Tucson Soaring Club Flight Training Syllabus

INTRODUCTION

A problem, which seems to be inherent in the nature of flying clubs, is the lack of continuity of flight instruction received therein. Most club Flight Instructors are 'pulling a duty', have "real jobs" elsewhere and are, therefore only available to fly a day or two per month. For the active Student, this means an apparently-endless string of new Instructors to be 'broken in' by them, then possibly never flying with them again. The tendency of the new Instructor, when faced with a Student for the first time, is to "start with the basics"; that is: glides, turns, stalls; whatever. Next week, new Instructor, same drill; over and over again, ad nauseum. The Student doesn't progress and gets frustrated. Each Instructor, in turn, thinks he or she is being safe, conservative and productive. In the end, as a source of flight instruction, the club has failed the Student and they often either quit or go to a commercial operation to finish their ratings.

This Flight Training Syllabus, its integrated Student Training Record and Flight Instructor Daily Sheet are an attempt to remedy this endemic problem. In a sense, we have adopted a Part-141-type (FAA Approved Flight Training School) curriculum to gliders and by dividing the learning into distinct "phases" with articulated goals, standards and mandatory phase checks; essentially mini-checkrides. With this, we hope to dramatically improve the dialogue between Instructors with each other and between Instructor and the Student as well. While instruction from later phases may be given, no phase may be completed out of sequence and each phase must be signed off by a 'Check Airman', designated by the Chief Flight Instructor. The primary goal here is to stop unnecessary redundancy and repetition when moving from one Instructor to the next. The Student will get "signed off" and graded on a given area by each subsequent Instructor and, upon completion of a group or "phase", will progress to the next in sequence. Once through an area in the curriculum, the Student may then presumed competent therein and doesn't need to reprove this with each subsequent new Instructor.

This necessarily imposes a new level of record-keeping responsibility upon each Instructor for every Student they fly with. This will be accomplished in the Student's Training Record, kept either by the Student (their option) or in the Instructor's Office in a dedicated file along with the Student's logbook; which the Instructor is tasked with completing at the end of each of their duty period, by the end of that day. The Instructor takes aloft a Flight Instructor's Daily Sheet for the purpose of such record-keeping as is necessary to jog their memories when doing the followup requisite paperwork. This sheet may also be filled out prior to the Instructor's duty day, after reviewing each of his/her Student's records and circling the work/maneuvers needed to progress that Student in their appropriate phase. The Students will then be debriefed at the glider and the Instructor may

elect to do the records there, at that time, if the Student has them. If not, the records will be left by the Student in their "Vertical File" in the Instructor's Office for the Instructor to complete at the end of their duty day.

This Syllabus, then, is a 'living document' and will change as experience and circumstances dictate. Similarly, with the Student Training Record and the Flight Instructor Daily Sheet, which will all be available on **Schedule Now**, to reprint as necessary. It is anticipated that this system will soon migrate to an all online record-keeping system which will obviate the necessity of the Student Training Record to be written. The Instructor will then enter the appropriate information through their, or the club's laptop at the end of the day. Each Instructor will then be able to look at their upcoming student's records and determine their respective needs from home on the evening prior to their duty. Then a Daily Sheet can be printed at home, with a shorthand Lesson Plan tailored for each Student for the next day. Such records would be the restricted province of Flight Instructors and the Student to whom they belong, thus secure.

This Student Training Syllabus, the Student Training Record and the Flight Instructor's Daily Sheet are the work product primarily of Jeff Bonneville, CFI-G and James Lyne, CFI-G for the exclusive benefit and use by the Tucson Soaring Club, Inc., a 501(c)(3) non-profit corporation. It is copyrighted and governed by the Fair Use Doctrine and thus may be used by other clubs and schools for non-commercial and non-profit educational purposes, with attribution. For any other purpose, duplication or use is not authorized without the expressed, written permission of the authors and TuSC. It is intended to be educational only and should it ever be contradicted by an FAA Regulation, AIM, Pilot Operating Handbook, or other approved document, that approved document shall always govern.

James D. Lyne, Chief Flight Instructor, TuSC

GROUND PROCEDURES:

1.1 Preflight Inspection of the Glider

Purpose:
The pilot is always responsible for the airworthiness of the aircraft. Fortunately, a good preflight inspection will reveal nearly all mechanical deficiencies. Also, FAR 91.7 requires a preflight inspection before each flight.

References: Glider Flying Handbook, Chapters 2,3,4 and pages 6-4 to 6-5

Procedure:
Try to schedule one of your first three flights for the first morning period. Ask the Instructor to show you the preflight inspection procedure. Inspect the glider the same way every time. As you approach the glider, inspect its overall condition for signs of obvious damage. Remove the control locks from the ailerons and rudder. Unbuckle the seat belt securing the control stick. Before the glider's first flight of the day (and before you take the glider to the line), do a Positive Control Check. Ask the Line Chief or Assistant Line Chief to assist you. The assistant will hold each control surface as you attempt to move it with the cockpit controls. For example, the Line Chief will loosely hold the left aileron while you gently move the stick left and then right. He will report to you as he feels the control pressure. Check every control surface including the ailerons, spoilers, elevator, rudder, and trim tab. During the hookup procedure, test the towrope release mechanism and the glider wheel brake.

Performance Criteria:
Exhibits knowledge of the elements related to preflight inspection, including which items must be inspected, for what reasons, and how to detect possible defects. Inspects the glider using the appropriate checklist. Verifies the glider is in condition for safe flight, notes any discrepancies, and determines if maintenance is required. Inspects the launch equipment, including towline, tow hitches, weak links, and release mechanism.

1.2 Ground Handling and Securing the Glider

Purpose:
Prevention of glider damage during ground operations.

References: Glider Flying Handbook, pages 6-1, 6-2, 6-3.

Procedure:
Move the glider forward from under the shade hangar by pushing on the top surface of the wing near the wing root, while another person supports the wing tip. Avoid pushing on the trailing edge of the wing. Grob 103 only: Upon stopping to turn the glider, lift the glider tail or press down on the nose to pivot on the main

gear and keep the tail wheel from dragging. When lifting the tail, use the horizontal stabilizer, inboard, near vertical fin of the glider. Prevent scratches by not placing objects (even parachutes) on the wings. For long moves over the ground, secure the control stick loosely with the seat belt to prevent banging the control surfaces against the stops. Tie down both wings firmly, but not tightly, to reduce stress on the wings. When leaving the glider, ensure that both canopies are closed and latched, and that windows are closed. Remove battery and install pitot tube covers. Double check glider security by referring to the tie-down checklist posted in the shade ramada. Take battery to battery room and place the battery on the charging system.

Performance Criteria:
Exhibits knowledge of the elements related to ground handling procedures. Selects the appropriate ground handling procedures and equipment for existing conditions. Determines the number of crewmembers needed. Handles the glider in a manner that will not result in damage during movement. Secures the glider and controls, as necessary, in proper position.

TAKEOFF:

2.1 Checklist and Signals

Purpose:
Proper use of checklists ensures that critical tasks have been performed. During the takeoff, the actions of the ground crew, glider pilot, and tow pilot are coordinated by use of visual signals during takeoff.

References: Glider Flying Handbook, pages 6-4, 7-1, 7-2.

Procedure:
Never hurry or allow yourself to be rushed just before takeoff. The best way to avoid feeling rushed is to complete as many tasks as possible *before* moving to the flight line. Always have the pre-flight inspection (including checking for ballast), tow release, brake operation and positive control checks completed prior to moving into the launch position. Strap yourself in and complete the before-takeoff checklist. Tell (or signal) the Assistant Line Chief that you are ready for hookup. Follow his/her verbal and hand signals for opening and closing the hook. Moving to the takeoff line without being fully prepared is an unsafe act. Social pressure to hurry is inevitable. Those waiting to fly may not always successfully hide their impatience. Even if no one else is waiting to fly, club members may still seem impatient because they know that delays increase club expense. Stopping and restarting the towplane's engine is expensive. Use of a printed checklist is always preferred, particularly if it is aircraft-specific, it is required by the POH in the Grob 103. The mnemonic checklist below will suffice almost universally to cover the basics for most gliders. Memorize and rehearse this checklist so that you can move with deliberateness and competence. Verbalize the item challenge

and responses in quotes. Always use the printed checklist when available and when required by the Pilot Operating Handbook, as is the case with the Grob 103s. The 'fallback', memorized "abracadabra" mnemonic checklist is:

A – "*Altimeter*"-"*set*" to correct elevation. Radio tuned to proper frequency.

B – "*Seat belts and shoulder harnesses*"- "*fastened*" and tightened.

C – "*Controls*"- checked for "*free and correct*" movement

C - "*Canopy*"- "*closed & locked*", and checked.

C - "*Cable*" or towrope properly "*connected*" to the correct hook.

D – "*Dive brakes*"- "*closed and locked*" and guarded during takeoff.

D – "*Direction*"- of wind "*checked*" and emergency plan reviewed (and also verbalized).

Once the checklist is completed, give the Line Chief the 'thumbs up' signal. He will level the wings, and clear the pattern. The tow pilot will take up the slack in the rope. As he does, inspect the rope for obvious defects. Check that the appropriate weak link is installed at the glider end of the rope. If you see a defect or are not sure of the condition of the rope, stop the takeoff by signaling to have the wing lowered or by pulling the release. Make a final check of the wind and watch for the ready signal from the towplane (wagging of the rudder). When you are ready; wag your rudder, the signal to launch.

Performance Criteria:
Exhibits knowledge of the elements related to the before takeoff check, including the reasons for checking the items, and how to detect malfunctions. Establishes a course of action with crewmembers, including signals, speeds, wind, and emergency procedures. Ensures that the glider is in safe operating condition. Checks towline hookup and release mechanism, using the appropriate hook for the type of launch conducted. Ensures no conflict with traffic prior to takeoff. Completes the prescribed checklist.

