# Gliding Australia Training Manual

## TRAINER GUIDE

GLIDING AUSTRALIA

Unit 36

Airspace and Navigation

# Unit 36 - Airspace and Navigation

## AIM

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.

## PRE-REQUISITE UNITS

- 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

## COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

| ELEMENT | PERFORMANCE STANDARD |
|---|---|
| 1. **Airspace Classification** | • **Identify:**<br>○ A, C, D, E and G airspace on charts and explain limitations on their use.<br>○ Prohibited, Restricted and Danger areas on charts and explain rules re their use.<br>○ Airspace categories encountered on a simulated flight using VNC and other relevant charts. |
| 2. **Radio procedures in uncontrolled Airspace** | • **Demonstrate:**<br>○ Required radio monitoring and radio calls within E class airspace and CTAF.<br>○ Compliance with CTAF procedures.<br>○ Obtaining and applying information from ATIS.<br>• **Explain:**<br>○ Operation and application of ADS-B and Transponders<br>○ Compatibility between Flarm and ADS-B/transponder |
| 3. **Altimetry** | • **Demonstrate:**<br>○ Altimeter settings to be used above and below 10,000 feet.<br>• **Describe:**<br>○ The use of cruising levels that would apply to a powered aircraft and Touring Motor Gliders |

| | |
|---|---|
| 4. **Search and Rescue** | • **Describe:**<br>○ Knowledge of SAR phases and pilot responsibilities.<br>○ Knowledge of local club procedures regarding SAR.<br>○ How to use an emergency beacon |
| 5. **Basic Navigation** | • **Demonstrate (pre-flight):**<br>○ Obtain and interpret NOTAMs and determine if the NOTAMs will impact on the flight.<br>○ Discuss conversion of UTC time/date to local time/date.<br>○ Draw a proposed flight path onto WAC and VNC/VTC.<br>○ Identify key landmarks that should assist with navigation decisions.<br>○ Identify any areas of unsuitable terrain given expected weather conditions and amend track accordingly.<br>○ Measure distances (km) and track (true and magnetic) for each leg.<br>• **Demonstrate (in flight):**<br>○ Recognise major landmarks and identify current location on map.<br>○ Adjust track and heading to account for wind and deviation to thermal sources.<br>○ Navigate by map and compass and describe the limitation of the compass when turning. |

## 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 a cross country flight

## LESSON PLANNING AND CONDUCT

### Briefing

The Trainer is expected to use the theory course PowerPoint and the Pilot Guide to assist with delivering this unit.

#### Airspace Classification

- Trainer to Brief the Australian airspace system (including ACDEG, Prohibited, Restricted and Danger areas) explaining where glider pilots can fly and the differing rules that apply. Refer to VFRG, CASA airspace classifications.

- Explain the difference between controlled and uncontrolled airspace.
- Refer to Pilot Guide for diagrams and detail.
- It is a pilot responsibility to comply with airspace restrictions and limitations, monitor radio relevant to airspace, comply with varying rules of the air.

### Use of charts and documents for flight planning, airspace requirements, and radio frequencies

- The Trainer should introduce the various charts and documents listed here, and their applicability. Have examples available.
- VNC/VTC (Visual Navigation Charts / Visual Terminal charts).
    - These are the best source of information for glider pilots for airspace and frequencies. These charts are updated in May and November each year and pilots must fly with current charts. VNC/VTC charts will also show if airspace is permanent or activated by Notam.
- ERSA (En-Route Supplement Australia) https://www.airservicesaustralia.com/aip/aip.asp
    - Trainer to demonstrate information available in ERSA.
- Note: There are software providers that provide all the current information (Maps/VNC/VTC) which includes real time activation of restricted airspace for your IPAD or tablet etc. e.g. Oz Runways or AvPlan - If available, these can be used in addition to the paper maps.

### Prohibited, Restricted and Danger areas classification.

- Discuss with Student the P, R, and D areas within the scope of common flights from your area.
- Details are shown in ERSA or through NOTAMs.

