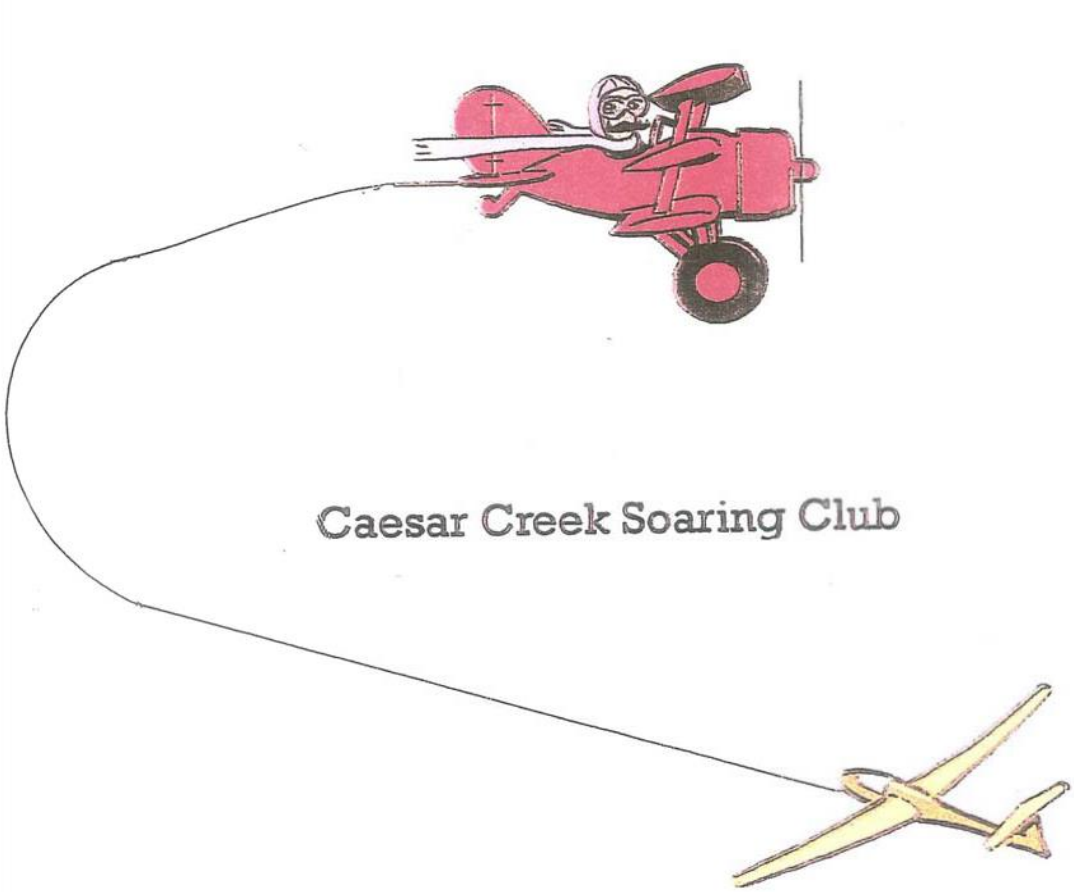
Caesar Creek Soaring Club

Tow Pilot's Guide



Sixth Edition, 2018 – Tim Christman

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1 General

1.1 Towing for CCSC – Standards, goals and ideals

1.1.1 Flying tow planes is one of the major contributions to CCSC's successful and efficient operation. This key role carries with it primary responsibility for safety, preserving our expensive aircraft, minimizing noise disturbances and maintaining an efficient and cost effective flight operation. Remember that exercising Safety, Aircraft care, Noise control and Efficient operation = SANE towing.

1.1.2 This guide provides current CCSC standards, rules and procedures to help our tow pilots carry out these responsibilities. Instructors and ground crew personnel may find it useful. The guide has been approved by the CCSC Board and is intended to standardize the operating procedures to which all CCSC tow pilots are expected to adhere. None of this however, can substitute for good judgment. In no case should any pilot tow in conditions that they feel are beyond their practical skill level or endurance, or which tax the equipment in use.

1.1.3 Towing also implies certain ideals. Since operating a tow plane is the one prerequisite to CCSC operations, tow pilots must be especially conscientious in meeting their assigned crew schedules. Moreover, in the volunteer spirit which is one of CCSC's unique strengths, qualified tow pilots should consider themselves available to help meet unexpected needs. As a goal and ideal, tow pilots should be available throughout the crew day as early or as late as necessary, within reason of course, to provide a fellow club member with a tow.

1.2 Eligibility to Tow

1.2.1 Eligibility to tow is based on a combination of FAA, CCSC, and insurance requirements.

1.2.2 A candidate must meet the following minimum certification and experience requirements.

1.2.2.1 Private Certificate, with ASEL and Glider ratings

1.2.2.2 Current FAA 3rd Class or higher medical certificate or BasicMed course completion certificate.

1.2.2.3 Flight Review within the preceding 24 months (FAR 61.56)

1.2.2.4 250 hours total time with 150 hours SEL PIC (FAR 61.69)

1.2.2.5 25 hours conventional gear (tail wheel) time

1.2.2.6 High performance (over 200 HP) qualification

1.2.2.7 In addition, the candidate must be a CCSC and SSD member in good standing.

1.3 Check-out of tow pilots

1.3.1 A candidate must complete a tow pilot qualification program meeting all FAA, CCSC, and insurance requirements. This process is conducted by designated check-pilots in accordance with the “Tow Check-out Procedures” (see attachment B).

1.3.2 Tow check-pilots will be experienced tow pilots holding a current CFI-A certificate. Check-pilots will be designated by the Chief Tow Pilot.

1.3.3 Before making unsupervised tows in CCSC aircraft, the candidate must:

1.3.3.1 Obtain a logbook endorsement from a CFIG certifying that they have received ground and flight instruction in gliders and they are familiar with the techniques and procedures essential to the safe towing of gliders.

1.3.3.2 As a ground crew member, observe the procedures of slack take- up, glider launch, climb, release and let-down. This includes the use of accepted approach and departure patterns and noise avoidance zones.

1.3.3.3 As the sole manipulator of the controls, complete five tows in a two-place tow plane with a designated check-pilot in the rear seat. Make as least three take-offs and landings in the Pawnee, followed by ten supervised tows in the Pawnee with the check- pilot observing from the ground or from the glider being towed, or as specified by insurance. The candidate will then be assigned to a mentor until released for unsupervised towing.

1.3.3.4 Complete the necessary logbook endorsements for solo flight in the Pawnee and for clearance to tow.

1.4 Annual self review

1.4.1 In order to stay current in towing procedures, tow pilots should review at least on an annual basis, the aircraft manuals, this guide and the UOP's. Note also the annual currency requirement of FAR 61.69 (attachment C). Towing currency requires either three flights as PIC in a glider every twelve months, or accomplishing three tows while accompanied by a current and qualified tow pilot.

