Tow Pilot Manual

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Overview

This document covers tow pilot operations for the Mid-Georgia Soaring Association (MGSA) and is intended to standardize expectations, requirements, and procedures for new and existing tow pilots. Whenever possible, it will refer to existing documents instead of re-documenting topics that could then cause confusion. Appendices contain detailed cross-reference information to external documents. If there is a discrepancy between this document and the external document referenced, then the external document is the authority.

Driving Principle

The principle driving all towing operations with MGSA is:

> ***Every launch involves multiple aircraft and multiple people whose lives all depend on each other***.

This type of operation is sometimes conducted in congested airspace, with multiple gliders, tow planes, jump operations, and GA traffic operating in close proximity. Glider towing is complex and carries risk with every operation.

All decisions are to keep these facts in mind, and they should be made to assure that all actions are:

Safe, Legal, Operationally Consistent, and Smart

Organization

This document is organized to be useful in an initial read for new tow pilots, but also as a reference and refresher for experienced tow pilots. The following margin markers call out key information:


Flight Safety


Operational Safety


Club Policies and Procedures


Best Practices


External Document with More Detail

Becoming an MGSA Tow Pilot

The Process for becoming a tow pilot for MGSA includes:

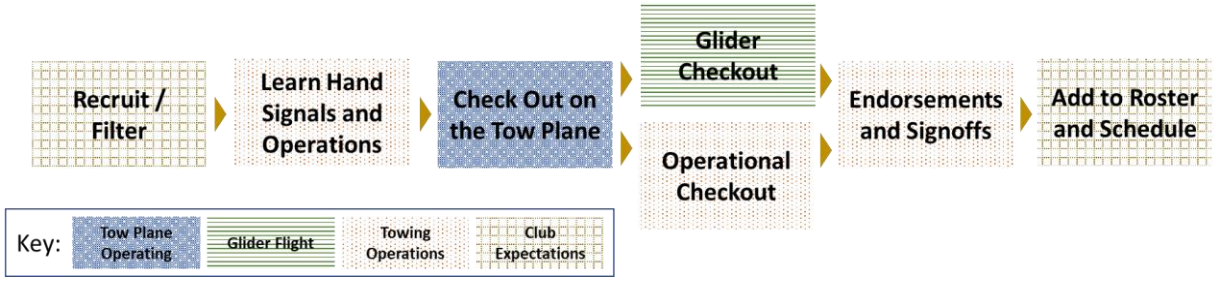


Figure 1: The New Tow Pilot Process

This process is covered in detail later in this document.

Learn Hand Signals and Operations

For those who have never towed before, there are two on-line courses that must be studied. Each has a pass-fail exam at the end, and a passing score must be documented and shown to the Checkout Pilot. (See the Appendix for links to the on-line courses.)

The first of these is a Wing Runner course which covers general glider staging, hookup, and launch, including hand signals with the glider pilot as well as with the tow pilot.

The second is the Tow Pilot course which covers tow rope and weak link ratings, safety and emergency situations, aerotow, and other topics.

Check Out on the Tow Plane

Tow plane operations is all about flying the airplane safely. The depth of review is dependent on the new tow pilot's experience with the type.

New to the Type

Review of the POH and a thorough walk-around are initial steps. The walk-around should be assisted by an experienced tow pilot using the POH and the club's Prep and put-away checklists as references. Familiarization with the cockpit, instruments, controls, systems, and placards should follow the detailed preflight.

Advancement through the Tow Pilot Rubric will guide the new tow pilot through startup, taxi, fast taxi, simulated takeoff, simulated landing, and minor crosswind techniques.

The tow pilot is not to take off without receiving at least a verbal approval from the checkout pilot. This can be done verbally via radio and should be recorded on the rubric.

Once the new Tow Pilot has completed the Rubric, it is up to the tow pilot to decide when he/she is ready for tow operations.

Experienced in Type

A log book review and verbal discussion of the Tow Pilot Rubric may be enough to satisfy the checkout pilot that the new pilot is capable of handling the aircraft. If so, then the checkout pilot can sign the Rubric as ready for takeoff and the experienced pilot may get comfortable with the exact aircraft and its handling qualities.

Glider Checkout

Experience at the glider end of the tow rope is required for tow pilots by the FAA. A Glider instructor must endorse the tow pilot's log book that training has been given in gliders to satisfy FAR61.69(a)(3).

New to Glider Flight

Someone new to glider flight should be walked through the procedures used at the staging area, including how to tell when gliders are "secure" and when they are particularly vulnerable to propwash. They should then be taken for instruction flights with particular emphasis placed on safety and glider-specific decision making, particularly under tow.

Previous Glider Experience

Those with previous glider experience – such as rated glider pilots – can be familiarized with more specifics regarding MGSA's staging and launch procedures.

Operational Checkout

Details about towing operations are available in other documents, including "MGSA Launch Procedure.pdf" and "TOST-winch-launch.pdf" (see Appendix for where to find these documents.) These provide a lot of detail on how MGSA conducts towing operations and are updated when procedures change.

New to Towing

Those tow pilots who are new to towing should spend some time observing tow operations and running wings until they are comfortable with standard launches as well as unusual situations, like quick turnarounds and launching gliders with water ballast.

> ***It is important that new tow pilots NOT tow under circumstances in which they do not feel prepared to operate safely.***

Previous Towing Experience

Those with previous towing experience should be particularly careful regarding skydive operations deconfliction. At a minimum, tow pilots should review "F&OR Rev 12-6-2020.pdf" and "Skydive Deconfliction2.pptx" (see Appendix for locations for these documents).

Endorsements and Signoffs

There are two key FAA endorsements (by a CFI) required to fly as a tow pilot:

1. Tow pilot competency
2. Instruction in Gliders

<unfinished>

Add to Roster and Schedule

<unfinished>

Towing Operations

Preparation

First, make sure that you as the PIC of the tow plane are ready to fly. Follow the FAA's IMSAFE checklist: Illness, Medication, Stress, Alcohol, Fatigue, Eating. Don't fly with known deficiencies… others can carry the load!

Do a thorough weather check the night before you are due to tow. If you have concerns, communicate with the OD and coordinate communications with the club early.

Be prepared to be at the field all day. Even if all gliders have been launched, some return and other club members take them up again. The tow pilot is "on call" all day until the OD says to put the tow plane away.

Bring food and drink for the day. Due to the "on call" nature of towing, leaving the airport for food is not expected of the tow pilot. Also, bring sunscreen, a hat, and clothes for the weather. There will be no heater available, and getting across the field to the hanger can interrupt operations. Bring everything you need and be ready to fly.

Some tow pilots have moved their vehicle to the keyhole. This is fine as long as it does not interrupt operations. It can be logistically complex.

The Field (D73) and Environment

Monroe airport (D73) is a city-owned airfield southeast of the city of Monroe, GA. It appears on the ATL sectional and is only a few miles to the east of the Atlanta Mode C veil.

