlike WAC, VNC shows airspace. Because of that, they're updated much more frequently than WAC. VNC can either be downloaded in pdf format free from the Airservices Australia website's Aeronautical Information Package (AIP) area or a print version can be bought through the same website.
- At first glance, VNC are ideal for gliding however there are only 14 charts that cover Adelaide, Tasmania, Darwin, Perth and a strip of the eastern seaboard from Cairns to Melbourne. They don't cover a large amount of the inland where most gliding takes place.
- There are other charts which could be used when planning cross-country flights like En- Route Charts (ERC) and Visual Terminal Charts. (VTC). Both these chart types are updated frequently and can be downloaded from the Airservices Australia website's Aeronautical Information Package area.
- Airspace is shown on the Visual Navigation Chart (VNC) or Visual Terminal Chart (VTC).



For additional detail see these documents:

- ☐ https://www.casa.gov.au/search-centre/visual-flight-rules-guide
- ☐ https://www.casa.gov.au/operations-safety-and-travel/airspace/airspace-regulation/radio-procedures-non-controlled-airspace
- ☐ https://www.casa.gov.au/operations-vicinity-non-controlled-aerodromes

Aerodrome and Other information

- ERSA (En-Route Supplement Australia) https://www.airservicesaustralia.com/aip/aip.asp

  Your Trainer will demonstrate information available in ERSA.

Radio procedures in uncontrolled airspace

- Refer https://www.casa.gov.au/operations-safety-and-travel/airspace/airspace-regulation/radio-procedures-non-controlled-airspace
- Focus on terminology to be used in radio transmission and information to be provided in a CTAF.
- Identify the relevant radio frequencies (area frequency in class E and CTAF frequencies).
- Note the need to monitor the Area frequency in E class airspace. With a group of gliders, one pilot can monitor the area frequency on behalf of the group.
- Your trainer will show you how to access ATIS (Automatic Terminal Information Service), and the information that it provides. If available, you should demonstrate in flight. An explanation of ATIS is in the VRFG and frequencies are listed in ERSA aerodromes.

Anti-Collision Systems Available in Australian Airspace

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 can provide 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.

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.
- However, some gliders are fitted with transponders and ADS-B equipment which does makes it easier for ATC to identify you. Refer to the VFRG.
- https://www.casa.gov.au/sites/default/files/2021-08/advisory-circular-91-23-ads-b-enhancing-situational-awareness.pdf

FLARM

- FLARM (FLight alARM) 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.

Altimetry

- 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).

Altimeter Settings

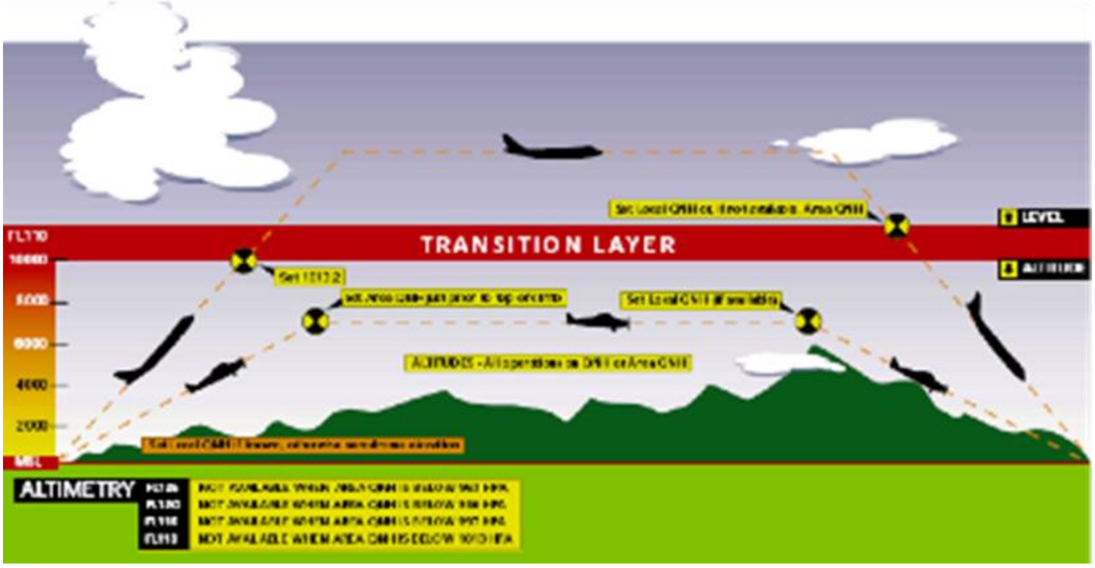
- To be of any use, the altimeter must have a reference pressure from which to measure. There is a sub-scale on the dial of the altimeter on which to set this reference pressure. Once it is set, the instrument will measure with reasonable accuracy the vertical distance above that reference. This is measured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