1.5 Chief Tow Pilot

1.5.1 Duties and responsibilities of the Chief Tow Pilot are as follows:

1.5.2 Administer and supervise the tow pilot qualification program which:

1.5.3 Promotes procedures to enhance tow pilot currency and performance and

1.5.4 Recruit new tow pilots and assist in their qualification.

1.5.5 Monitor towing operations for:

1.5.5.1 Safety and efficiency and

1.5.5.2 Proper care of equipment and

1.5.5.3 Noise abatement control.

1.5.6 Identify problems, trends and needs:

1.5.7 Act as a focal point for noise control and associated community relations issues

1.5.8 Address problems with the CCSC Board and Operations Director.

1.5.9 Promote communication among tow pilots, instructors and crews:

1.5.10 Organize and conduct tow pilot meetings at least annually and

1.5.11 Publicize current towing issues in the club newsletter.

2 <u>Towing Operations</u>

2.1 Safety

2.1.1 All flights in tow planes should be performed in a safe, conservative manner. Tow pilots are to remember that the tow planes are a club asset, which are to be operated in a manner consistent with minimizing aircraft maintenance and prolonging the aircraft life.

2.1.2 Safety both in the air and on the ground is of paramount importance. The tow pilot has the final authority on whether conditions permit safe towing and on abort or wave-off decisions during tow. The tow pilot may immediately release a glider when, in the tow pilot's judgment, safety is compromised. Those aspects of towing operations which have particularly important safety implications are covered in this section.

2.2 Preflight and Check Flight

2.2.1 Before the first tow of the day, conduct a thorough preflight inspection using the approved procedure (see attachment G). Review the daily log and note and maintenance problems.

2.2.2 Look for evidence of bird nests, oil leaks or residue and verify the integrity of the tow release and its ability to release at a high tow rope angle. All of our Pawnees now have

“inverted” releases, which, in theory, will properly release under extreme angles of the tow rope.

2.2.3 Service the aircraft with fuel and oil if necessary, do a run-up check and perform a check-flight. As part of the run-up, insure that the engine is up to proper operating temperature. The Lycoming tends to over-pressurize, particularly in 48L, if the engine is not fully warmed-up and excessive oil pressure readings will become evident.

2.2.4 During the check-flight, verify that the ASI is operating properly. Note the winds aloft.

2.2.5 If you take over the tow plane while operations are underway, visually verify the fuel level and determine the number of tows that you can safely make before refueling becomes necessary. Eight (8) to Ten (10) tows is a good rule of thumb for both safety and crew rest considerations. The fuel indicators are rather unsophisticated and should not be considered accurate or reliable.

2.3 Departures, Approaches and Tow Patterns

2.3.1 During the hook-up, note the type of sailplane and plan the appropriate tow speed to be used. Typically, the use of approximately 65 MPH for the Schweizer's and 70-75 MPH for the glass ships unless the glider pilot requests a different tow speed. Receive and fill-out the tow card and note any special condition or request such as first solo, water ballast, etc.

2.3.2 Consult with the glider pilot if any questions exist for tow speed of other issues.

2.3.3 The tow pilot is the last line of defense to insure the club UOP’s are followed. Check each tow card for completeness. For example:

- 2.3.3.1 Instructor signature for solo flights
- 2.3.3.2 Flight Review / 90 Day solo date
- 2.3.3.3 Pilot’s signature on bottom of card

2.3.4 Set the trim, check flaps full up, lock the safety harness and turn on the fuel pump (909 only). Ensure area in front of glider is clear prior to taking up slack. Take up slack as signaled by the wing runner.

2.3.5 It's important to verify visually that all the rope slack is gone and to also clear for traffic. It's not totally unusual for an inexperienced wing runner to give you the go-ahead when another tow plane is landing downwind and coming straight at your airplane!

2.3.6 When towing the trainers and most other ships, it is important to apply power smoothly. High performance ships, on the other hand, require a more accelerated take-off

(more on that later). During the take-off roll, check your tachometer indication to verify full power.

2.3.7 When airborne, smoothly transition to a climb attitude. Avoid abrupt pitch attitude changes. Maintain full throttle and steady airspeed during the climb and use a constant pitch attitude. Full throttle provides not only maximum climb rate but also provides auto-enrichment of the fuel mixture for optimum engine cooling.

2.3.8 Turns on tow should normally be limited to moderate values (20 degrees) particularly with an inexperienced student at the other end. Level the wings momentarily between turns and look for other traffic. It is good operating practice to do a series of “S” turns for shallow climbing turns to clear for traffic. It is very difficult to see over the nose straight ahead so prolonged straight climbs are not a good idea. The fundamental idea is to provide your customer, the glider pilot, with a safe comfortable ride and to avoid other traffic.

2.3.9 Plan your flight path to be upwind of the glider port at release altitude. As you approach the requested release altitude, monitor the glider more frequently in the mirror. On release, usually a slight forward surge is felt, but the release must be confirmed as the glider turns to the right. At this point note the altitude. As part of your descent procedure, fly away from the release point to provide separation.

2.3.10 After release, power should be reduced very gradually to minimize shock cooling. The let-down procedure is covered in more detail in section 2.11. Descend in wide turns to clear the descent path. Avoid power-on spirals as they create a serious noise disturbance and this practice may not allow you to clear for other aircraft in your vicinity.

2.3.11 When approaching the gliderport for landing, remain clear of the glider traffic pattern. Remember to yield to glider traffic. This is tricky when landing to the east as the traffic patterns tend to merge. An altitude of 200 feet “over the fence” will normally provide more than adequate tow ring clearance. Obviously, it is extremely important not to drag the tow rope over the flight line area. A partial power full flap approach at approximately 75 MPH in the Pawnee provides a relatively steep approach profile and clearing the flight line area with a comfortable margin should not be a problem.

2.3.12 You should plan to be solidly on the ground by mid-field. Landing downwind requires a little more diligence with respect to airspeed control and approach profile.

2.4 Standard Signals

2.4.1 The Standard American Soaring Signals are used in CCSC flight and ground

operations for communication between ground crew personnel, tow pilots and glider pilots. This set of signals is covered in Attachment H. Tow pilots need to have a functional knowledge of all of the signals.

2.4.2 Note that the “something is wrong with the airplane” signal covers such situations as the gliders spoilers popping open. A wagging of the tow plane's rudder is to alert the sailplane pilot that a possible emergency situation exists.

2.4.3 A common in-flight signal (steering the tow plane) is given by the sailplane's moving out to one side and maintaining that position. This indicates a request for a new heading. If conditions allow, the tow pilot should heed this request. Be certain, however, that the glider is not “boxing the wake” or possibly signaling that he cannot release.

2.5 Student Training

2.5.1 Many CCSC flights involve student pilots. Remember that tracking behind a tow aircraft is a significant challenge for a new glider pilot. Be prepared for boxing the wake and other out of position maneuvers, often without any warning. Climb straight ahead if possible, attempting to maintain a stabilized airspeed and heading.

2.5.2 It's good practice to increase your airspeed by +5 MPH while you and your tow plane are being pulled around the sky. Additional airspeed provides a safety margin and improved control response.

2.5.3 With a new solo student or an initial solo flight, it is particularly important to fly smoothly and predictably. This implies shallow turns, staying close to the field and a constant flight attitude.