3.1 Normal Takeoff

Purpose:
To get off the ground in conditions where crosswinds are not a significant factor.

References: Glider Flying Handbook, pages 7-2, 7-3

Procedure:
The takeoff has three phases. In the first phase, the glider and towplane are on the ground. During initial acceleration, apply full back stick to reduce weight on the nose wheel, then continuously reduce back pressure as the glider accelerates and roll on the main wheel in the ‘touchdown attitude’. Maintain this pitch attitude by using outside references (the relationship between the glider's nose and the horizon). The stick will usually be held slightly aft, however this will depend upon the weight of the occupants. Use the rudder to maintain directional control while holding the wings level. New student pilots often err by letting a wing drop. The glider will turn in the direction of the bank. In addition, the long wingspan makes it easy to drag a wing tip on the ground. During the second phase, the glider becomes airborne but the towplane remains on the runway. The glider will make a smooth transition to flight if you maintain the attitude established during the ground roll. If you force the glider off the ground, it will tend to bounce once or twice. Stay about three feet above the runway and no higher then the top of the towplane. If you climb too high you could pull the towplane's tail up causing its propeller to hit or, worse yet, causing it to crash. If you inadvertently balloon up higher than you intended, gently ease back down to the proper altitude. Don't dive at the ground. During the final phase of the takeoff, the towplane becomes airborne. At this point, use normal tow references for position. (See section on towing.) Often, the towplane stays below 20 feet to gain airspeed in ground effect. Then it will begin to climb. Avoid the tendency to drop low as he starts the climb. When you solo, the glider will feel slightly different during the takeoff.

Performance Criteria:
Exhibits knowledge of the elements related to normal takeoff, including configurations and tow positions. Uses proper signals for takeoff. Lifts off at an appropriate airspeed. Maintains proper position until towplane lifts off. Maintains directional control and proper wind-drift correction throughout the takeoff. Maintains proper alignment with the towplane.

4.1 Crosswind Takeoff

Purpose:
To develop the skill to take off with crosswinds of more than five knots, or with unexpected side gusts generated by thermals.

References: Glider Flying Handbook, pages 7-3 to 7-4

Procedure:
Here's what to do during each of the three phases of takeoff:
Phase 1: Before you begin to roll, apply rudder opposite the wind. The opposite rudder counteracts weathervaning. Full rudder may be required because it will be ineffective initially. As your airspeed increases, ease off the rudder. In light to medium crosswinds, keep the wings level. This may require aileron pressure into

the wind. In strong crosswinds you may have to keep the upwind wing slightly low. If the wing is placed too low, the glider will turn in the direction of bank. Since this is the same direction as the turn caused by weathervaning, you may not have enough rudder to keep the glider on the runway.
Phase 2: When the glider lifts off, stay directly behind the towplane, over the runway centerline. To do this, fly the glider in a crab, or sideways with reference to the direction of takeoff. If the glider drifts to either side of the runway, it will pull the towplane's tail to that side. This will complicate the tow pilot's takeoff.
Phase 3: When the towplane becomes airborne, the tow pilot crabs to maintain runway alignment. You will need to drift downwind to take up normal tow position. But watch for ground obstructions too (like the windsock at midfield).
If you stay centered on the runway, the towplane may not be able to crab.
This whole discussion on the three phases of takeoff boils down to a single simple rule. From the beginning of the takeoff roll, maintain the normal towing references on the towplane. That is, keep the towplane on the horizon, and the vertical stabilizer centered on top of the towplane cockpit. This works for any wind conditions. (See section on Aero Tow - Normal).

Performance Criteria:
Exhibits knowledge of the elements related to crosswind takeoff, including configurations and tow positions. Uses proper signals for takeoff. Lifts off at an appropriate airspeed. Maintains proper position until towplane lifts off. Maintains directional control and proper wind-drift correction throughout the takeoff. Maintains proper alignment with the towplane.

AEROTOW

5.1 The 200-Foot Call

Purpose:
To develop the habit of **always** checking, recognizing and identifying the 200-foot altitude 'Decision Point' in every tow.

References: Glider Flying Handbook, pages 7-4 , 7-5 , 7-6

Procedure:
If the towplane loses power, or if the rope breaks below 200 feet, the glider must land straight ahead – slight maneuvering is acceptable to avoid obstructions. Above 200 feet, the glider may turn 180-degrees and return to the runway. This turn is always into the wind. See the section on takeoff emergencies. As the glider passes through 200 feet (2300 feet msl at El Tiro), verbally call out "*two hundred*." Do this for every takeoff throughout your gliding career.

Performance Criteria:
Without prompting from the Instructor, the Student will call out "*two hundred*" as the glider passes through 200 feet. Student assesses distance from the runway

and identifies an alternate landing site.

6.1 Normal (high) Tow Position

Purpose: To maintain correct position during aero tow.

References: Glider Flying Handbook, pages 7-2, 7-3

Procedure:
The TuSC uses the normal (or high) tow position. Fly this position by maintaining proper references to the towplane. During straight flight, the towplane's vertical stabilizer should be centered on the towplane cockpit. The towplane should be approximately on the horizon. Remain just above the propwash of the towplane. Most students over-control during their first attempts at flying on tow. A correction for a minor error causes a bigger error. The glider then begins to swing back and forth, getting further and further out of position. This occurs because the student is slow at recognizing his error and then makes too large a correction. The goal is to see errors early so they can be corrected with small control movements. Changes in attitude (that is, changes in bank angle or pitch angle) tell you about position errors before they occur. After all, the glider does not usually move left or right unless it first banks left or right. Watch the relationship between the horizon and the towplane. Even small changes in attitude will be apparent. If a bank or pitch change is necessary use a small, smooth control movements to correct the error before the glider gets out of position. If you do get way out of position, don't make a big correction. Instead, slowly ease the glider back into position. Learn to relax. Don't focus on the towplane so intensely that you are not aware of changes in your pitch and bank. Generally the bank angle of the glider should be the same as the towplane’s bank angle. Turbulence also causes deviations in position, especially on good thermalling days. Remember that the glider flies through the same air that the towplane flies through, but about two seconds later. If it gets bumped, so will you. In a turn, the towing references change slightly. Keep the towplane on the horizon as before. Also, use the same amount of bank as the towplane. However, if you keep the fin centered you will be outside of the correct position. This produces a mild ‘crack-the-whip’ effect. Your airspeed will increase, and returning to the correct position without causing a slack towrope may be difficult. When you are on the same circle as the towplane, you will see some of the side of the towplane’s fuselage (the side at the inside of the turn). Instructors will suggest slightly different references, but all will put you in approximately the same position. Here are two ways to correctly position the glider behind the towplane:

• Position the glider so that the towplane vertical fin is at the outside edge of the top of the towplane cockpit.

• Position the glider so you can just begin to see, but not read, the numbers on the towplane fuselage (the side on the inside of the turn).

• The nose of the glider should point to the outside wing tip of the towplane. Learn to use all of the references. This will broaden your visual field of view. It will also make it easier to fly behind other types of towplanes. Never lose sight of the towplane. If you do, immediately release and turn right. Do not try to move back into position blind; you could cause a mid-air collision.

Performance Criteria:
Exhibits knowledge of the elements related to high-tow (slightly above the wake) position during various phases of aero tow. Makes smooth and correct control applications to maintain vertical and lateral positions during high tow. Maintains proper tow position during turns.

7.1 Low Tow Position

Purpose:
To develop the skill to fly in the low-tow position. This is the standard position in some glider operations, and it is used by the TuSC for cross-country towing.

References: Glider Flying Handbook, page 7-6

Procedures:
Position the glider so that the horizontal stabilizer of the towplane is above the wing of the towplane wing. This places you a few feet below the propeller turbulence. The lateral references are the same as for the normal-tow position.

Performance Criteria:
Exhibits knowledge of the elements related to low-tow (slightly below the wake) position during various phases of aero tow. Makes smooth and correct control applications to maintain vertical and lateral positions during low tow. Maintains proper tow position during turns

7.2 Boxing the Wake

Purpose:
To develop skill and coordination while flying in tow. To learn to identify the location of the towplane's wake.

References: Glider Flying Handbook, pages 7-11, 7-12

Procedure:
Begin from normal tow. Smoothly move straight down to low tow, just below the wake. Stay in low tow for approximately five seconds. This lets the tow pilot know that you may be boxing the wake. If you move to the side without first dropping to

low tow, the tow pilot may think you are signaling for a turn (see Aero Tow - Signals). You may box the wake either clockwise or counter-clockwise. This explanation describes a clockwise box. Begin from the low tow position. Then, move to the left using coordinated aileron and rudder. As you move sideways, add left stick and rudder to counteract the sideways pull of the rope. Stop the glider in the lower left corner of the box for a two-count. As with other tow positions, this has a vertical (up-and-down) and horizontal (side-to-side) reference. For both lower corners, use the same vertical reference as for low tow. That is, keep the horizontal stabilizer above the wing. The horizontal reference is the towplane's tailwheel being aligned directly above the main wheel. Stay in this position for a two-count. Then smoothly move up to the upper left corner using outside stick and rudder. To maintain your horizontal position keep the tail wheel vertically aligned with the main gear. The vertical reference for the upper corners is the same as normal tow (e.g. the towplane on the horizon.) Stabilize in this position for a two-count. Using aileron and rudder, move to the other upper corner for a two-count. If done properly, you will pass through normal tow position on the way. Move to the lower right corner for a two-count. Complete the box by moving back to low tow hold for a two-count and then up to normal tow.

Performance Criteria:
Exhibits knowledge of the elements related to boxing the wake (maneuvering around the wake). Maneuvers the glider, while on tow, slightly outside the towplane’s wake in a rectangular, box-like pattern holding briefly at each corner. Maintains proper control and coordination.

