

Gliding Australia Training Manual

Trainer Guide



Unit 9

Lookout Scan Procedures

Unit 9 - Lookout Scan Procedures

AIM

To develop the skills and knowledge required to apply appropriate lookout procedures and scanning techniques.

PREREQUISITE UNITS

- GPC Unit 1 Lookout Awareness

COMPLEMENTARY UNITS

This unit may be read in conjunction with:

- GPC Unit 21 Radio use and endorsement
- GPC Unit 22 Use of Situational Awareness Aids
- GPC Unit 31 Thermal Entry
- GPC Unit 32 Soaring with other gliders.

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COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Effective lookout	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ The practice of alerted see and avoid. ○ Visual scanning techniques and their applications. ○ Focus of attention and time management in the cockpit. • Demonstrate: <ul style="list-style-type: none"> ○ Use of the clock code in communication of traffic.
2. Lookout scan procedures	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ Risks and causes of mid-air collisions. ○ Responsibility for collision avoidance. ○ Aircraft appearance at various distances and time to impact if no avoidance action. ○ Aircraft blind spots. • Demonstrate: <ul style="list-style-type: none"> ○ Cruising scan technique. ○ Full scan technique. ○ Targeted scan techniques (Turning, Circuit, Thermalling).
3. Perform lookout during flight	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ The need for a clean canopy. • Demonstrate: <ul style="list-style-type: none"> ○ Appropriate combinations of scanning techniques for various manoeuvres including cruising, turning, pull-ups and pushing forward. ○ Scan rate is adjusted as required for various manoeuvres and hazardous situations. ○ Identification of blind arcs of other aircraft. ○ Safely combining cockpit instrument scan, FLARM and visual scanning techniques to ensure situational awareness.

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KEY MESSAGES

- Lookout must be top priority at all times. This supports situational awareness where you are aware of all other traffic and can predict and avoid potential conflict situations.
- When communicating the location of other traffic to a co-pilot, use the clock code.
- An effective lookout requires head movements, and focused attention, not just glances.
- Different scan techniques are required for different circumstances.
- Alerted see-and-avoid is more effective than unalerted see-and-avoid, so radio must be monitored attentively and used wherever possible.

LESSON PLANNING AND CONDUCT

Notes:

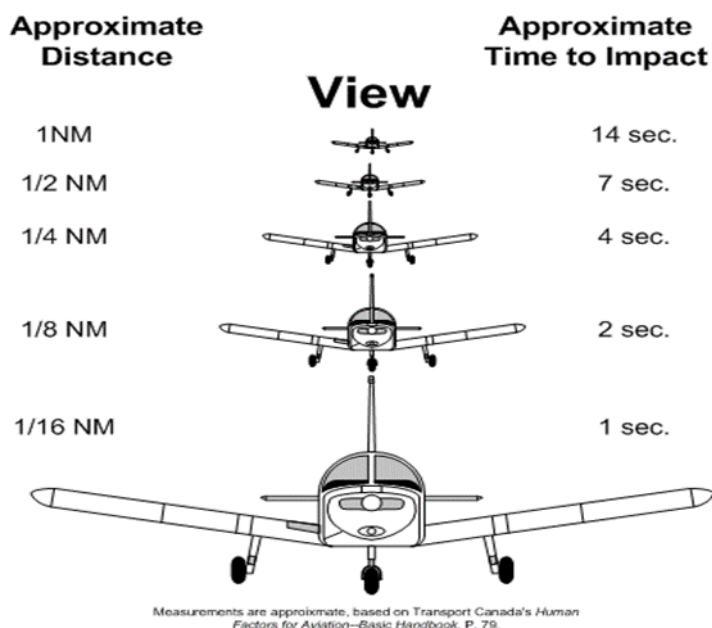
1. Lookout is developed and reinforced throughout pilot training, post-solo and post-GPC coaching.
2. Shortcomings in pre-solo instructing of lookout are often evident in post-solo training and coaching and in flight reviews.
3. Require a high standard, retraining and correcting poor lookout habits is difficult and time-consuming.
4. Trainers have an absolute responsibility to get this training right. This includes intervening and preventing manoeuvres when student lookout is insufficient or incorrect.
5. It may not be possible to sign this competency unit off as 'competent' till much later in the training.

