Gliding Australia Training Manual

Trainer Guides

Section B

Units: 27 - 44 (GPC)

Gliding Australia Training Manual

Trainer Guide

Unit 27

Advanced Aerotowing

Unit 27 - Advanced Aerotowing

AIM

To develop and demonstrate the skills and knowledge required to conduct Advanced Aerotow techniques.

PRE-REQUISITE UNITS

- GPC Unit 13A Launch and Release Aerotow;
- GPC Unit 14A Take-off Aerotow;
- GPC Unit 19 Crosswind take-off and Landing;
- GPC Unit 20A Launch emergencies.

COMPLEMENTARY UNITS

There are no complementary units to this GPC Unit.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Changing station on tow	• **Describe** ○ The correct high and low tow position. • **Demonstrate** ○ Advising the tow pilot prior to commencing such manoeuvres. ○ Transition from low tow to high tow. ○ Transition from high tow to low tow. ○ Correct pace to avoid getting caught in the slipstream and to avoid kiting manoeuvres.
2. Boxing the slipstream	• **Describe:** ○ The steps involved in boxing the slipstream. • **Demonstrate:** ○ The correct pace to complete the manoeuvre. ○ The five steps in a clear & distinct manner. ○ That airspeed is maintained through the manoeuvre.
3. Cruising and descending on tow (B Certificate training)	• **Demonstrate:** ○ Level flight on tow in both high and low tow position. ○ Descent on tow, with use of airbrake where required. ○ That airspeed is monitored and adjusted. ○ That bows in the tow rope are corrected. ○ Appropriate lookout. ○ Maintaining situational awareness to avoid unsafe terrain. ○ Knowledge of last light and weather issues that may impact the flight.

KEY MESSAGES

- These exercises are very useful in confidence building and co-ordination, enabling students to recover from unexpected positions, understanding the forces at work on aerotow in other than a launching situation.
- The tug pilot should be briefed prior to the tow on any such manoeuvres and any specific requirements throughout the exercise.
- Getting out of station is quite possible in each of these manoeuvres so a good level of aircraft control is required prior to introducing these exercises.
- If sight of the tug is lost at any time during the exercises, the glider must release immediately.

LESSON PLANNING AND CONDUCT

Briefing

Changing station on tow

All flight exercises in this unit will be demonstrated by the instructor followed by student practice under close instructor supervision to prevent towplane upset.

In any exercise involving deliberate station-changing on tow, the tug pilot should be briefed on any such manoeuvres and any requirement to maintain heading throughout the exercise prior to the tow. Also advise the tow pilot by radio prior to commencing the manoeuvre.

- A suggested phraseology is: “Tango Uniform Golf, Glider Xray Yankee Zulu boxing the slipstream”.
- Ensure you get an acknowledgement from the tug pilot.

GPC Unit 13A is to be revised, during which the student is to demonstrate:

- Both high and low tow, and the correct way to transition between the two.
- The pace to move through the slipstream without “getting stuck”;
- How to level out above the slipstream;
- The normal relative position of the towplane when in High Tow.

When the exercise is completed and the tug can again turn, call “Tango Uniform Golf, Glider Xray Yankee Zulu exercise completed”.

It is imperative that the student is competent with the correct high and low position as described above prior to undertaking the Boxing the Slipstream exercise.

Boxing the slipstream

This is a very useful exercise in confidence building and co-ordination, enabling students to recover from unexpected positions.

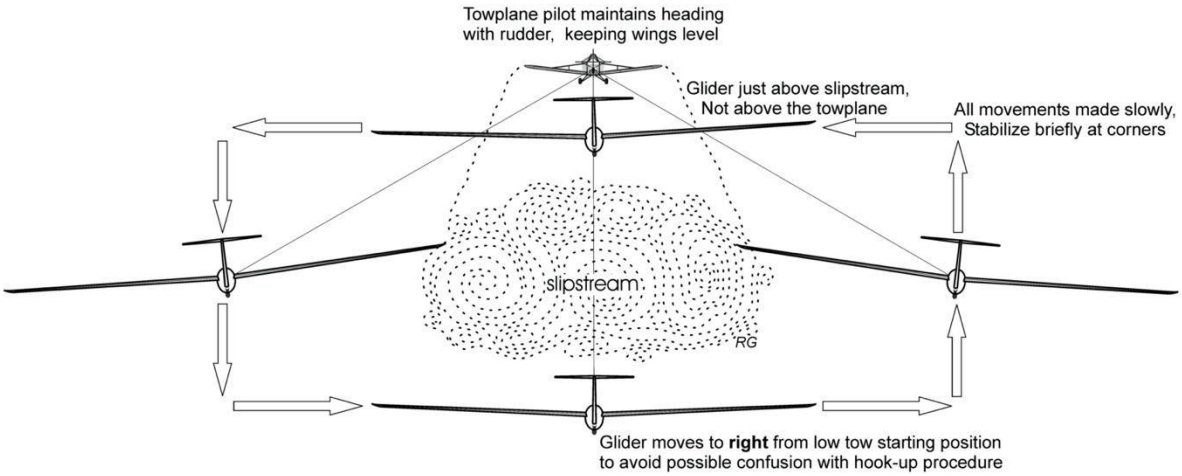
If possible, first attempts at this exercise are done in smooth conditions at a slow tempo.

The Instructor will demonstrate the procedure, with emphasis on pace of the different legs of the box, and smooth use of controls. Explain that the exercise is commenced by going RIGHT first so as not to confuse with the hookup procedure.

Make gentle control inputs to prevent overcontrolling. Use rudder and aileron to bank the glider and move to each side so that the glider's nose is slightly outside of the towplane's wingtip. Hold just enough bank to stabilise in each corner of the box for a couple of seconds. When traversing from the top right to top left corner, initially reduce the amount of right bank to drift into the centre and don't reverse to left bank until almost behind the towplane. Maintain the towplane's wheels on the horizon from the top right to top left corners.

If the glider moves too quickly into the centre, a bow may develop in the rope. As soon as a bow starts to form, increase the pressure on the towrope by increasing the bank slightly away from the towplane and slow the rate of movement into the centre. If the bow in the rope tightens too quickly, the instructor must be ready to release the towrope just before the rope pulls tight to avoid a tug upset or broken weak link.

Student practicing will receive assistance from the Instructor if required.



Cruising on tow

On long retrieves or positioning tows, low tow is easier to maintain, especially in turbulent conditions.

In smooth conditions, high tow has the advantage of the glider pilot being able to see more of the ground ahead for situation awareness. Also if the glider has a belly release, it lessens the rope rubbing on the nose.

It is important to know what the maximum aerotow speed of the glider is from the Aircraft Flight Manual and cockpit placards.

The Tug Pilot must be briefed on:

- The glider's maximum aerotow speed of the glider; and
- The sequence of the flight exercises to be carried out.

In level flight, with the tug/glider combination not climbing, e.g. cross-country ferry flights, the feel of the glider is quite different, as follows:

- The trim of the glider is considerably affected - the trim control will almost certainly need to be reset;
- Slack will develop in the rope very easily;
- Airbrakes may be cracked and used to help keep the rope tight, or the glider can be flown in the tug slipstream - this creates quite a lot of extra drag.

When releasing from tow in level flight, there must be no delay in making the right turn, otherwise the rope may get quite close to the glider.

This is true whether releasing from the high tow or the low tow position.

The slipstream may be in a slightly different position compared to where it usually is. However, as usual, low-tow is still just below the slipstream and high-tow just above.

Descending on Tow

Descending on tow is:

- Safer in low tow, less chance of losing sight of the tug and causing a tug upset.
- More likely to result in a slack rope, in particular if the tow pilot reduces power too quickly;
    - Use of airbrake and/or yaw is likely to be required.
    - This may be the case when descending below airspace steps or below cloud ahead.

Radio communication with the tow pilot is typically required.

Lookout

Emphasise to look ahead at the tow plane but also search for possible conflicting traffic.

The glider pilot will typically have better visibility than from the tow plane.

Scan ahead, above and to each side on a regular cycle.

FLIGHT EXERCISES

Changing station on Tow

Brief the Tug Pilot prior to take-off and advise by radio prior to commencing the manoeuvre.

In the revision of GPC Unit 13A, the student must demonstrate:

- The correct way to transition between the High and Low tow;
- The pace to move through the slipstream without “getting stuck”;
- Levelling out above the slipstream;
- The normal relative position of the towplane when in High Tow.

It is imperative that the student can demonstrate the correct high and low position as described above prior to undertaking the Boxing the Slipstream exercise.

Boxing the slipstream

Ensure that the student is competent in performing the high and low tow position as a prerequisite to the exercise. The high tow/low tow flying skills are building blocks for this exercise.

Brief the Tug Pilot prior to take-off and advise by radio prior to commencing the manoeuvre.

- A suggested phraseology is: ‘Tango Uniform Golf, Glider Xray Yankee Zulu boxing the slipstream’.
- Ensure you get an acknowledgement from the tug pilot.

Instructor demonstrates the procedure, with emphasis on pace of the different legs of the box, and smooth use of controls.

- It is strongly recommended that smooth conditions are picked for student first attempts at these manoeuvres and that they are done at a slow tempo.
- Handover/Takeover for student practice.

When the exercise is completed and the tug can again turn, call 'Tango Uniform Golf, Glider Xray Yankee Zulu boxing the slipstream exercise completed'.

Flying level on Tow

Brief the Tug Pilot prior to take-off to level off at a set altitude plus any other proposed sequence.

The Instructor demonstrates the configuration with the tug/glider combination not climbing.

Emphasise that the feel of the glider is quite different:

- The trim of the glider is considerably affected - the trim control will almost certainly need to be reset;
- Slack will develop in the rope very easily;
- Airbrakes may be cracked and used to help keep the rope tight, or the glider can be flown in the tug slipstream - this creates quite a lot of extra drag.

Handover/Takeover for student practice in both high and low tow in cruise.

Ensure when releasing from tow in level flight that there must be no delay in making the right turn, otherwise the rope may get quite close to the glider.

- This is true whether releasing from the high tow or the low tow position.

The slipstream may be in a slightly different position compared to where it usually is. However, as usual, low-tow is still just below the slipstream and high-tow just above.

Descending on Tow

Ensure glider is stable and in low tow;

- Advise the tow pilot by radio when ready for descent.
- Descending on tow is more likely to result in a slack rope, in particular if the tow pilot reduces power too quickly;
- Use of airbrake and/or yaw is likely to be required.
- When ready, advise the tow pilot to level off.

Handover/Takeover for student practice.

- Repeat exercise until competency is achieved.

Lookout

Emphasise to look ahead at the tow plane but also search for possible conflicting traffic.

Scan ahead, above and to each side on a regular cycle.

COMMON PROBLEMS

Problem	Probable Cause
• Student 'cuts corners' on boxing the slipstream.	Student in rush to complete exercise or cannot maintain station at the step positions.

	Reiterate need to pause at each step position, maintaining control inputs.
• Student allows rope to bow when descending behind tug.	Occurs particularly with higher performance gliders. Demonstrate use of yaw or small amounts of airbrake to create drag and keep tension on the tow rope.

THREAT AND ERROR MANAGEMENT

The instructor must never allow a situation to develop beyond their skills in these exercises.

This means an instructor attempting this unit must be in current practice and aware of their ability and limits.

The instructor must know when to take control as the situation demands**,** doing so in a calm & reassuring manner.

Instructors should note that this exercise, while challenging, should also be an enjoyable experience with minimum stress for all concerned.

If a significant bow in the rope occurs, turn the glider away from the bow and, if necessary, release the rope just before the rope comes taut.

Abort the exercise if conditions make the objectives unachievable.

- Maintain situational awareness of remaining within gliding distance of the field if practicing manoeuvres requiring the tow plane to maintain heading.
- If necessary, suspend the exercise and radio the tow plane to turn towards the airfield.

Getting out of station is quite possible in each of these manoeuvres so a good level of aircraft control is required prior to introducing these exercises.

Descent on tow may result in the glider catching up with the tow plane due to its lower drag, so be prepared to release if necessary.

Rapid use of airbrakes can break the tow rope weak link.

Poor control when in high tow and with boxing the slipstream can result in a tug upset. If you lose sight of the tow plane below the nose of the glider you must release!!!

If a large bow or loop develops in the rope and threatens the glider wingtip you must release!!!

The instructor must be mindful that it is the tug pilot's right to release the glider at any time if the safety of the combination is considered at risk.

TRAINING MATERIALS AND REFERENCES

- Australian Gliding Knowledge.
- GFA MoSP 2 Operations.
- Pilot Guide GPC Unit 27.

Gliding Australia Training Manual

Trainer Guide

Unit 28

Sideslipping

Unit 28 - Sideslipping

AIM

To develop the student's knowledge and ability to confidently utilise a sideslip to increase their descent rate.

Instructors should review the Aircraft Flight Manual to verify that sideslipping is permitted, and if so what circumstances and restrictions apply.

PRE-REQUISITE UNITS

- GPC Unit 10 Use of Ancillary Controls.
- GPC Unit 12 Slow Flight and Stalling.
- GPC Unit 17 Stabilised Approach and Landing.

COMPLEMENTARY UNITS

- GPC Unit 19 Cross wind landings

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Knowledge regarding sideslips	• **Describe** ○ The effect of a sideslip. ○ Situations when a sideslip can be beneficial. ○ Risks associated with the use of a sideslip. ○ The control movements required to commence and leave a sideslip. ○ False airspeed indications in a sideslip.
2. Conduct sideslips	• **Demonstrate** ○ A controlled sideslip at height. ○ Maintaining a constant track across ground whilst in the sideslip. ○ Recovery from sideslip at the same speed as the entry. ○ A controlled sideslip on final approach (subject to local restrictions). ○ A sideslip and return to normal coordinated flight. Both to the left and right

Unit 28 - Sideslipping

KEY MESSAGES

- Sideslips are used to increase the glider's decent rate without increasing its airspeed.
- Sideslipping should only be introduced after the pilot can fly at a constant speed with good stick and rudder coordination and can conduct a stabilised approach and landing with effective use of airbrakes.
- Maintaining a sideslip to a low level just prior to round out is NOT recommended unless the pilot is very experienced, current at sideslipping and competent. This is not required for this unit of competency.
- Aircraft with effective airbrakes will rarely require the use of sideslip.
- Sideslip manoeuvres in some gliders in conjunction with particular control settings (such as airbrakes) can result in uncommanded pitch down manoeuvres due to tailplane blanking. Always check the Aircraft Flight Manual / Pilot Operating Handbook prior regarding the use of sideslips with other controls before flight.