8.1 Slack Rope Recovery (Dual Instruction Only)

Purpose:
To develop the skill to recover from slack rope. A slack rope may result from turbulence. This maneuver is designated as "dual only" (not to be performed solo) because it could break the towrope or entangle it with the glider.

References: Glider Flying Handbook, page 7-10.

Procedure:
The slack rope will appear as a slight bow or large loop in the rope. The loop may move behind the glider's cockpit. If corrective action is not taken, the rope may break when it is pulled taught. Large loops may tangle with and damage control surfaces. When the loop begins to develop, be sure it is passing under the glider. If it's not, raise the nose slightly so it will. A loop passing over the glider is much more likely to cause an entanglement. It is usually possible to reduce a loop's growth. Do this by yawing the glider (with the rudder) away from the loop. This will slow the glider. If necessary, lift the wing on the side of the developing loop. It is much better for the loop to pass under the wing. The loop will stop growing and begin straightening out. Just as the rope straightens, gradually release the rudder so the glider begins to straighten. If timed properly, this will prevent a second

loop from forming. Do not have the nose of the glider pointed straight at the towplane when the rope straightens. Having the yaw, softens the jolt and helps prevent the rope from breaking. Spoilers can also be used to stop a loop from growing. However, their use is usually reserved for extreme conditions such as flying through mountain rotor. Use spoilers sparingly and cautiously. The Instructor will set up a slack rope demonstration by taking the controls and climbing above the towplane and then pushing over. This will cause the glider to shoot ahead. During the pushover, the Instructor will give the controls back to you to make the recovery.

Performance Criteria:
Exhibits knowledge of the elements related to the causes, hazards, and corrections related to slack line. Recognizes slack line and applies immediate, positive, and smooth corrective action to eliminate slack line in various situations.

9.1 Tow Signals (Dual Instruction Only)

Purpose:
To communicate with a tow pilot without use of radios. In-flight signals are mostly used to request a turn, a change of speed, or an emergency release. These signals are designated "dual only" because, if performed improperly, they could result in extreme deviations from normal tow positions.

References: Glider Flying Handbook, pages 7-1 and 7-2.

Procedure:
Steering Turn -- To direct the tow pilot to turn left or right, move to the side opposite the desired direction of turn, and maintain this position. This will have the effect of pulling the towplane to the desired heading. The tow pilot may wait a few seconds before he begins to turn. Stay on the outside of the turn, keeping the towplane in the normal position on the horizon until it is pointed in the desired direction. Return to the normal-tow position to stop the turn. Speed up/slow down signal -- To speed up, stay in the normal tow position and rock your wings. To slow down, use the rudder to yaw the sailplane from side to side. In practice at the TuSC, speed-up and slow-down signals are seldom used. However, the FAA requires that you know these signals. You may also need to know them when flying at other gliderports, or operating without a radio. The tow pilot may direct the glider to release by rocking his wings. When you see this signal release immediately. If the tow pilot has a serious problem (engine trouble), he may only rock his wings once or twice before pulling his release. This will snap the rope back toward you. Make it pass under you by immediately raising the nose lightly. Otherwise, the ring on the rope may strike your canopy or entangle with the glider.

Performance Criteria:
The Student will be able to give the signals to change speed and turn. If the tow

pilot rocks his wings, the student will release immediately, before being prompted by the Instructor.

10.1 Release from Tow

Purpose:
To release the glider from the towrope without causing a collision hazard with the towplane or other aircraft.

References: Glider Flying Handbook, page 7-8

Procedure:
As you approach release altitude, glance right to clear for other aircraft (see Basic Airwork - Clearing). Do this without taking your eyes completely off the towplane or getting out of position. Do not release unless you are stabilized in good position. Otherwise, a "soft release" or "hard release" could result. Pull the release handle twice and visually verify that the rope springs away, then turn right. The towplane will turn left. As you turn, be sure you are well clear of the towplane. Control your pitch attitude to fly at your intended airspeed. Next, get squared away. Immediately, clear the area. Find the outside references for your intended flying speed, and trim the glider. Trim to reduce the control forces as much as possible.

Performance Criteria:
Exhibits knowledge of the elements related to tow release, including related safety factors. Maintains high-tow position with normal towline tension.
Clears the area before releasing the towline. Releases the towline and confirms release by observing the towline. Makes level or climbing turn.

BASIC AIR WORK

10.2 Clearing the Area (to be graded on all flights)

Purpose:
To develop the visual habits for avoiding a midair collision. This is so important to the safety of others that the student must be graded "S" before advancing beyond the basic airwork section. This item is graded on all flights.

References: Glider Flying Handbook, pages 7-23, 10-5.

Procedure:
Training your eyes and mind to continuously clear (look for other aircraft). Develop a scan pattern using the block system. Airborne objects are best detected through a series of eye fixations. That is, by stopping and focusing at several points on the horizon. When the eye sweeps across the sky, it is not

effective at detecting small objects. Never gaze fixedly at the horizon or instruments. Divide the sky into 10 -15 degree sectors. This will give you 9 to 12 blocks. Starting with the block directly ahead, focus at the center for one to two seconds. Move your eyes to the next block to one side and do the same. Continue with each block to that side. Then, swing your eyes back to the center block and do the same to the other side. Practice until the scan pattern becomes a habit. Before performing altitude-losing maneuvers, you must make clearing turns. (see Stalls – Introduction) The student shall call out all air traffic. This reassures the Instructor and allows him to help keep track of air traffic. Calling out traffic is a good practice any time you have extra eyes on board.

Performance Criteria:
To be graded "S" for the second flight, the student should look in the direction of the turn before beginning the turn and call out "*clear* _____" (the direction of the turn). As training progresses, the student's scan pattern should become more consistent.

11.1 Airspeed Control / Straight Glides

Purpose:
To develop the skill to control airspeed using outside references and pitch control. This is a prerequisite skill for all other flight maneuvers.

References: Glider Flying Handbook, page 7-22

Procedure:
Pitch controls airspeed. Pitch is controlled by the elevator (forward and aft movement of the stick). Moving the stick forward causes the nose to pitch down. When the glider is placed in a lower pitch attitude, it accelerates. The acceleration stops as the glider stabilizes at a new, higher air speed. If the glider is placed in a higher pitch attitude, it slows and stabilizes at a lower air speed. Glider pilots fly using outside rather than instrument references. Use outside references by aligning parts of the glider with the outside horizon. Control airspeed with the pitch reference (the vertical relationship between the nose and the horizon). Pitch is a very sensitive determinant of airspeed. Obvious changes in the position of the nose precede changes in airspeed by several seconds. You do not need an airspeed indicator to fly a glider. The indicator lags actual airspeed slightly and it lags pitch considerably. If you attempt to adjust airspeed by looking at the airspeed indicator only, you will never be able to fly at a constant speed. The airspeed indicator will help you initially find the pitch attitude for a particular airspeed. You can also use it as an occasional double check. After release, the Instructor will demonstrate how to use pitch attitude to fly at best L/D speed (51 knots). Then you'll practice it. Observe the position of the nose of the glider with respect to the horizon. Keep the nose of the glider at a constant distance below the horizon. After a few seconds (remember that there is a time lag) check the airspeed indicator. Note the airspeed associated with that

reference. Once you know the outside reference for a particular airspeed, you can use it to maintain air speed within 2 to 3 knots. A change in pitch of two inches (the apparent distance the nose moves relative to the horizon), increases or decreases airspeed by about five knots. This ‘rule of thumb’ is dependent upon many factors including passenger weight and airspeed. It is best to experiment to find your own ‘rule of thumb’. Before long, you naturally forget such rules as you begin to fly by feel.

Performance Criteria:
Exhibits knowledge of the elements related to straight glides, including the relationship of pitch attitude and airspeed. Tracks toward a prominent landmark at a specified airspeed. Demonstrates the effect of flaps, spoilers, or dive brakes, if equipped, in relation to pitch attitude and airspeed. Exhibits smooth, Coordinated control, and planning. Maintains the specified heading, ±10 degrees, and the specified airspeed, ±10 knots.

12.1 Turns and Coordination Exercises

Purpose:
To develop the skill to make coordinated turns using the ailerons and rudder. Uncoordinated flight creates drag, which decreases glider performance. These skills are required for flying on tow, flying in the traffic pattern, and working thermals.

References: Glider Flying Handbook, pages 3-11, 4-14, 7-21 through 7-25

Procedure:
The ailerons (controlled by the side-to-side movement of the stick) control bank angle. However, coordinated turns require that ailerons and rudder be used together. Using the ailerons alone causes the glider to yaw opposite the direction of roll and skid (fly sideways). The Instructor will demonstrate how the ailerons create this ‘adverse yaw’. He will show you how this affects the yaw string. He will also show you how the rudder compensates for adverse yaw. Then, you'll practice making turns using the stick and rudder together. The control movements for a turn quickly become second nature. To turn left, you must first bank to the left by simultaneously moving the stick left and pushing on the left rudder. The glider will roll into a left bank. When it reaches the desired bank angle, center the stick and rudder. When the controls are centered, the glider tends to stay in the bank and the turn. During a left turn, make corrections as necessary to keep the bank constant. If the bank begins to increase, move the stick and rudder right. If the bank begins to decrease, move the ailerons and rudder to the left. Roll out of the left bank by moving the stick and rudder to the right. The bank decreases. As the wings level, center the controls. In a turn, airspeed is maintained just as it is in level flight. If the nose is too low, the glider will speed up. If the nose is too high, the glider will slow down. However, in a bank, the pitch references are slightly different. Additional energy is needed to

turn the glider. This slows the glider unless the nose is lowered slightly to compensate.

