STUDENT REFERENCE HANDBOOK

SOARING!

LESC

est. 1983

LESC Student Reference Handbook

compiled by the
Lake Elsinore Soaring Club
for use by its student pilots.

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Introduction

Welcome to the Lake Elsinore Soaring Club! You have just taken a big leap onto your road of becoming a glider pilot and experiencing the joy of soaring. You have just purchased all the resources you will need to earn your solo rating in a glider. Your kit includes the following:

- *Glider Basics—First Flight to Solo*
- *The Glider Flying Handbook*
- *The SSA Glider Pilot Logbook*
- *The LESC Student Reference Handbook*
  - » Pre-solo task completion standards
  - » Pre-solo student curriculum
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  - » Post-solo tasks discussion
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  - » Glider Aviator's Model Code of Conduct

You should understand that these materials are the 'must have' resources you'll need in order to obtain the knowledge to solo. After you have achieved your first solo flight, you will start working on your SSA "A", "B", "C", and Bronze badges. You will also simultaneously start working towards your private pilot's license with a glider rating. In order to obtain your license you will need to pass a written test as well as an oral and flying (or 'practical') text with an FAA examiner, much like you may have done to earn your driver's license. Your instructor can tell you about this process in more detail. To earn your license it is highly recommended that you get:

- ASA *Private Pilot Test Prep*
- *Private Pilot Practice Test Standards for Glider*
- Los Angeles Sectional
- Plotter
- *After Solo* by Thomas Knauff
- *Federal Aviation Regulations* (FAR)
- *Airman's Information Manual* (AIM)

From first flight to solo it takes on average 20-35 flights. At LESC we have instruction each Wednesday, Saturday, and Sunday. You can use the online scheduler (*See* your *New Member Package* for details) to schedule both gliders and instructor time. We recommend that you fly regularly so that you can retain the previous lesson's knowledge by the time you take your next lesson. However, it is possible to overwhelm yourself too, so for that reason (and in fairness to other students) please limit your instruction to one block per day. The LESC's fleet of Schweizer SGS 2-33 gliders is available for your instruction. We encourage you to read through the aircraft's *Pilot Operating Handbook* (included in this package) before your first lesson, so that you can be familiar with the airplane and get the most out of your instruction, right from the beginning.


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Pre-Solo Task Completion Standards

This is a list of the tasks that LESC's students must accomplish prior to soloing, and the standards for completing each task. Your progress on each task will receive a 1–10 rating by your instructor, with a rating of 7 or better required on all tasks before you will solo.

You will notice there is no fixed time or number of flights associated with these tasks. The frequency that a student can fly will have the greatest impact on the progress of these tasks. Try to fly once a week if you can.

RECORDS

All student training records are maintained on-line and contain all documentation regarding any and all training received by the LESC instructional staff. You'll receive a link to your student records from your flight instructor.

CURRICULA

Pre-flight, Surface Ops, Towline Inspection

Students *must* become familiar with the *SGS 2-33 Flight-Erection-Maintenance Manual* as is describes the flight envelope, characteristics and procedures to be used in varied flight scenarios. (*see* page 17)

You will be taught the proper use of the *SGS 2-33 Preflight Checklist* (*see* page 37) and be able to explain its importance. You will also be taught proper glider ground handling—where to pull/push the glider as well as how to clean a glider and prepare it for flight. You will be instructed never to leave a glider unattended and to make sure the canopy is closed and latched. Always visually check the tow line before it is attached to the glider, looking for frays, cuts and knots in the rope.

Signals (ground & in flight)

You will be taught the Standard American Soaring Signals. (*see* page 12)

Ground Handling & Securing

You will learn to demonstrate proper ground handling and securing of the glider and explain the consequences associated with doing so incorrectly.

Wing Runner Course Certificate

You'll complete the *Soaring Safety Foundation Wing Runner Course* prior to solo to demonstrate that you have a clear understanding of how to interact with ground crew. (*see* page 39)

Glider Basics Written Test

Since this is what it says—Glider Basics—all chapter tests from the *Glider Basics* text (*see* page 51) will be completed within the first 10 flights. It's LESC policy that you will not be allowed to fly, even dual, after your 10th flight until you have completed these tests.

The purpose is not that you pass the tests (after all the answers are in the book), but rather to make sure that you understand these basic principles and we don't have to go back and "unlearn" bad habits or assumptions.

Student Certificate

You will be directed to IACRA to obtain your Student Certificate before solo.

Assembly & Disassembly

Learn the eleven pins (7 inside and 4 outside) that are commonly removed when the glider is trailered. Make sure that you understand the need and duties of the four people required to assemble/disassemble an SGS 2-33.

Pre-launch Checklist

Make sure you use the pre-launch checklist prior to every flight. (*see* page 37)

1. Altimeter & Trim—*set*
2. Belts—*fastened (make sure you check the back seat as well)*
3. Ballast—*as needed*
4. Controls—*freedom of movement and clear of obstructions*
5. Cable—*checked and connected*
6. Canopy—*closed, latched, and verified*
7. Dive brakes—*closed and locked*
8. Direction of wind—*noted*
9. Emergency procedures—*(at a minimum) landing straight ahead below 50 feet, turns can be made above 100 feet and at 200 feet a return to the airport is possible*

Normal Launch

Initially, you'll follow along on the controls as the instructor performs the take off and aerotow. The principal lesson is for you to notice how *little* the instructor moves the controls.

Just as the pilot doesn't make the aircraft fly when off tow, the pilot doesn't make the glider take off either. The glider will take off if the angle of attack is proper and the relative airflow is strong enough to provide enough lift.

Demonstrate that in a 2-33, the glider pilot sets the angle of attack by holding the stick just aft of the neutral position. Keeping the wings level with necessary aileron deflections, while steering the path of the glider with the rudder while on the ground, it will take off when conditions (angle of attack and speed) are right. However, you should understand that if the glider begins to weathervane due to wind or a wing continues to drop even with aileron input that opposite rudder should be used to lift the wing. Don't attempt to force the glider to take off sooner or force it to stay on the ground. This technique will help you prevent PIOs (Pilot-Induced Oscillations) later on when you fly different gliders, especially single place sailplanes.

Hold the stick lightly and to place your feet on the rudder pedals while the instructor performs the take off. Notice that the instructor is holding the stick in the pre-set fore and aft position. After take off the instructor will move the stick slightly forward to hold the glider just a few feet above the ground as the tow plane develops enough speed for take off and climb.

It's important to keep the wings level and stay directly behind the tow plane. Allowing the glider to become too high during the take off is dangerous for both you and the towplane.

After demonstrating the take off, it's time for you to give it try. Place the glider in a normal flight attitude and wait for the aircraft to become airborne. Don't yank the stick back to get off the ground too soon. Once airborne, remain 2–5 feet off the ground (no higher) until the tow plane lifts off. The glider should rise with the tow plane remaining in the high tow position

Tow

The instructor will help you learn the tow by letting you fly for 10 seconds, then taking control regardless of how well you are doing. This will give you a chance to get a feel for the flight controls on tow and a chance to relax a bit (about 30–60 seconds) after finding out how different it is than normal flight. As you get more proficient, your instructor will lengthen the time before taking back control. Eventually you will be flying the entire tow.

You will learn to maintain a constant position behind the tow plane with its landing gear on the horizon. During the aerotow, your instructor will explain to fly the glider with the glider's wings level with the tow plane's wings while keeping the tow plane's wheels on the horizon. Flying the tow is essentially formation flying. In formation flying there is always an established lead—in this case the tow plane. The glider pilot uses the flight controls to place the glider in proper position in reference to the lead—the tow plane. If you are continually chasing the tow plane and can't seem to keep in position, it may be that you are fixating on the tow plane and are not seeing the "big picture". Look beyond the tow plane at the horizon. This will allow you to see the tow plane as part of the overall picture and keep your focus on the horizon, keeping the glider in position up and down. It also allows you to see the tow rope while making it draw a straight line through

the middle of the tow plane, which will keep you in position left and right.

During the tow, you are flying 200 feet behind the tow plane and at normal towing speeds, which is about 1½–2 seconds delay. That means that when you see tow plane move, you will do the same thing in about 1½–2 seconds as well. You need to maintain the same bank angle as the tow plane, particularly in turns. While turning, the tow rope should draw a straight line through the middle of the tow plane.

Before releasing from the tow, you will visually clear the airspace both left and right. Before making a level or climbing right turn upon release, you'll announce that the rope is free and clear of the glider. It should be emphasized that you should not descend during the turn—the purpose of the turn is to get away from the rope and descending will put the glider closer to the rope. Once clear of the rope, maneuver in a way as to maintain visual contact with the tow plane until it's reasonable to assume that both pilots are aware of the location of each other and that their flight paths won't result in a collision.

Crosswind Launch (wing down)

With a wing down launch you should apply full sick and rudder in order to pick up the down wing quickly. Once the wing is up, care should be taken to maintain position behind the tow plane and not allow the glider to drift down wind.

Box the Wake

You should be able to demonstrate control of the glider on tow by "Boxing the Wake." The box is started by transitioning from the high to low tow position (the horizontal stabilizer will be even with the wing struts on a Callaire), then back up to high tow. You'll then smoothly maneuver the glider to one side or the other until the tail wheel of the tow plane is visually outside the main wheel. You will then drop to the low tow position while remaining in the outside of the wake. Once in the low tow position, you'll then maneuver to the other side of the wake so that the tail wheel is again outside the other main wheel. Now you can come up to the high tow position while remaining outside the wake. Now it's a simple as easing control pressure to allow the glider to return to the normal high tow position.

Pitch, Roll, Yaw, Adverse Yaw

You will be taught smooth coordinated control of the glider in all three axes. Your instructor will demonstrate pitch control and its relationship to speed control before teaching roll control. Once you're comfortable with rolling the glider into a turn (while you control the rudder) introduce yaw and coordinated turns. Make sure you can tell the difference between a slip and a skid. Your instructor will explain the hazards of skids and the proper use of slips. Remember to always clear the airspace before turning the glider.

Pre-landing Checklist, Pattern Speeds

You are required to always use the pre-landing checklist:

1. Traffic
2. Obstacles
3. Wind direction & velocity
4. Air Speed
5. Retractable gear down & locked
6. Drag Devices (Spoilers and/or Flaps)

You will learn to fly the pattern at $(1.5 \times V_s)$ + the headwind on final as published in the *2-33 Flight-Erection-Maintenance Manual*. Given that, the minimum speed at which the pattern should be flown in a 2-33 dual is 60 mph. (*see* page 17)

Traffic Patterns

You will be taught standard traffic patterns with a 45° entry from the IP to Downwind, Base and Final legs. The standard pattern flown is listed in the *LESC Standard Operating Procedures*.

TLAR Technique

This is straight forward and taught straight from the *Glider Basics* text.

After the you understand the proper use of the flight controls and can maintain a constant airspeed and coordinated constant speed turns, you are ready to learn the "That Looks About Right" or TLAR technique of judging angles in reference to the touch down

point to fly proper landing patterns. There are 3 basic glide ratios you should be able to identify.

The 5:1 glide ratio is the most important in gliding. It's the glide angle (in still air) that most gliders perform with the dive brakes fully deployed. If you understand this and learn to recognize it, you should have little difficulty making accurate landings on any spot.

20:1 is roughly the glide ratio (in still air) of the 2-33 with spoilers closed and is the minimum angle the glider will fly.

12:1 is the optimum glide ratio as it is about halfway in between the two extremes. The optimum pattern would be flown entirely at 12:1, giving the pilot room for correction both plus and minus the target.

When flying the pattern, you should keep the runway at a 45° down angle while on downwind (other angles such as 30°, are more difficult to grasp). The turn to base should be made when the landing point is 45° behind the glider, and should be a constant speed 45° bank turn. The turn from base to final should also be a constant speed 45° bank turn, lining up with the centerline of the runway. Don't develop bad habits such as over shooting the turn to final

You will learn to fly the pattern at $(1.5 \times V_s)$ + the headwind on final as published in the *2-33 Flight-Erection-Maintenance Manual*. Given that, the minimum speed at which the pattern should be flown in a 2-33 dual is 60 mph. (*see* page 17)

Normal Landing

A lot happens when landing, making it a complex task. Landing should be broken down into smaller building blocks making it easier to teach and comprehend.

You should be watching the horizon as the principal reference to airspeed control. Some students will watch the airspeed indicator, making it virtually impossible to maintain a constant airspeed. Your instructor may cover the airspeed indicator which will force you to use the horizon as a speed reference.

Understand the mechanics of flight. If you don't understand that the wings, not the rudder, turn the glider, or that the nose will drop when initiating a turn, or that aileron deflection causes adverse yaw, you won't be able to properly coordinate constant speed turns. Proper control input is essential to coordination.

Improper use of trim. Some students will leave the trim in the normal flying position while landing. This makes speed control more difficult. Setting the trim full forward will help keep the nose below the horizon and maintain a constant speed of at least $1.5 \times$ Stall Speed (V_s).

Be sure to understand the elements involved in landing. You should understand the normal pattern legs and the TLAR technique. You should understand proper alignment with the runway and how to flare before touching down. Changing from controlling the glider in flight to controlling it on the ground can be troublesome for some students.

Tailwind Landing

First, you should be made aware that when possible landing into the wind is preferable to a downwind landing. Make sure you are aware that after touchdown in a downwind landing, control authority will be lost at a higher ground speed, necessitating good control of the glider and a quick stop. There is a tendency for you to want to slow the glider down since your eyes are telling you that you are going too fast. Make sure you maintain your airspeed.

Crosswind Landing

You'll learn to apply any combination of slip and or crab to maintain a stabilized approach and decent to the runway. You'll be asked to understand and demonstrate the need to land on the downwind side of the runway with the upwind wing held slightly low as well as the hazards of failing to do so.

Slips to Landing

You'll first be introduced to slips while at altitude. Get used to the way the glider feels and sounds. Get to where you can smoothly transition form normal flight to a slip and back to normal flight. Once you are familiar with slips at altitude, then your instructor will have you do slips on final. Be careful not to stall the glider.

Aircraft Radio Procedures

Your instructor will have you start using the radio early in your training. That way it's not as big a distraction. Your instructor will help teach you the proper radio procedures for use at Elsinore.

Collision Avoidance, Wind Shear & Wake Turbulence

You will need to be vigilant by looking outside the aircraft to be aware of possible collisions, wind shear and wake turbulence.

It's important to recognize that flying is a three dimensional activity, which means that collision threats can come from any direction and the only way to combat them is to be cognizant of all threats—again looking in all directions outside the glider. Time spent looking at instruments or anything else that brings your attention back inside the aircraft only increases the risk of a collision.

You will understand the hazards associated with flying into a wind shear. You will be able to identify conditions that may contribute to these hazards and how to mitigate them again by looking outside the aircraft. There's nothing inside the glider that will help you avoid these hazards.

You will understand that wake turbulence is caused by the production of lift and that the heavier the aircraft, the stronger the wake turbulence will be. You need to be aware of where other aircraft using the same runway you are using took off or touched down and how to avoid the wake turbulence generated. You also will understand that wake turbulence will extend behind aircraft in flight—just like the wake generated by the tow plane. In general, the heavier the aircraft, the longer (further behind) the wake turbulence will exist.

Time spent with your attention diverted inside the aircraft will only increase the likelihood of encountering these threats.

Drop-Zone Familiarization

This is a great way to begin training. On your first flight, your instructor will have the tow pilot do a DZ familiarization tow where the glider is towed around the perimeter of the DZ. Your instructor will point out the landmarks denoting the limits of the DZ. As your training progresses, they'll test your knowledge of the DZ by having you make maneuvers near the DZ boundaries, but with instructions to stay clear of the DZ. The limits of the DZ are published in the *Standard Operating Procedures*.

Current Weather & Winds

You will demonstrate that you know how to obtain current weather and winds and describe the hazards that may be present. It is required that you enter this information on your Tow Pass and you should be taught this procedure early on to develop the proper habit of doing so.

Glider Instruments

You will be able to draw a plumbing schematic to show the hookups for each instrument and their proper sources. You will also understand what the instrument is actually measuring, not what it's indicating and be able to properly interpret what your instruments are telling you.

Glider Performance

You will demonstrate that you understand how to maximize the performance of the glider for the given air mass by properly adjusting speeds and flight paths to accommodate for changing weather. You will also demonstrate proper control inputs to minimize drag and achieve maximum performance and a safe termination of the flight.

Speed To Fly

Your instructor will provide you with the basic idea of speeding up in sink and slowing down in lift. Use the 5 MPH rule of thumb for every 100 FPM down over the standard 200 FPM of sink in the 2-33. Speed to fly is really an adjustment of the best L/D speed. This can be easily demonstrated using the aircraft polar.

Precision Turns

You should be able to roll out within 5° of a predetermined heading. Always be sure to clear the airspace on either side before turning the glider.

Slow Flight

Slow flight should be conducted at the verge of stall. If you want to take the aircraft up to stall to find that precise attitude and speed this is fine, provided you don't stall the aircraft for the remainder of the slow flight demonstration. Once a stable slow flight condition has been established, your instructor will have you make a 90° turn, remaining in slow flight. Be careful about steepness of bank and the application of controls not to exceed the critical angle of attack (use of rudder to lift a falling wing rather than aileron). Always be sure to clear the airspace on either side before turning the glider.

Steep Turns

Steep turns should be made at a bank angle between 45° and 60°. Speed shouldn't deviate more than 10 MPH through the turn. Bank and pitch control via visual reference to the horizon is important. Always be sure

to clear the airspace on either side before turning the glider.

Stalls—Forward

Stalls should be taught after you have demonstrated the ability to control the glider in all three axes. Teaching stalls prior to this may cause you anxiety while performing stalls, which will affect your ability to recover from them in a timely fashion. Remember that stall is a function of angle of attack and may occur at any flight attitude regardless of speed.

Stalls, like every maneuver have a setup, execution and recovery.

Setup for stalls by clearing the airspace. Clearing turns must be made prior to initiating any stalling maneuver and three stalls may be executed before another series of clearing turns is required. This can be accomplished with two steeply banked 90° turns (one in each direction) or a single turn of 180° or more, looking in all directions, above, below, forward, behind, left and right of the glider during each turn.

To execute forward stalls, pull the nose of the glider up to an attitude where your feet are on the horizon and maintain this attitude as the glider slows by applying appropriate back stick pressure. At the first indication of the stall (verbalize what you see as an indication of the stall), you should immediately neutralize the controls to gain airspeed.

Recovery will be made smoothly with minimum altitude lost and not enter into a secondary stall.

Stalls—Turning

Stalls should be taught after you have demonstrated the ability to control the glider in all three axes. Always remember that the stall is a function of angle of attack and may occur at any flight attitude regardless of speed.

Stalls, like every maneuver have a setup, execution and recovery.

Setup for stalls by clearing the airspace. Clearing turns must be made prior to initiating any stalling maneuver and three stalls may be executed before another series of clearing turns is required. This can be accomplished with two steeply banked 90° turns (1 in each direction) or a single turn of 180° or more, looking in all directions, above, below, forward, behind, left and right of the glider during each turn.

To execute turning stalls, begin a shallow bank (approximate 10° to 15°) turn, then pull the nose of the glider up to an attitude where your feet are on the horizon and opposite aileron to prevent the inside wing from dropping too much, making it more difficult to stall (be careful not to level the glider or you will end up with a forward stall). At the first indication of the stall (verbalize what you see as an indication of the stall), you should immediately center the stick and apply full opposite rudder. You will then let the glider build enough airspeed that the stick can be used to level the wings.

Recovery will be made smoothly with minimum altitude lost and not enter into a secondary stall.

Uncoordinated Flight

You will demonstrate uncoordinated flight as well as understanding when uncoordinated flight is preferable.

Spin Demo

While not required by the FAA, all LESC students are required to experience a spin before they solo. Most importantly, you should recognize the conditions that lead to a spin. Don't be afraid—spins can be fun! Since there is a Victor airway that runs down the middle of the valley, spins need to be conducted back over the Ortega's. This will necessitate a high tow, so make the most of it—do several spins. Make sure you understand that while you have to force a 2-33 to spin dual, it spins rather nicely solo!

Benign Spiral

You will be made aware that while you may not be able to maintain level flight without visual reference, because of the stability designed into the 2-33 (and most gliders—other than aerobatic aircraft), the glider will inherently want to return to level flight. Your instructor will demonstrate this by having you trim the glider to fly hands-off at about 50 mph and then have you open the spoilers and take your hands and feet off the controls. You'll see that the glider will fly just fine without your control inputs.

Next, your instructor will demonstrate that the glider will eventually return to stabilized flight by commanding a large aileron input to upset this stabilized flight and then taking your hands and feet off the controls and then waiting for the glider to return to stabilized flight

Flight Without Reference to Instruments

You learn to fly the glider without reference to any instruments, judging adequate safety margins. The safety of the flight should never be in question.

Rope Break

Your first action should be to drop the nose to maintain airspeed. Then a coordinated 45° banked turn back to the airport should be executed. A normal landing (probably down wind) will then be made.

Wave Off

You should readily notice the wing wag of the tow plane and release. Special vigilance should be given to avoid the tow rope and giving the tow plane the room it needs (they're probably going to turn back to the airport).

Rudder Waggle

This is best accomplished before giving the Wave Off. Make sure the spoilers are *not* deployed, then do a systematic check of other systems.

Slack Line Recovery

Once you understand how a slack line condition can occur, the CFIG will take the controls of the glider on tow and introduce a slack line scenario. You will use any combination of yaw and or spoilers to return the glider to a normal high tow position without breaking the rope or descending below the tow plane.

You'll also learn to understand and demonstrate that a release from the tow plane is required if the belly of the slack line is even with the cockpit and the hazards associated.

Full-Spoiler Landing

After you have mastered normal landings and are comfortable with TLAR, it's time to learn how to handle a situation where your spoilers might become jammed in the extended position. During your preflight checklist, your instructor may unexpectedly extend full spoilers and hold them in place. You will need to adjust your flight path to continue to a safe landing with the extra drag of the extended spoilers. Your instructor will ask you questions about your intentions and plans, and how you think you're doing.

No Spoiler Landing

After you've made a few slips to landing, it's time to "jam the spoilers closed" when you're doing your pre-landing checklist. Glide path control should be handled by slipping the glider. The pattern can be extended if need be, but you should stay pretty close to a normal approach.

Diverting to an Alternate Landing Area

Early in your training, your instructor will have you look back at the airport as you fly the take off and ask you to identify landable areas. It won't be long until one day there will be another airplane in the runway, or the glider is not on the glider slope, or the winds are just too high. Before this happens, your instructor will explain to you how we can land the glider in the areas you have identified and show you other options you may not have noticed.