Area Summary

To the northeast is Athens, and to the northwest is Lawrenceville. Note that Covington is within the Mode C veil, so a transponder is required to fly there for fuel or other reasons.

Both the glider operations and skydive operations are marked on the Sectional.

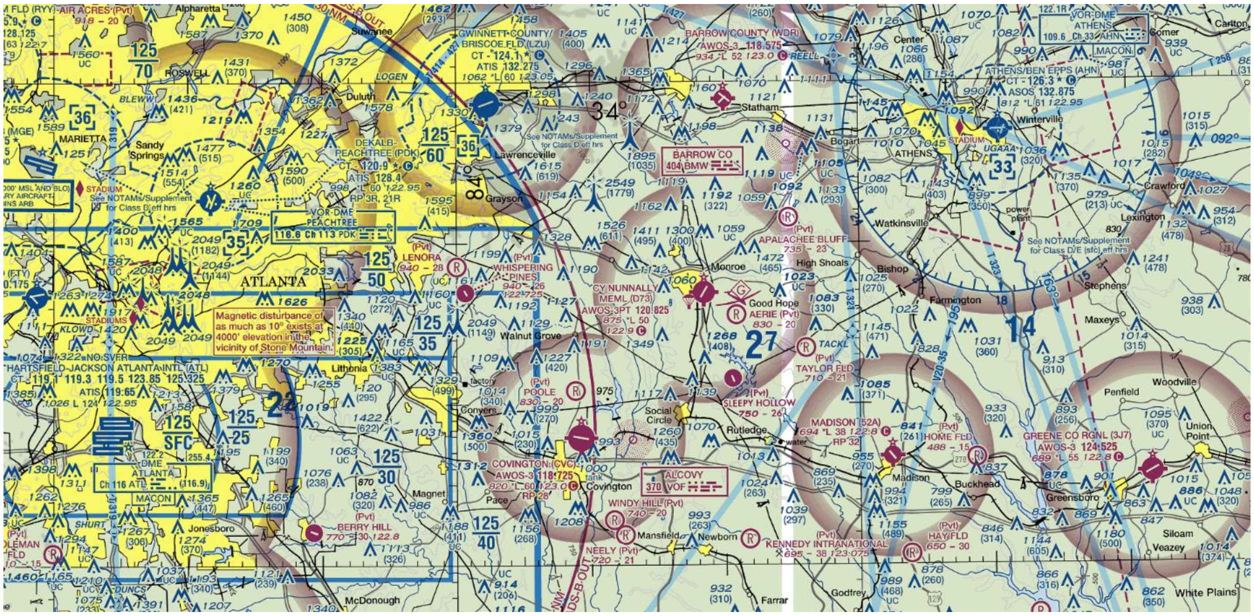


Figure 2 - Sectional of Monroe Area

Field Summary

The runway at Monroe was repaved in 2020 and is in excellent shape.

There are T-hangars on the south side of the field (this is where the Pawnee is housed) and larger hangars on the northeast side at midfield. The MGSA clubhouse and hangar for club ships is located next to Skydive Monroe on the northwest side of the field.

The Keyhole area at the approach end of Runway 3 is where most Club operations are centered. On operational days, the Club sets up tents in the grass near this keyhole and parks gliders around the pavement here.

FAA Identifier:	**D73**
Lat/Long:	33-46-57.1000N 083-41-34.1000W
	33-46.951667N 083-41.568333W
	33.7825278,-83.6928056
Elevation:	875.2 ft. / 266.8 m (surveyed)
CTAF:	122.9
Runway 3/21:	
Dimensions:	5000 x 75 ft.
Surface:	asphalt, in excellent condition
Pattern:	Left (both runways)

Figure 3 - D73 Summary Information

It is somewhat unusual for gliders to operate out of a paved airport. Many experienced tow pilots have never towed off of cement except during an aero retrieve. The paved runway is one reason the club demands solid tailwheel experience ON CEMENT.

Both Skydive Monroe and the Flight School sometimes operate at high tempo, particularly on weekends. At times, the jump plane – currently a modified King Air – performs hot turns, loading the next set of jumpers without shutting down its engines.

One key aspect of the runway environment is that there are few options for landing on grass. Riprap was used for erosion control in places, making some grass areas non-options for landing. All tow pilots are required to take a "golf cart tour" of the airport prior to towing to familiarize themselves with the airport and landing possibilities.

The wind sock is located on the northwest side of field. The automated weather system is here, too, but is often inaccurate or inoperable. A second wind sock is located on top of the hangars on the south side of the field.

The club prefers to stage and launch on Runway 3 since the approach end of 21 is quite muddy and lacking in staging space. Gliders often land on 21, landing long to end up at the keyhole for another launch. Pattern is left for both runways.

Wind is often out of the north or northwest. (Note: TAFs for KATL are often very close for Monroe.) This sometimes causes rotor over the trees from the left while operating on Runway 3. You may also experience in increase in crosswind as you pass the end of the tree line along the north side of the field.

Hangar

The Pawnee is kept at the first hangar just inside the vehicle gate on the south side of the airport.

Gate code: **1400**
Hangar combination: **5448**

The best place to park for the day is across from the hangar and beyond the gate fence post. Make sure to park clear of any airplane that may taxi past.

Because the Pawnee is kept in the end hangar, both doors must open in the same direction. When opened, they overlap with the hangar next door. For this reason, leaving the hangar doors open without being nearby to close them if asked is considered a bad idea. Always leave the hangar doors closed when away from the hangar.

Inside the hangar are the following:

Location	Contains
Lockable enclosed metal cabinet	Paperwork, fragile items, and any electronics
Hardware shelves	Bolts, screws, raw materials
Tool chest	Tools, consumables (anti-seize, loc-tite, safety wire, etc.) Everything necessary to do pilot-required tasks involving the airplane.
Work bench	Area for local work
Operations Shelves	Preflight, put-away, and consumables for operating the airplane.

Figure 4 - Hangar Contents

One Operational Shelf is for Preflight. It contains everything needed to get the airplane ready for flight, including oil, tire pressure gauges, etc. Next to this shelf is posted the preflight checklist, a combination of POH information and MGSA policies.

On the Put-away Shelf can be found microfiber cloths and cleaning compound. Next to this shelf is a put-away checklist that should be followed when the flying day is done. Also next to the put-away checklist is a QR code for submitting squawks on the airplane as well as service requests for the hangar, such as resupply of consumables or missing tools.

Airplane

Any issues with the airplane or maintenance deficiencies can be found on the Maintenance List. This is kept in Google Sheets (link available on the MGSA Groups.io page) and indicates any grounding issues. Items submitted via the QR code are reviewed and added to this list.

Log books are locked in the Club hangar along with the glider logbooks. Contact Club management to get access to these logbooks. The maintenance team keeps up with these records and tow pilots should not update them without consulting the maintenance team or Club management.