LESSON PLANNING AND CONDUCT

Briefing

- A model glider is especially useful to illustrate sideslipping. If this is not available, ask the student to holding their arms out and imagine what is happening to the glider in a sideslip to assist them to 'internalise' the concepts.
- After the student has achieved the confident ability to fly with coordinated controls describe and demonstrate Sideslipping. Explain that sideslipping is a safe and useful skill to use when seeking to increase the rate of descent of the aircraft.
- A pilot's ability to confidently sideslip is potentially a useful technique to increase the rate of descent and can also be used in crosswind landings. If the student has seen a wing-down crosswind approach, then they have already seen a form of sideslip.
- Sideslipping results in a loss of significant lift generated by the wings as the relative airflow flows across the wing at an angle, hence the glider descends at a higher rate. The sideslip can therefore be used to provide a steeper descent path.
- When the aircraft is sideslipping the airflow into the airspeed indicator via the pitot tube is affected by the angle the fuselage is deflected from straight into the relative airflow. This affects the airspeed instrument reading so the pilot must rely on glider attitude to maintain a safe airspeed.

When sideslip may be of benefit

A sideslip may be of benefit in the following circumstances:

- On approach, flare and landing when visibility ahead is restricted by any combination of sun, rain and canopy haze. A slight sideslip (often with airbrake used normally) of as little as 5-10 degrees can be used to markedly improve forward visibility.
- In a descent when landing in a strong crosswind. In this situation, if the pilot holds the into-wind wing down, the slip into the wind assists with the rate of descent and helps offset the drift caused by the cross wind.

- To prevent a glider being sucked into a cloud using sideslip to enhance the sink rate if used in addition to full air brakes.
- Where the airbrakes are jammed closed (e.g., frozen closed from a high-altitude flight in wave).

Entering and recovering from a sideslip

- To enter a sideslip from straight and level flight:
    - Note the nose attitude for a safe speed.
    - Apply aileron to produce the desired amount of bank – the bank angle determines the descent rate in the sideslip and
    - Apply opposite rudder to prevent turning and maintain a constant heading.
- Note that this results in uncoordinated flight as indicated by the yaw string.
- There is a limit to the amount of sideslip, dependant on the effectiveness of aileron and rudder.
- Identify the track of the glider and ensure the required track is maintained by adjusting the amount of aileron and rudder used.
- The glider's attitude is controlled by use of the elevator as normal. It is important that prior to recovering from the sideslip that the nose attitude is returned to the original position. Note that the ASI does not work effectively in a sideslip so it cannot be used to monitor air speed.
- Sideslip is removed by first confirming a safe nose attitude and then rolling wings level with aileron and simultaneously removing the rudder input.
- In the sideslip the glider does not move in the direction the nose is pointing, but at an angle to the nose on the same side as the lower wing. This must be allowed for when planning to straighten up onto a specific heading.

Sideslip for Landing

- Most gliders have excellent airbrakes so sideslip is not usually required.
- Sideslip can increase the descent rate which can help if a steep approach over high obstacles is required.
- If a very high rate of descent is experienced, recovery must be commenced in time to arrest the rate of descent to a level that is appropriate for landing.
- In the sideslip the forward wing tip is much closer to the ground, so you need to recover at a higher height than a normal round out.
- In a crosswind landing using sideslip, the lower wing is angled into the wind. This reduces the size of the angle required to correct the drift compared with the alternate approach (upper wing into wind).
- Ensure all drift is corrected prior to touch down otherwise wheel damage is possible/likely.
- In post-solo training, prior to outlanding endorsements assessments, it is good to confirm and if necessary, consolidate a student's sideslipping ability as this can enable them to:
    - descend more quickly, if necessary, to land in smaller paddocks over tall trees etc., or
    - land safely if they have misjudged their height or discovered too late that the surface they are landing on has a downward slope.

- Sideslipping is a potentially useful skill, but its use comes with some risk. Flying the approach with coordinated controls and airbrake is the best option if this suits the circumstances. Problems that might occur in using sideslip on approach are:
    - If the attitude is nose high on recovery you risk an immediate stall, an uncommanded nose drop and resulting collision with the ground.
    - If the nose attitude is lower than normal on recovery you will have a much higher airspeed than expected/required, so you risk needing to adjust airbrakes at low altitude and an extended landing distance - which may defeat the reason for doing the sideslip in the first place.

Flight Exercises

Demonstration at height:

- Trainer demonstrates sideslip, pointing out control movement to establish.
- Note the heading and track and nose attitude prior to commencing the sideslip.
- Demonstrate adjusting the amount of slip and adjusting rudder to stop the turn.
- Demonstrate the limit of slip, usually when the glider turns.
- Demonstrate that ASI readings are not useful.
- Recover from the sideslip by removing the bank and the yaw.
- Note the heading and track and nose attitude are back to their original position. Confirm that the airspeed has returned to normal.
- Handover control to the student and guide them through the sideslip. If necessary, they can follow you through on the controls.
- Direct student to vary the nose attitude and then return to the original attitude before recovering.
- Note the airspeed at recovery.
- Demonstrate converting a straight sideslip to a turning sideslip and a normal turn into a slipping turn.

Demonstrate and practice on landing

- Once the student has mastered the sideslip at height you can introduce its use on landing.
- If used in a crosswind approach, demonstrate the lower wing into crosswind (as per a wing-down crosswind landing).
- There are potential risks with this so don't rush and don't demand compliance if they are struggling.
- Focus on maintaining track on the landing path.
- Focus on correct nose attitude prior to recovering from sideslip.
- Recovery at 300' AGL is sufficient followed by a normal landing with airbrakes. Continuing the exercise below this altitude will increase risk, particularly with low experience or uncurrent students.
- Ensure situational awareness of wing relative to the ground and accurate control of nose attitude.

Notes

- Skilled demonstrations by the instructor are essential:
  - Emphasise gradual application of the controls.
  - Be vigilant, ready to take over on first signs of mishandling when sideslips are used on final approach.

COMMON PROBLEMS

Problem	Probable Cause
• In sideslip glider's actual track deviates from desired track.	Student may not understand that glider heading and track will be different in a sideslip. Use a glider model to illustrate the flight path in a sideslip and the difference between heading and track.
	Student is not noticing deviation from desired track or has not applied correction to aileron to vary sideslip in that direction. Instructor can demonstrate use of sideslip to fly along a variety of tracks and how changes to control inputs affect the glider's achieved track.
• Glider emerges from sideslip at high airspeed.	Student may not be monitoring nose attitude in the sideslip or assuming a lower attitude is required. Ask student to assess attitude during sideslip entry and exit.

THREAT AND ERROR MANAGEMENT

- Instructor needs to be current with sideslip landings.
- Ensure correct nose attitude is achieved.
- Monitor lookout and situational awareness throughout practice.
- Set and observe personal minima.

TRAINING MATERIALS AND REFERENCES

- Model Glider for Briefing.
- Pilot Guide GPC Unit 28.
- Australian Gliding Knowledge.

Gliding Australia Training Manual

Trainer Guide

Unit 29

Steep Turns

Unit 29 - Steep Turns

AIM

To develop the skills and knowledge to perform steep turns in a glider (60° of bank).

PRE-REQUISITE UNITS

- GPC Unit 8 - Sustained turns, all controls
- GPC Unit 26 - Competence for first solo

COMPLEMENTARY UNITS

There are no complementary GPC units to this unit.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Enter Steep Turn	• **Describe** ○ The higher stall speeds, lift vector, induced drag and aircraft operating limits for steep turns. ○ Risks associated with steep turns. • **Demonstrate** ○ Targeted scan prior to commencement of turn. ○ Selection of attitude to achieve required airspeed. ○ Use of coordinated controls when rolling into the turn. ○ Judgement of required bank angle.
2. Maintain Steep Turn	• **Demonstrate** ○ Maintenance of attitude, airspeed and G loading. ○ Maintenance of nominated angle of bank. ○ Flying by attitude as opposed to speed. ○ Alternating between lookout and monitoring of attitude and angle of bank/rudder coordination.
3. Conduct Roll Out from Steep Turn	• **Demonstrate** ○ Lookout prior to rollout. ○ Identification of roll-out heading. ○ Wings rolled level with coordinated controls. ○ Return to normal flight attitude. ○ Emergency actions and anomalies are identified and rectified during steep turn regime.

Unit 29 - Steep Turns

KEY MESSAGES

- Ability to maintain nose attitude during turn is critical.
- Lookout is more difficult under 2G or more loading.
- Steep turns can result in stalls or spiral dives if not conducted correctly.
- High G loading for prolonged periods may lead to blood loss to the upper body with resulting grey-out or black-out of flight crew.

LESSON PLANNING AND CONDUCT

Briefing

- This unit is a prelude to teaching the kind of manoeuvring needed to be able to thermal well, and to teach the student how to recognise and recover from a spiral dive.
- A steep turn is no different to any turn of a lesser angle of bank save in degree, all control functions are the same. However a higher speed is required for a steep turn than for say a thermalling turn.
- From a medium turn, select a suitable nose attitude for the required speed. Typically, 70 kts but confirm with the Aircraft Fight Manual.
- Increase the angle of bank to the required angle (60 degrees) and maintain the nose position with elevator.
- Considerable back (up) elevator will be needed to maintain the nose attitude in a steep turn.
- Heavier loads are placed on the aircraft during a steep turn and consequently the stalling speed is increased. The speed to maintain the turn should be increased in proportion to the angle of bank.
- High G loading and noise level may mask pre-stall warnings, so extra care is needed.
- Care must be taken to maintain the attitude. If the nose is allowed to drop the speed will build up very rapidly and the glider could enter a spiral dive. To correct, ease the back pressure on the stick and reduce the angle of bank with the ailerons.

Flight Exercises

- Instructor demonstrates a steep turn.
- Points out speed and angle of bank, and higher G Loading.
- Explain the need for use of back elevator to maintain nose attitude.
- Demonstrates recovery to level flight.
- Let student come on controls if they are hesitant.
- Student practices steep turn.
- Instructor to monitor speed and bank and use of elevator to ensure to completion of the exercise correctly.
- Repeat exercise a number of times to develop confidence.

Notes:

- If student is competent at 45° bank turns, they should find this relatively easy, otherwise they may be hesitant to apply a steep angle. Gradually get them to demonstrate turns at increasing angles of bank before trying proper steep turn.
- Application of coordinated aileron and rudder should be smooth and progressive. Larger aileron movement requires commensurate larger rudder pedal movement. Steeper turns will require more back-stick pressure to maintain nose attitude.

TABLE OF TYPICAL STALLING SPEEDS AT GIVEN ANGLES OF BANK

ANGLE OF BANK	'G' LOADING	TYPICAL STALLING SPEED (KTS)
0 degrees	1	33
10 degrees	1.02	33
20 degrees	1.06	34
30 degrees	1.15	35
40 degrees	1.2	38
50 degrees	1.56	41
60 degrees	2.0	46
70 degrees	2.92	56
80 degrees	5.75	79

COMMON PROBLEMS

Problem	Probable Cause
• Student does not conduct adequate look-out in turn.	G-loads may prevent adequate lookout.
• Nose attitude is not maintained (typically is lowered) during steep turn.	Student is not providing the significant back stick force required to maintain attitude. Demonstrate the steep turn and allow the student to feel the control input required. Beware of excessive back stick as this can increase chances of stall as G-load increases. The student needs to select a suitable attitude and fly to that.

THREAT AND ERROR MANAGEMENT

- Ensure appropriate lookout on entry and during steep turns.
- Beware of aggressive stick movements on entry, requires smooth control.
- Beware of excessive speed and G loading.
- Reinforce spiral dive recovery actions.

TRAINING MATERIALS AND REFERENCES

- GPC Unit 29 Student Guide.

Gliding Australia Training Manual

Trainer Guide

Unit 30

Thermal Centring Techniques

Unit 30 - Thermal Centring Techniques

AIM

To develop the student's skills and ingrained habits in centring thermals effectively.

PRE-REQUISITE UNITS

- GPC Unit 11 Introduction to Soaring
- GPC Unit 26 Assessment of competence for first solo

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 31 Thermal Entry

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Demonstrate glider control and awareness	• **Demonstrate** o Good lookout o Consistent bank and attitude in Thermaling turns o Use of coordinated controls in Thermaling turns
2. Thermal centring	• **Describe** o Lag limitation of total energy vario and impact on centring o The feel and vario techniques for thermal centring • **Predict** o Where the core is relative to the glider • **Demonstrate** o Centring to achieve positive climb at all points for two Thermaling turns o Effective Thermaling in both directions

Unit 30 - Thermal Centring Techniques

KEY MESSAGES

- Horizontal thermal structure and size
- Awareness of accelerations and gusts and how they feel - feel of vertical accelerations is instantaneous
- The vario always lags because it takes time to accelerate the glider upwards or downwards, typically a glider turns through 45-60 degrees in this time – this must be compensated for when using the vario to centre
- Maintain coordinated control of the glider with consistent bank and attitude (actual angle not critical)
- Use terms vertical acceleration or surge, not lift and sink
- Students who are successful using the feel technique need to understand the vario technique as well

LESSON PLANNING AND CONDUCT

Briefing

Brief the horizontal structure of a thermal with reference to the diagrams in the pilot guide for this unit.

Brief the lag limitations of variometers as discussed in the pilot guide for this unit (gust limitations are covered under thermal entry).

Reinforce the importance of developing a mental picture of the lifting and sinking air while Thermaling and the location of the core.

The two standard techniques below should be trained – each identifies the point of correction by different means but the action in each case is the same.

1. Feel Technique (Ignoring the vario)

   Thermaling by feel is by far the best technique and other techniques are secondary. In the ideal situation, we will feel upward and downward accelerations or surges.

   When a sustained upward acceleration is felt, bank should be reduced to about half for 2-3 seconds before resuming the original angle of bank. On the next turn repeat if necessary.

2. Vario Technique

   The student may not feel acceleration because the thermal is very wide, the strength is low, the glider has little natural feel, the student is too tense, or for a number of other reasons. For this reason a secondary technique is trained using vario indications. This technique compensates for vario lag. Vario lag will be different for each glider/weight/vario combination and generally equates to around a 45 to 60 degree portion of a typical Thermaling turn.

   Identify the minimum vario indication in the turn (preferably using audio). 45 degrees (1/8 turn) after this point bank should be reduced to about half for 2-3 seconds before resuming the original angle of bank. On the next turn repeat if necessary.

Note:

- The period of 2-3 seconds at reduced bank is the time to hold that bank; it does not include the time to reduce and increase bank.

- Speed and bank angle changes will change the turn radius and centre; unless these are constant when centred, the centre of the thermal will be quickly lost.
- With both techniques, the vario indication is used to confirm that the thermal has been centred. If a positive vario indication remains reasonably constant throughout a turn, then the thermal has been centred.
- Beware of vario installations that have leaks or produce variable lag.
- The yaw string should be a little on the outside of the turn (slight slip). Thermaling with the yaw sting on the inside of the turn risks a spin.

Flight Exercises

Feel Technique

Demonstration. Position the glider in a thermal so that it is not centred. Ask the student to describe what is being felt at each point in the turn and from that identify where the centre of the thermal is most likely to be. Ask the student to identify the surge and correct using the feel technique. It is importantly to fly smoothly at a constant attitude so that the student has the best chance of feeling the surge.