Simulated Off-field Landing

Your instructor will set up the parameters for a simulated off field landing—preferably not on the normal runway. Without reference to the altimeter (which is pretty much useless in a such situations), you will demonstrate the ability to land with in the specified parameters.

Over Wire Pattern

If the winds are more than 10 MPH favoring runway 29L, it's time for an over the wires pattern. This is a conventional left-hand pattern with the base leg flown directly over the wires on Corydon street. Your touch down point is still the middle set of tires. Have no fear, someone will bring the cart out and drag you back. Take note: it's not very noticeable but the runway does run down hill towards the lake.

Steep Approach

You will learn to understand the increase in parasitic drag with the increase in speed.

Your CFIG will demonstrate a steep approach to landing from 800' to 1000' AGL when turning Base to Final. This will emphasize and demonstrate to you the *wide* (1000'-200' = 800') window of variability where you can still make a safe landing. This will also serve to emphasize that being higher on final is better than being lower.

Make sure you understand that more than 70% of all glider accidents and more than 85% of all glider

fatalities are a result of being too low on final and not reaching the touchdown point.

Thermal Technique

Your instructor will describe the dynamics of a thermal to you, paying particular attention to both the lift and sink generated. You should be aware that it is easier to make adjustments to core a thermal if you can maintain a constant speed and bank angle. These should be maintained by visual reference to the horizon, not the instruments. To make the most advantage of the thermal's energy, the glider should be flown at minimum sink speed. Make sure you understand that as bank angle increases so does the minimum sink speed.

Ridge Technique

Your instructor will describe the dynamics of ridge lift to you, paying particular attention to the location both the lift and sink generated. You should understand that all turns are made away from the ridge and faster gliders should pass slower gliders between the slower glider and the ridge. Since there is obviously wind, make sure you are aware of the wind direction and how it will affect your return to the airport.

Wave Technique

Your instructor will describe the dynamics of wave generation to you, paying particular attention to both the lift and sink generated.

Solo Practice Area (including Sedco Hills)

You will be able to describe the limits under which you are allowed to fly solo as well as being familiar with how to safely return to the airport from the Sedco Hills.

Silent Pattern

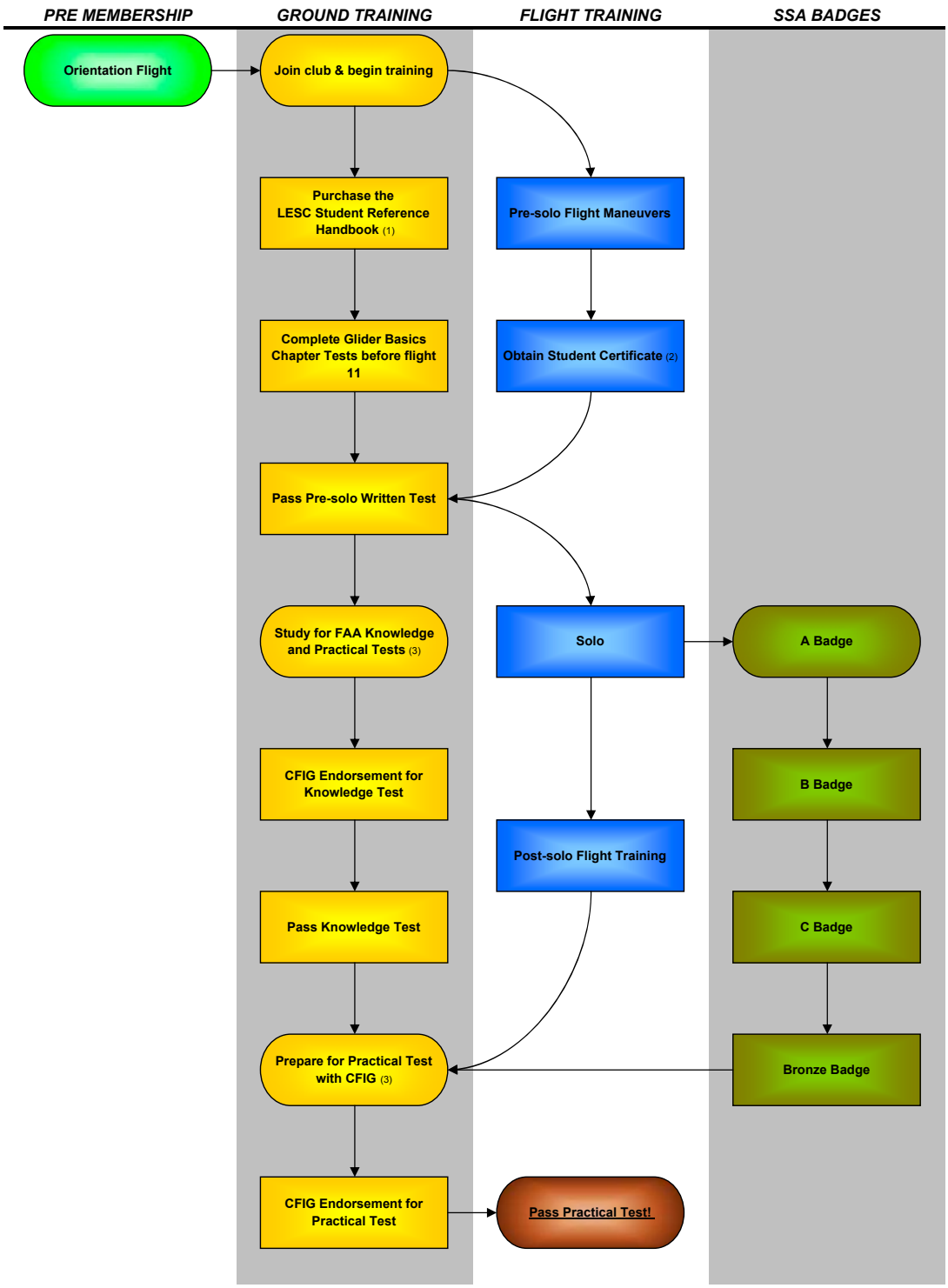
The Silent Pattern is the last flight before solo. Basically, the instructor is a fly on the wall and shouldn't have to say anything. If he or she does, it's time for some more dual instruction before trying another Silent Pattern. That's not the end of the world. The purpose of a Silent Pattern is just to make sure you *both* know that you're ready to solo.

First Solo!

This is the flight you've all been waiting for! Your instructor will make sure all the paperwork is filled out prior to sending you off on your first solo.

Once you have returned, the CFIG will need to update the training system to indicate that you are signed off to fly the SGS 2-33 solo and award you your SSA "A" badge or direct you to an SSAI who can award the badge.

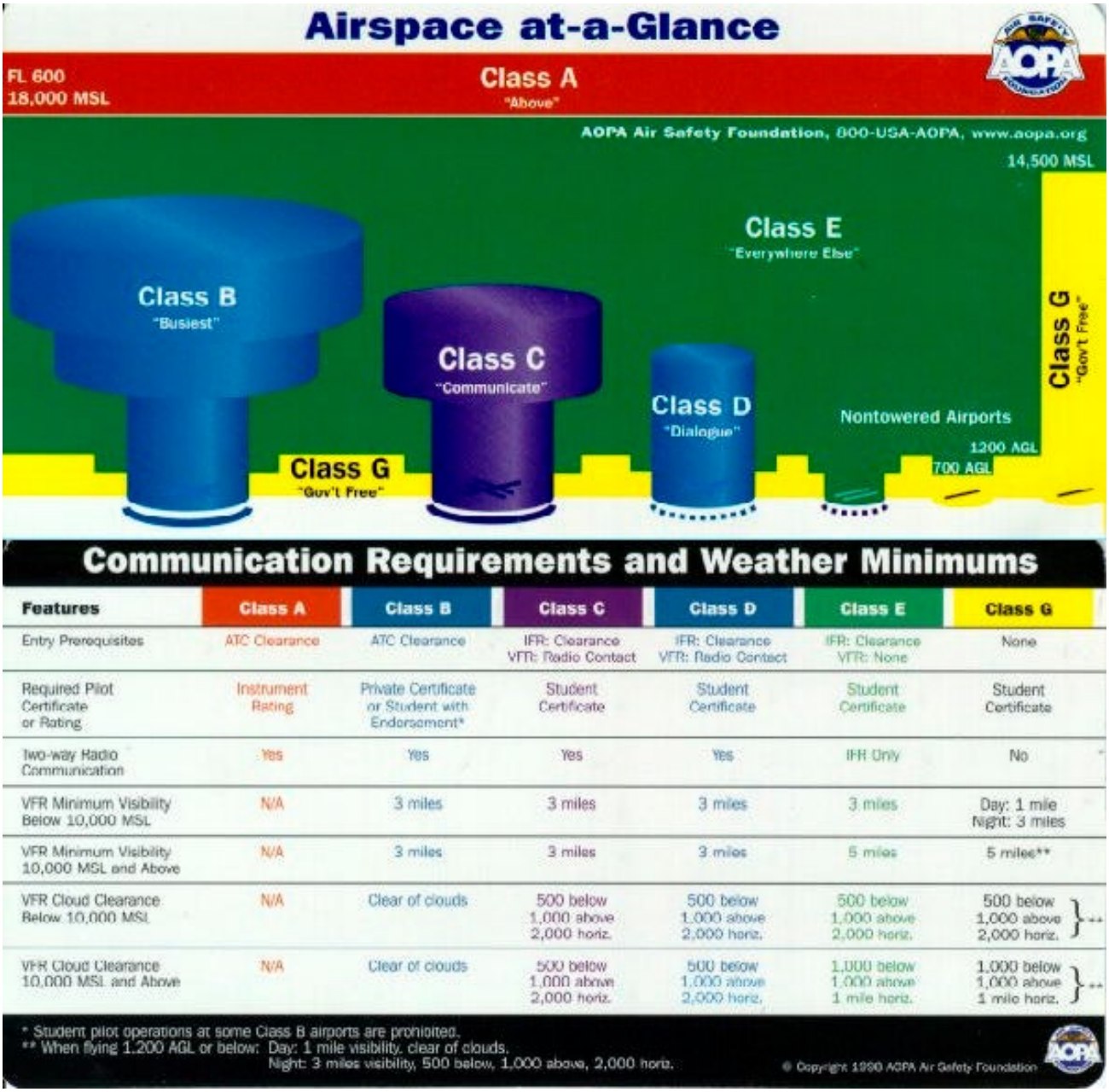
LESC Flight Training Flowchart



(1) Available for purchase at the LESC clubhouse or www.ssa.org.
(2) Available from the Flight Standards District Office or a Designated Pilot Examiner.
(3) Study guides available at www.ssa,.org - check with your CFIG.

Figure 1 Standard Glider Signals

Figure 2 Types of Airspace



Communication Requirements and Weather Minimums

Features	Class A	Class B	Class C	Class D	Class E	Class G
Entry Prerequisites	ATC Clearance	ATC Clearance	IFR: Clearance VFR: Radio Contact	IFR: Clearance VFR: Radio Contact	IFR: Clearance VFR: None	None
Required Pilot Certificate or Rating	Instrument Rating	Private Certificate or Student with Endorsement*	Student Certificate	Student Certificate	Student Certificate	Student Certificate
Two-way Radio Communication	Yes	Yes	Yes	Yes	IFR Only	No
VFR Minimum Visibility Below 10,000 MSL	N/A	3 miles	3 miles	3 miles	3 miles	Day: 1 mile Night: 3 miles
VFR Minimum Visibility 10,000 MSL and Above	N/A	3 miles	3 miles	3 miles	5 miles	5 miles**
VFR Cloud Clearance Below 10,000 MSL	N/A	Clear of clouds	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz. **
VFR Cloud Clearance 10,000 MSL and Above	N/A	Clear of clouds	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz.	1,000 below 1,000 above 1 mile horiz.	1,000 below 1,000 above 1 mile horiz. **

* Student pilot operations at some Class B airports are prohibited.
** When flying 1,200 AGL or below: Day: 1 mile visibility, clear of clouds.
Night: 3 miles visibility, 500 below, 1,000 above, 2,000 horiz.

Figure 3 Airspace Depiction On Sectional

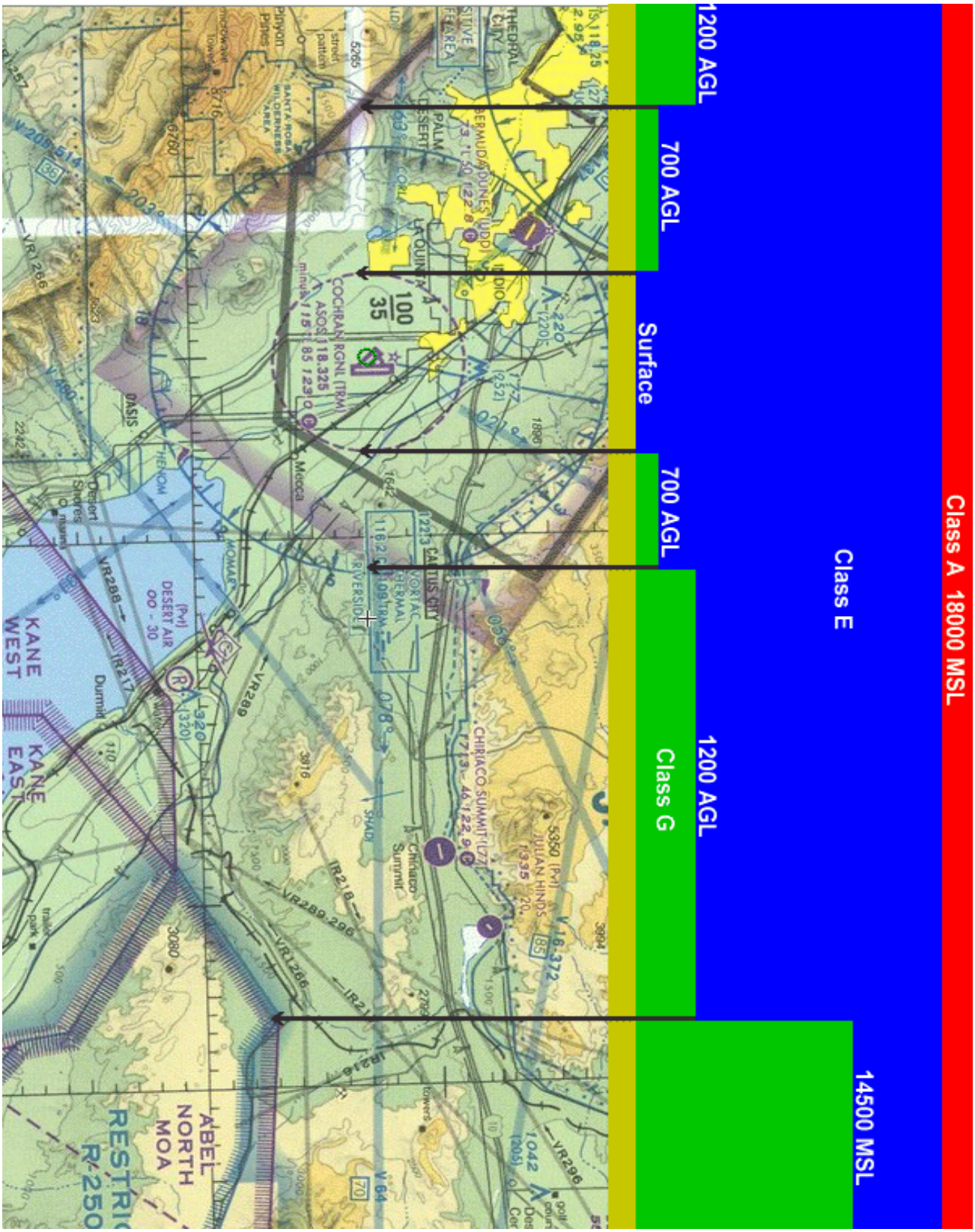


Figure 4 Right-of-Way Rules

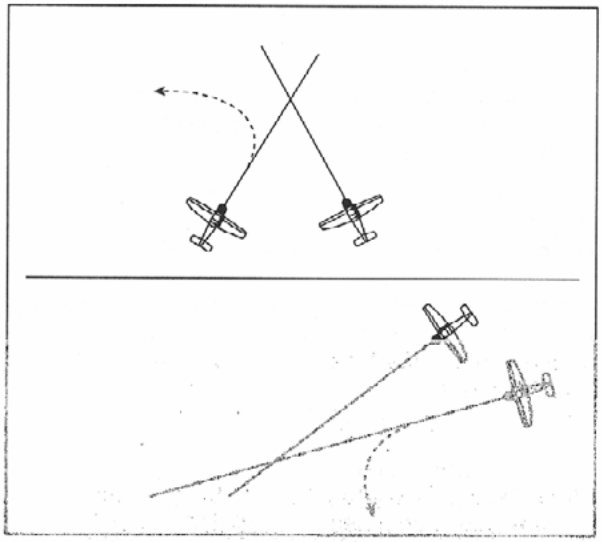


Figure 4-2. Aircraft on converging courses: Aircraft on the right has right-of-way—aircraft on the left must yield.

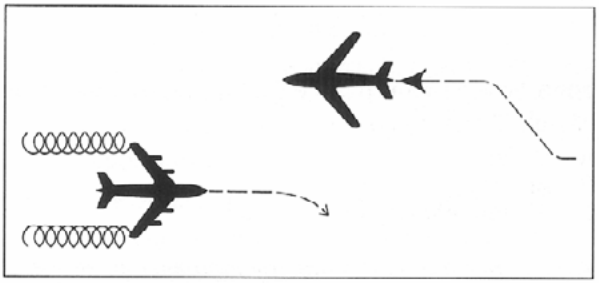


Figure 4-3. Aircraft approaching head-on

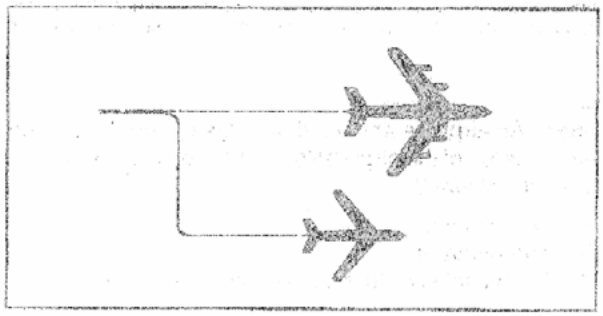


Figure 4-4. One aircraft overtaking another.

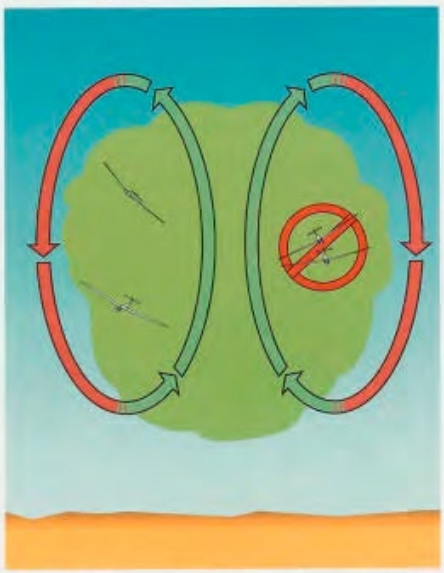


Figure 10-13. When thermalling, avoid flying in another glider's blind spot, or directly above or below another glider.

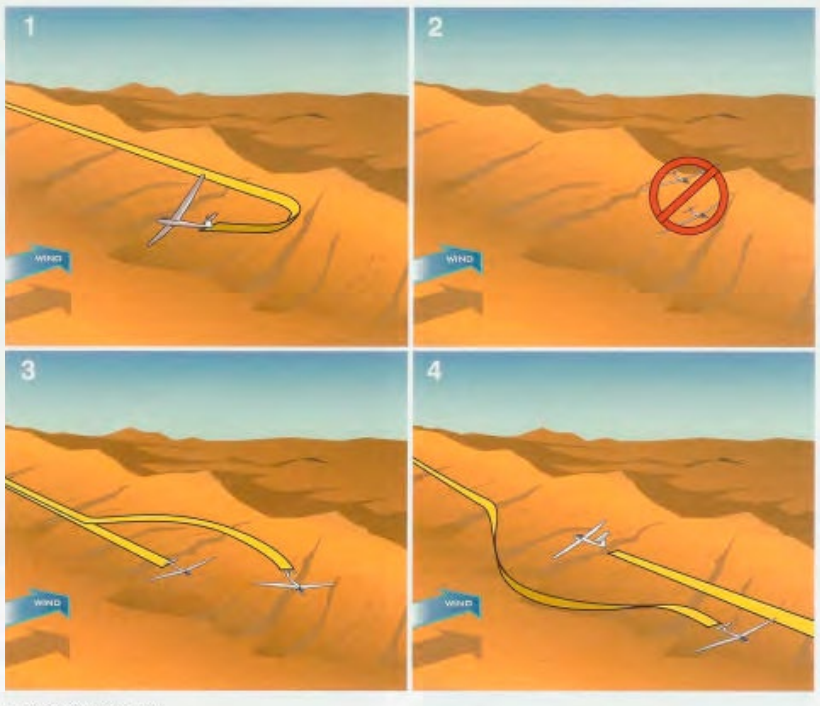
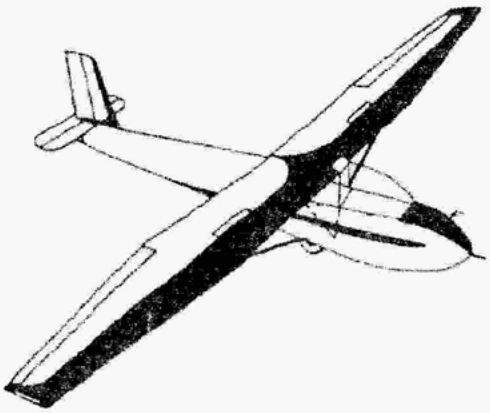


Figure 10-15. Ridge rules.



THE SGS 2-33 SAILPLANE

FLIGHT – ERECTION – MAINTENANCE

MANUAL

K & L SOARING, LLC

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SCHWEIZER SGS 2-33 AND 2-33A

FLIGHT – ERECTION – MAINTENANCE

MANUAL

The Model SGS 2-33A Sailplane is the same as Model SGS 2-33 except for the rudder used. SGS 2-33 uses rudder, P/N 26K714-3, whereas Model SGS 2-33A uses rudder, P/N 33700K-1. The 33700K-1 rudder is taller and incorporates a balance weight in the upper forward end which overhangs the top of the fin. The static-unbalance limits of the 33700K-1 rudder, after covering and finishing is complete, is 0 to 13 in./lbs. tail heavy, measured from the hinge center line.