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 knowledge of the location. 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 to fit into the total system as smoothly as possible. The system works as follows:
    - All aircraft (including gliders) operating below 10,000ft will be on the QNH (mean sea level) altimeter setting. This may be an aerodrome QNH if the aircraft, or setting the elevation of the airfield prior to take-off, 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.



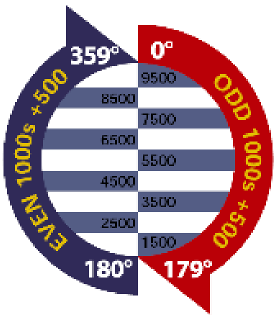
- To re-cap, aircraft (including gliders) operating below the transition altitude use the QNH altimeter setting and refer to their vertical positions as altitudes. Aircraft (including gliders) operating above the transition level use the standard pressure setting (1013.2 hPa) and refer to their vertical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

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) 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 Degrees through East to 179 Degrees	From 180 Degrees through West to 359 Degrees
Cruising altitudes	1,500	2,500

(area QNH)	3,500 5,500 7,500 9,500	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 are 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.

Basic Navigation

- If you are going to fly cross-country you need to learn some navigation skills.
- GPS has completely changed the way we fly. You can now glance at a single display and read your latitude and longitude, speed over the ground, track, height above the ground, distance to go, distance made good and more.
- But you can still be lost. And of course, the GPS may stop working because the battery runs flat or there's a fault in the electronics. GPS may have changed everything but it hasn't rewritten the rules about basic navigation. In fact, GPS has made learning the basics even more important.
- On most days when we fly, either the sun will be visible or we'll know where it is. Though the sun moves around a lot, from minute to minute, your angle to the sun is one of the best clues as to which way you are heading.

- A lot of the terrain we fly over in Australia is flat but in the same way that we look at the ground for clues as to where thermals might trigger, we should look for significant landmarks to aid our navigation. Like using a bread-crumb trail, we can fly from landmark to landmark, always remembering that when we return, the sun will be lower and we'll be approaching from the opposite side and the landmarks may look quite different.

- By watching our drift across the ground when circling, the pattern of wind on water, drifting smoke or the shadows of clouds moving across the landscape, we can get clues as to the wind direction. These elements help us build a mental picture of where we are as we fly. If we rely only on GPS and forget to note all these details, we'll get lost more easily!
- What this means is that we should all fly with current charts and use our GPS, glide computers and EFBs to update our position on the chart. We should not rely on unapproved electronic navigation aids as primary in-flight tools.

