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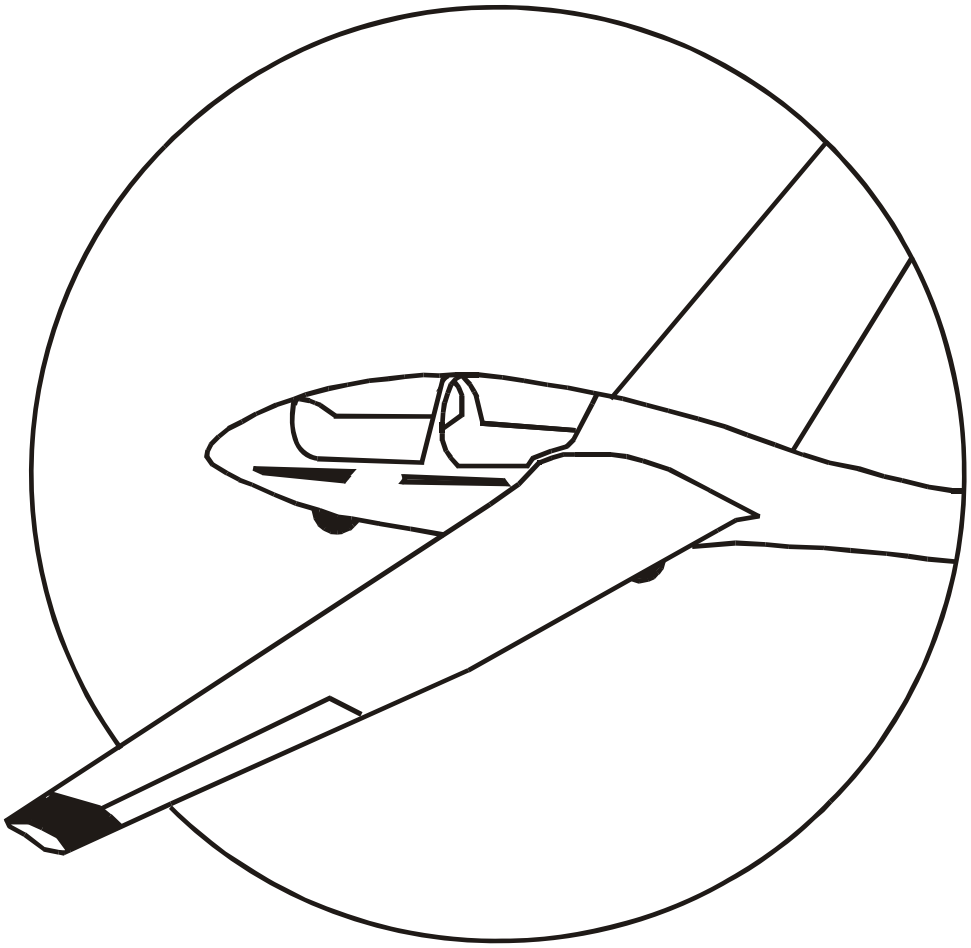

TRAINEE GUIDE

VIKING T Mk 1

EDITION 5 **JUNE 2007**

ACP 122 Edn 5

TRAINEE GUIDE VIKING T Mk 1

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TRAINEE GUIDE - VIKING T Mk 1

ACP 122

TRAINEE GUIDE
VIKING T Mk 1

EDITION 5 **JUNE 2007**

AIRFIELD DISCIPLINE AND SAFETY

AIM To familiarise you with basic ground handling procedures and safety awareness.

1. Before you carry out any associated ground duties connected with gliding operations, you will be briefed on the procedures to be used. Your briefing will cover some or all of the following topics:

a. **Aircraft ground handling.**

(1) How to put on and remove a Tail Dolly.

(2) Manning positions and how to ground-handle a glider.

(3) Parking and picketing aircraft.

(4) Extra manning in strong and gusty wind conditions.

b. **Retrieving.**

(1) By hand.

(2) By vehicle.

c. **Care of Aircraft and Equipment.**

(1) Protecting the GRP surface.

(2) Canopy handling.

(3) Looking after parachutes.

d. **Control of personnel on the airfield.**

(1) At the launch point.

(2) Launching procedures.

(3) Aircraft operating area hazards.

(4) Movement of personnel by MT vehicle.

e. **Airfield Duties.**

(1) Cable handling, safety precautions and cable orderly duties.

(2) Wing tip orderly duties.

(3) Aircraft Log keeping.

(4) Launch Signaller's duties.

2. **Aircraft ground handling.** All ground handling is to be supervised by an instructor.

a. **By hand.** The Viking may be moved forwards or backwards with a wing tip holder steering. When moving backwards, push on the leading edges of the wings close to the fuselage. The aircraft may be pulled forwards with one person pulling on the metal cross bar behind the front seat. Care must be taken to ensure that the canopy is not damaged during this operation. Other persons may assist by pushing forward on the fuselage immediately behind the trailing edge of the wing. Unless a tail dolly is fitted to the aircraft, the person at the cockpit must balance the aircraft on its main wheel whenever the glider is being turned.

b. **By vehicle.** The Viking may be towed by a vehicle using a suitable towrope. The aircraft commander supervises the retrieve and advises the vehicle driver on the route for the combination to take. The wing tip holder keeps the wings level and steers the aircraft to follow the towing vehicle. The aircraft commander remains close to the cockpit during the retrieve, to prevent the glider over-running the tow rope and to release the tow rope when necessary.

3. Whenever the aircraft is being towed or turned the wing tip which is to pass close to any obstruction must be manned so as to ensure a safe clearance.

4. **Parking.** Whenever the aircraft is to be left unattended, even for a short period, it is to be turned so that the hinge line of the canopy is into wind and the into wind wing is to be raised, leaving the downwind wing tip on the ground. If the wind is fresh or if the glider is to be left unattended, it must be picketed down in the approved manner.

5. **Canopy handling.** Your instructor will brief you on opening and closing the canopy and on how to lock it. You should not handle a canopy without specific instructions. A firm hold is required whilst the canopy is unsecured until fully open (held by the lanyard) or locked firmly down. Do not hold on to or lean on any part of the open canopy whilst entering or leaving the cockpit. The area around the DV panel opening is particularly vulnerable to damage if ill treated.

6. **Strong winds.** In strong winds or gusty conditions there is a requirement for more personnel to help on the airfield. To avoid damage in the event of a gust which could catch the canopies, someone will be required to hold them whilst the crews strap in. It may also be necessary to use extra personnel when an aircraft is being pushed or towed.

7. **Airfield supervision.** On the airfield all personnel are under the direct supervision and control of the Duty Instructor (DI). He will arrange for your training and supervision in the various airfield duties. Launching gliders demands teamwork so keep yourself available to assist as required.

8. **Movement of personnel.** Cadets must not walk unescorted on the operating area of the airfield unless specifically authorised to do so by an instructor. Cadets are prohibited from driving MT vehicles.

9. **Care of Aircraft.** Glass Reinforced Plastic (GRP) is a material well suited to modern aircraft construction. When handled correctly it is immensely strong but it is susceptible to damage if treated carelessly, for example by banging with parachute harness buckles and standing or sitting on areas which have not been specifically strengthened. The perspex of the canopies can be easily scratched by rough handling or by placing anything sharp edged on top of the instrument panel coaming. Any damage to the canopy impairs visibility and creates a flight safety hazard.

10. **Cable handling.** Glider launching cables can be dangerous if handled carelessly. Being attached to a very powerful winch, they are capable of cutting through practically anything. You must not handle cables until suitably trained for the duties of a cable orderly, and only then under the close supervision of gliding school staff. There are a number of simple safety rules to follow when handling cables:

a. Never put your fingers through the cable rings.

b. Never handle a cable for longer than necessary.

c. Never step over cables.

d. Handling cables when another cable is being used for launching can be hazardous. Only do so when instructed to by a gliding school staff member.

11. **Launch Sequence.** When a glider is ready to be launched the cable orderly brings the cable end to the glider, ensuring that the drogue parachute is in view of the crew. The drogue and weak link assembly must be examined before each launch. The aircraft commander will give the order to level the wings and then order **'cable on'.** The cable orderly says loudly **'open'** and the aircraft commander will operate the release hook. The cable orderly then inserts the smaller of the two rings into the release hook under the fuselage of the aircraft (or in the nose if the launch is to be by aerotow). When the ring is in place, the cable orderly says loudly **'close'** and the aircraft commander closes the release hook. Now the cable orderly ensures that it is

correctly attached by applying a firm forward pull on the cable. Finally he says **'cable on, sir'** then moves clear of the aircraft wing.

12. **Cable checks.** Before the first flight on either winch or aerotow on any given day, the respective release hook must be checked for serviceability. To do this the cable is attached as above and it is tested by being released whilst under tension from each cockpit in turn. Whilst applying forward force to the cable, the orderly says loudly '**tension'** whereupon the aircraft commander will operate the release control and the cable should release cleanly. The process is then repeated from the other cockpit. The cable is attached for a third time to check that it will automatically back release if the glider over runs the cable. When attached, the cable is pulled smartly towards the rear. If it releases cleanly the cable orderly says loudly to the aircraft commander **'back release checked'**. The aerotow hook in the nose of the aircraft does not have a back-release facility, so only the first two stages of this check are required. Once the cable checks have been satisfactorily completed, the normal launch sequence in para 11 will be followed.

13. **Wing tip handling.** The wing tip orderly's duties begin when the aircraft commander orders **'wings level'**. Keeping your fingers clear of the aileron, hold the wings level using the hand nearest the aircraft whilst facing in the direction of launch. Once the cable is securely attached and the cable orderly is clear of the aircraft, the aircraft commander will ask you if it is **'all clear above and behind'**. Your duty is to carefully look in these areas and either confirm **'all clear above and behind, sir'** or loudly say **'no sir'** if another aircraft is approaching. If your answer was no and the aircraft commander releases the cable you must put the wing down until asked for wings level again. If your answer was **'all clear above and behind, sir'**, then the aircraft commander will hold one finger straight up and say **'take up slack'**. With your free hand you must raise one finger whilst saying loudly **'take up slack'** to relay the order to the signaller. The crew in the launch point caravan will now signal to the winch driver to begin the launch. When any slack has been taken up in the cable and the aircraft commander raises two spread fingers and says **'all out'**, you are to use your free hand to raise two fingers and say loudly **'all out'**. The signaller will then relay this to the winch driver. If you are in any doubt as to what you have to do, do not transmit the signals but ask for guidance. When the aircraft begins to accelerate, move forward at the same rate until the glider outpaces you. Do not grip the wing tip too firmly, just enough to ensure you balance the wings until the aircraft is gaining speed. Do not assume that every launch will accelerate as quickly as the last one. If you do not balance the wings until the glider is moving quite rapidly, a wing may drop to the ground with serious consequences.

14. **Emergencies.** If anyone sees a dangerous situation developing whilst a glider is preparing to launch they will shout **'STOP, STOP, STOP'**. On hearing this the wing tip orderly is to repeat the command as loudly as possible. The aircraft commander will release the cable. Once the cable has been released the wing tip orderly is to place his wing on the ground.

15. **Log Keeper and Signaller Duties.** The Log keeper and signaller duties will be explained to you before your are required to undertake them. If in any doubt ask a VGS staff member to re-explain the duties to you.

INTRODUCTION TO THE VIKING

AIM To familiarise you with the Viking.

1. **Introduction to the Viking.** The Viking is a conventional, tandem seat glider of GRP construction. It has a mid-mounted wing which affords excellent all round visibility, and a T-tail. During GS training the trainee occupies the front seat. Both cockpits have a set of flying controls and instruments. The empty weight is approximately 400kg and the maximum all up weight is 625kg. The minimum permitted load in the front cockpit is 70kg (although with ballast fitted this is reduced to 55kg). The normal maximum front seat weight is 110kg although this maximum reduces if ballast weights are fitted. Full details of these limitations are shown in the Viking flight reference cards (FRC). The rear seat has no minimum weight requirement but, like the front seat, has a maximum of 110kg. The aircraft has one main wheel, incorporating a powerful disc brake, situated under the rear cockpit. There are also small wheels situated under the nose and at the tail. The normal flying speed in the circuit is 50 knots (kts).

2. Before beginning your flying instruction, you will be shown around the aircraft to familiarise you with the following features:

   a. It's construction and layout, the location of control surfaces, wheels and permitted handling points.

   b. Safety precautions when operating the canopies, including how to jettison them in the event of an emergency.

   c. Getting into the aircraft, operating the harness and adjusting the rudder pedals.

   d. Weight and balance placard. Use of fixed ballast weights and seat cushion arrangements.

   e. Operating the flying controls.

   f. The cockpit layout, instruments, electrics and radio.

   g. Aircraft performance and permitted speeds.

   h. Precautions when ground handling.