2.6 Hot Weather Operations

2.6.1 In many respects, operation during the hot weather and high density altitude conditions merits extra caution. The need for frequent rest periods becomes evident

2.6.2 Our “D” model Pawnee, 909, is not as robust as the other tow planes, even under more favorable conditions. For this reason, it is not advisable to tow heavy glass ships with 909 under high density altitude conditions.

2.7 Cold Weather Operations

2.7.1 Cold weather in Ohio can impact flight operations in a number of ways. While aircraft climb more efficiently, blowing snow, slick spots on the runway and the possibility of frozen brakes can make operations more challenging. On landing, your braking action can

be greatly reduced, although brakes are not normally necessary with our runway. Brakes should be used sparingly as snow may melt on them, freeze in flight and then present a real surprise upon touchdown!

2.7.2 Our Pawnees are fitted with electric engine heaters, which are normally left on during the cold weather periods. The importance, however, of a proper engine warm-up prior to the check flight cannot be overstated.

2.8 Refueling and Crew Rest

2.8.1 As a general rule, tow pilots should plan on a rest and refueling break after 8-10 tows. Ideally, the goal is to have three tow pilots assigned to each crew, to permit rotation of rested pilots. It's probably fair to say that we all enjoy the flying, but we also perform better, and more safely, when rested properly. Refueling regularly also assures a safe level of fuel on board. Note that on hot humid days, fuel consumption can be 3 +gallons per tow, particularly in 909.

2.9 Towing High Performance Ships

2.9.1 Be aware of the sailplane that is being towed. Many of the sailplanes are fiberglass gliders with L/D ratios in the 40's and 50's. A recent example is/was the ASH-25, affectionately referred to as “Big Wings”. The proper technique for towing a large heavy glider is somewhat different then towing, for example, the friendly little 1-26. Consider the fact that the ASH-25 has a wing span of almost 85 feet, as compared to only 40 feet for the Schweizer. Also, the gross weight of “Big Wings” is approximately 2 1/2 times that of the 1-26. It becomes apparent that you are dealing with a different kind of animal! It is fair to say that pilots of high performance gliders are quite finicky about tow speeds, and there are other considerations with towing these ships, which are outlined below. If unsure of the proper technique, discuss these issues with the glider pilot prior to tow.

2.9.2 Unlike towing a trainer, the trick is to use an accelerated take-off so the sailplane acquires aileron control early in the take-off roll. A “jump-start” take-off may be appropriate if the sailplane is carrying water ballast.

2.9.3 Upon lift-off, the tow plane should be allowed to accelerate quickly to the desired tow speed. Avoid rapid “pitch-ups” in the climb out.

2.9.4 Once the target airspeed has been obtained, the idea is to maintain a constant airspeed of 70-75 MPH or more, if the glider pilot has requested a higher airspeed.

2.9.5 Due to 909's marginal climb performance on high density altitude days; it is

advisable not to use 909 when towing heavy gliders.

2.9.6 It is good towing practice to think about an “abort point”. If you are more than halfway down the field during the take-off roll and not solidly airborne, maybe it is time to abort the takeoff!

2.10 Emergency Procedures

2.10.1 During the early part of the take-off roll, if the tach indicates less than full power output, the take-off should be aborted.

2.10.2 Note that max static RPM is 2300 +/-50 RPM with the standard (IA 200) 2 blade propeller. During a full power climb out expect 2375-2400 RPM @ 70
MPH. 2575 RPM is the red line for straight and level speed for a Pawnee.

2.10.3 In the event of a power failure on take-off, standard procedure is for the tow plane to release the glider, land on the left side of the runway and remain to the left. The glider lands to the right and stays to the right of the tow plane.

2.10.4 If the rope should break during take-off or the glider pilot pulls the release, the tow pilot should climb straight ahead, leaving the runway clear for the glider to land and roll out.

2.10.5 Upset of the tow plane as the result of the glider becoming excessively high is a possibility the tow pilot should always be alert to. All of the CCSC Pawnees now have “Tost” tow releases, and while there is no guarantee, the theory is that the Tost hitch will release despite a strong upward moment on the release. It is essential that the tow pilot immediately release the rope if the glider gets too far out of position. Part of the preflight involves checking the action of the release under tension, and with the rope at an angle to the axis of the tow plane. Ultimately, the best protection against this hazard results from proper training of student pilots, and the Club's excellent safety record is evidence that our students are well trained to recognize the danger of getting too high on tow.

2.10.6 While this is very uncommon, a failure of the glider's release mechanism can occur, in which case the glider pilot moves out to a position that is easily visible to the tow pilot and rocks the gliders wings. The tow pilot should return to the gliderport and release the rope in a position for the glider pilot to execute a normal landing pattern. If the tow plane also experiences a release failure, the tow pilot signals by fish tailing the tow plane and then enters a wide shallow descending turn at minimum tow speed. The tow plane should then make for a field with a long runway such as Stewart's Field with its 3000 foot runway. The tow plane will establish a long final.

The glider should move to the low tow position and when making the runway should land first then followed by the tow plane. With the glider down first, it can use brakes to keep from overrunning the tow plane. The tow plane should coast to a stop using no brakes if possible.

2.11 Aircraft Care

2.11.1 The tow pilot is responsible for the proper care and operation of the tow planes, some of the most valuable assets in the Club's inventory. Tow planes are to be used for towing operations and Club related functions only.

2.11.2 Preflight

2.11.2.1 As part of the preflight, oil should be added if the level is below 9 quarts. Note that 48L and 33Z have screw-on type oil fittings, while 909 has a clamp fitting. In either case, the fitting must be secured. Check the fuel level to assure full tanks. Preheat should be used if the ambient temperature is less than 20 degrees. The Pawnees have electric engine preheaters which are normally left on during cold weather.

2.11.3 Engine Cooling During Descent

2.11.3.1 It is critical to the useful life of the engine that care be exercised to prevent shock cooling of the engine during the letdown following glider release. With the constant take-off, climb, descent and landing entailed in the towing operation, the engines are subjected to severe thermal stress. This rapid heating and cooling can result in cylinder head cracks and other expensive repairs. Loss of service can be greatly reduced by following good practice in power, airspeed and configuration control.

2.11.3.2 After glider release is confirmed, make a turn to the left, and then: Smoothly retard the throttle to 2100-2200 RPM.

2.11.3.3 Lower full flaps (airspeed indicator within the white arc).

2.11.3.4 Trim the airplane for the new configuration and airspeed.

2.11.3.5 Allow airspeed to increase to 90 MPH.

2.11.3.6 Gradually reduce power in small increments during the let-down.

2.11.3.7 Maintain partial power all the way to the flare to prevent excessive cooling.

2.11.3.8 Carb heat is not normally used during descent.

2.11.4 Post flight

2.11.4.1 After the last flight of the day, top-off the fuel tanks to prevent condensation. Turn the prop to horizontal to clear the overhead beams if putting the

plane into the barn hangars. Make sure that the wing tips clear of the sides of the hangar as it is pushed back then chock the wheels in place when finished. After the plane is safely in, turn the prop to a 45 degree angle to discourage our winged friends from making a perch out of it and to discourage the use of the front vents as a nesting place.

2.12 Noise Control

2.12.1 CCSC takes noise complaints seriously, and noise control is an urgent requirement for tow plane operation. It is extremely important that we minimize noise disturbance since we must promote favorable community relations, in order to continue the Club's successful operation.