Performance Criteria:
Exhibits knowledge of the elements related to turns to headings, including the relationship of pitch attitude, bank angle, and airspeed. Enters and maintains an appropriate rate of turn with smooth, proper, and coordinated control applications. Maintains the desired airspeed, ±10 knots, and rolls out on the specified heading, ±10 degrees.

13.1 Stall Recognition and Orientation

Purpose:
To develop the ability to recognize the indications of a stall and to gain confidence in the glider's ability to recover from the stall. Sailplanes used for training are generally very well behaved when stalled. That is, they will recover on their own if the controls are released. The sensations of the stall are very mild.

References: Glider Flying Handbook, pages 7-26 to 7-30

Procedure:
Before performing this maneuver make clearing turns (see Stalls-Clearing Turns and Safety). Perform this maneuver with the spoilers closed. From wings level flight, raise the nose slightly above the horizon and hold this attitude. The airplane will gradually slow and stall. Observe the following indications of the approaching stall:
• Nose attitude is high.
• Airspeed and wind sounds decrease.
• Control effectiveness decreases. As the ailerons lose effectiveness, the nose may hunt slightly (sway from side to side). Just before the stall, the decrease in elevator effectiveness may require a full aft stick to keep the nose up.
• A slight vibration or buffeting may occur just before the stall.
• At the stall, the nose will gently ‘break’, that is it will attempt to drop through the horizon. Be prepared to detect and recite the indications of a stall to the instructor as they occur. To recover from a stall, lower the nose to just below the horizon. Then gently lift the nose back to the normal glide reference attitude.

Performance Criteria:
Exhibits knowledge of the elements related to stall recognition and recovery, including the aerodynamic factors and flight situations that may result in stalls, and the hazards of stalling during uncoordinated flight. Selects an entry altitude that will allow the maneuver to be completed no lower than 1,500 feet AGL. Establishes and maintains a pitch attitude that will result in a stall during both straight and turning flight with and without flaps, spoilers, or dive brakes, as appropriate. Maintains a specified bank angle of up to 15 degrees of bank and ±10 degrees during turns. Recovers at the stall. Uses smooth and coordinated

control applications throughout the maneuver.

INTERMEDIATE AIR WORK

14.1 Flight at Minimum Control Airspeed (Stall Speed +3 knots)

Purpose:
To develop the skills to fly the glider at just above stall airspeed.

References: Glider Flying Handbook, page 7-26

Procedure:
Before performing this maneuver, make clearing turns. (see Stalls, Clearing Turns, and Safety.) Begin slowing the glider to just above stall airspeed. You should learn to 'feel' for the correct airspeed, but it will be below 45 knots. The exact speed will depend upon the glider, airspeed indicator errors, and occupant weight. Notice that controls will be 'sloppy', that is, it will require a larger control movement to affect the glider. You may occasionally feel a slight buffeting. The stall speed of all aircraft increases slightly during a turn, and with the spoilers open. Keep your bank shallow, that is, 10 to 15 degrees. Notice that rolling in or out of a turn requires larger control movements at lower airspeeds.

Performance Criteria:
Exhibits knowledge of the elements related to maneuvering at minimum control airspeed, including flight characteristics and controllability. Establishes and maintains the airspeed at which any further increase in angle of attack or change in configurations would result in a stall in straight or turning flight in various configurations and bank angles. Adjusts the airspeed to avoid stalls in turbulent air or as bank is increased. Applies control inputs in a smooth and coordinated manner. Uses proper procedures to avoid stalls when raising a lowered wing. Maintains target heading, ±10 degrees during straight flight, and the desired bank angle ±10 degrees, during turns.

14.2 Medium and Steeply Banked Turns

Purpose:
To develop the skills required for turning in the traffic pattern and in thermals. A medium bank is 30 to 45 degrees. A steep bank is 45 to 60 degrees.

References: Glider Flying Handbook, pages 7-22 to 7-26

Procedure:
In steeply banked turns, the glider follows the same aerodynamic rules as it does in shallow bank turns. However, it will feel different, and things happen faster. There will be an increase in G loading, rate of turn, and stall speed.

In a turn, the inside wing always moves through the air slower then the outside wing. As bank angle approaches 45 degrees, the difference in speed between them becomes increasingly apparent. If the ailerons remain centered, the bank angle will tend to increase. The outside wing produces more lift then the inside wing. To maintain a constant bank, the pilot must hold a little ‘top aileron’, that is, aileron opposite the turn. This in turn generates a little adverse yaw, which must countered by holding a little ‘bottom rudder’. Steep turns also affect the way you use the elevator. Remember that the elevator causes the glider to pitch about its lateral axis. In a 60 degree bank, any change in pitch will mostly affect the rate of turn. It will have less effect in positioning the nose above or below the horizon. To decrease airspeed, you will have to roll out of the turn slightly, and then raise the nose. Simply pulling back on the stick will just increase the rate of turn. Because of the faster turn rate, new pilots have a tendency to overshoot (turn beyond) their intended rollout heading. To prevent this from occurring, begin the rollout sooner.

Performance Criteria:
Exhibits knowledge of the elements related to steep turns, including load factor, effect on stall speed, and overbanking tendency. Establishes the recommended entry airspeed. Enters a turn maintaining a bank angle of 45 / ±5 degrees, with smooth and coordinated control applications. Maintains desired airspeed, ±10 knots. Recovers with smooth and coordinated control application within 10 degrees of the desired heading.

15.1 Forward Slips

Purpose:
To develop the skills necessary to lose altitude quickly. You may need this to lose excess altitude in the traffic pattern or to descend through large areas of lift. A forward slip is uncoordinated flight in which rudder is applied in the direction opposite the bank. In a slip, the glider flies sideways through the air and generates a large amount of drag. The most difficult part in doing a good slip is maintaining glider directional control and preventing unintentional turns. This exercise is for a full slip. At times, you may perform a partial slip.

References: Glider Flying Handbook, pages 3-12 to 3-14 and 7-36 to 7-38

Procedure:
Begin the full slip by rolling into a shallow bank and applying full opposite rudder. Notice that the glider's ground track and heading are different. Learn to identify and fly the ground track (the path over the earth). If your track veers off in the direction of bank, correct by decreasing the angle of bank slightly. If your track veers away from the direction of bank, correct by adding bank. With practice you'll be able to control the direction by increasing or decreasing the angle of

bank slightly. The amount of slip is limited by limited rudder travel. If you use more then 10 to 15 degrees of bank, there will not be enough rudder control left to maintain directional control and the glider will turn in the direction of bank. You will learn from experience what bank angles can be maintained in a slip.

Performance Criteria:
Exhibits knowledge of the elements related to forward, side, and turning slips to landing, with and without the use of drag devices. Recognizes the situation where a slip should be used to land in a desired area. Establishes a slip with and without the use of drag devices. Maintains the desired ground track. Maintains proper approach attitude. Makes smooth, proper, and positive control applications during recovery from the slip. Touches down smoothly within the designated landing area.

16.1 Airspeed Use (Best L/D, Minimum Sink, Speed to Fly)

Purpose:
To develop the knowledge and skill to use the performance airspeeds appropriate to the pilot's goals, whether they are maximizing distance or duration.

References: Glider Flying Handbook, pages 5-1 to 5-15 and 7-33 to 7-34 and Glider Polars Made Easy, by Bob Wander

Procedure:
The pilot should memorize the airspeeds listed in his glider's manual.
These fall into two general categories: limitations and performance. Airspeed limitations are set for maximum tow speed, maximum winch launch speed, maneuvering speed (Va), and never-to-exceed speed (Vne). This section deals exclusively with performance airspeeds: minimum sink, best L/D (Lift over Drag; pronounced "Best L over D"), and ‘Speed-To-Fly’. The minimum sink speed is the airspeed that will produce the minimum rate of sink. Manuals usually specify this for wings-level flight. The minimum sink speed is always higher when the glider is turning. In general, use minimum sink speed to maximize climb in thermals, and to ridge soar. Occasionally, you will want to add two to five knots to improve control effectiveness. This is especially true when the air is turbulent, when you are flying close to other aircraft, and when you are flying near rocks. The best L/D speed produces the best glide ratio through the air. It will produce the best glide ratio in relation to the ground only when there is no wind and no lift or sink. In still air, fly at the best L/D to cover the greatest distance. The speed-to fly is the airspeed that produces the flattest glide under any conditions. This speed takes into account the movement of the air mass both horizontally (wind) and vertically (lift and sink). The proper use of speed-to-fly is at the heart of cross-country flight. Even if you don't plan to fly cross-country, speed-to-fly is important. It can easily make the difference between finding the next thermal and landing. In windy conditions, it can be the difference between making it back to the airport or landing in the desert. Speeds-to-fly are calculated from the glider's

polar chart. These speed numbers are placed on a rotatable speed-to-fly ring (or MacReady ring) that is mounted on a total energy variometer indicator on the glider instrument panel. The pilot then flies at the speed indicated on the ring by the variometer needle. The pilot can rotate the speed ring to adjust for wind and lift conditions. In the absence of a speed ring, there are some rules of thumb that work well. Here are some speed-to-fly rules of thumb using the best L/D and minimum sink speeds as references:

• With no wind (and no lift or sink), the speed-to-fly is the best L/D airspeed.
• With a headwind, the speed-to-fly is higher than best L/D airspeed. Use the best L/D airspeed plus ½ of the estimated headwind component.
• With a tailwind, the speed-to-fly is slower than best L/D airspeed but never slower than minimum sink speed. With a light tailwind fly slightly slower then the best L/D airspeed; in a strong tailwind fly closer to minimum sink speed. Since the minimum sink and best L/D speeds are only a few knots apart, this tailwind rule of thumb is quite accurate.
• In lift, the speed-to-fly is slower than best L/D airspeed.
• In sink, the speed-to-fly is faster than best L/D airspeed.

In summary, fly faster in a headwind and in sink. Fly slower with a tailwind and in lift.