Serial Numbers 86 and up incorporated the balance rudder in factory production. Serial numbers prior to No. 86 may be converted to Model SGS 2-33A by changing the rudder and accomplishing the documentation of same in accordance with manufacturer's Service Letter No. SL-102-4

The SGS 2-33 & 2-33A have a gross weight of 1040 lbs. Both versions are eligible for a gross weight of 1080 lbs. provided they have 33928-001 kit installed and each wing panel weighs 155 lbs. or above.

Flight, Erection and Maintenance instructions contained in this manual are identical for both Models, SGS 2-33 and SGS 2-33A

K & L SOARING, LLC

5996 STATE ROUTE 224

CAYUTA, NY 14824

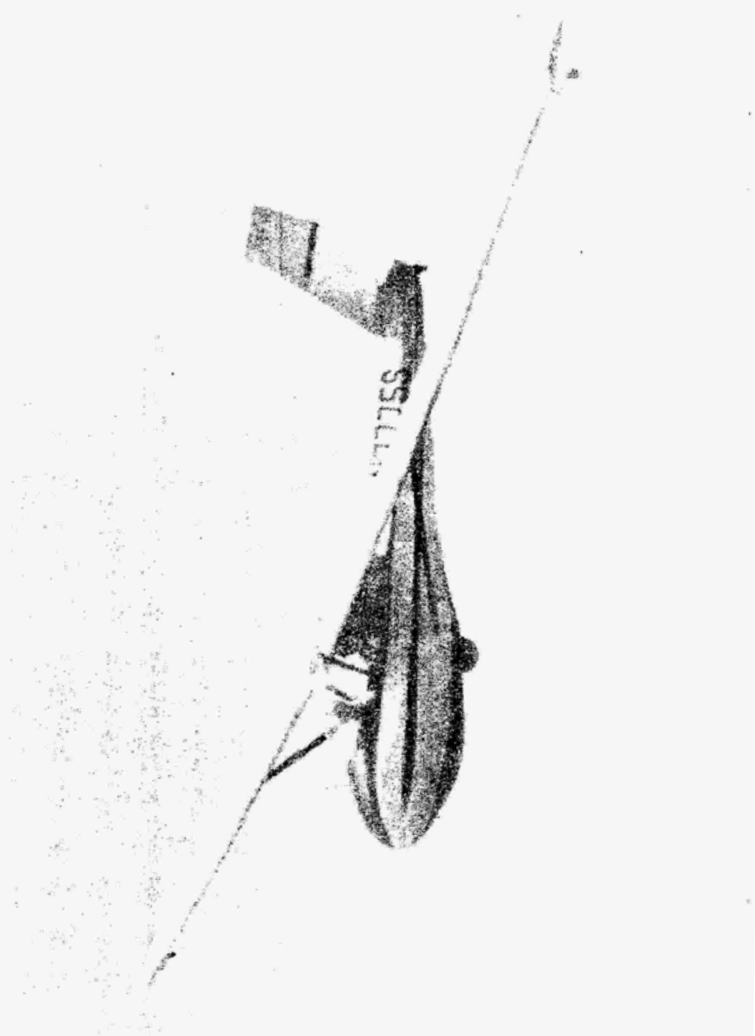

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Table of Contents

SECTION ONE – FLIGHT PROCEDURES

SECTION TWO – ERECTION & MAINTENANCE

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GENERAL DESCRIPTION

The SGS 2-33 is a conventional two-place tandem, intermediate-training sailplane, manufactured by Schweizer Aircraft Corp., Elmira, New York. Its construction is all metal with fabric cover on the fuselage and tail surfaces. It has a one piece canopy for increased visibility. The wings are tapered in the outboard section, and have dive-brakes incorporated.

Overall dimensions are: Length - 25' 9"
Span - 51' 0"
Height - 9' 3-1/2"
Wing View - 219.48 sq.ft.
Aspect Ratio - 11.85-1

Flight Controls –

1. Tow release knob:
   Front – located at center bottom of instrument panel.
   Rear – located at located at top left of front seat back.
2. Dive Brake and Brake Lever:
   Front – located at left side of cockpit under instrument panel.
   Rear – located at center of left side of cockpit.

   To use dive brake, push forward and down and then straight back. The wheel brake is actuated only at the extreme aft position of the dive – brake/wheel brake control handle
3. Control Sticks:
   Front & Rear – are conventional and both are mounted on a single torque tube
4. Rudder Pedals:
   Front – located on left and right forward of floor board and are conventional. They are toe type pedals and are adjustable.
   Rear – located to left and right of front seat and are not adjustable.
5. Trim Lever:
   Front only – located on left side below dive brake lever
   Four positions from full forward to full rearward
   Use as needed
   (See Supplement No. 1 for Ratchet Trim – Page 8)
6. Instruments:
   Front only – ASI is required. Additional instruments may be added up to full panel as desired.
   NOTE: Instrument flight is prohibited, regardless of instrumentation.

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Supplement No. 1 to SGS 2-33

Flight-Erection-Maintenance Manual

FLIGHT CONTROLS –

2. Dive Brake & Wheel Brake (Ref. Item 2 on Page 6)

Beginning with SGS 2-33A, Serial No. 500, a new main landing wheel, including a hydraulic brake installation (P/N 33216-2) is provided, superseding the mechanical brake.

The hydraulic brake is rigged so that it is actuated only at the extreme aft position of the divebrake/wheelbrake control handle.

The main wheel is a split-rim type (Cleveland Model 40-78D or K & L Soaring Model 33218-001) incorporating a Cleveland Model 30-63D (includes torque plate) or K & L Soaring Model 33218-003 (needs 33218-007 torque plate) hydraulic brake. This is a disc type brake, actuated by a Gerdes Products A049-3P or K & L Soaring Model 33218-005 master cylinder located adjacent to the control bellcrank on the left hand side, aft of the rear seat. It is permissible to mix between the Cleveland & K & L Soaring part numbers for the brake system. (i.e. Use a Cleveland Brake with a K & L Soaring Wheel)

The brake system is serviced with hydraulic fluid (specification MIL-H-5606, or equivalent) by removing the plastic plug from the top plate on the master cylinder and filling through this hole.

To bleed the brake system, remove the bleeder-valve cap on the wheel brake assembly opposite the line-attach point. Actuate the brake master cylinder and while maintain pressure crack the bleeder-valve screw at the wheel brake to allow air to escape. Repeat this cycle, adding hydraulic fluid as necessary, until the air is exhausted. Check brakes for normal operation; then tighten the bleeder valve screw and replace the bleeder-valve cap. Also replace the plug in the brake master cylinder filler hole.

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Supplement No. 1 (Cont'd)

5. Trim Lever (Reference Item 5 on Page 6)

On sailplane serial no. 500 and up, a ratchet-lock trim installation (P/N 33140G) is provided, superseding the bungee-type trim found on lower serial-number ships.

The trim control lever for the ratchet-lock trim system is located just forward and to the left of the front cockpit control stick. The system is integral with the forward control stick and torque tube assemblies.

The trim is operated with the fingers of control stick hand by aft pressure on the locking lever. The control stick is then moved to the position which gives the desired airspeed, at which point the locking lever is released to engage the trim lock.

Prior to take-off, the trim should be set (locked) at the elevator-neutral position which is checked by stick line-up with the trim placard neutral-arrow, located on the floorboard to the left of the control stick.

After take-off, the desired trim settings may then be obtained as noted above.

Maintenance of the ratchet lock trim system is limited to maintaining security of attachments and periodic lubrication, with special attention to the spring-cartridge, per codes "A" and "B", Page 2-5 of the Erection and Maintenance Instructions section of this manual. There are no field adjustments to be made to the trim system or the spring cartridge.

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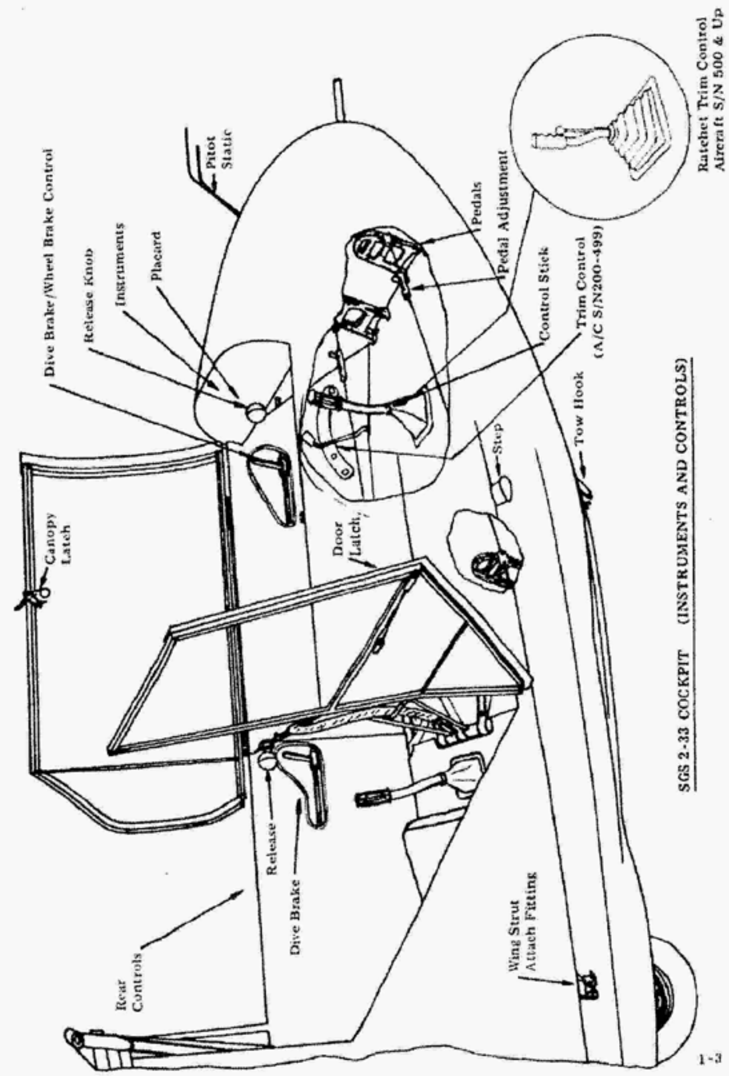

SGS 2-33 COCKPIT (INSTRUMENTS AND CONTROLS)

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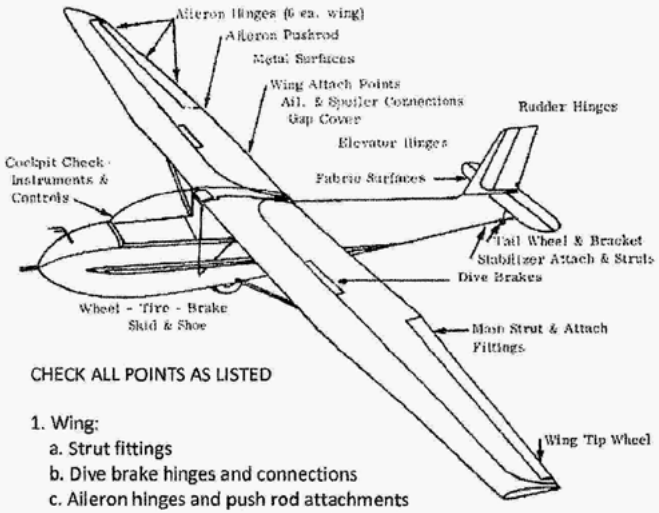

CHECK ALL POINTS AS LISTED

1. Wing:
   a. Strut fittings
   b. Dive brake hinges and connections
   c. Aileron hinges and push rod attachments

2. Tail Assembly:
   a. Hinge points, rudder and elevator
   b. Push rod attachment to elevator horn
   c. Stabilizer struts and stabilizer attachment to fuselage.
   d. Rudder cable connection to rudder horn
   e. Tail wheel assembly

3. Fuselage:
   a. Release control
   b. Flight controls for free movement including release
   c. Instruments
   d. Canopy attach points and latch
   e. Safety belts and shoulder harnesses
   f. Rear door and window attach points and latches
   g. Fabric for damage
   h. Wheel, tire and brake
   i. Static and pitot tubes for water or other foreign objects.

4. Tow Rope:
   a. Condition and attachment of rings.

WINCH OR AUTO TOWS

Precautions:
1. Be sure equipment is suitable for purpose
2. Person driving car or operating winch should be experienced with equipment and know towing characteristics of the SGS 2-33.
3. Never hook rope or wire to empty sailplane.

Winch or auto tows may be executed in the usual manner using either the forward, or the CG release, although the latter should result in a higher altitude. There is no tendency to oscillate with either release. Maximum speed for auto, or winch tow, is 69 MPH.

CAUTION:
1. Do not climb at full back stick position until a safe height for stall recovery is reached (75 - 100 ft.).
2. Level out before releasing.

Aero Towing:
1. Trim (bungee lever) forward position recommended for solo take-off.
2. You will notice that aileron control is somewhat heavy at fast towing speeds, but they reduce to a normal level at slower speeds.

FREE FLIGHT

Flying Speeds:

Best Gliding Speed	(L/D) 23-1 @ 50 mph	2-Place @ 1040 lbs.
	(L/D) 23-1 @ 52 mph	2-Place @ 1080 lbs.
	(L/D) 23-1 @ 45 mph	1-Place
Min. Sink Speed	3.1 FPS @ 42 mph	2-Place @ 1040 lbs.
	3.2 FPS @ 44 mph	2-Place @ 1080 lbs.
	2.6 FPS @ 38 mph	1-Place

Flight Limits-Speeds:

	1040 lbs.	1080 lbs.
Dive	98 mph	100 mph
Aero Tow	98 mph	100 mph
Dive Brakes Extended	98 mph	100 mph
Auto or Winch Tow	69 mph	70 mph

Aerobatics: All aerobatics (except spins) are prohibited.

Stalls: Are very gentle and always straight ahead with no tendency to go off to either direction. Buffeting occurs before the stall 34 mph solo, 38 mph dual @ 1040 lbs & 39 mph dual @ 1080 lbs..

Spins: The 2-33 will spin, depending on the weight of pilots and equipment, etc., Care should be taken to avoid stalls and spins at low altitude by using adequate air-speed.

Useful Loads: The placard weight/s on the instrument panel must be strictly adhered to. This will insure that center of gravity will be maintained in flight. The weights stamped are maximums and minimums which are easily compared with that of the pilot and passenger.

NOTE: Seat ballast must be added if minimum weight of pilot's is less than placard minimum.

Spiralling in thermals: In order to remain aloft or gain altitude it is necessary to spiral. The diameter of a thermal is normally quite small; therefore, a fairly steep bank is required. Although this is general practice, it may not be necessary in areas where large diameter thermals are found. The best flying speed in any thermal, at any degree of bank, is a few miles per' hour above the stall and just above the buffet onset speed. (Note – Uncoordinated flight will yield higher buffet speeds.)

Example:

	Solo (790 lbs.)	Dual (1040 lbs.)	Dual (1080 lbs.)
Stalling speed - level flight	34 mph	38 mph	39 mph
Stalling speed - 30° bank	36.5 mph	41 mph	42 mph
Buffeting	34-37 mph	39-42 mph	40-43 mph
Spiralling speed	39 mph	43 mph	44 mph

Keep in mind that the steeper the spiral, the higher the minimum-sink and stalling speed will be. Sometimes it is necessary to spiral very steeply and sacrifice slow speed and low sink to remain within the limits of the thermal. This is especially true in strong, small-diameter thermals.

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Slipping: The SGS 2-33 can be slipped both forward, and while turning. The slipping-turn is done in a normal manor, but due to limited rudder area, the forward slip must be done with very little low wing and full rudder. The airspeed (for controllability) should be kept between 45 - 50 mph solo, and 50-55 mph dual.

LANDING

Pattern: It is general practice to fly a traffic pattern. Downwind and base legs and final approach. Extra speed is also used depending on wind velocity and gust conditions. It is good practice to add 1 mph to airspeed for each mph of wind.

Dive-brakes: Approach should be made high, with use of dive brakes. Dive brakes increase drag, which in turn allows for a steeper and more controllable glide path. They can also be used to lose altitude rapidly at any time during a flight, or during a tow to take up slack, or to lower sailplane from a too-high position. When flying solo, the stalling speed of the 2-33 is 34 mph with dive-brakes closed and 36 mph with dive-brakes open. For dual flight, the speeds are 38 mph and 40 mph at 1040 lbs & 39 mph and 41 mph at 1080 lbs, respectively.

It is unsafe however, to make an approach with dive brakes open in the speed range of 38 - 45 mph as the descent rate is so great that a proper flare-out for landing cannot be made.

Touch Down: Can be done with dive brakes either open or closed although it is preferable to land with them open. With dive brakes open, the glide path is quite steep, therefore, a flare-out must be executed 2 - 5 ft. above the ground at 43 - 47 mph. By holding a level attitude close to the ground, the sailplane will settle to a smooth, level touch-down. DO NOT FLARE OUT TOO HIGH - this will cause a very hard landing and may result in injury to occupants or sailplane.

Touch down with Dive-brakes: Is executed by letting the sailplane land itself at, or near, 45 mph. Be careful not to ease the stick back after touchdown This will cause a steeper angle-of-attack and the sailplane

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Closed: will lift off. Opening the dive-brakes after touchdown will help keep the sailplane on the ground.

Taxiing after touch down: Even though sailplane is on the ground, it should literally be flown to a stop with use of all controls. Wheel brake may be used if a quick stop is desired or necessary.

Getting out of the 2-33 On the ground it is tail down when empty, and nosedown with pilot in the seat. When pilot gets out he should keep his weight on the side of the cockpit until he is in a position to lower the tail gently to the ground.

GENERAL FLIGHT PROCEDURE IN STRONG WINDS

1. Be careful during ground handling operations. Keep tail high to and from tie down area.
2. Keep well up-wind of your landing area.
3. When going against wind, it is good practice to add wind velocity to air speed at best L/D.

EXAMPLE

Speed at best L/D (solo)	45 mph
Wind velocity	+ 15 mph
Desired speed	60 mph

This speed will give a better glide angle than a slower approach.

4. Land into the wind whenever possible. In crosswind landing, crab into the wind to maintain desired path over the ground and at the last moment, straighten ship to line of flight and touch down. Be careful while the ship is rolling.

   Downwind landing in high winds - Land with brake full on and maintain control as long as possible.

TIE DOWNS

The 2-33 should never be left unattended in strong winds or gusty conditions. Tie down points are at each wing where main struts are attached and at tail wheel bracket. Be sure ropes and stakes used for tying down are adequate and in good condition.

Flight Limitations for 2-33 and 2-33A

In any aircraft, it is important to know the operating limits and that exceeding these limits can highly endanger the aircraft and its occupants. The following information is provided for the 2-33 and 2-33A at 1,040 lbs. & 1080 lbs. gross weight.

The speeds with which you should be familiar are:

	1040 lbs.	1080 lbs.
Placard Speed (never exceed) with or without Dive Brakes open	98 mph	100 mph
Placard Speed (never exceed) for aero tow)	98 mph	100 mph
Speed to begin maneuvering with caution	65 mph	66 mph
Placard Speed (Never exceed) for auto or winch tow	69 mph	70 mph

In the 2-33, at speeds over 65 mph, the pilot must maneuver with caution. The maximum load factor which should be attained in flight is 4.67 G, and the pilot can easily exceed this in abrupt maneuvers at speeds over 65 mph. The speeds between 65 mph and the 98 mph placard should be treated as a cautionary range and maneuvering within this range should be gradually reduced to a minimum as velocity increases.

The 2-33 limit load factor of 4.67 should not be exceeded in operation. A safety factor of 1.5 is required by the FAA which gives an ultimate load factor of 7.0, but this safety factor is required to allow for material variations and inadvertent atmospheric conditions. Because of its light wing loading, a sailplane can develop very high loads if speed limitations are not rigidly adhered to. Normal category light airplanes are usually certified to a limit load factor of 3.8 G's.

Understanding the Flight Envelope

The FAA required design flight envelope is presented on the following page. On the horizontal axis are indicated velocities in miles per hour, and on the vertical axis are load factors expressed in "G" units.

The straight lines labeled "gust load factors" represent the effect of the FAA required 24 ft. per second gust on the sailplane as speed varies. They diverge from the one "G" situation where the glider would be at rest or in perfectly balanced level flight. The curved lines diverging from zero "G" represent forces which can be induced by moving the elevator (or other) control abruptly at various speeds. As you can see, the faster you fly the more effect moving your controls will have. Gusts will also have more effect as speed increases.

The speed for maneuvering with caution occurs where "G" loading from an abruptly moved control meets the 4.67 limit load factor. Assuming smooth and limited movement of the controls, the placard or "red-line" speed occurs where gusts could meet the 4.67 limit load factor without any maneuvering.

Normal placard speeds are reduced 10% from design speeds to provide an extra margin of safety. Thus, on the graph, the diagonal hatched area indicates speeds at which you must use caution in maneuvers. You should neither maneuver nor fly so fast as to expose your ship to loads within the cross-hatched area marked, "NO MANEUVER".

It can be inferred from the graph that abrupt maneuvering in gusty conditions is dangerous and can lead to very high "G" loads.

In normal operation the major cases of high "G" loads are tight spirals in thermals which would not normally exceed 2 or 2.5 G's. Winch or auto towing can produce high loads, but if the auto-winch placard speed is observed, this will be within safe limits. The best ground launch climb is obtained at speeds well below placard limits.