### Radio procedures in uncontrolled airspace

- Ask student to review a drawn task and identify airspace that may impact the flight. Draw a task that encompasses G, E and PRD areas; and includes CTAF airfields. Ask them to 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.
- 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.
- Explain how to access ATIS, and the information that it provides. If available demonstrate on the ground or in flight.

### ADS-B and Transponders

- Some gliders are ADS-B and Transponder equipped, and a number of cheap, low power ADSB equipment is becoming available. Describe how these work, and how they assist with alerted see and avoid with powered traffic.
- Note that Powerflarm will receive ADS-B input, but other Flarms will not
- Ask the student to read the following advisory circular and refer to the relevant manuals when they are going to operate with this equipment.

- https://www.casa.gov.au/sites/default/files/2021-08/advisory-circular-91-23-ads-b-enhancing-situational-awareness.pdf
- Explain that aircraft operated to Visual Flight Rules (VFR), that a Mode A/C or Mode S transponder is required for operations in Class C airspace, Class E airspace, and for flight above 10 000 ft AMSL in Class G airspace. The exception to this requirement is any aircraft that does not have an engine or sufficient engine-driven electrical power generation capacity to power a Mode S transponder (such as a glider). The reference document is Civil Aviation Order 20.18.
- Refer to the pilot guide for additional detail.

### Altimetry

- Transition layer, altitude and level. Refer to the diagram in the Pilot Guide.
- The system of altimetry used in Australia makes use of a transition layer between the transition altitude (which is always 10,000 ft) and the transition level which is typically FL110 in order to separate aircraft that are using QNH from those using Standard Pressure 1013.2 hPa as a pressure datum.
- Touring motor gliders need to be aware of the cruising levels and comply with the requirements. (see TMG Authorisation).
- Gliders that climb above 10,000 feet and stay there are required to change their altimeter to the standard Pressure 1013.2 hPa and Flight levels when communicating with other traffic to support alerted see and avoid.
- For all operations at or below the transition altitude, the altimeter reference will be the forecast area QNH if the local QNH is not known.
- The positions to change between QNH and 1013.2 hPa shall always be:
    - on climb - in the Standard Pressure Region after passing 10,000 ft and prior to levelling off
    - on descent - prior to entering the Transition Layer and is shown in the diagram in the Pilot Guide.
- QNH is available from a reporting station, the ATIS, TAF, ARFOR, AERIS,or from ATS.
- Pilots may obtain local QNH by setting the altimeter to aerodrome elevation before take-off.

## SEARCH AND RESCUE

Explain the purpose of the SAR system and emphasise pilot responsibility:

- Pilots are responsible for their own SAR. Do not assume that someone else will do all the work.
- Pilot should fly with maps that cover the entire route.
- Pilot should wear a watch (Visual Flight Rules).
- Planned routes must take into account potential adverse weather and the problems of rising ground in deteriorating meteorological conditions.
- Always tell someone what you are going and leave a written note of your plan with your arranged SAR person (your crew?).
- Overflying jets will monitor 121.5 and if you have landed in a remote location, you can often pass a message to your base by using this frequency.

- Other things which you can do to help yourself and Australian Maritime Search and Rescue (AMSA) in emergency situations are:
    - Remain near your glider after exiting. It is easier to spot a glider than a person.
    - Refer to 'Hints for survival' on page 5.19 in ERSA EMERG and in the GFA Airways and Radio Procedures manual, sections 5 and 6.
- Always carry water and take extra supplies if you are flying over hot arid areas and carry a 'survival food kit' of high calorie food items packed in a small waterproof container.
- Explain the benefits and use of survival radios/beacons.

**Distress Beacons**

- 406 MHz beacons are either GPS or non-GPS capable. GPS 406 MHz beacons provide an encoded (GPS) location that enables the COSPAS-SARSAT satellite system to calculate the beacon's location much faster than for that of a non-GPS 406 MHz beacon.
- Emergency locator transmitter (ELT)—for use in aircraft
- Personal locator beacon (PLB)
- Emergency position indicating radio beacons (EPIRB)
- See CASA's Visual Flight Rules Guide section 5 for further information on SAR

## BASIC NAVIGATION PRINCIPLES

Brief Navigation Principles to cover the following topics.