3. **Parachute.** Before beginning flying you will be instructed in wearing and operating the parachute including the emergency abandonment procedure.

4. **Cockpit layout.** The controls and instruments are shown in Fig 1.

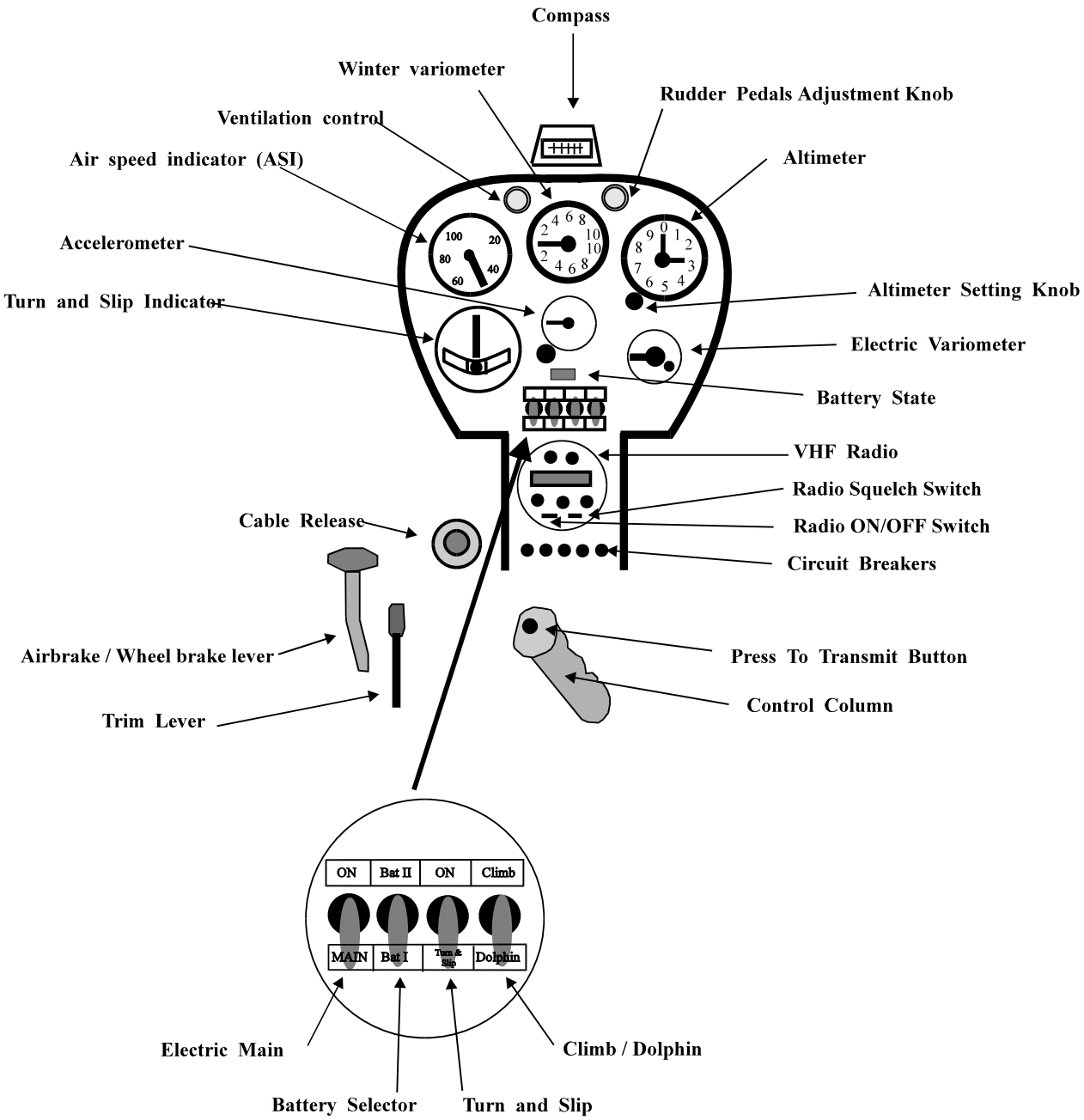


Fig 1. The Viking cockpit.

THE AIR CADET ORGANISATION GLIDING TRAINING SCHEME

1. **Aim.** To familiarise you with the gliding training available within the Air Cadet Organisation.

2. **Gliding Scholarship (GS).** To be awarded Gliding scholarship blue wings you must complete groundschool and flying exercises 1 to 13 in this study guide. To be awarded GS silver wings you must also complete exercise 14 and fly one solo circuit, safely culminating in a normal landing.

3. **Advanced Gliding Training (AGT).** To be awarded AGT gold wings you must complete exercises 15 and 16 and fly a further five solo circuits. Trainees proceeding onto AGT 2 will also complete exercise 17. AGT 2 courses conducted at Portmoak include further exercises but these are covered in a separate trainee guide.

INSTRUCTION

4. **Ground instruction.** There will be a classroom presentation at the start of your course covering airfield safety and discipline, introduction to the aircraft, use of the parachute and aircraft abandonment drills. Further ground instruction, relating to the exercises to be flown, will be given prior to the relevant sortie. This study guide will back up that ground instruction and you should read it as necessary during your course. An essential knowledge examination is part of the course and you have to pass this before the award of your wings. This guide contains all the information you will need to pass the examination.

5. **Pre flight briefing.** Before each sortie you will be given a pre-flight briefing which will comprise:

a. **Aim.** This is what you will be expected to achieve during the sortie.

b. **Airmanship.** You will be taught what is meant by airmanship and the airmanship considerations relevant to the planned exercise.

c. **Exercise brief.** This will cover how the exercise is to be taught, highlighting the control inputs and visual cues used to achieve the manoeuvre in question.

d. **Flight brief.** This explains which aspects of the flight your instructor will perform and which will be your responsibility.

e. **Check of understanding.** You may be questioned to test your understanding of the exercise. If you are unsure of any aspect you will have the opportunity to ask questions about it.

6. **Air instruction.** Following the briefing, you will be given practical instruction appropriate to the exercise, by a qualified instructor. The pace of this instruction will be matched to your ability and you will only be expected to perform a new manoeuvre after you have been taught how to do it. A typical instructional sortie will follow the pattern:

a. **Demonstration.** This will show clearly what you will be expected to achieve by the end of the exercise and will explain any terms with which you are not familiar.

b. **Teaching.** When being taught you will follow through on the relevant controls and be clearly shown how to achieve the manoeuvre. You will then be given the opportunity to ask any questions you have about this exercise. Complicated exercises may be broken down and taught in small sections.

c. **Tasking.** You will now be told what you are expected to do to practise this exercise. If at all unclear on your tasking you will have the opportunity to say so at this stage.

d. **Practice.** You will be given control to fly the aircraft through the exercise you have just been taught. Your instructor will monitor your performance and will not allow you to get into a difficult situation. He will be ready to take back control at any time if necessary. At the end of this practice your instructor will take back control and explain clearly how you have done. At this stage he will either give you further training or practice if required, or move on to the next part of the syllabus.

To repeat, if you are not sure what is expected of you, ask your instructor again until you are sure and confident.

EFFECTS OF CONTROLS - 1

AIM To select the datum attitude using co-ordinated controls.

1. You will need an understanding of the following topics:

   a. Airmanship - definition and explanation - use of the clock code.

   b. Hand over/take over of control and follow through procedures.

   c. Axes of an aircraft.

   d. Stability.

   e. Definition of datum attitude.

   f. Primary effects of elevator - aileron - rudder.

   g. Effects in a banked attitude.

   h. Proportional control response.

   i. Effect of airspeed on control response.

   j. Aileron drag - adverse yaw - co-ordination - balance.

2. **Airmanship - clock code.** Airmanship is the airborne equivalent of road craft and is a skill which develops with experience. It includes awareness of other traffic, remaining within safe gliding range of a suitable landing area, considering the effect of approaching weather, and maintaining a high level of situational awareness. At the start of your training the instructor takes full responsibility for the airmanship but as your training progresses you will be expected to develop a good standard of airmanship before being allowed to fly solo. This will include judging how to remain within gliding range of the airfield and keeping a good look out for other aircraft. Even on your first flight you provide another useful pair of eyes to see other aircraft and you should report any that you see to your instructor. At some stage you will be taught the use of the clock code to report sightings. This code assumes you are at the centre of a clock and therefore 12 o'clock is directly ahead, 3 o'clock is directly to your right, 6 o'clock directly behind you, and 9 o'clock directly to your left. So to report an aircraft that appears above the horizon and slightly left of directly forward you should say "Aircraft left 11 o'clock high". See Fig 2. If you can estimate the distance that will also be useful.

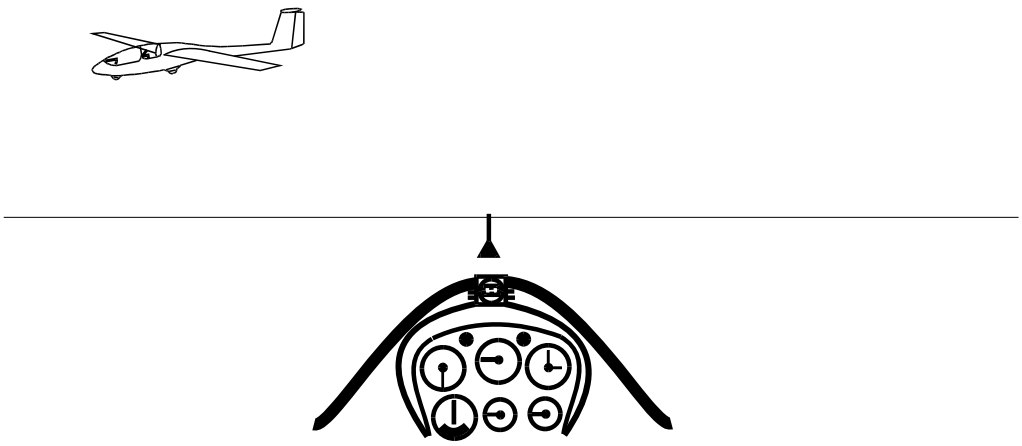


Fig 2. "Aircraft left 11 o'clock high".

3. **Follow through and hand over/take over of control.** Invariably you will have the required manoeuvre demonstrated to you before you are taught how to achieve it. When being taught you will be required to 'follow through' on the relevant controls. When your instructor says **'Follow me through'** you must place your right hand lightly on the control column and feet lightly on the rudder pedals and then say **'Following through, sir'**. Once the teaching phase is completed your instructor will say **'Relax'**. You must release the controls and say **'Relaxed, sir'**. It is perfectly acceptable to leave your feet resting lightly on the rudder pedals when your instructor is flying the aircraft so long as you do not restrict their movement in any way. Once you have been taught a skill and your instructor wants you to practise he will say **'You have control'**. You are to put your hands and feet on the relevant controls and say **'I have control, sir'**. After this practice, or at any time the instructor sees the need, he will join you on the controls and say **'I have control'**. You are to immediately release the controls and reply **'You have control, sir'**. Again, it is perfectly acceptable to leave your feet resting lightly on the rudder pedals. Before take-off on your first instructional sortie you will practise these procedures.

4. **Attitude.** Your instructor will demonstrate the datum attitude to you and will ask you to note the position of the horizon in relation to the aircraft's canopy. You should memorise what the datum attitude looks like as you will be expected to return the aircraft to this attitude throughout your training. The airspeed of the aircraft in this attitude is 50 kts. Next your instructor will demonstrate how stable the aircraft is, showing that a firm but light grip on the controls is all that is necessary. This enhances your ability to feel how the aircraft responds and how it is affected by movements of the air. During your training you will learn to recognise and achieve various attitudes: nose low; nose high and banked. See fig 3.

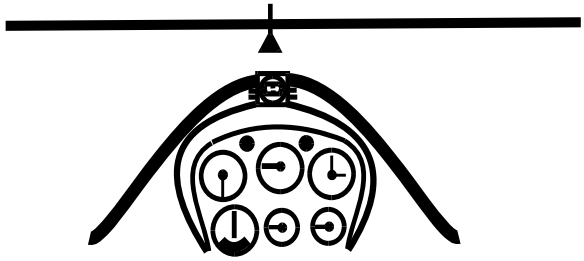


Fig 3a. Datum attitude.

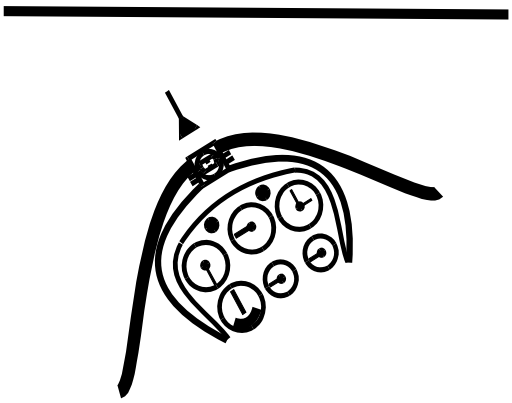


Fig 3b. Banked attitude left, nose low.

