

# **Southern Eagles Soaring - Tow Pilots Operations**

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## **I. Introduction**

The following document describes the operational procedures used by ***Southern Eagles Soaring (SES)*** when towing gliders. New tow pilots need to be checked out, using this document as a guide, before being allowed to act as PIC in any SES owned tow plane. All items should be reviewed both on the ground and in the air with the prospective tow pilot.

All airwork will be done with a qualified SES tow pilot. In addition, emergency procedures, appropriate airspeeds, and maximum bank angles will be reviewed by a qualified CFI-G, and an endorsement placed in the tow pilots logbook.

A copy of this document should be given to every existing and newly qualified tow pilot. In addition, a copy of this document should be carried in the tow plane at all times while performing glider tows.

## **II. FAR and Insurance Requirements**

All SES tow pilots must be qualified under FAR Part 61.69, Glider Towing: Experience and Training Requirements:

*a) No person may act as pilot in command of an aircraft towing a glider unless that person:*

- 1) Holds at least a private pilot certificate with a category rating for powered aircraft;*
- 2) Has logged at least 100 hours of pilot-in-command time in the aircraft category, class, and type, if required, that the pilot is using to tow a glider;*
- 3) Has a logbook endorsement from an authorized instructor who certifies that the person has received ground and flight training in gliders and is proficient in--
  - i) The techniques and procedures essential to the safe towing of gliders, including airspeed limitations,*
  - ii) emergency procedures;*
  - iii) signals used, and*
  - iv) maximum angles of bank.**
- 4) Except as provided in paragraph (b) of this section, has logged at least three flights as the sole manipulator of the controls of an aircraft towing a glider or simulating glider-towing flight procedures while accompanied by a pilot who meets the requirements of paragraphs © and (d) of this section;*
- 5) Except as provided in paragraph (b) of this section, has received a logbook endorsement from the pilot, described in paragraph (a)(4) of this section, certifying that the person has accomplished at least 3 flights in an aircraft while towing a glider, or while simulating glider-towing flight procedures; and*
- 6) Within the preceding 12 months has --
  - i) Made at least three actual or simulated glider tows while accompanied by a qualified pilot who meets the requirements of this section; or*
  - ii) Made at least three flights as pilot in command of a glider towed by an aircraft.**

- b) Any person who before May 17, 1967, has made and logged 10 or more flights as pilot in command of an aircraft towing a glider in accordance with a certificate of waiver need not comply with paragraphs (a)(4) and (a)(5) of this section.*
- c) The pilot, described in paragraph (a)(4) of this section, who endorses the logbook of a person seeking glider-towing privileges must have:*
- 1) Met the requirements of this section prior to endorsing the logbook of the person seeking glider-towing privileges; and*
  - 2) Logged at least 10 flights as pilot in command of an aircraft while towing a glider.*
- d) If the pilot described in paragraph (a)(4) of this section holds only a private pilot certificate, then that pilot must have:*
- 1) Logged at least 100 hours of pilot-in-command time in airplanes, or 200 hours of pilot-in-command time in a combination of powered and other-than-powered aircraft; and*
  - 2) Performed and logged at least three flights within the 12 calendar months preceding the month that pilot accompanies or endorses the logbook of a person seeking glider-towing privileges --*
    - i) In an aircraft while towing a glider accompanied by another pilot who meets the requirements of this section; or*
    - ii) As pilot-in-command of a glider being towed by an aircraft.*

The insurance requirements are even more stringent:

*When in flight, the aircraft will only be operated by the pilot(s) specified below who posses(es) the current and valid ratings and certificates for the aircraft being flown, and if required, a current and valid medical certificate.*

*FOR POWERED AIRCRAFT WHILE USED FOR SAILPLANE TOWING NOT FOR HIRE:*

*For (named pilots) or any pilot maintaining a private or more advanced pilot certificate who is a member of the named insured soaring club and has flown a minimum total pilot-in-command time in powered aircraft of 500 hours of which no fewer than 100 hours have been in single engine aircraft having the same type of fixed landing gear (either conventional tailwheel or tricycle) as the aircraft being flown with at least 10 takeoffs and landings in aircraft of the same make and model being flown and no less than 10 flights while towing sailplanes.*

Some of our tow pilots do not meet the 500 hour requirement in powered aircraft but are insured on an extra-cost waiver based on their experience in gliders, multi-engine aircraft, etc. on a case by case basis. Under no circumstances will the insurance company insure a pilot with less than 200 hours.

