Cross-Country Training
Season 2005/2006

Gliding Club of Victoria Training

INTRODUCTION

Welcome to the soaring program for 2005/2006. Soaring requires preparation; it's a demanding task, yet a rewarding one that gives maximum enjoyment for your dollar and leaves memories that last forever. However, to be rewarded requires application and this season's program is arranged as a reminder to focus your efforts towards safe and efficient cross-country flight.

The program is in seven modules and covers:

1. Hazards during take-off and landing
2. Lookout
3. Out-landing
4. Thermal Soaring
5. Speed to fly theory
6. Strategy for soaring
7. Task setting guidelines

One module will be sent fortnightly to your email address during the winter months.

The content is intended for self-study, and will be supported by briefing and discussion at Benalla pre-soaring season.

ACKNOWLEDGEMENTS

Copy published in this document ' Cross-Country training, Season 2005/2006' is intended for the use of members of the Gliding Club of Victoria alone, to serve as a basis for discussion, and to improve the safety and efficiency of soaring by its members.

1.Hazards during take-off and landing – 'Swings and Roundabouts' by Derek Piggott.UK

2. Lookout- Material from GFA edited for GCV.

3. Out-landing – GCV publication 'Paddocks for Promising Pilots.

4. Thermal Soaring- BGA Soaring Course.UK.

5. Speed to Fly Theory- BGA Soaring Course.UK

6. Soaring Strategy- John Cochrane USA

7. Task Setting Guidelines –based on BGA Soaring Course amended and edited to reflect Benalla conditions.

Front photograph 'Approaching Mt Buffallo Chalet by GCV member Hein Mading

MODULE ONE

HAZARDS DURING TAKEOFF&LANDING

HAZARDS DURING TAKEOFF&LANDING

Swings and Roundabouts

Safer Crosswind Takeoffs and Landings

By Derek Piggott

An accident at Lasham has emphasized the personal responsibility, which rests on every pilot of a glider just prior to being launched

On the day in question a Nimbus 2 was starting on a car launch when it swung off and ground looped into a K-8 about 150 yards ahead of the launch point and a short distance to the side of the runway edge. The Nimbus pilot, realizing that the take-off would involve an element of risk, had in fact asked the K-8 to be removed. When this had been done for a short distance, the situation was accepted rather than cause further delay by still refusing to be launched. The Nimbus was undamaged, but the K-8 had one wing amputated at about half–span as well as other serious damage.

Later that day an identical situation arose at the aero-tow point, when a Kestral pilot was preparing to be launched with an obstruction about 100 yards ahead and not far to one side. In both cases the wind strength was about 5 to 10 knots, and almost at right angles to the takeoff direction. The accident caused considerable consternation, and many pilots obviously did not understand the factors involved that influenced gliders during takeoff and landing. They do not all behave as well as most training gliders and it is vital to understand the differences.

The most important point is that, regardless of who may be at the launch point, and however inexperienced the pilot may be, it is he who bears the responsibility for accepting or rejecting the launch in the light of the situation as he sees it from he cockpit. If he has the slightest doubt about his ability to launch safely, bearing in mind such hazards as a positive sideways swing or a cable break at any stage, then he must refuse the launch. He must not be influenced against his judgment to go ahead in a doubtful situation and must never be criticized for playing safe by refusing the launch.

If a cable break could result in part of the cable landing on or close to the glider mid-field, then it is not safe to launch. Sooner or later, if such a risk is acceptable, the cable will break at the wrong moment and an accident will occur. The pilot who takes a chance is always to blame if he creates a hazard that was unnecessary.

Furthermore, if anyone at the launch point sees any reason to think that the pilot has not seen or understood a potential danger, then it is his or her duty to stop the launch. This particular accident, although the ultimate responsibility of the Nimbus pilot, would never have happened if only one of the dozen or more competent pilots at the launch point had cared enough to shout STOP! To say that it was not their responsibility to stop the launch is not good enough. Safety is everybody's business.

Crosswind effects

The main effects of a crosswind on the ground are well known. The wind tends to lift the upwind wing and the glider tends to swing, or weathercock, into wind. Inexperienced pilots often find it difficult to remember, or to work out quickly, the control movements required to keep going straight. But once the wind direction is known it is easy- it is always the into wind wing which must be held down [by moving the stick slightly into wind], and it is always necessary to rudder out of wind. This applies during any crosswind takeoff; it applies equally for crosswind landings whether into wind, wing down or crabbing method is used.