Flying from A to B

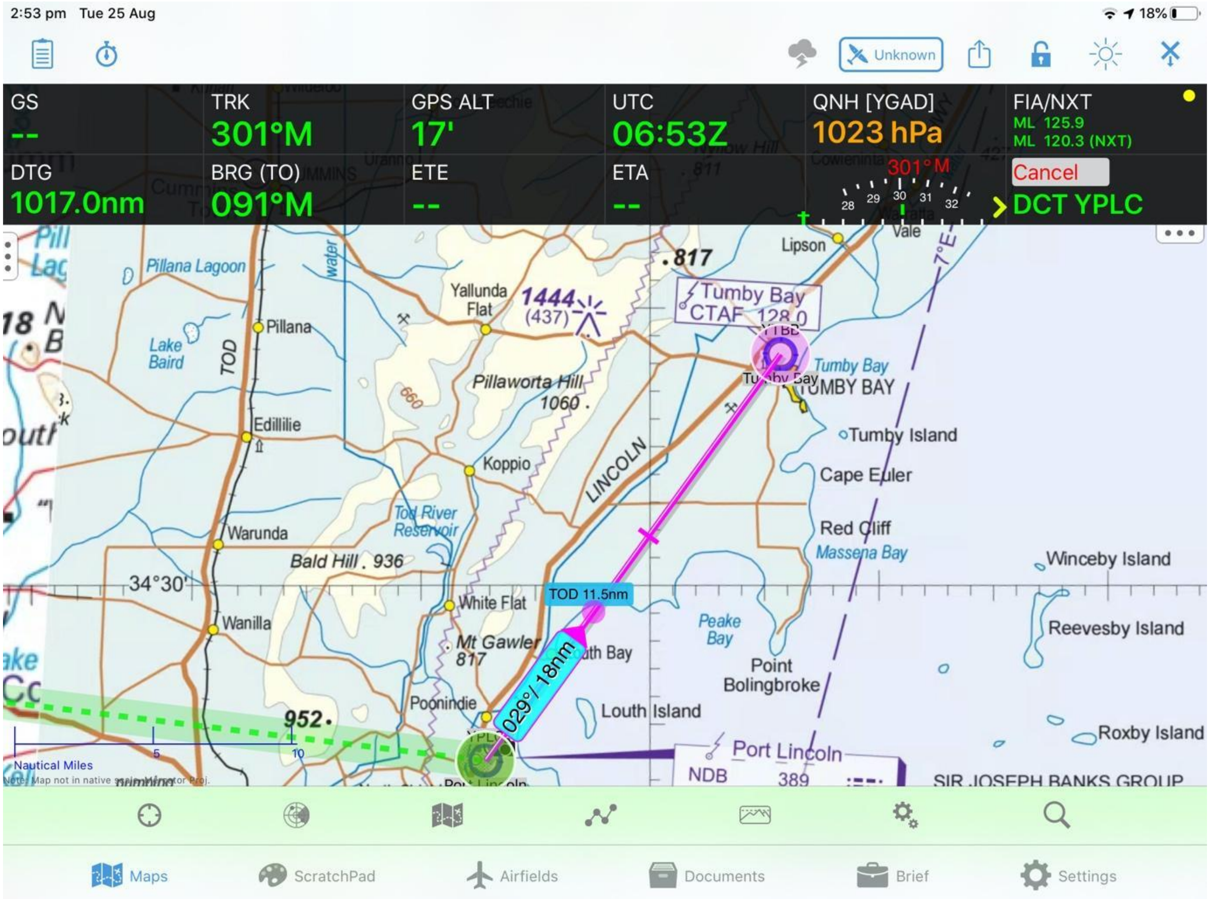
- At some time, you're going to want to fly to somewhere far enough away that you can't see it. You can get the distance and bearing from a chart or by entering its waypoint on a GPS or glide computer.
- Many experienced navigators draw their course on a map, either in pencil or with a removable felt tip on a plastic laminated map before launching.

How to measure distance and track on a WAC chart

Distance

- As each small division along the line of longitude (lines going north south) is 1 NM it's quite easy to determine the distance between two points. A scale of 1:1,000,000 on a WAC Chart means that each mm measured on the map is 1km distance. Your Trainer will demonstrate this to you.

Track



- Above we see an example of a track drawn between two points. To measure the track, we need a protractor which is lined up with the line of longitude to give us 029 degrees (True). Your Trainer will show you.
- If we look just to the right of our track, we see a dotted line and at the top is says 7E.
- This is the compass variation in this area indicating the difference from True North to Magnetic North. As it's indicating 7 degrees (E) East we have to subtract this figure from our measured track of 029 giving us 022 (Magnetic) to steer on our gliders compass.
- If you fly this heading using your compass and if there's zero wind (which is hardly ever) and you fly accurately, your glider's Track will be the same as the line on the chart.
- Since there's almost always some wind, and you'll drift while cruising and circling, your Heading, or the direction in which the glider is pointing is hardly ever the bearing you read off the chart. You will need to offset your heading to compensate for the drift due to the wind and any excursions when thermalling.
- Steering to a compass heading is quite difficult, so pick a large distant landmark on your chart that is close to the right bearing shown on the chart and keep the glider tracking more or less at that until you are close enough to pick another landmark further away.

