Air Sailing, inc.
RENO, NEVADA

Air Sailing Gliderport

Tow Pilot Manual

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ASI Safety Committee

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Section 1 Qualifications and Approval

Safety Committee Concurrence

Air Sailing Gliderport (ASG) uses two (2) Piper Pawnees as tow planes. The Pawnees are larger and more powerful than most primary tailwheel trainers. They are also single-seat aircraft which do not permit dual instruction. In addition, flying conditions at ASG can be more demanding than what some prospective tow pilots may be used to. For these reasons it is necessary that prospective tow pilots have sufficient tailwheel experience before ever soloing a Pawnee at ASG.
A prospective tow pilot must be vetted and approved by the Lead Tow Pilot.
Before any flights occur in a Pawnee, the Lead Tow Pilot will submit the applicant's name and qualifications to the ASI Safety Committee and obtain their concurrence.

Pilot Experience and Qualifications

For both prospective and existing tow pilots:

- Air Sailing Gliderport (ASG) tow pilots must be members of ASI.
- Hold a Private Pilot certificate or higher with an airplane single-engine land rating.
- Have a current Third Class medical certificate or higher.
- Have a current Flight Review as per Part 61.56.
- Have a High-Performance endorsement or previous experience per Part 61.31(f) (required for Pawnee operations).

Prospective Tow Pilots must have the following minimum tailwheel experience before they are allowed to fly a Pawnee, or any other conventional-geared tow plane, at ASG.

- Tailwheel Endorsement
- Minimum of 25 hours of logged tailwheel time
- Minimum of 10 hours and 30 tailwheel landings within the previous 12 months.

ASG Tow Pilot Training

Complete the Soaring Safety Foundation (SSF) on-line Tow Pilot Course.

Minimum of ten (10) orientation flights in a Pawnee before towing a glider.

Minimum of five (5) training flights towing a glider containing either an ASG tow pilot or ASG CFIG. During these flights the following must be practiced and satisfactorily demonstrated.

- *Hook Up and Launch Procedures*
- *Pattern Tows*
- *Rope Breaks*
- *Slack Line*
- *Box the Wake*
- *"Off Tow" Procedures*

Discussion of retrievals from other airports.

Discussion of retrievals from dry lake beds.

Tow Piloting Approval

After the ASG Chief Tow Pilot has insured that the prospective tow pilot has the requisite skills, knowledge, and experience, he will endorse the new tow pilot's logbook with a statement that he is qualified to tow gliders per 14 CFR Part 61.69.
Note that the logbook endorsement must be by an authorized instructor. Note also that 61.69 (4) may require a flight in a two passenger aircraft.
The new ASG Tow Pilot may now tow the general population.

Currency

Existing ASG qualified tow pilots must meet the currency requirements of 14 CFR Part 61.69.

Exceptions and Deviations

Any exceptions or deviations to these requirements or procedures must be approved by the ASI Safety Committee.

Section 2 General Aero Tow Procedures

This section discusses generic tow plane operating procedures at ASG and is not aircraft specific. The following is intended to be a guide to ASG-unique towing procedures and not an exhaustive description of all towing considerations. Refer to the Glider Flying Handbook, Chapters 7 and 12, and Towpilot Manual by Burt Compton for additional in-depth towing information. Numerous other texts and websites exist.

Preflight

Upon arrival at the field, the tow pilot must conduct a thorough preflight of the tow plane. It's particularly important to inspect the tires for condition and inflation (note: the tailwheel tire should be firm and without sidewall bulge), drain water from fuel tanks and lines (not while inside hangar), and check the condition of the landing gear attachments, tailwheel springs, and tow hook. Apply engine preheat when ambient temperatures are below freezing. If the fuel tanks are not appropriately filled, refuel before flight operations commence.

Tow Pilot Safety Responsibilities

The Tow Pilot is responsible for the safety and proper operation of the tow plane and launch operations.
The Tow Pilot may refuse to perform a tow for any reason.
The Tow Pilot shall not leave the pilot's seat while the prop is turning.