2.12.2 There are numerous locations across the country where irate residents have been successful in closing airports down, or at a minimum, have cost airport operations dearly in legal defense fees. Generally, noise complainants respond favorably when we point out our noise reduction procedures, patterns and avoidance zones and special equipment. Establishing and adhering to a noise control program can be an important legal protection.

2.12.3 Noise Avoidance Zones

2.12.3.1 Consistent with safe operations, tow pilots must remain clear of the noise zones indicated on Attachment D. Our neighbors in these areas have exchanged numerous phone calls and we must treat these zones with great care.

2.12.3.2 It is important to also avoid the zone immediately to the North of the field along Elbon Road, including the senior citizen home at the east end of the field. Avoid the town of Oregonia, two miles to the South. Also, avoid built up areas (hard to do anymore) and most important, do not spiral down over houses. Descend in wide turns. This way, you will annoy a bunch of people a little bit of the time instead of just one person all the time! Vary your climb-out and let-down patterns. Lastly, whenever possible, avoid low altitude high power maneuvering (go-arounds cannot always be avoided).

2.13 Efficient Operation and Good Practice

2.13.1 Since the entire flight operation comes to a halt (or never begins) without operating tow planes, it is imperative that tow pilots make every effort to meet their crew day assignments. If you are unable to fly on your assigned day, you are responsible for finding a qualified replacement.

2.13.2 Tow pilots are responsible for obtaining a tow card prior to each tow, for noting the actual release altitude (if different than the requested altitude) and for turning in all of the tow cards to the crew chief at the end of operations.

2.13.3 Aero tow retrieves must be authorized by the crew chief and may be made only from established improved public use airports (Ref. UOP's 2.6 & 4.9.9).

2.13.4 Although this is not a normal responsibility, off duty tow pilots are encouraged to help out when requested, or when there is an obvious need. This is in the best CCSC tradition of volunteer spirit, and can make a big impact on the operation.

2.14 Ground Operations

2.14.1 In preparing for hook-up, taxi close to the glider so that the crew person can pick up the tow rope and hand you the tow card. Set your power at idle and avoid blowing your prop wash at crew personnel and equipment on the field. If there is an excessive delay in preparing the glider for hook-up, the engine should be shut down to conserve fuel and to prevent plug fouling.

2.14.2 After hook-up, ensure area in front of glider is clear, and then take up slack carefully until you receive the signal to stop. Observe the rope in the mirror to avoid jerking the glider. Some crew may signal for slack take-up before hooking up to the glider. This is perfectly acceptable, but the rope should never be connected to the glider without the pilot on board.

2.15 Adjustments to Patterns

2.15.1 It may be advantageous to land downwind to reduce the turnaround time on a busy day. This is a common practice at CCSC, but should be done only when the wind is light (generally less than 10 MPH) and only with the concurrence of the other tow pilots and the crew chief. Downwind landings are standard during contest operations.

2.15.2 When operating from RWY 27, a favored and safe departure entails a 45 degree right turn just before reaching the river, proceeding to the Northwest, and then turning left 45 degrees and flying along Middletown Road. This pattern allows separation from Waynesville airport and takes the glider well upwind of the gliderport. It also provides more than adequate separation from the noise zone to the Southwest of the field.

2.16 Tow Speeds

2.16.1 A general rule is to tow Schweizers at 65 MPH and glass sailplanes at 70-75 MPH. However, if the sailplane is carrying water ballast, the pilot may request 75-80 MPH.

This results in a rather “flat” climb but is assures improved control for both aircraft. If questions or concerns exist, discuss the tow speed with the glider pilot.

2.16.2 Keep in mind that the Pawnee airspeed indicators are calibrated in MPH, whereas most glass sailplanes use knots as their airspeed reference. The conversion factor is 1:15, so to convert knots to miles per hour, multiply knots by 1.15 and the result is your desired airspeed in MPH.

2.17 Use of Thermals

2.17.1 To aid climb rate, tow in lift if possible. Moreover, the opportunity to release in lift is always appreciated by the glider driver. However, it is important not to fly too aggressively with an inexperienced pilot on the other end of the rope.

2.18 Contest Towing

2.18.1 CCSC hosts several contests and events each year such as the Region 6 South contest and in the past the once venerable Wright Memorial Meet, along with frequent “mini-contests” for the benefit of Club members. Any tow pilot who actively crews will, at some point, be exposed to the special rigors of the contest environment

2.19 Special Procedures

2.19.1 Glider contests are highly controlled and disciplined events, with specific procedures every day. The launch operation proceeds at a rapid pace, without interruption, until all of the contestants are successfully launched.

2.19.2 Tows are made to a standard release altitude of 2000' AGL and at a predetermined release area. Contest operations require launch of all sailplanes (perhaps 20-40) with in a time interval of about one hour (if it is a single class contest). This necessitates a highly efficient and well-coordinated towing operation.

2.19.3 As an example, downwind landing may be standard, assuming wind conditions permit, with three or more tow ships active. Common practice at the CCSC gliderport is to stage the sailplanes at the east end of the field. Tows are made to the West using the right side of the field as a take-off zone. The tow plane makes a straight out, or dog-leg departure to the right, and then proceeds West to the release area. The tow plane then returns promptly and makes a downwind landing using the South side of the runway. With the advantage of our wide runway, landing against opposing traffic does not usually present a safety problem, as long as all pilots are operating in a “heads-up” manner.

2.19.4 With this expedited procedure, the tow plane will taxi up to the start line, is then pointed to the next sailplane by the Launch Director, and continues rolling without stop. The launch crew captures the rope while the tow pilot takes up the slack. Sometimes there will be a “Starter”, stationed several hundred feet up field of the start line, who will relay signals from the wing runner (or Launch Director), and gives the slack take-up and the take-off signals to the tow pilot so the need to check in the mirror is lessened, but it is always a good idea to check every so often. If it's done properly, the tow plane is in continuous motion. It is important; however, that the tow pilot responds immediately to the Starter’s instruction and should be prepared to stop quickly. A crew member may be under the glider as the tow rope snug’s up, or a knot may be discovered in the rope.

2.19.5 Tow pilots should attend the pilot's briefing which typically takes place at about 10 am each day. Tow procedures and release points may vary each day, according to conditions and task selection. Each tow pilot must be tuned into the patterns and procedures to be used in towing each contest day.

2.20 Contest Chief Tow Pilot

2.20.1 A Chief Tow Pilot (CTP) will usually be appointed for each contest. Their responsibilities include scheduling pilots for each contest day, choosing the appropriate patterns and procedures for the day's launch, briefing the contestants at the pilot's meeting and flying one of the tow planes.

2.20.2 Obviously, each tow pilot must be tuned into the patterns and procedures to be used in towing each contest day.

3 <u>The Piper Pawnee</u>

3.1 The Pawnee is among the most capable, reliable and cost-effective glider tow aircraft in use anywhere. Although checkout in any one of the three is sufficient to meet make and model requirements, there are some differences among the three aircraft.

3.2 CCSC operates three Pawnee models:

3.2.1 B model (33Z),

3.2.2 C model (48L)

3.2.3 D model (909)

3.3 Although checkout in any one of the three is sufficient to meet make and model requirements, there are some differences among the three aircraft.