Light crosswinds, in particular those with a slight downwind component; provide by far the most treacherous conditions for takeoffs and landings. Due to the crosswind there is the tendency for the glider to start a swing, while due the downwind component there is a delay before the controls can become effective, during which the ground speed has increased and accentuated the effects of inertia. So prevention is far better than cure, and the wing tip holder should always be on the downwind side so that any pull he may exert is anti-swing into wind. This is contrary to the usual practice. He should also hold his wing tip a little above the horizontal and be prepared to run with it, not just balance it and let go. The pilot himself can help by anticipating a swing into wind and by applying opposite rudder before he starts to roll, also by holding the stick back to increase the tail load. As the controls begin to become effective the opposite rudder can be reduced and the tail raised long before full flying speed has been reached.

Strong crosswinds

Unless the wind is more than about 60 degrees to the direction of take-off a strong crosswind seldom creates problems. This is because good control is reached at a much lower ground speed, and inertia effects are relatively minor. However, with stronger winds the tendency to wing into wind is far more pronounced, and at low speed cannot always be controlled by opposite rudder. In this case, again, the wingtip holder should be on the downwind side and should hold his wingtip well above the horizontal to prevent the wind getting under the upper wingtip. Provided that there is normal acceleration on take-off, the pilot should have good aileron control, and be able to hold off any windward swing by means of rudder, shortly after the wingtip holder has let go.

Of course there is a definite limit to the strength of crosswind component that can be accepted with some of the modern gliders. The main preventative measure is to leave room on both sides of the takeoff path to allow for a possible swing. Room must be left into wind, particularly for the case of a cable break, but there must also be room on the downwind side for a swing that might occur if the turning tip should touch the ground. If the ground is rough or the grass long, a violent swing will occur and the launch will most certainly have to be abandoned.

Stabilizing effect

On take-off the pull of the towrope exerts a stabilizing effect and helps to prevent swinging, but how much effect this can have is dependent on the position of the tow release. A nose hook for aero towing can be a very useful asset in crosswind conditions. In strong crosswinds, it is often an advantage to start the takeoff run a little on the upwind side of the tug aircraft so that the load in the rope is already helping to prevent a swing into the wind.

If the cable breaks during the take-off run there is a real risk that the pilot will be unable to prevent the glider from weather cocking into the wind and running into any obstruction on the downwind side of the take-off path. Always consider the possibility of a break during the ground run, as well as what should be done in the case of a break later during the launch.

Weather cocking

In flight the directional. Or weathercock stability is assured by the existence of the fin and rudder, which provide more sideways area behind the C of G than ahead of it. Thus, with aileron and rudder held central, the glider will always weathercock into line with the relative airflow, just as a [church] wind vane will always swing directly into wind. When rudder is applied, the nose of the glider yaws until the force produced by the rudder is balanced by the tendency of the aircraft to swing back into line with the airflow. If the aircraft is very stable because of a large fin, the rudder will not be able to produce a large angle of yaw before this balance occurs. With a smaller fin the directional stability will be less, the rudder will be more effective and the angle of yaw far greater. Now when the glider is on the ground it moves not about its C of G as in flight, but about its point of contact with the ground. If the wheel is well ahead of the C of G the glider will have a greater tendency to weathercock and the rudder power will be less. Conversely, if the wheel is behind the C of G the directional control will be much better.

All modern gliders fitted with retractable wheels, also many others including the k 6 and Olympia 463 series, have their landing wheel well ahead of the C of G, and when stationary or at low speeds the tail skid or tail wheel is resting firmly on the ground. Another key factor is that the position of the wheel also affects the behavior of the glider once a swing has begun. The swing will be increased by the inertia of the glider. Any tendency to swing will therefore be increased by the mass of the glider behind the C of G trying to move on in a steady direction, thus accentuating the swing and making it even worse.

Sliding sideways

A swing can only occur if the tail is sliding sideways over the ground, and a tail wheel with a rubber tyre will resist skidding sideways over tarmac, though it will not be so good if it is bouncing over rough grass. On the other hand, a metal tail skid, or a metal or nylon wheel, will easily slip sideways on tarmac, but is much better on grass or earth.

Any extra load on the tail wheel will help to increase its resistance to moving sideways and so help to prevent a serious swing. On the other hand, the friction of the tailskid will make intentional steering more difficult unless the tail load is reduced. It is, therefore, helpful to hold the stick back on the gliders during the early part of the ground run until sufficient speed has been reached to ensure good rudder control. Similarly, after landing the stick should be held right back to increase the tail loads if there seems any risk of a swing developing.