Taxi

It is important to hold the stick properly during taxi. Controls should be set to "climb into or dive away" from the wind as required. Be vigilant for ground personnel. Ensure that the mixture is leaned during ground operations to reduce plug fouling.

Runup

Perform run up in accordance with the aircraft operating manual. As a minimum, check mags, carb heat, controls for freedom of movement, brakes, and fuel quantity.

First Flight of the Day

ASG encourages tow pilots to make a checkout flight each towing day to check out the tow plane's systems, warm the oil to operating temperature, and to re-familiarize themselves with its handling as required. If the tow pilot has not acted as pilot-in-command within the last 90 days [current to carry passengers], the tow pilot shall complete three landings in a Pawnee prior to the first tow of the day.

Takeoff

Usually it is the tow pilot who attaches the tow rope to the tow plane. Prior to the first tow the tow pilot should inspect the rope.

When the wing runner signals that they are ready for you, start up and taxi to a position in front of the glider to be towed.

There must be a successful radio communications check. This may be initiated by either the glider or the tow plane. If the communications check is unsuccessful, the launch shall be terminated. Successful radio communications are a pre-launch requirement at Air Sailing.

The wing runner will signal when to stop by holding both arms out to the sides of his body (standard SSA glider signals). After stopping, perform the takeoff check list (printed on the dash of the aircraft) and observe the wing runner for the next signal.

When the glider pilot is ready for takeoff he will instruct the wing runner to "raise the wing". The signal to start the takeoff is the glider pilot fanning the glider's rudder back and forth, followed by the wing runner rotating his arm in the takeoff signal. The tow pilot shall acknowledge "ready" by waggling the tow plane's rudder, make a takeoff radio call, insure the mixture is properly set, and advance the throttle smoothly for takeoff.

For safety reasons (dust devils, wind gusts) do not climb out of ground effect too soon. Hold the plane in ground effect as you accelerate to climb speed and then begin the climb. Do not zoom up. It is extremely difficult for a new student to follow this type of maneuver. The need for acceleration in ground effect will be even more noticeable for heavy, two-place, high-performance gliders. Avoid any abrupt changes in your climb angle.

Before attempting operations from dry lakes a discussion with the chief tow pilot, or other experienced tow pilot, should take place.

Although it is permissible to perform takeoffs (with and w/o a glider) from the dirt, the asphalt runways should be used for the tow plane whenever possible for the following reasons:

- Less rolling resistance for a shorter ground run
- Less dust debris hitting the prop or the glider
- Improved visibility for the glider

CAUTION: Tow Pilots have been known to start their takeoff when they observed the glider wagging his rudder as part of his (the glider's) takeoff checklist and while the wing was still on the ground. Occasionally, takeoffs will be made with the wing of the glider resting on the ground, (unassisted takeoff) but you must be informed of this in each individual case. Some pilots like to takeoff with partial spoilers. Also, some motorgliders are unable to wag their rudders. These are all exceptions that must be communicated to the tow pilot and wing runner before attempting to launch. **Unless you are specifically briefed to do something different ahead of time, never start your takeoff unless:**

1. Glider wing is up
2. Spoilers are closed
3. Canopy is closed
4. All line crew are clear
5. You get the radio call ("Standby for rudder" or "Ready for takeoff")
6. You see the rudder wag and/or Wing runner gives takeoff signal
7. The runway and pattern are clear

Remember, regardless of any signals you receive from anyone else, you are still responsible for checking to make sure it is safe to start your takeoff.

If you experience any problem early during your takeoff roll, pull the emergency release handle, abort the takeoff, and pull off to the left side of the runway, if possible. Do not stop short; keep the tow plane rolling so the glider does not climb up your back. The glider should pull off to the right, but as some gliders lack directional controllability at low speeds, you cannot depend on the glider pilot being able to point the glider where he or she wishes.

If you feel the tow line break during takeoff, even though you may believe you can stop the tow plane before you reach the end of the runway, continue the takeoff so the glider will have a clear shot at an emergency landing, either on or off the field. Emergencies rarely happen, but they are possible, and you should constantly keep in mind what you would do if they should occur.