Preflight

Preflight should be conducted according to the Preflight Checklist. As always, the POH is the authority on this topic. MGSA policies are intended to keep the aircraft in the best possible working condition, so long-term towing use within our environment is a key consideration.

The tow rope is critical to glider safety and it is the tow pilot's responsibility to inspect it before use and assure that it is ready for a day of towing. (Tip: recruit a glider pilot to help with the inspection in the grass at the keyhole instead of trying to unwind it in the hangar.) When inspecting the tow rope, pay particular attention to fraying, local discoloring, flattening or cuts in the shielding. Knots typically will not pass through the funnel system, so if the rope was pulled out of the reel, it almost cannot have a knot in it. If there is a problem with the tow rope, inform the OD immediately and look for alternatives.

Every tow pilot is expected to know how to trim the rope and re-tie the Tost end. Written instructions for this procedure are included in the repair kit under the pilot's seat, but first-hand training is necessary to understand how to do it properly.

Check the mirrors (1 is just left of vert. stab., 2 is on funnel, 3 is just right of vert. stab) to make sure that they point in the right direction for you to be able to see what you need to see. In particular, Mirror #2 (left side of the cockpit) is aimed at the tow funnel. <<<??? Correct?>>>

There is a white three-ring binder on the deck behind the pilot's seat. This is the flight log. Review it to see when the aircraft was last flown, that it was fueled, if oil was added.

Maintenance items should be submitted electronically and NOT just jotted down in the log. The log is for recordkeeping purposes and NOT used to track or take action on the aircraft's condition.

Oil level should be 9 quarts. More than this will be blow overboard by the engine almost immediately. Only use oil found on the Preflight Shelf. Other oil in the hangar may be the wrong type for current operation. (For example, mineral oil or non-standard viscosity used for specific reasons.)

Ready to Tow

Once the engine is started, make sure all engine instruments are in the green. After electrical systems are turned on, make sure the ammeter is showing a charge.

Any time the tow plane is being operated on the ground, the mixture should be pulled back as much as possible without causing the engine to run rough or quit. This is critical to prevent lead buildup in spark plugs. On the Pawnee, the mixture setting should be LOWER than half; usually around 1/3.

Warm up the engine until the temperature indicator is within the green arc. This is an investment in the life of the engine. This can take some time, particularly in the winter. Be patient.

Do a thorough run-up with the mixture rich. In particular, make sure both magnitos are clear and the engine runs smoothly on each mag and on both.

Take a test turn around the patch. While doing this, listen to and "feel" the airplane for anything unusual. Keep an eye on the oil pressure, the sound of the engine, feel of the controls, etc.

Some clubs do not do test patterns prior to a day of towing. It is a strong MGSA tradition for the tow pilot to test the tow plane ahead of towing any gliders.

Once the test pattern is complete, park ready to tow. Normally, Runway 3 is used for launches. Position the tow plane next to the runway near the keyhole at the approach end of Runway 3 to signal ready to tow. Take care to park where you will not hit a runway edge light when you taxi back onto the runway. Also, point the tail of the airplane away from any tents, vehicles, or chairs that have been set up and be particularly careful of propwash on gliders.

Always participate in safety briefing. If glider pilots need to know anything unusual about the airplane, weather conditions, etc., address this during the briefing.

Types of Tows

There are several types of tows depending on what the glider pilot and/or instructor are trying to accomplish. Here are the types of tows and the expectations of the glider pilot:

Type	**Description**	**Release Alt.**

"Normal"	Club member seeking lift for typical flight.	2000 – 3000
Competition	Simulating a race environment.	2000
Pattern	Setting up for a landing – position on a downwind leg, often by overflying the airport.	1500
High	Aerobatic flight or a series of maneuvers, often for instruction or checkout.	3000+
PTTT	Simulated rope break.	200 - 500

Figure 5 - Types of Tows

Towing

Glider towing is a team effort, so it is all about coordination. Being synchronized with the ground team and the glider is key to both safety and efficiency, particularly at Monroe with occasional heavy traffic.

It can be helpful to think about towing a glider as "flying formation with a rope between aircraft." The glider pilot has to focus on the tow plane until release. Any deviation from that is dangerous for everyone. Tow plane upsets happen very quickly, so the tow pilot should be ready and willing to cut the glider loose if the tow plane is in danger.

Many experienced tow pilots are accustomed to working on grass with a tow rope that is always extended. The Tost Reel system allows movement on hard surfaces without abrading the tow rope. For it to work, though, the tow pilot must be very aware of the state of the tow rope and must make sure it is fully reeled in during landing and taxi operations.

Dragging the tow rope on hard surfaces will cause it to weaken, changing its breaking strength. This can cause a glider under tow to be released unexpectedly at a low altitude, which can be very dangerous.

If the tow rope is either run over by a glider or dragged on the runway (i.e. landing while rope is extended) it must be inspected prior to another tow.

Hookup

Make sure the tow rope is reeled in and the winch is off before taxiing onto a hard surface.

Swing the tow plan's tail away from gliders to avoid blowing open canopies with propwash.

Lift the elevator to allow the ground crew to access the tow rope end.

Once hooked up, take out slack:

1. Quick walk until you see red stripes on the rope
2. Slow walk until you see the 4th (long) segment
3. Go taut without pulling the glider forward

Do not move until you see the wing runner swinging their arm (lets you know they see you and the safety cone is clear)

Takeoff and climb

Announce departure, something like “Monroe Traffic, Pawnee 23L departing runway 3, glider in tow.”

Throttle advance should take about five seconds.

1. Faster is hard on the crankshaft of our six-cylinder engine.
2. Slower is hard on the glider pilot as they try to keep the wings level at low airspeed.

Be aware of glider behind you if aborting:

1. If you are already moving faster than a jog, release / cut the tow rope so that the glider can move away from the tow plane (and its propeller)
2. If possible, keep to the left-hand side of the runway to give the glider room to pass on the right.
3. If possible, don’t brake while the glider is behind you. Give them an opportunity to go around you to the right.

Be VERY aware of glider position on early upwind; release IMMEDIATELY if glider kites.

Kiting (glider climbing too high, pulling the tail of the tow plane up) is the single most dangerous event that can happen to a tow pilot. The tow plane can become uncontrollable (not enough elevator force to counter the glider’s wings) and crash in a matter of a few seconds. Keep a VERY close eye on the glider at low altitude and be ready to cut the glider loose!

Allow the tow plane to drift with the wind (don’t maintain center line). This allows the glider to turn into the wind if it releases prematurely. A turn into the wind helps the glider to align with the runway for landing.

Start looking for traffic early!

You are the eyes for both you and the glider… he’s looking at YOU so that he does not kite. You are a formation of two, and the tow pilot is the lead ship. The tow pilot is responsible for seeing and avoiding traffic on behalf of both aircraft.

Turnout only after the end of runway. Turning out with runway still ahead of you leaves useful runway unused, and it provides fewer options in case of emergency for both the tow pilot and the glider pilot.