- Demonstrate how to access NAIPS, identify NOTAMs and interpret the Notam.
- Introduce charts for the local area (VNC, VTC, WAC).
- Brief key map features including ground features, airspace limits and radio frequencies.
- Identify large features that will help you stay on track to your goal and refine to smaller features if required.
- Identify areas of un-landable terrain, adjust the track accordingly.
- Reinforce the need to follow thermal sources so the flight is unlikely to comprise straight lines.
- Ask the student to measure a distance on a chart and calculate a track between two points. Discuss the difference between true north and magnetic north and how to apply variation.
- Explain the use and reason for deviation cards on powered sailplanes.
- Describe how wind will affect the required track between two points and how to counter drift.
- Compare the charts to a satellite view using something like Google Maps. Whilst the charts show roads, rivers and terrain, they do not show forests. It can be a good idea to mark the extent of large forests on the chart. Features that run along the desired track are good for following. Features that run across the track are good for measuring progress.
- Discuss limitations of the compass when turning.
- Ask the student pilot to prepare a task that takes these into account. If possible, you should fly this task.

## FLIGHT EXERCISES

Observe the student planning a flight outside the local flying area, checking relevant information sources including charts, NOTAMs, airspace information, and weather information.

- Conduct the flight with emphasis on navigation relative to ground features, airspace boundaries (if applicable), and correct use of radio.
- Navigate map to ground
- Monitor progress on track – how fast are they flying, so where do they expect to be?

This flight can be made in conjunction with GPC Unit 38 Meteorology and Flight Planning (trainer to evaluate competence).

### NOTES FOR THE TRAINER

- Whilst the local area may have no airspace restrictions, a pilot with a GPC is expected to be able to fly from any site without needing additional training except for specific local procedures (if any). This means understanding the types of airspace gliders can use and how they are marked as well as understanding airspace that is activated or deactivated by NOTAM. Plan flights from other areas which do have a greater variety of terrain and airspace.
- Navigation without use of electronic aids is an essential basic skill. It is recommended that all students conduct their early cross-country flights with reference to maps with electronic aids as a secondary source of information.
- Whilst radio use will have been trained pre-solo, the student may not have used it to make CTAF transit calls, inbound calls, or air to air communication in class E airspace.
- Independent Operators are required to manage their own Search and Rescue responsibilities

## THREAT AND ERROR MANAGEMENT

- Navigation is difficult under some conditions such as poor visibility and homogeneous terrain, compounded by wind effects such as strong cross winds. Give exposure to a range of conditions but do not create a situation that puts the student under duress.
- Challenge the student to decide when the conditions are too difficult to ensure a safe flight and cancel accordingly.
- A thorough understanding of map features and effective preparation will enable the student to more easily identify features on the ground.
- Explain the benefit of monitoring progress on track so as to enable realistic estimates of current location based on time since passing a previously identified location.
- Electronic instruments can fail so emphasise the need for an alternate means of navigation, and the skills to do this.
- Complex airspace and radio procedures are a threat that will lead to errors unless carefully managed. Possible errors include airspace infringements, incorrect use of radio and incorrect radio frequencies.
- All pilots must have a thorough understanding of airspace and associated regulations, even if these procedures are simple at their home airfield – this can only be achieved through training. Similarly, radio procedures in the vicinity of aerodromes require training and practice.
- Interpreting NOTAMs is error-prone due to the complex format. In addition, errors in converting from UTC to local time are common. Avoiding these errors comes down to

training, practice and diligence. Encourage pilots to check their understanding of NOTAMs with experienced pilots.

## TRAINING MATERIALS AND REFERENCES

- Various links to CASA documents within this unit
- ERSA
- VFRG
- NOTAM user guide - https://www.airservicesaustralia.com/wp-content/uploads/NWS-User-Guide.pdf
- Maps, rulers,
- GPC Theory Lesson #7 and #11