During takeoff, be especially alert to the possible emergency situation that may require pulling the emergency release handle. "Controls-to-the-stop" justifies an immediate release. Other situations will require a judgment call. If there is doubt about a safe outcome for the tow plane and pilot, then pull the release.

Premature Termination of Tow (PT3)

In the event of an actual or simulated rope break, continue to fly straight ahead while maintaining awareness (preferably sight) of the glider's location. Do not reflexively turn left as soon as the glider is off tow, but rather continue to climb to pattern altitude and then fly a normal pattern for landing, always giving the glider priority for all runways.

Climb

Fly attitude and make minor adjustments to your pitch attitude to maintain tow speed. Do not allow the glider to overpower the tow plane. This will require, at times, heavy control pressures in the tow plane, but it is a necessary evil.

When towing gliders that are unfamiliar to you, inquire as to what tow speed they desire. Unless otherwise stated, assume the flowing:

> Schweizer ships: Tow speed is ~ 65 MPH IAS (56 - 60 KIAS)
Lower triangle on airspeed indicator.

> Glass ships: Tow speed is ~ 75 MPH IAS (60-70 KIAS) or as requested
Upper triangle on airspeed indicator.

Beware of low tow speeds causing excessive cylinder head or oil temperatures.
If you experience a power loss, engine failure, or other emergency after becoming airborne, signal the glider by rocking your wings, maintain safe airspeed, and look for a safe place to land. Execute engine restart procedures, if able. If, after the glider has released, you find you still have partial power, use your own judgment as to whether you will be able to return to the gliderport or be forced to land in the first available field.

Normally, make the initial climb (first 1000 feet AGL) within the normal traffic pattern of the gliderport (i.e. crosswind then downwind and then turn on course for the remainder of the climb. This is more important for training flights or lower performance gliders probably flown by low time pilots). Wind direction and velocity may require a different flight path. First turns should be made into the wind when possible.

During climb, you should NEVER FLY TO A POSITION FROM WHICH THE GLIDER CANNOT RETURN TO THE GLIDERPORT. Fly along straight legs, turning only when necessary to keep from getting too far from the gliderport. Turn with bank angles of between 15 and 20 degrees. Steeper banks are hard for students to follow, while shallower banks take too long to make the turn. Climbing turns in thermals are discouraged. Students require long straight legs to perform their practice maneuvers (i.e. “Blue Hangar Tow”). However, you can make use of lift even while flying straight legs by directing your course under building clouds, or through areas of known lift. Try to position the glider for release in lift if you can.

NOTE: While towing, the tow plane shall not determine the release point of the glider in tow. At Air Sailing the glider pilot is responsible for determining when to release.

NOTE: The definitive signal for emergency release is the wing rock. Although ASG does require radios, a radio only call to release is likely to get a “say again” or “please confirm” as a response. Also, such a radio call could be heard by a second glider under tow resulting in an unnecessary release.

CAUTION: Use discretion when signaling the glider by fanning (wagging) the rudder, use the radio instead. In general, this signal should only be used at a minimum altitude of 1000 feet AGL due to the tendency of glider pilots to mistakenly interpret this as a request for immediate release. If the glider configuration is in question, make a radio call or wait for sufficient altitude prior to fanning the rudder.

When towing on runway 21, before turning left crosswind, make a right turn lining up with the emergency field. Then turn crosswind when the field is no longer an option for the glider.

If towing on runways 03 or 35 turning crosswind will require a turn at a lower altitude because of the rising terrain. The tow pilot and glider pilot should be prepared to deal with a rope break at low altitude.

Avoid flying over the house on the east side of runway 17 near the south end.

Descent

While the rate of climb is limited by the performance of a particular tow plane, the rate of descent is largely controlled by pilot technique. As this is a club operation, safety and conservation of assets are extremely important in this phase of the tow.

In order to protect our investment and keep repair costs to a minimum, the club has a recommended descent procedure. The essence of proper descent technique is to retain a sufficiently high power setting in the descent so as to prevent rapid cooling of the engine. This may be accomplished in a number of ways.