There are a few landable fields available for the tow plane in case an airport return is not possible. The best is a mile to the north of the departure end of Runway 3. Beware, however, because there are

power lines along the east side of this field, and there are sometimes hay bales present. Other field further north are available, but many are being developed and are no longer safe to land on.

While climbing, keep an eye on oil temperatures. While performing successive tows on hot days, oil pressure can increase into the yellow arc. If this happens, inform the OD and let the tow plane rest for 20 minutes after landing.

Release

Make sure of clean release, then turn left. The glider should turn to the right. Release is usually easy to "feel" as the drag on the tow plane is suddenly reduced.

Activate the tow rope reel IMMEDIATELY after turning away from the glider. This is your best chance to remember to do this. Reconfiguring the aircraft for descent or calling down release altitude before pressing the Winch ON switch dramatically increases your chance of landing with the tow rope extended.

Once the glider is clear and the tow rope reel is activated, radio in release altitude.

If you can, write down the glider number and the release altitude manually. The OD is supposed to keep a record, but it is not unusual for the OD to ask the tow pilot later about a missed release altitude.

Letdown

Because glider towing is a series of climbs and descents, shock cooling is a particularly important issue for these operations. Letdown procedure is key to the life of the engine. Balancing this is the desire for the next glider to launch.

Set the engine to greater than 2000 RPM. (2200 RPM is recommended)

If you want to use flaps, extend them as soon as the engine power is reduced. Note that the airspeed indicator is marked with a white arc showing the operational limitations while flaps are deployed. Stay within these limits!

Plan entry into the pattern such that you are not "diving in." Arrive at pattern altitude first, then enter downwind on a 45 degree standard entry.

One way to keep airspeed down while RPM is in the desired range is to "spiral" down over a point. A 60-degree bank generates less than 2g of lifting force, but can cause a noticeable increase in descent rate. If you choose to spiral down, be sure to move away from any gliders and clear the area first (including below and in all directions). Do NOT spiral down over down town Monroe! Do so over sparsely-populated areas.

Once you are at traffic pattern altitude, be positioned for a quick pattern entry.

Landing and Taxi

Pre-landing checklist includes a double-check that the tow rope is, in fact, retracted. DO NOT count on remembering this in the pattern; there are too many distractions.

Land safely! No operational considerations trump safe operations.

Execute the after-landing checklist. In particular, check that your flaps are up.

Reminder: Lean the engine for taxi operations.

If there is traffic on final approach or waiting for you to depart, then exit using the taxiway. If not – and you landed fairly short – a back-taxi can be the quickest option. Always announce a back-taxi on the radio.

If you are back-taxiing, avoid taxing directly at the glider and ground crew in the last 50 yards or so. Taxi at an oblique angle so that a brake problem (overheat from landing, for instance) does not carry the propeller into any people.

Fueling

There is a fuel farm near the FBO adjacent to the Pawnee hangar. In the pocket to the right of the pilot's seat in the Pawnee is a bank bag. There is a credit card in the bag that can be used to purchase fuel. (Note: The card should be used for nothing else.) The fuel farm is a standard self-serve arrangement. The ground wire should be attached to the aircraft frame or engine block, NOT on a rusty surface.

It is rare to need to add more than 26 gallons of gas to the Pawnee. When the pump asks how much to fill, enter 30 gallons.

The top of the Pawnee fuel tank is flat and level, so when the tank reaches full, it overflows quite dramatically, with fuel running inside the cockpit area. This is obviously a fire hazard and is to be avoided. One method for preventing this is to insert a finger into the tank alongside the fill nozzle so the fuel level can be detected before it is completely full.

Also, the fuel nozzle does NOT shut off when the lever is released. It has to be forced to the "off" position. In addition, it will pump quite slowly when partially depressed. This should help in filling the tank without spilling fuel.

The fuel float does not give a good indication of when it is time to fuel the airplane. Sitting on the ground in three-point attitude, the float should not be below the bottom of the fuel vent. This represents 30 minutes of flight time remaining, so it is illegal to take off without refueling.

Make absolutely sure that the fuel cap is correctly reattached prior to startup and taxi. More than one fuel cap has been left on the ground at the pump.

Skydive Deconfliction

< unfinished; detailed in separate document; see Appendix A >

Emergency Situations

Note: This material was taken from the Chilhowee Tow Pilot Manual.

Premature Termination of Tow (PT3)

1. Premature termination of tow is any time the glider and tow plane disconnect from each other for any reason from initial acceleration up to pattern altitude. Things that could cause PT3 are tow rope break, glider releases, or tow plane releases.
2. Both the tow pilot and the glider pilot should plan for a possible PT3 at all times while participating in an aerotow.
3. Take-off roll less than 10 kts.
    a. Slowly reduce power to idle and coast to the left.
    b. Do not stop suddenly as you could be rear-ended by the glider.
4. Take-off roll more than 10 kts.
    a. If the PT3 is NOT due to a tow plane problem continue takeoff then fly the pattern and land.
    b. If the PT3 is due to a tow plane problem, decelerate as slowly as possible and coast to the left. The glider should take the right. Plan to use the entire runway. If you stop suddenly, the glider could hit you from behind.
5. Airborne less than 200’ AGL.
    a. Speed up and continue straight ahead so the glider can maneuver in any direction necessary.
    b. When clear, fly a pattern and land after the glider.
6. Airborne greater than 200’ and less than 1000’ AGL
    a. Continue straight, level wings if in a turn, to provide the glider with maximum room to maneuver.
    b. Make a normal pattern entry and land after the glider is down.
7. Airborne greater than 1000’ AGL.
    a. Treat as a normal release.

Glider Loss of Control on Ground

1. Be alert for trending from the runway centerline of either the tow plane or the glider.
    a. If the glider is towing on a nose hook, the force of the tow plane provides a stabilizing force and you should not release unless the situation worsens.
    b. If the glider is towing on a CG hook the problem will certainly get worse and you should release immediately.
2. Directional loss of control by the glider is a serious situation and requires immediate release by both the tow and glider pilots.
3. If at or around rotation the glider goes kiting, perform an immediate release andcontinue your take-off roll. Reenter the pattern as normal.
    a. You may not have time to check the mirror for verification of kiting.
    b. If you receive a sudden nose down moment with opposing stick and a continued trend for nose over then the glider is kiting.

Tow Plane Loss of Power

1. On takeoff roll.
    a. Decelerate as slowly as possible and coast to the left. The glider should take the right. Use the entire runway when possible. If you stop suddenly, the glider could hit you from behind.
2. Airborne at low altitude.
    a. Immediately release the glider.
    b. Set up best glide for configuration and prepare for a forced landing
    c. Troubleshoot if you have time: check fuel on, mags on, alt air.
3. Airborne at high altitude.
    a. Signal the glider to release by rocking your wings.
    b. If the glider doesn't comply then pull the release handle.
    c. Fly best glide speed for configuration and set up a landing back at the airfield.
    d. Troubleshoot and attempt to restart as time and altitude permit: mixture rich, mags both on, carb heat hot, fuel on, throttle idle, attempt restart.