Performance Criteria:
Exhibits knowledge of the elements related to speed-to-fly, and its uses. Describes the effect of various atmospheric conditions on the glider's performance. Explains the applicable performance speeds and their uses. Determines the speed-to-fly for a given situation and maintains the speed ±5 knots.

17.1 Unusual Attitude Recovery

Purpose:
To develop the ability to recognize and recover from a high-speed spiral dive and to recover from excessive bank/pitch attitudes. A spiral dive is a steeply banked spiraling turn. New pilots can confuse it with a spin. If recovery is delayed or if incorrect recovery techniques are used, the speeds and G-loading will continue to increase. This could exceed the structural limits of the airframe.

References: Glider Flying Handbook, pages 7-25 to 7-26

Procedure:
The Instructor will set up situations resulting in unusual pitch or bank attitudes. He will then give control to the student, and the student will recover. If the glider is in an extreme nose down attitude the recovery must be made gradually or else the glider may be over stressed. The spiral dive may be set up either by the student or by the Instructor. Roll into steep bank turn of at least 60 degrees. Allow the nose to drop slightly so that air speed increases. Now, try lifting the nose by pulling straight back on the stick. (instead of raising the nose, pulling

back on the stick only increases the rate of turn, G-loading, and air speed.) Recover by first rolling out of the bank, relaxing back pressure, and then raising the nose to the level-flight attitude.

Performance Criteria:
The student should be able to enter a spiral dive and recover. The student should be able to recover from excessive bank and pitch attitudes without over stressing the glider.

STALLS

The Stall Series

In the beginning, the Instructor may demonstrate or have you practice a single type of stall several times. Later, you will begin performing a stall series, that is, a sequence of several types of stall. During the series, each recovery should lead into a setup for entering the next stall. Of course, you should plan the sequence before you take off. A typical series would be a straight ahead stall, turning stall, and a cross-controlled stall. Performing a stall series will sharpen your flying skills, and will allow you to make the most of your flight time.

18.1 Straight-Ahead Stalls

Purpose:
To develop the ability to avoid and recover from a wings level stall. This simulates a stall that could occur on final approach. It would most likely happen when the pilot finds himself low on final. The natural, and incorrect, tendency is to lift the nose to stretch the glide. The glider then slows and stalls.

References: Glider Flying Handbook, pages 7-26 to 7-32

Procedures:
Enter the stall by opening the spoilers and gradually slowing the glider by raising the nose. (This maneuver can also be performed with the spoilers closed) Notice the indications of the approaching stall (see Basic Airwork: Stall Recognition and Orientation). Be prepared to describe them to the Instructor as they occur. Recover by simultaneously lowering the nose below the horizon a few degrees and closing the spoilers. As soon as nose goes below the horizon, you can begin a gentle pull out. Adjust the pullout so you return to a stable glide of no more than 45 knots. Gaining more airspeed than this means that you gave up more altitude than necessary. If you hurry the recovery, you could enter a secondary stall, that is, another stall. It is caused by raising the nose too quickly -- before the glider has regained sufficient flying speed. Secondary stalls during training seem harmless. However, they cause an additional loss of altitude. It could be serious if it occurs after a ‘real’ recovery, close to the ground. Recover from a secondary stall the same as you would from any stall.

Performance Criteria:
The student will be able to accomplish the four Stall Objectives (listed in the introduction) for a straight-ahead stall.

19.1 Turning Stalls

Purpose:
To develop the ability to avoid and recover from a turning stall. This simulates a stall that could occur while thermalling or while turning in the traffic pattern. In a thermal, it may occur if the pilot attempts to increase the climb by slowing the glider, or if he tightens the turn without increasing his airspeed. In the pattern, a stall may occur if turns are made at too low an airspeed.

Procedure:
Enter the stall by raising the nose slightly above the horizon and rolling into a 15 degree banked turn. Maintain this attitude until the glider stalls. Practice the stall with the spoilers open and with them closed. Recover by simultaneously lowering the nose, closing the spoilers, and applying opposite rudder. The rudder will keep the glider from rolling into a steeper bank during the first part of the stall. When the nose passes through the horizon, use coordinated aileron and rudder to attain level flight. Resist the temptation to level wings with the ailerons during the first part of the stall. Doing so will aggravate the stall and it could cause the glider to ‘fall off’ in the direction of the turn. Use ailerons only after the stall is broken, that is, when the nose is descending through the horizon and the wing is flying again.

19.2 Accelerated Stalls

Purpose:
To develop the ability to avoid and recover from an accelerated stall. An accelerated stall simulates overshooting final approach during a turn from base leg, and then tightening the turn in an attempt to turn back to the runway.

Procedure:
Enter the stall with airspeed of about 51 knots. Roll into a 15-degree bank turn and apply back pressure on the stick. The back pressure will have to be applied rather quickly or the glider may not stall. Also, allowing the nose to drop will prevent the stall. Recover by releasing back pressure.

19.3 Cross-Controlled Stalls

Purpose:
To develop the ability to avoid and recover from a cross-controlled stall. This stall simulates one that could occur in the traffic pattern. It is most likely to occur when

a pilot is low on base leg and attempts to turn to final. The stall then occurs when he makes two additional mistakes: getting too slow and becoming uncoordinated. The first mistake, getting slow, occurs when the pilot raises the nose to stretch the glide. The second mistake, getting uncoordinated, happens in the turn to final. When close to the ground, many pilots are fearful of banking steeply. Instead, they try to turn the glider with the rudder, causing a skid. However, the skid tends to increase the bank. The pilot unconsciously counteracts this with aileron opposite of the turn. At this point, the pilot is cross-controlled; the rudder is into the turn, and ailerons are opposite to the direction of turn. This condition, in addition to being slow, causes the glider to stall and spin. A cross-controlled stall can occur when the glider is in a slip and then inadvertently stalled.

Procedure:
Enter the maneuver from a slip configuration; then stall the glider. Properly performed, the glider will stall and roll in the direction of the high wing. Failure to recover immediately, may allow the aircraft to enter a spiral dive. Recover by centering the ailerons, using rudder to level the wings and lowering the nose. Complete the recovery as with any turning stall.

20.1 Incipient Spin

Purpose:
To develop the ability to avoid and recover from an incipient spin or actual spin. Many gliders spin if you use the wrong technique during a stall recovery, if you stall during a turn in a thermal, or stall during a turn in the pattern. In this exercise, you will practice the traditional spin entry and recovery techniques.

Procedure:
The entry technique for the incipient spin and a spin are the same. Begin by performing a straight-ahead stall. Just before the nose drops, quickly bring the stick full aft (against the stop) and apply full rudder in the desired spin direction. Hold these control positions. The nose will drop and slice (yaw) across the horizon. In a full spin, the rotation will continue. If pro-spin aileron control is held, the glider will transition from the dive into another stall and a possible incipient spin. Before this happens, recover. If required, use spoilers to keep airspeed under control. The normal recovery technique for the incipient spin or full spin is:
1. Apply full opposite rudder (opposite the direction of the rotation) and stick forward to break the stall.
2. When rotation stops recover from the dive.
CAUTION: Refer to the Aircraft Flight Manual for spin recovery procedure. If different from this procedure, the Aircraft Flight Manual procedure always takes precedence.

Performance Criteria:
Exhibits knowledge of the elements related to stall recognition and recovery, including the aerodynamic factors and flight situations that may result in stalls,

and the hazards of stalling during uncoordinated flight. Selects an entry altitude that will allow the maneuver to be completed no lower than 1,500 feet AGL. Establishes and maintains a pitch attitude that will result in a stall during both straight and turning flight with and without flaps, spoilers, or dive brakes, as appropriate. Maintains a specified bank angle of up to 15 degrees of bank, ±10 degrees during turns. Recovers at the stall. Uses smooth and coordinated control applications throughout the maneuver.

SOARING TECHNIQUES

21.1 Thermalling

Purpose:
To develop the skill to find and to center in thermal lift. Thermals are the primary source of lift at El Tiro. When practical, you will be introduced to other sources of lift including ridge lift, shear line, and wave. However, these are not covered here.

References: Glider Flying Handbook, pages 10-1 to 10-8

Procedure:
Study the ground for features that could generate thermals. Hills, runways, and towns are good thermal sources. The black hills just south of El Tiro frequently produce thermals. So does the airport and some of the horse corrals to the southeast and northwest. Dust devils mark newborn thermals that will quickly climb to your altitude. Also, watch for indications of lift in the sky. These include cumulus clouds, circling sailplanes, and birds. Once you find a thermal, you will circle in it to climb. A pilot is said to have ‘centered the thermal’ when the variometer indicates the same rate of climb through the entire circle. Having a thermal perfectly centered is a rare, transient event. Thermals are not perfectly round and they ‘snake’ back and forth as they climb. So, the pilot must constantly adjust his circle. There are several techniques for centering thermals. Read and use the methods described in the GFH. These procedures are basic and straightforward. After you gain some experience, you will learn to make corrections by varying your bank rather than by rolling out. This modified technique centers thermals more quickly. Here is some additional information to keep in mind. Learn to visualize the thermal's location and shape. Since they are invisible, you will have to rely on the variometer and feel. Keep your eyes outside the cockpit at least 90 percent of the time. Check the variometer by quickly glancing at it. You will not be able to thermal well unless you have the skill to make nearly perfect circles with constant bank and constant airspeed. Every change in bank or airspeed moves the center of your circle. Unintentional changes in bank and airspeed causes you to skitter about the sky, and you may lose track of the thermal's location. This is the most common reason that pilots lose thermals.

Performance Criteria:
Exhibits knowledge of the elements related to thermal soaring. Recognizes the indications of, and the presence of, a thermal. Analyzes the thermal structure and determines the direction to turn to remain within the thermal. Exhibits coordinated control and planning when entering and maneuvering to remain within the thermal. Applies correct techniques to re-enter the thermal if lift is lost. Remains oriented to ground references, wind, and other aircraft. Maintains proper airspeed in and between thermals.