Briefing

- Mid-air collision is a high risk and can be managed through an effective lookout. All aircrew in all aircraft are responsible for avoiding collisions.
- Effective lookout is a combination of the aircraft's crew using a variety of scan techniques in conjunction with alerts from radio, FLARM or situational awareness.
- The scan techniques used, and the frequency of use will vary depending on the actions being performed, the traffic level and the surrounding environment.
- The human eye has limitations, and you must take actions to reduce these impacts (see pilot guide and GFA Human Factors Manual).
- To see an aircraft, you have to focus your eye on the area where it is or may be. This means that you have to look and focus then move to another area and look and focus, etc.
- We have scanning techniques to ensure that we look at the key places and focus on that area. A passing glance is not appropriate as the eye will not focus on the object. Utilise a continuous cycle that primarily focuses attention outside the cockpit, but also includes a periodic scan of cockpit instruments including FLARM.
- Aircraft fly fast, 60 knots airspeed is approximately 120 kph, equivalent to highway driving speed. This means that two gliders flying head-on towards each other will be closing at roughly 240 kph!

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- A small speck a few kilometres away can quickly become an aircraft that can collide with you in the time that it takes you to complete two circles in a thermal.
- The following diagram gives you some idea of the problem:



- Note that closing speed is the sum of the speed of the two aircraft if flying directly towards each other. If one glider is circling, then the time to impact is double what is shown here. Given that a single circle in a thermalling glider takes 15-20 seconds, you need to be aware of the other aircraft and increase your targeted scan as you circle because one turn later it will be too close.
- Notice the “blooming” effect of the confliction at the last minute (very frightening!)
 - <https://www.youtube.com/watch?v=uztz25m1pD4> (Start at 1:05)
 - <https://www.youtube.com/watch?v=W3BQqhaxUsY>

Scanning Techniques

FULL SCAN: A Systematic scan along the horizon from behind our left wing tip, directly ahead through to behind our right wing tip, including the area above and below the horizon, and directly overhead our glider and below the glider. This will take a few minutes to do correctly and should be repeated regularly depending on traffic density.

- We may also have aircraft coming from the side, across our flight path, or overtaking us on either side, so we also need to monitor these areas. The technique is to focus on a spot for a few seconds, then moving our view 20-30 degrees ahead and repeating the process.
- This FULL SCAN can be completed in stages, interrupted by a CRUISING scan or TARGETED scan as required.

CRUISING SCAN: When flying straight the most dangerous area is straight ahead and 60 degrees cone around the flight path - including the area above and below the horizon. We need to see aircraft in this region quickly so we can avoid any collisions risk. We focus on this cone of airspace (known as a CRUISING scan).

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- In situations where there is random traffic (cross country, training area, etc) it may pay to broaden the size of the Cruising Scan cone to 120 degrees.

TARGETED SCAN: This where we focus on a smaller area which has potential increased traffic or greater risk. Examples include:

- Turning the glider. You will be turning into an area that you may not have had clear vision of previously. You start this scan by firstly looking in the opposite direction to the planned turn to identify threats from behind and the side; then scanning around the horizon through straight ahead and finishing at the area behind the wing in the direction you are turning. This will progressively let you see any aircraft that may be coming from behind you.
- Joining a thermal with other gliders. You need to identify all of the gliders in the thermal, not just the first one you see. Also look for other gliders that are also trying to join the thermal, they may come from any direction. If you are pulling up to slow down to enter the thermal, look up as well.
- Thermalling: Looking at the horizon in the direction of the turn to identify any aircraft that is approaching you. Remembering that it will be another 20 seconds before you see this view again so you need to identify potential conflicts so that you can monitor their movement.
- Leaving a thermal: Before straightening up to leave, first focus on the area outside the turn to detect if another glider is joining or overtaking in that area.
- Joining the circuit for landing: There is likely to be increased traffic, arriving from many different directions. You should conduct a TARGETED scan before you get to the circuit joining area so that you have better situational awareness of all gliders that may be in conflict with you. Monitor radio and visually identify any aircraft that calls.