Climb Performance Degradation

1. When towing very heavy gliders such as the loaded 2-32 or a fiberglass sailplane full of water it is normal to have reduced climb performance, particularly with high density altitude.
    a. Keep your airspeed on target and have a little patience.
2. If performance degradation is not so easily explained then do this.
    a. First check your tow plane configuration. Carb heat COLD? Magnetos BOTH ON? Flaps NONE for Pawnee or 1st NOTCH for Callair? Throttle full forward?
    b. Next, check your mirrors and take note of the position of glider high drag devices such as airbrakes or flaps if you can see them.
        a. Wiggle your rudder to advise the glider that you think its configuration is out of order.
        b. If climbing but slowly, consider waiting to give this signal until the glider is in position to make a safe landing back at the gliderport. Glider pilots have sometimes misinterpreted the rudder waggle signal to mean "release now" with fatal consequences.
        c. Give the glider a chance to fix the problem.
        d. If performance doesn't improve AND your safety of flight is threatened, release the glider.

Tow Upsets

1. Never let the glider pilot place you in a position that you run out of airspeed, altitudeand ideas at the same time.
2. If you have reached or are quickly approaching full elevator control deflection and youare still trending in the opposite direction, you have a tow upset.
    a) Remember that stick position is a great indicator of angle of attack. If you reach the aft stop you will be stalled. If this happens near the ground you will crash.

Releasing the Glider

1. At any time the tow plane safety of flight is threatened you must release the glider. Tow upsets are a primary example.
   a) If you receive a sudden nose down moment with opposing stick and a continued trend for nose over then the glider is kiting.
   b) If you are nearing full aft elevator deflection release immediately.
   c) Experienced tow pilots who did not release immediately and lived to tell the tale have reported that it took as much as 1500' to recover from a tow upset.
   d) You do not have a lot of time to release the glider in this circumstance.
2. Remember which aircraft you are in and exactly where and how each release lever works. It is a good idea to practice a release each time you stop for fuel. While looking forward with your hand on the throttle (you can move throttle to full after you shut down), quickly and without looking, move your hand to the release and pull it.
   a) The Pawnee has a release handle next to the flap handle on the floor.

Double Release Failure

1. This is a very unlikely occurrence.
2. Cause and effect:
   a) Glider tow hook fails to release.
   b) Glider pilot tells tow pilot of the failure, either over the radio or by moving out to the left and rocking his wings.
   c) The tow pilot tries to release.
   d) The tow plane release fails too.
   e) Tow pilot tells glider pilot of the failure, either over the radio or by fishtailing the tow plane.
3. Procedure:
   a) Tow pilot first does a gradual reduction of power and very slow transition to level flight.
   b) Glider pilot goes to low tow position.
   c) Tow pilot gradually initiates a descent. The best way to do this is if you have radio communication is request the glider pilot to deploy airbrakes to half.
      i) Danger in the descent is from the glider's tendency to overrun the tow plane. Remember the glider will always outperform a tow plane in a glide. Even 23:1 in the 2-33 is much better than you would get in the tow plane at best glide.
   d) Tow pilot sets up for a long final to an equally long runway.
   e) A gradual descent to landing is flown by the tow plane. Be mindful that if obstacles are to be cleared they must also be cleared by the glider on low tow 200' behind and 50' below the tow plane.
   f) Fly a shallow and constant speed final to landing.
   g) The glider will touch down first and should wait to deploy wheel brakes until the tow plane is on the ground too.

Appendix A – Topics for Tow Pilots

Key to Priorities:
Prerequisite – Complete before towing
Review – Complete ASAP or when needed.
FYI – Read if needed.

Section 1 – New Tow Pilot Onboarding

Area	Topic	Priority	Source / Reference
Recruit / Filter	Tow Pilot Requirements Tow Pilot Currency	**Prerequisite**	F&OR Rev 12-6-2020.pdf
	Regulations affecting Tow Pilots	**Prerequisite**	Towing-related FARs.pdf
Glider Ground Operations	Tow Pilot On-Line Course	**Prerequisite**	https://www.soaringsafety.org/learning/towpilot/towpilot.html
	Wing Runner On-Line Course	**Prerequisite**	https://www.soaringsafety.org/learning/wingrunner/wingrunner.html
	General Aviation Operations	Review	Monroe-Walton Co General Aviation Operations.pdf
Check out on the Tow Plane	Pawnee POH	**Prerequisite**	
	Prep and put-away checklists	**Prerequisite**	
	Tow Pilot rubric (TBD)	**Prerequisite**	
Glider Checkout	Launch Procedures	**Prerequisite**	MGSA Launch Procedure.pdf TOST-winch-launch.pdf
	Rope Breaks	**Prerequisite**	SAFETY PTTT.pdf Safety Bulletin Mar 2018 v2.0.pdf
Operational Checkout	Skydive Operation Coordination and Deconfliction	**Prerequisite**	F&OR Rev 12-6-2020.pdf Skydive Deconfliction2.pptx Safety Parachute V1.1.pdf Parachute safety v 1.2.pdf
	OD Checklist	Review	OD Check list 5-21-20.pdf
	Tying a Tost knot	Review	TOST-winch-knot.pdf
	Cross-Country / Retrieval	Review	Aerotow guide V2.0.pdf
Endorsements and Signoffs	Private Pilot as Tow Pilot	FYI	Umphres-Soaring Society of America_2010_Legal_Interpretation.pdf
	Endorsements Reference		
Add to Roster and Schedule	OD/Tow Pilot Schedule	**Prerequisite**	MGSA <year> OD Tow Pilot Schedule.xls
	Club Calendar for the year	Review	MGSA <year> CALENDAR.pdf
	MGSA Membership Roster	Review	MGSA Roster <date>.pdf
	Insurance	Review	F&OR Rev 12-6-2020.pdf

Area	Topic	Priority	Source / Reference
	New Member Orientation	FYI	MGSA NEW MEMBER ORIENTATION PROCEDURES_012017.pdf
	Club Bylaws	FYI	Bylaws-2018.pdf
	Code of Conduct	FYI	Code of Conduct Regulations.pdf

Section 2 – Existing Tow Pilot Refresher

Area	Topic	Source / Reference
Towing Currency Requirements	Tow Pilot Currency	F&OR Rev 12-6-2020.pdf Towing-related FARs.pdf
Changes		
Airplane Condition / Squawks		
Refresher	Towing Cross Country	Aerotow guide V2.0.pdf
	Launch Procedures	MGSA Launch Proceedure.pdf TOST-winch-launch.pdf