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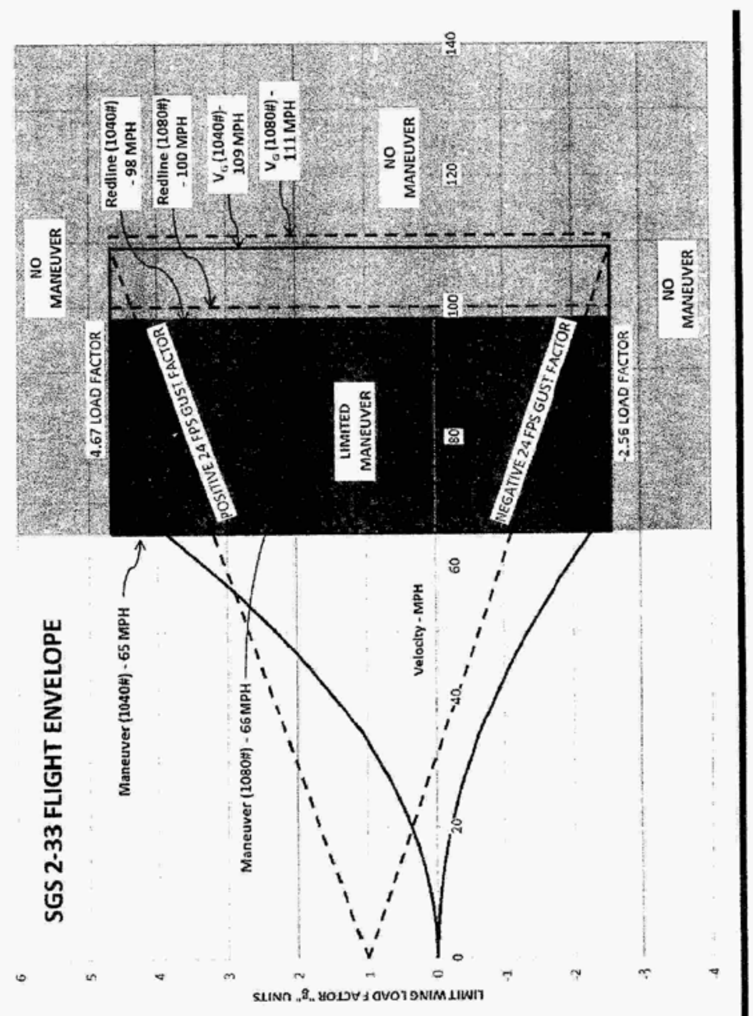

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WEIGHT AND BALANCE CALCULATIONS

SGS 2-33 or 2-33A

Example Sailplane - Serial Number 369 (Refer to Form I-4427 for your aircraft)

My Sailplane - Serial Number________ (Refer to Form I-4427 for your aircraft)

ITEM	WEIGHT	ARM	MOMENT	WEIGHT	ARM	MOMENT
Sailplane empty weight & empty C.G.	612	96.12	58,825			
Front Pilot Weight	170	43.80	7,446		43.80	
Rear Pilot Weight	150	74.70	11,205		74.70	
Ballast, if used	0	13.05	0 (See Form I-4606A or B For Ballast Arm)		13.05	
Total Moment			77,476			
Total Weight	932					

Example: Total Moment / Total Weight = 77,476 / 932 = 83.13 Actual Flying C.G.

My Sailplane: Total Moment / Total Weight = ______ / ______ = Actual Flying C.G.

This CG is between the limits of Sta. 78.20 and 86.10, and gross weight is less than 1040 lbs. or 1080 lbs., so this sailplane has a proper flight weight and balance loading.

1. Is this between the CG limits?
2. Is total weight less than 1040 lbs. or 1080 lbs.

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2-33A GROSS WEIGHT and BALANCE CALCULATIONS

When preparing for any particular flight the pilot must answer two questions:

1. Is my weight and my passenger's weight within the maximum limits of gross weight for this flight? And
2. Is the sailplane properly balanced for this flight?

The following procedure is designed to help the pilot determine the actual weight and balance of his 2-33A for any particular flight loading. To do this, we calculate the moments of the aircraft and each occupant using the equation weight X arm = moment (WA=M).

The sailplane must be balanced within forward and rearward C.G. limits when it is flown. These limits are defined at Sta. 78.20" for forward limit. And Sta. 86.10" for the rear limit. This figure is constant for all 2-33's. The weight and empty center of gravity of each specific 2-33 is determined at manufacture, or on any subsequent reweighing, so this information is available to any pilot from Schweizer Form I-4427 to calculate his operational weight and balance. Also known are the arm (or distance aft of station "0") for optional ballast, the front pilot and the rear pilot. With this given information we can develop a form for calculating the actual arm (or c.g. location) for the sailplane for any particular loading.

__Items Known:__

Front Pilot Weight__________Sta. 43.80

Rear Pilot Weight__________Sta. 74.70

Sailplane Empty Weight__________ 2-33 s/n________

Removable Ballast Weight________(19 ½ lbs. installed)

Baggage Capacity – None allowed

Sailplane Empty C.G.__________ 2-33s/n________

Limits: Forward: Sta. 78.20 (all 2-33's)

Rear: Sta. 86.10 (all 2-33's)

Wing Weights:

LH Wing: __________ RH Wing: __________

__To Be Determined:__

1. Whether the actual CG of the particular 2-33 to be flown will fall within the above limits.
2. Whether total gross weight is not greater than the maximum allowable 1,040 or 1,080 lbs. for any 2-33.

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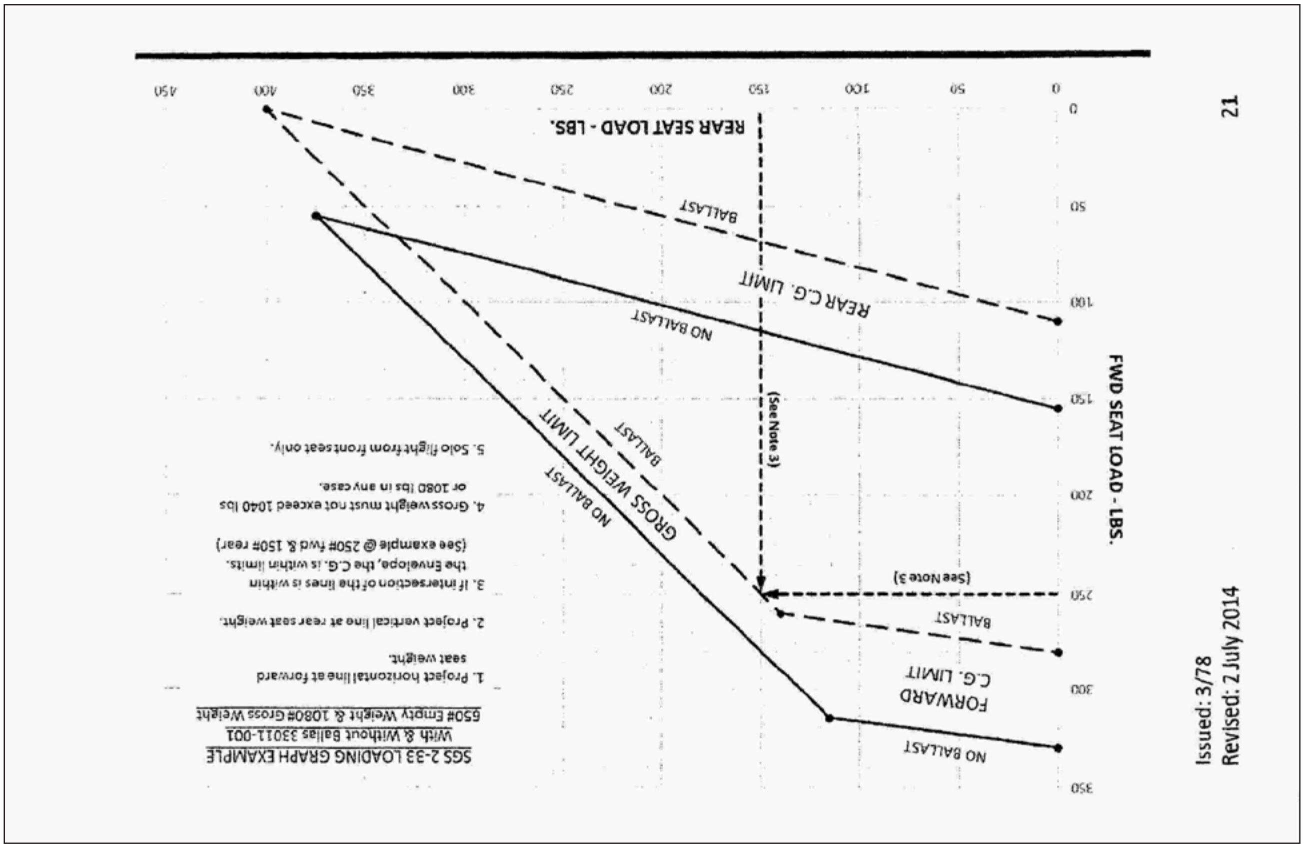
SGS 2-33 LOADING GRAPH EXAMPLE
With & Without Ballas 33011-001
650# Empty Weight & 1080# Gross Weight
1. Project horizontal line at forward seat weight.
2. Project vertical line at rear seat weight.
3. If intersection of the lines is within the Envelope, the C.G. is within limits. (See example @ 250# fwd & 150# rear)
4. Gross weight must not exceed 1040 lbs or 1080 lbs in any case.
5. Solo flight from front seat only.
REAR SEAT LOAD - LBS.
FWD SEAT LOAD - LBS.
REAR C.G. LIMIT
FORWARD C.G. LIMIT
GROSS WEIGHT LIMIT
BALLAST
NO BALLAST
(See Note 3)
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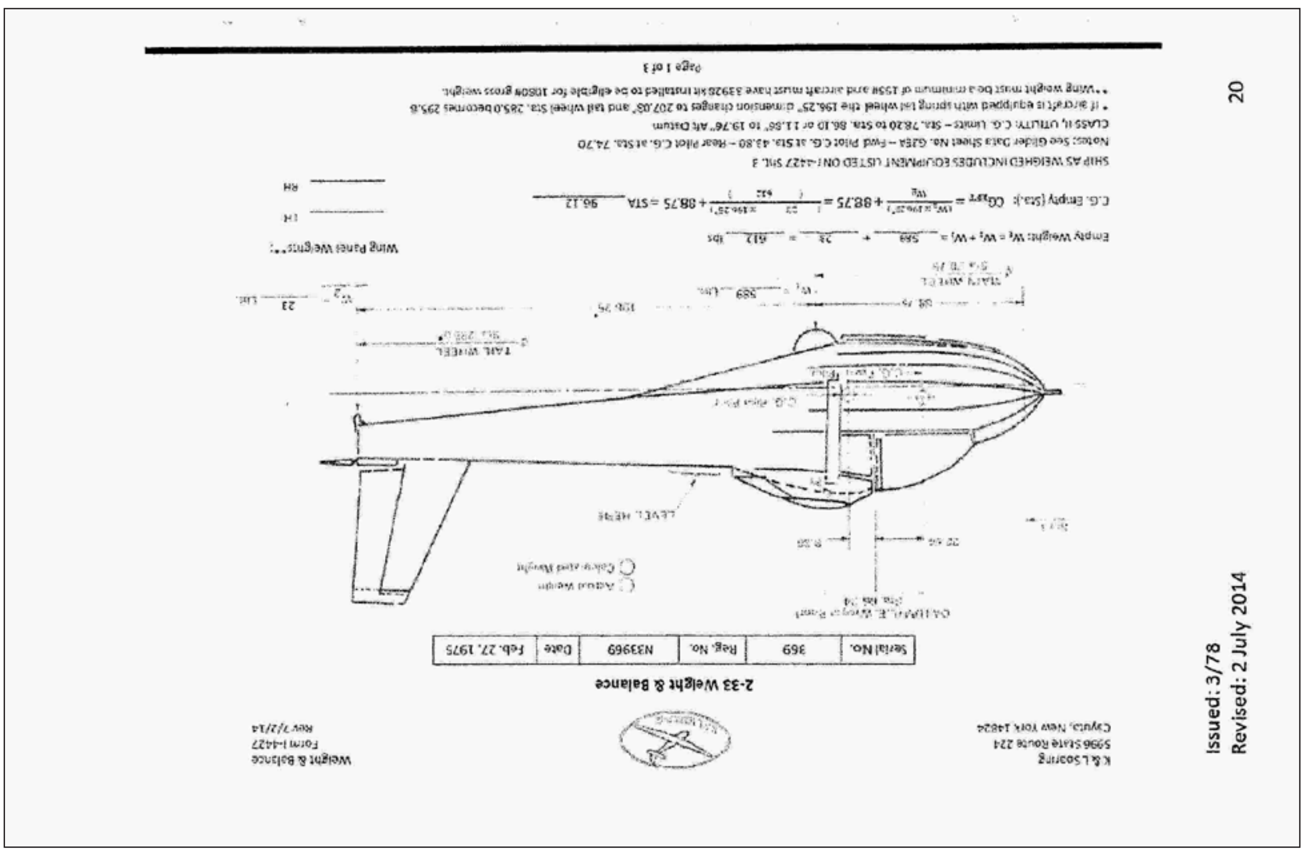
K & L Soaring
5996 State Route 224
Cayuta, New York 14824
Weight & Balance
Form I-4427
Rev 7/2/14
2-33 Weight & Balance
Serial No. 369
Reg. No. N33969
Date Feb. 27, 1975
SHIP AS WEIGHED INCLUDES EQUIPMENT LISTED ON I-4427 SH. 3
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ERECTION AND MAINTENANCE INSTRUCTIONS

MODEL SGS 2-33 & 2-33A

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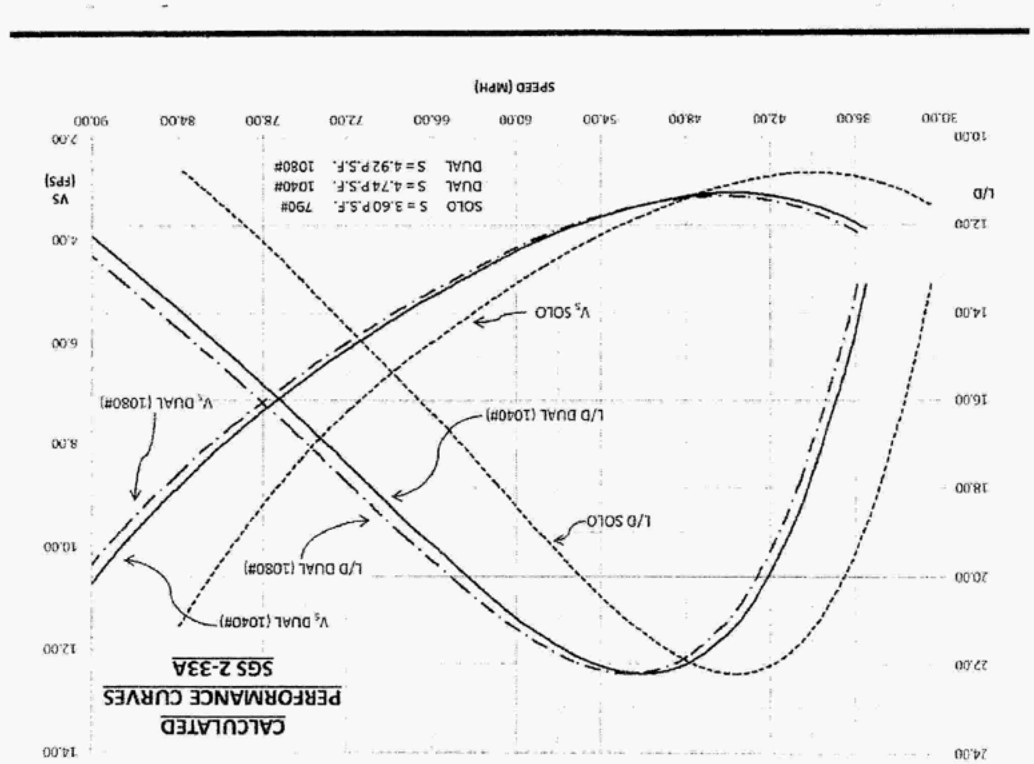

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SGS 2-33 - ERECTION PROCEDURE

A. TO REMOVE A/C FROM TRAILER:

1. Remove trailer from towing vehicle and block wheels.
2. Raise rear of trailer and block in position with sawhorse, jack or other suitable means.
3. Remove wing-to-trailer tie-down from wing tip skid brace from L. H. wing. (Note: R. H. wing is mounted on the L. H. side of trailer and L. H. wing on R. H. side of trailer.)
4. Remove upper wing-to-trailer attach pin, support the wing to prevent twisting.
5. Remove lower wing to trailer attach pin and remove wing from trailer and place on ground.
6. Remove blocking means from rear of trailer.
7. Raise and block the front end so that aft end of the trailer rests on the ground.
8. Remove the rear tail wheel bracket-to-trailer jack attachment, bolt and support fuselage.
9. Remove front fuselage tie downs and carefully roll the ship aft out of wheel well and off trailer into assembly position.

B. ASSEMBLY OF THE AIRCRAFT:

1. With the fuselage in an upright position, attach wing struts to fuselage with (2) P/N 33916-005 (7/16") bolts and #2 Commercial safety pins. Optional attach hardware (2) P/N 33916-005 Bolt, (2) AN960-716 washer, (2) AN310 nut, and #2 Commercial safety pins. Second optional attach hardware (2) P/N 33428B-1 bolt special, (2) P/N 33428B-3 collar, (2) AN310-5 castle nut and safety with #2 commercial safety pins.

   NOTE: The wing and strut attach bolts must have a grip-length of 1-13/16" min., to avoid threads in bearing.

2. Lift and place L. H. wing in position and attach to fuselage with an 33916-005 (7/16") bolt in front fitting and an 33916-003 (3/8") bolt in rear fitting. Install #2 Commercial safety pins in bolts.

B. ASSEMBLY OF THE AIRCRAFT (CONT'D):

3. Raise L.H. strut and attach to wing strut-fitting with P/N 33916-005 (7/16") bolts and #2 Commercial safety pin. Optional attach hardware P/N 33916-005 Bolt, AN960-716 washer, AN310 nut, and #2 Commercial safety pin. Second optional attach hardware P/N 33428B-1 bolt, P/N 33428B-3 collar, AN310-5 castle nut and safety with #2 commercial safety pin.
4. Attach aileron push-rod to bellcrank on fuselage. This connection is made with (1) AN393-25 Clevis Pin and (1) Commercial safety pin
5. Repeat above items 1 thru 4 for R.H. Wing. While sliding this wing in position, check to make sure that the dive-brake torque tube fittings are properly positioned to mesh (bolt into opposite slot), with dive-brakes on both wings closed.
6. Attach the dive-brake push tube (in fuselage) to the bellcrank on the torque tube of the L.H. Wing. Use an AN393-21 pin and secure with #1 commercial safety pin.
7. Check items 1 thru 6 on each wing for proper installation and safetying.
8. The wing tip wheel is installed by inserting the ferrule on the spring assembly into a hole on the lower side of the wing. Secure in place using an AN3-6A bolt, with a washer under the head, screwed into a 10-32 nutplate which is fastened to the internal bracket assembly.
9. Install wing gap cover, the Plexiglass Assembly is put in place between the wing leading edges and secured with "airloc" studs. The aft gap-cover assembly is then hooked over the wing trailing edges, the pierced-strap inserted in the takeup mechanism, and tightened with a screwdriver. The padding assembly is then put in place between the wing roots and secured to the root rib on each side.

C. INSTALLATION OF STABILIZER AND ELEVATOR:

1. It is seldom necessary to remove elevator and stabilizer of this aircraft for normal purposes. However, if they have been removed, the following method should be used for reassembly.
2. Place assembled elevator and stabilizer into position, with strut lugs on stabilizer on the bottom side. Secure with (2) AN4-13A bolts, (1) AN4-33A bolt, (3) AN960-416L washers and (3) AN365-428 nuts thru stabilizer front and rear spar fittings, and fuselage attach fittings.

C. INSTALLATION OF STABILIZER AND ELEVATOR (CONT'D):

3. Place stabilizer struts in position and secure each with AN3-7 bolts, AN960-10 washers, AN310-3 nuts and cotter pins.

4. Connect elevator push-rod to elevator horn with AN4-6 bolt, AN310-4 nut, AN960-416 washer and cotter pin. Use caution not to overtighten nut and cause binding of the elevator control.

D. INSTALLATION AND REMOVAL OF FIN AND RUDDER:

For normal handling and trailering, the Fin and Rudder Assembly are left attached to the fuselage. However, if an occasion arises where the Fin must be removed from the Fuselage, follow the procedure listed below.

1. Fin Removal from Fuselage:
   a. Disconnect rudder cables from rudder horn.
   b. Remove screws attaching metal fairing to fin. This includes the AN520-10 screw and nut.
   c. Remove inspection hole covers from aft fuselage.
   d. Remove the (5) AN3 bolts attaching fin to fuselage.
   e. Remove fin by lifting up, tilting it slightly to the right to clear the notch in the fin spar past the elevator push tube

2 Fin and Rudder Assembly Installation (reversal of procedure above):
   *a. The fin rear spar is attached to the fuselage by (4) AN3-5A bolts, (4) AN960-10 washers and (4) AN365-1032 nuts.
   b. The fin forward-fitting is attached to the fuselage by (1) AN3-14A bolt, (1) AN960-10 washer and (1) AN365-1032 nut.
   c. The rudder cables are attached to the rudder horn by (2) AN3-6 bolts, (2) AN960-10 washers, (2) AN310-3 nuts and (2) AN380-2-2 cotter pins.
   d. The fin fairing is installed with (10) #4 x ¼, Type Z, "PK" screws, (1) AN520-10-54 screw, (1) AN960-10 washer and (1) AN365-1032 nut.

3. Rudder to Fin Assembly Installation (hinge hardware):
   a. At upper and center hinges – AN3-11 bolt, AN960-10 washer, AN310-3 nut and AN380-2-2 cotter pin.
   b. At lower hinge – AN4-11 bolt, AN960-416 washers (2 each side of male hinge inside female segment), AN310-4 nut (with washer) and AN380-2-2 cotter pin.

* On ship 508 and up, the rear fin spar is attached using (4) each AN4-5A bolt, AN365-428 nut, AN960-416 washer (under nut), AN960-416L (under bolt head). All previous Ser. No's. may have the fin spar modified and use this hardware per drawing 33924D, Rev A.

E. PERFORM LINE INSPECTION TO DETERMINE THAT:

a. All controls move freely in the correct direction with no binding or lost motion
b. All control components are properly safetied.
c. Both dive brakes open equally and that wheel brake is actuated at the end of the control travel.
d. That ailerons are in neutral, in conjunction with the stick position.

NOTES:

1. In view of the fact that the glider may have to be disassembled rather frequently in the field; the number of bolted attachments are kept to a minimum. However, should be owner or operator be so inclined, all of the attachment fittings may be made with appropriate AN bolts, nuts and cotter pins, replacing the clevis and safety pins specified. LSP-1 safety pin us an acceptable alternate for #1 and #2 commercial safety pins.
2. For trailering, the L.H. rear window should be removed and stored in the cockpit, as there is minimum clearance between window hinge and trailer. (L.H. Wing)

SGS 2-33 – GENERAL MAINTENANCE

The sailplane can be serviced with a minimum of lubricants; a good grade of lubricating oil or powdered graphite and No. 2 cup grease.

1. Lubrication: See Figure 1

   a. Lubricating oil should be used at the following points, except that in dry and dusty conditions, powdered graphite is recommended on the exposed hinge points.