3.4 The D version, 909, is a later model with wing fuel tanks and engine driven and electric boost pumps. The other two models have fuselage tanks, and gravity feed system. Also 909 has five fuel sump drain points, one in each wing, and two side-by-side under the fuselage near the fuel cross feed and the customary drain under the cowling. All five should be checked for water and sediment as part of the preflight. The other two models have a single drain under the cowling. The electric fuel pump will show only a subtle increase in pressure on the gauge, so if you turn off the electric pump, and a significant drop occurs, you can suspect a problem with the engine driven pump. Normal procedure is to leave the boost pump off during taxi and take- off. The pump can then be turned off about half-way to release altitude, and the reactivated at the same point during letdown.

3.5 With the wing tanks, occasionally the fuel will not feed in proportional amounts, particularly if you are in the habit of making turns mostly in one direction. A minor weight imbalance may occur, which is corrected by refueling the aircraft. This imbalance, if it does occur, is not a serious situation, but you may end up flying much like the infamous Chinese fighter pilot, One Wing Low!

3.6 All three tow planes are fitted with Gomolzig mufflers which reduce the decibels quite a bit as compared with the old straight mufflers.

3.7 Strangely enough, the earliest model, 33Z, appears to be the most robust of the three and should be used for towing heavy ships. It has an extra 14 sq/ft of wing area and Hoerner tips (slight upward flaring geometry which helps with vortices) so its span is 20” greater. Note that if stored in the barn, 33Z will only fit in the North hangar space. On the other hand, 909 has the most anemic climb performance and caution is advised if it is used to tow heavier gliders, if at all.

4 <u>Acknowledgements</u>

4.1 Updated - Tow Pilot's Guide.

4.1.1 This revised and updated Tow Pilot's Guide represents the combined effort of several CCSC members, who contributed ideas, suggestions and other input. In particular;

4.1.2 John Antrim offered numerous ideas on towing procedures and tow plane care and maintenance.

4.1.3 Rob Cluxton rendered valuable input on tow pilot checkout procedures.

John Murray provided constructive comments on towing procedures for high performance sailplanes.

4.1.4 Tom Bales, along with other CCSC tow pilots, contributed to the section on Towing Tips.

4.1.5 Rich Carraway first put this manual into typed form.

4.1.6 Andrew Dignan converted the third edition into electronic form.

4.1.7 Hopefully, this Guide will server to standardize, and further improve, a safe and efficient towing operation that has been a CCSC tradition for many years.

4.1.8 Reviewed and printed in 2010 by Rich Carraway Tom Rudolf and William (Buck) Towne. Added paragraph numbers and clarification. No content changes.

4.1.9 Updated by Tim Christman to reflect FAA and UOP updates.

5 Attachment A

5.1 Minimum Requirements for CCSC Tow Pilot Qualification

5.1.1 A tow pilot candidate must meet the following basic requirements

5.1.1.1 Minimum Ratings

5.1.1.1.1 Hold a Private Pilot certificate with Aircraft Single Engine Land (ASEL) and Glider ratings

5.1.2 Minimum Experienced

5.1.2.1 250 total hours of pilot flight time in powered or other aircraft.

5.1.2.2 150 hours PIC.

5.1.2.3 25 total hours of pilot flight time in conventional gear (tail dragger) aircraft with an instructor endorsement per FAR 61.31.

5.1.2.4 A High Performance (over 200 HP) endorsement per FAR 61.31.

5.1.2.5 A CFIG endorsement for glider tow requirements per FAR 61.69.

5.1.3 Insurance and Club UOP Requirements

5.1.4 CCSC and SSD membership in good standing.

5.1.5 Familiarity with written SSA and CCSC towing procedures (this Tow Pilot's Guide).

6 Attachment B

6.1 Tow Pilot Checkout Procedures

6.1.1 The prospective CCSC tow pilot must:

6.1.2 Describe and demonstrate Pawnee aircraft systems via

6.1.2.1 Written test given by the Chief Tow Pilot or their designate.

6.1.2.2 Oral exam and test review given by the Chief Tow Pilot or their designate.

6.1.3 Demonstrate preflight for each Pawnee with respect to:

6.1.3.1 Fuel requirements.

6.1.3.2 Check flight procedures.

6.1.4 Discuss and demonstrate tow procedures as it relates to:

6.1.4.1 Use of tow cards.

6.1.4.2 Review and knowledge of all standard tow signals.

6.1.4.3 Taxi patterns in the vicinity of the flight line.

6.1.4.4 Proper take-up of slack action.

6.1.4.5 Appropriate airspeeds and bank angles.

6.1.4.6 Use of published departure and approach patterns.

6.1.4.7 Review noise sensitive areas.

6.1.4.8 Effect of out-of-position tow on the tow plane.

6.1.4.9 Glider release and initiation of descent.

6.1.4.10 Proper descent configuration for minimizing shock cooling.

6.1.4.11 Proper approach speed and approach profile for rope clearance.

6.1.4.12 Refueling after 8-10 tows.

6.1.4.13 Aircraft logbook entries at the end of the day.

6.1.5 Describe emergency procedures for:

6.1.5.1 Loss of power on tow.

6.1.5.2 Release failure for both tow plane and sailplane.

6.1.6 Be supervised/instructed on a minimum of five tows in a two-place tow plane by the Chief Tow Pilot or a person designated and acceptable to the CTP to act in the CTP's place.

6.1.7 Be supervised on 10 take-off and landings (as required by CCSC Tow plane insurance) or if the prospective tow pilot meets insurance requirement be observed on at least 3 take-offs and landings.

6.1.8 Be supervised on 5 actual tows at CCSC using the Pawnee.

6.1.9 Have an endorsed pilot's logbook for both the Pawnee checkout and the glider

tow clearance.

6.1.10 The insurance company often requires more than the above listed requirements. All check outs will be tailored to meet insurance requirements.

7 Attachment C

7.1 Federal Aviation Regulations

7.1.1 Among the myriad regulations that govern our activities as pilots, there are four regulations of particular interest to the tow pilot candidate. The following is an overview of each. A tow pilot candidate must meet the following basic requirements:

7.2 Towing Gliders (FAR 91.309)

7.2.1 This regulation deals with tow lines, which must have a breaking strength of not less than 80% of the maximum certificated operating weight for the glider, and not more than twice (200%) this operating weight. A towline may have a breaking strength of more than twice (200%) the maximum certificated operating weight if safety links are used at both ends

7.2.2 A safety link installed at the tow plane end must have a breaking strength greater, but not more than 25 percent greater (101% to 125%) than that of the safety link at the towed glider end of the towline and not greater than twice the maximum certificated operating weight of the glider. Note: This regulation puts the onus on the TOW PILOT, not the glider pilot, to ensure that the proper combination of tow rope/weak links is used. Be aware of this when towing very light gliders such as the Sparrowhawk.

7.2.3 Before conducting any towing operation within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport, or before making each towing flight within such controlled airspace if required by ATC, the pilot in command notifies the control tower. If a control tower does not exist or is not in operation, the pilot in command must notify the FAA flight service station serving that airport before conducting any towing operations in that airspace. A good example of when this regulation comes into play is when doing a retrieve from an airport when the tower is closed. Class E airspace extends from the surface upward when the control tower at a Class D airport is closed, thereby bringing this regulation into play during the flight planning for the retrieve.