Southern Eagles Soaring prefers its tow pilots to be active glider pilots, even if only at the student glider pilot level. Having insight into what is happening at the other end of the rope makes for safer towing operation in both aircraft.

### **III. Preflight of the Towplane (C-175 N7500M)**

While there is no official preflight checklist for the C-175, the preflight is similar to a C-172 or other similar airplane. Items specific to the C-175 tow plane are as follows:

- Check security of tow hook in the rear of the plane.
- Check for proper operation (including release) of the tow hook.
- Check security of STOL components. (wingtip and center of wing)

#### **Fuel management:**

Fuel management is extremely important during tow operations. Being too heavy can degrade the performance of the tow plane. But the FAR's require a minimum of 30 minutes of fuel on board at all times. So we must balance the objectives of not being too heavy with not having to refuel every few tows.

A wooden fuel stick, calibrated for the left/right tanks of the C-175 should be in the plane. Always check the fuel quantity with the fuel stick, and confirm this level using the fuel gauges inside the plane.

\*

The C-175 holds 25 gallons of useable fuel per side. Using a conservative fuel burn of 10 gals/hour, we have 5 hours of flight with full tanks. Using half tanks gives 2 ½ hours, and with a 60 minute reserve allows approximately 1½ hours flight time before needing to refuel. When refueling, adding 6-8 gallons per side should restore approximately half tanks.

#### **Recent Experience:**

SES encourages the tow pilot to make a practice tow or traffic pattern if the tow pilot has not towed recently, or has reason to believe that one is warranted. Remember the FAR's require at least 3 actual or simulated tows within the preceding 12 months. However these are the legal minimums and should not be used to represent an appropriate safety level.

## IV. Standard SSA Tow Signals & Procedures

All tow pilots should be familiar with the standard SSA tow signals. Figure 1 below illustrates the signals used on the ground. Figure 2 illustrates the signals used in the air.

A mirror is attached on the left strut of N7400M. The tow pilot should periodically use this mirror to look for any signals from the glider. Of course, since most gliders will be equipped with a radio, listen for verbal signals from the glider pilot in addition to looking for visual signals.

Once the glider is ready to be attached, the tow plane should be positioned to the side of the runway approximately 100 feet in front of the glider. The tow pilot should watch for the Wing Runner or other ground personnel giving the *Take Up Slack* signal (*fig 1 signal 3*), moving his/her lowered arm from side to side. The tow plane should be eased forward until all slack is taken up, or the *Hold* signal (*fig 1 signal 4*), both arms held out straight, is seen.

When the tow plane is ready for take-off, he/she should indicate this to the glider pilot by a rudder waggle (*fig 1 signal 10*). The tow pilot should then wait for the *Begin Take-Off* signal (*fig 1 signal 6 or 7*), which is either a circular motion of the arm or a rudder waggle from the glider. At this point the tow pilot should radio his/her departure intentions and proceed with the tow.

Be sure to watch for the *Stop Operation* signal (*fig 1 signal 9*) from ground personnel. If this signal is seen, terminate the tow at once and determine the nature of the problem before taking further action.