Appendix B –Document and Resource Locations

Document	Relevant Topic(s)	Location
Aerotow guide V2.0.pdf	Towing cross country	Groups.io/main/files/Procedures
Bylaws-2018.pdf	Requirements / limitations of club membership.	Groups.io/main/files/Club Organizational Documents
Code of Conduct Regulations.pdf		Groups.io/main/files/Club Organizational Documents
F&OR Rev 12-6-2020.pdf	Insurance Tow Pilot Requirements Tow Pilot Currency Skydive Operation Coordination	Groups.io/main/files/Club Organizational Documents
GliderPocketGuide.pdf	Glider weight max weights, Vne, Vt and Vs information	Groups.io/main/files/MGSA Aircraft Manuals
MGSA Launch Proceedure.pdf TOST-winch-launch.pdf	Hookup / Launch	Groups.io/main/files/Procedures
MGSA NEW MEMBER ORIENTATION PROCEDURES_012017.pdf		Groups.io/main/files/Club Organizational Documents
Monroe-Walton Co%20 General Aviation Operations.pdf	Airport procedures (jump and glider)	Groups.io/main/files/Other Documents
OD Check list 5-21-20.pdf	Glider operations checklists	Groups.io/main/files/Club Organizational Documents
SAFETY PTTT.pdf Safety Bulletin Mar 2018 v2.0.pdf	Rope Breaks	Groups.io/main/files/Safety Corner
Skydive Deconfliction2.pptx Safety Parachute V1.1.pdf Parachute safety v 1.2.pdf	Parachute Operation safety	Groups.io/main/files/Safety Corner
TOST-winch-knot.pdf	Tying a new tow rope end	Groups.io/main/files/Procedures
Towing-related FARs.pdf	Regualtions	Groups.io/towpilots/files
Umphres-Soaring Society of America_2010_Legal_Interpretation.pdf	FAA Opinion Letter on Legality of towing as a Private Pilot	Groups.io/towpilots/files

Appendix C – The Tost Rope System

Rope System Overview

The tow rope is connected to the glider by a Tost ring. This ring is connected to an End piece that is designed to break at a pre-set force. The end is connected to the tow rope. If the pre-set force is exceeded, the ring and back of the End link will disconnect from the rope, leaving minimal hardware attached to the glider.

The forward 10 feet of the tow rope is painted with one-foot alternating red and white stripes. This is visible to the tow pilot in the Pawnee's #2 mirror, allowing a quick let-out of rope and a gentle snugging of the rope prior to acceleration.

The rope passes through a rewind funnel at the extreme rear of the tow plane. This in most cases prevents the Tost End from striking the rear of the airplane in propwash as it is rewound. It also provides a protective housing for the End when the rope is fully retracted.

Forward of the funnel is the Guillotine. This allows the tow pilot to cut the rope either electronically or manually if the tow plane is in danger.

Ahead of the guillotine is a solid Stop Ring the prevents the Stop Ferule from passing through. This transfers the weight of the glider to the airframe of the tow plane.

Finally, the electrically operated Reel rewinds the rope until the Tost End stops inside the funnel. A clutch mechanism then shuts off the motor.

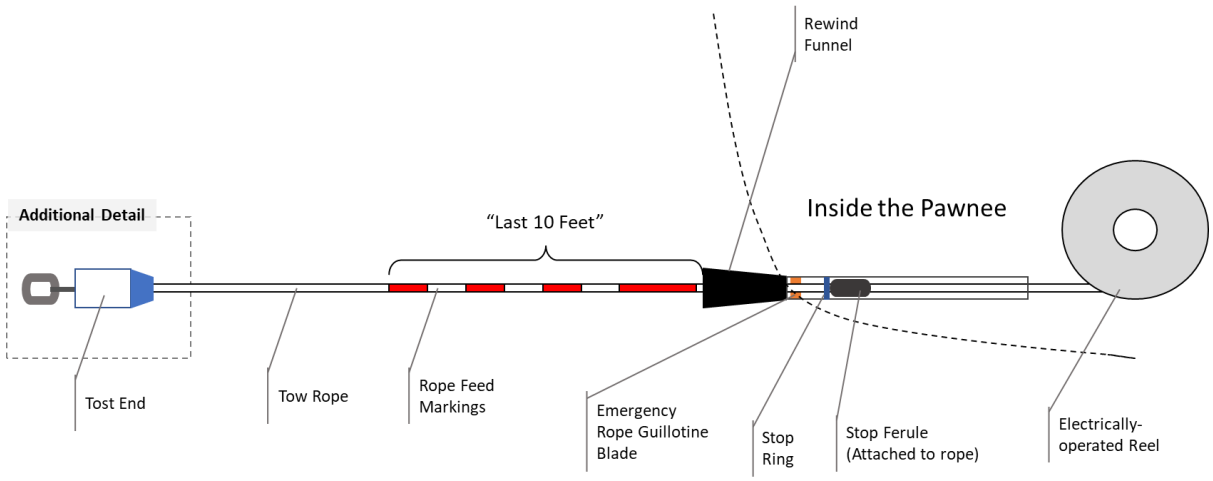


Figure 6 - Tost Reel System

Rope End

At the back of the rope, a single knot prevents the tow rope from passing through a restrictive opening in the Weighted End. This bears the entire weight of the glider under tow. The free end of this rope is visible through the clear plastic cover tube and is wrapped in red tape so that any slippage in the knot is detectable. (Note: When the end is shown to glider pilots for "acceptance" prior to hookup, this tape is what they are looking at. They are making sure the tape is not disappearing into the housing and in danger of slipping free.)

A bolt passes through the Weighted End and the Link. The link is designed to break at a specified force. It is then connected to the glider via a set of rings.

The clear plastic tube bears no weight and only serves to protect the Link, the rope, and associated bolt ends.

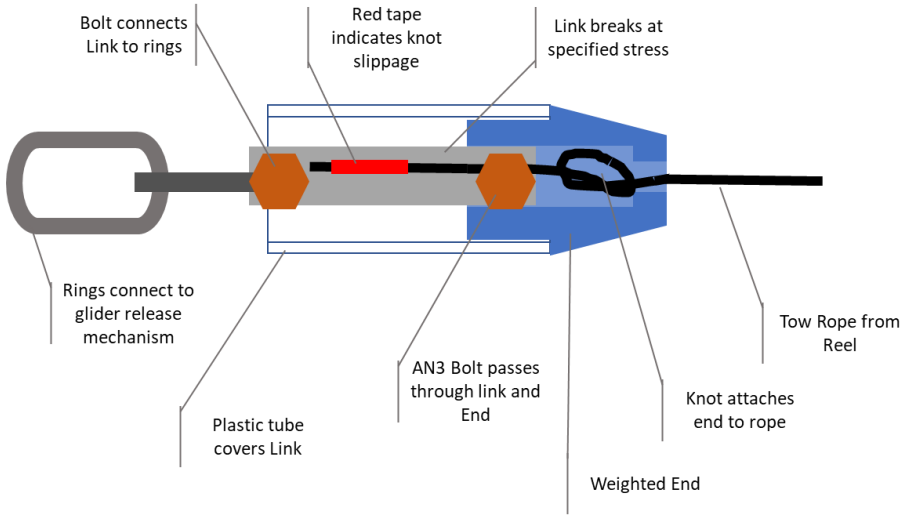


Figure 7 - Tost Hookup End

Rope Re-Attachment

If the rope becomes abraded – for instance, if it is run over by a glider on the ground prior to launch – the damaged portion of rope must be cut away. Then the forward bolt is removed from the End assembly and the Weighted End separated from the plastic tube. The old rope is removed and the new rope is fed through the front hole and tied such that it will reach near the back of the tube. Red tape is then wound around the end of the rope and the parts reassembled. (Note: all tools required to complete this repair are found in the storage box under the pilot's seat in the tow plane.)