At glider release, as confirmed by it turning right after release, stop the climb with forward stick while rolling into a left bank, turn left 90 degrees, and avoid climbing above release altitude. Maintain straight and level flight for one or two minutes to maximize the lateral separation between yourself and the glider. Reduce power slightly to maintain 2400 to 2500 rpm on descent.

An alternate descent procedure (flaps full down and steep spiraling letdown), while effective at preventing shock cooling, may present an excessive exposure to midair collision due to limited cockpit visibility in steeply banked turns. Slow speed letdowns with full flaps may be used if restricted to no more than moderately banked turns.

Keep your head on a swivel during the descent and try to keep track of aircraft in the pattern, those transiting the area, and the glider you have launched.

Always remember that you are towing a 200-foot rope. Do not fly over people, animals, buildings, or power lines at low altitude. When landing, come in high and slip, if necessary, so the end of the towline clears any obstacles. Keep your flight path over clear areas, then land.

Landing

Watch for gliders and plan for landing in the most expeditious and safe manner. Although left hand traffic is recommended at ASG, flying a right base entry to land is permitted by the tow plane to expedite landing. For instance, a simulated rope break on takeoff from runway 17 lends itself to an easy right base entry for runway 3L.

Pattern tows: After release of a glider in the downwind of 17, maintain speed and enter a left crosswind for runway 3L. This assures traffic deconfliction and expedites ground operations. The tow plane should wait at the diagonal taxiway near the tetrahedron for the landing glider to pass.

Be extra vigilant for ground personnel and landing glider traffic. Never cross directly in front of a landing glider. Do not rely on radio calls from the gliders in the pattern. Use your eyeballs as the primary collision avoidance sensor.

Weather Considerations

Keep alert for changes in the weather. If you see a storm approaching the gliderport, make a radio call to cancel tow operations.

Headwork Items

Do not fly when you are fatigued or ill. Do not wait until you feel you can no longer fly to ask for relief. It gets very hot during the summer soaring season at ASG. Ensure that you are properly hydrated. If you need relief, please call on the radio and ask for one. If no relief is available, park the aircraft and take a break.

Securing the Aircraft

At the completion of flight operations, top off the fuel. Clean the spark plugs by leaning the mixture , then shutdown by pulling the mixture to idle cutoff. When securing the aircraft make sure all switches (mags, master, fuel pump) are off and that the throttle and mixture are closed.
Give the plane a post-flight inspection to identify flight safety hazards. If necessary, take the required actions to ground the aircraft.
Particularly check the induction and exhaust systems for leaks, carburetor and carburetor heat box for security, oil leaks in general, spark plugs and mufflers for security, and the condition of the tail wheel leaf springs. Wipe out oil from the inside of the cowling and on the lower fuselage and landing gear struts. Bring any discrepancies to the attention of the Chief Tow Pilot and enter the discrepancy in the aircraft notebook. Note the start and stop tach times and the total fuel and oil added for the day in the Tow Sheets.

Tow Ropes

Air Sailing uses tow ropes with a manufacturer's rated breaking strength of 2,000 Lbs. End connection hardware is always tied using a bowline knot. The ASI Operating Procedures Manual discusses maximum and minimum glider weights and the possible need for weak link adapters. Tow ropes shall be between 190 to 250 feet in length and shall terminate on the glider end with both a standard TOST connector and a Schweizer ring.

Section 3 Piper Pawnee Operations

ASI and NSA operate two (2) Piper Pawnee tow planes. This section discusses operating procedures that are specific to the Pawnees. The Pawnees were designed as a crop dusters and are thus intended for hard work. The light weight of the Pawnee and its large engine give the aircraft excellent towing capability, reliability, and all around safety. Although the maximum gross weight of the plane is 2900 pounds, in our operation we typically operate at about 2000 pounds gross weight. The cockpit design provides nearly 360 degrees of visibility.