Suggested Patter

"I'm going to demonstrate thermal centring by feel. On the next turn we should expect to feel a surge as we fly into the stronger part of the thermal. Tell me when you feel the surge… OK that's great, remembering the diagram from the briefing, the thermal is a little to our right when we feel the surge. Tell me again when you feel the surge… lookout in the direction we'll be correcting… OK, reducing bank …1...2. 3. Back into the turn now and we'll do a full turn to see if it worked… Do you think we need to try again? …"

Student Exercises. Position the student in the thermal as before and have them repeat the actions demonstrated. Once the student has centred the thermal, take control again and move them away from the core to repeat the exercise.

Vario Technique

Demonstration. Position the glider in a thermal so that it is not centred. Fly a complete accurate circle and ask the student to identify the vario minimum. Emphasise the importance of maintaining lookout – use audio as a cue. Identify a ground feature 45 degrees from that point and correct when at that identified heading.

Suggested Patter

"Now demonstrating using just the vario. We need to keep looking out, listen to the audio and check the vario needle when necessary. On the next turn let me know when you think the vario is indicating the peak and the minimum… OK, that's great. On the next turn we'll pick a ground feature 45 degrees to our right when the vario is at the minimum then reduce bank on that heading… lookout in the direction we'll be correcting … OK, there's the minimum. That farmhouse looks like about the right angle… reducing bank …1…2…3. Back into the turn…"

Student Exercises. Position the student in the thermal as before and have them repeat the actions demonstrated. Once the student has centred the thermal, take control again and move them away from the core to repeat the exercise.

Flight Management

The most effective means of teaching pilots to thermal requires an extensive ground briefing away from the glider. There is too much happening in a short space of time, both in terms of sensory inputs to the pilot as well as required control inputs in relation to what is felt for this to be effectively taught only in the air.

The pilot should not be loaded with other tasks/exercises at the same time.

In their air, students must be prevented from making control inputs without suitable lookout first. This means the trainer needs to be well ahead of the student to be certain the sky is clear and able to see the students head move. Remember, the student could well turn in the opposite direction to what the trainer thinks is best.

Don't introduce thermal centring when there are other gliders in the thermal at similar height (within 500 feet). Once the student has a good grasp of the concepts this can be relaxed.

COMMON PROBLEMS

Problem	Probable Cause
• Not maintaining constant nose attitude	1. Flying using airspeed indicator instead of nose attitude relative to the horizon 2. Not trimmed correctly • Note: Tail ballast may be required to allow sufficient back trim for heavier pilots
• Not maintaining constant angle of bank	Not using visual references for angle of bank. Direct the student to visual references such as instrument screws and glare shields.
• Not feeling surges	The student may be distracted by the vario (visually and aurally). For this training exercise, consider turning the sound off and covering the vario.

Debrief

Review

- Lookout
- Requirement for precise coordinated flight
- Using acceleration feel to position the glider with respect to the core
- Using the vario as an indicator to identify where the core is
- How to position the glider's circle to where it needs to be
- Using the vario as confirmation the thermal has been centred

THREAT AND ERROR MANAGEMENT

- The primary threats for thermal centring are collisions with other aircraft and stall/spin. Both should be considered for the conduct of the flight exercises and the student should be trained to recognise the threats and mitigating actions.

- Effective lookout must be maintained at all times with a regular full scan and targeted scan before maneuvering in the thermal. Given the time taken for a full scan this will need to be anticipated and conducted prior to the re-centring trigger. Be wary of not maintaining lookout in particular when training the vario technique and encourage your student to only glance at the vario when necessary.
- Do not change the direction of the turn while Thermaling, even if you think there are no other gliders in the thermal or nearby.
- Skidding turns when Thermaling may not be recognised before a spin develops. Be wary of an increasing skid combined with further back stick to keep the nose on the horizon – the result is likely to be a spin without warning. The yaw string should always be a little on the outside of the turn – in this state the glider is unlikely to spin (and it's also most efficient).

Gliding Australia Training Manual

Trainer Guide

Unit 31
Thermal Entry

Unit 31 - Thermal Entry

AIM

To develop the student's knowledge and skills for safe thermal entry and the first Thermaling turn.

PRE-REQUISITE UNITS

- GPC Unit 30 Thermal Centring Techniques

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 32 Soaring with Other Gliders

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Identify a thermal	• **Identify** o A thermal (as opposed to a gust)
2. Enter a thermal	• **Demonstrate** o Appropriate lookout o Appropriate nose attitude o Waiting for the peak before turning o Identifying if the turn is away from the core and correcting

KEY MESSAGES

- Initial turn direction is less important than making the turn – it can be corrected if wrong
- Minimise changes in attitude during entry to maximise feel
- Lookout with respect to thermal entry and ongoing scan
- The vario indication is not particularly useful for thermal entry due to lag and gust sensitivity. In particular the vario indicates rising air with a lag and horizontal gusts instantaneously, so it's very important to learn to enter thermals by feel
- Steps for thermal entry
- Patience

LESSON PLANNING AND CONDUCT

Briefing

Conduct a ground briefing covering the following elements:

- Refresh vario lag discussed under GPC 30 – Thermal Centring Techniques. Brief the impact of horizontal gusts on the vario indication as discussed in the pilot guide for this unit – this can make the vario indication useless for thermal entry. Discuss the importance of feel of vertical accelerations. The vario is used to confirm what was felt.

- The three key decisions on thermal entry: Deciding to turn/not turn; when to turn; and which way to turn.
- With reference to the diagram in the pilot guide for this unit, discuss the feel and actions on thermal entry. In particular draw attention to:
    - Full scan and targeted scan. When approaching a thermal, there is a good chance others are as well and from any direction. A FULL and TARGETED lookout scan is essential to ensure situational awareness and to predict where each glider is likely to be when the thermal is joined well before actually entering the thermal.
    - Turning the same way as gliders already in the thermal. If joining a thermal with other gliders, the turn must be in the same direction as the other gliders, and if at the same height the glider should be positioned opposite. The direction of turn of other thermalling gliders can take a while to establish when approaching. Once the direction of turn is clear, aim to arrive outside of the turn being used by other glider(s). They need to be concentrating on climbing and not avoiding you! See also GPC 32 – Soaring with Other Gliders.
    - The 'cobblestone' feel approaching the thermal as a trigger to set nose attitude for reduced speed. Entry speed for feel and manoeuvrability should be 10-20 knots below cruise speed.
    - The need to WAIT when flying through the surge (or increasing vario indication)
    - Turn if/when the acceleration has been sustained for at least five seconds or when the upward acceleration stops (refer to decision chart in the pilot guide)
    - Assess based on feel if the turn was the right way
    - If the turn is towards sink continue the turn through 270° , then straighten for between 3 and 10 seconds (see further information in the pilot guide), and resume turn
    - Re-trim to thermalling speed
    - On the next turn re-centre the turn as necessary

Flight Exercises

Demonstration of thermal entry and first turn

From well outside a thermal refresh what will be felt and the actions on thermal entry:

- Draw attention to FULL SCAN and TARGETED SCAN
- Discuss appropriate entry speed and when to adjust the nose attitude
- Discuss the need for waiting for the sustained surge or vario indication before turning
- Then as you fly into the thermal:
    - Verbalise feel in the context of the thermal structure – turbulence, the surge and

relate this to the vario indication when it happens. Ask the student to tell you when they feel the surge.

- Verbalise the decision if/when to turn

- Demonstrate the first turn
  - If turning in the correct direction, verbalise the choice of angle of bank – tight turn (40º) if acceleration feel is building on turn entry; shallower turn if searching
  - If turning in the incorrect direction, demonstrate the process of turning through 270º, straightening for 3 to 10 seconds, then recommencing a tight turn.
- Repeat as necessary.

Student Exercises

The student practices thermal entry as many times as possible on a cross country flight. (If conditions are not suitable for cross country, the trainer can fly out of a thermal for about 20-30 seconds and then turn back. Hand over to the student when approaching the thermal again)

Note

- Don't introduce thermal entry when there are other gliders in the thermal at similar height (within 500 feet). Once the student has a good grasp of the concepts this can be relaxed.
- The student must be relaxed to be able to feel the thermal. Trying to combine other exercises may overload them and be counterproductive.
- Make sure appropriate lookout scan is continuing at all times. Be aware of the student fixating on the panel and attitude only. NEVER allow the student to turn without a clear lookout first.
- If the student is reacting to the vario and not feel, ask the student to turn the sound off (check they know how to do this before the flight) and cover the vario display(s) (this will likely have to be done on the ground).
- Make sure attitude is held constant from well before the area of rising air is entered. Changing attitude applies vertical accelerations to the glider, masking the thermal feel.

COMMON PROBLEMS

Problem	Probable Cause
• Turning in a gust	Not waiting for a sustained surge of at least 5 seconds
• Turning too late	The student taking too long deciding which way to turn – get the student to pick a direction before reaching the thermal
• Turning too early	Not waiting for at least 5 seconds or until the surge subsides before turning

Debrief

Review

- Lookout when approaching a thermal and on entry
- Understanding of thermal structure and size
- Understanding of lag and gust limitations of variometers
- Awareness of accelerations and gusts and how they feel
- Steps for thermal entry
- Patience

THREAT AND ERROR MANAGEMENT

- The primary threat for thermal entry is collision with other gliders either already in the thermal or approaching at the same time. Thermal entry can be high workload so be wary of poor lookout while distracted by other tasks.
- When approaching a thermal, there is a good chance that others are as well and from any direction. A FULL and TARGETED lookout scan is essential to ensure situational awareness and to predict where each glider is likely to be when the thermal is joined well before actually entering the thermal. If another glider is in the thermal it can be difficult to see which way it is turning from some distance away so be vigilant as the thermal is approached.
- Always thermal in the same direction as other gliders, regardless of height differences (look for gliders that may be much lower or higher).
- Always assume that there may be gliders approaching the thermal or in the thermal in addition to any that you have seen.
- Before commencing the first turn a TARGETED SCAN is required in the direction of the turn.
- Encourage your student to only glance at the vario when necessary – in any case the vario is not a very useful instrument for thermal entry.
- Do not enter the thermal if there is any collision possibility with other gliders. Do not assume that other pilots have seen you.

Gliding Australia Training Manual

Trainer Guide

Unit 32

Soaring with Other Gliders

Unit 32 - Soaring with Other Gliders

AIM

To train how to safely and cooperatively fly with other gliders. This requires awareness, separation and predictability.

PRE-REQUISITE UNITS

- GPC Unit 31 Thermal Entry

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Demonstrate situation awareness	• **Demonstrate** o Consistent lookout locating other gliders • **Recognise** o Potential conflicts such as converging headings or converging height changes o Double-blind situations • **Predict** o Intentions of other pilots
2. Maintain separation	• **Describe** o The concept of a separation bubble o How “separation priority”works • **Demonstrate** o Appropriate separation from other gliders when: o Cruising, allowing adequate space for other gliders to turn quickly without conflict o Entering a thermal o Thermaling
3. Fly predictability	• **Demonstrate** o Predictable behaviour when: o Cruising o Entering a thermal o Thermaling

Unit 32 - Soaring with Other Gliders

KEY MESSAGES

- **Lookout** is essential for awareness of other aircraft and predicting behaviour
- Separation is maintained by thinking ahead and predicting what other aircraft might do.
- If you are in another pilot's blind spot, you are responsible for giving way.
- Adopt gentle, predictable maneuvering techniques, join in with other gliders cruising or circling patterns and don't surprise anyone or burst any bubbles!

LESSON PLANNING AND CONDUCT

Briefing

Explain the concepts below and then have the student explain them to you. Personal examples from the trainer's experience may be helpful.

As it will be necessary to fly with other gliders, it would be helpful if those pilots also attended the briefing.

Awareness

Stress the importance of keeping a constant lookout to locate other aircraft and predict:

- what the other aircraft might do; and
- where conflict may occur due to converging headings or converging heights.

Separation

Explain the "bubble" concept.

Explain the principle of Separation Priority when cruising:

- Give way to anyone within a half-sphere ahead (up/down, left/right)
- You must give way to these gliders no matter how the gliders in front, or to the side, maneuver
- When overtaking make the other pilot aware (radio)
- Do not enter double-blind situations. Eg aircraft under the nose or over the tail – you can't see each other

Predictability

Explain the importance of predictability and the steps for Thermaling with other gliders below.

1. Approaching a thermal
   - FULL scan and TARGETED scan is very important as discussed in GPC Unit 31 Thermal Entry
   - Locate gliders in the thermal and identify their direction of turn.
   - Plan ahead for arrival – which gliders will you be joining in with?
   - Slow down before arriving to synchronize with the other gliders' speed. Never pull up in the core near another Thermaling glider.
2. Thermal entry
   - Join with zero potential conflict – fly around the outside of the other gliders' circle (with at least 60m separation) until an opening is available or they climb above.

3. Thermalling
    - Go with the flow – match other gliders bank angle and speed
    - Make small centring corrections when safe to do so
    - Don't turn inside other gliders
    - Note that one pilot with a small bank angle disrupts the thermal for the others who are forced to follow him/her
4. Leaving a thermal
    - Exit with a gentle roll-out after checking for potential conflict
    - If you roll to wings level (zero bank), others will assume you are leaving so don't turn back into the thermal

Flight Exercises

Flying for this unit requires reasonable thermal conditions with at least two other gliders available together to cruise and thermal with. If this is not possible then flight exercises must be delayed to another day or potentially be conducted at another site.

You should demonstrate cruising, thermal joining, Thermaling and leaving:

- Explain what is happening and what you're thinking or planning
- Ask the student what they would do
- Point out any non-compliant flying which other pilots may do (and counsel them later)

Student practice (under supervision) of cruising, thermal joining, Thermaling and leaving:

- Use several thermals until the student is consistently able to demonstrate competence in awareness, separation and predictability.
- It is essential that the student maintains a good lookout for the duration You must also keep a consistent lookout and be ready to take-over when needed.