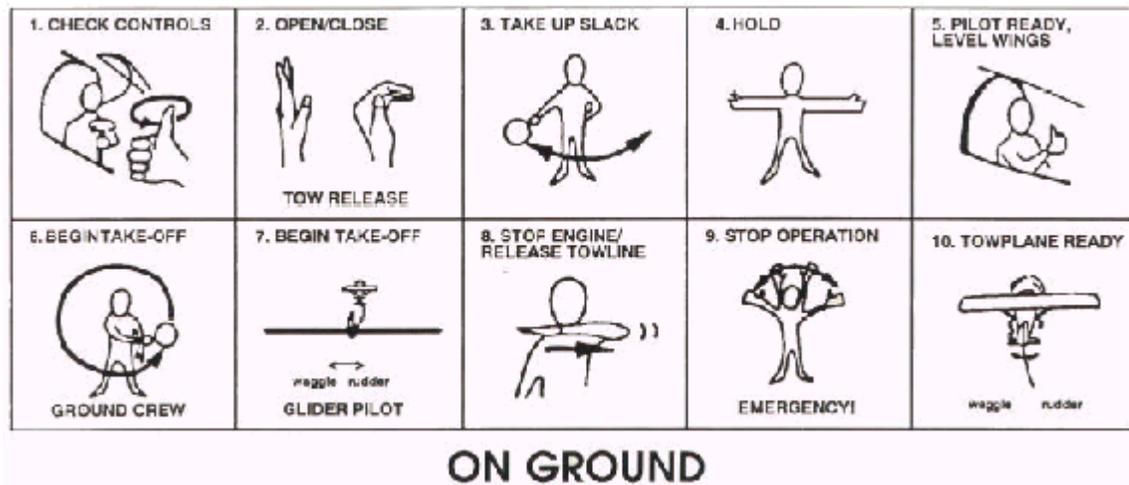
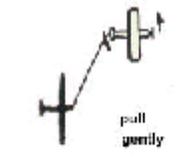
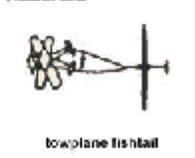


Figure 1

Once in the air, if the glider positions itself the extreme left or right tow position, it indicates a desire for a turn in the opposite direction (*fig 2 signal 1 or 2*). If the glider is to the extreme right, the tow pilot should turn left and vice versa. Another way to think of this is, turn the direction that your nose is pointing!

If the glider waggles his wings quickly, the tow plane should increase speed (*fig 2 signal 4*). A rudder waggle by the glider indicates he/she wants the tow plane to decrease speed (*fig 2 signal 5*). If the glider performs shallow turns from left to right, this indicates the glider cannot release, and the tow pilot should initiate the release (*fig 2 signal 3*). If the tow pilot cannot release either, he/she will yaw the tow plane left and right (*fig 2 signal 7*) to indicate to the glider pilot that the tow plane cannot release. At this point the two pilots should initiate the emergency procedures outlined in **Section XI (B)**.

If the tow pilot suspects the glider is flying with spoilers out, he/she should waggle the rudder to warn the glider pilot (*fig 2 signal 8*). A wing waggle of the tow plane (*fig 2 signal 6*) indicates the tow pilot needs the glider to release immediately.

<p>1. TURN RIGHT</p>  <p>pull gently</p>	<p>2. TURN LEFT</p>  <p>pull gently</p>	<p>3. SAILPLANE CANNOT RELEASE</p>  <p>move out, then rock wings</p>	<p>4. INCREASE SPEED</p>  <p>rock wings</p>
<p>5. DECREASE SPEED</p>  <p>waggle rudder</p>	<p>6. RELEASE NOW!</p>  <p>rock wings</p>	<p>7. TOWPLANE CANNOT RELEASE</p>  <p>towplane fishtail</p>	<p>8. WARNING - SPOILERS OUT</p>  <p>waggle rudder</p>

**IN AIR**

**Figure 2**

## **V. Radio Communications**

LaGrange Airport (LGC) uses the Common Traffic Advisory Frequency (CTAF) of 122.975. The tow plane, as well as most of the gliders, have radios. All tow plane pilots are expected to announce their position and intentions at key times during the tow. These include:

- Taxiing to a runway and/or crossing any active runways
- Taxiing into position on the runway
- Departing with glider in tow
- Crosswind/Downwind/Base/Final as appropriate
- Clear of the active runway

If the glider has a radio, or the glider pilot is carrying a handheld radio, you may also communicate with the glider pilot about the tow. Please keep these types of communication to a minimum, since we are sharing this frequency with other non-glider traffic.

If the tow plane needs fuel and gliders are awaiting tows, you may also call *LaGrange Unicom*, the FBO and let them know you are taxiing in for fuel. This usually saves a few minutes.

## **VI. Departure Patterns at LGC**

By agreement with LGC Airport Management, all gliders and tow planes will adhere to standard left-hand traffic for all runways. Gliders and tow planes operate on Runways 3, and 21, depending on wind condition. All turns within one mile of the airport, at or below 1000 ft AGL, will be to the left.