7.3 Glider Towing - Experience and Instruction Requirements (FAR 61.69)

7.3.1 A tow pilot must hold at least a Private-Airplane certificate. The pilot must have a logbook endorsement from a CFI-G, certifying that ground and flight instruction has been given in towing procedures. They must log at least three tows, accompanied by a qualified tow pilot, and must also log at least ten tows as PIC. A private pilot must have at least 100

hours of pilot-in-command time in powered aircraft, or 200 hours pilot-in-command time in a combination of powered and other aircraft (such as glider).

7.3.2 For currency, within the preceding 12 months the tow pilot must have at least three actual or simulated tows while accompanied by a qualified tow pilot, or made at least three PIC flights in a glider towed by an aircraft.

7.4 High Performance Airplanes (FAR 61.31.(F))

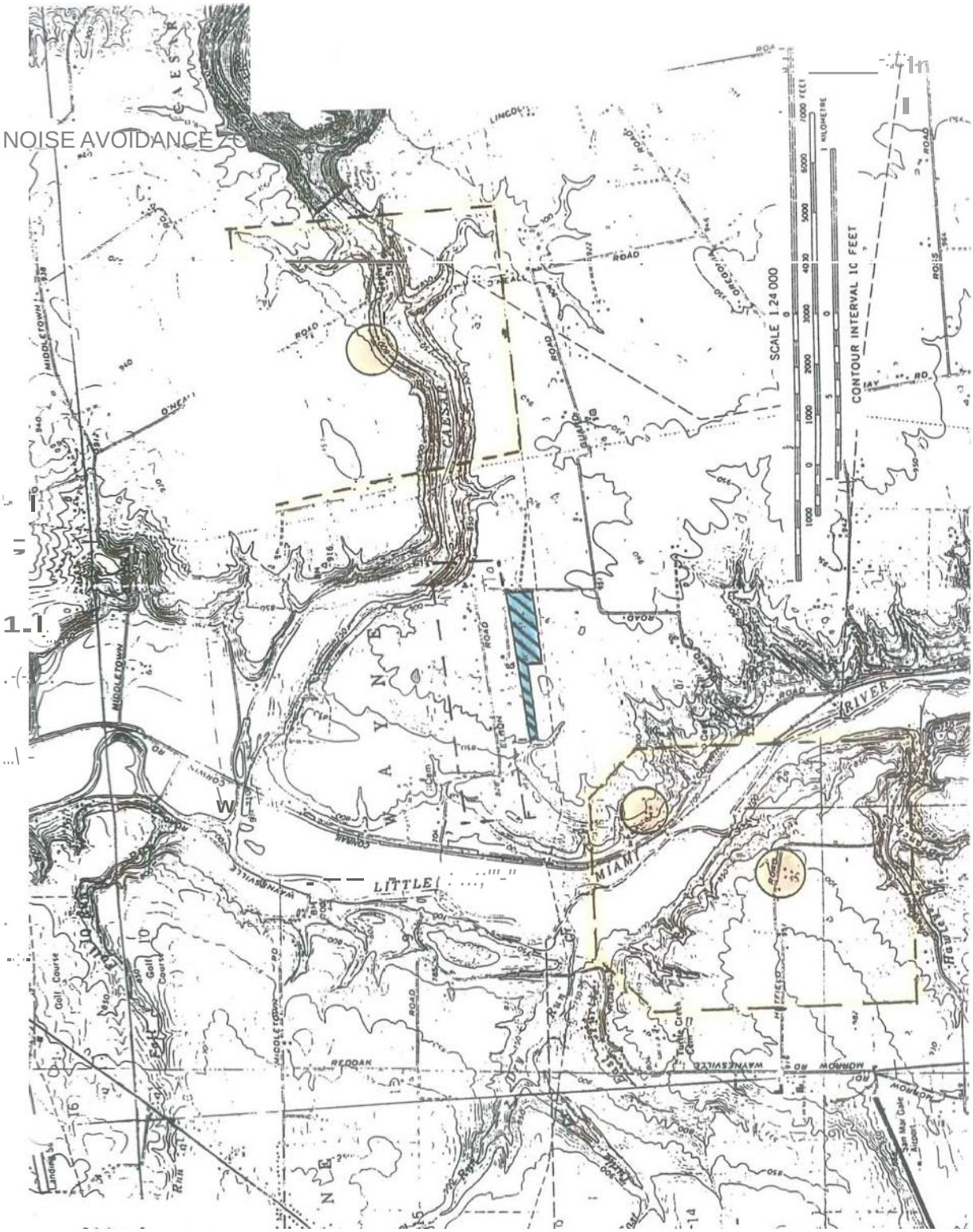
7.4.1 A tow pilot candidate must have a high performance endorsement to operate an airplane with over 200 HP. This endorsement can easily be accomplished in a Cessna 182 or other airplane over 200 HP, such as the Stearman at Red Stewart field (220 HP radial motor).

7.5 Tailwheel airplanes (FAR 61.31)

7.5.1 The CCSC UOP's also require at least 25 hours of tailwheel time. Unless the candidate has PIC time in tailwheel aircraft prior to April, 1991, a logbook endorsement certifying competency in tailwheel airplanes from a qualified instructor is required, along with the 25 hours.

8 Attachment D

8.1 Noise Area map



9 Attachment E

9.1 Tips for CCSC Tow Pilots

9.1.1 Vary your climb-out and letdown patterns to disperse the noise.

9.1.2 Speed up 5 MPH when the sailplane is practicing out-of-position maneuvers for improved control response.

9.1.3 Smoothly accelerate on take-off when operating around the flight line.

9.1.4 “Clear” the prop area when starting the engine.