22.1 Collision Avoidance

Purpose:
To develop collision avoidance skills while working lift. Here, collision avoidance means avoiding collisions with the ground and other aircraft. It involves much more than clearing. It means knowing what to do to keep from creating closure on another aircraft and the ground.

References: Glider Flying Handbook, pages 10-7 to 10-8

Procedure:
When approaching or working a thermal, be especially vigilant. Thermals are magnets for gliders. High performance gliders are hard to see and they often approach thermals at over 100 knots. While you are a solo student, do not attempt to circle with another glider at the same altitude. With experience, you will learn to adjust your circle to fly on the opposite side of the thermal from another glider. Two gliders circling in this manner have the advantage of being able to use each other as "variometers." Gliders entering a thermal must not interfere with gliders already in the thermal. All gliders in a thermal should turn in the same direction. If within 5NM of the field, SOP's state all thermalling turns must be to the left. The first one in to enter the thermal establishes the direction. Set up your approach to come in on a tangent to the circle established by other gliders in the thermal. If necessary, come into the thermal wide; then spiral in. Plan to arrive in the circle opposite the other glider. This makes it much easier to see him and for him to see you. While thermalling, maintain visual contact with all other gliders. Also, never place yourself in another pilot's blind spot. If another glider is within a couple of hundred feet of your altitude and you lose sight of it, leave the thermal. If there is any doubt about whether you can maintain a large margin of clearance from other gliders, find another thermal. Competition pilots carry parachutes because of the potential for mid-air collision. They also use radios to coordinate with others. Good judgment dictates that students without parachutes or radios maintain extra clearance from other sailplanes. Even if you think you are the only one in a thermal, never arbitrarily reverse your turn. If another glider is approaching the thermal, your turn reversal could set up a head-on collision. As a student, do not enter dust devils below 1500 feet (agl). Dust devils can be very turbulent near the ground. When ridge soaring, make all turns

away from the hill (into the wind). When a glider turns toward a hill, the tailwind adds to the glider's groundspeed resulting in a rapid closure with the hill. Do not climb closer than 500 feet to the base of clouds. This is the minimum distance allowed by the FAR's. Flying in a cloud will almost certainly cause spatial disorientation. You will not know which way is up, which way you're banked, or which way your nose is pointed. You could end up in a diving spiral. Do not become so engrossed with thermalling that you lose track of your position with relation to the airport. As a general rule, avoid thermalling while drifting downwind from the airport.

Performance Criteria:
The student will be able to enter a thermal without creating a collision hazard. He will be able to explain the rules of right of way. While circling in a thermal, he will maintain good visual lookout. When near others, he will make corrections that allow him keep visual contact with others, and allow others to see him.

PATTERN AND LANDING

23.1 Traffic Pattern and Landing Checklist

Purpose:
To ensure that checklist tasks necessary for a safe approach and landing have been completed.

References: Glider Flying Handbook, pages 7-34 to 7-38

Procedure:
On the entry and the downwind leg, complete the landing checklist.
A written checklist is always preferred and is *required* by the POH in the Grob 103s. Below is a standard, mnemonic checklist which will work pretty universally in most gliders for the required basics. Memorize and rehearse this checklist so that you can complete it without becoming distracted from flying and clearing for traffic. However, always use the checklist mounted on the instrument panel when available or required. The “You Stall” checklist should be verbalized as follows in the quotations:

U –“*Undercarriage*” – Check “*down and locked*”
S – “*Speed*” – Calculate approach speed based upon wind (“*55 knots*” + ½ of estimated wind speed for the Grob 103)
T - Trim – “*Trim*” so that the aircraft will fly the chosen approach speed, hands-off
A –“*Airbrakes*” -- Check spoiler operation
L –“*Look outside*”-- Look for other aircraft, wind indicators, runway activity
L –“*Land*”ing pattern -- Plan landing pattern (consider wind corrections)

Performance Criteria:
The student must complete the before-landing checklist while maintaining control

of the glider and continuing to clear the airspace around the glider.

24.1 Traffic Pattern, Airspeed, and Collision Avoidance

Purpose:
To develop the skill to fly the traffic pattern while maintaining pattern airspeed and continuing to clear. The traffic pattern serves two purposes. First, it allows for the orderly sequencing of aircraft approaching the runway. It makes it easier for pilots to see each other and it allows pilots to maintain separation. Second, it keeps the glider close to the runway so it can safely land even if it encounters heavy sink or adverse winds.

Procedure:
Before entering the pattern, identify the active runway by checking the Tetrahedron, windsock, or by observing activity on the ground (takeoffs in progress or gliders queued for launch). The active runway may have changed since you took off. The traffic pattern consists of an entry leg, a downwind leg, a base leg, and a final approach. Begin the entry leg at least 1/4 mile from the IP (initial point). Fly toward the IP at a 45-degree angle to the downwind leg and maintain traffic pattern airspeed. Plan to arrive at the IP at 800 feet AGL (2900 feet MSL at El Tiro). Fly the traffic pattern at 51 knots in the Grob 103, plus 1/2 of the estimated wind speed. When landing into the wind, windshear (a change in the speed or direction of the wind) will cause the glider to lose airspeed. Normally, you'll notice shear on short final below 50 feet. Generally, windshear gets stronger as the wind speed increases. Shear in the vicinity of thunderstorms has caused large aircraft to crash. We counter ‘everyday’ shear by carrying extra airspeed equal to 1/2 the wind speed. At the IP, turn to the downwind leg, parallel to the runway. (The most common error made on downwind is angling into the runway.) Do not use the altimeter after the IP; use outside references instead. Notice the angle between the horizon and the runway. It should be about 30 degrees. If it is less than this, you are low. If the angle is greater, you are high. If you are low, move the downwind leg in, toward the runway to achieve the correct angle. Continue to search for other aircraft. Check the wind by looking at the windsock. Check the runway for obstacles including aircraft, cars, people, cows, and dogs. Decide upon a touchdown spot. Be prepared to change landing spots later in the pattern if obstacles move onto the runway. As you continue downwind past the touchdown spot, begin concentrating on when to turn to the base leg. Turn to the base leg when the touchdown spot is approximately 45 degrees behind you. Turning sooner puts you higher in the pattern. So, if you are low on downwind, you can turn base sooner to compensate. Conversely, turning to base leg later than normal puts you lower in the pattern. However, if you are high on downwind, open the spoilers more instead of extending downwind. Arriving at the normal ‘turn-to base’ position high could indicate a strong tail wind. That same wind will make it hard to penetrate back to the runway on final. Extending your turn to base can also cause traffic conflicts. Gliders behind you may be counting on your turning a normal base leg. Don't extend the downwind leg unless it is

absolutely necessary (for pattern spacing or to correct for being *extremely* high). Turn to the base leg using a 30 - 45 degree bank. As you are turning, begin concentrating on your glide path (in a glider the entire pattern is a glide path). Ideally, you would open the spoilers about half way abeam your landing aim point, and keep them there until touchdown. More likely, you will have to adjust for being high or low. You can make changes by adjusting the spoilers, by angling the base leg toward the runway, or by adjusting the amount of bank angle used on the base-to-final turn. Normally, the base leg is perpendicular to the runway. However, if you are so low that you must close the spoilers, angle back toward the runway slightly to regain a margin of safety. If you are extremely low, turn directly toward the runway. If you are high, open the spoilers further. If you are extremely high, open the spoilers fully and execute a forward slip too. Turn to the final leg, using 30 - 45 degrees of bank angle. If you are low, start the turn a little early. This shortens the pattern. If you are high, start the turn a little later. One of the most common errors on final is failure to maintain a constant air speed. Airspeed variations make judging your glide path difficult. Maintain a constant airspeed with the elevator. Use spoilers and, if necessary, a slip to adjust your glide path. Again, collision avoidance includes more than just looking. Remember that all of the club's aircraft eventually enter the pattern. They tend to converge on the IP at the end of the scheduled periods. When two gliders are approaching the IP, the lowest glider has the right of way. In the pattern, the glider in front has the right of way. Make yourself easy to see by flying a good, rectangular pattern. Failure to see or be seen by another aircraft could have very unfortunate results.

Performance Criteria:
Completes the appropriate checklist prior to arriving abeam the landing zone on downwind. Exhibits knowledge of the elements related to traffic pattern procedures for gliders. Follows established traffic pattern procedures. Maintains awareness of other traffic in pattern. Maintains proper ground track with crosswind correction, if necessary. Crosses designated points at appropriate altitudes, unless conditions make such action impractical. Selects touchdown and stop points. Adjusts glidepath and track promptly to compensate for unexpected lift, sink, or changes in wind velocity. Makes smooth, coordinated turns with a bank angle not to exceed 45 degrees when turning final approach. Maintains recommended approach airspeed, +10/-5 knots. Maintains crosswind correction and directional control throughout the approach and landing. Constantly adjusts spoilers, or dive brakes, as appropriate to maintain correct glidepath.

25.1 Flaring to Land

Purpose:
To develop the skill to transition from flight to the runway. This is included as a separate grading item because some students have trouble with the flare.

References: Glider Flying Handbook, page 7-36.