Aileron Hinges	Elevator Hinges
Rudder Hinges	Dive-Brake hinges
**Torque Tube bearings	Dive-Brake Control bellcrank

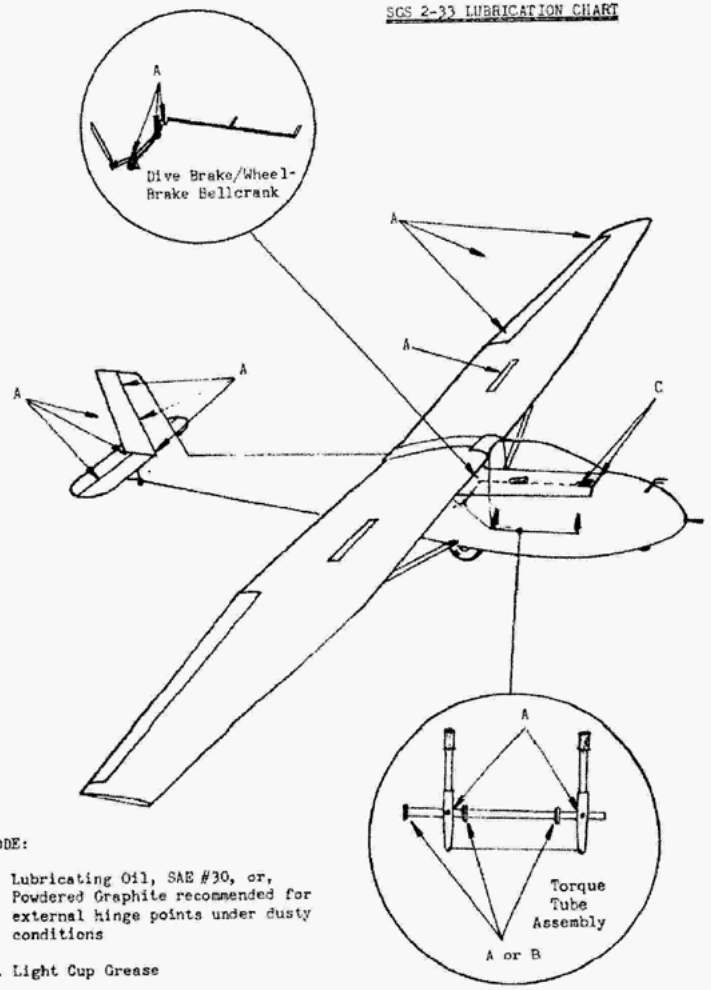
   b. Lubricate all oil, (or graphite) points, every 20 hours flyirg time or 6 months elapsed time, whichever is sooner.

NOTES:

* Rod end Bearings and Control Pulleys – are the sealed type and require no lubrication under normal conditions

** The Torque Tube bearing may be lubricated with cup grease whenever the aircraft undergoes major disassembly.

SGS 2-33 LUBRICATION CHART



CODE:

A. Lubricating Oil, SAE #30, or, Powdered Graphite recommended for external hinge points under dusty conditions

B. Light Cup Grease

C. Dry, Stick-type Lubricant

FIGURE 1.

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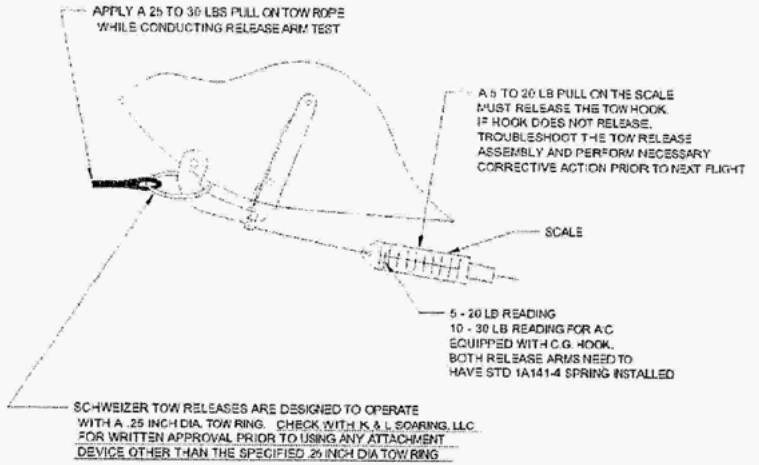

NOTE: IF RELEASE LOADS ARE TOO HIGH WITH C.G. SYSTEM IT IS PERMISSIBLE TO ADD A LINK TO SHORTEN STD 1A141-2 SPRING. LINK SHOULD BE MADE AS SHOWN BELOW. IF REQUIRED THEY SHOULD BE ADDED TO BOTH RELEASE ARMS TO BALANCE BOTH RELEASE SPRINGS

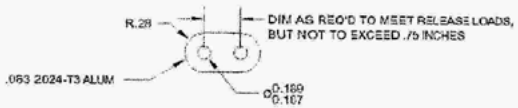

Figure 2

2. Leveling:
   a. To level fuselage laterally, prop up the wing tips and test for horizontal on fuselage members, see Figure 3.
   b. To level longitudinally, prop up the tail and test for horizontal on the top longeron of fuselage aft of wing, see Figure 3.
3. Rigging:
   a. The proper dihedral angle of incidence are built into the wing and fuselage at the factory

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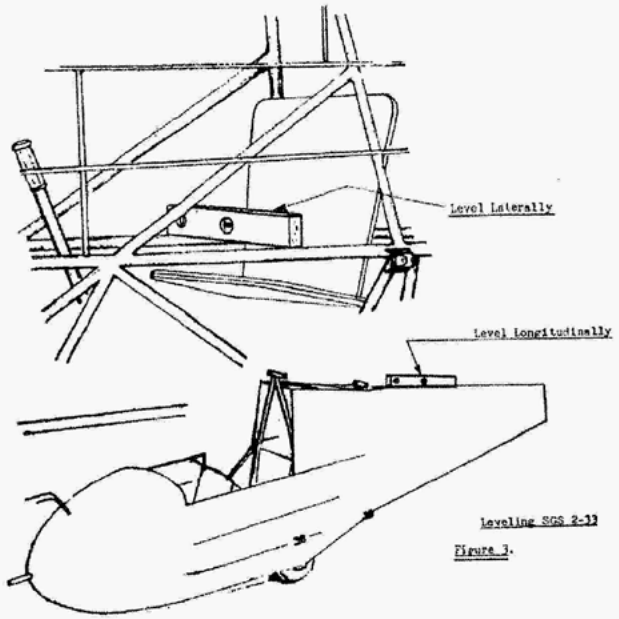


Figure 3.

b. Elevator and rudder control system rigging is accomplished by turnbuckles on the cables. Elevator cables are rigged to 30 ± 5 pounds tension. Rudder control system tension is maintained by springs on rudder pedals. Cables should be rigged with turnbuckle threads flush with the barrel. Double-wrap turnbuckles in accordance with FAA Manual No. AC43.13-1, Figure 4.5 or MS33591. The static-unbalance limits of the 33700K-1 rudder, after covering and finishing is complete, is 0 to 13 in./lbs. tail heavy, measured from the hinge center line.

c. The Dive-brake/wheel-brake control linkage should be rigged so that there is no slack or lost control motion when control is started. The wheel-brake cable is rigged so that the brake arm us actuated to the last 1 – 1 ½" of control rod travel (after the dive-brakes have been effectively opened.)

a. Tow release spring tension is checked by applying a force of 5-20 lbs. (10-30 lbs. for C.G. hook install) at the end of the release arm. The hook should then release. If tension is not within this tolerance, the spring should be replaced. See Figure 2 & Service Bulletin SA-001.

4. Control Surface Travels:

a. When control surface rigging has been disturbed, travel of the movable surfaces must be rechecked to assure that surface deflections are within specified tolerances. Approved travels for the various surfaces are shown below.

Control Surface	Travel	Tension
Elevator – 1040# GW	23° ± 2° Up	30# ± 5#
	23° ± 2° Down	
Elevator – 1080# GW	25° - 26° Up	
	23° ± 2° Down	
Rudder	30° ± 2° L & R	No Tension Except For Return Springs
Aileron	38° ± 2° Up	No Tension
	18° ± 2° Down	
Dive Brakes	85° ± 5° Upper Door	No Tension
	75° ± 5° Lower Door	

PREFLIGHT INSPECTION:

1. Inspect the following for condition, operation, security of attachment and/or other signs of failure.
   a. Wing and attachment bolts.
   b. Struts and strut attachment bolts.
   c. Stabilizer struts and attachment bolts.
   d. Stabilizer.
   e. Elevator.
   f. Fin.
   g. Rudder.
   h. Fuselage covering and structural tubing.
   i. Control cables.
   j. Controls and control system push rods.
   k. Ailerons.
   l. Dive-brakes and controls
   m. Main wheel and brake.
   n. Tire (maintain tire pressure at 15lbs.)
   o. Tail wheel and bracket
   p. Skid and skid shoe (Skid should be replaced if cracks or splits are evident. Shoe need not be replaced except for wear-through or breakage.)
   q. Shoulder harness and safety belts.
   r. Canopy

s. Release hook and release system.
t. Pitot system (After prolonged tie-down or exposure to rainy weather, remove lines from instruments and expel any water which may have collected in lines though them.)

CAUTION: DO NOT BLOW INTO PITOT TUBE WITH INSTRUMENTS CONNECTED.

ANNUAL, AND/OR 100 HOUR INSPECTION, SGS 2-33:

1. Fuselage Group:
   a. Check control stick and torque tube assembly, lubricate torque tube support bearings. Inspect internal surface of torque tube for corrosion, clean and apply Paralketone if necessary.
   b. Check controls for ease of operation.
   c. Check control cables for safety, corrosion, wear and security of attachment.
   d. Check elevator push tube for condition, wear, especially at fairlead and security of cable attachments. Also check fairlead for slippage in clamp.
   e. Check fuselage members for cracks misalignment and any other damage. Weld clusters for rust particularly in "cupped" areas without adequate drainage.
   f. Note if primer has been scraped off any fuselage member leaving exposed metal, sandpaper lightly to remove rust or impurities and touch up with zinc chromate primer, Specification MIL-P-8585A.
   g. Check cable pulleys for wear and attachment, replace if necessary.
   h. Check fairleads for wear and attachment, replace if necessary.
   i. Check fuselage fabric and finish for cracks and deterioration (check tensile strength, if below 35 pounds per inch fabric must be replaced.)

   NOTE: A synthetic fabric "Ceconite 103" manufactured by Cooper Engineering Co., Box 3428, Van Nuys, California 91405, is used on the aircraft. The "Ceconite Process"* procedure Manual No. 101 should be procured from them for guidance in repair and maintenance of this fabric. FAA Manual No. 43.13-1 (superseding CAM 18) is also used as a guide for testing and repairs – See Chapter 3

   *Trademark R Registered in U.S Patent Office and Canada.

j. Check canopy and rear doors for condition latches and attachment.
k. Check Plexiglas for cracks or excessive crazing.
l. Check safety belts, shoulder harness, brackets and bolts.
m. Check springs for corrosion, cracks and wear at ends.
n. Check bungee control latch plate, if badly worn, replace.
o. Dive-brake/wheel-brake mechanism, for wear, alignment and linkage attachment. Lubricate control rod at forward guide with dry stick type lubricant.

2. Landing Gear Group:
   a. Remove wheel, inspect brakes.
   b. Inspect wheel bearings for condition, repack.
   c. Check tire pressure (15 psi)
   d. Inspect tire for wear and cuts.
   e. Inspect tail wheel and bracket for cracks and wear.
   f. Inspect skid and shoe for cracks, wear and attachment.
   g. Inspect brake for wear and operation.

3. Empennage Group:
   a. Inspect stabilizer for condition and attachment.
   b. Inspect stabilizer fittings and bolts for wear and signs of failure.
   c. Inspect stabilizer struts for damage and security of attachment.
   d. Inspect elevator and hinges for condition and security of attachment.
   e. Inspect elevator horn for condition and pushrod for security of attachment.
   f. Inspect fin for dents, general condition and attachment.
   g. Inspect rudder and hinges for condition and security of attachment.
   h. Check fabric and finish on stabilizer, elevator and rudder for cracks and deterioration. (check tensile strength, if below 35 pounds per inch fabric must be replaced.)

   NOTE: See note under 1.i above

4. Wing Group:
   a. Remove wing gap cover, inspect wing attachment fittings and bolts for condition and security of attachment.
   b. Inspect aileron push roads for condition and security of attachment.
   c. Inspect dive brake linkage for corrosion, wear and security of attachment.
   d. Inspect wing struts, strut fittings and attachment bolts for condition and attachment.
   e. Inspect fixed surfaces for dents, corrosion, loose rivets and other signs of structural failure or damage.

f. Inspect ailerons and hinges for condition, operation and attachment.
g. Inspect ailerons bellcranks for condition, evidence of damage and attachment.
h. Inspect dive brake mechanism and hinges for condition, operation and attachment.
i. Inspect wing tip wheels for damage and attachment.
j. Inspect push rod fairleads for wear or breakage and attachment.
*k. Remove all access covers and doors and inspect inside of wing & spar for general condition. (Ref: 33431)
*l. At strut access door, inspect main spar around each Hi-Shear or Bolt for cracks. Look at spar cap angles for cracks emanating from rivet holes.
*m. Wing Strut, Main Spar & Rear Spar attach fittings must be removed and have NDT performed every 20 years

* Inspections are recommended for 1040# GW and required for 1080# GW

5. Tow Hook:
   a. Inspect hook for wear, cracks, roughness and attachment.
   b. Check mechanism for freedom of operation. Lubricate guide-tubes with a dry stick type lubricant.
   c. Check release mechanism by applying force of 5-20 lbs (10-30 lbs. for C.G. hook install). Ref. page 32, section 3.d and Figure 2.
   d. Check ring clearance between hook and fuselage when hook is closed, using a 2-1/4" O.D. ring made from 5/16" dia. Stock.
6. Cabin Group:
   a. Inspect instruments for range markings, zero readings and security of attachment.
   b. Inspect instrument panel for security of attachment.
   c. Inspect nameplate, decals for legibility and security of attachment. Check "Flight Limits" placard for correct Min./Max. Pilot weights per current weight and balance statement.
   d. Inspect air-vent for operation and security of attachment.
   e. Inspect seats for damage and security of attachment.

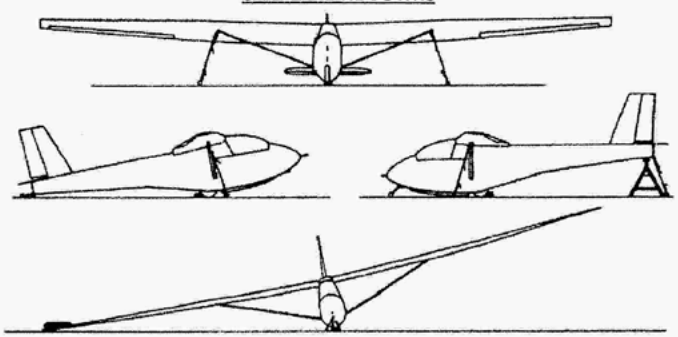
REMOVABLE BALLAST FOR SGS 2-33 and 2-33A

Removable ballast installations, part number 33011-001, 33011-013, or 33019-001, have been developed for the SGS 2-33 and 2-33A models to simplify the balance requirements necessary for relatively light weight pilot flying solo.

The installation consists of a canister assembly which is securely attached to the sailplane structure in a well forward location for maximum effectiveness. The ballast proper, is a steel bar with a handle for convenience in inserting or removing from canister. A snap-in pin retains the ballast in place. For each ballast installation a special "Flight Limits" placard is installed and is stamped to show the resultant actual minimum and maximum pilot weights when the removable ballast is in place. These figures are calculated for each sailplanes based on the current weight and balance at the time the ballast is installed. It is calculated by using Form I-4606A or B depending upon ballast installation.

This installation provides a safe and convenient means of ballasting for flight for the light-weight pilot without the penalty of reduction of useful load, as would be incurred by a like amount of permanent ballast.

SAILPLANE TIE DOWNS



Many more sailplanes are damaged on the ground by the wind than in flying accidents. It is usually due to leaving the ship unsecured or using inadequate tie downs.

In the normal, tail down, ground position, the wing has a high angle of attack. A 2-22 or 2-33 (empty wgt. 500#), facing into the wind will be subjected to lift forces as shown:

WIND	LIFT	NET LIFT	WIND	LIFT	NET LIFT
30 mph	750	250#	60 mph	2,900	2,400#
40 mph	1,300	800#	70 mph	3,950	3,450#
50 mph	2,000	1,500#	80 mph	5,200	4,700#

Therefore, it is very important that adequate tie downs are provided. The following procedures are recommended:

1. Sheltered Area: Tail down, ropes (*), at wings and tail (***).
2. Unsheltered Area: Facing into prevailing wind. Rope at wings and tail, and chain tie down to release hook.
3. Unsheltered – High Wind Hazard: Tail supported on padded stand. Rope to wings and two ropes to tail. Short chain (5/16" welded link), tie down to tow hook.
4. Flightline Tie Down: Short chain tie down to tow hook (tail in air). Water filled tire tube on end of one wing.

NOTE:

*Minimum size of recommended ropes – 5/16" nylon or 1/2" manila – renewed each season (Knots can reduce rope strength by 50%)

**Size and style of ground anchor will depend on soil composition and type of sailplane. In light sandy soils, anchor arm or chain longer and set deeper. A ground anchor should be able to withstand a vertical pull of at least 2,000#. Should not be located directly under tie downs.

***Rudderlock – recommended if control locks are not used. Ailerons and elevator can be secured with seat belts around control stick.

****Securing the spoilers or dive brakes open will decrease lifting forces

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BACK COVER

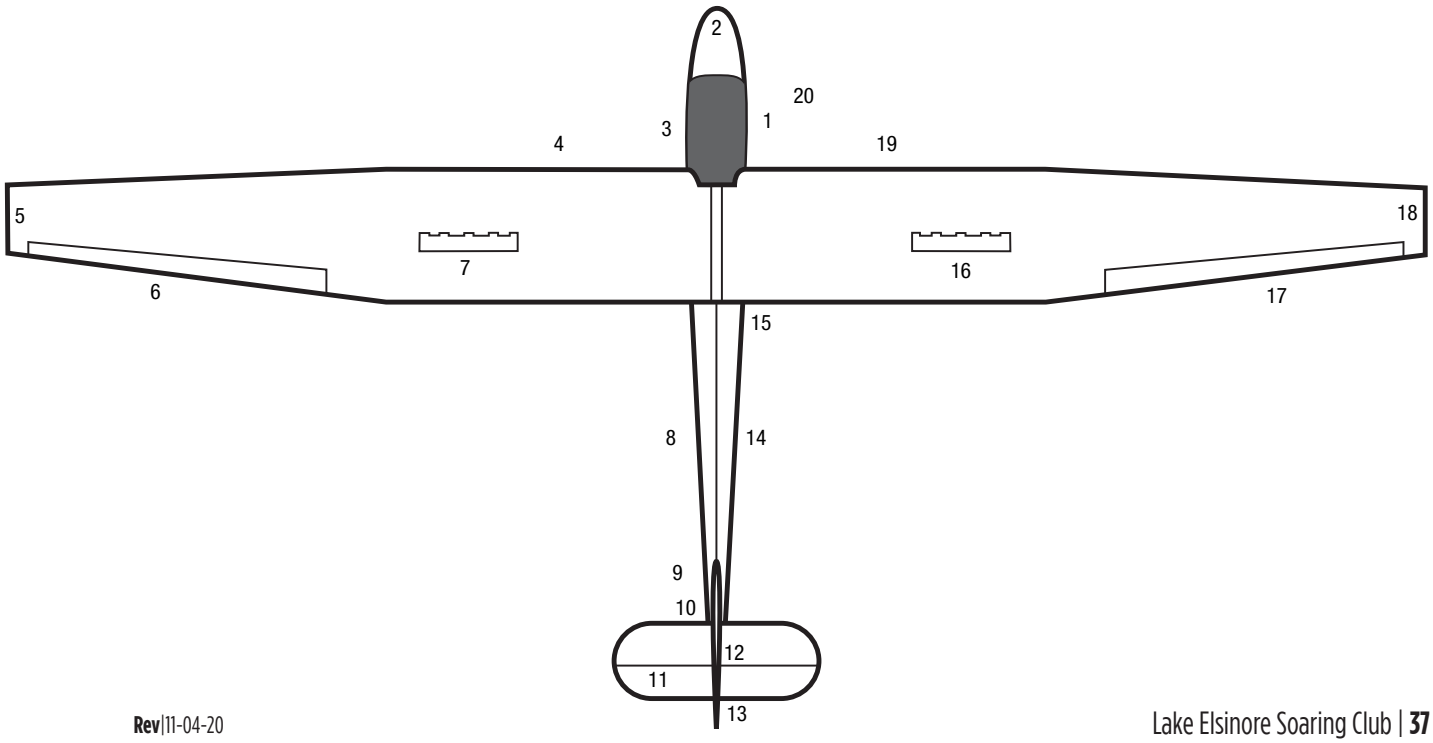
Schweizer 2-33 Checklists

LAKE ELSINORE SOARING CLUB

Preflight

1. Registration and Airworthiness Certificate.
   Operation placard - gross weight and C.G within limits.
   Ballast - secured in place (if required).
   Flight controls - -freedom of movement in proper direction.
   Spoilers, dive brakes - proper operation and retraction, wheel break.
   Trim control - proper operation and set for takeoff.
   Instruments checked.
   Seatbelt and shoulder harness.
   Canopy - attachment and release.
   Wing and flight control attachments proper and complete (7 safety pins).
   Loose items removed and or secured properly.
2. Nose - damage, pitot tube and static ports, ventilator and yaw string.
   Tow hitch and release.
3. Skid.
   Wheel and tire.
4. Right wing, damage, dents, tears, wrinkles, popped rivets.
   Wing struts and attachments.
   Dive brakes.
5. Tip wheel.
6. Aileron - hinges and linkage, freedom of movement.
7. Spoilers.
8. Right side fuselage skin.
9. Empennage, general condition.
10. Bolts and struts safetied.
11. Hinges and linkage checked and safetied.
12. Freedom of rudder and elevator.
13. Tail wheel and underside of fuselage.
14. Left side fuselage skin.
15. Left wing, damage, dents, tears, wrinkles, popped rivets.
16. Spoilers.
17. Aileron - hinges and linkage, freedom of movement.
18. Tip wheel.
19. Wing struts and attachments.
    Dive brakes.
20. Left side of nose
21. **POSITIVE CONTOL CHECK**.