Notes

- You (as the trainer) need to be competent when flying in relatively close proximity to other gliders. If you are uncomfortable flying near other gliders then it may be best for another trainer to train this unit.
- Student judgement of the distance to gliders and the closing rate or relative speed between gliders will take time to develop
- This exercise will be challenging for many students because they need to concentrate on what's happening outside the glider while maintaining accurate control of the glider
- Any shortcomings in glider control will need to be addressed away from the pressure of flying with other gliders before continuing with this unit

COMMON PROBLEMS

Problem	Probable Cause
• Failure to recognise potential conflicts	Poor lookout and/or spatial awareness Lack of understanding of potential conflict situations
• Failure to maintain separation	Misjudging closing speeds and geometry Incorrectly predicting behaviours of others Flying unpredictably
• Poor aircraft handling when near other gliders	Distraction and overload
• Joining a thermal by aiming at the middle on approach	Heading directly towards a glider in a thermal (the student should pick a heading when the tail of the glider is pointing directly at them and maintain that heading)
• Not maintaining position opposite another glider in a thermal	Heading at the glider ahead in the turn instead of outside the tail

THREAT AND ERROR MANAGEMENT

- The primary risk with soaring with other gliders is loss of separation and collision.
- All of the threats and associated management below applies to the conduct of the training exercise and future flying for the student. Ensure that the student understands the threat situations and appropriate management.
- Be aware that judging distance and closing speed to other aircraft is difficult, particularly for inexperienced pilots or pilots that lack currency. Plan ahead and increase margins so that judgement errors do not result in lack of separation.
- Lack of separation is likely to result from poor lookout when cruising (watch for gliders in front maneuvering and converging headings), when entering thermals, whilst Thermaling, and leaving. When entering thermals always join gliders already in the thermal from the outside of their circle and such that 60m separation is maintained. Be vigilant with a regular full scan and targeted scans before maneuvering.
- Anticipate double-blind situations and prevent the situation arising. It's too late once in the situation since separation is not visible. In the cruise, don't allow a glider to remain directly under the nose – maneuver to one side to keep the front glider visible. While Thermaling never turn inside another glider. When leaving a thermal conduct a targeted scan in the direction of exit as well as under the outboard wing.
- Unpredictable behaviour is a threat. All pilots should be predictable at all times so that other pilots can maintain separation through anticipating their actions and likely flight path. Gliders that are ahead in the cruise will expect gliders following to give way if they turn – leave enough space to do this safely. However leading gliders should not maneuver suddenly and unexpectedly, and should not rely on following gliders seeing them and giving way appropriately.

Gliding Australia Training Manual

Trainer Guide

GLIDING
AUSTRALIA

Unit 33
Thermal Sources and Structure

Unit 33 - Thermal Sources and Structure

AIM

To develop the student's knowledge and skills related to thermal sources, thermal structure, and thermal lifecycle.

PRE-REQUISITE UNITS

- GPC Unit 31 Thermal Entry

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 38 Meteorology and flight planning
- GPC Unit 40 Cruising, speed to fly, height bands and thermal selection

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Describe thermal structure and lifecycle	• **Describe** o The difference between thermal sources and triggers o The vertical thermal structure o How thermals cycle and variations with terrain and time of day
2. Identify and navigate to sources and triggers	• **Identify** o Potential thermal sources and triggers taking into consideration sun, wind, terrain, vegetation, time of day, cloud cover • **Demonstrate** o Navigation to relevant thermal sources and triggers in a search for thermals

Unit 33 - Thermal Sources and Structure

KEY MESSAGES

- Thermals are rising buoyant air from a thermal source.
- The ground is a thermal source when it is heated by the sun. Darker and hotter surfaces generate better thermals.
- Thermals have a lifecycle and may have a bubble structure.
- There may not be a thermal at the 'perfect' location relative to sources and triggers since you need to be at the right point of the cycle (the bubble may be below or above).
- When navigating to likely locations of thermals relative to sources and triggers the effect of wind drift needs to be considered.
- Thermaling at low level increases the risk of a spin – maintain safe speed near the ground and have a clear break-off point at a safe height for a circuit and landing.

LESSON PLANNING AND CONDUCT

Briefing

Brief:

- Air buoyancy due to surface temperature and humidity relative to the surrounding air.
- Thermal sources through heating of the ground by the sun and the ground heating the air. Discuss the effect of terrain, surface, sun and wind with reference to variations with time of day.
- The lift, sink, and turbulence structure of a thermal and variation with height.
- Thermal triggers and the difference in size between thermal sources and triggers.
- Thermal cycling and bubbles through exhaustion and replenishment of a pool of buoyant air.
- The impact of wind.
- The relationship between convection height, thermal strength and horizontal spacing.

Advise that care must be taken when Thermaling at low level (in the turbulent super-adiabatic layer) due to the possibility of an inadvertent spin under these conditions. Safe speed near the ground must be maintained when Thermaling at low-level, and a clear break-off point at a safe height is essential for a circuit and landing.

Flight Exercises

The flight exercises for this unit are best combined with flight exercises for one of the other units (such as Thermal entry or Meteorology and flight planning).

Demonstration

- Point out ground features and discuss their likelihood as a thermal source
- Point out potential triggers

Student exercises

- Ask the student to identify potential thermal sources and triggers, and sample as many as practical to develop understanding of how to use them and the cycling behaviour.

COMMON PROBLEMS

Problem	Probable Cause
• Confusing sources with triggers	• Thermal source areas are large • Triggers are small • Only a small amount of experience with which to judge – the student needs to devote the time to watch and learn.

THREAT AND ERROR MANAGEMENT

- Thermals in the super-adiabatic layer are disorganised and turbulent. Thermaling in this layer creates increased risk due to these conditions.
- Combined with the likely high stress of the situation for the student potentially causing mishandling of the glider, particularly when on a cross country flight, there will be increased risk of inadvertent spin.
- Be aware of this when training at low level and discuss the effect and mitigation strategies with the student – for example breaking off the flight at increased altitude, being aware of the effect of stress on concentration, and increasing Thermaling speed at low level.
- At a minimum, safe-speed-near the ground should be maintained when Thermaling at lower level.

Gliding Australia Training Manual

Trainer Guide

Unit 34

Outlanding Planning Demonstration & Execution

Unit 34 - Outlanding Planning Demonstration & Execution

AIM

To develop the skills and knowledge required to plan, prepare and perform a landing in an unknown field. This may include a landing at the conclusion of a cross country flight and in an emergency situation (launch failure, low in circuit, etc) close to the airfield.

PRE-REQUISITE UNITS

- GPC Unit 15 - Break-off & Circuit Planning
- GPC Unit 16 – Circuit Joining and Execution
- GPC Unit 17 - Stabilised Approach and Landing

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 35 - Flight preparation, glider, trailer and pilot.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARD
1. **Select a suitable landing area**	**Demonstrate** • Commits to outland • Identify suitable landing area (W6S)
2. **Prepare and Plan for outlanding**	**Demonstrate** • Determine landing direction and aiming point • Plan circuit • Configure glider • Communicate intentions
3. **Perform safe circuit to a field**	**Demonstrate** • Standard circuit, not too high • Monitor suitability of field and approach path throughout the circuit • Prelanding check • Monitor angle to aiming point • Maintain safe speed • Final turn above 300 feet AGL

4. **Land in field**	**Demonstrate** • Adjust touchdown point to optimise safety • Ensure clearance from any obstacles • Minimise ground roll
5. **Post outlanding actions**	**Describe** • Communicate successful outlanding • Secure glider • Contact property owner

KEY MESSAGES

- Outlanding requires concentration and planning and adherence to standard procedures. It should not be done in haste so an early decision to land is critical.
- Set personal minima for decision to land and for flying the circuit, and stick to these.
- The student needs to be able to monitor and estimate height above ground without reference to instruments
- Identifying obstacles, wires, crops, wind direction are key observations required
- Every landing the student makes is practice for an eventual outlanding.

NOTE TO INSTRUCTORS:

THE INSTRUCTOR TEACHING THIS UNIT SHOULD BE COMPETENT AT OUTLANDING, WITH RECENT PRACTICE

LESSON PLANNING AND CONDUCT

Briefing

An outlanding may be required at any time, even when flying locally or approaching for circuit. Pilots must develop the skill to identify when a landing at the airfield is not working out and to choose to select and fly a safe circuit for another field.

Select suitable landing area

- Situational awareness – identify when an outlanding is the best or only option. It is a common activity in gliding.
- You have to ensure that you always have glide to suitable landing fields, and as you get lower to remain in contact with those fields.
- Ensure that you have a choice of fields that are big enough and appear clear of hazards.

Unit 34 - Outlanding Planning Demonstration & Execution

Prepare for outlanding

- Select a field based on the following criteria. W6S: WSSSSSS
- Wind, Size, Slope, Surface, Stock, Surroundings, SWER (Single Wire Earth Return) wires.
- Identify wind direction and land into wind where possible
- Actions required to configure glider for landing can be undertaken at height in preparation for landing:
    - Straps are tight,
    - Water ballast dumped in gliders so equipped,
    - Engine configuration set
    - Radio is on the correct frequency, that volume and squelch are correctly set, and that the microphone is positioned for best performance.
    - Flaps set,
    - Undercarriage lowered,
    - Speed required at circuit
    - Trim to an appropriate speed for the downwind leg,
- You need to set up for a normal circuit, only the location is different. Select a field and identify landing area and aiming point and configure the glider for landing prior to commencing the circuit at a 'normal' circuit height.
- Make a radio call so that others are aware of your intentions. You may have difficulty making contact once you are on the ground.
- Estimate your height above ground based on observation of features such as trees, stock, fences

Perform circuit

- Dangers in the field, such as high crops, wires, ditches, fences, tree stumps, tree branches, stock are more easily observed as you get lower and closer. A high, wide circuit reduces your opportunity to identify and adapt to problems.
- You require a high level of concentration and observation to avoid any traps.
- The circuit should be consistent with what you do back at the airfield
- Monitor speed, track and angle to ensure a final turn no lower than 300 feet AGL
- On Final, select a track that avoids and clears all obstacles. Clear obstacles by at least 50 feet (1 wingspan). Be prepared to adjust your aiming point if you see an obstacle, fence, ditch or rough ground.

Landing

- Touch down as slow as possible by holding off as long as you can. This will reduce the ground run and means you will hit bumps and holes and branches on the ground at a much lower speed.
- Use the wheel brake to stop the glider as quickly as possible. Assume there is a hole in the ground directly ahead which will swallow your main wheel. Avoid the temptation to taxi closer to the house.

Post landing

- Explain the need to tie the glider down, protect against stock.
- When walking to the house or road, take water with you. It may be a while before you return.
- Note location of gates and roads. Take photos. Leave flashing lights at key locations.
- Use your mobile to contact your crew. Text may work better if in low reception area.

Use of See You and Google Earth and simulators

- Review available fields in your flying area. (crops may be different but you can see many issues.)
- Look for power lines and roads and houses.
- Identify field that could be suitable.
- Select a suitable field ad plan the circuit

Flight Exercises

On field exercises to practice outlanding

- it is possible to develop some skills on your normal airfield. The Instructor should select an area of the field where the pilot has not landed before or arrange an angled approach. This is to remove the familiar approach surroundings as pilots, however unintentionally, use them to assist judgment. You can even simulate fences and rough ground with suitable props. It is most important that the marked area has a safe undershoot and over-run area available.
- The instructor should conduct a Risk Assessment based on weather conditions and the field.
- The Instructor must watch the approach and landing and assess the following: -
    - The standard circuit was used;
    - The normal approach path was used and there was no "hopping" over the fence;
    - The airbrakes were not excessively worked in and out;
    - The landing was normal, not forced on or "floated" over the fence;
    - No excessive nose skid grinding or excessive wheel brake was used;
    - The aircraft stayed within the selected area. If any of these features are noted, the Instructor should re-brief the pilot before a further attempt.
- The pilot should display a degree of polish well above the minimum standard.
- Demonstrate an approach with (nearly) full airbrake to show how this can be used to shorten the landing distance.
- Explain the option of a ground loop to avoid hitting a fence. Reduce speed and firmly place the wing tip on the ground, keeping the tail wheel/skid off the ground.

In flight exercises

- Within close proximity to the airfield, demonstrate and then ask student to point out suitable fields. Compare their size to the normal landing area. Identify risks and describe possible circuit and approach.

- On local cross country flights, student to indicate areas that are suitable for safe flights, and areas where landing opportunities are limited.

Motor gliders

- The best training opportunity is where you have a motorglider available, for identifying and selecting a suitable field, and then to fly the circuit down to low level. Landing if the Aircraft is suitable.

Outlanding

- Where possible, an actual glider landing in a field is great training. Even having arranged a suitable field with farmer approval for an outlanding provides the pressure and focus required to fly the circuit and landing.

Advice to Instructor regarding their responsibility to maintain safe flight.

The student preferably needs to conduct a dual outlanding to complete this unit. If you are sending a pilot cross country without having completed an actual outlanding, then you need to be very confident about their skills and performance under pressure. This would require very benign conditions and terrain.

COMMON PROBLEMS	
Problem	**Probable Cause**
• Failure to identify problems with field	Not learning and not following the W6S
• Circuit too high or too low	Possibly using ground features for circuit rather than angles to the aiming point. Re-training required.
• Poor speed control	Possibly overloaded. Instructor support/advice recommended
• Overshoot or undershoot on landing	Failure to select an aiming point and not monitoring progress to achieve this.

THREAT AND ERROR MANAGEMENT

- Not committing to land and then trying to thermal
- Not following normal procedures for circuit and landing
- Human factors – losing focus and discipline
- Poor speed control and height management

TRAINING MATERIALS AND REFERENCES

- Australian Gliding Knowledge

Unit 34 - Outlanding Planning Demonstration & Execution

Gliding Australia Training Manual

Trainer Guide

Unit 35

Flight preparation: glider, trailer and pilot

Unit 35 - Flight preparation: glider, trailer and pilot

AIM

To develop the student's skills, knowledge and ingrained habits to minimise risks due to inadequate preparation for themselves, the glider and trailer. This is essential for the pilot to be able to concentrate on achieving their goals when flying cross country.

PRE-REQUISITE UNITS

- There are no pre-requisites for this unit

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 36 Navigation and Airspace
- GPC Unit 38 Meteorology and Flight Planning
- GPC Unit 39 Advanced Soaring Instruments and Flight Computers

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Describe personal preparation	• **Describe** o Physical limitations that may affect a pilot's performance on the day of a flight o Personal needs for cross-country flying
2. Demonstrate glider preparation	• **Demonstrate** o Glider preparation to ensure the glider is ready to go
3. Demonstrate retrieve readiness	• **List** o Common faults that would prevent or delay a retrieve • **Demonstrate** o Trailer inspection to ensure the trailer is ready for go

Unit 35 - Flight preparation: glider, trailer and pilot

KEY MESSAGES

- Effective personal and equipment preparation leads to a greater likelihood of the pilot achieving their goals and increases their overall enjoyment of the sport.
- Being prepared and relaxed will reduce the risk when outlanding.
- Concerns over the state of a retrieve vehicle, the trailer or availability of crew leads to concerns about the possibility of an outlanding and not being willing to leave the circuit area, abandoning tasks at the first sign of difficulty and/or not concentrating on the basics of flying. The result is a pilot who is unable to enjoy cross country flight and is liable to leave the sport.

LESSON PLANNING AND CONDUCT

Briefing

This unit is a ground briefing only, but competency should be checked by observing and questioning using questions such as “What are you doing about …?” or “Why are you doing …?”

Whilst most of the material should be covered over time through normal training, it is helpful to present this section of the syllabus to a pilot as a whole to ensure clear understanding of the importance of being prepared and how this is achieved.

Brief the importance of preparation for successfully achieving cross country goals and the safety benefits.

Brief the following points (derived from the pilot guide).

Personal Preparation

- The importance of physical condition and rest.
- Fatigue and dehydration effects of alcohol on the days prior to a flight.
- Necessary personal items such as hat, sunglasses, clothing, drinking water, charged phone, satellite tracker/beacon.
- Meteorology and preflight planning, maps, airspace restrictions (Refer to Unit 38 – Meteorology and flight planning).
- SAR considerations (reference also GPC Unit 36 Navigation and Airspace - SAR).