Procedure:
Having difficulty with the flare is more likely the result of nervousness, than a lack of skill. Actually, making the flare is easy when it is compared with some other flight maneuvers. So, try to relax on the final approach leg. Hold the stick lightly with your fingertips. Try to broaden your perceptual field by looking around a little. At approximately 50 feet, set the spoilers to about half open. Making spoiler adjustments below this altitude will not significantly change the position of the touchdown point, and could lead to a “Pilot-Induced Oscillation” (PIO). The flare (also called the ‘round out’) should be a gradual level-off. At about 10 feet agl, begin bringing the nose up gradually, but maintain a descent, keeping spoilers in the half position. Judge altitude by looking toward the far end of the runway. Don't try to judge altitude by looking straight down; it's not nearly as accurate as looking ahead. The glider will almost level off before descending to the ground. Hold it off until out of ‘up elevator’ for a low energy landing. The touchdown should almost come as a surprise. The main wheel should contact the ground first. If you bring the nose up too rapidly, the glider may ‘balloon’. That is, it will level off too high or will even begin to climb. Do not chase it by shoving the stick forward, as this will result in a very hard landing or a PIO. Instead, arrest any further climb, hold your pitch angle and let the glider sink back toward the ground of its own accord. Do not close the spoilers as the glider begins to descend as this may cause the glider to rise further. Just hold what you’ve got and let the glider settle as the speed bleeds off.

Performance Criteria:
Makes smooth, timely, and positive control application during the roundout and touchdown. Touches down smoothly within the designated landing area, with no appreciable drift, and with the longitudinal axis aligned with the desired landing path

26.1 Alignment and Accuracy

Purpose:
To develop the skill to make a safe and accurate approach. Alignment is listed before accuracy because it is initially more important to safety than coming close to a touchdown spot. Poor runway alignment can cause wing tips to catch on obstacles. Accuracy is important when flying into short runways or landing away from the airport. For this reason, accuracy should become increasingly important as you progress.

References: Glider Flying Handbook, page 7-36.

Procedure:
Roll out of the base-to-final turn so that you are aligned with the center of the runway. If you are not aligned, get aligned. Don't wait. Learn to judge where your glide path intercepts the ground. This is called the “aim point” in the GFH. It's

where you'd hit if you didn't flare. If you look carefully, you'll notice that this spot is the only one that remains stationary in your visual field. The ground on the far side will appear to move up. The ground on the near side will move down, under the glider. While still on the downwind leg, choose a touchdown spot. Then, when on final, choose an aim point that is approximately 100 feet closer to you than your planned touchdown spot. The goal is to adjust the glide path so it intercepts the ground at the aim point. The flare will carry the glider from the aim point to the touchdown point. Do this using the spoilers and, if necessary, a slip. As you approach the touchdown point, judge altitude by looking far down the runway – do not look straight down. Always maintain the chosen traffic pattern air speed on final. Do not try to alter the glide slope by increasing or decreasing airspeed. This will only complicate the task. Also, don't make S-turns to adjust the glide slope. It also complicates things and it can result to dangerously low turns.

Performance Criteria:
Adjusts glidepath and track promptly to compensate for unexpected lift, sink, or changes in wind velocity. Selects touchdown and stop points.

27.1 Rollout and Stop

Purpose:
To develop the skill to taxi and maintain control of the glider after touchdown.

References: Glider Flying Handbook, page 7-36.

Procedure:
Continue to control the glider during the rollout. Keep the wings level and hold the stick back. Use the rudder to steer. Maintain runway alignment until your speed is under control. You can slow the glider by using the spoilers or wheel brake (or both). The spoilers are most effective at high speed. Reserve the wheel brake for lower speeds. Using the wheel brake at high speed wears it out rapidly. In addition, glider brakes are notoriously unreliable. If you want to extend the taxi distance, close the spoilers shortly after touchdown, but be aware that closing the spoilers too soon could send you back into the air. As you slow, you may gently turn the glider off the runway. However, never aim the glider at people or obstacles until you are certain that it will stop well short, even without brakes. The Grob 103 will lose rudder authority and be unable to turn when speed decreases to less than 20 knots (airspeed). Always stop with the upwind wing on the ground. As you slow, lower the upwind wing. After stopping, open the air brakes. This decreases the effect of gusts on the wing. When exiting the glider, remove any ballast, close and latch the canopy. **Never** leave a glider with the canopy open or unlatched, as gusts and thermals can easily rip a canopy off any glider. Before walking away, tie down the glider or pass it directly to the possession of another club member. On hot days, shade the seat belt shoulder harness hardware under a seat cushion so it won't 'brand' the next pilot.

Performance Criteria:
Maintains control during the after-landing roll stopping short of and within 200 feet (70 meters) of a designated point. Secures the glider properly. Performs a satisfactory postflight inspection.

28.1 Crosswind Corrections

Purpose: To develop the skill to adjust the pattern, flare, and rollout to compensate for crosswinds.

References: Glider Flying Handbook, pages 7-36 and 7-37.

Procedure:
In light crosswinds, the ground track of the traffic pattern should be nearly the same as a no-wind pattern. However, on the downwind leg you will have to crab slightly to keep from being blown toward or away from the runway. Position the downwind leg closer to the runway when strong crosswinds are coming from the direction of the runway. Conversely, position the downwind leg a little further out when strong crosswinds are blowing toward the runway. On final, you may use a crab to maintain runway alignment. When properly crabbed, the glider will fly right down the center of the runway even though the nose will be pointed off to one side or the other. Maintain the crab into the flare. However, just before the glider touches down (at approximately three feet) use the rudder to gently straighten it out. That is, the nose of the glider should be pointed in the direction of landing at touchdown. If it's not, the glider will slide sideways, placing potentially damaging side loads on the tire. To keep from drifting downwind at this point, lower the upwind wing slightly. You may also use a sideslip to maintain runway alignment on final. When slipping always lower the upwind wing. This is the same technique that is used on the crosswind takeoff. Be assertive in maintaining directional control after landing. Remember that the glider will tend to weathervane into the wind. If left unchecked, the glider will roll off the runway. Always stop with the upwind wing down.

Performance Criteria:
Maintains crosswind correction and directional control throughout the approach and landing. Maintains control during the after-landing roll.

28.2 Slips to Landing

Purpose:
To develop the skill to lose excess altitude or to land short over an obstacle.

References: Glider Flying Handbook, pages 7-36 to 7-38

Procedure:
Slips increase the rate of descent on final. You may use a slip to adjust the

landing point or to land over an obstacle. Except for practice or crosswinds, the slip is normally used only after it becomes clear that full spoilers won't be adequate. The approach to landing slip is called a “forward slip” in the GFH. Aerodynamically, it is the same as the side slip. The only difference is the ground course flown. With no crosswind, a forward slip produces a ground track leading straight down the runway. To do this, the glider's nose must point off to the side. As soon as you see that you are high, begin the slip. Apply full air brakes, drop the upwind wing slightly (not more than 15 degrees), and apply full rudder. Start the slip with proper pattern airspeed. The airspeed indicator is not reliable during a slip due to relative wind blowing into static port. So maintain outside pitch references for pattern airspeed similar to a wings-level approach. When back on the correct glide path, recover from the slip. Come out of the slip at least 50 feet above touchdown to give yourself time to get squared away before the flare. If you have trouble controlling your ground track, come out of the slip early to realign with the runway. Do not allow the nose of the glider to rise during a slipping turn. Realize that while in a slip, the airspeed indicator will give a false reading. You can begin slipping as early as the downwind-to-base turn. Just roll into the turn and apply opposite rudder. The glider will continue the turn as long as you use enough bank to counteract the rudder. It is essential that you maintain airspeed in the slip – do not allow the nose to rise or drop in this maneuver. Maintain your pitch ‘sight picture’.

Performance Criteria:
Exhibits knowledge of the elements related to forward, side, and turning slips to landing, with and without the use of drag devices. Recognizes the situation where a slip should be used to land in a desired area. Establishes a slip without the use of drag devices. Maintains the desired ground track. Maintains proper approach attitude. Makes smooth, proper, and positive control applications during recovery from the slip. Touches down smoothly within the designated landing area.

29.1 Downwind Landing (five knots or greater wind factor)

Purpose:
To develop the skill to land downwind, that is, in the same direction as the wind. Expect four things to occur differently during downwind landings. First, the ground will go by faster. You could be fooled into thinking that your airspeed is higher then it really is. Second, as the glider slows during rollout, aileron and rudder control will be lost sooner. For example, with a five knot tailwind, the wings will "see" an airspeed of zero when the glider is still rolling across the ground at five knots. Third, you will have a tendency to overshoot the landing spot. Fourth, the rollout distance will be much greater. This is because landing distance is proportional to the square of the ground speed (energy = mass X velocity, squared). The difference between landing into or against a 5-knot wind is 10 knots of groundspeed. This increases the rollout distance by 20 percent. Landing with a 10-knot tail wind increases the landing rollout by 45

percent.

References: Glider Flying Handbook, page 7-38.

Procedure:
If you maintain airspeed and anticipate these effects, you will not have any problems. Do not become distracted by the high ground speed. As always, maintain airspeed using outside attitude references. Also, expect to end up high on final. Be ready to slip. Finally, during landing roll, keep the glider pointed straight down the runway in anticipation of losing aerodynamic control early. If the wind has a crosswind component, expect the glider to weathervane into the wind as rudder effectiveness is lost. Also, begin lowering the upwind wing sooner before aileron control is lost

Performance Criteria:
Exhibits knowledge of the elements related to downwind landings, including safety related factors. Adjusts flaps, spoilers, or dive brakes, as appropriate. Maintains recommended approach airspeed, ±5 knots. Uses proper downwind landing procedures. Maintains proper directional control during touchdown and rollout. Applies brake smoothly to bring glider to a stop.

EMERGENCIES

This section contains procedures for handling emergencies. Memorize and mentally rehearse all of them. This will give you the confidence to respond without undue hesitation if the need arises. Adverse weather and other peculiar circumstances may require modification of these procedures. However, the following basic rules apply to all glider emergencies. Maintain aircraft control. This includes maintaining directional control and airspeed using outside attitude references. Analyze the situation and take proper action. Some emergencies, such as a towline break, require immediate action. However, be sure you know what is happening before you act. Memorizing the emergency procedures will help.