Appendix D – FARs Applicable to Tow Pilots

1. 14 CFR Part 61
   a. 61.3, 61.23, 61.31, 61.56, 61.69, and 61.113.

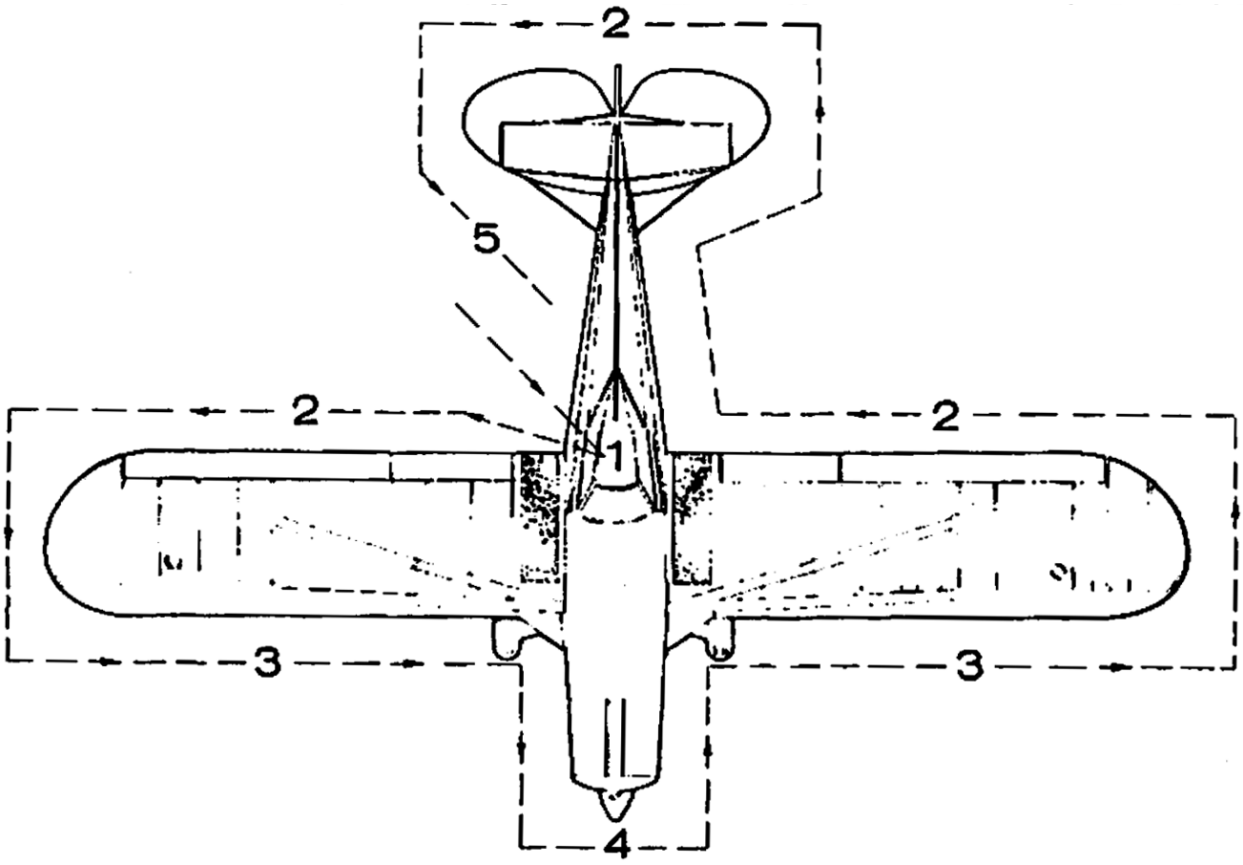
2. 14 CFR Part 91
   a. 91.3, 91.7, 91.9, 91.13, 91.15, 91.103, 91.109, 91.113, 91.119, 91.141, 91.151, 91.153, 91.155, 91.159, 91.207(f)(9), 91.211, 91.215, 91.221, 91.309, 91.313, 91,405, and 91.409.

3. 14 CFR Part 43
   a. 43.3(a), 43.3(g), Appendix A.

4. AIM
   a. Chapters 3, 4, 7 and 8.

Appendix E – Checklists

Note: If this document differs from what is posted in the hangar, then the version in the hangar takes precident.



Preflight Checklist

#	POH	MGSA
1	a) Check general appearance b) Check cockpit: magnetos OFF c) Check windshield	• Record Tach time and pilot
2	a) Check top side of wings, strut security, flap and aileron security and wing tip light. b) Check tail surfaces, tail brace wires and fittings for condition and security. c) Visually check fuel supply; secure caps.	• No wingtip light; no fuel in wings. • Check tailwheel pressure. • Lubricate tailwheel. • Check tow rope secure.
3	a) Check leading edge of wing for dents and condition. b) Check landing gear for security, check tires for proper inflation, cuts, and flat spots.	• Check fuel quantity and float movement. • Secure fuel cap.
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) Open fuel drains: two (2) fuel tanks, one header tank, and the fuel filter. Allow sufficient fuel to drain so that the system is free of water or sediment. d) Drain tank fuel vent line until all water of fuel is drained out. e) Check air filter for security.	• Single fuel drain near exhaust exit.
5	a) If agricultural equipment is installed, check for security and general condition. b) Check turtle deck for condition and security.	• Tow rope to be checked at the point of launch with help from OD.

Put-away Checklist

1) Fill with fuel; receipt and credit card in airplane.
2) Back into hangar; install chocks on both main wheels, return oil drip pan.
3) Record Tach time, number of tows, fuel added, and comments in log.
4) Clean Plexiglas and wing leading edges.
5) Magnetos OFF, Beacon ON, Master switch OFF.
6) Close windows / vents.
7) Lock hangar.
8) Communicate squawks (aircraft and tools/equipment) and supply requests to Tow Pilot e-mail list ASAP.