PRE-LAUNCH	PRE-LANDING
A - ALTIMETER & TRIM SET	T - TRAFFIC
B - BALLAST	W - WIND DIR & VEL
B - BELTS	R - RUNWAY CHOICE
C - CONTROLS	G - GEAR DOWN
C - CABLE	S - SPOILERS
C - CANOPY CLOSE & LOCK	S - SPEED
D - DIVEBRAKES	
D - DIRECTION OF WIND	
E - EMERGENCY PROCEDUERS	



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Wing Runner Course

Safe soaring operations depend upon good coordination between the glider pilot, tow pilot, and ground crew. The Soaring Safety Foundation has created an online course to help you learn the proper procedures for working both as a wing-runner and for working *with* wing runners as a glider pilot. As a member of the club, we hope you'll take the opportunity to help your fellow members fly quickly and easily as a part of the ground crew, just as they will do for you.

The final section of this course is a quiz. Successful completion of the quiz will earn the student a certificate which can be presented to soaring operations as evidence of the knowledge training required to be a safe and efficient wing runner.

This course is based on the standard signals and operating procedures of the Soaring Society of America. Newly certificated wing runners should receive practical instruction on wing running at their particular soaring operation before putting their knowledge into practice, as special circumstances often require unique signals and procedures to be used.

Click Here to Access the SSF Wing Runner Course and Quiz

(http://www.soaringsafety.org/school/wingrunner/toc.htm)

Right-of-Way Rules

An aircraft in distress has the right-of-way over all other aircraft!

In General Aviation:

1. A balloon has the right-of-way over all other category of aircraft
2. A glider has the right-of-way over an airplane, airship, rotorcraft, weight-shift control aircraft, or powered parachute
3. An airship has the right-of-way airplane, rotorcraft, powered parachute, or weight-shift control aircraft.
4. An aircraft towing or refueling other aircraft has the right-of way over all other engine-driven aircraft.
5. When two aircraft of the same category are converging at approximately the same altitude (except head-on) the aircraft on the others right has the right-of-way. (*see* Figure 4-2, page 15)
6. When aircraft are approaching head-on, each pilot shall alter course to the right. (*See* Figure 4-3, page 15) An aircraft being overtaken has the right-of-way. The overtaking aircraft shall alter course to the right. (*see* Figure 4-4, page 15)

During Ridge Soaring (Figure 4.10-4.15)

1. Make all turns away from ridge.
2. Do not fly directly above or below another glider.
3. Pass another glider on the ridge side.
4. The glider with the ridge on its right-hand side has the right-of-way.

During Thermal Soaring

1. The first glider that enters the thermal establishes the direction of turn in the thermal.
2. Do not fly directly above or below another glider. (*See* Figure 4.10-13, page 15)

Tow Ropes

14 CFR 91.309(a)(3)

(3) The towline used has breaking strength not less than 80 percent of the maximum certificated operating weight of the glider or unpowered ultralight vehicle and not more than twice this operating weight. However, the towline used may have a breaking strength more than twice the maximum certificated operating weight of the glider or unpowered ultralight vehicle if:

(i) A safety link is installed at the point of attachment of the towline to the glider or unpowered ultralight vehicle with a breaking strength not less than 80 percent of the maximum certificated operating weight of the glider or unpowered ultralight vehicle and not greater than twice this operating weight;

(ii) A safety link is installed at the point of attachment of the towline to the towing aircraft with a breaking strength greater, but not more than 25 percent greater, than that of the safety link at the towed glider or unpowered ultralight vehicle end of the towline and not greater than twice the maximum certificated operating weight of the glider or unpowered ultralight vehicle;

Examples:

If a glider weighs 1000 lbs.:

- » Minimum towrope strength is 800 lbs. (1000 × 0.80 = 800 lbs.)
- » Maximum towrope strength[1] is 2000 lbs. (1000 × 2 = 2000 lbs.)

If a glider weighs 612 lbs.:

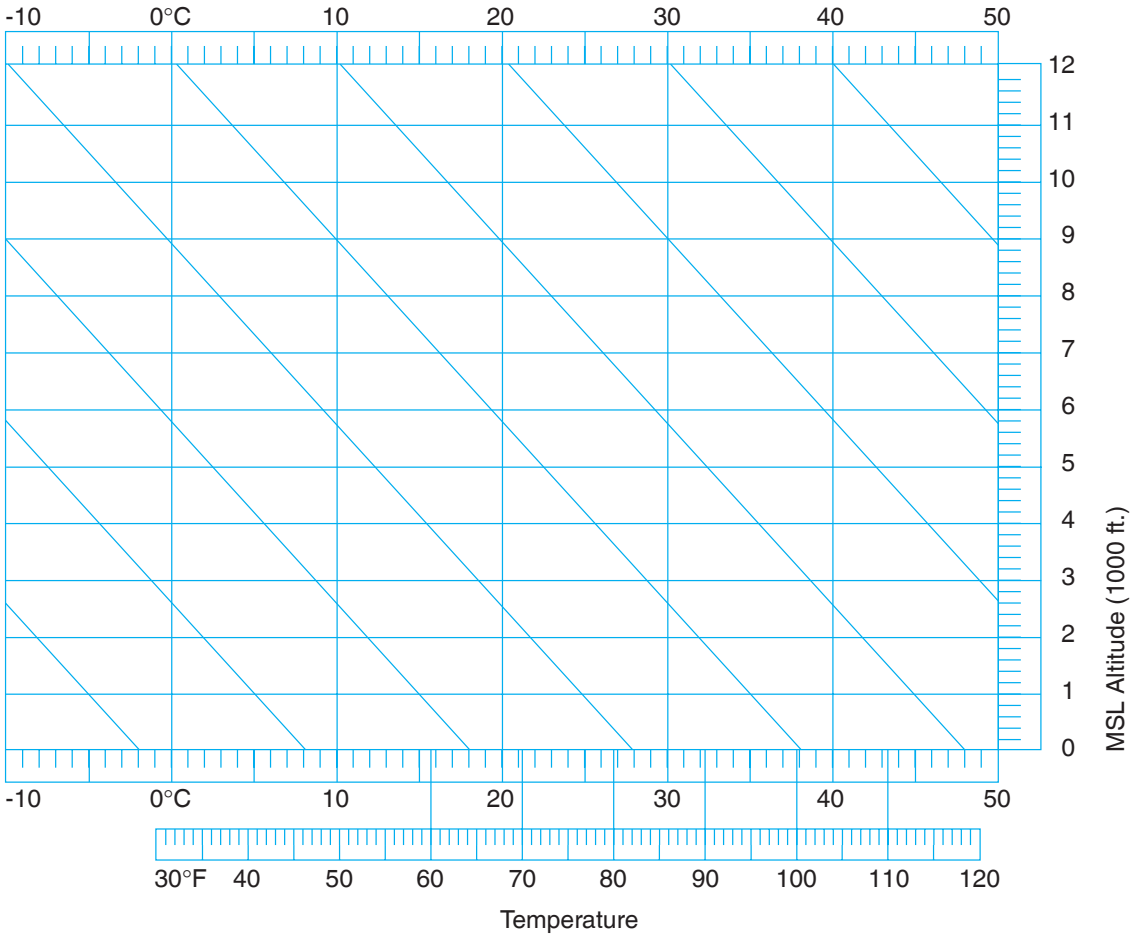
- » Minimum towrope strength is 490 lbs. (612 × 0.80 = 490 lbs.)
- » Maximum towrope strength[1] is 1224 lbs. (612 × 2 = 1224 lbs.)

1 These maximums are if the is no weak link.

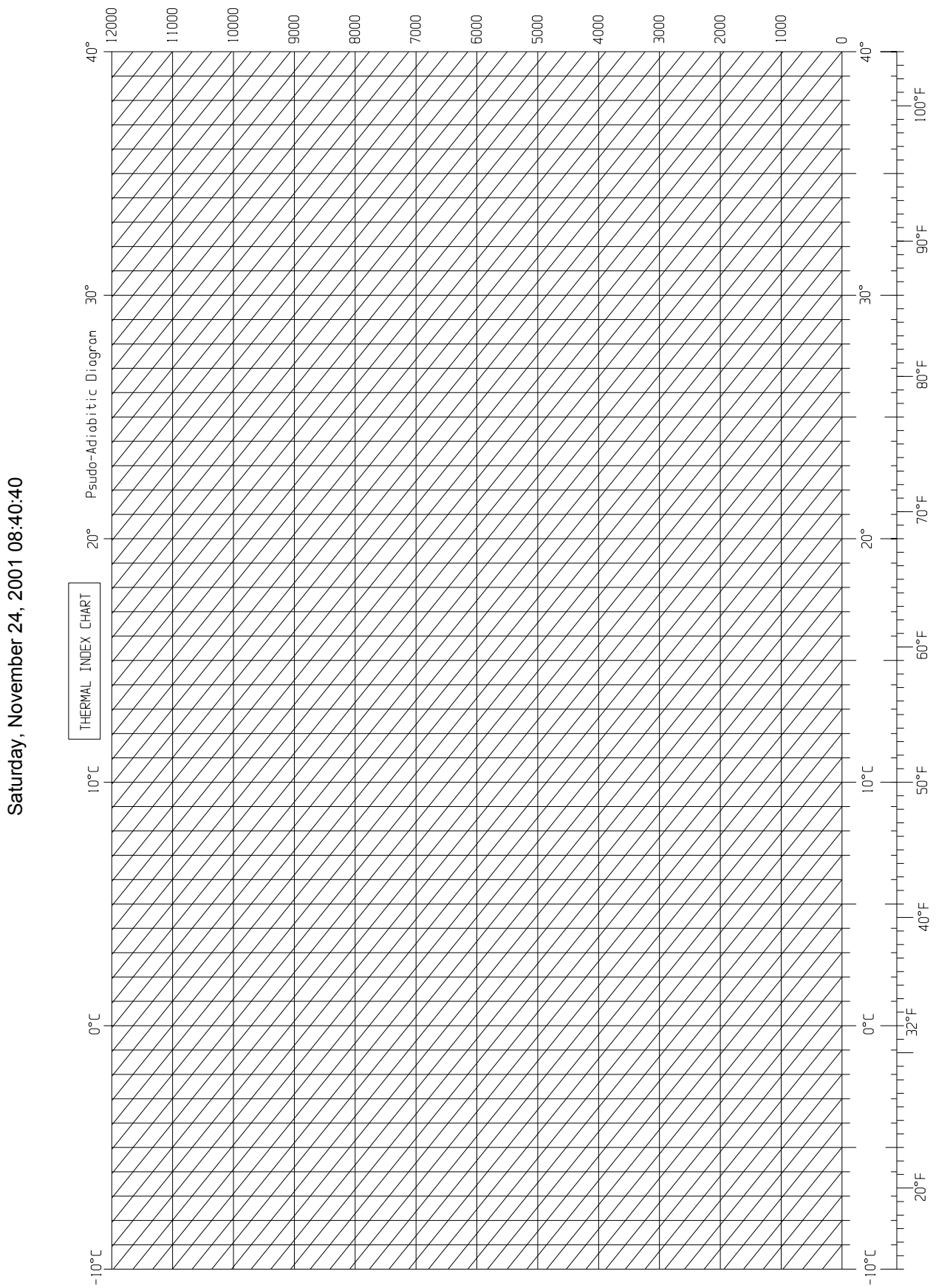
THERMAL INDEX

FSS: (800) WXBRIEF

Altitude	Wind Direction	Wind Speed	Temp.	Max. Forecast Temp.
6000				
9000				
12000				



1. Obtain forecast high temperature for the area.
2. Obtain winds/temps aloft from Flight Service for 6, 9, and 12,000 ft. msl.
3. Plot local high temperature at field elevation (alt. msl). Draw line parallel to dry adiabat up from field elevation high temperature.
4. Plot temperatures for various altitudes from winds/temps aloft forecast.
5. Connect points of temperatures at various altitudes.
6. Compare temps aloft to the line up from field high temperature.
7. Higher negative number means stronger lift.


Saturday, November 24, 2001 08:40:40
THERMAL INDEX CHART
Psudo-Adiabitic Diagram
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
40°
30°
20°
10°C
0°C
-10°C
100°F
90°F
80°F
70°F
60°F
50°F
40°F
32°F
20°F

Radio Procedures Training

OBJECTIVE:
To develop the student's understanding of aircraft radio equipment, operation, procedures and requirements as well as LESC's standard operating procedures.

ELEMENTS:
- » Basic aircraft radio operation.
- » Aircraft radio procedures.
- » Identifying and using proper aircraft radio frequencies.
- » Proper aircraft radio phraseology.
- » Aircraft radio contact requirements
- » LESC Radio Procedures.

SCHEDULE:

Basic radio theory	10 min.
Aircraft radio equipment familiarization	15 min.
Aircraft radio services	10 min.
Aircraft radio contact requirements	5 min.
Aircraft radio procedures demo/practice	10 min
Debriefing	10 min.
TOTAL TIME	**1 HOUR**

EQUIPMENT:
- » White board, markers, eraser.
- » Aircraft radio and instruction manual.
- » *Federal Aviation Regulations* (FAR).
- » *Aeronautical Information Manual* (AIM).
- » Los Angeles sectional chart.
- » *LESC Standard Operating Procedures*.

INSTRUCTOR ACTIONS:
- » Discuss lesson objective.
- » Discuss basic radio theory.
- » Familiarization of aircraft radio equipment and controls.
- » Discuss aircraft radio contact requirements per FAR 91.126, 91.127, 91.129, 91.130, 91.131,
- » Discuss how to identify the proper aircraft radio frequency to be used.
- » Discuss available aircraft radio services.
- » Discuss the use of emergency aircraft radio frequencies.
- » Discuss the proper aircraft radio phraseology per AIM 4-2.
- » Discuss traffic advisory practices at airports without operating control towers per AIM 4-19
- » Demonstrate proper aircraft radio phraseology.
- » Evaluate student performance of aircraft radio procedures.
- » Discuss LESC radio procedures per the *LESC Standard Operating Procedures*.
- » Administer written exam.
- » Answer questions.

STUDENT ACTIONS:
- » Discuss lesson objective, take notes, ask questions.
- » Take written exam.
- » Perform proper aircraft radio procedures.

COMPLETION STANDARDS:

By means of written and oral testing, the student should demonstrate understanding of basic radio theory, aircraft radio equipment and controls. The student will identify the proper aircraft radio frequencies and procedures to be used. The student will demonstrate the proper aircraft radio phraseology and follow the *LESC Standard Operating Procedures.*

A basic understanding of radio theory will aid the student in effective aircraft radio communications. The communications portion of the civil aircraft band is amplitude modulated and spans 118.0 to 136.0 MHz in the VHF spectrum. The navigation portion of the civil aircraft band is a little larger and spans 108.0 to 136.0 MHz.

Be sure that the student is aware that VHF radio communications are line of sight, and that any obstructions greatly attenuate the transmitted signal. Because any airframe component (including the canopy) will reduce the effectiveness of your transmitter, an externally mounted antenna should be used when available. Line of sight limitations also make your aircraft radio more effective at altitude than on the ground. A hand held radio will reach several hundred miles from 6,000 feet with an externally mounted antenna, but may not talk around the corner on the ground. Keep this in mind when preparing for an off-field landing. It is quite likely that the only radio contact you will be able to make while on the ground will be with other airborne aircraft and not your chase crew.

Impress upon the student the need to be familiar with the radio equipment. Commonly used features of the radio equipment such as adjusting the volume or squelch and changing frequencies should require little effort. Most of the time, these functions will need to be performed in or near the airport traffic pattern. The aircraft radio is a tool to provide the pilot with more information and a level of safety. It shouldn't bring added stress or distraction at these critical phases of flight. Plenty of practice on the ground will aid in reducing the distraction while using the radio in flight.

Key to effective radio communications is understanding the intent of each transmission. Prevent overmodulation and speak in a clear, normal tone of voice. Don't rush your transmissions either. Doing so may cause garbled, unintelligible transmissions and necessitate a retransmit.

Your student will need to be familiar with the *Aeronautical Information Manual* chapter 4, section 2 concerning radio communications phraseology and techniques. This section covers everything from common sense radio operating techniques, to the phonetic alphabet and provides examples of phraseology to be used at airports with an operating control tower.

For the phraseology to be used at airports without an operating control tower, the student will need to become familiar with AIM 4-1–9.

Each student should be made aware of the radio requirements for each category in the National Airspace System. These are spelled out in the following FARs.

- 91.126—Class G airspace.
- 91.127—Class E airspace.
- 91.129—Class D airspace.
- 91.130—Class C airspace.
- 91.131—Class B airspace.
- 91.135—Class A airspace.

A good method of ensuring this is to sit down with a sectional chart and have the student describe the radio requirements for several different localities.

With the sectional chart still open, have the student identify airports with and without control towers and determine the correct frequency to use. Also have the student determine if FSS is available and the appropriate frequency to use. Have the student identify ATIS, ASOS/AWOS services and frequencies when available. Discuss navigation aids that also provide voice communications with your students. This is a valuable service available that most soaring pilots don't take advantage of, since we seldom use NAVAIDS. These NAVAIDS can provide direction finding capability as well as contact with flight service stations that may be out of normal radio range. Emphasize the value of these services to a pilot who is lost, or will be landing / has landed in a remote area. Have the student identify a nearby NAVAIDS that provides this service and have them tell you what facility is providing the service.

The correct usage of the Emergency or "Guard" frequency 121.50 MHz should be discussed with students as well as the correct phraseology. While emergency locator transmitters typically use this frequency, they are also continuously monitored by a controlling facility capable of providing emergency service.

While on the topic of available aircraft radio services pay particular attention to the services offered by flight service stations. Most pilots associate FSS with powered and more specifically IFR flights. However FSS does more than receive and process IFR flight plans, provide pilot briefings, en-route communications, relay ATC

clearances, originate NOTAMS and broadcast aviation weather and National Airspace System (NAS) information. They also provide VFR search and rescue services, assist lost aircraft and aircraft in emergency situations as well as monitor the NAVAIDS mentioned above.

Once you have covered these topics with your student, have them simulate the correct procedures and phraseology for several nearby airports selected from the sectional chart.

Once the student has shown proficiency in the proper procedures and phraseology, it's an easy step to acquaint them with the standard operating procedures used by the LESC. Have the student simulate an approach to landing to runway 11R, including calling for a wind advisory and pattern entry announcement, ensuring uses the correct frequencies. Discuss the radio calls if the pattern is reversed and runway 29L is to be used. The student should be made aware that our tow planes and other power traffic in the area will be monitoring the MULTICOM frequency 122.90 MHz. While on tow, the student should also be monitoring MULTICOM should the need to contact the tow pilot arise. One off tow, the student should change to 123.50 MHz for glider operations. It is very important that the student is aware that any emergency situation should be announced on the MULTICOM frequency.

It is also wise to be familiar with the frequencies used at nearby airports, in case the need arises to land there for any reason.

The student should now be ready to operate the radio in the vicinity of Skylark Airport. From this time forward the student should be making all the radio calls to gain proficiency.

BASIC AIRCRAFT RADIO OPERATIONS AND PROCEDURES WRITTEN EXAM

1. What is the civil aircraft voice communication band frequency range?
   a. *108.0 to 136.0 MHz.*
   b. *118.0 to 136.0 MHz.*
   c. *180.0 to 360.0 MHz.*
   d. *108.0 to 136.0 kHz.*

2. What is the civil aircraft radio navigation band frequency range?
   a. *108.0 to 136.0 MHz.*
   b. *118.0 to 136.0 MHz.*
   c. *180.0 to 360.0 MHz.*
   d. *108.0 to 136.0 kHz.*

3. Which portion of the radio spectrum do civil aircraft radio communication use?
   a. HF
   b. VHF
   c. UHF
   d. VLF

4. What form of modulation is used by civil aircraft radios?
   a. *Single Side Band (SSB).*
   b. *Frequency Modulation (FM).*
   c. *Amplitude Modulation (AM).*
   d. *Continuous Wave (CW).*

5. What is the effective range of an aircraft radio at 10,000 feet MSL?
   a. *200 miles.*
   b. *500 miles.*
   c. *1000 miles.*
   d. *Line of sight.*

6. What is the effective range of an aircraft radio at 10,000 feet MSL?
   a. *1 mile.*
   b. *10 miles.*
   c. *1000 yards.*
   d. *Line of sight.*

7. What are the radio requirements for Class G airspace?
   a. *Must have ATC clearance.*
   b. *Must establish two way radio communication with ATC*
   c. *Plane-to-plane communications.*
   d. *No radio VFR radio requirements.*

8. What are the radio requirements for Class B airspace?
   a. *Must have ATC clearance.*
   b. *Must establish two way radio communication with ATC*
   c. *Plane-to-plane communications.*
   d. *No radio VFR radio requirements.*

9. What are the radio requirements for Class D airspace?
   a. *Must have ATC clearance.*
   b. *Must establish two way radio communication with ATC*
   c. *Plane-to-plane communications.*
   d. *No radio VFR radio requirements.*

10. What are the radio requirements for Class A airspace?
    a. *Must have ATC clearance.*
    b. *Must establish two way radio communication with ATC*
    c. *Plane-to-plane communications.*
    d. *No radio VFR radio requirements.*

11. What are the radio requirements for Class C airspace?
    a. *Must have ATC clearance.*
    b. *Must establish two way radio communication with ATC*
    c. *Plane-to-plane communications.*
    d. *No radio VFR radio requirements.*

12. What are the radio requirements for Class E airspace?
    a. *Must have ATC clearance.*
    b. *Must establish two way radio communication with ATC.*
    c. *Plane-to-plane communications.*
    d. *No radio VFR radio requirements.*

13. What frequency should LESC pilots use while on tow?
    a. *123.500 MHz.*
    b. *123.300 MHz.*
    c. *122.900 MHz.*
    d. *122.800 MHz.*

14. You are getting low and need to land at French Valley Airport. Which frequency should you use when announcing your intentions?
    a. *123.500 MHz.*
    b. *123.300 MHz.*
    c. *122.900 MHz.*
    d. *122.800 MHz.*

15. What frequency is used by LESC to obtain surface wind information at Skylark Airport?
    a. *123.500 MHz.*
    b. *123.300 MHz.*
    c. *122.900 MHz.*
    d. *122.800 MHz.*

16. What frequency would you use to obtain weather information at Hemet-Ryan Airport?
    a. *123.500 MHz.*
    b. *123.000 MHz.*
    c. *118.375 MHz.*
    d. *123.300 MHz.*