30.2 Off-Field Landing (just in case)

If you ever get into a position where you cannot make it to the runway, all is not lost. Be especially aware of the following considerations for off-field landings... just in case:
• Pick a place to land as soon as practicable. Make a good selection so you won't be changing your mind at the last minute.
• Land into the wind.
• In sloping terrain, land uphill.
• Land parallel to washes and plowed furrows.
• Pick farm fields rather than roads. Roads have hard-to-see posts that are spaced closer together then the glider's wingspan.

• Fly with perfect traffic pattern airspeed; not faster or slower.
• If landing in raw desert, level off at the bush tops to slow the glider. Allow the glider to sink to the ground as airspeed decreases. Do not stall the glider.
• At touchdown, stop the glider immediately. Deploy full spoilers and full wheel brake to stop the glider as soon as possible.

31.1 Takeoff Abort

Purpose:
A tow abort could occur because of a broken towline, inadvertent release of the tow hook mechanisms, or loss of towplane power. There are three stages at which a tow might be aborted. This section covers takeoff aborts, that is, those occurring between the time the towline is attached and the beginning of a positive climb. That is, when the towplane begins to climb out of ground effect.

References: Glider Flying Handbook, pages 7-4 to 7-6.

Procedure:
All takeoff aborts occurring during the glider's ground roll or just after it becomes airborne should be handled in approximately the same way: If the glider aborts and the towplane continues to take off, continue straight ahead and maintain pitch attitude, using outside references. If the glider is airborne, it will fly back down to the runway. If the towplane loses power, you will see a large slack loop develop in the towrope. Pull the release twice. If you do not release the rope, the aborting towplane could jerk the glider. To prevent a collision with the towplane (and its fuel), steer to the right side of the runway. The towplane should steer left. Steer to the right only after establishing positive control of the glider. Do not attempt to make low altitude turns. In some circumstances, you may opt to abort before or during the ground roll. If something goes wrong after the towrope is attached (a bee gets into the cockpit or a snake slithers out from under the seat cushion) pull the release twice. Abort (by pulling the release) if you lose directional control of the glider during the ground roll.

Performance Criteria:
The student will maintain directional and attitude control during a simulated takeoff abort. If the abort simulates a towplane abort (power loss), the student will taxi the glider to the right side of the runway.

31.2 Rope Break at Less than 200 Feet
(Ground Instruction only, not to be performed in flight)

Purpose:
This section covers tow aborts that occur between the beginning of a positive climb and before reaching an altitude of 200 feet. Altitudes below 200 feet are inadequate for making a safe turn back to the runway. You must land straight ahead. See Off-Field Landing: (just in case).

References: Glider Flying Handbook, pages 7-4 to 7-6.

Procedure:
The Instructor will ask the Student to brief the procedure for this emergency. Maintain aircraft control. You will probably have to lower the nose. Pull the release twice. This will prevent the entanglement of the rope and control surfaces. Establish normal landing pattern airspeed. Land straight ahead. If altitude permits, try to pick a favorable landing spot. Use spoilers as necessary, but begin the flare with at least half spoilers. If landing in rough terrain, let the airspeed bleed off by holding glider just off the tops of the bushes. Stop as soon as possible.

Performance Criteria:
The Student will be able explain this procedure without prompting by the Instructor.

32.1 Rope Break at or above 200 Feet (Dual Instruction Only)

Purpose:
Rope breaks between 200 and 500 feet require decisive action. At 200 feet and above, you can make a 180-degree turn and return to the airport. Generally, altitudes in excess of 200 feet add an extra margin of safety.

References: Glider Flying Handbook, pages 7-4 to 7-6.

Procedure:
Before every takeoff, decide in what direction you would turn if the rope broke. Deciding in the air takes time. Each second that you delay really costs two seconds. Here's why: during a one-second delay you will fly one second away from the airport and then have to make up for it by flying back for an additional second. Consider the following when deciding upon the direction of turn:
• At single-runway facilities, turn into the crosswind. During the turn, the crosswind will blow the glider toward the runway centerline. If the turn is made away from the crosswind, the glider will be blown off the centerline.
• If the towplane has begun a turn, it is usually best to continue turning in that direction. Turn reversals consume a great deal of altitude and distance.
• At multiple runway facilities, it is sometimes best to turn to a runway other then the departure runway behind you.
For a rope break or tow abort at 200 feet or above:
• Maintain aircraft control. Lower the nose **immediately** to maintain or regain airspeed.
• Immediately turn back to the runway. Avoid very steep turns at low altitudes. As you complete about 135 degrees of turn, you will see what corrections will be needed to align with the runway.
• Make a normal landing. Remember that it will probably be a downwind landing.

Performance Criteria:
During a simulated rope break at 200 feet or above, the student will follow the appropriate emergency procedures. He will assess his options. If altitude and distance permits, he will initiate an immediate turn to the runway, and simultaneously establish pattern airspeed. Delays will be deemed excessive if the Instructor has time to tell the student to take action.

33.1 When You Can't Release the Towrope

(Student Briefing Only – not to be performed in flight)

Purpose:
Occasionally, a glider's release mechanism fails to operate. It is possible, though unlikely, that the towplane's release could also fail. The pilot must have the knowledge to handle such a sequence of events.

References: Glider Flying Handbook, pages 7-4 to 7-6.

Procedure:
This is one of the emergency procedures requiring coordination between the tow pilot and glider pilot. Therefore, it is specified in the TuSC SOP's. Memorize it. Keep these additional items in mind:
• Be prepared for the towplane to release you at any time after you give your signal. Unless you have a radio, there will be no warning. If you have a working radio, inform the tow pilot of your situation.
• When he releases, it is important that you pull the nose up so that the rope does not come up over the wing or into the canopy.
• If you ever suspect that all or part of the towrope is still attached to your glider be careful on landing. Stay high on approach so that the rope won't snag on a fence or other obstacle.
• If the towplane cannot release, expect a slack rope to develop when he levels off or descends. Use a small amount of spoilers to keep it tight.

Performance Criteria:
The student will be able explain this emergency procedure as explained in the SOP's and above.

34.1 The Check Glider Condition Signal

Purpose:
The tow pilot can use this signal to alert the glider pilot that a problem may exist with the glider's configuration (the spoilers/air brakes are open).

Reference: SSA Signals.

Procedure:

If the tow pilots sees or suspects that the glider in is not in the proper configuration. This may be that the spoilers/airbrakes are open, but the glider pilot should not assume that to be the case. The tow pilot gives the signal by quickly wagging the rudder. The towplane wings should not rock, as that could be mistaken to be the glider “release” signal. When you see the signal, immediately check spoilers/airbrakes, as these could cause the towplane to have trouble climbing. If they are closed, check all other possible configuration items and look around at your aircraft. As you do this, don't forget that your first priority is to fly the glider.

Performance Criteria:
The student should be able to explain how the signal is given, what it means, and what the glider pilot should do.

34.2 Low at the Initial Point (IP)

Purpose:
Occasionally, heavy sink, wind, or poor flight planning place the glider below normal pattern altitude. The pilot must have the skill and mental flexibility to depart from the standard pattern when necessary.

References: TuSC Standard Operating Procedures.

Procedure:
If the glider arrives at the IP close to 600 feet, it is usually safe to fly a modified standard pattern. Shorten the pattern by moving the downwind leg closer to the runway. Try not to get so close to the runway that you have to make a 180-degree turn to final. Watch your altitude (use outside references) and relationship to the runway. You may not be able to extend downwind to a normal base leg turn point. So, be prepared to turn base early. If very low, turn base before reaching the end of the runway. This may mean landing beyond the normal touchdown point, that is, at mid-field. If you are too low to fly a modified conventional pattern, head directly to a point where you can turn final and land. At multiple runway facilities, you may choose to land on a runway other than the active runway. When deciding upon a runway, choose the one providing the greatest margin of safety. Many pilots become fixated on the ‘normally active’ runway. They will attempt to fly to it when another one would be safer. Take any runway that offers even a marginal safety improvement. At El Tiro, the IP's are always at the end of cross-runways. You can always open the spoilers and slip to a landing on that runway. That is, the one perpendicular to the active runway. Try to land short of the runway intersections unless you are sure there won't be a conflict with aircraft on the active runway. Inform the Line Chief of your intentions by radio, if time permits.

Performance Criteria:
When low at the IP, the student will be able to make the conservative decision

about where to land and adjust the pattern as necessary to land safely.

35.1 Low on Final Approach Leg (Using Ground Effect)

Purpose: To develop the skill to extend the glide when low on final.

References: Glider Flying Handbook, page 3-14.

Procedure:
This technique uses ground effect to extend the final glide. When the glider is within about one half of the wingspan of the ground, induced drag begins to decrease. This increases the L/D. As you get closer to the ground, this effect becomes more pronounced. By diving to the ground and leveling off just above the bushes, you substantially increase the gliders L/D. The maneuver provides another advantage when you are penetrating a stiff headwind. Since wind speed usually decreases close to the ground, the glider will have less wind to fight. (Be aware that strong winds also produce ground level turbulence.) This is a low altitude maneuver. It is not profitable if the dive begins from a very high altitude as a significant amount of energy will be wasted before getting into ground effect. A dive from a high as 200 feet may be worthwhile. You can trade this altitude for airspeed to arrive at just above the ground with 70 to 85 knots. Get as close to the ground as you safely can. Hitting bushes or other obstacles at high speed could substantially shorten your approach. However, it is usually possible to skim a foot or two above them. Do not attempt to turn while this close to the ground. Be prepared to land short of the runway if necessary. You will gradually lose airspeed. If you get so slow that the glider no longer wants to fly, let it settle to the ground. Open the spoilers and stop as soon as possible
.

Performance Criteria:
The student will be able to extend the touchdown point using ground effect. He/she will be able to skim above a smooth surface at not more than two feet above ground level (agl).