Wheel brake

Many violent swings and ground loops during landings occur because of the use of the wheel brake after touch down. If the brake is powerful, the effect is to reduce the load on the tail and it can then slip sideways more easily. The effect of rapid deceleration is even more significant. Unless the glider is running absolutely straight, the deceleration increases the effect of the mass behind the C of G and so accelerates the swing. Violent braking in modern gliders should always be avoided, especially if they start to swing.

Swings often start after a touchdown with drift, and it is useful to remember that a slight over-correction for drift in a crosswind, will produce a small swing contrary to the main weather cocking action therefore it is better to overdo the correction.

The possibility of an uncontrollable swing depends on the type of glider and the wind conditions. Special care is essential with gliders that have the main wheel ahead of the C of G; since they will be unstable once a swing has been started. If the surface offers low resistance to the tail wheel or tail skid slipping sideways, it will help to prevent a swing by keeping the tail firmly on the ground at low speeds.

Anticipation

Crosswind takeoffs should be started with full rudder applied in anticipation of the tendency to swing into wind. The glider should be held by the downwind wing tip with the into-wind below the horizontal position. This will help to prevent any swing into wind and ensures that if the wingtip man does drag the wing, the aircraft is always swung out of wind.

Leave ample room for swinging into wind and always bear in mind that the cable break during the take-off roll so that the glider may swing into any obstruction on the upwind side, even though it is several hundred yards ahead of the launch point. In light winds, leave ample room for the possibility of a ground loop in either direction. Avoid fierce braking after landing, particularly if the glider is turning at the time.

Above all, remember that it is the very light wind conditions that are the most critical. Do not be tempted to take off or land near obstructions or other glides in these seemingly easy conditions.

Finally, if you ever do ground loop, make sure that it is only your own machine that can be damaged. Inspect the glider very carefully. With the modern types the loads on the rear fuselage can be very high. Almost invisible hairline cracks in the glass-fibre machines may look like minor cracks in the paint finish. They could result in a complete fuselage failure on a subsequent flight. Judging from some of this kind of damage brought to light on C of A inspections, there may be a number of pilots flying dangerously unserviceable machines all over the world.

Comments from the instructor panel

In the United Kingdom it is now mandatory to release if a wing touches the ground during tow, apparently this has led to a significant decrease in ground loops associated with aero-tow. Some flight manuals state that with any swing greater than 15 degrees the sailplane should be released from tow. Both statements serve as guidance and should a swing develop pilots are urged to err on the side of caution.

MODULE TWO

LOOKOUT

LOOKOUT

THE DEVELOPMENT OF AN EFFECTIVE LOOKOUT

Introduction

The practice of "see-and- avoid" is recognized as the primary method that a pilot uses to minimize the risk of collision avoidance when flying in controlled airspace in visual meteorological conditions. "See-and-avoid" is directly linked with a pilot's skill at looking about outside the cockpit or flight deck and becoming aware of the surrounding visual environment. Its effectiveness can be greatly improved if the pilot can acquire skills to compensate for the limitations of the human eye. These skills include the application of effective visual scanning, and the development of habit patterns that can be described as "good airmanship'.

The aim is to make pilots aware of the skills required to make look-out more effective and is directed towards those pilots who do their flying under visual rules[VFR].

A study of over two hundred reports of mid air collisions showed that they can occur in all phases of flight and at all altitudes. It may be surprising that nearly all mid air collisions occur during daylight hours and in excellent visual metrological conditions. While the majority of mid air collisions occurred at lower altitudes where most VFR flying is carried out, collisions can and did occur at higher altitudes. Because of the concentrations of aircraft in the vicinity of aerodromes, most collisions occurred near aerodromes when one or both aircraft were descending or climbing. Although some aircraft were operating as instrument flight rules flight [IFR] flights, most were VFR controlled.

There is no way to say whether it is the experienced or the inexperienced pilot who is more likely to be involved in a mid-air collision. While a novice has much to think about and so may forget to maintain an adequate lookout, the experienced pilot, having flown through many hours of routine flight without spotting any hazardous traffic, may grow complacent and forget to scan.

It you use your eyes and maintain vigilance through proper awareness, it will not be difficult for you to avoid mid-air collisions. The results of studies of the mid-air collision problem show that there are certain definite warning patterns.