Other considerations:

- When describing traffic locations to others, use the 'clock code' relative to the aircraft. Twelve o'clock is on the nose, six o'clock is behind, three o'clock is to the right and nine o'clock is to the left.
- Locate the blind spots of an aircraft.
- Do not fly in another aircraft's blind spot; for example, do not follow another directly astern and higher. The glider that is behind and can see the glider ahead is responsible to maintain separation.
- A glider doing a pull-up can be in a double-blind situation where you cannot see the glider above and behind you, and you may be below the nose of the glider behind you and therefore not visible to it— there is no obvious fix for this so prevention is the only defence. Avoid flying directly above or below another glider with less than 500 ft clearance.
- A dirty canopy will significantly affect a pilot's ability to identify other airborne traffic. Ensure that your canopy is clean before each flight to reduce this threat.
- Glare from a rising or setting sun can also be a significant threat to lookout. Avoid flying directly into the line of the sun at these times as it will be difficult to see other traffic.

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PRE-FLIGHT BRIEFING

To emphasise the importance of looking back as far as possible, the student should be seated in the glider on the ground with the right wingtip down and the trainer then walks to a position of about five o'clock and ask the student to look for them.

Emphasis that this is where a threat might first appear and turning to look back over their shoulder as far as is comfortably possible, will ensure that any threat is seen and assessed as soon as possible.

FLIGHT EXERCISES

Using Full Scan

- Demonstrate a full scan to the student, describing where you are looking and the pace of progressing around the horizon.
- Emphasise the need to move your head and to focus for a few seconds at each step.
- Ask the pilot to demonstrate the Full Scan, ask them to say out loud where they are looking and what they see. Ensure they are turning their head in particular when looking behind the wing. If they don't look STOP them.

Using Cruise Scan

- Demonstrate flying towards a prominent landmark, or back to the airfield. Whilst flying straight explain how you conduct the Cruising Scan. Focus on a cone directly ahead which spans say 30 degrees each side of the direction of flight (so from eleven o'clock through to one o'clock). Confirm that you are also looking above the horizon and below the horizon. Point out landmarks ahead within that cone.
- Ask the pilot to demonstrate the Cruise Scan, ask them to say out loud where they are looking and what they see. Ensure they are turning their head. If they do not look STOP them!
- Where the traffic pattern is random (lone cross-country or in the terminal area, i.e., local soaring) concentrate the scan on straight ahead and then to about 60 degree to each side. When flying fast, concentrate more on straight ahead, when flying slower expand the area of concentration.

Using Targeted Scan

- This can be delivered over a series of flights and repeated/assessed often. Entering a turn and entering the circuit can be described on every flight.
- The terminal area (within say, 5 miles) at a crowded site is a high traffic area with random traffic. This is particularly dangerous airspace and lookout needs to be excellent. High speeds in this area are not appropriate. Flying pre-start in a competition is a particularly hazardous situation of this type.
- Gliders on a reciprocal heading are very difficult to see. Avoid such circumstances and where this is not possible take special care. Examples are in thermal streets, and in vicinity of an obvious thermal close to a turn point, or flying in the opposite direction of the circuit.

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COMMON PROBLEMS

PROBLEM	PROBABLE CAUSE
<ul style="list-style-type: none"> Student doesn't turn head when conducting look out. 	Student may have motion sickness or has forgotten to move head for optimum lookout. Reinforce correct scan technique.
<ul style="list-style-type: none"> Student fails to conduct periodic lookout. 	Student is focused on the flight procedure and has missed the lookout step. Remind and reinforce the need for periodic lookout.
<ul style="list-style-type: none"> Student fails to conduct targeted or cruising scan when required. 	Student may be distracted with other tasks. Stop the procedure and refocus on the prerequisite lookout.

THREAT AND ERROR MANAGEMENT

- Ensure fit to fly - use IMSAFE mnemonic prior to flight.
- If vision correction is needed, use spectacles and carry a spare pair.
- Bright sunlight can affect lookout - use sunglasses.
- Dirty canopies will reduce look out effectiveness.
- Headwear that protects from the sun may also cut down the breadth of vision, broad brimmed baseball caps are not recommended.
- Bright coloured hats worn in the front cockpit will also interfere with rear seat visibility due to reflection of the hat in the canopy.
- Maintain VMC, consider the effects of precipitation and sun glare from rising or setting sun has on visibility.

TRAINING MATERIALS AND REFERENCES

- Theory Lesson 3
- GPC Pilot Guide Unit 9
- Australian Gliding Knowledge pages 240-246
- MoSP Part 2 Operations
- GFA Human Factors Manual (OPS 0010)