17. Write down the radio call used when requesting winds at Skylark Airport.

18. Write down the radio call used when entering the pattern at Skylark Airport.

    _____

    _____

19. What radio frequency is used to contact March Air Force Base?

    _____

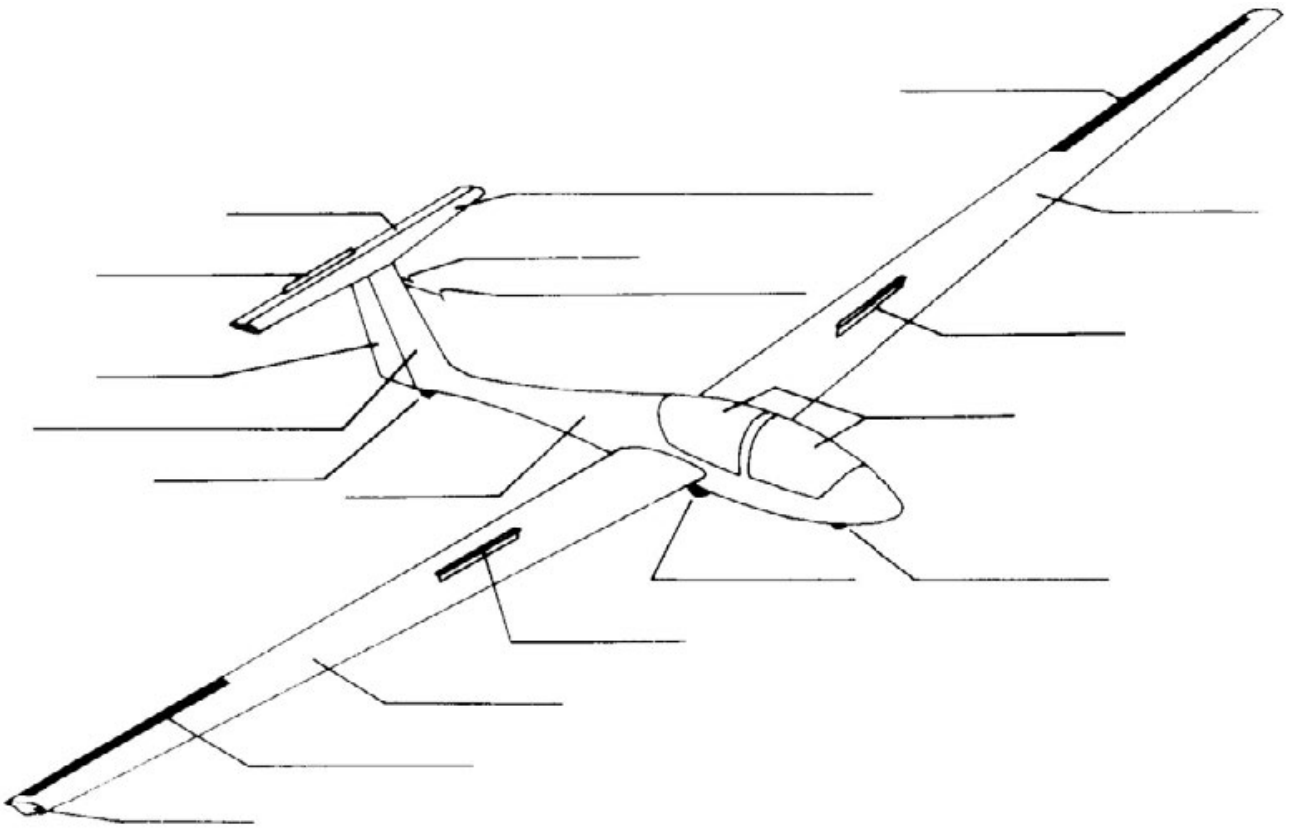
20. What is the Emergency or "Guard" radio frequency?
    a. *121.500 MHz*
    b. *122.800 MHz.*
    c. *122.900 MHz.*
    d. *123.300 MHz.*

21. What frequency should be used to contact Flight Service in the area of the Homeland VOR?
    a. *121.500 MHz*
    b. *122.200 MHz*
    c. *243.000 MHz*
    d. *255.400 MHz*

22. What flight service station provides voice communications via the Julian VORTAC?
    a. *Riverside*
    b. *Los Angeles*
    c. *San Diego*
    d. *Warner Springs*

Written Tests from "Glider Basics"

by Thomas Knauff



TEST #1 NOMENCLATURE

1. Name all the parts of the aircraft diagrammed above, using the spaces provided.

2. Why does an aircraft have: Ailerons? Elevator? Rudder?

3. What does the wing do?

4. What is angle of attack?

5. Name three things that happen when angle of attack is changed.

6. Pushing on the left rudder pedal will cause the nose of the glider to yaw which way?

7. Why does a glider have a yaw string?

8. In the following drawing, which rudder should be pressed to straighten the yaw string?

9. Before making a turn, a pilot should always:

10. What turns an aircraft?

TEST #2 STABILITY

1. Name the three axes of the glider.
   a.
   b.
   c.

2. When the glider moves about any axis, it rotates about the _____ __ _____.

3. The glider fuselage tends to fly streamlined through the relative airflow because of the _____ effect and thus is stable about the yaw (vertical) axis.

4. The glider tests to fly with its wings level because the wings are mounted on the fuselage at an angle called _____.

5. Pitch stability is achieved by a balancing act between the horizontal stabilizer and the ____ __ _____.

TEST #3 SHALLOW, MEDIUM, AND STEEP TURNS

1. When a pilot 'flies' an aircraft, only three things arebeing controlled. They are:
   a.
   b.
   c.

2. In a shallow turn, the pilot will need to hold some aileron (into, against) _____ the turn because of _____ stability.

3. In a steep turn, the pilot will need to hold some aileron (into, against) _____ the turn because of the _____ tendency.

4. During all turns, some _____ will be needed in the direction of the turn.

TEST #4 PRE-FLIGHT

1. What is meant by 'popped' rivets?

2. What would cause a popped rivet?

3. What are some of the common signs of possible hidden damage?

4. What should you look for when checking the tow release mechanism.

5. What would distorted hinges on the ailerons or dive brakes indicate?

6. What should a student pilot do if evidence of damage or excessive wear is found?

7. What documents are required in a glider?

8. What should you look for when checking the pitot tube during your pre-flight?

9. How can you ensure that you check every important pre-flight item?

10. Who is responsible for checking the tow rope before each flight?

TEST #5 FORWARD STALLS

1. What is a stall?

1. 2. Name six signs of an impending stall in the order they occur.
   a.
   b.
   c.
   d.
   e.
   f.

3. Where on the wing does a stall first occur? When the wing stalls, the glider pitches nose down. Why?

4. What is the minimum stalling speed of the glider you are being trained in?

5. Can a glider stall at a higher airspeed? How? (Name six reasons.)
   a.
   b.
   c.
   d.
   e.
   f.

6. Why is it important to practice stalls?

7. How is a normal recovery made from a forward stall?

8. If a wing starts to 'drop' during a forward stall, how should that wing be raised? Why?

TEST #6 TURNING STALLS

1. Turning stalls are most likely to occur close to the ground. Why?

2. Name three occasions where a turning stall is most likely to happen.
   a.
   b.
   c.

3. Without an abrupt control motion, a turning stall is most easily entered from
   a. *a shallow turn*
   b. *a medium turn*
   c. *a steep turn*

4. Give a step-by-step recovery procedure from a turning stall.

5. How do you prevent turning stalls close to the ground?

6. What is one control not to use during the first steps of a turning stall recovery?

7. From the standpoint of turning stalls, the most difficult bank angle to stall a glider is a:
   a. *shallow turn*
   b. *medium turn*
   c. *steep turn*

TEST #7 LANDINGS

1. What is the dive brake open glide ratio of most sailplanes?

2. What is the listed maximum glide ratio of the glider you fly?

3. Below 1,000 feet AGL a pilot should never _____?

4. What is the three-item checklist performed at the IP?
   a.
   b.
   c.

5. What is the primary judgmental decision to be made during the downwind leg?

6. What two checkpoints are used during the downwind leg?

7. What is the normal desired sink rate during the downwind leg?

8. What should you do if you experienced excessive sink during the downwind leg?

9. What would you do if you encountered lift during the downwind leg?

10. How should the turn onto the base leg be made?

11. Upon completion of the turn onto the base leg, you realize that you are too high. What will you do?

12. You are on base leg ready to turn into final and realize you are to high. There is one type of pattern that should be avoided. What is it?

13. On final it is important to maintain a constant _____ using the _____ control, and "freeze" the desired touchdown point on the windshield using which control?

14. On final you realize that you are above the 15:1 glide slope. As a student pilot you should _____?

15. As an experienced pilot, when might you find the TLAR method most useful?

LESC Pre-Solo Written Exam

September 2020

Instructor Note: All Previous Versions Are Obsolete

1. **Complete the following information for CA89:**

   What is the field elevation?_____

   What is the CTAF frequency?_____

   What is the pattern entry altitude at the IP?_____

   What areas are sensitive when flying a standard pattern?_____

   How many runways are there?_____

   What are the runway designations?_____

   What airspace is CA89? _____

   How high is the CA89 airspace?_____

   Not including the parachute operation at CA89, is there any other airspace consideration specific to CA89? _____

   If so,what is it?_____

2. **What documents must be in your possession during solo flight? (Circle the correct answer)**
   a. Student glider pilot's license, medical certificate, logbook, and photo ID
   b. Photo ID, logbook, and pilot's license
   c. Student glider pilot's license, medical certificate, and logbook
   d. Photo ID, logbook, medical certificate, and pilot's license

3. **Ensuring the aircraft is safe for flight is the responsibility of the…**
   a. Owner or Operator
   b. Mechanic or Inspector that approved the current Annual Inspection in the aircraft logbook
   c. Chief Flight or Duty Instructor
   d. Pilot in Command

4. **During an emergency, what action is required of the pilot in command?**
   a. Maintaining aircraft control
   b. Meeting the extent of the emergency
   c. Select a suitable landing area and fly a modified pattern
   d. Report your situation and intentions on LESC CTAF 122.90

5. What must a pilot do before every departure and every landing?

a. Establish 2-way radio communications with the tow plane and CTAF
b. Verify the wind direction and velocity by looking at the airport wind indicators
c. Review the pre-takeoff and pre-landing checklists
d. Set the Altimeter to the current pressure setting if known, or field elevation

6. The day VFR weather minimums are:

a. 3 statute miles and clear of clouds in Class A airspace
b. 5 statute miles, 1,000 feet below. 1,000 feet above, and 1 horizontal mile in Class B airspace
c. 1 statute mile and clear of clouds in Class D airspace
d. 3 statute miles, 500 feet below, 1,000 feet above and 2,000 horizontal feet in Class C airspace

7. Prior to entering Class A, B, C, or D airspace, a pilot must…

a. Contact ATC and give a position report
b. Establish 2-way radio communications
c. Remain well clear of any conflicting traffic and then contact ATC and give a position report
d. Gliders are prohibited from entering Class A and B airspace

8. If "Washout" is built into the design and shape of the wing, what purpose does "Washout" serve?

a. Helps reduce wing tip vortices
b. Allows the stall to start at the root of the wing instead of near the wing tip
c. Helps reduce parasitic drag caused by the ailerons
d. Helps reduce induced drag caused by the ailerons

9. Which type of air mass are thermals likely to develop?

a. Stable
b. Stationary
c. Unstable
d. Dry

10. A line of thunderstorms that often develop ahead of an advancing cold front are known as:

a. Shear line thunderstorms
b. Pre-frontal thunderstorms
c. Squall line thunderstorms
d. Embedded thunderstorms

11. The basic definition of *hypoxia* is:

a. Excessive nitrogen in the bloodstream
b. A lack of oxygen
c. A lack of carbon dioxide
d. Too much carbon dioxide

12. Which of the following aircraft has the right of way?

a. Glider in the landing pattern
b. A tow plane towing a glider
c. A hot air balloon
d. Any aircraft declaring an emergency

13. When 2 or more gliders are sharing the same thermal, the direction of turn is determined by:

a. The closest glider to you
b. The first glider in the thermal
c. All turns are to the right in the Northern Hemisphere
d. All turns are to the left in the Northern Hemisphere

14. While ridge soaring, you wish to overtake a slower glider, the safest way to do this is to…

a. Pass on the inside
b. Always pass on the right side
c. Radio the glider and announce your intentions to pass on either the right of left side, whichever is safer
d. Move to the outside of the slower glider prior to passing

15. The required items for the Schweizer 2-33A include…

a. Altimeter, Airspeed Indicator, and Vertical Speed Indicator
b. Seat Belts and Airspeed Indicator
c. Flight Manual, Seat Belts, Altimeter, and Airspeed Indicator
d. Altimeter, Airspeed Indicator, Vertical Speed Indicator, and Seat Belts

16. Which Instruments make up the Pitot/Static system?

a. Airspeed Indicator, Altimeter, and Vertical Speed Indicator, with Ram Air going into the Static ports
b. Altimeter, Vertical Speed Indicator, and Total Energy Compensator, with Static Air going into all three instruments
c. Energy Probe, Total Energy Compensator, Vertical Speed Indicator, Altimeter, and Airspeed Indicator
d. Altimeter, Airspeed Indicator, and Vertical Speed Indicator, with Static Air going into all three instruments

17. Spoilers, Dive-brakes, and other similar devices, are primarily used for:

a. Allowing the pilot to reduce airspeed without pulling back on the stick
b. Allowing the pilot to adjust the aircraft's angle of attack
c. To control altitude
d. Controlling stability during the landing approach

18. While banking the ailerons produce a roll rate. Provided you do not use adequate rudder, you can expect:

a. An increase in drag causing the nose to yaw towards the inside of the turn
b. An increase in drag causing the nose to yaw towards the outside of the turn
c. A decrease in drag causing the nose to yaw towards the inside of the turn
d. The aircraft to enter a skidding turn

19. The maximum airspeed at which abrupt full control deflection may be applied without exceeding the glider's designed load limits is called:

a. Top of the yellow arc maximum caution airspeed
b. V_A Maneuvering airspeed
c. V_{NE} Never exceed airspeed
d. Best L/D airspeed

20. The aerodynamic tendency of an aircraft to maintain uniform flight and return to that condition when disturbed is called:

a. Stability
b. Controllability
c. Inertia
d. Dihedral

21. As bank angle increases, the stall speed and load factor will:

a. Remain the same
b. Decrease/increase
c. Increase/increase
d. None of the above, since bank angle has no effect on the stall speed

22. Coordinated flight can best be determined by reference to the:

a. Compass
b. Horizon
c. Yaw string or ball
d. Airspeed indicator

23. How does a glider move through the air without an engine?

a. Newton's Law
b. Bernoulli's Law
c. Magnus Effect
d. Boyle's Law

24. A spin might develop from which flight attitude?

a. Excessive nose high
b. While performing cross controlled maneuvers
c. Uncoordinated turns
d. Stall

25. A stall will occur when…

a. The nose is raised well above the horizon
b. The wings upper and lower pressure differences are equal
c. The indicated airspeed falls below 38 mph
d. The critical angle of attack is exceeded

26. A 60-degree bank angle will increase the stall speed by…

a. 40%
b. 20%
c. 2 G's
d. 4 G's

27. If the tow rope has a knot in it, the effective breaking strength is reduced by…

a. 30%
b. 60%
c. 20%
d. 50%

28. According to the FAR's, a tow rope's breaking strength should not exceed:

a. Maximum glider gross weight limits
b. Not less than 80% or more than 200%, of the gliders gross weight
c. 2 times the certificated operating weight of the glider
d. No more than 25% of the gross weight of the tow plane

29. Before taking off in a crosswind, the flight controls should be placed as to:

a. Hold the downwind wing high and apply upwind rudder
b. Hold the upwind wing high and apply downwind rudder
c. Hold the downwind wing low and apply upwind rudder
d. Hold the upwind wing low and apply downwind rudder

30. Before commencing any launch, what must the pilot do?

a. Set the flight controls into the prevailing winds
b. Make sure the canopy is closed and locked
c. Verify the spoilers/dive brakes are closed and locked
d. All of the above

31. Define and list the recommended airspeeds for the 2-33A glider:

	Solo	Dual
Red Line airspeed	_____	_____
Maneuvering airspeed	_____	_____
Minimum Sink airspeed	_____	_____
Stall speed	_____	_____
Best L/D	_____	_____
Maximum aero tow airspeed	_____	_____

32. Maximum performance is known as Best L/D. What does Best L/D mean?

a. Lift is at its maximum
b. Parasite drag is at its minimum
c. Parasite and Induced drag are equal
d. Induced drag is at its minimum

33. Glider performance results from…

a. Polar Graphs as illustrated in the Aircraft Flight Manual
b. Indicated Airspeed
c. Groundspeed
d. Sink Rate as indicated on the Vertical Speed Indicator

34. When flying through areas of heavy sink, you should:

a. Fly at best L/D airspeed
b. Continue flying your indicated airspeed
c. Fly at minimum sink airspeed to conserve altitude
d. Lower the nose and fly faster to get out of the area of sink as rapidly as possible

35. While on aero tow you notice the tow plane's wings rocking, you should:

a. Release Immediately
b. Do nothing as the tow plane probably encountered turbulence
c. Stop the boxing maneuver and return to normal tow position
d. Check your Spoilers/Dive brakes

36. Why must you release immediately if you lose sight of the tow plane during an aero tow?

a. The tow plane may over stress your wings and cause significant control loss
b. You will overstretch the weak link or tow rope until it breaks
c. The tow plane may not be able to recover
d. You will not know where the tow plane is and there will be greater risk of a midair collision

37. The primary cause of slack in the towline during aero tow is from:

a. Deceleration of the glider
b. Being towed downwind
c. Inadvertently encountering the tow plane's wake vortices (propwash)
d. Acceleration of the glider

38. If a slack line develops during aero tow, what is the greatest danger?

a. An increased chance of breaking the towline
b. The glider becoming entangled in the towline
c. Developing knots in the towline
d. A pre-mature back release

39. While on tow you notice the tow plane's rudder wagging, you should:

a. Release immediately
b. Begin boxing the wake
c. Close your Spoilers/Dive brakes
d. Stop boxing the wake and return to normal tow position

40. While flying your 2-33A for some time you notice yourself approximately 5nm away from the field. Using the information below, determine what altitude is required to safely return to the field:

Field elevation: 1,500' MSL
Winds are 10mph
IAS 50mph
L/D 15:1

a. 3,500' MSL
b. 4,000' MSL
c. 4,500' MSL
d. 5,000' MSL

41. You have been soaring at an unfamiliar airport for over 2 hours and you find you have drifted 10nm downwind. From the following information, what Indicated Altitude is required to return to the same airport, and arrive at pattern altitude? Show your calculations.

Field Elevation: 1,900' MSL
Headwind: 20kts
IAS: 60mph
L/D: 12:1

a. 7,900' MSL
b. 6,900' MSL
c. 6,000' MSL
d. 5,000' MSL

42. Using the information from question 41, how long will it take to glide back to the airport and lose all of that altitude, with a 400' per minute sink rate? Show your calculations.

a. 12.50 minutes
b. 15.00 minutes
c. 17.25 minutes
d. 19.75 minutes

43. What is the sink rate of the 2-33A at 60 mph dual, in still air?

a. 252 feet per minute
b. 660 feet per minute
c. 11 feet per second
d. 3.1 feet per second

44. Refer to the 2-33A Calculated Performance Curves. What is the projected sink rate flying solo at 69 MPH?

a. An L/D of 5.2:1
b. A sink rate of 16.6:1
c. A sink rate of 402' per minute
d. A sink rate of 5.3' per second

45. During an approach to landing into a 20 mph headwind, you notice yourself low. You should:

a. Lower the nose and increase airspeed
b. Use spoilers to control your glide angle
c. Slow to Minimum Sink Speed to conserve altitude
d. Stretch your glide by raising the nose just above the horizon

46. When landing into a 15kt quartering headwind, you should…

a. Be alert for Low Level Wind Shear near the ground
b. Fly at Best-L/D airspeed
c. Conserve altitude by flying at Minimum Sink airspeed
d. Increase your ground speed

47. If attempting to land in gusty wind conditions, you should:

a. Fly at the recommended pattern airspeed on final
b. Slow to V_A (maneuvering airspeed) to minimize high wing loads
c. Add extra airspeed to your normal pattern airspeed allowing for unexpected gusts and sink
d. Always land into the wind

48. If you find it necessary to land in the vicinity of a thunderstorm, you should expect:

a. Light and variable winds, possible Thunder and Lightning

b. Turbulence, gusty surface wind's, heavy sink, wind shifts, and heavy rain or hail

c. High steady winds and moderate rain showers

d. Heavy sink, rain, hail, and light winds

49. What effect does an aft CG have?

a. Cruise airspeed increases

b. Stall speed increases

c. Aircraft is more stable

d. Spin recovery is easier

50. Using the sample Schweizer 2-33A weight and balance information below, determine:

a. Total gross weight

b. Actual CG location

c. Is the gross weight within the allowable limits?

d. Is the CG within the allowable limits?

If not, what can be done to make the aircraft legal to fly?

2-33A Weight and Balance Data
Sample Aircraft

CG Range: STA. 78.20 to STA. 86.10
Maximum authorized gross weight: 1040 lbs

Arms:

Sailplane empty	96.12
Front pilot	43.80
Rear pilot	74.70

Weights:

Sailplane empty	691 lbs
Front pilot	98 lbs
Rear pilot	240 lbs

51. On the back of this page, draw and label the 6 legs of a standard airport traffic pattern: Note: Instructor and student must correct test to 100% prior to student solo

Date of corrections_____

Student name _____

Student signature _____

Instructor name_____CFIG #_____Exp_____

Instructor signature _____

Glider Aviator's Model Code of Conduct

INTRODUCTION

The *Glider Aviator's Model Code of Conduct* (*Code of Conduct*) offers recommendations for all pilots who fly gliders, regardless of their ratings and privileges. It seeks to advance flight safety, airmanship, and the glider community.

The *Code of Conduct* is not a standard and is not intended to be implemented as one. The *Code of Conduct* presents a vision of excellence in glider operations. Its principles complement and underscore legal requirements.

Pilots who desire to fly properly equipped gliders under Instrument Flight Rules (IFR) should also refer to the *Aviators' Model Code of Conduct* (*see* 'Additional Resources', below).

The Principles

The *Code of Conduct* has seven sections, each containing Principles and Sample Recommended Practices.