## **VII. Maximum Bank Angles**

For safety reasons, the tow plane will be limited to no more than 10° of bank while towing a glider.

## **VIII. Use of Aircraft Attitude for Airspeed Control**

Airspeed control is of great importance during the tow. If the towplane is too fast, the glider has control and stress problems; too slow, the climb performance suffers, and a stall becomes possible. While watching the Airspeed Indicator (ASI) is important, remember pitch and power controls airspeed. Learn what the proper pitch “looks like” while towing glass (10°-12° pitch up) and wood ships (12°-15° pitch up). Use this mental picture to control airspeed, and occasionally crosscheck your speed with the ASI. Try not to “chase” the ASI as this will cause pitch oscillations throughout the tow.

## **IX. Towing Speeds for Wood and Fiberglass Gliders**

If possible, the tow pilot should confer with the glider pilot to determine the appropriate airspeed for tow. This can be done on the ground or over the radio. In the absence of any verbal communication between the pilots, the following default speeds should be used:

- 60 MPH - Wood and cloth gliders
- 70 MPH - Fiberglass gliders

Please note that there may be slight airspeed calibration differences between the glider and tow plane. The tow pilot is urged to talk to the glider pilots about the tows and whether the tow speeds were appropriate.

## **X. Out-of-Position Towing Used in Glider Flight Training**

Occasionally a glider pilot (usually a student with instructor) will want to "*box the wake*". This is a training exercise designed to let the student get a feel for the different tow positions (left, right, high and low).

Normally, the glider pilot(s) will let the tow pilot know his/her intentions so that the tow pilot will not be surprised by the strange feel. The tow procedure is basically the same as normal. Use rudder to keep the nose from yawing too much and elevator to keep the appropriate pitch up attitude.

## **XI. Emergency Procedures in the Glider and Towplane**

### **A. Glider in Abnormally High Tow Position**

The most dangerous situation for the tow pilot is when the glider gets too high on the tow. Glider pilots are instructed to release tow any time the tow plane is not in sight (glider is above the tow plane). This is for the protection of BOTH pilots. The tow pilot should follow a similar rule:

**Anytime the nose of the tow plane is being forced down, and there is insufficient elevator authority to compensate, the tow pilot MUST release the glider.**

Even if there is enough elevator to hold the tail down, prolonged flight in this situation should be avoided. If the glider continues an abnormally high tow then the tow plane is flying straight and level with FULL UP elevator to keep the tail from rising. This could cause a rare *tail stall*, which may prove difficult or impossible to recover from while a glider is in tow.

Don't think of this as abandoning the glider. The glider pilot may have a hard time releasing during the nose down descent, in which case releasing the glider is the appropriate response.

### **B. Both Pilots Unable to Release**

Should both pilots be unable to release, don't panic. Communicate with the glider pilot. He/she may want to try to break the weak link of the towrope.

If releasing is not possible, make a normal approach to the longest runway available. During the flare, however, keep the tow plane off the ground as much as possible. You may even want to add a touch of power to extend the flare. The point is to allow the glider to get on the ground first. Once on the ground, the glider will decelerate rapidly, using up any slack in the rope. After the slack is gone, the tow plane will decelerate and eventually touch the ground. After a safe speed is released, the tow pilot should make a slight **left** turn (the same as in the air). The glider pilot will make a slight right turn. This will assure that the glider will not run into the tow plane from behind.

## **XII. Descent Techniques**

Once the glider is released, the tow plane should descend as rapidly as possible, without shock cooling the engine. The first power reduction should be from full power down to 20" MP. Once the CHT is 350° or cooler, MP may be reduced 2" per minute until landing. Two common techniques used by SES tow pilots, after the glider releases, are:

### **1) Descent with no flaps:**

- left turn
- **Flaps** 0° (to allow airspeed increase)
- **Power** to 20", pitch down
- **Prop** 2300 - 2400 RPM, **Mixture** as required
- accelerate to 120 - 130 MPH while setting up for downwind entry
- reduce power as desired upon reaching 350° CHT
- setup for normal pattern and landing

### **2) Descent with flaps:**

- left turn
- **Power** to 20", pitch down
- **Flaps** 40°
- **Prop** 2300 - 2400 RPM, **Mixture** as required
- accelerate to top of white arc while setting up for downwind entry
- reduce power as desired upon reaching 350° CHT
- setup for normal pattern and landing

**Caution:** If using method 2, be sure to maintain an airspeed within the flap operating range (white arc), otherwise damage to the flaps could result.