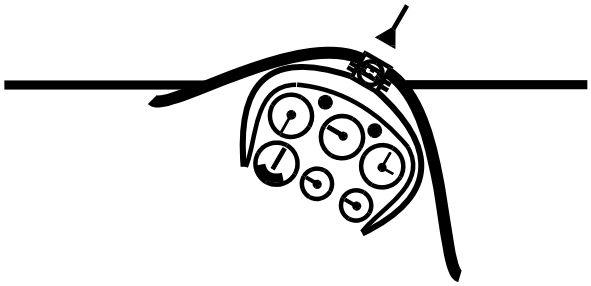


Fig 3c. Banked attitude, right, nose high.

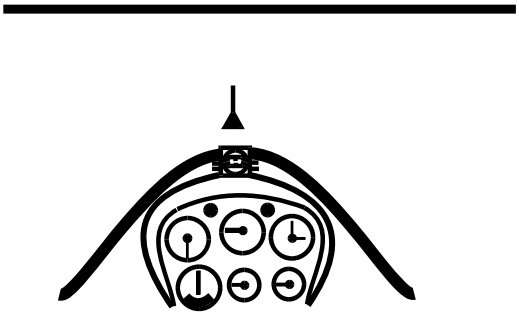


Fig 3d. Approach attitude.

5. **Axes.** The aircraft can move about one or more of its 3 axis. These movements are summarised below and explained in detail in para 6.

MOVEMENT	CONTROL	MOTION	AXIS
Stick forward pitches nose down and vice-versa	Elevator	Pitching	Lateral
Stick right rolls right and vice-versa	Ailerons	Rolling	Longitudinal
Right pedal forward yaws nose to the right and vice-versa	Rudder	Yawing	Normal

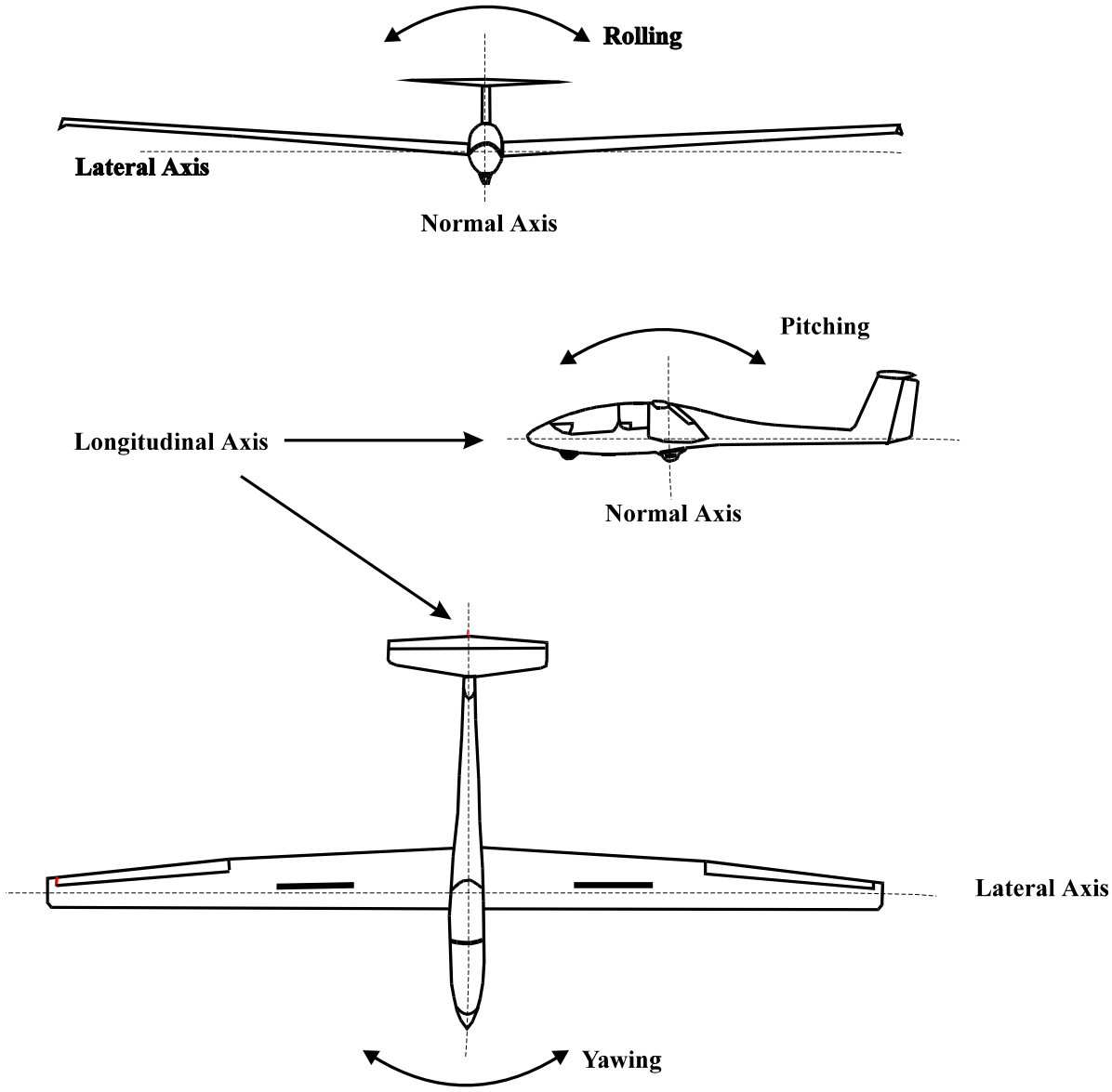


Fig 4. Movement about the three axes.

6. **Primary effects of controls.**

a. **Pitching.** Moving the control column forward pitches the nose of the aircraft down, and moving the control column aft pitches the nose up. The neutral point for the elevator is that position of the control column where no pitch change is taking place. A lower nose attitude leads to an increase in airspeed and more airflow noise. A nose-high attitude will lead to a reduction of airspeed and airflow noise.

b. **Rolling.** Moving the control column to the right causes the aircraft to roll to the right. Moving the control column to the left causes roll to the left. In both cases the roll will continue until a neutral position is found for the control column, preventing further roll.

c. **Yawing.** The aircraft is flying in balance when the slip ball is in the middle. When the right rudder pedal is moved forward the aircraft's

nose will yaw to the right, the slip ball will move to the left and the aircraft will be flying out of balance. If the left rudder pedal is moved forward the nose will yaw to the left and the slip ball will move to the right. The aircraft is once again flying out of balance. Returning the rudder to neutral restores balanced flight with the slip ball central. The yaw string on the canopy also shows the state of balance but is more sensitive to yaw than the slip ball. The yaw string is more convenient to use than the slip ball because it is in your line of sight whilst looking ahead, but it works in the opposite sense. If the string is off to the left then you will need right rudder to bring the aircraft back into balance.

7. **Primary effects in a banked attitude.** The primary effects of all the controls are relative to the axes of the aircraft. For this demonstration, the aircraft will be placed in a banked attitude and each effect flown. You will then see that regardless of where the horizon appears, the aircraft still pitches, rolls and yaws relative to its own axes.

8. **Proportional response.** The response of the aircraft to all the controls is proportional to the amount of control input. This will be taught using the aileron response as an example. If the control column is moved a small amount, the aircraft will roll only slowly in that direction. If the control column is deflected a larger amount, a faster rate of roll will be observed. So a larger, rather than faster, deflection of any of the primary controls produces a quicker response. It follows that all control inputs should be smooth and progressive.

9. **Effect of airspeed on control response.** The Viking is normally flown at 50 kts. At lower airspeeds the response of the controls is decidedly sluggish whereas at higher airspeeds the controls are more responsive and feel firmer. Your instructor will allow you to note these effects at speeds of 45 kts and 60 kts.

10. **Adverse yaw and co-ordination.** When the control column is moved to one side the down-going aileron produces more lift than the up going aileron and consequently also produces more induced drag. This is known as aileron drag and it causes adverse yaw (yaw in the opposite direction to the roll, see Fig 5, next page. This effect will be demonstrated to you. You will then be taught how to eliminate adverse yaw by co-ordinating the use of aileron with rudder. This co-ordination of aileron and rudder is necessary to ensure balanced flight.

11. **Selection of the Datum Attitude.** Once you have mastered the co-ordinated use of aileron and rudder, your instructor will teach you how to re-select the datum attitude should the aircraft's attitude change. The datum attitude is normally defined as flying the Viking at 50 kts, in balance and with the wings level. Your instructor will demonstrate any minor changes to this as required. The technique is to firstly roll the wings level using co-ordinated aileron and rudder, then secondly, use the
elevator to select the correct pitch attitude, checking the balance on the red yaw-string on the front of the canopy directly in front of you.

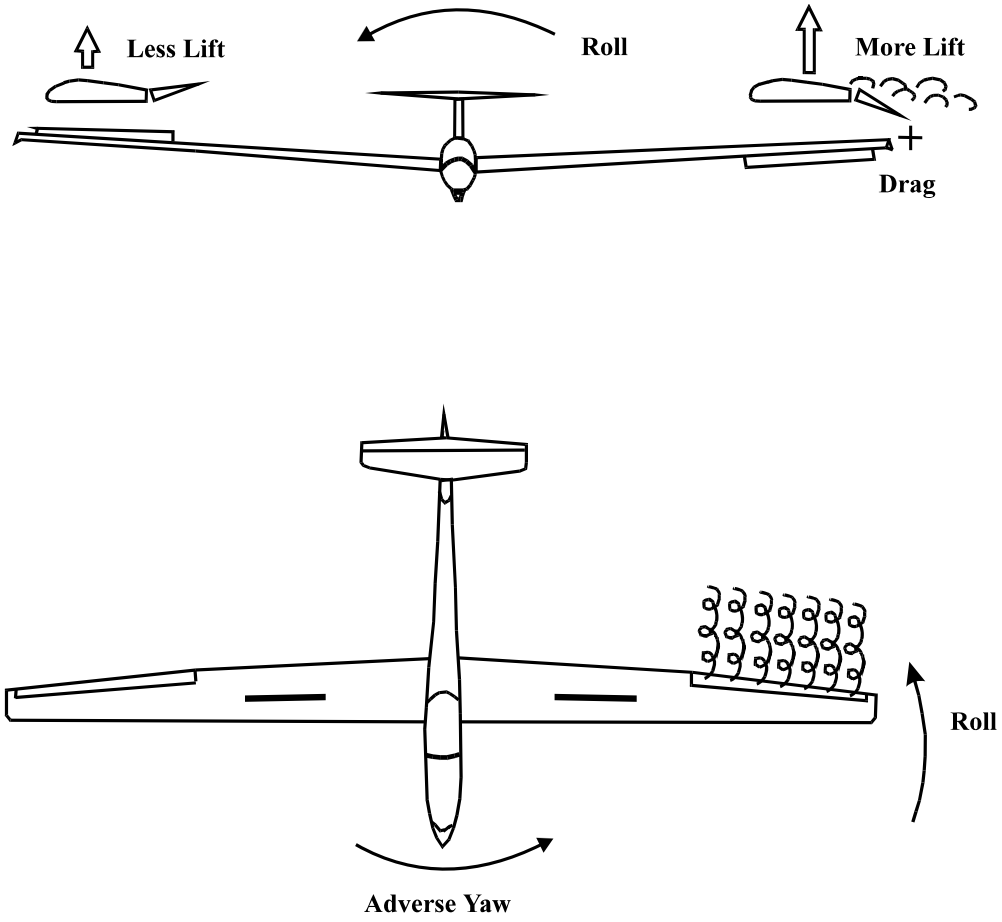


Fig 5a. **Aileron Drag inducing Adverse Yaw**

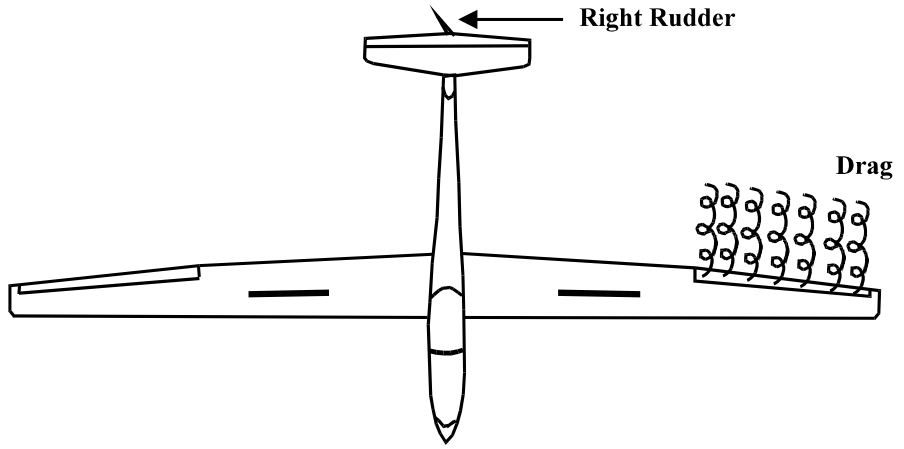


Fig 5b. **Rudder overcoming Adverse Yaw**

12. **Lookout and use of the visual horizon.** You should use visual judgement to assess changes in attitude and listen to the changes of airflow noise. Basic flying skills rely on the use of all of your senses. Do not depend on the instruments, but use them to confirm the visual cues you can see by looking at the horizon ahead and for making fine adjustments. Note that your

view straight ahead is directly over the compass mounted on top of the instrument panel cover.