The Pawnee's most unusual feature is its long nose and the downward slope of the cowl. This presents a very unusual picture to the pilot when in level cruise and in the touchdown phase of landing. While landing, bringing the nose above the horizon, as with most taildraggers, may slam the tailwheel down at touchdown. Not desirable. The landing attitude for touchdown is just the same as viewed by the pilot when sitting on the ground.

V Speeds in MPH IAS

Vs0	60	Vglide	80	Va	120
Vs1	61	Vfe	109	Vno	124
Vx	71	1.3 Vso	78	Vne	156
Vy	83				

Fuel

Red Tow has two main fuel tanks containing a total of 36 usable gallons. A fuel shutoff valve is located at the right side of the cockpit. It normally remains open (down) at all times, but should be closed for a forced landing.
Blue Tow has a single fuselage tank, forward of the cockpit. Red Tow has dual wing tanks. Both Pawnees carry only 36 gallons. Fuel consumption is approximately 14 GPH actual time (10 GPH tach). **For both aircraft, refueling is mandatory after 2 hours of tach time.**

One underbelly drain requires preflight action located near the firewall. From the Pawnee operating manual, section 2, fuel system: "One-way check valves are used in the vent line to prevent excess fuel overflow during taxi turns or uncoordinated flight. These check valves have two pressure release holes which bypass the check valves and will allow slight overflow during thermal expansion of a full tank." Also, from section 3, preflight checklist: "Drain tank fuel vent line until all water or fuel is drained out." Therefore, if this fuel vent line drain is not emptied during preflight inspection, it backs up fuel in the expansion tank, fills it and allows it to drain overboard.

Oil

Maximum oil capacity is 12 quarts; maintain oil level at or above 9 quarts. If the oil level is found below 9 quarts at the start of an operating day, the tow pilot should add one quart of oil. During the summer season, straight 50 weight oil (100 AW) is used. 20W50 is used during the cold season. For engine break-in mineral oil is used.

Tires and Brakes

The Pawnee has individual toe brakes, including a parking brake pull-tab for each. Main wheel tire pressure is 25-30 psi; tail wheel pressure is 70-80 psi.

Starting Procedures

Red Tow has dual electric fuel pumps in addition to an engine-driven pump. Blue Tow is gravity fed and does not have electric fuel pumps. Make sure the fuel pump switch is on during takeoff and landing operations. Fuel pressure should be between 3 and 5 psi. Prior to engine start, perform a thorough preflight. Check mags off, mixture off, throttle closed and master switch off.

Prime according to the temperature: 5 shots @ 30F or below; 1 shot less for each 10F above 30F., i.e., 4 @ 40F, 3 @ 50F, 2 @ 60F, 1 @ 70F and above. Apply engine preheat when ambient temperatures fall below freezing.

Start the Pawnee on the left magneto only. Only the left mag has an impulse coupling to aid starting. Using the right mag can lead to severe kickback while attempting start.

Perform Pre-start cockpit check:

- Controls free
- Seatbelt fastened
- Mixture rich
- Flaps up
- Left mag only on (never start on both mags)
- Battery master on
- Fuel pump on (note pressure)
- Crack throttle open ½ inch
- Announce “CLEAR PROP”
- Engage starter

AFTER START, BE SURE THE RIGHT MAG IS TURNED ON and keep RPM below 1000 while waiting for oil pressure to rise above minimum pressure. Shut down the engine if no oil pressure indication is noted within 30 seconds.

In cold weather, after starting, it may be necessary to add a primer stroke or two to keep the engine running. Do not pump the throttle in an attempt to keep the engine running, as an induction fire may result. Do not leave the primer

unlocked or pulled out during start as this may allow excess fuel to be sucked into the engine and contribute to a fire.

Slowly lean the mixture to the “mark” on the mixture on the control quadrant. Use this mixture position for all ground operations except during runup, T/O, and climb. Advance mixture to full rich before adding T.O. power. (After glider release at top of climb, slowly reduce power in stages to below 2000 RPM & reset mixture to the mark while keeping airspeed no higher than 110 MPH IAS.)