## **XIII. Final Approach and Dropping the Tow Rope**

Due to the towrope hanging from the back of the tow plane, the final approach should be made slightly high. Remember, there is a power line just before the approach end of Runway 21. The tow pilot should cross the power line at 150-200 ft AGL (around 850-900 MSL). After crossing the threshold, reduce power, add any additional flaps as desired, drop the tow rope in the middle of the runway, and try to land and hold short of Runway 13-31.

With 30°-40° of flaps, final approach speed can be made around 65-70 MPH. At this speed, it is fairly easy to stop before crossing Runway 13-31. Although it is nice to hold short of 13-31, don't do so at the expense of the towplane's tires and brakes. Skidding the tires actually increases the stopping distance and reduces controllability as the tires are gaining a new bald spot!

#### **XIV. Thermal Seeking While on Tow**

Occasionally you may find a nice thermal while towing. If you have discussed this situation with the glider pilot beforehand, AND you are outside the airports traffic pattern (above 2200 ft MSL, or greater than 2 NM from the airport), you may try to *work* the thermal. Determine an appropriate turning direction and try to circle within the thermal (remember 10° bank angle turns). You may not be able to stay within the thermal with this bank angle, but sometimes it is worth a try.

#### **XV. Fatigue**

Only you can be the judge of your alertness level. Towing has added dangers not present in regular powered flying. If you feel you are getting fatigued, stop flying. Safety is the most important part of our flying. No one will fault the tow pilot for playing it safe.

#### **XVI. SES Paperwork Responsibility**

The designated tow pilot of the day should keep track of all tows by filling out the daily tow sheet. Before starting the engine, log your name, the date, fuel level, Hobbs time and Tach time. For each tow, log the glider pilot, glider type, and altitude AGL of the tow.

At the end of the day, log the ending Hobbs and Tach times, total fuel added and ending fuel level. Additionally, you should collect all monies owed and verify that the correct amount was collected. That money, should be forwarded to the club treasurer (either in person or by mail).

#### **XVII. Fueling the Towplane at Troupair**

The tow pilot is responsible for maintaining a safe fuel level in the tow plane at all times. The FAR's require 30 minutes of fuel reserve. Forty-five minutes or one hour reserve seems wiser.

The tow pilot should refuel any time the calculated fuel reaches 45-60 minute (preferably 60 minute) reserve or **either** fuel gauge reaches 1/8 or below. The tow pilot should add fuel at any time deemed necessary. **This decision is at the SOLE discretion of the tow pilot.** Do not let any factors other than safety (including a line of gliders waiting to be towed) affect your fueling decision.

You may taxi up to Troupair at any time. Check the fuel quantity of each tank, using the fuel stick. Since the tow plane spends a lot of time in a left bank, the right tank may be slightly lower than the left tank. Tell the line person the amount of fuel per side to add.

Always double-check your fuel quantity with the fuel sticks **and** by the gauges to insure an appropriate fuel level before returning for towing. Be sure to check the fuel quality, by draining the sumps, after refueling.

SES has an account with Troupair, so you do not have to pay any bills.

## **XVIII. Retrieving the Tow Rope**

After the last tow, there may or may not be anyone waiting to retrieve the tow rope. If no one is available, the tow pilot should avoid dropping the rope on an active runway. You might instead drop the rope in the grass next to the runway, then go around the pattern for a final landing. Alternatively, you may drop the rope in the grass then *sideslip* to land on the runway. Another possibility would be to land in the grass without releasing the towrope at all.

Each tow pilot should make a realistic evaluation of their abilities and experience and the current weather and traffic conditions when determining which of these alternatives is best suited to him/her.

The tow pilot should verify the towrope is placed back in the tow plane prior to its being put up for the day.