EFFECTS OF CONTROLS - 2

AIMS **To select the datum attitude and fly in balance and in trim**
To operate the airbrakes correctly.

1. You will need an understanding of the following topics:

   a. Further effects of aileron and rudder.

   b. Use of trimmer.

   c. Use of airbrakes.

2. **Airmanship.** During this exercise you will be expected to assist your instructor in looking out for other aircraft. You will also be shown that it is important to re-trim the aircraft every time you select a new datum attitude. This will reduce the likelihood of the attitude changing should you become distracted.

3. **Further effects of rudder and aileron.** The elevator has only one effect, its primary effect (Pitch). Both the rudder and aileron have a primary effect and further effects. These are:

   a. **Rudder.** With the elevator and ailerons held neutral continued application of rudder will produce:

      (1) Yaw (primary effect), then:

      (2) Roll, in the same direction as the yaw (further effect). The roll is induced by the advancing wing producing more lift.

      (3) Continued roll and yaw in the same direction leads to a spiral descent.

   b. **Aileron.** With the rudder and elevator held neutral continued application of ailerons will produce:

      (1) Roll, (primary effect), then:

      (2) Yaw in the direction of the roll. The yaw is caused because, when the aircraft is rolled, it goes out of balance and begins to slip toward the lower wing. The airflow meets the side of the aircraft and causes it to "weathercock" in the same direction as roll.

      (3) Continued roll and yaw in the same direction leads to a spiral descent.

4. **Use of the trimmer.** The Viking only has elevator trimming so the following relates only to this. If a forward or rearward pressure is required to maintain the desired attitude the aircraft is “out of trim”. The aircraft is said to be “in trim” when it maintains a selected attitude without the need to hold any fore or aft pressure on the control column. The trim control is the small green lever inboard of the airbrake lever. It works in the same sense as the control column. If a forward pressure is required on the control column to maintain the required attitude, then the trim lever must be moved forward until this forward pressure is removed, and vice versa. The aircraft needs to be re-trimmed after every change of pitch attitude and you will be taught how to do this using the sequence:

a. Select the new attitude.

b. Hold the new attitude.

c. Trim as required.

d. Check for accuracy, by relaxing on the control column.

5. **Use of airbrakes.** The blue lever on the left side of the cockpit is moved rearwards to open the airbrakes. When operated, the airbrakes reduce the total lift generated by the wing and increase the drag. An increased rate of descent can therefore be maintained without increasing the airspeed. When landing, this allows the approach to be adjusted to land the aircraft in a chosen area. You will be taught the following points:

a. Rearward pressure on the airbrake lever first overcomes the strong, over-centre lock. Further rearward movement opens the airbrakes. Back pressure on the lever once the airbrakes are fully open, operates the wheel brake.

b. At approach speed the airbrakes tend to be sucked open after being unlocked so a firm hold is required on the lever. At reduced airspeed, e.g. as the aircraft slows down before landing, the airbrakes tend to close under their own weight, so positive control is also needed at this stage.

c. As the airbrakes are opened there is a nose down pitch change and co-ordination with the elevator will be necessary to maintain the required attitude.

d. The further you open the airbrakes the greater the rate of descent, although the greatest rate of change in effectiveness is over the first half of the airbrake travel.

e. As the brake lever is moved forward again the rate of descent decreases, there is a nose up pitch tendency, which must be controlled with the elevator. To lock the airbrakes closed requires a firm push on the lever.

f. As the airbrakes are opened and the drag increases, a slightly lower nose attitude is needed to ensure that the correct airspeed is maintained. Similarly, as the airbrakes are closed and the drag from them is reduced, maintaining the correct airspeed will require a slightly higher nose attitude.

STRAIGHT GLIDE

AIM **To achieve and maintain the straight glide in balance and in trim.**

1. **Airmanship.** During this phase of your training you will be taught a, systematic scan which allows you to fly the aircraft safely and accurately, whilst maintaining good situational awareness. The scan comprises **L**ookout - **A**ttitude - **I**nstruments (**LAI).** The lookout scan must cover the whole field of view in a regular, organised way. One recommended pattern is to lookout as far as possible in one direction along the horizon, then scan above and below the horizon as your eyes travel back to the front of the aircraft. Confirm the correct attitude is being maintained or adjust it as necessary. Check that the airspeed is correct and the aircraft is in balanced flight at a safe altitude. Repeat the lookout to the opposite side, re-check attitude and instruments. Finally look above the aircraft before re-checking attitude and instruments and then start the whole cycle again. The work cycle is therefore:

LOOKOUT - ATTITUDE - INSTRUMENTS

You should report any aircraft that you see to your instructor, using the clock code described in chapter 4.

2. **Straight glide.** You will first be shown how to recognise a straight glide. This is done by checking:

a. Wings level.
b. Normal gliding attitude.
c. Airspeed 50 kts.
d. Aircraft in balance.
e. Flying on a constant heading towards a reference point on the nose.

You will then be taught how to achieve the straight glide from a descending, banked attitude. This is accomplished by using co-ordinated controls to roll the wings level, selecting the correct pitch attitude, then ensuring that the aircraft is in balance and trimmed correctly. Next you will be taught to maintain this condition and incorporate an organised scan using the **LAI** work cycle. This will ensure a good all round look out, monitoring of the aircraft attitude and instruments and highlight any corrections necessary to continue in the straight glide. After this you will be taught how to regain the straight glide toward a specific heading reference.

3. **The Exercise.** The teaching points for this exercise are as follows:

a. **Achieving the straight glide.**

(1) Select the attitude - use co-ordinated controls to roll wings level, then pitch to the correct attitude.

(2) Hold the attitude - check speed (50 kts).

(3) Check trim - adjust as necessary.

(4) Check in balance and maintaining a constant heading.

b. **Maintaining the straight glide.**

(1) Look out for other aircraft.

(2) Attitude. Confirm wings level, pitch attitude correct, heading constant. Correct as necessary.

(3) Instruments. Confirm airspeed correct (50 kts) and aircraft in balanced flight, correct as necessary. Note altitude.

(4) Look out for other aircraft to opposite side.

(5) Check attitude and instruments as above.

(6) Look out above for other aircraft.

(7) Check attitude and instruments as above.

(8) Repeat process.

This scan is a continuous work cycle and it will apply throughout all your flying. When correcting airspeed errors it is important to look ahead and make an appropriate correction to the attitude. Due to the aircraft's inertia there will be a small delay before the effect of the attitude change is registered on the ASI.

c. **Regaining a heading reference.** Once you have mastered the basic work cycle described above, you will be taught to use a reference point to ensure you can make the aircraft fly straight on a particular heading. If during the scan (**LAI**) you notice you are no longer heading toward your selected reference point the following procedure is used:

(1) Apply a small amount of bank towards your heading reference using co-ordinated controls.

(2) Roll the wings level when the heading reference is regained.

(3) Continue with the standard scan work cycle (**LAI**).

You will be given the opportunity to practice this once your instructor teaches you.

WINCH LAUNCH

AIM **To take-off, climb and release.**

1. **Airmanship.** The new aspects of airmanship involved in this exercise include:

   a. Completing the take off checks using the flight reference cards (FRC's).

   b. Checking for other aircraft in the launch and landing area.

   c. Awareness of wind speed and direction. (Wind sock).

   d. Planning for a possible launch failure.

   e. Checking with wing tip holder that it is all clear above and behind.

2. **Signals.** Before commencing the launch ensure that all controls are central. Then, having checked that it is all clear above and behind and confirmed that the projected take-off path is clear, give the order to **'Take up slack'.** This verbal signal is backed up by holding up one finger of your left hand vertically. Once you note that the wing tip holder has relayed this signal to the launch point caravan, place your left hand close to the cable release control. When the cable is taut, order **'All out'** and raise two spread fingers of the left hand**.** Again, once the signal has been relayed, place your left hand close to the cable release control. If at any time you detect a problem such as the cable winding in too quickly during the take up slack phase, or the glider jerking forward and over running the launch cable, or if a wing tip touches the ground during the launch or if you hear the order **'STOP' 'STOP' 'STOP'**, ***RELEASE THE LAUNCH CABLE IMMEDIATELY*****.** The correct way for anyone on the airfield to stop a launch is to shout **'STOP, STOP, STOP'.** On hearing a stop signal a pilot about to take off is to release the launching cable from the glider immediately. Once the ground crew have confirmed that the cable has fallen clear of the aircraft, the wing tip holder is to lower the wing tip to the ground.

3. **Ground run.** Once the all out signal has been transmitted to the winch driver you can expect a smooth but rapid acceleration. The ground run only lasts a few seconds during which time you should keep the wings level with aileron and steer the glider straight with the rudder, whilst balancing the glider on its mainwheel using the elevator. In doing so the glider will lift off when it has sufficient airspeed. As the glider accelerates during the ground run the controls will become more responsive and smaller inputs will be required. Use separate, uncoordinated aileron and rudder inputs until the glider becomes airborne, after which normal co-ordination of rudder and aileron is necessary.

4. **Initial climb.** Once the glider has lifted off select a shallow climb angle at first until the aircraft accelerates through 50kts.

5. **Transition to the full climb.** Provided that the glider continues to accelerate and is clear of the ground, make a smooth progressive transition to the full climb attitude using the elevator.

6. **The full climb.** In the Full Climb attitude you should see the horizon cutting the canopy frame symmetrically on each side just below the curved section. Use co-ordinated aileron and rudder to keep the wings level and apply a steadily increasing back pressure on the control column to maintain the climb attitude. The ideal climbing speed is 55-60kts. If the speed is increasing toward the maximum permitted for winch launching of 65kts signal by yawing the glider positively from side to side, holding the wings level with aileron, until the speed is reduced. If the airspeed remains too high then the launch must be abandoned. This is done once a safe height has been reached by pulling the release twice and then selecting the approach attitude. If during the full climb the speed decays toward the minimum permitted of 50kts then the angle of climb must be reduced. If this has no effect, or if the speed decays further, then the launch must be abandoned by pitching the glider smoothly down to the approach attitude and pulling the release twice.

7. **The release.** During the later stages of a launch, the nose of the glider will start to be pulled down despite a continued back pressure on the control column and the aircraft will stop climbing. When the horizon appears over the coaming it is time to terminate the launch by lowering the nose still further to below the normal gliding attitude, before pulling the release twice. Once the cable has been released you can select the normal gliding attitude. Alternatively, the winch driver may decide to terminate the launch by closing the throttle, in which case you will sense the reduction in power. As before you should lower the nose to below the normal glide attitude and operate the release twice, before selecting the normal gliding attitude. Occasionally you may find that the cable back-releases of its own accord but to be on the safe side you must still operate the cable release twice.

8. After releasing the nose may try to pitch up, select and hold the normal gliding attitude, trim and begin a normal scan.

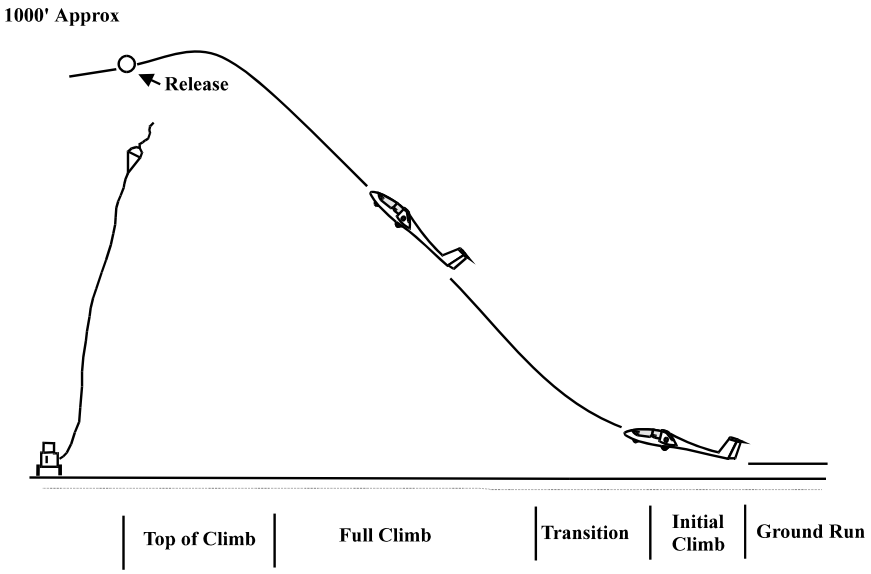


Fig 6. Stages of the winch launch.