Engine Runup

DURING ENGINE RUNUP, ENSURE THAT YOU HOLD THE STICK FULL BACK AND THE BRAKES FIRM.
Set 1800 RPM with mixture setting at RICH. Check mags, left and right, 25 to 125 RPM drop. Check carb heat for 100 to 125 RPM drop.

Takeoff

Liftoff will occur at about 60 MPH IAS. Do not try to force or pull the aircraft into the air; let it fly itself off the ground. Takeoffs and tow in the Pawnee are made FLAPS UP and at 65 to 75 MPH IAS (depending on type of glider on tow).

Release

Ensure that the maximum engine RPM of 2575 is not exceeded.
The tow release handle is just forward of the throttle quadrant. When using the tow release handle, a pull of approximately 30 pounds is required to release the rope.

Descent

Maintain sufficient RPM (2400 to 2500) during descent to prevent shock cooling.

Landing

Approaching the traffic pattern, perform the landing checklist. About 2100 RPM should hold level flight on downwind. Maintain 80 MPH IAS on downwind and base leg while gradually reducing power on base and final.

Abeam the approach end of the runway, maintain 1800 RPM. On base leg, maintain 1600 RPM. On short final approach, use idle power as desired. Final approach in the Pawnee is made at 70 to 80 MPH IAS with flaps as desired. Touchdown should be at about 60 MPH. In strong crosswinds, half flaps or no flaps will afford more control and a reduced tendency for the upwind wing to rise during touchdown.

CAUTION: At idle throttle and below 70 MPH, the Pawnee can (and usually will) develop a significant sink rate WITHOUT WARNING, particularly with full flaps.
The Pawnee does not float at landing speeds. During the flare for landing, avoid getting

the nose too high. Remember the picture you had sitting on the ground. Following the touchdown, keep the stick full back and raise the flaps. This will help avoid porpoising.

Refueling

Refuel at 2.0 hours tach time or less. Record the tach time on the tow sheet when full by crossing out the previous entry and writing down the new time beside the old.
Make a radio call when heading to the fuel pump.
After refueling, check each gas cap for security.

Section 4 Tow Sheets

Listed below are instructions for completing the Tow Sheets.

1. Date — Example format: 6/12/15

2. Tow Plane — Make sure you circle which tow plane you are flying. Blue is owned and operated by NSA and Red is owned and operated by ASI and each does separate billings and invoices.

3. Tach — Note the starting tachometer and the final tachometer on each Tow Sheet. A tach reading for each take off is nice but optional.

4. Glider — If using the N-number use at least the last three alpha-numeric characters.
   NSA has a club ship identified as “ZAP”; that is acceptable.
   A club ship or private glider with a two or three letter tail designator may be used. For example, Roger “Coot” Harris is “RD” and that is acceptable.

5. Pilot — Minimum information should be the person’s bird call sign or First Initial and Full Last Name.
   If the information is not volunteered during the initial radio call then the tow pilot should ask “Pilot’s Name?” and it shall be understood that this is the person to be billed.
   This is especially important for a 2 place ship where the “pilot” we recognize is not the person paying for the tow.