Glider Preparation

- Checking the airworthiness of the glider in advance and cleaning (especially the canopy); checking gap tapes.
- Batteries must be fully charged and sufficient for the duration of the flight. Discharging lead acid batteries below 50% significantly reduces battery life. Modern electronic systems typically draw large current the may discharge the glider batteries in an extended flight.
- The glider must be adjusted for an extended flight – seating position comfortable (with the parachute) with everything within easy reach.
- The importance of being familiar with the instruments (particularly flight computers and oxygen systems
- Flight declaration. Emergency water and tie down kit.

Trailer and Retrieve Preparation

- Trailers are commonly poorly maintained and have missing fittings. Is the trailer registered? Tyres must be in good condition and appropriately inflated. Discuss weight limits for car/trailer combinations, braking systems, electrical connections.
- Discuss common problems with pilot's cars for a retrieve – insurance for any driver, full tank of fuel (what sort of fuel), keys are not in the pilot's pocket!

Checklist

The pilot guide for this unit contains a checklist. Cover the points in the checklist and suggest that the student creates their own checklist for their specific circumstances.

EXERCISES

Spend time looking at and finding faults with various trailers and gliders around the club and point out the simple remedies. For example, what are the ballast limits for the glider? are the batteries charged? do you know how to operate the flight computer? Has the trailer been prepared for the upcoming flying season? Have the tyres been checked? are all the rigging aids present and working? can you find the keys to unlock the trailer?

Observe the student preparing for a cross country flight (even if the flight is not conducted).

Notes

- Training for this unit is best conducted with a number of pilots as a group in the form of a targeted discussion facilitated by the coach.
- Make sure all pilots participate and test that knowledge has been gained by re-questioning.
- Use a number of real trailers, both good and bad to demonstrate the common problems and the implications of them.
- Use a number of gliders to demonstrate seating positions and getting comfortable for a long flight.
- Encourage pilots to prepare and use checklists as an aid to being confident that all essential tasks have been completed.

COMMON PROBLEMS

Problem	Probable Cause
• Not remaining hydrated in flight	Not set up for comfortable peeing in flight
• Rushed preparation on the day of the flight	Lack of preparation prior to the day of the flight
• Missing preparation items	Not using a check list

THREAT AND ERROR MANAGEMENT

- Ensure that the student has a good understanding of the need for thorough preparation to manage threats and errors in their future cross country flights.
- Cross country flight introduces additional threats beyond those arising from local soaring flights, such as longer flight times and outlanding. Poor physical and mental condition is a significant contributor to errors in judgement, particularly related to outlanding and normal landings at the end of the flight. Good preparation well before a cross country flight is essential for improving physical and mental condition.
- Timely preparation will reduce stress and fatigue, and improve comfort and hydration.
- Excessive use of alcohol in the days preceding a cross country flight will impact hydration and concentration.
- Outlanding risks are higher with lack of flight planning. Appropriate consideration before the flight to weather analysis, outlanding options, airspace, SAR arrangements etc. is essential to reduce the risk.

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

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

Gliding Australia Training Manual

Trainer Guide

Unit 37

Passenger Carrying

Unit 37 - Passenger Carrying

AIM

To ensure that a glider pilot with passenger carrying endorsement:

- Knows their responsibilities regarding the safety of another person.
- Knows the rules regarding the carriage of passengers.
- Knows how to conduct an effective safety briefing for the passenger.
- Knows how to conduct pre-flight checks with the passenger.
- Is capable of putting the passenger at ease.
- Knows what to do if the passenger is unwell or emotional before or during the flight.

PRE-REQUISITE UNITS

- GPC Unit 26 – Assessment of Competence for First Solo.

COMPLEMENTARY UNITS

- GPC Unit 24 – Human Factors & Pilot Limitations.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. **Knowledge of conditions associated with carriage of passengers.**	• **Describe** ○ The human factors that will be relevant to passenger carriage and what the PIC can do to address these; ○ The rules regarding the carriage of passengers and how the flight costs are charged; ○ The threats and errors that can be associated with flying passengers.
2. **Provide an effective safety briefing and conduct pre-flight checks.**	• **Demonstrate** ○ An effective pre-flight safety briefing to the passenger that covers at a minimum: ○ cockpit ingress, ○ harness use, ○ use of controls and instruments, ○ FOD, ○ location of and use of sick bags and ○ emergency procedures and egress from the aircraft. ○ An effective briefing of the passenger where they are required to assist with manoeuvring the aircraft at any time on the ground.
3. **Fly safely with a passenger on board.**	• **Describe** ○ Situations where it is safer to not undertake the passenger flight. • **Demonstrate** ○ The ability to fly accurately whilst talking with a simulated passenger. ○ A simulated passenger flight from initial briefing to return to launch point.

Unit 37 - Passenger Carrying

KEY MESSAGES

- Carriage of passengers is a privilege not a right and the ability to do so will be determined by competence in this Unit and your Club's Operational Policies.
- There are specific legal rules about passenger flights. Failure to comply with these may leave the pilot or the Club open to fines, sanctions and other legal actions.
- In a passenger flight the PIC is entirely responsible for another person's safety & wellbeing.
- The student must provide a through safety brief to the passenger.
- Ensure the passenger is aware that they should report any traffic they see.
- The passenger may be nervous or unwell and the student must know how to handle these situations.
- Ensure that suitable airsickness bags are carried.

LESSON PLANNING AND CONDUCT

Passenger Carrying Rules

Private Passenger Flying

A private passenger flight may be conducted by any pilot holding a Private Passenger endorsement. The passenger must not manipulate the controls and the pilot must pay at least half the cost of the flight.

The costs of the flight that can be shared are the relevant proportion of annualised maintenance costs or the cost of hiring the aircraft, the cost of the launch for the flight, and landing charges. It does NOT include amortisation of the cost of the aircraft, loans, leases or insurance; as these are costs incurred by ownership rather than cost considered in operating the aircraft.

Public notice of the availability of a cost sharing private flight by any form of public advertisement or announcement is not permitted. CASA has advised that soliciting flights for the purpose of promoting cost sharing is also not permitted on the basis that the pilot is essentially gaining a reward.

Regulations	• Civil Aviation Regulations 2(7A), 228 & 249 • GFA Operational Regulations 4.1.5 & 4.1.6 • Manual of Standard Procedures, Part 2, paragraph 10.5
Responsibility	Undertaken on behalf of the pilot alone. The pilot's Club is not a party to the arrangement.
Authorisation	The pilot must hold a valid Private Passenger Endorsement and meet Annual Flight Review requirements.
GFA Membership	The passenger does not need to be a financial member of the GFA.
Civil Liability	The pilot should consider warning the passenger that gliding is a 'Dangerous Recreational Activity'. A court may limit the damages awarded if it is satisfied that the passenger knowingly undertook a dangerous activity.

Liability Insurance (Refer GFA Insurance Summary for full details)	The pilot has the protection of the GFA Broad Based Liability Insurance (BBL) and any further liability insurance cover on the glider, up to the $ limit of each policy, for liability claims for injury or property damages to a third party (including the passenger). Pilots should satisfy themselves that they have adequate liability cover and consider topping up beyond that.

Charter Flight

A charter flight can only be conducted by an operator holding an Air Operator Certificate (AOC). The passenger must not manipulate the controls and the flight is for 'Hire and Reward', so the passenger will be charged a mutually agreeable fee for the flight. At the time of writing this bulletin there were no operators holding an AOC for glider charter flights.

Regulations	• Civil Aviation (Carriers' Liability) Act • Civil Aviation Regulations 206(1)(b) & 228 • Civil Aviation Order 95.4.1 • GFA Operational Regulation 4.2 • Manual of Standard Procedures, Part 2, paragraph 10.7
Responsibility	The Club or Operator must hold an Air Operators Certificate (AOC) issued by CASA.
Authorisation	The pilot must hold a valid Charter Pilot Endorsement, meet Recent Experience and Annual Flight Review requirements, and hold a valid medical certificate.
GFA Membership	The passenger does not need to be a financial member of the GFA.
Civil Liability	Liability in respect of charter flights is governed by the Civil Aviation (Carriers' Liability) Act.
Liability Insurance (Refer GFA Insurance Summary for full details)	The Club or Operator must hold Carriers Liability Insurance. Liability is capped under the Civil Aviation (Carriers' Liability) Act. [**Note**: this type of cover is not provided under the GFA Insurances]

Air Experience Flight

A person who wants to experience gliding can undertake an air experience flight with an Instructor. The person must sign up as a member of the GFA before the flight and can, if they so desire, receive in-flight instruction and manipulate the controls.

Regulations	• Civil Aviation Order 95.4, paragraph 5.2 • GFA Operational Regulation 4.1.5 • Manual of Standard Procedures, Part 2, paragraph 11.1
Responsibility	Air Experience Flights can only be undertaken under the auspices of a Training Club. Non-training clubs and individuals operating without the support of a Training Club cannot conduct Air Experience Flights.
Authorisation	The pilot must hold a valid Air Experience Instructor or higher endorsement, Meet Recent Experience and Annual Flight Review requirements, and hold a valid medical certificate.
GFA Membership	The participant must be a financial member of the GFA.
Civil Liability	The participant must sign a membership application, including a 'Terms & Conditions and Exclusion of Liability'

Liability Insurance (Refer GFA Insurance Summary for full details)	document. [Refer also to the Competition and Consumer Act 2010 (Cth) and various State and Territory Acts.] If the Club or Instructor are liable for injury or property damages to a third party sustained from the flight (including to the student), they have the protection of the GFA Broad Based Liability Insurance (BBL) plus any further liability insurance on the glider, up to the $ limit of the highest value policy. Clubs should satisfy themselves that they have adequate liability insurance cover on their two-seater training gliders, over and above the BBL excess value.

Charity Fund Raising Flying

Under certain circumstances, CASA allows private pilots to carry paying passengers during charity fundraising events. That's a departure from the normal rules: In most situations where passengers are paying for a flight, Civil Aviation Legislation requires the pilot to hold an Air Operator's Certificate. In the case of charity fundraising flights, however, CASA feels that the public benefits justify extending the privilege to private pilots subject to certain rules.

Private passenger flights may only be conducted by persons holding a private passenger endorsement issued by their CFI. A private passenger flight may be conducted as a charitable flight under the auspices of a bona-fide charity. Consequently, a pilot wishing to conduct charity fundraising flights should make enquiries to ensure that the charitable entity is currently endorsed as a 'deductible gift recipient' for the purpose of subsection 30.227(2) of the Income Tax Assessment Act 1997 (Cth) as in force from time to time.

CASA is not concerned with the form of benefit conferred on the charitable entity as a result of a charitable operation. A charitable operation can make a profit where those profits are donated to the charitable entity, and it is acceptable for the operator to recoup their genuine costs and to donate only the profits of the charitable operation.

However, the passenger needs to be well informed of the circumstances and nature of the flight and retaining evidence of such notification would be prudent and actively encouraged. GFA suggests that participants sign an acknowledgement of the risks and an exclusion of liability along similar lines to that included in the forms used for AEFs.

Legal liability

When conducting passenger flights, ensuring informed participation by the recipient of the flight is paramount and retaining evidence of such notification would be prudent and actively encouraged. While persons undertaking an Air Experience Flight are informed of the risks and sign a waiver when they apply for GFA membership, there is no standard form for Charter or Private passenger carrying. GFA recommends that pilots and operators of private or Charter flights have their passengers sign an acknowledgement of the risks and an exclusion of liability along similar lines to that included in the forms used for AEFs.

Committees and Panels need to be mindful that passenger operations conducted outside the legal framework approved by CASA may expose clubs, its officers and pilots-in-command to serious corporate and individual risks, and may compromise insurance coverage.

Briefing

About Passenger Flying

The student is to be briefed on the following:

- When flying passengers, a pilot will now be in charge of the safety of another person (the passenger).
- The regulations regarding passenger flying – no advertisement, share of operational flight costs, liability, use of controls only by PIC.
- The difference between passenger carriage and instructional flights.
- The human factors associated with flying private passengers – need to fly accurately, not trying to impress or show off, need to communicate with the passenger, understanding of the effects of dehydration, G forces and height change. The same Human Factors that affect the Pilot are also applicable to the passenger.
- That the experience should be pleasant, not stressful for the passenger. This could be a new Club member.
- Ensuring aircraft loading and configuration is correct.
- Ensuring weather/environment is suitable.
- The threats and errors associated with flying with other (non-pilot) people – responsibility for others' lives, distractions (questions, conversation, illness, attempting manoeuvres outside training).
- The need to consider the welfare of the passenger – flying coordinated and conservatively, ensure hydration, not flying longer than necessary. Ensure that the passenger's health and safety needs have priority. Make sure that suitable airsickness bags are carried.

Ensure that if in doubt remember the primacy of – AVIATE, Navigate, communicate.

Passenger Briefing (Classroom or on-Field)

- Describe how to provide a thorough briefing to the passenger that covers: airfield safety, safety in the aircraft (harness, canopy, controls), where to put hands and feet, what not to touch, use of FOD (cameras, phones), need for sterile cockpit during checks and critical sequences.
- The passenger briefing should ensure that your passenger has no loose objects that could pose a problem in flight. If they have a camera, ensure the passenger holds it in such a manner so that it cannot foul the control column. Passengers should be advised never place any object on the floor or close to the control column, and should they inadvertently drop something they should immediately tell you. Loose objects such as phones are best left on the ground but if carried they should be stowed securely in the pocket on the cockpit wall. If portable devices have a wrist strap, they should use them.
- If parachutes are worn, providing a thorough briefing on the wearing, aircraft egress, parachute deployment and landing procedures.
- Providing a briefing on potential launch failure scenarios (such as winch launch failure) so that they may be aware of recovery manoeuvres ahead of time, without being alarmist.
- Provide a briefing on the objectives of the flight.
- Describe how to encourage the passenger to be part of the flight crew by reporting traffic they see.
- Provide advice on how to assist an anxious or nervous passenger, prior to and during flight.

- Where the passenger is expected to assist moving the aircraft on the ground after landing, what advice needs to be given on the safe handling of the aircraft and hazardous or fragile areas to avoid touching.

Flight Exercises

During flights, demonstrate and practice the following:

- Providing information on local area landmarks, airfield/s, other traffic, weather during flight whilst maintaining good lookout, situational awareness and responding as needed to radio calls.
- At circuit joining, briefing passenger on the landing sequence and need to ensure the harness is tight.
- Enforcing sterile cockpit procedures in critical flight sequences (launch, approach, emergencies).
- Demonstration of conservative and accurate flight manoeuvres (including thermalling) to reduce stress on a passenger.

Demonstrate increased stress loads by tasking the student to perform a difficult activity whilst asking questions. Ensure that the primacy of AVIATE-NAVIGATE-COMMUNICATE is utilised.