Causes of mid-air collisions

What contributes to mid-air collisions? Undoubtedly, traffic congestion and aircraft speeds are part of the problem. In the head-on situation, for instance, a glider and a light twin-engined aircraft may have a closing speed of 250 kts. It takes a minimum of 10 seconds for a pilot to spot traffic, and identify it, realize it is a collision threat, react, and have the aircraft respond. Two converging aircraft at 250 kts will be less than 25 seconds apart when the pilots are first able to see each other, so it is obvious that they will need to pay attention.

The reason most often noted in mid-air collision statistics reads " failure of pilot to see other aircraft"- in other words, failure of the see-and-avoid system. In most cases at least one pilot of the pilots involved could have seen the other in time to avoid the collision if that pilot had been watching properly. Therefore, it could be said that it is really the eye, which is the leading contributor to mid-air collisions. Take a look at how its limitations affect your flight.

Limitations of the eye

The human eye is a very complex system. Its function is to receive images and transmit them to the brain for recognition and storage. It has been estimated that 80% of our total information is through the eyes. In other words, the eye is our prime means of identifying what is going on around us.

In the air we depend on our eyes to provide most of the basic input necessary for flying the aircraft, e.g. attitude, speed direction and the proximity of opposing air traffic. As air traffic density and aircraft closing speeds increase the problem of mid –air collision increases considerably, and so does the importance of effective scanning. A basic understanding of the eye's limitations in target detection is probably the best insurance a pilot can have against collision.

The eye and consequently vision, is vulnerable to many things including dust, fatigue, emotion, germs, fallen eyelashes, age, optical illusions, and the effect of alcohol and certain medications. In flight, atmospheric conditions, glare, lighting, windshield distortion, aircraft design, cabin temperature, oxygen supply, acceleration forces and so forth influence vision.

Most importantly, the eye is vulnerable to the vagaries of the mind. We can ‘see’ and identify only what the mind permits us to see. A daydreaming pilot staring out into space is probably a prime candidate for a mid air collision.

One inherent problem with the eye is the time required for accommodation or refocusing. Our eyes automatically accommodate for near and far objects, but change for something up close, like a dark instrument panel two feet away, to a well-lighted landmark or aircraft target a mile or so away takes one to two seconds. That can be a very long time when you consider that you need 10 seconds to process the necessary information to avoid a mid-air collision.

Another focusing problem usually occurs when there is nothing to specifically focus on, which usually happens at very high altitudes, as well as lower levels on vague, colourless days above a haze or cloud layer when no distinct horizon is visible. Pilots experiencing something known as “empty field myopia”, i.e. staring but seeing nothing, not even opposing traffic entering their visual field.

The effects of what is called “binocular vision” have been studied during investigations of mid- air collisions, with the conclusion that this is also a casual factor. To actually accept what we see, we need to receive cues from both eyes. If an object is visible to only one eye, but hidden from the other by a windshield post or other obstruction, the total image is blurred and not always acceptable to the mind. Therefore, it is essential that pilots move their head when scanning around obstructions.

Another inherent eye problem is the narrow field of vision. Although our eyes accept light rays from an arc of nearly 200 degrees, they are narrow limited to a relatively area [approximately 10-15 degrees] in which they can actually focus on and classify an object. Although movement on the periphery can be perceived, we cannot identify what is happening there and we tend not to believe what we see out of the corners of our eyes. This, aided by the brain, often leads to “tunnel vision”.

Motion or contrast is need to attract the eyes' attention, and tunnel vision limitation can be compounded by the fact that at a distance an aircraft on a collision course will appear to be motionless. The aircraft will remain in a seemingly stationary position without appearing to move or grow to size, for a relatively long time, and then suddenly bloom into a huge mass, almost filling up the canopy. This is known as the "blossom effect". It is frightening that a large insect smear or dirty spot on the canopy can hide a converging aircraft until it is too close to be avoided.

In addition to its inherent problems, the eye is also severely limited by environment. Optical properties of the atmosphere alter the appearance of aircraft, particularly on hazy days.

'Limited visibility" actually means " limited vision". You maybe legally VFR when you have the specific visibility, but at that distance on a hazy day you may have difficulty in detecting opposing traffic; at that range, even though another aircraft may be unavoidable because of the high closing speeds involved.

Light also affects our visual efficiency. Glare, usually worsens on a sunny day over a cloud layer or during flight directly into the sun, makes objects hard to see and scanning uncomfortable. An aircraft that has a high degree of contrast against the background will be easy to see, while one with low contrast at the same distance may be impossible to see. In addition, when the sun is behind you, an opposing aircraft will standout clearly, but if you are looking into the sun, the glare of the sun will usually prevent you from seeing the other aircraft. Another problem with contrast occurs when trying to sight an aircraft against a cluttered background. If the aircraft is between you and the terrain that is varicolored or heavily dotted with buildings, it will blend into the background until the aircraft is quite close.