1. General Responsibilities of Aviators
2. Passengers and People on the Surface
3. Training and Proficiency
4. Security
5. Environmental Issues
6. Use of Technology
7. Advancement and Promotion of GA

The Sample Recommended Practices

Sample Recommended Practices are basic suggestions for using the Code of Conduct principles and tailoring the principles to specific aviation communities and organizations. The Sample Recommended Practices may be modified to satisfy the unique capabilities and requirements of each pilot, mission, aircraft, and GA organization. Some Sample Recommended Practices exceed the provisions of their associated *Code of Conduct* principles. They are not presented in any particular order.

Benefits of the Code of Conduct

The *Code of Conduct* benefits pilots and the glider community by:

1. highlighting important practices to make pilots better, safer aviators,
2. promoting improved pilot training, better airmanship, appropriate pilot conduct, personal responsibility, and pilot contributions to the GA community and society at large,
3. encouraging the development and adoption of good judgment and ethical behavior,
4. advancing self-regulation through the glider community as an alternative to government regulation, and
5. promoting and making flying a more rewarding experience.

Note: Not all flight operations are authorized in all jurisdictions. References to the United States Federal Aviation Administration (FAA) are used as examples. In other jurisdictions, applicable laws and regulations must be followed.

Glider Aviators' Model Code of Conduct: Principles

GENERAL RESPONSIBILITIES OF AVIATORS

Pilots should:

1. make safety the number one priority,
2. seek excellence in airmanship,
3. develop and exercise good judgment, and apply sound principles of aeronautical decision-making,
4. recognize and manage risks effectively,
5. maintain situational awareness, and adhere to prudent operating practices and personal operating parameters (*e.g.*, minimums),
6. aspire to professionalism,
7. act with responsibility and courtesy, and
8. adhere to applicable laws and regulations.

Explanation: This section of the *Code of Conduct* serves as a preamble to the *Code of Conduct*'s other principles. It emphasizes safety, excellence, risk management, and responsibility.

Sample Recommended Practices

1. Approach flying with seriousness and diligence, recognizing that your life and the lives of your passengers and others depend on you.
2. Recognize, accept, plan for, and do not underestimate the costs of implementing proper safety practices.
3. Identify and adapt to changing flight conditions based on sound principles of airmanship and risk management. Be prepared to alter or abort your flight accordingly.
4. Recognize the increased risks associated with flying in inclement weather, at night, in congested areas, at high altitude, or over rugged, mountainous, or forested terrain. Plan for and manage such risks prudently.
5. Develop, use, periodically review, and refine personal checklists and personal minimums for all phases of flight. Review these materials regularly with a flight instructor or other trusted mentor.
6. Make personal wellness and an honest self-evaluation of your fitness a precondition of each flight (for example, by using the I'M SAFE checklist—*see*, *e.g.*, FAA AC 60-22). Consider undergoing periodic voluntary medical examinations to confirm your fitness.
7. Know your personal susceptibility to hypoxia, and establish O_2 personal use parameters—for example, above 8,000 ft. MSL. Use supplemental oxygen on flights where it may be beneficial.
8. See and avoid. Practice techniques for seeing and avoiding other aircraft. Scan for traffic continuously. Be particularly vigilant when joining, soaring with, and leaving gaggles, as well as when ridge soaring.
9. Listen and be heard. Monitor applicable frequencies to remain aware of the location of other aircraft, and concisely inform other pilots of your position and intentions. Doing so is particularly important in gliders and towplanes that are not transponder-equipped.
10. Comply with or exceed the requirements for mandatory inspections, Safety Directives (SDs), Airworthiness Directives (ADs), and Manufacturers Continued Airworthiness Instructions, as appropriate. Adhere to recommended inspections, service bulletins, and checklists.
11. Exercise safe ground operations, including: assembly, ground handling, preflight inspection, tiedown, disassembly, and trailering.

12. Evaluate the weather before each flight, using all available appropriate aviation resources. Study micrometeorology for your soaring area (including, where applicable, thermal, ridge and/or wave soaring).

13. Plan every flight carefully. Calculate weight and balance, and consider the effects of wind on range. Conduct a thorough cross-country preflight, including diversion alternatives. Be particularly diligent in planning for the safe premature termination of flight.

14. Maintain sufficient altitude to provide suitable landing options in the event of an emergency.

15. Adhere to applicable rules and operating practices of your flying club or school, your FBO, flight center, or glider rental provider.

16. Seek advice from experienced pilots and flight instructors. Integrate this advice into your flying.

17. Adopt a goal-oriented approach to pattern planning and operations:
    a. Begin pattern planning while approaching the airport/landing area, taking into account all factors that may prevent reaching the intended landing spot.
    b. Exercise care to maintain an appropriate approach airspeed.
    c. Be prepared to adapt your pattern in response to changing conditions.
    d. Use appropriate publications to identify published traffic patterns and relevant aviation activities.
    e. Work with airport operators and other pilots to harmonize flight operations for both normal and abnormal conditions.
    f. Exercise extreme caution when flying at unfamiliar airfields.

18. Communicate your intended flight itinerary to ground personnel prior to departure, even when flying locally. Update this information in-flight periodically by announcing current status via radio.

19. Learn appropriate normal, abnormal, and emergency procedures. Use agreed-upon and consistent visual signals for communication and coordination among the glider pilot, tow pilot/winch operator, and other launch crewmembers. If practicable, use compatible transceivers to enhance such communications.

20. Operate rental gliders as if you owned them. Communicate all discrepancies affirmatively and promptly.

21. Develop and adhere to conservative operating parameters, such as the following:
    a. Departures—select a departure alternate landing site for emergency landing just after takeoff in the event of rope break or launch power failure.
    b. Maneuvering—minimize turns and maneuvers below a predetermined safe altitude except as required for towing, takeoff, landing, or obstacle clearance.
    c. Landing—be aware of any adverse conditions such as crosswinds, obstacles, and any potentially conflicting ground traffic.
    d. Emergency landing sites—whenever practicable, fly within range of a suitable emergency landing site. Recognize that the emergency landing site may be private or otherwise restricted property and that the pilot may be on such property without invitation. The pilot should seek to greet, apologize, explain the necessity for the incursion, thank, and promptly take all reasonable measures to remove the glider and remediate any harm caused to the property.
    e. Night operations—recognize the increased risks associated with night operations.

PASSENGERS AND PEOPLE ON THE SURFACE

Pilots should:

1. maintain passenger safety first and then reasonable passenger comfort,

2. manage risks and avoid unnecessary risks to passengers and to people and property on the surface and in other aircraft,

3. brief passengers on planned flight procedures and inform them of any significant or unusual risks associated with the flight,

4. seek to prevent unsafe conduct by passengers, and

5. avoid operations that may alarm or disturb passengers or people on the surface.

***Explanation*:** Pilots are responsible for the safety and comfort of their passengers. Passengers place their lives in pilots' hands, and pilots should exercise sufficient care on their behalf. Such care includes disclosing unusual risks, and exercising prudent risk management. Pilot responsibility also extends to people on the ground and in other aircraft.

Sample Recommended Practices

1. Keep your passengers as safe as possible—*as though they were your closest loved ones*.

2. Aspire to treat your passengers with professionalism.

3. Plan and fly conservatively to improve safety margins.

4. Tactfully disclose risks to each passenger and accept a prospective passenger's decision to refrain from participating.

5. Require that passengers wear seat belts and shoulder harnesses.

6. To avoid sun exposure, consider the use of hats, visors, and sun block. In an open cockpit, consider the use of helmet and eye protection.

7. Provide a thorough passenger briefing prior to flight (*see* 'Additional Resources' below).

8. Determine the experience, background, and concerns of each passenger. Incorporate them into the preflight briefing and flight activities.

9. Refrain from practicing training maneuvers that involve unusual attitudes or slack-line procedures with passengers.

10. If available, obtain favorable insurance coverage for passengers, and urge passengers to do so as well. Confirm that there are no misrepresentations on insurance applications, and that you and any other pilot on the policy have complied with all policy provisions.

11. Instruct passengers to avoid touching or obstructing critical flight controls, and to keep cameras and the like clear. Brief and maintain a sterile cockpit for takeoffs, landings and other workload-intensive times.

12. Encourage passengers to serve as safety resources—for example, by having them identify nearby aircraft, and keep track of landmarks.

13. Assess unfamiliar passengers for potential safety and security problems.

14. Remember that passenger safety begins on the ramp before ever entering the aircraft. Watch passengers closely and keep them clear of ground-based hazards (*e.g.*, fuel trucks, propellers, slippery surfaces).

TRAINING AND PROFICIENCY

Pilots should:

1. participate in training to maintain and improve proficiency beyond legal requirements,

2. participate in flight safety education programs,

3. remain vigilant and avoid complacency,

4. train to recognize and deal effectively with emergencies, and

5. accurately log hours flown and maneuvers practiced to satisfy training and currency requirements.

***Explanation*:** Training and proficiency underlie aviation safety. Recurrent training is a primary component of proficiency and should include both air and ground training. Each contributes significantly to flight safety and neither can substitute for the other. Training sufficient to promote flight safety may well exceed what is required by law.

Sample Recommended Practices

1. Pursue a rigorous, life-long course of aviation study.

2. Use the manufacturer's flight manual to determine your glider's limitations, calculate performance, plan flights, properly secure cargo, (for an engine-equipped glider) determine fuel requirements, and calculate weight and balance.

3. Follow and periodically review programs of study or series of training exercises to improve proficiency. Consider a training plan that will yield new ratings, certificates, and endorsements.

4. Supplement stick-and-rudder training with scenario-based training to build decision-making and risk-management skills.

5. Train for flight over challenging environments such as high altitude wave, low altitude ridge, in gaggles with other gliders, or over remote, desert, or mountainous terrain. Train for survival, and carry adequate survival equipment and drinking water.

6. Understand and use appropriate procedures in the event of system malfunctions (*e.g.*, lost communications, instrument problems).

7. Achieve and maintain proficiency in the operation of avionics.

8. Know current aviation regulations and understand their implications and rationale.

9. Understand and comply with the privileges and limitations of your pilot certificate.

10. Attend aviation training programs offered by industry organizations, the Soaring Safety Foundation, the Soaring Society of America, and the FAA.

11. Participate in the FAA Pilot Proficiency Program ("WINGS").

12. Stay updated with diverse and relevant aviation publications.

13. Develop a systematic approach to obtaining timely weather briefings and evaluating flight conditions.

14. Conduct a periodic review of recent accidents and incidents, focusing on probable causes.

15. Periodically demonstrate mastery of applicable practical test standards (PTS), and train to exceed PTS minimums.

16. Obtain adequate training before flying an unfamiliar glider, even if you have flown that type in the past.

17. Avoid practicing maneuvers in busy airspace or over congested areas.

18. Maintain currency that exceeds minimum regulatory requirements.

19. Seek to fly at least once monthly during the soaring season. Voluntarily complete a glider proficiency check with a qualified flight instructor at the outset of each soaring season. Emphases should include stall and spin awareness and avoidance.

20. Develop a practical understanding of the mechanics and systems of each glider you fly, including assembly/disassembly procedures, and safety checks, including positive control checks.

21. Join a type club or support organization for the glider you fly to learn more about its safe operation, including capabilities and limitations.

22. Consider maintaining a log to track errors and lessons learned on each flight.

23. Register at *http://www.faasafety.gov* to receive announcements of safety meetings and literature, and to review appropriate safety courses online.

SECURITY

Pilots should:

1. seek to maintain the security of all persons and property associated with their aviation activities,
2. remain vigilant and immediately report suspicious, reckless, or illegal activities,
3. secure aircraft to prevent unauthorized use, and
4. avoid special-use airspace except when approved or necessary in an emergency.

***Explanation*:** Enhanced security awareness is essential for the glider community. Threats to security demand responsive action. This Section addresses promoting national security and preventing criminal acts.

Sample Recommended Practices

1. Check NOTAMs thoroughly during preflight preparation, and obtain updates during long flights, including NOTAMs for airspace restrictions.
2. Always use a transponder with altitude encoding if equipped and operable unless otherwise authorized or directed by ATC.
3. Confirm that airport ramp access gates are closed securely behind you to prevent "tailgating" by unauthorized persons.
4. Become familiar with *Airport Watch* (+1-866-GA-SECURE) and other means to report and deter suspicious activities.
5. Report security concerns, flight safety hazards or anomalies such as poor radio coverage to the appropriate authorities.

ENVIRONMENTAL ISSUES

Pilots should:

1. recognize and seek to mitigate the environmental impact of aircraft operations,
2. for engine-equipped gliders and towplanes, minimize the discharge of fuel, oil, and other chemicals into the environment, during refueling, preflight preparations servicing and flight operations,
3. avoid environmentally sensitive areas,
4. comply with applicable noise-abatement procedures and mitigate aircraft noise in populated or other noise-sensitive areas, and,
5. review and adhere to prudent hazardous materials handling procedures.

***Explanation*:** Reducing pollution caused by aviation will reduce health problems, environmental impact, and unfavorable public perceptions of GA. Environmental issues can also close airports and increase regulatory burdens on GA.

Sample Recommended Practices

1. For engine-equipped gliders and towplanes, use a Gasoline Analysis Test Separator (GATS) jar, or other environmentally sound device/procedure for all fuel sampling. Return fuel samples to the fuel tanks or dispose of them properly.
2. Learn and adopt environmentally responsible methods for all aspects of glider care, especially degreasing aircraft and handling run-off.
3. Adhere to applicable local noise abatement procedures provided safety is maintained. Follow procedures to reduce noise such as reducing engine power as soon as practicable after takeoff (for self-launch gliders and towplanes).
4. For engine-equipped gliders and towplanes, if practicable, fly well above noise-sensitive areas, or avoid them altogether.

5. Consider the impact of aircraft on wildlife and conform to recommended practices (such as those of the National Park Service minimum altitudes) when flying near wilderness and environmentally sensitive areas.

6. Patronize service providers (such as FBOs, repair services, and aircraft cleaners) that adhere to environmentally friendly practices.

USE OF TECHNOLOGY

Pilots should:

1. become familiar with and properly use appropriate affordable technologies,

2. monitor applicable airport advisory frequencies and report position concisely when approaching airports without an operating control tower and other higher-risk areas, if radio-equipped,

3. for gliders and towplanes, use transponders or other position-indicating technologies during in-flight operations, if available or otherwise directed by ATC, and

4. if practicable, carry transceivers and navigational equipment and use them in appropriate circumstances.

***Explanation*:** Innovative, compact, and inexpensive technologies have greatly expanded the capabilities and visibility of gliders and towplanes. This section encourages the use of such safety-enhancing technologies.

Sample Recommended Practices

1. When practicable, invest in new technologies that advance flight safety. Train to use them properly. Learn and understand the features and limitations of such technologies.

2. Inspect and maintain all avionics and flight instruments to keep them operational, current, and approved for the intended flight.

3. Recognize that programming avionics may cause distractions, and that distractions may lead to errors.

4. Avoid programming navigation systems while under tow.

5. Self-announce your position periodically when operating in areas proximate to aviation activities and especially during traffic pattern operations.

6. Glider and tow pilots operating in areas that include significant aircraft traffic should consider installing transponders with Mode C capability to enhance their visibility.

7. For soaring operations proximate to high-traffic airports, consider discussing operations and technological aids with the appropriate ATC facility.

8. Consider purchase, installation, and use of parachutes (personal or ballistic).

9. When selecting a glider, consider safety devices such as reinforced cockpit shells, effective canopy ejection devices, automatic control hookups, and cockpit ergonomics.

10. Maintain basic flying and navigation skills to enhance safety in the event of the failure or absence of advanced technologies and services.

ADVANCEMENT AND PROMOTION OF GENERAL AVIATION

Pilots should:

1. advance and promote general aviation, safety, and adherence to the *Code of Conduct*,

2. volunteer in and contribute to organizations that promote general aviation, and use their aviation skills to contribute to society at large,

3. demonstrate appreciation for aviation service providers,

4. advance a general aviation culture that values openness, humility, positive attitudes, and the pursuit of personal improvement, and

5. promote ethical behavior within the general aviation community.

***Explanation*:** Glider (and other GA) operations have a well-recognized and worsening public relations problem. Vigilance and responsive action are essential to ensure GA vitality and to enhance the GA experience for pilots and passengers.

Sample Recommended Practices

1. Strive to conform fully to the *Code of Conduct*.

2. Serve as a GA *ambassador* to the public by providing accurate information and refuting misinformation concerning GA activities, and by encouraging potential student pilots.

3. Recognize that your actions reflect upon the entire aviation community.

4. Volunteer in support of general aviation.

5. Join and support the national soaring organization in your country of residence.

6. Make charitable use of your aviation resources (for example, by donating flight time to youth).

7. Express appreciation to controllers, service personnel, and ground handlers for their assistance and good service.

8. Participate in aviation-related fund raising events.

9. Invite constructive criticism from your fellow aviators and provide the same when asked.

10. Adhere to the highest ethical principles in all aviation dealings, including business practices.

11. Seek to resolve disputes informally and congenially.

ADDITIONAL RESOURCES

1. The *Glider Aviators' Model Code of Conduct*, the *Aviators' Model Code of Conduct*, the *Light Sport Aviators' Model Code of Conduct*, the *Seaplane Pilots' Model Code of Conduct*, and the *Student Pilots' Model Code of Conduct* are available at *http://www.secureav.com.*

2. Resources to help the Lake Elsinore Soaring Club advance pilot skills and promote flight safety are available at *http://www.soarelsinore.org/*.

3. Further information about gliding is available at:
   FAA:
   http://www.faa.gov (search glider), and *http://www.faasafety.gov*
   EAA:
   http://www.sportpilot.org/
   SSA:
   http://www.ssa.org/
   SSF:
   http://www.soaringsafety.org/
   SecureAv:
   www.secureav.com/Gliders-Listings-Page.html

4. Annotated *Commentary* helps implementers interpret the *Code of Conduct* and provides source materials and supplemental aides. Available at *http://www.secureav.com*.

ABBREVIATIONS

AD	Airworthiness Directive
AGL	Above Ground Level
ATC	Air Traffic Control
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
GA	General Aviation
IFR	Instrument Flight Rules
MSL	Mean Sea Level
PTS	Practical Test Standards
SD	Safety Directive
VFR	Visual Flight Rules

NOTICE

The *Lake Elsinore Soaring Club Code of Conduct* is a customized version of the *Aviators' Model Code of*

Conduct created by Michael S. Baum. ©2007 Michael S. Baum. All Rights Reserved. Terms of Use are available at *http://www.secureav.com*.

Pilots and the aviation community may use the *Code of Conduct* as a resource for code of conduct development, although it is recommended that this be supported by independent research on the suitability of its principles for specific or local applications and situations. It is not intended to provide legal advice and must not be relied upon as such.

EDITS, ERRATA, COMMENTS

The *Code of Conduct* is a living document, intended to be updated periodically to reflect changes in aviation practices and the aviation environment. Please send your suggestions, edits, errata, questions and comments to the Permanent Editorial Board at *PEB@secureav.com*.

ACKNOWLEDGMENTS

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May 24, 2007


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LESC Solo Checklist

Date: _____/_____/_____

Student: _____

Instructor: _____

As a student pilot at LESC, I am ready to solo and have:

☐ Taken a pre-solo written examination administered by a flight instructor per FAR Part 61.87(b) and have reviewed it with a flight instructor.

☐ Hold a current student pilot's license.

☐ Had my logbook endorsed by a flight instructor.

☐ Received pre-solo flight training per FAR Part 61.87 (c) and am familiar with procedures of and proficient at maneuvers per FAR Part 61.87(l).

☐ Reviewed and signed the *LESC Standard Operating Procedures Manual* (SOP).

☐ Received additional flight training and briefings on maneuvers and operations specific to Skylark Airport.

☐ Completed reading of and taking the self tests in *Glider Basics, From First Flight to Solo.*

I attest that I have received the above training and am ready to solo:

Signature: _____

Parent or Guardian (if under 18):

Name (*please print*): _____

Signature: _____


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From Solo to License

Congratulations! You have joined the exclusive society of those who know and love soaring! Your training however is not over. In fact, you will find you will learn something on nearly every flight you take in your entire soaring career.

First of all, as an SSA member, you have earned your SSA "A" badge by soloing. You should plan on working towards your "B", "C" and Bronze badges as your skills and knowledge improve and increase. Please see your instructor for details.

If you already haven't done so, you should pick up *After Solo* and complete this fine work to complement *First Flight to Solo*, and the *Soaring Flight Manual*.

Also, please don't forget that as a soloed student you are subject to an endorsement program from your instructor. Your initial solo privileges may be one flight, five flights, thirty days and eventually forty-five days (maximum). This means that at the expiration of these designated periods, you must conduct a flight review with your instructor. You should plan on flying occasionally with an instructor to hone your skills and work on your badges outside of this program as well.

When you feel you're ready, you should start studying for the FAA written exam. This will be a sixty question multiple choice test administered on a computer. You must score 70% or higher to pass. There are several self-study tools available, from books containing the question and answer pool to computer based training which emulates the actual exam itself. There is even a free website to practice taking the test. Please discuss with your instructor the method which may be best for you.

Before scheduling your exam at one of the designated FAA testing sites, you must obtain an endorsement for aeronautical knowledge from your instructor. Take this along with photo ID to the testing center (along with payment for theappropriate fee), and you're on your way. Make sure you don't lose the results report! Bring the results in so your instructor can log it in his logbook, and discuss any questions you may have missed.

Now the real fun of preparing for your Private Pilot-Glider license begins. There are two parts to the actual examination with an FAA designee. These parts consist of an oral exam and a practical flight test. These are described in detail in the *Private Pilot Practical Test Standards for Gliders* (PTS), a publication of the FAA which is available here in the clubhouse or by download from the SSA website. It is also available for download on the LESC instructors web page. You should understand and know it well. A good book to pick up is Bob Wanders' *Private Pilot Check ride Made Easy* available from the SSA.

The PTS describes in detail the items which will be covered in the oral exam as well as the practical test. You should be prepared to spend three to four hours in the oral exam, followed by two to three flights with the designee. During the first part of the oral, you will be given three tasks to complete which are weight and balance calculation, a cross country profile and obtaining winds and temps aloft to complete an adiabatic chart. You will then be asked several questions to test your knowledge as dictated by the PTS.

The practical test will consist of a flight routine which your instructor will introduce to you, which you should practice for several weeks. Your instructor will then sign your endorsement when he feels you are ready and help you schedule time with a designee. You can either have the designee come to Skylark (recommended as you are familiar with your home field), go to Hemet or any other glider port where a designee is available.

Seems like a lot of effort doesn't it? It's actually pretty easy when you take it one step at a time. Once you've completed your license then you'll be able to introduce others to the exhilaration of soaring!


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