Ensure that the student conducts a safe (simulated) passenger flight from briefing through to post-flight return to launch point.

Notes:

- Passenger flying has some elements in common with Grade 4 instruction (Air experience) with respect to responsibility for and respecting the passenger's needs.
- Individual Gliding Clubs may have specific policies regarding Private Passenger flying which need to be made clear to the student.

COMMON PROBLEMS

Problem	Probable Cause
• Failing to understand the flight is about the safety and needs of the passenger.	Student may feel the need to impress friends or others with their flying skills or may be unaware of sensitivities to G or height in others. Brief the student on human factors and note any events in the flying that could bring discomfort to passengers.
• Failure to adequately brief the passenger on risks, cockpit ingress, egress, use of controls, harness or emergency procedures.	Student may assume knowledge that the passenger does not have. Instructor should act as an uninformed passenger and advise which areas have not been covered adequately by the student.
• Failure to adequately communicate with the passenger or assess their wellbeing during the flight.	Student may be overloaded with flying the aircraft. Do not proceed with passenger training until basic and safe flying skills are well established.

• Failure to carry suitable airsickness bags (very messy!)	Student may not have inspected the passenger cockpit adequately. Ensure airsickness (emesis) bags are easily available to the passenger in flight.
• Allowing the passenger to touch the controls or pay more than the allowable share of the flight costs.	Possible misunderstanding of air legislation. Student must understand the limits and restrictions on passenger flying.

Debrief

- Ensure that the student describes what elements of the briefing and flight may have caused discomfort or distress to a potential passenger and what steps they can take to reduce or eliminate these.
- Ensure that the student describes anything in their ground briefs, flying style, mannerisms and communication needs adjustment to improve the experience for the passenger.

THREAT AND ERROR MANAGEMENT

THE THREATS AND ERRORS THAT CAN APPLY TO THIS UNIT ARE AS FOLLOWS:

- Anxious, unwell or talkative passenger that distracts the PIC:
  - PIC loses situation awareness through loss of orientation or failure to lookout.
- Passenger does not know correct weight and no on-field means of verification:
  - Aircraft loading is incorrect.
- Passenger brings items on board that become FOD (such as pens, camera, phone):
  - Potential damage to aircraft or impact on manoeuvrability.
- Passenger rests parts of body on critical aircraft controls:
  - Inadvertent change in aircraft configuration.
- Feeling the need to impress the passenger:
  - Potential for placing aircraft outside the flight envelope.
  - Potential for frightening a nervous passenger.
- Allowing the passenger to fly the aircraft:
  - Violation of air legislation and regulations.
- Feeling pressured by the passenger to conduct a manoeuvre or prolong a flight outside areas of competence (e.g., aerobatics) or beyond what the pilot would normally do.
- The signs (verbal and non-verbal) of discomfort that a passenger can exhibit:
  - Missing warning signs of panic, nausea, barotrauma, heat exhaustion/stroke, hypothermia.

TRAINING MATERIALS AND REFERENCES

- GPC Unit 37 Pilot Guide

Gliding Australia Training Manual

Trainer Guide

Unit 38
Meteorology and Flight planning

Unit 38 – Meteorology and Flight Planning

AIM

To develop the student's knowledge and skills in determining the suitability of the forecast weather for cross country flight and in setting an appropriate task for the expected conditions.

PRE-REQUISITE UNITS

- GPC Unit 33 Thermal sources and structure
- GPC Unit 34 Outlanding planning, demonstration and execution
- GPC Unit 36 Airspace and Navigation

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 40 Cruising, speed to fly, height bands and thermal selection

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Predict soaring conditions	• **Demonstrate** o Accessing relevant weather information for the local area • **Predict** o Wind speed and direction at different times and heights o Cloud layers o Thermal heights, strengths and the soaring window
2. Plan flight	• **Describe** o Weather threats and mitigation strategies • **Predict** o Cross country speed • **Plan** o Suitable task distance o Suitable task waypoints o Review NOTAMS and radio frequencies.

KEY MESSAGES

- How to access and use weather information relevant to planning a flight.
- Weather threats such as wind, rain, thunderstorms, and dust/smoke and effect on flight planning.
- The concept of the soaring window.
- The likely cross-country speed that can be achieved based on predicted thermal strength, wind and other conditions.
- Selection of a suitable task.

LESSON PLANNING AND CONDUCT

Briefing

Pre-flight briefings are based on predicted weather, so it is important to compare actual flight experiences against the predictions with the student after the flight.

The lesson can either take the form of a presentation covering the details, or a less formal approach of simply working the student through the process prior to a flight. Presenting a lecture is often more efficient with a number of students. The less formal approach works best with a single student.

Meteorology and flight planning is a very large subject. At the GPC level it is only necessary to train the minimum to allow students to predict basic soaring weather for flight planning purposes. Emphasise that inexperienced pilots should be conservative – if in doubt don't fly cross country or speak with an instructor or coach. Meteorology and flight planning will be covered in greater detail in the post-GPC syllabus.

It is important that the student learns to predict the soaring conditions themselves, however most likely there will be a daily club weather briefing and discussion on possible tasks. This is a great learning environment. Student pilots can also talk with experienced pilots on the day.

Weather predictions

This section discusses sources of weather information and the information to be extracted, or predicted, from the weather sources.

Ensure that the student(s) have sufficient knowledge to be able to access weather information sources in future (including login). Demonstrate access to each source listed below and how to find the relevant information:

- Looking outside!
- Bureau of Meteorology – General forecast, synoptic chart, prognostic chart, satellite images
- NAIPS area forecast
- Atmospheric soundings
- Gliding weather models (such as GFA Met, Skysight and XCSkies)

Students must be able to interpret and use general weather forecasts and not rely solely on gliding weather models.

A list of basic weather information required is below. This information is used for task planning (discussed later) and assessment of weather hazards:

- Weather events and timing (fronts, wind, rain, thunderstorms, dust/smoke etc)

- Wind speed and direction during the day (at surface and selected altitudes)
- Cloud – cumulus cloud base and high cloud over the day
- Maximum temperatures over the task area
- Thermal heights
- Thermal strength
- Soaring window

Predicted versus actual. Discuss the importance of comparing information from general and gliding forecasts with actual observations such as local temperatures and satellite images – look outside and don't get seduced by computer models. Are fronts/troughs/cumulus development progressing as expected?

Brief the formation of cumulus cloud from condensation of rising water vapour forming water droplets (condensing when the dew point is reached). Describe calculating the approximate cumulous cloud base in feet (where present) derived from the difference between the observed dew point and temperature multiplied by 400.

At this level predicting thermal heights and strengths from modelled and observed atmospheric soundings is not covered. This information can be found in the gliding weather models, or from talking with experienced pilots. The rule of thumb generally applies that the higher the thermals go, the stronger they are – for example often 3 to 4 knots for 4000 foot thermals, and 6 to 7 knots for 10000 foot thermals.

Similarly predicting the time when thermals start and stop (the soaring window) from first principles is not covered in this unit – this information is available from gliding weather models.

Make sure the student understands the implications of wind on cross country flight:

- Impact on outlanding
- Impact on achieved speed - the stronger the head wind, the slower the average speed
- Impact on thermals – broken and so harder to use, so slower average achieved climb rate
- Increased danger in using thermals low

Flight Planning

Flight planning in the context of this unit is the process of using the weather predictions to plan an appropriate task. This requires the student to develop an understanding of achievable cross-country speeds under various conditions and other considerations for planning a task including safety.

At the GPC level the student only needs to be aware that MacCready theory can be used to calculate achievable cross-country speed given the performance of the glider and the strength of the thermals. It is not necessary to delve into the theory. It should be noted that an inexperienced pilot is only expected to achieve speeds much lower than theoretically possible – generally due to average climb rates significantly lower than for experienced pilots.

The pilot guide for this unit includes guidance on typical achievable speeds for an inexperienced pilot flying an unballasted glider such as an LS4. These speeds are intentionally low and hopefully will provide a sense of achievement when exceeded. If there is any significant wind, then cross country speed will be reduced, particularly for inexperienced pilots. A rule of thumb that can be applied is that if predicted winds are above 5 knots at flying heights, reduce the predicted average speed by about 1 kph per knot of wind speed. If possible, it is useful to review cross country speeds actually achieved by the pilot from previous flights under different conditions.

Some considerations for task planning are:

1. Task time. This should be shorter than the soaring window as predicted from the weather analysis and should take into account time to climb in the first thermal and before leaving on task. Early cross-country pilots should not be too ambitious with task time. Consider landing well before significant weather events.
2. Task distance. Calculated from the predicted cross-country speed in the task time available.
3. Task waypoints. The following should be considered:
    - Airspace restrictions.
    - NOTAMS at aerodromes enroute.
    - Radio frequencies enroute
    - Areas of adverse weather.
    - If possible, fly down wind on 1st and last legs - into wind during the peak of the day.
    - Avoid flying west at the end of the day (visibility is poor).
    - Placing the airfield mid-leg minimises any retrieve.
    - Silver Distance requires flying to at least 50km from the tow release point and launch point. Be aware of other geometry requirements for badge flights.
    - Choose a task that avoids difficult outlanding terrain (or make sure enough height is available to cross) or choose a task that remains within range of suitable airfields.
    - What is the longest retrieve the pilot is comfortable with (if needed)?

Discuss possible tasks using a map or use an application such as SeeYou.

The simple task planner table in the pilot guide for this unit is a tool that can be used for planning a task. The student may wish to keep the completed planner for each day to use for future reference.

COMMON PROBLEMS

Problem	Probable Cause
• Incorrectly setting task distance	Incorrectly predicting the wind and or thermal strengths/heights over the soaring window Incorrectly estimating likely task speed with the student's experience in the predicted conditions Not factoring in the time from launch to leaving on task
• Choosing an inappropriate task	Unfamiliarity with local conditions, terrain and airspace

Flight Exercises

Conduct the planned flight. This flight is best conducted in conjunction with flight exercises from Navigation and Airspace or Advanced soaring instruments and flight computers.

As the flight progresses, query your student on their perception of the conditions encountered relative to the predicted conditions. Emphasise the need to watch for changes such as the progression of a front, cloud and changes in wind direction and strength.

Ask your student to comment on task progress relative to the progress anticipated during flight planning. As necessary, replan the remainder of the flight.

Debrief

It is useful, regardless of whether or not a task was flown, to demonstrate basic elements of reviewing a flight (detailed flight analysis is in the post-GPC syllabus). It would be best to do this with a

recorded flight of the student if possible. Alternatively, a flight showing examples of both good and poor climbs would be helpful.

Attention should be paid to individual thermals and the climb rate achieved for the duration of the thermal. Any drop off in thermal climb rate should be reviewed at the beginning of the thermal and prior to leaving the thermal to highlight thermal centring issues or spending too much time in a weakening thermal.

The achieved heights, thermal strengths and weather should be reviewed against the forecasts for the day. Reasons for variations should be discussed.

If possible, show students how applications such as SeeYou can be used to determine achieved cross-country speed, average thermal climb rate achieved during a task and percentage of time spent thermalling against cruising.

THREAT AND ERROR MANAGEMENT

- The main weather threats include wind, rain, thunderstorms, and dust/smoke. Ensure that the student can access and understand the appropriate information sources to assess the likelihood of these weather events. Appropriate actions may be not to fly, task in a different direction, task for a shorter part of the day, abandon the task, or simply increased vigilance.
- Ensure that the student is aware of the dangers of outlanding in difficult conditions such as strong winds or gust fronts. At all times it's always a good idea for pilots to seek advice from experienced instructors.
- Other than specifically related to weather events, unlandable terrain may be a major cross country flying threat. Ensure that the student understands areas of unlandable terrain in the local tasking area and how to assess this during task planning – for example through the use of Google Maps.
- At some sites it is advisable to fly with a database of airfields and always keep at least one within glide at all times (stepping stones).

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Trainer Guide

Unit 39

Advanced soaring instruments and flight computers

Unit 39 – Advanced Soaring Instruments and Flight Computers

AIM

To develop the student's knowledge and skill in the use of modern flight computers without degrading their lookout and situational awareness.

The focus is on moving map flight computers, including personal devices such as the Oudie and mobile phones.

The pilot should become familiar with the operation of the devices they will use and apply the concepts outlined in this unit.

PRE-REQUISITE UNITS

- GPC Unit 38 Meteorology and flight planning

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Describe information available and assumptions	**Describe** o Averager and netto modes of electric variometers o The purpose of relevant items shown on flight computer pages and at what stage of the flight each item is of use o The basis on which flight computer predictions of wind, ETA and arrival height are made
2. Demonstrate practical use of a flight computer	• **Demonstrate** o Setting up a task and parameters on the ground o Navigating a task and adjusting parameters (such as thermal strength) in the air o Excellent lookout with minimum "screen time" o Correct interpretation of the information displayed

KEY MESSAGES

- The pilot needs to think and look ahead.
- Flight computers can be a distraction from the tasks at hand and degrade pilot performance.
- Flight computers display accurately what's happening now and in the past. Predictions of finish height, ETA etc. are based on assumptions of climb rate and winds.
- Flight computers can display a huge amount of information - only relevant or useful information should be displayed.
- The display should be uncluttered to allow relevant information to be seen clearly and quickly.

LESSON PLANNING AND CONDUCT

Briefing

Electric Variometers

Brief the concepts of electric varios with reference to:

- Averaging of the instantaneous vertical climb/sink rate (averager)
- Netto and relative netto
- Configurable parameters such as total energy compensation based on a mix of the total energy probe, pitot, GPS and inertial sensors
- Speed to fly information
- Many other display features blurring the distinction between varios and flight computers

Note that electric variometers still suffer from limitations related to lag and gust sensitivity. Advanced functions require configuration and a good understanding of what is displayed.

Flight Computers

Discuss the many types of flight computers available (there's a list in the pilot guide for this unit). This unit can't cover the breadth of these devices, and nor is it appropriate for an in-experienced pilot to use many of the features – they should learn to fly cross country using the basics first then move on to the fancy devices if they wish. However there are common principles which are covered below.

All systems display and allow configuration of:

- A task
- MacCready setting (assumed climb rate)
- Airspace boundaries
- Wind vectors
- Required track and actual track
- Distance and bearing to next turn point
- Finish height or final glide data

Using an example device such as those available in the club gliders, demonstrate configuration and display of the above items. Most devices have a simulator that can be run on a computer – these are a great way to

demonstrate use of the device. Or use the appropriate pages from the manual and then demonstrate in a glider. If the club gliders don't have flight computers try using the Oudie simulator (search for it on google).

Explain the effects of the MacCready setting, wind, bugs, ballast and finish height on the predictions made by the computer for the task (particularly ETA and finish height).

At the flight computer to be used:

- Ensure correct computer setup for the pilot, glider polar, bugs, airspace, turn-points, finish height, ballast and connection to other devices.
- Help to set up a short task on the flight computer.
- If possible, run through a simulation or replay of a flight on the computer so the pilot can see how it works and what it displays.