MEDIUM TURNS

AIM **To turn on to specific headings using up to 30° of bank.**

1. **Airmanship.** Before executing any turning manoeuvre it is vital to look out all around to ensure the area is clear. During a turn the LAI work cycle is maintained but the lookout is biased towards the direction that you are turning. When exiting a turn it is important to look out in the direction of the previously raised wing as this blocks your view in that direction when banked. Maintaining a situational awareness during turns uses the scan as described, both to avoid conflict with other aircraft and to maintain orientation with respect to the base airfield and known landmarks.

2. You will be shown a medium turn so that you can recognise the attitude required. In the early stages of this lesson you will be taught the entry, maintenance and exit of turns separately.

3. The aircraft has an increasing tendency to pitch nose-down as bank is increased so a slight rearward pressure on the stick will be necessary to maintain the correct pitch attitude whilst turning. We do not normally trim out this force except for prolonged turning.

a. **Maintaining the turn.**

(1) Lookout into the direction of the turn, particularly at horizon level.

(2) Check the Attitude. Use co-ordinated aileron, rudder and elevator to maintain the correct angle of bank and pitch attitude for 50 kts.

(3) Scan the instruments. Make fine adjustments of attitude if the speed is incorrect or rudder if the aircraft is not in balance.

b. **Entering the turn.**

(1) Before entering any turn you must lookout. Start in the direction of the intended turn but scan right around the horizon to look away from the turn as well. Check above and give a final look in the turn direction. If it is clear look ahead.

(2) Use co-ordinated controls to achieve the medium turn attitude (20-30° angle of bank). A small amount of back pressure may be required on the control column to prevent the nose from pitching down

The work cycle is therefore Lookout, Attitude, Instruments **(LAI).**

c. **Exiting the turn.**

(1) Use co-ordinated controls to return to the straight glide attitude.

(2) As soon as this attitude is achieved, look out to check the area which had been masked by the raised wing during the turn.

(3) Resume the normal scan for a straight glide.

4. **Rolling out onto a selected feature.** This exercise requires anticipation because the aircraft continues turning, although at a reducing rate, until the wings are levelled. See Fig 7.

a. Look out to confirm the area is clear.

b. Approximately 10-15° before the required heading is achieved, look ahead.

c. Using co-ordinated controls, achieve the straight glide attitude.

d. If a slight error exists, use the technique that you learned in lesson 6 for regaining a heading reference.

e. Resume the normal scan (LAI).

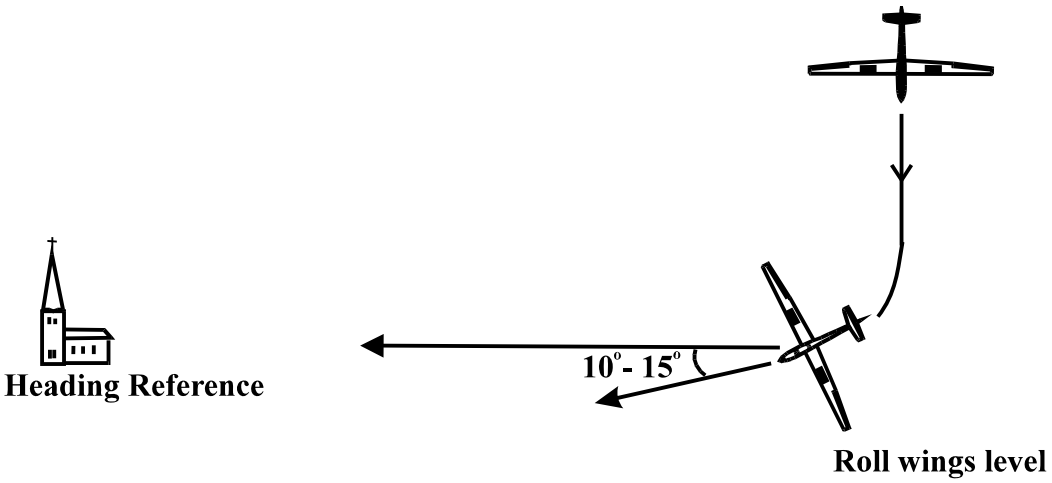


Fig 7. **Rolling out onto a selected feature.**

5. **Recovery from an over banked turn.** If the angle of bank exceeds 45° and the airspeed begins to increase, trying to reduce speed using the elevator is less effective and results in the 'G' loading on the aircraft increasing. (Effects in a banked attitude chapter 4). The correct recovery action is as follows:

a. Reduce the angle of bank using co-ordinated aileron and rudder.

b. Adopt the correct pitch attitude using the elevator.

c. Regain datum attitude, and re-enter the turn if required.

You will be given the opportunity to practice this recovery once your instructor has taught it.

APPROACH AND LANDING

AIM **To fly the approach and landing.**

1. **Airmanship.** A good lookout is especially important in the circuit, where the concentration of traffic is bound to be highest. The approach and the landing area must be checked whilst on the downwind leg. Note the wind speed and direction from the windsock and mentally confirm the approach speed appropriate for the conditions. Select the correct attitude at 400 ft or as soon as you are established on base leg, if earlier. Remember that in the circuit, the lower aircraft has right of way but must not cut in front of another aircraft already established on the approach. So a glance downwind should be made, to confirm that there is no other aircraft on long finals.

2. **Final approach.** Glider approaches are always made with a reserve of height and the approach is steepened by means of the airbrakes. To allow for adjustment in each direction, approaches are always planned to use about half airbrake. The airbrakes also make the aircraft more controllable close to the ground in that there is less tendency for the aircraft to balloon upwards as the nose is pitched up before landing. They also reduce the length of the ground run after landing.

a. Wings level, correct approach speed, in balance.

b. Correct heading for any drift.

c. As the start of the Designated Landing Area (DLA) disappears beneath the nose smoothly open a minimum of ½ airbrake.

d. Maintain the approach path using co-ordinated aileron and rudder.

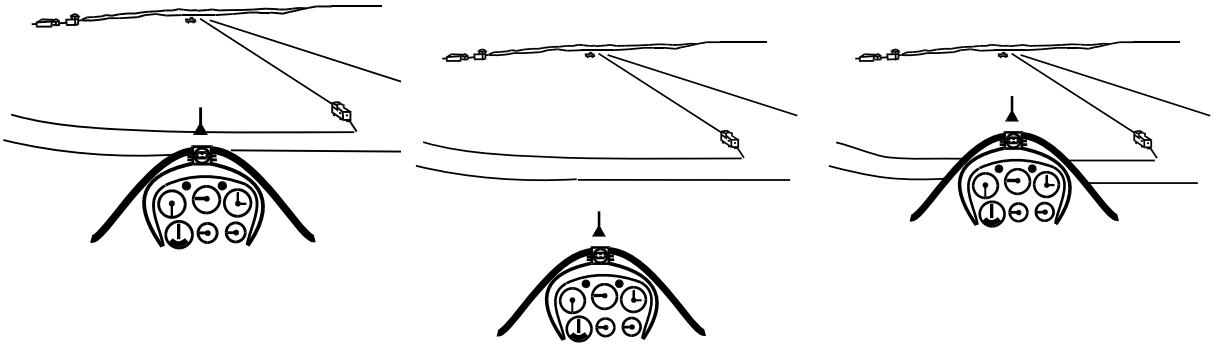
e. Maintain the approach speed with pitch.

f. Adjust airbrake as necessary to maintain the correct aiming point. If undershooting, reduce the airbrake setting slightly. If overshooting, increase the airbrake setting slightly. Remember that any change in airbrake setting will require a small change in attitude to maintain the correct speed

g. Aim to complete the approach with a minimum of ½ airbrake selected.

h. **The Approach Workcycle** (The four **A**s)

- **A**ttitude.
- **A**irspeed – control with pitch attitude
- **A**iming Point – control with airbrake
- **A**lignment with landing area – control with aileron (bank)



a	b	c
Good approach. airspeed	Correct airspeed, but undershooting	Correct but overshooting

Fig 8. **The Aiming point.**

3. **Aiming point.** You will be taught to recognise and use an aiming point (see fig 8) to control your approach path. In Fig 8a the aiming point is correct, so providing the airspeed is correct, the approach is good. At 8b the aiming point has risen in the canopy showing that the aircraft is undershooting. This may be because you have too much airbrake, or the nose may be pitched too far down. In 8c the aiming point is lower than normal in the canopy so the aircraft is overshooting. This may be caused by too little airbrake, or the nose may be pitched too high.

4. **The landing.** Essentially, the landing can be broken down into three parts, the round out, hold off, the touch down and ground run. See Fig 9.

a. **Round out.** This is the change of attitude from the approach attitude to one of flying level just above the ground. Your instructor will teach you how to recognise when to do this.

b. **Hold off.** This is a period where the aircraft is losing airspeed because it is gliding level. If the attitude remained the same then the aircraft would sink towards the ground as the reduction in speed caused a reduction in lift. To prevent the aircraft touching down early we increase the angle of attack of the wings by applying a back pressure on the control column. This progressively pitches the nose of the aircraft up until the landing attitude is achieved. Fig 10 shows a landing attitude, although, dependent on sitting height, this will vary from one individual to another. Remember that the airbrakes tend to close as airspeed reduces so it is vital to hold the airbrake lever firmly.

c. **Touch down and ground run.** The aircraft lands on its main wheel and tail wheel together. Once on the ground smooth application of full airbrake is required. Next the control column must be brought smoothly and progressively back to its stop. Steer the aircraft straight

with rudder, keeping the wings level with separate movement of the ailerons. Coarser movement of the ailerons and rudder will be necessary as the aircraft slows down on the ground. Wheel brake may be used as necessary to bring the aircraft to a controlled stop. The flight is not over until the aircraft has finally come to rest.

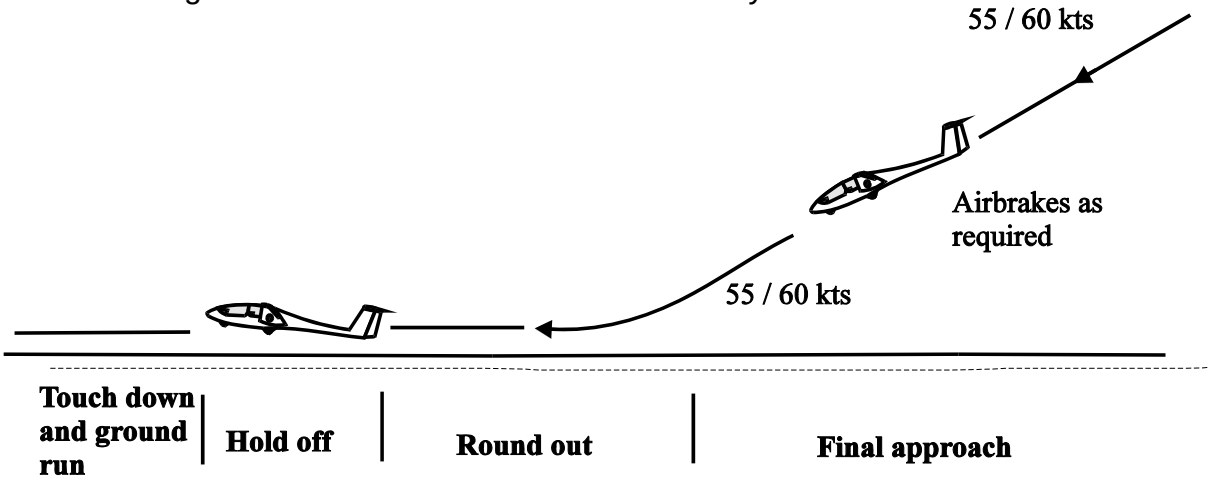


Fig 9. **Approach and Landing.**

5. The elements which go to make up the landing are as follows:

a. **The round out.**

(1) Look well ahead towards the far end of the runway.

(2) Maintain the airbrake setting.

(3) From the approach attitude pitch the nose up.

(4) Achieve the level attitude just above the ground.

b. **The hold off.**

(1) Look well ahead.

(2) Maintain airbrake setting.

(3) As the aircraft starts to sink, prevent it by raising the nose.

(4) Adopt the landing attitude. The aircraft will sink onto the ground on its main and tail wheels.

c. **The ground run.**

(1) Look well ahead.