Appendix F – Tow Pilot Rubric

Tow Plane Operation

Area of Skill or Understanding	Unprepared	Minimum Acceptable	Excellent
POH	Not familiar with POH information.	Knows basic systems and performance information.	Understands aircraft systems in detail and performance capabilities in a variety of situations.
Engine / aircraft systems	Has difficulty starting the engine or configuring the aircraft.	Can start, run, and shut down the engine with the help of a checklist.	Can operate the aircraft well and confidently without the use of a checklist if necessary.
Taxi / ground handling	Can keep the airplane on the taxiway and not hit anything.	Can maneuver confidently on cement and grass in up to moderate crosswinds.	Can operate on any surface in any winds within aircraft's capability.
Fast taxi	May swerve in mild wind; may not account for tailwind.	Centerline between mains with minimum swerving.	Taxis straight at consistent speed without swerving.
Runway taxi (tail up)	Cannot keep centerline between mains. May "hop" in a crosswind.	Centerline always between mains, crosswind correction applied, tail in appropriate position.	Keeps aircraft aligned and on centerline, able to taxi tail-up on one (upwind) wheel.
Crosswind correction	Drifts with a mild crosswind; may not input enough correction.	Consistent correct crosswind corrections applied preemptively. Aircraft is never out of control.	Constant crosswind corrections applied to fully neutralize effects of wind.
Ready for Takeoff			
Takeoff	Struggles to keep airplane under positive control throughout acceleration and liftoff.	Keeps the airplane aligned with runway and lifts off smoothly at appropriate airspeed.	Consistent positive control, smooth aircraft handling, and excellent airspeed control.
Stalls	Drops a wing or fails to apply corrections correctly and promptly.	Correct and rapid correction of stall and quick return to flight.	Able to conduct extensive maneuvering at and within stalled condition. Confidently recovers from stall at will.
Pattern	May not consider skydive or glider operations or work with other GA traffic.	Good skydive deconfliction procedures, interfaces well with gliders and GA traffic.	Preemptively plans tows and patterns to avoid conflicts; acts as a club ambassador on the radio with other traffic.
Wheel landing	May porpoise / PIO.	Solid mains contact with aircraft aligned with runway.	Excellent speed, directional, and wheel contact control at all times.
3-point landing	May misjudge height above runway or drift with crosswind.	Good aircraft control and consistent touchdown.	Solid touchdown even with some crosswind; no drift or porpoising.
Ready for Towing Operations Training			

Glider Flight

Area of Skill or Understanding	Unprepared	Minimum Acceptable	Excellent
Risks in the staging area	Does not demonstrate care appropriate to fragile gliders.	Demonstrates good management of canopy, dolly and wing-up.	Good grasp of potential damage to gliders, proactive prevention.
Coordination with Tow Pilot	Does not communicate with tow pilot.	Understands key radio calls.	Keeps up with operational interactions.
Tow abort procedure	May not be aware of dangers associated with abort on the runway.	Understands which way to turn and how to avoid tow plan propeller. Has abort plan in mind.	Ready to abort takeoff at any point without endangering people or property.
PTTT	Does not plan for return; may not be aware of wind direction or consequences.	Has a solid plan for before and after 200' threshold.	Ready to act if a release happens at any point in the flight.
Land-out considerations	Limited ability to understand what a "good" land-out location is for a glider.	Understands priorities for land-out.	Can select best possible landing option from any point.
Tow positions	Not aware of tow positioning.	Understands limitations on extend and speed of changes.	Knows how movements affect tow plane and understands the difference between controlled and uncontrolled movement.
Airspeeds	Aware that gliders are different from powered aircraft.	Knows Vne and Vs ranges of club aircraft.	Understands multiple speed requirements (with/without water, etc.) and signals to increase/decrease speed.
Release	Has not considered issues involved in a clean release.	Knows which way to turn and keeps an eye on the tow plane.	Knows what a good position is for release, how glider pilots decide when to release.
Release failure	Does not have a plan for release failure.	Knows where and how to guillotine tow line.	Knows how to handle various release problems, including landing with glider under tow.
Wx / Lift sources	Does not have a working knowledge of lift.	Understands how to drop gliders off near lift.	Good working knowledge of lift and how to find it.
Key decision points (release, pattern entry, base leg)	May not know what key decision points are for gliders	Understanding of why glider decision points are important.	Good working knowledge of glider flight profile and decision point calculus.
Glider Flight Endorsement			

Towing Operations

Area of Skill or Understanding	Unprepared	Minimum Acceptable	Excellent
Wx and OD coordination	May not have information needed for decision making.	Has current TAFs, OD name and number, and has a go/no-go recommendation prepared.	Gathered soaring information as well as TAFs and reports options to OD.
Airplane prep procedure	Does a typical preflight and taxis the airplane to the staging area.	Completes club prep checklist and inspects tow rope with OD at staging area.	Notes all squawks and consumables shortages during thorough preflight. Develops recommendations for aircraft maintainers.
Responsibilities	Considers himself a "tow plane driver."	Contributes to safety culture and maximizes launch speed.	Achieves fast but safe turnaround while improving procedures and safety.
Launch procedure	Considers himself a "top plane driver."	Knows key interaction points with glider pilots.	Has thorough knowledge of glider operations and how to interact with ground crew and glider crew.
Release procedure	Does not have a procedure.	Knows which way to turn, uses a consistent procedure.	Has a mental release plan ready at all times to deconflict with traffic and quickly get back on the ground.
Skydive deconfliction	Tries not to hit skydivers.	Knows the exclusion zone and how to avoid skydive areas as well as descending drop plane.	Maintains good communications with the drop plane and works with exclusion zone to minimize disruption.
Tow Endorsement			
Issue handling and communication	Does not have a plan for issue handling.	Knows who to call with problems at the hangar.	Knows how to escalate all types of problems and how to report issues.
Fast turnaround	Does not consider fast turnaround.	Does not waste time with large patterns, extensive taxiing, etc.	Able to safely get on the ground at the staging area quickly, turned and ready for hookup without delay.
Airplane put-away procedure	Puts the airplane in the hangar and locks the door.	Completes put-away checklist and	Cleans up the hangar, removes trash, double-checks the Master and Mag switches.

Club Expectations

Area of Skill or Understanding	Unprepared	Minimum Acceptable	Excellent
Key points of contact	Does not know who to contact on what topics.	Able to identify key people on roster for specific issues.	Has an escalation plan for communications. Makes sure important messages get to the right people. Follows up to make sure.
Locations of information	Does not know what information is found where.	Knows the two key sources of information (web and groups.io)	Uses Tow Pilot Manual Appendix to quickly find key documents.
Scheduling expectations	Does not schedule tow days.	Schedules at the start of the season at least one tow day per month.	Schedules at the start of the season and helps fill in open days in the upcoming three weeks.
Ready for Club Roster / Schedule			

Document Modification History

Date	Author	Modifications Made
2/1/2022	T. Walter	Initial Author
2/1/2023	T. Walter	Major revision and expansion

Note: This document is structured to be printed in black and white or grey scale on 8 ½ x 11 paper.