And, of course, there is the mind, which can distract the pilot to the point of not seeing anything at all, or cause cockpit myopia- staring at one instrument without even "seeing it".

As can be seen, visual perception is affected by many factors. Pilots, like others, tend to overestimate their visual abilities and to understand their eyes' limitations. Since a major cause of mid-air collisions is the failure to adhere to the practice of see-and-avoid, it can be concluded that the best way to avoid collisions is to learn how tom use your eyes for an efficient scan

Visual scanning technique

To avoid collisions you must scan effectively from the moment an aircraft moves until it comes to a stop at the end of the flight. Collision threats are present on the surface, at low altitudes in the vicinity of aerodromes, and at cruising levels.

Before take-off, scan the airspace and runway visually, to ensure that there are no aircraft or objects in the take-off area.

After take-off, scan to ensure that no aerodrome traffic will be an obstacle to your safe departure.

Before and during any turn, focus particular attention in the direction of turn.

Remain constantly alert to all traffic in your normal field of vision, as well as periodically scanning the entire visual field outside the aircraft to ensure detection of conflicting traffic. Remember that the performance capabilities of many aircraft, in both speed and rates of climb/descent, result in high closure rates, limiting the time available for detection, decision and evasive action.

How to scan

The best way to scan good scanning is by eliminating bad habits. Naturally, not looking out at all is the poorest scanning technique. Glancing out at intervals of five minutes or so is also poor when considering that it takes only seconds for disaster to happen.

Glancing out and "giving the old once around" without stopping to focus on anything is practically useless; so is staring out into one spot for long periods of time.

There is no one technique that is best for all pilots. The most important thing is for each pilot to develop a scan that is both comfortable and workable.

Learn how to scan properly by knowing where and how to concentrate your search.

It would be desirable, naturally, to be able to look everywhere at once, but that is not possible, concentrate on the areas most critical to you at any given time.

Always look out before you turn and make sure your path is clear. Look out for traffic making an unusually entry into the circuit. During aero tow decent and climb-out, tug pilots must make gentle turns to see if anyone is in the way.

During that very critical approach stage, do not forget to scan all round to avoid tunnel vision. Pilots often fix their eyes on the point of touchdown. You may never arrive at the runway if another pilot is also aiming for the threshold at that time.

In normal flight, you can generally avoid the threat of mid-air collision by scanning an area at least 60 degrees left and right of your flight path. Be aware that constant angle collisions often occur when the other aircraft initially appears motionless at about you 10 o'clock or 2 o'clock positions. This does not mean that you should forget the rest of the area you can see. You should also scan at least 10 degrees above and below the projected flight path of your area. This will allow you to spot any aircraft that is at an altitude that might prove hazardous to you, whether it is level with you, climbing from below or descending from above.

The probability of spotting a potential collision threat increases with the time spent looking outside. To be most effective, the gaze should be shifted and refocused at regular intervals. Most pilots do this in the process of scanning the instrument panel but it is also important to focus outside the cockpit to set up the visual system for effective target acquisition. Pilots should also realize that their eyes might require several seconds to refocus when switching views between items in the cockpit and distant objects. Proper scanning requires the constant sharing of attention with other piloting tasks, thus it is easily degraded by such conditions as fatigue, boredom, illness, anxiety or preoccupation.

Effective scanning is accomplished by a series of short, regularly spaced eye movements that bring successive area of the sky into the central visual field. Each movement should not exceed 10 degrees and each area should be observed for at least one second to enable detection. Although horizontal back-and- forth eye movements seem preferred by most pilots, each pilot should develop the scanning pattern that is most comfortable and then adhere to it to assure optimum scanning. Peripheral vision can be most useful in spotting collision threats from other aircraft. Each time a scan is stopped and the eyes are refocused; peripheral vision takes on more importance because it is through this element that the presence of other aircraft is often detected. Remember that if another aircraft shows no horizontal or vertical motion on the windscreen, but is increasing in size, take immediate evasive action.

Scan patterns

Two scanning patterns described here have proven to be effective for pilots and involve the "block" system of scanning. This system is based on the premise that traffic detection can be made only through a series of eye fixations at different points in space. The viewing area is divided into segments, and the pilot methodically scans for traffic in each block of airspace in sequential order.