(2) Smoothly apply full airbrake.

(3) Progressively move the stick to its back stop.

(4) Steer straight with the rudder.

(5) Keep the wings level with aileron.

(6) Use the wheel brake as necessary to come to a controlled stop.

(7) Allow the aircraft to settle with one wing on the ground.

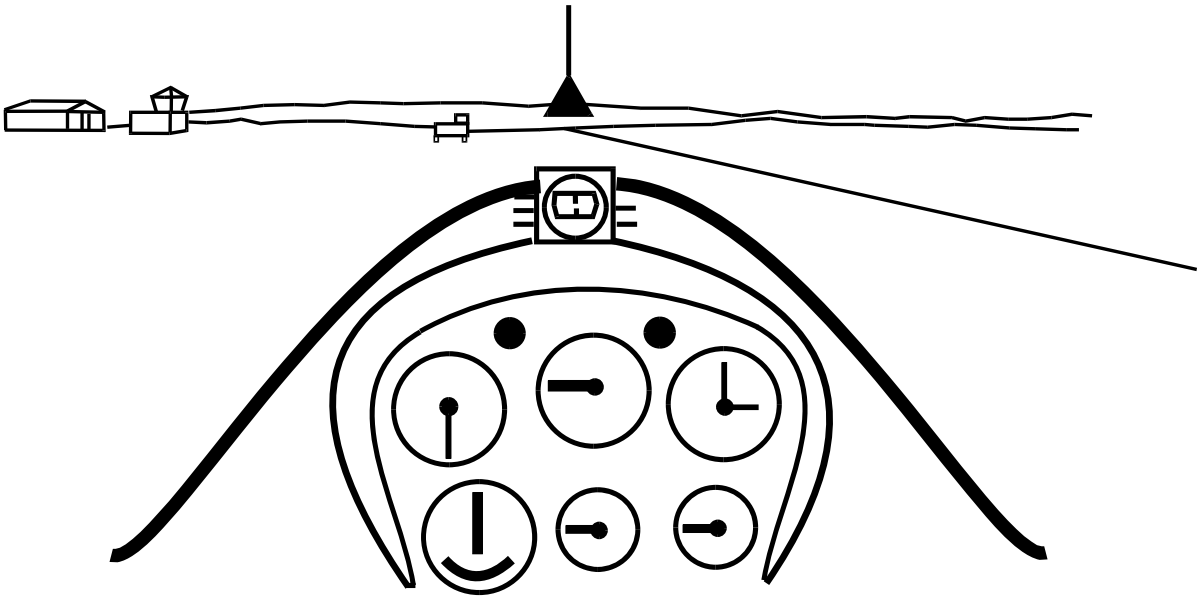


Fig 10. **The Landing attitude.**

6. **Balloon landing.** When a glider climbs during the landing phase, we call it 'ballooning'. This can result from over-rotating during the round-out, a bounce or touching down too fast. If you approach too fast, the elevator is more sensitive than usual, and ballooning is more likely. Insufficient airbrakes or gusty wind conditions also increase the likelihood of ballooning. Your instructor will teach you how to recover from a balloon landing (or from rounding out too high) as follows:

a. Recognise the balloon.

b. Select the level attitude, maintain airbrake setting.

c. As the aircraft descends, reselect the landing attitude.

d. Normal ground roll.

7. **The Bounce.**

a. **Recognition** – The aircraft gets airborne again after touching down, probably due to the wrong landing attitude or touching down with flying speed being still present .

b. **Recovery:** Use the balloon landing recovery as above

STALLING

AIM **a. To monitor the speed and prevent the stall.**
b. To recognise and recover from stalls with minimum height loss.

1. **Airmanship.** Before we deliberately stall the aircraft we always carry out the Pre-stalling checks from the FRCs. These are known as the HASELL checks from their mnemonic and provided that we cover them conscientiously we may be sure that it is safe to proceed. The lookout aspect is particularly important since the aircraft is not manoeuvrable when being flown at speeds close to the stall. We must also confirm that we will remain within safe gliding range of the airfield allowing for the additional height loss inherent in stalling.

2. **Considerations.** When the angle of attack of an aerofoil exceeds a critical angle (about 15° for the Viking wing) the airflow over the aerofoil will progressively become turbulent and break away. See Fig 11. This dramatically reduces the amount of lift generated until it is no longer enough to support the aircraft and a large and rapid loss of height can occur. You will learn to recognise the symptoms of a stall and the correct recovery technique. Finally, you will learn to recognise the signs of a developing stall, so that you can prevent it from happening.

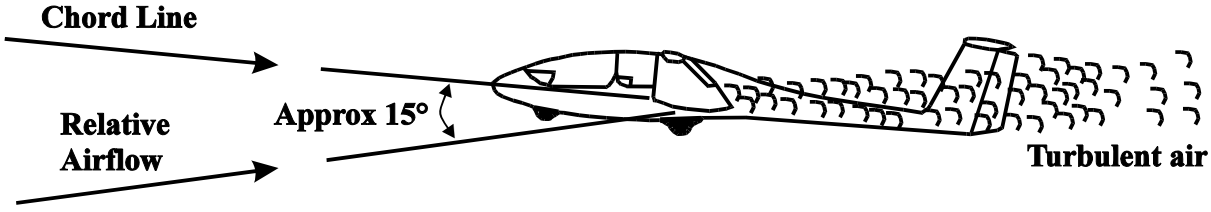


Fig 11. The approaching stall.

3. When ready to commence the exercise, Confirm that you are well within gliding range and complete the HASELL checks as follows:

H Height. Sufficient to recover by 500 ft, within gliding range of the airfield.

A Airframe. Airbrakes set as required.

S Security. Harnesses tight. Canopies locked. No loose articles.

E Engine. Not applicable in the Viking.

L Location clear of Built up areas, Controlled airspace, Cloud.

L Look out to ensure that we will remain clear of other aircraft throughout the exercise.

4. **Reduced 'G'.** During the stall it is possible that you will experience a sensation of approaching weightlessness or reduced 'G'. You will have clearly demonstrated to you that this sensation is not necessarily a symptom of the stall. Mistaking reduced 'G' for a stall could result in you adopting an unnecessarily steep nose-down attitude by further forward movement of the control column in a misguided attempt to recover. In this situation ignore the senses and select the recovery attitude - no lower!!

5. **The full stall.** There are four symptoms of the full stall which may appear individually or in any combination.

a. Buffeting of the airframe.

b. Nose pitching down despite the control column being held fully back.

c. Increased sink.

d. Possible wing drop.

6. **Standard stall recovery (SSR).** If one or more of the above symptoms is detected it is vital to take the standard stall recovery action immediately.

a. Move the control column centrally forward sufficiently to adopt the recovery attitude. (Note that centrally in this context means without any aileron being applied).

b. Regain safe flying speed (50 kts).

c. Roll the wings level if necessary.

d. Return to the correct attitude confirming that the aircraft is in balanced flight.

7. **Further stalling.** It is possible to stall the Viking from a shallow nose high attitude. In such a case the recognition of the approaching stall is more difficult because the nose high attitude is less obvious. Additionally at the stall the aircraft will not pitch down and it will be necessary to move the control column further forward than normal to achieve the recovery attitude. Conversely, when stalling from a steep nose-up attitude the nose will pitch down positively and less forward movement of the control column will be required for recovery.

8. **Stalling in a turn.** You will be taught how to recover from a stall in a gliding turn. There is a greater likelihood of a wing drop during this type of stall but the standard stall recovery must still be applied as any attempt to raise the down going wing with aileron, before the wings are unstalled, can

make the situation worse. During this exercise it is usual to return the aircraft back to a gliding turn attitude once the flying speed has been regained.

9. **Approach to the stall.** There are four signs of the approach to the stall which you will be taught to recognise:

a. A high nose attitude.

b. Decreasing airspeed.

c. Decreasing airflow noise.

d. Decreasing control effectiveness accompanied by sloppy feel.

10. **Stall prevention.** Once you are proficient at recovering from the full stall, you will be taught to prevent the situation occurring. By recognising the signs of the approach (para 9 above) to the stall (incipient stall) and taking preventative action before the full stall develops, a much smaller height loss is experienced and the recovery is conducted more safely and efficiently.

a. Recognise the first sign of the approaching stall.

b. Reselect the normal gliding attitude.

The stall has been prevented with minimum loss of height.

11. **Incipient stall in the turn.** Just as in any other phase of flight, recognising the signs of the approach to the stall and, in this case, immediately re-selecting the turning attitude, will minimise any height loss.

12. **Stall prevention with airbrakes open.** If, during an approach to land with airbrakes open, the aircraft entered an attitude where it was approaching the stall, it would probably prove more difficult to detect than normal. This is because:

a. The nose attitude will not be particularly high.

b. The noise from the airbrakes will mask the reducing noise level.

c. During a stable approach control inputs are often very limited, and therefore the reducing control effectiveness will not be noticed.

Selecting the approach attitude alone would not be sufficient to recover in this situation because the extra drag created when the airbrakes are open would prevent the aircraft from accelerating to the correct speed quickly. The higher rate of descent due to a portion of the lift being destroyed by the airbrakes would also make it inadvisable to leave them open. If you recognise an approaching stall in this situation, the correct recovery action is:

a. Recognise the first sign(s) of the approaching stall.

b. Close the airbrakes whilst simultaneously reselecting approach attitude.

c. Check approach speed has been regained then re-select airbrake as necessary.

CIRCUITS - 1

AIM **To plan and fly a normal circuit.**

1. **Airmanship.** In the circuit you will be expected to apply all of the airmanship skills you have been taught so far. You will need a high standard of lookout, a situational awareness for the whole of the circuit area and an appreciation of the effects of the wind. To ensure that you remain within safe gliding range you will need to glance regularly at the Designated Landing Area (DLA). The workload during the circuit phase will be greater than that experienced during previous exercises.

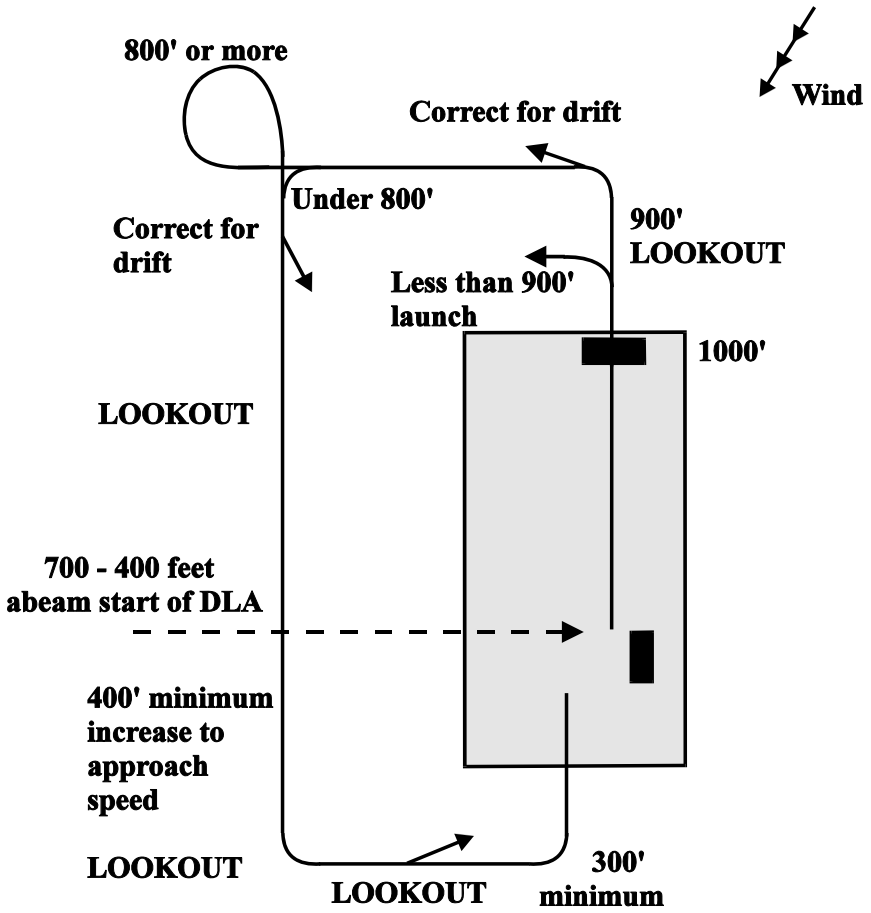


Fig 12. The Viking normal circuit.

2. **Launch.**

a. Terminate the launch at 1000 feet maximum.

b. Select the normal gliding attitude and trim.

c. Fly forwards towards a suitable feature to keep straight. Scan (LAI).