- It doesn't matter if the point you pick is not exactly on the right track. Most pilots can't fly that accurately and you'll almost certainly have to correct for drift due to the wind. At least you will be looking out of the window rather than staring into the cockpit.
- As you get close to one chosen landmark, pick another large landmark further along your course and track for that.
- When flying gliders cross-country, we have a few differences compared to powered aircraft. We're going to spend a significant percentage of our time circling and if there's any wind at all, we will drift downwind with the thermal when circling.
- Gliders are quite capable of flying cross country at well over 100 kph average speed. Combine that with the fact that we generally fly from thermal to thermal rather than in straight lines, and you can see that navigating in a glider is an interesting challenge.
- In-flight navigation is done with a combination of instruments like compass, paper charts, GPS and our mental map, most of which needs to be prepared in advance.
- Unlike many other countries with active aviation, almost all Australia's population centres are close to the coast and the inland areas, though great for gliding, are not that interesting to most aviation cartographers.
- What this means is that for flights under Visual Flight Rules (VFR) the detailed aviation charts are coastal. If you want VFR charts of the inland, they're probably going to be WAC or VNC charts.

Search and Rescue. (SAR)

- 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.

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.
- Successful SAR assumes that someone knows where you were heading and is expecting you to return. If you don't tell anyone then no one will come looking. Not a great position to be in. They also need to know where you are expecting to fly to, so if you say that you are heading towards Town A but then change your mind and head in the opposite direction, SAR will never find you. So make sure you let people know when you change your plans.

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 or your crew 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.

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.

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

- 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.

Survival Tips

- Flying in remote areas carries a number of possible risks, For further details review the survival tips in included in ERSA and in the ***GFA Airways and Radio Procedures Manual***.
- 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 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.

Before Flight

- Sensible precautions which can be taken before flight include the following:-
- 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.
- 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. 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.
- 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.
- An Emergency Locator Transmitter (ELT) or EPIRB or ELT is a sensible piece of equipment to carry, if venturing into remote areas.
- Even if the glider is equipped with a panel-mounted radio, an additional hand-held radio is an advantage for use in remote areas.
- White emergency strobe lights are very effective in guiding a retrieve crew to the exact location of the glider after dark.

In Flight

- Keeping in Touch.
- 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. 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.

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.

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.
- 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.

FLIGHT EXERCISES FOR THIS UNIT

- A mixture of cross-country flights to demonstrate use of maps and charts, identification of airspace and radio frequencies, flight within a CTAF and compliance with procedures. This can be combined with assessment for other cross country related units.

THINGS YOU MIGHT HAVE DIFFICULTY WITH

- Navigation is difficult under some conditions such as poor visibility and similar terrain, compounded by wind effects such as strong cross winds.
- Complex airspace and radio procedures can lead to errors unless carefully managed. Possible errors include airspace infringements, incorrect use of radio and incorrect radio Frequencies

HOW DO YOU DEMONSTRATE COMPETENCE?

- By demonstrating knowledge of Airspace classifications, and ATC clearances, SAR procedures and Basic navigation.

RESOURCES & REFERENCES

- GPC Theory Lessons #7 and #11
- Reviewing the various links contained in this Pilot Guide – ERSA, VFRG, various CASA documents
- https://www.airservicesaustralia.com/wp-content/uploads/NWS-User-Guide.pdf

SELF-CHECK QUESTIONS

- Review a WAC and VNC for your local flying area, up to 200km radius. Identify P, R, D areas, and areas with E,C,A airspace. For each area, identify the heights that you can fly in these areas.