9.1.5 Avoid power-on spirals during letdown (spread the noise).

9.1.6 Use minimum power around the fuel ramp to avoid picking up stones, gravel, etc. (props are expensive!)

9.1.7 Schedule rest/refueling periods after 8-10 tows.

9.1.8 Coordinate with crew chief and other tow pilots on landing patterns and direction.

9.1.9 Warm up the engine prior to your check-flight regardless of the air temperature (avoid excessive oil pressure).

9.1.10 Maintain adequate engine power during letdown to minimize the possibility of shock cooling.

9.1.11 Avoid abrupt throttle movement.

9.1.12 Use the electric fuel pump in 909 during take-off and landing.

9.1.13 Drain fuel sumps as part of your preflight (note that 909 has five).

9.1.14 Be careful not to over-tighten oil caps.

9.1.15 Allow for at least 200 feet altitude over the fence to assure rope clearance.

9.1.16 Top-off the fuel tanks following your test flight.

9.1.17 Make sure the seat adjustment rail pins are in place and the safety harness is locked (48L and 33Z).

10 Attachment F

10.1 Pawnee PA25-235 Specs

10.1.1 Engine: Lycoming O-540

10.1.2 Rated HP: 235

10.1.3 Rated speed RPM: 2575

10.1.4 Oil sump capacity: 12 qts. (9-11 normal operating).

10.1.5 Oil pressure: Minimum/Maximum: 60/90 lbs

10.1.6 Oil temperature: 120-245 degrees normal operating range

10.1.7 Maximum magneto drop: 150 RPM.

10.1.8 Electrical system: 12 volt DC

10.1.9 Empty weight: approximately 1524 lbs.

10.1.10 Gross weight: approximately 2900 lbs.

10.1.11 Fuel capacity: 38 gallons (48L), 38 gallons (33Z)[1] , 36 gallons (909)

10.1.12 Fuel requirements: STC approved for autogas (87 octane minimum NO ETHANOL) or 80/87 or 100LL avgas

10.1.13 Fuel consumption: 14 gallons/hour at 75%

10.1.14 Stall speed: 46 MPH at normal operating weight

10.1.15 Flap operating range: 0-109 MPH (white arc)

10.1.16 Best rate of climb: 80 MPH

10.1.17 Best angle of climb: 71 MPH

10.1.18 Normal approach speed: 75 MPH (full flaps)

10.1.19 Tire pressures: 25 lbs. (main) 50 lbs. (tailwheel)

11 Attachment G

11.1 Pawnee Pre-flight

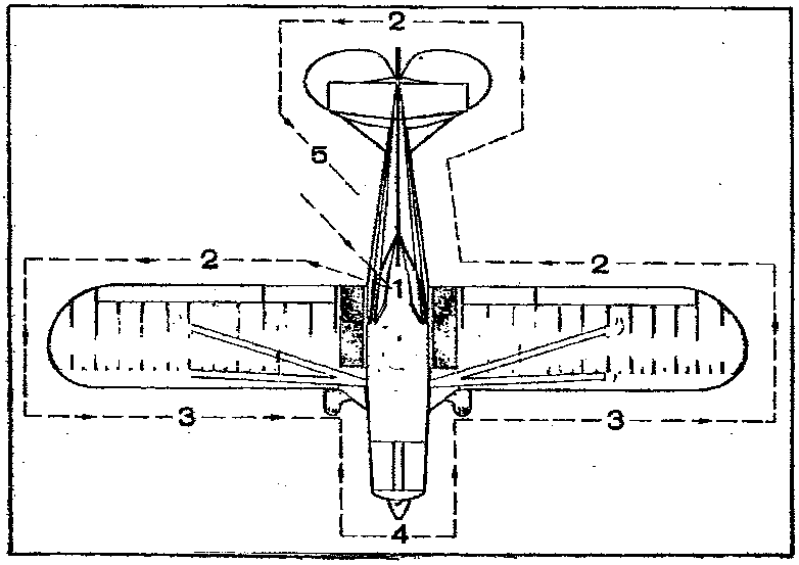
The preflight should be a careful visual inspection made prior to flight. The following is an outline for preflighting the Pawnee.

1.a. As the aircraft is approached check the general appearance.

b. Check cockpit for general appearance. Check the master and magneto switches in off position.

c. Check windshleld and condition of cockpit enclosure.

2.a. Check top side of wings, strut security, flap and aileron security and wing tip light.



b. Check tall surfaces. tail brace wires and fittings for condition and security.

3.a. Check leading edge of wing for dents and condition.

b. Check landing gear for security, check tires for proper inflations, cuts and flat spots.

4.a , Check propeller and spinner for condition and. security.

b. Open engine cowling and check for oil capacity. Check engine and accessories for security.

c. Drain fuel strainer. Allow sufficient fuel to drain so that the system is free of sediment.

d. Check fuel tank for leaks and quantity.

e. Check air filter for security.

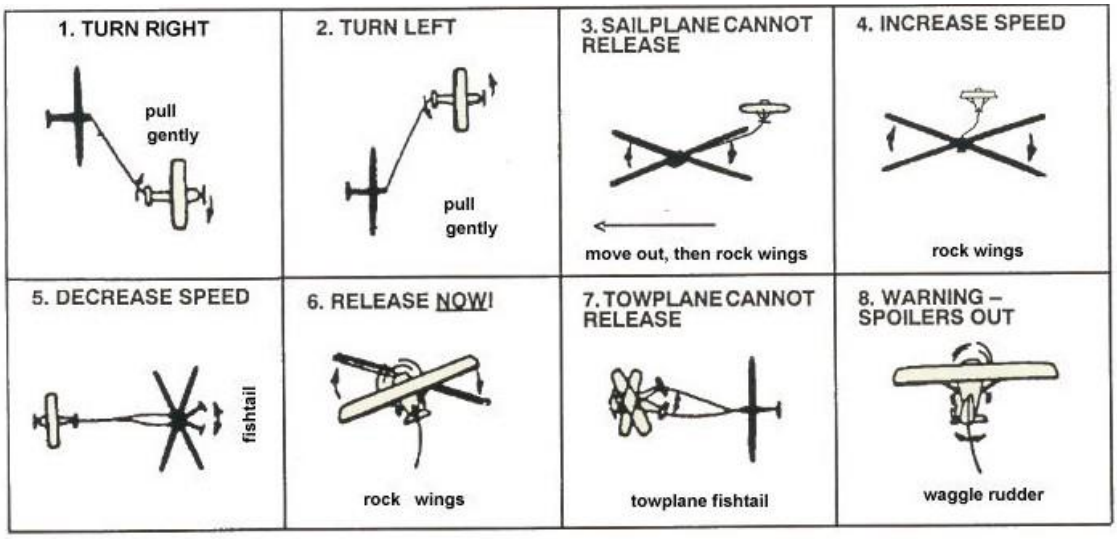
5.a. If agricultural equipment is installed, check for security and general condition.

b. Check turtle deck for condition and security.