3. **Crosswind.**

a. At the upwind boundary or at 900 feet LOOKOUT and turn in the circuit direction, to track at 90° to the launch line. Continue until you reach the crosswind boundary.

b. If at 800 feet or more carry out a 270° turn in a direction opposite to the circuit to establish downwind. If less than 800 feet turn immediately downwind in the circuit direction.

4. **Downwind.**

a. Establish a straight glide, parallel to the launch line at a suitable distance out from it. Typically you should be observing the landing area at an angle of 20° to 30° below the horizontal.

b. Continue the LAI work cycle whilst maintaining a track parallel to the runway. Picking a suitable heading reference will assist in this. Assess whether you will be between 400 - 700 feet opposite the launch point to be within the normal circuit parameters.

c. Check the landing area is clear, or note the positions of other aircraft and vehicles.

d. By 400 feet or at the downwind boundary, look out and turn to track at 90° to the final approach.

5. **Base leg.**

a. Turn sufficiently to correct for drift.

b. Once established on base leg (or 400 feet if earlier) select the approach attitude and trim.

c. Confirm that your height is sufficient to commence the final turn by 300 feet. Look out for aircraft already established on long finals, recheck the landing area, place your hand ready on the airbrake lever. Concentrate on the DLA, so that you can judge when to commence your final turn.

6. **Final turn.** The final turn should be commenced at no lower than 300 ft AGL and always be made at the approach speed appropriate to the conditions. The angle of bank, normally 20 to 30 degrees, is adjusted so as to exit the turn when aligned with the longest, unobstructed approach path. You should have scanned thoroughly for other aircraft beforehand so that you can concentrate your attention towards the intended landing area during the final turn.

a. Look out to ensure that it is clear to commence your final turn. Check for anyone on long finals.

b. Judge the entry point and enter the turn using 20-30° of bank.

c. Maintain the approach speed throughout the turn. Adjust angle of bank as necessary to intercept the runway centre line.

d. Anticipate the exit to roll the wings level on the correct approach path.

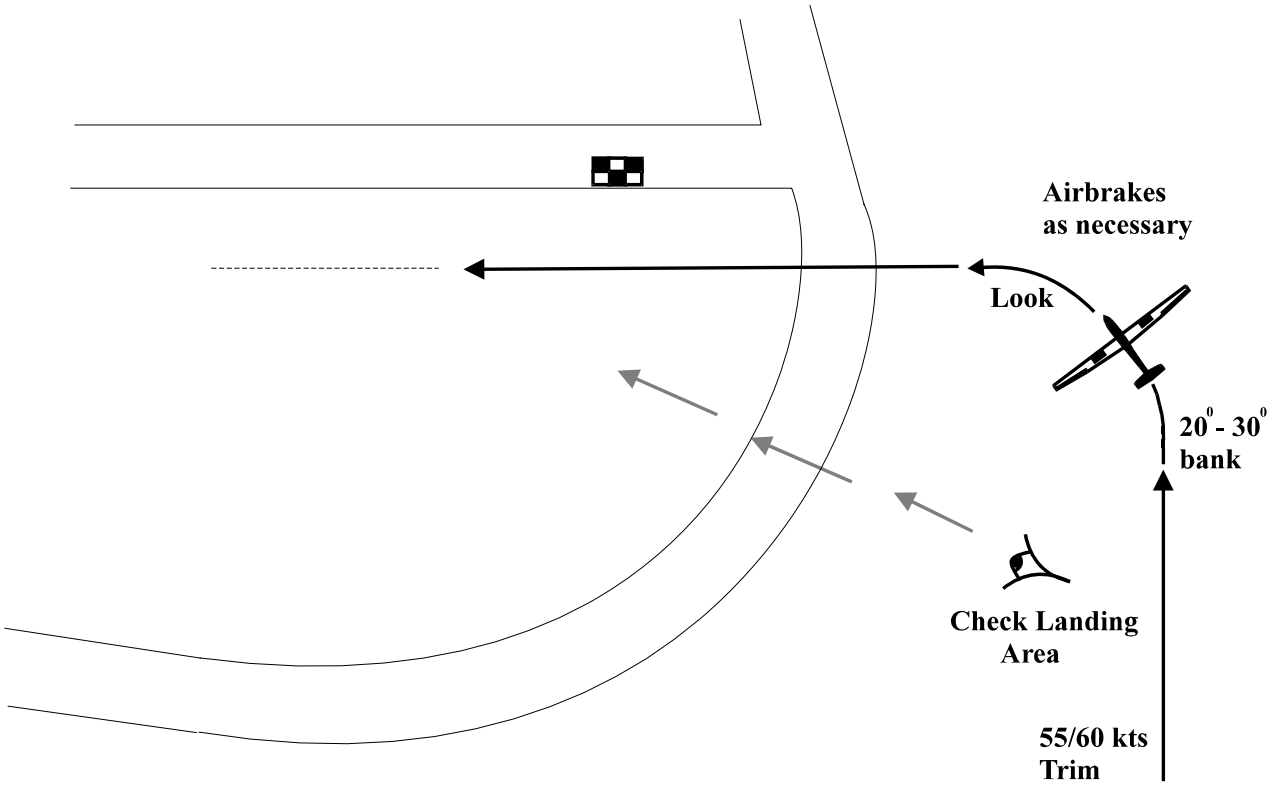


Fig 13. The final turn.

7. **Wind velocity.** Your instructor will give you advice to help you cope with variations in wind strength and direction. Increasing wind strength will mean it is necessary to move the base leg closer to the airfield. Any cross wind will affect the headings required to achieve the required track over the ground in the various phases of the circuit. Cross wind will affect your choice of angle of bank during the turn to downwind and onto final approach. A cross wind which tends to blow you toward the airfield (closing cross wind) will need a decision to turn earlier on the base leg for the final turn. With an opening cross wind (tending to blow you away from the airfield) you will need a decision to turn slightly later on the base leg for the final turn. Your instructor will teach you how to adjust your circuit appropriately.

CIRCUITS - 2

AIM **To recognise and handle high and low circuit situations correctly.**

1. **Airmanship.** In the circuit situational awareness involves constantly knowing your position and height in relation to the airfield, the effect of lift and sink on your circuit and the relative positions of other aircraft both in the air and on the ground that might affect your circuit planning. By maintaining situational awareness you can adjust your circuit to cope with high and low circuits should the situation arise. Early recognition of high and low circuit situations developing allows for easier and safer corrective action to be taken.

2. **The high circuit.** Delay in releasing from the winch launch, flying through a thermal or poor circuit planning may place you too high on the downwind leg. You will be taught to recognise this problem and correct for it. You will then practise this yourself.

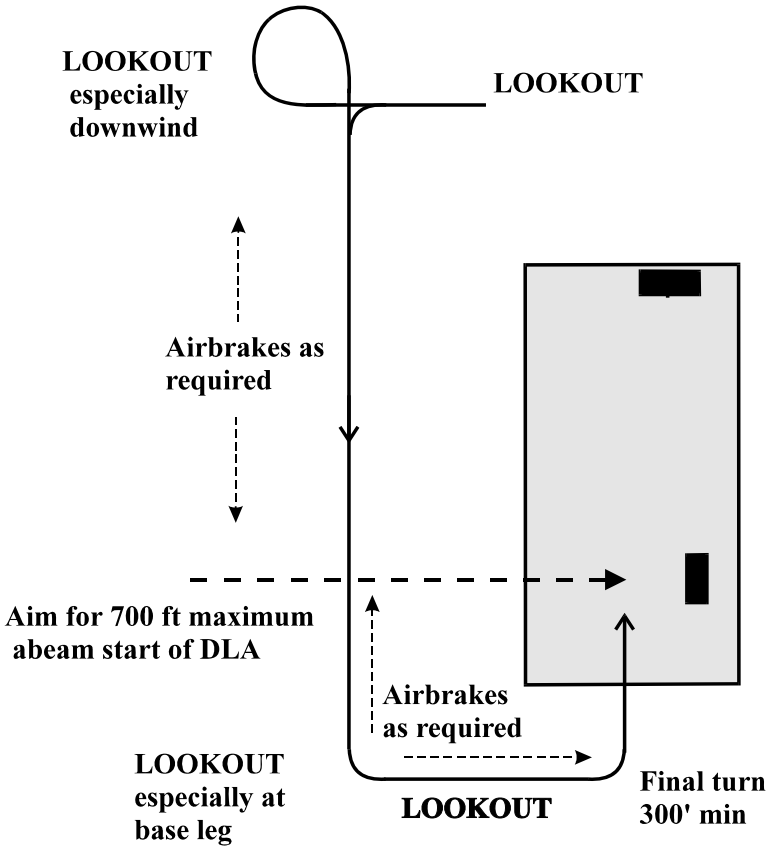


Fig 14. The high circuit.

a. **If high crosswind.**

(1) Note height at or above 800 feet at end of crosswind leg.

(2) Use the 270° turn to achieve the downwind leg.

b. **If high downwind.**

(1) Note height likely to exceed 700 feet abeam the launch point.

(2) Use airbrakes to achieve the correct height band opposite the landing area.

Note: It is recommended that you use the airbrakes in straight flight only and that you apply full airbrake for a short duration to allow time to reassess the situation.

3. **The low circuit.** If heavy sink is encountered or for any other reason you recognise that you are much lower in the circuit than usual, it is imperative to establish the aircraft within easy gliding range of the DLA. This can be achieved by angling in towards the landing area, aiming the aircraft approximately half way along the normal base leg, such that a U turn will bring you down on the DLA, effectively cutting off the base leg from the normal circuit.

a. Recognise the situation.

b. Turn towards the middle of the normal base leg.

c. Increase to approach speed by 400 feet.

d. Start the final turn by 250 feet or at the downwind boundary; whichever comes first.

e. A landing close to the launch point is unlikely. A safe landing anywhere within the DLA is the priority.

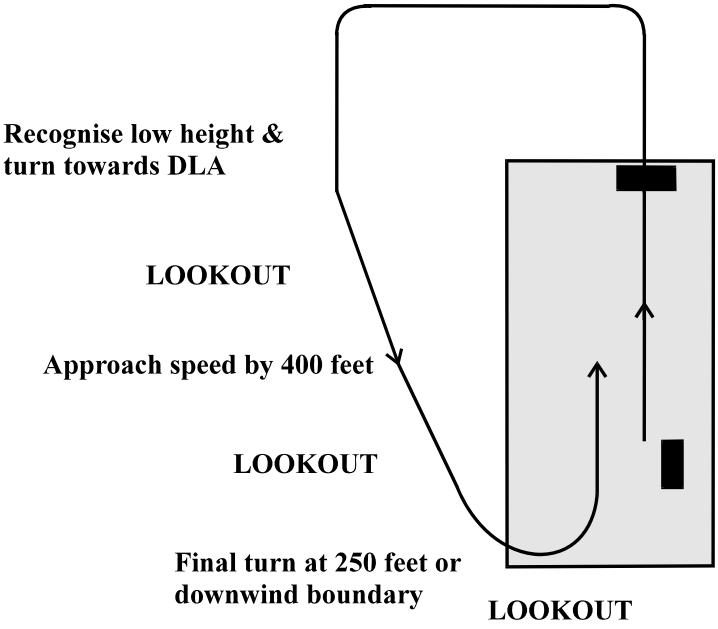


Fig 15. The low circuit.

LAUNCH FAILURES

AIM To land safely following a launch failure.

1. **Airmanship.** A launch failure may occur as a break in the cable, a previous join in the cable may part, the weak link system might fail or the winch may lose power. It is good airmanship to be ready for a possible launch failure before every launch. Noting where the other gliders are, both in circuit and on the landing area, may avoid a conflict in the event of a failed launch. If the launch does fail there will be a rapid loss of airspeed. The priority is to minimise the airspeed loss by selecting the approach attitude (never lower the nose below the approach attitude) and to carry out a safe landing. Whilst selecting the approach attitude you may experience reduced 'g'; ignore this sensation and select the correct attitude. The aircraft must not be turned or airbrakes used until the appropriate approach speed has been achieved. If it is possible to intercept the normal circuit pattern after a high launch failure then this should be your course of action. The following procedures cover the cases where it is not possible to regain the normal circuit.

2. **Immediate Actions.** Following a launch failure our immediate actions should be to avoid stalling and regain a safe flying speed as well as to rid ourselves of any remaining cable. As soon as a failure is apparent therefore we must:

a. Promptly lower the nose to the approach attitude.

b. Pull the cable release twice.

3. **Low launch failure.** Except in the case of a very low launch failure, which will be discussed later, we do the following: (See Fig 16)

a. Carry out the Immediate Actions listed above.

b. Confirm that it is possible to land ahead (a small turn may be made, to aim for a better landing area or to avoid approaching directly towards the winch).

c. Ensure that approach speed has been achieved.

d. Use airbrakes as necessary. (Full airbrakes are recommended to avoid running out of DLA).

e. Approach and land as normal.

f. Use the wheel brake to stop before the end of the airfield.

g. Only in an extreme situation might you induce a ground loop to avoid hitting a solid obstruction.