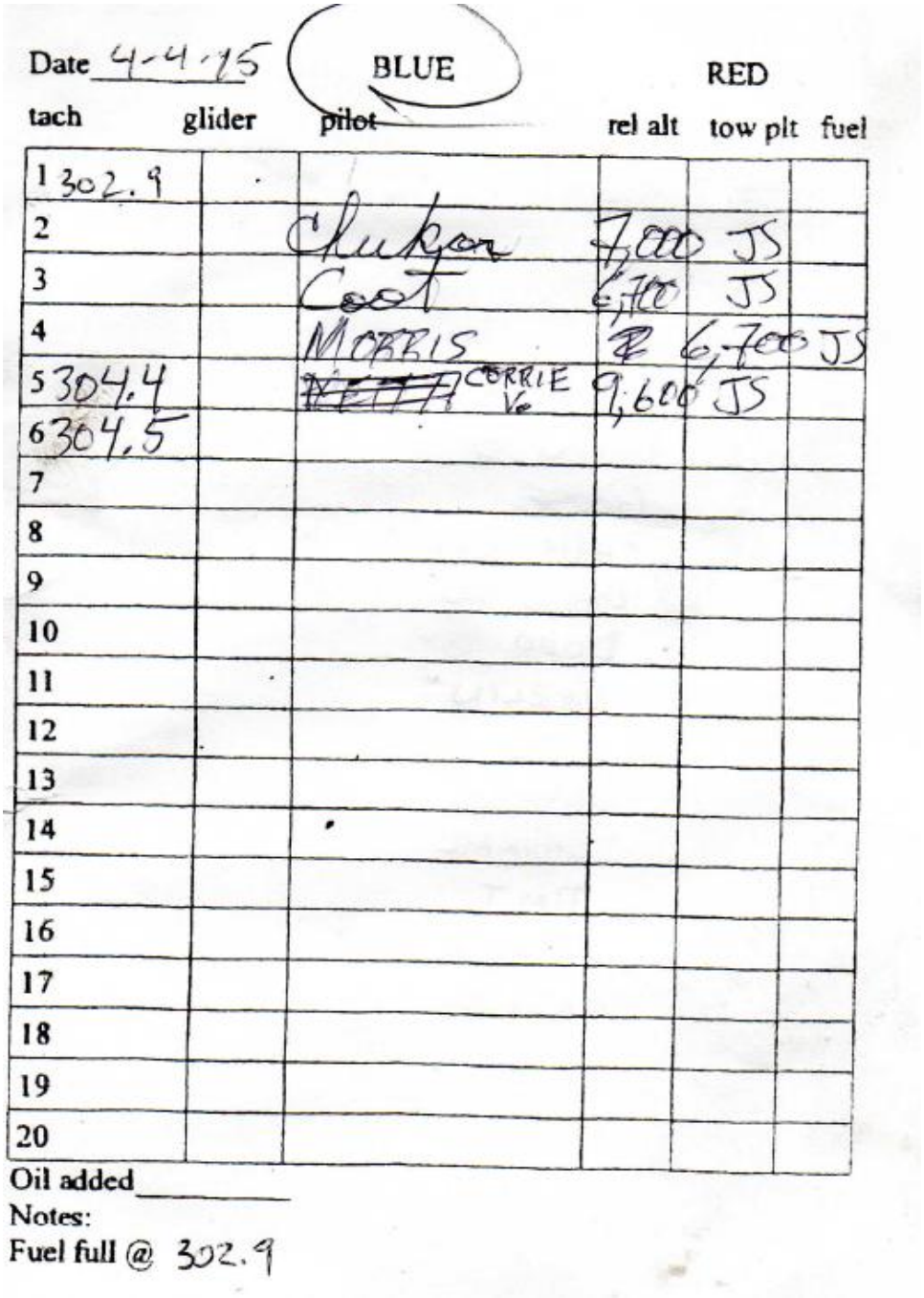
6. Release Altitude (Rel Alt)
   Please note 7,000’ as 7.0 or 8,400’ as 8.4
   Pattern Tow = PT
   Simulated Rope Break = SRB
   Land On Tow = LOT
   Simulated LOT = PT
   Aero Retrieves are billed per tach hour so it is very important to record Start and End tach times.

7. Tow Pilot — Please use your initials or something I will recognize.

8. Fuel — (Unused).

9. Oil — This entry is a **measure** of the oil showing on the stick when checked during pre-flight with the engine cold. This entry is not critical, but is helpful to track possible oil burning and leaking.
   Ensure this measure is between 9-11 quarts before starting the engine.

10. Full Fuel **Full Fuel @ is critical and a MUST. This is important because fueling is required every two (2) tach hours.** If this line hasn't been filled in then make sure you top-off the aircraft off before flying.



Date 4-4-15 BLUE RED

tach	glider	pilot	rel alt	tow plt	fuel
1 302.9					
2		Chukran	7000	JS	
3		Coat	6,700	JS	
4		MORRIS	6,700	JS	
5 304.4		~~KEITH~~ CORRIE Ve	9,600	JS	
6 304.5					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Oil added _____

Notes:

Fuel full @ 302.9

END