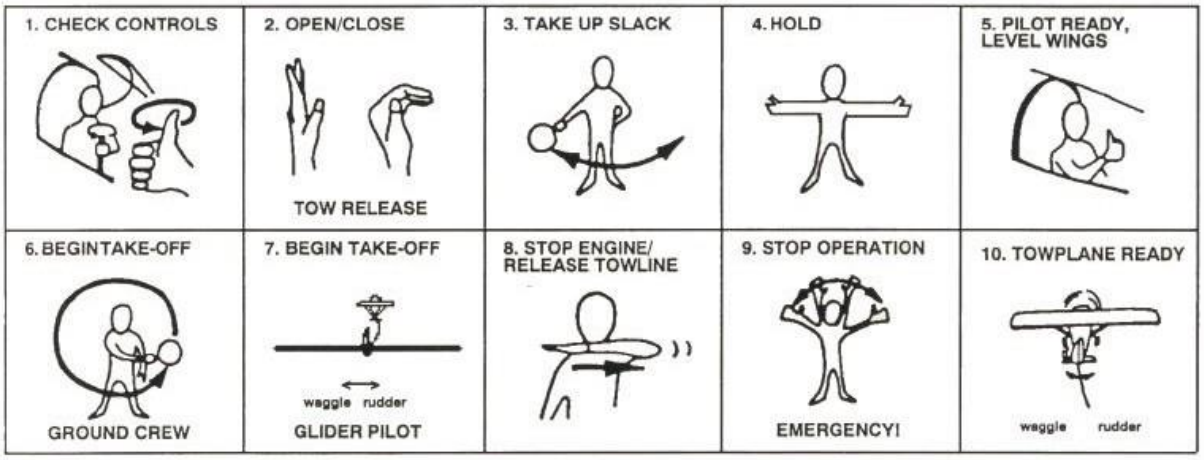
12 Attachment H

12.1 Standard American Soaring Signals

12.1.1 See Chart Below:



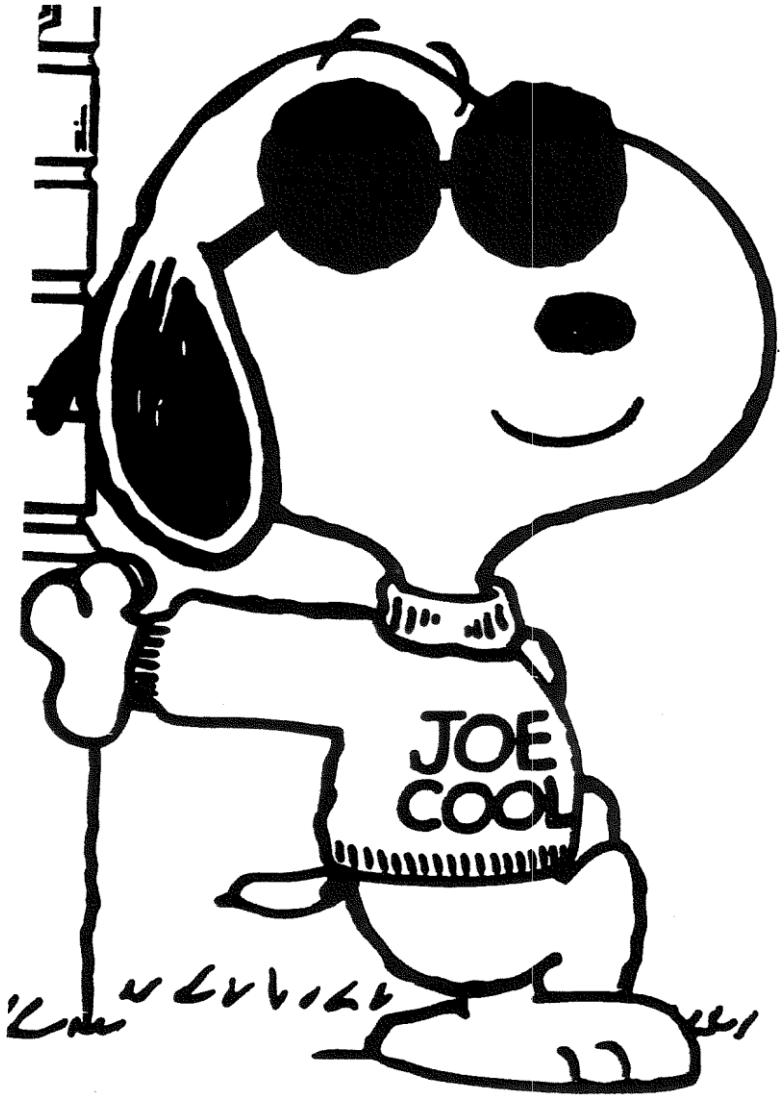
IN AIR

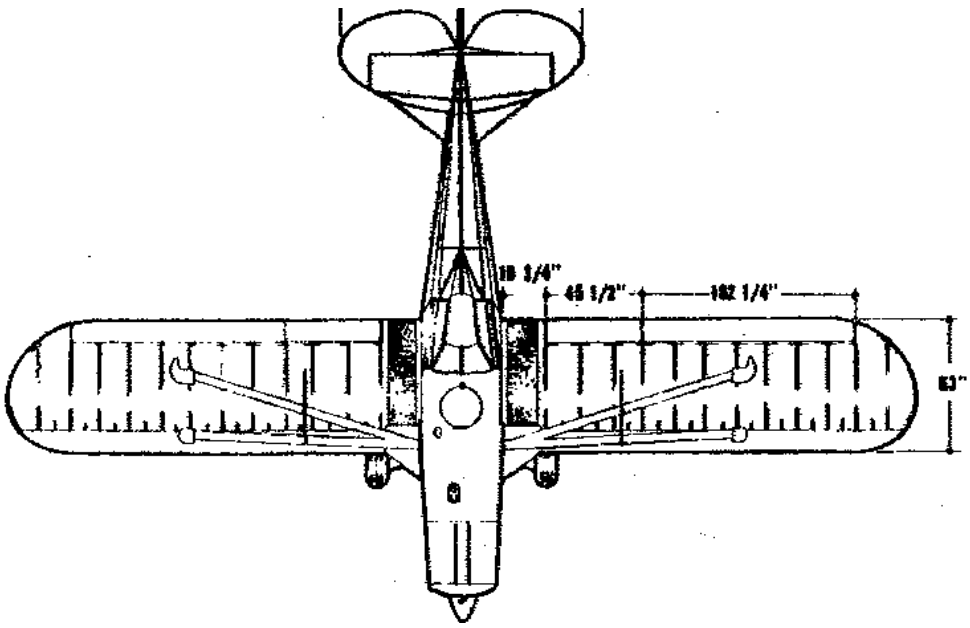


ON GROUND

13 Attachment I

13.1 A Typical CCSC Tow Pilot

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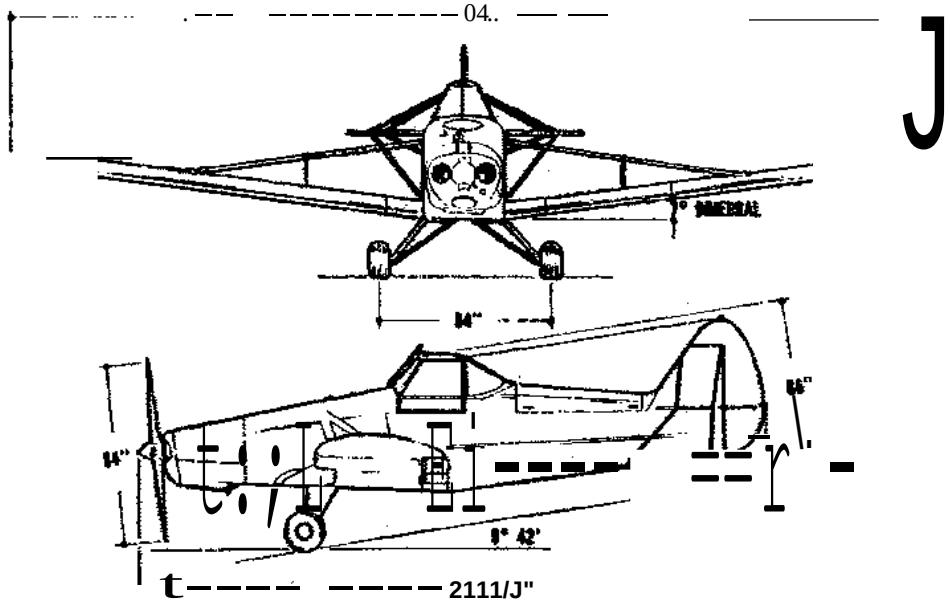
45 1/2"
182 1/4"
63"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