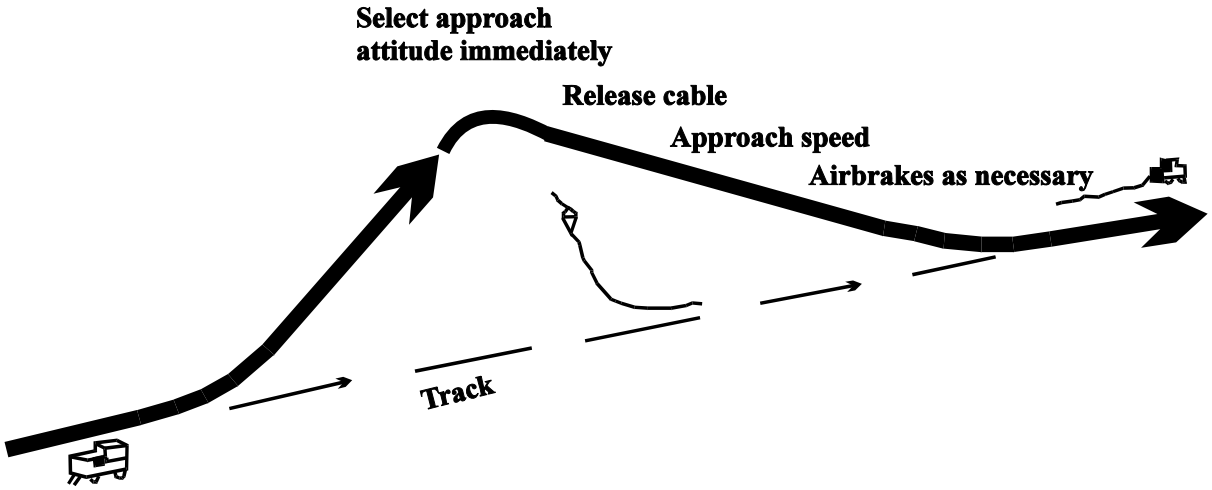


Fig 16. Land ahead launch failure.

4. **High launch failure.** (See Fig 17)

a. Carry out the Immediate Actions.

b. Confirm that it is not possible to land ahead.

c. Confirm approach speed (55 or 60 kts) before turning.

d. Turn through approximately 180°.

e. Check your height:

(1) If at 250 feet or less, continue the turn to line up with a suitable landing area.

(2) If above 250 feet, continue downwind to either 250 feet or the downwind boundary, whichever comes first.

f. Complete final turn towards the DLA.

g. Approach and land normally.

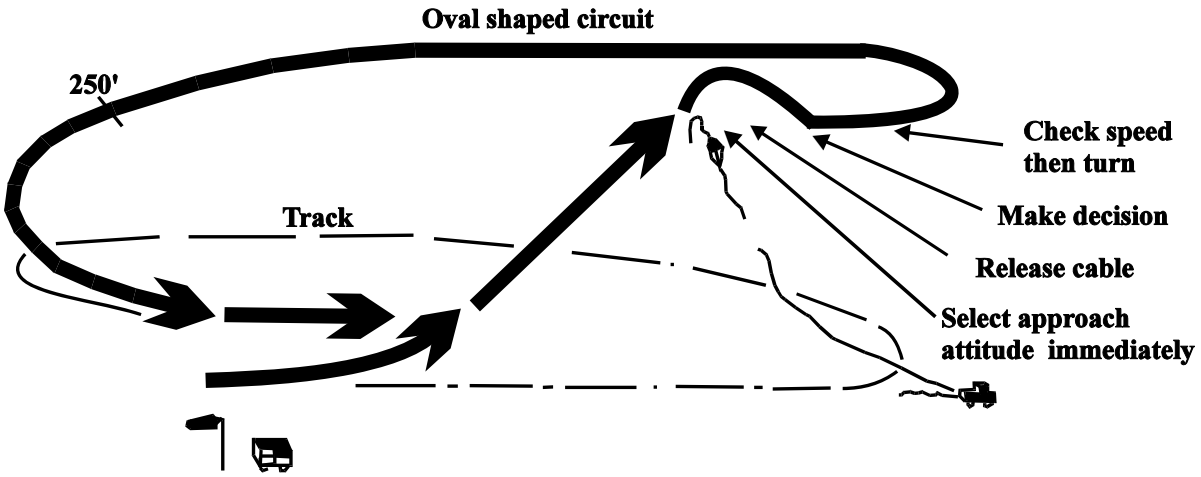


Fig 17. High launch failure.

5. **Very low launch failure.** In the event of a launch failure too low to permit pitching down to the normal approach attitude, normal approach speed is unlikely to be achieved, and using airbrakes may not be an option. The actions are to be:

a. Select an appropriate attitude.

b. Release the launch cable only if you have time.

c. Land ahead.

d. If the approach speed is not achieved it is unsafe to operate the airbrakes normally.

6. The recovery attitude required in this case is likely to be similar to the balloon landing recovery: i.e. pitch down to the level attitude and allow the aircraft to settle. If 50 kts is not achieved then do not operate the airbrakes until touchdown. If more than 50 but less than 55 kts is achieved, you may open the airbrakes a small amount but do not attempt to use full airbrake until after landing. Any operation of the airbrakes when close to the ground as in this situation must be cautious and smooth. As always you should look well ahead during the hold-off for landing. With little or no airbrake selected close to the ground the hold off will be longer than normal. The aircraft will also become over sensitive to elevator inputs and the likelihood of a balloon landing is increased. The aim should be to hold the aircraft in the correct attitude and not to try to force it onto the ground.

7. **Winch Failure.**

a. **Symptoms.** - Deceleration, possibly marked.

- Speed reduces towards 50 kt.

b. **Immediate actions.** - Select a level attitude to accelerate.

- If the speed does not increase, release cable and treat as a launch failure.

8. **Summary.** The various options for most launch failures except the very low case are summarised in the diagram fig 18

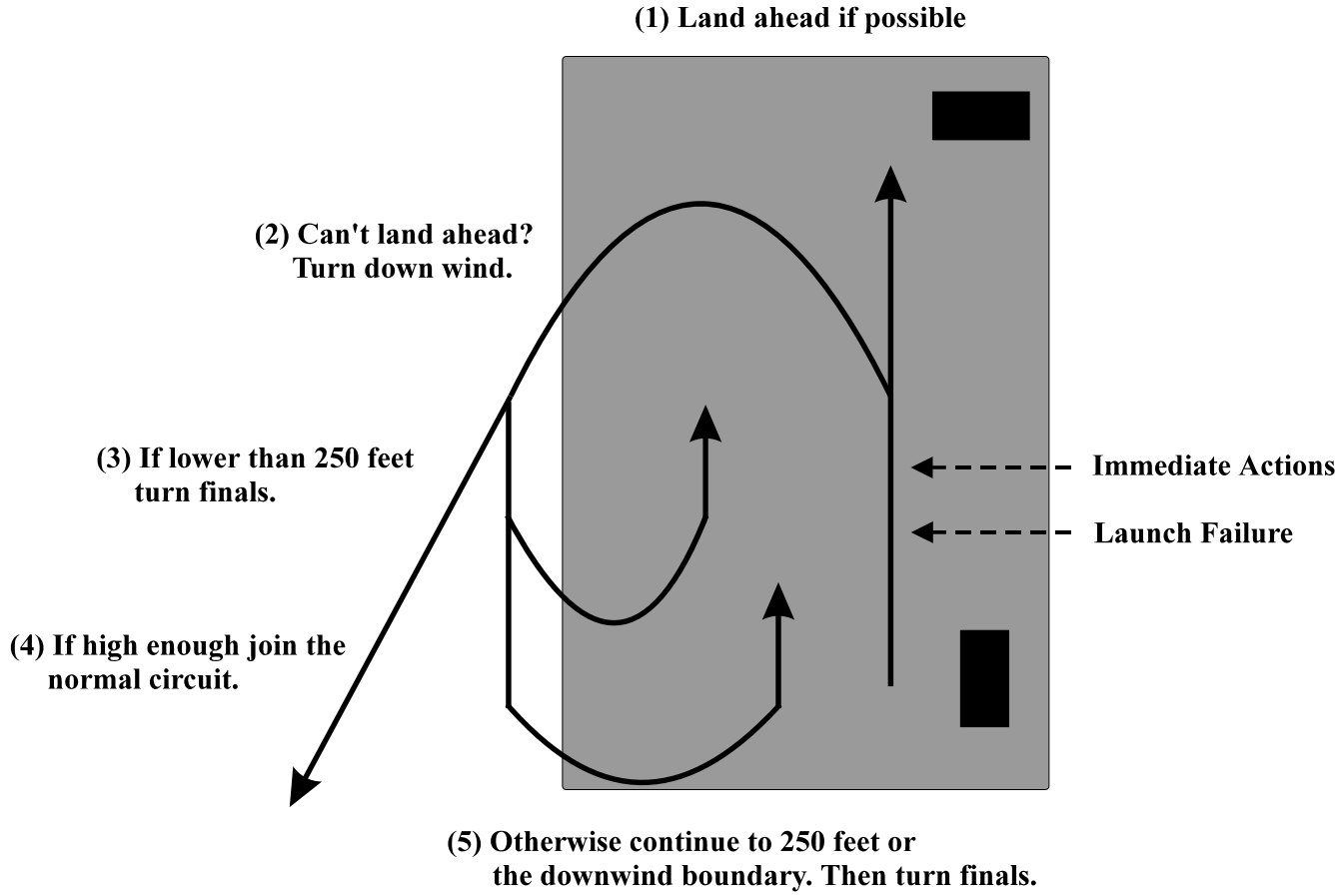


Fig 18. Circuit and landing options after launch failure.

PRE SOLO CHECK & FIRST SOLO

AIM To fly a normal circuit and landing.

1. **Airmanship.** Your first solo will not come as a surprise to you. For several launches you will have been handling the aircraft for the complete flight without help from your instructor. You will have been making all of the airmanship checks and decisions for yourself. The solo check will consist of a minimum of 3 launches with an A category instructor and will include at least one simulated launch failure. Following a satisfactory check flight you will be briefed to fly one solo circuit.

2. There are several minor differences affecting your solo flight caused by the reduction in all up mass of the aircraft.

   a. During the launch the ground run will be slightly shorter.

   b. The aircraft will exhibit a tendency to pitch up slightly more in the early part of the launch.

   c. The release height will be achieved slightly earlier and a little closer to the launch point.

   d. The trim lever position for the circuit speeds will be slightly further forward.

   e. The elevator response will be a little more effective and feel lighter.

   f. The glider will 'float' longer during the hold off.

3. Before flying solo it is vital that you are thoroughly familiar with the rules of the air. You will be expected to pass a simple test of these rules before your first solo.

4. **Collision avoidance.** The following general **Rules of the Air** (paras 4 – 9 below) apply to all aircraft including gliders:

   a. Even when under Air Traffic Control, the commander of an aircraft has the over riding duty to take all possible measures to ensure that his aircraft does not collide with another.

   b. Aircraft are not to be flown in such close proximity to other aircraft as to create a hazard.

   c. Formation flying is only to be carried out when all the commanders concerned agree.

d. An aircraft which is obliged to give way to another aircraft shall avoid passing over, under or ahead of the other aircraft unless well clear.

e. An aircraft which has the right of way shall maintain its course and speed unless by doing so there is a risk of collision.

f. A tug and glider combination is considered to be a single aircraft under the command of the tug pilot.

5. **Converging.** Some aircraft have priority over others because of their limited manoeuvrability and for other reasons. The order of priority is as follows:

a. Flying machines give way to airships, gliders and balloons.

b. Airships give way to gliders and balloons.

c. Gliders give way to balloons.

6. Subject to the above order of priority, when two aircraft of the same category are converging and there appears to be a danger of collision the aircraft which has the other on its right must give way, provided that mechanically driven aircraft shall always give way to aircraft which are towing other aircraft or objects. An easy way to remember this is 'on the right is in the right'.

7. **Approaching head on.** Each aircraft must alter its heading to the right.

8. **Overtaking.** The aircraft being overtaken has the right of way. The overtaking aircraft must pass to the right of the other aircraft and keep out of the way until well clear. However, a glider overtaking another glider in the UK may pass either to the left or right of the glider being overtaken.

9. **Priority when landing.** Landing aircraft have the right of way over all other aircraft in flight or on the ground. When two or more aircraft are landing, the lower aircraft has the right of way unless:

a. Air Traffic Control has given priority to a higher aircraft.

b. The lower aircraft has cut in front of another aircraft.

c. The lower aircraft becomes aware that a higher aircraft is making an emergency landing.