Flight Exercises

Do the short task set in the flight computer. The whole task may be within gliding range of the airfield or can be combined with a flight for one of the other GPC units.

Monitor the student's lookout and understanding of the information being displayed. Be aware that the student may become absorbed by the computer and lose lookout and awareness.

COMMON PROBLEMS

Problem	Probable Cause
• Distraction with flight computers resulting in poor lookout	Lack of familiarity with use of flight computers Lack of discipline with dividing on-screen tasks into small units
• Relying too much on the information displayed	Lack of understanding of the underlying assumptions and calculations used by flight computers Incorrect configuration of the flight computer

THREAT AND ERROR MANAGEMENT

- Flights computers, otherwise known as "advanced distraction devices" introduce significant threats that must be carefully managed. Pilots must be aware of the distraction from other tasks such as maintaining good lookout.
- Screen time should be kept to a minimum – this can be achieved by ensuring that only the required information is presented and that the pilot is well practiced in using the device.
    - Where increased screen time is unavoidable, such as reprogramming a task, this should only be conducted after moving away from other aircraft, conducting a full scan lookout with a 180 degree turn, and then regular full scans. Break longer tasks into smaller sub-tasks and conduct a full scan between each sub-task.
- Incorrect interpretation of the information displayed can lead to errors such as misjudging final glides or infringing airspace. In addition, configuration of flight computers is complex and misconfiguration may give erroneous results, potentially impacting safety. All pilots using them must be familiar with the use of the device, be aware of limitations and the potential for incorrect setup; basic setup problems include such items as incorrect glider polar, weight, airspace, and task. This should be practiced on the ground.

- Even with correct configuration, predictions by a flight computer are dependent on history and assumptions about future events. For example the flight computer won't know about wind changes and changes in flight conditions ahead – so ETA and final glide height may be incorrect.

TRAINING MATERIALS AND REFERENCES

- Flight computer manuals and device simulators

Gliding Australia Training Manual

Trainer Guide

Unit 40

Cruising, speed to fly, height bands and thermal selection

Unit 40 – Cruising, speed to fly, height bands and thermal selection

AIM

To develop the student's skills and ingrained habits in selecting a path through the air that improves achieved glide performance; selecting and maintaining an appropriate speed to fly; using height bands to manage risk in terms of locating the next thermal; and choosing which thermals to accept.

PRE-REQUISITE UNITS

- GPC Unit 39 Advanced soaring instruments and flight computers

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Demonstrate Cruising - Track selection	• **Demonstrate** o Looking to the distance on track to identify several thermal sources and/or cumulus clouds and following a pathway through these to maximise the chance of finding thermals o Identifying and following a pathway through areas of rising air to extend glide performance whilst making progress on task
2. Identify Height Bands	• **Identify** o Appropriate height bands for the conditions
3. Demonstrate appropriate cruise speeds	• **Demonstrate** o Consistently determining and adjusting cruise speed based on height band and expected conditions o Maintaining the nominated speed throughout the flight +/- 5 knots
4. Select thermals appropriately	• **Identify** o The thermal strength required appropriate to the height band and conditions • **Demonstrate** o Selecting only thermals that meet criteria
5. Demonstrate final glide	• **Identify** o Sufficient height for final glide • **Demonstrate** o Monitoring glide and taking appropriate actions

Unit 40 – Cruising, speed to fly, height bands and thermal selection

KEY MESSAGES

- Aim to fly a track through rising (or less sinking) air to improve glide performance and maximise the chance of finding the best climbs.
- The speed to fly should be based on the expected conditions ahead, not the last thermal.
- Cruising strictly to MacCready speed to fly theory is inefficient and impossible to achieve - use block speeds (plus or minus 10 knots) that approximate MacCready speeds.
- Don't take every thermal unless necessary - be selective with thermal strength and avoid wasting time by centring too many thermals.
- Don't climb to the top of each thermal - leave when you think the next climb will be better (or to remain below cloud).
- Divide the convection height into three bands: in the top band cruise fastest and only take strong climbs; in the middle band cruise more conservatively and be prepared to take weaker climbs; below 2000 feet prepare for an outlanding and stay within reach of an appropriate landing site while searching for a climb.
- Transition from a soaring pilot to a landing pilot with sufficient height for a safe circuit.

LESSON PLANNING AND CONDUCT

Briefing

Using the pilot guide as a reference brief:

- Cruising – Track selection
- Height Bands
- Speed to Fly
- Thermal selection
- Final glides

Do not brief in too much detail. These topics are an introduction at the GPC level and will be discussed in more detail in the advanced training syllabus. Final glides are for more advanced cross-country.

Assist the student to plan a task. The task for this unit will need to be of sufficient length to demonstrate and allow the student to practice each of the competencies. A triangle task of at least 150 km should be sufficient.

Review the set task:

- Based on the weather forecast, determine thermal height and strength expected.
- Nominate height bands and expected cruise speeds.
- Consider potential thermal sources on track, and areas with potentially weaker thermals.
- Identify where the last thermal for final glide is likely to be.

Flight Exercises

Demonstration

- Point out the direction to the next waypoint whilst you fly the glider. Point out areas of better or reduced thermal potential, areas that may be hotter or have good trigger points. Point out lines of cumulus (if present) in the general direction of track and describe hopping between the clouds.
- Advise the upper height band and challenge the student not to thermal until coming to the bottom of the height band. Suggest the appropriate speed to fly and state the need to maintain this speed unless flying into lift, when you can reduce speed by 10 knots to get a better feel.

Student Exercises

- Key skills are flying in the direction of track, aiming for a good thermal or thermal source, and maintaining the set cruise speed. Monitor these three elements and provide positive feedback, or suggest improvements.
- Monitor and emphasise lookout and use of trim.
- Once this has been consistently demonstrated change the focus to feeling for better air as you fly towards the next thermal. Fly at a slower speed to get better feel if necessary.
- Point out the height lost in reaching the next thermal and monitor this for subsequent glides. As the glider descends to the next height band, make sure you announce this and encourage a small speed reduction and greater focus on finding a thermal.
- As you approach 2000 feet talk about a possible outlanding and then take over. Your focus should be to climb. Ask the student to identify suitable landing fields. Monitor their contribution, but also consider alternatives.
- There is no problem with outlanding. It will be a good experience for the student. Do not try thermalling at very low altitude in order to 'save' the flight. This sets a poor example for future solo flights.

COMMON PROBLEMS

Problem	Probable Cause
• Losing too much height in the glide	Not selecting and following an appropriate track
• Cruising speed too slow or too fast for the conditions	Incorrect understanding of appropriate cruise speed Not considering the height band and looking at the conditions ahead Inattention to cruising speed
• Limited ability to feel the air	Cruising too fast
• Taking every thermal regardless of strength	Not selecting thermals in accordance with the selection criteria (is the next thermal likely to be better?)
• Climbing in weak rising air at the top of a thermal	Not leaving when the next thermal is likely to be better

THREAT AND ERROR MANAGEMENT

- The primary threats for this unit relate to outlanding and collision with other traffic.
- Recap with the student threats and mitigating actions identified in the GPC units ‘Soaring with other gliders’, ‘Outlanding planning, demonstration and execution’ and ‘Navigation and airspace’.
- Reinforce the importance of transitioning at the appropriate time from a soaring pilot to a landing pilot, allowing sufficient height for a full circuit, and not selecting a track over unlandable terrain. In particular discuss the dangers associated with becoming low on final glide and the temptation to try stretch the glide to the airfield – make an early decision to find a thermal and plan for a possible outlanding.
- As always, emphasise the importance of maintaining good lookout at all times.

TRAINING MATERIALS AND REFERENCES

- G Dale. ‘The Soaring Engine – volume 1’, Chapter: Flatland soaring
- G Dale. ‘The Soaring Engine – volume 3’, Chapter: Flying

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Unit 41

Demonstrated Cross Country Capability

Unit 41 – Demonstrated Cross Country Capability

AIM

To evaluate the student's capability to combine the GPC competencies to safely plan and achieve cross country flight in thermals.

PRE-REQUISITE UNITS

- GPC Unit 40 Cruising, speed to fly, height bands and thermal selection

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Plan a cross country flight	• Demonstrate satisfactory flight planning considering at least: o personal preparation o meteorology o airspace and radio frequencies o NOTAM o safe outlanding options and trailer/crew arrangements o task setting, task declaration and official observer awareness o flight computer programming
2. Demonstrated cross country flight	• Demonstrate o Effective lookout throughout all stages of the flight o Proficient navigation and choice of route considering thermal sources, weather and airspace o Safe consideration of outlanding options o Appropriate decisions on when to take thermals and when to leave o Safe entry to thermals and centring within 2-3 turns o An appropriate cruise speed relative to anticipated climb rate and height o Competent use of a flight computer

KEY MESSAGES

- For safe and successful cross-country flight, good pre-flight preparation is essential.
- In-flight choice of route, thermals and cruise speed must be constantly re-evaluated with consideration of weather, terrain, outlanding options and airspace.

LESSON PLANNING AND CONDUCT

Briefing

Advise the student that Demonstrated Cross Country Capability is an assessment unit. They will be observed in all aspects of flight planning and flight conduct on a cross country flight in thermal conditions. With the exception of safety concerns, the assessor will not prompt the student. Training sequences will not be conducted on the cross-country flight.

Ask the student to go through the complete flight planning exercise. It may be helpful for students to use the required flight planning competency for this unit and competencies from the prerequisite units as a checklist.

The planned cross-country flight need not be long but must include at least two waypoints well beyond glide of the departure airfield given the anticipated conditions of the day.

If flight planning is not completed to a suitable proficiency then do not continue with the flight assessment until the student undertakes further training and can demonstrate proficient flight planning.

Flight Assessment

The flight should be conducted in a twin seater glider with the student in the front seat (assuming tandem configuration). Assess the competencies listed under flight conduct for this unit.

Ensure that effective lookout is maintained at all times, particularly during high stress portions of the flight.

The student should have met the performance standard required by all the pre-requisite units; however it is to be expected that there will be lapses in concentration putting this all together to achieve cross country flight. The flight assessment can be signed off provided that the flight is conducted safely and the student can demonstrate that they understand the concepts and demonstrate the required performance standard most of the time.

Flying for this sequence requires reasonable thermal conditions such that a relatively straightforward cross country flight can be conducted with limited risk of outlanding. If an outlanding becomes necessary it is best conducted by the student under observation, provided that the assessor holds a L1 or above instructor rating. Outlanding does not preclude a satisfactory assessment of proficiency.

Debrief

Provide feedback on the flight planning and flight – strengths and areas for further improvement. Highlight further training opportunities in the Advanced Training Syllabus.

Undertake review/s of flight traces and explain good and poor decisions, areas for improvement and how to self-analyse.

COMMON PROBLEMS

Problem	Probable Cause
• Lapses in proficiency of previously trained cross-country competencies	Limited multitasking ability – this will improve with time but performance related to safety must not be compromised

THREAT AND ERROR MANAGEMENT

- Threats and errors related to cross country flying are covered in the prerequisite units.
- For Demonstrated Cross Country look out for errors related to multi-tasking. For example, lookout may be acceptable in isolation, but may become poor when trying to navigate, while stressed at the low end of the height band, while trying to work out why the flight computer wind seems to be wrong etc. As previously trained, make sure that the student is always prepared for a safe outlanding.
- The debrief is a good opportunity to review threats and errors related to the cross-country sequences.

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Unit 42

Daily Inspection, Pilot Maintenance Limits,
DI Certificate

Unit 42 - Daily Inspection, Pilot Maintenance Limits, DI Certificate

AIM

To develop the skills and knowledge required for assessment and examination by an authorised Daily Inspector (DI) Examiner:

- To perform a daily inspection on a glider;
- Including elements of pilot maintenance within approved limits, and;
- Correctly complete the DI Certificate.

PRE-REQUISITE UNITS

- GPC 25 Threat and Error Management;
- GPC 24 Human Factors and Pilot Limitations;
- GPC 3 Pre-flight Preparation

COMPLEMENTARY UNITS

Nil.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Describe the key elements of the GFA Glider Airworthiness System.	• **Describe:** ○ the principle of Airworthiness. ○ the purpose of GFA Certificate of Registration. ○ the purpose of a Certificate of Airworthiness. ○ the purpose of a Sailplane Maintenance Release and Daily Inspection Record.
2. Conduct a Daily Inspection under supervision.	• **Observe, Participate in, and conduct:** ○ Daily Inspections under direct supervision of Instructors and DI Examiners. • **Describe:** ○ The implications of entries made, or missing, in the Sailplane Maintenance Release and Daily Inspection Record; ○ The airworthiness implications of defects, disconnections, obstructions, incorrect functionality, incorrect adjustments discovered during DIs that require judgement of potential non-airworthy conditions. ○ Appropriate actions that are undertaken to rectify discrepancies. • **Conduct under supervision:** ○ Allowed pilot maintenance actions on minor defects;

	○ Daily inspection certified in accordance with regulatory requirements.
3. Recognise non-airworthy conditions.	• **Recognise Non-airworthiness due to:** ○ Missing or expired Sailplane Maintenance Release and Daily Inspection Record; ○ Outstanding Recurring Maintenance items (Due date or Time in service or Launches); ○ Outstanding non-cleared Major Defects; ○ Incorrect rigging of control connections, and failure to conduct and sign independent control checks after disconnection and reconnection; ○ Obstruction or incorrect functionality of primary and ancillary controls; ○ Physical or electrical defects or other incorrect functionality. • **Describe:** ○ Airworthiness implications of outstanding non-cleared minor defects; ○ Actions to be taken upon recognition of non-airworthy conditions.
4. Recognise limits of allowed pilot maintenance.	• **Describe:** ○ Maintenance actions that are permitted to be conducted by a glider pilot in command who does not hold glider maintenance qualifications; ○ Actions to be taken on identifying maintenance requirements and airworthiness limitations beyond PIC authorisation or ability; ○ Documents, references and authorised persons that may assist in conduct of allowed pilot maintenance.
5. Complete a Daily Inspector Examination.	• **Successfully complete**: ○ A Daily Inspection Examination under the supervision of an authorised Daily Inspection Examiner.

Unit 42 - Daily Inspection, Pilot Maintenance Limits, DI Certificate

KEY MESSAGES

- Human factors matter. Self-discipline and avoidance of interruptions and distractions are critical to correct daily inspections. If interrupted, start again.
- Use the checklist in the Daily Inspection Schedule in the Maintenance Release.
- Know the glider. Check the type-specific manuals. Seek advice from others with experience of inspecting that glider type.
- Beware of airworthiness problems and risks associated with poor ground handling.
- Pilot safety depends upon Airmanship, Airworthiness discipline and Standards.
- Near enough is NOT good enough, she'll be right is NOT right. Cavalier attitudes towards airworthiness and maintenance may have serious safety consequences.
- A signed Daily Inspection by a qualified inspector certifying an airworthy glider is a prerequisite for flight. No exceptions.
- A signed Daily Inspection certifying an Independent Control Check after disconnection and reconnection of controls is mandatory. No exceptions.
- Look at the glider from a distance first, and flight control functionality, checking major airworthiness defects before examining the detail.