Side-to side scanning method

Start at the far left of your visual area and make a methodical sweep to your right, pausing very briefly in each block of the viewing area to focus your eyes. At the end of the scan, return to and scan the instrument panel and then repeat the external scan.

Front to side scanning methods

Starting at the center block of your visual field [center front windshield]; move to the left focusing very briefly in each block, then swing quickly back to the center block after reaching the last block on the left and repeat the performance to the fright. Then after scanning the instrument panel, repeat the external can.

The time-sharing plan

External scanning is just part of the pilot's visual work. To achieve maximum efficiency in flight, a pilot has to establish a good external scan and learn to give each scan its proper share of time. The amount of time spent scanning outside the cockpit in relation to what is spent inside depends, to some extent, on the workload
Inside the cockpit and the density of traffic outside. Generally, the external scan will take about ten times as long as the look at the instrument panel.

During an experimental scan training course, using military pilots whose experience ranged from 350 hours to over 4000 hours of flight time, it as discovered that the average time needed to maintain a steady state of flight was three seconds for the instrument scan and 19 to 20 seconds for the outside scan. Glider pilots need even less time on instruments, especially with audio variometers..

An efficient instrument scan is good practice, even when flying VFR. The ability to scan the panel quickly permits more time to be allotted to exterior scanning, thus improving collision avoidance.

Developing an efficient time-sharing plan takes a lot of work and practice, but it is just as important as developing good landing techniques. The best way is to start on the ground, in your own aeroplane or the one you usually fly, and then use your scans in actual practice at every opportunity.

In two-seaters if one pilot is occupied with essential work inside the cockpit, [e.g. map reading], the other pilot; in other words the second pilot must scan ahead and to both sides of the aircraft.

Collision avoidance check list

Collision avoidance involves much more than proper scanning techniques. You can be the most conscientious scanner in the world and still have an in –flight collision if you neglect other important factors in the "see-and-avoid" technique. It might be helpful to use a collision avoidance checklist as routinely as you do the per-takeoff and landing checklists. Such a checklist might include the following items:

Check yourself

Start with a check of your own conditions. Your eyesight, and consequently your safety, depends in your mental and physical conditions. If you are distracted before a flight, you should think twice about flying under such circumstances. Absentmindedness and distraction are the main enemies of concentrated attention during flight.

Plan ahead

To minimize the time spent "head down" in the cockpit, plan your flight ahead of time. Have maps folded in proper sequence and within handy reach. Keep your cockpit free of clutter. Be familiar with headings, and distances, etc. ahead of time so that you spend minimum time with your head down in maps.

Check your maps, NOTAM, etc. in advance for such potential hazards as restricted areas, military low-level routes, intensive training areas and other high-density
Areas.

Clean canopy

During the pre-flight, make sure that your canopy is clean.

Adhere to procedures

Follow the established operating procedures and regulations, such as proper circuit practices. You can get into trouble, for instance, by skimming along the bottom of clouds without observing proper cloud clearance.

In most in-flight collisions at least one of the pilots involved was not where he was supposed to be.

Avoid crowded airspace

If you cannot avoid aerodromes enroute, fly over them well above circuit eight. Military aerodromes in particular, should be avoided as they usually have a very high concentration of fast moving jet traffic operating in the vicinity.

Compensate for blind spots

Compensate for your aircraft's design limitations. All aircraft have bind spots; know where they are in yours. For example, a high-wing aircraft that has a wing down in a turn blocks the view of the area you are turning into. A mid wing blocks the area beneath you.

One or other of these limitations apply to the instructor's cockpit of most two-seat gliders.

Use all available eyes

The command pilot of a two-seater will have established crew procedures which ensure that an effective scan is maintained at all times. Obtain the assistance of the other pilot to look out for traffic, which you have been made aware and monitor the movement of other aircraft, which you have already sighted. Remember, however, that the responsibility for avoiding collision is yours and you must maintain your vigilance at all times.

Scan

The most important part of your checklist is, of course, to keep looking out at where you are going and to watch for other traffic. Make use of your scan constantly.

If you adhere to good airmanship, keep yourself and your aircraft in good condition develop an effective scan time-sharing system, you will have the basic tools for avoiding a mid-air collision. And as you learn to use your eyes properly, you will benefit in other ways. Remember, despite their limitations, your eyes provide you with colour, beauty, shape, motion and excitement. As you train them to spot miniscule targets in the sky, you will also learn to see many other important " little"
Things you may now be missing, both on the ground and in the air. If you use the brain behind the eyes, you will be around to enjoy these benefits