LESSON PLANNING AND CONDUCT

- This unit must be performed in conjunction with an authorised Daily Inspection (DI) Examiner. Only an authorised DI Examiner can sign a student pilot off as qualified for award of a DI Rating.
- Instructors who are not authorised DI examiners, yet who hold DI ratings, are expected to conduct training for this unit through student observation and supervision with DIs conducted by the instructor.
- When the student has been trained in these DI foundation competencies, they must be handed over to an authorised DI Examiner for training, examination and approval of a DI Rating.
- The instructor is expected to be capable of training a student to a standard suitable for assessment and examination by an authorised DI Examiner**.**

Daily Inspection Lesson Planning

- A structured approach to DI lesson planning is far preferable to ad-hoc training during preparations for flying operations. The latter training may be "loose" and lead to training and education gaps, and of most concern, poor primacy and habits.
- The Club Training Panel and Club Maintenance Officer must have clear policies and protocols for integrating the operationally-focused daily inspection training provided by instructors with that provided by authorised daily inspection examiners.

The DI training system in clubs should be structured to utilise:

- Disciplined observation of instructors conducting daily inspections during preparations for flying operations.
- Student participation in conducting daily inspections, under supervision of the instructor actually conducting and signing the daily inspection.
- Student self-study of the GFA Daily Inspectors Handbook.
- 'Ground school' sessions on airworthiness documents and references, glider type-specific handbooks and schedules, daily inspections, rigging and control connections, common defects and errors, relevant accidents and occurrences.
- 'Ground school' sessions on human errors and biases, human factors, threat and error management, in the context of both daily inspection and pilot maintenance.
- Supervised participation in pilot maintenance, defect repairs, annual inspections, glider de-rigging and rigging evolutions and post-rigging checks.
- Airworthiness education, training and examination by an authorised Daily Inspection Examiner.
- Ongoing mentoring and education of pilots in airworthiness issues and occurrences.

Pilot Maintenance Training

- It is essential that solo pilots and Daily Inspectors understand the limits of allowed pilot maintenance. These are defined in the DI Handbook (and MoSP Part 3 Airworthiness and CASA regulations).
- Daily Inspectors may carry out and certify the following maintenance:
    - Inflate tyres (under inflation must be rectified before flight);
    - Change main wheels, tyres, tubes and brake shoe plates by exchange with serviceable item(s) or replacement of parts, including fitting axle nut split pins & brake shoe bolt lock-wiring (in the case of a hydraulic disc brake slave cylinder) under supervision from a Form 2 inspector.
    - Adjust cable actuated wheel brakes for better braking;
    - Change nose- and tail-wheels, tyres and tubes;
    - Secure removable ballast;
    - Clean out the fuselage and other components;
    - Replace simple gap tape – fixed surface to fixed surface, e.g. fuselage to wing junction;
    - Polish canopies using appropriate materials and processes;
    - Remove or replace instruments (other than the ASI and altimeter) where this does not affect the pitot-static system, e.g. TE driven variometer; g meter, navigation display;
    - Install and remove/replace batteries;

  - Perform Independent Daily Inspections after re-rigging gliders;
  - Lubrication as appropriate;
  - Change or amend placards under instruction
  - Change worn skid shoes and plates.

- It is self-evident that students must be supervised in carrying out these activities, by instructors, airworthiness officers and Form 2 inspectors as appropriate, until they are deemed competent in these tasks and hold a Daily Inspection rating.
- The principle here is: If you are not sure what you are doing, then do not undertake the matter on your own. Rather take the initiative and find competent assistance so that you have appropriate supervision while conducting the task, or that the other person carries out the task while you observe, assist them and learn from them.

INSTRUCTOR NOTES

The DI instructor (Form 2 Inspector or DI Trainer) and DI examiner must insist on very high standards of self-discipline and attention to detail. Pilots' lives depend upon discovery of non-airworthy conditions and successful completion of daily inspections.

- Avoid distractions and interruptions. If interrupted, start again.
- Insist that students download, print and study the Daily Inspectors Handbook.
- Place high emphasis on primacy, and recognition of key non-airworthy conditions including incorrect rigging, non-connection of controls, incorrect functionality of primary and ancillary controls, obstructions, adjustment of seats and harnesses, cable releases, glider-specific common defects.
- Always use the Daily Inspection Schedule checklist in the Sailplane Maintenance Release
- When minor defects are discovered, always ask the student whether these are within scope of allowed pilot maintenance, or whether they require an authorised maintenance officer to remedy and sign defect clearance.
- A required training outcome is that pilots and daily inspectors understand the limitations of allowed pilot maintenance. It is highly desirable that they should be able to conduct some of these tasks. Further airworthiness training in particular tasks may be required.
- It is a good idea to get the student to self-analyse and debrief their performance of supervised daily inspections and pilot-allowed maintenance, and airworthiness insights arising from those activities.
- Beware of over-confidence, poor self-discipline, cavalier or dismissive attitudes. Pilots may benefit from sobering education using SOAR Occurrence Reports, Accident Summaries and Airworthiness Notices.
- Educate students that the GFA Maintenance Department is particularly concerned about the continuing high rate of preventable accidents, injuries and defects arising from:
  - Incorrect glider rigging and disconnected controls;
  - Jamming, obstruction, incorrect adjustment and obvious damage to controls;
  - Incorrect adjustment and rigging of seats and harnesses;
  - Incomplete and interrupted daily inspections and pre-flight checks;
  - Incorrect and unauthorised pilot maintenance;
  - Ground handling errors affecting airworthiness.

THREAT AND ERROR MANAGEMENT

- Human Error may drive many non-airworthy conditions, including:
    - Flight with disconnected, obstructed or incorrectly adjusted controls;
    - Flight with mis-rigged pins and safety devices;
    - Flight with major defects not cleared;
    - Flight with Daily Inspection not completed and signed;
    - Flight with electrical, avionics, fuel, engine management and ancillary systems not correctly configured or functional.
- Stay alert. Always adopt a defensive mental posture, assuming possible defects until checked correct. Do not assume; check.
- Avoid distractions and interruptions. If interrupted, start again.
- Pilots may rush inspections and checks may be less thorough. They may also be inclined to downplay the significance of a minor defect. Self-discipline is critical to safety outcomes.
- Independent Control Checks are essential after disconnection and reconnection of controls.
- If in any doubt, a second pair of eyes may assist in reducing airworthiness risks and checking any pilot maintenance prior to flight.
- Dehydration, fatigue, overheating, cold or discomfort may contribute to lapses and errors in inspections and pilot maintenance. Inaccessibility and poor visibility may drive inspection and maintenance errors. Using the wrong tools may cause errors and defects.

TRAINING MATERIALS AND REFERENCES

- GFA Daily Inspectors Handbook.
- TEM (Daily Inspections).pptx
- GFA MoSP Part 3 Airworthiness.
- GFA Basic Sailplane Engineering.
- GFA Form 1 Sailplane Maintenance Release and Daily Inspection.
- Pilot Operations Handbooks, Glider Flight Manuals, Glider Maintenance Manuals, Glider Type Sheets, Technical Notices and Airworthiness Directives (Type-specific.)
- GFA SOAR Reports and Occurrence Summaries.

TRAINING NOTES AND LESSON PLANNING FOR POWERED SAILPLANE PILOTS

- During conversion training to powered sailplane, much emphasis is placed upon the operational and handling aspects of powered sailplanes. Equal emphasis must also be placed upon the ground handling, daily inspection and airworthiness aspects of these powered

sailplanes, to ensure that airworthiness issues do not become safety and operations occurrences.

- Daily Inspection training for pilots of powered sailplanes and touring motor-gliders introduces higher systems complexities and risks, compared with non-powered sailplanes described above. These include:
    - Power plant;
    - Internal combustion engine;
    - Jet engine;
    - Electric drive;
    - Fuel system;
    - Battery system;
    - Engine management systems;
    - Electrical system;
    - Avionics;
    - Glider pilot and fuel loading and ballasting.
- Daily Inspection training must therefore include study of glider type-specific handbooks and references, and systems handbooks as necessary.
- It must be emphasised that correct conduct of ground tests of engines and powered sailplane systems is no guarantee that they will actually operate correctly in flight.
- DI training must therefore emphasise key checks and recognition of non-airworthy conditions. Examples include fuel system airlocks and leaks; fuel valves; voltage checks; interlocks for engine or propeller operation and retraction; EMS and sensor functionality checks.
- Study of maintenance problems, airworthiness and operations occurrence reports is highly recommended.
- Study of propulsion system human factors issues is also highly recommended. Higher systems complexity is a risk driver for human factors occurrences.
- Note also that prior powered flying experience should bring advantages of engine management and airworthiness experience and knowledge, BUT also might bring unrealistic expectations of higher reliability and obvious inspection issues. Powered sailplane powerplants are demonstrably less reliable than those used in general aviation.

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Unit 43

Independent Operator Responsibilities

Unit 43 - Independent Operator Responsibilities

AIM

To advise the pilot when operating independently on:

- their rights and responsibilities.
- areas to consider when planning flights.

PRE-REQUISITE UNITS

- GPC Units 1 to 42

COMPLEMENTARY UNITS

There are no complementary units to this training.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Assessment of conditions and factors for safe operations.	• **Describe** ○ The environmental factors that would be taken into consideration when operating independently. ○ The human factors that would be taken into consideration when operating independently.
2. Knowledge of SAR processes.	• **Describe** ○ The entities that can be used for monitoring SAR time. ○ The process the PIC can use to cancel SAR.
3. Knowledge of the accident reporting process.	• **Describe** ○ The types of aviation occurrences that must be reported. ○ The timeframes required to lodge reports on occurrences. ○ The mechanisms that are used for reporting aviation occurrences. ○ The information that needs to be included in an occurrence report.
4. Knowledge of rating and site limitations.	• **Describe** ○ The limitations and responsibilities of a pilot operating independently. ○ The processes and limitations associated with the site used by the pilot.

KEY MESSAGES

- A pilot operating independently has greater freedom but is also solely responsible for their flying operation.
- An independent operation is not any less safe than a supervised Club operation, however the pilot must ensure that they have conducted an effective threat and error assessment.
- Use of SAR reporting times using Flight Note for the planned operation left with a third party are a prudent means of ensuring that action can be taken if a flight is overdue or an accident occurs.

LESSON PLANNING AND CONDUCT

Briefing

Assessment of Conditions and Factors Affecting Safety

Many of these factors have been considered in GPC Units 24, 36 and 38,

To demonstrate competency in this unit the student should review these other units and explain the conditions of weather or human factors that should be considered when deciding to operate.

The bottom line is “it’s better to be on the ground wishing you were in the sky than in the sky wishing you were on the ground”.

Knowledge of SAR Processes

SAR processes are covered in GPC Unit 36 and OPS 0005 Airways & Radio Procedures for Glider Pilots.

To demonstrate competency in this unit the student should review this unit 36 and OPS0005 and explain how to prepare and use a Flight Note, how to brief the holder of the note with regard to their SAR responsibilities and how & when to cancel the SAR process.

Knowledge of the Accident/Incident Reporting Process

Aviation accidents & incidents are notified in accordance with the Transport Security Investigation Act.

There are two types of occurrences:

- Immediately Reportable Matters – must be reported to the ATSB & the GFA EMO as soon as reasonably practical by telephone.
- Routine Reportable Matters – must be reported to EMO within 72 hours.

All gliding accidents & incidents are reported via the SOAR system and reporters tick the ‘report to ATSB’ box to satisfy this requirement.

The SOAR system provides a detailed list of fields that must be used to enter information regarding the occurrence.

Pilots must explain how to access the SOAR report system, available in the menu of JustGo (GoMembership).

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Knowledge of Independent Operator Rating and Site Limitations

The rating is only valid if the pilot has:

- Completed their GPC and
- Successfully completed their flight review.

An independent operator must also have a current copy of relevant charts & NOTAMs applicable to their operation.

Multiple independent operators can fly at the same site simultaneously, however each pilot is responsible for the conduct of their own operation.

Where an independent operator has additional ratings then they can be utilised as follows:

- A pilot who also holds a Private Passenger rating may carry private passengers independently.
- A pilot who also holds a Charter or AEI rating may carry out independent Charter or AEF flights on behalf of their Club.
- A pilot who also holds a Level 1 Instructor rating may, with CFI authorisation, carry out independent instructing flights within the limitations of the Level 1 rating.

When operating at a site with a resident gliding club, Independent Operators must comply with any site-specific requirements set by the resident club.

Flight Exercises

There are no flight exercises associated with this unit.

COMMON PROBLEMS

Problem	Probable Cause
• Unable to access SOAR.	Pilot may not have current URL or telephone numbers for reporting points within GFA (EM/Ops, RM/Ops etc.).

THREAT AND ERROR MANAGEMENT

- Ensure pilot has sufficient experience to adequately judge ability to fly and resist undue influences.
- Consider the capacity needed to withstand pressures to operate in marginal conditions.

TRAINING MATERIALS AND REFERENCES

- MOSP 2, Section 13.
- GFA Unit 43 Pilot Guide.
- GFA OPS 0005 Airways & Radio Procedures for Glider Pilots.
- En-Route Supplement Australia
- NAIPS
- Windy and other on-line meteorological forecast tools.
- National Search & Rescue Manual

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Unit 44

Glider Pilot Certificate (Application Authorised)

Unit 44 - Glider Pilot Certificate (Application Authorised)

AIM

To ensure that the pilot has completed all the pre-requisites for the application for a GFA Glider Pilot Certificate.

PRE-REQUISITE UNITS

- GPC Units 1 to 43

COMPLEMENTARY UNITS

There are no complementary units to this training.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Completion of all pre-requisite GPC Elements.	• **Demonstrate** ○ Completion of all previous GPC elements by examination of the student's training record.

KEY MESSAGES

- The award of a GPC recognises that the student has been trained and assessed as competent to safely operate a sailplane as an independently proficient GFA soaring pilot following satisfactory completion of the GPC Training Syllabus.

LESSON PLANNING AND CONDUCT

Briefing

Completion of GPC Application

The student needs to complete the first section of the GPC Application Form (F007).

CFI Certification

The CFI needs to ensure that the student has completed the GPC training syllabus and that the Club holds the associated training records.

Ensure the student logbook is endorsed IAW MOSP 2 (10.6).

Credential Submission

Once the form is certified the student must upload a copy of the form as a credential in Go Membership.

FLIGHT EXERCISES

There are no flight exercises associated with this unit.

COMMON PROBLEMS

Problem	Probable Cause
• Incomplete training records.	Student may not have had instructor sign off on all elements.

THREAT AND ERROR MANAGEMENT

- Ensure pilot has an up-to-date logbook and training record.
- Ensure that all pilot details are accurate on the form.

TRAINING MATERIALS AND REFERENCES

- MOSP 2, Section 10.6.
- GFA Unit 44 Pilot Guide.